OP 1

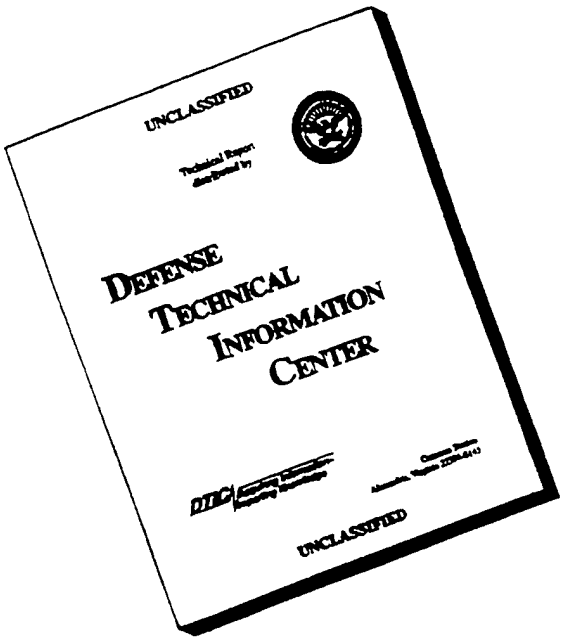
(SECOND REVISION)

PREPARATION OF ORDNANCE PUBLICATIONS

A BUREAU OF ORDNANCE PUBLICATION

Enclosure (1)

DISCLAIMER NOTICE



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NAVY DEPARTMENT

BUREAU OF ORDNANCE

WASHINGTON 25, D. C.

To all holders of Ordnance Pamphlet 1 (2nd Revision) OP 1 (2nd Rev) CHANGE 1
insert change; write on cover 'Change 1 inserted'
Approved by The Chief of the Bureau of Ordnance 20 September 1946

W. F. Schaffel
Acting Chief of Bureau

4 Pages _____ Page 1

Ordnance Pamphlet 1 (2nd Revision) PREPARATION OF ORDNANCE PUBLICATIONS
is changed as follows:

1. Insert change sheet between cover and title page, and make the following changes:

2. Page iii: Change the page numbers of the last three chapters to 54, 57, and 59 respectively.

3. Page 1: Under "Types of publications," change twelfth item in table to read:

   Bulletin of Ordnance Information ... NAVORD INFO ... NAVORD INFO - 0-Year

4. Page 4: In fourth line, change "Ordnance Publications Subcenters" to "District Publications and Printing Offices".

5. Page 8: Under paragraph "3. Specifications and production schedule," change first sentence to read:

   After the preliminary check has been made, necessary specifications in addition to the general specifications contained in OP 1 are prepared jointly by the Publications Section and the cognizant technical section.

6. Page 10: Delete paragraph title "Operation."

7. Page 11: Delete paragraph on "Theory."

8. Page 13: Under paragraph "Typing," change fifth sentence (eighth line) to read:

   Primary side headings appear in upper and lower case on a separate line flush with the left margin and are underscored in blue.

9. Page 16: In third line, insert following "NAVORD OD 3447," the words "(to be replaced by OP 1700)."

10. Page 34: Under paragraph "Size," in last line of third paragraph change "10-point" to "9-point."

11. Page 38: Under paragraph "OP arrangement," change fourth line of table to read:

    p. iii - Contents (may include list of illustrations)

12. Page 38: Under paragraph "Credit line," delete existing paragraph. Add the following:

    Credit lines are not permitted in government publications.

13. Page 47: Delete paragraph "Classification."

14. Make corrections and additions as listed on attached pages 3 and 4.

D I S T R I B U T I O N

Requests for additional copies of OP 1 (2nd Rev) Change 1 should be submitted on NAVORD FORM 1, ORDNANCE PUBLICATIONS AND FORMS REQUISITION, to U. S. Naval Gun Factory, Wash. 25, D. C. (Attn: Ordnance Publications Distribution Center); or on NAVGEN 47, FORMS AND PUBLICATIONS REQUISITION, to Publications and Printing Office, 12th or 14th Naval District. Mailing addresses should be obtained from Lists 10 nn and 10 eee of the Standard Navy Distribution List.

DISTRIBUTION:
Edition No. 2 (Part 2) to Catalog of Activities of the Navy
2 copies unless otherwise noted.

7.k,q,r,x*,hh; 7.(5 copies),a,j,p*,s; 8.h*,cc,ee*; 10.m,n,w,hh; 10.(25 copies),eee; 12.a*;

* Applicable Addressees

Page 2: Under "Related publications instructions," sixth line, add:

In addition to general compliance with the requirements of this OP, Naval activities or contractors preparing Ordnance pamphlets must obtain detailed specifications from the Administrative Division, Publications Section.

Page 10: Under "Standard outline," change the list of headings as follows:

Introduction
Theory and Functional Description
How to Operate
Physical Description
Installation and/or Assembly
Maintenance
Overhaul and/or Repair
Appendices
Index
Safety Precautions

Page 10: Under "Introduction," first sentence, delete "and how it works." Delete second sentence. At end of paragraph, add:

References to related publications and a statement of the scope of the OP may be included.

Page 10: After paragraph "Introduction," add the following:

Theory and functional description. A brief statement of the theoretical problem is followed by a functional description of the unit stating in general terms how the equipment solves the problem. Only the theory peculiar to the equipment is included. Theory which is covered in basic references or training courses is omitted. Taking into consideration the prospective readers, theory should be simplified but may be supplemented where required by detailed explanation in appendix.

Page 12: Delete paragraphs "Parts," "Chapters," "Sections," "Paragraphs," and "Subordinate paragraphs," and substitute the following:

Parts. Certain large volumes may need subdividing into a limited number of "Parts," numbered with Roman numerals, such as Part I, Part II, Part III, etc.

Chapters. Subdivisions within a volume or part are called "Chapters." They are serially numbered throughout the OP, using Arabic numerals.

Sections. Chapters may require major subdivisions, which are designated "Sections." Sections may be serially numbered in decimal form, using Arabic numerals. The whole-number part will be the chapter number, and the decimal part will be the serial number of the section; for example, Sections 1 and 2 of Chapter 1 should be designated as Section 1.1, Section 1.2, etc.

Paragraphs. The initial paragraph of a chapter should always be numbered as 1, in Arabic. Subsequent major paragraphs should be numbered serially throughout each chapter or section. It is not necessary that all paragraphs be numbered.

Subordinate paragraphs. When it is necessary to subdivide a paragraph, subparagraphs may be used. Additional subdivisions in paragraph form are considered unnecessary.

It will not be necessary to use this complete list of divisions except in unusually long OP's. An OP is normally divided into the required chapters. For short OP's formal divisions may not be necessary, and the use of properly chosen running heads and the numbering of major paragraphs will suffice.

Page 13: Under paragraph "Preparation instructions," add the following after the first sentence:

Exceptions to the use of NAVEXOS FORM 315 are made in the case of OCL's, which are typed on 8" x 10½" paper; Changes, prepared on NAVORD FORM 545; OHI's, prepared on NAVORD FORM 583; and OMI's, prepared on NAVORD FORM 566. Typing must be single-spaced except in such cases as mathematical formulas, which may be double-spaced for display.

Page 18: Under "Line illustrations," change first sentence of second paragraph to read:

Line drawings may simulate the halftone effect by use of line shade, dotted or hatched screens, craftint process, or other mechanical shading means.

Page 42: After the table in the first column, add the following sentence:

Display type (Vogue Bold or face substituted for it) may not be run in with text type, but must appear always as separate lines; the use of both italic and bold face text type in a single publication is discouraged, since this practice involves extra hand-work for the printer and consequently additional expense.

Page 42: Delete the paragraphs "Overrule," "Fixed head," "Running heads," and "Page numbers" and substitute the following:

Running heads. On verso (left-hand) pages, the title of the OP (which may be an abbreviated or short title) is set flush left; the OP number, suffixed by "Preliminary" or revision number if applicable, is set flush right. On recto (right-hand) pages, the chapter title is set flush right; in very brief OP's, in which there is no breakdown into chapters, the recto running head indicates the principal subject matter on the page. Running heads are not used on the opening pages of chapters or sections when these begin new pages, or over full-page illustrations. A one-point face rule, extending the width of the type area, appears below each running head.

Page numbers. The title page and letter of promulgation are usually counted as pages i and ii, although the folio is not printed on these pages. In most cases the first page bearing a printed folio is the table of contents, page iii. The first page of the text is page 1 (Arabic), a recto page.

The page numbers are set at the outer margin of the type page, below the text. Odd numbers shall always appear on right-hand pages.

Page 59: Under "Format" add a third paragraph:

Usually NAVORD Reports are prepared on NAVEXOS FORM 315, the use of which is explained on pages 13-15 of this pamphlet. If it is necessary to use glossy prints of illustrations for clarity, these prints must be supplied by the originator of the report along with the manuscript and specific instructions for their insertion.

PRNC-5392-4-22-48-500

NAVY DEPARTMENT
BUREAU OF ORDNANCE
WASHINGTON 25, D. C.

To all holders of ORDNANCE PAMPHLET 1 (2nd Rev.) OP 1 (2nd Rev) **CHANGE 2**
insert change; write on cover 'Change 2 inserted'
Approved by The Chief of the Bureau of Ordnance 4 April 1947

W. F. Lehnfeld
Acting Chief of Bureau

1 Page _____ Page 1

ORDNANCE PAMPHLET 1 (2nd Revision) PREPARATION OF ORDNANCE PUBLICATIONS
is changed as follows:

1. Insert Change 2 instruction sheet after Change 1 instruction sheets and before title page.

2. The forwarding of technical reports on research, development, or tests by various Bureau of Ordnance activities in the body of letters or as unindexed enclosures of letters is hereby discontinued. All such reports must be issued, in accordance with the procedures set forth by OP 1, Change 2, either as NAVORD OD's or NAVORD REPORTS, or on NAVORD FORMS. This does not apply to progress or routine test reports.

Rev. inserted

3. Page 49: Delete page 49, Chapter 8, "Ordnance Data" and substitute new pages 49 and 49A, Chapter 8, "Ordnance Data".

4. Page 59: Delete page 59, Chapter 13, "Ordnance Reports" and substitute new pages 59 through 59D, Chapter 13, "Ordnance Reports".

DISTRIBUTION

Requests for additional copies of OP 1 (2nd Revision) Change 2 should be submitted on NAVGEN 47, Stock Forms and Publications Requisition, through the District Publications and Printing Office by which addressee is serviced. Mailing addresses may be obtained from List 10.VV of the Standard Navy Distribution List.

DISTRIBUTION:
Standard Navy Distribution List No. 46 (Part 1) and Edition No. 4 (Part 2) to Catalog of Activities of the Navy.
2 copies unless otherwise indicated.

7.A,S,X,Y,QQ*,RR*,FFF,GGG; 7.(5 copies),D,R,W*,Z; 8.K*,BB,CC,FF,GG,II*;10.N,W; 10.(25 copies)VV-12th and 14th only; 10.(50 copies)VV - PRNC only; 10.(10 copies) VV - all others; 11.(BuOrd*)

*Applicable Addressees

NAVY DEPARTMENT
BUREAU OF ORDNANCE
WASHINGTON 25, D. C.

To all holders of ORDNANCE PAMPHLET 1 (SECOND REVISION)
insert change; write on cover 'Change 3 inserted'
Approved by The Chief of the Bureau of Ordnance

OP 1 (2nd Rev) CHANGE 3

8 September 194

K. H. Wolk
Acting Chief of Bureau

1 Page _____ Page

ORDNANCE PAMPHLET 1 (SECOND REVISION) PREPARATION OF ORDNANCE PUBLICATIONS
is changed as follows:

Page 47, delete entire paragraph entitled Revisions and replace with the following new paragraphs:

Revisions

If a proposed NAVORD OCL supplements or modifies a previous OCL, the earlier publication is superseded. An exception is permitted where only a few words or groups of a few numbers are to be changed. Such instructions may be issued as a Change to the original OCL. A change to an OCL is prepared in the same form and manner as the original OCL, bearing the title, BUREAU OF ORDNANCE CIRCULAR LETTER OCL 00000, Change 0000.

In the case of a superseding OCL, any of the contents of the original OCL remaining effective are included in the new publication, and a statement of the supersession appears in paragraph 1 of the new publication. (Disposition of the superseded publication is also stated: i.e., if RESTRICTED or nonclassified, the superseded publication should be destroyed; if CONFIDENTIAL, destroyed by burning).

Place this change sheet between Change 2 sheet and title page.

DISTRIBUTION

Requests for additional copies of OP 1 2d Revision (Change 3) should be submitted on NavGen 47, Stock Forms and Publications Requisition through the District Publications and Printing Office by which addressee is serviced. Mailing addresses may be obtained from List 10.VV of the Standard Navy Distribution List.

Standard Navy Distribution List No. 48 (Part 1) and Edition No. 6 (Part 2) to Catalog of Activities of the Navy.
2 copies unless otherwise indicated.

7.A,S,X,Y,QQ*,RR*,FFF,GGG; 7.(5 copies),D,R,W*,Z; 8.K*,BB,CC,FF,GG,II*; 10.N,W; 10.(25 copies),VV except PRNC - 50 copies; 50 copies W.C.; 11.(BuOrd*).

*Applicable Addressees

NAVY DEPARTMENT
BUREAU OF ORDNANCE
WASHINGTON 25, D. C.

To all holders of Ordnance Pamphlet 1(2nd Rev.)
insert change; write on cover 'Change 4 inserted'
Approved by The Chief of the Bureau of Ordnance

OP 1(2nd Rev.) CHANGE 4

1 October 1948

M. R. Kelley
Acting Chief of Bureau

1 Page _____ Page 1
Enclosures: pages 42a,42b.

ORDNANCE PAMPHLET 1(SECOND REVISION)
is changed as follows:

PREPARATION OF ORDNANCE PUBLICATIONS

1. Note the following information on figures 30, 31, 32, and 33 (pages 39, 40, 41, and 43):

   See OP 1, Change 4, for revised regulations concerning locations of security CLASSIFICATION on all printed pages.

2. Pages 39 and 40 (figures 30 and 31), change quoted material in last paragraph of letters of promulgation to read:

   "This publication is (CLASSIFICATION) and shall be safeguarded in accordance with the security provisions of U. S. Navy Regulations. It is forbidden to make extracts from or to copy this classified document without specific approval of the Chief of Naval Operations or originator, as applicable, except as provided for in article 9-10 of the United States Navy Security Manual for Classified Matter."

3. Page 42, second column, replace paragraph headed "Classification" with new pages 42a and 42b attached. The changes concern the new locations of security CLASSIFICATION on covers and pages of Ordnance publications as required by the United States Security Manual for Classified Matter.

4. Page 44, first column, change first sentence of second paragraph under "Reproducible materials" to read:

   Reproducible materials should be forwarded to: The Superintendent, U. S. Naval Gun Factory, Washington 25, D. C., Attn: Code DE 780, unless otherwise directed.

NAVY DEPARTMENT
BUREAU OF ORDNANCE
WASHINGTON 25, D. C.

To all holders of Ordnance Pamphlet 1 (2nd Rev.)
insert change; write on cover 'Change 5 inserted'
Approved by The Chief of the Bureau of Ordnance

OP 1 (2nd Rev.) CHANGE 5
1 OCTOBER 1952

F. G. Gould
Director, Administrative Division

1 Page _____ Page 1

ORDNANCE PAMPHLET 1 (SECOND REVISION) PREPARATION OF ORDNANCE PUBLICATIONS
is changed as follows:

1. Page 8, para 7, delete the first sentence and insert the following:

> Upon approval of step 6, the original and six (6) copies (carbon, etc.) of the manuscript are submitted to the Bureau for approval. Each copy is bound in a loose-leaf folder, to protect, and to avoid loss of, pages.
>
> Each manuscript copy must contain one print each (photostat, blueprint, etc.) of all illustrations reduced to printed size. Good book practice dictates that each illustration in a printed book must appear as close as possible to its first mention in the text. Illustrations submitted with manuscripts for approval, however, should be assembled in numerical sequence in the back of each folder to allow easy removal of the entire set for review while reading the text.

2. Insert this CHANGE sheet in the front of the book, following CHANGE 4.

DISTRIBUTION

Requests for additional copies of OP 1 (2nd Revision) Change 5 should be submitted on NAVEXOS 158, Stock Forms and Publications Requisition, to the District Publications and Printing Office by which addressee is serviced.

Standard Navy Distribution List (Part 2) to Catalog of Naval Shore Activities:
Two (2) copies unless otherwise noted:

A5(BuOrd); F2,3; J30; K(5 copies)2A; K2D,3,4,5A,B,D,E,6A,6B,7,8,9,10,11, 12,13A,B,C,16,20,22; L(6 copies)1; L6; M46

D20766

OP 1

(SECOND REVISION)

PREPARATION

OF

ORDNANCE PUBLICATIONS

21 JANUARY 1946

NAVY DEPARTMENT

BUREAU OF ORDNANCE

WASHINGTON 25, D. C.

21 January 1946

ORDNANCE PAMPHLET 1 (SECOND REVISION)

PREPARATION OF ORDNANCE PUBLICATIONS

1. Ordnance Pamphlet 1 (Second Revision) defines ordnance publications, establishes style and format, and outlines procedure for preparation and approval. It also sets forth requirements for final copy and artwork. OP 1 standardizes and systematizes the preparation and handling of ordnance publications.

2. The provisions of OP 1 shall be strictly adhered to by all who are engaged in the preparation of copy and illustrations for ordnance publications. Requests for deviation from its provisions shall be directed to the Chief of the Bureau of Ordnance.

3. This publication supersedes Ordnance Pamphlet 1 (First Revision) (Preliminary), which should be destroyed.

G. F. HUSSEY, JR.
Vice Admiral, U. S. Navy
Chief of the Bureau of Ordnance

CONTENTS

Chapter		Page
1.	Introduction	1
2.	Ordnance Pamphlets	5
3.	Preparing Outline and Manuscript	9
4.	Preparation of Illustrations	18
5.	Format	38
6.	Bureau of Ordnance Manual	45
7.	Ordnance Circular Letters	46
8.	Ordnance Data	49
9.	Ordnance Standards	50
10.	Ordnance Handling Instructions	51
11.	Ordnance Modification Instructions (Aviation)	55
12.	Ordnance Charts	58
13.	Ordnance Reports	60

Chapter 1

INTRODUCTION

Ordnance publications provide fleet and shore activities with information and instructions for the design, manufacture, alteration, operation, maintenance, and overhaul of ordnance equipment, as well as information regarding the procedures and policies of the Bureau of Ordnance. Ordnance publications vary in form from a tag or mimeographed leaflet to a bound book.

Types of publications

The Bureau of Ordnance issues the following types of information:

Title	Short Title	Index
Bureau of Ordnance Manual	(none)	(none)
Ordnance Circular Letters	NAVORD OCL	OP 0
Ordnance Pamphlets	OP	OP 0
Registered Ordnance Pamphlets	ORD	RPS 6
Ordnance Data	NAVORD OD	OP 0
Ordnance Specifications	NAVORD OS	(none)
Ordnance Standards	NAVORD OSTD	NAVORD OSTD 0
Ordnance Alterations	NAVORD ORDALT	NAVORD ORDALT 00
Ordnance Handling Instructions	NAVORD OHI	OP 0
Ordnance Modification Instructions (Aviation)	NAVORD OMI–V	OP 0
Ordnance Charts	NAVORD CHART	OP 0
Bulletins of Ordnance Information	NAVORD INFO	(none)
Ordnance Allowance Lists	NAVORD LIST	(none)
Ordnance Reports	NAVORD REPORTS	(none)
Bureau of Ordnance Forms	NAVORD FORM	(none)
Army publications describing Army ordnance equipment used by the Navy	(Army Symbols)	OP 0
Bureau of Ordnance Drawings	(none)	Bureau of Ordnance List Sketches
Bureau of Ordnance Line Sketches	(none)	(none)

Identification

All blank forms and publications issued by the Bureau of Ordnance are identified by a short title and serial number. The identification appears in the upper right-hand corner of publications and in the upper left-hand corner of NAVORD FORMS. The Bureau of Ordnance Manual and Bureau of Ordnance Drawings and Sketches do not bear a short title.

Definitions

Each Bureau of Ordnance publication serves a particular function as outlined in succeeding chapters. Basic Bureau policy and procedures are outlined in the Bureau of Ordnance Manual. NAVORD OCL's are issued to prescribe policy matters of temporary nature which do not change the Manual. The OP is the basic publication relating to specific ordnance equipment or data for field and fleet use. ORD's have the same content as OP's but bear register numbers because of their high classification. NAVORD OD's contain reports of inspection and test data which furnish material for inspectors and research personnel. Ordnance equipment lists are published as NAVORD OD's.

Standard design and manufacturing methods are prescribed in NAVORD OSTD's. Manufacturing requirements for specific ordnance material are outlined in NAVORD OS's. NAVORD ORDALTS are used to prescribe major ordnance alterations to ordnance equipment; minor modifications of aviation ordnance are outlined

in NAVORD OMI–V's, which require no report of completion. NAVORD CHARTS are large illustrated charts for instruction. NAVORD REPORTS describe the methods and results of ordnance research projects. War Department publications which describe Army ordnance used by the Navy are also furnished to the Naval service. NAVORD OTI's have been eliminated as Bureau publications. Material formerly issued as NAVORD OTI's is issued as CHANGES to existing OP's or NAVORD OD's, preliminary OP's, or NAVORD ORDALTS.

Determination of type

The Publications Section of the Bureau of Ordnance decides in which type of publication information should be issued to serve the purpose most efficiently.

Related publications instructions

The chapters of this OP which describe organizing, outlining, writing, illustrating, layout, and printing of OP's may be found helpful in preparing any ordnance publication. Specific instructions are included for preparing all but four types of publications. Instructions for preparing ordnance drawings and sketches are outlined in OP 599. Instructions for preparing NAVORD OS's are included in NAVORD OSTD 67; and for preparing ORDALTS, in NAVORD OSTD 65. Instructions for Registered OP's (ORD's) are contained in RPS 4, issued by the Chief of Naval Operations.

Copyright

All ordnance publications are Government publications and may not be copyrighted.

Classification

The Bureau of Ordnance encourages officers and enlisted personnel to obtain technical knowledge necessary for efficient handling, maintenance, or operation of ordnance equipment. Ordnance publications, therefore, are issued in as low a classification as is consistent with security to permit the information to reach necessary personnel first hand. Changes in the classification of current OP's, NAVORD OD's, and Registered Ordnance Pamphlets are made by the issuance of a Change. Changes in the classification of all other ordnance publications are made by letter or memorandum to the Publications Section for inclusion in the "All Ships and Stations" letters.

Related ordnance publications

The Bureau of Ordnance is responsible for the design, manufacture, procurement, issue, and maintenance of ordnance material. It is also responsible for preparing information required for the operation and maintenance of this material. However, the Bureau of Ordnance has no authority to prescribe methods of operation and training. "Reports of Gunnery Exercises" and the preparation and issue of miscellaneous operating instructions are matters primarily under the cognizance of the Chief of Naval Operations, and Fleet and Force Commanders. General ordnance instructional texts which do not describe specific ordnance equipment are prepared by direction of the Chief of Naval Personnel.

U. S. Navy Regulations, 1920, Article 972, contains the official "safety precautions" which govern the operation of ordnance material. Additional instructions and precautions, sometimes similar in purpose and scope to these safety precautions, will be found in ordnance publications. In case of conflict, the instructions contained in the Navy Regulations govern.

Publications containing regulations of other agencies or Government Departments which are applicable to Naval Ordnance activities, are also stocked for issue by the Bureau of Ordnance.

Assignment of responsibilities

Within the Bureau of Ordnance, responsibility for all publications except NAVORD ORDALTS and NAVORD OS's is assigned as follows:

Publications Section. The Publications Section of the Administrative Division numbers and classifies publications as to type, checks proposed publications for possible duplication, estimates required quantities, establishes style and format by the issuance and revision of OP 1 and enforcement of its provisions, notifies the Planning Division of publication delays, assists in the selection of commercial publication

contractors, arranges for printing and procurement, distributes and indexes, prepares or coordinates the preparation of allowance lists, and maintains a job history of all publications.

Production Division. The Production Division obtains new and revised OP's from contractors for ordnance equipment procured under performance specifications which make the contractor responsible for detailed design. All contracts for ordnance equipment call for the preparation of an OP in accordance with OP 1, except when it is concluded that the equipment is adequately covered by existing publications. The completion date for an OP is specified in the manufacturer's contract and is in advance of the completion date for the equipment under procurement, to insure availability of the approved OP in time to meet service requirements. Sufficient time is allowed for Bureau approval and subsequent printing of the publication through the Publications Section of the Bureau.

Research and Development Division. The Research and Development Division is responsible for preparing new or revised ordnance publications pertaining to ordnance material produced as a result of design prepared within the Bureau or under Bureau supervision by other Naval Ordnance activities; for editing and approving the technical contents of all publications on ordnance material; and for serving in the capacity of initiator or coordinator of new and revised publications not specifically under the cognizance of the other divisions.

Fleet Maintenance Division. The Fleet Maintenance Division is responsible for preparing new publications, as well as changes to or revisions of existing publications, on equipment in the field when the Fleet Maintenance Division decides that such additional information is required. The Fleet Maintenance Division is also responsible for preparing and revising the Bureau of Ordnance Manual.

NAVORD ORDALTS and OS's

Responsibilities for Ordnance Alterations (NAVORD ORDALTS) and Ordnance Specifications (NAVORD OS's) are assigned as follows. Any division or section of the Bureau, noting the necessity for a NAVORD ORDALT, forwards recommendations to the Research and Development Division and, when practicable, includes all pertinent data.

The Research and Development Division is responsible for preparing and approving all Ordnance Specifications and Ordnance Alterations, whether prepared inside or outside the Bureau. NAVORD OS's and NAVORD ORDALTS are referred by the Research and Development Division to the cognizant technical sections of the Maintenance and Production Divisions for comment as to matters coming under their respective responsibilities.

The Fleet Maintenance Division is responsible for suggesting a NAVORD ORDALT to the Research and Development Division when necessary for the satisfactory operation of equipments in service.

The Publications Section of the Administrative Division is responsible for the reproduction and distribution of NAVORD OS's and NAVORD ORDALTS prepared in the Bureau.

Publications control

All contacts with the Executive Office of the Secretary (Publications Branch) and Naval Gun Factory (Pamphlet Editing, Printing, and Distribution Sections) are cleared through the Administrative Division (Publications Section).

Distribution

When an ordnance publication is available for initial distribution, the Bureau automatically forwards through Ordnance Publications Distribution Centers the minimum number of copies which it is estimated that interested activities will require. This initial distribution is in addition to publications packed with the equipment. Commissioning allowances of applicable ordnance publications are also furnished as required to Naval vessels, Aircraft activities, Advanced Bases, and other Naval activities.

Commanding Officers redistribute ordnance publications and requisition the required number of additional copies necessary for the proper dissemination of the technical information. Requests from any Naval activity for copies of ordnance publications are honored when forwarded through official channels.

Stocks of ordnance publications at the Ordnance Publications Distribution Center, U. S. Naval Gun Factory, Washington 25, D. C. and at various Ordnance Publications Subcenters are available to replace destroyed or damaged copies and to supply copies to newly commissioned activities, reference libraries, etc.

Chapter 2

ORDNANCE PAMPHLETS

As the basic type of technical publication issued by the Bureau, OP's are issued to serve the following purposes:

Equipment OP's

Equipment OP's provide instructions required for the effective use of ordnance equipment. Each item of ordnance equipment is covered by an OP containing necessary instructions on theory, description, operation, installation, assembly, maintenance, overhaul, repair, and safety precautions. This type of OP serves as a general reference and maintenance manual for personnel on board ship, and as a reference book for instruction and training of officers and enlisted personnel. Normally one copy of each OP is forwarded with each piece of equipment described, as well as to all interested activities.

Specific-subject OP's

Specific-subject OP's provide a central source of all information relating to a specific ordnance subject. For example: instructions concerning restricted and unserviceable ammunition, sight settings for masthead bombing, safety data for A.A. guns, ordnance fitting-out information, mine disposal information, ammunition code information, effective rocket temperatures, instructions for preparing ordnance publications, range tables, indexes, catalogs, etc.

OP's of both types may be either preliminary or final, and may include several volumes or be as brief as one page.

Identification

Each OP is identified by a serial number assigned by the Bureau of Ordnance (OP 1000). If it is necessary to divide an OP into separate volumes, each volume is assigned an alphabetical designation. An equipment OP, for example, may be assigned the following designation: OP 1000 (Description and Operation), OP 1000A (Installation), and OP 1000B (Parts Catalog). Normally one OP number is assigned to each type of ordnance equipment or ordnance subject.

Preliminary OP's

When it appears unlikely that the preparation of an OP will be completed by the time the first equipment is delivered, an OP in preliminary form may be prepared. While the cover and title page of preliminary OP's should conform to the specifications in chapter 5, expedient means of preparation may be used to insure availability of the preliminary OP. Steps 5 and 6 of the approval procedure may be eliminated for preliminary OP's, upon approval of the Bureau. Preliminary OP's bear the same number as the subsequent final OP but are marked "Preliminary." A Letter of Promulgation signed by the Chief of the Bureau appears directly after the title page of each preliminary OP. This letter states that because of the urgent need for the information, it has been issued in preliminary form, and that the OP will be issued in complete, final form as soon as practicable.

OP changes

Information amending, supplementing, correcting, reclassifying, or modifying an OP is issued as a CHANGE to the affected OP or OP's, rather than by means of NAVORD OCL's or other publications. Like the basic OP, changes may be either temporary or final in character. Changes to an OP, bearing the same number as the OP, are identified, filed, and reprinted with the OP. A requesting activity thus is able to receive at one time all existing pertinent information on a subject, instead of an OP with supplementary and variously numbered NAVORD OCL's and other publications for separate filing. Changes to OP's are prepared on NAVORD FORM 545.

OP revisions

An issue subsequent to the first OP is desig-

972836 O—51——2

nated as the FIRST REVISION. If the first issue was Preliminary, the word "Preliminary" is dropped when the first revision is issued. Each subsequent revision bears the next higher revision number. Revision numbers are assigned by the Publications Section of the Bureau of Ordnance.

Classification

A publication falling under the definition of an OP may be issued in any of five classifications: TOP SECRET, SECRET, CONFIDENTIAL, RESTRICTED, and NONCLASSIFIED. TOP SECRET or SECRET publications are always registered. Those of other classifications may or may not bear a register number, depending upon the accountability desired. When registered, a publication becomes an ORD and bears an ORD number assigned by the Bureau of Ordnance. OP's are issued in the lowest classification possible, consistent with U. S. Navy Regulations, to facilitate the availability of the instructions to personnel using the equipment.

Who prepares OP's

The Bureau of Ordnance decides who prepares OP's. They may be prepared within the Bureau of Ordnance, within another Naval activity, by a manufacturer whose equipment contract may call for the preparation of an OP, or by a commercial specialist in technical publications working under contract to the Navy Department. When an officer in the Bureau of Ordnance believes that certain information should be published, he may initiate preparation of a publication containing that information. It is the policy of the Bureau to encourage such individual initiative.

Contract requirements

Contracts for equipment generally call for the preparation of an OP in accordance with OP 1, except in those instances where adequate publications already exist. The OP may be preliminary or final, depending upon the information available at the time it is written. In any event the OP is as complete and comprehensive as possible under the circumstances. After the issue of such an OP, the Bureau may desire to have it revised or converted from a preliminary to a final OP. Special and separate arrangements are made in each case by the Bureau. When NAVORD ORDALTS or NAVORD OS's are the appropriate publications, instructions in NAVORD OSTD 65 or NAVORD OSTD 67, respectively, apply. When an OP or preliminary OP is prepared by the manufacturer of ordnance equipment, preparation is scheduled in time to permit forwarding for the approval and signature of the Chief of the Bureau, and for delivery of one copy with the first equipments.

Planning and approval procedure

The following procedure is followed in planning and preparing an OP:

1. Notification. When preparation is initiated within the Bureau, NAVORD FORM 806 (Proposed Ordnance Publication Form, fig. 1) is forwarded to the Publications Section. When a publication is planned by an activity outside the Bureau, NAVORD FORM 352 (Ordnance Publication Report, fig. 2) is forwarded to the Publications Section of the Bureau. The activity or Bureau section responsible for preparing an ordnance publication continues to keep the Publications Section currently informed of publications under preparation, together with the prospective date of completion, by forwarding NAVORD FORM 352 or 806 as appropriate.

2. Preliminary check. When notified of a proposed publication as in 1 above, the Publications Section checks existing publications for duplication. Review of existing publications by the cognizant technical section before preparation is started, is also essential to avoid duplication. Publications previously issued should be combined and consolidated so that they may be superseded by issue of the proposed publication. Thus the user of the equipment need refer to fewer publications. Ordnance publications are listed in OP 0 (Index of Ordnance Publications). At the time the proposed publication is checked for possible duplication, the Publications Section estimates the required quantity and determines the method of reproduction. The proposed method of treatment, and the scope and nature of the publication, are also approved at this time by the Bureau of Ordnance Training Officer and the Publications Section.

PROPOSED ORDNANCE PUBLICATION
NAVORD FORM 806 (REV. 4/45)

Instructions: Resubmit with any change in information.

TO: PUBLICATIONS SECTION (Ad6)

PUBLICATION TITLE *(Specify Mark & Mod)*		DATE
		ESTIMATED COMPLETION DATE
TYPE OF PUBLICATION ☐ OP ☐ OTHER *(Specify)*	NUMBER ASSIGNED *(If any)*	SECURITY CLASSIFICATION
PUBLICATIONS TO BE SUPERSEDED		

TYPE OF EQUIPMENT COVERED *(Specify Mark & Mod)*	SCHEDULED DATE OF FIRST EQUIPMENTS
	TOTAL EQUIPMENTS TO BE FURNISHED
NAME OF CONTRACTOR	CONTRACT NUMBER
REMARKS	

SECTION	ROOM	EXTENSION	SIGNATURE

Figure 1. Proposed Ordnance Publication Form (within Bureau).

ORDNANCE PUBLICATION REPORT
NAVORD FORM 352 (REV. 5/45)

INSTRUCTIONS: Submit in duplicate - original to BuOrd, copy to NavGun. Resubmit with each change in information.

TO: ☐ THE CHIEF OF THE BUREAU OF ORDNANCE (Ad6), NAVY DEPARTMENT, WASHINGTON 25, D.C.

☐ SUPERINTENDENT, U.S. NAVAL GUN FACTORY, WASHINGTON 25, D.C.

TITLE OF PUBLICATION *(Specify Mark & Mod)*	EQUIPMENT COVERED
NUMBER ASSIGNED *(If any)*	SCHEDULED DELIVERY DATE OF FIRST SERVICE UNIT
SECURITY CLASSIFICATION	TOTAL EQUIPMENTS TO BE FURNISHED
PUBLICATIONS SUPERSEDED	CONTRACT NUMBER
ESTIMATED DATE TO BE FORWARDED FOR BUORD APPROVAL ▶	CONTRACTOR
PRINTING PROCESS TO BE USED	
ESTIMATED DATE COMPLETED COPIES TO BE DELIVERED TO NAVGUN ▶	
REMARKS	COGNIZANT NAVAL INSPECTOR OF ORDNANCE
	SIGNATURE AND DATE

(P)

Figure 2. Ordnance Publication Report (outside Bureau).

3. Specifications and production schedule. After the preliminary check has been made, necessary specifications in addition to the general specifications contained in OP 1, are prepared by the cognizant technical section and approved by the Publications Section. As part of the specifications, a preparation production schedule is prepared by the cognizant technical section and approved by the Publications Section to insure availability of completed OP's together with delivery of the first equipments. An OP is made available for each item of new equipment, even though it may be preliminary in nature. If it appears that a publication will not be available in time to meet service requirements, the Publications Section notifies the Planning Division so that the necessary follow-up may be instituted.

4. Selection of contractor. If the proposed publication is to be prepared by a commercial specialist in technical publications, the Publications Section assists in selecting the contractor after competitive proposals have been obtained by the technical section. The cognizant technical section informs the Publications Section of the first estimated cost and of any subsequent cost changes. The contract is written and administered by the technical section, subject to approval of the Publications Section.

5. A complete outline of the OP is next submitted for the approval of the cognizant technical section, the Training Officer, and the Publications Section, unless such an outline was submitted with the specifications. The outline includes sufficient detail to indicate the scope of the OP.

6. Upon approval of step 5, one representative chapter of the OP complete with typical artwork and full text is submitted:

a. To the cognizant technical section for approval of technical accuracy.

b. To the Training Officer for approval of suitability for the personnel who will use the OP.

c. To the Publications Section for approval of format as outlined in OP 1 and in any additional specifications.

7. Upon approval of step 6, two copies of the manuscript, including photostats of the artwork reduced to printed size, and the final artwork of the complete OP are submitted for approval as in 6 above. At this time a Letter of Promulgation is prepared by the cognizant technical section for the signature of the Chief of the Bureau; also, a list of activities to which the OP is to be distributed. The OP is then submitted to the Publications Section by the cognizant technical section, together with the Publications Approval Form (NAVORD FORM 356), via the Research and Development Division for editing and technical approval and via the Fleet Maintenance Division for a suggested distribution list. The Letter of Promulgation is then checked by the Publications Section for format and submitted for the signature of the Chief of the Bureau.

OP job history

All correspondence from the originating section relating to the preparation of an OP or any other publication is cleared through the Publications Section prior to forwarding and, upon forwarding, a copy is sent to the Publications Section to be included in the publication's job history. Similarly, correspondence originating with the preparing agency is cleared through the Publications Section for information. Upon completion of the OP, a breakdown of all costs is submitted to the Publications Section to be added to the job history. The job history also includes a copy of the specifications with any amendments, original cost proposals, and records of approval.

Final disposition

After the OP has been printed, the Publications Section adds the OP to the index and allowance lists, and also maintains inventories at Ordnance Publications Distribution Centers.

Chapter 3

PREPARING OUTLINE AND MANUSCRIPT

This chapter outlines a procedure which may be followed in developing the specifications (or outline) and text of an OP into the final manuscript. The method of preparation applying to equipment OP's, with which this chapter is primarily concerned, is applicable to other publications as well.

To whom addressed

Before starting work on an OP, decide exactly to whom the publication is to be addressed. The extent and limitations of the reader's knowledge must be kept in mind during all phases of preparation. The majority of equipment OP's are intended for use by both officers and enlisted personnel. They should be written in language that may be understood by the average candidate for an enlisted rating. It is reasonable to assume that such a candidate has had two years of high school and little or no advanced technical education. Also, find out the basic Navy training which the average reader will have completed, so that the contents of the OP may be confined to the equipment discussed. Avoid repetition of basic concepts and technical information presented in Basic Naval Training Courses such as "Basic Electricity" (NAVPERS 10622), "Basic Hydraulics" (NAVPERS 16193), "Gunner's Mate 3/c" (NAVPERS 10013–4), etc.

Language should be as simple as is consistent with technical accuracy. Technical information should be presented as simply as possible, in a step-by-step procedure that can be understood by all readers. Phraseology requiring specialized knowledge should be avoided where ordinary phraseology will clearly convey the intended meaning. Whenever abbreviations may confuse the reader, they should be eliminated in favor of full words. Information should be presented in a direct manner that will not be tedious to more extensively trained personnel.

Familiarization

An author must be thoroughly familiar with the subject before the OP is planned. For complicated equipment, the author should be able to lay out functional schematics before drafting a final outline or text. It is advisable to see actual operation of the equipment to be described. As OP's are usually started when the equipment is still under development, only a working model may exist. It may be necessary to make observations in the laboratory or in the manufacturer's plant. When possible, information compiled from field and operational tests should be used.

Photographs. Photographs of the equipment may also serve as a means of familiarization. When observing the equipment, take photographs while the equipment is disassembled and at various stages of assembly. Detailed photographs, however, should not be made until the outline of the OP has been planned.

Previous publications. In some instances, previous ordnance publications describing the equipment are available. Although intended primarily for manufacturers, NAVORD OS's often contain information which may assist in the preparation of the OP. Specifications contain weights, dimensions, and the composition of various parts. They also contain details on the supplemental materials, such as lubricants, used in operation and maintenance. Having all relevant publications at hand will save time when preparing the manuscript, since information can be taken from other publications and reworked for inclusion in the OP. All publications possible should be combined and consolidated, so that they may be superseded; users of the OP then need to refer to fewer publications.

Ordnance drawings and sketches are not only used as the basis for many of the illustrations, but are valuable in a preliminary study of the equipment. As the authoritative

source of complete information concerning the equipment, ordnance drawings and sketches are essential.

Preparation of the outline

When familiar with the equipment, the author or project director may give consideration to the preparation of the outline for the OP. (If the OP is to be commercially contracted, the outline may form part of the specifications.) The specifications or outline will be submitted for the approval of the Bureau, as stated in chapter 2.

Standard outline. The outline given below has been found effective in a large number of OP's. It will not be possible always to conform with the standard outline, because of variations in ordnance and in the purposes for which OP's are prepared. The content of the OP is decided by its purpose, not by the information which happens to be available. In general, however, text and illustrations are developed according to the list below. All headings may be used or a sufficient number selected for adequate discussion of the equipment concerned. The chapter relating to Safety Precautions must appear in all OP's on equipment.

INTRODUCTION
HOW TO OPERATE
DESCRIPTION and/or OPERATION
INSTALLATION and/or ASSEMBLY
MAINTENANCE
OVERHAUL and REPAIR
THEORY
APPENDIX
INDEX
SAFETY PRECAUTIONS

Normally one chapter is devoted to each heading. In explaining complex equipment it may be necessary to devote an entire volume to a single subject. If an OP discusses a different assembly or subassembly in each chapter, it may be advisable to follow through the major portion of the outline in each separate chapter. While this standard outline may not be used in its entirety in any OP, it serves as a check list to make certain that no points are overlooked. All topics listed are included in each OP in the order indicated unless deviation is approved in special instances by the Bureau. A brief summary follows:

Introduction. This portion of the OP explains briefly what the equipment is, where it is used, what it does, and how it works. A series of simple illustrations is sometimes helpful to tell "how it works." Normally the introduction is general in nature and consists of few pages, without details of description and operation. A brief description or tabulation of the major differences in marks and mods may be included.

How to operate. Following the introduction, the reader is told briefly how to operate the equipment. In this chapter, it is not intended to direct the actions of personnel, but rather to describe what must be done to make the equipment work.

Description. The equipment is described by functional assemblies or systems rather than mechanical arrangement. This means that actions which are unusual, or not readily apparent from accompanying illustrations, are carefully explained. Physical description is combined with "how the equipment operates." If other equipment is used in combination, the connection or association is clearly described. Description of electrical circuits and units may be included in a separate chapter or chapters for clarity.

Operation. If the preceding description has not fully covered the operation of the equipment, this is now covered in detail. It is important that the OP include a step-by-step discussion of a full cycle of operation, if applicable to the equipment described. This portion of the OP also discusses preparations necessary for operation, related equipment required, and special precautions to be observed, as well as relevant specifications and performance data. It is often helpful to simplify the text by tabulating such data in the appendix chapter, with appropriate textual reference when necessary. Possible reasons for failure should be included in the chapter on operation, when pertinent.

Installation. Installation chapters furnish instructions for setting up or installing the equipment. Unpacking and checking instructions are included, and reference is made to special tools required. In addition to nomenclature of illustrations, it is often helpful to identify parts by ordnance drawing piece numbers.

Installation instructions are obviously unnecessary in an OP describing a turret or piece of equipment similarly extensive, and would be included in a separate volume if essential.

Assembly. Assembly instructions may or may not be required in addition to installation instructions already discussed. In preparing the assembly chapter, detailed instructions giving the exact assembly sequence are required, as well as reference to special tools needed. It is desirable to tabulate replacement limits for valves, pistons, springs, etc. If preferred, this tabulation may be inserted in the appendix and referenced.

Maintenance. In this portion of the OP, normal and special routines are specified as applicable for filling, draining, flushing, lubricating, testing, inspecting, special checking, and adjusting. Trouble-shooting instructions are also included.

For complicated equipments or systems, the maintenance chapter may develop into Part 2 of the OP. Special consideration should be given to planning and organizing this material. The treatment of maintenance may include such topics as shipboard installation, complete alignment checks, periodic alignment and adjustment checks, trouble shooting (analysis), and repair information, including tables of values.

Overhaul and repair. Complete instructions for disassembly, overhaul, repair, and reassembly, as accomplished by the fleet, are included in this portion of the OP. Again it is helpful to use a step-by-step procedure, with reference to special tools required. For short OP's, this information may be included in the maintenance chapter.

Theory. This portion of the OP includes theory peculiar to the equipment which has not been covered in previous chapters, and is needed for instructors. Theory which is covered in basic training courses is omitted. In the interests of clarity, theory may, on occasion, appear earlier. In other instances, it may be summarized in a complete volume.

Appendix. The appendix is limited to operational and maintenance data required for shipboard use. This chapter should not be regarded as a catchall, but rather as a means of summarizing lists, tabulations, tables of marks and mods, and charts which are necessary in the OP but may be deleted from the text and referenced only. When necessary, lists of spare parts as well as drawings and diagrams referred to in the text, may be included in the appendix. It also includes tabulated data, such as specification and performance statistics, as well as weight summaries.

Index. In bulky pamphlets and where the Table of Contents is considered inadequate, a cross index should be included for ready reference to information contained in the OP.

Safety precautions. Precautions that are essential to the safe operation of equipment by operating personnel should be incorporated in the text at appropriate positions. They should be clearly set apart by the side heading "Safety precautions." Safety precautions should be the type of warning that might be posted on or near equipment to help prevent accidents. They should not be confused with the normal cautions and warnings with regard to disassembly, lubrication, maintenance, etc., which are not considered as safety precautions.

Each OP that contains safety precautions shall have these precautions reprinted at the end of the pamphlet. They should be assembled to form an unnumbered chapter following the appendix and preceding the distribution list. Suitable headings should be used to indicate the operation of specific equipment to which the precautions apply.

Writing the text

Having developed and obtained approval of an outline adapted from the standard outline, the author starts his text. The fact that equipment OP's serve the dual purpose of operation and maintenance manuals for shipboard personnel, as well as reference texts for the instruction of officers and enlisted personnel, cannot be too strongly emphasized. As stated earlier, wording should be brief and simple in all places where brevity and simplicity can be achieved without sacrifice of technical accuracy. The three criteria of a successful OP are (1) Does it fulfill its purpose? (2) Is it accurate? (3) Is it complete?

Illustrations shorten text. Complete information and correct explanation need not result in wordy text. The use of properly planned illus-

trations will reduce the text and make it quicker to read, easier to remember, and sharper in meaning.

Tables and diagrammatic charts. It is frequently advisable to use tables and diagrammatic charts to simplify instructions and express facts concisely. Elaborate or complicated tables and charts should be avoided, since they confuse the reader and defeat their purpose. Sufficient explanation should always be given to make diagrams clearly understood.

The writing process

Starting to write. Begin to write by reviewing the outline of the first chapter. Consult all material, including source material, which is applicable to that particular chapter. Develop each subdivision of the chapter completely, both in manuscript and in descriptive matter for the illustrations. The logical relationship of text and illustrations is thus established.

Descriptive matter for illustrations. It is not necessary to have the illustrations in final form before writing the descriptive matter that will accompany them. After deciding what illustrations will be required and visualizing how they will be presented, the technical writer may prepare descriptive captions and, in some instances, nomenclature while the illustrations are still under preparation. The illustrations, with their captions and nomenclature, thus accomplish a large part of the task of explanation. A smaller burden of explanation is left for the text, which can be correspondingly crisp and direct. Figure captions should be as short as possible, but should indicate precisely the purpose of the illustration.

Completing the text. Guided by the outline, the author weaves text and illustrations for each chapter into a unified, easily understood presentation. The subheads of the outline appear as display subheads in the manuscript. Illustrations, with attached captions, are placed at one side in sequence. In effect, two manuscripts are thus developed simultaneously—the text proper and the descriptive matter for illustrations.

Breakdown of OP

Normally OP's are broken down by chapters; however, the following additional categories are available:

Volumes. When separately bound books are necessary for large OP's, they are termed "Volumes," numbered and lettered as OP 1000, OP 1000A, OP 1000B, etc.

Parts. Certain large volumes may need subdividing into a limited number of "Parts," numbered with Arabic numerals as Part 1, Part 2, Part 3, etc.

Chapters. Subdivisions within a volume or part are called "Chapters." They are serially numbered throughout the OP, using Arabic numerals.

Sections. Long chapters may require major subdivisions, which are designated as "Sections." Sections may be serially numbered with Arabic numerals through the chapter.

Paragraphs. Text within chapters (or sections) is divided into paragraphs. Paragraphs are not numbered unless each is part of a definite sequence of operations. Deviation from this practice must be approved by the Publications Section of the Bureau. The first line of each paragraph is indented.

Subordinate paragraphs. When it is necessary to subdivide a paragraph, subparagraphs are used. Additional subdivisions in paragraph form are considered unnecessary.

It will be necessary to use this complete list of divisions only in unusually long OP's. An OP is normally divided into the required chapters. For short OP's, formal divisions may not be necessary and the use of properly chosen running heads will suffice.

Requirements for final manuscript

The following specifications apply to the preparation of the final manuscript submitted for approval:

Contents of the manuscript. The manuscript proper contains all text and text headings, such as section heads and subheads. In addition, the following separate units are appended to the manuscript proper:

Cover
Title page
Backbone of cover
List of fixed and running heads, with chapter or section identifications
List of figure captions

Number of copies. The original (Printer's copy) and one clean carbon copy are delivered

to the Bureau unless otherwise specified. In addition, a second carbon copy may be prepared for the writer's reference.

Typing. The printer's copy is typed double spaced on white bond paper, 8 in. x 10½ in. Photostats of all illustrations, reduced to final size, are inserted in the manuscript at the desired points in the text. Figure numbers and captions are placed under the illustrations for identification. Chapter and section headings are centered and typed all caps. Primary side headings appear in lower case on a separate line flush with the left margin, and are underscored in blue. Secondary side headings are typed lower case followed by a period, run into the paragraph, and underlined in red. Where bold face is desired elsewhere in the text for emphasis, it is also underlined in red. Subordinate paragraph headings are typed lower case followed by a period, run into the paragraph, and underlined in green. Where caps and small caps are desired elsewhere, they are also underlined in green. Tabular matter is typed on separate pages and inserted where appropriate in the text. Vertical rules in tables are generally considered unnecessary. Occasional horizontal rules are desirable in extensive tables and should be specified in the manuscript.

Typing of formulas. All mathematical formulas are clearly typed, or, if necessary, legibly hand-lettered. They should be carefully checked. There is danger of serious inaccuracy, loss of printing time, or both, if there is any question in the mind of the typesetter as regards symbols, exponents, subscripts, or any other components of mathematical expressions.

Numbering. All pages of the typed manuscript are numbered consecutively.

Binding. Manuscripts are bound in a folder with an acco binder or other loose-leaf fastening device.

Preparing manuscripts for quick offset printing

If a manuscript is 16 pages or less, if the publication is temporary in nature, and if a high quality of reproduction, particularly in halftones, is not required, the text may be prepared as outlined in figure 3. Text is typewritten, photographed at approximately 20 percent reduction in size, and printed from plates made from the photographic negaitves. Negatives of illustrations requiring a different scale of reduction are stripped into the negative before plates are prepared for printing. Use of this process affords the most rapid means of printing.

Preparation instructions. Type the manuscript on NAVEXOS FORM 315. Elite type should be used if practicable. Type should be clean, and a silk or somewhat worn cotton ribbon should be used. When an error occurs in typing, correct the manuscript by retyping on another sheet; cut to fit, and paste neatly over the error. Erasures show on the finished job. Page headings, page number, the classification, and text headings should be typed as indicated in figure 3. Double space between paragraphs, and indent the first line only. All other lines run the full width of the allotted space. With the exception of the classification and page number, do not type beyond the blueline box provided on the form, as material outside will not be photographed. Illustration space should be reserved when typing. Simple line drawings reproduce better than halftones, as delicate shadings are lost in this method of reproduction. Simple line drawings prepared with bold lines may be pasted in place or drawn in india ink directly on the form. Photographs and renderings should be prepared with high contrast of light and dark areas, and if requiring reduction may be reduced as shown in figure 3. A tissue overlay is placed over the original artwork and a rectangle drawn about the area to be used. A diagonal is drawn on this rectangle, and the desired dimensions are obtained by completing a smaller rectangle as indicated. Figure captions are centered below illustrations, with double spacing above and below. The cover, title page, and Letter of Promulgation are prepared on 8 x 10½-inch bond paper, and photographed the same size. The BuOrd seal is added by the Publications Section.

Style guide

Design drawings are used as a guide for spelling, compound words, abbreviations, and nomenclature. If drawings are inconsistent, Webster's New International Dictionary is followed. In cases of alternative spellings in Webster, the Government Printing Office Style

972836 O—51——3

TYPING GUIDE

FOR PHOTOGRAPHIC REDUCTION
NAVEXOS-315 Rev. 6-44

NOTE - Do not type outside blue lines, A and B, for single column pages which, when reduced, will fit on 8"x10½" page with an image size of 6½"x9". For double column pages, type within dotted lines C and D, trim off excess paper and paste-up on Paste-up Form # 969 to obtain image size of 6½"x9" which fits 8"x10½" page. Page numbers should be centered in the box at the bottom for single column pages. For numbers on double column pages, type numerals in box on Paste-up Form # 969. Signatures, if used, must be in black India ink.

C D

A

PREPARATION OF ORDNANCE PUBLICATIONS OP 1

HEADINGS

Page Headings. Page headings shall be typed as shown above.

Chapter Headings. The top of a page beginning a new chapter shall be spaced and typed as follows:

(blue line)

Chapter 00

CHAPTER TITLE

Begin each chapter on a new page, except when one third or more of page space remains after the end of the previous chapter. In such a case, start the new chapter on the old page, spacing as above between chapters.

Text Headings. Headings for text within a chapter shall be typed according to the following:

#1 Heading - Centered Heading (Use caps and lower case; underscore; allow one space above and below.)

#2 Heading - SIDE HEADING (Type in caps at extreme left of text page, with one space above and below.)

#3 Heading - Side Heading (Indent five spaces and type in caps and lower case on same line as text; underscore.)

SCALING ILLUSTRATIONS FOR REDUCTION

A method of scaling illustrations for reduction is indicated in figure 3a, below:

B

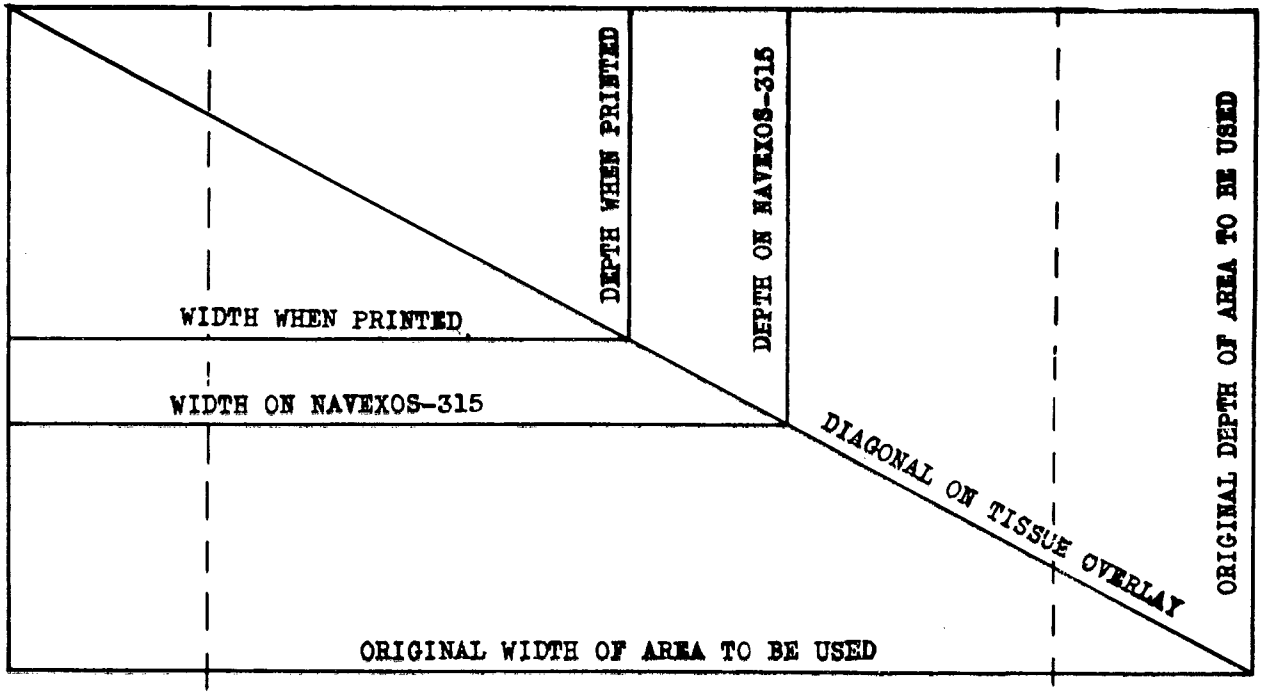

Figure 3a. Scaling illustrations for reduction

The reduced size of an illustration, and the space to allow on this form may be determined by placing a tissue overlay over the original artwork and drawing a rectangle about the area to be used. Draw a diagonal on this rectangle. Any rectangle drawn on the same diagonal is in proportion to the original rectangle. Choose a desired dimension of width or depth, either in printed size or on form NAVEXOS 515. Then complete the rectangle to determine the unknown dimension. It should be noted that all text and drawings on this form will be reduced 20% when printed. This should be considered when typing the text, and adequate space allowed for illustrations.

A B

CLASSIFICATION

PAGE NO.

Figure 3. Form used for quick offset reproduction.

Manual is followed. Fire control terms and symbols should be consistent with NAVORD OD 3447, "Standard Fire Control and Torpedo Control Symbols." Diagrammatic electrical symbols follow the standard symbols listed in Bureau of Ships 9–S–3744 if inconsistency is found on design drawings. Where alternative nomenclature has been firmly established by service usage, it may be noted parenthetically in addition to standard nomenclature. In any event nomenclature should be consistent in text and illustrations. The following may be a helpful reference to terms often used by the Bureau of Ordnance.

Mark and mod. The term "mark" as applied to ordnance equipment is normally abbreviated without a period when followed by an Arabic numeral (Mk 6). It is spelled in full on the cover and title page and in the Letter of Promulgation. If desired, it is also spelled in full in chapter heads, section heads, running heads, and fixed heads, but not in other display type. When the words mark and mod are used as common nouns, and not as parts of the nomenclature of a particular piece of gear, they are not capitalized. Capitalization is used when the exact title of ordnance gear is specified. When the mark number of ordnance gear is given, the title of the gear must accompany it. In accordance with current Bureau policy, the first equipment of a type is designated by the mark number and Mod 0 such as: Gun Director Mk 37 Mod 0; Gun Director Mk 37 Mods 0 and 1 (instead of Gun Director Mk 37 and Mk 37 Mod 1); and Gun Director Mk 37 All Mods (instead of Gun Director Mk 37 and Mods). When referring to a type as a whole, use Gun Director Mk 37 Type or Gun Director Mk 37.

Numbers. Numbers one to ten are spelled out, with the exception of such cases as are noted below. From 11 on, they appear as numerals. However, a sentence should not begin with a numeral if this can be avoided; "Twenty-five men are required" is correct usage. Arabic numerals are used for dates, degrees, identification, distances, dimensions, and percentages, and in tabulations. The expression 6″/47 turrets is permissible, and small-caliber weapons are identified as caliber .22, caliber .38, etc. Fractional quantities are designated by fraction: as, ¼-inch. Decimal values are designated by decimal number: as, 4.5-inch; 0.623 ± 0.005 inches. Units of measure are spelled out except where used in parenthetical expressions and tabulations. Symbols are used in the text for degrees and for angular designations of minutes and seconds, except at the end of a sentence.

Security classifications. Any reference to a security classification is written in caps, with no quotes and no underscoring, such as RESTRICTED or CONFIDENTIAL.

Compound words. All compound words used as unit modifiers which are not sufficiently common and familiar to be written as one word, are hyphenated: as, foot-operated switch; 6-inch 47-caliber turret. When used in series, the first word of each compound is written with a hyphen followed by a comma: all 1-, 2-, or 3-mount installations. A hyphen is used in the adjectives 40-mm, 20-mm, 37-caliber, etc.

Publication and drawing symbols. Publication symbols appear in all caps: as, NAVORD OCL X1c–45; NAVORD OD 4464 (1st Rev). Abbreviated references to Bureau of Ordnance drawings and sketches are written without the use of "Number" or "No.": BuOrd Dwg 66454; BuOrd Sk 65888 (Rev A). Bureau of Ordnance Manual references appear as follows: BuOrd Manual, paragraph 6D5. References to paragraphs, figures, and chapters are spelled out: as, "See paragraph 2, NAVORD OCL GV3–45" and "See figure 4, chapter 2." As an exception to this rule, "(fig. 20)" may be used.

Projectiles. Abbreviations for types of projectiles—antiaircraft, high capacity, armor piercing, etc.—are used as follows: A.A.; H.C.; A.P. Two capital letters and two periods are used, with no space between the letters.

Navy locations. Abbreviations of official Navy locations and activities may be used: such as, NAS; NATB; NATS. Abbreviations of this type are permitted in the text when the meaning is clear. When the U. S. Navy is referred to as in Navy, Navy Yard, Naval, or Naval Training Base, the first letter is capitalized.

Punctuation. Do not use quote marks unless necessary for clarity. Unnecessary quotes tend to confuse rather than clarify. Commas and periods always appear inside quotes; semicolons, outside. The placing of exclamation

marks and question marks depends in each case on the content of the sentence. In a series, each member of the series is followed by a comma, including the one immediately preceding the "and" or "or."

Spelling. The following words commonly used in ordnance publications are listed for reference:

a–c (a)
A.C. (n)
airproof
airtight
air vent
alongside
antiaircraft
anti-kick
anti-overhaul
appendixes

backlash
base ring
bomb sight
bore sight
breechblock
breech door
build-up (a)

candle power
cap screw
centerline
circuit breakers
clockwise
coordinate
counteraction
counterbalance
counterbore
counter borer
counterclockwise
countermovement
counterrecoil
counterweight
crankcase
crossbar
crosshead
cross-level (a)
crossline
crosspiece
cross-section (a)
cross shaft (n)
cross-shaft (a)
cross wire
cutoff
cutout

dashpot
de-energize
Diesel
disc
dovetail
drawings numbers
dripproof
drop block
drop-out (a)
drydock

endways
endwise
equidistant
equispaced
eyebolt
eye lens
eyepiece

fillister
fire controlman
fireproof
flywheel
fog-proof
footplate
freewheeling
fuse (elec.)
fuze (Ord.)

gasproof
gastight
gage
gunfire
gun sight

hand crank
handset
handwheel
headset
horsepower
hydropneumatic
indexes
indicator-regulator
interconnected

jackbox
jackscrew

kickback

landmark
latticework
left-hand (a)
leveling
locknut
lockscrew
lockwasher
lockwire

mid-cycle
mid-point
mid-position
midway
moistureproof
motor-transmission (a)
multicylinder

oilproof
oiltight
Oldham
outboard
overhaul
overrun
oversize
overstress
overtraveling
overvoltage

petcock
power-off (a)
prerequisite
prestarting
pull-off (a)
pull-out (a)
push button (n)
push-button (a)
push fit

raintight
rammerman
rangefinder
ray filter
readjust
realign
receiver-regulator
re-energize
re-engage
reinsert
re-seat
right-hand (a)

safeguard
screw driver
screwhead
self-align
self-correction
self-contained
semiannular
semiannually
semiautomatic
semifixed
semifloating
setscrew
shipboard
shockproof
short-circuit (a)
stand-by
subassembly
subbase
subcaliber
subheading
subparagraph
subunit
supercharge
superstructure

take-off (n or a)
tap bolt
throwout (a)
toweling

underside
underway
undervoltage

valve plate

water-cooled
water line
waterproof
water seal (n)
water-seal (a)
watertight
weatherproof
Woodruff key
worm wheel (n)
worm-wheel (a)

Chapter 4

PREPARATION OF ILLUSTRATIONS

Principal types of illustrations

Broadly speaking, three types of illustrations are used in OP's—those reproduced in halftone (fig. 22), those reproduced in line (fig. 8), and a combination of the two (fig. 28).

Halftone illustrations. Illustrations for halftone reproduction are usually photographs, wash drawings, or airbrush drawings. They are preferable when it is desired to give a realistic picture, since their range of tone values actually separates the details of a complicated piece of equipment.

In the interest of economy and ease of production, photographs requiring a minimum of retouching should be used.

Line illustrations. Illustrations for line reproduction include several types of line drawings, such as outline sketches, mechanical drawings, etc. They are excellent for picturing charts or parts of equipment in simple diagrammatic form.

Line drawings may simulate the halftone effect by the use of line shading. The effect of contours is approximated by shading the drawing with a series of lines similar to original woodcuts. However, in drawings of this type the lines must not be too close together, or the spaces between will fill up when the drawings are reduced in reproduction.

Combination plates. Combination plates consist of halftones and line drawings which are prepared as separate units and then joined by the engraver to form unified plates.

Recommended graphic techniques

The three types of illustrations summarized above may be presented in three styles which are particularly suitable for portraying ordnance equipment, since they explain graphically the complicated details and relationship of parts.

Exploded view. This view is used to show all the parts of a piece of equipment or of a subassembly. Parts are shown separately in proportionate size, grouped to indicate how they will be joined in assembly.

An exploded view has several advantages. It makes an excellent illustration for a parts list, since it clearly shows the parts, pictures the comparative size of related parts, and suggests their general arrangement. Exploded views are frequently ideal for showing assembly and disassembly with a minimum of textual explanation. A disadvantage of the exploded view is that it does not show the equipment in complete and actual assembly.

The preparation of an exploded view requires time and painstaking care. One method is to photograph a complete exploded assembly. Another is to photograph the parts separately, in the same perspective and in the same focus; then assemble them, mount them in position, and retouch them. A third method is to have the exploded view completely drawn.

Phantom view. A phantom view pictures the assembled equipment; but, like an X-ray plate, it allows certain interior parts to show through in varying gradations of tonal value. More than one group of interior parts can be shown in the same phantom, and certain parts can be emphasized through the use of deeper tones. The advantage of the phantom view is that it emphasizes any given part and at the same time pictures, with considerably less emphasis, related interior or hidden parts in complete and actual assembly; moreover, it correctly relates interior assemblies to the exterior.

Cutaway view. In the cutaway view, the exterior or housing is shown cut away to expose an interior part or interior assembly in full detail. Any number of sections may be cut away, up to and beyond a full cross section.

The cutaway view differs from the phantom in that certain exterior parts must be sacrificed in order to show interior parts in full detail.

One advantage of the cutaway view is that it gives a clear-cut picture of selected interior parts in actual assembly. A disadvantage is

that it cannot show as many interior parts in realistic relationship as can a phantom drawing.

Preparation of exploded, phantom, and cutaway views

All three views may be assembled from photographs to give the illustration "realistic perspective." Such illustrations have depth and show the equipment as it actually appears.

On the other hand, an artist preparing any of the three styles may work from drawings, using the principle of isometrics. An isometric drawing follows all the laws of perspective except that of diminishing dimensions. Thus, all measurements of parts are in exact scale to each other. An isometric drawing is realistic without distorting the actual dimensional scale.

The three styles of illustration may also be prepared from drawings as orthographic (flat plane) views. In this case, perspective is entirely eliminated and only direct front or side elevations are shown; however, realism and depth may be achieved by the use of gradations of tone.

In some instances it may be desirable to combine several of the foregoing methods of presentation in one illustration to achieve the desired effect.

Summary. These three specialized graphic techniques—exploded view, phantom view, and cutaway view—are likely to require extra time and expense in preparation. They should not be used except when the complexity of the equipment precludes the use of simpler techniques. They are summarized here for general guidance in contacts with artists; but it is assumed that the technical knowledge of artists will be depended upon for advice concerning art treatment.

Ordnance drawings

Ordnance drawings are seldom suitable for reproduction in an OP in their original form; however, they are invaluable in the preparation of the illustrations which have just been discussed. Since they are the authoritative source of complete information on the equipment, ordnance drawings make a definite and important contribution to the illustration of an OP.

In considering the use of ordnance drawings, it must be noted that they usually contain much detail drawn with fine lines. When the drawings are reduced, these lines become thin and weak. Reduction may even close up the spaces between lines, causing an irregular, spotty appearance. To secure a clearly printed illustration, ordnance drawings should be simplified in detail and redrawn with heavier lines that will stand reduction.

Many ordnance drawings are prepared for manufacturing purposes and contain detail and nomenclature useful only in manufacturing. This information is usually of no value in an OP and should be eliminated. The four principal types of ordnance drawings, with the special type of information each supplies, are summarized as follows:

General arrangement drawings picture a piece of equipment and show all the component parts that make up its complete assembly. They may show the parts in full detail or as subassemblies. General arrangement drawings show all the parts in relation to the whole. Thus they may form the basis of illustrations in the chapters on general description.

Detail drawings show one or more parts or components of a piece of equipment in careful detail. They may form the basis of illustrations in the chapter describing the parts.

Assembly drawings show individual parts of the equipment in the relation they bear to each other in a subassembly. Assembly drawings may form the basis of illustrations in the assembly chapter.

Schematic drawings picture the functional plans of parts or units. Since they chart phases of operation, they may form the basis of diagrams throughout the pamphlet.

In addition to these four principal types, all other ordnance drawings relative to the equipment should be consulted. They include vital information on all phases of the equipment and its use.

Photographs

Effective photographic illustrations require thoughtful planning. Care must be exercised to include all the desired details in each photograph, to show them at the most favorable angle, and to arrange the lighting to secure the high contrast necessary for sharp, clear repro-

duction. Although final retouching is generally necessary to bring out details and heighten contrast, the time and cost of this retouching may be materially reduced by careful planning of the original photograph.

Interest and teaching value may often be increased by including a correctly clothed and posed workman in a photograph of gear. He may be shown assembling, servicing, or operating the equipment in accordance with the accompanying text. At times, the explanatory value of such an illustration may reduce the need for detailed text. The inclusion of a human figure is also useful in giving the reader an idea of the size of the equipment.

When photographs are intended for offset reproduction, retouching should be bolder and stronger. Offset reproduction gives a slightly flat, grayish effect unless the artwork has been especially prepared with strong contrasts of light and shade.

Supply the retoucher with duplicate prints, one to be prepared for reproduction, the other to be used for reference during the progress of the retouching. When the retoucher is working on sections of a photograph, he is likely to lose a sense of the complete picture. The artist may unintentionally cover an important detail with the airbrush. With an extra print at hand, the original appearance can be checked and mistakes avoided.

Use of color in illustrations

Color may be used in OP's, but it should always serve a functional purpose to show complicated circuits, mechanical motion, hydraulic action, etc. Color should not be used merely for decoration. Color should not be used when the information can be shown by other means such as screens, patterns, and varied lines. In the interest of economy, when more than one color is used, such use should be confined to as few printing forms as possible. Color coding should be consistent throughout each pamphlet, and also throughout each series of related pamphlets, as far as practicable.

Foldouts

Foldout illustrations should be held to a minimum. Whenever possible, wiring diagrams, lubrication charts, etc., should be planned to occupy one page or facing pages.

Planning illustrations

The well-illustrated OP is one in which text and illustrations complement one another. Illustrations must be planned to picture topics of the outline. Relate each illustration to specific topics of the outline; thus the text explains the illustrations. A logical sequence of illustrations aids the reader in interpreting the subject illustrated, its purpose, how it operates, how it is maintained, overhauled, repaired, and reassembled.

Effective OP's make liberal use of illustrations, but elaborate, excessive illustrating is not good planning. Illustrations must be limited to essentials to speed production, limit costs, and give the reader a manual that is compact and convenient to use.

In planning and selecting illustrations, ask the following questions:

a. Is the proposed illustration essential to understand clearly the subject matter?

b. What is the simplest technique that may be used to present effectively the illustration with the least expenditure of artist's time?

c. Can any part of the illustration be eliminated or more simply outlined without losing effectiveness?

Example of planning

An example of illustration planning for an average OP is shown in figures 4 through 28. These illustrations complement the text, which describes and provides instructions for one ordnance assembly. It is an average treatment which, because of careful planning and development of each subject, defines the equipment for the reader. This illustration treatment could have been much more elaborately planned; but elaborate, excessive illustrations are not good planning.

The first step in illustration planning is to use the standard outline described on page 10, listing subordinate topics. Beside each topic or related group of topics, the required illustration is indicated. The type or class of illustration is noted and its features described. Required illustrations may be classified as

Introduction illustrations
Description and/or operation illustrations
Instruction illustrations (including installation and/or assembly, maintenance, overhaul, and repair)

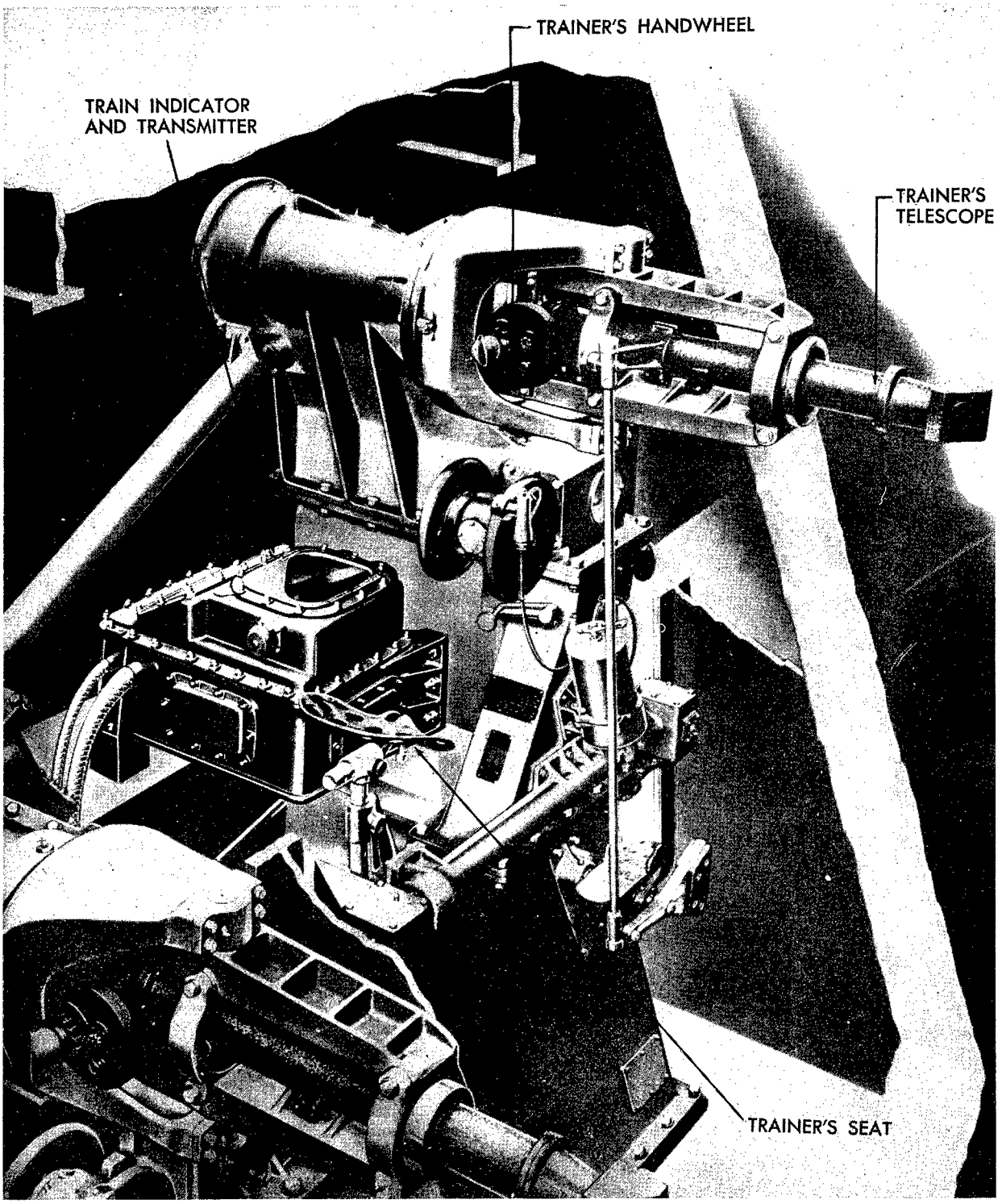

Figure 4. Sample of an introduction illustration. It shows the installed arrangement of a train indicator and transmitter. The legend and nomenclature identify the instrument and its turret station arrangement with respect to other equipment.

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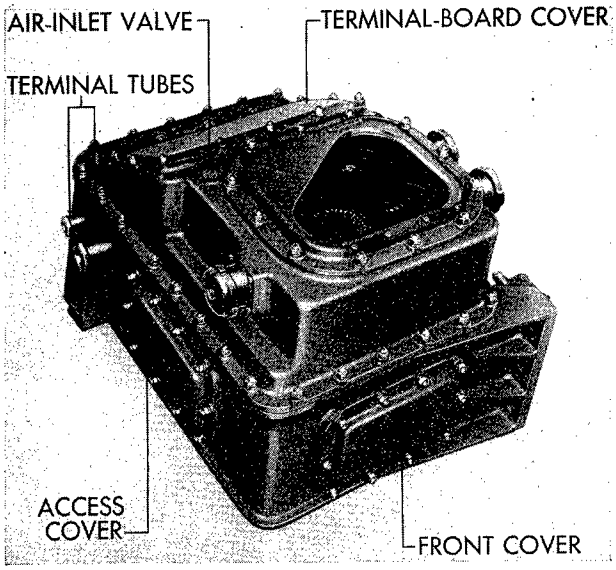


Figure 5. A description illustration. It is an assembled arrangement perspective view of the instrument shown in installed arrangement in figure 4. This illustration, together with figures 6, 7, and 8, identifies exterior elements and internal components.

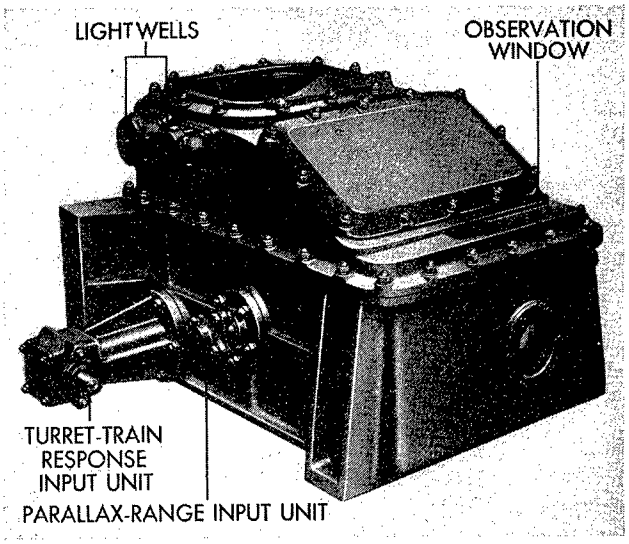


Figure 6. A description illustration with different perspective of the instrument shown in figure 5. It is part of the assembled arrangement illustrations (figs. 5, 6, 7, and 8).

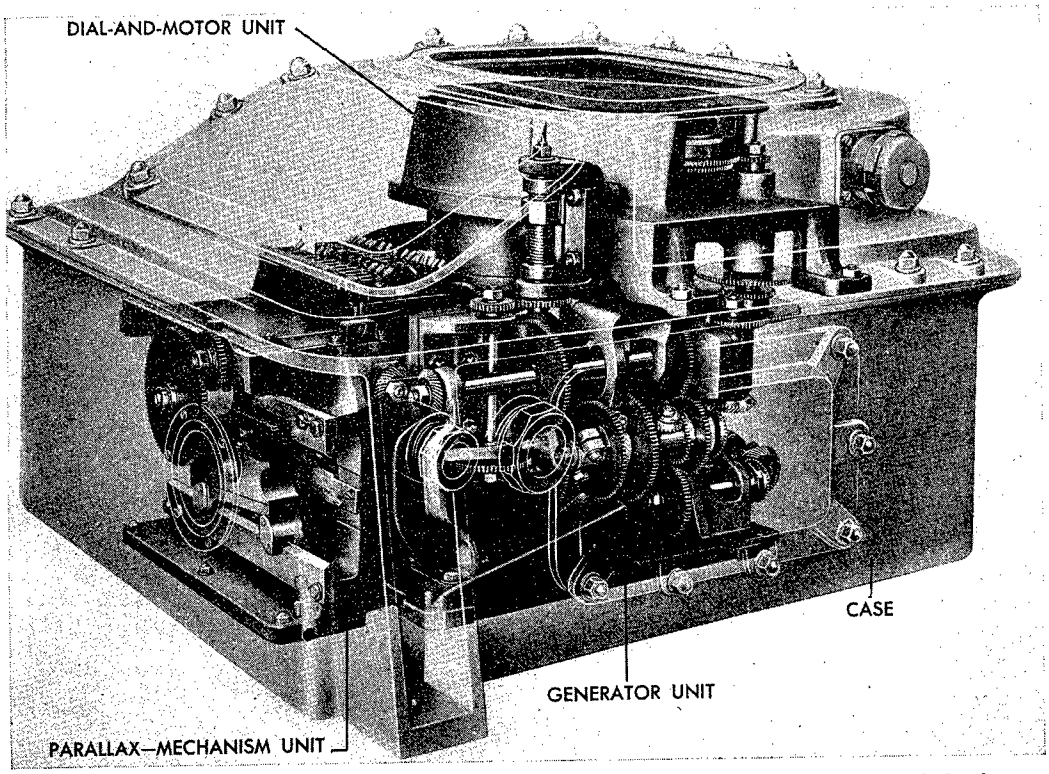


Figure 7. A third description illustration. This phantom view shows the assembled relation of the four component units: two-piece case, dial and motor, generator, and parallax mechanism.

Introduction illustrations. The introduction as defined on page 10 tells briefly what the equipment is. One or more illustrations may be used to show general arrangement, and installed arrangement with respect to the ship, mount, turret, or associated major assembly. These illustrations are not planned to define or explain any of the parts or functional details of the device. They reveal the mounted position and the relationship of the device to other equipment with which it functions. If the illustrations are effectively developed, the reader will understand what the device is, where it is located, and what it does. See figure 4.

Description illustrations. The description as defined on page 10 explains the mechanical composition of the whole device and the functional arrangement of its parts. Illustrations planned for this text may be of the types defined in the subparagraphs following.

ASSEMBLED ARRANGEMENT ILLUSTRATIONS. Two or more pictures of the assembled device may be used to show its exterior form and external parts and the assembled arrangements of its interior elements. Components are

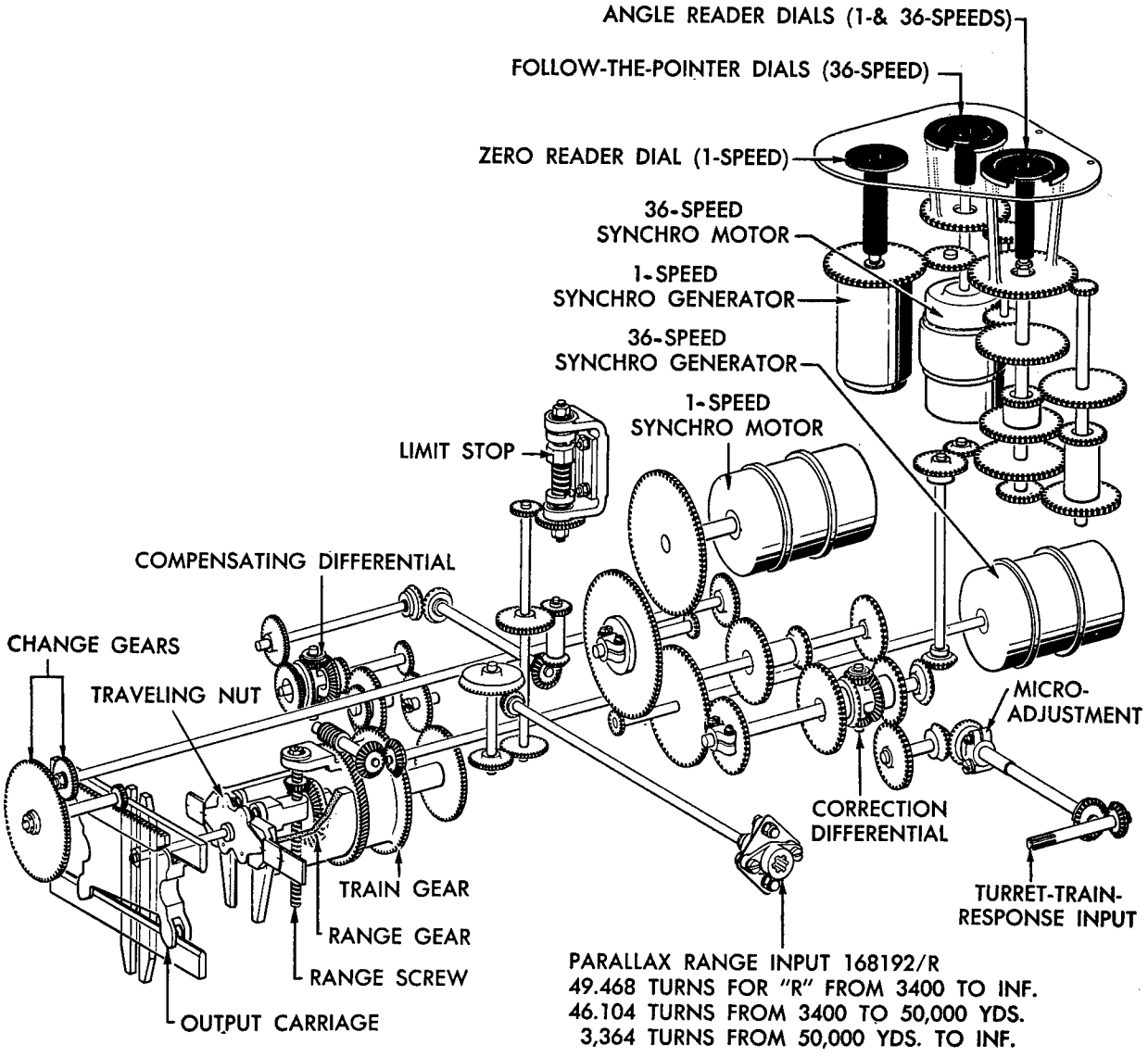


Figure 8. An isometric schematic, identifying the parts enclosed in the case, completes the assembled arrangement illustrations.

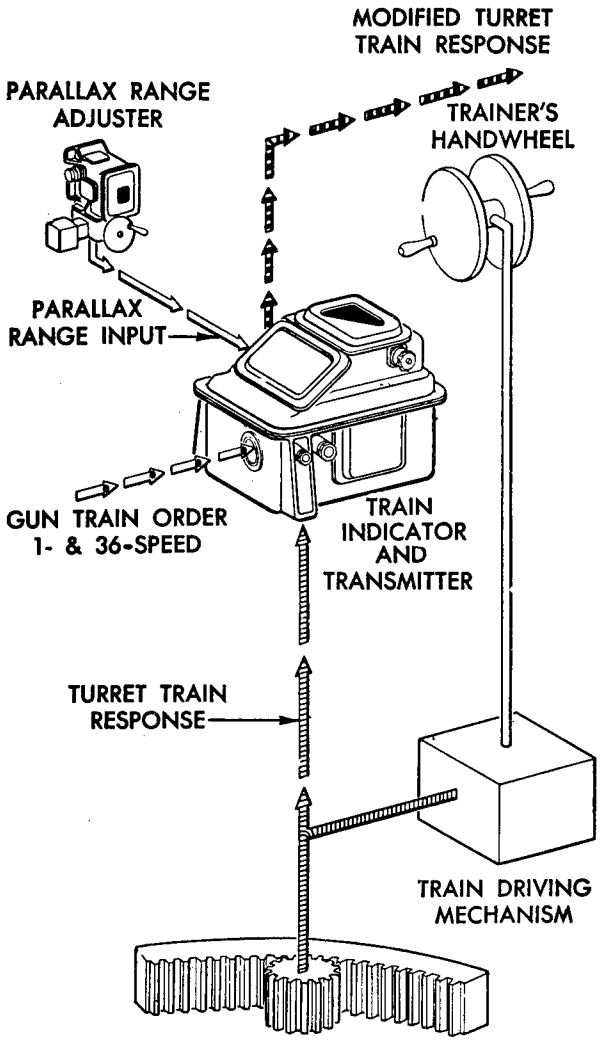


Figure 9.

identified by these illustrations, which reveal over-all construction and mechanical arrangement. They locate components in the assembled arrangement of the whole device. They do not attempt to explain functional or system arrangements. Two examples of illustrations showing the external form and parts are figures 5 and 6, which illustrate both sides of the train indicator. Examples of illustrations of assembled arrangements of the internal parts are figure 7, showing the interior with the enclosing case phantomed, and figure 8, a line drawing of the parts within the case.

FUNCTIONAL ARRANGEMENT ILLUSTRATIONS. The opening description defines the system or functional arrangement of all components as part of the whole device. Illustrations

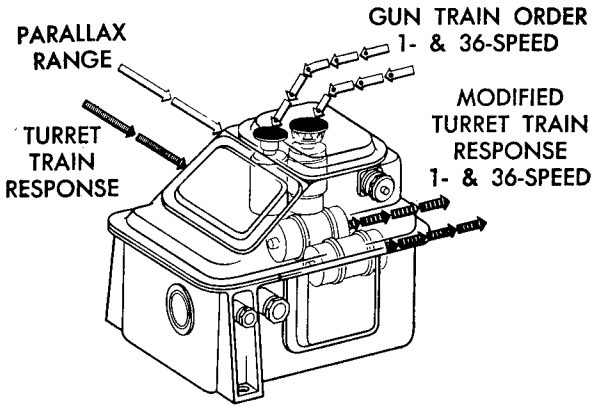


Figure 10.

Figures 9 and 10 are functional arrangement illustrations. Figure 9 is a functional flow diagram giving elementary definition of mechanical and electrical inputs and electrical output. Figure 10, an outline drawing, supplements figure 9 and defines the components that receive and transmit. They illustrate a general description explaining the purpose of the instrument and functions of the essential components.

for this text vary, depending on the subject. The functions of the components of self-contained assemblies such as ammunition units may be revealed in sectional views of the assembly. The functions of components of complex fire control instruments or automatic mechanisms may best be revealed by diagrams. Elementary functional flow diagrams, figures 9 and 10, schematic drawings, and isometric outline drawings of gearing arrangements are variants of diagrammatic illustrations. The object of these illustrations is to define the general purpose of the whole device and designate position within the system and the duty of each component subassembly. The illustrations do not attempt to show how the units operate.

COMPONENT ILLUSTRATIONS. The text describing the parts comprising an assembly is commonly an explanation of functional groups. Illustrations for this text show component subassemblies. They may be photographs, sectional view drawings, or any combination treatment that reveals the assembled arrangement of the parts. Such illustrations are planned to show parts in a normal position; they are never schematic treatments. They may show functional characteristics to indicate flow of liquid, air, or electric current, or direction of rotation or movement. See figures 11 through 14.

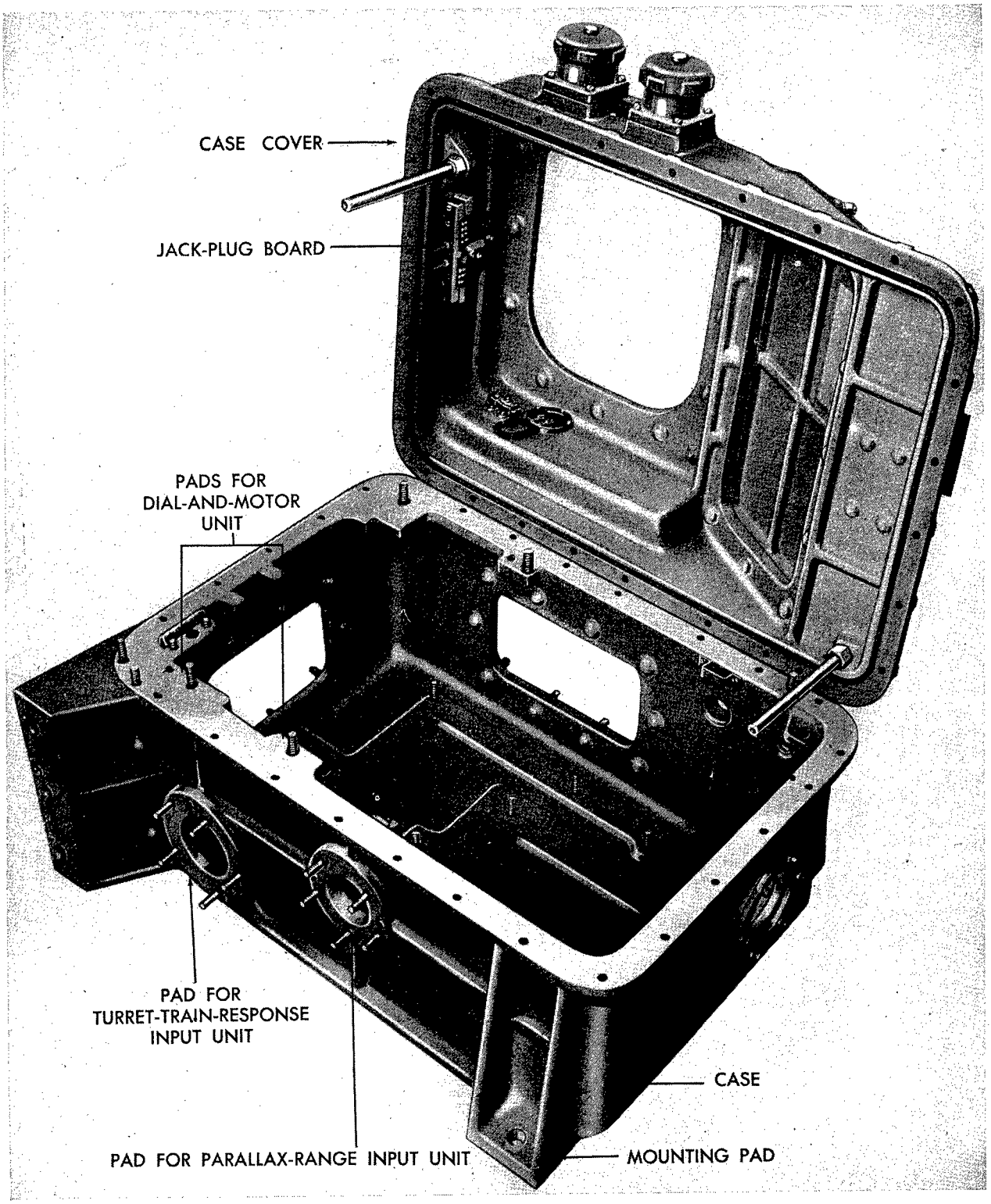
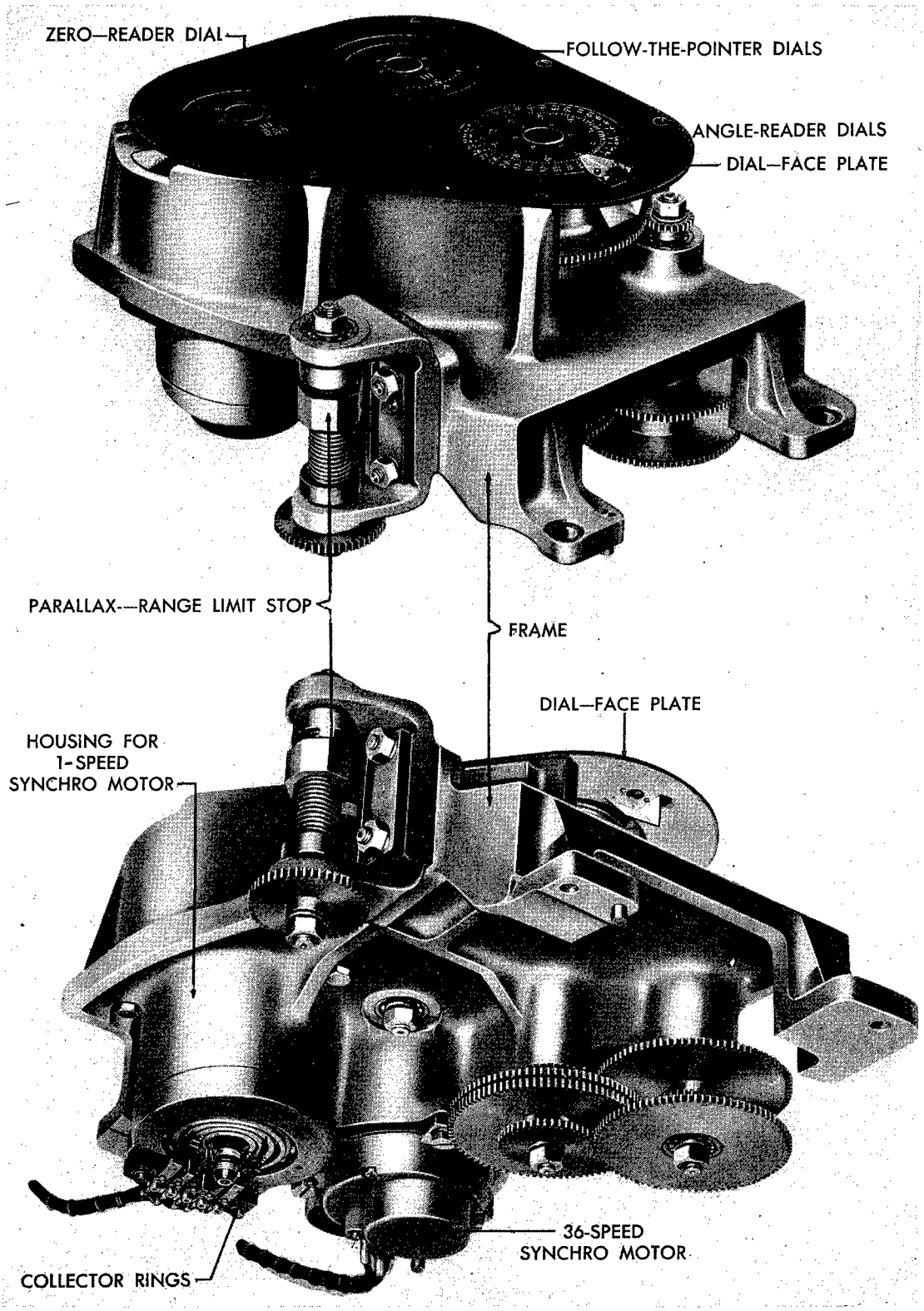


Figure 11. A component illustration identifying the essential parts of the case. Figures 11 to 19 illustrate all the components of the instrument.



Figures 12 and 13. Figures 12, 13, and 14 are component illustrations identifying the parts of the dial-and-motor unit.

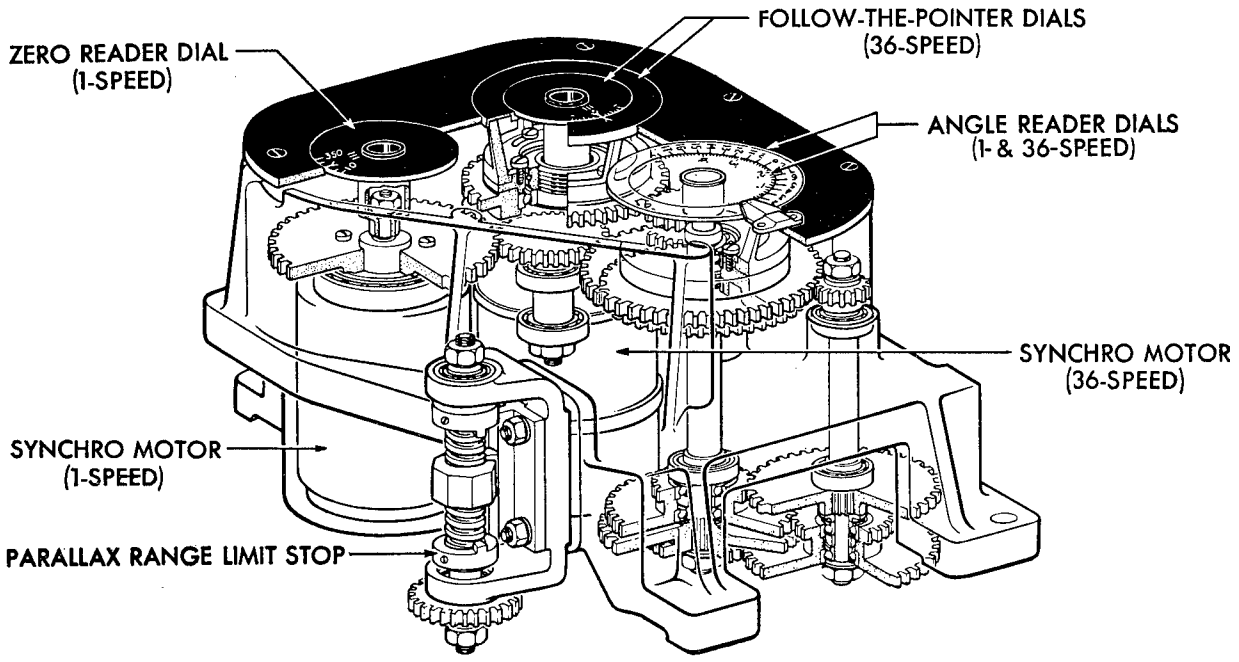


Figure 14. A component illustration showing mechanical assembly of critical elements that are concealed in figures 11, 12, and 13.

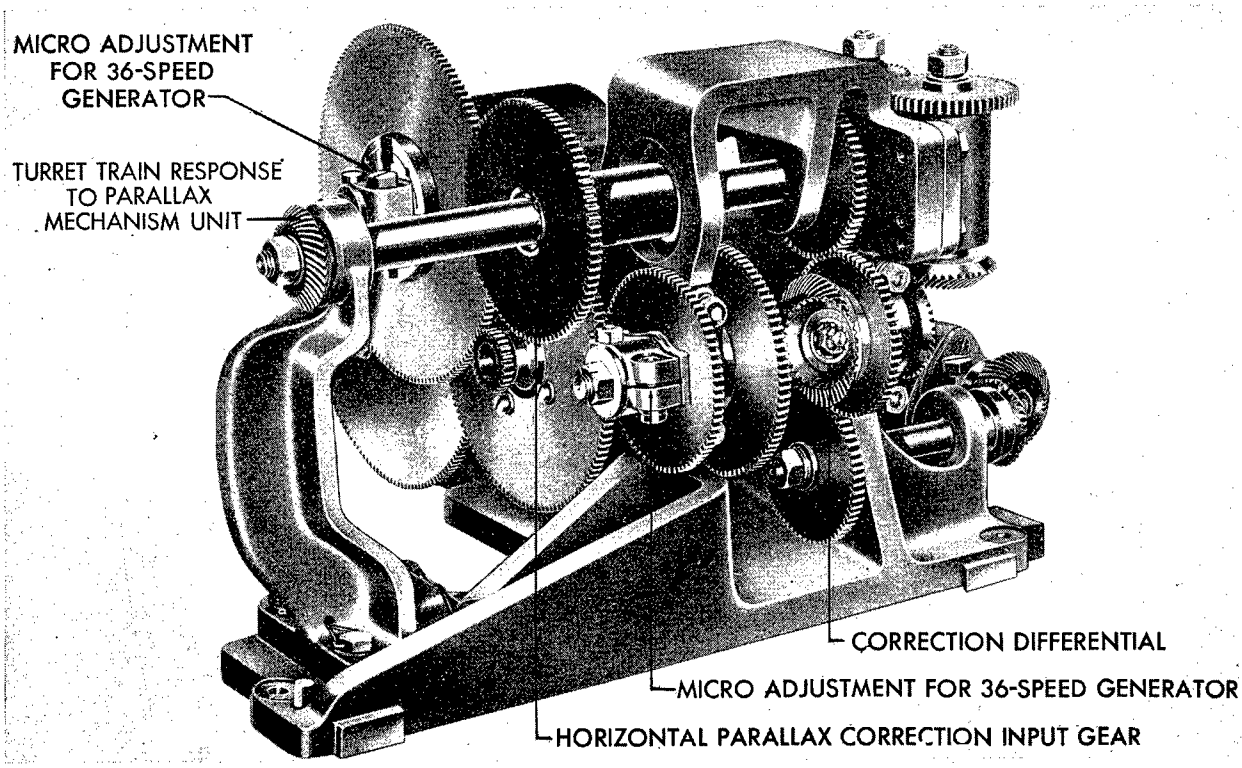


Figure 15. A component illustration in the series that shows the four components of the instrument. It identifies the parts of the component shown in figure 7.

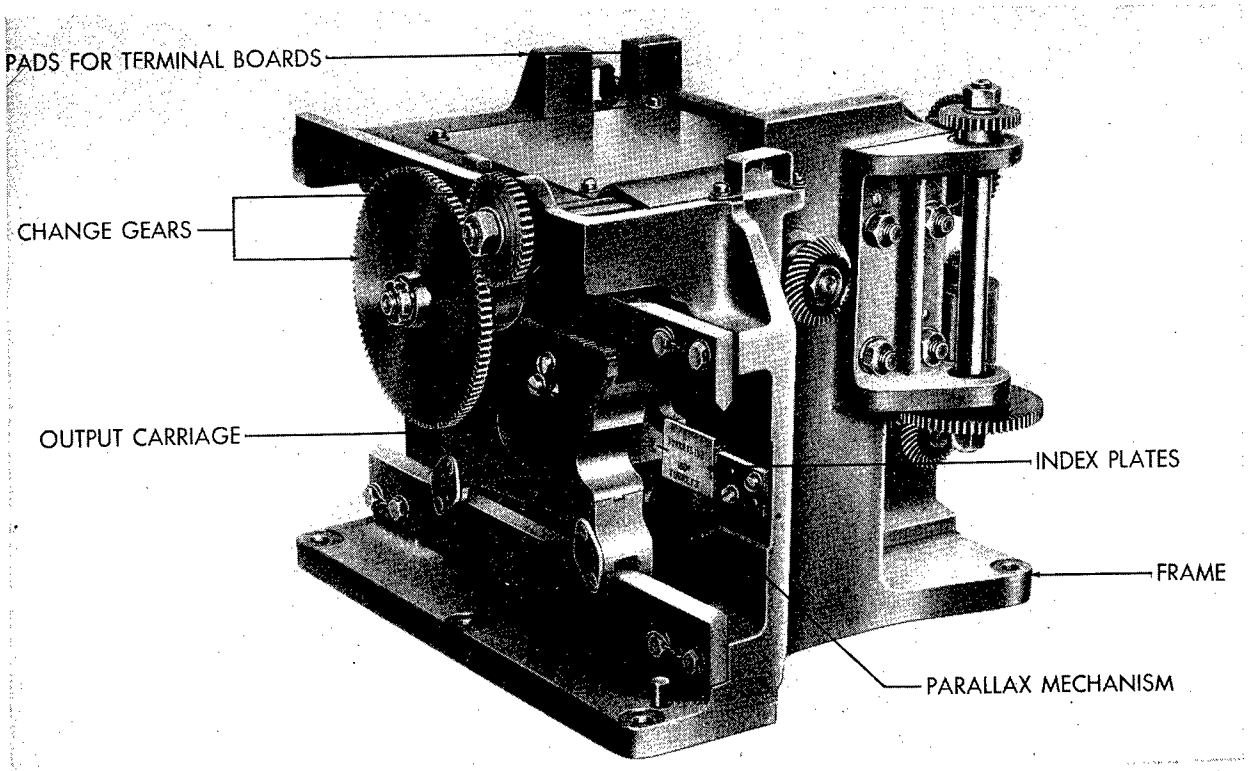


Figure 16. Figures 16 and 17 illustrate the parallax mechanism unit and complete the illustration of the four components of the instrument.

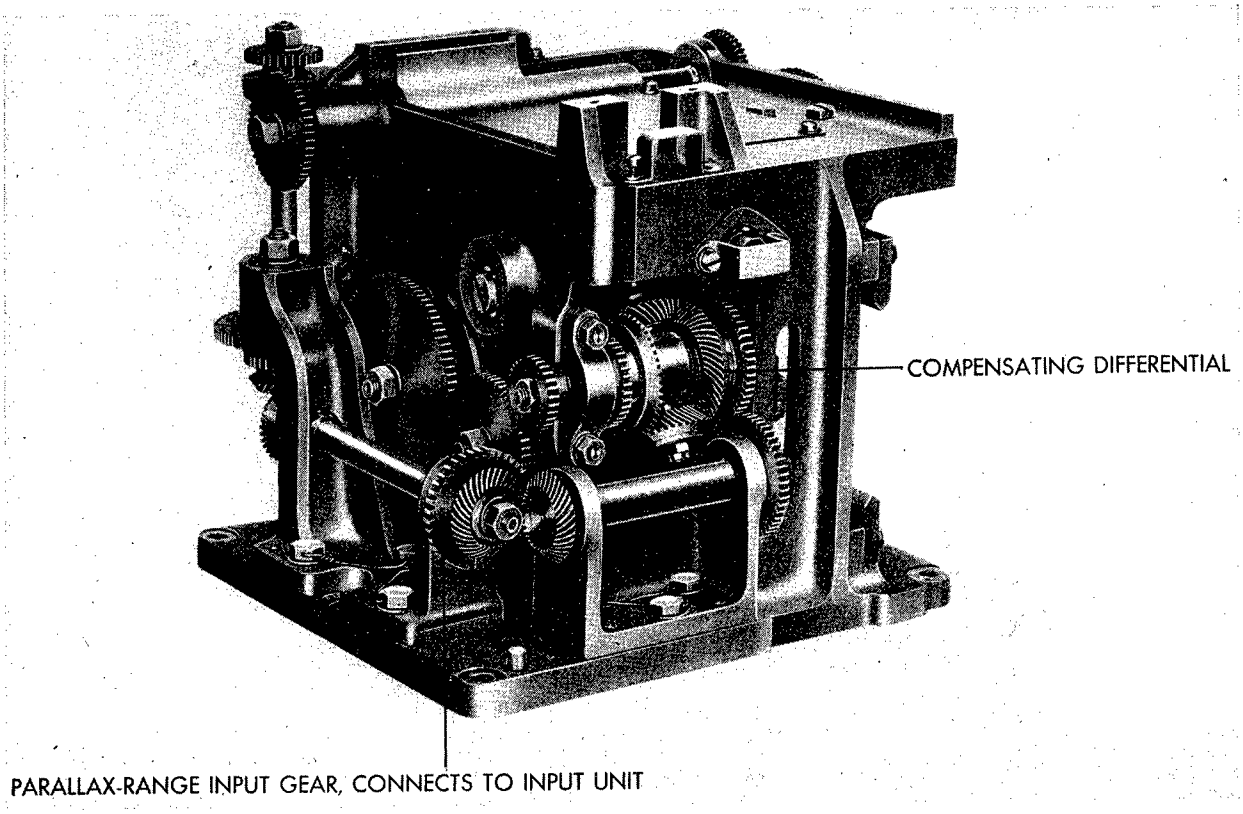


Figure 17.

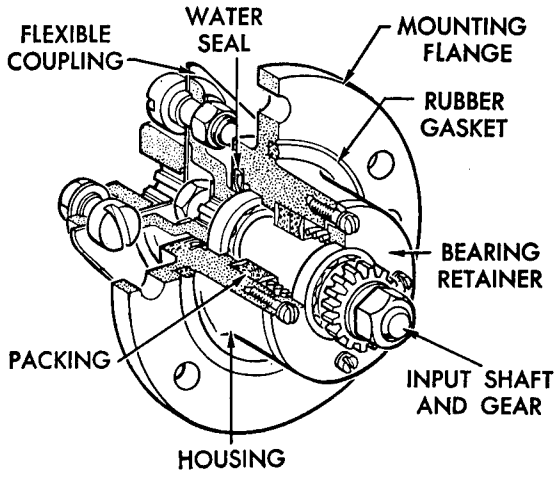


Figure 18. An arrangement detail illustration showing a cutaway view of the parallax range input unit.

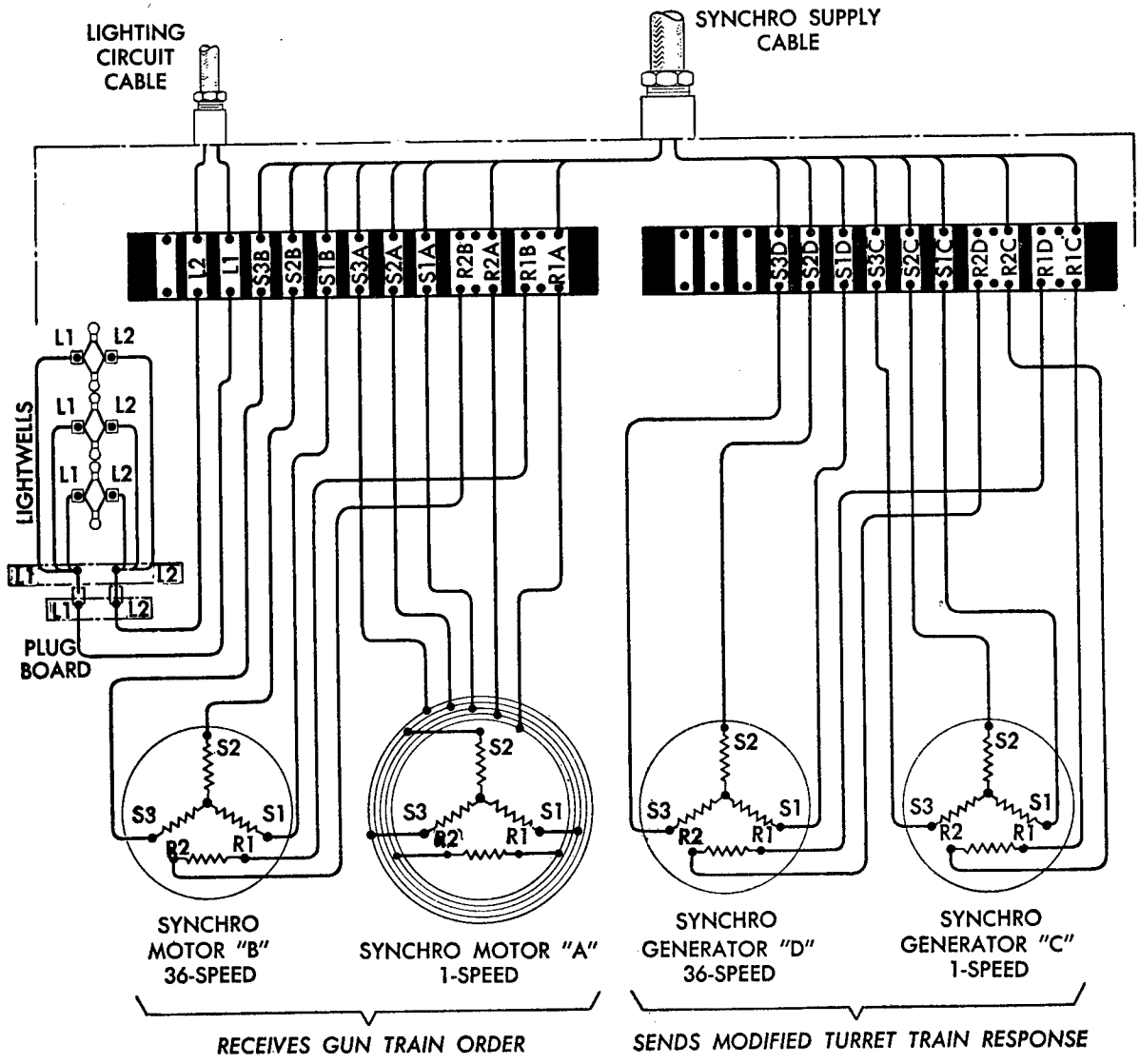


Figure 19. A subordinate illustration drawn as a schematic wiring diagram to show details of the dial-and-motor unit.

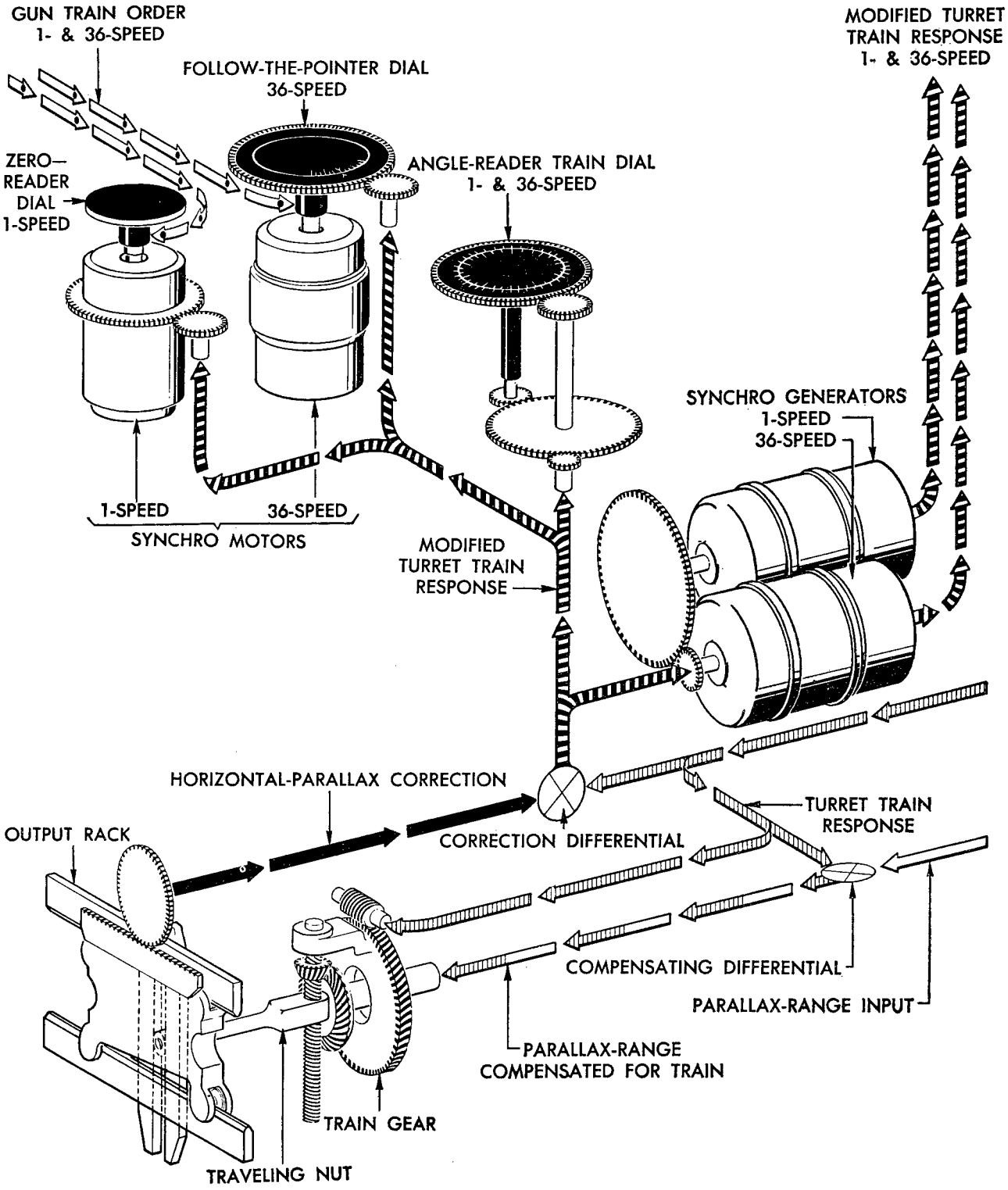


Figure 20. This is a functional flow diagram showing inputs and outputs of component parts. It illustrates the function of each component concerned in the functional description text.

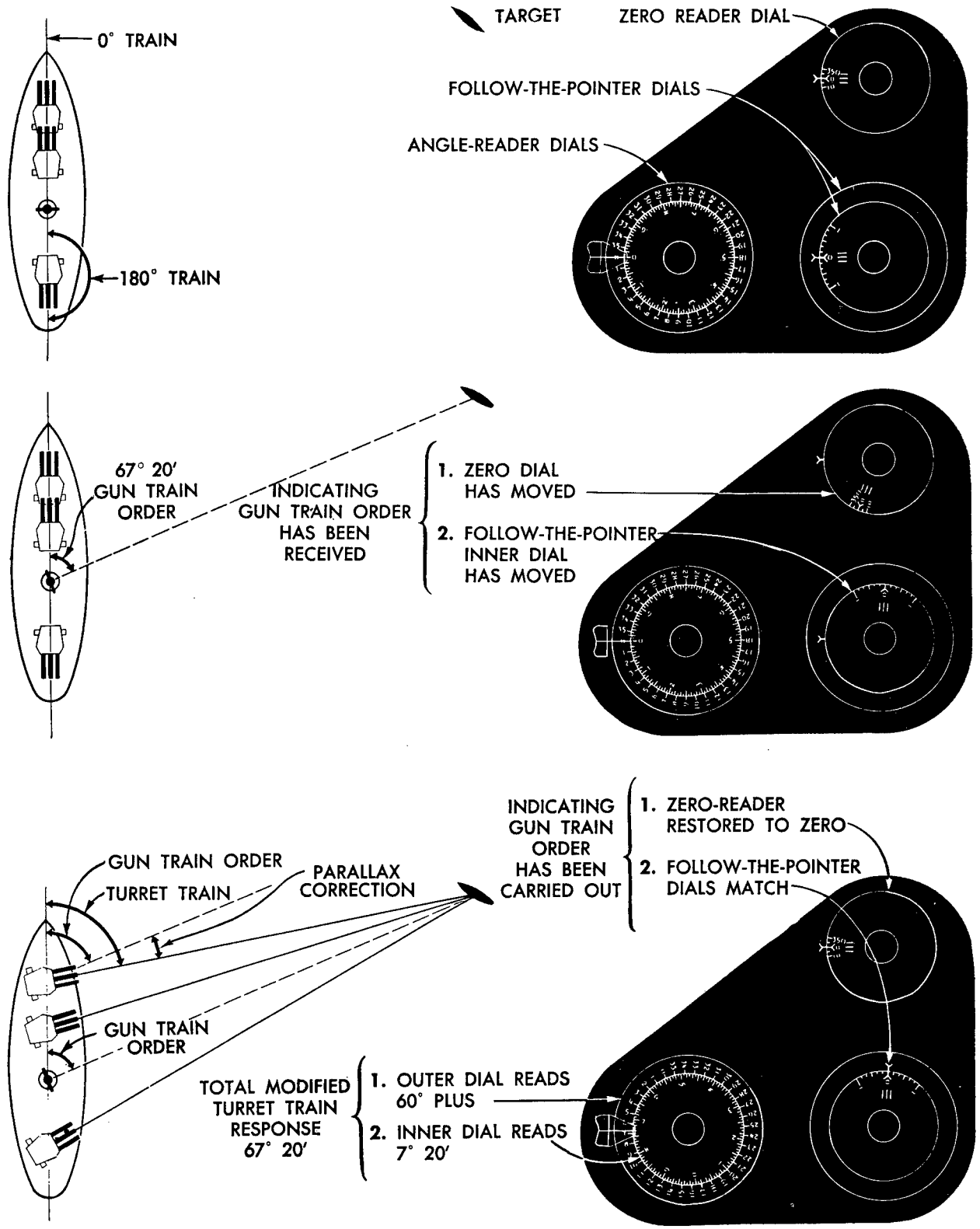


Figure 21. Operation illustrations—sequential action diagrams showing dial movements in response to orders, and resultant gun laying movement. In such sequential action pictures, the legends define the full story of operation.

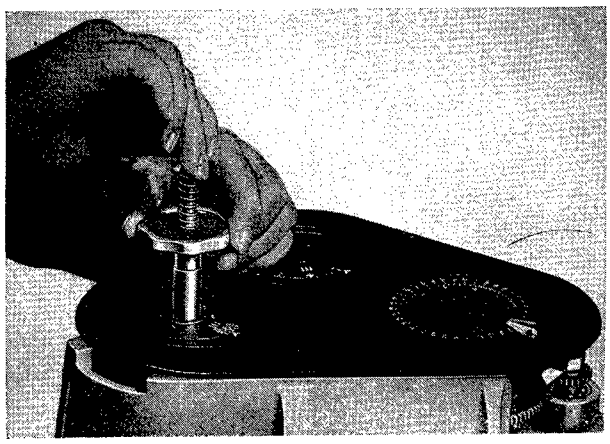


Figure 22.

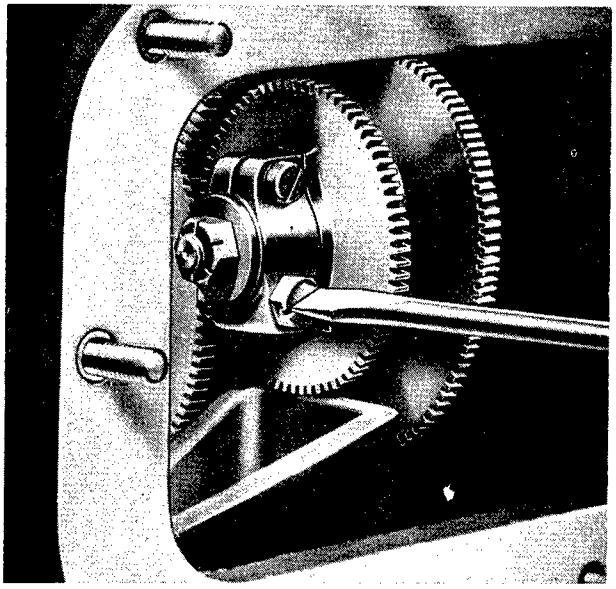


Figure 23.

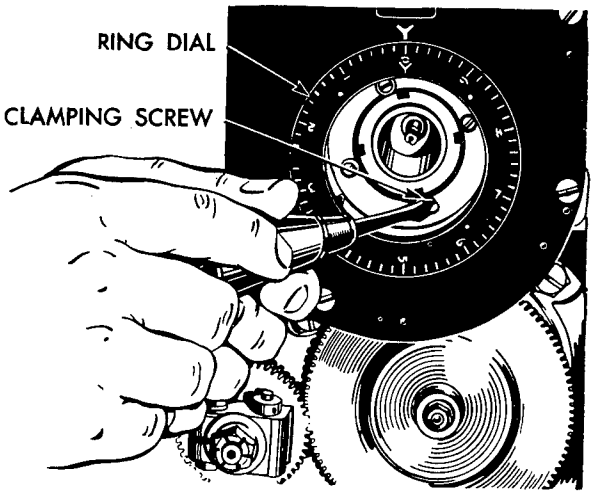


Figure 24.

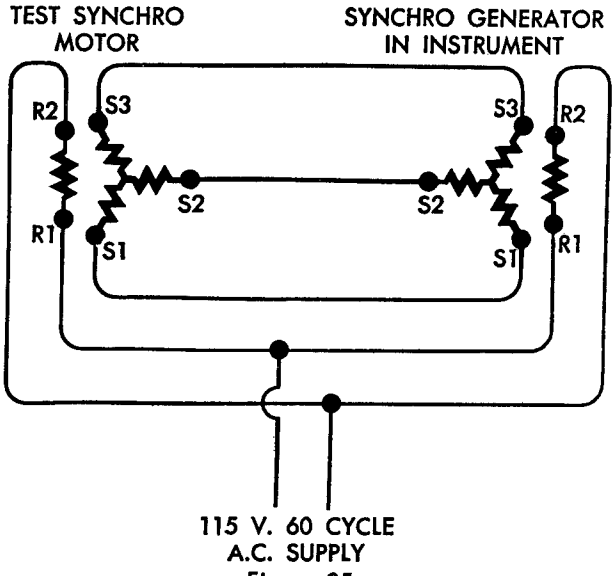


Figure 25.

Figures 22 to 24 are instruction illustrations showing adjustment. Figure 25 is a schematic wiring diagram for test purposes.

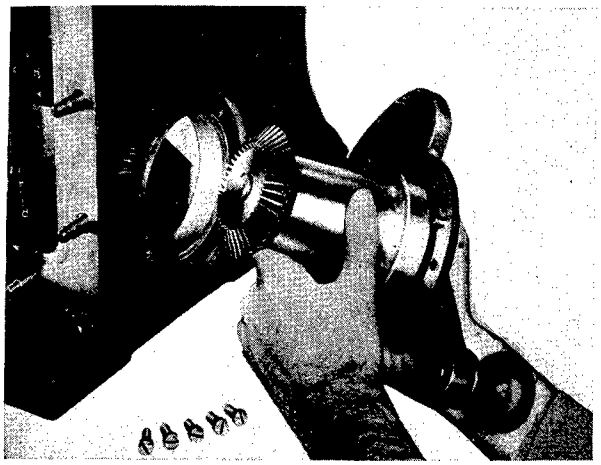


Figure 26. An instruction illustration to show the method of performing a difficult dismantling and reassembly operation.

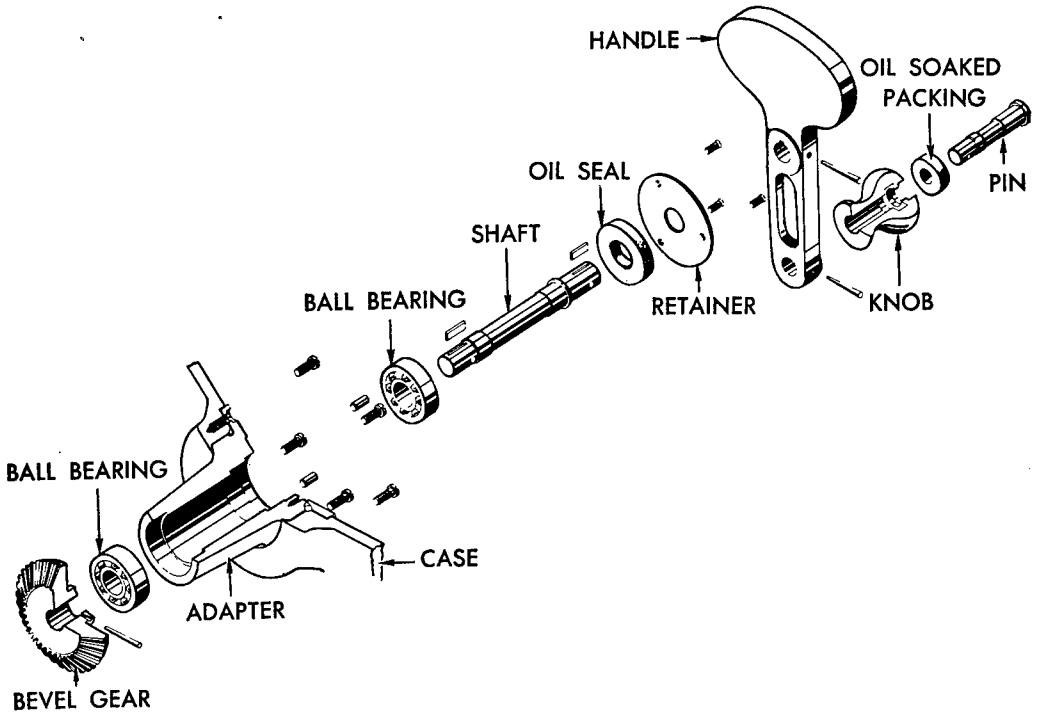


Figure 27. An instruction illustration showing a typical exploded view. The treatment may be used to identify parts and to show disassembly and reassembly.

ARRANGEMENT DETAILS OF COMPONENTS. In some instances, the text describing the parts comprising a subassembly requires subordinate pictures to show special features of the mechanism. They emphasize details or illustrate alternate positions of parts. See figures 15 through 19.

Operation illustrations. The operation text as defined on page 10 describes a full cycle of actions and, when pertinent, procedure for preparing for operation. The required series of illustrations indicates the sequence of actions as illustrated by figures 20 and 21. Functions of complex hydraulic mechanisms and electronic devices may be illustrated by schematic diagrams of the system in critical control positions as in figure 20. Actions of other devices such as machine gun mechanisms may be illustrated by simple outline drawings that indicate the positions of parts in sequence throughout the cycle.

Instruction illustrations. The instruction text varies with the design of the equipment. In most instances, it includes instructions in operation, maintenance, servicing, trouble shooting, adjustment, disassembly, and reassembly. Illustrations of each class of instructions may be of several types as shown in figures 22 through 28. They may be photographs of an assembled arrangement with instruction notes, outline drawings with dimensional data, line-drawing or photographic exploded views, or combinations of any of such types. However, all treatments have certain common objectives that require planning and development:

a. Each illustration must precisely illustrate the instruction.

b. Each illustration must be as simple in its treatment as possible. Shading, elaborate tone treatment, phantom treatment, and color effects are not suitable. They obscure the instruction.

c. Each illustration must show the parts to which the instruction applies and nothing more. Illustration of unrelated gear confuses the instruction.

d. Illustrations must not carry nomenclature other than that pertinent to the instruction.

Illustration consolidation. After the number and types of illustrations have been determined, plan their preparation with repeated use of basic illustration layouts wherever possible. Frequently a "master" photograph or line drawing in perspective can be the basis of several required illustrations. One layout may be copied and, in whole or in parts, treated in different ways. The use of a common point of view for as many illustrations as possible will result in the fewest man-hours in their preparation.

Requirements for artwork

Original artwork should be provided for all illustrations unless excepted by the Bureau. This permits the clearest possible reproduction, since illustrations lose in quality and detail with each step of reproduction or rephotographing.

Reproduction from a proof containing a halftone illustration is likely to produce a moire pattern in the final plate. This clouded appearance results from the reproduction of the halftone screen. If this type of material must be used, it should be rephotographed and the original screen eliminated by retouching.

Pencil drawings result in weak and faded reproductions, particularly when offset reproduction is used. Pencil should not be used for either halftone or line illustrations.

Figures. All illustrations in an OP are designated as "Figures" and are serially numbered throughout the OP. Figure numbers are Arabic numerals, set in type in accordance with type specifications.

Captions. Captions do not appear on artwork for illustrations, but are included in the manuscript. They are set in type in accordance with copy supplied with the manuscript.

Backgrounds. Backgrounds of all halftone illustrations—whether with or without nomenclature—shall be prepared in the full width of the illustration, without paste-overs, joining lines, or any type of blemish which would detract from the appearance of the finished cut if it were prepared by expedient means as a square halftone.

Black backgrounds are permissible, but usually not desirable. Black backgrounds are not used on colored illustrations. Colored backgrounds are not used unless they are essential to the clarity of the illustrations.

The vignette treatment is sometimes desirable for secondary or fragmentary illustrations. This background, with its broken edges and elimination of continuous outline, emphasizes the parts within so that they stand out in bold relief.

Borders. When desirable, border rules may be used on line drawings. Borders should not be used on artwork intended for halftone or combination cuts unless specifically needed to clarify illustrations.

Cropping. In the absence of borders, tick marks shall appear on all illustrations to indicate the corners for cropping.

Screens. Patterned or toned screens of the "Zip-O-Tone" type may be added to line drawings whenever toned areas are desired. This work should be done by the artist directly upon the artwork. In case such a procedure cannot be followed, the engraver may lay a mechanical, or "Ben Day," tone at the time the engraving is made. The area where the tone screen is desired should be indicated with a blue wash, and the screen or degree of tone desired should be plainly marked.

Bleeds. Bleed illustrations, which run beyond the margin of the text, are not used.

Size. Illustrations should be prepared, whenever possible, to a single size scale for reproduction. This saves time and expense in making plate negatives. The preparation of artwork in large, unwieldy sizes is neither necessary nor desirable. Artwork that is twice the printed size provides sufficient clarity for reproduction.

Illustrations should be carefully planned to suit the format of OP's. Normally illustrations should be planned for a width of either 19 or 39½ picas when printed. Large illustrations that require foldout pages should be avoided. By careful planning, such illustrations can be reduced in size or broken into smaller views for printing on facing or subsequent pages.

Be certain that reduced reproductions are uniform in detail in regard to arrow heads, nomenclature size, symbol size, weight of lines, cross-hatch spacing, etc. Lettering should be uniform throughout the OP; never smaller than 10-point.

The line weight on all line cuts should be

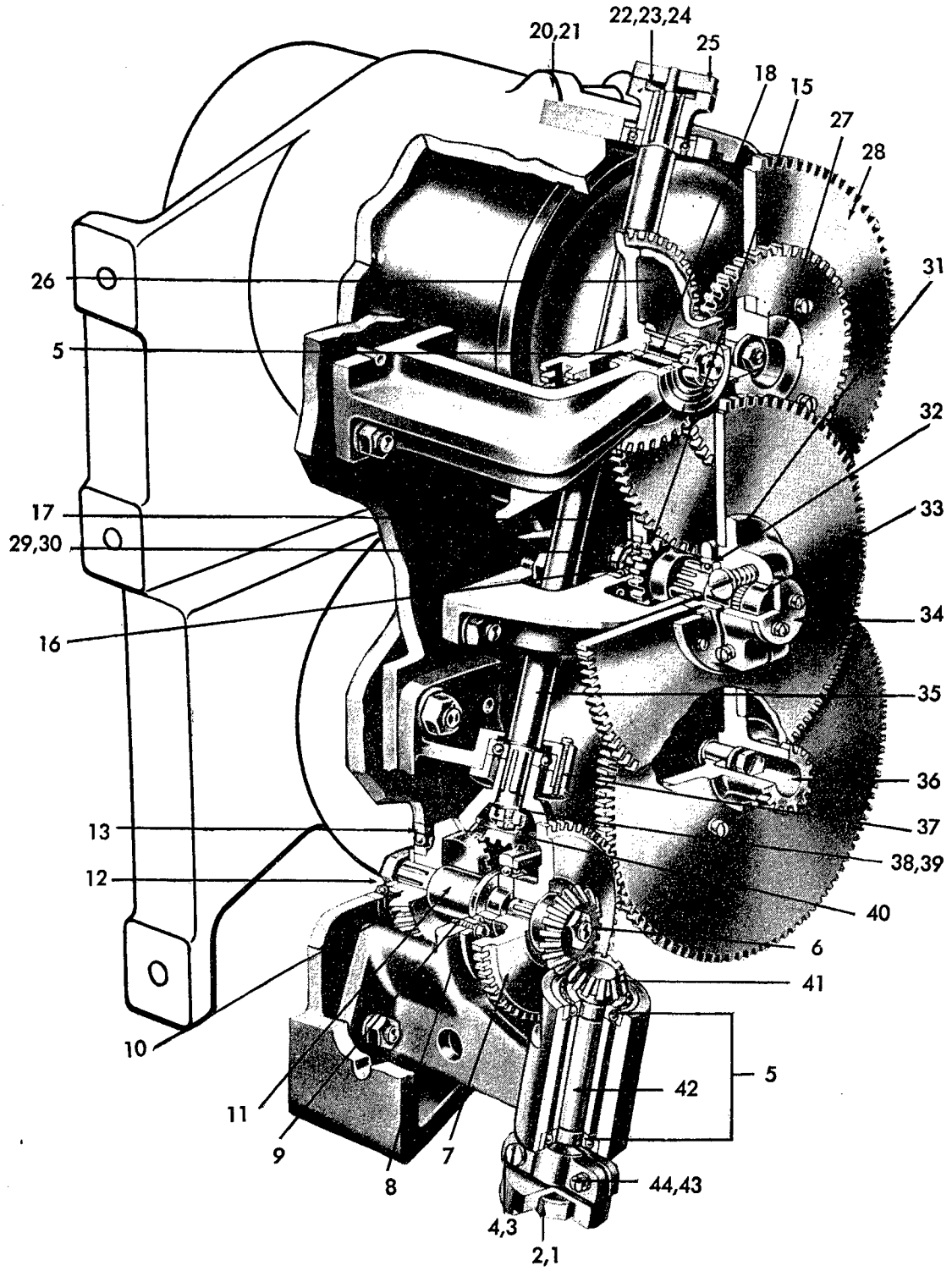


Figure 28. An illustration of parts arrangement and identity. Each interior functional group of parts should be shown by an illustration of this type, the parts being identified preferably by part names and piece numbers.

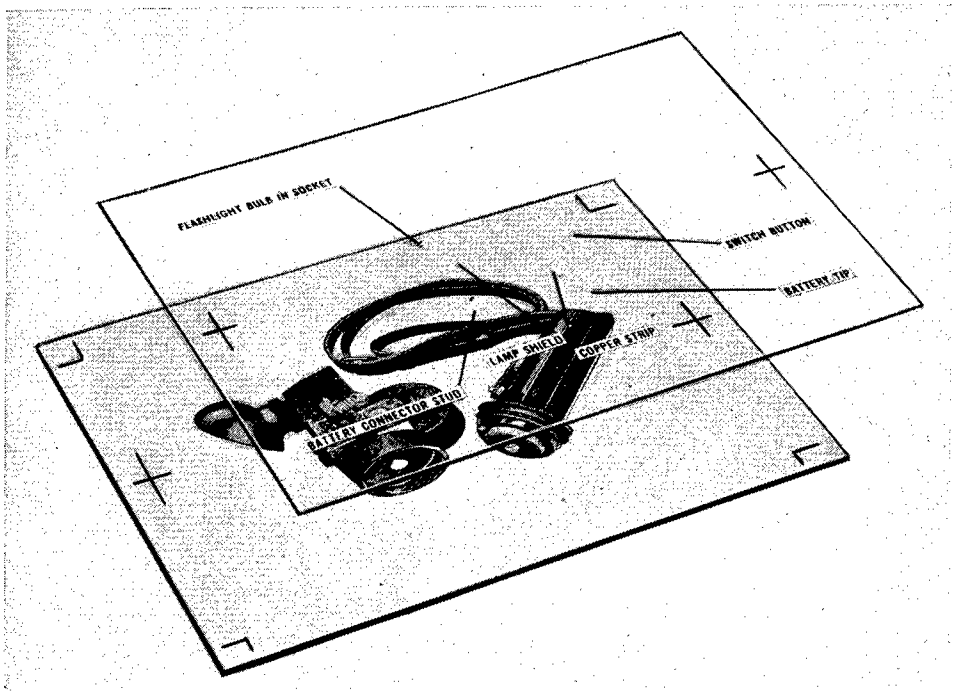


Figure 29. Preparation of an overlay.

heavy enough for effective presentation, consistent with the object shown. The minimum thickness of an object line is 0.006 inch and dimension line 0.003 inch when reduced to printed size. The minimum space between parallel lines should not be less than 1½ times the line weight used.

Mounting and protection. Illustrations should be mounted individually on binder's board, except illustrations made on heavy bristol or illustration board. They are furnished in the following sizes: 20 x 30 inches, 15 x 20 inches, or 10 x 15 inches. Each piece of artwork shall have a protective flap of kraft paper, and also an inner flap of tissue paper unless a color overlay is used. Changes requested by the Bureau are indicated on the tissue flap. Large line drawings may sometimes be more efficiently prepared on tracing cloth, in which case mounting, overlays, and flaps are not required.

Overlay for halftones. A transparent overlay should be prepared for all halftone illustrations on which nomenclature and arrows are used, as shown in figure 29. The nomenclature and arrows are indicated on the overlay. A protective coating (lacquer or other suitable substance) should be used over the parts of the overlay likely to be damaged by handling. Care should be taken that all arrows and guides point directly to the parts to which they refer. Register marks should appear both on the drawing and on the overlay. When the marks on the overlay appear directly over the marks on the drawing, the overlay and drawing are in register and thus the material on the overlay is in proper position.

Overlay for colored illustrations. Use a vellum or tissue overlay to show the outline of the colored areas. A suitable color guide, colored with crayon, to indicate the color separations to the printer, should always be prepared for all colored illustrations. As previously stated, color coding should be consistent throughout the OP.

Line cuts. Legends and guide lines for line cuts may appear directly on the original artwork.

Nomenclature. Index numbers on illustrations, with explaining legend under the drawing or photo, may be used only when an extremely large amount of nomenclature is required. Annotated illustrations which have the name of the part or assembly, with an arrow pointing it out, are preferred. Only nomencla-

ture pertinent to the accompanying text should be used.

Nomenclature leaders must not cross details of the illustrations parallel to crosshatch lines. They should not be parallel to the straight edges of illustrations.

Repeated illustrations. When artwork is repeated in the OP or is duplicated in other publications being printed at approximately the same time, glossy photographs of the artwork (suitable for reproduction) should be furnished.

Marking. Each piece of artwork bears in its margin and on the protective flap of kraft paper the following information for the guidance of the engraver and printer:

BUREAU OF ORDNANCE ORIGINAL

OP number
Figure number
Prepared by
Date prepared
Approved by
Illustration derived from
Finished size in picas
Colors used
Type of printing
Classification

Chapter 5

FORMAT

All Bureau of Ordnance publications are printed by the Publications Section of the Bureau. The standard format for an OP has been set up as illustrated by this OP and figures 30 through 37. The Publications Section of the Bureau is responsible for marking the manuscript for the printer.

OP arrangement

The separate elements of an OP are arranged as follows:

Cover
p. i—Title page
p. ii—Letter of Promulgation
p. iii—Contents
p. iv—First illustration
p. 1—Text begins (includes subjects outlined in Chapter 3)
Last p.—Distribution list

Very brief OP's. When it appears that the text of a preliminary or final OP may be printed in a few pages, the OP may be produced in the form of a four- or eight-page leaflet. In this event, the first page is the standard cover; the second contains the Letter of Promulgation; and the text begins on the third page and is followed directly by the distribution list.

Cover. Figure 32 illustrates the cover layout, with type sizes indicated. The date should be the same as that on the Letter of Promulgation. The cover is printed in black ink only. The cut of the seal is one inch in diameter and is furnished by the Bureau of Ordnance. The classification is printed on the cover of the OP as indicated.

Credit line. For OP's that are prepared by the manufacturers of the equipment, a credit line may be printed in 10-point * type enclosed by a one-point rule on the title page or on the back of the title page in the following manner:

> Prepared for the Bureau of Ordnance by
> Manufacturing Company
> Chicago, Illinois

Title page. Figure 33 illustrates the title page. It is similar to the cover but not identical to it. The classification of the OP appears again on the title page. The date shall be the same as that on the Letter of Promulgation.

Letter of Promulgation. Figures 30 and 31 are samples for the preparation of the Letter of Promulgation, which is the first numbered page of each OP. Figure 31 specifies requirements for the Letter of Promulgation for a preliminary OP. The Letter of Promulgation shall be submitted for the signature of the Chief of the Bureau at the time the artwork and manuscript are submitted for final approval. The letterhead and signature are reproduced as line cuts.

Contents. The Table of Contents includes all chapter headings and often the primary side heads as they appear in the manuscript. Double columns are generally used.

Typography and page layout

Layout of text pages. The type page is 39½ picas wide and 54 picas deep, exclusive of folio. A space of two picas at the top of each page is provided for the running head and the overrule. This leaves a space of 39½ by 52 picas for text and/or illustrations. Columns are 19 picas wide, with a center margin of 1½ picas between columns.

* Twelve points equal one pica. Six picas equal one inch.

NAVY DEPARTMENT

BUREAU OF ORDNANCE

WASHINGTON 25, D. C.

CLASSIFICATION 21 January 1946

ORDNANCE PAMPHLET 000

GUN SIGHT MARK 00 MOD 0—PARTS CATALOG

1. The first paragraph should contain a brief description of the purpose of the pamphlet, the equipment to which it applies, and related equipment.

2. The second paragraph may contain further instructions and special precautions which apply to the use of this pamphlet. Reports of errors, corrections, or other suggestions may be invited when appropriate in this paragraph.

3. The third paragraph should list publications superseded and applicable references. If no publications are superseded, the statement "This pamphlet does not supersede any existing publication" shall be made. Directions concerning the disposition of the superseded publications should be stated.

4. For applicable publications, the following will become paragraph 4: "It is not intended that this publication be carried in aircraft for use therein."

5. The last paragraph should contain instructions for the handling of this publication. For nonclassified OP's, this paragraph should be omitted. For classified OP's, the following statement should be made: "This publication is (CLASSIFICATION) and shall be safeguarded in accordance with the security provisions of U. S. Navy Regulations, 1920, Article 76."

[Signature]

G. F. HUSSEY, JR.
Vice Admiral, U. S. Navy
Chief of the Bureau of Ordnance

Figure 30. Letter of Promulgation.

NAVY DEPARTMENT

BUREAU OF ORDNANCE

WASHINGTON 25, D. C.

CLASSIFICATION 21 January 1946

ORDNANCE PAMPHLET 000 (PRELIMINARY)

GUN SIGHT MARK 00 MOD 0—PARTS CATALOG

1. The first paragraph should contain a brief description of the purpose of the pamphlet, the equipment to which it applies, and related equipment.

2. The second paragraph may contain further instructions and special precautions which apply to the use of this pamphlet. Reports of errors, corrections, or other suggestions may be invited when appropriate in this paragraph.

3. Preliminary OP's will contain the following statement in the third paragraph: "Because of the urgent need for this information, it has been issued in preliminary form. This pamphlet will be revised and issued in complete, final form as soon as practicable."

4. The fourth paragraph should list publications superseded and applicable references. If no publications are superseded, the statement "This pamphlet does not supersede any existing publication" shall be made. Directions concerning the disposition of the superseded publications should be stated.

5. For applicable publications, the following will become paragraph 5: "It is not intended that this publication be carried in aircraft for use therein."

6. The last paragraph should contain instructions for the handling of this publication. For nonclassified OP's, this paragraph should be omitted. For classified OP's, the following statement should be made: "This publication is (CLASSIFICATION) and shall be safeguarded in accordance with the security provisions of U. S. Navy Regulations, 1920, Article 76."

[Signature]

G. F. HUSSEY, JR.
Vice Admiral, U. S. Navy
Chief of the Bureau of Ordnance

Figure 31. Letter of Promulgation for Preliminary OP.

24–pt.

RESTRICTED

24–pt.

OP 000

(FIRST REVISION)

2–pt. face rule
(39½ picas)

18–pt.

24–pt.
or 36–pt.

ROCKET LAUNCHER

MARK 0 MOD 0

18–pt.

PARTS CATALOG

2–pt. face rule

A BUREAU OF ORDNANCE PUBLICATION

00 MONTH YEAR

18–pt.

Figure 32. Cover.

As an occasional variation in layout, where judgment dictates a single wider column, the width may be increased.

All spacing and other details of textual layout shall be planned with a view toward economy and keeping the size of the OP to a minimum without sacrificing legibility.

The following table indicates the type faces which are used in OP's.

Use	Type size and face
Text, regular; and table of contents	10–pt. Modern, leaded two points
Text, emphatic; and box heads (Replaces italics)	10–pt. bold of text, leaded two points. Underscore in manuscript with red.
Chapter heads.....	14–pt. Vogue Bold or similar caps or caps and lower case as indicated
Fixed and running heads; also section heads	12–pt. Vogue Bold or similar caps
Primary side heads..... (Always separate lines)	12–pt. Vogue Bold or similar caps and lower case. Underscore in manuscript with blue.
*Secondary side heads...	10–pt. bold of text. Underscore in manuscript with red.
*Alternate style for secondary side heads and other special uses	Caps and small caps of text (10–pt. Modern). Underscore in manuscript with green.
Figure captions. When figure captions are lengthy, the use of the text face is prescribed for the explantory portion, with only the figure title in Vogue Bold or similar italics.	10–pt. Vogue Bold or similar italics, caps and lower case
Footnotes	8–pt. of text, leaded two points
Formulas	Italics of text (10–pt. Modern). Underscore in manuscript with black.
Nomenclature	When nomenclature is not set in type, a Leroy template 140 with No. 1 pen may be used for 2 to 1 reduction.

Overrule. On the top of each page, 4½ picas below the top trim edge of the page, a one-point face overrule, extending the width of the type page, will, with occasional exceptions, be used on pages from the Contents through the page preceding the distribution list. It is omitted from pages on which a new chapter begins; the chapter head, centered above the text, furnishes sufficient display.

Fixed head. The title of the OP (which may be an abbreviated or short title) and the OP number appear above the rule on each left-hand page of text, unless the page begins a new chapter.

Running heads. Running heads are used above the rule on right-hand pages other than those on which new chapters begin. Normally the running head is an abbreviated chapter head. In very brief OP's, in which there is no breakdown into formal chapters, the running head indicates the principal subject matter of the page.

Page numbers. Title pages will be unnumbered. The back of the title page and any other pages preceding page 1 of chapter 1 will be unnumbered unless they exceed 3, in which case they will be numbered consecutively, beginning with the back of the title page (normally reserved for the Letter of Promulgation) as page ii, using Roman numerals. Pages of the text shall be numbered consecutively, beginning with the first page of chapter 1, using Arabic numerals.

The page numbers are set at the outer margin of the type page, below the text. Odd numbers shall always appear on the right-hand pages.

Classification. The classification of the OP appears on each page in line with the page number and in the same type size and face with the number. Nonclassified OP's do not require this marking.

Chapters. Each chapter preferably begins a new page.

Index markers. Index markers are not considered necessary in OP's.

Illustrations. Illustrations are located as nearly adjacent to the related text as practicable. Figure numbers are indicated, using Arabic numerals.

Distribution list. Each OP contains, on the last page, a list of the activities to which the OP is initially distributed. The distribution list

* The use of these faces shall be limited to bulky and/or complicated pamphlets which require additional headings or other special uses. The number of sizes and faces of type used in an OP should be kept to a minimum consistent with clear organization, logical division, and proper emphasis of the text.

CLASSIFICATION. The classification of Ordnance publications appears twice on front and back covers and all imprinted pages as described below and shown on front and back of this sheet. Although the classification shown in the illustrations is RESTRICTED, these examples are not of a classified nature.

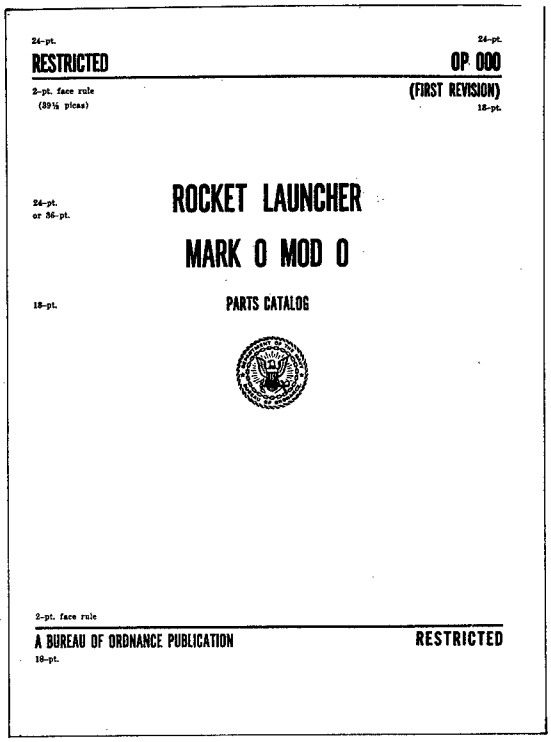
Front cover - 1. Retain CLASSIFICATION at top, flush left, as at present. 2. Add CLASSIFICATION at bottom, flush right, replacing publication date which will not appear on cover.

Back cover - 1. Omit CLASSIFICATION from vertical backbone copy. 2. Add CLASSIFICATION flush left on back cover, 3 picas from top and 3 picas from bottom.

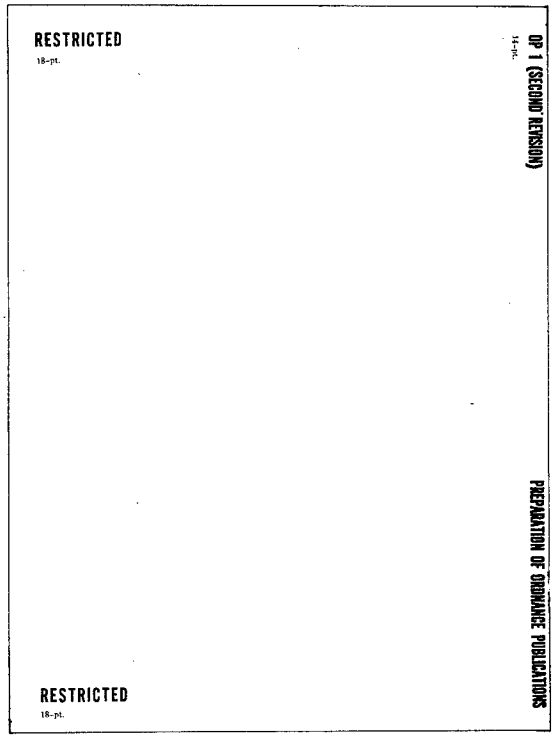
Title page - 1. Retain CLASSIFICATION at top, flush left, as at present. 2. Add CLASSIFICATION at bottom, flush right, replacing "This publication . . . Article 76" which will not appear on the title page. 3. Move date of publication from under BuOrd seal to bottom of page flush left opposite CLASSIFICATION.

Text pages - all imprinted text pages including letter of promulgation: 1. Omit CLASSIFICATION from bottom center of pages. 2. Add CLASSIFICATION to both top and bottom of every imprinted page, flush inside of page to align at top of page with running head, or sink 3 picas from top if page does not have a running head, and to align at bottom of page with folio. 3. Blank pages are not to be imprinted with CLASSIFICATION. 4. Note that the last paragraph of the letter of promulgation has been changed to read: "This publication is (CLASSIFICATION) and shall be safeguarded in accordance with the security provisions of U. S. Navy Regulations. It is forbidden to make extracts from or to copy this classified document without specific approval of the Chief of Naval Operations or originator, as applicable, except as provided for in article 9-10 of the United States Navy Security Manual for Classified Matter".

NOTE: Non-classified publications do not require this CLASSIFICATION identification. Non-classified publications, intended for official use only, should have that statement printed at the top of the front cover only, where the CLASSIFICATION would appear on classified publications. This statement should read: "FOR OFFICIAL USE ONLY"



(Front cover)



(Back cover and backbone)

24-pt.

RESTRICTED

2-pt. face rule (39½ picas)

24-pt.

OP 000

(FIRST REVISION)

18-pt.

24-pt. or 36-pt.

ROCKET LAUNCHER MARK 0 MOD 0

18-pt.

PARTS CATALOG

2-pt. face rule (39½ picas)

00 MONTH YEAR

RESTRICTED

18-pt.

(Title page)

RESTRICTED

NAVY DEPARTMENT
BUREAU OF ORDNANCE
WASHINGTON 25, D. C.

21 January 1946

ORDNANCE PAMPHLET 000

GUN SIGHT MARK 00 MOD 0—PARTS CATALOG

1. The first paragraph should contain a brief description of the purpose of the pamphlet, the equipment to which it applies, and related equipment.

2. The second paragraph may contain further instructions and special precautions which apply to the use of this pamphlet. Reports of errors, corrections, or other suggestions may be invited when appropriate in this paragraph.

3. The third paragraph should list publications superseded and applicable references. If no publications are superseded, the statement "This pamphlet does not supersede any existing publication" shall be made. Directions concerning the disposition of the superseded publications should be stated.

4. For applicable publications, the following will become paragraph 4: "It is not intended that this publication be carried in aircraft for use therein."

5. The last paragraph should contain instructions for the handling of this publication. For nonclassified OP's, this paragraph should be omitted. For classified OP's, the following statement should be made: "This publication is (CLASSIFICATION) and shall be safeguarded in accordance with the security provisions of U. S. Navy Regulations. **It is forbidden to make extracts from or to copy this classified document without specific approval of the Chief of Naval Operations or originator, as applicable, except as provided for in article 9-10 of the United States Navy Security Manual for Classified Matter."**

[Signature]

A. G. NOBLE
Rear Admiral, U. S. Navy
Chief of the Bureau of Ordnance

RESTRICTED 39

(Letter of promulgation. Style for pages beginning new chapter. table of contents, list of illustrations, distribution list, etc.)

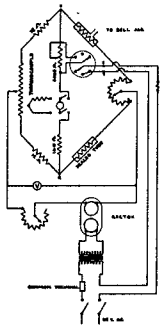


Figure 61—DPI Pirani Circuit

and since the temperature of the wire will be less than when sealed, its resistance will be less. The precision wound resistors being equal, the difference in the resistances of the open pressure indicating and the sealed compensating filaments will result in an unbalanced bridge circuit. The consequential current flowing through the 0–200 micrommeter (graduated in pressure units), will be proportional to the difference in resistance of the two tubes. If the pressure indicating tube is connected to a system in which the pressure is being reduced, the resistance of the indicating filament will increase proportionately, because of the reduced heat conductivity around the filament. As the pressure in the system is reduced, the resistance of the indicating filament will approach that of the compensating filament, the bridge will approach a condition of balance, and the current flowing through the microammeter will be reduced. Thus, the amount of current flowing through the microammeter will be proportional to the pressure, and the smaller the current, the better the vacuum. The pressure in microns corresponding to the current in microamperes is shown by fig. 62. In operation, however, it is unnecessary to refer to this calibration curve, because the microammeter has been graduated directly in units of pressure. A double scale range is provided; one range being from 0 to 0.75 mm (750 microns), and the other from 0 to 20 microns. When the pressure in the system has been reduced below 0.02 mm (20 microns), the full sensitivity of the microammeter can be used by turning the Sensitivity Selector Switch (marked **off-mm-micron**) to the micron position. This shunts out the 4,000-ohm (5,000-ohm in some circuits) adjustable resistor in series with the microammeter.

Forepressure Tubes

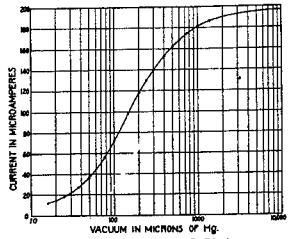
7.15 Optics Filming Units Mks 5 and 6 are equipped with two sets of Pirani filament tubes. One pair is used to measure the bell jar pressure and the other to measure the forepressure. The electrical circuit has been provided with a selector switch by means of which either pair of Pirani tubes can be connected into the bridge circuits (fig. 63).

Leak Detector Device

7.16 Several of the Mk 5 units are equipped with a leak detector device. This device merely consists of a switch and a six-ohm potentiometer in series with the pressure indicating filament. The purpose of this arrangement is to permit the use of the full sensitivity of the microammeter for leak detection work when the pressure in the vacuum system is not low enough to permit normal switching to the micron scale. In the OFF position of the switch, the six-ohm potentiometer is shorted so that in effect it is out of the circuit. In the ON position, the potentiometer can be adjusted so as to add sufficient resistance to the pressure indicating arm of the bridge to approach a balanced circuit. Less current will then flow through the microammeter so it can be switched to the micron scale. Thus, small changes in pressure will cause a greater deflection of the meter needle than would occur if the millimeter scale were used. It must be remembered, however, that when the leak detector device is ON, the

60 RESTRICTED

(Left hand text or illustration page)



PIRANI GAUGE, TYPE PG-1
CURRENT vs. VACUUM
VOLTAGE: 3 VOLTS PER TUBE

Figure 62—Calibration Curve, DPI Pirani Gauge

meter readings do not represent the actual pressure in the system and such reading must not be used in the normal operation of the Optics Filming Unit. The filament of the ionization gauge is wired into the switch so that the ionization gauge can not be operated if the leak detector switch is left in the ON position unintentionally.

Calibration—DPI Pirani Gauge

7.17 The general calibration procedure for the DPI Pirani gauge is similar to that of the other two intermediate range gauges discussed herein, but the calibration adjustment of the electrical circuit is quite different. In this gauge, a constant voltage is applied to the bridge circuit, and the resistance arms are adjusted so that at pressures below one micron the bridge will be in balance. The procedure is as follows:

(1) With the Sensitivity Selector Switch (marked **off-mm-micron**) in the OFF position, check the zero settings of the pressure microammeter and the 0–5 voltmeter. If the meter needles do not rest at zero, adjustment can be made by means of the screw on the front of the meters at the base of the meter needle.

(2) Turn the Sensitivity Selector Switch to the millimeter (mm) position.

(3) Adjust the "Pirani Voltage" potentiometer so that the 0–5 voltmeter reads 3 volts.

(4) Rotate the bell jar-forepressure switch to the bell jar position.

(5) Secure the vacuum system and start the mechanical pump.

(6) When the pressure is reduced to 100 microns or below, turn on the diffusion pump.

(7) If after sufficient pumping time has elapsed the Pirani gauge shows a constant reading of two or three microns, it is quite possible that the pressure is actually below one micron and can be checked with the ionization gauge.

(8) On the other hand if the reading is above four or five microns, a leak rate test should be made. See paragraph 10.11.

(9) If the leak rate test indicates that the pressure was probably below one micron, then the pressure may be checked with the ionization gauge.

(10) When the ionization gauge shows that the pressure is below 1×10^{-4} mm of Hg. (0.1 micron) the reading of the Pirani gauge should be adjusted to read zero by means of the 1.5-ohm

RESTRICTED 61

(Right hand text or illustration page)

24–pt.

RESTRICTED

2–pt. face rule
(39½ picas)

24–pt.

OP 000

(FIRST REVISION)

18–pt.

24–pt.
or 36–pt.

ROCKET LAUNCHER

MARK 0 MOD 0

18–pt.

PARTS CATALOG

18–pt.

00 MONTH YEAR

2–pt. face rule
(39½ picas)

12–pt.

Figure 33. Title page.

is furnished by the Bureau of Ordnance at the time the manuscript is submitted for final approval. As a matter of economy, the distribution list may, if necessary, be printed on the inside of the back cover. In any case, the distribution page omits the rule and fixed or running head.

Printing and binding

Printing process used. The printing process to be used is determined by the Bureau of Ordnance, Publications Section.

Reproducible materials. To provide for eventual reprinting, reproducible materials are filed. These consist of a complete set of negatives if the job is offset. If printing is by letterpress, the reproducible materials consist of reproduction proofs of text and glossy unscreened prints or negatives of illustrations. In some cases, where electros have been made, plates may be required.

Reproducible materials should be sent to: The Superintendent, U. S. Naval Gun Factory, Washington 25, D. C. (Attn: Section 8) unless otherwise directed. Material packed is so identified and arranged that individual pieces may be readily located.

Page size. OP's are produced in Navy Department standard size, 7⅞ x 10¼ inches.

Soft fold. Occasionally pamphlets that would require a large number of foldouts can be produced as a stitched pamphlet approximately twice the normal pamphlet size and given a soft fold. OP 1164 is an example of this variation in format.

Foldouts. Foldouts should be avoided. Large illustrations should be broken so that they may be printed on facing pages. (See Fig. 3.) If the illustrations cannot be reduced to page size or printed on facing pages and foldouts are required, they should be grouped in one place, preferably at the end of the pamphlet.

Covers. Covers are grey, tan, or blue flexible tagboard, uncoated bristol, or equivalent stock that will withstand wear and service. It is approximately 150-pound substance. Leatherette or fabricoid covers are generally considered unnecessary; they may be used, however, upon special approval of the Bureau. The title, classification, and OP number are printed on the backbone of sewed or loose-leaf pamphlets. OP's without a backbone carry this information on the back cover in display type, reading from top to bottom, positioned so that it may be easily read when filed in a standard file cabinet.

Binding. Generally a saddle-wire stitch with two staples is used for OP's with 96 pages or less. Other OP's have a sewed binding. All sewed OP's carry a reinforcing sheet in both the front and the back of the OP, glued to the inside of the cover and to part of another sheet which is sewed into a signature. Loose-leaf binding is not recommended.

The binding sometimes used for OP's is "saddle wire loose-leaf." A saddle stitched OP is punched with three ¼-inch holes 4¼ inches center to center to fit standard binders available at fleet and field activities. This format results in a sturdy OP that can be used with or without a binder.

Security precautions. Security precautions followed in preparing and printing ordnance publications are in accordance with SECURITY MEASURES FOR THE PROTECTION OF CLASSIFIED PRINTED MATTER DURING PRODUCTION (NAVEXOS P–29).

Chapter 6

BUREAU OF ORDNANCE MANUAL

The Bureau of Ordnance Manual is issued under the authority of the Secretary of the Navy, has full force and effect of Navy Regulations, and is issued to provide uniform procedures insuring accurate and expeditious performance of work under the cognizance of the Bureau. Information that amends, supplements, or in other ways permanently changes the Manual, is issued as a change on the Publications Change Form (NAVORD FORM 545). Field and fleet activities thus are able to find in a single publication the administrative and technical instructions necessary for a clear understanding of the requirements and work of the Bureau.

Preparation and approval

Manuscript for the Bureau of Ordnance Manual is prepared on white bond paper in duplicate. It is typed, double spaced, and submitted together with NAVORD FORM 356 for the approval of the Chief of the Bureau. It is then forwarded for the approval of cognizant Bureaus, and ultimate approval of the Secretary of the Navy by signature on the Letter of Promulgation, in accordance with the provisions of U. S. Navy Regulations.

Printing and binding

The Bureau of Ordnance Manual is printed on pages 5⅞ x 9⅛ inches, with three T punches 3½ inches center to center. These pages fit into a loose-leaf ½-inch strap binder furnished by the Bureau of Ordnance.

Changes

Changes to the Bureau of Ordnance Manual are prepared on NAVORD FORM 545 and submitted together with NAVORD FORM 356 for the signature and approval of the Chief of the Bureau of Ordnance. NAVORD OCL's or other publications are not used for issuance of changes to the Manual. When time permits, the change is typeset and printed to conform to the format of the Manual. If speed is essential, the typewritten change form may be photographed and printed by the offset process in a size which will conform to the size of the Manual.

Chapter 7

ORDNANCE CIRCULAR LETTERS

NAVORD OCL's are issued over the signature of the Chief of the Bureau to announce Bureau policy matters of general interest which, because of their temporary nature, are not suitable for inclusion in the Bureau of Ordnance Manual. The contents of NAVORD OCL's are limited to such policy matters. NAVORD OCL's do not contain information which may be issued in other ordnance publications. Letters issued jointly by the Chief of the Bureau of Ordnance and another bureau are normally issued as circular letters.

Preparation and approval

NAVORD OCL's are prepared and issued by the Bureau of Ordnance; in some exceptional instances appropriate Naval activities may be requested by the Bureau to prepare NAVORD OCL's, which shall be forwarded for the approval and signature of the Chief of the Bureau of Ordnance.

Identification

NAVORD OCL's are divided into nine series, according to subject matter. They are serially numbered within each classification, each calendar year (NAVORD OCL X1–46). NAVORD OCL numbers and classification symbols are assigned by the Bureau of Ordnance, Publications Section.

A—Ammunition and Pyrotechnics
C—Chemical Warfare Equipment
F—Fire Control and Optical Equipment
G—Guns and Mounts
M—Mines and Depth Charges
N—Nets and Booms
T—Torpedoes and Torpedo Tubes
V—Aviation Ordnance Equipment
X—Miscellaneous material not covered by the above

NAVORD OCL's containing information for both aviation personnel and ordnance station personnel are indicated by the normal classification symbol first, then the aviation symbol (NAVORD OCL AV4–46).

Classification

NAVORD OCL's may bear any appropriate classification.

Distribution

NAVORD OCL's are distributed by the Ordnance Publications Distribution Center, U. S. Naval Gun Factory, Washington 25, D. C. A list of the activities to which it is distributed appears at the end of each NAVORD OCL.

Preparation

NAVORD OCL's are typed, single space, and submitted in duplicate by the originating section of the Bureau of Ordnance, together with NAVORD FORM 356. In preparing a NAVORD OCL, note particularly the style guide in chapter 3. In addition, the following rules are prescribed, as noted in figure 34.

Originating section. The originating section is designated in the upper left-hand corner. No file number is necessary, as each letter bears a NAVORD OCL number.

NAVORD OCL number and date. Do not type the number and date. Leave these spaces blank; they will be filled in by the Publications Section.

Subject. In the subject, the main noun and its modifiers are separated from the action or explanatory phrase by a dash. The subject is worded so that only one dash is needed. Minor breaks should be designated by commas. The main words preceding the dash are capitalized. Following the dash, only the first word and any subsequent proper nouns or proper adjectives are capitalized.

References. When more references than one are given, the plural form "References" is used. The identification symbol of an ordnance publication is written in all caps: as, NAVORD OCL. The remainder of reference to a NAVORD OCL consists of its letter-number desig-

nation, the word "dated," and the date written thus: day, first three letters of month without a period, and last two digits of year. References to paragraphs should begin with a lower case letter, with the word spelled out, and an Arabic numeral. Abbreviations follow the rules in chapter 3.

Enclosures. "Herewith" is capitalized and enclosed in parentheses. Do not use "(HW)."

Text. Indent ten spaces beyond the paragraph number to start the text.

The sentence regarding material to be superseded is stated as follows if the material is RESTRICTED or nonclassified: "Reference (a) is hereby superseded and should be destroyed." If it is classified CONFIDENTIAL or higher, the latter part of the sentence reads: ". . . should be destroyed by burning." The word "canceled" is used instead of "superseded" only when a publication is no longer in effect and is not superseded by any other publication.

Indentation and topic designations. Indentations and subparagraph designations as shown are standard for NAVORD OCL's when an outline setup is desired.

Signature. The title of the Chief of the Bureau is typed as indicated, five spaces (never less) below the closing line of the letter.

Distribution. The distribution list is typed in by the Publications Section.

Classification. Indicate the classification with a rubber stamp, on all pages, in the center of the page at the bottom.

Revisions

If a proposed NAVORD OCL supplements or modifies any part of a previous OCL, the earlier publication is superseded. Any of its contents remaining effective are included in the new publication, and a statement of the supersession appears in paragraph 1 of the new publication. (Disposition of the superseded publication is also stated: i.e., if RESTRICTED or nonclassified, the superseded publication should be destroyed; if CONFIDENTIAL, destroyed by burning.)

Printing

After signature by the Chief of the Bureau, NAVORD OCL's are printed by offset, thus reproducing the signature on the printed copy. NAVORD OCL's of more than one sheet are stapled or folded on the side.

NAVY DEPARTMENT

BUREAU OF ORDNANCE

WASHINGTON 25, D. C.

(Originating Section) NAVORD OCL (Symbol and Number)

(CLASSIFICATION) Day Month Year

BUREAU OF ORDNANCE CIRCULAR LETTER (Symbol and Number)

Subject: Type the subjects here – separated by dash.

References: (a) References, if any, appear here.
(b)

Enclosures: (A) Enclosures, if any, appear here.
(Herewith) (B)

1. Reference (a) is hereby superseded and should be destroyed.

INDENTATION

2. Indentations and subparagraph designations as outlined below are standard for NAVORD OCL's. Note use of topic headings between paragraphs 1 and 2, and 2 and 3.

a. Lower case letter is the first breakdown below the paragraph number. The letter designating the subparagraph is placed in the first space after the last space used by the paragraph number.

b. The second line and all succeeding lines are extended to the left-hand margin.

(1) A sub-paragraph is designated by the Arabic numeral in parentheses. The initial parenthesis begins in the first space following the last space used by the subparagraph letter designation.

(2) Sub-paragraphs are also extended to left-hand margin starting with the second line.

SIGNATURE

3. The title of the Chief of the Bureau is typed as indicated below, five spaces below the closing line of the letter.

[Signature]

G. F. HUSSEY, JR.
Vice Admiral, U. S. Navy
Chief of Bureau

D I S T R I B U T I O N

Figure 34. NAVORD OCL format.

Chapter 8

ORDNANCE DATA (NAVORD OD)

NAVORD OD's contain such various types of authoritative Ordnance information as advance information or instructions on Ordnance equipment, installation and alignment data, and miscellaneous data (for example, parallax data, tables of weights and dimensions, etc.). NAVORD OD numbers are applied also to Ordnance equipment lists.

Data on tests or inspection results are contained in NAVORD FORMS or NAVORD REPORTS as designated by instructions for testing or inspection.

Preparation and approval

NAVORD OD's may be prepared by the Bureau of Ordnance, or authority to prepare and approve NAVORD OD's may be delegated by the Bureau to appropriate activities in individual cases.

Depending upon the contents, NAVORD OD's prepared or authenticated in the Bureau of Ordnance may be approved by the Chief of the Bureau or by the cognizant division or section chief signing by direction of the Chief of the Bureau.

Identification

NAVORD OD's bear serial numbers which are assigned by the Bureau of Ordnance, for example NAVORD OD 3000

Classification

NAVORD OD's shall bear any appropriate classification required by the contents.

Distribution

By nature of their contents, the distribution of NAVORD OD's is limited to groups specially interested. Additional copies may be procured by submission of request on NAVGEN FORM 47, "Forms and Publications Request," to the Bureau of Ordnance (Publications Section). A list of the activities to which distribution is made appears at the end of each NAVORD OD, under the heading "Distribution."

Contents

The contents of a NAVORD OD varies according to the subject matter presented. Ordnance equipment lists have a standardized form. They list all shipbuilder's ordnance items to be installed in one ship, or one class of ships, as distinguished from Ordnance allowance lists which cover all items to be carried aboard after the date of commissioning. Ordnance equipment lists are prepared on NAVORD FORMS 491 series which are especially adapted to the information required.

Format

The cover page of NAVORD OD's conforms to the sample specified for OP's. When produced by expedient methods, the cover may be typewritten. The format of the contents will vary with the subject matter.

A Letter of Promulgation, setting forth the purpose of the NAVORD OD, publications superseded, references, and classification restrictions, appears immediately after the cover page. This letter is signed either by the Chief of the Bureau or by direction of the Chief of the Bureau. When authority to prepare a NAVORD OD is delegated,

the letter of promulgation is signed by the Commanding Officer of the activity designated.

Printing

In view of the limited quantities of NAVORD OD's which are normally required, expedient means of reproduction may be used. These include blueprinting, dittoing, mimeographing, etc. NAVORD OD equipment lists, however, are normally required in larger quantities and are usually printed.

Changes

NAVORD OD changes, except for equipment lists, are prepared on the PUBLICATIONS CHANGE FORM (NAVORD FORM 545). Changes to equipment lists are prepared on NAVORD FORM 491M, which is specially adapted to these NAVORD OD's. Changes are serially numbered for each NAVORD OD by the Bureau of Ordnance (Publications Section).

Revisions

When a NAVORD OD is revised, all current changes are incorporated and the publication is then titled NAVORD OD 0000 (First Revision). Subsequent revisions are serially numbered. Revising and equipment list OD requires a revision sheet (NAVORD FORM 1028) explaining the reasons for the revision and bearing a revision number. Revision numbers are assigned by the Bureau of Ordnance (Publications Section).

Delete

Chapter 8

ORDNANCE DATA

NAVORD OD's contain reports of inspection and test data. The material is primarily for inspectors and research personnel. NAVORD OD's also contain ordnance equipment lists which provide planning information for the Bureau of Ordnance and the Bureau of Ships.

Preparation and approval

Authority to prepare and approve NAVORD OD's is delegated by the Bureau to appropriate activities.

Identification

NAVORD OD's bear serial numbers which are assigned by the Bureau of Ordnance, Publications Section (NAVORD OD 1000).

Classification

NAVORD OD's may bear any appropriate classification.

Distribution

NAVORD OD's are distributed by the Ordnance Publications Distribution Center, U. S. Naval Gun Factory, Washington 25, D. C. A list of the activities to which it is distributed appears at the end of each NAVORD OD.

Contents

NAVORD OD's are of two types.

Inspection and test data. Reports of inspection and test data vary according to the subject matter to be presented. However, information is normally included specifying the equipment involved, the purpose of the test or inspection, the test or inspection procedure, results of the test or inspection, conclusions and recommendations.

Equipment lists. Ordnance equipment lists have a standardized form. They list all ordnance material one ship or one class of ship is designed to carry, in contrast to NAVORD LISTS, which show the material actually on board a particular ship. Ordnance equipment lists are prepared on NAVORD FORMS 491a–1.

Format

The cover page of NAVORD OD's conforms to the sample outlined for OP's. When produced by expedient methods, the cover may be typewritten. A Letter of Promulgation, setting forth the purpose of the NAVORD OD, publications superseded, references, and classification restrictions, appears immediately after the cover page. This letter is signed by the Commanding Officer of the activity designated by the Bureau to approve the NAVORD OD, or is signed within the Bureau by direction of the Chief of the Bureau.

Printing

In view of the limited quantities of NAVORD OD's which are normally required, expedient means of reproduction may be used. These include blueprinting, ditto, mimeograph, etc. NAVORD OD equipment lists, however, are normally required in larger quantities; therefore, these are usually printed.

Changes

NAVORD OD changes, except for equipment lists, are made by using the PUBLICATIONS CHANGE FORM (NAVORD FORM 545). Changes to equipment lists are prepared on NAVORD FORM 491M, which is specially adapted to these NAVORD OD's. Changes are serially numbered for each NAVORD OD by the Bureau of Ordnance, Publications Section.

Revisions

When a NAVORD OD is revised, all current changes are incorporated and the publication is then titled NAVORD OD 0000 (First Revision). Subsequent revisions are serially numbered. Revision numbers are assigned by the Bureau of Ordnance, Publications Section.

Chapter 9

ORDNANCE STANDARDS

NAVORD OSTD's present Bureau of Ordnance methods and practices which have become standardized (markings, sizes, formulas, design features, etc.). Their purpose is to provide a guide for the standardization of Bureau of Ordnance methods of design, drafting, and manufacture.

Approval

NAVORD OSTD's are approved by the Chief of the Bureau of Ordnance by signature on the Letter of Promulgation.

Identification

NAVORD OSTD's bear serial numbers assigned by the Bureau of Ordnance, Research Division (NAVORD OSTD 100).

Classification

NAVORD OSTD's may bear any appropriate classification.

Distribution

NAVORD OSTD's are distributed by the Ordnance Publications Distribution Center, U. S. Naval Gun Factory, Washington 25, D. C. A list of the activities to which it is distributed appears at the end of each NAVORD OSTD.

Format

The cover page of NAVORD OSTD's conforms generally to the sample outlined for OP's, with the NAVORD symbol and the identifying number in the upper right-hand corner.

A Letter of Promulgation setting forth the purpose of the NAVORD OSTD, publications superseded, references, and classification restrictions, appears immediately after the cover page. This letter is signed within the Bureau by direction of the Chief of the Bureau of Ordnance.

Printing

NAVORD OSTD's may be produced by expedient methods or set in type, as determined by the quantity required.

Changes

Changes to NAVORD OSTD's are made by using NAVORD FORM 545 (Publications Change Form).

Revisions

When a NAVORD OSTD is revised, all current changes are incorporated and the new publication is then titled NAVORD OSTD 100 (First Revision). Subsequent revisions are serially numbered by the Bureau of Ordnance, Research Division.

Chapter 10

ORDNANCE HANDLING INSTRUCTIONS

NAVORD OHI's are distributed when necessary with any type of ordnance equipment, attached to the equipment or included in the shipping container. In tag or card form they provide personnel, particularly enlisted men, with information regarding installation, use, and special care in handling ordnance equipment. They are not used for long or detailed instructions, or as substitutes for OP's.

Preparation and approval

NAVORD OHI's may be prepared by any Naval activity on NAVORD FORM 583 and are forwarded for the approval and signature of the Chief of the Bureau.

Identification

NAVORD OHI's are divided according to subject matter into nine classes, as are NAVORD OCL's. They are serially numbered within each classification, each calendar year (NAVORD OHI A1–46). Classification symbols and numbers are assigned by the Bureau of Ordnance, Publications Section.

NAVORD OHI's containing information for both aviation personnel and ordnance station personnel are indicated by the normal classification symbol first, then the aviation symbol (NAVORD OHI AV3–46).

Classification

NAVORD OHI's bear the lowest classification possible, to permit distribution with ordnance equipment. Security precautions in shipping ordnance equipment are commensurate with the classification of the NAVORD OHI's, if the NAVORD OHI's bear a higher classification than the equipment.

Distribution

In addition to distribution with the equipment, supplementary distribution is made to appropriate Naval activities by the Ordnance Publications Distribution Center, U. S. Naval Gun Factory, Washington 25, D. C. A list of the activities to which it is distributed appears at the end of each NAVORD OHI.

Contents

Contents of NAVORD OHI's conform in general to the sample illustrated by figure 36. The contents of NAVORD OHI's are flexible and need not conform to the suggested outline.

Revisions

If a proposed NAVORD OHI supplements or modifies any part of a previous OHI, the earlier publication is superseded. Any of its contents remaining effective are included in the new publication, and a statement of the supersession appears in paragraph 1 of the new publication. (Disposition of the superseded publication is also stated.)

Preparation of NAVORD OHI's

NAVORD OHI's are prepared on NAVORD FORM 583 as indicated below.

Typing. Manuscripts are typed to conform as closely as possible with the style indicated by figure 36.

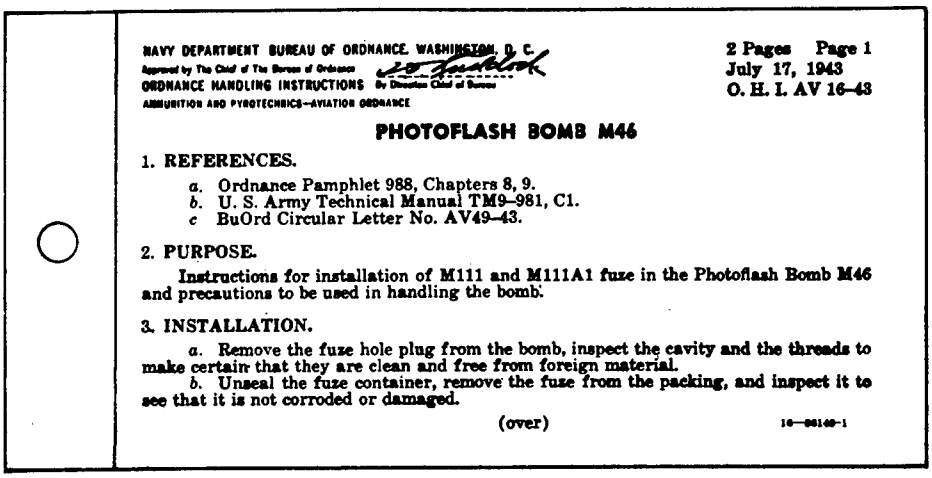
Paging. Pages are numbered consecutively with Arabic numerals at the foot of the page.

Paragraphs. Paragraphs are numbered consecutively with Arabic numerals. Subparagraphs are indicated by a lower case letter followed by a period. Further subdivisions are to be avoided; but, if necessary, are indicated by an Arabic numeral in parentheses.

Headings. Paragraph headings conform to those shown in figure 36.

Illustrations. Illustrations are identified as figures, numbered consecutively with Arabic numerals. A concise caption should be clearly indicated. Instructions regarding the preparation of illustrations for OP's apply also to NAVORD OHI's. However, in view of the fact that frequently time does not permit setting NAVORD OHI's in type, the expedient means allowed for preparing illustrations for preliminary OP's may be used.

Printing. NAVORD OHI's are normally printed as a tag, as illustrated by figure 35, or as a card. Occasionally printing is by offset on standard Navy size paper (8 x 10½ inches) punched to fit a standard three-post binder (three ¼-inch holes 4¼ inches center to center). When time permits, it is desirable to set in type.



NAVY DEPARTMENT BUREAU OF ORDNANCE, WASHINGTON, D. C.
Approved by The Chief of The Bureau of Ordnance
ORDNANCE HANDLING INSTRUCTIONS
By Direction Chief of Bureau
AMMUNITION AND PYROTECHNICS—AVIATION ORDNANCE

2 Pages Page 1
July 17, 1943
O. H. I. AV 16-43

PHOTOFLASH BOMB M46

1. REFERENCES.

a. Ordnance Pamphlet 988, Chapters 8, 9.
b. U. S. Army Technical Manual TM9-981, C1.
c BuOrd Circular Letter No. AV49-43.

2. PURPOSE.

Instructions for installation of M111 and M111A1 fuze in the Photoflash Bomb M46 and precautions to be used in handling the bomb.

3. INSTALLATION.

a. Remove the fuze hole plug from the bomb, inspect the cavity and the threads to make certain that they are clean and free from foreign material.
b. Unseal the fuze container, remove the fuze from the packing, and inspect it to see that it is not corroded or damaged.

(over)

16—88148-1

Figure 35. NAVORD OHI printed as a tag.

ORDNANCE HANDLING INSTRUCTIONS
NAVORD FORM 583 (REV. 1/45)

NAVY DEPARTMENT
BUREAU OF ORDNANCE
WASHINGTON 25, D. C.

NAVORD OHI	
DATE	PAGE 1 of PAGES

APPROVED BY THE CHIEF OF THE BUREAU OF ORDNANCE

TITLE

1. REFERENCES

Each OHI is preceded by a summary of references to any additional material (Bureau of Ordnance Manual, Ordnance Circular Letters, Ordnance Pamphlets, Ordnance Data, Ordnance Handling Instructions, Ordalts, Ordnance Specifications, Ordnance Standards, Army publications, ordnance drawing numbers, ordnance sketch numbers, stock numbers of the equipment, etc.) which contains information on the subject. Where practicable, reference is made to specific chapters and paragraphs.

If there are no references, this is indicated in the first paragraph.

2. PURPOSE

Indicate here the reason for issue. This may be one sentence in length.

3. INSTALLATION

Instructions giving the pertinent information for the installation of the equipment step by step is given here. When essential, any necessary drawings, sketches, and photographs which may clarify the installation procedure are included. Every effort should be made to condense this information to allow presentation on a single card or tag.

4. USE AND CARE IN HANDLING

Precautions to be taken in handling, installing, and using the equipment are presented in this paragraph.

D I S T R I B U T I O N

Figure 36. NAVORD OHI format.

Chapter 11

ORDNANCE MODIFICATION INSTRUCTIONS (AVIATION)

NAVORD OMI–V's are used for modifying aviation ordnance equipment when the modification is relatively simple and speed is essential. NAVORD OMI–V's do not require a report of accomplishment. When a record of accomplishment of an alteration is desired, a NAVORD ORDALT is used.

Preparation and approval

NAVORD OMI–V's may be prepared by any Naval activity on NAVORD FORM 566, and are forwarded for the approval and signature of the Chief of the Bureau.

Identification

NAVORD OMI–V's are numbered serially by the Bureau, Publications Section, each calendar year (NAVORD OMI–V1–46).

Classification

NAVORD OMI–V's are nonclassified or RESTRICTED.

Contents

Contents of NAVORD OMI–V's shall conform to the sample illustrated by figure 37.

Revisions

If a proposed NAVORD OMI–V supplements or modifies any part of a previous OMI–V, the earlier publication is superseded. Any of its contents remaining effective are included in the new publication, and a statement of the supersession appears in paragraph 1 of the new publication. (Disposition of the superseded publication is also stated.)

Distribution

NAVORD OMI–V's are distributed by the Ordnance Publications Distribution Center, U. S. Naval Gun Factory, Washington 25, D. C. A list of the activities to which it is distributed appears at the end of each NAVORD OMI–V.

Preparation of NAVORD OMI–V's

NAVORD OMI–V's are prepared on NAVORD FORM 566. Specifications for the preparation and printing of NAVORD OMI–V's conform to those outlined for NAVORD OHI's described in chapter 10.

NAVORD FORM 666
28 Oct 1948

(CLASSIFICATION)

NAVY DEPARTMENT, BUREAU OF ORDNANCE, WASHINGTON, D.C.

Approved by The Chief of The Bureau of Ordnance _____
Acting Chief of Bureau

AVIATION ORDNANCE MODIFICATION INSTRUCTIONS

NAVORD OMI-V

Date:

Pages _____ Page 1

CONTENTS (Title)

Paragraph* Page

1. References
2. Purpose-urgency
3. Items to which applicable
4. Source and supply of material
5. By whom performed
6. Instructions for accomplishing work
7. Disposition of replaced material

* Paragraphs not required will be numbered and titled but left blank.

ILLUSTRATIONS

Figure Page

1. Title
2. Title

1. REFERENCES

Each OMI-V will be preceded by a summary of references to any additional material (Bureau of Ordnance Manual, Ordnance Circular Letters, Ordnance Pamphlets, Ordnance Data, Ordnance Handling Instructions, Ordnance Technical Instructions, Ordnance Specifications, Ordnance Standards, Army publications, ordnance drawings numbers, ordnance sketch numbers of the equipment, etc.) which contains pertinent information on the subject. Where practicable, reference should be made to specific chapters and paragraphs. To assist the unit accomplishing the modification in avoiding the possibility of overlooking previous modifications to the same equipment, make the statement:

"This is the nth OMI-V which has been ordered for the subject equipment."

If there are no references, this should be indicated in the first paragraph.

2. PURPOSE-URGENCY

Indicate here the reason for issue. Cite any malfunctions intended to be corrected by these instructions; also, difficulties encountered in the use of the equipment. State whether the accomplishment of the modification is to be

a. As soon as practicable (after receipt of necessary parts).

b. Mandatory for supply and overhaul activities; optional for operating units, but not later than next overhaul of the equipment.

c. Other applicable statement.

3. ITEMS TO WHICH APPLICABLE

If all equipment of subject type is not to be modified, state exceptions and means of identifying same; or list that equipment to which it is applicable.

4. SOURCE AND SUPPLY OF MATERIAL

Describe source and distribution of necessary material. Describe composition of the modification kit. State when expected to be available.

5. BY WHOM PERFORMED

State whether modification will be performed by personnel of the organizations to which the affected equipment is assigned, or state special instructions.

6. INSTRUCTIONS FOR ACCOMPLISHING WORK

Give complete instructions for accomplishing work, making adequate use of parts, numbers, sketches, etc.

7. DISPOSITION OF REPLACED MATERIAL

Direct disposition of replaced material: such as, "Overboard"; "Scrap for salvage of usable material"; or any special instructions.

D I S T R I B U T I O N

Figure 37. NAVORD OMI–V format and contents.

Chapter 12

ORDNANCE CHARTS

NAVORD CHARTS are visual aids for instruction of officers and enlisted men in the understanding and use of ordnance equipment. They present enlarged views (usually colored), which outline the operation and component parts of ordnance equipment.

Preparation and approval

NAVORD CHARTS are prepared by activities designated by the Bureau and are approved by the Chief of the Bureau.

Identification

NAVORD CHARTS are classified and numbered by the Bureau of Ordnance, Publications Section. They are divided into nine classes, as are NAVORD OCL's (NAVORD CHART F3). When revised, the new NAVORD CHART is identified by the same letter and number with revision date added (NAVORD CHART F3–Rev 46).

NAVORD CHARTS may be nonclassified, RESTRICTED, or CONFIDENTIAL. They carry the lowest possible classification to permit wide use.

Distribution

NAVORD CHARTS are stocked and distributed by the Ordnance Publications Distribution Center, U. S. Naval Gun Factory, Washington 25, D. C.

Specifications for NAVORD CHARTS

NAVORD CHARTS shall follow the specifications outlined below.

Size. The over-all size of NAVORD CHARTS is 32 x 42 inches—four times letter size (8 x 10½ inches). This may be varied in exceptional cases upon specific approval of the Bureau.

Border. Lineweight ⅛ inch, 1¼ to 1½ inches from edge of paper.

Artwork. The same size as printed chart (32 x 42 inches) is recommended.

Contents

NAVORD CHARTS contain a full or partial section of the main feature to be presented, as large as possible. They show an actual-size external view, if practicable. Insets are used to show operation, small details, modifications, etc. (These may be full views, sections, phantom views, or combinations.) Where necessary, two or more sheets may be used.

Nomenclature

Nomenclature may be set in type (a sans-serif face, all caps), and printed labels pasted in place.

Titles are set at the bottom of the chart in large type (approximately 72-point) to suit layout. Other titles appear under each view or inset.

Designation. Mark and mod designations are shown.

Labeling. Main parts are labeled. Steps in operation are listed briefly if space permits.

Classification appears at bottom of sheet, outside of the border.

Arrows. Lines from nomenclature to object terminate with a small solid circle on the subject. Use straight lines; avoid crossing. Lines passing over dark or shaded portions are highlighted.

Linework and type size

The linework, details, and type size are so handled that, if the charts are subsequently reduced to 8 x 10½ inches, they remain legible. In the reduced size, weight of object lines should be 0.006 inches or greater; weight of dimension lines, 0.003 inches or greater. Space between adjacent lines should be 1½ times the lineweight. The lettering should reduce to a height of not less than 0.07 inches.

Colors

Solid color printing (unscreened) will be used with all colors. Black may be printed halftone and should be used for all outlines and shading to show depth.

Number of colors. The number of colors should be limited to five and black. Additional colors may be obtained by using a combination of any color printed over a black halftone (Ben Day).

Overlays. In preparation of artwork, colors are indicated with colored crayon on a vellum overlay. Outlines of colored areas must be clearly shown.

Mounting

Charts are printed on cloth-backed paper secured to a wood slat at the top and to a wood dowel at the bottom. Two screw eyes (⅜-inch eyes), fitted to the top slat and spaced 16 inches center to center, provide for hanging. A suitable fastener, such as a shoestring, is tied to each of the screw eyes.

Chart numbers

A NAVORD CHART number appears on each chart, located just outside the border in the upper right-hand corner in approximately 18-point type. When two or more sheets comprise a NAVORD CHART, the sheet number follows the chart number: e.g., NAVORD CHART F17—Sheet 1 of 2. The number, title, and classification of the chart are also printed or stamped on the back of each chart, so that they may be seen when the chart is rolled.

Chapter 13

ORDNANCE REPORTS (NAVORD REPORTS)

NAVORD REPORTS cover technical reports of tests and studies (including research, development, experimental and preliminary tests, studies, or projects) and miscellaneous reports (for example, descriptions of methods and results of research projects, examination of foreign ordnance, summaries of scientific or engineering opinions, compilations of engineering data, analysis of problems, etc.) made by Naval Ordnance activities or by any other activity at the request of the Bureau of Ordnance. NAVORD REPORTS do not include routine tests and progress reports unless specifically included by Bureau of Ordnance direction.

NAVORD REPORTS differ from other ordnance publications in one or more of the following respects:

(a) NAVORD REPORTS may contain the opinions or findings of small groups within the Bureau of Ordnance or its activities and may not necessarily reflect the policy of the Bureau.

(b) NAVORD REPORTS may be intended to form the basis fof offical action only by the originator of the report.

(c) NAVORD REPORTS may be intended for information purposes only and/or may not represent the authoritative and final judgment of the originating activity.

NAVORD REPORTS are prepared, reproduced, and distributed by the originating activity for the information of other interested activities.

Preparation and Approval

NAVORD REPORTS are prepared and approved by the activity initiating the information. Depending upon the subject matter, approval may be made by the Sub-Section Chief or Section Chief in charge of the project within the Bureau of Ordnance, or the Project Leader or Commanding Officer of the reporting field activity.

The statements of a NAVORD REPORT become those of the Bureau of Ordnance only when signed by the Chief of the Bureau or by direction of the Chief of the Bureau.

Identification

Serial numbers are assigned to NAVORD REPORTS by the originating activity from a block of numbers assigned to the activity by the Bureau of Ordnance (Publications Section). Preferably, the NavOrd number should not be assigned to a report until it is ready for issue in order to prevent gaps in the numerical order. If, after assignment, a number is not to be used because of cancellation of a projected report, the Bureau of Ordnance (Publications Section) should be immediately notified of such cancellation. The number, once cancelled, should remain cancelled and not be reassigned. The activity may assign its own identification number in addition to the official NAVORD REPORT number, if desired for use in filing and for ready reference.

When NAVORD REPORTS are issued before completion of the tests (or studies, projects, etc.), succeeding reports on the same subject should bear the same NAVORD REPORT number with the added designation of "Part 2" or "Part 3", etc. and shall reference the previous parts of the report.

An index, NAVORD REPORT 0, will be compiled by the Publications Section of the Bureau of Ordnance from NAVORD REPORTS received in the Bureau of Ordnance. This index will be distributed to activities under Bureau control and to a limited number of outside activities. NAVORD REPORT 0 will be revised as required.

Classification

NAVORD REPORTS shall bear the appropriate classification determined by the contents.

Distribution

The reporting activity arranges for the initial distribution to interested activities, appending the distribution list at the end of the report. Normally, a general distribution to the field and fleet will not be made as NAVORD REPORTS, in most instances, are of primary interest to limited groups of personnel. In addition to normal distribution within the Bureau of Ordnance, three (3) copies of the finished report and the master copy (if made - see section on Preparation in this chapter) are forwarded to the Bureau of Ordnance (Publications Section) for permanent storage and future reproduction.

After initial distribution, subsequent copies will be printed and distributed by the Bureau of Ordnance (Publications Section) as required to fill requests approved by the cognizant Section in the Bureau of Ordnance.

Format

The format will be determined by the preparing activity. The only fixed requirements are as follows:

(a) The NAVORD REPORT number should be placed in the upper right hand corner of the cover. Covers may be of the same stock as text pages or any stock available or the text may be inserted in any standard office report folder. The reports may be bound by stapling (two staples) or by through fasteners on the left hand side.

(b) The title page should indicate the name of the principal author or authors giving credit also to any substantial contributors to the report. The commanding officer of the preparing activity and, if desired, the principal officers should be indicated.

(c) Except in unusual circumstances as, for example, when it is desired to make a report pocket-size for easier handling, reports should be typed single space on 8 inch x $10\frac{1}{2}$ inch paper. All graphs, sketches, photographs, etc., should be produced on 8 inch x $10\frac{1}{2}$ inch paper or folded to stay within this size. All folded sheets should be secured to the report in such a manner that these sheets can be unfolded for examination without the necessity of taking apart the report.

(d) The distribution list should be indicated on the last page of the report.

Contents

Material included in NAVORD REPORTS should be organized with a view towards completeness and clarity. The exact organization will vary with the type of report. The following is the preferred outline

for NAVORD REPORTS. If changes in this outline, however, would be advantageous, modifications may be made without requiring approval.

1. Foreword

Where appropriate a suitable foreword may be included to indicate any of the following items:

(a) Reference to the previous reports on the same subject.

(b) Statements of acknowledgment for collaboration and/or assistance.

(c) Statements that the report is for information only and does not represent the authoritative and final judgment of the issuing activity.

(d) Statement as to other phases of the subject being investigated when the report is on only one segment of the problem.

(e) Statement that the report is not to be used as a basis for action, rather as information and a basis for further development.

(f) Any other pertinent information (security, references, etc.).

2. Table of Contents.

3. Abstract. This should be a brief but comprehensive summary of the report.

4. Introduction. This section should contain:

(a) Authorization

(b) Statement of the problem.

(c) Previously known facts bearing on the problem.

(d) Theoretical considerations.

Items 4(c) and 4(d), above, are intended primarily for use in reports of research projects and may be omitted in other cases where this information is not applicable.

5. Materials or Equipment Tested. This material should be identified by name, serial number, contractor, and any other pertinent information such as drawing or sketch number. If this information is not available, as in the case of some experimental equipment, a complete description, including diagrams, should be given.

6. Description of Test Apparatus. The principal pieces of equipment used in conducting the tests should be itemized. Unless the test set up is extremely simple, a photograph or sketch of the test set up would be desirable. Wiring diagrams may also be desirable in some cases.

7. Test Procedure. A detailed description of the procedure in conducting each phase of the test should be given in chronological order or in the sequence found in the applicable specifications.

In simple tests sections 6 and 7 may be combined. In some tests, sections 6 and 7 may be replaced by a reference to a standard procedure described in a previous report or in other standard publications.

8. Test Results and Discussion. Test results (tabulation and/or plots

of data should be given in detail in this section of the report. If the test data are voluminous, separate data sheets or plates may be placed in the appendix and referred to in this section by page or plate numbers. Discussion of or comments on test results may be required occasionally to clarify interpretation of results and arrival at conclusions.

9. Conclusions. The facts established and their bearing on the problem should be stated.

10. Recommendations. Recommendations should be made concerning the materials or equipment tested. Recommendations may also be made on improved test procedure. Sections 9 and 10 on conclusions and recommendations may be omitted in some instances where the testing activity lacks the background knowledge or when the test has been conducted in accordance with a specific procedure outlined by the Bureau of Ordnance and final conclusions and recommendations will require other applicable tests or sources of information. In these cases the reporting activity would be responsible only for the accuracy of the results obtained from the test outlined in the directive.

11. Appendix. Bibliography, photographs, drawings, data sheets, reproductions of oscillograph tapes, and other illustrative material may be included in this section.

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Where the subject matter of the NAVORD REPORT is such that only a small number of copies will be required in the opinion of the preparing activity or the Bureau of Ordnance, sufficient carbon copies may be prepared in one typing operation. The original copy will be considered the master copy which is to be forwarded to the Bureau (Publications Section) for possible future reproduction.

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The finished vellums (or tracing cloths) plus half-tone negatives constitute the master copy to be forwarded to the Bureau of Ordnance (Publications Section). If the report has been printed by offset, all negatives are forwarded to the Bureau of Ordnance (Publications Section).

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Changes made by the Bureau of Ordnance will be prepared on NAVORD

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Chapter 13

ORDNANCE REPORTS

NAVORD REPORTS describe the methods and results of Ordnance Research Projects. The contents may vary according to the subject matter presented.

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