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NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA
HIGH PERFORMANCE WHEELCHAIR CHASSIS: ENGINEERING DRAWINGS.(U)
JAN 79 R A GARRETT, J P WIER
NOSC/TD-218

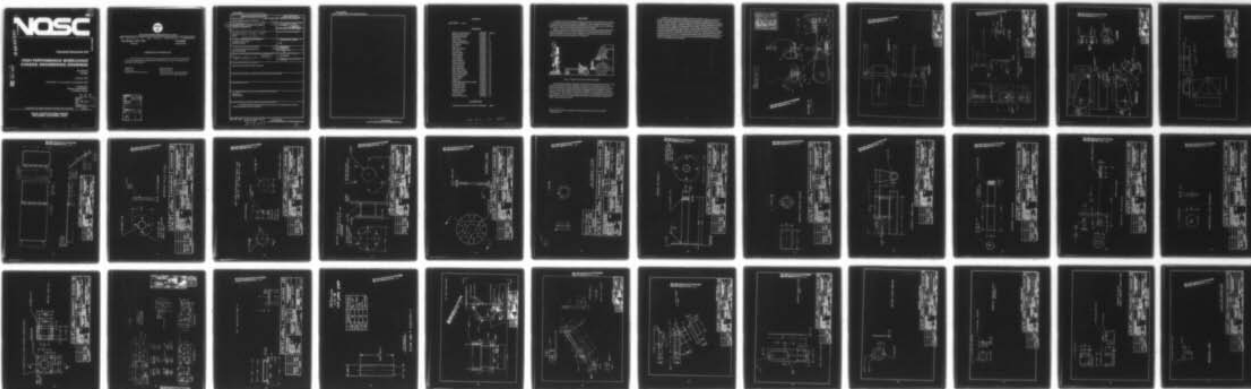
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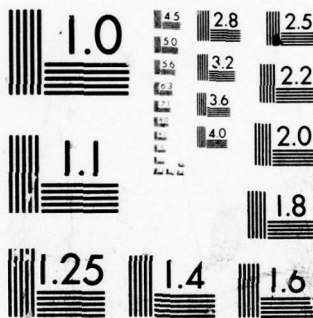


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NOSC TD 218

Technical Document 218

HIGH PERFORMANCE WHEELCHAIR CHASSIS: ENGINEERING DRAWINGS

RA Garrett
JP Wier

4 January 1979

Final Report: 17 June 1976 to 15 December 1978

Prepared for
Veterans Administration
Prosthetics Center

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The work reported in this document was sponsored by the Veterans Administration Prosthetics Center and was performed under NOSC Work Unit CE09. The document was reviewed by WT Rasmussen.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The wheelchair chassis described in this report is the second part of a three-phase plan to develop an integrated transportation system for paraplegics.		

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ILLUSTRATION

1 Integrated transportation system for paraplegics . . . page 3

79 103 26 007

DISCUSSION

The High Performance Wheelchair Chassis is one part of a three-phase plan to develop an Integrated Transportation System for Paraplegics. The development of the system is sponsored by the Veterans Administration Prosthetics Center (VAPC) and is a cooperative effort of the VAPC and the Naval Ocean Systems Center (NOSC).

Phase I consisted of the design and fabrication of a prototype ambulator; Phase II is a wheelchair chassis which accepts the ambulator to form the ambulator/wheelchair subsystem; and Phase III is a street vehicle designed to functionally accommodate the integrated ambulator/wheelchair subsystem. (See figure 1.)

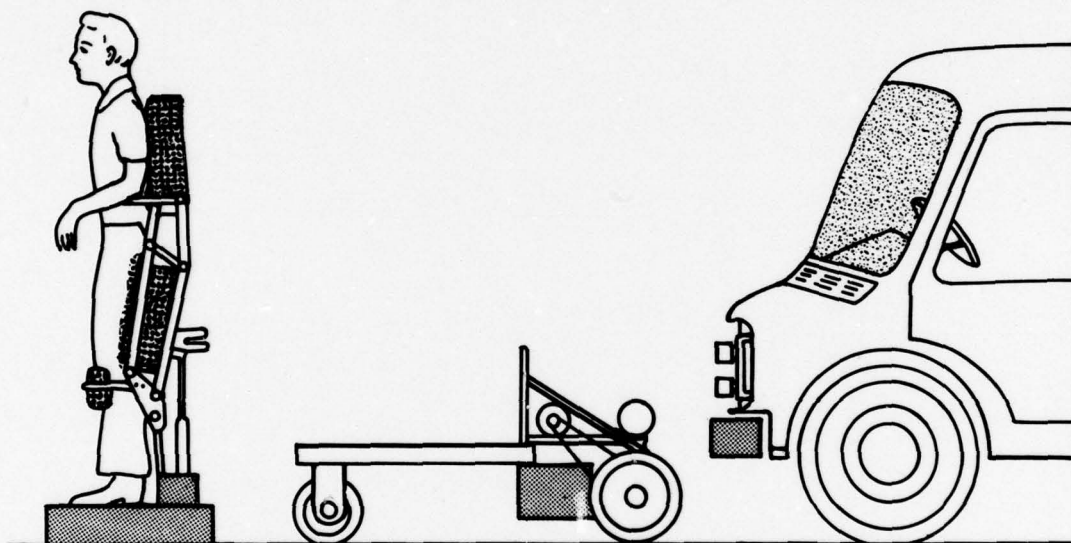


Figure 1. Integrated transportation system for paraplegics.

The ambulator/wheelchair subsystem consists of two modules that can separate to provide increased mobility while the paraplegic is supported in the upright position. The ambulator contains an erecting mechanism powered by an electric-motor-driven jackscrew fixed to a small, stable platform that provides a paraplegic with the capability of being raised into a fully erect position, and allows the ambulator to be detached from the wheelchair mainframe. The occupant can then move away from the wheelchair and move about under his own control. For a more detailed description of the ambulator mechanism see NOSC Technical Document 208.¹

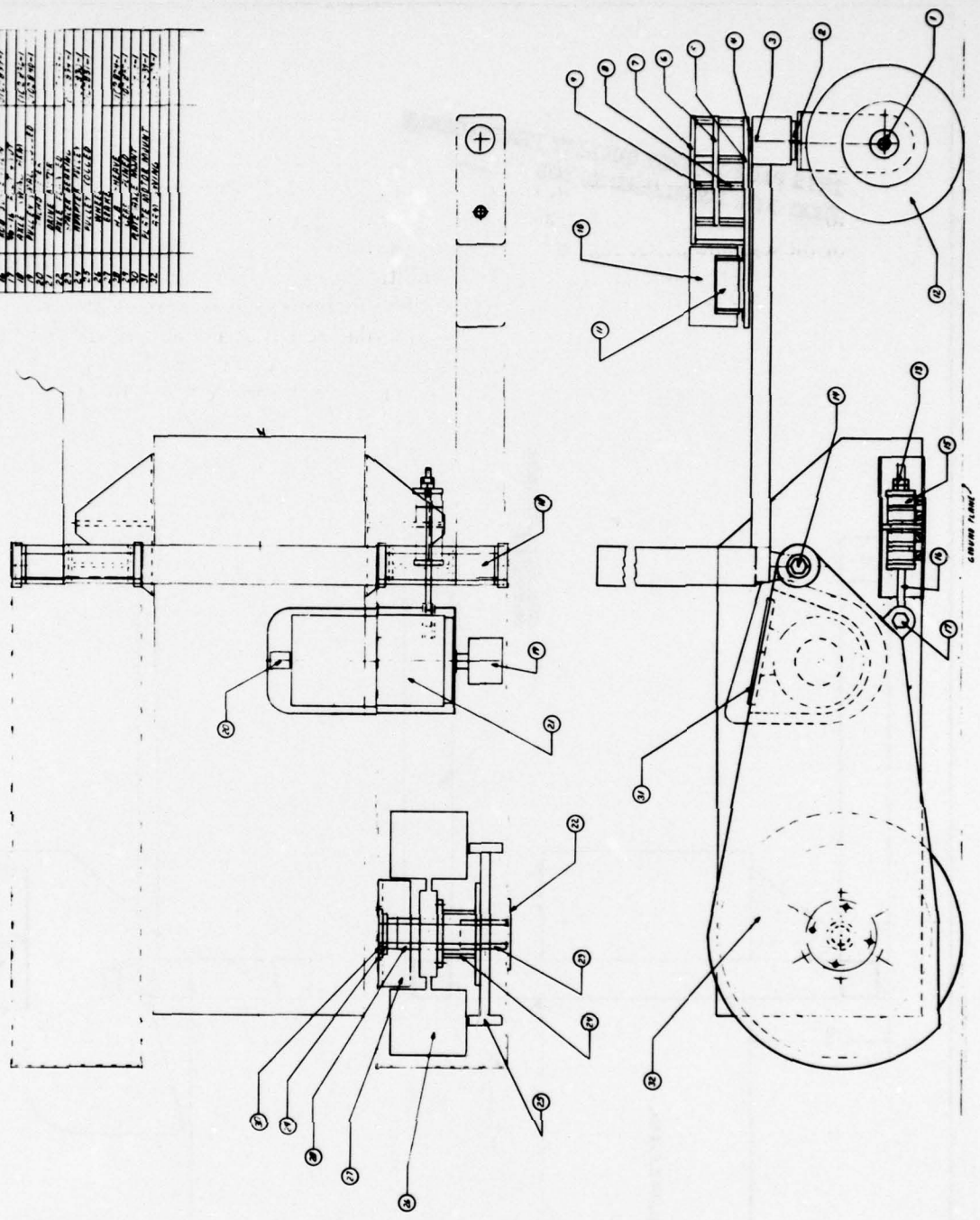
¹NOSC TD 208, Ambulator for Paraplegics: Engineering Drawings, by RA Garrett and J Weir, 1 November 1978.

In addition to providing the paraplegic with the capability to stand or sit at will, it is felt that the ambulator/wheelchair subsystem will provide better general health for the person. It allows the patient to load his skeleton periodically, providing bone stress needed to reduce calcium washout, a condition resulting in a loss of calcium, especially in the bones of the legs and pelvic region. Standing improves circulation, and relieves pressure areas which lead to tissue breakdown and decubiti. It also enables easier living in a stand-up world and makes possible seemingly routine functions such as cooking at a stove or working at a sink or workbench. These kinds of everyday activities are, at best, difficult and often impossible tasks to perform in a conventional wheelchair. The psychological benefit of conversing with someone at an eye-to-eye level may be the greatest benefit of all, and should prove to be a significant morale booster.



- NOTES
1. ALL WHEELS & MATERIALS ARE TO BE STAINLESS STEEL.
 2. THE BRAKE UNIT SHOULD BE DRILLED AND TAPPED TO TAKE 1/8"-32 SCREWS.
 3. LUBRICATE WHEELS PRIOR TO ASSEMBLY.
 4. SEE AIRCRAFT PROCEDURE FOR WHEEL-SPARE ASSEMBLY.

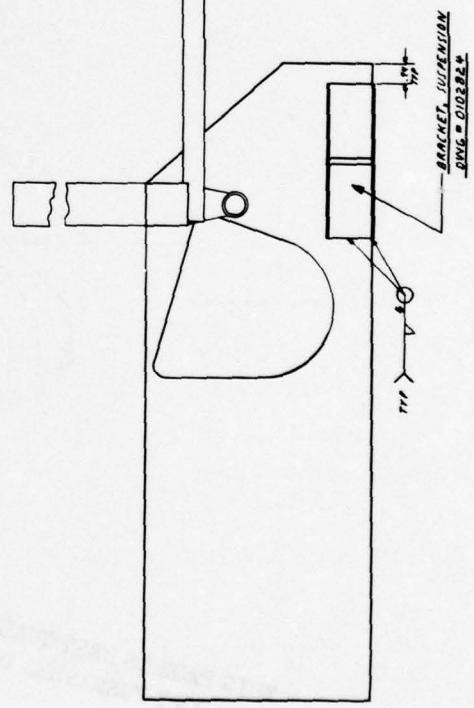
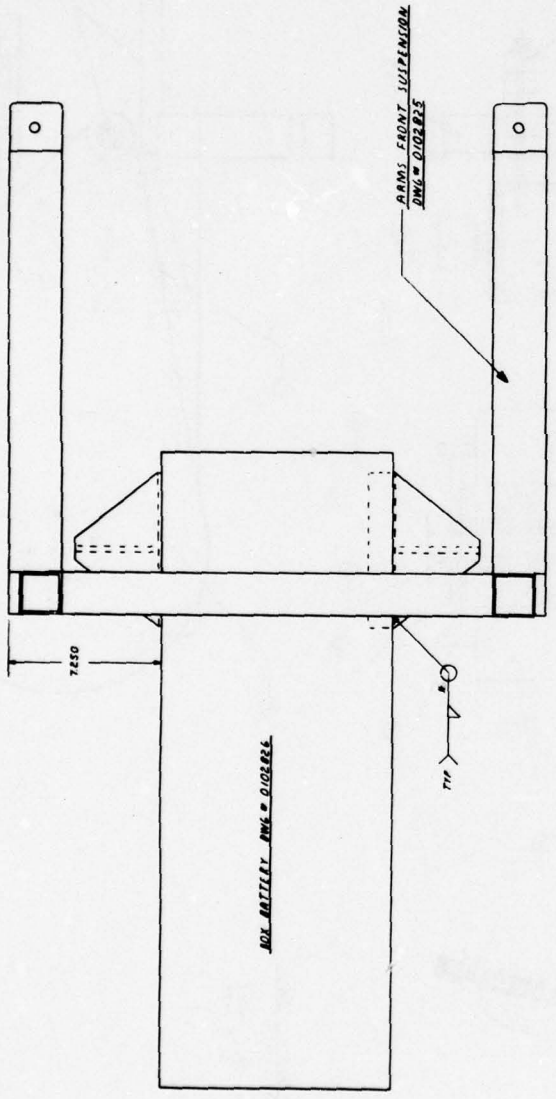
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4	WHEEL NUT	100-100-4
5	WHEEL LOCKWASHER	100-100-5
6	WHEEL LOCKWASHER WASHER	100-100-6
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29	WHEEL LOCKWASHER WASHER	100-100-29
30	WHEEL LOCKWASHER WASHER	100-100-30



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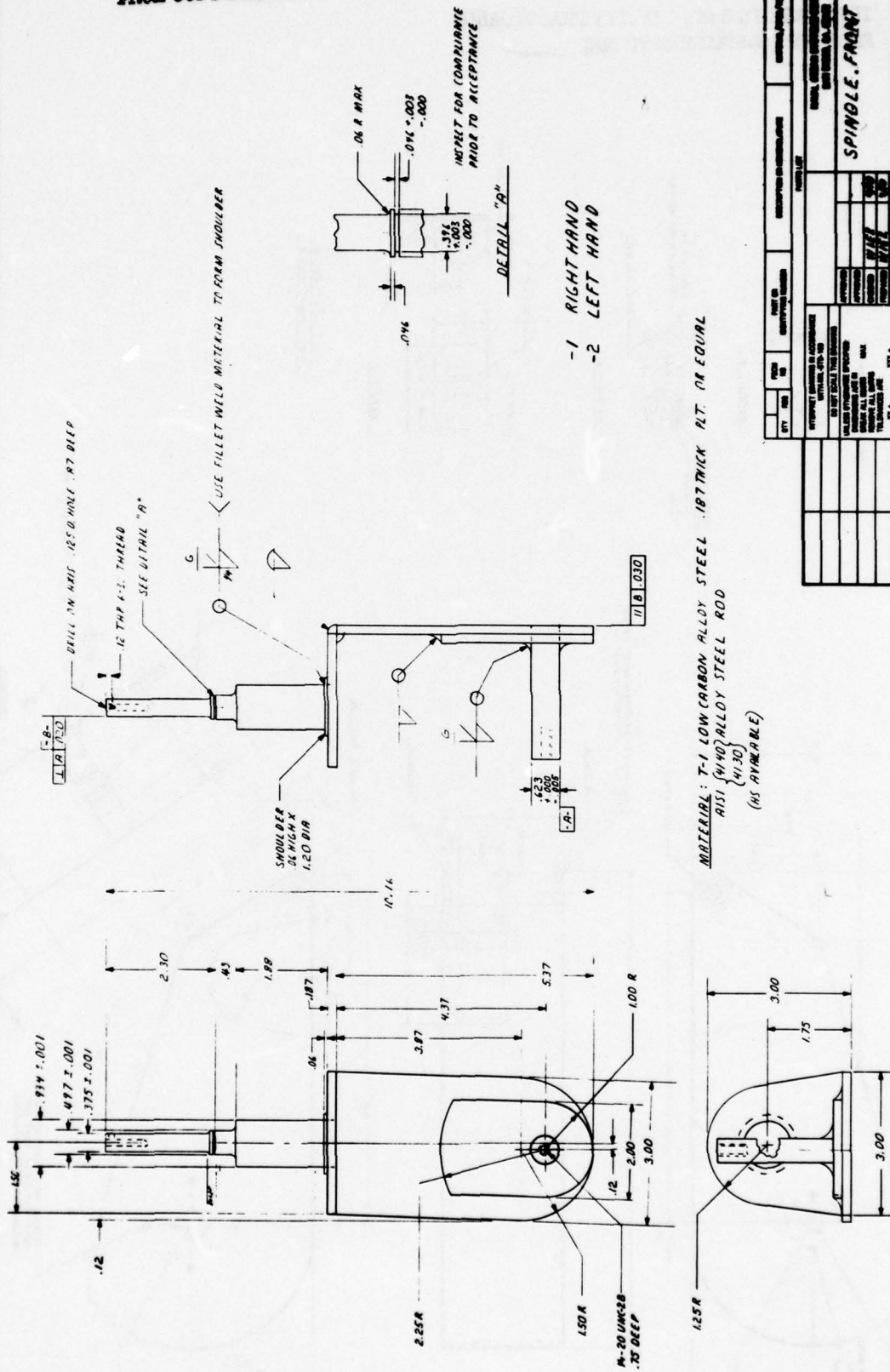
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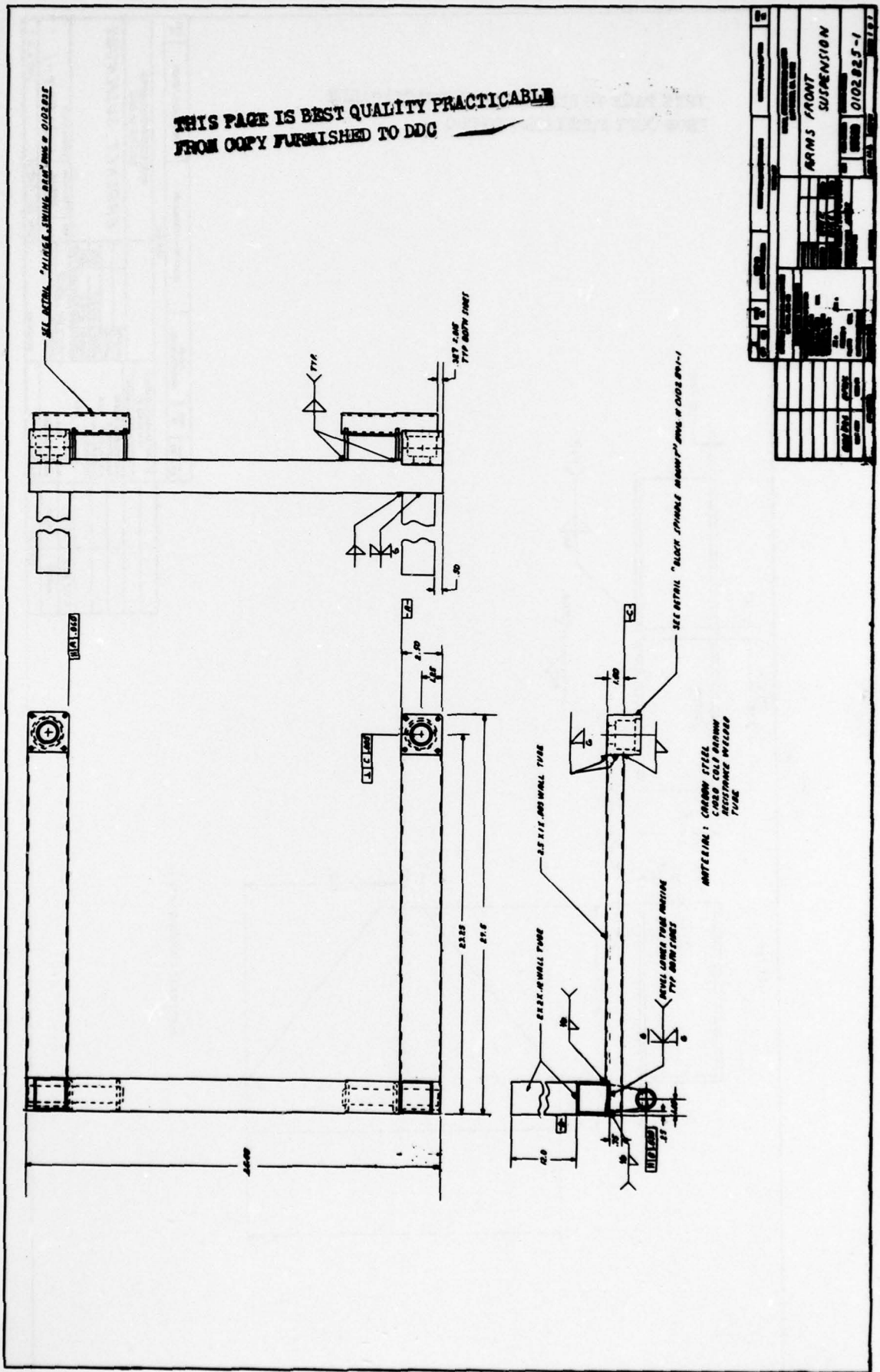


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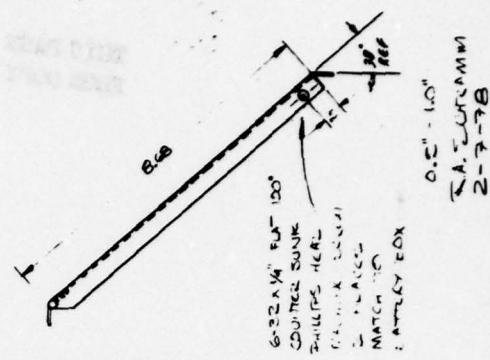
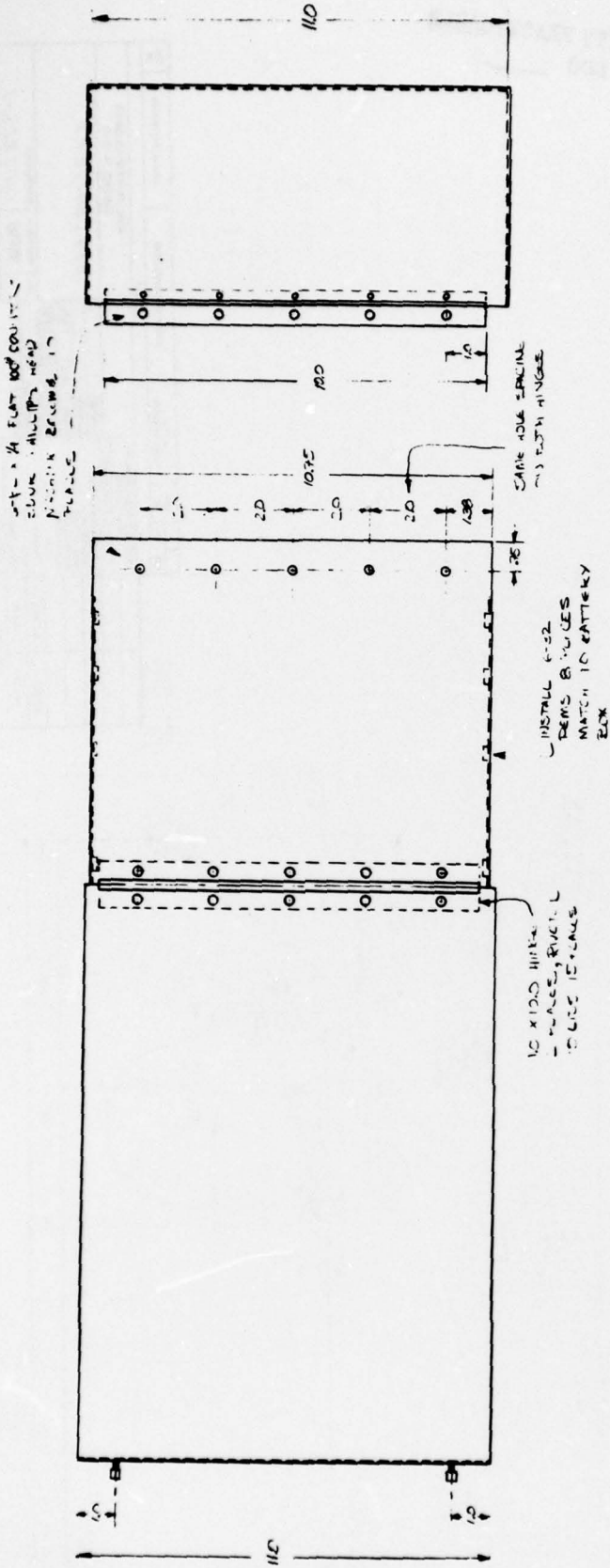
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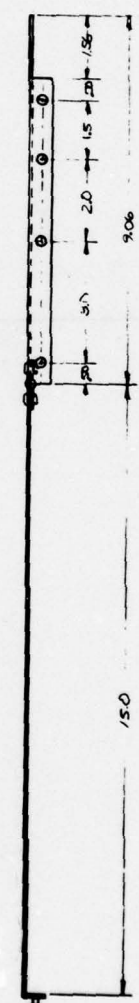
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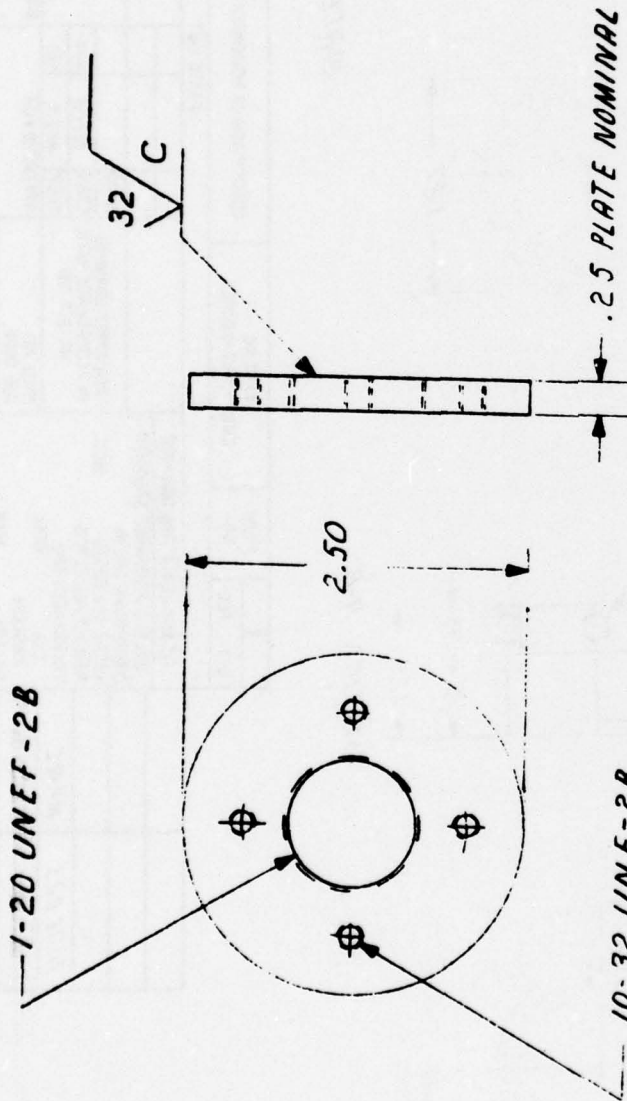
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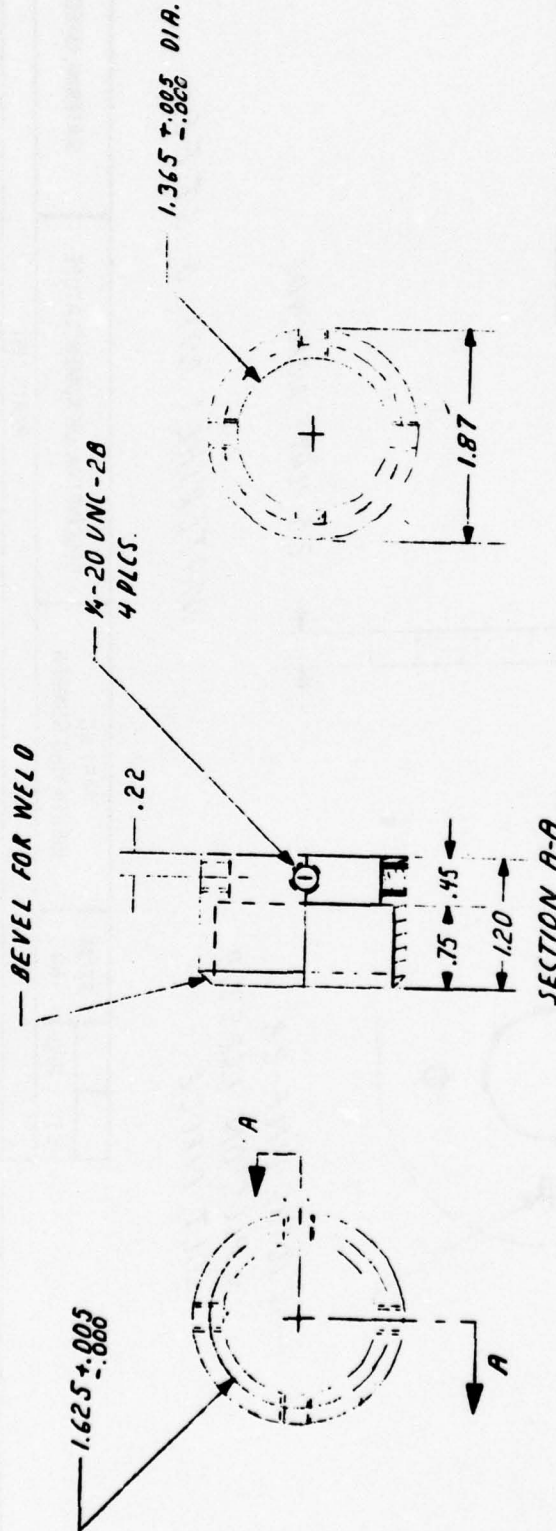


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NOTE: PART TO BE WELDED TO WHEEL HUB
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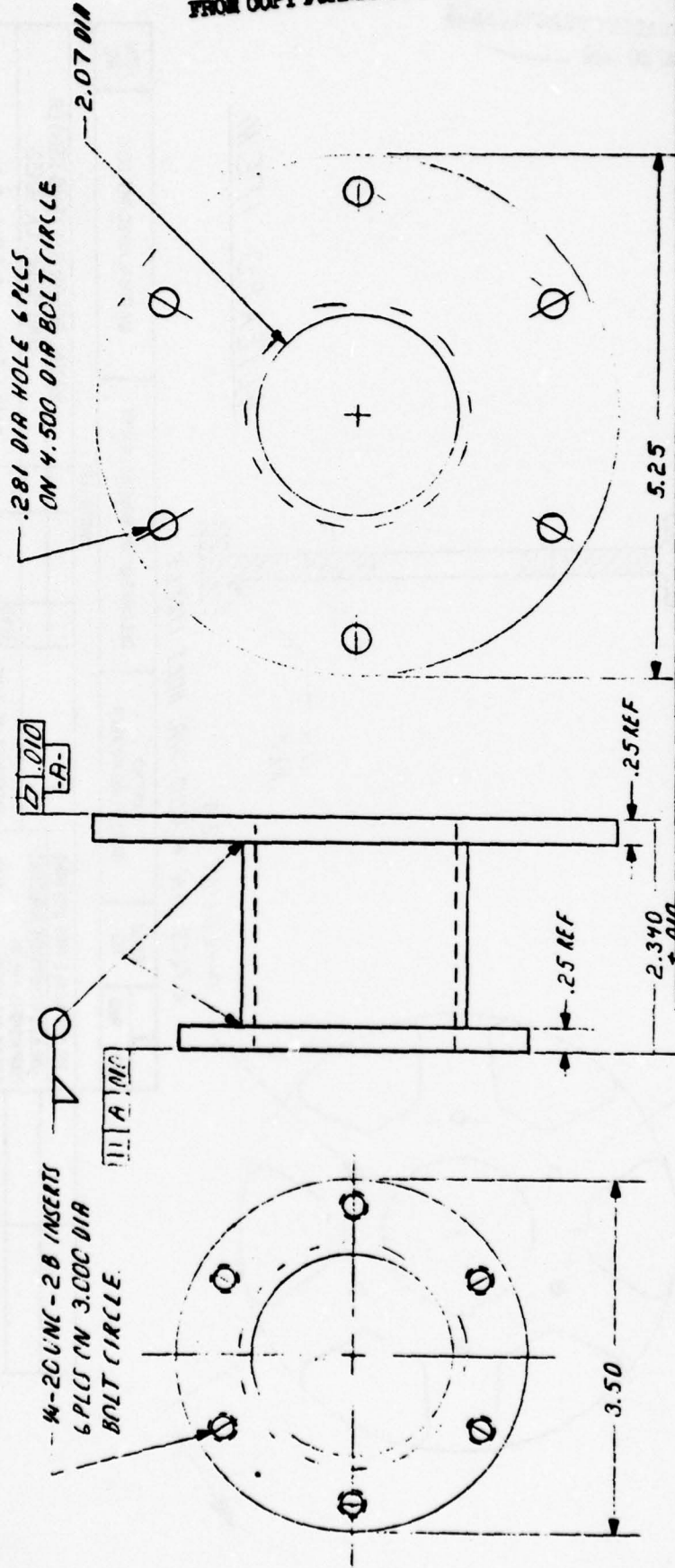
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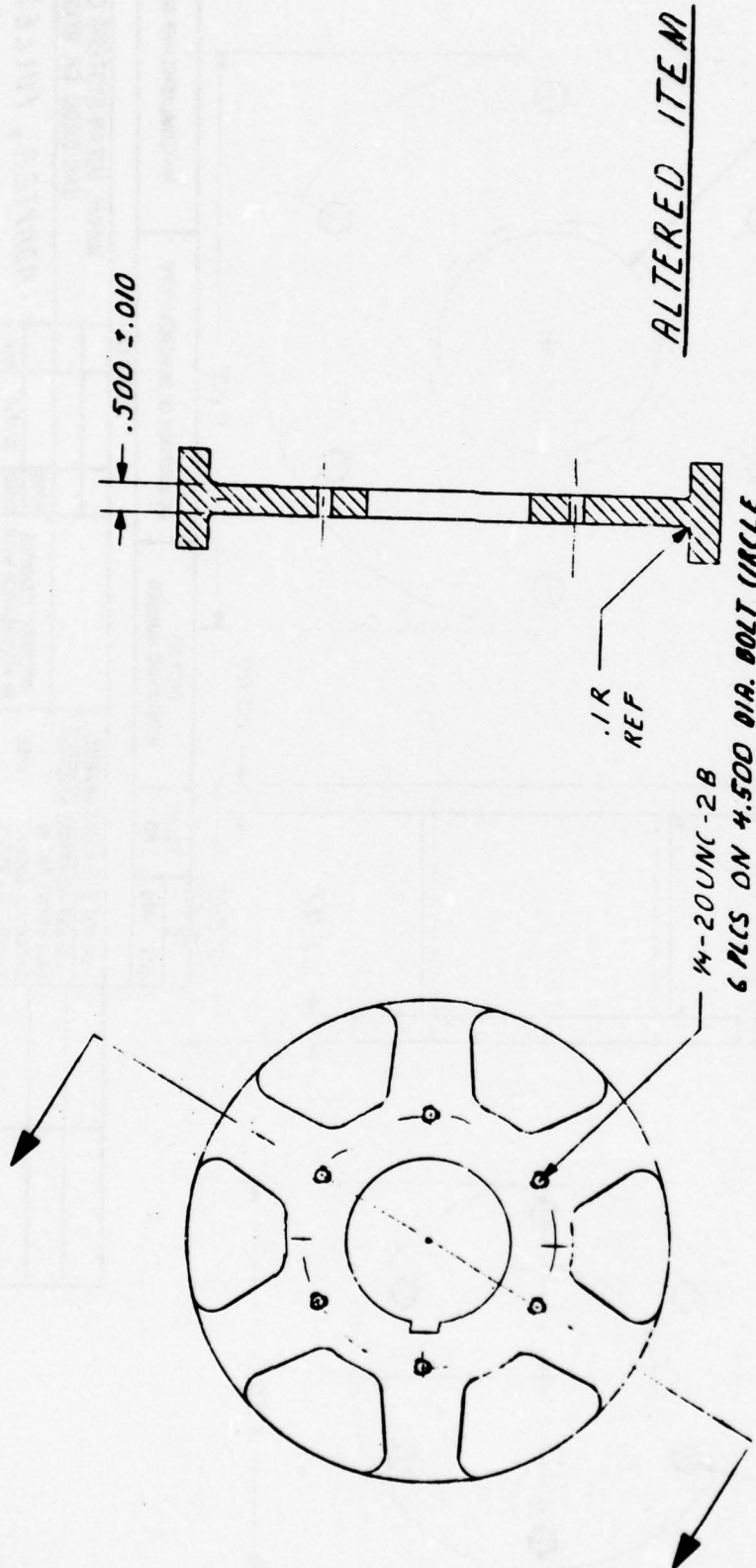
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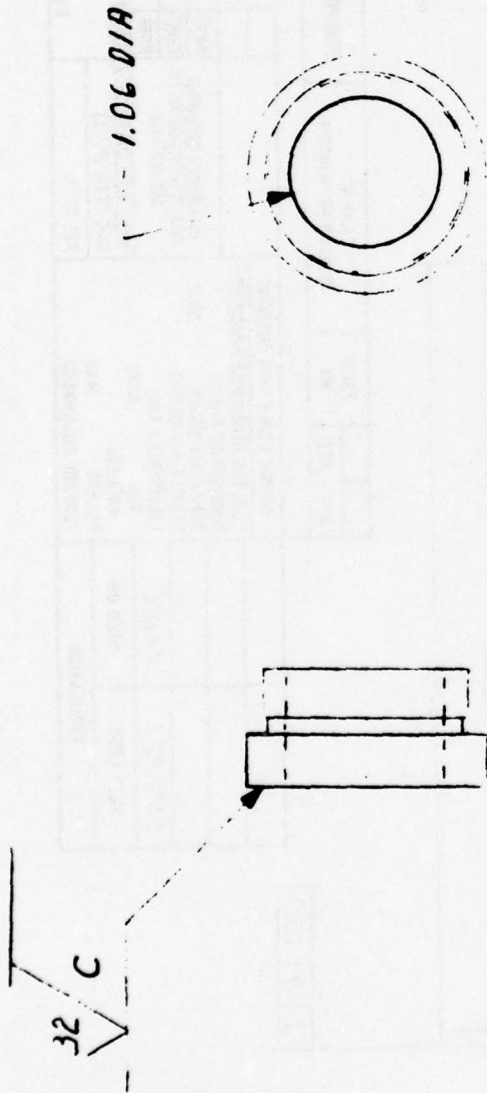
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ALTERED ITEM

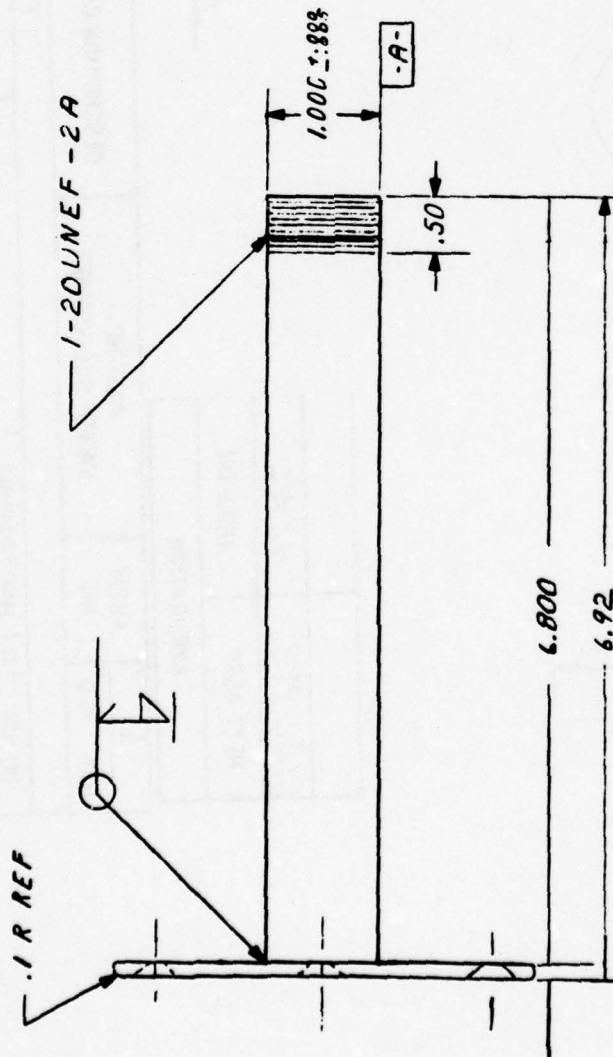
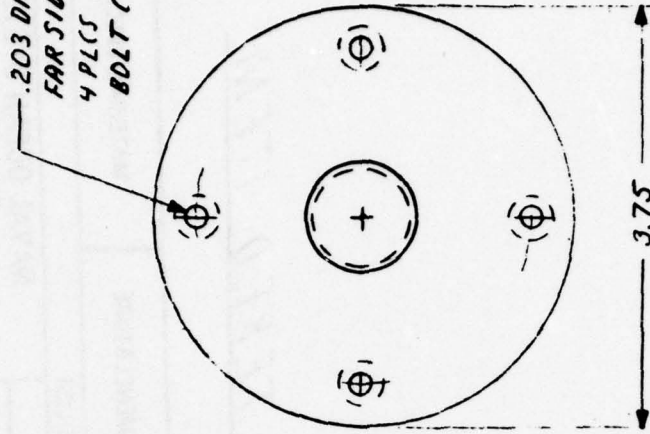
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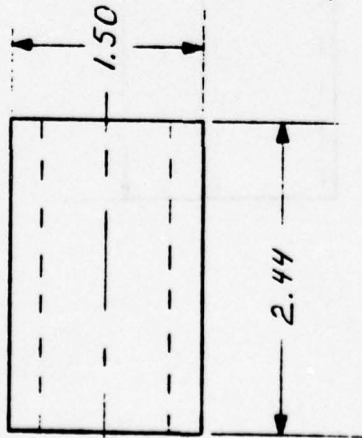
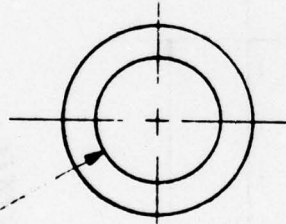


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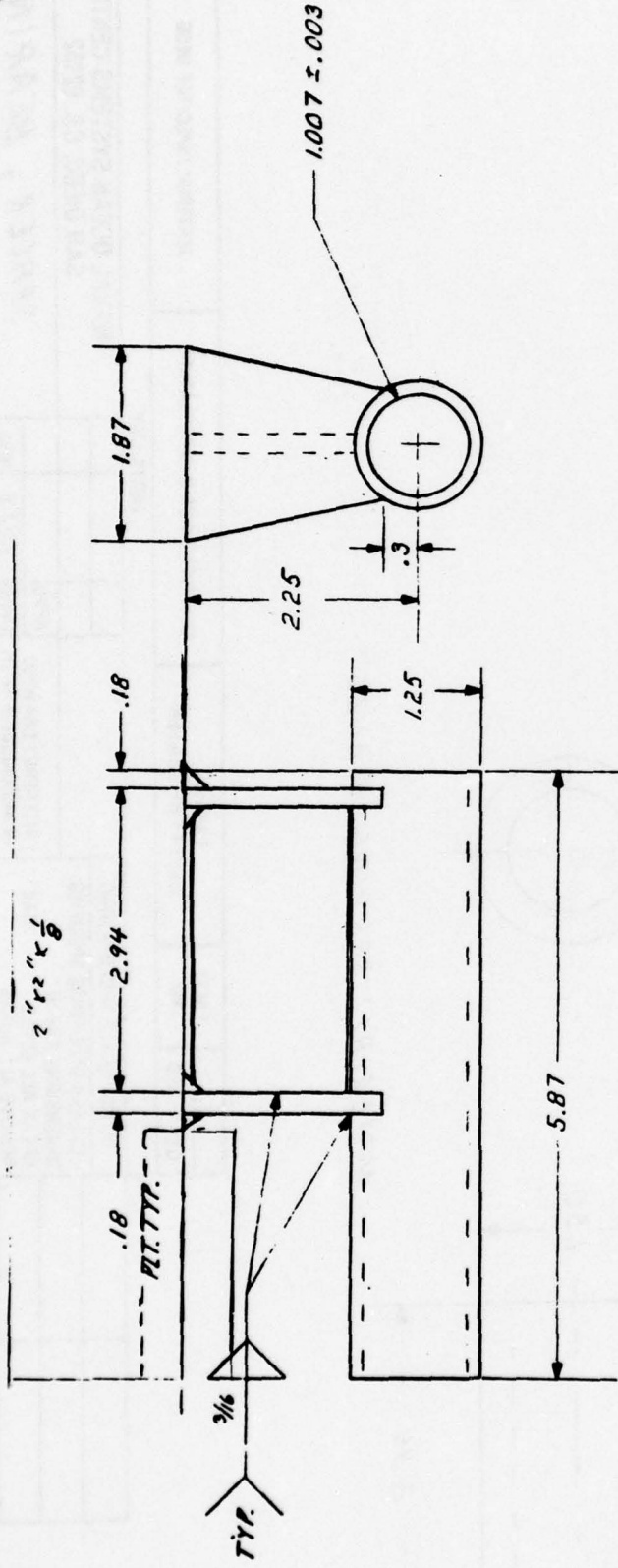


MATERIAL: BEARING BRONZE

QTY		FSCM NO.	PART NO IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL / SPEC / REF DESG	ITEM NO
DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED.		INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100		NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92152		
DIMENSIONS ARE IN MAX.		APVD		SPACER, BEARING		
BREAK ALL EDGES		CHKD WIER g/0		SIZE FSCM NUMBER DRAWING NUMBER		
REMOVE ALL BURRS		PREP WIER g/0		55910 0102834-1		
TOLERANCES ARE .XX± .XXX±		APPROVED FOR		SCALE 1:1 UNIT WT.		
ANGLES: MAX.		BY DIRECTION		SHEET 1 OF 1		
FILLETS		REL DATE				
SURFACE ROUGHNESS						
0102823		HPWC				
NEXT ASSY		USED ON				
APPLICATION						

11ND NOSC 391028 (11-77)

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MATERIAL : CARBON STEEL

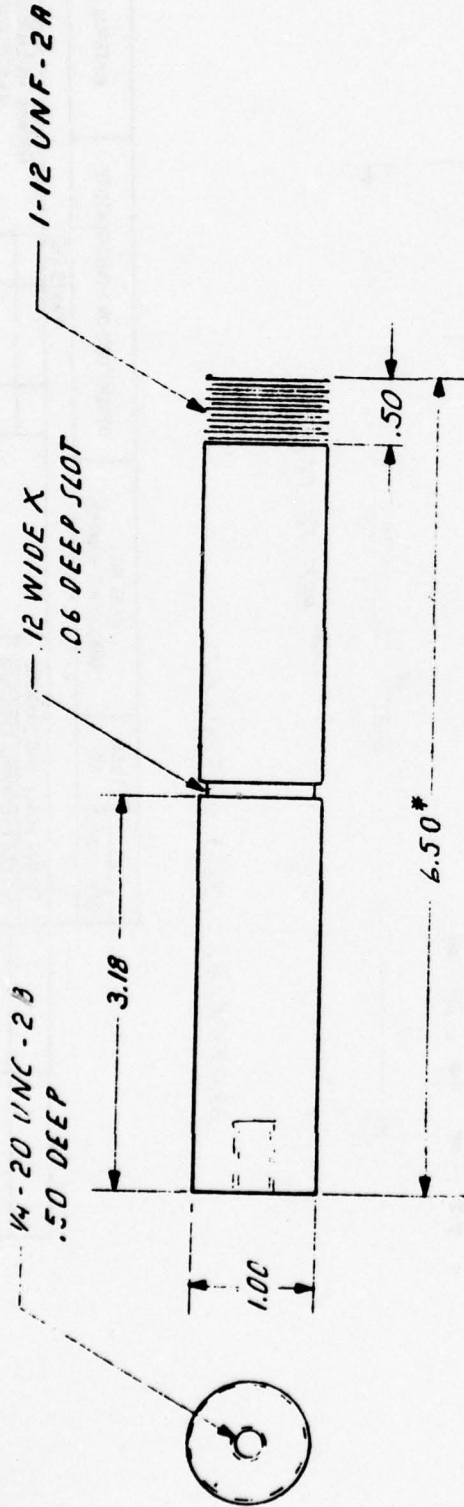
QTY	REQ	FSCM NO.	PART NO IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL/SPEC/REF DESG	ITEM NO.
				PARTS LIST		
				NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92132		
				HINGE, SWING ARM		
				APPROVED BY: WIER 4/10		
				INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-883		
				PROJ. NO. 10922407		
				REL DATE		
				BY: WIER 4/10		
				APPROVED FOR		
				BY: WIER 4/10		
				SIZE / FSCM NUMBER / DRAWING NUMBER		
				55010	0102835-1	
				SCALE 1:1	UNIT WT.	SHEET 1 OF 1

DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MAX. BREAK ALL EDGES REMOVE ALL BURRS TOLERANCES ARE: .XX6 ANGLES .XX6 FILLETS MAX SURFACE ROUGHNESS

0102835 HPWC
NEXT ASSY USED ON
APPLICATION

1140 MODC 3/16/79 (11.77)

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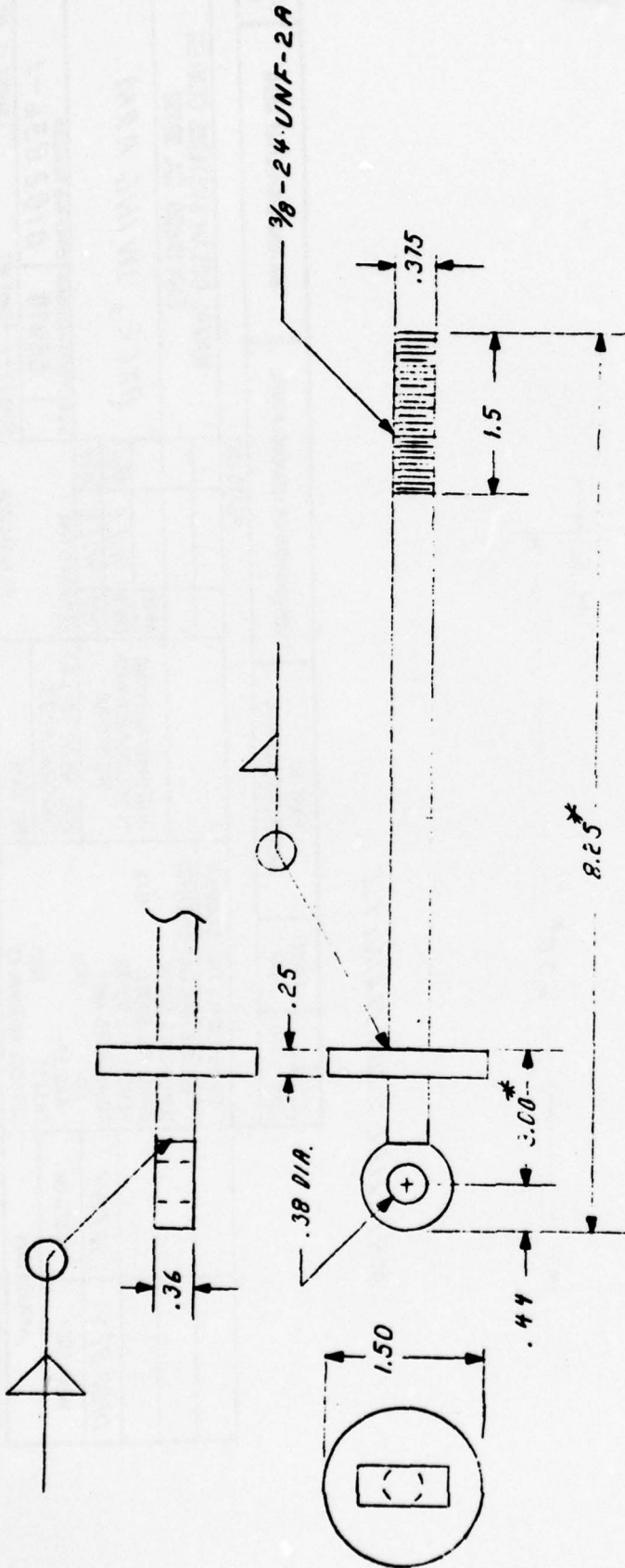


MATERIAL : 303 STAINLESS

QTY		FSCM NO.	PART NO. IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL/SPEC/REF DESG	ITEM NO.
					NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92152	
					AXLE, SWING ARM	
					APPROVED FOR	
					BY DIRECTION	
					APVD	
					CHKD W I E R 7/10	
					PREP W I E R 7/10	
					INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100	
					PROJ. NO. 727926A01	
					COG CODE #233	
					REL DATE	
					DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MAX. REMOVE ALL BURRS TOLERANCES ARE: XXS .XXXS ANGLES: MAX. FILLETS: MAX. SURFACE ROUGHNESS	
					0102 825	
					H P W C	
					NEXT ASSY USED ON	
					APPLICATION	
					SIZE FSCM NUMBER DRAWING NUMBER 55910 0102836-1	
					SCALE: 1/1 UNIT WT.	
						SHEET 1 OF 1

11ND MOBC 281028 (11-77)

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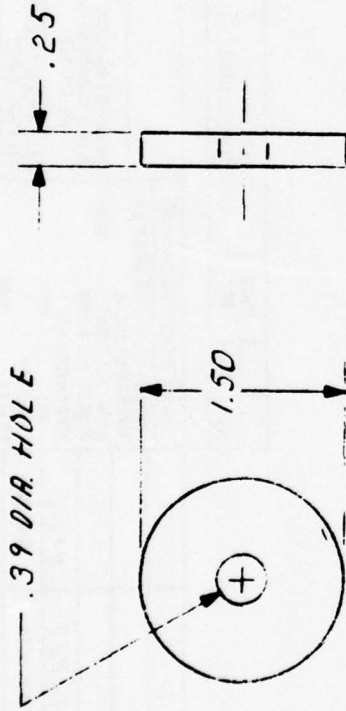


MATERIAL: 303 STAINLESS

QTY		FSCM NO.	PART NO. IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL / SPEC / REF DESG	ITEM NO.
PARTS LIST						
DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN MAX. BREAK ALL EDGES REMOVE ALL BURRS TOLERANCES ARE: .XX± .XXX± ANGLES: MAX. FILLETS SURFACE ROUGHNESS			APVD CHKD WIER 9/10 PREP WIER 9/10 APPROVED FOR		NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92152	
0102 82 4 HPWC			INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100		ROD, SUSPENSION	
NEXT ASSY USED ON APPLICATION			PROJ. NO. 720 89 22 2001 COS CODE 8237		SIZE FSCM NUMBER DRAWING NUMBER 55010 0102 837 -1	
			REL. DATE		SCALE 1/1 UNIT WT. SHEET 1 OF 1	

1140 MODC BRNBR (11-77)

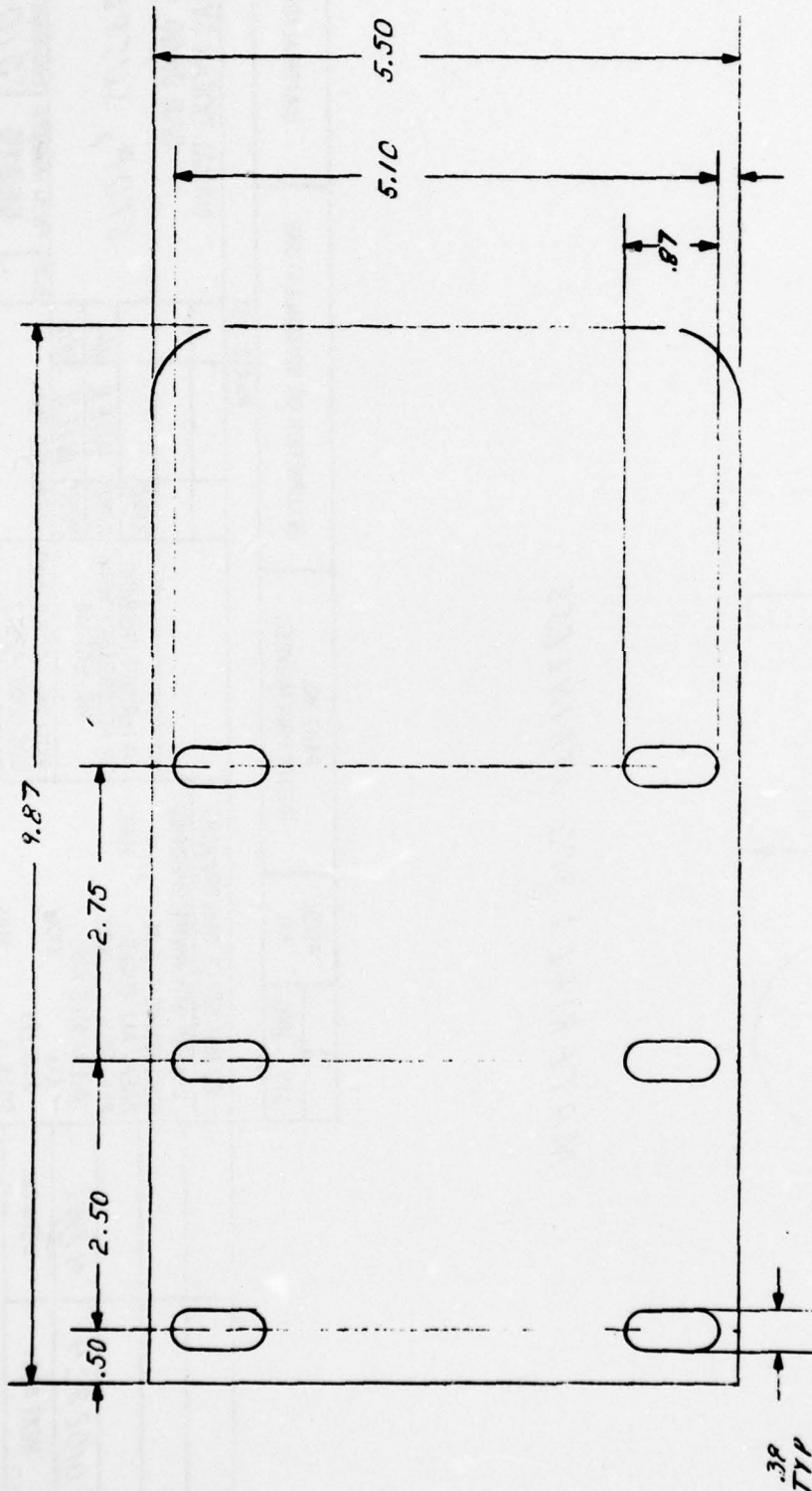
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FROM COPY FURNISHED TO DDC



MATERIAL: 303 STAINLESS

QTY		FSCM NO.	PART NO. IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL/SPEC/REF. DESG	ITEM NO.
					NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92152	
					STOP, SUSPENSION	
					SIZE FSCM NUMBER DRAWING NUMBER 55910 0102838-1	
					SCALE 1:1 UNIT WT.	SHEET 1 OF 1
DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN BREAK ALL EDGES REMOVE ALL BURRS TOLERANCES ARE: .XX± ANGLES: FILLETS SURFACE ROUGHNESS				APVD CHKD WIER W/0 PREP WIER W/0 APPROVED FOR		
INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100				BY DIRECTION		
PROJ. NO. (E09822A07) COG CODE 82.7.7						
REL DATE						
APPLICATION						
NEXT ASSY						
HPWC						
USED ON						

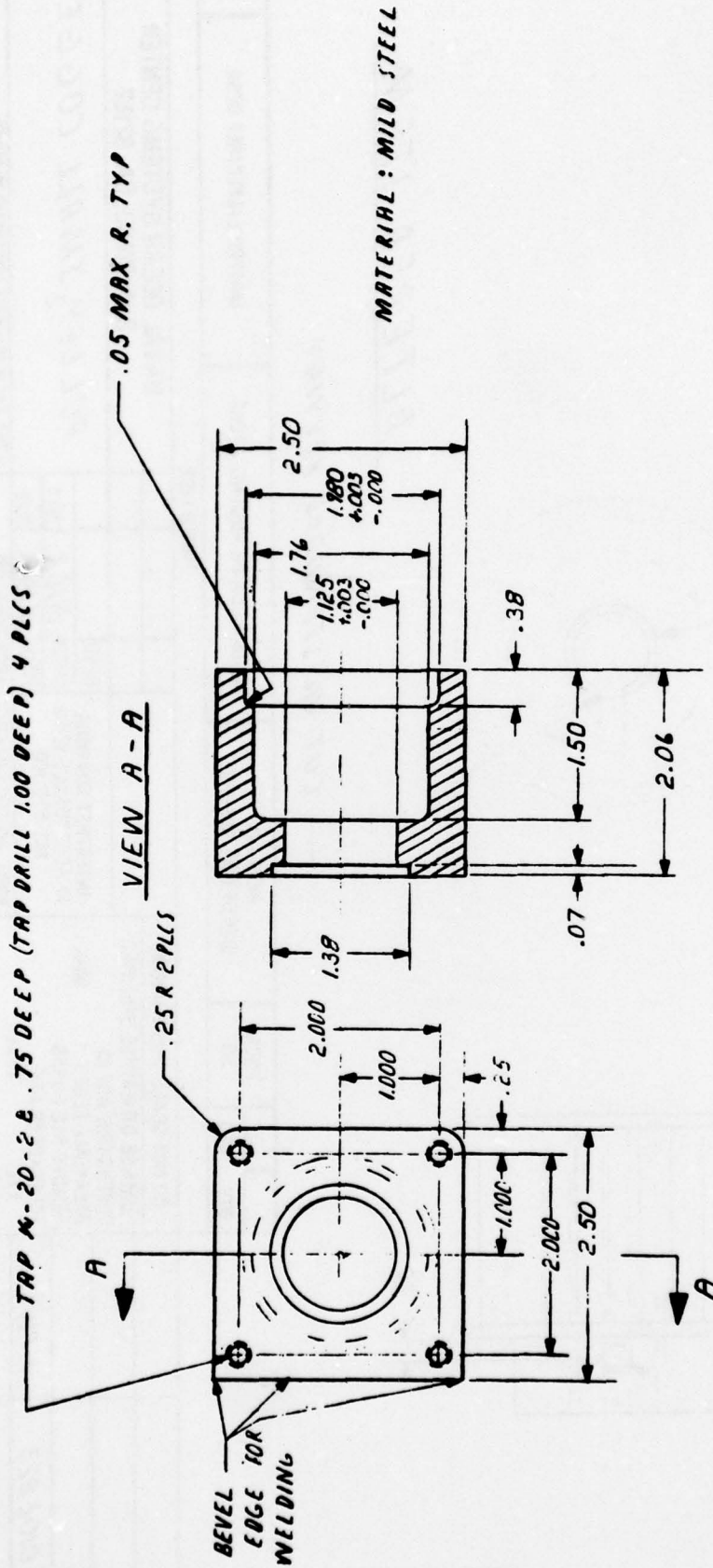
114ND MO5C 3010/70 (11-77)



.39
TYP

MATERIAL: .12 THICK
AL ALLOY PLT.

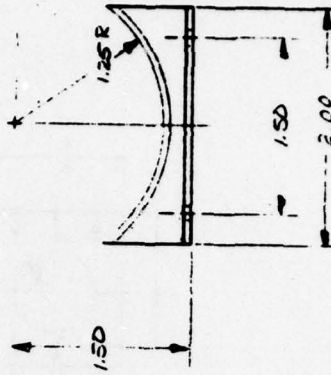
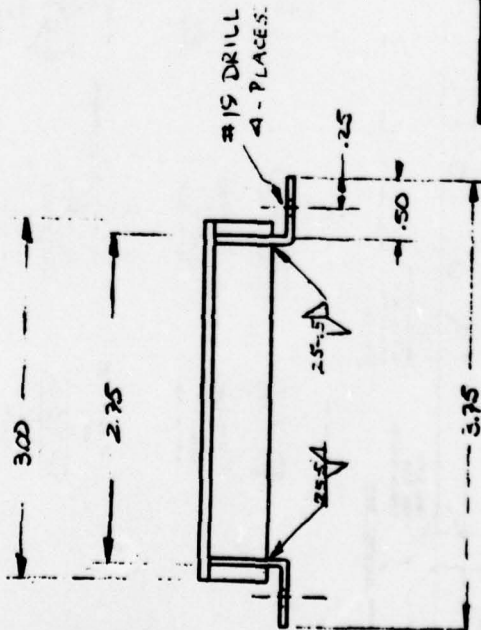
QTY		FSCM NO.	PART NO IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL/SPEC/REF DESG	ITEM NO.
DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MAX. BREAK ALL EDGES REMOVE ALL BURRS TOLERANCES ARE: .XXLg ANGLES: XXLg FILLETS MAX. SURFACE ROUGHNESS						
INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100						
PROJ NO: 607822A07 APPROVED FOR						
REL. DATE						
BY: DIRECTOR						
PARTS LIST						
APVD: _____ CHKD: WIER 3/80 PREP: WIER 5/80						
NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92152						
PLATE, MOTOR MDUNT						
SUBJ FSCM NUMBER DRAWING NUMBER 55910 0102 839 - 1						
SCALE: 1:1 UNIT WT. SHEET 1 OF 1						
APPLICATION						
NEXT ASSY H PNC USED ON						



QTY		FSCM NO.	PART NO. IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL / SPEC / REF. DESG.	ITEM NO.
					NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92132	
PARTS LIST						
					BLOCK, SPINDLE MOUNT	
				APPROV		
				CRD W/IER		
				PREP W/IER		
DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN BREAK ALL EDGES REMOVE ALL BURRS TOLERANCES ARE: .XXs ANGLES: FILLETs SURFACE ROUGHNESS				INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-199	APPROVED FOR	BY DIRECTION
D402 P25 HPNC				PROJ. NO. C109232CAM		
NEXT ASSY USED ON				CDS CODE P2.73		
APPLICATION						
SCALE 1:1 UNIT WT.						SHEET 1 OF 1

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MATL .063 ALUMINUM 6061-T6



QTY		FSCM NO	PART OR IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL / SPEC / REF DESG	ITEM NO.
PARTS LIST						
DO NOT SCALE THIS DRAWING			NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92152			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN BREAK ALL EDGES MAX REMOVE ALL BURRS TOLERANCES ARE: XX ± XXX ± ANGLES ± FILLETS MAX SURFACE ROUGHNESS			CRADLE MOTOR			
0102851	H/PWC		APVD			
NEXT ASSY	USED ON		CHKD WIER WHO			
APPLICATION			PREP SCHIRAHM W/O			
			APPROVED FOR			
			BY DIRECTION			
			SIZE			
			FSCM NUMBER 55910			
			DRAWING NUMBER 0102852-1			
			SCALE			
			UNIT WT			
			SHEET 1 OF 1			

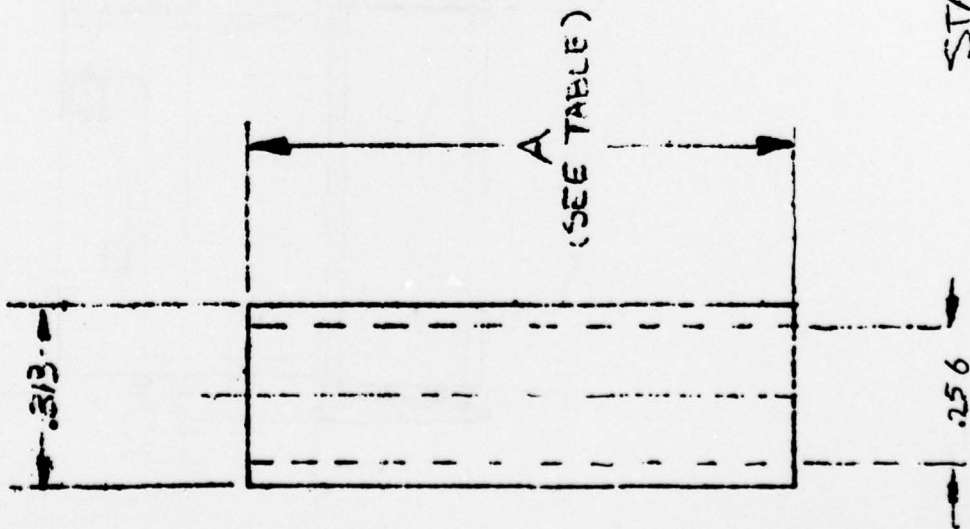
RA SACHAMM

4-6-78

CHKD p. 100. 9/10/78

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A	QUANTITY	MATERIAL
.395	8	5/16 O.D.
.875	4	DUNA STEEL
1.375	8	TUBE
1.500	12	22 Ga. WALL X .25 ID

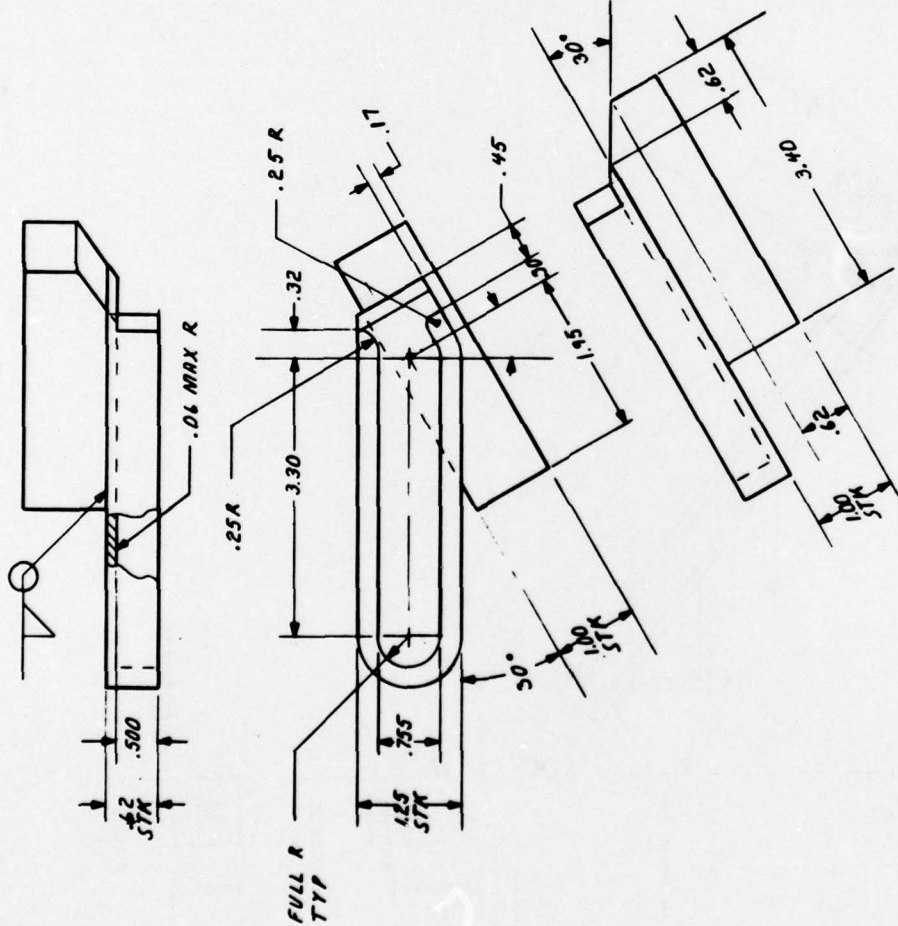


STANDOFFS

FSCM DWG 0102853-1

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1 - LEFT SHOWN
2 - RIGHT



LOWER LIFTING RAIL

QTY	REQ	PCN	NO	PART NO IDENTIFYING NUMBER	DESCRIPTION OR IDENTIFICATION	UNITS/REQ/REP	REV	NO
					NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA 92162			
					APR 64			
					INTERPRET DRAWINGS IN ACCORDANCE WITH MIL-STD-100			
					PART NO. C48792130 REQ. NO. C48792130			
					DATE: 10/21/75			
					APPROVED FOR			
					BY: _____			
					DATE: _____			
					SCALE: 1:1			
					FIG. NO: 0103960			
					REV. NO: 1			

DO NOT SCALE THIS DRAWING
UNLESS OTHERWISE SPECIFIED.
DIMENSIONS ARE IN
DECIMALS UNLESS OTHERWISE SPECIFIED.
MAX.
BREAK ALL EDGES
REMOVE ALL BURRS
TOLERANCES ARE
XXX
XXX
XXX
PALLETS
SURFACE FINISHES

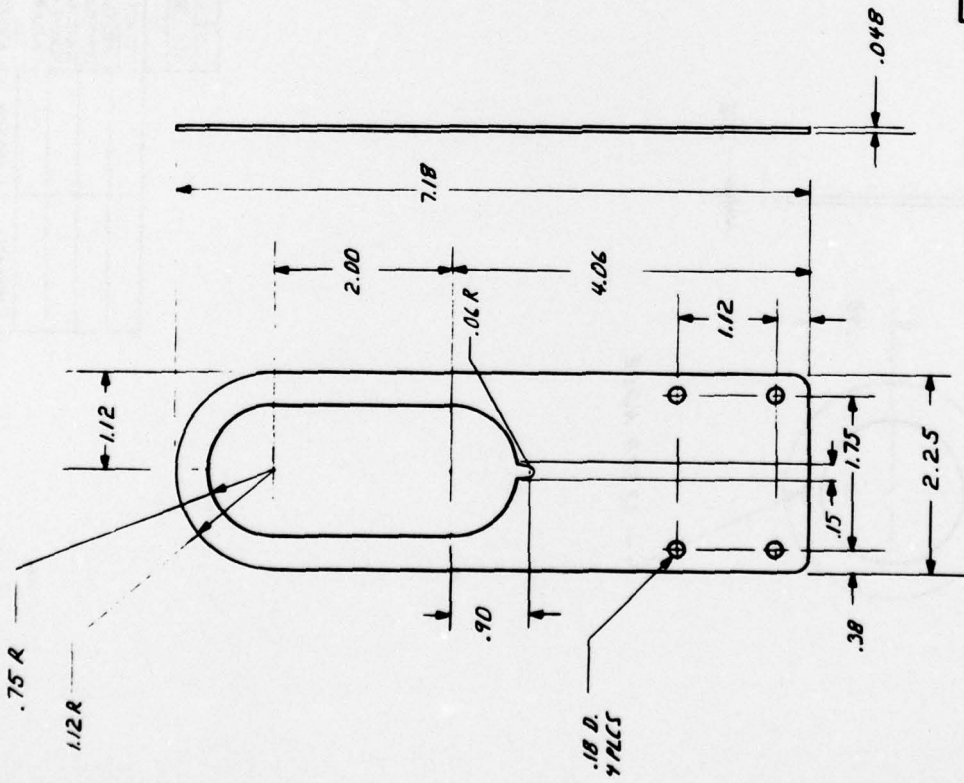
REF. TO C48792130
MIL. SPEC. P. 2.3.3

REL. DATE
10/21/75

APPLICATOR
10/21/75 (10/75)

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MATERIALS: STAINLESS STEEL
 420



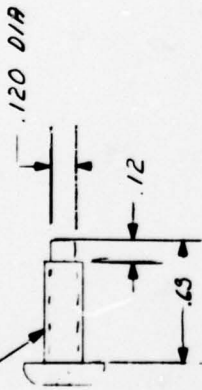
HEAT TREAT TO RC 65 MIN

QTY		FROM NO.	PART NO. IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE		MATERIAL/AFSC/MSF UNS		ITEM NO.
						NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92162		
			INTERPRET DRAWINGS IN ACCORDANCE WITH MIL-STD-105			CONNECTOR TRACAE		
			FULL INDICATIONS TO GOVERN DIMENSIONS			DRAWING NUMBER: 0103961		
			DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED: UNLESS OTHERWISE SPECIFIED: BREAK ALL CORNERS REMOVE ALL BURRS TOLERANCES ARE: DIMS: FRACTIONS DECIMALS ANGLES: DEGREES PALLETS: SURFACE FINISHES:			DRAWING TITLE: APPROVED FOR		
			MAX. ANGLES: 30°			SCALE: 1.00		
			MAX. SURFACE FINISHES: 125			DATE: 1961		
						BY: J. M. D. [Signature]		SHEET: 1 OF 1
						APPICATION		

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PIVOT PIN, CONNECTOR

PAN HEAD SCREW 10-32 UNF



MODIFIED PART

QTY REQ		FSCM NO		PART NO IDENTIFYING NUMBER		DESCRIPTION OR NOMENCLATURE		MATERIAL/SPEC/REF DESG		ITEM NO
						PARTS LIST		NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA. 92152		
				INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100		APVD		PIVOT PIN, CONNECTOR		
				PROJ NO 060982762 COG CODE 233		CHKD GAE/ST/9/21 PREP CJE/2/9/80		SIZE FSCM NUMBER DRAWING NUMBER 55910 2103965		
		DO NOT SCALE THIS DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN BREAK ALL EDGES REMOVE ALL BURRS TOLERANCES ARE XX± ANGLES: FILLETS SURFACE ROUGHNESS		REL DATE		APPROVED FOR		SCALE		SHEET 1 OF 1
NEXT ASSY		USED ON		APPLICATION		BY DIRECTION		UNIT WT.		