FR-1529

REPORT NO. [illegible]-1529

DATE 28 April 1939

SUBJECT

Report of Test

on

[illegible]orns, Navy Types H-1 and H-2, Manufactured

and Submitted by the Navy Yard,

Portsmouth, N. H.

By

[illegible] Hardesty
W. B. Roberts [illegible]

NAVAL RESEARCH LABORATORY

BELLEVUE, D. C.

April 20, 1939 NRL Report No. B-1529

NAVY DEPARTMENT

BUREAU OF ENGINEERING

Report of Test

on

Horns, Navy Types H-1 and H-2, Manufactured and Submitted by the Navy Yard, Portsmouth, N.H.

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
Washington, D.C.

Number of Pages: Text - 6 Plates - 4

Authorization: BuEng.let. S65-4(2-27-Ds) of 8 March 1939.
BuEng.let. S65-4(2-1-Ds) of 22 March 1939.

Date of Test: April 1939.

Tested by: G.K.C. Hardesty, Sr.Engineering Aide

Prepared by: W.B. Roberts, Chief Engineering Aide, Chief of Section.

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Approved by: H.M.Cooley, Captain, U.S.N., Director.

Distribution:
BuEng. (5)

vhw

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APPENDICES

AUTHORIZATION FOR TESTS

1. These tests were authorized by references (a) and (b) and an additional reference pertinent to these tests is listed as reference (c).

Reference: (a) BuEng.let. S65-4(2-27-Ds) of 8 March 1939.
(b) BuEng.let. S65-4(2-1-Ds) of 22 March 1939.
(c) Specifications 17S11(INT) of 15 February 1938.

OBJECT OF TESTS

2. The object of these tests was to determine conformance of the sample horns with the specifications, reference (c), and their suitability for Naval use as Navy types H-1 and H-2.

ABSTRACT OF TESTS

3. The sample horns were set up in suitable test circuits at this Laboratory where their performance was carefully observed for compliance with the requirements. The tests were concluded with an inspection of the horns to determine compliance with the specifications in the matter of design, materials and workmanship.

Conclusions

(a) Both of the subject horns passed a satisfactory test and they complied with the specifications except for the coil winding requirements. However, on the type H-1 horn, it was necessary to place a 500 ohm resistor in series with the condenser shunting the contacts before a stable note could be had. This resistor not only improved the quality of the note but reduced the peak voltage at the contacts from approximately 460 volts to 330 volts.

(b) The winding of the type H-2 horn was found to be partially shorted and charred at the end of the test.

Recommendations

(a) It is recommended that the sample horns be approved for Naval use subject to the use of an approved magnet wire, properly impregnated, and a 500 ohm resistor connected in series with the condenser shunting the contacts on the type H-1 horn.

DESCRIPTION OF MATERIALS UNDER TEST

4. The sample horn, submitted as a Navy type H-1, is of the vibrating type, employing contacts to interrupt the circuit, and is designed to operate on 115 volts, direct current.

5. The electromagnet is made up of thin iron punchings of "U" shape, on which is located a single winding. The noise is produced by a steel button, riveted to the under side of the flat soft iron hinged armature, striking the nickel-chromium alloy diaphragm each time the circuit is interrupted. Directions for adjustment are located in the bottom of the case.

6. The electromagnet, vibrator, terminal block and condenser are located on a heavy BE metal chassis, which also serves as a clamping ring for the diaphragm. Steel inserts are provided in the cover for the clamping ring screws.

7. The case, of cast aluminum alloy, is provided with two (2) bosses, one tapped for a 3/4 inch (IPS) standard Navy terminal tube, and two (2) mounting lugs with holes to accommodate 3/8 inch bolts. A 1/4 inch square rubber gasket is recessed into the rim of the case and insures watertightness when the "V" edge cast aluminum alloy cover is held in place by four (4) 5/16 inch brass cap screws which thread into steel inserts located in the rim of the case.

8. The case and cover are finished on the outside with gray paint over zinc chromate and aluminum paints and the inside of the case with black insulating varnish over zinc chromate and aluminum paints.

9. An engraved nameplate of corrosion-resisting material is attached to the cover. Four (4) 1/8 inch drain holes are provided in the case cover which is cast integral with the projector.

10. The type H-2 horn is very similar except that it has no contacts and is designed to operate on 115 volts a.c. 60 cycles.

11. Further details are given in photographs, Plates 1, 2, 3 and 4.

METHOD OF TEST

12. The sample horns were first tested to determine their electrical characteristics, pitch of note and sound pressure output.

13. They were then subjected to an endurance test of 1500 cycles of "one minute on" and "one minute off", the first 750 cycles at an ambient temperature of 60°C. and the second half at 0°C. During the first half of this test, the temperature rises of the windings were determined by the resistance method.

14. They were next placed on a standard Bureau of Engineering shock stand and subjected to 20 shocks of 250 foot pounds each as specified in paragraph F-2g, followed by the vibration test specified in paragraph F-2h.

15. The sound pressure output and pitch of note were again checked at the conclusion of the endurance, shock and vibration tests to note any change.

16. Next followed tests for satisfactory operation when inclined at all angles and supplied with ± 10% rated voltage and frequency as specified in paragraphs B-3 and D-12i.

17. Then followed tests for dielectric strength, insulation resistance and watertight integrity.

18. The salt spray test was then conducted to determine resistance to corrosion. One of the sample horns was subjected, under ultra-violet, to a 20% salt spray at 55°C. for 3 minutes, followed by an air blast at 55°C. for 3 minutes, the cycle being repeated for an uninterrupted period of 100 hours.

19. The tests were concluded with a careful examination of the samples to determine compliance with the specifications pertaining to design, quality of workmanship and materials, and any defects resulting from the tests.

RESULTS OF TESTS

20. The test results obtained were as follows:

Requirements	Test Values	
	Type H-1	Type H-2
Voltage: 115 volts	115 volts.	115 volts.
Current: Type H-1 direct; H-2 a.c. 60 cycles.	D.C.	A.C. 60 cycles.
Amperes: Not specified.	0.16 amperes.	0.194 amperes.
Watts: Not to exceed 25.	11.8 watts.	13 watts.
Power Factor: Not less than 40% on a.c. types.	--	58.2%
Pitch of Note: 100 to 600 C.P.S.	230 C.P.S.	120 C.P.S.
Sound Pressure Output: Not less than 75 decibels at 18 feet in a soundproof room.	91 db.	79 db.
Weight: Shall not exceed 6 pounds.	4 pounds, 8 ounces.	4 pounds, 6 ounces.

Requirement	Test Values	
	Type H-1	Type H-2
by an air blast at 55°C. for 3 minutes, the cycle being repeated for a period of 100 hours. Shall show no serious corrosion and shall operate satisfactorily at the end of the test.		
Nameplates: Shall be in accordance with N.D. Specification 42N2.	Complied.	Complied.
Case Material: Shall be of bronze or cast aluminum alloy in accordance with paragraph D-3.	Complied, cast aluminum alloy.	Complied, cast aluminum alloy.
Diaphragm: Shall be of nickel-chromium alloy.	Complied.	Complied.
Painting: One priming coat of zinc chromate paint, followed by two coats of aluminum paint prior to finishing coat of gray paint.	Complied.	Complied.
Protective Covering for Coils: Shall be non-hygroscopic and not glued or cemented to the coil.	Complied, varnished cambric used.	Complied, varnished cambric used.
Contacts: Shall be of tungsten.	Complied.	None used.
Terminal Block: Shall be of phenolic material.	Complied.	Complied.
Coil Windings: Shall be of double silk or double cotton covered enameled copper wire.	*Single silk enameled copper wire.	*Single silk enameled copper wire. NOTE: The insulation was found burned at end of test.

* Denotes failure to comply with the specifications.

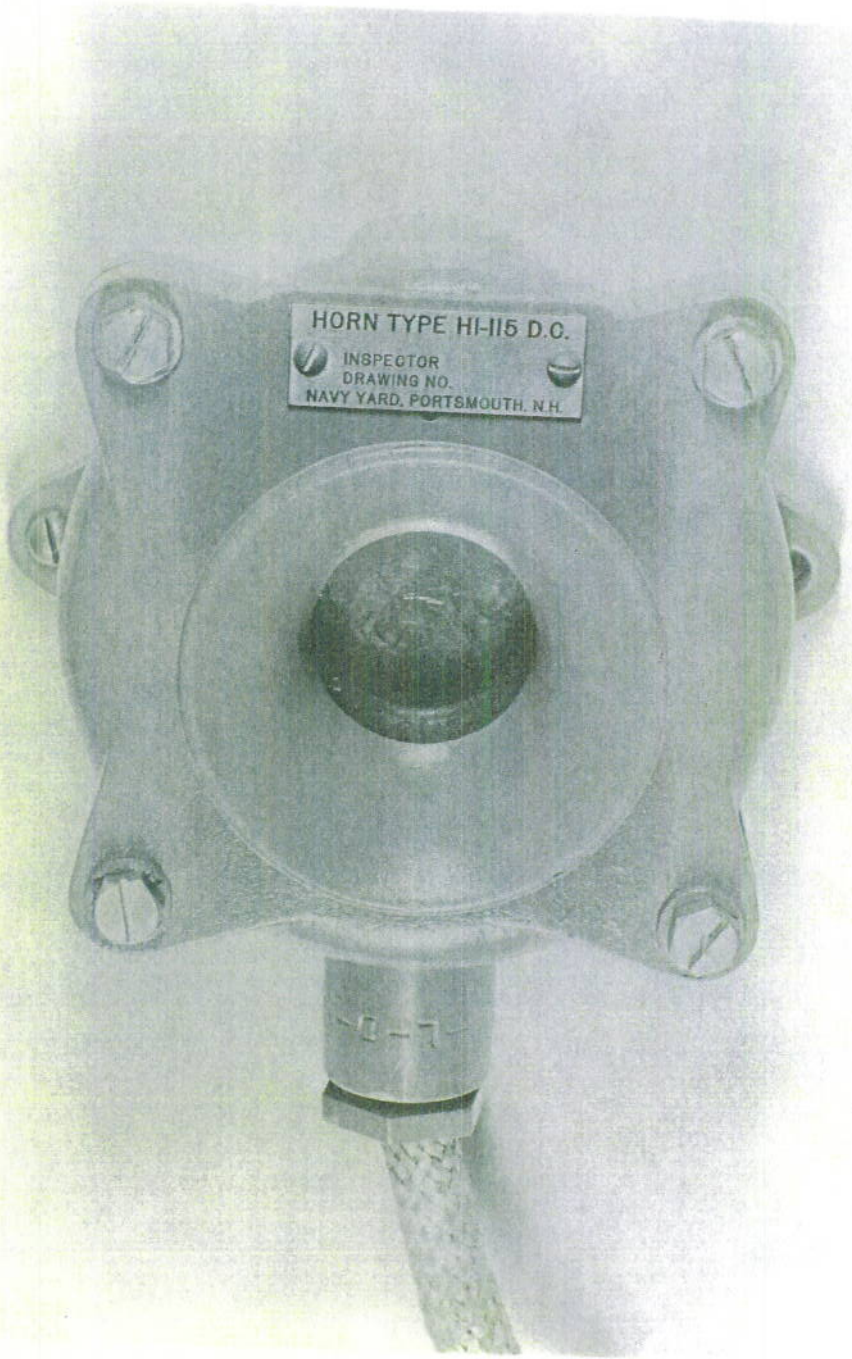
HORN TYPE HI-115 D.C.
INSPECTOR
DRAWING NO.
NAVY YARD, PORTSMOUTH, N.H.

Plate 1

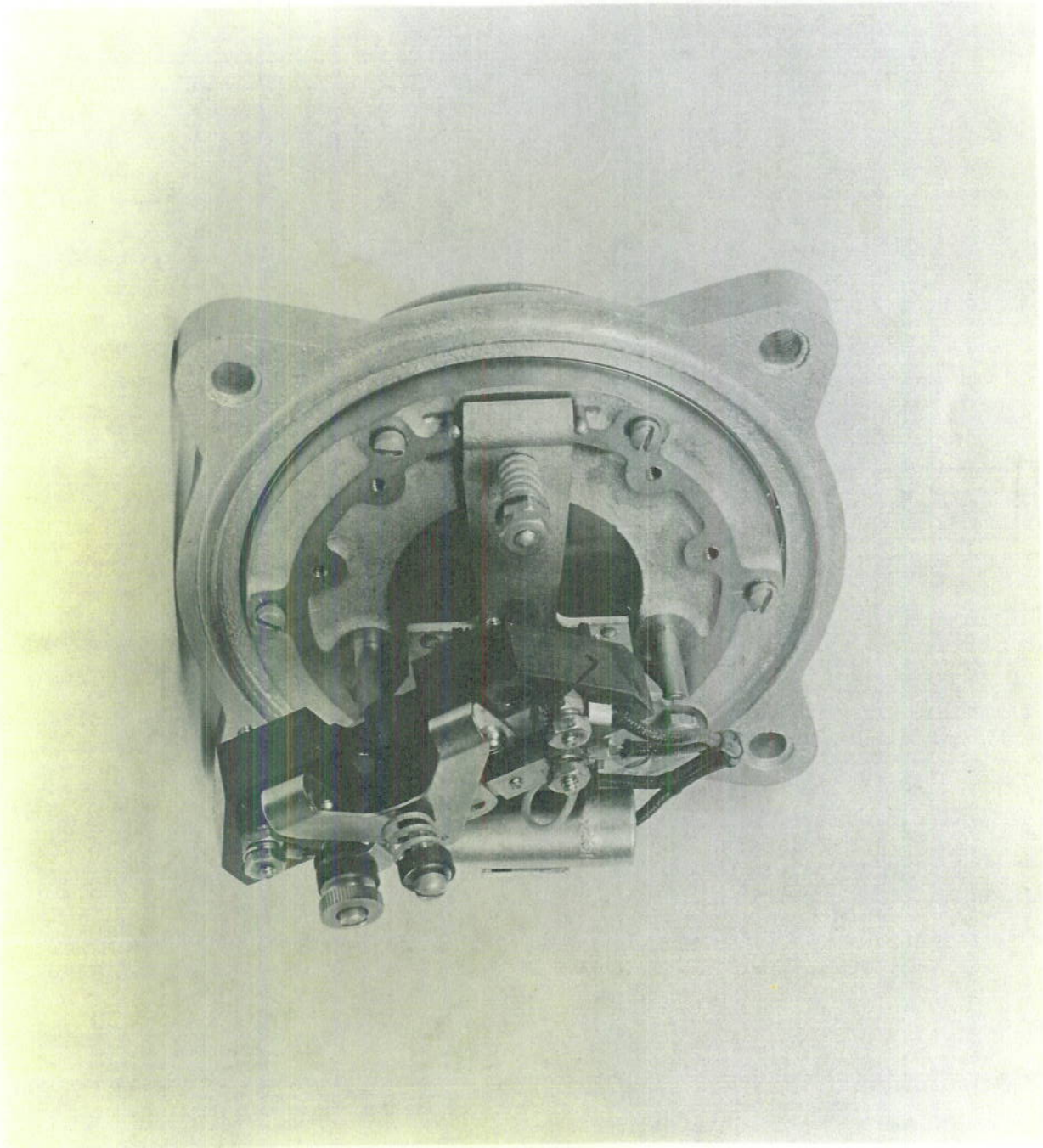

Plate 2

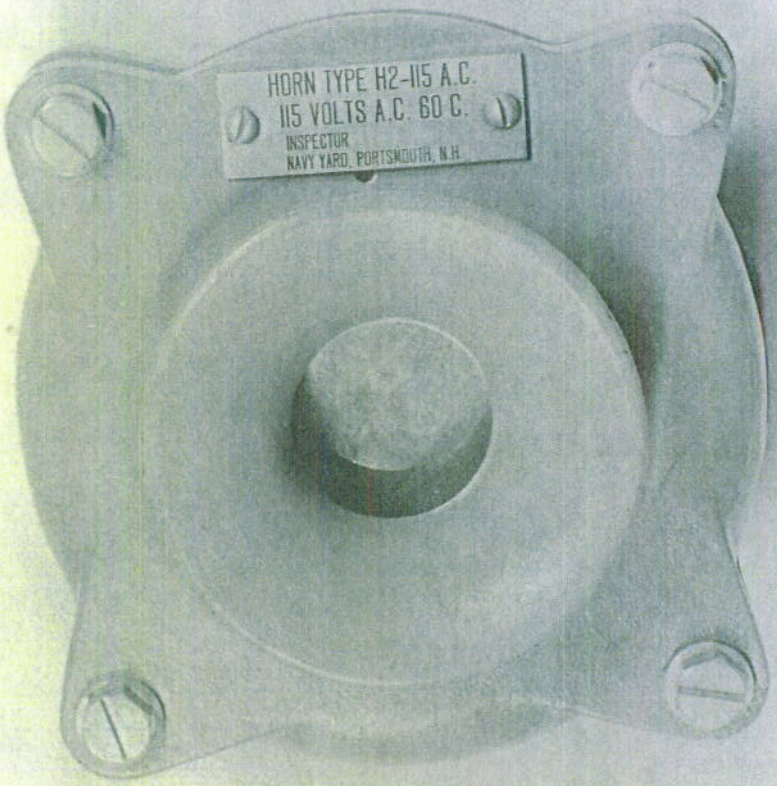
HORN TYPE H2-115 A.C.
115 VOLTS A.C. 60 C.
INSPECTOR
NAVY YARD, PORTSMOUTH, N.H.

Plate 3

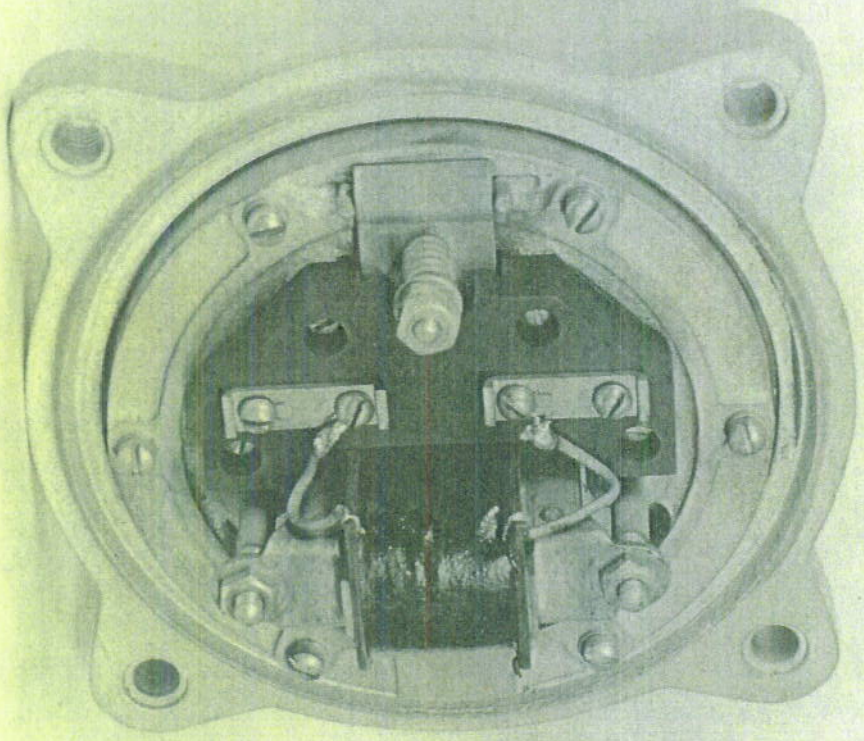

Plate 4