

FR-1246

REPORT NO. B-1246

DATE 11 March 1936

SUBJECT

Report on  
Test of Annunciator  
Manufactured by  
Portsmouth Navy Yard.

by

W. B. ROBERTS

Naval Research Laboratory  
Office of Naval Research  
Navy Department  
Washington 25, D. C.

APPROVED FOR PUBLIC  
RELEASE - DISTRIBUTION  
UNLIMITED

11 March 1936

NRL Report No. B-1246

NAVY DEPARTMENT  
BUREAU OF ENGINEERING

Report  
on  
Test of Annunciator  
Manufactured  
by  
Portsmouth Navy Yard.

NAVAL RESEARCH LABORATORY  
ANACOSTIA STATION  
WASHINGTON, D.C.

Number of Pages: Text - 5      Plates - 3  
Authorization: BuEng. ltr. S65-5/L5(1-21-Ds) of 22 January 1936.  
Date of Test: February and March 1936.  
Prepared by: \_\_\_\_\_  
W.B. Roberts, Principal Engineering Aide,  
Chief of Section.  
Reviewed by: \_\_\_\_\_  
W.M. Haynsworth, Jr., Lieutenant, USN.  
Approved by: \_\_\_\_\_  
H.M. Cooley, Captain, USN, Director.  
Distribution:  
BuEng. (5)

ejj

1036

TABLE OF CONTENTS

<u>Subject</u>	<u>Page</u>
1. Authorization .....	1
2. Object of Test .....	1
3. Abstract of Test .....	1
(a) Conclusions .....	1-a
(b) Recommendation .....	1-b
4. Description of Material under Test .....	2
5. Method of Test .....	2
6. Results of Test .....	3
7. Comments on Results of Test .....	4
8. Conclusions .....	5

APPENDIX

Annunciator, set up for test .....	Plate 1
Annunciator, case cover removed .....	Plate 2
Annunciator, rear view of drop assembly .....	Plate 3

MAR 17 1938

## AUTHORIZATION

1. This test was authorized by reference (a) and other additional references pertinent to this problem are listed as references (b), (c), (d), (e), (f) and (g).

- Reference: (a) BuEng. ltr. S65-5/L5(1-21-Ds) of 22 January 1936.  
(b) Navy Specifications SGS(65)-41 of 1 May 1934.  
(c) BuEng. ltr. S65-4(11-12-Df) of 22 January 1936  
to Comdt., Navy Yard, Portsmouth, N.H.  
(d) Portsmouth Plan No. 13906, Alt. 6; BuEng. No. 11-T-738-L,  
Alt. 4.  
(e) Portsmouth Plan No. 29174, Alt. 1; BuEng. No. 11-T-1030-L,  
Alt. 2.  
(f) Portsmouth Plan No. 29175, Alt. 1; BuEng. No. 11-T-1030-L,  
Alt. 2.  
(g) Portsmouth Plan No. 29172, Alt. 1; BuEng. No. 11-T-1072-L,  
Alt. 2.

## OBJECT OF TEST

2. The object of this test was to determine the suitability of the four (4) drop annunciator, references (d), (e), (f), and (g), for the Naval Service, and its conformance with specifications, reference (b).

## ABSTRACT OF TEST

3. The annunciator was set up in a test circuit, energized with 115 volts, alternating current, 60 cycles, and closely observed while under test for conformance with specifications, reference (b). Upon completion of all tests, it was carefully examined to determine the quality of workmanship and conformance with the specifications relative to materials.

Conclusions

(a) This annunciator, as manufactured and submitted for test by the Portsmouth Navy Yard was, in general, satisfactory under test for conformance with the specifications, except as noted in paragraphs 19 and 20.

(b) If modified in accordance with the Bureau's comments noted under reference (c), and comments of this report, the annunciator should prove satisfactory for the Naval Service.

MAR 17 1936

Recommendation

(a) Due to the generally satisfactory test results, it is recommended that the annunciator be approved for Naval use, subject to corrections, given under reference (c), and modifications in accordance with the "COMMENTS" of this report.

## DESCRIPTION OF MATERIAL UNDER TEST

4. This annunciator was manufactured by the Portsmouth Navy Yard for 115 volt, alternating current, 60 cycle operation. It is of the mechanical reset type, embodying four drops and two alarm relays, each relay being connected in series with two drops.

5. Each drop contains a 1" x 1" target, secured to the target holder by bending over small ears. The target is released when the magnet is energized and it falls into view from the combined force of gravity and a coil spring.

6. The magnetic circuit of each drop is of the "U" shaped type, embodying a solid iron core, supporting a single winding and having an armature so located that the magnetic circuit is completed when it is attracted to the pole piece. The armature is held in its normally open position by a coil spring and has a projecting latch for engaging the target holder when the drop is reset.

7. The four drops are mounted on a hinged steel plate on which is located a mechanical reset device operated by an external thumb lever. A watertight packing gland is provided where the lever shaft extends through the case.

8. All terminals are secured to insulation material and mounted on the back of the hinged plate.

9. The two relays are mounted on a separate steel plate secured to four bosses in the case. Mounted behind this plate are two 0.25 mfd. 200 volt condensers in cans, each connected across the contacts of a relay. The relays are of simple design, having a core consisting of two laminations supporting a single winding. The magnetic circuit is completed with the use of a "U" shaped steel stamping, on which the two contacts and the hinged armature are mounted.

10. The entire mechanism is mounted in a rectangular cast aluminum alloy case, provided with four mounting lugs, and four bosses for terminal tubes, one tapped for 1-1/4-inch and another tapped for two 3/4-inch tubes. Steel inserts are provided for the cover securing bolts and in the bosses to which the mounting plates are secured.

11. The case cover is of cast composition BE material, embodying eight lugs drilled for 5/16-inch bolts and two steel dowel pins. A glass window of watertight construction is located in the cover and has a black plate provided with four openings so that only the drops are visible.

## METHOD OF TEST

12. First, the annunciator was tested for endurance by operating each drop 10 times per minute at its rated voltage by means of a motor-driven contact maker. The test set-up is shown by Plate 1, and in addition, a 115 volt, a.c., 60 cycle buzzer, consuming a current of 0.022 amperes, was

Requirements

**Inclination:** Drops and relays shall operate satisfactorily when inclined 30° to the vertical in any direction on frequencies of 5 cycles below to 5 cycles above normal and on voltages from 20% below to 10% above normal.

**Shock Integrity:** Satisfactory operation when subjected to twenty 50-foot pound blows on Bureau of Engineering shock stand.

**Power Factor:** Not less than 30%.

**Watertight Integrity:** Shall not leak when submerged in 3 feet of salt water for a period of one hour.

**Dielectric Strength:** Shall withstand 1240 volts, a.c., 60 cycle, applied between all current carrying parts and ground for a period of one minute before and 500 volts after watertight test.

**Insulation Resistance:** Not less than 5 megohms when measured with a 1000 volt megger before and one megohm after watertight test.

**Weight:** Not specified.

**Dimensions:** Not specified.

**Case Material:** Case, aluminum alloy.  
Cover, cast composition BE.

Test Values

Satisfactory operation under all conditions.

Drops satisfactory.  
Relay unsatisfactory.  
(See "Comments;" par. 19 and par. 20.)

61.43%, one push-button depressed.

The case was found to be watertight under this test.

No breakdowns occurred under this test.

The lowest resistance obtained was 200 megohms.

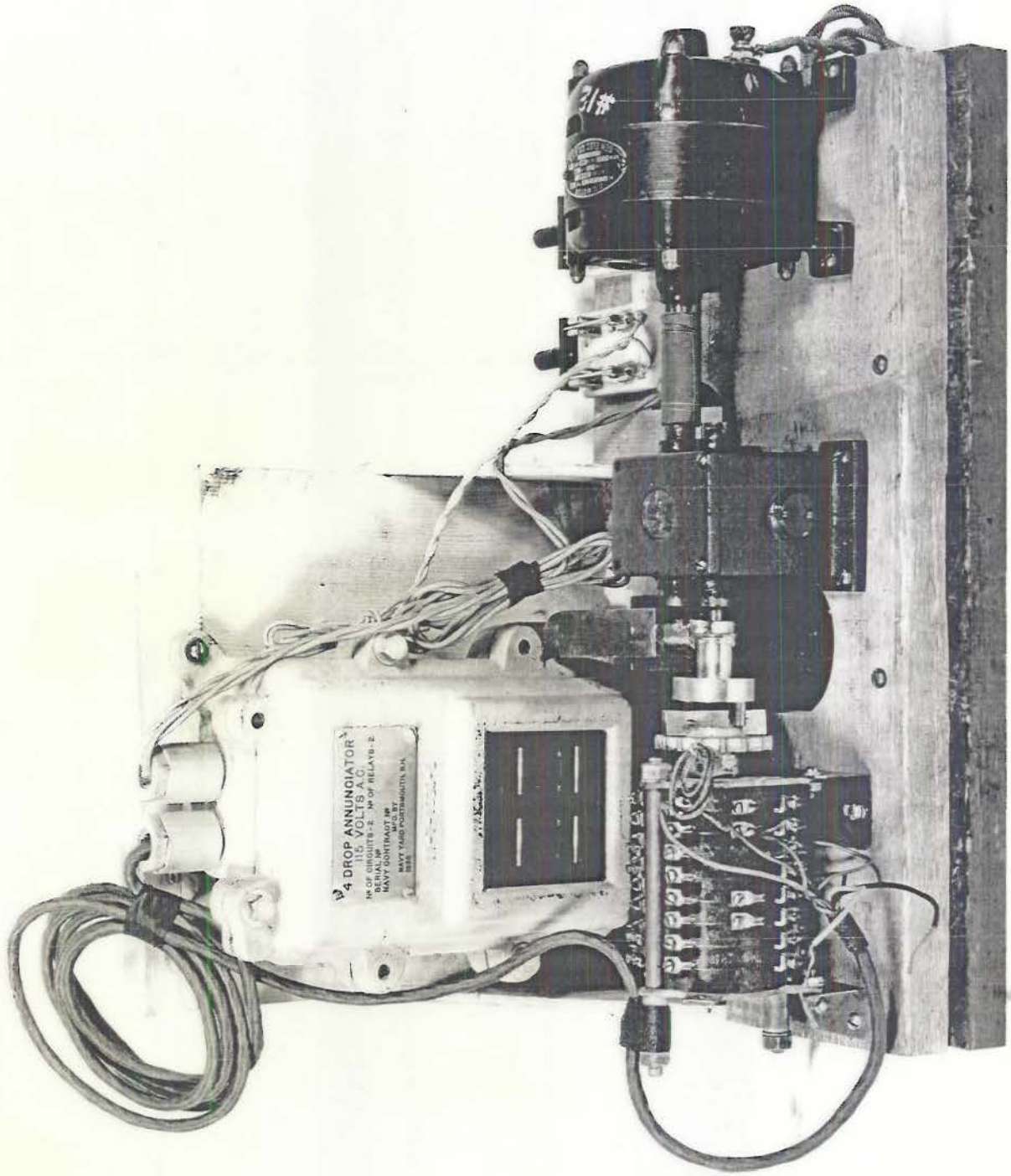
Total weight, 15 lbs.

Height - 12"75  
Width - 7"75  
Depth - 4"75

Case and cover materials as specified.

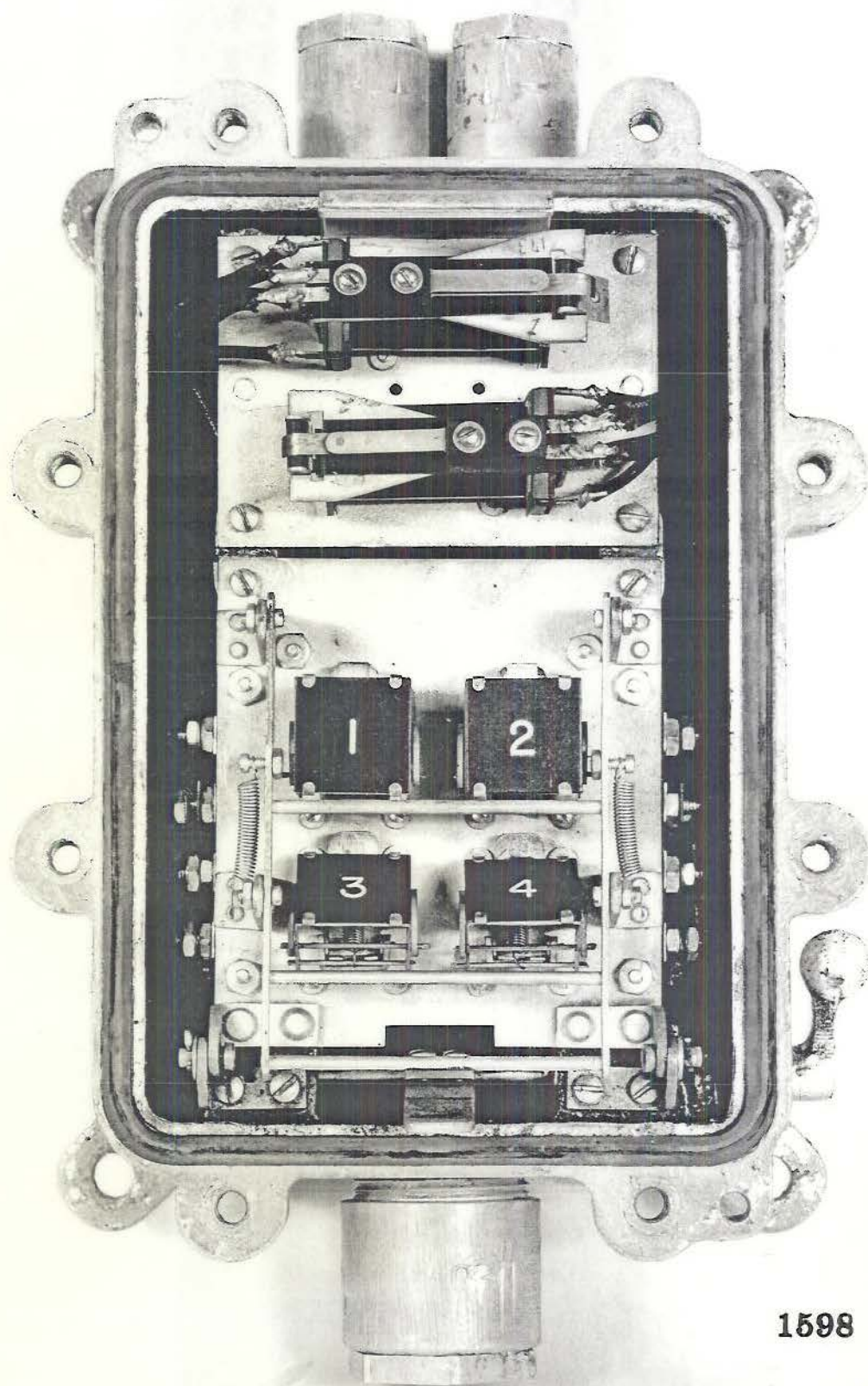
COMMENTS ON RESULTS OF TEST

19. Both of the series relays failed to withstand the shock test requirement. With the annunciator mounted in its normal position on a Bureau of Engineering shock stand, the relay chassis, piece 1, bent and closed the contacts when 50-foot pound shocks were applied. This defect can be corrected by bracing the end to which the armature is hinged.

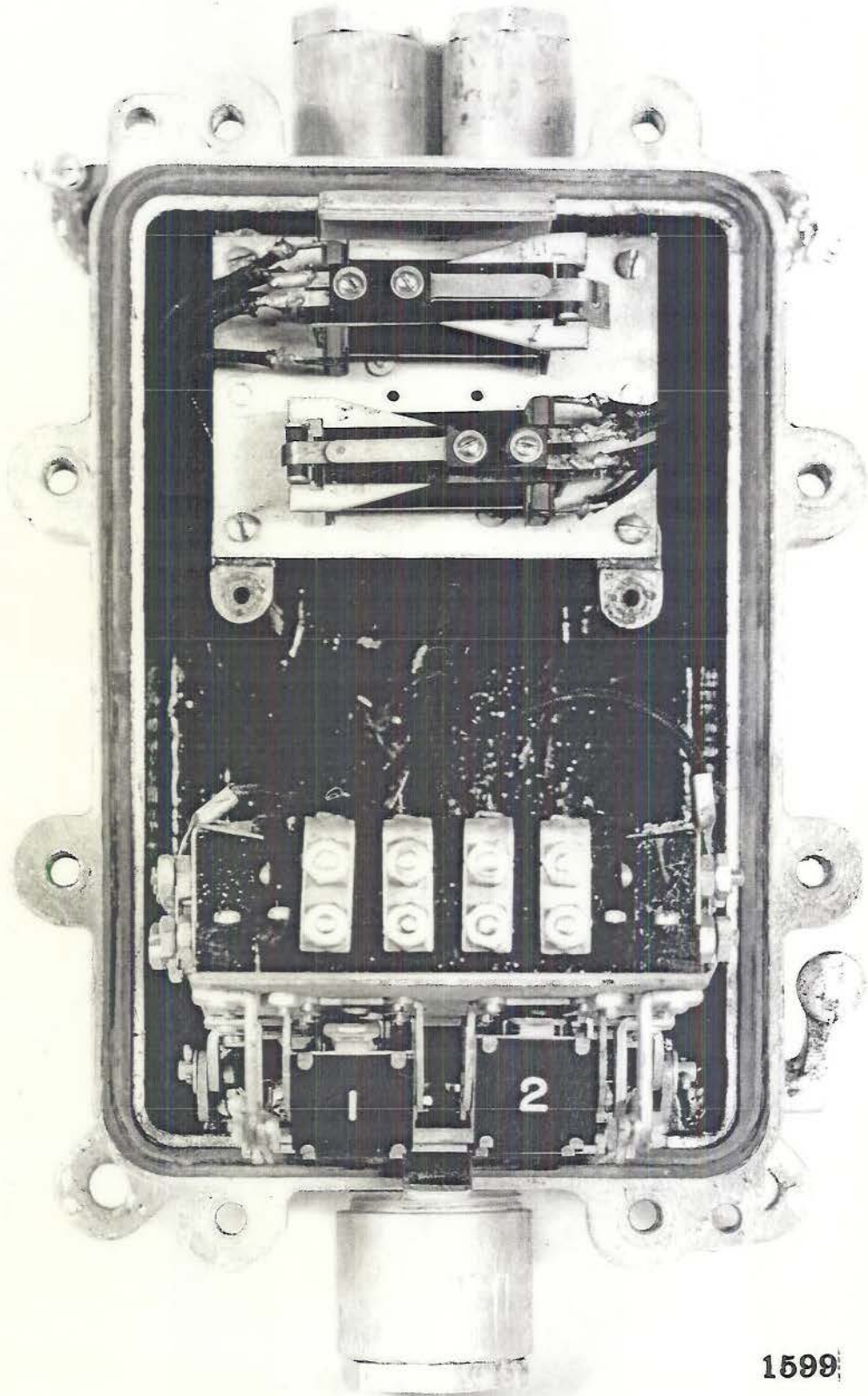


1569

NAVAL RESEARCH LABORATORY  
ANACOSTIA STATION  
WASHINGTON, D. C.



1598



1599