12 October 1937 NRL Report No.B-1403

FR-1403

NAVY DEPARTMENT

BUREAU OF ENGINEERING

Report of

Test on Bell and Buzzer

Manufactured and Submitted by
Chas. J. Henschel and Company, Inc.

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
WASHINGTON, D. C.

Number of Pages: Text - 6. Plates 4.

Authorization : Bu.Eng.ltr. S65-4/L5(7-29-Ds) of 14 August 1937.

Date of Test : August and September 1937.

Tested by : _____
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Distribution :
Bu.Eng.(5)

mts

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APPENDICES
(Photographs)

AUTHORIZATION

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

References: (a) Bu.Eng.ltr. S65 4/L5(7 29 Ds) of 14 August 1937.
(b) Specifications SGS(65) 102a of 1 June 1936.
(c) Specifications SGS(65) 103a of 1 June 1936.

OBJECT OF TEST

2. The object of this test was to determine how closely the bell and buzzer submitted complied with the specifications, references (b) and (c), and their suitability for the Naval Service.

ABSTRACT OF TEST

3. The subject bell and buzzer, shown by Plates 1 to 4 inclusive, were set up at this laboratory in suitable test circuits and their performance was carefully observed while under test in conformance with the specifications. All tests were made in the order specified, and were followed with an inspection of the samples to ascertain whether they were in strict accordance with the requirements in the matter of materials, design, and workmanship.

CONCLUSIONS

(a) The type A2 1/2 bell failed to meet the following requirements of the specifications, reference (b).

(1) The total weight of the sample bell is 1 pound, 9 ounces, while that allowed is 1 pound.
(2) The priming coat of zinc chromate paint has been omitted.
(3) Although not required, the brass nameplate should be replaced with one of "Monel" metal, or its equivalent. The relief etching used is not permitted.

(b) The type A4 buzzer failed to meet the following requirements of the specifications, reference (c).

(1) The armature supporting spring was found fractured at the conclusion of the endurance test.
(2) The total weight of the buzzer is 1 pound, 2 ounces, while that allowed is 12 ounces.
(3) Although not specified, the brass nameplate should be replaced with one of "Monel" metal, or its equivalent. The relief etching used is not permitted.
(4) The priming coat of zinc chromate paint has been omitted.

RECOMMENDATIONS

(a) It is recommended that approval of the subject bell and buzzer be withheld, until such time as the manufacturer corrects the doficiencies noted under "Conclusions" of this report

DESCRIPTION OF MATERIAL UNDER TEST

4. The sample bell and buzzer are manufactured by the Chas. J. Henschel and Company, Incorporated, Amesbury, Massachusetts, and are shown by photographs, Plates 1 to 4 inclusive.

TYPE A2-1/2 BELL

5. This bell is of the vibratory type and is designed to operate from a 115 volt, a.c. 60 cycle supply. It employs a single form wound coil located on a laminated core of "U" shape, and a set of adjustable contacts for interrupting the current. A flat steel armature, attached to the gong striker shaft, completes the magnetic circuit. A packing gland is provided where the striker shaft extends through the case cover. The entire unit and a terminal block of phenolic material, equipped with 9-S-1841 L terminals, are mounted on bosses which are integral parts of the case cover. The case and cover are of cast aluminum alloy, and a flat rubber gasket is employed for waterproofing. Six fillister head No. 10-24 machine screws, cadmium plated and used as through bolts, secure the case cover. The case is provided with two mounting lugs and one external boss tapped for 3/4 inch (IPS) terminal tube. The stainless steel gong is 2-1/2 inches in diameter, and is secured to a projecting support, cast integral with the cover, with a fillister head No. 10-24 cadmium plated steel screw. A steel pin definitely locates the gong with reference to the striker arm which is of brass, except for the steel striker. A brass nameplate is mounted on the cover with two steel drive pins. The case and cover are painted gray on the inside and outside.

TYPE A4 BUZZER

6. This buzzer is of the contactless type, employs a single form wound coil located on a laminated core of "U" shape, and is designed to operate from a 115 volt, a.c. 60 cycle supply. A flat piece of soft iron, riveted to a flat steel spring, completes the magnetic circuit. The armature supporting spring is secured at one end with two fillister head No. 10-24 steel screws, cadmium plated, which thread into a boss. The noise is produced by the armature striking against the pole pieces at a rate of 120 times per second. The aluminum alloy case is provided with two mounting lugs, one external boss tapped for 3/4 inch terminal tube, and a flat rubber gasket for waterproofing. The case cover is secured with four No. 10-24 cadmium plated machine screws, used as through bolts. A brass nameplate is secured to the cover with two steel drive pins. The buzzer mechanism and a terminal block equipped with 9-S-1841 L terminals, are mounted on bosses cast integral with the cover. The case and cover are painted gray on the inside and outside.

METHOD OF TEST

7. The samples, as received, were first tested for power consumption and sound output at rated voltage and frequency.

8. Following this, they were placed on a Bureau of Engineering shock stand and given the required blows of 250 foot pounds each, under the conditions specified under references (b) and (c).

9. They were next placed under the required endurance tests, during which time the temperature rise of each sample was obtained, using the resistance method.

10. The remaining tests were conducted in the order required under the specifications.

11. The usual inspection of the samples, pertaining to the quality of workmanship and suitability of design and materials, concluded the test

RESULTS OF TEST

12. The test results obtained follow:

(Specifications SCS(65) 102a, Bells, Interior Communication:

Requirements	Test Values
Voltage: 115 volts.	115
Frequency: 60 cycles.	60
Amperes: Not specified.	0.039
Watts: Not over 5 watts.	3.2
Power Factor: Not less than 50%.	71.34%
Shock Integrity: Shall withstand 50 shocks of 250 foot pounds each under the conditions specified under par.F 2h.	Complied.
Endurance: Shall be capable of operation under the conditions specified under par.F 2i.	Complied.
Temperature rise: Shall not exceed 35°C at ambient temperature of 65°C during the period of the endurance tests.	6.88°C
Voltage and frequency variations: Shall operate at 103.5 V. at 65 cycles and 126.5 V. at 55 cycles, under the conditions specified under par.F-2i.	Complied.

Requirements	Test Values
Sound Output: Shall be not less than 35 db.	48 db.
Insulation Resistance: Shall be not less than 10 megohms preceding the immersion test, and 1 megohm following.	Before 200 megohms. After 5 megohms.
Dielectric: Shall withstand 1500 V. a.c., 60 cycles, preceding the immersion test, and 500 V. a.c., 60 cycles, following.	Complied.
Waterproofness: Shall operate after being placed in water to a depth of 3 feet for a period of 1 hour	Complied.
Total weight: Not over 1 pound.	*1 pound, 9 ounces.
Inclination: Shall operate satisfac torily in any plane 45° from the ver tical at 10% over and 15% under rated voltage.	Complied.
Nameplates: Shall be in accordance with Spec. 17N1.	*Brass relief etched nameplate mounted on aluminum case cover.
Terminal Block: Shall be of molded phenolic material equipped with 9-S-1841-L terminals.	Phenolic material block equipped with 9-S-1841-L terminals.

*Denotes failure to comply with the specifications.

13. The results obtained from the low pitch low intensity buzzer, when tested in conformance with SCS(65)-103a, follow:

Requirements	Test Values
Voltage: 115 volts.	115
Current: Alternating.	Alternating.
Amperes: Not specified.	0.053
Watts: Not over 5 watts.	2.6
Temperature rise: Not over 30°C at ambient temperature of 70°C by resistance method.	7.4°C

Requirements	Test Values
Sound output: Shall be not less than 35 db under the conditions specified under par. E-5.	50 db.
Inclination: Shall operate in any plane 45° from the vertical at 10% over and 10% under rated voltage.	Complied.
Endurance: Shall operate satisfactorily 700 cycles of one minute on, every alternate minute, at ambient temperature of 70°C, and 700 cycles at 0°C. Also at 103.5 V. at 65 cycles and 126.5 V. at 55 cycles.	*See remarks under "Conclusions".
Shock integrity: Shall withstand 20 blows of 250 foot pounds each, under the conditions specified under par.F-2g(3).	Complied.
Dielectric: Shall withstand 1500 V. a.c., 60 cycles, prior to the immersion test, and 500 V. a.c., 60 cycles following.	Complied.
Pitch of Note: 60 to 500 CPS.	120 CPS at 60 cycle input.
Insulation Resistance: Shall be not less than 10 megohms following the dielectric test, and 1 megohm following the immersion test.	After dielectric - 200 megohms. After immersion 40 megohms.
Watertight Integrity: No leaks shall occur when immersed in water to a depth of 3 feet for a period of 12 hours.	Complied.
Total Weight: Shall not exceed 12 ounces.	*1 pound, 2 ounces.
Nameplate: Shall be in accordance with Specifications 17N1.	*Brass relief etched nameplate mounted on aluminum case cover.

*Denotes failure to comply with the specifications.

CONCLUSIONS

14. The type A2-1/2 bell failed to meet the following requirements of the specifications, reference (b).

(a) The total weight of the sample bell is 1 pound, 9 ounces, while that allowed is 1 pound.
(b) The priming coat of zinc chromate paint has been omitted.
(c) Although not required, the brass nameplate should be replaced with one of "Monel" metal, or its equivalent. The relief etching used is not permitted.

15. The type A4 buzzer failed to meet the following requirements of the specifications, reference (c).

(a) The armature supporting spring was found fractured at the conclusion of the endurance test.
(b) The total weight of the buzzer is 1 pound, 2 ounces, while that allowed is 12 ounces.
(c) Although not specified, the brass nameplate should be replaced with one of "Monel" metal, or its equivalent. The relief etching used is not permitted.
(d) The priming coat of zinc chromate paint has been omitted.

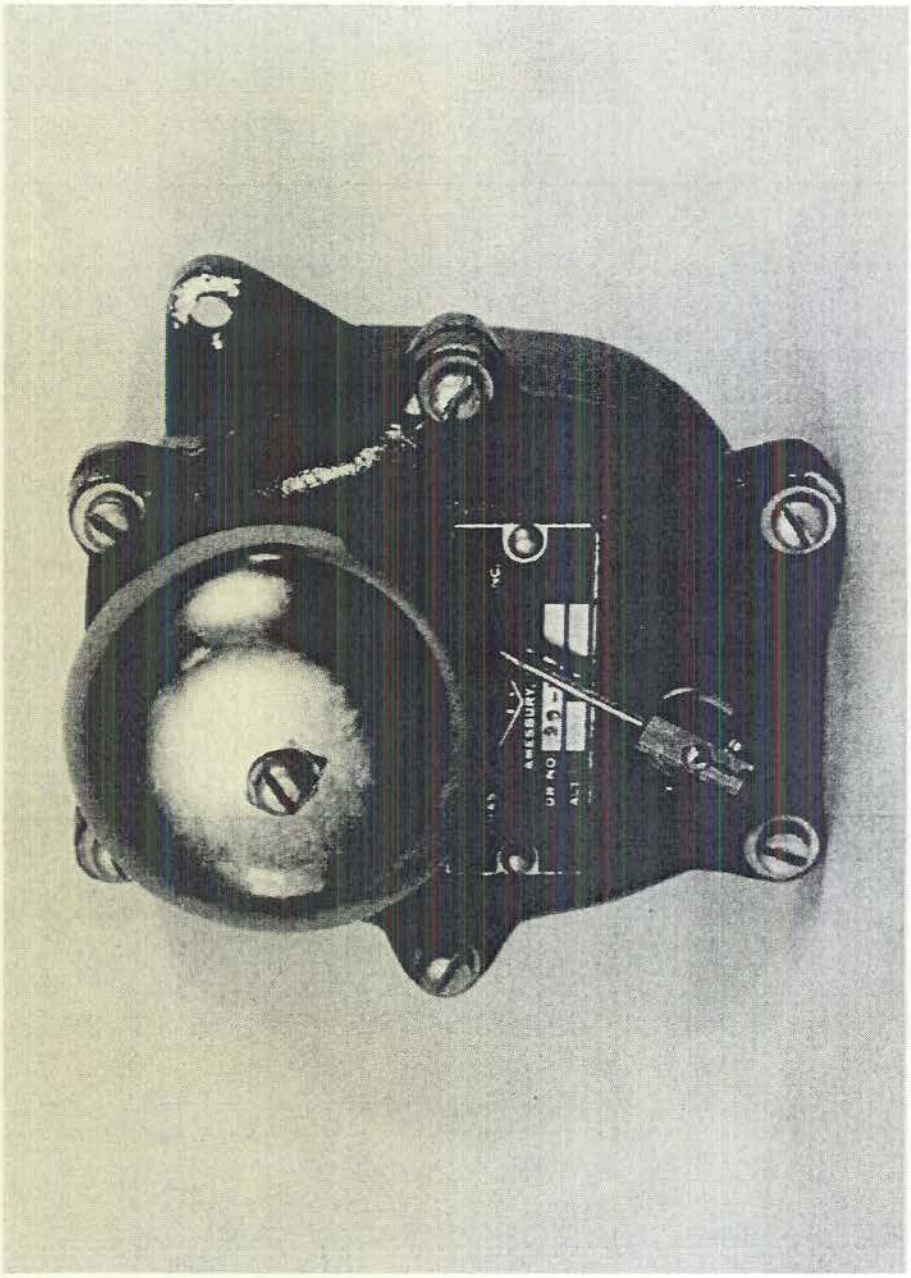
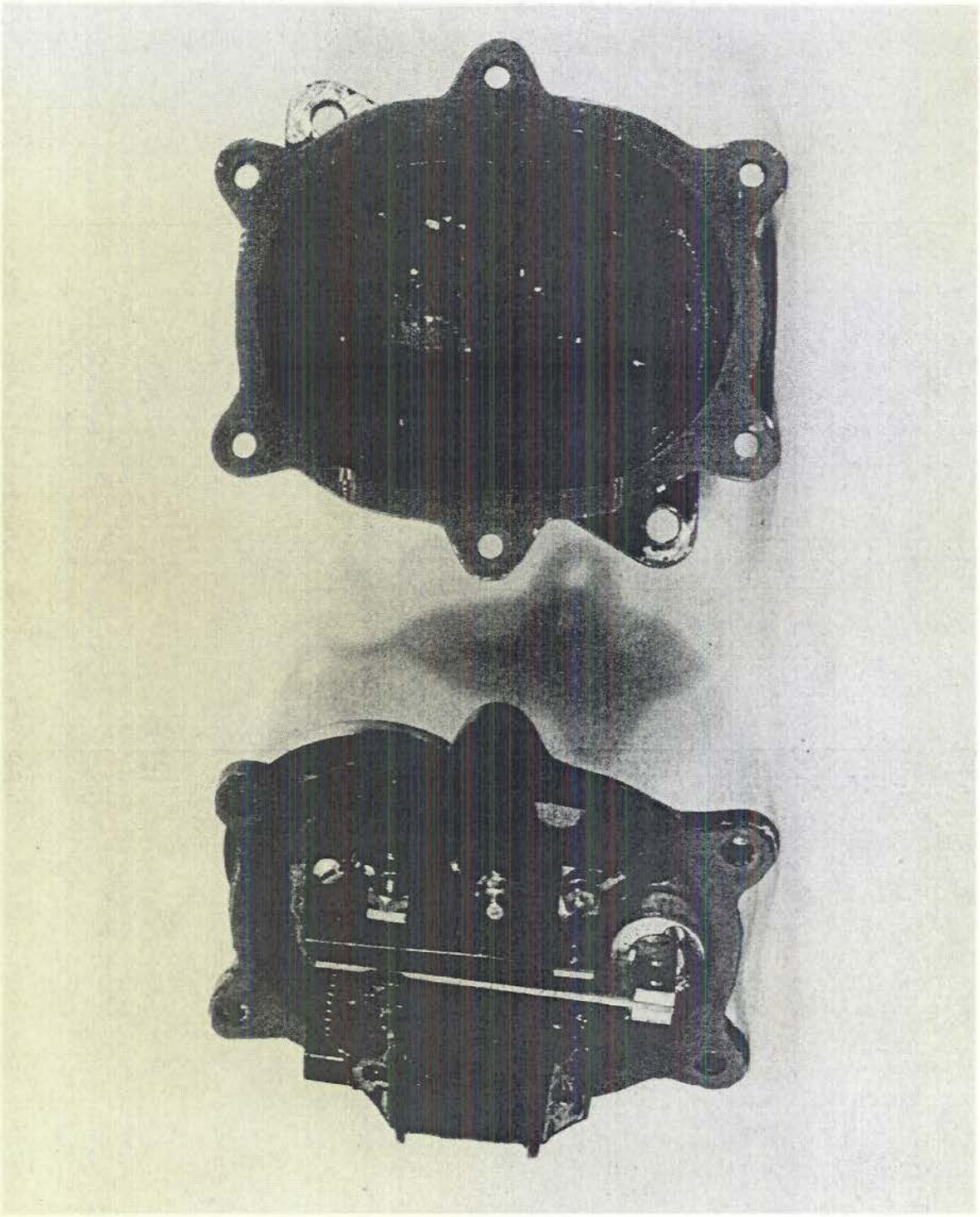


Plate 1



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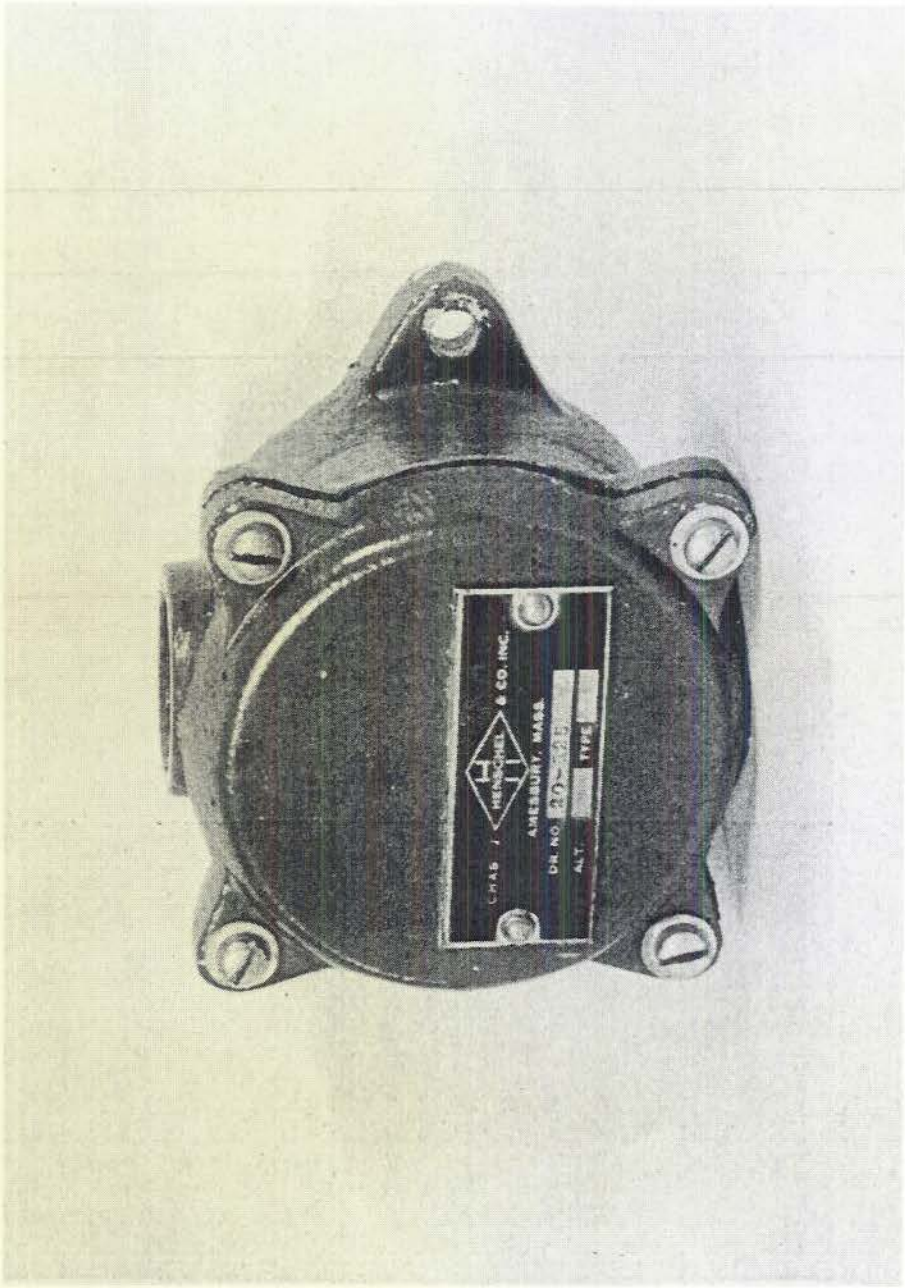

Plate 3

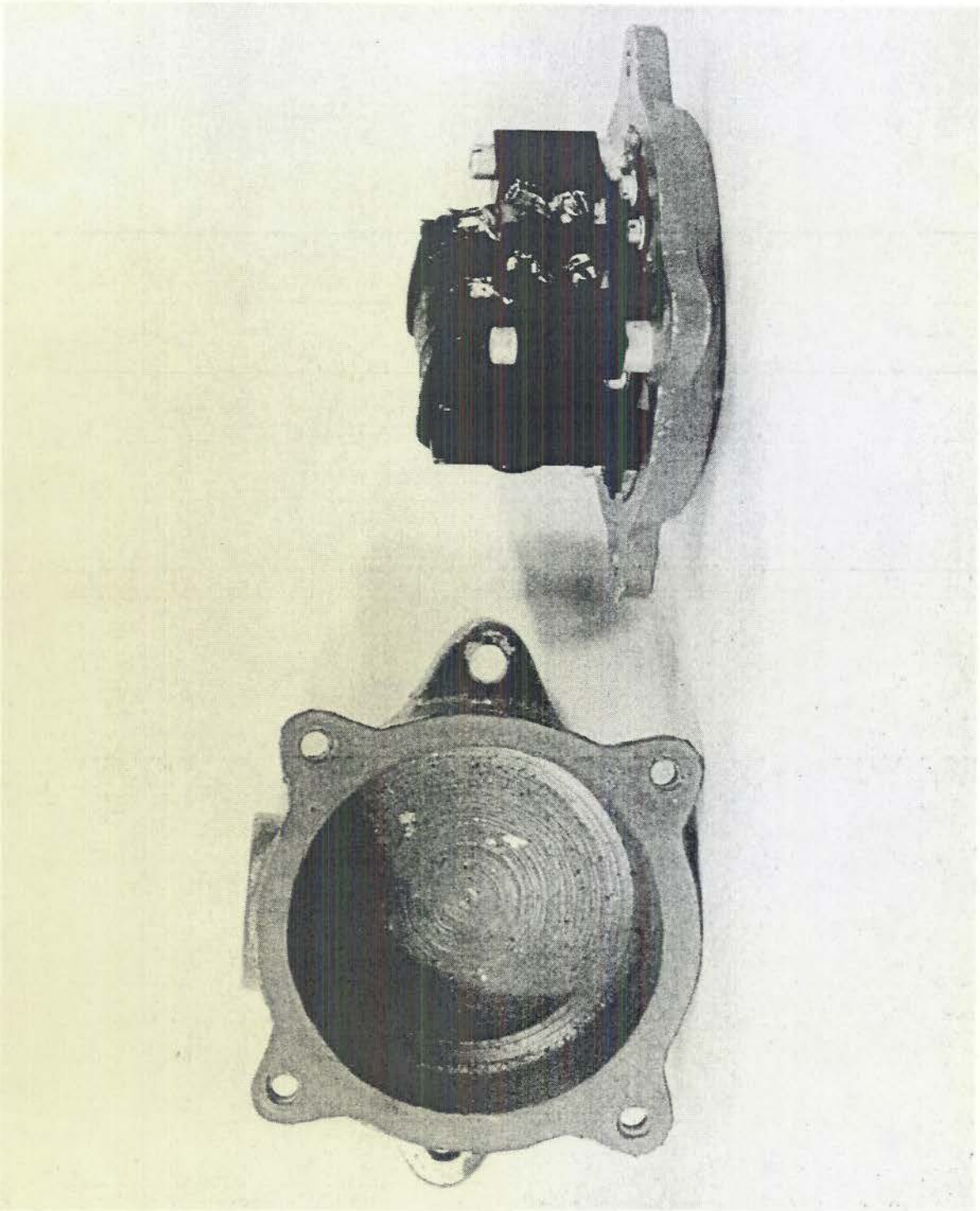

Plate 4