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NAVY DEPARTMENT

Report of Test

on

Bells, Types CV1O, CVX1O, and CSWT 10

Submitted by

Signal Engineering and Manufacturing Company,
New York, New York

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ANACOSTIA STATION
WASHINGTON, D. C.

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Distribution: BuShips (6)

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APPENDICES

AUTHORIZATION FOR TEST

1. This problem was authorized by reference (a), and other references pertinent to this problem are listed as references (b) to (e) inclusive.

Reference: (a) BuShips Ltr. S65-4(355) of 29 January 1942
(b) Specification 17S11(INT) of 1 October 1940
(c) Signal Eng. & Mfg. Co. Plan A-3054
(d) Signal Eng. & Mfg. Co. Plan A-3056
(e) Signal Eng. & Mfg. Co. Plan A-3057

OBJECT OF TEST

2. The object of this test was to determine how closely the manufacturer's types CV-10 and CVX-10 (vibrating bells) compared with the Navy type B-4 vibrating bell, under specification, reference (b). Inasmuch as their type CSWT-10 single stroke bell was not covered by the specification, it was checked against the requirements for a type B-4 bell only where applicable.

ABSTRACT OF TEST

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

CONCLUSIONS

(a) The sample bells meet the specification except in the following respects:

1. Type CV-10 Vibrating Bell

(a) Para. E-2c(2) - Stroke frequency is 11.5 strokes per second in lieu of 40 to 60 per second.
(b) Para. D-11h - The bell would not operate in all planes as required.
(c) Para. F-2h(2) - The bell would not operate during the vibration test.
(d) Para. D-12d - Test not conducted as case is not of splash-proof or watertight design.
(e) Para. E-1 - Weight (10 pounds, 12 ounces) exceeds the 8 pounds allowed.
(f) Para. E-13 - Relief etching used on both nameplates. Circular nameplate of aluminum.
(g) Para. D-6b - The wire in the solenoid is not insulated with cotton or silk.
(h) Para. D-9c - Laminated core construction is not applicable to this design.
(i) Para. D-10b - Terminal lugs are not in accordance with Bureau drawing 9-S-1841-L.
(j) Para. D-11i - The bell is designed for 4 point mounting in lieu of 3 point.
(k) Para. H-3b - Brass nameplate is identified as aluminum.

2. Type CVX-10 Vibrating Bell

(a) Para. E-2c(2) - The stroke frequency is 12 strokes per second in lieu of 40 to 60 per second.
(b) Para. D-11h - The bell would not operate in all planes as required.
(c) Para. F-2h(2) - The bell would not operate during the vibration test.
(d) Para. D-12d - Approximately 10 cc of water entered the case.
(e) Para. E-1 - Weight (16 pounds, 9 ounces) exceed the 8 pounds allowed.
(f) Para. E-13 - Relief etching used on both nameplates. Circular nameplate of aluminum.
(g) Para. D-6b - The wire in the solenoid is not insulated with cotton or silk.
(h) Para. D-9c - Laminated construction is not applicable to this design.
(i) Para. D-10b - Terminal lugs are not in accordance with Bureau drawing 9-S-1841-L.
(j) Para. D-11i - The bell is designed for 4 point mounting in lieu of 3 point.
(k) Para. H-3b - Brass nameplate is identified as aluminum.

3. Type CSWT-10 Single Stroke Bell

(a) Para. E-2c(2) - The bell is designed for single stroke in lieu of 40 to 60 per second.
(b) Para. D-11-h - The bell would not operate in all planes.
(c) Para. F-2p (2) - Inside of plunger guard tube (pc. 31237) corroded.
(d) Para. E-1 - Weight (16 pounds) exceeds the 8 pounds allowed.
(e) Para. E-13 - Relief etching used on both nameplates. Circular nameplate of aluminum.
(f) Para. D-6b - The wire in the solenoid is not insulated with cotton or silk.
(g) Para. D-9c - Laminated construction is not applicable to this design.
(h) Para. D-10b - Terminal lugs are not in accordance with Bureau drawing 9-S-1841-L.
(i) Para. D-11i - The bell is designed for 4 point in lieu of 3 point bulkhead mounting.
(j) Para. H-3b - Brass nameplate is identified as aluminum.

(b) All of the bells are equipped with 10-inch gongs in lieu of 8-inch and are not designed in accordance with para. E-2c.

(c) All of the cases are provided with 1/2-inch (IPS) threaded bosses in lieu of 3/4-inch.

RECOMMENDATIONS

(a) These bells, although being of good commercial design and of first class workmanship, are not recommended for Naval use because of the many departures from the specification. The most important violations were their failure to operate during the vibration test and inability to respond to the short current impulses produced by the bell contacts of engine order transmitters.

(b) The type CSWT-10 bell is not recommended as it is of a type not covered by any designation in the specification. In addition, it has other undesirable features as given in paragraph 22.

DESCRIPTION OF MATERIAL UNDER TEST

4. The subject bells, submitted by Signal Engineering and Manufacturing Company, New York, are of the solenoid and plunger operated type and are designed to operate from a supply of 115 volts, a.c., 60 cycles.

5. The vibrating types employ the principle of a resonant circuit, using a coil and condenser connected in series. The circuit is in resonance with the plunger in some definite position giving the initial impetus which sets the plunger in motion. When the plunger is in the "down" position, the current in the coil is maximum and when the plunger is in the "up" position the current is minimum. This cycle of maximum and minimum current is periodic. The period of the cycle depends on the mass of the plunger, its distance of travel, and the constants of the recoil spring.

6. The single stroke bell is of the conventional solenoid plunger type.

7. Details of the design and construction of the bells are shown in photographs, Plates 2 to 7 inclusive, and drawings, references (c),(d), & (e).

METHOD OF TEST

8. The sample bells, following tests to determine their electrical characteristics and sound pressure output at rated voltage and frequency, were subjected to further tests in the following order:

(a) Stroke frequency
(b) Inclination
(c) Endurance and temperature rise
(d) Sound pressure output following endurance
(e) Shock
(f) Vibration
(g) Dielectric
(h) Insulation resistance
(i) Splashproof
(j) Salt spray
(k) Peak voltages across the coil and condenser

9. The frequency of the plunger was determined with a galvanometer type oscillograph by insulating the gong from the frame, thus forming a pair of contacts which controlled the current through one of the galvanometers. A moving film recorded the current impulses. A comparison with a standard 60 cycle wave gave a determination of the plunger frequency accurate to within one-tenth of a cycle per second.

10. The peak voltages across the coil and condenser in the circuit were measured with a cathode ray oscillograph by matching the voltages with known values.

11. The minimum time interval required for the plunger to administer one completely effective stroke of the gong was determined experimentally through the use of an adjustable interval contact closing device. This interval was then measured with a recording film type oscillograph.

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

RESULTS OF TEST

13. The test results obtained on the type CV-10 bell were as follows:

Requirements	Test Values
Voltage: 115 volts	Tested at 115 volts, a.c., 60 cycles
Amperes: Not specified Watts: Shall not exceed 25 watts	Position of Plunger / Ampere / Watts Reciprocating / 0.055 / 4.2 Up / 0.022 / 1.4 Down / 0.099 / 11.8
Sound pressure output: Shall be not less than 65 decibels at 18 feet in a soundproof room under the following conditions:	
(a) Before the endurance test	84 decibels
(b) Following the endurance test	83 decibels
Stroke frequency: Shall be within 40 to 60 per second.	*11.5 strokes per second
Inclination: Shall operate in any position when supplied with rated voltage and frequency and ± 7 volts and 5 cycles.	*Operated at 45° from vertical at the required voltage and frequency variations.
Endurance test: Shall operate 1500 cycles of "one minute on" and "one minute off" the first 750 cycles at 60° C and the second at 0° C ambient temperatures.	Complied
Temperature rise: Maximum temperature shall not exceed 115° C during the endurance test. (55° C rise at 60° C ambient temperature).	Complied. 11.1° C above 60° C ambient temperature.
Shock test: Shall withstand 20 shocks of 250 foot pounds each as specified in paragraph F-2g.	Complied
Vibration test: Shall be mounted on a standard Navy 3 foot pound vibration machine and subjected to six tests of 30 minutes each at frequencies of 100, 150, 200, 250, 300, and 350 shocks per minute.	*Would not operate under vibration but operated satisfactorily following each period of test.
Dielectric test: Shall withstand twice the rated voltage plus 1250 volts, 60 cycles for one minute between electrical circuits and between electrical circuits and ground.	Complied
Insulation resistance: Shall be not less than 5 megohms at not less than 500 volts d.c.	Complied. Greater than 200 megohms by 1000 volt megger.

Requirements	Test Values
Splashproof integrity: Shall be subjected to a 1-inch stream of water, under a pressure head of 35 feet, played from a hose at a distance of 5 feet, for 5 minutes, without the entry of water into the case.	* Not conducted as the case is obviously not splashproof.
Salt spray test: Shall be subjected, under ultra-violet light, to a 20 per cent salt spray at 55° C for a period of 3 minutes, followed by an air blast at 55° C for 3 minutes, the cycle being repeated continuously for 100 hours.	* Not conducted as case is not splashproof or watertight.
Weight: Shall not exceed 8 pounds.	* 10 pounds, 12 ounces.
Nameplate: Shall be in accordance with N.D. Specification 42N2.	* Relief etching used on both nameplates, circular nameplate is of aluminum.
Dissimilar metals: Contact of dissimilar metals, except steel, with aluminium alloys shall be avoided as much as practicable in the assembly of parts. Where contact cannot be avoided, an approved spar varnish or other approved material shall be used between the faying surfaces.	Complied
Protection of exterior surfaces: Exterior surfaces of all equipment, except nameplates, gongs, and strikers, shall be finished with two coats of gray paint specifically approved by the bureau concerned.	Complied
Clearances: Clearances between any two electrical circuits or between any electrical circuit and ground, where not separated by at least 1/16-inch of approved insulating material, shall be not less than 1/8-inch, unless otherwise approved.	Complied
Wiring: All wiring shall be in accordance with the requirements of N.D. Specification 15C1, unless otherwise approved.	Complied. Type SICF-1 1/2
Coil Windings: May be either single or double silk or cotton covered enameled copper wire.	* Enameled copper wire.

Requirements	Test Values
Protective covering for coils: Shall be nonhygroscopic, not glued or cemented to the coils, but shall be overlapped and cemented in the lap.	Complied
Waterproofing of coils: All coils shall be impregnated with an approved synthetic resinous material or other suitable and approved waterproofing and insulating compound.	Complied
Magnetic circuits: Shall be of laminated punchings of the best available grade for the purpose and shall be protected against corrosion.	* Laminated construction not applicable to this design. Plunger is copper, nickel and chrome plated.
Terminal block: Shall be of approved material and type, and readily accessible.	Complied
Terminal lugs: Shall be in accordance with Bureau of Engineering drawing 9-S-1841-L, unless otherwise specified by the bureau concerned.	* Lugs are not in accordance with Bureau Drawing 9-S-1841-L.
Supply leads: Shall enter through the casing attached to the mounting bulkhead and not through any removable part.	Complied
Terminal wiring: Shall be lead in through a boss drilled and tapped for a Navy standard terminal tube. The case shall be provided with two bosses, one located at the top and the other at the bottom of the case, unless otherwise approved by the bureau concerned.	* Bosses tapped for 1/2-inch (IPS) terminal tubes in lieu of 3/4-inch.
Mounting lugs: Shall be designed for 3 point bulkhead mounting.	* Designed for 4 point bulkhead mounting.
Contacts: All contacts for making and breaking an electrical circuit shall be of tungsten.	None used.
Agreement with test plans: Bluepring plans of sufficient detail to show all essential components of the equipment to be tested shall be furnished, and shall check with the equipment.	* Brass nameplate is identified as aluminum.

14. Additional information on Type CV10 Vibrating Bell

	Position of Plunger	Volts
Peak Voltage at coil	Reciprocating	308.0
	Up	208.6
	Down	453.0

Peak Voltage at Condenser	Reciprocating	196.0
	Up	52.5
	Down	315.0

15. The bell must be energized for at least 0.292 second to obtain one effective stroke of the plunger.

16. The average duration of the current impulses produced by the contacts operated by the detent wheel of an engine order telegraph transmitter during normal operation is 0.023 second. (See Plate 1).

RESULTS OF TEST

17. The test results obtained on the type CVX10 bell were as follows:

Requirements	Test Values
Voltage: 115 volts	Tested at 115 volts, a.c. 60 cycles
Amperes: Not specified. Watts: Shall not exceed 25 watts	Position of Plunger / Ampere / Watts Reciprocating 0.076 7.0 Up 0.023 1.9 Down 0.146 17.6
Sound pressure output: Shall be not less than 65 decibels at 18 feet in a soundproof room under the following conditions:	
(a) Before the endurance test	85 decibels
(b) Following the endurance test	83 decibels
Stroke frequency: Shall be within 40 to 60 per second.	* 12.0 strokes per second
Inclination: Shall operate in any position when supplied with rated voltage and frequency and ± 7 volts and 5 cycles.	* Operated at 45° from vertical at the required voltage and frequency.
Endurance test: Shall operate 1500 cycles of "one minute on" and "one minute off" the first 750 cycles at 60° C and the second at 0° C ambient temperatures.	Complied
Temperature rise: Maximum temperature shall not exceed 115° C during the endurance test. (55° C rise at 60° C ambient temperature).	Complied. 12.9° C above 60° C ambient temperature.
Shock test: Shall withstand 20 shocks of 250 foot pounds each as specified in paragraph F-2g.	Complied

Requirements	Test Values
Vibration test: Shall be mounted on a standard Navy 3 foot pound vibration machine and subjected to six tests of 30 minutes each at frequencies of 100, 150, 200, 250, 300 and 350 shocks per minute.	* Would not operate under vibration but operated satisfactorily following each period of test.
Dielectric test: Shall withstand twice the rated voltage plus 1250 volts, 60 cycles, for one minute between electrical circuits and between electrical circuits and ground.	Complied
Insulation resistance: Shall be not less than 5 megohms at not less than 500 volts, d.c.	Complied. Greater than 200 megohms by 1000 volt megger.
Splashproof integrity: Shall be subjected to a 1-inch stream of water, under a pressure head of 35 feet, played from a hose at a distance of 5 feet, for 5 minutes, without the entry of water into the case.	* Approximately 10 cc of water entered the case.
Salt spray test: Shall be subjected, under ultra-violet light, to a 20 per cent salt spray at 55° C for a period of 3 minutes, followed by an air blast at 55° C for 3 minutes, the cycle being repeated continuously for 100 hours.	Not conducted due to similarity to type CSWT10 bell which was subjected to the salt spray test.
Weight: Shall not exceed 8 pounds.	* 16 pounds, 9 ounces.
Nameplate: Shall be in accordance with N.D. Specification 42N2.	* Relief etching used on both nameplates. Circular nameplate of aluminum.
Dissimilar metals: Contact of dissimilar metals, except steel, with aluminum alloys shall be avoided as much as practicable in the assembly of parts. Where contact cannot be avoided, an approved material shall be used between the faying surfaces.	Complied
Protection of exterior surfaces: Exterior surfaces of all equipment, except nameplates, gongs, and strikers, shall be finished with two coats of gray paint specifically approved by the bureau concerned.	Complied

Requirements	Test Values
Clearances: Clearances between any two electrical circuits or between any electrical circuit and ground, where not separated by at least 1/16-inch of approved insulating material, shall be not less than 1/8-inch, unless otherwise approved.	Complied
Wiring: All wiring shall be in accordance with the requirements of N.D. Specification 15C1, unless otherwise approved.	Complied. Type SICP-1-1/2
Coil windings: May be either single or double silk or cotton covered enameled coppér wire.	*Enameled copper wire
Protective covering for coils: Shall be non-hygroscopic, not glued or cemented to the coils, but shall be overlapped and cemented in the lap.	Complied
Waterproofing of coils: All coils shall be impregnated with an approved synthetic resinous material or other suitable and approved waterproofing and insulating compound.	Complied
Magnetic circuits: Shall be of laminated punchings of the best available grade for the purpose and shall be protected against corrosion.	*Laminated punchings not applicable to this design. Plunger is copper, nickel, and chrome plated.
Terminal block: Shall be of approved material and type, and readily accessible.	Complied
Terminal lugs: Shall be in accordance with Bureau of Engineering drawing 9-S-1841-L, unless otherwise specified by the bureau concerned.	*Lugs are not in accordance with Bureau drawing 9-S-1841-L.
Supply leads: Shall enter through the casing attached to the mounting bulkhead and not through any removable part.	Complied
Terminal wiring: Shall be lead in through a boss drilled and tapped for a Navy standard terminal tube. The case shall be provided with two bosses, one located at the top and the other at the bottom of the case unless otherwise approved by the bureau concerned.	Bosses tapped for 1/2-inch (IPS) terminal tubes in lieu of 3/4-inch.
Mounting lugs: Shall be designed for 3 point bulkhead mounting.	*Designed for 4 point bulkhead mounting.

Requirements	Test Values
Contacts: All contacts for making and breaking an electrical circuit shall be of tungsten.	None used
Agreement with test plans: Blueprint plans of sufficient detail to show all essential components of the equipment to be tested shall be furnished and shall check with the equipment.	*Brass nameplate is identified as aluminum.

*Denotes failure to comply with the specifications.

18. Additional Information on Type CVX-10 Bell

	Position of Plunger	Volts
Peak voltage at coil	Reciprocating	254.0
	Up	187.6
	Down	355.6
Peak voltage at condenser	Reciprocating	190.0
	Up	50.4
	Down	306.6

19. The bell must be energized for at least 0.21 second to obtain one effective stroke of the plunger.

20. The average duration of the current impulses produced by the contacts operated by the detent wheel of an engine order telegraph transmitter during normal operation is 0.023 second (See Plate 1).

RESULTS OF TEST

21. The test results obtained on the type CSWT-10 bell were as follows:

Requirements	Test Values
Voltage: 115 volts	Tested at 115 volts,a.c., 60 cycles
Amperes: Not specified	0.116 ampere with plunger at top o stroke
Watts: Shall not exceed 25 watts	6.4 watts with plunger at top of stroke
Sound pressure output: Shall be not less than 65 decibels at 18 feet in a soundproof room under the following conditions:	
(a) Before the endurance test	73 decibels
(b) Following the endurance test	74 decibels
Stroke frequency: Shall be within 40 to 60 strokes per second.	*Single stroke

Requirements	Test Values
Inclination: Shall operate in any position when supplied with rated voltage and frequency and ± 7 volts and 5 cycles.	*Operated at 45° from vertical at the required voltage and frequency.
Endurance test: Shall operate 1500 cycles of "one minute on" and "one minute off", the first 750 cycles at 60° C and the second at 0° C ambient temperatures.	Complied when operated at 90 strokes per minute every alternate minute.
Temperature rise: Maximum temperature shall not exceed 115° C during the endurance test. (55° C rise at 60° C ambient temperature).	Complied. 10.8° C above 60° C ambient temperature.
Shock Test: Shall withstand 20 shocks of 250 foot pounds each as specified in para. F-2g.	Complied
Vibration test: Shall be mounted on a standard Navy 3 foot pound vibration machine and subjected to six tests of 30 minutes each at frequencies of 100, 150, 200, 250, 300 and 350 shocks per minute.	Complied
Dielectric test: Shall withstand twice the rated voltage plus 1250 volts, 60 cycles, for one minute between electrical circuits and between electrical circuits and ground.	Complied
Insulation resistance: Shall be not less than 5 megohms at not less than 500 volts, d.c.	Complied. Greater than 200 megohms by 1000 volt megger.
Splashproof integrity: Shall be subjected to a 1-inch stream of water, under a pressure head of 35 feet, played from a hose at a distance of 5 feet, for 5 minutes, without the entry of water into the case.	Complied
Salt spray test: Shall be subjected, under ultra-violet light, to a 20 per cent salt spray at 55° C. for a period of 3 minutes, followed by an air blast at 55° C for 3 minutes, the cycle being repeated continuously for 100 hours.	*Satisfactory except for slight rusting inside of plunger guard tube (pc. 31237).
Weight: Shall not exceed 8 pounds.	*16 pounds.
Nameplate: Shall be in accordance with N.D. Specification 42N2.	*Relief etching used on both nameplates. Circular nameplate is of aluminum.
Dissimilar metals: Contact of dissimilar metals, except steel, with aluminum alloys shall be avoided as much as practicable in the assembly of parts. Where contact cannot be avoided, an approved spar varnish or other approved material shall be used between the faying surfaces.	Complied

Requirements	Test Values
Protection of exterior surfaces: Exterior surfaces of all equipment, except nameplates, gongs, and strikers, shall be finished with two coats of gray paint specifically approved by the bureau concerned.	Complied
Clearances: CIearances between any two electrical circuits or between any electrical circuit and ground, where not separated by at least 1/16-inch of approved insulating material, shall be not less than 1/8-inch unless otherwise approved.	Complied
Wiring: All wiring shall be in accordance with the requirements of N.D. Specification 15C1, unless otherwise approved.	Complied. Type SICP-1-1/2
Coil windings: May be either single or double silk or cotton covered enameled copper wire.	*Enameled copper wire.
Protective covering for coils: Shall be non-hygroscopic, not glued or cemented to the coils, but shall be overlapped and cemented in the lap.	Complied
Waterproofing of coils: Allcoils shall be impregnated with an approved synthetic resinous material or other suitable and approved waterproofing and insulating compound.	Complied
Magnetic circuits: Shall be of laminated punchings of the best available grade for the purpose and shall be protected against corrosion.	*Laminated punchings not applicable to this design. Plunger tube is copper, nickel, and chrome plated.
Terminal block: Shall be of approved material and type, and readily accessible.	Complied
Terminal lugs: Shall be in accordance with Bureau of Engineering drawing 9-S-1841-L unless otherwise specified by the bureau concerned.	*Lugs are not in accordance with Bureau drawing 9-S-1841-L
Supply leads: Shall enter through the casing attached to the mounting bulkhead and not through any removable part.	Complied
Terminal wiring: Shall be lead in through a boss drilled and tapped for a Navy standard terminal tube. The case shall be provided with two bosses, one located at the top and the other at the bottom of the case, unless otherwise approved by the bureau concerned.	*Bosses are tapped for 1/2-inch (IPS) terminal tubes in lieu of 3/4-inch.

Requirements	Test Values
Mounting lugs: Shall be designed for 3 point bulkhead mounting.	*Designed for 4 point bulkhead mounting.
Contacts: All contacts for making and breaking an electrical circuit shall be of tungsten.	None used.
Agreement with test plans: Blueprint plans of sufficient detail to show all essential components of the equipment to be tested shall be furnished and shall check with the equipment.	*Brass sample is identified as aluminum.

*Denotes failure to comply with the specifications.

CONCLUSIONS

22. The sample bells meet the specification except in the following respects:

(1) Type CV-10 Vibrating Bell

a. Para. E-2c(2) - Stroke frequency is 11.5 strokes per second in lieu of 40 to 60 per second.
b. Para. D-11h - The bell would not operate in all planes as required.
c. Para. F-2h(2) - The bell would not operate during the vibration test.
d. Para. D-12d - Test not conducted as case is not of splash-proof or watertight design.
e. Para. E-1 - Weight (10 pounds, 12 ounces) exceeds the 8 pounds allowed.
f. Para. E-13 - Relief etching used on both nameplates, Circular nameplate of aluminum.
g. Para. D-6b - The wire in the solenoid is not insulated with cotton or silk.
h. Para. D-9c - Laminated core construction is not applicable to this design.
i. Para. D-10b - Terminal lugs are not in accordance with Bureau drawing 9-S-1841-L.
j. Para. D-11i - The bell is designed for 4 point mounting in lieu of 3 point.
k. Para. H-3b - Brass nameplate is identified as aluminum.

(2) Type CVX-10 Vibrating Bell

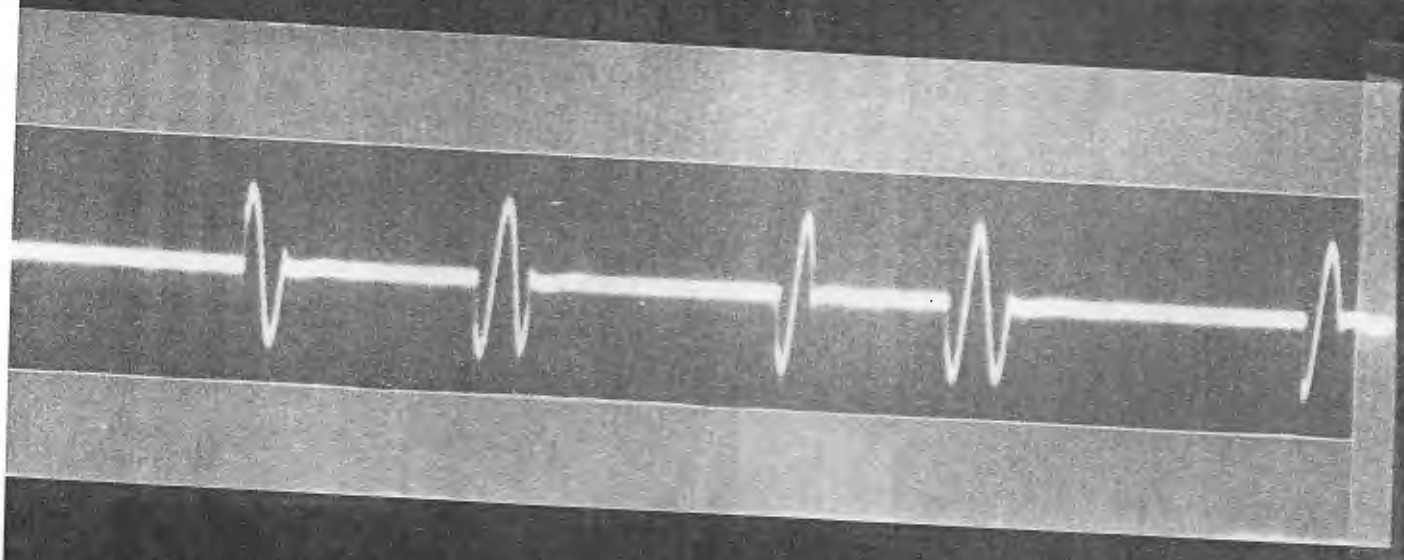
a. Para. E-2c(2) - The stroke frequency is 12 strokes per second in lieu of 40 to 60 per second.
b. Para. D-11h - The bell would not operate in all planes as required.
c. Para. F-2h(2) - The bell would not operate during the vibration test.
d. Para. D-12d - Approximately 10 cc of water entered the case.
e. Para. E-1 - Weight (16 pounds, 9 ounces) exceed the 8 pounds allowed.
f. Para. E-13 - Relief etching used on both nameplates. Circular nameplate of aluminum.
g. Para. D-6b - The wire in the solenoid is not insulated with cotton or silk.
h. Para. D-9c - Laminated construction is not applicable to this design.
i. Para. D-10b - Terminal lugs are not in accordance with Bureau drawing 9-S-1841-L.
j. Para. D-11i - The bell is designed for 4 point mounting in lieu of 3 point.
k. Para. H-3b - Brass nameplate is identified as aluminum.

(3) Type CSWT-10 Single Stroke Bell

a. Para. E-2c(2) - The bell is designed for single stroke in lieu of 40 to 60 strokes per second.
b. Para. D-11h - The bell would not operate in all planes.
c. Para. F-2p(2) - Inside of plunger guard tube (pc. 31237) corroded.
d. Para. E-1 - Weight (16 pounds) exceeds the 8 pounds allowed.
e. Para. E-13 - Relief etching used on both nameplates. Circular nameplate of aluminum.
f. Para. D-6b - The wire in the solenoid is not insulated with cotton or silk.
g. Para. D-9c - Laminated construction is not applicable to this design,
h. Para. D-10b - Terminal lugs are not in accordance with Bureau drawing 9-S-1841-L.
i. Para. D-11i - The bell is designed for 4 point in lieu of 3 point bulkhead mounting.
j. Para. H-3b - Brass nameplate is identified as aluminum.

23. All of the bells are equipped with 10-inch gongs in lieu of 8-inch and are not designed in accordance with para. E-2c.

24. All of the cases are provided with 1/2-inch (IPS) threaded bosses in lieu of 3/4-inch.



OSCILLOGRAM GIVING DURATION OF CURRENT IMPULSES IN BELL CIRCUIT OF TYPICAL ENGINE ORDER TELEGRAPH TRANSMITTER— 60 CYCLE SUPPLY

PLATE I

PLATE 2

PLATE 3

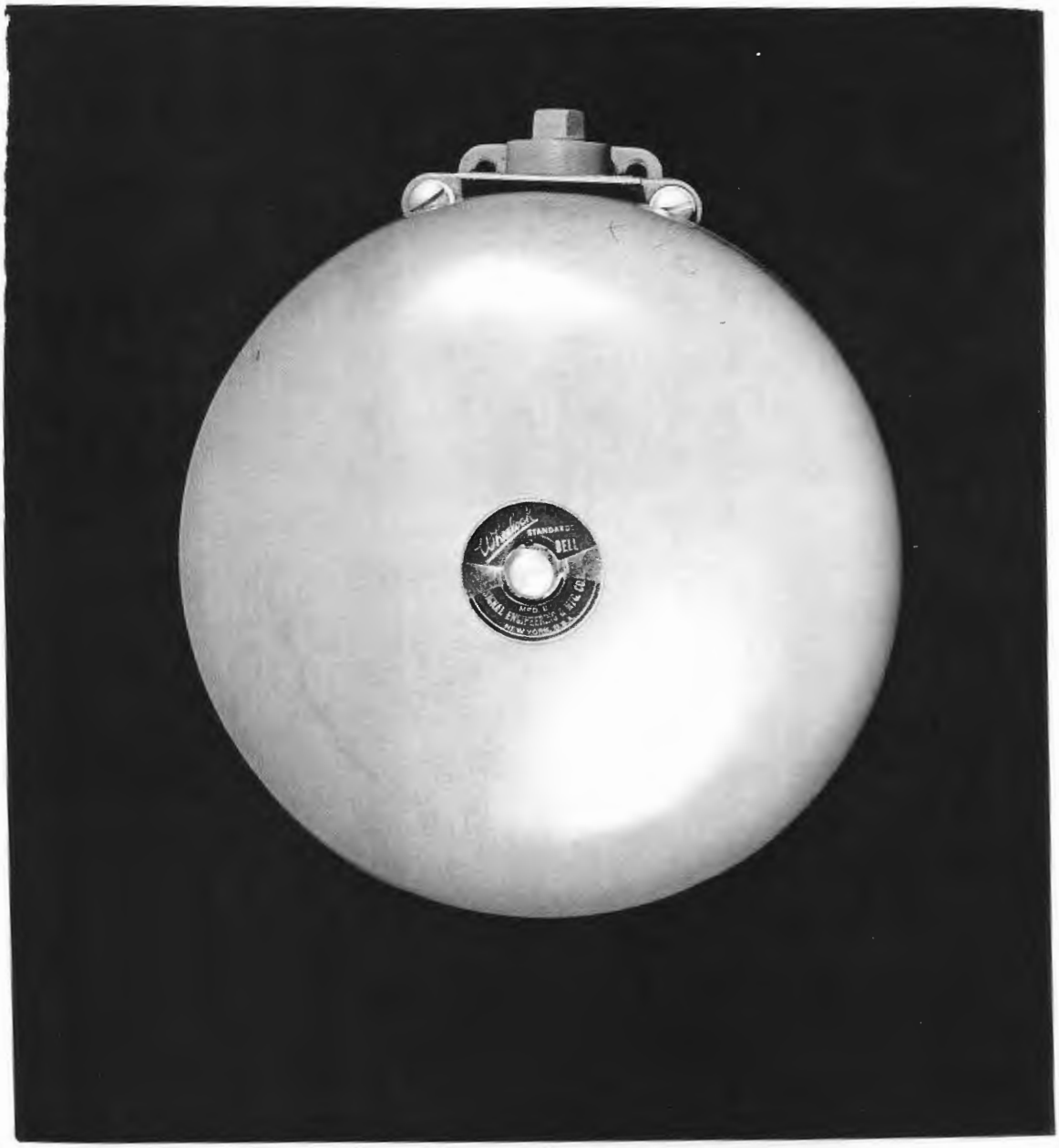


PLATE 4

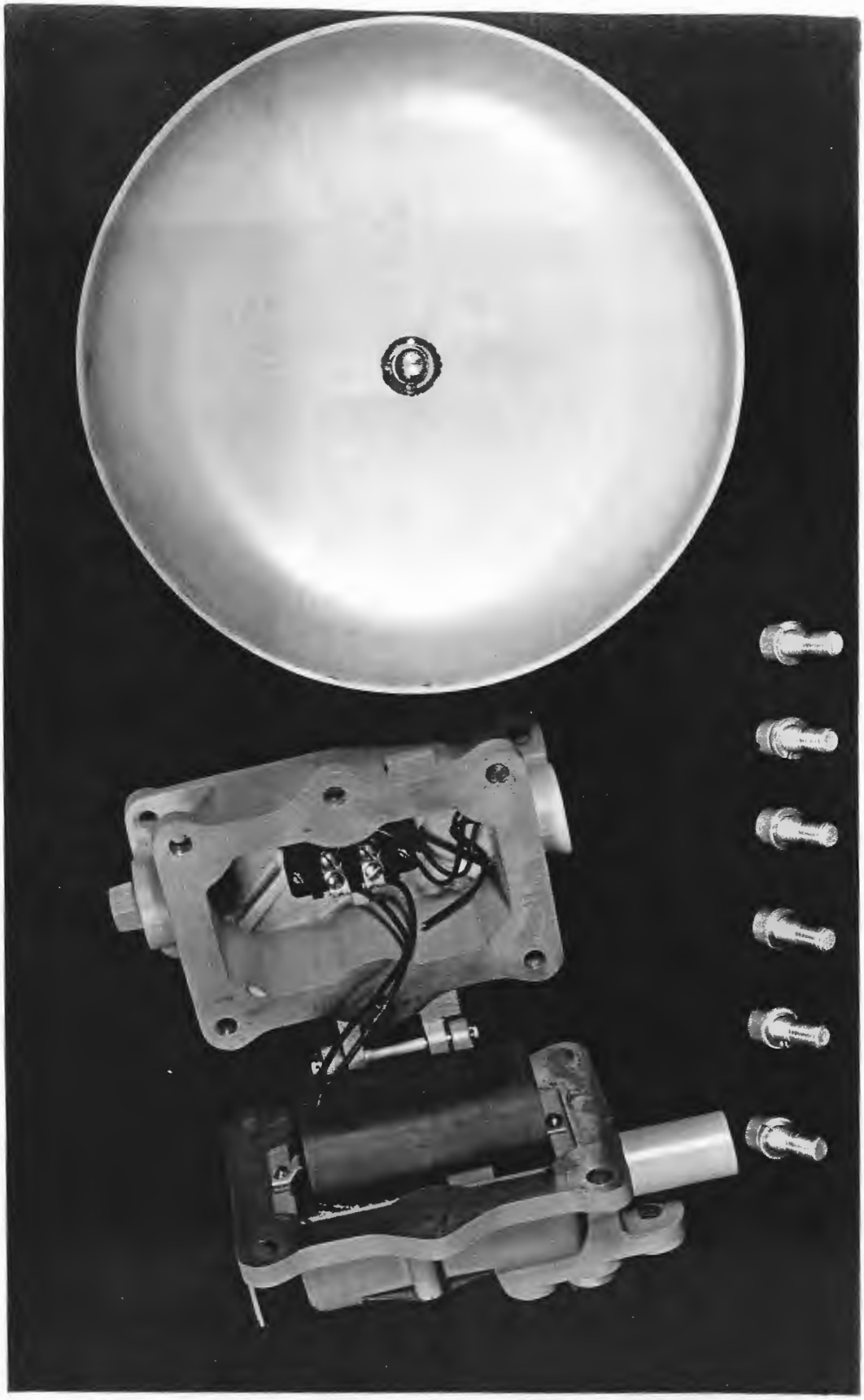


PLATE 5

PLATE 6

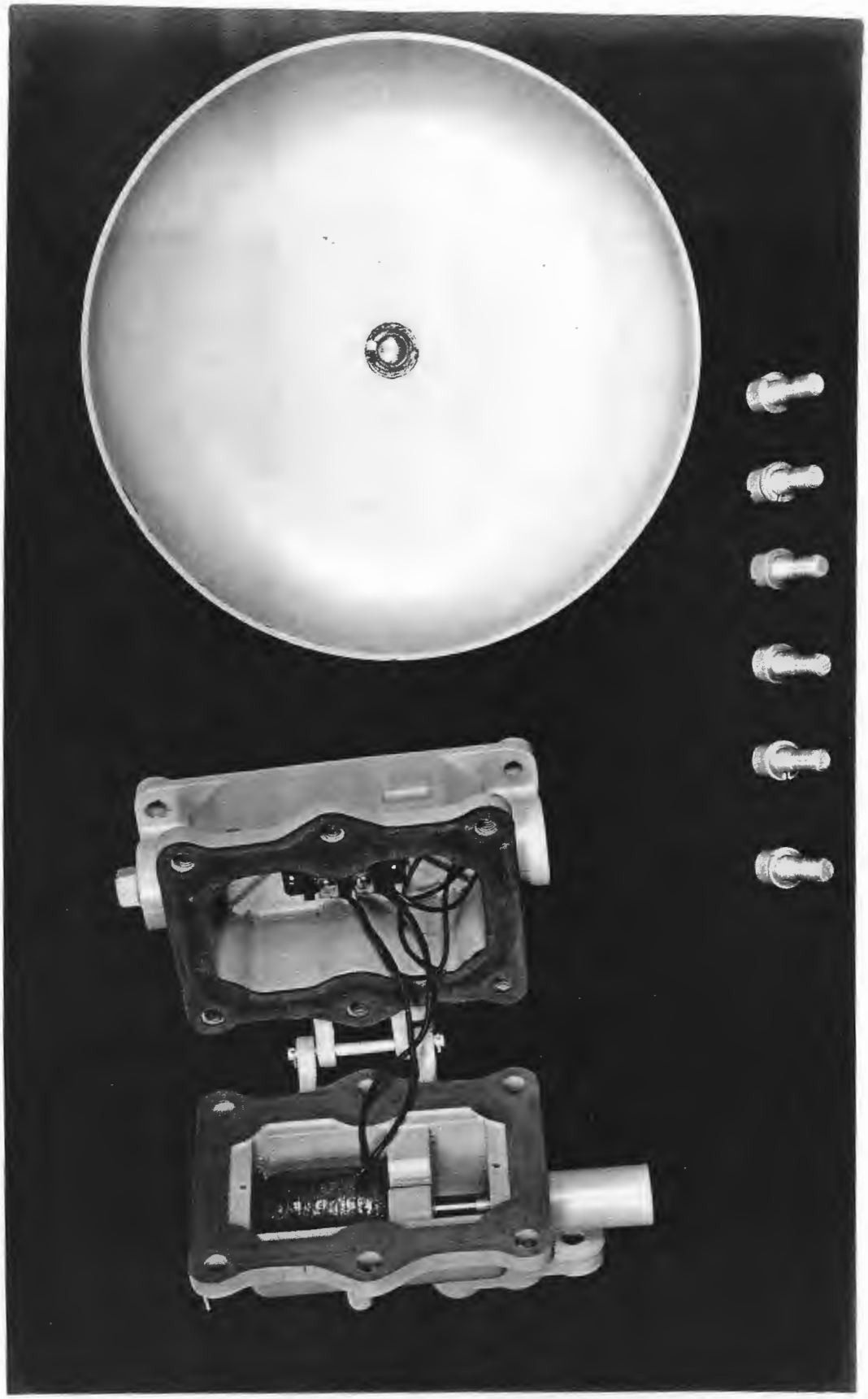


PLATE 7