TEST SET TYPE FACILITIES FOR REGISTERS AND SENDERS GENERAL DESCRIPTIVE INFORMATION NO. 5 CROSSBAR OFFICES

CONTENTS

1. INTRODUCTION

1.01 This section provides general descriptive information concerning the test set type facilities designed for use in the maintenance of No. 5 crossbar registers and senders. These testing facilities, which are less expensive than the automatic monitor register and sender test circuit, have been made available as an alternate standard for the smaller No. 5 crossbar offices. In addition to an equipment first cost saving, a floor space saving of from one to four equipment bays will realized.

1.02 The field of application for the test set type maintenance facilities will be generally in offices ranging up to about 10,000 lines in size and depending upon the number of originating registers, incoming registers, and outgoing senders.

1.03 In order to perform similar maintenance tests, the test set type facilities will require more maintenance time than the automatic monitor register and sender test circuit. Additional time will be required for connecting and disconnecting the test sets, for manually dialing the test numbers, and for reading the trouble recorder cards to determine the test results.

1.04 The test set type facilities are the only means available for testing revertive tandem-type incoming registers. All other types of registers and all types of senders, except intermarker group senders, may be tested by either type facilities. Intermarker group senders are tested by means of the master test control circuit.

1.05 If the test set type facilities are installed originally in an office, no particular circuit or equipment penalty is imposed which would prevent the subsequent installation of the more expensive test facilities.

1.06 A determination of whether the test set type facilities should be provided initially will depend upon the savings which can be realized by deferring the higher first cost expenditure for the automatic monitor register and sender test circuit.

2. GENERAL FEATURES

2.01 Two small portable test sets, a register test set for testing originating and incoming registers and a sender test set for testing outgoing senders, comprise the basic test control devices. In conjunction with these two test sets, several frame-mounted test circuit control units, each adapted to testing particular types of incoming registers or outgoing senders, are provided. These equipment units total approximately 20 mounting plates, plus several control keys and selecting switches located in the master test frame control bay.

2.02 Patching and connecting facilities are provided so that the portable test sets may be used either at the master test frame or at the frame location of the circuit being

tested. The remote control feature from the frame location is provided so that the operation of the register or sender being tested can be observed readily during the test call.

2.03 The two portable test sets and associated frame-mounted test control circuits provide the basic operational test equipment for registers and senders.

2.04 In addition to the above test equipment, an electronic pulse generating test set and a digit control test set are available. The 3A pulse generating test set, when used in conjunction with the register and sender test sets and associated circuits, provides a means of making precision pulsing capability tests of dial pulse and MF registers and of revertive pulse senders. The 3A digit control test set, when patched to the 3A pulse generating test set, provides a means for presetting a series of pulses representing a number composed of a selected combination of digits. The 3A pulse generating test set without the 3A digit control unit is capable of generating only trains of pulses of the same digit.

2.05 Since the 3A pulse generating test set and the 3A digit control test set are required for relatively infrequent applications of precision tests of pulse counting and registering circuits, they can be used in common by several offices in an area rather than be provided on a one per office basis.

3. PRINCIPLES OF TEST SET TYPE MAINTENANCE FACILITIES

A. Basis for Use

3.01 The test set type facilities permit the application of new test procedures and techniques which were evolved during field trials. A basic premise of these techniques is that well-designed functional circuits are capable of performing satisfactorily in service with little maintenance attention over long periods of time. This is particularly true of registers and senders where a considerable built-in margin of capability exists. For such circuits, means for applying simple operational and relatively infrequent marginal tests are adequate.

3.02 For day-to-day maintenance the 3A pulse generating test set is not required. The register and sender test sets and associated test circuits provide the means for identification and clearing of trouble. They are also capable of applying routine operational tests which provide, in most instances, some margin over service requirements.

3.03 Routine operational tests can be employed to disclose troubles, such as open contacts, broken wires, and crosses. However, these troubles have been found to be so infrequent as to warrant their disclosure, in most instances, by other means, such as automatic trouble recordings, alarms, extended operational tests, and inspections. Clearance of troubles of this type will not generally entail reconditioning to restore built-in margins.

3.04 Frequent testing appears to be unnecessary for detecting gradual deterioration, and periodic precision pulsing capability tests need be made only at extended intervals.

3.05 When analysis of trouble records and reports shows that pulsing performance has degraded, those circuits or circuit features which are weak from a pulsing capability standpoint can be reconditioned to re-establish their inherent marginal capability. The test set type maintenance facilities, when used in conjunction with the pulse generating test set, provide a means for accomplishing this objective.

B. Considerations Regarding Application

3.06 Options have been made available in the master test frame connector, the master test control circuit, the office common control circuits, and in the register and sender circuits so that with one exception, as discussed in 1.04, either the test set type or the present automatic monitor register and sender test facilities may be employed.

3.07 When the test set type facilities are provided, independent tests of incoming registers may be made without interfering with tests of other circuits being tested by the master test frame, since the connections for testing incoming registers do not require the use of the master test control circuit.

3.08 However, when the test set type facilities are installed in an office having the automatic monitor register and sender test circuit, this circuit cannot be used for testing or monitoring while the test set type facilities are being used for testing any types of registers or senders, and vice versa.

4. DESCRIPTION OF TESTING EQUIPMENT

A. Register Test Set

4.01 The register test set, shown in Fig. 1, is a portable set contained in an aluminum case approximately 12 inches long, 9 inches wide, and 7 inches high including the cover. The test set is provided with two dials, nominally 10 and 20 pulses per second, to simulate the two dial speeds encountered in service. The dials are used for testing both dial pulse incoming and originating registers. A keyset is provided for use in testing multifrequency, revertive, and tandem revertive incoming registers.

4.02 The dials, keyset, control keys, jacks, and lamps are mounted on the face panel of the test set. Some additional test set apparatus, such as resistors, capacitors, and a repeating coil, are mounted in the lower part of the test set case. The test set may be attached to a rolling ladder step by fastening it to the side of the ladder with a strap.

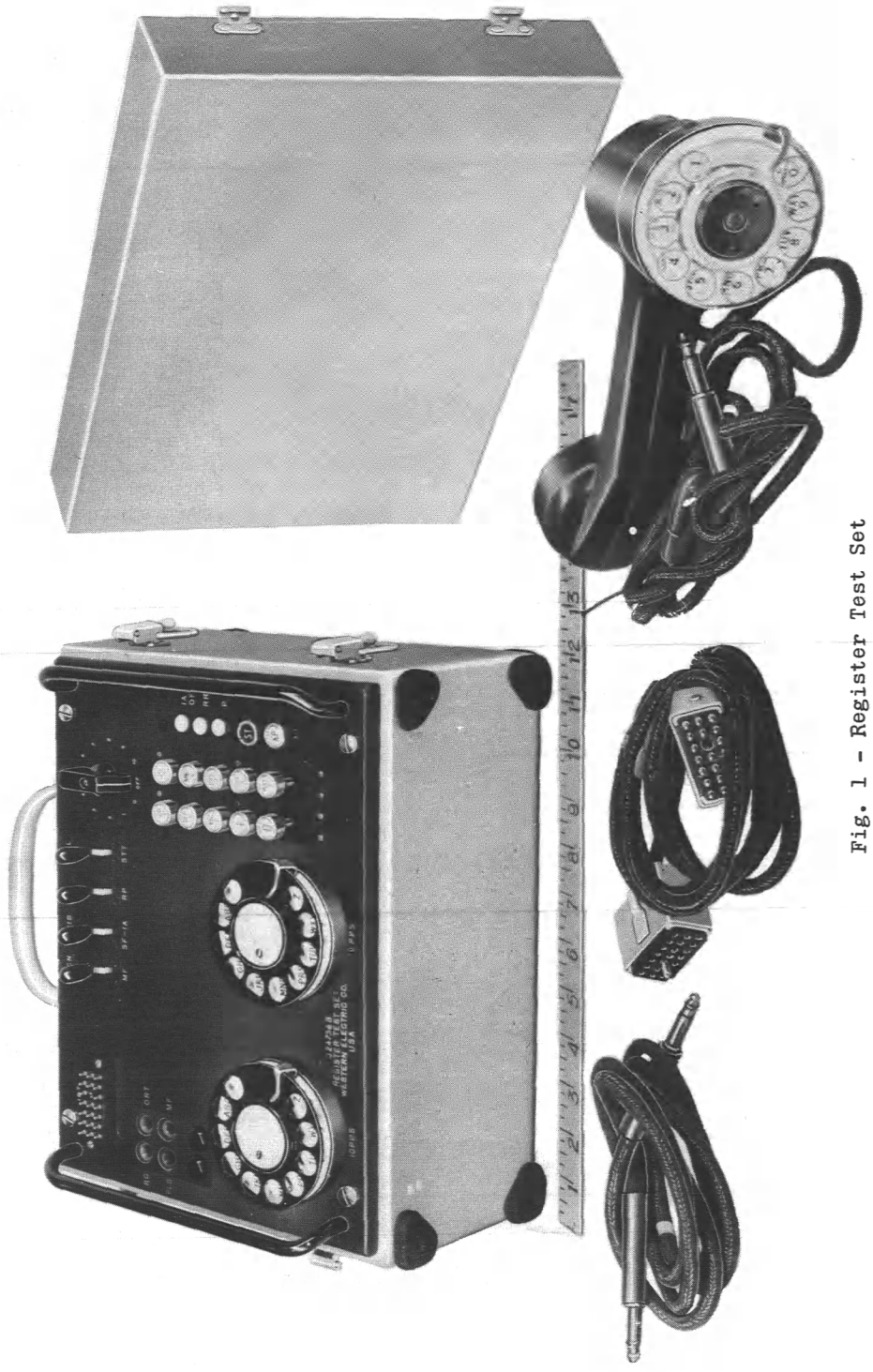

Fig. 1 - Register Test Set

B. Incoming Register Test Circuit

4.03 The keys, lamps, and switches of the incoming register test circuit are mounted in the master test frame control bay key and lamp panel. The relay equipment of the test circuit is mounted on the left bay of the master test frame control bays. These incoming register test circuit units may be equipped as required by the types of incoming registers employed in an office. The incoming register test circuit is not required for testing originating registers.

4.04 A multiconductor belt line connected to the incoming register test circuit has jack appearances at the master test frame control bay and at each of the incoming register frames. The register test set may thus be connected to the incoming register test circuit at any of the jack appearances by means of a multiconductor patching cord.

C. Sender Test Set

4.05 The sender test set, shown in Fig. 2, is a portable set contained in a aluminum case approximately 10 inches long, 8 inches wide, and 6 inches high including the cover. The test set is used for testing dial pulse, MF, revertive, and PCI outgoing senders. The face panel mounts lamps for digit counting and test progress indications, control keys, a rotary control switch, jacks, and two multicontact connectors. Additional test set resistors are mounted in the lower part of the test set case. The test set may be attached to a rolling ladder step by fastening it to the side of the ladder with a strap.

D. Sender Test Circuit

4.06 The keys, lamps, and switches of the sender test circuit are mounted in the master test frame control bay key and lamp panel. The relay equipment of the test circuit is mounted on the left bay of the master test frame control bays. These sender test circuit units may be equipped as required by the types of senders employed in an office.

4.07 A multifrequency receiver is required in conjunction with the sender test circuit to recognize and record the output of MF senders. A regular service MF receiver, mounted on an incoming register frame, may be used for this purpose. However, if no MF incoming registers are used in an office, it is necessary to provide an MF receiver mounted on the master test frame recorder bay for association with the MF sender test facilities.

4.08 A multiconductor belt line connected to the sender test circuit has multiple jack appearances at the master test frame control bay and at each of the sender frames. The sender test set may thus be connected to the sender test circuit at any of the jack appearances by means of two multiconductor patching cords.

E. 3A Pulse Generating Test Set and Power Supply Unit

4.09 The 3A pulse generating test set is assembled in two portable units for greater convenience in handling. When in use, the two units are connected together by means of a multiconductor cord. Storage space for the cords is provided in the cover of the test set.

4.10 The pulse generating test set unit, shown in Fig. 3, is housed in an aluminum case, 17 by 13 by 7-1/2 inches in size, and weighs approximately 31 pounds. The electronic equipment for generating pulses and the controls for establishing or regulating the per cent break, speed of pulsing, number of pulses per digit, and the interdigital time are contained in this unit. The values established are indicated on two meters, one principally for reading per cent break, the other for reading pulses per second. The interdigital time and the supply voltage ranges are also indicated by these meters under control of switches provided for this purpose. A 10-step cold cathode counting tube, visible on the test set panel, follows and indicates the number of pulses. This tube may be employed for visual pulse counting purposes.

4.11 The power supply unit, shown in Fig. 4, is housed in an aluminum case, 13 by 13 by 7-1/2 inches in size, and weighs approximately 38 pounds. It operates from 105- to 125-volt, 60-cycle ac power supply and contains apparatus for converting this power to 6.3 volts, 60 cycles ac and to an electronically regulated 300 volts dc. This regulated high voltage dc is supplied to the pulse generating unit as +200 volts and −100 volts with reference to ground.

F. 3A Digit Control Test Set

4.12 The 3A digit control test set, shown in Fig. 5, is assembled in a portable case, 13 by 13 by 7-1/2 inches in size, and weighs approximately 12 pounds. It contains rotary switches and electronic equipment to control the pulse count of the 3A pulse generating test set to which it is patched by means of a power supply cord and a multiconductor signal control cord.

5. METHOD OF OPERATION

A. General Method of Testing Registers

5.01 The register test set is used in conjunction with the trunk test circuit, the master test control circuit, the trouble recorder, and a telephone set when testing dial pulse originating registers.

Fig. 2 - Sender Test Set

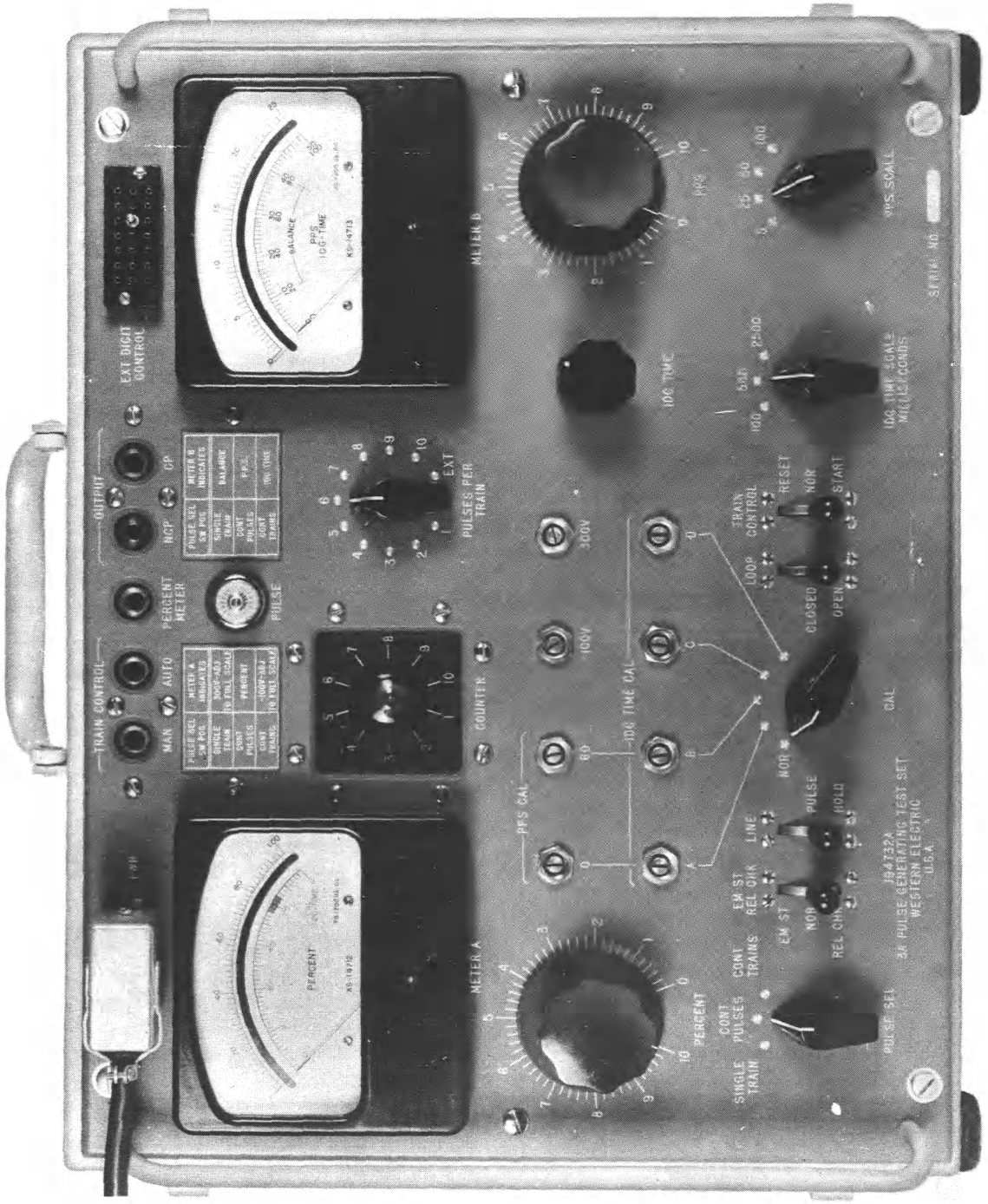

Fig. 3 - 3A Pulse Generating Test Set

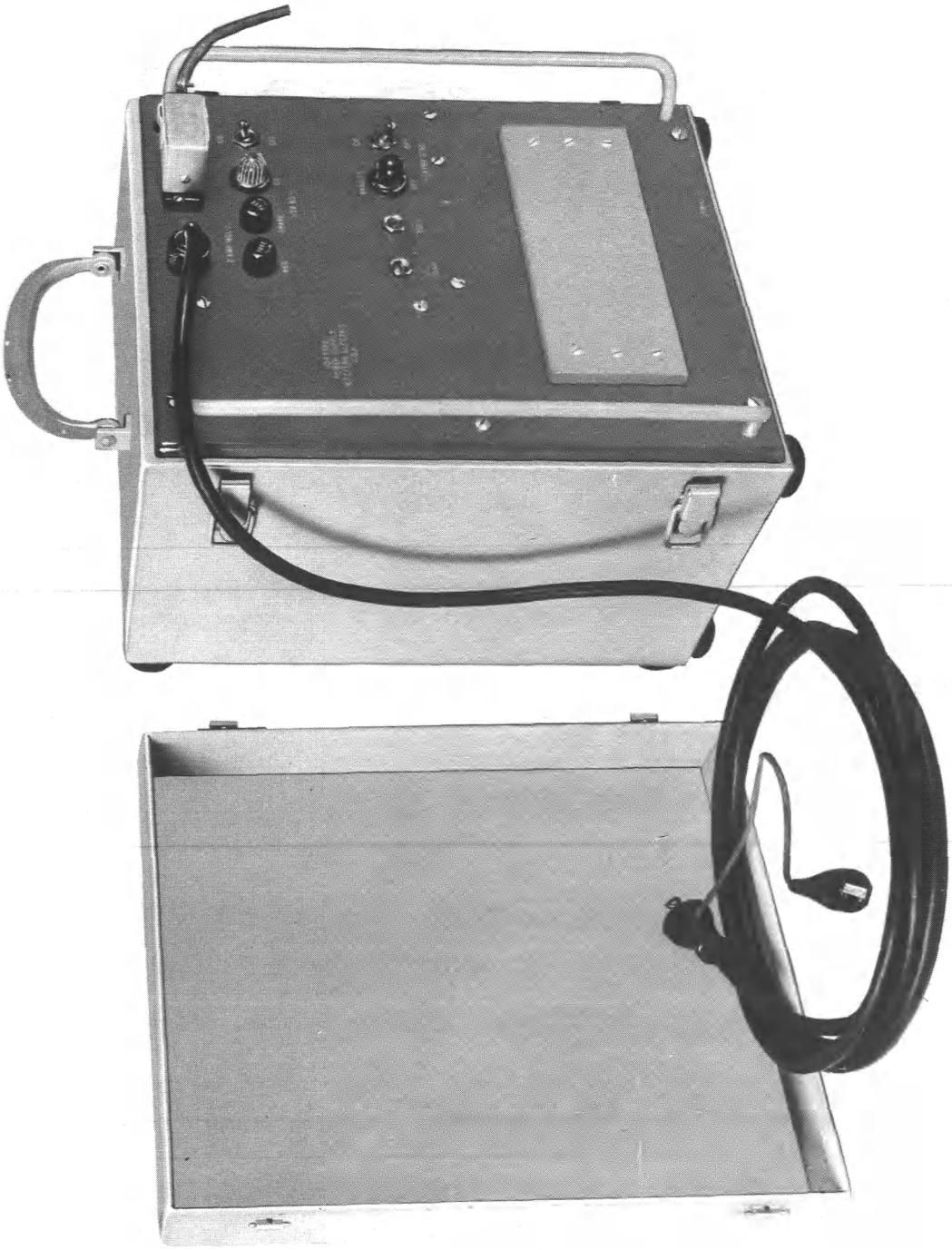

Fig. 4 - Power Supply Unit for 3A Pulse Generating Test Set

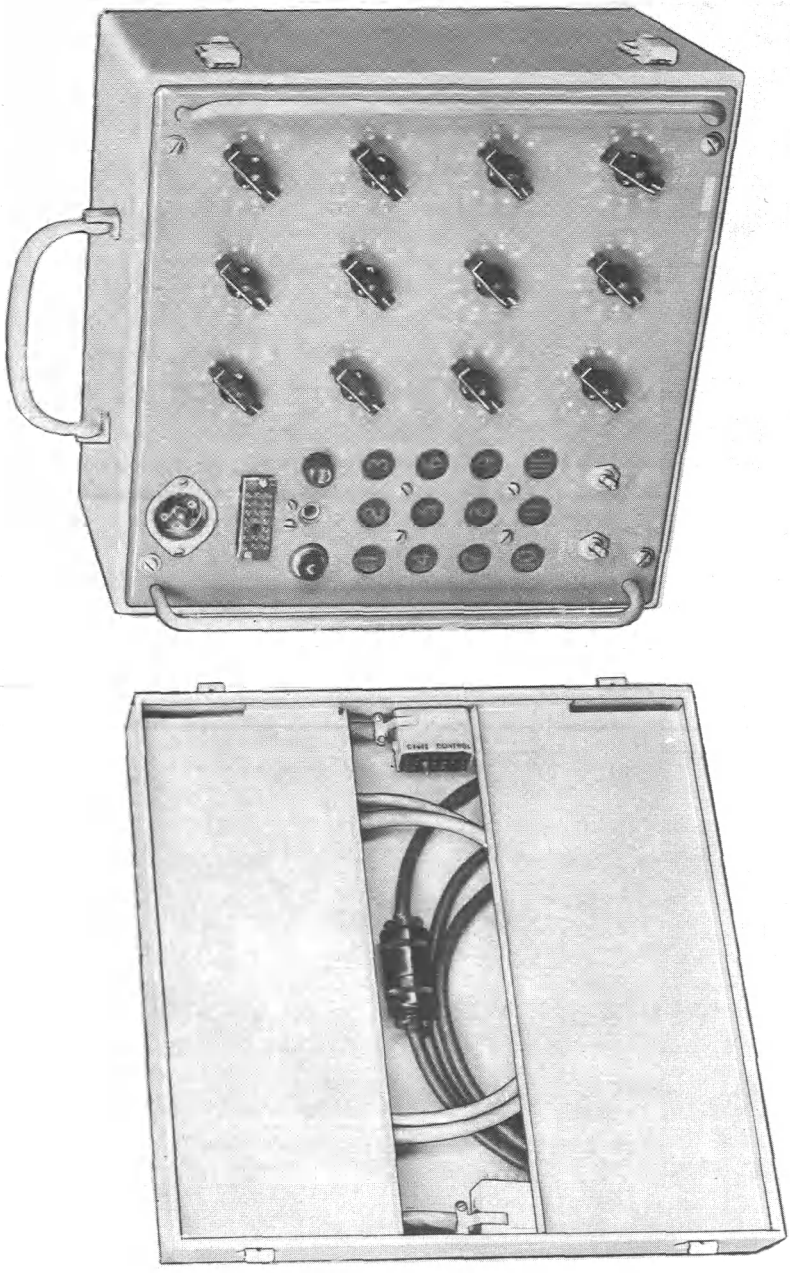

Fig. 5 - 3A Digit Control Test Set