BELL SYSTEM PRACTICES
Teletypewriter Stations

ADDENDUM P31.601
Issue 3, September, 1954
AT&T Co Standard

TIME SWITCHES FOR TELETYPEWRITER STATIONS

1. GENERAL

1.01 This addendum supplements Section P31.601, Issue 3 and replaces Addendum P31.601, Issue 2.

1.02 This addendum is being reissued to correct the number of hours of operation of synchronous motor to wind fully WHE-11, WH-11, VSWE-11 and VSW-11 clocks and to include changes in Addendum P31.601, Issue 2.

1.03 The changes this addendum makes in Section P31.601, Issue 3 are as follows:

*3.22 (Add)

(a) Change Fig. 8 (Sketch B) to substitute the following note for the one regarding machine screws: "Machine screws and connectors are required when Types V and W time switches are used as shown. These screws and connectors must be ordered separately."

The Sangamo Electric Company's parts numbers are 41679 for the screws (2 required), 41646 for the short connector and 41647 for the long connector (1 each required). As indicated the screws make contact with the connectors when the connectors are installed behind the terminal block.

(b) Change Fig. 8 (Sketch D) to show the code of the relay as KS-5721-L1.

*5.01 Change last sentence to read as follows:

When the spring is unwound it requires approximately 105 hours of operation of the synchronous motor to wind it fully.

BELL SYSTEM PRACTICES
Teletypewriter and Manual Telegraph Station and P.B.X. Installation and Maintenance

SECTION P31.601
Issue 3, April, 1949
AT&T Co Standard

TIME SWITCHES FOR TELETYPEWRITER STATIONS

Contents **Paragraphs**

Contents

1. GENERAL

1.01 This section covers time switches and supplementary equipment for use in turning on or off the power supply for teletypewriters at specified times.

1.02 This section is revised to include a new type of time switch and to make other general revisions.

2. GENERAL OPERATING FEATURES

(A) Clock Mechanism

2.01 All time switches covered herein are equipped with a clock mechanism identified as the "Spring Motor"; the main spring of which is wound and kept fully wound by an electric motor. The electric motor is driven by the same source of power that the time switch controls. When the power fails the "spring motor", as a reserve fall-back, continues to drive the time switch until the power is restored or the spring is run down. The method of activating and the length of time stored in the reserve fall-back, varies with the different type switches.

(B) Time Dial

2.02 All types are equipped with a 24-hour time dial with the night period 6 PM to 6 AM suitably indicated by black stencilling. A pointer is provided to indicate the correct time.

(C) ON & OFF Features

2.03 All types have either ON and OFF levers or pins which can be set to alternately close and open a set of contacts once or several times each 24-hour period. The levers or pins can be set accurately to operate on the hour, fifteen minutes before or after the hour or on the half hour. An arrangement is provided whereby these operations can be accomplished manually without affecting subsequent operations by the levers or pins.

(D) By-Passing Switch

2.04 A hand operated by-passing switch may be provided for use at some installations, as discussed later, when overtime service is desired.

(E) Omitting Features

2.05 All time switches covered herein have an Omitting Device. This can be set to prevent the ON and OFF operations on any desired day or days and is referred to as the Omitting Feature. It is usually set to prevent the turning on of the Teletypewriter on Sundays and holidays. Use of this feature is optional.

(F) Advance Time Cut-off Feature

2.06 Time switches currently being furnished (as recommended herein) are equipped with an Advanced Time Cut-off feature. This provides for an advanced OFF operation on any selected day or days. For example, OFF 5:30 PM Monday to Friday; OFF 1:30 PM Saturday only. The minimum

time interval between the adjusted ON and advanced OFF operation is 2-1/2 hours. Use of this feature is optional and when provided it is identified by the letter "E" on the end of the manufacturer's code No.

(G) Switch Contacts

2.07 All switches specified herein are equipped with single-pole single-throw contacts. When the connected load exceeds the load limits it will be necessary to provide auxiliary (relay-operated) load circuits as specified herein.

3. CODING AND DETAILED DESCRIPTION OF TIME SWITCHES AND SUPPLEMENTARY EQUIPMENT

3.01 The time switches as specified herein are all manufactured by the Sangamo Electric Co. located at Springfield, Ill.

3.02 Figures 1 to 6, inclusive, illustrate the various types of time switches. Figures 8 and 9 cover the wiring and assembly and Table A details equipment, wiring and assembly for various types of installations.

3.03 The manufacturer's label, code designation and operating instructions attached to the time switch case should be disregarded and replaced by these instructions. The code number and power data stencilled on the face of the switch (as covered in 8(D)) should be used for identifying the various types.

(A) Switches for A-C Regulated Power

Type WHE-11 (Approved) **Fig. 1**

3.04 Coded as "Sangamo Time-Switch WHE-11, arranged for operation on voltage ——— and frequency ———, and equipped with insulating cover No. 70659."

3.05 Equipped with Omitting and Advanced Time Cut-Off features, silver contacts and time dial driven by a synchronous motor with spring motor fall-back of 10-hour reserve. The fall-back mechanism is activated by a **"Thermal-Blocking Device"** which permits mounting this type switch on the TTY table.

3.06 Arranged for one or two separate ON and OFF operations each 24-hour period. The minimum time limit between ON and OFF operation is 30 minutes; and between OFF and ON operation is 90 minutes.

3.07 There is an interval of approximately 30 minutes after each OFF operation, during which time the manual ON feature is disabled. A hand operated by-passing switch may be

provided, which shorts out the contacts and bridges this dead spot when overtime service continuous with normal service is desired.

3.08 For general indoor or outdoor use and mounted in a metal gasket sealed cabinet 5 inches wide, 10 inches long and 4 inches deep. The cabinet is provided with combination 1/2, 3/4 and 1-inch knockouts on the sides, bottom and back for wiring connections and a hinged door on the front secured by a hasp.

Type WH-11 (For Reuse Only) **Fig. 2**

3.09 Identical with the WHE-11 except that it is not equipped with the Advanced Time Cut-off feature. Included to cover information on switches now in use.

Types VSWE-11 and VSW-11 (Mfr. Disc.—Reuse Only)
Figs. 3 & 4

3.10 Identical with the WHE-11 and WH-11 except that reserve fall-back mechanisms are activated and disabled by a **"Mechanical-Blocking Device."** These types cannot be mounted on the TTY table. Included to cover information on switches now in use.

Type VW-11 (Mfr. Disc.—Reuse Only) **Fig. 5**

3.11 Similar to the WHE-11 except that it is not equipped with the Advanced Time Cut-off feature and is equipped with an electrically wound spring motor drive.

(B) Switches for D-C and Non-Regulated A-C Power

Type TCHE-11 (Approved) **Fig. 6**

3.12 Coded as "Sangamo Time Switch TCHE-11 arranged for operation on (specify D-C or A-C, voltage and frequency) power."

3.13 Equipped with Omitting and Advanced Time Cut-off features, mercury contacts and time dial driven by an electrically wound spring motor drive with 20-hour reserve. D-C and A-C switches of this type are not interchangeable.

3.14 Arranged for 1 to 48 separate ON and OFF operation each 24-hour period. Minimum time between each ON and OFF or OFF and ON operation is fifteen minutes.

3.15 On this type of switch the manual ON and OFF levers are not intended for operation by the customer. Consequently, if any TTY operation is desired in normally OFF periods, a hand operated by-passing switch is necessary.

3.16 For general indoor mounting and is housed in a metal cabinet 7 inches wide, 13 inches long, and 5 inches deep. The cabinet is provided with 3/4" knockouts in the bottom, back and sides for wiring connections and a hinged door on the front secured by a slotted screw.

Type TCH-11 (For Reuse Only) **Fig. 6**

3.17 Identical with the TCHE-11 except that it is not equipped with the Advanced Time Cut-off feature. Included to cover information on switches now in use.

(C) By-Passing Switch

3.18 The hand operated by-passing switch is provided when it is desired to start TTY equipment after it has been stopped automatically by the time switch. In addition to the time switch the following equipment will be required when this feature is specified.

1—Crouse Hinds, FS 22 Condulet—(two gang shallow type or equivalent outlet box with 3/4" threaded connections and arranged to accommodate one tumbler switch and one receptacle-type pilot light).

1—Crouse Hinds, S-32242 Two-Gang Cover Plate (or equivalent flush-type cover plate arranged for one tumbler switch, one round receptacle and equipped with one round ruby jewel for receptacle-type pilot lamp).

1—Bryant No. 3851 Pilot Receptable with No. 618, 120-volt lamp (or equivalent).

1—Bryant No. 5862 Flush Tumbler Switch double-pole single-throw, with 20-ampere "T" rating (or equivalent).

1—3/4" Close Conduit Nipple (threaded on both ends).

2—3/4" Conduit Locknuts.

1—3/4" Conduit Bushing.

(D) Load Requirements and Auxiliary Load Circuit

3.19 The total teletypewriter running load (as determined from BSP P30.019) controlled by the time switch alone should not exceed 20 amperes on either a-c or d-c power. When the connected load exceeds this value, one or more auxiliary load circuits should be provided. The total teletypewriter running load connected to each additional auxiliary load circuit should not exceed 20 amperes.

3.20 If by-passing switch is used the connected load should not exceed the rating of this switch.

3.21 The equipment listed below will be required in addition to the time switch for each additional load circuit as may be required. When customer's power is of any type other

than 115-volt 60-cycle a-c, it will be necessary to provide apparatus other than detailed below and such cases will require additional consideration.

1—KS-5721 List 1 Mercury Type Relay (For 105 to 125-volt 60-cycle a-c power).

1—Type A Columbia Surface Cabinet Aluminum Finish 4-1/2" wide, 9" high and 3" deep (or equivalent).

2—P-206519 R.H.M. Screws (8 x 32, 1/2" long).

2—P-284151 Washers.

2—P-221761 Lock Washers.

2—P-206518 Nuts.

4. SPARE PARTS FOR TIME SWITCHES

4.01 Spare parts for Time Switches will not normally be required as local repairs are not recommended. All switches are furnished with spare omitting pins; spare ON and OFF pins are provided with the type TCH-11 and TCHE-11 switches. However, additional pins and insulating cover for contacts may be obtained and are coded as follows:

Types WHE-11, WH-11, VSWE-11, VSW-11 and VW-11

#35052 Omitting Pin for Sangamo (Type) Time Switch.

Types TCHE-11 and TCH-11

#33500 Omitting Pin for Sangamo (Type) Time Switch.
#25183 ON Pin (Short) for Sangamo (Type) Time Switch.
#25182 OFF Pin (Long) for Sangamo (Type) Time Switch.

Parts for Contact Insulating Cover

Note: See Part 8(E) for requirements and types of switches requiring these covers.

#70659 Sangamo Insulating Cover
#31198 Sangamo Terminal Block Screw
#60174 Sangamo Insulating Plate Screw

5. DESCRIPTION OF RESERVE FALL-BACK MECHANISM

(A) Types WHE-11, WH-11, VSWE-11 and VSW-11

Figs. 1-4

5.01 These types are equipped with a self-starting synchronous motor which starts automatically when current is applied and drives the time dial. The spring-motor, which is operative only when the power is off, is automatically wound and kept fully wound through one side of a differential gear driven by the synchronous motor. The escapement wheel

associated with the spring-motor is locked when the power is connected (as discussed in the following paragraphs). When the power fails the escapement is released, the spring-motor drives the time dial and in this manner bridges the power failure. When the spring is unwound it requires approximately 24 hours operation of the synchronous motor to wind it fully.

5.02 The differential gear train, lock mechanism and automatic fall-back device cannot be observed without removing the dustproof cover, which is not recommended.

5.03 The automatic fall-back mechanism (Fig. 7) consists of a stop pin on the escapement wheel associated with the spring-motor and a latch spring which is positioned under control of the motor driving power. When the power is ON the latch spring is positioned so that it engages the stop pin and locks the escapement wheel near the extreme end of its rotating arc. When the power is OFF, as during a service interruption, the latch spring is moved away from the stop pin. This, in turn, releases the escapement wheel, starts the spring-motor which then drives the time dial until power is restored, thereby bridging the period of power failure. **Fig. 7**

5.04 Upon restoration of power the blocking device moves into the path of the escapement wheel stop pin, which near the end of its arc, pushes the latch spring out of its path and then locks the wheel in its wound position.

5.05 On the WHE-11 and WH-11 time switches the latch spring is moved by a bi-metallic element "Thermal-Blocking" as illustrated in Figure 7-A whereas on the VSWE-11 and VSW-11 types the latch spring is mechanically operated or "Mechanical-Blocking" as illustrated in Figure 7-B. Since the "Thermal-Blocking" device is less susceptible to vibration and shocks, the WHE-11 and WH-11 types may be mounted on the teletypewriter table. **Fig. 7**

5.06 With either type, when the spring is fully run down, or possibly under other conditions, the escapement wheel may stop in dead center (not latched in its wound position) as illustrated in Figure 7-C. A separate mechanical device is provided to reset, i.e. start, the escapement wheel when this occurs. Note 1 on Figures 1, 2, 3 and 4 details instructions for using this device. **Fig. 7**

(B) Types TCHE-11, TCH-11 and VW-11 **Figs. 5 & 6**

5.07 These types are equipped with an electrically wound spring-motor which drives the time dial. When power fails the spring motor continues to drive the time dial until the power is restored or the spring runs down. When the spring is unwound the time required to wind it fully, upon reconnection

to power, is approximately 20 hours for the VW-11 and 10 hours for the TCHE-11 and TCH-11. However, time will be accurate and sufficient reserves will be stored after approximately four hours of operation for the VW-11 and after 10 minutes for the TCHE-11 and TCH-11 types.

6. SETTING "ON & OFF", "TIME DIAL", "OMITTING" AND "ADVANCED TIME CUT-OFF" FEATURES

(A) Determining Settings from Service Orders

6.01 Service Orders will specify the settings governing the adjustable features of the time switch which may be one or more of the following:

(a) ON Setting—Set as specified in Service Order. If not specified, set 15 minutes prior to "start of service" time.

(b) OFF Setting—Set as specified in Service Order. If not specified, set for 15 minutes after "close of service" time.

(c) OMIT Setting—Set as specified in Service Order. If not specified, install pins for the regular recurring day or days for which no service is taken.

(d) ADVANCE TIME CUT-OFF Setting—Set as specified in Service Order. If not specified, set cut-off for 15 minutes after service hours on the regular recurring day or days for which shorter period service is taken.

6.02 After determining the various settings as required by Service Orders the adjusting procedures as detailed in (B) or (C) below should be applied, depending on the type of time switch.

6.03 If the omitting feature is not required, i.e., ON & OFF operations are required on all seven days of the week, all pins should be removed from the omitting disc and the procedures for adjusting the omitting feature should be disregarded.

6.04 If the advanced time cut-off feature is not required, i.e., the same OFF time is specified for all days, all pins should be removed from the advanced time cut-off disc and the procedures for adjusting this feature should be disregarded.

(B) Procedures for Types WHE-11, WH-11, VSWE-11, VSW-11 and VW-11 Figs. 1-5

ON and OFF Levers

6.05 For a single ON and OFF operation in 24 hours, the ON levers should be stacked together and the OFF levers stacked together at the desired time locations. This may be done by turning the thumb knob clockwise while holding

the time dial. After sliding the levers to the desired position, they should be secured by turning the thumb knob counterclockwise. The time at which an operation occurs is indicated by the position of the leading edge of the lever, which is marked by an arrow.

6.06 When more than one ON and OFF operation is desired, proceed as in foregoing except slide the individual ON and OFF levers to the desired positions instead of stacking them together. When more than one ON operation is used the bottom ON lever (which advances the Omitting Disc) should be used for the earliest ON operation. When the OFF feature is not desired and the customer is to shut off the time switch manually each day, the OFF levers should be positioned about two hours ahead of the ON levers to insure that the machine will not be turned off by the time switch during the service period.

Caution: The OFF levers should be parallel to the surface of the time dial. If the top lever or all levers are bent away from the time dial, they may interfere with the Omitting Disc and advance it falsely. This is liable to occur when the levers pass under the spokes on the disc, and because of being bent, they come in contact with the end of the pin that projects through the bottom side of the disc.

Time Dial

6.07 Set time dial to the correct time as indicated by pointer by turning the knob counterclockwise. For accuracy, the back-lash should be taken up in a clockwise direction. Operate power disconnect switch to ON position and release lock mechanism as covered in Note #1 on the figure.

Omitting Feature

6.08 Screw the omitting pin into the omitting disc on the day omitting operation is desired and all other pins that may be installed in the disc should be removed.

6.09 The omitting disc, which indicates the day of the week, is advanced each day by the stud on the bottom ON lever. This disc should be positioned manually so that the diamond on the omitting lever points to the day of the week under the following conditions:

(a) To indicate the day on which the adjustment is made if the bottom ON lever has passed or advanced the omitting disc for that day.

(b) To indicate the day prior to the day on which the adjustment is made if the bottom ON lever has not advanced or passed the omitting disc for that day.

Advanced Time Cut-off (WHE-11 and VSWE-11 Only)

Figs. 1 & 3

6.10 Loosen thumb knob by turning clockwise while holding time dial. Slide advanced-time cut-off lever until the pointer indicates the time of day advanced cut-off is desired. Recheck position of ON and OFF levers to insure they have not slipped. Tighten thumb knob, set time dial to correct time as covered in 6.07.

6.11 Screw cut-off pin in spoke on advanced time cut-off disc on day advanced OFF operation is desired.

6.12 The advanced time cut-off disc, which indicates the day of the week, is advanced each day by the stud on the advanced time cut-off lever. This disc should be positioned manually so that the diamond on the manual OFF lever points to the day of the week under the following conditions:

(a) To indicate the day on which the adjustment is made if the stud has not passed or advanced the advanced time cut-off disc for that day.

(b) To indicate one day later than the day on which the adjustment is made if the stud has passed or advanced the advanced time cut-off disc for that day.

(C) Procedures for Types TCHE-11 and TCH-11

ON and OFF Pins **Fig. 6**

6.13 Set the ON pin (shorter and light colored) in the outer circle of holes, **EXACTLY ON** the dial line indicating the time when ON operation is desired. Set the OFF pin (longer and darker colored) in the inner circle of holes, **IMMEDIATELY AHEAD** of the line indicating the time when OFF operation is desired. Repeat for the number of operations required daily. All other pins should be removed from the dial. When the OFF feature is not desired, remove all OFF pins.

Time Dial

6.14 Set for correct time by moving the dial in the clockwise direction until the pointer at the bottom of the dial points to two divisions later than the correct time. Then move the dial in the counterclockwise direction until the pointer points to the correct time. This is for the purpose of eliminating the back-lash in the gearing. Operate power disconnect switch to ON position. This type of switch is not equipped with a lock mechanism and operation of spring-motor should be indicated by ticking of the clock mechanism.

Omitting Feature

6.15 Remove the time dial by loosening the dial knob in the middle of the dial. Screw the omitting pin into the omitting disc on the day omitting operation is desired. All other pins that may be installed in the disc should be removed.

6.16 Move the omitting disc manually until the indicating arrow points to the day on which the switch is adjusted. (Variations in setting the omitting disc are not encountered in this type as the omitting disc is stepped between 12 Midnight and 1 AM by a pin permanently fastened to the back of the time dial.)

6.17 Replace the time dial taking care that the position as it is installed is at approximately the correct time of day as indicated by the time pointer and check for correct time setting and adjust as covered in 6.14.

Advance Time Cut-off (TCHE-11 Only)

6.18 Install advanced time cut-off dog (using special screw provided) in the outer circle of holes on the time dial exactly on the dial line indicating the time **one hour earlier** than the time the advanced OFF operation is desired.

Note: This advanced time cut-off on early model TCHE-11 switches was performed at a fixed time by a pin permanently staked to the under side of the time dial. Switches now being furnished by the manufacturer are equipped with a movable dog, which can be adjusted to any desired time. The earlier models can be identified by the Hamilton escapement with an ovel-shaped cover under the time dial, while the later models use an Elgin escapement with a round cover.

6.19 Install a cut-off pin in the spoke of the advanced time cut-off disc for the day Advanced Cut-off operation is desired and remove all other pins.

6.20 Set time dial to correct time of day as covered in 6.14.

6.21 The advanced time cut-off disc, which indicates the day of the week, is advanced each day by the advanced time cut-off dog. This disc should be positioned manually until the indicating arrow points to the day of the week under the following conditions:

(a) To indicate the day on which the adjustment is made if the dog has passed or advanced the advanced time cut-off disc for that day.

(b) To indicate the day prior to the day the adjustment is made if the dog has not passed or advanced the advanced time cut-off disc for that day.

(D) Storage of Excess Pins

6.22 Store excess pins in the spaces provided in the clock. Any pins remaining, after the storage spaces are all taken up, may be discarded.

7. MAINTENANCE TESTS AND REQUIREMENTS

Caution: Whenever it is necessary to remove the insulating cover for inspection of the contacts or to remove the time switch for inspection or replacement, the power supply should be removed by operating the power disconnect switch, or by removing the TTY cord if time switch is mounted on the TTY table.

(A) Routine Maintenance Tests

7.01 Check time dial and pointer for correct time. Reset time dial as covered in part 6 if time indicated is more than 5 minutes from correct time.

7.02 Variations should not exceed 5 minutes per month. Failure to keep correct time as noted on successive inspections is an indication of trouble or the possibility of previous power failures of long duration and which should be investigated.

(B) Procedures in Case of Trouble

7.03 Trouble clearance procedures on time switches should be confined to the items covered below and regulation of clock mechanism, as covered in part 8, since under certain conditions the manufacturer's guarantee is voided if any work or adjustment is made on the gear train, motor or clock mechanism. If troubles develop in the time switch it should be removed and returned to the manufacturer for repairs.

7.04 Failure of the time switch to perform its intended functions or to keep correct time is an indication of trouble. In the event of such failures, the time switch should be checked for obvious troubles. Clock spring partially or completely run down may be the result of a long power failure or a series of short power failures. Checks of the reserve stored in the clock spring are not required unless trouble is suspected. When a check of the reserve is required, it is preferable that the switch be replaced and the check made off the customer's premises.

7.05 Check operation of manual ON and OFF features.

7.06 Check operation of fall-back mechanism by operating the power disconnect switch to the OFF position. If the time switch is mounted on the TTY table, remove power

cord from receptacle. Satisfactory operation of the spring motor will be indicated by the "ticking" sound or by movement of the second hand on switches so equipped. Restore disconnect switch to the ON position or restore power cord to receptacle. Failure of the clock mechanism on this test may be the result of spring-motor rundown or other internal trouble. If time switch is a WHE-11, WH-11, VSWE-11 or a VSW-11 the escapement wheel associated with the spring-motor may be stopped in dead center position. To check, operate the reset mechanism as covered in Note 2 on Figs. 1 to 4 and repeat test. If the spring-motor still fails to start the switch should be replaced. **Figs. 1-4**

7.07 Check the spokes and the pins of the omitting and advanced time cut-off disc for correct setting.

7.08 Check Hand-Operated By-Passing Switch by operating switch to ON position. The pilot light should operate and if the time dial has passed the adjusted OFF setting the teletypewriter equipment should start.

7.09 Check Auxiliary Relay-Operated Load Circuit by momentarily operating the power disconnect switch to the OFF position then restoring to the ON position. The teletypewriter load connected to each auxiliary load circuit should follow the operation of the power disconnect switch. Since the associated relay is equipped with mercury contacts no effective maintenance procedures can be applied and upon failure of this test the associated wiring should be checked first and relay replaced as required.

8. MAKE READY PROCEDURES PRIOR TO INSTALLATION

(A) Cleaning and Lubrication

8.01 Switches as received from the manufacturer are lubricated with special oils and grease and certain parts are treated with a special solution to prevent spreading of oil away from bearings. The clock as received should operate for several years without cleaning or lubrication and, since special lubricants are required and ordinary cleaning compounds will dissolve the special treatment for preventing spreading of lubricants, it is suggested that when satisfactory regulation can no longer be obtained, or if other troubles develop which indicate the need for cleaning or lubrication, the switches be turned in for repairs.

(B) Regulation of Clock Mechanism

8.02 All switches should be tested by connecting to the proper power supply and preferably should be operated for at least seven days to check for accuracy in time and to

insure that the clock spring is fully wound. When such tests cannot be made prior to installation, arrangements should be made for equivalent checks after installation.

Types WHE-11, WH-11, VSWE-11 & VSW-11 **Figs. 1-4**

8.03 No regulation of the synchronous driving motor is required. The fall-back clock mechanism can be regulated by opening the regulating cover to the left of the time dial and moving pointer. Since the clock mechanism should operate only when the power fails, errors would be in small increments of time and no change from the factory setting is recommended.

Type VW-11 **Fig. 5**

8.04 To regulate, slide the regulating cover to the open position and move the pointer to the "fast" (if clock loses time) or "slow" (if clock gains time) position in small increments and recheck until clock maintains accurate time.

Types TCHE-11 & TCH-11 **Fig. 6**

8.05 To regulate remove time dial, slide escapement cover to open position and move the notched wheel to the "fast" (if clock loses time) or "slow" (if clock gains time) position. One notch on wheel corrects 2 seconds variation in each 24 hours. Close escapement cover before replacing time dial.

(C) Stencilling Manual OFF Lever on Types WHE-11 & VSWE-11 **Figs. 1 & 3**

8.06 The manual OFF lever on switches of this type is not suitably stencilled to indicate its intended purposes. This lever is identified in the figure and the OFF designation should be added to the lever, using 1/4" stencils and black ink.

(D) Stencilling Code Number & Power Data on Face of Time Switch

8.07 Stencil the code number and power data on the face of the time switch and as indicated on the figures covering the particular type of time switch being used. This is for future identification in cases where switches are interchanged between cases.

(E) Insulating Cover Types WHE-11, WH-11, VSWE-11, VSW-11 & VW-11 **Fig. 10**

8.08 These type switches should be equipped with the insulating cover which encloses the operating contacts. This cover is provided to prevent accidental contact with the power supply while adjusting and testing the time switch. The

coding of the parts required is covered in Part 4. Figure 10 illustrates the method of installing the cover.

9. INSTALLATION PROCEDURES

Note: The procedures outlined in Part 8 should be applied before installing the time switch.

(A) Equipment Wiring & Assembly Detail

9.01 Details covering the type of time switch and auxiliary features, together with the responsibility for the provision of various component parts are indicated by Table A. Wiring plans and mounting arrangements that apply are covered in Figures 8 and 9. **Figs. 8 & 9**

(B) Load Data

9.02 The TTY running load (as determined from BSP P30.019) connected to the time switch direct and to each auxiliary load circuit, when provided, should not exceed 20 amperes. Information as to the actual TTY load should be furnished to the customer for his use in determining the size of wire, fusing, etc.

(C) Power Disconnect Switch

9.03 A power disconnect switch should be provided with all wall-mounted time switches and auxiliary load circuits. This should be any approved double-pole, single-throw switch with a 20-ampere "T" rating. In the event the customer does not provide this switch **do not proceed with the installation** and refer the matter to your supervisor.

(D) Teletypewriter

9.04 The teletypewriter equipment should be equipped with a power cord as outlined in BSP P30.019, and the regular power switch on the equipment should be left operative and in the ON position.

(E) Adjustment & Tests

9.05 Upon completion of the installation, the service order settings should be adjusted as outlined in Part 6 and time switch and all supplementary equipment tested as outlined in Part 7(B).

9.06 Certain changes and manual operations of the time switch which are the responsibility of the customer are detailed in Part 11 and in the notes attached to this section. These notes where applicable should be given to the customer at the completion of the installation and prior to start of service.

10. REMOVAL PROCEDURES

10.01 Upon removal of the time switch or when power is disconnected for an extended period of time the spring-motor lock mechanism should be operated to prevent the spring from running down. The procedures for performing this function vary with type of switch and are indicated in Note 1 on the figures covering all types except the TCHE-11 & TCH-11. There is no lock mechanism provided in these types and under this condition the spring motor will continue to drive the time dial until unwound.

11. CUSTOMERS OPERATING PROCEDURES

11.01 These notes give the customers operating procedures when type WHE-11, WH-11, VSWE-11, VSW-11 and VW-11 switches are provided. The notes are not available separately and where a copy is desired complete copies of the section should be ordered, the notes detached and left in the cover of the time switch.

11.02 These notes do not apply when Type TCH-11 and TCHE-11 switches are provided, as the construction of these switches is such that manual operation of the ON and OFF levers and the installation and removal of extra omitting pins by the customer is not recommended. When switches of this type are provided the maintenance forces should install and remove omitting pins only when specifically directed.

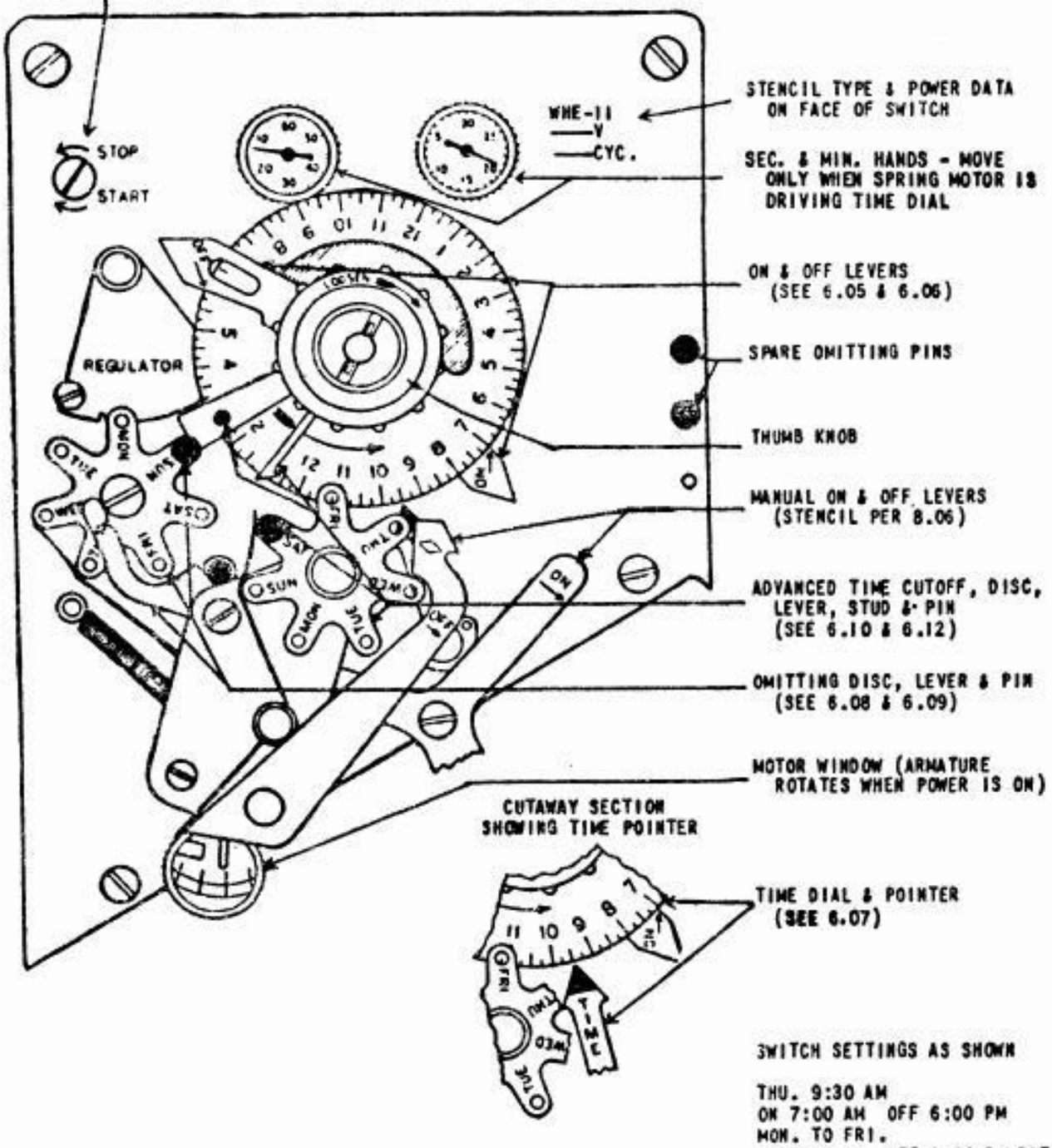
NOTES: 1, LOCK MECHANISM FOR SPRING MOTOR

(A) TO RELEASE - TURN SCREW IN DIRECTION OF START ARROW (MOTOR SHOULD START AND SECOND HAND MOVE WHEN POWER IS OFF)

(B) TO STOP - TURN SCREW IN DIRECTION OF STOP ARROW (TO LOCK MOTOR WHEN SWITCH IS REMOVED)

2. RESET OF SPRING MOTOR

TURN SCREW TO STOP THEN TO START (FOR USE WHEN MOTOR FAILS TO START WHEN POWER IS OFF)



SWITCH SETTINGS AS SHOWN

THU. 9:30 AM
ON 7:00 AM OFF 6:00 PM
MON. TO FRI.
ON 7:00 AM OFF 1:00 PM SAT.
OMITTING PIN SET FOR SUNDAY
ADVANCED CUTOFF DISC PIN SET FOR SAT.

FIG. 1
TYPE WHE-11

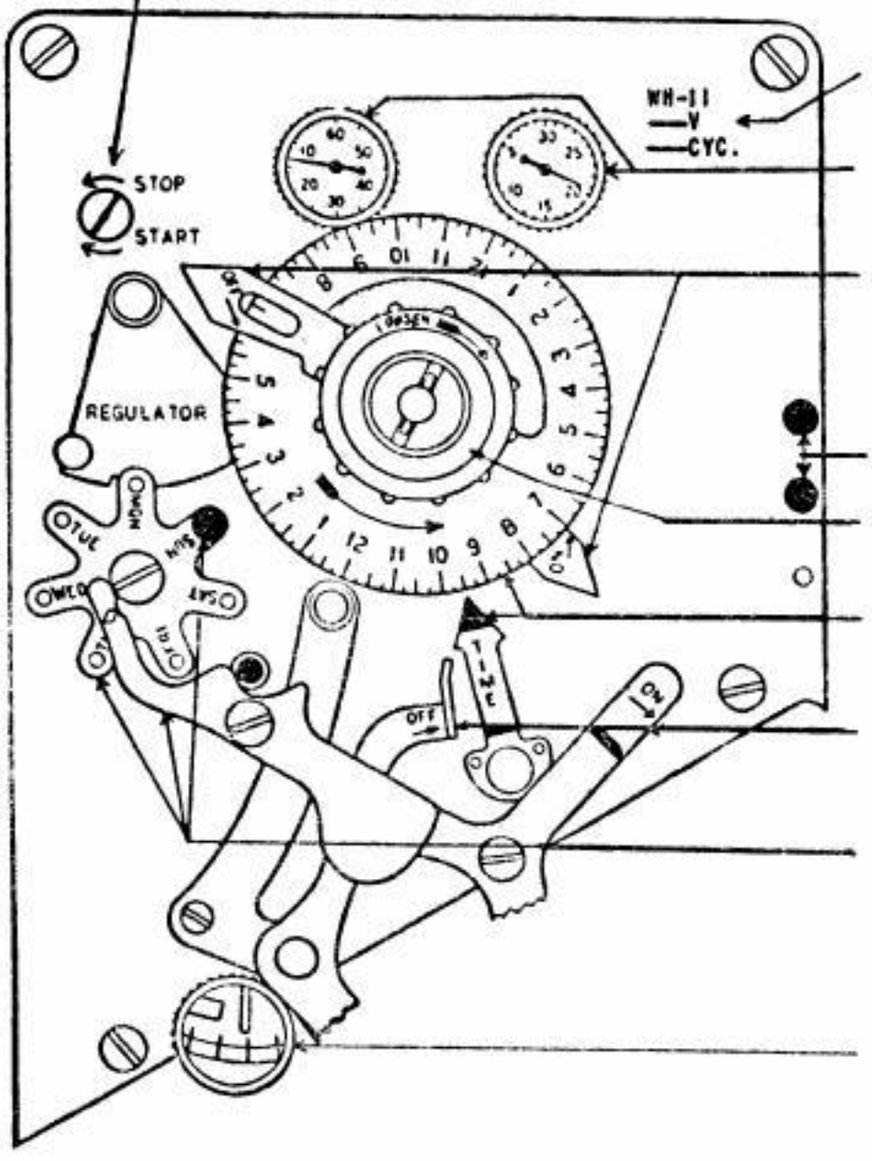
NOTES: 1, LOCK MECHANISM FOR SPRING MOTOR

(A) TO RELEASE - TURN SCREW IN DIRECTION OF START ARROW (MOTOR SHOULD START AND SECOND HAND MOVE WHEN POWER IS OFF)

(B) TO STOP - TURN SCREW IN DIRECTION OF STOP ARROW (TO LOCK MOTOR WHEN SWITCH IS REMOVED)

2, RESET OF SPRING MOTOR

TURN SCREW TO STOP THEN TO START (FOR USE WHEN MOTOR FAILS TO START WHEN POWER IS OFF)



STENCIL TYPE & POWER DATA ON FACE OF SWITCH

SEC. & MIN. HANDS - MOVE ONLY WHEN SPRING MOTOR IS DRIVING TIME DIAL

ON & OFF LEVERS (SEE 6.05 & 6.06)

SPARE OMITTING PINS

THUMB KNOB

TIME DIAL & POINTER (SEE 6.07)

MANUAL ON & OFF LEVERS

OMITTING DISC, LEVER & PIN (SEE 6.08 & 6.09)

MOTOR WINDOW (ARMATURE ROTATES WHEN POWER IS ON)

SWITCH SETTINGS AS SHOWN

THU. 9:30 AM
ON 7:00 AM OFF 6:00 PM
MON. TO SAT.
OMITTING PIN SET FOR SUNDAY

FIG. 2
TYPE WH-11

NOTES: 1, LOCK MECHANISM FOR SPRING MOTOR

(A) TO RELEASE - MOVE TEST KNOB TO RUN (MOTOR SHOULD START & SECOND HAND MOVE WHEN POWER IS DISCONNECTED)

(B) TO LOCK - MOVE TEST KNOB TO LOCK (FOR USE WHEN SWITCH IS REMOVED FROM SERVICE

2, TO RESET SPRING MOTOR

TURN SCREW COUNTERCLOCKWISE AND THEN RELEASE (FOR USE WHEN MOTOR FAILS TO START WHEN POWER IS OFF)

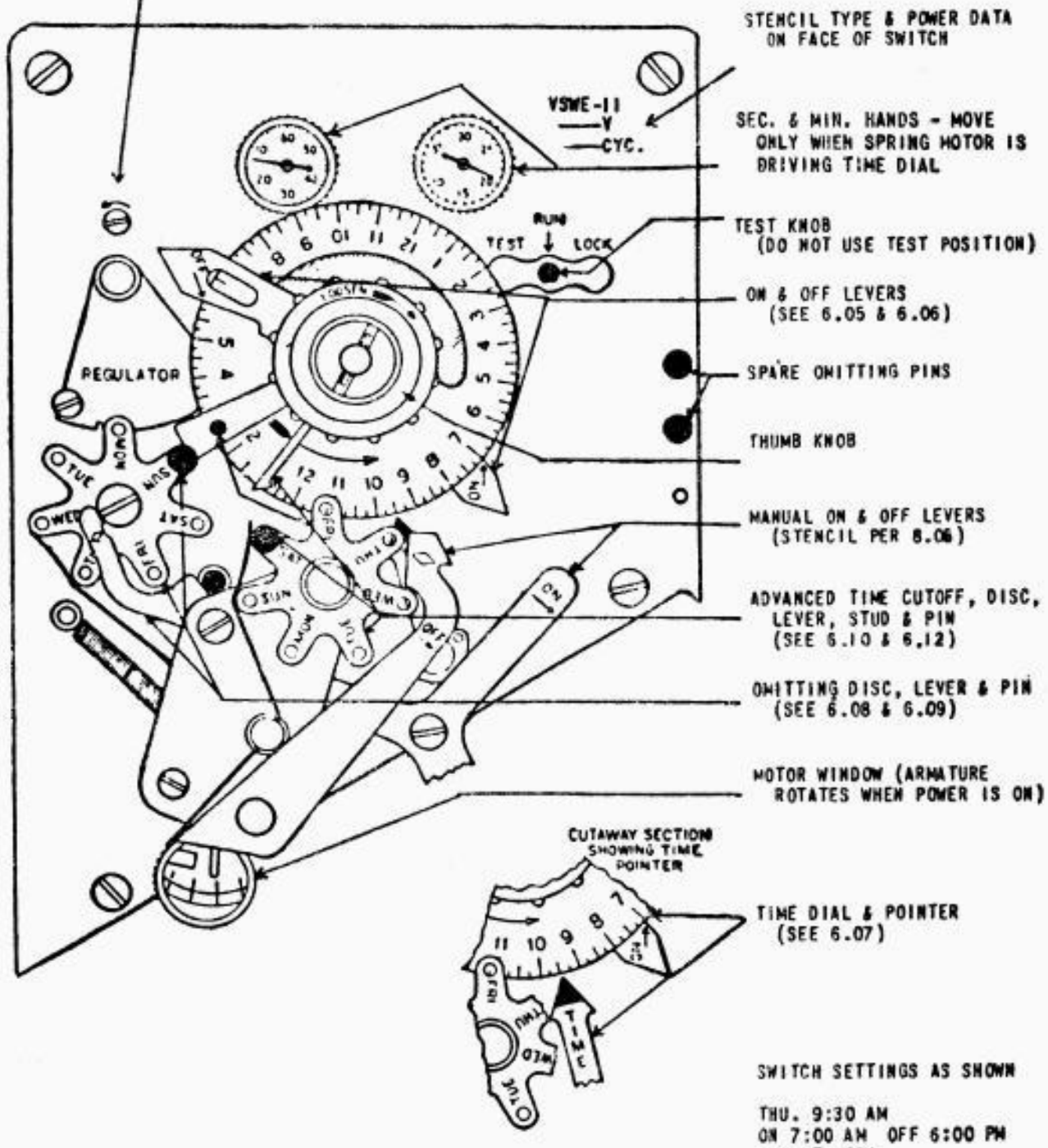


FIG. 3
TYPE VSWE-11

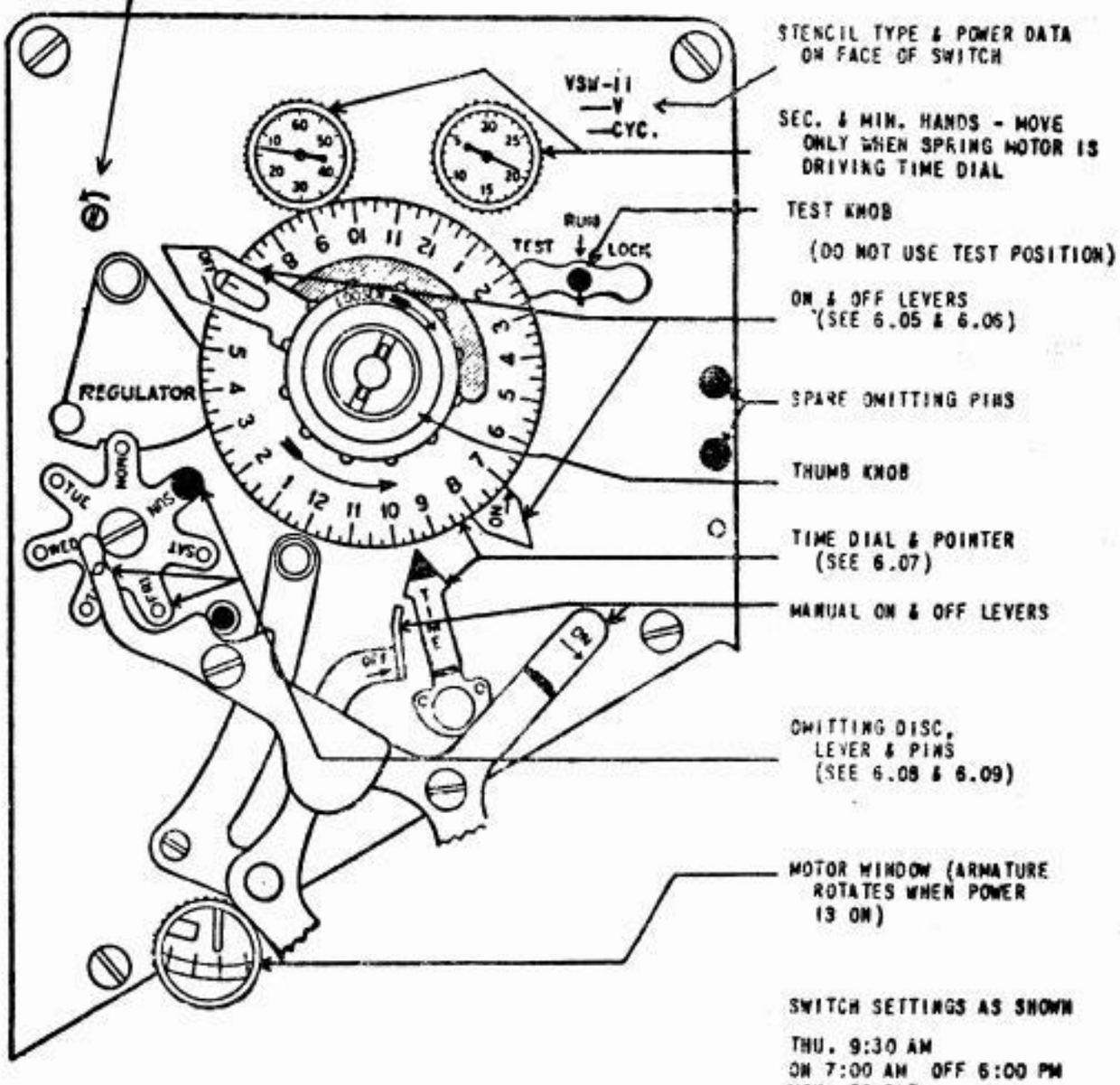
NOTES: 1, LOCK MECHANISM FOR SPRING MOTOR

(A) TO RELEASE - MOVE TEST KNOB TO RUN (MOTOR SHOULD START & SECOND HAND MOVE WHEN POWER IS DISCONNECTED)

(B) TO LOCK - MOVE TEST KNOB TO LOCK (FOR USE WHEN SWITCH IS REMOVED FROM SERVICE

2, TO RESET SPRING MOTOR

TURN SCREW COUNTERCLOCKWISE AND THEN RELEASE (FOR USE WHEN MOTOR FAILS TO START WHEN POWER IS OFF)



SWITCH SETTINGS AS SHOWN

THU. 9:30 AM
ON 7:00 AM OFF 6:00 PM
MON. TO SAT.
OMITTING PIN SET FOR SUNDAY

FIG. 4
TYPE VSW-II

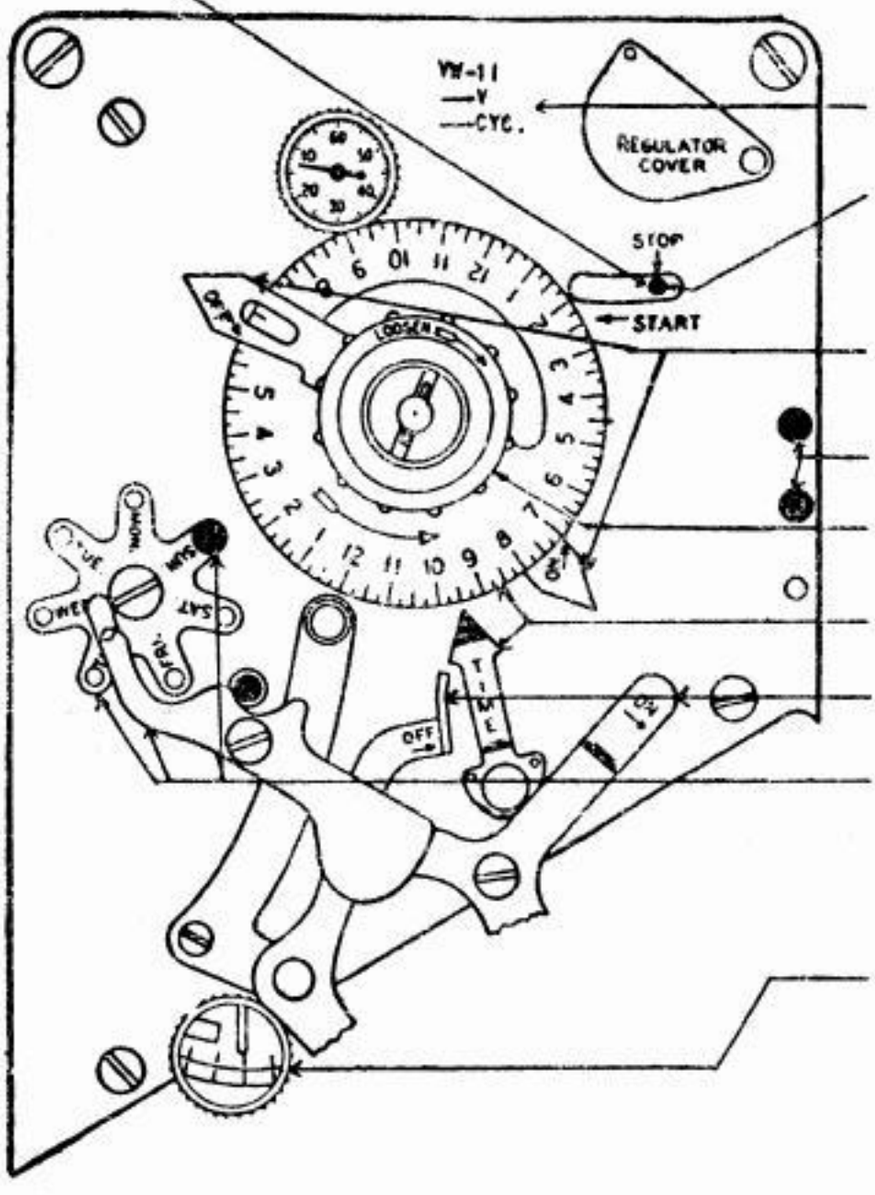
NOTES: 1, LOCK MECHANISM OF SPRING MOTOR

(A) TO RELEASE - MOVE TEST KNOB TO 'START' (MOTOR SHOULD OPERATE & SECOND HAND MOVE WITH POWER ON)

(B) TO LOCK - MOVE TEST KNOB TO 'STOP' (FOR USE WHEN SWITCH IS REMOVED)

2, RESET OF SPRING MOTOR

THERE IS NO RESET FEATURE ON THIS TYPE SWITCH



STENCIL TYPE & POWER DATA ON FACE OF SWITCH

TEST KNOB

ON & OFF LEVERS (SEE 6.05 & 6.06)

SPARE PINS

THUMB KNOB

TIME DIAL & POINTER (SEE 6.07)

MANUAL ON & OFF LEVERS

OMITTING DISC, LEVER & PIN (SEE 6.08 & 6.09)

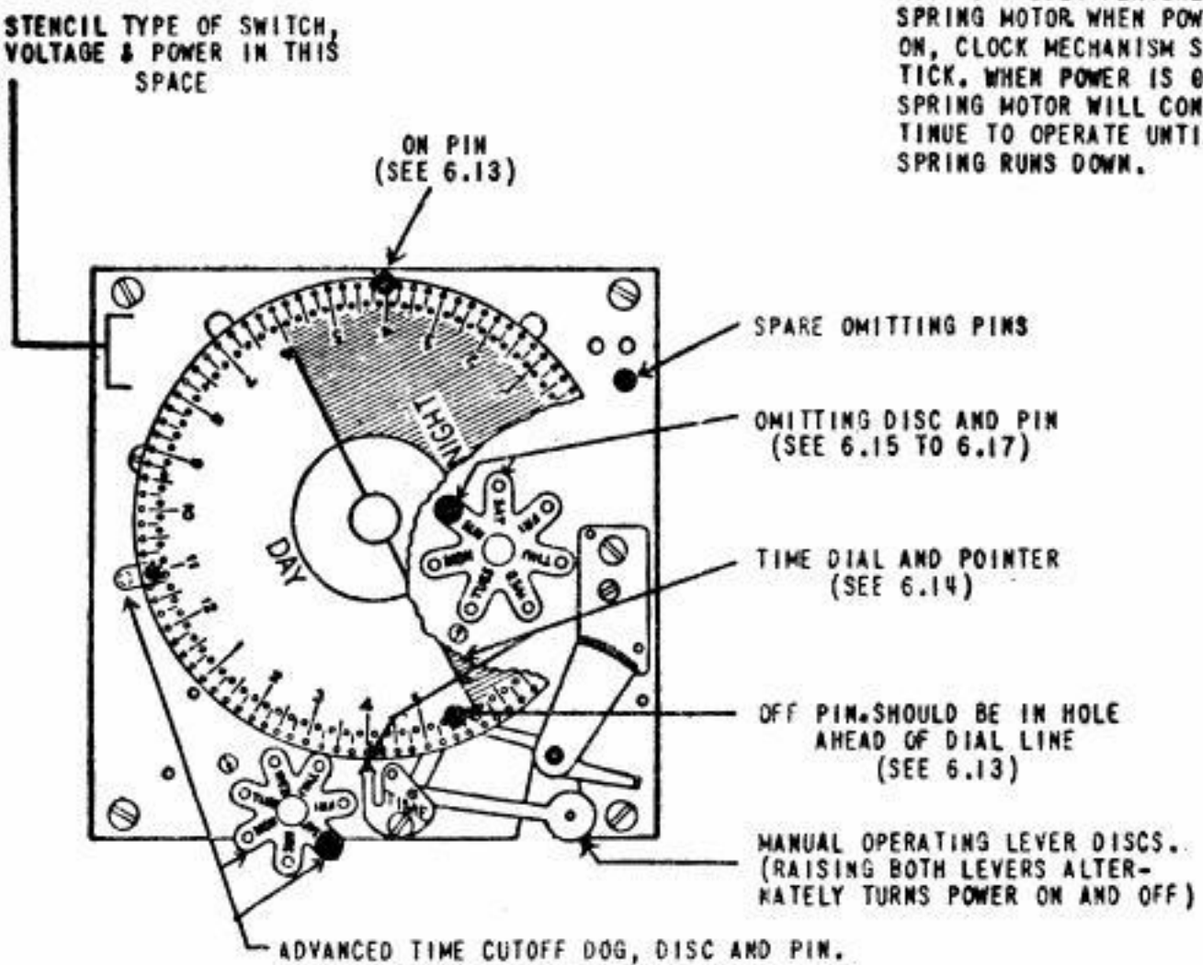
MOTOR WINDOW (ARMATURE ROTATES WHEN POWER IS ON)

SWITCH SETTING AS SHOWN

THU. 9:30 AM
ON 7:00 AM OFF 6:00 PM
MON. TO SAT.
OMITTING PIN SET FOR SUNDAY

FIG. 6
TYPE VW-11

NOTES 1 & 2, THIS TYPE SWITCH IS NOT EQUIPPED WITH LOCK MECHANISM OR RESET FEATURES FOR SPRING MOTOR. WHEN POWER IS ON, CLOCK MECHANISM SHOULD TICK. WHEN POWER IS OFF, SPRING MOTOR WILL CONTINUE TO OPERATE UNTIL SPRING RUNS DOWN.

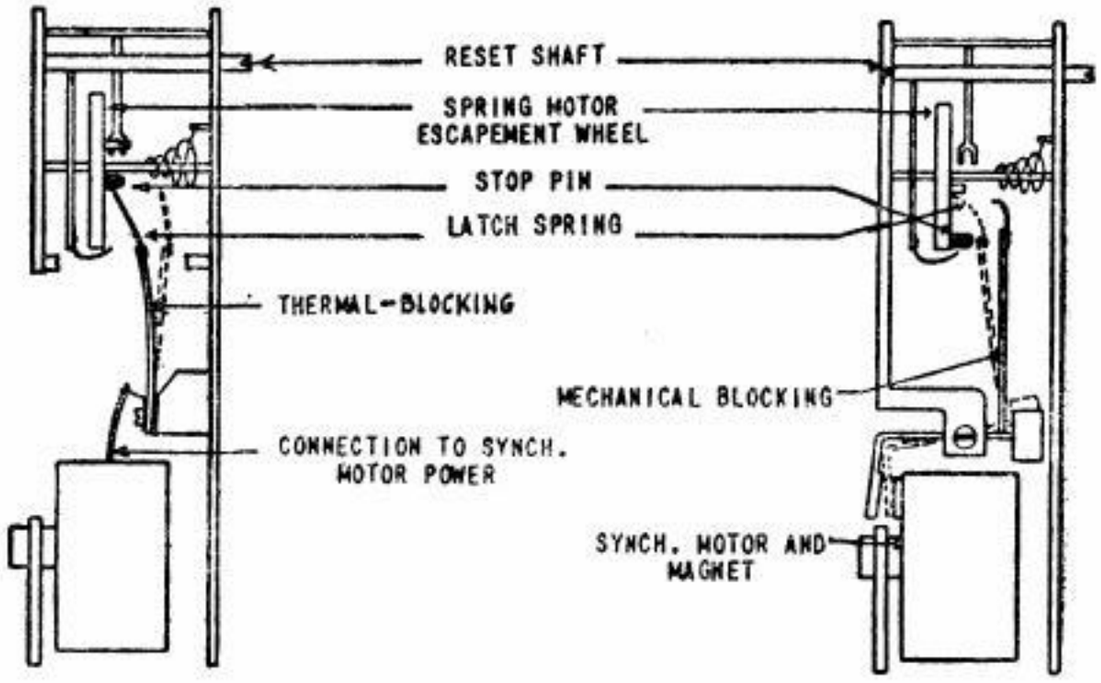


SWITCH SETTINGS AS SHOWN

TUES. 4: PM
ON 4:00 AM OFF 5:45 PM MON. TO FRI.
ON 4:00 AM OFF 12:00 NOON SAT.
OMITTING PIN SET FOR SUN.
ADV. TIME CUTOFF PIN SET FOR SAT.

(TCHE IS ILLUSTRATED - TCH IS IDENTICAL BUT IS NOT EQUIPPED WITH ADV. TIME CUTOFF FEATURE)

FIG. 6
TYPES TCHE-11, TCH-11

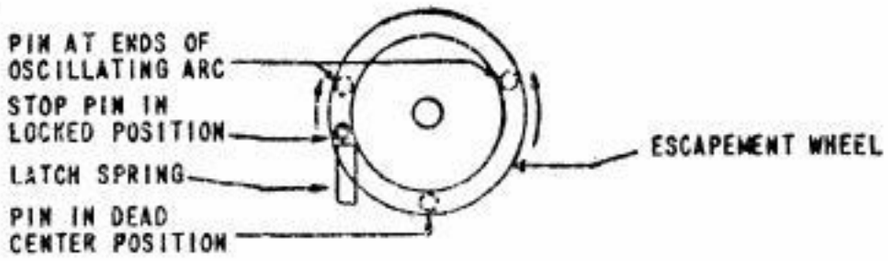


(A)
TYPE WH

POWER ON-SYNCH. MOTOR DRIVING TIME DIAL (DOTTED LINE POWER OFF)

(B)
TYPE VSW

POWER OFF-SPRING MOTOR DRIVING TIME DIAL (DOTTED LINE POWER ON)



(C)
METHOD OF LOCKING SPRING MOTOR

(OPERATION OF FALL BACK MECHANISM FOR SPRING MOTOR)

FIG. 7
TYPES WH-11, WHE-11, VSW-11, VSWE-11

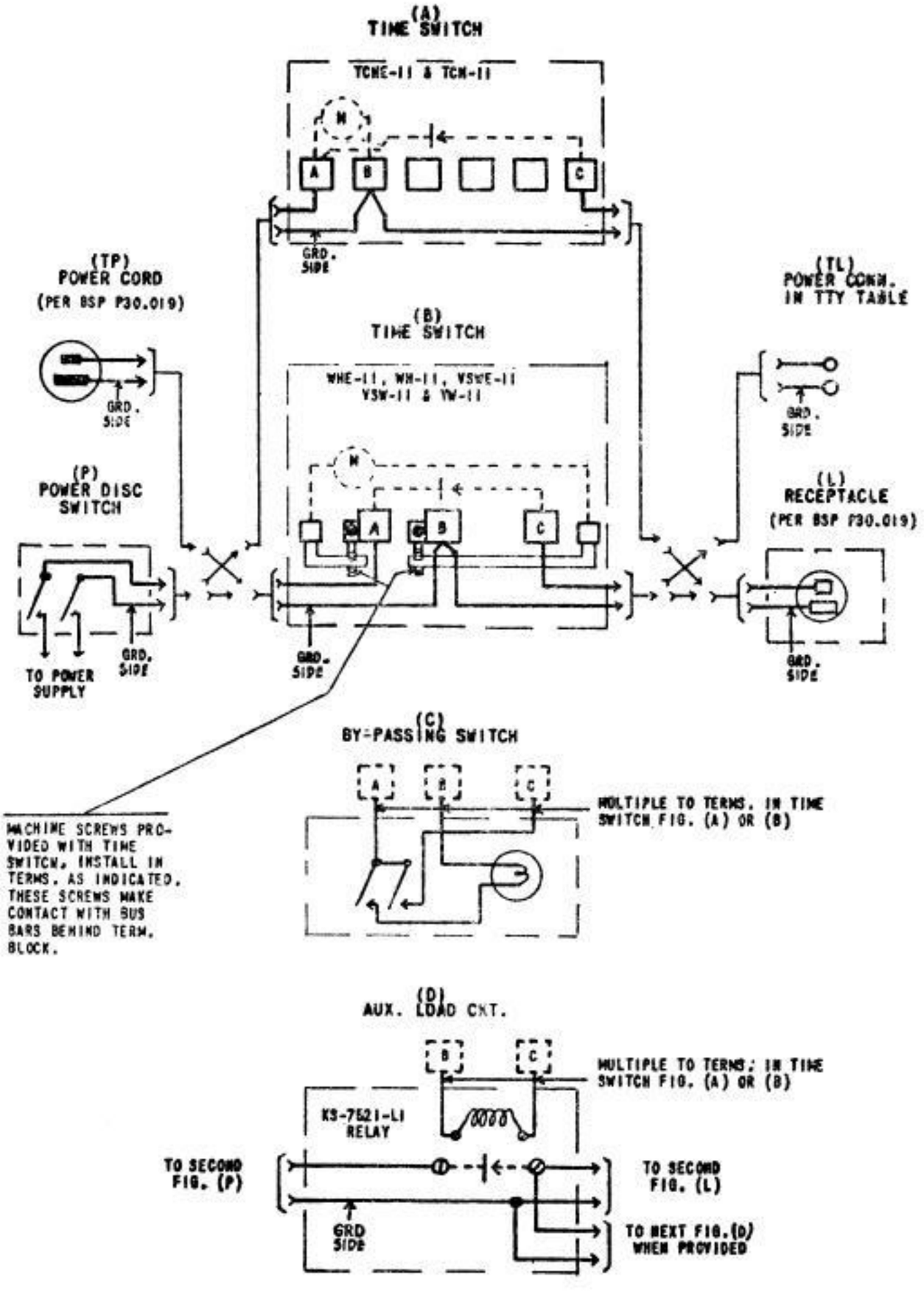
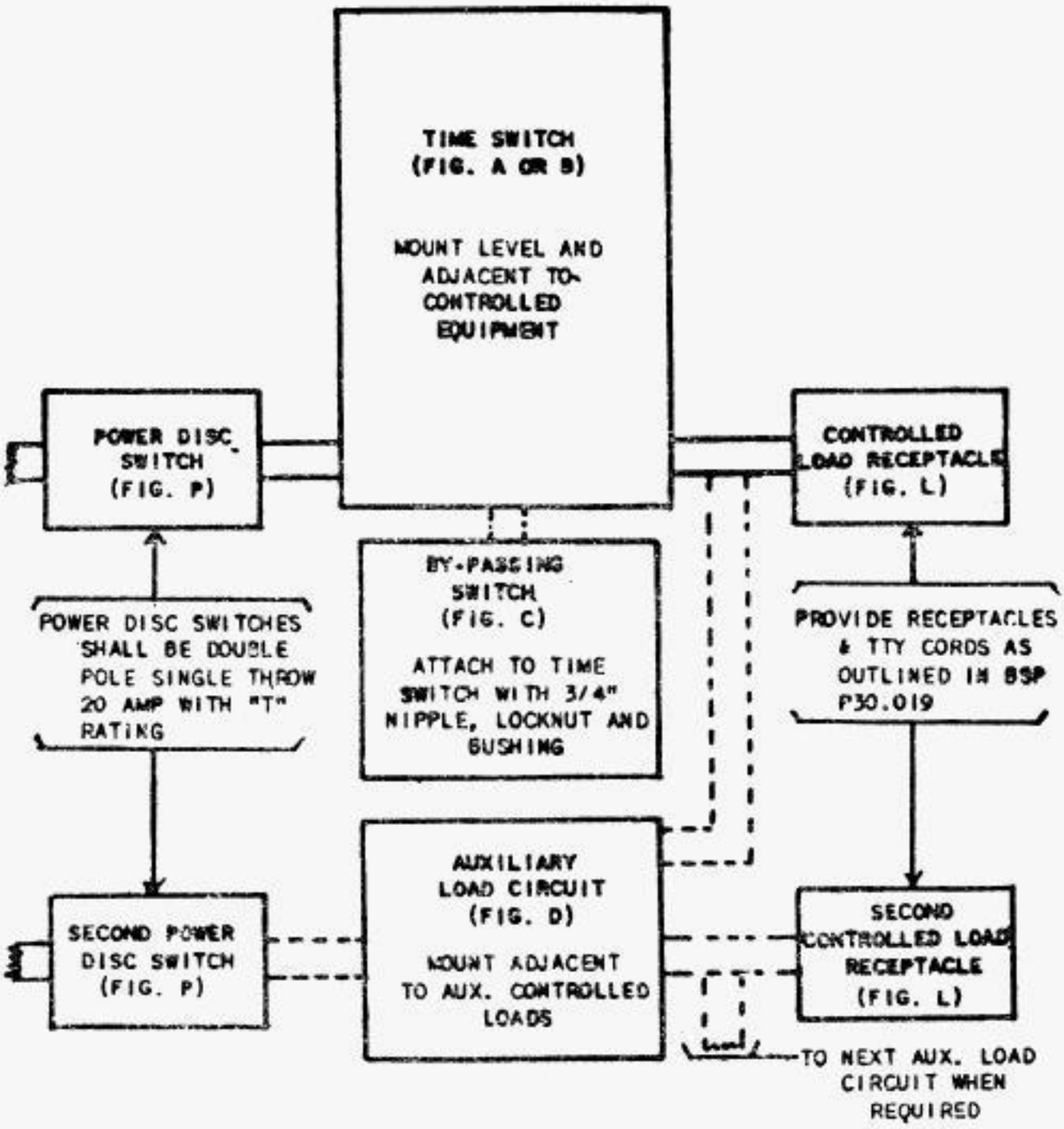


FIG. B
WIRING DIAGRAM



NOTES: 1, THE CUSTOMER SHOULD PROVIDE THE POWER DISC SWITCH, CONTROLLED LOAD RECEPTACLES, WIRING, AND CONDUIT.

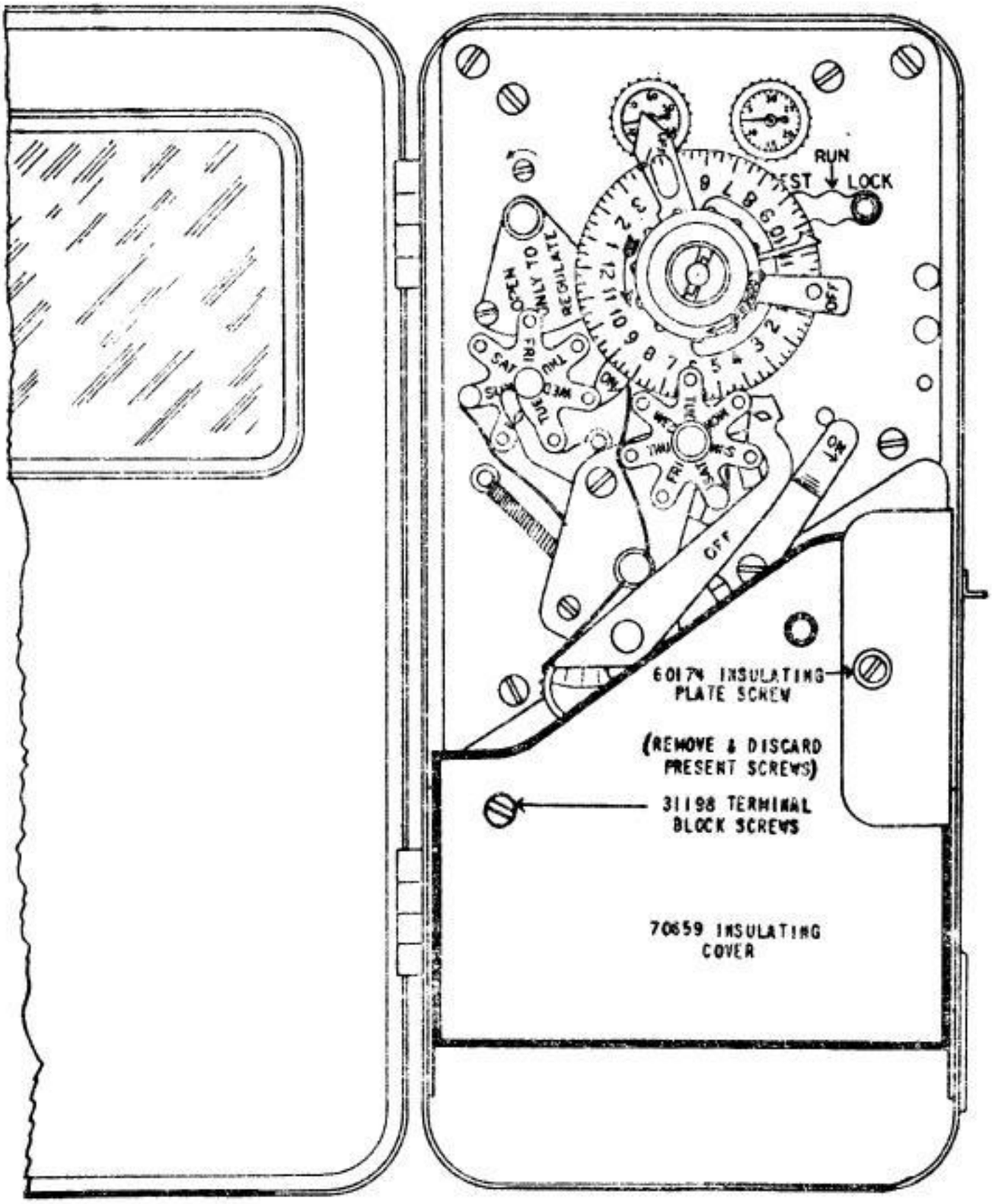
2, ALL WIRING SHOULD BE IN RIGID CONDUIT, BX OR OTHER APPROVED CABLING AND SHALL MEET ALL LOCAL REGULATIONS.

3, THE TEL. CO. SHALL PROVIDE THE TIME SWITCH, BY-PASSING SWITCH & AUX. LOAD CIRCUIT (WHEN SPECIFIED).

4, FIG. NUMBERS IN BLOCKS AGREE WITH THOSE SHOWN ON FIG. B

FIG. 9

ASSEMBLY DETAIL FOR WALL MOUNTED SWITCHES



NOTE - SEE 8.08(E) FOR TYPES OF SWITCHES

FIG. 10
INSULATING COVER
FOR CONTACTS

TABLE A
INSTALLATION DATA (SEE PARTS 8 & 9)

Type of Mounting	Type of Power	Time Switch	Fig. No.	Status & Descrp.	Wiring Data: For All Installations	Wiring Data: Supl. Eqpt. when Req. — By-passing Switch	Wiring Data: Supl. Eqpt. when Req. — Aux. Load Circuits	Assembly Data
On TTY Table	A-C Reg.	WHE-11	1	Approved Par. 3.04	Figs. P-B-L on Fig. 8 (Note 1)	Fig. C on Fig. 8 (Note 2)	Not Recommended	All Wiring & Eqpt. to be furnished by the Tel. Co. see Note 4 for Assembly Data.
		WH-11	2	Reuse Only Par. 3.09				
On Wall or Other Location Free of Vibration	D-C or Non Reg. A-C	TCHE-11	6	Approved Par 3.12	Figs. P-A-L on Fig. 8	Fig. C on Fig. 8 (Note 2)	Fig. D on Fig. 8 (Note 3)	Assemble per Fig. 9 Customer to provide all wiring & eqpt. For Disc. Switch & Load Recpt. (Figs. P & L on Figs. 8 & 9) Tel. Co. to provide By-passing Switch & Aux. Load Ckt. when required.
		TCH-11	6	Reuse Only Par. 3.17				
	A-C Reg.	WHE-11	1	Approved Par. 3.04	Figs. P-B-L on Fig. 8 (Note 1)			
		WH-11	2	Reuse Only Par. 3.09				
		VSWE-11 VSW-11 VW-11	3 4 5	Mfr. Disc. Reuse Only Par. 3.10-.11				

NOTES:
1. These types should be equipped with insulating cover per Par. 8.08 (E) and Fig. 10.
2. By-passing switch described in 3.18. Assemble pilot light & switch in condulet as shown in Fig. 9.
3. Aux. load circuit described in 3.21. Mount relay in a vertical position in cabinet and in such a manner that hinge for door is at the top.
4. Time switch should be mounted in a safe and convenient location on table and in such a manner that it is accessible for maintenance and service purposes.

NOTES ON THE USE OF TIME SWITCHES

The initial settings of the time switch will be made by the Telephone Company installer as covered by his service order. However, the customer is responsible for the following adjustable features of the time switch, the operation of which is described in these Notes.

1. Operation of Power Switch on Teletypewriter Equipment.
2. Manual "OFF" Operation of Time Switch.
3. Manual "ON" Operation of Time Switch (when By-Passing Switch is not provided)
4. Operation of By-Passing Switch.
5. Operation of Omitting Features for Holidays.

1. OPERATION OF POWER SWITCH ON TTY EQUIPMENT

The power switch on the teletypewriter equipment should normally be left in the ON position. This switch should be used to stop the equipment at times when it is necessary to change paper and ribbons and it should always be restored to, and left in, the ON position upon completion of such service operations.

2. MANUAL OFF OPERATION OF TIME SWITCH

When it is desired to stop the teletypewriter equipment in advance of the adjusted OFF time (for example when it is desired to discontinue operation at 3:00 PM when switch is adjusted to stop equipment at 5:00 PM) proceed as follows:

(a) Open cover by unhooking hasp on the right-hand side.

(b) Move the lever stamped "OFF" downward until it snaps. This releases the ON lever and does not affect the next ON operations of the switch.

3. MANUAL ON OPERATION OF TIME SWITCH (WHEN BY-PASSING SWITCH NOT PROVIDED)

When it is desired to start the teletypewriter equipment after it has been stopped automatically by the time switch (as for example on any day 30 minutes after the adjusted OFF time or on omitted day such as on a Sunday) proceed as follows:

(a) Open cover by unhooking hasp on right side of cover.

(b) Move the lever stamped ON downward in the direction of the arrow until the switch snaps.

(c) At the completion of the special service period turn power OFF by manually operating the OFF lever as described in 2 above.

Note: 30 minutes must elapse after power is turned OFF automatically by the time switch before power can be turned ON manually by the above method. When overtime service, continuous with normal service is required, arrangements should be made for the provision of a By-Passing Switch.

4. OPERATION OF THE BY-PASSING SWITCH (WHERE PROVIDED)

This By-Passing Switch is not an integral part of the time switch, but is an additional unit consisting of a tumbler switch and a pilot lamp. It may be provided in conjunction with the time switch.

It is used when overtime is required or when for some other reason the turn-off feature of the time switch is to be by-passed. Operation of the tumbler switch to the ON position supplies power to the teletypewriter machine and renders the turn-off feature of the time switch ineffective.

Caution: When the condition requiring the use of the by-passing switch is terminated, the tumbler switch should be returned to the OFF position. This restores the time switch to normal operation.

5. OPERATION OF OMITTING FEATURE FOR HOLIDAYS

If on any special day such as a holiday it is desired to omit the starting of the teletypewriter machine, this may be accomplished by inserting a pin in the spoke of the cut-out disc provided for this purpose.

Remove the pin from its spare position along the right edge of the face plate about two inches from the upper right-hand corner and screw it into the disc on the spoke stamped with the day on which the holiday falls. This disc is the one to the left of the time dial and pins can be added or removed with the fingers.

The additional pin should be inserted from one to six days prior to the holiday and removed the day after the holiday in order to secure normal operation on the same day of the following week.

Caution: When adding or removing the pins care should be taken not to change the position of the spokes of the cut-out disc.