# THE TYPE 51 DIAL

## BULLETIN 528

AUTOMATIC ELECTRIC

*Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . . . Machine Switching Automatic Dial Systems*

*Makers of Telephone, Signaling and Communication Apparatus...Electrical Engineers, Designers and Consultants*

Factory and General Offices: 1033 West Van Buren Street, Chicago 7, U.S.A.

Your Type 51 dial incorporates the latest design improvements - the result of Automatic Electric Company's long experience in manufacturing and supplying dials to users all over the world.

Automatic Electric dials are distinguished throughout the telephone industry for their rugged construction, extremely quiet operation and long service life with little, or no maintenance required. In view of this, the general information provided in this booklet is all that the average telephone service man will need. Telephone companies large enough to have their own repair shops may need more detailed information. A bulletin containing such information is obtainable upon request.

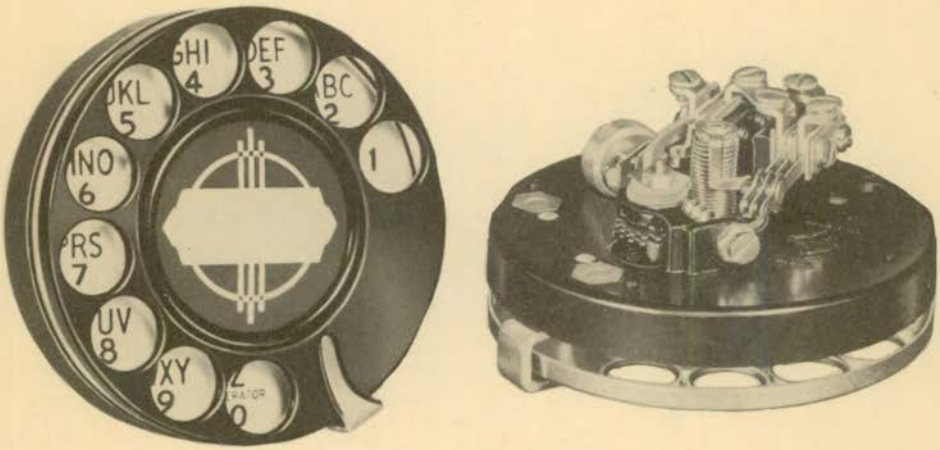



Fig. 1. The type 51 dial.

# THE TYPE 51 DIAL

## DESIGN FEATURES

Construction - A sturdy, shallow cup provides the mounting base for the dial working parts. Interior of this cup contains the main gears and main shaft assembly. The number plate and finger plate mount over the open side of the cup concealing the gear system while the back side mounts the main spring, governor, and impulse and shunt spring assemblies leaving these working components accessible for adjustment (Figs. 1 and 2).

Governor - Automatic's time-tested governor is retained in the Type 51 dial. Weighted reeds whirling within a governor cup provide smooth braking action and precise control of impulsing speed (Fig. 3). A tapered bearing and a taper on the non-thrust end of the worm shaft, assure rotation of this shaft in one direction only. The thrust end (governor cup end) rides against a ball bearing to reduce friction and accompanying wear.

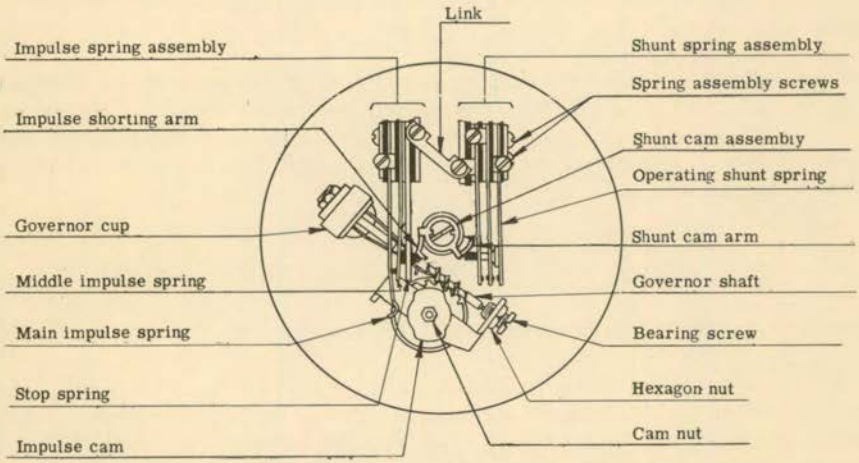



Fig. 2. External details of standard dial (rear view).

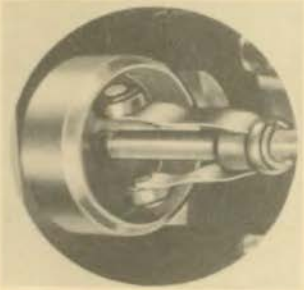


Fig. 3. Governor and governor cup.

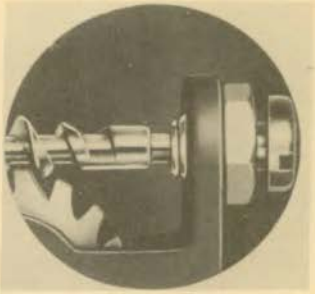


Fig. 4. Worm gear and governor worm assembly.

Worm gear - The worm gear driving the governor worm (Fig. 4) is manufactured of phosphor-bronze and fibre laminations. Oil retaining properties of the fibre assure continual lubrication of the worm and facilitate the "wearing-in" of the worm gear to the worm contour for smooth, bind free and silent operation.

Silent operation - The worm gear construction described above, "anti-chatter" design of the impulsing springs and cam, plus a unique pawl silencer, all combined result in an exceptionally quiet dial. The pawl silencer, operating on a "friction principle", causes the pawl to be lifted completely clear of the ratchet during dial windup, completely eliminating all noise during this operation.

Dial connections - Screw terminals are employed to facilitate dial installation or replacement (Fig. 2).

Variables - Number plates and number cards are offered in different designs and arrangements and can also be purchased to replace those on existing dials. Various shunt spring combinations are available to meet different telephone instrument circuit arrangements such as occur in old instruments or instruments of other manufacturers.

## PROCEDURE FOR CHANGING DIAL NUMBER CARD

(a) Insert escutcheon tool beneath escutcheon ring opposite the digit "5" (Fig. 5).

(b) Press the tool tip down and also against the side of the locking lever (concealed under the escutcheon assembly). Press the lever counter-clockwise until the tool is opposite digit "6" (see Fig. 6). The escutcheon ring is now unlocked. With the tip of the tool still inserted, lift out the escutcheon ring to remove the entire escutcheon assembly.

(c) Hold the escutcheon assembly back side up (Fig. 7) and with the thumbs, rotate the clamping plate counter-clockwise until the ''locking tongue'' is free of the escutcheon ring ''locator''.

(d) Press in on the transparent cover to remove contents of the escutcheon ring (clamping plate, dial card and transparent cover).

(e) Obtain the proper dial card or print the correct number on the existing card.

(f) Replace the escutcheon components including the new or corrected dial card into the escutcheon ring in the following order; transparent cover, dial card and clamping plate. Position the cover and dial card so that their ''locator notches'' slip over the escutcheon ring locator. Insert the clamping plate into the escutcheon ring with the curvature facing inward (toward dial card). Rotate clamping plate clockwise until the locking tongue engages the locator.

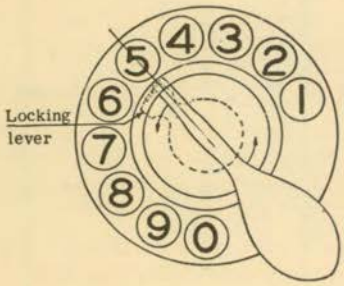



Fig. 5. Unlocking escutcheon ring.

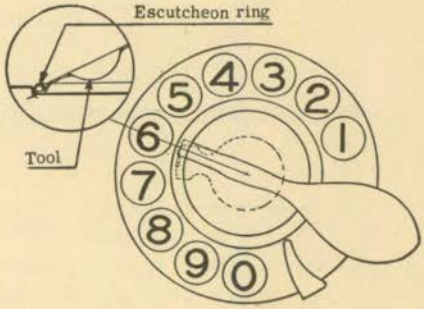



Fig. 6. Escutcheon ring unlocked.

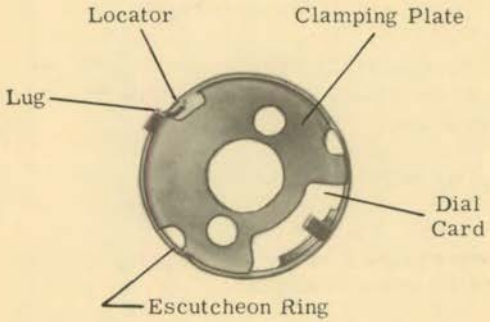



Fig. 7. Rear view of dial escutcheon assembly.

(g) Before mounting escutcheon assembly on the dial, determine that the locking lever is against the low notch on the finger plate, i.e., between digits "6" and "7" (Fig. 8). Grasp the escutcheon assembly and insert the lug on the ring into the slot in the escutcheon recess of the finger plate. This slot is located just above the finger stop. Press the entire assembly into the recess.

(h) While pressing ring down, insert escutcheon tool beneath the escutcheon ring opposite digit "7" so as to engage the lower side of concealed locking lever (Fig. 8). Press the lever clockwise to its uppermost limit, that is, until the tool is opposite digit "6" (Fig. 9). The escutcheon assembly is now locked in place.

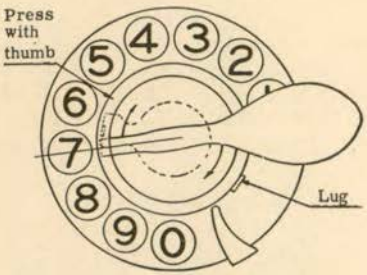



Fig. 8. Locking escutcheon ring.

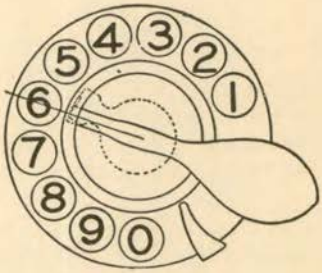


Fig. 9. Escutcheon ring locked.

## INSPECTION AND ADJUSTMENTS AT THE TELEPHONE

It is recommended that maintenance men be instructed to make only the inspections and minor adjustments listed below when servicing the dial at the telephone. If a dial becomes damaged, the maintenance man should be instructed to replace this dial with a good one and to return the damaged dial to the exchange shop or to Automatic Electric Company for repair.

(a) Make certain all parts are secure and tight.

(b) Clean the dial, if necessary, to remove grease, dirt or other foreign matter which may impair dial operation, obscure numbers or letters or otherwise detract from dial appearance.

(c) Wind the finger plate fully and make certain it restores freely to the normal position.

(d) Increase or decrease tension of the main spring to assure easy winding and smooth and proper restoration of the dial.

(e) Regulate dial speed to nominal 10 pulses per second by adjustment of governor wings.

(f) Adjust and regulate tension of impulse and shunt springs.

(g) Adjust impulse shorting arm and shunt cam arm.

(h) Re-set impulse cam.

(i) If dial appears dry or somewhat sluggish, lubricate the exposed portions of dial as indicated in the lubrication chart in the back of this booklet.

## DIAL TOOLS

The maintenance man making dial adjustments at the telephone will require only the tools shown in Figure 10, a screw driver and a No. 4 artist's sable rigger brush for lubricating. These tools, uses of which are listed below, may be purchased from Automatic Electric Company.

(a) Escutcheon Tool (Part No. H-26917) - Used for unlocking and removing dial escutcheon assembly (see "Procedure for Changing Dial Card").

(b) Socket Wrench (Part No. H-16480) - Fits the impulse cam lock nut and is used when the impulse cam is reset.

(c) End Wrench (Part No. H-25937) - Fits the impulse cam holding nut and is used when the impulse cam is reset.

(d) Pliers (Part No. H-16290-7) - For adjusting the impulse and shunt springs and the governor wings.

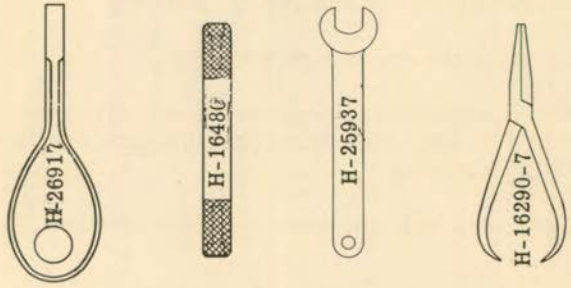



Fig. 10. Dial tool.

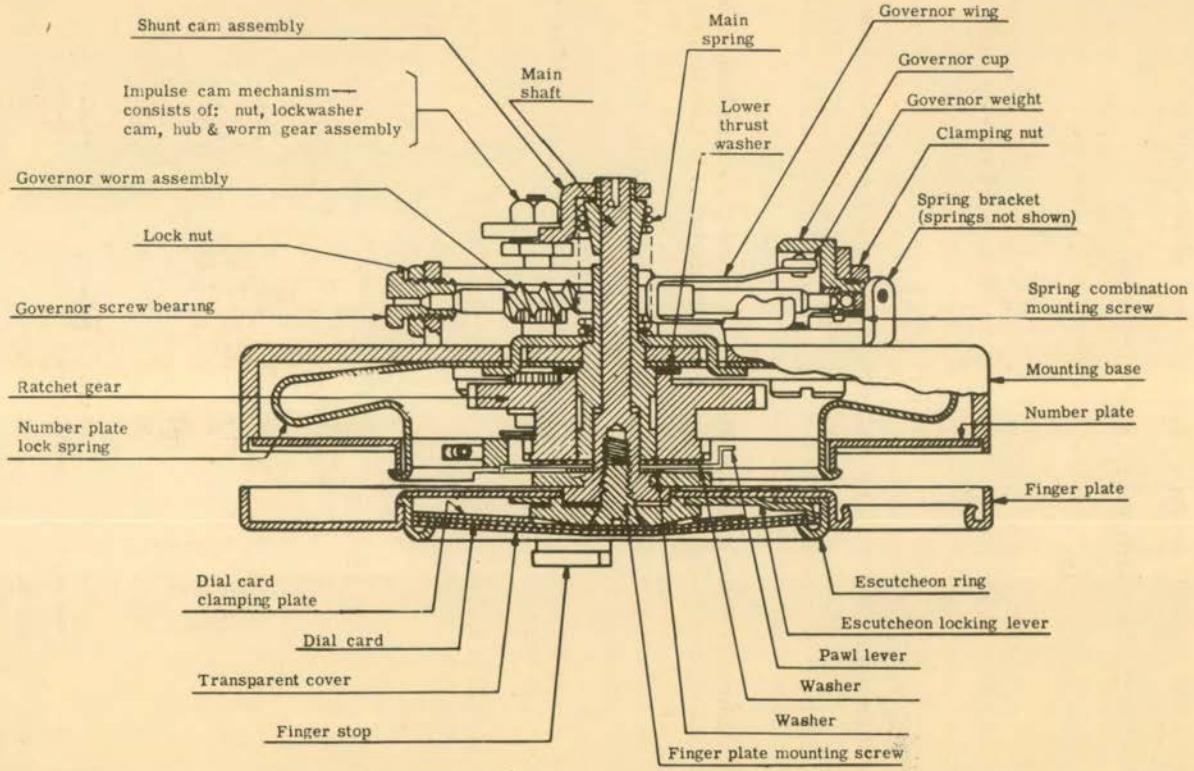



Fig. 11. Cross section of type 51 dial.

## EXTERNAL LUBRICATION FOR DIALS

Low Temperature Lubricant (Spec. 5660) shall be applied as follows:

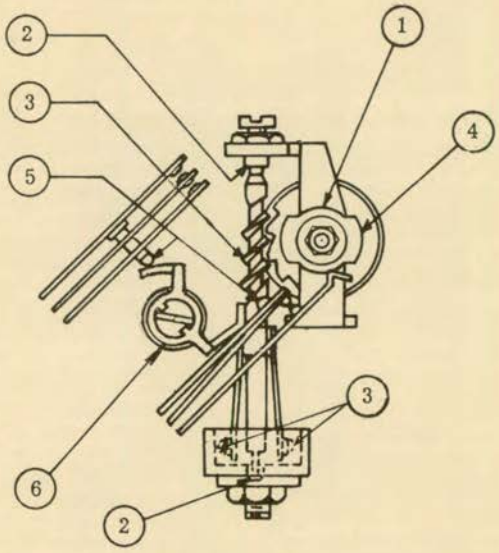
1. Distribute one dip to the exposed worm gear shaft bearing.
2. Distribute one dip to the governor shaft bearings.
3. Governor shaft worm - one dip. Brush small amount on shaft under governor wings for rust protection and on governor buffers.
4. Distribute one dip to the edge of the cam and threaded portion of cam shaft.
5. Distribute one dip to the contact spring buffers. Allow to stand a short time and then remove surplus oil.
6. Distribute one dip between spring coils for rust protection.

Excessive lubricant shall not be allowed to remain on any surface.

A dip shall be considered to be the amount retained in a No. 4 artist's sable rigger brush after being dipped in the lubricant to a depth of 3/8'' and then scraped on the edge of the container to remove surplus. There should not be sufficient lubricant adhering to the brush to form a drop at the end of the bristles

Lubricate only when necessary to provide smooth and positive mechanical performance.

**NOTE: The lubricant used consists of different ingredients which may in time congeal (change from fluid to solid). If this happens, merely shake the bottle, and the mixture will readily become liquid again.**

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