

*Stromberg-Carlson telephone dials  
construction & maintenance*

**T-1010**



**STROMBERG-CARLSON**

**TELEPHONE DIALS -SERIES "D"**

*construction and maintenance*

**STROMBERG-CARLSON**

A DIVISION OF GENERAL DYNAMICS CORPORATION



Stromberg-Carlson  
No. 1543 Telephone  
with Dial

Over the years Stromberg-Carlson Telephone Dials have won the enthusiastic acclaim of subscribers and operating companies alike, for they are quiet, good looking and as dependable as a fine watch. This bulletin describes the construction and maintenance of these dials which continue the Stromberg-Carlson tradition of providing dependable, highest quality apparatus in keeping with the most modern trends in the telephone industry.

# Stromberg-Carlson Telephone Dials

## CONSTRUCTION AND MAINTENANCE

The extended-style number plate marks the dial of the future with its distinctive numbers and letters in white on a black background outside the finger wheel. Subscriber acceptance and performance tests have indicated increased visibility, with a corresponding decrease in wrong numbers.

The Stromberg-Carlson dial offers eight design features that result in longer life, lower maintenance cost, and increased subscriber satisfaction.

The extended number plate is the most distinctive feature of the Stromberg-Carlson Dial. The location of the letters and numerals outside of the finger wheel provides greater visibility, reducing the possibilities of errors in dialing. The characters are on the underside of the number plate and are thus protected to prevent marring.

The dial mechanism is mounted on a rigid die-cast aluminum housing and is encased in a transparent plastic cover. Thus, the moving parts are always in perfect alignment, and are protected from external dirt and grime.

The wind-up operation produces motion only in the main and secondary shafts, with the result that the other moving parts are in action for impulsing only. This feature decreases wear of vital elements.

Quiet operation is achieved by this economy of motion. It is further insured by using, for the impulse cam drive, two thin flat springs, operating in conjunction with slots in their associated parts.

The extended number plate is locked into the housing rim for smoother contour and dust-tight fit, yet it is easily changed by removing the finger plate and two screws.

## FEATURES

1. Visibility.
2. Protection.
3. Economy.
4. Quietness.
5. Neatness.

- 6. Precision. The gears and other rotating parts are precision machined, or molded, to insure a smooth movement and to reduce wear. A dependable locking device assures positive and uniform impulsing.
- 7. Simplicity. The terminal arrangement is very simple. The terminal screws extend directly through the dust cover, making cable, soldered connections or a terminal block unnecessary.
- 8. Efficiency. All necessary field adjustments can be made without removing the dust cover from the dial. The opening in the dust cover (closed by a snap-on lid) gives ready access to the working parts. Speed adjustment, cleaning of contacts, etc., can be done without disturbing any connections or mounting screws.

## CONSTRUCTION AND MAINTENANCE

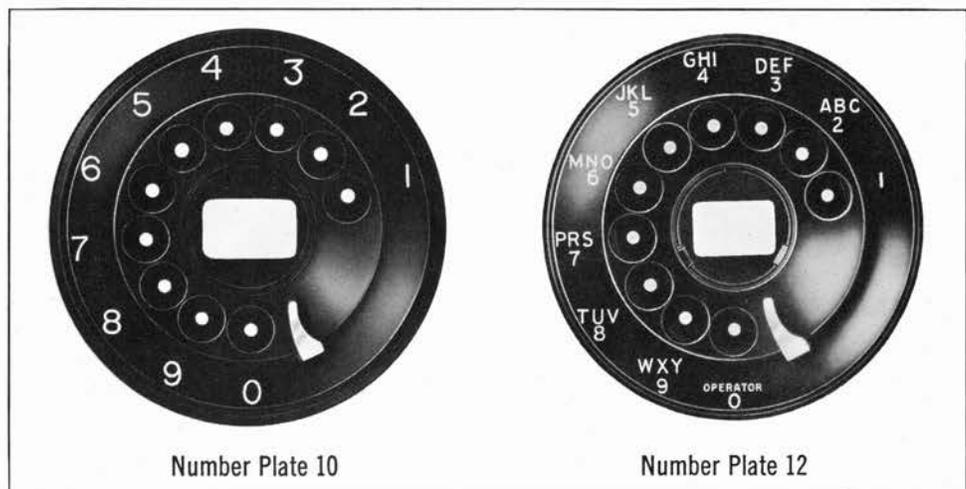
### General

The mechanism of the dial is mounted on the die-cast front (10). The bridge (11), which supports the impulse and shunt spring assemblies and which provides bearings for the pinion and main shafts, is attached to this front. In order to keep dust and dirt from the working parts, a clear plastic dust cover (22) completely encases the rear of the dial. Connections to the shunt and impulse springs are made directly through the terminal screws (20) appearing on the back of the dial.

### Number Plates

There are two standard number plate designs as shown below. The number plate is made of a tough, durable plastic and blends in with the contour of the modern Stromberg-Carlson 1500 Series Telephones.

The number plates are fastened with two tabs, which fit into recesses in the front, and with two screws (27 and 28) which also fasten the finger stop (26). The tabs do not require bending, and the number plate is easily accessible from the front.



## *Telephone Dials*

The stamped metal finger plate (7) is finished in black enamel.

Finger Plate

The station number card (2) provides space for the station number and is protected by a clear plastic holder (1). The method of removing the holder is not readily apparent and this feature should discourage tampering by unauthorized persons. The holder is retained in place by a spring (5) which engages three projections on the holder. The location of the station number card is controlled by means of three notches, 120° apart, on the periphery of the number card which fit around the legs, or projections of the holder. To assemble, place the card in proper position and press the holder until it is "Home," at which point it will be flush with the finger plate.

Station Number Card

Card holder is best removed by using a card holder removing tool 211992-000. By pressing down the vacuum cup in the approximate center of the card holder and withdrawing quickly and firmly, the card holder can be removed. A slight moistening of the vacuum cup will improve the operation of this tool.

The finger stop is held by means of two screws. It is easily replaced or tightened from the front without removing any other parts. The clearance between the finger stop and the finger plate must be checked to see that there is no binding interference. Check by dialing digit "O" which will give a full sweep of the finger plate.

Finger Stop

The standard dial has two sets of break contacts, normally open. The springs are mounted on the bridge by means of two screws. Contact separation should be .015" minimum while contact pressures should be between 25 and 35 grams. While checking the contact pressure, hold the finger plate off normal so that contacts are made.

Off Normal (Shunt) Spring Group

The impulse spring group is mounted in the same manner as the shunt spring group, but on the opposite side of the bridge. When the finger plate is held "Off Normal" the contact pressures are to be between 28 and 33 grams including "Follow," and, when the dial is pulsed, there should be a minimum contact separation of .015". The impulse ratio, or percent make, is set at the factory at 38-1/2%, plus or minus 1-1/2%. If any work is required on the impulse springs, be very careful to insure that the impulse ratio is maintained within the prescribed limits.

Impulse Springs

The clear plastic dust cover (22) is attached to the dial by the terminal screws (20). The holes in the cover must be located on the bosses on the posts so as to assure that the dial will be seated properly in the telephone. A connector (21) is provided which connects shunt and impulse springs and is easily removed to suit circuit conditions.

Dust Cover

**Main Spring** A helical wound main spring (18), which provides the driving power for the dial, fits over the main shaft assembly. The lower end of the spring is engaged by one of the tabs in the spring anchor (23). The upper end of the spring is engaged by one of the slots in the top of the power shaft. One and three quarter turns should provide adequate tension for correct dial operation.

**Combination Cam** The combination cam (19) is next assembled to the top of the power shaft, making sure that the cam is keyed to the shaft correctly. In assembling the power spring into the dial, care should be taken to see that the spring is properly seated over the spring anchor on the power end and properly nested in the combination cam on the upper end.

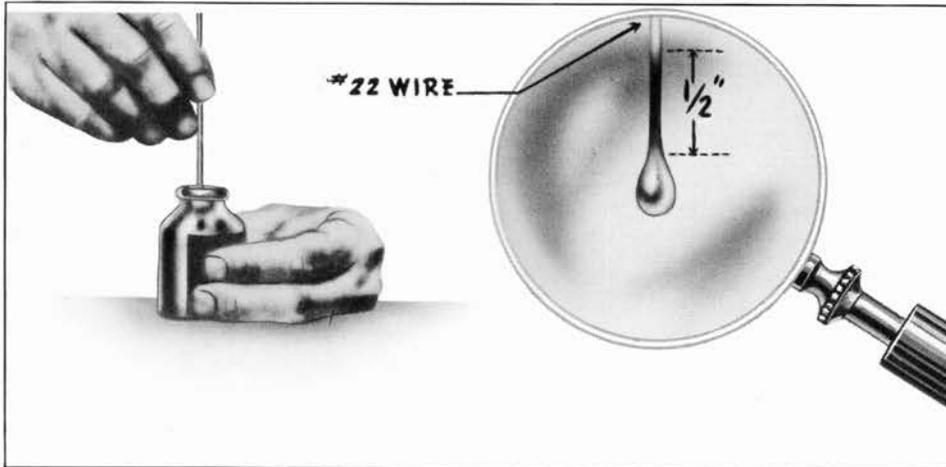
**Governor** The normal operating speed and factory adjustment of the dial is 10 impulses per second, plus or minus one-half impulse. To regulate the speed of the dial, adjust the springs (15) of the governor to decrease or increase the friction of the weights on the inside surface of the cup (14). A slight spreading of the springs will reduce speed, while bringing both arms closer will increase the speed. The governor springs should be formed as nearly alike as possible.

There should be perceptible end-play in the governor worm shaft, but this end-play should not exceed .010". The governor must be completely free—running without the slightest drag. The end-play can be regulated by loosening the lock nut (13) over the screw thread at the tail bearing (16) and, by turning with a screw driver, increase or decrease the play. The lock nut at both the tail bearing end and at the governor cup end of the worm shaft must be firmly tightened.

**Pinion Shaft Assembly** The pinion shaft assembly consists of a one-piece pinion gear and shaft, worm wheel, ratchet, spring clutch, and impulse cam assembly (25). The whole assembly is driven directly by the main gear, the worm wheel drives the worm and the governor. The phenolic impulse cam pulses the impulse springs. While the dial is being wound up, the spring clutch prevents turning of the worm wheel and governor, while one of the springs of the cam assembly prevents the turning of the impulse cam on the windup.

**Lubrication** There are points of the dial which will need lubrication, should the dial become sluggish. The oil used for this purpose is a special product (Stromberg-Carlson Dial Lubricant, part number 209285-000). *No ordinary lubricant* should ever be used on the dial mechanism.

The following parts, worm shaft (15), pinion shaft (24), main shaft (17), main spring (18), are to be lubricated. One drop of lubricant 209285-000 is to be applied to each part, at points specified, except for the main spring. A drop of oil is defined as that amount of oil that adheres to a piece of 22 gauge wire after it has been immersed in oil to a depth of 1/2".



Oil both the tail end and governor cup bearings. Also one drop of oil can be applied to one of the governor weights. Oil should also be applied to the worm where it contacts the worm wheel.

Worm Shaft (15)

Oil both bearings, one in the bridge(11) and the other in the front casting (10). Distribute a drop as evenly as possible on the outside of the spring clutch.

Pinion Shaft (24)

To oil the main shaft properly, it will be necessary to remove the finger plate (7). Remove any dust around the bearing under the finger plate before applying the oil. Distribute one drop as evenly as possible between the shaft and main bearing in the front casting. It will not be necessary to oil the bridge bearing since the combination cam (19) is made of nylon. However, the cam bearing surface should be wiped clear of dirt before reassembly.

Main Shaft (17)

The main spring, before reassembly into the dial, should be cleaned. After assembly and before the bridge is fastened in place, the spring should be lubricated with 4 or 5 drops of 209285-000 lubricant. Operation of the dial will distribute the lubricant evenly over the entire spring.

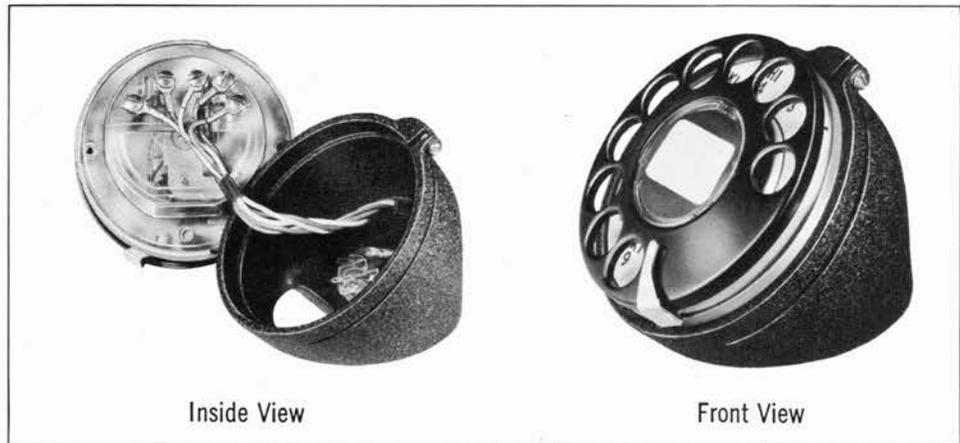
Main Spring (18)

This assembly is used for mounting a small Stromberg-Carlson Dial on switchboards. A simple screw operated clamp plus the cable connection enable this mounting to accommodate all standard small dials. The mount can also be placed in either the horizontal or vertical place.

## SWITCHBOARD DIAL MOUNTING ASSEMBLY

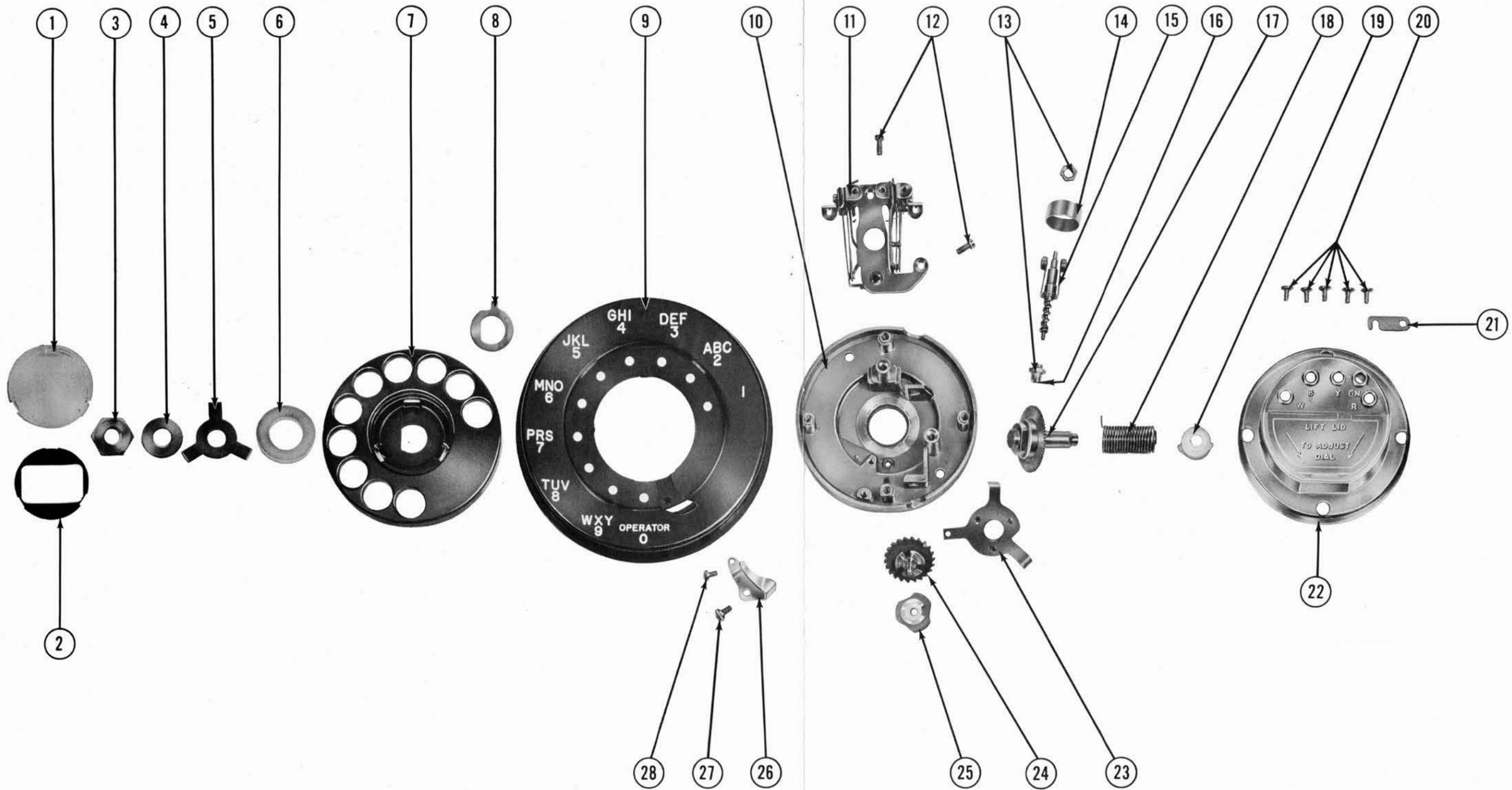
The Stromberg-Carlson dial mounting is simple, small, light in weight, and furnished in an attractive black wrinkle finish. When ordering, specify: 211205-000 No. 3 Switchboard Dial Mounting Assembly.

Switchboard Dial  
Mounting Assembly

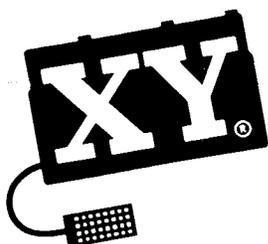


**DIAL COMPONENTS  
PARTS LIST**

| <i>Item No.</i> | <i>Part Name</i>                   | <i>Part No.</i> |
|-----------------|------------------------------------|-----------------|
| 1               | Card Holder                        | 49772-000       |
| 2               | Station Card No. 5                 | 211231-000      |
| 3               | Nut                                | 49814-000       |
| 4               | Washer                             | 200568-000      |
| 5               | Spring Retainer                    | 49811-000       |
| 6               | Spacer                             | 202248-000      |
| 7               | Finger Plate                       | 213074-000      |
| 8               | Stop Washer                        | 213058-000      |
| 9               | Number Plate:<br>Type No. 10       | 207716-000      |
|                 | Type No. 12                        | 207718-000      |
| 10              | Front Casting Assembly:<br>Casting | 213052-000      |
|                 | Bearing (main shaft)               | 49779-000       |
|                 | Bearing (pinion shaft)             | 49804-000       |
| 11              | Bridge and Spring Assembly         | 213064-000      |
| 12              | Screws (Bridge)                    | 501210-000      |
| 13              | Nut                                | 8927-000        |
| 14              | Governor Cup                       | 49780-000       |
| 15              | Worm Shaft Assembly                | 212924-000      |
| 16              | Tail Bearing                       | 213490-000      |
| 17              | Power Shaft Assembly               | 213056-000      |
| 18              | Power Spring                       | 213070-000      |
| 19              | Combination Cam                    | 213057-000      |
| 20              | Screws (terminal)                  | 502123-000      |
| 21              | Connector                          | 204333-000      |
| 22              | Cover Assembly                     | 204334-000      |
| 23              | Spring Anchor                      | 213059-000      |
| 24              | Pinion Shaft Assembly              | 213069-000      |
| 25              | Impulse Cam                        | 211438-000      |
| 26              | Finger Stop                        | 213071-000      |
| 27              | Screw (finger stop)                | 515273-000      |
| 28              | Screw (finger stop)                | 501123-000      |



DIAL COMPONENTS



## **STROMBERG-CARLSON**

A DIVISION OF GENERAL DYNAMICS CORPORATION

*factory and general offices* **ROCHESTER 3, NEW YORK**

*sales offices* **ATLANTA • CHICAGO • KANSAS CITY • SAN FRANCISCO**

*makers of the famous XY line of products*

*"There is nothing finer than a Stromberg-Carlson"*