

Oct. 14, 1941.

P. B. DRAKE

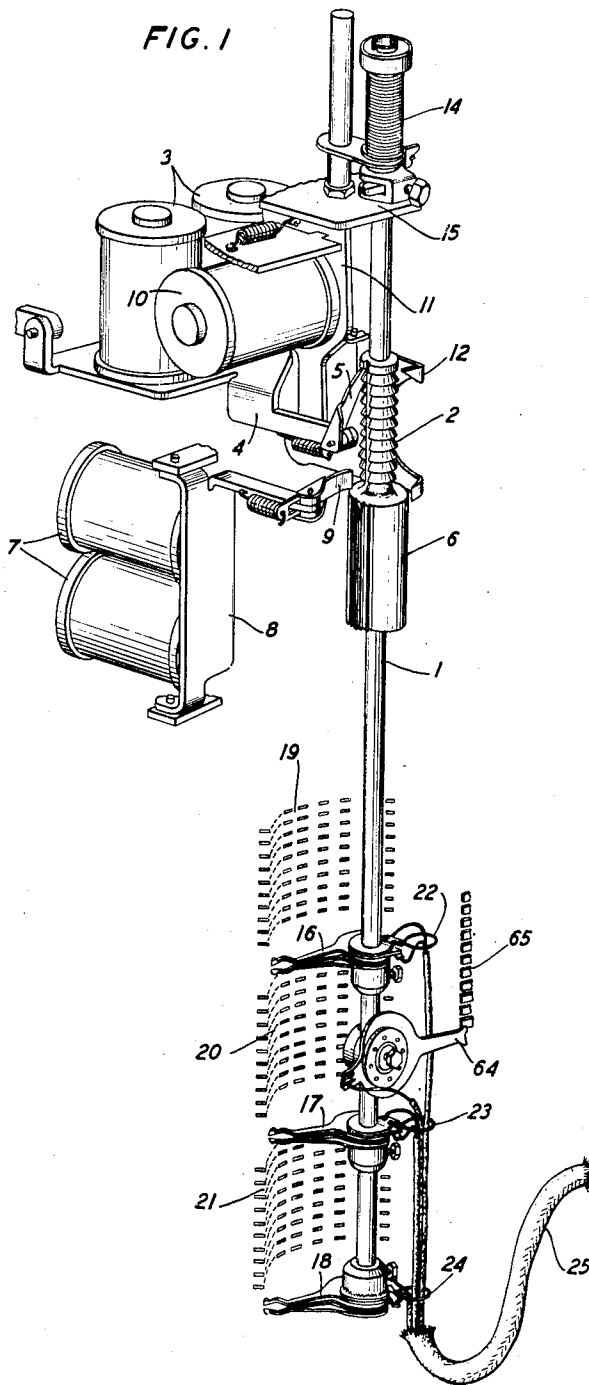
2,259,103

AUTOMATIC SWITCHING DEVICE

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2 Sheets-Sheet 1

FIG. 1



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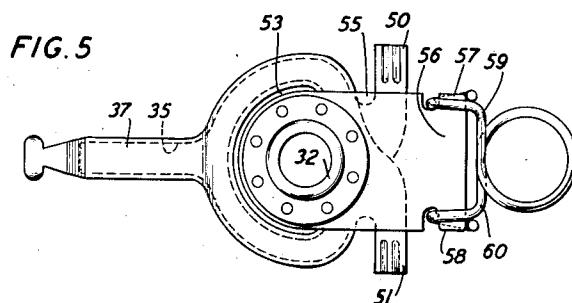
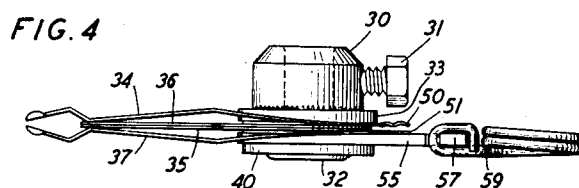
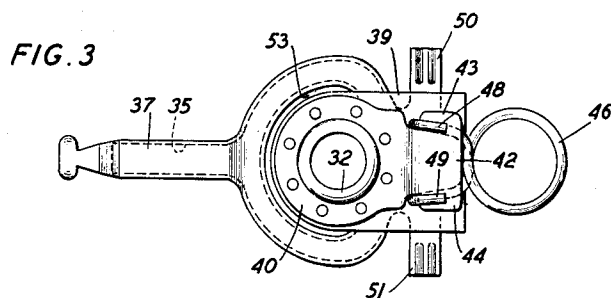
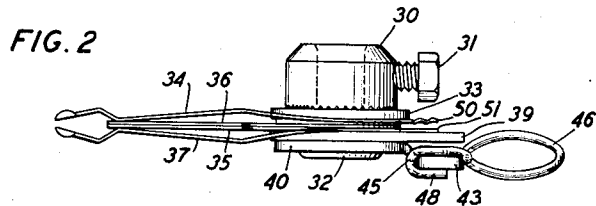
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2 Sheets-Sheet 2



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AUTOMATIC SWITCHING DEVICE

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6 Claims. (Cl. 179—27.52)

This invention relates to electrical switching devices and particularly to improvements in switches used for the establishment of connections between subscribers' lines in automatic telephone systems.

The object is to simplify and improve certain parts of automatic switching devices and to facilitate the assembling and replacing of such parts.

Heretofore in automatic switches, particularly of the step-by-step type having wipers and mechanism for guiding said wipers over contacts to establish telephone connections, the current conducting cards for said wipers have been secured to the shaft on which the wipers are mounted by means of cord guides, such cord guides consisted of insulating washers clamped together with the wipers as parts of the wiper assemblies and provided with projections having large eyelets through which the cords were threaded.

This invention relates to improved cord guides for such wiper assemblies comprising a holder or washer permanently secured to the wiper assembly and a guide ring or clip detachably mounted on this holder. The purpose of this detachable guide ring arrangement is to permit the replacement of any wiper assembly without disturbing the connection to any other assembly on the shaft.

The invention has been illustrated in the accompanying drawings in which:

Fig. 1 shows an automatic step-by-step switch of the Strowger type in a simplified form with the applicant's invention applied to the wiper assemblies on the shaft.

Fig. 2 shows a side view of a wiper assembly with a preferred form of the applicant's invention applied thereto.

Fig. 3 shows a top view of the assembly shown in Fig. 2.

Fig. 4 shows a wiper assembly with a modified form of the applicant's guide ring attached thereto.

Fig. 5 shows a top view of the assembly shown in Fig. 4.

Referring now to the drawings and particularly to Fig. 1, the Strowger switch shown in this figure is illustrated in a somewhat simplified form for the sake of clearness. The usual central wiper carrying shaft 1 has been shown with the ratchet 2. A vertical magnet 3, an armature 4 operated thereby and an actuating pawl 5 engaging the ratchet 2 have been shown for lifting the shaft in a vertical direction. Below the ratchet 2 is shown a ratchet 6, rotary magnet 7, armature 8 and actuating pawl 9 engaging the ratchet

6 to rotate the shaft for locating the wipers at the desired terminals. Release magnet 10 has been shown with its armature 11 and double-dog pawl 12 operated by the armature 11 to release the shaft from an actuated position. The retractile spring assembly 14 is shown attached to the upper end of the shaft 1, one end of this spring being connected to the shaft at the other end to the frame 15.

At the lower end of the shaft 1 has been shown wiper assemblies 16, 17 and 18 and corresponding banks of terminals 19, 20 and 21 to which connections may be made by the corresponding wipers being lifted in a vertical direction and then rotated to engage the desired terminals. The usual arrangement is for the wipers 16 to establish connections for the sleeve conductors, and wipers 17 and 18 for tip and ring conductors. These wipers are assembled with guide rings 22, 23 and 24 respectively in accordance with the applicant's invention. Through the guide rings, cords 25 may be threaded and soldered to projections on the wipers as will hereinafter be described.

As stated, Figs. 2 and 3 show a wiper assembly arranged with the applicant's cord guide in a preferred form. This wiper assembly consists of a bushing 30, having an aperture through which the shaft 1 is passed, and a screw 31 for securing the assembly to the shaft. On a reduced portion 32 provided at the lower end of this bushing are mounted a metal washer 33, a wiper 34, two insulating washers having projections 35 and 36, a wiper 37, an insulation washer 39 and a metal washer 40. These parts 33 to 40 are clamped together on the reduced portion 32 of bushing 30 by performing a spinning operation on the end of the reduced portion. The metal washer 40 is provided with a projection 42 having transversely extending portions 43 and 44. The projection 42 and its extensions 43 and 44 are bent at the point 45 to lie in a lower plane but parallel with the washer 40 as shown particularly in Fig. 2. The guide ring or clip 45 is mounted on this extension and may consist of a loop of wire having its ends 48 and 49 bent first approximately parallel with each other and then over on themselves to form hooks. The hook 48 is passed over the extension 43 and hook 49 is passed over the extension 44 by first compressing the loop 45 and then letting it spring back and thus cause these hooks 48 and 49 to clamp the guide ring securely on the projection 42. The hooks 48 and 49 are so bent over themselves that they practically form a snug fit around

extensions 43 and 44. The wipers 34 and 37 are provided with extensions 50 and 51, respectively, to which conductors may be attached. These wipers, in order to make them flexible, also have cut out portions at their base such as is shown at 53.

A modified form of the applicant's invention as disclosed in Figs. 4 and 5 show the guide ring connected to an insulating washer 55 having a projection 56 with the transverse extensions 57 and 58 on which a guide ring is mounted. It should be noted that the guide ring in this case consists of two loops of wire and the bent over ends 59 and 60 are so formed as to completely surround the extensions 57 and 58, respectively.

Referring now back to Fig. 1, in connecting the cords 25 through the guide rings to the wipers, the cord may consist as shown of seven individual conductors. All of these are threaded through the lower guide ring 24 and then two of these conductors are connected individually to projections 50 and 51 of the wipers 18. The remaining conductors are threaded through the guide ring 23 and then two of the conductors are connected to the wipers 17 in the same manner. Then an additional conductor is extended to be connected to the special wiper 64. This wiper and corresponding contact bank 65 are provided in certain type of step-by-step switches as is well known in the art. The remaining two conductors are then threaded through the upper guide ring 22 and connected to the wipers 16.

It is readily seen that by means of these detachable guide rings, it is extremely easy to replace any one of these wiper assemblies in case it becomes defective without disturbing any of the other connections. For example if the wiper assembly 16 become defective, it is merely detached from the shaft 1 and the guide ring 24 and the associated conductors are detached from the wiper assembly. Another wiper assembly is then placed on the shaft, the conductors soldered onto this new assembly and the guide ring placed on the extensions 43 and 44. In former constructions where the cord guides are integral with the wiper assemblies, it was necessary to remove the cord 25 from all of the wiper assemblies, unthread them from the cord guides, replace the defective wiper assembly and rethread the cord through all the cord guides and resolder them to the assemblies.

Wipers of the type employed on switches heretofore used may be replaced by assemblies in accordance with the applicant's invention by removing the old wipers from the shaft and cutting the cord guides so that they may be removed from the cords. The new wipers may then be assembled on the shaft and the cords soldered to the terminals. The guide rings may then be placed on the cords by passing the cords between the ends of the guide ring coil and then mounted on the assemblies as heretofore described.

What is claimed is:

1. In a switch, a shaft, contact banks, wiper assemblies secured to said shaft and including projecting members, means for actuating said shaft to cause the wipers of said assemblies to engage the contacts in said banks, guide rings, and conductors threaded through said guide rings and connected to said assemblies, said guide rings and projecting members being so constructed that after the conductors have been threaded through the guide rings and connected to the wipers of said assemblies said guide rings may

be detachably mounted on the respective projecting members in fixed positions to guide the conductors and may be removed from the associated projecting members to permit the removal of any wiper assembly without disturbing the connections of the conductors to the wipers of other assemblies.

2. In a switch, a shaft, contact banks, wiper assemblies secured to said shaft, each assembly having prongs extending therefrom, means for actuating said shaft to cause the wipers of said assemblies to engage the contacts in said banks, conductors connected to the wipers of said assemblies, and a guide ring for each of said assemblies, each guide ring having hook-shaped projections extending therefrom for securing the ring in a fixed position on the prongs of the assembly after the conductors have been threaded through said ring and for detaching the ring from said assembly to permit the substitution of the assembly without disturbing the conductors connected to the wipers of other assemblies.

3. In a switch, a shaft, contact banks, wiper assemblies secured to said shaft, each assembly having a member fixedly secured thereto and provided with two oppositely located prongs projecting therefrom, means for actuating said shaft to cause the wipers of said assemblies to engage the contacts in said banks, conductors connected to the wipers of said assemblies, and a guide ring for each of said assemblies, each guide ring consisting of a helically coiled flexible wire having its ends bent in the form of hooks for mounting on the opposite prongs of the corresponding assembly member to hold the ring in a fixed position under its own tension after the conductors have been threaded through said ring and for detachment from said prongs to permit replacement of the wiper assembly without disturbing the conductors connected to the wipers of other assemblies.

4. In a switch, a shaft, contact banks, wiper assemblies secured to said shaft, each assembly having an insulation member fixedly secured thereto and provided with a projecting end in which slots are cut on opposite sides to form oppositely extending prongs, means for actuating said shaft to cause the wipers of said assemblies to engage the contacts in said banks, conductors connected to the wipers of said assemblies, and guide rings for said conductors, each ring comprising a flexible metal spring shaped to form a complete ring with looped ends for securing the ring on the prongs of the corresponding insulating member and for detaching the ring to permit replacement of the wiper assembly without disturbing the conductors connected to the wipers of other assemblies and threaded through the associated rings.

5. In a switch, a shaft, contact banks, wiper assemblies secured to said shaft, means for actuating said shaft to cause the wipers of said assemblies to engage the contacts in said banks, guide rings, conductors threaded through said guide rings and connected to said assemblies, said guide rings and assemblies being so constructed that after the conductors have been threaded through said guide rings and connected to the assemblies, said guide rings may be detachably mounted on the respective assemblies in fixed positions to guide the conductors and so that if conductors connected to an assembly are disconnected therefrom, the guide ring may be disconnected from said assembly for the removal of said assembly without disturbing the connec-

tion of the conductors to other assemblies and another assembly substituted for said removed assembly and after the conductors have been connected thereto the associated guide ring may be detachably secured to said assembly in a fixed position.

6. In a switch, a shaft, contact banks, wiper assemblies secured to said shaft, each assembly having a member permanently secured thereto and provided with two oppositely located prongs projecting therefrom, means for actuating said shaft to cause the wipers of said assemblies to engage the contacts of said banks, conductors connected to said assemblies and the associated wipers, a guide ring for each of said assemblies having two loop-shaped projections extending

therefrom, so arranged that each of said loops may be fitted over a corresponding prong to secure the ring to an assembly in a fixed position after the conductors have been threaded through said rings for subsequent connection with the wipers of said assembly and so that the loops can be removed from the corresponding prongs and the associated wiper assembly disconnected from the conductors and removed from the shaft and another wiper assembly substituted and the associated ring secured in the same manner to said substitute assembly and the conductors connected to said substitute assembly without disturbing the connections of the conductors to other wiper assemblies.

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