

May 24, 1932.

R. A. ROAD ET AL

1,859,470

SELECTOR BRUSH

Filed April 10, 1931

FIG. 1

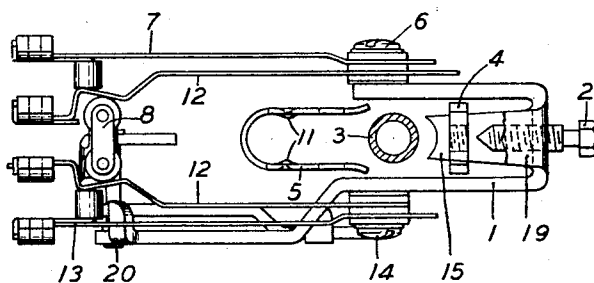


FIG. 2

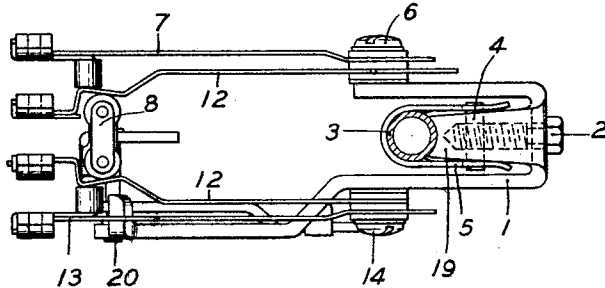


FIG. 3

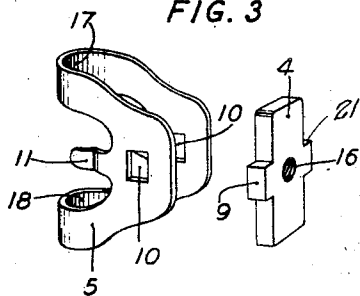
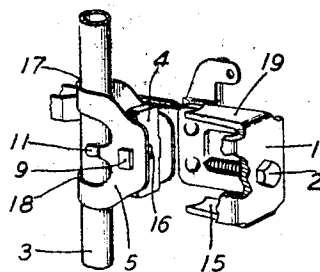


FIG. 4



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SELECTOR BRUSH

Application filed April 10, 1931. Serial No. 529,056.

This invention relates to automatic and semi-automatic telephone exchange switching apparatus and more specifically to a switch brush assembly for panel type selector switches.

The object of the invention is the provision of a brush assembly whose parts are simple and of rugged construction and having new and novel features which simplify manipulating, dismounting, adjusting and assembling the brush parts with greater ease and facility than was possible heretofore.

In order to more clearly understand the invention, the type of switch contemplated herein, of which the brush assembly forms a part, will be briefly described. The said switch is capable of accurately and rapidly serving a large number of lines, any line being reached through one of a plurality of multiply connected sets of brushes on a common brush shaft or rod. The stationary terminals are arranged in vertical rows in the form of a panel, and each row has a set of normally inactive brushes individual thereto. These rows of terminals may be multiplied horizontally across the panel to be accessible to as many individual switching devices as may be required to handle the greatest number of simultaneous calls.

The terminals of the desired line are reached by causing the set of brushes having access to the row of stationary terminals in which the desired line terminates to be released, and then causing the said brush set to traverse the terminals in the row until the terminals of the desired line are reached. All of the brushes having access to the sections of the row of terminal sets which are in the same vertical line are secured to a common shaft. The brushes of the several sets are normally held in their retracted position by a hinged roller mechanism whereby they may pass between the terminals of a set without engagement therewith. A single brush selecting or tripping device is provided for selectively operating said hinged roller mechanism to render operative the brushes of any desired set. This brush selecting means comprises a trip rod extending through the frame parallel to the brush rod.

This trip rod is provided with a series of inwardly projecting lugs or fingers, one for each brush set, arranged at progressively increasing distances above the normal positions. These fingers normally extend slidably to one side of the line of travel of the brush shaft, means being provided whereby the trip rod may be momentarily rotated to cause one of said fingers to engage its respective hinged member in order to release a desired set of brushes. A selector switch of this general character is disclosed in Patent No. 1,123,696, granted January 5, 1915 to E. B. Craft and J. N. Reynolds.

The invention is confined to the structure of the brush assembly or brush set for a selector switch of the type above described and in the embodiment of the invention disclosed, a single unit brush-frame with a trip lever and cooperating roller mechanism hinged at the forward end is provided. To the sides of the frame are secured the brush springs which make electrical contact with the terminals of contact banks with which the brush set cooperates. In order to secure the brush assembly to the brush rod or elevator, a clamping means is employed consisting of two detachable clamping units; a front and rear unit. The front unit has an upper and lower semicircular inverted U-shaped portion with a prong on each side. This front unit can be separately secured or clipped to the elevator or brush rod by the two prongs mentioned so that it will not fall off the rod while the brush assembly is being fastened thereto. The rear unit consists of a rectangular piece with a shoulder in the middle of each of its long sides for cooperation with openings in the front clamping unit. A clamping screw joins the rectangular piece or rear clamping unit to the rear of the brush frame and causes the circular bearing surfaces of the front unit to embrace the rod from the front and thus secure the brush frame thereto. As the front unit is brought to bear more tightly against the brush rod by driving the clamping screw further into the rear unit, the fact that the inner surfaces of the front unit bearing against the brush rod are equal and sym-

metrical with respect to the direction of the line of travel of the screw, causes an equal strain against all parts of the rod with respect to the center of the clamping unit, thereby eliminating any possibility of lateral distortion of the brush frame either to the right or to the left.

For a more detailed description of our invention, reference is now made to the accompanying drawings in which:

Fig. 1 is a plan view of the brush frame together with such other parts of the brush assembly as are contemplated in this invention;

Fig. 2 is likewise a plan view of the brush but with said parts shown cooperatively related and connected to each other as they will be when the brush set is assembled for operation;

Fig. 3 is a longitudinal perspective view of the front and rear clamping units; while

Fig. 4 shows the two said clamping units attached to the brush rod together with the rear part of the brush assembly, partly cut away, in its proper position relative to the clamping units ready for attachment thereto.

Referring to the various figures of the drawings wherein the same number is used in each figure to designate the same part of the structure therein illustrated, 1 is the brush frame; 2 is a clamping screw in the center of the rear end of the brush frame; 3 is the brush rod or shaft; 4 is a rear clamping unit the center of which is tapped for receiving screw 2; 5 is the front clamping unit; 7, 12 and 13 are the brush springs of the assembly which are attached to the sides of the brush frame 1 by assembly screws 6 and 14; while 8 is the hinged brush releasing device shown in its normal position and holding the brush springs separated.

The brush frame 1 is a well known structure for carrying the brush springs and brush tripping device and has rear, top and bottom horizontal lugs 15 and 19 whose forward ends are of the same configuration as the periphery of the brush rod 3. Through the center of the rear end a clamping screw 2 is passed which is used for attaching the brush frame to the rear clamping unit as more completely described hereinafter.

The front clamping unit of which 5 is but one embodiment is of any suitable flexible material. It has upper and lower semicircular portions 17 and 18, respectively, with a dented flexible convex prong 11 on each of its sides and midway between the said upper and lower semicircular portions. In the center of each face is a slot 10 which registers with shoulders 9 and 17 of the rear clamping unit 4 as more particularly described hereinafter.

The rear clamping unit 4 is a solid member in the form of a nut with two shoulders 9 and 21 in the middle of each of its long

ends and a tapped hole 16 in the center of the unit for the reception of screw 2.

The clamping unit 5 can be placed on the brush rod through its U-shaped opening and made secure thereto by the supporting action of the convex face of each of the prongs 11. By bending the prongs inwardly or outwardly along the dent line, any desired security of the clamping unit to the brush rod can be obtained and the convex curvature of each prong supplies the unit with the necessary sliding motion for removing it from the rod when forward pressure is applied to the ends of the unit. In the position of attachment to the rod the clamping unit will remain stationary and, at such a time, the rear clamping unit 4 can be attached thereto by inserting its shoulders 9 and 21 into the registering slots 10. When both clamping units are thus connected to each other and to the rod, the brush frame can be attached to the rear clamping unit. The brush tripping device 8, which is hinged to the brush frame at 20, is then released and the space occupied by the roller mechanism made vacant thereby. The brush rod is then passed through the center of the brush assembly through the space formerly occupied by the roller mechanism and said assembly is then placed in a position relative to the clamping unit as disclosed in Fig. 4 so that the screw 2 in the rear of the brush frame will register with the tapped hole 16 of the rear clamping unit.

The screw is then driven through the hole 16 until the curved edges of the lugs 15 and 19 tightly abut upon the surface of the rod. As the screw is driven deeper, the rear clamping unit is pulled forward and is tensioned against the front edges of slots 10. The rear clamp, in its forward motion, carries with it the front clamping member whose two semicircular surfaces bear more firmly against the surfaces of the rod, equally throughout the surfaces of contact. As the front clamping unit is pulled forward towards the screw by the rear clamping unit, prongs 11 which are tensioned against the rod surface, converge towards the axis of the rod and apply a pressure in the opposite direction to the pressure exerted by semicircular surfaces of contacts 17 and 18 of the front clamping unit. The deeper screw 2 is driven, the more tightly the front clamp grips the rod, the top and bottom tongues 15 and 19 of the brush frame will abut against the opposite side of the rod with greater pressure, and the prongs 11 will tend to converge more towards the axis of the rod. There are, then, two oppositely acting forces which hold the brush assembly in place on the rod, namely, the semicircular surfaces 17 and 18 of the front clamping unit exerting pressure in one direction and the circular edges of the top and bottom lugs 15 and 19 of the brush frame exerting

pressure in the opposite direction. Since the pressure is exerted through symmetrical surfaces of contact and is directed along the same line of action and is in opposite directions, there will be no tendency for the brush assembly to shift or move in a horizontal plane, thereby always keeping the individual brushes in the same position relative to the plane of the terminals in the bank with which the brushes are to engage.

It will be seen that, with this novel arrangement of attaching a brush set to a selector rod, said brush set can be easily dismounted from the selector rod without disturbing either the rod itself or other brush sets which are mounted thereon. All that is necessary, in such cases, is to loosen the screw 2 until the brush frame is disengaged from the rear clamping unit 4 and, by moving the brush frame either above or below the clamping device, the brush assembly may be withdrawn from the rod by releasing the brush tripping device and withdrawing said brush set past the rod in the same manner as when the brush set was being attached to the clamp. New brushes may be then installed, or the old ones repaired and remounted on the clamping unit which has, in the meanwhile, remained attached to the rod.

The clamping device may as easily be dismounted from the rod. By extending the two faces of the front clamping unit shoulders 9 and 21 of the rear clamping unit may be taken out of slots 10 and removed. The front clamping unit can likewise be removed by extending the two faces thereof, thereby relieving some of the pressure which the prongs 11 exert upon the surface of the rod. The clamp is of sufficient resiliency to yield to a back pressure now applied to the edges of the clamp so as to disengage the prongs 11 from the rod.

What is claimed is:

1. In a brush assembly, a brush frame, a brush rod, a clamping device comprising a front clamping member for separate attachment to said rod, a rear member for attachment to said front member, and means for attaching said brush frame to said rear member.

2. In a brush assembly, a brush frame, a brush rod, said frame having lugs for engagement against said brush rod, a clamp embracing said brush rod, said clamp having prongs for holding said clamp to said rod, a member serving as a nut detachably connected to said clamp, and a clamping screw for joining said nut member with said frame whereby when said screw is tightened said clamp is drawn tightly toward said lugs to embrace said rod to prevent lateral movement of said frame around said rod.

3. In a brush assembly, a brush frame, a brush rod, a clamping device comprising a clamping member having flexible prongs for

engaging said clamping member to said rod, a nut member for attachment to said clamping device and a clamping screw for joining said nut member with said frame whereby when said screw is tightened and said clamping member is drawn to said rod said flexible prongs are drawn towards each other to hold said clamping member rigid on said rod.

4. In a selector switch, a brush rod, a brush set comprising a frame, said frame having lugs for engagement against said brush rod, a U-shaped clamp embracing said brush rod, a member serving as a nut detachably connected between the arms of said clamp, and a clamping screw for joining said nut member with said frame whereby when said screw is tightened said brush rod is drawn by said clamp tightly against said lugs to secure said frame to said rod.

5. In a selector switch, a brush rod, a brush set comprising a frame, said frame having lugs for engagement against said brush rod, a U-shaped clamp embracing said brush rod, said clamp having a prong on each arm thereof for holding said clamp upon said rod, a member serving as a nut detachably connected between the arms of said clamp, and a clamping screw for joining said nut member with said frame whereby when said screw is tightened said brush rod is drawn by said clamp tightly against said lugs to secure said frame to said rod.

In witness whereof, we hereunto subscribe our names this 8th day of April, 1931.

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