

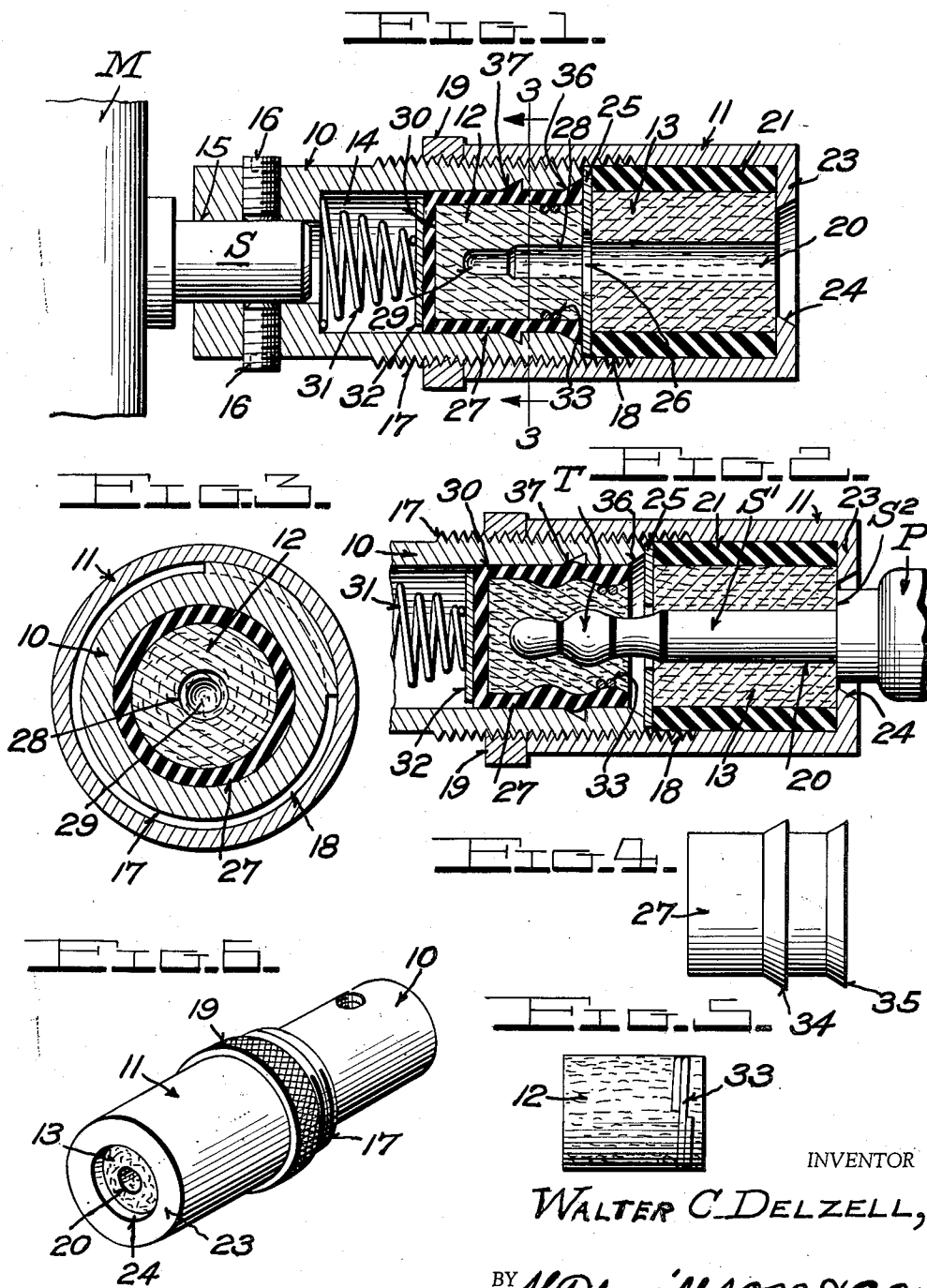
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ELECTRIC SWITCHBOARD PLUG POLISHER

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ELECTRIC SWITCHBOARD PLUG POLISHER

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1

My invention relates to cleaning and polishing devices, and it is particularly useful for maintaining switchboard terminal connector plugs used in telephone, telegraph and radio equipment, free from damaging oxides, corrosion, dirt or other insulating films.

In order to have highly efficient and trouble-free circuit operation in systems employing such equipment, it is necessary to keep switchboard plugs clean and polished. Because of the shape of such plugs it is difficult to effectively polish them, and the cleaning operation if done by hand requires much time. It is therefore an object of the invention to provide a portable, power driven device by means of which the tips, sleeves and shoulders of such plugs may be cleaned and polished rapidly and efficiently, thus saving much time of telephone and telegraph maintenance men.

Another object of the invention is to provide a device of this character which will do satisfactory work on switchboard plugs of different shapes and sizes.

Another object is to provide the device with means for varying the pressure of a polishing element against the plug.

Another object is to provide the device with separate polishing elements for the tip and sleeve portions of such plugs, and in which the elements, usually felt bodies or sleeves, may be readily replaced when completely worn out.

Another object is to provide the device with a tip polishing felt which is spring pressed toward the sleeve polishing felt to cause the plug tip to be more effectively cleaned and polished and to permit the device to operate on unusually long plugs.

Another object is to so construct and mount the tip polishing felt that it will effectively polish the annular grooves or depressions in the plug.

Another object is to provide a device of this character which is of simple and dependable construction and which will polish the plugs with speed and accuracy.

With the above and other objects and advantages in view, the invention resides in the novel combinations and arrangements of parts and the novel features of construction hereinafter described and claimed, and illustrated in the accompanying drawings which show the present preferred embodiment of the invention.

In the drawings:

Fig. 1 is a central longitudinal sectional view on an enlarged scale through the polisher showing it secured to the shaft of an electric motor.

2

Fig. 2 is a similar view of a part of Fig. 1 showing a switchboard plug insert in the device;

Fig. 3 is a cross sectional view taken on line 3-3 in Fig. 1;

Fig. 4 is a side elevation of the elastic member surrounding the tip felt;

Fig. 5 is a side elevation of the tip felt; and Fig. 6 is a perspective view of the polisher.

The plug cleaner and polisher is in the nature of a chuck which may be rotated by a shaft preferably power driven and into which the plug is inserted. The device comprises an inner body section 10 containing a plug-tip polisher 12 and an outer sleeve like section 11 containing a plug-sleeve polisher 13 and telescoped on the inner section 10, the two sections being preferably connected by screw threads. The polishers 12, 13 are preferably made of compressible felt and will be referred to as the tip felt 12 and the sleeve felt 13 but they may be made of equivalent materials. The body 10 has a large cylindrical bore or chamber 14 which opens outwardly and in which the tip felt is slidably mounted. The inner or rear portion of the body may be formed with a reduced concentric bore 15 to receive the shaft S of an electric motor M, one or more Allen set screws 16 being used to fasten the body to the shaft. Obviously the bore 15 may receive a short rod that may be fastened in the chuck of an electric drill or other rotating tool. The body 10 has external screw threads 17 engaged by internal threads 18 in the inner or rear portion of the sleeve 11, the two casing sections of the device being secured in adjusted position by a lock nut 19 preferably in the form of a ring having a milled or roughened outer surface. The purpose of this telescopic adjustment of the two sections is to put endwise pressure on the sleeve felt 13 for the reasons hereinafter explained.

The compressible sleeve felt 13 is in the form of a cylindrical body with a central longitudinal bore 20 having a normal diameter slightly less than the sleeve diameter of a switchboard plug to be polished by the device. The felt 13 is surrounded by a cylindrical compressible and resilient sleeve-like member 21 preferably made of rubber, rubber-like or plastic material which has elastic properties. The felt and its compressing sleeve 21 have the same length, and the outside diameter of the sleeve is such that it, with the felt therein, may be dropped into the open end of the section 11 so that both parts of the unit will abut an end wall 23 at the outer end of the section 11. A central opening 24 is formed in the wall 23 and has a diameter greater than the

3

shouldered portion of a switchboard plug but less than the external diameter of the felt 13. A metal washer 25 is disposed in the sleeve section 11 between the outer end of the body section 10 and the adjacent ends of the rubber sleeve 21 and its contained felt. The washer has a central opening 26 of greater diameter than the diameter of the sleeve of a plug to be cleaned. The washer prevents the sleeve polishing unit from being forced into the chamber 14 when the sleeve section is adjusted rearwardly on the body section to compress the unit 13, 21.

In Fig. 2 there is conventionally shown a switchboard plug P of the type commonly used in telephone equipment. It has a sleeve S' extending from a shoulder S² to the tip portion T. The plugs used in the telegraph and radio equipment are slightly different with respect to the shape of the tip, the length of the sleeve and the dimensions of both, but all switchboard plugs have tips with pointed or rounded extremities and one or more circumferentially reduced portions between their extremities and their sleeves forming annular grooves or channels which are difficult to clean and polish. In order to effectively perform that operation the tip felt 12, which is of cylindrical shape, as seen in Figs. 1 and 5, and has a surrounding resilient sleeve 27 of rubber or the like, is formed with a bore or socket 28 with a reduced and closed inner end or bottom 29 so that it is shaped somewhat like the tip of the plug. The rubber sleeve 27 has an end wall 30 and hence the compressible member is cup shaped. The member 27 has a sliding fit in the chamber 14 and is forced forwardly or outwardly by a coil spring 31 which thrusts at one end against the bottom of the chamber 14 and at its other end against a disk or washer 32 of a size which substantially covers the end wall 30 of the rubber cup. The spring 31 normally holds the outer end of the unit 12, 27 against the washer 25 but the unit moves inwardly, as shown in Fig. 2 when the end of the plug tip T reaches the bottom 29 of the socket in the felt 12 and the plug continues to move into the sleeve felt 13. The extent of inward movement of the tip felt will depend upon the length of the plug since the inward movement of the plug into the device substantially stops when the plug shoulder S² engages the outer end of the sleeve felt 13. In some cases where the plug is relatively short the tip T will be effectively cleaned and polished without inward movement of the tip polishing unit 12, 27, since the socket 28, 29 may have substantially the shape of the plug tip and the spring 31 will be strong enough to hold the tip felt against endwise movement as the plug tip is forced into it.

To increase the gripping action of the felt 12 on the plug tip I may embed in the felt a split resilient wire ring or coil 33 of one or two turns. This ring or coil will expand as the larger portion of the plug tip passes it but will contract as a smaller portion passes, thus tending to force the felt into the annular groove or grooves in the plug tip. One or more of such split rings or coils may be used. I may also form on the exterior of the rubber cup or member 27 one or more outwardly projecting annular ribs of angular shape in cross-section to be disposed normally in annular grooves in the wall of the chamber 14 and to be moved out of such grooves when the tip unit is forced inwardly, thus putting additional pressure on the felt 12 at points substantially opposite the annular grooves in the plug tip. As shown, two of such ribs or flanges 34 and 35 are

4

preferably provided. The rib 35 is at the outer end of the rubber cup and it normally engages a beveled edge 36 at the end of the section 10. The rib 34 normally lies in an annular groove 37 in the wall of the chamber 14 spaced inwardly from the outer end of that section. The annular ribs have their outer surfaces inclined in an inward and rearward direction, and the grooves or channels 36, 37 are correspondingly inclined so that these coacting parts serve to cam the adjacent portions of the rubber sleeve 27 inwardly, as seen in Fig. 2, as the tip polishing unit is forced rearwardly. The coaction of these parts tends to force the felt 12 into the grooves of the plug tip.

In using the device it is preferably applied to the shaft of a small $\frac{1}{30}$ H. P. electric motor having a speed of 1500 R. P. M. and rotating in a counter-clockwise direction so that there will be no tendency of the device unscrewing the parts of a plug that have a threaded connection. The plug is pushed into the device with sufficient inward pressure to insure a firm compression of the felts and their elastic rubber sleeves, the plug being moved in an inward and outward motion several times, and being forced inwardly a sufficient distance to cause the outer end of the felt to polish the shoulder S² of the plug. The felts normally have a snug fit in the rubber sleeves or members and when the plug is inserted in them they are compressed and have a tendency to enlarge and put the rubber under compression. When the plug is pulled out of the device both the felts and the rubbers tend to resume their normal shapes. The felts may be dipped in a cleaning fluid but it is preferable to use a suitable polishing compound in powdered form that may be dropped into the bore 29 and will be spread by the plug. To prevent the rubber members from sticking and to enable the cup member 27 to slide more freely, they may be sprinkled with talcum powder. The sliding movement of the tip polishing unit 12, 27 takes care of variations in the lengths of the plugs. As the sleeve felt wears it may be compressed in an endwise direction by screwing the outer sleeve section 11 back on the body section 10. The construction is such that the felts may be readily replaced with new ones when worn out. Due to the mounting of the felts in the rubber sleeves or members they will be self aligning and automatic in action except for the adjustment of the outer sleeve.

Excellent results have been obtained from the details disclosed and they are preferably followed, but it will be understood that within the scope of the invention as claimed, numerous minor changes may be made.

I claim:

1. A switchboard plug polisher comprising a rotatable body having a chamber in its outer end, a sleeve telescopically adjustable on the outer end of said body and having an outer end with a central opening, a washer within said sleeve abutting the outer end of said body, a compressible plug-sleeve polisher in said sleeve between its outer end and said washer, said polisher having a central bore to receive and polish the sleeve of a plug, a compressible plug-tip polisher slidable in said chamber and having a central outwardly-open socket to receive and polish the tip of a plug, and spring means in said chamber to yieldably hold said plug tip polisher against said washer.

2. The structure of claim 1 in which each of said polishers comprises a cylindrical body of felt surrounded by a sleeve of elastic rubber.

5

3. The structure of claim 1 together with contacting means on said chamber wall and said plug-tip polisher for inwardly compressing the latter as it slides rearwardly in said chamber.

4. The structure of claim 1 in which each of said polishers comprises a cylindrical body of felt surrounded by a sleeve of elastic rubber, together with at least one annular, outwardly projecting flange formed on the rubber sleeve of said plug-tip polisher, said flange having a rearwardly inclined outer surface to coact with a similarly inclined surface on the wall of said chamber to cause said last mentioned rubber sleeve to be inwardly compressed about its contained felt body when said plug-tip polisher slides rearwardly in said chamber.

5. The structure of claim 1 in which each of said polishers comprises a cylindrical body of felt surrounded by a sleeve of elastic rubber, together with a split resilient wire ring surrounding the exterior of the felt of said plug-tip polisher.

6. The structure of claim 1 in which the telescopic adjustment of said sleeve on said body comprises external screw threads on the outer end portion of said body, internal screw threads in the inner end portion of said sleeve, said inter-

6

nal threads being engaged with said external threads for longitudinal movement of said sleeve on said body to vary the endwise compression of said plug-sleeve polisher between said washer and the outer end of said sleeve, and a lock nut engaged with said external threads and with the rear extremity of said sleeve to hold said sleeve in an adjusted position.

7. In a switchboard plug polisher, a cup-shaped elastic rubber, compression member to receive a plug-tip polishing felt, said member having a cylindrical outer surface with at least one annular, outwardly projecting rib, the latter being of angular shape in cross-section and having its outer surface inclined inwardly and toward the closed end of the cup-shaped member.

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