July 16, 1935. O. N. GIERTSEN ET AL 2,008,276

TELEPHONE PLUG CLEANING MACHINE

Filed April 17, 1934 2 Sheets-Sheet 1

FIG. 1

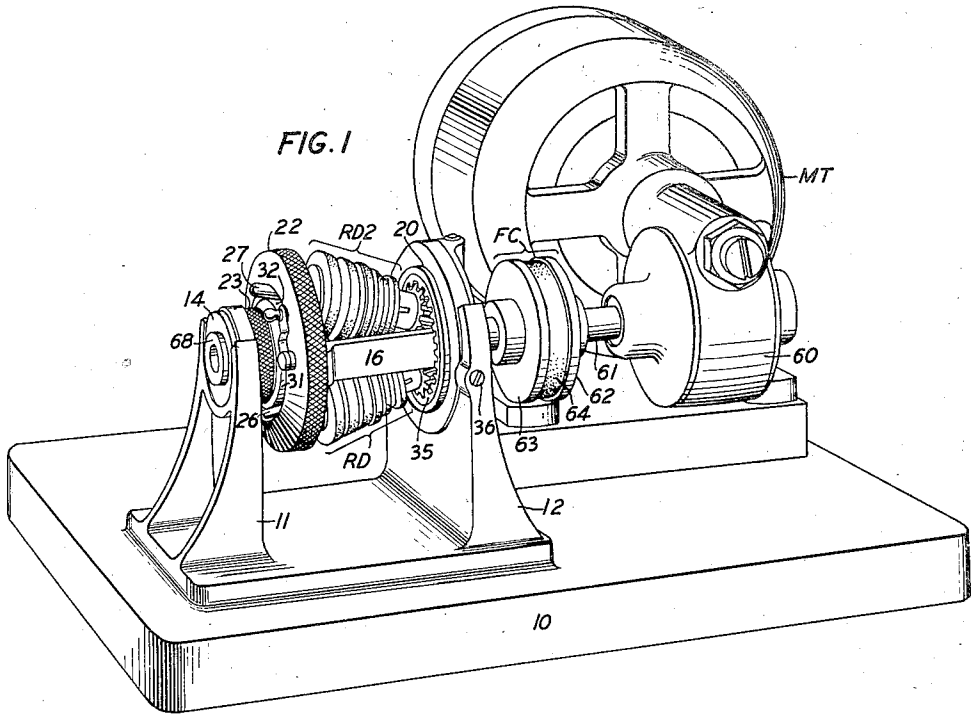


FIG. 4

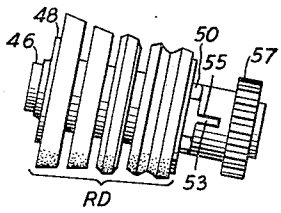
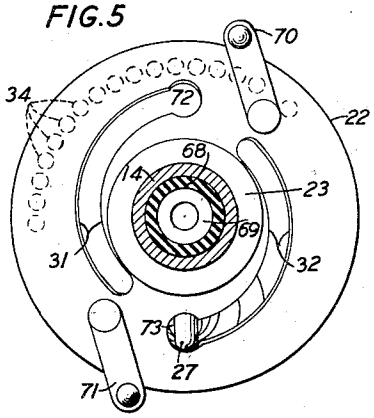
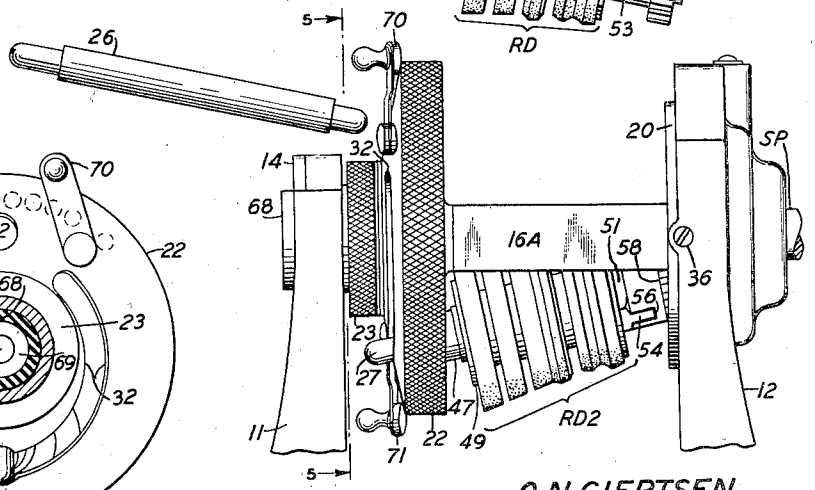


FIG. 5





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July 16, 1935. O. N. GIERTSEN ET AL 2,008,276

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Filed April 17, 1934 2 Sheets-Sheet 2

FIG. 2

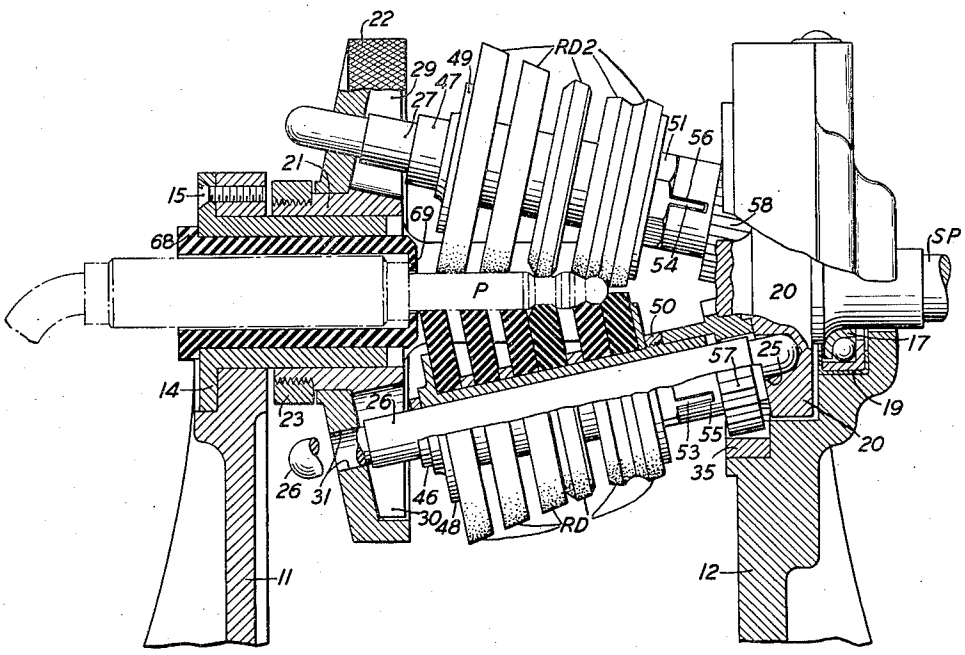
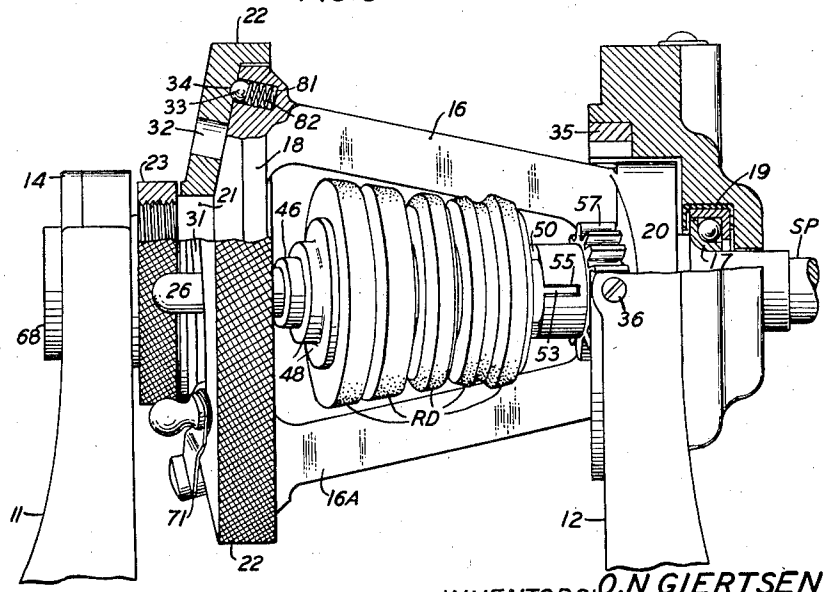


FIG. 3



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TELEPHONE PLUG CLEANING MACHINE

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6 Claims. (Cl. 51—80)

This invention relates to cleaning machines, and more particularly to a type of cleaning machine for use in cleaning the contacting surfaces of switching plugs and the like.

In telephone exchanges, for example, in order to assure positive electrical contacts between the plugs and their associated switching elements on the switchboard, it is necessary to clean these plugs frequently to remove the oily coating which becomes deposited on their contacting surfaces while handling these plugs in the course of switching operations. Such cleaning operation as affected by any ordinary method has proved to be difficult, too costly and to take too much time.

The object of this invention is to provide a cleaning machine of this type which will be simple, efficient in operation and wherein the contacting surfaces of telephone plugs are cleaned in a positive manner and in a minimum of time.

According to this invention, the contacting surfaces of a telephone switching plug are cleaned by engaging the plug with the peripheral or effective surfaces of two sets of closely spaced abrasives bearing rubber discs, which are moved in a planetary movement through the operation of a supporting rotatable frame connected to a motor and a gearing mechanism which connects the spindles to an internal gear held stationary on the support of the rotatable frame. Means is provided for changing the spaced relation of the spindles on their supporting frame for adjusting the cleaning effect of the discs with respect to the contacting surfaces of the plug, and a bushing is provided for guiding the plug in position with respect to the effective surfaces of these discs.

In the drawings, Fig. 1 is a perspective assembly view of the machine;

Fig. 2 is an enlarged view showing a number of operating parts in section;

Fig. 3 is an enlarged front view;

Fig. 4 is a partial side view showing one of the cleaning elements and its supporting shaft removed from the machine; and

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 4.

In Fig. 1, 10 is a supporting base having integrally formed therewith the upright supports 11 and 12 and on upright support 11 is mounted a sleeve 14 held securely therein by a number of screws such as 15 shown in Fig. 2.

Upright supports 11 and 12 serve for rotatably mounting a frame structure having two oppositely and obliquely disposed arms 16 and 16A terminating at one of their ends in the form of a disc portion 20 and a spindle SP and the other end of bars 16 and 16A terminate in the form of a disc 18 having a hub portion 21 rotatably engaging the sleeve 14. The spindle SP engages the rotor element 17 of a ball bearing, the stator element of which is mounted in a countersunk hole 19 in upright support 12 and on hub 21 is rotatably mounted a rotary adjustable ring 22, Figs. 1, 2, 3 and 4, which is held in position thereon by a nut screw 23.

The disc portion 20 is provided with two oppositely disposed holes such as 25 shown in Fig. 2 for receiving the ends of spindles 26 and 27. The disc portion 18 of the rotating frame thus formed is provided with two oppositely disposed radial slots 29 and 30 for receiving the enlarged end portions of spindles 26 and 27 and the ring 22 mounted thereon is provided with grooves 31 and 32 for receiving the reduced end portion of shafts 26 and 27. These grooves are eccentrically disposed with respect to the turning center of ring 22 as to form camming surfaces which upon the rotation of this ring move the shafts 26 and 27 in the radial slots 29 and 30 for changing the angle relation of these spindles for a purpose that will be hereinafter described in detail.

The disc portion 18 of the rotating frame as shown in Fig. 3 is provided adjacent its periphery with a countersunk hole 31 for receiving a spring 32 and steel ball 33, the latter engaging depressions 34 arranged in a circular row in ring 22 as shown in Fig. 5 for yieldably holding this camming ring in adjusted relation with respect to the disc portion 18 of the frame.

In upright support 12 is mounted a ring gear 35 held against rotary movement therein by a set screw 36 shown in Figs. 1, 2 and 4. On spindles 26 and 27 are rotatably mounted the sleeves 46 and 47 having flange portions 48 and 49 serving as abutment for a plurality of abrasive bearing sulphur free rubber discs RD and RD2 secured on the sleeves 46 and 47 by nut screws 50 and 51 threadedly engaging the ends of the sleeves as shown.

Nut screws 50 and 51 are each provided with a pair of lugs 53 and 54 for operatively engaging with slots 55 and 56 in the hub portions of gears 57 and 58 and each of these gears is provided with a bearing portion for free movement on spindles 26 and 27.

The ends of grooves 31 and 32 as shown in Fig. 5 terminate in holes 72 and 73 each of a diameter corresponding to that of the enlarged portion of spindles 26 and 27 to permit the removal of these spindles and thereby the cleaning disc

assemblies RD and RD2 from their supporting frame for repair and replacement of the discs. Shafts 26 and 27, however, are normally prevented from being moved in registry with holes 72 and 73 by a pair of spring arms 70 and 71 pivoted on the ring 22 and movable in registry with these holes for engaging them with a springing action.

The spindle portion SP of the frame is connected to a motor MT through a gear reduction mechanism, not shown, comprising an ordinary worm screw and a worm gear mounted in the housing 60, the worm gear being mounted on a shaft 61 connected to the spindle portion SP above mentioned by a coupling FC in the form of discs 62 and 63 and a rubber ring 64 which is mounted on the end of spindle SP is compressed between these discs for frictionally imparting movement to the rotating frame upon the operation of the motor MT.

The sets of discs RD and RD2 are disposed on the spindles 26 and 27 in staggered relation to each other and are made of such peripheral shape and diameter as to register with the configuration of the metallic portions of the plug P as shown in dotted lines in Fig. 2 and a bushing 68 mounted in bushing 14 is provided for guiding the plug P between the sets of discs RD and RD2, this bushing having a flange abutting portion 69 engaging an enlarged portion of the plug for locating it with respect to the rubber discs.

In a typical operation of the machine, a plug P, the metallic parts of which are to be cleaned, is placed in the bushing 68 in position as shown in Fig. 2 and the ring 22 rotated as to secure the proper contact pressure between the discs RD and RD2 on the surface of the plug, this adjustment being effected through the camming action of slots 31 and 32 on the ends of shafts 26 and 27 and their consequent radial movements in slots 29 and 30 of disc portion 16 of the frame, the ring 22 being prevented from relative movement with disc portion 16 of the rotatable frame through the spring-pressed ball 33 in engagement with one of the depressions 34 in ring 22.

The operation of motor MT upon the closure of a suitable switching device, not shown, is effective to rotate the rotatable frame through the movement of shaft 61 connected to the spindle portion SP of this frame by the friction clutch FC, the rotary movement of the frame being thus effective to actuate the sets of cleaning elements or discs RD and RD2 through the engagement of gears 57 and 58 with ring gear 35 in a planetary movement on the periphery of plug P for cleaning it.

In practice, it has been found that only a relatively small number of turns of the rotating frame was sufficient for the thorough cleaning of a telephone plug, thus reducing this operation to a minimum of time.

What is claimed is:

1. In a machine for cleaning telephone plugs having irregular contacting surfaces, a mounting having upright supports, a frame structure rotatably mounted on said supports, a pair of spindles journaled at both ends on said frame, a sleeve rotatably mounted on each of said spindles, cleaning elements carried by each of said sleeves and having effective surfaces corresponding to the contacting surfaces of the plug, means for positioning the plug with respect to said elements, and a gearing mechanism for rotating said sleeves, upon the movement of said frame.

2. In a machine for cleaning telephone plugs having irregular contacting surfaces, a mounting base having upright supports, a frame structure rotatably mounted on said supports, a plurality of spindles journaled at both ends on said frame, a sleeve rotatably mounted on each of said spindles, cleaning elements of different geometrical cross-sections carried by each of said sleeves, a stationary gear mounted in one of said supports, a pinion carried by each of said sleeves and engaging said gear, means for rotating said frame to cause the movement of said sleeves, and means in one of said supports for guiding the plug in position for engaging its irregular surfaces with their corresponding elements on said sleeves.

3. In a machine for cleaning telephone plugs having non-uniform surfaces, a mounting base having upright supports, a frame structure rotatably mounted on said supports, a pair of spindles journaled at both ends on said frame, a sleeve rotatably mounted on each of said spindles, cleaning elements carried by each of said sleeves and collectively engaging the non-uniform surfaces of the plug, a gearing mechanism for rotating said sleeves upon the movement of said frame, means in one of said supports for guiding the plug in registering relation with said elements, and adjustable means or simultaneously changing the spaced relation of said spindles for controlling the cleaning effect of each of said elements on the plug.

4. In a machine for cleaning the contacting surface of telephone plugs, a base having upright supports, a frame structure rotatably mounted on said supports, a stationary annular gear mounted in one of said supports, a plurality of spindles carried by said frame and disposed in oblique relation to each other, a sleeve rotatably mounted on each of said shafts, cleaning elements carried by each of said sleeves, a pinion mounted on each of said sleeves and engaging said annular gear for rotating said elements upon the movement of said frame, and means adjustable for changing the oblique relation of said spindles for controlling the pressure contact of said elements on the plug.

5. In a machine for cleaning the contacting surfaces of telephone plugs, a rotatable frame structure, a pair of obliquely disposed spindles supported at each end on said frame, cleaning elements carried by each of said spindles between their supporting points and actuated by the movement of said frame, means relatively rotatable with respect to said frame and cooperating therewith for adjusting the oblique relation of said elements for controlling their contact pressure on the plug, and yieldable means automatically operating for holding said elements in said adjusted relation.

6. In a machine for cleaning the contacting surfaces of telephone plugs, a rotatable frame structure, a pair of spindles supported at each end on said frame, cleaning elements disposed in rows on said spindles and each of said spindles being disposed obliquely with respect to the turning axis of said frame, an adjustable camming disc carried by said frame for simultaneously changing the spaced relation of said elements for controlling their contact pressure on the plug, means carried by said frame and engaging said disc for holding said elements in said adjusted relation and means carried by said frame for actuating said elements.

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