

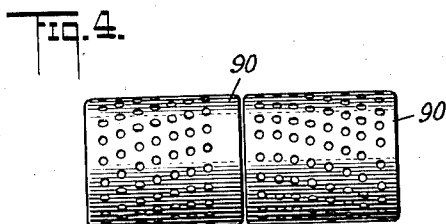
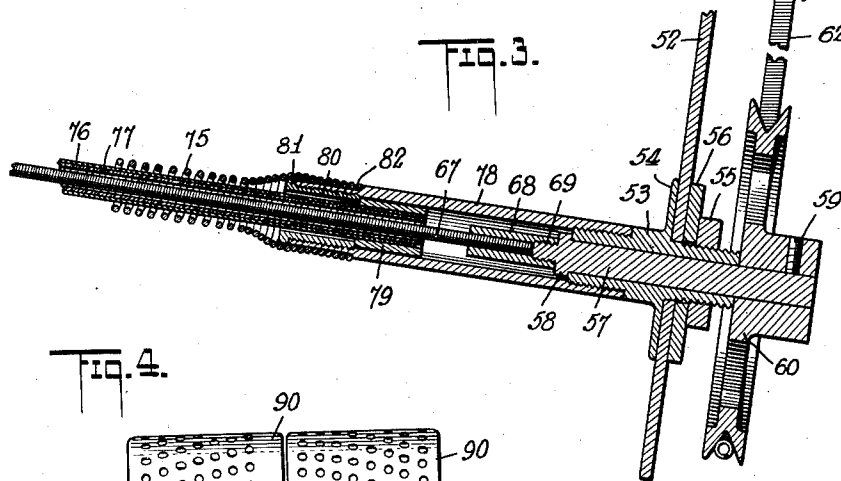
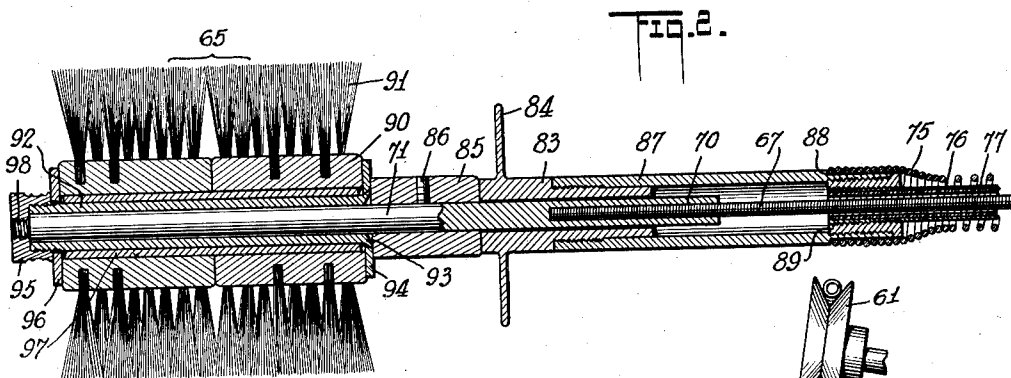
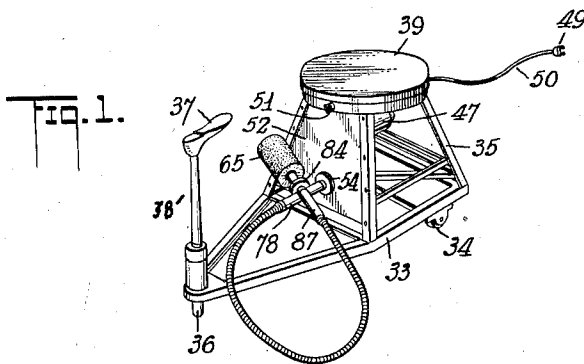
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FLEXIBLE SHAFT

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FLEXIBLE SHAFT

Application filed July 23, 1928. Serial No. 294,673.

My present invention is concerned primarily with flexible driving shaft structures, particularly of such a structure which is well suited for use in conjunction with the power drive of a shoe polishing device or the like, although features of the invention are applicable to other uses.

It is among the further objects of the invention to provide equipment of the above type, by which shoes may be rapidly shined to a higher and more permanent polish, than was practicable heretofore, yet requiring only a small fraction of the time consumed by hand polishing, and requiring no muscular effort on the part of the operator.

Another object is to provide a power driven equipment of the type mentioned, which is of small bulk, yet so rugged as to withstand, without danger of derangement, the hard usage to which it may be subjected by mechanically unskilled operators and which, in fact, is substantially foolproof.

Another object of the invention is to provide shoe shining equipment of the type noted above, dispensing with the menial labor of a bootblack and rendering the operation a clean and substantially effortless one for the operator while avoiding the danger of splashing polish on the garments of the patron.

This application is a continuation in part of my copending application Serial #161,497 filed Jan. 17, 1927.

The invention may be more fully understood from the following description in connection with the accompanying drawing, wherein.

Fig. 1 is a perspective view illustrating a portable stool for the operator, especially useful in barber shops where the operator must move from place to place shining the shoes of patrons receiving tonsorial treatment in the barber chairs.

Fig. 2 is an enlarged longitudinal sectional view through the brush, showing its connection to the driving means.

Fig. 3 is a longitudinal sectional view showing the manner in which the brush operating shaft is secured to the stool and driven, and

Fig. 4 is a diagrammatic plan view of the

brush showing the bristle tuft arrangement utilized.

The portable operator's unit of Fig. 1 includes a chassis 33 with wheels 34 upon the rear part of which is mounted a stool 35 preferably of construction generally similar to that disclosed in my prior application. At the forward end of the chassis is a floor engaging rubber stud 36 to prevent the unit from slipping about the floor under the pressure of a foot on the rest 37 which is supported at the top of a post 38 rising from the forward end of the chassis.

Under the seat 39 there is mounted a suitable electric motor 47 which may be energized from any suitable wall outlet (not shown) by the insertion of a terminal plug 49 at the end of the flexible leads 50. A small rotary snap switch 51 controls the motor circuit and is disposed directly under the seat and at the forward end thereof, by which the operator can readily open and close the motor circuit, without rising from or turning on his stool.

Between the two forward legs of the stool is disposed a metal panel 52 through which extends a fixed bearing bushing 53 provided with a flange 54 clamped against the outer face of the panel by a nut 55 threaded upon the inner part of the bushing and clamping a large disk 56 against the inner face of the panel 52.

Within the bushing is mounted a mechanical terminal in the form of a bearing stub shaft 57, to the outer end of which is secured as by a set screw 59, the hub of a driven pulley 60. The motor shaft has a smaller driving pulley 61 and the torque is transmitted from the motor to the driven pulley preferably by a resilient belt 62.

Preferably the bushing 53 is mounted under the seat so as to tilt slightly upward as shown. The motor 47 is preferably mounted at a corresponding tilt, so that the transmission belt 62 extends in proper relation in a plane at right angles to the shafts between which it transmits torque.

Upon the outer end of the stub shaft 57 is mounted the flexible driving shaft 67. For this purpose the extremity of said shaft has brazed thereonto a terminal socket 68 thread-

ed upon a corresponding nipple 69 fixed upon the end of the stub shaft 57. The opposite end of the flexible shaft 67 preferably extends and is brazed into a corresponding socket 70 in the extremity of a metal shaft 71 upon which the rotary brush 65 is mounted. The brush and its specific mount will be later described.

In order to protect the flexible shaft from injury an armor sheath 75 of helically wound spring wire is used. Housed within sheath 75 encircling the flexible shaft 67 is a protective flexible tubular casing including an outer woven layer 76 and an inner flexible metallic layer 77 preferably of spirally wound strip stock. A terminal fitting or sleeve 78 screwed on the outer end of bushing 53 receives a collar 79 grazed on the end of the casing. This collar is held against removal from the sleeve by a hollow plug 80 screwed into the outer end of the sleeve 78 to an extent limited by its abutment flange 81. The plug 80 encircles the casing behind the collar 79. The end of the spring armor 75 is distended and slipped over the reduced end of the sleeve 78 to an extent limited by an external shoulder 82 on the sleeve.

At the brush end of the flexible shaft 67 the rigid shaft extension 71 has a bearing in a handle bushing 83 adapted to be manually grasped by the operator, and formed with a guard flange 84 to protect the operator's hand from contact with the rotary parts.

At one end the bushing 83 abuts and forms a thrust bearing for a spacing collar 85 fixed by a set screw 86 to turn with shaft extension 71. Screwed over the reduced opposite end of the bushing 83 is a sleeve 87 over the reduced end of which the brush end of the sheath 75 is slipped into abutment with a shoulder 88 on the sleeve. A hollow plug 89 similar to plug 80 is screwed into the end of sleeve 87 and the end of the casing 76, 77 is screwed into the plug or otherwise firmly secured thereto.

The rotary brush 65 preferably includes two similar brush units axially aligned and held in abutment although it might be formed as a single member. Each of the units comprises a hollow core 90 into which the brush tufts 91 are secured, preferably by metal stitching (not shown), which in itself is not my invention. A hub sleeve 92 extends through the core 90 and has an overturned end 93 reacting against an end disk 94 and is secured in position by a nut 95 threaded upon the opposite end thereof, and reacting against a disk 96. This nut also is threadedly connected to a reduced threaded end 98 of flexible shaft extension 71 whereby the hub sleeve 92 is fixed to turn with the flexible shaft 67. If desired a non-metallic liner sleeve such as 97 may be interposed between the brush cores 90 and sleeve 92.

The bristle tuft arrangement as shown in

Fig. 2 consists of arcuate rows of tufts extending longitudinally of the cores with the ends of the rows in advance of the centers of the rows. Thus adjacent rows produce a scoop-like configuration adapted to pass air entering between the ends of the rows towards the center of the brush before it is forcibly discharged in a radial direction. Obviously this arrangement might be produced on a single core or two core units such as these illustrated may cooperatively produce the desired bristle arrangement.

In use, the operator seated on his stool, having daubed the shoe, simply turns the switch button 51 under the seat, whereupon the brush will revolve. The operator gently holds the brush against the shoe, while passing it over the surface thereof. In practice, it is neither necessary nor desirable to exert any substantial pressure on the shoe with the brush. I have discovered that this operation produces a higher and more permanent polish that results from more intense pressure.

The special arrangement of tufts produce a more powerful blast of air than does the more conventional arrangement. Accordingly the solvent of the polish is rapidly evaporated, leaving the carnauba or other wax base on the shoe, and imparting a high and hard polish thereto, without melting or softening the wax by heat, or gumming the brush with such softened wax.

When it is desired to lay down the brush when still spinning, the handle member 83, 87 is merely laid crossways upon the terminal piece 78, as best shown in Fig. 1. The terminal being inclined downward toward the metal panel 52, it will be seen that the handle 83 tends to slide towards the panel, and the end disk 84 sustains the brush from being drawn off by the weight of the depending flexible shaft and armor sheath.

The various threaded connections afforded in my driving transmission are preferably right hand threads, opposite to the direction of rotation of the flexible driving shaft 67. Thus, obviously the tendency of the rotating mechanism is to tighten rather than loosen the parts carrying these threads, which threads, therefore, need not be and preferably are not locked. This arrangement, affords great convenience for charging brushes. The operator need merely revolve the brush upon its handle in clockwise direction by hand and draw it off, slipping the substitute brush thereover. Without further operation, as soon as he holds the brush against the shoe, the tread is automatically closed and remains secure throughout use.

It will thus be seen that there is herein described a device in which the several features of this invention are embodied, and which device in its action attains the various objects

of the invention and is well suited to meet the requirements of practical use.

As many changes could be made in the above construction, and many apparently
5 widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall
10 be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to receive by Letters Patent is as follows:

15 1. In a power driven implement of the character described, the combination of a stationary support having a relatively fixed bearing bushing, a driving shaft stub rotatable therein, a flexible shaft secured to said stub, a tool secured to the outer end of said
20 flexible shaft, a protective casing enveloping said flexible shaft, a tubular fitting fixed with respect to said bearing bushing, encircling the driving end of said flexible shaft and affording a mount for the extremity of said casing,
25 and means carried by said protective casing and received within said tubular fitting for mounting the end of said protective casing.

30 2. A flexible driving shaft assemblage including a flexible shaft connected at one end to a source of power and at its other end to an implement to be driven, bearing bushings encircling the shaft adjacent opposite ends
35 of the latter within which the shaft is freely rotatable, a flexible protective casing fixedly secured at its ends to the bearing bushings and a protective sheath encircling the casing and rotatable relatively to the bearing
40 bushings.

45 3. A flexible driving shaft assemblage including a flexible shaft connected at one end to a source of power and at its other end to an implement to be driven, bearing bushings encircling the shaft adjacent opposite ends
50 of the latter and within which the shaft is freely rotatable, a flexible protective casing fixedly secured at its ends to the bearing bushings and a protective sheath comprising a coiled spring the enlarged ends of which encircle and are rotatable on the ends of bearing
55 bushings.

4. A power transmission shaft comprising a flexible shaft section, a rigid shaft section secured to each end of the flexible shaft section in rigid axial alignment therewith, a
60 bushing for mounting each of said rigid shaft sections, a sleeve projecting from each of said bushings, each of said sleeves enclosing a portion of said flexible shaft section, a protecting casing for said flexible shaft section, and means carried by the ends of said protecting casing for reception in said sleeves to secure
65 said protecting casing in position.

5. A power transmission shaft comprising a flexible shaft section, a rigid shaft section

secured to each end of the flexible shaft section in rigid axial alignment therewith, a bushing for mounting each of said rigid shaft sections, a sleeve projecting from each of said bushings, each of said sleeves enclosing a portion of said flexible shaft section, a protecting casing for said flexible shaft section, and means carried by the ends of said protecting casing for reception in said sleeves to secure said protecting casing in position, said last mentioned means comprising rigid elements carried by the protecting casing for reception in their respective sleeves.

6. A flexible power transmission shaft comprising a flexible shaft section, a rigid shaft section carried by each end of said flexible shaft section, a bushing for each of said rigid shaft sections, a sleeve rigidly attached to each of said bushings, a protecting casing for said flexible shaft section, and means carried by each end of the protecting casing for reception in said sleeves to secure the protecting casing about said flexible shaft section, one of the sleeves having a guard flange thereon.

7. A flexible power transmission shaft comprising a flexible shaft section, a rigid shaft section carried by each end of said flexible shaft section, a bushing for each of said rigid shaft sections, a sleeve rigidly carried by each of said bushings, a protecting casing for said flexible shaft section, a collar rigidly carried by one end of said protecting casing for reception in one of said sleeves, a screw plug on the casing behind the collar for securing said collar in said sleeve and thereby securing the flexible casing to the sleeve, and means for securing the other end of the protecting casing to the other sleeve.

8. In a device of the character described, a rotary tool, a rigid shaft, on which said tool is mounted, a bushing for said shaft, a sleeve secured to said bushing and having a guard flange thereon, said bushing and said sleeve forming a handle for said tool, a flexible shaft extending into said sleeve and rigidly secured to the shaft on which the tool is mounted, a protective casing for said flexible shaft, and a screw threaded element carried by said protective casing, and having threaded engagement with the interior of said sleeve for securing the protective casing thereto.

9. Apparatus of the character described, having power transmission including a flexible shaft, an implement secured to the outer end of said transmission, a sleeve adjacent said implement and encircling the end of the power transmission, the sleeve having a flange thereon and having a part serving as a handle for manipulating the implement, a protective casing encircling said flexible shaft and means comprising a screw threaded coupling element attached to said protective casing and having threaded engagement with

said sleeve for connecting said protective casing to said sleeve.

10. A yielding power transmitting element including non-rotating terminal pieces, one of which has a flange thereon, a protective casing, means comprising threaded couplings for securing opposite ends of said protective casing to said pieces and a flexible driving shaft extending longitudinally through said casing, said flexible shaft having bearing ends, and bearing bushings for said ends, rigid with said terminal pieces.

Signed at New York city in the county of New York and State of New York this 18th day of July A. D. 1928.

HERMAN E. SCHULSE.

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