

April 28, 1942.

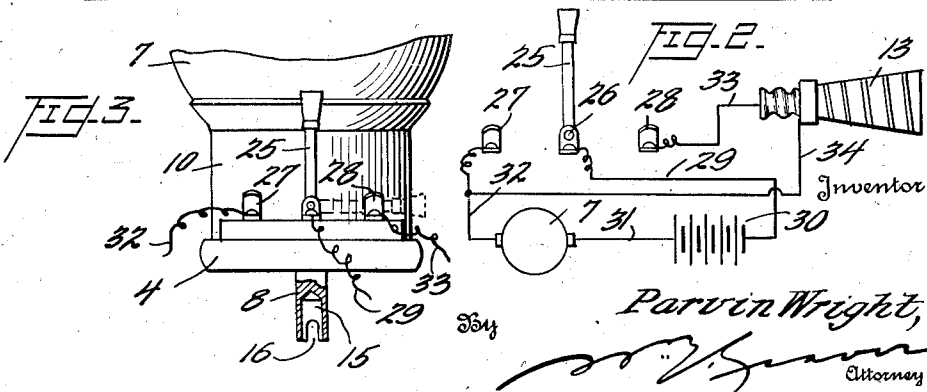
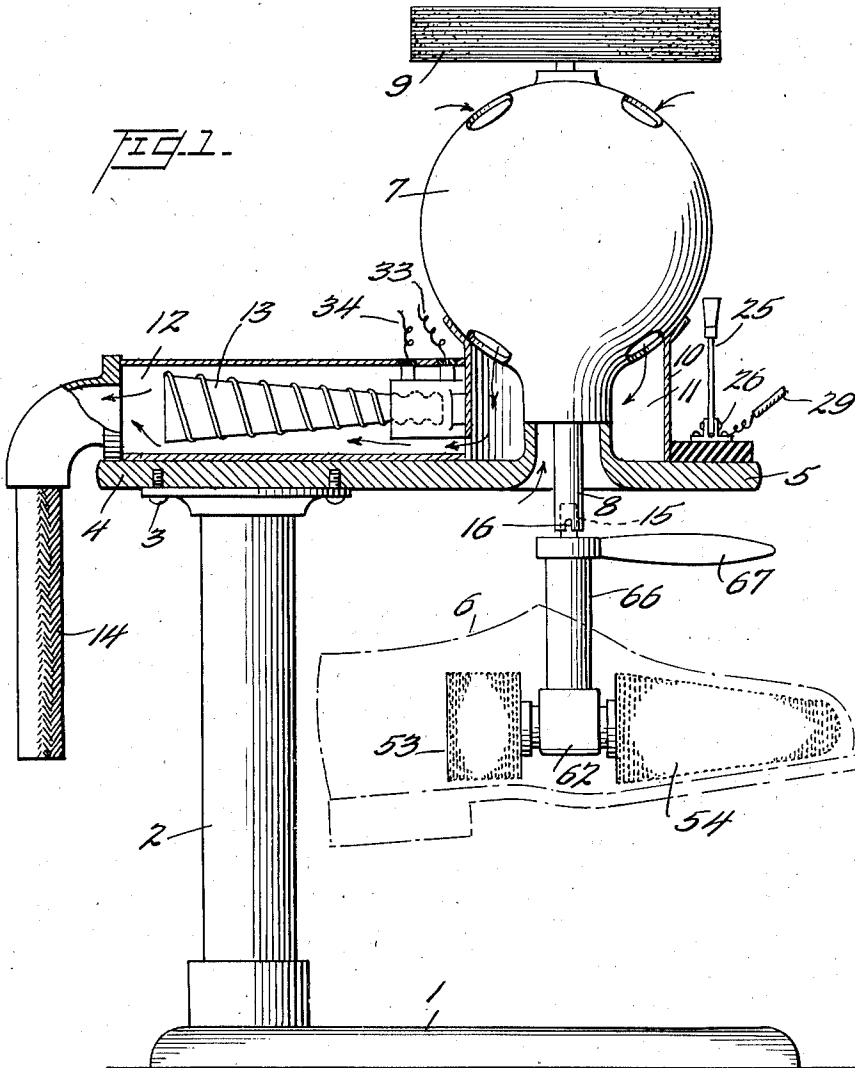
P. WRIGHT

2,281,131

CLEANER APPARATUS

Filed Nov. 24, 1941

2 Sheets-Sheet 1



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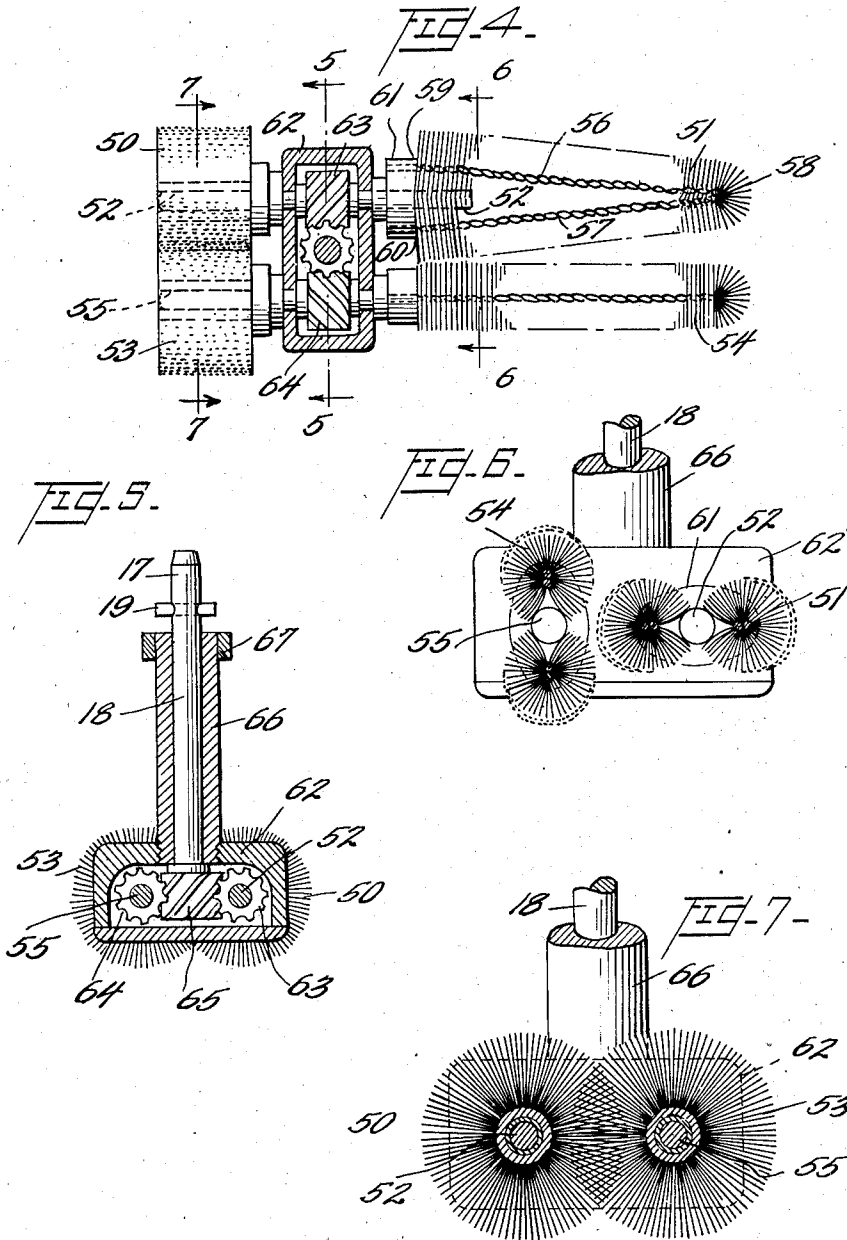
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,281,131

CLEANING APPARATUS

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5 Claims. (Cl. 15—36)

This invention relates to cleaning apparatus, and more particularly to an apparatus for cleaning the inner and/or concave surfaces of an article, the invention having for its object to provide a device which is simple in construction and more efficient in use than those heretofore proposed.

With these and other objects in view the invention resides in the novel details of construction and combinations of parts as will be disclosed more fully hereinafter and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification and in which like numerals designate like parts in all the views—

Fig. 1 is a side elevation partly in section of an apparatus made in accordance with this invention;

Fig. 2 is a wiring diagram illustrating the electric circuits utilized with this device;

Fig. 3 is a partial elevation of the electric switch for controlling said electric circuits;

Fig. 4 is a horizontal plan view partly in section of brush elements that may be employed in this device;

Fig. 5 is a vertical sectional view taken as on the line 5—5 of Fig. 4 and looking in the direction of the arrows;

Fig. 6 is a partial vertical sectional view taken as on the line 6—6 of Fig. 4 and looking in the direction of the arrows; and

Fig. 7 is a vertical sectional view taken as on the line 7—7 of Fig. 4 and looking in the direction of the arrows.

While this invention is applicable to the cleaning of surfaces of various objects, and especially the inner and/or concave surfaces thereof, and also while it is evident that cleaning elements of various kinds (i. e. abrasive, polishing pads, impregnated or wetted pads, bristle brushes, etc.) and shapes may fall within the scope of this invention, yet for a complete understanding of said invention the following description and the drawings are an embodiment thereof as applied to the cleaning of the inside of a shoe with bristle brush cleaning elements.

According to the drawings 1 is a base member rigidly supporting an upright or standard 2 to the upper end of which is secured, as by the screws 3, a plate 4 having a portion 5 which extends beyond the standard 2 a distance sufficient to permit a shoe, indicated in broken lines at 6, to be disposed therebeneath without interfering with said standard. An electric motor indicated

at 7 is secured in any suitable manner to said plate and/or its extension 5, with the axis of the motor shaft 8 disposed substantially vertically and substantially perpendicular to the plane of said plate. The upper end of the motor shaft 8 may have secured thereto a buffer 9 or polishing wheel of any suitable relatively soft material which may be used to freshen up or polish the exterior surface of a shoe.

The motor 7 is of the type having a fan attachment used primarily for ventilating the motor within its housing, and consequently preferably the motor is mounted on a continuous wall such as an annular support 10 carried by the plate 4 to provide a chamber 11 through which air from within the motor housing may pass into a second chamber 12 containing an electric air heating element 13, the air heated within chamber 12 passing into a flexible hose 14, all as indicated by the arrows. The lower end of the motor shaft 8 extends a short distance below the plate 4 and is axially recessed as at 15 and provided with a diametric slot, notch or kerf 16 so as to receive the upper end 17 of the brush element shaft 18 having a lateral extension such as the diametric pin 19 for engagement with said slot and by means of which the shaft 18 is rotated by the motor 7 (see Figs. 1 and 5).

In Figs. 1, 2 and 3 is illustrated the wiring by means of which the motor 7 is activated, and the heating element 13 is energized, said wiring comprising a switch blade 25 pivoted as at 26 and adapted to be swung in one direction into electrical engagement with the stationary contact 27, and to be swung in the opposite direction into electrical engagement with the stationary contact 28. The blade 25 through its pivot mounting 26 is connected as by the wire 29 to one side of a source of electric current (indicated by the battery 30), the other side of said source being connected as by the wire 31 to one side of the motor 7, the other side of said motor being connected as by the wire 32 to the stationary contact 27, whereby the said motor will be activated when the blade 25 is swung to close the circuit through stationary contact 27. The other stationary contact 28 is connected as by the wire 33 to one terminal of the electric air heating element 13, the other terminal of which is connected as by the wire 34 to the wire 32, whereby both the heating element 13 and the motor 7 will be energized and activated respectively and simultaneously when the blade 25 is swung to close the circuit through stationary contact 28. In other words the electric motor is activated

in either closed position of the blade of this electric switch, but the heating element 13 is energized only when needed, thereby minimizing the amperage drawn from the source of the electric current.

The cleaning element of this device as illustrated comprises four brushes arranged in pairs, one pair comprising the brushes 50 and 51 mounted upon opposite ends of shaft 52, and the other pair comprising the brushes 53 and 54 mounted upon opposite ends of the shaft 55, the shafts 52 and 55 being spaced from each other and substantial duplicates as to length and positions, i. e. they are parallelly disposed normally in a common horizontal plane with their ends in radial alignment, but obviously they need not be parallel with each other as in the case where this device is to be used for cleaning the inside surfaces of an object other than a shoe. Brushes 50 and 53 are substantial duplicates, and brushes 51 and 54 are substantial duplicates, the two brushes 50 and 53 adapted to operate in the rear or heel portions of the shoe and having their bristles of such radial extent that they will overlap, interfit, or be meshed or geared together upon rotation of their respective shafts 52 and 55 as will be clear from Fig. 7, but the pair of brushes 51 and 54, adapted to operate in the forward or toe portions of the shoe, may or may not have their bristles in contact with each other.

In other words, each of the brushes 51 and 54 is generally of flattened conical or wedge shape in that it is of tapered appearance when observed from one direction, but is substantially of rectangular appearance when viewed from a direction at right angles to the first mentioned direction of observation. That is to say, each of these two brushes in one position has the tapered appearance or shape given to brush 51 in Fig. 4, whereas when rotated through 90° it has the rectangular appearance or shape given to brush 54 in said figure of drawings.

The reason for this is that the brush 51 may be formed of bristles having equal lengths and mounted between two wires twisted together, this being a well known brush form, and then the wire foundation bent as illustrated so that the two portions 56 and 57 of the wire loop thus formed will not be parallel to each other, but will be divergent from the closed end 58 of the loop, with the divergent ends 59 and 60 of the wire foundation adequately secured in diametric positions to a member 61 secured to the shaft 52.

The shafts 52 and 55 are mounted or journaled in opposite walls of a gear casing 62 disposed between the heel brush 50 (or 53) and the toe brush 51 (or 54), and within said casing and upon the shaft 52 is mounted the spiral gear 63 of a certain pitch, and within said casing and upon the shaft 55 is mounted the spiral gear 64 of an opposite pitch, the gears 63 and 64 being spaced from each other and within this space there is disposed the spiral gear 65 mounted upon the lower end of shaft 18, the gear 65 being enmeshed with the gears 63 and 64 whereby rotation of shaft 18 will cause opposite directional rotation of shafts 52 and 55 and the brushes carried thereby. A sleeve 66 serves as a bearing for the shaft 18, the lower end of said sleeve having rigid connection (threaded if desired) with a wall of the gear casing 62, and the upper end of said sleeve terminating just below the diametric pin 19 and having a handle 67 rigidly secured thereto by means of which the cleaning device as a whole is brought into and held in

interfitted or locked relation with the shaft 8 of the electric motor 7.

The separation of the shafts 52 and 55, as well as the divergency of the portions 56 and 57 of the wire foundation of brush 51 are made such that the brush 51 may not interfere with the similarly formed and mounted brush 54, and this is well illustrated in Fig. 6. It will be understood that the gears 63 and 64 are of equal but opposite pitch and of the same size, wherefore during the rotation of brushes 51 and 54, each brush will always be disposed so that its transverse section will be disposed at 90° to the transverse section of the other brush; in other words the brushes 51 and 54 may be said to be geared together with or without actual contact of the bristles thereof. The purpose of providing two shafts 52 and 55, and imparting opposite directional rotation thereto, is to avoid "walking" of the brush elements on the surfaces of the article being cleaned, and therefore to insure control of the brush elements on said surfaces. In the case of cleaning the inside of a shoe, the separation distance between a toe brush and a heel brush (the space in which is located the gear casing 62) is made less than the difference between the overall length of the brush element and the inside dimension of the shoe, in order that relative movement between the brush element and the shoe will cause all portions of the shoe surface to be cleaned.

In the operation of this device, a shoe, which has been worn for some length of time or which is believed to be soiled from one cause or another, has the brush element placed inside thereof as indicated in Fig. 1, the brush element first having been dipped in a cleansing solution, and then the combined shoe and brush element is applied to the mechanism for actuating the brush element. In other words, the motor 7 is started by throwing the switch blade 25 into contact with the stationary contact 27 to activate the motor 7, then the shoe 6 is held in one hand of the operator while with the other hand the operator through the handle 67 causes engagement between the end of the motor shaft 8 and the end 17 of the brush element shaft 18, whereupon the four brushes are revolved within the shoe, and the shoe can be manipulated in all directions to cause the four brushes to thoroughly scrub, cleanse and disinfect (by virtue of the cleansing solution) the inner surfaces of the shoe. This scrubbing action need be for only a short period of time, after which the operator disengages the shafts 8 and 18, removes the brush element from the shoe, throws the switch blade 25 to the other stationary contact 28 to energize the heating element 13 and when the latter becomes sufficiently hot, the operator places the free end of the flexible hose 14 within the shoe and permits the current of heated air, flowing from chamber 12 through said hose, to dry the inside surfaces of said shoe.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of this invention and therefore it is desired not to be limited to the exact foregoing disclosure except as may be required by the claims.

What is claimed is:

1. A cleaning device for the inside of a shoe, comprising a pair of shafts disposed substantially in a common plane, heel-cleaning elements mounted on two adjacent shaft ends, toe-cleaning elements mounted on the other adjacent shaft ends, and a third shaft disposed between said

pair of shafts and having its axis substantially perpendicular to the plane thereof, said third shaft disposed between the heel-cleaning and toe-cleaning elements and having connections for imparting opposite directional rotation to said pair of shafts, the heel-cleaning elements separated from the toe-cleaning elements by a distance which is less than the difference between the overall length of the cleaning elements and the inside length of the shoe.

2. A cleaning device for the inside of a shoe, comprising a shaft disposed substantially in a horizontal plane and having a heel-cleaning element mounted on one end thereof and a toe-cleaning element mounted on the other end thereof, and a second shaft having its axis substantially perpendicular to the plane of said first mentioned shaft and disposed substantially between the heel-cleaning and toe-cleaning elements and having driving connections with said first-mentioned shaft, the heel-cleaning element separated from the toe-cleaning element by a distance which is less than the difference between the overall length of the cleaning elements and the inside length of the shoe.

3. A cleaning device comprising a pair of parallel shafts disposed with their ends substantially abreast of each other, similarly shaped cleaning elements mounted on adjacent ends of said shafts, two axial sections of each cleaning element taken at right angles to each other being generally triangular and rectangular respectively, said cleaning elements being so mounted on their respective shafts that their transverse sec-

tions are disposed at 90° to each other, and a third shaft having driving connections for imparting simultaneous opposite directional rotation to said pair of shafts.

5 4. A cleaning device comprising a pair of substantially parallel shafts disposed substantially in a common plane with their ends substantially abreast of each other, similarly shaped cleaning elements mounted on adjacent ends of said
10 shafts, each cleaning element having one axial section which is generally triangular in shape, and another axial section which is substantially rectangular in shape, said two axial sections being substantially at right angles to each other,
15 said cleaning elements being so mounted on their respective shafts that their transverse sections are disposed at 90° to each other, and driving means for imparting simultaneous opposite di-
20 rectional rotation to said pair of shafts.

5. A cleaning device comprising a pair of parallel shafts of equal length disposed substantially in a common plane with their ends abreast of each other, similarly shaped cleaning elements mounted on adjacent ends of said shafts,
25 two axial sections of each cleaning element taken at right angles to each other being generally triangular and rectangular respectively, said cleaning elements being so mounted on their respective shafts that their transverse sections are
30 disposed at 90° to each other, and a third shaft having driving connections for imparting simultaneous opposite directional rotation to said pair of shafts.

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