May 8, 1956 W. T. THEIS ET AL 2,744,272

AIR-DRIVEN FLOOR POLISHER

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FIG. 1.

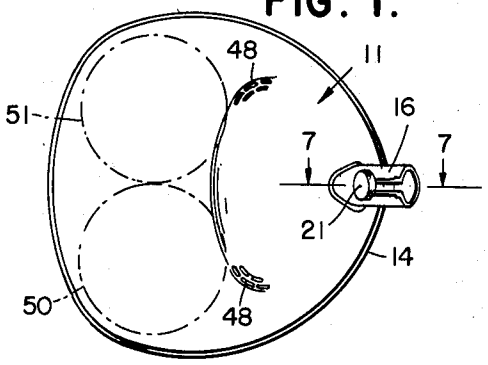


FIG. 2.

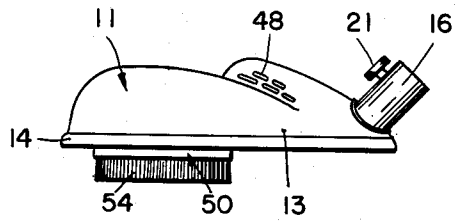
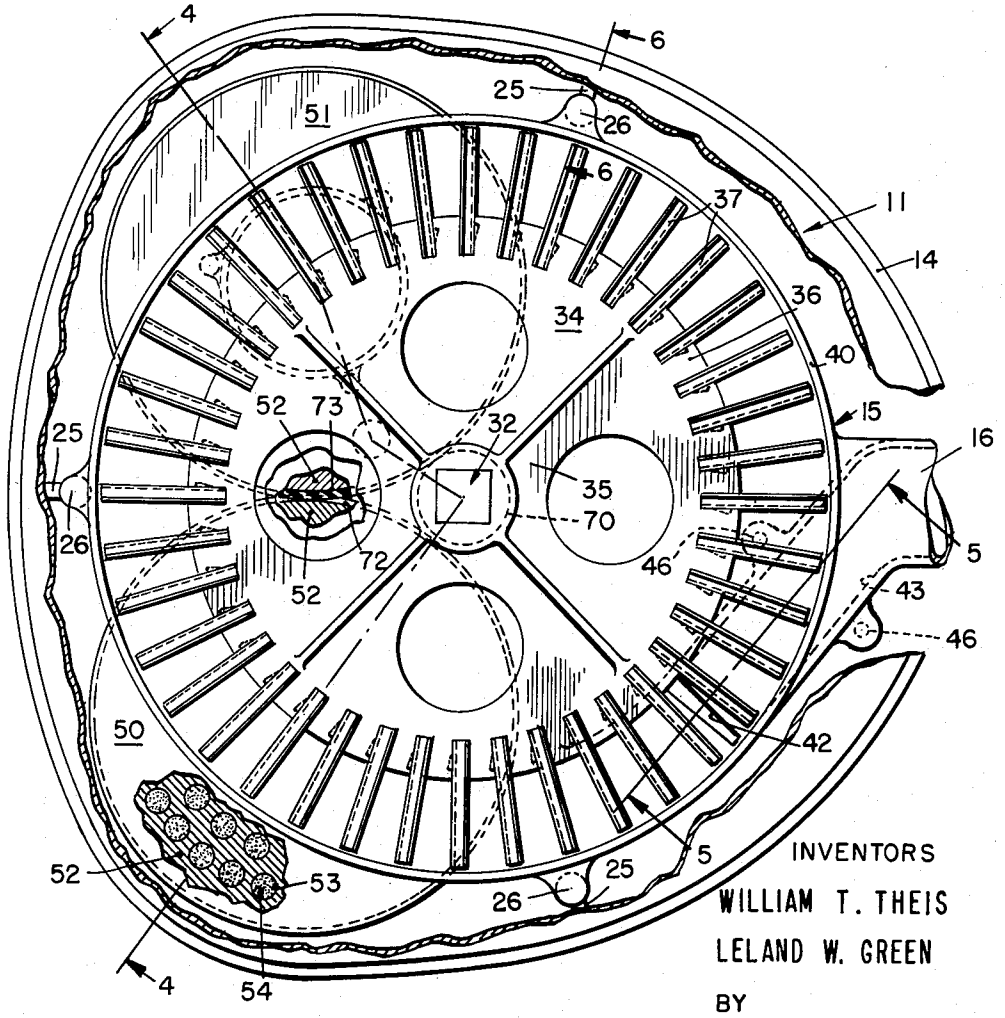


FIG. 3.



INVENTORS

WILLIAM T. THEIS

LELAND W. GREEN

BY

Mason & Graham

ATTORNEYS

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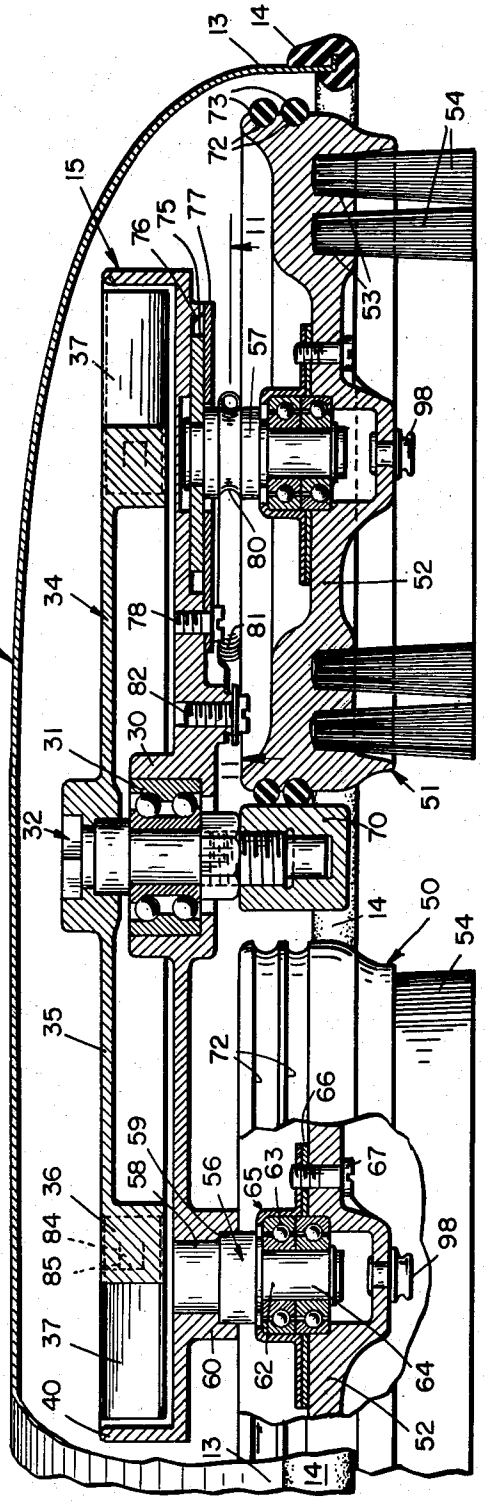


FIG. 4.

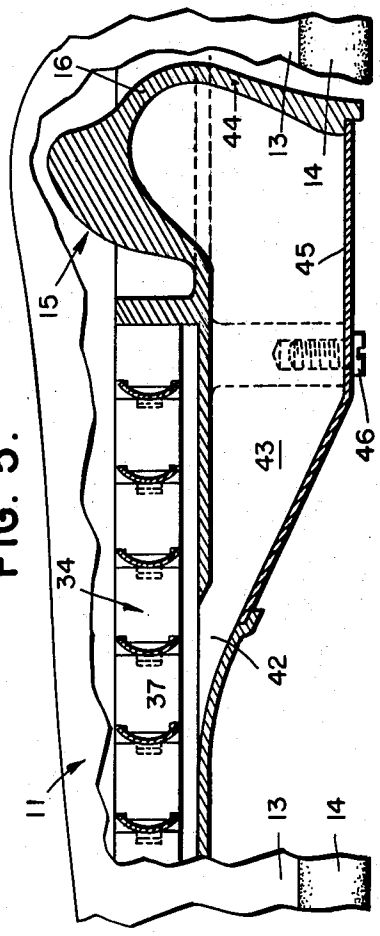


FIG. 5.

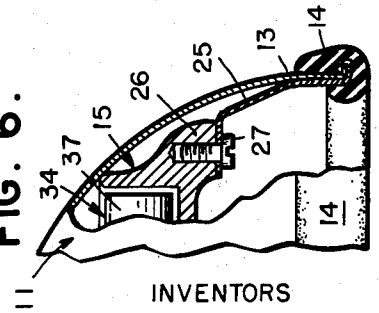


FIG. 6.

INVENTORS

WILLIAM T. THEIS

LELAND W. GREEN

BY

Mason & Graham

ATTORNEYS

May 8, 1956 W. T. THEIS ET AL 2,744,272

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FIG. 7.

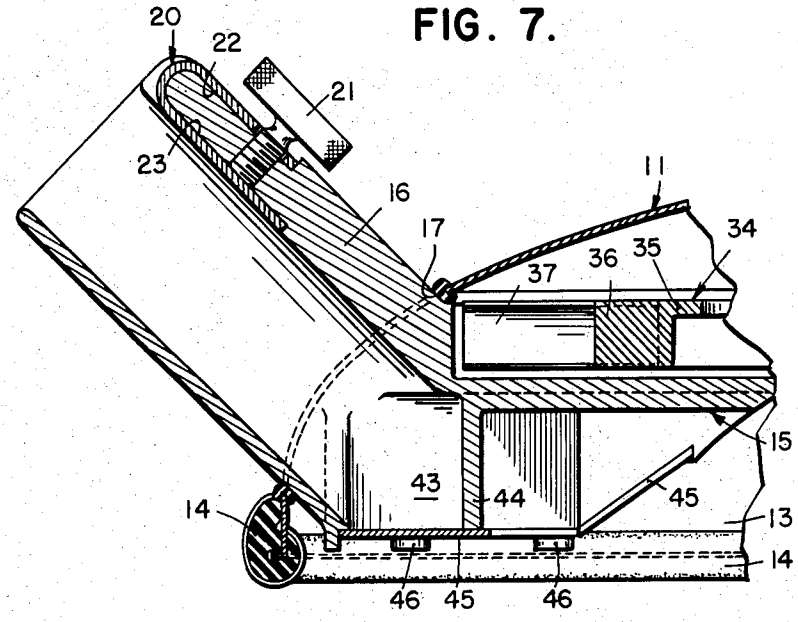


FIG. 8.

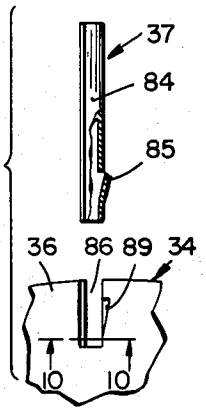


FIG. 9.

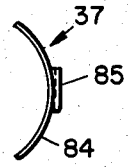


FIG. 11.

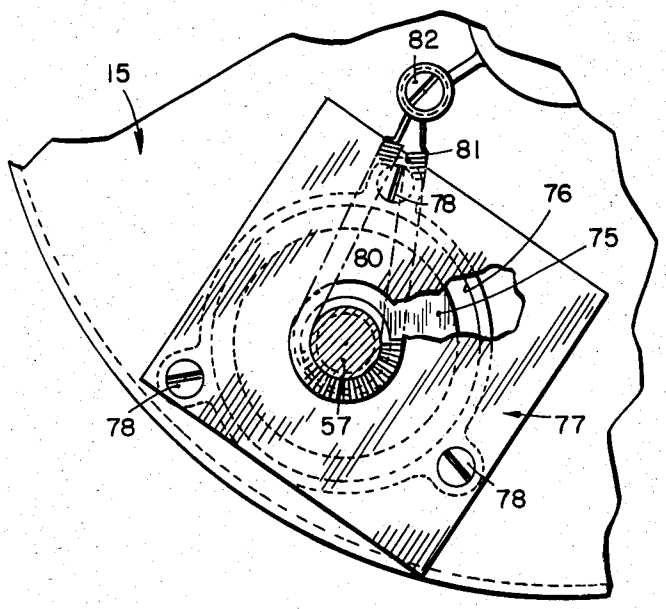
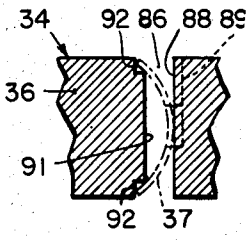


FIG. 10.



INVENTORS

WILLIAM T. THEIS

LELAND W. GREEN

BY

Mason & Graham

ATTORNEYS

United States Patent Office

2,744,272

Patented May 8, 1956

2,744,272

AIR-DRIVEN FLOOR POLISHER

William T. Theis, North Hollywood, and Leland W. Green, Malibu, Calif., assignors to Interstate Engineering Corporation, El Segundo, Calif., a corporation of California

Application November 2, 1950, Serial No. 193,704

3 Claims. (Cl. 15—49)

This invention has to do with floor polishers for use in conjunction with vacuum cleaners and particularly floor polishers involving one or more rotary brushes which are driven by a turbine wheel supplied with air by the vacuum cleaner to which the device is attached.

An object of the invention is to provide a novel improved air-driven rotary floor polishing device for use as an attachment to a household vacuum cleaner.

A further object is to provide a floor polishing device with rotary brushes having novel means for mounting and driving the brushes.

Another object is to provide an improved turbine assembly and an improved brush assembly which accommodate various attachments.

A further object is to provide novel and improved means in a device of the type indicated for conducting air to the turbine wheel and exhausting spent air therefrom.

These and other objects will be apparent from the drawings and the following description. Referring to the drawings:

Fig. 1 is a plan view of a device embodying the invention;

Fig. 2 is a side elevational view of the device of Fig. 1;

Fig. 3 is an enlarged sectional plan view of the device of Fig. 1;

Fig. 4 is a sectional view in the planes of line 4—4 of Fig. 3;

Fig. 5 is a fragmentary sectional view on line 5—5 of Fig. 3;

Fig. 6 is a fragmentary section on line 6—6 of Fig 3;

Fig. 7 is an enlarged section on line 7—7 of Fig. 1;

Fig. 8 is an exploded view of a portion of the turbine wheel and a blade;

Fig. 9 is an end elevational view of a blade;

Fig. 10 is an enlarged section on line 10—10 of Fig. 8; and

Fig. 11 is a section on line 11—11 of Fig. 4.

More particularly describing the invention, the floor polishing device includes a housing or cover generally indicated by 11. The housing is of the general shape shown in Figs. 1 and 2 terminating in a relatively vertical wall 13, the margin of which is provided with a bumper 14 of rubber or a rubber-like material.

Mounted within the housing is a chassis plate 15 which is formed to provide a neck 16 adapted to project through an opening 17 in the housing. The neck 16 is generally tubular, being adapted to receive a conduit such as a wand at the end of the hose leading from the exhaust or blower side of a vacuum cleaner. The neck is provided with a clamp (Fig. 7) which includes a U-shaped metal strap 20 and a thumb screw 21 threaded in the neck for tightening the inner leg of the metal strap into holding engagement with the wand inserted in the neck. The neck is recessed at 22 and 23 to receive the strap 20.

The chassis plate is mounted in the housing by means of three clips 25 which fit within the bumper 14 at their lower ends and extend around the lower edge of the wall 13 of the housing. The upper ends of these clips are

secured to mounting bosses 26 on the chassis by means of bolts 27 (Fig. 6).

The chassis plate 15 is formed with a central hub portion 30 (Fig. 4), for the reception of a bearing 31 which rotatably supports a shaft 32 which carries a turbine wheel generally indicated by 34. The wheel 34 and shaft 32 are fixed together. The turbine wheel includes a central casting section 35 which terminates in a peripheral section or rim 36 which is slotted in a manner to be described later for the reception of blades or vanes generally indicated by 37.

The chassis plate has a marginal flange 40 which surrounds the periphery of the turbine wheel. For the purpose of supplying air to the wheel, the chassis plate is provided with an air port or opening 42 which leads to an air inlet passage 43 formed in part by a wall extension 44 on the chassis plate and in part by a plate 45 which is secured to the chassis plate by bolts 46 as shown in Figs. 3, 5 and 7. The passageway 43 communicates with the interior of the neck 16 so that air supplied by a vacuum cleaner or other source enters neck 16 and traverses the passageway 43 reaching the opening 42 where it is directed angularly toward the vanes of the turbine wheel. Spent air leaves the housing through ports 48 therein.

The chassis plate supports a pair of brush wheels generally indicated by numerals 50 and 51. Both wheels are mounted for rotation and, as will hereinafter be explained, the wheel 51 is driven by the turbine shaft and in turn drives the other wheel.

Each of the brush wheels includes a wheel disk 52 which may be made of plastic or any desirable material. These wheels are each provided with a plurality of circumferentially spaced bores 53 positioned in two concentric rows in which are mounted bristles 54.

The wheels are rotatably mounted on spindles indicated by numerals 56 and 57. The spindle 56 is stationarily mounted within a bore 58 and counterbore 59 formed in a hub 60 on the underside of the chassis plate. The spindle 56 is provided with a portion 62 of reduced diameter about which is mounted a suitable ball bearing means 63. The spindle 56 is provided with a snap ring 64 for retaining the bearing means. The wheel disk 52 is detachably mounted on the bearing by means of a retainer plate 65 and a bushing bearing gasket 66 which are secured by means of bolts 67.

It will be apparent that, with the above construction, the brush wheel 50 is mounted for rotation on the chassis plate and in this connection it is to be noted that the wheel is spaced from a drive nut 70 mounted on the lower end of the turbine shaft 32. Each of the wheel disks 52 is provided with a pair of peripheral grooves 72. Resilient drive bands 73 of rubber or rubber-like material are mounted in grooves 73 of the disk 52 of wheel 51.

The brush wheel 51 is mounted on the chassis plate for rotation and also for limited lateral movement toward and away from the turbine wheel shaft. In order to accomplish this, the spindle 57 is provided with a flange 75 which fits within a recess 76 in the under surface of the chassis plate. The spindle flange 75 is retained in position in the recess by means of a plate 77 which is secured by screws 78. The recess 76 is slightly deeper than the thickness of the flange 75 and of greater lateral extent so as to permit movement of the flange relative to the chassis plate. The spindle 57 is provided with a peripheral groove 80 to receive a tension coil spring 81 which is looped around the spindle and secured at its ends to a screw 82 mounted in the chassis plate. It will be apparent that with this construction the spindle 57 and its carried brush wheel 51 will be yieldably urged in a direction toward the turbine wheel shaft. The wheel disk 52 of the brush wheel 51 is mounted for rotation on the spindle 57 in the same manner and by the same type

of means as have been described in connection with the mounting of the other wheel on the spindle **56** and the corresponding parts have been designated by the same numerals.

In view of the fact that the spring **81** urges the brush-wheel **51** toward the turbine shaft, the wheel will consequently be driven by the shaft through the driving bands **73** which bear against the periphery of the drive nut **70**. The spring **81** also serves to urge the brush wheel **51** into driving engagement with the brush wheel **50** to rotate the same through the medium of the drive bands **73** which engage the surfaces of the grooves in the periphery of wheel **50**.

One of the features of the invention is that the turbine wheel is constructed of a central member **35** which may be a casting into which are inserted a plurality of blades which merely snap into place. Referring particularly to Figs. 8–10, the blades **37** each consist of an arcuate strip of metal or other material **84** having a tab **85** on the convex side thereof adjacent the inner end. The blades are received in slots **86** in the rim **36** of the member **35**.

The slots are characterized by a straight, substantially radially disposed wall **88** which is interrupted by a notch or recess **89** extending from the upper surface part way through the rim.

The opposite side wall of the slot includes a straight, substantially radially disposed portion **91** and a pair of recesed end sections **92**. With this construction, it will be apparent that the blades may be snapped into place in the slots of the casting and will be retained in place by the tabs **85** engaging the walls of the recess **89** and by the lateral margins of the blades being seated in the recessed ends **92** of the opposite wall. The blades are sprung so that they are slightly flattened in cross-section in the region of the blade-receiving slots.

In the operation of the device it will be apparent that a wand or other conduit from a vacuum cleaner may be detachably secured in the neck **16** and that air supplied by the cleaner will enter the neck and passageway **43** emerging from port **42** to drive the turbine wheel. Rotation of the turbine wheel drives the brush wheel **51** which is yieldably urged into peripheral engagement with the drive nut **70** on the turbine wheel shaft by spring **81**. The brush wheel **51** in turn makes peripheral contact with the brush wheel **50** to rotate the same.

While the device is primarily designed for use as a floor polisher, the wheel disks **52** are each provided with a button **98** which serves as a means for detachably securing other devices to the wheels such as sanding disks for example. It will also be noted that the drive nut **70**, being threadedly mounted on the turbine shaft, may be removed for the purpose of installing a chuck or the like for holding a drill or other tool.

Although the invention has been particularly shown and described, it is contemplated that various changes and modifications can be made without departing from the scope of the invention as set forth in the following claims.

We claim:

1. In a floor polisher, a housing having an open lower end and having an air exhaust port thereabove, a chassis plate member mounted in said housing and including a tubular neck projecting through the housing, said chassis plate being formed to provide a circular recess on its upper side for the reception of a turbine wheel, said chassis plate having a port therethrough from the lower side to said recess, means providing a passage between said last-mentioned port and said neck, a turbine wheel rotatably mounted on said chassis plate and positioned in said recess, a rotary brush wheel rotatably mounted on the underside of and carried by said chassis plate, and drive means operatively connecting said turbine wheel and said brush wheel.

2. In a floor polisher, a dome-like housing having an open lower end substantially commensurate in size with the over-all size of the housing and having an air exhaust port thereabove, a chassis plate member mounted within and supported by said housing below said port and including a tubular neck projecting through the housing, said chassis plate being formed to provide a circular recess on its upper side for the reception of a turbine wheel, said chassis plate having a port therethrough from the lower side to said recess, means carried by said chassis plate member providing a passage between said last-mentioned port and said neck, said chassis plate member having a hub mounted centrally of said recess, a bearing in said hub, a shaft in said bearing and projecting to opposite sides of said chassis plate, and a turbine wheel on said shaft within said recess.

3. In a floor polisher, a dome-like housing having top and side walls and terminating in an open lower end substantially commensurate in size with the over-all size of the housing, said housing having an air exhaust opening in the upper portion thereof, a chassis plate mounted within and supported by said housing intermediate said exhaust opening and the lower edge of the housing, said chassis plate having a circular recess on its upper surface for the reception of a turbine wheel and having a port therethrough communicating with said recess, said plate having a tubular neck projecting through said housing, means carried by said chassis plate providing a passage between said port and said neck, a driveshaft journaled in said plate and projecting to opposite sides thereof, a turbine wheel fixed to said shaft and received in the recess of said plate, a second shaft mounted on and projecting below said plate, and a wheel on said second shaft in peripheral engagement with said driveshaft, said wheel being adapted to mount a member for engaging a surface to be worked.

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