July 10, 1934. T. O. ADAMS 1,965,787

VACUUM CLEANER

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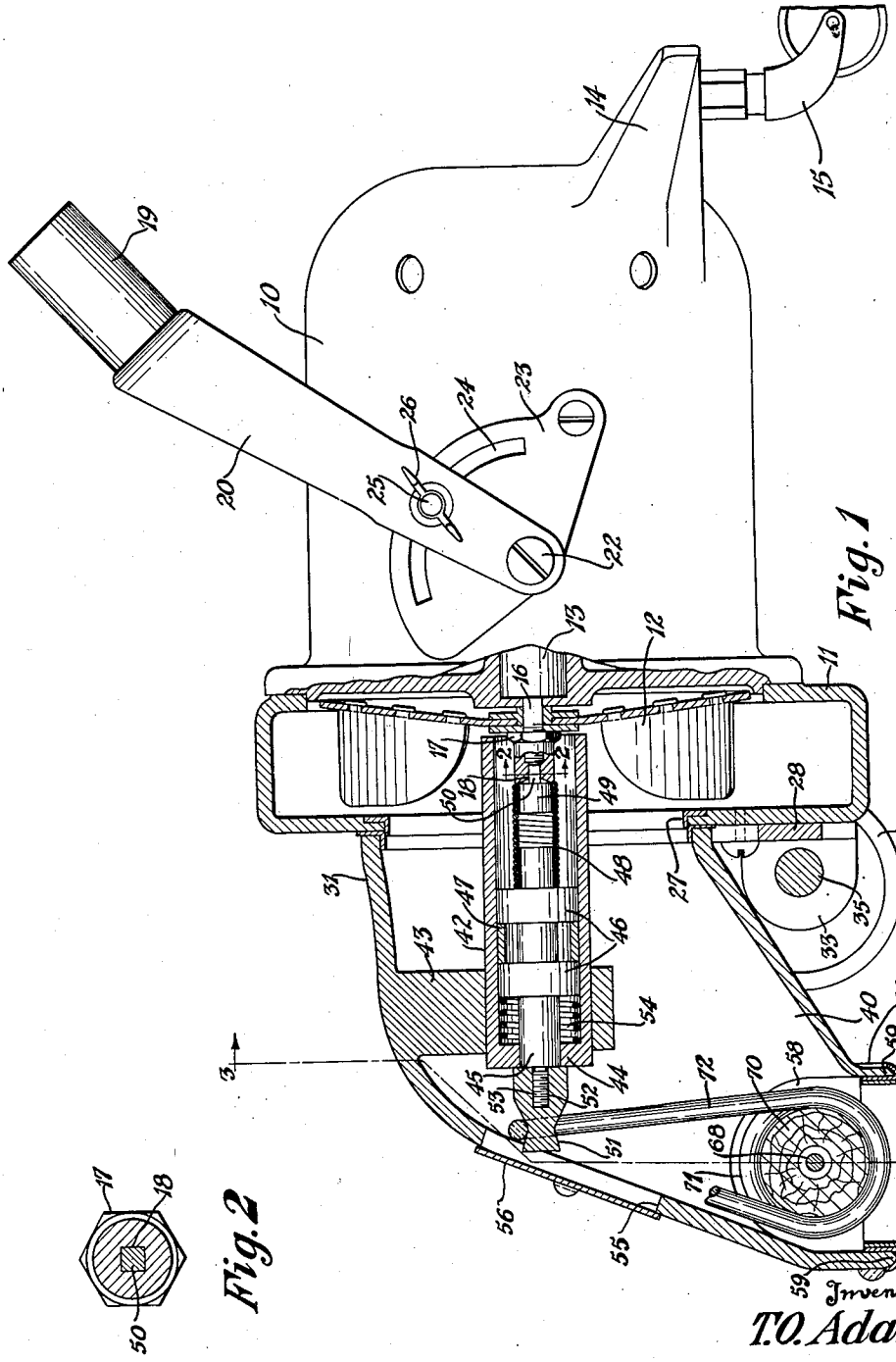


Fig. 1

Fig. 2

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Fig. 3

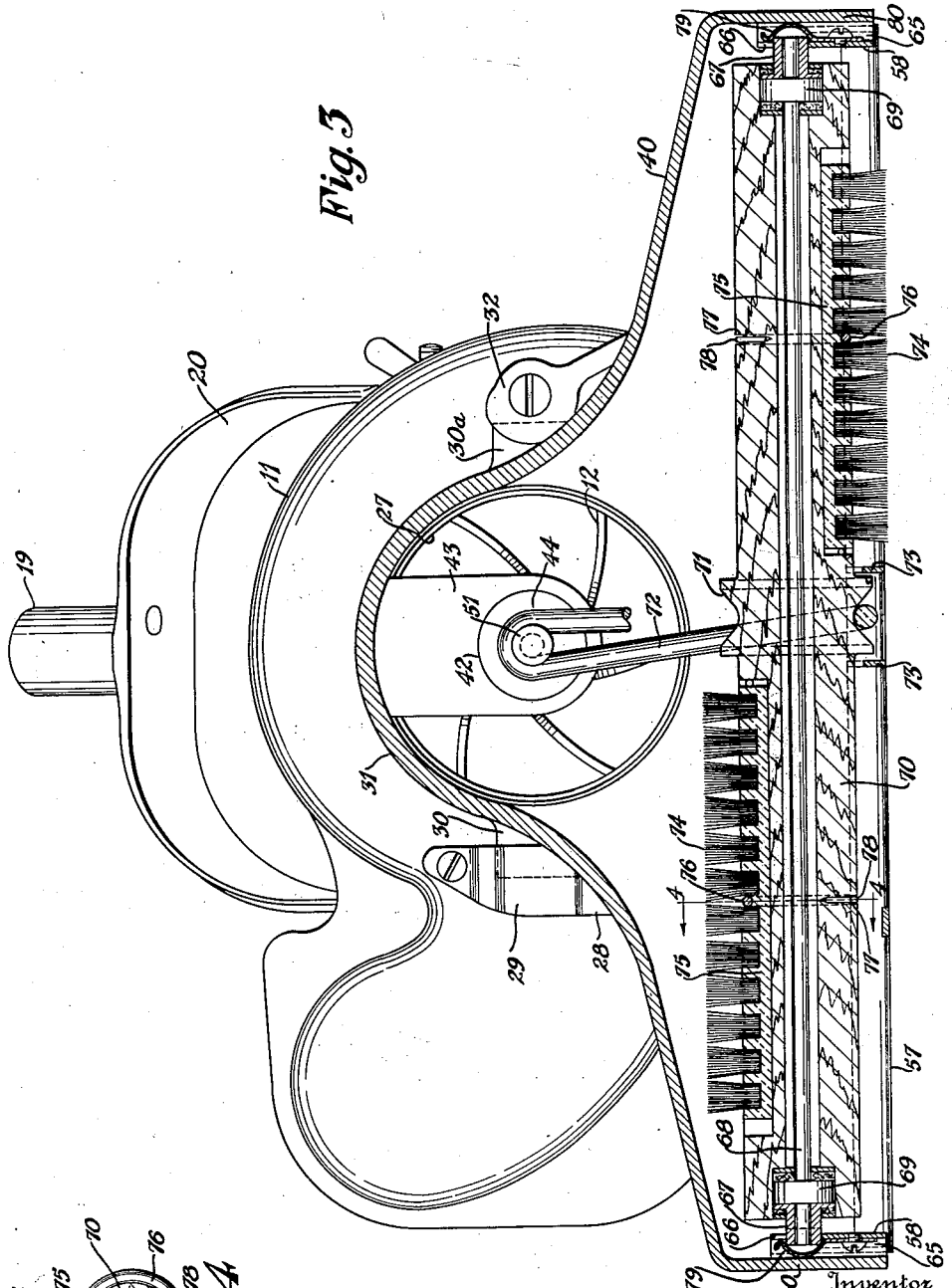
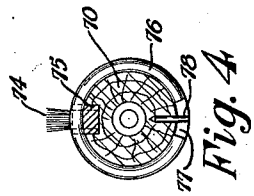


Fig. 4



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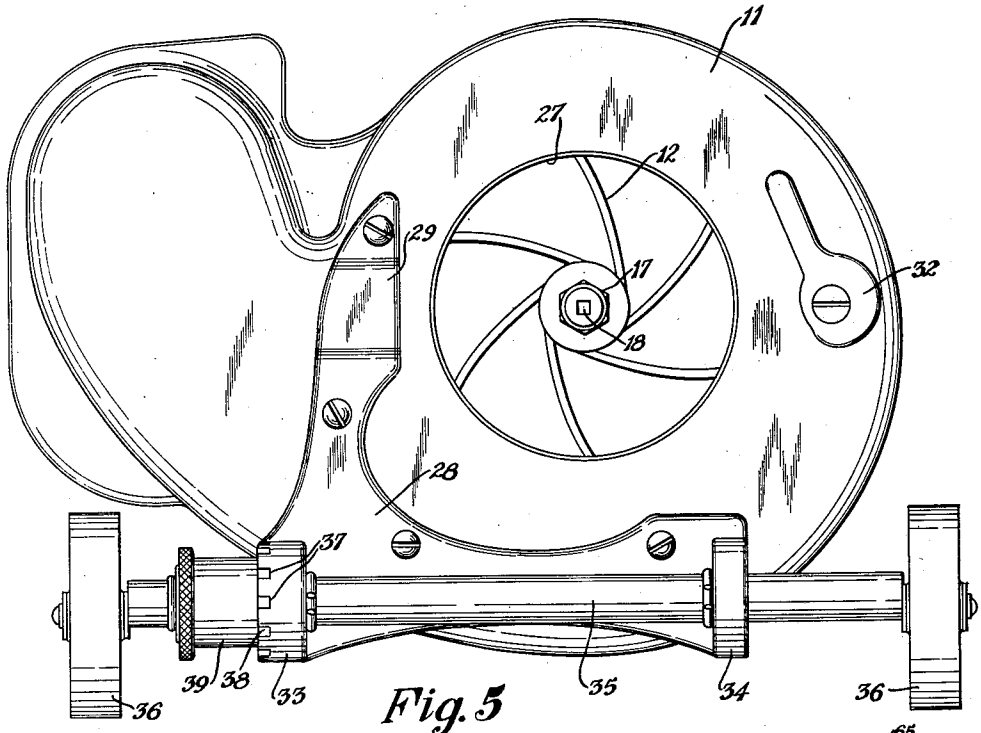


Fig. 5

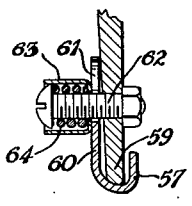


Fig. 7

Fig. 6

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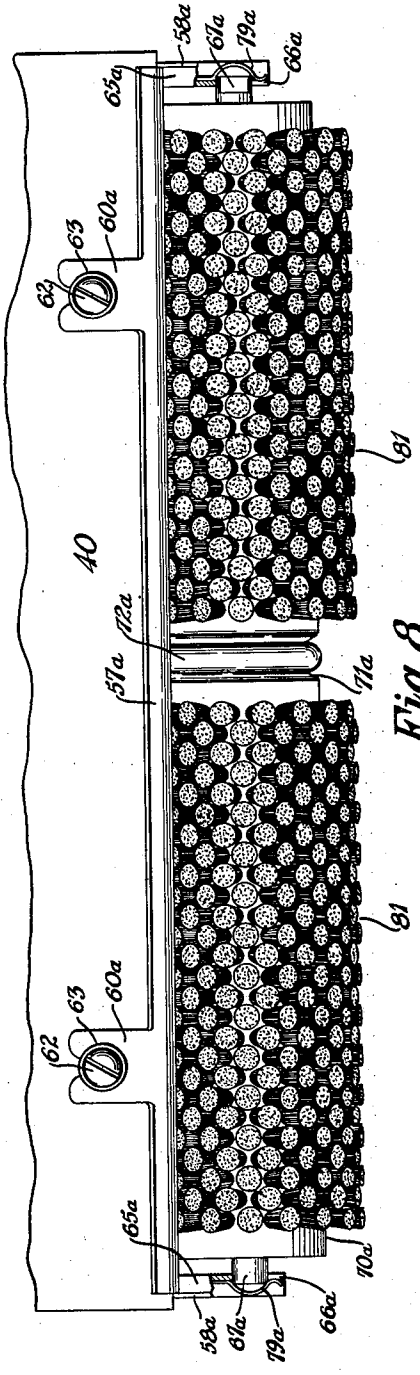


Fig. 8

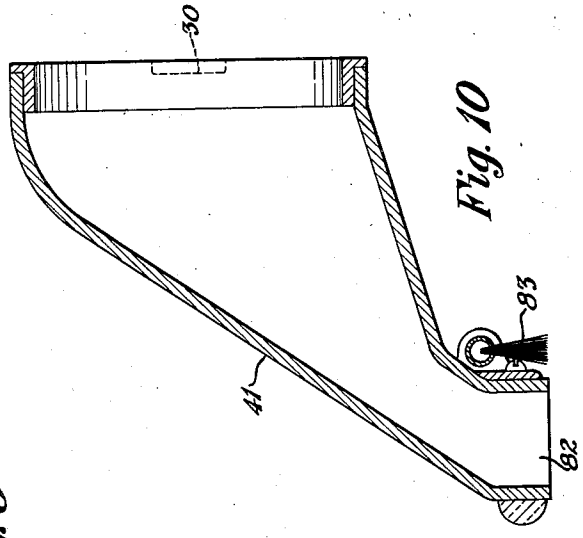


Fig. 10

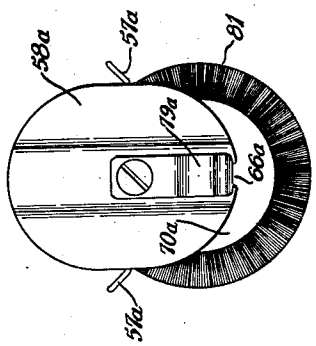


Fig. 9

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UNITED STATES PATENT OFFICE

1,965,787

VACUUM CLEANER

Thomas O. Adams, New Philadelphia, Ohio, assignor, by direct and mesne assignments, of one-half to Wise-McClung Corporation, New Philadelphia, Ohio, a corporation of Ohio, and one-half to The P. A. Geier Company, Cleveland, Ohio, a corporation of Ohio

Application May 13, 1932, Serial No. 611,107

3 Claims. (Cl. 15—8)

The invention relates to portable vacuum cleaners adapted to be moved to and fro over the objective surface, and more particularly to that type of cleaner in which the motor and fan casing are located upon a horizontal axis, the nozzle being detachably connected to the fan casing.

An object of the improvement is to provide a vacuum cleaner which may be quickly and easily converted from a motor driven brush type to a straight suction type of cleaner.

Another object is to provide a removable nozzle having a rotatable brush therein and means within the nozzle for operatively connecting the brush to the motor.

A further object is to provide a motor driven floor polisher arranged to be substituted in the nozzle for the motor driven brush.

A still further object is to provide a unitary structure carried by the casing of the sweeper and including bearings for the front wheels, the adjusting means for raising and lowering the nozzle, and the locator for attaching the nozzle to the casing.

Still another object is to provide a novel construction of bracket for supporting the motor driven brush within the nozzle, and provided with curved lips arranged to surround the mouth of the nozzle to permit easy operation of the cleaner over the floor.

Another object is to provide springs within the brush bracket flush with the ends of the bracket and adapted to contact with the ends of the nozzle to lock the brush shaft in the bracket when located within the nozzle.

A further object is to provide a detachable brush insert in the motor driven brush, and to provide a new and simple device for retaining said insert in the brush.

The above, together with other objects which will be later described, or which will appear in the drawings and following description, may be attained by constructing the improved vacuum cleaner in the manner illustrated in the accompanying drawings, in which

Figure 1 is a longitudinal sectional view of the improved vacuum cleaner showing the motor driven brush operatively associated therewith;

Fig. 2, an enlarged transverse section through the detachable coupling between the brush and the motor, taken on the line 2—2, Fig. 1;

Fig. 3, a section taken substantially on the line 3—3, Fig. 1, showing a longitudinal section of the nozzle and motor driven brush;

Fig. 4, a transverse section through the brush, showing the means for holding the removable insert therein, taken on the line 4—4, Fig. 3;

Fig. 5, a front elevation of the sweeper casing, with the nozzle removed, showing the unitary structure comprising the front wheel bearings, adjustment and locator;

Fig. 6, a detached perspective view of the removable bracket for supporting the motor driven brush within the nozzle;

Fig. 7, a fragmentary sectional view through the rear wall of the nozzle and the adjacent portion of the bracket showing one of the spring plungers for holding the bracket in position upon the nozzle;

Fig. 8, an elevation of the lower portion of the nozzle viewed from the rear, showing the floor polishing brush mounted therein;

Fig. 9, an end elevation of the floor polishing brush detached from the nozzle; and

Fig. 10, a transverse sectional view through the straight suction nozzle which may be substituted for the motor driven brush nozzle.

Similar numerals refer to similar parts throughout the drawings.

The improved vacuum cleaner may comprise the motor 10 located in horizontal position, as best shown in Fig. 1, and having the fan casing 11 attached to its forward end and containing the suction fan 12 mounted upon the shaft 13 of the motor, all in usual and well known manner.

The rear portion of the motor may be provided with the usual lugs 14 such as are ordinarily provided for attachment of the rear casters. To these lugs may be connected the casters 15.

As shown in Fig. 1, the fan 12 may be fixed upon the reduced screw threaded end 16 of the motor shaft as by the nut 17, the outer end of which may be provided with the squared opening 18.

For the purpose of moving the cleaner to and fro upon the surface to be cleaned, the usual handle 19 may be provided, being preferably provided with the bail portion 20 which straddles the motor casing and is pivotally connected thereto in usual manner as indicated at 22.

The usual form of arcuately slotted sector 23 may be provided adjacent to the pivotal point of one leg of the bail 20, the arcuate groove 24 thereof receiving the screw 25 upon which may be mounted the clamping nut 26 for fixing the handle at any desired angle with reference to the cleaner.

The front side of the fan casing 11 is provided with the usual inlet opening 27 for communication with the nozzle in usual and well known manner.

A unitary structure or bracket 28 is attached to the front side of the fan casing in fixed relation to said inlet opening and is provided with means for properly locating the nozzle with reference to the inlet opening 27, said means including a pocket 29 formed in the bracket 28 to receive a lug 30 formed upon one side of the neck portion 31 of the nozzle, a similar lug 30*a* being formed upon the other side thereof and adapted to be engaged by the pivoted locking member 32 to retain the nozzle in position.

An integral pair of bearing members 33 and 34 may be provided upon the lower portion of the bracket member 28 within which is journaled the axle 35 upon the ends of which the front wheels 36 are eccentrically mounted. The bearing member 33 is provided on its outer side with a plurality of notches 37 for selective engagement by a tooth 38 upon the adjusting member 39 which is fixed upon the shaft 35.

Suitable spring means (not shown) may be provided for normally urging the member 39 toward the toothed side of the bearing 33. By rotating this bearing member 39 the axle 35 is rotated therewith within the bearings 33 and 34 and by means of the eccentrically mounted wheels 36 the nozzle may be raised or lowered with relation to the floor or other objective surface upon which the cleaner is supported.

The fan casing above described is arranged to have selectively attached thereto either the motor driven brush housing nozzle 40 provided with a motor driven brush which will be later described or a straight suction nozzle indicated generally at 41. Describing first the motor driven brush housing nozzle 40 shown attached to the cleaner in Figs. 1 and 3, a tube 42 may be axially mounted within the neck portion 31 of the nozzle, being preferably fixed within the depending lug 43. The outer end portion of the tube may be closed by the wall 44 through which is slidably and rotatably mounted the shaft 45 which may also be journaled through the spaced bearings 46 slidably mounted within the tube 42 and held in spaced relation as by the sleeve 47.

To the inner end of the shaft 45 is attached a flexible shaft preferably in the form of a coil spring 48 fixed around the end portion of the shaft 45 and having fixed within its other end a metal core 49 provided with a squared reduced projection 50 adapted to be inserted within the squared socket 18 of the nut 17; and the flexible shaft coil spring 48 with the core 49 fixed thereto provides in cooperation with the nut 17 on the end of the motor shaft 16, universally yielding means connecting the shaft 45 to the motor.

A pulley 51 is fixed upon the outer end of the shaft 45, being preferably provided with the internally threaded socket 52 for connection to the reduced threaded extension 53 of the shaft and is normally held in contact with the outer wall 44 of the tube 42 by means of an expansion spring 54 located between said wall and the adjacent bearing member 46, tending to always urge the shaft 45 inward toward the position shown in Fig. 1 of the drawings.

An opening 55 may be provided in the front side of the nozzle 40, as is customary in sweepers of this type, for the connection of an attachment hose, and is arranged to be normally covered as by the cap 56.

A motor driven brush is arranged to be mounted within the mouth portion of the brush housing nozzle 40, being carried by a bracket illustrated in detail in Fig. 6. This bracket may be formed of sheet metal, preferably stainless steel, and comprises generally the side bars 57 and end members 58. The side bars 57, as best shown in Fig. 1, are concaved to fit over the rim edges 59 at the mouth of the nozzle 40, forming curved lips for contact with the carpet or other surface to be cleaned. This has been found to be an advantage as the steel lips prevent contact of the aluminum nozzle with the carpet, thus preventing the aluminum from marking the carpet.

For the purpose of detachably connecting the brush carrying bracket to the mouth portion of the brush housing nozzle, a pair of upright ears 60 may be formed upon the rear lip 57 of the bracket, each ear having a notch 61 at its upper end to receive a bolt or stud 62 upon the nozzle. A spring pressed plunger 63 is mounted upon each bolt and adapted to be normally urged into contact with the adjacent ear by means of the spring 64 located around the bolt within the hollow plunger 63.

Each end plate 58 of the bracket has a vertical internally disposed channel portion 65 formed at its center, the upper portion thereof being notched as at 66 to receive the bearing boss 67 at the corresponding end of the brush shaft 68.

This shaft is provided near each end with a ball bearing or the like 69 upon which is journaled the brush cylinder 70 formed of wood or the like and having a pulley 71 at its central portion arranged to be operatively connected to the pulley 51 as by a belt 72.

The bracket is preferably provided with a spaced pair of crossbars 73 adapted to be located upon opposite sides of the pulley 71 to assist in preventing threads, hair and the like from being wound upon the pulley.

The brush roll 70 is provided on each side of the pulley with a row of bristles as indicated at 74, the bristles on each side of the center of the roll being diametrically oppositely disposed to those on the other side, as best shown in Fig. 3. These bristles are preferably carried in a removable insert indicated at 75 and adapted to be received within a longitudinal groove in the peripheral portion of the brush roll, a split spring ring 76 being located within a circular groove 77 in the brush roll for normally retaining the insert in place.

For the purpose of preventing the split ring from turning in the groove to a point where the insert 75 might be released, a pin or stud 78 is located in the groove 76, preferably at a point diametrically opposite to the insert, as shown in Figs. 3 and 4.

For the purpose of detachably securing the brush within the bracket, a curved spring 79 may be fixed within the channel portion 65 in each end plate 58 of the bracket, these springs being arranged to contact with the inner surfaces of the end walls 80 of the nozzle when the brush is mounted therein, as shown in Fig. 3. The springs thus cannot be moved outward to release the bearing bosses 67 from the grooves 66 excepting when the bracket is removed from the nozzle.

For the purpose of polishing hardwood floors and the like the motor driven brush above described may be removed from the nozzle 40 and replaced by the floor polisher shown in Figs. 8 and 9. This floor polisher is carried within a bracket similar to the bracket which carries the motor driven brush and comprises the side bars 57*a* which may be concaved for fitting over the rim edges of the mouth of the nozzle, and the end plates 58*a* which are of greater height than

the end plates 58 of the bracket above described.

The bracket is thus arranged to support the brush roll 70*a* of the floor polishing brush at a point spaced below the mouth of the nozzle 40 and for this purpose the end plates 58*a* of the bracket may be provided with the vertical channel portions 65*a* notched in their lower ends as at 66*a* to receive the bearing pintles 67*a* of the floor polishing brush, curved springs 79*a* being provided for normally retaining said pintles within the notches 66*a*.

Ears 60*a* may be provided upon the rear member 57*a* of the bracket for engagement with the studs 62 and plungers 63 carried by the nozzle 40 and above described.

A pulley 71*a* is provided at the central portion of the brush roll 70*a* for engagement by the belt 72*a* for connection to the pulley 51 in order to operatively associate the floor polishing brush with the motor. Upon each side of the pulley the brush roll is substantially covered with bristles indicated at 81, forming a substantially solid brush suitable for polishing hardwood floors and the like.

When it is desired to use the cleaner as a straight suction cleaner instead of as a motor driven brush, the nozzle 40 may be removed and the nozzle 41 attached to the fan chamber. This nozzle, as shown in Fig. 10, has a substantially narrow mouth 82 which is unobstructed by a brush or the like, thus providing for straight suction cleaning. If desired, a straight brush 83 may be connected to the nozzle adjacent to one lip thereof as shown in Fig. 10.

The improved vacuum cleaner may thus be quickly converted to either a straight suction cleaner, a motor driven brush cleaner or a motor driven floor polisher as desired, by attaching the desired nozzle to the fan casing or by attaching either the motor driven brush shown in Fig. 3 or the floor polishing brush shown in Fig. 8 within the mouth of the nozzle 40.

I claim:

1. A vacuum cleaner including a motor and a fan casing, a nozzle detachably connected to the fan casing, a rotatable brush within the nozzle, a shaft mounted for yielding endwise movement within the nozzle, means operatively connecting the brush to said shaft, and universally yielding means detachably connecting the shaft to the motor.

2. A vacuum cleaner including a motor and a fan casing, a nozzle detachably connected to the fan casing, a rotatable brush detachably mounted within the nozzle, a shaft detachably mounted for yielding endwise movement within the nozzle, means operatively connecting the brush to said shaft, and universally yielding means detachably connecting the shaft to the motor.

3. In a vacuum cleaner including a motor and a fan casing, a detachable brush housing, a rotatable brush, means carried by the brush housing detachably rotatably mounting the brush, a shaft detachably mounted for yielding endwise movement within the brush housing, means operatively connecting the brush to said shaft, and universally yielding means detachably connecting the shaft to the motor.

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