Oct. 23, 1928. 1,688,580

J. W. GERNANDT

COMBINED VACUUM CLEANER AND POLISHER

Filed Dec. 3, 1924 2 Sheets-Sheet 1

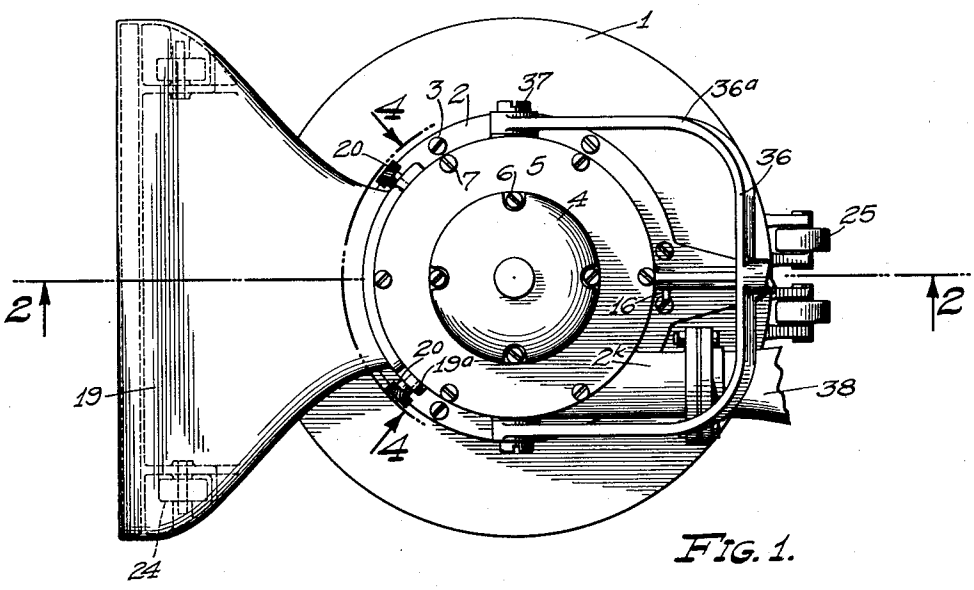


FIG. 1.

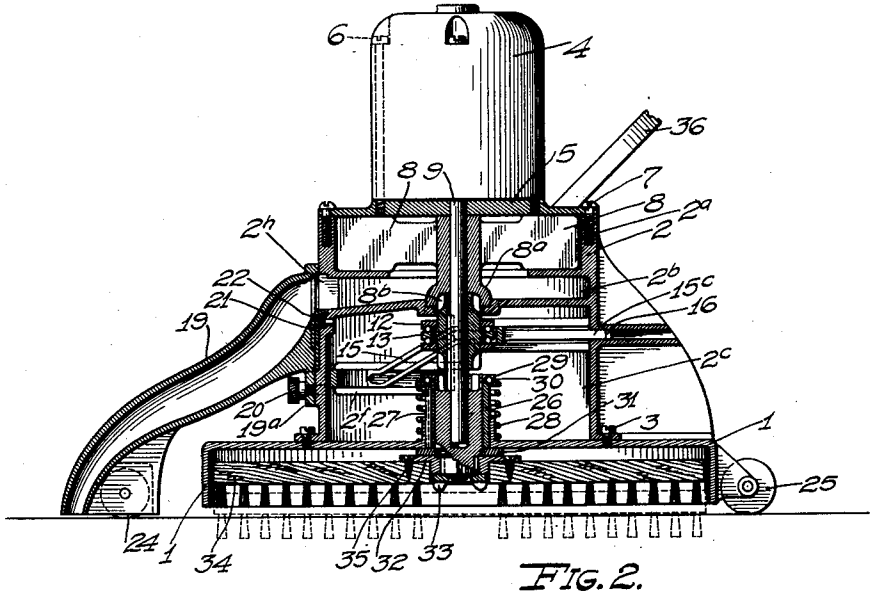


FIG. 2.

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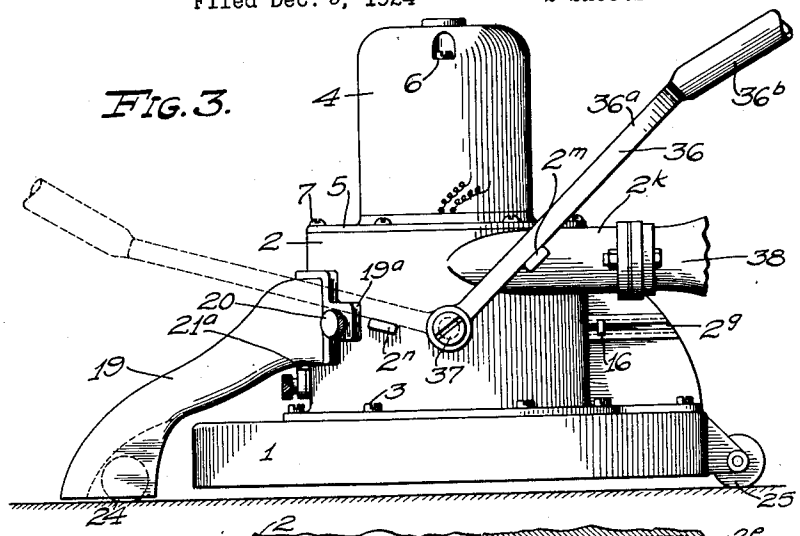
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FIG. 3.



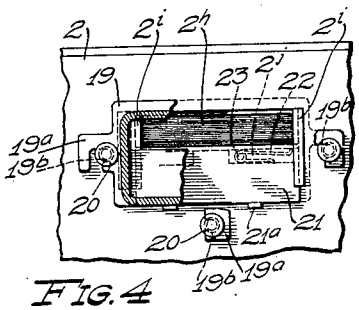


FIG. 4

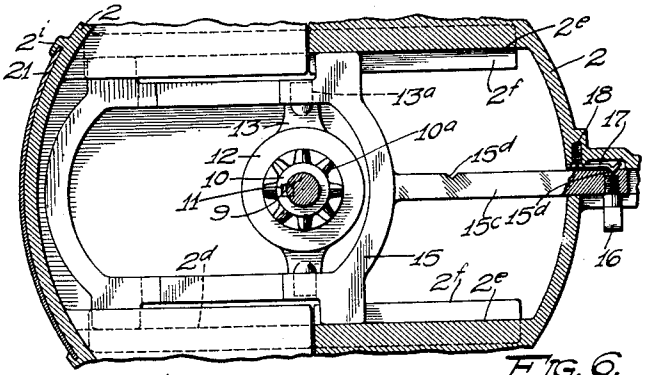


FIG. 6.

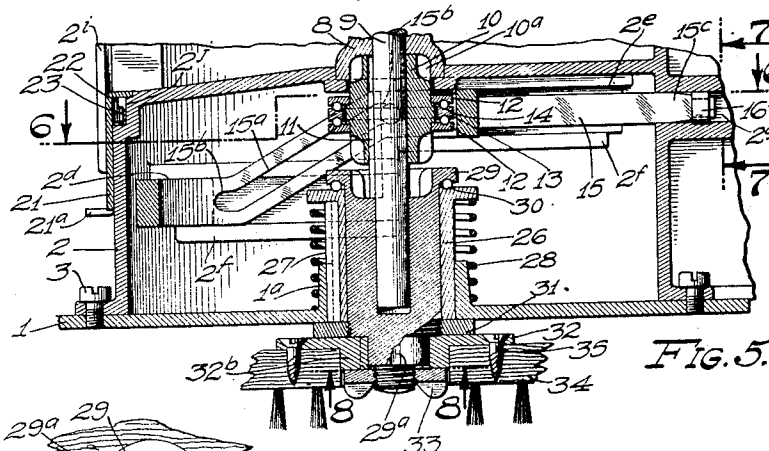


FIG. 5.

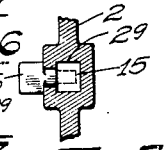


FIG. 7.

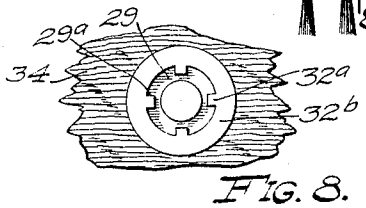


FIG. 8.

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Patented Oct. 23, 1928. 1,688,580

UNITED STATES PATENT OFFICE.

JOHN W. GERNANDT, OF SAN DIEGO, CALIFORNIA.

COMBINED VACUUM CLEANER AND POLISHER.

Application filed December 3, 1924. Serial No. 753,622.

My invention relates to a combined vacuum cleaner and floor polisher, and the objects of my invention are: first, to provide a machine of this class which is adapted to serve as a vacuum cleaner for cleaning floors, rugs, fabrics and the like, and also as a polisher for polishing waxed and other floors or surfaces; second, to provide a machine of this class having a unitary power plant adapted to independently operate the blower of the vacuum cleaning means or the polishing member of the polishing means; third, to provide a machine of this class from which the vacuum cleaning portion or suction nozzle may be disconnected when using the machine as a polisher; fourth, to provide a machine of this class in which the polishing member may be disengaged from the floor or other surface adapted to be polished when using the machine as a vacuum cleaner; fifth, to provide a novel clutch mechanism for a machine of this class for connecting the blower with the shaft of the power plant when the polishing member is disconnected therefrom, or for connecting the floor polishing member with said shaft when said blower is disconnected; sixth, to provide a clutch mechanism for a machine of this class whereby the polishing member is simultaneously connected with the shaft of the power plant and lowered to engage the floor or other surface adapted to be polished; seventh, to provide a mechanism for a machine of this class whereby the housing enclosing the mechanism thereof is automatically raised from the floor or other surface adapted to be polished when the polishing member is lowered; eighth, to provide a combined vacuum cleaner and polisher from which the suction nozzle of the vacuum cleaning attachment may be easily removed when using the machine as a polisher, and in which the port or opening of the blower normally connecting the interior of the same with the one end of the suction nozzle is automatically closed when the suction nozzle is disconnected, so as to prevent large objects from becoming lodged in the passage communicating with the blower, or from being drawn into the blower itself when the same is operated; ninth, to provide a machine of this class which may be practicably used as a floor polisher, either with the suction nozzle connected or disconnected therefrom; tenth, to provide a novelly constructed floor polishing machine; eleventh, to provide as a whole a novelly constructed combined vacuum cleaner and polisher, and twelfth, to provide a machine of this class which is simple and economical of construction proportionate to its functions, durable, efficient, easy to operate, and which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Figure 1 is a plan view of my combined vacuum cleaner and floor polisher, with the handle and dirt catcher partially broken away; Fig. 2 is a sectional elevational view thereof, taken through 2—2 of Fig. 1, showing certain parts and portions in elevation to facilitate the illustration and showing by dotted lines the downwardly shifted position of the polishing member, the elevation of the clutch or shifting mechanism and the compartment enclosing the same being slightly distorted vertically to more clearly illustrate the structure; Fig. 3 is a side elevational view of the combined machine, showing by dotted lines a fragmentary portion of the handle in another operating position; Fig. 4 is a fragmentary sectional elevational view, taken from the front side of the machine through the line 4—4 of Fig. 1, showing particularly the gate for closing the port to the blower when the suction nozzle is removed; Fig. 5 is an enlarged fragmentary sectional view of the clutch or shifting mechanism shown on a reduced scale in Fig. 2; Fig. 6 is a sectional view thereof in plan, taken through 6—6 of Fig. 5, showing certain parts fragmentarily and in section to facilitate the illustration; Fig. 7 is a transverse sectional view thereof, taken through 7—7 of Fig. 5, and Fig. 8 is a sectional view taken through 8—8 of Fig. 5.

Like characters of reference refer to similar parts and portions throughout the several views of the drawings.

The polishing member housing 1, blower and clutch mechanism casing 2, screws 3, motor 4, plate 5, screws 6 and 7, fan member 8, motor shaft 9, clutch member 10, key 11, col-

lars 12 and 13, balls 14, clutch shifting member 15, knob 16, spring catch 17, screw 18, suction nozzle 19, screws 20, gate plate 21, springs 22, pins 23, rollers 24 and 25, shiftable journal member 26, key 27, compression spring 28, brush supporting and rotating member 29, balls 30, retaining nut 31, brush supporting disc 32, wing nut 33, brush 34, screws 35, handle member 36, screw studs 37 and the dirt catching bag 38, constitute the principal parts and portions of my combined vacuum cleaner and floor polisher.

The housing 1 or base member of my combined machine is constructed in circular form and is adapted to conceal from view and enclose the sides and top portion of the polishing member 34, which may be of any suitable construction, such as the brush illustrated in the drawings. Extending above the housing 1 and secured centrally thereto, preferably by means of screws 3, is a blower and clutch mechanism casing 2. The motor 4 of my machine is positioned with its axis vertically and is secured at its lower end, by means of screws 6, to the plate 5, which plate is secured, by means of screws 7, to the upper end of the casing 2, and serves as the upper wall of the blower or fan compartment of the casing 2. The casing 2 is preferably divided into three separate compartments 2^a, 2^b and 2^c, the first being the blower compartment, the second the air passage compartment communicating with the compartment 2^a, and the compartment 2^c enclosing the clutch mechanism. In the compartment 2^a is revolubly mounted the fan member 8, the hub of which is preferably provided with an enlarged portion 8^a at its lower end which is seated in a recess in the wall separating the compartments 2^b and 2^c. The shaft 9 of the motor 4 extends downwardly from said motor, through the hub of the fan member, through the clutch member 10, and into the supporting and rotating member 29 at the lower end of the casing 2.

The clutch member 10 is reciprocally mounted intermediate the ends of the shaft 9 and is prevented from rotating relatively thereto by means of the key 11 secured to said shaft. At the opposite ends of said clutch member is provided a plurality of teeth 10^a in the semblance of gear teeth, which are adapted to be inserted into correspondingly notched recess portions 8^b at the lower enlarged portion 8^a of the fan member 8 and at the upper end of the member 29, as shown best in Figs. 2 and 5, for driving the fan member 8 or the member 29, depending upon whether the clutch member is shifted upwardly or downwardly. Intermediate the ends of the clutch member 10 are secured a pair of spaced apart collars 12 between which is revolubly mounted another collar 13 between which and the collars 12 are positioned balls 14, thus forming a double ball bearing. At diametrically opposite sides of the collar 13 are provided rounded lugs 13^a which are adapted to ride in angularly and horizontally positioned slots 15^a and 15^b, respectively, of the clutch shifting member 15. This member 15 straddles the clutch member 10 and is provided with the said slotted portions on each side. The member 15 is reciprocally mounted in guide portions 2^d and 2^e within the compartment 2^c of the member 2, there being provided removable plates 2^f to permit ready assembly of the clutch shifting member 15 in the casing 2. The one end of the member 15 is slightly reduced, as indicated by 15^c, which portion 15^c extends outwardly from the casing 2 and is guided in a T-shaped channel 2^g provided in an extended portion at the outer side of the casing 2. At the outer end of the portion 15^c of the shifting member 15 is secured a knob 16 for readily shifting the member 15. At the inner end of the T-shaped channel portion of the casing 2 is secured, by means of a screw 18, a spring catch member 17, the free end of which is adapted at all times to engage the reduced portion of the member 15 and be depressed into notched portions 15^d at the inner and outer ends of the reduced portion 15^c of the member 15 for holding the clutch member 10 in either an upper or lower position.

The compartment 2^b of the casing 2 is provided with an opening 2^h at its one side over which is positioned the one or supporting end of the suction nozzle 19, which is constructed similarly to those on conventional vacuum cleaners. The nozzle 19 is provided at its sides and preferably lower portion with outwardly extending lugs 19^a which are provided with horizontal slots 19^b adapted to receive the threaded shank portions of the thumb screws 20. This method of connection of the suction nozzle 19 with the casing 2 permits the former to be quickly secured to or disconnected from the latter when desired.

At each side of the opening 2^h of the casing 2 and at the outer side of the casing are provided vertically extending guide portions 2^i in which is reciprocally mounted a gate plate 21 which is adapted to automatically close the opening 2^h when the suction nozzle 19 is removed and is adapted to be forced downwardly by the nozzle 19 engaging outwardly extending lugs 21^a at the lower edge of the plate 21, as shown best in Figs. 4 and 5. This plate 21 is normally forced upwardly by means of springs 22 which are mounted on pins 23 within recesses 2^j in the wall of the casing 2 behind the plate 21 and contiguous to the opening 2^h, as shown best in Figs. 4 and 5.

Near the lateral ends of and behind the suction mouth of the nozzle 19 are revolubly mounted rollers 24 for supporting the forward end of the machine. At the one side of the housing 1, opposite the side to which

the nozzle 19 is secured, are revolubly mounted other rollers 25 for supporting the rear end of the machine from the floor.

The supporting and rotating member 29, previously mentioned, is revolubly mounted in the hollow shiftable journal member 26 and is retained therein by a flange portion at its upper end and a nut 31 secured near its lower end. Between the flange portion at the upper end of the member 29 and the upper end of the journal member 26 are provided balls 30 to reduce to a minimum the friction thereagainst when the member 29 is forced downwardly by the clutch member 10. The shaft 9 of the motor extends into the member 29 and is revolubly supported therein at its lower end. The journal member 26 is reciprocally mounted in a vertical direction in a boss 1^a extending upwardly from and positioned centrally with the housing 1, a key 27 being secured to the journal member 26 and slidable in a vertical slot in the boss 1^a to prevent rotary movement of the journal member 26 with the member 1. A compression spring 28 is positioned around the boss 1^a and engages at its upper end the annular outwardly extending flange at the upper end of the member 26 and is adapted to retain said member 26 in its upper position, as shown in Fig. 5.

The lower end of the member 29 is slightly reduced and is provided in the periphery of this reduced portion with a plurality of vertical slots 29^a which are adapted to receive correspondingly shaped, inwardly extending portions 32^a of the hub portion 32^b of the brush supporting disc 32 into which the member 29 extends. This disc 32 is removably secured to the reduced lower end of the member 29 by means of a wing nut 33, as shown best in Fig. 5. The polishing member 34, which is shown as a brush in the drawings, is secured to the disc 32 by means of screws 35 or in any other suitable manner.

The handle member 36, for moving the machine about the floor, is provided with a bifurcated portion 36^a which is pivotally connected, by means of screw studs 37, at the ends of its leg portions, to the opposite sides of the casing 2. To the middle portion of the free end of the bifurcated portion 36^a of the handle member 36 is secured an outwardly extending straight handle portion 36^b, fragmentarily shown in the drawings. On the one side of the casing 2 is provided a pair of lugs 2^m and 2^n to limit the downward positions of the handle member 36, as shown by solid and dotted lines in Fig. 3, it being noted that the machine is adapted to be operated from either side, as desired.

The casing 2 is provided with a side outlet connection 2^k, the interior of which communicates tangentially with the interior of the fan or blower compartment 2^a of the casing 2. To the outer end of the connection 2^k is adapted to be secured in any convenient manner the dirt catching bag 38 of any suitable construction.

The machine, with the clutch member, clutch shifting member and other members shifted and arranged as shown in the drawings, is adapted to be used as a vacuum cleaner. To use the same as a floor polisher, the clutch shifting member 15 is pulled outwardly by means of the knob 16 until the spring 17 engages the inwardly positioned notch 15^d, which operation causes the lugs 13^a to be forced downwardly by reason of the inclined slots 15^a and into the lower horizontal portions 15^b of the slots, which horizontal portions cause the lugs 13^a to be locked in their lower position. When the lugs 13^a and the collar 13 are shifted downwardly, the clutch 10 is first disengaged from the hub of the fan member 8 and immediately engaged with the member 29, the continued downward shifting of the clutch member 10 causes the spring 28 to be compressed, causing the member 29 to be forced downwardly and the polishing member 34 secured at the end thereof to be extended below the lower portion of the housing 1, as shown by dotted lines in Fig. 2, which raises the frame of the machine from the floor. The nozzle 19 is removed by partially unscrewing the thumbscrews 20, shifting the same to the right and raising the same upwardly. As the nozzle 19 is removed, the gate plate 21 is automatically raised over the opening 26.

It will be seen from this construction, as illustrated in the drawings and disclosed in the foregoing specification, that there is provided a combined vacuum cleaner and polisher as aimed at and set forth in the objects of the invention and throughout the specification, and though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

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

1. In a machine of the class described, a supporting frame, a motor mounted thereon, a polishing member revolubly mounted coaxially with said motor near one end of said frame, and a clutch means adapted to connect said motor with said polishing member and force the latter beyond said frame.

2. In a machine of the class described, a supporting frame, a motor mounted thereon, a polishing member revolubly mounted coaxially with said motor near one end of said frame, and means adapted to simultaneously connect said motor with said polishing mem-

ber and force the latter beyond said frame for shifting the frame away from the surface to be polished.

3. In a machine of the class described, a supporting frame, a motor mounted thereon, a polishing member revolubly mounted coaxially with said motor near one end of said frame, spring means normally shifting said polishing member to a nonpolishing position, and means adapted to simultaneously connect said motor with said polishing member and force the latter from said frame and said frame from the surface to be polished.

4. In a machine of the class described, a housing, a motor supported thereby, a polishing member revolubly mounted coaxially with said motor at the lower end of said housing and substantially enclosed thereby, spring means normally holding said polishing member within the lower end of said housing, and means adapted to simultaneously connect said motor with said polishing member and force the latter below said frame for raising the frame away from the surface to be polished.

In testimony whereof, I have hereunto set my hand at San Diego, California, this 21st day of November, 1924.

JOHN W. GERNANDT.