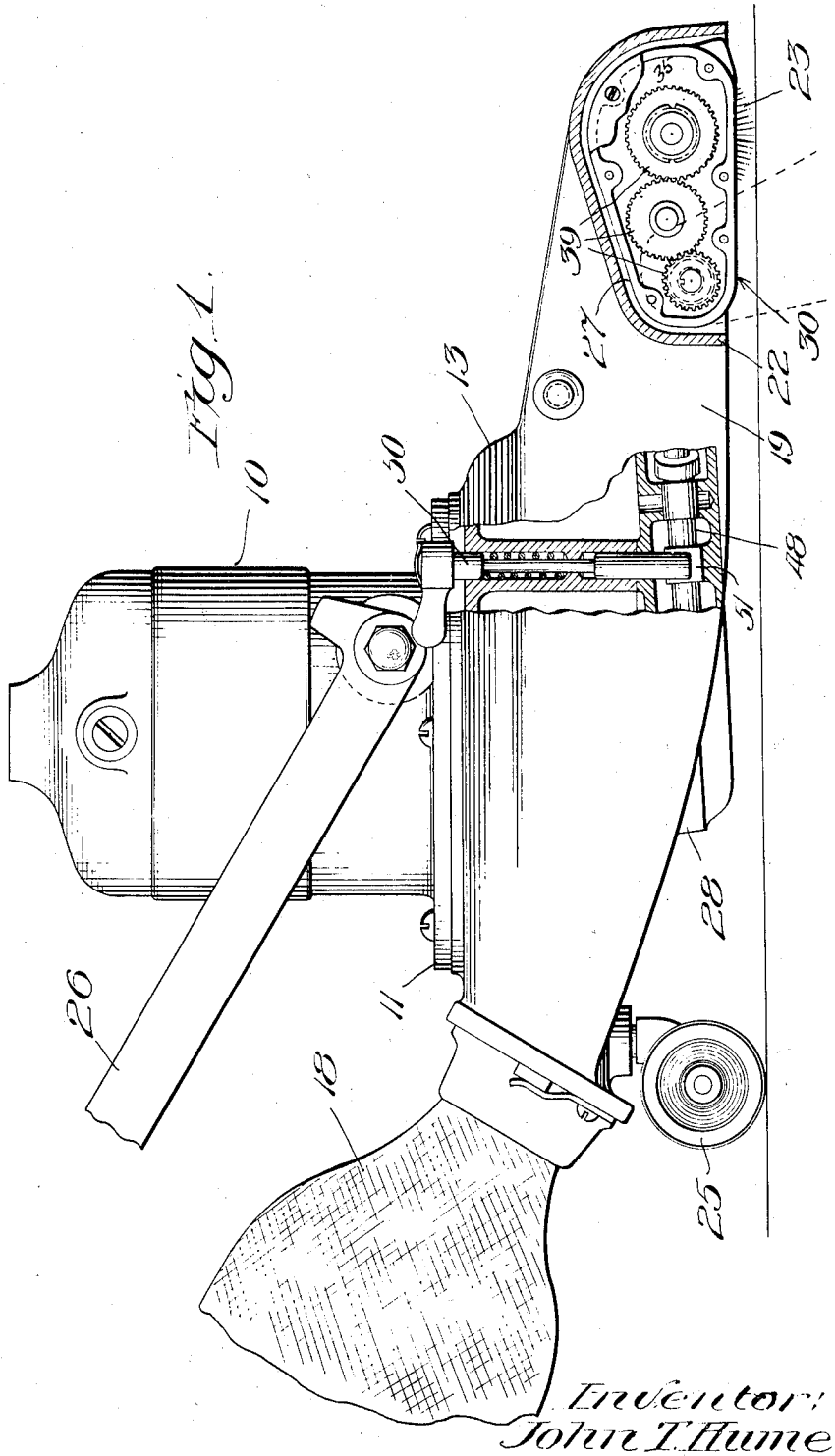
May 19, 1925. 1,537,946

J. T. HUME

VACUUM CLEANER

Filed Dec. 19, 1921 3 Sheets-Sheet 1



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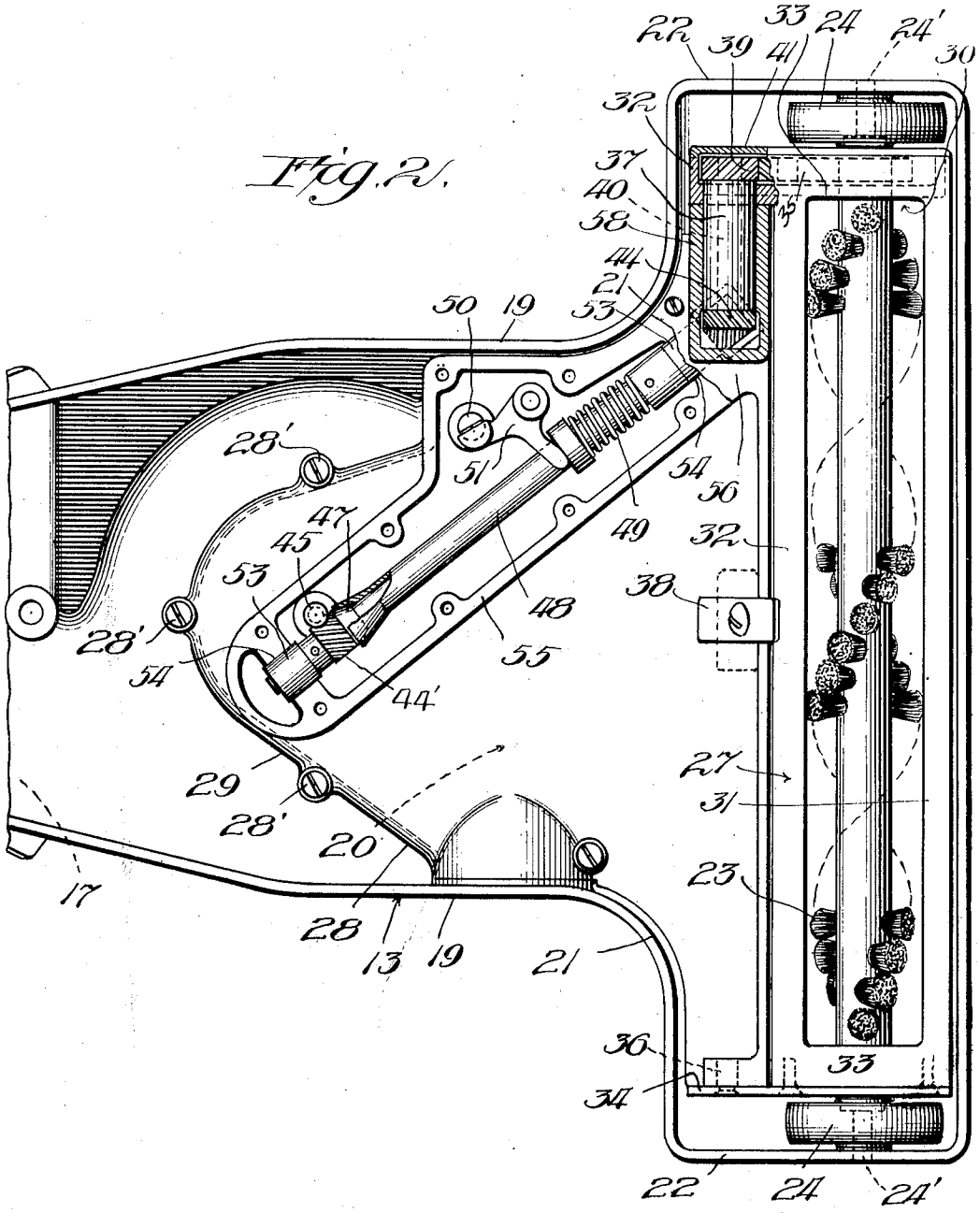
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Fig. 2.



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VACUUM CLEANER

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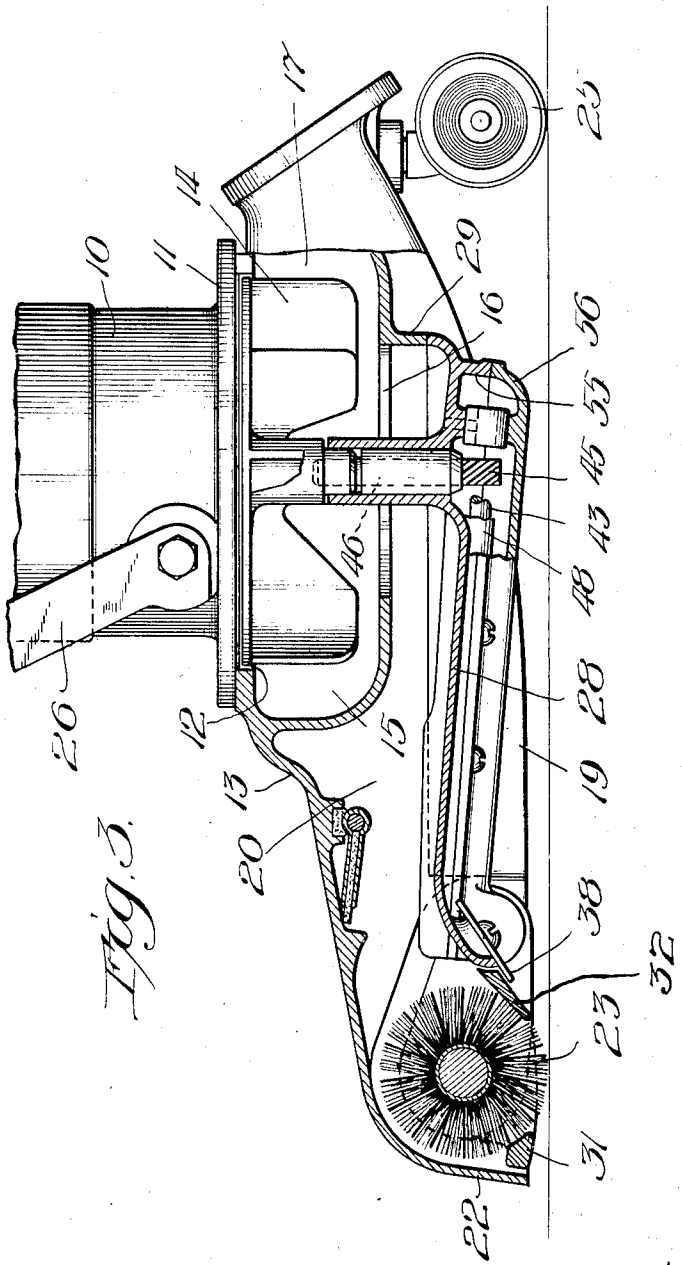


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN T. HUME, OF CHICAGO, ILLINOIS, ASSIGNOR TO HURLEY MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

VACUUM CLEANER.

Application filed December 19, 1921. Serial No. 523,414.

To all whom it may concern:

Be it known that I, JOHN T. HUME, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vacuum Cleaners, of which the following is a specification.

My invention, in some particulars, is more specially an improvement in brush-equipped vacuum cleaners, and upon the cleaners set forth in my co-pending applications, respectively, Serial No. 455,100 filed March 24, 1921, (now Patent No. 1,458,939, June 19, 1923), and Serial No. 519,230, filed December 1, 1921. Among the desiderata satisfied by my invention are simplification and improvement of the brush-drive; improvement in the mounting of parts, affecting the nozzle and affecting also the brush; and general simplification, and minimization of manufacturing costs. Other and further objects of my invention will become apparent hereinafter.

In the drawings Figure 1 is a side elevation with parts broken away, showing a vacuum cleaner embodying my invention; Fig. 2 is an inverted plan view with parts broken away and with gear-box cover removed;

Fig. 3 is a vertical section on line 3—3 of Fig. 2.

It will be understood that features of my invention may be embodied in machines differing in generalities of design and construction from the machine herein shown, which is of the vertical-motor type; but in the specific arrangement illustrated 10 is a motor vertically disposed with its casing base 11 closing the top opening 12 of main frame 13, and in the main frame there is a motor driven fan 14 disposed in horizontal fan chamber 15, 16 being the fan eye at the bottom of said chamber and 17 being a tangential outlet passage with which a bag 18 or other suitable dust receptacle may be associated in any desirable fashion. The main frame element 13 is preferably a casting suitably shaped at its rear end for symmetry and of approximate width of the fan casing, in front of which casing the main frame walls extend forwardly, preferably nearly in parallelism as at 19 to provide an air passage 20 that communicates with the fan eye at its rear and that, at its front, flares as at 21 into a main nozzle structure 22, which is the proper dimension to receive the rotatable brush 23. This main frame is preferably mounted on front rollers 24 and a rear caster 25 to facilitate propulsion by means of handle 26 which is preferably pivoted to the motor frame as shown.

Preferably the wheels 24 support the main nozzle structure with the bottom edge of its end and front walls at a predetermined distance from the work-plane or plane of support; and these wheels are preferably housed within the ends of the nozzle structure to project only slightly therebelow. Such wheels may, for simplicity, be mounted directly on the end walls of the nozzle structure as on pins 24′ which may be fixed as shown or adjustable, if desired, both types of wheel mounting being known.

As in my application Serial No. 519,230 aforesaid, I preferably provide in freely movable association with the main nozzle structure a sub-nozzle element 27 and also I arrange the brush 23 for free movement therein, preferably co-relating these two freely movable elements through a common mounting so that they move together with respect to the main nozzle structure. In embodying my present invention I preferably localize the sub-frame structure which is movable in respect of the main frame for the stated free movement of the sub-nozzle and the brush, to structure generally contained within the main nozzle 22, and provide as the bottom of the air passage 20 a normally-stationary plate 28. The main frame casting may conveniently be formed with a partition wall 29 which, with the exterior side walls defines the air passage and nozzle structure as an open-bottom shell, and the bottom plate 28, removably secured as by screws 28′ completes the enclosure of the air passage and extends forward into the rear portion of the nozzle structure 22, to afford support to the movable brush and sub-nozzle, and to form, in effect, a demountable continuation of the main frame. At the ends of this bottom plate, and within the confines of the main nozzle structure, provision is made for pivotally supporting the sub-frame structure 30 which includes the sub-nozzle 27 and the brush 23. Specifically sub-nozzle

27 is an oblong frame with its front and rear lips 31 and 32 shaped for coaction with the proximate surfaces of the front lip of the nozzle and the front edge of the plate 28, its end-bars 33 having secured thereto arms 34 and 35 that extend back within the main structure and are pivotally supported as on pin 36 and bushing 37 respectively carried by opposite ends of the bottom plate 28. This sub-frame need move through only a short range of displacement in normal operation, and I provide on the bottom plate 28 a pivoted stop latch 38 which, in the position shown, suitably restricts downward movement of the pivoted sub-frame but which may be turned to dotted line position (Fig. 2) to release the sub-frame for full movement to the dotted line position shown in Fig. 1, in which position the operation of brush removal is easy.

As the brush is to be motor driven, the arm 35 may be formed as a gear casing, to contain a suitable gear-train 39, one element of which is connected with the brush spindle and another element of which is mounted on a shaft 40 extending through the bushing 37, so that such gear train is operable from the shaft 40 in any position of the sub-frame. A detachable cover 41 may close the gear case to dust-proof it and accommodate grease-lubrication. When the sub-frame is swung down to clear the wheels 24, the arm 34 may be detached from the sub-nozzle and its pin 36 withdrawn, whereupon the other arm may be removed endwise, that gear of train 39 which is on shaft 40, being preferably keyed on to facilitate its removal.

By this arrangement, providing a brush driven at its end, an inexpensive "solid" brush structure may be employed and the brush may be uninterrupted between its effective ends, such arrangement also permitting of the use, if desired, of such narrow brush mountings and wheels that a surface may be cleaned very close to a baseboard or other side-obstructions.

Preferably the shaft 40 is only long enough to locate its inner end at a convenient point from which a straight shaft may be run into cooperative relation to the vertical motor shaft, wholly within the plane area of the main frame. A shaft 43, so arranged, is at one end connected by suitable gears 44 with the shaft 40 and at its opposite end carries, preferably loosely as to rotation, a gear 44′ which meshes constantly with the gear element 45 on vertical shaft 46 which is detachably connected with the motor shaft. Thus when gear 44′ is clutched against rotation on shaft 43, the motor drives the brush through the gearing and shaft connections stated.

I prefer to provide clutch-control over the connection of the motor shaft with the brush shaft, and to this end form the gear 44′ with the cone clutch element 47 with which cooperates the conical recess of clutch sleeve 48, having a suitable collar at its remote end and normally pressed by spring 49 to effect the clutch engagement. Clutch disengagement may be effected by depression of a spring elevated plunger 50, the cam surface at the bottom of which will act upon a bell crank lever 51 pivoted to the bottom plate 28 to press the collar and throw the sleeve clutch out of cone engagement against the tension of spring 49.

I prefer that the shaft 43 and the appliances carried thereby shall be mounted in bearing bushings 53, removably placed in seats 54 formed therefor on the underside of the bottom plate 28; and I further prefer to permit of lubrication and for dust-proofing, that the shifting and clutch operating lever be housed in a shaft case. Pendent walls 55 of suitable configuration, and a cover plate 56 (providing portions complemental to seats 54) afford a suitable enclosure, whereof the separable cover is detachably screwed to the pendent walls. This cover plate may extend from beyond the rear end of the shaft 43 to a point of union with a bearing lug 58 for the bushing 37, which lug may conveniently be cast on the bottom plate 28.

The operating member 50 for the clutch-release may be made operatable by means of handle 26 or by manual movement by construction, as described in my aforesaid applications, shown herein but needing no detailed description.

It will be apparent with the construction described, whether embodied in the specific form shown or with variations such as will readily occur to those skilled in the art for adaptation of the invention to other makes and styles of machines, desirable simplicity, economy, ruggedness and facility of replacement and repair of those parts that are inherently susceptible to wear, are desirably attained, together with desirable unity of brush construction, improvement in brushing function and enclosure of all parts that need dust-proofing or require lubrication.

I claim:

1. In a vacuum cleaner having a main nozzle structure, a sub-nozzle having front and rear lips and pivotally mounted within the main nozzle structure for free movement with respect to the main nozzle-structure, whereby it may tend to follow the work-plane free from the weight of the main nozzle structure.

2. In a vacuum cleaner having a main nozzle structure, a power driven rotatable brush in the nozzle, and frame members wherein said brush is mounted, said frame members being pivoted within the main nozzle structure and otherwise free there-

from for movement toward and from the work plane free from the weight of the main nozzle structure.

3. In a vacuum cleaner having a frame providing a nozzle structure longer than the width of the rear portion of the frame, an uninterrupted, vertically movable brush in said nozzle, a motor fixedly carried by the main portion of the frame, and connections comprising only gears and stiff shafts between said motor and an end of said brush, said connections lying wholly within the plan confines of the frame and housed in the frame, and leaving the brush free for bodily up and down movement.

4. In a vacuum cleaner having elongated, brush-receptive nozzle structure and a relatively narrow frame structure in rear of said nozzle, a motor carried by said frame structure, an uninterrupted brush in the nozzle, and gearing and shafting connecting said motor and one end of said brush, said shaft and gear mechanism including a short shaft paralleling that portion of one end of the brush which is within the nozzle, gearing connecting the outer end of said short shaft with the end of the brush, and shafting and gearing connecting the inner end of said short shaft with the motor.

5. In a vacuum cleaner a frame structure providing a brush receptive nozzle, and an air passage leading thereto and having a bottom plate, a sub-frame pivoted to said bottom plate for movement within the nozzle structure free from the weight of the latter, and a brush carried by said sub-frame.

6. In a vacuum cleaner a frame structure providing a brush receptive nozzle, and an air passage leading thereto and having a bottom plate, a sub-frame pivoted to said bottom plate for movement within the nozzle structure free from the weight of the latter, and a brush carried by said sub-frame, said sub-frame having front and rear lips and constituting a sub-nozzel.

7. In a vacuum cleaner having a main nozzle structure, a sub-frame pivotally mounted at its rear within said nozzle structure, said sub-frame providing front and rear lips of a sub-nozzle structure and carrying a brush having its lower or working portion extending out between said lips, and means for rotating said brush in any position of said sub-frame structure.

8. In a vacuum cleaner, a main frame providing the walls of a nozzle structure, side and top walls of an air passage, and a fan chamber; a bottom plate forming a bottom for, and substantially closing the underside of, said air passage, and a sub-frame pivoted with respect to said bottom plate and arranged in the nozzle, said sub-frame carrying a brush.

JOHN T. HUME.