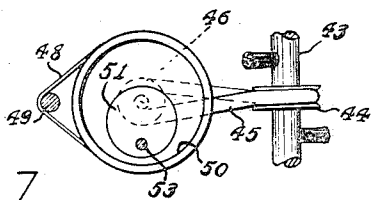
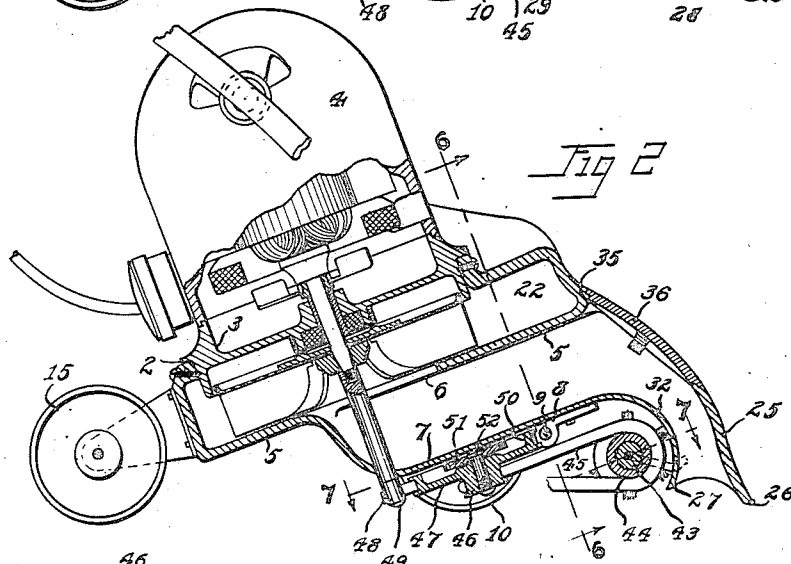
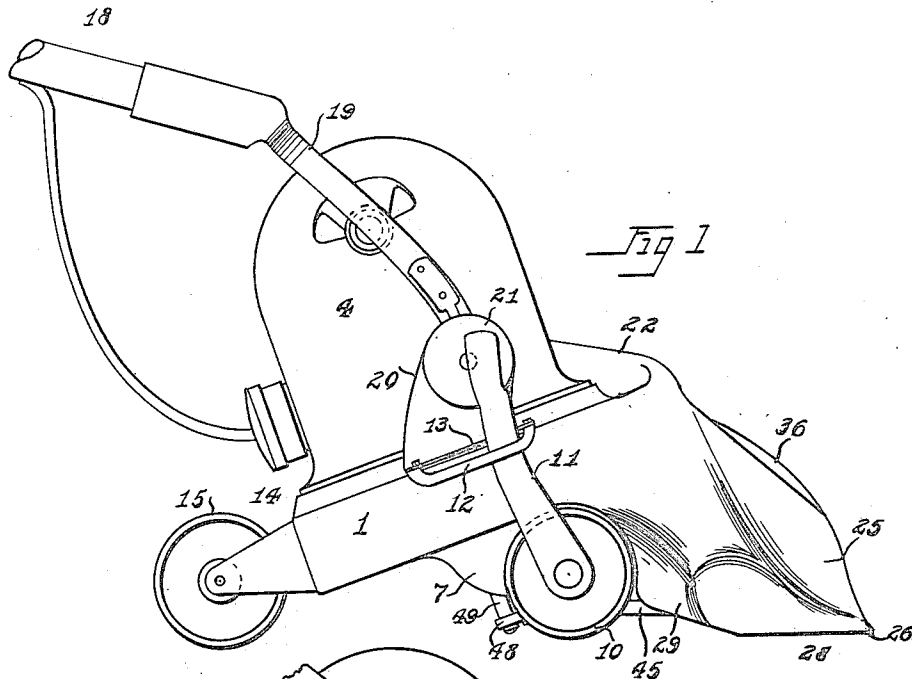


J. B. KIRBY.
 VACUUM CLEANER.
 APPLICATION FILED JUNE 9, 1917.

Patented Feb. 18, 1919.

3 SHEETS—SHEET 1.

1,294,473.



Inventor
 James B. Kirby
 By *Will Smith, Robert West*
 Attys

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Fig. 3

Fig. 4

Inventor
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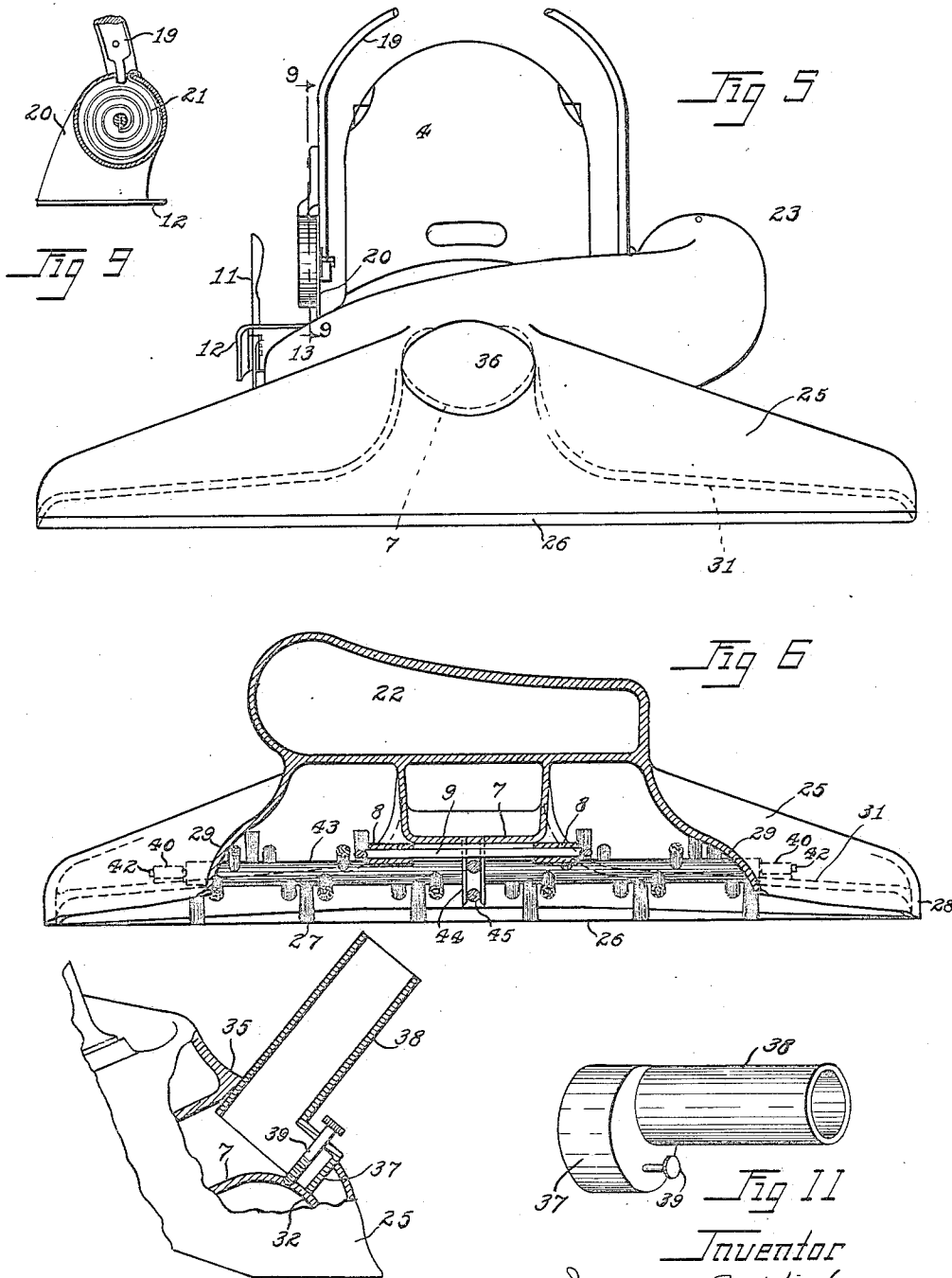
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UNITED STATES PATENT OFFICE.

JAMES B. KIRBY, OF CLEVELAND, OHIO.

VACUUM-CLEANER.

1,294,473.

Specification of Letters Patent.

Patented Feb. 18, 1919.

Application filed June 9, 1917. Serial No. 173,704.

To all whom it may concern:

Be it known that I, JAMES B. KIRBY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Vacuum-Cleaners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to suction cleaners and has for its object the provision of a new and improved brushing mechanism in connection with a device of this character; the provision of new, positive, improved, and simplified means for driving said brushing mechanism; the provision of a new and improved construction and arrangement of the nozzle and brush chamber; the provision of new and improved means for supporting a countershaft; while further objects and advantages will appear as the description proceeds.

In the drawings accompanying and forming a part of this application I have illustrated one form of construction wherein my invention may be embodied although it will be understood that the same is only one out of many by which the advantages of my invention may be secured. In these drawings, Figure 1 represents a side elevation of my improved cleaner, the dust bag being omitted; Fig. 2 represents a vertical, central, longitudinal section through my cleaner and corresponding to the line 2—2 of Fig. 4; Fig. 3 is a vertical, longitudinal, section corresponding to the line 3—3 of Fig. 4; Fig. 4 is a bottom plan view of the cleaner casing; Fig. 5 represents a front elevation of the cleaner casing; Figs. 6 and 7 are sectional views taken on the line 6—6 and 7—7 respectively of Fig. 2 and looking in the direction of the arrows; Fig. 8 is a sectional view taken on the line 8—8 of Fig. 4 and looking in the direction of the arrows; Fig. 9 is a sectional view taken on the line 9—9 of Fig. 5 and looking in the direction of the arrows; Fig. 10 is a detail view showing the mode of attaching the extension hose; and Fig. 11 is a perspective view of the extension-hose nipple.

Describing the parts by reference characters, the casing of my improved cleaner comprises a metal bottom part having a fan chamber 1 of generally cylindrical shape having in its upper wall an axial opening 2 in which is secured the neck 3 of a motor

shell 4, preferably as described and claimed in my Patent No. 1,209,720, dated December 26, 1916. The lower wall of said fan chamber is formed by a flat plate 5 having at its central part an inlet opening 6, and integral with this wall is a hollow hood 7 which overlaps and communicates with the aperture 6 and extends forwardly from that point toward the forward side of the casing. Journaled in bearings 8—8 secured to the lower face of this hood is a rock shaft 9 on which are journaled the carrying wheels 10—10, said shaft being of crank shape so that the wheels are arranged eccentrically of said bearings. An arm 11 projects from this shaft and means are provided for securing said arm at a plurality of adjusted positions whereby the height of said casing can be regulated, as claimed in my Patent No. 1,209,718, dated December 26, 1916. Such means in this embodiment comprise a slotted plate 12 through which said arm projects, one side of the slot being provided with notches 13. At a point removed from the bearings 8 the wall of the fan chamber is provided with a bracket 14 to which is journaled a single central roller 15; all of said wheels being arranged as described and claimed in my Patent No. 1,184,458, dated May 23, 1916. Also the said wheels and roller are so disposed that the fan chamber and motor are supported with their common axes tilted rearwardly as described and claimed in my copending application filed October 30, 1916, Serial No. 128,385. An operating handle 18 is attached to the casing by means of a curved yoke 19 whose arms are pivoted to brackets 20 secured one at each side of the machine, preferably in front of the center of gravity as described and claimed in my Patent No. 1,184,458, aforesaid, and one of said brackets preferably comprises a spring arrangement 21 constructed and arranged to tend to elevate the forward portion of the cleaner when this handle is depressed, as described and claimed in my copending application filed September 15, 1913, Serial No. 789,746. The fan chamber 1 communicates with a tangentially arranged outlet passage 22 terminating in a discharge neck 23 adapted for the attachment of the usual dust bag (not shown).

Projecting forwardly and downwardly from the elevated forward part of the fan chamber is the collecting nozzle 25 whose forward wall terminates in an elongated

horizontal lip 26 parallel to the axis of the wheels 10—10. Parallel to said lip 26 and a short distance in the rear thereof is a second lip 27 defining therewith a narrow elongated inlet mouth, transversely arranged, the latter lip being elevated above the plane of the first lip so as to present an open inlet passage at all times as described and claimed in my Patent No. 1,206,117 granted November 28, 1916.

The extremities of said lips are connected by end walls 28—28, which walls merge with the skirts 29—29 which extend from points on the sides of the cleaner casing just forward of the wheels 10—10 to meet the ends of the nozzle. At points adjacent the end portions of the nozzle the lip 27 is carried by a web 31 integral with the forward wall of the nozzle and forming the roof of the inlet mouth; at the central portion of the inlet the lip 27 is connected directly with a semi-cylindrical web 32 which merges with the wall of the hood 7, and in this way the interior of the inlet mouth is placed in communication with the fan chamber 1. The space defined between the skirts 29, 29 and at the rear of the lip 27 constitutes an independent chamber which is utilized for the reception of the brushing mechanism next to be described. The forward wall of the nozzle is provided with an aperture 35 in alinement with the hood 7 and adapted to receive either a removable cap 36 for closing it or a hose connection tube extending into the hood and communicating directly with the inlet opening 6 as described and claimed in my former Patent No. 1,184,459 granted May 23, 1916. In this embodiment the connecting nipple consists of a hollow circular body 37, adapted to fit into the aperture 35 and to rest against the web 32 so as to close the passageway leading to the nozzle, and having a tubular portion 38 adapted for the reception of a flexible tube. A suitable thumb screw 39 secures the device in place by being inserted in a threaded aperture formed in the web 32.

Secured inside the brush chamber are a pair of spaced plates 40, 40 having their ends turned over as shown at 41, 41 to form forwardly opening notches adapted to receive the bearing pins 42, 42 of a rotatable cylindrical brush 43 which is thereby supported parallel to the axis of the wheels 10, 10 and immediately at the rear of the lip 27. The arrangement of the bearings is preferably such that the ends of the bristles are slightly below the lip 27 and slightly above the lip 26. At its central point the brush body 43 is provided with a grooved pulley 44 receiving the rubber belt 45 by which it is connected to a second grooved pulley 46 which is integral with a larger pulley 47. The two last mentioned pulleys constitute, in effect, a countershaft, and the

pulley 47 is connected by a suitable belt 48 with a driving shaft 49 connected directly to the motor shaft and projecting axially through the aperture 6 and through an opening in the wall of the hood 7. The interior of the pulley 47 is hollowed out as shown at 50 for the reception of a supporting plate 51 to which is attached the stud 52 on which the countershaft is journaled, and this plate 51 is pivoted to the wall of the hood 7 at a point 53 eccentric to this stud. In this way an equalization is effected between the belts 45 and 48 so that the strain thereon is the same. Also by making the belt 45 of some elastic material such as rubber, a constant tension is produced upon the belt 48 which may be made of a more lasting material such as leather which is better suited to withstand the high speed of the shaft 49, which in the cleaners ordinarily made and sold under my inventions approximate fifteen thousand revolutions per minute.

The arrangement above described occupies a minimum of space, which is necessary because of the necessity of keeping the machine low so as to enable it to be operated beneath furniture and to prevent upsetting. Also the brush operating mechanism is entirely removed out of the air stream so that no clogging by dust and refuse is possible. The direction of twisting the belt 45 is selected so that the brush 43 will throw the dust beneath the lip 27 and into the suction mouth where the rush of air will pick it up and carry it away. The tension of the belt 45 retains the brush always in place in its bearings notwithstanding that the latter consist merely of open hooks, while the removal of this belt permits the ready removal of the brush for purposes of cleaning or replacement. The cooperation of the wheels 10—10 and lip 26 prevent the suction from elevating the floor covering to an extent sufficient to engage the lip 27, so that communication always exists between the brush chamber and inlet mouth wherefore the body of the fabric is cleansed by the air drawn therethrough while refuse adhering to the surface such as lint and thread is displaced by the brush operating in conjunction with the air passing beneath the lip 27.

It will be apparent that changes in the shape, arrangement and relation of many of the parts of the cleaner can be made without departing from the scope of my invention or sacrificing the benefits secured thereby, wherefore I do not confine myself to the details of construction and arrangement herein described except as the same are recited specifically in the claims hereto annexed or rendered necessary by the prior state of the art.

Having thus described my invention, what I claim is:—

1. In a suction cleaner, a casing having a

5 cylindrical fan chamber and a nozzle, said chamber having at one side an axial opening communicating with said nozzle and at the other side a motor whose shaft projects axially into said chamber, said nozzle being deflected away from the axis of said chamber and having a pair of spaced lips defining an elongated inlet mouth, and a brushing device supported outside of said mouth adjacent to one of said lips, said motor shaft being extended through the wall of said nozzle and operatively connected to said brushing device.

10 2. In a suction cleaner, a casing having a fan chamber and a nozzle, a suction fan in said chamber having a shaft extending through the wall of said nozzle, said nozzle having an inlet mouth located at one side of said shaft, a rotary brush journaled between said mouth and shaft, and speed reducing driving mechanism operatively connecting said shaft and brush.

15 3. In a suction cleaner, a casing having a fan chamber and a nozzle, a suction fan in said chamber having a shaft extending through the wall of said nozzle, said nozzle having an inlet mouth located at one side of said shaft, a rotary brush journaled outside of said mouth, and a countershaft journaled to the exterior of said casing and operatively connected both to said brush and to said first shaft.

20 4. In a suction cleaner, a casing having a fan chamber and a nozzle, a suction fan in said chamber having a shaft extending through the wall of said nozzle, said nozzle

having an inlet mouth located at one side of said shaft, a rotary brush journaled between said mouth and shaft, a countershaft journaled to the exterior of said casing between said brush and shaft, and belt connections between said shaft and countershaft and between said countershaft and brush.

25 5. In a suction cleaner, a casing having a fan chamber and a nozzle, a suction fan in said chamber having a shaft extending through the wall of said nozzle, said nozzle having an inlet mouth located at one side of said shaft, a rotary brush journaled to said casing outside of said mouth, a countershaft journaled to the exterior of said casing between said shaft and brush, said countershaft being movable along the line between said brush and shaft, and belts connecting said countershaft to said brush and shaft respectively, one of said belts being elastic.

30 6. In a suction cleaner, a casing having a fan chamber and a nozzle, a suction fan in the said chamber having a shaft extending through the wall of said nozzle, said nozzle having an inlet mouth located at one side of said shaft, a rotary brush journaled to the exterior of said nozzle between the said mouth and shaft, depending skirts carried by said nozzle and inclosing the top sides of said brush, and power transmitting mechanism operatively connecting said brush and shaft externally of said nozzle.

In testimony whereof, I hereunto affix my signature.

JAMES B. KIRBY.