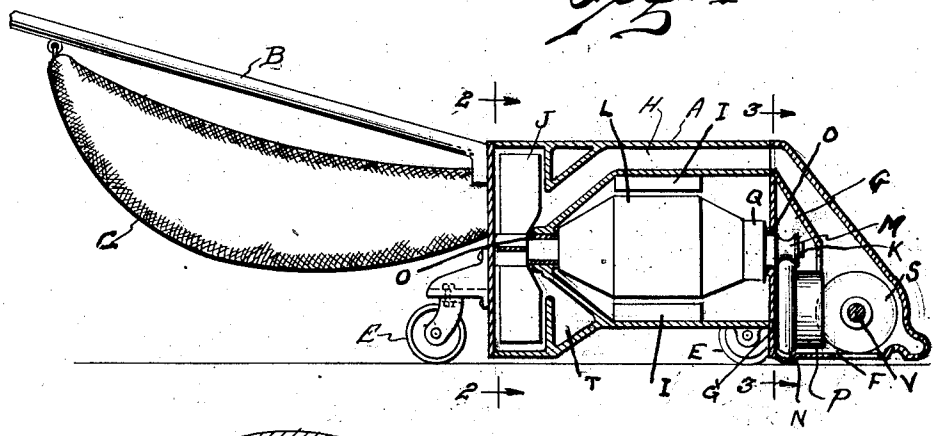
June 2, 1925. 1,540,099

S. J. BOYER

VACUUM CLEANER

Filed April 9, 1921 2 Sheets-Sheet 1

Fig. 1



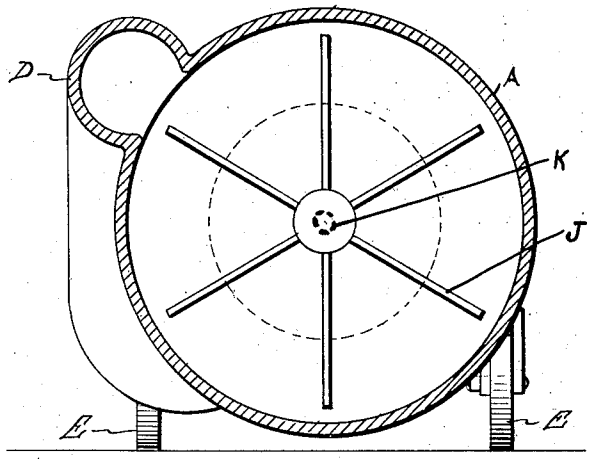


Fig. 2

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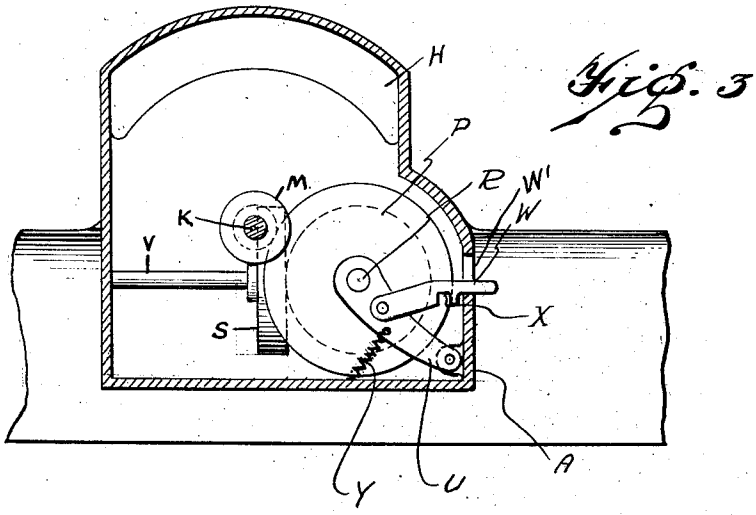

Fig. 3

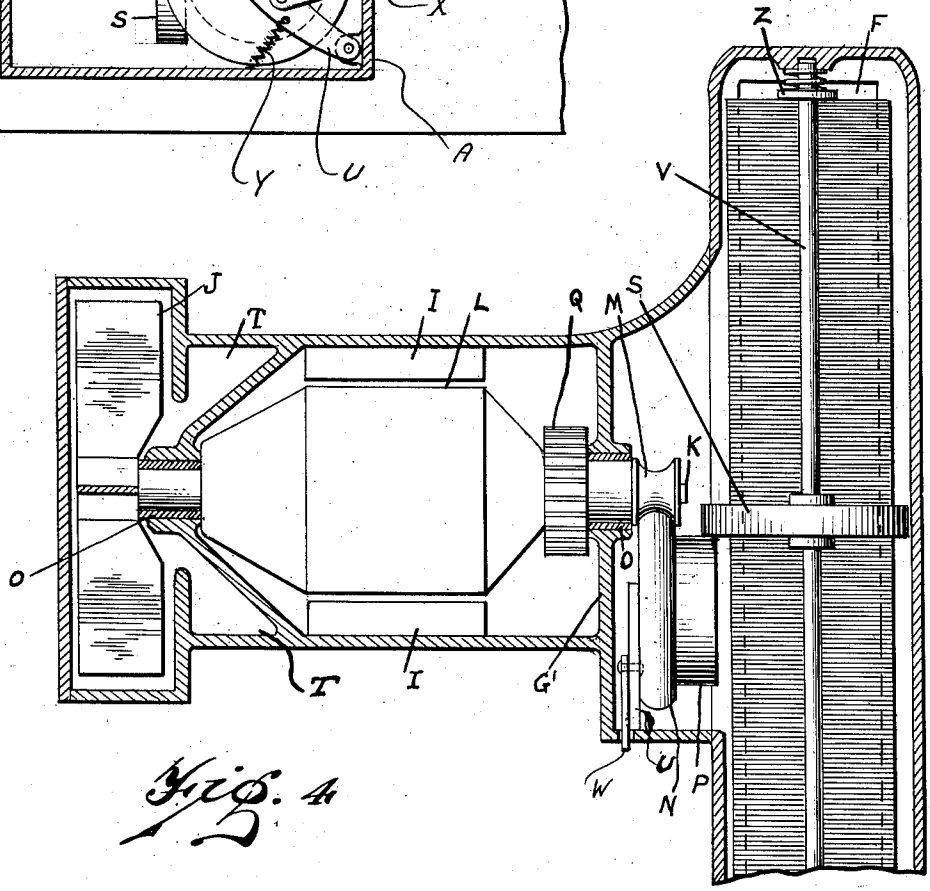

Fig. 4

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Patented June 2, 1925. 1,540,099

UNITED STATES PATENT OFFICE.

STEPHEN J. BOYER, OF DETROIT, MICHIGAN.

VACUUM CLEANER.

Application filed April 9, 1921. Serial No. 459,859.

To all whom it may concern:

Be it known that I, STEPHEN J. BOYER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Vacuum Cleaners, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to vacuum cleaners and has for its object an improved arrangement of parts by means of which not only are the operative parts and the bearings more efficiently protected against dust and other foreign matter, but as well there is avoided the uncertainty of operation and frequent necessity for repairs and adjustment which the quite general use of cord or belt transmission members between the several operative parts necessitates. My improved construction also makes possible a shallower metal shell for the motor and other operative parts, thus rendering my device of correspondingly greater utility in reaching under furniture to make the cleaning operation as thorough as possible.

In the drawings:

Figure 1 is a side sectional elevation of my improved construction.

Figure 2 is a sectional elevation along the line 2—2 of Figure 1 and looking in the direction of the arrows there shown.

Figure 3 is a similar elevational view along the line 3—3 of Figure 1, and looking in the direction of the arrows.

Figure 4 is a detail plan view, partly in sections.

A represents the shell or casing of the cleaner, designed to be pushed along in front of the operator by means of the handle B, from which is suspended the dust-collecting bag C, whose mouth fits over the outlet aperture D in the shell A. A triangularly shaped space T is formed between the fan casing and the tapered enclosing wall surrounding the adjacent end of the armature L, constituting a suction bay for the air indrawn toward the fan J, before it passes out through the aperture D. Rollers or casters E support the entire shell at a suitable distance above the floor or carpeted surface to be cleaned. The inlet slot F is located in the bottom of the casing, near its forward end, and as usual extends transversely of the casing, as brought out particularly in Figure 4.

Within the casing is a partition wall G which with the adjacent casing wall forms the passage H, leading from the inlet slot F to the suction fan J, which is located at the rear of the shell adjacent the outlet aperture D, and is mounted on the shaft K, which is journaled in the bearings O, and which also carries the armature L and commutator Q, outside of which are located the field coils I; both end journalings of the shaft are thus wholly protected and isolated from the path of the dust-laden air current, which is guided along the passage H. The air passage arches the motor in a direction longitudinally of the vacuum cleaner and extends upwardly and rearwardly from the inlet at an inclination and then horizontally in a rearward direction and then downwardly and rearwardly at an inclination to the outlet. The forward end of the shaft K carries a friction pulley M, preferably of aluminum or similar friction metal, which operatively engages the periphery of the fiber disk N, which with the fiber disk P is rotatably carried on the shaft R. The outer end of the fiber disk P is located just within the adjacent portion of the partition or inner wall G, through a very narrow aperture in which projects the relatively thin friction disk S, with whose surface near its edge the face of the fiber disk P is in frictional engagement. This disk S is in turn mounted on the shaft or central stem of the brush V. These several friction members are enclosed and thus protected against the dust in the passage H, by the branch wall G′ and the wall G already referred to. The brush V being located just above and in parallel relation to the inlet slot F catches the lint and similar fabric particles drawn in therethrough by the suction, while permitting the dust to pass on through the passage H, through the fan J, and ultimately into the bag C.

In Figures 1, 3 and 4, I have shown a useful adjunct by means of which I may temporarily disconnect the brush from receiving rotative actuation from the armature shaft K without halting its rotation. It consists of an arm U pivoted at its lower end to the inner face of the shell A, while supporting with its upper end the shaft R, which carries the discs N and P. This arm V is nor-

mally and yieldingly drawn by the spring V, so that the peripheral edge of the disk N is in frictional engagement with the pulley M, which thus rotatively actuates it and its connected parts as already described. Connected with the arm U, however, is a lever or link W, which is notched as at X, while its outer end projects outside the casing A through the aperture W'. If this lever or link is drawn outwardly against the pull of the spring V until the notched portion X can engage over the surrounding edge of the shell wall A, it can thus be anchored sufficiently far from its normal position to draw the arm U and consequently the disk N away from the aluminum pulley M, from which it consequently no longer receives rotative actuation and the rotative actuation of the brush V ceases accordingly. Whenever the notched portion X is detached from its engagement with the edge of the aperture W', the pull of the spring Y draws the disk N into contact with the aluminum pulley M once more, and the rotation of the disks N and P and of the aluminum disk S and brush V is resumed accordingly.

This possibility of disconnecting the brush V from sharing the rotative movement of the shaft K makes my device easily adaptable to the cleaning of walls and similar smooth and hard surfaces, where the suction action of the fan J on the inlet aperture F is all that is needed; and where indeed the added action of the brush is often positively undesired. On the other hand, when the positive and reliable rotation of the brush V is desired, this is cared for by the action of the spring thrust collar Z, which, by its yielding opposition to end thrust upon the shaft of the brush V, tends to keep its aluminum disk S in frictional engagement with the fiber disk P.

My construction thus embodies complete housing of the bearing and power-transmission parts against clogging with dust or lint, and makes possible the entire omission of endless belting or similar unreliable and easily misplaceable parts. And since all of the power-transmitting parts are located forward of both the fan and the armature, the height of the casing and its consequent usefulness in reaching under articles of furniture, is limited only by the chosen diameter of the fan member and of the armature. Moreover, the use of frictionally driven power-transmitting members between the armature shaft K and the brush V involves a sufficient degree of automatic slippage so that if ravelings from a carpet or even harder obstructing articles are drawn in through the inlet aperture F, their tendency to block or at least retard the further rotative movement of the brush does not result in any stripping of gears and consequent disablement of the mechanism, such as would be the case if the armature shaft K and the brush shaft V were positively connected by a train of gearing.

What I claim is:

A vacuum cleaner, having in combination with a plurally apertured casing, a partition member constituting, with the adjacent top portion of the casing, an air passage at either end of which the apertures in the casing are located, a brush member rotatably journaled in said air passage adjacent the inlet aperture, a motor member protected by said partition member from access of the air passing through said passage, a fan member carried on the projecting end of the shaft of said motor adjacent the outlet aperture in the casing, a series of friction driving members operatively connecting said motor member and said brush, and externally accessible means whereby said last named members may be temporarily rendered inactive.

In testimony whereof, I sign this specification in the presence of two witnesses.

STEPHEN J. BOYER.

Witnesses:
WILLIAM M. SWAN,
EDWARD P. ECHLIN.