J. W. SHANAHAN & F. C. MASON.

VACUUM CLEANER.

APPLICATION FILED AUG. 17, 1914.

1,222,477.

Patented Apr. 10, 1917.

2 SHEETS—SHEET 1.

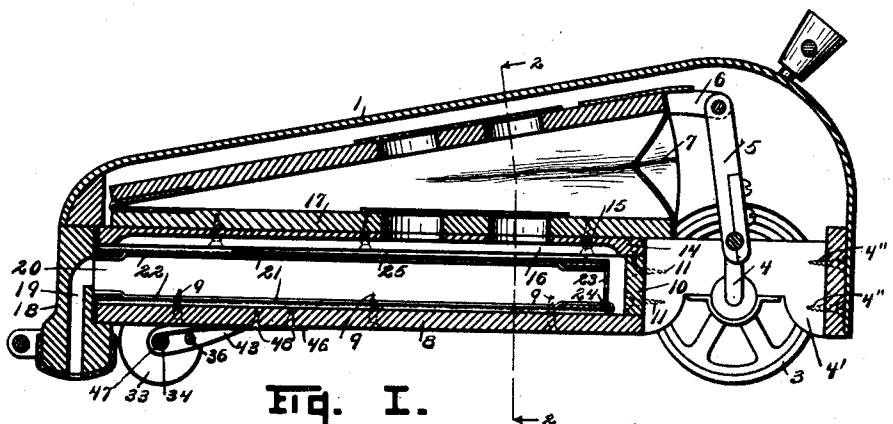

Fig. I.

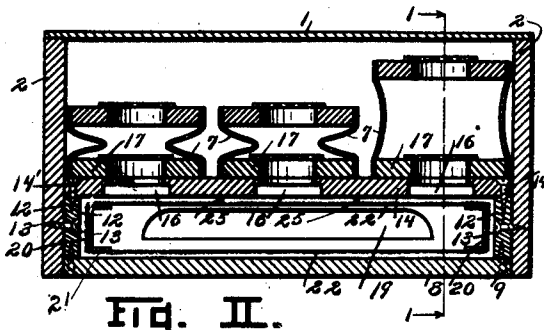

Fig. II.

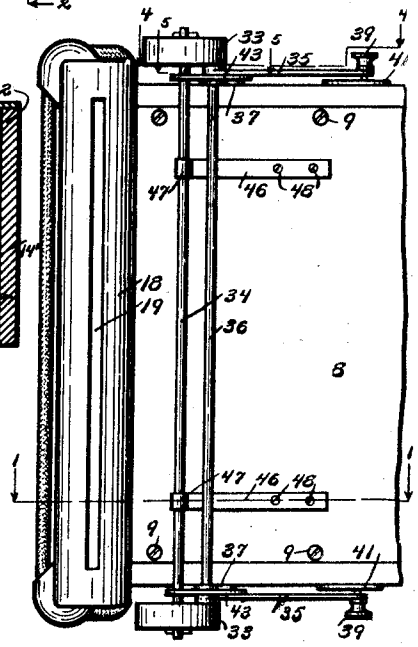

Fig. III.

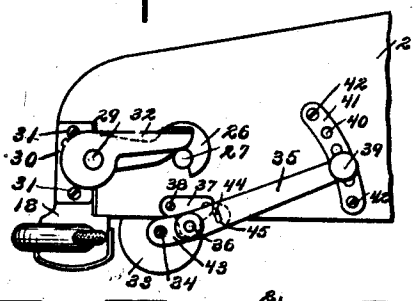

Fig. IV.

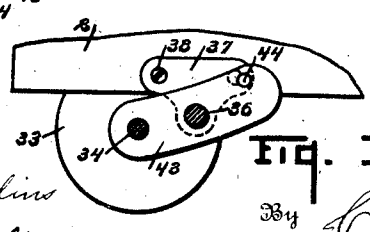

Fig. V.

Witnesses

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2 SHEETS—SHEET 2.

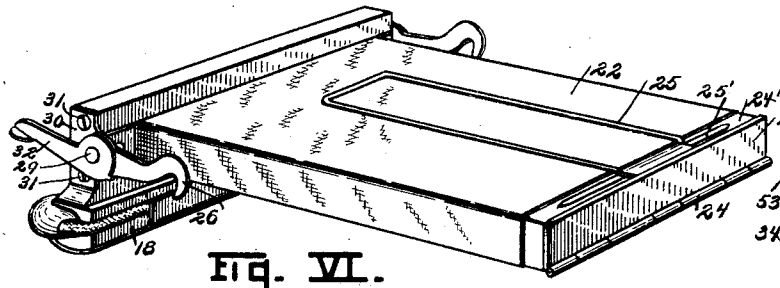

Fig. VI.

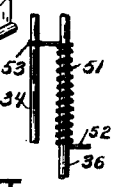

Fig. XI.

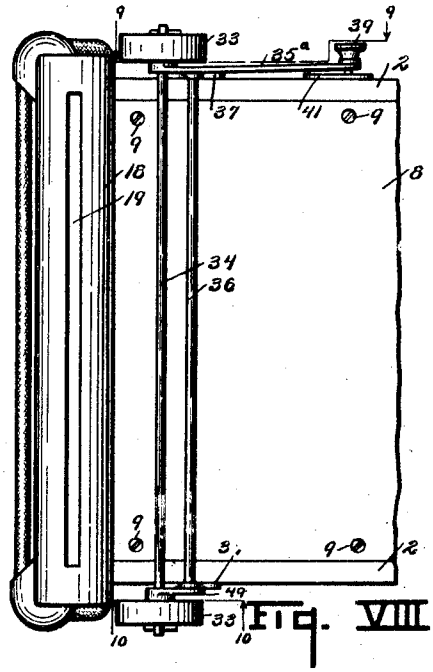

Fig. VIII.

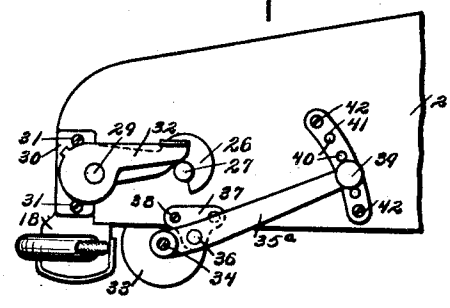

Fig. IX.

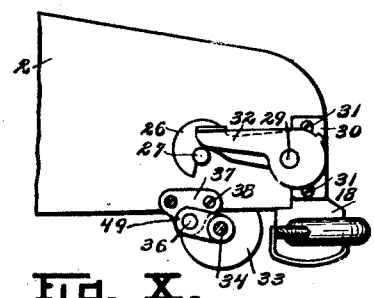

Fig. X.

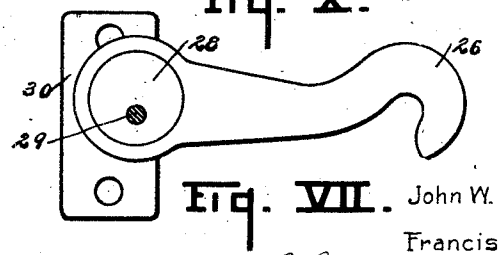

Fig. VII.

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UNITED STATES PATENT OFFICE.

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VACUUM-CLEANER.

1,222,477. Specification of Letters Patent. Patented Apr. 10, 1917.

Application filed August 17, 1914. Serial No. 857,134.

To all whom it may concern:

Be it known that we, JOHN W. SHANAHAN and FRANCIS C. MASON, citizens of the United States, residing at Grand Rapids, Michigan, have invented certain new and useful Improvements in Vacuum-Cleaners, of which the following is a specification.

This invention relates to improvements in vacuum cleaners. While the improvements are here shown especially adapted to hand-operated vacuum cleaners, they are also available for those which make use of the application of power.

The objects of this invention are:

First, to provide an improved construction of bellows supporting board and bellows guard means.

Second, to provide an improved construction of dust collecting receptacle.

Third, to provide an improved attaching means for the nozzle structure.

Fourth, to provide improved nozzle supporting means that are resilient and capable of regulation when desired.

Further objects will appear from the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure embodying a preferred form of our invention is fully illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a longitudinal vertical sectional elevation of a vacuum cleaner embodying our invention, taken on a line corresponding to line 1—1 of Figs. II and III.

Fig. II is a detail vertical sectional view taken on the irregular line 2—2 of Fig. I, showing the cross section of the bellows and dust receptacle and their various compartments.

Fig. III is an inverted detail plan view of the forward end of our improved vacuum cleaner.

Fig. IV is a detail side elevation view of the front portion of our improved vacuum cleaner, showing the adjusting means for regulating the height of the nozzle and details of the attaching means for the nozzle block, the axle 34 being in section on line 4—4 of Fig. III.

Fig. V is an enlarged detail sectional elevation view taken on a line corresponding to line 5—5 of Fig. III, showing the supporting rods and the equalizer means for the carrying wheels.

Fig. VI is a detail perspective view of the dust collecting receptacle removed from the vacuum cleaner, showing the arrangement of the handle to the closing door to serve as a guard between the dust collecting receptacle and the bellows.

Fig. VII is an enlarged detail view of one of the attaching hooks for attaching the nozzle, showing the eccentric for operating the same.

Fig. VIII is an inverted detail plan view of a modified structure, corresponding to the view illustrated in Fig. III, showing adjustability with the yielding spring feature omitted.

Fig. IX is a detail sectional elevation view taken on a line corresponding to line 9—9 of Fig. VIII, showing the said adjustable carrying wheel structure.

Fig. X is a detail sectional elevation view taken on a line corresponding to line 10—10 of Fig. VIII, showing the adjusting arm at that point.

Fig. XI is a detail view of a modified form of the spring for holding the nozzle carrying wheels yieldingly in position.

In the drawing, sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar numerals of reference refer to similar parts throughout the several views.

Referring to the numbered parts of the drawing, our improved vacuum cleaner is inclosed in a general casing 1 provided with comparatively thick sides 2, 2 which serve to support the remaining parts. The usual handle 2^a is provided. Carrying and driving wheels 3, 3 are disposed toward the rear of the same and are secured to crank axle 4 which is journaled in supporting blocks 4' (see Fig. I), and is connected by pitmen 5 to the arms 6 of a series of bellows 7, preferably three in number. The blocks 4' are secured by screws 4'' or in any other way. The bottom board 17 of the bellows is retained in place on the top 14 of the dust collecting receptacle box by upwardly pointing screws 15 through said top.

The box or compartment for the dust collecting receptacle is disposed below the bellows chamber, and is made knockdown or

detachable, so that the various parts of our improved vacuum cleaner are readily accessible. This box consists of a bottom 8 which is secured by upward pointing screws 9 to the end 10 and the sides 12 thereof (see Figs. I and II). The end 10 is secured to the supporting blocks 4' by the laterally extending screws 11, and the sides 12 are secured to the sides 2 of the case by outwardly pointing screws 13. Downwardly projecting screws 14' secure the top board 14 to the sides 12 and the end 10.

From this description it will be seen that the entire structure is accessible by withdrawing the screws 9. The bottom board 8 may then be removed when the lateral screws through the sides and ends may be withdrawn and the upwardly pointing screws 15 may be withdrawn and the dust receptacle box removed. The top 14 may then be detached, if it is desired to completely disassemble the top, by withdrawing screws 14'. Also, if made in this way, the parts are very readily and securely assembled by screws, glue joints being avoided thereby, and a structure that can be readily taken apart for inspection and repairs is produced.

We provide the top board 14 on its underside with longitudinal grooves 16 leading to the openings to the bellows intake valves. These serve a very useful purpose in giving air clearance for the dust collecting receptacle. The parts between the grooves are in effect ribs to hold the dust collecting fabric out of contact with the bellows board.

The nozzle block 18 is made detachable, and is provided with passage 19 delivering into the dust collecting receptacle. The dust collecting receptacle is made up of a frame comprising side bars 20, 20 formed with inwardly projecting flanges 21 to stiffen and strengthen the same. These are secured by suitable means to the detachable nozzle block 18. A dust filtering fabric 22 is disposed around the same and is preferably quite taut. At the inner end of the frame is a door 23 with hinges 24 on a suitable door frame 24' for the discharge opening. A handle 25 consisting of an elongated bail or loop is secured to the door 24 and is disposed on top of the filtering fabric 22 of the dust collecting receptacle and holds the same down away from the bellows to insure full action of the partial vacuum formed thereby. A suitable snap catch 25' is provided for retaining the door in its closed position.

The nozzle block to which the dust collecting receptacle is attached is detachably secured in place by the hooks 26 at each side, each of which is carried on an eccentric 28 which is pivoted on a pin 29 on a plate 30. Each hook 26 engages a pin 27 on the corresponding side of the casing. Each plate 30 is retained in place on the ends of the nozzle block 18 by screws 31, 31. A handle 32 is provided for turning each eccentric 28 to actuate the corresponding hook 26 and draw the nozzle block tightly into position against a suitable gasket to make an air tight joint.

The front end of our improved vacuum cleaner is carried on wheels 33, 33 at the sides thereof, which are journaled on the opposite ends of the rod 34. An adjusting lever 35 is secured on the opposite ends of the rock shaft 36, which is carried by little brackets 37 secured to the opposite sides 2 of the case by screws 38 (see Fig. IV). This adjustment is accomplished by the pin 39 carried by the end of the lever 35 which is adjustable in holes 40 in the plate 41 which is secured to the sides of the case by screws 42, 42. Rock shaft arms 43 are secured to the rock shaft 36 at each end and project downwardly and forwardly and carry the rod 34. The arms 43 project along the levers 35 and are provided with outwardly projecting pins 44 which are disposed in the transversely disposed slots 45 in the levers 35. A pair of springs 46 turned into eyes 47 at their forward ends to embrace the rod 34 are secured by screws 48 to the underside of the bottom board 8 and serve to hold the shaft 34 with its wheels 33 yieldingly downward, thus holding the nozzle of our improved vacuum cleaner slightly elevated, but so that the same will yield readily when pressure is applied to the operating handle.

It will be seen that by this means the carrying wheels 33, while they are yielding, are adjustable through considerable limits, making it possible to adjust the same with accuracy to a great variety of carpets, varying from thin ingrain carpet to Wilton carpets of deepest pile.

If the user of the vacuum cleaner will take pains to adjust the carrying wheels accurately for each particular piece of work, the spring feature can be entirely dispensed with, and in Figs. VIII, IX and X we show a modification in which there is substituted for the rock shaft arms 43 a lever 35ª which is rigidly secured to the rock shaft 36 and a rock shaft arm 49 is rigidly secured to the opposite end of the rock shaft 36, so that when the lever 35ª is adjusted the same as the lever 35, the elevation of both the carrying wheels will also be definitely adjusted to just the right position for the particular job of work required.

It is possible to modify the springs and in place of the preferred springs 46 we show in Fig. XI a coiled spring 51 coiled upon the rock shaft 36 with its end 52 projecting to contact with the bottom of the case and its opposite end 53 looped over the rod 34 to urge the same yieldingly downward. We further bring attention to the fact that when spring action only is required, the rock shaft 36, the adjusting levers 35 and their adjust-

ing means, and the brackets 37, 37, and all that they carry may be omitted, and the rod 34 be carried by the springs 46, only the eyes 47 serving to hold the same. A very effective structure is thus produced which is exceedingly economical of manufacture and by setting the springs 46 to the average conditions a very satisfactory suction cleaner for all ordinary uses is produced which adapts itself quite readily to the varying conditions.

We have described our invention in its most approved form but we are aware that our improved vacuum cleaner is capable of considerable modification without departing from the broad features of our invention.

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

1. In a vacuum cleaner, the combination of a suitable casing provided with a suction nozzle toward the front thereof, carrying wheels toward the front end of said casing revoluble on the end of a suitable axle beneath the same, a rock shaft beneath the said casing, arms connecting said rock shaft to said axle, adjusting levers with suitable transverse slots therein, pins on said rock shaft arms extending into said slots, adjusting means on the side of said casing for adjusting said levers, and springs secured to the underside of said casing connecting to the said rod axles to urge the said carrying wheels yieldingly downward, all coacting substantially as described for the purpose specified.

2. In a vacuum cleaner, the combination of a suitable casing provided with a suction nozzle toward the front thereof, carrying wheels toward the front end of said casing revoluble on the end of a suitable axle beneath the same, a rock shaft beneath the said casing, arms connecting said rock shaft to said axle, adjusting levers with suitable transverse slots therein, pins on said rock shaft arms extending into said slots, adjusting means on the side of said casing for adjusting said lever, and spring means to urge the said carrying wheels yieldingly downward, all coacting substantially as described for the purpose specified.

3. In a vacuum cleaner, the combination of a suitable casing provided with a suction nozzle toward the front thereof, carrying wheels toward the front end of said casing revoluble on the end of a suitable axle beneath the same, a rock shaft beneath the said casing, arms connecting said rock shaft to said axle, an adjusting lever, and adjusting means on the side of said casing for adjusting said lever, all coacting substantially as described for the purpose specified.

4. In a vacuum cleaner, the combination of a suitable casing provided with a suction nozzle toward the front thereof, carrying wheels toward the front end of said casing revoluble on the end of a suitable axle beneath the same, a rock shaft beneath the said casing, arms connecting said rock shaft to said axle, and spring means to urge the said carrying wheels yieldingly downwardly, all coacting substantially as described for the purpose specified.

In witness whereof, we have hereunto set our hands and seals in the presence of two witnesses.

JOHN W. SHANAHAN. [L. S.]
FRANCIS C. MASON. [L. S.]

Witnesses:
JOHN A. COLLINS,
ELIZABETH C. SCHOPPS.