H. E. FANSHAWE.

VACUUM CLEANING APPARATUS.

APPLICATION FILED FEB. 10, 1909.

954,726.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.

FIG. 2.

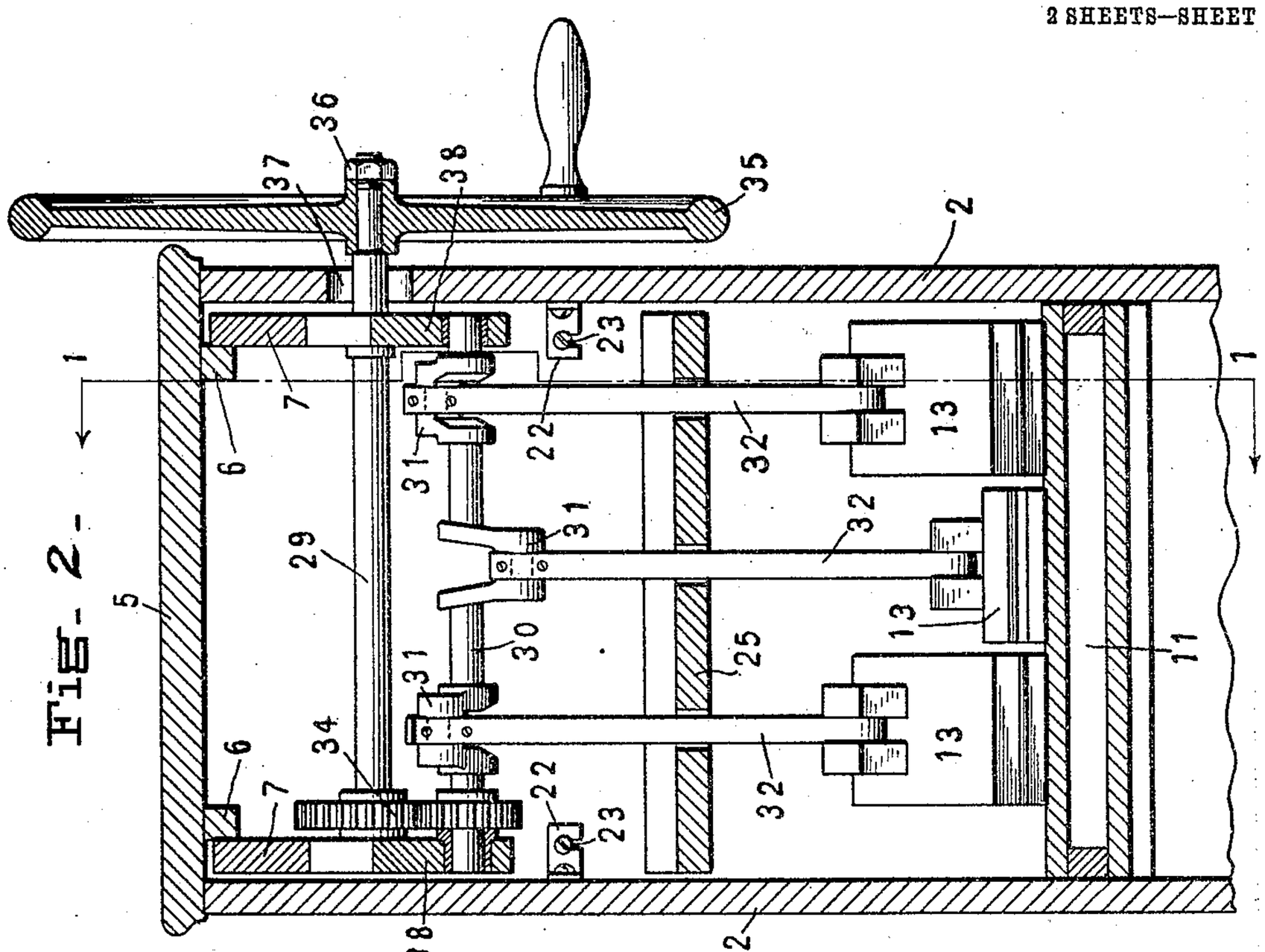
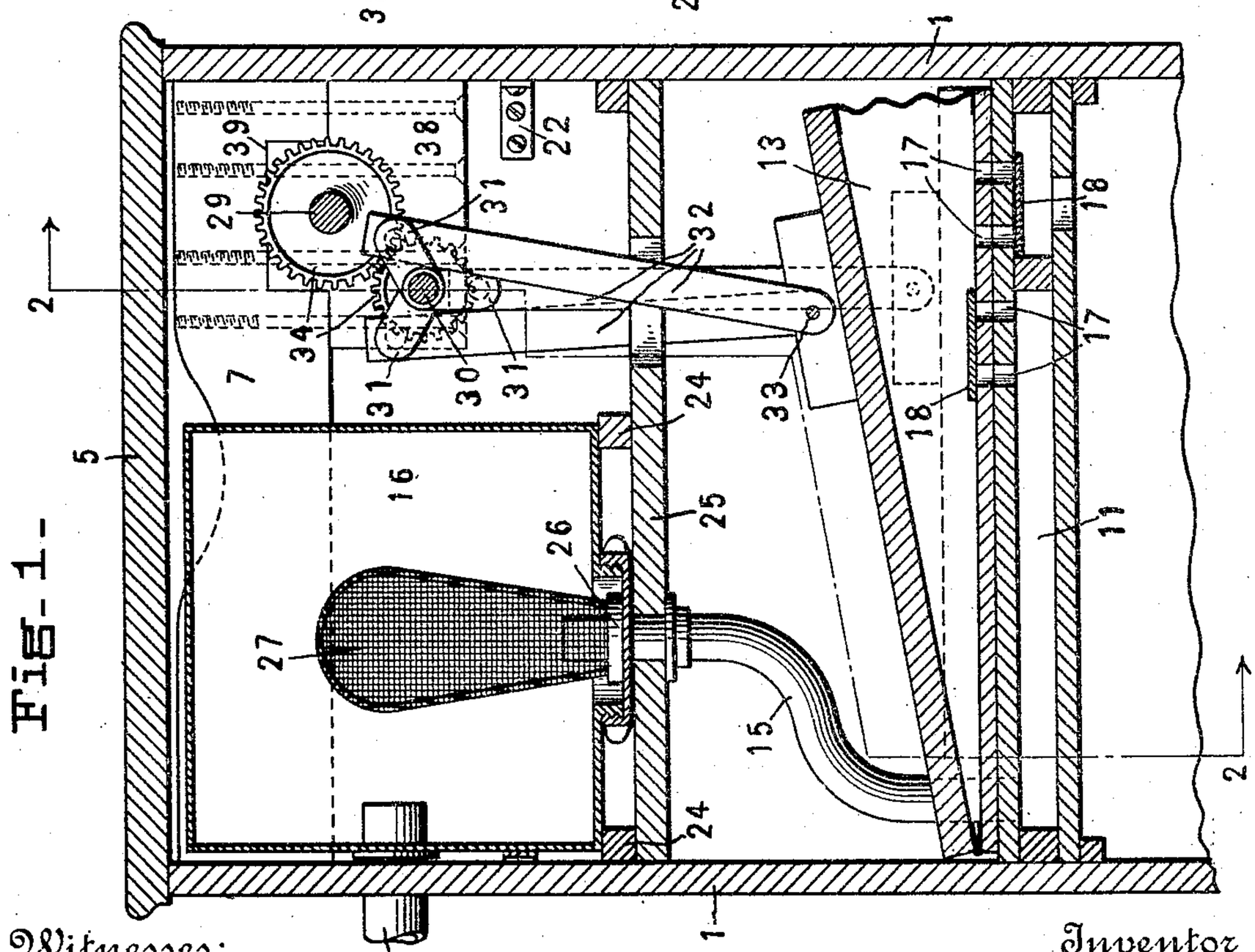



FIG. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

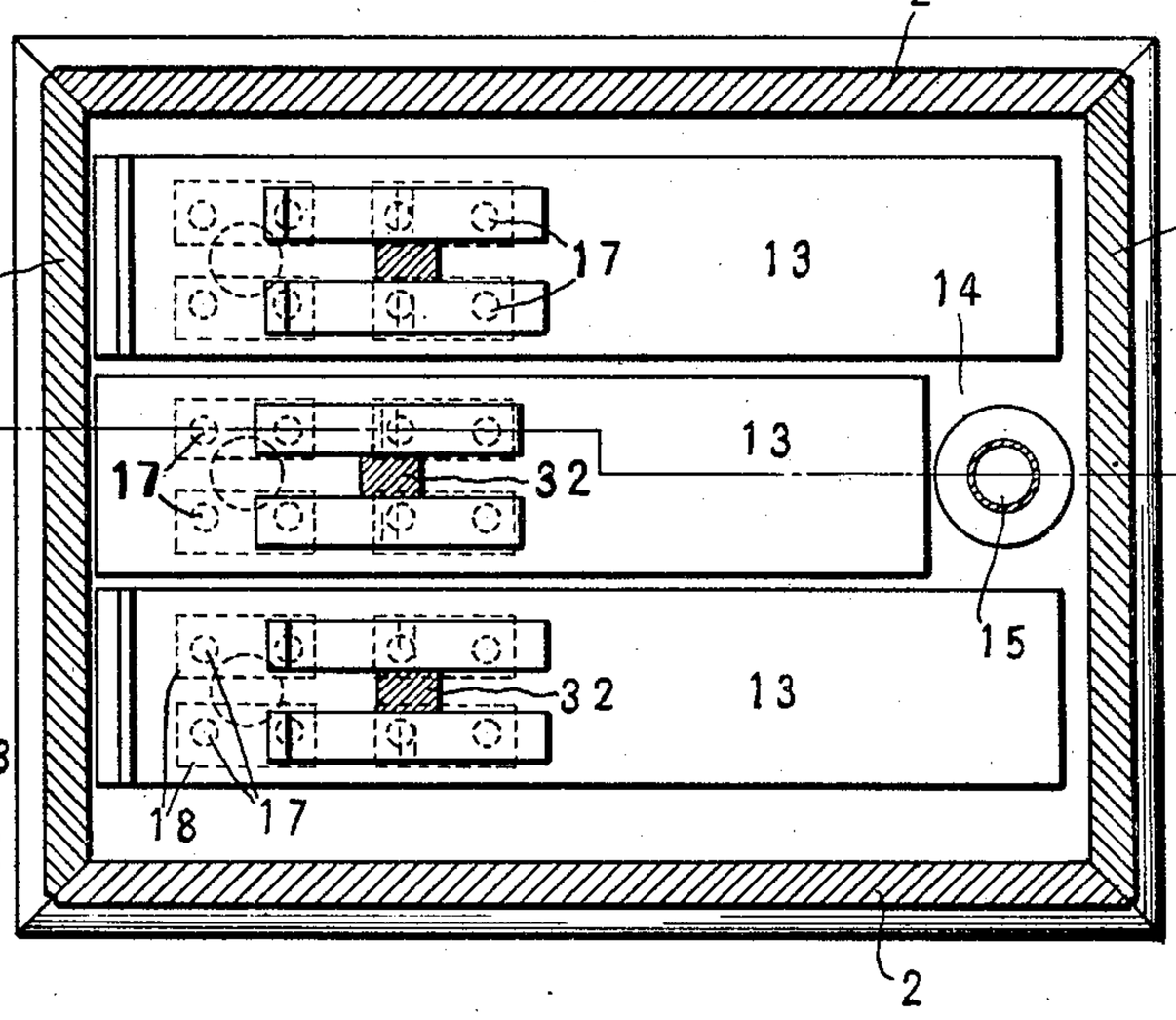


Fig. 7.

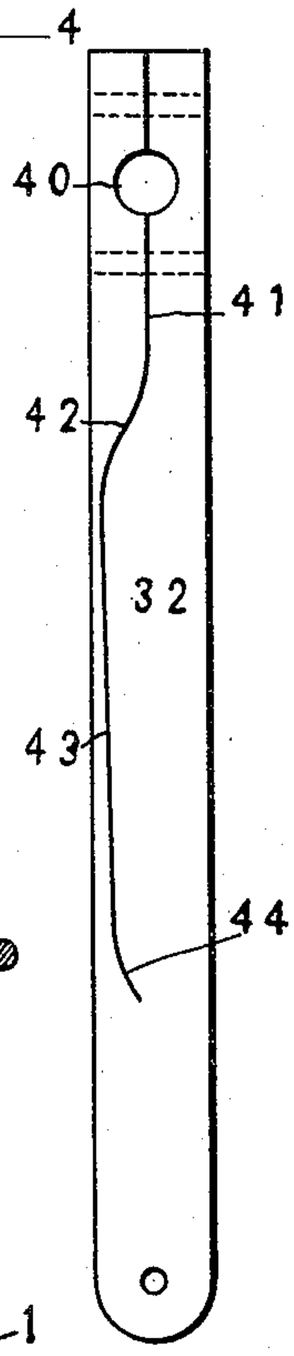


Fig. 5.

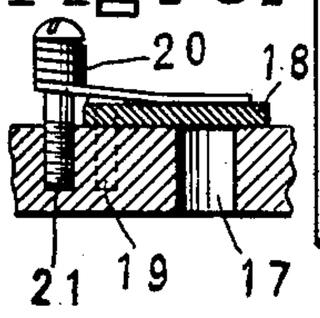


Fig. 6.

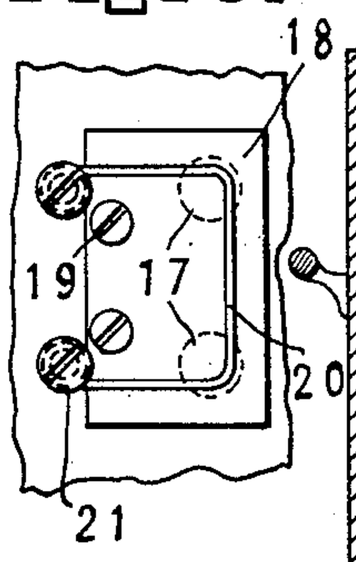


Fig. 4.




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# UNITED STATES PATENT OFFICE.

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## VACUUM CLEANING APPARATUS.

954,726. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed February 10, 1909. Serial No. 477,105.

*To all whom it may concern:*

Be it known that I, HENRY E. FANSHAWE, a citizen of the United States, and a resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Vacuum Cleaning Apparatus, of which the following is a specification.

My invention relates to improvements in vacuum cleaning apparatus and the main object of the invention is to provide a device of this character which may be operated either manually or by other suitable power, which may be readily shifted from place to place, and which will operate to thoroughly and quickly remove all dust, dirt, or other foreign matter.

With the foregoing and similar objects in view, the invention resides in mounting the wind chest in the casing so as to form a horizontal partition therein, supporting the bellows on top of the wind chest, in mounting the operating means for the bellows and the box or receptacle above the bellows and separated therefrom, and in connecting the receptacle with the wind chest so as not to interfere with the bellows.

Another feature of the invention consists in providing the casing of the apparatus with fixed and removable sides and in supporting the different parts of the mechanism on the fixed sides so that the removable sides may be readily detached to permit access to the interior of the casing.

Other features of the invention are means for supporting the apparatus, which is normally easily portable, stationary, when so desired, and a novel form of gearing between the power shaft and the crank shaft.

While the structure and combinations above set forth comprise the preferred embodiment of the invention, I do not wish to limit myself to these particular features, as various changes and modifications may be made as come clearly within the legal intent of the appended claims.

Figure 1 is a vertical sectional view of the upper portion of the apparatus taken on the section line 1—1 of Fig. 2. Fig. 2 is a similar view taken on a plane at right angles to that of Fig. 1. Fig. 3 is a horizontal sectional view of the device looking downward on the bellows and the top of the wind chest. Fig. 4 is a vertical sectional view of the lower portion of the apparatus taken on the line 4—4 of Fig. 3. Fig. 5 is a detail cross sectional view of one of the flap valves and the mounting therefor. Fig. 6 is a top plan view of the same. Fig. 7 is a detached detail view of one of the pitmen for the bellows.

In the preferred embodiment of my invention the casing of the apparatus is made with a pair of fixed sides 1, and a pair of removable sides 2, the removable sides preferably having a rabbeted connection with the bottom 3, as illustrated at 4. The purpose of making certain of the sides removable is to render the interior parts of the mechanism more accessible for inspection or regulation, but it is obvious that this feature of removability is not an absolutely essential feature of the invention and may be dispensed with, if so desired. Also, instead of making two of the sides removable, only one side could be made so. The top 5 of the casing is also preferably made easily removable and is normally held in place by the cleats 6, which engage the supporting and spacing bars 7, these bars extending between the fixed sides and serving to brace the sides apart as well as to support a portion of the driving mechanism. In order to make a secure corner joint, the removable sides are preferably joined to the fixed sides by means of the angular latch members 22, which engage the headed projections 23, on the inner walls of the fixed sides.

The apparatus is preferably mounted on casters 8 so as to be easily moved from place to place; and to hold the device stationary, when so desired, extensible studs or supports 9 are carried by the bottom and are adapted to be projected below the casters so as to lift the apparatus off the casters and thus support the device stationarily. These supports preferably take the form of screw pins, which, as shown, are engaged direct in the bottom of the casing. The angular brackets 10 assist in securing the fixed sides to the bottom.

The wind chest 11 is preferably mounted horizontally in the casing and supported between the fixed sides so as to constitute a horizontal partition, dividing the casing into a lower exhaust compartment 12, and an upper chamber in which is mounted the bellows and other parts. Any number of bellows 13 may be used and these bellows are preferably supported directly on top of the wind chest, and when so mounted, one or more of the bellows (the center one in the

present instance) is made shorter than the rest so as to leave a clear unoccupied space 14 on top of the wind chest, through which unoccupied portion is passed the conductor tube 15 which leads from the receptacle 16. By so mounting the bellows on the top of the wind chest, the wind chest and bellows combined occupy but a comparatively small space and as a further advantage, the entire operating mechanism for the bellows may be placed in the top of the casing directly above the bellows, so as to be readily accessible. Also the valve openings 17 between the bellows and wind chest may be formed straight through the wall of the bellows and the top of the wind chest, or the top of the wind chest itself might be used to serve as the lower side to the bellows. In order to avoid having large valves and still provide free passage between the wind chest and bellows, the valve openings are preferably arranged in pairs as shown in Figs. 3, 4 and 6. Each pair of openings are adapted to be closed by a flap valve 18, the flap being of sufficient size to properly cover the openings or ports and being secured along one edge by screws or suitable fastenings 19. These flaps are preferably made of some flexible material such as leather or rubber, so as to have a slight hinge movement. To hold the valves normally closed, springs 20 are employed, these springs preferably being made of spring wire in U-shape with the ends of the wire coiled about the posts 21, as best shown in Figs. 5 and 6. Springs of this formation will hold the valves properly seated and the comparatively long parallel arms or sides of the springs will allow for the proper lifting movement of the valves.

The receptacle is supported in the upper portion of the casing preferably upon the cleats 24 carried by the horizontal support or partition 25. Besides forming a support for the receptacle, this partition forms a separate compartment in the top of the casing for the bellows operating mechanism. The exhaust tube 15 has a slip joint connection 26 with the bottom of the receptacle, and a dust filter 27, of ordinary construction, is mounted therein. The suction tube 28 (only a portion of which is shown) is passed in through the wall of the casing and has slip joint connections with the side of the receptacle.

The operating means for the bellows consists of two shafts 29 and 30 which are mounted parallel in the top of the casing, one of the shafts having cranks 31, on which are engaged the pitmen 32, the other ends of the pitmen being pivoted to the bellows at 33. The two shafts are connected by reduction gearing 34 so that the crank shaft will rotate faster than the driving shaft, and on the outer extended end of the driving shaft is usually mounted a hand wheel 35, but of course when the apparatus is to be operated by other than hand power, a belt pulley, gear wheel or similar contrivance would be substituted for the hand wheel. This hand wheel, pulley, or whatever it may be, is preferably made easily removable from the shaft and for this reason a nut 36 or other removable securing means would preferably be employed for fastening it upon the shaft. The opening in the side of the casing for the passage of the driving shaft is preferably made in the form of a slot 37 to allow for a lifting movement of the side when removing the same. The journal bearings for both the shafts are preferably carried in the same journal block 38 so that the shafts shall always be held in true parallelism, and these journal blocks are supported by the spacing bars 7, they being preferably set into the bars as at 39, so as to hold the journal blocks solidly in place and prevent any lateral play thereof.

I have devised a novel form of pitman for use in my invention and the same is well illustrated in Fig. 7. As shown in the said figure, a crank opening 40 is provided near the upper end of the pitman and a cut or split 41 extends inward from the end of the stick through the crank opening and down a short distance, thence angularly as at 42, toward the edge of the stick, and is then continued down comparatively close to the edge and parallel to the first part of the cut at 43, it finally ending in the inturned curved portion 44. By this arrangement the split end may be readily sprung open to receive the crank. The cut is sufficiently long enough to allow for the proper amount of spring without danger of splitting the stick any farther, the central part of the stick is substantially whole for the greater part of its length so as to receive the full amount of thrust without danger of breaking, and the inturned curve at the inner end of the split serves to obviate the danger of a continued split.

What is claimed is:—

1. In a vacuum cleaning apparatus, a casing, having two fixed and two removable sides, a horizontal wind chest connecting the fixed sides, bellows carried thereby, operating mechanism for the bellows located above the same, a receptacle adjacent to the operating mechanism for the bellows, supporting means for said operating mechanism and receptacle, extending between the fixed sides of the casing carrying the receptacle and operating mechanism, means of connection between the receptacle and wind chest, and a removable cover closing the top of the casing.

2. In an air suction apparatus, the combination with a casing, of a wind chest forming a horizontal partition therein, bellows mounted on top of said partition, means for

actuating the bellows, and a receptacle, all located above the horizontal partition.

3. In an air suction apparatus, the combination with a casing and a wind chest constituting a horizontal partition therein, bellows mounted on top of said partition, a second partition above the bellows, a receptacle removably supported on said second partition, and driving means for the bellows contained in the compartment above the second partition.

4. In an air suction apparatus, the combination with a casing and a wind chest forming a horizontal partition therein, bellows mounted on top of said partition, one of the bellows being shorter than the others, thereby leaving a clear unoccupied space on top of the chest, a receptacle, a connection from said receptacle entering the wind chest through the unoccupied portion in the top thereof, and means for actuating the bellows.

5. In combination with a casing and a wind chest forming a horizontal partition therein, bellows mounted on top of said partition, a supporting partition above the wind chest partition, a receptacle mounted on the supporting partition, a crank shaft journaled in the compartment above the supporting partition, and pitmen on said crank shaft extending down through openings in the supporting partition and connected with the bellows.

6. In combination with a portable casing having stationary and removable sides, a wind chest forming a horizontal partition in the casing, bellows mounted on top of the casing, the bellows arranged to leave an unoccupied space on top of the wind chest, a supporting partition above the wind chest, a receptacle removably mounted on said supporting partition, a crank shaft and a parallel driving shaft journaled in the compartment above the supporting partition, a hand wheel on the extended end of the driving shaft, reduction gearing between the driving shaft and crank shaft, and pitmen on the crank shaft, extending through openings in the supporting partition and connected with the bellows.

7. In combination with a casing and a wind chest therein, bellows on the chest, one of the bellows being shorter to leave an unoccupied space on the chest, a box, connections between the box and the wind chest, entering through the unoccupied portion of the chest, and means for actuating the bellows.

8. In combination with a receptacle, bellows below the dust receptacle, a wind chest beneath the bellows, and connections between the receptacle and wind chest passing clear of and independent from the bellows.

Signed at New York, borough of Manhattan, in the county of New York and State of New York this 8th day of February A. D. 1909.

HENRY E. FANSHAWE.

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