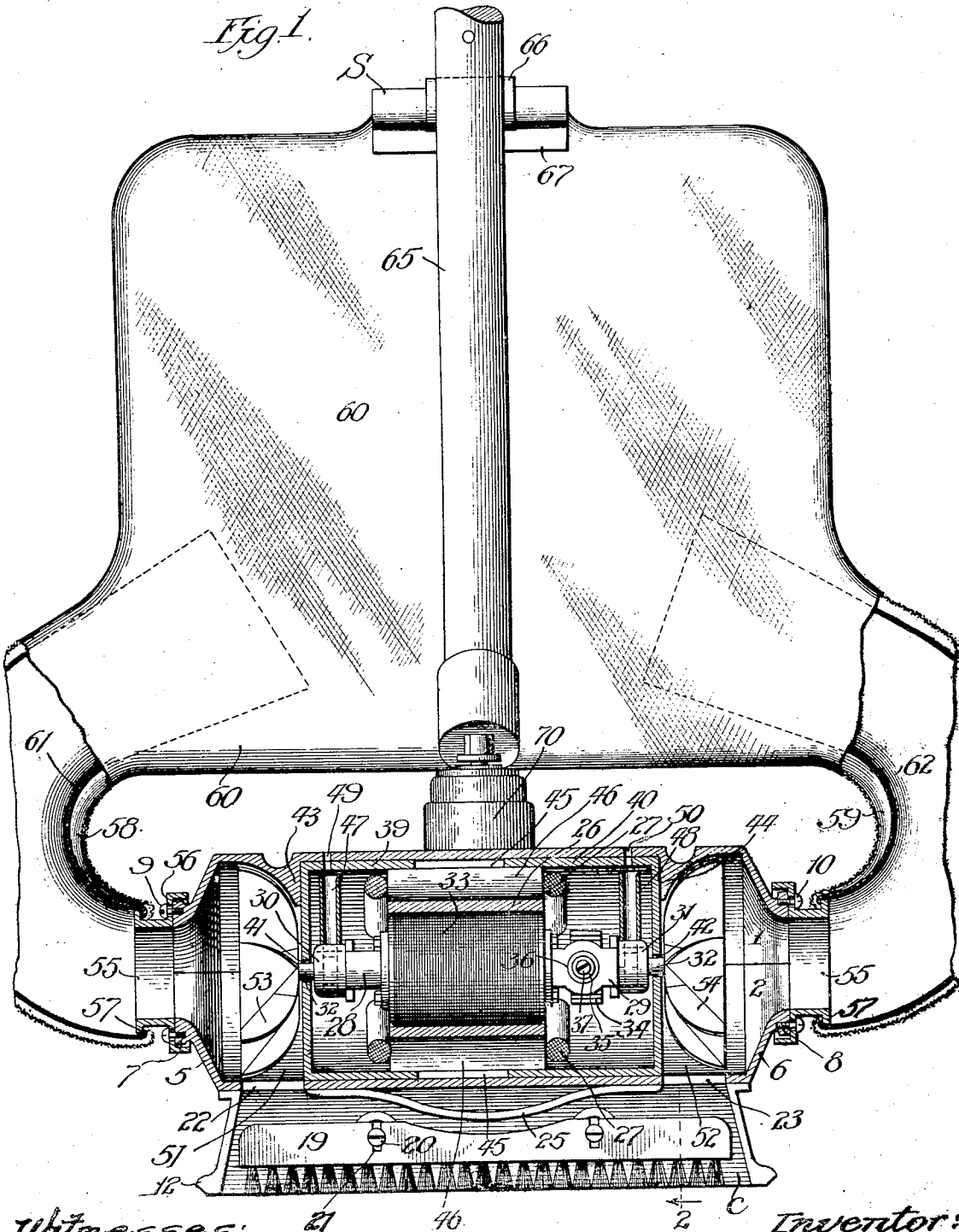


H. TIDEMAN.
 SUCTION CLEANING DEVICE.
 APPLICATION FILED AUG. 25, 1910.

1,205,412.

Patented Nov. 21, 1916.

3 SHEETS—SHEET 1.



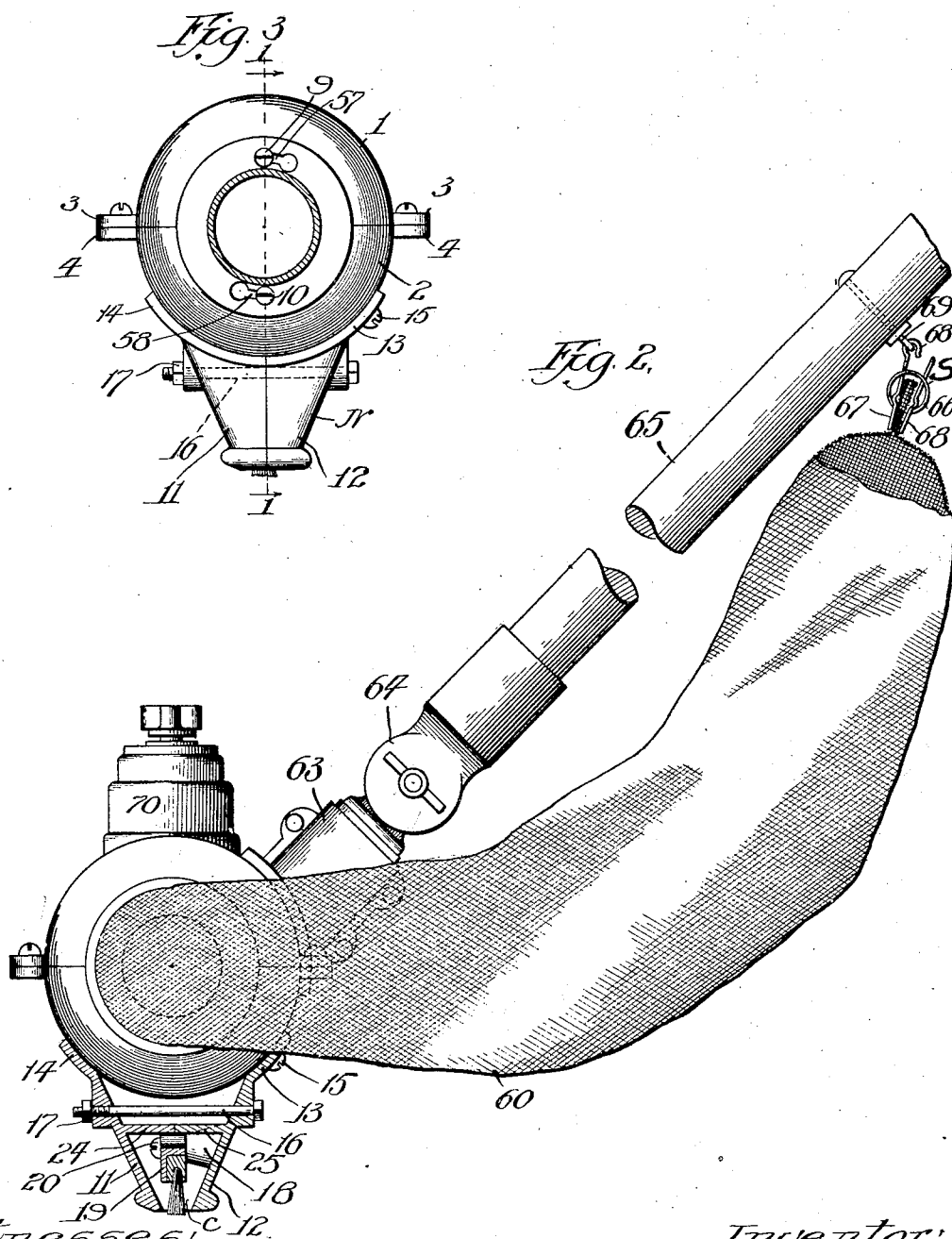
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Witnesses:
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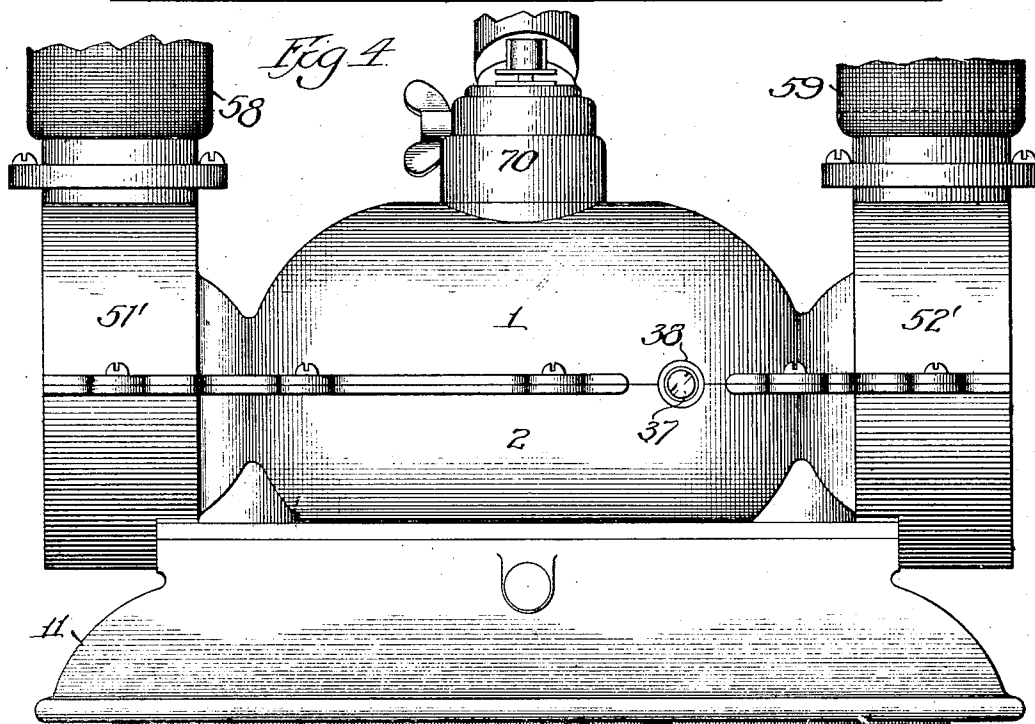
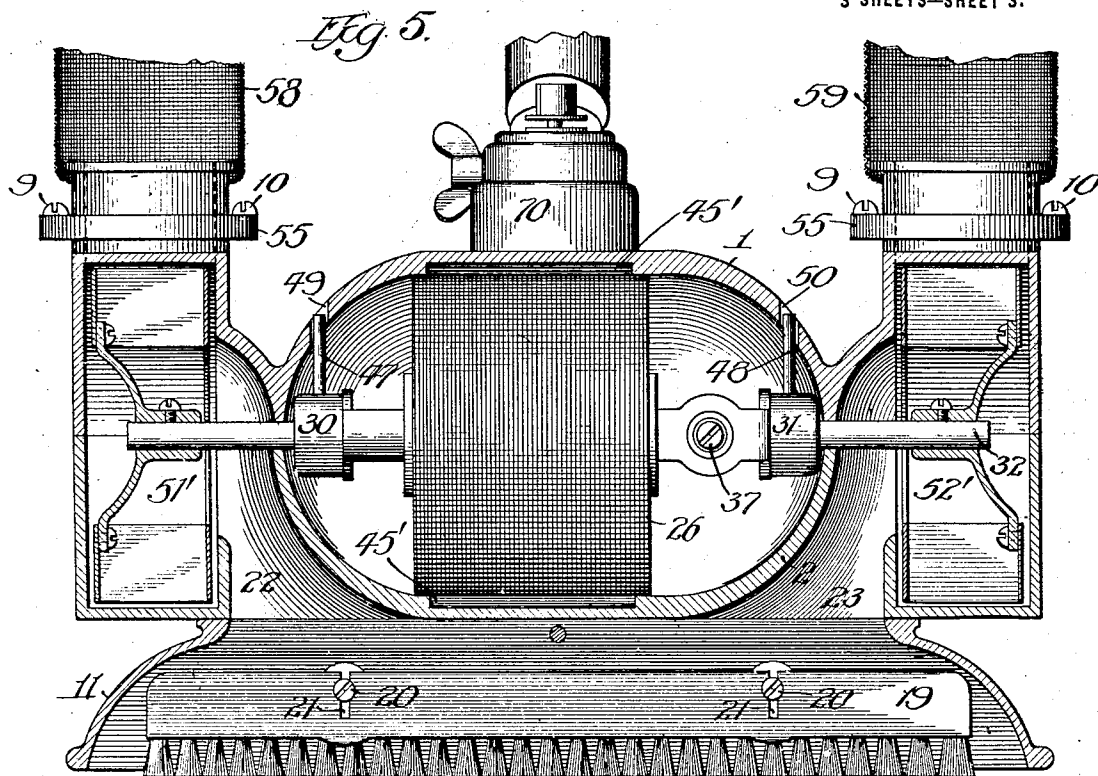
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

HENRY TIDEMAN, OF MENOMINEE, MICHIGAN, ASSIGNOR OF ONE-HALF TO B. B. DOWNS, OF ST. PAUL, MINNESOTA.

SUCTION CLEANING DEVICE.

1,205,412.

Specification of Letters Patent.

Patented Nov. 21, 1916.

Application filed August 25, 1910. Serial No. 578,856.

To all whom it may concern:

Be it known that I, HENRY TIDEMAN, residing at Menominee, in the county of Menominee and State of Michigan, have invented certain new and useful Improvements in Suction Cleaning Devices, of which the following is a full, clear, and precise specification

My invention relates to suction cleaning devices such as sweepers, particularly to that class in which the motor source, the suction producing elements, and the cleaning elements are all included in a unitary structure.

Among the important objects of my invention are to provide a very light and more evenly balanced machine; to provide a retaining frame or housing which comprises a minimum number of parts connected together to be most readily assembled and taken apart; to provide a construction in which the electric driving motor within the housing has its armature shaft extending horizontally to thus bring down the center of gravity as closely as possible to the tool end of the machine; to provide a suction creating member such as a fan at each end of the armature shaft in position to draw air directly through the tool, this construction enabling the use of a much longer suction inlet and greatly increasing the capacity of the machine without materially increasing the weight or size thereof; to provide improved and simplified means for oiling the various bearings within the housing; to provide cooling air spaces adjacent the electric motor to prevent undue heating thereof; to provide for improved connection with the outlet ends of the housing of a dust receiving bag; to provide improved means for said bag for preventing return of dust into the housing when the motor is at rest; and in general to provide all around improved construction of devices of the class referred to.

The various features of my invention will be clearly understood from the following specification and by reference to the accompanying drawings, in which drawings—

Figure 1 is a front elevational view of a machine with the lower part in vertical section along line 1, 1, Fig. 3, Fig. 2 is a side elevational view of the machine with the tool part thereof in vertical section along plane 2, Fig. 1, Fig. 3 is an end view of the

housing part of the machine, showing the manner of connecting the dust bag thereto, Fig. 4 is a front elevational view with the upper parts of the dust bag and handle broken away and showing a modified form of arrangement, and Fig. 5 is a sectional view of the lower part of the machine corresponding to the view in Fig. 1.

In the forms shown in Figs. 1, 2 and 3 the housing is substantially cylindrical in form and comprises the upper and lower halves 1 and 2 having lateral lugs 3 and 4 suitably distributed for locking the halves together. The ends 5 and 6 of the housing are contracted and terminate in coupling flanges 7 and 8 from which extend coupling screws 9 and 10 respectively. The nozzle or tool end N is of conical cross-section and comprises the halves 11 and 12, the halves having flanges 13 and 14 along their upper edges for engaging against the lower half 2 of the housing, the half 12 being rigidly secured to the housing by means of screws 15 passing through the flange 13. The half 11 forms a cover part which is held in place against the housing and the half 12 by screw rods 16 passing transversely through the halves and engaged by nuts 17. With this construction, by removing the nuts 17 the cover part 11 can be removed. The half 12 has also a number of interior shoulders 18 against which a brush frame 19 may be adjustably held by means of screws 20 engaging slots 21 in said brush frame, the brush frame extending entirely across the tool compartment *c* formed by the halves 11 and 12. The lower half 2 of the housing has openings 22 and 23 at its ends communicating with the ends of the brush compartment *c*. In order to assist in maintaining the relative positions of the nozzle halves and also to deflect the inflowing air and dust toward the openings 22 and 23 ribs or baffle plates 24 and 25 are extended from the halves 11 and 12 to meet when these halves are brought together, as shown in Fig. 2.

The driving motor structure comprises a field ring 26 carrying field windings 27 and at its ends supporting bearing brackets 28 and 29 terminating in bearing frames 30 and 31, these bearing frames journaling the armature shaft 32 supporting the armature 33 within the field frame. The shaft between the armature and bearing frame 31

mounts a commutator 34 engaged by brushes 35 mounted in brush holders 36 supported from the frame 29, adjusting screws 37 for the brushes being accessible from the exterior of the housing through openings 38 provided in said housing. Cylindrical caps or ends 39 and 40 engage a distance over the ends of the field ring and have axial openings 41 and 42 for accommodating the armature shaft. The caps or ends with the motor parts therein are inserted between the halves 1 and 2 of the housing with their outer ends abutting against shoulders 43 and 44 provided on the upper half 1 of the housing, and when the housing halves are clamped together the entire motor structure will be rigidly held in place. The inner ends of the caps 39 and 40 do not meet but leave an annular cooling air space 45 about the field ring, this air space being connected with grooves 46 cut across the field ring so that the air space 45 is in communication with the interior of the caps 39 and 40. Tubes 47 and 48 communicate with and extend upwardly from the bearing frames 30 and 31 to receive oil applied through oil holes 49 and 50 cut through the housing wall and through the caps 39 and 40. Oil can be therefore easily and directly supplied to the armature shaft bearings. Between the ends of the shells 39 and 40 and the adjacent ends of the housing the fan compartments 51 and 52 accommodate fans 53 and 54 mounted on the ends of the armature shaft, these compartments communicating with the brush or nozzle compartment through the openings 22 and 23 already referred to. Upon operation of the motor the dust-laden air will be drawn upwardly through the nozzle compartment *c* and into the fan compartments 51 and 52 to be expelled by the fans from the housing frame through the ends thereof surrounded by the flanges 7 and 8. In Figs. 1, 2 and 3 the outlets from the housing are axially disposed, and the flanges 7 and 8 receive coupling heads 55 whose two outer flanges 56 have slots 57 and 58 expanded at one end to receive the heads of the screws 9 and 10, the slots and screws forming a sort of bayonet coupling for locking the coupling heads to the housing ends. To these coupling heads are secured inlet ends 58 and 59 extending from the lower corners of the dust-bag 60 preferably of some textile material which will readily allow air but not dust to pass between its meshes. The dust-laden air expelled by the fans passes through the ends 58 and 59 into the bag, in which the dust is removed from the air and collected. In order to prevent the return of dust into the housing upon stopping of the motor traps 61 and 62 are provided, these traps being in the form of tubular members of cloth secured at one end to the coupling heads 55 together with the

ends 58 and 59, the other ends of the tubes extending a distance into the bag, as shown in Fig. 1. When the motor is in operation the force of the inflowing air will hold the traps extended, but as soon as the motor stops the flexible walls of the traps will collapse to thus prevent return of dust to the housing. A metallic frame extension 63 secured to the housing has adjustable pivotal connection at 64 with the operating handle 65, from which handle the other end of the bag 60 is supported. As best shown in Fig. 2, the end of the bag has an outlet opening which, however, is held close when the machine is in operation by means of an ordinary spring clamping device *S* comprising a cylindrical spring jaw 66 and the jaw plates 67 and 68. The spring clamp is applied to close the outlet of the bag, and the hook 68 provided on one of the clamping plates is engaged with an eye 69 mounted on the handle 65. Thus during operation of the machine the bag is amply supported and held in distended position to receive the dust-laden air and to strain the dust from the air. When the dust is to be removed from the bag and the bag cleaned the clamp *S* is withdrawn from the bag to allow the bag to open, and the dust can then be blown from the bag. The bag can also be entirely removed from the machine and emptied by merely uncoupling the heads 55 from the housing and by disconnecting the bag from the clamp *S*. A circuit controlling switch 70 for the motor can be conveniently mounted on the housing in front of the handle supporting extension 63.

In the modifications shown in Figs. 4 and 5 the housing also comprises an upper and lower half, but the motor field frame 26 is inserted directly between the housing halves without the interposition of caps, as is the case in the arrangement of Fig. 1, the housing halves, however, being grooved to provide the annular air space 45' about the field frame. In this modified form, also, the oil tubes 47, 48 extend to the exterior through the openings 49, 50 in the top half of the housing. Also, the outlets from the housing extend tangentially upwardly from the fan compartments 51' and 52', the flanges 7 and 8 at the outlet ends having the screws 9, 10 for cooperating with the slotted heads 55 in the same manner as shown in Figs. 1 and 3 to couple the bag to the housing. With this modified form of construction and arrangement the device can be used more efficiently for cleaning along corners and base boards, as all parts of the machine, including the bag, are entirely within the ends of the nozzle. The armature core and field frame are of course of magnetic material, but all the other metallic parts are preferably of aluminum in order to make the machine as light as possible.

The machine can therefore by means of its handle be easily moved back and forth over surfaces to be cleaned, and owing to the multiple outlet arrangement maximum suction efficiency is obtained with minimum weight and size. Furthermore, the disposition of outlets at both ends of the housing causes a more uniform distribution of suction effect along the suction inlet than if only one outlet were provided centrally of the machine, as is the case in prior machines of this class. The machine is also better balanced by the provision of an outlet at each horizontal end. Again, by placing the outlets at the end of the housing the motor parts will be separated by only comparatively thin walls from the exterior, and the cooling effect is greater, and the motor parts can be more readily and directly oiled without the use of complicated oil delivery passageways through framework of the machine, as is the case in prior devices. The housing comprising only two parts can be very quickly taken apart to allow inspection or repairs, and likewise the nozzle cover or both parts of the nozzle frame can be quickly and readily detached for adjustment of the brush or for other purposes. The spring clamp which I have provided also allows the bag to be readily opened and closed at its outer end. I do not desire to be limited to the exact forms, construction and arrangements which I have shown, as changes and modifications are possible which

would still come within the scope of my invention, and

I therefore claim the following:

1. In a suction device, the combination of a horizontally disposed motor housing having end compartments, motor mechanism within said housing including a horizontally disposed driving shaft extending into the end compartments of the housing, and fans in said end compartments operatively connected with said shaft to be simultaneously driven thereby, said end compartments having a common inlet and separate outlets said inlet being a long narrow slot-like opening.

2. In a suction device, the combination of a horizontally disposed housing frame necked at its ends to form outlets, a motor frame arranged centrally within said housing and terminating short of the ends thereof to leave fan compartments between the motor frame and said outlets, a fan in each end compartment connected with the motor, and a common inlet to said fan compartments extending throughout the chief width of the device, and having a long narrow slot.

In witness hereof, I hereunto subscribe my name this 22nd day of August, A. D., 1910.

HENRY TIDEMAN.

Witnesses:

LEOPOLD JACKMAN,
A. D. GIBBS.