

H. KOCH.
SUCTION CLEANING DEVICE.
APPLICATION FILED JUNE 4, 1910.

1,016,921.

Patented Feb. 6, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

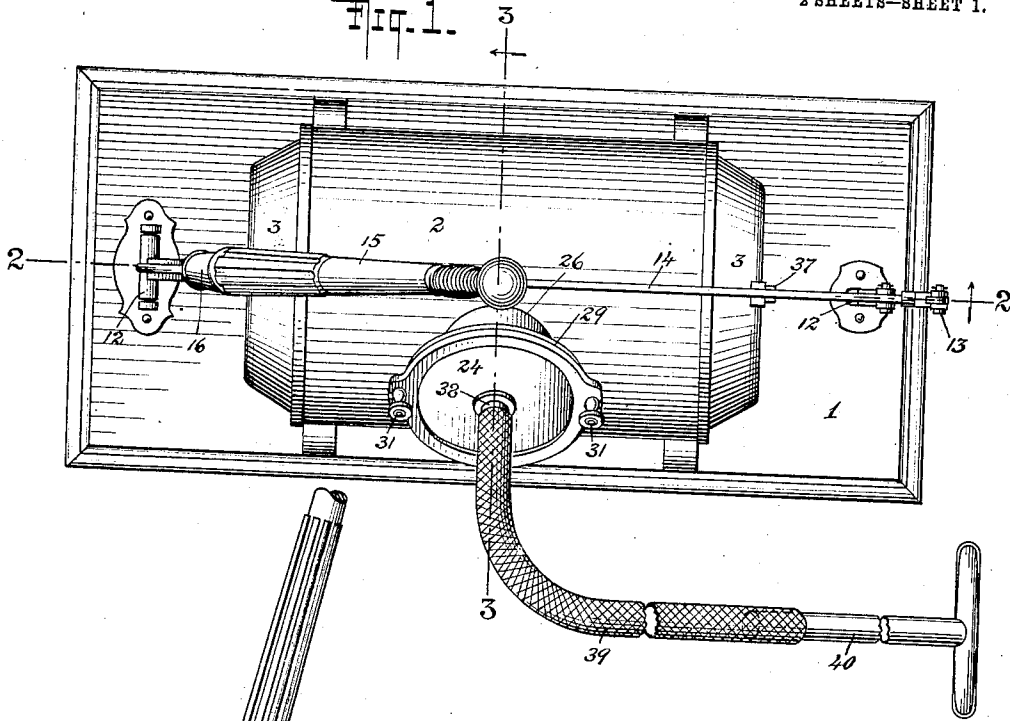
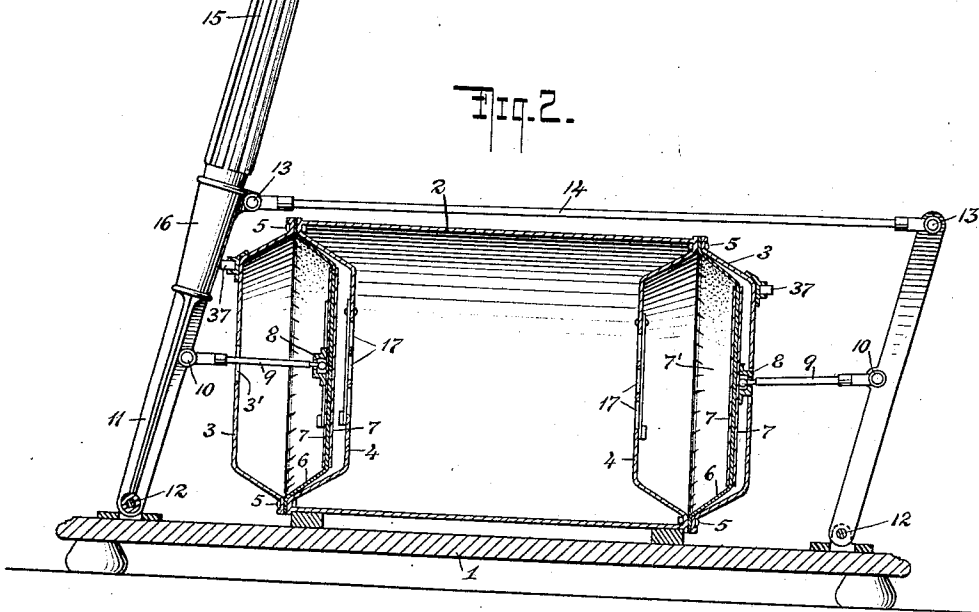


Fig. 2.



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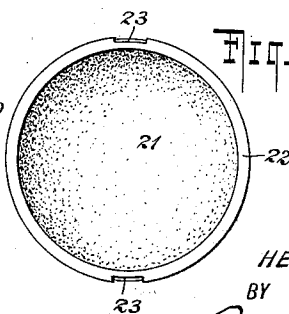
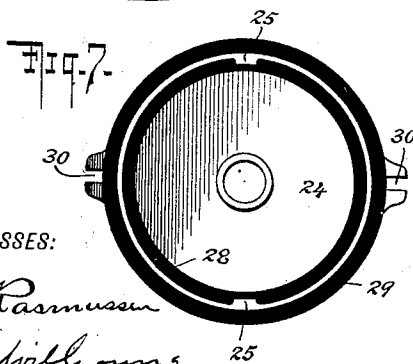
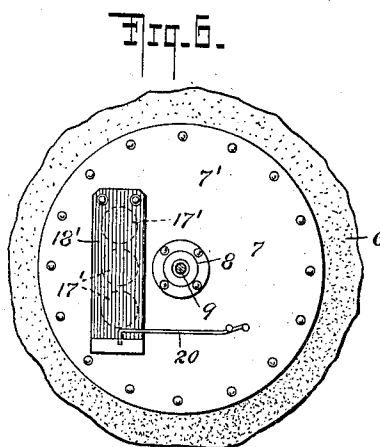
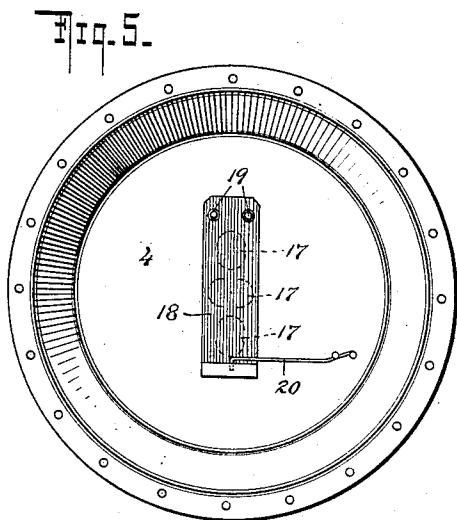
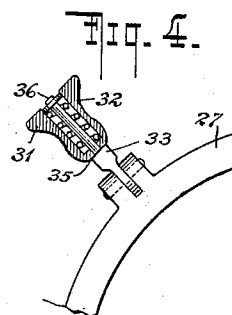
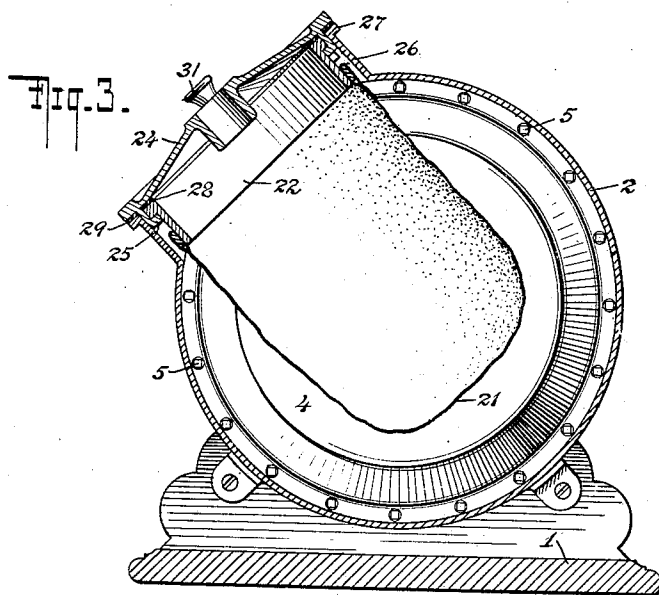
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UNITED STATES PATENT OFFICE.

HENRY KOCH, OF RAHWAY, NEW JERSEY, ASSIGNOR TO THE REGINA COMPANY, OF RAHWAY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SUCTION CLEANING DEVICE.

1,016,921.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Application filed June 4, 1910. Serial No. 564,962.

To all whom it may concern:

Be it known that I, HENRY KOCH, a citizen of the United States, and a resident of Rahway, Union county, State of New Jersey, have invented certain new and useful Improvements in Suction Cleaning Devices, of which the following is a specification.

My invention relates to a portable mechanism to be used for the purpose of cleaning by suction. Such devices are now quite extensively used, more particularly for cleaning carpets, rugs and floors, but incidentally also cleaning walls, ceilings, clothing, portières, furniture and a large number of other articles in common use. Such devices usually require, in addition to a suction mechanism, a suitable nozzle adapted to the particular character of the cleaning which is to be done and, further, include a receptacle or collector for the retention of the dirt and dust which is collected.

My invention relates to the form and arrangement of a main suction chamber, pumps, a dust collector and operating mechanism and has for its object to provide a simplified combination having a minimum number of parts so as to lessen the weight, cost of manufacture and power required for operation.

In the drawings accompanying this specification, which are hereby made a part thereof, Figure 1 is a plan view of a preferred form of my invention; Fig. 2 is a longitudinal section taken along the line 2—2 of Fig. 1; Fig. 3 is a cross section taken along line 3—3 of Fig. 1; Fig. 4 is an enlarged detail showing one of the snap catches used to hold the dust collector in position; Fig. 5 is an enlarged view, looking toward the center, of the diaphragmed head of one of the suction pumps used in my apparatus; Fig. 6 is a similar view of the oscillating diaphragm of one of the suction pumps; Fig. 7 is an enlarged view, taken from below, of the cover plate to which the suction hose and dust collector are attached; and Fig. 8 is a similar view, taken from above, of the mouth of the dust collector and the ring by means of which said dust collector is removably joined to the cover plate.

Referring to the drawings, 1 is a suitable

base provided with feet and having mounted thereon a sheet metal cylinder or body 2 provided at each end with a sheet metal head 3 having the form of a truncated cone; at the center of each head is a hole 3' of generous diameter. Each end is further provided with an inner head 4 similar to 3 but projecting inwardly instead of outwardly. These two heads, may be fastened together and to the body 2 (said body having an inwardly turned flange for this purpose) by peripheral rivets 5 or by any other equivalent means.

Similar suction pumps are provided at each end of the body or suction chamber 2 said pumps forming end walls of said suction chamber and being constituted as follows: At each end of 2 and fastened peripherally between 3 and 4, so as to form a dividing wall herebetween, is a loose disk 6 of flexible leather, upon the two sides of which are mounted concentric metal disks 7 circumferentially riveted together and to 6; the diameter of these disks is preferably a trifle less than that of the smaller ends of heads 3 and 4. The diameter of the leather disk 6 is sufficiently greater than the larger diameter of heads 3 and 4 to enable the metal disks 7, which, with leather disk 6 constitutes the oscillating member of the suction pump, to be carried to and fro so as to nearly contact with said smaller ends of 3 and 4; in this way the oscillating member 7' of the pump sweeps over substantially the entire chamber included between either pair of heads 3 and 4. At the center of the outer metal disks 7 is fixed a casting 8 having flexible attachment to one end of a link 9 by a "ball and socket joint;" the outer end of 9 after threading through 3' is pivoted at 10 to a lever arm 11 itself fulcrumed and pivoted upon a transverse spindle 12 attached to the base 1. The lever arms 11 extend upwardly above body 2 and their upper extremities are pivotally connected, parallel with one another, at 13 with each end of a connecting rod 14. An operating handle 15 fits into a socket 16 formed at the top of one of the lever arms 11.

Each head 4 is pierced with holes (shown dotted) at 17, Fig. 5. Over these holes and flat against the outer side of the head is

held a strip of flexible leather 18 riveted to the head at one end as at 19; a spring 20, having tension both away from the riveted end at 19 and against the head 4 and engaging the free end of 18, normally holds the strip flat against the head so as to seal or close the holes. Pierced through the metal disks 7, Fig. 6, as also through the leather 6 between said disks, is another set of holes 17' covered on the outer side of the disk with a strip 18', similar to strip 18 just described, and similarly fastened and held flat and in tension. The arrangement of strip 18 or 18' with the underlying hole 17 or 17' constitutes a form of valve used in many varieties of pneumatic mechanism and is commonly known as a "flap valve."

The dust collector is placed, at or about the middle of body 2, between the two suction pumps, and comprises a bag 21 preferably of some soft woolly material adapted to catch and retain dust; the material of this bag should be fairly closely woven. For convenience and comfort in handling, the outer surface of the bag may, if desired, be smooth and free from loose fibers. The mouth of the bag is suitably fastened to a metal neck ring 22 having diametrically opposite notches 23. This neck ring has bayonet attachment with the under side of a cover plate 24, the notches 23 engaging with lugs 25 formed upon said plate. When thus in position upon the plate the bag 21 is thrust into body 2; between the suction pumps, at an opening or miniature manhole 26 the plate 24 being faced off on its under surface to engage a similarly faced flange 27 at the mouth 26. Rubber gaskets 28 and 29, between neck ring and cover plate and between cover plate and flange respectively, insure tight connection.

Diametrically opposite on each side of the cover and integrally attached thereto are projecting slotted tongues 30, and pivoted to correspondingly placed lugs upon flange 27 are snap catches 31 adapted to engage said slotted tongues or to be instantly disengaged therefrom at will. Each catch comprises a nut 32 slidable upon the pivoted spindle 33 but engaging with a central spring 34 tending to keep said nut down against a shoulder 35 formed upon the spindle. A washer 36 fixed to the outer end of the spindle prevents the nut from being withdrawn from the spindle. By the use of these opposite spring catches to engage the cover plate and hold it down I am enabled not only to instantly remove the cover plate with its attached dust collector for cleaning and emptying of the contents thereof and as instantly to replace the same, but I secure a substantially uniform sealing pressure of the cover plate upon its flange around substantially the entire periphery of

said plate and there is no risk of raising one side of the plate, thus causing the leak, by undue pressure upon the other side as is often the case where bolts or some equivalent fastening means are employed.

Attached centrally to and projecting outwardly from each head 3, I provide a bumper 37 of soft rubber or equivalent material; the function of this bumper is to prevent the lever arms 11, as they make their inward stroke in operating my invention as will be hereinafter described, from striking heads 3 and thereby producing noise as well injuring the heads and communicating jar to the hand of the operator.

Bored axially through cover plate 24, which is suitably thickened at this point for the purpose, is a cylindrical hole into which fits a tubular plug 38 itself fixed within the end of a flexible hose 39 of chosen length and bore; this plug is fitted smoothly and may be instantly inserted in or removed from 24. The outer end of 39 is adapted to have frictionally fitted therein any preferred form of nozzle 40.

The operation of my cleaning device is as follows: Handle 15 is grasped by the hand and moved longitudinally to and fro so as to sweep the oscillating member 7' of each suction pump back and forth across the chamber included between heads 3 and 4. As 7' moves inwardly the volume of air between it and inner head 4 tends to become compressed so that the flap valve of 4 remains closed while that of 7', being on the outer side thereof, will open thus allowing said volume of air to move from the inner to the outer side of 7'. Upon the reverse stroke, as 7' moves outwardly, suction will tend to be established between 4 and 7' so that the valve of 4 will now open and that of 7' will close thereby drawing air from within the body 2 and establishing a suction current through the nozzle, hose, wall of the dust collector, and body 2. Since for either direction of movement of handle 15 one or the other of the suction pumps is making an outward stroke it follows that the indrawn current of air will be substantially continuous for continuous operation of the handle. While theoretically there should be a very brief cessation of the suction current as each stroke is reversed, in practice even this is eliminated by reason of the hose 39 being constricted somewhat during the stroke against its elasticity which causes it to expand and continue the suction for a brief interval after that due to the pump proper ceases.

By reason of the fact that the collector is situated in the suction chamber between the suction pumps, the operation of the latter produces an alternate suction at one side of the collector and then at the other side thereof. This results in a circulatory

stream of air in the suction chamber which sweeps against the collector and prevents the clogging up thereof. Furthermore the passage of air from the inlet alternately toward one pump and then toward the other pump keeps the dust in the collector stirred up, preventing it from matting against a part of the collector wall so as to clog up the collector and permitting the easy and successful operation of the cleaner until the collector has become completely filled with dust and dirt.

I purposely make the bag 21 of the dust collector large so as to present a large superficial screening area to the incoming air. In this way the velocity of said air is greatly reduced so that the dust and dirt borne by the same is easily caught by the fabric of the bag without any risk of its being carried therethrough while at the same time the frictional resistance interposed by said fabric is a minimum.

At convenient times the plug 38 is pulled out of cover plate 24 and the latter, with attached dust collector, removed. The bag is then disconnected by opening the bayonet joint uniting 22 and 24 and the dirt emptied therefrom. Occasionally the bag should be turned inside out and both sides thoroughly brushed.

While I have described my improved cleaning device as manually operated I may, if I prefer, operate it by other power as *e. g.*, by a small motor of suitable speed connected in any convenient and usual way.

Many changes of detail as in the shape and size of the parts, the character of the valves, and the mode of attachment of the several parts may be made without depart-

ing from the spirit of my invention which is embodied in the following claims.

I claim:

1. In a suction cleaning device, the combination of a suction chamber provided with an inlet opening, oppositely arranged suction pumps constituting end walls of said chamber said pumps having reciprocating members adapted to move in a common axis, means for operating said pumps, and a dust collector supported within said chamber between said inlet opening and said pumps.

2. In a suction cleaning device, the combination of a suction chamber provided with an inlet opening, oppositely arranged suction pumps constituting end walls of said chamber said pumps having reciprocating members connected together for simultaneous operation, means for actuating said members, and a dust collector supported within said chamber between said inlet opening and said pumps.

3. In a suction cleaning device, the combination of a suction chamber provided with an inlet opening, oppositely arranged suction pumps constituting end walls of said chamber said pumps having reciprocating members connected together for simultaneous operation, means for actuating said members, and a dust collector removably supported within said chamber between said inlet opening and said pumps.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY KOCH.

Witnesses:

FRANK F. KIRKPATRICK,
ELMER G. WILLYOUNG.