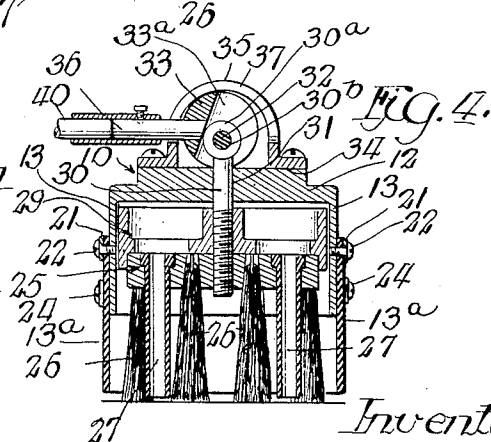
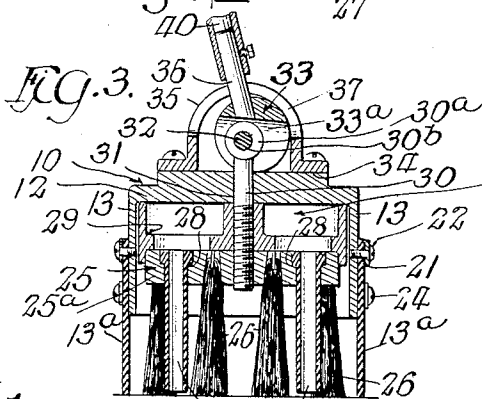
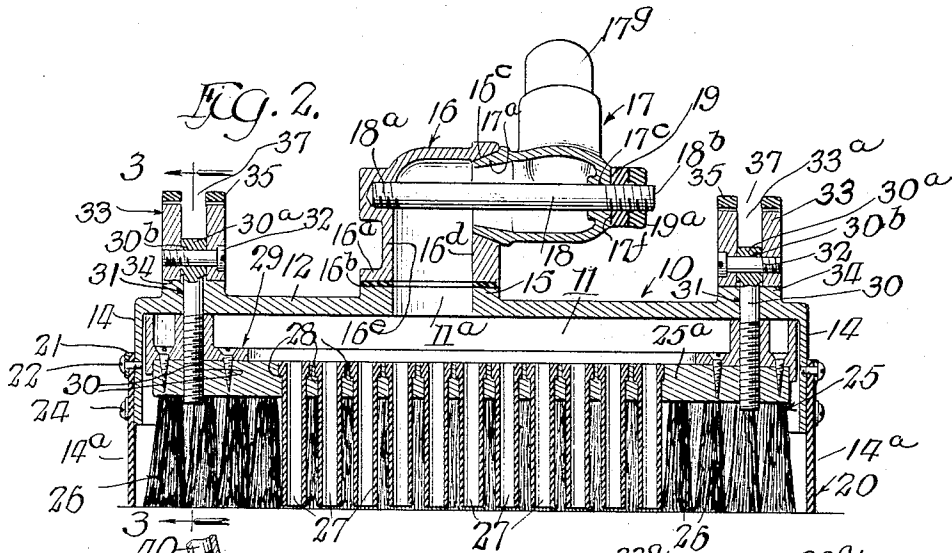
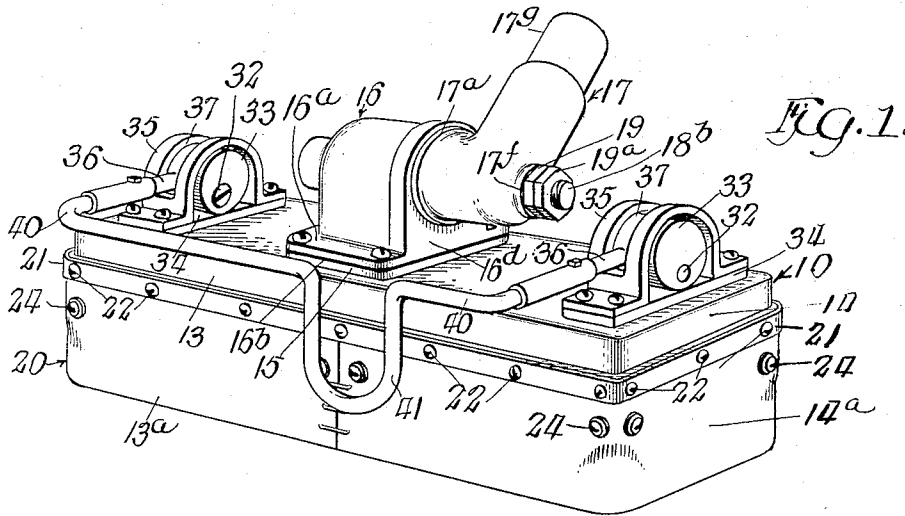


A. E. MOORHEAD.
VACUUM CLEANING DEVICE.
APPLICATION FILED JUNE 15, 1911.

1,042,711.

Patented Oct. 29, 1912.



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UNITED STATES PATENT OFFICE.

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AMERICAN ROTARY VALVE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF
ILLINOIS.

VACUUM CLEANING DEVICE.

1,042,711.

Specification of Letters Patent.

Patented Oct. 29, 1912.

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To all whom it may concern:

Be it known that I, ALBERT E. MOORHEAD, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vacuum Cleaning Devices; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in tools adapted for use in vacuum cleaning systems and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a view representing a perspective view of my improved vacuum cleaning tool. Fig. 2 is a view representing a longitudinal central section of my improved vacuum cleaning tool. Fig. 3 is a view representing a cross-section through my improved vacuum cleaning tool in a plane indicated by the line 3—3 of Fig. 2. Fig. 4 is a view representing a section similar to that of Fig. 3 showing the parts of the vacuum cleaning tool in a different relative position.

Referring now in detail to that embodiment of my invention illustrated in the drawings, 10 indicates the tool head which consists of a casting inclosing an elongated inlet chamber 11, having a top wall 12, side walls 13, 13 and end walls 14, 14. The tool head is provided with means for attaching it to a tubular handle member which is adapted for the supply of water to the inlet chamber in the head and also for the exhaust of air therefrom.

As shown in the drawings, the means for attaching the tool head to the handle member comprises a swivel connection by means of which the handle member may be adjusted at various angles to the tool head to accommodate the position of the handle to people of different heights. To the top wall 12 of the chamber 11 is rigidly secured a chambered coupling member 16 the interior of which communicates with the inlet chamber 11 through an aperture 11^a in its top wall 12. As shown herein, a flange 15 surrounds the said aperture 11^a and to this is secured by suitable screws a flange 16^a formed at the base of the coupling member

16, a rubber gasket 16^b being interposed between the adjacent faces of said flanges to make an air tight joint. A handle coupling member 17 is secured to the coupling 16 in such manner that it is rotatively adjustable in a vertical plane extending at right angles to the longitudinal axis of the chamber 16.

As illustrated in the drawings, the coupling member 16 has a vertical wall 16^c extending at right angles to the longitudinal central axis of the head 10 in which is provided an annular opening 16^d having inwardly tapering walls which constitute a conical seat for a tubular, conical, lateral extension 17^a of the handle coupling 17. Opposite the tubular extension 17^a and in axial alinement therewith the handle coupling is provided with an aperture 17^b through which extends a rod 18 having one end 18^a threaded into a recess in the wall 16^c of the coupling member 16 opposite and in axial alinement with the opening 16^d in the wall 16^b thereof and its other end 18^b threaded to receive a nut 19 and jam-nut 19^a, the first of which engages against a flat boss 17^c on the handle coupling 17. It is apparent that by drawing up the nuts on the rod 18, an air tight joint is made between the two coupling members and that angular adjustment of the handle coupling member with reference to the plane of the tool head may be had by loosening the nuts 19, 19^a and rotating the tubular extension 17^a within its seat. The tubular end 17^b of the handle coupling is adapted for attachment in a familiar manner to a tubular handle member (not shown) having connections for supplying water to the tool for use in scrubbing, or for exhausting air from the chamber 11 in said head so as to maintain a partial vacuum therein.

The side and end walls of the chamber 11 are provided with a flexible elastic continuous flange 20 forming a downward extension thereof the lower edge of which is adapted for close contact with a floor or other surface that is to be cleaned. Said flange 20 is preferably made of rubber and as shown herein is formed by a strip of sheet rubber which is long enough to extend about the outer vertical walls of the chamber 11 to form side and end extensions or flanges 13^a, 13^a, 14^a, 14^a, the lower edges of which terminate in a common plane, the ends of the

strip abutting against each other and being laced together as illustrated in Fig. 1. A binding strip 21 is secured against the upper edge of the rubber strip 20 by screws 22 extending through apertures in the strip and threaded into the walls of the chamber. Below said binding strip and preferably at the corners of the chamber wall and adjacent its ends, the strip 20 is secured to the walls of said chamber by other screws 24. This construction rigidly supports the upper part of the strip forming the downwardly extending wall flange and provides an air tight joint which prevents the entrance of air between the strip 20 and the metal walls of the inlet chamber 11 under the force of the vacuum maintained in said chamber.

Within the chamber 11 is mounted a brush member 25 adapted for scrubbing. Said brush member is provided with bristles 26 and is arranged to be raised or lowered so as to bring the contact plane of the brush member, that is to say, the plane in which the lower ends of its bristles 26 terminate, to the level of the plane of the lower edge of the flexible flange extending downwardly from the chamber walls, or to a level below said plane in which latter case the tool head will be supported on the bristles of the brush member. The brush member is provided with a plurality of flexible elastic tubes 27 extending through the brush member and having their lower ends in the contact plane thereof, said tubes being adapted for the passage of water drawn or sucked up from the surface that is being cleaned under the action of the partial vacuum produced in the inlet chamber. As shown in the drawings, said brush member consists of an elongated rectangular plate 25^a preferably made of wood and having its edges slightly spaced from the side and end walls of the chamber 11. Said plate 25^a constitutes the back of the brush to which are secured the bristles 26 in longitudinally and transversely arranged rows in a familiar manner. Between the rows of bristles are arranged the flexible elastic tubes 27, the lower ends of said tubes terminating in the contact plane of the brush member or slightly above the same and having their upper ends secured in recessed openings 28 in the plate 25^a. Said tubes thus open through the plate 25^a and communicate with the inlet chamber 11 above the brush member. The plate 25^a is rigidly secured to a horizontal open frame 29 arranged in vertically sliding relation with the side and end walls of the chamber 11. The frame 29 is suspended from the top wall 12 of the chamber 11 by screws 30, 30 which are threaded through the frame 29 and through the plate 25^a. The upper ends of said screws 30 extend through apertures 31 in the top wall

of the chamber 11 and are provided above said wall with heads 30^a having transverse apertures 30^b through which extend pivot screws 32 carried by cams 33. Each of said cams consists of a circular disk provided with a slot 33^a in which the head 30^a of the associated screw is located, the screw 32 which pivotally connects said head to the cam being located eccentrically with reference to said disk. A flat boss 34 is formed on the outer surface of the top wall 12 of the chamber 11 upon which the cam 33 bears, the same being held thereon by means of a curved strap 35 secured to the top wall of the tool head. An operating arm 36 is rigidly secured to the cam and projects through a slot 37 formed in the strap 35 and located in a vertical plane.

As shown in Fig. 3 with the operating arms 36 in substantially vertical position, the cam holds the frame 29 up against the top wall 12 of the chamber 11 in which case the contact plane of the brush member is at the same level with or slightly above the level of the plane of the lower edge of the flexible flange extending downwardly from the walls of the inlet head. When the operating arm is shifted to a horizontal position, as shown in Fig. 4, the movement of the cams has caused a downward movement of the brush member so that its contact plane is below the level of the plane of the lower edge of said flexible flange extending downwardly from the walls of the inlet head, so that the tool head rests upon and is supported by the brush member, the said flexible wall flange being then raised above the surface that is being cleaned.

The operating arms are preferably connected by a bail member 40 having a loop 41 arranged at an angle to the plane of the bail and adapted to lie against the front wall of the tool head when the arms 36 are in horizontal position and the brush member is in its lower position relative to the tool head. Said loop may be kicked by the foot to swing the bail member 40 from horizontal to vertical position, thus swinging the cam-operating arms 36 into vertical position and raising the brush member so that the tool head will rest upon the flexible flange extending downwardly from its side and end walls. The loop 41 is arranged so that when the bail 40 is shifted to vertical position the side members of said loop will straddle the handle coupling and thus offer no obstruction to an adjustment of the handle coupling 17 at any angle.

As shown in the drawings, the bail member 40 is removably connected to the cam-operating arms 36, 36, so that when it is desired to adjust the brush member in the tool head, said bail member may be disconnected from said arms, the straps 35, 35 removed and the screws 30, 30 which suspend the

brush from the top wall of the head may be rotated to adjust the brush member up or down. In making this adjustment the cam-operating arms 36 when brought to horizontal position as shown in Fig. 4 may be used as crank-arms to rotate said screws.

The operation of my improved tool is as follows: With the brush member in its lower position as shown in Fig. 4, water is supplied to the inlet chamber from which it passes through the tubes 27 to the floor or other surface to be cleaned. The tool head is then pushed backward and forward over the floor just as in the case of the usual scrubbing brush and the operation is continued until the dust and other impurities have been removed from the floor, the same being now carried in solution or in suspension in the water which covers the floor. The supply of water to the head is then cut off by a suitable valve (not shown) located in the tubular handle member attached to the tubular end 17^s of the handle coupling 17, and a valve (not shown) controlling the exhaust through said tubular handle member is opened so as to produce a partial vacuum in the inlet chamber of the head. The brush member is now raised within the head to the position illustrated in Fig. 3 which causes the flexible flange on the tool head to engage the floor, and the tool head is moved backward and forward over the floor. The flexible flange by its contact with the floor incloses the space about the brush member, so that the partial vacuum maintained in the inlet chamber causes the water to be sucked up through the tubes 27 carried by the brush member into the inlet chamber and thence through the tubular handle in a familiar manner whence the water is led to a suitable place for discharge. As the tool head is moved over the floor the flexible flange of the head assumes a position inclined away from the direction in which the tool head is being moved and that part of the flange in advance namely, one of its sides 13^s, 13^a having atmospheric pressure on its outer surface tending to raise it from contact with the floor opposed by the lesser pressure within the inlet head, is slightly raised from contact with the floor, thus permitting the water in advance of it to be drawn into the inlet chamber. That part of the flange at the rear of the advancing tool head on the other hand by reason of its rearward inclination is held by the atmospheric pressure on its outer surface in close contact with the floor so as to produce a wiping action which prevents the escape of any water at the rear of the advancing tool. By this operation all the water is removed from the floor. The operation may be repeated as often as desired, the tool first being used to scrub the floor and then for

removing the water therefrom, until the floor has been thoroughly cleaned and rinsed.

While in describing one embodiment of my invention, I have referred to certain details of mechanical construction and arrangement, it is to be understood that my invention is in no way limited thereby except as pointed out in the appended claims.

I claim as my invention:—

1. A tool for use with vacuum cleaning systems comprising a head containing an elongated inlet chamber having side and end walls and a top wall, means providing a passage opening into said head adapted for the supply of water thereto and for the exhaust of air therefrom, a brush member located in said inlet chamber, a plurality of flexible tubes carried by said brush member having their lower ends substantially in the contact plane of said brush member and their upper ends opening into said inlet chamber above said brush member, the vertical walls of said chamber being provided with a yielding flange forming a downward extension thereof to inclose the space about said brush member and having its lower edge adapted for engagement against the surface to be cleaned, said brush member and said flange being capable of relative vertical movement, and means for producing relative vertical movement between said brush member and said flange to raise or lower the contact surface of said brush member relatively to the lower edge of said flange.

2. A tool for use with vacuum cleaning systems comprising a head containing an elongated inlet chamber having side and end walls and a top wall, means providing a passage opening into said head adapted for the supply of water thereto and for the exhaust of air therefrom, a brush member vertically movable in said inlet chamber, a plurality of flexible tubes carried by said brush member having their lower ends substantially in the contact plane of said brush member and their upper ends opening into said inlet chamber, the vertical walls of said chamber being provided with a yielding flange forming a downward extension thereof to inclose the space about said brush member and having its lower edge adapted for engagement against the surface to be cleaned when said brush member is in raised position, suspension members threaded into said brush member and projecting at their upper ends through apertures in the top wall of said inlet chamber, cams supported on said head and to which the upper ends of said suspension members are pivotally connected, removable slotted straps adapted for holding said cams in place, and operating arms connected to said cams and projecting through the slots of said straps.

3. A tool for use with vacuum cleaning systems comprising a head containing an elongated inlet chamber having side and end walls and a top wall, means providing a passage opening into said head adapted for the supply of water thereto and for the exhaust of air therefrom, a brush member vertically movable in said inlet chamber, a plurality of flexible tubes carried by said brush member having their lower ends substantially in the contact plane of said brush member and their upper ends opening into said inlet chamber, the vertical walls of said chamber being provided with a yielding flange forming a downward extension thereof to inclose the space about said brush member and having its lower edge adapted for engagement against the surface to be cleaned when said brush member is in raised position, suspension members threaded into said brush member and projecting at their upper ends through apertures in the top wall of said inlet chamber, cams supported on said head and to which the upper ends of said suspension members are pivotally connected, removable slotted straps adapted for holding said cams in place, operating arms connected to said cams and projecting through the slots of said straps, and a bail member connecting said arms and adapted for operating them in unison.

4. A tool for use with vacuum cleaning

systems comprising a head containing an elongated inlet chamber having side and end walls and a top wall, means providing a passage opening into said head adapted for the supply of water thereto and for the exhaust of air therefrom, a brush member vertically movable in said inlet chamber, a plurality of flexible tubes carried by said brush member having their lower ends substantially in the contact plane of said brush member and their upper ends opening into said inlet chamber, the vertical walls of said chamber being provided with a yielding flange forming a downward extension thereof to inclose the space about said brush member and having its lower edge adapted for engagement against the surface to be cleaned when said brush member is in raised position, means for supporting said brush member in said chamber, said means including members adapted for vertical adjustment of said brush member, and means operable from the outside of said head for raising and lowering said brush member.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 10th day of June A. D. 1911.

ALBERT E. MOORHEAD.

Witnesses:

CLARENCE E. MEHLHOPE,
GEORGE R. WILKINS.