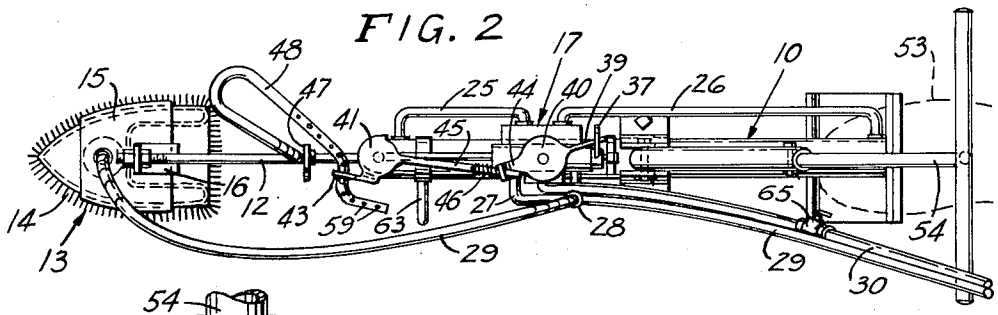
Feb. 19, 1957 F. L. BAILES 2,781,745

HYDRAULIC MOTOR FOR A SCRUBBING MACHINE

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FIG. 2



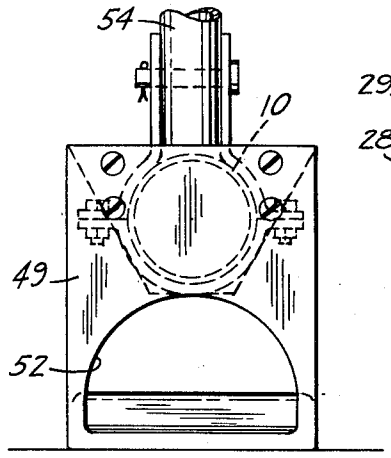


FIG. 3

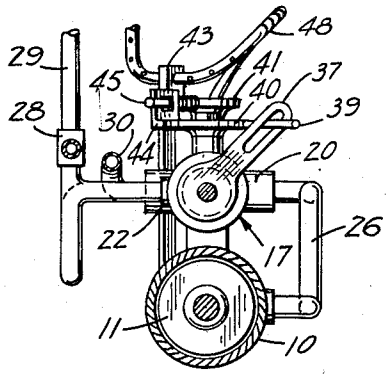


FIG. 4

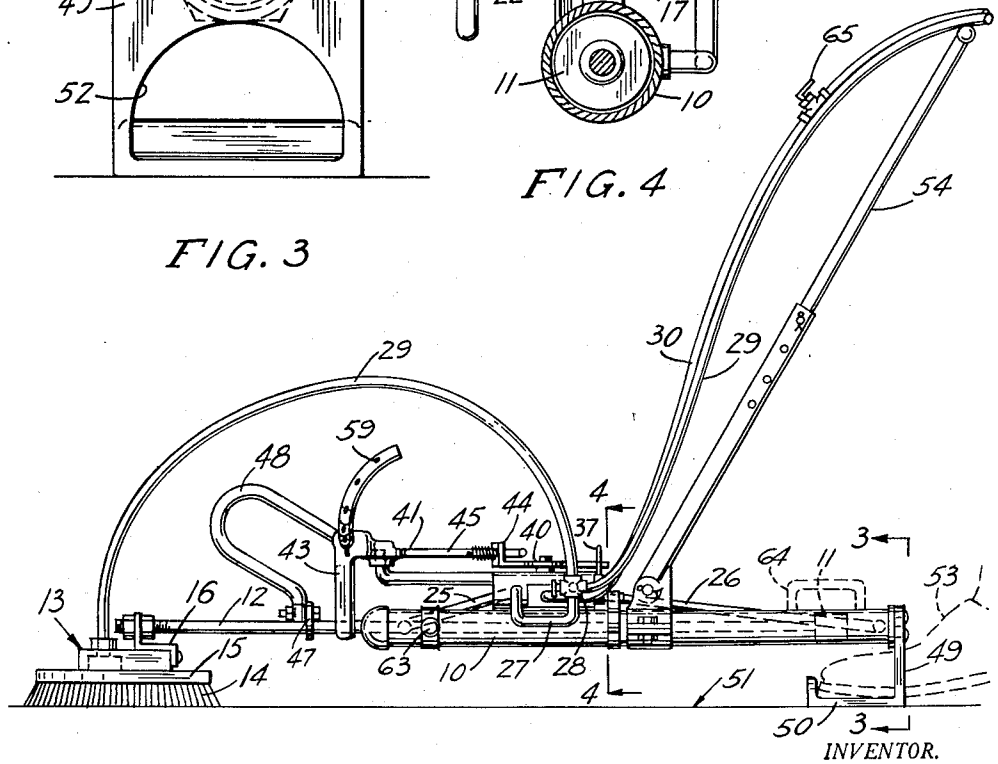


FIG. 1

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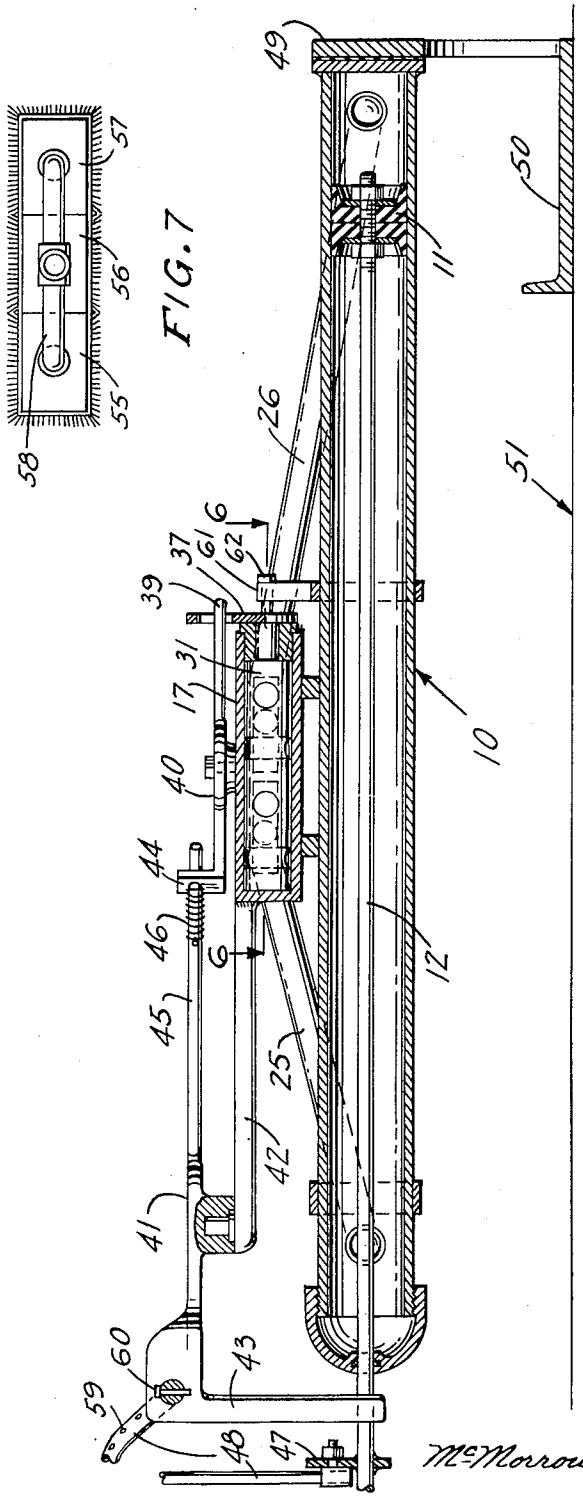


FIG. 7

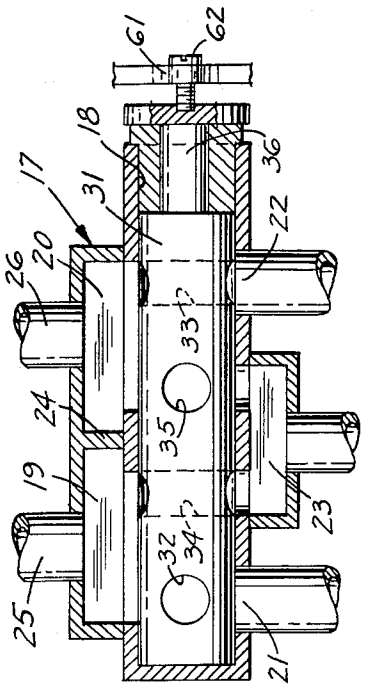


FIG. 6

FIG. 5

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2,781,745

HYDRAULIC MOTOR FOR A SCRUBBING MACHINE

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Application March 29, 1955, Serial No. 497,561

3 Claims. (Cl. 121—164)

The present invention relates to scrubbing machines.

The primary object of the present invention is to provide a scrubbing machine universally usable on floors, walls, vehicles and the like, and one providing a means for flushing away the loosened dirt.

Another object of the present invention is to provide a scrubbing machine having means for brushing the loosened dirt away from the operator of the machine and one permitting the operator to work in an erect position on a floor to be scrubbed.

A further object of the present invention is to provide a scrubbing machine of sturdy construction, simple in structure, economical to manufacture and one highly effective in action.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in connection with the annexed drawings, in which:

Figure 1 is a side view in elevation of the machine of the present invention showing in dotted lines the foot of an operator.

Figure 2 is a top plan view of the present invention showing in dotted lines the operator's foot.

Figure 3 is an end view in enlarged detail taken on line 3—3 of Figure 1.

Figure 4 is a detail view partially in cross section taken on line 4—4 of Figure 1.

Figure 5 is a greatly enlarged partial side view in cross section.

Figure 6 is a vertical view in cross section on line 6—6 of Figure 5.

Figure 7 is a top plan view of another brush arrangement for use with the machine of the present invention.

Referring in greater detail to the drawings, in which like numerals indicate like parts throughout the several views, the present invention consists in a scrubbing brush comprising an elongated horizontally disposed cylinder 10 having a reciprocating piston 11 working within it, the piston being shown in dotted lines, Figure 1, and being connected to one end of a piston rod 12. The piston rod 12 projects by its other end through one end of the cylinder 10 and carries on its projecting end a work engaging tool 13 consisting of a swab 14 supported on a backing plate 15 which is adjustably connected by the bracket 16 to the piston rod 12 so that it can be turned to either side or upwardly for cleaning vertical or overhanging surfaces.

A closed valve housing 17 is mounted on the upper side of the cylinder 10 intermediate the ends of the latter and is provided with a bore 18 extending inwardly from the one end of the housing remote from the end of the cylinder 10 which has the projecting piston rod 12.

In Figures 5 and 6 the valve housing 17 is shown in detail and is seen to have distributing ports 19 and 20, one adjacent each end and on one side of the housing, and exhaust ports 21 and 22 on the side opposite, also one adjacent each end. An inlet chamber 23 is positioned intermediately of the exhaust ports 21 and 22. A partition 24 subdivides the housing into two valve chambers each connected in communication with the inlet chamber 23.

Conduits 25 and 26 connect the distributing ports 19 and 20 to the adjacent ends of the cylinder 10, and, as seen in Figures 1 and 2, another conduit 27 connects the exhaust ports 21 and 22 to a distributing valve 28 which controls the amount of flushing water fed through conduit 29 to the work tool 13. By adjustment of the valve 28, part or all of the waste water may be directed to the tool 13 or may be carried to a place of disposal by the conduit 29 which is arranged as one-half or a double conduit line, the other half 30 connecting in communication the inlet port 23 to a source of fluid under pressure.

A cylindrical valve 31 within the bore 18 is rotatable for a limited 90° of rotation and has a pair of apertures in the portion of the valve positioned in each of the valve chambers. The apertures 32 and 34 of one pair are arranged so that at the limit of movement of the valve in one direction, the aperture 34 connects the inlet chamber 23 to the distributing port 19 and the aperture 33 connects the distributing port 20 to the adjacent exhaust port 22, and at the limit of the movement of the valve in the other direction, apertures 35 and 32 make the same connections, respectively.

The valve 31 is provided on its projecting end with a valve stem 36 to which is secured a valve operating arm 37, the free end of which is slotted and receives the one end 39 of a lever 40 mounted on the upper side of the housing 17 for pivotal movement about a vertical axis. Another lever 41 is mounted upon a bracket 42 projecting from the one end of the housing 17 adjacent to the end of the cylinder 10 which has the piston rod projecting therefrom and is also movable about a vertical axis. The second lever 41 has one end formed with a downwardly projecting extension 43, the end of which is adjacent to the piston rod 12.

The confronting other ends 44 and 45 of the levers 40 and 41, respectively, are connected together for loose sliding movement and having a spring 46 providing an over center action by biasing the lever ends away from each other.

An abutment member 47 is carried on the piston rod 12 intermediate its ends and engages the lower end of the extension 43 upon execution of the retractile movement of the piston rod 12 and is operable to shift the operating arm 38 to the limit of its swinging movement in the one direction, and a flexible strap 48 connects the abutment member 47 to the upper end of the extension 43 so that upon execution of extensile movement of the piston rod the operating arm 38 is moved to the limit of its movement in the opposite direction.

An L-shaped plate 49 as shown in detail in Figures 3 and 7 has a base portion 50 for supporting the scrubbing machine upon a surface to be scrubbed, the latter being indicated by the reference numeral 51 in Figure 7, the plate 49 being provided with a toe hole indicated by the reference numeral 52 so that the operator's foot indicated in Figures 1 and 2 by the reference numeral 53 may secure the machine to the surface to be scrubbed at the one end with the operator standing erect and holding and directing the scrubbing action by means of the handle 54. It will be seen that the machine can be intermittently lifted from its horizontal position to a position with the brush out of contact with the surface to be scrubbed, the foot of the operator holding down the one end of the machine while the operator pulls upwardly on the handle 54. This will permit the operator to raise the brush on each of the retractile strokes of the piston and to lower the brush upon each of the extensile strokes of the piston so that the dirt that is loosened and the flushing water may be brushed away from the operator.

In Figure 7 is shown an alternative form of the tool in top plan view in which three brushes **55**, **56** and **57** are joined together and are connected by a conduit **58** so that the flushing water may be fed to the central portion of each of the brushes.

The flexible strap **48** is provided on its free end with a series of holes **59**, Figure 2, in which is selectively inserted a pin, Figure 1, so that the effective length of the strap **48** may be adjusted and the resulting stroke of the piston rod affected to vary its length and therefore the length of scrubbing movement of the brush. A clamp **61** having its lower end surrounding and secured to the cylinder **10** has an upper end provided with a threaded aperture through which extends the screw **62** havings its free end seated in the valve stem **36** in order to retain the cylindrical valve **33** within the housing **17**.

An outwardly projecting stub **63** on one side of the cylinder provides a handle, another handle being shown in dotted lines in Figure 1 and indicated by the reference numeral **64**, it being expected that when the handles **63** and **64** are used the longer handle **54** will be detached. A valve **65** in conduit **30** controls the flow of water to the machine and regulates the speed of its scrubbing action.

In use the machine may be used for scrubbing floors, large areas of halls, for cleaning walls and ceilings, and for washing vehicles. The brush may be lifted after each extensile movement of the piston rod so that the loosened dirt and the flushing water may be continuously pushed away from the operator.

When used for washing automobiles, the mop or swab **14** (Fig. 2) is used and when washing floors, walls or other surfaces the brush arrangement shown in Figure 7 is used.

The scrubbing machine of the present invention may be run by the pressure of water from an ordinary water hydrant, and for some purposes may be connected to a source of steam under pressure.

What is claimed is:

1. A scrubbing machine comprising a horizontally disposed cylinder, a reciprocating piston working within said cylinder, a piston rod extending slidably through one end of said cylinder and having the other end exteriorly of said one end of said cylinder, means for connecting a tool on said other end of said piston rod, a closed housing exteriorly of said cylinder, a partition in said housing subdividing said housing into two valve chambers, said housing being provided on one side intermediate the ends thereof with an inlet chamber connected in communication with each of said valve chambers, an exhaust port adjacent each end of said housing on said one side connected in communication with the adjacent one of said valve chambers, a distributing port adjacent each end of said housing on the other side thereof also connected in communication with the adjacent one of said valve chambers, said housing being provided with a bore extending inwardly from one end thereof through both of said valve chambers, conduit means connecting each end of said cylinder with the adjacent one of said distributing ports, other conduit means connecting said inlet chamber to a source of fluid under pressure and said exhaust ports to a place of fluid disposal, a valve mounted within said bore for a limited rotary movement and having a portion projecting from said housing, the portions of said valve within each of said valve chambers each being provided with a pair of apertures disposed at a right angle to each other, the apertures of one of said pairs of apertures being arranged with respect to the apertures of the other pair so that at the limit of rotary movement of said valve in each direction one aperture of one pair connects said inlet chamber with the adjacent one of said distributing ports and one aperture of the other pair connects the other distributing port with the adjacent exhaust port, and means carried on said piston rod exteriorly of said cylinder operatively connected to said valve projecting portion so that upon execution of reciprocal movement of said piston rod in one direction said valve is moved to the limit of its movement in one direction and upon execution of movement of said piston in the other direction said valve is moved to the limit of its movement in the other direction.

2. A scrubbing machine comprising a horizontally disposed cylinder, a reciprocating piston working within said cylinder, a piston rod extending slidably through one end of said cylinder and having the other end exteriorly of said one end of said cylinder, means for connecting a tool on said other end of said piston rod, a closed housing exteriorly of said cylinder, a partition in said housing subdividing said housing into two valve chambers, said housing being provided on one side intermediate the ends thereof with an inlet chamber connected in communication with each of said valve chambers, an exhaust port adjacent each end of said housing on said one side connected in communication with the adjacent one of said valve chambers, a distributing port adjacent each end of said housing on the other side thereof also connected in communication with the adjacent one of said valve chambers, said housing being provided with a bore extending inwardly from one end thereof through both of said valve chambers, conduit means connecting each end of said cylinder with the adjacent one of said distributing ports, other conduit means connecting said inlet chamber to a source of fluid under pressure and said exhaust ports to a place of fluid disposal, a valve mounted within said bore for a limited rotary movement and having a portion projecting from said housing, the portions of said valve within each of said valve chambers each being provided with a pair of apertures disposed at a right angle to each other, the apertures of one of said pairs of apertures being arranged with respect to the apertures of the other pair so that at the limit of rotary movement of said valve in each direction one aperture of one pair connects said inlet chamber with the adjacent one of said distributing ports and one aperture of the other pair connects the other distributing port with the adjacent exhaust port, an operating arm connected to said valve projecting portion for limited swinging movement transversely of said housing so as to effect movement of said valve, and lever means connecting said operating arm to said piston rod exteriorly of said cylinder so that upon execution of the reciprocal movement of the latter in one direction said arm is swung to the limit of its movement in one direction and upon execution of reciprocal movement of said piston rod in the other direction said arm is swung to the limit of its movement in the other direction.

3. A scrubbing machine comprising a horizontally disposed cylinder, a reciprocating piston working within said cylinder, a piston rod extending slidably through one end of said cylinder and having the other end exteriorly of said one end of said cylinder, means for connecting a tool on said other end of said piston rod, a closed housing exteriorly of said cylinder, a partition in said housing subdividing said housing into two valve chambers, said housing being provided on one side intermediate the ends thereof with an inlet chamber connected in communication with each of said valve chambers, an exhaust port adjacent each end of said housing on said one side connected in communication with the adjacent one of said valve chambers, a distributing port adjacent each end of said housing on the other side thereof also connected in communication with the adjacent one of said valve chambers, said housing being provided with a bore extending inwardly from one end thereof through both of said valve chambers, conduit means connecting each end of said cylinder with the adjacent one of said distributing ports, other conduit means connecting said inlet chamber to a source of fluid under pressure and said exhaust ports to

a place of fluid disposal, a valve mounted within said bore for a limited rotary movement and having a portion projecting from said housing, the portions of said valve within each of said valve chambers each being provided with a pair of apertures disposed at a right angle to each other, the apertures of one of said pairs of apertures being arranged with respect to the apertures of the other pair so that at the limit of rotary movement of said valve in each direction one aperture of one pair connects said inlet chamber with the adjacent one of said distributing ports and one aperture of the other pair connects the other distributing port with the adjacent exhaust port, an operating arm connected to said valve projecting portion for limited swinging movement transversely of said housing so as to effect movement of said valve, a lever pivotally mounted on said housing on the upper side thereof for limited movement about a vertical axis and having one end operatively connected to said operating arm adjacent the free end of the latter, a second lever pivotally mounted on said housing in end to end relation with respect to said first lever for pivotal movement about a vertical axis and having one end adjacent to said piston rod, each of the other ends of said first and second levers being connected together for over center movement so that upon execution of pivotal movement of said second lever said valve is moved with snap action from the limit of its movement in one direction to the limit of its movement in the other direction, flexible means connecting said piston rod to said one end of said second lever for effecting pivotal movement in one direction of said second lever upon execution of reciprocal movement of said piston rod in one direction, and abutment means carried on said piston rod intermediate the ends thereof engageable with said second lever one end for effecting pivotal movement of the latter in the other direction upon execution of reciprocal movement of said piston rod in the other direction.

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