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1,464,031

G. L. DALY

FLOOR SCRUBBING MACHINE

Filed May 3, 1921

3 Sheets-Sheet 1

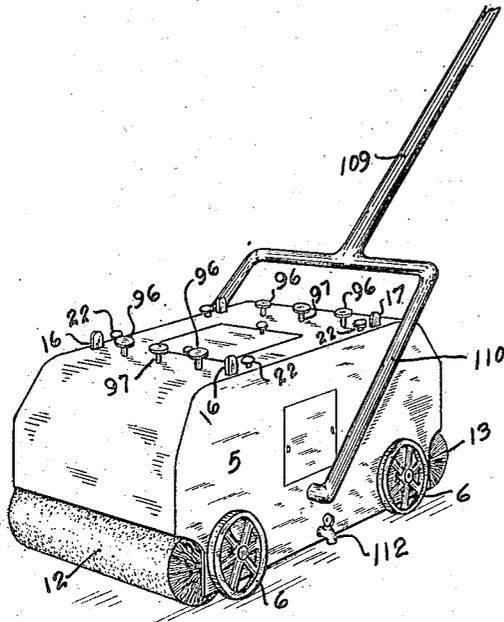


Fig. 1.

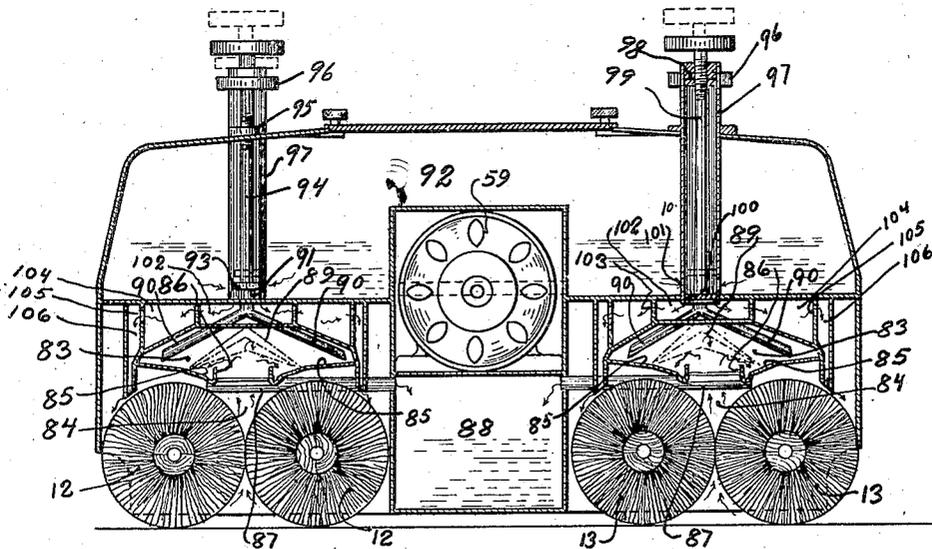
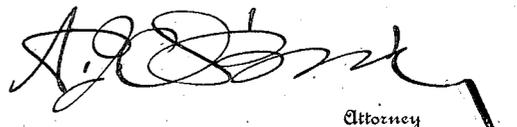


Fig. 2.

Inventor
Glenn L. Daly.

By 
Attorney

Aug. 7, 1923.

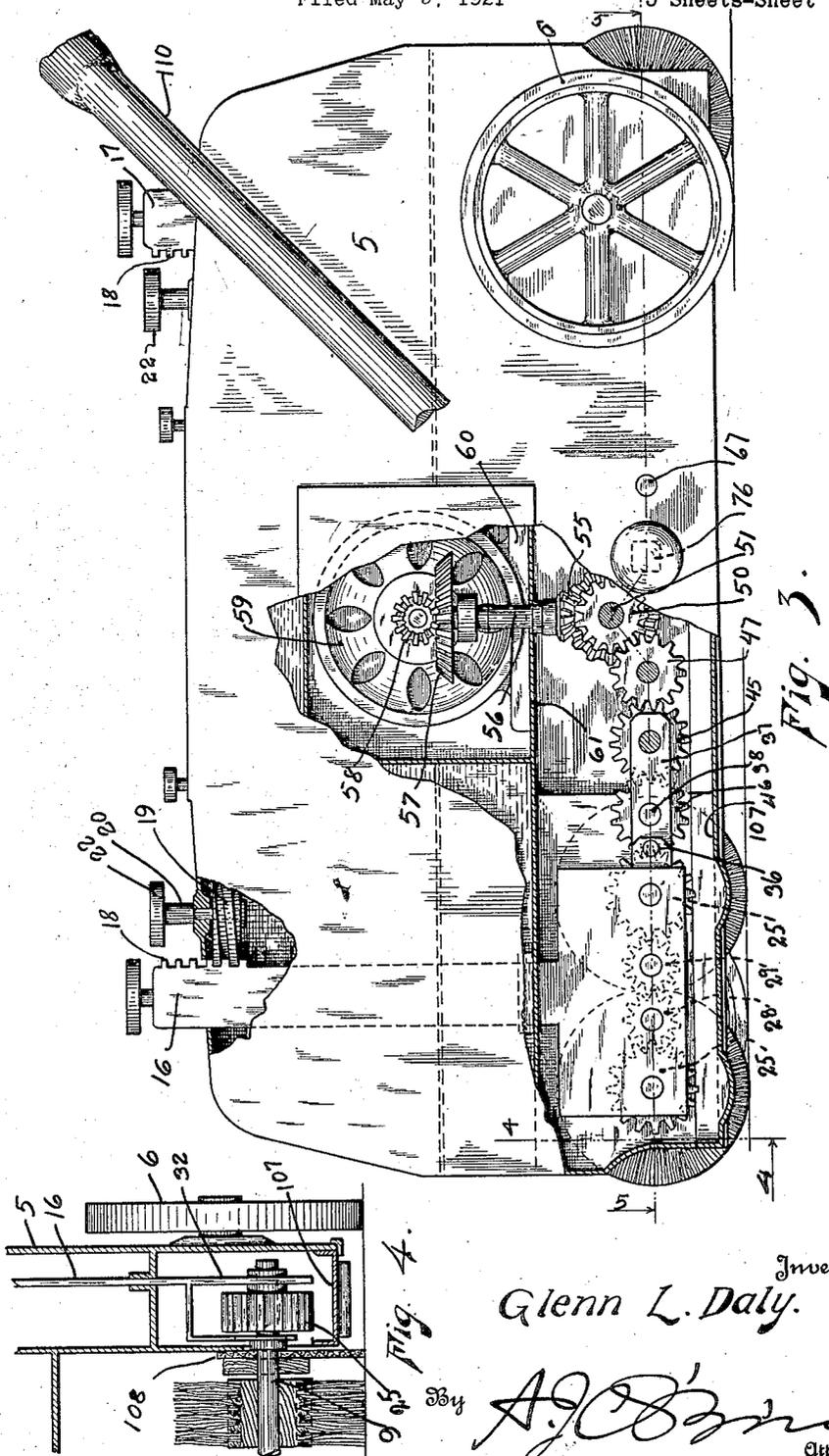
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G. L. DALY

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3 Sheets—Sheet 2



Inventor
Glenn L. Daly.

A. J. [Signature]
Attorney

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G. L. DALY

FLOOR SCRUBBING MACHINE

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3 Sheets-Sheet 3

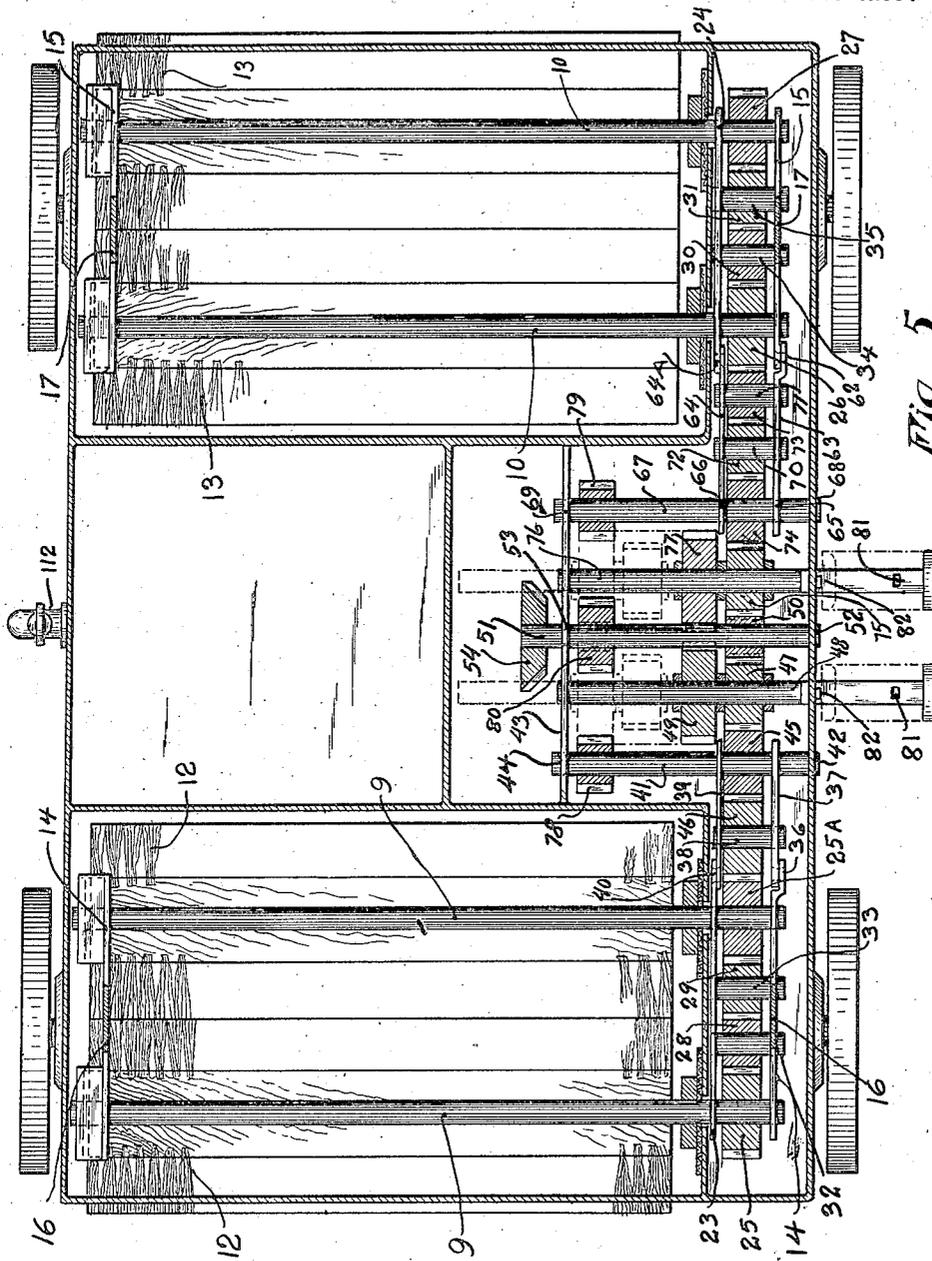
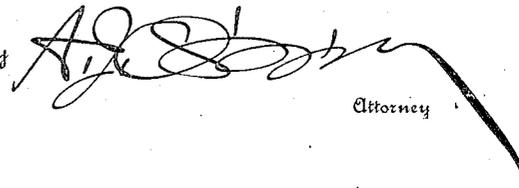


Fig. 5.

Inventor.

Glenn L. Daly.

By  Attorney

UNITED STATES PATENT OFFICE.

GLENN I. DALY, OF DENVER, COLORADO.

FLOOR-SCRUBBING MACHINE.

Application filed May 3, 1921. Serial No. 466,458.

To all whom it may concern:

Be it known that I, GLENN L. DALY, citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Floor-Scrubbing Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in floor scrubbing machines, my object being to provide a machine of this class which will be comparatively simple in construction, reliable, durable and efficient in use.

Generally speaking, the machine consists of a structure having four brushes arranged in pairs, one pair being in front and the other pair in the rear, the brushes of each pair co-operating with each other and rotating in such a manner that their inner portions, or those toward each other are moving upwardly simultaneously whereby the dirty water or refuse is carried upwardly and brought into contact with a sort of shield preferably composed of a screen which acts to limit the upward movement of this liquid refuse and causes it to flow into gutters from which it is carried by suitable conduits into a refuse tank located in the lower part of the machine.

Provision is made for raising and lowering the two pairs of brushes as they become worn whereby they may be used as long as the bristles are of such length as to do efficient work. The range of the vertical adjustment may be regulated in a commercial machine as may be desired. The principle only of vertical adjustment is intended to be brought out in this application.

The power for operating the brushes in the manner stated, as illustrated in the drawing, consists of an electric motor which is mounted centrally on the machine and its shaft has a gearing connection with a vertical shaft which in turn is connected by a multiplicity of gears arranged both forwardly and rearwardly from the center of

the machine and in such a manner as to operate the brushes. Provision is also made for changing the speed of the gears, all of which will hereinafter be set forth in detail.

Having briefly outlined my improvement I will proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing:

Fig. 1 is a perspective view of my improved machine.

Fig. 2 is a vertical, longitudinal section of the same shown on a larger scale.

Fig. 3 is an elevation of the machine partly broken away and partly in section shown on a still larger scale than in Fig. 2.

Fig. 4 is a fragmentary sectional view taken on the line 4—4 Fig. 3, looking toward the right.

Fig. 5 is a horizontal section taken approximately on the line 5—5, Fig. 3, looking downwardly, or, viewed in the direction of the arrows adjacent the section line.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a housing which is mounted on four wheels 6, two being located in the front and two in the rear. These wheels are adapted to support the machine in rolling contact with the floor or other surface to be cleaned or scrubbed.

The shafts upon which the two forward brushes are mounted are designated by the numeral 9 and those upon which the two rear brushes are mounted are designated by the numeral 10. The front brushes will be designated by the numeral 12 and the rear brushes by the numeral 13. The opposite ends of the two shafts of each pair of brushes are journaled in and supported by frame plates, the frame plates of the forward shafts being designated by the numeral 14 and those of the rear shafts by the numeral 15. These frame plates are each provided with a vertically disposed arm, the arms of the forward plates being designated 16 and those on the rear plates 17. One edge of the upper portion of each of these arms is provided with a series of teeth 18 adapted to be engaged by worm 19 which is connected with the lower extremity of the spindle 20

which is journaled in a reinforced part 21 in the top of the housing 5. Each stem 20 is provided with a manipulating disc or head 22 whereby the worm may be rotated for the purpose of raising and lowering the brushes whenever they may require such manipulation. Spaced inwardly from the plates 14 and 15 on one side of the machine are two bars which are respectively designated by the numerals 23 and 24, the shafts 9 and 10 being journaled in these last named bars as well as in the plates 14 and 15. Mounted on the portions of the shafts 9, between the plate 14 and the bar 23 are gears 25 and 25^a. Similar gears 26 and 27 are mounted on the corresponding portions of the shafts 10. Between the gears 25 and 25^a and co-operating therewith are two gears 28 and 29, while between the two gears 26 and 27 and co-operating therewith are two gears 30 and 31. These last named gears are all mounted on short shafts, those in front being designated 32 and 33 and those in the rear, 34 and 35. One forward plate 14 is pivotally connected at its rear end as shown at 36 with a short bar 37 in which is mounted one end of a short shaft 38 whose opposite end is mounted in a similar bar 39 whose forward extremity is pivotally connected as shown at 40 with the rear end of the bar 23. Each of the bars 37 and 39 is also pivotally connected at its rear end with a shaft 41 which is journaled at its outer end in one side of the housing as shown at 42 and at its inner end in the housing partition 43 as shown at 44. The shaft 41 is provided with a gear 45 which is fast thereon and meshes on one side with a gear 46 mounted on the short shaft 38 and on the other side with a gear 47 loose on the shaft 48 which also carries a second gear 49 also loose thereon and of larger size than the gear 47. The gear 47 also meshes with a gear 50 fast on a central shaft 51 located somewhat above the horizontal plane of the series of shafts heretofore described and best illustrated in Fig. 3. The shaft 51 is journaled at one end in the housing as shown at 52 and near its opposite end in the housing partition 43 as shown at 53. This shaft carries a beveled gear 54 which meshes with a beveled pinion 55 fast on the lower extremity of the vertical shaft 56 upon whose upper end is a beveled gear 57 meshing with a similar pinion 58 fast on the shaft of the operating motor 59 which is mounted on the machine in any suitable manner. As shown in the drawings the base 60 of the motor engages an inner, horizontally disposed housing part 61.

The forward end of one of the rear plates 15 is pivotally connected as shown at 62 with the rear end of a bar 63, while the forward end of the bar 24 is pivotally connected, as shown at 64^a, with a bar 64. The

forward ends of both of the bars 63 and 64 are pivotally connected as shown at 65 and 66 with a shaft 67 which is journaled at its outer extremity in the housing as shown at 68 and at its inner extremity in the housing part 43 as shown at 69. The two bars 63 and 64 carry short shafts 70 and 71 upon which are respectively mounted gears 72 and 73 which mesh with each other. The gear 72 also meshes with a gear 74 fast on the shaft 67 while the gear 73 meshes with the gear 26 on one of the brush shafts 10. The gear 74 also meshes with a gear 75 loose on a shaft 76 which also carries a gear 77, also loose thereon, somewhat larger than the gear 75. The two shafts 41 and 67, near their inner extremities are respectively provided with gears 78 and 79 which are adapted to respectively mesh with the gears 49 and 77 when the shafts 48 and 76 are shifted longitudinally for the purpose of changing the speed of the brushes, the shifted position of these two shafts being indicated by dotted lines in Fig. 5. When the two shafts 48 and 76 are shifted longitudinally for the purpose of changing the speed of the brushes, the gears 49 and 77 also both engage a gear 80 fast on the central shaft 51, as indicated by the dotted lines in Fig. 5.

From the description already given it will be understood that when the motor is operating, rotary movement will be imparted to both pairs of brushes by virtue of the gearing connections between the shaft 51 and the gears on the brush shafts as just explained, and it will also be noted that the movement of the brushes will be as heretofore described, i. e. that the inner portions of the individual brushes of each pair will be moving upwardly while their outer portions will be moving downwardly, for the purpose of carrying the dirty water or refuse material upwardly as heretofore outlined.

Attention is called to the fact that the two pairs of brushes may be raised by virtue of the connections of the vertical arms 16 and 17 with the worms 19 without breaking the gearing connections heretofore noted, by virtue of the pivotal connections between the forward plate 14 and the bar 23 and the two bars 37 and 39, and the pivotal connection between the plate 15 and the bar 24 and the two bars 63 and 64, these pivotal connections being sufficiently loose to permit the necessary range of adjustment which in any event is comparatively slight, the draughtsman being unable to indicate it in the drawing.

The two shafts 48 and 76 are longitudinally movable in their bearing parts, their outer portions being square or polygonal in cross section to fit openings of counterpart shape formed in the housing. The outer polygonal portion of each shaft is provided

with notches 81 which are adapted to engage a spring locking device 82 mounted on the housing, for securing the said shafts in the adjusted position when actuated for the purpose of changing the speed of the brushes.

Above each pair of brushes is formed a chamber 83 which is open just above the space 84 between each pair of brushes to receive the refuse material as it is thrown upwardly and away from the brushes by centrifugal force. The bottom portions 85 of this chamber are inclined downwardly and co-operate with upturned parts 86 to form gutters in which the liquid or semi-liquid refuse material will collect and pass thence into a conduit 87 which discharges into the refuse tank 88.

In order to insure that the refuse material which is carried upwardly by the brushes shall be deposited in the chambers 83, I locate a screen device 89 composed of a series of superposed layers of mesh material, each layer being downwardly inclined from an apex and the several layers being suitably spaced but tapering to points at their extremities remote from their apexes. The theory of this screen arrangement is that each screen member will have a tendency to catch the liquid refuse material and cause the same to trickle downwardly to the bottom portions 85 of the chamber and pass thence into the gutters as heretofore explained. In the absence of these screen members there would be a tendency for the material thrown upwardly by the brushes into the chambers 83, to fall directly downwardly between the brushes.

In order to flush the chambers 83 in the event that they should become clogged or foul from the retention of the refuse material, I provide pipes 90 which project into the chambers 83, extending through sealed openings formed in the top portions of the housing forming the chambers. The two pipes 90 are united at their upper extremities where they merge into a vertical portion 91 which is open to receive flushing liquid from the chamber 92, this opening, however, being normally closed by a valve 93 fast on the lower extremity of a vertically disposed stem 94 which is threaded into a reinforcement 95 with which the top of the housing is provided. The upper extremity of this stem 94 is provided with a hand piece 96 to facilitate the manipulation of the stem for opening and closing the upper vertical portion 91 of each flushing device. As illustrated in the drawing, there are two of these flushing devices for each chamber 83.

In order to supply the brushes with the necessary soapy liquid or other cleaning compound when the machine is in use, I provide a relatively large tube 97 which is centrally supported in the housing, its upper extremity extending above the same and carrying a

plug 98 having a threaded opening to receive the threaded part of a spindle 99 whose lower portion carries a piston 100 which fits closely within the tube. The lower portion of this tube is provided with openings 101 which communicate with the liquid in the receptacle 92. The piston 100, when in its lowermost position, closes the openings 101, while, when the piston is raised as shown by dotted lines at the right of Fig. 2, the liquid from the receptacle 92 enters the lower portion of the tube freely and passes downwardly through the open end thereof into a small chamber 102 having openings 103 in the side walls thereof, said openings being located somewhat above the bottom of the chamber 102. On opposite sides of the chamber 102 are compartments 104 which are adapted to receive the soapy water or other cleaning compound which overflows through openings 105 near the top of the side walls of said compartments, this cleaning compound passing thence into distributing members 106 which are open at the bottom whereby the cleaning compound is delivered to the brushes on the outer or downwardly moving portions of the latter, thus making it effective for cleaning purposes.

In order to catch any grease or oil that might drop from the series of gears located beyond the ends of the brushes, a pan 107 is slidably mounted in the housing below these gears as best illustrated in Fig. 4. This pan may extend the entire length of the machine and may be removable from either end thereof or, if desired, two pans might be provided, one removable from each end of the machine.

At the end of each brush and extending downwardly to the surface to be cleaned, is an apron 108 preferably composed of rubber or other suitable or similar material. These aprons are mounted on the shafts of the brushes and are vertically adjustable therewith.

The machine is provided with a handle 109 which is forked at its forward extremity and provided with arms 110 which are pivotally connected with the housing of the machine on opposite sides. By virtue of this handle the machine may be moved back and forth over the surface to be cleaned.

The refuse liquid material may be drawn from the machine through a faucet 112, the valve of which is normally closed.

From the foregoing description the use and operation of my machine will be readily understood. As soon as the motor is started, power is transmitted through the medium of the gears heretofore described to the two pairs of brushes which are thereby rotated in such a manner as to cause the dirty liquid or refuse material to pass upwardly above the brushes into the chambers 83 whence it is

delivered to the gutters and discharged through the medium of the conduits 87 to the refuse tank 88, the cleaning compound being in the meantime fed to the brushes from the tank or receptacle 92 as heretofore explained.

After a suitable cleaning period, the duration of which experience will determine, the cleaning liquid should be cut off from the brushes and the chambers 83 should be flooded for the purpose of removing any refuse material which may have lodged therein with a tendency to clog.

Attention is called to the fact that by virtue of the speed changing mechanism heretofore described, it will be practicable to rotate the two pairs of brushes at different speeds. This may be required in order to do the most efficient work. Further, it will be understood that the cleaning liquid or compound may be delivered to one set of brushes while the other set are free from liquid, as may be required.

Again, it will be readily understood that the machine when in commercial use will be so constructed that the brushes may be readily removed and replaced as circumstances may require.

I claim:

1. A portable machine for cleaning floors and the like, comprising a framework adapted to be moved over the surface to be cleaned and having mounted thereon a pair of co-operating rotary brushes, means for operating the same to cause the lower portions of the individual brushes to move toward each other, the two brushes being mounted in close proximity to each other, a chamber arranged above the brushes and open at the bottom to receive the refuse material carried upwardly by the brushes, means for catching the refuse material and directing it to the bottom of the chamber on opposite sides of the opening, means for draining the chamber, and a refuse receptacle carried by the machine into which the said refuse is directed.

2. A portable machine for scrubbing floors and the like, comprising a framework adapted to be moved over the surface to be cleaned and having mounted thereon a pair of co-operating cylindrical rotary brushes, means for operating the same to cause the lower portions of the individual brushes to move toward each other, the two brushes being mounted substantially in tangential relation, a chamber arranged above the brushes and open at the bottom to receive the refuse material carried upwardly by the brushes, a receptacle for cleaning-compound carried by the machine, means for supplying said compound to the brushes, comprising a chamber, a conduit in communication with said receptacle, the said chamber being also in communication with said conduit

and having an outlet for supplying the cleaning material to the brushes, and means for regulating said supply.

3. A portable machine for cleaning floors and the like, comprising a framework adapted to be moved over the surface to be cleaned and having mounted thereon a pair of co-operating rotary brushes, means for operating the same to cause the lower portions of the individual brushes to move toward each other, the two brushes being mounted in close proximity to each other, a chamber arranged above the brushes and open at the bottom to receive the refuse material carried upwardly by the brushes, and means for catching the refuse material and directing it to the bottom of the chamber on opposite sides of the opening.

4. A portable machine for cleaning floors and the like, comprising a framework adapted to be moved over the surface to be cleaned and having mounted thereon a pair of co-operating rotary brushes, means for operating the same to cause the lower portions of the individual brushes to move toward each other, the two brushes being mounted in close proximity to each other, a chamber arranged above the brushes and open at the bottom to receive the refuse material carried upwardly by the brushes, and means for catching the refuse material and directing it to the bottom of the chamber on opposite sides of the opening, comprising a number of superposed mesh members having parts downwardly inclined from apexes.

5. A portable machine for cleaning floors and the like, comprising a framework adapted to be moved over the surface to be cleaned and having mounted thereon a pair of co-operating rotary brushes, means for operating the same to cause the lower portions of the individual brushes to move toward each other, the two brushes being mounted in close proximity to each other, a chamber arranged above the brushes and open at the bottom to receive the refuse material carried upwardly by the brushes, and means for supplying the same with flushing liquid.

6. A portable machine for cleaning floors and the like, comprising a framework adapted to be moved over the surface to be cleaned and having mounted thereon two pairs of rotary brushes, the individual brushes of each pair being arranged to co-operate and mounted substantially in tangential relation, a motor carried by the frame, and an operative connection between the motor and the brushes, said connection arranged to cause the lower portions of the individual brushes of each pair to move toward each other, a refuse receiving chamber having an opening, above each pair of brushes, means for catching said refuse material and delivering it to said chamber on

opposite sides of the opening, means for draining said chamber, and a refuse receiving tank in communication with the drainage means.

5 7. A portable machine for cleaning floors and the like, comprising a framework adapted to be moved over the surface to be cleaned and having mounted thereon a pair of co-operating rotary brushes, means for

operating the same to cause the lower portions of the individual brushes to move toward each other, the two brushes being mounted substantially in tangential relation, and means for varying the speed of the brushes as circumstances may require. 10 15

In testimony whereof I affix my signature.

GLENN L. DALY.