

April 23, 1929.

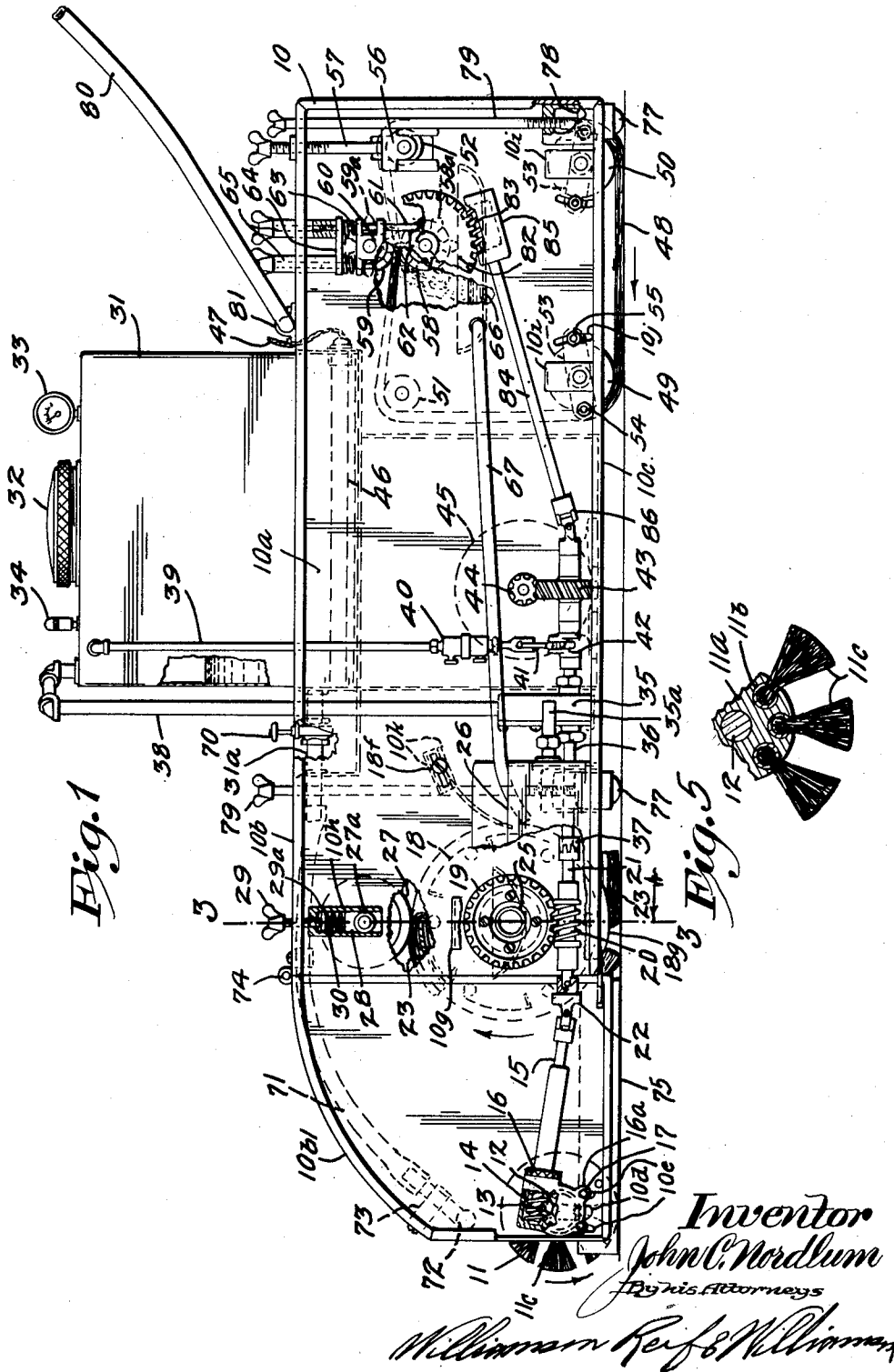
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SCRUBBER, WASHER, AND DRIER FOR FLOORS

Filed Aug. 28, 1926

2 Sheets-Sheet 1



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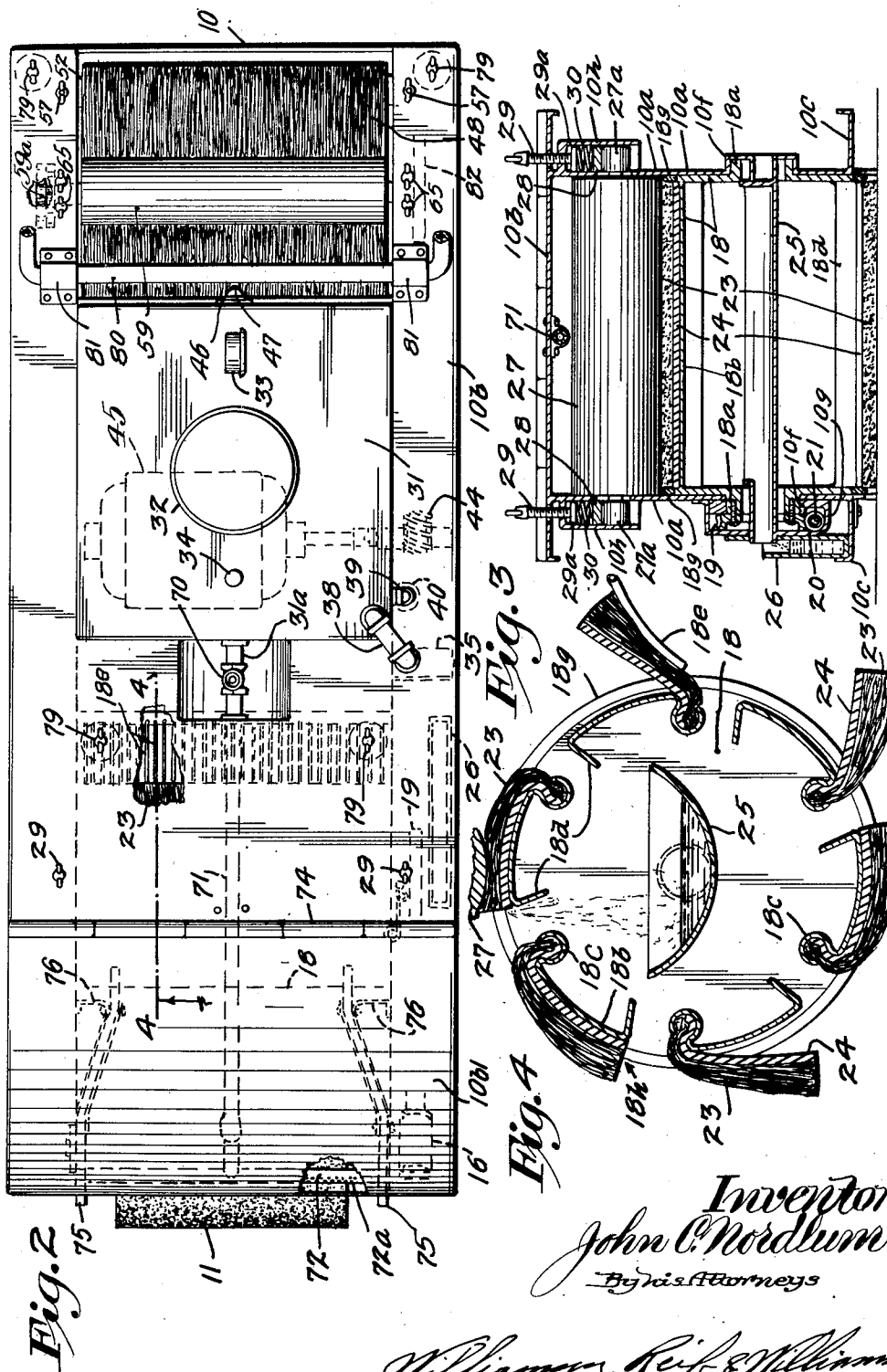
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UNITED STATES PATENT OFFICE.

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SCRUBBER, WASHER, AND DRIER FOR FLOORS.

Application filed August 28, 1926. Serial No. 132,109.

This invention relates to a scrubbing machine, and particularly to a machine of the type in which a movable scrubbing member is mounted, together with mopping and drying members, which members are mounted on a frame with a motor by which they are driven, which frame also carries a water receptacle for supplying water to the scrubbing member.

It is an object of this invention to provide a scrubbing machine comprising a scrubbing member to which water is supplied from a tank carried by the machine, together with a novel and efficient form of mopping means.

It is another object of the invention to provide such a mopping means comprising a substantially cylindrical rigid member having openings extending therethrough, together with circumferentially spaced fabric mops and having a pressing roller at the top of said member for squeezing water from said mops, which water runs to the inside of said member and is received in a stationary receptacle therein.

It is still another object of the invention to provide a mopping means such as set forth in the preceding paragraph, in which the mops have therebeneath a resilient or elastic means.

It is also an object of the invention to provide such a mopping means as defined in the two preceding paragraphs, which also has a comb disposed at one side, beyond the pressing roller, against which the fabric strands of the mop strike to loosen and separate the said strands.

It is still another object of the invention to provide a scrubbing machine having a frame, a scrubbing brush roller at the front thereof, a revoluble mop member in the rear of said scrubbing roller, a drying or wiping member in the rear of said mopping member, a water supply tank on said frame having water under pressure therein, means for delivering water from said tank to said brush, a receptacle for receiving the water from said mopping member and drying member, a pump for returning the water from said receptacle to said tank, together with a motor on said frame for driving said parts.

It is also an object of the invention to provide a scrubbing machine comprising a frame having scrubbing, mopping and wiping members thereon with means for vertically adjusting said frame to vary the distance between said members and the floor.

These and other objects and advantages of

the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views and in which:—

Fig. 1 is a view in side elevation of the machine, certain parts being broken away and others shown in vertical section;

Fig. 2 is a plan view of the machine;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1;

Fig. 4 is a vertical section of the mopping means taken substantially on line 4—4 of Fig. 2; and

Fig. 5 is a partial vertical section through the brush roller, Figs. 4 and 5 being shown on an enlarged scale.

Referring to the drawings, the machine comprises a frame 10 of general rectangular shape having the side plates 10^a, top plate 10^b and the bottom side members or rails 10^c. A rotatable scrubbing brush or roller 11 is mounted in the forward end of the frame, said brush having a shaft 12 carried in suitable bearings mounted in the side members 10^a, which shaft has a gear 13 secured thereto with which meshes the worm gear or spiral gear 14 secured to a shaft 15 journaled in the gear housing 16. The brush member 11 has a central solid portion 11^a having longitudinal grooves of substantially cylindrical shape in cross section extending longitudinally of grooves 11^b. Brush members 11^c are slidable in said grooves 11^b and may be separately removed and renewed. The shaft 12 is vertically adjustable in slots 10^d in the side plates 10^a and the bearings for said shaft have lugs 16^a projecting therefrom having bolts 17 extending therethrough to the inner sides of plates 10^a, said bolts extending through slots 10^e in the side members 10^a and having nuts at their outer sides adapted to be tightened to hold the bearings for shaft 12 in adjusted position. The side plates 10^a have bearings 10^f formed therein in which are journaled the trunnions 18^a projecting axially from the ends of the cylindrical member 18 which extends between the side plates 10^a, one of said trunnions having secured thereto a worm wheel gear 19 meshing with and driven by a worm gear 20 secured to and driven by a shaft 21, which shaft 21 is connected at its forward end by a universal joint 22 to the shaft 15. The member 18 is in the form of a hollow shell or drum and is formed with spaced longitudinally extending seg-

mental portions 18^b, each having cylindrical seat portions 18^c at one side and inwardly extending lips 18^d at their other sides. The member 18 has a yielding bead or rim 18^e at each end which will be made of rubber or similar material, which projects beyond the outer sides of the segments 18^b. Seat portions 18^c have clamped therein the ends of fabric mop members 23 preferably formed from fabric strands and the ends of layers 24 of rubber or similar elastic material. The mop members 13 are adapted to strike against a comb or tooth member 18^e, which member has a rod at its rear side extending between the side plates 10^a and movable between ribs 10^k on the inner sides of the side plates. A screw 18^f extends through a slot between ribs 10^k and is threaded into the rod of member 18^e by means of which it may be held in different positions. The member 18 has a pan 25 extending thereacross substantially axially thereof, the ends of which are secured to the side plates 10^a and the casing 10^g secured to one of the side plates, which encloses the worm gear 20 and worm wheel gear 19. One end of the trough 25 is closed and the other end is adapted to discharge into a receptacle 26 secured to the casing 10^g and supported in one of the flanges 10^c. A roller 27 extends between the side plates 10^a and has trunnions 27^a carried in bearing boxes 28 slidable in guides 10^h secured to the side plates 10^a. The bearing boxes are engaged at their upper sides by compression coil springs 30 disposed in the guides 10^h. Screws 29 have plates 29^a at their lower ends slidable in the guides 10^h and bearing upon the upper ends of springs 30, which screws are threaded in the upper ends of the guides 10^h and extend through openings in the top plate 10^b above which they are provided with suitable handles. The roller 27 is thus resiliently pressed downward against the member 18 and the pressure on said roller can be adjusted.

A tank 31 is carried on the upper portion of the frame, which tank is adapted to contain water, as shown in Fig. 1, and is closed so that the water can be placed under pressure. Said tank has a removable cover or lid 32 and a pressure gauge 33 is also secured to the top thereof. A blow-off valve 34 is provided at the upper portion of said tank. A discharge pipe 31^a leads from the lower forward end of tank 31 and is controlled by a valve 70. A conduit 71 connects the discharge pipe 31^a to a distributing member 72 extending longitudinally of brush 11 above the same and having a multiplicity of perforations 72^a in its forward and lower side. The member 72 is held in place by a bracket 73 secured to the forward portion 10^{bi} of the top plate 10^b, which portion is hinged on the pintle 74 and is movable upwardly thereabout. A rotary pump 35 is mounted on one of the rails 10^c and is driven by a shaft 36

connected at one end by a toothed clutch 37 to the shaft 21. Pump 35 has an inlet conduit 35^a which extends into or communicates with the receptacle 26 and said pump has a discharge outlet to which is connected the discharge pipe 38 which extends to and discharges into the top of the tank 31. A conduit 39 also communicates with the upper portion of the tank 38 and extends to a reciprocating air pump 40 connected by a pitman 41 to a crank shaft 42, which crank shaft is connected to or forms part of shaft 36 of the pump 35 and has secured thereto a worm wheel gear 43 driven by a suitable worm gear 44 secured to the armature shaft of a motor 45 indicated by the dotted lines in Figs. 1 and 2, which motor will be carried on a suitable plate in the bottom of the frame 10. The tank 31 has a heating member 46 disposed adjacent its bottom, which may be of the electrical type and heated by current from a conductor 47.

In the rear of the member 45 and adjacent the rear end of the frame there is provided a wiping member 48. This member is in the form of an endless fabric absorbent mop which runs over the rollers 49, 50, 51 and 52 carried on shafts journaled in the side members 10^a. The bearings for the rollers 49 are vertically movable in guide members 10ⁱ and carried on links 53 pivoted at 54, said links having bolts 55 connected thereto and projecting through slots 10ⁱ in the side plates 10^a and which bolts are provided with clamping nuts by means of which the links 53 and the rollers 49 and 50 are adjusted in position. The roller 52 is also carried in bearing blocks 56 to which are secured screws 57 extending upwardly through the top plate 10^b of the frame in which they are threaded and provided with suitable operating handles at their upper end. By moving the roller 52, the member 48 can be suitably tensioned. The member 48 between rollers 51 and 52 runs between squeezing rollers 58^a and 59, the roller 58 having trunnions journaled in bearings in the side plates 10^a. The roller 58 has secured thereto a worm wheel gear 82 meshing with and driven by a worm gear 83 secured to a shaft 84, said worm wheel gear being disposed, and said shaft being journaled in, a casing 85 secured to the side of one of said plates 10^a. Roller 59 is driven from roller 58 through ringer gears 58^a and 59^a secured to the other ends of rollers 58 and 59. The shaft 84 is connected by a universal joint 86 to the shaft carrying gear 43. The roller 59 has its trunnions journaled in bearing boxes 60 which are slidable on rods 61, the lower ends of which are secured in a block 62 attached to the inner sides of plate 10^a. Springs 63 surround the rods 61 and bear at their lower ends on the bearing boxes 60 and are engaged at their upper ends by a plate 64, through which said rods 61 extend. Said rods are

surrounded above plate 64 by threaded sleeves 65 through which the threaded portions of rod 61 extend, said rods having operating handles at their upper ends. By turning the rods 61, the sleeves 65 are moved downward against the spring 63 so that the pressure on roller 59 can be adjusted. A pan 66 extends lengthwise of the rollers 58 and 59 beneath the same and receives the water expressed from the member 48. Pipe 67 connects pan 66 to the receptacle 26 so that the water in pan 66 flows by gravity into receptacle 26.

Yielding members 75 such as sheets of rubber extend along the ends of brush 11 parallel to said ends and converge at their rear ends where they are secured to brackets 76 attached to and projecting inwardly from the side plates 10^a. Members 75 are adapted to engage the floor and to move inwardly the water so that the same will be effectively taken up by mop member 18.

The frame member 10 is supported on ball rollers or casters 77 contained in casing 78, which are slidable vertically in guideways formed on the side plates 10^a which casings 78 are engaged by the threaded lower ends of screws 79 which project upwardly through the top plate 10^b of the frame and have suitable operating handles at their upper ends. A handle member 80 is swingingly supported in bearings 81 secured to the top plate 10^b adjacent the rear portion thereof, said handle member extending rearwardly, and being of bail formation and by means of which the machine is moved.

In operation the water will be placed in the tank 31, preferably with some soap or washing compound, and will be heated to the proper temperature by the heating member 46, the conductors 47 being connected to some suitable source of current supply. The motor 45 will also be driven by some suitable connection such as a cord extending to some suitable source of current supply. The brush 11 will thus be rotated as will also the mop member 18 and the member 48 will be traversed about the rollers 51, 52 and 53. The valve 70 will be opened and a suitable amount of the water allowed to pass through the member 72 on to the top of brush 11. The brush 11 will thus scrub the floor, being rotated in the direction of the arrow shown in Fig. 1. As the device is moved forwardly, the water from brush 11 will be moved inwardly by the member 75 and this water will be taken up by the mop members 13 which are moved along the floor in the rotation of member 18, which member moves in the direction of the arrow shown in Fig. 1. As the members 13 are carried about the forward side of the roller, they are well saturated and in passing under the roller 27 the water will be expressed therefrom and moved toward the free ends of said mops. This

water will drain from said rear ends and will flow through the space between the segments 18^b as shown in Fig. 4 and will drop into the pan 25. The water is prevented from running over the ends of the member 18 by the rim members 18^a. From pan 25 the water will run to one side and into receptacle 26. As the members 13 pass from under roller 27 they are thrown outwardly by the resiliency of the members 24 when released from the roller 27 and will strike against the teeth of the member 18^a. The mops will have the strands thereof separated and will be brought to a loose and fluffy condition by the impact against member 18^a. As the members 13 drag past said comb 18^a the strands thereof will be straightened and brought into efficient condition for the mops again to engage the floor and take up more water. The member 18^a can be adjusted somewhat farther from member 18, as desired. As the machine is progressed over the floor, the member 48 will engage the floor and wipe the same dry of any water or moisture which still remains thereon. The water in the member 48 will be expressed therefrom as said member passes between rollers 58 and 59 and this water drops into the pan 66 as shown in Fig. 1. It will be noted that the rollers 58 and 59 are driven through the gear 82 and that these rollers cause the movement of the member 48. The water drains from pan 66 into the receptacle 26. The water collecting in receptacle 26 is again pumped into the tank 31 through the pipe 38 by pump 35. Pump 40 is operated as the machine is running and pumps air into the top of the tank 31, to place the water therein under pressure. The pressure in the tank will be indicated on gauge 33 and should the pressure increase beyond the desired point, the blow off valve 34 will be operated.

The frame can be adjusted to bring the members 11, 18 and 48 into the correct and desired relation to the floor. The machine will be propelled about the floor as desired by the handle 80 and will run very easily on the floor on the ball members 77.

From the above description it is seen that applicant has provided a simple, novel and efficient scrubbing machine. The water is effectively delivered to the scrubbing member and is completely removed from the floor after the floor has been cleaned by said scrubbing member. The machine is quite compact and the floor can be very quickly and efficiently cleaned thereby. The device has been amply demonstrated in actual practice and found to be very successful and efficient.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which, generally stated, consists in a device capable of carrying out

the objects above set forth, in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

5 1. A scrubbing machine having in combination, a mopping means comprising a revol-
luble rigid hollow cylindrical member hav-
ing spaced parallel segments, circumferen-
tially spaced fabric mops each comprising a
10 multiplicity of strands overlying said seg-
ments and a presser roller above said member
for engaging said mops and pressing the same
against said segments to squeeze the water
therefrom and to the ends thereof, said water
15 running between said segments into said
member, a stationary pan in said member re-
ceiving said water and a comb member beyond
said roller in the direction of rotation of said
member against which said mops are swung,
20 adapted to separate said strands and fluff up
said mops.

2. The structure set forth in claim 1, said
mop members being secured along one edge
to one edge of said segments and a layer of
25 elastic material underlying said mops and
disposed between the same and said segments
and secured to the segments at the same edge
as said mop members, said mop members and
layers being free at their opposite edges.

30 3. A scrubbing machine having in combi-
nation, a mopping means comprising a revol-
luble rigid hollow cylinder, circumferentially
spaced mops of fabric strands secured at their
advance edges to said cylinder, sheets of re-
35 silient material beneath said mops and se-
cured thereto at their advance edges, a press-
er roller above said cylinder for expressing
water from said mops and a toothed member
beyond said presser roller in the direction of
40 the rotation of said cylinder, extending at an
angle thereto, against which said mops are
thrown as said cylinder revolves, for opening
the strands of said mops.

4. A scrubbing machine having in combi-

nation, a mopping means comprising a revol- 45
luble hollow cylindrical member having end
portions and longitudinally extending spaced
segments therebetween, said segments having
one edge bent inwardly substantially radially
and having sockets formed in their other 50
edges, and fabric mops having one edge se-
cured in said sockets, said sockets being at
the advance edges of said segments in the
direction of rotation of said member and
pressing means above said mopping means for 55
engaging said fabric mops to press the water
therefrom whereupon the water will run into
said cylindrical member between the segments
thereof, said radial edges of said segments
acting to prevent the water from striking the 60
bottom of said segments.

5. The structure set forth in claim 4, and
sheets of elastic material underlying said
mops having one edge free and having one
edge received in said sockets with said mops. 65

6. A scrubbing machine having in combi-
nation, a mopping means comprising a revol-
luble, substantially hollow cylindrical mem-
ber having longitudinally extending spaced
openings therethrough, elastic sheets over- 70
lying said member between said openings,
fabric mops overlying said sheets, said mops
and said sheets being secured to said member
only along their forward longitudinal edges,
a presser roller above said member for en- 75
gaging said mops and pressing the same and
said elastic sheets against said member to
squeeze the water from said mops, whereupon
on release from said roller said elastic sheets
will throw the free edges of said mops out- 80
wardly from said member, said member be-
ing adapted to receive the water squeezed
from said mops through said openings, and
a stationary pan in said member for receiv-
ing the water. 85

In testimony whereof I affix my signature.

JOHN C. NORDLUM.