July 8, 1924. 1,500,692

G. H. WAGONER

SCRUBBING MACHINE

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Fig. 1.

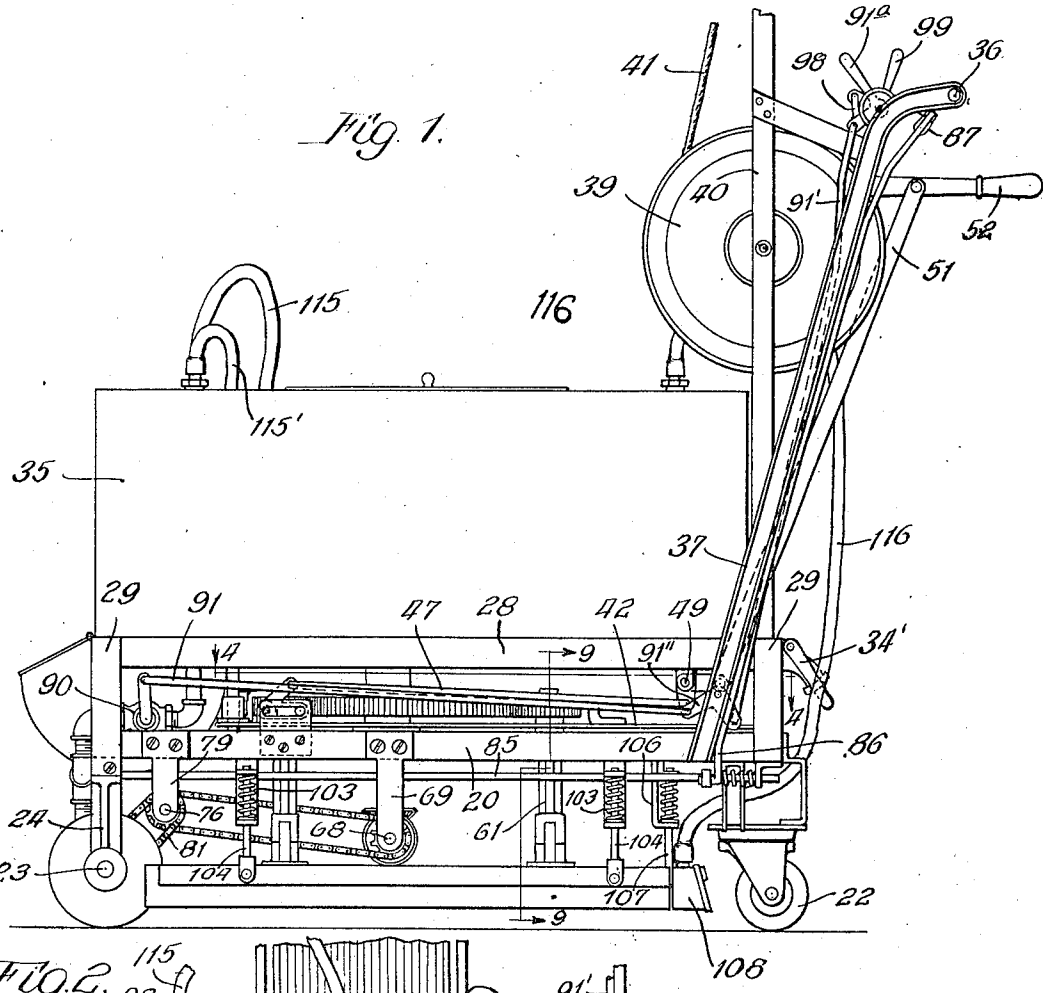


Fig. 2.

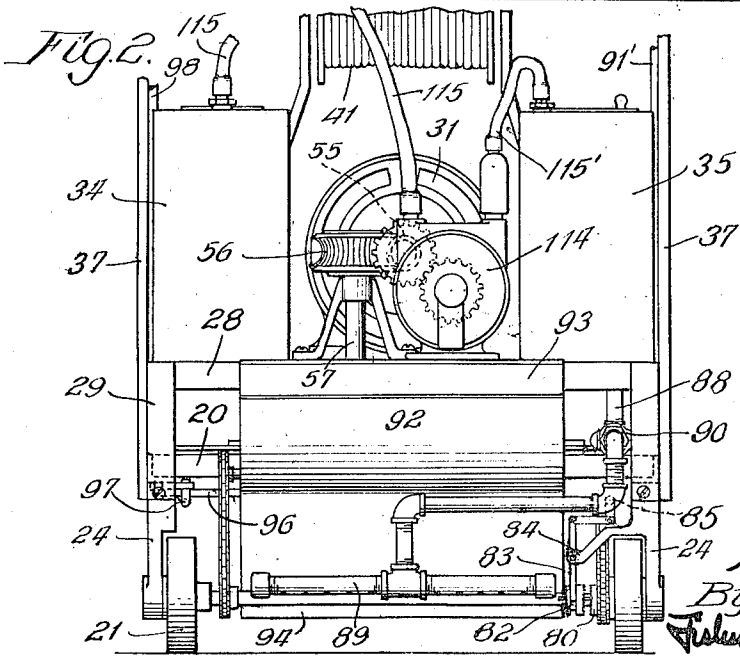
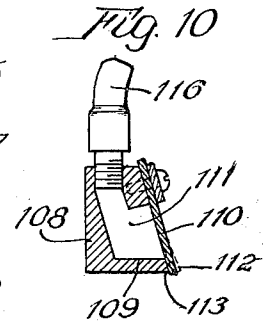


Fig. 10



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Fig. 3

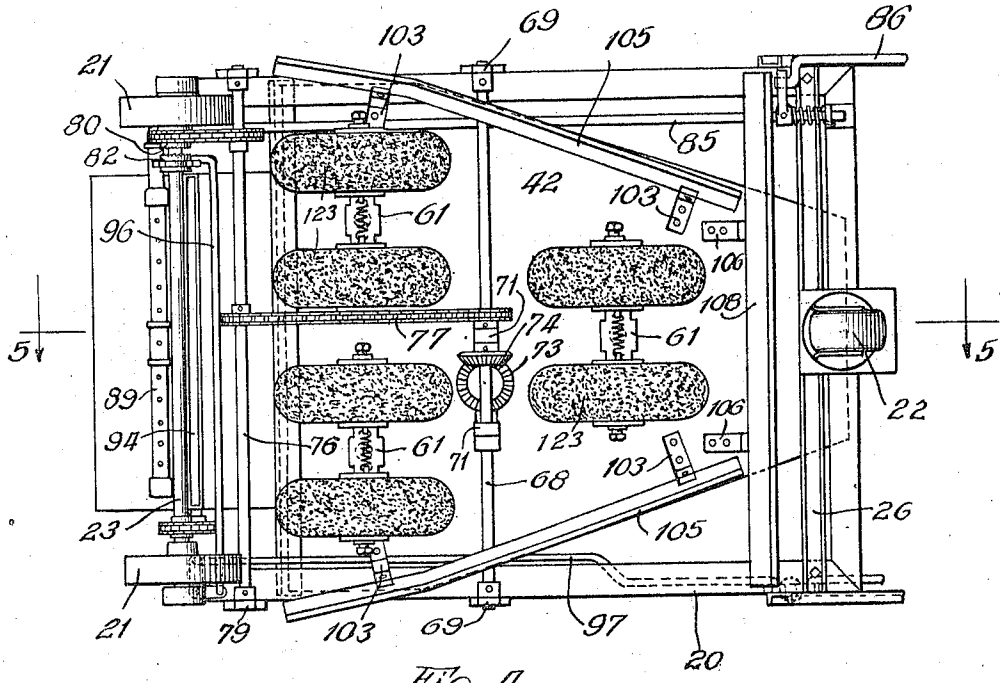
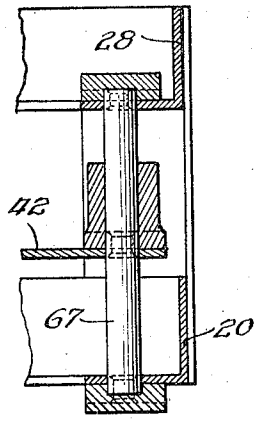
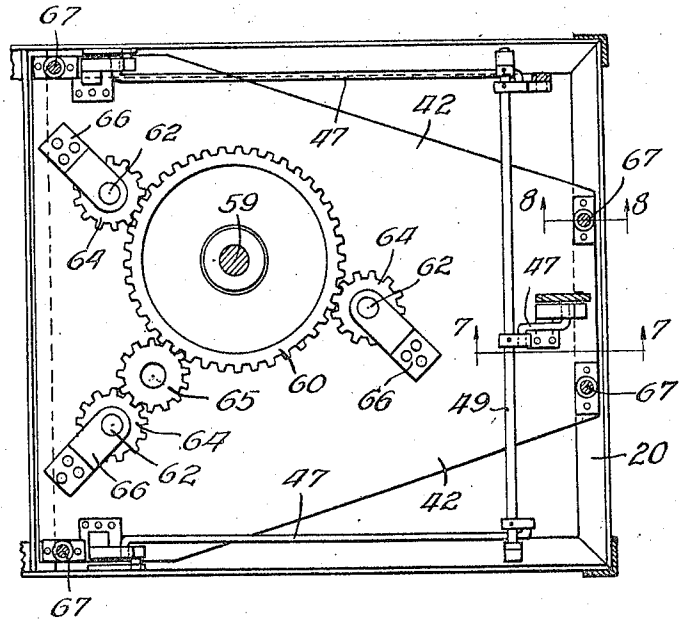


Fig. 4

Fig. 8





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SCRUBBING MACHINE

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Fig. 13.

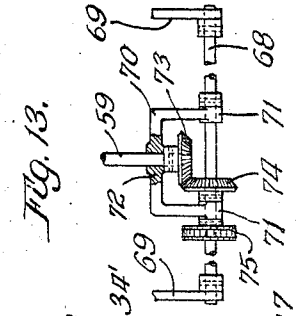
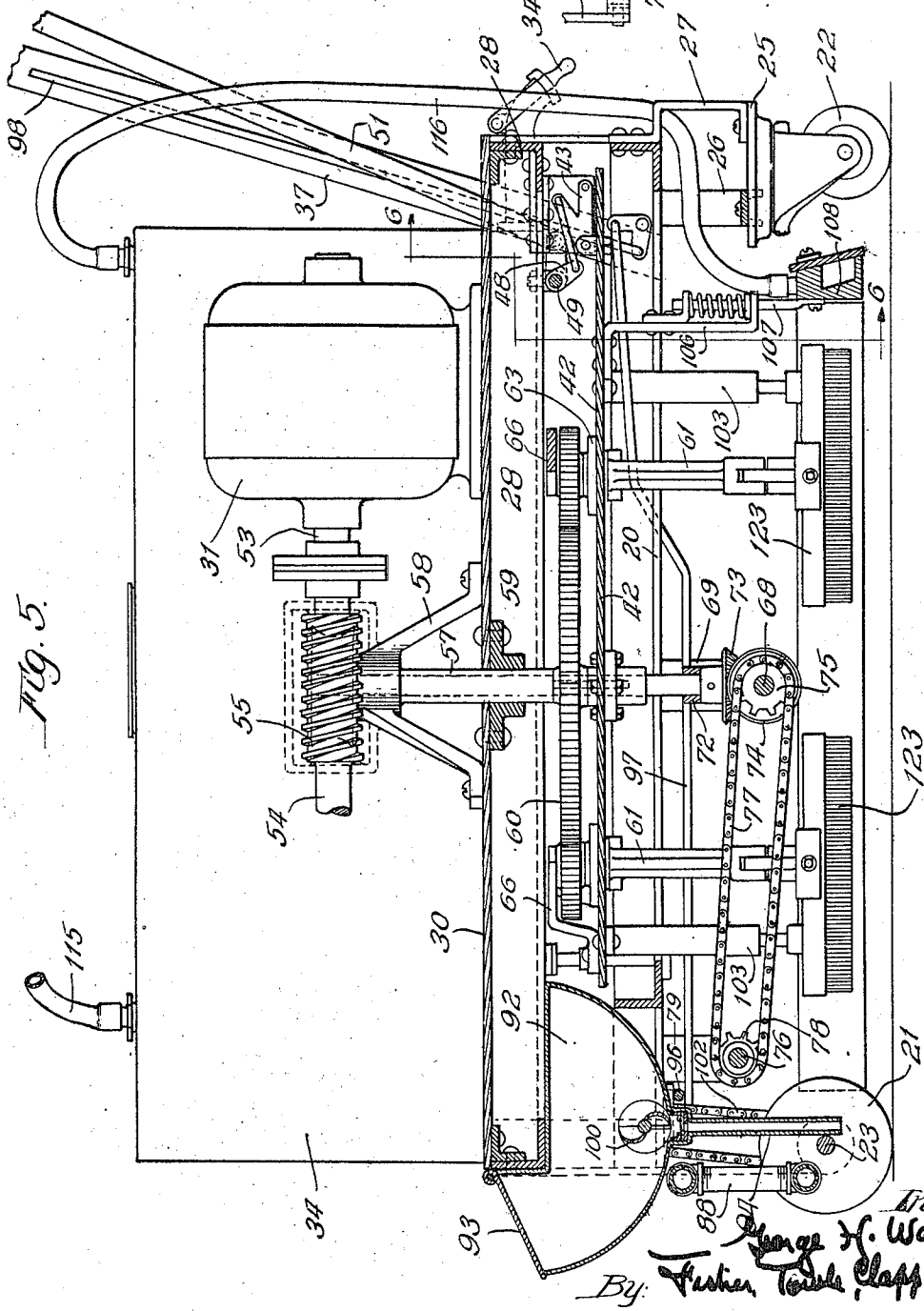


Fig. 5.



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Fig. 6

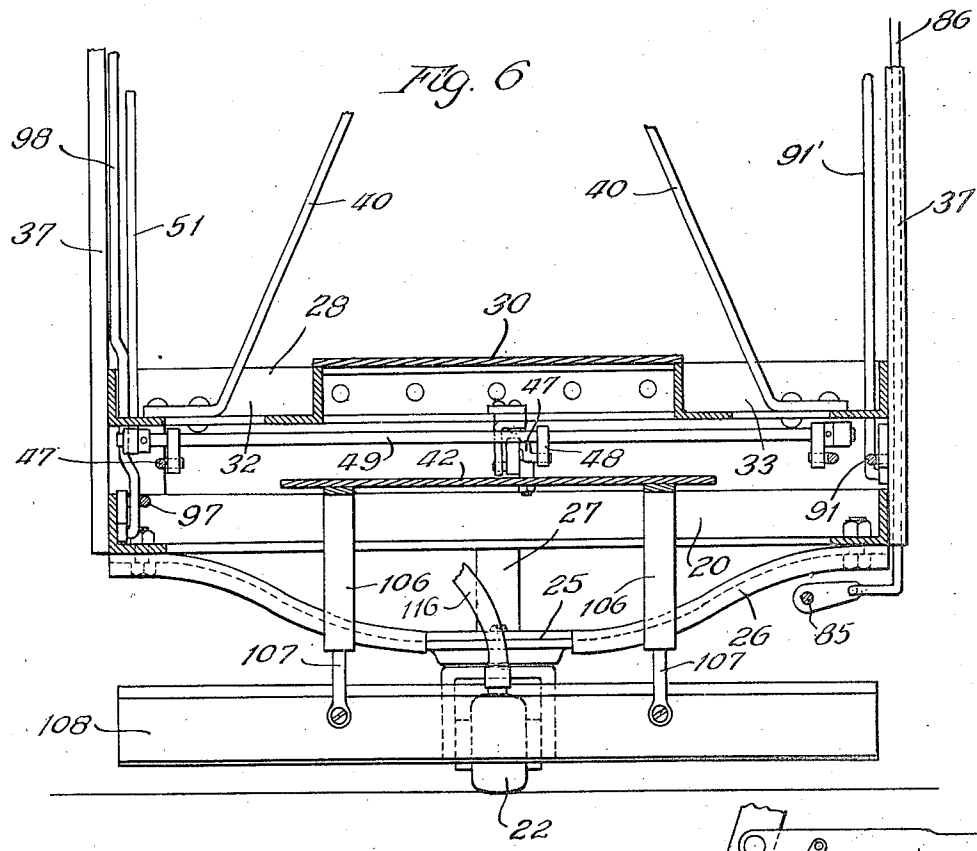
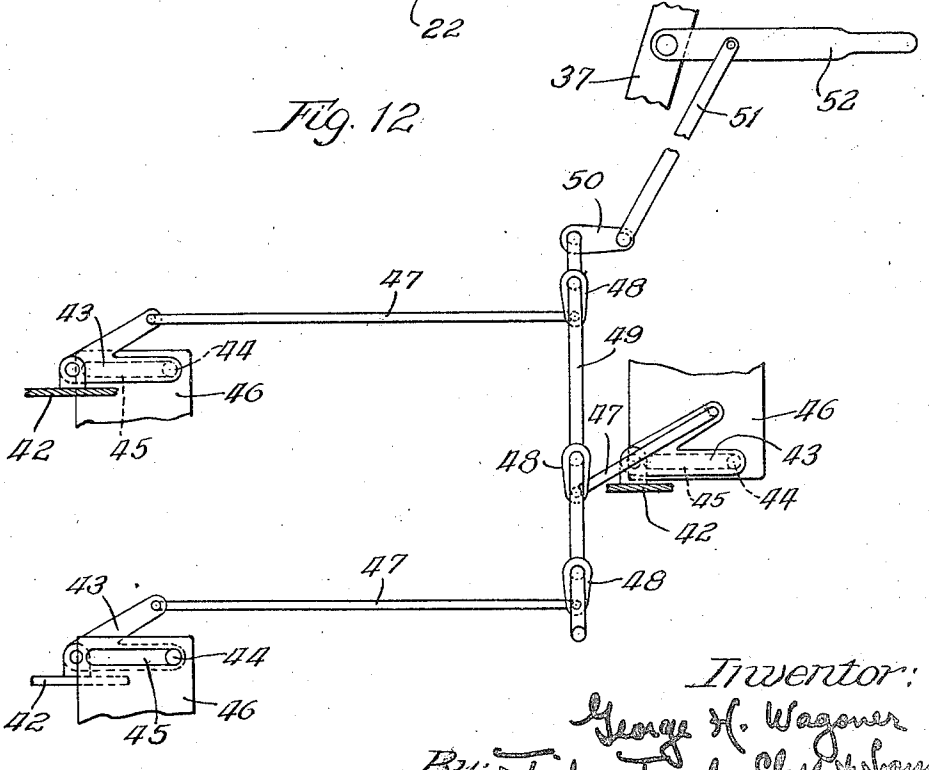


Fig. 12



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SCRUBBING MACHINE

Filed May 11, 1921

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Fig. 9

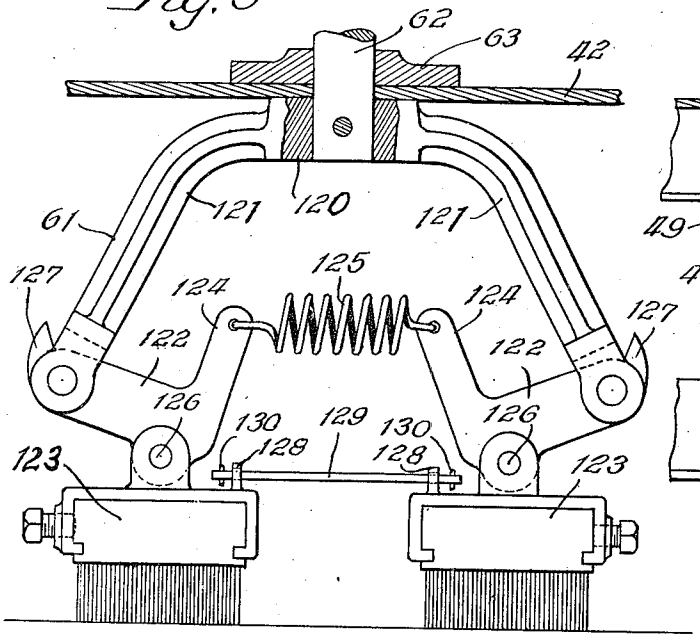


Fig. 7

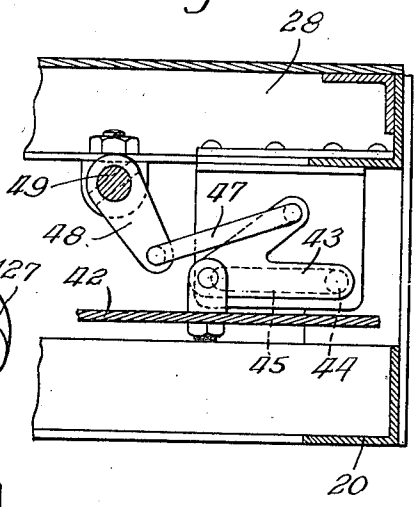
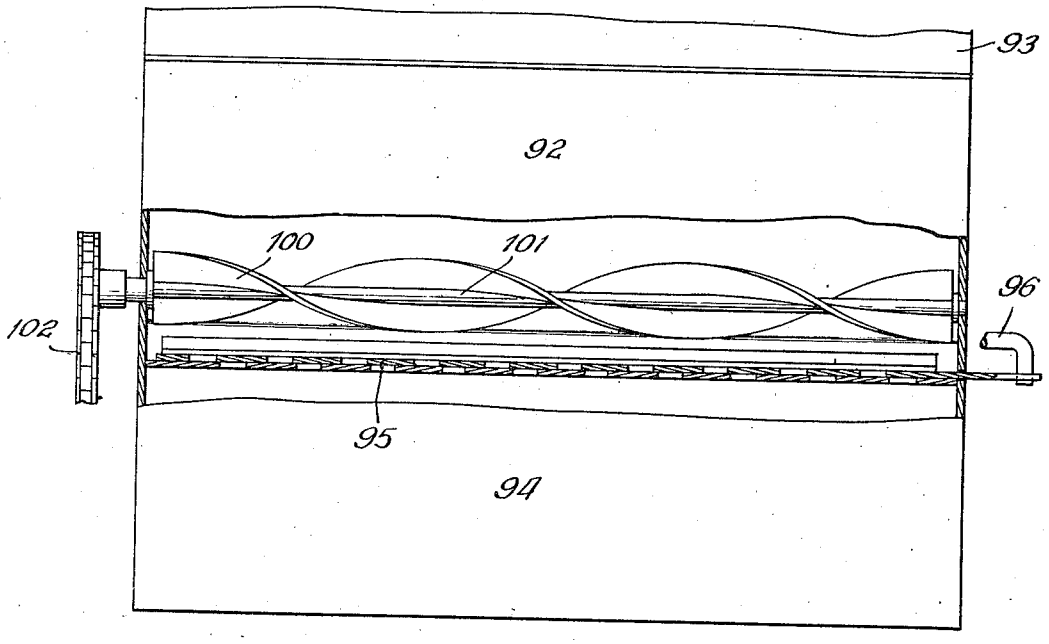


Fig. 11



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UNITED STATES PATENT OFFICE.

GEORGE H. WAGONER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO MORTIMER H. SWAFFORD, OF CHICAGO, ILLINOIS.

SCRUBBING MACHINE.

Application filed May 11, 1921. Serial No. 468,629.

To all whom it may concern:

Be it known that I, GEORGE H. WAGONER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Scrubbing Machines, of which the following is a specification.

This invention relates to scrubbing machines of the portable type but more particularly to those in which cleaning fluid is applied to the floor in front of one or more advancing scrubbing members, and the soiled fluid is collected by the machine and conveyed to a suitable receptacle.

The primary object of the invention is to provide a new and improved machine of this type which can be more conveniently controlled and operated and which is more efficient on operation than devices of a similar nature heretofore known.

Further objects of the invention are to provide improved means for collecting and withdrawing the soiled fluid, to facilitate the movement of the machine from place to place when not in operation, to provide an advantageous device for feeding soap powder or other cleaning materials or chemicals, to produce an improved scrubbing member, and to provide self-propulsion for the machine.

The many other objects and advantages of the invention will be better understood by reference to the following specification when considered in connection with the accompanying drawings illustrating a selected embodiment thereof, in which:—

Fig. 1 is a side elevation of the scrubbing machine.

Fig. 2 is a partial front elevation.

Fig. 3 is a bottom plan view.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a vertical section on the line 5—5 of Fig. 3.

Fig. 6 is a section on the line 6—6 of Fig. 5.

Figs. 7 and 8 are respectively enlarged vertical sections on the lines 7—7 and 8—8 of Fig. 4.

Fig. 9 is an enlarged detail elevation of one of the scrubbing members.

Fig. 10 is an enlarged detail section of the nozzle for withdrawing the soiled fluid.

Fig. 11 is an enlarged detail front elevation, partially in section, of the soap powder feeder.

Fig. 12 is a diagrammatical view of the lifting mechanism, and

Fig. 13 is a detail view of a portion of the power driving mechanism.

Referring to the drawings, the scrubbing machine comprises a main frame 20 supported at its front end by a pair of wheels 21 and at its rear by a castor 22. The wheels 21 are secured upon the shaft 23 supported in the lower extremities of the depending legs 24. The castor 22 is swiveled in a bracket composed of a base plate 25 supported by a bowed frame member 26 extending from side to side of the main frame 20, and a depending arm 27 attached to the rear of this frame.

An upper frame 28 is supported by corner irons 29. The frames 20 and 28 are preferably composed of angle irons bolted, screwed, riveted or otherwise secured together, though any other suitable material might be used. A platform 30 is supported by the upper frame, and a motor 31 of any suitable type is mounted on this platform. Parallel seats 32 anl 33 are formed in the upper frame 28 to support fluid holding tanks or receptacles 34 and 35. A guiding handle 36 is mounted in oppositely disposed members 37 secured to the frames 20 and 28 near the rear of the machine. A reel 39 is revolubly mounted in supports 40 secured at their lower extremities to the frame 28. The cord 41 wound on the reel contains the feed wires which supply current to the motor 31. This cord 41 is connected by a socket, plug or other suitable means to a convenient source of electrical supply and the reel holds the surplus cord to permit the machine to be moved back and forth over an extended area. Any suitable form of reel might be provided but I have found it advantageous to use one which automatically takes up the slack in the cord and yieldingly permits the cord to be unwound from the reel.

A movable platform 42 is supported by the frames 20 and 28 and connected thereto by bell cranks 43. The lower arm on each of these bell cranks is provided with a pin or stud 44 which is slidably mounted in a horizontal slot 45 in upright plates 46. The

two forward plates 46 are connected to the frame 20 and the rear plate is secured to the upper frame 28. The upper arms of the bell cranks 43 are connected by links 47 to the corresponding crank arms 48 on the shaft 49 revolubly mounted on the frame 28. The shaft 49 is connected by a crank arm 50 and a link 51 to the operating handle 52 mounted on one of the members 37 near the guiding handle 36. Movement of the handle 52 causes the plaform 42 to be raised or lowered.

The main shaft 53 of the motor 31 is directly coupled or otherwise operatively connected to a shaft 54 provided with a worm 55 which drives a gear 56 on the upper extremity of a vertical shaft 59 supported by the bracket 58 on the platform 30. A gear 60 is splined upon the shaft 59 and this gear is supported by the platform 42. Scrubbing members 61 are secured on the lower end of stud shafts 62 projecting through the platform 42 in suitable bearings 63. Pinions 64 are secured on the upper portion of the stud shafts 62 above the platform 42 and are driven by the main gear 60. In the present embodiment of my invention I have incorporated three scrubbing members but any suitable number may be used. One of the pinions 64 is driven indirectly by the gear 60 through the medium of an idler gear 65 which causes the direction of rotation of the shaft to be reversed in order that the two scrubbing members at the front of the machine may rotate in opposite directions. The upper extremities of the shafts 62 are preferably supported by corresponding arms 66 secured upon the upper face of the platform 42. The vertical movement of the platform 42 is guided by suitable rods 67 having their opposite extremities seated in the frames 28 and 20, as indicated in Fig. 8 of the drawings.

A shaft 68 is supported at its opposite ends by depending arms 69 secured to the lower frame 20. A bridge 70 is provided at its opposite ends with sleeves 71 fitting about the shaft 68 on which the bridge rests. A bearing 72 is provided in the raised portion of the bridge 70 to support the lower portion of the shaft 59. A bevel gear 73 is secured upon the lower end of the shaft 59 below the bridge 70 and this gear meshes with a corresponding gear 74 upon the shaft 68. A sprocket 75 is secured upon the shaft 68 to drive a shaft 76 through the medium of the chain 77 and the sprocket 78. The shaft 76 is supported at its opposite ends by depending arms 79 in the same manner as the shaft 68. A clutch member 80 is freely mounted upon the shaft 23 and driven by a chain 81 from the shaft 76. The opposing clutch member 82 is splined upon the shaft 23 and movable thereon into operative engagement with the member 80. The member 82 is controlled by the arm 83 pivoted intermediate its ends on the outer extremity of the arm 84 projecting inwardly from the depending leg 24. The arm 83 is linked to the rod 85 which is operated by the rod 86 controlled by a handle 87 mounted on one of the members 37 near the guiding handle 36. This construction permits the shaft 23 to be driven from the motor 31 in order that the machine may be self-propelled.

A fluid supply pipe 88 is connected to the supply tank 35 and a sprinkler pipe 89 is connected to the outer extremity of this pipe. The flow of fluid from the pipe 89 is controlled by a valve 90 operated by the rod 91 which is connected to the control rod 91′ by the bell crank 91″. A handle 91ª on the member 37 operates the rod 91′.

A receptacle 92 is supported by the forward end of the upper frame 28 to hold a supply of soap powder or other cleaning material, and this receptacle is provided with a hinged cover 93. An elongated nozzle 94 communicates with the bottom of the receptacle 92 and the discharge of the powder through this nozzle is controlled by a gridiron gate or valve 95 which is operated by a rod 96 linked to the control rod 97 connected by the rod 98 to the control handle 99. An agitator 100 is mounted upon the revoluble shaft 101, trunnioned in the end walls of the receptacle 92 and driven by the chain 102 from the shaft 23.

Depending arms 103 are secured upon the under face of the movable platform 42 and each of these arms carries a spring-pressed plunger 104. These depending arms are in the present embodiment arranged in pairs on substantially opposite side edges of the platform 42 and a squeegee or scraper 105 is carried by each pair of plungers. A pair of similar depending arms 106 carry plungers 107 on which is mounted an elongated nozzle 108 for withdrawing the soiled fluid. The nozzle 108 extends across the rear of the machine and preferably abuts the ends of the squeegees. The squeegees retain the cleaning fluid in the path of the scrubbing members and guide the soiled fluid to the nozzle. This nozzle may be of any suitable type but I have found a most advantageous form to be that shown in detail in Fig. 10, in which the base 109 is closed and a flap or valve 110 of stiff leather, rubberized fabric or other suitable material normally forms a tight closure for the mouth 111 in the rear face of the nozzle. The valve 110 is secured along its upper edge to the body of the nozzle and its free lower edge 112 extends slightly below the lower edge 113 of the nozzle. When the machine moves forward with the nozzle in operative position, the lower edge of this valve is moved by the resistance of the floor slightly away from the edge 113 of the nozzle, as indicated in dotted lines in

Fig. 10, and a narrow slit is formed to admit the soiled fluid. The valve 110 also acts as a squeegee.

Suction within the nozzle 108 is produced by a pump 114, preferably driven by the motor 31. A suction pipe 115 connects this pump with the soiled fluid tank 34 which is also connected by a suction pipe 116 with the nozzle 108. The tank 34 is preferably air tight so that a vacuum produced therein by the action of the pump causes a suction in the pipe 116 connected to the nozzle.

When the platform 42 is in its raised position the squeegees 105 and the nozzle 108 are preferably clear of the floor, as indicated in Fig. 1 of the drawings. This greatly facilitates the moving of the machine from place to place when it is not in operation. When this platform is lowered, the squeegees and nozzle are yieldingly pressed against the floor by the spring plungers 104 and 107 respectively. The tank 34 separates the fluid from the air so that substantially no fluid is drawn through the pipe 115 into the pump 114. The air exhaust pipe 115′ from the pump 114 is preferably connected to the tank 35 so that any moisture which may be sucked in by the pump will be carried to this tank. The soiled fluid is withdrawn from the tank 34 by the cock 34′.

The scrubbing members 61 are secured upon the lower extremities of the corresponding stud shafts 62 and are revoluble therewith. Each scrubbing member consists of a brush holder having one or more brushes secured thereto. In the present embodiment the holder comprises a hub 120 provided with a pair of arms 121 projecting outwardly and downwardly therefrom. Bell cranks 122 connect each of these arms with their respective brushes 123 and the inner ends 124 of these bell cranks are connected by an extensible spring 125 which normally tends to draw these arms together and to yieldingly force the brushes downwardly. The brushes 123 are preferably pivotally connected to the bell cranks 122 at 126. Stops 127 are preferably provided to limit the outward movement of the bell cranks 122. The brushes of each scrubbing member are provided with oppositely disposed lugs 128 through which passes a rod 129 to maintain the brushes in substantially parallel relation though permitting sufficient relative movement to compensate for irregularities in the floor. Cotter pins 130 passing through this rod adjacent to its opposite ends determine the maximum spacing between the brushes. When the platform 42 is in its uppermost position the brushes 123 are preferably raised above the floor in the manner indicated in Fig. 1. The brushes are yieldingly pressed against the floor by the springs 125 when the platform 42 is in its depressed or operative position.

To move the machine from place to place without performing the scrubbing operation, the platform 42 should be in its raised position. The motor is then started and the clutch thrown in. The operator guides the machine by the handle 36. To start the washing operation, the platform 42 is lowered to bring the scrubbing members into contact with the floor and the handles controlling the supply of water and soap powder are set at the proper position. The spray pipe 89 first wets the floor and the nozzle 94 sprinkles soap power or other cleaning material in predetermined quantities upon the wet floor. The floor thus wet with the cleaning mixture is then acted upon by the rapidly rotating scrubbing members. The squeegees 105 retain the fluid beneath the scrubbing members and aid in conducting the soiled fluid to the nozzle 108 which effectively collects the same and conducts it to the tank 34. It will thus be seen that a supply of clean water mixed with sufficient soap powder is always provided as the brushes move over the floor and the floor is left in a substantially dry condition after the machine has completed its operation. Conversely, when it is desired to stop the operation of the machine the supply of soap and water is shut off and the platform 42 is raised. To stop the propulsion of the machine, the clutch on the shaft 23 is disengaged by the control handle 87. The motor 31 is controlled by any suitable form of switch. The machine may be propelled by hand when this method is preferable, as in cleaning small or much obstructed floor areas.

The machine is easily controlled and operated and the cleaning is performed in a highly efficient manner. The construction is simple, economical and durable. The suction nozzle thoroughly dries the floor surface and removes all fluid from cracks or small depressions which could not be reached by mops or similar articles generally used for this purpose. This is particularly important in the case of wooden floors, for the fluid remaining in the cracks causes the floor boards to warp and quickly ruins the appearance of the floor as well as making the cleaning increasingly difficult. The form of the nozzle insures adequate suction at all times.

The present invention relates particularly to the type of scrubbing machine shown in the United States patent granted to William J. Lane, No. 1,118,870, on November 24, 1914.

I am aware that many changes may be made in the form and arrangement of the various parts without departing from the spirit of my invention and I reserve the right to make all such as fairly fall within the scope of the following claims.

I claim as my invention:

1. A scrubbing machine comprising a frame, a platform supported in said frame, rotary brushes supported by said platform, squeegees supported by said platform, and means for raising said platform relative to said frame to correspondingly move said brushes and said squeegees.

2. A scrubbing machine comprising a supporting frame, a platform mounted in said frame, rotary brushes supported by said platform, squeegees supported by said platform, and means including a single operating lever for raising said platform relative to said frame to correspondingly move said brushes and said squeegees.

3. A scrubbing machine comprising a supporting frame, a platform mounted in said frame, rotary brushes supported by said platform, squeegees supported by said platform, a suction nozzle supported by said platform, and means for raising said platform relative to said frame to correspondingly move said brushes, said squeegees and said nozzle.

4. A scrubbing machine comprising a portable supporting frame, a platform mounted in said frame, rotary brushes supported by said platform, squeegees supported by said platform, a suction nozzle supported by said platform, and means including a single operating lever for raising said platform relative to said frame to correspondingly move said brushes, said squeegees and said nozzle.

5. A scrubbing machine comprising a frame, a series of rotary scrubbing brushes mounted in the lower portion of said frame, means for actuating said brushes, fluid retaining means disposed substantially along the lower side edges of said frame opposite said brushes, a suction nozzle at the lower rear portion of said frame, means for producing a suction in said nozzle, and means including a single operating lever for simultaneously raising said brushes, said retaining means and said nozzle.

6. A scrubbing machine comprising a frame, a horizontal platform mounted on said frame, means for raising and lowering said platform, rotary scrubbing brushes mounted on said platform, power driven means for actuating said brushes, an elongated nozzle carried by said platform and extending transversely thereof in rear of said brushes, and means for producing a suction in said nozzle.

7. A scrubbing machine comprising a frame, a group of rotary brushes mounted in the lower portion of said frame, squeegees disposed on opposite sides of said group, an elongated suction nozzle connecting the rear ends of said squeegees in rear of said brushes, and means for producing a suction in said nozzle.

8. In a scrubbing machine, the combination with scrubbing mechanism, of a suction nozzle comprising a casing having a closed base and a suction mouth formed in its rear face, and a flap valve connected on its upper edge to said casing above said mouth and projecting over said mouth to form a closure therefor, the lower edge portion of said valve projecting below the base of said casing.

9. In a scrubbing machine, the combination with scrubbing mechanism, of a suction nozzle comprising an elongated casing closed at the base and having a suction mouth formed in its rear wall, and a flap valve of stiff material secured along its upper edge on the rear wall of said casing above said mouth and projecting downwardly over said mouth to normally form a yielding closure therefor, the lower edge portion of said valve projecting below the base of said casing to cause said mouth to be automatically opened by the frictional resistance of the floor on said valve as said nozzle is advanced thereover in operative position.

10. In a scrubbing machine, the combination with scrubbing mechanism, of a combined suction nozzle and scraper comprising an elongated nozzle casing closed at the base and provided with a mouth in its rear face, and a flap valve extending over said mouth and projecting below the base of said casing, the projecting portion of said valve forming a scraper.

11. In a scrubbing machine, a frame, supporting wheels for said frame, and a suction nozzle carried by said frame and having a normally closed mouth automatically opened by the frictional engagement of the nozzle with the surface being cleaned during the forward movement of said nozzle.

12. In a scrubbing machine, a frame, and a scrubbing member revolubly mounted in said frame and comprising a brush support provided with a pair of oppositely disposed depending arms, a bell crank connected at its outer extremity to the outer extremity of each of said arms, a spring connecting the inner extremities of said bell cranks, and a brush mounted on each of said bell cranks intermediate its ends.

13. In a scrubbing machine, a frame, and a scrubbing member revolubly mounted in said frame comprising a brush support provided with a pair of oppositely disposed depending arms, a bell crank pivotally connected at its outer extremity to each of said arms, a spring connecting the inner extremities of said bell cranks, a brush pivotally mounted on each of said bell cranks intermediate its ends, and means for maintaining said brushes in substantially parallel relation.

GEORGE H. WAGONER.