Sept. 30, 1941 J. S. THOMPSON 2,257,205

CARPET WASHING MACHINE

Original Filed March 16, 1935 3 Sheets-Sheet 1

FIG. 2

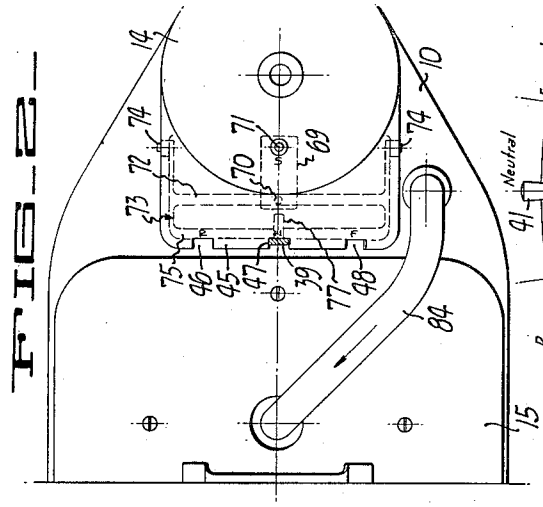


FIG. 1

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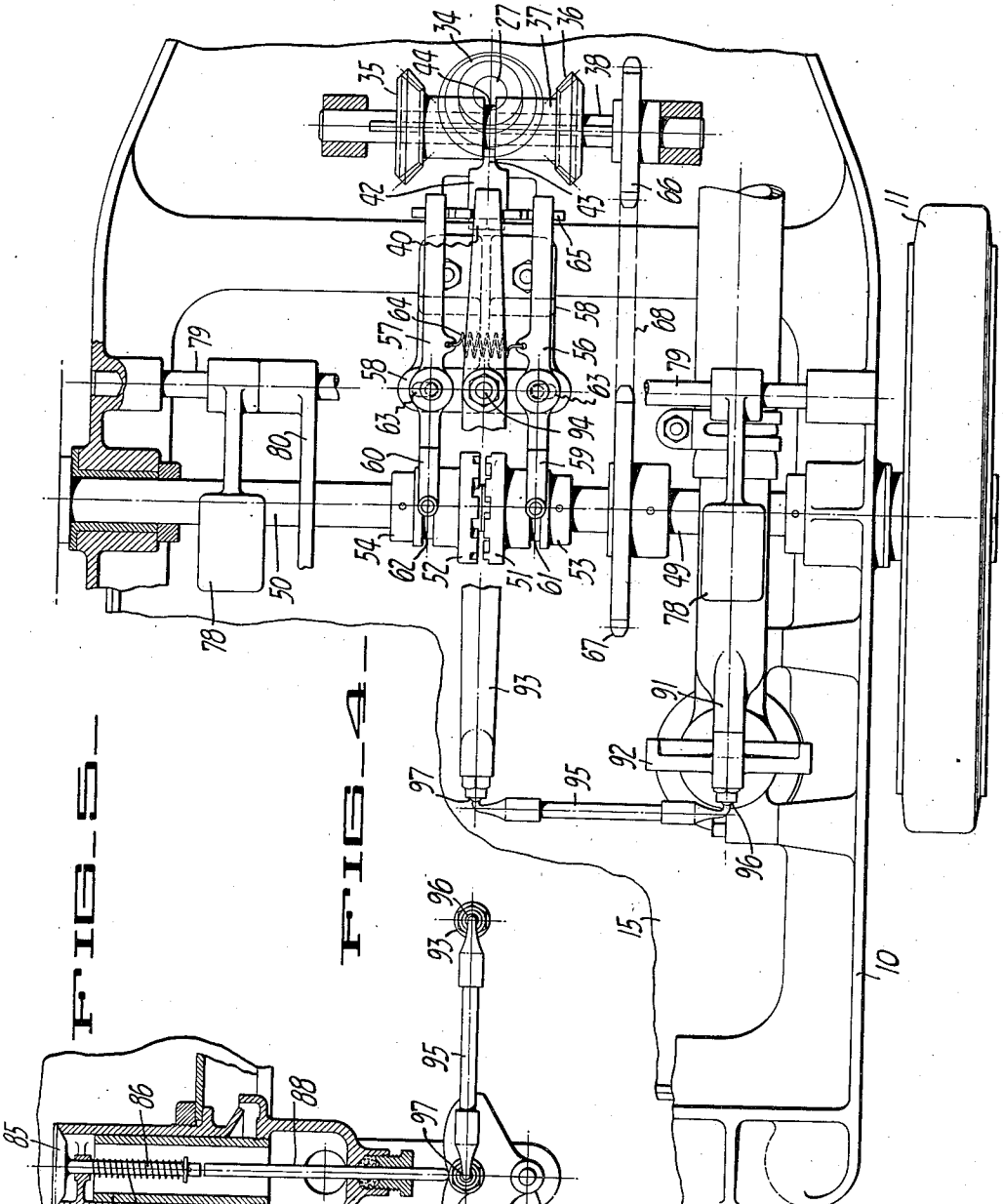


FIG. 4.

FIG. 5.

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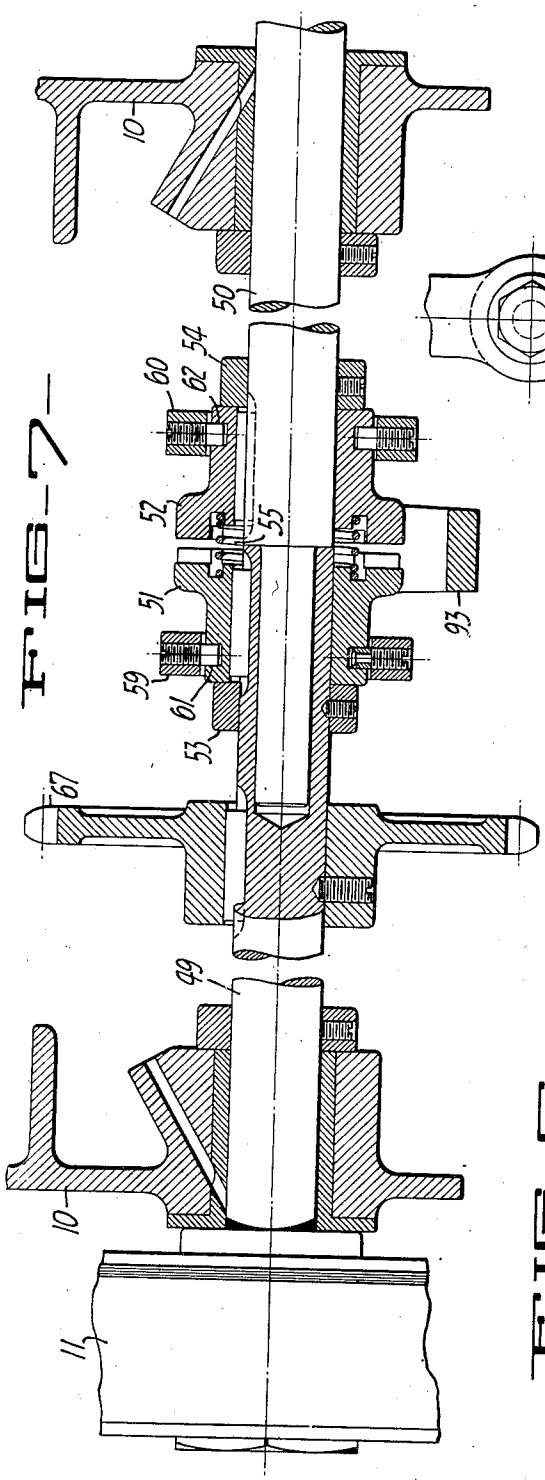


FIG. 7

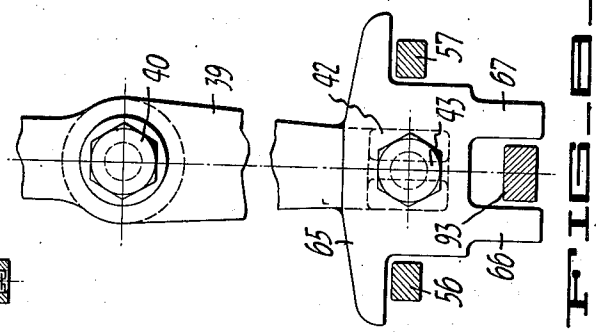


FIG. 8

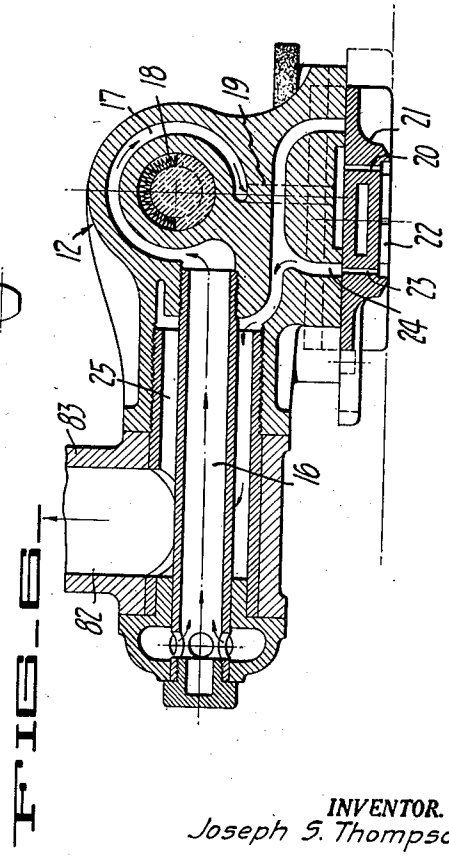


FIG. 6

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UNITED STATES PATENT OFFICE

2,257,205

CARPET WASHING MACHINE

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Original application March 16, 1935, Serial No. 11,445. Divided and this application June 13, 1938, Serial No. 213,321

10 Claims. (Cl. 141—1)

This invention relates generally to devices or machines for the cleaning of various surfaces where a washing or cleaning liquid is employed. It is of particular value where it is desired to wash carpets, rugs, or other floor surfacing materials, without removing the carpet or rug from its normal position on the floor.

The subject matter disclosed and claimed herein has been divided from my co-pending application Serial Number 11,445, entitled Carpet washing machine, filed March 16, 1935, now issued Letters Patent No. 2,129,797, granted September 13, 1938.

Objects of the present invention can be briefly summarized as follows: To provide a driving and clutching mechanism whereby the supporting wheels can be driven at the same speed for travel of the machine in a straight line or can be disconnected for independent rotation to facilitate turning; to make possible continued washing of a particular spot while the wheels of the supporting carriage are being driven; and to provide additional improved driving means and control features which will facilitate manipulation by an operator.

Further objects of the invention will appear from the following description in which a desirable embodiment of the invention has been set forth in detail in conjunction with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a side elevational view, partly in transverse cross-section, illustrating one embodiment of the present invention.

Fig. 2 is a detail in plan, showing particularly the relationship of the control lever in conjunction with an electric motor switch.

Fig. 3 is a fragmentary detail showing a portion of the mechanism of Fig. 2 in detail.

Fig. 4 is a bottom plan view of a portion of the machine illustrated in Fig. 1, showing the drive mechanism.

Fig. 5 is a cross-sectional detail taken along the line 5—5 of Fig. 1 and showing a discharge valve and a control therefor.

Fig. 6 is a side elevational detail in cross-section showing the washing head incorporated in Fig. 1.

Fig. 7 is a fragmentary detail in cross-section showing particularly the main axle of the machine.

Fig. 8 is a detail in side elevation showing the lower end of the main control lever.

As shown in Fig. 1 the machine consists of a carriage frame 10 which is provided with wheels 11 and which serves to support a suitable washing head 12. Associated with the washing head there is a liquid pump 13 adapted to be driven by an electric motor 14. To afford a convenient supply of washing liquid the carriage frame 10 also supports a suitable liquid tank 15. When the machine is in operation liquid from tank 15 flows to the washing head 12 where it is brought into contact with the surface to be cleaned. After such contact the liquid is sucked back to the head by pump 13 and is delivered back to the tank. Various types of washing heads can be used as desired. The head illustrated is one which is disclosed and claimed in my co-pending application Serial Number 11,445. Briefly it includes an inflow passage 16 which connects with a passage 17 which encircles an electric heating element 18. From passage 17 the cleaning fluid then passes through ducts 19 and 20 to a rug contacting plate 21. The fluid here contacts the surface to be cleaned in the small cut-away portion or recesses 22, and then it is sucked up through ducts 23 and 24 to the outlet passage 25, whence it is returned by the pump mechanism to the fluid tank 15.

Suitable power means for driving my device is indicated by electric motor 14. To provide means whereby it may drive the wheels 11 of the carriage frame 10 the motor shaft is shown extending downwardly into a gear housing 26. The gears carried in housing 26 serve to transmit motion at a reduced speed to shaft 27. As representative of such gearing a worm 28 on the lower end of shaft 29 engages a gear 30 carried by the intermediate shaft 31. Rotatable together with gear 30 there is a worm 32 which engages a gear 33 carried by shaft 27. In order that the axle and clutch mechanism may be best understood I have shown them fully in Fig. 4. As illustrated there, there is a bevelled gear 34 mounted upon the upper end of shaft 27 which bevelled gear is adapted to cooperate with either one of two bevelled gears 35 and 36. These latter two gears are mounted upon a hub 37 which in turn is splined to intermediate horizontal shaft 38.

In order to secure forward or reverse drive connections, means are provided enabling the operator to selectively engage either one or bevelled gears 35 or 36 with bevelled gear 34. The manual shifting means shown consists of a control lever 39 conveniently mounted on the machine, preferably between the motor 14 and the tank 15. This lever is pivotally mounted on stud 40 and is provided with a handle 41 at its

upper end. The lower end of the lever is provided with an off-set portion 42 carrying finger 43. This finger 43 extends into annular groove 44 formed in the intermediate portion of hub 37 between bevelled gears 35 and 36. The upper end of lever 39 cooperates with a suitable quadrant 45 having three lever positioning notches 46, 47 and 48. These three notches may be termed neutral, reverse and forward. It will presently be made clear how positioning of lever 39 in either of the notches will produce the desired results.

Instead of affording a direct drive between shaft 38 and the wheels 11, a drive to a suitable automatic clutch is provided. Thus the wheels 11 are mounted upon two separate aligned shafts 49 and 50 which are separately journalled in the sides of carriage frame 10. The inner end of shafts 49 and 50 are preferably journalled together as by having the inner end of shaft 49 bored in order that it receives male shaft 50. Splined upon the inner ends of these shafts, are the elements 51 and 52 of the jaw-type clutch. These elements are normally urged apart against the abutment collars 53 and 54, by the compression spring 55 as shown to best advantage in Fig. 7. When urged together against the compression spring 55 it is evident that shafts 49 and 50 are connected together to operate in unison, thus producing the same result as a single shaft. When elements 51 and 52 cooperate as previously explained it is evident that the two wheels will rotate in unison thus making the machine go forward or reverse in a straight line. This is an important feature of the invention as has been explained previously.

To enable a selective shifting of clutch elements 51 and 52 responsive to operation of the control lever 39, two supplementary levers 56 and 57 are provided as is shown in Fig. 4. These levers are pivotally secured to a supporting bracket 58 and the ends of the levers adjacent the corresponding clutch elements 57 and 52 are provided with forks 59 and 60 for engaging the grooves 61 and 62 of the clutch elements. The pivotal connection between the levers 56 and 57 with bracket 58 preferably permits a certain amount of lost motion, as by having the pivot pins for the levers extending through slots 63 formed in the bracket. A tension spring 64 connects directly between the two levers.

Still referring to Fig. 4, it will be noted that I have mounted upon the lower end of control lever 39 and adjacent the off-set portion 42, a plate 65. This plate extends downwardly between the adjacent ends of levers 56 and 57 as shown in Fig. 8 and at its lower extremity is provided with two spaced lugs 66 and 67. Thus when the control lever 39 is in the position represented by notch 47 or neutral, plate 65 occupies the positions illustrated in Figs. 4 and 8 and the clutch elements 51 and 52 are dis-engaged. When manual control lever 39 is shifted to the position represented by notch 48 bevel gear 35 is brought into engagement with gear 34 and at the same time shifting of plate 65 actuates lever 56 to slide clutch element 51 into engagement with corresponding clutch element 52. Similarly when the control lever 39 is shifted to a position corresponding to notch 46, gears 36 and 34 are brought into engagement and lever 57 is shifted to bring clutch element 52 into engagement with corresponding element 51.

In order to transmit motion to the wheels from power driven shaft 38 sprocket 66 is mounted on shaft 38. Another corresponding sprocket 67 is mounted on the shaft 49 and these two sprockets are connected by drive chain 68.

From the above it is evident that when manual control lever 39 is forced to a position corresponding to notch 48 which I have indicated as forward, gears 34 and 35 will be brought into mesh and clutch elements 51 and 52 will be engaged to drive the machine forwardly. Likewise when the clutch lever is shifted to the position represented by notch 46 both of the wheels will be driven to propel the vehicle rearwardly. This is obvious because gears 34 and 36 will be brought into mesh. In the event the jaws of clutch elements 51 and 52 are so positioned that they can not immediately engage when the manual shift lever is shifted to one of the positions above, the slack afforded by tension spring 64 and slots 63 permits immediate engagement of one of the bevelled gears 35 and 36 with gear 34, following which the clutch elements 51 and 52 will snap to closed position when the jaws of the same assume proper relative positioning.

I have also provided means whereby the energizing circuit to the motor 14 is automatically closed when the lever 39 is thrown to either forward or reverse positions. Thus as shown in Figs. 2 and 3 a motor starting switch 69 is provided which is controlled by the start and stop buttons 70 and 71. Starting button 70 underlies bar 72 forming part of the yoke 73. The side branches of this yoke are secured to the motor housing by pivotal connection 74 to enable a swinging movement of the yoke in a vertical position. The transverse bar 75 of the yoke which underlies the notched quadrant 45 is provided with an upper cam surface 76. A pin 77 mounted upon control lever 39 is arranged to engage the cam surface 76 and the character of this surface is such that when lever 39 is in neutral position, the switch 69 may be opened by compression of button 71, with the button 70 retaining the yoke in an elevated position. When the lever 39 is shifted from a neutral position to either forward or reversed positions the starting button is automatically depressed by downward movement of yoke 73 to start the motor before engagement of the drive to the wheels. While the lever 39 is in either forward or reverse position, depression of button 70 makes it impossible for an operator to stop the motor by depressing button 71. Thus to stop the motor it is necessary to first move the control lever to a neutral position.

With the driving and clutching means described above, it is a simple matter to traverse adjacent paths to cover an entire floor surface. When control lever 39 is shifted to position 48 the machine moves forwardly in a straight line. When the end of the line of travel is reached, the operator shifts the control lever 39 to neutral position, to disengage the wheels both with respect to the motor and with respect to each other, in order that they may rotate independently. He can then readily turn the machine to any direction desired. When the machine has been turned in the direction of the next line of travel, control lever 39 is again shifted to position 48 and the machine moves forward in a straight line. Alternately at the end of a line of travel, the machine may be shifted laterally while lever 39 is in neutral, and then caused to move in a reverse direction along a line parallel to the preceding path. While travelling either forwardly or backwardly, the machine requires only a minimum amount of attention.

At times an operator will find it desirable to retain the machine stationary while continuing a washing operation upon a particularly dirty spot. To enable an operator to do this, I have provided means operable by means of a foot pedal to elevate the wheels from the floor, thus permitting the wheels to revolve without movement to the machine. Thus as shown in Figs. 1 and 4, I provide a pair of floor contacting levers 78 which are secured at spaced points to horizontal shaft 79. Likewise secured to shaft 79 there is a foot lever 80, the outer end of which projects beyond the rear end of the carriage frame, in position for convenient depression by the foot of the operator. A tension spring 81 serves to ordinarily urge the lever 80 towards a raised position out of contact with the floor. When the foot lever 80 is depressed by the foot of the operator, levers 78 are swung downwardly into contact with the floor to elevate the carriage and lift the wheels 11 clear of the floor. While in this position the washing head remains in contact with the floor so that a washing operation on a particular spot may proceed while the machine remains stationary.

I have previously referred to means for withdrawing washing liquid through passage 25 together with any dirt or air which may be admitted into cut-away portion or recess 22. Suitable pumping means for carrying out this operation can best be illustrated as in Fig. 1. The pump as illustrated is of the gear type having its main operating shaft 29 directly coupled to the shaft of the electric motor 14. The inflow side of the pump is connected to the passage 82 formed by conduit 83 while the outflow side is connected to a pipe 84 which serves to deliver liquid back into the tank 15. From this description it will be seen that washing fluid supplied to the washing head flows through passage 16 and thence about the heating element through passages 19 and 20 to the floor contacting surface. It is then withdrawn by suction through ducts 24 and 25 to the pump 13 and from thence delivered back to the tank through pipe 84.

With reference to the flow of washing liquid from tank 15 to the washing head 12 certain other features must be described, particularly valve mechanism for controlling the outflow of the washing liquid from the tank. It is desirable that this valve be controlled by movements of the manual control lever 39 so that when this lever is in a neutral position represented by notch 47 the valve is closed, while in either reverse or forward positions the valve is open for delivery of washing liquid. As representative of a suitable valve and operating mechanism of this character, the valve is shown provided with a vertically movable valve member 85 of the poppet type. The sliding stem 86 for the valve member 85 is urged to a closed position by spring 87. Extending upwardly through the external part of the valve body and in alignment with the stem 86 there is an operating plunger 88. The body of the valve is formed by two interfitting and separable parts 89 and 90, part 89 being carried by the tank 15 and part 90 being carried by the carriage frame. To provide operating means for the plunger 88, the bracket 91 serves to pivotally support a two lobed cam 92. The exterior of the plunger 88 rests upon the surface of this cam so that when the cam is in the neutral position illustrated in Fig. 5, the valve member 85 is in closed position. However, when the cam is swung either to the left or to the right from the neutral position shown, plunger 88 is lifted to open the valve member 85. As shown in Fig. 4 mounted beneath the levers 56 and 57 there is another lever 93. Intermediate the ends of this lever there is a pivotal connection 94 to bracket 58. One end of the lever extends between the lugs 66 and 67 while the other end is connected to the cam 92 through link 95. Universal swivel connectors 96 and 97 to the ends of link 95 are desirable.

With the arrangement as described when the lever 39 is in a neutral position, cam 92 is likewise in a neutral position so that the valve 85 is closed. However, when lever 39 is moved to either forward or reverse position, cam 92 is moved to open the valve member 85 and effect flow of washing liquid to the washing head 12.

I claim:

1. In a machine of the character described, a carriage having two aligned wheels, separately rotatable aligned shafts for said wheels, a washing head supported by the carriage, pumping means supported by the carriage for circulating washing liquid through the head, an electric motor for driving said pumping means, drive means serving to connect the motor to one of said shafts, said drive means being reversible, and a clutch serving to releasably connect said shafts to rotate in unison, said clutch when disengaged serving to permit independent rotation of one wheel with respect to the other.

2. In a machine of the character described, a wheel carriage, a washing head supported by said carriage, pumping means supported by the carriage for circulating washing liquid throughout the head, an electric motor for driving the pumping means, a reversible drive means adapted to be shifted from neutral to connect the motor to one of said wheels, a clutch serving to releasably connect the wheels of the carriage to rotate in unison, said clutch when disengaged permitting rotation of one wheel independently with respect to the other, and a single control lever for shifting the drive means and for operation of said clutch, to directly connect said wheels when said one wheel is connected to be driven by the motor.

3. In a floor washing machine of the character described, a wheel carriage, an electric motor supported by the carriage, a reversible drive means adapted to be shifted from neutral to connect the motor to one of said wheels, a clutch serving to releasably connect the wheels of the carriage to rotate in unison, said clutch when disengaged permitting rotation of one wheel independently with respect to the other, and a single control lever for shifting the drive means and for operation of said clutch, to directly connect said wheels when said one wheel is connected to be driven by the motor.

4. In a machine of the character described, a wheel carriage, a washing head supported by the carriage, means supported by the carriage for circulating washing liquid throughout said head, motor means for driving the wheels of the carriage and also for driving said liquid circulating means, and manually operable elevating means for lifting the carriage to a position with the wheels above the supporting floor, without however, elevating said washing head, whereby the washing head may operate on a localized area while stationary.

5. In a machine of the character described, a wheel carriage, a washing head supported by the

carriage, pumping means supported by the carriage for circulating washing liquid through the head, an electric motor for driving the pumping means, reversible drive means operatively connecting the motor to the wheels of the carriage, a control lever for reversing said drive means, and a motor switch automatically closed by operation of the control lever, when the control lever is shifted from neutral position to either forward or reversed position.

6. In a floor cleaning machine of the character described, a carriage having two aligned wheels, separately rotatable aligned shafts for said wheels disposed in end to end relation, an electric motor, reversible drive means from said motor to one of said shafts, a clutch between said shafts providing for direct coupling of said one shaft to the other of the shafts for transmitting the motor drive thereto, and a common control means for said drive means and said clutch to cause simultaneous engaging and disengaging thereof.

7. In a floor cleaning machine of the character described, a carriage having two aligned wheels, separately rotatable aligned shafts for said wheels disposed in end to end relation, an electric motor, reversible drive means from said motor to one of said shafts, a manipulable control means for said drive means movable in either direction from a neutral position to engage said drive means and control the direction of operation thereof, a clutch between said shafts, and means controlled by said control means for engaging said clutch upon movement of said control means in either direction from said neutral position.

8. In a floor cleaning machine of the character described, a carriage having two aligned wheels, separately rotatable aligned shafts for said wheels disposed in end to end relation, a motor on said carriage, a reversible drive connection from said motor to one of said shafts, a clutch between said shafts including a clutch element slidably mounted on and keyed to each of said shafts and spring means urging said clutch elements apart, and a common control means for said drive connection and said clutch.

9. In a floor cleaning machine of the character described, a carriage having two aligned wheels, separately rotatable aligned shafts for said wheels disposed in end to end relation, a motor on said carriage, a reversible drive connection from said motor to one of said shafts, said drive connection including drive establishing means movable in either direction from a neutral position to establish the drive and control the direction thereof, a clutch between said shafts including a clutch element slidably mounted on and keyed to each of said shafts and spring means urging said clutch elements apart, and a common control means for said drive connection and said clutch, including means for moving said drive establishing means in either direction and means for moving one or the other of said clutch elements in response to movement of said drive establishing means in either direction.

10. In a machine of the character described, a wheel carriage, a washing head supported by the carriage, a tank on the carriage, pumping means supported by the carriage for circulating washing liquid from the tank through said head and back to the tank, an electric motor for driving the pumping means, a valve for controlling the flow of liquid from said tank, a control lever for opening said valve, and a motor switch closed by operation of said lever upon movement thereof to open said valve.

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