Feb. 13, 1940. W. SISMAN 2,190,576

WALL CLEANING APPARATUS

Filed July 18, 1938

Fig. 1.

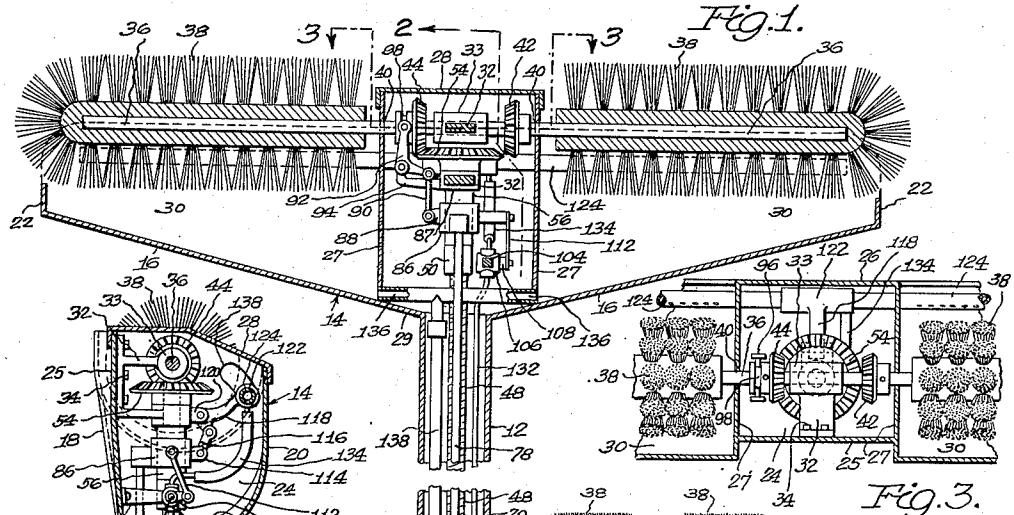


Fig. 2.

Fig. 3.

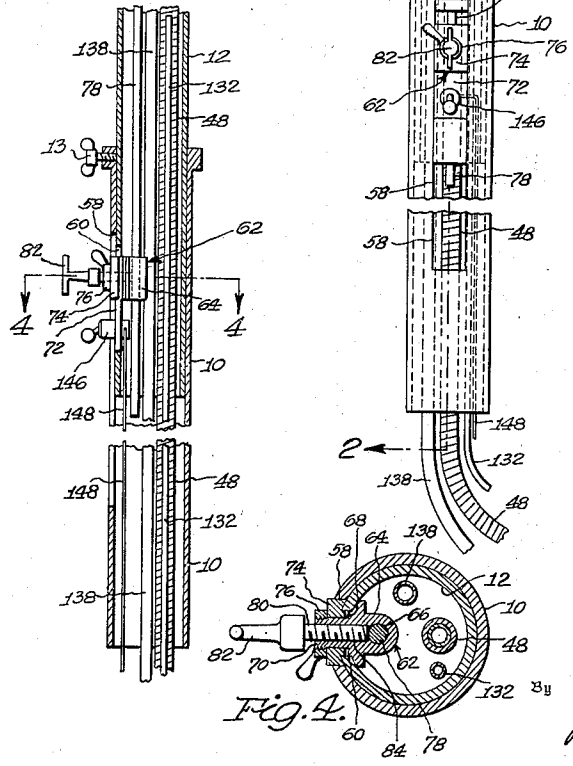


Fig. 4.

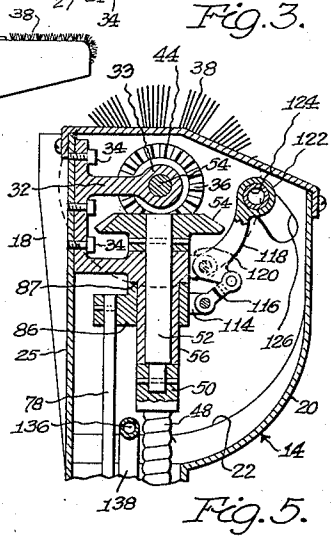


Fig. 5.

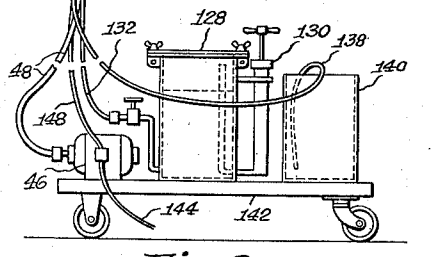


Fig. 6.

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WALL CLEANING APPARATUS

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4 Claims. (Cl. 15—50)

This invention relates, in general, to wall and ceiling cleaning devices and, in particular, to that type which is not only reversible in motion but is adapted for scrubbing action as well as for wiping action.

The main object of this invention is to improve a wall and ceiling cleaning apparatus so that same is adapted for scrubbing surfaces as well as for thereafter wiping same, the scrubbing action taking place during the rotation of the brushes in one direction with said brushes being sprayed with a cleaning solution from a spray member, and the wiping action taking place during the rotation of the brushes in an opposite direction with said spray inoperative and said brushes and said spray member in rubbing contact with each other for removing as much fluid as possible from said brushes.

Another object is to adapt the above type of apparatus for the change-over from scrubbing action to wiping action so that said change-over is accomplished easily, quickly and effectively, said change-over being effected by a minimum number of manual operations.

Another object is to construct a cleaning apparatus which is light and easy to handle, which is readily adjustable in length, which is easily and quickly converted from a scrubbing device to a wiping device, which is adapted for the employment therewith of a cleaning solution which might otherwise be too hot or too strong if cleaning by hand were resorted to, which may be employed in disinfecting sick rooms or scrubbing and wiping interior or exterior surfaces, and which may be employed without the use of ladders or scaffolding.

Other objects and advantages will become readily apparent from a reference to the following specification taken in conjunction with the accompanying drawing, in which:

Figure 1 is a sectional view of the cleaning apparatus and showing in detail the invention incorporated therein, said apparatus being shown in scrubbing position;

Figs. 2 and 3 are detailed sectional views taken along the lines 2—2 and 3—3, respectively, in Fig. 1;

Fig. 4 is a detailed sectional view taken along the lines 4—4 in Fig. 2;

Fig. 5 is an enlarged sectional view, taken transversely through the mechanism chamber, and showing the apparatus in wiping position; and

Fig. 6 is a diagrammatical view of the cleaning apparatus, in assembly and ready for use.

A pair of telescopically arranged tubular body members 10 and 12 is shown in the drawing, the outer member 10 adjustably supporting the inner member 12 against relative movement with respect to member 10 by means of a threaded thumb set screw 13 which screws into a threaded bore at the top end of member 10 and up against the wall of member 12, and the inner member 12 being integrally formed at its outer end with an enlarged casing or housing, generally indicated at 14.

The bottom wall 16 of the casing 14 diverges laterally from side to side of the tubular member 12 in an upward direction. The front and back walls 18 and 20, respectively, of the casing 14 diverge from the front and back of the tubular member 12 in an upward direction, the front wall 18 extending to a higher elevation than the rear wall 20, and the rear wall 20 being spaced considerably farther from the axis of tubular member 12 than wall 18. For providing the end walls of the casing 14 the bottom wall 16 is peripherally flanged, as at 22, and supported in the casing 14 directly above the end of tubular member 12 is an enclosed chamber 24 defined by front and rear walls 25 and 26, end walls 27, and top and bottom walls 28 and 29.

The walls 27 of chamber 24 divide the casing 14 into three chambers, namely, two end brush chambers 30 and the intermediate machinery chamber 24.

A bracket 32, secured to the front wall 25 of chamber 24 by bolts 34, is provided with an upper horizontal bearing 33 adapted for centrally supporting a horizontal shaft 36 extending in either direction from and laterally of the bearing 33, each laterally extending portion of shaft 36 having fixedly secured thereto, but removable therefrom, a brush 38 provided with the usual bristles. Between the brushes 38 and bearing 33 the shaft 36 is additionally supported by the end walls 27 of chamber 24, such as by being journaled therein, as at 40, and between each end wall 27 and the bearing 33 there is provided on shaft 36 a pair of spaced, opposed bevel gears 42 and 44. Gears 42 and 44 are locked to shaft 36 so as to rotate therewith and so as to have no longitudinal movement relative thereto. During inoperation of the device each of the gears 42 and 44 is equally spaced from the extended central axis of the inner tubular member 12 and from each end of bearing 33.

Extending upwardly through the members 10 and 12, from a motor 46 and in driven connec-

tion with the shaft thereof, is a vertical, flexible driving shaft 48 the end of which opposite the end connected to said motor shaft being formed with a head 50 which is coupled to the hub portion 52 of a bevel gear 54 for driving the latter. The hub 52 of gear 54 is journaled in a vertical bearing 56 provided in the lower portion of bracket 32, and the axis of gear 54 is caused to be normal to the co-axes of gears 42 and 44 and, during inoperation of the device, equally spaced from the opposing faces of gears 42 and 44.

Formed in the walls of outer and inner tubular members 10 and 12 is a pair of adjacent, vertical, longitudinal slots 58 and 60, respectively, slot 60 in member 12 being narrower and shorter than slot 58 in member 10. Extending through the slots 58 and 60 is a cross head member, generally indicated at 62, comprising an inner guide portion 64 (see Figs. 2 and 4) overlappingly engaging the inner wall of member 12 adjacent the slot 60 and having a vertical bore 66 formed therein, a shoulder portion 68 fitting into the slot 60, an exteriorly threaded, reduced neck portion 70 extending outwardly of the slot 58 in member 10, and a plate portion 72 fitting into the slot 60 in member 12 and extending downwardly from the shoulder portion 68. A collar 74, having an inner diameter substantially equal to the outer diameter of the neck portion 70 of the member 62 and an outer width substantially equal to the width of slot 58 in member 10, is adapted for fitting over said neck portion 70 within said slot 58 up against the outer wall member 12. A wing nut 76 is screwed onto the neck portion 70 of member 62 and is adapted for holding members 62 and 74 in place with respect to tubular members 10 and 12.

Within the tubular members 10 and 12 there is disposed a rigid rod 78 one end of which passes through the bore 66 in member 62 and is held against relative sliding movement with respect thereto by means of the stem 80 of a control handle 82, stem 80 being threadedly engageable with an internally threaded bore 84 in member 62 and adapted for being screwed into bore 84 for frictionally contacting rod 78 to prevent sliding movement of the latter with respect to member 62. The other end of rod 78 is fixedly secured to a collar 86 which is externally mounted for reciprocation about the body of bearing 56 of stationary bracket 32 within chamber 24, the reciprocations of collar 86 being governed and controlled by the rod 78, and collar 86 being normally spaced from and below an annular shoulder 87 formed on bearing 56.

An arm 88 integral with and extending from one side of collar 86 in chamber 24 has pivotally secured thereto one end of an arm 90 (see Fig. 1), the other end of arm 90 being pivotally secured to one end of a bell crank 92. Bell crank 92 is pivotally secured intermediate its ends to the end of an arm 94 which is formed integral with and extends from a side of the bearing 56 of the rigid bracket 32, the free end of bell crank 92 being provided with a fork 96 (see Fig. 3) which engages an annular grooved slot 98 formed in the hub of gear 44. It will be seen that, with proper manipulation of the wing nut 76, which is explained later, movement of the rod 78 upwardly from the position shown in Fig. 1 will force the collar 86 upwardly along the bearing 56 of bracket 32 to the shoulder 87 formed on the member 56, the upward movement of the collar 86 causing counter-clockwise movement of the bell crank 92 about its pivot and a resulting left-hand movement of the brush shaft 36, the gear 44 being fixedly secured to said shaft. Therefore, if motor 46 is driving gear 54 through the flexible shaft 48, and gear 54 is in mesh with gear 44, as shown in Fig. 1, the brush shaft 36 will be rotating in one direction; but, this direction is readily changed to an opposite direction by forcing rod 78 upwardly, as described, which disengages gears 44 and 54 and brings into engagement gears 42 and 54 and causes opposite rotation of the shaft 36 and brushes 38.

Within chamber 24 and to a lower portion of the front wall 25 thereof there is rigidly mounted an end of a bracket 104. The opposite end of bracket 104 is adapted for rigidly supporting a valve body 106 in which body 106 is mounted an oscillatably rotatable valve stem 108, the inner end of valve stem 108 being provided with the usual bore (not shown) for communicating one side of the valve with the other and which is adapted, by partial rotation of the stem 108, to cut off one side of the valve from the other, and the outer end of valve stem 108 having rigidly secured thereto, against relative rotation therewith, the end of an arm 110. Arm 110 extends rearwardly of the outer end of stem 108 and to the free end of arm 110 is pivotally supported an end of an arm 112, the free end of arm 112 being directed upwardly and pivotally connected to the reciprocally mounted collar 86. It will be seen that movement of rod 78, which causes movement of the collar 86 for intermeshing gears 44 and 54 or gears 42 and 54, also causes, through said movement of collar 86, the simultaneous rotation of valve stem 108 in valve body 106 in one direction or the other in accordance with the pull or push exerted by arm 112 on arm 110, arm 110 being fixedly secured to the outer end of valve stem 108. The setting of valve stem 108 will be presently discussed.

On the rear face of reciprocally mounted collar 86 there is a lug formation 114 to which is pivotally connected an end of an arm 116, the free end of arm 116 being pivotally connected to an end of a bell crank 118 (see Figs. 2 and 5). Bell crank 118, intermediate its ends, is pivoted to a lug formation 120 formed on the rear face of rigid bracket 32 between the bearing portions 33 and 56. The free end of bell crank 118 is provided integrally with an elongated sleeve portion 122, and by this sleeve portion 122 of pivoted bell crank 118 is supported a pipe length 124 which extends on either side of the sleeve 122 through arcuate slots 126 in end walls 27 of chamber 24 into chambers 30 to positions rearwardly adjacent the brushes 38, said extended portions of said pipe 124 adjacent said brushes 38 being perforated along their lengths exteriorly of chamber 24 and interiorly of chambers 30. In connection with the pipe length 124, which is driven arcuately within and along the slots 126, it is to be noted that movement of rod 78 not only causes collar 86 to effectuate engagement between the gears 44 and 54 or between the gears 42 and 54 and to effectuate partial rotation of the valve stem 108 relatively to valve body 106 in one direction or the other, but simultaneously, through the movement of bell crank 118, it causes the arcuate movement of pipe 124 along slots 126 in one direction or the other. It is pointed out that the slots 126 in the end walls 27 of chamber 24 each has a center of curvature on the extended, fixed pivotal axis of bell crank 118, that

the slots 126 have one end limit substantially outwardly of a plane which is tangent to the bristle ends of brushes 38 and another end limit substantially inwardly of said plane, and that the width of the slots 126 is substantially equal to the outer diameter of the pipe 124 for guiding same therealong and for aiding in the support of pipe 124 by sleeve portion 122 of bell crank 118.

Leading from a pressure tank 128, which is preferably equipped with a pumping apparatus 130 and which tank is filled with high pressure cleaning fluid of any selected constituency, there is a flexible fluid feed line 132, the free end of line 132 communicating with one side of the valve body 106. To the other side of valve body 106 there is connected one end of a hose length 134, the other end of hose 134 leading into and being connected to an opening provided therefor in the pipe 124. It is obvious that the pressure tank 128 and pumping apparatus 130 can take any desired form, and that same can be entirely dispensed with if city water is sufficient for cleaning purposes since, in the latter case, it will only be necessary to connect the supply line 132 to a source of said city water which is usually maintained at a pressure sufficient for carrying out the herein invention.

A drain pipe 136, provided in the bottom wall 29 of chamber 24 and extending between the downwardly converging sides of the bottom wall 16 of casing 14 above tubular member 12, communicates intermediate its ends with a drain conduit 138 which passes downwardly through the tubular members 10 and 12 and into a waste tank 140, said conduit 138 conveying into said tank 140 the soiled or waste fluid from the casing 14. It is obvious that conduit 138 can be inserted into the usual drain outlet usually found inside or outside buildings, if desired, thereby eliminating the tank 140. Also, if desired, a wheeled carriage 142 may be employed for supporting the motor 46, pressure tank 128, pumping apparatus 130 and waste tank 140 in a mobile manner. Motor 46 is connected in the usual manner to the usual electrical circuit by means of the usual insulated electrical conduits 144.

If desired, the cleaning device may be equipped with a rheostat, diagrammatically illustrated at 146, connected to the plate 72 of cross head member 62 and made readily accessible to the operator, said rheostat being connected in the motor circuit by means of conduits 148 for selectively controlling the speed of motor 46.

In Figs. 1 and 2 there is illustrated the cleaning device in wall scrubbing position. The motor 46 is presumably operating the flexible shaft 48 which is adapted for driving the gear 54 in a counter-clockwise direction (Fig. 1) so as to drive gear 44 in a counter-clockwise direction (Fig. 2). Gear 44, being locked to brush shaft 36, drives said shaft counter-clockwise (Fig. 2). Valve 106—108 is presumably open at this time to permit fluid to flow upwardly through the feed line 132 into the perforated pipe 124, thus spraying the rotating brushes 38 which are presumably being held in contact with the wall being cleaned by manual force exerted on handle 10—12 of the device. It is to be noted that, in the scrubbing position shown in Figs. 1 and 2, the pipe 124 is in spaced position from the bristle ends of the brushes 38, said pipe being in the lowermost limit of the slots 126 in the end walls 27 of chamber 24. The spacing between the shoulder 87 on rigid bracket 32 and the slidable collar 86 is also to be noted in these figures.

The wiping operation, the position for which appearing in Fig. 5, follows the scrubbing operation. To adapt the device for wiping, it is necessary to loosen nut 76 to release the hold of collar 74 on the inner tubular member 12, while at the same time maintaining the hold of handle stem 80 on rod 78, and raise handle 82 and rod 78 together so as to bring collar 86 and shoulder 87 into contact with each other. The slots 58 and 60 in tubular members 10 and 12 permit this upward movement of handle 82, nut 76, collar 74 and cross head 62. Then, nut 76 is tightened against collar 74 to hold cross head 62 tightly against the inner wall of tubular member 12. When collar 86 is forced upwardly by rod 78, the linkage system 90—92 causes disengagement of gears 44 and 54 and brings into engagement gears 42 and 54, thereby reversing the rotation of brush shaft 36; it also drives the linkage system 110—112 to cause valve stem 108 to rotate relative to valve body 106 through substantially a 90 degree arc, thereby closing the valve and cutting off the fluid supply to the pipe 124; it also drives the linkage system 116—118 to cause the upward shifting of pipe 124 through the arcuate slots 126 from the lower to the upper limits thereof, thereby bringing the "dry" pipe 124 into rubbing engagement with the clockwise rotating brushes 38 to rid said brushes of as much fluid as possible so that said brushes are better able to wipe clean the scrubbed walls.

The over-all length of tubular members 10 and 12 may be changed at will according to the height of the walls or ceilings to be cleaned. It is only necessary to loosen thumb screw 13 and handle 82, thus freeing the members 10 and 12 and rod 78 so that members 10 and 12 may be moved in either direction relatively to one another while keeping rod 78 in its original position, and then tightening the screw 13 and handle 82 into place.

While the invention has been described with some detail it is not intended that the description be definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will come within the purview of the attached claims.

What I claim is:

1. A cleaning apparatus comprising a handle having a head, a brush supported by said head, means for rotating said brush in one direction, means for supplying a cleaning fluid to said brush, said second means including a spray member spaced from said brush, and means for causing the reversal of rotation of said brush, said third means simultaneously effectuating the inoperation of said second means and bringing said spray member into rubbing contact with said brush.

2. A cleaning apparatus comprising a rotatable shaft with driven means thereon, a brush on said shaft and rotatable therewith in one direction, a second shaft with driving means thereon in rotatable driving engagement with said driven means, means for rotating said second shaft, means including a spray member for conducting a supply of cleaning fluid to said brush and spraying said brush therewith, a valve for controlling said fluid supply, and means connected to said driven means, said spray member and said valve and operable for simultaneously

causing reversal of the rotatable direction of said driven means, contacting said brush with said spray member and closing said valve.

3. In an apparatus of the character described comprising, a brush having an axis of rotation and supported for movement thereabout, a spray member supportable in either of two positions, one of said positions being a position whereat said brush and said member are co-engageable and the other of said positions being a position whereat said brush and said member are spaced from each other, control means for a cleaning fluid supply for said spray member, and means cooperable with said spray member and said control means for disposing said member in said second position therefor and actuating said control means for the introduction of said fluid to said brush during a washing operation and for disposing said member in said first position therefor and actuating said control means for terminating said fluid introduction to said brush during a wiping operation.

4. A cleaning apparatus comprising a rotatable shaft with driven means thereon, a brush on said shaft and rotatable therewith, a second shaft with driving means thereon in rotatable driving engagement with said driven means, means for rotating said second shaft, means for conducting a supply of cleaning fluid to said brush, said latter means including a spray member movable into contact position with and out of contact position from said brush, a valve for controlling said fluid supply, and means connected to said driven means, said spray member and said valve and operable for simultaneously causing reversal of the rotatable direction of said driven means, the shifting of said spray member into contact with said brush and the closing of said valve.

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