Sept. 8, 1953 W. C. ROE 2,651,073

MOP WRINGER

Filed Sept. 25, 1947 2 Sheets-Sheet 1

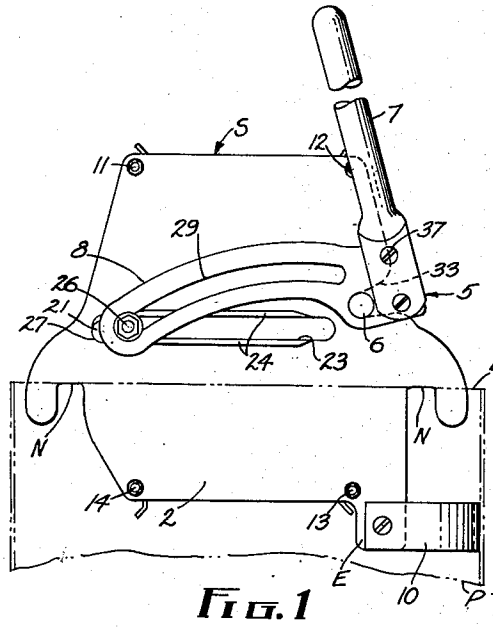

FIG. 1

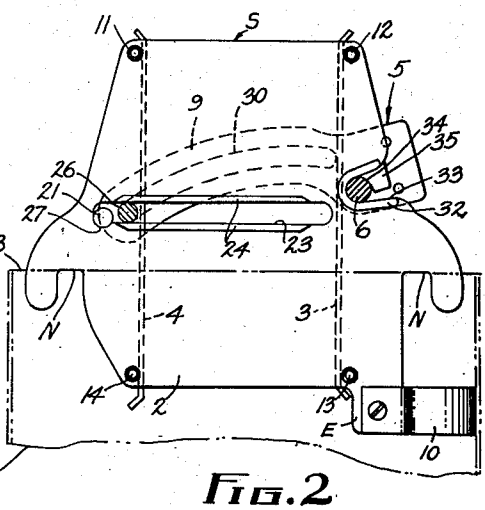

FIG. 2

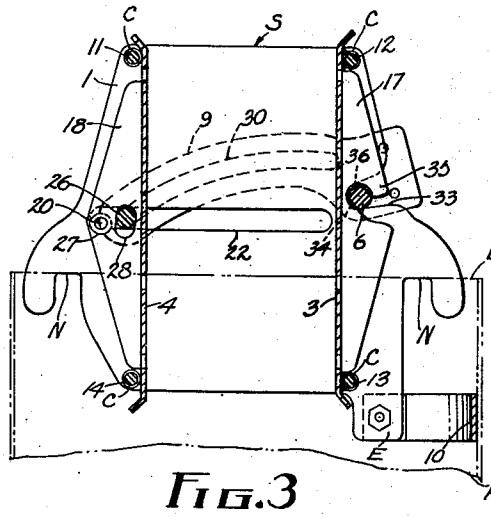

FIG. 3

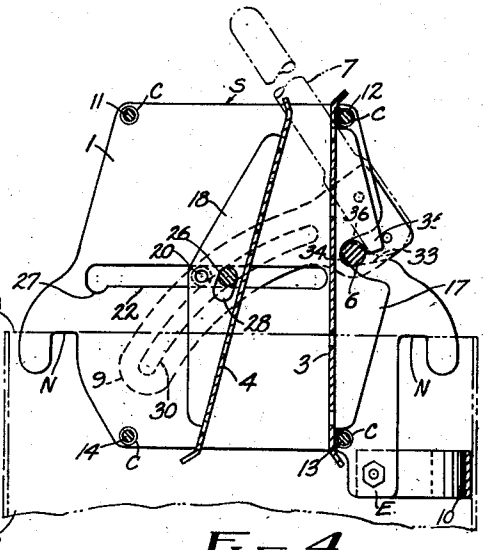

FIG. 4

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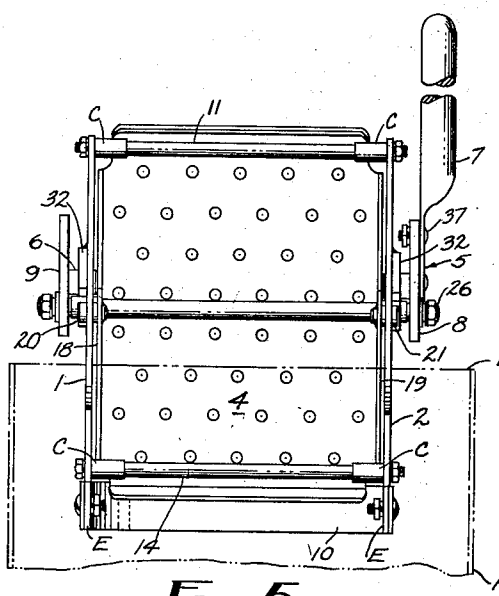

FIG. 5

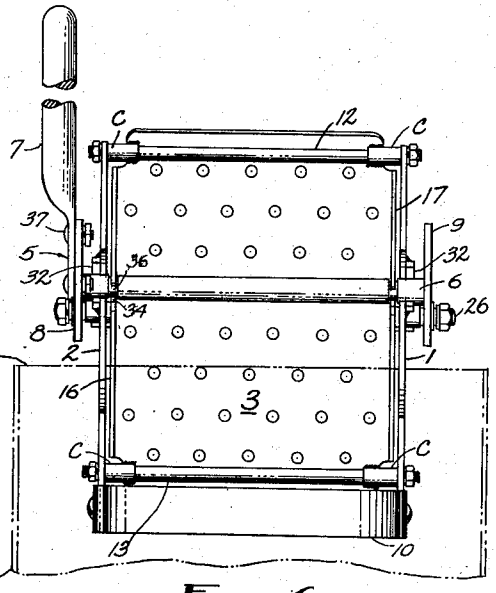

FIG. 6

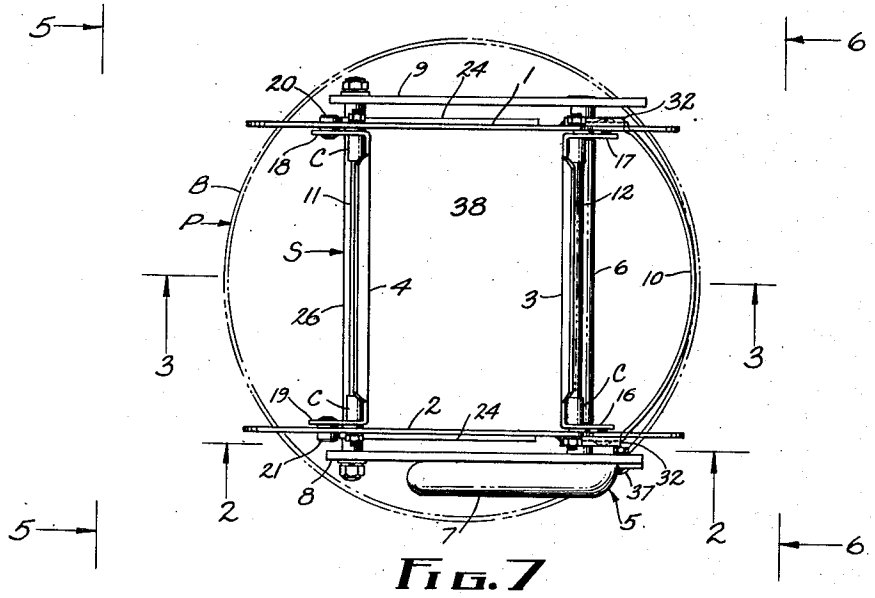

FIG. 7

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MOP WRINGER

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6 Claims. (Cl. 15—261)

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This invention relates to mop squeezers and more particularly to means for squeezing mops with improved facility, efficiency and economy.

Generally speaking the prior art includes pocket type squeezers of limited capacity with closed bottoms and contractable sides which receive more or less the mass of the wet mop and permit a squeezing of so much thereof as may be received therein. This type always presents a problem and dilemma. If the squeezer be as large as desired for a good sized mop then it must be disposed much to one side of the center of the pail or bucket with which it is associated to make satisfactory room for the mop to be dipped in the pail prior to the squeezing thereof. But the more eccentric the position of the squeezer with reference to the pail the more will be the spilling and squirting over the side of the pail and the more liable will the whole assembly of pail and squeezer be to tipping and losing its whole contents during the squeezing operation. It is no answer to suggest using smaller mops or larger pails or squeezing out less water or suds since all such compromises merely measure the inherent insufficiency of the device. Another type of prior art device admits the mop to the middle of the pail and permits its extraction between adjustable wringer rolls. This type while putting the mop in a desirable position relative to the pail involves the operator in the difficulty of both squeezing the rolls upon the mop and causing relative movement between the rolls and mop wherewith to wring out the contents of the latter. Usually a foot actuated treadle is provided for squeezing the rolls and the operator's main strength and awkwardness is required to hoist the mop through the rolls while straining to hold the rolls together. Often the more the operator lifts upwardly on the mop handle the harder he presses down on the treadle and the more the mop resists extraction from the rolls. All of this tends to effect a self-stopping, back-breaking wrestle between the operator, mop, wringer and pail, often leading to toppling the pail or giving up the effect to remove any substantial quantity of liquid or suds from the mop.

It is among the objects of my invention to solve the problems and avoid the dilemmas of the prior art, and to provide a mop squeezer that will be easy to operate and will do an efficient job of removing liquid and suds from a wide range of shapes, kinds and sizes of mops without splashing or spilling or hazard of toppling the pail or requiring especial ingenuity, patience or skill by the operator. Another object is to provide a mop squeezer having improved operating characteristics with increasing mechanical advantage apportioned to and balanced against the increase in pressure desired to be applied to the mop to extract the most reluctant increments of liquid and suds therefrom. Another object is to provide a mop squeezer in which squeezing is induced to take place near the center of the pail wherewith to avoid squirting fluid away from or over the sides or brim of the pail. Another object is to squeeze the whole of a large mass of mop between relatively movable pressure plates of large area while exerting greater squeezing pressure in upper rather than lower portions of the mass without, however, denying the lower part of the mass ample squeezing pressure. Another object is to provide a large, free opening through the squeezer directly into and centrally of the pail so that the mop after immersion in the pail may be withdrawn directly into the bite of the squeezer thereby eliminating the characteristic dipping in one side of the pail and transferring the dripping mop up and around from pail to squeezer. Another object is to provide a squeezer in which different portions of the map may be easily squeezed step by step. That is to say, the upper portion of a large mop may be squeezed as much as desired whilst a lower portion or lower portions depend below the squeezer in position to be raised in whole or in part into the grip of squeezer when the same is opened to permit the raising of the mop thereinto. A companion object is to provide that any desirable large or small portion or increment of the fluid laden part of the map may be raised into the squeezer and squeezed, and if extreme dryness is desired with unusually modest squeezing effort, to provide that a corresponding multiple step by step succession of squeezes be available to progressively dry succeeding portions and/or overlapping portions of the mop and to provide that the squeezed fluids shall flow in the direction from the dry to the wet portions of the mop.

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Other objects are to provide that my squeezer may be easily attachable to and detachable from the pail or bucket on which it is mounted; be secure in its attachment thereto as against dislodgment during the working thereof; be of essentially simple and rugged construction and economical of manufacture; and have a desirable stability and balance with respect to the torque applied thereto and the distribution of its internal and external torque reactions whereby to lend safety and security to the use and operation thereof. Another object is to provide an im-

proved mounting and carriage for a movable pressure plate whereby to enhance its travel, position and coaction with the mop to be squeezed. Another object is to provide a squeezer with an improved operating linkage, support and means of assembly thereof.

Other objects will appear from the following description of a preferred form and embodiment of my invention, reference being had to the accompanying drawings in which Figure 1 is a side elevation of my mop squeezer viewed from the side of the operating lever; Figure 2 is a vertical sectional view taken in the plane of the line 2—2 of the top plan view of my squeezer shown in Figure 7; Figure 3 is a vertical sectional view taken in the plane of the line 3—3 of Figure 7; Figure 4 is a view similar to Figure 3 showing the parts in a middle working position, a dot and dash showing of the position of the handle being added although the handle is behind the plane of the line 3—3; Figure 5 is a "front" end elevation viewed from the plane of the line 5—5 of Figure 7; Figure 6 is a "rear" end elevation viewed from the plane of the line 6—6 of Figure 7, and Figure 7 as mentioned above is a top plan view of my squeezer; in all views my squeezer is depicted as mounted upon the brim of and in operative relation to a conventional pail or bucket, the upper portion of which is shown or suggested in broken lines.

In the preferred form of my invention shown in the drawings my mop squeezer S comprises vertically disposed parallel, spaced apart, fixed side plates 1 and 2, which serve as the main structural frame elements of the squeezer, a fixed vertically disposed perforate pressure plate 3 secured between and extending transversely of the side plates of what may be conveniently called the "rear" of the squeezer, a movable, sometimes vertically disposed perforate pressure plate 4 similar in size and shape to the plate 3, positioned at the "front" of the squeezer in its idle open position vis-a-vis the rear plate 3 and movable bodily from front to rear and back and forth of the squeezer transversely of the side plates 1 and 2 under the influence of the operating lever 5 which is fulcrumed and pivotally supported on an axis and shaft 6 carried and pivotally mounted at the "rear" of the side plates 1 and 2. The lever 5 comprises the manually operable handle 7 as the force arm thereof and also comprises a pair of work arms 8 and 9, carried at opposite ends of the shaft 6 exteriorly of the plates 1 and 2.

As suggested particularly in Figures 3 and 4 counter-clockwise rotation of the lever 5 compels bodily movement of the front pressure plate 4 toward the rear plate 3 wherewith to squeeze the mop or portion thereof disposed therebetween. Each of the side plates 1 and 2 is provided with downwardly facing notches N formed in its front and rear edges respectively somewhat below mid-height thereof wherewith to receive the brim B of the pail P and be located and supported thereupon. As shown in Figure 7 the plates 1 and 2 lie in planes of chords of the brim of the pail; the notches being deep enough to give the plates a secure seat on the brim of the pail and being wide enough to admit of desirably wide tolerance between pails of somewhat different size and shape.

Each of the plates 1 and 2 has a downward extension E adjacent its rear edge to which opposite ends of a curved resilient metallic strap 10 are secured. As shown in Figures 1–4 and 7 the strap 10 is bowed to bear snugly against the inner curved surface of the pail P when the squeezer is mounted on the pail; preferably the rearward edges of at least one pair of the notches N are urged by the contact between the strap and the pail into snug contact with the sides of the pail adjacent the brim when the squeezer takes its operative engagement therewith. When the lever 5 is swung counter-clockwise the tendency of the squeezer to pivot bodily about the brim B at its contact therewith in the front notches N is resisted by contact between the strap and the pail substantially below the brim, it being preferable that the strap lie below the brim a distance considerably greater than the shaft 6 lies above the brim in relation substantially as shown.

As shown especially in Figures 5–7 the side plates 1 and 2 are rigidly secured together and spaced apart by four stay bolts 11, 12, 13 and 14 which pass through the upper and lower, front and rear corners thereof respectively, each bolt having a shoulder or collar C fixedly secured at each end and appropriate nuts and lock washers between which the four corners of the plates are secured. The rear and fixed pressure plate 3 is fixedly secured to and carried by the bolts 12 and 13 as by being welded to the collars C thereof, Figures 3, 4, 6 and 7, the plate 3 having its upper and lower ends bent or rounded rearwardly to overlie more or less the bolts, Figures 3 and 4, and whereby to stiffen the plate and to present smooth edges to the mop in its movement relative thereto. The positive attachment and integration of the plate 3 to the bolts 12 and 13 and hence to the plates 1 and 2 stiffens the structure of my squeezer and gives desirable rigidity to the relation of the plates and stay bolts and holds the bearings and guides for the moving parts in proper alignment. Rearwardly extending, preferably tapering, side flanges 16 and 17 of the plate 3, preferably spaced slightly away from the side plates 1 and 2, extend substantially the full height of the plate 3 and stiffen the plate against the mop squeezing pressures, see Figures 6 and 7.

The movable pressure plate 4 is preferably a substantial replica of the plate 3 departing therefrom only in the particulars presently to be described. The pressure plate 4 has forwardly extending, preferably tapering, side flanges 18 and 19 which lie adjacent to and are spaced from the side plates 1 and 2 wherewith to facilitate the free bodily movement of the plate 4 frontwardly and backwardly of the squeezer between the side plates, Figures 3 and 4. The movable plate 4 also has its upper and lower edges bent or flared forwardly, complementing the similar configuration of the upper and lower edges of the plate 3. The plate 4 while shown in Figures 2 and 3 for example as having contact with the stay bolts 11 and 14 is freely movable with respect thereto; the stay bolts limiting the forward movement of the plate and constraining it to a substantially vertical position, Figures 2 and 3, when the squeeezer is in its full open position. The plate 4 is primarily supported in the squeezer by trunnions 20 and 21 which are carried respectively at about mid-height of the flanges 18 and 19 respectively and in the foremost portion thereof whereby to be disposed forwardly of the center of gravity of the plate. As shown in Figure 7 the trunnions each extend outwardly from the side flanges of the plate and extend through horizontally disposed slots 22 and 23 in the side plates 1 and 2 respectively in which the trunnions have close free sliding contact and guidance when the plate 4 is induced to move

relative to the side plates 1 and 2. Preferably each of the slots 22 and 23 have longitudinal extending outwardly disposed flanges 24 formed of the stock stricken from the side plates when the slots are made whereby to enhance the bearing areas of the edges of the slots for the support of the trunnions 20 and 21 and also for the ends of the pressure plate actuating shaft 26 presently to be described. As shown particularly in Figures 2 and 4 the forward ends of the slots 22 and 23 are notched downwardly as at 27 to a depth preferably slightly less than the radius of the trunnions 20 and 21 and curved on about the same radius as the radius of the trunnions wherewith to permit the trunnions to drop to a slightly lower level than the bottom edges of the slots 22 and 23 when the plate 4 has been advanced to its foremost position as shown in Figures 2 and 3. It will be noted particularly in these figures that the plate 4 in its foremost position may stand a little lower than the plate 3 by approximately the depth of the notches 27.

Both of the flanges 18 and 19 of the plate 4 have identical and identically disposed elongated and slightly inclined apertures 28, see Figures 3 and 4, their inclination running upwardly and rearwardly as viewed: the apertures having a fore and aft dimension but slightly in excess of the diameter of the shaft 26 and the apertures having a length preferably about twice the diameter of said shaft. The shaft 26 is horizontally disposed transversely of the side plates 1 and 2. It extends through the apertures 28, having a close but free fit therewith, and thence through the slots 22 and 23 of side plates 1 and 2, respectively. The shaft and slots being of such relative size that they have a close but sliding and/or sliding and rolling contact. Rearward movement of the shaft 26 from its foremost position, shown in Figure 3, carries the plate 4 rearwardly to, toward or beyond the position shown in Figure 4 by contact of the shaft with the rearward edge of the apertures 28; the plate 4, however, being induced to tip from the vertical to the inclined position shown in Figure 4 by virtue of the trunnions 20 and 21 being secured in the flanges 18 and 19 at a level inducing the plate to stand vertical only when the trunnions rest in the notches 27, Figures 3 and 4. As shown in Figure 3 the shaft 26 is spaced from the upper ends of the apertures 28 when the plate 4 is in its foremost vertical position, and as the trunnions are moved from the notches up onto the lower edges of the slots 22 and 23 the plate is induced to tip to the extent of the depth of the notches 27 and the space between the upper ends of the apertures 28 and the shaft 26. My preference is to make these dimensions such as to induce an initial free tipping of about 15–20° as shown in Figure 4. After the plate has been moved rearwardly of its foremost position sufficiently to raise the trunnions out of the notches then rearwardly bodily movement of the shaft 26 will move the plate 4 rearwardly in its inclined position as shown in Figure 4, but if the upper portion of the plate 4 encounters greater resistance than the lower portion thereof as by squeezing a mop or portion thereof having greater mass or bulk above the level of the shaft 26 than below it, the plate 4 is still free to swing counterclockwise about the axis of the trunnions 20 and 21, as viewed in Figure 4, to or beyond a vertical position until the bottom of the apertures 28 contact the shaft 26. In the form and with the parts proportioned approximately as shown the plate 4 is free to swing counterclockwise through about 30 to 40° from the position of Figure 4, an amount which I find satisfactory for all practical purposes in squeezing a desirable wide range of sizes and shapes of mops. Regardless of the precise angle that the plate 4 ultimately takes with respect to the vertical in its action of squeezing the mop the relative positions of the trunnions 20 and 21 with respect to the apertures 28 and the inclination of the latter always induces the plate to tend to take the inclined position, shown in Figure 4, wherewith to engage the upper portions of the mop first and initiate the squeezing of higher portions of the mop before squeezing lower portions thereof and/or to exert greater squeezing pressures upon higher as compared with lower portions of the mop or portion thereof that is being squeezed.

To induce fore and aft movement of the shaft 26 its ends are extended outwardly beyond the side plates 1 and 2 and the slots 22 and 23 and are extended through and lie within the curved slots 29 and 30 formed in the work arms 8 and 9 respectively, see Figures 1–4; the slots 29 and 30 having a width approximately equal to the diameter of the shaft 26 wherewith to have a close free sliding and/or sliding and rolling engagement therewith and the slots 29 and 30 having length such that the shaft 26 will lie in or adjacent the forward ends of those slots when the plate is in its foremost position, Figures 1, 2 and 3, and will facilitate the movement of the plate 4 rearwardly substantially to contact with the plate 3 beyond the position shown in Figure 4 when the lever 5 has been swung from the position shown in Figure 1 to the full extent of its counterclockwise movement bringing the work arms almost to a vertical position. It will be understood, of course, that the arms 8 and 9 are identically related to the shaft 6 as are the slots 29 and 30 wherewith to transmit the same components of squeezing force from the lever to the opposite ends of the shaft 26 during the working stroke. It will be seen especially by comparison between Figures 3 and 4 that the curvature of the slots 29 and 30 taken with their disposition in space relative to the slots 22 and 23 and relative to the axis of the shaft 6 provides an increasing mechanical advantage between the force arm of the lever 5 and the rearwardly acting component of force delivered to the shaft 26 as the plate 4 and shaft 26 are moved rearwardly. In the position shown in Figure 3 there is a relatively low mechanical advantage in the above mentioned respect and correspondingly a relatively high rate of travel of the shaft 26 per degree of angular movement of the lever 5 at the beginning of the movement of the plate 4 from its foremost position. Thereafter as the plate is moved rearwardly the mechanical advantage is increased with a proportionate decrease in the relation of the rate of movement of the plate to the angular movement of the lever until in about the position shown in Figure 4 whilst the mop of average size is being forcibly squeezed, a desirably high and increasing mechanical advantage is effected. The ends of the shaft 26, approximately flush with the outer faces of the arms 8 and 9 respectively, are appropriately shouldered and threaded wherewith washers of diameter larger than the width of the slots 29 and 30 are held on the ends of the shaft by nuts and lock washers, as shown in Figures 1 and 5–7, to restrain the shaft 26 from endwise movement and constrain it to its desired operative position.

As mentioned above, the shaft 6 at the rear of the squeezer serves as the pivotal axis and fulcrum for the lever 5. This shaft is rotatably supported for rotation about a fixed axis located as shown in open U-shaped rearwardly and somewhat upwardly facing bearings 32, see particularly Figures 2 and 7, which are preferably welded to the outwardly facing sides of the plates 1 and 2 and lie transversely coextensive with similarly shaped and disposed notches 33 formed in the rearward edges of the side plates, see Figures 1, 4 and 6. As shown in these figures the foremost and lowermost parts of the notches and bearings terminate in substantial semi-cylindrical surfaces of diameter substantially the same as the diameter of the shaft 6 wherewith to support the latter for free rotation therein. The bearing surfaces of and related to the plates 1 and 2 respectively are aligned transversely of the squeezer wherewith the shaft is supported horizontally and normal to both the side plates. As shown best in Figures 2, 3 and 4 it will be seen that the shaft also extends through forwardly and upwardly extending aligned notches 34 cut in the rearwardly extending flanges 16 and 17 of the fixed pressure plate 3. These notches terminate in semi-circular surfaces which face downwardly and slightly rearwardly and lie forwardly of depending portions 35, Figures 2, 3 and 4, which serve as keepers to secure the shaft from bodily rearward displacement away from its intended disposition in the bearings 32 and notches 33. That is to say, the crossing direction of the notches 33 and 34 which collectively lie around more than 180° of the shaft 6 when the parts are assembled retain the shaft in its desired position for rotation about a fixed axis. Shallow grooves 36 are cut in the shaft 6 at axially spaced points corresponding to the spacing of the notches 34 wherewith the notches collaborate with the grooves to restrain the shaft against endwise movement; the notches 34 having their radii of curvature smaller than the notches 33 to correspond with the radii of the grooves 36. The disposition of what may be called crossing notches as the same are viewed in Figures 2, 3 and 4 facilitates the assembly of the parts; it being convenient to bring the shaft with the arms 8 and 9 secured to the ends thereof substantially to its intended position in the bottoms of the bearings 32, then to bring the plate 3 with the bolts 12 and 13 secured thereto into locking or keeping relation with the shaft and thereafter bring the side plates home on the bolts 12 and 13 sliding the bearings longitudinally along the shaft 6 to assemble the shaft and plates and thereafter hold the assembly by the stay bolts 12 and 13. The extreme ends of the shaft are fixedly secured as by splines or welds or both, not shown, to the work arms 8 and 9, both the latter being held in the same angular relation to the shaft. The provision of the notched and open bearings 32 and the retaining notches 34 permits the pre-assembly of the arms and shaft.

Preferably the handle 7 is attached to one or the other of the work arms 8 or 9, depending on whether or not the squeezer is to be used right-handedly or left-handedly. For this purpose the rearward ends of the arms 8 and 9 are provided with spaced bolt holes for receiving bolts 37 by which the lower flattened end of the handle 7 is conveniently and removably attached to the rearward end of either of the work arms.

It will be observed that the axis of the shaft 6 lies somewhat above the level of the slots 22 and 23 of the side plates 1 and 2, lying about mid-height of my squeezer but only at a small elevation above the brim of the pail and somewhat forwardly of the rear pair of notches N in the side plates. During the working stroke of the lever 5 the reaction from the torque of the lever is, as mentioned above, largely taken at the brim of the pail through the forward pair of notches N but the downward component of force from the lever is in greater measure diverted to the rearward pair of notches N so that in the operation of squeezing a mop there tends to be an approximately equal or stable distribution of pressure between all of the notches N and the brim of the pail.

In operation, with the squeezer in its wide open position, Figures 1, 2 and 3, the mop is passed into the pail P through the large central rectangular opening 38 of the squeezer, Figure 7, and immersed in the contents of the pail; the handle of the mop lying in the opening 38 between the side and pressure plates. Thereafter raising the mop until preferably the lower end of the handle lies at about the level of the top of the squeezer and brings the body of the mop or at least the upper portion thereof into position to be squeezed by the movement of the plate 4 toward the plate 3 as above described. If the mop is of greater length than the height of the pressure plates such portion or portions of the mop as are not squeezed out on the first squeezing operation are merely raised up into the squeezer for a second or successive squeezing operation until the whole of the mop regardless of the amount by which its length exceeds the height of the squeezer is squeezed out. During the squeezing operation or operations the greater squeezing always tends to be effected at a higher level than the lesser squeezing wherewith to induce the fluids to flow downwardly within the mass of the mop and/or exteriorly thereof into the pail, but withal, the pressure plate 4 is always free to assume a position related to the vertical in a way that will distribute the pressure without undesirable lack of uniformity throughout the mass of the mop that is being squeezed. At no time is is necessary to pass the mop into the pail other than through the opening 38 of the squeezer and at no time is it ever necessary to undertake to squeeze any mass of the mop other than that which may be efficiently received within the squeezer and squeezed therein.

While I have illustrated and described a preferred form and embodiment of my invention, changes, modifications and improvements will occur to those skilled in the art who come to understand and appreciate the fundamental principles thereof and I do not care to be limited in the scope of my patent to the form and details of my invention herein specifically disclosed nor in any manner other than by the claims appended hereto.

I claim:

1. A mop squeezer adapted to be mounted on the brim of a pail, said squeezer having spaced side plates arranged substantially symmetrically about the vertical axis of the pail, the ends of said plates resting on the brim of the pail, said squeezer also having first and second laterally spaced pressure plates, said side and pressure plates defining a mop receiving opening in said squeezer, said first pressure plate being movable with respect to said second pressure plate, said side plates having horizontal slots depressed at the ends remote from said second pressure plate,

said first pressure plate having side flanges facing away from said opening and parallel with said side plates and said flanges having vertically elongated apertures, trunnions carried by said flanges more remote from said first plate than said apertures and movably supported in said slots, a movable shaft extending through said apertures and said slots for moving said first plate, said first plate being supported on said trunnions and said movable shaft, and the upper ends of said apertures having a height relative to said trunnions to permit the first plate to limitedly incline by gravity to space the bottoms of the pressure plates farther than the tops when the trunnions are moved out of said depressed slot ends and to return the first plate to the vertical position when the trunnions enter said depressed ends in the position of maximum opening between said pressure plates.

2. The mop squeezer of claim 1 in which said second pressure plate is secured to said side plates near the ends thereof remote from the first pressure plate and has flanges extending parallel to said side plates and facing away from said opening, means for moving said first pressure plate including work arms slidably engaging said movable shaft, a handle and a rotatable shaft, said work arms being attached to said rotatable shaft near its extremities, said rotatable shaft being disposed adjacent said ends of the side plates, said ends of the side plates and said flanges of the second plate having transversely aligned notches for receiving said rotatable shaft, certain of said notches opening differently than others whereby to secure said rotatable shaft against bodily removal therefrom.

3. A mop squeezer adapted to be mounted on the brim of a pail having side plates and first and second perforate pressure plates, said first pressure plate being movable with respect to said second pressure plate, said second pressure plate being secured to said side plates near the ends thereof remote from said first plate, said side plates having horizontal slots therein, means for moving said first pressure plate including a rotatable shaft carried by said side plates adjacent said ends thereof and more remote from said first pressure plate than said second pressure plate, work arms secured to the ends of said rotatable shaft outside said side plates and rotatable with said shaft, a movable shaft engaging said first pressure plate and having its ends carried in said slots of said side plates, said work arms having curved slots therein for slidably receiving the said ends of said movable shaft whereby said movable shaft is advanced along the slots of said side plates and the slots of said work arms as said work arms are swung about the axis of said rotatable shaft.

4. The combination of claim 3 in which the axis of said rotatable shaft is adjacent the ends of the said slots in said side plates and the slots in said work arms are offset from the axis of said rotatable shaft at the ends of said arms adjacent said axis and said slots in said work arms are curved at their opposite ends to be inclined with respect to the slots in said side plates when the pressure plates are in wide open position.

5. The mop squeezer of claim 4 in which the path of movement of said work arms overlaps the path of movement of said movable shaft and defines therewith a variable angle in a vertical plane, said variable angle approaching 90° as said work arms are swung about the axis of said rotatable shaft to advance said movable shaft along the slots of said side plates and the slots of said work arms toward said second pressure plate.

6. A mop squeezer having side plates and first and second perforate pressure plates, said first pressure plate being movable with respect to said second pressure plate, said second pressure plate being secured to said side plates near the ends thereof remote from said first pressure plate and having flanges extending parallel to said side plates and away from said first pressure plate, means for effecting relative movement between said pressure plates including a rotatable shaft disposed adjacent said ends of the plates, said ends of the plates and said flanges having transversely aligned notches for receiving said shaft, said notches opening in directions substantially away from said first plate, certain of said notches opening differently than others, and having at least upper portions closed to restrain upward displacement of said rotatable shaft, said side plates having aligned substantially horizontal slots therein, said means also including work arms secured to the ends of said rotatable shaft and a movable shaft connected to said first plate and slidably supported in the slots of said side plates transversely of said side plates, said work arms having curved slots slidably receiving said movable shaft whereby said movable shaft is advanced along the slots of said side plates and said work arms and said first plate is advanced relative to said second plate as said work arms are swung about the axis of said rotatable shaft.

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