Feb. 12, 1924. 1,483,838

P. F. SCHNEIDER ET AL

WASHING MACHINE

Filed April 23, 1921 2 Sheets-Sheet 1

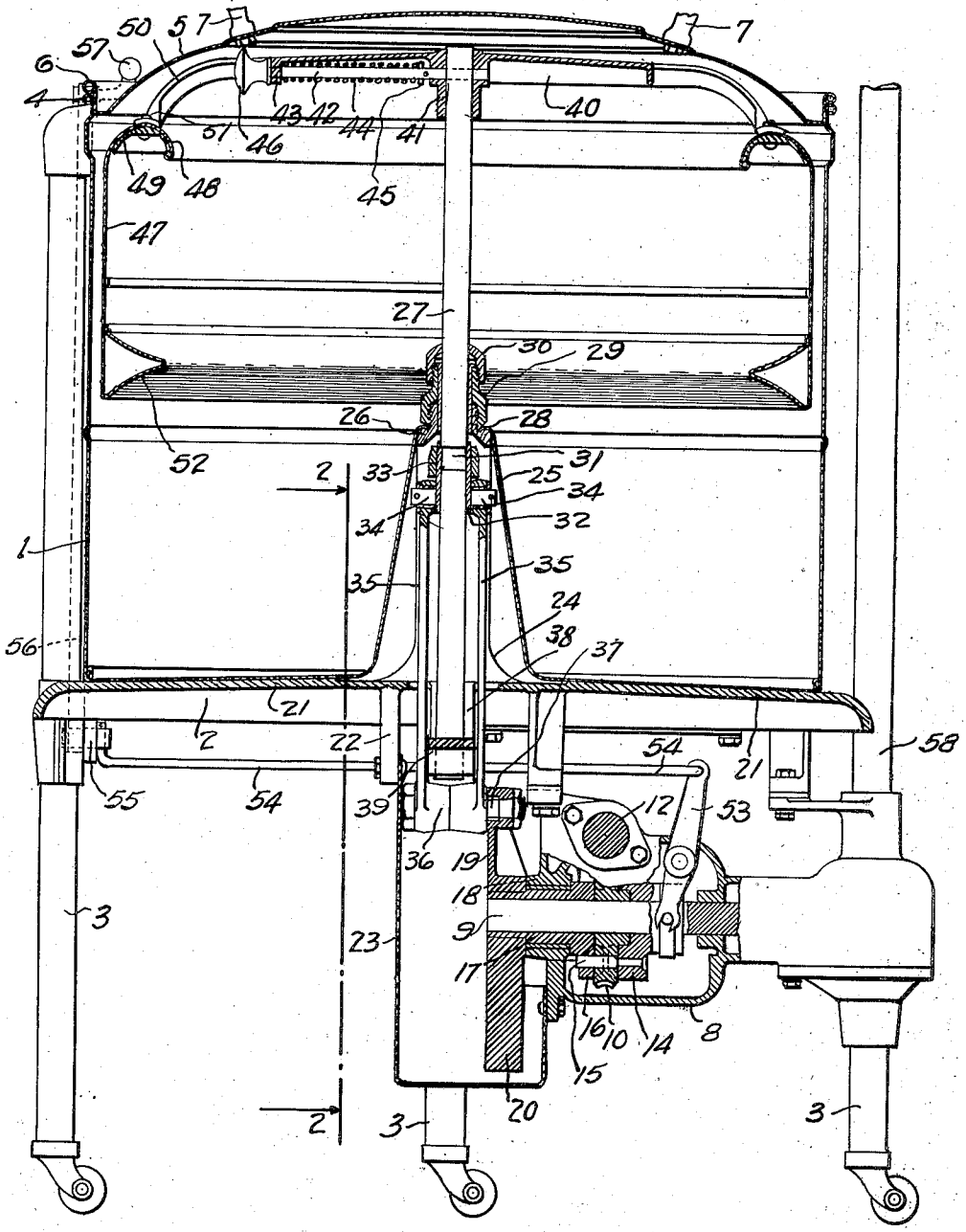

Fig. 1.

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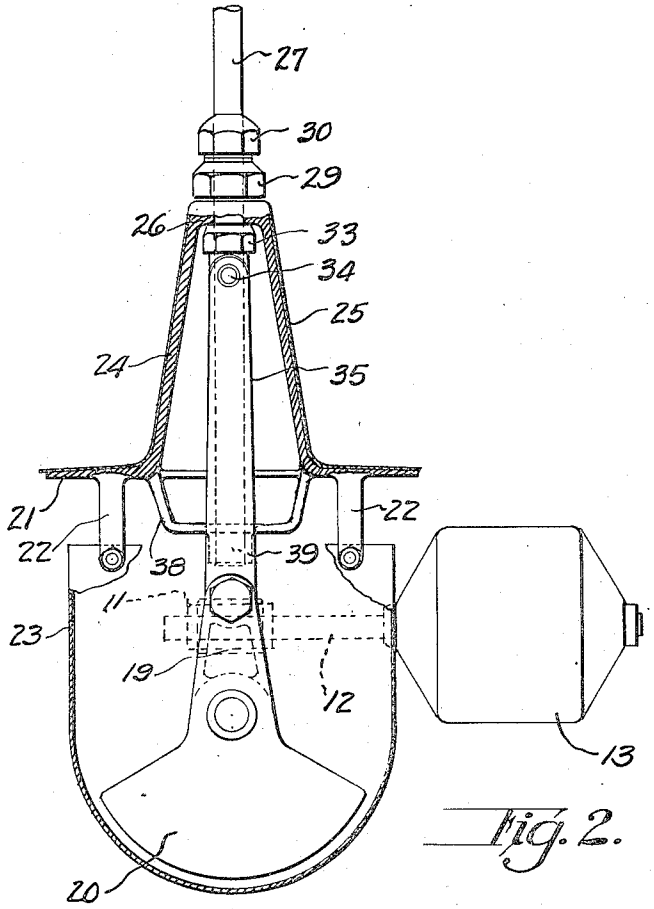

Fig. 2.

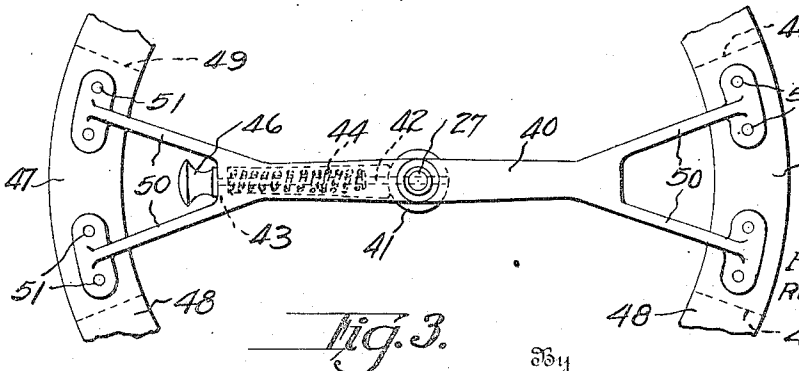

Fig. 3.

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UNITED STATES PATENT OFFICE.

PETER F. SCHNEIDER AND RAYMOND J. SCHNEIDER, OF DETROIT, MICHIGAN.

WASHING MACHINE.

Application filed April 23, 1921. Serial No. 464,031.

To all whom it may concern:

Be it known that we, PETER F. SCHNEIDER and RAYMOND J. SCHNEIDER, citizens of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Washing Machines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to washing machines and the object of the invention is to provide a washing machine drive for reciprocating a vertical shaft to which an agitating device is attached. Another object of the invention is to provide a washing machine drive in which a vertical shaft is supported in bearings at two points, the upper bearing extending upwardly into a central protuberance formed in the bottom of the tub and the lower bearing being supported on the frame beneath the tub, the connecting rod for driving the shaft being connected thereto between the bearings. In this invention the vertical shaft is reciprocated by the connecting rod pivoted thereto, the lower end of the connecting rod being pivotally connected to a rotating crank which drives the same. Heretofore we have attempted to mount the connecting rod beneath the bottom of the tub but the connecting rod being necessarily of considerable length to cause the best reciprocating action necessitated the raising of the tub to such height as to make the washing machine impractical. This defect is remedied by providing the upward extending conical protuberance in the bottom of the tub in which the upper end of the connecting rod might travel and a casing depending from the bottom of the tub is provided for the lower end of the connecting rod and crank and thus the reciprocating mechanism is completely enclosed in the said proturbance and casing. With this construction we found that the clothing which normally lies near the bottom of the tub was prevented by the protuberance from coming in contact with the vertically reciprocating shaft which might cause the clothes to be torn by being drawn into the packing nut therefor, the said conical protuberance preventing the clothing from gathering at the center of the tub and causing the same to settle in the portion of the tub beneath the agitator where the agitation of water is the greatest. By pivoting the connecting rod to the shaft between the two vertically aligned bearings therefor no undue strain is put on the shaft and thus a smooth vertical reciprocation thereof is produced. A further object of the invention is to provide a mechanism for reciprocating a vertical shaft in which the weight of the shaft is counter-balanced to cause a smooth operation of the reciprocating mechanism. These objects and the several novel features of the invention are hereinafter more fully described and claimed and the preferred form of construction by which these objects are attained is shown in the accompanying drawings in which—

Fig. 1 is a section through a washing machine embodying our invention.

Fig. 2 is a section taken on line 2—2 of Fig. 1.

Fig. 3 is a plan view of the yoke for the agitator.

The device consists of a sheet metal cylindrical tub 1 mounted upon the base 2, as shown in Fig. 1, which is supported on a series of legs 3 which extend upwardly and form a support for the upper portion of the tub. The tub 1 is provided with a rolled upper edge 4 and a cover 5 is provided for the tub having a rolled edge 6 adapted to rest on the rolled edge 4, the said cover being provided with a pair of handles 7. Beneath the frame 2 is a casing 8 in which is rotatably mounted a shaft 9. Secured to the shaft 9 is a worm gear 10 meshing with the worm 11 shown in dotted lines in Fig. 2 which is secured to the shaft 12 of the electric motor 13. Also mounted on the shaft 9, as shown in Fig. 1, is a clutch member 14 having a series of pins 15 thereon extending through the gear 10 and into apertures provided therefor in the clutch member 16. Formed integrally with the clutch member 16 is a tubular member 17 in which the shaft 9 is rotatable and which is rotatable in the bearing 18 formed therefor in the casing, a crank 19 being secured on the end of the tubular member 17. The crank 19, as shown more particularly in Fig. 2, is provided with a counter-balance 20 on the lower end thereof. When the clutch member 14 is in the position shown in Fig. 1 the said clutch member 14, clutch member 16 and tubular member 17 are rotated by rotation of the gear 10

which rotates the crank 19 with the shaft to which the gear 10 is secured. By disengaging the clutches the clutch member 14 is moved to the right of Fig. 1 to withdraw the pins 15 into the gear 10, thus allowing the clutch 16 and tubular portion 17 to remain stationary while the shaft 9 is rotatable therein. A frame member 21 is provided across the bottom of the tub having two depending arms 22 to which is secured a casing 23 for the counter-balanced crank 19. The frame member 21 is provided with an upwardly extending frame portion 24 fitting within a conical sheet metal proturberance 25 formed in the bottom of the tub 1. This frame member, as shown more particularly in Fig. 1, extends upwardly and provides a bearing 26 for the vertically reciprocable shaft 27. The bearing member 26 is provided with a shoulder 28 over which the upper end of the conical proturbance 25 is rolled and a nut 29 is provided about the shaft 27 and is threaded on the bearing 26, the nut being provided with a sharp edge which engages the inturned end of the member 25 and binds the same behind the shoulder 28 of the bearing 26. This provides a water tight joint for the upper end of the conical portion 25 and a packing nut 30 is threaded onto the member 29 which prevents leakage about the shaft 27. The shaft 27 is provided with a tapered face 31 and a sleeve 32 is provided about the shaft having a slotted upper end, a nut 33 being threaded onto the slotted upper end of the member 32 to bind the same on the tapered face 31 of the shaft 27. This sleeve 32 carries a pair of stub shafts 34 to which is pivotally connected a bifurcated connecting rod 35, the lower end of the said rod being connected together at 36 and being pivotally mounted in a short shaft 37 to which the crank 19 is pivotally secured at the outer end. The frame member 21 is provided with a depending portion 38 which extends downwardly and provides a bearing 39 for the lower end of the shaft 27, as shown more particularly in Fig. 2. This bearing is positioned beween the arms 35 of the connecting rod and allows the connecting rod to be operated without striking the said bearing. Mounted on the upper end of the shaft 27 is a yoke 40 having a central bearing 41 for the shaft and a spring pressed pin 42 is provided extending through a partition 43 in the yoke, through the bearing portion 41 and through an aperture provided therefor in the shaft 27, as shown more particularly in Fig. 3. A coiled spring 44 is provided about the pin 42 and a washer 45 is secured to the said pin, the spring forcing against the partition and by means of the washer 45 forcing the pin through the aperture provided in the upper end of the shaft. To release the said yoke from the shaft it is necessary to pull on the knob 46 which disengages the pin from the shaft and allows the yoke to be lifted therefrom to allow the clothing to be more readily removed from the tub. An agitator or drum 47 is provided within the tub having an inturned upper flange 48 adapted during reciprocation to throw the water downward toward the center of the tub. A metal strip 49 is also provided at each side within the inturned flange 48 and the bifurcated ends 50 of the yoke are secured to the flange 48 and strips 49 by the rivets 51, as shown more particularly in Figs. 1 and 3. By this construction the yoke is secured to the drum in a manner to prevent the rivets from tearing out of the flange 48 thus providing a solid construction which at the same time is very light. The lower edge of the drum is preferably provided with a V shaped inturned flange 52 which, during reciprocation of the drum, aids greatly in agitating the water in the tub. A lever 53, shown in Fig. 1, is pivoted within the casing 8 for controlling the clutch member 14 and a rod 54 extends from the lever 53 and is connected by means of a short lever 55 to a vertical rod 56 having a handle 57 on the upper end thereof by which the rod 56 may be rotated. It can thus be seen that upon turning the rod 56 in one direction or the other the rod 54 is moved to throw the lever 53 so that the clutch members are engaged or disengaged at will.

In operation the electric motor 13 is energized and the shaft 12 is rotated thereby and by means of the worm 11 and worm gear 10 the shaft 9 is rotated and when the clutches are in engagement, as shown in Fig. 1, the counter-balanced crank 19 is rotated. This movement of the crank causes the connection rod 35 to be reciprocated in the bearings 26 and 39, reciprocation of the said shaft causing the drum 47 to be reciprocated to agitate the water and wash the clothes within the tub. To disengage the driving mechanism the lever 57 is turned to move the rod 54 to the left which, by means of the lever 53, withdraws the pins 15 from engagement with the clutch member 16 and allows the crank 19 to remain stationary while the shaft rotates in the tubular portion 17. The shaft 9 is connected by gearing not here shown to the vertical shaft 58 which is adapted to drive a washing machine wringer of the usual type provided for washing machines. It will be noted that during rotation of the crank 19 the portion 20 thereof counter-balances the weight of the shaft 27 and agitator 47 and due to this construction a very smooth operation is attained, the crank 19 being formed as shown to prevent vibration.

From the foregoing description it becomes evident that the device is very simple and efficient in operation, will not easily get out of order, is of comparatively low manu-

facturing cost, is very smooth in operation and provides a device which accomplishes the objects described.

Having thus fully described our invention, its utility and mode of operation, what we claim and desire to secure by Letters Patent of the United States is—

1. In a washing machine, a sheet metal tub having a central protuberance extending upwardly from the bottom thereof, a frame supporting the tub, a pair of bearings in vertical alignment carried by the frame, the upper of said bearings extending into the protuberance of the tub, a shaft vertically reciprocable in the said bearings and extending through the said protuberance, a drive shaft beneath the tub, a counter-balance crank thereon and a connecting rod pivotally connected at the upper end to the vertical shaft and at the lower end to the counter-balanced crank.

2. In a washing machine, a frame, a sheet metal tub mounted on the frame, a pair of vertically aligned bearings supported by the said frame, a vertically reciprocable shaft mounted in the said bearings and extending into the tub, a drive shaft rotatably mounted on the said frame, a gear on the said shaft, an electric motor provided with a worm meshing with the said gear, a tubular member rotatably mounted on the drive shaft and adapted to be connected or disconnected with the said gear, a counter-balanced crank secured to the end of the tubular member, and a connecting rod pivotally connected to the vertical shaft between the bearings and pivotally connected at the lower end to the said crank.

3. In a washing machine, a sheet metal tub provided with a central protuberance extending upwardly from the bottom thereof, a frame supporting the tub, a pair of vertically aligned bearings carried by the said frame, a shaft reciprocably mounted in the said bearings and extending upwardly through the protuberance in the bottom of the tub, a yoke secured to the upper end of the shaft, an agitator secured to the said yoke, a horizontal shaft, a counter-balanced crank on the end thereof, means for rotating the shaft and crank, and a connecting rod pivotally connected at the upper end to the vertical shaft and at the lower end to the counter-balanced crank.

4. In a washing machine, a sheet metal tub provided with a central protuberance extending upwardly from the bottom thereof, a frame supporting the tub, a pair of vertically aligned bearings carried by the said frame, the upper bearing forming a support for the upper end of the protuberance, a shaft reciprocably mounted in the said bearings and extending upwardly through the protuberance in the bottom of the tub, a yoke secured to the upper end of the shaft, an agitator secured to the said yoke, a drive shaft carried by the frame, a gear on the said shaft, an electric motor provided with a worm meshing with the said gear, a tubular member rotatably mounted on the drive shaft and adapted to be connected or disconnected with the said gear, a counter-balanced crank secured on the end of the tubular member, and a bifurcated connecting rod pivotally connected to the vertical shaft between the bearings therefor and pivotally connected at the lower end to the counter-balanced crank.

5. In a washing machine, a sheet metal tub provided with a central conical protuberance extending upwardly from the bottom thereof, a frame supporting the tub and having a portion extending upwardly into and supporting the protuberance, a vertical shaft supported in a bearing at the lower end provided on the frame and extending upwardly through the aforesaid frame portion and conical protuberance, a packing nut for the said shaft threaded onto the frame portion and securing the conical protuberance at the upper end to the frame portion to prevent water leakage, an agitator supported on the upper end of the said shaft, a drive shaft rotatably mounted in the frame, a counter-balanced crank on the end thereof, and a bifurcated connecting rod pivotally connected at the lower end to the said crank and at the upper end to opposite sides of the shaft between the bearings therefor.

6. In a washing machine, a sheet metal tub having a central protuberance extending upwardly from the bottom thereof, a frame supporting the tub, a pair of bearings in vertical alignment carried by the frame, the upper of said bearings extending into the protuberance of the tub, a shaft vertically reciprocable in the said bearings and extending through the said protuberance, a drive shaft beneath the tub, a counter-balanced crank thereon, and a connecting rod comprising two arms pivotally connected at the upper end to the opposite sides of the vertical shaft and, at the lower end to the counter-balanced crank.

7. In a washing machine, a sheet metal tub provided with a central protuberance extending upwardly from the bottom thereof, a frame supporting the tub, a pair of bearings in vertical alignment carried by the frame, the upper of the said bearings extending into and supporting the protuberance of the tub, a shaft vertically reciprocable in the said bearings and extending through the said protuberance, a drive shaft beneath the tub, a counter-balanced crank thereon, a connecting rod pivotally connected at the upper end to the vertical shaft between the bearings therefor and at the lower end to the counter-balanced crank, and

a casing beneath the said protuberance enclosing the said crank and lower end of the connecting rod whereby the reciprocating parts are enclosed in the said casing and central protuberance.

8. In a washing machine, a tub having a central protuberance extending upwardly from the bottom providing a recess closed to the tub and open at the bottom, a frame supporting the tub, a reciprocable rod extending upward through the protuberance, said protuberance having a bearing at the upper end for the rod, a packing nut at the top of the said protuberance for preventing leakage thereinto, driving means for the rod including a crank and a connecting rod pivotally connected at its upper end to the reciprocable rod extending upward into the protuberance during reciprocation thereof.

9. In a washing machine, a tub having a cone shaped protuberance extending centrally thereinto from the bottom providing a recess closed to the tub and open at the bottom, a rod reciprocable through the cone shaped protuberance, there being a bearing for the rod at the upper end of the protuberance, and driving means including a crank and a pitman connected with the rod, the protuberance permitting the pitman connection to the rod to pass above the bottom of the tub in its operation.

10. In a washing machine, a tub having a recess formed centrally of the bottom thereof extending upwardly into the tub and closed thereto, a rod vertically reciprocable centrally of the recess, there being a bearing for the rod at the upper end of the wall of the recess, and a driving means for the rod, connection thereof with the rod playing in the recess.

11. In a washing machine, a sheet metal tub having a recess formed centrally of the bottom thereof and extending upwardly into the tub, the recess being closed to the tub and open at the bottom to the exterior of the tub, a frame member supporting the tub having a part extending upwardly into the recess, a reciprocable rod extending into the tub through the recess, a bearing for the rod carried by the upwardly extending portion of the frame, a packing nut for the rod in the upper end of the recess, a second bearing for the rod carried by the frame, and driving means for the rod connected therewith between the bearings.

12. In a washing machine, a sheet metal tub having a member extending upwardly into the tub centrally thereof providing a recess closed to the tub and open through the bottom thereof, a rod reciprocably mounted in the recess and extending into the tub, a packing means at the top of the said member, an agitator member within the tub connected with the rod, and means for actuating the rod to operate the agitating member.

In testimony whereof, we sign this specification.

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