May 29, 1951

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2,554,885

PRESSURE ROLLER APPARATUS

Filed April 30, 1947

2 Sheets-Sheet 1

FIG. 1.

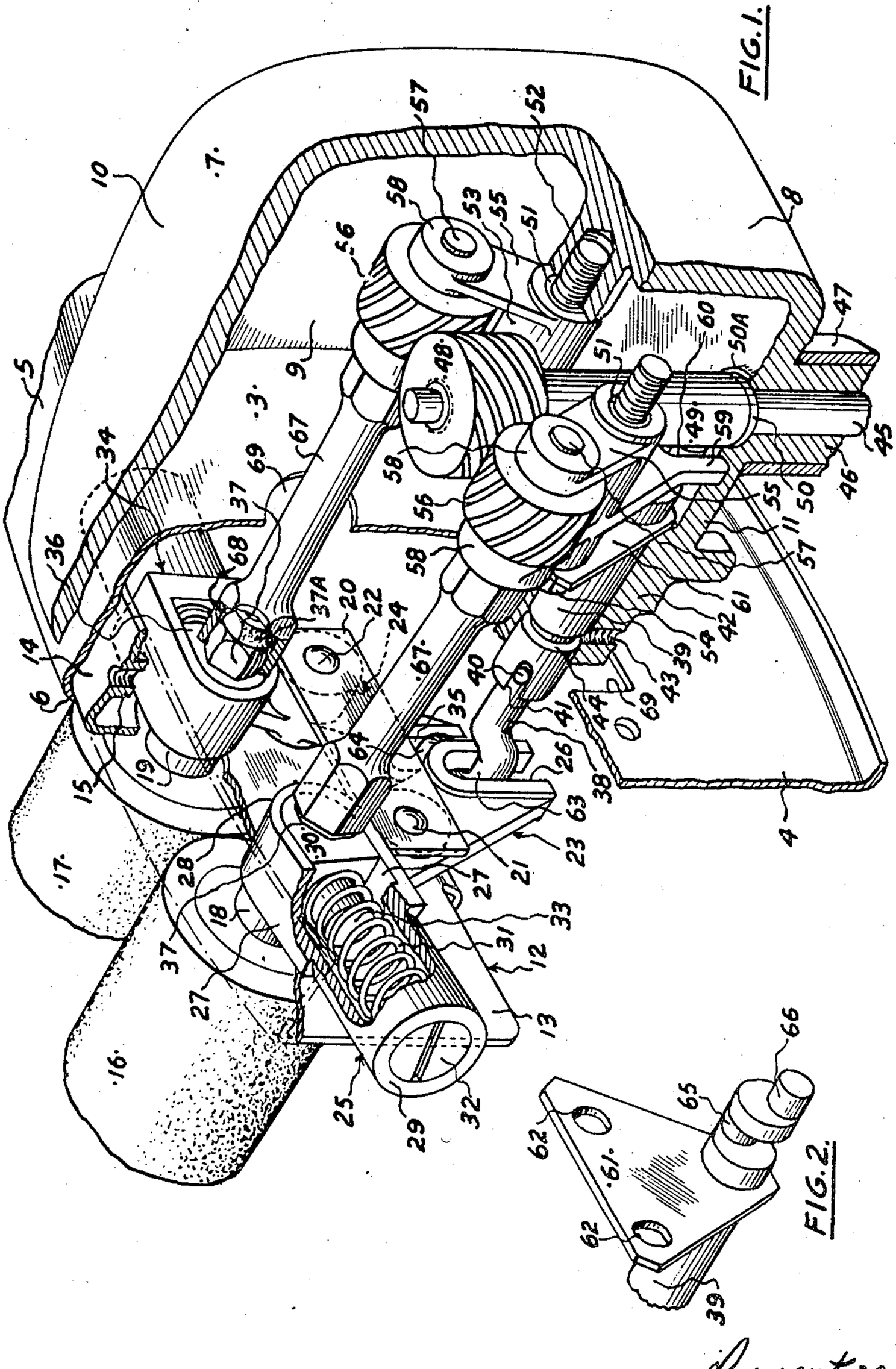

FIG. 2.

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2 Sheets-Sheet 2

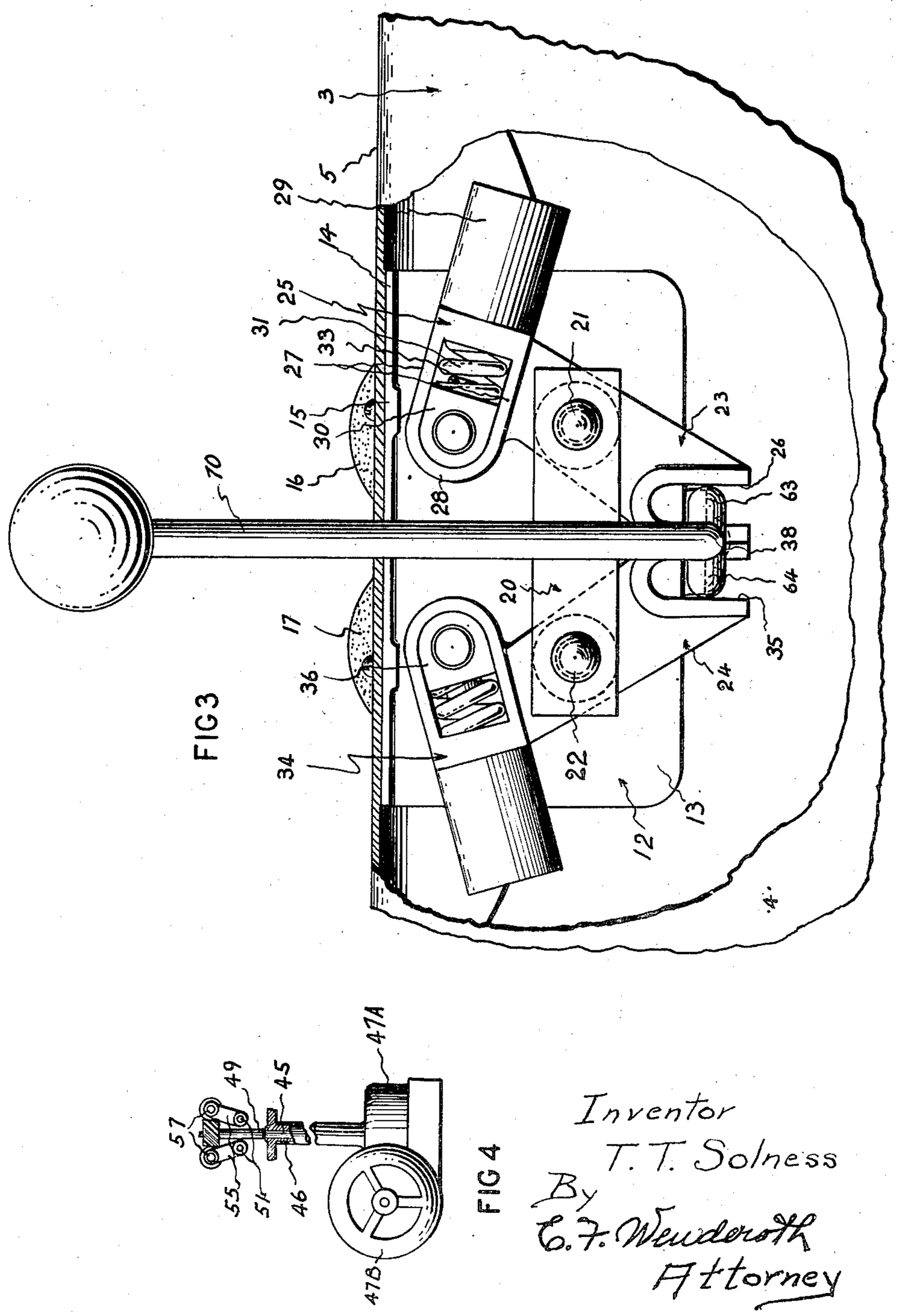

FIG 3

FIG 4

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UNITED STATES PATENT OFFICE

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PRESSURE ROLLER APPARATUS

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3 Claims. (Cl. 68—253)

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This invention relates to pressure roller apparatus such as is associated with washing machines and is used for expressing water from articles of clothing or the like, fed between the rollers or for ironing or pressing such articles.

Various devices and mechanisms have been proposed for effecting a quick release of pressure applied by the rollers to articles passed between them, in the event of jamming either by clothes or the like or by a hand or hands of an operator becoming accidentally caught in the rollers, but even though the release is effected, the rollers, when power driven as in the case of an electric washing machine, continue to be driven, and the danger element is not entirely removed until the rotation of the rollers ceases. This necessitates actuating mechanism separate from and independent of the pressure release mechanism.

The objects of the invention is, therefore, to provide improvements in the aforesaid type of pressure roller apparatus whereby the release of pressure applied by the rollers to an article or articles between them is effected simultaneously with the interruption of the drive to said rollers, and by the operation of one and the same actuating means or mechanism, and also whereby the pressure is retained at all times on the rollers and facilitates the resetting of the latter for use.

Accordingly the invention comprises improved pressure roller apparatus including a pair of rollers having approximately parallel spindles, means for driving the roller spindles comprising two spaced gears each mounted on a spindle and having its axis approximately coaxial with that of a roller spindle, two spaced rods, each being rockably but non-rotatably secured at its respective ends to a roller spindle and a gear spindle, a third gear normally meshing with the other two and means for rotating the third gear, a bearing block at each end of each roller spindle in which the roller spindle is journalled, a housing at each end of each roller spindle in which the bearing block is slidably located, means normally urging each bearing block towards the end of its housing adjacent to the adjacent housing so as to maintain the rollers in contact with each other and adapted to permit limited separation of the rollers without disconnecting them from the driving means, pivoted levers to which the respective bearing block housings and the first two gears are secured, and means for causing substantial separation of the rollers and simultaneously disconnecting the driving means

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from them, comprising means for simultaneously moving the levers to which the bearing block housings are secured to separate adjacent bearing block housings and the rollers and moving the other levers to move the first two gears out of mesh with the third gear.

The invention will now be described with reference to the drawings in which:

Fig. 1 is a fragmentary perspective view of the apparatus at and outwardly of one end of the rollers.

Fig. 2 is a perspective view of the outer end of a crankshaft extension and an associated outrigger plate.

Fig. 3 is an elevation of the opposite end of the apparatus to that shown in Fig. 1, one part being broken away.

Fig. 4 is a part sectional end elevation showing the roller driving means.

Referring mainly to Fig. 1, a casing 3 comprises a cylindrical outer wall 4 surrounding the upper part of a washing machine bowl (not shown), inwardly extending upper walls or covers 5 and depending parallel inner walls 6. The wall 4 is secured adjacent to its lower edge to the outside of the bowl of the washing machine.

A housing 7 for the drive mechanism comprises an outer wall 8, side walls 9, an upper wall or cover 10 and a base 11. The free edges of the walls 9 abut against the outside of the wall 4. The cover 10 extends inwardly of the free edges of the walls 9 and ends slightly outwardly of the wall 6.

A plate 12 has a downwardly depending wall 13 and an outwardly extending flange 14, located under the cover 5.

The housing 7 and the plate 12 are supported respectively on and from the casing 3 by being detachably secured thereto, for example, by a bolt passing through holes in the covers 5 and 10 and screwed into a screw threaded hole in a boss 15 on the underside of the flange 14.

Rollers 16 and 17 have resilient outer surfaces and are secured to spindles having their ends journalled respectively in bosses 18 and 19 and in associated bearing blocks.

The rollers are mounted between the walls 6 with their axes parallel and in a horizontal plane and above the bowl of the washing machine and with the outer ends of the rollers located inwardly of the wall 13.

A plate 20 is located symmetrically with respect to the roller axes between the walls 4 and 13 and is rigidly secured to and spaced from the lower part of the wall 13 by rivets 21 and 22.

Arms 23 and 24 are pivotally mounted on the rivets 21 and 22 respectively, between the wall 13 and the plate 20.

The arm 23 has a housing 25 on its upper end and a slot 26 formed on its lower end. The housing 25 comprises parallel parts 27 joined by a curved part 28, and a hollow cylindrical part 29.

A bearing block 30 shaped similarly to the end of the housing 25 is located between the parts 27 and is normally pressed against the part 28 by means of a spring 31 located within the part 29 between a plug 32 and a spigot 33 integral with the block 30. The boss 18 is also integral with the block 30.

The arm 24 has a housing 34 similar to the housing 25, on its upper end and its lower end is slotted at 35. The slotted lower end of the arm 24 is displaced relative to the lower end of the arm 23 parallel to the roller axes and towards the rollers.

One roller spindle extends through the boss 18 and the block 30 and the other through the boss 19 and a bearing block 36 integral therewith and similar to the block 30. The spindles have nuts 37 on their outer ends.

A crank shaft 38 extends across the top of the bowl parallel to and beneath and medially between the roller axes. It is supported in bearings secured for example to the lower edges of the plates 13 on the opposite sides of the washing machine bowl. At the end of the crankshaft shown in Fig. 1, the crankshaft is connected to an extension 39 by means of a pin 40 on the shaft and a slot 41 on the inner end of the extension.

The extension 39 is rotatably mounted in a cylindrical bore in a boss 42 secured to or integral with the base 11 and located medially of and adjacent to the inner edge of the latter. Axial displacement of the extension 39 within the boss is prevented by means of a set screw screwed into a hole 43 in the boss so that its inner end engages a groove 44 in the extension.

A drive shaft 45 is located in a cylindrical bore in a boss 46 depending for a short distance below the floor 11 and disposed medially of the housing 7 adjacent to the wall 8.

Driving means for rotating the shaft 45 are connected to its lower end and the shaft is surrounded by a sleeve 47 surrounding the bush 46 and extending downwards for the greater part of the length of the shaft.

The driving means may comprise gearing enclosed in a gear box 47A and driven by a motor 47B (see Fig. 4).

The shaft extends into the housing 7 and a helical gear 48 is secured on its upper end at about the level of the roller axes.

The shaft and the gear are supported on a floating sleeve 49 surrounding the shaft between the underside of the gear and the upper surface of a fixed thrust washer 50 supported on a shallow boss 50A on the floor 11.

Similar shafts 51 having their axes in the same horizontal plane and parallel to the roller axes and symmetrically disposed in relation to the latter are secured in bosses 52 extending inwardly from the walls 8 of the housing 7.

A sleeve 53 is rotatably mounted on each shaft 51 between a head 54 on the latter and the boss 52.

Parallel arms 55 extend upwardly from each end of each sleeve 53. A helical gear 56 is secured between each pair of arms 55 to a spindle 57 journalled in bosses 58 on the upper ends of the arms 55.

In the normal position of the rollers, that is when they are in contact or closely adjacent, the gears 56 mesh with the gear 48.

The inner end of each spindle 57 has a nut secured thereon similar to the nuts 37.

An arm 59 is secured to or intergral with each sleeve 53 and extends downwardly therefrom and is slotted as at 60. The arms 59 are displaced relative to one another parallel to the roller axes.

An outrigger plate 61 (see also Fig. 2) is loosely mounted, by means of holes 62, on the shafts 51 between each head 54 and the inner end of the sleeves 53. The extension 39 passes loosely through a hole at the bottom of the plate 61. The plate is located outwardly of the boss 42.

The crankshaft 38 has formed integral therewith cranked portions 63 and 64 located respectively in the slots 26 and 35. The outer end of the extension 39 has formed integral with it and adjacent to its outer end, crank pins 65 and 66, one of which is located in one slot 60 and the other in the other slot 60.

Normally the cranked portions 63 and 64 of the shaft 38 and the crank pins 65 and 66 are located so that the slotted lower ends of the arms 23 and 24 are furthest apart, and therefore the housings 25 and 34, the blocks 30 and 36 and the rollers 16 and 17 are closest together. Similarly the arms 59 are furthest apart and therefore the gears 56 are closest together and in mesh with the gear 48.

Rotation of the shaft 45 is transmitted through the gears 48 and 56 to the rollers by means of rods 67. Each end of each rod has a socket, one of which is adapted to engage a nut 37 and the other to engage the nut on the inner end of the spindle 57. A resilient pad 37A is secured to the outer end of each nut 37.

The nuts and the corresponding sockets are hexagonal as shown or otherwise formed to ensure positive power transmission. To ensure power transmission at maximum efficiency during normal operation the rods 67 are disposed so as to diverge slightly towards the gears 56 when the rollers are in contact. Consequently, each roller spindle, its associated rod 67 and its associated gear 56 are most nearly coaxial for normal positions of the rollers, that is, when they are slightly separated by clothing passing between them. The plates 4 and 13 are perforated as at 69 to allow the rods 67, boss 42 and like members to pass through them.

The arrangement shown in Fig. 3 on the side of the bowl diametrally opposite to that shown in Fig. 1 is somewhat similar to that shown in Fig. 1.

However, the power transmission mechanism and its associated parts outwardly of the outer end of the crankshaft 38 are dispensed with and an operating handle 70 for rotating the crankshaft is secured on the latter.

For convenience the numbers on the parts shown in Fig. 3 are the same as those on the corresponding parts shown in Fig. 1.

Rotation of the crankshaft by means of its handle rotates the axes of the cranked parts 63 and 64 and the crank pins 65 and 66. The slotted lower ends of the arms 23 and 24 move in opposite directions towards each other, as also do the slotted arms 59. Consequently the blocks 25 and 34 move apart as also do the bearing blocks 30 and 36, the rollers 16 and 17 and the two sets of arms 55.

The gears 56 consequently move out of mesh

with the gear 46 and power transmission to the rollers ceases.

To permit the rollers to move apart a short distance, for example, when clothing is being fed between them, without stopping their rotation, the nuts 37 and the nuts on the inner ends of the spindles 57 are provided with slightly convex curved sides. These allow the socketed ends of the rods 67 to rock slightly on the nuts as the rollers move apart and the blocks 30 and 36 move towards the plugs 32 within the blocks 25 and 34 respectively against the springs 31. However, transmission of power through the gearing to the rollers is not interrupted.

Although the invention has been described as applied to pressure rollers having their spindle axes in the same horizontal plane and mounted above a washing machine with the wall 4 secured to the latter, it is to be clearly understood, as indicated by the claims, that the invention is not to be so confined. The rollers may have their axes in a non-horizontal plane and may be dissociated from a washing machine, for example, when used for ironing or pressing. In the latter case alternative supports for the walls 4 would be provided.

I claim:

1. Improved pressure roller apparatus including a pair of rollers having approximately parallel spindles, means for driving the roller spindles comprising two spaced gears each mounted on a spindle and having its axis approximately coaxial with that of one of said roller spindles, two spaced rods, each being rockably but non-rotatably secured at its respective ends to one of said roller spindles and one of said gear spindles, a third gear normally meshing with the other two gears, means for rotating the third gear, a bearing block at each end of each roller spindle and in which the roller spindle is journalled, a housing at each end of each roller spindle and in which the bearing block is slidably located, means normally urging each bearing block towards the end of its housing adjacent to the adjacent housing so as to maintain the rollers in contact with each other and adapted to permit limited separation of the rollers without disconnecting them from the driving means, pivoted levers to which the respective bearing block housings and the first two gears are secured, and means for causing substantial separation of the rollers and simultaneously disconnecting the driving means from them, comprising means for simultaneously moving the levers to which the bearing block housings are secured to separate adjacent bearing block housings and the rollers and moving the other levers to move the first two gears out of mesh with the third gear.

2. Improved pressure roller apparatus as in claim 1 wherein one end of each lever is slotted and the lever moving means comprise a crankshaft having oppositely disposed cranked portions engaging the respective slotted ends of the adjacent levers to which the housings are secured,

and other oppositely disposed cranked portions engaging the respective slotted ends of the levers to which the first two gears are secured, and means for rotating the crankshaft.

3. Improved pressure roller apparatus including a pair of rollers having substantially parallel spindles, a pair of levers located remotely outwardly of one end of the pair of rollers and having slotted lower ends and being pivoted respectively on axes substantially parallel to and below and equally spaced from a medial line between the rollers, means for driving the roller spindles comprising two helical gears mounted respectively on spindles secured respectively to the upper ends of the levers and each having its axis approximately coaxial with that of a corresponding one of said roller spindles, a rod flexibly connecting each gear spindle to the corresponding roller spindle, a third helical gear, a shaft between and substantially at right angles to the spindles of the first two gears and on which the third gear is mounted, the third gear normally meshing with the first two and means for rotating the shaft of the third gear, a pair of levers located adjacent to each end of the pair of rollers and pivoted respectively on axes substantially parallel to and below and equally spaced from a medial line between the rollers, each lever adjacent to the rollers having a housing secured to its upper end and being slotted at its lower end, a bearing block slidably located in each housing and in which the roller spindle end is journalled, spring means normally urging each bearing block towards the end of its housing adjacent to the adjacent housing so as to maintain the rollers in contact, a crankshaft located substantially parallel to and below the medial line between the rollers, pairs of oppositely disposed cranked portions of the crankshaft located respectively in the slotted lower ends of the pairs of levers and means for rotating the crankshaft to displace laterally the lower ends of adjacent levers and therefore to separate the rollers and move the first two gears out of mesh with the third gear.

TUOMO TUISKU SOLNESS.

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