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W. L. LINDGREN

**1,857,730**

# CONVEYING MECHANISM FOR DISHWASHING MACHINES

Filed Dec. 15, 1930

3 Sheets-Sheet 1

Fig-7

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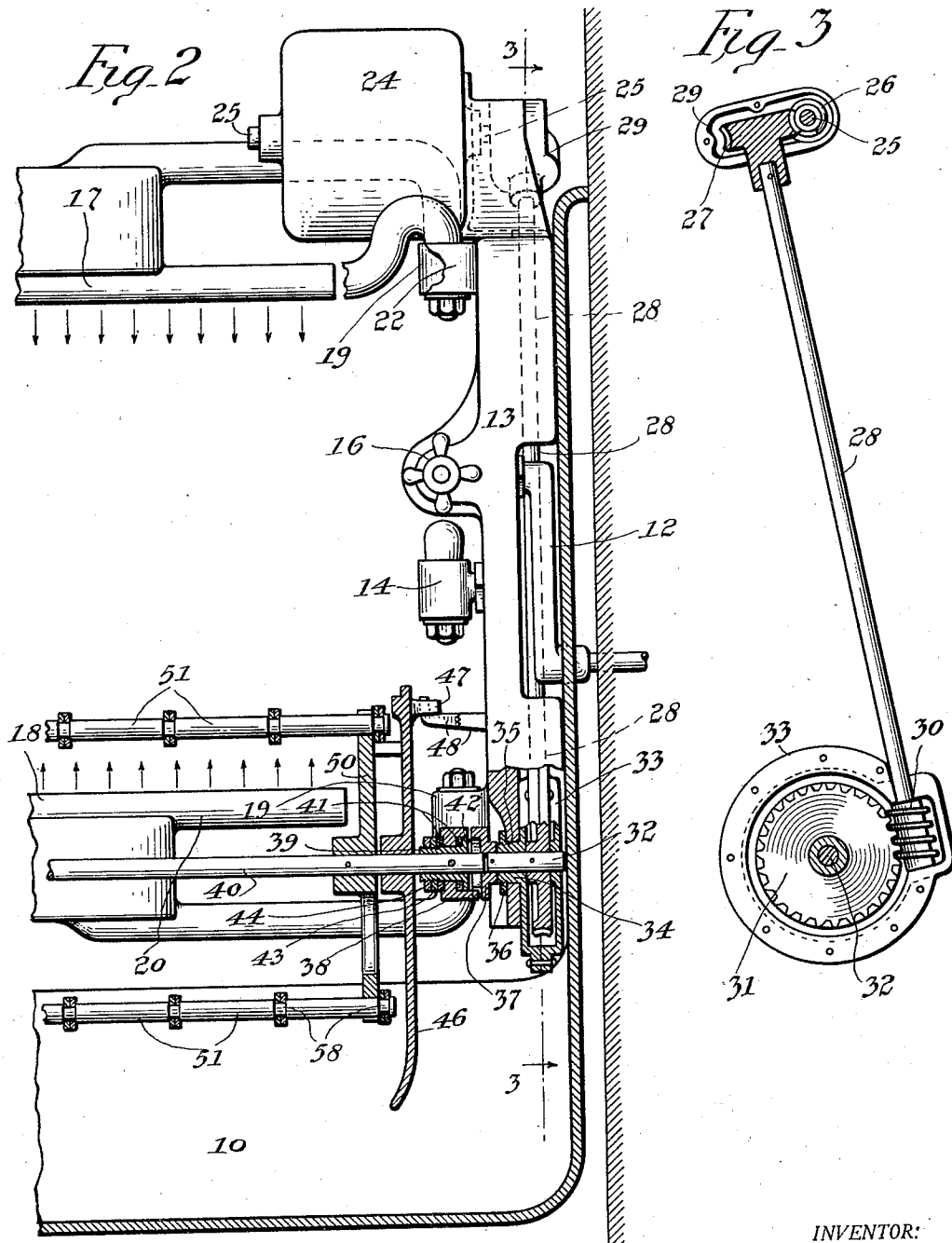
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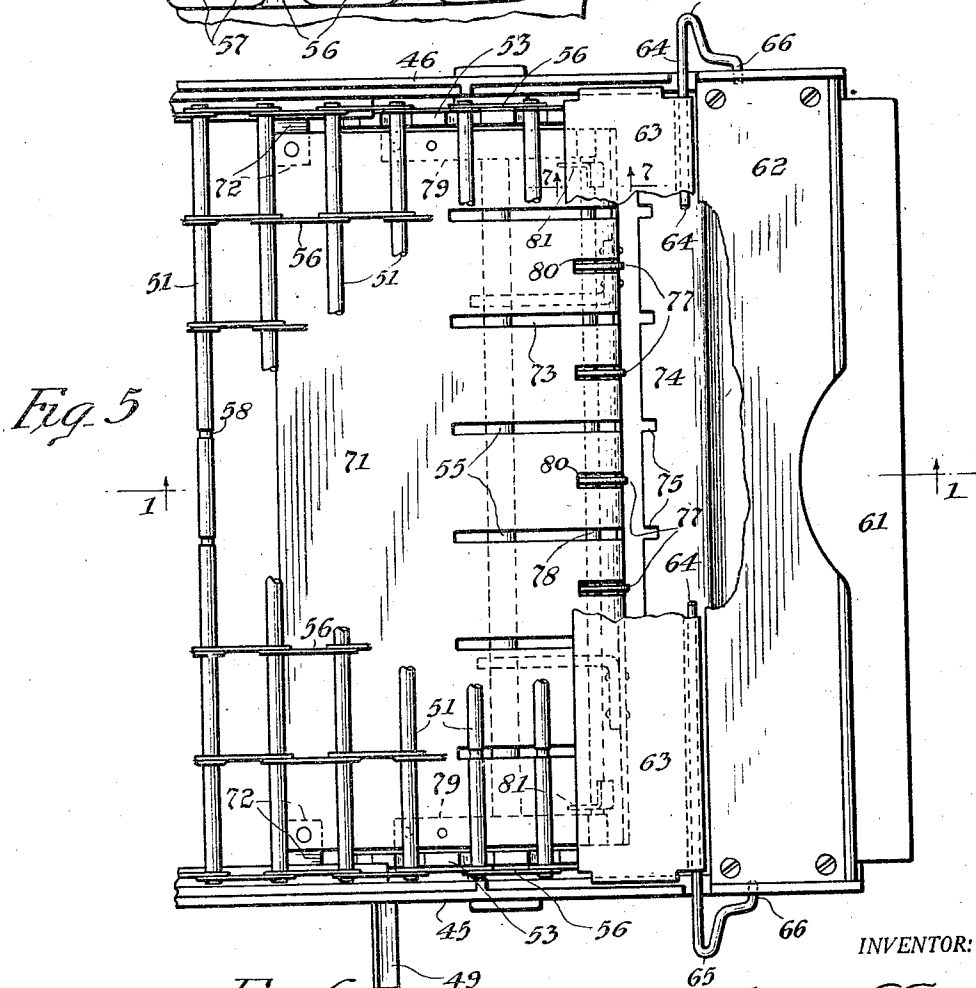
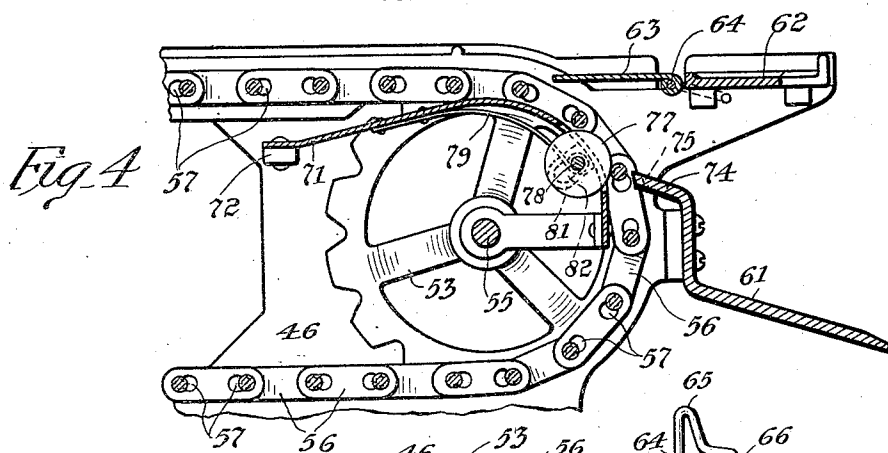
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CONVEYING MECHANISM FOR DISHWASHING MACHINES

Filed Dec. 15, 1930

3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

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## CONVEYING MECHANISM FOR DISHWASHING MACHINES

Application filed December 15, 1930. Serial No. 502,316.

My invention is concerned with conveying mechanism for dish-washing machines of the type in which the dishes, etc., are carried through the machine on the upper run of an endless carrier, such, for instance, as is shown in my Patent No. 1,798,426, granted March 31, 1931, and my present invention is intended to produce such a device, in which knives, forks, spoons, etc., may be readily carried through it, and, when desired, be discharged upon the extension of the sink proper, or at some other desired point, instead of being discharged on the table on which cups, saucers, plates, etc., are discharged.

To this end, it consists in a novel structure and combination of elements, all of which will be hereinafter fully described, and the novel features and combinations particularly pointed out in the claims.

To illustrate my invention, I annex hereto three sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Fig. 1 is a front elevation of a portion of a dish-washing machine embodying my invention, in which the conveying mechanism is seen in vertical section on the line 1—1 of Fig. 5;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a detail in section on the line 3—3 of Fig. 2;

Fig. 4 is a slightly enlarged view of the right-hand end of Fig. 1, but with the ejecting rollers in a different position;

Fig. 5 is a top plan view of the mechanism seen in Fig. 4, with a portion of the conveyor proper and associated mechanism broken away;

Fig. 6 is a side elevation of one of the links employed in the conveyor, and Fig. 7 is a detail on the line 7—7 of Fig. 5.

In carrying out my invention in its preferred form, the conveying mechanism proper is removably placed in the sink 10, which is provided with piping connections 11 and 12 leading from the hot and cold water supply pipes to a casting 13 which is provided with a swiveled discharge spout 14 in the face thereof and adapted to discharge tempered

water into the sink in the customary manner when the dish-washing machine is not in use. The casting is also provided with the hot and cold water cocks 15 and 16, and also with the upper and lower soapy-water spray pipes 17 and 18, which are swiveled in the pair of lugs 19, and it is likewise provided with the pair of rinse-water spray pipes 20 and 21, which are likewise swiveled in lugs 22 and 23, the lugs 19, 22 and 23 projecting forwardly from the four corners of the rectangular casting 13. The casting 13 is provided with suitable internal conduits (not shown), by which the water from the pipes 11 and 12 is controlled by the cocks 15 and 16, and is discharged downward from the spray pipes 17 and 20 and upward from the spray pipes 18 and 21, when they are turned to extend transversely of the sink and across the conveying mechanism to be described. The mechanism heretofore referred to is fully described and claimed in the companion application No. 502,315, of even date herewith.

The motive power for the conveyor consists of the electric motor 24, which is suitably secured on the top of the casting 13, and has its armature shaft 25 provided with the worm 26 meshing with the worm gear wheel 27 secured on the upper end of the shaft 28, the gears 26 and 27 being enclosed in the housing 29. The lower end of the shaft 28 is provided with a worm 30 meshing with a worm gear wheel 31 secured on the short shaft 32 journaled in the housing 33 for the gears 30 and 31, which housing has a short tubular extension 34 projecting through the aperture 35 provided in the bottom of the casting 13 and held in place by the nut 36 on the threaded outer end of the tubular extension 34. The shaft 32 has pinned on the outer (left-hand) end thereof the clutch member 37 which co-operates with the clutch member 38, which is frictionally mounted on the sleeve 39 pinned on the inner end of the horizontal drive shaft 40. The friction connection between the clutch member 38 and the sleeve 39 is provided by means of the friction disks 41 interposed on one side between the inner portion of the clutch member 38 and the disk

42 formed on the inner end of the sleeve 39, and at the other side between the other side of the inner portion of the clutch member 38 and the nut 43 which is held in place by the lock nut 44 on the threaded outer end of the sleeve 39. With this slip clutch arrangement shown, the friction between the clutch member 38 and the sleeve 39 can be adjusted to any desired degree so that, under ordinary conditions, the shaft 40 will be driven and the conveyor operated, but in case of some obstruction offering substantial resistance to the further movement of the conveyor, the shaft 40 will cease to rotate, while the clutch member 38 rotates on the sleeve 39, thus preventing possible damage to the conveyor or to the articles carried thereby.

The conveying mechanism proper is made up of the pair of side plates 45 and 46, of any suitable design to co-operate with the moving elements hereinafter described. The plate 46 has projecting from the upper edge thereof a pair of recessed lugs 47 which catch over the hooks 48 projecting from the front side of the casting 13 to support that side of the conveying mechanism, the other side being supported by the brackets 49 projecting forwardly from the side piece 45 and resting on the front edge of the sink, one of said brackets 49 being shown in Fig. 5.

The shaft 40 is journaled in suitable bearings formed in the center of the side plates 45 and 46 and has secured thereon one or more sprocket wheels 50, one of said sprocket wheels being preferably located just inside of each of the side pieces 45 and 46. These sprocket wheels mesh with the rods 51 which form the transverse members of the endless conveyor which is carried by the pairs of sprocket wheels 52 and 53 preferably secured on shafts 54 and 55 suitably journaled in the side pieces 45 and 46 near the ends thereof. The longitudinal members of the conveyor are formed of the links 56, which, as best seen in Fig. 6, have the elongated apertures 57 therein, the inner and adjacent ends of said apertures being circular and of a diameter so that they will pass over the rods 51, while the outer ends thereof are circular and of a reduced diameter so that they will only pass over the annular recess 58 formed in the rods 51 for the purpose of receiving said links. With the construction shown, the links can be assembled on the rods 51, as clearly shown in Fig. 5, by bringing the rods close enough together so that the enlarged portions of the apertures 57 can pass over the rods, and when the links are all in position, upon stretching the conveyor, the links will be secured in place thereon by reason of the engagement of the smaller parts of the recesses with the annular grooves 58.

The side pieces 45 and 46 are connected at the receiving end by the cross pieces 59 and 60 secured thereto, the cross piece 60 being

on the level of the upper run of the conveyor belt, and serving as a table upon which the dishes are placed as they are shoved on to the conveyor. The other ends of the side members are connected by the guide plates 61 located in the same horizontal planes as that of the cross piece 59 and by the cross piece 62 located in the same horizontal plane as that of the cross piece or table 60, and serving to receive the cups, saucers and other dishes as they are delivered at that end of the machine, and from which they must be removed by hand. The conveyor frame is provided with the switch plate 63 which has its outer edge curved to form a circular recess or tube to receive the wire bail 64 to which it is secured, by spot welding or otherwise, and which bail has the extension 65 at each end by which it is manipulated, and the in-turned ends proper 66 journaled in apertures in the side plates 45 and 46, so that this switch plate 63 can either be left in the position shown in full lines in Figs. 1, 4 and 5, or else turned up into the dotted-line position shown, when it is desired to deliver table cutlery from the machine.

The handling of table cutlery on devices of this character presents something of a problem, and the knives, forks and spoons are intended to be laid lengthwise transversely of the conveyor, and to prevent the possibility of their accidentally falling through the meshes thereof, at the start of the passage through the machine, I provide the sheet-metal plate 67, seen in vertical cross section in Fig. 1, which has its outermost end curved down, as shown, and secured to the brackets 68 supported by the shaft 54. Its inner end is flat, and extends up far enough to engage the under sides of the links 56, and that end is supported by downturned portions 69 thereof being fastened to the lugs 70 projecting inwardly from the side pieces 45 and 46. At the discharge end, I provide the somewhat similar sheet-metal plate 71, which has its inner end secured to the lugs 72 projecting inwardly from the side plates 45 and 46, and the plate 71 is inclined upwardly, as seen in Figs. 1 and 4, to form a cam surface which will engage the portions of table cutlery projecting through the meshes of the conveyor and cam them upward into proper position. The outermost portion of the plate 71 is curved into the arc of a circle, and to accommodate the links 56 and permit the plate as a whole to extend upwardly as far as possible, the limit being formed by its contact with the rods 51. I form therein the elongated slots 73, which receive the links 56 as they pass around the highest part of the plate 71. The guide plate 61 is designed to catch the table cutlery which will fall thereon when the switch plate 63 is turned up as seen in dotted lines in Fig. 1, and the innermost portion 74 thereof has the recesses 75 formed

therein to permit the adjacent edges of the links 56 to pass therethrough, and bring the rods 51 in substantial contact with the edge proper, so that the table cutlery cannot be caught by said edge as it is delivered on to the plate 61. The outer edge of the plate 71 is supported by the arms 76 mounted on the shaft 55. In order to insure the cutlery being jarred off of the conveyor, and to aid in disengaging it if it should be entangled therein, I provide the ejector disks 77, which are journaled on a rod 78 secured at its ends in bearings formed in the ends of the pair of leaf springs 79, which have their other ends riveted to the under side of the plate 71, as clearly shown in Figs. 1 and 4, and to accommodate these disks 77, I provide recesses 80 in the plate 71, through which recesses the disks 77 project. During the operation of the apparatus, these disks are constantly vibrated by reason of their co-operation with the rods 51. As seen in Fig. 1, the rods engage the disks 77 and force them back, and as each rod passes the disks, they spring back into the position shown in Fig. 4, where they project between the adjacent rods, thus producing a constant vibrating action that tends to throw the cutlery off of the conveyor and disengage it therefrom, if necessary.

To prevent the disks 77 being accidentally or maliciously pushed in beneath the plate 71 and displaced along the rod 78 and out of the recesses 80, I secure on the under side of the plate near the ends of the rod 78 the preferably sheet-metal brackets 81 having the slot 82 therein through which the rod 78 passes, the slots 82 being so short that the rod 78 cannot be moved downward far enough to disengage the disks 77 from the slots 80.

The operation of the apparatus will be readily apparent. When it is not in use, the conveyor is lifted out of the sink, and the spray members 17, 18, 20 and 21 are turned parallel to the sink, in which position the water is shut off therefrom, and the spout 14 can then be turned into position across the sink, in which the water controlled by the cocks 15 and 16 is discharged therefrom in the customary manner. When dishes are to be washed, the conveyor, which will ordinarily be provided with a cover (not shown), is placed in the sink, the spray members 18 and 21 having been previously turned into operative position so that they can be passed through the large recess 83 formed in the side plate 46 to receive the same, the lugs 47 being caught on the hooks 48 and the clutch members 37 and 38 likewise being engaged, the cocks 15 and 16 are manipulated to furnish water of the desired temperature, the motor is started, and the dishes are fed from the table 60 on to the conveyor belt, which carries them between the spray members 17 and 18 for application of the soapy water, after which they are carried between the

spray pipes 20 and 21 to rinse off the soapy water, and they are delivered automatically on to the table formed by the cross piece 62 and the switch plate 63, from which they are taken by hand. When the table cutlery is to be washed, the switch plate 63 is swung to the dotted-line position shown in Fig. 1, and the cutlery is then passed through the device as heretofore described.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In a dish-washing machine, the combination with an endless skeleton conveyor adapted to receive table cutlery at one point and automatically to discharge it at another point, of a cam plate extending beneath the conveyor to a place just beyond the discharge point, and means to operate the conveyor, said cam plate adjacent the discharge point substantially contacting with the under side of the conveyor.

2. In a dish-washing machine, the combination with an endless skeleton conveyor adapted to receive table cutlery at one point and automatically to discharge it at another point, of a plate extending beneath a portion of the conveyor to a place just beyond the discharge point, said plate having slots therein at the discharge point, spring-pressed rollers beneath the plate projecting into the slots, and means to operate the conveyor.

3. In a dish-washing machine, the combination with an endless skeleton conveyor adapted to receive table cutlery at one point and automatically to discharge it at another point, of a plate extending beneath a portion of the conveyor to a place just beyond the discharge point, said plate having slots therein at the discharge point, spring-pressed rollers beneath the plate projecting into the slots, a discharge guide plate engaging the upper surface of the conveyor and having recesses in its adjacent edge to accommodate the passage of the conveyor, and means to operate the conveyor.

4. In a dish-washing machine, the combination with an endless skeleton conveyor composed of a series of transverse parallel rods and links connecting them to form an endless skeleton belt, and supporting sprocket wheels for the same, of a plate extending beneath the conveyor to a place beyond the discharge point, slots in the plate at its discharge point, spring-pressed rollers beneath the plate projecting into the slots and adapted to be contacted by the rods of the conveyor and moved inwardly thereby and returned

by the springs, and means to operate the conveyor.

5. In a dish-washing machine, the combination with an endless skeleton conveyor composed of a series of transverse parallel rods and links connecting them to form an endless skeleton belt, and supporting sprocket wheels for the same, of a plate extending beneath the conveyor to a place beyond the discharge point, slots in the plate at its discharge point, spring-pressed rollers beneath the plate projecting into the slots and adapted to be contacted by the rods of the conveyor and moved inwardly thereby and returned by the springs, a discharge guide plate engaging the upper surface of the conveyor beyond the discharge point and having recesses in its adjacent edge to accommodate the passage of the links of the conveyor, and means to operate the conveyor.

6. In a dish-washing machine, the combination with an endless skeleton conveyor adapted to receive table cutlery at one point and automatically to discharge it at another point, of a plate extending beneath the conveyor to a point beyond the discharge point, said plate having slots therein at its discharge point, leaf springs secured at one end to the under side of the plate, a transverse rod secured in the free ends of the leaf springs, rollers journaled on the rod extending into the slots, and means for operating the conveyor.

7. In a dish-washing machine, the combination with an endless skeleton conveyor composed of a series of transverse parallel rods and links connecting them to form an endless skeleton belt, and supporting sprocket wheels for the same, of a plate extending beneath the conveyor to a point beyond the discharge point, slots in the plate at its discharge point, leaf springs connected at one end to the under side of the plate, a transverse rod secured in the free ends of the leaf springs, rollers journaled on the rod extending into the slots and adapted to be contacted by the rods of the conveyor and moved inwardly thereby and returned by the springs, a discharge guide plate engaging the upper surface of the conveyor and having recesses in its adjacent edges to accommodate the passage of the links of the conveyor, and means to operate the conveyor.

8. In a dish-washing machine, the combination with a horizontally movable skeleton conveyor adapted to carry table cutlery thereon by the supporting action of the carrier alone, of means for moving said carrier, and a cam plate beneath the same and substantially in contact therewith near the point of discharge adapted to raise any cutlery thereon extending through the carrier.

9. In a dish-washing machine, the combination with a horizontally movable skeleton carrier consisting of an endless belt made up

of transverse parallel rods connected by spaced longitudinal members, of sprocket wheels co-operating with the rods to support the carrier, means for rotating said wheels, and a cam plate beneath and substantially engaging the rods and extending between the wheels over which the cutlery is discharged.

10. In a dish-washing machine, the combination with a frame consisting of a pair of side plates, of a horizontally movable skeleton carrier consisting of an endless belt made up of transverse parallel rods connected by spaced longitudinal members, sprocket wheels co-operating with the rods to support the carrier, means for rotating the wheels, and a cam plate beneath said carrier secured at its lower end to the inner side of the side plate and having the main portion thereof extending upwardly at an angle to a point directly beneath the carrier which it substantially engages and thence curved concentrically with the axes of the wheels at the discharge ends to the discharge point.

11. In a dish-washing machine, the combination with side frames, of a horizontally movable skeleton carrier adapted to carry table cutlery thereon by the supporting action of the carrier alone, a member over which the cutlery is discharged below the end of the conveyor, a discharge table above said member, and a switch plate pivoted adjacent the table to direct the cutlery on to the table or allow it to pass over said member, depending upon how it is adjusted.

12. In a dish-washing machine, the combination with a frame, of a horizontally movable skeleton carrier mounted therein adapted to carry table cutlery thereon, means for moving said carrier, a cam plate beneath the same near the point of discharge adapted to raise any cutlery thereon extending through the carrier, a member over which the cutlery may be discharged below the end of the conveyor, a discharge table carried by said frame above said member, and a switch plate pivoted on the frame adjacent the table to direct the cutlery on to the table or allow it to pass over the member, depending on how it is adjusted.

13. In a dish-washing machine, the combination with a frame consisting of a pair of side plates, of a horizontally movable skeleton carrier consisting of an endless belt made up of transverse parallel rods connected by spaced longitudinal members, sprocket wheels co-operating with the rods to support the carrier, means for driving the carrier, a cam plate beneath said carrier secured at its lower end to the inner side of the side plate and having the main portion thereof extending upwardly at an angle to a point directly beneath the carrier and thence curved concentric with the axes of the wheels at the discharge end to the discharge point, and a member connecting the ends of the frame in

the plane of the hubs of a wheel over which the cutlery may be discharged below the end of the conveyor.

14. In a dish-washing machine, the combination with side frames, of a horizontally movable skeleton carrier adapted to carry table cutlery thereon, a member secured to said frames at the discharge point of the conveyor over which the cutlery may be discharged below the end thereof, a discharge table above said member, and a switch plate pivoted adjacent the table to direct the cutlery on to the table or allow it to fall over the member, depending on how it is adjusted, said switch plate consisting of a sheet-metal plate supported by a wire bail having its in-turned ends engaging the supporting brackets of the table.

15. In a dish-washing machine, the combination with an endless skeleton conveyor adapted to receive table cutlery at one point and automatically to discharge it at another point, of a plate extending beneath a portion of the conveyor to a place just beyond the discharge point, said plate having slots therein at the discharge point, spring-pressed rollers beneath the plate projecting into the slots, means to prevent the rollers from being depressed out of the slots, and means to operate the conveyor.

16. In a dish-washing machine, the combination with an endless skeleton conveyor adapted to receive table cutlery at one point and automatically to discharge it at another point, of a plate extending beneath the conveyor to a point beyond the discharge point, said plate having slots therein at its discharge point, leaf springs secured at one of their ends to the under side of the plate, a transverse rod secured in the free end of the leaf springs, rollers journaled on the rod, stops to prevent the inward movement of the rod to keep the rollers in the slots, and means for operating the conveyor.

In witness whereof I have hereunto set my hand this 2nd day of December, 1930.

WALDEMAR L. LINDGREN.