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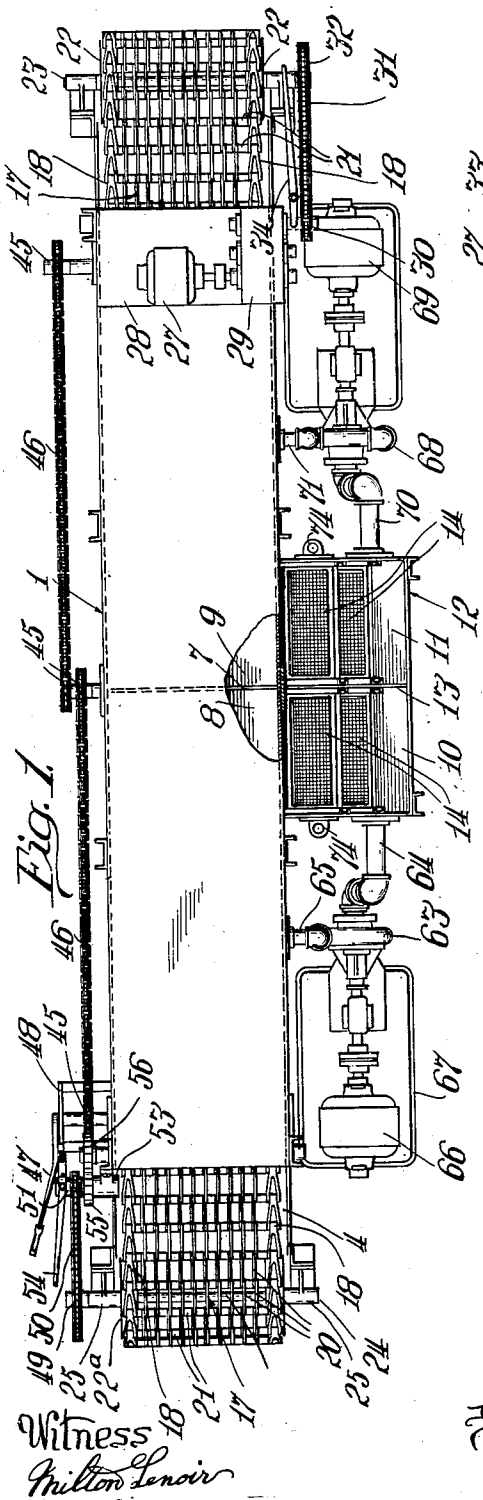
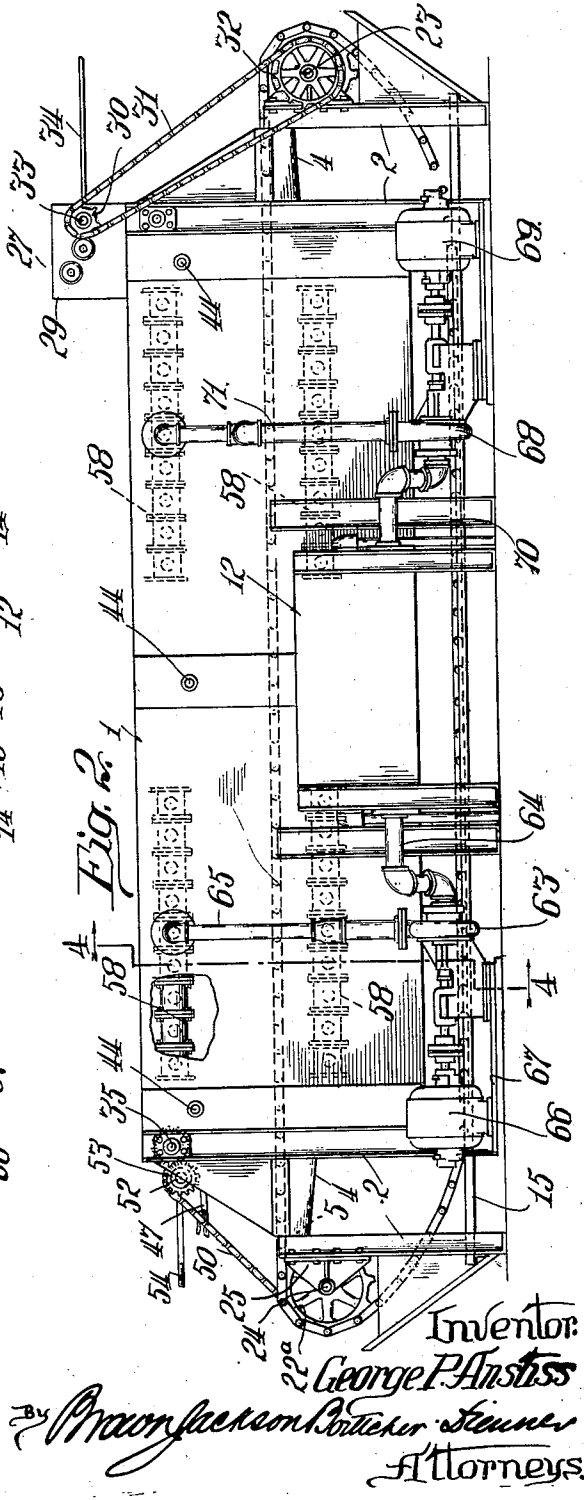
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WASHING MACHINE

Filed May 26, 1928

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Fig. 3.

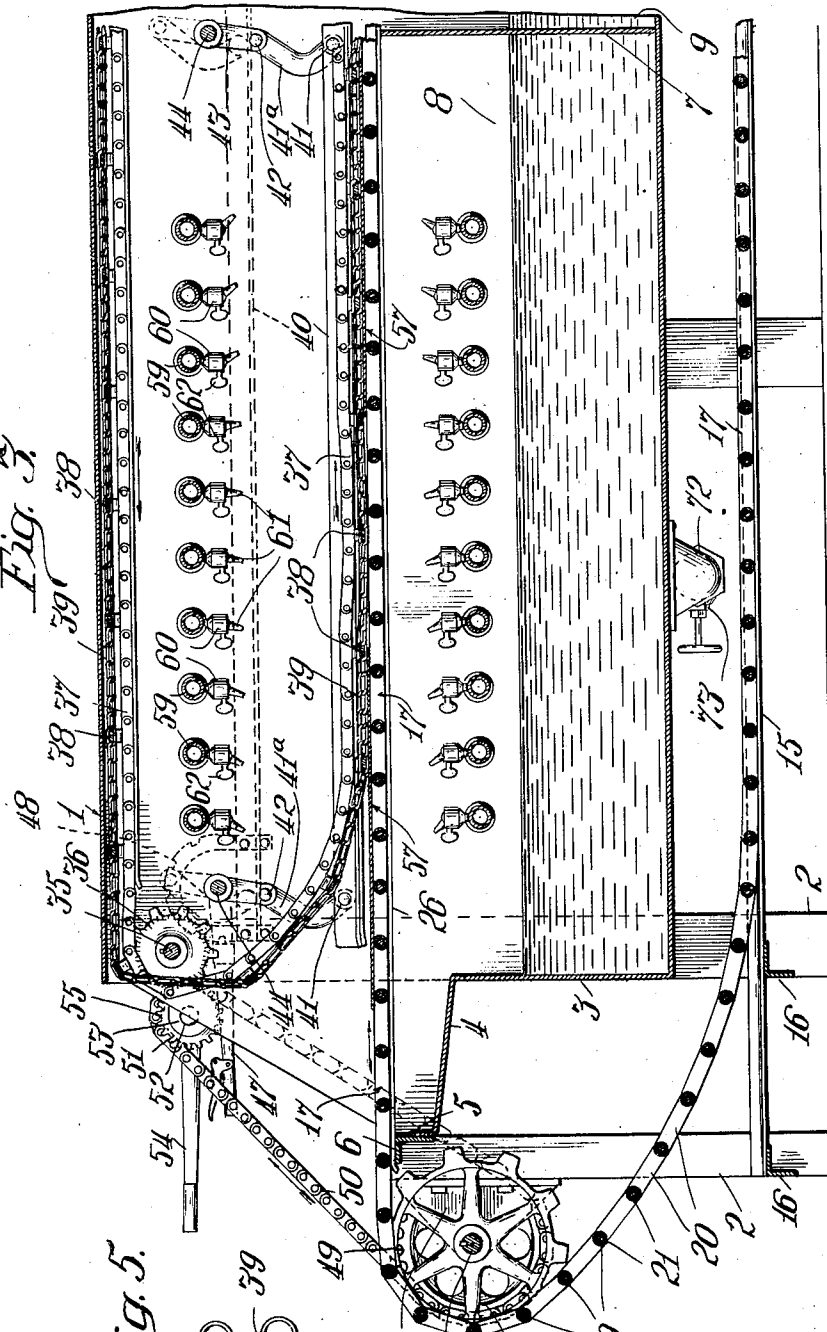
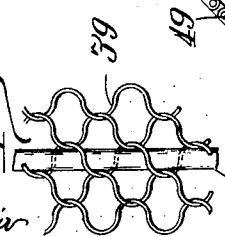


Fig. 5.

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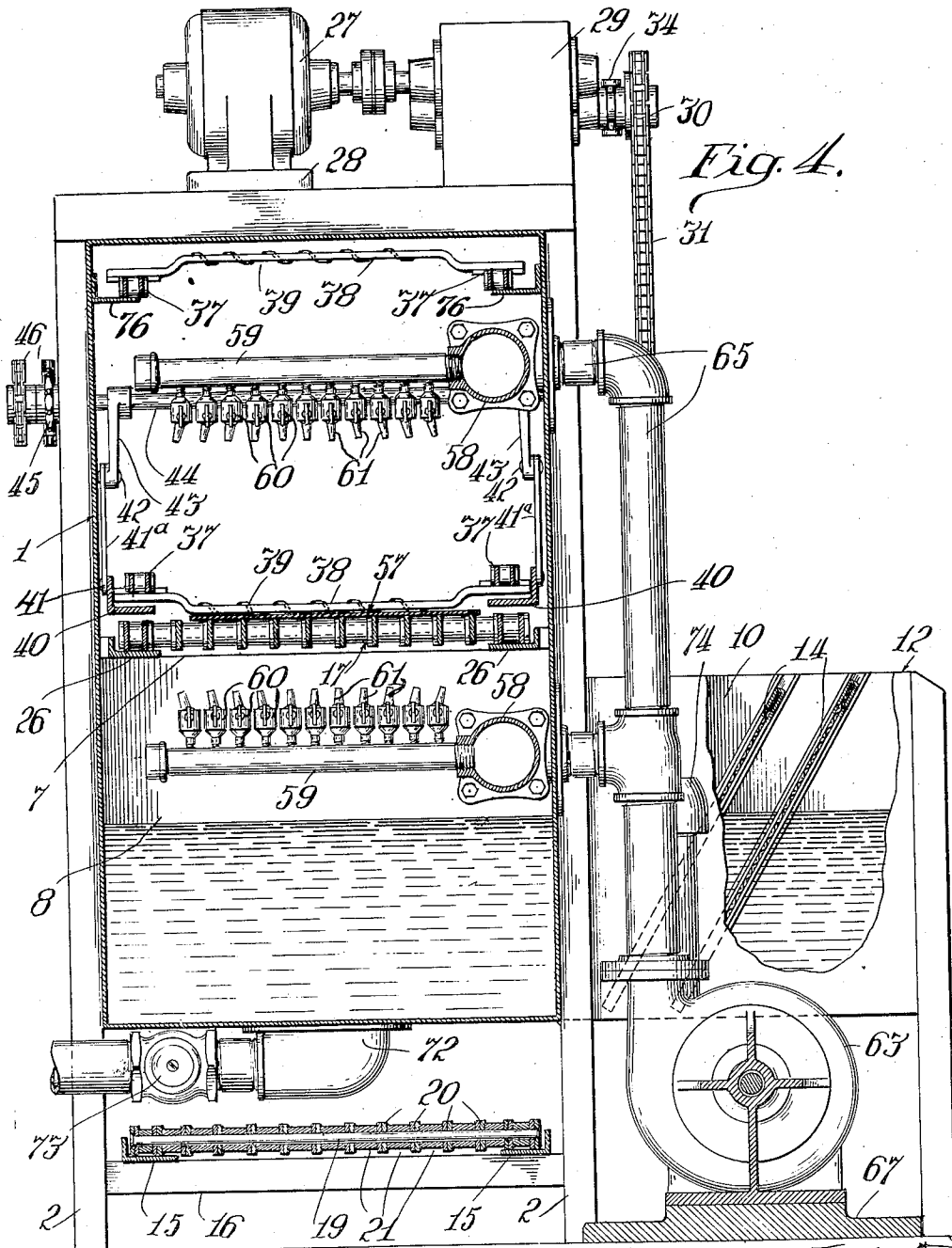


Fig. 4.

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UNITED STATES PATENT OFFICE

1,944,679

WASHING MACHINE

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Application May 26, 1928. Serial No. 280,673

4 Claims. (Cl. 141—1)

This invention relates to washing machines, and more particularly to a machine for washing castings, punchings, and other articles of like nature.

In foundries and machine shops, and similar establishments, it is desirable that castings, punchings and other articles of like nature be effectively cleaned to remove scales, grease and other foreign materials therefrom so as to be in proper condition to be subjected to further operations in the completion of the articles to be produced. There is a demand for a machine capable of effectively cleaning articles of the types referred to by washing the scale and grease and other foreign materials therefrom, but it has been found to be very difficult to devise such a machine due to the great diversity in shape, size, and weight of the various articles to be washed.

A further difficulty which has been encountered is that the articles to be washed must be subjected to relatively large sprays or streams of washing solution under comparatively high pressure so as to assure proper cleansing thereof, and this necessitates that such articles must be effectively held during the washing operation. My invention relates primarily to means for subjecting the articles to be washed to a suitable washing spray, and to means for holding the articles during washing thereof, the latter means being adapted to accommodate articles of various shapes and sizes.

One of the main objects of my invention is to provide a washing machine which will effectively wash castings, punchings, and various other articles of a diversity of forms and size, this machine being provided with means for holding the articles during washing thereof and the holding means being readily flexible to conform to the shape of the articles held thereby. A further object is to provide simple and efficient holding means, such means being effective for holding articles of insufficient weight to resist the force of the spray streams striking such articles, the holding means including a readily flexible member which is moved into inoperative position when washing relatively large and heavy articles, such as large castings, so as to facilitate passage of such articles into and through the machine. Further objects and advantages will appear from the detailed description.

In the drawings:

Fig. 1 is a plan view of a washing machine constructed in accordance with my invention, partly broken away;

Fig. 2 is a side view of the machine;

Fig. 3 is a fragmentary vertical sectional view

of the machine taken longitudinally thereof from the entrance end;

Fig. 4 is a transverse vertical sectional view of the machine taken through the washing portion thereof;

Fig. 5 is a fragmentary detail of the web structure of the upper or hold down conveyor.

The machine includes a casing 1 suitably constructed of sheet metal and mounted upon supporting members or legs 2. This casing is of elongated rectangular shape in plan and is of rectangular cross-section. The lower portion of the casing is provided with upwardly extending end walls 3 from the upper edges of which extend upwardly and outwardly inclined drain plates 4 the outer portions of which are turned upwardly to form flanges 5 secured to angle bars 6 extending between the end legs 2 and secured thereto. The lower portion of the casing is of trough-like construction and is divided by a partition member 7 extending transversely thereof, midway between the end walls 3, into two tanks 8 and 9. These tanks, which may be termed the collecting tanks, communicate at their inner ends with receiving compartments or tanks 10 and 11, respectively, of a receiving tank structure 12 disposed at one side of casing 1 centrally thereof.

The receiving tank structure 12 is divided by a central partition 13 and preferably has suitable screens 14 suitably supported therein and disposed between the collecting tanks and the receiving tanks or compartments.

Angle guide rails 15 are disposed beneath casing 1 longitudinally thereof, these rails being supported upon angle bars 16 connecting certain of the legs 2. The rails 15 support and guide the lower run of a main endless conveyor 17 which comprises side chains 18 which are connected by cross rods 19. The rods 19 pass through the ends of links 20 and through spacing collars 21 disposed between the ends of the pairs of links. This provides a conveyor construction which has the desired flexibility and yet is capable of supporting heavy loads.

Side chains 18 of the conveyor pass about drive sprocket wheels 22 secured on a drive shaft 23 mounted in suitable brackets at the delivery end of the machine. The side chains also pass about idler sprocket wheels 22a secured upon a shaft 24 supported in suitable brackets 25 at the inlet end of the machine. The upper run of the conveyor, which is under tension during operation of the machine, travels through the casing 1 from the inlet to the outlet end thereof. Angle guide rails 26 are suitably mounted within the casing 1

and support the upper run of the conveyor. This renders it possible to support heavy loads upon the upper run of the conveyor during travel thereof through the casing. The conveyor is
 5 driven by means of an electric motor 27 of suitable type mounted upon a base 28 above the casing at the outlet end thereof.

This motor has driving connection, through a suitable speed reducing transmission 29, with a
 10 sprocket pinion 30 about which passes a sprocket chain 31, this chain also passing about a drive sprocket 32 secured on the drive shaft 23. The sprocket 30 is loose upon its shaft 33 and has associated therewith suitable clutch means for
 15 clutching the sprocket to and declutching it from shaft 33. The clutch is controlled by a suitable clutch lever 34 whereby the lower main conveyor can be thrown into and out of operation at will.

The casing 1 is open at each end above the upper run of the main conveyor to permit the articles to be washed to readily pass into and out of the casing. Shafts 35 are rotatably mounted through casing 1 transversely thereof adjacent
 20 each end and the top wall of the casing. Sprocket wheels 36 are secured upon these shafts and receive side chains 37 of an upper hold down conveyor which comprises cross rods 38 which are suitably spaced apart and are inserted through
 25 the meshes of a web structure 39. The end portions of these rods are slightly offset (Fig. 4) and are suitably secured to certain of the links of the side chains. The mesh structure 39 is preferably formed of wire suitably woven to provide a plurality of interengaging meshes (Fig. 5) which are
 30 loosely connected but are not secured together, in that such meshes are free for relative movement. This provides an open and easily flexible structure which will readily adapt itself to differently shaped objects supported upon the upper run of
 35 the lower main conveyor.

Angle guide rails 76 are suitably supported in casing 1 and serve to support and guide the upper run of the upper conveyor. The lower run of this conveyor is guided and supported by guide
 45 rails 40 to which are pivotally secured, at 41, the lower ends of links 41a of approximately hook shape. The upper ends of these links are pivotally secured at 42 to arms 43 secured on shafts
 50 44 suitably mounted on casing 1 transversely thereof and between the runs of the upper conveyor. The shafts 44 are mounted adjacent each end and at the center of casing 1 and are connected in a suitable manner for simultaneous and similar operation. I have shown these shafts as
 55 interconnected by suitable sprocket wheels 45 and chains 46 passing about the same. An operating lever 47 is secured upon one of the shafts 44 so that by turning this lever in proper direction the rails 39, and, consequently, the lower
 60 run of the upper conveyor can be raised or lowered as desired. I preferably provide a quadrant 48 adjacent the lever 47, this lever being provided with a detent element for cooperating with the quadrant to secure the lever in adjustment in
 65 a known manner. This provides simple and efficient means whereby the lower run of the upper conveyor can be adjusted toward or away from the upper run of the lower conveyor, and can be held in desired adjustment. By turning
 70 the lever 47 into its extreme position in a clockwise direction, as considered in Fig. 3, the guide rails 39 are raised into the uppermost position thus raising the lower run of the upper conveyor into full inoperative position.

75 At this time, the pivots 42 are disposed above

the shafts 44 and beyond dead center relative thereto, as indicated in Fig. 3, so that lowering of the lower run of the upper conveyor into operative position is prevented even though the detent of the lever should become disengaged from its associated quadrant. This provides simple and efficient means for preventing casual movement
 80 of the lower run of the hold down conveyor into operative position when the machine is being used for washing articles with which it is not desired
 85 to use the hold down conveyor.

The upper conveyor may be driven in any suitable or preferred manner. For this purpose I have shown a sprocket wheel 49 secured on the idler sprocket shaft 24 and connected by a
 90 sprocket chain 50 to a sprocket wheel 51 loosely mounted upon a stub shaft 52 mounted in a bracket 53 which is suitably secured to one of the supporting legs 2. A suitable clutch structure is provided for clutching the sprocket 51 to the shaft 52 and for declutching the sprocket from
 95 this shaft. This clutch is controlled by a clutch lever 54 suitably mounted adjacent shaft 52. A spur gear 55 is secured upon stub shaft 52 and meshes with spur gear 56 secured upon shaft 35
 100 for driving the upper conveyor. The intermeshing gears 55 and 56 serve to drive the upper conveyor oppositely to the lower conveyor so that the lower run of the upper conveyor travels
 105 through the casing in the same direction as the upper run of the lower conveyor. In the machine illustrated, the sprockets and the gears for driving the upper conveyor are so proportioned that this conveyor is driven at the same speed as the
 110 lower conveyor.

This is not, however, essential and in some cases the conveyors may be driven at different speeds as, for instance, where it is desired to impart a rolling motion to the articles being
 115 washed. In fact, it is not essential that the upper conveyor be always driven or that, when driven, it travels in the same direction as the lower conveyor. I do not, therefore, limit my invention to a machine in which the upper conveyor is driven in the manner illustrated and described,
 120 though this is the more common and, usually, the preferred form of the machine.

Since the drive of the upper conveyor is from the entrance end of the machine, the upper run of this conveyor is under tension during drive
 125 thereof and the lower run is slack. When the guide rails 39 are in lowered position, the lower run of the hold down conveyor, which is slack, rests upon the articles passing through the machine. In Fig. 3 I have shown two punchings in
 130 the form of plates 57 of sheet metal which are passing through the machine from left to right as considered in this figure. These plates are held between the upper run of the lower conveyor and the lower run of the upper conveyor,
 135 which rests upon the plates, so as to be confined thereby and held against displacement from between the conveyors. While I have shown flat plates 57, articles of irregular contour will be similarly held by the hold down conveyor which,
 140 due to its flexibility, can readily conform to the contours of articles of various shapes. These two conveyors coact to hold articles which are passed through the machine during washing and rinsing
 145 of such articles.

For washing the articles I provide headers 58 which extend along one side of casing 1 above the washing solution collecting tank 8. The lower header 58 is disposed beneath and adjacent to the upper run of the lower conveyor, and the
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upper header is disposed between the runs of the upper conveyor. A plurality of spray pipes 59 extend from each header, these pipes being disposed transversely of the casing. Each pipe is provided with a plurality of spray nozzles 60, spaced apart longitudinally thereof and each provided with a suitable tip 61 which is adjustable, this tip being secured in adjustment by means of a screw 62. The nozzles of the upper pipes are disposed to direct the spray streams downwardly on to the upper surface of the articles to be washed so as to impinge upon the same at various angles, and the tips of the nozzles of the lower pipes are directed to project the spray streams against the under face of the articles at different angles thereto. The particular construction of the spray nozzle is disclosed in detail in my copending application for washing machine, Serial No. 56,297, filed September 14, 1925, which has matured into Patent No. 1,730,348, granted October 8, 1929, and need not be illustrated nor described in detail herein. A similar arrangement of headers and spray pipes is provided above the tank 9.

Washing solution is supplied under pressure to the headers 58 by means of centrifugal pump 63 of suitable type having its inlet connected by a pipe 64 to the receiving tank 10, the outlet of this pump being connected by a pipe 65 to the headers. Pump 63 is driven by an electric motor 66 of suitable type mounted upon a suitable base 67.

Rinsing water is similarly supplied from tank 11 to the headers for the rinsing pipes, by means of a pump 68 driven by a motor 69 and connected to tank 11 and the rinsing pipe headers by an intake pipe 70 and an outlet pipe 71, respectively.

In the operation of the machine, a suitable washing solution is placed in the tank 8 and a suitable rinsing solution, or water, is placed in tank 9. The articles entering the machine first pass over the compartment 8 and are subjected to the washing sprays from above and below, the open work construction of the two conveyors facilitating thorough washing of the articles. The articles then pass over the rinsing tanks where they are subjected to the rinsing sprays from above and below so as to thoroughly remove the washing solution, after which the articles are discharged from the machine. The washing liquid and the rinsing liquid are collected by the tanks 8 and 9 and return therefrom to the tanks 10 and 11, respectively, from which the liquids are withdrawn by the pumps and supplied under pressure to the spray pipes in the manner described. Each of the tanks is provided with a suitable drain pipe 72 opening through the bottom of the tanks 8 and 9, respectively, such pipe having a suitable drain valve 73. This provides means whereby the liquid can be drained from the tanks when required as, when it is desired to renew the liquid in either tank, and I also preferably provide the tanks 10 and 11 with suitable overflow pipes 74.

The upper hold down conveyor is intended to cooperate with the upper run of the lower main conveyor to hold articles passing through the machine so as to prevent such articles from being moved upon the lower conveyor by the spray streams which should be discharged with appreciable force against the articles with a view to thoroughly washing the same. It is not necessary, however, when washing heavy articles, such as heavy castings, to use the hold down conveyor since such articles are of sufficient weight to assure against their being moved by force of

impact of the spray streams. Under such conditions, the guide rails 39 are raised into full inoperative position, thus raising the lower run of the hold down conveyor into full inoperative position, as previously described. When washing relatively light articles of appreciable height, the rails 39 may be raised into an intermediate position, in the manner described previously, so as to permit passage of such articles through the machine, the height at which the lower run of the hold down conveyor is adjusted being such that it will bear upon the articles and hold them against movement upon the upper run of the lower conveyor during the washing and rinsing operations. The machine is thus adapted for effectively holding relatively light articles of various shapes and sizes during washing and rinsing thereof, and when heavy articles are being passed through the machine the hold down conveyor is moved out of operation. This conveyor, when not in use, is thrown out of operation by means of the clutch lever 54.

As above indicated, and as will be understood by those skilled in the art, changes may be made in the construction and arrangement of parts of the invention without departing from the field and scope of the same, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention is disclosed.

What I claim is:

1. In a machine of the character described, a casing, upper and lower endless conveyors operating in the casing, the upper conveyor being readily flexible and having its lower run sufficiently slack to rest upon articles supported upon the upper run of the lower conveyor, when said lower run of the upper conveyor is lowered into operative position, guide members extending beneath the lateral portions of the lower run of the upper conveyor, means for raising and lowering said guide members for moving the lower run of said upper conveyor out of and into operative position, and means for projecting liquid onto said articles.

2. In a machine of the character described, a casing, upper and lower endless conveyors operating in the casing, the upper conveyor being flexible and having its lower run sufficiently slack to be disposed in proximity to the upper run of the lower conveyor, when said lower run is lowered into operative position, guide members extending beneath the lateral portions of the lower run of the upper conveyor, shafts extending transversely of the casing between the runs of the upper conveyor, arms secured to said shafts, links connecting the arms to the guide members, means for turning the shafts for raising and lowering the guide members, said links being of substantially hook shape and the connections between the links and the arms being disposed beyond dead center position relative to the shafts when said guide members are in full raised position whereby the guide members are held against casual lowering thereof, and means for projecting liquid onto articles confined between the two conveyors.

3. In a machine of the character described, a lower conveyor, a flexible upper conveyor, supporting and drive members at the ends of the upper conveyor, the upper conveyor passing about said members and the lower run of said upper conveyor being free and slack between the supporting and drive members for independent

upward movement, guide rails for said lower run of said upper conveyor, means for adjusting the position of said guide rails vertically, the two conveyors being endless and coacting to confine articles between the adjacent runs thereof and one of the conveyors being of open work construction, and means for projecting washing solution through the open work conveyor onto the articles.

4. In a machine of the character described, a lower endless conveyor, an upper endless conveyor, guide rails beneath the sides of the lower run of the upper conveyor, means for raising and lowering the rails, the lower run of the upper conveyor being disposed in proximity to the upper run of the lower conveyor when the rails are lowered and cooperating therewith to confine articles between the adjacent runs of the conveyors, and means for projecting a washing solution onto such articles.

10 lower endless conveyor, an upper endless con-

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