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ROLLER SUPPORT

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Fig. 1.

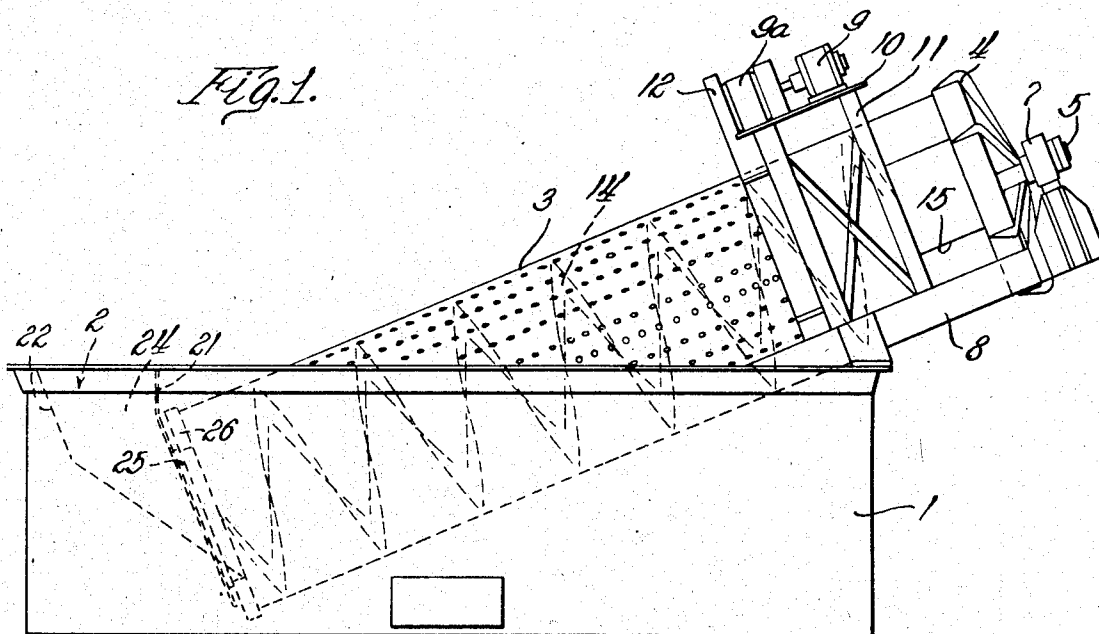


Fig. 2.

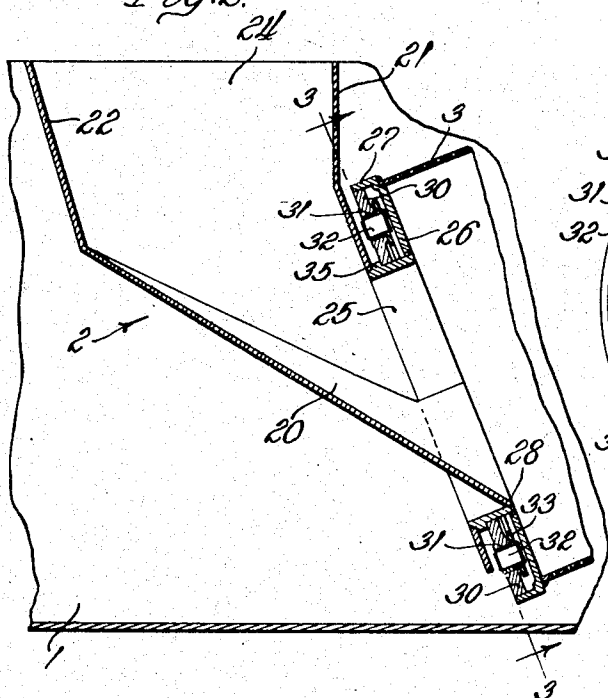
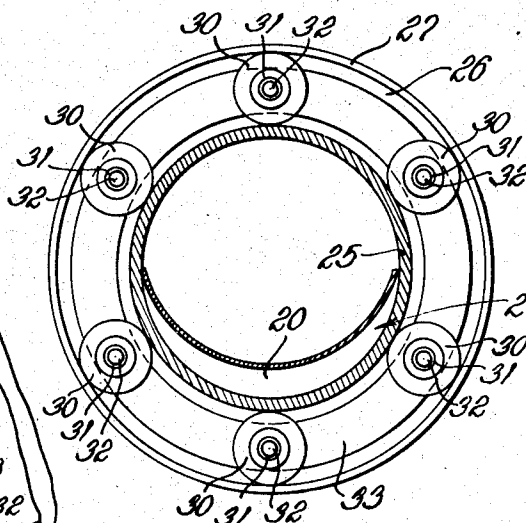


Fig. 3.



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ROLLER SUPPORT

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4 Claims. (Cl. 141—1)

The present invention relates to an improvement in roller support, and more particularly is directed to the supporting and maintaining of a rotating inclined conveyor drum concentric with the outlet of a feed hopper of a quenching and washing machine or the like.

Quenching and washing machines of the type referred to generally comprise a tank containing a liquid bath having a hopper adjacent one end thereof, and in which an inclined drum containing a spiral is disposed, with one end of the drum disposed concentrically of the discharge opening of the hopper for rotation thereabout. Articles to be quenched or washed are dumped into the hopper and are conveyed upwardly through the bath by the drum and spiral therein and are then discharged through an outlet at the other end of the drum. Heretofore the drum has been supported for rotation by rollers mounted in a bracket secured to the bottom of the tank, or the drum has been hung in a roller bearing carried by the tank and disposed intermediate the ends of the drum. With either of these mountings, the quenching solution in the tank which contains grit or other abrasive substances which lodges in the bearings causing wear and eventual destruction thereof. If the bearings are not frequently renewed, the drum will settle with respect to the hopper so that these parts contact each other and upon continued use they will be rapidly worn away requiring their replacement.

My invention is directed to providing an improved bearing mounting of the drum with respect to the hopper for maintaining these parts in concentric relation. More specifically, I provide a pair of concentric and overlapping elements, one of which is associated with the hopper and comprises an inner race, the other element being associated with the drum and comprising an outer race between which elements a plurality of bearing rollers are maintained in spaced relation and mounted for rotation about their own axes and the axis of the drum, by a spacer ring so that slag and dirt will not enter the bearings and wash out the lubricant, thereby maintaining the concentricity between the drum and the hopper. Other objects and advantages will appear from the detail description.

Now in order to acquaint those skilled in the art with the manner of constructing and operating my invention, I shall describe, in conjunction with the accompanying drawing, a specific embodiment of the same.

In the drawing:

Figure 1 is a side elevation of a quenching and washing machine embodying my invention;

Figure 2 is a vertical sectional view of a portion of the machine of Figure 1 showing the rotatable drum supported upon the discharged end of the hopper in accordance with my invention; and

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 2, looking in the direction of the arrows.

Referring now to the drawing, I have shown a tank 1 which is adapted to contain a quenching liquid for tempering, or, if desired, a cleansing liquid. The tank is open at its top, and a hopper 2 is disposed adjacent one end thereof. An inclined perforate drum 3 is disposed in the tank 1 and is supported with its lower end adjacent the outlet of the hopper. The drum is provided at its upper end with a spider 4 secured thereto in which a shaft 5 is fixed. The shaft 5 is rotatably mounted in a radial and thrust bearing 7, of suitable known type, carried by a frame 8, which is fixed to the tank 1 in any suitable manner. An electric motor 9, supported on a platform 10 carried by a frame 11 secured to and extending upward from frame 8, drives drum 3 through a speed reducing unit 9^a and suitable known mechanism enclosed by a guard 12. Any other suitable known means may be provided for rotating the drum at proper speed and in proper direction.

Articles to be quenched or washed are dumped into the hopper 2 and are carried upwardly through the drum by means of a spiral conveyor 14 therein. The lower portion of the drum and of the conveyor 14 extends into the liquid in the tank so that the articles are quenched or washed, as the case may be, during a considerable portion of their upward travel through the drum. The articles continue their upward movement, passing out of the treating liquid and excess liquid clinging thereto returns to the tank through the perforations in the upper portion of the drum above the level of the liquid in the tank. The drum is provided adjacent its upper end with an outlet 15 through which the treated articles are discharged in the rotation of the drum. The structure so far described is known and need not be illustrated nor described in greater detail here.

Referring now to Figures 2 and 3, the hopper 2 may be of any suitable form and is shown as comprising an inclined arcuate lower wall 20, front and rear walls 21 and 22, respectively, and side walls 24 connecting walls 20, 21 and 22.

Ring 25 fits into a corresponding opening in wall 21 and receives in its lower portion, the lower substantially semi-circular portion of wall 20. The latter wall and wall 21 are secured to ring 25 in any suitable manner, conveniently by welding, and the hopper 2 is welded or otherwise suitably secured in tank 1.

A ring 26 having a downwardly extending circumferential flange 27 is welded to the lower end of drum 3 concentric therewith and extends concentrically about the upper portion of ring 25 in close proximity thereto, the clearance 28 between these two rings being slight and only that required for mechanical considerations. In practice this clearance is about $\frac{1}{16}$ " and may be slightly less, in certain cases. Flange 27 of ring 26 overlaps ring 25, as shown. A plurality of bearing rollers 30 are disposed between ring 25 and flange 26, in contact therewith. That provides a roller bearing for the lower end of the drum 3, ring 25 and flange 27 constituting the inner and outer races, respectively, of such bearing. Preferably, each bearing roller 30 is mounted for rotation about its own axis, by means of a bushing 31 and a pintle 32, the latter being suitably fixed in a spacer ring 33 disposed within the annular channel defined by flange 27 and ring 25. In Figure 3 I have shown six bearing rollers 30 evenly spaced by means of ring 33 and the associated pintles 32. Any suitable number of rollers 30 may be provided. Ring 25 is provided at the outer face of wall 21, with an outer circumferential shoulder 35 with which rollers 30 contact, effective for retaining rollers 30 and ring 33 in proper operative position within the channel defined by flange 27 and ring 25. It will be noted that the inner surface of flange 27 is unobstructed, assuring that scale, grit and other abrasive materials which may be deposited upon such surface will readily be washed therefrom and discharged downwardly into the tank, in the rotation of the drum.

It will be seen that as the drum is rotated, the roller bearing maintains it concentric with ring 25, and the rollers 30 travel about ring 25 carrying with them ring 33, which assures that the rollers 30 do not remain in a fixed position. Due to the slight clearance between rings 25 and 26, previously referred to, there is little likelihood of metal chips or the like, or of small articles being treated, passing through the space 28. Any metal chips, scale or other particles which may fall upon the inner surface of flange 27 will be quickly removed therefrom, in the manner above stated. In the event exceptionally large metal chips or scale particles tend to adhere to the inner surface of flange 27, they will quickly be ground into small particles by rollers 30, which small particles will then readily be washed from flange 27 and discharged therefrom into the tank.

It will be understood that various modifica-

tions and re-arrangements of parts may be made within the broader aspects of my invention.

I claim:

1. In a machine of the class described, the combination of a tank, a hopper, a stationary inner ring fixed to said hopper, said hopper discharging through said inner ring, a rotatably mounted inclined drum extending downwardly into said tank and having an outer ring adjacent its lower end, and a plurality of bearing rollers disposed between said rings maintaining them in concentric spaced relation.

2. In a machine of the class described, the combination of a tank, a hopper, a stationary ring fixed to said hopper, said hopper discharging through said ring, a rotatably mounted inclined perforate drum extending downwardly into said tank and having a ring at its lower end fitting closely about said first ring and provided with a circumferential flange extending about said first ring in concentric spaced relation thereto, the inner surface of said flange being flat lengthwise of said drum and unrestricted, and a plurality of bearing rollers confined between said first ring and said flange in rolling contact therewith.

3. In a machine of the class described, the combination of a tank, a hopper in said tank having an inner wall, a ring fixed in said wall having an exterior circumferential shoulder at the inner face of said wall, said hopper discharging through said ring, a rotatably mounted inclined perforate drum extending downwardly into said tank, a ring secured on the lower end of said drum fitting closely about said first ring and having a circumferential flange extending about said first ring in concentric spaced relation thereto and defining therewith an annular channel, a spacer ring in said channel free from said first and second rings, and a plurality of bearing rollers rotatably mounted in spaced relation on said spacer ring with their circumferential surfaces contacting said first ring and said flange and their lower surfaces contacting said shoulder, the inner surface of said flange being unobstructed for discharge therefrom downwardly into said tank of substances deposited upon said surface.

4. In a machine of the class described, a tank, a hopper secured in said tank having an inner wall, an inclined rotatably mounted drum having its lower end disposed in said tank adjacent the lower end of said hopper, two rings respectively secured to said hopper and to the lower end of said drum in overlapping relation defining an inner bearing race and an outer bearing race, a plurality of bearing rollers disposed between said races in rolling contact therewith, and means disposed between said races for maintaining said bearing rollers in spaced apart relation.

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