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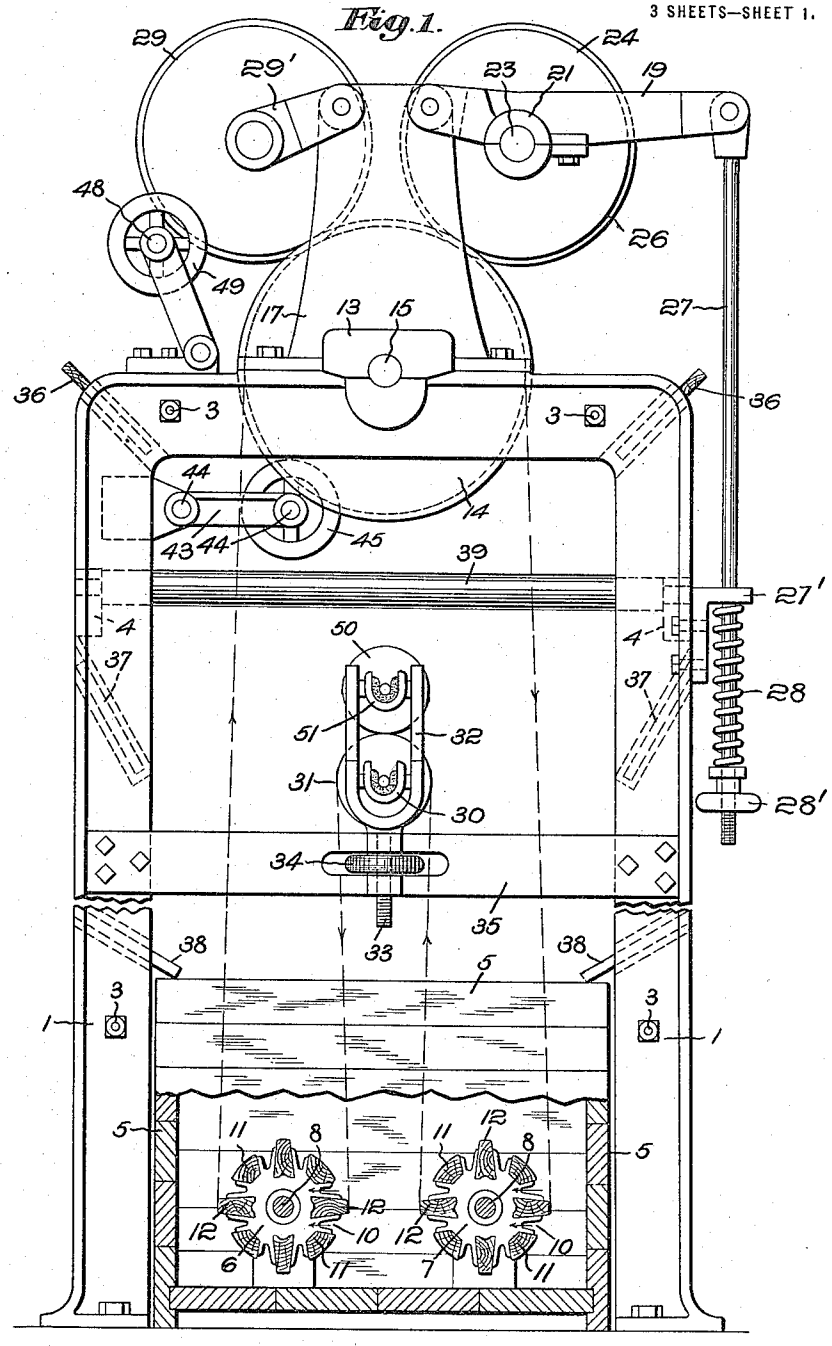
WASHING OR RINSING MACHINE FOR TEXTILE MATERIAL.

APPLICATION FILED JAN. 28, 1914.

1,165,896. Patented Dec. 28, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



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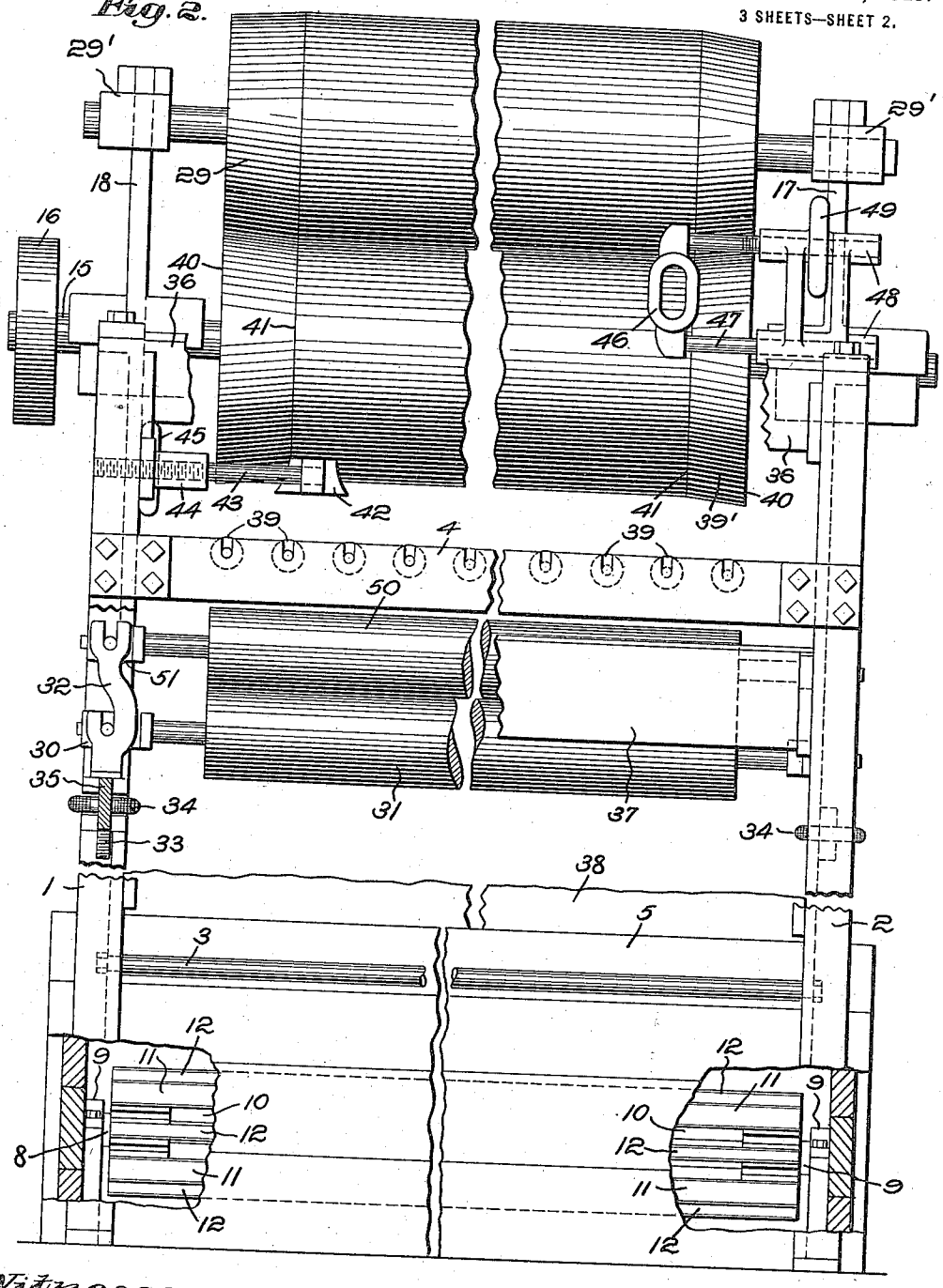
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

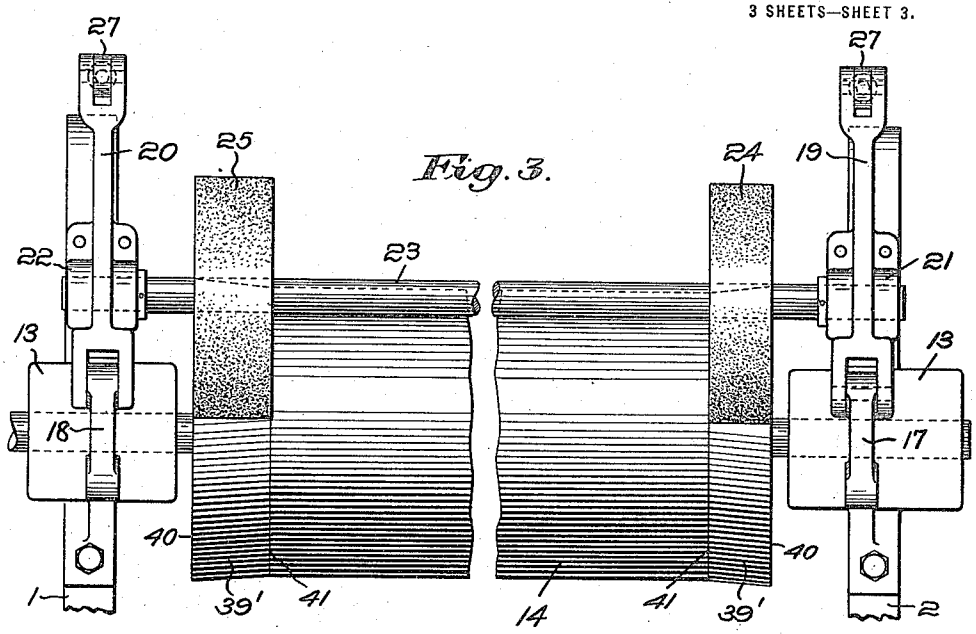
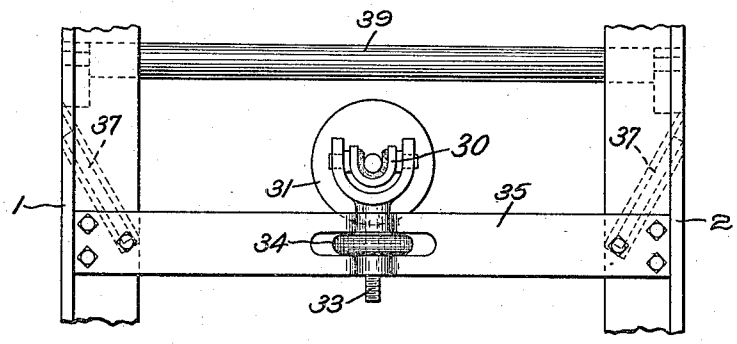


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WASHING OR RINSING MACHINE FOR TEXTILE MATERIAL.

1,165,896. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed January 28, 1914. Serial No. 815,054.

To all whom it may concern:

Be it known that I, ISAAC E. PALMER, a citizen of the United States, and resident of Middletown, in the county of Middlesex and State of Connecticut, have invented an Improvement in Washing or Rinsing Machines for Textile Material, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to washing or rinsing machines for textile material.

In order that the principle of the invention may be readily understood, I have set forth a single embodiment thereof in the accompanying drawings, wherein—

Figure 1 is an end elevation of the apparatus, a portion thereof, however, being shown in section; Fig. 2 is a side elevation of the apparatus shown in Fig. 1, parts of the apparatus being broken away and shown in section; Fig. 3 is a plan view of a portion of the apparatus shown in Figs. 1 and 2, the rider roll being omitted; and Fig. 4 is a detail showing a slightly modified form of a portion of the apparatus.

In my Patents No. 766,464, August 2, 1904, No. 816,179, March 27, 1906, and No. 985,695, February 28, 1911, I have disclosed apparatus for washing, rinsing and otherwise treating textile fabrics, of which the present invention is an improvement.

Referring more particularly to the drawings, the end frames of the apparatus are represented at 1 and 2 in the several figures. These frames are of general rectangular form and are connected together by suitable tie rods 3, 3 and spacing bars 4. Within the lower portion of the frames 1 and 2, is positioned a suitable tank or vat 5 having therein fluid circulating and fabric guiding rollers 6, 7. Each of these rollers is provided with a shaft or axle 8 loosely mounted in suitable bearings 9. Fast upon each end of each shaft or axle 8 is a head, spider or casting 10 having peripheral recesses or sockets wherein are fixedly set bars or strips 11, 12 preferably of wood, and preferably shaped substantially as shown and spaced apart, so that the liquid may enter between each pair of bars on the down-turning side of the rollers and be discharged therefrom between other bars, as for example those on the up-turning side. Inasmuch as the said rollers are driven by the textile material, as hereinafter set forth, the liquid is thereby circulated between the bars 11 and 12, and thus the liquid in the vat is kept in constant agitation. Preferably the bars 11 taper inwardly and the bars 12 taper outwardly as shown and the construction is such that in whichever direction the said rollers 6 and 7 be driven, they act to circulate the liquid. In other words, the rollers are reversible and act similarly upon the liquid whichever be their direction of rotation. It is therefore possible to change or reverse the course of the material through the apparatus.

In the upper portion of the frames 1 and 2, I provide suitable bearings 13, 13 wherein is mounted a master feeding roller 14, the same having fast on the shaft 15 thereof a pulley 16 driven from any suitable source of power. At the ends of the feeding roller 14, there are mounted upon the framing suitable brackets 17, 18. Upon the brackets 17, 18 are pivotally mounted lever arms 19, 20, provided with suitable bearings 21, 22, wherein is loosely mounted a shaft 23. Upon said shaft are mounted two squeeze rolls 24 and 25. In the present embodiment of the invention, one of said rolls is loose and the other is fast upon said shaft 23, so that they may rotate at a differential speed with respect to each other, if this be required, by the tension of different portions of material. Preferably the squeeze roll 24 is loose and the squeeze roll 25 is fast upon the shaft 23, though this condition may be reversed. Preferably each of said squeeze rolls is faced with rubber, as indicated at 26 in Fig. 1. In order to hold the said squeeze rolls yieldingly against the feeding roller 13 I have herein represented the lever arms 19 as having pivotally connected thereto rods 27 downwardly extending and passing loosely through brackets 27′ upon the framing, said rods being surrounded below said brackets by coil springs 28, the tension whereof may be adjusted by nuts 28′ mounted upon the threaded lower ends of said rods. Any other suitable means may, however, be provided yieldingly to hold squeeze rollers 24, 25 against the master feeding roller 14.

It will be observed that the squeeze rolls

24 and 25 are located at one side of a vertical plane passing through the axis of the feeding roller 14 and at the other side of said vertical plane is positioned a rider roll 29, which may be and preferably is of the entire length of the feeding roller 14 whether the latter be cylindrical, or have its ends slightly inclined. The rider roll 29 is supported upon arms 29′ permitting it to rest by gravity against the feeding roller 14 and permitting it to yield to inequalities in the material passing through the apparatus. It will be observed that the rider roll 29 is at the opposite side of the axis of the feeding roller 14 from the squeeze rolls 24 and 25.

In the present embodiment of the invention, I have, for the purpose hereinafter set forth, shown the feeding roller 14 provided with flaring ends but have represented the rider roll 29 as of the full length of the feeding roller and having tapered ends permitting the rider roll to conform substantially to the shape of the feeding roller, it being evident that the material between the said two members will fill any spaces between their surfaces, so that the rider roll presses against the material from end to end of the feeding roller. Within the scope of my invention the ends of the feeding roller 14 may be inclined, either by making them flaring or tapered, but herein I have represented them as flaring.

At a suitable point between the liquid circulating rollers 6 and 7 and below the feeding roller 14, and preferably central with respect to the sides of the apparatus, I have loosely mounted in suitable bearings 30 a tensioning and tension reversing roller 31 over and about which the textile material is adapted to pass as hereinafter more fully set forth. Each of the bearings of the roller 31 is substantially of U shape, as indicated most clearly in Fig. 1, and each is supported by a yoke 32 having a threaded spindle or extension 33 passing through a hand nut 34 positioned in cross braces 35 of the end frames 1 and 2. By suitable adjustment of one or both of the hand nuts 34, either end of the roller 31 may be elevated or depressed, or both ends may be elevated or depressed, thereby to impart any suitable tension to the textile material at any suitable part of its course.

At suitable points upon the frames 1 and 2, I have provided drip or drain boards 36, 37, 38, which may be rendered removable, if desired, as by being mounted in suitable slides. These boards receive the liquid draining from rolls above them and direct the same into the vat or tank 5. Upon the spacing bars 4, I loosely mount a series of spaced, guiding rollers 39, between which the textile is directed as hereinafter more fully set forth.

While I may provide any suitable means for tensioning the textile material during its course into and through the vat, I preferably provide means to vary the tension thereof both at the in-take and at the out-take points, thus controlling the tension of the fabric throughout its entire course. This result I have preferably accomplished by providing each end of the master feeding roller 14 with a flaring portion 39′, of any desired lengths, those indicated in Figs. 2 and 3 having been found to give excellent results. Said flaring ends are herein shown as of different lengths, to which construction I am not, however, limited. The angularity of its flared portions may be varied as desired, but it is preferably such that the diameter of the roller 14 at each end 40 is substantially greater than the diameter of the cylindrical portion thereof. From each end 40 inward to substantially the points 41, 41, the diameter of the roll decreases as indicated. The length of each flaring portion of the roller 14 preferably substantially equals respectively the width of the squeeze rolls 24, 25, and while the latter may be cylindrical and the rubber surfaces thereof may contact throughout with the flared surfaces 39′, I may, if desired, correspondingly and reversely taper the said squeeze rolls 24 and 25. Preferably, the flare of the ends of the feeding roller 14 is slight, and is somewhat exaggerated in Fig. 2.

The textile material, preferably in the form of yarn or a fabric in rope condition, is introduced between the squeeze roll 24 and the adjacent tapered end of the feeding roller 14 through any suitable guide. For this purpose, I have, in Figs. 2 and 3, indicated a pot eye 42 having a yokelike supporting member 43, supported with capacity for longitudinal movement in bearings 44, 44, one arm of said member being threaded and receiving thereon a hand nut 45 whereby the position of the pot eye may be varied or adjusted. At the opposite end of the feeding roller 14 and adjacent the squeeze roll 25, I provide a similar pot eye 46 having a yokelike member 47, likewise supported in bearings 48, 48, one arm of said member being threaded and receiving thereon a hand nut 49 whereby the position of this pot eye may also be varied or adjusted. In this manner, both the in-take end of the fabric and the out-take end thereof, or either, may be adjusted along the flared portions of the feeding roller 14, with the consequent diminution or increase in speed of the in-take end and the out-take end thereof, or of either, according to the direction of adjustment. Obviously, I may, if desired, employ automatic means to effect suitable adjustment of the said pot-eyes, controlled by the tension upon the fabric at selected portions of its course, but for simplicity of construction, I prefer to employ manually

adjustable means. In this manner, the tension of the textile material, both at the intake end and the out-take end may be varied, and consequently the tension throughout the entire course thereof may be varied or controlled.

The textile material in any suitable form is introduced through the pot-eye 42 as described and passes between the squeeze-roll 24 and the adjacent end of the feeding roller 14. It may then be directly passed once about the feeding roller 14, but preferably it is passed directly downward substantially vertically, as indicated in Fig. 1, about the liquid circulating roll 6, is then passed directly and vertically upward and about the roller 31, thence directly and vertically downward about the liquid circulating roll 7, and thence directly and vertically upward and again about the feeding roll 14 at a point slightly spaced from its first contact therewith. The material is then passed through the described circuit repeatedly, the various courses of the material being separated from each other by the guide rollers 39. Finally, the material is discharged from the washing machine between the squeeze roll 25 and the adjacent tapered end of the feeding roller 14.

It will be observed that the apparatus is provided with a single positively driven roller, namely, the feeding roller 14, which constitutes a master roller controlling and determining the passage of the material throughout the apparatus. All the other rollers are driven by draft of the material, and thus no undue tension is imparted to the material, and the tension may be very accurately controlled throughout the entire course thereof. The roller 31, positioned, as it is, directly between and at a considerable elevation above the liquid circulating rolls 6 and 7, reverses the tensioning of the material that occurs when the latter is passed about the liquid circulating rolls 6 and 7. In other words, by passing the material up and over the roller 31, that portion of the material under treatment which was outside in passing around the roll 6 becomes inside on the roller 31, and thus the outer and inner parts of the material become at intervals returned to their normal relations without undue stretching of one portion with respect to the other throughout the entire operation. Conversely, the portion of the material which was outside in passing around the roller 31 becomes the inside when it passes about the roll 7, and thus the stretch is again reversed.

Inasmuch as the roller 31 may be adjusted at either or both ends thereof, it becomes a tensioning roller to impart a direct stretching action to the material as well as to reverse the tension thereof, as previously stated. Moreover, by positioning the roller 31 at a considerable height above the circulating rolls 6 and 7, and preferably outside of the tank or vat 5, I obtain a long stretching zone between the said roller 31 and the liquid circulating rolls 6 and 7. Furthermore, by locating the said tensioning roller 31, substantially centrally between the sides of the washing machine and also substantially as indicated beneath the feeding roll 14, I obtain a balanced condition of the textile material as it passes through the apparatus.

Because of the vertical course taken by the fabric in passing from roller to roller, I obtain great compactness of construction, and because of the fact that the material is subjected to a vertical and prolonged stretch between the roller 31 and the circulating rolls 6 and 7, I get a more effective return of the fibers to their normal condition than would be possible were the said roller 31 located in substantially close proximity to the liquid circulating rolls 6 and 7.

Preferably I provide a roller immediately overlying and coöperating with the tensioning roller 31. In Figs. 1 and 2 I have, for this purpose, represented a roller 50 mounted in prolongations of the yoke 32 for the roller 31. Mounted in the upper ends of the yoke arms 32 are bearings 51 wherein the coöperating roller 50 is mounted to be rotated by the fabric. The material is passed between the rollers 31 and 50 so that the liquid is thereby expelled partially or wholly therefrom. It will be observed that the rollers 31 and 50 are adjusted as a unit at one or both ends. The said roller 50 may be of any desired size and may be of greater diameter than the roller 31. Furthermore, it will be observed that the material after passing about the liquid circulating rolls 6 and 7, passes directly over the master or feeding roller 14, and thus is subjected to an effective squeezing action between it and the rider roll 29, so that the washing or rinsing liquid is effectively expelled therefrom periodically, and the material is again intermittently subjected thereto in its passage about the circulating rolls 6 and 7. If desired, and as represented in Fig. 4, I may employ the roll 31, mounted as indicated in Fig. 1 or in any other suitable manner, and omit the overlying roll 50.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims:

1. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, and a plurality of rolls located within the tank

and about each of which the material passes, said rolls being loosely mounted and rotated only by draft of the material, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to the other in a continuous circuit about said roller and rolls.

2. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, and a plurality of loosely mounted, liquid circulating rolls located within the tank and about which the material passes and which are rotated only by the draft of the material, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to the other in a continuous circuit about said roller and rolls.

3. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, a pair of spaced, loosely mounted rolls located within the tank and about each of which the material passes and a loosely mounted adjustable and tension reversing roller located above and between said pair of rolls, said rolls and tensioning roller being rotated only by the draft of the material, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to the other in a continuous circuit about said roller and rolls.

4. A washing or rinsing apparatus comprising, in combination, a tank, a master feeding roller located above the tank, a pair of spaced, loosely mounted, liquid circulating rolls located within the tank and about each of which the material passes, a loosely mounted roller located above the tank and between said liquid circulating rolls, and means vertically to adjust either or both ends of said roller, thereby to vary and control the tension upon the material.

5. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, means positively to rotate the same, and a set of loosely mounted rolls within the tank, said rolls each having spaced, longitudinal bars shaped to circulate the liquid through the rolls in either direction of rotation thereof, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to the other in a continuous circuit about said roller and rolls.

6. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, means positively to rotate the same, a set of loosely mounted rolls within the tank, said rolls each having spaced, longitudinal bars shaped to circulate the liquid through the rolls in either direction of rotation thereof, and a loosely mounted adjustable reversing roller located above and between said liquid circulating rolls, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to the other in a continuous circuit about said roller and rolls.

7. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, means positively to rotate the same, a pair of loosely mounted, liquid circulating rolls mounted within the tank adjacent opposite sides thereof, and a loosely mounted reversing roller located between and above said liquid circulating rolls and substantially mid-distance between said sides of the tank, said liquid circulating rolls and said reversing roller being rotated only by draft of the material thereabout, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to the other in a continuous circuit about said roller and rolls.

8. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank and having material receiving portions of different diameter, means positively to rotate said roller, a rider roll peripherally engaging said master roller above and at one side of the axis of the latter, and one or more squeeze rolls peripherally contacting with said master roller above and at the other side of the axis thereof.

9. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, means positively to rotate said roller, a rider roll peripherally engaging said master roller above and at one side of the axis of the latter, and in-take and out-take squeeze rolls peripherally contacting with said master roll above and at the other side of the axis thereof and at opposite ends of said roller.

10. A washing or rinsing apparatus comprising in combination a tank, a master feeding roller located above the tank, means positively to rotate said roller, a rider roll peripherally engaging said master roller above and at one side of the axis of the latter, and in-take and out-take squeeze rolls peripherally contacting with said master roll above and at the other side of the axis thereof and at opposite ends of said roller, and a freely rotating shaft whereon said squeeze rolls are mounted, one of said rolls being fast and the other loose thereon.

11. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, means positively to rotate the same, a pair of loosely mounted, liquid circulating rolls mounted within the tank adjacent opposite sides thereof, and a loosely mounted revers-

ing roller located between and above said liquid circulating rolls and substantially mid-distance between said sides of the tank, said liquid circulating rolls and said reversing roller being rotated only by draft of the material thereabout, and a series of spaced, guiding rolls between said liquid circulating rolls and said stretch reversing roller and mounted transversely thereto.

12. A washing or rinsing apparatus comprising in combination a feeding roller having a flared end and a squeeze roll peripherally contacting with said flared end.

13. A washing or rinsing apparatus comprising in combination a feeding roller having an end portion of its peripheral surface at an inclination to the main portion of said surface, and a squeeze roll peripherally contacting with said inclined end.

14. A washing or rinsing apparatus comprising in combination a feeding roller having both ends inclined and in-take and out-take squeeze rolls peripherally contacting with said inclined ends.

15. A washing or rinsing apparatus comprising in combination a feeding roller having both ends flared, and in-take and out-take squeeze rolls peripherally contacting with said flared ends.

16. A washing or rinsing apparatus comprising a substantially cylindrical feeding roller having at least one end provided with an inclined portion.

17. A washing or rinsing apparatus comprising in combination a substantially cylindrical feeding roller having at least one end provided with an inclined portion, a squeeze roll or rolls coöperating with said inclined portion or portions, and a guide or guides to introduce the material between said squeeze roll or rolls and the inclined portion or portions of said feeding roller.

18. A washing or rinsing apparatus comprising in combination a substantially cylindrical feeding roller having an inclined end, a squeeze roll peripherally contacting with said inclined end, and a guide to introduce material between said inclined end and said squeeze roll, said guide being adjustable along said inclined end.

19. A washing or rinsing apparatus comprising in combination, a substantially cylindrical feeding roller having a flared end, a squeeze roll contacting with said flared end, and a guide adjustable along said flared portion, longitudinally of the feeding roller.

20. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, means to rotate the same, a plurality of loosely mounted rolls within the tank, and a pair of coöperating rolls located above and between the tank rolls, with means for adjusting said coöperating rolls as a unit, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to another thereof in a continuous circuit about said roller and rolls.

21. A washing or rinsing apparatus comprising in combination, a tank, a master feeding roller located above the tank, means positively to rotate the same, a pair of loosely mounted liquid circulating rolls within the tank, and a pair of coöperating loosely mounted tension reversing rollers located above and between said liquid circulating rolls, said master feeding roller being relatively positioned to receive the material from one of said rolls and to return it to another thereof in a continuous circuit about said roller and rolls.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ISAAC E. PALMER.

Witnesses:
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CHARLES M. SAUER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."