Nov. 21, 1950 O. S. VIGERUST 2,530,494

FLATWORK WASHER

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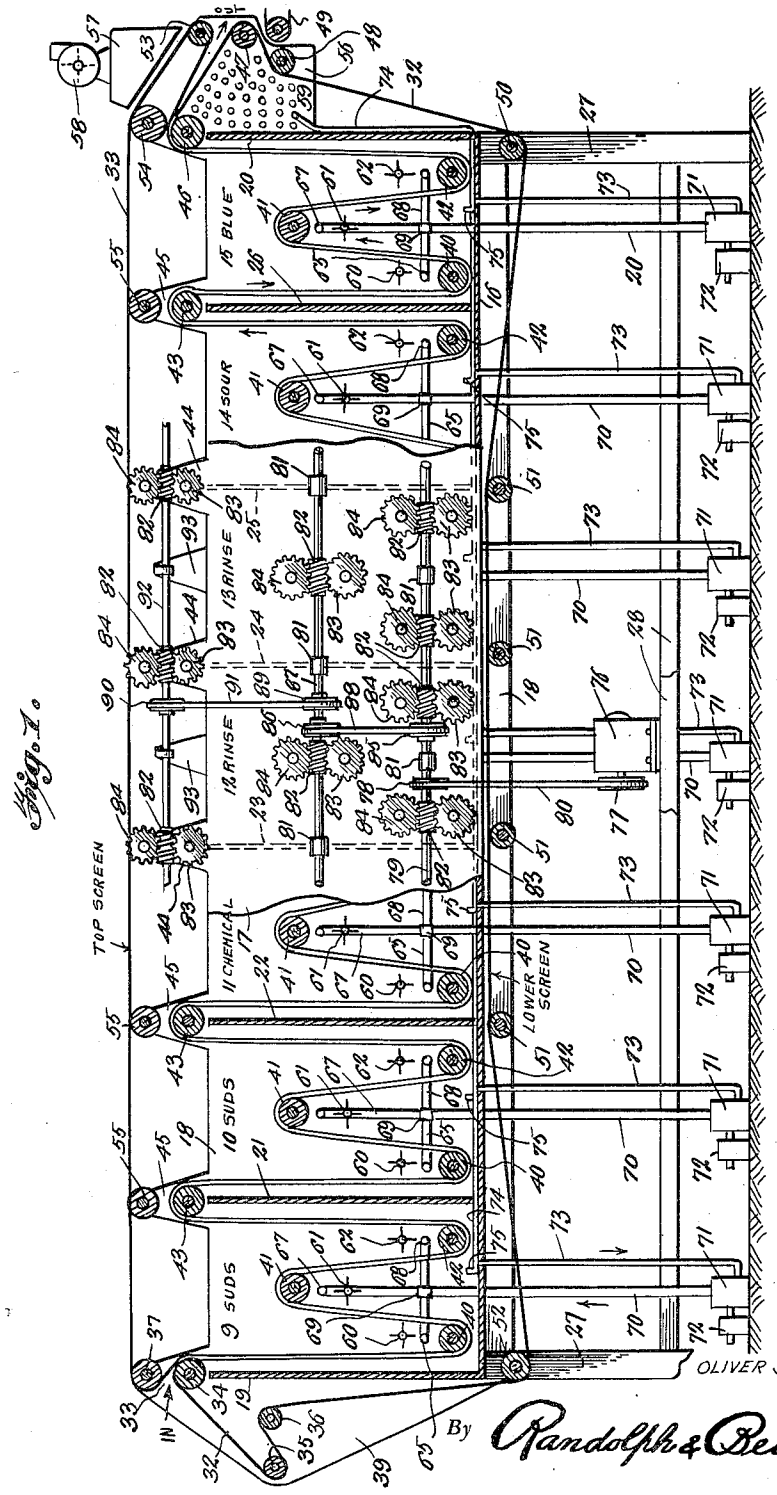


Fig. 1.

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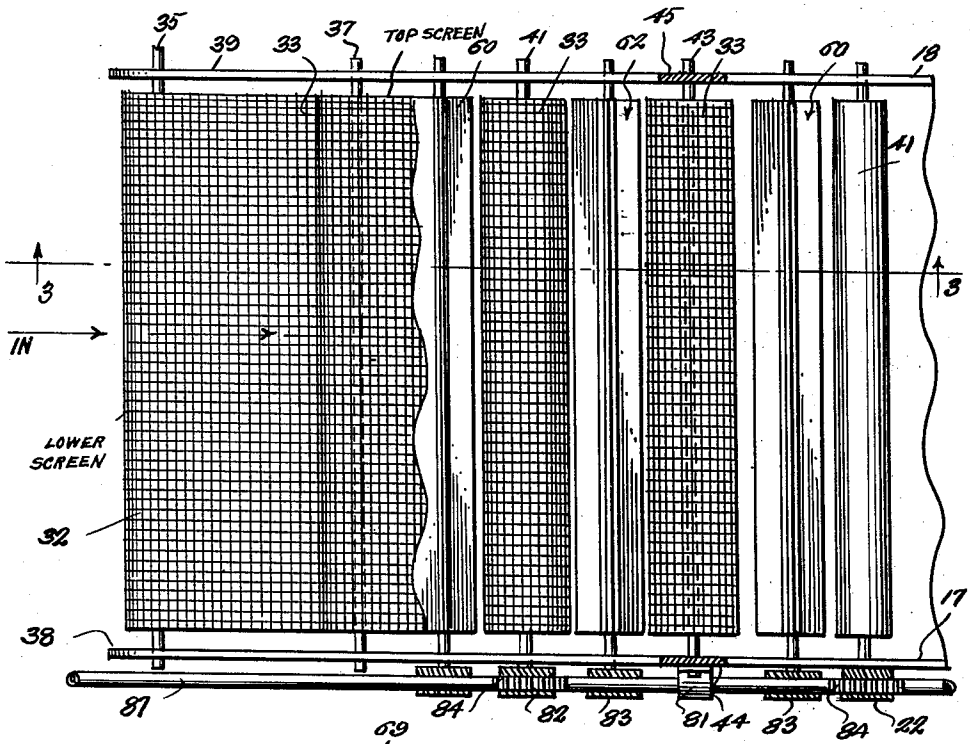
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FLATWORK WASHER

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Fig. 2.



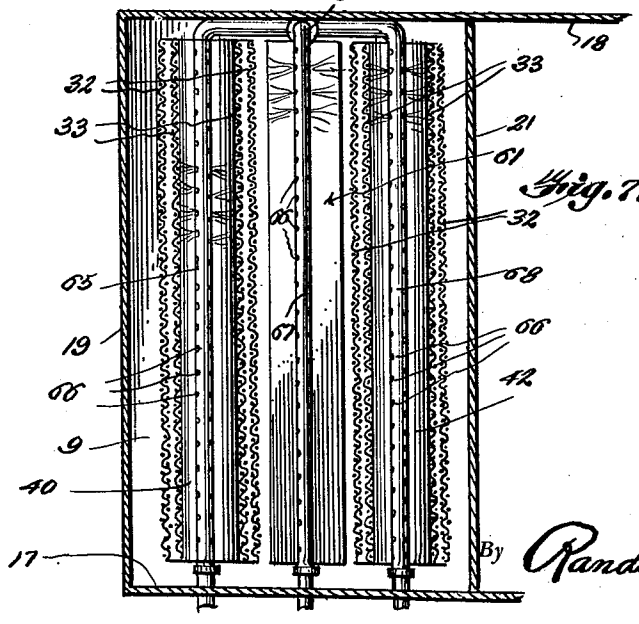


Fig. 7.

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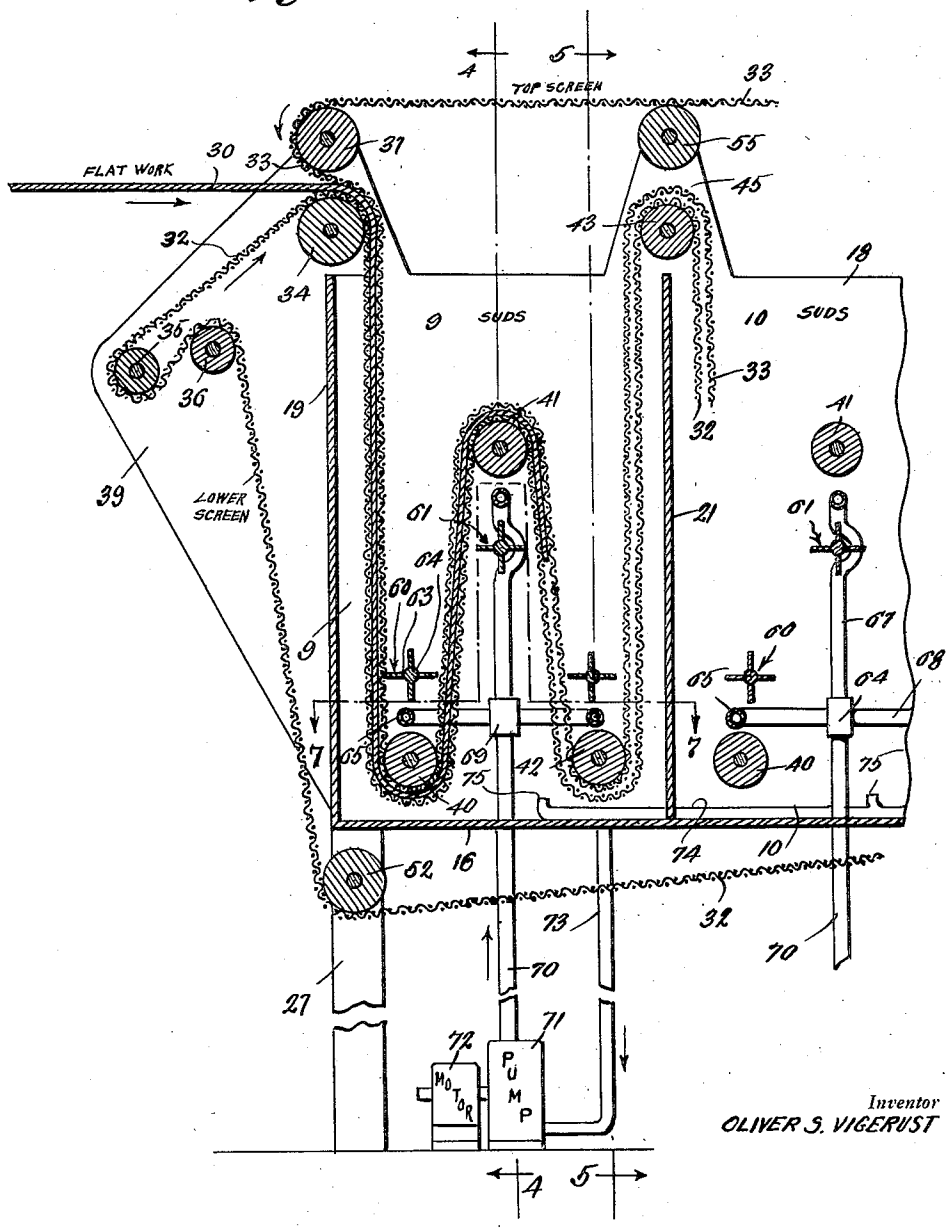
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Fig. 3.



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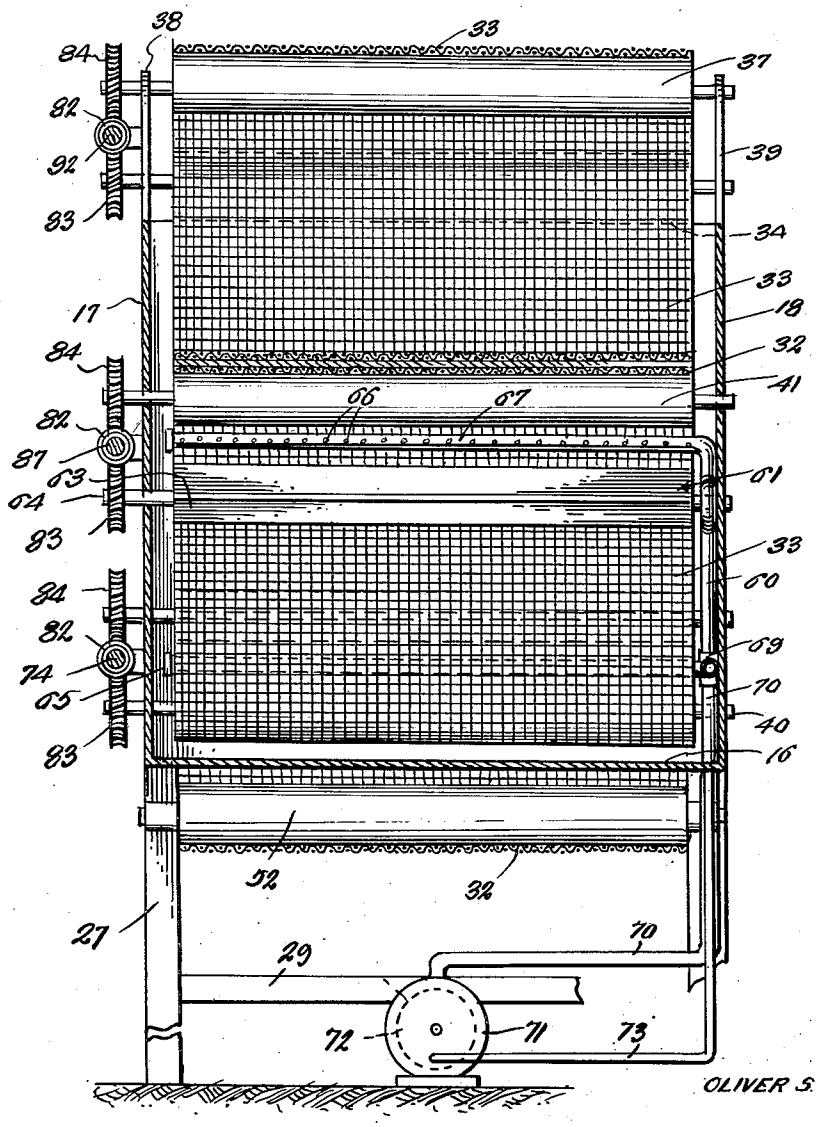
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Fig. 4.



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Fig. 5.

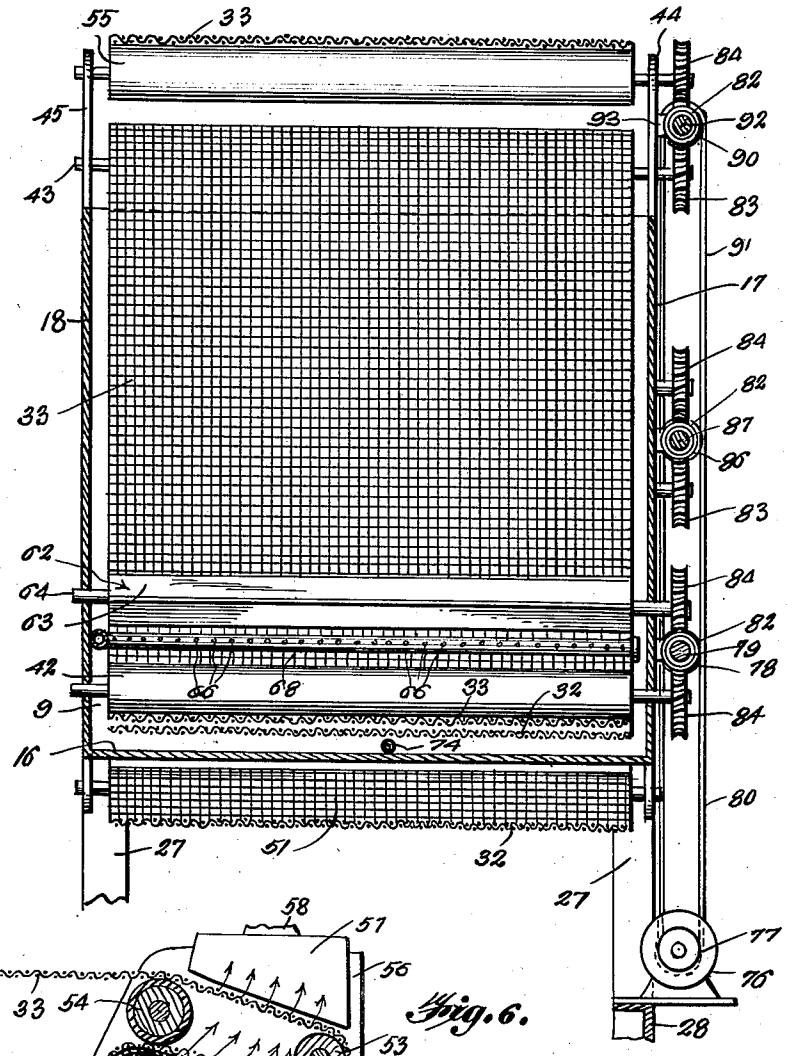
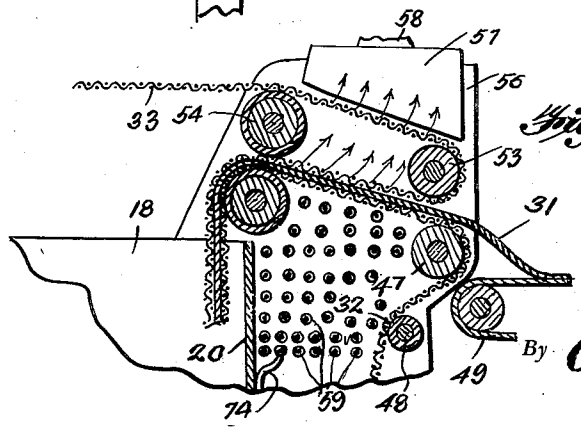


Fig. 6.



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Patented Nov. 21, 1950 2,530,494

UNITED STATES PATENT OFFICE

2,530,494

FLATWORK WASHER

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Application February 8, 1946, Serial No. 646,437

4 Claims. (Cl. 68—9)

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This invention relates generally to laundering machines and more particularly to a flat work washer in which foraminous endless belts are employed to move flat pieces of fabric such as sheets, towels and the like, automatically through a series of tanks for diverse washing treatments and thereafter through novel drying apparatus for discharge to a flat work ironer.

An object of the present invention is to provide new and improved means including agitators for increasing the effectiveness of the washing treatments applied to the fabrics.

Another object is to provide new and improved apparatus for conditioning the laundered fabrics for ironing prior to discharge thereof to the flat work ironer.

A further object is to provide new and improved means for controlling the temperature of the treating fluids.

An additional object is to provide a new and improved drive for the foraminous belts and the aforesaid agitators.

The foregoing and additional objects, advantages and features of the present invention will become more clearly apparent from the following detailed description of a preferred embodiment thereof, reference being had to the accompanying drawings in which—

Figure 1 is a view in elevation of the flat work washer with portions of the tanks being broken away to illustrate various features of construction;

Figure 2 is a plan view of the left hand end of the washer as viewed in Figure 1;

Figure 3 is a sectional view taken along the line 3—3 of Figure 2;

Figure 4 is a sectional view as viewed along the line 4—4 of Figure 3;

Figure 5 is a sectional view as seen along the line 5—5 of Figure 3;

Figure 6 is a somewhat enlarged fragmentary view of the right end portion of the washer as viewed in Figure 1; and

Figure 7 is a sectional view taken along the line 7—7 of Figure 3.

Referring now to the drawings and more particularly to Figure 1 thereof it will be seen that the washer comprises seven tanks generally designated 9 through 15 and forming a unitary structure having a bottom wall 16, side walls 17 and 18, end walls 19 and 20, and partitions 21 through 26. While the seven tanks are thus formed by partitioning the unitary tank, it will be understood that separate tanks may be employed, if desired. The unitary tank structure may be supported above ground level in any convenient manner such, for example, as by a supporting frame-work including post or upright members 27 and longitudinal bracing members 28 and 29 extending therebetween.

The flat work such as pieces 30 and 31 are conveyed through tanks 9 to 15 between a pair of endless foraminous belts 32 and 33. The belts

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may be formed of any suitable material for the purpose such, for example, as wire mesh. The belts are caused to move together through the tanks on the same rollers therein, the arrangement of the rollers being the same in all the tanks. Accordingly, it will suffice to describe only one of the tanks which may be identical in all other details as well.

Belts 32 and 33 enter tank 9 over a roller 34, belt 32 being fed thereto from rollers 35 and 36 and belt 33 being fed from roller 37, all of which rollers are supported for rotation between end brackets 38 and 39. The belts move along end wall 19 to the bottom of tank 9, thence around a roller 40 and diagonally upwardly to a roller 41 from whence the belts are passed diagonally downwardly and under a roller 42 at the bottom of tank 9 and thence upwardly along the partition 21 between tanks 9 and 10 and over a roller 43 into tank 10, rollers 40, 41 and 42 being supported for rotation between side walls 17 and 18 and roller 43 being supported for rotation between brackets 44 and 45 which may be secured to or formed integrally with the side walls 17 and 18 respectively, as is desired.

The belts pass over a roller 46 upon leaving tank 15, belt 32 being fed from roller 46 over rollers 47 and 48 adjacent the flat work ironer 49, upon which flat work piece 31 is being discharged, and thence over roller 50, a plurality of rollers 51 and roller 52 back to roller 36. Belt 33 is fed from roller 46 over rollers 53 and 54, and thence over a plurality of rollers 55 back to roller 37. Rollers 46, 47, 48, 53 and 54 are supported for rotation between a pair of end brackets 56 which also may serve to support a fan housing or canopy 57 and electric fan 58 for drawing heat from a plurality of steam coils 59 through the washed flat work after the same has passed between rollers 46 and 54 which are rubber covered and arranged in closely spaced relation so as to serve as wringers. Steam coils 59 also conveniently may be supported by end brackets 56.

Rollers 50 and 52 are conveniently journalled between supporting posts 27, rollers 51 are journalled between side walls 17 and 18, and rollers 55 are journalled for rotation between oppositely disposed brackets 44 and 45.

Each of tanks 9 through 15 has three rotary agitators 60, 61 and 62 mounted therein adjacent rollers 40, 41 and 42 respectively and supported for rotation by side walls 17 and 18. The agitators may be identical and preferably are formed with four blades 63 disposed equidistantly about a shaft 64 which is extended through side walls 17 and 18. Intermediate agitator 60 and roller 40 and co-extensive therewith is a pipe 65 having a plurality of ports or nozzles 66 therein disposed at predetermined intervals along the length thereof. Similar pipes 67 and 68 are interposed between roller 41 and agitator 61 and between roller 42 and agitator 62 respectively pipes 65, 67 and 68 have bended portions which

are joined by a union 69. The union in turn is connected to a pipe 70 which leads through the tank individual thereto to a fluid pump 71 adapted to be driven by an electric motor 72. The fluid pumped upwardly through pipe 70 and thence discharged through the nozzles 66 in pipes 65, 67 and 68 is returned to the pump through a pipe 73 which interconnects the tank individual thereto and its associated pump.

The water and detergent which collects at the bottom of the tanks conveniently may be heated to desired temperature by passing steam thereinto from a steam pipe 74 connected to the steam coils 29 and extended along the bottom of the tanks, the pipe having a plurality of suitable steam outlets 75 therein individual to the several tanks.

The rollers and agitators are driven synchronously from an electric motor 76 supported on a support member 28, the motor being provided with a driving pulley 77 which is adapted to drive a similar pulley 78 carried on a shaft 79 by reason of the endless belt 80 trained therebetween. Shaft 79 is journalled in suitable brackets 81 supported on side wall 17 and has a plurality of worms 82 secured thereto for rotation therewith. Worms 82 are so mounted as to mesh with worm gears 83 and 84 secured for rotation with either of roller 40 and agitator 60 or roller 42 and agitator 62 respectively.

Shaft 79 also carries a pulley 85 which drives a similar pulley 86 carried on a shaft 87 by means of the endless belt 88 trained therebetween. Shaft 87 and its journal supports may be identical to those of shaft 79. Likewise, the worms mounted thereon and the worm gears driven thereby may be identical to those associated with shaft 79, the worm gears 83 and 84 driven by shaft 87, however, being employed to drive rollers 41 and agitators 61.

Shaft 87 also carries a pulley 89 which drives a similar pulley 90 by means of an endless belt 91. Pulley 90 is carried by a shaft 92 which is journalled in brackets 93 supported on side wall 17. Shaft 92 also carries a plurality of worms 82 for driving worm gears 83 and 84 individual thereto and secured to corresponding rollers 43 and 55.

If desired, the foregoing driving connections for the rollers and agitators may be provided on both sides of the washer. Moreover, if desired, motors 72 may be dispensed with and pumps 71 driven from shaft 79 as by belt and pulley connections extended therebetween.

From the foregoing the operation of the washer should be obvious, it being understood the several tanks may be used for applying different washing treatments to the flatwork passed therethrough. For example, tanks 9 and 10 might contain suds, tank 11 suds and bleach, tank 12 first rinse, tank 13 second rinse, tank 14 sour bath and tank 15 blue bath. In each tank the detergent is forced by pump through the flatwork as it passes the nozzles 66 and the agitators keep the water stirring thereby creating a whirlpool which keeps the soil and detergent in motion.

It should now be apparent that a flatwork washer has been provided which is well adapted to fulfill the aforestated objects of the invention. Moreover, while a preferred embodiment of the invention has been disclosed in particularity, it will be understood that various additional embodiments may be resorted to without departing from the spirit and scope of the invention as defined by the appended claims.

I claim as my invention:

1. In a flatwork washer of the character disclosed, the combination of a plurality of tanks adapted to contain liquid, a pair of endless foraminous belts adapted to be passed progressively through the tanks with flatwork pieces carried therebetween, a plurality of nozzles in each tank and disposed adjacent said belts therein, a detergent in each tank and means for forcing the detergent through said nozzles and onto the flatwork pieces carried by the belts, a plurality of rotary agitators in each tank and arranged adjacent to said nozzles therein, a plurality of rollers in each of said tanks for directing the belts in a predetermined path therethrough adjacent said nozzles and agitators therein, said rollers and agitators being grouped in pairs, a pair of worm gears secured to each adjacent pair of rollers and agitators, a drive shaft, a plurality of worms carried by said shaft, each of the worms being disposed between and in mesh with a pair of worm gears, and means for driving the shaft.

2. In a flatwork washer of the character disclosed, the combination of a plurality of tanks adapted to contain liquid, a pair of endless foraminous belts being adapted to be passed progressively through the tanks with flatwork pieces carried therebetween, a plurality of nozzles in each tank and disposed adjacent said belts therein, a detergent in each tank and means for forcing the detergent through said nozzles and onto the flatwork pieces carried by the belts, a plurality of rotary agitators in each tank and arranged adjacent to said nozzles therein, a plurality of rollers in each of said tanks for conveying the belts together therethrough and disposed therein so as to cause the belts to traverse a substantially W-shaped path in each tank, one of said nozzles being disposed in the vertex of each V of the W-shaped path, one of said rotary agitators being disposed adjacent each nozzle in the V of each W-shaped path, and means for driving said rollers and agitators from a common source of power therefor.

3. A washer as in claim 2, said nozzles each being disposed between a roller and agitator which, in combination with the adjacently disposed portions of the belts and flatwork piece, carried thereby, forms a substantially enclosed space into which the nozzles discharge.

4. A washer as in claim 2, said driving means including a shaft having worms keyed thereto, said rollers and agitators having worm gears, and the worm gears, connected to the adjacently disposed rollers and agitators, being disposed in spaced, adjacent relationship to accommodate one of the worms therebetween and with which said worm gears are enmeshed.

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