This invention relates to improvements in washing machines, particularly what is known as slack washing machines.

The object is the production of a washing machine which is especially efficient in washing in either cold water, or hot water, or soapy water, or any kind of liquid, towels, cloth of any description, or textile fabrics of any kind, after such fabrics have been bleached, dyed, or processed in any way.

A second object of the invention is the production of a machine in which a chain or length of toweling, or towels, or cloth or fabric of any kind is suspended and conveyed through the washer, and thoroughly cleansed therein, the textile fabric passing through the washer, after being previously washed or bleached or processed in any way, at a good rate of speed while the machine is continuously in operation.

In slack washing machines of the usual construction, there is a tendency of those parts of the fabric resting loosely in the water of the vat to float and tangle up, causing the machine to hang up or stop, and tearing or damaging the goods.

Such accidents are specially troublesome when hot water is used, as it is then impracticable to promptly disentangle the goods by hand; and for this reason it has been frequently found preferable to use a depth of water in the machine that is insufficient to permit the proper soaking and washing of the material therein.

My invention is intended to remedy these and other disadvantages, and to provide a machine that will be speedy, efficient, and economical in use.

My invention will be more fully understood after reference to the accompanying drawings in which like parts are indicated by similar reference symbols throughout the several views, and in which:

Figure 1 is a plan view of the complete apparatus, parts being broken away.

Figure 2 is a front elevation of the machine as seen from the bottom of Figure 1.

Figure 3 shows an end view of the machine as seen from the right of Figures 1 and 2.

Figure 4 shows a section along the line 4—4 of Figure 1, and looking in the direction of the arrows.

Figure 5 shows a horizontal section along the line 5—5 of Figure 2, and looking downward.

Figure 6 shows a vertical section along the line 6—6 of Figure 1, and looking in the direction of the arrows.

A represents a tank or vat which may be made of metal or wood, but which is shown as of wood, and is preferably approximately quadrantal in cross section as shown in Figure 4, so that the bottom wall A' provides a curved surface for the fabric to slide upon more readily. The front wall A of the tank is preferably vertical as shown in Figure 4. The end walls A' and A'' are also preferably vertical as shown in Figure 6. Secured transversely of the vat are a number of vertical partitions B, which may be either straight across the vat, but are preferably set diagonally or in a substantial spiral form as shown in Figures 4, 5 and 6. These partitions B are cut at b and b' to form openings B', so that the partitions may communicate above the line b. These partitions may be provided at the base with one or more openings b' to permit the liquid to flow from one chamber to another, and also to permit the tank to be thoroughly drained when desired.

The vat may be supported by the end walls A' and A'', or other suitable support may be provided therefor.

At one end of the vat, I provide a bracket C, which carries the bearing G' for the drive shaft D, the other bearing D' of which is carried by the end wall A of the vat.

The shaft D carries the pulley D', which is driven by the belt E from an electric motor or other convenient source of power. The gear F meshes with the gear G which is fast on the shaft G' carrying the reel H, on which the fabric is supported, as will be hereinafter described. The opposite end of the shaft G' carries a pulley G'' on which the belt I engages, which belt passes over the pulley J on the shaft J' of the squeeze roller J above which is mounted the upper squeeze roller J'', which is turned by the friction of the fabric passing between the two squeeze rollers, as will be hereinafter described. The shaft D carries a pulley D', which engages a belt K passing over the squeeze roller M for the final wringing of the fabric. The upper squeeze roller M' is turned by friction of the fabric as will be hereinafter described. In order to guide the fabric, I provide a guide bar N shown in Figures 4, 5 and 6, which extends length-wise of the vat and is provided with a number of pegs n. This guide bar is in
substantial alignment with the squeeze roller J2 and J3. The vat is provided with a plate P perforated as at P2, shown in Figure 2, through which the material is supplied to the washer, and at the other end it is provided with a similar plate P3 perforated as at P3 through which the material is passed as it leaves the machine. The last chamber formed by the end wall and the last partition of the machine is surmounted by a guide roller Q for delivering the fabric to the squeeze rollers or wringer M and M'. This guide roller Q is mounted in the brackets Q', see Figures 1 and 5.

The washing solution may be supplied to the vat in any convenient way by a suitable pipe R, see Figure 3, and may be drained off, and the tank may be drained through the pipe S closed by the valve S', see Figure 2. In order to heat the water in the vat, steam may be supplied through the pipe T, controlled by the valve T'. Fresh water may be supplied to the fabric as it is drawn out of the washing solution, through the perforated pipe U, which is perforated at u, see Figure 1. This pipe U is mounted in brackets V and V' carried by the frame of the machine, and the pipe is preferably tilted slightly so as to adjust the flow of fresh water through the perforations u.

Having thus described the construction of the parts, the operation of the device is as follows:

Assuming the drive shaft D to be rotating and the vat to be supplied to the right depth with the washing fluid, soapy water, cold or hot, or whatever it may be, the free end of the fabric, toweling or other material is fed between the rotating squeeze rolls J2 and J3, which serve to feed it to the reel H. The free end of the strip is passed over the reel, and, as the reel rotates, this strip is carried to the first chamber of the vat at the left of the first partition shown in Figure 1. The free end is drawn from this chamber between the corresponding pegs n of the bar N, and passes again through the squeeze rolls J2 and J3, and goes back above the reel again, and then down into the next chamber of the vat between the first two partitions, and so on continuously.

As the end of the strip reaches the last compartment of the vat, it is drawn over the guide roller Q and sent to the squeeze rolls M and M', where it is wrung nearly dry.

As the strip passes through the machine, it is apt to pile up in the various compartments of the vat, and the accumulated material in these compartments is thus thoroughly soaked before passing over the reel again.

After each soaking operation, it passes again through the squeeze rolls J2 and J3, and finally, is subjected to a final wringing through the squeeze rolls M and M'. The cleansing effect of these squeeze rolls J2 and J3 may be supplemented by spraying clear water or other liquid on the fabric through the pipe U; thus a rinsing effect may be obtained at each passage of the strip through the squeeze rolls J2 and J3.

By having the partitions B provided in the vat separating the vat into a number of communicating compartments, any serious trouble with the tangling up or the lapping of the material in the machine is avoided; for, should such difficulty occur, it will occur in only one compartment, and may readily be taken care of in that compartment without disturbing the goods in the other compartments. This is especially desirable where hot water is used, it then being difficult to manipulate the tangled lengths of the fabric without scalding the hands.

While I have shown the partitions in the vat as set at an acute angle to the axis of the reel, these partitions may be set at right angles to the reel if it is desired; but it is preferable to set same at an acute angle as shown, to facilitate the feeding of the strip progressively to the reel.

If it is desired to heat the liquid in the vat, steam may be admitted through the pipe T.

The washing liquid may be supplied through any convenient pipe such as R, and the tank may be drained through any suitable drain pipe S, see Figures 3 and 4.

It will be seen that after the first strip of material has been fed to the machine in the slackened condition just referred to, other strips may be attached to the end of the first, and the operation of the device may be continued indefinitely.

While I have shown one embodiment of the invention in its preferred form, it will be obvious that various changes might be made in the construction, combination, and arrangement of parts, which can be used without departing from the spirit of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. A slack washing machine comprising a vat provided with a plurality of transversely disposed partitions separating said vat into a series of compartments, adapted to receive the strips of fabric, with passages for permitting the washing fluid to flow from one compartment to the next, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a wringer provided with rollers for drawing said fabric from the last compartment and wringing same, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

2. A slack washing machine comprising a vat provided with a plurality of transversely disposed partitions separating said vat into a series of compartments, adapted to receive
the strips of fabrics, with passages for permitting the washing fluid to flow from one compartment to the next, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a bar provided with guide teeth for guiding the fabric from said compartments to said rollers, a wringer provided with rollers for drawing said fabric from the last compartment and wringing same, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

3. A slack washing machine comprising a vat provided with a plurality of transversely disposed partitions separating said vat into a series of compartments, adapted to receive the strips of fabrics, with passages for permitting the washing fluid to flow from one compartment to the next, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a bar provided with guide teeth for guiding the fabric from said compartments to said rollers, a perforated pipe parallel to said rollers for supplying rinsing fluid to the fabric after it passes said guide teeth, a wringer provided with rollers for drawing said fabric from the last compartment and wringing same, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

4. A slack washing machine comprising a vat provided with a plurality of axially inclined partitions separating said vat into a series of compartments provided with fluid passages connecting adjacent compartments, adapted to receive the strips of fabrics, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a wringer provided with rollers for drawing said fabric from the last compartment and wringing same, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

5. A slack washing machine comprising a vat provided with a plurality of axially inclined partitions separating said vat into a series of compartments provided with fluid passages connecting adjacent compartments, adapted to receive the strips of fabrics, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a bar provided with guide teeth for guiding the fabric from said compartments to said rollers, a bar provided with guide teeth for guiding said fabric from said compartments to said rollers, a perforated pipe parallel to said rollers for supplying rinsing fluid to the fabric after it passes said guide teeth, a wringer provided with rollers for drawing said fabric from the last compartment and wringing same, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

6. A slack washing machine comprising a vat provided with a plurality of axially inclined partitions separating said vat into a series of compartments provided with fluid passages connecting adjacent compartments, adapted to receive the strips of fabrics, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a bar provided with guide teeth for guiding the fabric from said compartments to said rollers, a perforated pipe parallel to said rollers for supplying rinsing fluid to the fabric after it passes said guide teeth, a guide roller for guiding said fabric to said wringer, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

7. A slack washing machine comprising a vat provided with a plurality of transversely disposed partitions separating said vat into a series of compartments, adapted to receive the strips of fabrics, with passages for permitting the washing fluid to flow from one compartment to the next, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a bar provided with guide teeth for guiding the fabric from said compartments to said rollers, a perforated pipe parallel to said rollers for supplying rinsing fluid to the fabric after it passes said guide teeth, a guide roller for guiding said fabric to said wringer, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

8. A slack washing machine comprising a vat provided with a plurality of axially inclined partitions separating said vat into a series of compartments with fluid passages connecting adjacent compartments, adapted to receive the strips of fabrics, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a bar provided with guide teeth for guiding the fabric from said compartments to said rollers, a perforated pipe parallel to said rollers for supplying rinsing fluid to the fabric after it passes said guide teeth, a guide roller for guiding said fabric to said wringer, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

9. A slack washing machine comprising a vat provided with a plurality of transversely disposed partitions separating said vat into a series of compartments, adapted to receive the strips of fabrics, with passages for permitting the washing fluid to flow from one compartment to the next, a reel journaled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a perforated pipe par-
allel to said rollers for supplying rinsing fluid to the fabric, a wringer provided with rollers for drawing said fabric from the last compartment and wringing same, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

10. A slack washing machine comprising a vat provided with a plurality of axially inclined partitions separating said vat into a series of compartments, adapted to receive the strips of fabrics, with passages for permitting the washing fluid to flow from one compartment to the next, a reel journalled transversely of said compartments, combined feeding and squeezing rollers substantially parallel to said reel, a perforated pipe parallel to said rollers for supplying rinsing fluid to the fabric, a wringer provided with rollers for drawing said fabric from the last compartment and wringing same, and means for simultaneously rotating said reel, said squeeze rollers, and said wringer.

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