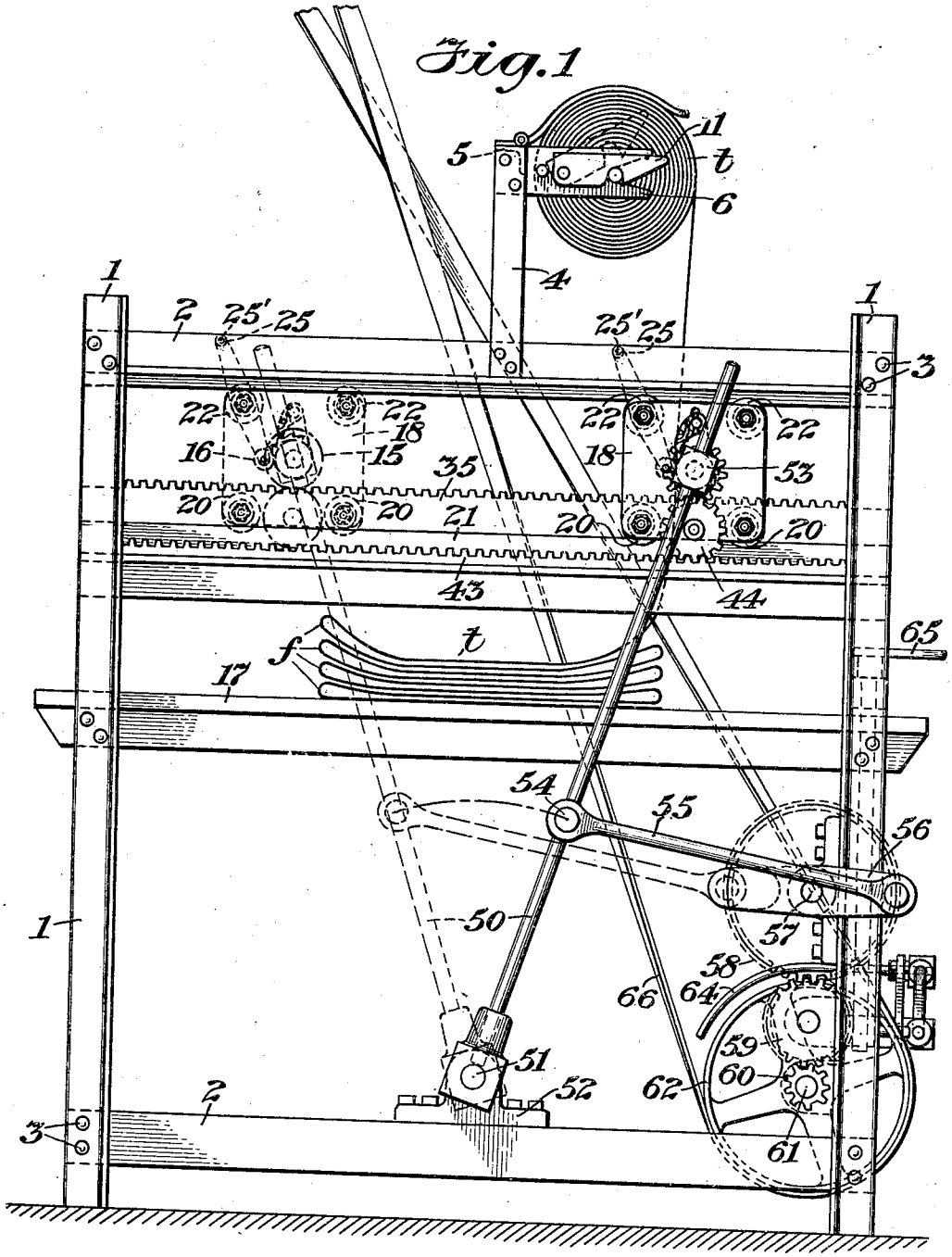
Sept. 15, 1931. J. H. ADDLER 1,823,078

TOWEL BUNDLING MACHINE

Filed Nov. 27, 1929 4 Sheets-Sheet 1

Fig. 1



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TOWEL BUNDLING MACHINE

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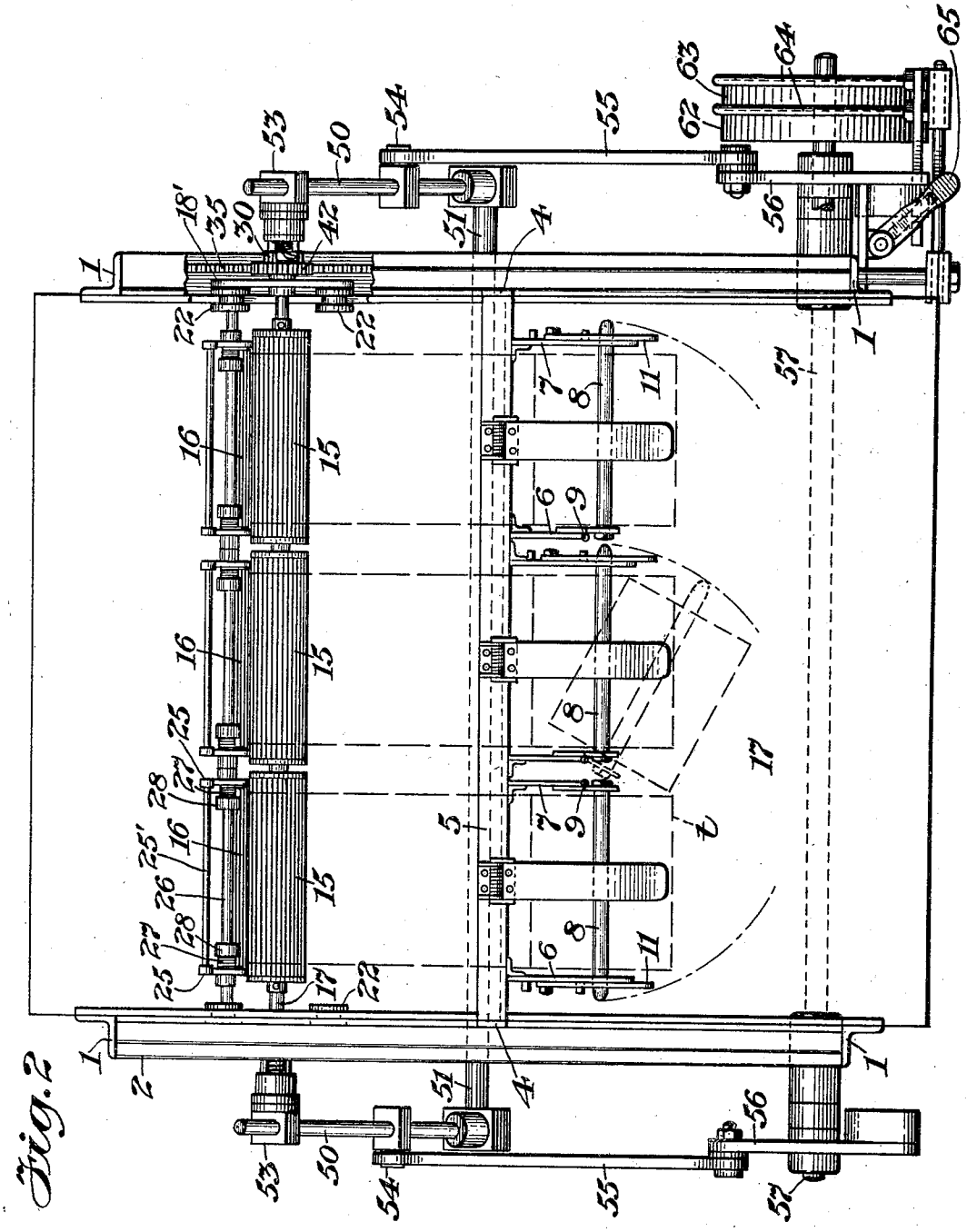


Fig. 2

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TOWEL BUNDLING MACHINE

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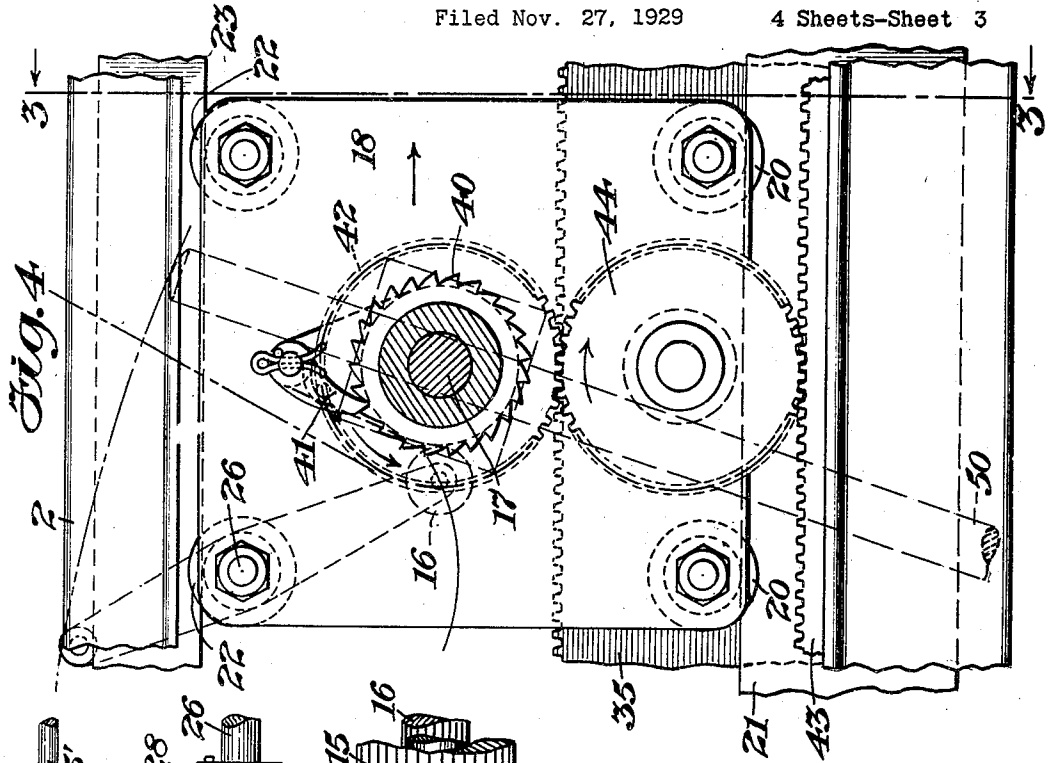


Fig. 4

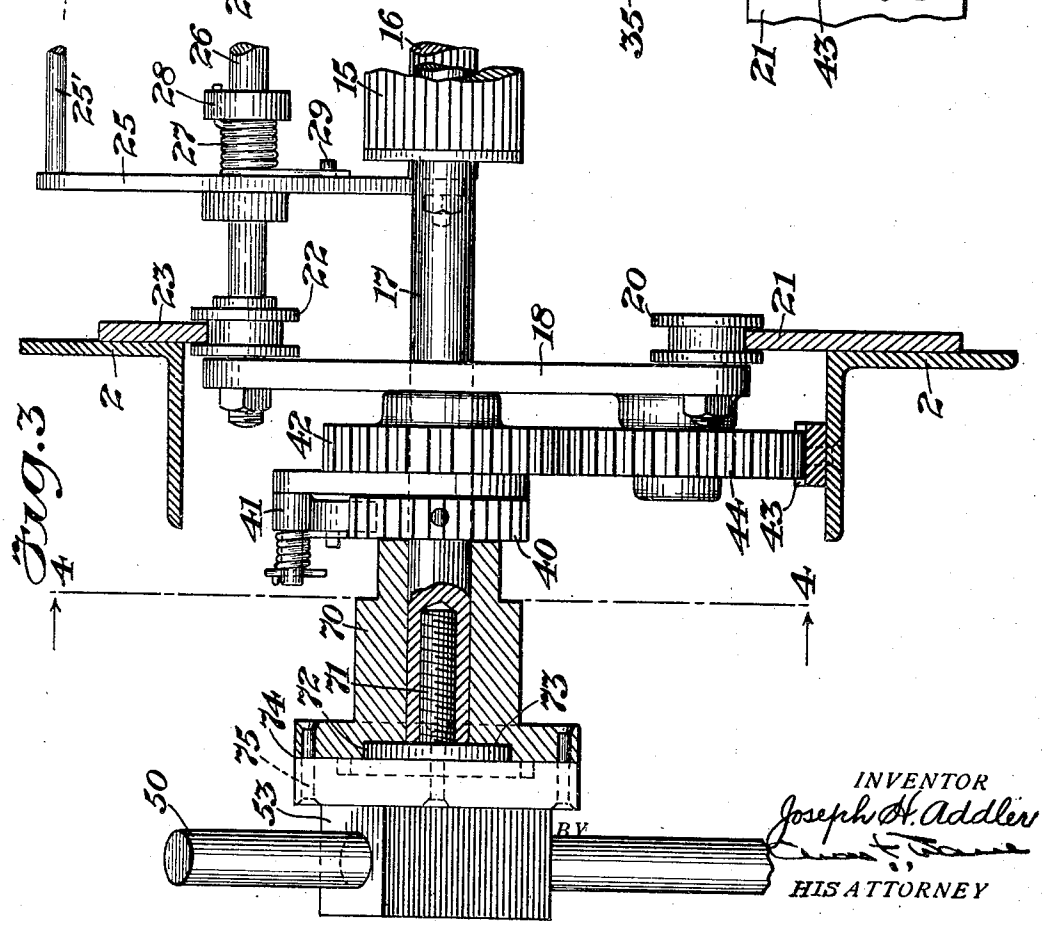


Fig. 3

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TOWEL BUNDLING MACHINE

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Fig. 5

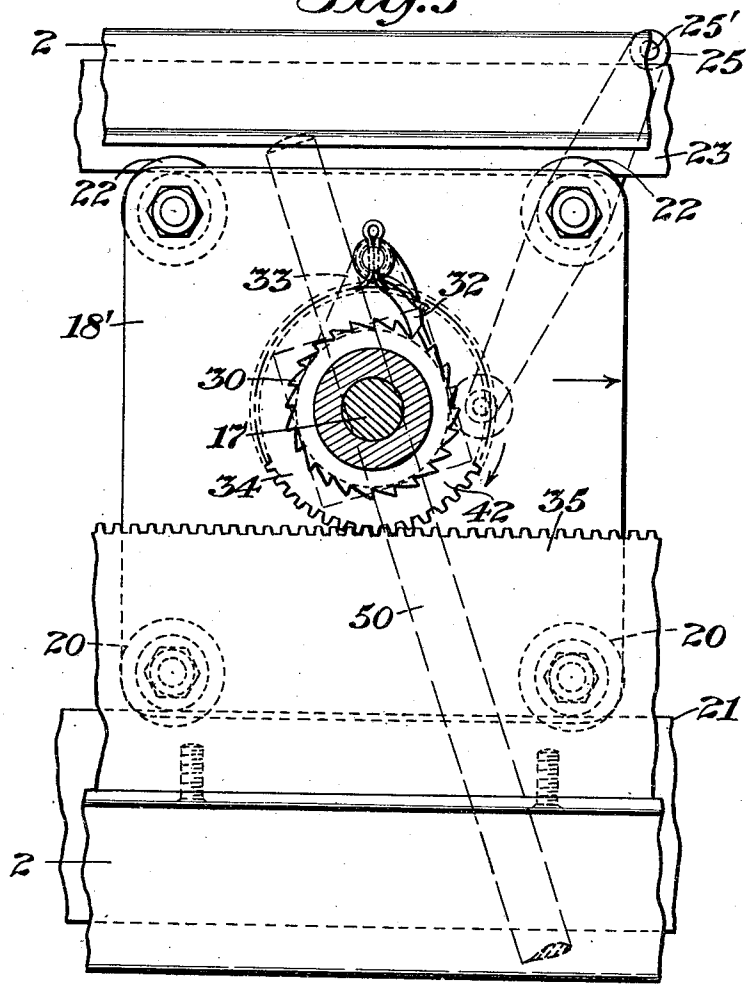


Fig. 6

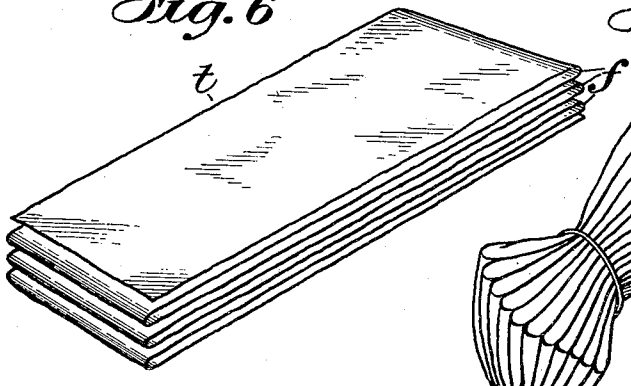
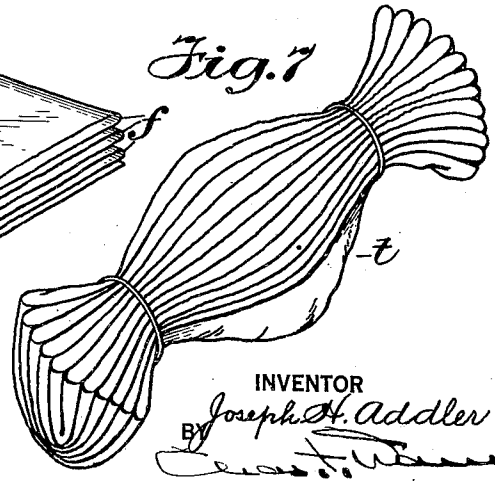


Fig. 7



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Patented Sept. 15, 1931 1,823,078

UNITED STATES PATENT OFFICE

JOSEPH H. ADDLER, OF BROOKLYN, NEW YORK, ASSIGNOR TO PULLCLEAN MANUFACTURING CORPORATION, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF DELAWARE

TOWEL BUNDLING MACHINE

Application filed November 27, 1929. Serial No. 410,131.

As well known, towels are made up in at least two different forms, one in short lengths for individual use, and another in long lengths which are rolled up and carried by a support of some kind, usually a cabinet, from which the towel is drawn in successive lengths as required for use by one or any number of persons.

In the washing of these towels, no particular trouble is experienced with the short ones for the reason that there is no necessity of folding these, and, consequently, the water or other washing liquid may readily pass or circulate in contact with their entire surface. It is quite different however with the long ones in roll form. With these it has been a practice to roll the same loosely and then tie them up in bundle form preparatory to the washing operation, in an effort to open up and separate the several folds or convolutions of the towel sufficiently to permit of a free flow or circulation of the washing water through all parts of the bundle. Such method of bundling the towel has not proven satisfactory however for the reason that the folds or convolutions of the towels, particularly adjacent the ends of the bundle, have a tendency to maintain a surface contact with each other sufficiently to prevent such a flow or circulation of the washing water between the same as is necessary for the thorough cleansing of the towel. Because of this, it has been the object of my present invention to provide a machine for so folding a towel, of the kind adapted to be used in roll form, that, when tied up in bundle form, the several layers or folds thereof will be maintained in a sufficiently separated condition as to permit of the free circulation of the washing water between the same and thereby assure the proper and thorough washing of the towel. This object I attain by the provision of a machine which is operative to take a roll of soiled towelling and pile the same upon a table or other suitable support in a series of reversely extending superimposed folds, which folds act to maintain the adjacent layers of the towelling in a somewhat separated condition, particularly at the ends thereof, so that when the pile is subsequently drawn or bunched up in a transverse direction and tied, the resulting bundle of towelling will be sufficiently open between the folds to permit of proper washing in the manner referred to.

Referring now to the accompanying drawings forming part of this specification,

Fig. 1 is an end elevation of a machine embodying one form of my invention, and showing the operation of the same in pulling a towel from a roll thereof and laying the same in reversely extending folds upon a table or support.

Fig. 2 is a top plan of the machine, with the towel pulling and positioning rolls at the front end of their stroke, corresponding in position with the dotted line position of Fig. 1.

Fig. 3 is an enlarged detail, in section and elevation, the section being on line 3—3 of Fig. 4, showing the travelling plate at that side of the machine illustrated in Fig. 1 in which is supported the adjacent end of the shaft which carries the towel pulling and folding rollers, together with the adjacent mechanism for imparting movement to the plate and also for imparting rotating movement to the rollers.

Fig. 4 is a sectional elevation taken on the line 4—4 of Fig. 3.

Fig. 5 is a view similar to Fig. 4, taken from the opposite side of the machine.

Fig. 6 is a perspective view of a towel folded by the machine, and

Fig. 7 is a view of the same after being bunched together transversely and tied up.

To explain in detail, the frame of the machine, which may be of any construction suitable for the purpose, is here shown as made up of angle-iron, and comprises four upright or corner posts 1 connected by horizontally extending cross-pieces, such as 2, the parts being secured together by suitable fastening means, such as the bolts or rivets 3.

At the upper side of the frame and adjacent the front thereof is a support for one or more rolls of towelling. This comprises two uprights 4, 4 on the opposite end frames, connected at their upper ends by a cross-bar 5. On this cross-bar, as best shown in

Figs. 1 and 2, are mounted three pairs of forwardly projecting bracket arms, each pair being indicated at 6 and 7. Carried at the ends of each pair of these bracket arms is a rod or spindle 8 on which a roll of towelling, such as *t*, is adapted to be mounted. For the convenient positioning or placing of the rolls on these spindles and their removal therefrom, the spindles are preferably hinged at one end to one arm of each pair, as at 9, and at their opposite or free ends are adapted to be removably fastened within an open notch in the other bracket arm by a suitable hook or latch 11, as best shown in Fig. 1. With this construction, the spindles may be readily swung outwardly at one end for the positioning or removal of the rolls of towelling as indicated by dotted lines in Fig. 2. While spindles for three towels have been shown, it will be understood that one or more may be employed according to the number of towels it may be desired to fold at any one time.

After a towel has been positioned on one of the spindles, its free end is then drawn down and passed between two rolls 15 and 16 which have a rotating movement in a direction to pull the towel downwardly from the roll and deliver the same upon a table 17 carried by the machine frame. These rolls 15 and 16, in addition to their rotating movement, also have a bodily reciprocating movement in a horizontal path parallel with the table whereby they will be operative to lay or pile the towel, being drawn downwardly thereby, in reversely folded superimposed layers upon the table, as shown in Fig. 1.

The rolls 15 and 16 may be operated to thus pull down and fold the towel by any suitable means. In the present case, the roll 15 is mounted on a shaft 17 which is journaled adjacent its opposite ends in a pair of carrying plates or blocks 18, 18′ mounted for a horizontal movement at the opposite ends of the frame, these plates as here shown each being provided with a lower pair of grooved rollers 20, 20 engaging a lower track rail 21, and an upper pair of grooved rollers 22, 22 engaging an upper track rail 23 (see Fig. 3); both pairs of rails being rigidly attached to the machine frame. Means are provided, to be hereinafter described, for rotating the roll 15 always in the same direction, i. e., in a direction to pull down the towel from its roll, irrespective of its direction of movement horizontally. The roll 16 which cooperates with the roll 15 in pulling down the towel, is a pressure roll for maintaining the towel in gripping relation with the positively actuated pulling roll 15. This pressure roll is here shown as being journaled in the lower ends of a pair of bracket arms 25, 25 pivotally mounted intermediate of their ends on a rod 26 which is connected at its ends with the carrying plates or blocks 18, 18′ for movement therewith. The bracket arms 25, 25 are rigidly connected at their upper ends to a cross-rod 25′, whereby to form a somewhat rigid frame for the support of the roll 16, and are acted upon to yieldingly hold the latter in normal cooperative gripping relation to the roll 15 by means of coiled springs 27 located on the rod 26 adjacent each of the arms 25, these springs engaging at one end with collars 28 fixed on the shaft and at their opposite ends engaging with pins 29 on said arms, as shown in Fig. 3. As here shown, three sets of rolls, 15 and 16, are mounted on the rod 17 for acting on a like number of towels carried by the three spindles 8, although it will be understood that one or more sets of these towel pulling and folding rolls may be employed as desired.

As hereinbefore referred to, the rolls 15 are always rotated in the same direction on both their forward and backward strokes as effected by the reciprocation of their carrying plates 18, 18′, in order to cause a continuous unwinding of the towels from their rolls on the spindles 8. This is effected in the present case by the following means: The end of the shaft 17 at the right side of the machine, and at a point thereon outside of the plate 18′ (see Figs. 2 and 5), is provided with a ratchet 30 fixed thereon, as by means of a pin or screw (not shown). Engaging with this ratchet is a spring-pressed pawl 32 carried by a plate 33 rigidly attached to a gear 34 loosely mounted on the shaft between said ratchet and the plate 18′, and which gear engages directly with a rack 35 fixedly mounted on the frame in a position parallel with the track rails 21—23. With this combination of parts, when the plates 18, 18′, with their supported parts are advanced from the full line position of Fig. 1 to the dotted line position in same figure, as in the direction indicated by the arrow in Fig. 5, the gear 34 is rotated in a clockwise direction (as viewed from the right side of the machine) by its engagement with the rack and thereby causes the attached pawl 32 to impart a like movement to the engaged ratchet 30, which latter, being fast on the shaft 17, imparts a corresponding movement to said shaft and its supported rolls 15. As a means for continuing a like direction of rotation to the rolls 15 on the reverse movement of the parts, i. e., from the rear of the machine towards the front, the end of the shaft 17 at the left of the machine, as best shown in Figs. 3 and 4, is also provided with a fixedly attached ratchet 40 engaged by a spring-pressed pawl 41 carried by a gear 42 loose on the shaft 17, like the corresponding parts at the opposite side of the machine, but in this case the gear 42, instead of engaging directly with an actuating rack like

the corresponding gear 34 at the right side of the machine, is here rotated in an anti-clockwise direction (as viewed from the left of the machine) from a rack 43 acting through an interposed gear 44 mounted on the plate 18; this additional interposed gear 44 acting to cause rotation of the shaft 17 with its attached rolls 15 in the same direction on the forward or reverse stroke of the towel folding parts as that on the rearward stroke of said parts when the shaft 17 is being rotated by the action of the gear 34; it being understood that during the rearward stroke of the parts, when the pawl 32 is effective to rotate the shaft 17 by engagement with the ratchet 30, the pawl 41 at the opposite side of the machine is idle and slides over the teeth of the ratchet 40, while on the reverse stroke of the parts the pawl 41 will in turn be effective to rotate the shaft while the pawl 32 idles and slides over its ratchet 30.

The roller shaft 17 and its sliding carrier plates 18—18′ may be reciprocated back and forth in the manner described by any suitable operating means. The means herein shown comprise a pair of vertically ranging rods 50, 50 at opposite sides of the machine, which are mounted at their lower ends on a rock-shaft 51 journalled in blocks 52 on the lower part of the frame and at their upper ends passing loosely through openings in blocks 53, 53 mounted for oscillating movement on the opposite ends of the roll carrying shaft 17. Connecting at one end with these rods 50 at a point intermediate of their ends, as at 54, is a pair of links 55, 55, which latter at their opposite ends connect with a pair of cranks 56, 56 carried by a shaft 57, which latter is driven through a train of gearing 58, 59 and 60 from a drive shaft 61 mounted adjacent the lower front end of the machine and provided with fast and loose pulleys 62 and 63 respectively, for engagement by a driving belt, such as 66. A slidably mounted belt-shifter of usual construction, such as 64, operatively connected with an operating handle 65, is provided for shifting the belt from one pulley to the other to control the starting and stopping of the machine.

The blocks 53 may be mounted on the ends of the shaft 17 for oscillating movement, whereby to accommodate themselves to the swinging movement of the engaging rods 50, in any suitable manner. In the present case as most clearly shown in Fig. 3, these blocks are each provided with an extension sleeve 70 loosely fitting on the end of the shaft for rotary movement thereon, and are movably retained on such shaft by means of a screw 71 threaded into an opening in the end of the shaft with its head 72 engaging the block within an opening 73 therein; such positioning of the screw being permitted by reason of the block being in section on a line 74 intersecting the opening 73, and the two sections being secured together by suitable fastening means, such as the screws 75.

With a machine such as shown and described, when the end of a towel on one of the spindles 8 has been passed between a pair of rolls 15 and 16 and the machine set in operation, the said rolls will act to continuously pull down the towel from that on the spindle, and, because of the bodily reciprocating movement imparted to the same, will lay or pile the towel on the table 17 in a series of reversely extending superimposed folds, such as indicated at *f* in Figs. 1 and 6. After a towel has been thus folded, it is then drawn together transversely adjacent its opposite ends and tied up in bundle form, as shown in Fig. 7. When the towel is thus bundled or bunched up, the several layers thereof will be maintained in a sufficiently separated condition as to permit of the free circulation of the washing water between the same and so assure the thorough washing of the towel.

What I claim is:

1. In a machine of the class described, a towel holder, means including a pair of co-operating rolls for engaging and pulling the towel from the holder, one of said rolls being a driven roll and the other a secondary spring-pressed one in engagement with the driven one, means for imparting a bodily reciprocating movement to the said rolls, and means for positively rotating the driven roll in the same direction during both strokes of its reciprocation, for the purpose set forth.

2. In a machine of the class described, a towel holder, means including a roll for pulling the towel from said holder, means for reciprocating the towel pulling means, and means for rotating the said roll in the same direction during both strokes of its reciprocation, said latter means comprising a pair of ratchets fixedly connected with the roll, a pair of gears loosely mounted on the roll and carrying pawls for driving engagement with the ratchets, and means for rotating one of said gears in a clockwise direction during one stroke of the pulling means and the other gear in an anti-clockwise direction during the opposite stroke of said pulling means.

3. In a machine of the class described, a towel holder, means including a roll for pulling the towel from said holder, means for reciprocating the towel pulling means, and means for rotating the said roll in the same direction during both strokes of its reciprocation, said latter means comprising a pair of ratchets fixedly connected with the roll, a pair of gears loosely mounted on the roll and carrying pawls for driving engagement with the ratchets, and means including

a pair of stationary racks for rotating one of said gears in a clockwise direction during one stroke of the pulling means and the other gear in an anti-clockwise direction during the opposite stroke of said pulling means.

4. In a machine of the class described, a towel holder, means including a roll for pulling the towel from said holder, means for reciprocating the towel pulling means, and means for rotating the said roll in the same direction during both strokes of its reciprocation, said latter means comprising a pair of ratchets fixedly connected with the roll, a pair of gears loosely mounted on the roll and carrying pawls for driving engagement with the ratchets, and a pair of stationary racks one engaging directly with one of said gears and the other engaging the other gear through an interposed gear.

5. In a machine of the class described, a towel holder, track rails mounted on the frame of the machine, a pair of carrier plates mounted for reciprocation on said rails, a pair of rolls mounted on said plates for pulling the towel from its holder, means for reciprocating the carrier plates and supported rolls, and means for positively rotating one of said rolls in the same direction during both strokes of its reciprocation by the carrier plates, said latter means comprising a pair of ratchets fixedly connected with said positively rotated roll, a pair of gears loosely mounted on the same roll and carrying pawls for driving engagement with the ratchets, and a pair of stationary racks one engaging directly with one of said gears and the other engaging the other gear through an interposed gear, said latter gear being mounted on one of the carrier plates.

In testimony whereof I affix my signature.

JOSEPH H. ADDLER.