Aug. 25, 1942. R. BARNETT 2,294,267

STARCHING MACHINE

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Fig. 2.

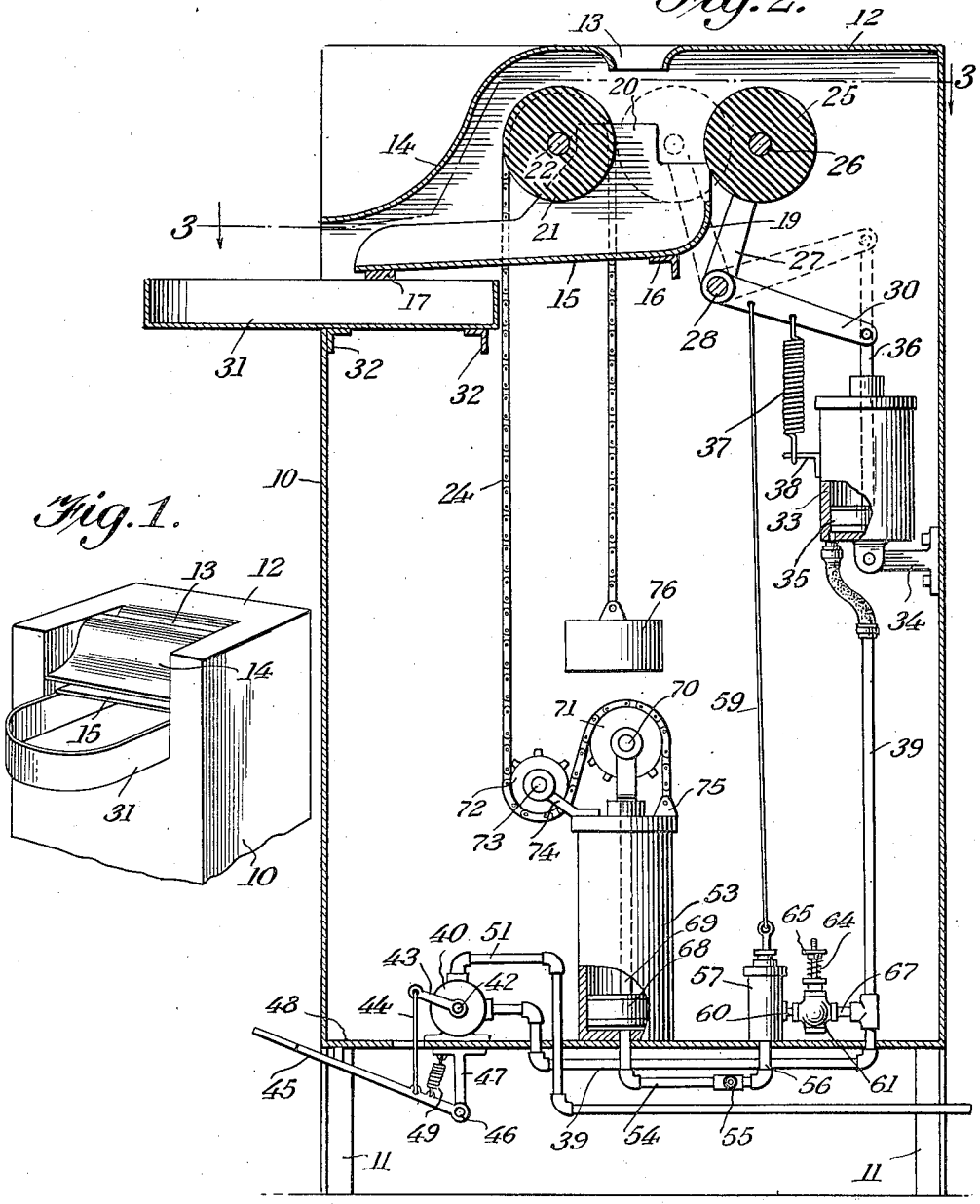


Fig. 1.

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Fig. 3.

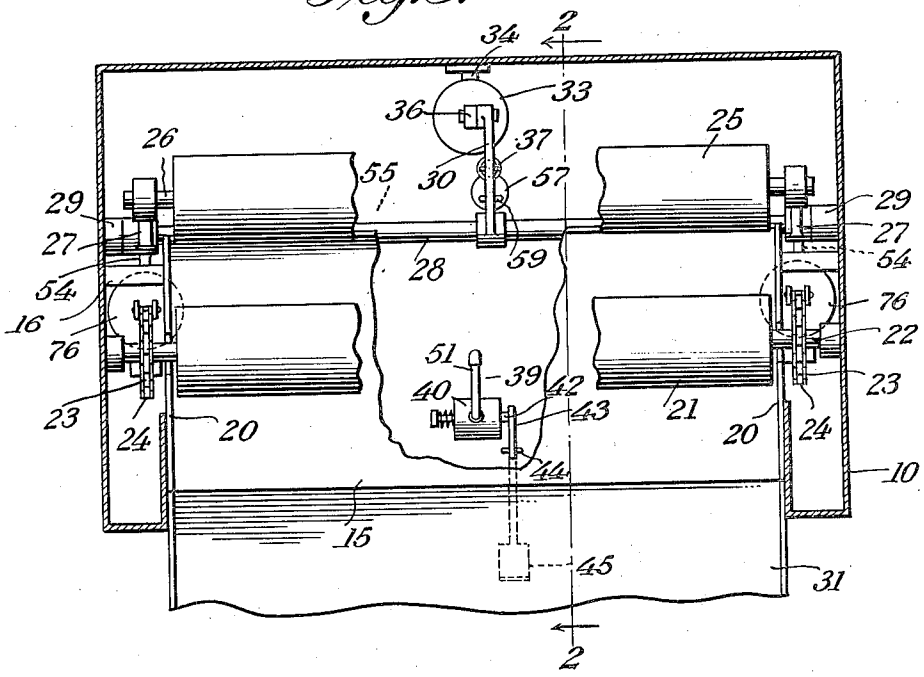


Fig. 4.

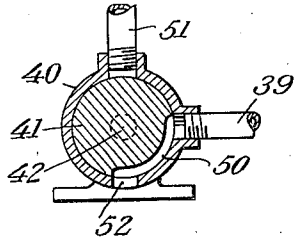
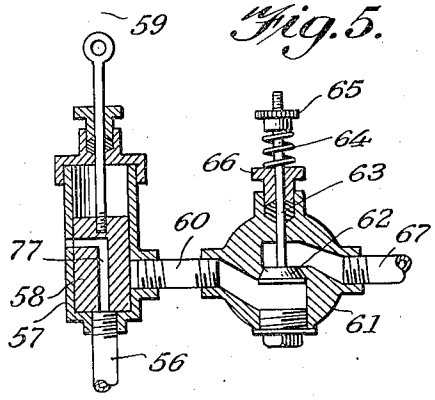


Fig. 5.



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Patented Aug. 25, 1942

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UNITED STATES PATENT OFFICE

2,294,267

STARCHING MACHINE

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Application March 22, 1941, Serial No. 384,731

3 Claims. (Cl. 91—18)

This invention relates to starching machines and has for an object to provide a machine of this type in which one of the wringer rolls is normally held spaced from the driven wringer roll to permit starched articles being inserted between the rolls, whereupon movement of a single pedal will control pneumatic means to bring the spaced roll and starched article into contact with the driven roll and press the article with great pressure against the driven roll so that the article will be squeegeed and fed upwardly through a delivery opening at the top of the machine.

A further object is to provide a machine of this character in which air pressure is the motive power for operating the device so that flexibility of control is effected and timing of the device improved.

A further object is to provide a device of this character which will be formed of a few strong, simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view, the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming a part of this specification:

Figure 1 is a detail perspective view showing the starch container drip can and delivery apron of the machine.

Figure 2 is a vertical sectional view of the machine taken on the line 2—2 of Figure 3.

Figure 3 is a cross sectional view of the machine taken on the line 3—3 of Figure 2.

Figure 4 is a cross sectional view of the pedal controlled air supply valve.

Figure 5 is a longitudinal sectional view showing the automatic valve for timing the release of air from the air cylinders which operate the swingable roll.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, 10 designates a casing which is supported upon legs 11 and is provided with a top wall 12 having an opening 13 therein at about the transverse center thereof, the front portion of the top wall being reversely curved to provide a downwardly extending delivery apron 14.

Below the opening 13, a drip pan 15 is removably supported upon transverse bars 16 and 17, the apron being curved upwardly at the rear end, as shown at 19, and having side walls 20 which extend upwardly to a point near the opening 13. A roll 21 of rubber, or other material, is fixed to a transversely disposed shaft 22, both ends of which are equipped with sprocket gears 23, shown best in Figure 3, over which respective chains 24 are trained to actuate the gears and rotate the roll.

A roll 25 formed of rubber, or other material, is mounted on a transversely disposed shaft 26 which is journalled at the ends in crank arms 27 which are secured to a rock shaft 28, best shown in Figure 3, the ends of which are journalled in bearings 29 mounted on the side walls of the casing. A crank arm 30 is secured to the center of the rock shaft and extends downwardly therefrom for operating the rock shaft to swing the roll 25 toward the roll 21 after an article, such as a shirt, has been inserted in the opening 13 and the cuffs thereof submerged in a starch container 31, which is removably mounted on cross bars 32 disposed in the casing below the free end of the drip pan. A portion of the shirt, of course, will exist between the two rolls 21 and 25 so that when the spaced roll 25 is swung toward the driven roll, the shirt will be clamped between the rolls to be fed upwardly through the opening 13 in the top of the casing, and during such feeding movement the cuff, or the collar, whichever is starched, will be fed between and squeegeed between both rolls.

A pneumatic cylinder 33 is mounted on a bracket arm 34 which is fixed to the rear wall of the casing 10 and is provided with a piston 35, having a piston rod 36 which is connected to the crank arm 30. A helical spring 37 is connected at the upper end to the crank arm 30 and at the lower end is connected to the bracket arm 38 which projects from the cylinder. The spring normally holds the crank arm 30, and piston 35, at their lowermost limits of movement to normally hold the roll 25 spaced from the roll 21, as best shown in Figure 2. A compressed air supply pipe 39 is connected to the bottom of the pneumatic cylinder underneath the piston. The air supply pipe 39 is connected to a control valve casing 40, best shown in Figure 4, having a plug valve 41 therein, the stem 42 of which projects through the casing 40 and is equipped with a crank arm 43 which is connected by a link 44 to a pedal 45, the lower end of which is connected by a pivot pin 46 to a downwardly extending bracket arm 47 secured to the bottom 48 of the casing. A helical spring 49 is connected

to the pedal and to the bracket arm to normally hold the valve in position to shut off air from the compressed air supply pipe 39.

The plug valve 41 is provided with an arcuate passage 50 adapted to cross connect the air supply pipe 39 with an air inlet pipe 51 when the pedal is depressed and let compressed air, from any suitable source of supply, into the air supply pipe 39, into the pneumatic cylinder 33 under the piston 35 thereof. While the pedal is held depressed, the air will continue to build up pressure in the cylinder underneath the piston. When the pedal is released, the spring 49 moves the plug valve 41 to dispose the passage 50 to cross connect the compressed air supply pipe 39 with an air vent 52 in the valve casing 40 and vent the pneumatic cylinder 33 to the atmosphere.

When predetermined air pressure has been built up in the cylinder 33 underneath the piston 35 to hold the swingable roll 25 in position to clamp the starched article under great pressure against the roll 21, the latter is started to rotate, and for this purpose mechanism is provided including a pair of relatively large pneumatic cylinders 53, which are disposed on the bottom 48 of the casing approximately underneath the sprocket gears 23 of the roll 21. Both cylinders are provided in the bottom with air supply pipes 54 which connect with a common air supply pipe 55, which is connected by a pipe 56 to the bottom of the casing 57 of a vertically slidable plug valve 58, best shown in Figure 5. The plug valve is connected by a link 59 to the crank arm 30 of the rock shaft 28 so that when the rock shaft 28 is moved to rock the swingable roll 25 into operative position, the plug valve 59 will be moved upward to open position to establish communication between the air supply pipes 54 for the cylinders 53 and a pipe 60 which is connected to the valve casing 61 of an automatic valve.

The automatic valve is provided with an upwardly closing cone valve 62, having a stem 63 upon which a helical spring 64 is sleeved and compressed between a nut 65 on the stem and the top of a gland nut 66 connected to the valve casing. The tension of the spring is such that when predetermined air pressure builds up in the cylinder 33 which controls the roll 25, the built up pressure in the air supply pipe 39 will be exerted upon the cone valve 62 through a pipe 67 which connects the pipe 39 to the automatic valve casing 61, and will overbalance the pressure of the spring 64, thus letting compressed air from the pipe 39 into the bottom of both large cylinders 53 underneath the respective piston 68 therein, through the open valve 58.

The piston rods 69 of the pistons 68 project through the top of the large cylinders 53 and are forked at the upper ends to receive respective stub shafts 70 to which are secured sprocket gears 71 of relatively large diameter. Sprocket gears 72 of relatively small diameter are secured to respective shafts 73 carried by bracket arms 74 which are secured to the top of the respective cylinders 53. The sprocket chains 24 heretofore mentioned as being trained over the sprocket gears 23 of the rotatable roll 21, are trained under the sprocket gears 72 and over the sprocket gears 71 and secured at the lower ends to the lugs 75 which project from the top of the cylinders 53. The free ends of the chains are equipped with weights 76. When air is let into the cylinders 53 underneath their pistons 68, the piston rods 69 will be moved upwardly carrying the large sprocket gears 71 upwardly and rotating the small sprocket gears 72 as the chain is drawn thereover at such a speed that the weights 76 will be raised quickly out of the way of the upwardly moving sprocket gears 71 and at the same time the sprocket gears 23 of the rotatable roll 21 will be rotated to rotate the roll. This rotation of the roll will be effected while the pedal 45 is being held down, or until at least the pistons 68 in the air cylinders 63 reach their upward limit of movement.

When the operator removes his foot from the pedal 45, the spring 49 thereof moves the air supply valve 41 to disconnect the pipes 51 and 39 and connect the pipe 39 through the passage 50, with the vent 52, so that air is let out of the cylinder 33. Thereupon the spring 37 rocks the rock shaft 28 to swing the roll 25 outwardly from the roll 21, and while this is occurring, the link 59 closes the plug valve 58 to cut off communication between the pipe 39 and the large air cylinders 53 and vent the large cylinders 53 to the atmosphere through the pipes 56 and a passage 77 in the valve 58, this position of the parts being shown in Figure 5. As air is vented from the cylinders 53, the weights 76 gravitate and the fixed end of the sprocket chains 24 simultaneously push down the sprocket gears 71 to cause the pistons 68 to recede to initial position ready for the next operation.

Since the operation of the parts has been described as the description of the parts progressed, it is thought the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. In a starching machine, the combination of stationary and movable wringer rolls, crank means mounting the movable roll to swing toward and away from the stationary roll, a relatively short air cylinder having a piston connected to the crank means for operating the crank means, a pipe for supplying air to and releasing air from the cylinder, a foot pedal operated valve controlling the pipe, a relatively long air cylinder, a piston in the long cylinder, drive means connecting the piston with the stationary roll for rotating the roll when air is let into the long cylinder, an air control valve connected to the bottom of the long cylinder and operated by the crank means for admitting air to and releasing air from the long cylinder, a pressure control valve connected to the air control valve and to the air supply pipe of the short cylinder for admitting air to the long cylinder through the air control valve when pressure in the short cylinder reaches a predetermined maximum for causing rotation of the stationary roll, a drain pan below the rolls, and a starch container below the delivery end of the drain pan.

2. The structure as of claim 1 and in which said crank means comprises a rock shaft, a crank arm on the rock shaft supporting the movable roll, a piston in the short air cylinder, a crank arm on the rock shaft connected to the piston for rocking the roll toward the stationary roll when air is let into the cylinder, and a helical spring connected to the second named crank arm and to the cylinder for rocking the movable roll away from the stationary roll when air is released from the short cylinder.

3. The structure as of claim 1 and in which said drive means comprises a piston in the long cylinder, a large sprocket gear carried by the piston, a small sprocket gear carried by the long cylinder, a sprocket gear carried by the stationary

roll, a sprocket chain connected at one end to the cylinder and trained over the large sprocket gear then under the small sprocket gear, then over the sprocket gear carried by the roll and thence extended downwardly toward the long cylinder, and a weight on the free end of the sprocket chain, movement of the piston under influence of air in the cylinder moving the large sprocket gear upward to pull the sprocket chain over the small sprocket gear and roll sprocket gear to rotate the roll and elevate the weight, said weight gravitating and resetting the stationary roll in initial position when air is released from the long cylinder.

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