

July 20, 1954

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2,684,187

PNEUMATIC APPARATUS FOR TURNING SOCKS

Filed Nov. 24, 1950

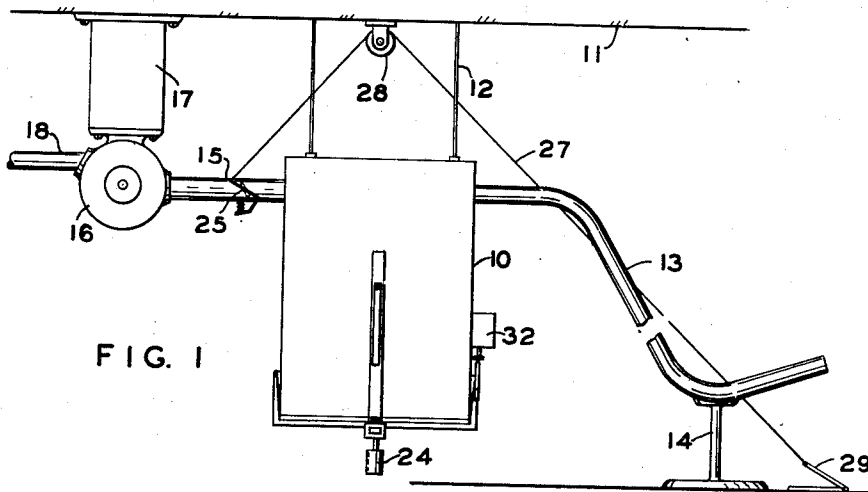


FIG. 1

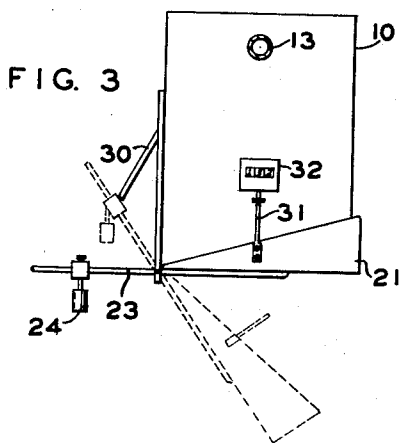


FIG. 3

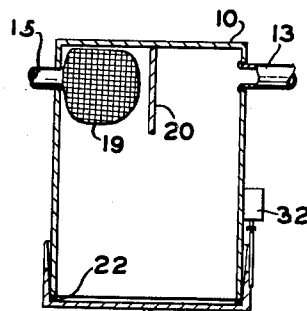


FIG. 2

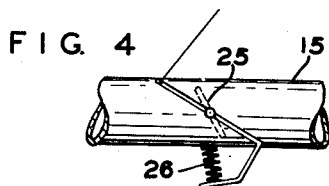


FIG. 4

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2,684,187

PNEUMATIC APPARATUS FOR TURNING SOCKS

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Application November 24, 1950, Serial No. 197,319

5 Claims. (Cl. 223-43)

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My invention relates to a device for use in the sock making industry and more in particular to pneumatic apparatus which will automatically turn or reverse socks, and which will automatically record the number of socks turned during any working period.

In the making of socks, it is known that they must be turned inside out and reversed before being sent to the dyeing vat. By turning and reversing the sock the loose thread ends are turned inside the sock, leaving a clean outer surface unmarred by loose or broken thread ends.

The only known practice before the present invention for turning socks has been to slip the sock upon a wooden form having a smooth surface and a tapered outer end, the form being of sufficient width to snugly receive the sock. When the sock is fitted over the form, an operator is able to grasp the upper end of the sock near the opening thereof and peel or manually reverse the sock in taking it off the form. Since such work is usually paid for by the piece, certain other workers are required to count and record the number of socks turned by each worker. It is apparent, therefore, that the manual operation of turning socks is slow and expensive.

It is an object of the present invention to provide a machine for turning socks which is automatic in its operation and which employs pneumatic means for turning the sock.

Another object of the invention is to provide a pneumatic sock turning machine having a suction tube at one side of a receiving chamber and a suction fan at the other side of the chamber, the socks being drawn through the tube to the chamber and there fluffed and tossed to relieve them of accumulated lint.

Another object of the invention is to provide a hinged bottom door on the sock receiving chamber suitably weighted and counterbalanced so that when the suction is relieved inside the chamber the door will swing open to deposit a predetermined number of socks as a batch ready for further processing.

A further object of the invention is to provide counting mechanism operatively engaged by each closing of the bottom hinged door to record the number of times a deposit of socks is made and consequently the total number of socks turned by the machine operator. The hinged door is so arranged that the weight of a given number of socks might be made to overcome the counterbalance to deposit the socks automatically, which weight could be recorded by the counter mechanism as dozens, fifties, hundreds, etc.

Further objects and advantages of the invention will become apparent in the course of the following detailed description when viewed together with the accompanying drawing in which:

Fig. 1 is a side elevational view of an embodiment of my invention in an automatic sock turning machine.

Fig. 2 is a cross-sectional view of the sock receiving chamber of the invention showing the hinged bottom door in closed position.

Fig. 3 is a detail view of what might be considered as the front of the machine and illustrating both the open and closed positions of the bottom door.

Fig. 4 is a detail view of a damper mechanism used to cut off the suction of the blower fan from the inner sock receiving chamber.

In the drawing, numeral 10 designates a box-like, metallic container supported in the present instance from the room ceiling 11 by cables or rods 12. At the upper end of the container 10 is a tube 13 bent in the manner shown and rested upon a floor standard 14. The outer end of the tube 13 is inclined slightly upwardly so as to be easily accessible to an operator sitting facing the same.

Fixed to the opposite side of the container 10 is another length of tubing 15 constituting an exhaust connected to the inlet side of a blower fan 16. The fan 16 is also fixed to a standard 17 suspended from the room ceiling 11, and is provided with its own exhaust tube 18 which may be extended to some point outside the building. As seen in Fig. 2, the inner end of the exhaust tube 15 which projects inside the container 10 is provided with a screening member 19 sufficient to pass dust or lint yet small enough to prohibit the passing of anything as large as a sock.

At the top of the container 10 and fixed between two of the side walls thereof is a baffle plate 20 positioned at right angles to the inlet tube 13 so that socks being drawn into the container 10 will not be drawn directly against the screen member 19 on the exhaust tube 15.

A hinged door 21 constitutes the entire bottom of the container 10 and is adapted to swing downwardly in the manner shown by the dotted lines in Fig. 3. Fixed to the lower edge of the container 10 is a gasket 22 which seals the container against the entrance of air around the door 21 when the door is closed.

On the bottom side of the door, and fixed to the same, is a counterbalance rod 23 extended outwardly from the container 10 and supporting a counterbalancing weight 24 adjustable to any

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position along the rod 23 to offset the weight of any given number of socks to be accumulated in the container.

As shown in Figs. 1 and 4, the exhaust tube 15 is provided with a valve 25 held in the normally open position by means of a compression spring 26. The valve is actuated to close by means of a flexible cable 27 attached thereto and passed over a pulley 28 from whence it is extended to a treadle 29 positioned on the floor near the operator. The operator counts the number of socks fed into the inlet tube 13, and when the required number is reached for a batch, the treadle is pressed with the foot to block the suction of the fan 16 momentarily and allow the weight of the socks accumulated on the bottom door 21 of the container 10 to overbalance the counter-weight 24 and open the trap door 21 to dump the socks out of the container. It is within the scope of the present invention to provide a counter-balancing mechanism of such sensitivity that the weight of a given number of socks will automatically open the trap door and record the number of batches of socks turned by an operator during a working period.

As shown in Fig. 3, the opening swing of the door 21 is limited by the projecting stop pin 30, and when the weight of the socks is removed by the batch being dumped out of the container, the counter-weight 24 takes over and closes the door. As the door closes, the push rod 31 attached thereto punches the counting mechanism 32 to advance it one unit.

To describe briefly a complete operation of the machine, let it be assumed that socks are furnished the machine operator in such quantity that the machine is made to run continuously. The operator is seated facing the inlet end of tube 13, which end is rendered smooth by polishing so as not to be injurious to the sock. The tube end is, of course, of such diameter as to loosely receive the open end of the sock which the operator places upon it. When the toe of the sock approximately abuts the tube end, the operator presses or taps the center of the stretched fabric end to start the movement, and the suction of the fan 16 pulls the socks inwardly and from around the outside of the tube, thus turning or reversing the sock. The sock is drawn by the suction upwardly inside the inlet tube 13 and into the container 10. The amount of suction is sufficient to pull the sock along with considerable speed so that it is made to strike the baffle plate 20 and fall downwardly upon the trap door 21. Other socks then follow as fed by the operator and are jostled and tumbled about by the force of air being drawn across them. This tumbling action not only frees the socks of the accumulation of lint which is removed by the fan but also relieves the stiffness of the fabric to render it more suitable for dyeing.

When the operator has counted, say a dozen socks, the foot treadle is pressed to block the suction of the fan and the counter-balanced bottom door 21 falls open to deposit the batch of socks thus turned onto a table or into a container. As the door closes by action of the weight 24, the counter 32 is actuated to record the batch just leaving the machine, and the operator releases the foot treadle 29. Suction is again applied to the inside of the container which assists in sealing the lower trap door 21 and prepares the machine to receive another batch of socks in the manner just described.

The machine is compact and can be manufac-

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tured at a very low cost. A battery of several machines may be connected to a single blower fan by their exhaust tubes and the several trap doors might be positioned over a conveyor belt simultaneously carrying all of the socks away for further processing. Other changes might also be made in the actual construction of the machine without departing from the spirit and scope of my invention as defined by the following claims.

I claim:

1. Apparatus of the class described comprising a receptacle, exhaust means connected to said receptacle for withdrawing air therefrom, damper means selectively operable to block said exhaust means, said receptacle being provided with bottom door means hinged thereto for selective opening and closing, weight means adjustably connected to said door means and arranged to counterbalance said door means to close the same, counter means operatively connected to said door means and arranged to be advanced in response to movements of said door means, and tubular inlet means communicating with said receptacle, said tubular inlet means being provided with a free end over which socks may be fitted for turning by being drawn off said end and through said inlet means into said container and onto said bottom door means by said exhaust means, said bottom door means being constructed to open by the weight of a predetermined number of socks thereon when said exhaust means is blocked by said damper means, said exhaust means cooperating with said weight means to hold said door means in closed position.

2. Apparatus of the class described comprising a receptacle, exhaust means connected to said receptacle for withdrawing air therefrom, damper means selectively operable to block said exhaust means, control means operably connected to said damper means, said receptacle being provided with bottom door means hinged thereto for selective opening and closing, weight means adjustably connected to said door means and arranged to counterbalance said door means to close the same, counter means operatively connected to said door means and arranged to be operated in response to movements of said door means, and tubular inlet means communicating with said receptacle, said tubular inlet means being provided with a free end over which socks may be fitted for turning by being drawn off said end and through said inlet means into said container and onto said bottom door means by said exhaust means, said bottom door means being constructed to open by the weight of a predetermined number of socks thereon when said exhaust means is blocked by said damper means, said exhaust means cooperating with said weight means to hold said door means in closed position.

3. Apparatus of the class described comprising a receptacle, exhaust means connected to said receptacle for withdrawing air therefrom, damper means selectively operable to block said exhaust means, foot treadle control means operably connected to said damper means, said receptacle being provided with bottom door means hinged thereto for selective opening and closing, adjustable weight means adjustably connected to said door means and arranged to counterbalance said door means to close the same, counter means operatively connected to said door means and arranged to be advanced one unit each time said door means is closed, and tubular inlet means communicating with said receptacle, said tubular inlet means being provided with a free end

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over which socks may be fitted for turning by being drawn off said end and through said inlet means into said container and onto said bottom door means by said exhaust means, said bottom door means being constructed to open by the weight of a predetermined number of socks thereon when said exhaust means is blocked by said damper means, said exhaust means cooperating with said weight means to hold said door means in closed position.

4. Apparatus of the class described comprising a receptacle, exhaust means connected to said receptacle for withdrawing air therefrom, damper means selectively operable to block said exhaust means, foot treadle control means operably connected to said damper means, said receptacle being provided with bottom door means hinged thereto to swing downwardly for selective opening, adjustable weight means adjustably connected to said door means and arranged to counterbalance said door means to close the same, counter means operatively connected to said door means and arranged to be advanced one unit each time said door means is closed, and tubular inlet means communicating with said receptacle, said tubular inlet means being provided with a free end over which socks may be fitted for turning by being drawn off said end and through said inlet means into said container and onto said bottom door means by said exhaust means, said exhaust means cooperating with said weight means to hold said door means in closed position, said bottom door means being constructed to open by the weight of a predetermined number of socks thereon when said exhaust means is blocked by said damper means.

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5. Apparatus of the class described comprising a receptacle, exhaust means connected to said receptacle for withdrawing air therefrom, exhaust control means selectively operable to divert said exhaust means from said receptacle, said receptacle being provided with a bottom door hinged thereto to swing downwardly for selective opening, counterbalancing means connected to said door to close the same, and tubular inlet means communicating with said receptacle, said tubular inlet means being provided with a free end over which socks may be fitted for turning by being drawn off said end and through said inlet means into said receptacle and onto said bottom door by said exhaust means, said exhaust means cooperating with said counterbalancing means to hold said door in closed position except when said control means is operated to divert said exhaust means from said receptacle, said inlet means being inoperable to turn socks when said bottom door is open.

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