Nov. 8, 1932. T. SUGIYAMA ET AL 1,886,757

METHOD OF REPLENISHING A SUPPLY OF COCOONS AUTOMATICALLY

Filed April 7, 1931

Fig. 3.

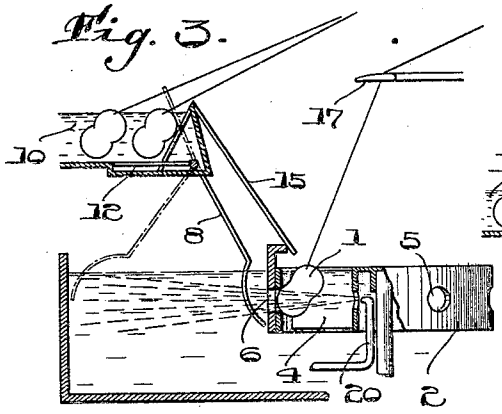


Fig. 1.

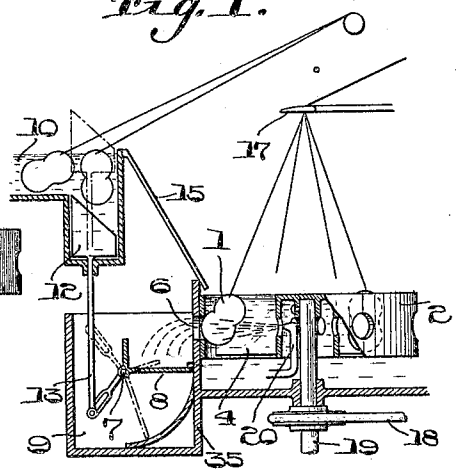


Fig. 4.

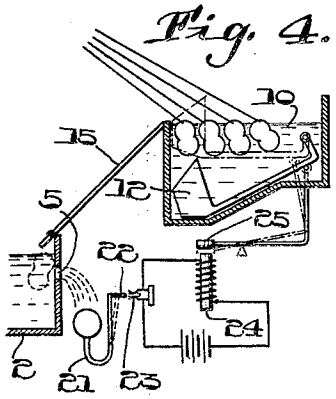


Fig. 2.

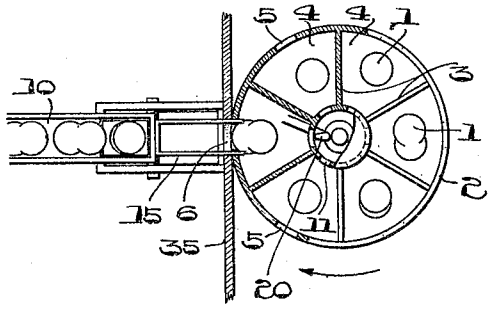


Fig. 5.

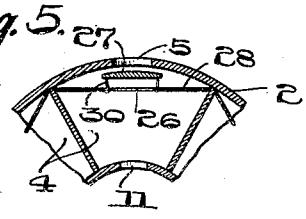
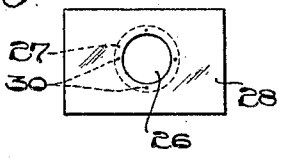


Fig. 6.



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UNITED STATES PATENT OFFICE

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METHOD OF REPLENISHING A SUPPLY OF COCOONS AUTOMATICALLY

Application filed April 7, 1931, Serial No. 528,444, and in Japan October 29, 1930.

The present invention relates to a method of replenishing a supply of cocoons automatically, which consists in providing an outlet for hot water near reeling cocoons around a reeling device; and causing the said cocoons to close the said outlet for hot water directly or indirectly at ordinary time, but to allow the hot water to be discharged from the outlet as soon as the reeling is finished or the fibre is broken to put a cocoon out of its normal position, so that the discharge energy, weight or temperature of the hot water may be utilized to replenish a supply of cocoons electrically or mechanically. The object thereof is to provide a simple method by which a supply of cocoons is replenished automatically immediately when the reeling is finished or the fiber is broken to put a cocoon out of its normal reeling position.

Referring to the accompanying drawing which shows examples of the devices used for carrying this invention into practice,

Fig. 1 is a partial vertical section of a preferred embodiment of the invention.

Fig. 2 is a horizontal section of Fig. 1 taken in the plane of the reeling reservoir.

Fig. 3, a sectional side view of a modified construction;

Fig. 4, the other modified device for starting the replenishment of a supply of cocoons by utilizing the temperature of the hot water and thus exciting a heat-sensitive element;

Fig. 5, a plan partly in section of a device for utilizing cocoons indirectly as an opening and closing valve;

Fig. 6, a front view of the same observed from the interior of a reeling device.

In Figures 1 and 2, a cocoon 1 is put in a reeling chamber 4 partitioned by a radial wall (3) in a round reeling reservoir 2 rotated in one direction in the hot water of a reeling basin by the rotation of an axis 19. The said reservoir 2 has its external wall pierced with a small hole (5) of any desired shape (round in the drawing) near the centre of each chamber. The reservoir 2 rotates in contact with one of the side walls of a basin 35 on its outer circumference, the said side wall having an outlet 6 to allow the hot water of the reeling chamber to flow out automatically when the reservoir 2 rotates and its small hole 5 meets the outlet. Outside the said outlet 6 there is provided within a chamber 9 a blade 8 which rotates on its axis 7 by receiving the discharged hot water, and the arm fixed to the said axis 7 is connected with a rod 13 which supports the feeder 12 of a cocoon feeding device attached to the end of a replenishing device 10, so that every time the hot water is discharged from the outlet 6, the feeder is pushed up to have cocoons in the replenishing device roll out one by one on a guide rail 15, which then conducts the cocoons to the reeling chamber.

The reservoir has also a perforation 11 in the internal wall opposite the small hole 5. A nozzle 20 is preferably provided in a position opposite the said perforation to eject steam or vapor constantly or intermittently. 17 is a cocoon fibre-collecting device; and 18 a rope for transmitting power to the reservoir 2.

The following is the function of the above-mentioned device:—

By the rotation of the rope 18, the axis 19 is rotated in one direction and rotates the reservoir. Then, a cocoon 1 is put in each of the reeling chambers 4 and is reeled up and collected in the device 17 and then wound around a reel. If the reeling is effected in this manner, each chamber 4 rotates in succession in contact with the side wall 35 of the basin and consequently the small hole 5 of each chamber moves successively, meeting the outlet. Thus, when any of the chambers 4 comes round to this position and the small hole 5 meets the outlet 6, the latter takes an open condition, which induces the hot water to flow out at once, when the reeling cocoon 1 in the chamber is attracted to the outlet by the action of the hot water to flow out and thus closes the outlet like a kind of valve to prevent the outflow of the hot water without causing any other motion. But, if the chamber comes round to this position after the reeling is finished or a cocoon falls and is driven out of it, the hot water will flow out from the basin at once, because there is nothing to prevent its outflow from the outlet. This rotates the blade 8 in the path of the

falling water to a position indicated by a dotted line and at the same time pushes up the feeder 12 to replenish a supply of cocoons automatically, the fibre being brought in contact with the fibre reeled up at the bifurcated part of the collecting device 17 and attached to it. Further, it is preferable to have the hot water spouted from the nozzle 20 so as to press a cocoon more forcibly against the outlet and thus provide a more effective valve action.

Fig. 3 shows an example of a device, wherein the blade is provided in the hot water of the basin and the feeder is put into operation by only the discharge energy from the spray 20.

Fig. 4 is an example of a device for starting a supply of cocoons by the utilization of the heat possessed by the discharged hot water, wherein a temperature responsive relay is provided in the path of the discharged hot water. The relay is made of a tank used for sealing up ether or any other material sensitive to heat, with an arm 22, to the end of which as well as its opposite side is fixed an electrical contact 23 so that immediately the tank is heated by the discharged hot water, the arm is extended owing to the expansion of the tank and closes the electrical contact 23 and attracts an iron piece 25 by means of a magnet 24 and a supply of cocoons is performed successively by the movement as indicated by a dotted line.

In all the above examples, a round reeling reservoir which rotates in one direction is used, but the same action and effect may be obtained if they are so constructed as to have their reeling chambers arranged semi-circularly or straightly and to make reciprocal movement intermittently. Also, the same action may be obtained if the reservoirs connected straightly or semi-circularly are placed fixedly with their chambers having small holes as stated above and a sliding plate with an outlet for hot water is brought in contact with each of the small holes and the outlets are opened in succession by the reciprocal movement of the chambers.

In the above examples, the outlet is made in a round form in the midway of the inner and outer circumferential walls, but when the present invention is performed by float reeling, it is advisable to have half of the outlet above the hot water with its upper part open, instead of submerging it. Also, instead of making an outlet open, directly on the circumferential wall of the reservoir, a special pipe for discharging the hot water may be provided near the reeling part to let the water flow out automatically or to have it sucked by the pump or the like from outside. Thus, the outlet may be designed in many ways.

Figure 5 shows an example of utilizing the cocoon indirectly as a valve for the outlet. 28 is a rubber diaphragm with a perforation 26 in the centre. Between the said perforation and a small hole of the external wall there is a valve 27 which is connected to the diaphragm by several legs 30. As described before, the hot water tends to flow out in the direction indicated by arrows in Fig. 5, as long as there is a cocoon. Consequently, the cocoon presses the diaphragm 28 outwardly to make the valve 27 close the hole 5. However, as soon as there is no cocoon, the hot water passes through the space between the perforation 26 and the said valve 27 and flows out freely from the outlet.

In brief, the characteristic feature of this invention consists in utilizing reeling cocoons directly or indirectly as an opening and closing valve for the hot water and replenishing a supply of cocoons. Thus, as the present invention can accomplish the desired object by very simple means, it increases the efficiency of the work and improves the quality of the product as compared with the known methods and consequently gives considerable benefit to this branch of industry.

Claims:

1. In combination, a cocoon reeling device including a liquid container having a liquid outlet, said container being adapted to receive a cocoon and the flow of liquid through said outlet being controlled by the cocoon, cocoon replenishing means associated with said reeling device and actuated when the fiber is exhausted and free flow of liquid through said outlet is possible, means for receiving a plurality of cocoons arranged to be rotated whereby the cocoons are successively moved into register with said outlet.

2. In combination, a cocoon reeling device including a liquid container having a liquid outlet, said container being adapted to receive a cocoon and the flow of liquid through said outlet being controlled by the cocoon, cocoon replenishing means associated with said reeling device and actuated when the fiber is exhausted and free flow of liquid through said outlet is possible, a rotatable receiver for cocoons having a plurality of compartments and an opening in each compartment successively movable into registration with the outlet of said container.

3. In combination, a cocoon reeling device including a liquid container having a liquid outlet, said container being adapted to receive a cocoon and the flow of liquid through said outlet being controlled by the cocoon, cocoon replenishing means associated with said reeling device and actuated when the fiber is exhausted and free flow of liquid through said outlet is possible, means for directing a flow of fluid against the cocoon to maintain the latter in position to restrict the flow of liquid through said outlet.

4. In combination, a cocoon reeling device

including a liquid container having a liquid outlet, said container being adapted to receive a cocoon and the flow of liquid through said outlet being controlled by the cocoon, cocoon replenishing means associated with said reeling device and actuated when the fiber is exhausted and free flow of liquid through said outlet is possible, said replenishing means including a member adapted to be impinged by the liquid emerging from said outlet whereby the replenishing means is set in operation.

5. In combination, a cocoon reeling device including a liquid container having a liquid outlet, said container being adapted to receive a cocoon and the flow of liquid through said outlet being controlled by the cocoon, cocoon replenishing means associated with said reeling device and actuated when the fiber is exhausted and free flow of liquid through said outlet is possible, said replenishing means including an electrically actuated operating device, and thermo-sensitive means controlled by the temperature of the liquid flowing through said outlet.

6. In combination, a cocoon reeling device including a liquid container having a liquid outlet, said container being adapted to receive a cocoon and the flow of liquid through said outlet being controlled by the cocoon, cocoon replenishing means associated with said reeling device and actuated when the fiber is exhausted and free flow of liquid through said outlet is possible, a receiver for cocoons including an elastic diaphragm provided with a perforation normally obstructed by the cocoon, and a valve member supported by said diaphragm and coacting with said outlet to control the flow of liquid therethrough.

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