Nov. 4, 1924. 1,514,078

V. FIORUZZI

AUTOMATIC SILK REELING PROCESS AND DEVICE THERETO

Filed Oct. 28, 1921 3 Sheets-Sheet 1

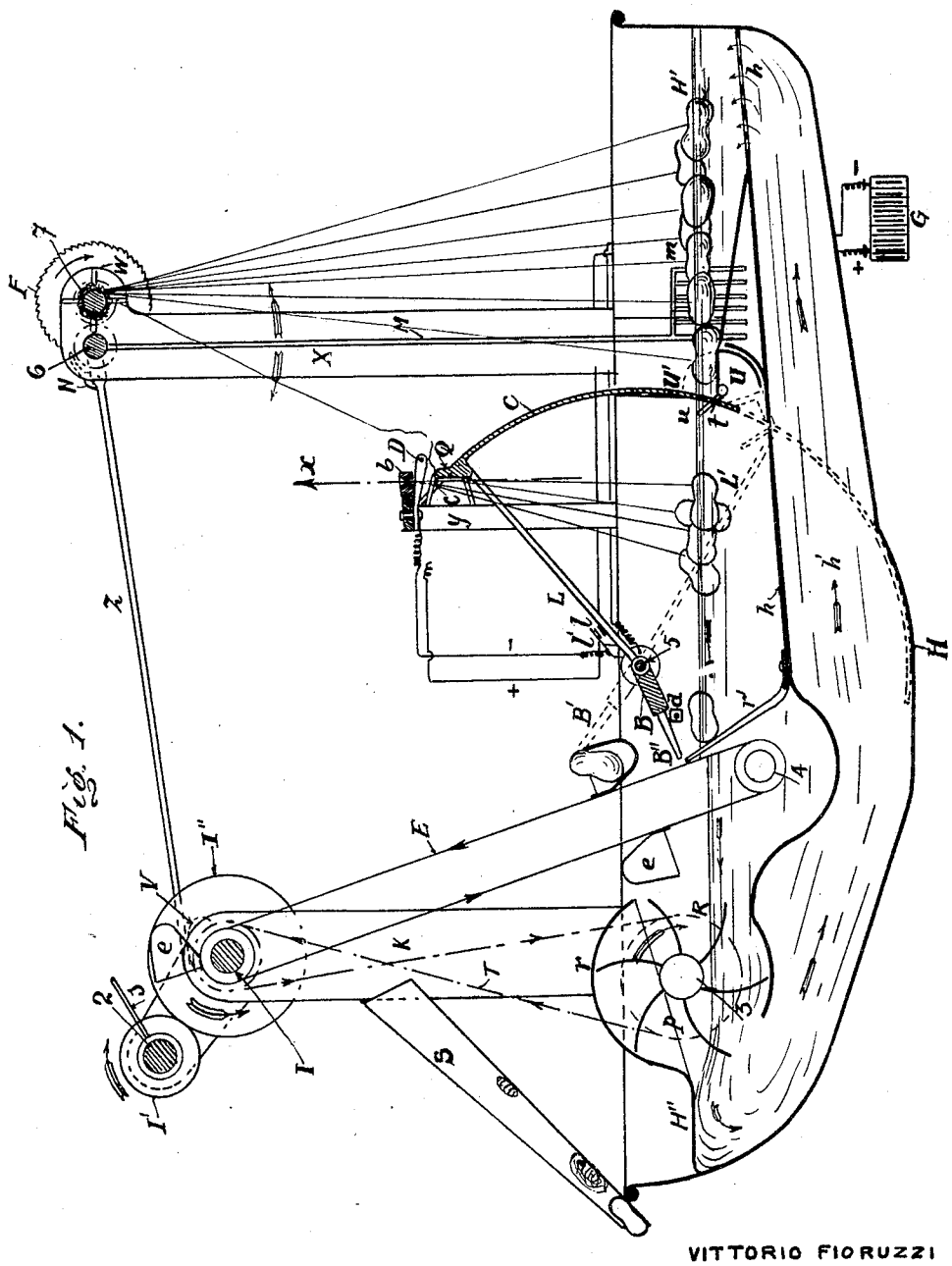


Fig. 1.

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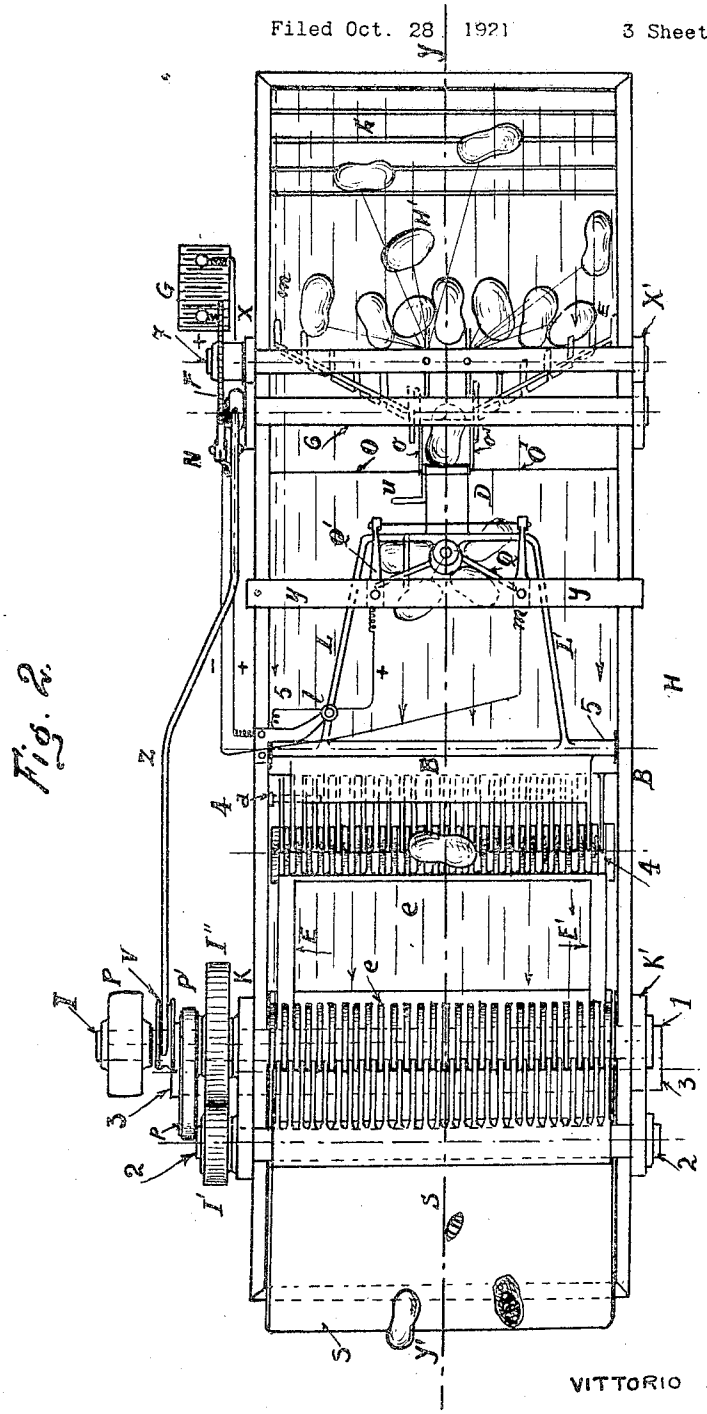


Fig. 2.

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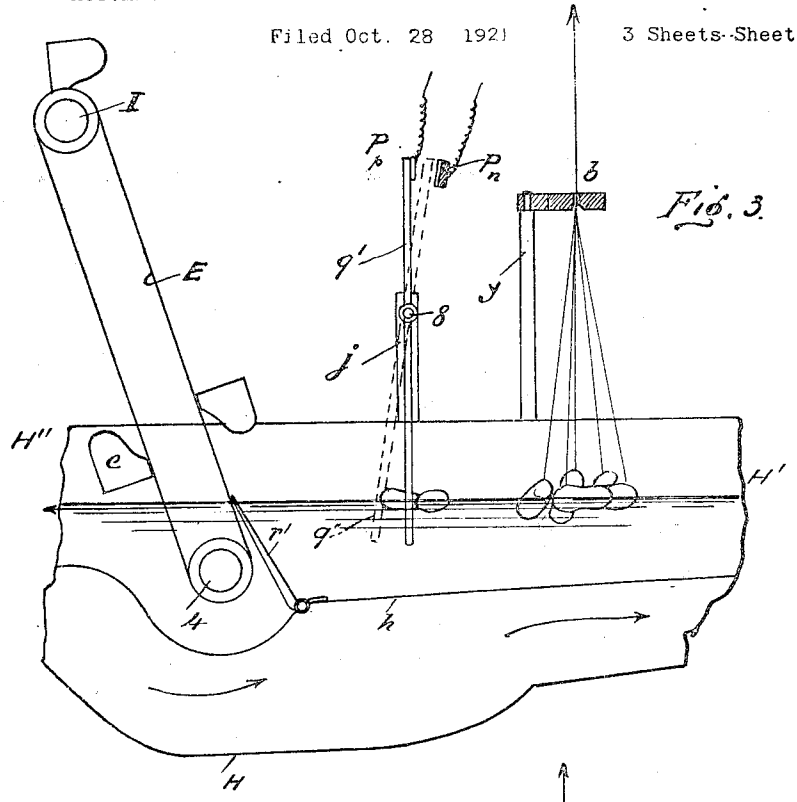


Fig. 3.

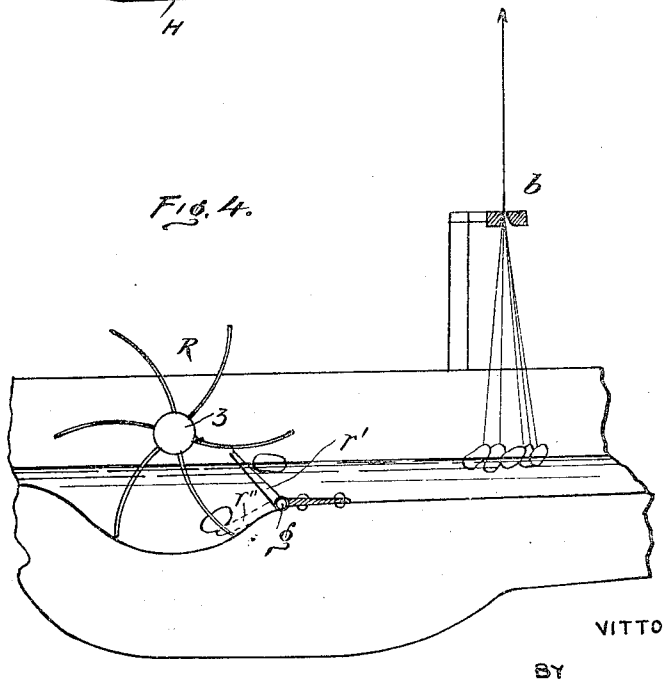


Fig. 4.

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Patented Nov. 4, 1924. 1,514,078

UNITED STATES PATENT OFFICE.

VITTORIO FIORUZZI, OF PIACENZA, ITALY.

AUTOMATIC SILK-REELING PROCESS AND DEVICE THERETO.

Application filed October 28, 1921. Serial No. 511,070.

To all whom it may concern:

Be it known that I, VITTORIO FIORUZZI, residing at 68, Via San Salvatore, Piacenza, Italy, have invented certain new and useful Improvements in Automatic Silk-Reeling Processes and Devices Thereto, of which the following is a specification.

The present invention relates to a process and a device for the automatic reeling of the cocoons coming from the basins, means whereby each fresh cocoon is fed being controlled by the exhausted cocoon.

The improved device, which may be built in a plurality of sections forming a single battery and may replace the ordinary hand reeling-basins, essentially comprises: a basin into one end of which the fresh cocoons are filled haphazard; means in the said basin for guiding the cocoons in the required direction; a mechanical device for leading the cocoons to the thread-guiding button, one cocoon at a time; a contact closing an electric circuit each time a fresh cocoon is fed to the thread guiding button and having for its object to cut the filament of the fresh cocoon by burning it at a predetermined point, in order that the device feeding the fresh cocoons to the button may weld together the fresh filament and the previous one; a device for conveying the exhausted cocoons out of the reeling basin, the said exhausted cocoons being utilized to actuate a mechanical or electric arrangement which in turn actuates the device by which the fresh cocoons are singled out and fed to the thread guiding button and the electric circuit is closed; and means for setting up a water circulation in the reeling basin in order that the exhausted or detached cocoons be carried off by the water in the required direction.

The process is carried out by the device illustrated on the accompanying drawings.

Fig. 1 is a longitudinal section of the apparatus taken on the line *y*—*y*, Fig. 2;

Fig. 2 is a plan of the same;

Figs. 3 and 4 show in longitudinal part sections two alternative solutions of the problem, in which the cocoon directly controls an electric drive.

Referring particularly to Figs. 1 and 2, H is the basin in which for easier reference we have lettered H′ the rear and with H″ the forward portion of the upper canal, and with *h′* the lower canal which latter is separated from the upper canal by the partition *h*. K—K′ are stanchions arranged at the end of the front basin-portion H″ and supporting at a certain height above the basin level the elevator shaft I which may extend across the whole length of a row of basins forming a battery. The shaft 1 is driven by the motor through the pulley P, and in turn drives the reed spindle 2 through the gears I′—I″ and also the shaft 3 with its vane wheel R through the belt or chain T and the pulleys *p*—*p′*. To the driving shaft I is keyed the cam V which by means of the rod Z imparts an alternating rotary or rocking motion to the cross shaft 6 extending the whole length of the basin battery and carried on stanchions X—X′ arranged at the rear end H′ of the basin. The rotary forward and backward motion of the horizontal shaft 6 is transmitted through the vertical rod M to the rakes *m* secured to the bottom end of said rod M and arranged in the rear basin portion H′ where the cocoons are filled in; the object of the rakes *m* is to straighten the cocoons and permit of their being fed forward a single cocoon at a time.

At the rear end of the rod Z, near the shaft 6, a pawl N is provided which, at each stroke imparted by the cam V to the rod Z, causes the ratchet wheel F to advance one tooth. In its turn the ratchet wheel F imparts a very slow motion to the shaft 7, to which the filaments of the reserve cocoons in the rear end H′ of the basin are attached, for the purpose of keeping the filaments taut; the shaft 7 is carried on brackets secured to the stanchions X—X′.

A splash-guard *r* is provided over the vane wheel R keyed on the shaft 3. This wheel R, by turning in the direction shown by the arrow, sets up a water stream in the basin, the direction of flow being from H′ towards H″. O O′ are partitions forming the guiding canal for the cocoons passing one by one from the receiving end of the basin. U is a sluice or vane pivoting about *t* and conveying the cocoons one by one to the space right under the button *b*; the vane U being adapted to close the canal formed by the partitions O—O′. C is a further sluice or vane secured to the double-armed lever B—L swinging on the shaft 5; the one lever arm L carries a platinum plated point *l* and the filament guide Q—Q′, while the other lever arm B carries the reed B″. *y* is a support carrying the button *b*

and the resistance D, and extending across the whole length of the battery; *a* is a spring-stop provided under the arm B of the double lever B—L; *r'* is a rake preventing the detached or exhausted cocoons from passing into the basin portion H'' instead of being carried off by the buckets *e* of the elevator E; the said buckets consist of tines, so that they can pass through the dents of the rake *r*.

S is an inclined chute receiving the exhausted cocoons from the elevator E and conveying them into suitable receptacles. 4 is the bottom shaft of the elevator E; and G is a current generator.

The operation of the device is as follows: The cocoons are filled haphazard into the basin space at the rear of the rakes *m*—*m'*, and the ends of the cocoon filaments are attached to arms W secured to the cross shaft 7. When the driving shaft I is running, it actuates the rod Z through the cam V, and the vane wheel R through the shaft 3. The revolving wheel R sets up a water stream from H' towards H'' in the upper portion of the basin, all the cocoons at the rear of the rakes *m*—*m'* being thus drawn towards the canal formed by the walls O O'. The rod Z actuated by the cam V imparts a rocking motion to the shaft 6 which in turn transmits motion through the rod M to the rakes *m*—*m'* the object of which is to straighten the cocoons and convey them one by one to the canal built by the walls O—O'.

When one of the cocoons, whose filament is being unwound, detaches itself, the current set up by the wheel R carries it towards the elevator E where it is stopped by the rake *r'* and is retained until it is received and raised by one of the elevator buckets *e*. When the rising bucket *e* with the cocoon therein reaches the reed B'', the gaps between the tines of the bucket being partially obstructed by the cocoon the reed B'' is raised and the lever B—L is tilted about its shaft 5 from the position shown at B—L, Fig. 1, to the position shown at B'—L', Fig. 1. During this tilting movement the vane C attached to the lever arm L is lowered and at the end of the movement, when the upper edge of the vane C dips into the liquid thus leaving the canal O—O' open, the end of the lever arm L bears downwardly upon the projection *u* of the vane U; this latter vane U is thus swung about its center *t* and moves from the position shown at U to the position shown at U', Fig. 1, thus obstructing the canal O—O' and lifting the foremost cocoon over the vane C to a position situated right under the fixed thread guiding button *b*.

As soon as the vane C has sunk to its lowest limit and the vane U has consequently been raised, the reed B'',—being no longer in contact with the cocoon by which it was supported (that is to say, when the reed has reached the position B')—drops again through its own weight into its former position B'' carrying with it the lever L, vane C and thread guide Q, these parts being thus restored to their initial positions, and the filament of the cocoon thus fed over the vane C is guided against the other filaments that are being unwound and that after passing the eyelet *b* form the strand or raw silk thread *x*, Fig. 1.

The said reed on its return stroke from B' to B'' acquires a momentum owing to which it causes the spring stop *a* to yield or bend, thus bringing the platinum points *l'*—*l'* momentarily into contact and closing the circuit in which the resistance D is inserted. The resistance D thus traversed by the electric current becomes hot and burns the cocoon filament which is brought against it by the filament guide Q—Q' and whose end is secured to one of the arms or hooks W of the shaft 7. As soon as the filament is burnt it is caught by the filaments that are being unwound and is carried by them across the button *b*, thus replacing the filament of the cocoon that had been detached. Of course as soon as the effect of the reed's momentum ceases, the spring stop *a* returns to its natural position and forces the reed B'' back into its normal position, the points Z, Z' being thus moved out of contact so that the circuit is no longer traversed by the current. As soon as the vanes C and U have returned to their normal positions a fresh cocoon, under the influence of the water stream, takes the place of the former one in the canal O—O', in readiness for the next cycle of operation.

The cocoon that had been raised by the elevator E is dumped on to the inclined chute S and is thus conveyed to suitable receptacles.

In order to ensure that no cocoon shall remain sticking to the buckets *e* instead of being dumped on to the inclined chute, a rotary reed *s* is provided on the shaft 2 actuated by the gear wheels I'—I'', the reed *s* being so set that it scrapes the cocoons out of the buckets *e* as they pass the shaft 2.

When the feeding of a fresh cocoon is effected by the exhausted or detached cocoon, not mechanically, but electrically, the exhausted cocoon, on leaving the basin, actuates a lever which closes a circuit and thus energizes an electromagnet which imparts to the vane C a motion similar to the one above described and for the same purpose.

As examples the arrangements shown in Figs. 3 and 4 may be described as follows:

In Fig. 3 E is the elevator carrying the detached cocoons out of the basin; *e* are the elevator buckets, I the driving shaft, 4 the bottom shaft of the elevator, *r'* the rake-like vane preventing the detached cocoons from passing directly to the front portion

H'' of the basin instead of being conveyed thereto by the elevator, j is the support for a spindle 8 about which the rake-shaped lever q'—q'' can swing, P_p is a positive pole carried on q', and P_n is a negative pole of an electric circuit, y (as in Fig. 1) is the support for the button b.

When a cocoon is detached, the water stream carries it towards H'' and causes it to strike against the rake-lever q' and to tilt the latter into the position 2'' shown in dotted lines. The contact points P_p—P_n are accordingly brought into contact with each other and the electric circuit is closed; the closure of the electric circuit starts the motion of the vanes of the cocoon reservoir and thus causes a fresh cocoon to be conveyed right under the button b.

As the rake q' is not arranged right under the support y of Fig. 2, it is not necessary that, in order to let the cocoon pass, the cocoon should be raised above the level of the basin water.

For the chrysalides the operation is exactly similar to the foregoing one.

An alternate arrangement is that shown in Fig. 4. In this arrangement the vanes of the wheel R are built as in Fig. 1, in the form of rakes; and the dents of the rake vane r' are staggered with respect to the dents of the vanes of the wheel R. The vane r' is hinged at g. The dents of the vanes of the wheel R' can freely pass through these of the vane r' when there are no cocoons on the vane r', but when a cocoon lies against the vane r' the latter is obliged to pivot about g whereby it closes an electric circuit controlling the vane C of the cocoon reservoir and letting a fresh cocoon pass whilst its filament is burnt in the manner above described.

The cocoons that detach themselves may be utilized in order to cause a mechanical device to actuate an electric circuit or a valve and thus to control the opening of the door by means of levers or electric current or gas jet or liquid jet.

What I claim is:

1. An automatic silk reeling device comprising a basin, a slowly rotating member to which are attached the ends of the filaments from the fresh cocoons supplied to the basin, means for guiding the filaments being wound, an automatic feeder for supplying a fresh cocoon to replace one which has become detached, and means for automatically controlling the feeder.

2. An automatic silk reeling device comprising a basin, a slowly rotating member to which are attached the ends of the filaments from the fresh cocoons supplied to the basin, means for guiding the filaments being wound, an automatic feeder for supplying a fresh cocoon to replace one which has become detached, a vane wheel for drawing the cocoons towards the said feeder, and means for automatically controlling the feeder.

3. An automatic silk reeling device according to claim 2, having an elevator for removing the detached cocoon or chrysalis from the basin, a device operated by the cocoon or chrysalis in said elevator for operating the means for automatically controlling the feeder, and an electric circuit controlled by the feeder and having resistances for burning the filament of the fresh cocoon.

4. An automatic silk reeling device according to claim 2 in which the automatic feeder comprises a swinging lever, a vane secured to the lever, a second vane operated by the first vane for feeding the fresh cocoon over the first vane, means on the first vane for guiding the filament of the fresh cocoon to the means for guiding the filaments being wound, means for severing the filament of the fresh cocoon from the slowing rotating member, and means for swinging the said lever automatically.

5. An automatic silk reeling device according to claim 2, having an elevator for removing the detached cocoons from the basin, an inclined chute for receiving the cocoons from the elevator, and a rotating reed operated in phase with the elevator and adapted to engage the cocoons to discharge same from the elevator to the chute.

6. An automatic silk reeling device according to claim 2, having an elevator for removing the detached cocoons from the basin, a reed for retaining the detached cocoon in position, bucket members mounted on the elevator and consisting of prongs adapted to pass between the dents of the reed to receive the cocoon, and means engaged by the cocoon in the moving bucket for operating the feeder for supplying the fresh cocoon.

In testimony whereof I affix my signature

VITTORIO FIORUZZI.