(No Model.)

F. G. BERWICK & S. HADFIELD.

AUTOMATIC STOP MOTION FOR WOOL COMBING MACHINES.

No. 564,912. Patented July 28, 1896.

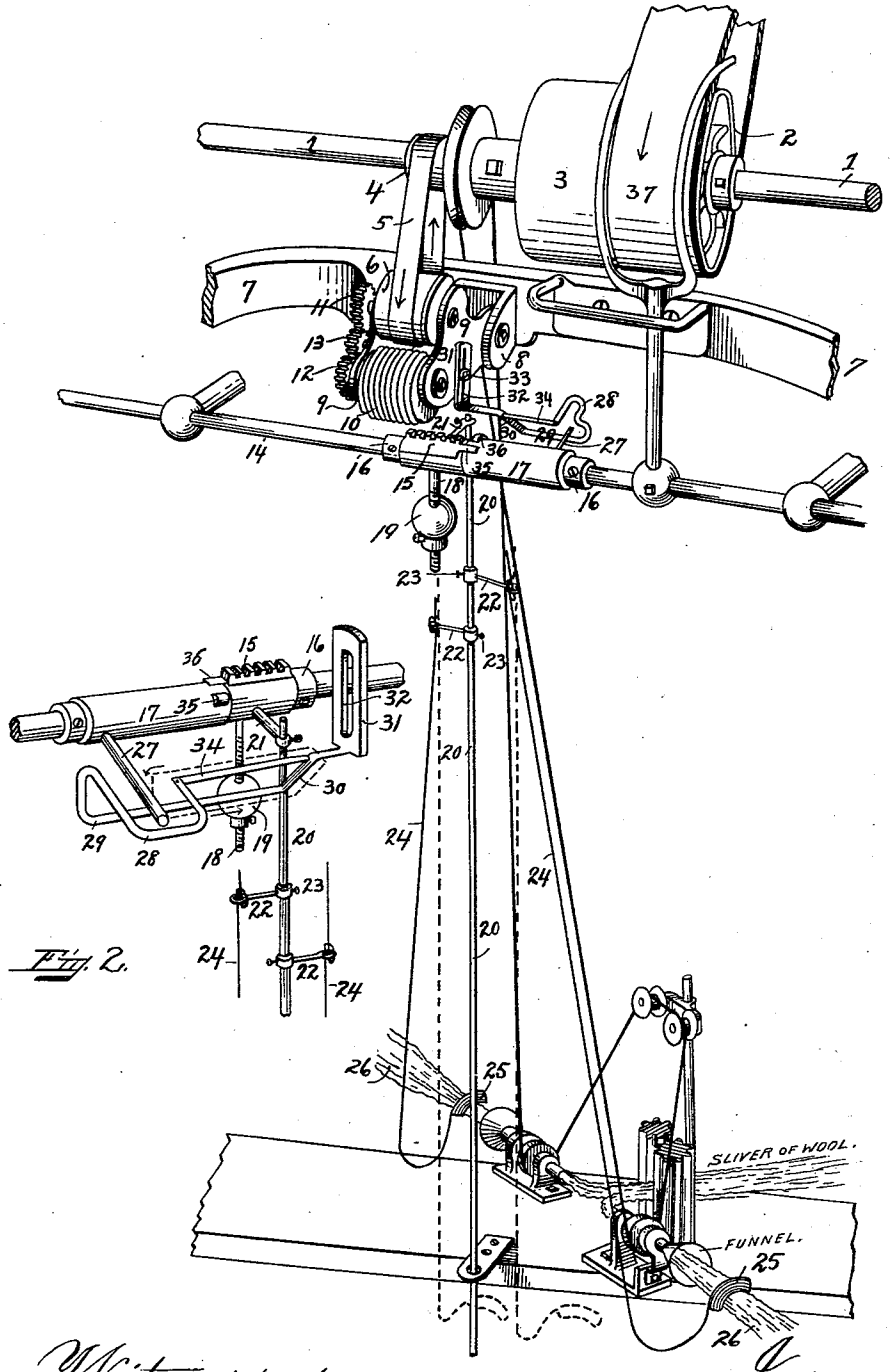

Fig. 1.

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

FRANK G. BERWICK AND SAMUEL HADFIELD, OF LAWRENCE, MASSACHUSETTS.

AUTOMATIC STOP-MOTION FOR WOOL-COMBING MACHINES.

SPECIFICATION forming part of Letters Patent No. 564,912, dated July 28, 1896.

Application filed January 3, 1896. Serial No. 574,220. (No model.)

To all whom it may concern:

Be it known that we, FRANK G. BERWICK and SAMUEL HADFIELD, citizens of the United States, and residents of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Stop-Motions Applicable to Wool-Combing Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to improvements on combing-machines in use in worsted mills; and the object of our invention is to provide a mechanism in part attachable to the frame of the comb with its coöperative parts attached to the shipper-rod for the purpose of automatically stopping said comb at such times as the "sliver" of wool which is being manipulated becomes separated or severed, and thus prevent injury to the "pins" through which the combing of the wool is accomplished.

We attain our object by the mechanism illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front view in perspective of sufficient portions of a comb-frame and the bed thereof to subserve an intelligent description of our invention thereto attached. Fig. 2 is a similar enlarged view from the rear of the automatic "throw-off" features of our improvement.

Similar characters designate like parts throughout the views, referring to which—

The numeral 1 designates the shaft of the comb which carries the fast and loose pulleys 2 and 3. Upon this shaft also is the small belt-pulley 4, which carries the belt 5, communicating with the pulley 6, which actuates and is a part of my improved automatic stop-motion mechanism as hereinafter described.

7 designates a portion of the frame of the comb to which is firmly secured by a nut and bolt the hanger 8, this in turn supporting by similar means the two frames 9, which uphold the belt-pulley 6, the worm 10, and their attendant actuating-gears, comprising the pinions 11 and 12 and the intermediate smaller gear 13. Motion is thus transmitted from the pulley 4 to the worm 10, the organized assemblage receiving its motion through the belt 5 from the shaft 1, previously alluded to.

We now refer to the "shipper-rod" 14, upon which is adjusted the worm-rack 15 and the sleeve 17, which are both loose upon said rod 14 while retained in their appropriate positions, and restrained from independent longitudinal movement by their fixed collars 16, the normal position of the worm-gear 15 being disengaged, as illustrated. A threaded rod 18 depends from the hub of the worm-gear 15, and supports the adjustable counterweight 19, whose office is to poise said gear 15 normally, this weight being regulated to equiponderate the vertical rod 20, adjustably suspended from the short arm 21, also projecting from the same hub and in a position at right angles to the threaded rod 18. The appurtenances to rod 20 comprise two sliding hangers 22, vertically adjusted and respectively secured by screws 23, said hangers in turn loosely suspending each, a hanging wire 24 terminating at its lowest end in a reflexed form and provided with an anti-friction terminal 25 of rubber, porcelain, or other suitable material, which is supported in proximity to the funnels by the sliver of wool 26 as long as the latter remains intact or unbroken with the comb mechanism running smoothly. When, however, the sliver 26 is severed from any cause, the suspended wire or wires 24 impart their additional weight to the vertical rod 20, which obviously overcomes the counterweight 19, and consequently semirotates the worm-rack 15 into mesh with the rotating worm-gear 10, thus actuating longitudinally the shipper-rod 14 with its attached shipper, and through it the belt 35 is moved upon the loose pulley 3, thus stopping the comb.

We will now revert to the two-track automatic device through which the rack 15 is thrown off from worm 10. (See Fig. 2.) The loose sleeve 17 previously mentioned is provided with a short projecting rod or traveler 27 (in a similar position as the arm 21 previously described) resting below the loop 28 and upon the lower supporting-track 29, of which it forms a part, so long as the comb runs properly and the sliver of wool is integral. The longitudinal portion of said

track 29 is interrupted by a short and quick incline 30 integral therewith and adjacent to the reflexed shank 31, provided with the slot 32, by which it may be adjustably secured by the bolt and nut 33 against the frame-piece 9. 34 designates the flexible upper track bridging the highest end of said incline, and the terminal of the loop 28 to which said flexible track is secured. Said sleeve 17 is further provided with a lug 35, which coacts with a flange 36, forming a part of rack 15, whose office will be presently described.

To illustrate the operation of our automatic safety device, the sliver 26 is supposed to be severed, the wire or wires and described connections fall to the positions indicated by dotted lines, Fig. 1, their additional weight augmenting the weight of the rod 20 brings the rack 15 into mesh with worm 10, the flange 36 consequently turning backward in juxtaposition to the lug 35, the traveler 27 resting upon track 29. From this position the shipper-rod 14, actuated by the worm 10 through the rack 15, carries the traveler 27 along to the foot of the incline 30 in the path of the dotted line and arrows, Fig. 2. In such a position the belt 35 is already thrown upon the loose pulley 3. The rack 15, however, has sufficient further action (without disturbing the belt or pulley 3) to raise the traveler 27 to the top of incline 30, past the free end of the flexible track 34, so that it rests upon it momentarily. Meanwhile, in mounting said incline 30 the traveler 27 has semirotated the lug 35 forward again against the flange 36, which action releases the rack 15 from the worm 10, the counterweight overcoming the weight of the now suspended parts, previously instrumental in bringing said rack in the path of the worm, as hereinbefore described. The machine-operator having reunited the sliver, restores the wires 24 and their terminals 25 to a proper position as formerly upon the sliver, and manually ships the belt again upon the fast pulley 2, the traveler 27 of course moving from its rest along the flexible track 34, being upheld thereby until it reaches the loop 28, whence it falls to its original position on 29, as illustrated. The counterweight 19, upon the suspension of the terminals 25 upon the sliver, again obviously exerts its influence to hold the rack 15 in its normal position on the shipper-rod 14, while the lug 35 falls away from the flange 36 on the descent of the traveler 27 to its place of rest 29, as previously shown.

In the practical construction of our invention we do not desire to restrict ourselves to the precise form of the several devices illustrated and described, but may employ therefor substantially the equivalents which would be within the fair scope and spirit of our invention.

Having thus described the operation and construction of our improved invention, we desire to secure by Letters Patent of the United States, and we claim—

1. In a combing-machine, the combination of the comb-driving shaft, fast and loose pulleys mounted thereon, a bracket connected to the framing, a pulley 6, and worm mounted on said bracket, gearing connecting the same, said pulley 6 having a belt connection with said driving-shaft, a belt-shifter and a rod carrying the same, a rack on said rod and means controlled by the sliver for throwing said rack into engagement with the worm upon the breakage of the sliver to thereby shift the belt, substantially as described.

2. In a machine for wool-combing, the fast and loose pulleys, the revoluble shaft driving said pulleys, the shipper-rod and means thereon under control of the worm-rack for shifting the main belt to the loose pulley, the said worm-rack and the main belt, in combination therewith, the small belt-pulley 4 deriving motion from the main shaft, the worm, the means for transmitting motion from the pulley 6, to actuate the worm, and the worm-rack carried by the shipper-rod having two hangers connected thereto, the two hanging wires suspended thereby provided with antifrictional terminals at their lower ends adapted to be supported upon and by the sliver of wool while the functions of the comb are uninterrupted, substantially in the manner and for the purpose set forth.

3. In a machine for combing wool, the comb-driving shaft and belt-pulleys mounted thereon, the shipper-rod, and means thereto attached for shipping the main belt from one pulley to the other, comprising the worm-rack mounted on the shipper-rod and provided with a projecting arm, the means supported thereby and controlled by the sliver to insure engagement of the worm and worm-rack when said sliver is severed, the worm, the sleeve and the counterweight restoring the worm-rack to its normal position, the lug, and the worm-rack flange adapted to abut against the said lug on the sleeve as the latter is semirotated automatically to throw the rack out of engagement with the worm, and means for rotating said worm, substantially in the manner specified.

4. In a machine for combing wool, the comb-driving shaft, the driving-pulleys thereon, the bracket, and the frames supported thereby, the pulley 6, and the worm mounted within the frames, the gearing communicating motion from the pulley to said worm, the rod provided with a movable worm-rack, the overlapping flange forming an integral part thereof, the movable sleeve on said rod provided with a lug adjacent to, and coacting with the flange, the collars preventing longitudinal movement of the said worm-rack and sleeve, the traveler projecting from, and adapted to semirotate the sleeve on the rod, and means whereby the said traveler is actuated to restore the normal position of the worm-rack substantially as described.

5. In an automatic stop-motion for combing-machines, the bracket, the frames there-

by upheld, the worm thereto connected, the worm-rack actuated by the worm, the rod provided with a belt-shifter, and the sleeve on said rod provided with a traveler, in combination therewith, the two-track automatic throw-off device, comprising a rigid track supporting and guiding said traveler while the worm and worm-rack are enmeshed, and the incline forming a part of said track, the flexible track, one end of which rests upon said incline to permit the escape of the traveler, the other end secured to a loop through which the traveler falls to its former starting-point on the rigid track, after restoring the worm-rack to its normal position on the shipper-rod substantially as specified.

6. In a combing-machine, the pulley 6, the worm and the connected gears adapted to be actuated from the comb-driving shaft, the worm-rack provided with means for its semirotation upon breakage of the wool sliver, the sleeve coacting therewith, the traveler thereon, adapted to actuate the sleeve, the track 29 limiting the downward movement of the traveler, the incline 30 integral therewith forcing the upward movement of said traveler, in a manner to semirotate the sleeve-lug 35 against the worm-rack flange 36, to disengage said worm-rack from the worm, the flexible track 34 to guide the traveler from the incline the loop 28 to receive and to permit the traveler 27 to fall to, its former point of rest, and means as hereinbefore described for the support and adjustment of the same substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 14th day of October, A. D. 1895.

FRANK G. BERWICK.
SAMUEL HADFIELD.

Witnesses:
THOS. BEVINGTON,
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