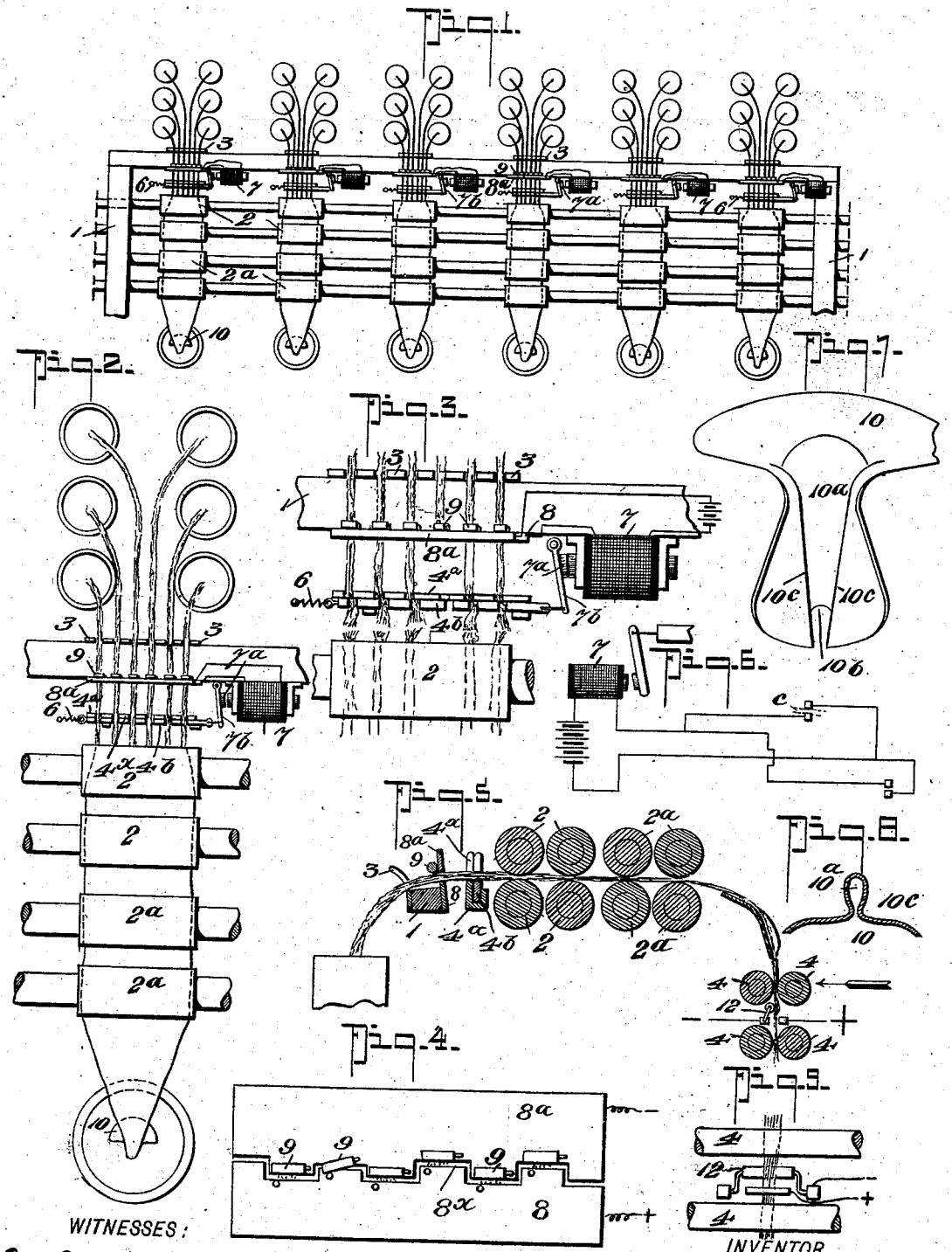
No. 655,141. Patented July 31, 1900.

S. M. WETMORE.

STOP MOTION FOR DRAWING FRAMES.

(Application filed Oct. 5, 1899.)

(No Model.)



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STOP-MOTION FOR DRAWING-FRAMES.

SPECIFICATION forming part of Letters Patent No. 655,141, dated July 31, 1900.

Application filed October 5, 1899. Serial No. 732,694. (No model.)

To all whom it may concern:

Be it known that I, SILAS MACBEE WETMORE, residing at Fayetteville, in the county of Cumberland and State of North Carolina, have invented certain new and useful Improvements in Stop-Motions for Drawing-Frames, of which the following is a specification.

This invention relates to improvements in stop-motions for drawing-frames of cotton machinery, such as is known in the art as "coiler drawing-frames."

In the construction of drawing-frames for coiling cotton it is usual to provide said frames with mechanical, electrical, or electromechanical stop-motions, generally so constructed as to be automatically set (by reason of the can becoming empty or the sliver breaking) to arrest the motion (through the media of coacting mechanisms) of the entire machine by shifting the drive-belt or the clutch upon the drive-shaft. Stop mechanisms constructed and operating on the lines indicated fail to effect all of the results desired, particularly so in coiler drawing-frames equipped with a number of railway-heads, in that when an end of any one of the heads runs out or one of the strands of the sliver breaks the shaft operating the entire set of heads comprised in the complete machine is held at rest and the machine remains inert until the operator adjusts the broken head. In mills where small help is employed this objectionable feature is of a serious nature, as one operator usually looks after a number of machines, and by reason thereof it frequently occurs that a machine thrown out of gear by the stop-motions, such as in general use, must of necessity remain idle until the operator can find time to readjust the same and again start it in motion. My invention primarily seeks to provide a simple and effective stop-motion for each head of the series constituting the complete machine, adapted to operate independently, whereby any one of the heads of the drawing-frame can be thrown out of operation automatically without disturbing the remaining heads—in other words, without stopping the machine.

To this end my invention comprehends in its general nature electromagnetical devices for each head held to a normal or inoperative position through the media of the perfect sliver or strand thereof engaging a movable part of the said devices, which part when a sliver breaks either at the corded end or strand end automatically drops and sets into an operative condition the stop-motion to throw out of operation the head with which it coacts without interfering with the operating-shaft or drive-gearing operating the remaining heads.

My invention also embodies a novel electromechanical mechanism including a separate circuit-closer for each strand of the sliver and a shifter engaging all of the strands of the sliver relatively so constructed and adapted to operate in such manner that when any one of the strands of the sliver breaks its coincident circuit-closer will automatically drop to close the circuit and energize the electromagnet to operate the shifting bar, which then grabs the remaining strands and effects sufficient tension thereon to cause them to break, thereby cutting out the one head without interfering with the operation of the remaining heads.

My invention also comprehends in its more specific nature a novel form of trumpet or guide constructed to coact with my improved stop-motion mechanism, whereby the ends of the broken heads after being passed through the draw-rolls in the usual manner can be grasped by the operator and inserted into the trumpet or guide without necessitating the stopping of the machine, an operation that is necessary in the ordinary construction of trumpet and stop-motion mechanism.

In the practical application of my invention various detailed constructions of mechanism may be employed to effect the objects above outlined and which may fall within the scope of my invention. I prefer, however, on the score of economy, simplicity of construction, and ease of operation to arrange the parts constituting my invention substantially in the manner disclosed in the accompanying drawings, in which—

Figure 1 is a diagrammatic plan view of the coiler drawing-frame, showing the same equipped with six headers. Fig. 2 is an enlarged plan view of a part thereof, illustrat-

ing the of the heads and my improved stop-motion and trumpet-guide device connected therewith. Fig. 3 is an enlarged plan of a part of the drawing-frame shown in Fig. 2. Fig. 4 is a front elevation of such part. Fig. 5 is a transverse section on the line 5 5 of Fig. 3. Fig. 6 is a diagrammatic view illustrating the manner of arranging the contacts in series in the battery-circuit. Fig. 7 is a detail view of the trumpet or guide; and Fig. 8 is a cross-section thereof on the line 8 8 of Fig. 7. Fig. 9 is a detail view looking in the direction indicated by the arrow in Fig. 5.

Referring to the accompanying drawings, in which like numerals indicate like parts in all the figures, 1 indicates the drawing-frame, which is shown equipped with six heads, each of which is fed from six cans—that is, six strands are fed to the drawing-rolls of each head to form the sliver.

2 2^a indicate the front and back drawing-rolls, one set for each head; 3, the sliver-guides; 4, the calender or sliver-compressing rolls, each of which, together with the operating-gearing therefor, may be of the ordinary construction, as said parts *per se* form no portion of my invention.

As before stated, I provide an independently-operated stop-motion for each head, and as all of the said stop-motions are alike a detailed description of such motion for one head will suffice for all.

My improved stop-motion comprises a sectional guide disposed between the usual sliver-guides and the front drawing-rolls, and the said sectional guide when in a normal position has its fingers registering with the front sliver-guides 3, so as to provide for a straightway run of the strands from the guides 3 to the front drawing-rolls 2, which, it should be stated, are fluted, as usual, for the proper engagement therewith of the strands. The sectional guides consist of a fixedly-held section 4^a, having finger members $4^\times$, and a movable section 4^b, also having fingers adapted to register with the fingers $4^\times$ when the sections are in their normal position and to slide over the front faces thereof, as shown in Fig. 5. The movable section 4^b is moved to its normal position by a suitable spring or weight—a spring 6 being shown—and it is arranged to be moved in an opposite direction transversely to the direction of pull of the strand-sliver by electromagnetic force. For this purpose an electromagnet 7 is provided disposed adjacent one end of the head, the armature 7^a of which forms a part of the pivoted lever 7^b, having pivotal connection with the sliding guide-section 4^b, the parts being so arranged that when the magnet is energized in the manner presently described the armature-lever will draw the sliding guide-section across its mate and pull the several cotton strands sidewise for a purpose presently made clear.

At a point between the main sliver-guides and the sectional guide therefor I provide a supplemental guide formed of two metallic sections 8 8^b, one of which forms a positive and the other the negative terminal of the electric circuit connecting with the electromagnet 7. The plates 8 8^a have a stepped arrangement of passages or slots through which the several strands of the sliver pass, one sliver passing through each slot.

Operatively mounted over each slot $8^\times$ is disposed a contact-maker, which may be a roll or drop member 9, electrically joined at one end with one guide-plate section 8^a and normally held from contact with the other plate-section by reason of its resting on the cotton strand that passes through the respective slot over which the said member 9 operates.

So far as described the manner in which my improvements operate is best explained as follows: Assuming the head to be in a proper operative condition, all the strands being unbroken, the several contact-makers are held lifted to keep the magnet-circuit broken, the shifting guide being then in such position that its fingers will register with the main sliver-guides, and thereby permit the strands to pass directly and freely over the guides 3 to and between the front draw-rolls. Now should any one of the strands of the sliver break it follows, as soon as the broken end passes through the sliding guide 8, and from under its respective contact-maker 9, that said contact member 9 will drop by gravity and connect the terminal plates 8 8^a, and thereby close the circuit to the electromagnet, which instantly, through the movement of its armature-lever, shifts the sliding guide member, which movement of the said guide member serves to grab the remaining and unbroken strands of the sliver and draws them taut under tension sufficiently to cause them to break usually at a point just in advance of the front draw-rolls, and thereby throw the entire head out of operation, it being understood that such result is effected without disturbing the remaining heads, it also being obvious that the same results will occur when the end of the strand is drawn up from the can. It will thus be seen that my improved stop-motion in any case of break of the sliver-strand or interruption of the feed of the strands only the head in which the sliver is so effected will stop while the remaining heads proceed with their work. This is obviously an advantage over the present usual form of stop-motion that throws the entire machine out of operation when one head runs out or its sliver therefor is in any way broken. As the strands usually break in advance of the front draw-rolls, to again start the head the operator picks up the ends which in my form of stop-motion are usually held within the main guides and the supplemental sectional guide-fingers and pushes the said ends into the draw-rolls, which operation is effected during the running of the rolls. Ordinarily the ends after being passed through the draw-rolls are connected, twisted, and passed through the

trumpet and into the calender or sliver-compressing rolls. In the passing of the strands to the trumpet it frequently necessitates the stopping of the machine to prevent the clear waste choking the trumpet. To overcome this and make it possible to quickly and effectively guide the strand ends that are passed through the rear drawing-rolls to the calender or sliver-compressing rolls, I provide a special form of guide which I term an "open" trumpet, in which the said strands can be almost instantaneously fed and properly guided without necessitating the stoppage of the machine. The open trumpet, which is illustrated in detail in Figs. 7 and 8, comprises a segmental disk portion 10, which lies in a plane with the sliver-body as it passes in the rear draw-rolls and forms a guide-rest therefor. The outer edge of the disk 10 terminates centrally in a semiconical pendent extension 10^a, tapering toward the lower end, which terminates in a depressed contracted seat 10^b, the base of which is of a diameter substantially that of the outlet end of the ordinary funnel-trumpet. The end walls that form the seat 10^b are made sufficiently thin to have a spring action, and that part of the walls above the seat 10^b (designated by 10^c) is slightly bent inward to form guards to prevent the sliver freely pulling out of the seat portion 10^b. The pendent end 10^a of the open trumpet is projected at an acute angle to the calender-rolls 11, so that the sliver as it drops down will tend to more firmly engage the seat portion 10^b, as indicated in Fig. 5.

By providing a guide as described it is manifest the operator need not twist the ends of the strands to thread the trumpet, as is now done, but can grasp the several ends and squeeze them down in the seat 10^b, with the ends hanging between the calender-rolls to be engaged thereby, the seat portion of the trumpet-guide holding the sliver-strands sufficiently compressed to prevent them from pulling out of the guide.

By means of my stop-motion and open trumpet or guide the machine need not be stopped until all of the cans fed to the several heads have become exhausted, as any one or more of the heads can be automatically thrown out of operation without interfering with the remainder, and such heads as have been stopped can be started again without stopping any part of the drive-gearing for the other heads.

As the sliver sometimes breaks between the calender-rolls by reason of the clearer waste choking the trumpet, I provide a supplemental circuit-closer device (indicated by 12) that is normally held open by contact with that part of the sliver under the calender-rolls. (See Figs. 5 and 9.) This circuit-closer is also in the nature of a drop member, which, together with the circuit-closers 8 8^a, is held in series with a magnet-circuit, as diagrammatically illustrated in Fig. 6, so that in case either of the closers 12 or 9 is operated the magnet will be energized. The electrical connections, including the member 9, will create a stop-motion in case of any break between the draw-rolls and the feeder-can, while the electrical devices 12 will effect a stop-motion in case of any breakage between the back draw-rolls and the calender-rolls.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An electric stop-motion for cotton-coiler drawing mechanisms, comprising devices for breaking the several strands of the sliver; a circuit-closer normally held open by the sliver but automatically closing upon a break in the sliver; and electromechanical devices governed by the circuit-closer for shifting the strand-breaking devices to an operative condition by the closing of the circuit-closer.

2. An electric stop-motion for cotton-coiler drawing mechanisms, comprising devices for breaking the several strands of the sliver; a plurality of circuit-closers, one engaging the sliver at the rear of the draw-rolls and one engaging the sliver in advance of the said rolls, said circuit-closers being normally held open by the sliver, but automatically closing upon a break in the sliver; and electromechanical devices governed by the said circuit-closers for shifting the strand-breaking devices into an operative condition by the closing of either of the said circuit-closers.

3. As an improvement in cotton-coiler drawing-machines, in combination with the drawing-rolls and the calender-rolls; a guide for receiving the sliver as it passes out of the drawing-rolls to the calender-rolls, said guide consisting of a rest portion and a pendent member having a receiving-mouth open its length and terminating in a contracted seat for the purposes specified.

4. As an improvement in cotton-coiler drawing-machines, the combination with the drawing-rolls and the calender-rolls; of a guide for receiving the sliver as it passes from the drawing-rolls to the calender-rolls, said guide consisting of a rest portion and a pendent semiconical member terminating in a contracted seat, said member having its discharge end projected at an acute angle to the coacting surfaces of the calender-rolls.

5. The combination with the drawing-rolls, and a shifting guide engaging the several strands of the sliver; of electromechanical devices connected with the said guide and adapted, when energized, to move the guide in a direction to break the several sliver-strands; a separate circuit-closer for each sliver-strand, normally held open by contact with the sliver-strand, and adapted to move to a closing position when the strand passes from engagement therewith, all of the said closers being in circuit with the electromechanical devices for operating the shifting guide, as specified.

6. In a mechanism for the purposes described; the combination with the drawing-

rolls and the main guides for the sliver-strands; of a supplemental guide member therefor, said guide member being adapted to automatically shift transversely of the line of feed of the sliver, whereby to break the sliver-strands; shifting mechanisms coacting with the said supplemental guide member, said shifting mechanism including a trip normally held to an inoperative position by the sliver and adapted to operate to shift the strand-breaking guide when a break occurs in the sliver as specified.

7. In a mechanism as described; the combination with the drawing-rolls and the main sliver-guides; of a shifting guide disposed between the main guide and the drawing-rolls for engaging the several strands of the sliver, said shifting guide moving in a plane transversely of the feed of the sliver; electromechanical devices coacting with the shifting guide and adapted when energized to shift the said guide and break the strands; a supplemental guide disposed between the main guide and the shifting guide, said supplemental guide having a separate passage for each strand and consisting of two plates forming the terminals of the circuit connected with the aforesaid electromechanical devices; and a gravity circuit-closer for each passage-way in the said supplemental guide, each closure being normally held open by reason of its coincident sliver-strand and adapted to drop to a closing position when the strand passes from thereunder, whereby to energize the electromechanical devices for operating the shifting guide for the purposes specified.

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