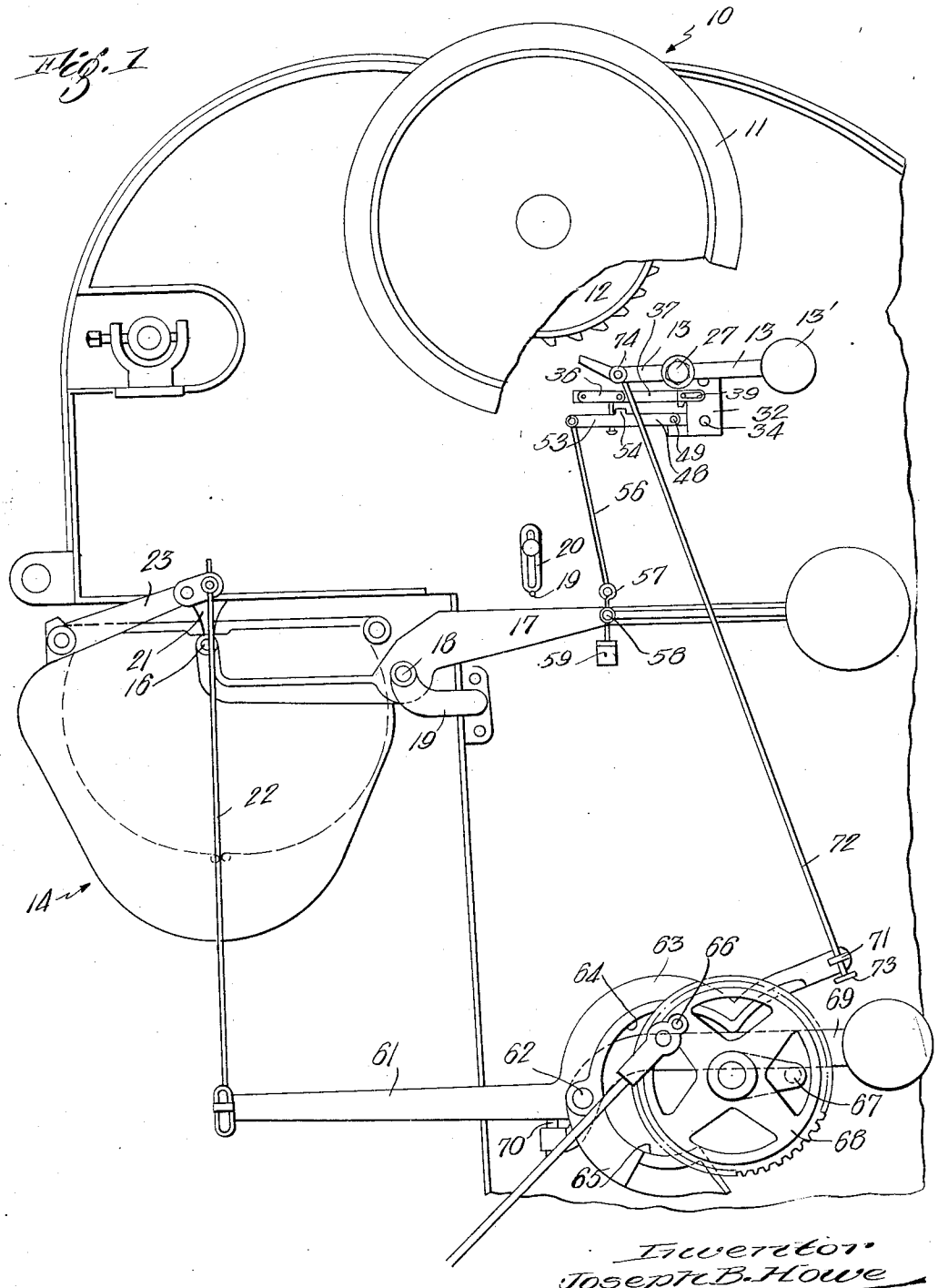
May 24, 1932. J. B. HOWE 1,859,444

LATCH MECHANISM

Filed March 7, 1930 3 Sheets-Sheet 1

Fig. 1



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LATCH MECHANISM

Filed March 7, 1930 3 Sheets-Sheet 2

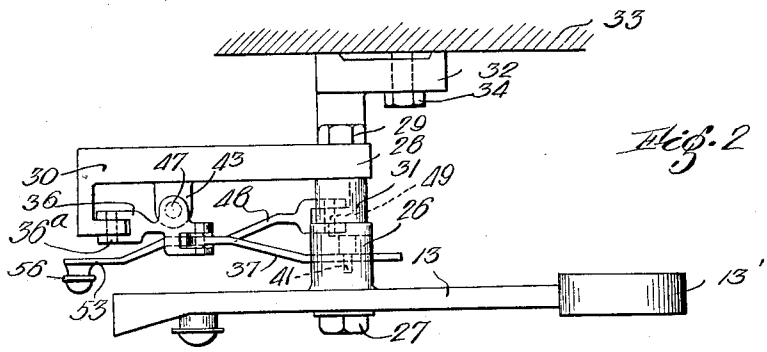


Fig. 2

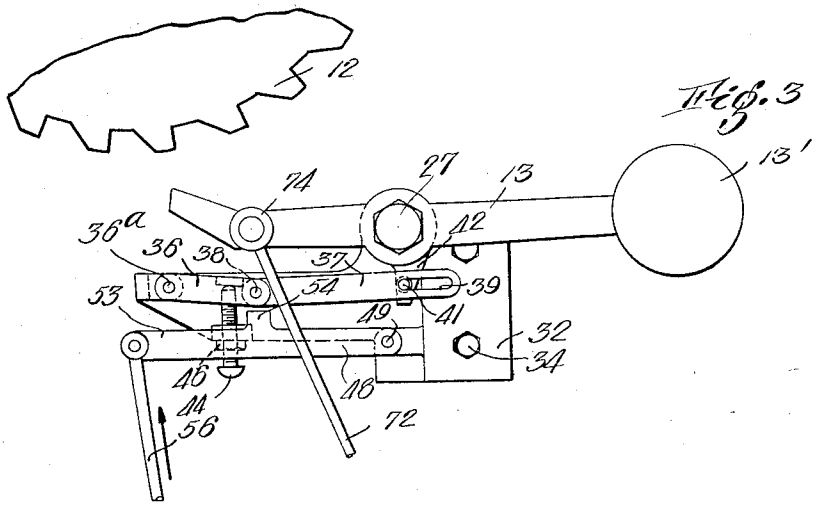


Fig. 3

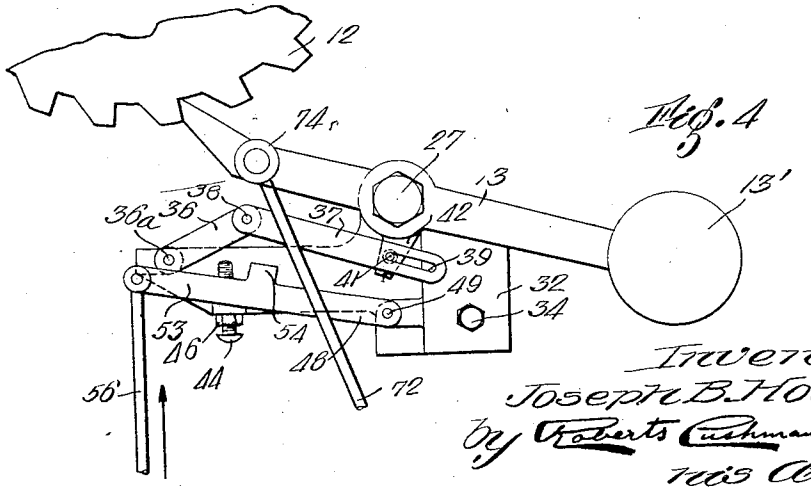


Fig. 4

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May 24, 1932. J. B. HOWE 1,859,444

LATCH MECHANISM

Filed March 7, 1930 3 Sheets-Sheet 3

Fig. 5

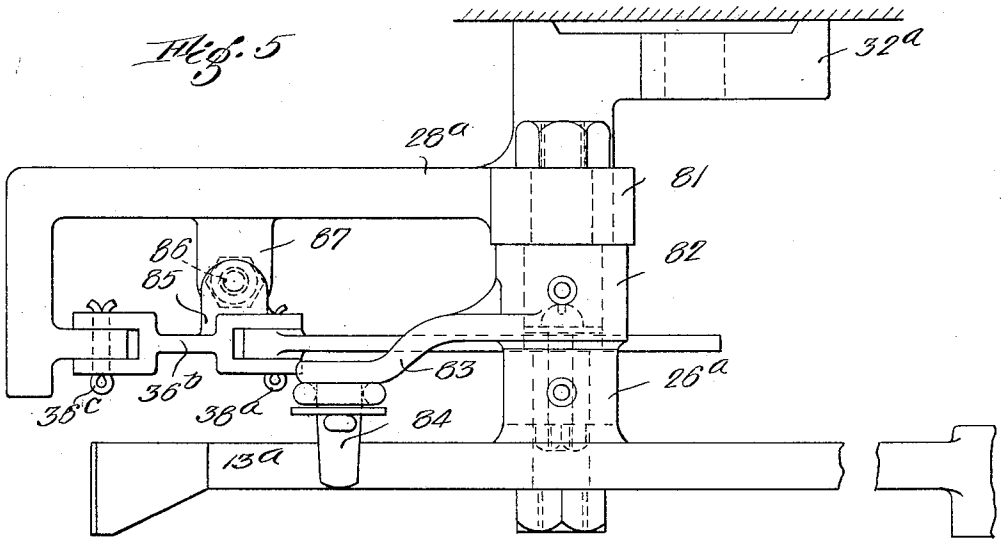
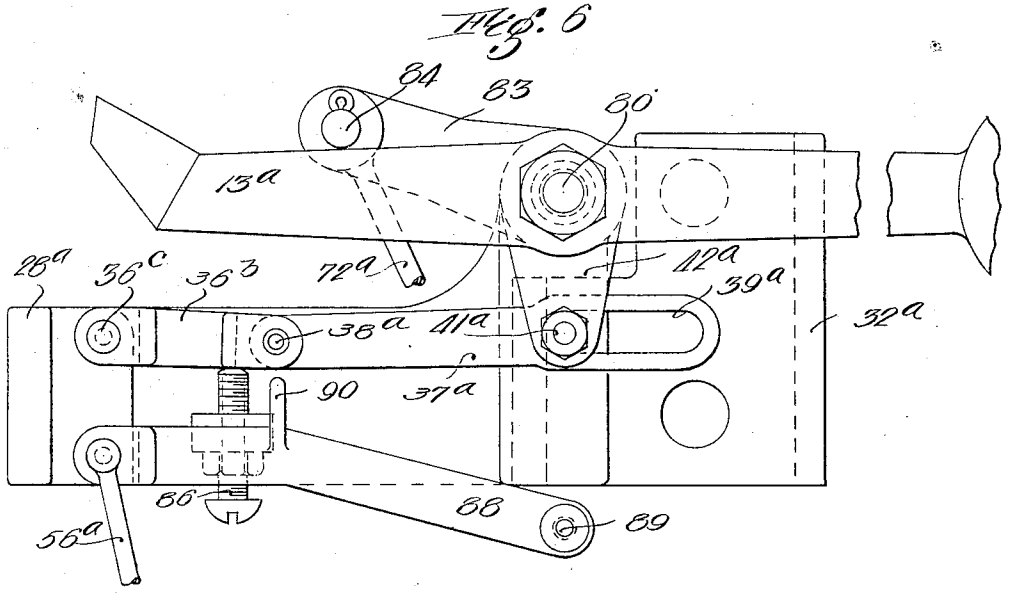


Fig. 6



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UNITED STATES PATENT OFFICE

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LATCH MECHANISM

Application filed March 7, 1930. Serial No. 434,146.

This invention pertains to textile machinery of that kind having means for delivering fibrous material, a movable part which controls the delivery of such material, and an actuator for said movable part, and relates more particularly to a trip mechanism or latch device normally preventing movement of said movable controlling part but which may be released by the actuator. The patents to Howe 1,434,058, October 31, 1922, and 1,733,225, October 29, 1929, may be cited as instances of the utility of such trip mechanism, the first patent relating to a card feeder in which the movement of a fiber delivering spike apron is determined by a trip of this general type, while the second patent relates to mixing and blending apparatus in which the operation of a fiber arresting catch pan (among other things) is determined by a trip mechanism.

For convenience in description of the present invention and its mode of application, it is herein illustrated with reference to its embodiment in a card feeder such as that above referred to, but in its broader aspects it is of general utility, and particularly in textile machines where the movement of an actuator responsive to the weight or pressure of fiber is relied upon to control other parts, and wherein, in order to ensure delicacy of operation, the actuator must not be placed under restraint or be called upon to exert substantial force in releasing the trip.

In accordance with the present invention, I provide trip mechanism which is sensitive and rapid in action, although positive in its operation, which is simple, rugged and durable in construction, and which is applicable to existing machines without substantial change in the latter. Furthermore, as applied to certain types of card feeder wherein a fiber delivering spike apron is actuated by means of a clutch controlled by a gravity pawl, the present invention provides a much more rapid and certain control of the pawl and release of the clutch than is possible with most trip mechanisms with which I am familiar.

In the drawings:

Fig. 1 is a side elevation of a portion of the right side of a card feeder of a known type having the present invention embodied therein;

Fig. 2 is a plan view to larger scale, showing my improved trip mechanism;

Fig. 3 is a side elevation of the trip mechanism of Fig. 2 together with portions of a card feeder controlling clutch;

Fig. 4 is a side elevation of the apparatus shown in Figs. 2 and 3, but showing the parts in different relative positions; and

Figs. 5 and 6 are a plan and front elevation respectively illustrating a modification of the structure of Figs. 1 to 4.

The features of the present invention are illustrated as embodied in a machine which resembles in general construction, the one shown in the patent to Bramwell, No. 216,372, June 10, 1879, and which is also further described and illustrated in my prior Patent No. 1,434,058, issued October 31, 1922.

In the machine disclosed in the Howe patent just referred to, the spike apron (not here shown) is driven by means comprising a two-part clutch 10, one of the elements of this clutch being a pulley 11, which rotates continuously. The engagement of the clutch parts is controlled by a ratchet wheel 12 which causes the clutch elements to be disengaged so long as the wheel 12 is held stationary by a pawl 13. Material delivered by the spike apron is deposited in the scale pan 14 fulcrumed at 16 on the duplex scale beam 17, which is fulcrumed intermediate its ends as at 18 upon brackets 19 fixed to the frame of the machine. When the desired amount of material has been deposited in the scale pan, the latter over-balances the scale beam and moves downwardly about its pivots 18, this counterclockwise movement of the beam being limited by a suitable abutment. When the scale pan has moved downwardly under the weight of the material deposited therein, it is discharged in any suitable way, for example by the movement of a connecting rod 22 attached to an operating lever 23.

The improved trip mechanism for controlling the position of the pawl 13 and for thereby determining the operation of the

spike apron is shown in detail in Figs. 2 and 3. The pawl 13 is provided with a hub 26 mounted to turn upon a stub shaft 27, fixed by a nut 29 in a boss 31 carried by a bracket 28. The bracket 28 is provided with a pad 32 by which it may be attached to any fixed support, for example the end frame 33 of the card feeder, by means of bolts 34. The free end 30 of bracket 28 has an L-shaped end to which the forked end of a link 36 is pivotally secured by a pin 36*a*. The other end of this link is pivotally connected to one end of a second link 37 by means of a pin 38. The opposite end of the link 37 is slotted at 39 to receive a pin 41 carried by an arm 42 depending from the hub of the pawl. The bracket 28 is also provided with a downwardly and laterally disposed lug 43 which carries an adjustable stop screw 44, the latter being provided with a lock nut 46 for holding the screw in adjusted position in the bracket.

The upper end of the screw 44 constitutes an adjustable abutment for engagement with a laterally disposed ear or lug 47 carried by the link 36 and by adjusting the screw 44 the normal position of the pivot pin relative to the plane determined by pivot pins 36*a* and 41 may be determined. The links 36 and 37 constitute a toggle latch, and when the pin 38 is disposed slightly below the plane defined by pins 36*a* and 41, the pawl is supported in the position of Fig. 3, since pin 41 can not move to the left under the influence of weight 13′. A lever 48 is fulcrumed upon the bracket 28 at a point 49. The lever 48 is bent to extend diagonally outward and below the pivot pin 38 which unites the links 36 and 37. The central portion of this lever carries a lug 54, which is adapted to engage the links 36 and 37 directly at the pivotal connection thereof when the lever 48 is moved upwardly. It will also be observed that the pivotal connections of the links 36 and 37 are offset laterally and that these links are bent or offset to extend diagonally between the pins 36*a* and 41. This arrangement permits greater freedom of movement for the lever 48 and the links 36 and 37.

A latch tripping rod 56 is pivotally connected to the outer end 53 of the lever 48 and carries at its lower end a stop, consisting in this instance of a loop 57 in the rod. The lower portion of the rod 56 is slidably received in an apertured pin 58, which is mounted to be free to turn in the scale beam 17. These parts are so adjusted that when the scale beam is over-balanced and moves in a counterclockwise direction, the pin 58 will engage the loop 57 and move the rod upwardly, the rod being supported at all other times in a fixed position by an angle bracket 59 mounted upon a fixed part of the machine.

Apparatus such as is disclosed in the patent to Howe 1,434,058 above referred to, may be used for discharging the scale pan and for withdrawing the pawl 13 from engagement with the ratchet 12. Such apparatus in brief comprises a lever 61 mounted upon a fixed pivot 62 and having a yoked end 63 provided with cam faces 64 and 65. This lever 61 is oscillated by cam-engaging rollers turning on studs 66 and 67 carried by the gear 68. A weighted lever 69 pivoted on stud 62 carries an adjusting screw 70 which engages the under side of the lever 61. The upper arm of the yoke carries an apertured lug 71 which slidably receives a rod 72 provided with an abutment 73 at its lower end and pivotally connected at 74 to the pawl 13.

In the operation of the apparatus, when the desired amount of material has been deposited in the scale pan 14, the latter moves downwardly, and the resulting counterclockwise movement of the scale beam 17 causes the pin 58 to engage the stop 57 of the rod 56 and thereby to move the lever 48 upwardly, whereupon the abutment 54 breaks the toggle joint comprising the links 36 and 37. This releases the pawl 13 so that the latter may swing under the influence of its counterweight 13′ into engagement with the ratchet 12, thereby disengaging the clutch 10 and stopping the operation of the spike apron.

Subsequent downward oscillation of lever 61 first results in releasing the contents of the pan (after which the latter swings upwardly to normal load receiving position) and then as lever 61 oscillates in the opposite direction, the lug 71 engages the abutment 73 on the end of the rod 72 and pulls the rod down to withdraw the pawl from ratchet wheel 12. The slot 39 in the end of the link 37 is so arranged and proportioned that the end of this slot will be engaged by the pin 41 as the pawl resumes its normal inoperative position (Fig. 3) so as to snap the links 36 and 37 into the position shown in Figs. 1 and 3.

The links 36 and 37 together with their pivotal connections comprise a toggle latch mechanism and by adjusting the screw 44 the position of these links may be adjusted so that normally the pivot point 38 is either on or slightly below its dead center position. Assuming that the point 38 is substantially in line with the pivotal connections at the ends of the links 36 and 37, it will be seen that the link 37 will move away from the pin 41 practically at the same instant that the abutment 54 of lever 48 is brought into engagement with the links and consequently there will be no delay in operating the pawl 13.

Referring to Figs. 5 and 6, the pad 32*a*, which is adapted to be attached by bolts or otherwise to the machine frame, supports a bracket 28*a*. A stub shaft 80 projects from a boss 81 forming a part of the bracket 28*a* and on the forward part of this shaft the

pawl 13*a* is pivoted. Between the hub 26*a* of the pawl 13*a* and the boss 81, a collar 82 is mounted to turn freely on the shaft 80. This collar is provided with an arm 83 having a projecting pin 84 projecting near its end. This pin overlies the pawl 13*a*, and intermediate its ends passes through an eye in the end of the resetting rod 72*a*.

A toggle link 36*b* is pivotally mounted at one end upon a pin 36*c* carried by the bracket 28*a*; the other end of this link is secured by a pin 38*a* to the second toggle link 37*a* whose opposite end is furnished with a slot 39*a* for the reception of a pin 41*a* carried by an arm 42*a* projecting from the hub 26*a* of the pawl.

A lever 88 is mounted to swing upon a stub shaft 89 secured to the machine frame, or to a portion of the bracket 28*a* as may be preferred, and this lever carries a finger 90 which is disposed immediately below the joint, defined by the pin 38*a*, between the toggle links 36*b* and 37*a*. An actuating rod 56*a* is secured to the free end of the link 88 and extends downwardly for actuation by the scale beam in the same way as the rod 56 above described.

The toggle link 36*b* is furnished with a lateral lug 85 which overlies the upper end of an adjusting screw 86 carried by an ear 87 projecting from the bracket 28*a*. Normally this screw is so adjusted that the joint between the links 36*b* and 37*a* is slightly below the plane defined by the pivot 36*c* and the pin 41*a*.

The operation of the mechanism disclosed in Figs. 5 and 6 is substantially identical with that of the mechanism shown in Figs. 1 to 4, it being noted, however, that the resetting rod 72*a* is not connected directly to the pawl but actuates the latter through the pin 84 carried by the arm 83.

Furthermore, in previous devices of this general class, where the weight of the pawl has been effective in holding the locking element in engagement therewith, the same weight has also been effective in resisting the movement necessary to release the locking element. It will be apparent that this objectionable feature is practically overcome by the present improvement and consequently the action of the pawl can be accelerated to any desired extent by loading it with weights, springs, or the like without interfering with the operation of this improved mechanism.

I claim:

1. The combination in a textile machine having movable means for delivering fibrous material, a movable part which controls the movable delivery means, and an actuator, of trip mechanism comprising a pair of jointed links forming a toggle latch normally restraining said movable part, and means operable by the actuator for breaking the toggle linkage whereby to release said movable part.

2. The combination in a textile machine having movable means for delivering fibrous material, a movable part which controls the movable delivery means, a movable actuator whose position is determined by the weight of material discharged by said delivery means, of trip mechanism comprising a pair of jointed links forming a toggle latch normally preventing movement of said movable part, and means operable by the actuator for breaking the toggle linkage whereby to release said movable part.

3. The combination in a textile machine having movable means for delivering fibrous material, a movable part which in one position interrupts operation of the fiber delivery means and in another position permits operation of the fiber delivery means, a pivoted actuator which is responsive to the weight of fiber discharged by said delivery means, trip mechanism comprising a pair of jointed links forming a toggle latch normally preventing movement of said movable part and means operable by the actuator for breaking said toggle linkage to release said movable part.

4. The combination in a textile machine having movable means for delivering fibrous material, a pivoted controller which in one position interrupts operation of the fiber delivery means and in another position permits operation of such delivery means, a pivoted actuator which swings in response to the weight of fiber discharged by said delivery means, of trip mechanism comprising a pair of jointed links forming a toggle latch which normally prevents said pivoted part from moving, and means operable in response to swinging of the actuator to release said pivoted controller.

5. The combination with a scale beam, movable means for delivering material and a part to be moved in response to tipping of the beam for stopping the movable means, of trip mechanism comprising a pair of jointed links forming a toggle latch, one of said links comprising a limiting stop for the part to be moved, means tending to move said part, an abutment normally positioning the joint between the links at a point at one side of the line joining the remote ends of the links, and means actuated by the scale beam in tipping to move said joint to the other side of said line.

6. In an apparatus of the class described, movable fiber delivery means, a movable controller for said delivery means, an abutment means normally holding the controller in an unstable position, an actuator responsive to fiber discharged by said delivery means, and means responsive to movement of the actuator for withdrawing the abutment means in a direction substantially opposite to that in which force is applied to hold the controller in the unstable position.

7. In an apparatus of the class described, movable fiber delivery means, a pivoted controller, and means tending to swing the controller, of movable means normally holding the controller in a given position, and means for withdrawing said movable means substantially in the direction in which force is applied thereto by said controller when the latter is in said given position.

8. In an apparatus of the class described, the combination with a gravity pawl, a pivotal support therefor, and a clutch element, the pawl being movable about its support from a position of unbalance to engage the clutch element, of means movable in the path of swing of the pawl for supporting the latter into unbalanced position, and means for withdrawing the movable means approximately in the direction in which force is transmitted thereto by the pawl while the latter is supported in the unbalanced position.

9. In an apparatus of the class described, the combination with a pawl, a pivotal support therefor, and means tending to move the pawl about its support, of a member connected to the pawl, means for holding the member in position to hold the pawl stationary, and means for supporting the member for movement with the pawl when the holding means is not effective.

10. In an apparatus of the class described, a pivoted controller, means tending to turn the controller, a fixed pivot, a link supported thereby, a stop engageable with the link for limiting pivotal movement thereof, a second link connecting the first link to the controller, and means providing for adjustment of the stop.

11. Apparatus of the class described comprising a pivotally mounted controller lever, means tending to swing said lever in one direction, and latch means normally restraining said controller lever, said latch means comprising a toggle linkage having a pair of links pivotally united, a fixed pivotal support for the end of one link, the other link having an elongate slot therein, a pin projecting from the controller lever into said slot, a stop normally limiting movement of the toggle linkage in one direction whereby the pin on the controller lever is held against movement by engagement with one end of the slot in the link, and means for breaking the toggle linkage whereby to permit movement of said pin so as to allow the controller lever to swing.

12. In an apparatus of the class described, fiber delivery means, a pivoted controller, and means tending to swing the controller, and latch means normally restraining the controller, said latch means comprising a fixed support, a pair of links having their adjacent ends pivotally connected together and their remote ends pivotally connected respectively to the controller and to the fixed support, abutment means for limiting movement of the links about the fixed support, and a lever engageable with one of the links for moving the links away from the abutment means.

13. In an apparatus of the class described, fiber delivery means, a pivoted controller, means tending to move the controller, and latch means normally restraining the controller, said latch means comprising a fixed support, a pair of links having their adjacent ends pivotally connected together and their remote ends pivotally connected respectively to the controller and to the fixed support, and means engageable with one of the links for limiting movement thereof relative to the fixed support.

14. In an apparatus of the class described, fiber delivery means, a pivoted controller, means tending to move the controller, and latch means normally restraining the controller, said latch means comprising a fixed support, a pair of links having their adjacent ends pivotally connected together and their remote ends pivotally connected respectively to the controller and to the fixed support, the connection between the link and the actuator comprising a pin projecting from the actuator and engaging an elongate slot in the link.

15. In an apparatus of the class described, fiber delivery means, a pivoted controller, means tending to move the controller, and latch means normally restraining the controller, said latch means comprising a fixed support, a pair of links having their adjacent ends pivotally connected together and their remote ends pivotally connected respectively to the controller and to the fixed support, a lever engageable with one of the links for moving the link away from the abutment means, and a lug on the lever positioned to engage the links substantially at the pivotal connection thereof.

16. In an apparatus of the class described, fiber delivery means, a pivoted controller, an arm carried by said controller, a pin on said arm, a member having a slot receiving said pin, means for holding said member stationary, and means for supporting said member to permit the slotted end thereof to move with said arm when the holding means is not effective.

17. In an apparatus of the class described, the combination of a clutch element, spaced supports, a pawl mounted to pivot on one of the supports, means tending to move the pawl into engagement with the clutch element, toggle mechanism interposed between the pawl and the other support, and means for holding the toggle mechanism locked in position to hold the pawl out of engagement with the clutch element.

Signed by me at Boston, Massachusetts, this 27th day of February, 1930.

JOSEPH B. HOWE.