(No Model.) 4 Sheets—Sheet 1.

W. P. CANNING.

STOP MOTION DEVICE FOR FLY FRAMES.

No. 484,776. Patented Oct. 25, 1892.

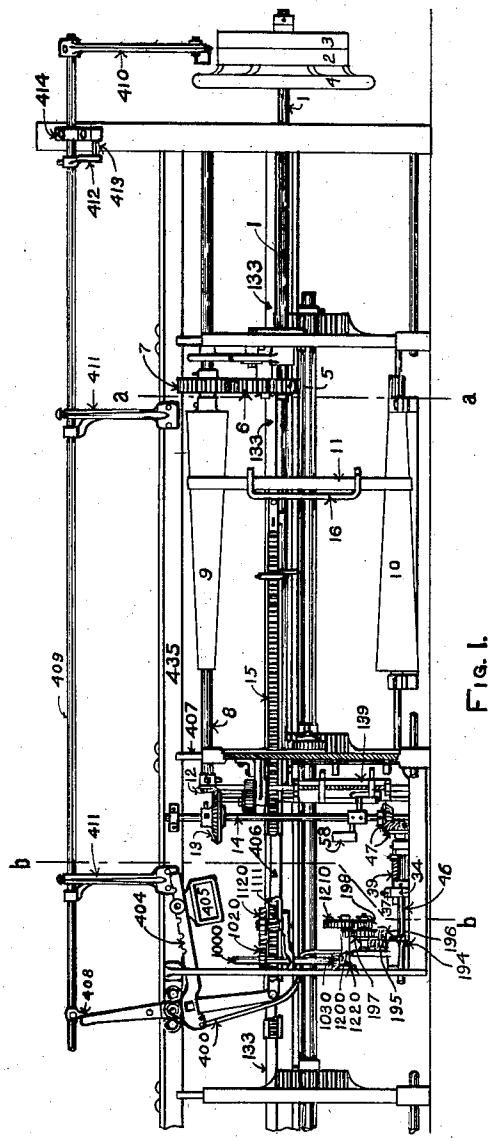

Fig. 1.

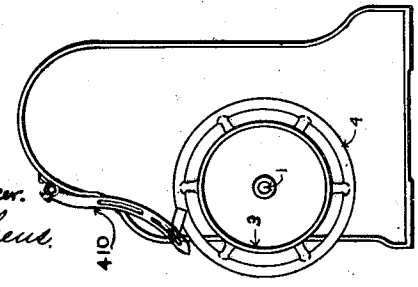

Fig. 2.

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(No Model.) 4 Sheets—Sheet 2.

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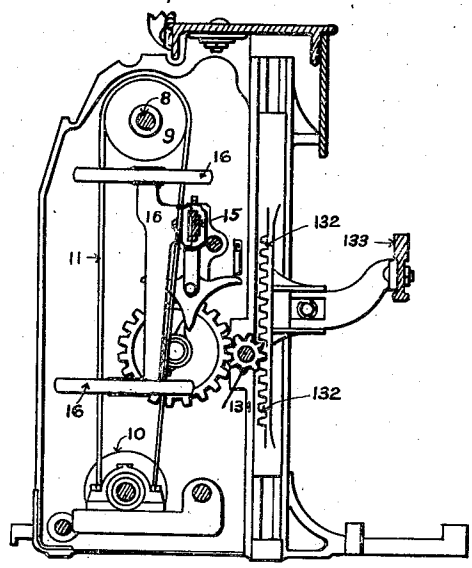

FIG. 3.

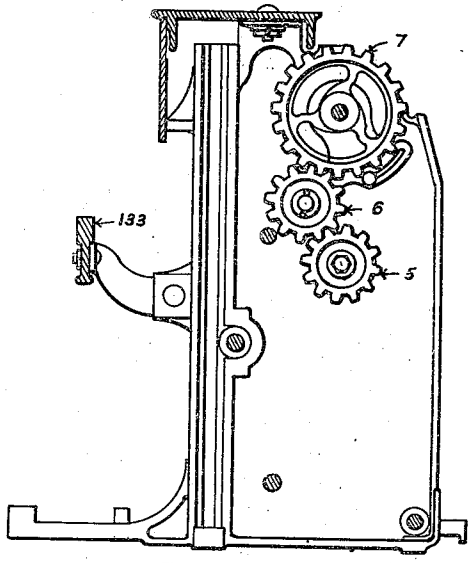

FIG. 4.

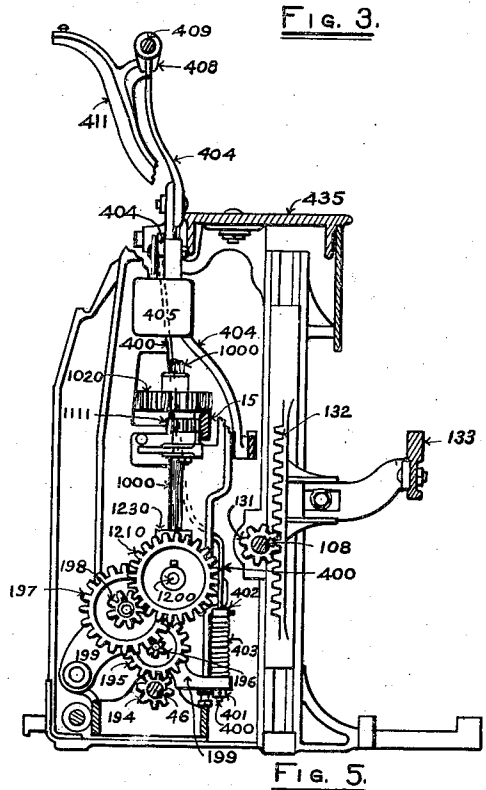

FIG. 5.

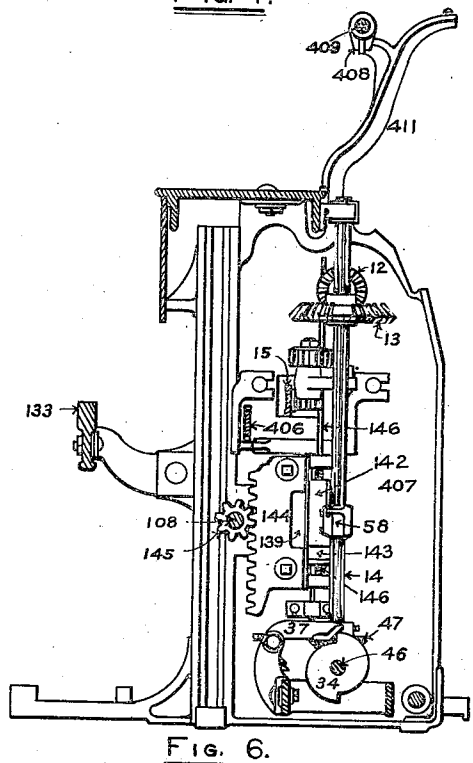

FIG. 6.

WITNESSES.

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(No Model.) 4 Sheets—Sheet 3.

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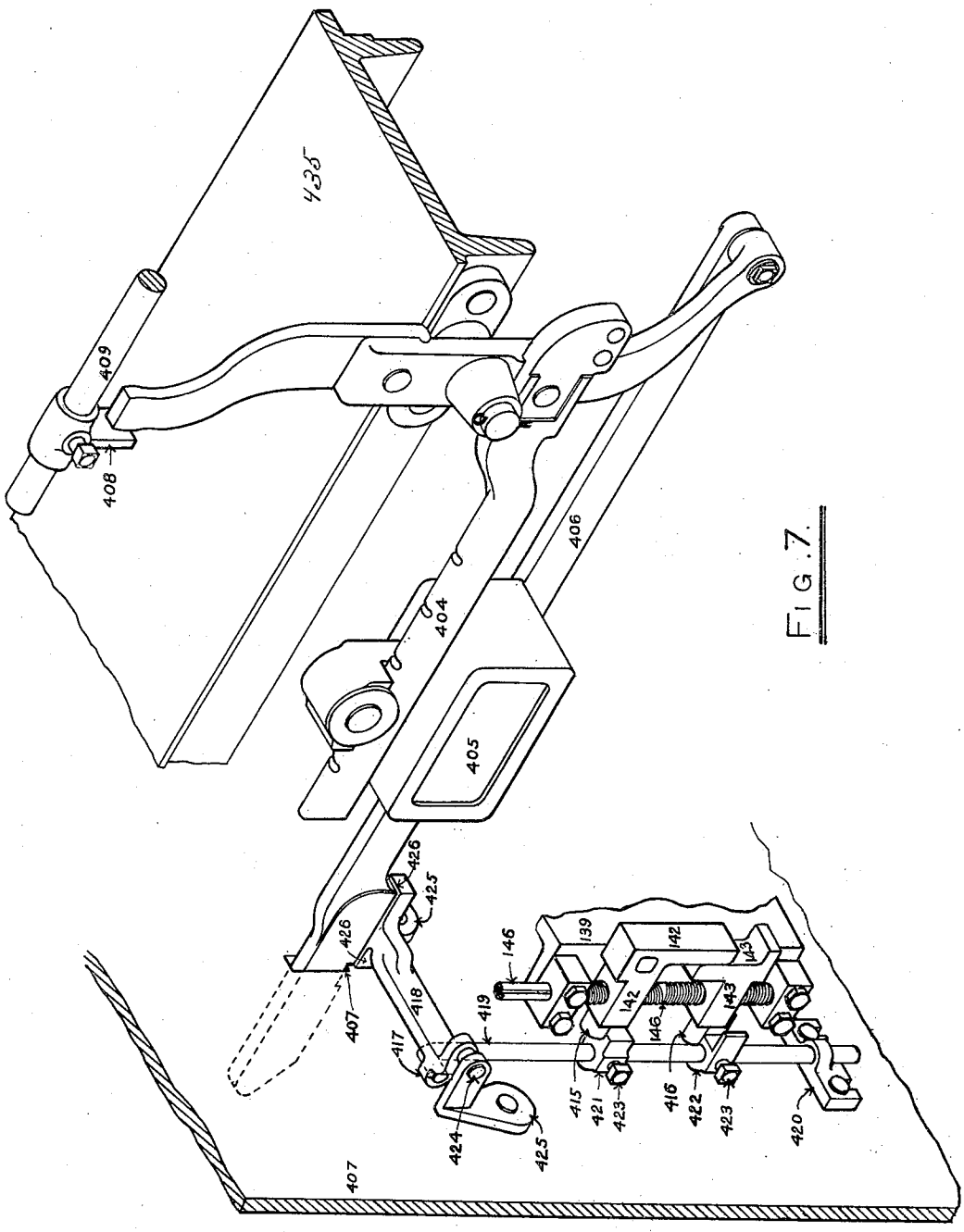

FIG. 7.

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(No Model.) 4 Sheets—Sheet 4.

W. P. CANNING.

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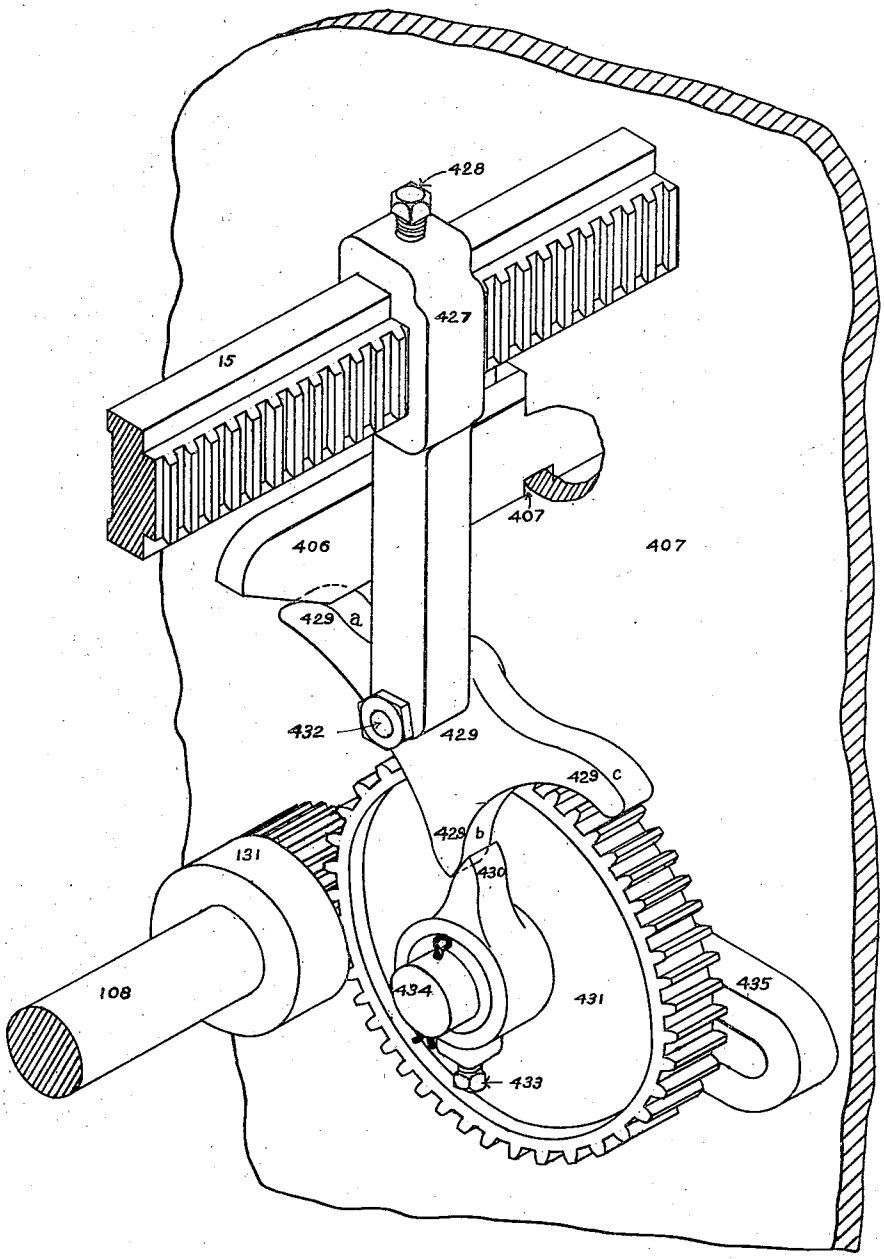

FIG. 8.

WITNESSES.
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Saml. G. Stephens.

INVENTOR.
William Pitt Canning.

UNITED STATES PATENT OFFICE.

WILLIAM PITT CANNING, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE LOWELL MACHINE SHOP, OF SAME PLACE.

STOP-MOTION DEVICE FOR FLY-FRAMES.

SPECIFICATION forming part of Letters Patent No. 484,776, dated October 25, 1892.

Application filed July 19, 1892. Serial No. 440,555. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM PITT CANNING, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Stop-Motion Devices for Fly-Frames, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to spinning-machines of the class usually known as "fly-frames" and in particular to the stop-motion devices which are employed in such machines for arresting the motion of the latter in case of accident or emergency or of the completion of the work desired to be performed.

My present invention comprises devices for causing the driving-belt of a fly-frame to be shipped from the fast pulley on the driving-shaft to the loose pulley in the case of excessive traverse in either direction of the taper-motion head forming part of the builder mechanism and upon the completion of the winding of a set of bobbins, and also whereby whenever the shipping devices of the machine are operated to throw the driving-belt from the fast pulley on the driving-shaft to the loose pulley a break shall be occasioned in the train of devices by which the cone-rack is moved to shift the cone-belt along the cone-pulleys. This break or disconnection in the said train of devices leaves the cone-rack free to be moved by hand into the desired position in the machine, as is required, for instance, in winding up the frame by hand by power applied to the wind-up shaft after the completion of the winding on upon one set of bobbins and preparatory to restarting the machine with a fresh set of bobbins.

My invention consists in certain novel features of construction and combinations of parts, which will first be described with reference to the accompanying drawings, and then be particularly pointed out and defined in the claims at the close of this specification.

In the accompanying drawings, Figure 1 is a view in rear elevation of a portion of a fly-frame having my invention applied thereto. Fig. 2 is an end elevation, the view being taken from the right-hand side in Fig. 1. Fig. 3 is a view in vertical section on the line *a a* in Fig. 1, looking toward the left in the latter figure. Fig. 4 is a view in vertical section on the line *a a* in Fig. 1, looking toward the right in said figure. Fig. 5 is a view in vertical section on the line *b b* in Fig. 1, looking toward the left in the latter figure. Fig. 6 is a view in vertical section on the line *b b* in Fig. 1, looking toward the right in the latter figure. Fig. 7 is an isometric showing the essential parts of the excessive-traverse stop-motion. Fig. 8 is an isometric showing the characteristic parts of the full-bobbin stop-motion.

In the accompanying drawings, 1 is the driving-shaft. 2 is the fast or driving band-pulley thereon.

3 is the loose pulley.

4 is the fly-wheel.

5 is the twist-gear at the inner end of the driving-shaft.

6 is the twist-intermediate.

7 is the upper twist-gear on the top-cone shaft.

8 is the top-cone shaft.

9 is the top cone.

10 is the bottom cone.

11 is the cone-belt.

12 is a bevel-gear at one end of the cone-shaft 8.

13 is the gap segment-gear or tumbling-gear at the upper end of the tumbling-shaft, which is engaged and driven intermittingly by the said gear 12.

14 is the tumbling-shaft.

15 is the cone-rack, which is operated from the said tumbling-shaft through connections hereinafter described, and 16 is the cone-belt guide, which is mounted upon the said rack 15.

46 is a horizontal shaft, which is geared to the lower end of the tumbling-shaft 14 by a pair of miter-gears 47 47 and has applied to the same the impulse or starting devices, which at the proper moment in each dwell resulting from a gap on the gear 13 presenting itself to the gear 12 communicate to the tumbling-shaft the slight movement of forward rotation which carries the first teeth of one of the segments of the gear 13 into position for being engaged by the gear 12. The said starting or impulse devices comprise a cam-disk 34, having two oppositely-disposed noses or risers and an arm 37, which is acted upon by a spring 39, so as to cause its free end to bear upon the periphery of the cam-disk 34, the parts

being so disposed and arranged as that when the tumbling-shaft stops in consequence of the action of the taper-motion devices hereinafter referred to and of a gap upon the segment-gear 13 presenting itself to the gear 12 the cam will be arrested with the apex of the nose or riser thereof in contact with the inclined end of the arm 37, the said arm being thereby upheld and the spring 39 maintained in a state of tension. Thereafter immediately upon the release of the tumbling-shaft by the taper-motion devices the action of the spring-pressed arm will occasion the aforesaid slight advance of the shaft 46 and the tumbling-shaft 14.

The starting or impulse devices which I have described are claimed in the application for a United States patent, filed by me July 8, 1892, Serial No. 439,377.

On the reverse-shaft 46 is mounted the gear 194, which meshes with a gear 195, having a connected pinion 196 meshing with a gear 197, having connected therewith the gear 198, which meshes with the gear 1210, mounted on the short horizontal shaft 1200, on which is also mounted the miter-gear 1220, meshing with the miter-gear 1030, mounted on the wind-up shaft 1000 near the lower end thereof. On the said shaft 1000 is also mounted the cone-rack gear 1020, which meshes with the gear 1120, the latter being connected with the gear 1111, engaging with the cone-rack 15. The gears 195, 196, 197, and 198 are mounted on the swinging arm 199. (See Fig. 5.)

Through a hole in the free end of the arm 199 passes a bent rod 400, having a collar 401 thereon below the said arm and a spring 403 on the same above the arm and between the latter and a collar 402. The upper end of the said rod is connected with one arm of a lever 404, pivotally mounted on the beam 435. (See Figs. 1 and 7.) To a second arm of this lever is hung a weight 405, while to a third arm thereof, extending downward, is pivoted a latch 406, adapted, as shown in Fig. 7, to engage with a portion of the machine-framing 407 or other fixed hold for the purpose of retaining the weighted lever in the position in which it is shown in Fig. 1. A fourth arm of the said lever extends upward, as shown clearly in Figs. 1, 5, and 7, into proximity with a projection 408 on the shipper-rod 409, the latter carrying the belt-shipper 410. The construction and arrangement are such that when the weighted lever 404 stands in the position in which it is represented in the drawings and so long as it is held in such position by the engagement of the latch 406 with the fixed hold 407 the swinging arm 199 will be held depressed with the gear 195 in mesh with the gear 194. The position aforesaid of the weighted lever is that which is occupied by it during the working of the machine, and hence during such working the driving-connections intermediate the cone-rack and the tumbling-shaft will be unbroken and the said rack will be advanced at regular intervals. However, when the latch 406 is disengaged from the fixed hold 407 and the lever 404 is permitted to move under the influence of its weight 405 the machine will be stopped by the driving-band being shifted from the fast pulley 2 to the loose pulley 3 in consequence of the upwardly-projecting arm of the weighted lever acting upon the projection 408 to move the shipper-rod 409 and shipper 410, and simultaneously therewith the swinging arm 199 will be lifted through the rod 400 and the gear 195 will be raised out of mesh with the gear 194, thereby causing a break in the driving connections of the rack. The shipper-rod 409 is supported in stands 411 411 and has affixed thereto an arm 412, carrying a pin 413, sliding through a bearing 414, the said arm, pin, and bearing serving to prevent the weight of the shipper from turning the shipper-rod. The spring 403, interposed between the collar 402 and the top of the swinging arm 199, is intended to yield if the gears 195 and 194 should fail to reenter into mesh properly when the shipper-rod 409 is moved to restart the machine. If when the said rod is thus moved and the lever 404 is pushed by the projection 408 into the position it occupies in Fig. 1 and the rod 400 is carried downward to depress the swinging arm 199 and the ends of the teeth on the gears 195 and 194 should come in contact and thereby prevent the said gears from intermeshing properly, the spring will yield until in the ensuing movement of the shaft 46 the gear 194 is rotated sufficiently to permit the teeth of the gear 195 to enter among the teeth thereof.

I have provided as follows for automatically disengaging the retaining-latch 406 of the stop-motion devices from the fixed hold 407 whenever there occurs an excessive traverse of the lifting or traverse rail in either direction, and thereby freeing the stop-motion devices, so as to permit the same to act to disconnect the driving-power from the machine: The taper-motion head 139 will in practice be reciprocated vertically by the engagement of a rack 144, carried thereby, with the pinion 145 on the lifting-shaft 108, and thus will be moved whenever the lifting or traverse rail is moved, the shaft 108 being actuated in known manner and provided with gears 131, which mesh with racks 132, connected with the lifting or traverse rail 133. The jaws of the taper-motion head are shown at 142 and 143, respectively, and the taper-motion screw at 146, the said jaws co-operating in usual and known manner with the tumbling-dog 58 on the tumbling-shaft 14, and by such co-operation determining the time at which the movements of partial rotation shall be imparted to the tumbling-shaft 14. I prefer to combine with the taper-motion head and jaws the means for acting to disengage the latch, and hence in the embodiment of my invention which I have illustrated in the drawings (see Fig. 7) I have ap-

plied to the jaws 142 and 143 projections 415 416 in the shape of round studs projecting from the back ends of the said jaws. The projection 415 is shorter than the projection 416, but is greater in diameter than the latter. From an arm 417, projecting to one side of the pivotal points of a double-acting rocker 418, hangs a rod 419, which at its upper end is pivoted to the said arm and at its lower end passes through a fixed guide 420. At intermediate points blocks 421 422 are secured to the rod 419 by screws 423 423. The block 421 is located on the rod 419 at a point just above the highest point reached by the stud 416, carried by the jaw 143, during the normal movements of the lifting or traverse rail and taper-motion head. The stud-block 421 has a simple solid stud and is intended for cooperation with the said stud 416, the said stud-block 421 being too short to be engaged by the stud 415, carried by the jaw 142. The block 422 is mounted on the rod 419 at a point just below the lowest point reached by the stud 415, carried by the jaw 142, during the normal movements of the lifting or traverse rail and taper-motion head. The said block 422 has a split projecting portion, the space between the sides thereof being so deep and wide that the stud 416 may pass freely therethrough without engagement, although the width of the said space is so proportioned that the stud 415 cannot pass through without engagement. The double-acting rocker 418 is pivoted, as at 424, to fixed stands 425 425, and it is formed with projections 426 426, extending on opposite sides of a line passing through the pivots, both of the said projections 426 426 being located below the latch 406. The operating mechanism of the taper-motion head and traverse-rail moves the same vertically simultaneously with each other, although as the taper-motion head ascends the lifting or traverse rail descends, and vice versa. Should the lifting-rail continue to move in one direction too long in consequence of the reversing devices which are employed failing to act at the proper time, the correspondingly-continued movement of the taper-motion head will carry the appropriate stud 415 or 416 into contact with its co-operating block 421 or 422, the particular stud which comes into such contact being determined by the direction of the movement, and cause the said stud to move the said block and the rod 419 in the direction in which the taper-motion head is moving at the time of such contact, so as to turn the rocker 418 on its pivots, and thereby cause one of the projections 426 to lift and disengage the latch 406 and render the lever 404 free to move under the influence of its weight. The blocks 421 422 are set on the rod 419 at a distance apart slightly greater than that moved over by the studs 415 416 during the proper working of the parts, and hence they will not be engaged by the said studs unless the reversing devices fail to act and the lifting-rail and taper-motion head continue to move on in their respective directions beyond the points at which reversal should occur. It will be understood from the foregoing that the stud 416 engages only with the block 421, and that it does so only in the case of excessive upward movement of the taper-motion head; also, that the stud 415 engages only with the block 422, and that it does so in case only of excessive downward movement of the taper-motion head.

I have provided as follows for automatically disengaging the retaining-latch 406 of the stop-motion devices from the fixed hold 407 when the winding of the material upon the bobbins has so far proceeded as that the bobbins have been filled to the desired extent: To the cone-rack 15 I apply a bracket 427, the same having an opening therethrough to permit it to be slipped over the end of the rack, and I secure the said bracket at a predetermined point on the rack by a screw 428. To a downwardly-projecting part of the bracket I pivot a trip 429, having an arm 429^a, which eventually passes under the free end of the latch 406 as the rack 15 reaches or nears the end of the endwise movement which is given to it during the regular working of the machine for the purpose of shifting the cone-belt upon the cone. The trip has a second arm 429^b, which as the the arm 429^a passes under the end of this latch 406 comes within the path of the movement of a striker 430, which rotates in unison with a gear 431, meshing with a gear carried by the lifting-shaft 108. If desired, the latter gear may be one of the gears 131, which engage with the racks of the lifting or traverse rail for the purpose of actuating the latter. The engagement of the gear 431 with the gear on the lifting-shaft causes the gear 431 to oscillate in unison with the movements of the lifting or traverse rail. After the trip 429 has been carried into the path of the striker 430 by the endwise movement of the cone-rack the said striker as it moves in one direction will act upon the arm 429^b to tilt the trip and cause its arm 429^a to bear upward the free end of the latch 406 and to disengage the said latch from the fixed hold 407, thereby permitting the usual stop-motion devices to act. The trip 429 swings freely on its pivot 432, so that when the arm 429^a slides under the inclined end of the latch 406 the trip will turn on its pivot without raising the latch, the trip being provided with a counterbalancing-arm 429^c. For convenience the striker 430 is connected with the gear 431 by being formed with a tubular boss or hub and slipped upon a hub or sleeve projecting laterally from the gear. The striker 430 is connected with the gear by a screw 433, passing through the boss or hub of the striker and taking bearing against the exterior of the hub or sleeve of the gear. This mode of connection enables the striker to be adjusted as desired around the axis of the gear and provides for the

striker being set so as to cause the same to act upon the trip and disengage the retaining-latch 406 at any desired point during the winding of the last layer of material upon the bobbins. The gear 431 turns upon a stud 434, projecting from the stand 435, which is slotted, as shown in Fig. 8, so as to permit it to be secured in proper position upon the machine-framing.

I claim as my invention—

1. The combination, with the retaining-latch of a fly-frame stop-motion and the reciprocating taper-motion head, of tripping devices operating to release the latch in case of excessive traverse of the head in either direction, substantially as described.

2. The combination, with the retaining-latch of a fly-frame stop-motion and the reciprocating taper-motion head, of tripping devices intermediate the said latch and head and operating to release the latch in case of excessive traverse of the head in either direction, substantially as described.

3. The combination, with the retaining-latch of a fly-frame stop-motion, the reciprocating taper-motion head, and the taper-motion jaws applied to the latter, of projections extending from said jaws and devices engaged by the said projections to trip the latch in case of excessive traverse of the head in either direction, substantially as described.

4. The combination, with the retaining-latch of a fly-frame stop-motion, the reciprocating taper-motion head, the taper-motion jaws, and the taper-motion screw, of projections extending from said jaws and devices engaged by the said projections to trip the latch in case of excessive traverse of the head in either direction, substantially as described.

5. The combination, with the retaining-latch of a fly-frame stop-motion, the reciprocating taper-motion head, and the taper-motion jaws, of the studs 415 416, carried by the jaws and differing in their diameters and lengths, as described, the rod 419, carrying the blocks 421 and 422, and a device operated by the said rod for releasing the latch, the whole operating to release the latch in case of excessive traverse of the head in either direction, substantially as described.

6. The combination, with the retaining-latch of a fly-frame stop-motion, the reciprocating taper-motion head, and the taper-motion jaws, of the studs 415 416, carried by the jaws and differing in diameters and lengths, as described, the rod 419, carrying the blocks 421 and 422, and the safety-rocker to which one end of the rod is connected, the whole operating to release the latch in case of excessive traverse of the head in either direction, substantially as described.

7. The combination, with the retaining-latch of a stop-motion for a fly-frame, of the cone-rack, a bracket applied thereto, and a trip carried by said bracket and adapted to pass under the end of the latch, a striker whereby said trip is moved to disengage the latch, the lifting-shaft, a gear-wheel on the lifting-shaft, and a gear-wheel meshing with said gear-wheel on the lifting-shaft and with which the said striker is connected and caused to rotate, substantially as described.

8. The combination, with the retaining-latch of a stop-motion for a fly-frame, of the cone-rack, a bracket applied thereto, and a trip carried by said bracket and adapted to pass under the end of the latch, a striker whereby the said trip is moved to disengage the latch, the lifting-shaft, a gear-wheel on the lifting-shaft, a gear-wheel meshing with said gear-wheel on the lifting-shaft, and means for connecting the striker thereto with capacity for rotary adjustment about the axis thereof, substantially as described.

9. The combination, with the cone-rack and devices for moving the same endwise as required for shifting the cone-belt, the said devices embracing a series of two or more intermeshing transmitting gear-wheels, of a movable gear-wheel support, stop-motion devices, and a rod and spring interposed between a movable member of the said stop-motion devices and the said movable support, the whole providing for moving the support to disconnect the gear-wheels when the stop-motion devices are caused to act and the spring yielding when the gear-wheel fails to re-enter into mesh properly, substantially as described.

10. The combination, with the cone-rack and devices for moving the same endwise as required for shifting the cone-belt, the said devices embracing a series of two or more intermeshing transmitting gear-wheels, of a movable gear-wheel support, stop-motion devices, and a rod connecting with a movable member of the stop-motion devices and passing through a hole in the movable support, a collar on the said rod above the movable support, a spring interposed between the said collar and the said support, and a collar on the rod beneath the support, substantially as described.

11. The combination, with the cone-rack and devices for moving the same endwise as required for shifting the cone-belt, the said devices embracing a series of two or more intermeshing transmitting gear-wheels, of a movable gear-wheel support, a weighted lever forming part of the stop-motion devices, a rod connected with an arm of the said lever and passing through a hole in the movable support, a collar on the said rod above the movable support, a spring interposed between the said collar and the said support, and a collar on the rod beneath the support, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM PITT CANNING. [L. S.]

Witnesses:
SAML. G. STEPHENS,
EMMA F. ESTES.