Aug. 7, 1945. H. T. OVERBEY 2,381,684

STOP MOTION FOR TEXTILE MACHINES

Filed Dec. 15, 1944 5 Sheets-Sheet 1

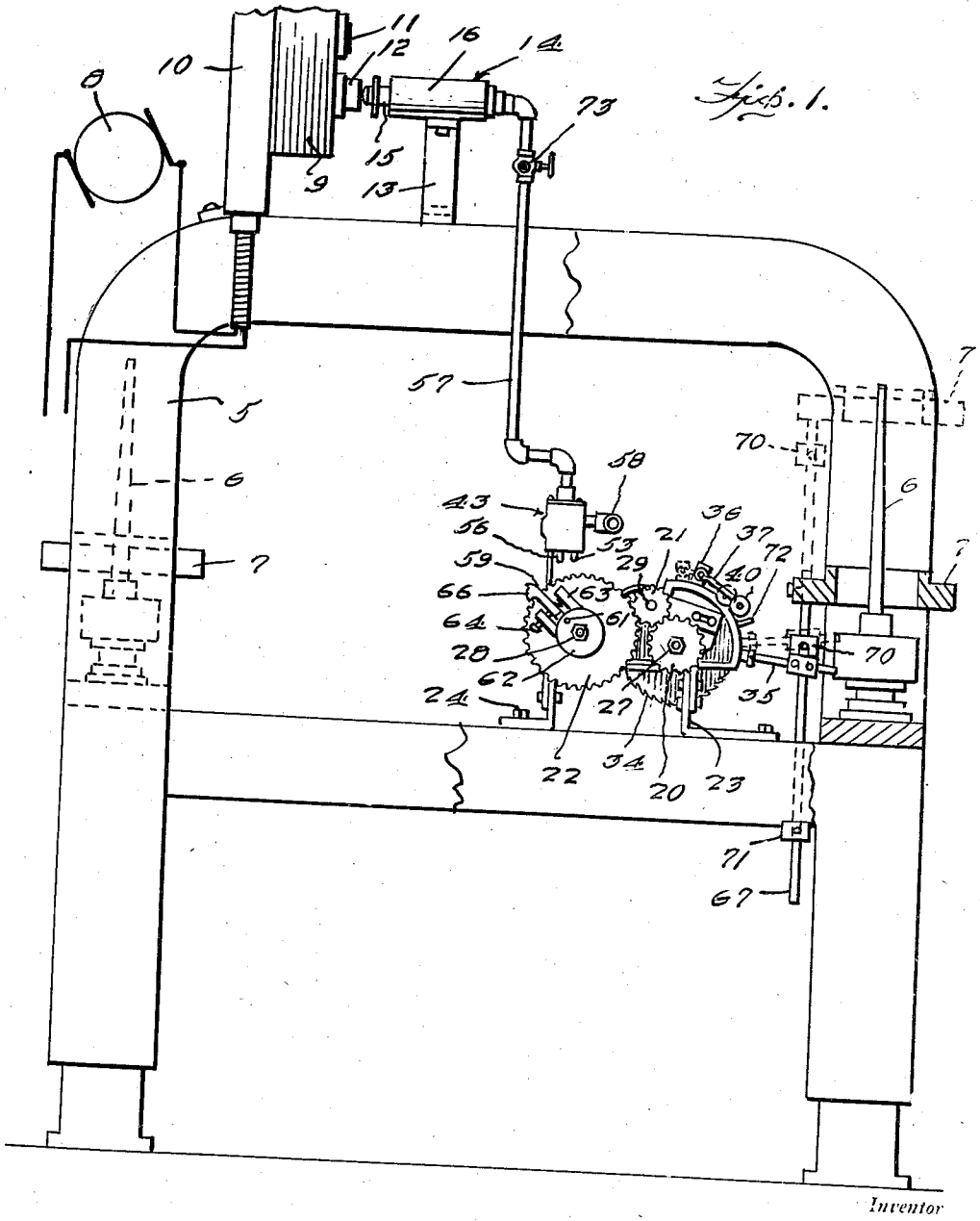


Fig. 1.

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5 Sheets-Sheet 2

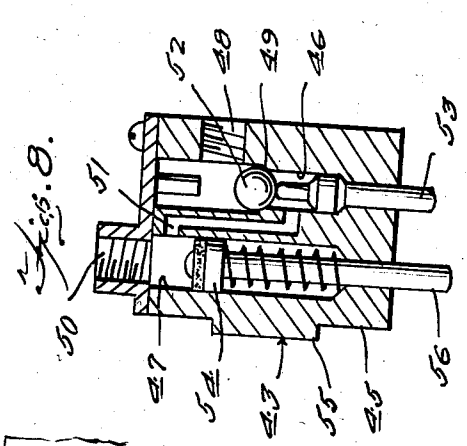


Fig. 8.

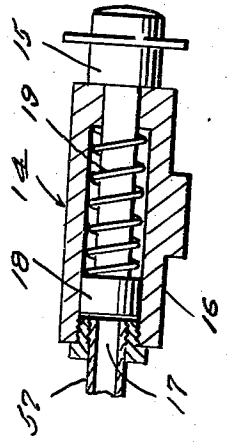


Fig. 9.

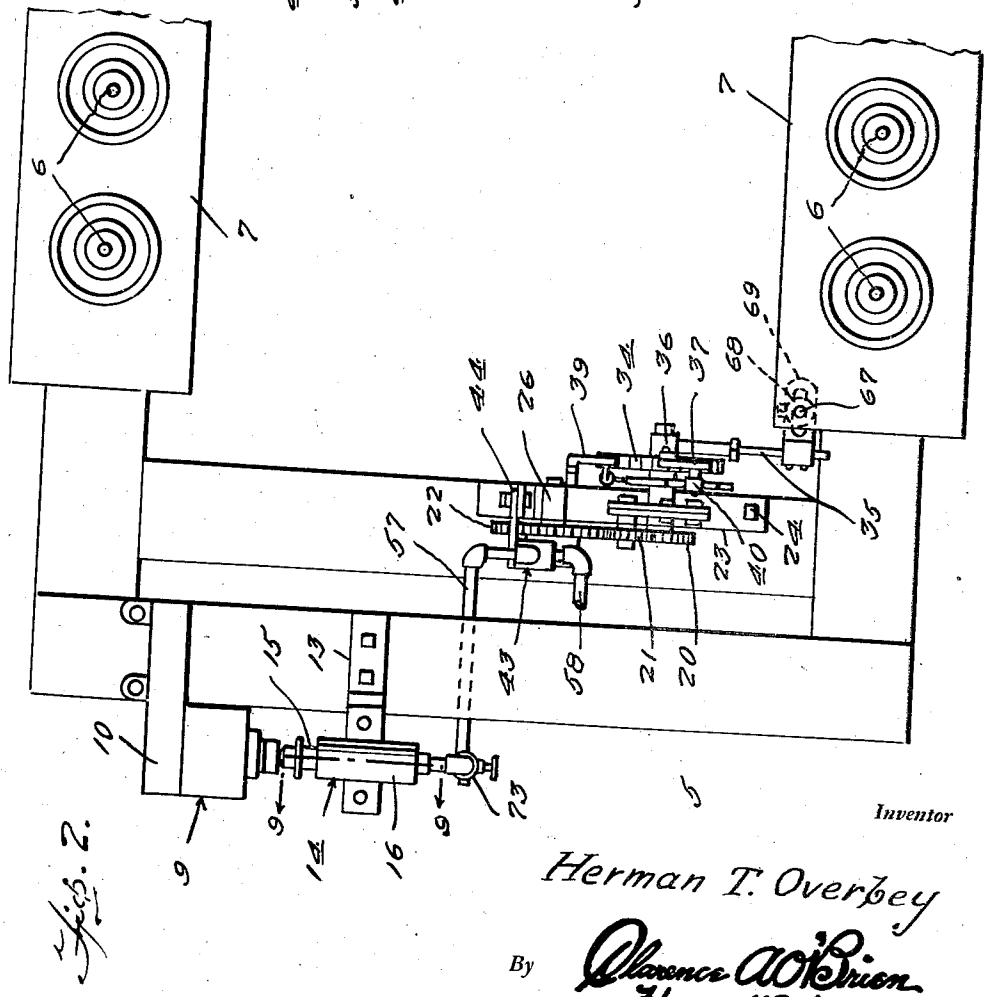


Fig. 2.

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STOP MOTION FOR TEXTILE MACHINES

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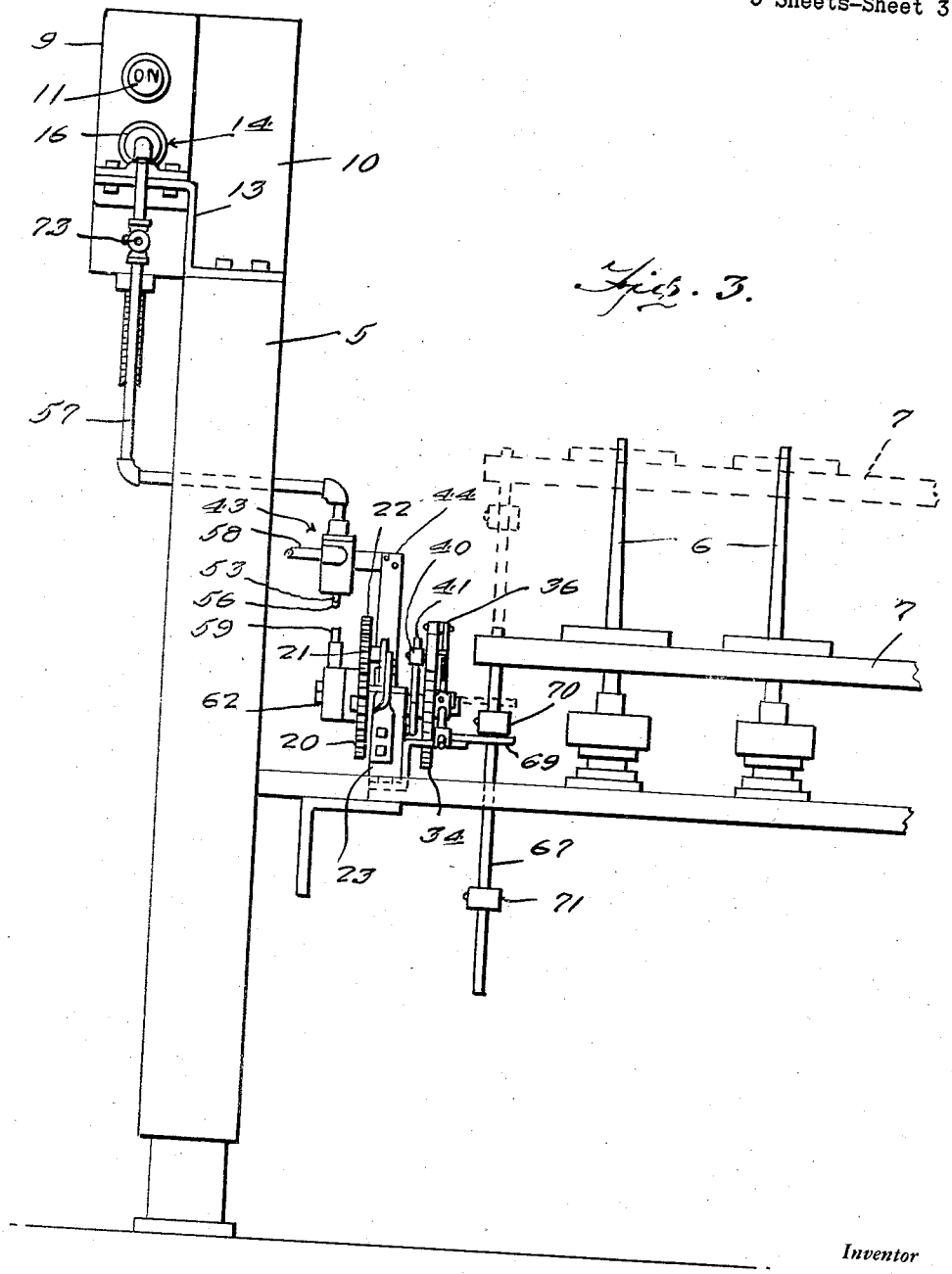


Fig. 3.

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STOP MOTION FOR TEXTILE MACHINES

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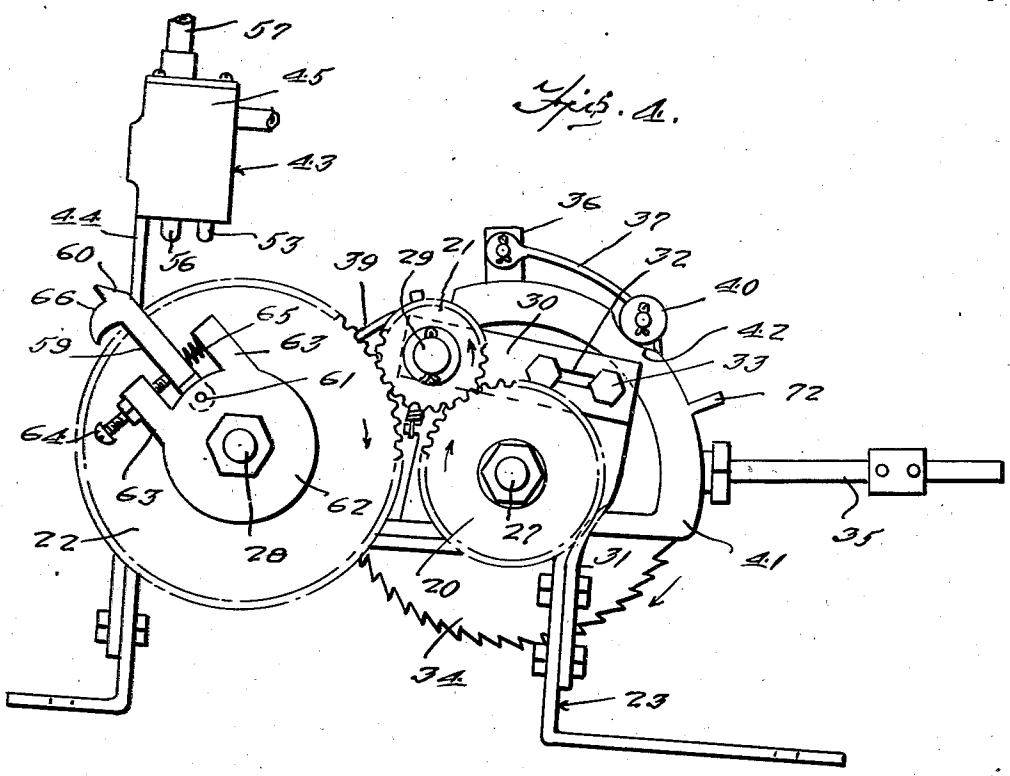


Fig. 4.

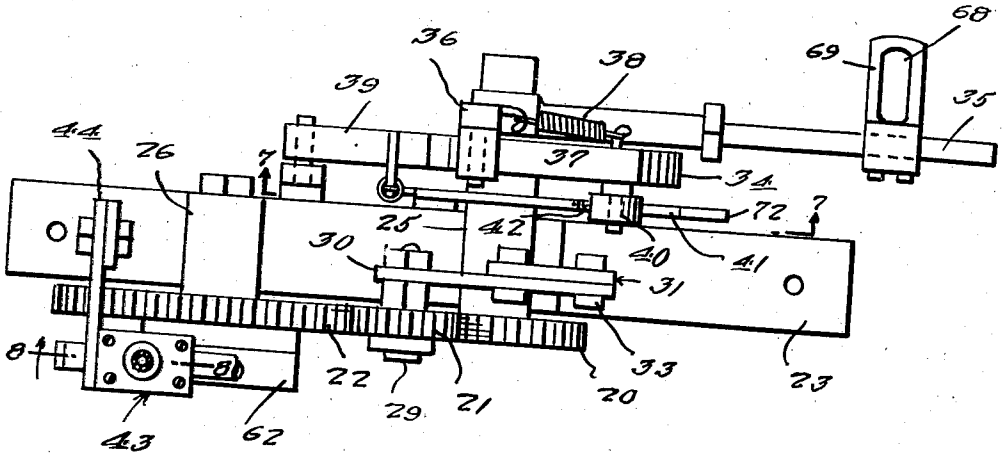


Fig. 5.

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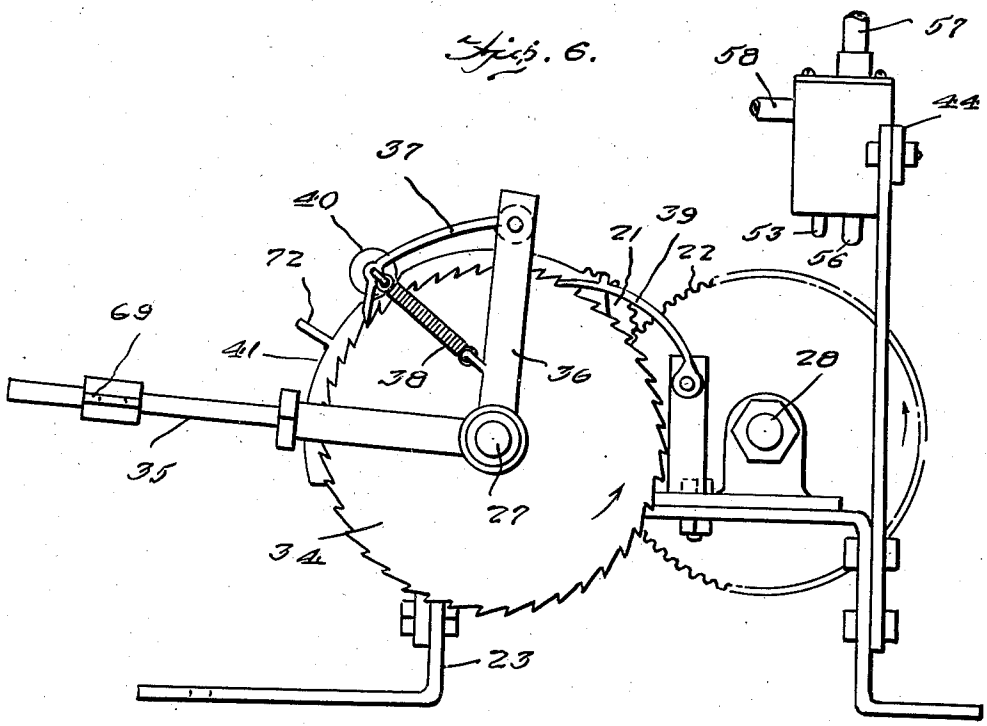
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STOP MOTION FOR TEXTILE MACHINES

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Fig. 6.



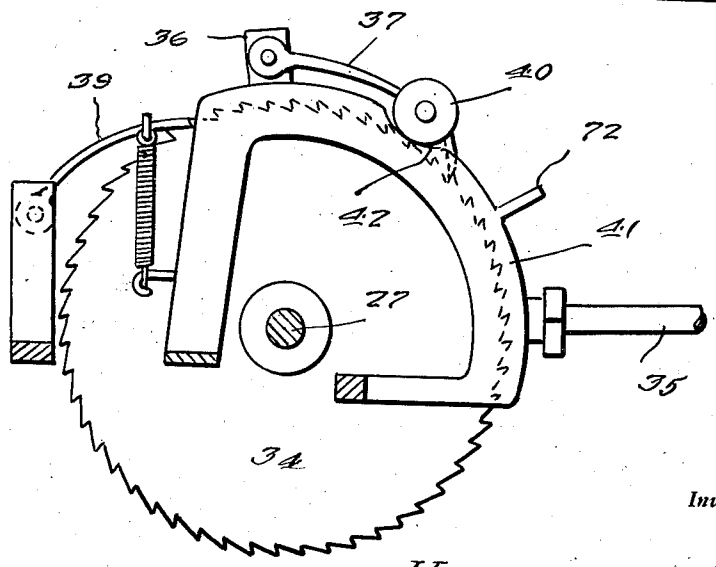


Fig. 7.

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Patented Aug. 7, 1945 2,381,684

UNITED STATES PATENT OFFICE

2,381,684

STOP MOTION FOR TEXTILE MACHINES

Herman T. Overbey, Wadesboro, N. C.

Application December 15, 1944, Serial No. 568,301

6 Claims. (Cl. 57—79)

This invention relates to twisting, spinning and similar types of textile machines, and has more particular reference to an improved stop motion for automatically stopping the machine when the desired amount of thread or yarn has been wound on the bobbins of the machine.

An important object of the present invention is to provide a stop motion of the above kind which may be readily conditioned to vary the amount of thread or yarn wound on the bobbins before the machine is stopped.

Another object of the invention is to provide a stop motion of the above kind which is comparatively simple in construction, highly efficient in operation and capable of being readily and economically installed upon existing textile machines.

More specific objects and features of the invention will become apparent from the following description when considered in connection with the accompanying drawings, and the invention consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the drawings and claimed.

In the drawings, wherein like reference characters indicate corresponding parts throughout the several views:

Figure 1 is a fragmentary view, partly in end elevation and partly broken away and in section, of a twisting machine equipped with a stop motion mechanism embodying the present invention.

Figure 2 is a fragmentary top plan view thereof.

Figure 3 is a front elevation of the construction shown in Figure 2.

Figure 4 shows part of the stop motion mechanism as seen in Figure 1, but drawn on an enlarged scale to more clearly reveal details of construction.

Figure 5 is a top plan view of the construction shown in Figure 4.

Figure 6 is a view looking at the opposite side of the construction shown in Figure 4.

Figure 7 is a fragmentary vertical section taken substantially on line 7—7 of Figure 5.

Figure 8 is a vertical section through the control valve, taken substantially on the plane of line 8—8 of Figure 5.

Figure 9 is an enlarged longitudinal section through the pneumatically operated actuator, taken substantially on the plane of line 9—9 of Figure 2.

Referring in detail to the drawings, 5 indicates part of the frame of a conventional form of twisting machine, which machine includes vertical rotating spindles 6 and vertically reciprocating ring rails 7. Power-driven operating means of conventional form is provided for the spindles 6 and ring rails 7, including a motor diagrammatically illustrated at 8 in Figure 1. As this operating means forms no specific part of the present invention and is well known in the art, specific illustration and description thereof herein is deemed unnecessary.

In the illustrated embodiment of the present invention, a switch 9 for controlling the motor 8 is fixed to a bracket 10 rigidly mounted upon the frame 5 of the machine, such switch being of a well known snap-type including a button 11 adapted to be pushed to throw the motor into operation and a button 12 adapted to be pushed to throw the motor out of operation.

Rigidly mounted upon a bracket 13 fixed to the machine frame 5 is a pneumatically operated switch actuator 14 including a spring-retracted, pressure-projected plunger 15 disposed to operate the switch button 12. As shown in Figure 9, the plunger 15 is slidable in a casing 16 having an inlet 17 at the end opposite that through which the plunger 15 projects. The end of plunger 15 adjacent inlet 17 has a piston head 18, and a coil spring 19 surrounds the plunger 15 between the head 18 and an end wall of the cylinder 16 so as to normally yieldingly retract the plunger. Compressed air admitted through the inlet 17 acts upon the head 18 to project the plunger against the action of spring 19.

Mounted upon the frame 5 of the machine adjacent an end of one of the ring rails 7 is a unit including a train of gears 20, 21 and 22. This unit includes a frame 23 which is bolted upon the machine frame 5, as at 24, and includes transverse bearings 25 and 26 in which are journaled the shafts 27 and 28 of the gears 20 and 22. The gear 21 is rotatable on a spindle 29 supported by an adjustable member 30 of a bracket 31 attached to the frame 23. It will be noted that the train of gears is located at one side of the frame 23, and that the smaller intermediate gear 21 is adjustable toward or from the driven gear 22. This adjustment is made possible by providing a longitudinal slot 32 in the bracket member 30, and bolting the member 30 to the main part of the bracket 31 by means of bolts 33 extending through the slot 32. The purpose of this adjustment will be more clearly apparent from the later description.

Ratchet mechanism is provided for operating the train of gearing, and this mechanism includes a ratchet wheel 34 secured on the shaft 27 of gear 20 at the opposite side of frame 23 from that at which gear 20 is arranged. Mounted for rocking movement on the shaft 27 is an actuating lever 35 having an upwardly projecting arm 36 to which

is pivoted a pawl 37 that is yieldingly engaged with the ratchet wheel 34 by means of a tension spring 38. A second spring-pressed pawl 39 is provided behind the pawl 37 so as to engage the ratchet wheel 37 and prevent retrograde movement of the latter. The pawl 39 is formed and arranged so as to act as a stop for the arm 36 in one direction, and carried by pawl 37 and disposed at one side of the latter is a roller 40. Rigid with the frame 23 is a segment 41, and the roller 40 is arranged to roll on the outer edge of this segment. At an intermediate point, the segment 40 has a cam recess 42 in the outer edge thereof, and the arrangement is such that when the roller 40 enters the recess 42, pawl 37 is allowed to engage ratchet wheel 34. The arrangement is also such that when the lever 35 is swung downwardly, pawl 37 turns the ratchet wheel 34 the distance of one tooth, whereupon roller 40 rides out of recess 42 and causes disengagement of the pawl 37 from the ratchet wheel. Thus, ratchet wheel 34 and gear 20 are given a step-by-step intermittent movement, the ratchet wheel and gear 20 moving the distance of one tooth of the ratchet wheel each time the lever 35 is swung downwardly. Naturally, the same relative degree of movement is also imparted to the gears 21 and 22, and it will be apparent that lever 35 must be swung upwardly for each succeeding operative stroke.

A valve 43 is provided for controlling the operation of the actuator 14, and this valve is rigidly mounted on a bracket 44 fixed to the frame 23 so as to be disposed directly above and to one side of the gear 22. As shown in Figure 8, the valve 43 includes a casing provided with parallel bores 46 and 47, an inlet 48 leading into one side of the bore 46 above a valve seat 49 in the latter, and an outlet 50 leading from the top of the bore 47. A passage 51 is provided in the casing which affords communication between the bore 46 at a point below the seat 49 and the upper portion of the bore 47. Arranged to seat by gravity upon the valve seat 49 is a ball valve 52 that is adapted to be unseated by means of a vertically slidable operating stem 53 projecting through the bottom of the casing 45. A piston 54 is movable in the bore 47 and is yieldingly elevated by a spring 55, said piston having a rod 56 slidably projecting through the bottom of the casing 45 and surrounded by the spring 55. The upper limit of movement of piston 54 is below the point where the passage 51 opens into the bore 47. Outlet 50 is connected with the inlet 17 of actuator 14 by means of a pipe 57, and inlet 48 is connected with a suitable source of air under pressure (not shown) by a pipe 58. A cam element 59 is rotatable with the driven gear 22 and is arranged to actuate stem 53 to unseat valve 52 upon the completion of each revolution of gear 22. As shown, the cam element 59 is in the form of an arm having a beveled end 60 for engagement with the lower end of stem 53, said arm being pivoted at 61 to a hub member 62 secured on the shaft 28 of gear 22. Hub member 62 has a pair of spaced arms 63 between which the cam arm 59 is arranged and between which said cam arm has limited swinging movement. Swinging movement of cam arm 59 is adjustably limited in the direction opposite that in which the gear 22 turns, by means of a set screw 64 carried by one arm 63. Swinging movement of cam arm 59 in the other direction is yieldingly resisted by a spring 65 interposed between said cam arm 59 and the other arm 63 of the hub member 62. The cam arm 59 has a cam lug 66 which projects from the free end portion thereof in a direction opposite that in which the gear 22 turns. The arrangement is such that when the gear 22 completes a revolution, the beveled end 60 of arm 59 rides under stem 53 so as to elevate the latter and unseat the valve 52, thereby admitting air under pressure from the bore 46 to the top of bore 47. This air pressure actuates the plunger 15 of the actuator 14 so that switch 9 is operated to throw the motor 8 of operation and stop the machine. Should the mechanism be faulty due to wear or change of adjustment, the cam arm 59 might not ride completely past the stem 53, in which case the valve 52 would be held unseated. In order to avoid this, the air pressure in bore 47 forces piston 54 downwardly so that its rod 56 engages the cam lug 66 and swings the cam arm 59 about its pivot 61 and against the action of spring 65 so as to cause the beveled end of cam arm 59 to move completely past the stem 53. This allows the stem 53 to lower and insures that the valve 52 will be allowed to seat for cutting off the supply of air after operation of the actuator 14.

The actuating lever 35 of the ratchet mechanism is operatively connected to the adjacent ring rail 7. For this purpose, a rod 67 is fixed to and depends from such ring rail, and slidably extends through a slot 68 provided in a lateral arm 69 carried by the lever 35. Adjustable on the rod 69 are spaced abutments or collars 70 and 71 that are spaced apart a distance less than that of the distance of movement of the ring rail 7. Thus, each time the ring rail 7 moves upwardly, the collar 71 will engage the arm 69 and swing the lever 35 upwardly to set the pawl 37 in position for its next stroke. As the ring rail completes its downward movement, collar 71 engages arm 69 and causes downward movement of lever 35 so as to operate pawl 37 for turning ratchet wheel 34 and gear 20 for a distance equal to the distance of one tooth of the ratchet wheel 34. This cycle is repeated until the gear 22 completes a revolution for moving cam arm 59 until it actuates valve stem 53 to cause stopping of the machine as above described. By using a smaller gear 20 and a larger gear 21, the speed of rotation of gear 22 can be varied so as to change the number of reciprocations of the ring rail 7 necessary to effect stopping of the machine. In this way, the amount of yarn or thread to be wound on the bobbins can be changed in accordance with the size of package to be produced. The adjustment at 32, 33 accommodates for this change in relative sizes of the gears 20 and 21, and it will be apparent that such change effects a change in the ratio of the gearing between shafts 27 and 28. The downward stroke of lever 35 may be suitably limited by any desired means, such as a stop lug 72 provided on the segment 41 and arranged in the path of the roller 40. After operation of the actuator 14, the air under pressure may be suitably bled from the pipe 57 and the cylinder of actuator 14 so that the plunger 15 may retract to thereby permit resetting of switch 9 in the position wherein the button 11 is pressed inwardly to again start the motor 8. This will be done after the filled bobbins have been removed from the spindles and new bobbins substituted therefor. As shown, a manually operable bleed valve 73 may be placed in the pipe 57 adjacent the actuator 14 so as to exhaust the compressed air from the actuator 14 and pipe 57 to the atmosphere. It will be noted from Figure 3 that the unit embodying the ratchet mechanism and train of gearing

may be readily mounted upon the frame of the machine adjacent an end of one ring rail, a sufficient space being provided at this point in most existing machines.

From the foregoing description, it is believed that the construction and operation, as well as the advantages of the present invention, will be readily understood and appreciated by those skilled in the art. It is to be understood that the invention is susceptible of various modifications and that changes may be made in details of construction illustrated and described, such as fairly fall within the spirit and scope of the invention as claimed.

What I claim as new is:

1. The combination with a textile machine embodying a vertically reciprocating ring rail, power-driven operating means for the ring rail, and a device operable to throw said operating means out of operation, of an automatic stop motion for the operating means including a pneumatically operated actuator for said device, a valve for controlling the operation of said actuator, a train of gearing including a driven gear, ratchet mechanism for operating said gearing including an actuating lever operable by the ring rail, and a cam element rotatable with the driven gear and arranged to open said valve to cause operation of the actuator upon completion of each revolution of said driven gear.

2. The combination with a textile machine embodying a vertically reciprocating ring rail, power-driven operating means for the ring rail including a driving motor, and a switch operable to throw said motor out of operation, of an automatic stop motion for the operating means including a pneumatically operated actuator for said switch, a valve for controlling the operation of said actuator, a train of gearing including a driven gear, ratchet mechanism for operating said gearing including an actuating lever operable by the ring rail, and a cam element rotatable with the driven gear and arranged to open said valve to cause operation of the actuator upon completion of each revolution of said driven gear.

3. The combination with a textile machine embodying a vertically reciprocating ring rail, power-driven operating means for the ring rail, and a device operable to throw said operating means out of operation, of an automatic stop motion for the operating means including a pneumatically operated actuator for said device, a valve for controlling the operation of said actuator, a train of gearing including a driven gear, ratchet mechanism for operating said gearing including an actuating lever operable by the ring rail, and a cam element rotatable with the driven gear and arranged to open said valve to cause operation of the actuator upon completion of each revolution of said driven gear, said valve including an operating stem, said cam element embodying a pivoted cam arm movable in the direction of rotation of said driven gear, yieldable means resisting such movement of the cam arm, and pneumatically operated means carried by said valve and rendered operative upon opening the latter for swinging said cam arm against the action of said yieldable means so as to insure complete passage of the cam arm beyond the operating stem of the valve.

4. The combination with a textile machine embodying a vertically reciprocating ring rail, power-driven operating means for the ring rail, and a device operable to throw said operating means out of operation, of an automatic stop motion for the operating means including a pneumatically operated actuator for said device, a valve for controlling the operation of said actuator, a train of gearing including a driven gear, ratchet mechanism for operating said gearing including an actuating lever operable by the ring rail, and a cam element rotatable with the driven gear and arranged to open said valve to cause operation of the actuator upon completion of each revolution of said driven gear, said train of gearing including a driving gear and an intermediate gear arranged between and meshing with the driving and driven gears, and adjustable mounting means for said intermediate gear for permitting change in the ratio of gearing between the ratchet mechanism and the cam arm by change in the relative sizes of the driving and intermediate gears.

5. The combination with a textile machine embodying a vertically reciprocating ring rail, power-driven operating means for the ring rail, and a device operable to throw said operating means out of operation, of an automatic stop motion for the operating means including a pneumatically operated actuator for said device, a valve for controlling the operation of said actuator, a train of gearing including a driven gear, ratchet mechanism for operating said gearing including an actuating lever, means operatively connecting the actuating lever with the ring rail including a vertical rod carried by and movable with the ring rail, a pair of spaced abutments carried by said rod, and an arm carried by said actuating lever and arranged in the path of movement of said abutments, and a cam element for opening the valve rotatable with the driven gear.

6. The combination with a textile machine embodying a vertically reciprocating ring rail, power-driven operating means for the ring rail, and a device operable to throw said operating means out of operation, of an automatic stop motion for the operating means including a pneumatically operated actuator for said device, a valve for controlling the operation of said actuator, a train of gearing including a driven gear, ratchet mechanism for operating said gearing including an actuating lever operable by the ring rail, and a cam element rotatable with the driven gear and arranged to open said valve to cause operation of the actuator upon completion of each revolution of said driven gear, said ratchet mechanism further including a spring-pressed pawl carried by the actuating lever, a segment, and a roller carried by said pawl, said segment having a cam recess for receiving the roller and permitting engagement of the pawl and formed for causing disengagement of the pawl to limit the degree of movement imparted to the driving gear by said ratchet mechanism.

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