

S. K. MARSHALL & M. H. McKINNEY.

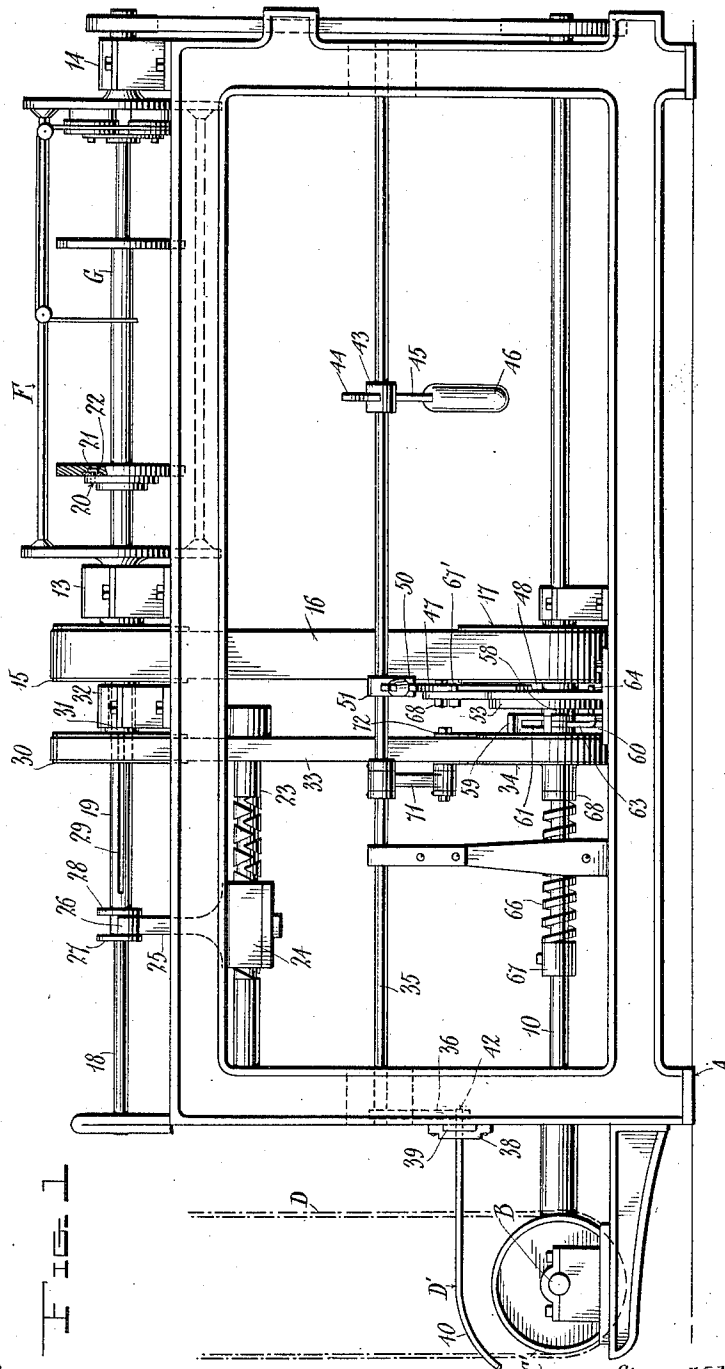
STOP MOTION FOR SPINNING MACHINES.

APPLICATION FILED FEB. 14, 1911.

1,018,919.

Patented Feb. 27, 1912.

4 SHEETS-SHEET 1.



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4 SHEETS—SHEET 2.

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FIG. 2

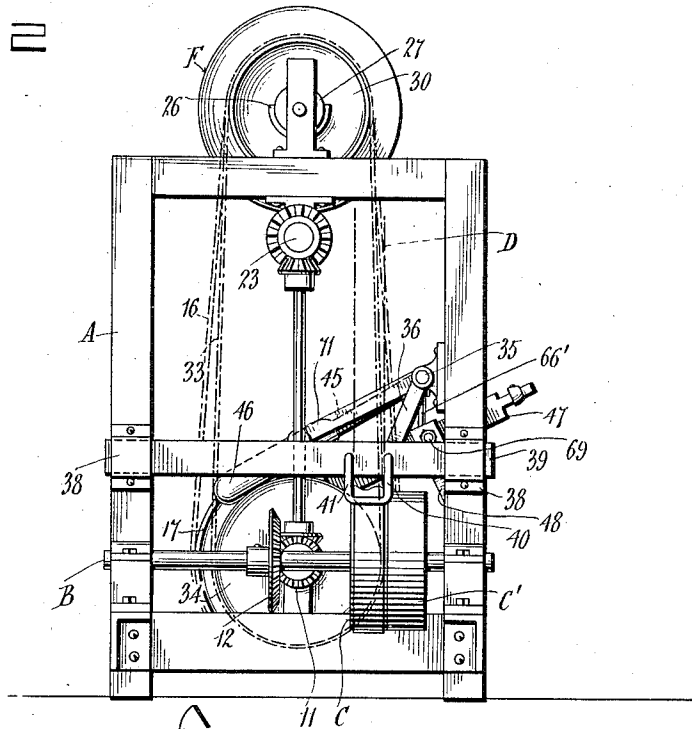
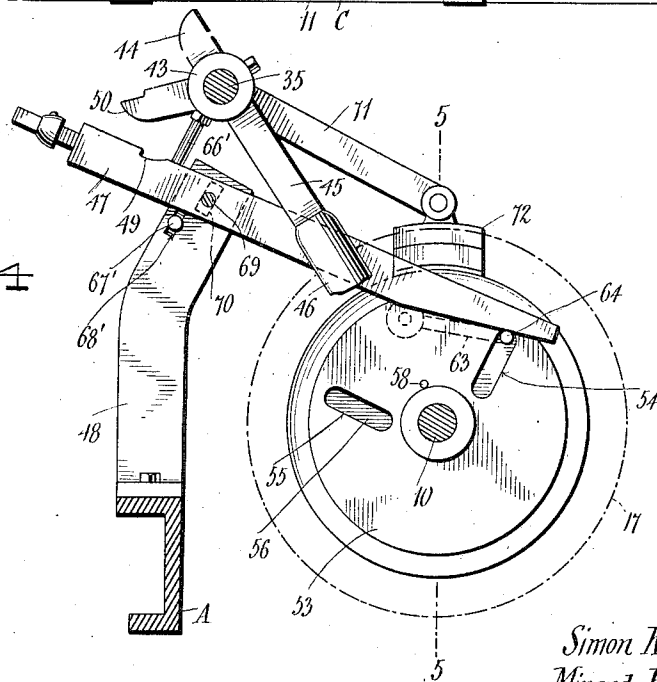


FIG. 4



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4 SHEETS—SHEET 4.

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FIG. 7

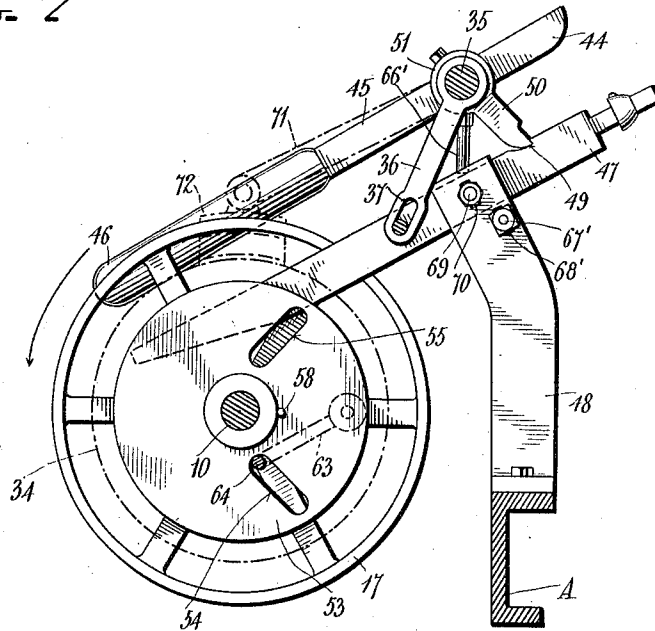
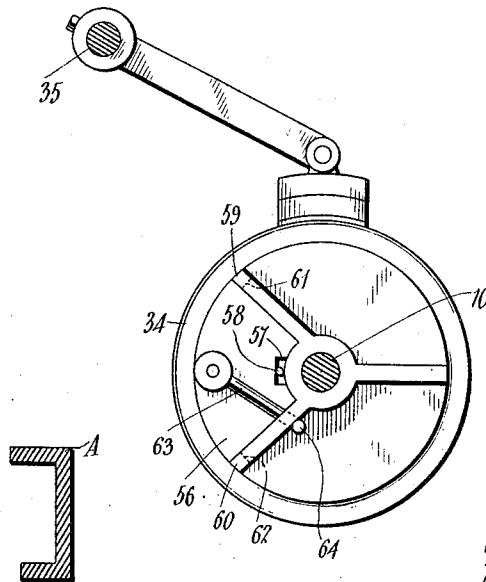


FIG. 8



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FIG. 3

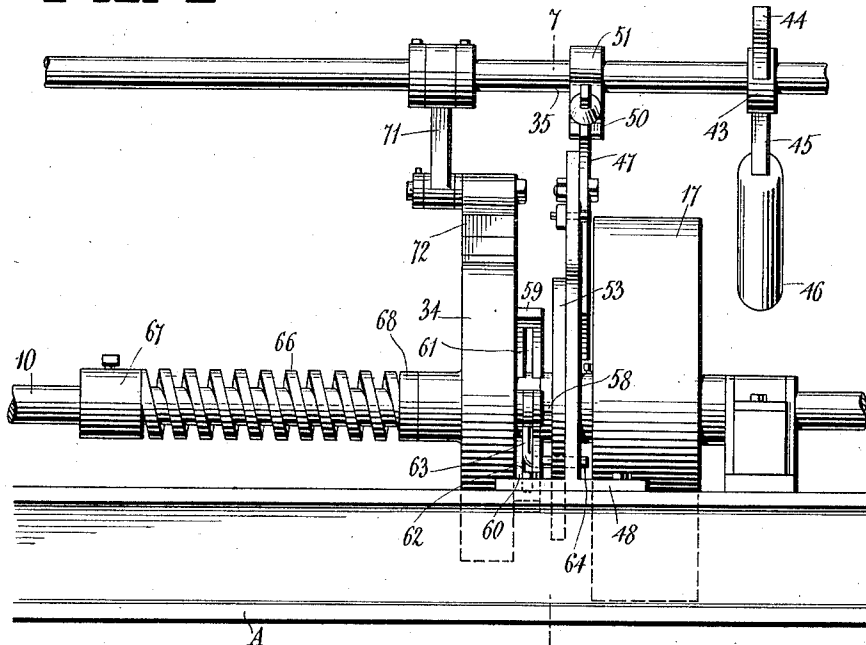


FIG. 5

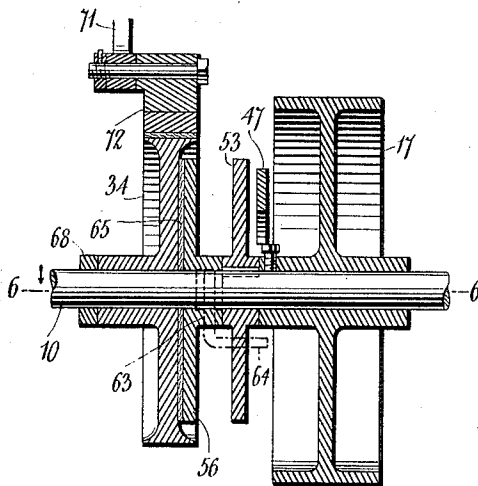
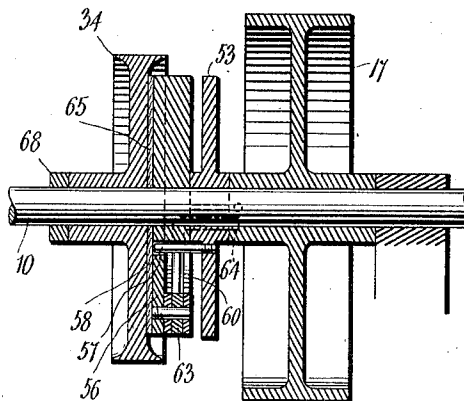


FIG. 6



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UNITED STATES PATENT OFFICE.

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STOP-MOTION FOR SPINNING-MACHINES.

1,018,919.

Specification of Letters Patent.

Patented Feb. 27, 1912.

Application filed February 14, 1911. Serial No. 608,521.

To all whom it may concern:

Be it known that we, SIMON K. MARSHALL and MINARD H. McKINNEY, citizens of the United States, residing at Xenia, in the county of Greene, State of Ohio, have invented certain new and useful Improvements in Stop-Motions for Spinning-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a stop motion for spinning machines and is particularly adapted for application to spinning jennies of the type used in the manufacture of twine.

The object of the invention resides in the provision of a mechanism which when associated with a machine of the character named will be automatically operated to positively bring the machine to a full stop upon the breakage of the yarn.

A further object of the invention resides in the provision of a mechanism for association with machines of the character named which are driven through the medium of a belt connection to insure the prompt and certain action of the belt shipper upon breakage of the yarn to move the belt from the fixed pulley to the loose pulley and stop the machine.

With these and other objects in view, the invention consists in the details of construction and in the arrangement and combination of parts to be hereinafter more fully described and particularly pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters of reference denote corresponding parts in the several views; and in which,

Figure 1 is a side elevation of a spinning jenny having the invention associated therewith; Fig. 2, an elevation of the driving end of the jenny illustrated in Fig. 1; Fig. 3, an enlarged side elevation of a fragment of the machine illustrated in Fig. 1; said fragment including the tripping mechanism of the stop motion; Fig. 4, an end view of what is shown in Fig.

3; Fig. 5, a section on the line 5—5 of Fig. 4; Fig. 6, a section on the line 6—6 of Fig. 5; Fig. 7, a section on the line 7—7 of Fig. 3 looking toward the positive trip plate; and Fig. 8, a section on the line 7—7 of Fig. 3 looking toward the friction trip plate.

Referring to the drawings, A indicates the frame of the machine, in which is arranged at one end transversely thereof a shaft B having mounted thereon fast and loose pulleys C and C' respectively; said pulleys receiving motion through the main belt D, which latter is adapted to be shipped from one of said pulleys to the other by means of a belt shipper D'. Journaled in the frame A and extending longitudinally thereof is a shaft 10 which derives motion from the main shaft B through bevel gears 11 and 12 fixed on said shaft 10 and the shaft B respectively.

F indicates generally the flier of the machine which is rotatably supported upon the frame A by means of journal bearings 13 and 14. One of the trunnions of the flier F is extended beyond the bearing 13, and upon this extension is fixed a belt pulley 15 which is operatively connected by means of a belt 16 to another belt pulley 17, which latter is fixed upon the shaft 10. Mounted upon the top of the frame A is a spindle 18 which passes through the trunnions of the flier F and has mounted thereon a hollow driving spindle 19 adapted for movement longitudinally of the spindle 18. This driving spindle 19 is movable through the trunnion of the flier F which is supported by the bearing 13 and has one end thereof disposed between the trunnions of the flier F provided with a driving plate 20 which carries near its periphery a laterally projecting stud 21 for a purpose that will presently appear. Also mounted upon the spindle 19 is a bobbin G which has the end thereof disposed adjacent the driving plate 20 provided with a socket 22 in which the stud 21 is detachably mounted so that that rotation of the bobbin G which is effected by the tension of the yarn between same and the flier F will be transmitted to the hollow driving spindle 19.

In order to effect the reciprocation of the hollow driving spindle 19 during the opera-

ation of the machine, there is journaled in the frame A beneath the spindle 18 is a traverse screw 23 which is rotated by means of suitable connections with the shaft 10.

5 Mounted for travel upon the traverse screw 23 is a box 24 provided with an upwardly extending portion 25 terminating in a forked end 26 which embraces the hollow driving spindle 19 and is secured against

10 longitudinal movement with respect to the latter by means of flanges 27 and 28 formed on said hollow driving spindle 19. By this construction it will be apparent that during the operation of the machine the traverse

15 screw 23 will be rotated and this rotation will effect a reciprocation of the box 24 which in turn through the various connections heretofore described will effect a corresponding reciprocation of the hollow driving

20 spindle 19. A longitudinal key-way 29 is formed in the outer face of the hollow driving spindle 19 and receives therein a key carried by a pulley 30 which surrounds said hollow driving spindle and is provided with

25 a laterally extending boss 31 which is journaled in a bearing 32 disposed between the belt pulley 15 and the pulley 30. By this construction it will be apparent that the rotation of the pulley 30 will effect a rotation

30 of the hollow driving spindle 19, while at the same time said spindle will be free to move longitudinally through the boss of the pulley 30, the latter being held against movement laterally during such reciprocation of the hollow driving spindle by reason

35 of the connection between the boss 31 and the bearing 32. The pulley 30 is connected by a belt 33 to the bobbin driving pulley 34 which pulley is loosely mounted upon the

40 shaft 10 and frictionally controlled as will more fully hereinafter appear.

The stop motion of the machine which forms particularly the subject matter of this invention and provides for automatically stopping the machine almost instantaneously upon the breaking of the yarn between the bobbin and flier comprises the following structure: Rotatably mounted in the frame A and disposed longitudinally

50 thereof is a shaft 35 which is provided at its end adjacent the shaft B with a crank arm 36 having formed in its free end a slot 37. Mounted upon the end of the frame A adjacent the shaft B at corresponding points

55 on opposite sides of said frame are brackets 38 in which is slidably mounted for movement transversely of the frame a bar 39. Carried by this bar 39 and projecting laterally therefrom are a pair of spaced teeth 40

60 and 41 which are so positioned as to embrace the belt D so that when the bar 39 is reciprocated transversely of the frame A the belt D will be shipped from the fixed pulley to the loose pulley and vice versa. The

65 tooth 40 has its inner end projected beyond

the inner side of the bar 39 so as to form a stud 42 which extends into the slot 37 of the crank arm 36. This connection between the crank arm 36 and the bar 39 is such, as will be apparent, as to cause said bar to be reciprocated as the shaft 35 is oscillated, this oscillation of the shaft 35 and the resultant reciprocation of the bar 39 serving to ship the belt D as desired.

Fixed upon the shaft 35 is a sleeve 43 which has radiating therefrom at diametrically opposite points arms 44 and 45, the latter of which has its free end weighted as at 46. The position of the weighted arm 45 is such that when the shaft 35 is rotated so as to ship the belt D to the fixed pulley, said arm will constantly tend to influence the shaft 35 to rotate in the opposite direction and ship the belt D to the loose pulley unless said shaft is secured against the last named rotation by a suitable means. This rotation of the shaft 35 under the influence of the weighted arm 45 is normally prevented by means of a trip lever 47 which is pivotally mounted upon a standard 48 rising from the frame A. This trip lever is pivoted intermediately to said standard and has formed on one side of said pivot a notch 49 in which is adapted to be engaged a pawl 50 radiating from a sleeve 51 fixed upon the shaft 35 in substantially the same vertical plane with the trip lever 47. From this construction it will be apparent that when the shaft 35 is locked against rotation by the engagement of the pawl 50 in the notch 49, an upward movement of the end of the trip lever opposite to the end where the notch 49 is disposed will cause the pawl 50 to become disengaged from said notch, when the shaft 35 will be immediately released to the influence of the weighted arm 45 and cause said shaft to rotate and ship the belt D to the loose pulley. The disengagement of the trip lever 47 from the pawl 50 is automatically effected upon the breaking of the yarn between the flier and bobbin by means of a mechanism to be now particularly described.

Fixed upon the shaft 10 between the pulleys 17 and 34 is a positive trip plate 53 which has formed therein slots 54 and 55 for a purpose that will presently appear. Loosely mounted upon the shaft 10 between the positive trip plate 53 and the pulley 34 is a friction trip plate 56 which has formed therein adjacent its center a slot 57 into which projects a pin 58 secured to and projecting laterally from the positive trip plate 53 so that when the positive trip plate 53 is rotated through the medium of the shaft 10, the friction trip plate 56 will be correspondingly rotated as a result of the engagement of the pin 58 with one end of the slot 57. The friction trip plate 56 is further provided on its side adjacent the positive trip

plate 53 with substantially radially disposed projections 59 and 60 which are provided respectively with slots 61 and 62. Pivoted upon the friction trip plate 56 adjacent its periphery and on the side thereof disposed adjacent the positive trip plate 53 is a tripping dog 63 which in this instance is shown as extending through the slot 62, the positioning of this dog in the slots 61 and 62 being a selective matter depending upon the direction in which the parts of the machine are being rotated. The free end of the dog 63 is provided with a lateral extension 64 which in this instance is shown as projecting through the slot 54 in the positive trip plate, it being understood that if said plate were being rotated in a direction opposite to that indicated by the arrow in Fig. 7, the tripping dog would extend through the slot 61 and its laterally bent end would project through the slot 55. Disposed between the friction trip plate 56 and the pulley 34 is a leather friction disk 65 which controls the speed of the bobbin G with respect to the flier F in the usual and well-known manner. The pulley 34 is forced into engagement with the leather friction disk 65 by means of an adjusting spring 66 encircling the shaft 10 and having its outer end abutting a collar 67 detachably secured upon the shaft 10 and its inner end engaging a loose sleeve 68 which abuts the hub of the pulley 34.

The operation of the stopping mechanism is as follows:—Assuming the machine to be at rest, the arm 44 of the sleeve 43 is grasped and moved downwardly so as to rotate the shaft 35 and effect the shipping of the belt D from the loose pulley C' to the fast pulley C. This done, the rotation of the shaft 10 is immediately instituted and transmitted to the belt pulley 17 fixed thereon. This rotation of the belt pulley 17 is then transmitted to the belt pulley 15 by means of the belt 16 which results in setting up the rotation of the flier F. This rotation of the shaft 10 is, as will be apparent, also transmitted to the positive trip plate 53 which latter in turn rotates the friction trip plate 56 through the medium of the engagement of the pin 58 with one end of the slot 57. This rotation of the friction trip plate 56 is transmitted to a certain degree to the belt pulley 34 dependent upon the friction created by the spring 66 in forcing the belt pulley 34 against the leather friction disk 65. The rotation of the belt pulley 34 is transferred by means of the belt 33 to the pulley 30 and this last named pulley will in turn effect the rotation of the hollow driving spindle 19 and in turn the rotation of the bobbin G which is operatively connected to said driving spindle by means of the stud 21. These various movements having been set up in the machine, the pawl 50 engages 65 with the notch 49 and thus locks the shaft

35 against rotation and secures the belt D upon the fixed pulley in a manner heretofore described. As soon as the full rotation of the flier F is attained, the tension exerted upon the yarn between the flier F and the bobbin G will rotate said bobbin and this tension will of course be transmitted through the hollow driving spindle 19, pulley 30, and belt 33 to the belt pulley 34 and cause said belt pulley 34 to partake of a more rapid rotation than would normally be transmitted to it by the various connections between the same and the belt pulley 17. This increased speed of rotation of the belt pulley 34 will produce sufficient friction in conjunction with the leather friction disk 65 to cause the friction trip plate to move ahead in unison therewith and position the pin 58 at the opposite end of the slot 57 from that in which it was disposed upon the institution of the operation of the machine. This relative movement between the friction trip plate 56 and the positive trip plate 53 will force the laterally bent end 64 of the tripping dog 63 to the inner end of the slot 54 and thus position the end 64 of said tripping dog so that the same will not engage the adjacent end of the trip lever 47 during the normal operation of the machine. However, as soon as the yarn between the flier F and the bobbin G breaks and the tension thereof on the bobbin is removed, the rotation of the latter will immediately decrease and this same condition will arise in the various connections between the bobbin and the positive trip plate 53 which include the friction trip plate 56. Now, upon the slowing down of the friction trip plate 56, a slight relative movement between said plate and the positive trip plate 53 equal to the length of the slot 57 will take place and this relative movement will cause the free end 64 of the tripping dog to move toward the outer end of the slot 54 in position to engage the end of the trip lever 47 upon a partial rotation of the positive trip plate 53. This engagement of the trip lever 47 by the end 64 of the tripping dog will remove the pawl 50 from the notch 49 and the weighted arm 45 will immediately rotate the shaft 35 so as to ship the belt D to the loose pulley C' in the manner heretofore referred to.

In order to prevent the trip lever 47 from falling back upon the end 64 of the tripping dog after the former has been tripped by the latter, there is mounted on the sleeve 51 a radially disposed stud 66 which upon the rotation of the shaft 35 moves forward to the position previously occupied by the pawl 50, and in this position engages the outer end of the trip lever and holds the same against upward movement under the influence of the weight of the inner end thereof.

The movement of the outer end of the

trip lever 47 when the latter is tripped by the end 64 of the tripping dog is limited by means of a stud 67 which is adjustably mounted in a slot 68 formed in the standard 48. The pivotal connection between the trip lever 47 and the standard 48 may also be adjusted longitudinally through the medium of the pivot pin 69 which is disposed in a slot 70 formed longitudinally of the standard 48.

The relative movement arising between the positive trip plate 53 and the friction trip plate 56 upon the breaking of the yarn between the flier F and the bobbin G is accelerated by means of a friction mechanism which includes an arm 71 loosely mounted upon the shaft 35 having journaled in its free end a friction shoe 72 engaging with the periphery of the belt pulley 34. It will of course be understood that when the tension of the yarn between the flier and bobbin is normal, the frictional engagement of the shoe 72 with the belt pulley 34 is ineffective but as soon as this tension is removed, the friction produced by the shoe 72 engaging with the belt pulley 34 will cause the belt pulley and in turn the friction trip plate 56 to slow down instantly and thus accelerate the positioning of the end 64 of the tripping dog 63 for engagement with the trip lever 47.

What is claimed is:—

1. In a stop motion for spinning machines the combination with a bobbin and flier, driving means therefor and a belt shipper actuating mechanism, of driving connections between the driving means and flier and bobbin respectively, the driving connections between the driving means and bobbin including a pair of rotating elements adapted to normally rotate in unison, means for rotating one of said elements relatively to the other upon a predetermined reduction in the tension of the yarn between the bobbin and flier, and means actuated by the relative rotation of said elements for tripping the belt shipper actuating mechanism.

2. In a stop motion for spinning machines, the combination with a bobbin and flier, driving means therefor and a belt shipper actuating mechanism, of driving connections between the driving means and flier and bobbin respectively, the driving connections between the driving means and bobbin including a pair of rotating elements adapted to normally rotate in unison, friction controlled means for rotating one of said elements relatively to the other upon a predetermined reduction in the tension of the yarn between the bobbin and flier and means actuated by the relative rotation of said elements for tripping the belt shipper actuating mechanism.

3. In a stop motion for spinning machines, the combination with a bobbin and flier and

driving means therefor, connections between the driving means and flier and bobbin respectively, the connections between the driving means and bobbin including a pair of rotatable elements adapted to normally rotate in unison, a belt shipper and a belt shipper actuating mechanism constantly tending to ship the belt when the latter is disposed upon the fixed pulley, a trip lever for holding the belt shipper actuating mechanism against the influence of said tendency, means for rotating one of the elements in the connections between the driving means and the bobbin relatively to the other of said elements upon a predetermined reduction in the tension of the yarn between the bobbin and flier, and a tripping dog movable under the influence of relative rotation of said elements into engagement with the tripping lever to disengage the latter from the belt shipper actuating mechanism.

4. In a stop motion for spinning machines, the combination with a bobbin and flier, a driving shaft, a belt shipper and a belt shipper actuating mechanism constantly tending to ship the belt when the latter is disposed upon the fixed pulley; of a trip lever for holding the belt shipper actuating means against the influence of said tendency, connections between the driving shaft and bobbin including a disk fixed on said shaft having a slot therein, a second disk loosely mounted on said shaft having a slot therein, a laterally projecting pin carried by the first named disk and projecting through the slot of the second named disk whereby the rotation of the former is transmitted to the latter and said disks are adapted for limited relative movement, a friction connection between said second named disk and the bobbin whereby said second named disk will move relatively to the first named disk upon a predetermined reduction in the tension of the yarn between the flier and bobbin, a tripping dog pivoted to the second named disk and having a laterally extending free end projecting through the slot in the first named disk for movement toward the outer end of said slot to engage the trip lever and release same from engagement with the belt shipper actuating means upon a relative movement of the second named disk with respect to the first named disk.

5. In a stop motion for spinning machines, the combination with a bobbin a flier, a belt shipper and a belt shipper actuating mechanism, driving means, driving connections between the driving means and the flier, driving connections between the driving means and the bobbin; of elements in the driving connections between the driving means and the bobbin adapted to move relatively to each other upon a predetermined reduction in the tension of the yarn between the flier and bobbin, means actu-

ated by the relative movement of said elements to trip the belt shipper actuating mechanism, a belt pulley also included in the connections between the driving means and the bobbin, and a friction shoe engaging the periphery of said belt pulley for accelerating the relative movement of said elements.

In testimony whereof, we affix our signatures, in presence of two witnesses.

SIMON K. MARSHALL.
MINARD H. McKINNEY.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."