(No Model.) 2 Sheets—Sheet 1.

J. ASPINALL.

STOPPING MECHANISM FOR TWINE BALLING MACHINES.

No. 454,991. Patented June 30, 1891.

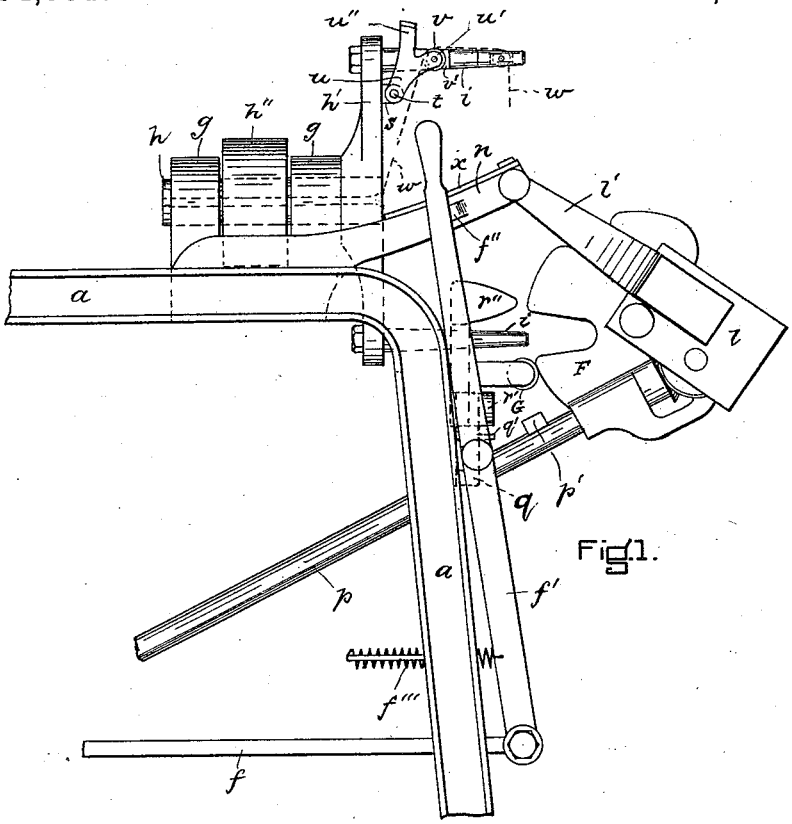

Fig. 1.

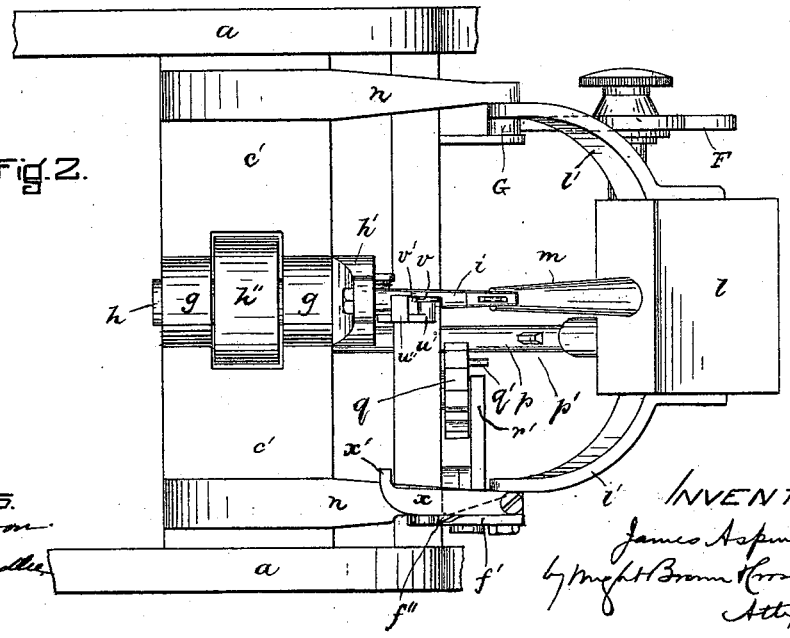

Fig. 2.

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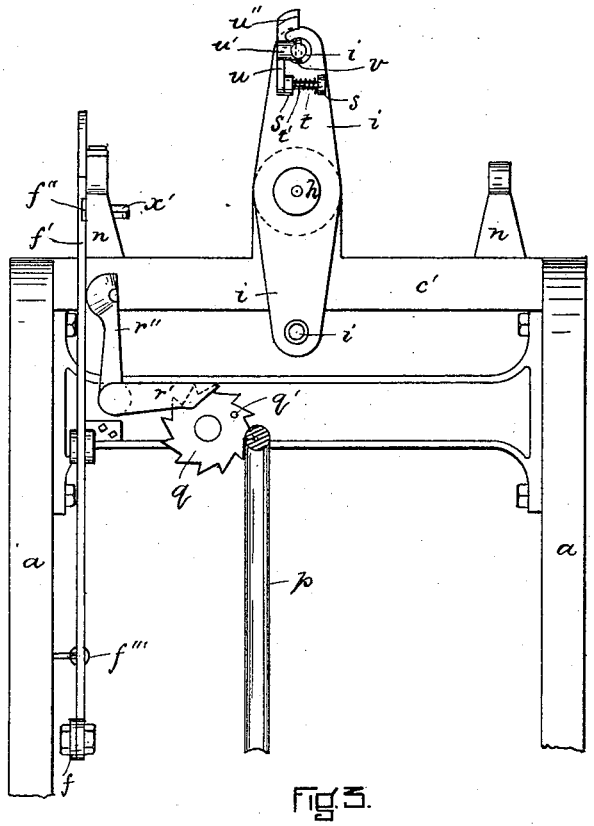

Fig. 3.

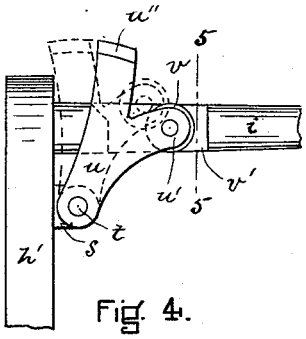

Fig. 4.

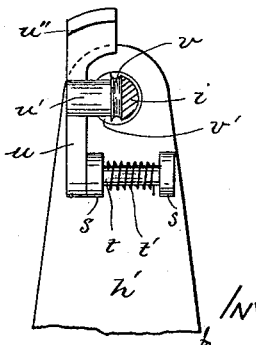

Fig. 5.

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UNITED STATES PATENT OFFICE.

JAMES ASPINALL, OF PLYMOUTH, ASSIGNOR OF ONE-HALF TO CHARLES F. BROWN AND ARTHUR W. CROSSLEY, OF BOSTON, MASSACHUSETTS.

STOPPING MECHANISM FOR TWINE-BALLING MACHINES.

SPECIFICATION forming part of Letters Patent No. 454,991, dated June 30, 1891.

Application filed March 16, 1891. Serial No. 385,197. (No model.)

To all whom it may concern:

Be it known that I, JAMES ASPINALL, of Plymouth, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Stopping Mechanisms for Twine-Balling Machines, of which the following is a specification.

This invention relates to twine-balling machines of the kind shown and described in Letters Patent of the United States No. 262,412, dated August 8, 1882; and it has for its object to provide improved attachments for a machine of this class, whereby the belt-shipper of said machine will be automatically caused to shift the driving-belt from the fast to the loose pulley on the driving-shaft, thus stopping the operation of the machine whenever the ball of twine reaches a certain predetermined size.

The invention also has for its object to provide improved means whereby the said belt-shipper will be similarly operated in case of the breaking of the twine during the winding of a ball, the operation of this device being also automatic.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of as much of the front portion of a twine-balling machine of the kind above named as I have deemed necessary to show in order to illustrate my invention. Fig. 2 represents a top plan view of the parts shown in Fig. 1. Fig. 3 represents a front view of the same, the swinging head carrying the ball-spindle being removed in order to show more clearly the parts behind the same. Fig. 4 represents a side elevation, on a larger scale, of one of the fly-arms, which fly-arm is also shown in side elevation in Fig. 1. Fig. 5 represents a section on the line 5 5, Fig. 4.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a a* represent portions of the frame of the machine, and *c'* represents one of the cross-pieces of the same, in which are bearings *g g* for the hollow winding-spindle *h*. Said spindle is provided with a pulley *h''*, over which a belt passes, said belt passing over another pulley on the main shaft of the machine. (Not shown.) The said main shaft has a fast and a loose pulley at its rear end, on one of which a belt connected with the power-giving shaft is adapted to run. The belt-shipper *f* is adapted to move the last-mentioned belt from the fast pulley to the loose one, or vice versa, and said shipper is operated by the lever *f'*, which is pivoted to the frame of the machine. The front end of the winding-spindle *h* is provided with the fly-head *h'*, from which the fly-arms *i* project, the above-described construction being that shown in Patent No. 262,412, before mentioned.

n n are two arms affixed to the frame of the machine, which support the swinging head *l*, carrying the ball-spindle *m*, on which the twine is wound to form a ball, the arms *l' l'* of said head being hinged or pivoted to the end of the arms *n n*. Said spindle *m* is rotated by the gearing driven by the shaft *p* in the manner shown and described in the patent already referred to, and the plate-cam F on the swinging head co-operates with the fixed roller G in the manner also described in said patent. The shaft *p*, which causes the ball-spindle *m* to rotate, has a backward and forward sliding motion, said shaft being in its farthest forward position when the machine is first started to make the ball, and slides slowly backward, carrying the head *l* with it as the ball increases in size, the plate-cam F regulating this movement, and when the ball is almost of the size required and ready for its finishing windings the cam F permits a sudden drop or backward slide of the shaft *p*, thus bringing the spindle *m* to its least inclination or the position in which it is nearest the perpendicular, all as described in said Patent No. 262,412. The arm *n* on the side of the machine at which the operating-lever *f'* of the belt-shipper is located is provided with a catch *f''*, with which the said lever is adapted to be engaged when the shipper is holding the belt on the fast pulley and the machine is operating.

f''' represents a spring attached to the

frame of the machine and to the lever f', said spring operating to move the lever, so as to cause the belt-shipper to shift the belt from the fast to the loose pulley, so that when the lever f' is moved to set the machine in operation it is moved against the stress of said spring f'''.

In carrying out my invention I provide the shaft p with a tooth or projection p'. When the final drop of said shaft occurs, bringing the spindle m and ball thereon into position for the latter to receive its final end windings, said tooth p' comes into gear with a ratchet-gear q, affixed to the frame of the machine. The said gear q is provided with a pin q' on its front surface. As the shaft p rotates, the tooth p' thereon comes in contact with the teeth on the gear q successively, thus rotating said gear slightly at each rotation of the shaft p. When the gear q has been partially rotated, as described, a given number of times, the pin q', thereon will strike one end r' of a bell-crank lever pivoted to a fixed support on the frame of the machine and will force the same upwardly, causing the other end r'' of said bell-crank lever to press the lever f' of the belt-shipper out from the catch f'' on the arm n, with which it is engaged, thus allowing it to be moved by the spring f''' to shift the belt from the fast to the loose pulley, thus stopping the operation of the machine.

From the foregoing it will be seen that the machine will be automatically stopped when the ball has reached the required size. The number of the end windings given the ball may be determined by the number of teeth given to the gear q. The shaft p by its tooth p' causes said gear to rotate the space of one of its teeth at every rotation of said shaft, so that the shaft p rotates as many times as there are partial rotations of the gear q required to bring the pin q' in contact with the end r' of the bell-crank lever, as will be readily seen. It will also be obvious that the gear q may be set so that it will require almost one complete rotation of said gear to bring its pin q' in contact with the bell-crank lever, or said gear may be set so that only a rotation of the space of a few of its teeth will be required to bring about said contact.

My invention also comprises means for automatically stopping the operation of the machine in case the twine should break during the winding process, and to this end I provide one of the fly-arms i with the attachment next described, the same being best illustrated in Figs. 4 and 5 of the drawings.

s s represent ears affixed to the fly-head h'. t represents a short shaft or stud journaled in said ears s s and having affixed to one end a bifurcated piece u. One arm u' of the piece u is provided with a small grooved pulley v, and the said piece u is adapted to swing on its pivot-stud t, so that said pulley v will enter a recess v' in the arm i, the pulley being free to rotate in said recess.

t' represents a spring, one end of which is attached to the stud t and the other end of which is connected to the fly-head, the stress of said spring tending to throw the piece u back to the position shown in dotted lines in Fig. 4.

When the machine is in operation, the twine is passed over the pulley v and thence over the pulley at the outer end of the arm i, as shown by the dotted line w w in Fig. 1, and the tension of the twine is sufficient to overcome the stress of the spring t' and hold the piece u in the position shown in said figure and in full lines in Fig. 4. Should the twine break, the forward and downward pressure on the pulley v on the arm u' is removed and the spring t' will immediately move the piece u to the position shown in dotted lines in Fig. 4, thus bringing the other arm u'' of said piece into line with the projection x' on an arm x, which is pivoted to the arm n, with which the operating-lever f' of the belt-shipper is engaged with its catch f''. It will thus be seen that when the arm u'', revolving with the fly-head, is brought in line with the projection x' it will strike the same, and will move the same and the arm x' outwardly, (the end of the arm u'' or the end of the projection x' being beveled to effect this movement,) causing the arm x to disengage the lever f' from the catch f'' and allowing said lever to be operated by its spring f''' to shift the belt and stop the operation of the machine, as already described.

It will be seen that the above-described improvement operates automatically to stop the machine whenever the twine is broken during the winding operation.

I do not limit myself to the exact form of the piece u here shown, as the same may be variously modified, the essential point of the same being that it shall be held in one position by the tension of the spring, and shall be automatically moved to another position upon the release of said tension, in which latter position it shall be adapted to automatically cause the release of the operating-lever of the belt-shipper from its catch, and consequently the stoppage of the operation of the machine.

Various changes may be made in the details of construction and arrangement of parts of my invention without departing from the nature or spirit thereof.

I claim—

1. In a twine-balling machine, the combination of a driving-shaft provided with a fast and loose pulley, a belt-shipper which in its normal position holds the driving-belt in engagement with the loose pulley, a lever engaged with said shipper and adapted to be engaged with a fixed detent and thereby hold the shipper in position to keep the belt upon the fast pulley, the revolving ball-spindle, a sliding and rotating shaft driving the ball-spindle, a tooth or projection on said shaft, a ratchet-wheel affixed to the frame of the ma-

chine, the said tooth being adapted to come into engagement with said ratchet-wheel at a certain predetermined part of the sliding movement of said shaft and being adapted to move said wheel the space of one tooth at each rotation of said shaft, and a pin or projection on said gear-wheel which is adapted after a predetermined number of the said movements of said wheel by said tooth to cause the release from its detent of the operating-lever of the belt-shipper of the machine, said lever upon such release being automatically operated to shift the driving-belt from the fast to the loose pulley of the shaft and thus stop the operation of the machine, as set forth.

2. In a twine-balling machine, the combination of a driving-shaft provided with a fast and a loose pulley, a belt-shipper which in its normal position holds the driving-belt in engagement with the loose pulley, a lever engaged with said shipper and adapted to be engaged with a fixed detent and thereby hold the shipper in position to keep the belt upon the fast pulley, a revolving fly-head, a spring-supported arm on said head having a pulley or guide over which the twine is adapted to pass, the tension of said twine holding said arm out of its normal position against the stress of its spring, said spring being adapted when the tension of the twine is removed to move said arm so that the path of its revolution will intersect the belt-shipper lever, whereby said arm is caused to disengage said detent and permit the shipper to transfer the driving-belt to the loose pulley, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 10th day of March, A. D. 1891.

JAMES ASPINALL.

Witnesses:

ANDREW J. LATHROP,

CHAS. A. FLOYD.