

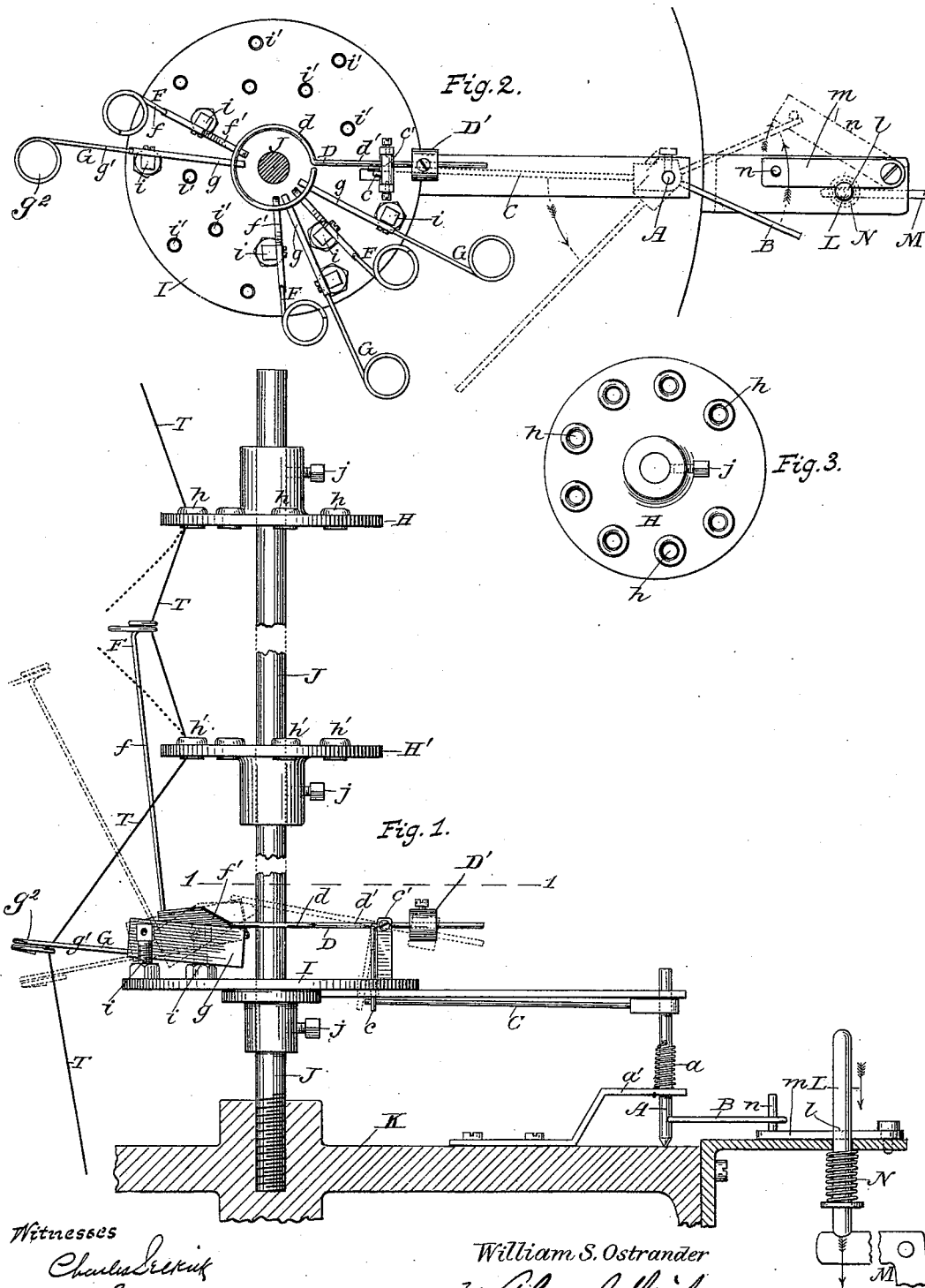
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APPARATUS FOR OPERATING BELT SHIFTERS FOR STOPPING KNITTING
MACHINES.

No. 582,676.

Patented May 18, 1897.



Witnesses

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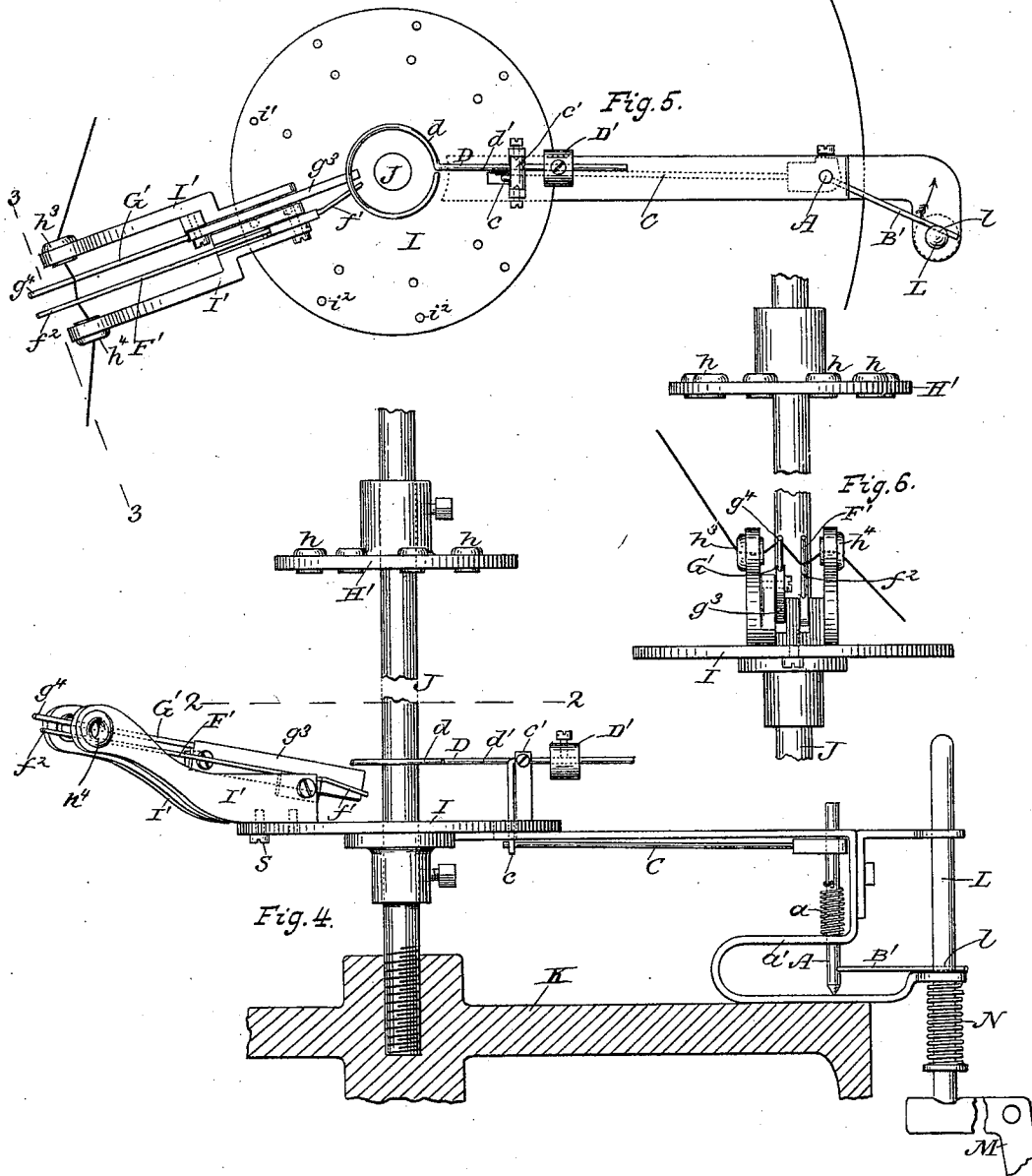
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UNITED STATES PATENT OFFICE.

WILLIAM S. OSTRANDER, OF AMSTERDAM, NEW YORK.

APPARATUS FOR OPERATING BELT-SHIFTERS FOR STOPPING KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 582,676, dated May 18, 1897.

Application filed May 3, 1895. Serial No. 547,989. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. OSTRANDER, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Apparatus for Operating Belt-Shifters for Stopping Knitting-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in apparatus for operating belt-shifters for stopping knitting-machines when a thread breaks or becomes tangled or caught; and while it is designed primarily for use with knitting-machines of a circular class it may, with some modifications, be used for operating belt-shifters for stopping other kinds of fabric-knitting machines by breaking of the thread or by snarling or catching of the same so as to increase the tension of the thread.

My invention has for its object to provide a simple and efficient means for holding the thread running from the bobbins to the needles under suitable tension and causing either a breakage of a thread or an excess of tension, as may result from a snarling or catching of a thread, to set into motion a simple means quickly applied and automatically causing a release of an arm which is held latched under tension and calculated to operate a suitable adjunct of a belt-shifter the latter may be provided with for operating said belt-shifter the moment such release is effected.

This invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation of an apparatus embodying improvements by which my invention may be carried into practice and illustrating one preferred form and arrangement of levers which may be employed. Fig. 2 is a plan of the same, taken at line 1 in Fig. 1. Fig. 3 is a plan view of a thread-guide plate which may be employed. Fig. 4 is a side elevation of the apparatus and illustrating another form and arrangement of levers which may be employed for carrying my invention into effect. Fig. 5 is a plan view of the same,

taken at line 2 in Fig. 4; and Fig. 6 is a side view taken at line 3 in Fig. 5.

Similar letters of reference refer to similar parts throughout the several views.

In carrying my invention into practice I employ, preferably, that form of apparatus illustrated and provided with either of the forms of thread-tension levers shown, which I at present consider preferable forms, yet parts thereof may be varied within certain limits without departing from the spirit of my invention.

I first provide a post-form pivot A, suitably supported and having with it a tension-spring *a*, held by one of its ends with the body of said spring and by its opposite end with a suitable stationary piece, as *a'*, and rigidly secure with said pivot an arm B, calculated to automatically disengage the usual pushing-bar employed, or its equivalent, for imparting motion to the lever operating the belt-shifter or an adjunct of the same. I also provide with said pivot a latching-arm C, calculated to engage with a suitable latch-keeper *c* and be held by the same under tension from spring *a* until said keeper is tripped. This latch-keeper *c* is automatically controlled by a gravity-trigger D, comprising a circular-form head *d* and an arm *d'*, suitably connected with pivot-piece *c'*, to which the said latch-keeper *c* is secured. A movable weight D' on an extension of said arm *d'* operates as a counterbalance by which to regulate the tension of the thread at which it may be broken, and it may be set at will for adapting said trigger to operate the latch-keeper at pressure corresponding with the tension at which the thread breaks. This trigger and latch are preferably pivoted to a suitable bed-plate through the means of posts *e e*, secured to the same. I also provide two sets of tension-levers for operating said trigger and causing it to release the latch-keeper *c* from engagement with latching-arm C. These tension-levers are employed, respectively, in numbers corresponding with the number of threads used with the machine for producing the fabric. These tension-levers may be of any suitable form of construction and arrangement by which those of one set may automatically operate the said trigger when a

thread breaks, while those of the other set may be automatically operated by an excess of tension of the thread for similarly operating the said trigger. F is one of my preferred forms of thread-tension levers, which is shown (in Fig. 1) to stand a little out of a vertical position with its thread-receiving end loop to be in situation between upper and lower thread-guiding eyes h h' , while its lower end is so pivoted that the short arm thereof is lighter than its opposite or long arm and is held from contact with the trigger D only when the thread T under tension draws the heavier and longer arm f forward to position of full lines in Fig. 1. These levers, (marked F in Fig. 1,) though shown to be about vertical when holding the thread at tension and unbroken, may be arranged about horizontal, as shown by levers F' in Figs. 4, 5, and 6, with its short arm f' lighter than the long arm f^2 and the thread under tension below the outer end portion of said long arm, as shown in Figs. 5 and 6. These levers F or F', I term "gravity" tension-levers, as their heavier arms f f^2 hold with the thread under tension until the thread breaks, when the weight of the said arm operates the trigger D. The levers of the other set, which I term the "draft" tension-levers, are shown to be in the form of levers G, Figs. 1 and 2, and of G' in Figs. 4, 5, and 6, and in both of which forms the inner arm beneath the trigger D is heavier than the outer arm and may have its weight overcome by the excess of the tension (from any accidental cause whatever) on the lighter arm, when the heavier arm will be automatically raised by such excessive tension and cause the trigger D to operate the latch-keeper.

With the form of lever G, Figs. 1 and 2, thread T is passed downwardly and outwardly from guide-eye h' , located on a plane above the plane of the outer end of said lever G, to and through an eye or loop g^2 , formed with the outer end of the lighter arm g' , and thence in direction downward and relatively inwardly to the needle, (not shown,) so that the lines of direction of thread T between the guide-eye h' and the needle (not shown) will, when under tension, form an obtuse angle with its lines intersecting in loop g^3 . In this case an excessive tension on thread T by its pull in a downward direction will force the outer arm g' of lever G downward from position of full lines in Fig. 1 to that indicated by dotted lines in the same figure, and thereby elevate the heavy end g of said lever and effect a tripping of trigger D, as indicated by dotted lines in Fig. 1, when the latch-keeper c will be carried out from engagement with the latching-arm C, and the latter, under the impulse of the torsion-spring a , will be quickly moved from position shown by full lines in Fig. 2 to that indicated by dotted lines in the same figure, while with the form of lever G' the thread is passed from a guide-eye h^3 to and over the outer end portion of the lighter arm g^4 and thence beneath the heavier arm of

the gravity tension-lever F' and then to the guide-eye h' , and through it and to the needle. (Not shown.) These several levers of each set when made in the form of levers F and G may be supported from any suitable bed-plate I by means of pivot-posts i , secured to said bed-plate by means of holes i' and suitable screw-threads in number corresponding with the number of said levers to be employed, while when they are in the form of levers F' and G' they may be pivoted with suitable arms l' , carrying each a guide-eye and secured to said plate by screws s , passing through holes i^2 , provided in said plate, as shown in Fig. 5. This plate I may be secured on a central shaft or post J by any suitable means, yet preferably in an adjustable manner by a sleeve and set-screw j , as shown, and is set apart about twenty inches, more or less, above the top plate of the machine from which post J is supported, while the lowermost plate II' is about the same distance from the bed-plate I; but in some cases these distances may be varied.

An elastic pushing-pin L, provided with a notch l , (indicated by dotted lines in Figs. 1, 2, 4, and 5,) is provided for imparting motion to lever M, made preferably in the form of a bell-crank lever for moving the belt-shifting device, (not shown,) which device is so well known that a description thereof is unnecessary. This pushing-pin when released is actuated by spring N pressing said pin against the end of one arm of said lever M, thereby automatically operating the same in the proper direction for moving the belt-shifting device (not shown) so as to shift the belt from the fast pulley driving the machine to the loose one in the usual manner, which requires no particular description. This pushing-pin L may be supported against the pressure of spring N by the arm l^3 , holding with notch l , as shown in Figs. 4 and 5, or said pin may be supported by a pivoted bar, as m , holding with said notch, as shown in Figs. 1 and 2, in which case I provide said pivoted bar m with pin n , against which the arm B may strike to move said bar out of notch l when the spring N moves said pin against lever M, operating the belt-shifting device. (Not shown.)

The operation of this apparatus will be readily understood and is as follows: Before the machine is started the several threads T will each be run from its bobbin (not shown) to the needles, (also not shown,) with each thread in contact and holding with a tension-lever of each set, so that each of the said levers may be caused to automatically operate the gravity-trigger D and thereby bring successively into operation the several devices which automatically give motion to the parts between the said gravity-triggers and the lever operating the belt-shifting device. (Not shown.) When the thread-tension levers are of form and arrangement shown in Fig. 1, a breakage of a thread T, as indicated by dotted lines in

said Fig. 1, allows lever F to fall from position of full lines to that of broken dotted lines and automatically cause the gravity-trigger D to operate the latch-keeper, as before described; but should the thread remain unbroken and become snarled or be so held as not to freely move from the bobbin to the needle the excessive tension of the thread on the tension-lever G, Fig. 1, operates to automatically move said lever from position of full lines to that of broken and dotted lines, Fig. 1, and thereby operate said gravity-trigger G. When the tension-levers are of the form and arrangement shown in Figs. 4, 5, and 6, the thread T, passing from a guide-eye h^2 to and through eye h^3 , and thence over lever G' and beneath lever F', and thence through a guide-eye h^4 to the needle, (not shown,) operates substantially in the same manner with said levers F' and G' as when operating with levers F G, and so that a breakage of the thread T operates to allow the said lever F' to automatically cause the gravity-trigger D to rise, while an excessive tension of the thread causes lever G' to automatically operate the same trigger in the same direction. In all cases when said trigger D is raised the latch-keeper will be moved to position of dotted lines, as indicated in Fig. 1, and through the latch-keeper c unlatch arm C, when the torsion-spring a will automatically turn post A and cause it to carry the arm B in a proper direction for releasing the pushing-pin L by suddenly moving away from it the device m in Fig. 5, provided to engage with the notch l in said pushing-pin, Fig. 5, or by striking pin n, provided with a pivoted bar, as m, disengage said bar from said notch l in the pushing-pin L, when the actuating-spring N automatically causes said pin to operate the lever M, provided to move the belt-shifter (not shown) so that the latter may effect a shifting of the belt (or clutch) and thereby effect a stoppage of the machine. After the thread, if broken, has been tied, or the excessive tension or cause of excessive tension of the thread has been removed, the belt-shifter (not shown) will be moved back to its normal position and the pushing-pin L will be raised and latched in place, when the latching-arm C will be latched in place by keeper c, when all parts will be in position and ready for automatic operation as soon as a thread is broken or caught from moving freely from the bobbin to the needle.

My above-described improvements may readily be applied to knitting-machines now in use, as well as being built with them, for operation either at the time of the breakage of a thread or at the time of the occurrence of an excessive tension of the thread, which, if continued, might result in the breakage of the same, so that in either case an immediate stoppage of the machine may be effected, and that an attendant may at once remove the cause of the stoppage, whatever it may be, and thereby give to the thread its proper con-

dition for continuing its run to the needle of the machine.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with an elastic pushing-pin L provided with notch l, of the pivoted post A, a torsion-spring a for revolving said post in one direction, arm B carried by said post, of arm C also carried by said post, a latch-keeper c for temporarily holding said arm C to position moved to, and a pivoted trigger connected with said latch-keeper and adapted to retain it in engagement with said arm C, substantially as and for the purposes set forth.

2. The combination with the pushing-pin L provided with notch l, pivoted post A, torsion-spring a, arm B carried by said post and adapted to engage with notch l in said post, of latching-arm C also secured to said post and adapted to hold the latter against the torsion of spring a, keeper c, pivoted trigger D, a lever provided with a weighted arm which is arranged below the long arm of said trigger D and a lighter arm adapted to receive the pressure of the thread running to the needles and yield downwardly under excessive tension of the thread consequent on the pull of the needles thereon, substantially as and for the purposes set forth.

3. The combination with pivoted post A, pushing-pin L provided with notch l, torsion-spring a, and arm B carried by said post, for operation with said notch of said pushing-pin, of a latching-arm C also secured to said post and adapted to hold it against the torsion of spring a, latch-keeper c, trigger D, a lever having its light arm beneath said trigger and its heavier arm projected outwardly and adapted to be held, from dropping, by the upward pull of the thread beneath the heavier arm of the lever, while the thread remains unbroken and is being pulled on by the needles, substantially as and for the purposes set forth.

4. The combination with a weighted trigger, adapted to operate a latch-keeper, of a lever provided with a long heavy arm adapted to be held in an elevated position by the thread, and a short light arm arranged beneath the trigger and adapted to operate the latter when the thread held by the heavy arm is broken, and a second lever having a light arm adapted to hold the thread and receive its pressure, and a heavy arm arranged beneath the said trigger and operating the same when the thread becomes snarled, substantially as and for the purposes set forth.

5. The combination with the trigger having an adjustable weight and a latch-keeper carried by said trigger, of the two thread-holding levers described, which are each adapted to trip the said trigger and have each its inwardly-extended arm arranged beneath the head end of said trigger, and each having its outwardly-extended arm adapted to hold the

thread and receive the pressure from the pull
of the same while it is being drawn to the
needles, one of said levers having its in-
wardly-extended arm heavier than its outer
5 arm and held from contact with the head end
of said trigger by the draft of the thread on
its outer arm until the thread breaks, and the
other lever having its inwardly-extended arm
held out of contact with said head of said
10 trigger by its own weight and until a snarl of

the thread, at a point between the bobbin and
the needles, imposes a strong pull on the outer
arm of the lever and thereby overcomes the
weight of the inner arm, substantially as and
for the purposes set forth.

WILLIAM S. OSTRANDER.

Witnesses:

ALEX. SELKIRK,

CHARLES SELKIRK.