(No Model.)

R. B. GOODYEAR.

STOP MOTION FOR KNITTING MACHINES.

No. 431,969. Patented July 8, 1890.

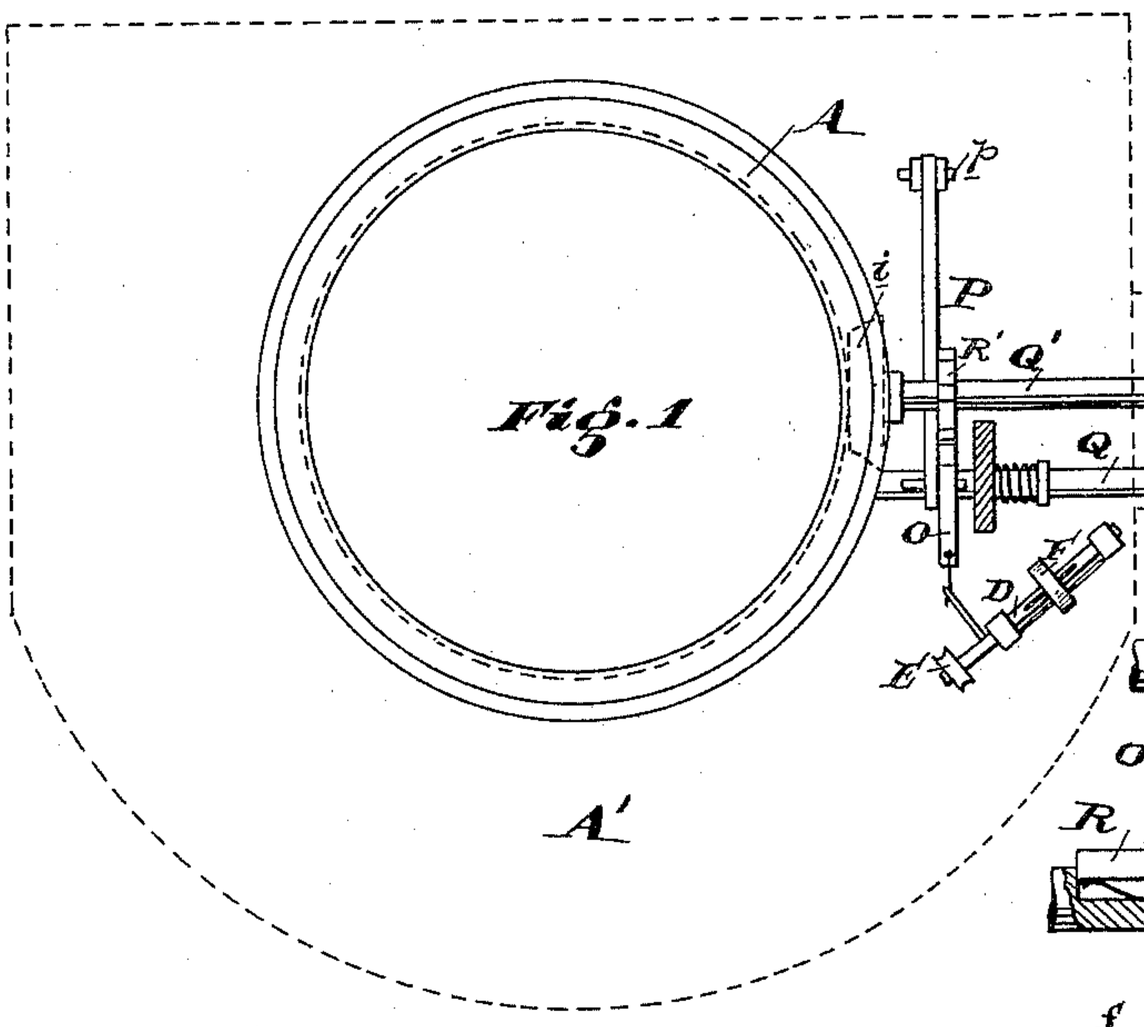

Fig. 1

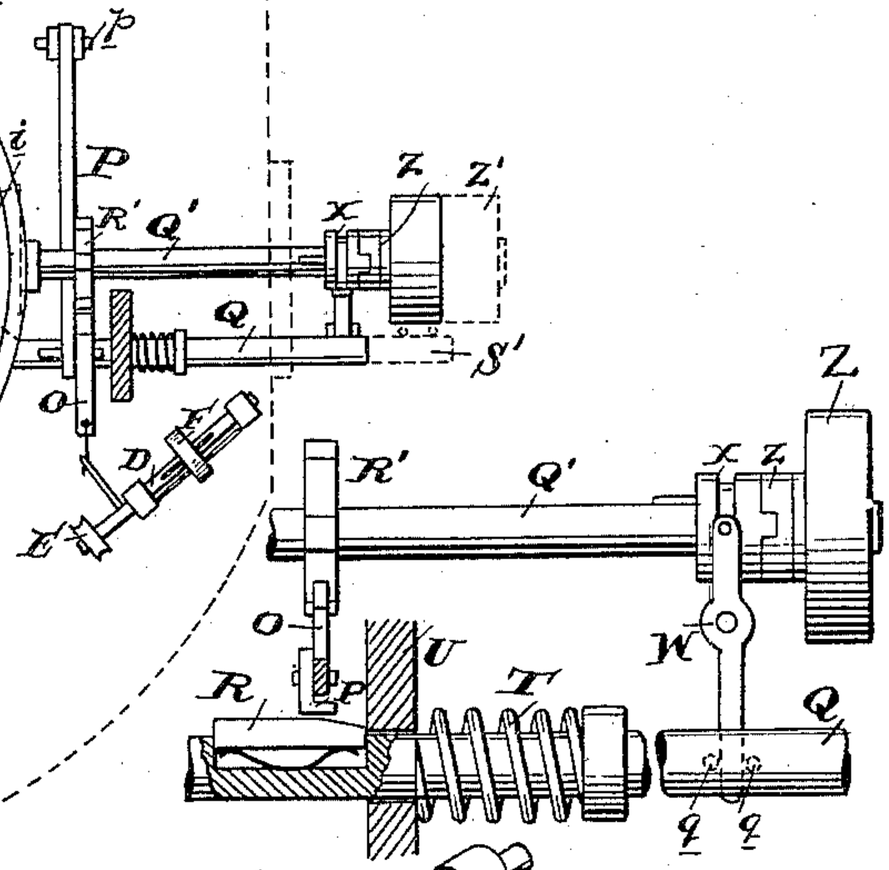

Fig. 3

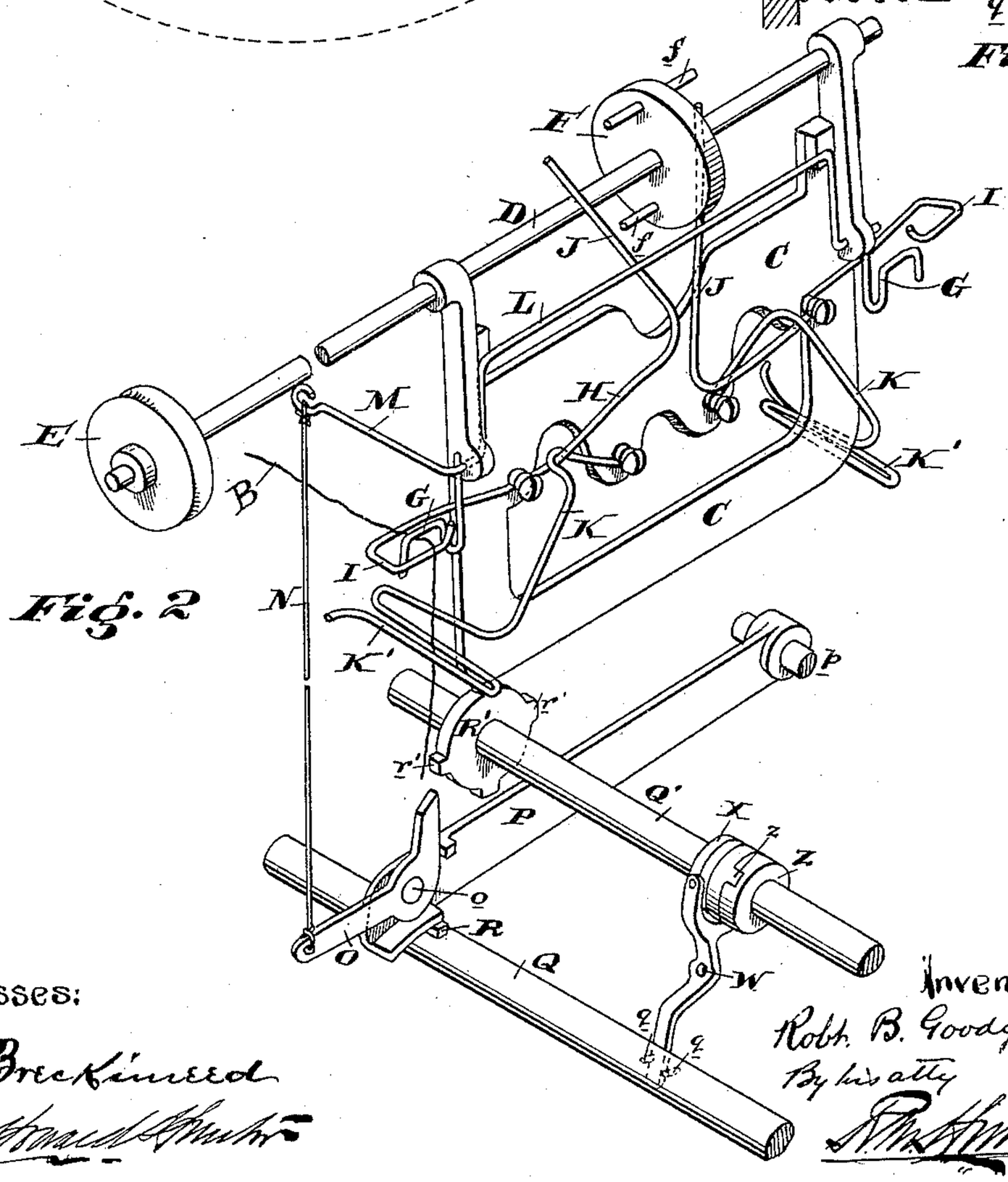

Fig. 2

Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

ROBERT B. GOODYEAR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JAMES TAYLOR, OF SAME PLACE.

STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 431,969, dated July 8, 1890.

Application filed July 9, 1888. Serial No. 279,410. (No model.)

To all whom it may concern:

Be it known that I, ROBERT B. GOODYEAR, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Stop-Motions for Knitting-Machines, of which the following is a specification.

My invention relates to stop-motions for knitting-machines; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

It is the object of my invention to automatically stop the operation of the knitting-machine if at any time the thread should become broken or knotted. If the machine is not stopped instantly when this occurs, it is evident that the fabric knitted will be imperfect.

To obviate the necessity of constantly watching the yarn or thread and to automatically put the machine out of operation in case of breakage or knotting, my invention is intended; and the result is accomplished by the mechanism shown in the drawings, in which—

Figure 1 is a plan view of a knitting-machine having my invention applied thereto. Fig. 2 is a perspective view, on an enlarged scale, of the stop-motion mechanism; and Fig. 3 is a side elevation of the shifting mechanism to stop the knitting-machine.

My invention is adapted to other machines besides knitting-machines where threads are fed to needles or other operating parts for any desired purpose—for instance, in lace-making machines, quilting-machines, embroidery-machines, &c.—and where the breakage of one thread necessitates the stoppage of the entire machine.

A is a knitting-head in an ordinary frame A′.

B is the thread which passes through the stop-motion mechanism to the needles.

C is an upright frame upon which the stop-motion mechanism operated by the thread is located, and is bolted or otherwise secured to the main frame A′. Journaled in arms on the upper part of this frame C is a shaft D, provided with a driving-wheel E, by which the shaft receives its motion from the main shaft of the machine through a band-connection or otherwise, as desired. Upon this shaft D is a disk F, located between the arms in which the shaft is journaled and provided with one or more pins *f*, projecting laterally from the sides of the disk. One pin *f* may be used; but I prefer to use two, as the stop-motion mechanism is then more quickly operated.

G G are fixed thread-guides, preferably constructed of pieces of curved wire extending from the sides of the frame C.

H H are levers pivoted to the frame C, having hooked or curved ends I on their shorter arms, which are adapted to fit over the fixed thread-guides G. These ends I constitute swinging thread-supports. The longer arms J of these levers H are bent upward at an angle, so that normally the weight of the longer arm J will throw it over against the disk F.

K K are two arms loosely pivoted to the frame C, provided with forked ends, through which the thread passes, located immediately beneath the fixed guides G. By these loosely-pivoted arms K K the mechanism is operated to stop the rotation of the knitting-head when the thread is knotted, as is hereinafter more fully explained.

L is a bar loosely pivoted in the frame C and normally standing erect slightly below disk F and beyond the arms J of the levers H.

M is an arm-extension of the bar L, extending outward from the frame C.

N is a wire or string connection between the arm M and the trip O, to one arm of which it is secured. The trip is preferably in the form of an angular lever, pivoted at *o* to a trip-supporting arm P, which is journaled at *p* to the main frame A′.

Q is a clutch or belt-shifter, upon which the trip-supporting arm P rests. This shifter is supported in an upright U of the main frame A′, and is recessed in that portion immediately below the trip-supporting arm P. In this recess is a spring lock or catch R, which normally presses against the side of the upright U.

T is a spring about the shifter Q, which tends to throw it forward. The lock or catch R, however, prevents this by holding the shifter in place.

q q are pins upon the shifter Q, between which the end of the Y-shaped lever W is

held. This Y-shaped lever is adapted to operate a clutch member X, loosely supported by a key or feather upon the power-shaft Q'.

R' is a wheel or hub having teeth or projections r' on its periphery, and is carried on the shaft Q' close to the trip O.

Z is a pulley loosely journaled on the power-shaft and having a recessed part z, adapted to engage with the clutch member X.

i is a gear-wheel, by which the head A is rotated in the usual manner.

These details of the power-actuated knock-off mechanism, consisting of the trip O and the mechanism operated by it, are fully set forth in Letters Patent No. 388,774, granted to me on the 28th day of August, 1888, and my present invention is concerned merely with an improvement on the thread-actuated mechanism set out in that application, for which the present invention may be substituted; but the trip-actuated devices are the same in both cases. The thread is brought up from the spool or bobbin through the forked end K' of the lever K and thence over the curved end I of the lever H and under the stationary thread-guide G, and thence to the needles.

The operation of the machine is as follows: The thread passing over the curved end I and under the guide G holds the long arm J of the lever up and away from the pins f on disk F, as shown on the left hand of Fig. 2. If the thread breaks, it will release the short end of the lever and allow the arm J to fall forward toward the disk F. As this disk rotates, the pins f will then come in contact with the arm J and push it outward against the pivoted bar L. The arm H is loosely pivoted to the frame C, so as to allow it to be pushed outward in this manner, or when the arm H is constructed of wire there will be sufficient flexibility for this purpose. When the pivoted bar L is pushed over, it will raise the arm-extension M, and thereby operate the trip to bring the knitting-head to a standstill. The trip O will be raised by the arm-extension M through its connection N to bring one arm of the trip within reach of the teeth r' of the wheel or hub R'. When one of the teeth of this wheel R' comes in contact with the trip O, it will force the trip down and with it its supporting-arm P upon the spring lock or catch R, which will be pressed down and will unlock the shifter Q. This will then be shot forward through the force of the spring T. The end of the lever W will be carried forward by the pins q q, and the clutch X will be disengaged from the pulley Z, and the machine will be immediately brought to rest. The broken part of the thread may be repaired and the machine started again into operation. The weight of the lever K is made to act upon the lever H, so as to assist in preventing the thread being drawn out from guide G and end I of lever H. If the thread is knotted, the knot will be caught between the wires of the forked arm K', and the tension of the thread upon the end or yarn support I of the lever H will be increased sufficiently to deflect the lever until the thread will be released from under the guide G, which will immediately release the lever H and allow the longer arm J to fall toward the disk F, when it will come in contact with the pins f, and the machine will be stopped, as before. I prefer to employ a pivoted lever K with the forked arm K', instead of a fixed arm, in order that the tension caused by the catching of the knot in the forked arm, while sufficient to deflect the thread support or arm I, will not be great enough to break the thread, as might occur if the fixed arm were employed. The lever K in falling, after the thread has been freed from lever H and guide G, strikes the lever H and causes it to positively move its end J into contact with the pins or projections on the rotating disk. This makes the device doubly sure in operation.

In place of the clutch mechanism X and lever W an ordinary belt-shifter S' may be used, as shown in dotted lines in Fig. 1. In this case Z will be a fixed pulley and an additional loose pulley Z' will be required.

The mere details of construction here shown are those preferred by me; but they are not to be considered limitations of my invention, as it is evident that they may be varied in many ways without departing from the principles of it.

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

1. The combination of a rotating needle-head with a fixed guide, under which the thread is guided, a pivoted lever held by the thread passing under said guide, a pivoted bar arranged in front of the long arm of said pivoted lever, a rotating part adapted to force said long arm against the pivoted bar to move it when the thread breaks, a trip actuated by the movement of said bar, a rotating part in connection with the needle-head, having a projection or tooth adapted to strike said trip, and mechanism, substantially as described, actuated by the trip to stop the rotation of the needle-head.

2. The combination of a rotating needle-head with a fixed guide, under which the thread is guided, a pivoted lever held by the thread passing under said guide, a pivoted bar arranged in front of the long arm of said pivoted lever, a rotating part adapted to force said long arm against the pivoted bar to move it when the thread breaks, a trip actuated by the movement of said bar, a rotating part in connection with the needle-head, having a projection or tooth adapted to strike said trip, and mechanism operated by said trip, consisting of a movable bar, a spring to move said bar, a catch to hold said bar against the spring, a support for the trip adapted to actuate the catch, and devices actuated by the movable bar to stop the rotation of the needle-head.

3. The combination of a rotating needle-head with a fixed guide, under which the thread is guided, a pivoted lever held by the thread passing under said guide, a pivoted bar arranged in front of the long arm of said pivoted lever, a forked lever between the forks of which the thread passes under the fixed guide, a rotating part adapted to force said long arm against the pivoted bar to move it, a trip actuated by the movement of said bar, a rotating part in connection with the needle-head, having a projection or tooth adapted to strike said trip, and mechanism, substantially as described, actuated by the trip to stop the rotation of the needle-head.

4. The combination of a rotating needle-head, a thread-guide, under which the thread passes, a pivoted lever held by the thread and released by the breaking of the thread, a pivoted bar arranged in front of said lever, a rotating part adapted to push the lever when released from the thread against said bar to actuate the bar, and trip mechanism, substantially as described, controlled by said bar to stop the rotation of the needle-head.

5. The combination of a rotating needle-head, a thread-guide under which the thread passes, a pivoted lever held by the thread and released by the breaking of the thread, a pivoted bar arranged in front of said lever, a rotating part consisting of a disk provided with a projection or pin adapted to push the lever when released from the thread against said bar to actuate the bar, and trip mechanism, substantially as described, controlled by said bar to stop the rotation of the needle-head.

6. The combination of a rotating needle-head, a thread-guide, under which the thread passes, a pivoted lever held by the thread, a pivoted bar arranged in front of said lever, a forked lever located under the pivoted lever and thread-guide, through the forked end of which the thread passes, a rotating part adapted to push the pivoted lever when released by the thread against said bar to actuate it, and trip mechanism, substantially as described, controlled by said pivoted bar to stop the rotation of the needle-head.

7. The combination of a fixed thread-guide, under which the thread passes, a pivoted thread-guide extending upon each side of the fixed guide and over which the thread passes, a stop-motion-controlling bar or arm actuated by the pivoted thread-guide, and a rotating projection to actuate the pivoted thread-guide when thrown out of normal action by the withdrawal of the thread from said pivoted and fixed guide, and thereby impart a positive action to the stop-motion-controlling bar or arm.

8. The combination of a fixed thread-guide, under which the thread passes, a pivoted thread-guide extending upon each side of the fixed guide and over which the thread passes, a stop-motion-controlling bar or arm actuated by the pivoted thread-guide, a second pivoted thread-guide having a slot open at one end for the thread, and a rotating projection to actuate the pivoted thread-guide when thrown out of normal action by the withdrawal of the thread from said pivoted and fixed guide, and thereby impart a positive action to the stop-motion-controlling bar or arm.

9. The combination of a fixed thread-guide, under which the thread passes, a pivoted thread-guide extending upon each side of the fixed guide, and over which the thread passes, a stop-motion-controlling bar or arm actuated by the pivoted thread-guide, a second pivoted thread-guide having a slot open at one end for the thread, and which said second pivoted thread-guide is connected to the first-mentioned thread-guide, so as to counterweight it against the action of the thread, and a rotating projection to actuate the pivoted thread-guide when thrown out of normal action by the withdrawal of the thread from said pivoted and fixed guide, and thereby impart a positive action to the stop-motion-controlling bar or arm.

10. The combination of the needle-head A, power mechanism to rotate it, upright support, lever H, pivoted to said support, fixed thread-guide G, shaft D, journaled in said support, disk F, having projections *f*, carried by said shaft, pivoted bar L, having short arm or extension M, trip O, connection N between said short arm M and trip O, and stop-motion mechanism, substantially as set out, controlled by said trip O to stop the rotation of the needle-head when the thread breaks.

11. The combination of the needle-head A, power mechanism to rotate it, upright support, lever H, pivoted to said support, fixed thread-guide G, shaft D, journaled in said support, disk F, having projections *f*, carried by said shaft, pivoted bar L, having short arm or extension M, lever K, having a forked end K′, through which the thread passes, trip O, connection N between said short arm M and trip O, and stop-motion mechanism, substantially as set out, controlled by said trip O to stop the rotation of the needle-head when the thread becomes knotted.

12. The combination of the needle-head A, power mechanism to rotate it, upright support, lever H, pivoted to said support, fixed thread-guide G, shaft D, journaled in said support, disk F, having projections *f*, carried by said shaft, pivoted bar L, having short arm or extension M, trip O, connection N between said short arm M and trip O, pivoted trip-support P, shaft Q′, carrying toothed wheel R′, adapted to operate the trip O, lock R, spring T, and shifting mechanism to stop the rotation of the shaft Q′ when the thread breaks.

13. The combination of a thread-guide fixed against vertical movement, a pivoted thread-guide lever vertically movable with respect to said first-mentioned thread-guide and having one end adapted to hold and guide the thread in conjunction with the said first-men-

tioned thread-guide, a pivoted bar or arm adapted to be operated by the movable thread-guide, an actuating projection to strike said movable thread-guide when the thread is broken or removed, the said actuating projection and movable thread-guide having movement one with relation to the other, and stop-motion mechanism actuated by the pivoted arm or bar when moved by the movable thread-guide.

14. The combination of power-actuated knock-off mechanism with a lever, one arm of which engages with said knock-off mechanism, the other arm forming a swinging thread-support, which releases the thread when undue tension is exerted thereupon and the lever is deflected.

15. The combination of power-actuated knock-off mechanism with a lever engaging therewith and forming a swinging thread-support, which releases the yarn when the lever is deflected, and a forked arm, through which the thread passes before reaching said support, whereby knots or other protuberances upon the thread will be caught and the thread subjected to tension sufficient to deflect the lever.

In testimony of which invention I hereunto set my hand.

ROBERT B. GOODYEAR.

Witnesses:
E. M. BRECKINREID,
ERNEST HOWARD HUNTER.