

July 31, 1923.

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E. S. HINELINE

STOP MOTION FOR KNITTING MACHINES

Filed Aug. 31, 1921

4 Sheets-Sheet 1

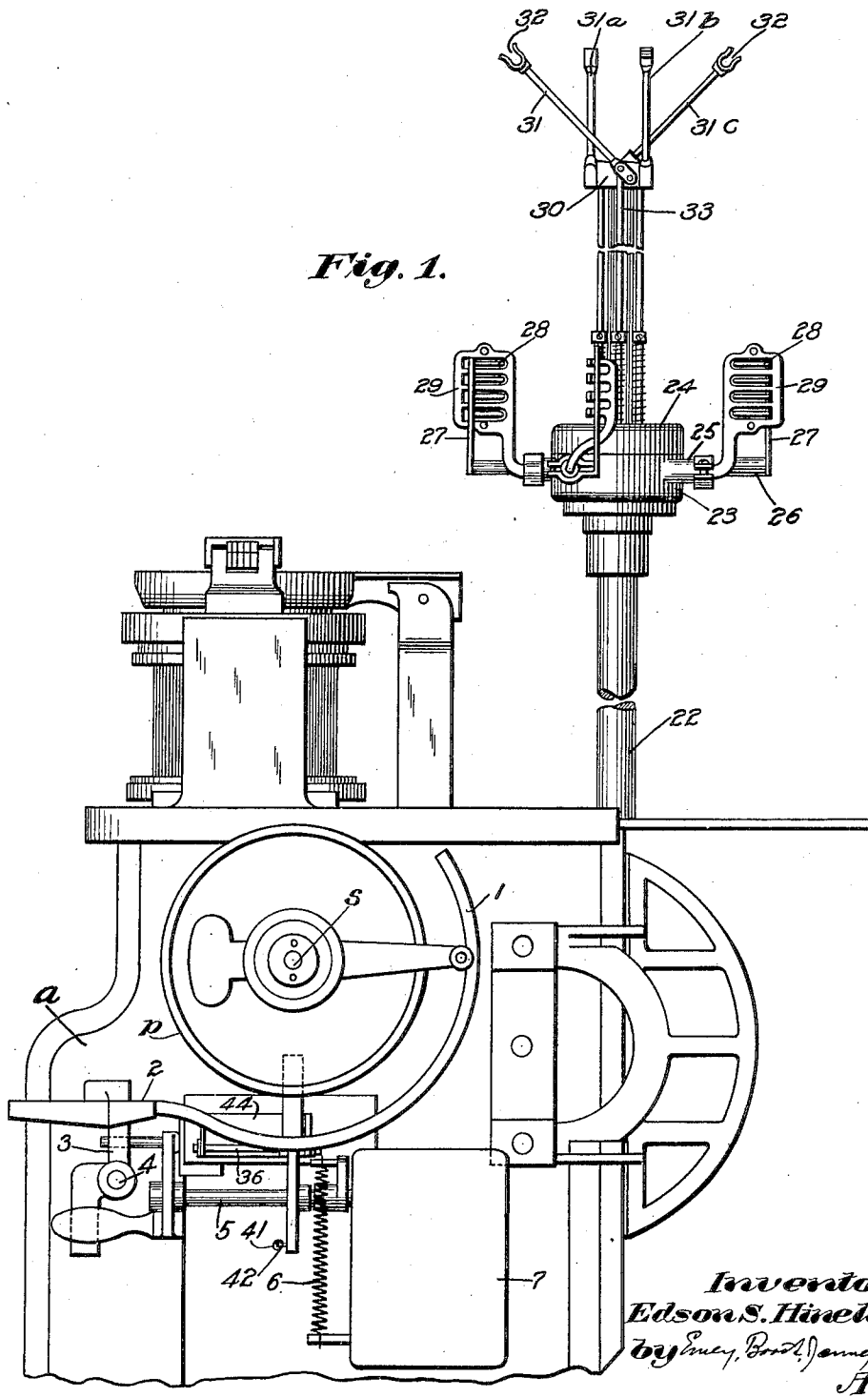


Fig. 1.

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Fig. 2.

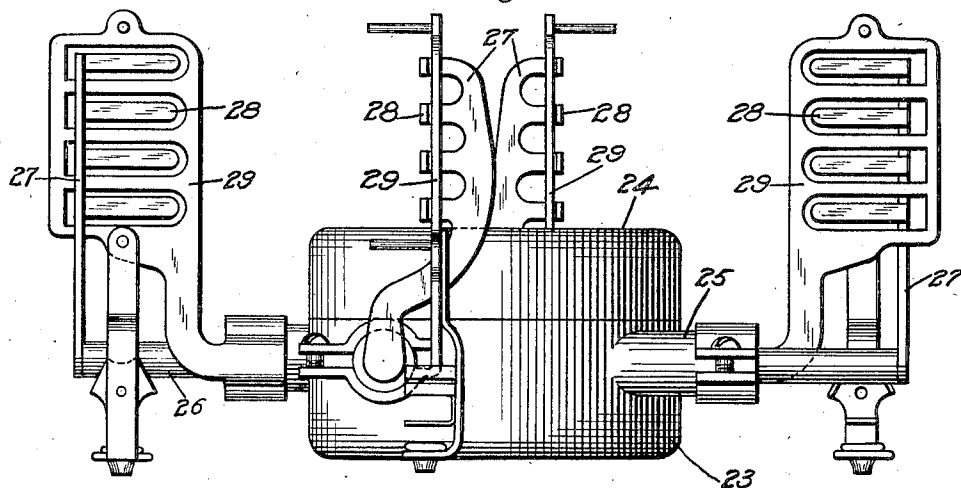
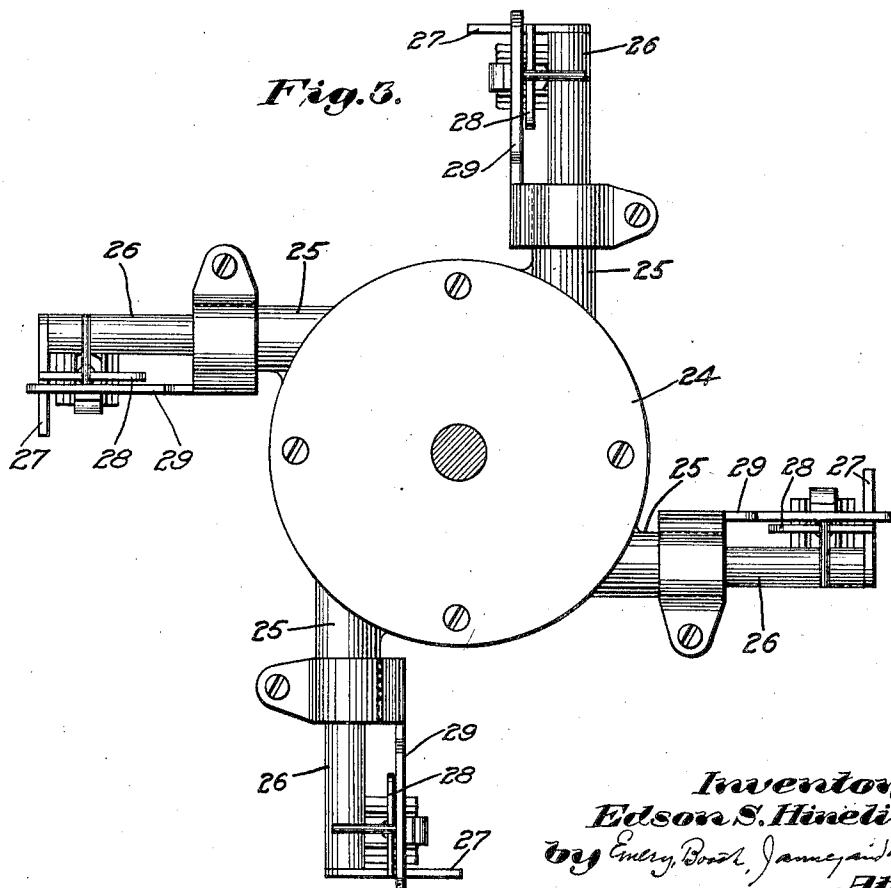


Fig. 3.



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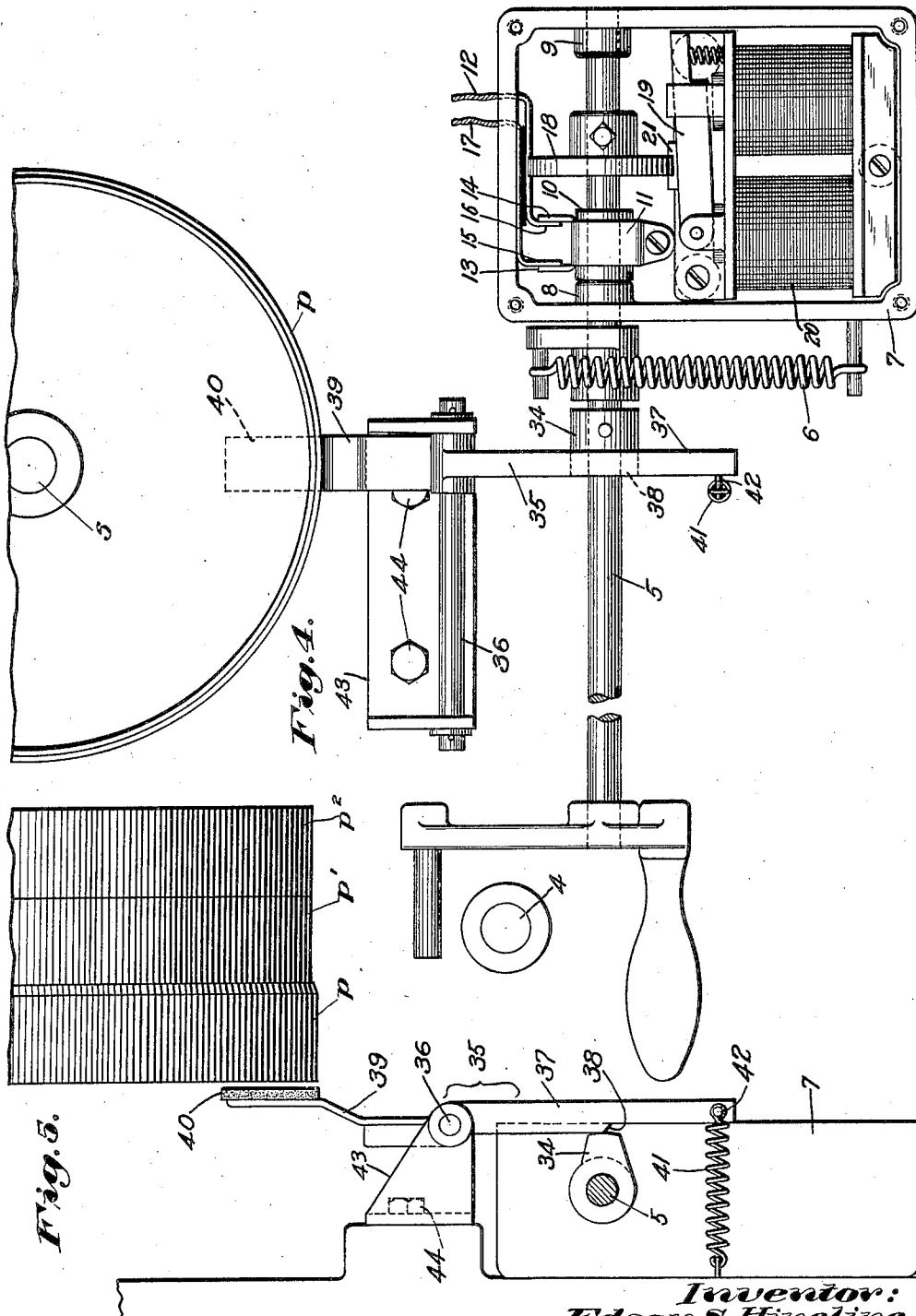
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4 Sheets-Sheet 3



Inventor:
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UNITED STATES PATENT OFFICE.

EDSON S. HINELINE, OF APPONAUG, RHODE ISLAND, ASSIGNOR TO HINELINE ENGINEERING COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

STOP MOTION FOR KNITTING MACHINES.

Application filed August 31, 1921. Serial No. 487,219.

To all whom it may concern:

Be it known that I, EDSON S. HINELINE, a citizen of the United States, and a resident of Apponaug, in the county of Kent and State of Rhode Island, have invented an Improvement in Stop Motions for Knitting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to stop motions for textile machines and particularly to electrical stop motions for knitting machines.

In order that the principle of the invention may be readily understood, I have disclosed certain embodiments thereof in the accompanying drawings, wherein—

Fig. 1 is a right hand elevation of an electrical stop motion embodying my invention;

Fig. 2 is a side elevation of a part of the structure shown in Fig. 1;

Fig. 3 is a plan view of the part of the structure shown in Fig. 1, the view being partly in transverse section;

Fig. 4 is a front elevation of a part of the structure shown in Fig. 1, the cover of the box or receptacle for the magnet and other parts being removed;

Fig. 5 is a side elevation of the structure shown in Fig. 4;

Fig. 6 is a view similar to Fig. 4 of a slightly modified form of my invention; and

Fig. 7 is a side elevation of the construction shown in Fig. 6.

The invention herein disclosed constitutes an improvement upon that shown in my co-pending application Serial No. 365,939, filed March 15, 1920, and more particularly relates to the brake mechanism. Certain parts are shown which are common to this application and to said co-pending application, and which will not be described herein with great particularity.

The stop motion herein disclosed is readily applicable to knitting machines of various types. I have chosen to represent it as applied to the so-called Banner machine of the type disclosed in the patent to Joshua D. Hemphill, No. 933,443, dated September 7, 1909, but obviously my invention is not restricted in its application thereto. It is

unnecessary to refer in detail to the knitting mechanism otherwise than to state that it is provided with a drive shaft *s*, whereon are positioned the loose pulley *p*², the slow speed pulley *p*' and the quick speed pulley *p*. When the machine is running, the belt is held upon the pulley *p* by means of a belt guide *l*, shown most clearly in Fig. 1, and which extends from an arm 2 itself extending from a shipper frame or member 3 mounted for sliding movement upon a suitable pin or stud 4 laterally extending from the frame or housing *a* of the machine.

Suitably mounted upon the framing of the machine is a rock shaft 5 having a machine-running and machine-stopped position, said rock shaft desirably having an upwardly extending arm shown in Fig. 4 and adapted to take against one side of the shipper frame 3.

Operatively connected to said arm is a spring 6, the opposite end whereof is attached to the framing of the machine in such a way that the springs tend constantly to rock the shaft 5 from the machine-running to machine-stopped position, and at the same time to move the shipper with the belt guide into a position to place the belt upon the loose pulley *p*².

In order to prevent all danger of fire from arcing or sparking all the contacts are preferably placed in closed receptacles. I attach to the framing of the machine a box or receptacle indicated at 7 in Fig. 1, it having a cover removed in Figs. 4 and 6, so as to show the interior construction. The rock shaft 5 extends into the box 7, being received in suitable bearings 8, 9. Mounted upon said shaft 5 within the box 8 is an insulation member or ring 10, to which is clamped or otherwise secured a metallic strip or clip 11 from which extends a lead wire 12. Said strip or clip has two contact blades or parts 13, 14 which are adapted when the shaft 5 is in the position shown in Fig. 4 to make contact with like parts or terminals 15, 16 extending from a lead wire 17.

The shaft 5 is provided with a cam or disk 18 fast thereon and having a radial notch adapted to be engaged by an armature 19 when the magnet 20 is de-energized. The armature is here shown as provided

with an upwardly extending projection 21 for this purpose.

So long as the magnet 20 remains de-energized, the projection 21 from the armature engages with the said notch upon the disk or cam 18, thereby preventing the rock shaft 5 from turning. When, however, the magnet 20 is energized in any suitable manner and as herein disclosed by either a broken thread or a thread having a faulty or impaired tension (and specifically though not necessarily by a thread having undue tension), the armature is attracted, withdrawing the projection 21 from the projection upon the cam 18, thereby permitting the shaft 5 to rock in a clockwise direction with the result that the belt is shifted to the loose pulley p^2 .

The shaft 5 cannot be restored to the machine starting position until the break or defective tension in the yarn is remedied, since said magnet remains energized so far as either defect continues, and therefore the said projection cannot be brought into co-acting relation to hold the rock shaft 5 in machine-running position.

The mechanism of my invention is adapted to be secured to knitting machines of general construction with no change in the structure of such machine. The machine herein illustrated is provided with an upwardly extending creel rod 22 shown broken away in Fig. 1. Desirably the said creel rod has a laterally extending bracket of the character shown in my said co-pending application, and directly supported upon said lateral bracket is a box or receptacle 23, shown most clearly in Figs. 1 and 2 and having a cover 24. The said box or receptacle is desirably provided with a series of mercury cups, preferably four in number, corresponding to the number of yarns. Laterally extending from said box or receptacle 23 are hubs 25, here shown as four in number and receiving therein for rocking movement shafts 26, which have upwardly extending therefrom and fast therewith grids or members 27 having spaced fingers 28 between which and the fingers of a fixed member 29, the thread is adapted to be placed, and in such a manner that while the thread remains unbroken, each corresponding member 27 is held in upright position. In a manner not herein necessary to describe in detail, the downward movement of the member 27 causes rocking movement of the corresponding rock shaft 26, and the making of a contact within the box or receptacle 33 as disclosed in my said co-pending application. Upwardly extending from said box or receptacle 23, 24, is a rod supporting at its upper end a head or block 30, here shown as square, and upon the four sides of which are pivoted levers 31, 31^a, 31^b, 31^c, each having a forked outer end 32 adapted to receive

the thread passing upwardly from the packages through the members 27, 29, and thereafter downwardly to the knitting machine. In the event of undue tension of a yarn or thread, the respective lever 31, etc. is drawn downwardly until the yarn slips out of the forked end 32, thereby providing sufficient slack to prevent breakage of the yarn, but before this action occurs, the machine is stopped through the following mechanism.

Each lever 31, etc. has pivoted thereto an upright rod 33, the lower end of which passes through the cover 24 of the receptacle 23 and is provided with an electrical contact at its end adapted to make contact with the mercury in the said cup 23. In this manner the machine is adapted to be stopped in the event either of yarn breakage or defect in the tension of the yarn, and particularly in the event of excessive tension.

I have provided means whereby the brake is applied to the fast pulley immediately upon the completion of the circuit in the manner described and the energization of the magnet 20. For this purpose I have in Figs. 4 and 5 shown a cam 34 fast upon the shaft 5 and adapted to engage a lever 35 pivoted at 36 and having an arm 37, itself provided with a cam portion 38 and also having a second arm 39 provided at its end with a brake face 40 of suitable material adapted to contact with a lateral face of the fast pulley p .

When the machine is in running position indicated in Figs. 4 and 5, the cam 34 occupies the position shown in Fig. 5 and holds the brake out of contact with the pulley 5. Immediately, however, upon the movement of the shaft 5, the cam 34 is withdrawn from engagement of the lever 35, and thereupon the spring 41 acts to move the brake face 40 forcibly against the pulley p . The said spring 40 is attached at one end 42 to said lever arm 37 and at its opposite end is attached to the frame of the machine.

It will be apparent that in this form of my invention the lever 35 is pivoted at 36 upon a bracket 43 secured by bolts 44, or otherwise, to the framing of the machine, and that the brake face 40 is adapted to contact with a lateral face of the pulley 5.

In Figs. 6 and 7, I have represented a slightly modified form of my invention. Therein the shaft has fast thereon a cam 45 upon which is adapted to ride a roll 46 carried upon the arm 47 of a bell crank lever pivoted at 48 between two upstanding ears 49 extending from a bracket 50, itself secured by a pair of screws 51 directly to the outer face of the box or casing 7. Desirably said bracket 50 is of the right angled form shown in Fig. 6, and is attached at a corner of the box 7 to two of the faces thereof.

The opposite arm 52 of the bell crank lever

has freely pivoted at its outer end at 53 a brake piece 54 having a suitable lining 55 adapted to contact with the peripheral edge of the quick pulley *p*, as indicated clearly in said Figs. 6 and 7.

Secured to the end 56 of the bell crank lever arm 47 is a coiled spring 57, the opposite end whereof is attached to a pin 58 secured to the box or receptacle 7. Said spring tends constantly to move the brake member 54, 55 into contact with the pulley *p*, such movement being prevented by the cam 47 so long as the shaft 5 is held from rotative movement by the de-energized magnet. It will be noted that the brake member 54 is pivoted for rocking movement at 53, so that it may conform in position to the periphery of the pulley *p*, so as to adjust itself thereto when applied. The brake herein disclosed is so quick acting that it acts while the belt is still on the driving pulley, whether at high speed or at low speed. This is of importance because it causes stoppage of the moving parts before the broken end of the yarn reaches the needles, and I have been enabled to reduce the height of the upright part indicated in Fig. 1, thus permitting an operative standing on the floor to rethread the mechanism conveniently.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims—

1. Stopping mechanism for knitting machines comprising in combination, a rock shaft having a disk, an electromagnet having an armature adapted to hold said disk from rotation until energized, means whereby yarn break or impaired tension effects energization of said magnet, a driving pulley, shipper means therefor, a brake adapted to be applied directly to said pulley, a lever carrying said brake, and a cam upon said rock shaft and controlling the movement of said lever.

2. Electrical stopping means for knitting machines comprising in combination, a rock shaft, a disk thereon, an electromagnet having an armature adapted when unenergized to hold said disk and shaft from rotation, means whereby yarn breakage or undue tension effects energization of said magnet and permits rotation of said rock shaft, a driving pulley, a shipper therefor controlled by said rock shaft, a brake adapted to be applied directly against said driving pulley, a lever carrying said brake, and a cam upon said rock shaft controlling said lever.

3. Stopping mechanism for knitting machines comprising, in combination, a shaft having fast and loose pulleys thereon, a rock

shaft, a spring tending normally to move said rock shaft into machine stopping position, shipping means caused to function by rocking movement of said shaft, thread fault detecting means, and connections therefrom to restrain said rock shaft from rocking movement but permitting said shaft to rock upon the occurrence of thread fault, a cam upon the rock shaft, a bracket secured to the framing of the machine, a lever carried by said bracket and adapted to be directly acted upon by said cam to maintain a brake from braking position, and a brake upon said lever and adapted to engage said fast pulley.

4. Stopping mechanism for knitting machines comprising in combination, a shaft having fast and loose pulleys thereon, a rock shaft, a spring tending normally to move said rock shaft into machine stopping position, shipping means caused to function by rocking movement of said shaft, thread fault detecting means, connections therefrom to restrain said rock shaft from rocking movement, but permitting said shaft to rock upon the occurrence of thread fault, a cam on the rock shaft, a bracket secured to the framing of the machine, a lever carried by said bracket and adapted to be directly acted upon by said cam to maintain a brake from braking position, and a brake upon said lever and adapted to engage said fast pulley.

5. Stopping mechanism for knitting machines comprising in combination, a shaft having fast and loose pulleys thereon, a rock shaft having two positions only, namely a machine running position and a machine stopping position, a spring tending normally to move said rock shaft into machine stopping position, shipping means caused to function by rocking movement of said shaft into machine stopping position, thread fault detecting means, and connections therefrom to restrain said rock shaft from rocking movement into machine stopping position, but permitting said shaft so to rock upon the occurrence of thread fault, a cam of relatively short radius and fast upon said rock shaft, a lever mounted upon the machine framing, and a brake upon said lever and adapted to engage the fast pulley upon the operation of the shipping means, said lever being adapted to be directly acted upon by said cam.

6. Stopping mechanism for knitting machines comprising in combination, a shaft having fast and loose pulleys thereon, a rock shaft having two positions only, namely, machine running position and machine stopping position, a spring tending normally to move said rock shaft into machine stopping position, shipping means caused to function by rocking movement of said shaft into machine stopping position, thread fault detecting means, and connections therefrom to restrain said rock shaft from rocking

movement into machine stopping position but permitting said shaft so to rock upon the occurrence of thread fault, a cam upon said rock shaft, a lever upon a fixed part of the machine, yielding means to keep the said lever in constant contact with said cam during the running of the machine, and a brake carried by said lever and adapted through the action of said yielding means to be moved into engagement with the fast pulley upon the 10 actuation of the shipping means by movement of the rock shaft.

In testimony whereof, I have signed my name to this specification.

EDSON S. HINELINE.