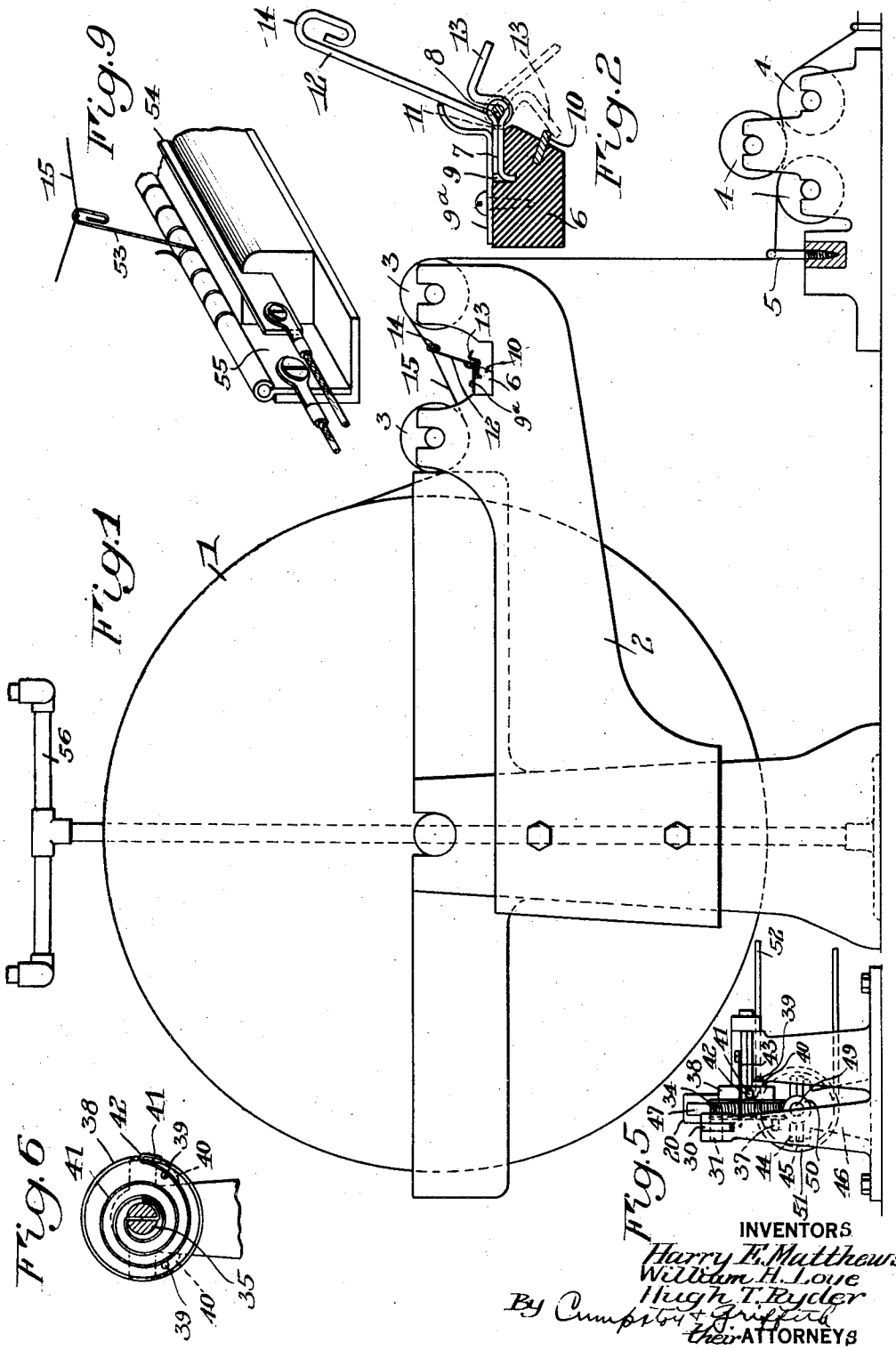
May 3, 1927. 1,627,292

H. E. MATTHEWS ET AL

ELECTRIC STOP MOTION FOR TEXTILE MACHINES

Filed April 23, 1926 2 Sheets-Sheet 1



INVENTORS
Harry E. Matthews
William H. Lowe
Hugh T. Ryder
By Cumpston & Griffith
their ATTORNEYS

May 3, 1927. 1,627,292

H. E. MATTHEWS ET AL

ELECTRIC STOP MOTION FOR TEXTILE MACHINES

Filed April 23, 1926 2 Sheets-Sheet 2

Fig. 3

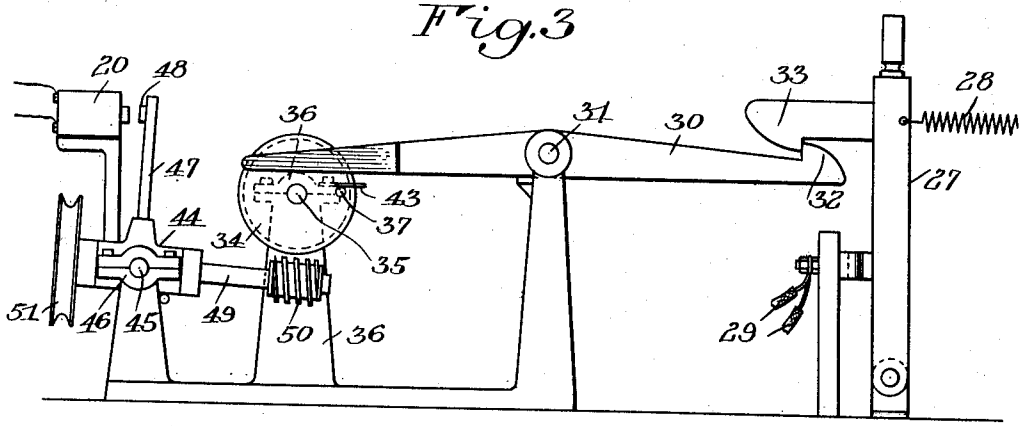


Fig. 4

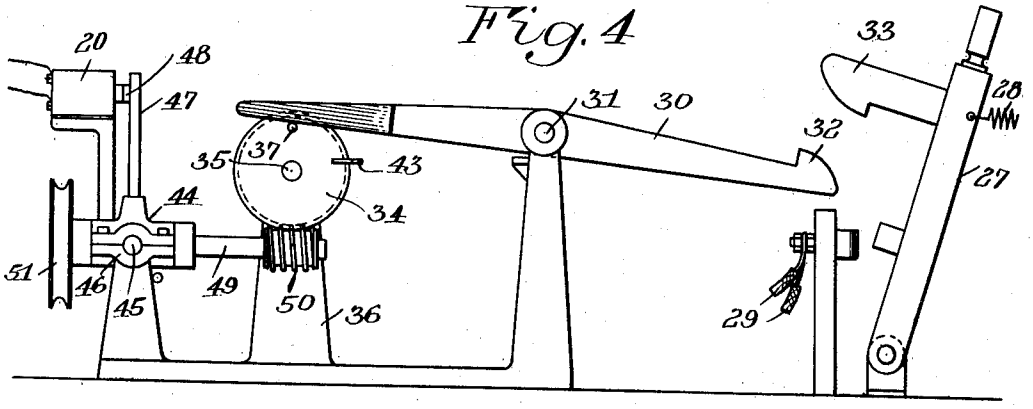


Fig. 7

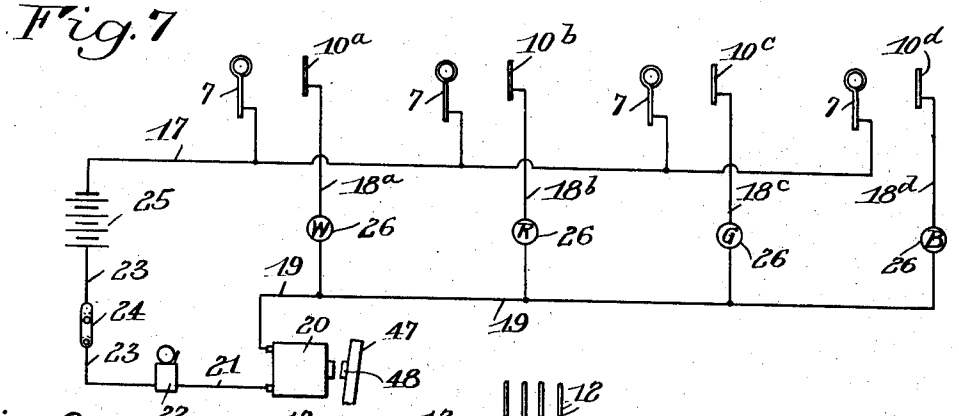
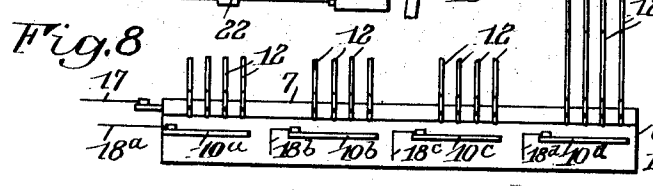


Fig. 8



INVENTORS
Harry E. Matthews
William H. Loye
Hugh T. Ryder
By Cumpston & Griffith
their ATTORNEYS

Patented May 3, 1927. 1,627,292

UNITED STATES PATENT OFFICE.

HARRY E. MATTHEWS, WILLIAM H. LOVE, AND HUGH T. RYDER, OF GREENSBORO, NORTH CAROLINA.

ELECTRIC STOP MOTION FOR TEXTILE MACHINES.

Application filed April 23, 1926. Serial No. 104,030.

This invention relates to textile and other machines, and in some of its specific aspects to the type of textile machine known as a beam twister. In such machines a large number of threads are wound upon a large spool or beam in separate groups along the length of the beam, and the threads thereon when run from such beams are twisted together in groups to form stranded threads. If for any reason one or more of the strand threads of any group should break, the twisted thread will be weakened and often such weakening is not discovered until the twisted threads are subsequently inspected and then such a break is expensive to remedy. Attempts have been made to overcome this difficulty and indicate the breakage of a strand thread leaving the beam, by having individual contact elements held in inactive positions individually by the threads leaving the beam, but each movable automatically into contact with a rail forming part of an indicating circuit whenever its supporting thread breaks. Such devices have been unreliable for the reason that the lint from the threads leaving the beams collects upon the rail, and when a contact element falls it may be held out of contact with the rail by a collection of lint so that the signal will not be effective.

Accordingly, an object of the invention is to improve and simplify such indicating systems, insure their operation under all conditions, and render them more dependable.

It is frequently desirable that a machine, such as the twister above referred to, be stopped within a certain interval after the happening of any operating condition, such as the breaking of a strand thread, if suitable corrective steps are not taken by an attendant within that interval.

Accordingly, another object of the invention is to provide an improved stop motion mechanism for textile and other machines, which will effect a stoppage of the machine within a desired interval after the happening of any controlling event in the operation of the machine, and which will be automatically reset when the machine is again made operative in the usual manner.

A further object is to provide improved means for accomplishing the above objects which will be relatively simple, dependable and inexpensive.

Various other objects and advantages will be apparent from the following description of embodiments of the invention, and the novel features will be particularly pointed out hereafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation, partly in section, of a part of the beam twister constructed in accordance with the invention;

Fig. 2 is a sectional elevation of the preferred contact mechanism of the same, on a somewhat larger scale than shown in Fig. 1;

Fig. 3 is a front elevation of an improved stop motion mechanism which also forms part of the invention, and which may be advantageously incorporated into beam twisters;

Fig. 4 is a similar elevation, with the parts in a different operative condition, namely, the position at which the machine is stopped by said mechanism;

Fig. 5 is a side elevation of the stop motion mechanism;

Fig. 6 is a sectional elevation through a portion of stop mechanism, and showing the returning spring for the cam;

Fig. 7 is a diagram of the electric circuit forming a part of the invention;

Fig. 8 is a front elevation of the contact mechanism, and

Fig. 9 is a perspective of a modified contact device which may be employed in substitution for that shown in Fig. 2.

Referring particularly to Figs. 1 to 8 the invention is illustrated in connection with a beam twister having a large spool or drum 1 which is rotatably mounted in a suitable frame 2, carries a plurality of threads separately wound thereon at specified points along its length, and which are to be unwound therefrom and twisted together in groups, as usual in the art. The frame 2 may be provided with a plurality of spaced guide bars or rollers 3 around which the threads pass after leaving the beam. The machine may also be provided with additional rollers 4 and guides 5 for receiving the threads from the bars or rollers 3 and conducting them to the spinning rail or mechanism by which the threads are twisted together to form larger threads as usual in the art.

At a suitable point such as, for example, between the bars or rollers 3, the machine is provided with suitable contact mechanism

to indicate the breaking of any threads, and if the machine does not stop within the time necessary to repair the break, to also control other mechanism to be described presently for stopping the machine. Such contact mechanism may comprise an elongated block 6 of insulating material suitably mounted in the frame so as to extend in a direction lengthwise with the beam, that is, crosswise of the travel of the threads which leave the beam. A metal plate 7 is doubled upon itself and at the edge where bent in doubling, is made tubular so as to form a bearing for a pivot rod 8 that is passed endwise therethrough. An edge of the doubled plate which is opposite the tubular portion is flanged laterally, and slidingly received in a groove 9 in the upper face of the block 6. The portion of the face of the block 6 upon which the plate 7 rests is preferably lower than the remainder of the upper block face by an amount approximately equal to the thickness of the doubled plate 7 so that the plate will be countersunk flush with the upper face of the block. A guard plate 9^a is secured upon the upper face of the block 6 so as to overlie a portion of the plate 7 and confine it slidingly against the block 6. The engagement of the flange 7 in the groove 9 prevents removal of the plate except by sliding of the plate 7 endwise of the block 6.

Below the plate 7 the block 6 also carries one or more metal plates or rails 10 which also extend in a direction lengthwise of the block but below and protected by the plate 7. The rails 10 project somewhat from the side wall of the block which the tubular edge of the plate 7 overhangs. The tubular edge of the doubled plate is provided with spaced transverse slots 11 exposing bearing portions of the pivot rod 8, and a plurality of contact elements 12 are pivotally mounted upon these exposed bearing portions and within the slots 11.

Each contact element may be advantageously formed of a strip of wire having an intermediate portion disposed in a slot 11 and looped nearly or entirely around the pivot rod 8 so as to be rotatably confined upon the rod and within a slot. The two ends of the wire extend angularly from the looped bearing portion as shown clearly in Fig. 2. One end or arm 13 of the wire, which may be shorter than the other end, is so positioned as to engage with the rail 10 when the wire is released and falls by gravity.

The other end of the wire is formed with an eye or loop 14, which is oblique to a plane transverse to the rod 8, and one of the threads 15 from the beam passes through the eye so as to hold the wire in a more or less upstanding position, as shown in Figs. 1 and 2, and with the contact arm 13 of the wire out of contact with the rail 10. When the thread breaks, the contact element will fall by gravity and carry the contact arm 13 into engagement with the rail 10 which is below and protected by the plate 7 to which the elements are pivoted. Any lint from the threads will thus not fall upon the rail in a manner to prevent contact therewith by the contact elements when the latter are released. In order to prevent accumulation of the lint in the slots 11, such as might bind the contact elements and prevent their rotation when released the guard plate 9^a may be extended upwardly and over the tubular portion of the plate 7 so as to overhang the latter and the rail 10, this being possible since the upstanding arms of the contact wire 12 are inclined away from the block when in raised position.

The plate 7 may extend for the full length of the beam and rotatably mount all of the contact elements, but the rail 10 is then preferably formed of separate individual rail sections which are disposed along the block 6 for engagement by any of a group of contact elements. Referring particularly to Fig. 7 and Fig. 8 the different rail sections 10 are designated respectively as 10^a, 10^b, 10^c, 10^d, etc. A common circuit wire 17 is connected to the plate 7, and branch circuit wires 18^a, 18^b, 18^c and 18^d are connected to the rail sections 10^a, 10^b, 10^c and 10^d. The branch wires 18^a, 18^b, 18^c and 18^d are connected to a common wire 19 which is connected to one side of an electromagnet 20, the other side of the latter being connected by a wire 21 to an audible signal device 22. The latter is connected by a wire 23, having a suitable manual switch 24, to a source of electric current 25 such as a battery.

The common wire 17 is connected to the other side of this source of current or battery. Each branch wire 18^a, 18^b, 18^c and 18^d may have included therein a distinctive signal device 26 such as colored lights, the colors of the lights being different in the different branches. For example, the light in the branch wire 18^a may be a white light and is designated by the letter "W," the wire 18^b may have a red light included in circuit therein and designated by the letter "R"; the wire 18^c may have inserted therewith a green light designated by the letter "G," and the branch 18^d may have included therein a blue light designated by the letter "B." Each rail section 10^a, 10^b, 10^c and 10^d will be engaged by any of the contact elements of a particular group.

When a thread breaks, one of the contact elements 12 of that group will be released and in falling its arm 13 will engage with a rail section with which it is associated, as shown in dotted lines in Fig. 2, and thus a circuit will be closed from the battery 25

through the plate 7, the falling contact element, a rail section, a branch wire having therein an indicating lamp, and the common portion of the circuit including the electromagnet 20 and the audible signal 22. The operation of the audible signal will indicate to the attendant that a break has occurred, and the particular light which is now illuminated will indicate the particular group of contact elements where the break has occurred, since it designates that the break has occurred in the group associated with a particular rail section. The lights may be mounted above the beam upon a frame 56 (Fig. 1). Obviously, other signal devices 26, such as annunciators, may be employed, if desired, but the colored lamps are simple and inexpensive and have been found to be very effective for the purpose.

The attendant should thereupon examine the group of contact elements associated with the contact rail where the circuit has been completed and locate thereby the fallen contact element 12, the strand thread supporting which has been broken. This strand thread should then be spliced promptly and during its splicing the fallen contact 12 will be elevated by the thread which is again passed therethrough, so as to stop the operation of the signal device and extinguish the indicating light without special attention by the operator.

If breaks should occur in rapid succession it might happen that a second break would occur before the first one was repaired, and if an ordinary annunciator were employed the resetting of the annunciator after one thread has been spliced would obliterate the indications of the others which should be spliced. By using the distinctive lamps as the indicating means, the act of splicing automatically resets the indicator for a new operation without in any way interfering with any indications of broken threads in other rail sections.

In the event that the attendant does not promptly splice the broken thread, it is desirable that the machine be stopped in order that the formation of the weakened threads will not continue. Accordingly, the electromagnet 20 is utilized to control a suitable stop motion mechanism. Such a stop motion mechanism may include a suitable element such as a switch 27 which controls the operation of the entire machine, and which is normally urged into a position to stop the operation of the machine. For example, a controlling switch may be biased to "open" position by a suitable spring 28 which is connected to the movble part of the switch, as shown particularly in Figs. 3 and 4. The contact posts of the switch are connected by wires 29 to the motor (not shown) operating the machine, as usual in the art. A latch lever 30, pivoted at 31, is provided with a hook-end 32 which is adapted to engage with a latch-nose 33 extending from the movable part of the switch when the switch is in closed position, so as to hold the switch in closed position as shown in Figure 3.

A worm wheel 34 (Figs. 3 to 5) is mounted upon a spindle 35 which is rotatably mounted in a suitable bearing 36, and carries a cam pin 37 projecting from a face thereof in a position to engage an arm of the lever 30, and rock it in a direction to disengage it from the switch part, this disengagement being shown in Fig. 4. A cup-shaped shell 38 (see also Fig. 6) is disposed with its open face against a face of the gear wheel 34, and is secured against rotation with the gear wheel in any suitable manner such as by screws 39 which pass through bearing lugs 40 of the frame support of spindle 35 and into the shell.

Within the shell 38 a coiled spring 41 may be disposed, the spring being connected at one end to the spindle 35 as shown in Fig. 6, its other end being hooked through a slot 42 in the peripheral wall of the shell, as shown particularly in Fig. 6. The spring 41 thus yieldingly urges the spindle 35 and the gear 34 in an angular direction to shift the pin 37 away from engagement with the lever 30 and into a normal position against a limit stop 43, such position being shown in Fig. 3. The limit stop 43 may be provided in any suitable manner, such as in the form of a spring plate which is mounted on the bearing 36 for the spindle, and extends around the gear into the path of the pin 37.

A bearing sleeve 44 (Figs. 3 and 4) is mounted for oscillation about a transverse axis by means of transversely extending trunnions 45 which are rockably supported in bearings 46. An arm 47 extends from the sleeve 44 into proximity to the electromagnet 20 and carries an armature 48 which is under the influence of the electromagnet 20, so that when the latter is energized the sleeve 44 will be rocked from the position shown in Fig. 3 into the position shown in Fig. 4. A spindle 49 extends axially of and is rotatably mounted in the sleeve 44, and carries a worm screw 50 which is adapted to move into meshing engagement with the worm wheel 34, whenever the sleeve 44 is rocked into the position shown in Fig. 4 by the energization of the magnet 20. The spindle 49 may also carry a drive pulley 51, which is connected by a suitable belt 52 (see Fig. 5) to a suitable part of the machine, so that the pulley 51, spindle 49 and worm screw 50 will rotate during the operation of the machine regardless of which angular position the sleeve 44 may be in.

When the machine is ready for operation all of the contact elements will be held upwardly by the threads which pass through their loops, the circuit of the battery 25 will

be open, and therefore the electromagnet 20 will be deenergized. The machine may now be started by operation of the controlling element or switch 27 from the position shown in Fig. 4 into the position shown in Fig. 3. The lever 30, which is either overbalanced in a manner to cause it to move into the position shown in Fig. 3, or biased for such movement by a suitable spring, will rock and engage the control switch 27 and hold it in "closed" position against the action of the spring 28. The spindle 49 is overbalanced or biased in such a manner as to normally move the worm screw 50 out of engagement with the gear wheel 34 when the magnet 20 is deenergized, and the parts of the stop motion mechanism are, therefore, put in a position as shown in Fig. 3.

If now one of the threads leaving the beam should break the contact element 12 which it supports in the position shown in Fig. 2 will be released, and will fall by gravity into contact with the one of the sections of rail 10. For example, assume that it falls into contact with the rail section 10^a, then a circuit will be closed from the battery 25 as follows: from the battery to wire 17, to the common plate 7, thence by the fallen contact element 12, to the rail section 10^a, thence by wire 18^a through light 26 to wire 19, thence through wire 19, magnet 20, wire 21, bell 22, wire 23 back to the battery.

The ringing of the bell will call the attention of the attendant to the fact that a break has occurred, and the lighting of the white lamp 26 will immediately indicate to the attendant that the break is in the group of threads related to the rail section 10^a, and then the attendant may quickly locate the fallen contact element 12 which rests against the rail section 10^a. The attendant then splices the broken thread without stopping the machine, and in so doing the contact element 12 is elevated to open the circuit again.

At the time the circuit was closed by the falling of contact element 12, the magnet 20 was energized and in attracting the armature 48 rocked the worm screw 50 into meshing engagement with the worm wheel 34; thereupon the latter was driven in a direction to carry the cam pin 37 away from its stop 35 and towards the position shown in Fig. 4. After the movement of the cam pin through a given angle, it will engage and rock the lever 30 to release the switch 27, whereupon the latter will be opened by the spring 28 and operation of the machine thereby stopped. The interval required for the moving of the pin 37 into a position where it releases the lever 30 is ordinarily such as to enable the attendant to locate and repair the break in the thread, and if the break has been mended and the circuit opened before the machine is stopped, the deenergization of the magnet 20 will allow movement of the worm screw 50 out of driving relation with the gear 34, whereupon the spring 41 which was tensioned by the movement of the gear wheel becomes effective and returns the gear wheel and its cam pin to its normal inactive position against the stop 43, as shown in Figure 3.

In Fig. 9, I have illustrated a slightly different mounting of the rail sections and common plate 7, in which the contact elements 53, corresponding to the contact elements 12, are not provided with the contact arms, but may fall directly into engagement with a rail section 54 when released, it being understood that in this case the rail section 54 will be disposed at one side of the plate 55 which mounts the contact elements.

It will be understood that other yarns or threads may also be taken from the beam at the bottom but at the side opposite the block 6 and carried over rollers similar to rollers 3. Such other threads may also be controlled by similar mechanism, but since the taking off and control of the yarns or threads from the outer side of the beam would be mere duplication of the guiding and control mechanism, it has been omitted from the drawing in the interest of simplicity.

It will be obvious that various changes in the details, which have been herein described, and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as explained in the appended claims.

What we claim is:—

1. In a machine for handling textile threads, a break indicator comprising a pivot member, a contact element mounted on said pivot member, and extending upwardly therefrom and carrying a loop, with a thread of the machine passing through said loop to hold said contact element against rotation, a contact member disposed below and protected by said pivot member, said contact element being movable into engagement with said contact member automatically whenever said contact element is released by a breakage of its supporting thread.

2. In a textile machine or the like, a break indicator comprising a base member formed of insulating material a pivot member mounted on said base member, a contact rail mounted on said base member adjacent said pivot member, a guard element extending over said pivot member and said rail, and a contact member pivotally mounted on said pivot member and adapted for contact with said rail.

3. In a textile machine or the like, a break indicator comprising a base member, a pivot member mounted on said base member and

projecting beyond a side edge thereof, a contact rail mounted on said base member below said pivot member, a guard element mounted on said base member above said pivot member and having an edge portion projecting beyond the outer edge portion of said contact rail, and a contact member pivotally mounted on said pivot member and adapted for contact with said rail.

4. In a textile machine or the like, a break indicator comprising a pivot member, a contact member positioned adjacent said pivot member, a contact element mounted on said pivot member and provided with a portion adapted for contact with said contact member and a portion adapted to receive a thread for normally holding said contact portion out of contact with said contact member, and roller means for guiding said thread to said contact element.

5. In a textile machine or the like, spaced bars for receiving and guiding a thread, a pivot member having a looped contact element pivotally mounted thereon positioned adjacent said bars, and a contact rail positioned below said pivot member; said contact element being adapted to be held between said bars by the thread carried thereby and to drop into contact with said contact rail when a thread breaks.

6. In a machine for handling textile threads, a break indicator comprising a base strip, a pivot member carried by said base, a plurality of contact elements pivotally mounted on said pivot member in spaced relation to one another along the same, each element comprising a strip of wire having a loop at one end through which a thread passes, and by which it is held in an upstanding position, and at another point looped around said pivot member to form a bearing and then extending angularly therefrom to form a contact arm, a contact rail carried by said base below said pivot member so as to be protected thereby and in a position to be engaged by the arms of any of the contact elements which may drop when a thread passing therethrough breaks, and a signal device and circuit connected to said pivot member and to said rail for operation by the breaking of a thread.

7. In a machine for handling textile threads, a break indicator comprising a base strip, extending in a direction across and transversely to the travel of threads handled by said machine, a plate secured in an approximately horizontal position on said base strip and having an edge projecting therefrom and rolled to form a tubular bead, said bead being slotted at spaced intervals along its length, a pivot rod disposed lengthwise through said bead, a plurality of wires hinged upon said rod and in said slots of the beads, one portion of each wire extending angularly from the other portion to form a contact arm, a contact rail carried by said base strip below and protected by said plate, and into contact with which the contact arms of said wires are biased when free to move, the other arms of said wires being provided with eyes through which threads may pass and by which the wires will be held in positions with their contact arms out of contact with the rail, whereby when a thread breaks the wire released thereby will move and carry its contact arm into contact with said rail, and electric means connected to said rail and to said plate, whereby the engagement of the contact arm of any wire with the rail will complete a circuit.

8. In a machine for handling textile threads, a break indicator comprising a base strip of insulating material having a side edge portion of a face depressed and provided with a groove running in a direction lengthwise of the strip, a guard element secured to said face of the strip and forming with the depressed portion of the face a channel, a bearing plate slidable lengthwise in said channel, projecting edgewise from the strip, and having a portion extending in to said groove to limit movement of the plate to a direction lengthwise of the strip, a contact rail carried by the strip at the side edge adjacent the depressed portion and below the bearing plate, and contact members hinged upon the projecting edge portion of the bearing plate and each biased individually to a position in engagement with said rail and carrying an eye through which a thread may pass for holding the member out of contact with said rail, and signal means including a controlling electric circuit connected to said rail and bearing plate, whereby when a thread breaks, the contact member supported thereby will fall and close the circuit, and cause an actuation of said signal means.

9. In a machine for handling textile threads, a break indicator comprising a base strip of insulating material having a side edge portion of a face depressed and provided with a groove running in a direction lengthwise of the strip, a guard element secured to said face of the strip and forming with the depressed portion of the face a channel, a bearing plate slidable lengthwise in said channel, projecting edgewise from the strip, and having a portion extending into said groove to limit movement of the plate to a direction lengthwise of the strip, a contact rail carried by the strip at the side edge adjacent the depressed portion and below the bearing plate, and contact members hinged upon the projecting edge portion of the bearing plate and each biased individually to a position in engagement with said rail and carrying an eye through which a thread may pass for holding the member out of contact with said rail, and

signal means including a controlling electric circuit connected to said rail and bearing plate, whereby when a thread breaks, the contact member supported thereby will fall and close the circuit, and cause an actuation of said signal means, the projecting edge portion of the bearing plate overlying the contact rail for protecting it against falling lint.

10. In a machine for handling textile threads, a break indicator comprising a base strip of insulating material having a side edge portion of a face depressed and provided with a groove running in a direction lengthwise of the strip, a guard element secured to said face of the strip and forming with the depressed portion of the face a channel, a bearing plate slidable lengthwise in said channel, projecting edgewise from the strip, and having a portion extending into said groove to limit movement of the plate to a direction lengthwise of the strip, a contact rail carried by the strip at the side edge adjacent the depressed portion and below the bearing plate, and contact members hinged upon the projecting edge portion of the bearing plate and each biased individually to a position in engagement with said rail and carrying an eye through which a thread may pass for holding the member out of contact with said rail, and signal means including a controlling electric circuit connected to said rail and bearing plate, whereby when a thread breaks, the contact member supported thereby will fall and close the circuit, and cause an actuation of said signal means, said guard element extending over the projecting edge of the bearing plate to protect the bearings of the contact members against clogging by falling lint.

11. In a machine for handling textile threads, a break indicator comprising a base strip of insulating material, a bearing plate secured to said strip and overhanging one edge, a contact rail carried by the strip at the side edge below the bearing plate, with the bearing plate overhanging the same to protect it from falling lint, a plurality of contact members hinged upon the projecting edge portion of the bearing plate, and each biased individually to a position in engagement with said rail, each contact member having an eye through which a thread may pass for holding the member out of contact with said rail, and signal means including a controlling electric circuit connected to said rail and the bearing plate, whereby when a thread breaks, the contact member supported thereby will fall and close the circuit and cause an actuation of said signal means.

HARRY E. MATTHEWS.
WILLIAM H. LOVE.
HUGH T. RYDER.