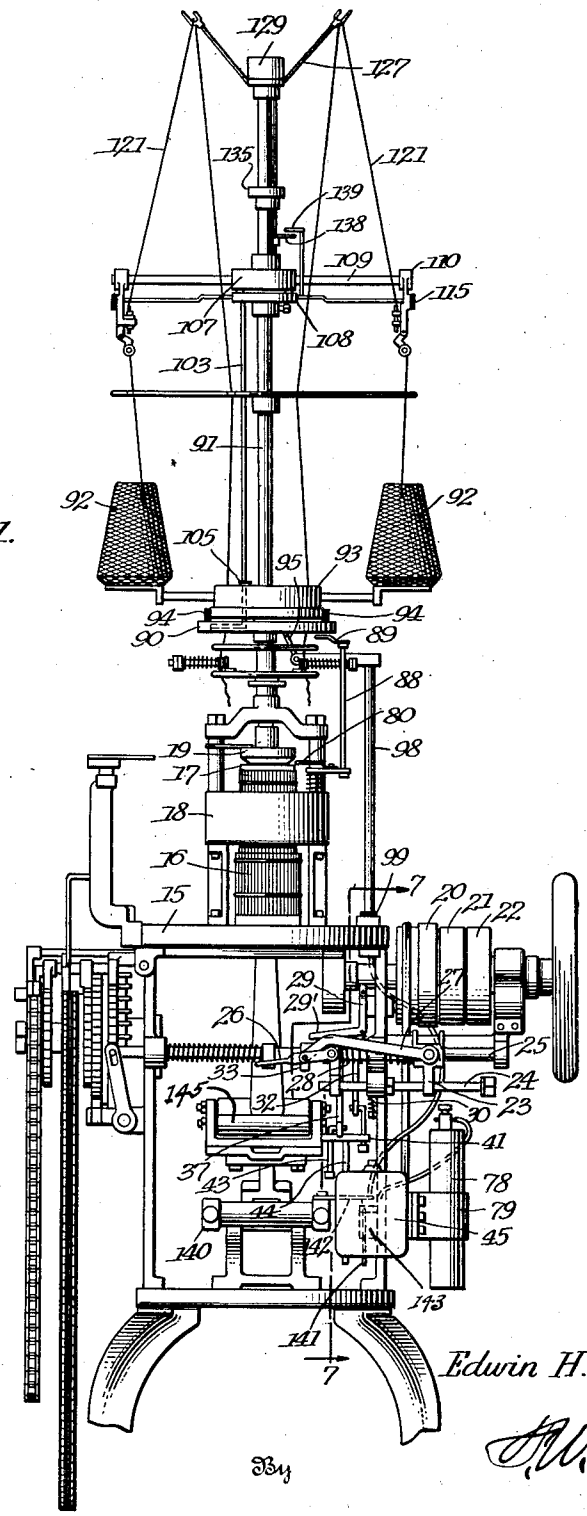
Dec. 13, 1938. E. H. NEWELL 2,140,087

STOP MOTION FOR KNITTING MACHINES

Filed July 3, 1934 4 Sheets-Sheet 1

Fig. 1.



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STOP MOTION FOR KNITTING MACHINES

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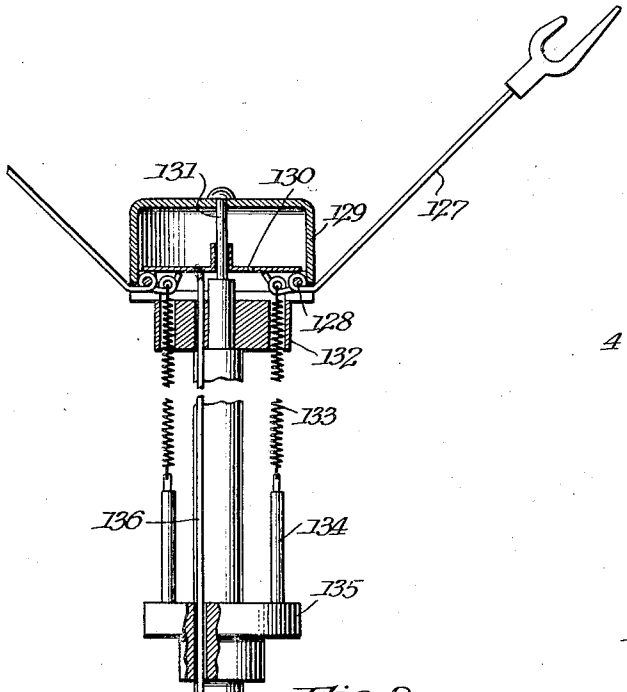


Fig. 2.

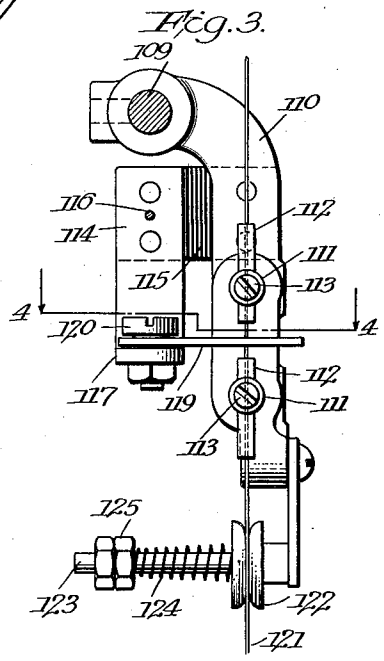


Fig. 3.

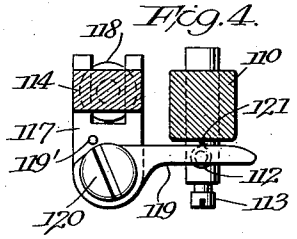


Fig. 4.

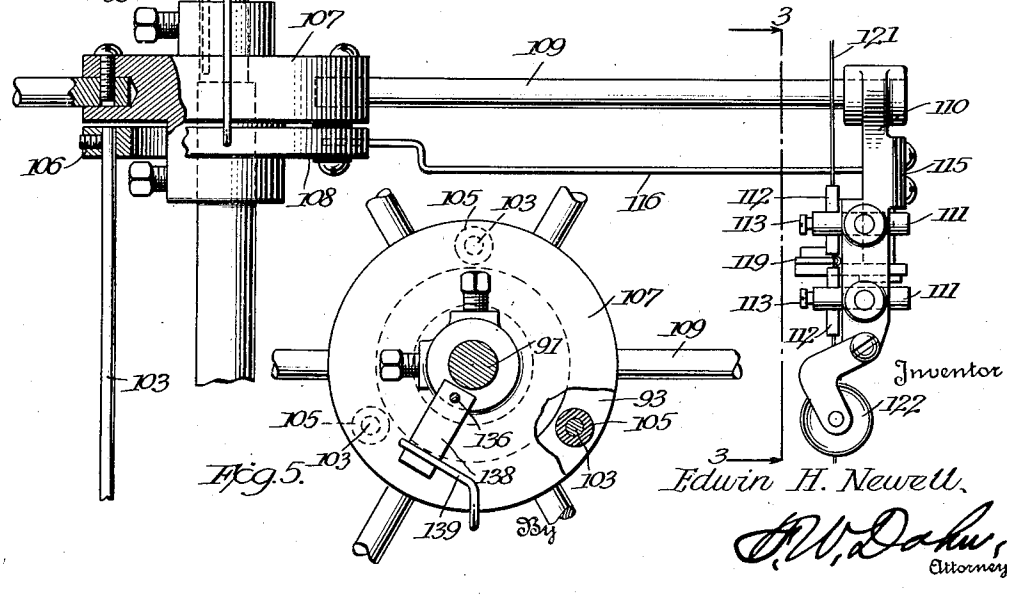


Fig. 5.

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STOP MOTION FOR KNITTING MACHINES

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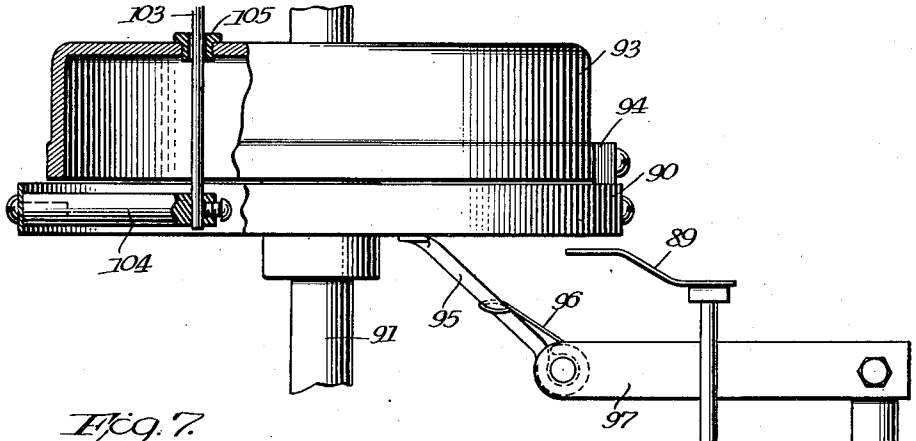


Fig. 6.

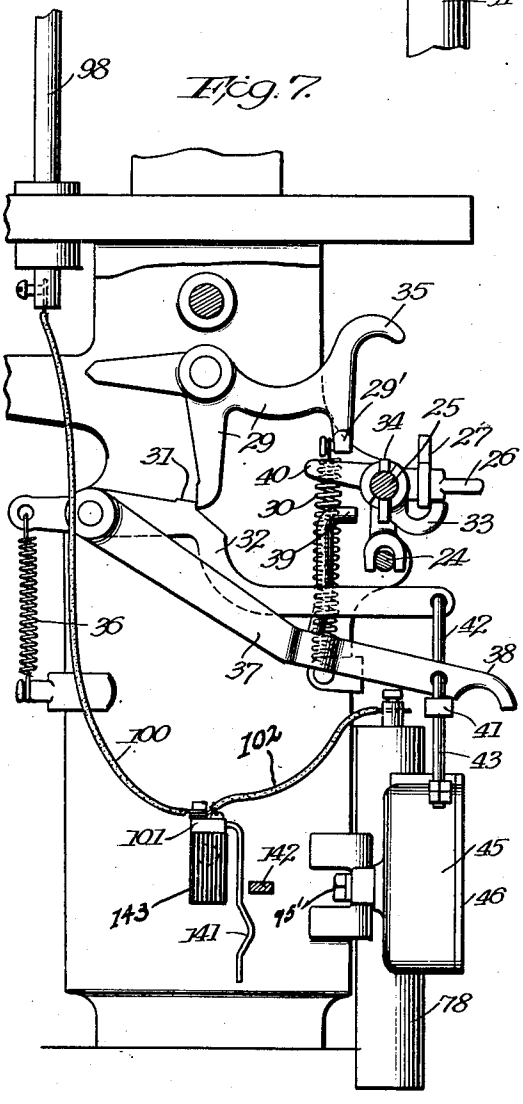


Fig. 7.

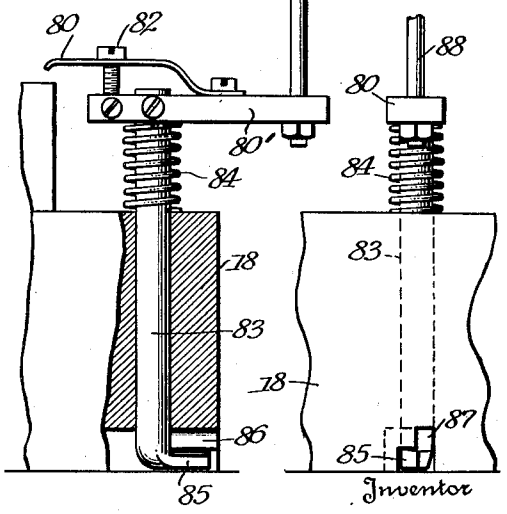


Fig. 6a.

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STOP MOTION FOR KNITTING MACHINES

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Fig. 8.

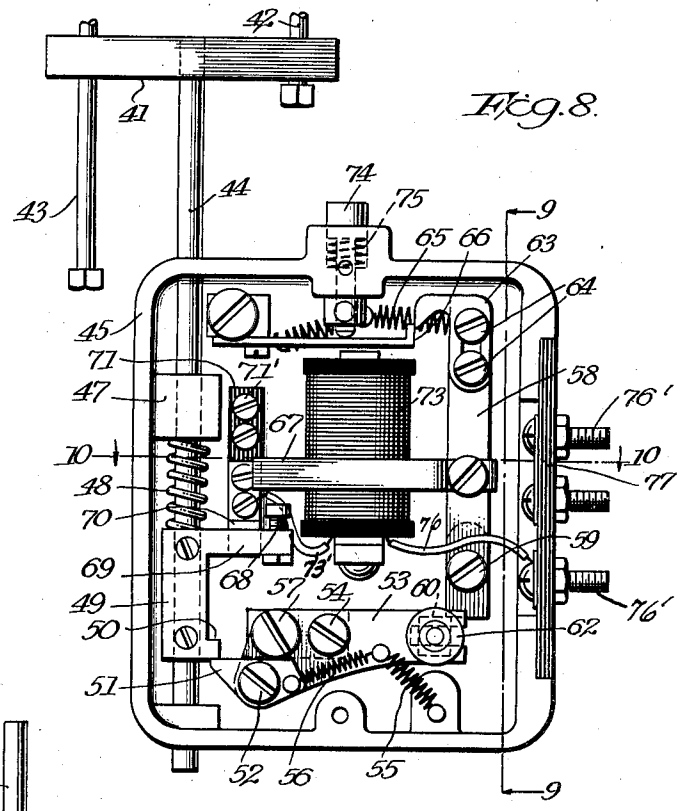


Fig. 9.

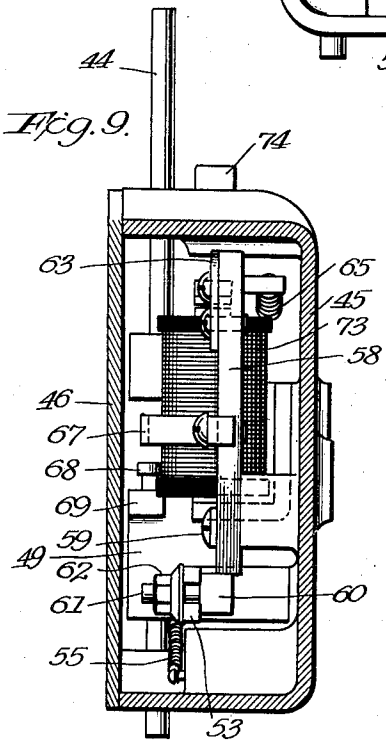
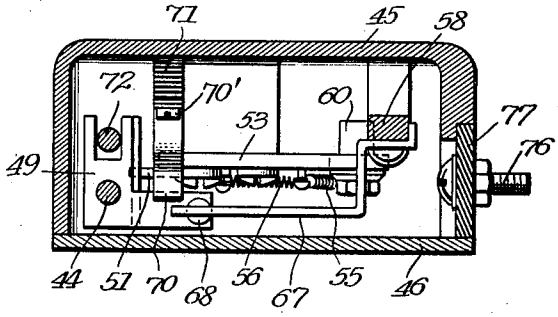


Fig. 10.



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Patented Dec. 13, 1938 2,140,087

UNITED STATES PATENT OFFICE

2,140,087

STOP MOTION FOR KNITTING MACHINES

Edwin H. Newell, Philadelphia, Pa., assignor to H. Brinton Co., Philadelphia, Pa., a corporation of Pennsylvania

Application July 3, 1934, Serial No. 733,690

28 Claims. (Cl. 66—157)

My invention relates to an electric stop motion for knitting machines and it is an object thereof to provide simple inexpensive quick-acting means for arresting the motion of a knitting machine under various conditions affecting the satisfactory operation thereof.

A further object of the invention is to provide means for arresting the operation of a knitting machine due to various contingencies, wherein the electrical means shall be operated by a single battery to which they are adapted to be connected in a particularly simple manner by a single circuit.

Another object of the invention is to provide improvements in details of various mechanisms for stopping the machine upon the occurrence of specific undesirable conditions.

Referring to the drawings, which are made a part of this application and in which similar reference characters indicate similar parts:

Fig. 1 is a front elevation of a circular knitting machine equipped with the devices constituting a preferred form of my invention;

Fig. 2 is an enlarged elevation of parts shown in Fig. 1 at the upper end of the machine, said view being partly in section;

Fig. 3 is a still larger elevation taken on line 3—3 of Fig. 2;

Fig. 4 is a plan of parts shown in Fig. 3, taken on line 4—4 of said figure;

Fig. 5 is a plan, partly broken away, on line 5—5 of Fig. 2;

Fig. 6 is an elevation of parts immediately below those shown in Fig. 2, this view being partly in section;

Fig. 6*a*, an elevation of parts shown in Fig. 6;

Fig. 7 is a vertical section on line 7—7 of Fig. 1;

Fig. 8 is an enlarged elevation of a magnetically operated latch shown in Fig. 1, the casing of the latch having its cover removed;

Fig. 9 is a vertical section on line 9—9 of Fig. 8, and

Fig. 10 is a section on line 10—10 of Fig. 8.

In the drawings, reference character 15 indicates the bed plate of a circular rib knitting machine of well known type said machine having a stationary needle cylinder 16, a stationary dial 17, a revolving cam ring 18, and a dial cam plate 19 revolving with the cylinder cam ring. The driving mechanism for the moving parts includes a high speed pulley 20, a low speed pulley 21 and a loose pulley 22 and the operating means for said pulleys comprises a belt which can be shifted from one to the other by a belt shipper 23 sliding on rods 24 and 25. In the operation of the machine the belt shipper is held in the position indicated in Fig. 1 by means of a manually operable handle 26 and a link 27, the handle swinging down so far that a line drawn through the pivots connecting the link to the handle and the belt shipper respectively passes below the pivot for the handle. A spring 28 tends to move the shipper towards the loose pulley. When the shipper and the driving belt are so moved a brake is applied to the high speed pulley, the operating handle for the brake being shown at 29 (Figs. 1 and 7). A spring 30 tends to move the lever 29 clockwise in Fig. 7 and a detent at 31 on a lever 32 serves to prevent such movement.

When the detent 31 releases the depending arm of lever 29, said lever 29 is swung about its pivot by spring 30 and an arm 29′ thereon strikes a rearwardly extending arm of a lever 33 pivotally supported on rod 25 and having a limited capacity of oscillation about said arm as shown by the notches adjacent its pin 34, which pin secures the lever to the rod and limits its oscillation. Such movement of levers 29 and 33 causes the forward arm of lever 33 to swing handle 26 about its pivot and free the belt shipper to the action of spring 28 to shift the belt and stop the machine. For returning the levers 29 and 33 to the position shown in Fig. 7 the lever 29 has heretofore been provided with a finger piece 35 by which it can be lifted to normal position, whereupon a spring 36 swings the lever 32 back into position for holding the lever 29. Another lever 37 pivoted coaxially with lever 32 is provided at its forward end with a grip 38 and at an intermediate point with a bent arm 39, the extremity of which is adapted to engage the arm 29′ of lever 29 for returning said levers 29 to the position shown in Fig. 7. Lever 33 returns to position automatically, thereby permitting the handle 26 to be returned manually to the high speed driving position. The respective levers 32 and 37 are connected by links 42 and 43 to a bar 41 on a rod 44, said rod serving through link 42 and means hereinafter described to pull down lever 32 and release lever 29 to the action of its spring 30, while lever 37 is adapted to be manually actuated for returning rod 44 to normal position wherein the automatic latch hereinafter described is reset. This action also returns lever 29 to the position of Fig. 7, and permits spring 36 to return the lever 32 to the position where its depending arm rides past detent 31 and holds lever 29 in place, as shown in Fig. 7. The finger piece 35 is superfluous in this machine, so far as

the electric stop motion is concerned, but is retained as being sometimes convenient.

The bar 41 is fixed to the upper end of a rod 44 which extends downwardly into a box 45 having a removable cover 46, the rod 44 extending through a hole in a lug 47 on the box 45 and being normally held in lowered position due to the action of a coil spring 48 encircling the rod and bearing at one end against lug 47, the spring at its other end bearing on a block 49 which is secured to the rod. At its lower end the block is provided with a detent 50 for engagement by a pawl 51 pivoted at 52 to a catch 53 which in turn is pivoted at 54 to the casing 45. A light spring 55 tends to move catch 53 clockwise and a spring 56 tends to move detent 51 counterclockwise, the movement of detent 51 being limited by a stop screw 57.

A latch 58 is mounted for oscillation on a pivot at 59, this latch being adapted to engage a squared block 60 carried by catch 53 so as to hold the catch in the position shown in Fig. 8 and consequently to hold the rod 41 and connected parts in the position there shown. Block 60 has a stem 61, which is preferably integral with the block, and which is threaded to receive a nut 62. Thus the block may be turned when its active portion becomes worn (i. e. the upper right-hand corner in Fig. 8), so as to bring a new corner into operative position. It being desirable that latch 58 shall engage block 60 only over a slight distance from its edge, so as to release the catch 53 quickly and so as to reduce the friction between the latch and the block 60, the stem 61 is adjustable along a slot in the catch 53 to vary the distance to which block 60 extends underneath latch 58.

A finger 63 is secured to the upper end of latch 58 by means of a pair of screws 64. A spring 65 tends to move the latch 58 counterclockwise and draws the finger 63 into engagement with a spring detent 66. For setting the latch against the action of spring 65 there is provided a long finger 67, said finger constituting means for returning the latch 58 to the position shown in Fig. 8 when the rod 44 is lifted by means of lever 37, such finger being then engaged by an adjustable screw 68 on a projection 69 carried by block 49. When the rod 44 is in its upper latched position a circuit is closed through projection 69 and a spring contact 70, secured by screws 70' to a block of insulating material 71, fixed to the box or casing 45 by screws 71'. It will be noted that the pivoted pawl 51 can rock as the rod 44 is moved upward, thus permitting lug 50 to pass the pawl and that the catch 53 is held by spring 55 in the position shown in Fig. 8. A rod 72, shown in Fig. 10, engages in a slot in block 49 for guiding the block and the connected parts.

An electromagnet 73 serves, when energized, as one means for releasing detent 66 from latch 58, whereupon the latch is moved about its pivot by spring 65, thus releasing catch 53 and permitting spring 48 to act through the rod 44 for withdrawing detent 31 from lever 29, through the connections above described. The detent 66 may also be manually released for stopping the machine and for this end there is provided a push button 74 normally held in elevated position by a spring 75, the reduced stem of the push button being positioned for engagement with detent 66. The box 45 is connected to a fixed frame portion by means of screws such as shown at 75'. The machine is stopped automatically on the occurrence of various undesirable situations, this being done through the mechanisms above described, the electromagnet 73 being connected for that purpose in a circuit from the battery 78 through a clamp 79, a screw 76', lead 76, the coil of the magnet, a lead 73', contact 70, projection 69, rod 44 and the casing 45 to the machine frame. The clamp is insulated from the casing 45 as shown at 77, and it carries the battery 78. When the rod 44 drops, as hereinafter described, the circuit is broken at 69, 70.

One such situation arises upon breakage of a needle or bending of the needle. In order to stop the machine upon such an occurrence I provide a feeler 80 (Figs. 1 and 6), (commonly known as a needle protector) this feeler being positioned to be engaged and turned under certain well-known conditions, e. g. by a bunch of yarn such as may be collected on account of a broken needle. The feeler consists of a resilient metal strip fixed to a bracket 80' and vertically adjustable by means of a screw 82. The bracket 80' is mounted on a rotary post 83 journalled in the cam ring 18 and surrounded at its upper end by a spring 84 which tends to elevate the post. At its lower end the post has a laterally extending foot 85 normally engaging under a shoulder at 86 on the cam ring. When the post is rotated due to engagement of the feeler 80 by an obstruction as above described the foot 85 is moved away from the shoulder and then, due to the action of spring 84, up into a recess 87 at one side thereof. Such upward movement elevates a rod 88 which is carried by a bracket 80' and brings a resilient finger 89 into engagement with a contact ring 90.

The contact ring 90 is supported on a post 91, such as is commonly used in machines of this type for supporting the yarn bobbins 92 and other conventional parts of the machine, the supporting means therefor consisting of a collar 93 fixed to the post and the contact ring being connected to the collar by screws passing through blocks 94 of insulating material.

A wiper 95 is held constantly in engagement with the contact ring by means of a spring 96, the wiper being pivotally supported on a bracket 97 mounted on a post 98. The post 98 is carried by the bed plate 15 and is insulated therefrom as shown at 99. At its lower end a conductor 100 leads from the post to a bar 101 and another conductor 102 leads from said bar to the terminal of battery 78. The battery being grounded on the frame it will be seen that when finger 89 engages the contact ring current will pass from the frame through wiper 95, bracket 97, post 98 and the conductors 100 and 102 to the battery, closing the circuit through the electromagnet 73. The electromagnet being energized, it retracts the detent 66, releasing latch 58, which is then moved by its spring 65 away from the block 60, whereupon the spring 48 forces the rod 44 downward and through link 42 and lever 32 withdraws the detent 31 from lever 29, whereupon said lever is moved by its spring 30 to knock off the machine through lever 33, handle 26 and its connected parts. After the damage has been repaired the needle protector may be reset and, the circuit being now broken, the tripping mechanism of Fig. 8 may be reset by elevating lever 37, thus also releasing lever 33 from the handle 28 and permitting spring 36 to position lever 32 operatively and raising lever 29. The handle 26 being now moved manually to the position illus-

trated in Figs. 1 and 7, operation will be resumed.

For stopping the machine upon failure of a yarn I provide means comprising a rod 103 connected to contact ring 90 by a conductor 104 and insulated from collar 93 as shown at 105. The rod 103 is secured to a ring 106 supported on a collar 107, and insulated therefrom by means shown at 108. The collar 107 is fixed to post 91 and carries a plurality of arms in the form of rods 109 for supporting contact finger carriers. Each of the contact finger carriers comprises a body member 110 (Figs. 2 to 4) provided with shafts 111 which are transversely bored to receive yarn guides 112 held in place by set screws 113 engaging axially extending threaded bores in the shafts 111. A block 114 is attached to each body member 110 by an insulating plate 115 and this block is connected to the ring 106 by a conductor 116. Adjacent the lower end of the block there is a bracket 117 adjustably secured thereto by means of a screw 118 engaging a slot in the bracket. At the inner end of the bracket 117 a contact finger 119 is pivotally supported by a bolt 120 and this contact finger is spaced from the body 110 and insulated therefrom solely by a yarn 121 coming off from one of the yarn masses 92. The outward swing of finger 119 is limited by a stop pin 119'. At the lower end of the body 110 a suitable tension is supported, consisting in this case of a pair of disks shown at 122, said disks being supported on a bolt 123 and being adjustably held in engagement with one another by means of a spring 124 and nuts 125.

Due to the location of the pivoted contact finger 119 in such a machine as herein illustrated, wherein the cam ring and the yarn carrying bracket revolve about a stationary needle bed, it will be seen that the pivoted finger 119 is subjected to the action of centrifugal force, which force presses it lightly against the yarn 121. Since the finger is spaced away from its coacting contact member 110 solely by the thickness of the yarn it will be seen that there is produced an electrical stop motion which acts practically instantaneously upon cessation of the yarn, the action of centrifugal force being constant and yet light so as not to injure a delicate yarn and being preferable in this respect to a spring such as may obviously be utilized in a similar yarn-controlled stop motion in situations where the finger would not come under the action of centrifugal force. When the yarn breaks a circuit will be closed immediately from the machine frame through the contact finger and through parts 117, 114, 116, 106, 103 and 104 to contact ring 90 and so on to the battery, as above outlined, thus energizing the electromagnet to release the latch mechanism and stop the machine.

My stop motion also includes means for stopping the machine upon excessive yarn tension, all connected in the common circuit. For each yarn 121 there is provided at the top of the post 91 a tension finger 127 pivoted at 128 on a cap 129 secured to the upper end of the post 91. At its inner end each finger 127 bears against the under face of a disk 130 slidable on a pin 131 which holds the cap 129 on its post. The cap is held in position by a collar 132 resting on a shoulder on the post 91 and this collar is provided with axially extending openings and springs 133, each attached to one of the fingers 127 at one end and at the other end to a stud 134 rising from a collar 135 fixed to post 91. A rod or wire 136 is secured at its upper end to the disk 130 and this wire is guided in apertures in collars 132, 135 and 107. Adjacent the lower end of the wire 136 a block 137 is fixed to the wire and this block carries a strip 138 of spring metal which strip forms a contact for engagement with a contact 139 extending upward from ring 106 and bent so as to be engaged by contact 138 when the latter is elevated.

It will be seen that upon excessive tension of one or more of the yarns the corresponding fingers 127 will be forced downward at their outer ends, thereby raising the disk 130, the wire 136 and the contact 138. If such excessive tension continues to a sufficient extent the wire 136 will be raised sufficiently to close the circuit through contacts 138 and 139, whereupon it will be evident that current will flow from the grounded frame through disk 130, wire 136, contacts 138 and 139 to the ring 106 and thence to the battery as above outlined.

My invention also comprises means for stopping the machine upon failure of tension in the fabric being knitted thereby. Such means is shown in Figs. 1 and 7 and consists in the bar 101 which is secured to a block of insulating material 143 on the fixed frame of the machine. A resilient bowed contact member 141 is fixed to the bar 101 (Fig. 7) and the arrangement is such that if the free end of the take-up bracket 140 (which may be a conventional pivoted device such as shown in the patent to Branson 334,338) falls excessively low as by reason of the fabric running off the needles, the bowed portion of spring contact member 141 will be engaged by a contact 142 fixed to the take-up bracket 140 whereupon a circuit will be closed through said contact members, the bar 101, and the conductor 102 to the electromagnet and so to battery 78 and stop motion magnet 73, whereupon the machine will be knocked off as above described.

When the take-up moves downward to an excessive extent, due to a press-off, the contact 142 will travel downward beyond the bowed portion of contact 141 and thus the circuit will be broken at this point as well as at 69, 70. The fabric will then be held at a point above the take-up by the rollers 145, forming part of the usual dogless device. In present machines it is usual to provide means for shutting off the power and applying a brake when the take-up falls, and the machine cannot be started again while the take-up is down.

In order to set up the press off for the resumption of knitting, for which purpose the machine must be turned forward by hand, it is necessary first to hold up the take-up by hand or to block it up, so that the brake can be released. With my device the circuit is closed only momentarily when the take-up drops, hence the brake can be released when the take-up is down and the machine can be turned forward without raising the take-up or blocking it up, thus making it more convenient to re-start after a press-off, and with less loss of time.

It will be obvious to those skilled in the art that various modifications may be made in my device without departing from the spirit of my invention and therefore I do not limit myself to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent is:

1. In a circular knitting machine, a stationary

needle cylinder, rotary needle cams, a bobbin supporting post rotating with the needle cams, a pivoted fabric take-up on the fixed frame of the machine below the needle cylinder, a needle protector, stopping means including a stop motion magnet, a source of current in a normally open circuit with said magnet and with the machine frame, means for closing said circuit to stop the machine upon failure of a yarn, means for closing said circuit upon actuation of the needle protector and means for closing it upon excessive downward movement of said take-up.

2. In a circular knitting machine, a stationary needle cylinder, rotary needle cams, a bobbin supporting post rotating with the needle cams, a pivoted take-up on the fixed frame of the machine below the needle cylinder, stopping means including a stop motion magnet, a source of current in a normally open circuit with said magnet and with the machine frame, means for closing said circuit to stop the machine upon failure of a yarn, means for closing said circuit upon excessive tension in a yarn, and means for closing it upon excessive downward movement of said take-up.

3. In a circular knitting machine, a stationary needle cylinder, rotary needle cams, a bobbin supporting post rotating with the needle cams, a needle protector, a pivoted take-up on the fixed frame of the machine below the needle cylinder, stopping means including a stop motion magnet, a source of current in a normally open circuit with said magnet and with the machine frame, means for closing said circuit to stop the machine upon failure of the yarn means for closing said circuit upon excess tension in a yarn, means for closing said circuit upon actuation of the protector and means for closing said circuit upon excessive movement of said take-up, each of said circuit-closing means being independently operative.

4. In a circular independent needle knitting machine having a needle bed and needle operating means one of which is rotatable relatively to the other, a stop motion including a contact ring fixed with relation to one of said relatively rotatable parts, a contact engaging said ring said contact being fixed with relation to the other of said relatively rotatable parts, stopping means including a source of current and a magnet in a normally open circuit with said ring, a post to which said ring is fixed, a conductor extending upward from said ring, means including yarn fingers at the upper end of the post for closing a circuit through said conductor and said ring upon excess tension of a yarn, a rod extending radially from the post, means operated by absence of a yarn for closing a circuit through said rod and said ring, a needle protector and a contact adapted to engage the under side of the ring upon actuation of the needle protector, thereby closing a circuit through said ring.

5. In a knitting machine having a stationary needle cylinder and rotary needle cams, stopping means including a fixed contact member and a movable contact member rotating with said cams, said members being so arranged that centrifugal force tends to close an electric circuit through said contacts, and means for guiding between them a yarn that is being fed to the knitting machine, said yarn being held in position to restrain the movable member except upon failure of the yarn.

6. In a knitting machine having a stationary needle cylinder and rotary needle cams, stopping means including a fixed contact member and a movable contact member rotating with said cams, the movable member being pivoted adjacent the fixed member in position to be forced into circuit-closing relation therewith by centrifugal force, and means for so guiding a strand fed to the machine as to cause it to bear against the fixed contact member and thereby to prevent said movable contact member from touching the fixed contact member.

7. In a knitting machine having a stationary needle cylinder and rotary needle cams, a rotary bobbin supporting post, a contact fixed to said post at a substantial distance from its axis, a movable contact between said post and said fixed contact said movable contact being movable into circuit-closing relation with the fixed contact by centrifugal force, means for guiding a yarn between said contacts, and a stop motion magnet in normally open circuit with said contacts and with a source of electricity.

8. In a stop motion for a machine having strand-supplying means rotating about an axis, stop mechanism including a magnet, a source of electric current in normally-open circuit with said magnet, a pair of coacting contacts rotating with the strand supply, one of said contacts being impelled by centrifugal force toward the other to close the circuit and means for guiding the strand between the faces of said contacts whereby the contacts are separated solely by said strand and the circuit is closed upon yarn failure.

9. In a stop motion for independent needle knitting machines, a rotatable post, means for moving said post in the direction of its axis, means restraining said post from axial movement, a needle protector on said post adapted to rotate the post when actuated, said protector comprising a flat metal strip, a bracket on the post, means for securing an end of the strip to the bracket, means adjacent the free end of the strip for flexing it vertically and holding it against lateral movement with reference to the bracket, means providing a normally open circuit, means for closing said circuit upon axial movement of said protector, and means for stopping the machine upon closing of the circuit.

10. In a stop motion for knitting machines, a support, a post rotatable in said support, a spring for moving said post in the direction of its axis, a foot on said post, means on the support to engage said foot and hold said post against axial movement said means releasing said post upon rotation thereof, a needle protector adapted to rotate said post, means providing a normally open electric circuit, means for closing said circuit upon axial movement of said post, and means for stopping the machine upon closing of the circuit.

11. In a stop motion for independent needle knitting machine, a cam ring, a rotatable element journaled in the cam ring, means for moving said element in the direction of its axis, means restraining said element from axial movement including a laterally extending foot on said element engaging a notch in said cam ring, a needle protector on said element adapted to rotate said element, and stopping means actuated upon axial movement of said element.

12. In a circular independent needle knitting machine having a needle bed and needle operating means one of which is rotatable relatively to the other, a stop motion including a contact ring fixed with relation to one of said parts, a

support fixed with relation to the other of said parts, a rotatable element on said support, a needle protector fixed to said element, means for moving said element axially upon rotation thereof by the needle protector, means carried by said element for contacting said ring and closing an electric circuit upon axial movement of said element, and stopping means operated upon the closing of said circuit.

13. In an electric stop motion for knitting machines, a cam ring, a rotatable post journaled in said cam ring, a feeler on said post adjacent the heads of the needles for rotating the post, means for raising said post to close a circuit upon rotation thereof, a laterally extending foot on said post engaging a notch in said cam ring for holding down the post and stopping means actuated upon the closing of the circuit including a contact on said post above said feeler.

14. In an electric stop motion for a circular knitting machine, a post, a disk movable axially thereof, a rod extending alongside said post and secured to said disk, a ring fixed to the post below said disk, a contact fixed to the ring, a contact on said rod, and pivoted yarn-engaging fingers engaging under said disk, and each operable upon excessive tension in a yarn for moving the disk to cause engagement of said contacts to close a circuit and stop the machine.

15. In an electric stop motion for a circular knitting machine, a post, a disk movable axially thereof, a ring fixed to the post below said disk, a contact on said ring, a rod fixed to said disk and extending parallel to said post, a resilient contact on said rod, and means operated by excessive tension in a yarn to elevate said disk and rod for causing said contacts to close a circuit and stop the machine.

16. In an electric stop motion for a circular knitting machine, a post, a disk movable axially thereof, a ring fixed to the post below said disk, a fixed collar on said post between said disk and said ring, a rod suspended from said disk and extending through said collar, guides for said rod at both ends thereof, circuit closing means on said rod and said ring, yarn fingers pivoted on said post and adapted to raise said disk to cause engagement of said circuit-closing means upon excessive tension of a yarn, and springs connected to said collar and said yarn fingers for holding said fingers normally in inoperative position.

17. In a knitting machine having a stationary needle bed and a pivoted fabric take-up on the fixed frame of the machine, a contact extending laterally from said take-up and movable therewith, a stop motion magnet and a source of electric current in normally open circuit with said contact, and a bowed spring contact on the fixed frame of the machine arranged approximately tangentially to the arc of movement of said movable contact so as to be engaged thereby upon excessive slack in the fabric.

18. In a stop motion for a knitting machine having a belt shipper and a brake the combination of a shipper lever, a brake lever and means tending to operate said levers and so to stop the machine, means operated by the brake lever for releasing the shipper lever to action, a hand lever providing a detent to restrain said brake lever, a yoke bar connected to said hand lever, a spring connected to said yoke-bar and tending to operate the same to release said detent, latching means for holding said yoke-bar against movement, electromagnetic means for releasing said holding means, a second hand lever connected to said yoke-bar for resetting said latching means, and connections from said second hand lever for resetting said shipper-releasing means.

19. A device as in claim 18, including a normally open circuit for said electromagnetic means, and means operable upon failure of a yarn for closing said circuit.

20. In a knitting machine having driving mechanism including fast and loose pulleys, a belt and a brake, the combination of stop mechanism including a belt shipper, a brake-operating lever, means for holding the brake-operating lever out of action, electrically-controlled means for releasing the brake lever, connections from the brake lever for actuating the belt shipper, and interconnected means for resetting the electrically controlled releasing means, the brake lever and the connections from the brake lever to the belt shipper and means actuated by undue slack in the fabric being knitted for closing a circuit to set in action said electrically controlled releasing means.

21. In an electric stop motion for a dial and cylinder knitting machine having a stationary needle cylinder, a stationary dial and revolving needle cams, the combination of a pivoted take-up, a stop motion magnet, a source of current, a fixed contact on the machine frame in a normally open circuit with said stop motion magnet and said source of current, a contact on said take-up adapted to engage said first-named contact during the downward movement of the take-up upon abnormal movement of said take-up, said last-named contact being so constructed as to pass on beyond the first contact during the downward movement of the take-up after closing the circuit, so as to break the circuit in case of a press-off.

22. In a stop mechanism for knitting machines, a brake-operating lever and a belt shipper operating lever pivoted on parallel axes, a resilient means for moving the brake-operating lever to apply the brake, a finger on the brake-operating lever for engaging and operating the belt shipper operating lever during such movement, a detent for holding the brake-operating lever out of action, a spring for holding said detent in place, a normally operable lever mounted coaxially with said detent, means on said lever for resetting said brake-operating lever, a plunger, lost-motion connections from said plunger to said last-named lever and said detent respectively, means biased to actuate said plunger in a direction to withdraw said detent from said brake-operating lever, electromagnetically controlled means for latching said plunger against operation, and means controlled by an element of the knitting machine for closing a circuit to release said restraining means, the return movement of said manually operable lever returning said brake-operating lever into position to be held by its detent and also returning said plunger into position to be latched out of operation.

23. In a stop mechanism for knitting machines, a brake-operating lever, a power-cut-off lever operable by said brake-operating lever, means tending to move said brake-operating lever so as to apply the brake and cut off the power, means acting automatically to latch said brake-operating lever against movement, a plunger tending to move in a direction to release said holding means, a latch for preventing movement of said plunger, electromagnetic means controlled by an element

of the knitting machine for releasing said latch, and a manually operable lever movable in one direction to return both said brake-operating lever and said plunger to position to be latched in idle position.

24. In a circular knitting machine having a stationary needle cylinder and revolving needle cams, the combination of a stop motion comprising a normally open circuit, a take-up mounted for movement upward and downward, a contact on the take-up, and a fixed contact on the machine so located that excessive downward movement of the take-up will first close the circuit to stop the machine, while farther downward movement will break the circuit.

25. In a circular independent needle knitting machine, having a needle bed and needle operating means one of which is rotatable with reference to the other, a stop motion including a contact ring fixed with relation to one of said relatively rotatable parts, a contact engaging said ring said contact being fixed with relation to the other of said relatively rotatable parts, stopping means including a source of current and a magnet in a normally open circuit with said ring, a post to which said ring is fixed, a reciprocable conductor rod extending upward alongside said post, a contact on said rod, a fixed contact in circuit with said ring and normally spaced from the contact on said rod, yarn fingers at the top of the post arranged to lift said reciprocable rod to close a circuit through said contacts, conductor rods and ring upon excess tension of a yarn.

26. A device as in claim 25, including a rod extending radially from said post, and means operated by absence of a yarn for closing a circuit through said rod and said ring.

27. In a knitting machine, a stop motion comprising a normally-open circuit, a take-up for the cloth including an element responsive to slack in the cloth, a contact movable with said element, and a contact constructed and arranged to be engaged by said first-named contact upon movement of said element caused by undue slack in the cloth and then to break the circuit upon continued movement of said element in the same direction.

28. In a stop motion for independent needle knitting machines, a rotatable post, means for moving said post in the direction of its axis, means restraining said post from axial movement, a needle protector on said post adapted to rotate the post when actuated, means providing a normally open circuit, means for closing said circuit upon axial movement of said post and means for stopping the machine upon closing of the circuit, said protector comprising a flat metal strip, a bracket on the post, means for securing one end of the strip to said bracket, and means adjacent the free end of the strip for flexing it vertically and for holding it against lateral movement with reference to the bracket.

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