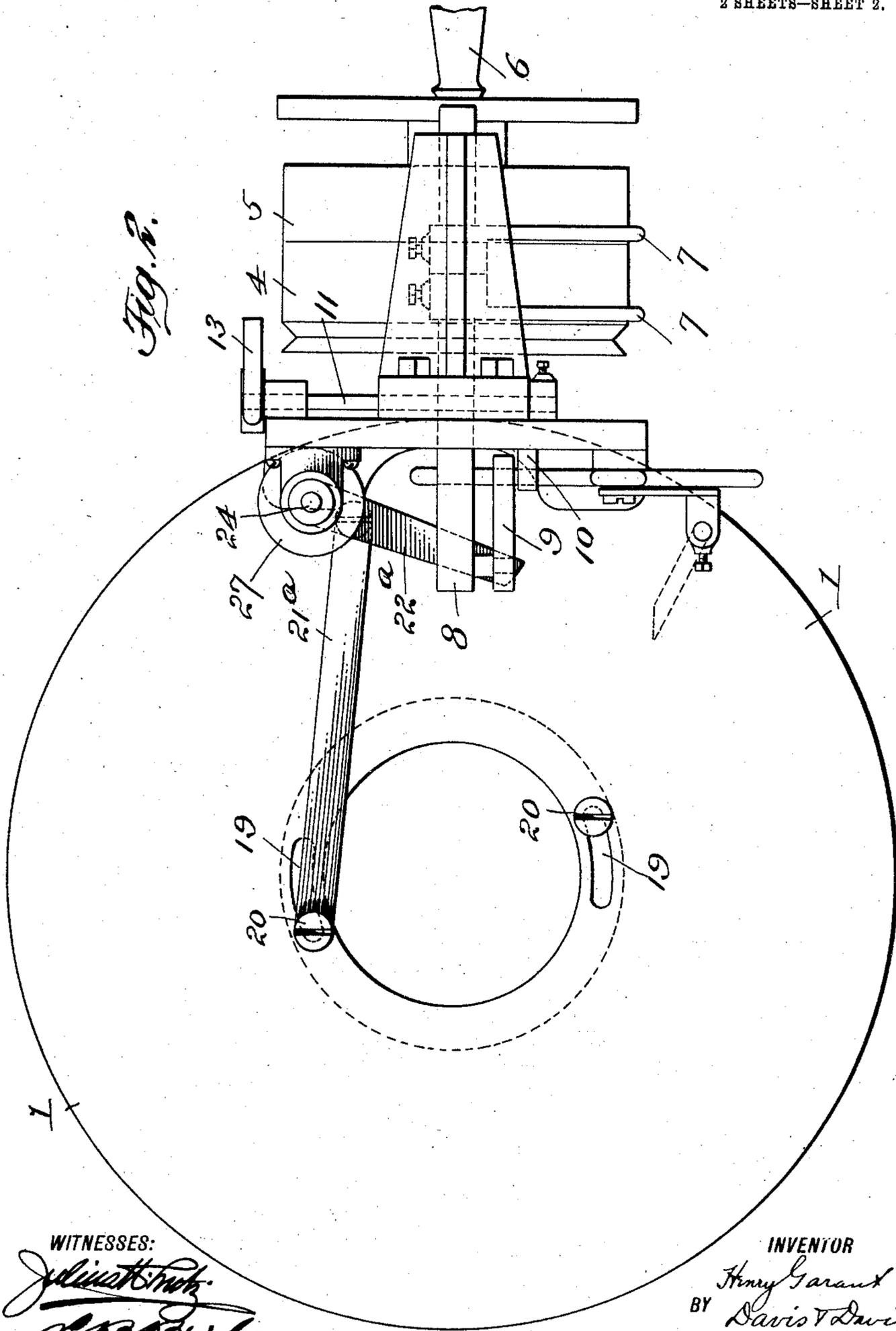


H. GARANT.
STOP MOTION FOR CIRCULAR KNITTING MACHINES.
APPLICATION FILED MAY 27, 1908.

908,989.

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2 SHEETS—SHEET 2.



WITNESSES:
J. J. Smith
C. R. Bridge

INVENTOR
Henry Garant
BY *Davis & Davis*
ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRY GARANT, OF CHATTANOOGA, TENNESSEE, ASSIGNOR OF ONE-HALF TO WALTER B. DAVIS, OF CHATTANOOGA, TENNESSEE.

STOP-MOTION FOR CIRCULAR-KNITTING MACHINES.

No. 908,989.

Specification of Letters Patent.

Patented Jan. 5, 1909.

Application filed May 27, 1908. Serial No. 435,235.

To all whom it may concern:

Be it known that I, HENRY GARANT, a citizen of the United States, residing in the city of Chattanooga, county of Hamilton, State of Tennessee, have invented certain new and useful Improvements in Stop-Motions for Circular-Knitting Machines, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a circular knitting machine showing my invention attached thereto; Fig. 2 a bottom plan view of that portion of the machine shown in Fig. 1; Fig. 3 a detail plan view of the tension adjusting plate; and Fig. 4 a similar view of the means for holding the tension plate in its various positions of adjustment.

One of the main objects of this invention is to provide means for automatically stopping the knitting machine when any undue strain is brought on the needle cylinder.

A further object of the invention is to so mount the needle cylinder that it may have a slight rotary movement with the cam ring, when any undue strain is brought upon the needles; and to provide means whereby a slight movement of the needle cylinder will automatically stop the machine.

Another object of the invention is to so mount the needle cylinder that it will be capable of a slight movement under abnormal conditions, and to provide means whereby said movement of the needle cylinder will stop the machine.

It is also an object of this invention to mount the needle cylinder so that it is capable of a slight rotative movement under abnormal conditions; and to provide a tension device to hold the needle cylinder stationary under normal conditions; and to provide means whereby when the cylinder is moved the machine will be stopped.

In the drawings I have illustrated only so much of the ordinary circular knitting machine as is necessary to show the application of my invention. In these drawings 1 designates the rigid support or table of the machine; 2 the driving shaft carrying the driving pinion 3, the fast pulley 4 and the loose pulley 5. On the end of this shaft is the usual crank 6 by which the machine may be hand-operated. The belt shifter 7 is carried by a reciprocating bar 8 and is maintained

in position to hold the belt on the fast pulley by the jointed links 9 and 10, one end of the link 9 being connected to the end of the bar 8, and one end of the link 10 being connected to a rock shaft 11. A spring 12 is mounted on the bar 8 and tends to throw the belt shifter to the loose pulley 5. When the links 9 and 10 are arranged as shown in Fig. 1, they hold the belt shifter on the fast pulley 4 against the tension of the spring 12. Connected to the shaft 11 is a handle 13 by which said shaft may be rocked to move the links 9 and 10 out of alignment and to permit the spring to shift the belt.

The beveled gear 3 meshes with a similar gear 14 mounted in the support 1 and carrying the cam ring and the needle operating mechanism. Secured to the support within the usual cam ring 15, shown in dotted lines in Fig. 1, is the needle cylinder 16 which carries the needles 17, only one of said needles being shown in Fig. 1 in order to simplify the drawings. As ordinarily constructed the needle cylinder is rigidly secured to the supporting table, the cam ring being rotated with the other needle operating mechanism and the needles being operated by the cam slot 18, shown in dotted lines in Fig. 1. In carrying out my invention the needle cylinder is so mounted that under abnormal conditions it is capable of a slight rotation with the cam ring. The table or support 1 is slotted as shown at 19, in Fig. 2, at diametrically opposite points, said slots being on an arc struck from the center of the needle cylinder. Screwed into the cam ring and passing through said slots are two retaining studs 20, said studs being shouldered as shown in dotted lines in Fig. 1, to hold the needle cylinder down to the support.

The thread or yarn 21 is run through the usual thread guide 22 and is by said guide led before the needles of the needle cylinder and of the needle dial 23 in the usual manner. As these parts of the machine are a well known construction, I have not deemed it necessary to fully illustrate them.

It is well known that in circular knitting machines of this general design the needles are easily and freely operated by the cam ring when the thread or yarn is of a uniform diameter, the needles having first been set to operate upon the desired uniform size of thread, but when the thread is larger in

diameter than the size for which the needles are set, the needles operate stiffly and there is considerable friction in the cam ring which tends to drag the needle cylinder around with the needle operating mechanism. When there is any considerable increase in the size of the yarn or thread it is desirable to stop the knitting machine in order to remove the defective portion of the thread. I make use of this binding of the needles in the cam ring under these abnormal conditions to operate a stop motion and to this end I mount the needle cylinder so that it is capable of a slight rotary movement with the cam ring under abnormal conditions, means being provided to hold it stationary under normal working conditions. To accomplish this I connect to the lower end of one of the studs 20 one end of a link 21^a. The other end of this link is pivotally connected to a horizontally swinging arm 22^a, near the pivot thereof, whereby a slight movement of the link 21^a will give considerable movement to the free end of said swinging arm. The free end of this arm is arranged directly over and close to the upper edge of the link 9 near the point of connection between said link and the reciprocating bar 8 of the belt shifter. The links 9 and 10 incline upwardly from the connection between the link 9 and the bar 8 to the rock shaft 11, so that when the arm 22^a is moved horizontally it will engage the upper edge of the link 9 and swing it downwardly, thereby moving the links 9 and 10 out of line and permitting the spring 12 to throw the belt shifter and thereby stop the machine.

The arm 22^a is secured to the upper end of a pintle 24 which is mounted in an upright bearing 25 secured in the supporting frame of the machine. Surrounding the pintle 24 and between the arm 22^a and the support 25 is a coil tension spring 26, the upper end of which is connected to the arm 22^a. The lower end of this spring is secured in an opening 27 in a plate 28 supported by the bearing 25 and surrounding the pintle 24. This plate is provided with an annular series of openings 29 which are adapted to be brought into engagement with a pin 30 on the bearing 25. By rotating the plate 27 the proper tension may be placed upon the spring 26 and by engaging the pin 30 in the proper opening 29 the required tension may be maintained on said spring. The tension of this spring is in the direction to oppose any movement of the needle cylinder and to hold the studs 20 against the end walls of the slots 19. It will thus be seen that the friction between the cam ring and the needles must be sufficient to overcome the tension of the spring 26 before the needle cylinder is permitted to move with the cam ring, and that, therefore, the strain required to move the needle cylinder and to operate

the stop motion may be varied. It is also clear that the spring 26 constitutes an adjustable or variable means for holding the needle cylinder stationary.

From the foregoing it is manifest that should there be any undue enlargement of the thread or yarn, as indicated at A in Fig. 1, the friction on the cam ring in forcing the needles to handle the thicker portion of the yarn will be sufficient to drag the needle cylinder with the cam ring to operate the belt shifter. It is also manifest that the strain required to move the needle cylinder may be varied by varying the tension of the spring 26.

It is manifest that I provide a stop motion which may be adjusted to the desired sensitiveness and that when so adjusted it will operate automatically whenever any objectionable conditions exist to cause a slight movement of the needle cylinder.

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

1. A stop motion for a circular knitting machine comprising a needle cylinder, means for permitting said cylinder to have a slight rotative movement, yielding means for holding said needle cylinder stationary under normal conditions, said means yielding and permitting the cylinder to move when abnormal friction is brought on the needles, and means operated through the movement of the cylinder to stop the machine.

2. A stop motion for a circular knitting machine comprising a movable needle cylinder, means for holding said needle cylinder stationary under normal conditions, means permitting said cylinder to be moved under abnormal conditions, and means operated through the movement of the cylinder to stop the machine.

3. A stop motion for a knitting machine comprising a needle holding means, means for normally holding said needle holding means stationary, means to permit said needle holding means to be moved under abnormal conditions, and means operated through the movement of the needle carrying means to stop the machine.

4. A stop motion for a circular knitting machine comprising a needle cylinder, means for permitting movement of said needle cylinder, a yieldable means for holding said needle cylinder stationary under normal conditions, said means permitting the cylinder to move under abnormal conditions, and means operated by the movement of the cylinder to stop the machine.

5. A stop motion for a circular knitting machine comprising a cam ring, a needle cylinder, means for movably supporting said cylinder, means for permitting said cylinder to have a slight rotary movement with the cam ring under abnormal conditions, and

means operated by the movement of the cylinder to stop the machine.

5 6. A stop motion for a circular knitting machine comprising a needle cylinder, means for mounting said cylinder to permit it to have a slight rotary movement with the cam ring, a belt shifter, and means operated by the movement of the cylinder to permit said belt shifter to stop the machine.

10 7. A stop motion for a circular knitting machine comprising a needle cylinder, means for permitting said cylinder to have a slight rotary movement, a belt shifter normally tending to shift the operating belt to the loose pulley, means to lock said belt shifter to hold the belt on the fast pulley, and means operated through the movement of the needle cylinder to release the belt shifter and permit it to move the belt to the loose pulley.

20 8. A stop motion for a circular knitting machine comprising a needle cylinder, means to permit said cylinder to have a slight rotary movement under abnormal conditions, a belt shifter normally tending to shift the belt to the loose pulley, means for locking said belt shifter to hold the belt on the fast pulley, a swinging arm adapted to release said belt shifter, means connecting said swinging arm to the needle cylinder, and a spring device to yieldingly hold said swinging arm and the needle cylinder against movement during the normal operation of the machine.

35 9. A stop motion for a circular knitting machine comprising a needle cylinder, means to permit said cylinder to have a slight rotary movement under abnormal conditions, a belt shifter normally tending to shift the belt to the loose pulley, means for locking said belt

shifter to hold the belt on the fast pulley, a swinging arm adapted to release said belt shifter, means connecting said swinging arm to the needle cylinder, a spring device to yieldingly hold said swinging arm and the needle cylinder against movement during the normal operation of the machine, and means for adjusting said spring to vary its tension on said swinging arm.

10. A stop motion for a circular knitting machine comprising a needle cylinder capable of a slight rotative movement, yielding means for holding said needle cylinder stationary under normal working conditions, and means to stop the machine operated through the needle cylinder when enlargements in the thread or yarn are engaged by the needles.

11. A stop motion for a circular knitting machine comprising a needle cylinder, means for supporting said cylinder to permit it to have a slight rotative movement, a rotatable cam ring for operating the needles, yieldable means for holding the needle cylinder stationary under normal working conditions, said yieldable means permitting the cylinder to rotate with the cam ring when the friction between the cam ring and the needles is abnormal, and means operated by the movement of the needle cylinder to stop the machine.

In testimony whereof I hereunto affix my signature in the presence of two witnesses this 21 day of May 1908.

HENRY GARANT.

Witnesses:

J. L. HUGHES,
J. H. WOOD.