

R. HUTCHINSON.
KNITTING MACHINE.
APPLICATION FILED DEC. 14, 1910.

1,021,678.

Patented Mar. 26, 1912.

2 SHEETS—SHEET 1.

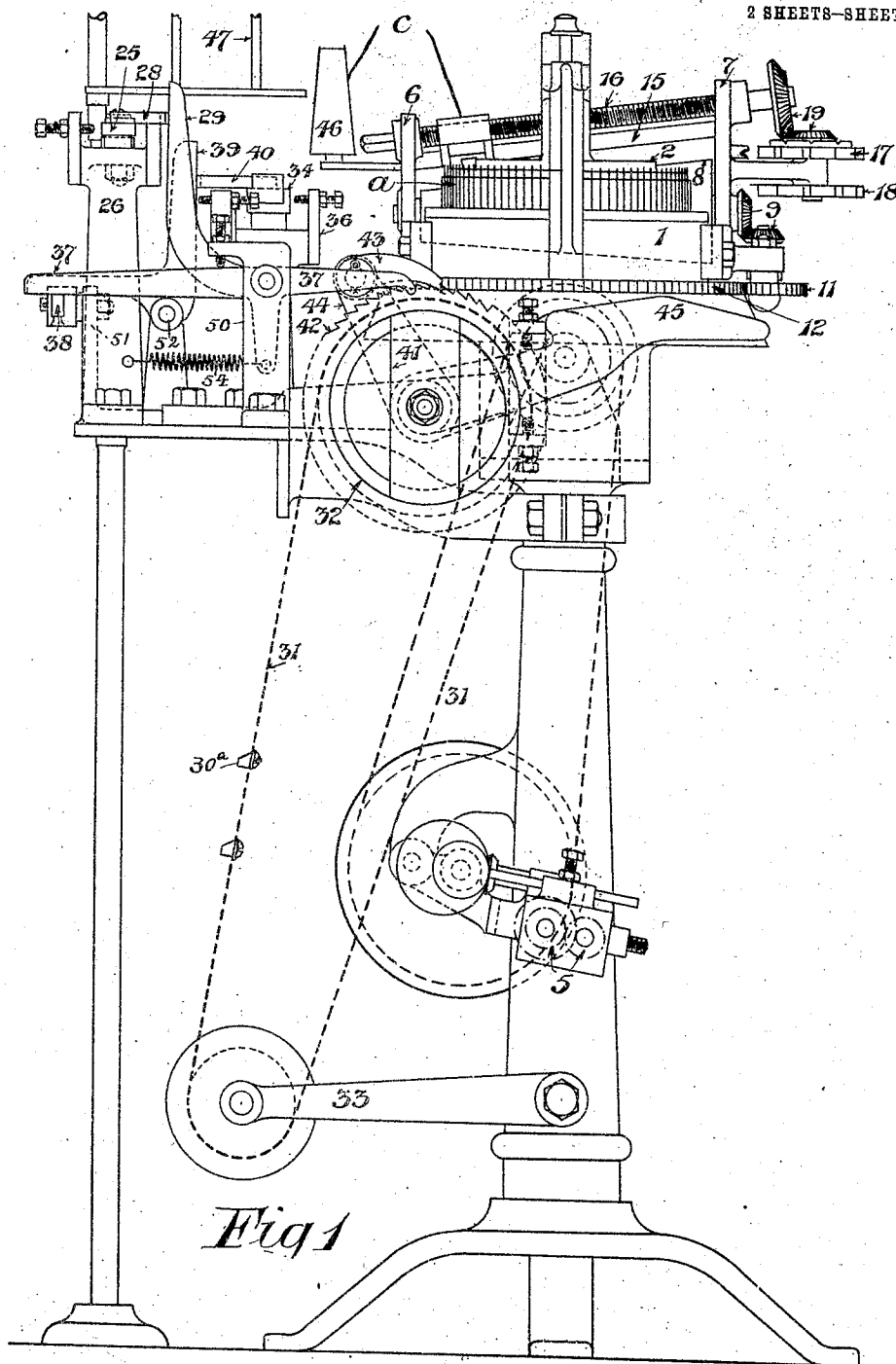


Fig 1

Witness: L. C. Brady
C. A. Baker

Inventor:
Rowland Hutchinson
By J. S. Barker
his Attorney

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2 SHEETS—SHEET 2.

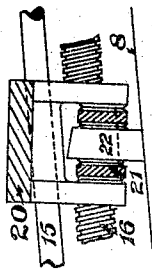


Fig 5

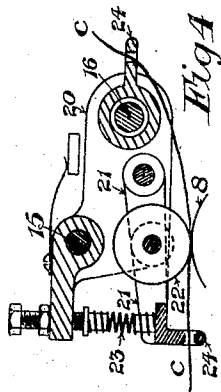


Fig 4

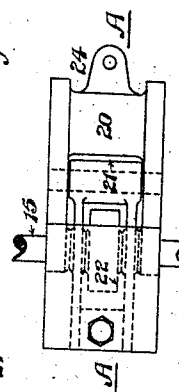


Fig 3

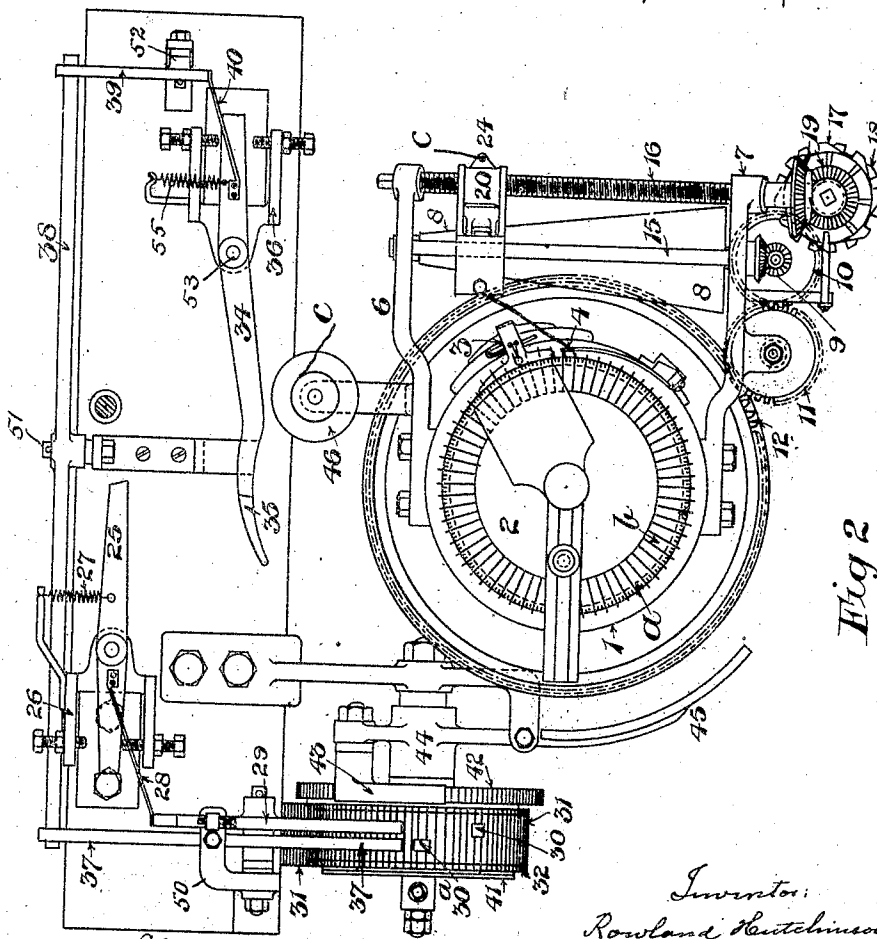


Fig 2

Witnesses: L.C. Brady
C. Barker

Inventor:
Rowland Hutchinson
By J.S. Barker
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UNITED STATES PATENT OFFICE.

ROWLAND HUTCHINSON, OF NOTTINGHAM, ENGLAND.

KNITTING-MACHINE.

1,021,678.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed December 14, 1910. Serial No. 597,266.

To all whom it may concern:

Be it known that I, ROWLAND HUTCHINSON, a subject of the King of Great Britain, and a resident of the city of Nottingham, in the county of the said city, England, have invented new and useful Improvements in Knitting-Machines, of which the following is a specification.

This invention relates to improvements in and applicable to circular latch needle rib knitting machines of the kind used for the manufacture of circular seamless knitted elastic stockings, knee caps, and other knitted seamless elastic goods for surgical and other purposes and in which the shape of the article is altered by varying the length of the elastic thread fed to the machine relatively to the circumference of the needles.

The present invention has for its object the provision of an improved elastic thread tension mechanism by means of which any desired length of elastic thread can be positively measured and fed to the machine for each course knitted and by which the length of the elastic thread fed to a course, and consequently the tension of the same, can be regularly and continuously varied according to the variation it is required to produce in the diameter and shape of the article being knitted.

In the drawings:—Figure 1 is the elevation of a circular knitting machine fitted with the improved elastic thread tension mechanism. Fig. 2 is a plan of the same. Fig. 3 is a plan of the elastic thread feeding roller bracket. Fig. 4 is a sectional elevation on the line A, A, Fig. 3, and Fig. 5 is a front sectional elevation of an elastic thread feeding device fitted with a conical pressure roller.

The knitting machine used for the manufacture of circular seamless knitted elastic goods and illustrated in the accompanying drawings has a fixed needle cylinder *a*, Fig. 2, a fixed ribber dial *b* and rotating knitting cams which are carried by the cam cylinder 1 and the ribber camplate 2. There is also a knitting thread guide 3 and an elastic thread guide 4 and some suitable form of work take up rollers 5 which in the drawing are shown driven from the machine driving shaft and pull down the work by the weight of the rollers and connected parts. The parts of the machine above described are constructed, arranged, and operated in substantially the same manner as

the corresponding parts of other circular rib knitting machines used for the production of knitted seamless elastic goods.

For the purpose of this invention the machine is provided with a conical elastic thread feed roller 8 which is fitted to rotate about a horizontal axis and has bearings in arms 6 and 7 which are attached to and rotate with the cam cylinder 1, and for rotating the roller 8 on its own axis it is geared by the toothed gear wheels 9, 10, 11, to a toothed gear wheel 12 which is fixed upon the machine framework. The arms 6 and 7 also carry a fixed guide rod 15 which is parallel with the surface of the roller 8 and a screw 16 which is parallel with the rod 15 and is intermittently rotated in opposite directions as may be required by the oppositely handed ratchet wheels 17 and 18 through the bevel toothed gear wheels 19 in the manner herein after described. Fitted to slide on the rod 15, and tapped to form a nut for the screw 16, there is a feed roller bracket 20, Figs. 4 and 3. The inside of this bracket carries a pivoted frame 21 in which is mounted the axle for the pressure feed roller 22, and this roller is pressed upon the surface of the conical roller 8 by a spring 23, the tension of which can be adjusted by means of a screw in the bracket 20. The feed roller 22 may be parallel as shown in Figs. 3 and 4 or a conical roller as shown in Fig. 5 may be used, and there are guide eyes 24 by which the elastic thread *c* is held in position between the rollers 8 and 22 and is traversed with the roller 22 over the surface of the conical roller 8.

In the manufacture of knitted elastic hosiery on machines of the kind herein referred to, the elastic thread is laid into the work and held therein by knitted loops formed from the knitting threads and if the length of the elastic thread fed to the needles for each course knitted is the same as the circumference of the needles then the article produced is approximately the same diameter as the needle cylinder. If however the length of elastic thread is stretched as it is laid or knitted into the course then after the fabric has left the needles the elastic thread contracts and thus reduces the diameter of the fabric produced. In the machine shown in the drawings the elastic thread is fed by the frictional contact between the conical roller 8 and the feed roller 22 and by varying the position of the roller 22 rela-

tively to the ends of the roller 8, the length of the elastic thread fed to each course is varied and consequently the diameter of the fabric produced is also varied, and in order that these variations may be produced without affecting the evenness and the regularity of the work it is necessary that the length of the elastic thread be varied regularly and automatically without having to stop the machine. For this purpose the screw 16 is geared to the oppositely handed ratchet wheels 17 and 18 and for actuating these wheels the machine is provided with ratchet clawkers 25 and 35.

The clawker 25 is pivoted on a bracket 26 provided with set screws for limiting its motion and it is normally held clear of the path of the wheel 17 by a spring 27. This clawker, 25, is connected by a spring 28 to a pattern lever 29 which is suitably pivoted and operated by pattern bits 30 on a chain 31. The clawker 35, for operating the wheel 18 is formed on or constitutes part of a lever 34 which is pivoted at 53 on a bracket 36 and is operated from pattern bits 30^a on the chain 31. These bits operate upon one end of a pattern lever 37 pivoted in a bracket 50 and held in working position by a spring 54. The other end of the lever 37 engages with and operates a lever 38, pivotally supported at 51, and which in turn acts upon a lever 39, represented as being of angular shape, and pivotally supported at 52. A spring connection 40 is interposed between and unites the lever 39 and the clawker lever 34, which latter is held in proper working position by a spring 55.

The pattern chain 31 is carried by a chain wheel 32 intermittently actuated by a ratchet wheel 42 and a clawker 43 on a lever 44 which has a cam shaped end 45 and is actuated by the head of the axle on which the wheel 11 is mounted or in any other suitable manner, and the chain is held tight by a weighted roller on the loosely pivoted lever 33.

The elastic thread *c* is carried by a bobbin 46 which rotates with the cam cylinder, and the elastic thread is guided to the bracket 20 and between the rollers 8 and 22 to the elastic thread guide 4, while the ordinary knitting threads are carried by a frame 47 and are suitably tensioned and guided to the thread guide 3.

What I claim is:—

1. The combination with a circular rib knitting machine of means for holding and guiding to the knitting mechanism an elastic thread, a conical feed roller for the elastic thread, means for rotating such roller, a pressure feed roller and means for traversing it to and fro over the conical roller substantially as herein set forth.

2. The combination with a circular rib knitting machine having a rotating cam

cylinder, of means for holding and guiding to the knitting mechanism an elastic thread, a conical roller for feeding the elastic thread, a frame attached to the rotating cylinder of the knitting machine in which is mounted the said conical feed roller, means for turning the said roller comprising a circular gear fixed on the machine frame, and a train of gearing carried by the frame which supports the conical roller and disposed between the said fixed gear and the axle of the conical roller, and means for traversing the holding and guiding means for the elastic thread along the feed roller, substantially as herein set forth.

3. The combination with a circular rib knitting machine of means for holding and guiding to the knitting mechanism an elastic thread, a conical feed roller for the elastic thread, arms carrying the same, toothed gear wheels for rotating the said roller, a pressure feed roller, a pivoted frame carrying such roller, a pressure feed roller bracket, and a screw for traversing the bracket substantially as herein set forth.

4. The combination with a circular rib knitting machine of means for holding and guiding to the knitting mechanism an elastic thread, a conical feed roller for the elastic thread, toothed gear wheels for rotating such roller, a pressure feed roller, a bracket carrying such roller, a screw for traversing the said bracket, and ratchet mechanism for rotating the screw in either direction substantially as herein set forth.

5. The combination with a circular rib knitting machine of means for holding and guiding to the knitting mechanism an elastic thread, a conical feed roller for the elastic thread, a pressure roller working in contact with the feed roller, a bracket in which is supported the contact roller for traversing the pressure roller, a screw for actuating the bracket, a ratchet wheel and clawker for rotating the screw in one direction, a ratchet wheel and clawker for rotating the screw in the opposite direction and pattern mechanism controlling the action of the clawkers substantially as herein set forth.

6. The combination with a circular rib knitting machine of means for holding and guiding to the knitting mechanism an elastic thread, a conical feed roller, a pressure feed roller, in working contact with the conical roller, a pivoted frame carrying such pressure feed roller, a bracket to which the frame is pivoted, a spring pressure device between the bracket and the frame, a fixed rod for the bracket to slide upon and a screw for traversing the frame substantially as herein set forth.

7. The combination with a circular rib knitting machine of means for holding and guiding to the knitting mechanism an elastic thread, a conical feed roller for the elastic

thread, a pressure feed roller bearing upon
the conical roller, a frame and bracket car-
rying the pressure roller, a screw for actu-
ating the said bracket, independent ratchet
5 wheels and clawkers for rotating the screw
in either direction, a pattern chain, and pat-
tern bits on the said chain for selecting the
clawker and ratchet mechanism to be
brought into operation, and operating mech-
10 anisms between the said pattern chain and
clawkers substantially as herein set forth.

8. The combination with a circular rib
knitting machine of means for holding and
guiding to the knitting mechanism an elastic
15 thread, a conical feed roller for the elastic
thread, a pressure feed roller, arms con-
nected to and rotating with the cam cylin-
der and carrying the said roller, a bobbin
for the elastic thread mounted to rotate

with the cam cylinder, a screw for travers- 20
ing the pressure feed roller, ratchet mecha-
nism for actuating the screw and pattern
mechanism controlling the action of the
ratchet mechanism substantially as herein
set forth. 25

9. The combination with a knitting ma-
chine of means for holding and guiding to
the knitting mechanism an elastic thread,
mechanism for positively feeding the elastic
thread to the knitting mechanism, means for 30
varying the speed at which the said feed
mechanism operates, and pattern mechanism
for controlling the feed-varying mechanism.

ROWLAND HUTCHINSON.

Witnesses:

WILLIAM H. POTLER,
JOHN GRUNDY.