

No. 679,641.

Patented July 30, 1901.

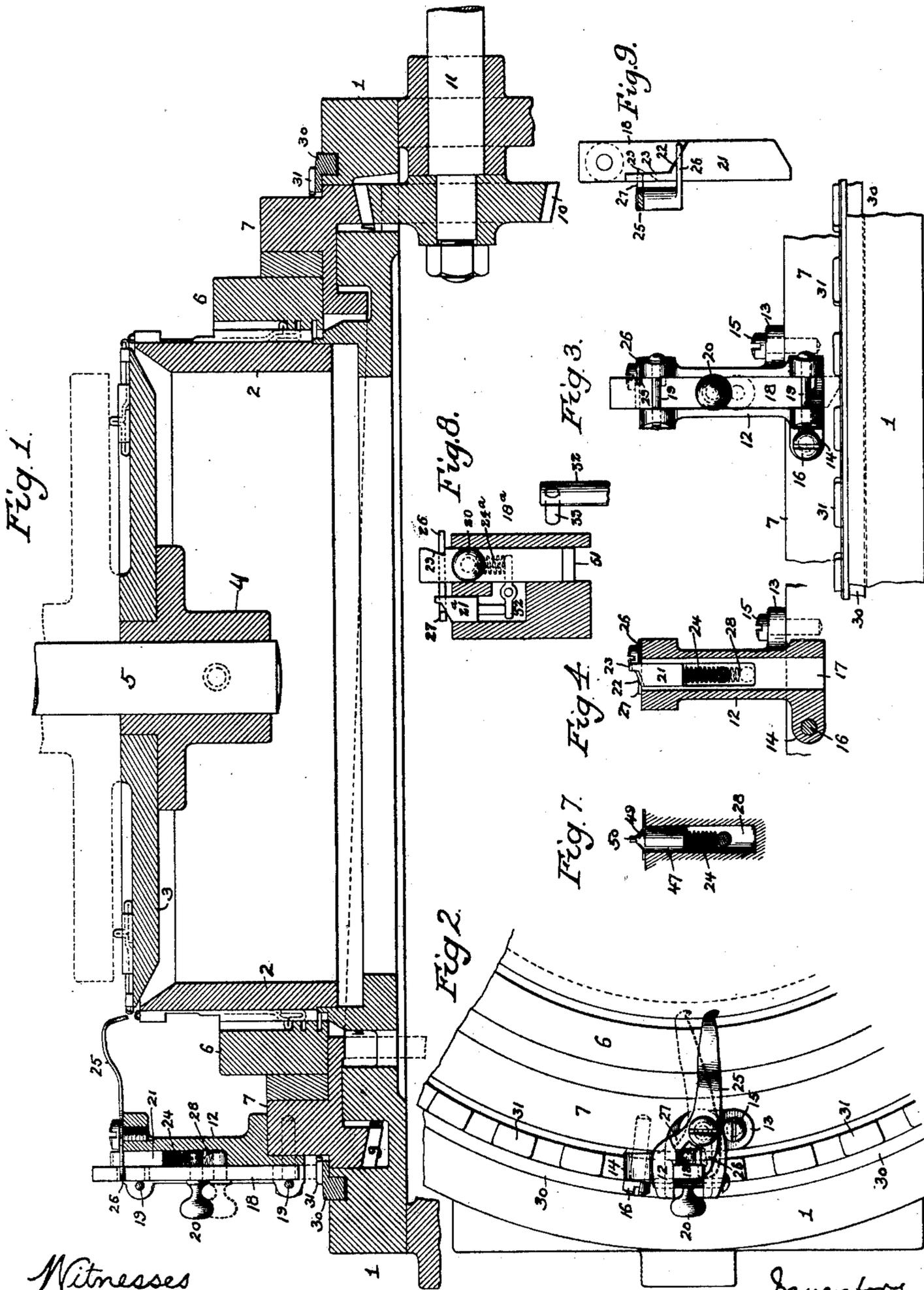
R. W. SCOTT & H. SWINGLEHURST.

RIB KNITTING MACHINE.

(Application filed Feb. 23, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses  
 Chas. D. Boy  
 Herman C. McKiss.

Inventors  
 R. W. Scott  
 H. Swinglehurst  
 by their attorneys  
 [Signature]

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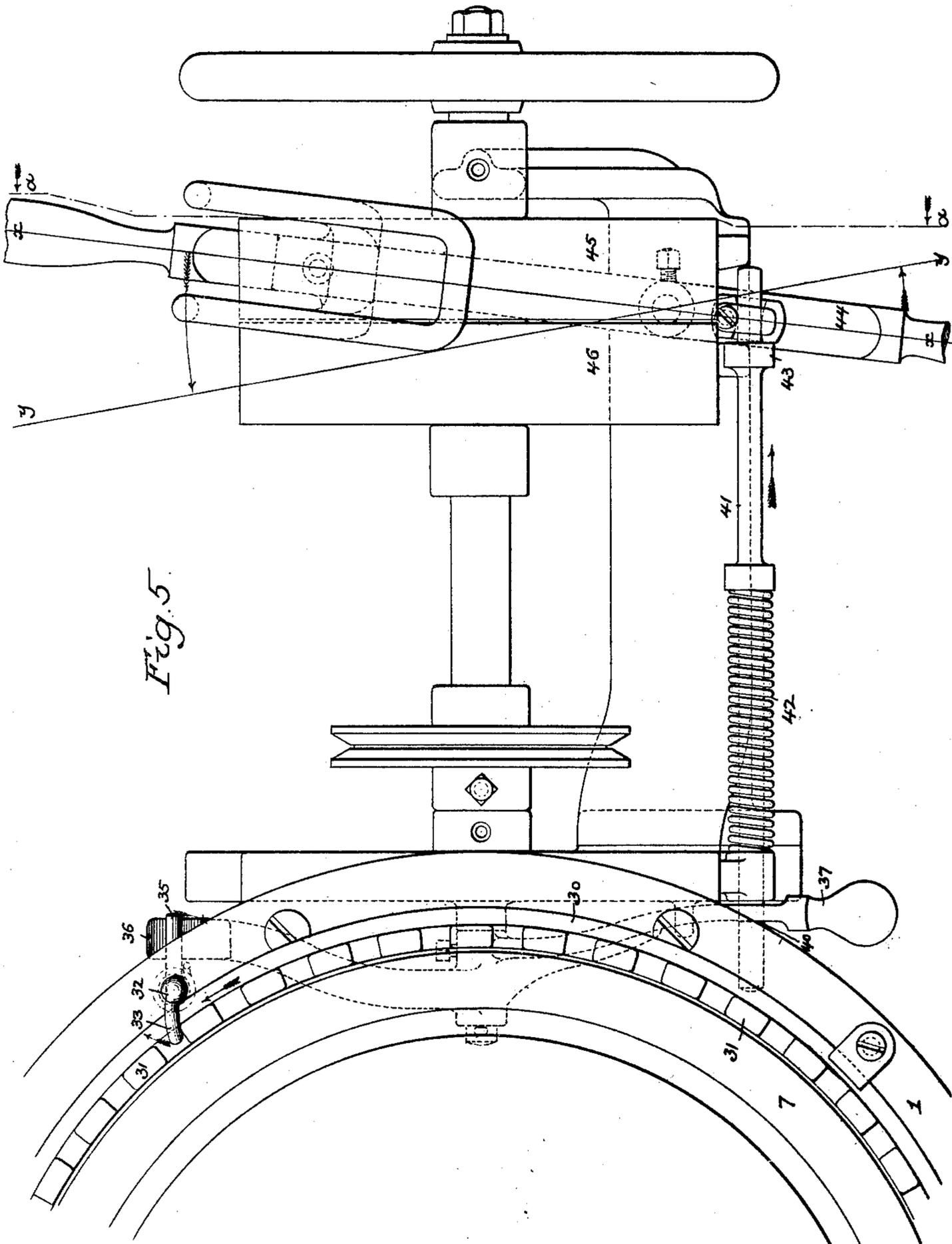


Fig. 5.

Witnesses  
Charles W. Coz.  
Norman E. McKies.

Robert W. Scott  
and  
Harry Swinglehurst  
by their Attorneys  
Howson & Howson

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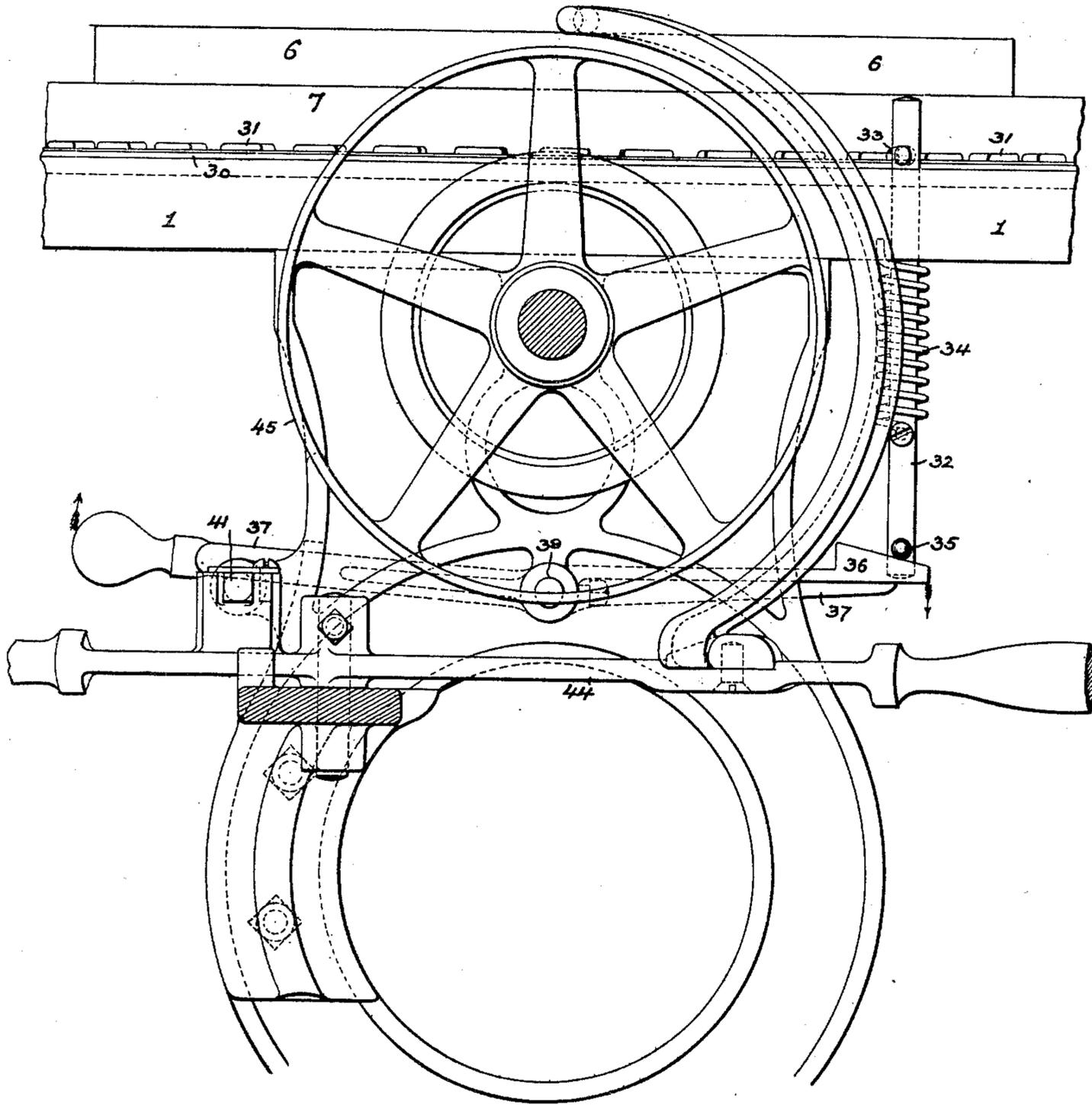
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3 Sheets—Sheet 3.

Fig. 6.



Witnesses -  
Chas. D. & Co.  
Herman E. McKiss.

Inventors  
Robert W. Scott  
and  
Harry Swinglehurst  
by their attorneys  
Hewitt & Brown

# UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT AND HARRY SWINGLEHURST, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO SAID SCOTT AND LOUIS N. D. WILLIAMS, OF ASHBOURNE, PENNSYLVANIA.

## RIB-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 679,641, dated July 30, 1901.

Application filed February 23, 1901. Serial No. 48,477. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT W. SCOTT and HARRY SWINGLEHURST, citizens of the United States, and residents of Philadelphia, Pennsylvania, have invented certain Improvements in Rib-Knitting Machines, of which the following is a specification.

The object of our invention is to provide simple and efficient means for stopping a knitting-machine when its normal operation is interfered with and damage to the machine or to the fabric which is being produced would otherwise result. This object we attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of sufficient of a rib-knitting machine to illustrate our present invention. Fig. 2 is a plan view of that part of the same to which the invention particularly relates. Fig. 3 is a front view of the same. Fig. 4 is a transverse section partly in elevation. Fig. 5 is a plan view of part of the machine, showing the belt-shipping mechanism; Fig. 6 is a view, partly in elevation and partly in section, on the line *a a*, Fig. 5, of said belt-shipping mechanism; and Figs. 7, 8, and 9 are views similar to Fig. 4, but illustrating modifications of the invention.

In Fig. 1 of the drawings, 1 represents part of the fixed bed or table of the machine, 2 the fixed needle-cylinder mounted thereon, and 3 the fixed needle-dial mounted upon the hub 4 at the lower end of the depending spindle 5 of the machine, as usual.

The ring which carries the cams for operating the needles of the cylinder 2 is represented at 6, this cam-ring being secured to and rotating with a ring 7, which has an annular rack 9, meshing with a pinion 10 upon the driving-shaft 11, as usual. Mounted upon and rotating with the cam-ring 7 is a vertical bracket 12, which has two lugs 13 and 14, the lug 13 overlapping the top of said ring 7 and being secured thereto by a vertical screw 15, while the lug 14 lies against the outer face of the ring and is secured thereto by a lateral screw 16, these two screws, at a right angle to each other, serving to secure the bracket to

the cam-ring in a manner which will best enable it to resist any strain to which it may be subjected. In the outer face of the bracket is formed a recess 17 for the reception of a vertically-sliding bolt 18, which is retained in position within the recess by means of transverse pins 19 and is provided with a projecting knob or handle 20, whereby it may be readily lifted. In the bracket 12 is also formed another recess 28, in which is vertically guided a block 21, having a beveled upper surface 22, terminating at one end in a vertical lug or shoulder 23, and between the lower end of this block 21 and the projecting inner portion of the stem of the knob 20 is interposed a coiled spring 24. Pivoted to the top of the bracket 12 is a trigger in the form of a lever 25, the inner arm of which is bent first upward and then downward and terminates close to the hooks of the cylinder and dial-needles when the latter are in their normal position or position of rest. The outer arm of the lever 25 has two limbs 26 and 27, and when the bolt 18 has been raised the limb 26 engages with a notch 29 in the side of the bolt, as shown in Fig. 3, so as to retain said bolt in the elevated position, the lever being held in this position by the action of the beveled upper end 22 of the block 21 upon its other limb 27, as shown in Fig. 4, the block 21 being held in the elevated position by the action of the spring 24, which when the bolt 18 is raised is under compression. If, however, there is knot or lump in the knitting-yarn, a bent or displaced needle, or other defect either in the yarn or needles which will interfere with the operation of the machine and which forms an obstruction in the path of the inner end of the trigger-lever 25, said lever will be struck thereby and moved to the position shown by dotted lines in Fig. 2, thereby withdrawing the limb 26 of the lever from engagement with the notch 29 in the bolt 18, and the latter under the influence of the spring 24 will be forced downward, and at the same time the spring, by reason of its expansion, will be rendered inert, so as to exercise no further lifting effect upon the block 21. Hence the latter will exert no influence upon the lever 25 other

than an arresting influence, due to the contact of the limb 27 of the lever with the stop-lug 23. Hence the lever will retain the inoperative position shown by dotted lines in Fig. 2.

In an annular groove in the bed 1 is free to turn a ring 30, having a series of upwardly-projecting teeth 31, and in said bed 1 is mounted a vertical rock-shaft 32, having at the upper end an arm or finger 33, which normally occupies a position between two of these teeth 31, as shown in Fig. 5, being retained in this position by the action of a torsional spring 34 upon the rock-shaft 32, as shown in Fig. 6. At the lower end of the rock-shaft is another projecting arm or finger 35, which bears upon the beveled end 36 of a lever 37, pivoted to the fixed frame of the machine at 39, the other arm of this lever being normally in engagement with a shoulder 40 upon a guided rod 41, which is acted upon by a coiled spring 42, tending to move it in the direction of the arrow, Fig. 5, and is provided with a collar 43, bearing upon a lug or projection upon the belt-shipper 44. The latter therefore normally occupies a position parallel with the line  $x$ , Fig. 5, and the driving-belt is applied to the fixed pulley 45, so as to operate the machine. As soon, however, as the bolt 18 is permitted to drop its lower end engages with one of the teeth 31 of the ring 30, which immediately partakes of the rotating movement of the cam-ring 7 and transmits such movement at once to the arm or finger 33 of the rock-shaft 32. Hence the other arm 35 of said rock-shaft acts upon the beveled end of the trip-lever 37 and withdraws said trip-lever from engagement with the shoulder 40 of the rod 41, which under the action of the spring 42 immediately moves the belt-shipper to the position indicated by the line  $y$  in Fig. 5 and transfers the belt from the fixed pulley 45 to the loose pulley 46, so as to stop the operation of the machine. After the defect which caused the stopping of the machine has been remedied the parts are reset by simply lifting the bolt 18, this movement having the effect of compressing the spring 24, and thereby imparting upward thrust to the block 21, so as to cause the beveled upper end of said block to act upon the limb 27 of the lever 25, and thereby force its limb 26 into the locking-notch of the bolt. As when the bolt 18 is depressed and the machine is stopped the trigger-lever 25 is entirely relieved from any influence tending to hold it in the operative position, as shown by full lines in Fig. 2, it is not necessary to hold the lever out of this position, as it would be if said lever was constantly under the action of a spring. Hence any manipulation of the needles that may be necessary is not interfered with by the presence of the lever 25. The use of the toothed ring 30 as a means of transmitting the movement of the rotating cam-ring 7 to the rock-shaft 32 insures the instant stoppage of the machine as soon as

the trigger-lever 25 trips the bolt 18, for as soon as the latter falls into engagement with a tooth of the ring 30 it immediately begins to move the latter and simultaneously another tooth of the ring acts upon the arm 33 of the rock-shaft, so that no time is lost between the movement of the lever 25 and the shipping of the driving-belt. A single spring, moreover, serves to actuate both the bolt 18 and the protector-lever, the tension of this spring being greatest when the parts are required to be held in engagement with each other and decreasing, if desired, to a nullity when the parts are free from engagement. The spring is, moreover, protected from the access of dust or dirt, an accumulation of which might interfere with the performance of its proper function.

Although we prefer in all cases to use a rectangular block 21 with projecting stop-lug at one side, as shown in Fig. 4, we may in some cases use a cylindrical block—such as shown, for instance, at 47 in Fig. 7—such block having an annular top 49, with central projecting stop-lug 50.

When our stop-motion device is supplementary to the action of stop mechanism of that class which becomes operative on the breaking of the yarn, any desired element of such stop mechanism may drop into the path of the lever 25, so that the latter will be struck thereby and moved rearwardly. For instance, such operation may be effected by a finger which is the equivalent of the finger  $h$  shown in the patent of F. Crawford, No. 445,465, dated January 27, 1891.

The bolt carried by the bracket 12 may, if desired, be constructed so as to be moved into operative position by a rising instead of by a falling movement. For instance, in Fig. 8 we have illustrated a construction in which the bolt is thus designed to operate. The bolt (represented in this case at 18<sup>a</sup>) has at the lower end a projecting toe 51, which when the bolt is raised is adapted to strike and operate the arm 33 of the rock-shaft 32, the bolt being normally held in the depressed position by engagement of the limb 26 of the lever 25 with the notch in said bolt, as shown in Fig. 8. When the bolt is thus depressed, the stem of the knob 20 compresses a spring 24<sup>a</sup>, which acts upon the bolt 21<sup>a</sup>, through the medium of a lever 52, so as to cause the beveled upper end of said bolt 21<sup>a</sup> to act upon the limb 27 of the lever 25 in the same manner as the block 21 in the construction shown in Figs. 1, 2, and 4.

In the still simpler embodiment of our invention (shown in Fig. 9) the bolt 18 and block 21 are made in one piece and the spring is dispensed with, the beveled end of the block 21 when the bolt 18 is raised by hand resting upon the limb 27 of the lever, so as to thrust the limb 26 of the same into the notch 29 of the bolt, said bolt falling by gravity when the lever is operated, so as to withdraw the said limb 26 from the notch.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. In a stopping mechanism for knitting-machines, the combination of a trigger serving as a protector, a bolt held in inoperative position by engagement with said trigger, and means, interposed between the bolt and trigger, whereby the latter is forced into engagement with the bolt when said bolt is moved into inoperative position, substantially as specified.

2. In a stopping mechanism for knitting-machines, the combination of a trigger serving as a protector, a bolt held in inoperative position by engagement with said trigger, and means, interposed between the bolt and trigger, whereby the latter is forced into engagement with the bolt when said bolt is moved into inoperative position, and is relieved from pressure when the bolt moves into operative position, substantially as specified.

3. The combination in a stopping mechanism for knitting-machines, of a trigger serving as a protector, a bolt held in inoperative position by engagement with said trigger, and resilient means interposed between the bolt and trigger and serving to move the bolt to operative position and to move the trigger into position to engage with the bolt and hold it in inoperative position, substantially as specified.

4. The combination in a stopping mechanism for knitting-machines, of a trigger serving as a protector, a bolt held in inoperative position by engagement with said trigger, and resilient means interposed between the bolt and trigger and serving to move the bolt to operative position and to move the trigger into position to engage with the bolt and hold it in inoperative position, said resilient means being inert when the bolt has been moved into operative position, substantially as specified.

5. The combination in stopping mechanism for knitting-machines, of a trigger acting as a protector, a bolt held in inoperative position by engagement with said trigger, a cam-block acting upon the trigger so as to hold it in engagement with the bolt, and a connection between said cam-block and bolt, substantially as specified.

6. The combination in stopping mechanism for knitting-machines, of a trigger acting as a protector, a bolt held in inoperative position by engagement with said trigger, a cam-block acting upon the trigger so as to hold it in engagement with the bolt, and a spring interposed between said cam-block and bolt, substantially as specified.

7. The combination in stopping mechanism for knitting-machines, of a trigger acting as a protector, a bolt held in inoperative position by engagement with said trigger, a cam-block acting upon the trigger so as to hold it in engagement with the bolt, and a spring interposed between said cam-block and bolt, said spring being inert when the bolt has been re-

leased from engagement with the trigger and moved to operative position, substantially as specified.

8. The combination in stopping mechanism for knitting-machines, of a trigger serving as a protector, a bolt held in inoperative position, by said trigger, a cam-block acting on the trigger to maintain it in engagement with the bolt, said cam-block having a stop-lug for restricting the backward movement of the trigger, and a connection between said cam-block and the bolt, substantially as specified.

9. The combination in stopping mechanism for knitting-machines, of a trigger serving as a protector, a bolt held in inoperative position, by said trigger, a cam-block acting on the trigger to maintain it in engagement with the bolt, said cam-block having a stop-lug for restricting the backward movement of the trigger, and a spring interposed between the bolt and said cam-block, substantially as specified.

10. The combination in stopping mechanism for knitting-machines, of a protector-lever having a forked arm, a bolt held in inoperative position by engagement with one of the limbs of said fork, a cam-block adapted to act upon the other limb of the fork so as to hold the first limb in engagement with the bolt, and a connection between said cam-block and the bolt, substantially as specified.

11. The combination in stopping mechanism for knitting-machines, of a protector-lever having a forked arm, a bolt held in inoperative position by engagement with one of the limbs of said fork, a cam-block adapted to act upon the other limb of the fork so as to hold the first limb in engagement with the bolt, and a spring interposed between the bolt and the said cam-block, substantially as specified.

12. The combination in stopping mechanism for knitting-machines, of a trigger serving as a protector, a bolt held in inoperative position by said trigger, a moving carrier for said bolt, a ring having upwardly-projecting teeth, means for moving the bolt into engagement with said toothed ring when released from the control of the trigger, and belt-shipper mechanism having as elements a shaft with finger also normally in engagement with the toothed ring, whereby movement of the bolt-carrier is immediately transmitted to said element of the belt-shipper, substantially as specified.

13. The combination in stopping mechanism for knitting-machines, of the cam-ring and stop mechanism carried thereby and mounted upon a bracket secured to the cam-ring by a vertical screw and a lateral screw, substantially as specified.

14. The combination in stopping mechanism for knitting-machines, of a rotating element of the machine, and a stop-motion device carried thereby and comprising a bracket having two slots one guiding a bolt and the

other a cam-block, resilient means interposed between said bolt and cam-block, and a trigger serving as a protector, said trigger engaging with the bolt to hold it in inoperative position, and being also engaged by the cam-block so as to maintain it in engagement with the bolt, substantially as specified.

In testimony whereof we have signed our

names to this specification in the presence of two subscribing witnesses.

ROBERT W. SCOTT.  
HARRY SWINGLEHURST.

Witnesses:

MURRAY C. BOYER,  
FLORENCE HILLMAN.