

No. 854,885.

PATENTED MAY 28, 1907.

A. V. GROUPE.
KNITTING MACHINE.
APPLICATION FILED FEB. 14, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

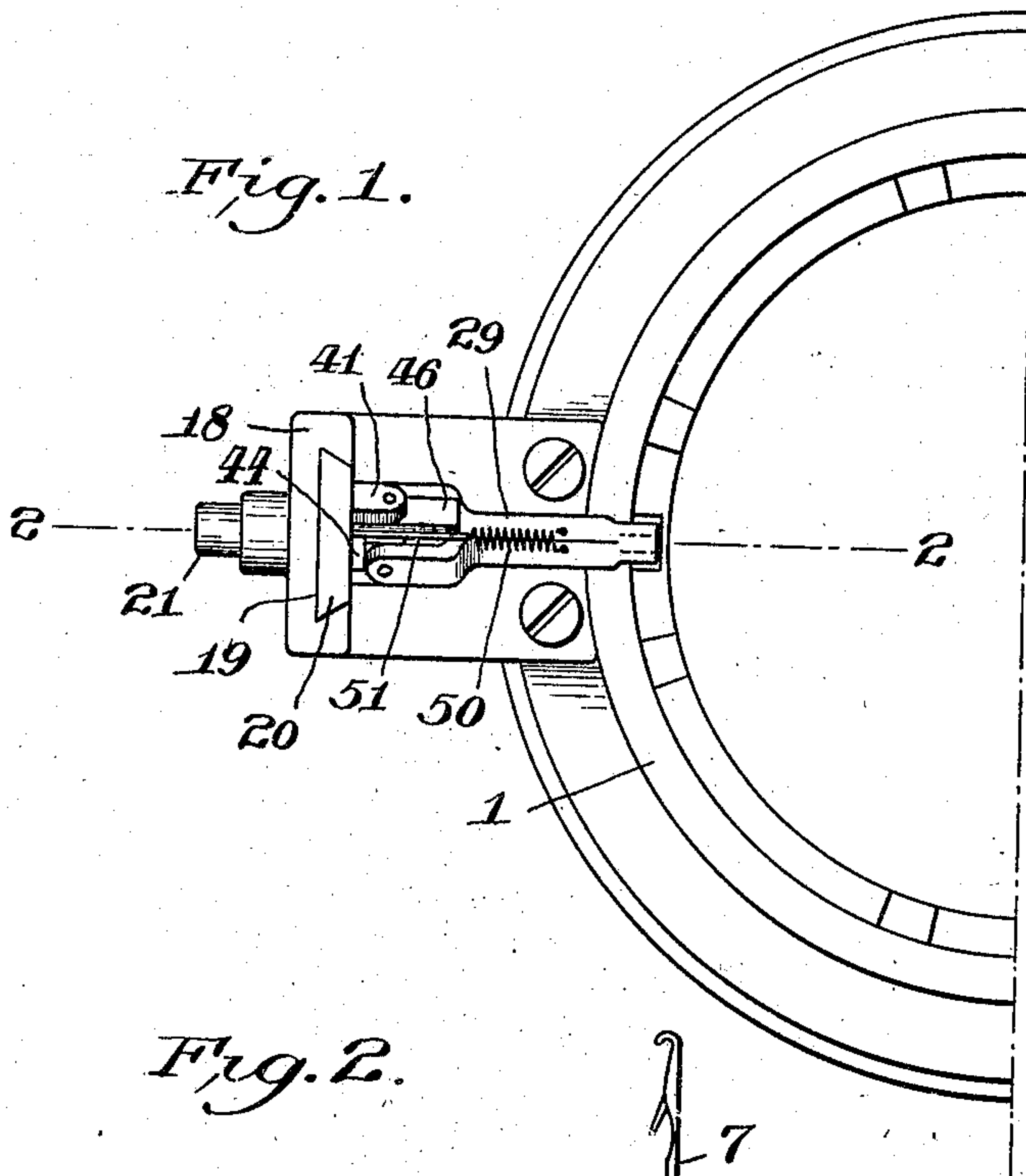
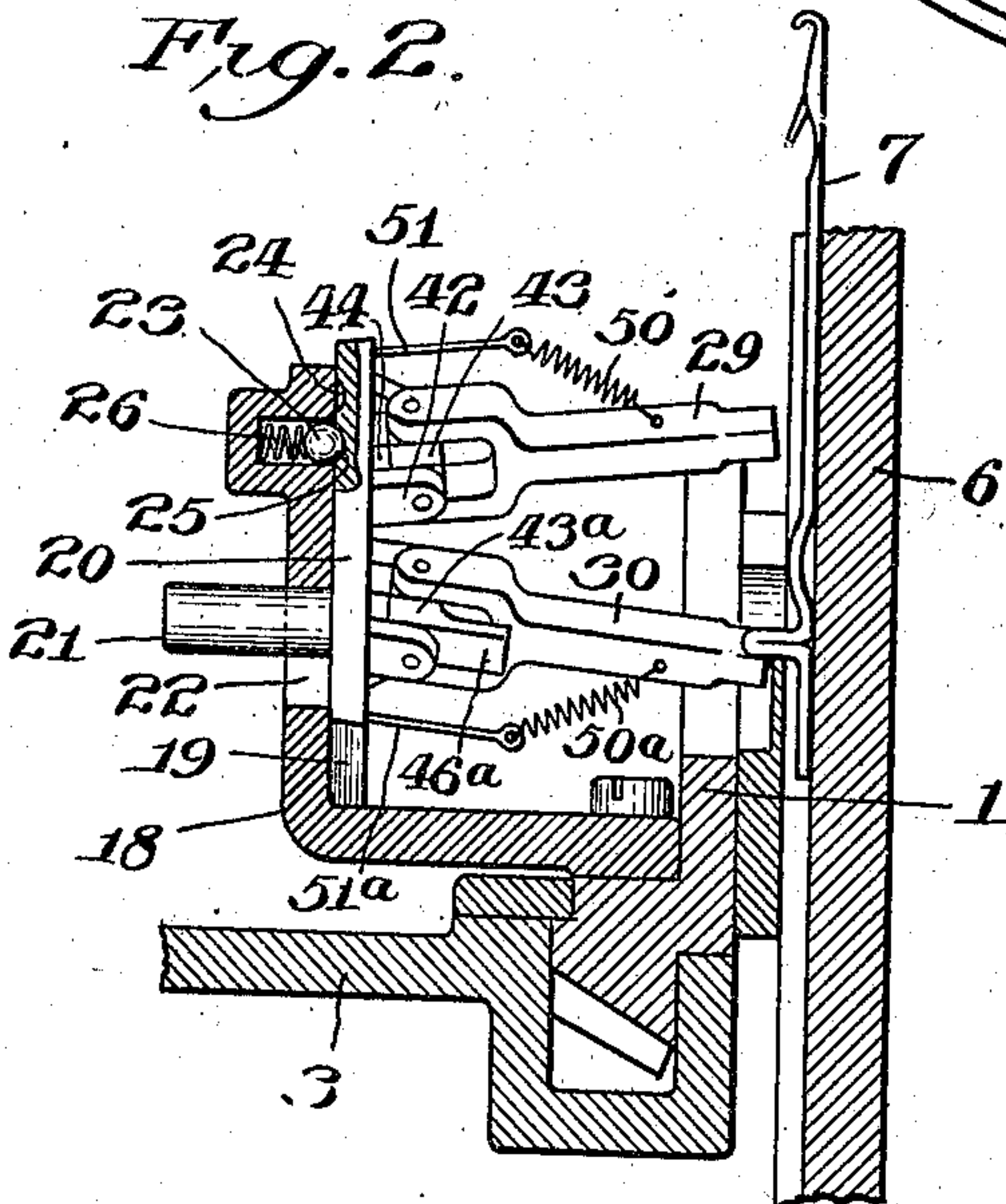


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 6.

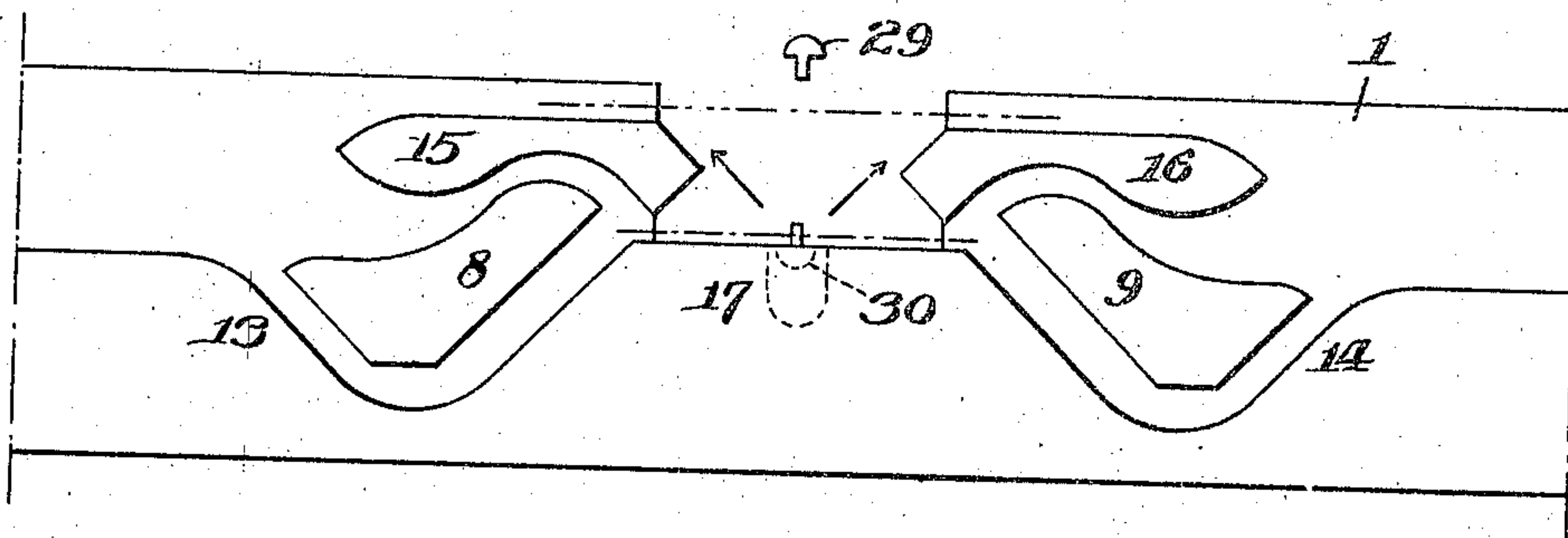


Fig. 7.

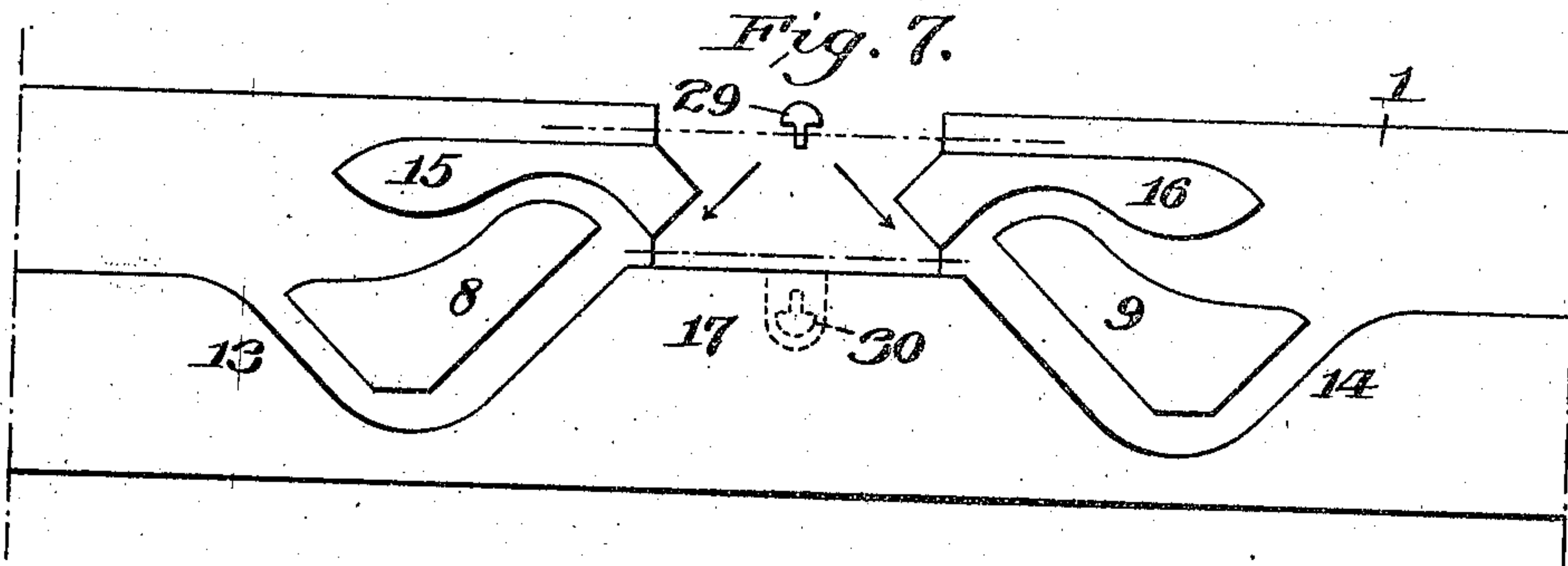
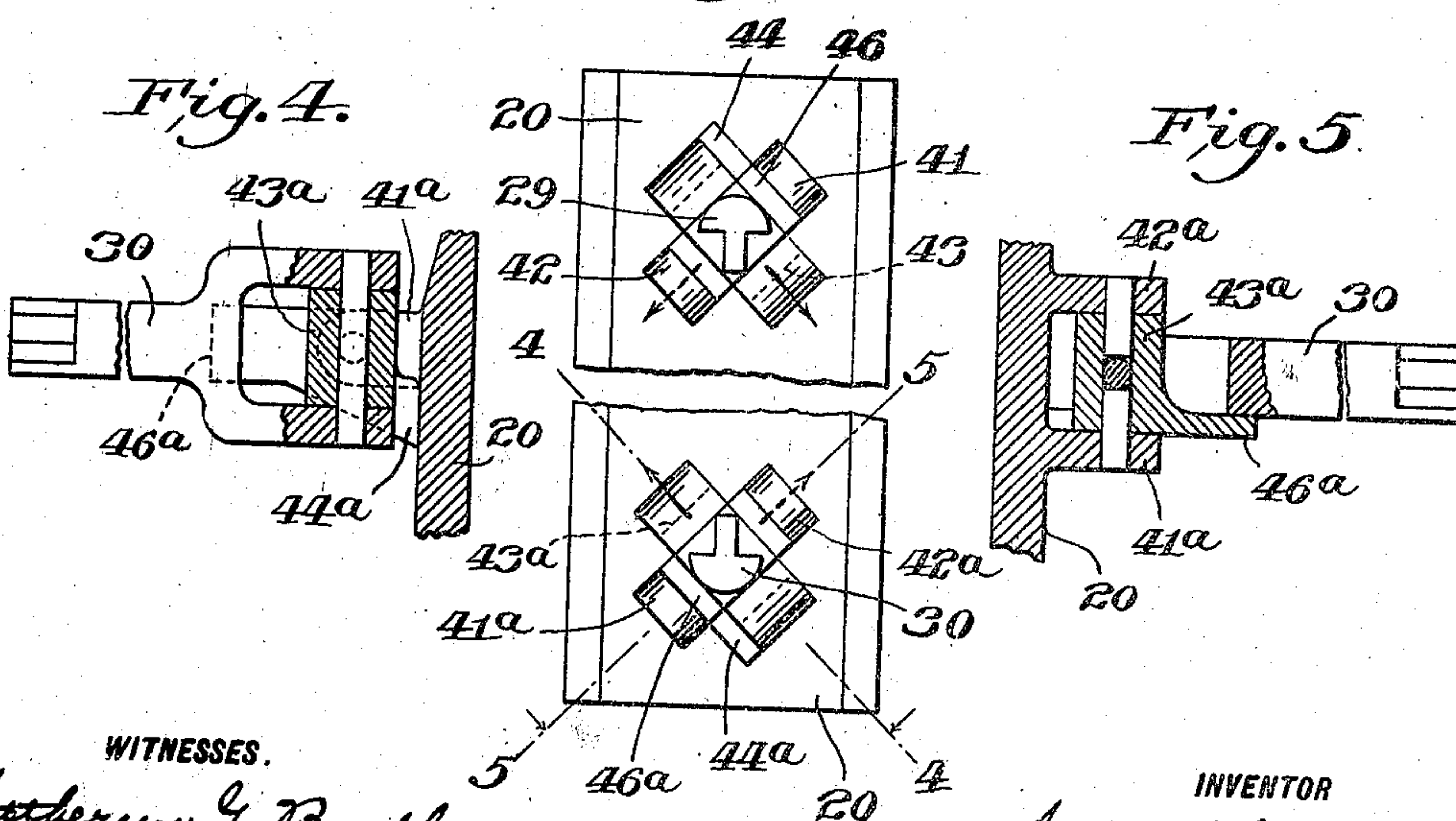


Fig. 3.



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KNITTING-MACHINE.

No. 854,885.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed February 14, 1906. Serial No. 300,977

To all whom it may concern:

Be it known that I, ANDREW V. GROUPE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification.

My invention relates to knitting machines, and especially to that class of such machines which is commonly known as the circular type, employed in the manufacture of stockings. Included in machines of this class is a cam cylinder provided with suitable knitting cams which are adapted to act upon the needles to effect the knitting operation.

The object of my invention is to provide a simple and efficient needle picking device whereby the required needles may be moved into and out of operative relation to the knitting cams during the knitting of the heel and toe parts of stockings or other fashioning operation.

The invention consists in the novel construction and combinations of parts which will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a plan view of the cam cylinder of a circular knitting machine provided with needle picking devices embodying my invention. Fig. 2 is a sectional view, as on the line 2—2 of Fig. 1, including the needle cylinder, one of its needles and the bed plate of the machine. Fig. 3 is an elevation of the needle picking devices and the adjustable support therefor, said support being partly broken away. Fig. 4 is a sectional view as on the line 4—4 of Fig. 3. Fig. 5 is a sectional view as on the line 5—5 of Fig. 3. Fig. 6 is a development of a portion of the interior of the cam cylinder, showing the knitting cams and the position of the notched inner ends of the needle picking arms during the operation of narrowing the fabric. Fig. 7 is a view similar to Fig. 6, showing the position of the notched inner ends of the needle picking arms during the operation of widening the fabric.

1 designates a portion of the cam cylinder, 3 a portion of the bed plate in which the cam cylinder is rotatably mounted, 6 the needle cylinder and 7 one of the needles. The cam cylinder is provided with the oppositely arranged stitch cams 8 and 9, the raising cams

13 and 14, the upper cams 15 and 16 and the central cam 17, whereby, during the actuation of the cam cylinder, the needles are acted upon to effect the knitting operation in the usual well known manner.

The construction and operation of the parts thus far are well known and no detailed description or illustration thereof is deemed necessary herein.

Secured to the cam cylinder 1 is a bracket 18 provided with a vertical guideway 19 to which is fitted a slide or support 20. This slide 20 is adapted to be moved vertically to two positions within the guideway 19, a pin 21 projecting fixedly from the slide and out through an opening 22 in the bracket 18 being adapted to take against the wall of said opening to limit the movement of the slide in either direction. The slide 20 is maintained in either the up or down position by a ball 23 arranged within an opening in the bracket 18 and forced toward the slide and into depressions 24 and 25 therein by the action of a spring 26. When the slide is in the up position, shown in Fig. 2, the ball is seated in the depression 25; when the slide is in the down position, the ball 23 is seated in the depression 24; and when the slide is moved to either the up or down position the ball is moved back against the spring 26 by the wall between the depressions 24 and 25.

The slide 20 carries two needle picking arms 29 and 30, having their free inner ends projecting into the cam cylinder 1. The free end of the upper arm 29 is provided with oppositely disposed needle-engaging notches adapted to engage certain needles to lower them relative to the knitting cams; and the free end of the lower arm 30 is provided with oppositely disposed needle-engaging notches adapted to engage certain needles to raise them relative to the knitting cams.

Projecting from the slide 20 adjacent to the outer end of the upper needle picking arm 29 are lugs 41 and 42 between which is arranged a block 43 which is pivoted to said lugs on an angle of about forty-five degrees to the vertical. The block 43 is adapted to move on said pivotal connection in the direction indicated by the full-line arrow in Fig. 3, a stop 44 on the block 43 being adapted to take against the support 20 to limit the movement of the block in the reverse direction.

Embracing the block 43 is the outer end of the needle picking arm 29, said arm being pivotally connected to the block 43 on a line intersecting and extending at right angles to the pivotal connection of the block 43 with the support 20. The arm 29 is adapted to move on its pivotal connection with the block 43 in the direction indicated by the dotted line arrow in Fig. 3, a stop 46 on the block 43 being adapted to engage the arm 29 to limit its movement in the reverse direction. Thus it will be seen that the horizontal pressure of a needle butt against the free notched end of the arm 29 in one direction will cause the arm to move on its pivotal connection with the block 43 in the direction indicated by the dotted-line arrow in Fig. 3, the stop 44 preventing the movement of the block 43 about its pivotal connection with the support 20; and that horizontal pressure of a needle butt against the notched end of the arm 29 in the opposite direction will cause the arm 29 and block 43 to move as a unit on the pivotal connection of the block 43 with the support 40 in the direction indicated by the full-line arrow in Fig. 3, the stop 46 preventing the movement of the arm 29 about its pivotal connection with the block 43.

The arm 29 is maintained normally elevated with the stop 44 in engagement with the slide 20 and the arm 29 in engagement with the stop 46 by the action of a spring 50 extending between the arm 29 and a projecting pin 51 on the slide 20, whereby the arm 29 is returned to the position shown in the drawings after being moved in either direction in lowering the needles.

Projecting from the slide 20 adjacent to the outer end of the lower needle picking arm 30 are lugs 41^a and 42^a between which is arranged a block 43^a which is pivoted to said lugs on an angle of about forty-five degrees to the vertical. The block 43 is adapted to move on a said pivotal connection in the direction indicated by the full-line arrow in Fig. 3, a stop 44^a on the block 43^a being adapted to take against the support 20 to limit the movement of the block in the reverse direction.

Embracing the block 43 is the outer end of the needle picking arm 30, said arm being pivotally connected to the block 43^a on a line intersecting and extending at right angles to the pivotal connection of the block 43^a with the support 20. The arm 30 is adapted to move on its pivotal connection with the block 43^a in the direction indicated by the dotted line arrow in Fig. 3, a stop 46^a on the block 43^a being adapted to engage the arm 30 to limit its movement in the reverse direction. Thus it will be seen that the horizontal pressure of a needle butt against the free notched end of the arm 30 in one direction will cause the arm to move on its pivotal connection with the block 43^a in

the direction indicated by the dotted-line arrow in Fig. 3, the stop 44^a preventing the movement of the block 43^a about its pivotal connection with the support 20; and that horizontal pressure of a needle butt against the notched end of the arm 30 in the opposite direction will cause the arm 30 and the block 43^a to move as a unit on the pivotal connection of the block 43^a with the support 20 in the direction indicated by the full-line arrow in Fig. 3, the stop 46^a preventing the movement of the arm 30 about its pivotal connection with the block 43^a.

The arm 30 is maintained normally in the position shown with the stop 44^a in engagement with the slide 20 and the arm 30 in engagement with the stop 46^a by the action of a spring 50^a extending between the arm 29 and a projecting pin 51^a on the slide 20, whereby the arm 30 is returned to the position shown in the drawings after being moved in either direction in raising the needles.

From the foregoing description it will be seen that each arm 29 and 30 has two separated pivotal connections with its support, and that the axes of said connections are arranged on inclines with relation to the axis of the cam cylinder. Further, it will be seen that the free end of the upper arm 29 is movable in downwardly-diverging paths on its pivotal connections and that during the turning of the arm about the axis of one of its connections it is prevented from turning about the axis of the other of its connections and that the free end of the lower arm 30 is movable in upwardly-diverging paths on its pivotal connections, and that during the turning of the arm about the axis of one of its connections it is prevented from turning about the axis of the other of its connections.

The inner notched ends of the picker arm 29 and 30 swing outwardly from within the cam cylinder during the movement of said arms on their pivotal connections, and the operation of the notched end of each arm engaging the needles and shifting them into or out of operative relation to the knitting cams is well known in this art.

In Figs. 6 and 7 I have illustrated by a dot-and-dash line the position of the butts of the active needles and by a two-dot-and-dash line the position of the butts of the inactive needles in passing the notched ends of the arms 29 and 30.

During ordinary circular knitting, such for example as the production of the leg portion of a stocking, the slide 20 is down, in which position the notched end of the arm 30 is below the path of the butts of the needles and they are unaffected thereby. After the completion of the leg portion, one half of the circular series of needles is moved to the inactive position as is usual and the slide 20 is raised to the position shown in Fig. 2. In this position of the slide, the notched end of

the arm 29 is above the path of the butts of the inactive needles and the notched end of the arm 30 is in the path of the butts of the active needles. The cam cylinder is now reciprocated, and during its movement in either direction, the notched end of the arm 30 engages the butt of the first needle in its path and moves said needle to the inactive position, said arm moving in either direction indicated by the arrows in Fig. 7, according to the direction of movement of the cam cylinder. This operation is continued until the required narrowing of the fabric has been effected. The slide 20 is then moved to the down position to bring the notched end of the arm 30 below the path of the active needles and to bring the notched end of the arm 29 into the path of the inactive needles. The cam cylinder is now again reciprocated, and during its movement in either direction, the notched end of the arm 29 engages the butt of the first needle in its path and moves said needle back to the active position, said arm moving in the direction of either arrow in Fig. 8, according to the direction of movement of the cam cylinder. This operation is continued until all the inactive needles are returned to the active position; whereupon the half of the circular series of needles previously moved out of action are returned to the active position and the cam cylinder is rotated to effect the knitting of the foot portion of the stocking, after which the toe portion is produced similarly to the heel portion, this operation of moving certain needles into and out of operative relation to the knitting cams in the manufacture of stockings being common and well known in this art.

I claim—

1. In a knitting machine, the combination

with the cam cylinder, of a support thereon, a member pivotally connected to said support, a picker arm pivotally connected to said member and provided with oppositely disposed needle engaging portions, means to prevent movement of said member when the picker arm is moved in one direction, and means to prevent relative motion between said member and arm when the picker arm is moved in another direction.

2. In a knitting machine, the combination with the cam cylinder, of a support thereon, a member pivoted to said support, a picker arm pivoted to said member and provided with oppositely disposed needle engaging portions; a stop to prevent movement of said member when the picker arm is moved upon its pivot, and a stop to prevent movement of the picker arm relatively to the member when the latter is moved upon its pivot.

3. In a knitting machine, the combination with the cam cylinder, of a support thereon, a member pivoted to said support, a picker arm pivoted to said member and provided with oppositely disposed needle engaging portions; a stop to prevent movement of said member when the picker is moved on its pivot, a stop to prevent movement of the picker arm relatively to the member when the latter is moved upon its pivot, and means for yieldingly maintaining said member and arm in engagement with their respective stops.

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW V. GROUPE.

Witnesses:

GEO. W. REED,
W. W. CANBY.