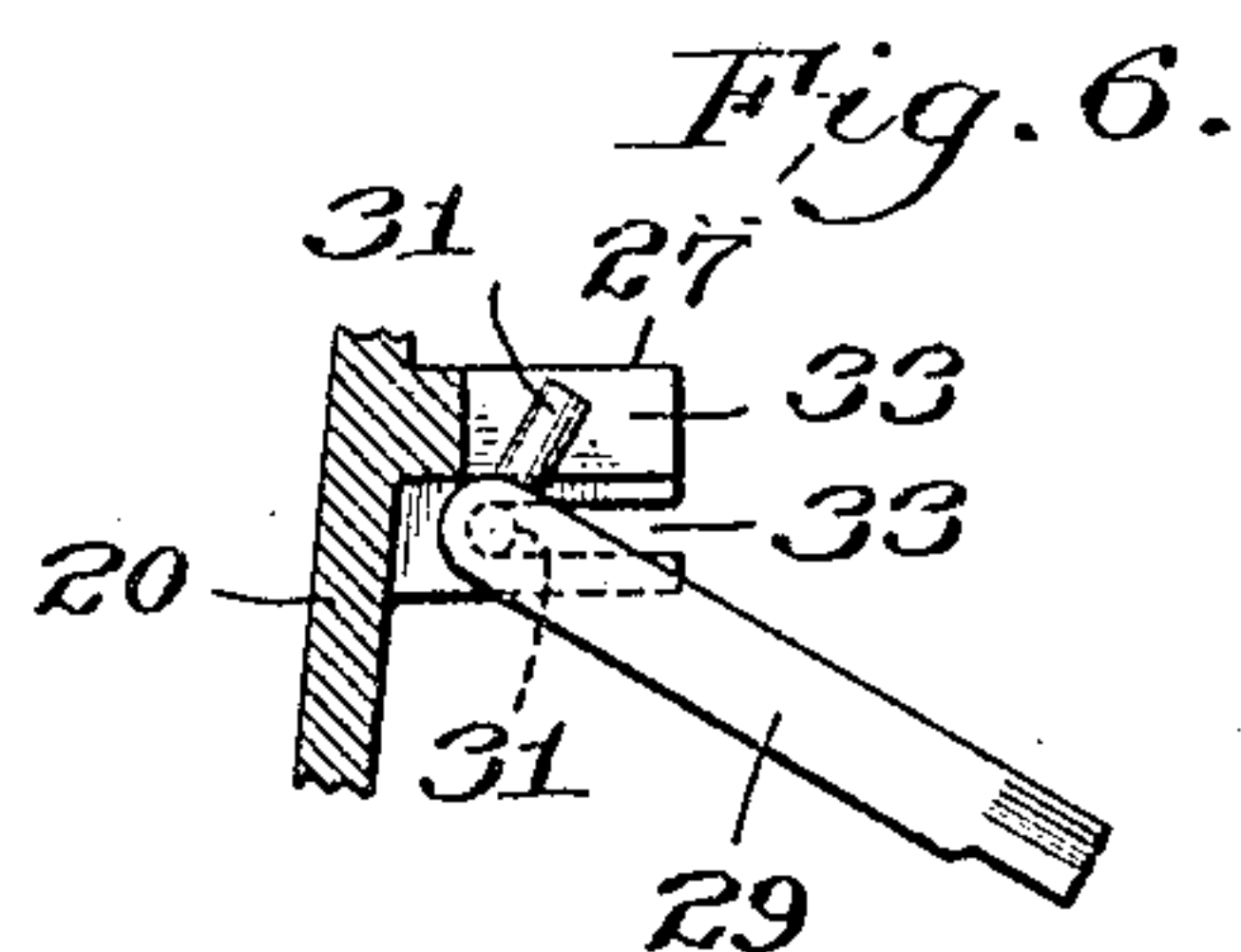
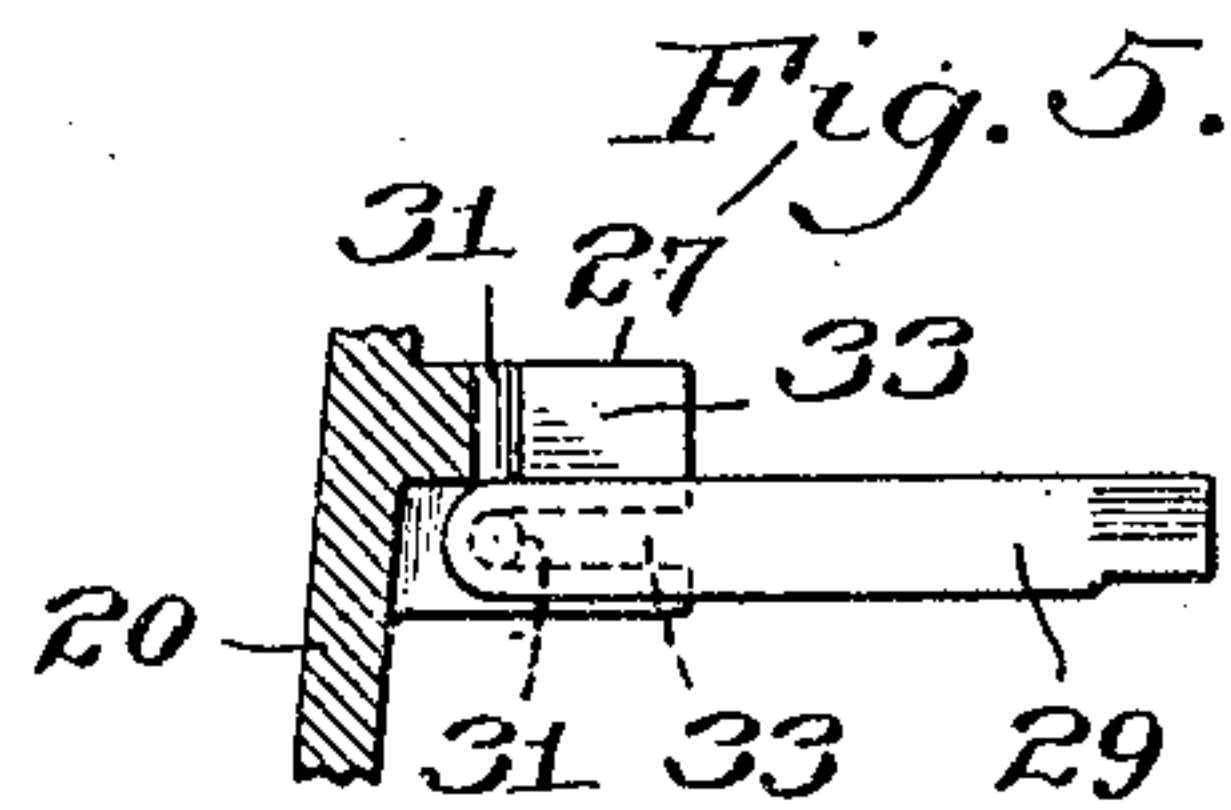
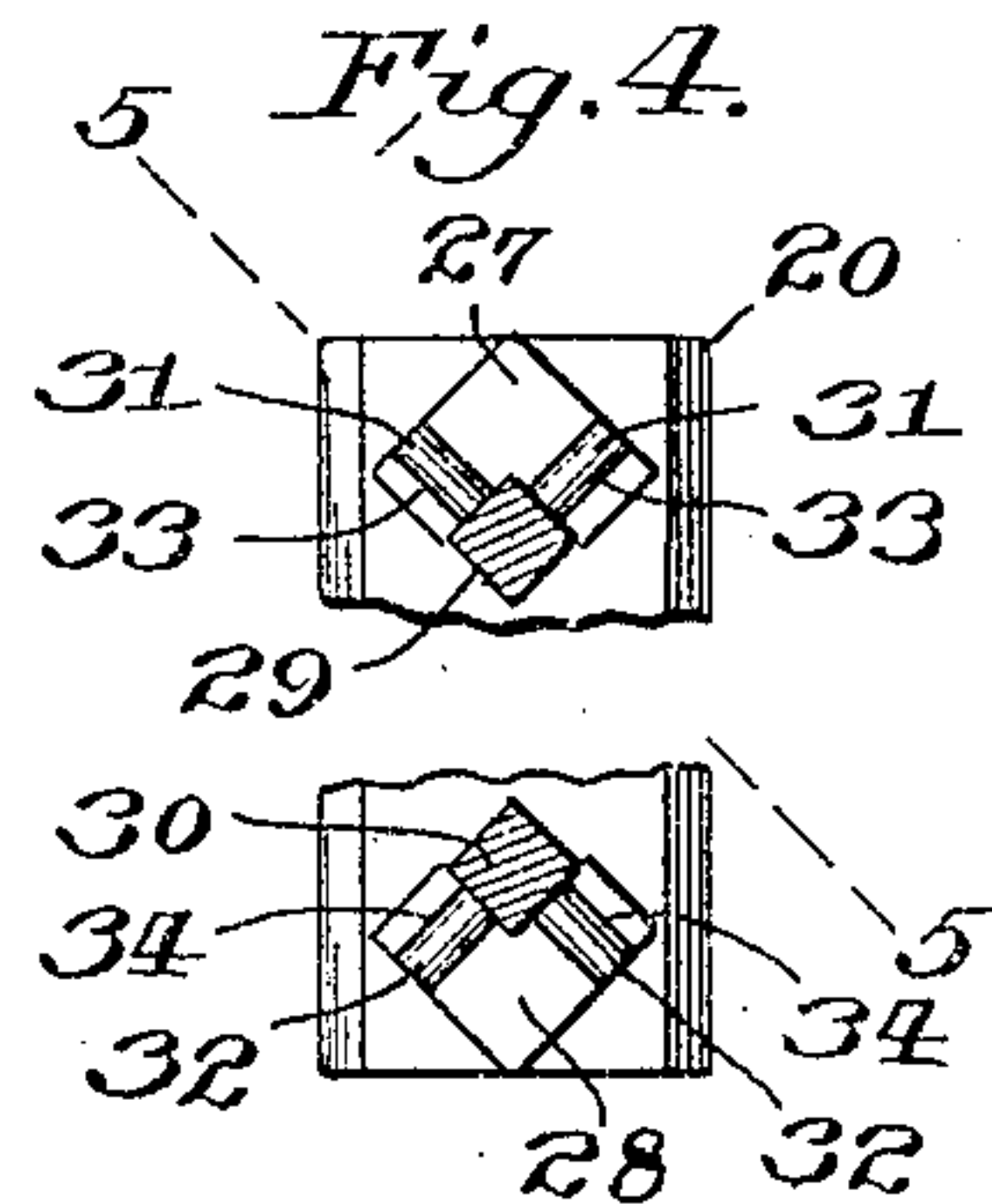
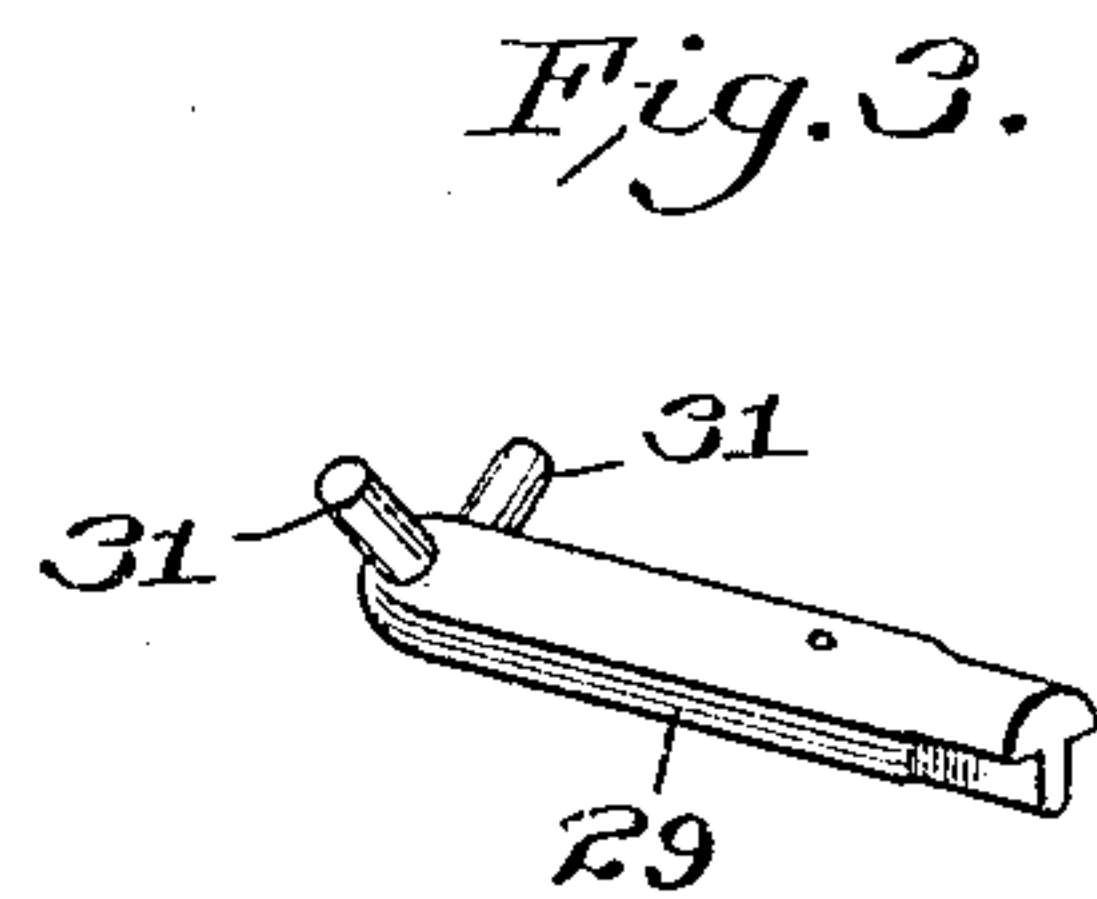
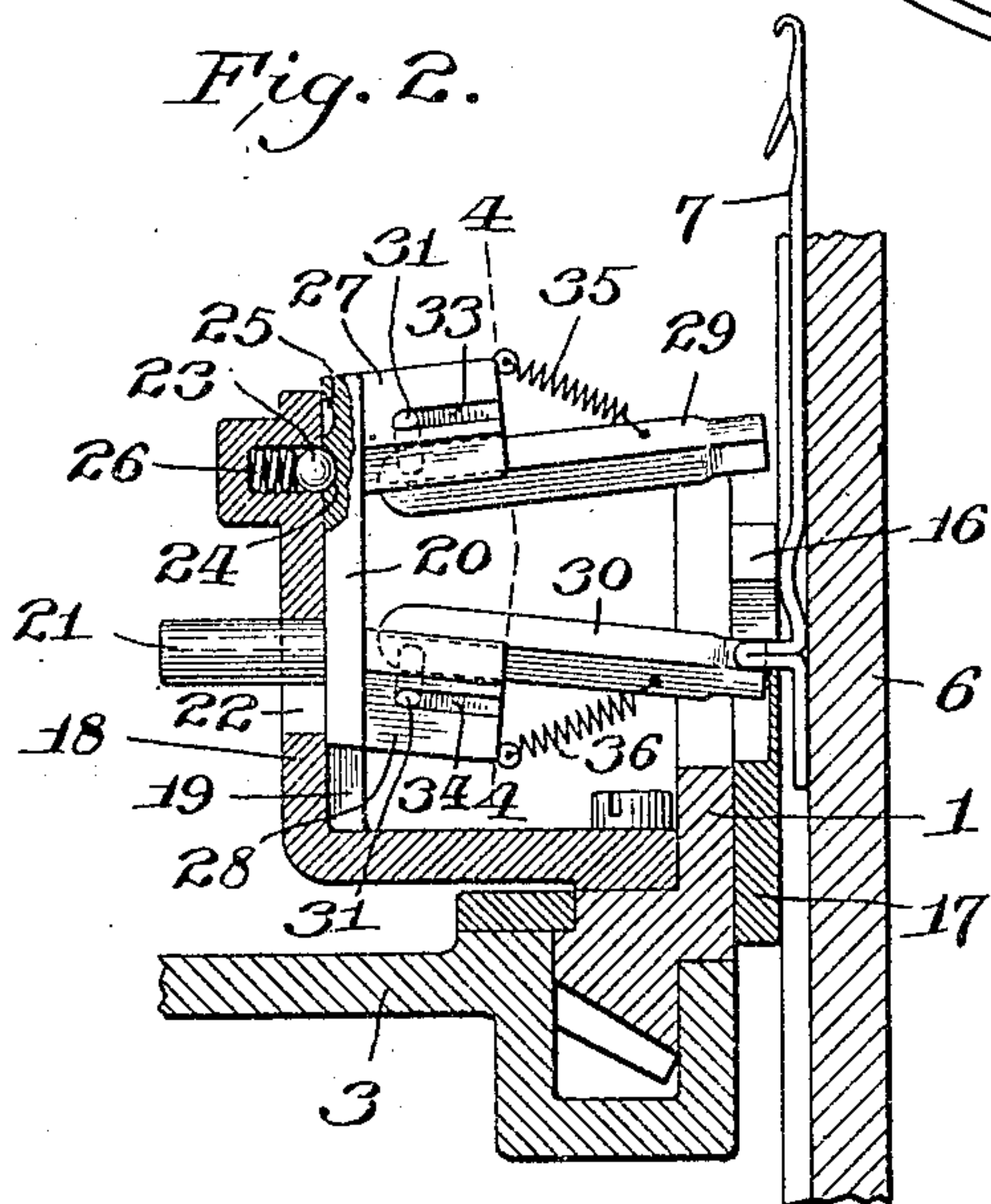
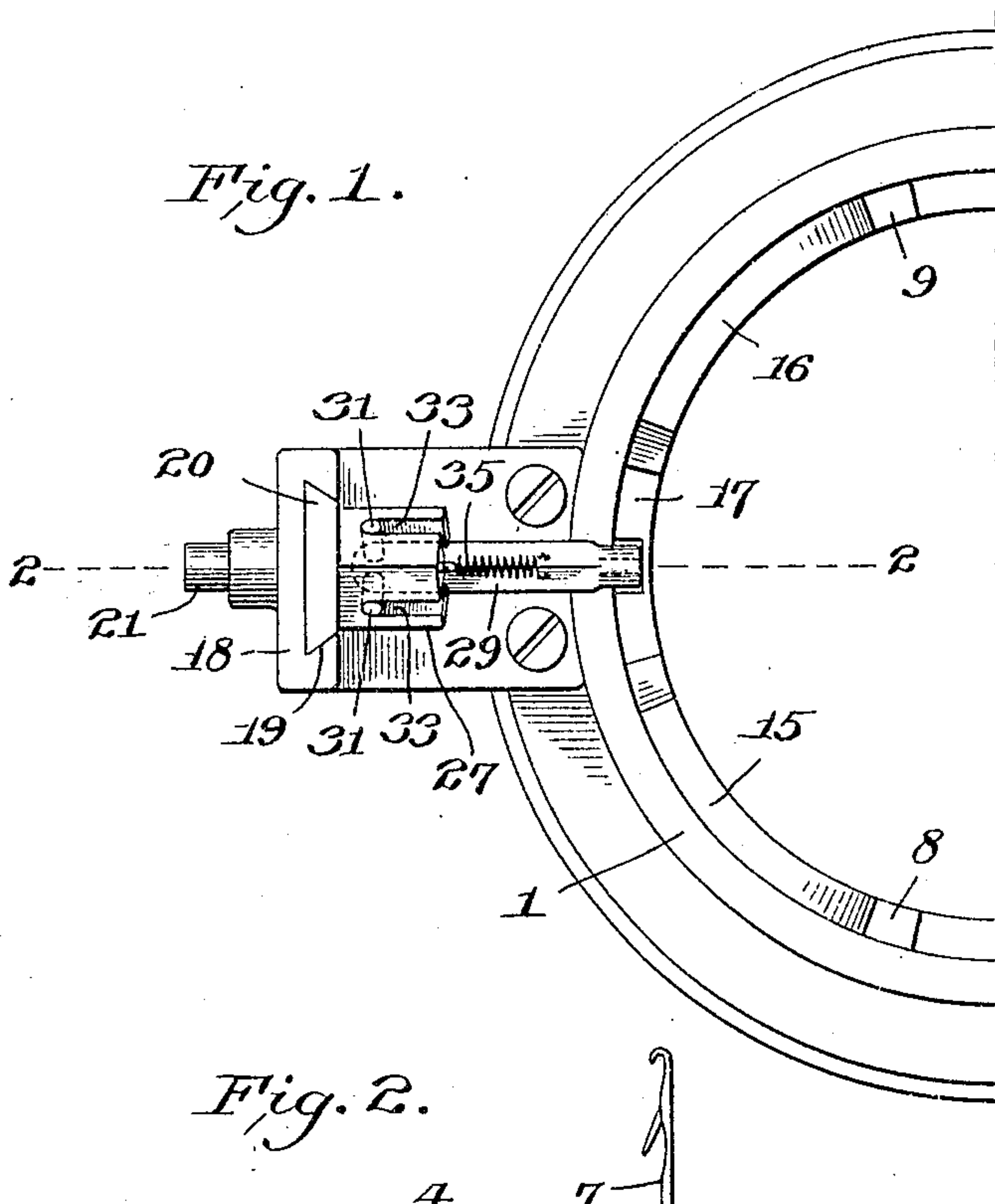


No. 875,707.

PATENTED JAN. 7, 1908.

A. V. GROUPE.
KNITTING MACHINE.
APPLICATION FILED JUNE 28, 1905.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 7.

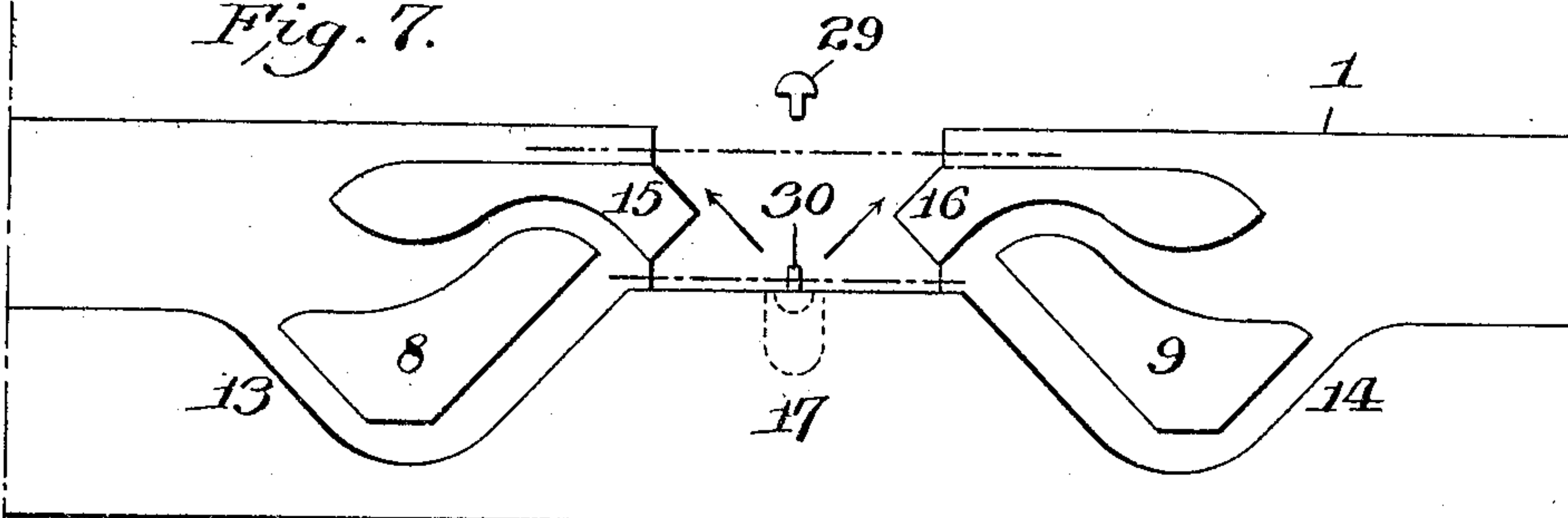


Fig. 8.

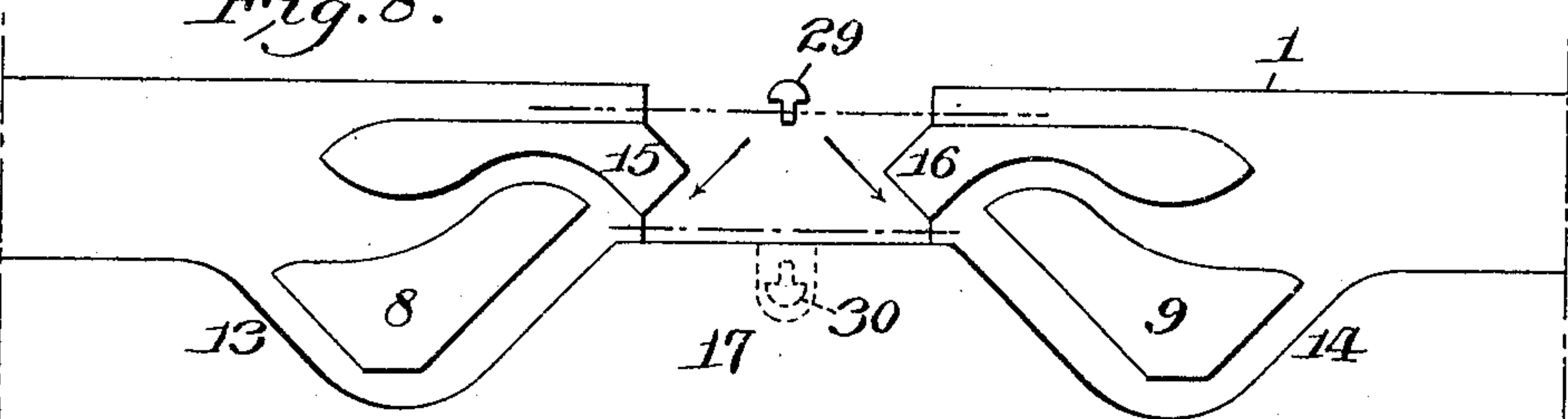


Fig. 9.

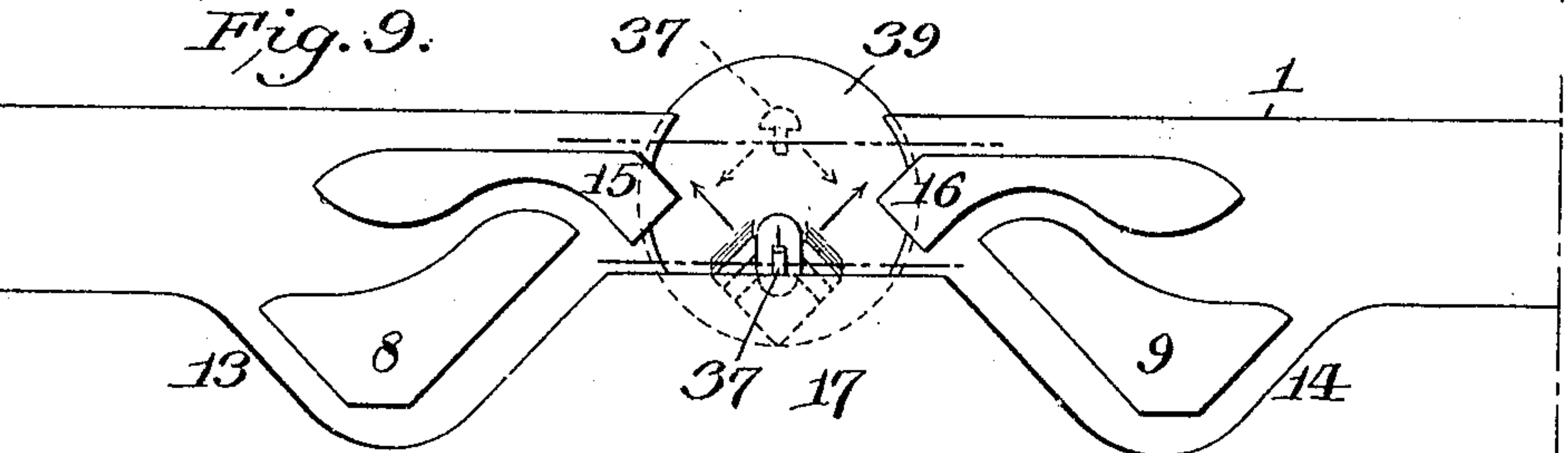


Fig. 11.

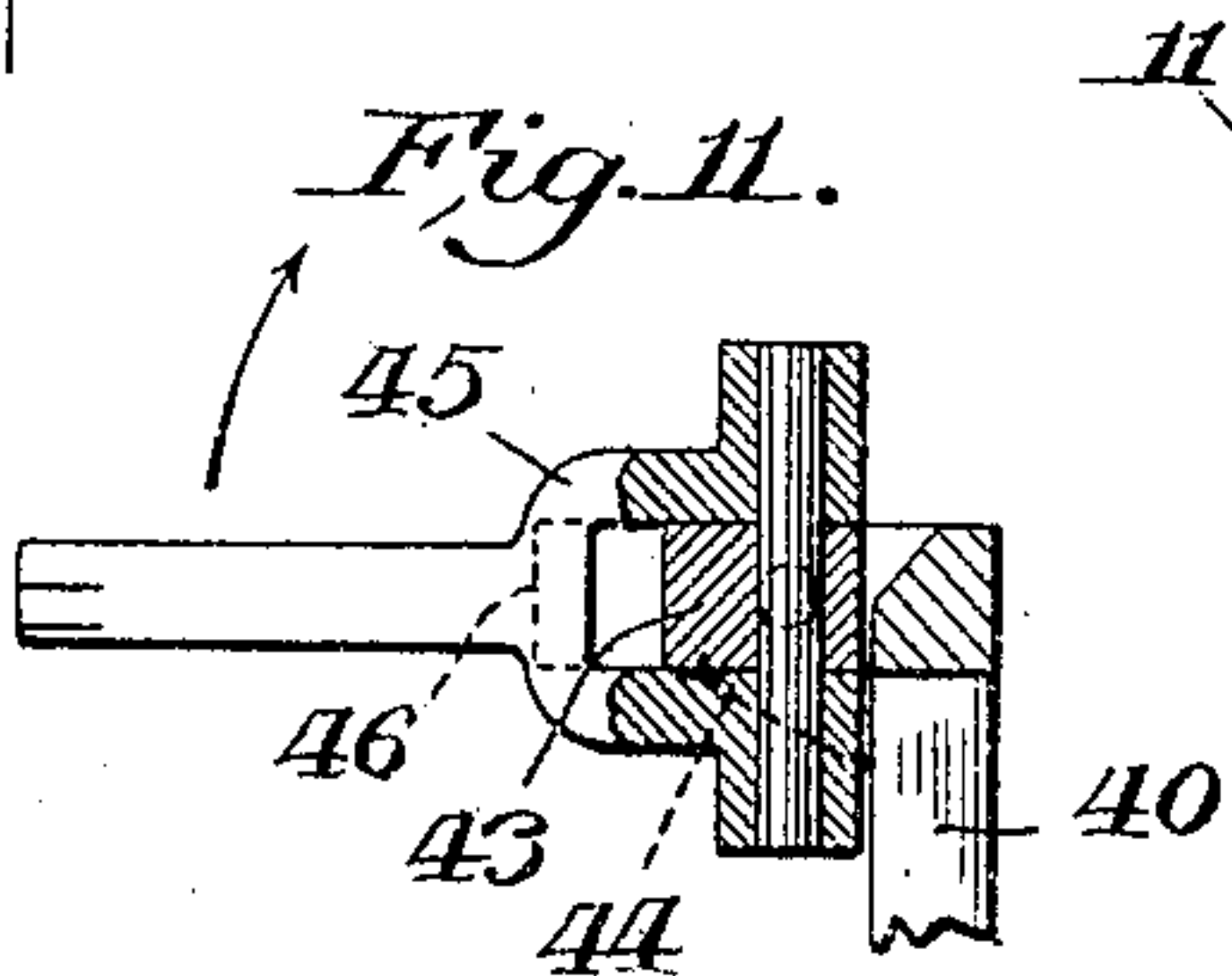


Fig. 10.

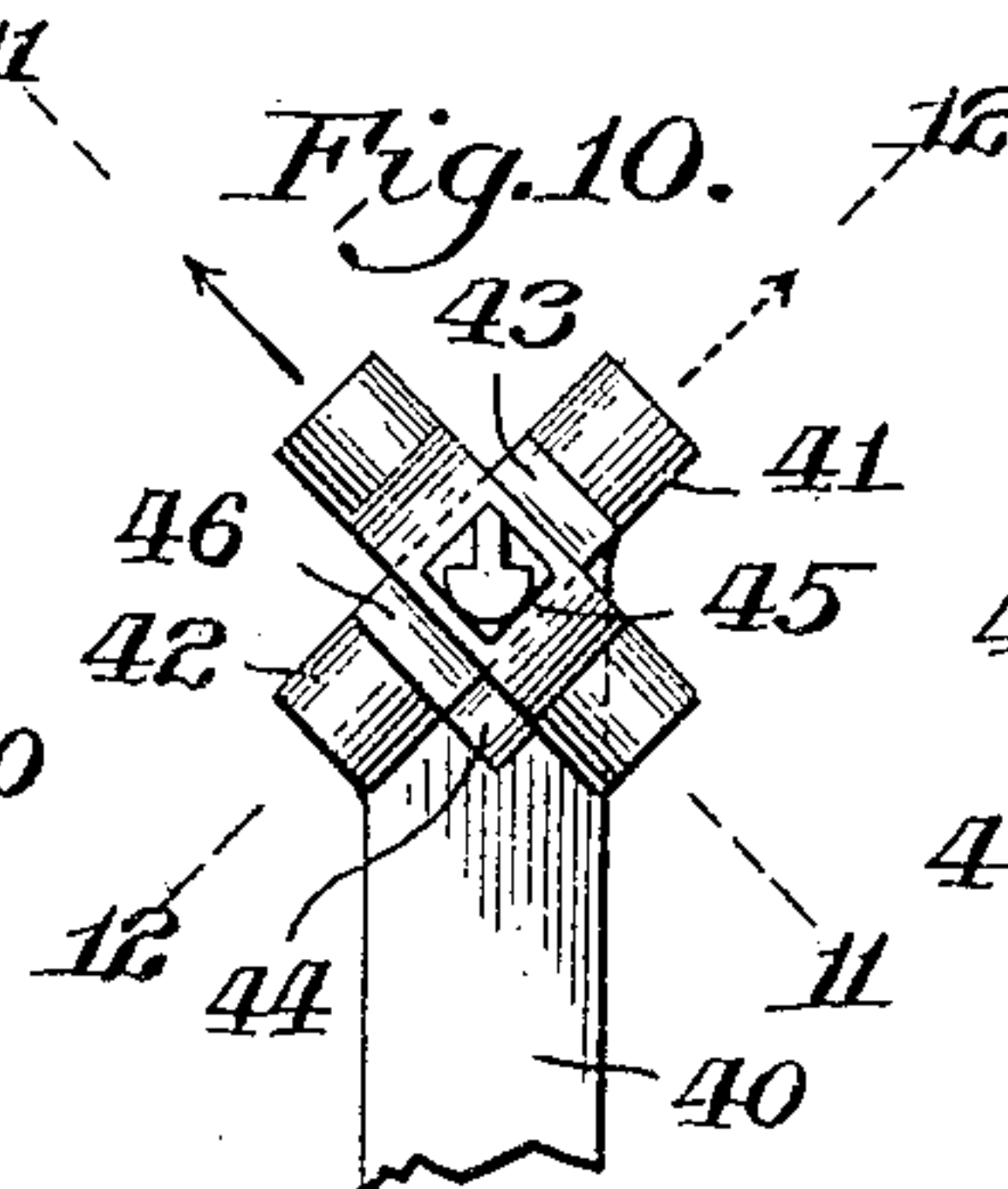
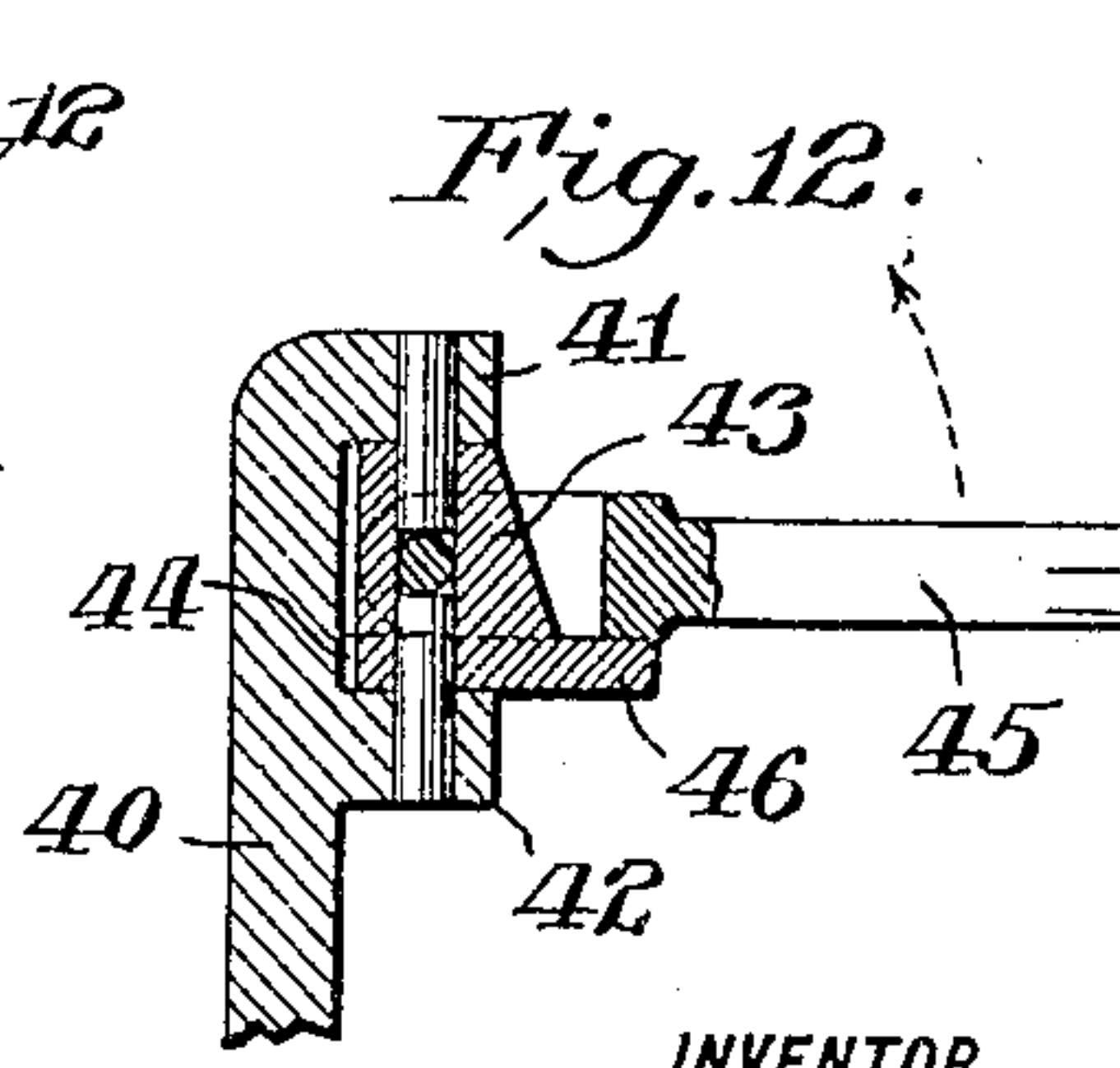


Fig. 12.



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UNITED STATES PATENT OFFICE.

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KNITTING-MACHINE.

No. 875,707.

Specification of Letters Patent.

Patented Jan. 7, 1908.

Application filed June 28, 1905. Serial No. 267,339.

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 a new and useful Improvement 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 a needle picking device 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 a perspective view of one of the needle picking arms. Fig. 4 is a sectional detail, as on the line 4—4 of Fig. 2. Fig. 5 is a sectional detail, as on the line 5—5 of Fig. 4. Fig. 6 is a view similar to Fig. 5, showing the needle picking arm in a different position. Fig. 7 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. 8 is a view similar to Fig. 7, showing the position of the notched inner ends of the needle picking arms during the operation of widening the fabric. Fig. 9 is a view similar to Fig. 7, showing a single needle picking arm and a suitable mounting therefor. Fig. 10 is an elevation of a needle picking arm and its support, showing a modified form of the pivotal connections of the arm with the support. Fig. 11 is a sec-

tional view, as on the line 11—11 of Fig. 10. Fig. 12 is a sectional view, as on the line 12—12 of Fig. 10.

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. Thus 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 and 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 24; when the slide is in the down position, the ball 23 is seated in the depression 25; 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 is provided with two projections 27 and 28 carrying the outer ends of two needle picking arms 29 and 30, respectively, 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 fixedly from the outer end of

each arm 29 and 30 are two pins 31, 31 and 32, 32, respectively. The pins 31, 31 project upwardly at right angles to each other and at angles of about forty-five degrees to the vertical; and the pins 32, 32 project downwardly at right angles to each other and at angles of about forty-five degrees to the vertical.

It may here be remarked that the arms 29 and 30 are alike in every particular excepting that they are disposed opposite to each other; that is to say, the pins 31, 31 of the arm 29 project upwardly while the pins 32, 32 of the arm 30 project downwardly, and the vertical wall between the needle-engaging notches of the upper arm 29 extends downwardly while the vertical wall between the notches of the lower arm 30 extends upwardly.

The pins 31, 31 and 32, 32 rest normally in the bases of sockets or slots 33, 33 and 34, 34, formed in the projections 27 and 28, respectively. These sockets or slots are arranged at angles corresponding to the angles of the pins, and the bases of the slots are made half round to receive and rotatably support the pins. The sockets or slots 33, 33 and 34, 34 extend from the pins 31, 31 and 32, 32 toward the cam cylinder, and the slots are of a width equal to the diameter of the pins, whereby, when one pin is turning about its axis in the base of its slot, during the movement of its arm, the other or companion pin may move through its slot toward the cam cylinder and serve to prevent axial movement of the pin about the axis of which the arm is moving. The pins 31, 31 and 32, 32 are maintained normally seated in the bases of their sockets and the arms 29 and 30 in the position shown, by the action of springs 35 and 36 extending between said arms and the projections 27 and 28, respectively, the engagement of the pins with the bases of their sockets limiting the movement of either arm about the axis of either of its pins. The movement of the arms 29 and 30 is also limited by said arms engaging the projections 27 and 28, thereby relieving the pins of some of the strain.

From the foregoing description it will be seen that each arm 29 and 30 has two separate pivotal connections with its support, and that the axis 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 arms 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. 7 and 8 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 the 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.

In Fig. 9 I have shown a single needle picking arm 37 like either of the arms 29 or 30 shown in Fig. 2. This arm 37 is carried by a projection 38 on a head 39 which is rotatably mounted in the cam cylinder, the projection 38 being like either of the projections 27 or 28 shown in Fig. 2. When the head 39 is in the position shown in Fig. 9, the notched end of the arm 37 is in the path of the butts of the active needles to move them to the inactive position, and when the head 39 is turned a half revolution the notched end of the arm 37 is inverted and brought to the position shown by dotted lines. In this position said notched end is in the path of the inactive needles to return them to the active position.

In Figs. 10, 11 and 12 I have shown a modified form of the pivotal connection of one of the picker arms with its support. Referring to these figures, 40 designates a support provided with projecting 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 arrows in Figs. 10 and 11, a stop 44 on the block 43 being adapted to take against the support 40 to limit the movement of the block in the reverse direction. Embracing the block 43 is the basal end of a needle picking arm 45, said arm being pivotally connected to the block on a line intersecting and extending at right angles to the pivotal connection of the block 43 with the support 40. The arm 45 is adapted to move on its pivotal connection with the block 43 in the direction indicated by the dotted line arrows in Figs. 10 and 12, a stop 46 on the block 43 being adapted to engage the arm 45 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 45 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. 10, the stop 44 preventing the movement of the block 43 about its pivotal connection with the support 40; and that horizontal pressure of a needle butt against the notched end of the arm 45 in the opposite direction will cause the arm 45 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. 10, the stop 46 preventing the movement of the arm 45 about its pivotal connection with the block 43.

Other modifications may be resorted to without departing from the invention.

I claim:—

1. In a knitting machine the combination with the cam cylinder, of a support thereon, and a needle picker having two separate pivotal connections with said support, the axes

of said connections being arranged on inclines with relation to the axis of the cam cylinder.

2. In a knitting machine, the combination with the cam cylinder, of a support thereon, and a needle picker having two separate pivotal connections with said support, the axes of said connections being arranged on inclines with relation to the axis of the cam cylinder and one of said connections being adapted to turn about the axis of the other of said connections.

3. In a knitting machine, the combination with the cam cylinder, of a support thereon, a needle picker provided with oppositely disposed needle engaging portions and having two separate pivotal connections with said support, and means to prevent the turning of the picker about the axis of one of its pivotal connections during the turning of the picker about the axis of its other pivotal connection.

4. In a knitting machine, the combination with the cam cylinder, of a support thereon, a needle picker having two separate pivotal connections with said support, the axes of said connections being arranged on inclines with relation to the axis of the cam cylinder, and means to prevent the turning of the picker about the axis of one of its pivotal connections during the turning of the picker about the axis of its other pivotal connection.

5. In a knitting machine, the combination with the cam cylinder, of a support thereon, a needle picker carried by the support and movable in either of two diverging paths, a pivot pin for the picker arranged at right angles to the plane of one of its paths, and a pivot pin for the picker arranged at right angles to the plane of the other of its paths.

6. In a knitting machine, the combination with the cam cylinder, of a support thereon provided with two sockets, a needle picker carried by the support and movable in diverging paths, a pivot pin projecting from the picker and arranged within one of said sockets, and a pivot pin projecting from the picker and arranged within the other of said sockets.

7. In a knitting machine, the combination with the cam cylinder, of needles provided each with a single butt, a needle picker to engage said needle butts and move the needles out of operative position, a needle picker to engage said needle butts and move the needles into operative position, and a common adjustable support for said pickers, said support being carried by the cam cylinder, whereby by adjusting said support one picker may be moved into and the other picker moved out of operative position.

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

ANDREW V. GROUPE.

Witnesses:

S. G. DOYLE,
H. L. CHEESEMAN.