

No. 676,372.

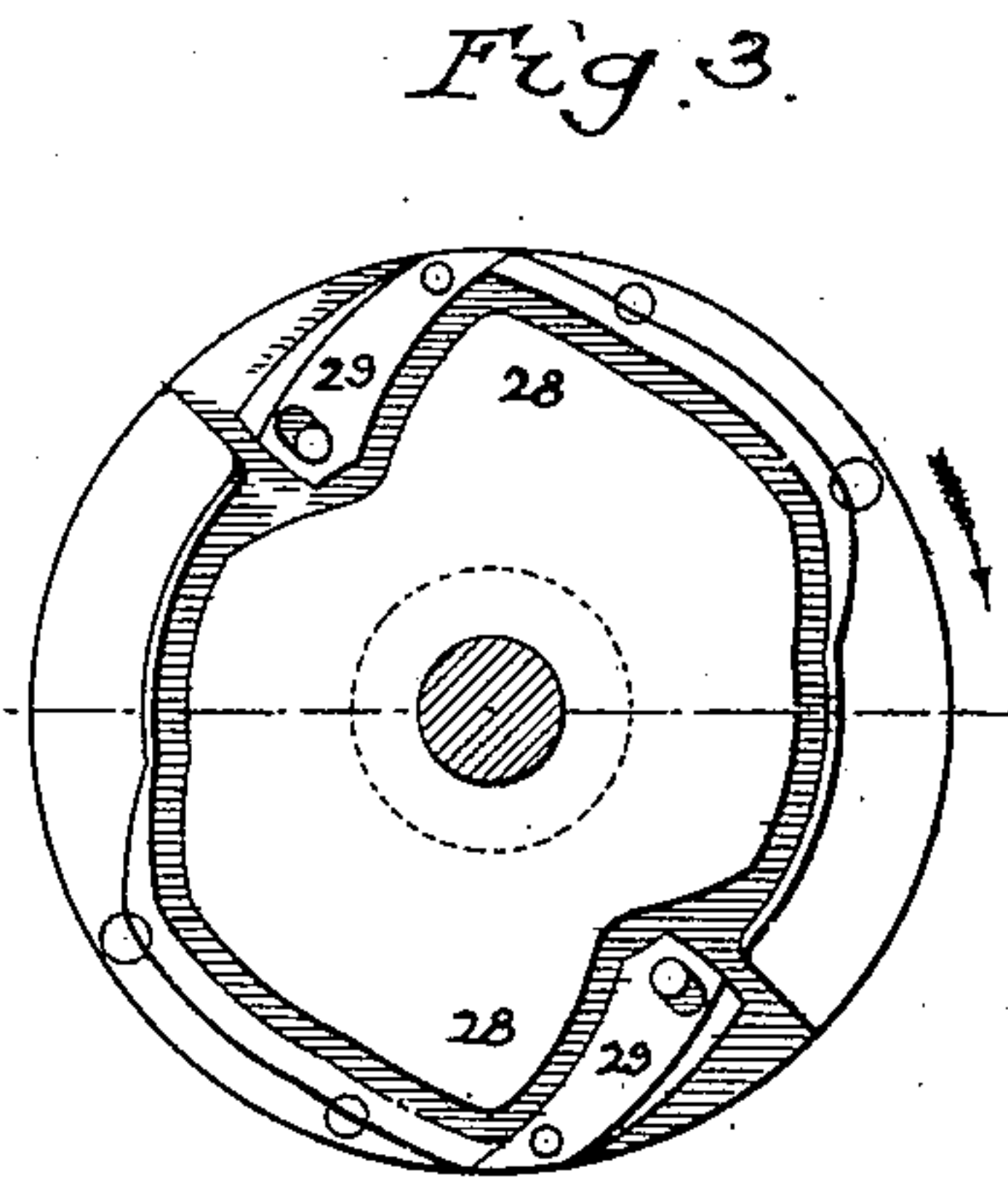
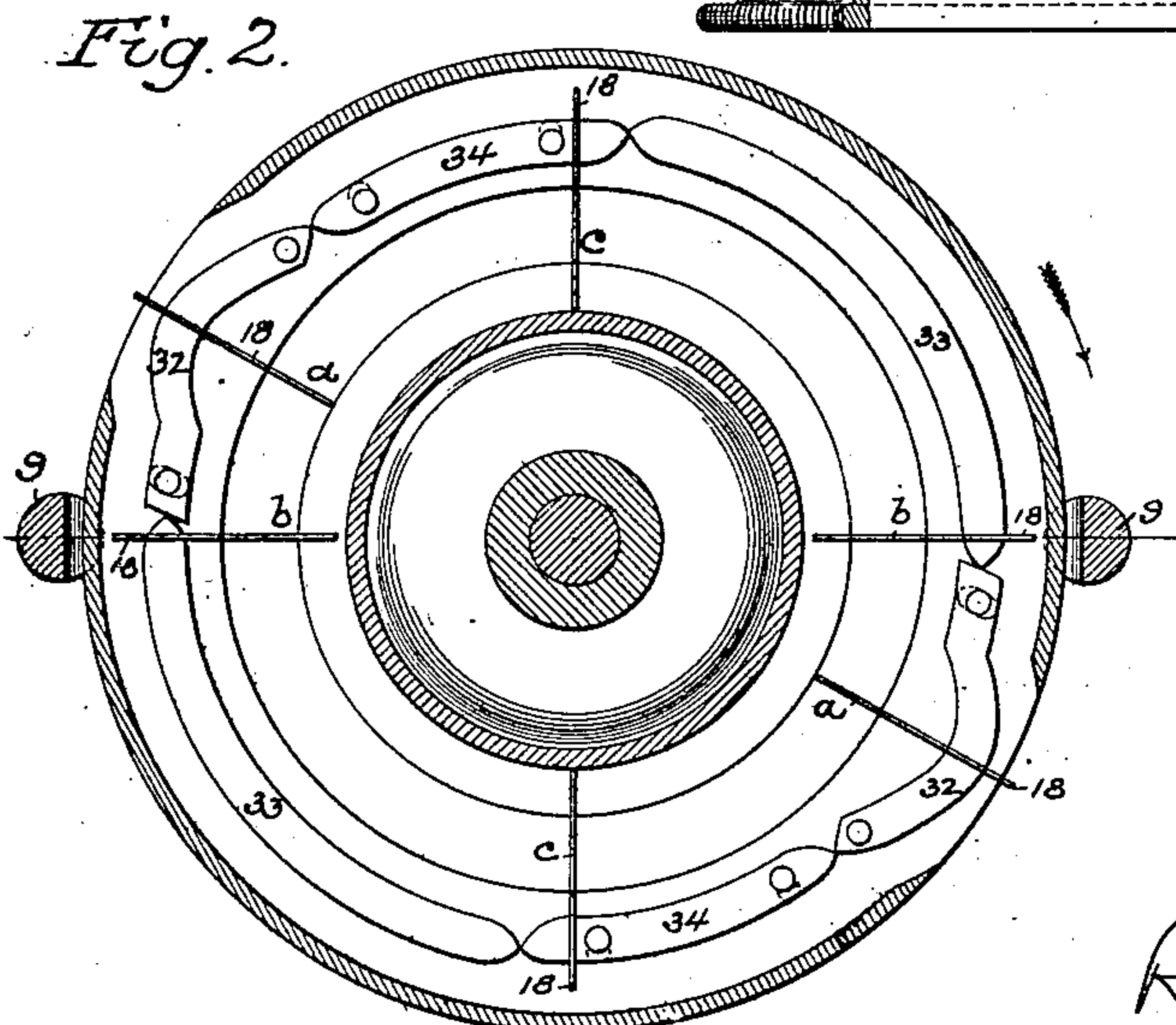
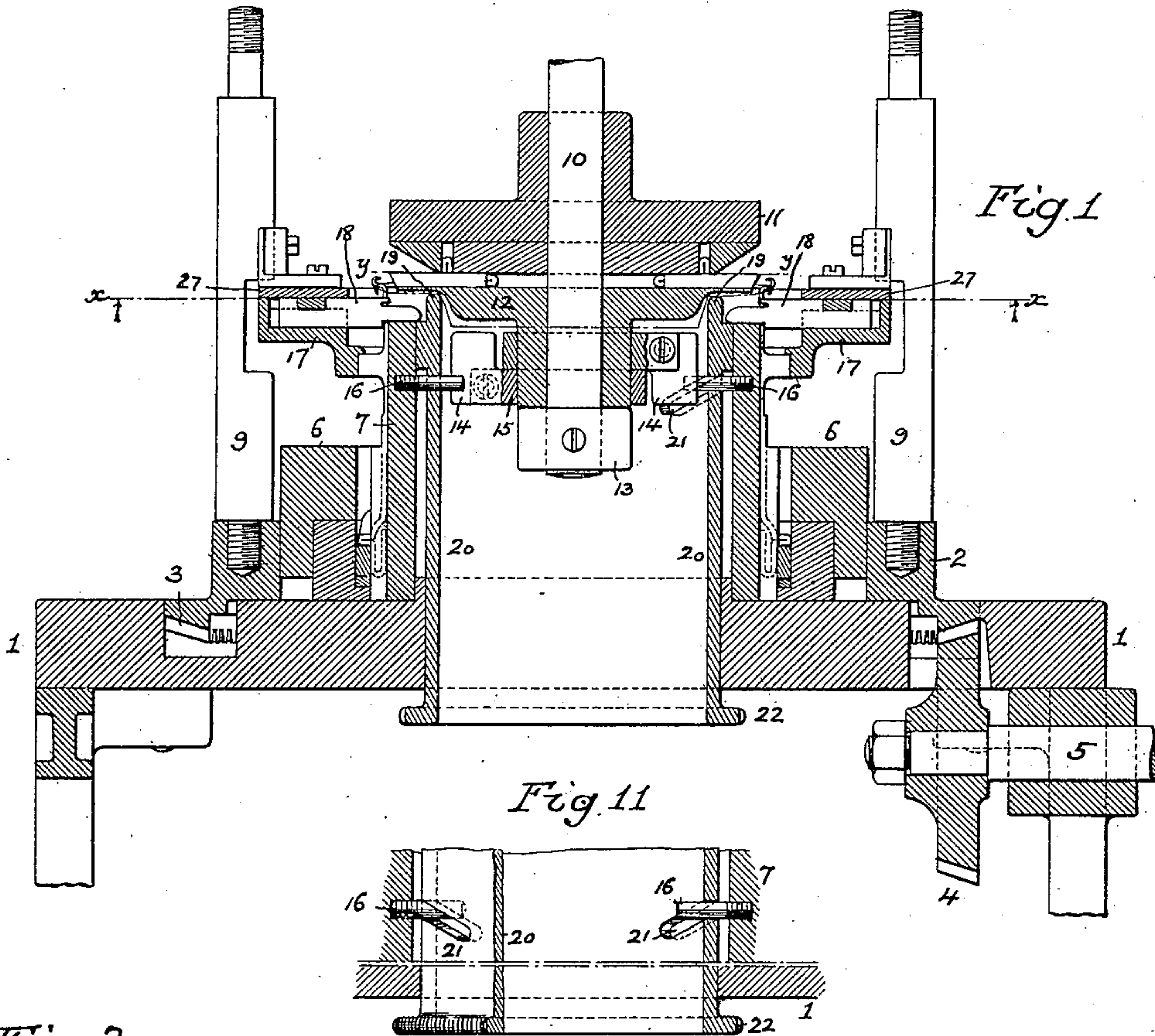
Patented June 11, 1901.

R. W. SCOTT.
RIB KNITTING MACHINE.

(Application filed Feb. 23, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses *Chas. D. ...*
Herman C. ...

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3 Sheets—Sheet 2.

Fig 4

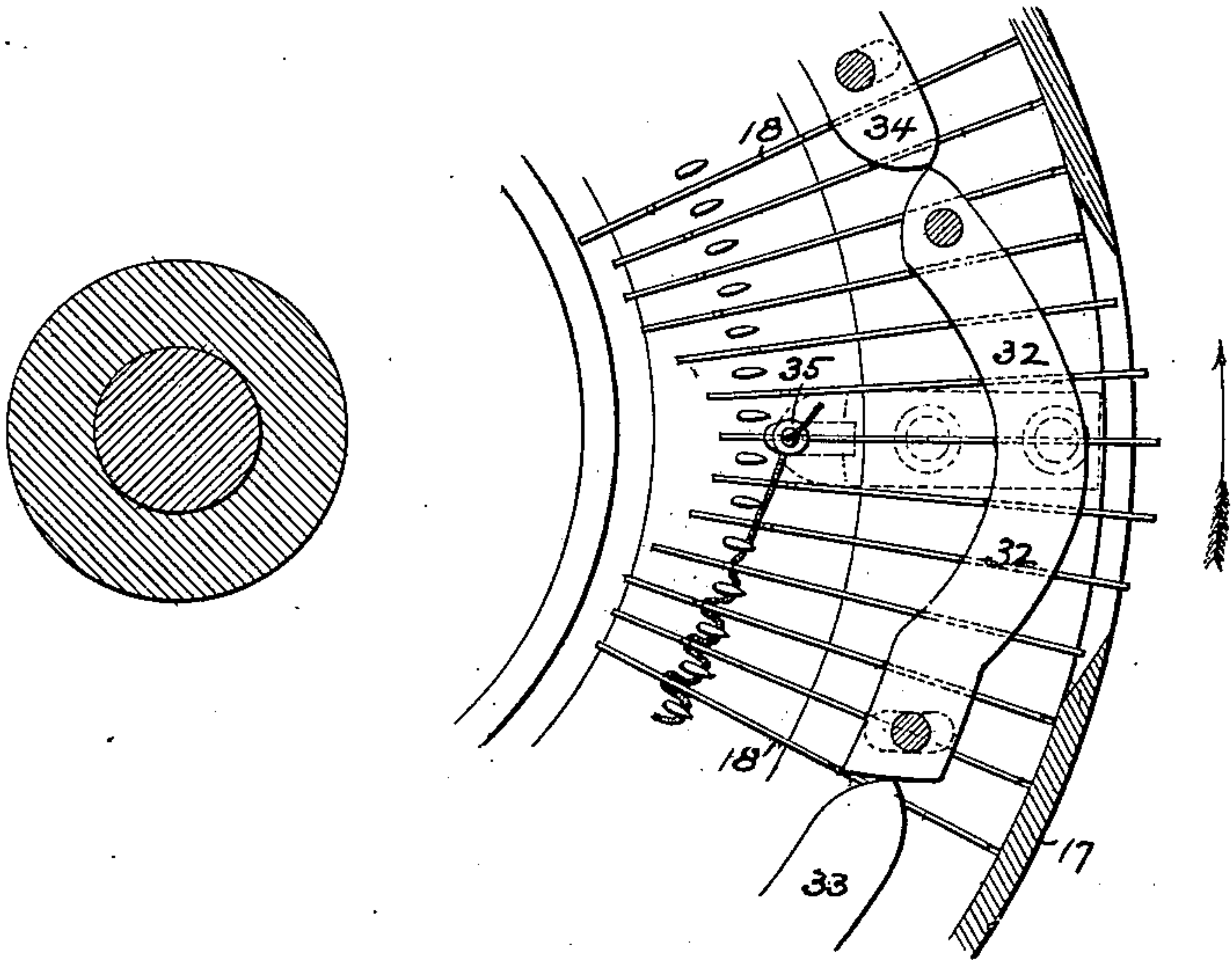


Fig 6

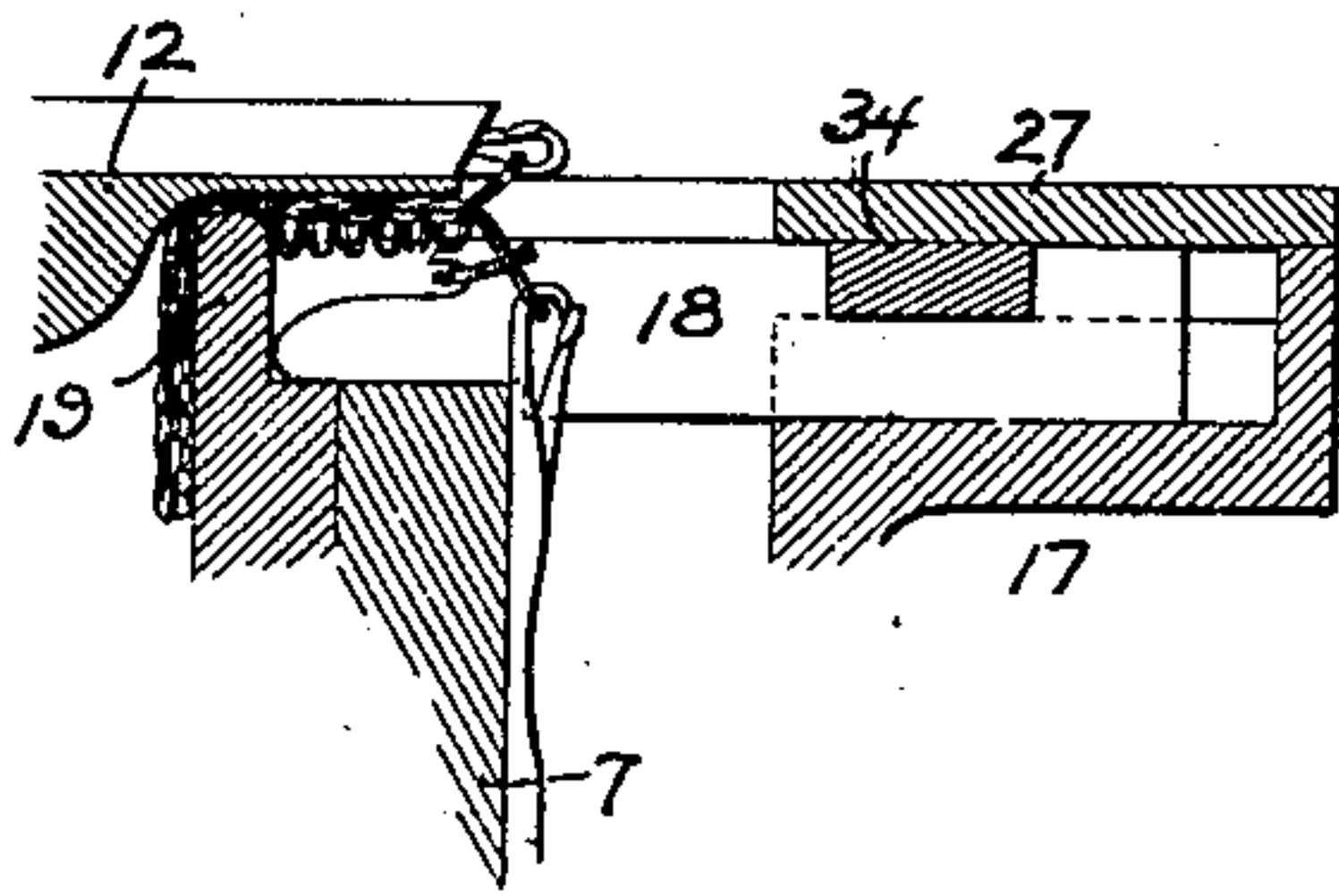


Fig 5

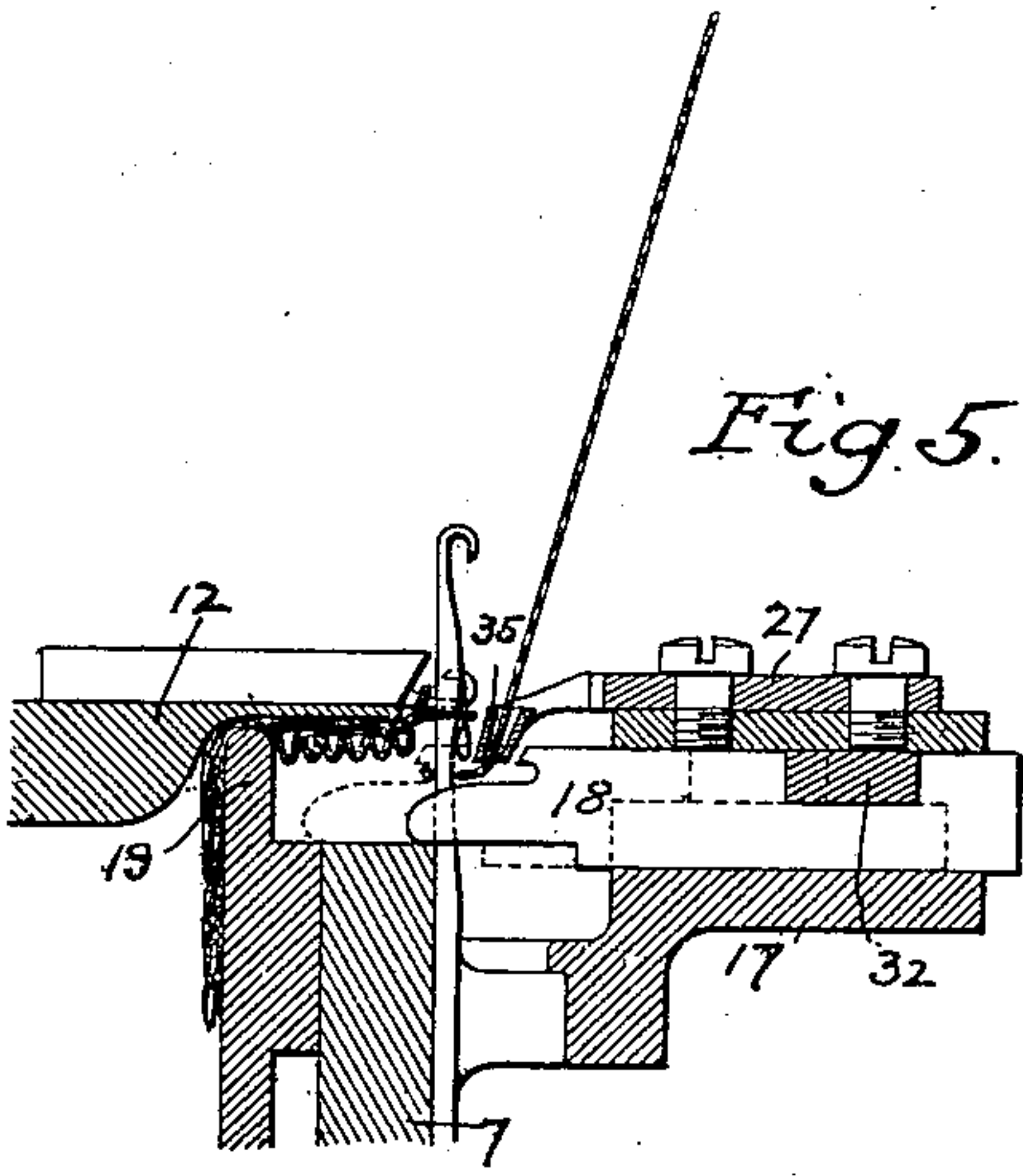
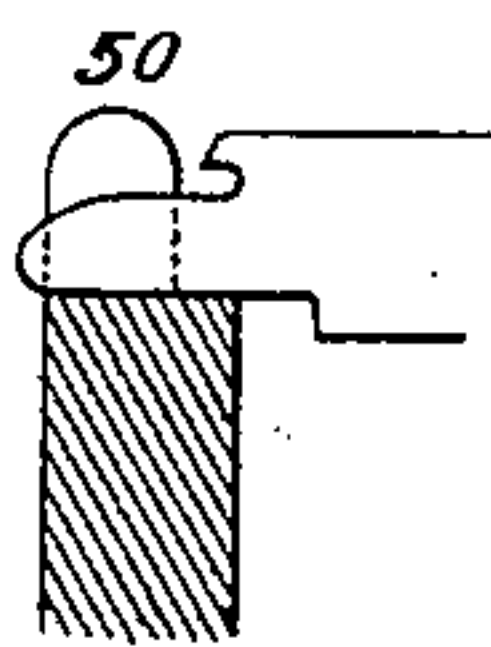


Fig 13



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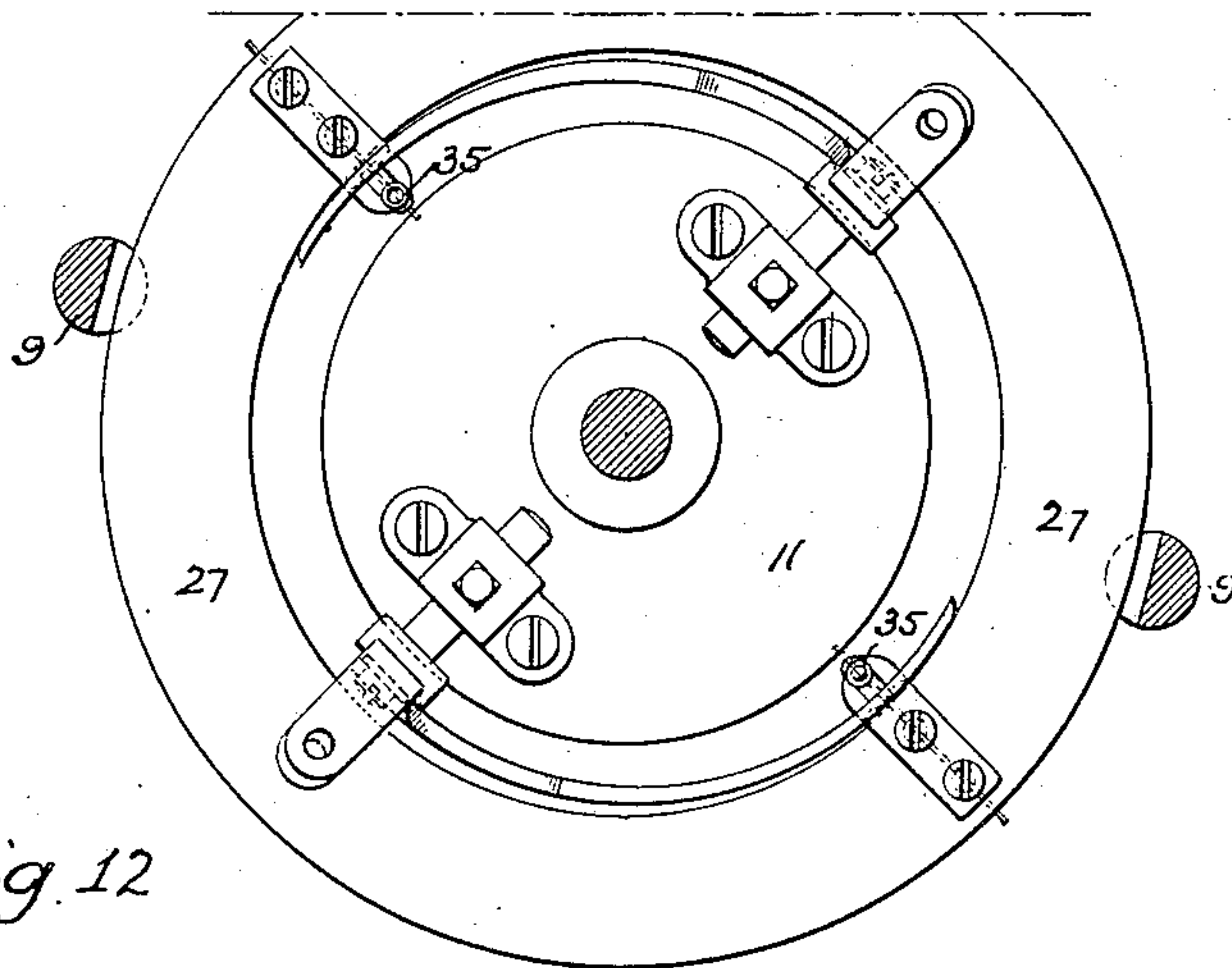


Fig. 7.

Fig. 12

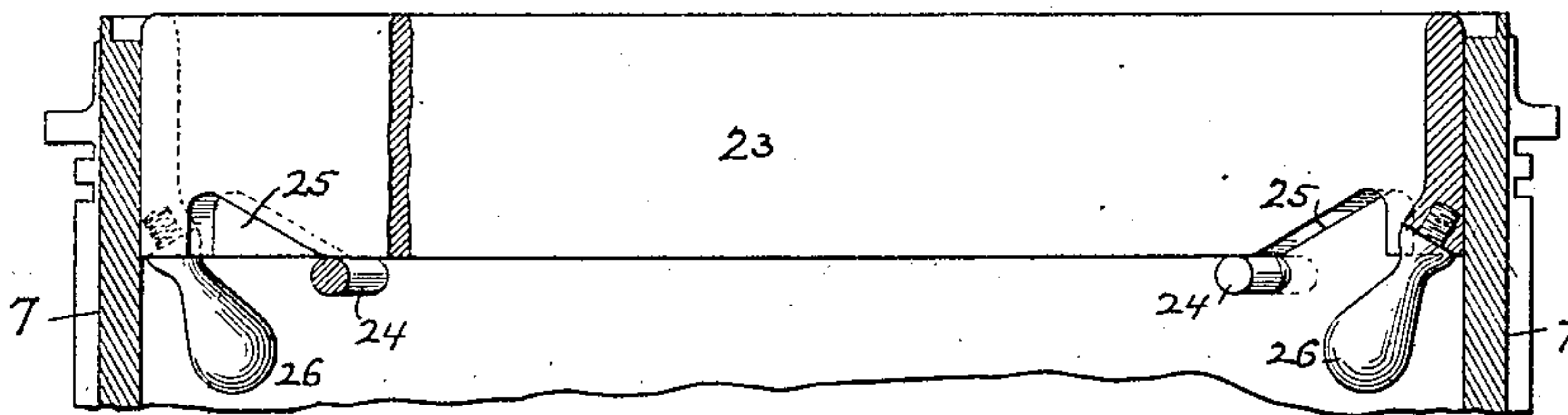


Fig. 8.

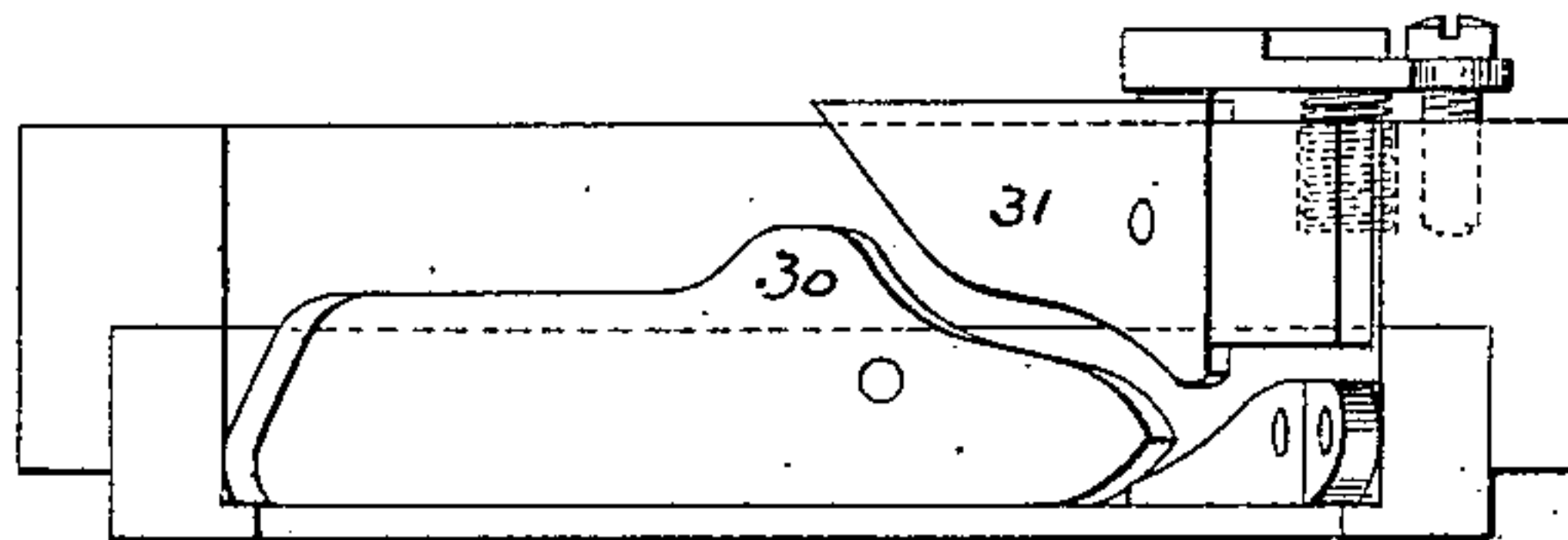


Fig. 9.

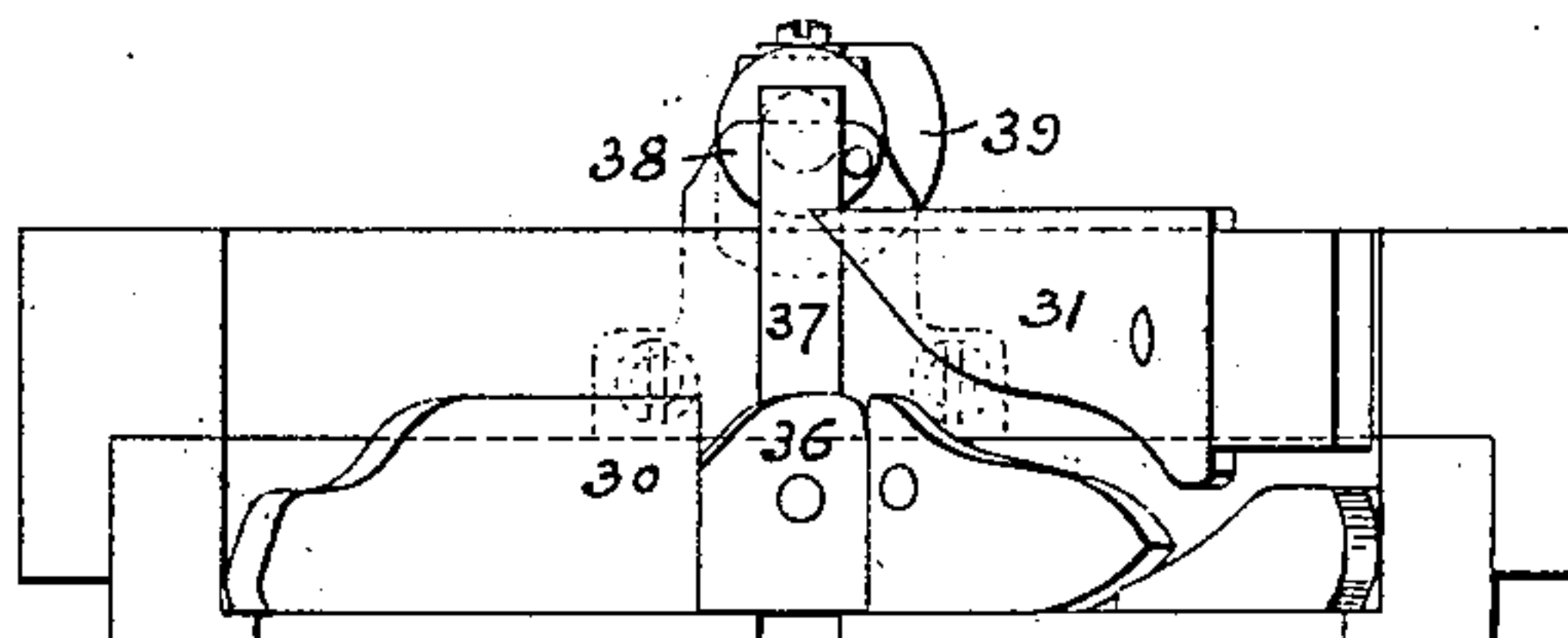
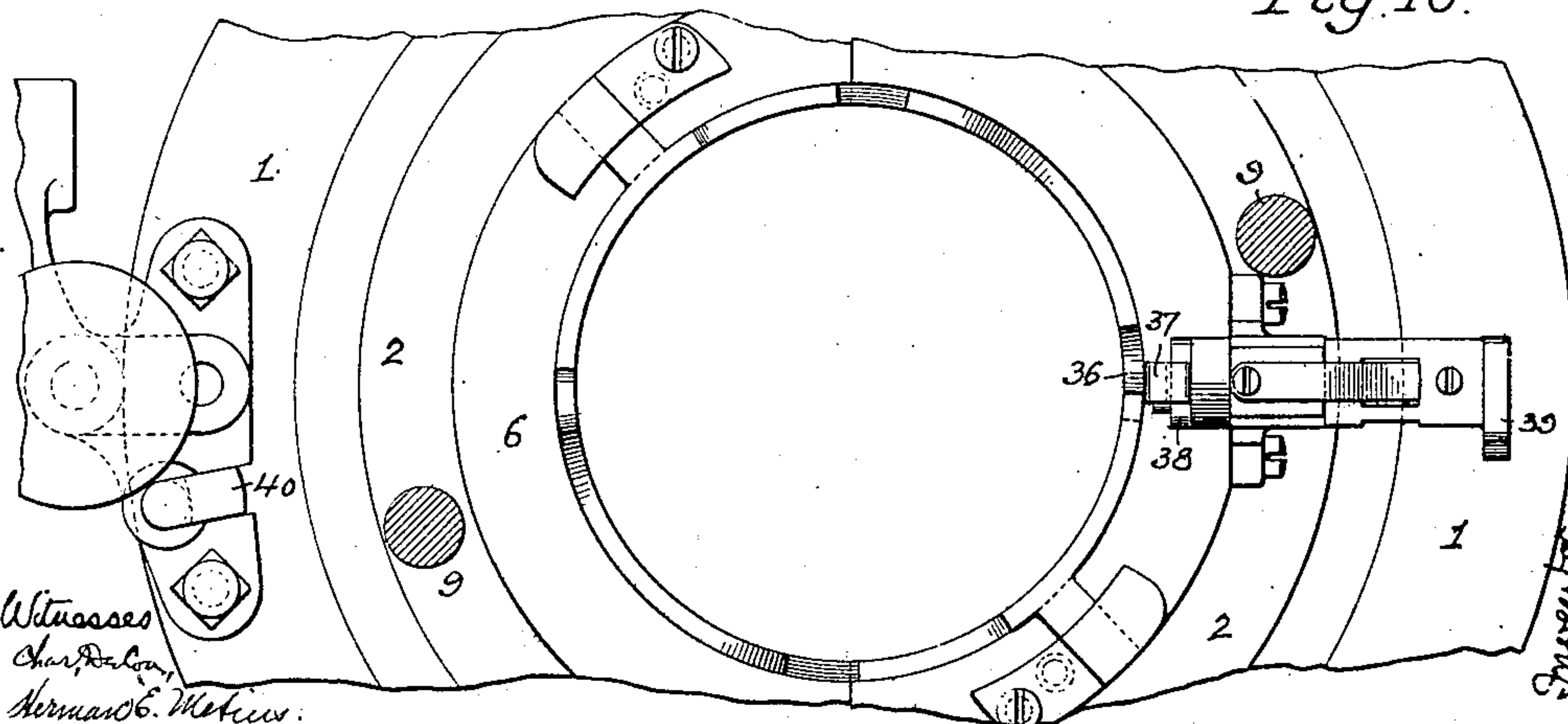


Fig. 10.



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UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO LOUIS N. D. WILLIAMS, OF ASHBOURNE, PENNSYLVANIA.

RIB-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,372, dated June 11, 1901.

Application filed February 23, 1901. Serial No. 48,478. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Rib-Knitting Machines, of which the following is a specification.

My invention relates to knitting-machines for producing a ribbed fabric having on one of its faces projecting loops which can be
10 subsequently brushed or gigged so as to form a fleece.

One object of my invention is to so construct such a machine that the fleecing-yarn can be applied to the ribbed web by mechanism of a simple character, and which is so applied to the machine as to be always easy of access, a further object being to so guide the knitted web that it will not be injured by or interfere with the free operation of the devices for applying the fleecing-yarn thereto; another object being to cause said devices to act as web-holders for maintaining the knitted web out of the way of the rising needles of the cylinder, and thus prevent the latter from "stabbing" the work or engaging with previously-formed stitches, thereby permitting the machine to be operated with a light take-up, and a final object being to so construct and locate the parts of the machine that
20 the knitted web will be formed with the fleecing-loops on the outer face of the same as the web is delivered by the machine, so that the brushing or gigging of the fleecing-loops can be effected without reversing or turning inside out a long and cumbersome knitted web.
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In the accompanying drawings, Figure 1 is a vertical sectional view of sufficient of a rib-knitting machine to illustrate my present invention. Fig. 2 is a sectional plan view on the line *xx*, Fig. 1, illustrating a few of the sinkers which act upon the fleecing-yarn and also the cams for actuating said sinkers, but omitting the needles of the machine. Fig. 3 is a sectional plan view on the line *yy*, Fig. 1, not illustrating the dial-needles. Fig. 4 is an enlarged sectional plan view of a series of sinkers and of parts of the cams for operating the same, illustrating the manner in which the fleecing-yarn is applied to the shanks of the
40 cylinder-needles. Figs. 5 and 6 are vertical
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sections illustrating the operation of the sinkers. Fig 7 is a plan view of the dial cam-cap and sinker cam-rings, illustrating the knitting-yarn guides and the fleecing-yarn guides. Fig. 8 is a view of one of the sections of the cylinder cam-ring, showing an adjustable draw-down cam forming part of the same. Fig. 9 is a view of a section of said cylinder cam-ring, illustrating an adjustable raising or projecting cam intended for use in the production of tuck-work. Fig. 10 is a plan view of a cylinder cam-ring provided with devices of the character shown in Figs. 8 and 9. Fig. 11 is a detached view of part of the machine, illustrating one of the features of my invention. Fig. 12 is a sectional view, illustrating a modification of the same; and Fig. 13 is a sectional view of part of the needle-cylinder, illustrating a modification of another feature of my invention.
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In Fig. 1 part of the fixed bed-plate of the machine is represented at 1, this bed-plate constituting a bearing for a ring 2, which has a bevel-gear 3, meshing with a bevel-pinion 4 on the driving-shaft 5, said ring 3 having mounted upon it, so as to rotate with it, the ring 6, which carries the cams for imparting vertical reciprocating movement to the needles of the cylinder 7, the latter being fixedly mounted upon the bed 1. The ring 2 also has vertical posts 9, which carry the usual arch, (not shown,) from which is suspended the central vertical spindle 10, which carries the cap 11, upon which are mounted the cams for imparting radial reciprocating movement to the needles of the dial 12, the latter being supported vertically upon the spindle 10 by means of a collar 13 at the lower end of the same, but being free from rotative connection with said spindle, so that the latter can turn therein while the dial is held in engagement with the needle-cylinder 7, so as to be prevented from turning. This engagement of the needle-cylinder and dial is effected by means of dogs 14, projecting from clamp-rings 15 on the hub of the dial and contacting with pins 16, projecting inwardly from the needle-cylinder.
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Fixedly mounted upon the upper portion of the needle-cylinder is a radially-grooved
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annular bed or ring 17 for the reception and guidance of a series of sinkers 18, which alternate with and play laterally between the needles of the cylinder 7, the inner ends of the sinkers projecting over the top of the needle-cylinder, as shown in Figs. 1, 5, and 6. To provide for the reception of the inner ends of these sinkers the outer portion of the dial 12 is recessed on the under side, as shown in Figs. 1, 5, and 6, and in order that the fabric as it passes from the needles shall be prevented from interfering with or being injured by the inner portions of the sinkers the needle-cylinder has on the inner side a vertically-projecting rib or shoulder 19, extending up closely to the under side of the recessed portion of the dial 12, but permitting space enough between the two to provide for the free passage of the knitted web. This shoulder instead of being a continuous ring may consist of a series of lugs or teeth only and may be secured to or formed integral with the cylinder, as will be understood on reference to the part 50 in Fig. 13, which illustrates a lug or tooth integral with the cylinder and projecting upwardly from the top of the same. In this case, however, it would be difficult to introduce a piece of knitted web into the machine, such introduction being effected from the inside of the needle-cylinder. Hence I prefer to make the rib 19 upon an element independent of the cylinder 7 and adjustable vertically in respect thereto, so that the rib may be lowered in order to offer the desired facility for introducing a piece of work and then raised again to its normal position, so as to hold the work out of the way of the inner ends of the sinkers 18. A simple method of accomplishing this result is to employ an internal cylinder 20, of which the upper edge forms the rib 19, (which in this case also may be either a continuous or a broken rib,) this cylinder having cam-slots 21 engaging with the inwardly-projecting pins 16 of the needle-cylinder, so that a partial turn of the said cylinder 20 will raise or lower the rib 19, the cylinder being, if desired, provided with a notched or milled flange 22 at the lower end and having such frictional contact with the interior of the needle-cylinder 7 or bed 1 or both as to prevent any likelihood of accidental movement from the position to which it has been adjusted. Fig. 12 illustrates a modification of this feature of the invention, intended for use in machines of larger size, the cylinder 20 in this case being replaced by a ring 23, resting upon inwardly-projecting pins 24 on the needle-cylinder and having in its lower edge beveled recesses 25, so as to provide for the desired lowering of the ring by a partial turning movement of the same, such movement being conveniently effected by manipulating knobs or handles 26, projecting from the under side of the ring. The reciprocating movement of the sinkers 18 is effected by means of cams on the under

side of a cam-ring 27, suitably connected either to the dial cam-cap 11 or to the posts, (in the present instance to the latter elements,) so as to be caused to rotate in unison with said dial cam-cap and the cylinder cam-ring 6. The machine shown in the drawings is a double-feed machine, the dial cam-cap having two needle-projecting cams 28 and two draw-in cams 29, and each half of the cylinder cam-ring likewise has a needle-projecting cam 30 and a draw-down cam 31, and the sinker cam-ring 27 is provided with two cams, each cam comprising three sections 32, 33, and 34, the section 32 being so formed as to first quickly withdraw and then quickly project each sinker. The section 33 follows the section 32 and is concentric with the axis of rotation of the sinker cam-ring, so that it acts to retain the sinker in the projected position to which it has been moved by the section 32. The section 34 acts to still further project the sinkers, and its action is followed by that of the section 32 of the following cam. The section 32 of each cam is adjustable radially at its delivery end, so that the extent of projection of the sinkers 18 thereby can be varied to form fleecing-loops of any required size, and the section 34 of the cam is likewise adjustable radially, so as to properly follow the action of said cam-section 32.

In the manufacture of ribbed knitted fabric the yarn is usually drawn by the cylinder-needles, and the stitches formed by these needles constitute the face of the fabric, the dial-needles drawing no yarn from the yarn-guide, but simply forming short loops of the yarn which has been already drawn from the yarn-guide by the cylinder-needles. This is effected by giving the draw-down cam of the cylinder cam-ring a comparatively abrupt angle, while the draw-in cam of the dial cam-cap is curved and of a lesser angle, so that the dial-needle draws inwardly more slowly than the cylinder-needle is drawn downwardly. As, however, I propose to apply the fleecing-yarn to the cylinder-needles and as the stitches drawn by these needles should therefore form the back of the fabric, I reverse the construction of cams usually employed, and therefore provide the dial cam-cap with the abrupt draw-in cams shown in Fig. 3, while the cylinder cam-ring is provided with a long and gentle curved draw-down cam, such as shown in Figs. 8 and 9. The fleecing-yarn is fed to the sinkers 18 by means of a fleecing-yarn guide 35, mounted upon and rotating with the sinker cam-ring 27, and in a double-feed machine, such as shown in the drawings, there may be two of these fleecing-yarn guides, as shown in Fig. 7, when it is desired to introduce a fleecing-yarn for each course of stitches in the fabric, or there may be but a single fleecing-yarn guide when it is only desired to introduce the fleecing-yarn in every other course of stitches.

The operation of the machine is as follows:

The machine being supposed to be without work on the needles, the cylinder 20 is first lowered and a piece of work drawn up through the same and between the top of the lowered rib 19 and the under side of the recessed outer edge of the dial 12 has the stitches at or near its outer edge "jabbed" upon the needles in the ordinary way, whereupon the cylinder 20 is again raised, so that its rib 19 will carry the work close up against the under side of the recessed outer portion of the dial. Knitting-yarn being introduced to the dial-needles just before they are drawn in by the cams 29, the stitches are formed by the joint action of said dial-needles and cylinder-needles, and a plain ribbed fabric is produced in the usual way, except that the dial-needles perform the primary function and the cylinder-needles the secondary function, as has already been pointed out. The fleecing-yarn guides 35 are so located in respect to the sections 32 of the sinker-cams that the fleecing-yarn will be laid in the throats of the sinkers 18 when the latter are fully retracted, as shown in Fig. 5, and on the projection of the sinkers the fleecing-yarn will be pressed around the shanks of the cylinder-needles, as shown by dotted lines in Fig. 5, said cylinder-needles at this time being elevated, so that the bottoms of their latches will be above the fleecing-yarn thus laid around the needle-shanks. Hence when the cylinder-needle is drawn down the fleecing-yarn will be "knocked over" with the old stitch from the needle, and said fleecing-yarn will, consequently, not be knitted into the fabric, but will simply be laid between the face and back wales of said fabric, the loops of fleecing-yarn projecting beyond the back wales to an extent dependent upon the extent of inward projection of the jacks 18, as will be readily understood.

In order to insure the drawing of the fleecing-yarn tightly around the rear wales of the fabric, so that it will not be likely to show on the face of the fabric, and also to assist the cylinder-needle in shedding its stitch and the fleecing-yarn, as well as to hold the previously-knitted web away from the rising cylinder-needle, and thereby lessen the strain otherwise necessary in the take-up to prevent the rising needle from stabbing the work, the sinkers 18, after being acted upon by the "dwell-section" 33 of the sinker-cams, are subjected to the action of the section 34, whereby a slight further inward movement is imparted to the sinkers and they are held in this position during the rise of the cylinder-needles. This will be understood on reference to Fig. 2, which represents the three positions imparted to a sinker by the action of the sinker-cams. Thus at *a* the sinker is represented in the fully-retracted position which it assumes preparatory to receiving the fleecing-yarn, at *b* the sinker is represented in the position to which it has been projected in order to draw

the fleecing-yarn around the shank of the cylinder-needle, and at *c* the sinker is represented as in the fully-projected position due to the action of the cam-section 34, this position being also shown in Fig. 6. At this point the fleecing-yarn has been incorporated with the fabric. Hence the sinker, by reason of its engagement with said fleecing-yarn, pulls the whole fabric inward and away from the hooked end of the cylinder-needle as it rises.

In making shaped garments, where the wide part of the tube is formed by tuck-stitches and the narrow part by plain stitches, it is desirable to make but one row of fleecing-loops for every two courses of fabric knitted, and in order to make such shaped garments upon my machine I can adjust the throw of the lifting-cam of the cylinder cam-ring by vertically adjusting the crest 36 of said cam by suitable automatic means—such, for instance, as those represented in Figs. 9 and 10—on reference to which it will be observed that the said movable portion of the lifting-cam has a shank 37, recessed on the outer face for the reception of the cam 38, which is mounted upon a shaft adapted to bearings on the cam-ring 6, said shaft having at the outer end a tappet 39, which can be struck so as to be moved in one direction or the other by a toe 40, adjustable vertically by pattern mechanism of a character common in this class of machinery.

The cam 38 may be constructed so as to impart positive movement to the portion 36 of the lifting-cam in both directions, or it may simply raise this portion of the cam, the descent of the same being due to the pressure of the needle-butts thereon.

While preferable, it is not necessary to the proper carrying out of my invention that the cam-rings and cap should constitute the rotating elements of the machine, as a reverse construction may be adopted, if desired—that is to say, the needle-cylinder, dial, and jack-ring may constitute the rotating elements, and the cam-rings and dial cam-cap may be fixed.

It will be apparent that my improved fleecing attachment constitutes a very simple addition to the ordinary mechanism of a rib-knitting machine, the sinker-bed and sinker cam-ring being mounted, so as to be readily accessible and so located as not to interfere with the ready application of work to the needles of the machine or so as to obstruct a full view of the needles and of the knitting operation, the attachment, moreover, comprising but a minimum of parts, and therefore adding but little to the cost of the machine.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the needle-cylinder, the needle-dial and cooperating cam mechanisms of a rib-knitting machine, with a sinker-bed outside of the needle-cylinder and carry-

ing-sinkers playing between the needles of the same, a sinker cam-ring, a guide for applying knitting-yarn to the needles of the machine, a guide for applying fleecing-yarn to the sinkers, and means for operating the various parts, whereby the sinkers lay the fleecing-yarn around the shanks of the cylinder-needles, substantially as specified.

2. The combination of the needle-cylinder, needle-dial and cooperating cam mechanisms of a rib-knitting machine, with a sinker-bed outside of the needle-cylinder and having sinkers which play between the needles of the cylinder, a sinker cam-ring, a guide for applying knitting-yarn to the needles, a guide for applying fleecing-yarn to the sinkers, and means for operating the various parts, the cams which operate the dial-needles being such as to cause said needles to draw the stitches of the knitting-yarn and the cams which act upon the cylinder-needles being such as to give them a secondary action, substantially as specified.

3. The combination of the needle-cylinder, dial and cooperating cam mechanisms of a rib-knitting machine, a sinker-bed outside of the needle-cylinder, sinkers playing between the cylinder-needles, a sinker cam-ring, a guide for applying knitting-yarn to the needles, a guide for applying fleecing-yarn to the sinkers, and means for operating the various parts, the needle-cylinder having a portion for holding the work away from the projected inner ends of the sinkers, substantially as specified.

4. The combination of the needle-cylinder, dial and cooperating cam mechanisms of a rib-knitting machine, a sinker-bed outside of the needle-cylinder, sinkers playing between the cylinder-needles, a sinker cam-ring, a guide for applying knitting-yarn to the needles, a guide for applying fleecing-yarn to the sinkers, and means for operating the various parts, the needle-cylinder having a portion for holding the work away from the projected inner ends of the sinkers, and said holder being vertically adjustable in respect to the cylinder, substantially as specified.

5. The combination of the needle-cylinder, needle-dial and cooperating cam mechanisms of a rib-knitting machine, a sinker-bed outside of the needle-cylinder, sinkers playing between the cylinder-needles, a sinker cam-ring, a guide for applying knitting-yarn to the needles, a guide for applying fleecing-yarn to the sinkers, and means for operating the various parts, the outer portion of the needle-dial projecting over the needle-cylinder, and said cylinder having a portion for holding the work adjacent to the under side of the dial and out of the way of the projected inner ends of the sinkers, substantially as specified.

6. The combination of the needle-cylinder, needle-dial and cooperating cam mechanisms of a rib-knitting machine, a sinker-bed outside of the needle-cylinder, sinkers playing be-

tween the cylinder-needles, a sinker cam-ring, a guide for applying knitting-yarn to the needles, a guide for applying fleecing-yarn to the sinkers, and means for operating the various parts, the needle-dial having a recessed outer edge projecting over the needle-cylinder, and said cylinder having a portion for holding the work adjacent to the under side of the dial and out of the way of the projected inner ends of the sinkers, substantially as specified.

7. The combination of the needle-cylinder, needle-dial, and cooperating cam mechanisms of a rib-knitting machine, a sinker-bed outside of the needle-cylinder, sinkers playing between the cylinder-needles, a sinker cam-ring, a guide for applying the knitting-yarn to the needles, a guide for applying the fleecing-yarn to the sinkers, and means for operating the various parts, said needle-cylinder having an internal structure mounted so as to partially turn within the cylinder and having a portion for holding the work out of the way of the sinkers, and a cam formation whereby it may be vertically adjusted in respect to the cylinder, substantially as specified.

8. The combination of the needle-cylinder, needle-dial, and cooperating cam mechanisms of a rib-knitting machine, a sinker-bed outside of the needle-cylinder, sinkers playing between the cylinder-needles, a sinker cam-ring, a guide for applying knitting-yarn to the needles, a guide for applying fleecing-yarn to the sinkers, and means for operating the various parts, said needle-cylinder having within it a supplementary cylinder projecting below the same and accessible so as to be partially turned within the needle-cylinder, and said internal cylinder having a portion for holding the work out of the way of the sinkers, and a cam formation whereby it may be adjusted vertically in respect to the needle-cylinder, substantially as specified.

9. The combination of the needle-cylinder, needle-dial, and cooperating cam mechanisms of a rib-knitting machine, with a sinker-bed outside of the needle-cylinder, sinkers carried thereby and playing between the needles of the cylinder, a guide for applying knitting-yarn to the needles, a guide for applying fleecing-yarn to the sinkers, a sinker cam-ring having a cam whereby a quick radial reciprocation is imparted to each sinker and the latter is then retained in the inwardly-projected position, said projecting portion of the cam being adjustable to vary its throw, and means for operating the various parts, substantially as specified.

10. The combination of the needle-cylinder, needle-dial, and cooperating cam mechanisms of a rib-knitting machine, with a sinker-bed outside of the needle-cylinder, sinkers carried by said bed and playing between the needles of the cylinder, a guide for applying knitting-thread to the needles, a guide for applying fleecing-yarn to the sinkers, a sinker cam-ring having a cam for quickly withdraw-

ing and projecting the sinkers and then for
imparting a further inward projecting move-
ment thereto, this latter projecting move-
ment preceding the rising movement of the
5 needles, and the cam for effecting it being
adjustable so as to vary its throw, and means
for operating the various parts, substantially
as specified.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

ROBERT W. SCOTT.

Witnesses:

F. E. BECHTOLD,
HERMAN E. METIUS.