

No. 786,345.

PATENTED APR. 4, 1905.

H. R. CAMPBELL & F. YAHN.
CIRCULAR KNITTING MACHINE.

APPLICATION FILED MAY 20, 1904.

4 SHEETS—SHEET 1.

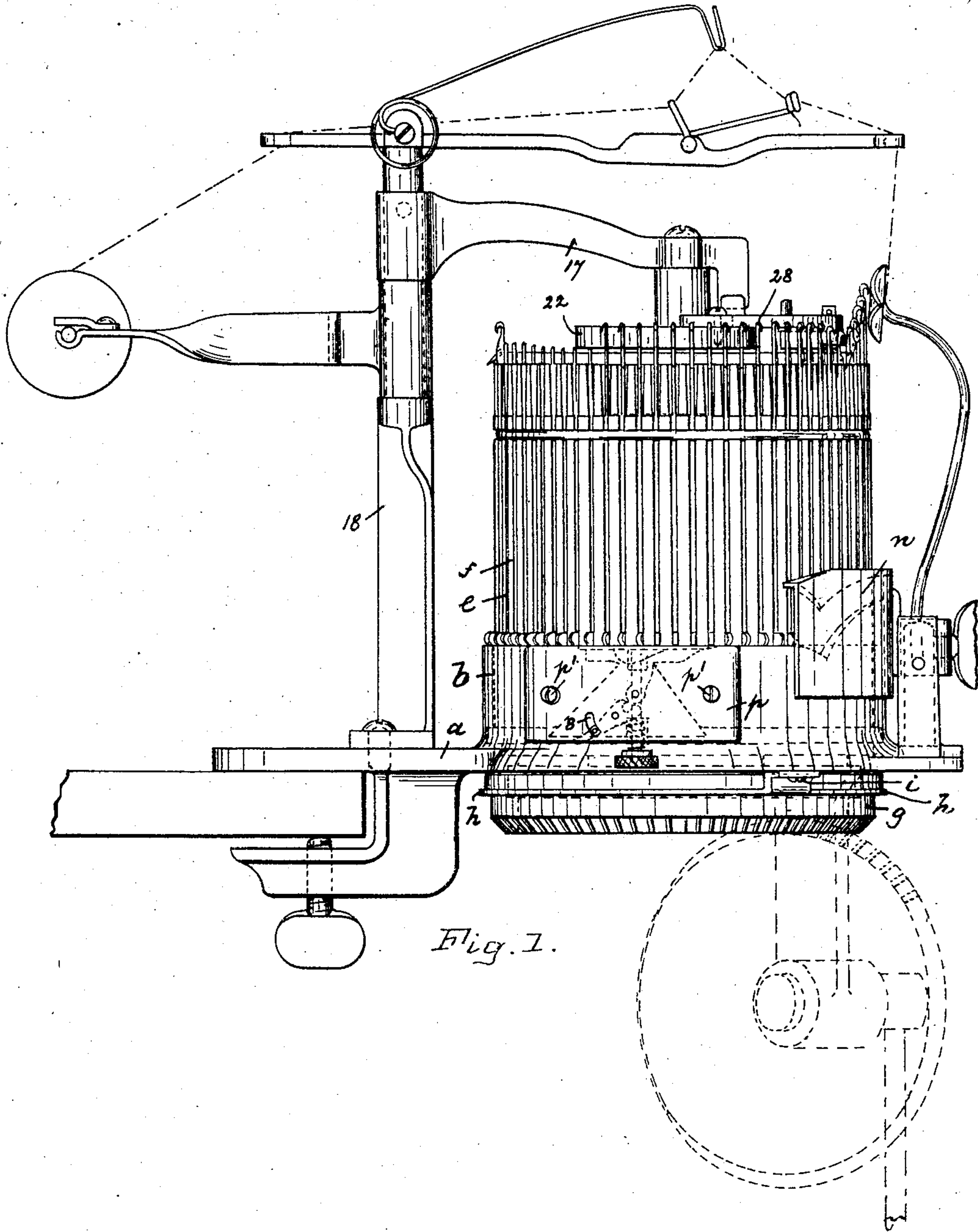


Fig. 1.

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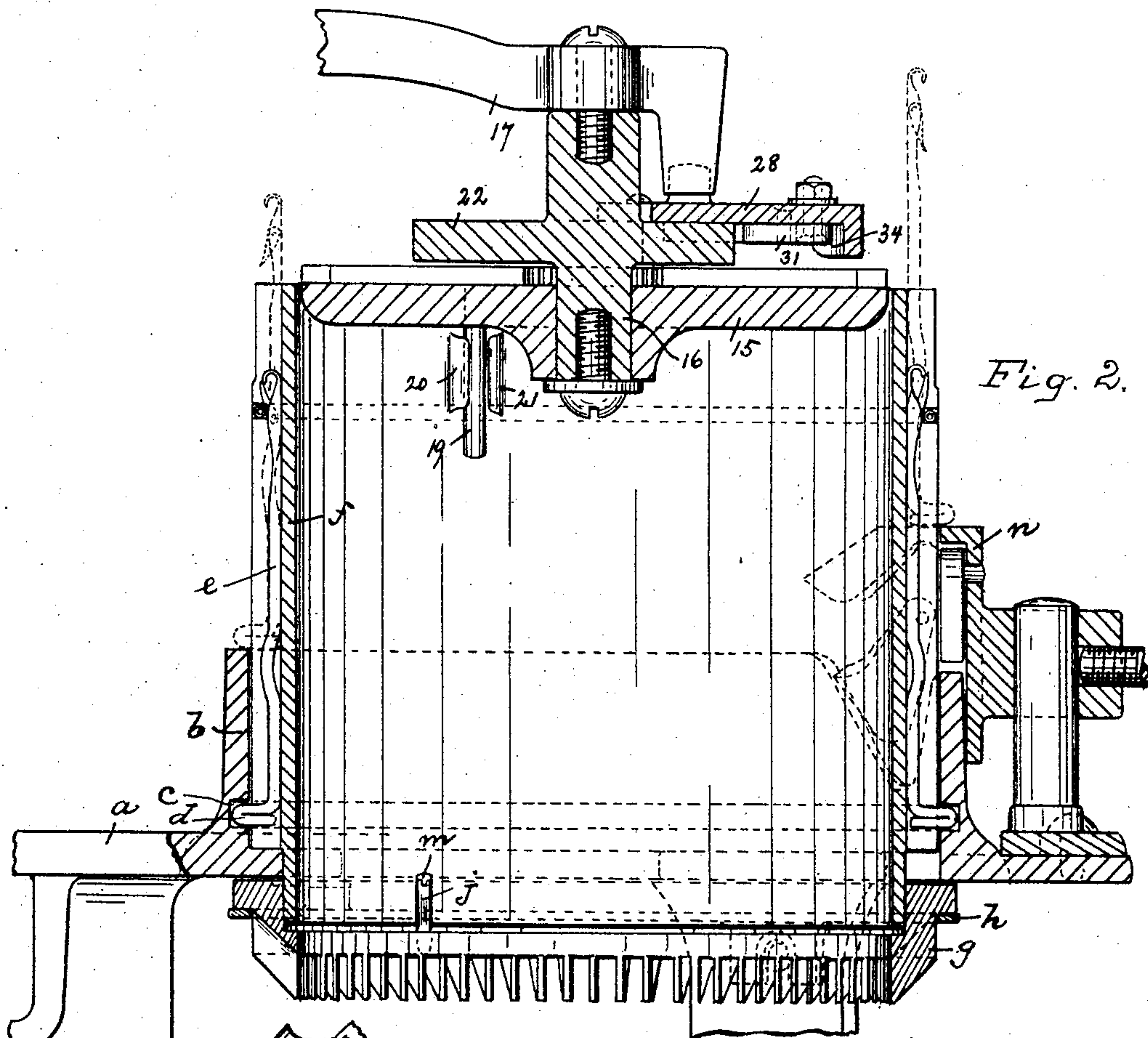


Fig. 2.

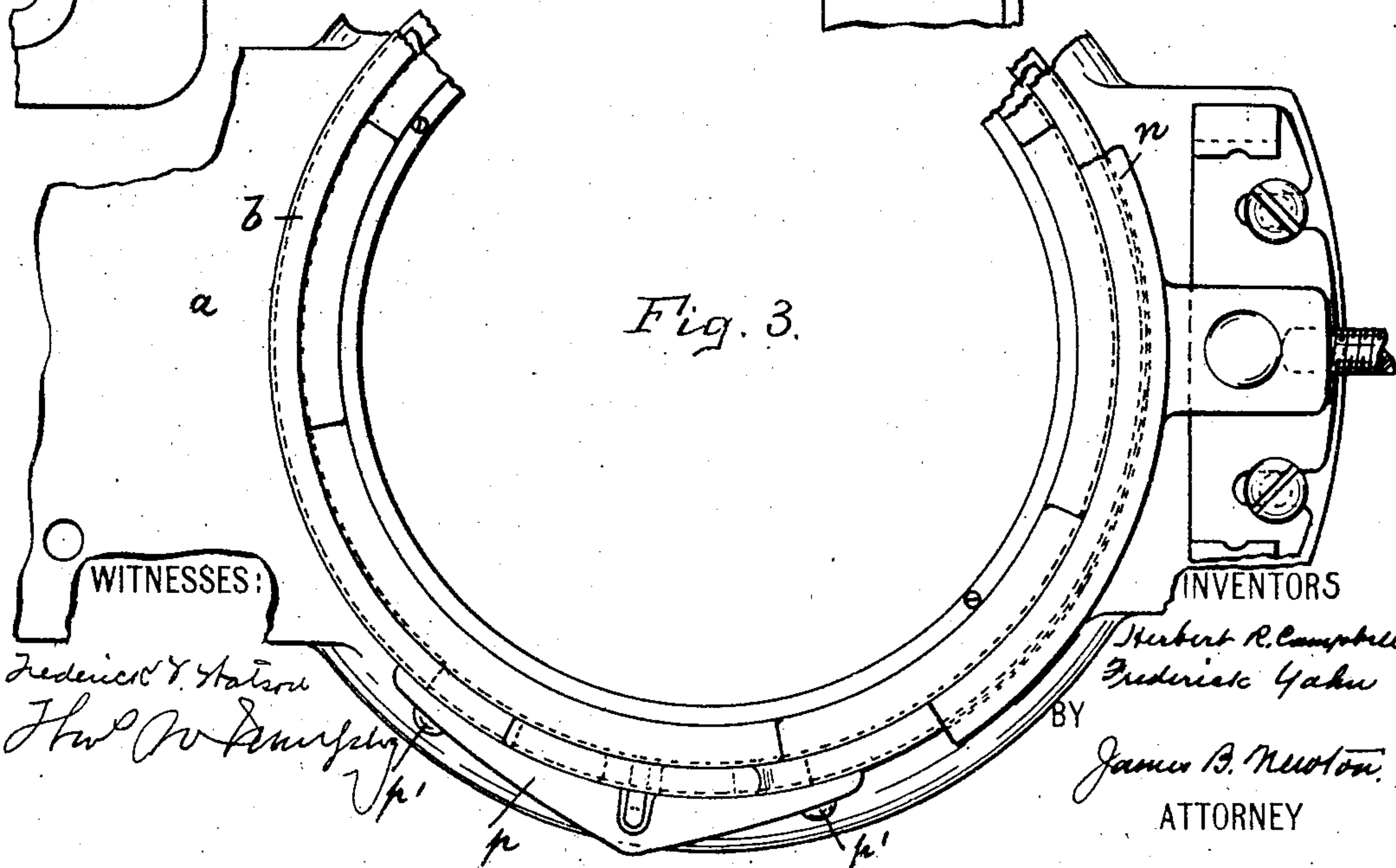


Fig. 3.

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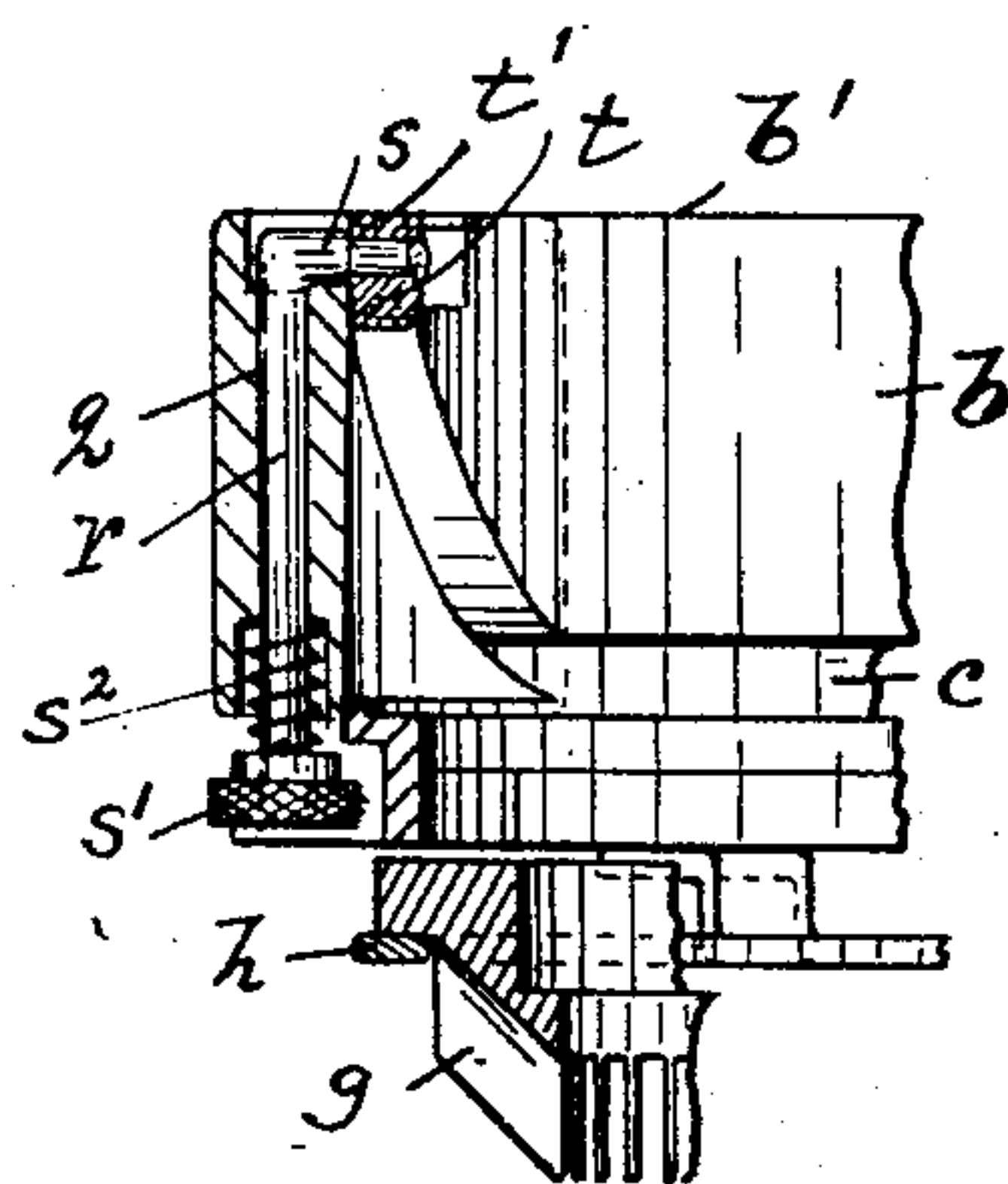


Fig. 8.

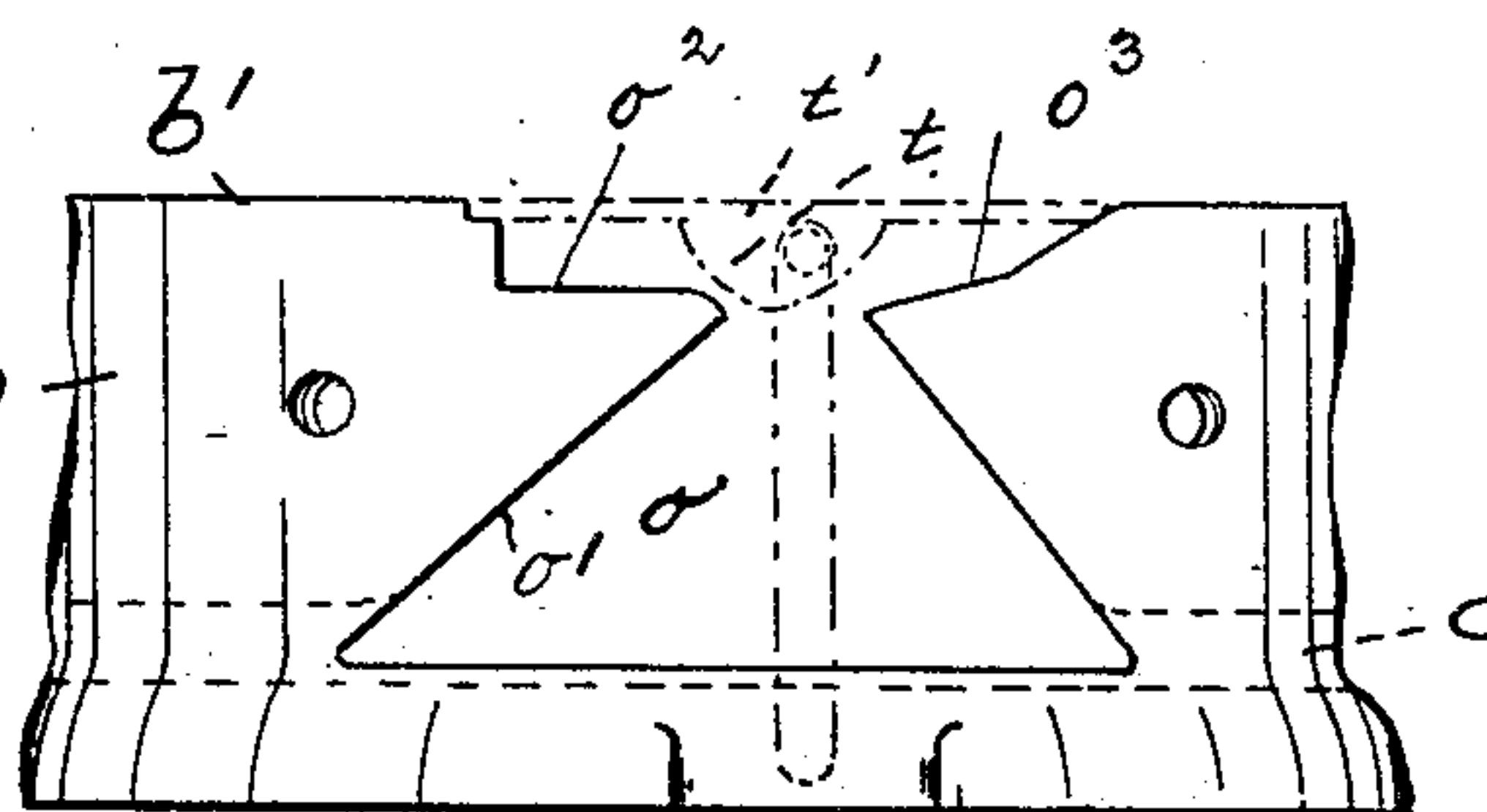


Fig. 7.

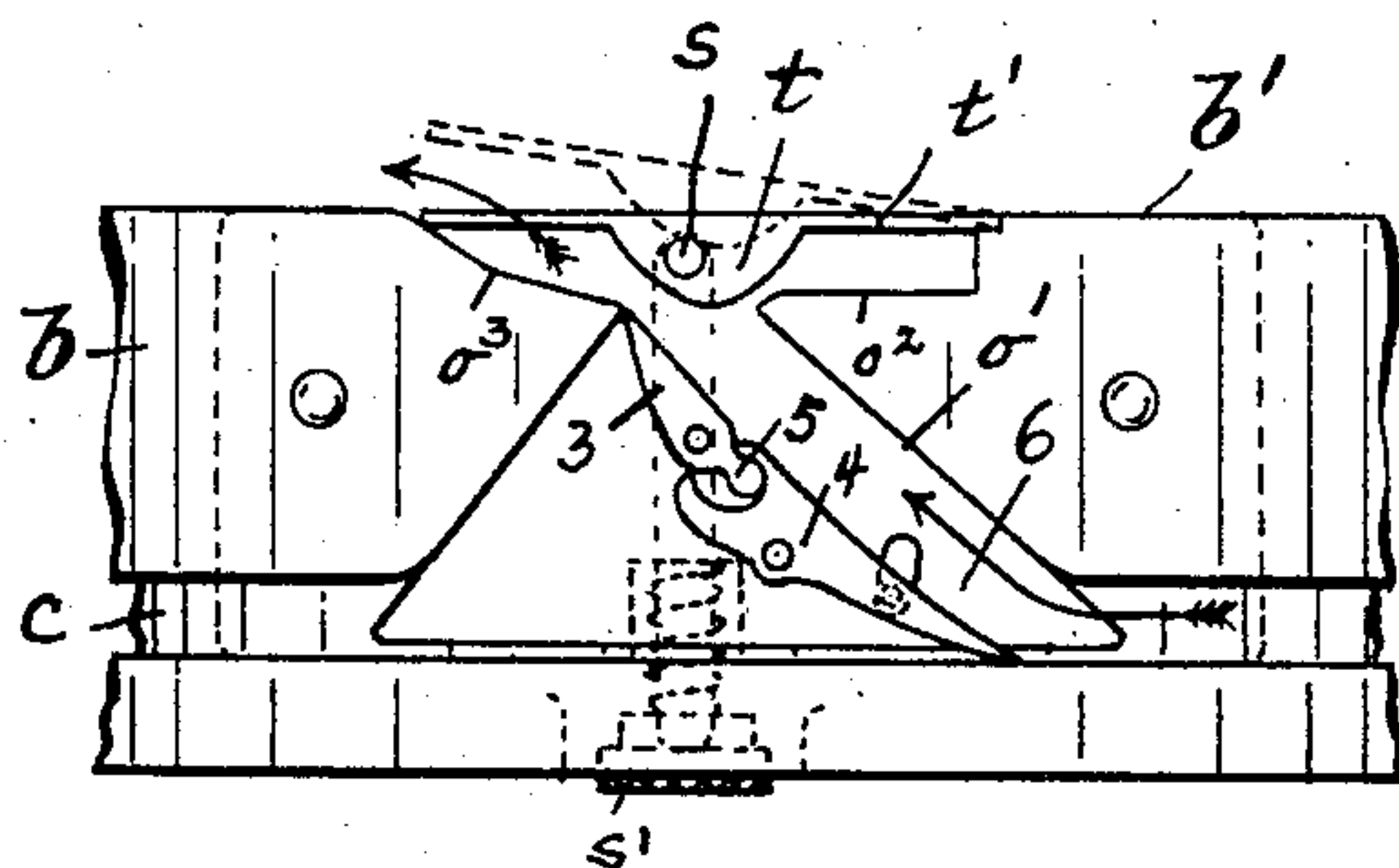


Fig. 5.

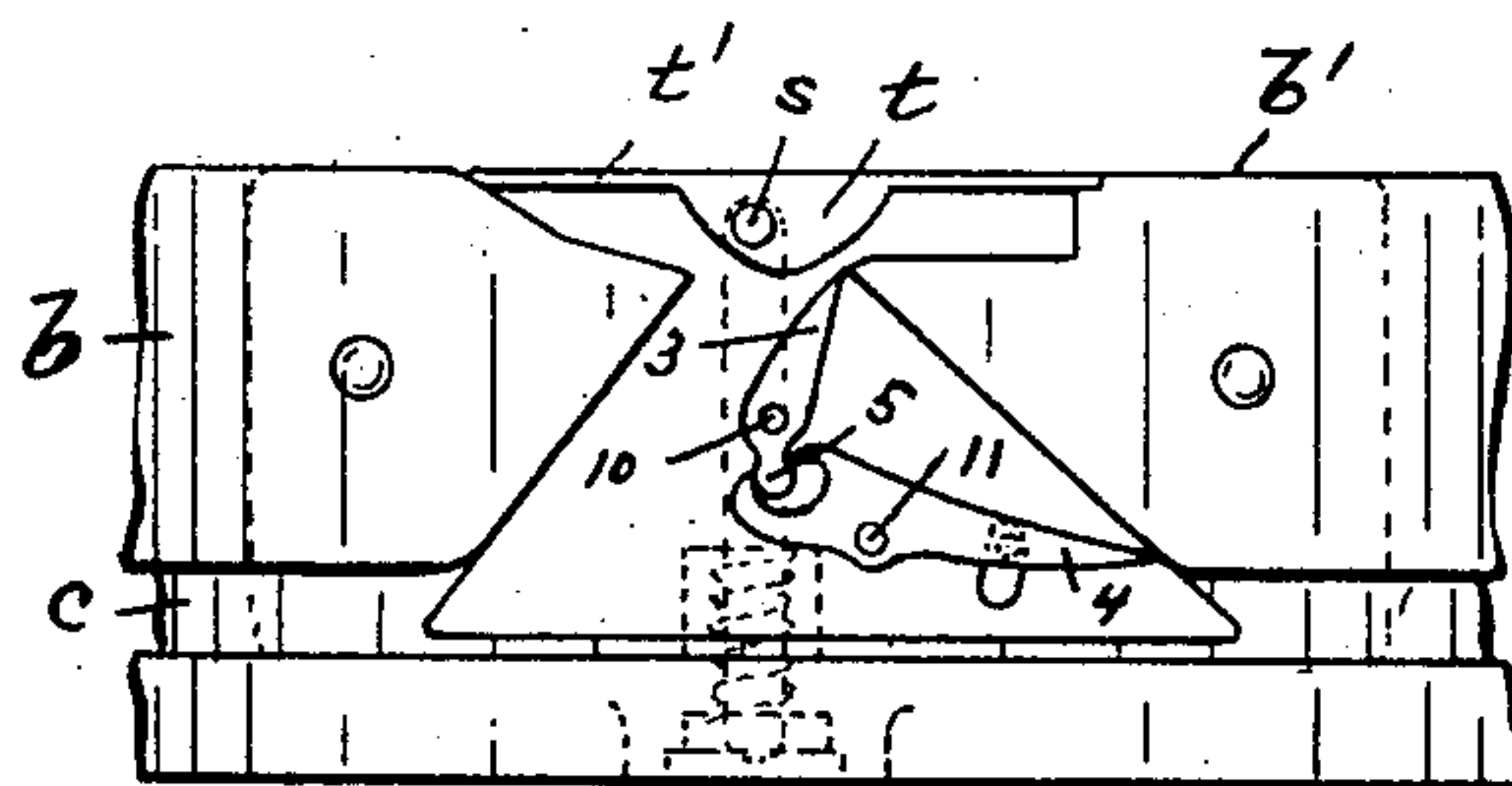


Fig. 6.

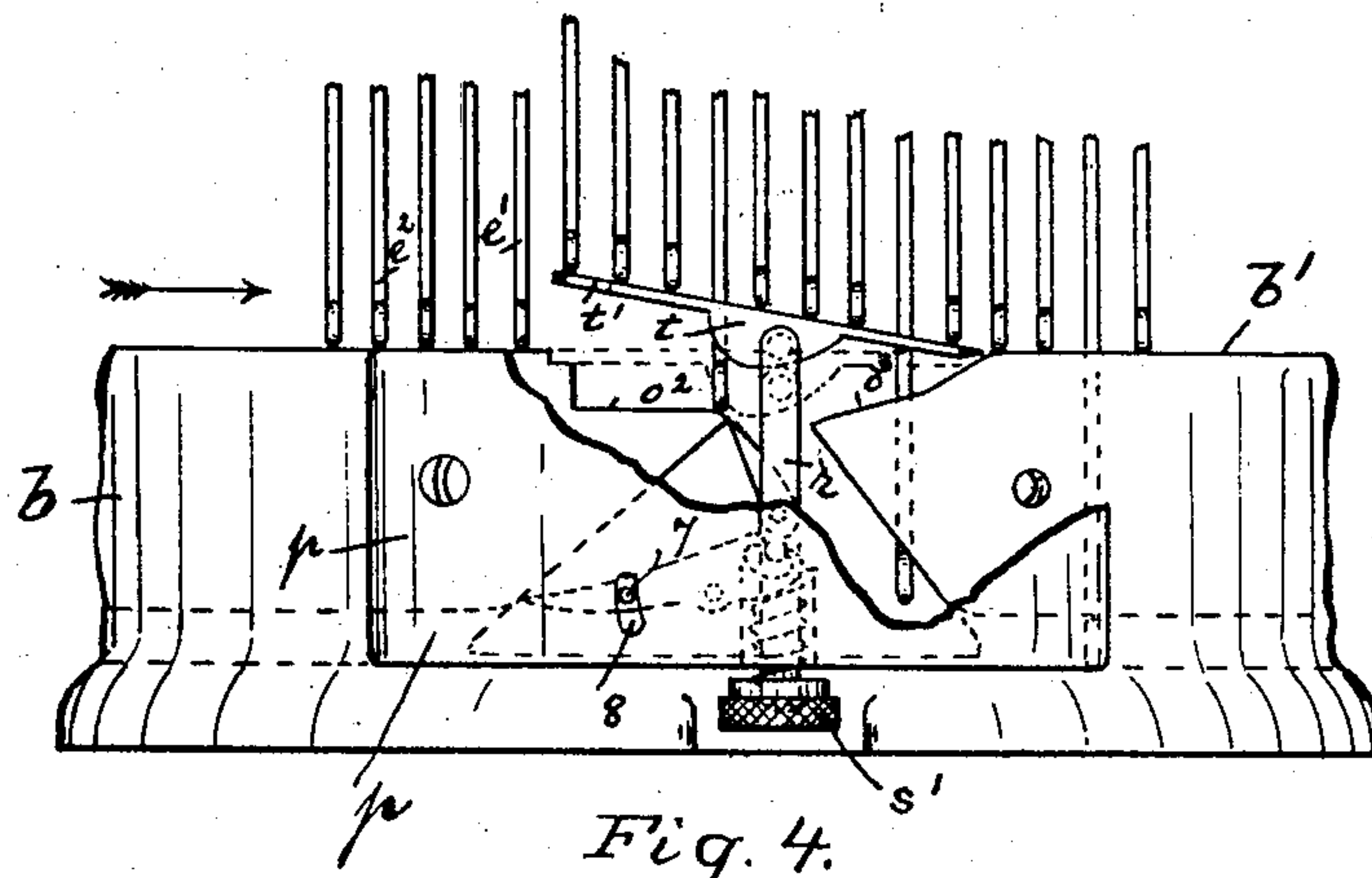


Fig. 4.

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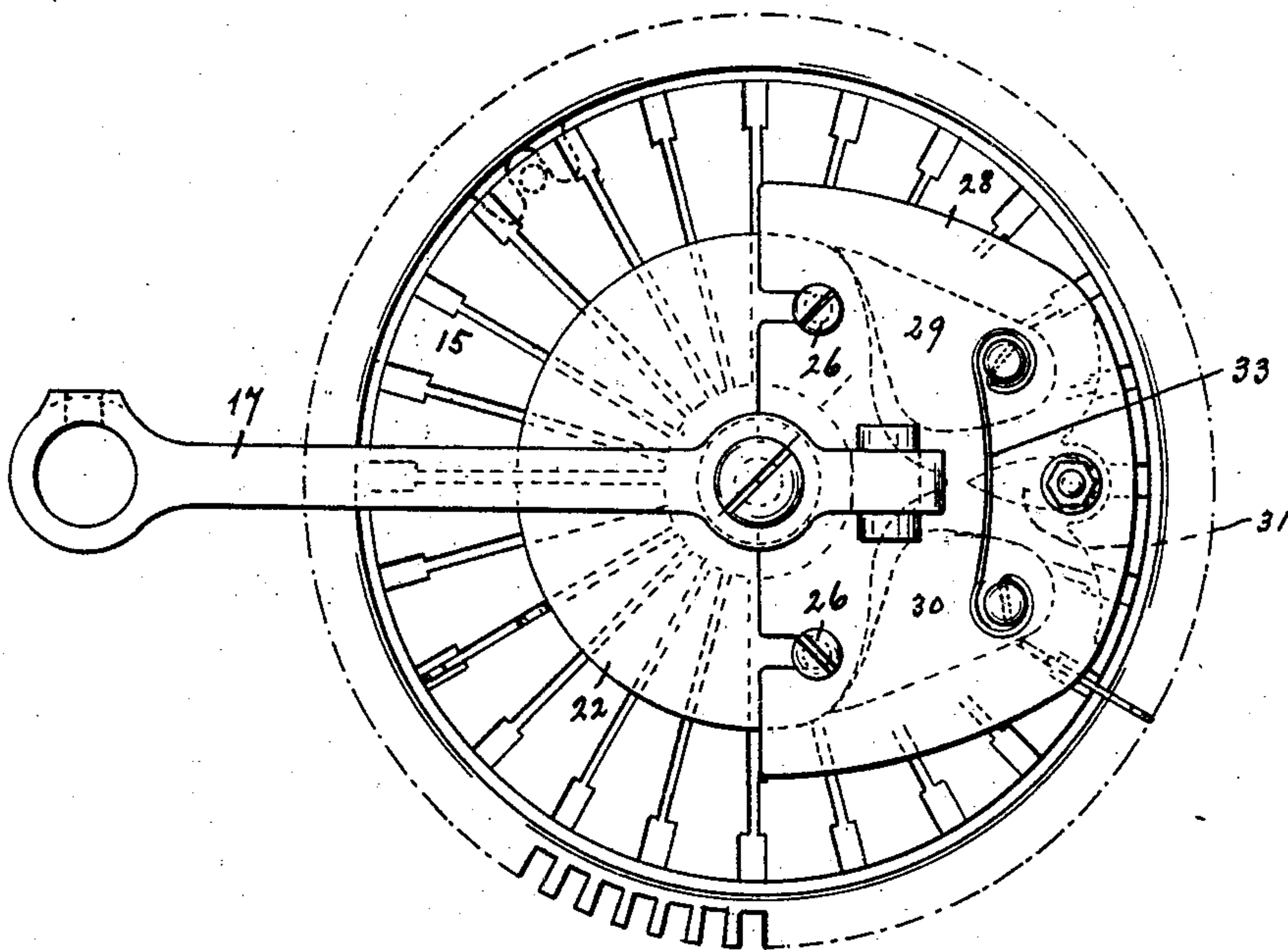


Fig. 9.

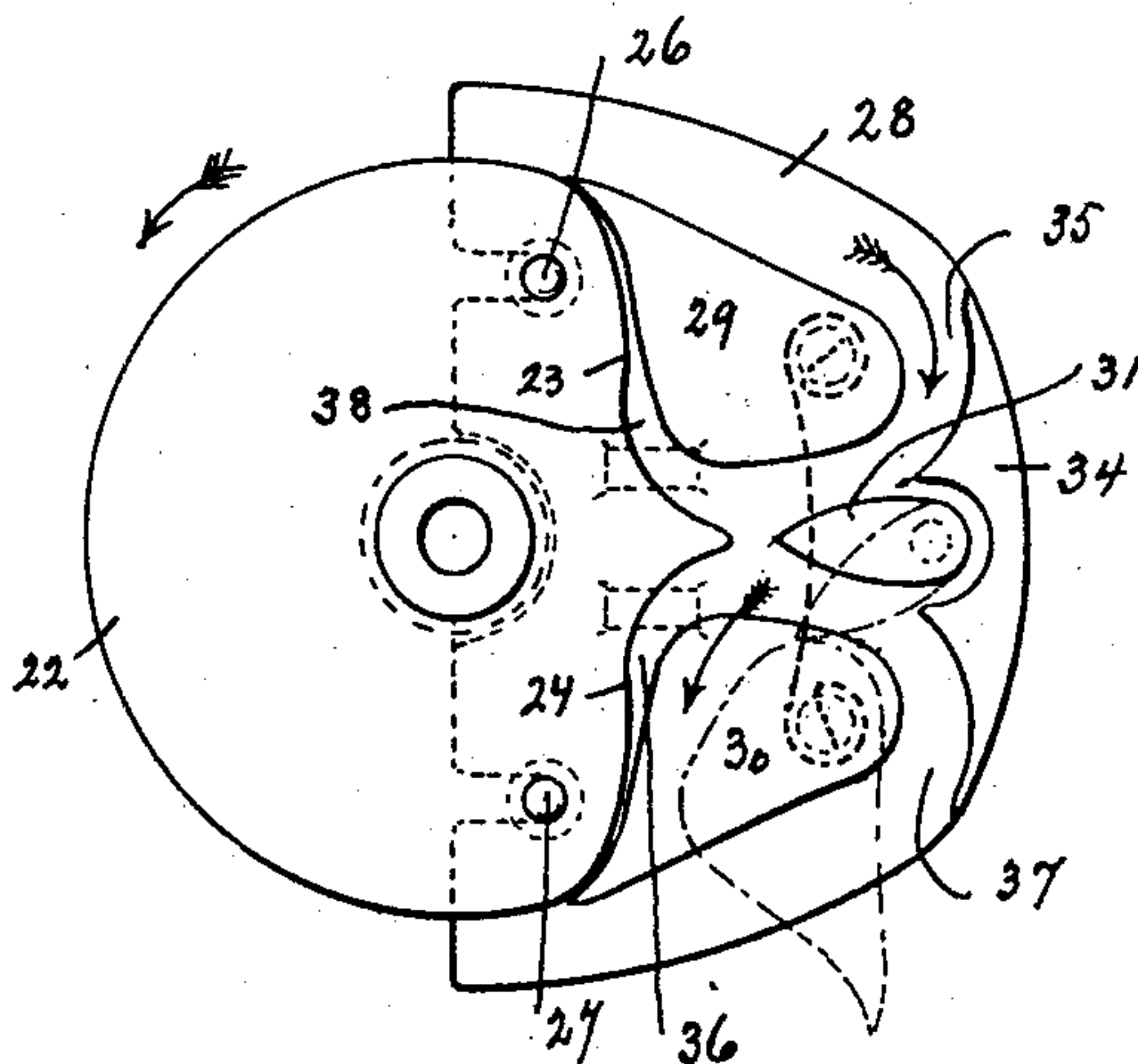


Fig. 10.

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UNITED STATES PATENT OFFICE.

HERBERT R. CAMPBELL, OF PROSPECT, AND FREDERICK YAHN, OF
HALEDON, NEW JERSEY.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 786,345, dated April 4, 1905.

Application filed May 20, 1904. Serial No. 208,972.

To all whom it may concern:

Be it known that we, HERBERT R. CAMPBELL, residing in Prospect borough, and FREDERICK YAHN, residing in Haledon, county of Passaic, State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Circular-Knitting Machines; and we hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in circular-knitting machines, and especially to that class of circular-knitting machines as is illustrated in United States Letters Patent No. 479,639, issued to J. B. Gearhart July 26, 1892.

The object of the invention is to provide a circular-knitting machine of simple, strong, and durable construction, reliable in operation, and easily handled.

A further object of the invention is to provide simple and effective means for quickly and readily interchanging the needle-cylinder and means for moving the needles into complete rest position.

A final object is to provide, in connection with the ribber, simple means for reversing the ribber—in other words, to permit of the ribber being turned from right to left, or vice versa.

The invention consists in the improved knitting-machine and in the combination and arrangement of the various parts thereof, substantially as will be hereinafter more fully described and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like characters of reference indicate corresponding parts in each of the several figures, Figure 1 is a side elevation of our improved knitting-machine, with certain parts broken away and others shown in dotted lines; Fig. 2, an enlarged cross-sectional view through the needle-cylinder, the ribber, and

the coöperative parts; Fig. 3, an enlarged detailed top plan view of Fig. 2 with the needle-cylinder and ribber removed and a portion broken away. Figs. 4, 5, 6, 7, and 8 are enlarged detailed views of a portion of the needle-cylinder-supporting frame and of the mechanism for bringing the needles into operative and rest position, respectively, as will be hereinafter more fully described; Fig. 9, an enlarged detailed top plan view of the ribber proper, and Fig. 10 a detail underneath view of a portion of Fig. 10.

In the drawings, *a* represents a frame provided with an annular vertical flange *b*, having in its lower inner portion a substantially rectangular-shaped groove or race *c*, adapted to receive the lower end or shanks *d* of the knitting-needles *e*, which latter are arranged in the needle-cylinder *f* in the usual and well-known manner. Said cylinder is revolvably mounted in the frame *a* and rests with its lower end in the annularly-grooved portion of the gear *g*, which latter in turn is revolvably mounted on the annular ring or flange *h*, secured to the under side of the frame *a* by means of screws *i*, as more clearly shown in Fig. 1 of the drawings. A pin *j* projects upward from the gear *g* and engages a recess *m* in the cylinder *f* to thus lock the cylinder to the gear, as will be manifest.

The annular vertical flange *b* is provided on one side and near the entrance to the usual and well-known cam-race *n* (see Figs. 1 and 7 more particularly) with a recess *o*, having its lower portion substantially triangular-shaped and its open upper portion substantially rectangular-shaped, forming races or guiding-surfaces *o'*, *o''*, and *o'''*, respectively, for purposes hereinafter described. A plate or cover *p* (see Figs. 1 and 4) is removably secured to the flange *b* to cover said recess *o* by means of screws *p'*, as shown in Fig. 1. Said plate or cover *p* is penetrated by a vertical hole or opening *q*, in which is slidably arranged a pin *r*, having its upper portion bent inward at right angles, as at *s*, and provided at its lower end with a suitable knob or handle *s'*. Spiral spring *s''*, surrounding the pin *r*, as shown in Fig. 8, is adapted to hold said pin in its normal position. On the

bent-in portion *s* of said pin *r* is fulcrumed a cam *t*, carrying a bridge or plate *t'*, adapted when in normal position to form a continuation of the top surface *b'* of the flange *b*, as clearly shown in Figs. 1, 5, and 6 of the drawings. It may be well to remark that the cam *t* is eccentrically arranged on its fulcrum for a purpose hereinafter more fully specified. On the inside of the plate or cover *p* are likewise pivotally arranged two pawls 3 and 4, having a ball-and-socket connection 5, adapted to form with the guide-surface *o'* a channel 6 for the purpose of guiding the shanks of the needles out of the race *c* into and upon the top surface *b'* of the flange *b* when the needles are intended to be thrown into operative position. To the pawl 4 is secured a pin 7, which projects through a slot 8 in the plate or cover *p*, and by means of said pin the pawls can be turned around their respective fulcrums 10 and 11 into the position shown in Fig. 6, in which position the shanks *d* of the needles *e* are free to move in the race *c*.

In operation when all the needles are to be used the pawls 3 and 4 and the cam *t* are in the position shown in Fig. 5. The needles which are being moved upward in the channel 6 out of the race *c* will raise or lift the bridge *t'* into the position shown in dotted lines in said Fig. 5 and then travel upon the top surface *b'* of the flange *b* to and into the ordinary cam-race *n*, as will be manifest. When it is desired to drop, say, every third needle, the bridge *t'* is raised by hand by means of the pin *r* into the position shown in Fig. 4. The needle (to be dropped)—say needle *e'*—will drop onto the guide-surface *o'* of recess *o*. The pin *r* is then released and by the spiral-spring action returns to its normal position, carrying down with it the bridge *t'*, which again closes the recess *o*, and the next following two needles will slide over the bridge *t'* into the cam-race *n*. During this movement the needle *e'* has reached a position where it bears against the cam *t* and in its further movement again raises the said cam and the bridge *t'* and allows the third needle (say *e''*) to drop onto the guide-surface *o'*. Meanwhile the first needle *e'* has cleared the cam and is moved with its shank through the channel 6 into the race *c*, the bridge-plate *t'* again returning to its normal position. This operation repeats itself with every third needle, as will be manifest; but of course it is well understood that by changing the shape of the cam any number of needles may be dropped while others remain in operative position.

The ribber 15, which carries the ribbing-needles adapted to cooperate with the knitting-needles proper, is revolubly mounted on the pin 16, which latter projects downward from the bracket 17, adjustably arranged on the upright 18, all of the usual and well-known construction. From the under side of the

ribber projects a pin 19, engaging a recess formed by lugs 20 and 21, which lugs project inward from the cylinder *f*, as shown in Fig. 2. Above the ribber and preferably integral with the pin 16 is a disk 22, being on one side thereof cam-shaped, as at 23 and 24, adapted to form guide or bearing surfaces for the shanks of the ribbing-needles, as will be hereinafter more fully described. On the disk 22 is adjustably secured, by means of screws 26 and 27, a plate 28, on which are fulcrumed cams 29 and 30 and also a switch 31. Said switch and cams, together with the cam-surfaces 23 and 24 of the disk 22, form grooves or channels for the shanks of the ribbing-needles, as can best be seen by inspecting Figs. 9 and 10 of the drawings. The cams 29 and 30, as heretofore stated, are pivotally secured to the plate 28 and are held in normal position (position shown in Fig. 10) by means of the coiled spring 33. A cam projection 34 is cast integral with the disk 28 to complete the respective channels or raceways for the shanks of the ribbing-needles. When the ribber is rotated in the direction of the arrow, Fig. 10, the shank of the needles will enter the channel 35, throw the switch 31 over into the position shown in dotted lines and move the cam 30 out of its normal position, (into the position likewise shown in dotted lines,) and will then enter the channel 36 thus formed between the cam 30 and the cam-surface 24. When the ribber is rotated in the opposite direction, the shanks of the needles will enter the channel 37, thence into the channel 38, which latter is formed by cam 29 and cam-surface 23 after the cam 29 has been moved out of its normal position by means of the pawl 31, as will be manifest.

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

1. In a knitting-machine, the combination with the needles and the cylinder carrying the same, of a frame penetrated by the lower portion of said cylinder, an annular vertical flange projecting from the frame and surrounding the said cylinder and provided with an annular groove or recess, a recess or channel connecting said annular recess with the top bearing-surface of the annular flange, a plate removably mounted on the annular flange and covering the recess or channel, a bridge-plate pivotally and slidingly mounted on said plate or cover, and a spring-controlled pin likewise arranged on said plate or cover for operating the bridge-plate, all said parts as and for the purposes described.

2. In a knitting-machine, the combination with the needles and the cylinder carrying the same, of a frame penetrated by the lower portion of said cylinder, an annular vertical flange projecting from the frame and surrounding the said cylinder and provided with an annular groove or recess, a recess or channel con-

necting said annular recess with the top bearing-surface of the annular flange, a bridge movably arranged over the recess or channel and a spring-controlled pin for operating said bridge, substantially as described.

3. In a knitting-machine, the combination with the needles and the cylinder carrying the same, of a frame penetrated by the lower portion of said cylinder, an annular vertical flange projecting from the frame and surrounding the said cylinder and provided with an annular groove or recess, a recess or channel connecting said annular recess with the top bearing-surface of the annular flange, a plate removably arranged on the annular flange and covering the recess or channel, a bridge-plate pivotally and slidingly mounted on said plate or cover, and means for raising and lowering said bridge-plate, all said parts substantially as and for the purposes specified.

4. In a knitting-machine, the combination with the needles and the cylinder carrying the same, of a frame, the cam-race carried by said frame, an annular flange projecting from said frame, and surrounding the lower part of said cylinder and having its top surface communicating with the cam-race, said annular flange being provided near its lower portion with an annular groove or recess adapted to receive the needle-shanks when in rest position, a recess or channel connecting said annular recess or groove with the top surface of the annular flange, a plate removably arranged on the annular flange and covering the last-mentioned recess or channel, and a bridge-plate pivotally and slidingly mounted on said plate or cover, all said parts substantially as and for the purposes described.

5. In a knitting-machine, the combination

with the needles and the cylinder carrying the same, of a frame, the cam-race carried by said frame, an annular flange projecting from said frame and surrounding the lower part of said cylinder and having its top surface communicating with the cam-race, said annular flange being provided near its lower portion with an annular groove or recess adapted to receive the needle-shanks when in rest position, a recess or channel connecting said annular recess or groove with the top surface of the annular flange, a plate covering the recess or channel, two switches pivotally arranged on said plate and within said groove or channel, means for operating said switches, a bridge-plate likewise carried by said plate or cover and pivotally and slidingly arranged thereon, and a cam or eccentric carried by said bridge-plate, all said parts substantially as and for the purposes described.

6. In a knitting-machine, the combination with the ribber, and with the frame supporting the same, of a cam-disk carried by the frame and above the ribber, an auxiliary plate adjustably arranged upon said cam-plate, spring-controlled cams carried by said auxiliary plate and adapted to cooperate with the cam-plate, and a switch pivotally arranged on the auxiliary plate and adapted to cooperate with the spring-controlled cam, all said parts substantially as and for the purposes described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

HERBERT R. CAMPBELL.
FREDERICK YAHN.

Witnesses:

JAMES B. NEWTON,
S. F. HOLDEN.