

No. 677,224.

Patented June 25, 1901.

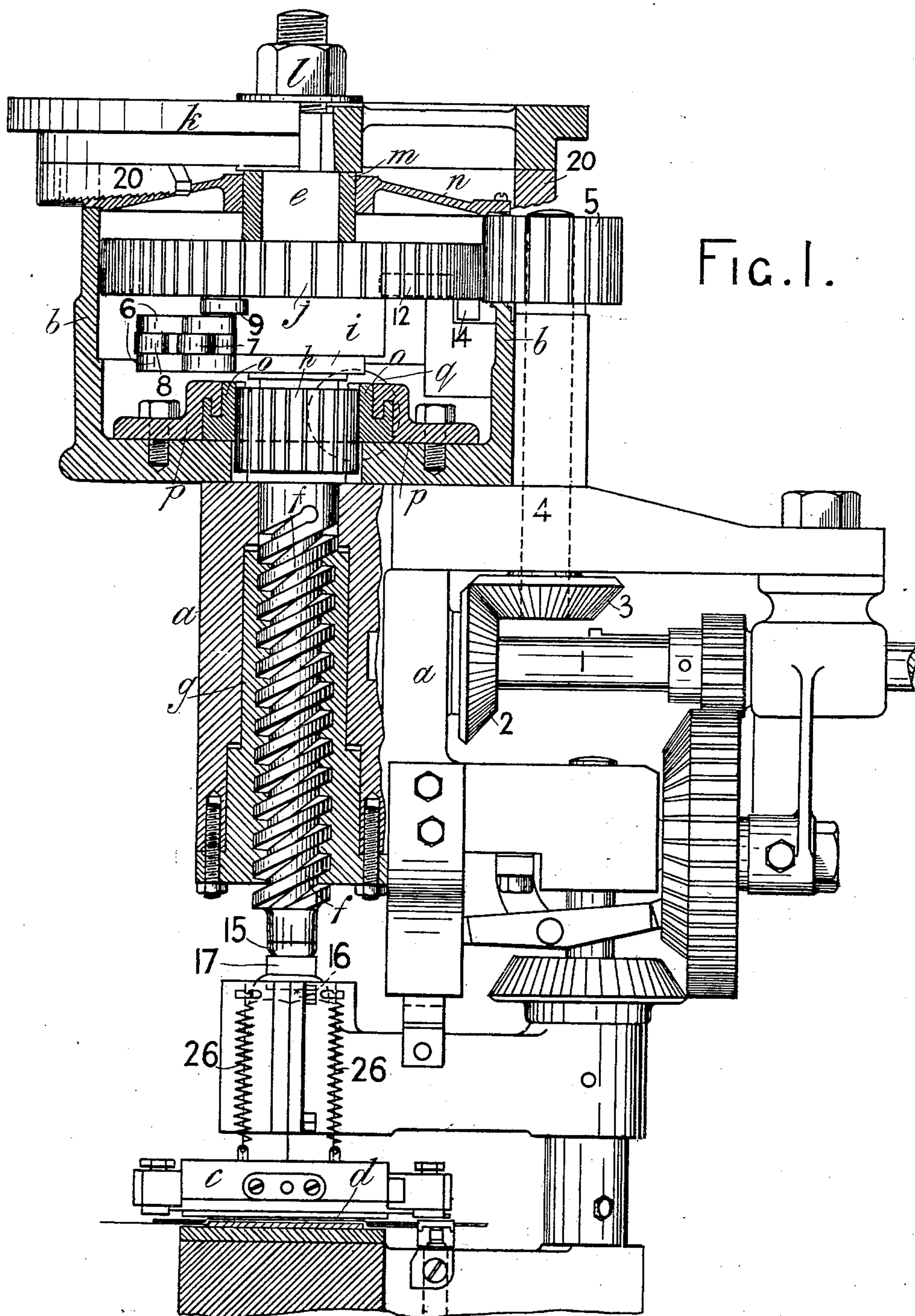
J. Y. JOHNSTON.

PRESS FOR PRINTING, EMBOSsing, OR PRINTING AND EMBOSsing.

(No Model.)

(Application filed Jan. 23, 1900. Renewed Apr. 23, 1901.)

5 Sheets—Sheet 1.



Witnesses

Arthur Woodman
William Henry Simms

Inventor

Joseph Y. Johnston

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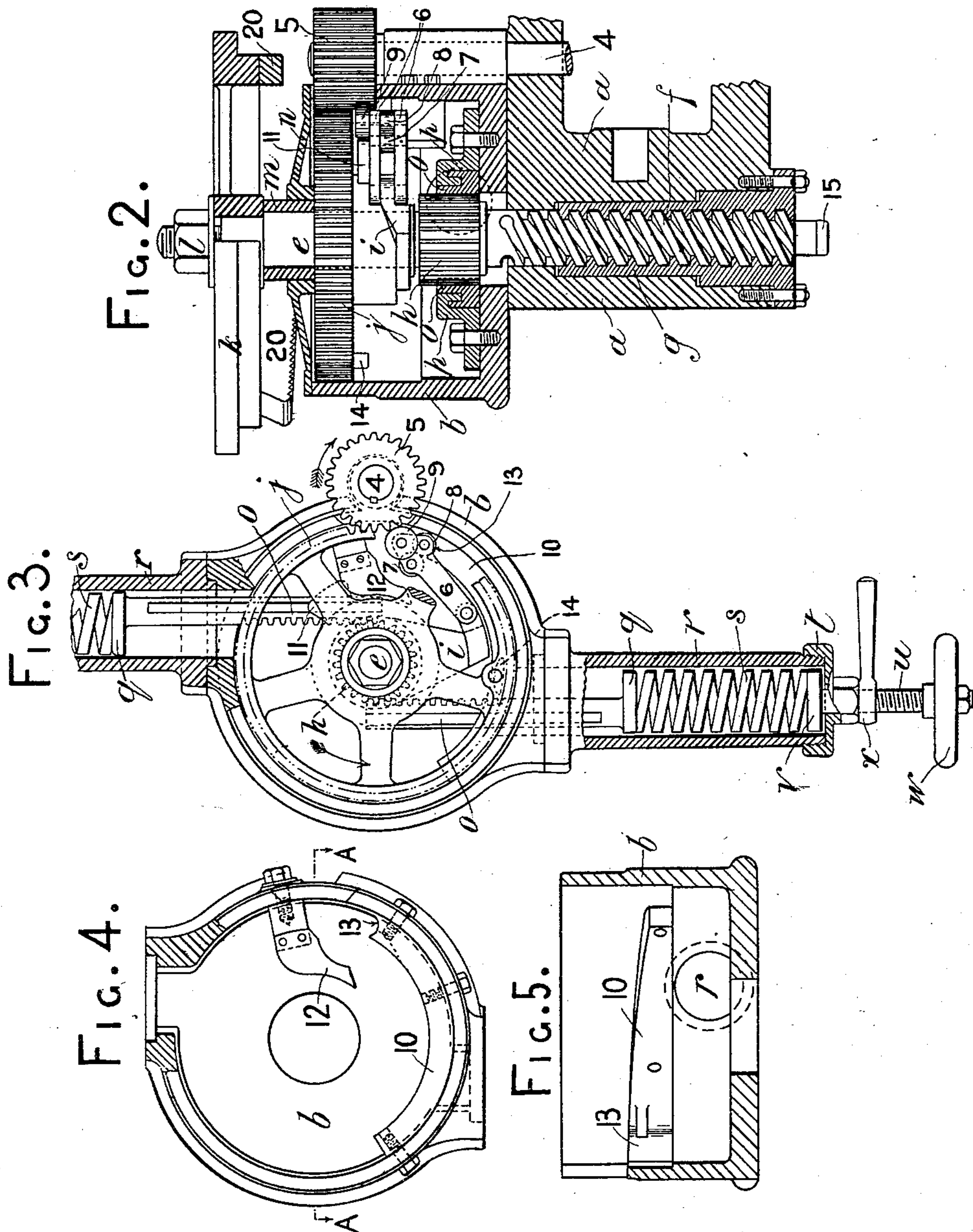
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5 Sheets—Sheet 3.

FIG. 6.

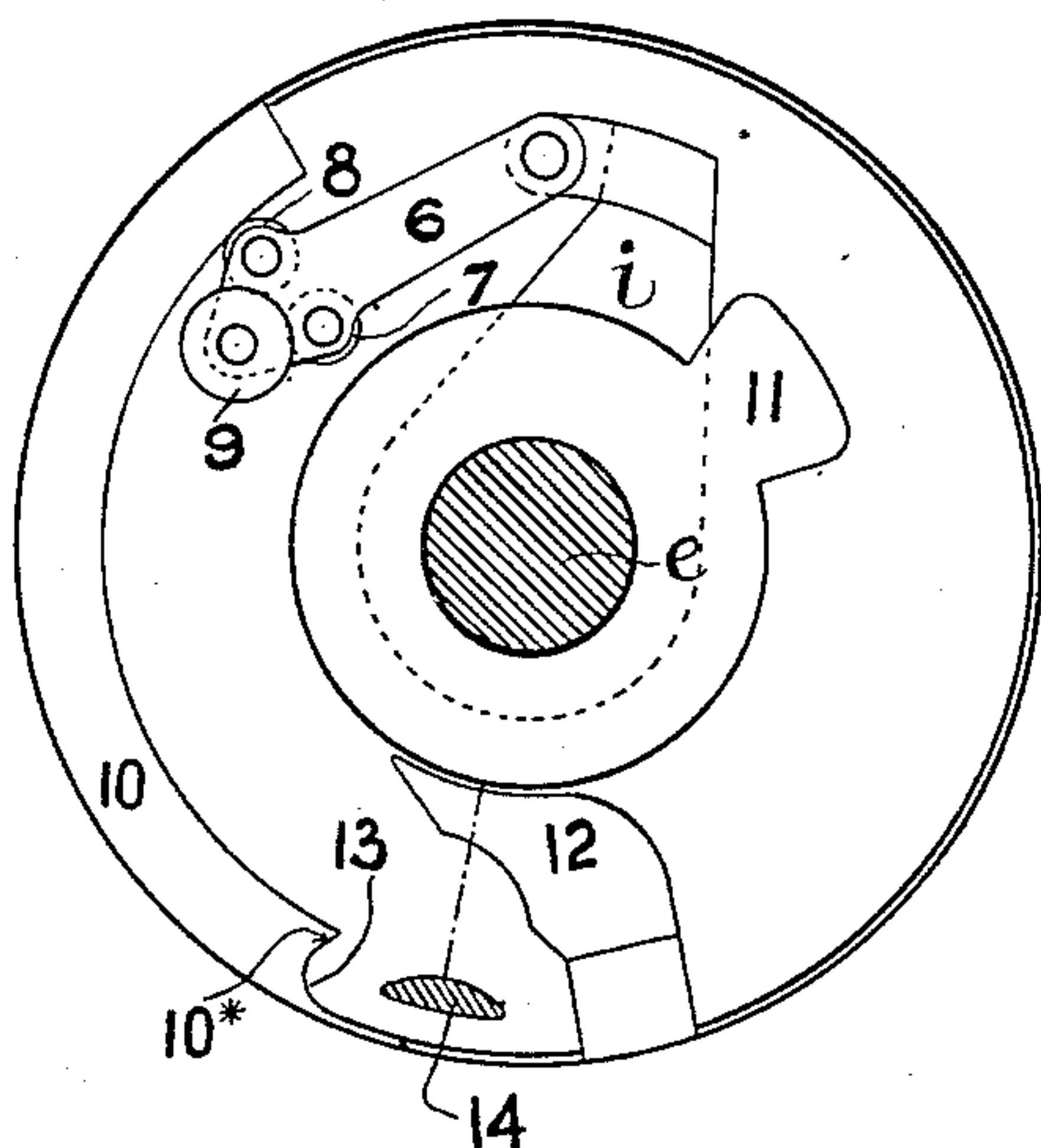


FIG. 7.

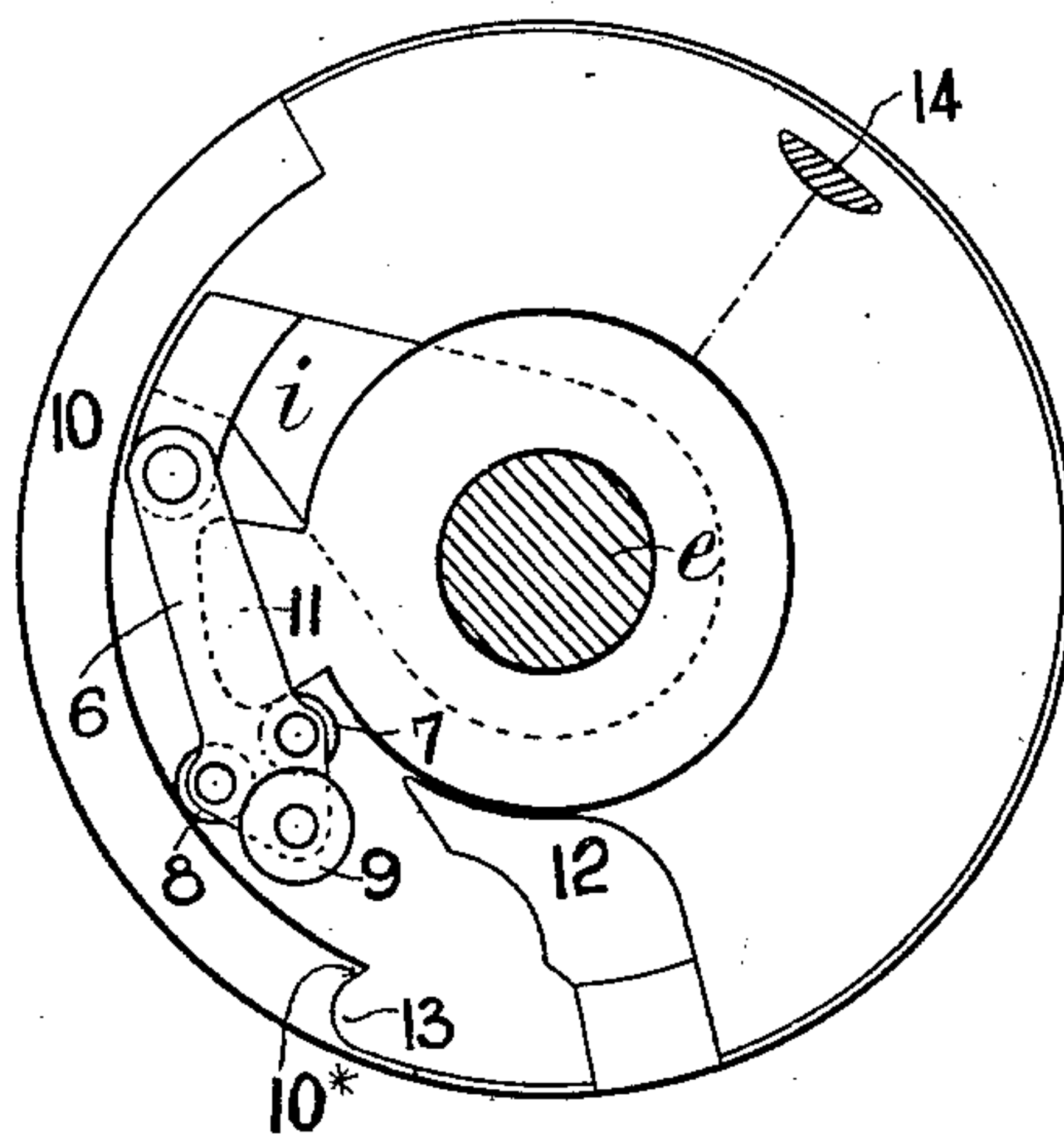


FIG. 9.

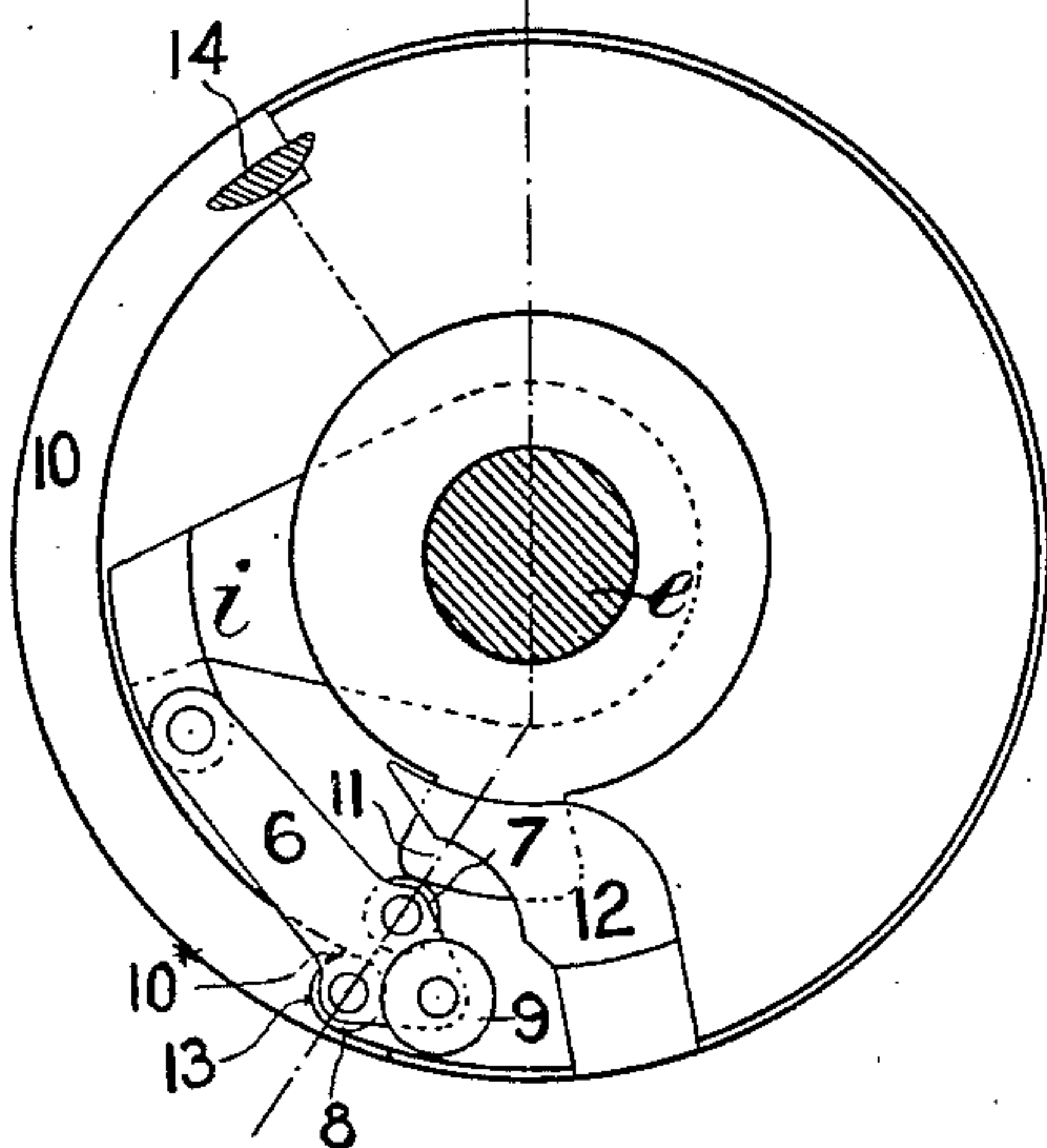
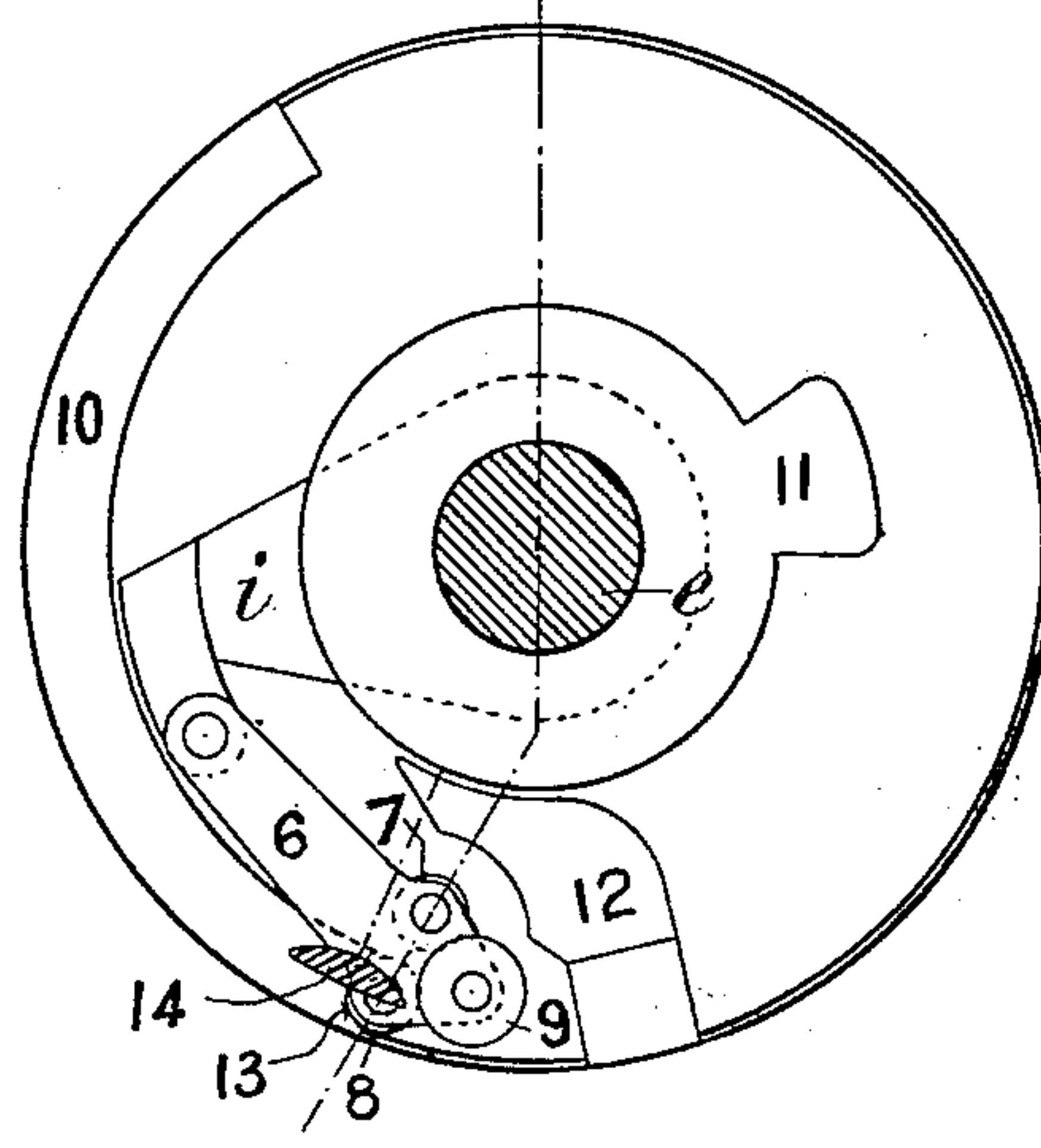


FIG. 10.



Witnesses

Arthur Wassman
William Henry Simms.

Inventor

Joseph Y. Johnston

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5 Sheets—Sheet 4.

FIG. 8.

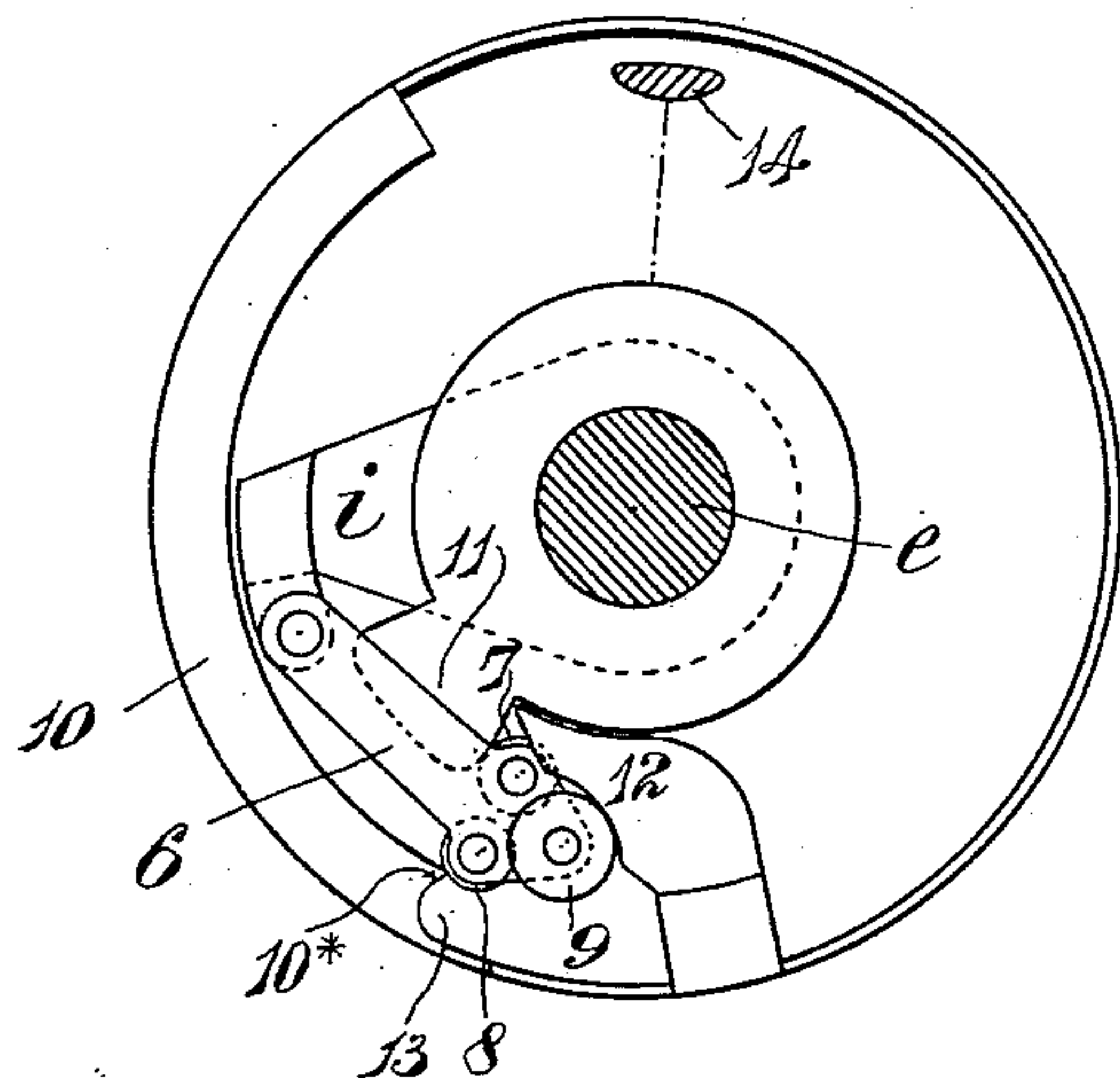


FIG. 12.

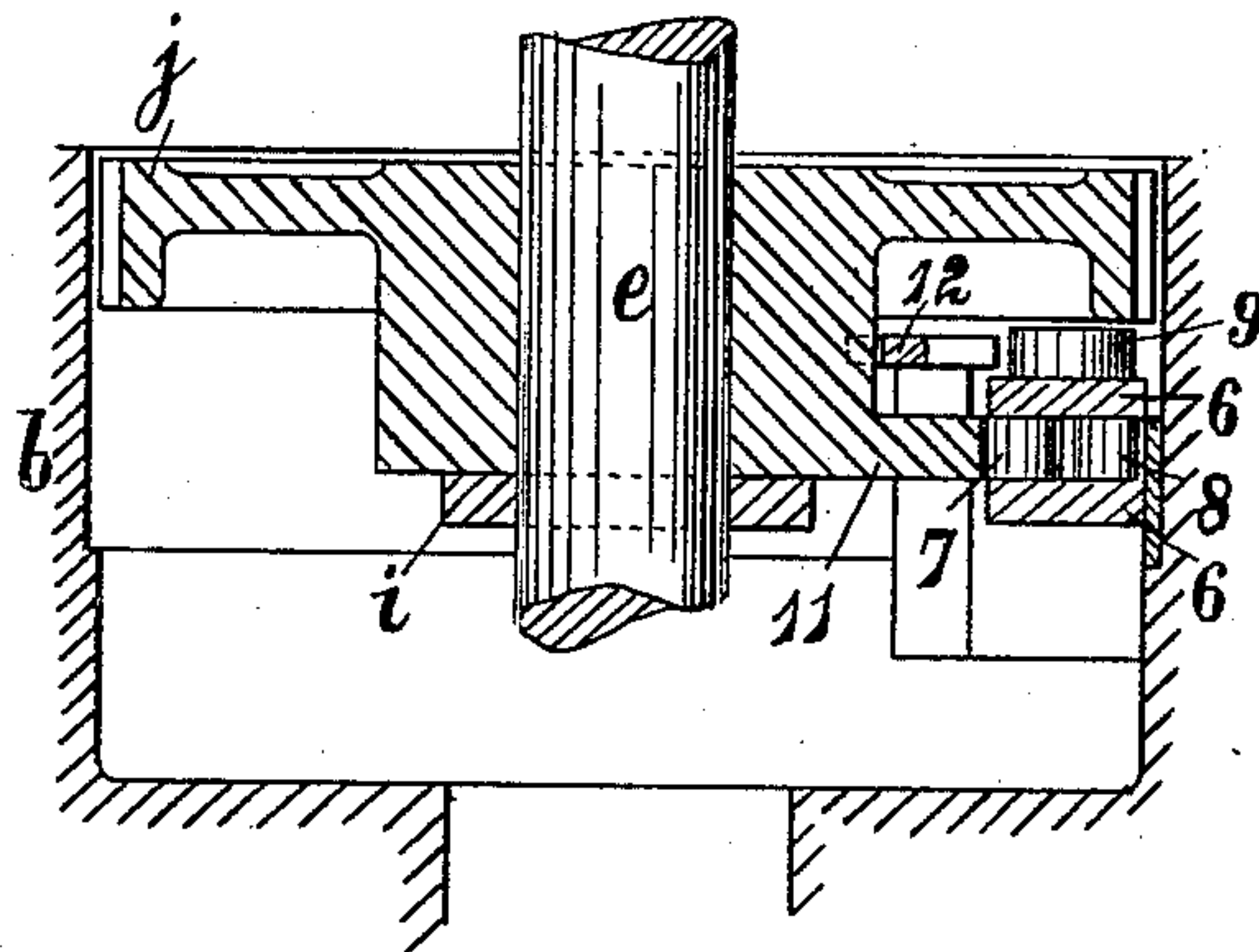


FIG. 11.

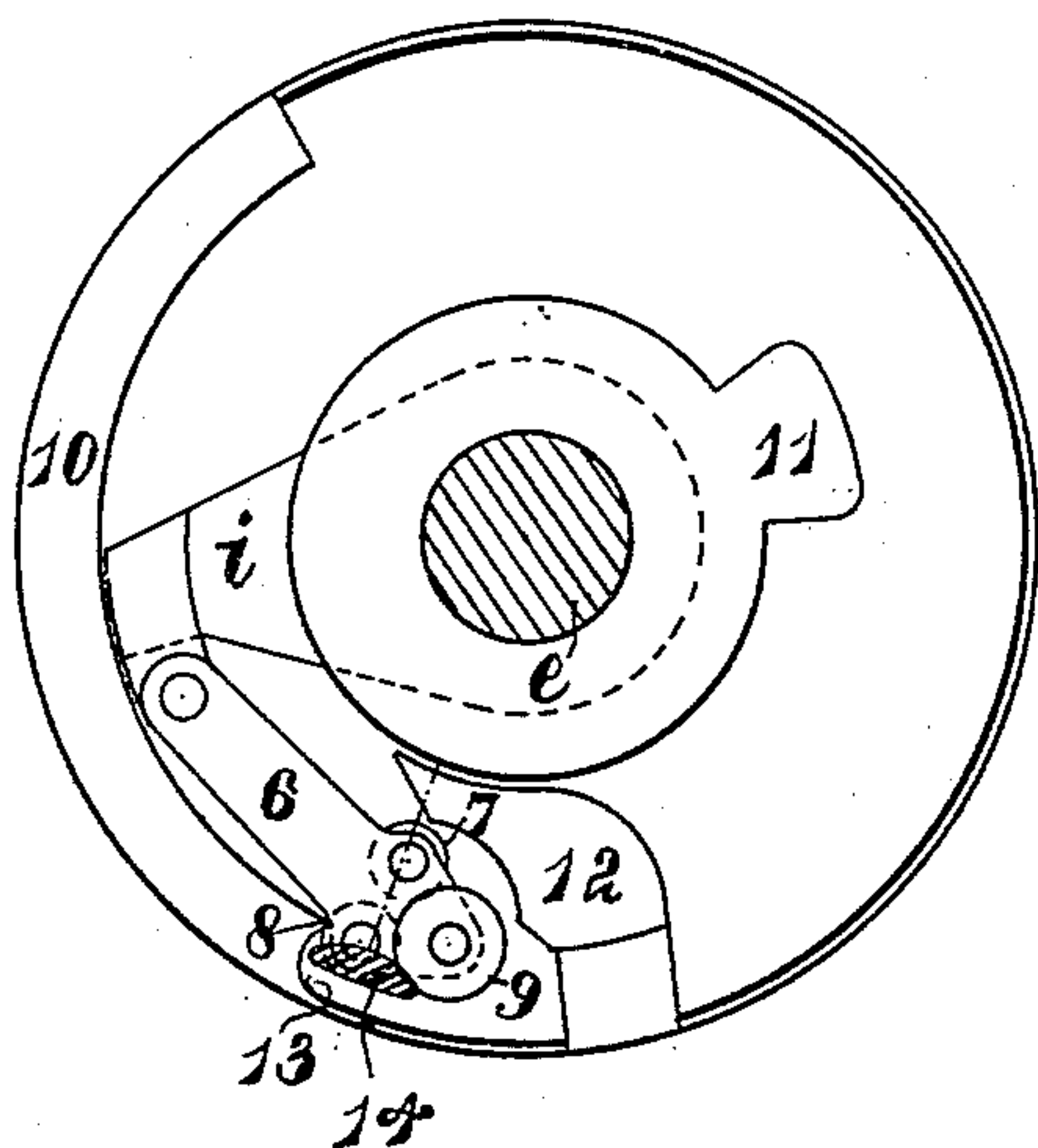
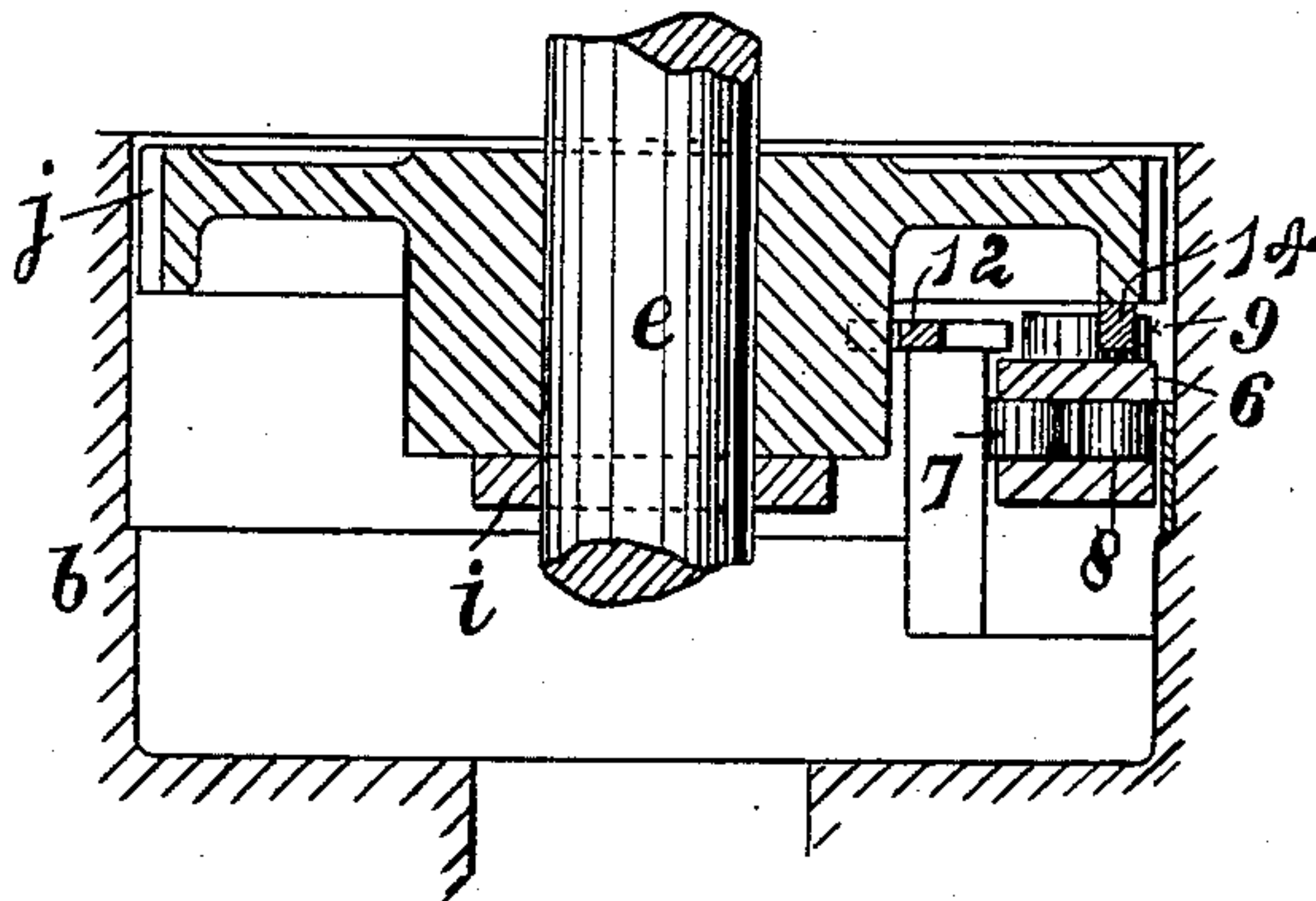


FIG. 13.



Witnesses

Arthur Wossnau
William Henry Simms.

Inventor

Joseph Y. Johnston

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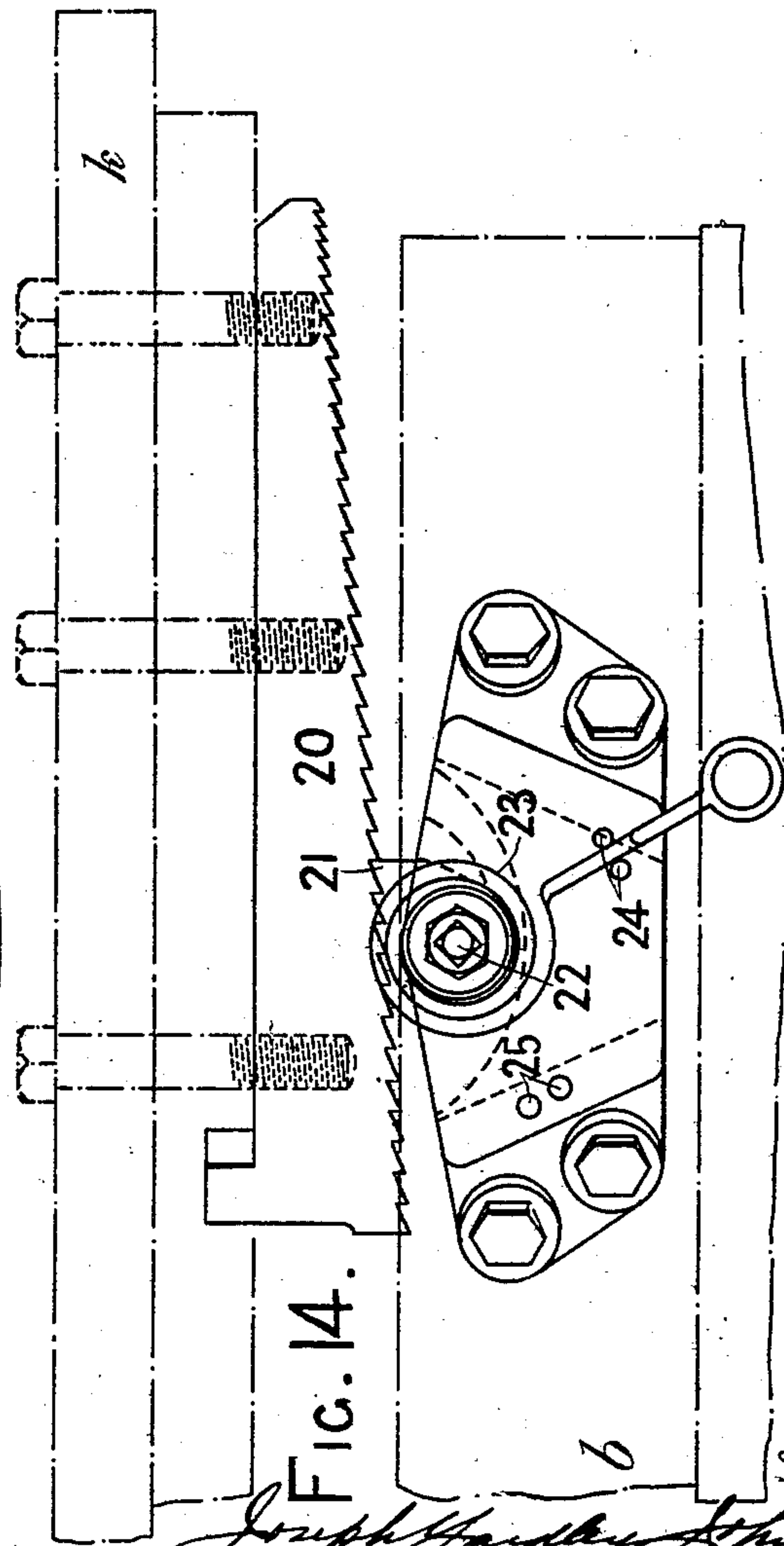
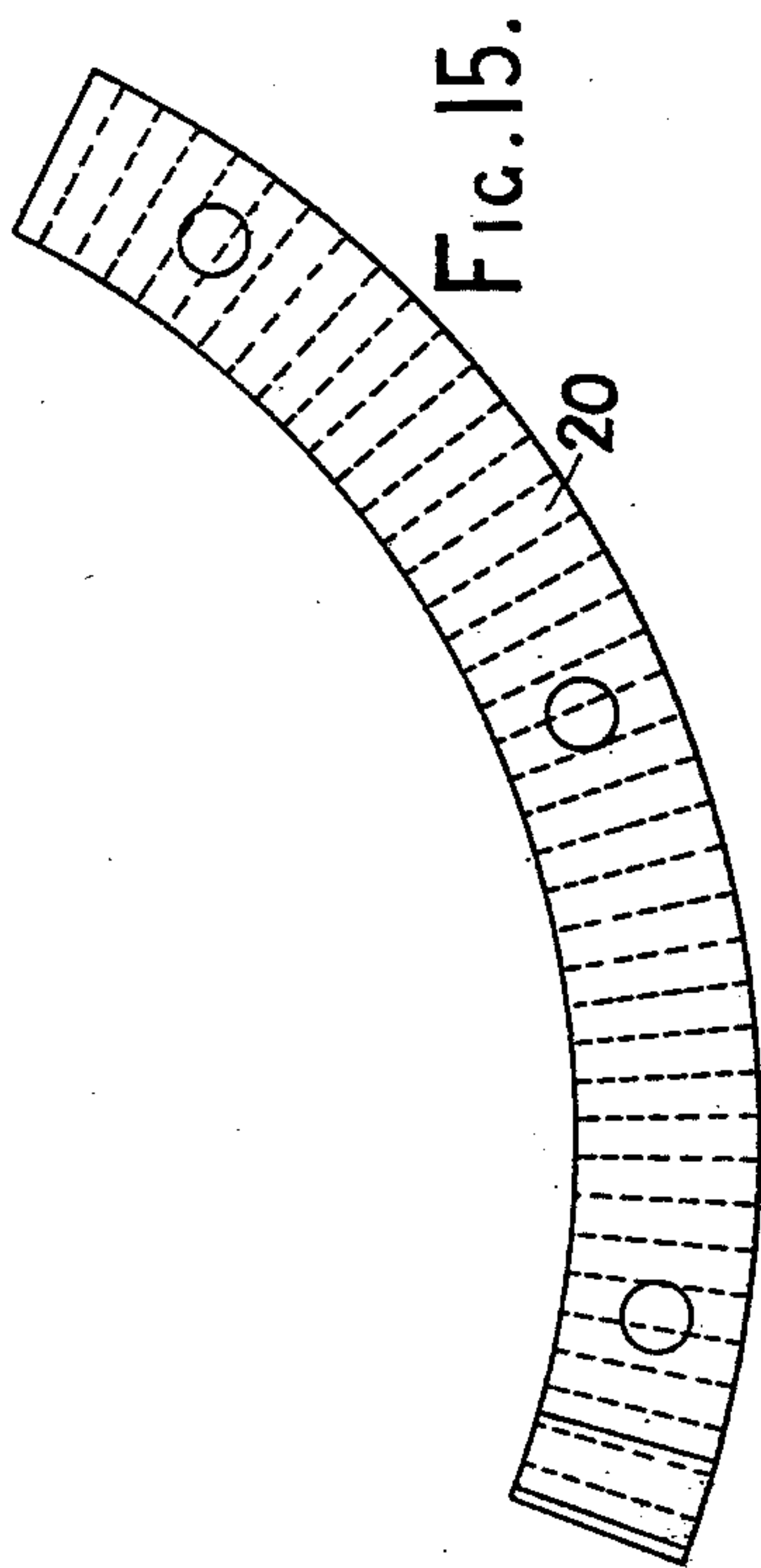
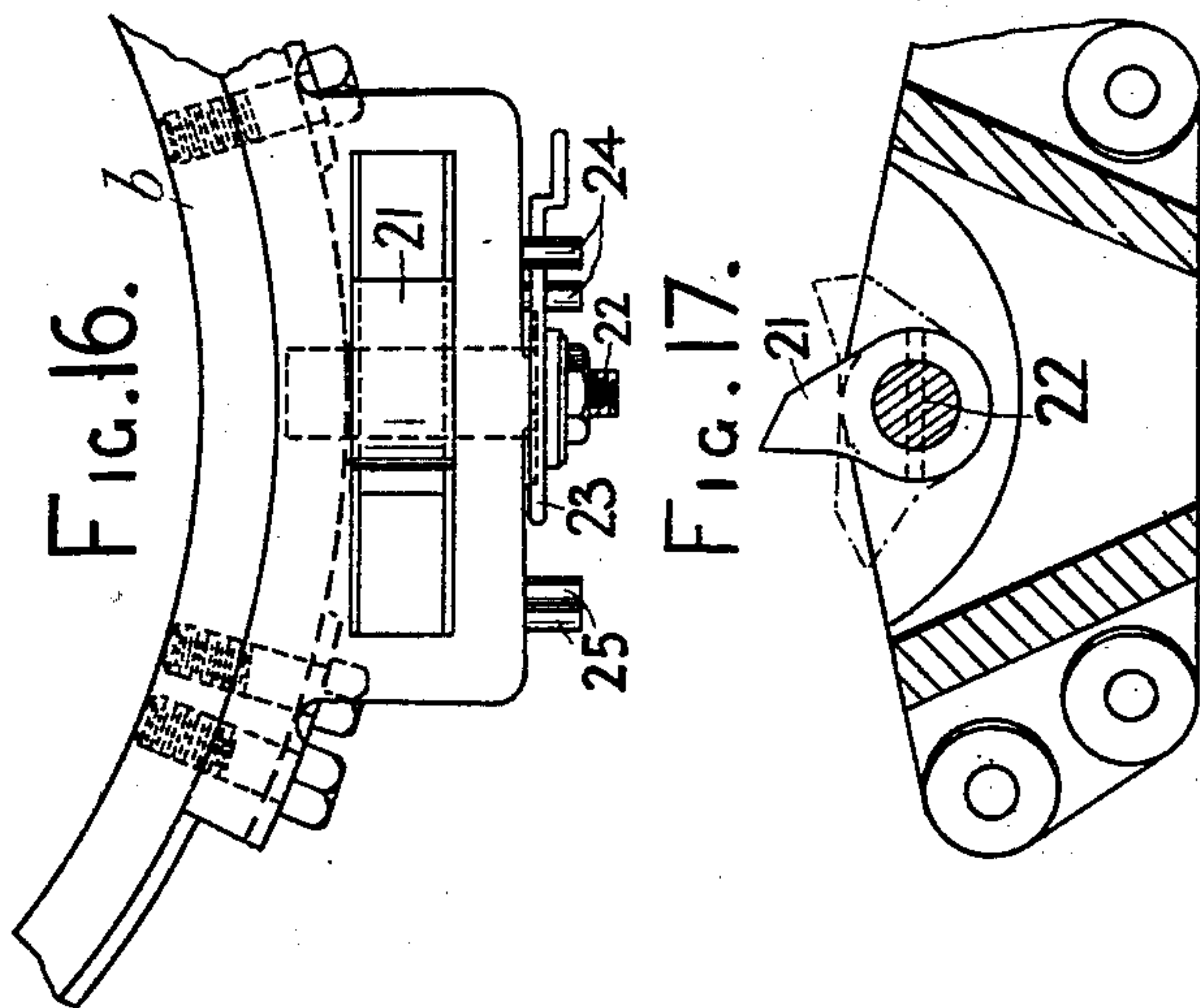
J. Y. JOHNSTON.

PRESS FOR PRINTING, EMBOSSED, OR PRINTING AND EMBOSSED.

(Application filed Jan. 23, 1900. Renewed Apr. 23, 1901.)

(No Model.)

5 Sheets—Sheet 5.



Witnesses
Arthur Woodman
William Henry Simms

Joseph Y. Johnston
Inventor

UNITED STATES PATENT OFFICE.

JOSEPH YARDLEY JOHNSTON, OF LONDON, ENGLAND, ASSIGNOR TO THE JOHNSTON NORTH AMERICAN PATENTS COMPANY, LIMITED, OF SAME PLACE.

PRESS FOR PRINTING, EMBOSSING, OR PRINTING AND EMBOSSING.

SPECIFICATION forming part of Letters Patent No. 677,224, dated June 25, 1901.

Application filed January 23, 1900. Renewed April 23, 1901. Serial No. 57,117. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH YARDLEY JOHNSTON, a citizen of the United States of America, residing at the city of London, England, have
5 invented Improvements in Presses for Printing, Embossing, or Printing and Embossing, of which the following is a specification.

My invention has reference to the impression mechanism of printing, embossing, or
10 printing and embossing presses in which the downward stroke of a plunger causes the engraved or other printing or embossing surface (hereinafter called a "die") to strike the material to be printed or embossed, objects be-
15 ing to provide more effectually than heretofore usual for preventing the die, after it has struck the material to be printed or embossed and has once left the same, returning thereto until the proper time for its next stroke, for
20 enabling the plunger to rebound quickly and the die to leave the material immediately after the impression has been struck, and for obviating shock and vibration.

The accompanying drawings illustrate a
25 convenient arrangement of impression mechanism according to this invention, which I will now describe, premising that as here described my improved apparatus is applied in a press which for convenience of description
30 I will assume is to be used for printing and which is so arranged that an arm adapted to revolve in a horizontal plane and carrying the die at its end first passes over apparatus which charges the die with ink, then over a
35 wiping apparatus which removes all superfluous ink, leaving only the female part of the die charged, and is then brought to rest and locked in register over a counter, force, male plate or other part between which and
40 the die the impression is to take place, the impression being then given by a blow of the die caused by the release and descent of the plunger from the raised position to which it had been carried and in which it had been
45 locked during the preceding cycle of operations.

Figure 1 is a sectional elevation of the upper part of a press provided with my improved mechanism for giving the impression-
50 blow, the plunger being shown in its lowest position. Figs. 2 and 3 show the said mech-

anism respectively in vertical and a horizontal section, with certain portions in elevation, the plunger being shown in its highest position. Fig. 4 is a sectional plan showing
55 certain fixed parts only of said mechanism. Fig. 5 is a vertical section on the line A A, Fig. 4. Figs. 6 to 11, inclusive, are diagrammatic plans; and Figs. 12 and 13 are diagrammatic sections through Figs. 9 and 10, illustrating the action of certain parts of the mechanism for raising, locking, and releasing the
60 plunger. Figs. 14 to 17 are detail views illustrating an arrangement for preventing the premature descent of the plunger. 65

Secured on the top of the press-frame *a* is a cylinder or casing *b*, the axis of which is in line with that of the shank of the block *c* carrying the die *d* when the latter is in registration. A plunger *e*, screw-threaded at its lower
70 part *f*, extends centrally through the cylinder-casing *b* and works in a long nut *g*, secured within the press-frame.

h is a spur-pinion formed on or secured to the plunger, and *i* is an arm secured above
75 said pinion. *j* is a spur-wheel which is free to rotate on the plunger above said arm. The plunger *e* is weighted by means of a fly-wheel *k*, that is fixed by a nut *l* upon a tapering polygonal part of the plunger. When it is
80 desired to increase the force of the blow delivered by the screw-plunger, one or more balance wheels or rings may be secured to the fly-wheel.

m is a sleeve between the fly-wheel *k* and
85 the spur-wheel *j* for preventing end motion of the latter. Thus owing to the wheel *j* being compelled to move up and down with the plunger *e* the weight of the fly-wheel may be reduced, and shock caused by the plunger
90 overrunning the wheel *j* while descending and meeting it during the rebound will be avoided.

The cylinder or casing is provided with a cover *n*, formed with a central aperture which
95 forms a bearing for a sleeve *m* and tends to prevent vibration of the plunger and fly-wheel and side strain and wear between the screw and nut.

The pinion *h* gears with a pair of sliding
100 racks *o*, working in guides *p*, (shown in Figs. 1 and 2 only,) secured in the cylinder *b*, par-

allel to each other. The racks *o* and the guides may be formed with reversely - arranged ribs and grooves, the ribs being made a sliding fit in the grooves, as shown. The racks *o* terminate in heads *q*, which work in tubular boxes *r*, bolted to the cylinder *b*, as shown. These boxes contain springs *s* and are closed by cap-nuts *t*, each of which is fitted with a screw-spindle *u*, having an adjustable abutment or end piece *v*, a hand-wheel *w*, and lock-nut *x*. By screwing the spindles *u* in or out the extent to which the springs *s* are compressed prior to the release of the plunger can be varied so as to regulate the force of the impression-blow as desired. When the plunger partially rotates, so as to rise from its lowest position, the racks *o* move outward freely during the first portion of their stroke. Then their heads abut against the springs *s*, which during the remainder of the stroke are compressed against the end pieces *v*. On the release of the plunger *e* the springs *s* quickly start it into motion, but will have expanded to their full length before the racks have completed their return strokes, thus relieving them and the plunger to which they are geared from pressure, so that the latter may deliver its blow freely and may be free to rebound quickly after the impression-blow is delivered. The lower part of the plunger is formed with a number of screw-threads of great or coarse pitch, so as to allow the rebound to occur.

The raising, locking, and releasing of the plunger are accomplished as follows: On the main shaft 1 of the press is keyed a miter-wheel 2, which drives another miter-wheel, 3, keyed on a shaft 4, on which is a spur-pinion 5, gearing with the spur-wheel *j*, which is thus kept in continuous rotation. The spur-wheel *j* is intermittently connected to the plunger *e* by means of a connector comprising a link 6, formed of a couple of connected plates and pivoted to the arm *i* of the plunger. The link is furnished with a drag-roller 7 and a locking-roller 8, arranged at the same level, and with a larger roller 9, occupying a higher position, the three rollers being arranged triangularwise, as seen in plan, Fig. 3, with the roller 9 at the end of the link. Secured upon a ledge within the cylinder *b* is a guide 10, and fixed to the spur-wheel *j* is a cam-arm 11, the forward edge of which comes in contact with the drag-roller 7, and so drags along with it the link 6, which is pivoted to the arm *i*, thus rotating and raising the plunger, the springs *s* being thereby compressed. This part of the action may be followed by reference to Figs. 6 and 7, which respectively show the position of the parts referred to when the plunger is at the bottom of its stroke and when the plunger has rebounded and the cam 11 has caught the roller 7. The face of the said cam is so formed that it makes contact with the roller 7 at the point at which a line passing through the axes of the roller

7 and of the pivot of the link 6 cuts the periphery of said roller. By this means as the connector is dragged around the tendency to force the locking-roller 8 against the guide 10 is avoided until the roller 9 is brought into contact with a fixed cam-plate 12. This plate is so shaped that as the roller 9 moves along it the free end of the connector is deflected by it, (see Fig. 8,) so as to cause the roller 8 to roll into a recess 13, formed in the end of the guide 10, the rearward part of the cam 11 as it continues its revolution then acting upon the roller 7 and forcing the roller 8 well home in the recess 13. (See Fig. 9.) The formation of the recess 13 is such that the roller 8 is retained therein after the cam 11 has passed and the plunger *e* thus locked in the raised position, with the springs *s* compressed ready to rotate the plunger reversely—i. e., in the direction required to give the impression-blow—the action of the springs tending to hold the roller 8 in the recess 13. The rollers 7, 8, and 9, in addition to performing the functions above mentioned, also serve as antifriction-rollers. The entry to the recess 13—that is to say, the part 10^x of the guide 10—is curved, the curve being struck from the center of the pivot of the connector when the latter is in the locked position, Fig. 9, at which time the center of the said pivot occupies the same position as at the time the cam 11 ceases to drag the link around. Thus the roller is guided easily and without backlash into the locked position in the recess 13 by the outer surface of said cam 11, and yet is securely held in the recess by the action of the springs *s*, since when in that position a line passing through the axes of the pivot of the link and of the roller 8 will lie outside the part 10^x of the guide. (See Fig. 9.) The release of the plunger is effected by a cam or tripping piece 14, fixed to the wheel *j* in such position that at the proper time it comes in contact with the cam-roller 9, and so causes the locking-roller 8 to roll out of the recess, and thus free the plunger. (See Figs. 10 and 11.) The springs *s* thereupon start the plunger rotating in the direction required to cause its descent; but before the impression-blow is delivered the springs *s* will have given out the energy stored in them, the actual blow being given by the further descent of the plunger owing to the inertia of the parts carried thereby and the continued action of gravity. The upward or return movement of the plunger is therefore not resisted by the springs *s* until a considerable part of the rebound has occurred, thereby enabling the quick rebound so essential to good results to be obtained.

In the above-described impression mechanism, wherein the connector is provided with rollers 7, 8, and 9 acting in conjunction with a guide 10, having a specially-formed recess 13, and with a cam 11 and fixed cam 12, friction is considerably reduced during the rais-

ing, locking, and releasing of the screw-plunger, as also during the return motion after release.

The lower end of the plunger *e* has secured
5 to it a hardened-steel button or disk 15, and a cavity 16 is formed in the die-holder shank *c* to receive a loose hardened-steel cylindrical piece 17, Fig. 1. The impact and friction are borne by these parts, which are readily re-
10 newable when worn. By the use of piece 17 of different thickness the length of stroke of the plunger can be conveniently regulated. The descent of the plunger *e* at the moment the impression-blow is given is suddenly
15 stopped owing to the die coming into contact with the paper resting upon the device which resists the impression-blow, whereupon the plunger immediately rebounds upward, its screw, which is made of great or coarse pitch,
20 so as to enable this rebound to occur, causing it to turn from the position shown in Fig. 6 to approximately that shown in Fig. 7. As some time elapses before the cam 11 again comes into position to engage with the roller
25 7, the plunger would be liable to descend and give a second blow unless means were provided to prevent premature descent of the plunger. As the extent to which the plunger rebounds varies, it is necessary that the
30 device shall be such as to hold it on the completion of the rebound notwithstanding variation within comparatively wide limits of the extent of the rebound. Figs. 14, 15, 16, and 17 are detail views illustrating an ar-
35 rangement for this purpose. Fixed to opposite portions of the fly-wheel *k* are a couple of racks 20, having toothed undersides formed as parts of screw-paths of the same pitch as the screw *f*, so that they are always in posi-
40 tion to engage correctly with pawls 21, fixed to spindles 22, journaled at opposite sides of the cylinder *b*. Each pawl is loaded by a coiled spring 23, one end of which is fixed to its spindle and the other end of which is held
45 between pins 24, so that the spring tends to retain the pawl with its nose upward. (See Fig. 17.) As the plunger rebounds the rack-teeth depress the pawls 21 against the action of their springs 23 and slip over them until
50 the rebound ceases, whereupon the rack-teeth are engaged by them and the plunger thus prevented from delivering a second blow. With this arrangement the plunger cannot descend prematurely to an extent greater than
55 corresponds to one tooth of the racks 20, no matter whether the rebound is great or little. While the raising of the plunger is being completed, as previously described, the racks 20 again slip over the pawls 21 until at the mo-
60 ment the plunger is locked in its uppermost position by the locking-roller 8 entering the recess 13 the racks clear or move beyond the pawls, which then assume a vertical attitude under the influence of the springs 23. When
65 the plunger descends, the racks move in the reverse direction and their ends come into contact with and push the pawls over back-

ward, (or to the left,) so that the racks 20 are able to slip over them. Before the blow is struck the other ends of the racks pass the
70 pawls, thus allowing them to again assume a vertical attitude, so that during the rebound the racks again depress them and at the end of the rebound are again engaged by them and a second blow prevented, as previously
75 described.

Each pawl can be turned into a position clear of the rack-teeth by releasing the end of the spring 23 from the pins 24 and insert-
80 ing it between pins 25. When the pawls are thus held in their inoperative attitude, the attendant can while the press is not running form or throw up a counter quickly by operating by hand the fly-wheel, which is then free
85 to descend.

The plunger in its descent forces the die-block *c* down against the resistance of springs 26, which are connected to the die-block and to the die-arm, in which it moves and which
90 lift the die *h* clear of the paper immediately the plunger rebounds and before the said die-arm is again started.

The quick free blow which is struck when apparatus such as hereinbefore described is employed insures the die *d* completing its
95 operative stroke and yielding a good impression notwithstanding give or variation of the counter or equivalent part, arising from constant use, or variations in thickness of paper or other material to be printed or impressed.
100 Another advantage of the quick free rebound blow is that when the machine is used for printing the ink is freely delivered upon the paper or other material, while leaving the edges of the engraving or other device that is
105 printed sharp and clear, whereas with a dwell blow, especially where soft paper or material is printed upon, the ink is liable to spit or run. Furthermore, the quick rebound blow when using soft paper or material also has the ef-
110 fect of calendering the surface simultaneously with the printing of the impression.

What I claim is—

1. In a press of the kind referred to, impression mechanism comprising a weighted screw-plunger, a fixed nut in which said plunger
115 works, a continuously-rotating part mounted on said plunger, means whereby said plunger and rotating part are intermittently coupled, means whereby said plunger is temporarily
120 locked in its raised position and whereby it is subsequently released, and springs which are compressed by the upward movement of the plunger and subsequently react thereon so as to cause its rapid descent when released, as
125 set forth.

2. In a press of the kind referred to, impression mechanism comprising a weighted screw-plunger, a fixed nut in which said plunger
130 works, means whereby said plunger is successively raised, locked, and released, a rack engaging with a pinion formed upon said plunger, and a spring arranged in the path of said rack and adapted to be compressed thereby

during the upward movement of the plunger, as set forth.

3. In a press of the kind referred to, impression mechanism comprising a weighted screw-plunger, a fixed nut in which said plunger works, a pinion secured to said plunger, a rack engaging said pinion, an abutment, a spring arranged between said rack and abutment so as to be compressed as the rack is moved by the rise of the plunger, a connector secured to said plunger, a continuously-rotating part loosely mounted on said plunger and adapted to intermittently engage said connector, a fixed cam adapted to cause the disengagement at the required time of said connector and part, a locking device adapted to engage said connector after its disengagement from said rotating part and a connector-releasing cam carried by said continuously-rotating part, as set forth.

4. In impression mechanism, the combination of a weighted screw-plunger, a link pivotally connected to said plunger, a locking-roller carried by said link, a guide formed with a recess adapted to receive and hold said roller, a continuously-rotating part, means for engaging said part to said link, means for disengaging said part and link and for causing said roller to roll into said recess, and means for causing said roller to roll out of said recess, all at the required times, as set forth.

5. In impression mechanism, the combination of a weighted screw-plunger, a link pivotally connected to said plunger, a locking-roller carried by said link, a guide formed with a recess adapted to receive and hold said roller, and the entry to which is curved, the curve being struck from the center of the pivot of said link, a continuously-rotating part, means for engaging said part to said link, means for disengaging said part and link and for causing said roller to roll into said recess, and means for causing said roller to roll out of said recess all at the required times, as set forth.

6. In impression mechanism, the combination of a weighted screw-plunger, a link pivotally connected to said plunger, a locking-roller carried by said link, a guide formed with a recess adapted to receive and hold said roller, a continuously-rotating part, a drag-roller carried by said link, a cam-arm carried by said part and having its forward face so formed as to make contact with the drag-roller at the point at which a line, passing through the axes of said drag-roller and of the pivot of the link, cuts the periphery of the drag-roller, means for disengaging said cam-arm and drag-roller and for causing the locking-roller to roll into and out of said locking-recess at the required times, as set forth.

7. In impression mechanism, the combination of a weighted screw-plunger, a link pivotally connected to said plunger, a locking-roller carried by said link, a guide formed with a recess adapted to receive and hold said roller, and the entry to which is curved, the

curve being struck from the center of the pivot of said link, a continuously-rotating part, a drag-roller carried by said link, a cam-arm carried by said part and having its forward face so formed as to make contact with the drag-roller at the point at which a line, passing through the axes of said drag-roller and of the pivot of the link, cuts the periphery of the drag-roller, means for disengaging said cam-arm and drag-roller and for causing the locking-roller to roll into and out of said locking-recess at the required times, as set forth.

8. In impression mechanism, the combination of a weighted screw-plunger, a continuously-rotating part mounted thereon, a cam-arm and a tripping-cam carried by said part, a link pivotally connected to said plunger, a drag-roller carried by said link and adapted to be engaged by said cam-arm, a locking-roller carried by said link, a guide formed with a recess adapted to receive and hold said locking-roller, means for disengaging said drag-roller from said cam-arm and means for causing said locking-roller to roll into and to roll out of said recess at the required times, as set forth.

9. In impression mechanism, the combination of a weighted screw-plunger, a continuously-rotating part mounted thereon, a cam-arm and a tripping-cam carried by said part, a link pivotally connected to said plunger, a drag-roller carried by said link and adapted to be engaged by said cam-arm, a locking-roller carried by said link, a guide formed with a recess adapted to receive and hold said locking-roller, a cam-roller carried by said link and adapted to be operated by said tripping-cam at the required time and a cam-plate so arranged that said cam-roller will be brought into contact therewith and the locking-roller caused to become engaged with the guide at the required time, as set forth.

10. In impression mechanism, the combination of the fixed cylinder or casing, a fixed nut in line therewith, a screw-plunger working in said nut and extending through said cylinder or casing, a continuously-driven spur-wheel free to rotate on said plunger, a link pivotally connected to said plunger, a drag-roller, a locking-roller and a cam-roller mounted on said link, a guide with recess and a cam-plate both carried by said cylinder or casing and a cam-arm and tripping device both carried by said spur-wheel as set forth.

11. In impression mechanism, the combination of a fixed cylinder or casing, the fixing-nut in line therewith, a screw-plunger working in said nut and extending through said cylinder or casing, a continuously-driven spur-wheel free to rotate on said plunger, a link pivotally connected to said plunger, a drag-roller, a locking-roller and a cam-roller mounted on said link, a guide with recess and a cam-plate both carried by said cylinder or casing and a cam-arm and tripping device both carried by said spur-wheel, a pinion fixed to

said plunger, a pair of sliding racks extending toward abutments, and springs arranged between said racks and abutments, the parts being adapted to operate so as to cause the raising, locking, releasing and descent of the plunger as set forth.

12. In impression mechanism, the combination of a screw-plunger, a link pivotally connected to said plunger, a locking-roller carried by said link, a recess adapted to receive said roller, a continuously-rotating part, means for engaging and for disengaging said part and link, as set forth.

13. In impression mechanism, the combination of a screw-plunger, a link pivotally connected to said plunger, a locking-roller and a drag-roller carried by said link, a recess adapted to receive said locking-roller, a continuously-rotating part, an arm connected to said part and having a forward face adapted to engage said drag-roller and an outer face adapted to bear against said drag-roller as set forth.

14. In impression mechanism, the combination of a screw-plunger, a link pivotally connected to said plunger, a locking-roller and a drag-roller carried by said link, a recess adapted to receive said locking-roller, a continuously-rotating part, an arm connected to said part and having a forward face adapted to engage said drag-roller and an outer face adapted to bear against said drag-roller, and means for disengaging said drag-roller from said arm, as set forth.

15. In impression mechanism, the combination with a screw-plunger of a fly-wheel secured thereto, a continuously-rotating part loosely mounted on said plunger, means for connecting said plunger and part and means for preventing longitudinal movement of said rotating part along said plunger, as set forth.

16. In impression mechanism, the combination with a screw-plunger of a fly-wheel secured thereto, a continuously-rotating part loosely mounted on said plunger, means for connecting said plunger and part, a sleeve fitting said plunger and extending between said fly-wheel and part, as set forth.

17. In impression mechanism the combination with a screw-plunger of a fly-wheel secured thereto, a continuously-rotating part loosely mounted on said plunger, means for connecting said plunger and part, a sleeve fitting said plunger and extending between said fly-wheel and part, and a bearing in which said sleeve is journaled, as set forth.

18. In impression mechanism of a press of the kind referred to, the combination of a weighted screw-plunger, a fixed nut in which said plunger works, a continuously-rotating part mounted on said plunger, means whereby said plunger and rotating part are intermittently coupled, means whereby said plunger is temporarily locked in its raised position and whereby it is subsequently released, and means whereby it is prevented from descending on the completion of its rebound

until it has again been raised to the top of its stroke, which means are independent of said continuously-rotating part, as set forth.

19. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, a cylinder or casing surrounding said means, and a cover to said cylinder or casing, said cover being formed with a central aperture or bearing through which said plunger extends, as set forth.

20. In impression mechanism, the combination of a screw-plunger, plunger raising, locking and releasing means, a pinion secured to said plunger, a pair of sliding racks gearing therewith, rack-guides, fixed boxes into which said racks extend, cap-nuts closing the ends of said boxes, and coiled springs located in said boxes, as set forth.

21. In impression mechanism, the combination of a screw-plunger, plunger raising, locking and releasing means, a pinion secured to said plunger, a pair of sliding racks gearing therewith, rack-guides, fixed boxes into which said racks extend, cap-nuts closing the ends of said boxes, and coiled springs located in said boxes, said springs being of such length that they will not exert pressure on the racks and plunger when the latter is at the end of its impression-stroke as set forth.

22. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, a pinion secured to said plunger, a pair of sliding racks gearing therewith, rack-guides, fixed boxes into which said racks extend, cap-nuts closing the ends of said boxes, and coiled springs located in said boxes, and spring-adjusting screws as set forth.

23. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, a pinion secured to said plunger, a pair of sliding racks gearing therewith, rack-guides, fixed boxes into which said racks extend, cap-nuts closing the ends of said boxes, and coiled springs located in said boxes, screw-threaded apertures through said cap-nuts, screw-spindles with heads and hand-wheels and working through said apertures and lock-nuts as set forth.

24. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, and a device which is not positively driven but is adapted to automatically engage at the end of the rebound with a part attached to the plunger and to hold it until it has again been raised and locked as set forth.

25. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, and a rack and a pawl said rack and pawl being connected, the one to the plunger, the other to a fixed part of the press, and adapted to automatically engage at the required time and prevent the descent of the plunger, as set forth.

26. In impression mechanism the combination of a screw-plunger, plunger raising, lock-

ing and releasing means, a rack carried by said plunger, and a pawl pivoted in fixed bearings, so as to engage with said rack at the required time as set forth.

5 27. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, a rack carried by said plunger and having its toothed surface formed as part of a screw-path and a pawl
10 pivoted in fixed bearings so as to engage with said rack at the required time, as set forth.

28. In impression mechanism, the combination of a screw-plunger, plunger raising, locking and releasing means, a rack carried by
15 said plunger and having its toothed surface formed as part of a screw-path and a pawl pivoted in fixed bearings so as to engage with said rack at the required time, the length of the rack being such that it will clear or move
20 beyond the said pawl at the ends of both the impression and return strokes of the plunger, as set forth.

29. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, a rack carried by
25 said plunger and having its toothed surface formed as part of a screw-path and a pawl pivoted in fixed bearings so as to engage with said rack at the required time, and so loaded
30 as to point lengthwise of the plunger as set forth.

30. In impression mechanism, the combination of a screw-plunger, plunger raising, locking and releasing means, a fly-wheel secured
35 to the upper part of said plunger, racks secured thereto and having toothed under sides formed as parts of screw-paths, pawls fixed to spindles journaled in fixed bearings so as to be capable of being turned in either direction, springs connected to said spindles and
40 tending to retain said pawls pointing upwardly, the length of the said racks being such that they will clear or move beyond their respective pawls at the ends of both the im-

pression and return strokes of the plunger as
set forth. 45

31. In impression mechanism, the combination of a screw-plunger, plunger raising, locking and releasing means, a fly-wheel secured
to the upper part of said plunger, racks se- 50
cured thereto and having toothed under sides formed as parts of screw-paths, pawls fixed to spindles journaled in fixed bearings so as to be capable of being turned in either direction, helical springs one of which is attached
55 by its inner convolution to each pawl-spindle, means for detachably securing the outer end of each spring in either of two positions, in one of which the pawl will be operative in the other inoperative as set forth. 60

32. In impression mechanism the combination of a screw-plunger, plunger raising, locking and releasing means, a fly-wheel secured
to the upper part of said plunger, racks se- 65
cured thereto and having toothed under sides formed as parts of screw-paths, pawls fixed to spindles journaled in fixed bearings so as to be capable of being turned in either direction, springs connected to said spindles and tending to retain said pawls pointing up-
70 wardly, the length of the said racks being such that they will clear or move beyond their respective pawls at the ends of both the impression and return strokes of the die-plunger, permitting said pawls to assume a ver-
75 tical attitude at such times and pushing said pawls into an operative position at the commencement of the ascent of the plunger and into a reverse or inoperative position at the commencement of its descent to give the im-
80 pression, as set forth.

Signed at 22 Bride Lane, London, England,
this 12th day of January, 1900.

JOSEPH YARDLEY JOHNSTON.

Witnesses:

WILLIAM B. CHILD,
ARTHUR WOOSNAM.