

May 9, 1933.

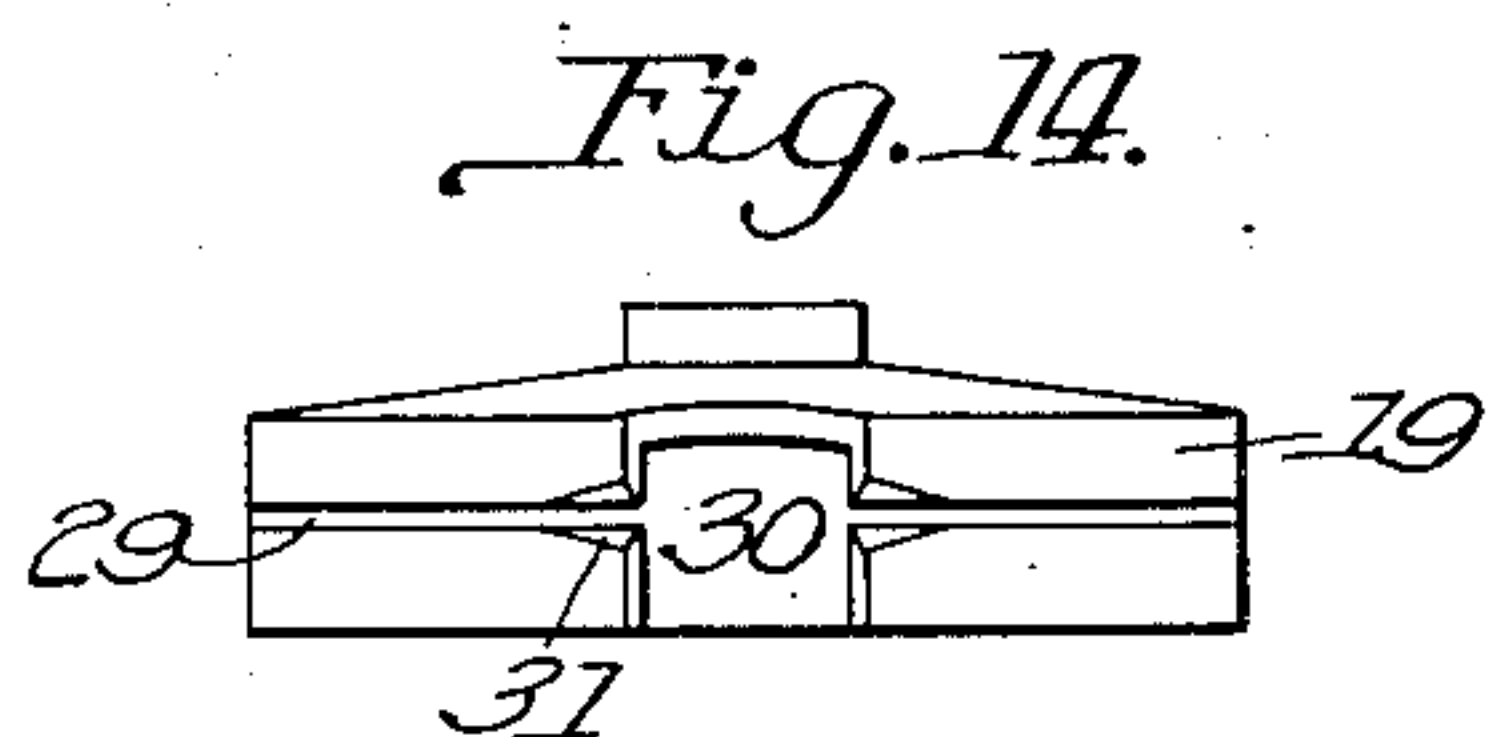
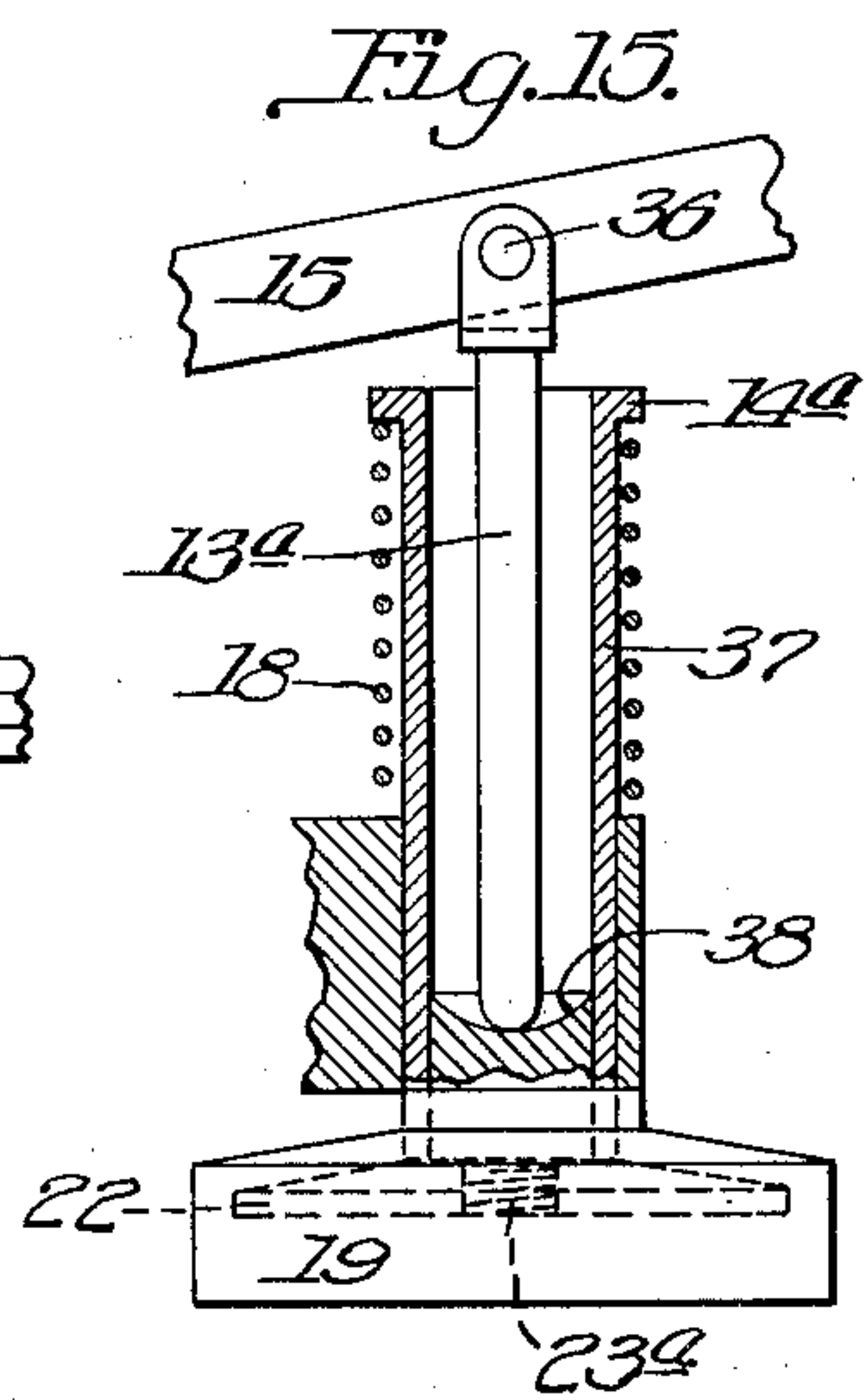
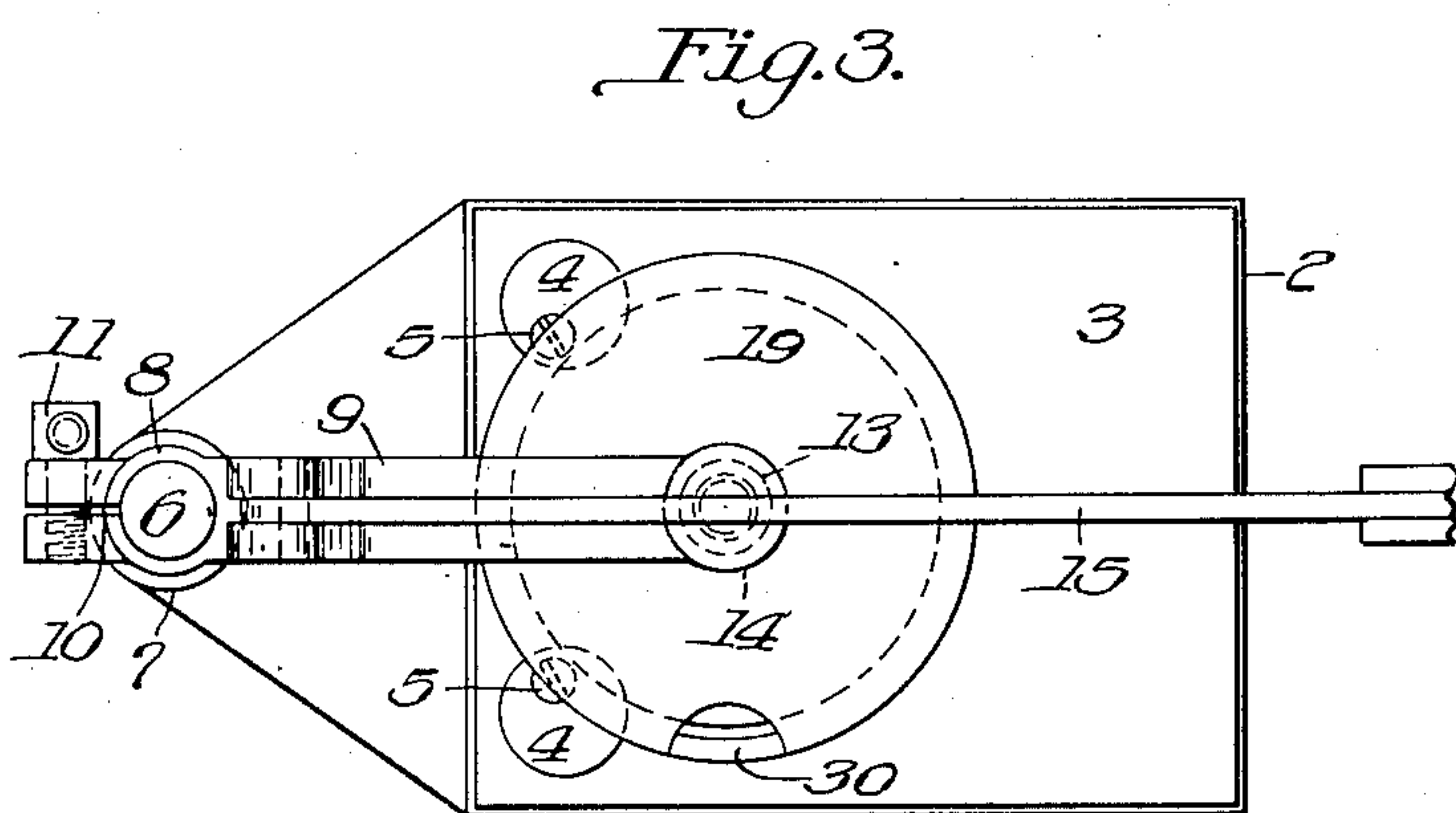
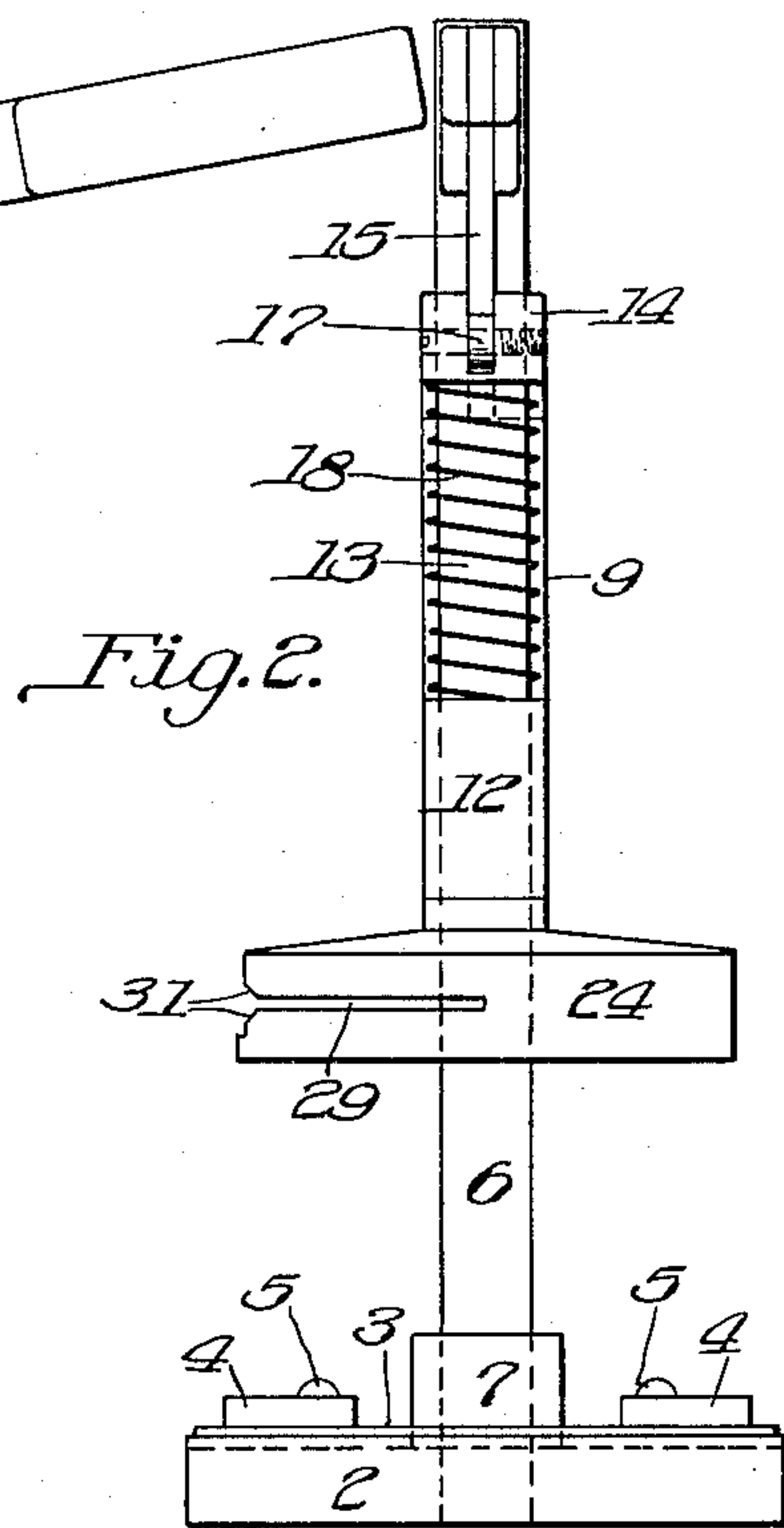
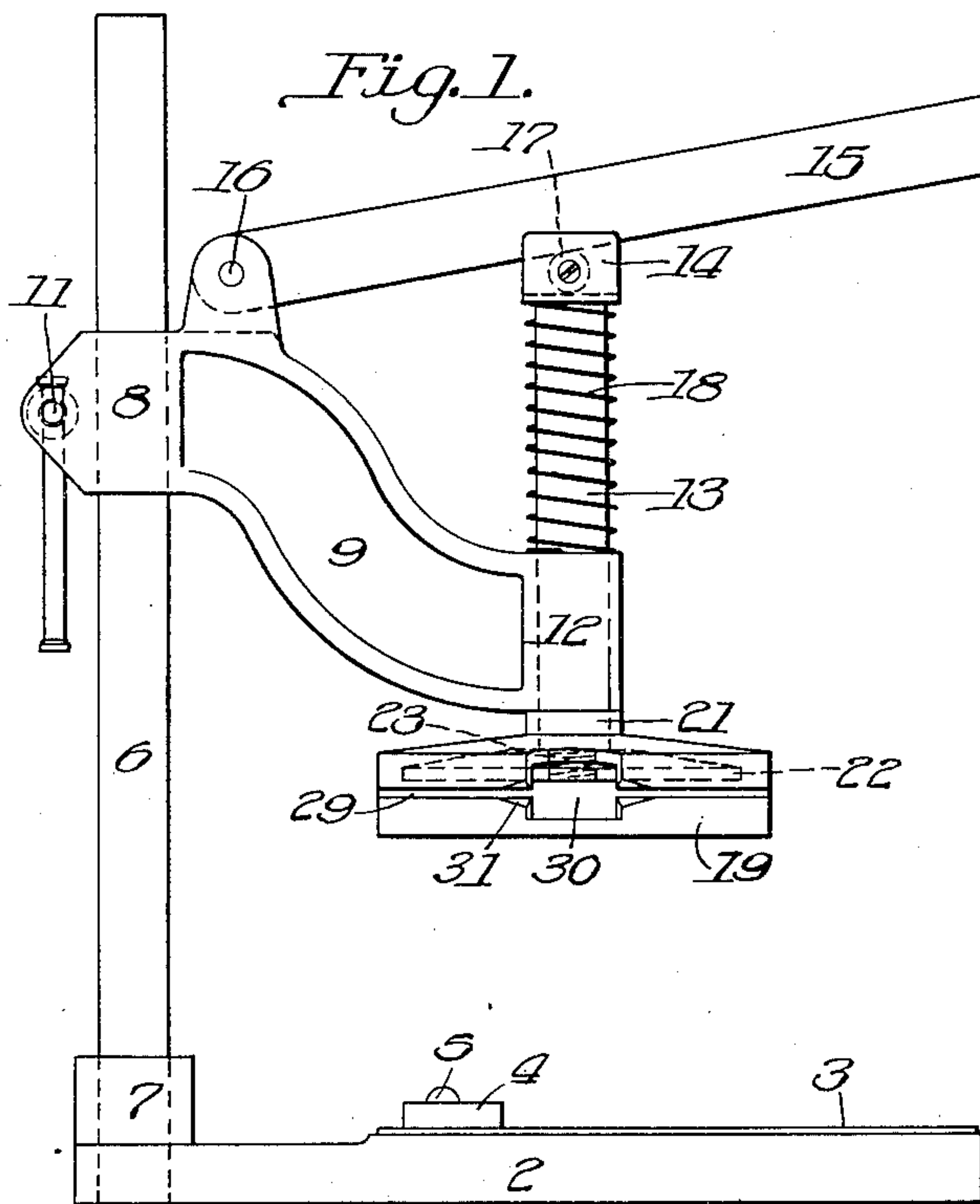
C. N. BERGMANN

1,908,216

CAPPING MACHINE

Filed Sept. 26, 1930

3 Sheets-Sheet 1



INVENTOR.
Christian N. Bergmann
BY *C. M. Clarke*
ATTORNEY

May 9, 1933.

C. N. BERGMANN

1,908,216

CAPPING MACHINE

Filed Sept. 26, 1930

3 Sheets-Sheet 2

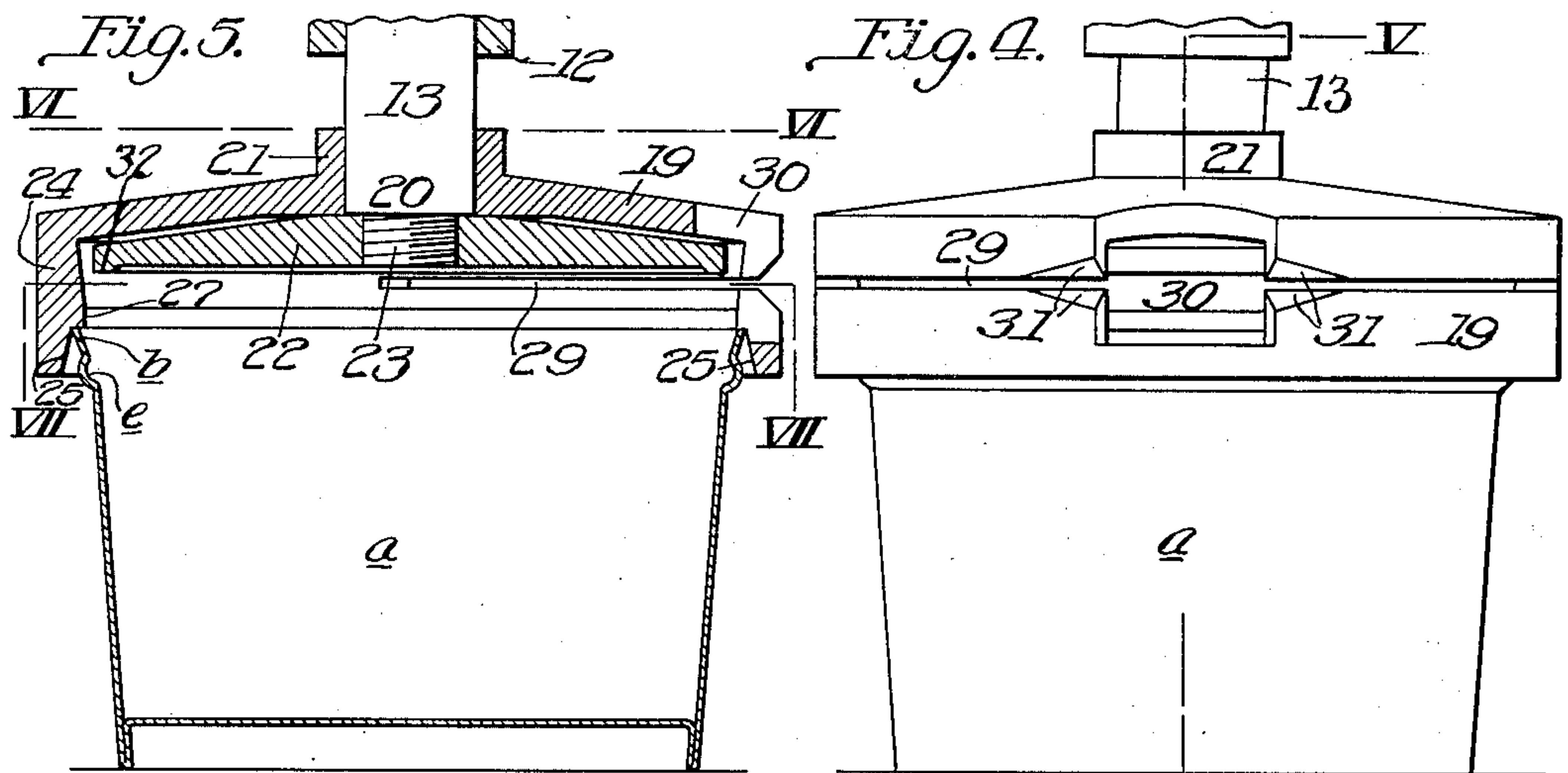


Fig. 6.

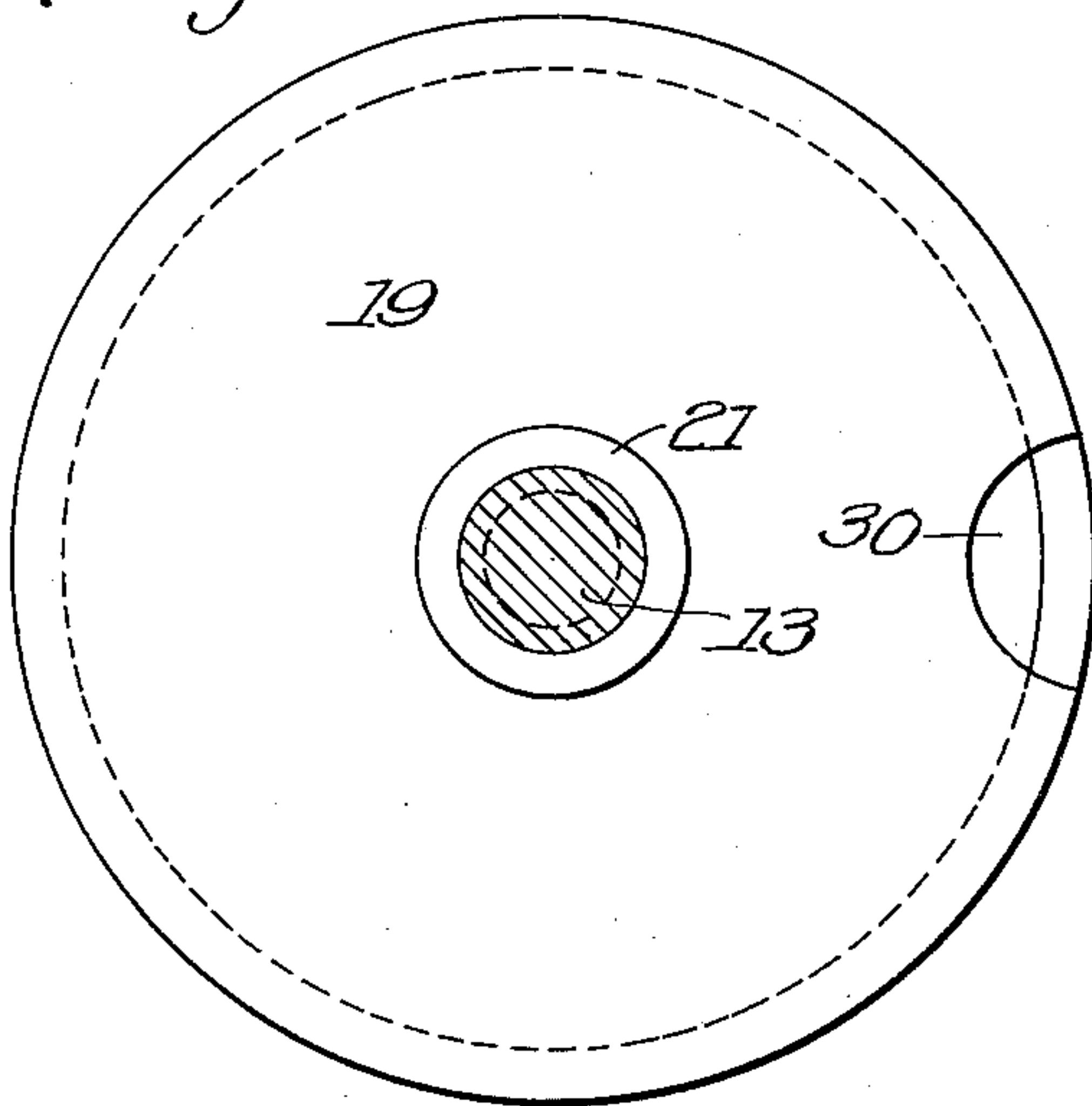


Fig. 7.

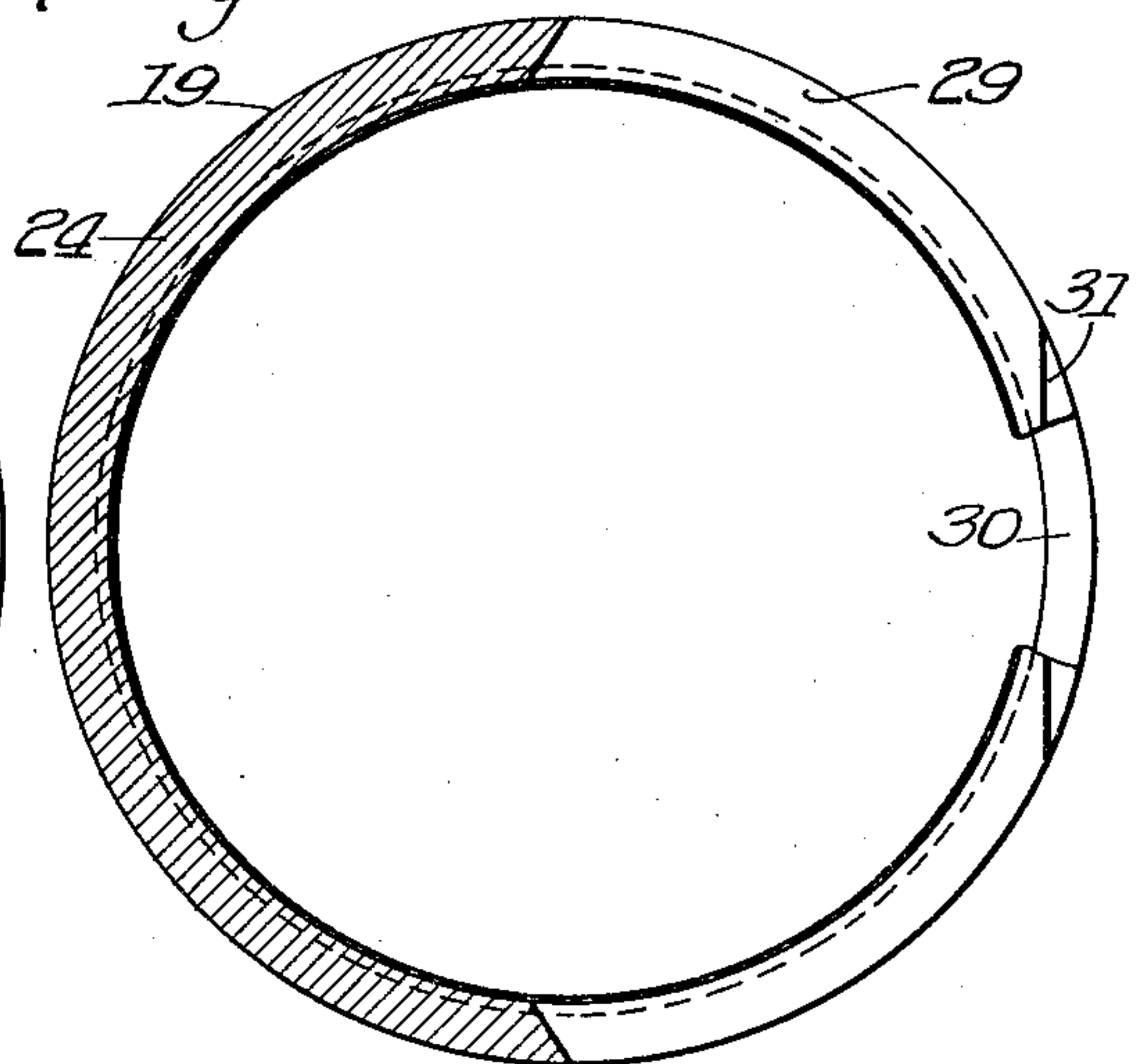
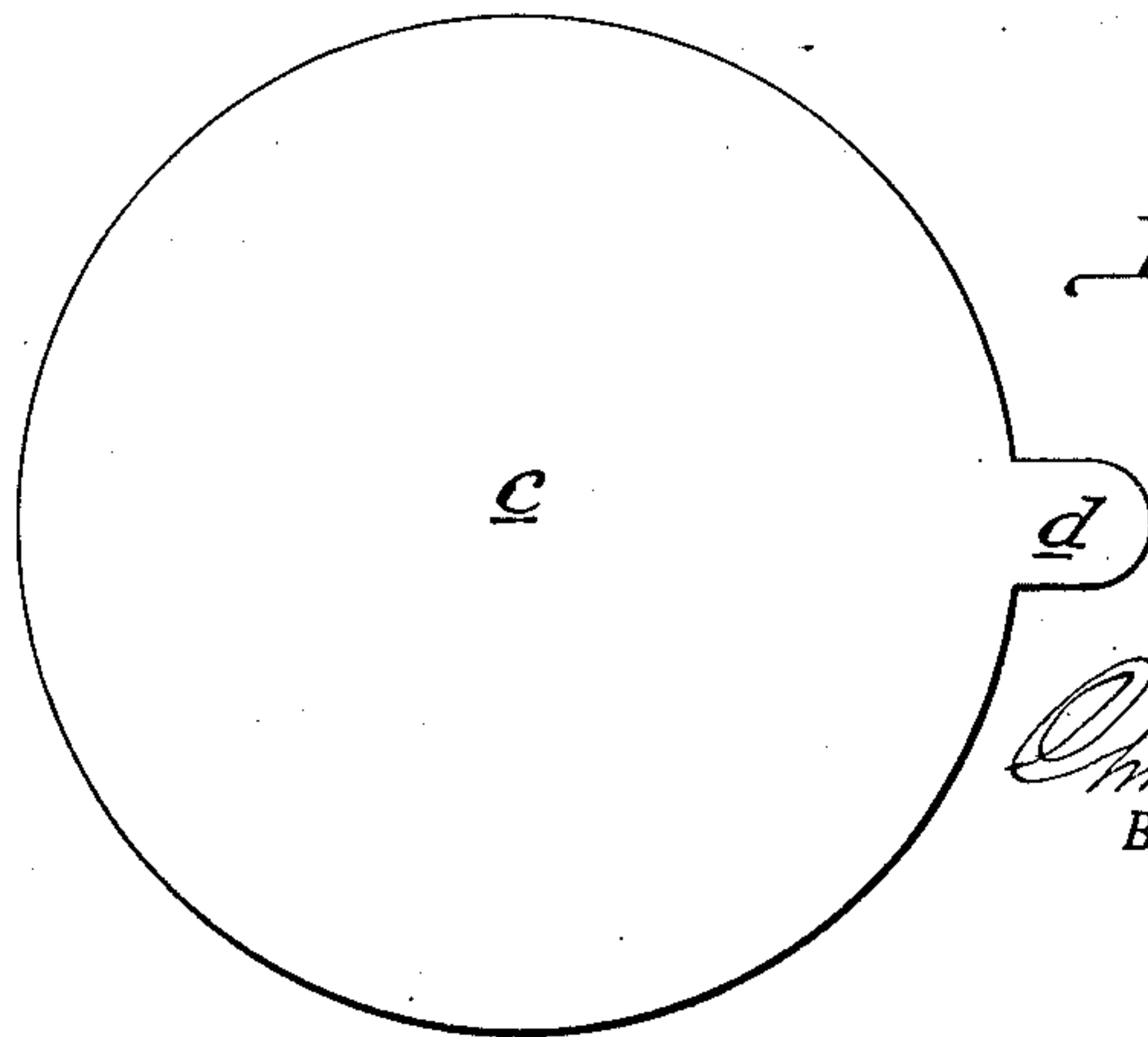


Fig. 8.



INVENTOR.
Christian N. Bergmann
BY C. M. Clark
ATTORNEY

May 9, 1933.

C. N. BERGMANN

1,908,216

CAPPING MACHINE

Filed Sept. 26, 1930

3 Sheets-Sheet 3

Fig. 9.

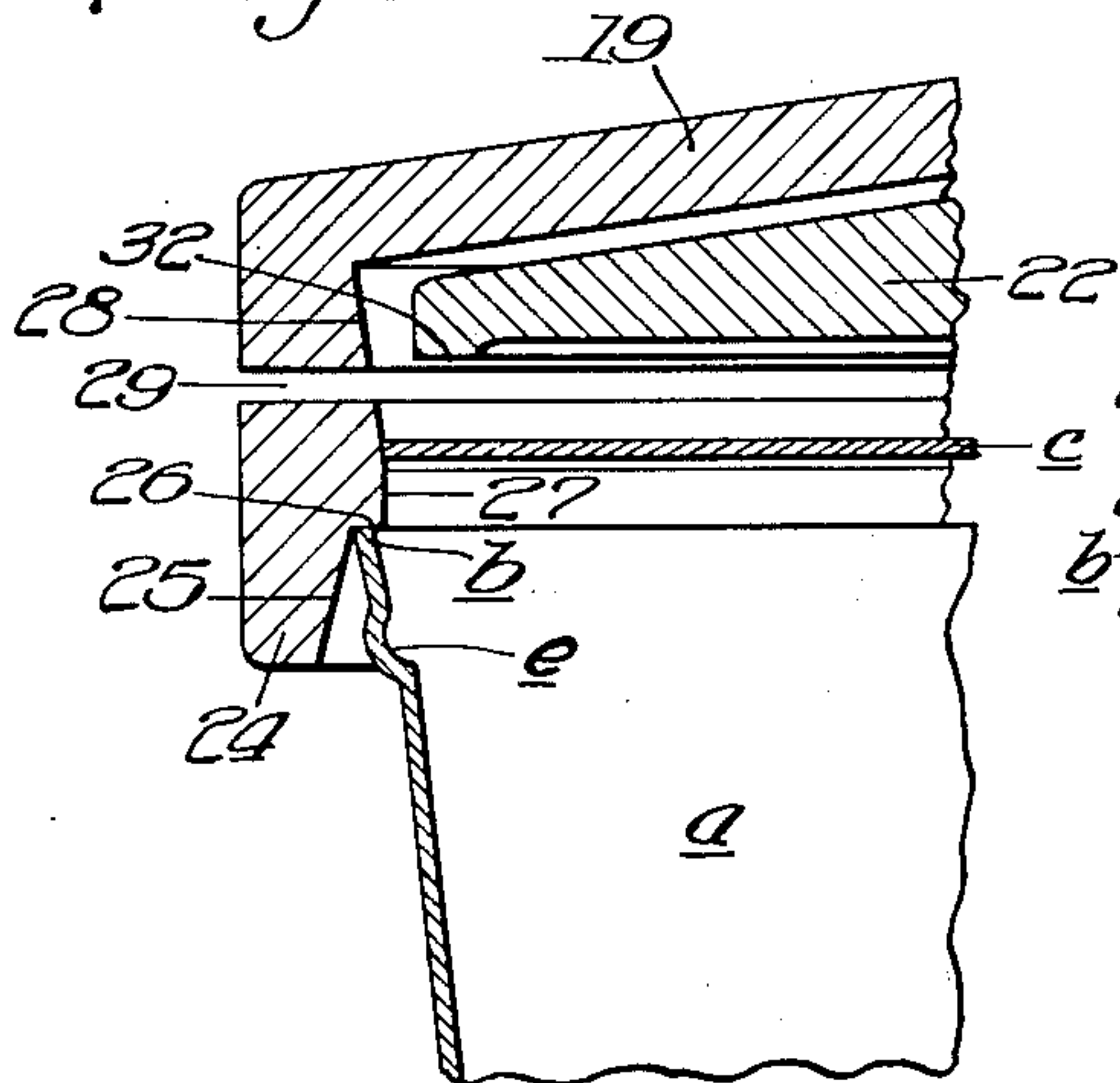


Fig. 10.

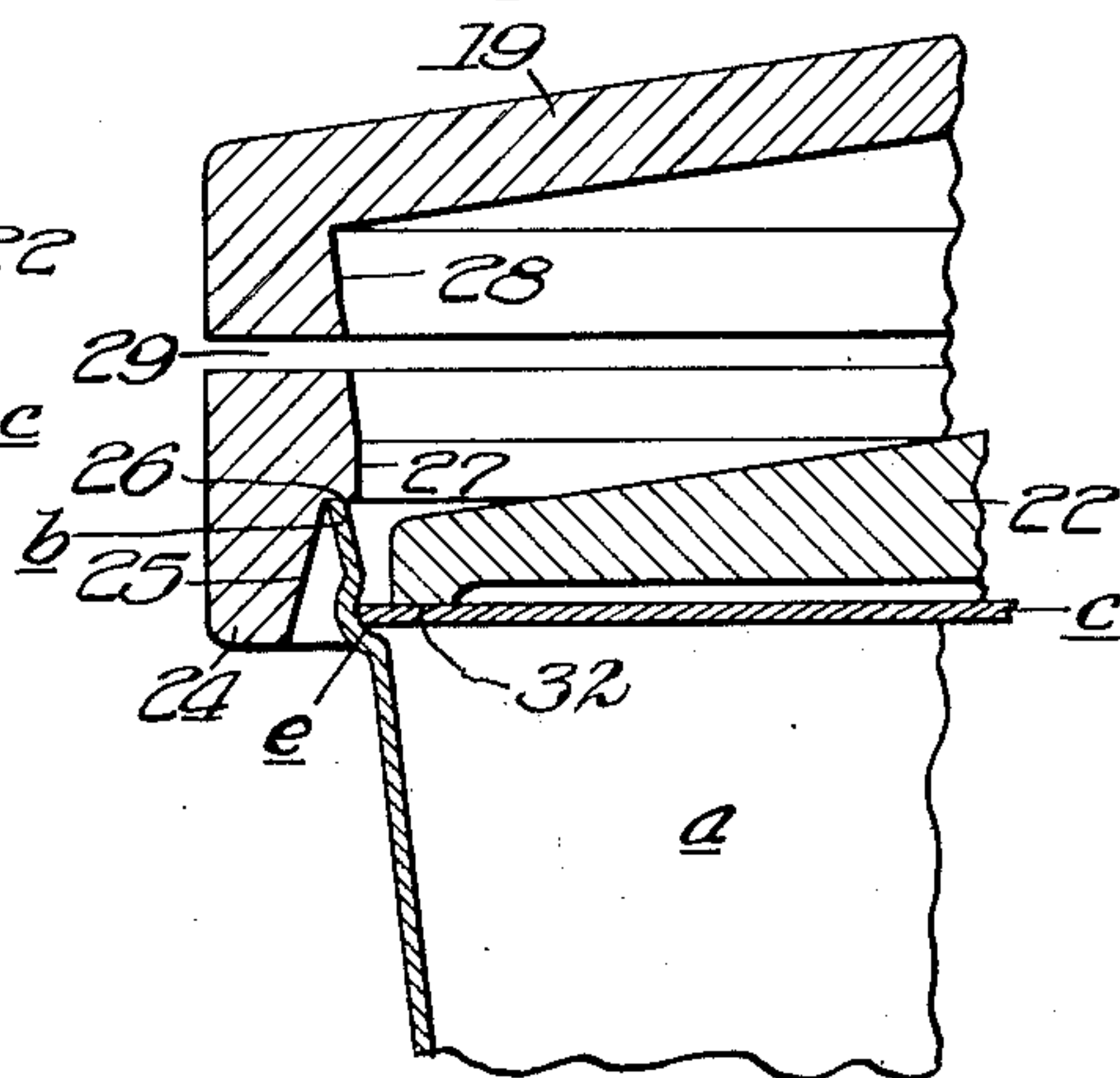


Fig. 11.

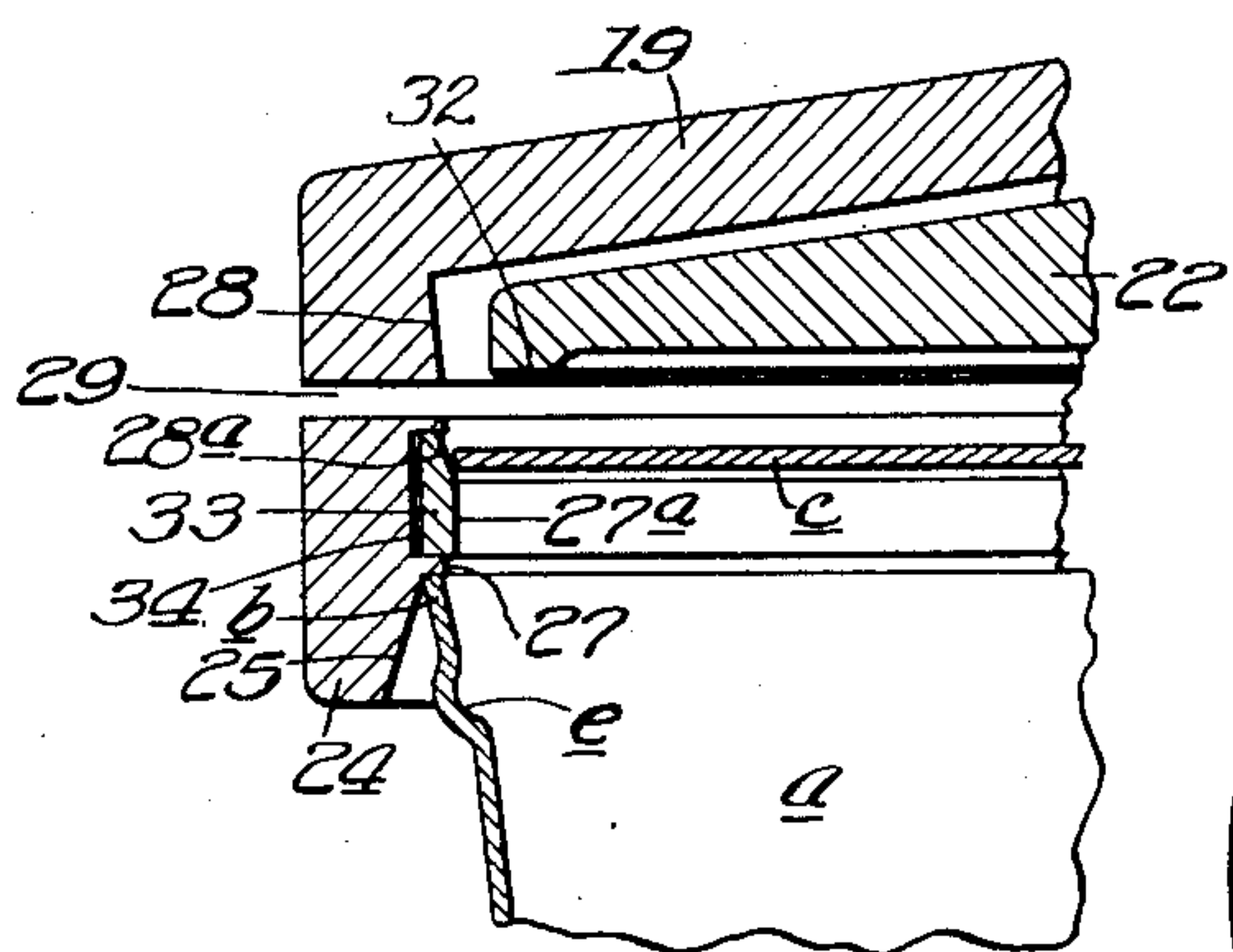


Fig. 12.

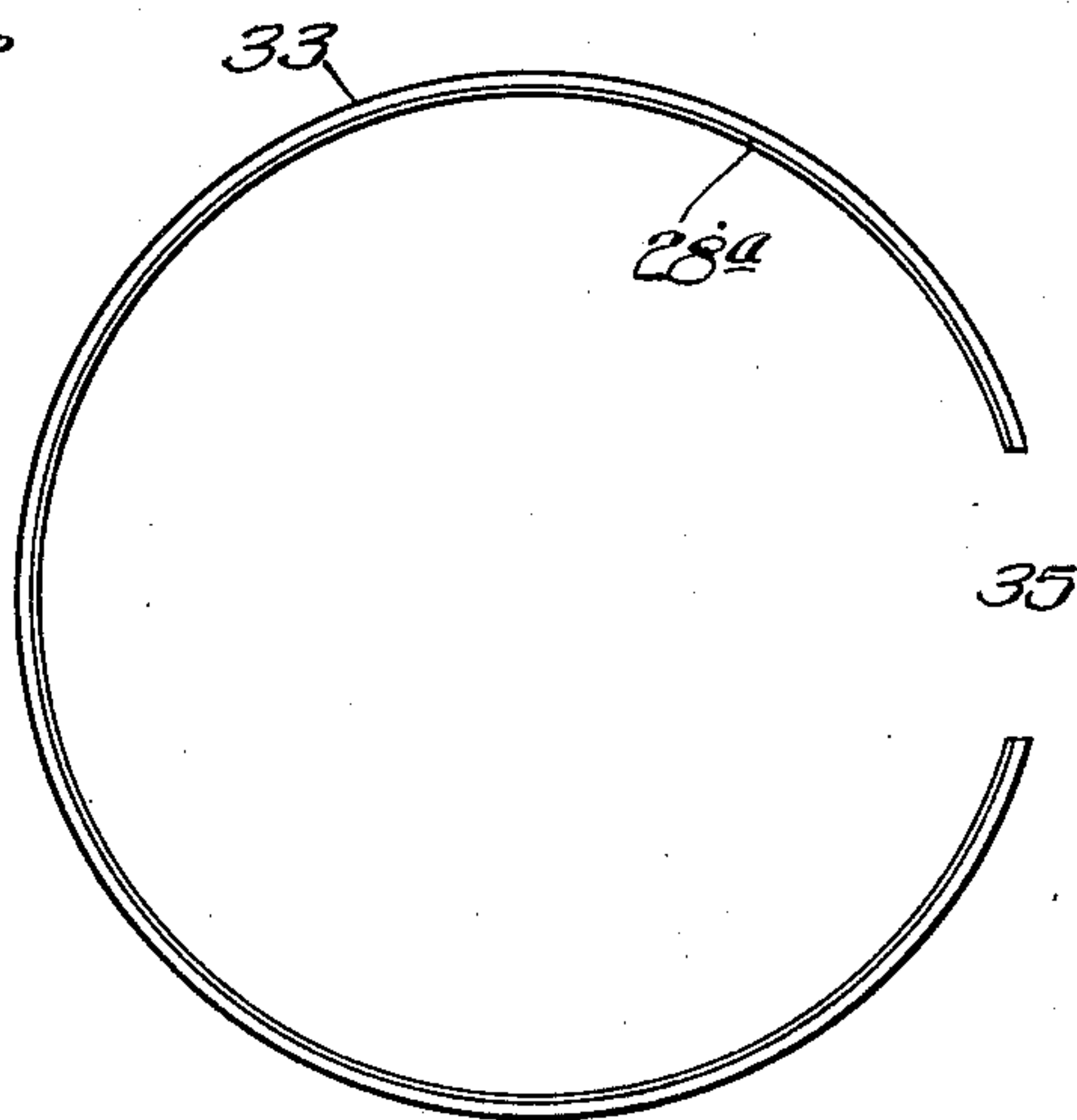
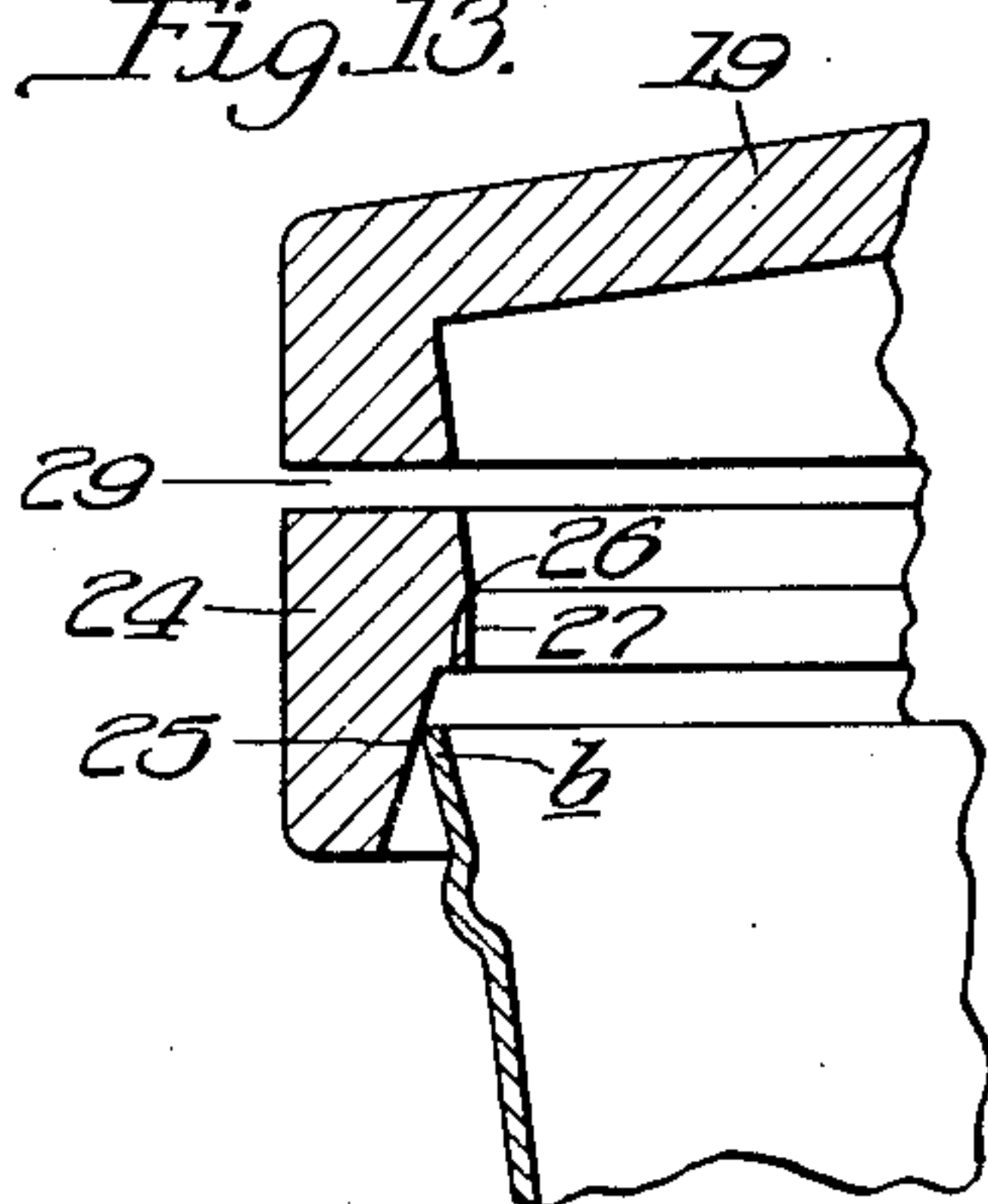


Fig. 13. 19



INVENTOR.

INVENTOR.
Christian N. Bergmann
BY C. M. Clark
ATTORNEY

BY

C. M. Clarke
ATTORNEY

ATTORNEY

UNITED STATES PATENT OFFICE

CHRISTIAN N. BERGMANN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO BERGMANN PACKAGING MACHINE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF DELAWARE

CAPPING MACHINE

Application filed September 26, 1930. Serial No. 484,509.

My invention is an improvement in capping machines, particularly designed for the purpose of applying thin paper caps or covers to similar cups or containers for the merchandizing of any suitable commodity, as ice-cream, cottage-cheese, preserves, or the like.

In the operation of placing paper caps on paper cups, or caps or cups of any other suitable material, of usually cylindrical form, the cup is provided with a flaring upper edge and a receiving annular groove into which the cap or cover is inserted with sufficient force, either with or without a removing tang, to place it securely in position for tight closure and retention of the contents.

Such operation may be performed by hand, but is subject to imperfect fitting, due to undue pressure at one side, improper centering, and various other reasons resulting in insecure and imperfect insertion.

Capping machines have been devised and used in which plunger mechanism is utilized for the insertion of the disk-like cover, of various kinds, and the use of plungers for such purpose is common and well known.

In my present invention I have provided, in a comparatively small, compact and simple mechanism, means whereby the cup may be accurately located on a supporting base in central alinement with a spring-retracted lowering cup and lid centering head adapted to annularly engage the upper edge of the cup, for truly circular centering with the plunger, and having an inner plunger disk for lowering the cover into desired position, in a simple, rapid and effective manner.

The outer shell or casing of the two-part plunger is so constructed as to ensure easy and accurate placement of the cover in correct concentric position within the rim of the cup, and of action thereon of an inner plunger head for positive, accurate placement within the cup.

One preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a view of the complete machine in side elevation, with the compound plunger elevated;

Fig. 2 is a front elevation of the machine;

Fig. 3 is a plan view of Fig. 1;

Fig. 4 is an enlarged view in front elevation, showing the centering head lowered upon the container;

Fig. 5 is a vertical sectional view on the line V—V of Fig. 4;

Fig. 6 is a plan view, partly in section, on the line VI—VI of Fig. 5;

Fig. 7 is a horizontal section on the line VII—VII of Fig. 5;

Fig. 8 is a plan view of one of the closing caps or disks for the container;

Fig. 9 is a vertical sectional view enlarged, showing the parts in position for operation, with the covering disk inserted laterally within the head;

Fig. 10 is a similar view showing the disk lowered into position by the plunger;

Fig. 11 is a similar sectional view showing a modified construction utilizing a split expansion ring;

Fig. 12 is a plan view of such ring;

Fig. 13 is a detail sectional view like Fig. 9, showing the action on a cup rim of larger diameter;

Fig. 14 is a partial view similar to Fig. 1, showing a modified construction of centering head;

Fig. 15 is a detail sectional view showing a modified construction of the lowering lever mechanism.

In the drawings, 2 is the supporting base of the machine of any suitable form adapted to provide a stable non-tilting support for the operative mechanism and of the container.

Base 2 is provided with a flat top 3 adapted to support the cup *a*, and is provided with a pair of eccentrically mounted guiding disks or abutments 4. Such guiding disks are secured by screws 5 to the base 2, and are capable of being rotated on and secured by such screws in proper position for guiding engagement against the annular bottom of the cup, so as to positively center it with relation to the plunger mechanism.

By such means the machine is adapted to use with cups of different capacities and diameters, means also being provided, as hereinafter described, for vertical adjustment of

the plunger mechanism, to accommodate it to containers of varying heights as well.

A supporting stem or post 6 is mounted in a boss or socket 7 at the rear end of the base extending upwardly of sufficient height to provide for mounting thereon of the clamping terminal 8 of supporting arm 9. Such clamping terminal is split, as at 10, and is provided with a tightening and loosening screw 11, so that the arm 9 may be fixedly held in any desired adjusted position.

Arm 9 is provided at its other end with a bearing terminal 12 through which extends the operating rod or shaft 13 having the divided terminal 14, between the opposite sides of which interfits edgewise the hand operating lever 15. Said lever is pivoted, at 16, between upwardly extending bearings of arm 9 and engages a roller 17 of terminal 14 for compensating pressure engagement. A retracting spring 18, acting against lowering pressure of lever 15, elevates the mechanism to its normally raised position.

A circular centering head 19 is slidably and rotatably mounted on the lower shouldered terminal 20 of stem 13 by its hub 21 and the inner plunger 22 which is screwed to the threaded terminal 23 of shaft 13, as in Fig. 5, in the manner of a nut.

Head 19 is hollow having the annular downwardly extending flange 24 for telescoping engagement over the upper outwardly flaring edge *b* of cup *a*, the head and cup being held in approximately concentric relation to each other by means of the guiding devices 4 above referred to.

The head 19 acts to exactly center the cup with relation to the plunger and the cover, and to correct any variation in the cup's position, or in its rim, from truly circular form. A further advantage is that the inner annular flaring face of the ring flange firmly braces the cup rim against the insertion pressure of the cap.

Flange 24 of head 19 is under cut, as at 25, flaring outwardly from a limiting shoulder 26 against which the upper edge *b* of the cup engages when the head is lowered.

Inwardly of shoulder 26 is a comparatively narrow vertical central opening-defining annular ring face 27 adapted to provide a comparatively tight passageway for the descending cap *c*, as it is lowered under pressure of the plunger 22.

Upwardly above such limiting interior rim portion 27 of the head the inner annular wall of flange 24 recedes somewhat, as at 28, providing ample space for easy clearance of the disk when inserted laterally into the interior of the head beneath the plunger.

For the purpose of facilitating such insertion, the head is provided with a transverse slot 29 extending through at least one-half of the annular area of flange 24, such slot being of just sufficient width to easily admit

of the thickness of the cover to the interior.

At the front of the head, midway of slot 29, head 19 and flange 24 are provided with an opening 30 of sufficient width and depth to admit the finger and thumb of the operator in placing the disk clear in, either with or without a tang *d*.

By reason of the rotatable mounting of head 19 on its supporting and actuating spindle, the head may be set annularly for insertion of the cover at the right or left side or front, as desired.

At each side of opening 30 the corners of the slotted flange 24 are preferably beveled or cut away, as at 31, thus facilitating entrance of the advancing edge of the cover *c* and facilitating its insertion. When thus inserted, the disk-like cover will then rest upon the downwardly and inwardly inclined annular face 28 immediately above the smallest diameter opening defined by the inner edge 27.

Plunger 22 is preferably provided with an annular downwardly extending comparatively narrow pressing ring or face 32 adapted to first engage the outer edge of the cover *c*, when the lever 15 is further lowered, after the head 19 has made engagement against and around the upper edge of the cup, as in Fig. 5.

A further advantage of the interior receding face of the plunger within the projecting rim 32 is that it permits outward bowing or arching of the cover when placed over the cup contents.

Thereupon, further lowering of the stem 13 effects positive downward movement of the cover *c* with centering binding engagement against inwardly tapered face 28 and final comparatively tight passage through innermost centering ring face 27, for exact central placement within the upper edge of the cup *a*. As is customary in such cups, it is provided with an annular groove *e* into which the cover is inserted with tight binding engagement at the final lowered position of plunger 22, as in Fig. 10.

Thereupon, pressure on lever 15 is released and the plunger and head are retracted, the filled and capped container is removed, and the machine is ready for another operation.

For the purpose of insuring such tight centering action of the cover, or avoiding any tendency to looseness or tightness, as from variations in dimensions of the cover, or variation from truly circular form, I have shown in Figs. 11 and 12 an alternative construction utilizing an inserted expansion ring 33, of the split ring type. Such ring is adapted to be inserted within a suitable annular receiving cavity 34 of flange 24, and generally conforms to the inner sloping face 28 and the limiting diameter 27, slightly below the insertion slot 29.

Such ring is separated sufficiently, as at

35, for compression and placement in the head, and will expand and occupy its proper position and will function as described as to the integral metal faces.

5 As shown, expansion ring 33 is mounted in annular recess 34 with slight clearance for necessary expansion, and has an inner sloping face 28a and a lower vertical rim face 27a adapted to function in the same manner as do faces 28 and 27 of the integral construction above described. The upper edge of ring 33 recedes slightly back of the lower edge of face 28 while the lower edge of its bottom face 27a extends slightly over the face 27, so as to ensure unobstructed but tight centering action on the downwardly moving cover c.

One important advantage of the cup centering function of inner flaring face 25 of flange 24 is that it permits operations of the machine with cups of varying diameter within the limits of the length and angle of such face.

25 In Fig. 13 I show the face 25 engaging against the outer rim b of a cup of increased diameter, too large to engage the shoulder 26, and the flaring edge of the flange will thus ensure centering engagement at all times. The machine is thus capable of operation in capping containers with any standard diameter of cap independent of such variation in diameter of the upper flared rim more or less with relation to the diameter of the standard cover receiving groove.

35 Fig. 14 shows a further modification of the head 19 in which the flange 24 is cut entirely through, allowing for an open bottom for clearance 30. By such construction the machine is adapted to be used with any suitable automatic cover feed device requiring clearance for a mechanical pusher of any type, to insert the cover in position.

45 In Fig. 15 I show a modified construction of the plunger-actuating mechanism in which the stem 13a may be pivotally connected to lever 15, as at 36. In such case a tubular section 37 is utilized supplementing the single rod 13 having a collar 14a for engagement by spring 18 and with a short stub extension 23a fixedly mounted in the lower end of tube 37, as by welding or otherwise. Its inner end is recessed or concaved, as at 38, providing a ball-like centering bearing for the lower rounded end of stem 13a, so that such stem may exert downward pressure and may swing laterally at its upper end by its connection with lever 15, while being entirely capable of effecting downward movement of the head and its parts, in the same manner as above described.

By such construction downward pressure is always exerted centrally and any binding tendency of the plunger rod is entirely prevented.

65 The construction and operation of the in-

vention will be readily understood and appreciated from the foregoing description. It provides a simple, efficient and continuously operative machine for rapid and accurate placement of caps or covers within the containers in the manner described; and is easily adapted to various sizes and capacities by the easy substitution of a different size of head and plunger and adjustment of the supporting arm 9 therefor, in connection with the adjustable cup-centering devices 4, as described.

The machine may be otherwise variously changed or modified in detail construction or otherwise by the skilled mechanic to adapt it to varying different conditions of use, but all such changes are to be understood as within the scope of the following claims.

What I claim is:

1. A cover placing machine having a vertically movable flanged head provided with an inner annular downwardly converging cover guiding face and a transverse horizontal insertion slot and a vertical finger clearance opening extending inwardly through the flange, and a relatively movable plunger. 85
2. A cover placing machine having a vertically movable flanged head provided with a transverse insertion slot, the flange of the head being interrupted by a finger clearance opening, beveled guiding faces on the outer corners of the flange adjacent the clearance opening, and a relatively movable plunger. 95
3. A cover placing machine having a vertically movable flanged head provided with a transverse insertion slot and a clearance opening through the flange midway of the slot, the flange being beveled at each side of the clearance opening for insertion of a cover, and a relatively movable plunger within the upper portion of the head above the slot. 105
4. Plunger mechanism for a capper as described consisting of a reciprocable spindle having at its lower end a rotatably mounted annular flanged centering head provided with an inner annular downwardly converging cover guiding face and a transverse slot extending through said face, and an independently movable cover inserting plunger secured to the spindle within the head. 115
5. Plunger mechanism comprising a reciprocable spindle, a vertically and rotatably movable annular head on the spindle having a surrounding flange provided with a transverse cover insertion slot, an interior outwardly flaring cup engaging face and a middle transverse contracted guiding face, and an inner relatively movable cover moving and inserting disk. 125
6. Plunger mechanism comprising a spring-retracted reciprocable spindle, a vertically and rotatably movable annular head on the spindle having a surrounding flange provided with a transverse cover insertion 130

slot, an interior outwardly flaring cup-engaging face, a middle transverse contracted guiding face with an intervening shoulder, and an inner relatively movable cover moving and inserting disk.

7. Plunger mechanism comprising a spring-retracted reciprocable spindle, a vertically movable and rotatable annular head on the spindle having a surrounding flange provided with a transverse cover insertion slot, an interior outwardly flaring cup-engaging face, a middle transverse contracted downwardly tapering guiding face having a terminal straight face wall and an inner annularly enlarged upper portion, and an inner relatively movable cover inserting disk on the spindle within said upper portion.

8. In a capping machine, a cover-applying head having a rim embracing flange provided with an annular flaring face and an insertion slot and a resilient annular guiding and centering device interposed between the slot and said face.

9. In a capping machine, a cover-applying head having a rim-embracing flange provided with an annular flaring face and an insertion slot and a resilient annular guiding and centering device interposed between the slot and said face, and a relatively movable plunger within the head operable across the slot.

10. In a capping machine, a cover-applying head having a rim-embracing flange provided with an annular flaring face and an inwardly extending shoulder defining a contracted guiding ring, and a narrow transverse insertion slot extending through the flange above said ring, the flange having an inwardly extending finger clearance opening.

11. In a capping machine, a cover-applying head having a rim-embracing flange provided with an annular flaring face and an inwardly extending shoulder defining a contracted guiding ring and a narrow transverse insertion slot extending through the flange above said ring, the flange having an inwardly extending finger clearance opening, and a relatively movable plunger within the head operable across the slot.

12. In a capping machine, a cover-applying head having a rim-embracing flange provided with an annular flaring face and an inwardly extending shoulder defining a contracted guiding ring and a narrow transverse insertion slot extending through the flange above said ring, the flange having an inwardly extending finger clearance opening, a relatively movable plunger within the head operable across the slot, and means for lowering the head over a receptacle and for imparting additional downward movement to the plunger.

13. In a capping machine, a cover-applying head having a rim-embracing flange provided with an annular flaring face and an in-

wardly extending shoulder defining a contracted guiding ring and a narrow transverse insertion slot extending through the flange above said ring, the flange having an inwardly extending finger clearance opening, a relatively movable plunger within the head operable across the slot, means for lowering the head over a receptacle and for imparting additional downward movement to the plunger, and means for retracting the head and plunger together.

14. In a cover placing machine, the combination of a supporting base having a post, a vertically adjustable bracket thereon having a spindle bearing, a spring retracted spindle therein having a lowering lever, a centering head rotatably mounted on the spindle having a depending flange provided with a tapered and shouldered inner face and a transverse insertion slot interrupted by a finger clearance opening, and a cover inserting plunger secured to the spindle below said head and normally located immediately above the transverse slot.

15. In combination with a base having a pair of adjustable centering guides consisting of laterally swinging disks each provided with an eccentrically located securing screw, a superimposed vertically movable spring-retracted circular head provided with a downwardly extending flange having an annular inwardly tapering guiding and centering face for a cover disk and a transverse insertion slot, and an inner relatively movable plunger adapted to engage the cover for a receptacle resting on the base and engaged by the guides.

16. In combination with a base having a pair of adjustable centering guides consisting of laterally swinging disks each provided with an eccentrically located securing screw, a superimposed vertically movable spring-retracted head provided with a downwardly extending inwardly tapered flange having a transverse insertion slot, and an inner relatively movable plunger within the flange adapted to engage the cover for a receptacle on the base and held against said guides in centering relation to the head and plunger.

17. In a capping machine for annular containers, the combination of a supporting base having a pair of adjustable centering guides consisting of laterally swinging disks each provided with an eccentrically located securing screw, an upwardly extending post on the base, a plunger bracket adjustably mounted on the post, a reciprocable stem carried by the bracket, a clamping head having an inwardly tapering transversely slotted flange and a relatively movable flange-enclosed plunger on the stem, a depressing lever for the stem, and a retracting spring.

18. In a capping machine for annular containers, the combination of a supporting base having a pair of adjustable centering guides consisting of laterally swinging disks each

provided with an eccentrically located securing screw, an upwardly extending post on the base, a plunger bracket adjustably mounted on the post, a reciprocable stem carried by the bracket, a downwardly extending inwardly tapering flanged clamping head having a transverse insertion slot and slidably mounted on the stem, a relatively movable plunger secured on the stem, a depressing lever for the stem pivoted on the bracket, and a retracting spring.

19. In a capping machine for annular containers, the combination of a supporting base having a pair of adjustable centering guides consisting of freely movable disks each provided with an eccentrically located securing screw, an upwardly extending post on the base, a plunger bracket adjustably mounted on the post, a reciprocable stem carried by the bracket, a downwardly extending inwardly tapering flanged clamping head slidably mounted on the stem and a relatively movable plunger secured on the stem, a depressing lever having flexible connection with the reciprocable stem, and a spring adapted to normally retract the stem and lift the plunger against and with the clamping head.

20. A cover placing machine provided with a spring retracted depressible spindle and a guiding bearing therefor, a cup centering head slidably mounted on the spindle having an annular depending flange provided with an inner tapering guiding face and a transverse insertion slot, and a cover inserting plunger secured to the lower end of the spindle and normally retracted above the slot and against the head.

21. A cover placing machine provided with a spring retracted depressible spindle and a guiding bearing therefor, a cup centering head slidably mounted on the spindle having an annular depending flange provided with an inner tapering guiding face and a transverse insertion slot and a lower flaring shouldered terminal, and a cover inserting plunger secured to the lower end of the spindle and normally retracted above the slot and against the head.

In testimony whereof I hereunto affix my signature.

CHRISTIAN N. BERGMANN.