

No. 697,726.

Patented Apr. 15, 1902.

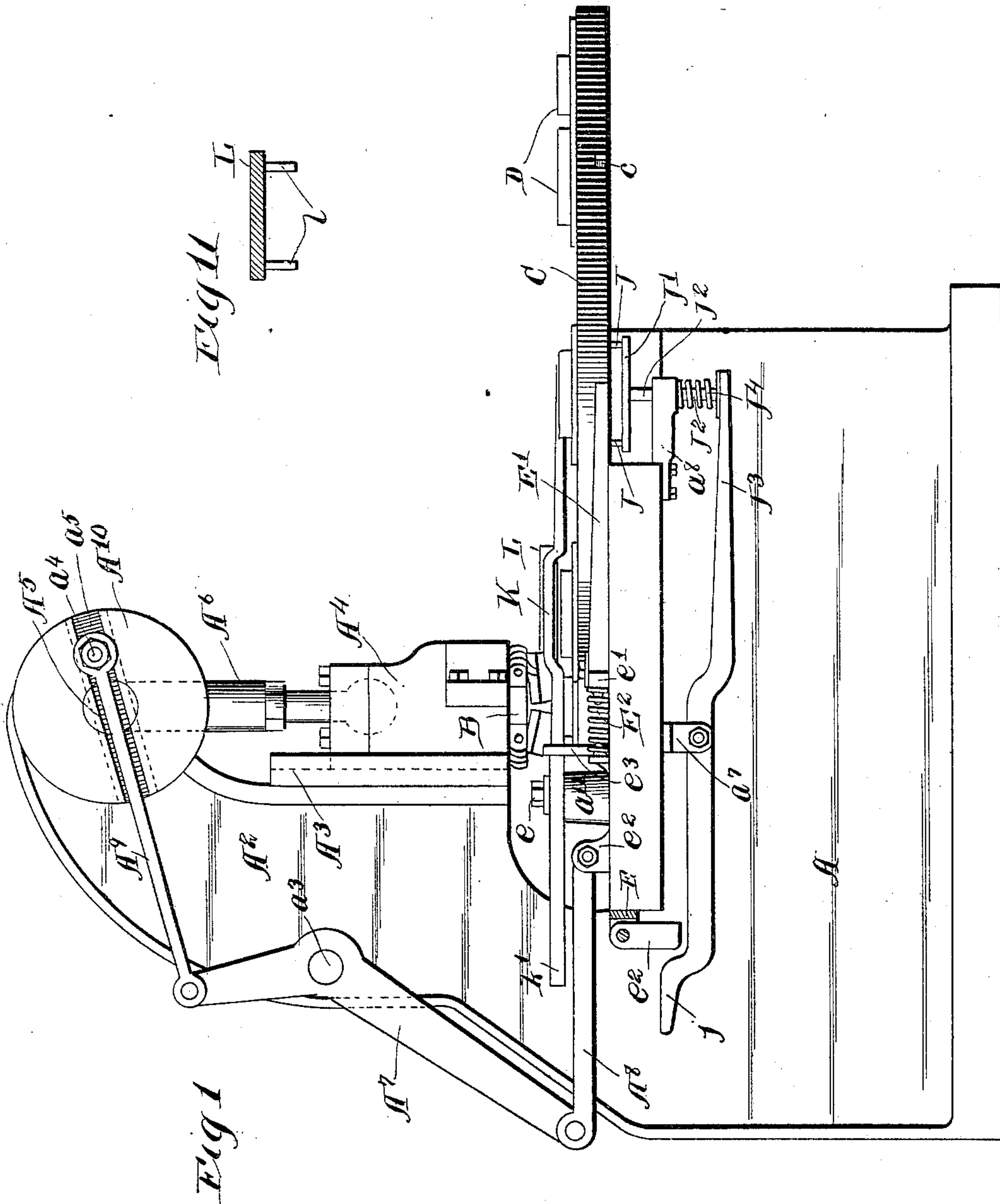
W. J. KENNY.

MACHINE FOR FLANGING CAN BODIES.

(Application filed Mar. 18, 1901.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses

Carl M. Crawford

William H. Hall

by

Inventor:

William J. Kenny

Robert Brown

His Attorneys

No. 697,726.

Patented Apr. 15, 1902.

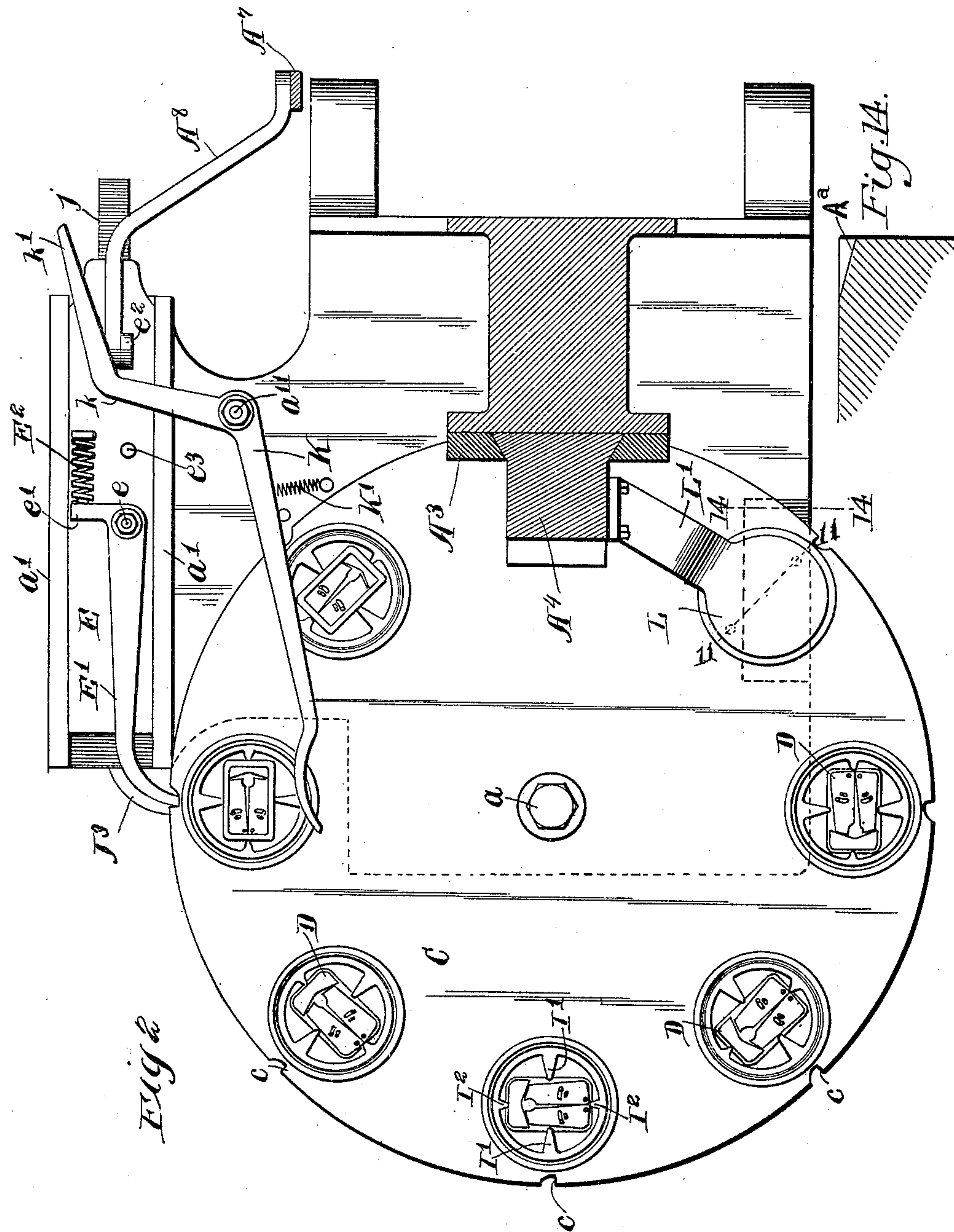
W. J. KENNY.

MACHINE FOR FLANGING CAN BODIES.

(Application filed Mar. 18, 1901.)

(No Model.)

4 Sheets—Sheet 2.



Witnesses:-
 Carl H. Crawford
 William H. Hall

Inventor:
William J. Kenny
by Robert Brown
His Attorneys

No. 697,726.

Patented Apr. 15, 1902.

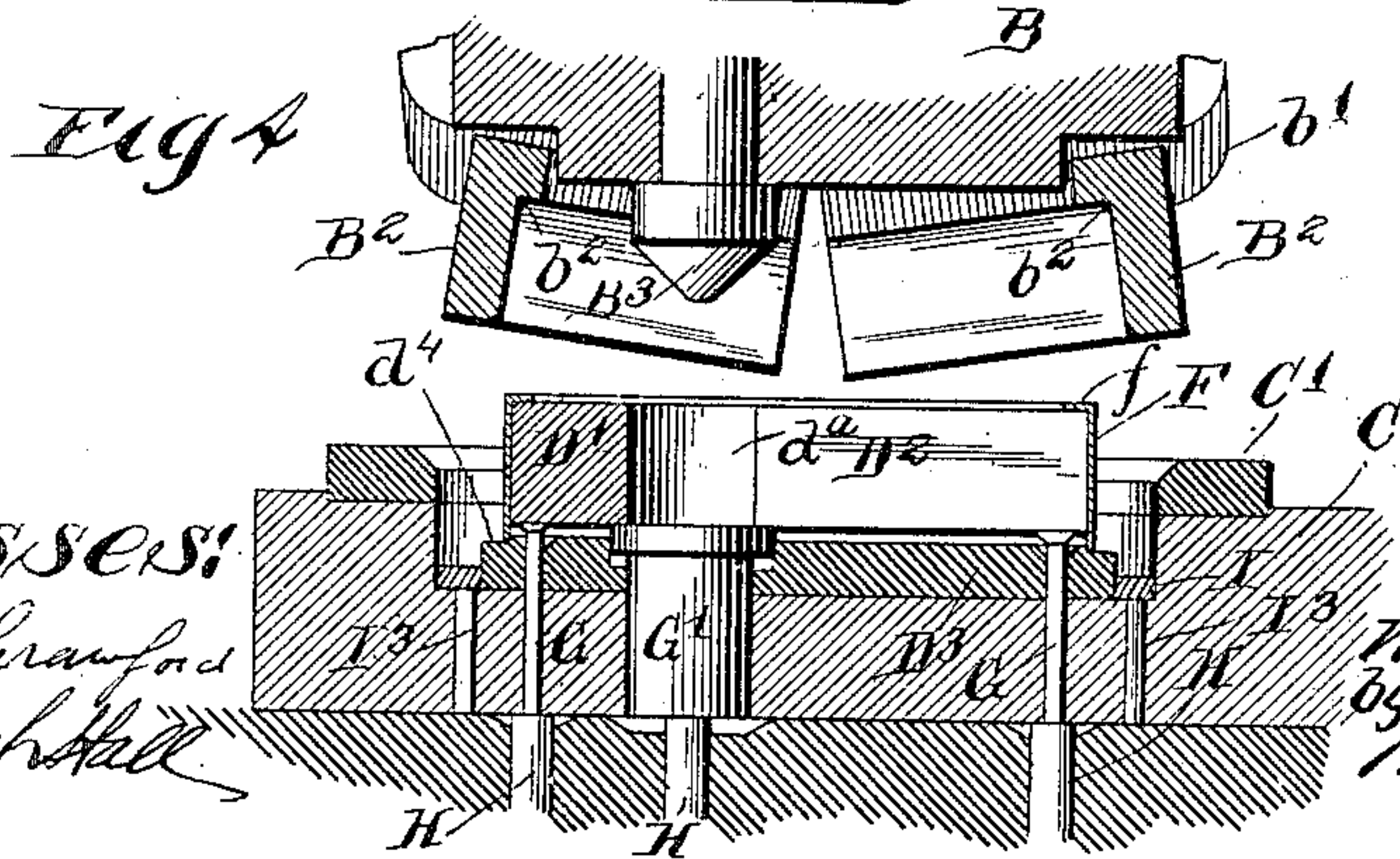
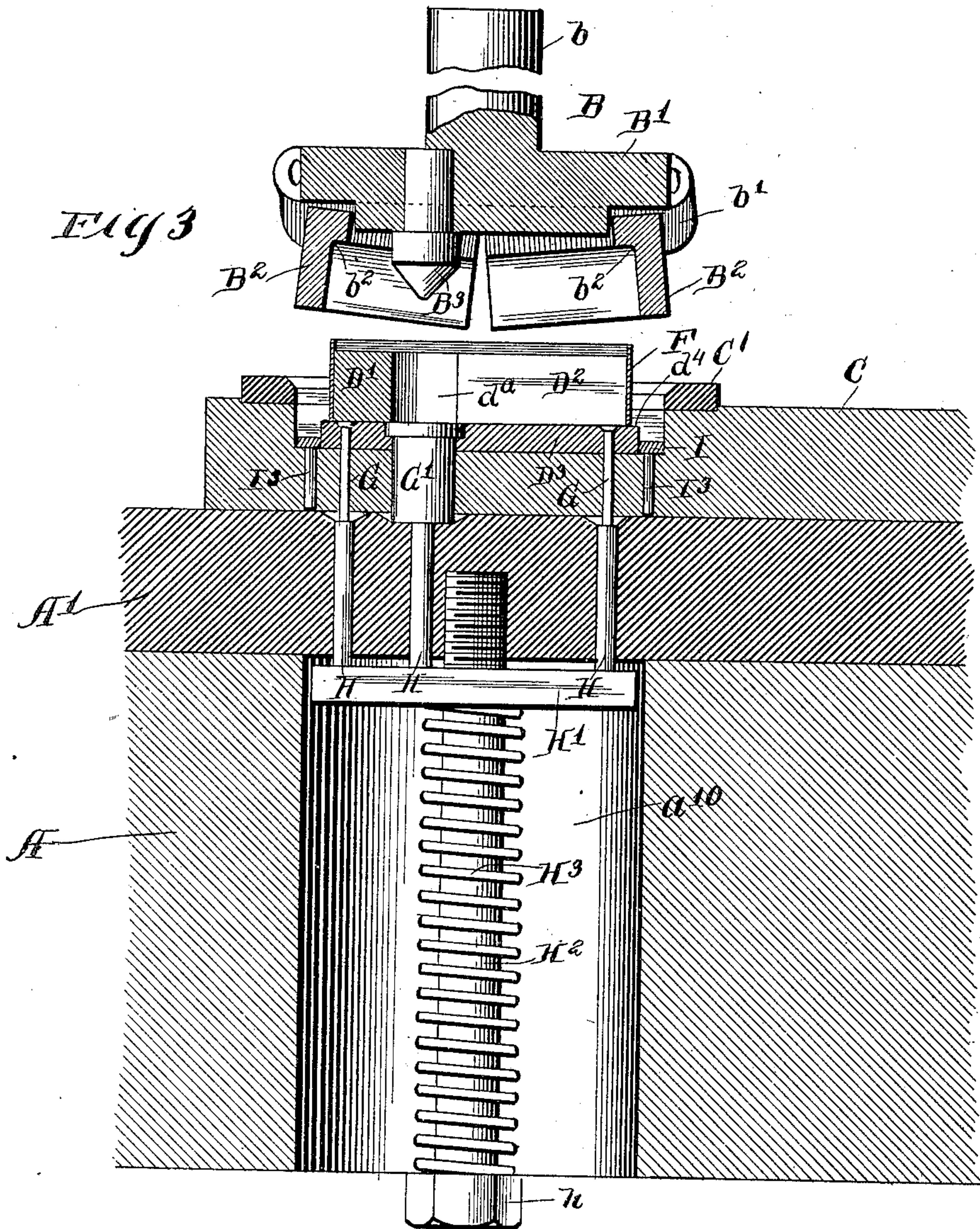
W. J. KENNY.

MACHINE FOR FLANGING CAN BODIES.

(Application filed Mar. 18, 1901.)

(No Model.)

4 Sheets—Sheet 3.



Witnesses:

Carl H. Crawford
William H. Hill

Inventor:

William J. Kenny

by Paul Brown

His Attorneys

No. 697,726.

Patented Apr. 15, 1902.

W. J. KENNY.

MACHINE FOR FLANGING CAN BODIES.

(Application filed Mar. 18, 1901.)

(No Model.)

4 Sheets—Sheet 4.

Fig 5

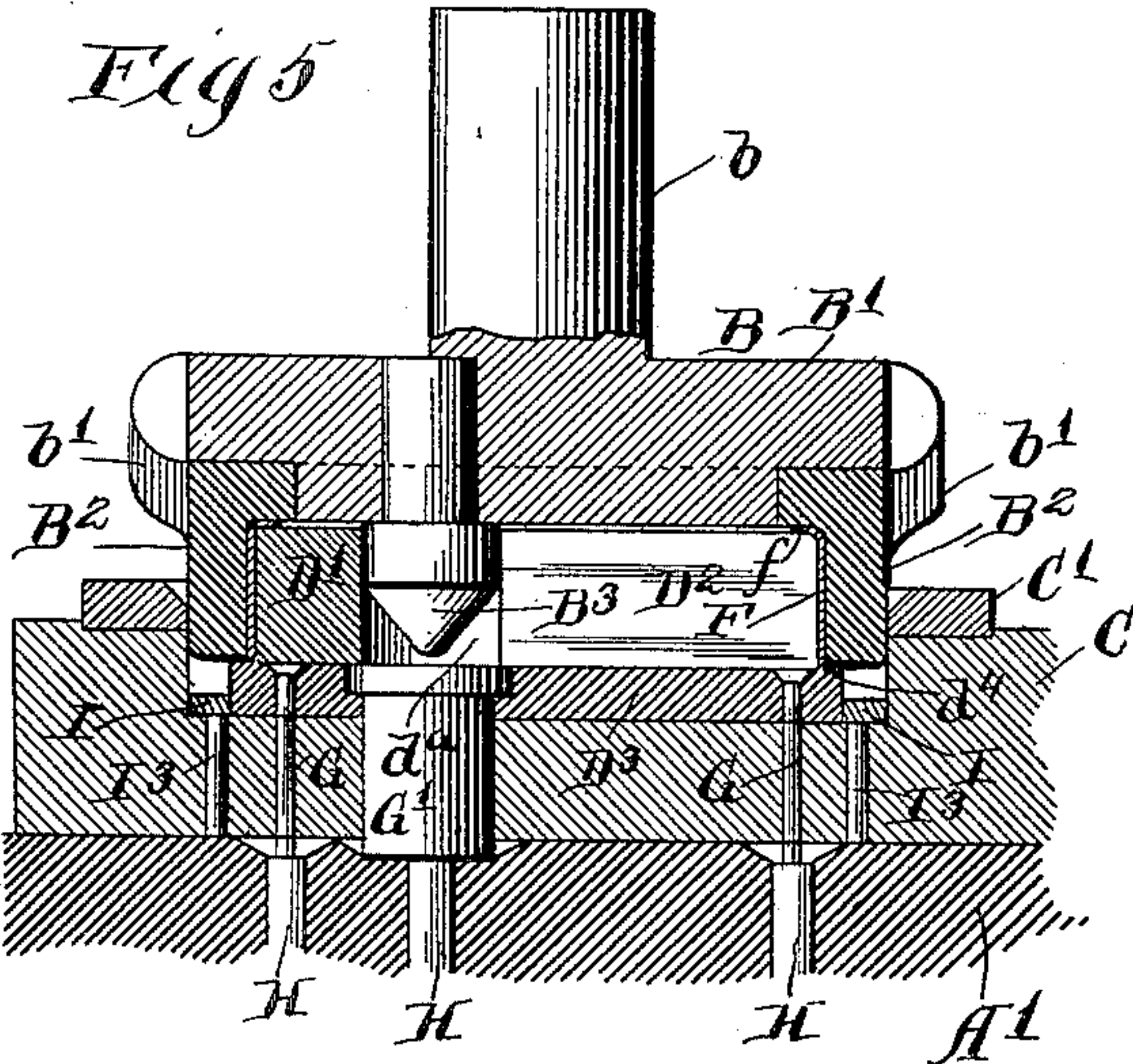


Fig 6

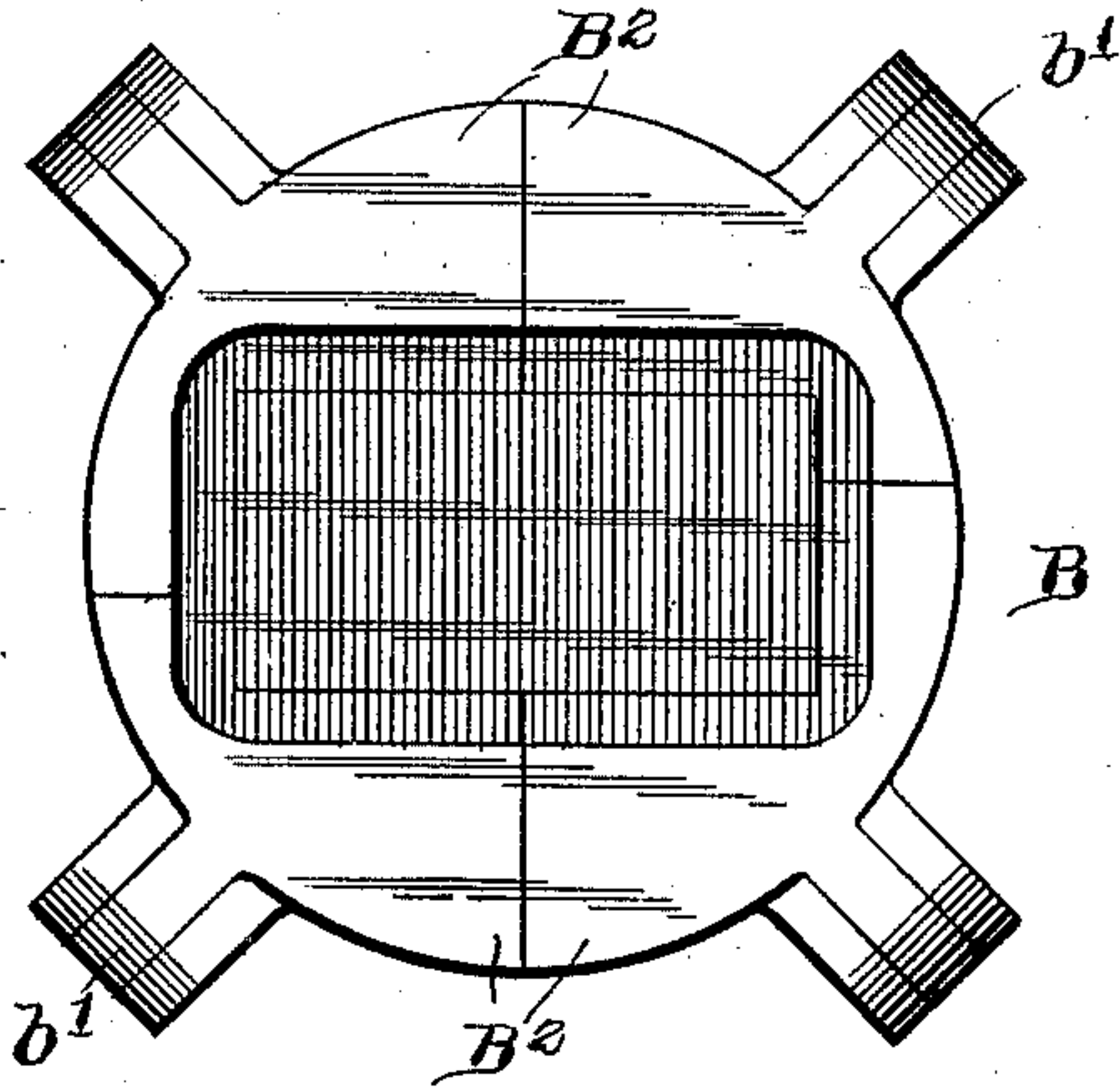


Fig 7

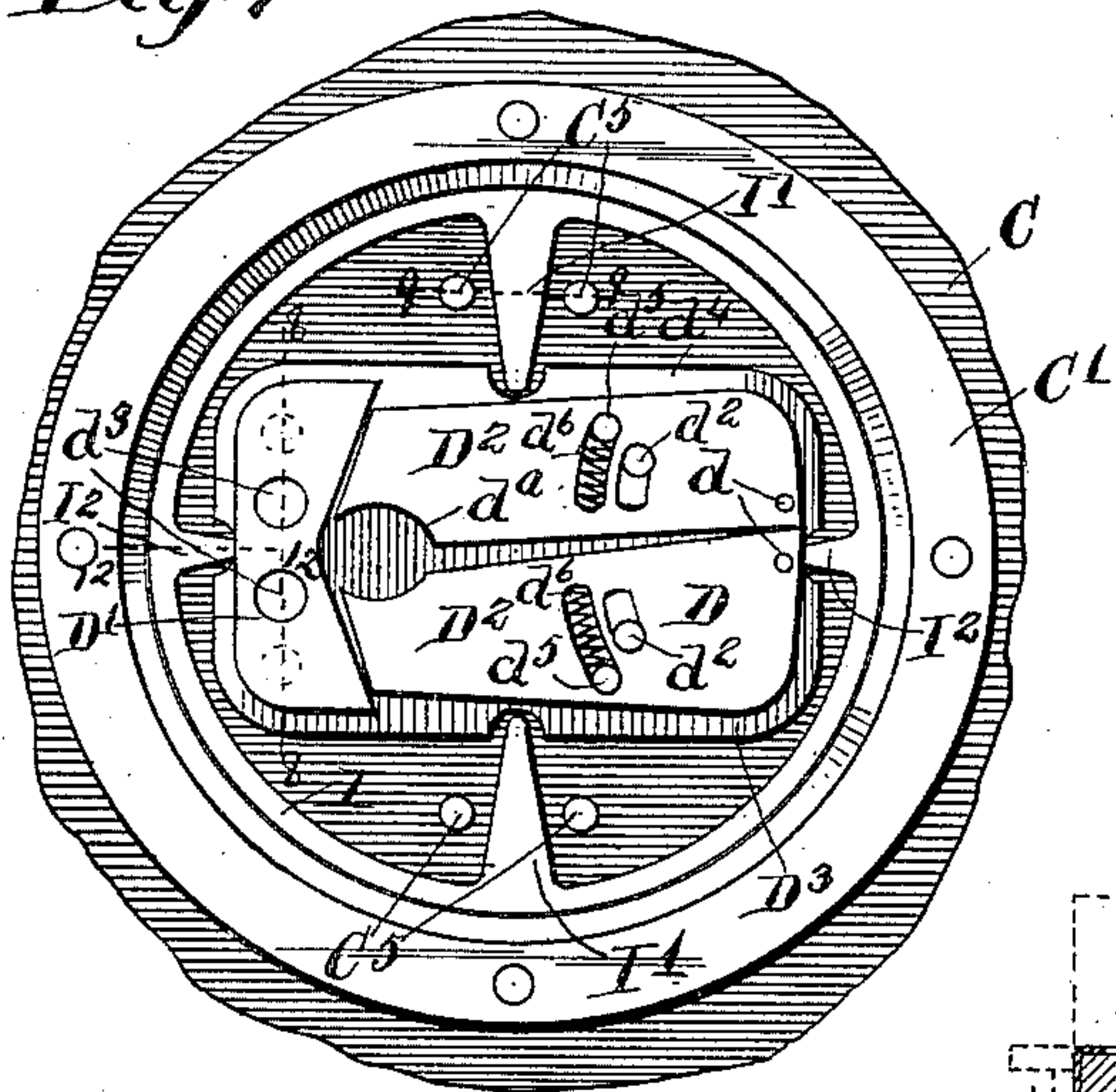


Fig 8

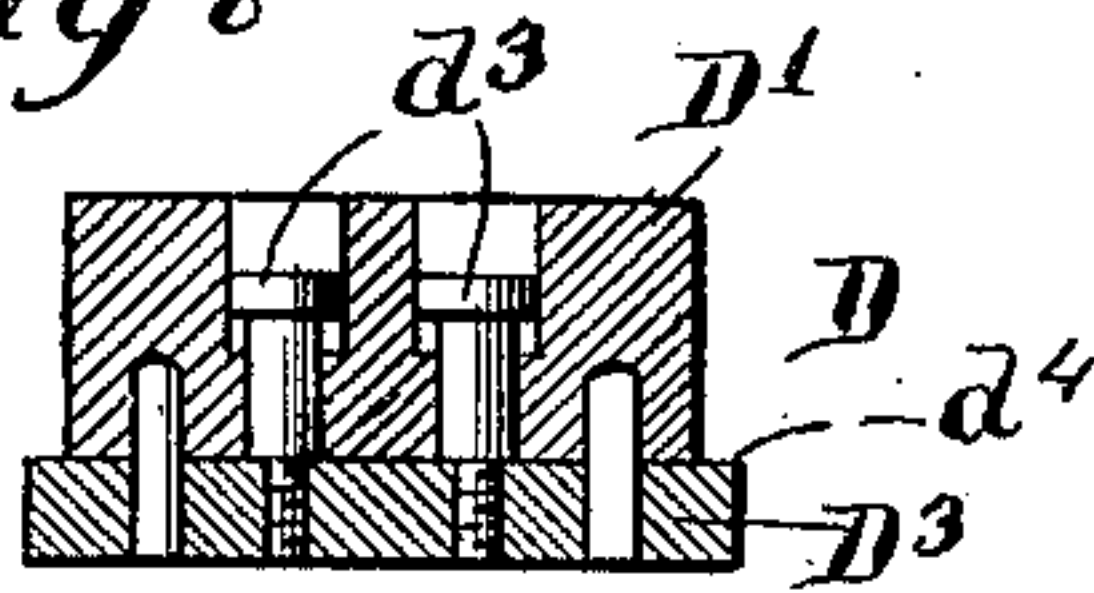


Fig 9

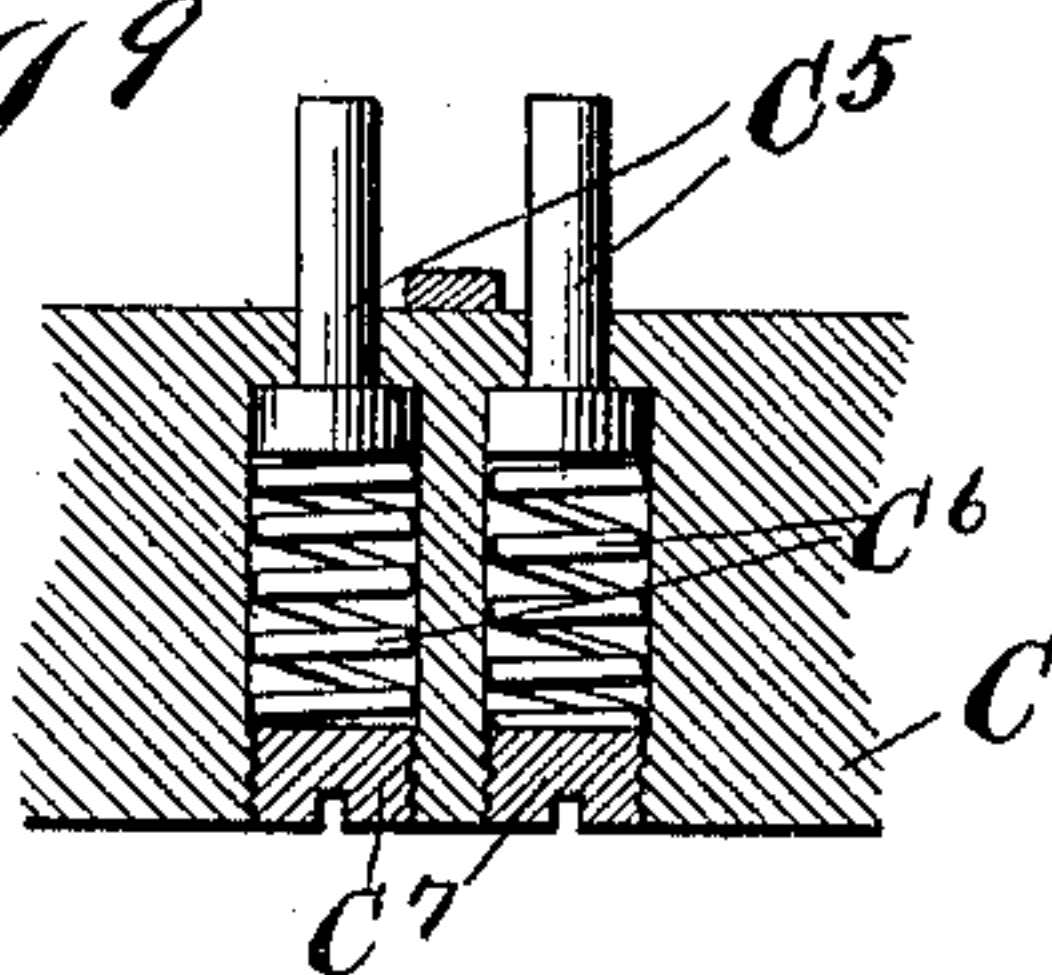


Fig 10

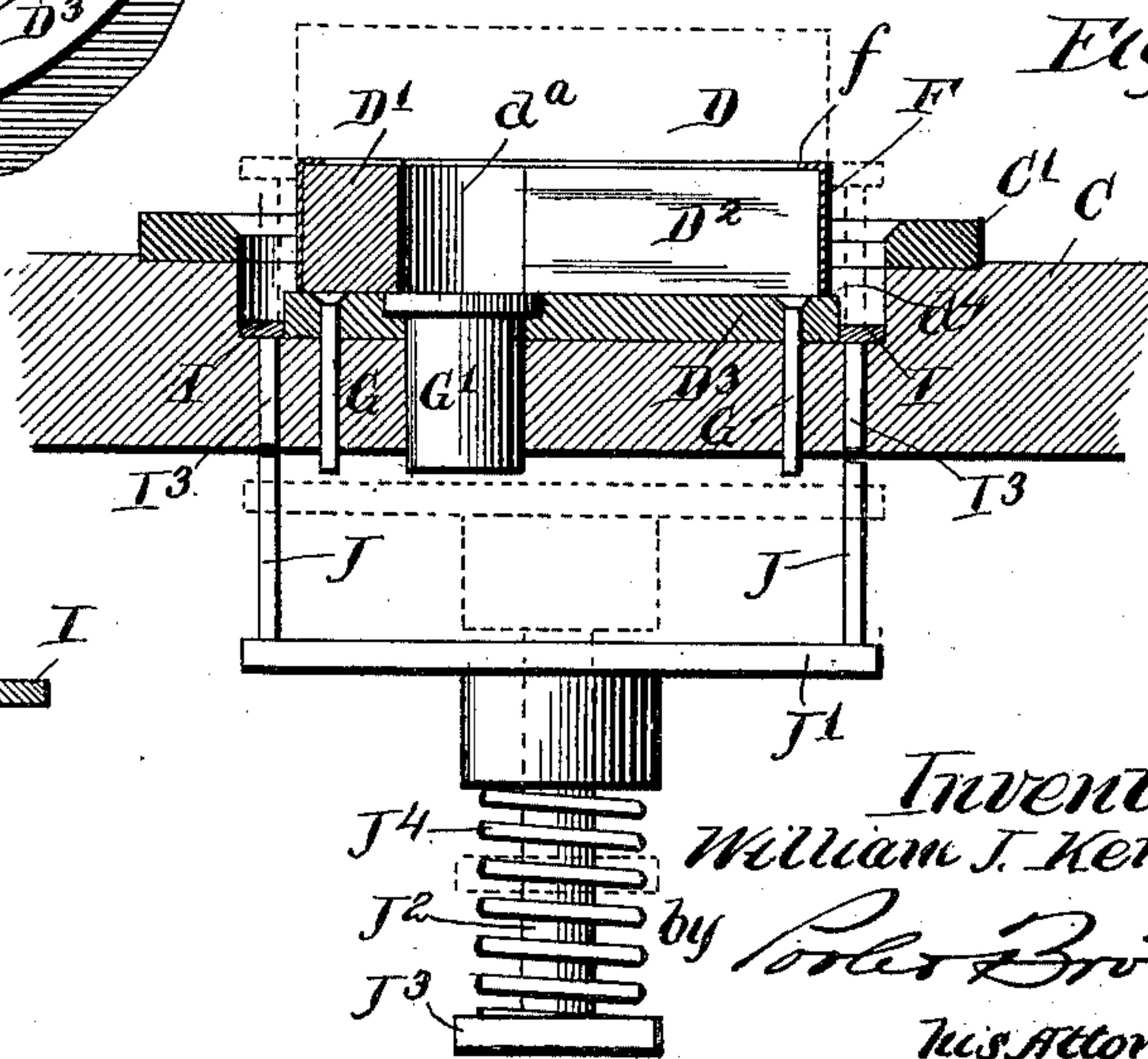


Fig 13

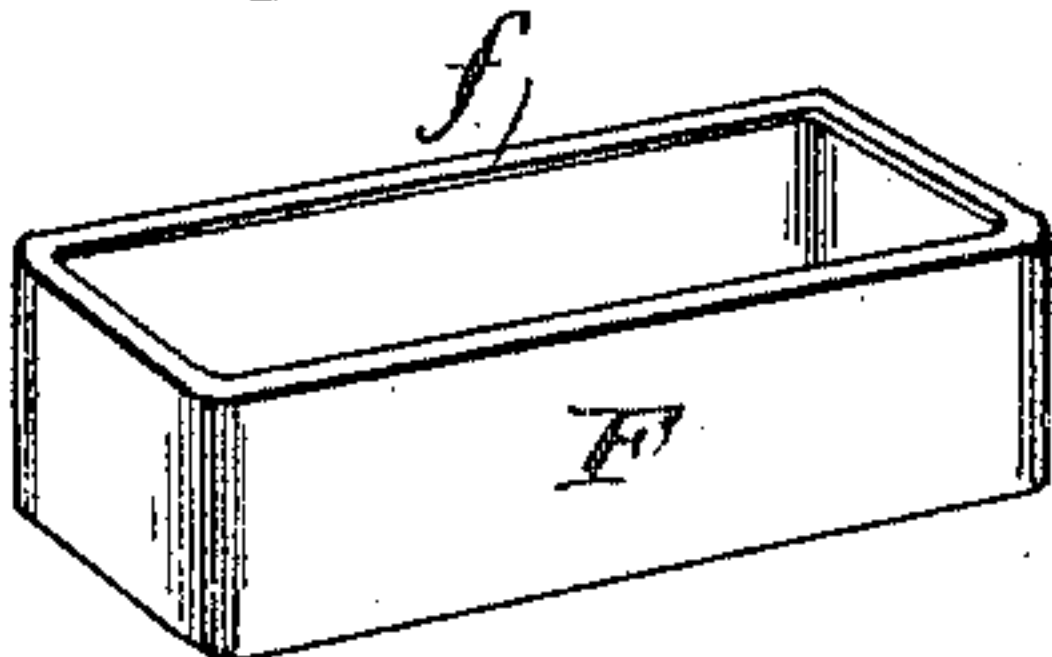
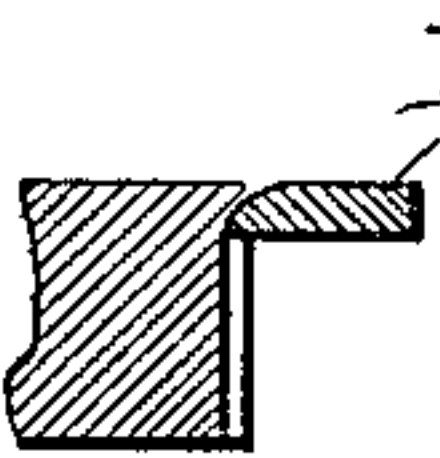


Fig 12



Witnesses:

Carl H. Crawford

William H. Hall

Inventor:

William J. Kenny

by Peter Brown

His Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM J. KENNY, OF MORTONPARK, ILLINOIS.

MACHINE FOR FLANGING CAN-BODIES.

SPECIFICATION forming part of Letters Patent No. 697,726, dated April 15, 1902.

Application filed March 18, 1901. Serial No. 51,587. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. KENNY, of Mortonpark, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Flanging Can-Bodies; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel machine employed in manufacturing sheet-metal cans.

The invention refers, primarily, to a novel construction for forming on the body-wall or can-body of cans flanges by which the top and bottom walls of the cans are fastened thereto.

The invention embraces also other improvements in machines of this character, as will hereinafter more fully appear.

An organized machine in which my improvements are shown as embodied embraces generally a suitable die-press which carries a vertically-reciprocating punch, a plurality of dies with which said punch coöperates, a carrier for said dies by which the dies are carried to and from the punch, and means for ejecting or removing the can-bodies from the machine after the flanges are formed thereon. The carrier herein illustrated consists of a rotary dial or disk which is mounted on the base of the die-press to rotate thereon, but may be made of other form.

The machine is herein shown as adapted to form both inturned and outturned flanges on a can-body, though it may be employed for separately forming either kind of flange.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of the machine embodying my improvements. Fig. 2 is a top plan view thereof with parts shown in section. Fig. 3 is a sectional detail taken through one of the dies and the punch before the punch has been depressed upon the die. Fig. 4 is a similar view of said parts adjusted to form an outturned flange. Fig. 5 is a similar view of the parts shown in Fig. 3 after the punch has been depressed and an inturned flange formed on the can-body. Fig. 6 is a bottom plan view of the punch.

Fig. 7 is a top plan view of one of the dies and its associated parts. Fig. 8 is a sectional detail on the line 8 8 of Fig. 7. Fig. 9 is a sectional detail on line 9 9 of Fig. 7. Fig. 10 is a sectional view of one of the dies and illustrates a part of the ejector device in position to eject a can-body from said die. Fig. 11 is a sectional detail on line 11 11 of Fig. 2. Fig. 12 is a sectional detail on line 12 12 of Fig. 7. Fig. 13 is a perspective view on a small scale of the can-body having an inturned flange formed thereon. Fig. 14 is a sectional detail of the bed-plate, taken on line 14 14 of Fig. 2.

First describing the general construction of the machine in which my improvements are embodied and referring more especially to Figs. 1, 2, and 3, A designates a base of a die-press provided on its upper surface with a bed-plate A', and A² designates a column rising from said base at the rear end thereof and provided over the bed-plate with guides or ways A³, in which travel a vertically-reciprocating head A⁴, which carries at its lower end a punch, (indicated as a whole by B'.) Said head is connected with and actuated from a crank-shaft A⁵ by means of a connecting-rod A⁶, which shaft is mounted in the upper end of a column A² in the manner shown in Fig. 1.

C designates a horizontal rotary carrier or dial which is mounted to rotate upon a concentrically-located pin or stud a, formed on or seated in the bed-plate A'.

D D designate as a whole a plurality of dies, which are mounted on the rotary carrier or dial C, said dies being annularly disposed and equally spaced about said carrier.

E designates a horizontally-movable slide-block which travels in guides or ways a', affixed to or formed on the base of the machine at one side of the carrier. Said slide carries a dog E', located above the ways, the outer end of which dog engages peripheral notches c in the carrier and the rear end of which is pivoted to swing in a horizontal plane on a pivot-stud e, rising from the slide. The tail e' of said dog is engaged by a spring E², herein shown as made spiral and which tends to throw the forward end of the dog toward the carrier and tends to maintain the same engaged with the notches c. The carrier rotates in a direction the reverse to that of the movement

of the hands of a clock, and the rear sides of the peripheral notches c with respect to their direction of movement are inclined to permit dogs to be disengaged therefrom when the slide which carries said dog is moved rearwardly. When said slide is moved rearwardly, the dog passes from the notch previously engaged by it until the end of said dog enters the notch c next in rear. At this time the direction of motion of said slide is reversed and engagement of the dog with the carrier causes the carrier to be rotated one step in advance or a distance equal to the distance between the centers of said dies. The actuating devices are so constructed that when the carrier is arrested one of the dies is beneath the punch in position to cooperate therewith in the next depression of the punch.

The slide E is given horizontal movement in the manner described from the crank-shaft A^5 through the medium of the following mechanism:

A^7 designates a bell-crank lever which is pivoted at its angle upon a pivot-stud a^3 , projecting from the column A^2 , and is pivotally connected at its lower end with a connecting-rod A^8 , the other end of which rod is pivoted to a stud e^2 , rising from the slide E . The upper end of said bell-crank lever is pivoted to one end of a connecting-rod A^9 , the other end of which is pivoted to a stud a^4 , mounted on a disk A^{10} , which latter is affixed to the crank-shaft A^5 . Said stud a^4 is adjustably affixed to said disk to permit it to move toward and from the center thereof, the stud in this instance being movably fixed in a groove a^5 , extending across said disk through the center thereof. The adjustment of the connecting-rod A^9 on the disk A^{10} is provided for the purpose of enabling the actuating device to be accurately adjusted with respect to the carrier, so as to center the dies thereon with respect to the punch.

Next describing the construction of the punch B and referring more particularly to Figs. 3, 4, 5, and 6, said punch is made as follows: The punch consists mainly of a horizontal plate B' , provided with a shank b , by which it is connected with a head A^4 and wings or segments B^2 , provided with lugs b' , by which they are pivoted in overlapping relation to extensions or lugs on the plate, whereby they are free to swing downwardly and outwardly, as shown in Fig. 3, when the punch is elevated. Said wings or segments form when folded together, as shown in Fig. 6, a continuous rim adapted to fit outside the can-body on the dies, as hereinafter described, and when closed together are desirably of exterior circular conformation to fill the depressions in the carrier in which the dies are located. The spreading of the wings enables the punch to freely slide over the dies, notwithstanding slight irregularities in the centering of the dies and also to correct any irregularity in the position of the can-bodies. Said dies and punch are made of the same

shape as the can-bodies on which the flanges are to be formed. In the present instance the punch is made to flange can-bodies of oblong, generally rectangular, shape, such as sardine-cans; but it will be understood that if cans of other shape—such, for instance, as cylindric—the dies and punch will be correspondingly changed in shape. Each of said wings includes part of the end and part of the side of the punch shell or rim, and the lugs b' , by which they are hinged to the punch-plate B' , are formed on the wings adjacent to the corners thereof, so that when the wings swing downwardly and outwardly the punch opens equally in all directions. Said wings when they assume a horizontal position are brought together to form a continuous shell; but when the punch is raised the inner or free ends of the wings drop down by gravity, as shown in Fig. 3, thereby throwing outwardly the entering edges of the wings and expanding or enlarging the hollow of the punch for the purpose above stated. The wings are provided interiorly between the vertical walls of the shell and short inwardly-extending flanges at the upper edges thereof with rounded or inclined deflecting-surfaces b^2 , the purpose of which will hereinafter appear.

The dies D consist each principally of a center block and a base or die plate D^3 . The center block of the die is made horizontally expansible and consists principally of three parts—namely, a stationary member D' and two movable members D^2 , which are pivoted at their ends remote from the stationary member upon studs d rising from the die-plate D^3 . The other end of said movable members or those adjacent to the stationary member swing outwardly and oppositely in a horizontal plane. The adjacent surfaces of said movable and stationary members are inclined to permit such relative movement, as clearly shown in Fig. 7. The exterior contour of the center block formed by said members D' D^2 is made of the same shape as the hollow part of the punch, and the can-body F (shown in Figs. 3, 4, 5, and 8) fits over said center block and within the punch. The body is placed on said center block when the movable members D^2 thereof are in their innermost position, as shown in Fig. 7, and said members are thereafter expanded outwardly to grip the body tightly thereon before the hollow punch descends upon said block and incloses the body. The expansion of the center block is effected in this instance by means of an expansion-pin B^3 , which projects downwardly from the plate of the hollow punch inside the shell thereof and is adapted to engage an opening d^a in the center block, formed one-half in each of the adjacent sides of the movable members D^2 . The entering end of said pin is made conical, as shown in Figs. 3, 4, and 5, to enable the same to readily enter the opening d^a in said center block. The dies are located in suitably-shaped depressions on

the upper surface of the carrier or dial, the depressions being herein shown as made circular.

C' designates a deflecting-ring surrounding each die or depression in the carrier in which the die is located, said ring being inclined at its upper surface on the inside thereof to engage the entering lower edges of the wings when the punch is depressed, and thereby cause said wings to swing inwardly to close the same together around the center block. As will be seen by an inspection of Figs. 3 and 4, said wings when the punch descends pass readily outside the body F, which has been placed over the center block, and when the wings strike the deflecting-ring the wings are caused to move inwardly and closely embrace a can-body. Just before this occurs the expanding-pin B³ enters the opening d³ in the center block and causes said block to expand outwardly against the body, whereby said body is held firmly in place between the punch and center block.

My improvements are designed to form either an inwardly or outwardly directed flange on the can-body.

I will first describe the operation of forming an inturned flange and refer more particularly to Figs. 3 and 5 in the description of such operation. The center block is made of slightly less thickness than the vertical width of the can-body, so that when the body is placed thereon, as shown in Fig. 3, the upper margin thereof projects slightly above said block. With this construction when the punch descends upon the die and the body placed on the center block thereof the deflecting-surfaces b² in said punch strikes the margin of said body which projects above the center block and serves to turn said margin inwardly, and the continued descent of the punch folds said margin down upon the upper surface of said block at substantially right angles to the body to form an inturned flange f, as shown in Fig. 5.

I will next describe the operation of forming an outturned flange on the body and refer more particularly in said description to Fig. 4. Before proceeding to such description, however, it may be observed that in some instances it is desirable to form a flange on both margins of the body, an inturned flange on one margin and an outturned flange on the other. The body illustrated in Fig. 4 is shown as having been previously formed with an inturned flange by the operation illustrated in Figs. 3 and 5 and just described and as being ready to have formed thereon on its lower margin an outturned flange. When the body has been previously formed with an inturned flange, as shown in Fig. 4, the die is provided with a center block thinner than the block previously used equal to the width of stock used in making the inturned flange. Said center block is vertically movable with respect to the base D³, and when an outturned flange is to be formed on

the lower margin of the body said block is raised a slight distance above its base and held yieldingly in such position till the punch descends thereon, the punch carrying said block downwardly until arrested by contact with the die-base. The center block is raised from the die-base and held in this position in the present instance by the following devices:

G G' designate vertically-movable pins fitting vertical openings in the carrier or dial and the die-base and made of slightly-greater length than the combined thickness of said base and the carrier. Said pins engage at their upper ends the lower surface of the center block, so that when they rise the center block is raised off said base.

d² d³ designate guide-pins projecting upwardly from the die-base and fitting loosely in guide-openings in the members of said center block to permit said block to rise and at the same time hold the same laterally in place. Said pins are headed at their upper ends to limit the upward movement of the center block. The guide-pins d³ fit in inclined slots in the movable members D² of the center block to permit the required horizontal movement of said members. The pivot-lugs d of said movable parts also fit loosely in their pivot-apertures to permit such vertical movement of the center block with respect to the die-base. The die-base in this instance is provided just outside the center block with a deflecting-surface d⁴, which when the can-body is placed over the center block is engaged by the lower margin of said body. The same die-base may be used for both operations by reversing the base. The pins G G' when the center block rests upon the die-base project at their lower ends below the dial or carrier and in the operation illustrated in Figs. 3 and 5 are adapted to rest in suitable openings on the upper surface of the bed-plate of the press. Said openings are inclined, as indicated in Fig. 5 thereof, to enable the pins G G' to pass out of the same upon movement of the carrier. The pin G', located directly under the expanding-pin B³, is made larger than the pin G to take the increased strain coming upon this part of the block. In the operation illustrated in Fig. 4 said pins are adapted to be engaged by plungers H, rising upwardly from a horizontal plate H', located within a suitable opening a¹⁰ in the base of the press. Said plate is mounted to slide vertically on a stud H², located in said opening a¹⁰, having screw-threaded engagement at its upper end with the bed-plate of the press. Said plate H' in the operation illustrated in Fig. 4 is adapted to be held upwardly against the bed-plate to project the plungers H upwardly and through the pins G G' to raise the center block off the die-base. This is effected through the medium of a spiral expansion-spring H³, surrounding said stud and interposed between said plate H' and a nut h at the lower end of the stud. When the center

block is raised off the die-base in the manner described and shown in Fig. 4 and the can-body is placed thereon, with its lower margin engaging the deflecting-surface d^4 on the die-base, the descent of the punch upon and around said body and block tends to depress said center block in contact with the die-base against the action of the spring H^3 , and the lower margin of said body by reason of its engagement with the deflecting-surface on the die-base is caused to be flanged outwardly, the entering edges of said hollow punch in the final descent of the punch flattening said flanges between the same and the horizontal part of the die-base to properly form said flange. In the operation illustrated in Fig. 3—that is, when an inturned flange is to be formed—the nut h is turned downwardly, so as to render the spring H^3 inert and permit the plate H' and plungers H to drop downwardly and also the pins G G' , whereby the center block is permitted to rest directly upon the die-base. The movable members D^2 of the center block are placed under the influence of springs which tend to hold said members in their innermost positions when not engaged by the expanding-pin B^3 . This construction is shown in Fig. 7 and consists of pins d^5 , passing upwardly through curved slots in said members occupying the outer ends of said slots when the members are in their innermost positions, and spiral expansion-springs d^6 are interposed between said pins and the inner ends of said slots. It will be observed also that the carrier in the construction shown projects beyond the bed-plate, and it will be necessary, therefore, in practice to incline the part of said bed-plate A' which the pins G G' first strike when passing onto the bed-plate, as shown in Figs. 2 and 14, to enable the pins to rise, A^a indicating such inclined portion of the bed-plate. In case the bed-plate extends entirely under the carrier the latter construction will be unnecessary.

In order to prevent the wings of the punch from swinging outwardly upon the ascent of the punch before they have passed above the deflecting-ring, (and which would cause a tendency of the parts to bind,) means are provided for holding said wings together and horizontal until this level is passed. This is accomplished in the present instance by means of spring-pressed pins C^5 , Figs. 7 and 9, which pass upwardly through apertures in the dial plate or carrier C into the openings in which the dies are mounted and adapted to engage at their upper ends the free ends of the wings of the punch. The pins are projected into said openings by spiral expansion-springs C^6 , located in suitable sockets in the carrier between the heads of said pins and headless screws C^7 , located in said sockets.

Means are provided for automatically removing the can-bodies from the dies after the flanges have been formed thereon. Said means consists of an ejecting device by which the bodies are raised from the center block

and a knock-off device by which said bodies after being raised are removed from the dies to a receptacle placed in suitable position to receive the same. The ejecting device is shown in Figs. 1, 7, and 10 and is made as follows: I designates an ejector-ring which is located in each depression or opening surrounding each die, said rings being made of such size as to fit snugly in said openings. Each ring is provided with a plurality of inwardly-directed fingers I' I^2 , which engage at their inner ends suitable notches in the die-base, whereby said inner ends of the fingers are located below the can-body, so that upon raising said ring the fingers strike the lower margin of the body and raise the same off the center block. The fingers located at the ends of the block engage vertical grooves in said block, as shown in Fig. 12. Said ejector-ring is provided with a plurality of depending pins I^3 , which pass loosely through openings in the carrier and are adapted to be engaged by suitable mechanism below the same for raising the pins and ejector-ring. The means for so raising the pins and ring consists, as herein shown, of a plurality of plungers J J , which rise upwardly from a horizontal plate or cross-bar J' , attached to the upper end of a post J^2 , engaged at its lower end by the outer or free end of a vertically-oscillatory lever J^3 . Said lever is pivoted between its ends to a depending lug a^7 , attached to or formed on the base of said press. A spring J^4 is interposed between a collar on the lower end of post and an arm a^8 , projecting from the base of the bed-plate, which tends to hold said post J^2 and the pins J in their lowermost positions. The free end of said lever is swung upwardly to raise the ejector-ring through the mechanism described by means of a dog e^2 , pivoted to a rearwardly-projecting arm on the slide E in such manner as to swing freely rearwardly, but incapable of swinging forwardly from a vertical position. When said slide E is moved rearwardly, said dog engages the upturned or inclined end j of the lever J^3 and depresses the rear end of said lever, which causes the forward end thereof to rise and the ejector-ring to be thrown upwardly. Upon the return movement of said slide the dog e^2 swings rearwardly and permits the same to ride freely over the upturned portion j of the arm J^3 . The upward or ejecting position of the ejector-ring I and associated parts is indicated in dotted lines in Fig. 10. Upon the disengagement of said dog e^2 from said lever J^3 the spring J^4 returns said lever and the ejector mechanism to their normal positions.

When the can-body has been raised by the ejector mechanism in the manner described, said body is acted upon by a knock-off device to remove the same from the machine, said knock-off device being constructed as follows: K designates an arm or lever which is pivoted between its ends upon a stud a^{11} , rising upwardly from the bed-plate of the press. The forward end of said lever is located just

inside of one of the dies—the die upon which the ejector device is in position to act at the time the carrier is brought to a stop. Said lever is adapted to be actuated just as the body is raised in such manner that the forward end thereof is swung outwardly away from the center of the carrier, and thereby comes in contact with the body and acts to throw the body off of the die and carrier into a receptacle placed to receive the same. The means for thus actuating the arm or lever consists of a pin e^3 , rising upwardly from the slide E and adapted to engage an inclined part k of the lever K, which is disposed at an angle to the forward end of said lever. It will be seen, therefore, that when the slide E moves rearwardly the pin e^3 contacts with said angularly-disposed arm of the lever K and causes the forward end of said lever to move radially outwardly. The rear end k' of said lever beyond the parts k thereof is made of such length as to prevent the pin e^3 becoming entirely disengaged from the lever, and in the forward movement of said slide the pin rides back on the lever, and when it has passed the angularly-disposed part k thereof said lever assumes its normal position, with its forward end inside the adjacent die under the influence of a spring K'.

In order to insure that the can-body is placed properly upon the center block before the dies pass under the punch and without the necessity of the operator using great accuracy in so placing the can-bodies, I have provided a gage-plate which is constructed to perform this work after the can-body has been fed to the die and before it has passed under the punch. Said gage is designated by the letter L in Fig. 1 and is provided with a rigid arm L', by which it is attached to the cross-head A¹, so as to move with the punch. Said gage consists of a flat horizontal plate and is adapted to be brought into contact with the upper margin of the can-body and push the same down over the center block and is provided also with pins l , adapted to engage the fingers I' of the ejector-rings I to depress said rings into their proper positions. It will be understood that the grooves in the ends of the center blocks formed to receive the ends of the ejector-fingers I² do not continue to the upper surface of the blocks, so that said ejector fingers and rings are prevented from rising above said blocks.

It is obvious that many changes may be made in the details of construction without departing from the spirit of my invention, and I do not wish to be restricted to such details except hereinafter made the subject of specific claims.

I claim as my invention—

1. In a machine for the purpose stated, the combination with a die provided with an expansible and contractible center block constructed to hold a sheet-metal body which embraces the block, said block filling said

body and the side faces of which have contact with, and exert pressure against, all parts of the walls of the body throughout the vertical depth of the block to prevent inward flexure of the body, of a hollow punch adapted to pass over said die and body, and means for forming a flange between said die and punch on the margin of said body.

2. In a machine for the purpose stated, the combination with a die provided with an expansible and contractible center block constructed to hold a sheet-metal body which embraces the same, said block filling said body and the side faces of which have contact with, and exert pressure against, all parts of the walls of the body throughout the vertical depth of the block to prevent inward flexure of the body, an expanding-pin on said punch which engages said block to expand the same outwardly against said body and means for forming a flange between said die and punch on the margin of the body.

3. In a machine for the purpose stated, the combination with a die having a center block embracing a stationary transverse member and a plurality of transversely-pivoted members, of a hollow punch adapted to pass over said block, and means for forming a flange between said die and punch on the margin of a sheet-metal body surrounding said block and located between the block and punch.

4. In a machine for the purpose stated the combination with a die provided with an expansible and contractible center block constructed to hold a sheet-metal body which embraces the block, said block being of less depth than the width of said body and formed to laterally fill the body from end to end of the block, of a hollow punch adapted to pass over said body and block, and means for folding that portion of the margin of the body which projects beyond the said center block away from the body and compressing the same between the die and punch to form a flange.

5. In a machine for the purpose stated, the combination with a die provided with an expansible and contractible center block adapted to hold a sheet-metal body which embraces the block, and the side faces of which have contact with the walls of the body throughout the vertical depth of the block to prevent inward flexure of the body, of a hollow punch adapted to pass over said die and body, and provided with side parts which are made of a depth equal to the depth of the block and adapted to surround and fit closely over said body, when the punch is in its lowermost position, to prevent outward flexure of said body and means for forming a flange between said die and punch on the margin of the body.

6. In a machine for the purpose stated, the combination with a die constructed to hold a sheet-metal body which embraces the die, of a hollow punch adapted to pass over said die and body, said punch embracing a plurality

of separable wings constituting, when contracted, a complete closed shell, said wings when free being adapted to swing away from each other to expand the punch.

5 7. In a machine for the purpose stated, the combination with a die constructed to hold a sheet-metal body which embraces the die, of a hollow punch adapted to pass over said die and body, said punch embracing a plurality
10 of separable wings provided with side parts adapted to pass outside the body to prevent flexure of that part of the body between said side parts of the punch and the die and each provided at its margin with a deflecting-surface.

15 8. In a machine for the purpose stated the combination with a die constructed to hold a sheet-metal body which embraces the die, of a hollow punch adapted to pass over said die
20 and body, said punch embracing a plurality of separate wings provided with side parts adapted to pass outside of the body to prevent flexure of that part of the body between said side parts and the die, and each wing being provided at both end margins with deflecting-surfaces.

25 9. In a machine for the purpose stated, the combination with a die constructed to hold a sheet-metal body which embraces the die, of a hollow punch adapted to pass over said die
30 and body, said punch embracing a plurality of separable wings constituting, when contracted, a complete closed shell, said wings, when free, being constructed to swing away
35 from each other to expand the punch, and an inclined deflecting-ring surrounding said die adapted to engage the entering margins of the hollow punch to close said wings together.

40 10. In a machine for the purpose stated, the combination with a die provided with a center block constructed to hold a sheet-metal body which embraces the block, said block being made of less depth than that of the body, of a hollow expansible punch adapted
45 to pass over said die and body and provided with interior deflecting-surfaces constructed to engage the margin of said body which projects above the center block to fold said margin inwardly over said block to form a flange
50 thereon, and means associated with the die for contracting the punch upon depression thereof.

55 11. In a machine for the purpose stated, the combination with a suitable die, constructed to receive and hold a hollow body thereover, of a hollow punch constructed to pass over and outside of said die and body and means for forming a flange on the lower margin of said body between said die and
60 punch after said punch has passed outside of said body.

65 12. In a machine for the purpose stated, the combination with a die comprising a die-base and a center block, and a punch adapted to pass over said block, of means for holding

the center block yieldingly above the die-base, said base being provided below the block with a deflecting-surface.

13. In a machine for the purpose stated, the combination with a die comprising a die-
70 base and a vertically-movable center block thereon constructed to hold a sheet-metal body which embraces the block, of means for holding said block above said base, said block being made of less depth than that of the body,
75 whereby the body projects below the block, a hollow punch adapted to pass over said block and body, and a deflecting-surface on the die-base adapted to turn the lower margin of said body out of the plane of the body
80 to form a flange thereon upon the descent of the punch.

14. In a machine for the purpose stated, the combination with a die comprising a die-
85 base and a center block, of means for yieldingly holding said block above said base, said block being less of width than that of a sheet-metal body embracing the same, whereby said body projects below said block and engages the die-base, and a hollow punch adapted to
90 pass over said block and body, said die-base being provided with a deflecting-surface which turns the lower margin of said body when the center block is depressed upon said base to form a flange thereon.

95 15. In a machine for the purpose stated, the combination of a die comprising a die-base and a center block, said block being constructed to hold a sheet-metal body which embraces the block, and spring-pressed pins
100 which pass upwardly through said base to hold said block yieldingly out of contact with the base, said block being made of less depth than the body whereby the body projects below said block in contact with the base, of a
105 hollow punch adapted to pass over said block and body and, when depressed, to press the block against said die-base and the die-base being provided with a deflecting-surface which turns the lower margins of the body to
110 form a flange thereon.

16. In a machine for the purpose stated, the combination with a die provided with an expansible and contractible center block constructed to hold a sheet-metal body which
115 embraces the block, said block filling said body and the side faces of which have contact with, and exert pressure against, all parts of the walls of the body throughout the vertical depth of the block, to prevent inward flexure
120 of the body, of a hollow punch adapted to pass over said block and body, means for forming a flange on the margin of said body between said die and punch and an ejector device for removing said body from the die.

125 17. In a machine for the purpose stated, the combination with a die provided with a center block constructed to hold a sheet-metal body which embraces the block, of a hollow punch adapted to pass over said block and
130

body, and means for forming a flange on the margin of said body between said die and punch, and an ejector device for removing said body from the die, said ejector device

5 embracing a ring surrounding said die and provided with radial fingers, the inner ends of which are located in notches in the die-base beneath said body when placed on the die.

18. In a machine for the purpose stated, 10 the combination with a die constructed to hold a sheet-metal body which embraces the die, a hollow punch adapted to pass over the die and body, and means for forming a flange on the margin of said body between the die and 15 punch, of a gage-plate for automatically locating the body on the die before the die passes under the punch.

19. In a machine for the purpose stated, the combination with a carrier, a die there- 20 on, a punch which coöperates with said die, the punch being made hollow to pass over the die, and means for forming a flange on the margin of the body between said die and punch, of a gage-plate movable with the punch 25 constructed to locate the body properly on the die before the die passes under the punch.

20. In a machine for the purpose stated, the combination with a carrier, a die on said carrier, and a vertically-reciprocating punch, 30 and means for forming a flange on a body located between the die and punch, of ejector device embracing a ring surrounding the die and adapted to lift the body away from said die and a gage-plate movable with the punch 35 adapted to locate the body properly on the die before it is moved under the punch, said plate being provided with projections adapted to engage the ejector-ring, to seat the same at the same time the body is adjusted on the die.

21. In a machine for the purpose stated, 40 the combination with a die embracing a center block provided with an outwardly-expandible member and constructed to hold a sheet-metal body which embraces the block and 45 formed to laterally fill the body from end to end of the block, a hollow punch adapted to pass over said block and body, and an expanding-pin on said punch adapted to spread the expanding members of the block out- 50 wardly against the body, of spring-actuating devices tending to hold said expanding members inwardly, and means for forming a flange on the margin of the body between said die and punch.

22. In a machine for the purpose stated, 55 the combination with a die constructed to hold a sheet-metal body which embraces the die, and a hollow punch embracing a plurality of pivoted wings which are adapted to swing 60 away from each other, and which, when closed together, form the shell of the punch, of means engaging the pivoted wings of the punch to hold the same closed during a part of the rising movement of the punch.

65 23. In a machine for the purpose stated,

the combination with a die constructed to hold a sheet-metal body which embraces the die, and a hollow punch adapted to pass over said die and body, said punch embracing a plu- 70 rality of pivoted wings adapted to swing away from each other, and which, when closed, form the shell of the punch, and means for forming a flange on said body between said punch and die, of spring-pressed pins or studs mount- 75 ed in said die adapted to engage the free ends of said wings to hold the wings in their closed positions during a part of the rising move- ment of the punch.

24. In a machine for the purpose stated, the combination of a rotary carrier, a plural- 80 ity of dies, disposed annularly upon the upper surface of said carrier, a reciprocating punch adapted to coöperate severally with said dies, said dies each embracing a center 85 block adapted to hold thereon a sheet-metal body which fits over said block, means for forming a flange on said body between the die and punch, and an ejector device embracing a ring surrounding each of said dies, a vertically-oscillatory lever pivoted between 90 its ends to the machine-frame and provided at one end with fingers or plungers adapted to pass through the openings in the carrier to severally actuate said ejector-rings, and means for oscillating said lever. 95

25. In a machine for the purpose stated, the combination of a rotary carrier, a plural- ity of dies disposed annularly upon the up- 100 per surface of said carrier, a reciprocating punch adapted to coöperate severally with said dies, said dies each embracing a center block adapted to hold thereon a sheet-metal body which fits over said block, means for 105 forming a flange on the body between the punch and die, and an ejector device embracing a ring surrounding each of said dies, a vertically-oscillatory lever pivoted between its ends to the machine-frame and provided 110 at one end with fingers or plungers adapted to pass through openings in the carrier to severally actuate said ejector-rings, and means actuating said lever embracing a horizontally- movable slide, and a pivoted dog on said slide adapted to engage an inclined part of said 115 lever.

26. In a machine for the purpose stated, the combination of a rotary carrier, a plural- ity of dies, disposed annularly upon the up- 120 per surface of said carrier, a reciprocating punch adapted to coöperate severally with said dies, said dies each embracing a center block adapted to hold thereon a sheet-metal body which fits over said block, means for 125 forming a flange on the margin of said body, and an ejector device embracing a ring surrounding each of said dies, a vertically-oscillatory lever pivoted between its ends to the machine-frame, and provided at one end with fingers or plungers adapted to pass through 130 openings in the carrier to severally actuate

said ejector-rings and actuating said lever,
and a horizontally-movable knock-off arm
adapted to move the body from the die after
it has been raised therefrom by the ejector
5 device.

In testimony that I claim the foregoing as
my invention I affix my signature, in pres-

ence of two witnesses, this 16th day of March,
A. D. 1901.

WILLIAM J. KENNY.

Witnesses:

WILLIAM L. HALL,
CARL H. CRAWFORD.