No. 828,865. PATENTED AUG. 14, 1906.

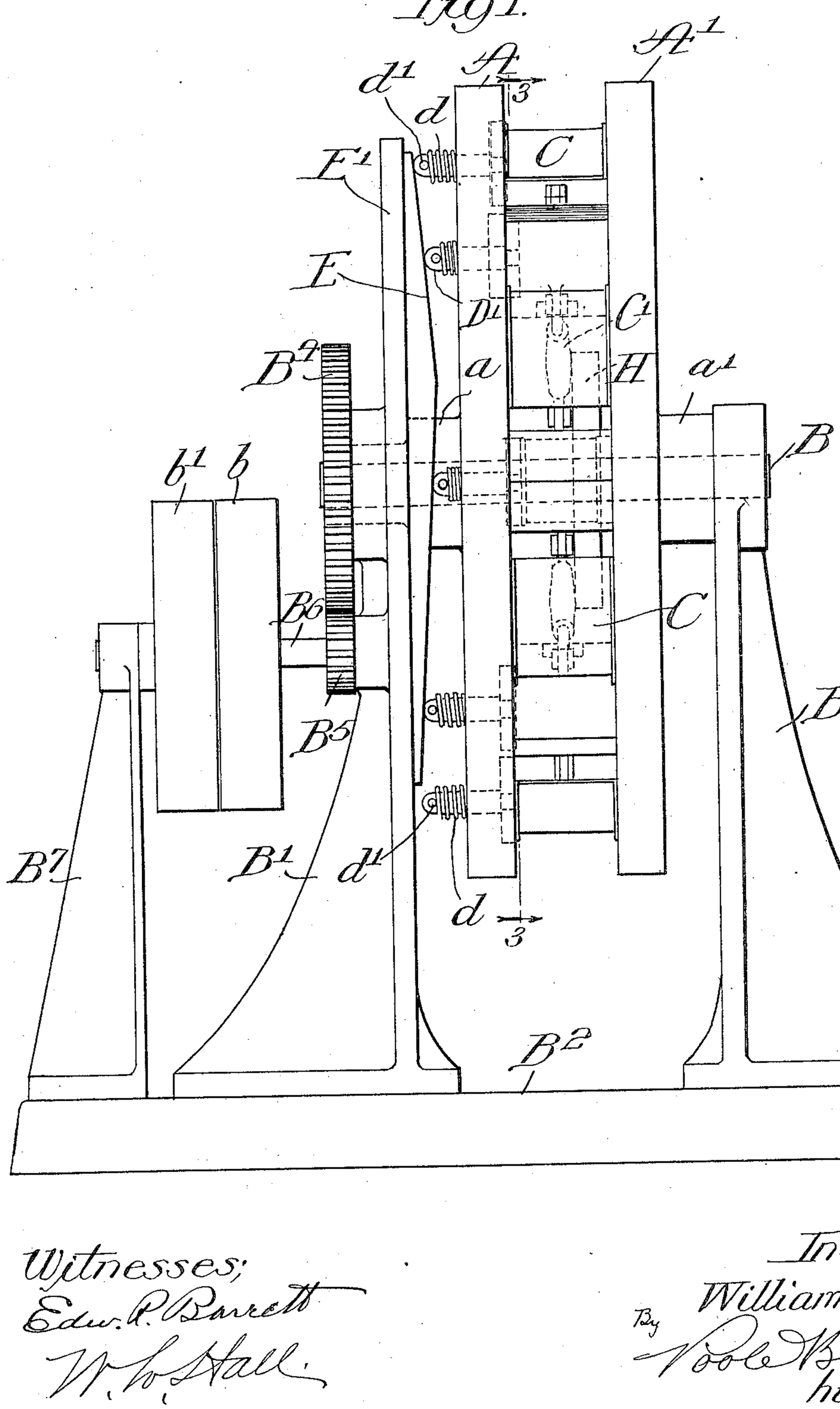
W. SPAIN.

CAN HEADING MACHINE.

APPLICATION FILED MAY 23, 1905.

4 SHEETS—SHEET 1.

Fig 1.



Witnesses;
Edw. P. Barrett
W. B. Hall

Inventor
William Spain
By Poole Brown
his Atty's

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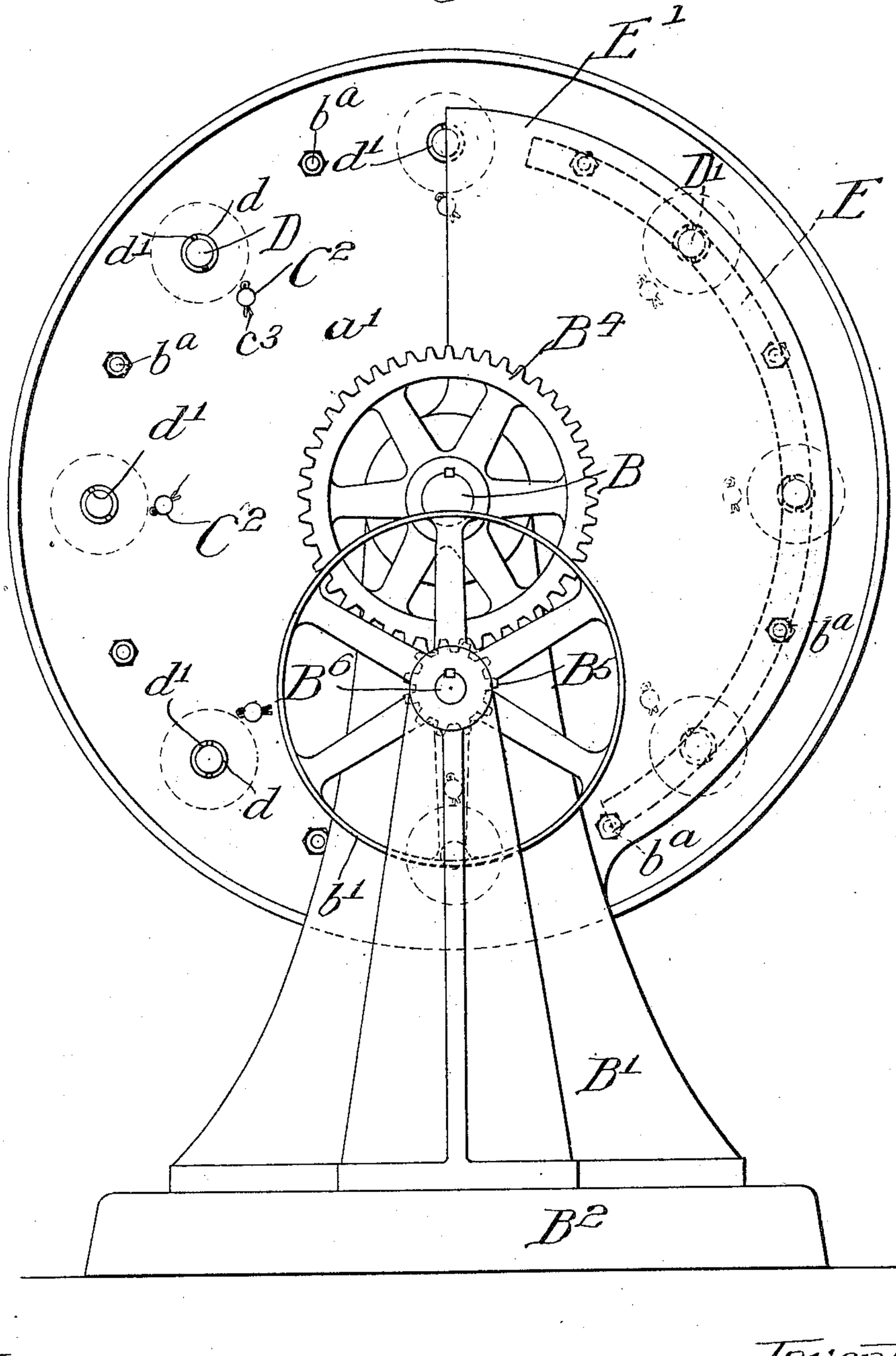
4 SHEETS—SHEET 2.

Fig. 2



Witnesses;
Edw. P. Barrett
W. L. Hall

Inventor
By William Spain
Poole & Brown
his Attys.

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4 SHEETS—SHEET 3.

Fig. 3.

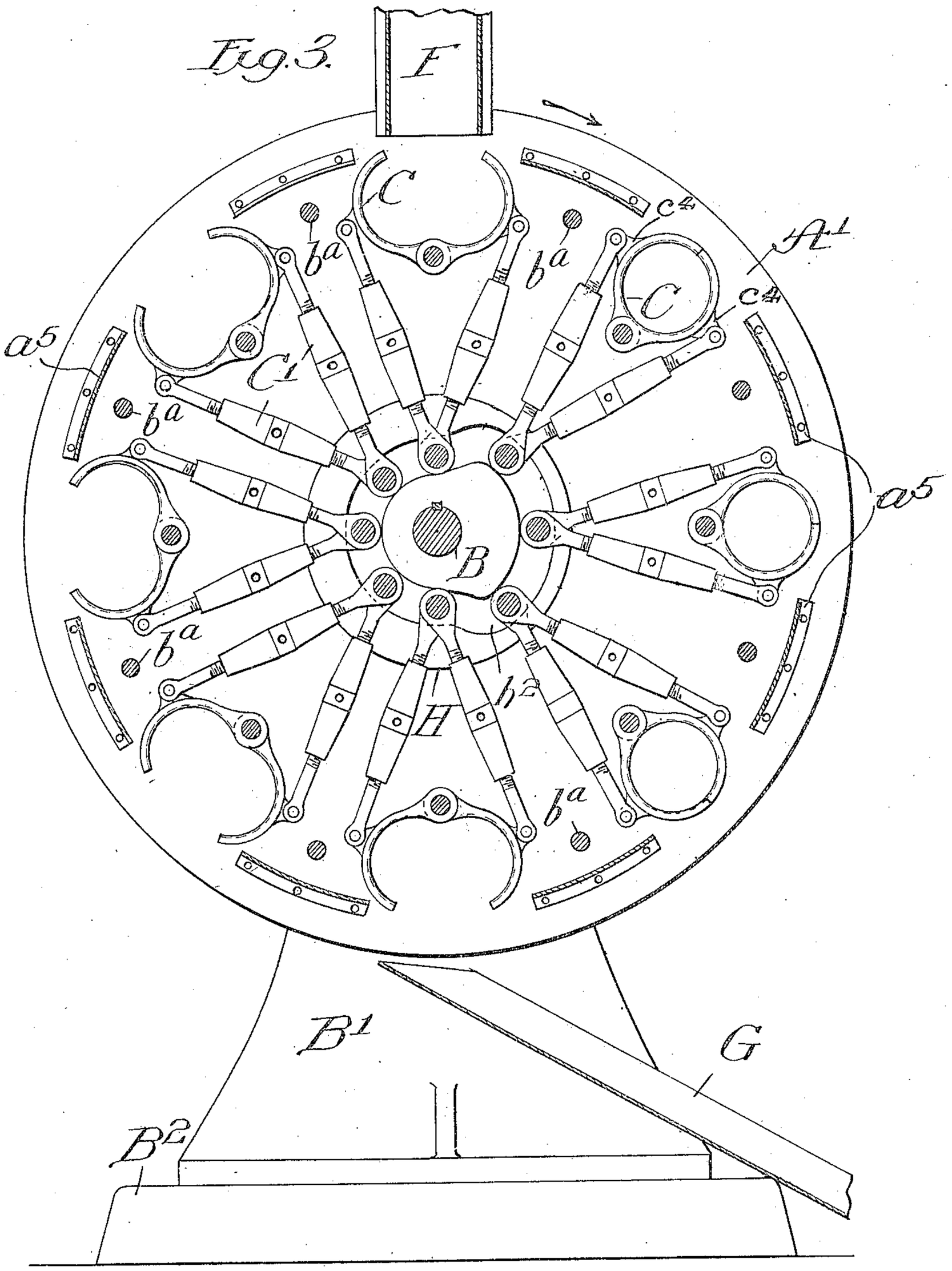
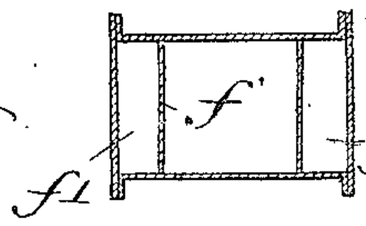


Fig 8.



Witnesses
Edw. P. Barrett
W. W. Hall

Inventor
William Spain
By Woolverton & Brown
His Attys

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4 SHEETS—SHEET 4.

Fig. 4.

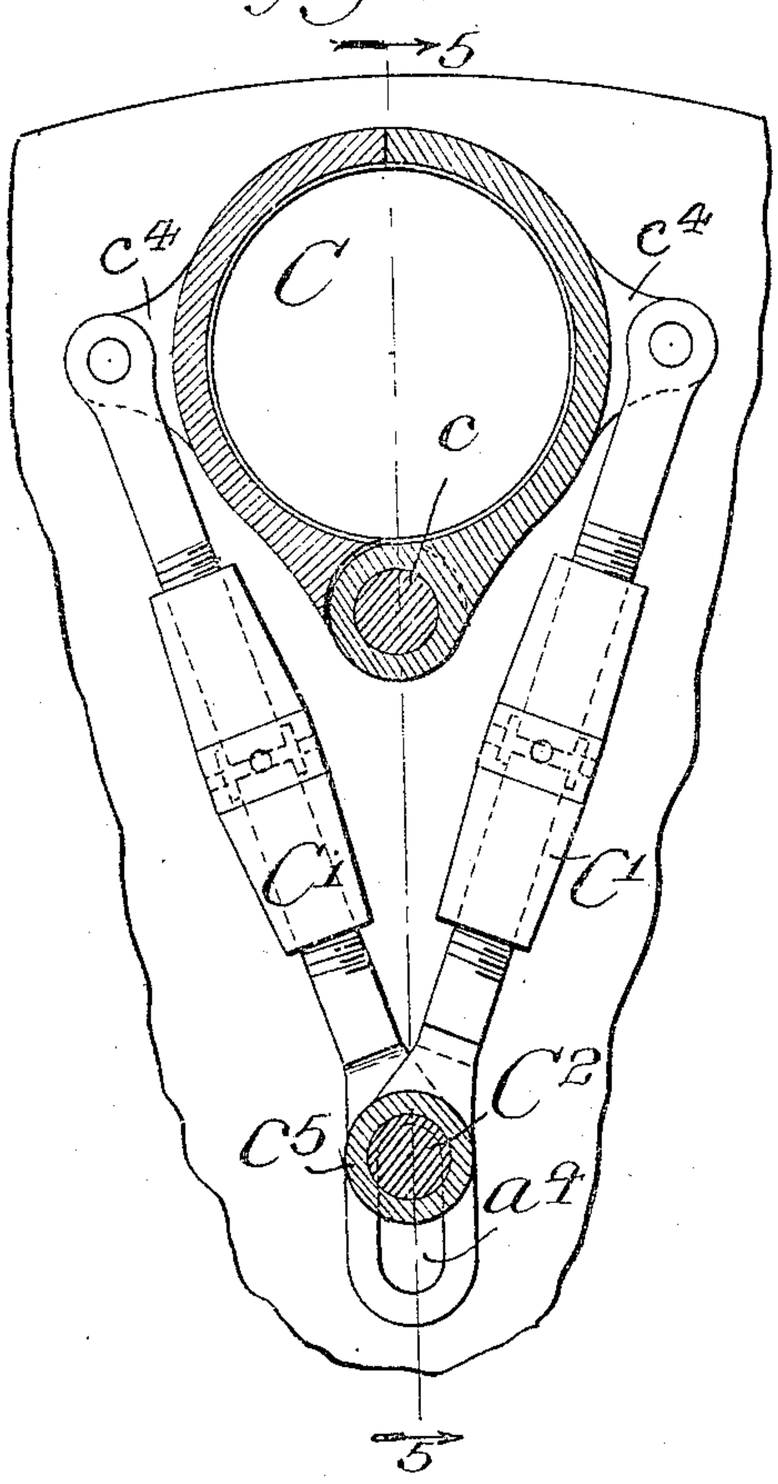


Fig. 6.

Fig. 5

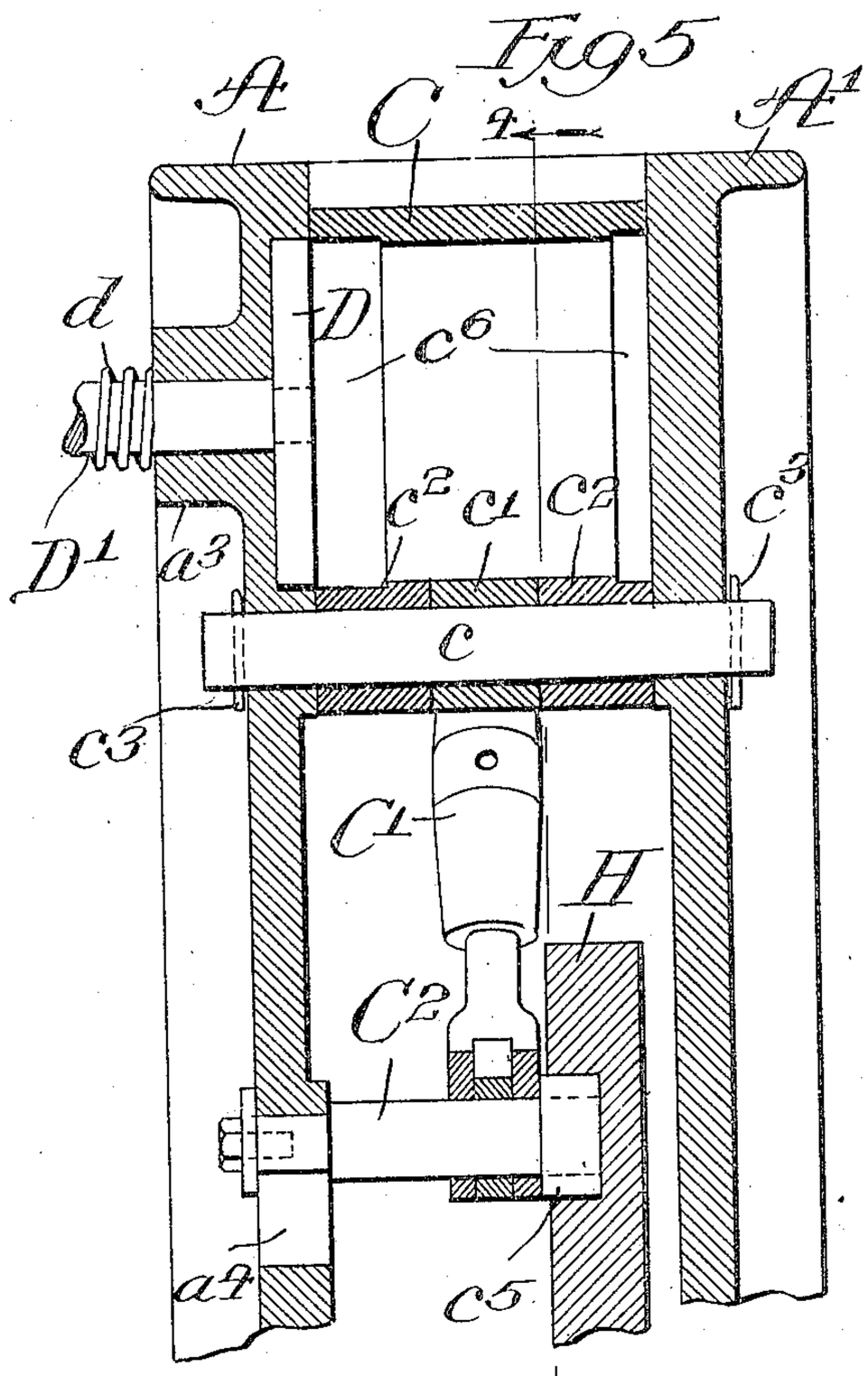
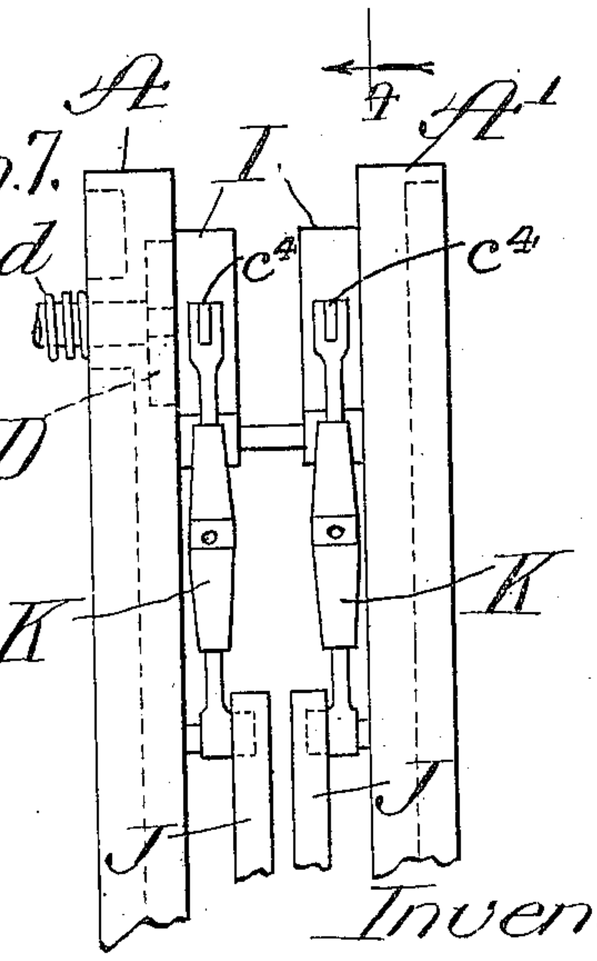
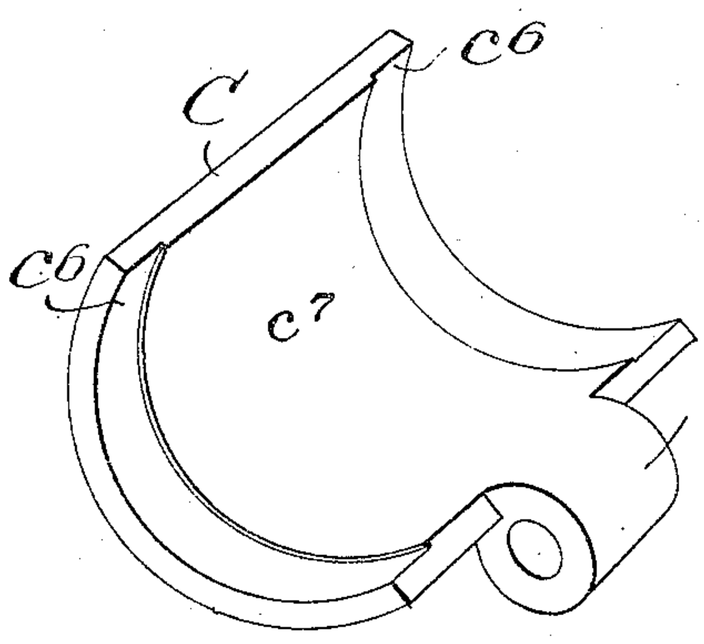


Fig. 7.





Witnesses;
H. G. Barrett
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Inventor
William Spain.
By Poole & Brown
his Atty's

UNITED STATES PATENT OFFICE.

WILLIAM SPAIN, OF CHICAGO, ILLINOIS.

CAN-HEADING MACHINE.

No. 828,865. Specification of Letters Patent. Patented Aug. 14, 1906.

Application filed May 23, 1905. Serial No. 261,827.

To all whom it may concern:

Be it known that I, WILLIAM SPAIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Can-Heading Machines; 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 improvements in can-heading machines or machines for applying the heads or ends of cans to the bodies thereof; and the invention consists of the matters hereinafter set forth, and more particularly pointed out in the appended claims.

The machine herein illustrated is designed for applying heads known as "snap-heads" to the can-body, or those in which the flanges or rims of the heads fit the ends of the bodies so closely as to render subsequent crimping of the flanges to the bodies unnecessary.

Among the objects of my invention is to simplify the construction and operation of such machines, to increase the output thereof, and to facilitate the work of adjusting the machines for cans of various sizes.

As shown in the drawings, Figure 1 is a front elevation of a can-heading machine made in accordance with my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical section taken on line 3 3 of Fig. 1 looking in the direction indicated by the arrow. Fig. 4 is a fragmentary view taken on line 4 4 of Fig. 5 and illustrating one of the can-holding chucks and its operating-links. Fig. 5 is a vertical section taken on line 5 5 of Fig. 4. Fig. 6 is a perspective view of one of the chuck wings or jaws detached from the other parts. Fig. 7 is a fragmentary front elevation, on a small scale, showing a modified form of chuck and chuck-actuating mechanism. Fig. 8 is a cross-section of the feed-chute.

As shown in said drawings, A A′ designate two parallel plates or disks which rotate in vertical planes about a stationary shaft B, which latter is mounted at its ends in the upper ends of suitable standards B′ B′, supported on a base-plate B^2. Said disks A A′ are held rigidly together in parallel relation by means of transverse connecting or stay bolts b^a and are rotated through the medium of a gear B^4, which is fixed on a boss *a* of the disk A and meshes with a gear-pinion B^5, fixed to a rotative drive-shaft B^6. Said drive-shaft is mounted at one end in the adjacent standard B′ and at its other end in a standard B^7 and is provided with fast and loose belt-pulleys *b b′*, through which power is transmitted to the machine. The rotating head or disk A′ is provided with a boss *a′*, that abuts against the adjacent standard B′, and the boss *a* of the disk A is formed with an annular shoulder, which similarly abuts against the adjacent standard, thereby confining said disks between said standards. Located between said disks and rotating therewith are a circular series of chucks or holders which receive the can heads and bodies set by set. Said chucks are located near the peripheries of the disks and are open while passing through a portion of their orbital path, and after a set of can heads and body have been delivered to a chuck, it is closed to center said parts of the can. During the remaining portion of movement of the chucks in their orbital path the chucks remain closed while the heading mechanism acts to force the heads upon the cans, and after such heading operation occurs the chucks are opened to discharge the cans.

The heading mechanism embraces laterally-reciprocating plungers, one plunger for each chuck and axially alined therewith, and said plungers move inwardly to effect the heading operation at the time the chucks are closed to center and hold the can heads and body. At all other times the plungers are retracted into their inoperative positions. Each of said chucks, as shown in Figs. 1 to 6, inclusive, consists of two curved complemental jaws or wings C C, which are hinged together at their inner sides by means of pins or rods *c*, extending through overlapping lugs *c′* c^2, respectively, of the two wings of each chuck, Fig. 4, whereby the jaws move outwardly away from each other to open and when closed constitute an interiorly cylindric holder for the can components. Said hinge-pins *c* extend not only through the overlapping hinge-lugs of the jaws, but through alined apertures in the side plates or disks A A′, and are held in position by means of cotter-pins c^3 or like fastening means. In this manner the jaws may be readily removed and replaced for the purpose of adjusting the machine to cans of varying diameters. The said chuck jaws or wings are operated to open and close through the medium of a suit-

able cam or equivalent mechanism, hereinafter to be described, and the operation of this part of the mechanism is such as to successively close the chucks after the can components are delivered thereto, hold the jaws closed while the contained can components are being forced together, and to finally open to permit the discharge of the complete cans.

The means for pressing the heads on the can-bodies while being held in the revolving closed chucks consists of a plurality of heading-plungers D, located in suitable recesses of the revolving disk or plate A, as herein shown, and provided with stems D′, extending outwardly through suitable bosses a^3 in said disk. Each heading-plunger is axially alined with its associated chuck. The plungers are forced inwardly to effect the heading operation by means of a stationary cam-track E, formed on or attached to a curved extension-plate E′ on the standard B′ and shown in full lines in Fig. 1 and in dotted lines in Fig. 2. The said heading-plungers are retracted in their recesses when the stems thereof are out of contact with the cam-track by means of spiral expansively-acting springs *d*, surrounding the stems D′ thereof and interposed between the outer face of the disk A and shoulders formed by pins *d*′, extending transversely through the outer ends of said stems. The cam-track E is located in position to force the heading-plungers inwardly during that part of the revolution of the chucks when said chucks are held closed to center a contained set of can heads and body, as shown at the right-hand side of Fig. 3 and also as indicated in Fig. 1.

The cans are preferably delivered to the open chucks at or near the highest part of the path of said chucks through the means of a suitable chute F. (Shown in Fig. 3.) The chucks are opened to discharge the cans after the heading operation thereof near the lower part of the orbital path of the chucks, and desirably a chute G is located to receive the cans and direct them away from the machine. The construction of the feed-chute F is shown in Fig. 8, it consisting of a central way *f*, through which are fed the bodies of the cans, and two side ways *f*′ *f*′, through which are fed the ends or heads of the cans. Said chute registers with the open chucks as they pass beneath the same and delivers the cans by gravity thereinto. In order to prevent can heads and bodies dropping by gravity from said chute between the chucks, curved guards a^5 a^5 are located between said chucks and extend inwardly from the inner faces of the disks in position to close the bottom of said chute as they pass thereunder, while permitting the can bodies and heads to enter the open chucks from the chute when said open chucks register with the chute. The guards a^5 are omitted from Fig. 1 in order to avoid confusion of the showing of other parts, said guards being clearly indicated in Fig. 3.

Referring now to the mechanism for opening and closing the chuck-jaws in the manner described to receive the can heads and bodies, hold said parts during the heading operation, and thereafter opening said jaws to discharge the completed cans, such parts are made as follows:

H designates a stationary cam-disk, which is fixed to the shaft B between the rotative disks A A′, as shown more clearly in Figs. 1, 3, and 4. Said disk is provided on its inner face with a cam-groove *h*.

C′ C′ designate operating-links, one pair for each chuck, which are hinged at their outer ends to lugs c^4 c^4 at the sides of the chuck-jaws and are overlapped at their inner ends and formed to provide openings through which transversely extend pins C^2. Said pins enter the cam-groove *h* and preferably carry rollers c^5, which provide an antifriction-bearing between the pins and cam-groove. Preferably the link-pins C^2 are extended laterally toward the disk A and have guiding engagement with an annular series of radial slots a^4 therein concentric with the center of said disk, as shown more clearly in Figs. 3 and 4, thereby constituting a guiding connection between the operating-links and the disk A which holds the said links in proper operative relation to each other and to the cam-disk.

The chuck jaws or wings C extend continuously from one plate A to the other plate A′ and fit snugly at their ends the side faces of said disks, as shown in Fig. 5. Said jaws are provided at the ends of their concave or inner faces with rabbeted portions c^6 c^6, which receive the ends or heads of cans, while the central portions c^7 receive the bodies of the cans. Such construction is provided for the reason that the flange or rim portions of said ends or heads are of greater diameter than the ends of the bodies of the cans, and it is necessary, therefore, that the parts of the chuck-jaws which receive the flanged heads should be correspondingly larger, so that the heads may pass readily onto the can-body. In machines employing but a single set of heading-plungers and where the movement of said plungers during the heading operation is all in one direction the rabbets c^6 at the ends of the jaws adjacent to said plungers are made wider than the rabbets at the opposite ends of the jaws. This is due to the fact that the narrower rabbets need be made but little wider than the flanges or rims of the can-heads, which vary but little, if any, in different length cans, while the wider rabbets must be made sufficiently wide to accommodate not only the width of the rim or flange of the head, but also the endwise movement thereof as it is forced onto the can-body and as the can-body is moved end-

wise when forced into the immovable head. Moreover, said wider rabbets should be made wide enough to accommodate cans of different lengths, and when shorter cans are operated upon the plungers are built up in any suitable manner to thicken the same.

The operation of the machine is as follows: A set of can heads and a body is delivered from the chute F to each open chuck as said chuck passes beneath the chute, said chuck being held open by reason of its relation to the groove of the cam-disk H. As each chuck and contained can components pass away from said chute in the direction indicated by the arrow in Fig. 3 the chuck-jaws are closed upon the can body and heads, thereby centering said bodies and heads relatively to each other. As each chuck passes away from the chute F in the rotation of the disks the adjacent guard a^5 closes the mouth of the chute, so as to prevent cans from dropping between the chucks. After each chuck has been closed about its contained can body and heads the stem of the associated heading-plunger engages the cam-track E to move the heading-plunger inwardly, as indicated in Fig. 1, thereby forcing the heads upon the can-body. During the inward movement of each plunger it operates in opposition to the smooth inner face of the opposite rotating disk A′ to force both can-heads upon the body, the can head or end adjacent to the plunger being forced upon the adjacent end of the body and the can itself being moved endwise, so as to force the same into the can head or end in engagement with the disk A′, said disk A′ constituting an abutment against which the plungers of all the chucks act. In this manner a single chuck acts to force the heads upon the can-body with the same accuracy and certainty as oppositely-acting plungers. As the stems of the plungers ride upon the descending side of the cam-track E, the plungers are retracted into their recesses by the springs *d*. The chucks open, as before stated, at or near the lower part of the path of movement thereof and discharge the cans into the chute G. It will thus be observed that the operation of heading the cans is continuous, the can components being automatically delivered to the revolving chucks from the chute F and the heading operation and the delivery of the headed cans from the machine being carried on without interrupting the rotation of the chuck-carrying disks A A′.

Instead of employing a chuck made of two lateral jaws which span the space between the disks A A′, I may employ a chuck comprising two pairs of coacting jaws I I, with a space between the same, as shown in Fig. 7. In this instance two cams J J are employed, and each pair of jaws of one chuck is provided with two operating-links K K, (corresponding in construction and function to the links C′ C′ shown in Figs. 3, 4, and 5.) The operation of the latter form of chuck is the same as hereinbefore described, the jaws being made of sufficient length to receive the can-heads and also to support and center the can-bodies.

I claim as my invention—

1. A can-heading machine comprising two rotative, parallel plates or disks, an annular series of chucks located between said disks, means for opening and closing said chucks, constructed to open the same at one part of the path of movement thereof to discharge the headed cans and close the same at another part of said path, means for feeding can heads and bodies set by set into the open chucks, whereby they are centered as the chucks are closed upon the same, and means for forcing said can-heads upon the bodies during that portion of the revolving movement of the chucks when they are closed upon the can components, each chuck comprising two semicircular jaws provided at the inner side of the chuck with overlapping apertured hinged lugs, hinge-pins extending through said apertured lugs and through alined openings in said disks and removable laterally from said disks.

2. A can-heading machine comprising an annular series of chucks revoluble about a horizontal axis, means for opening and closing said chucks, constructed to open the same at the lower part of the path of movement thereof and to close them at the upper part of said path, means for feeding two can heads and a body set by set to each open chuck, said chucks closing upon the can heads and bodies to center the same, a single annularly-disposed series of heading-plungers movable with said chucks and located severally in axial alinement therewith, and an abutment against which said plungers act, whereby, when forced inwardly, they act to force both heads upon the can-body.

3. A can-heading machine comprising two parallel, vertical, rotative plates or disks, an annular series of chucks located between and carried by said disks near their peripheries, means for opening and closing said chucks, constructed to open the same near the lower part of the path of movement thereof, and to close the same at the upper part of said path, a single annularly-disposed series of heading-plungers carried by one of the disks and located severally in axial alinement with the chucks, and means for moving said plungers toward the chucks, one of said plates constituting an abutment against which said heading-plungers act.

4. A can-heading machine comprising two parallel, vertical, rotative plates or disks, an annular series of chucks located between and carried by said disks near their peripheries, means for opening and closing said chucks, constructed to open the same near the lower

part of the path of movement thereof, and to close the same at the upper part of said path, a single annularly-disposed series of heading-plungers carried by one of the disks and located severally in axial alinement with the chucks, and means for moving said plungers toward the chucks, one of said plates constituting an abutment against which said heading-plungers act, said chucks being provided at their ends with interior rabbets to receive the can-heads and the rabbets adjacent to the plungers being made of greater width than the other rabbets.

5. In a can-heading machine, a chuck comprising two jaws hinged to swing toward and away from each other, combined with a heading-plunger at one side of the chuck and a fixed abutment at the other side of said chuck, said chuck-jaws being provided at their ends with interior rabbets to receive the can-head, the rabbet at the end of the jaws adjacent to the plunger being of greater width than the other rabbet.

6. A can-heading machine comprising two parallel, vertical, rotative plates or disks, an annular series of chucks located between and carried by the disks near their peripheries, means for opening and closing said chucks, constructed to open the same near the lower part of the path of movement thereof, and to close them at the upper part of said path, means for feeding a can-body and two heads into each open chuck, whereby the said body and heads are centered when the chucks are closed upon them, a single annularly-disposed series of spring-pressed heading-plungers carried by one of the disks and located severally in axial alinement with said chucks, and a stationary cam-track against which the stems of said plungers travel to move the plungers inwardly toward the can heads and body contained in the closed chucks, whereby said heads are forced upon the can-bodies between the said plungers and the oppositely-located rotative disk.

7. A can-heading machine comprising two parallel, vertical, rotative disks, an annular series of chucks located between and carried by said disks, each chuck comprising two jaws hinged together at their radially inner sides and filling the space between the disks, means for opening and closing the chuck-jaws constructed to open the same at the lower part of the path of movement thereof, and to close the same at the upper part of said path, means for feeding can heads and bodies set by set into the open chuck-jaws, whereby they are centered by the closing of the chuck-jaws, and means for forcing the heads upon the bodies during that part of the revolving movement in which they are centered by the closed chucks.

8. A can-heading machine comprising two parallel, vertical, rotative plates or disks, an annular series of chucks, located between and carried by said plates, said chucks each comprising two jaws which are hinged to each other at their inner sides, links hinged in pairs directly to the lateral sides of the jaws of each chuck and overlapping each other at their inner ends, and apertured in their overlapping parts, a pin extending through the apertures of the overlapping parts of each pair of links, a stationary cam-disk provided with a groove into which said link-pins extend, and means for forcing the can-heads upon the bodies during that part of the movement of the chucks in which the chucks are closed upon said can heads and bodies.

9. A can-heading machine comprising two parallel, vertical rotative disks or plates, an annular series of chucks located between and carried by said plates, said chucks each comprising two jaws which are hinged to each other at their inner sides, links hinged in pairs to the lateral sides of the jaws of each chuck and overlapping each other at their inner ends, and apertured in their overlapping parts, a pin extending through the apertures of the overlapping parts of each pair of links, a stationary cam-disk provided with a groove into which said link-pins extend, and means for forcing the can-heads upon the bodies during that part of the movement of the chucks in which the chucks are closed upon said can heads and bodies, one of said disks being provided near its center with an annular series of radial slots engaged by extensions of said link-pins.

10. A can-heading machine comprising two parallel, vertical, rotative plates or disks, an annular series of chucks located between and carried by said disks near their peripheries, each chuck comprising two curved jaws hinged together at their inner sides and movable toward and from each other at their outer sides to open and close the chuck, means for opening and closing said chucks, a single annularly-disposed series of heading-plungers carried by one of the disks and located severally in axial alinement with the chucks, means for moving said plunger toward the chucks, one of said plates constituting an abutment against which said heading-plungers act, and the chuck-jaws being provided at the outer ends of their inner faces with rabbets to receive the can-heads, the rabbets of the jaws adjacent to the plungers being of greater width than the opposing rabbets.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 13th day of May, A. D. 1905.

WILLIAM SPAIN.

Witnesses:
W. L. HALL,
E. R. WILKINS.