No. 871,383. PATENTED NOV. 19, 1907.

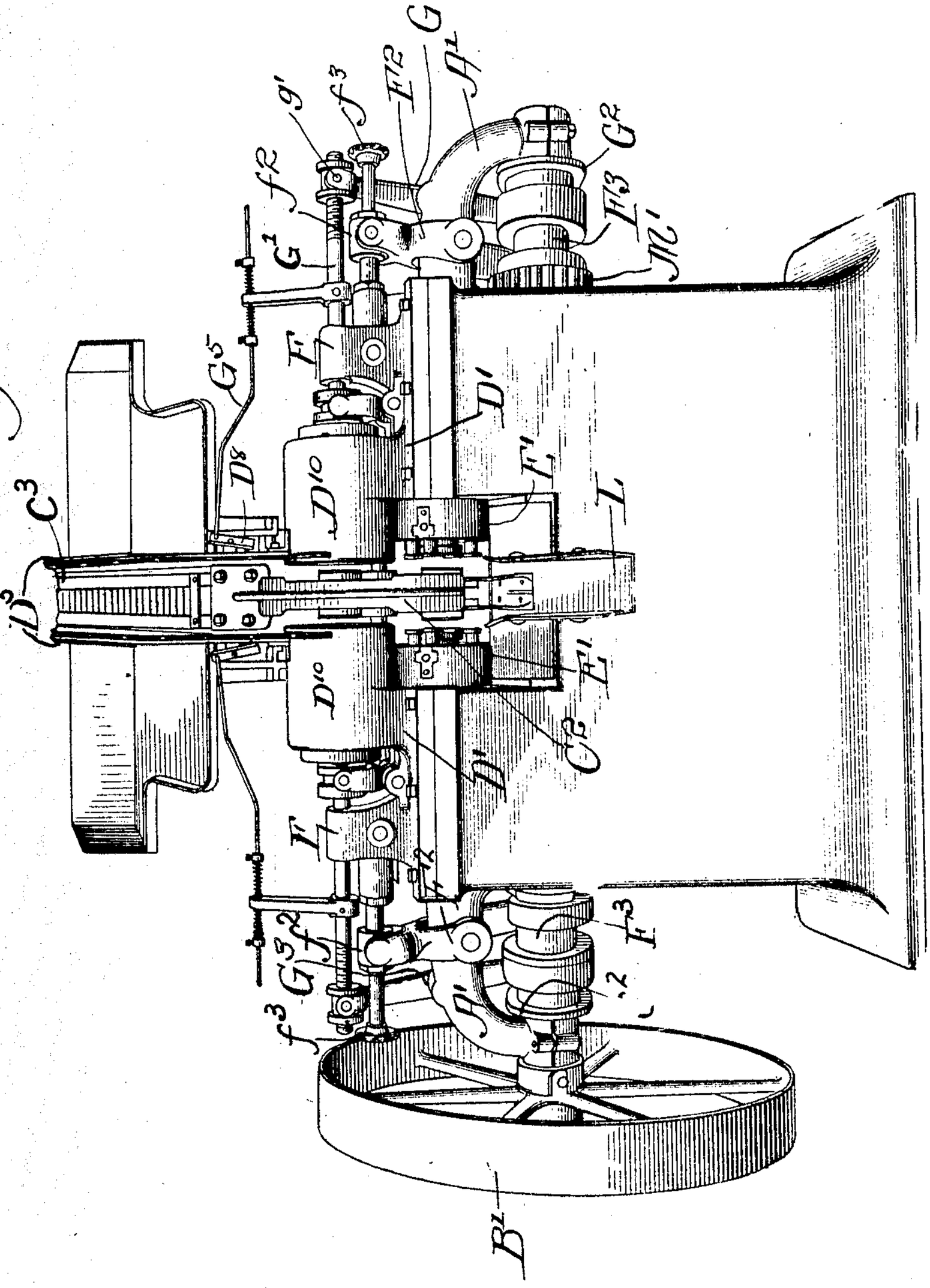
J. L. ALLEN.

CAN HEADING MACHINE.

APPLICATION FILED JAN. 29, 1906.

7 SHEETS—SHEET 1.

Fig. 1

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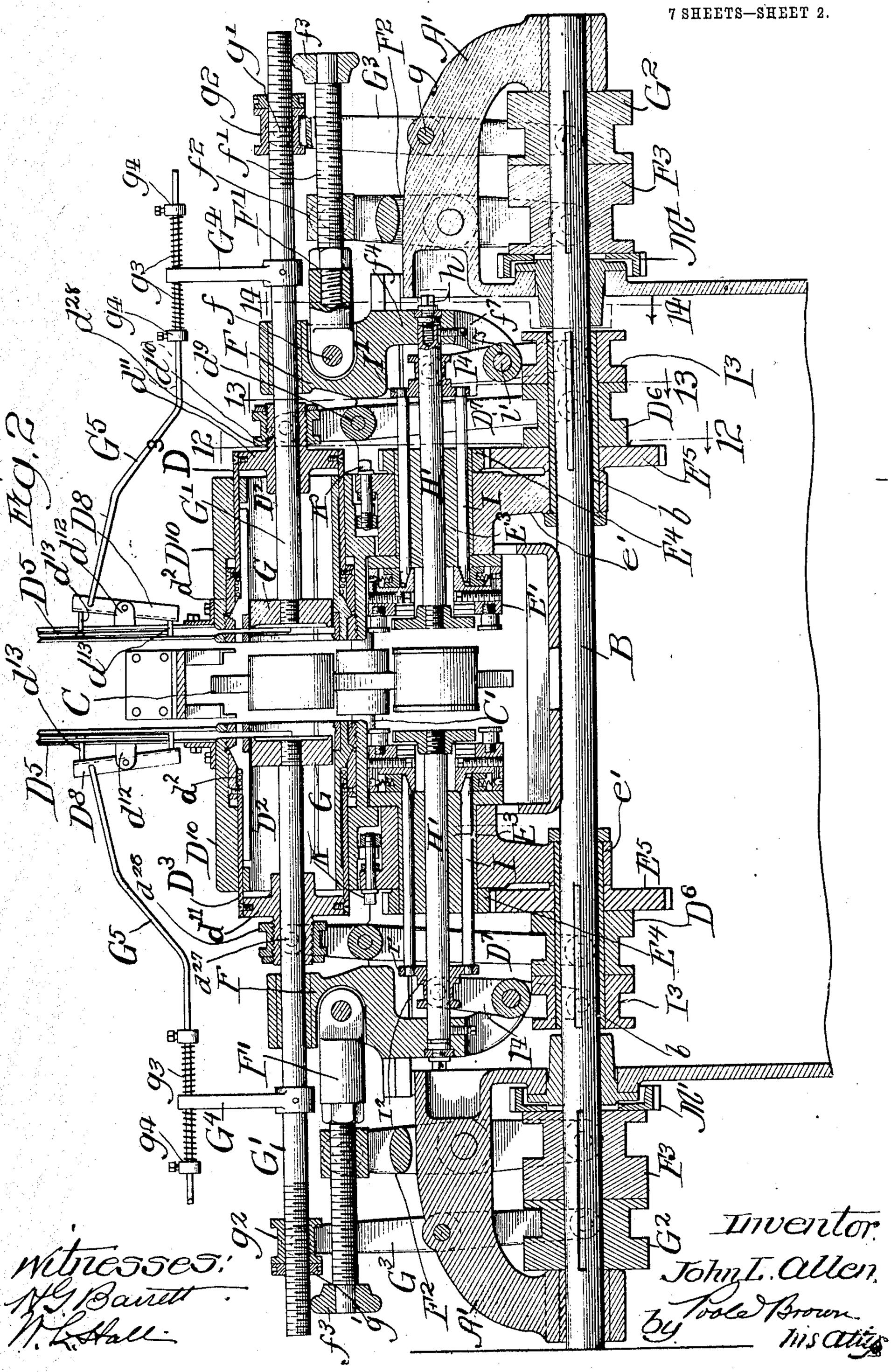
7 SHEETS—SHEET 2.

Fig. 2



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7 SHEETS--SHEET 3.

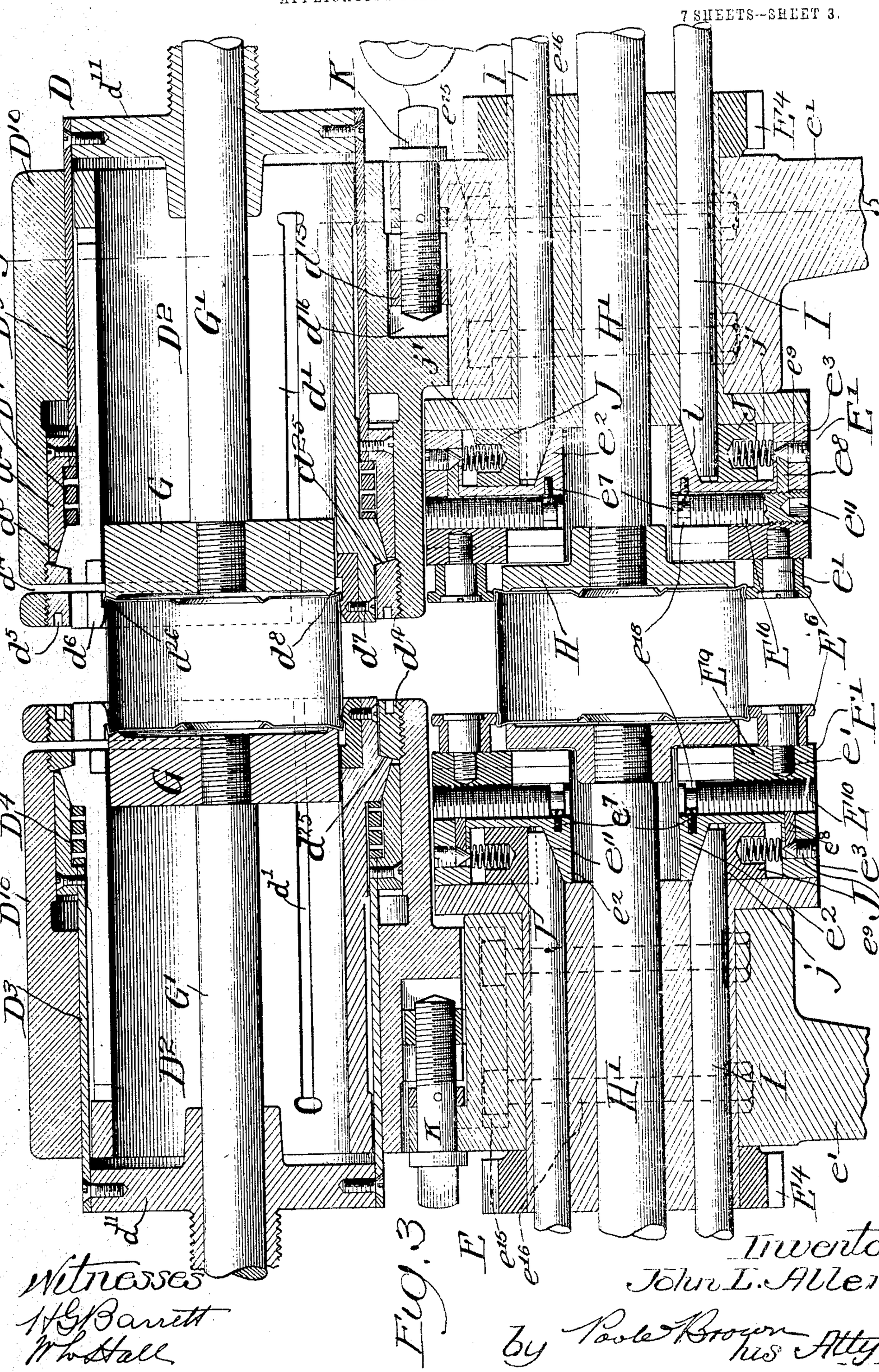

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Fig. 3.

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7 SHEETS—SHEET 4.

FIG. 3

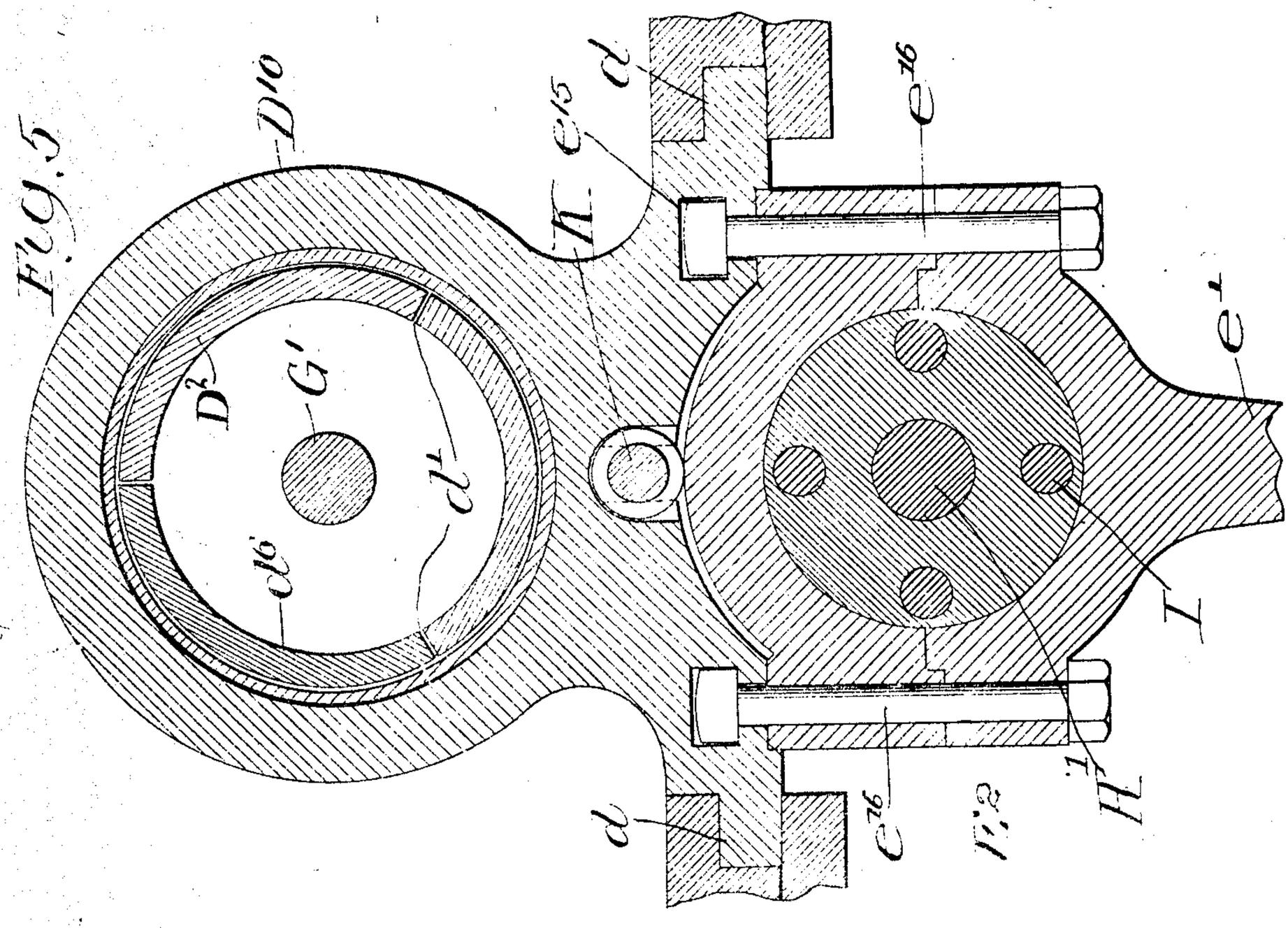
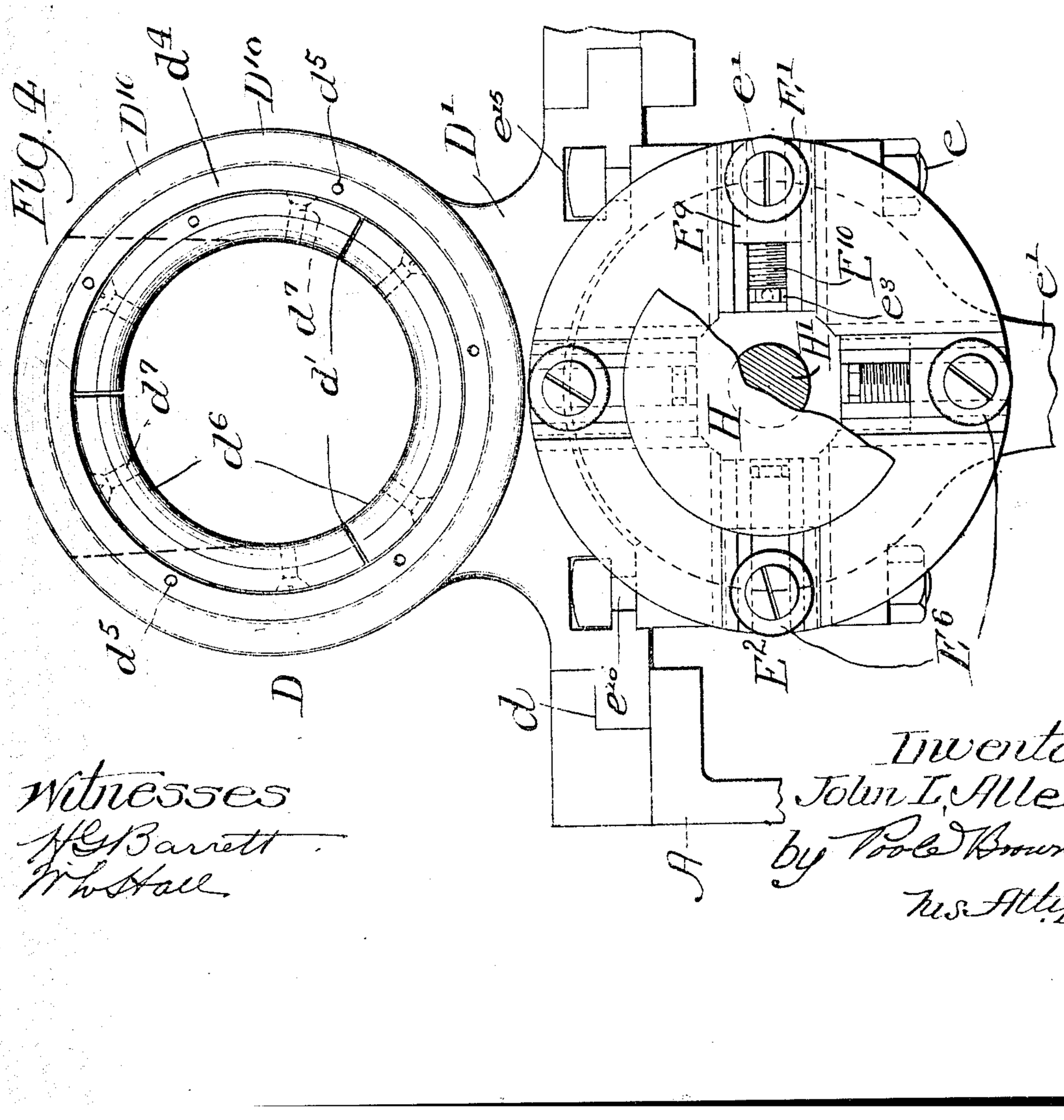



FIG. 4

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CAN HEADING MACHINE.

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7 SHEETS—SHEET 5.

Fig. 7

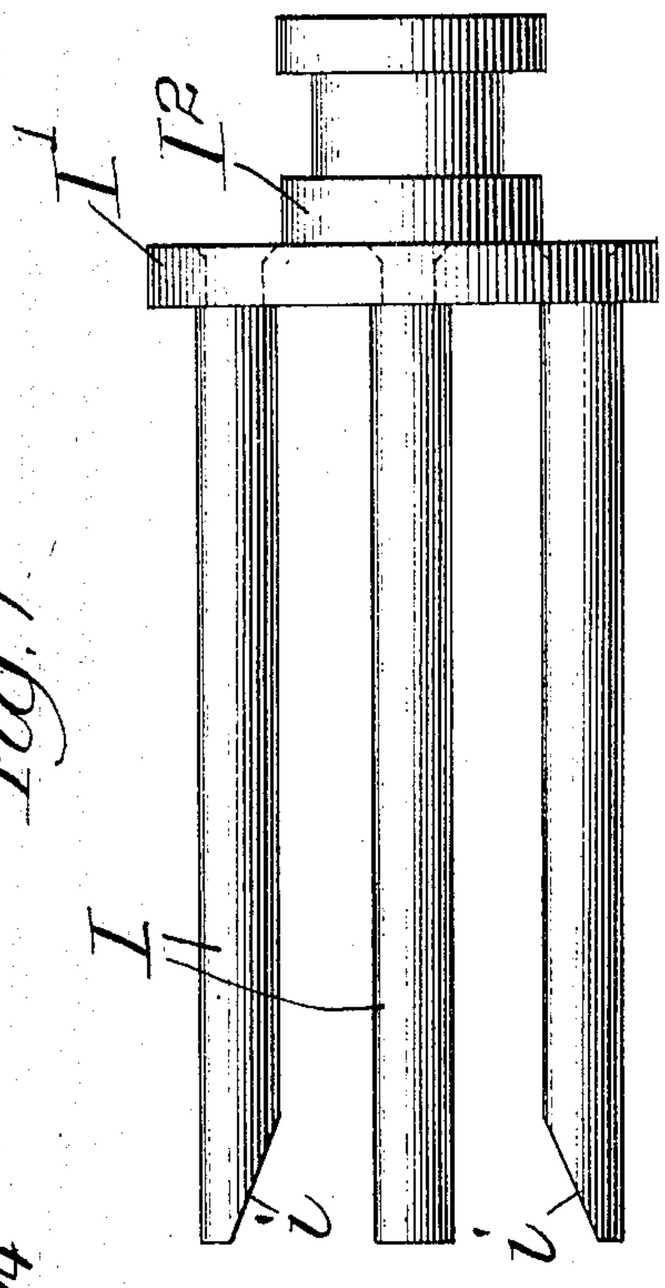


Fig. 11

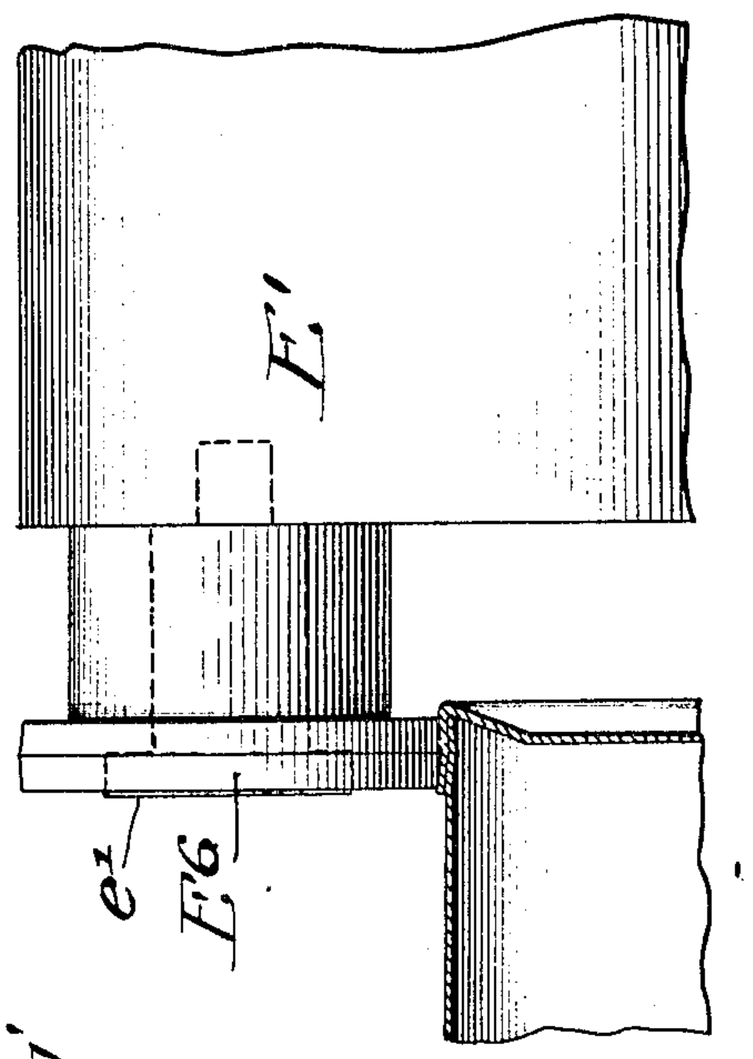


Fig. 6




Fig. 8

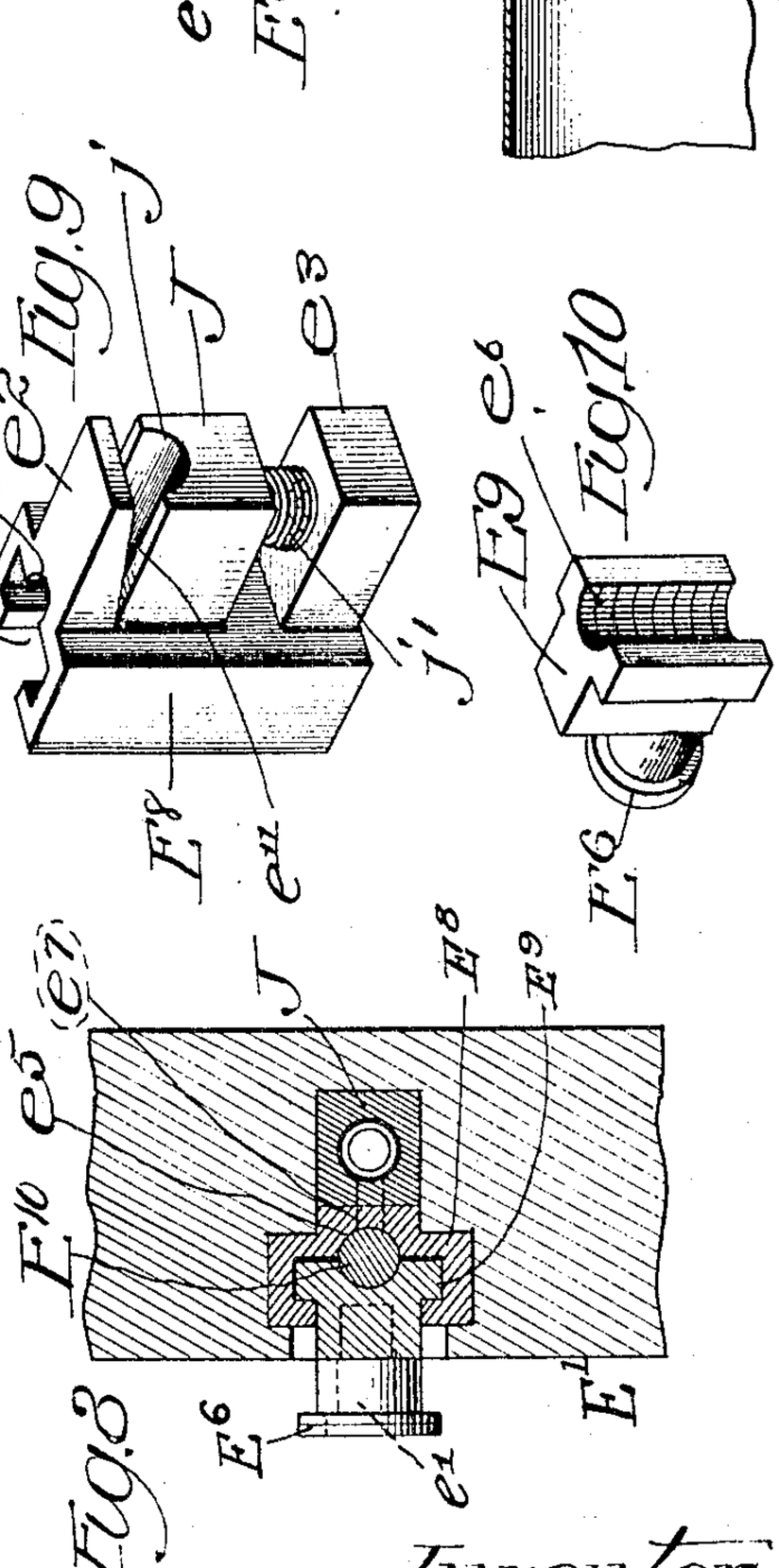


Fig. 9




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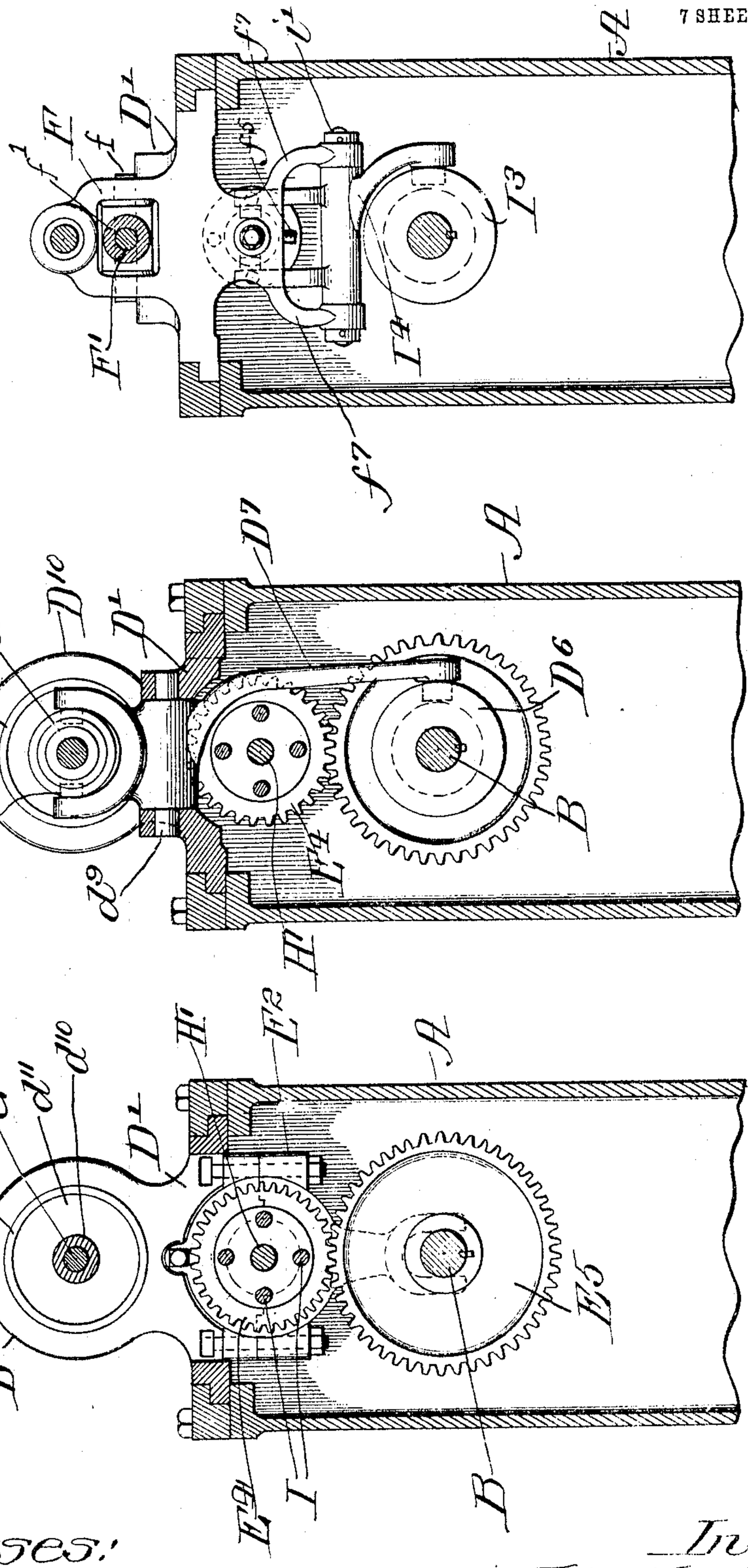
7 SHEETS—SHEET 6.

Fig. 14

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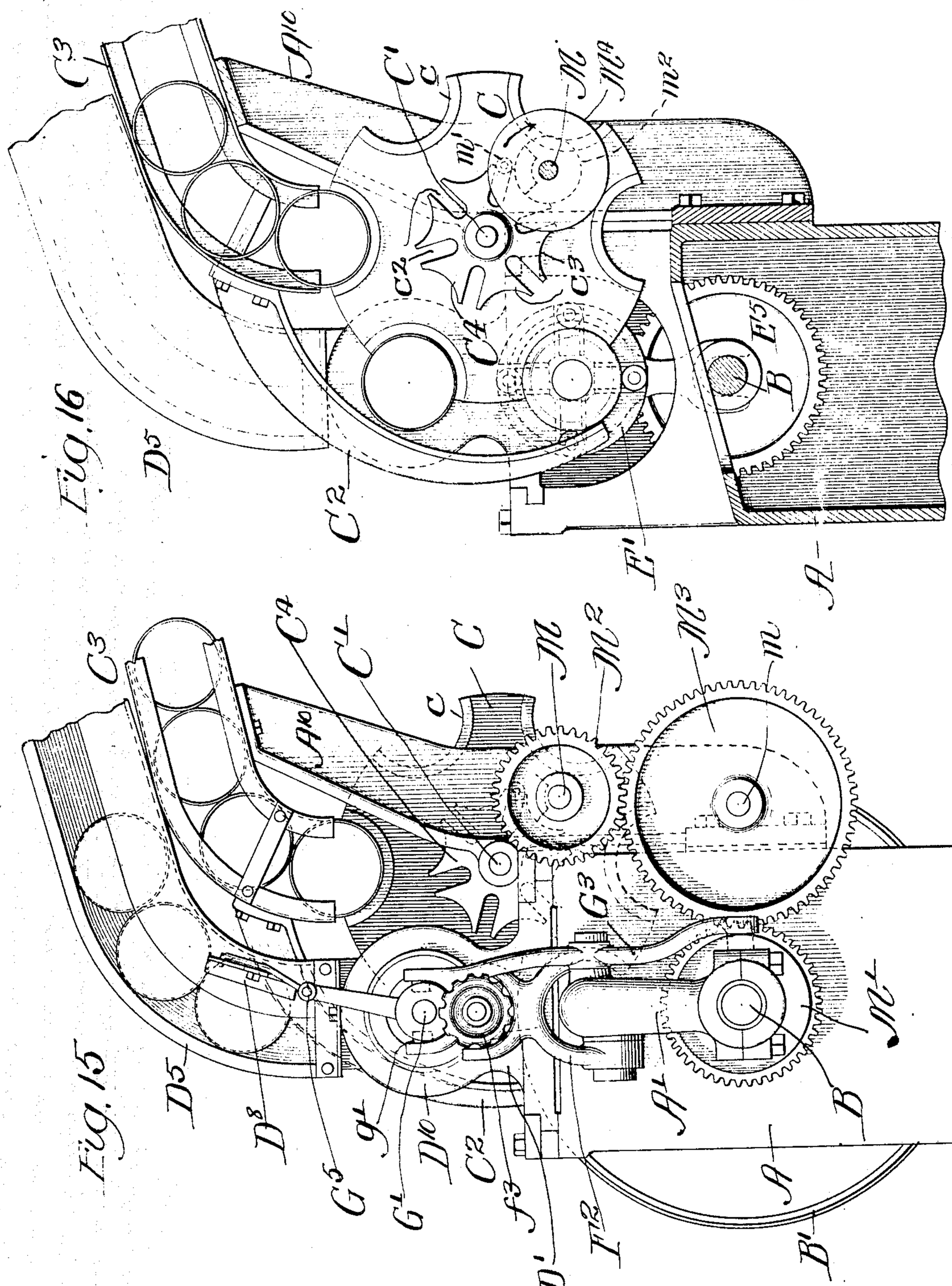
7 SHEETS—SHEET 7.

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# UNITED STATES PATENT OFFICE.

JOHN L. ALLEN, OF CHICAGO, ILLINOIS.

## CAN-HEADING MACHINE.

No. 871,383. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed January 29, 1906. Serial No. 298,379.

*To all whom it may concern:*

Be it known that I, JOHN L. ALLEN, a citizen of the United States, of 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 machines for fitting and fastening can heads to can bodies and refers more specifically to mechanism for crimping the flanges of the can heads upon the can body, and to improvements in a combined can heading and crimping machine.

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 front elevation of a can heading and crimping machine made in accordance with my invention. Fig. 2 is a vertical section, taken through the mechanism of the heading and crimping mechanisms. Fig. 3 is a view showing, on a larger scale, the essential working elements of the heading and crimping mechanisms Fig. 4 is an inner face view of the heading and crimping mechanisms, showing the crimping mechanism partly broken away. Fig. 5 is a cross-section, taken on line 5—5 of Fig. 3. Fig. 6 illustrates the crimping head removed from the machine. Fig. 7 illustrates an operating device for giving radial movement to the crimping jaws. Fig. 8 is a sectional detail illustrating the manner of assembling the crimping jaws. Fig. 9 is a perspective view of the crimping jaw frame. Fig. 10 is a perspective view of one of the crimping roll stud blocks, constituting part of one of the crimping jaws. Fig. 11 illustrates the manner in which the crimping rolls operate upon the head flange or rim. Fig. 12 is a vertical section, taken on line 12—12 of Fig. 2. Fig. 13 is a vertical section, taken on line 13—13 of Fig. 2. Fig. 14 is a vertical section, taken on line 14—14 of Fig. 2. Fig. 15 is a partial end view of the machine, showing means for feeding can heads and bodies thereto. Fig. 16 is a partial sectional view illustrating chutes for feeding can heads and bodies to the machine, and also the means for intermittently rotating the carrier by which the can bodies are brought successively into operative relation to the heading and crimping mechanisms.

As shown in the drawings, A designates the hollow cast-metal base of the machine, which is made of box-like form, as more clearly indicated in Figs. 1 and 12 to 14 inclusive, and B the main driving shaft having suitable bearing in said base and provided at one end with a belt wheel $B^1$. The machine herein shown embraces a carrier C by which the can bodies are received and in which they are successively carried to the heading and crimping mechanisms and in which they are held during the operation of the heading and crimping mechanisms. The carrier consists of a rotative wheel, shown more clearly in Figs. 2, 15 and 16, having peripheral depressions *c* to receive the can bodies and is mounted on a horizontal shaft $C^1$ that has intermittent rotative movement, as hereinafter described. The said carrier is located between the opposing, oppositely actuated parts of the can heading and crimping mechanisms, as more clearly seen in Fig. 2.

The carrier is so disposed, relatively to the heading and crimping mechanisms as to hold one can in position to be operated upon by the heading mechanism, while the next can in advance is in position to be operated upon by the crimping mechanism. The heading and crimping mechanisms are located vertically one over the other, as shown in Figs. 4 and 5, wherein D designates, as a whole, (Figs. 3 and 4), the heading mechanism and E designates, as a whole, the crimping mechanism. A suitable curved guide $C^2$ is located in front of and over the carrier to hold the can bodies in the depression *c* while being delivered to the can heading and crimping mechanisms. Said guide is fastened, as herein shown, to the feed chute $C^3$ by which the can bodies are fed to the depressions in said carrier. The body chute $C^3$ is supported on an arm $A^{10}$ rising from the machine base.

Inasmuch as the two sets of opposing heading mechanisms are essentially alike, the following description of said mechanisms, for sake of clearness, will refer to a single set or a single side of the machine. The oppositely acting parts of the heading mechanism are carried by two oppositely located cross-heads $D^1$ $D^1$ which have sliding engagement with the base A, said cross-heads being provided with cylindric parts $D^{10}$ in which the

operative parts of the heading mechanism are mounted. The cross-head is formed at its lower side to constitute laterally extending flanges *d* which have sliding engagement with suitably disposed, horizontal channels or ways in the upper side of the base of the machine, and said cross-heads are moved towards and away from each other to carry the heading mechanism into and out of operation, in the manner hereinafter to be described. The crimping heads $E^1$ (Fig. 6) constituting parts of the crimping mechanism, are mounted in depending heads $E^2$ of said cross-heads (Figs. 2 and 5) which, as herein shown, are made separate from and are attached to the main parts of the heads by means of vertical bolts *e e*. The means for operating said cross-heads to move them towards and from each other are made as follows:

Each cross-head is provided at its outer end with a large lug F rising therefrom. $F^1$ designates a horizontal operating rod which is pivoted at its inner end to a pin *f* extending transversely across a recess formed in the outer face of said lug, and said operating rod is operatively connected with a vertically swinging cross-head cam lever $F^2$ that is pivoted to a bracket $A^1$ on the base and is operated at its lower end by a suitable cam $F^3$ mounted on the main power shaft B outside of the end wall of the base A. The outer end of the bracket $A^1$ constitutes a bearing for that part of the power shaft which extends beyond said hollow base. Means are provided for varying the distance apart of the heading and crimping mechanism to accord to the length of cans of varying lengths. As herein shown, this adjustment is effected by making each operating rod $F^1$ of two parts, it comprising an outer screw-threaded section $f^1$ which has screw-threaded engagement with the inner pivoted end thereof, and has screw-threaded engagement also with a nut $f^2$ that is loosely carried by the upper end of the lever $F^2$ and which constitutes a connection between said cam lever and rod. The lower or depending end $E^2$ of the cross-head, which carries the crimping mechanism, is provided with a vertical extension $e^1$ that is forked at its lower end and fits over a sleeve *b* encircling and non-rotatively mounted on the power shaft, (Fig. 2). Said sleeve moves endwise on the shaft when the cross-heads move in their ways, and it carries some of the actuating cams and gear wheels of the mechanism, as will hereinafter more fully appear.

Referring now to the construction of the heading mechanism, whereby the can heads or ends are fitted to the bodies preparatory to the crimping mechanism, these parts are made as follows:—The active parts of each heading mechanism embraces, in general terms, a chuck adapted to receive and hold the head in position to be forced on the can body when the heading mechanism is forced towards said body. Each half of the heading mechanism embraces, in its construction a chuck sleeve $D^2$ contained within the cylindric bore of the part $D^{10}$ of the cross-head, and said sleeve is provided with longitudinal slits $d^1$ (Figs. 4 and 5), three being herein shown, the inner ends of which constitute fingers which are capable of being pressed together to close upon a can head. $D^3$ designates a closing sleeve closely surrounding the chuck sleeve and carrying at its inner end a wedge or closing ring $d^2$. Said wedge ring $d^2$ is provided with an annular wedge or tapered surface $d^3$ which engages complementally inclined exterior surfaces at the inner end of the split closing sleeve (Fig. 3). When the closing sleeve and wedge ring are moved inwardly relatively to the chuck sleeve by the means hereinafter described, the inclined surface of the ring $d^2$ acts to press together or close the fingers or split portions of the chuck sleeve upon a can head contained therein. The said chuck sleeve is held in place in the cross-head by means of an exteriorly screw-threaded locking ring $d^4$, (Figs. 3 and 4) which has screw-threaded engagement with the inner end of the hollow cylindric part of said cross-head. Said ring surrounds the extreme inner end of the chuck sleeve, and abuts at its outer end against an inwardly facing shoulder $d^{25}$ formed on said ring, (Fig. 3). Said locking ring is turned in place by means of a spanner engaging suitable spanner holes $d^5$ of the ring (Fig. 4). The segments of the facing ring are fastened to the chuck sleeve by means of screws $d^7$. The chuck sleeve is made larger than the largest can head to be operated upon and is provided with a removable facing ring made up of as many separate segments as there are parts or fingers of the chuck sleeve (Figs. 3 and 4), a number of different sizes of sets of said face rings are provided to provide for can heads of different diameter. The largest size facing ring is shown in Fig. 3 and in order to operate upon smaller sized can heads, rings having thicker walls are provided. The closing ring $d^2$ and sleeve $D^3$ are held normally in their retracted positions, to permit the chuck to spring open. A spring $D^4$ acts to hold the chuck sleeve outwardly against the locking ring $d^4$. The said facing ring is flared at its outer side or margin to permit the same to readily pass over a can body. The ring is provided with an annular recess $d^8$ (Fig. 3) in line with a receiving opening for said chuck designated, as a whole, by $d^{14}$ downwardly through which the can heads are dropped into the chuck, the heads being received in said recess with their rims or flanges directed inwardly, as shown in said Fig. 3. Said recess is made of greater width than that of the can head rim or flange. Be-

tween the outer sides of said recess and the narrowest internal diameter of the rim (which latter diameter is such as to permit the ring to slip snugly over the can body) is formed an annular shoulder adapted for engagement by the margins of a can head flange and acts as a stop $d^{26}$ to prevent the head from falling inwardly through the open end of the chuck sleeve when the head is deposited in the chuck. The chuck is closed by the closing ring $d^2$ before a can head is dropped into the chuck through the admission opening or slit $d^{14}$, and thereafter the head is pressed inwardly until arrested by the annular stop $d^{26}$ by means of a centrally located backing plate G that fits within the chuck sleeve and ring. The plate is operated to reciprocate inwardly and outwardly through the medium of a stem $G^1$ in a manner hereafter described. The can heads are dropped into the chuck at a time when the backing plate G is retracted, as shown in Fig. 2, and thereafter the backing plate G moves inwardly to confine the head between said plate and the annular stop shoulder $d^{26}$. Thereafter the cross-head is moved inwardly carrying the chuck, and the backing plate is moved inwardly at the same speed by its operating mechanism, and in this manner the head is forced on the can body, which latter is held in position to receive the head by the carrier C or other equivalent device.

The can heads are fed to the admission openings or slits $d^{14}$ of the heading chucks through laterally separated chutes $D^5$ $D^5$ supported in any suitable manner on the frame of the machine and attached at their lower ends to the cross-heads as shown in Fig. 2. The head chutes are designed to be flexibly connected with their supports at their upper ends (in a manner not necessary to be here shown) to permit the lower ends thereof to swing toward and from each other upon movement of the cross heads. Suitable controlling stops are provided at the lower ends of said chutes $D^5$ to hold the lower set of heads therein until the set last delivered therefrom are applied to the can body and until another body is in position to receive a set of heads. As herein shown, each controlling stop consists of a bar $D^8$ (Fig. 2) pivoted to a stud $d^{12}$ extending laterally from the adjacent chute, and said vertical bar is provided at its ends with horizontal stop pins $d^{13}$ $d^{13}$ adapted to alternately extend into the chute in the path of the heads by reason of the swinging movement of the bar $D^8$. The bar is adapted to be swung on its pivot. As herein shown, the can head stop mechanism heretofore described is operated from the plunger stem $G^1$, the operative connections being as follows: $G^4$ designates an arm rising from and fixed rigidly to said stem $G^1$. $G^5$ designates a rod which extends through an opening in the upper part of the upper end of said stud $G^4$ and is attached at its other end to the upper end of the swinging bar $D^8$ of said can head stop device in such manner that during each backward and forward reciprocation of the plunger, the controlling device is operated to permit one can head to be fed from the chute and to allow another can head to drop into position to be fed therefrom in the next operation of the machine. In order to prevent communication of abrupt movement from the endwise movable plunger stem $G^1$ to said stop device, the stud $G^4$ is preferably connected by a spring or cushion connection with the rod $G^5$. This is effected in the present instance by placing spirally, expansively acting springs $g^3$ $g^3$ between the upper end of said stud and collars $g^4$ $g^4$ adjustably fixed to said rod $G^5$, as shown in Fig. 2.

The sleeve $D^3$ carrying the wedge or closing ring $d^2$ is moved endwise in the hollow cylindric part $D^{10}$ of the cross-head through the medium of a cam $D^6$ fixed to the sleeve $b$, before referred to, and a vertically reciprocating lever $D^7$ which is pivoted to a horizontal pin $d^9$ on the cross-head (Figs. 2 and 13), and is operatively connected at its upper end with the hub $d^{10}$ of an end plate $d^{11}$ of said chuck closing sleeve $D^3$. As herein shown, the upper end of the cam lever is forked and is provided with inwardly extending pins $d^{27}$ engaging an annular groove in a nut $d^{28}$ fitting over and having screw-threaded engagement with said hub (Figs. 2 and 13). Said screw-threaded connection admits adjustment of the closing wedge or ring relatively to the chuck.

The stem $G^1$ of the backing plunger G is operatively connected with and actuated by a cam $G^2$ fixed to the power shaft B, whereby said plunger or plate is moved inwardly and outwardly at the proper times. Said stem $G^1$ is guided in its reciprocatory movement by the hub of the chuck actuating sleeve and the upwardly projecting lug F of the cross-head $D^1$, as clearly shown in Fig. 2. The operative connection between the said power shaft B and the cam $G^2$ consists of a vertically swinging cam lever $G^3$ which is pivoted to a cross-pin $g$ fixed to the bracket $A^1$ of the machine base. The lever $G^3$ engages a suitably shaped peripheral groove on the cam $G^2$ and is forked at its upper end and provided with pins $g^1$ which engage an annular groove in a nut $g^2$ that has screw-threaded engagement with said stem $G^1$. Said screw-threaded connection affords adjustment of the plate G relatively to the other parts of the heading chuck.

Before proceeding with the description of the crimping mechanism, brief reference will be made to the operation of the heading mechanism described. The heading mechanism is shown in its inoperative position in Fig. 2 with the chucks retracted and in posi-

tion to receive can heads from the chutes $D^5$. It may be assumed that the carrier C has just brought a can body in line with the opposing heading chucks. The first movement of the parts from the position shown in Fig. 2 in the operation of heading, is the closing of the inner ends of the chuck sleeve $D^2$, which is effected by inward movement of the wedge or closing rings $d^2$ through the action of the cams $D^6$ and interconnecting mechanism. Thereafter a set of can heads is delivered to the heading chucks through the slits or openings $d^{24}$ and the plungers or backing plates G are subsequently advanced through the medium of their operating cams $G^2$. The advancement of said backing plates or plungers act to force the can heads with the margins of their flanges against the annular stop shoulders $d^{26}$ of the removable facing rings $d^6$. The two opposing heading chucks are thereafter moved inwardly towards the can so as to force the can heads upon the body, which is held in axial alinement with the chucks by the carrier C, the plungers or backing plates following the chucks in this movement. After the can heads have been fitted upon the can bodies the chucks are retracted. Before the beginning of the retractive movement of the chucks, however, it is necessary to open the facing rings $d^6$ of the chuck sleeves to permit the rings to pass over the head flanges or rims of the headed can. This is effected by withdrawing the closing sleeves and rings $D^3$ $d^2$, respectively, and when so withdrawn the slitted parts or fingers of the chuck sleeves open outwardly radially past the flanges or rims of the can heads. Thereafter the cross-heads are retracted through the agency of their cams $F^3$ and interconnected mechanism. Said shoulders $d^{26}$ constitute abutments between which and the plates G the heads are held while being forced over the can bodies, said abutments being movable radially inwardly to pass into the path of the head flanges before the heads are pressed over the can bodies, and move radially outwardly to clear said flanges when the chucks are retracted. The cams operating the backing plungers G are so timed relatively to the cams $F^3$ that the plungers remain pressed against the can heads until the shouldered facing rings are withdrawn outwardly away from the can heads, after which said backing plates or plungers are retracted until brought to the positions shown in Fig. 2, or in rear of the admission openings $d^{14}$ of the chucks and therefore out of the paths of the heads next to be fed to the chucks.

Referring now to the construction of the crimping heads and the crimping mechanism carried thereby, the same is shown more clearly in Figs. 2, 3 and 6 to 11, inclusive, and are made as follows: The crimping heads $E^1$ are provided with cylindric necks $E^3$ which have bearing in openings in the depending removable parts $E^2$ of the cross-heads. Said necks are provided at their outer ends with gear wheels $E^4$ (Figs. 4, 12 and 13) which mesh with gear wheels $E^5$ carried by the sleeve *b* on the shaft B, whereby the crimping heads are continuously rotated during the operation of the machine. The crimping heads are made alike and in the following description but one head is referred to. Each head carries a plurality of crimping rollers $E^6$ $E^6$, four of said rollers being shown on each head and located at equal distances apart. Each of said crimping rollers is carried by a roller stud $e^1$ and said studs are mounted in any suitable manner upon radially movable crimping jaws carried by said heads. Said crimping jaws, and the means for mounting them in the heads, are each made as follows (Figs. 3, 7, 8, 9 and 10):—

$E^8$ (Figs. 8 and 9) designates the main frame of the crimping jaw provided with inner and outer rearwardly extending arms $e^3$ $e^3$, and said frame fits within a T-shaped, radial slot in the head which opens outwardly on the flat side of the head remote from the neck $E^3$. The body of the frame is provided with a longitudinal undercut groove $e^4$, and at the bottom of said groove with a longitudinal depression $e^5$. $E^9$ designates a flanged block sliding in said groove $e^4$ and carrying the stud $e^1$ upon which is mounted one of the crimping roll $E^6$, the stud $e^1$ extending outwardly through the open side of its associated radial groove. The roller stud block $E^9$ is made shorter than the main body of the frame and is adjustable radially in said frame for the purpose of adjusting the rolls on the head to cans of varying diameters. For this purpose, said block is provided in its inner face with a screw-threaded half-cylindric depression $e^6$ which coöperates with the longitudinal depression $e^5$ of the body of the frame to form an opening to receive an adjusting screw $E^{10}$ that has rotative, but non-endwise movement in the frame. As herein shown, the adjusting screw is held endwise immovable in the frame by a screw-stud $e^7$ (Figs. 3 and 8) fixed in the jaw frame near its inner end and projecting into the undercut groove $e^4$ thereof for engagement with an annular groove $e^{18}$ at the inner end of the adjusting screw. The longitudinal depression $e^5$ of the jaw frame is smooth or unscrew-threaded and the screw fits loosely in its opening formed by said groove and the groove of the roller stud block $E^9$. The screw is pressed against the screw-threaded depression $e^6$ of said block by means of a short horizontal push bar $e^8$ slidingly occupying a horizontal groove in the arm $e^3$ of the crimping jaw frame (Fig. 3) and projecting into the groove of the frame. Said bar $e^8$ is provided with a concave, screw-threaded inner end which engages the ad-

justing screw to force the same against the screw-threads of the grooved part of the block $E^9$. The push bar is forced towards the adjusting screw by means of a conical adjusting stud $e^9$ mounted in a screw-threaded opening in the arm $e^3$ and disposed at right angles to the push bar. The conical inner end of said stud engages a correspondingly inclined end of said push bar (Fig. 3). When the stud is turned inwardly, therefore, it acts on the push bar to force the latter against the screw and to hold the screw against its screw-threads. The construction described enables the rollers to be adjusted inwardly and outwardly to correspond with cans of varying diameters, and the screw $E^{10}$ also locks the rollers in adjusted positions. Said screws are shown as provided with axial, angular sockets $e^{11}$ whereby they may be rotated.

The crimping jaws normally occupy their radially outermost positions and are shifted inwardly against the head flanges when brought into operative position to said cans by means hereinafter to be described.

Located centrally of each set of crimping rolls is a crimping head plate H which is adapted to be moved inwardly against the can heads at the time the crimping rollers are brought into crimping engagement with the flanges of the can heads. Each plate is shown as attached to the inner end of a stem or plunger $H^1$ which extends outwardly through an axial opening in the neck $E^3$ of the crimping head and is attached at its outer end to a depending part $f^4$ of the lug F of the cross-head, whereby inward movement of the cross-head imparts a like inward movement of the crimping head plate and the crimping head. Said crimping head plate stem $H^1$ is non-rotatively fixed to the extension $f^4$ of the cross-head lug or arm F, but is endwise adjustable with respect thereto, whereby the plate H may be accurately adjusted to the crimping rolls. As herein shown, the stem extends through a transverse opening in said depending part of the cross-head, and is non-rotatively fixed thereto by means of a screw-stud $f^5$ which has screw-threaded engagement with an aperture in the depending part of the cross-head and enters a key-slot or way in said stem (Fig. 2). The means for adjusting said plates H and their stems inwardly and outwardly, consists of a headed screw $h$ that enters and has screw-threaded engagement with an axial socket in the end of the stem, and said adjusting screw is rotative, but endwise immovable, in the depending part of the cross-head. Consequently, when said screw is rotated it acts to give endwise movement to the stem $H^1$ and consequent movement to the crimping head plate H.

Next describing the means acting in each operation of the machine for moving the crimping jaws with the rolls thereof in engagement with the head flanges or rims of a can, when a can is properly presented thereto, said parts are made as follows: The radially outer faces of the inner arms $e^2$ of the gripping jaw frames are inclined as shown at $e^{11}$ (Figs. 3 and 9) and said inclined faces are engaged by the oblique or inclined ends $i$ of a plurality of endwise reciprocating operating rods I I that extend through elongated apertures in the neck $E^3$ and into the radial grooves of the heads; there being one operating rod for each crimping jaw. Said operating rods I of each set rotate with the associated head and are attached at their outer ends to a plate or disk $I^1$ (Figs. 2 and 7) fixed to or made a part of a sleeve $I^2$ which has sliding engagement with the stem $H^1$ of the crimping head plate H. Said sleeve $I^2$ is operatively connected with a cam $I^3$ on the sleeve $b$ of the shaft B by means of a vertically swinging cam lever $I^4$ which is pivoted to a cross-pin $i^1$ carried by fork arms $f^7$ on the depending part $f^4$ of the cross-head (Figs. 2 and 14). When said crimping jaw operating rods I are thrust inwardly through the action of the cam mechanism described, the inclined or cam surfaces $i^1$ of said rods act upon the inclined or cam surfaces of the arms $e^2$ of the crimping jaw frames to shift said jaws inwardly to bring the crimping rollers in contact with the flanges of the can head. Said operating rods are shown in Fig. 3 in their innermost positions to bring their crimping jaws into their operative positions. Preferably the jaws are radially retracted to their outermost positions by spring devices, a convenient form of which is shown and made as follows:

J J designate blocks which are interposed between the arms $e^2$ $e^3$ of the crimping jaw frames (Figs. 3 and 8) and bear at their ends against the body of said frames and bottom of the T-shaped grooves which receive the crimping jaws. Said blocks are provided with concaved depressions $j$ opposing the cam or inclined surfaces $e^{11}$ of the inner arms of said crimping jaw frames, and in said concave depressions the rounded ends of the operating rods I rest and slide. Said blocks J are pressed against the rounded surfaces of the operating rods I by means of springs $j^1$, each of which springs bear at one end against the inner face of the adjacent arm $e^3$ of the crimping jaw frame and occupies at its other end a socket in said block J, as shown in Fig. 3. It will be observed, therefore, that when said operating rods are moved inwardly they operate to force inwardly the crimping jaws against the action of said springs $j^1$, and when said rods are retracted the springs $j^1$ act against

the outer arms $e^3$ to retract or move radially outwardly said jaws from their operative positions to their inoperative positions.

The depending parts $E^2$ of the cross-heads carrying the crimping heads are adjustable inwardly and outwardly with respect to the cross-heads proper, in order to properly adjust the heading and crimping mechanisms relatively to each other. For this purpose the cross-heads are shown as provided with elongated openings or ways $e^{15}$ (Figs. 3, 4 and 5) in which slide the heads of the bolts $e^{16}$ that fasten the two parts of the cross-heads together, and said parts are adjusted with respect to each other and held in adjusted relation by means of adjusting screws K which have rotative, but non-endwise, movement with the parts $E^2$ of said cross-heads, as shown in Fig. 3, and have screw-threaded engagement with cross-bars $d^{15}$ located in suitable recesses $d^{16}$ in the cross-heads proper. By rotating said screw K in one direction or the other, the crimping mechanism is adjusted relatively to the heading mechanism to bring the same into vertical alinement.

The peripheries of the crimping rolls are shown as made transversely angular (Fig. 11), the said peripheries being slightly higher at the transverse center thereof and inclined towards both sides. This form of roll tends to depress the head flange or rim into the can bodies and form a slightly interlocking connection between the heads and bodies.

It will be observed that the can heads are slightly concave, the plates G and H entering the concave parts of said heads. The peripheries of the plates H therefore serve to support the heads and the ends of the can body when the crimping rollers are acting thereon.

The operation of the crimping mechanism will be obvious from the foregoing, but may be briefly stated as follows: In each step by step movement of the carrier C, a can, to which the heads have been applied, is presented between the opposing parts of the crimping mechanism. The first operation of the crimping mechanism is effected through the inward movement of the cross-heads which is effected by the cams $F^3$ and cam levers $F^2$ to move the crimping heads toward each other in a manner to force the rolls over the flanges or rims of the can heads and upon the can (this operation occurring while the heading mechanisms are being moved toward each other). Such inward movement of the crimping mechanism is arrested after the rollers have been brought into line with the flanges of the can heads, as shown in Fig. 3. After this operation occurs, the crimping jaw operating rods I are thrown inwardly by their appropriate cam mechanisms, thereby moving the crimping jaws radially inwardly and forcing the rolls with the desired pressure against the head flanges or rims. At the time the crimping heads move inwardly the crimping head plates H are moved against the heads of the cans and are in such position that when the rolls are pressed inwardly against the head flanges or rims, the margins of said plates take the stress due to the inward pressure of the rolls. The crimping heads are continuously rotated and when in contact with the rims or flanges of the heads roll said rims closely on the can bodies in a familiar manner. After the rims have been sufficiently crimped the crimping operating rods are first retracted so as to permit the crimping jaws to be restored to their radially outermost positions under the action of the springs $j^1$, after which the cross-heads are retracted and thereby carry the crimping heads away from the cans. In the next rotative step of the carrier the can upon which the heads have thus been crimped are discharged from the carrier chute L (Fig. 1) being conveniently placed below the carrier to receive the cans and discharge them from the machine.

It is to be understood that the carrier and the heading and crimping mechanisms cooperate in such manner that while the carrier is in position to hold a can body to receive a set of heads, the next advance can on the carrier is presented to the crimping mechanism and further that the heading and crimping mechanisms operate simultaneously when the carrier is at rest.

It will be noted that the connection of the cross-heads with the sleeves *b* on the shaft B, by means of the arms $e^1$, as described, act, when the cross-heads move inwardly or outwardly, to correspondingly shift the cams $D^6$ and $I^3$ as well as the gear wheels $E^5$. Inasmuch as the levers $D^7$ and $I^4$ are pivoted on the cross-heads and the gear wheels $E^4$ of the crimping heads are movable with the cross-heads, the inward and outward movements of the cross-heads have no effect on the relative movements of the parts actuated by the cams $D^6$ and $I^3$ and gear wheel $E^5$.

Any suitable mechanism may be employed to intermittently rotate the carrier C to successively bring the can bodies in operative position relatively to the heading and crimping mechanisms in the manner stated. The means herein shown for effecting such intermittent rotative movement of the carrier in its construction embraces a Geneva stop movement. It comprises a continuously rotating shaft M (Figs. 15 and 16) which is rotated from the power shaft B through the medium of a gear wheel $M^1$, herein shown as affixed to the cam $F^3$ (Fig. 2), a gear wheel $M^2$ fixed on the shaft M, and an intermediate gear wheel $M^3$ meshing with the gears $M^1$ and $M^2$ and mounted on a shaft *m* fixed to the rear wall of the hollow base.

The shaft M carries at its inner end a disk

$M^4$ provided with a laterally extending stud $m^1$ which engages the radial grooves $c^2$ of a wheel $C^4$ fixed to the shaft of the rotative carrier C, whereby the wheel shaft and carrier are rotated one step during each rotation of the disk $M^4$. The wheel $C^4$ and carrier are held at rest during that portion of the rotation of the disk in which the stud $m^1$ is out of engagement with the grooved wheel by engagement of an annular surface $m^2$ on said disk, with concave depressions $c^3$ on the periphery of the wheel $C^4$ between the grooves thereof.

Many of the details of construction hereinbefore described and illustrated have been shown as constituting convenient, and in some instances preferable, embodiments of my invention but it is to be understood that such details may be varied without departing from the spirit of my invention.

I claim as my invention:—

1. In a machine for fixing flanged can heads to the bodies thereof, the combination with a can body support, of a hollow chuck constructed to receive a can head and apply it to a can in said support, said chuck being provided at its inner open side with a shoulder, means for shifting said shoulder radially inwardly prior to the delivery of a can head to the chuck, means for locking the can head against said shoulder as the chuck is moved towards the carrier to apply the can head to a can in said carrier, and means for moving said shoulder outwardly prior to the retraction of the chuck.

2. In a machine for fixing flanged can heads to the bodies thereof, the combination with a can body support, of a hollow chuck constructed to receive a can head and movable toward and from said support, said chuck embracing an expansible and contractible ring having a shoulder facing away from the carrier, and means for locking a can head with its flange against said shoulder as the can head is moved by said chuck towards a can body in said support.

3. In a machine for fixing flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing hollow chucks movable towards and from an interposed can body on the carrier, each chuck comprising a contractible and expansible ring adapted to be passed over the end of the can body, means for contracting the chuck rings before they are passed over said can bodies, means whereby can heads are delivered to said chucks, and means for pressing and holding can heads against annular, interior shoulders of said contractible and expansible rings while the chucks are moving towards the can.

4. In a machine for fixing flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing hollow chucks movable towards and from an interposed can body on the carrier, each chuck comprising a contractible and expansible ring adapted to be passed over the end of the can body, means contracting the chuck rings, acting to contract them before they are forced over the can body, means whereby can heads are delivered to said chucks, means for pressing and holding the can heads against annular interior shoulders of said chuck rings while the chuck is moving towards the can, and means acting thereafter to expand said chuck rings prior to the retractive movement of the chuck.

5. In a machine for fixing flanged heads to can bodies, the combination with an intermittently rotative carrier and support provided with pockets to receive can bodies, of two opposing chucks movable towards and from an interposed can supported on the carrier, each chuck comprising a contractible chuck ring adapted to be passed over the end of the can body, means for closing said chuck ring prior to passing it over the can body, means whereby a can head is fed to said chuck, means acting to lock said head against the contracted ring whereby, when the chuck is moved inwardly the head is pressed upon the can body, and means acting thereafter to expand said ring preparatory to the retractive movement of the chuck.

6. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing chucks each movable towards and from a can body supported on the carrier, each chuck comprising a sleeve which is slitted at its inner end to constitute expansible and compressible chuck fingers, a removable segmental facing ring fitted to the inner end of said split sleeve, said chuck sleeve being transversely slitted to provide an opening through which can heads are delivered concentrically to the facing ring, means for contracting said facing ring prior to the delivery of a can head thereto, means for locking the head in said ring, whereby, when the chuck is moved toward a can, the can head carried by the chuck is pressed upon the can body, and means permitting the chuck to expand preparatory to the retractive movement thereof.

7. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing chucks movable toward and from an interposed can supported on the carrier, said chucks each including a segmental chuck ring which is flared on its inner side to pass snugly over a can body and provided with an interior, annular, outwardly or rearwardly facing shoulder, means for closing said chuck ring, means whereby can heads may be fed thereto, means for locking a can head in said ring with its flange pressed against said annular stop shoulder, whereby, when

the chuck is moved towards an interposed can, the head is pressed upon the body, and means thereafter acting to permit the chuck ring to expand.

8. In a machine for fastening flanged can heads to the bodies thereof, the combination with a support and carrier, of two opposing chucks movable towards and from a can supported on the carrier, each comprising a chuck sleeve that is longitudinally slitted to provide a plurality of inwardly collapsing segments, a removable segmental facing ring fitted to the inner end of said chuck sleeve, means acting on said chuck sleeve for contracting the same and the facing ring, means whereby can heads may be fed to the chuck in axial alinement with said facing ring, means for locking the can heads in said contracted facing ring, whereby, when said chuck is moved inwardly, said heads are pressed upon the can body, and means acting thereafter to permit the chuck to open preparatory to its retractive movement.

9. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing chucks movable towards and from an interposed can supported on the carrier, each comprising a slitted chuck sleeve, a segmental facing ring fitted to the inner end of said sleeve, means for contracting said sleeve and ring, said ring being flaring at its inner side and adapted to pass snugly over a can body, and provided with an interior, annular, outwardly or rearwardly facing stop shoulder, means whereby can heads are fed to the chuck in axial alinement thereto, means for forcing the heads with their flanges against said stop shoulder, whereby, when the chuck is moved towards the can body supported on the carrier, the head is pressed upon the end of said body, and means for releasing said chuck contracting ring preparatory to the retractive movement of the chuck.

10. In a machine for fastening flanged can heads upon the bodies thereof, the combination with a carrier and support, of two opposing chucks movable towards and from the support, each comprising a chuck sleeve which is longitudinally slitted at its inner end to constitute a plurality of spring fingers, a segmental facing ring fitted to the inner end of said slitted ring and adapted to pass over a can body, said sleeve and ring being transversely slitted to permit can heads to be received at the end of the chuck sleeve in axial alinement therewith, and a reciprocating plate or plunger in said sleeve adapted to force a can head with its flange against an internal annular stop shoulder in the ring, whereby, when the chuck is forced towards a can body, the head is forced over the end of said body.

11. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing chucks movable towards and from an interposed can supported on the carrier, each comprising a hollow chuck sleeve slitted to provide at one end a plurality of contractible chuck fingers adapted to pass over the end of the can, means for contracting the inner end of said chuck sleeve, means whereby the can heads a e delivered to the inner end of the chuck sleeve in axial alinement therewith, a plunger or plate within said chuck sleeve adapted to lock the can heads between the same and an opposing, interior annular shoulder of the chuck sleeve, whereby, when the chuck is moved inwardly the can head is pressed over the can body, and means for permitting the chuck sleeve to expand preparatory to the retractive movement thereof.

12. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing chucks, each comprising a hollow chuck sleeve slitted at one end to constitute spring fingers and provided with a transverse opening through which the can heads are fed to the chuck sleeve in axial alinement therewith, the inner end of said sleeve being flared to pass over the end of a can body, and provided with an outwardly facing, interior, annular stop shoulder, a locking plate reciprocating in the inner end of said sleeve for locking can heads between the same and said annular stop shoulder, whereby, when the chuck is moved inwardly, the can head is pressed upon the can body, and means permitting expansion of said chuck sleeve preparatory to the retractive movement of the chuck.

13. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing chucks, each comprising a hollow chuck sleeve slitted at one end to constitute spring fingers and provided with a transverse opening through which the can heads are fed to the chuck sleeve in axial alinement therewith, the inner end of said sleeve being flared to pass over the end of a can body and provided with an outwardly facing, interior, annular stop shoulder, a locking plate reciprocating in the inner end of said sleeve for locking can heads between the same and said annular stop shoulder, whereby, when the chuck is moved inwardly, the can head is pressed upon the can body, and means permitting expansion of said chuck sleeve preparatory to the retractive movement of the chuck, said backing plate being movable with the chuck sleeve when the latter moves toward the can body, and being moved relatively to said chuck sleeve when the latter is retracted from the can body to bring it out of line with said transverse feed opening.

14. In a machine for fastening flanged can

heads to the bodies thereof, the combination with a carrier and support, of opposing chuck heads movable toward and from a can head supported on the carrier, each chuck comprising a chuck sleeve which is slitted to constitute at its inner end spring fingers and provided with a transverse opening to admit can heads thereto in axial alinement with the sleeve, a wedge ring surrounding and movable longitudinally of the chuck sleeve to close the inner end of the latter, a plate or plunger reciprocating in said chuck sleeve and adapted to lock a can head delivered to the chuck between the same and an annular opposing stop shoulder in the outer end of the sleeve, whereby, when said chuck is moved inwardly, the head is pressed over the can body, and means for retracting said wedge ring to permit the said chuck sleeve fingers to expand preparatory to the retractive movement of the chuck.

15. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing heading chuck mechanisms, each comprising a cross-head movable towards and from a can supported therein, a chuck sleeve carried by said cross-head and slitted at its inner end to constitute spring chuck fingers, said cross-head and chuck sleeve being transversely slitted to provide an admission opening to admit can heads to said chuck sleeve, a reciprocating wedge ring surrounding said chuck and engaging a complemental wedge surface of the chuck ring to force the fingers inwardly, and a plunger reciprocating in said sleeve to lock the can head between the same and an opposing annular stop shoulder at the inner end of the slitted chuck sleeve.

16. In a machine for the purpose set forth, a hollow heading chuck which is slitted to constitute at its inner end spring chuck fingers, the inner end of said chuck being flaring to fit snugly over the end of a can body and provided with an interior, outwardly or rearwardly facing, annular stop shoulder, means for pressing the inner ends of said fingers inwardly to contract the chuck, means whereby can heads may be delivered to the chuck in axial alinement therewith, and means for locking a can head with its flange pressed against said annular stop shoulder.

17. In a machine for the purpose set forth, a hollow heading chuck which is slitted at its inner end to constitute chuck fingers, the inner end of said chuck being flaring to fit snugly over the end of a can body and provided with an outwardly facing annular stop shoulder, means for pressing said fingers inwardly to contract the chuck sleeve, means whereby can heads are delivered to the chuck in axial alinement therewith, and a reciprocating plunger located within said chuck and movable endwise thereof and adapted to lock a can head delivered thereto between the same and said annular stop shoulder.

18. In a machine for the purpose set forth, a heading chuck comprising a sleeve which is slitted to constitute chuck fingers, a removable, segmental facing ring fixed to the inner end of said sleeve and adapted to pass over the end of a can body, means whereby can heads may be fed to said chuck in axial alinement with the chuck sleeve, said facing ring being flared at its outer side to pass over the can body and provided at its other side with an outwardly or rearwardly facing, interior, annular stop shoulder, means for contracting said chuck, and a plunger reciprocating in said sleeve and adapted to lock the can heads between the same and said annular stop shoulder.

19. In a machine for the purpose set forth, a heading chuck mechanism comprising a cross-head provided with a cylindric opening, a chuck sleeve located within said opening and longitudinally slitted to provide at its inner end resilient chuck fingers, a segmental, removable, facing ring attached to the inner end of said sleeve and adapted to pass over the end of a can body, means whereby a can body is delivered transversely to said chuck in axial alinement with said sleeve, a ring having interior screw-threaded engagement with the cylindric opening of said cross-head for locking said chuck sleeve and facing ring in place, means for contracting said chuck sleeve, and means for locking a can head in said chuck sleeve against an annular, rearwardly facing, stop shoulder of said facing ring.

20. In a machine for the purpose set forth, a heading chuck comprising a cross-head provided with a cylindric opening, a chuck sleeve in said opening and longitudinally slitted at its inner end to provide a plurality of spring chuck fingers, said head and sleeve being transversely slitted to provide an opening to admit can heads to the chuck in axial alinement therewith, and means for pressing inwardly the chuck fingers preparatory to delivering a can head thereto, a wedge ring surrounding and movable endwise of the chuck sleeve, a sleeve also surrounding said chuck sleeve and attached to said wedge ring and extending outwardly from said cross-head for attachment to an actuating part, and a plunger movable endwise on said chuck sleeve for locking a can head between the same and an opposing annular shoulder in the inner end of said chuck sleeve.

21. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of two opposing heading chuck mechanisms comprising cross-heads movable towards and from the carrier and support and provided with alined hori-

zontal openings, the slitted chuck sleeves $D^2$ in said openings provided at their inner ends with segmental removable face rings $d^6$, said face rings being inwardly flared and provided with outwardly or rearwardly directed interior, annular shoulders, the wedge rings $d^2$ acting upon the slitted chuck sleeves to close the latter and the segmental face rings, the sleeves $D^3$ to which said wedge rings are attached and extending rearwardly from the cross-heads for engagement with actuating mechanisms, the plungers G within said chuck sleeves adapted to lock the can heads between the same and said annular shoulders, said cross-heads, chuck sleeves and face rings being provided with transverse admission openings $d^{14}$ to admit can heads to the chucks, and means for severally actuating said cross-heads, the wedge rings and the plungers for the purpose set forth.

22. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of opposing crimping mechanisms movable towards and from a can supported on the carrier, each comprising a rotative head provided on its inner face with a plurality of radial grooves, crimping jaws movable radially in said groove, crimping rollers carried by said jaws, means for moving said jaws inwardly comprising parallel operating rods extending inwardly through the head, and engaging at their inner ends said jaws, means for moving said rods toward and from the jaws, and spring devices for retracting the jaws when said operating rods are retracted.

23. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier and support, of opposing crimping mechanisms movable toward and from a can supported on the carrier, each comprising a rotative head provided on its inner face with a plurality of radial grooves, crimping jaws movable radially in said grooves, crimping rollers carried by said jaws, means for moving said crimping jaws inwardly, comprising parallel operating rods extending inwardly through the head, and provided with inclined surfaces adapted to engage inclined surfaces on the jaws; means for moving said rods longitudinally toward and from the jaws, and spring devices for retracting the jaws when said operating rods are retracted.

24. In a machine for fastening flanged can heads to the bodies thereof, the combination with a carrier or support, of two opposing crimping mechanisms, each comprising a rotative cr mping head provided on its inner face with a plurality of radial grooves, crimping jaws sliding in said grooves, crimping rolls carried by and extending inwardly from said jaws, means for radially adjusting said rolls on said jaws, and means for shifting said jaws radially inwardly during the crimping operation, comprising a plurality of parallel operating rods movable towards and from the jaws and provided at their inner ends with inclined surfaces, arms on said crimping jaws provided with inclined surfaces adapted for engagement by the inclined surfaces of said operating rods, and springs for restoring said jaws to their outer positions when the operating rods have been retracted.

25. In a machine for fastening flanged can heads to the bodies thereof, a crimping head provided on its inner face with radial grooves and crimping jaws slidable in said grooves, each comprising an elongated frame provided with a laterally opening longitudinal groove, a crimping roll block mounted in said groove and carrying a laterally extending crimping roll, said block and the bottom of the groove of the frame being provided with opposing depressions, constituting a cylindric opening, an adjusting screw located in said opening and endwise immovable in said frame and having screw-threaded engagement with said block, and adjustable means carried by the frame for holding the adjusting screw against the screw-threaded block, whereby, when the adjusting screw is rotated, the block and roll are shifted radially with respect to said jaw.

26. In a machine for the purpose set forth, the combination with a carrier and support, of opposing crimping mechanisms movable towards and from said support, each comprising a rotative head provided with a plurality of radially disposed grooves, crimping jaws mounted in said grooves, each comprising an elongated frame provided with a longitudinal, laterally opening groove, a crimping roll block mounted to slide endwise in said groove and carrying a crimping roll, said block and the bottom of the groove being provided with opposing depressions constituting a cylindric opening, an adjusting screw located in said opening and endwise immovable in said frame, and having screw-threaded engagement with said block, whereby, when the adjusting screw is rotated, the block and roll are shifted radially with respect to said frame, means for shifting said jaws inwardly during the crimping operation, comprising rods extending through the head and movable towards and from said jaws, means whereby inward movement of the rods imparts radially inward movement to said jaws, and springs for restoring said jaws to their outer positions when said rods are retracted.

27. In a machine for the purpose set forth, the combination with a carrie and support, of opposing crimping mechanisms movable toward and from said carrier and support, each comprising a rotative head prov.ded with a plurality of radially disposed s ots, crimping jaws carrying laterally extending crimping rolls, said crimping jaws emb acing

elongated frames which are movable radially in said slots and provided at their ends with rearwardly extending arms, the a ms at the radially inner ends of said frames being inclined, and means for shifting said jaws inwardly during the crimping operation, comprising rods extending through said heads and movable towards and from said jaws, said rods being provided with inclined faces adapted to engage the inclined faces of said frame arms, blocks interposed between said rods and the radially outer arms of said frames, and springs interposed between said blocks and said outer arms.

In testimony, that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN L. ALLEN.

Witnesse :
E. B. VILKINS,
D. E. MARMON.