No. 648,280. Patented Apr. 24, 1900.

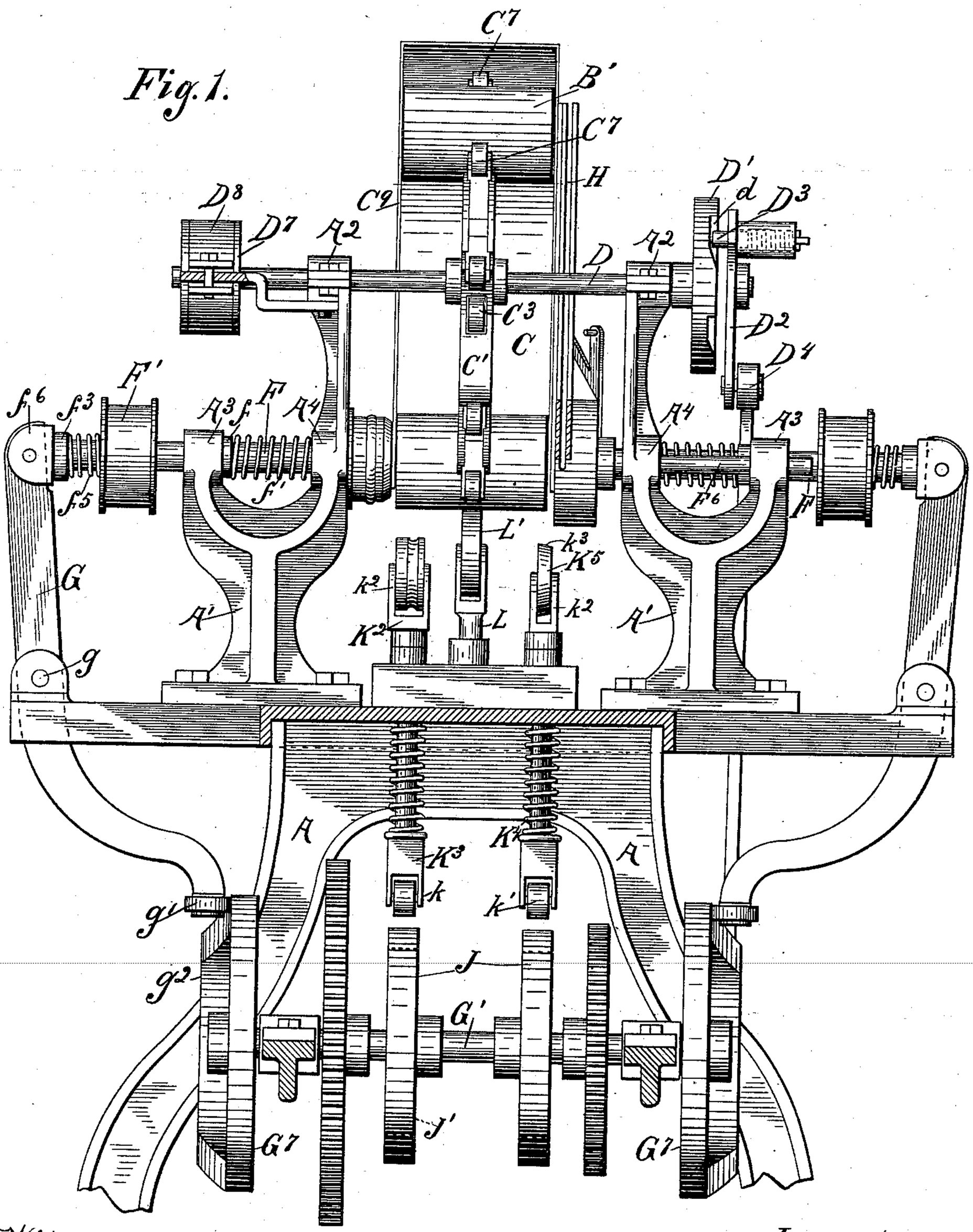
C. B. McDONALD.

CAN HEADING AND BEADING MACHINE.

(Application filed July 3, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses:
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W. H. Cotton.

Inventor:
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Fig. 2.

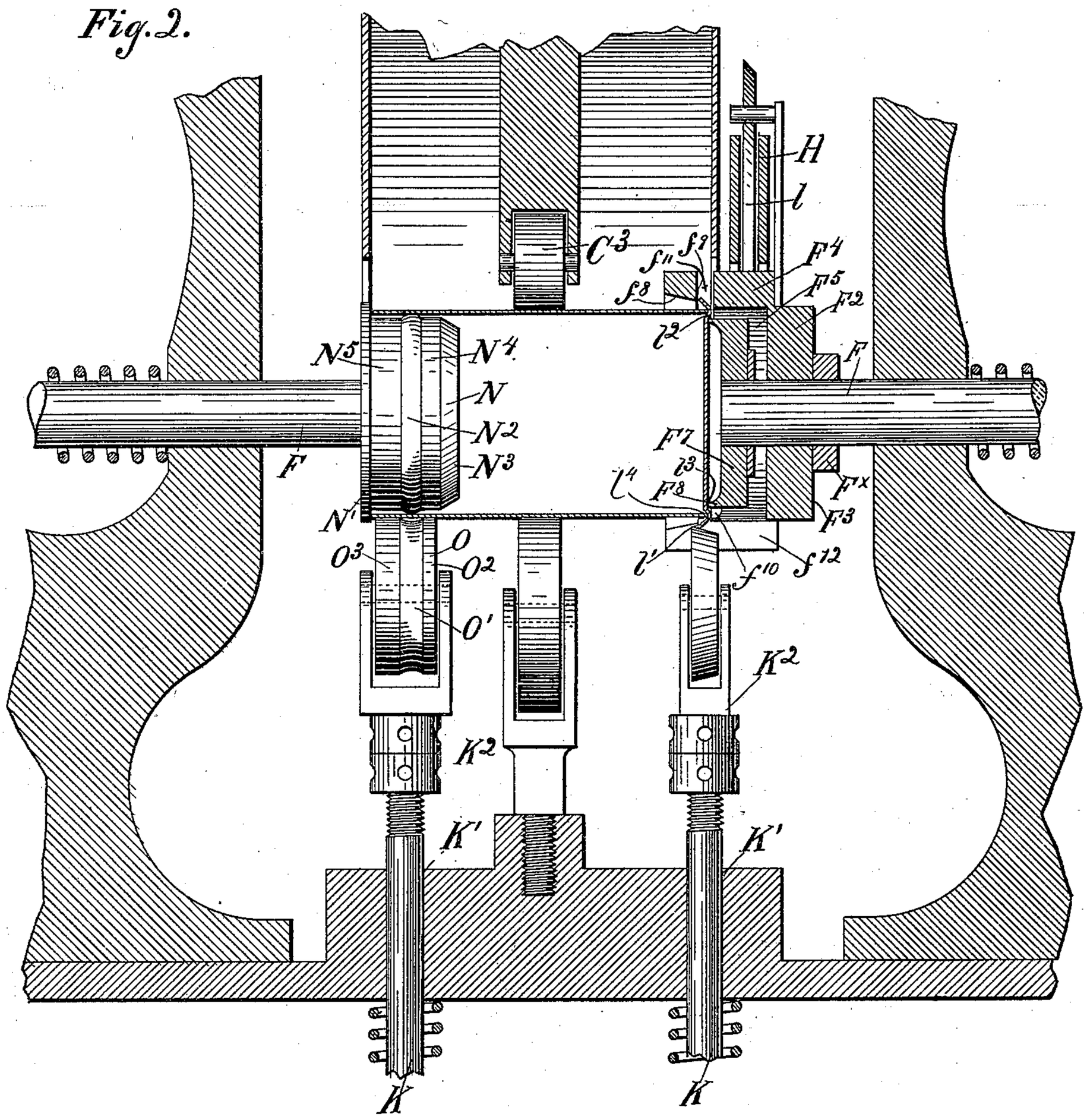

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES B. McDONALD, OF CHICAGO, ILLINOIS.

CAN HEADING AND BEADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 648,280, dated April 24, 1900.

Application filed July 3, 1899. Serial No. 722,681. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. McDONALD, residing at Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Can Heading and Beading Machines, of which the following is a specification.

My invention relates to an improvement in that class of can-manufacturing machinery known as "can-heading" machines and is designed to produce a machine that will simultaneously place a head upon one end of the hollow cylinder constituting the body of the can while it simultaneously forms a bead on said cylinder near its opposite end, the said bead being designed to coöperate with the removable cap ordinarily employed with such cans.

I have shown my improvement as applied to the type of machine shown in my Patent No. 594,547, dated November 30, 1897; but it will be understood that the broad idea of my invention might be employed in other types of machines.

Referring to the two sheets of drawings, in which the same letters of reference are used to designate identical parts in all the views, Figure 1 is an end elevation of the complete machine, except that a portion of the framework is shown in section and the feed and discharge chutes are omitted. Fig. 2 is a vertical section, on an enlarged scale, through the center of the heading and beading devices proper; and Fig. 3 is a side elevation of the completed can, a portion thereof being in section to show the construction of the bead.

In setting out my invention I will first describe the general construction of the complete machine in the particulars wherein it is the same as that shown in my prior patent referred to, and to which reference is made for a fuller illustration and description of the parts not specifically concerned with the present improvement.

Referring to the drawings by letter, A A represent the framework of the machine. This framework, near its center, is provided with two upright standards A′ A′. Suitable mechanism, such as a chute, (not shown,) is provided for carrying the can-bodies B′ to the operating parts of the machine, and they are taken from this chute one by one by the feed-wheel C, which may be briefly described as provided with a series of recesses C′, which are approximately semicircular in outline and of a somewhat larger radius than the can-body which they receive. Each of these recesses is provided with the rollers C^3 and C^7, with which the can-bodies directly contact, so that they are held in the feed-wheel by their three points of contact with the roller C^3 and the two rollers C^7, respectively, so that while thus securely held they are nevertheless perfectly free to revolve as necessary in the operation of the machine. The feed-wheel C is shown as partially inclosed by the casing C^9, and the casing C^9, in which it is mounted upon the shaft D, journaled in bearings A^2, formed in the standards A′ of the framework. On the shaft D at one end is keyed the ratchet-wheel D′, provided on its outer surface with the ratchet-teeth *d*, with which coöperate the spring-actuated plunger-pawl D^3, secured in the upper end of the crank D^2, which is loosely mounted on the shaft and has connected thereto the rod D^4, by which the crank D^2 is reciprocated to intermittently advance the feed-wheel. Upon the other end of the shaft D is keyed the friction-pulley D^7, surrounded by a friction-belt D^8, by which the momentum of the machine may be overcome.

Upon each side of the feed-wheel C and concentric with each recess C′ at the lowest point to which it is brought by the rotation of said feed-wheel is mounted a shaft F in bearings A^3 and A^4, formed in the standards A′ of the frame. The said shaft F is not only free to revolve in these bearings, but is also adapted to reciprocate longitudinally therein. Adjacent to the bearing A^3 the shaft F carries a collar *f*, secured thereto, so as to move longitudinally with the shaft and to permit the shaft to revolve loosely in said collar. Between this collar and the remaining bearing a coiled spring *f*′ surrounds the shaft. The shaft is thus held in its normal position with the collar *f* abutting against the bearing A^3. The shaft is revolved by the pulley F′, which is keyed to said shaft, but is free to slide thereon, so as to allow longitudinal movement of the shaft without interfering with its movement of revolution. The outer end of the shaft F fits into a cap f^3, which is pivotally secured by means of the ears f^6 to the lever G, which

is pivoted to the framework at g and is provided at its lower end with an antifriction-roller g', which coöperates with the cam-flange g^2, secured upon the face of the wheel G^7, to be subsequently referred to. A coiled spring f^5 surrounds the end of the shaft F, between the cap f^3 and the belt-pulley F', so as to provide a certain degree of resiliency in the inward movement of the shaft F, as caused by the inward movement of the cap f^3 under the actuation of the cam-wheel G^7. The two cam-wheels G^7, one on either side of the machine, are rigidly secured to the shaft G', mounted in suitable bearings in the framework and driven by the power applied to the machine. It will readily be seen that as the shaft G' rotates and the cam-flange g^2 contacts with the antifriction-roller g', the lever G will be swung about its bearing g, so as to force the shaft F inward against the resistance of the spring f^5 and f'.

The inner end of the right-hand shaft F carries a circular hood F^2. This hood comprises the disk-shaped back F^3 and an annular inwardly-projecting wall F^4, within which there is thus formed a circular recess F^5. The hood F^2 is loosely mounted on the shaft F, so as not to partake of the revolution of the shaft, but so as to move backward and forward with the same, being retained between the collar $F^\times$ and the chuck F^7, herein subsequently described. The guide-rods F^6 (one of which is shown in Fig. 1 secured at one end to the hood) extend through guide-apertures formed in the framework near the bearings A^3 and A^4 of the shaft F and permit the reciprocation of the hood F^2, while preventing its rotation. On the extreme end of the shaft F within the hood F^2 is mounted a disk-shaped chuck F^7, adapted to revolve with the shaft within the rear portion of the circular recess F^5 of the hood. The working surface of the chuck is provided with an annular rim F^8. The outer portion of the circular recess F^5 of the hood, somewhat larger than the inner portion, flares outwardly, as at f^8. The inner end of this flaring concave portion constitutes a shoulder f^9. Behind this shoulder there is thus formed a groove f^{10}. In the upper side of the hood an opening f^{11} is formed through the wall F^4 of the hood, adapted to permit the dropping of a can-head into the groove f^{10}. In the lower side of the hood there is formed a second opening f^{12}, through the wall F^4, adapted to permit the crimping-roll later described to contact with the lower edge of the cam-head when seated in the groove f^{10}. On the right-hand side of the feed-wheel C is located the inclined feed-chute H, down which pass the bottoms forming the lower heads of the cans. The chute H terminates over the hood F^2 and is provided with an opening in its bottom which registers with the opening f^{11} when the hood is in its normal and outward position. The can-head I falls from the chute H through said opening into the groove f^{10}. An automatic feeding device, which need not here be described, is provided to insure the regular feeding of a single head to the hood at each time that the hood comes to its normal outer position.

The can head or bottom I is disk-shaped and has its edge bent inward to form an annular lip I'. A short distance inside of the said lip is formed an annular ridge I^2 on the inside surface of the head, producing a corresponding annular depression I^3 on the outside surface of the said head. On the inner surface of the head there is thus formed between the lips I' and the ridge I^2 an annular groove I^4, which registers with the edge of the can-body.

The shaft G', heretofore described, carries a pair of cam-wheels J, identical in form with each other, each being provided along one portion of its periphery with a raised cam-surface, the limits of which on the other side of the wheel are indicated by the dotted lines at J'.

In the framework of the machine, separated by a distance substantially equal to the depth of the can to be headed, are located two upright spindles K, each of which is adapted to reciprocate in guideways K', formed in said framework. Each spindle is provided with an upper head K^2 and a lower head K^3 on opposite sides of the guideways K'. Between the lower head K^3 and the framework A a helical expanding spring K^4 surrounds the spindle and holds the same in a normal downward position, with the head K^2 abutting against the framework A. The lower head K^3 is provided with two perforated ears k, in which is mounted a roller k', adapted to travel around the periphery of the cam-wheel J. The upper heads K^2, carried by the spindle, are provided with the ears k^2, between which, on the right-hand one, is mounted a crimping-roll K^5, with a beveled surface k^3.

In the framework A, between the two crimping-roll spindles K, is mounted a short standard L, in which is journaled a roller L', the upper surface of the said roller being adapted to contact with the can-body carried by the feeding-wheel when in position to be headed.

The construction hitherto explained is that of my prior patent, above referred to, and the differences embodying my present invention will now be described.

On the left-hand side of the machine, instead of employing the chute H, the hoods F^2, and the chuck F^7, I fasten on the extreme inner end of the shaft a chuck N, which is formed with the flange N' thereon, against the inner surface of which the end of the can abuts when the shaft F has been advanced to its innermost position, as subsequently explained. At a suitable point on the cylindrical surface of the chuck N, I form the beading-ridge N^2, which is a circular bead extending around the entire periphery of the chuck, and I preferably form a beveled surface N^3 on the inner end of the chuck. Co-

operating with this chuck, and especially with the beading-ridge N^2, is the beading-roll O, which is mounted similarly to the crimping-roll K^5, but which is formed with the beading-groove O′ in register with and corresponding in size to the beading-ridge N^2. On either side of this groove O′ are the horizontal surfaces O^2 and O^3, which coöperate with the corresponding horizontal surfaces N^4 and N^5 on the chuck N.

The operation of my improved machine is as follows: The can-bodies B′ are taken up from the chute one by one in the recesses C′ of the feeding-wheel C, the said feed-wheel being given an intermittent motion through the ratchet-wheel D′ and connecting mechanism. In time each such can-body is brought by the revolution of the feed-wheel to a position between the hood F^2 and chuck F^7 on one side and the chuck N on the other side. The hood F^2 contains a can-head I, fed into it automatically. The hood and chucks are in their outer or normal position. By the revolution of the cam-wheels G^7 the hood and the chucks are brought toward each other upon opposite sides of the can-body, as shown particularly in Fig. 2. The can-head I is retained in its groove f^{10} by reason of the lip I′ engaging with the shoulder f^9, which forms the inner side of said groove. As the head in the hood approaches the body of the can the edge of the can-body fits into the annular groove I^4, extending around the head. The annular rim F^8 of the chuck F^7 fits within the circular depression I^2 of the head, while the chuck N enters the other end of the can-body until its flange N^5 is pressed firmly against it by the action of the springs, and thus the head and can-body are rapidly revolved by the revolution of the chucks, which the springs f^5 press inward against the head and the can-body with a yielding pressure. The can-body is readily revolved by its mounting between the rollers C^3, C^7, and C^7, of which there are three for each holder in the feed-wheel, and the roller L′, with which it comes in contact in this position. By the time that the chucks have been moved inward by the revolution of the cam-wheels G^7 the raised surfaces J′ on the cam-wheels J contact with the rollers k' and force upward the crimping-roll K^5 and the beading-roll O. The crimping-roll crimps down the lip I′ of the can-head I upon the can-body, the roll being revolved by contact with the revolving can-body. At the same time the upward pressure of the spring K^4 causes the beading-groove O′ to coöperate with beading-ridge N^2 to form the bead B^2 upon the can-body. The continued revolution of the cam-wheels J now permits the spindles and the crimping-roll and beading-roll to drop down to their normal position, and immediately thereafter the continued revolution of the cam-wheels G^7 permits the hood and chucks to resume their normal outer position. This leaves the can-body with its head in the feed-wheel. The lip I′ of the head, having been crimped down, no longer catches upon the shoulder f^9 of the hood and allows the head which is crimped on the can-body to remain in position thereon while the chuck and hood are withdrawn from over it. The subsequent rotation of the wheel C brings the can which had been headed and beaded to the point where it is discharged.

While I have shown my invention as embodied in the form which I at present consider best adapted to carry out its objects and as applied to a machine built in accordance with my prior patent, it will be understood that it is capable of some modifications, as well as application to other machines, and that consequently I do not desire to be limited in the interpretation of the claims, except as may be necessitated by the state of the art.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a machine of the class described, the combination of the can-supporting member comprising a support in which the can-body can rotate freely, with can-heading mechanism on one side thereof and the can-beading mechanism on the other side thereof, said mechanisms being adapted to rotate the can and operate on it during said rotation, and means for operating both of said mechanisms simultaneously.

2. In a machine of the class decribed, the combination of a can-supporting member consisting of a rotary support in which can-bodies are adapted to be rotated, with a beading mechanism located adjacent thereto and adapted to coöperate with the cans in one position of said support, said mechanism comprising a rotary chuck movable into position to coöperate with a can-body and a beading-roll adapted to coöperate with the can-body upon said chuck, and means for rotating and advancing said chuck and for moving said beading-roll.

3. In a machine of the class described, the combination of the shaft F, bearings for said shaft in which it can rotate and reciprocate longitudinally, a chuck on said shaft adapted to support a can-body and having a beading-ridge thereon; with a support for the can-body in which it is in axial alinement with said shaft and in which the can-body is free to rotate, a beading-roll located adjacent to said chuck and having a groove coöperating with said beading-ridge; and means to rotate and reciprocate said shaft F, and to bring said beading-roll into coöperative relation with the chuck when said chuck is in its inner position.

4. In a can-heading machine, the combination of the shafts F, bearings for said shafts in which they can rotate and reciprocate longitudinally, a chuck on the inner end of one of said shafts adapted to support a can-body and having a beading-ridge thereon, can-heading mechanism on the opposed inner end of the other shaft; with a support for the can-body in which it is in axial alinement with said shaft and in which the can-body is free to ro-

tate, a beading-roll located adjacent to said chuck and having a groove coöperating with said beading-ridge; and means to rotate and reciprocate said shafts F, and to bring the beading-roll into coöperative relation with the chuck, when said chuck is in its inner position, whereby the can will be beaded and headed simultaneously.

5. In a can-heading machine, the combination of the shafts F, bearings for said shafts in which they can rotate and reciprocate longitudinally, a chuck on the inner end of one of said shafts adapted to support a can-body and having a beading-ridge thereon, a can-heading mechanism on the opposed inner end of the other shaft F, said mechanism comprising a chuck and a hood for holding the can-head; with a support for the can-body in which it is in axial alinement with said shaft and in which the can-body is free to rotate, a beading-roll located adjacent to the beading-chuck and having a groove coöperating with said beading-ridge, and a crimping-roll located adjacent to the heading-chuck and coöperating therewith; and means to rotate and reciprocate said shafts F, and to bring the beading-roll and crimping-roll into coöperative relation with their respective chucks when said chucks are in their inner position.

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