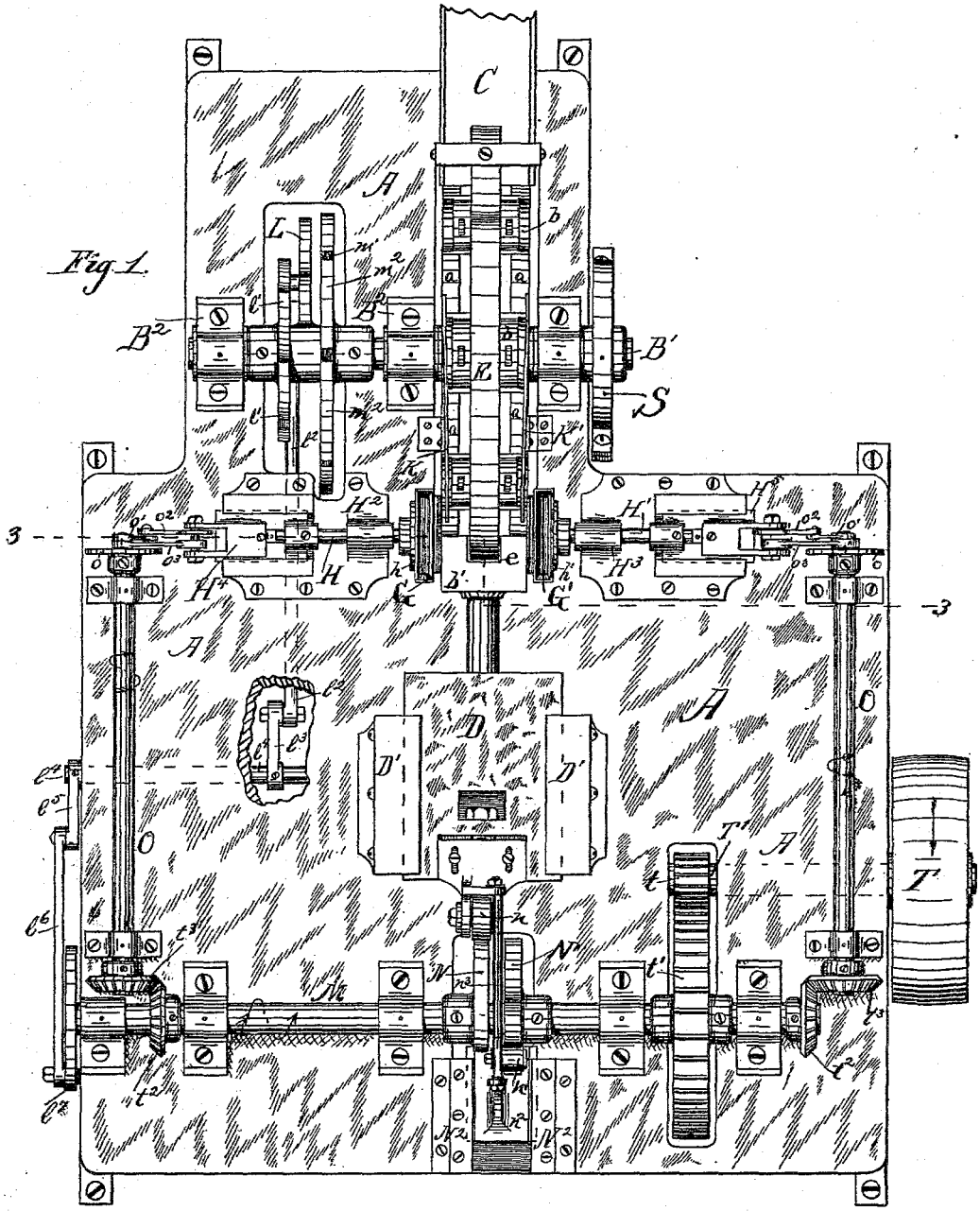
(No Model.) 4 Sheets—Sheet 1.

E. NORTON & J. G. HODGSON.

CAN ENDING MACHINE.

No. 274,363. Patented Mar. 20, 1883.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

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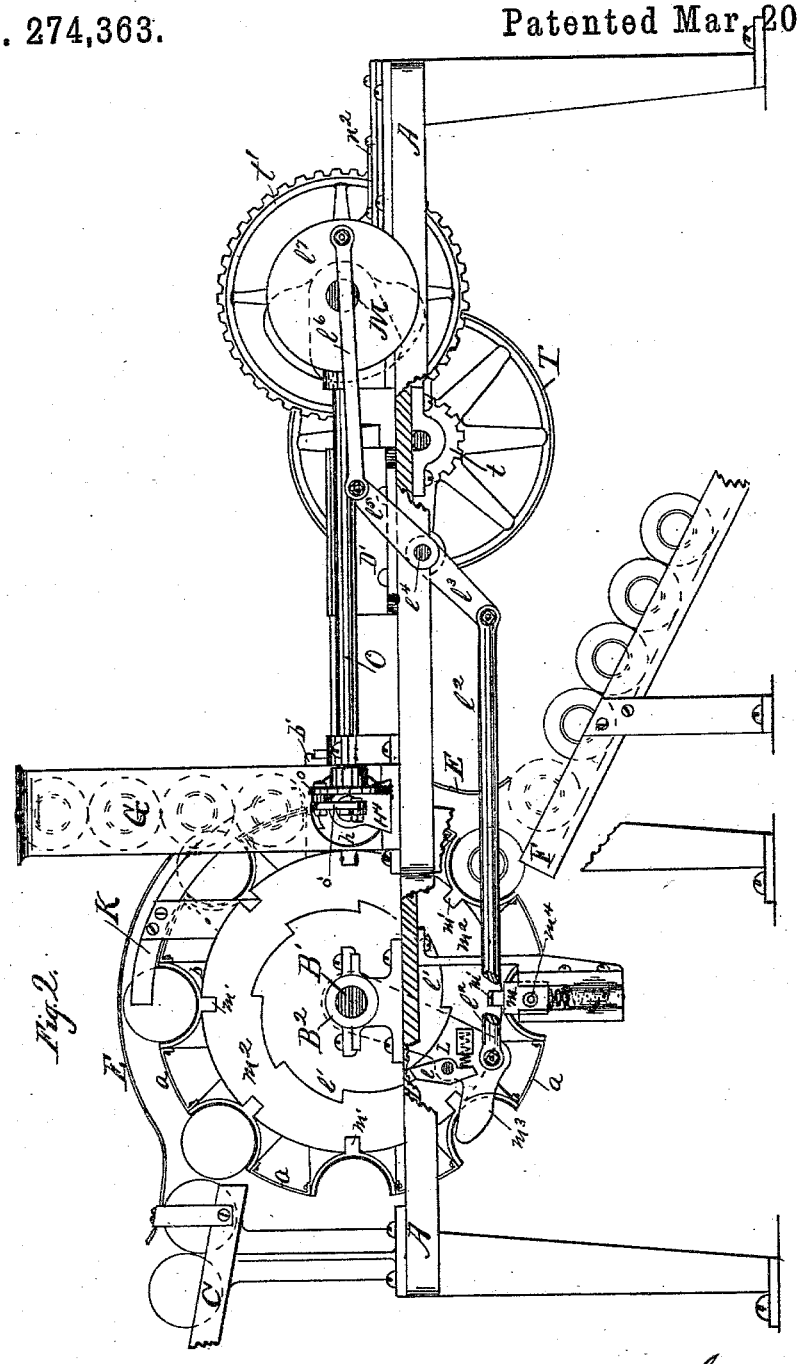

Fig. 2.

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Fig. 3.

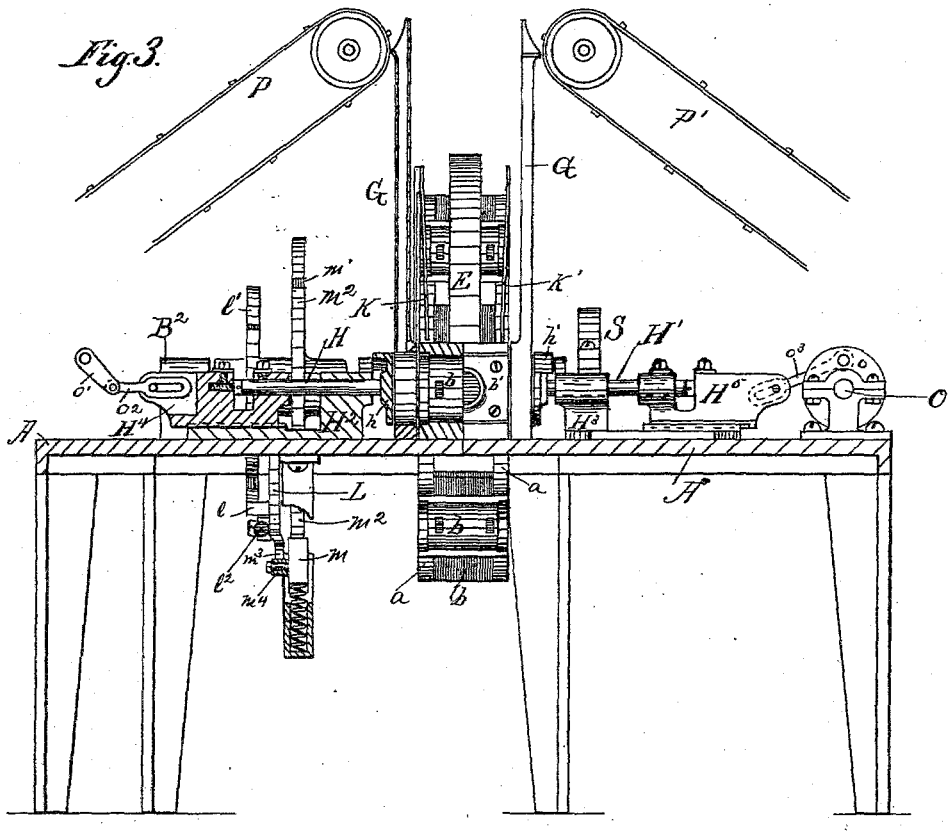
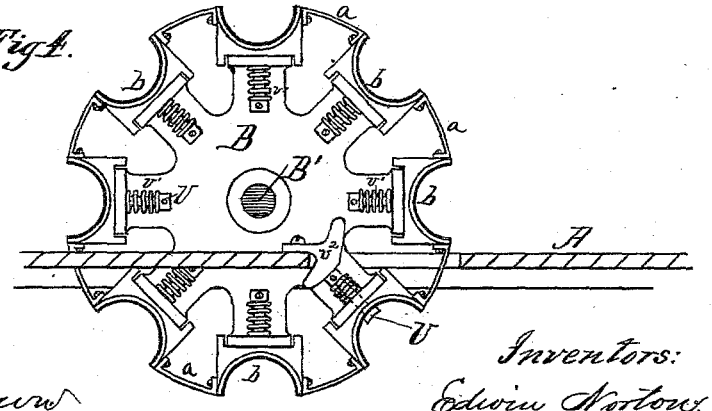


Fig. 4.



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(No Model.) 4 Sheets—Sheet 4.

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Fig. 5.

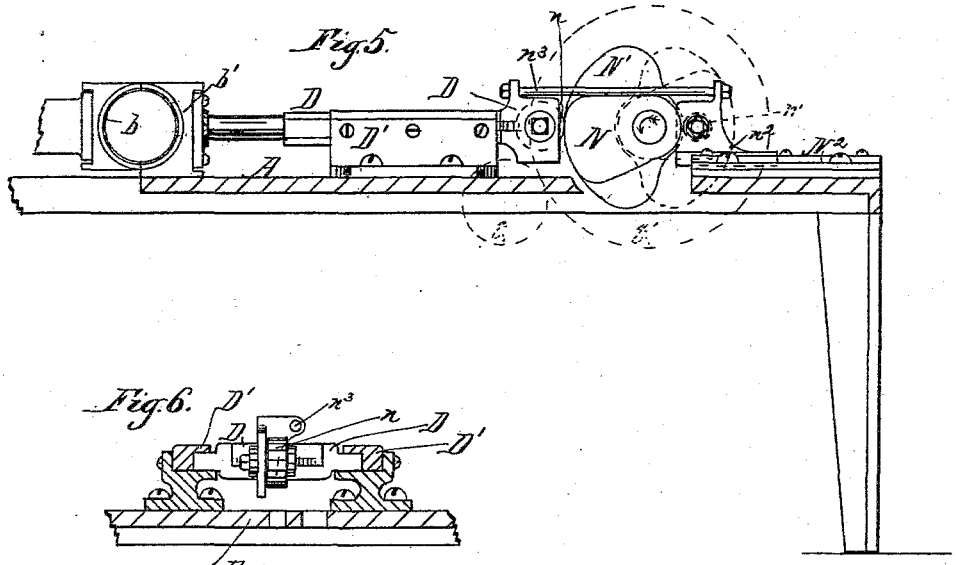


Fig. 6.

Fig. 7.

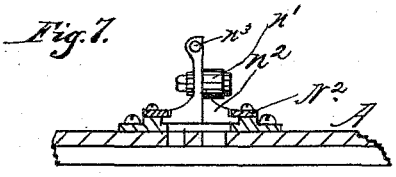


Fig. 8.

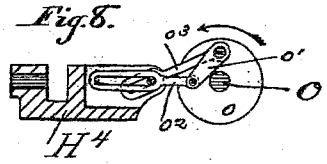
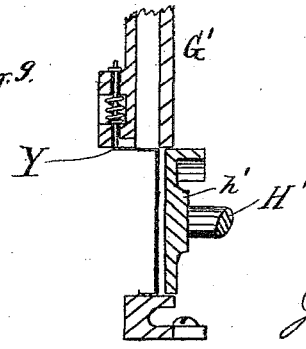


Fig. 9.



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UNITED STATES PATENT OFFICE.

EDWIN NORTON AND JOHN G. HODGSON, OF CHICAGO, ILLINOIS, ASSIGNORS TO SAID NORTON AND OLIVER W. NORTON, OF SAME PLACE.

CAN-ENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 274,363, dated March 20, 1883.

Application filed October 13, 1882. (No model.)

To all whom it may concern:

Be it known that we, EDWIN NORTON and JOHN G. HODGSON, citizens of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Can-Ending Machines, of which the following is a specification.

This invention relates to machines for applying the heads or ends upon sheet-metal cans, and more particularly to certain improvements upon the machine invented by said Edwin Norton, and for which an application for Letters Patent has been heretofore filed by him under date of June 24, 1882.

In the present invention a revolving wheel is employed, upon the periphery of which the fixed halves of the mold for clamping and sizing the can-bodies are mounted, and which is intermittingly rotated and locked in position to bring the half-molds alternately in front of a cross-head, upon the end of which the movable half of the mold is secured, the cross-head being also intermittingly operated so as to clasp and hold the can-body in the mold. The cans are fed into the half-molds from a suitable chute, and are held therein while the wheel is being rotated to carry the can in front of the reciprocating half-mold by means of a curved guard, which extends around the wheel from the feed-chute to near the discharge-chute, the movable reciprocating part of the mold being provided with a central slot for the guard. Transverse pistons—one at each end of the mold—are provided for forcing the can ends or heads upon the can-body. The can-heads are supplied from chutes, and are supported in the chute on the piston or a projection thereon while the heads are being applied to the can-body, and when the pistons are drawn back another head falls down in front of each piston, so that the feeding of the can-heads to the machine is automatic.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a machine embodying our invention. Fig. 2 is a side elevation. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is a detail view of half-mold wheel. Fig. 5 is a detail view of the cams and device for operating the reciprocating half-mold. Figs. 6, 7, 8, and 9 are details of parts hereinafter more fully described.

In the drawings, A represents the main frame of the machine. The fixed half-molds *b* are secured upon the periphery of a wheel, B, having its shaft B′ suitably journaled in bearings B^2 on the main frame of the machine. Curved braces *a* extend between the adjacent half-molds at each end, to support the can-bodies in the supply-chute C as the wheel revolves. The movable half *b′* of the mold is secured to the end of a cross-head, D, which reciprocates in suitable gibs, D′, secured to the main frame of the machine.

E is a curved guard, extending from the supply-chute C to the discharge-chute F, for the purpose of holding the can-bodies in the half-molds while the wheel revolves. This guard extends down in front of the half-mold on the cross-head, the central portion of the mold being cut out, forming a slot, *e*, therein, for the guard to fit in when the half-mold is moved forward to clasp the can.

G and G′ are the feed-chutes for the can-heads—one on each side of the wheel or at each end of the mold.

H and H′ are two pistons provided with disks or piston-heads *h h′*—one on each side of the mold—mounted in suitable guide-blocks, H^2 H^3, and secured adjustably to the sliding cross-heads H^4 H^5, whereby the pistons are reciprocated to force the can-heads upon the can-body clasped in the mold. The piston-heads *h h′* are made thick enough or provided with projections h^2 for supporting the can-heads in the feed-chutes while the pistons are moved forward to press the can ends upon the body. When the piston moves back the can-heads drop down, so that one can-head again comes in front of the piston-head, thus feeding the can-heads automatically.

K and K′ are stationary guides—one on each side of the wheel, just above or outside the circumferential line of the half-molds. These guides are somewhat tapering, or approaching each other near the reciprocating half-mold, and serve the purpose of slipping or centering the can-body endwise accurately to the middle of the mold before being clamped therein.

The wheel B is intermittingly rotated by means of the swinging arm L, provided with a spring-pawl, *l*, which engages with the ratchet-wheel l', and which is operated by means of the pitman-rod l^2, crank-arm l^3, shaft l^4, and crank-

arm l^5, rod l^6, and drive-wheel l^7 on the shaft M. The wheel B is locked in position while the can-heads are being applied to the can-body by means of the spring-catch m, which engages with the notches m' in the check-wheel m^2 on the shaft B′. The spring-bolt m is retracted to permit the wheel to revolve by a cam, m^3, on the swinging arm L impinging on a projection or roller, m^4, on said bolt when said arm L makes its backward stroke.

The cross-head D, to which the reciprocating half-mold is secured, is given its forward stroke by means of a cam, N, on the shaft M, which works against anti-friction roll n on the cross-head D. While the circular face or part of the cam N is passing the roller n the heads are applied to the can-body, the circular part of the cam holding the molds closed at this time. The cross-head D is given its backward stroke by means of a cam, N′, also on the shaft M, which works against a roller, n', on the small cross-head n^2, and which is connected with the cross-head D by means of the bar n^3.

N^2 are the gibs in which the cross-head n^2 slides.

The pistons for forcing the heads on the can-bodies are each actuated from a shaft, O, on either side of the machine, through the wheel o, provided with crank-arm o' and slotted links o^2 o^3, connected with cross-heads H^4 and H^5. The object of the slotted links o^2 o^3 is to give time for an end to drop in front of the piston while the piston-head is standing still, and also to allow the reciprocating half-mold to clamp the can-body before the ends are pushed on; and the links o^2 o^3 being slotted, as shown, they may both be connected to or operated from the same wheel or disk, the slot in the one link permitting the cross-head to be alternately operated by the other. The slot in one of the links o^2 o^3—the one which retracts the cross-head—is about twice the length of the slot in the other link, or the one which forces the cross-head forward to apply the head to the can-body. During the first quarter of the revolution of the disk o, supposing the parts in the position shown in Fig. 8, the link o^3 drives the cross-head H^4 or H^5 forward the requisite distance to force the can end upon the can-body, and at the same time the link o^2 slips back on the pin in the cross-head the full length of the long slot in said link, the cross-head having moved forward half the length of said slot, and the link itself having been pulled back the remaining half-length of said slot by the said quarter-revolution of the disk. During the next quarter-revolution of the disk the link o^2 pulls the cross-head back the length of its stroke, permitting a can end to fall in front of the piston, and during the next or remaining half-revolution of the disk the cross-head remains stationary, giving time for the turret or half-mold wheel to revolve and for the can to be clamped in position by the reciprocating half-mold. During this remaining half-revolution of the disk o, while the cross-head is stationary, the link o^3 slips first back and then forward on the pin in the cross-head the full length of its slot, and the link o^2 slips forward the full length of its longer slot, so that the parts are again brought into the original position shown in Fig. 8. By this means it will be observed that the cross-head begins to retract immediately after it makes its forward stroke, so as to release the can as soon as the ends are applied, and allow the half-mold wheel to continue its revolution. Of course it will be understood that the arms o' are fixed rigidly to their respective disks o, so as not to revolve thereon. The molds are chamfered away or slightly enlarged at either end to permit the flange of the head to fit outside the can-body.

The can-heads are delivered to the chutes G G′ by carriers P P′, or the chutes G G′ may be curved or inclined, so that the can-heads will roll into the same on their edge, if preferred.

T is the drive wheel or pulley of the machine, on the main shaft T′. Gears t t communicate motion to the shaft M, and bevel-gears t^2 t^3 communicate motion to the shafts O.

S is a friction-wheel applied to the shaft B′, to steady the revolution of the wheel B and prevent jarring in stopping the same.

The cans are discharged from the mold by means of a plug, V, which is held retracted by a spring, v', until the half-mold reaches the position shown in Fig. 4, when the pin V, coming in contact with the stationary cam v^2, is forced out and ejects the can from the mold into the discharge-chute F. When the reciprocating half-mold is drawn back the lower part of the stationary curved guard E serves to expel or strip the cans from reciprocating half-mold. Other devices, however, may be employed for preventing the cans clinging to the reciprocating half-mold when it is withdrawn.

It should be observed that the cross-head D may be adjusted to regulate the pressure of the reciprocating half-mold upon the can-body.

Y is a retaining spring-pin in the chutes G G′, for preventing the heads falling out of position when they drop down in front of the pistons.

It will be observed that the feed of the can-bodies to the machine is automatic. At every forward motion of the wheel a can-body from the chute C drops into one of the half-molds on the wheel as into a pocket.

The can-bodies as they are delivered to the machine are often more or less bent or dented out of true cylindrical shape, and frequently vary somewhat in their size or exterior diameter, owing to variations in thicknesses of the stock from which they are made and irregularity in soldering, or other causes.

The function of the mold or clamping device is not only to hold the can-body while the head or heads are being applied, but to size it and make its shape correspond accurately to the form of the can-heads to be applied; and by use of the term "sizing" in this specification we wish to be understood as meaning

truing the shape or form of the can-body to fit the can-head as well as compressing the same so to fit where necessary.

We claim—

1. In a machine for heading cans, the combination of a device for applying the head to the can-body with a device for seizing and clamping the can-body while the head is being applied, consisting of an intermittingly-revolving wheel provided with a series of half-molds upon its periphery, and a reciprocating half-mold mounted on the stationary bed or frame-work of the machine, substantially as specified.

2. The combination of an intermittingly-revolving wheel provided with half-molds upon its periphery with a curved guard for holding the can-bodies in the half-molds, and a reciprocating half-mold provided with a transverse slot or opening for said guard, substantially as specified.

3. The combination of a wheel having half-molds upon its periphery, a chute for delivering the can-bodies thereto, a curved guard, and a reciprocating half-mold provided with a slot or opening for said guard, whereby the can-body may be clamped in the mold without causing the guard to indent or press against the can-body, substantially as specified.

4. The combination of the half-mold wheel, chute for can-bodies, guard, movable half-mold, can-head-supply chute, and piston for forcing the can-head upon the can-body, substantially as specified.

5. The combination, with a can-body-clamping device, of a chute for automatically delivering the can-heads at the mouth of the same, and a piston for applying said heads to them, having a thick head or projection for supporting the can-heads in the chute while said piston makes its forward stroke, substantially as specified.

6. The combination of the can-body-clamping device or mold with a chute for the can-heads, a reciprocating head or piston at the base of said chute for automatically feeding the can-heads to the mouth of the mold and applying the same to the can-body, and a spring pin or device for holding the can-head in position at the mouth of the mold, substantially as specified.

7. The combination of the delivery-chute wheel having half-molds upon its periphery, reciprocating half-mold, chute for the can-heads, piston for applying the same to the can-bodies, and discharging-chute, substantially as specified.

8. The combination, with a wheel having half-molds upon its periphery, provided with plugs for ejecting the can therefrom of a reciprocating half-mold provided with a device for stripping or ejecting the can therefrom as the half-mold is withdrawn, substantially as specified.

9. The combination, with the shaft B′, of the swinging arm L journaled on said shaft, and provided with pawl *l* and projecting cam m^3, reciprocating pitman i^2, ratchet-wheel *l′*, check-wheel m^2, provided with notches *m′*, and spring check-bolt *m*, provided with roller m^4, substantially as specified.

10. The combination of a wheel having half-molds upon its periphery, a device for delivering the can-bodies thereto, curved guard, guides for centering the can-body longitudinally in the mold, a reciprocating half-mold, chutes for the can-heads, and a piston at each end of the mold for applying both heads to the can-body simultaneously, substantially as specified.

11. The combination of a wheel having half-molds upon its periphery, mechanism for intermittingly rotating and locking said wheel in position, a half-mold secured to a cross-head reciprocating in a line passing through the axis of said wheel and the center of the half-mold thereon when the wheel is held stationary, and a piston at each end of the mold for applying the heads to the can-body when clamped therein, substantially as specified.

12. The combination of a can-clamping mold or device with chute for delivering the can-heads at the mouth of said mold and a carrier for delivering the same to said chute, substantially as specified.

13. The combination of a wheel having half-molds on its periphery with a reciprocating half-mold and a device for stripping the cans from said reciprocating half-mold when it is withdrawn, substantially as specified.

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