No. 737,291. PATENTED AUG. 25, 1903.

W. H. SMYTH.

CAN BODY MACHINE.

APPLICATION FILED NOV. 29, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

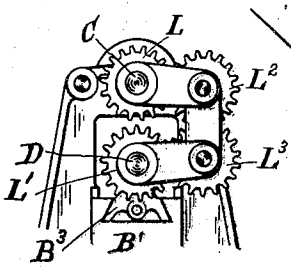


Fig. 3.

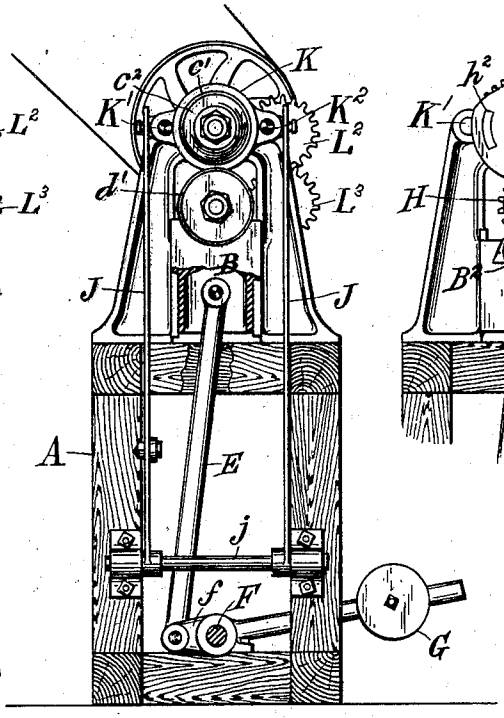


Fig. 1.

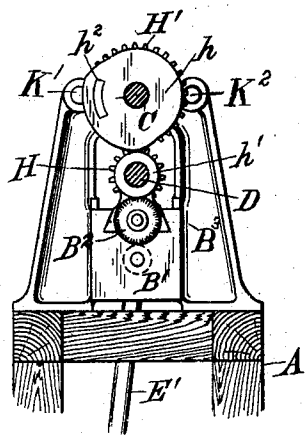


Fig. 4.

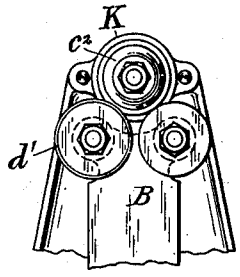
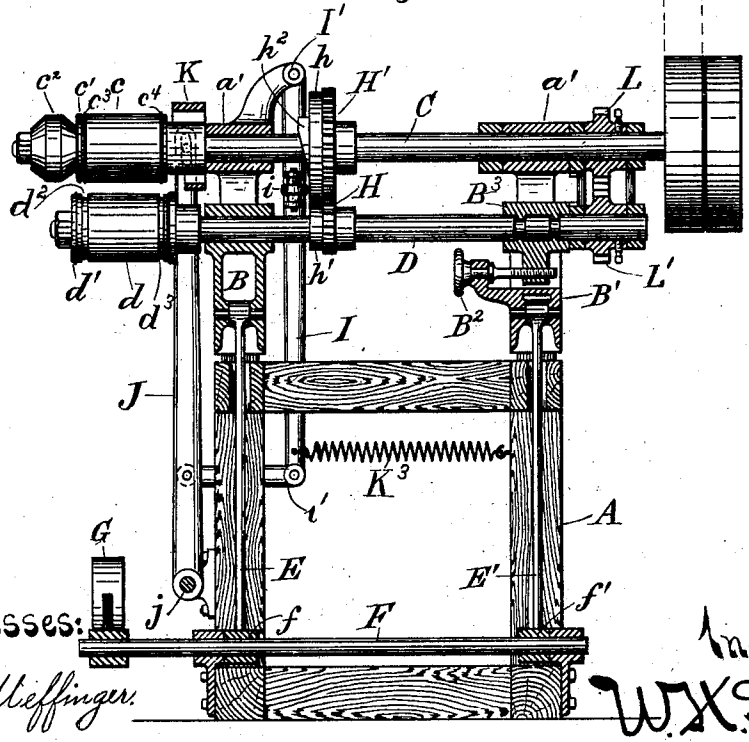


Fig. 5.



Witnesses:
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H. A. McKowen.

Fig. 2.

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W. H. Smyth

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

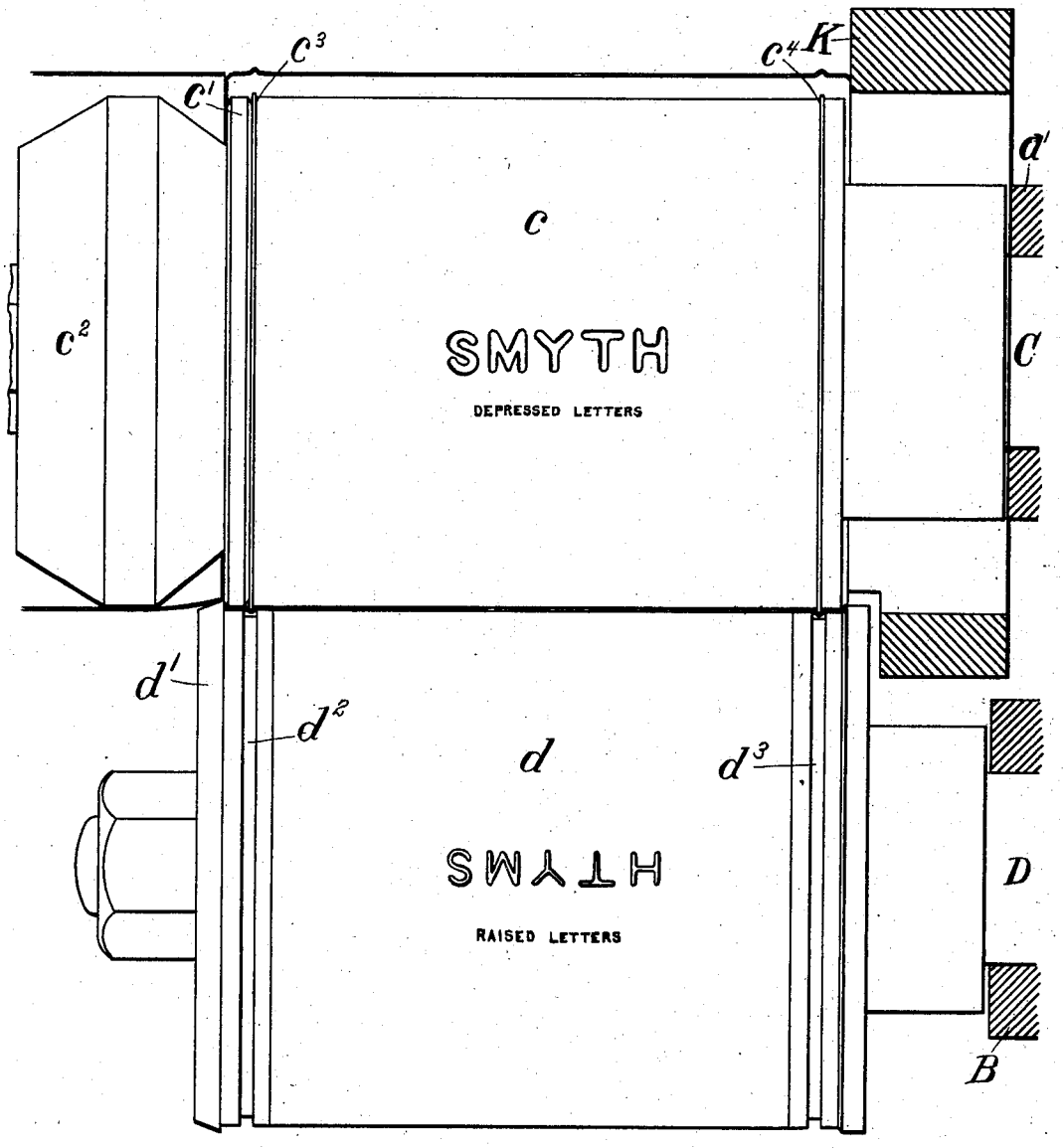

Fig. 6.

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No. 737,291. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM H. SMYTH, OF BERKELEY, CALIFORNIA.

CAN-BODY MACHINE.

SPECIFICATION forming part of Letters Patent No. 737,291, dated August 25, 1903.

Application filed November 29, 1901. Serial No. 83,968. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. SMYTH, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented certain new and useful Improvements in Can-Body Machines; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to a cutting, end-forming, and embossing machine for cylindrical can-bodies.

The object of the invention is to provide a simple and efficient device for turning the outer edges of cans slightly inward to facilitate the entrance of the can end into a cover or head and at the same time form on the can-body a raised circumferential bead against which the flange of the head may rest, also to form on the body of the can any lettering or other design in raised or depressed lines or characters.

A further object of the invention is to provide a machine that will trim the can-body to a definite length while performing its other functions or cut from a cylindrical form bodies of shorter length than the cylinder.

These objects are accomplished by means of the devices illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation. Fig. 2 is a side elevation. Fig. 3 is a detail of the motion-transmitting gearing of the rolls. Fig. 4 is a sectional elevation of the upper portion of the machine, showing the roll raising and lowering cam and the ejector-cam. Fig. 5 shows a detail of a modification. Fig. 6 shows a detail of the rolls, on enlarged scale, with the cutters and formers.

Referring to the drawings, A is a frame or stand of any suitable form, shown in the drawings as a frame the lower part of which is of wood and the upper part of metal.

Journaled in suitable boxes a' a' in the frame A is a longitudinal shaft C, provided on its rear end with a tight and loose driving-pulley and on its opposite end a can-forming roll c. This roll c is provided with raised or depressed designs when it is desired to have such on the can, as is indicated in Fig. 6. Forward on this roll is a cutting and edge-forming plate c', of a width approximately equal to the depth of a can-head, of hardened metal having its edges slightly beveled, as shown in Figs. 2 and 6. Upon the forward end of roll c is a slightly-raised circumferential bead c^3, and adjacent to the rear end of roll c at a distance from its rear edge approximately equal to the depth of a can-head is another similar bead c^4, as is shown in Figs. 2 and 6. Forward of the cutting and forming plate c' is a collar or wide washer c^2, having an inclined or tapered portion extending from both of its edges.

Beneath the shaft C in the frame A are two vertically-slidable blocks B B', carrying journal-boxes. One of these journal-boxes B^3 is transversely slidable in block B' to be adjustable therein. It is provided also with an adjusting-screw B^2, journaled in it and screwed into a nut projecting downwardly from the journal-box. The journal-box of B' is formed as a thrust-bearing. In the journal-bearings of B and B' rests a shaft D in the same vertical plane as C. On the forward end of D is a roller d, and forward of the roll d is a cutting-plate d'. Two grooves d^2 and d^3 are formed in the circumference of roll d, wider than the beads c^3 and c^4 of roll c, but corresponding therewith center and center as to longitudinal position, as shown in Fig. 6. In the roll d is also provided designs corresponding to but raised or depressed reversely to those upon the roll c. The parts c c' c^2 c^3 c^4 and d d' d^2 d^3 are each separate plates, so as to provide for different sizes and styles of cans. Hinged in the block B is a link E, and a similar link E' is similarly connected to block B'. These links E and E' are loosely connected to levers f and f', respectively, secured upon a shaft F, journaled in frame A. Secured upon one end of the shaft F is a counterweight G. Upon the shaft D is rigidly secured a gear-pinion H, and upon the shaft C is journaled a gear H', approximately twice the diameter of H. Attached to the side of the gear H' is a circumferential cam h, and journaled upon the shaft D in rolling contact with cam h is a cam-roller h'. Upon the face of the cam h is an arc-shaped cam-piece h^2. A vertical lever I, hinged at its upper end to the frame A at I', is provided. Lever I, having a friction-roller i suitably placed to engage with cam-piece h^2, is connected by a link i' to one of a pair of levers J, secured upon a shaft j,

journaled in frame A. These levers J extend upwardly, their upper ends being one on either side of the shaft C and connected to a slidable collar K slightly larger in internal diameter than the diameter of the beads c^3 and c^4, over which the collar K is adapted to move. To this collar the levers J J are loosely attached at their upper ends. The collar K slides horizontally upon pins K′ and K^2. (Shown in end view in Figs. 1 and 4.) To return the collar K, a suitable spring K^3 is attached to the lower part of lever I by one of its ends, the other end being attached to a suitable portion of the frame A, as shown in Fig. 2. Connecting the shafts C and D is a gear-train consisting of gears L, L′, L^3, and L^3, journaled in a suitable frame, the gears L and L′ being secured, respectively, upon the shafts C and D.

In operation and assuming the driving-belt to be on the tight pulley, the shafts C and D are put in rotation through their connecting train-gear L, L′, L^2, and L^3. A can is then slipped over the roll *c*, its inner end resting against the collar K. The rotation of shaft D by the intermeshing of pinion H with gear H′ rotates the cam *h*. Thus the raised portion of cam *h* travels off the cam-roll *h′*, and the counterweight G raises the shaft D, so that the rollers *c* and *d*, which by means of the adjusting-screw B^2 are accurately adjusted one to the other, come into operating engagement. Thus the cutting-plate *d′* trims the outer end of the can or severs it from a longer cylinder. The beads on the upper roll depress portions of the can into the grooves of the lower rolls, and the high portion of the lower roll bends the inner edge of the can in. A similar bending action on the front end of the can is caused by the cutting-plate *d′*, owing to the beveled character of the edge of the cutting-plate *c′*, the raised and depressed portions of the rolls *c* and *d* impressing themselves upon the surface of the can. The gear H′ being at least twice the diameter of H, at least two full revolutions of the rolls *c* and *d* will occur to one revolution of H′. The cutting, beading, and impressing of the can will take place during one revolution of the rolls *c* and *d*, and during the second or alternate revolution the can will be raised out of contact by the engagement of the circumferential cam *h* with the roller *h′*. During the first part of this open position of the rolls *c* and *d* the side cam h^2 will come in contact with the cam-roller *i* upon the lever I. Thus through its connection *i′* and lever J the collar K is moved outward and forces the finished can from off the roll *c*. During the remainder of the same revolution a second can or a further portion of a cylinder is shoved on the roll *c* and the described operation is repeated.

It is obvious that many changes may be made in form, proportion, and arrangement of the various parts without departing from the essential character of the invention. I therefore do not desire to confine myself to the particular form or arrangements of the parts herein shown; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate on the other roll adapted to engage therewith, said cutting and forming plate increasing in diameter from its cutting edge, whereby a can-body is cut and the cut edge turned in by the same operation.

2. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate on the other roll adapted to engage therewith, said cutting and forming plate increasing in diameter from its cutting edge whereby a can-body is cut and the cut edge turned in by the same operation and means adapted to move the rolls to and from each other.

3. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate on the other roll adapted to engage therewith, and a bending-plate upon the first-mentioned roll, of slightly larger diameter, on its other end and adapted to overhang the corresponding end of the second-mentioned roll whereby the edge of a can upon the last-mentioned roll is trimmed on one end and bent in on both ends.

4. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate on the other roll adapted to engage therewith, and a bending-plate upon the first-mentioned roll, of slightly larger diameter, on its other end and adapted to overhang the corresponding end of the second-mentioned roll whereby the edge of a can upon the last-mentioned roll is trimmed on one end and slightly bent in on both ends and means adapted to move the rolls to and from each other.

5. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate on the other roll adapted to engage therewith, said cutting and forming plate increasing in diameter from its cutting edge and a raised bead upon the cutting and edge-forming plate roll and a corresponding depressed portion upon the other roll whereby the edge of the can is cut, bent and a bead formed adjacent thereto at one operation.

6. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate on the other roll adapted to engage therewith, said cutting and edge-forming plate increasing in diameter from its cutting edge and a raised bead upon the cutting and edge-forming plate and a corresponding depressed portion upon the other roll whereby

the edge of the can is cut, bent and a bead formed adjacent thereto at one operation and means adapted to move the rolls to and from each other.

7. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate upon the other roll adapted to engage therewith and a raised bead upon the cutting and edge-forming plate roll and a corresponding depressed portion upon the other roll and a bending-plate on the first-mentioned roll of slightly larger diameter on its other end and adapted to overhang the corresponding end of the second-mentioned roll and a second raised bead upon the cutting and edge-forming plate roll and a second corresponding depressed portion upon the other roll whereby one edge of the can is trimmed and both ends are turned in and beads are formed thereon at the same operation.

8. In a machine for forming can-bodies having forming-rolls, a circular cutting-plate upon one roll and a cutting and edge-forming plate upon the other roll adapted to engage therewith and a raised bead upon the cutting and edge-forming plate roll and a corresponding depressed portion upon the other roll and a bending-plate on the first-mentioned roll of slightly larger diameter on its other end and adapted to overhang the corresponding end of the second-mentioned roll and a raised bead upon the cutting and edge-forming plate roll and a second corresponding depressed portion upon the other roll whereby one edge of the can is trimmed and both ends are turned in and beads are formed thereon at the same operation and means adapted to move the rolls to and from each other.

9. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, a gear-train connecting said shafts whereby they rotate in unison, means whereby the shafts and their rolls are caused to separate and means adapted to force the shafts together during alternate revolutions.

10. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and means adapted to force the shafts together during successive revolutions.

11. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and permitted to come together during successive revolutions and automatic ejecting or discharging devices for the finished product.

12. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and means adapted to force the shafts together during successive revolutions and automatic ejecting or discharging devices for the finished product.

13. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, one of said rolls having a circular cutting-plate and the other roll having a cutting and edge-forming plate, said cutting and forming plate increasing in diameter from its cutting edge, whereby a can-body is cut and the cut edge turned in by the same operation, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and permitted to come together during successive revolutions.

14. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, one of said rolls having a circular cutting-plate and the other roll having a cutting and edge-forming plate, said cutting and forming plate increasing in diameter from its cutting edge, whereby a can-body is cut and the cut edge turned in by the same operation, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and means adapted to force the shafts together during successive revolutions.

15. A machine for forming can-bodies comprising forming-rolls, movable to and from each other and secured upon parallel shafts, one of said rolls having a circular cutting-plate and the other roll having a cutting and edge-forming plate, said cutting and forming plate increasing in diameter from its cutting edge whereby a can-body is cut and the cut edge turned in by the same operation, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and permitted to come together during successive revolutions and automatic ejecting or discharging devices for the finished product.

16. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, one of said rolls having a circular cutting-

plate and the other roll having a cutting and edge-forming plate, said cutting and forming plate increasing in diameter from its cutting edge, whereby a can-body is cut and the cut edge turned in by the same operation, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and means adapted to force the shafts together during successive revolutions and automatic ejecting or discharging devices for the finished product.

17. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, one of said rolls having a circular cutting-plate and the other roll having a cutting and edge-forming plate, said cutting and forming plate increasing in diameter from its cutting edge and a bending-plate upon the first-mentioned roll of slightly larger diameter on its other end and adapted to overhang the corresponding end of the second-mentioned roll whereby the edge of a can upon the first-mentioned roll is trimmed on one end and slightly bent in on both ends, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one said shafts engaging with the other of said shafts whereby through its rotation the shafts and their rolls are caused to separate and permitted to come together during successive revolutions.

18. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, one of said rolls having a circular cutting-plate and the other roll having a cutting and edge-forming plate, said cutting and forming plate increasing in diameter from its cutting edge and a bending-plate upon the first-mentioned roll of slightly larger diameter on its other end and adapted to overhang the corresponding end of the second-mentioned roll and a raised bead upon the cutting and edge-forming plate roll and a corresponding depressed portion upon the other roll whereby the edge of the can is cut, bent and a bead formed adjacent thereto at one operation, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and permitted to come together during successive revolutions.

19. A machine for forming can-bodies comprising forming-rolls movable to and from each other and secured upon parallel shafts, a gear-train connecting said shafts whereby they rotate in unison, a cam upon one of said shafts engaging with the other of said shafts whereby through its rotation, the shafts and their rolls are caused to separate and permitted to come together during successive revolutions, a circular cutting-plate upon one roll and a cutting and edge-forming plate upon the other roll adapted to engage therewith and a raised bead upon the cutting and edge-forming plate roll and a corresponding depressed portion upon the other roll and a bending-plate on the first-mentionod roll of slightly larger diameter on its other end and adapted to overhang the corresponding end of the second-mentioned roll and a second raised bead upon the cutting and edge-forming plate roll and a second corresponding depressed portion upon the other roll whereby one edge of the can is trimmed and both ends are turned in and beads are formed thereon at the same operation.

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Witnesses:
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