(No Model.) 7 Sheets—Sheet 1.

E. P. HOLDEN & C. M. BROWN.

CAN BODY MACHINE.

No. 598,567. Patented Feb. 8, 1898.

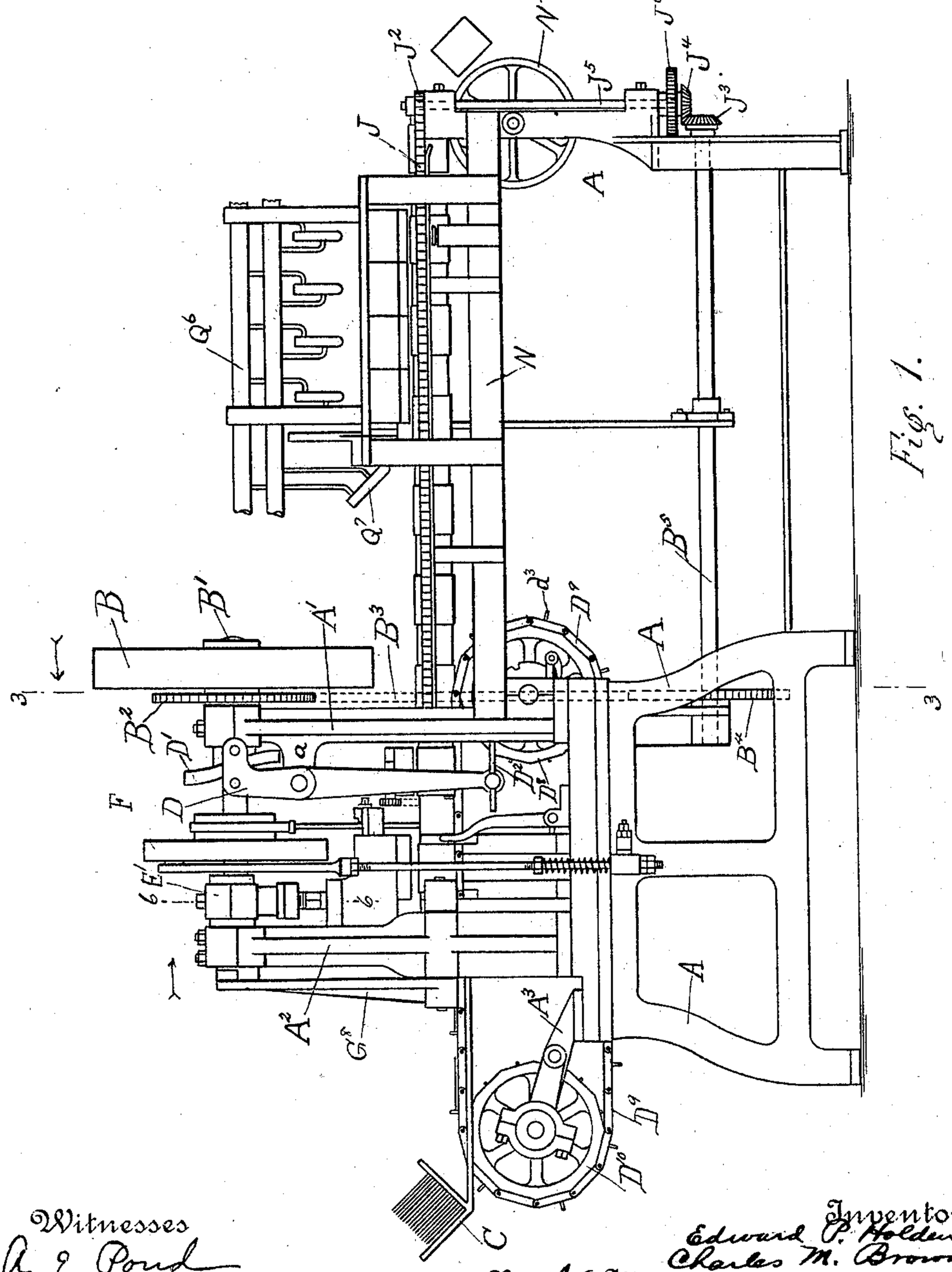

Fig. 1.

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(No Model.) 7 Sheets—Sheet 2.

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CAN BODY MACHINE.

No. 598,567. Patented Feb. 8, 1898.

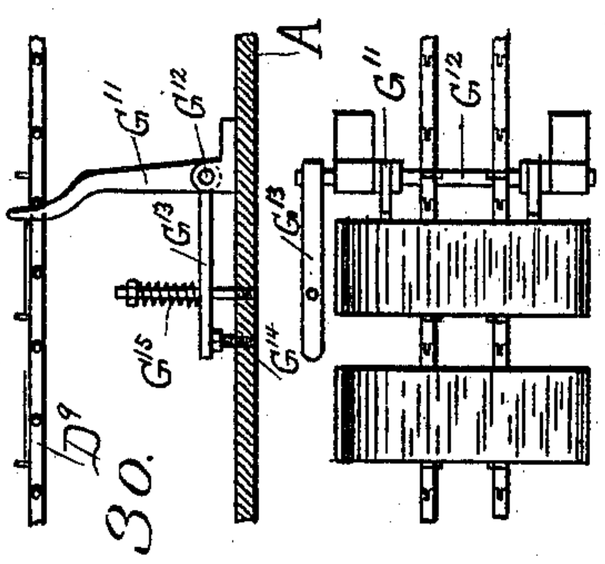

Fig. 30.

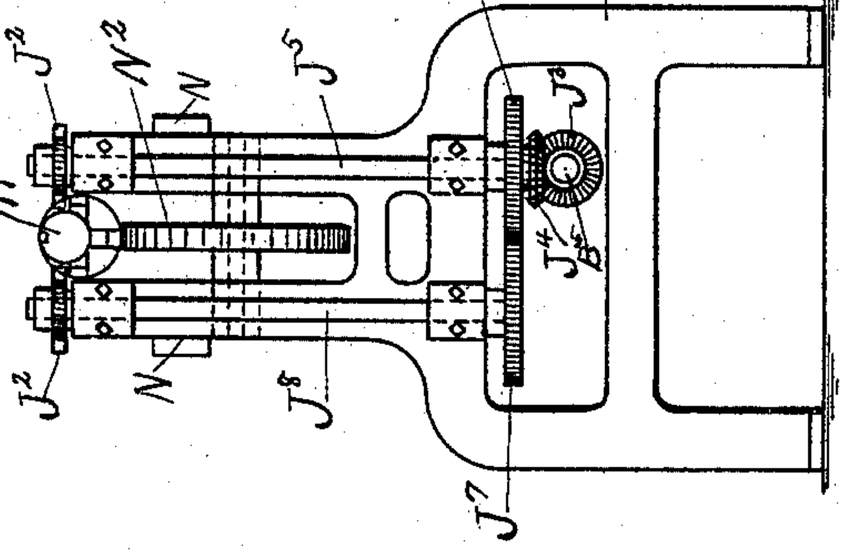

Fig. 31.

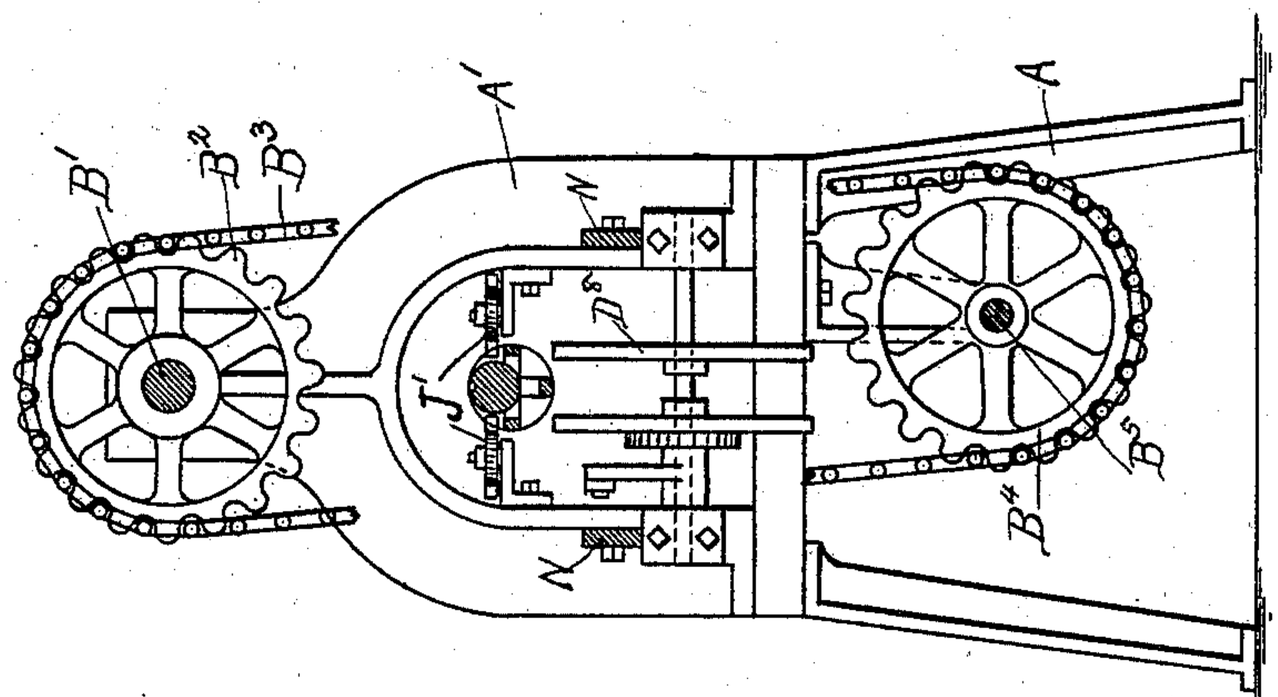

Fig. 3.

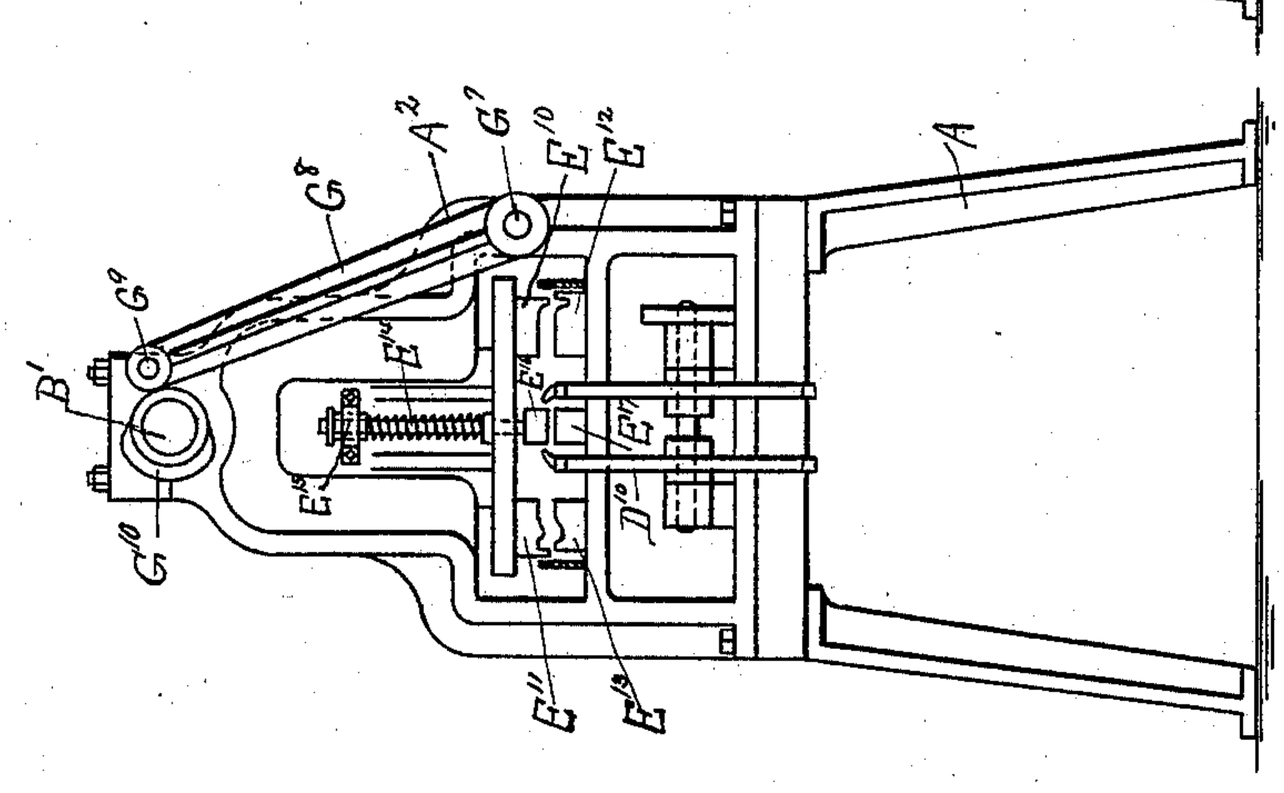

Fig. 2.

Fig. 4.

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CAN BODY MACHINE.

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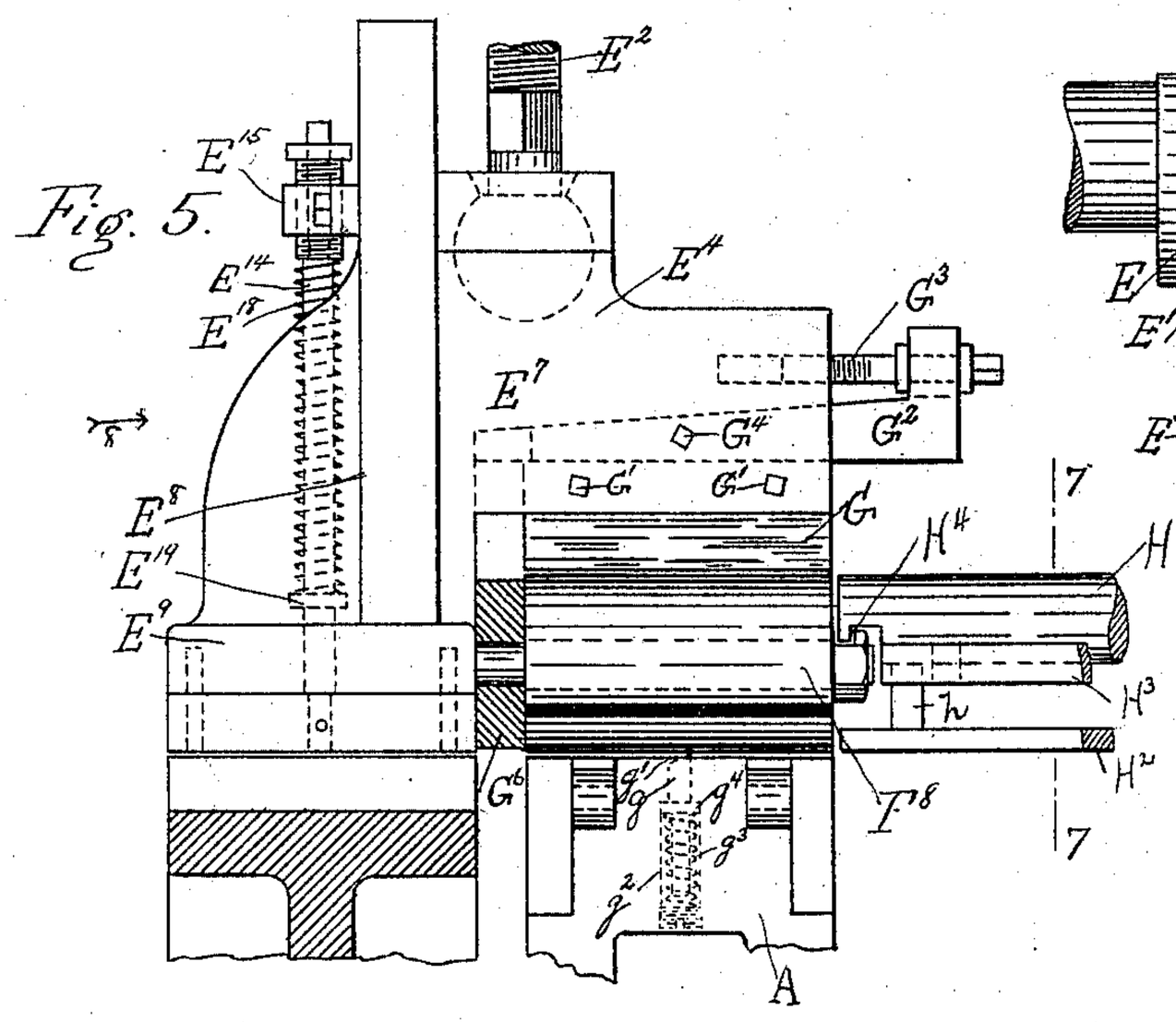
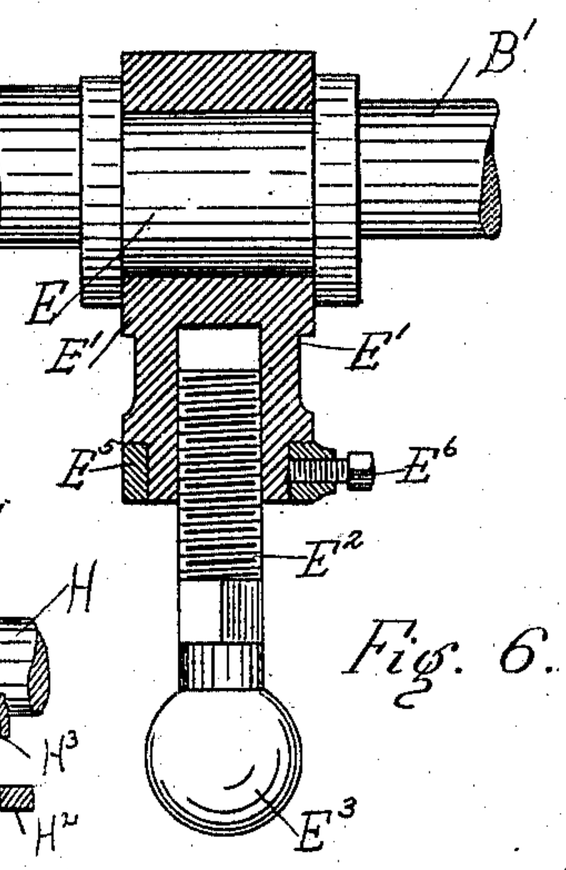


Fig. 5.



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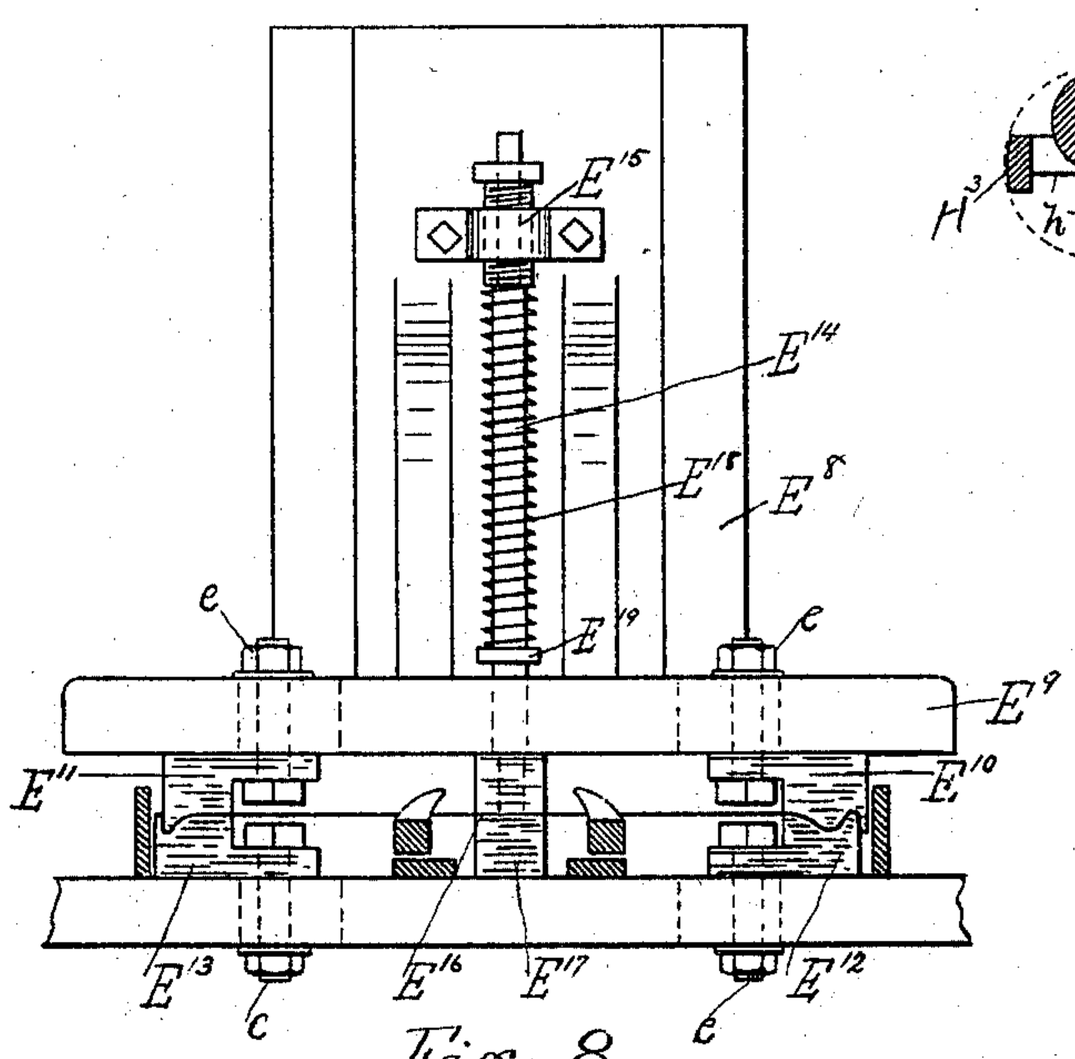

Fig. 8.

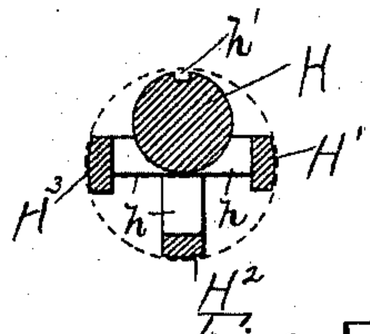

Fig. 7.

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CAN BODY MACHINE.

No. 598,567. Patented Feb. 8, 1898.

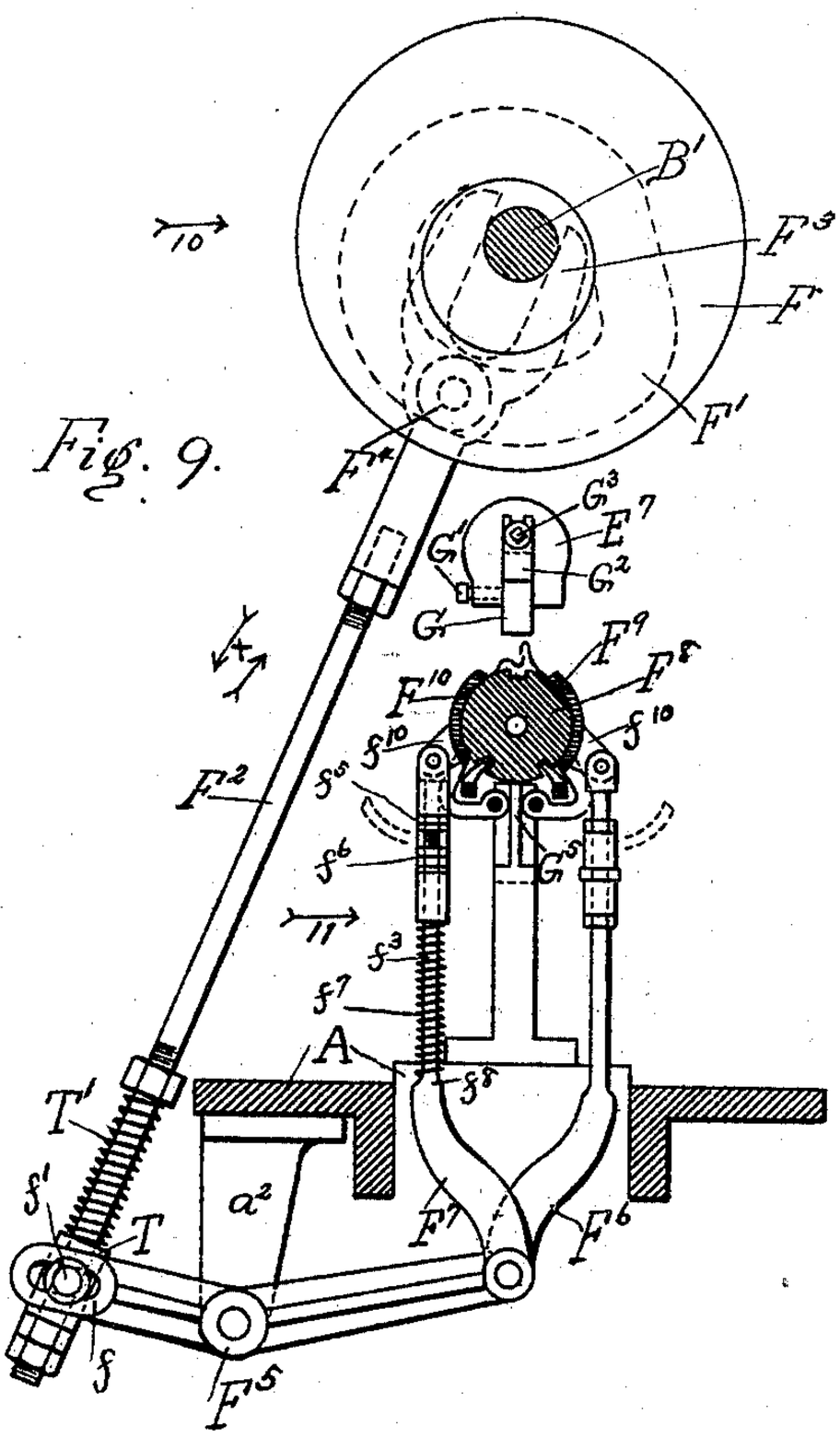

Fig. 9.

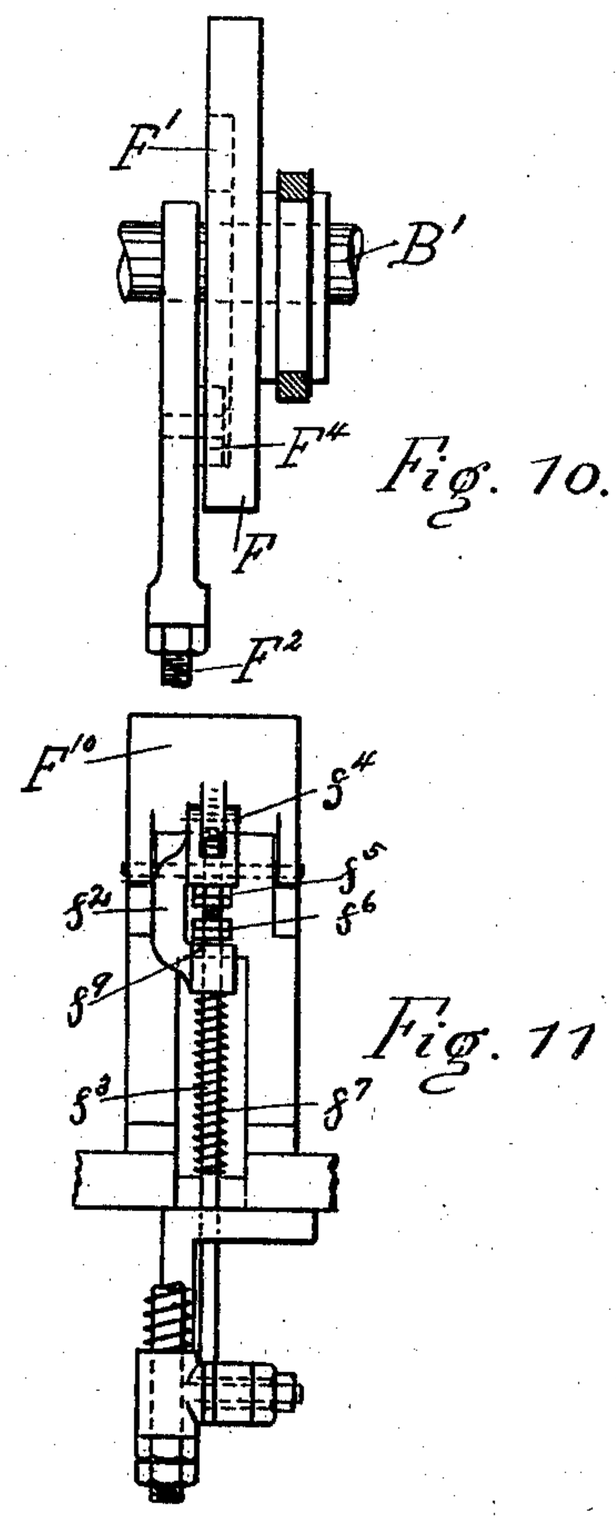

Fig. 10.

Fig. 11

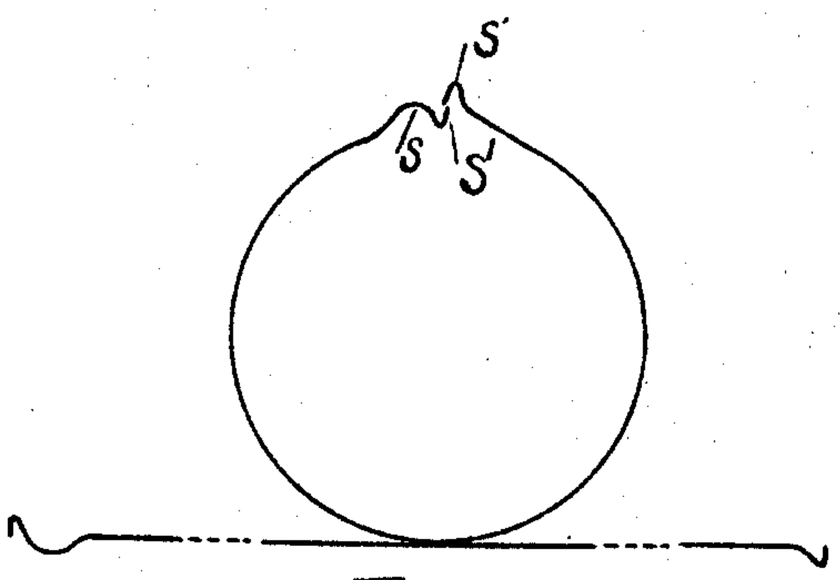

Fig. 12.

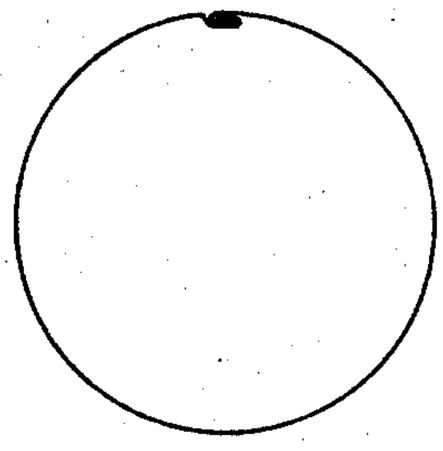

Fig. 13.

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CAN BODY MACHINE.

No. 598,567. Patented Feb. 8, 1898.

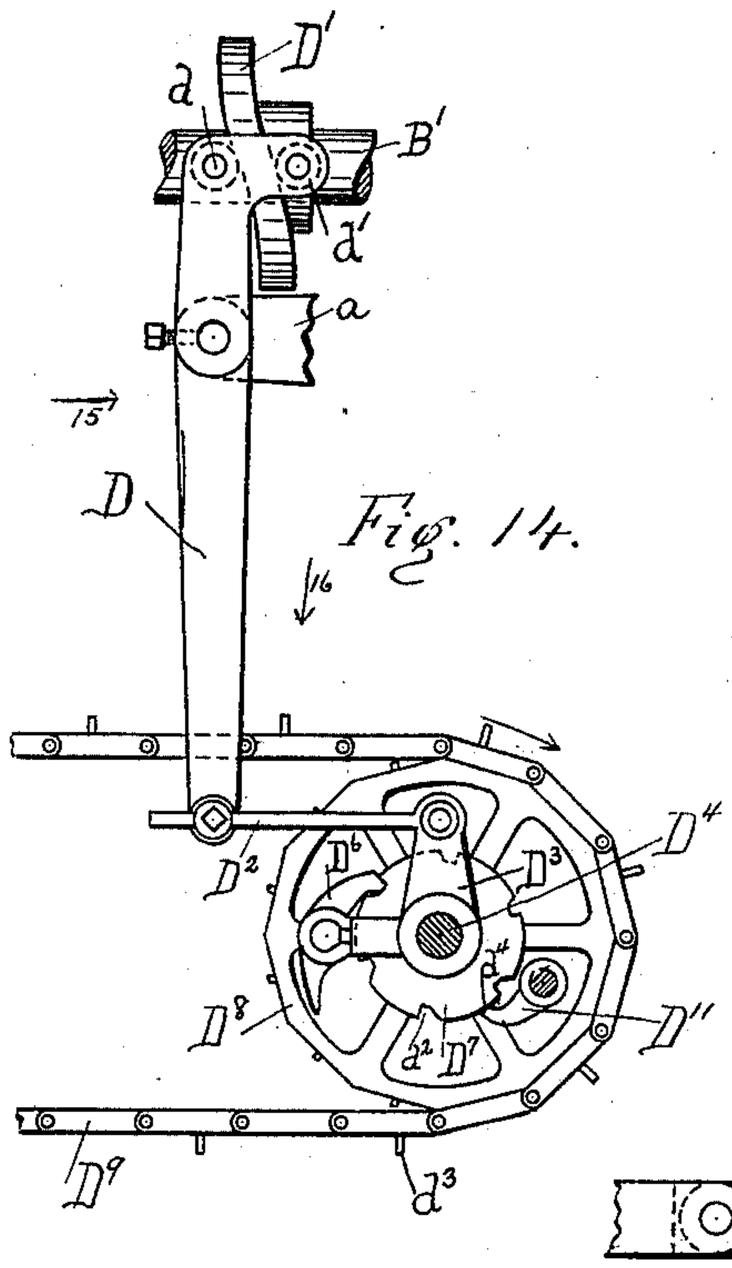

Fig. 14.

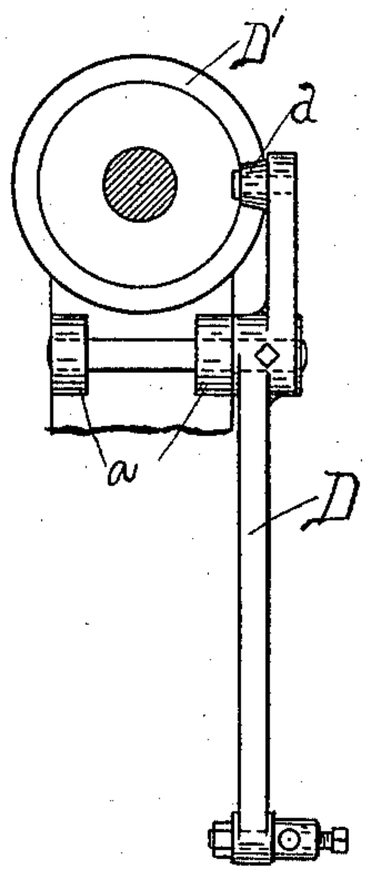

Fig. 15.

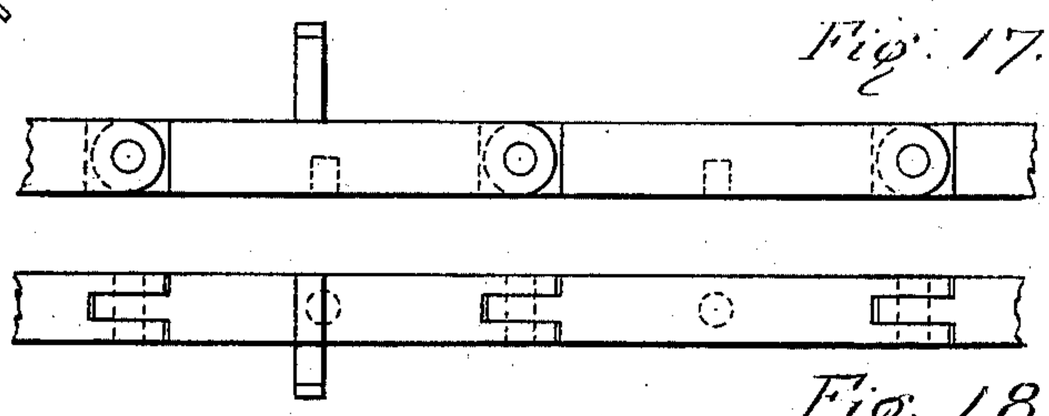

Fig. 17.

Fig. 18

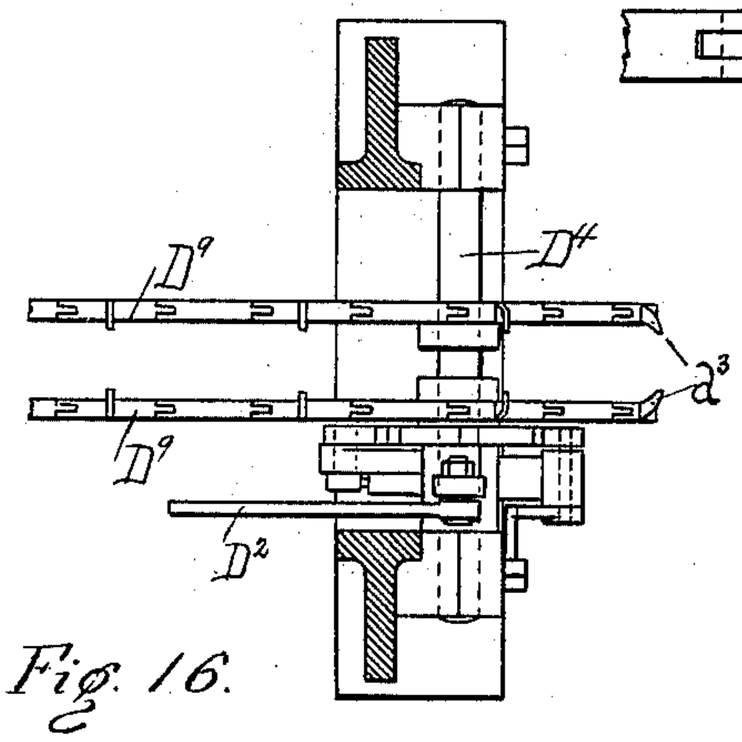

Fig. 16.

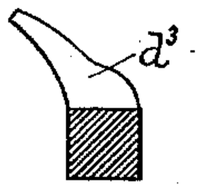

Fig. 19.

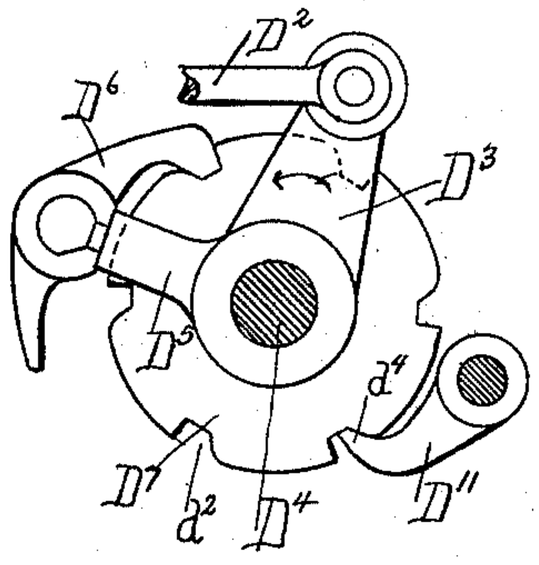

Fig. 20.

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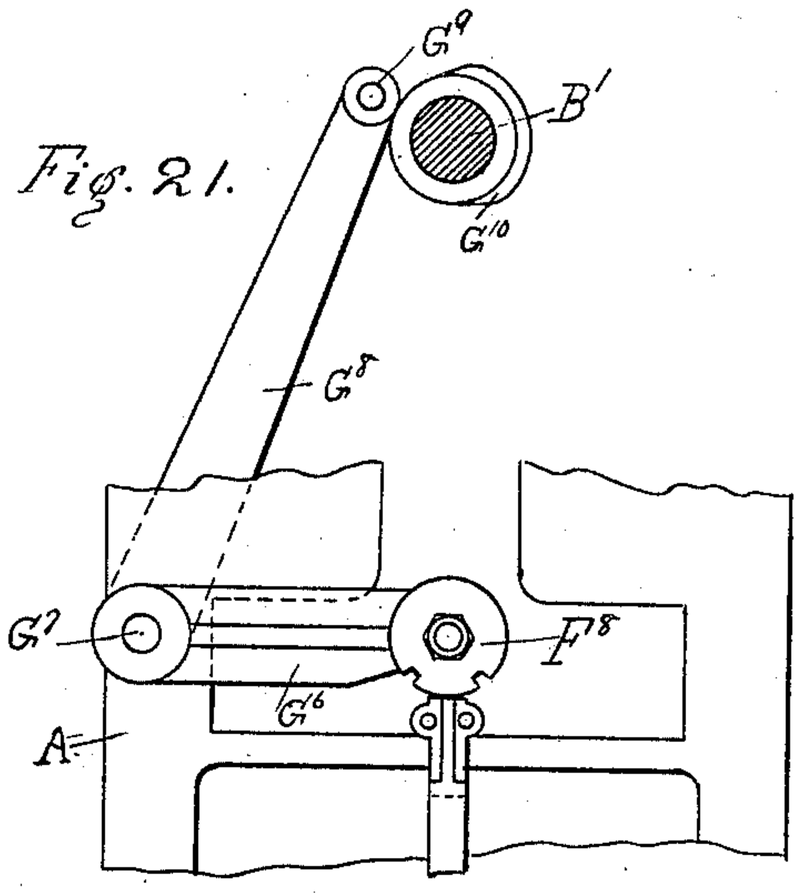
CAN BODY MACHINE.

No. 598,567. Patented Feb. 8, 1898.

Fig. 21.



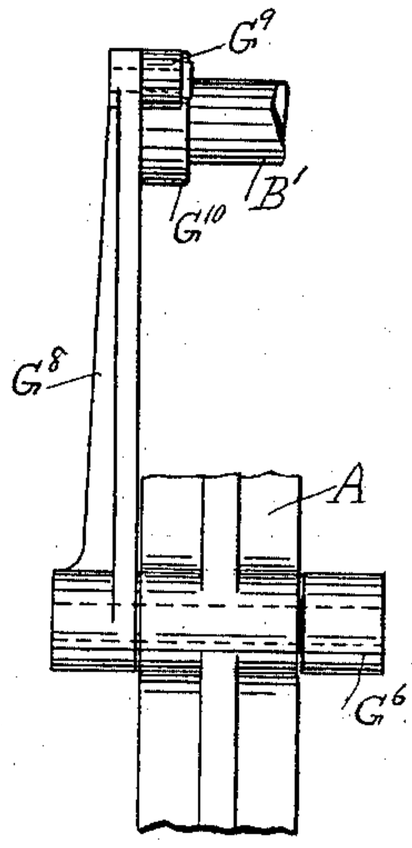


Fig. 22.

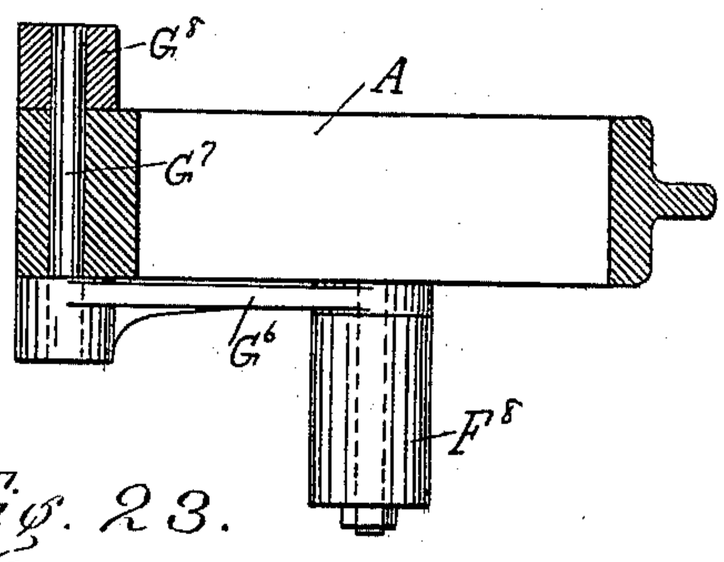


Fig. 23.

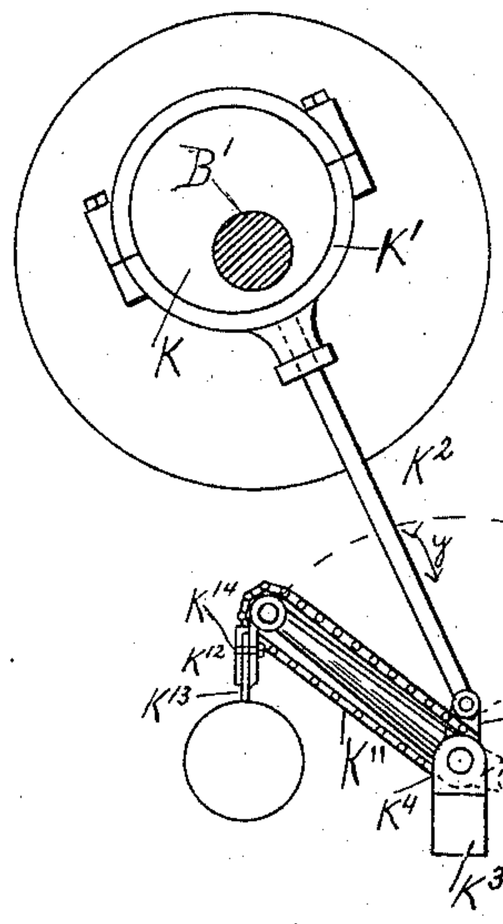


Fig. 24.

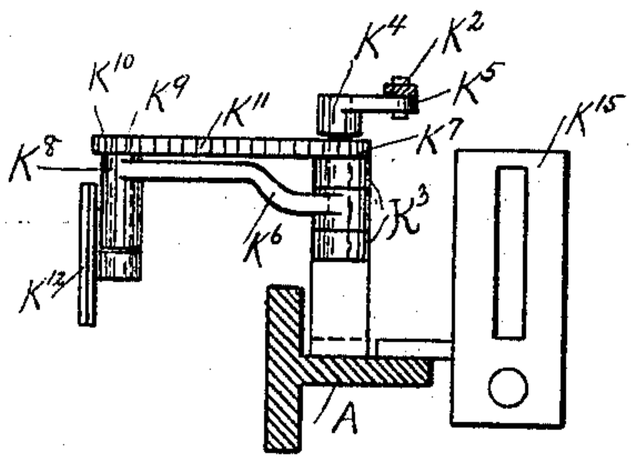
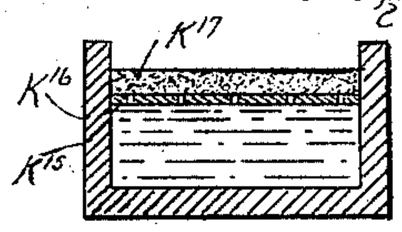


Fig. 25.

Fig 32



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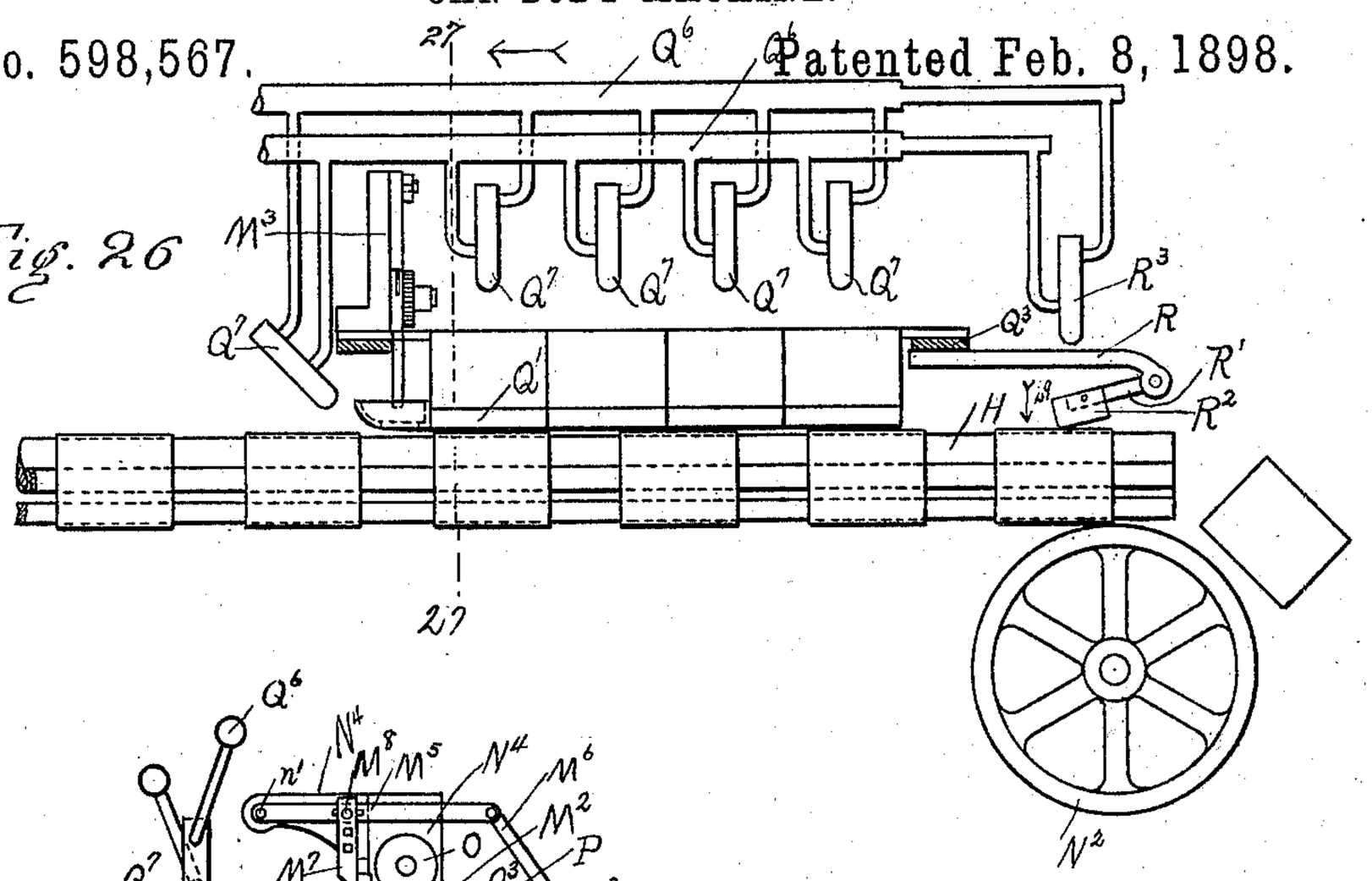
CAN BODY MACHINE.

No. 598,567. Patented Feb. 8, 1898.

Fig. 26



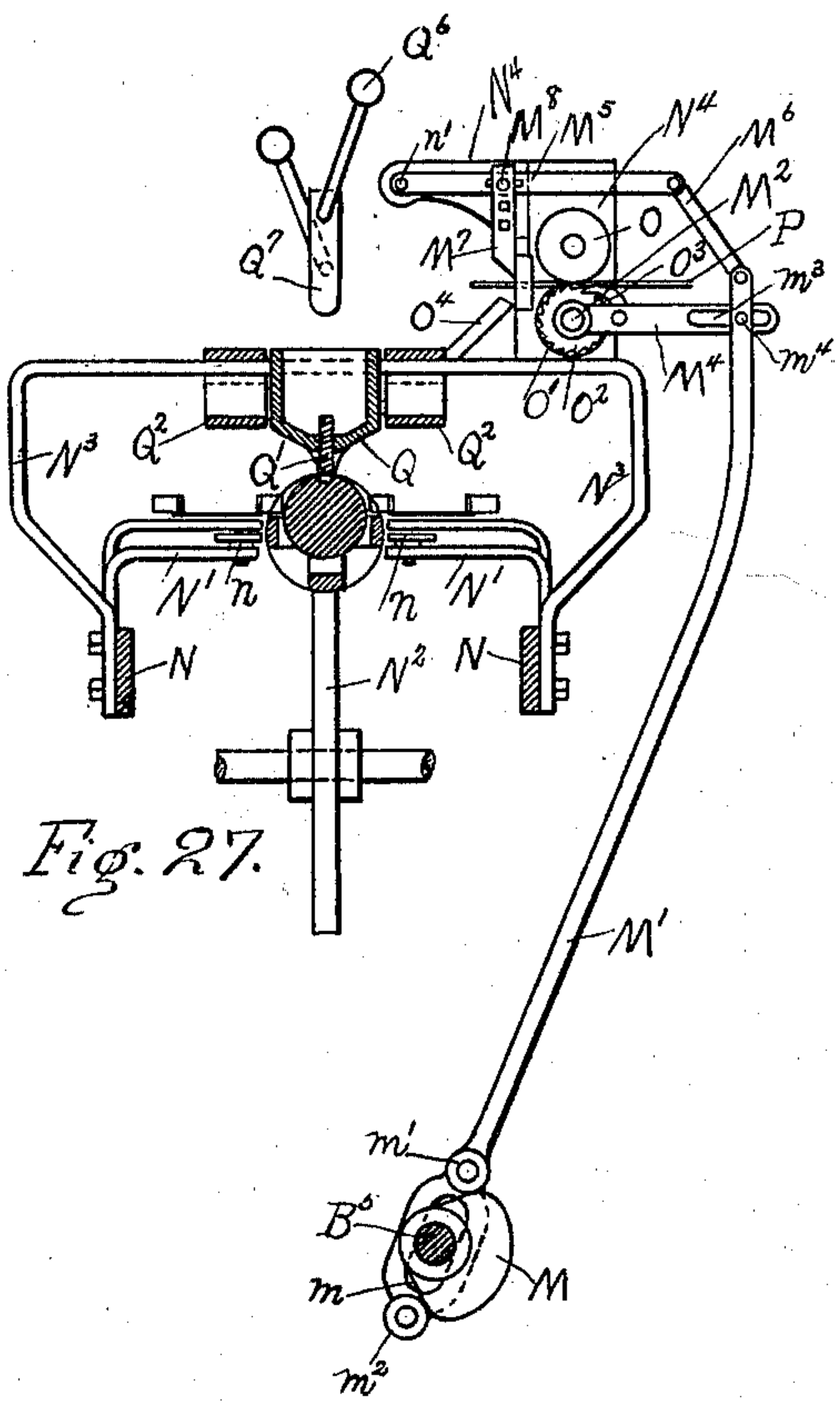


Fig. 27.

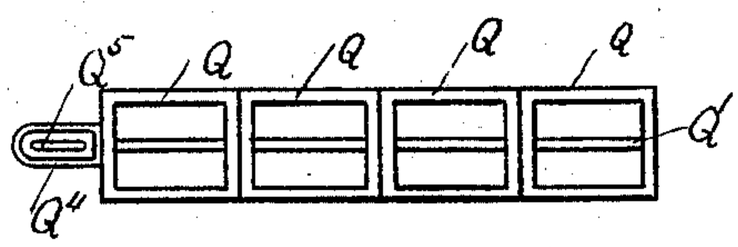


Fig. 28.

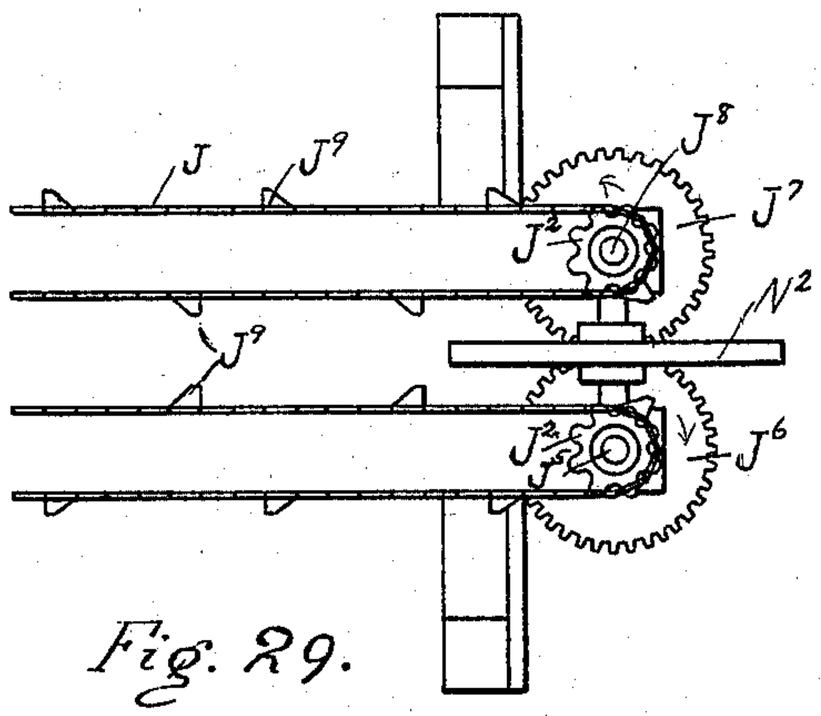


Fig. 29.

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UNITED STATES PATENT OFFICE.

EDWARD P. HOLDEN AND CHARLES M. BROWN, OF CHICAGO, ILLINOIS.

CAN-BODY MACHINE.

SPECIFICATION forming part of Letters Patent No. 598,567, dated February 8, 1898.

Application filed August 7, 1896. Serial No. 602,009. (No model.)

To all whom it may concern:

Be it known that we, EDWARD P. HOLDEN and CHARLES M. BROWN, citizens of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Can-Body Machines; and we declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has for its object the production of a machine for forming can-bodies; and it consists in mechanism for forming the blank, mechanism for shaping the body and engaging the edges of the same, mechanism for bumping the edges of the same to permanently engage them, mechanism for fluxing or rosining the joint, and mechanism for soldering the same.

The details of the mechanism will be more fully described and claimed.

In the drawings, Figure 1 is a side elevation of our machine. Fig. 2 is an end elevation thereof. Fig. 3 is a sectional view on the line 3 3 of Fig. 1. Fig. 4 is an end elevation of the end of the machine. Fig. 5 is a side elevation of a portion of the machine, showing the bumping mechanism. Fig. 6 is a sectional view on the line 6 6 of Fig. 1; Fig. 7, a sectional view on the line 7 7 of Fig. 5. Fig. 8 is an elevation in the direction of arrow 8, Fig. 5; Fig. 9, a detail illustrating the folding mechanism. Fig. 10 is a side elevation in the direction of arrow 10, Fig. 9. Fig. 11 is a side elevation in the direction of arrow 11, Fig. 9. Fig. 12 illustrates the blank after edges have been formed, but before the seam is locked. Fig. 13 illustrates the blank after the seam is locked; Fig. 14, a detail illustrating the endless-chain-operating mechanism; Fig. 15, an elevation in the direction of arrow 15, Fig. 14; Fig. 16, a plan view in the direction of arrow 16, Fig. 14. Figs. 17 and 18 are details of the endless chain. Fig. 19 is a detail of the projection on the chain-link; Fig. 20, a detail of the clutch mechanism shown in Fig. 14. Fig. 21 is an end view of the mechanism for operating the horn. Fig. 22 is a side elevation of the same; Fig. 23, a plan view of the same; Fig. 24, an end elevation of the mechanism for operating the fluxing device; Fig. 25, a plan view of the fluxing device; Fig. 26, a side view of the soldering mechanism. Fig. 27 is a sectional view on the line 27 27 of Fig. 26; Fig. 28, a plan view of the soldering-iron; Fig. 29, a plan view in the direction of the arrow 29, Fig. 26. Fig. 30 is a side elevation of the gaging-fingers. Fig. 31 is a plan view of the same. Fig. 32 is a section of the flux-vat.

In carrying out the invention, A represents the main frame of the machine, of any desirable construction; B, the driving-pulley, located on the shaft B′ and revolved from any suitable source of power.

B^2 is a sprocket-wheel on the shaft B′, connected by the sprocket-chain B^3 with the sprocket-wheel B^4 on the counter-shaft B^5.

C represents any suitable receptacle for holding the blanks.

A′ A^2 are suitable standards extending from and a part of the main frame and form the bearings for the main shaft B′. Pivoted to the extensions *a* on the standard A′ is the arm D, Figs. 1, 14, and 15. The upper end of this arm is provided with two rollers *d d′*.

D′ is a cam-plate on the shaft B′, and the rollers *d d′* travel against opposite faces on this plate D′. Thus a revolution of the shaft B′ causes a reciprocation of the lower end of the arm D. Pivoted to this lower end is a rod D^2, and the latter is pivoted to an arm D^3 on the counter-shaft D^4. The arm D^3 is in the form of a bell-crank lever and is provided on the end of its arm D^5 with the pawl D^6. (See Fig. 20.) On the shaft D^4 is a disk D^7, provided with notches d^2 on its periphery. On the same shaft D^4 are two sprocket-wheels D^8, over which pass sprocket-chains D^9, Figs. 14 and 16, the opposite ends of said chains being passed over sprocket-wheels D^{10}, supported from the arm A^3 on the main frame.

It will be seen that by the above-described mechanism an intermittent feed is provided for the blanks, the chains being provided with arms or projections d^3 (shown in detail in Fig. 19) for engaging the blanks, and a pawl D^{11}, Figs. 14 and 20, being provided to prevent an extended backward revolution of the chain. At this point, however, we desire to call attention to the fact that the notches

d^2 are slightly wider than the end d^4 of the pawl D^{11}. The purpose of this is that when the chain has fed the blank to the desired point through the medium of the movement of the pawl D^6 and the pawl starts back to engage another notch as it rides out of the notch d^2, there being a play between the end d^4 of the pawl D^{11} and the side of the notch which enables the pawl D^6 to draw the disk D^7 a very slight distance back in the direction af the arrow, Fig. 20, and this will of course move the chain correspondingly and will carry the projections d^3 away from the edge of the blank. The desirability of this slight backward movement at the end of the normal forward movement will be apparent as the description of the machine progresses.

We will now describe the mechanism for stamping or forming the ends of the blank. (Shown more particularly in Figs. 2, 5, 6, 7, and 8.) On the main shaft B′ is a crank E, Fig. 6, surrounded by a collar E′, the latter provided on its end with a pitman E^2, having on its end a ball E^3, adapted to fit into a corresponding ball-socket on the cross-head E^4. The collar E′ is split, and the tightening-collar E^5 is provided with a set-screw E^6, so that by tightening the set-screw the pitman may be held in the collar E′ by means of the set-screw in addition to the screw-threads. The cross-head E^4 is shaped as shown in Fig. 5, with a bumper portion E^7, the ways E^8, and the portion E^9, to which the forming-die is engaged.

E^{10} E^{11} are dies shaped to fit the corresponding stationary dies E^{12} E^{13}, as shown in Fig. 8, the dies being held to their respective plates by bolts *e*.

E^{14} is a rod mounted in the bearing E^{15} and the lower end passed through the portion E^9 of the cross-head. On the lower end of this rod is a block E^{16} and on the stationary frame a corresponding block E^{17}. A spring E^{18} tends to keep the block E^{16} in its lowermost position, a collar E^{19} limiting the movement, however. Now, as may be seen, as soon as the portion E^9 strikes the collar E^{19} the rod and block will be carried up; but as the cross-head descends to stamp the blank the blank will first engage between the two blocks E^{16} and E^{17} and be steadied during the process of stamping. Thus a revolution of the crank E operates to force down the dies and form the blank, as shown by the dotted lines, Fig. 12.

We will now describe the mechanism for bending or shaping the blank to form the body. (Shown more particularly in Figs. 9, 10, and 11.) On the main shaft B′ is a cam F, provided with a cam-groove F′ on its face.

F^2 is a rod bifurcated at its upper end, as at F^3, to embrace the shaft B′ and provided with a roller F^4, which travels in the cam-groove F′. The result of the revolution of the shaft B′ is a reciprocating motion for the rod F^2 in the direction of arrows X, Fig. 9. Pivoted to the arm a^2, extending from the main frame A, is an arm F^5, one end *f* being slotted to receive the pivot *f*′, that engages it to the end of the rod F^2, while at the opposite end are provided two arms F^6 F^7, Fig. 9. The pivot *f*′ is mounted on a block T, that embraces the end of the rod F^2. A spring T′ normally keeps the block T at the lower end of the rod F^2; but if the mechanism should be clogged by a misplaced blank or otherwise this spring will yield and thus save the balance of the mechanism.

F^8 is the horn around which the blank is folded.

F^9 F^{10} are wings. Each wing is provided with a projection f^{10}, to which the respective arms F^6 F^7 are pivoted.

The construction of the wing F^{10} and its connecting-arm is as follows: f^2, Figs. 9 and 11, is a fitting shaped at each end to loosely embrace the rod f^3. The upper end of this fitting is pivoted at f^4 to the arm f^{10} on the wing F^{10}. On the rod f^3 are two sets of nuts f^5 f^6, each set adapted to bear on its respective end of the fitting f^2. f^7 is a spring, one end bearing on the shoulder f^8 and the other end bearing on the lower end of the fitting f^2. It will be observed that between the nuts f^6 and the end f^9 of the fitting f^2 is a slight distance or play, the result being that as the wings are thrown up around the horn the wing F^{10} will be carried slightly in advance of the wing F^9 until the blank and wing come to a bearing on the horn, when the spring will yield slightly to accommodate the full play of the arm F^5.

We will now describe the mechanism for flattening or bumping the seam after the body has been folded around the horn. As before explained, E^7, Fig. 5, carries the bumper G. This bumper portion E^7 is slotted on its under side, and the bumper-steel proper, G, is held therein by the set-screw G′. Above the bumper-steel G and between it and the bumper portion E^7 is a wedge G^2, adapted to be forced in or out above the bumper-steel by the set-screw G^3, a set-screw G^4 being provided to additionally lock the wedge in position.

As above explained, the bumper-steel and dies are carried on the same cross-head, so that while one blank is being shaped by the dies the vertical movement of the pitman E^2 operates the bumper-steel to lock the contiguous edges of the blank into a seam, as shown in Fig. 13.

G^5, Fig. 9, represents a block stationary on the main frame A, to which the wings F^9 F^{10} are pivoted. In order that the blank may be fed under the horn F^8, mechanism is provided for raising said horn slightly, and this we will now describe.

G^6, Figs. 5, 21, 22, and 23, is an arm rigidly connected to the shaft G^7, carried by the main frame A. On the end of this arm G^6 the horn F^8 is carried, as shown in Fig. 23. On the shaft G^7 is an upright arm G^8, provided on its upper end with a roller G^9, which bears upon the cam G^{10} on the main shaft B′. Thus a revolution of the cam G^{10} acts to tilt the arm

G[8], and this tilts the arm G[6] and lifts the horn F[8]. In order that when the blank is fed under the horn it may be straightened and held in its proper position until the horn drops and clamps it, we provide the gaging-fingers G[11]. As shown in Figs. 30 and 31, these fingers are engaged to a shaft G[12], which is supported by the main frame A. On this shaft is also an arm G[13], the outer end of which rests on a set-screw G[14] and is normally held thereto by the spring G[15]. As the chain D[9] feeds the blank against these fingers, if the blank is not in its proper position, the fingers straighten and hold it where it should be until the horn by dropping clamps it. In order that the blank as it is fed forward may have a constant friction on it to prevent its moving too far forward and also to hold it in place in other directions, we provide the pin *g*, Fig. 5, having a beveled face *g'* toward the direction from which the blank approaches. This pin works in a socket g^2, (shown in dotted lines,) carried by the frame A, a spring g^3 being provided to keep the pin normally in its upper direction and a collar g^4 being provided, against which the end of the spring may bear. As soon as the seam has been bumped, as above explained, the chains D[9] carry it off from the horn F[8] and onto the horn H, where it is fluxed or rosined. This horn H is what may be termed a "compound" construction. It is composed of a cylindrical portion H, Fig. 7, and three parallel strips H', H[2], and H[3], supported from the cylindrical portion H by the pieces *h*. The cylindrical portion H is provided with a groove *h'*, in which the seam of the can travels. The strips H' H[2] H[3] act to steady the can as it passes through the successive operations. The horn H is engaged to the horn F[8] by the loose hook-joint H[4], Fig. 5.

The mechanism for accomplishing the fluxing we will now describe. It is shown more particularly in Figs. 24 and 25. On the main shaft B' is an eccentric K, surrounded by the collar K', a rod K[2] being attached to the collar. Supported by the bearing K[3], extending from the main frame, is a counter-shaft, (indicated by the dotted lines K[4], Fig. 25.) On this shaft is an arm K[5], to which the end of the rod K[2] is pivoted. Keyed to this shaft is an arm K[6]. On this shaft, but stationary with respect to the bearing K[3], is a sprocket-wheel K[7], and on the outer end of the arm K[6] is a bearing K[8], carrying a shaft (indicated by dotted lines K[9]) having on its end the sprocket-wheel K[10], a sprocket-chain K[11] connecting the sprocket-wheels K[7] and K[10]. On the shaft K[9] is also provided an arm K[12], having on its lower edge a fluxing material K[13], such as felt, wick, or any porous substance. This felt is clamped in the arm K[12] by the screws K[14].

K[15] is a vat or receptacle containing the liquid flux supported by the main frame. In the vat above the liquid is a perforated diaphragm K[16], and above this diaphragm is a pad of felt or the like K[17]. Now, as will be seen, a revolution of the eccentric K operates to give the rod K[2] a reciprocating motion in the direction of the arrows *y*, Fig. 24, and this operates to tilt the crank-arm K[5], which in turn oscillates the arm K[6]. The wick K[13] being mounted on the shaft K[9] and the latter being engaged by the sprocket-chain K[11] with the stationary sprocket-wheel K[7], as the arm K[6] is oscillated back and forth the arm K[12] and wick K[13] will always be maintained in a vertical plane, thus operating to bring the fluxing-strip K[13] alternately against the pad K[17] and against the seam of the can. As soon as the cans are fluxed they are carried forward one more movement by the chains D[9]. At this point they are picked up by the endless carriers J, Fig. 29, the inner ends of the chains being supported by the sprocket-wheels J', Fig. 3, and the outer ends by the sprocket-wheels J[2], Fig. 29. On the end of the shaft B[5] is a beveled gear J[3], meshing with the beveled gear J[4] on the vertical shaft J[5]. On the upper end of this shaft J[5] is located one of the sprocket-wheels J[2]. On the shaft J[5] is also a gear J[6], which meshes with the gear J[7] on the corresponding vertical shaft J[8], and on the upper end of the latter is the other sprocket-wheel J[2]. Thus a revolution of the shaft B[5] operates to move the sprocket-chains J. The latter are provided at intervals with projections J[9] to engage the can-body and push it along over the horn. Obviously the distance between the projections J[9] on each chain is the distance traveled by the chain for one revolution of the shaft B', so that by properly arranging the parts the can-body will be picked up by the chains J as soon as they have been thrown forward by the last movement of the chains D[9].

We will now describe the soldering mechanism. Extending the length of the machine and supported by the main frame are two longitudinal supporting-pieces N, which support the solder-cutting mechanism and the soldering mechanism. Extending from these supporting-frames N, Fig. 27, are arms N', having on their ends rollers *n*, adapted to keep the soldering-horn H in a central position, and N[2] is a wheel journaled in the main frame and adapted to support the outer end of the horn H. Extending also from the frames N are arms N[3], adapted, as hereinafter explained, to support the soldering-irons and adapted also to support the solder-cutting mechanism. This mechanism is shown more particularly in Figs. 26 and 27, the solder feeding and cutting mechanism being shown in Fig. 27. On the shaft B[5] is a cam M. M' is a rod slotted in its lower end, as at *m*, to embrace the shaft B[5] and provided with two rollers *m'* and m^2, adapted to bear upon the edge of the cam M. Thus, as will be seen, a revolution of the shaft B[5] gives the rod M' a vertical reciprocation. Pivoted on the counter-shaft M[2] (the latter supported on the arm N[3]) is an arm or lever M[4], provided on its end

with a slot m^3. On the rod M′ is a pin m^4, that enters the slot m^3 and is suitably engaged therein by a nut.

Pivoted to the frame N^4 at n' is an arm M^5, the free end of this arm M^5 being connected with the rod M′ by a link M^6. Working vertically in the frame N^4 is a cutter-knife M^7, the latter engaged to the arm M^5 by a slotted engagement, as at M^8. Pivoted to the frame N^4 is a roller O and another roller O′, the peripheries of the said rollers being grooved and adapted to engage the solder-wire P and feed it. On the shaft of the roller O′ is a ratchet-wheel O^2, engaged to the roller O′, and on the arm M^4 is a pawl O^3, adapted to engage the ratchet-wheel O^2, so that when the arm M^4 is raised the roller O′ will be revolved and the solder-wire P fed the requisite distance. The slotted engagement m^3 is provided, so that the length of solder-feed may be varied.

O^4 is a trough or chute below the solder-wire, into which the cut piece drops and is fed down to the soldering-iron. The operation of this soldering mechanism will at once be seen. A revolution of the shaft B^5 reciprocates the rod M′ vertically, and this tilts the arm M^4 and feeds the solder-wire. As the rod M′ comes down it draws down the arm M^5 and causes the knife M^7 to cut the solder, and the latter drops down into the trough O^4 and is fed to the soldering-iron.

Q, Fig. 28, represents what may be termed "soldering-iron boxes," each provided in its lower edge, Fig. 27, with a soldering-iron Q′. These soldering-irons and their boxes rest upon the soldering-horn H and are steadied in position by the frame Q^2, extending along the sides, and they are prevented from longitudinal movement by the frames Q^3, Fig. 26, extending across from one frame Q^2 to the other at each end of the series of solder-boxes. On the end of the forward soldering-iron, Fig. 28, is a soldering-pot Q^4, having a slot Q^5 in the bottom.

Q^6, Fig. 26, are supply-pipes for gas or other fuel and air, and Q^7 are heating-irons or burners. As the solder runs down the chute O^4 into the solder-pot Q^4 it is melted and drops through the slot Q^5 onto the can-seam, the can-body being forced along, as before explained, by the sprocket-chains J. After receiving the solder it passes successively under the four soldering-irons Q′, where the solder is thoroughly soaked into the seam. Supported on the frame Q^3 is an arm R, and pivoted to the outer end thereof is an arm R′, and this arm R′ is provided on its end with a suitable wiper R^2. The form of wiper which we have used and which we prefer is a block of soft steel or iron made concave on its under side to fit the convex surface of the can and heated from a suitable burner R^3. This block of hot steel or iron passing over the seam wipes off the surplus solder and gives a finished appearance to the can.

It is obvious that many details of construction of our machine might be altered without departing from the spirit of the invention, and we would have it understood that we contemplate the substitution of mechanical equivalents for the particular devices shown by us for accomplishing the various steps in the treatment of the blank from its insertion in the machine to its discharge.

We also desire to call particular attention to the shape of the blanks after they have been stamped to form the seam, as shown in Figs. 12 and 13. By forming on one side or one edge a raised portion S in addition to turning the edges, as at S′, to form the lock when the bumper comes down to engage the two edges S′ together it will flatten out the raised portion S, and thus increase the diameter of the body over the diameter of the horn, so that whereas in previous machines they have been obliged to reduce the diameter of the horn to enable the can-body to be slipped off after the seam has been formed we can make the diameter of our horn fixed and can easily slip the body off from the horn, because of the fact that the relative diameter of the body has been increased.

What we claim is—

1. In a can-body machine the combination of mechanism for carrying the blank to the shaping-dies; mechanism for engaging and holding the blank and mechanism for stamping the blank to the desired shape, said holding mechanism operated by the stamping mechanism, substantially as described.

2. In a can-body machine the combination of mechanism for engaging and holding the blank; vertically-reciprocating die mechanism for stamping the body and edges blank into the desired shape; folding mechanism for forming the blank into the body; bumping mechanism for forming the body-seams, mechanism for fluxing the seam; and mechanism for soldering the seam, substantially as described.

3. In a die-stamping mechanism the combination with a vertically-reciprocating movable die and the stationary dies, of a vertically-reciprocating yielding holding-block carried by the movable die and a stationary block between the stationary dies, said two blocks adapted to clamp the blank between them in advance of the movable die and hold it during the stamping operation, substantially as described.

4. In a die-stamping mechanism the combination with vertically-reciprocating movable dies and the stationary dies, of a vertically-reciprocating holding-block carried by the movable dies and between the same, spring mechanism for holding said block normally in advance of the movable dies and a stationary block between the stationary dies, said two blocks adapted to clamp the blank between them in advance of the movable dies and hold it during the stamping operation, substantially as described.

5. In a can-body machine the combination with the blank-folding wings and the folding-

horn, of a lever for operating said wings, said lever connected with its driving mechanism by a yielding connection, substantially as described.

6. In a can-body machine the combination with the folding-horn and folding-wings, of mechanism for operating the wings, one of said wings moving in advance of the other and yieldingly connected with its actuating mechanism whereby after the advance wing has reached its bearing its connecting mechanism will yield until the other wing reaches its bearing, said yielding mechanism being adjustable, substantially as described.

7. In a can-body machine the combination with the folding-horn and folding-wings, of a lever for simultaneously operating said wings, a connecting-rod for each wing extending from said lever to the wing, one of said rods constructed to yield after the wing has come to a bearing to permit the other wing to come to a bearing, said yielding mechanism being adjustable, substantially as described.

8. In a can-body machine the combination with a folding-wing and its actuating mechanism, of a connecting-rod between said actuating mechanism and the wing, said rod formed in two parts adapted to move with respect to each other, a spring for keeping the parts normally in an extended position and an adjustable stop for limiting the contracting movement, substantially as described.

9. In a can-body machine the combination with a folding-wing and its actuating mechanism of a connecting-rod formed in two parts adapted to move with respect to each other, a spring for keeping the parts normally in an extended position and an adjustable stop for regulating the normal length, substantially as described.

10. In a can-body machine the combination with a folding-wing and its actuating mechanism of a connecting-rod formed in two parts adapted to move with respect to each other, a spring for keeping the parts normally in an extended position and adjustable stops for limiting the play of the parts in both directions, substantially as described.

11. The combination with the wing F^{10} and lever F^5 of the rod f^3, spring f^7, fitting f^2 and nuts f^5, f^6, substantially as described.

12. In a can-body machine, a body-forming horn provided with mechanism for reciprocating it bodily vertically, substantially as described.

13. In a can-body machine, a vertically-reciprocating head carrying the stamping-dies, carrying a yielding holding-block for clamping the blank during the stamping operation and carrying also the bumping mechanism, substantially as described.

14. In a can-body machine a vertically-reciprocating head carrying the stamping-dies and carrying also the bumping mechanism, a pitman connecting said head with its actuating-shaft, said pitman connected with the head by a ball-and-socket joint, substantially as described.

15. In a can-body machine a vertically-reciprocating head carrying the stamping-dies and carrying the bumping mechanism, said head connected with its actuating-shaft by an adjustable pitman, substantially as described.

16. In a can-body machine the combination of the forming-horn capable of vertical reciprocation and a vertically-reciprocating head carrying the stamping-dies and carrying also the bumping mechanism, substantially as described.

17. In a can-body machine, the combination with a stationary block, of the forming-horn located above said block and mechanism for reciprocating said horn bodily vertically, substantially as described.

18. In a can-body machine, the combination with the forming-horn and mechanism for feeding the blank below the horn, of a friction device located below the blank below the horn and adapted to force the blank against the horn and retard the movement of the same, substantially as described.

19. In a can-body machine, the combination with the forming-horn and mechanism for feeding the blank to a point below the horn, of a spring-impelled retarding-pin below the horn adapted to bear upon the blank as it is fed between the horn and block, substantially as described.

20. In a can-body machine, the combination with the vertically-movable forming-horn and a stationary block below the same, of a friction device for steadying and retarding the blank as it is fed between the horn and block, said friction device adapted to bear upward against the blank, substantially as described.

21. In a can-body machine, the combination with the bumper and its carrying-block, of a wedge between the bumper and the block for regulating the vertical adjustment of the bumper, substantially as described.

22. In a can-body machine, the combination with a non-reciprocating intermittently-operating endless carrier, of a continuously-operating carrier adapted to pick up the can-bodies after they have left the intermittent carrier, substantially as described.

23. The combination with the carrier mechanism and mechanism for intermittently driving the same, of mechanism for giving said carrier a slight backward movement after it has come to a stop in its normal forward movement, substantially as described.

24. The combination with an endless-chain carrier and mechanism for intermittently driving the same, of mechanism for giving said carrier a slight backward movement after it has come to a stop in its normal forward movement, substantially as described.

25. The combination with an endless-chain carrier of a pawl-and-ratchet engagement for operating the same, said pawl after it has driven the chain forward adapted to retract

the chain slightly before disengaging from the ratchet, substantially as described.

26. The combination with the endless-chain carrier, of a pawl-and-ratchet engagement for intermittently actuating the same, the notches in the ratchet and the ends of the actuating-pawl being angularly shaped so that when the pawl has driven the ratchet forward and starts on its backward movement, it will draw the ratchet back slightly, and another pawl for limiting the backward movement of the ratchet, substantially as described.

27. In a can-body machine, the combination with the carrier mechanism and the forming-horn of pivoted yielding gage-fingers adjacent to the horn adapted to yield laterally against which the blank strikes and is guided, substantially as described.

28. In a can-body machine, the combination with a soldering-horn over which the cans are carried, of a soldering-iron and a soldering-pot located in advance of the iron and engaged to and supported by said iron, said pot provided with an opening in the bottom through which the solder is fed, substantially as described.

29. In a can-body machine, the combination with a series of soldering-irons arranged in line above a soldering-horn along which the can-bodies are moved, of a soldering-pot located in advance of the soldering-irons, heating apparatus for heating the irons and pot and solder-feeding mechanism for feeding the solder into the pot, substantially as described.

30. In a soldering-machine, the combination with a soldering-horn over which the cans are carried, of a soldering-iron located above said horn and normally resting thereon and carried thereby and mechanism for sliding said can along said horn under said iron, substantially as described.

31. In a can-body machine, the combination with a soldering-horn over which the cans are carried, of a series of soldering-irons, each independent of the other, located above said horn and normally resting thereon and carried thereby and mechanism for sliding said can along said horn and under said irons, substantially as described.

32. In a soldering mechanism, the combination with the horn over which the cans are carried, of a wiper pivoted above said horn and normally resting thereon and supported thereby and mechanism for carrying the can along said horn under said wiper, substantially as described.

33. In a soldering mechanism a wiper made of a block of metal pivoted above the soldering-horn and resting thereon and adapted to bear down upon the can, substantially as described.

34. In a soldering-machine a wiper made of a block of metal formed concave on its under side to fit the convex surface of the can to be wiped, said block pivoted above the soldering-horn and resting thereon and adapted to bear down upon the can, substantially as described.

35. In a soldering mechanism the combination with a soldering-horn, a metallic wiper pivoted above said horn and normally resting thereon and of sufficient weight to give sufficient pressure by gravity and mechanism for sliding the can along the horn under the wiper, substantially as described.

36. In a soldering mechanism, a fluxing device consisting of a flux-vat, a fluxing-strip mounted upon an oscillating or rocking arm and mechanism for oscillating said arm upon its pivot to carry the fluxing-strip alternately to the vat and to the can, substantially as described.

37. In a soldering mechanism, the combination with the flux-vat, the fluxing-strip mounted upon an oscillating or rocking arm, mechanism for oscillating said arm upon its pivot, of means for maintaining said fluxing-strip always in the same relative vertical position, substantially as described.

38. The combination with the flux-vat and the fluxing-strip mounted on a rocker-arm, of a sprocket-chain passed over a stationary sprocket-wheel at one end and over a sprocket-wheel on the supporting-shaft of the fluxing-strip at the other end, substantially as described.

39. The combination with a forming-horn and a can-body formed around the same and contiguous to the periphery thereof said body having an excess of metal therein, and bumping mechanism whereby when the body is bumped the diameter thereof will be enlarged to permit it to be removed from the horn, substantially as described.

40. The combination with a solid forming-horn and a can-body formed around the same and contiguous to the periphery thereof said body having an excess of metal therein and bumping mechanism whereby when the body is bumped the diameter thereof is enlarged, substantially as described.

41. The combination with a forming-horn and a can-body formed around the same and contiguous to the periphery thereof, said body having a bead or excess of metal and bumping mechanism for taking out said bead and thereby enlarging the diameter of the body, substantially as described.

In testimony whereof we sign this specification in the presence of two witnesses.

EDWARD P. HOLDEN.
CHARLES M. BROWN.

Witnesses:
ABBIE E. POND,
WALTER H. CHAMBERLIN.