(No Model.) 7 Sheets—Sheet 1.

R. D. HUME.

MACHINE FOR FORMING CAN BODIES.

No. 493,588. Patented Mar. 14, 1893.

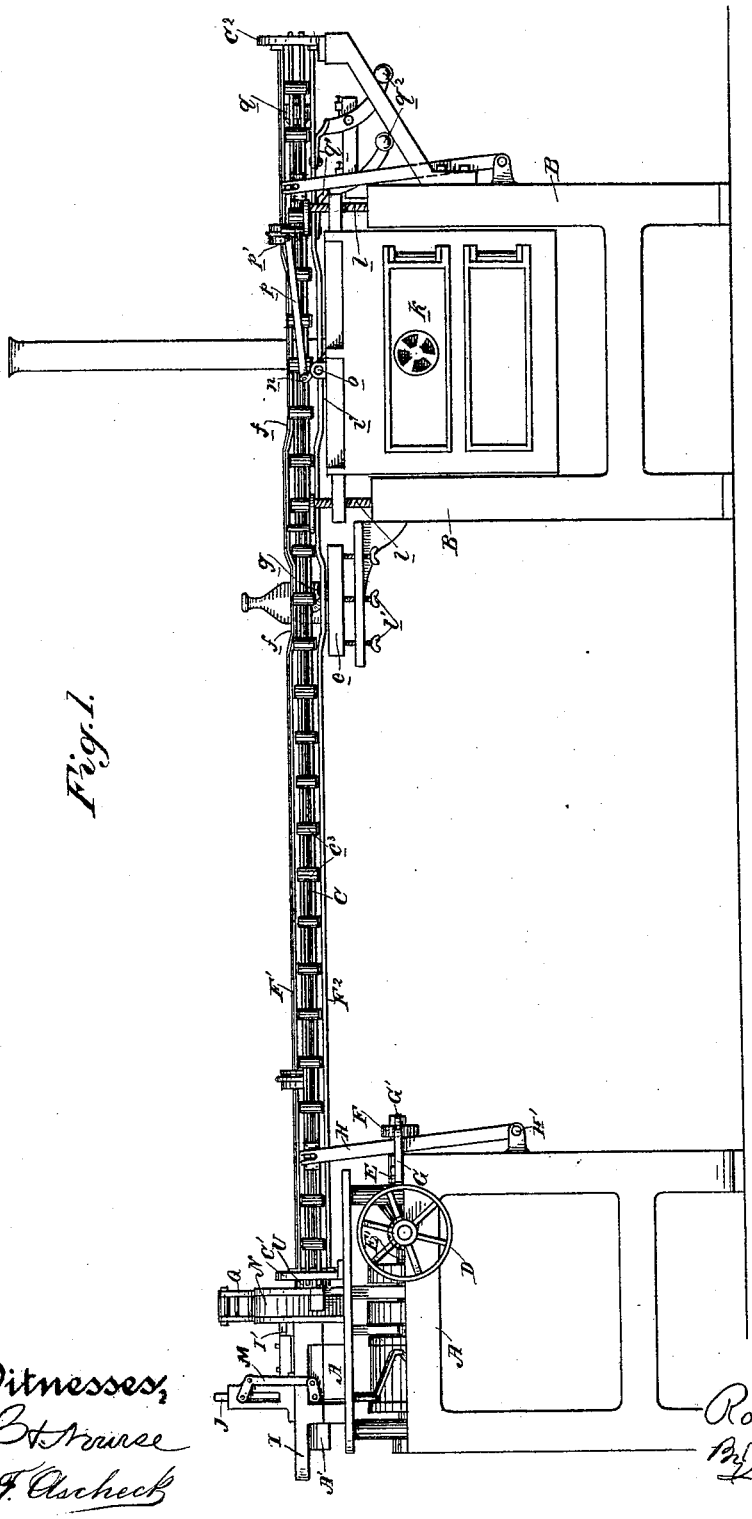

Fig. 1.

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(No Model.) 7 Sheets—Sheet 2.

R. D. HUME.

MACHINE FOR FORMING CAN BODIES.

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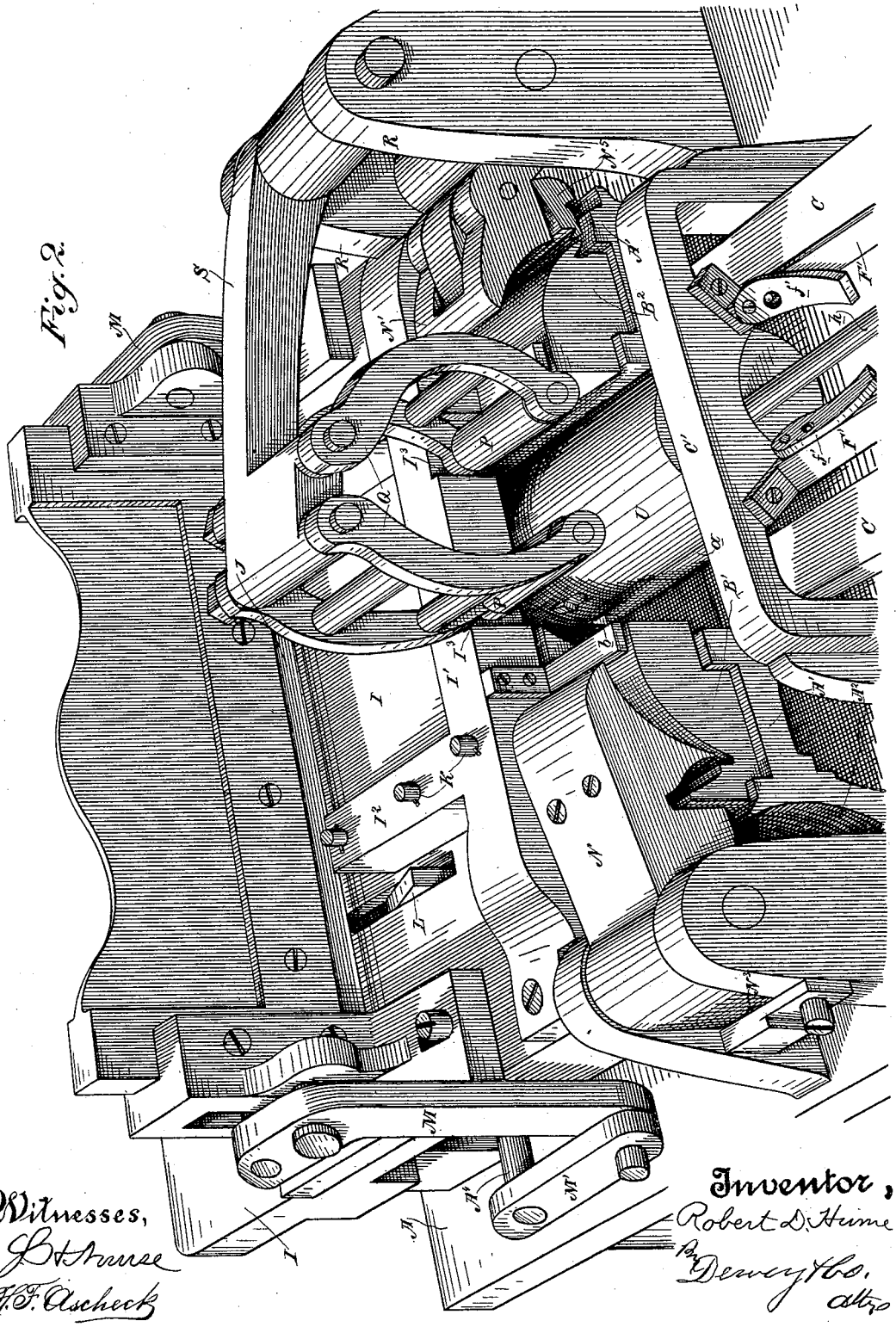
Fig. 2.



Witnesses,
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MACHINE FOR FORMING CAN BODIES.

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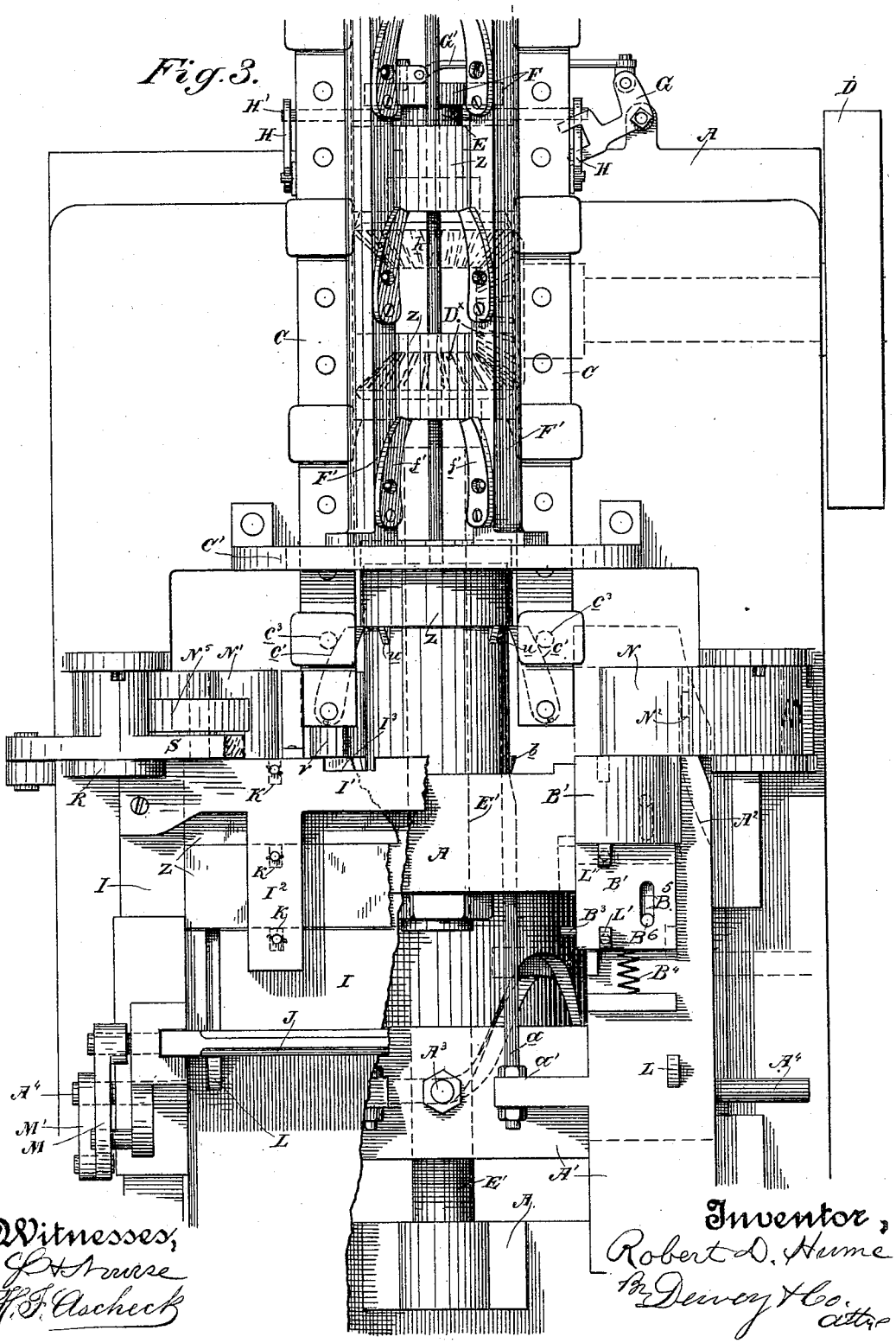
Fig. 3.



Witnesses,
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(No Model.) 7 Sheets—Sheet 4.

R. D. HUME.

MACHINE FOR FORMING CAN BODIES.

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Fig. 4.

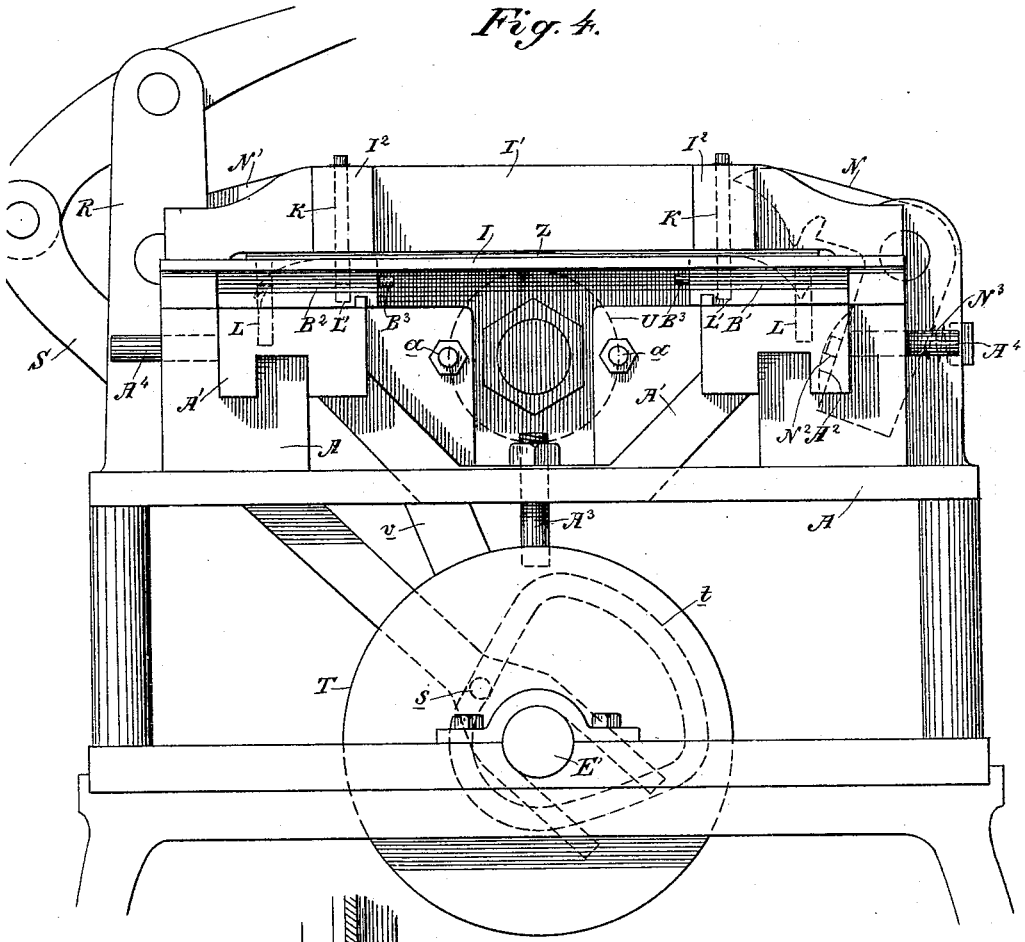
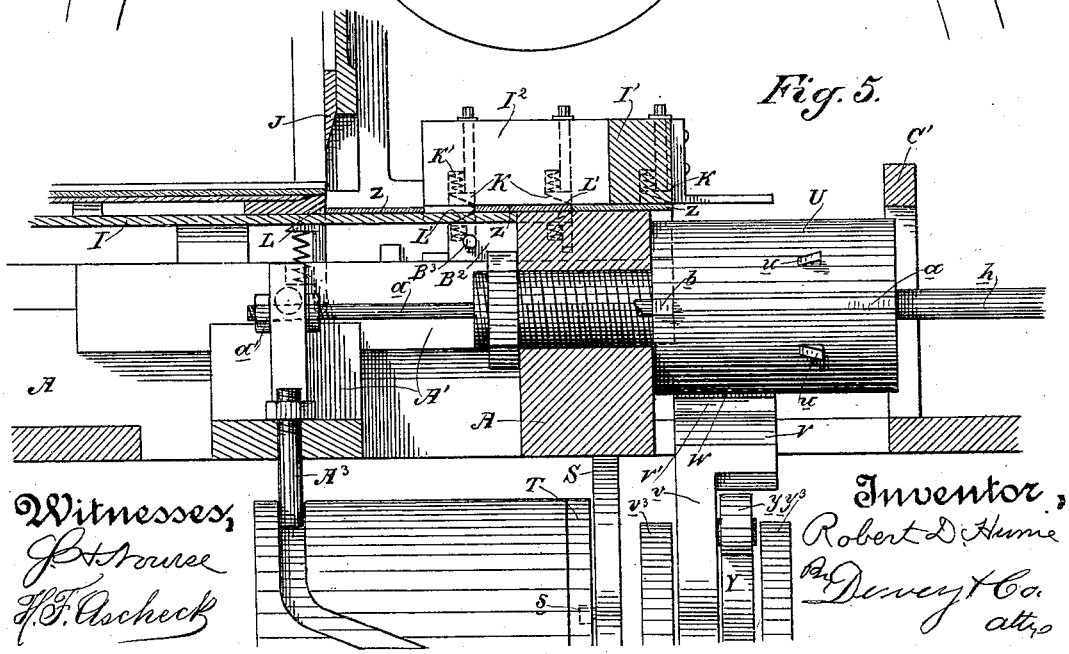


Fig. 5.



Witnesses;
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(No Model.) 7 Sheets—Sheet 5.

R. D. HUME.

MACHINE FOR FORMING CAN BODIES.

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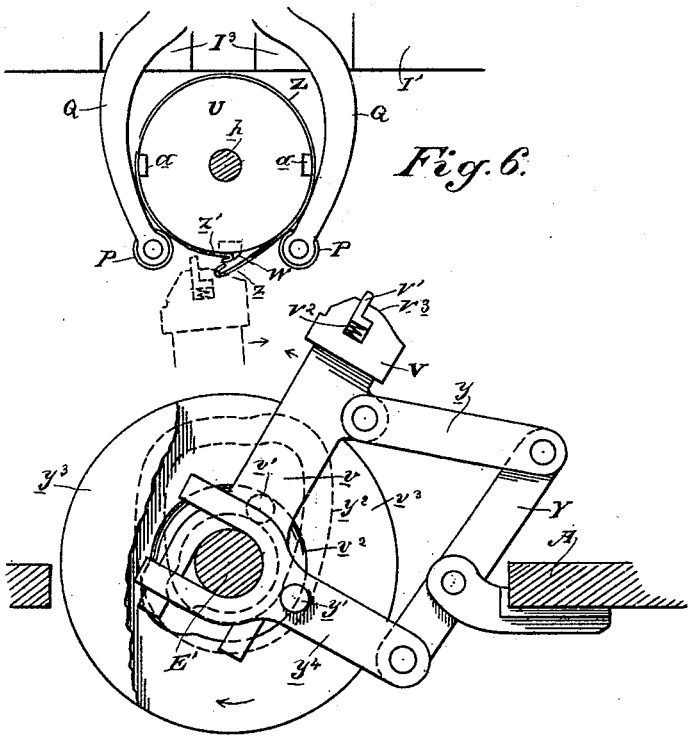

Fig. 6.

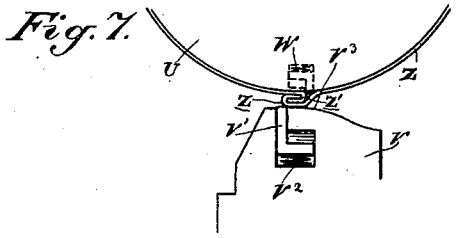

Fig. 7.

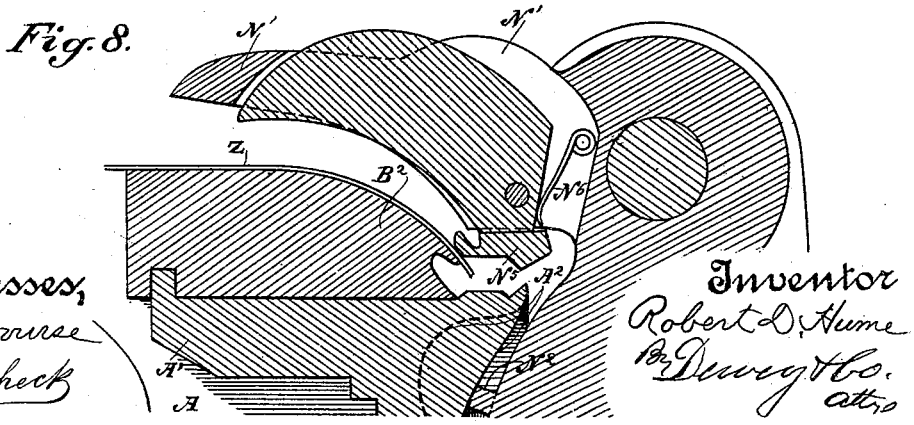

Fig. 8.

Witnesses,
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(No Model.) 7 Sheets—Sheet 6.

R. D. HUME.

MACHINE FOR FORMING CAN BODIES.

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Fig. 9.

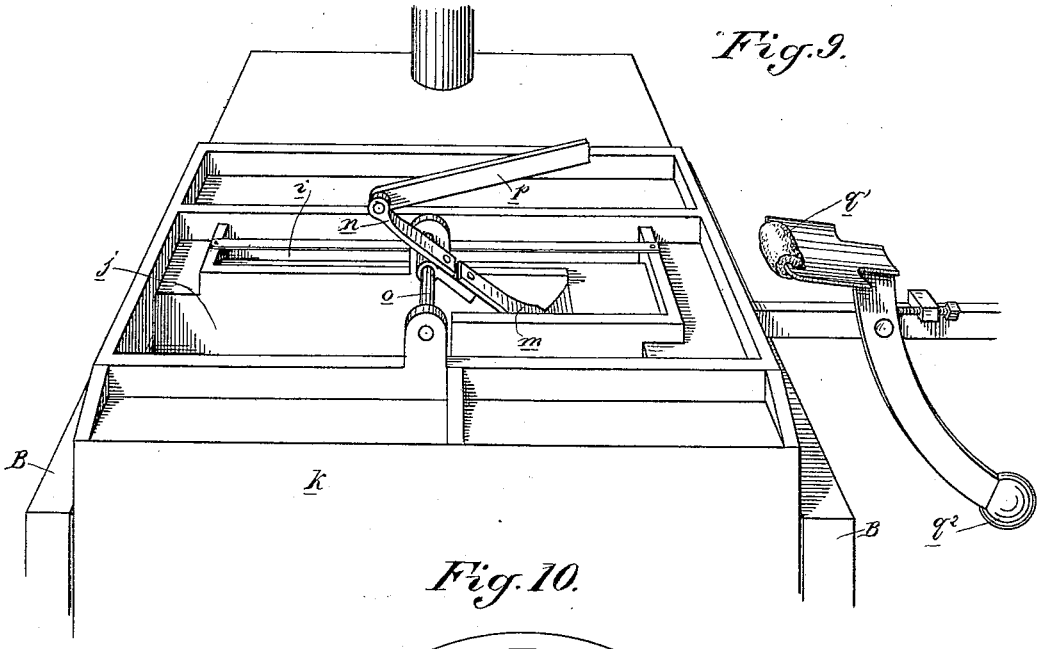


Fig. 10.

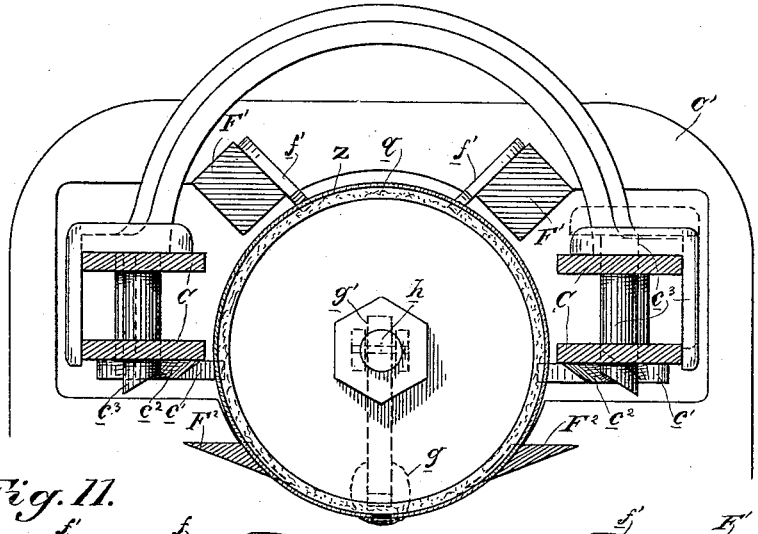
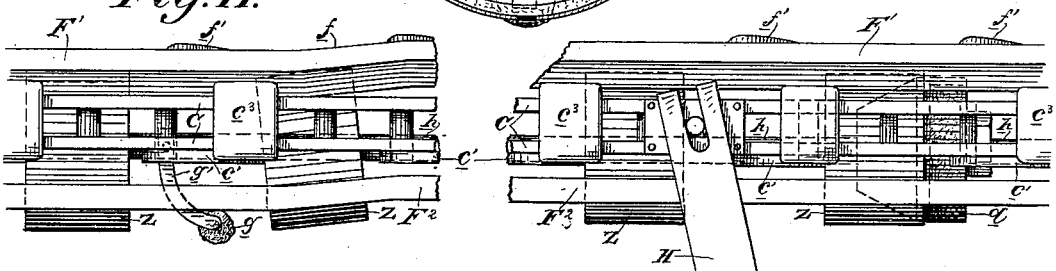
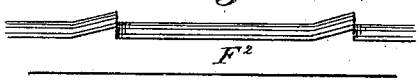


Fig. 11.



Witnesses,
S. H. Nourse
S. F. Ascheck

Fig. 12.



Inventor,
Robert D. Hume
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Atts.

(No Model.) 7 Sheets—Sheet 7.

R. D. HUME.

MACHINE FOR FORMING CAN BODIES.

No. 493,588. Patented Mar. 14, 1893.

Fig. 13.

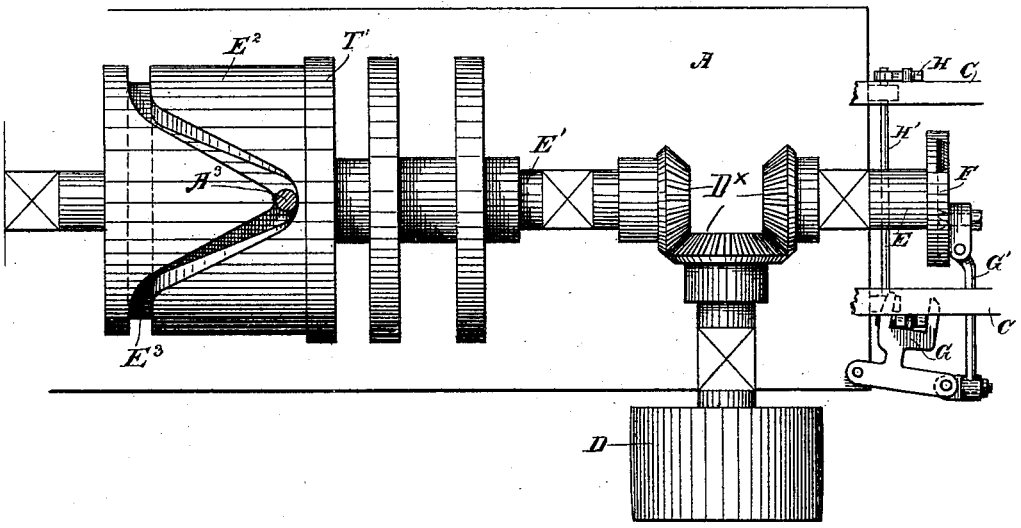
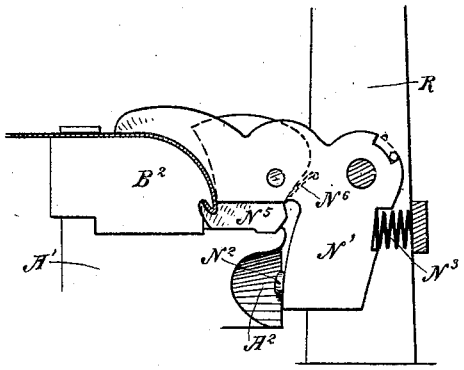


Fig. 14.



Witnesses,
L. Hourse
H. F. Ascheck

Inventor,
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Attys

UNITED STATES PATENT OFFICE.

ROBERT DENISTON HUME, OF GOLD BEACH, OREGON.

MACHINE FOR FORMING CAN-BODIES.

SPECIFICATION forming part of Letters Patent No. 493,588, dated March 14, 1893.

Application filed June 9, 1892. Serial No. 436,149. (No model.)

To all whom it may concern:

Be it known that I, ROBERT DENISTON HUME, a citizen of the United States, residing at Gold Beach, Curry county, State of Oregon, have invented an Improvement in Machines for Forming Can-Bodies; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a machine specially adapted for the manufacture of can bodies, the body being made in a single continuous operation from the sheets of tin.

It consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a general view of my machine. Fig. 2 is a perspective view of the body forming section of the machine. Fig. 3 is a plan view of the same. Fig. 4 is a rear elevation of the same. Fig. 5 is a longitudinal vertical cross section through the center of the same. Figs. 6 and 7 are detail views of the device for the locking of the seam. Fig. 8 is a cross section through the jaw N′ and its connections. Fig. 9 is a view of the soldering bath. Fig. 10 is a lateral cross section through the carrying device. Fig. 11 is a side view of part of the same. Fig. 12 is a plan view of the lower track rails showing the notches. Fig. 13, is a detail showing the device for transmitting power to the shaft E which carries the reciprocating mechanism. Fig. 14, is a detail showing the inclines A^2 on the carriage.

A is the frame or table which supports the forming end of the machine, and B supports the furnace and finishing end. From this table and over the furnace extends the reciprocating carrier C by which the can bodies, after having been seamed, shaped and locked together in the former, are transported through the acid and soldering baths to the delivery end of the machine.

Power to drive the various parts of the mechanism is applied through a pulley D which is fixed to a transverse shaft, and by means of beveled gears D^x, power is transmitted from this shaft to a longitudinal shaft E carrying the adjustable transversely reciprocating mechanism, consisting of a slotted disk F, a slide adjustable in the slot to increase or diminish the throw, a bell crank lever G connected with the slide by a connecting rod G′ and having a forked end which clasps one of the levers H, shown in Figs. 1 and 3. These levers H are fulcrumed at the lower end upon a shaft H′, and the upper ends are slotted and engage pins upon the sides of the carrier C so that by means of these oscillating bars H, the carrier is constantly reciprocated in a longitudinal direction.

The tin of which the cans are to be formed is placed upon the rear end of the machine upon a table I. The table I is fastened upon the frame A, and has across its forward end a guide bar I′ attached to it with rearwardly extending arms I^2. Secured into the under side of these arms I^2 are the retaining pawls K which are allowed to recede upwardly into the bars by means of springs K′ so that the sheets can be pushed in front of them. Their distance apart is equal to the length of a can body to be formed and after the sheet has pressed them up and has passed forward, they will fall in behind it, and keep it from going back again. Beneath this table or frame A is situated and properly guided therein a carriage A′, which carries similar pawls L projecting upwardly into the path of the travel of the sheets. The carriage A′ consists of two parallel pieces which carry the formers on their front ends, and have their lower outer ends curved out to form the inclines A^2. These pieces are united by a strong cross bar, carrying the pin A^3 which travels in the cam groove of the cylinder below and thus causes the carriage to reciprocate. The carriage A′ is forked on its front end where the inclines are formed, and to the top of each fork are connected the formers B′ and B^2 by means of pins B^6 projecting from the carrier into slots B^5 made in the rear ends of the formers, and on their inside they carry stop pins B^3 which move forward with the carrier into a slot cut in the main frame, and are arrested at the end of the slot, the carrier stopping also as shown in Fig. 3. The springs B^4 form an elastic connection with the carriage, and the slot will allow the latter to move farther on. The forks of the carriage also carry pawls L′ in their upper surfaces similar to the pawls K before described and having the same function and operation except that the pawls L move forward and push the tin before them,

while the pawls K are stationary and serve to retain the tin which is placed in front of them, in its place.

The carrier A is reciprocated by means of a pin A^3 which projects from the carriage down into a cam groove E^3 in the cylinder E^2 as shown in Fig. 13. The pin A^3 enters this groove and by the rotation of the cylinder, the carrier is moved forward, then back, and is then retained stationary during the time the pin is traversing that portion of the groove which extends around the cylinder at right angles to its axis. The cylinder is mounted on a shaft E (see Fig. 13) driven by bevel gearing from the pulley D. This same carriage A′ has also projecting from its outer sides, stout pins A^4 to which are attached links M′. These links are connected with the cranks M and the latter again with the cutter plate J. The jaws N and N′ are fulcrumed in short standards on the main frame A and consist of horizontal arms, the lower faces of which correspond with their respective formers over which they operate, and vertical arms with contact lug N^2 on the inner faces to come in contact with the inclines A^3, while to their outer sides springs N^3 are attached to force the jaws upwardly again after having done their work.

The jaw N′ which forms the inwardly bent hook on the edge of the sheet has its horizontal part formed of two pieces in the following manner:—Into the main piece N′ is let in and fulcrumed the shank of a secondary movable jaw N^5, with a spring N^6 to force it outwardly. This is for the purpose of enabling jaw N^5 to pass behind the hook on the former B^2, and by this construction, the spring will allow the jaw N^5 to be pressed inwardly as the main jaw N is coming down over the former, and when beyond the hook of the latter, the spring will force it forward and behind the hook, carrying the tin with it.

The operation as far as described is as follows:—A sheet of tin has been placed upon the table, the carriage has been moved forward, and by means of its connections, has severed a strip Z of the required size. Now on its backward movement, the former has also brought back with it the pawl L which slips underneath and beyond the rear edge of the strip where its spring will force it up again and behind the strip. Now the carriage moves forward and the pawl pushes the strip forward and behind the first set of pawls on the formers B′ and B^2, which will deliver it behind the first set of pawls K projecting downward from the arms I^2, and each succeeding advance of the carrier will bring another strip which will push the preceding one forward until the first one has finally reached over the formers B′ and B^2. By the next advance of the carriage, the formers will go forward also and take the strip along, by means of their foremost pawl, from under the guide bar I′, and advance alongside of the horn U until the stop pin B^3 comes in contact with the frame A, which takes place as soon as the strip is entirely clear of the bar I′. In the meantime the carriage has not reached the end of its travel yet, but advances still farther from under the formers and bringing its inclines A^2 to bear against the lugs N^2 on the lower parts of the respective jaws, forces the latter downward on the formers to perform their functions. While the bending into hooks is performed the carriage is stationary, on account of the shape of the actuating cam, and after the hooks are formed it will commence to recede, thereby first releasing the jaws, and then withdrawing the formers, leaving the strip hanging loosely over the horn U. By the time the carriage advances again, the hooks have been joined, and the so formed can body has already been delivered to the carrier C thereby presenting the horn clear and ready for another strip.

The edges of the sheet having been bent or folded, as above described, the sheet is bent into the form of a can as follows:—On the top of the frame A is formed a fulcrum stand R for a lever S, the lower end of which is forked over the shaft E′, and carries a friction roller *s* which travels in the cam groove *t* of a rotary disk T on the same shaft, to give the lever the required movement, (Fig. 4.) In the end of the upper part of the lever are hinged the curved arms Q carrying clamping rollers P in their lower ends. These rollers P are brought down over the strips Z and around the horn U by the descending of the lever S, and the curved arms Q are guided and kept from spreading while descending by grooves I^3 cut in the front edge of the bar I′ in which the rear pair of arms Q travels. After this is done they resume their former position again, and the locking of the hooks is now performed by means of a swinging head V, its shank *v* being forked over the shaft E′ and provided with a friction roller *v′* to travel in a cam groove v^2 on the side of a rotary disk v^3 on the same shaft. To the upper part of the shank *v* below the head V is pivoted a link *y* which connects the shank with a lever Y, and the latter is again attached to a link y^4 forked over the shaft E′, and its friction roller *y′* traveling also in a cam groove y^2 of a rotary disk y^3 to give the head the required swinging motion, (Fig. 6.) In the top of the head V is inserted a vertically moving plate V′ supported by a spring V^2 which allows it to be depressed. In the bottom of the horn is placed a similar movable plate W which may be pressed upwardly out of the way. Now as soon as the strip Z has been bent over the horn, and it is still kept in that position for a short length of time by the rollers P, the head V approaches the hook *z* and the latter is pushed over beyond the hook *z′*, depressing the plate V′ in the meantime until the latter is released again on the outside of hook *z*. Immediately after this the head V commences to return again whereby the plate V′ forces the hook *z* into

the hook z', the plate W stopping the latter from turning around the horn. The cam groove v^2 at once forces the head upwardly, depressing the plates V′ and W, and acting with its upper surface V^3 as a hammer against the now completed seam, after which the head will resume its normal position, clearing the way for the new can body to be delivered over into the carrier. This deliverance is accomplished by two movable rods a let into grooves in the sides of the horn U, and made flush with the surface of the latter. From the outer faces and on the front ends of these rods a project depression pawls b as before described for the purpose of pushing the can body along the horn, while the latter is also provided with some of these pawls u to keep the bent strip Z from moving back while the rods a are retracted. These rods a are attached with their inner ends to the carriage A′ at a' and are, therefore, subject to the movement of the latter.

Right in front of the horn rises a standard C′ to the outer face of which the four track rails F′ and F^2 are screwed and extend to a similar standard C^2 secured to a platform which rests on brackets extending from the standards B which carry the furnace. The upper two track rails F′ carry on their upper sides gravity pawls f' while the lower ones F^2 simply have notches made in their inner sides corresponding with the pawls in the upper ones, as regards their location.

Between the lower and upper rail the carriers C slide in such a manner that their pawls c' extend into the path of the cams so as to take hold of them from behind, and carry them forward. The distance between all these pawls is equal to the length of the travel of the carriage A′.

The pawls c' are hung to the bottom of the carriers C and move in a horizontal plane. Their outer edges are beveled off as shown at c^2 Fig. 10 and above is a weighted pin c^3, also beveled off, adapted to slide up and down, being guided by the two horizontal bars which constitute the carrier, and through which the pin passes. Now as the pawl is forced outward by the passing of the carrier back behind a new can, the pin is lifted up, and as soon as it has passed behind the can, the weight will force the pawl inwardly and behind the can again while the pawls on the track rails simply serve to keep the cans from being moved back again by the carrier. In this manner it is advanced until it reaches the point where the acid bath e is situated. At this point the supporting rails are bent downward a little as shown at f, Fig. 1 so that the can is depressed sufficiently to allow the edge which has been folded together to dip into the acid contained in the trough e. A wiper g is supported from the rod h by an arm g' and serves to apply the acid to the seam as the can passes. A similar rise in the guides raises the edge out of the acid trough, and it passes over beneath a central wiper rod h which extends through the center of the can body and is rigidly attached to the center of the horn. A similar depression of the guides shown at f depresses the can at this point so that it passes through the soldering bath i sufficiently to apply to the solder to the seam and thus solder it firmly together. Beneath this soldering bath i is a melting pot j within which the solder is melted by heat from a furnace k beneath it. The whole of this mechanism of the furnace and bath is supported by adjusting screws l on the standards B, by which its height can be regulated. The acid bath e is also similarly supported by screws l'. From the melting pot the solder is lifted up and delivered into the pan i by a scoop or dipper m which has a lever arm n fulcrumed upon a rock shaft o.

By means of a connecting rod p leading from the end of the lever arm n to the sliding carrier C with which it is connected, as shown at p', the dipper is first depressed into the solder in the melting pot, then lifted up so as to discharge a portion of the solder into the pan i through which the seam of the can passes. The surplus solder constantly flows out from this pan and back into the melting pot so that it is always kept hot for use. After leaving the solder bath, the can passes between wipers q and q' whereby any surplus of solder which may remain upon the seam is wiped off, as the can passes these wipers. The lowermost wiper q' is fulcrumed and has a weight q^2 at its lowermost ends which tends to hold it up against the seam from the outside, but which allows the wiper to be depressed sufficiently to allow the can to pass to the end of the apparatus from which it is delivered.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a can body forming machine, the table having the weighted stops projecting from its upper surface, a carrier reciprocating above the table having corresponding movable lugs projecting through its lower face adapted to engage the rear edge of the sheet of metal and carry it forward, a vertically reciprocating knife by which the sheet is cut into lengths sufficient for the can body, and a mechanism consisting of formers and folding jaws into which the opposite edges of the sheet of metal are delivered to be folded, substantially as herein described.

2. In a can body forming machine, the formers B, B^2 upon which the sheet of metal is delivered, having the hook-shaped lugs over which the edges of the sheet are turned, the jaws N, N′, N^5, adapted to fold the edges of the sheet over the formers, in combination with the reciprocating carriage A′ with the inclined faces A^2 which engage the lugs N^2 of the respective jaws, whereby the latter are caused to move about the formers, substantially as herein described.

3. In a can body forming machine the form-

ers B B′ having hook-shaped lugs over which the edges of the sheet of metal are turned, the jaws N, N′, N⁵ by which the outer fold is made, the reciprocating carriage A′ with the projecting pin, the cam grooved rotating cylinder with which it engages whereby the carriage is moved, links connected with the carriage and with cranks by which the vertically reciprocating cutter is actuated to cut the sheets of metal, supports upon which the formers are carried, and stop pins by which the movement of the formers is limited, substantially as herein described.

4. In a can body forming machine, the reciprocating carriage A′, the formers B B′ moved by the carrier, stop pins B³ by which the movement of the formers is arrested, and springs B⁴ whereby the carriage is allowed a further movement after the formers have been arrested, substantially as herein described.

5. In a can body forming machine, the reciprocating carriage and formers, and the jaws by which the edges of the sheet of metal are folded, in combination with the horn U, the curved arms Q by which the sheet is bent around the horn, the lever to which the curved arms are hinged, said lever having a forked lower end, and a cam on the shaft E′ with which the forked end of the lever engages whereby the arms are moved, substantially as herein described.

6. In a can body forming machine, the jaws by which the opposite edges of the sheet of metal are folded so as to engage with each other, a carrier by which the metal is delivered into said jaws, then moved forward above the horn over which the can is to be formed, bodily vertically reciprocating clamping jaws said jaws adapted to open and close and follow the exterior shape of the horn, as they reciprocate by which the edges of the sheet of metal are folded around the horn, and an oscillating head situated below the horn whereby the edges of the metal are brought together, substantially as herein described.

7. In a can body forming machine, the horizontal cylindrical horn about which the can is formed, vertically reciprocating jaws by which the sheet of metal is bent around said horn, an arm fulcrumed to oscillate beneath the horn having a spring actuated projecting plate V′ at its upper end, said plate being depressed when the arm swings beneath the meeting edges of the can until it passes behind the outermost of the folded edges, a stop W projecting from the horn against which the innermost fold of the metal is retained so that when the swinging arm V returns, the plate V′ will cause the edges of the can to interlock, substantially as herein described.

8. In a can body forming machine, the cylindrical body about which the can is formed having a stop W at its lower side, vertically reciprocating arms adapted to pass upon opposite sides of the horn and bend the sheet of metal around it, an oscillating arm and head pivoted beneath the horn and mechanism by which it is caused to swing transversely, a spring-actuated projecting plate by which the lower fold of the meeting edges of the metal is moved into line with the fold of the innermost one, and by which the two are interlocked upon the return oscillation of the head, and a mechanism by which the head is forced upwardly after the two edges are locked, so as to compress and secure the edges, substantially as herein described.

9. In a can body forming machine, mechanism by which the metal is cut and the can body formed, a horizontally reciprocating carrier with weighted or spring actuated lugs adapted to recede to allow a can body to pass and to be projected so as to engage the rear edge for the purpose of advancing it, and corresponding spring actuated lugs in the ways or track upon which the body moves, adapted to engage the rear edges of the cans to prevent their being moved backwardly by the reciprocations of the carrier, an acid bath situated beneath the guides and depressed sections of the supporting ways at a point above the acid bath whereby the seam of the can is allowed to dip into the acid as it passes over the bath and is again raised out of it as it leaves, substantially as herein described.

10. In a can body forming machine, the ways upon which the can body is moved, a reciprocating carrier by which the can is advanced upon said ways, depressed sections of said carrier which allows the can to be depressed for a short distance upon the ways and again raised, an acid bath situated beneath one of said depressions, and a soldering bath situated beneath the next succeeding depression whereby the constant reciprocations of the carrier will automatically dip the cans into the acid, raise them out of it and dip them into the solder and raise them out of it, substantially as herein described.

11. In a can body forming machine, guides or ways upon which the can travels, a reciprocating carrier by which it is moved, an adjustable acid bath situated beneath the ways, depressions in the ways by which the can is allowed to dip into the acid bath and again to be raised out of it, a furnace, melting pot, and soldering bath, adjustably suspended beneath the ways, depressions in the ways above the soldering bath, by which the seam of the can is depressed into the bath while passing above it and raised out of it as it passes beyond, and a means by which fresh solder is constantly delivered from the melting pot into the solder bath, substantially as herein described.

12. In a can body forming machine, a melting pot having the furnace situated beneath it, a solder bath situated above the melting pot, ways upon which the cans are moved, a reciprocating carrier by which they are advanced along said ways, depressions in the ways above the solder bath by which the can is depressed to allow the seam to dip into the

solder bath while passing above it and an oscillating ladle fulcrumed above the melting pot and adapted to lift the solder from the melting pot and deliver it into the solder bath whereby a constant supply is retained therein, substantially as herein described.

13. In a can body forming machine, the melting pot the furnace situated beneath it, and a solder bath situated above, ways along which the cans are moved above the solder bath and by which they are dipped into it, a reciprocating carrier by which the cans are moved along the ways, a ladle fulcrumed above the melting pot, a connecting rod by which the lever arm of the ladle is connected with the reciprocating carrier whereby the ladle is caused to dip into the melting pot and raise a portion of its contents and deliver them into the soldering bath, substantially as herein described.

14. In a can body forming machine, a furnace, melting pot, and solder bath, ways along which the cans are moved above the solder bath and dipped into it, interior wipers connected with a centrally supported shaft, and exterior wipers supported upon weighted yielding arms which bring the wipers into contact with the longitudinal seam of the can as it passes and allow the can to pass and be discharged, substantially as herein described.

In witness whereof I have hereunto set my hand.

ROBERT DENISTON HUME.

Witnesses:
W. F. RILEY,
J. H. MCELHANEY.