(No Model)

4 Sheets—Sheet 1.

R. D. HUME.

CAN HEADING MACHINE.

No. 572,360. Patented Dec. 1, 1896.

Fig 1

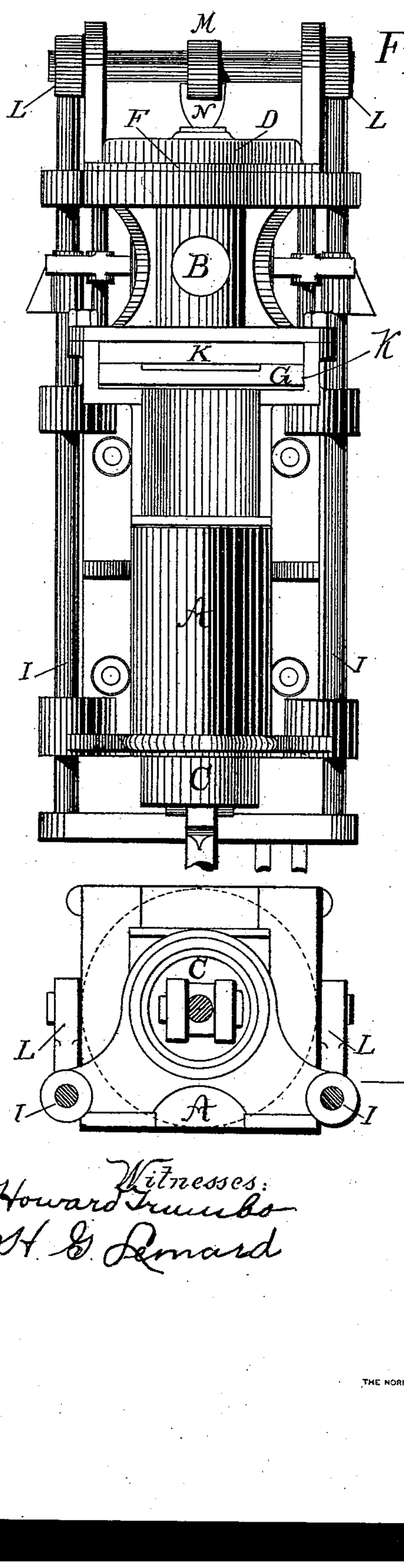

Fig 2

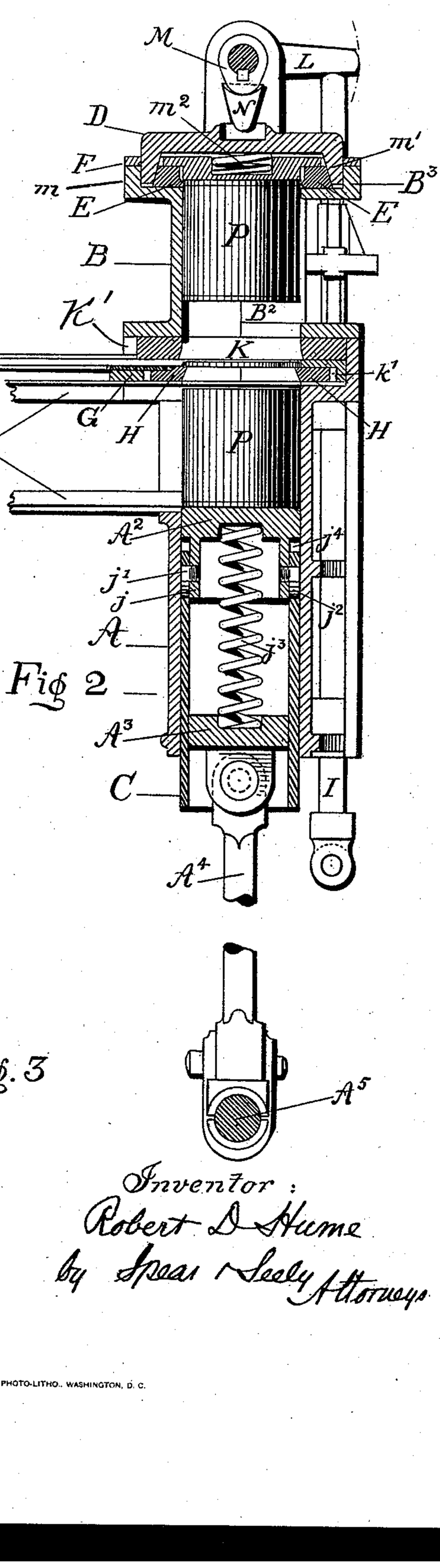

Fig. 3

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(No Model.) 4 Sheets—Sheet 2.

R. D. HUME.

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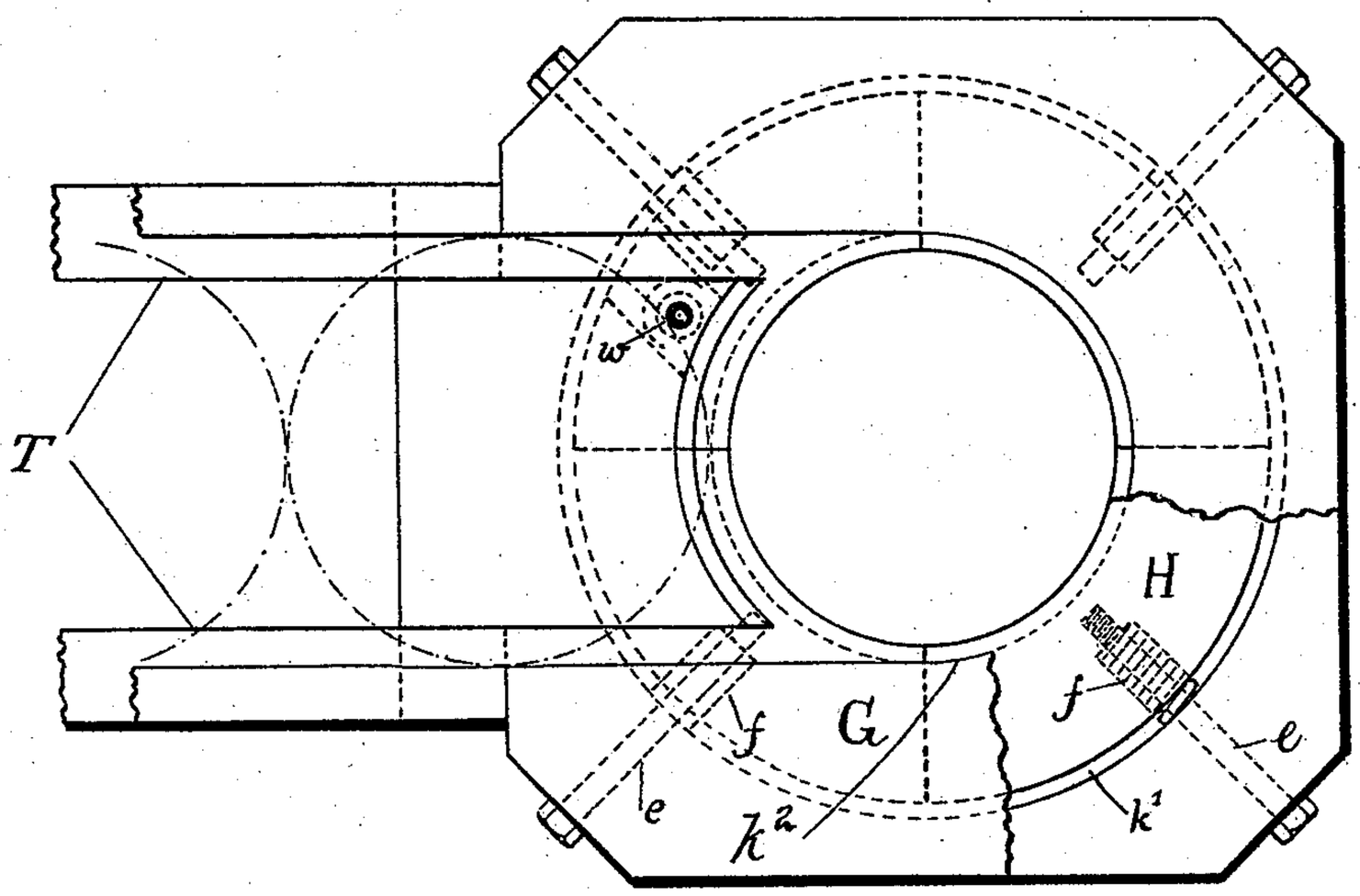

Fig. 4

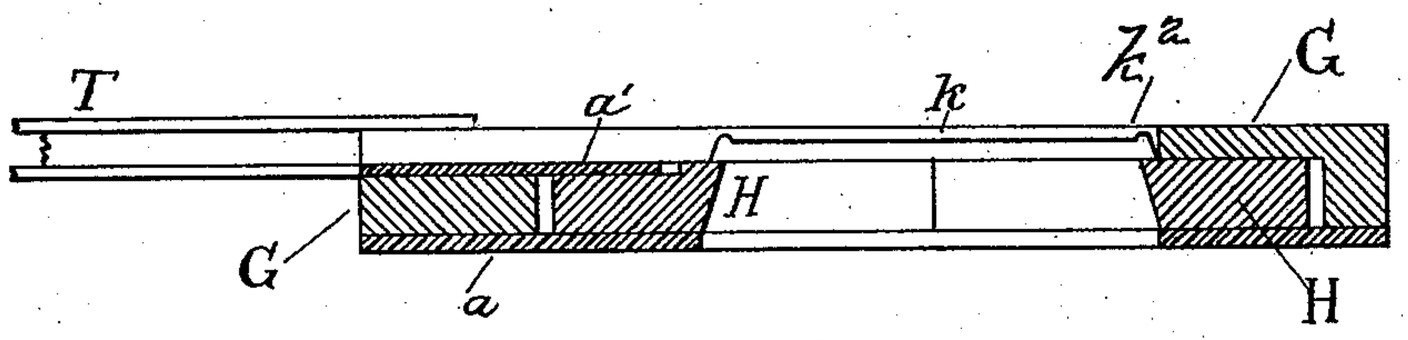

Fig. 5

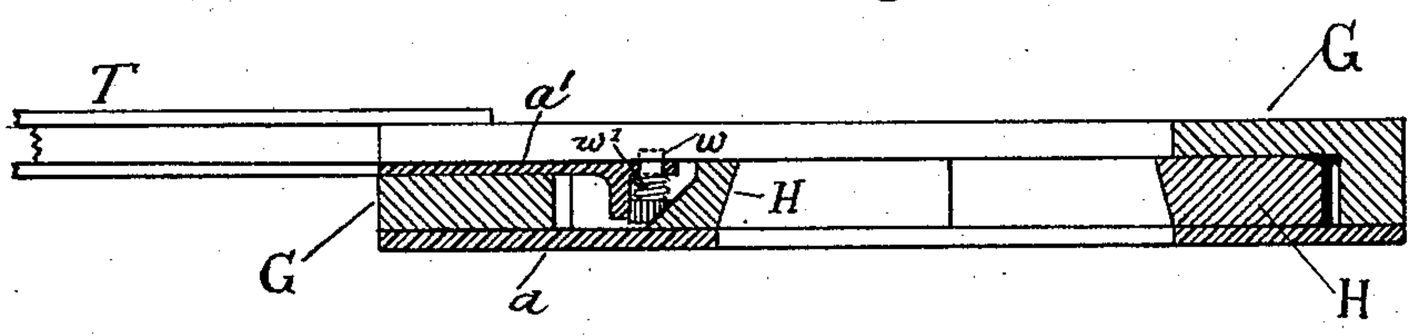

Fig. 6

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4 Sheets—Sheet 3.

R. D. HUME.

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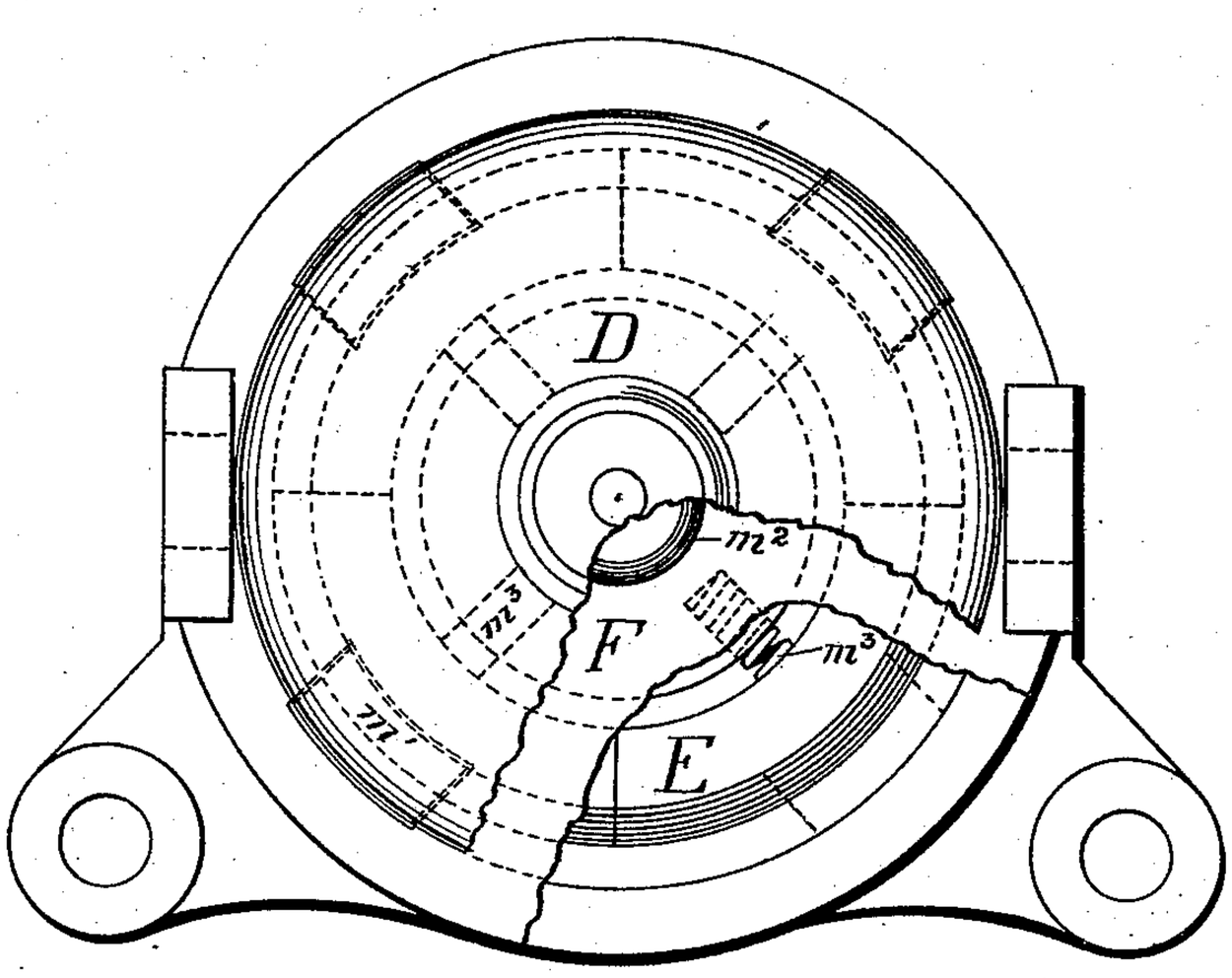

Fig. 7

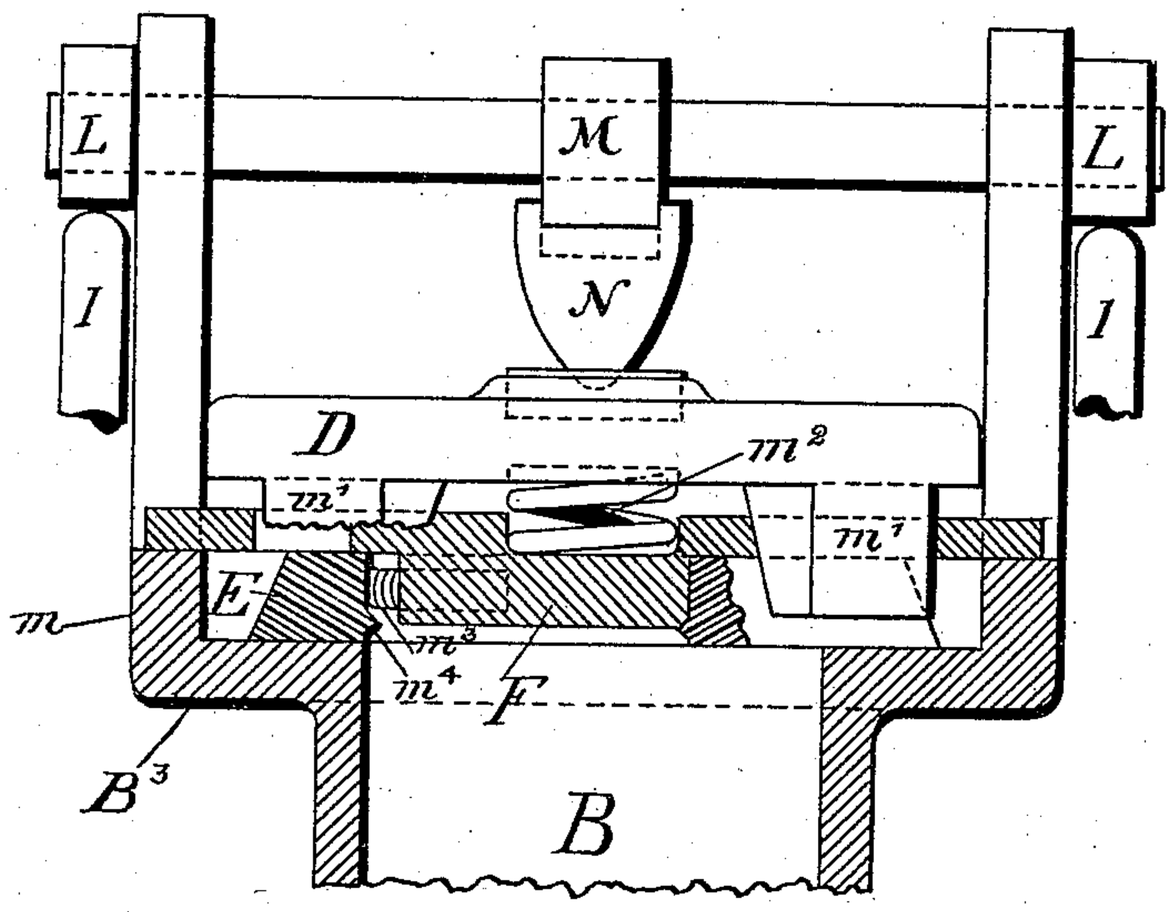

Fig. 8

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(No Model.) 4 Sheets—Sheet 4.

R. D. HUME.

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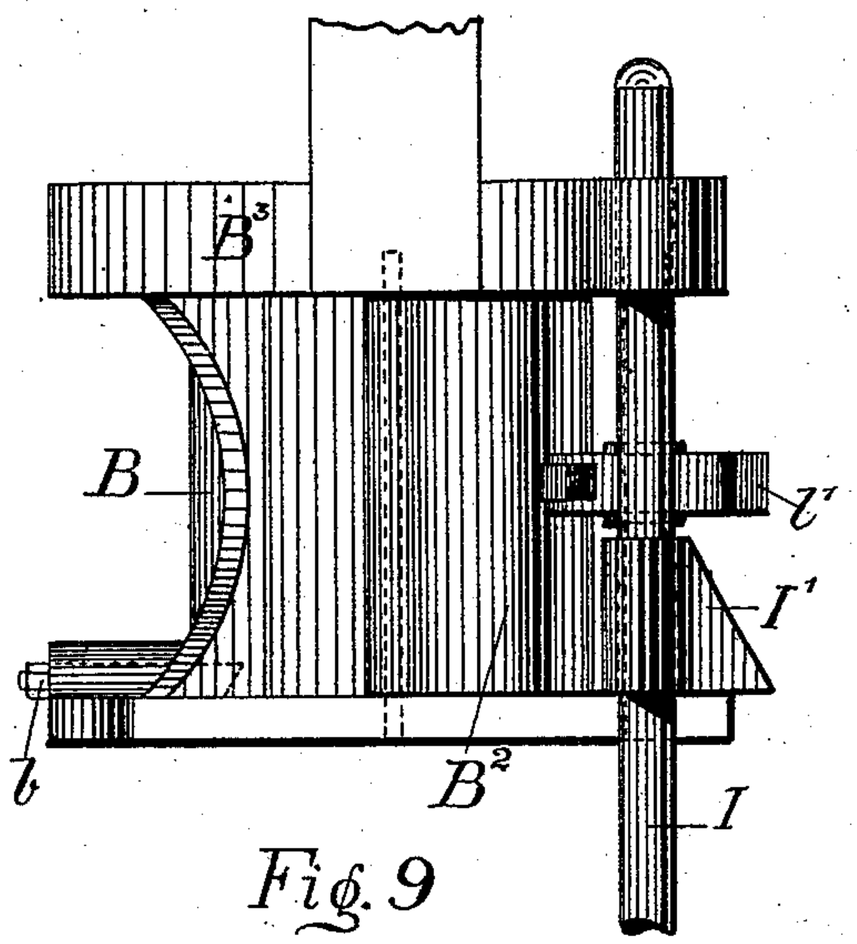

Fig. 9

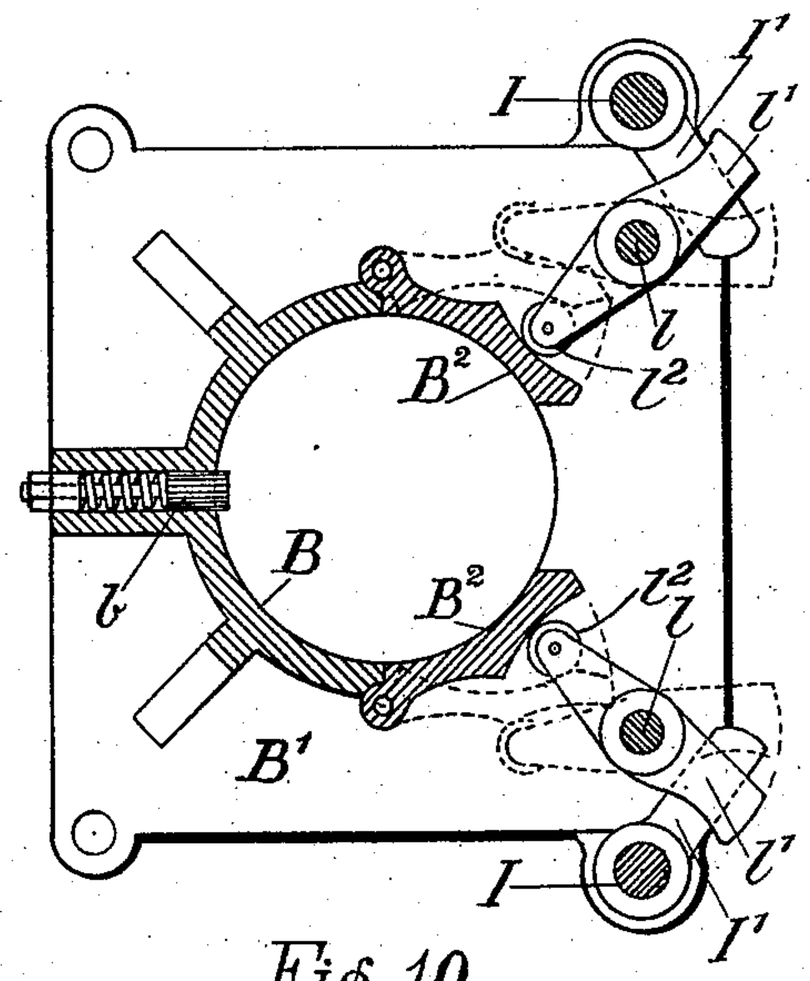

Fig. 10

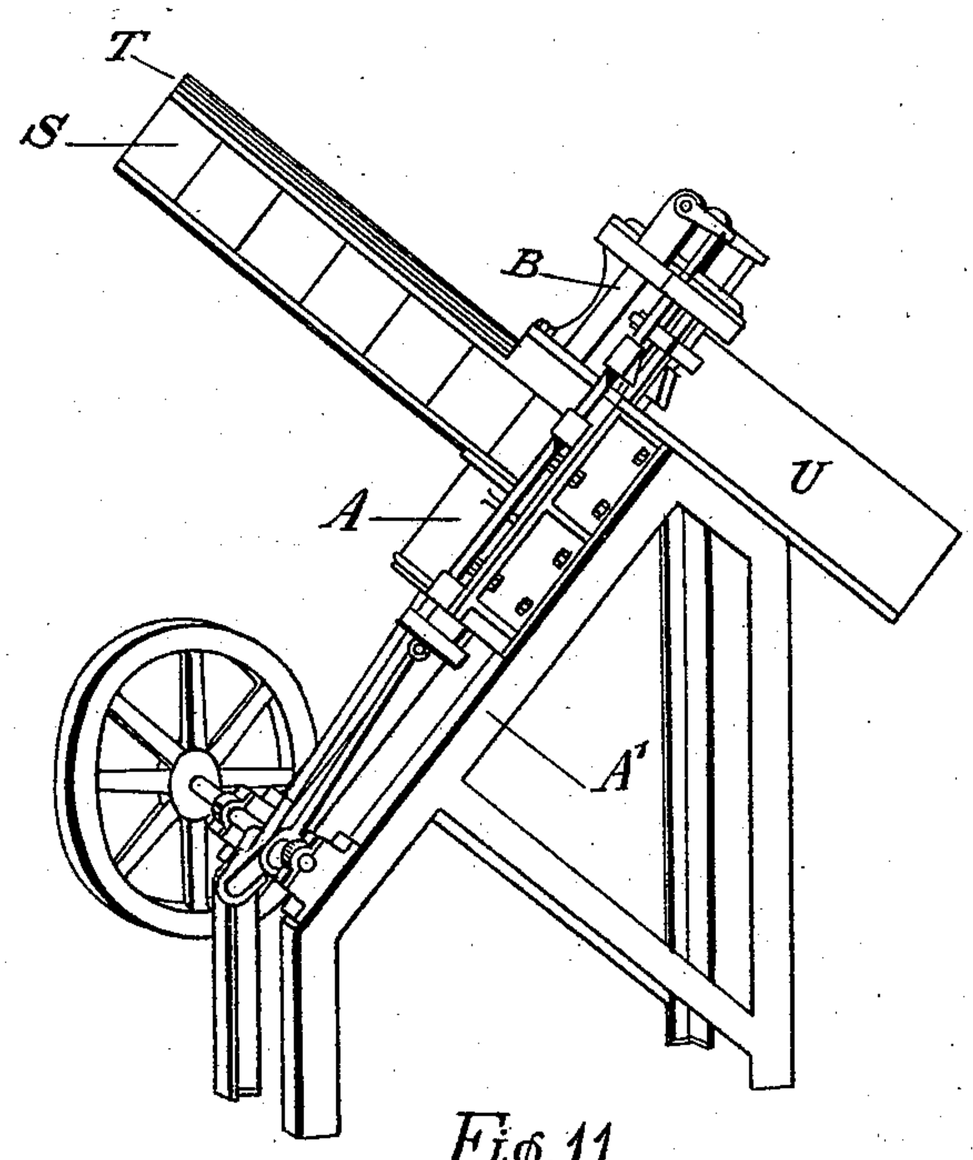

Fig. 11

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UNITED STATES PATENT OFFICE.

ROBERT D. HUME, OF GOLD BEACH, OREGON.

CAN-HEADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 572,360, dated December 1, 1896.

Application filed October 1, 1894. Serial No. 524,675. (No model.)

To all whom it may concern:

Be it known that I, ROBERT D. HUME, a citizen of the United States, residing at Gold Beach, in the county of Curry and State of Oregon, have invented certain new and useful Improvements in Can-Heading Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to machinery for placing heads upon the bodies of metal cans adapted to contain articles of food, such as fish, meat, vegetables, or other substances, and is especially adapted, although not necessarily, to supplying a head to a can already filled with such substances, having one head previously attached and fitted, with the other end open ready to receive the other head.

Heretofore in the art it has been usual to place the heads or covers on filled cans by hand, except in those instances where the heads or covers have been applied by machinery, which forms the ordinary slip-joint, no swaging or crimping of the head of the can being used. In such case the diameters of the can-heads and can-bodies are practically the same and the flange of the can-heads practically straight. Therefore in applying such heads it is necessary to size around and true up the can-body, so as to make its exterior diameter conform to the interior diameter of the can-head in order to telescope the two together. In that way a tight-fitting exterior joint is formed, without any crimping, known as a "slip-joint." I have discovered that a better and tighter outside joint can be made by using a head having an outwardly-flaring rim or flange, which can be joined loosely to the can-body because of its diameter being much larger than the diameter of the can-body. Then by swaging and crimping the head an absolutely tight-fitting exterior joint is made without the necessity of sizing, rounding, or truing up the can-body. My machine secures the head to the can by a swaging and crimping apparatus which compresses the flange of the head upon the body of the can and by the act of compression causes the open rim of the can to expand into the space above the crimped part of the head-flange and thereby make an absolutely tight fit. The can-bodies are not forced into the heads nor are the heads forced upon the can-bodies, but the latter are inserted loosely into heads having flaring flanges, which receive the upper open rims of the can-bodies, and in that position are carried to the crimping mechanism. During the operations of swaging and crimping the can-heads are held in contact with the can-bodies, and the contents of the filled cans remain undisturbed instead of having portions spilled and wasted. This result is produced because the open-ended can is positively centered and placed within the flange of the head, remains there until the crimping process has been completed, and is not subjected to any lateral pressure independently of the head itself.

The following detailed description will give any one skilled in the art a full comprehension of the means by which and the manner in which my can-heading machine operates, and this description should be read in connection with the accompanying drawings, in which—

Figure 1 represents an elevation of the machine. Fig. 2 is a longitudinal section showing the feeding-chutes for can bodies and heads, the cylinder and plunger for moving the can-bodies upward so as to meet the heads, and the crimping mechanism. Fig. 3 is a bottom plan view. Fig. 4 is a plan view of the mechanism for supplying and supporting the can-heads. Fig. 5 is a cross-section of the holder for the can-heads. Fig. 6 is a detail cross-section showing the device for controlling the feed of the heads. Fig. 7 is a plan view of the crimping mechanism. Fig. 8 is an enlarged vertical cross-section of the same. Fig. 9 is an enlarged elevation of the upper casting or cylinder which supports the crimping mechanism. Fig. 10 is a central horizontal section through the same. Fig. 11 is a general perspective view of the whole mechanism.

The operative parts of my machine are preferably supported by an inclined frame or table A′, Fig. 11, upon the incline of which the can-moving devices operate and to which the can bodies and heads are fed. My purpose in using the inclined frame is to permit the can bodies and heads to be supplied by gravity through chutes S and T, respectively, set substantially at right angles to the frame and which feed the can bodies and heads in with their axes in line with the direction of

such incline. The frame may, however, be vertical; but such an arrangement is open to the objection that the can heads and bodies, in order to be supplied with proper regularity and in proper numbers, should be fed in by hand or by additional mechanism instead of by gravity. Secured to this frame is a cylinder A, Fig. 2, open at one side to permit the can-bodies to enter through the chute S. Within this cylinder is a plunger composed of a head A^2, a sleeve C, and a plate A^3, to which is pivoted the connecting-rod A^4, which extends downward to the driving-shaft A^5. The connecting-rod receives reciprocating movement from the rotation of this shaft by means of a crank or an eccentric. The construction of the plunger is best shown in Fig. 2. The head A^2 has a downward flange j, which, by pins j', is secured to the sleeve C. These pins project through slots j^2 in the sleeve, the upper end of the latter surrounding the flange. A pressure-spring j^3 is held in place between the plunger-head and the plate A^3, to which the connecting-rod is attached. A space j^4 is left between the upper rim of the sleeve and the plunger-head equal to the length of the slots through which the pins j' pass. Hence when the plunger commences its upward stroke the sleeve will first move independently of the upper plunger-head providing a little lost motion. As soon as the upper edge of the sleeve strikes the head the latter, carrying the can, is forced upward. On the downstroke the sleeve is pulled down independently, the length of the slots allowing the spring j^3 to keep the plunger-head up against the can in the crimping mechanism until it is pulled down by the upper ends of the slots striking the pins j'.

The flanged can-heads are fed in above the plunger-head by a chute T, placed at the same angle to the frames as the chute S and above the latter. The can-heads have their flanges made flaring outwardly, so that as the cans are pushed up into them they will enter easily and freely without any special means or necessity for forcing or fitting them. This is shown in Fig. 5, the can-head being represented by k. At this point, therefore, the can head and body fit loosely one upon the other and are ready to be impelled still farther upward to the swaging and crimping devices, which close in the flaring flange of the head and make it fit tightly and inseparably.

It is first necessary to describe the special devices by means of which the can-heads are supported in position to receive the cans as they are impelled upward by the plunger. The chute T enters a recess formed in a plate G, Fig. 1, and between the latter and a swaging-plate K, adjoining it on its upper face. Both these plates are held in a square pocket or chamber K', formed with the cylinder A. The plate G has a downwardly-turned flange k' and a central passage k^2. The central opening in the plate G, Fig. 6, exactly fits the can-head for a part of its periphery, but it is of course cut away, as shown in the figure last named, to admit the head from the chute. In the space between the bottom of the box K and the main part of plate G is the sectional preventer-ring H, Fig. 5, composed, preferably, of four segments forced inwardly into contact by springs f upon rods e. The inner arcs or peripheries of these sections are formed upon an upwardly-converging bevel, making the central passage large enough at the bottom to admit the upwardly-moving can, while at the top a support is formed for the head where the passage is too small to let the latter drop through upon the can. It will now be readily understood that when the upper edge of the open end of the can is forced against the beveled sectional ring such sections will yield until the can has entered its head and has then been pushed up far enough to clear the ring H. The sections of the ring H will then spring in below the next head. The can has now a loosely-fitting flaring head applied to its open end. As the plunger continues its upward movement the head and can pass through the beveled swaging-ring K, before referred to as contained in the chamber K' of the main cylinder. This ring closes the flaring flange of the can-head down upon and substantially in line with the body. The can and head now pass into the upper cylinder B, in which the heads are crimped or secured and from which the headed cans are discharged. Thus the single upward stroke of the plunger carries the can into its head, swages the flange, and then carries it farther upward into the crimping mechanism. The cylinder B is secured to the box or pocket K' through its square base B', Fig. 10, and is in reality a half-cylinder provided with two hinged wings or flaps B^2, which, under certain conditions, retain the can in the cylinder and under others permit it to be discharged. Thus while the crimping is being done the hinged wings are rigidly held as parts of the cylinder, so that the can is firmly secured within a substantially continuous holder; but so soon as the head has been crimped the hinged wings are opened to allow the headed can to be discharged by the chute U, Fig. 11. When an inclined frame and chutes are used, the weight of the filled cans will open the wings so soon as their holding devices are withdrawn. With a vertically-moving plunger in a vertical frame, springs would be provided for throwing out the wings and permitting the filled cans to escape.

The can with its loose head carried upward by the plunger depresses and snaps over a spring-bolt b, having a beveled end, which prevents it from dropping downward, Figs. 9 and 10. At this time the wings of the cylinder are ready to be closed and rigidly hold the can in conjunction with the half-cylinder B while the crimping is being done. The devices for closing these wings inward are operated from the driving-shaft of the machine

through the sliding rods I I, which have bearings in the upper and lower castings. These rods reciprocate in line with the cylinders by means of cranks or eccentrics on the driving-shaft, their movements being so timed that as soon as the can and head have entered the upper cylinder the wings are closed inward and are firmly held. The same rods operate the crimping mechanism, which will be hereinafter described.

Still referring to Figs. 9 and 10, it will be seen that pins l are pivoted in the upper cylinder. To these pins are secured levers l', having rollers l^2, which bear upon the outer faces of the wings. Each rod I is provided with an incline I'. (See dotted lines in Fig. 10.) As both rods rise their inclines strike the edges of the levers l' and move them inward, causing their rollers to bear upon the pivoted wings, forcing both wings inward and clamping the can within the upper cylinder ready for the crimping operation. It must be borne in mind that at this point we have an open-ended can fitted at such end with a head loosely swaged, inclosed, and held rigidly within the upper cylinder B by means of the wings or flaps just described and the head of the plunger.

The cylinder B is provided with an integrally-formed or otherwise-fixed head B^3, Fig. 2, having an upwardly-extending circular flange m. D is a ring having downward-beveled projections m', and which fits within the flange m. Preferably these projections are four in number, and they pass through slots in the covering-plate F, Fig. 8, the latter being secured to the cylinder-head. The covering-plate is centrally recessed and is provided with a strong spring m^2, the upper end of which bears against the wedge-plate D and tends to force it constantly upward.

E are the crimping-dies, shown as four in number, having beveled outer peripheries and so disposed between the ring D and the plate F as to be forced inward against the can-head when the plate D is forced down, bringing the opposing bevels in contact, Fig. 2. The sections of the die E are normally forced outward by springs m^3 whenever the ring D is raised, Fig. 7, such springs being held within recesses in the covering-plate and bearing against the dies. Each section of the die is provided with a crimping edge m^4, which, when the dies are forced inward, bears upon the flange of the can-head and forces it inward throughout its whole circumference. The effect of this crimping-pressure is to close the flange tightly against the can-body and at the same time to crease the latter sufficiently to cause its upper edge to expand outwardly above the crease. By this it will be understood that the crimping-dies bear upon the flange of the can-head just above its lower edge and below the upper edge of the can-body, so that the upper edge of the latter is caused to flare slightly outward, tending to fill the space in the can-head above the crease and thus secure the head with absolute firmness to the body.

It has been stated that the spring m^2 tends constantly to throw the ring D upward and thus relieve the crimping-dies from pressure. This spring is overcome and the dies operated by forcing the ring D downward by mechanism operated by the rods I before described. A cam M is keyed upon a shaft M', the latter being journaled in standards M^2 on the upper cylinder-head. A lever L is secured to each end of the shaft M', these levers being struck and thrown upward by the rods I at each revolution of the crank-shaft. The cam M bears upon a cup N, which in turn bears upon the ring D and forces the latter down, compressing its spring m^2 and thereby driving the crimping-jaws inward, as before described. When the rods I descend, the spring m^2 throws the ring D upward and permits the crimping-die springs to force its sections outward. The withdrawal of the crimping-dies releases the can, which follows the piston downward until it is stopped by the bolt b, and is then discharged through the open wings of the upper cylinder into the chute U.

In Fig. 6 I have shown a simple device for holding each can-head back while the preceding can and head are passing through the preventer ring or support and into the swaging ring or plate. A recess is formed in one of the sections of the ring H in line with the chute T. Above and below the plate G and ring H are plates a' and a, the former being a continuation of the chute. In the inner end of the plate a' is a pin w, having a spring w'. The foot of this pin is beveled, so that when the sections of the ring H are forced outward the inclined end of the recess bears upon the foot of the pin and forces it upward through an opening in the plate a'. While the sections of the ring H are being forced inward the spring w' withdraws the pin w and permits the next can-head to pass into the machine.

It should be stated that when cans are to be headed with very thin or light metal round disks or blanks can be fed down the chute T instead of flanged can-heads. Such blanks will be enough greater in diameter than the can to form the flange when pushed upward through the swaging ring or plate. In this case after being swaged the head is crimped upon the can in the manner before described.

It is not essential that the crimping-dies should be of the exact shape shown in the drawings. When a receptacle of any kind has its upper edge or rim turned down over and around a stiffening-wire, the crimping-dies can be so shaped as to fold or crimp the flange of a head around such turned-down portion and thus secure it.

In the operation of the machine as described it will be observed that the can-body is moved by the plunger and inserted or entered into the can-head, the latter resting on its seat. I do not, however, limit myself to

this precise method, as it is obvious that the can-body may remain stationary on a seat while the head is moved and dropped or placed over it, or both head and body may be moved simultaneously into contact, after which the swaging and crimping operations may be performed.

Having described my invention, what I claim is—

1. In a machine for heading cans and in combination, means for feeding and holding in line can-bodies and flanged can-heads, a plunger for telescoping such can-bodies and can-heads together and for impelling them onward without changing the direction of motion which telescoped them, and mechanism located in the specified line of motion for compressing the flange of the head upon the can-body, substantially as described.

2. In a machine for heading cans, a reciprocating plunger for telescoping the can-body and its head together and for impelling the can body and head onward in the same line of motion which telescoped them, in combination with mechanism located in the specified line of motion for crimping the flange of the head against the outside wall of the can-body, and thereby making a tight exterior joint, substantially as described.

3. In a machine for heading cans, a chute for supplying the can-bodies, a chute for supplying the can-heads, a guide-passage for the can-bodies, a plunger for entering such can-bodies into the loosely-fitting heads, and then by the same stroke carrying such bodies and heads onward through the guide-passage, in combination with mechanism for crimping the heads upon the can-bodies, substantially as described.

4. In a can-heading machine, a tube or passage, a plunger working therein, a can-body chute connected with said passage, a can-head chute connected with said passage, and a sectional support for the can-heads yielding by the movement of the can-body and plunger so as to permit the can-body to enter the can-head, substantially as described.

5. In a can-heading machine, an inclined frame, a guide tube or passage supported thereby, a plunger working in said tube, crimping mechanism at the upper end of said tube, separate feed-chutes for can-bodies and can-heads entering said tube, substantially at right angles to the incline of the frame, and a discharge-chute, also substantially at right angles to said frame, substantially as described.

6. In a can-heading machine, the combination with a cylinder or passage for cans, having a plunger working therein, a chute for supplying can-bodies to said cylinder, a chute for supplying can-heads to said cylinder, and a support to receive the can-heads from their chute and retain them in line with the can-body and plunger, but adapted to yield and permit the can-body to enter its head, substantially as described.

7. In a can-heading machine, the combination with a cylinder or passage for the can-bodies, a plunger working therein, and a sectional support for the can-heads consisting of a sectional ring having springs for pressing it inwardly and adapted to yield as the can-body is impelled by the plunger, so as to permit the can-body to enter its head, substantially as described.

8. In a can-heading machine and in combination, a cylinder or passage for cans, a plunger working in said cylinder and forming a support for the can-bodies, a beveled sectional ring for supporting the can-heads above the plunger, a stationary plate surrounding said sectional ring, and springs interposed between said ring and plate, whereby said sections can yield and permit the can-body to enter the can-head, substantially as described.

9. In a can-heading machine, the combination of crimping mechanism, a driving-shaft having connections for operating said crimping mechanism, a cylinder or passage for can-bodies and can-heads, and a plunger connected to said driving-shaft, and working in said cylinder, said plunger consisting of two heads connected by a pressure-spring, and an external shell connected rigidly to the lower head and by slots and pins to the upper head, substantially as described.

10. In a can-heading machine and in combination, a cylinder or passage, a plunger working in said cylinder, a beveled swaging-ring for closing the can-head against the can-body, crimping mechanism for compressing the head upon the body, driving mechanism connected to said plunger for moving the can bodies and heads, and connections from said driving mechanism for operating the crimping mechanism, substantially as described.

11. In a can-heading machine, a two-part cylinder or passage for cans, a crimping mechanism in the upper part of the cylinder, a device in the lower part of the cylinder for forcing the can heads and bodies into the upper cylinder, and a driving mechanism having connections to said plunger and also to said crimping mechanism, substantially as described.

12. In a can-heading machine, a two-part cylinder, the upper part of which is a half-cylinder having hinged wings, a plunger in the lower part of said cylinder, crimping mechanism in the upper part of said cylinder, a driving mechanism and connections therefrom for operating said plunger, said wings, and said crimping mechanism, substantially as described.

13. In a can-heading machine, a cylinder or passage for can-bodies and can-heads, a mechanism for telescoping such can-bodies and can-heads together and for impelling said can bodies and heads through the said passage, dies for crimping said head upon said body, and mechanism for operating the crimping-dies, substantially as described.

14. In a can-heading machine, the combi-

nation with a plunger forming a support for a can-body and its head, of a sectional crimping-die, springs for forcing the sections of said die outward or apart, a wedge-plate for positively forcing said sections inward or together, means for positively operating said wedge-plate for the purpose last named, and means for releasing the die-sections from the pressure of said wedge-plate, substantially as described.

15. In a can-heading machine, and in combination, a crimping-cylinder B, a plunger for supplying can-bodies and flanged can-heads to said cylinder and for supporting them therein, a discharge-opening in said cylinder, pivoted wings for alternately opening and obstructing said discharge-opening, crimping mechanism carried by said cylinder and operated substantially as described, and a spring-bolt *b*, for entering between the descending plunger and the can-body in said cylinder, so as to insure the discharge of the completed can from the cylinder, substantially as described.

16. In a can-heading machine, and in combination, a crimping-die composed of separate sections beveled upon their outer peripheries, a slotted plate secured to a cylinder by which the crimping-sections are carried, a wedge-plate having projections adapted to enter said slots and bear upon the said sections, and means substantially as described for alternately forcing said plate against the said sections, and for retracting the said plate, substantially as described.

17. In a can-heading machine having a cylinder or passage and a plunger working in said passage, a chute for feeding can-bodies to said passage, and independent chute for feeding can-heads to said passage above the can-body, a yielding support for holding said can-head, and a spring mounted in a recess in said yielding support, and adapted by its yielding movement to be projected into the can-head chute, substantially as and for the purposes described.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 8th day of September, 1894.

ROBERT D. HUME.

Witnesses:
L. W. SEELY,
H. G. LEONARD.