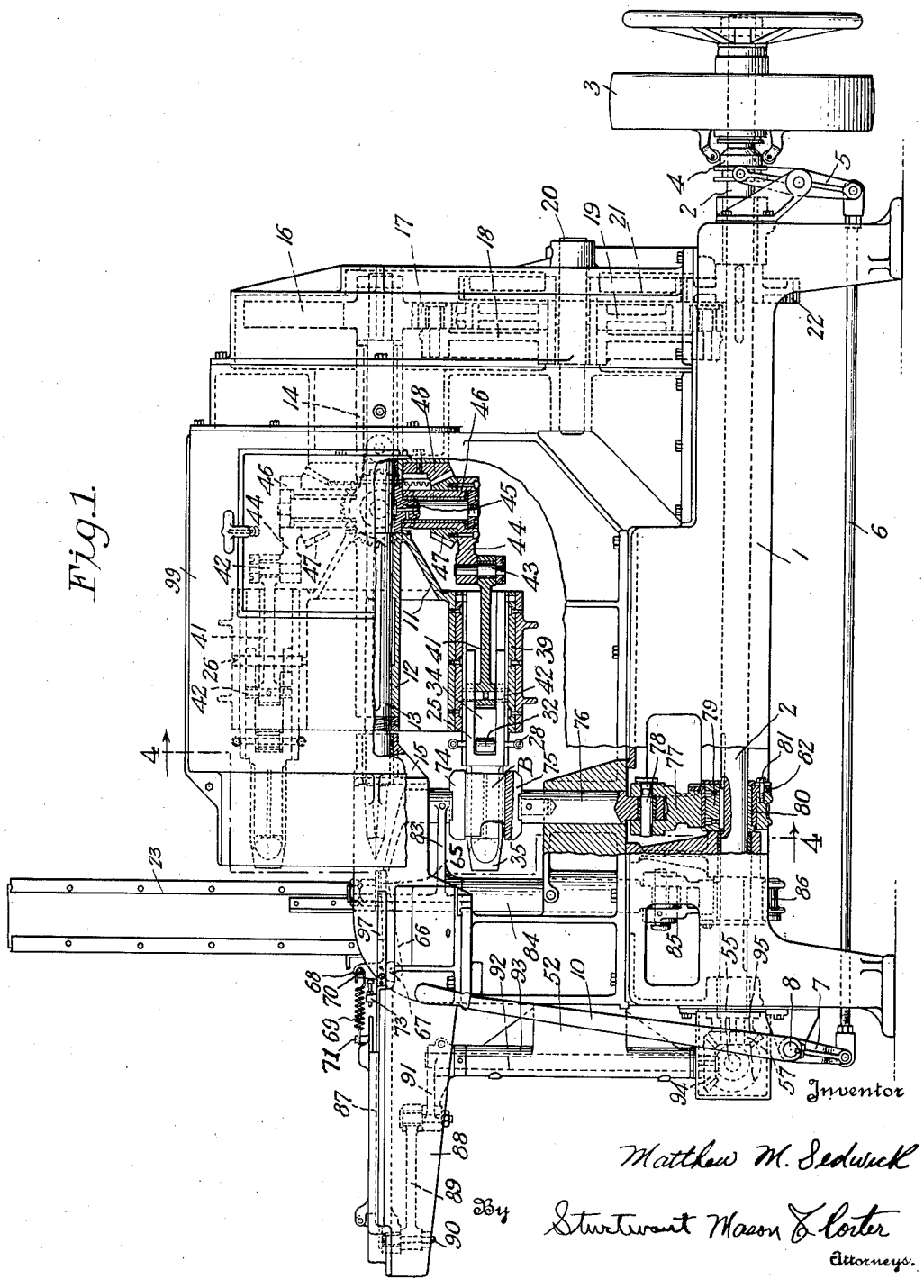
Dec. 18, 1934. M. M. SEDWICK 1,984,600

MACHINE FOR SHAPING METAL CAN BODIES

Filed Jan. 12, 1931 5 Sheets-Sheet 1

Fig. 1.



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MACHINE FOR SHAPING METAL CAN BODIES

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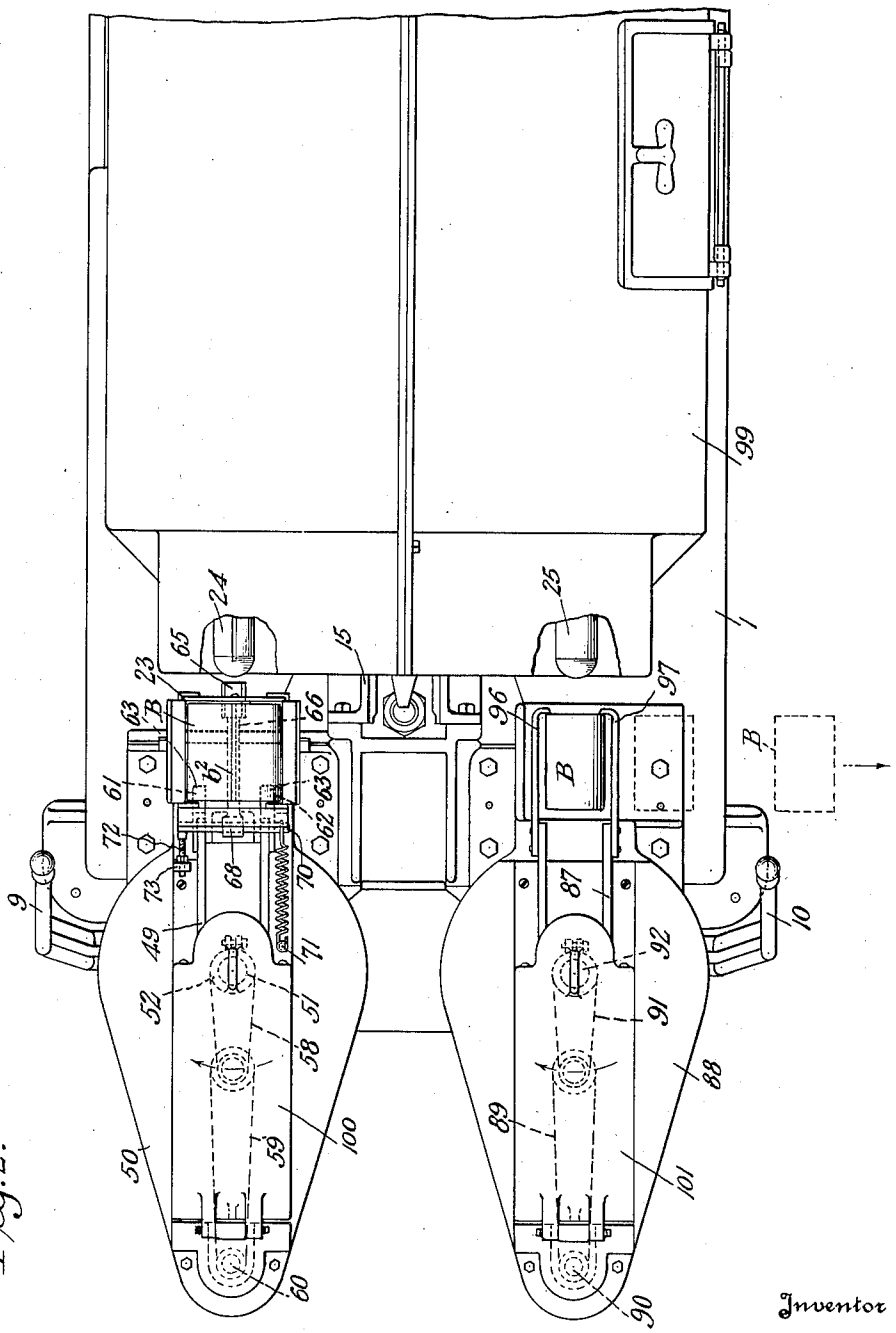


Fig. 2.

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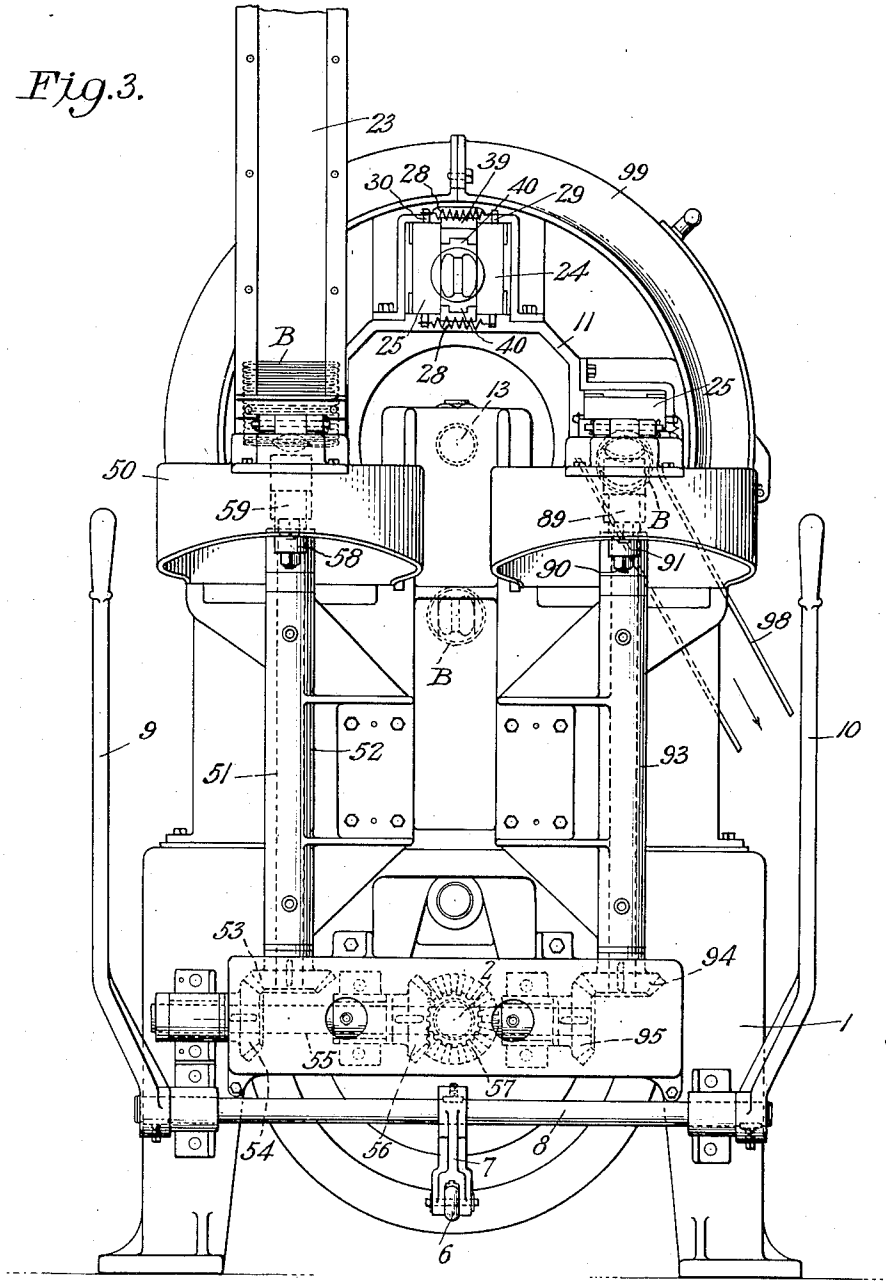
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MACHINE FOR SHAPING METAL CAN BODIES

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Fig.3.



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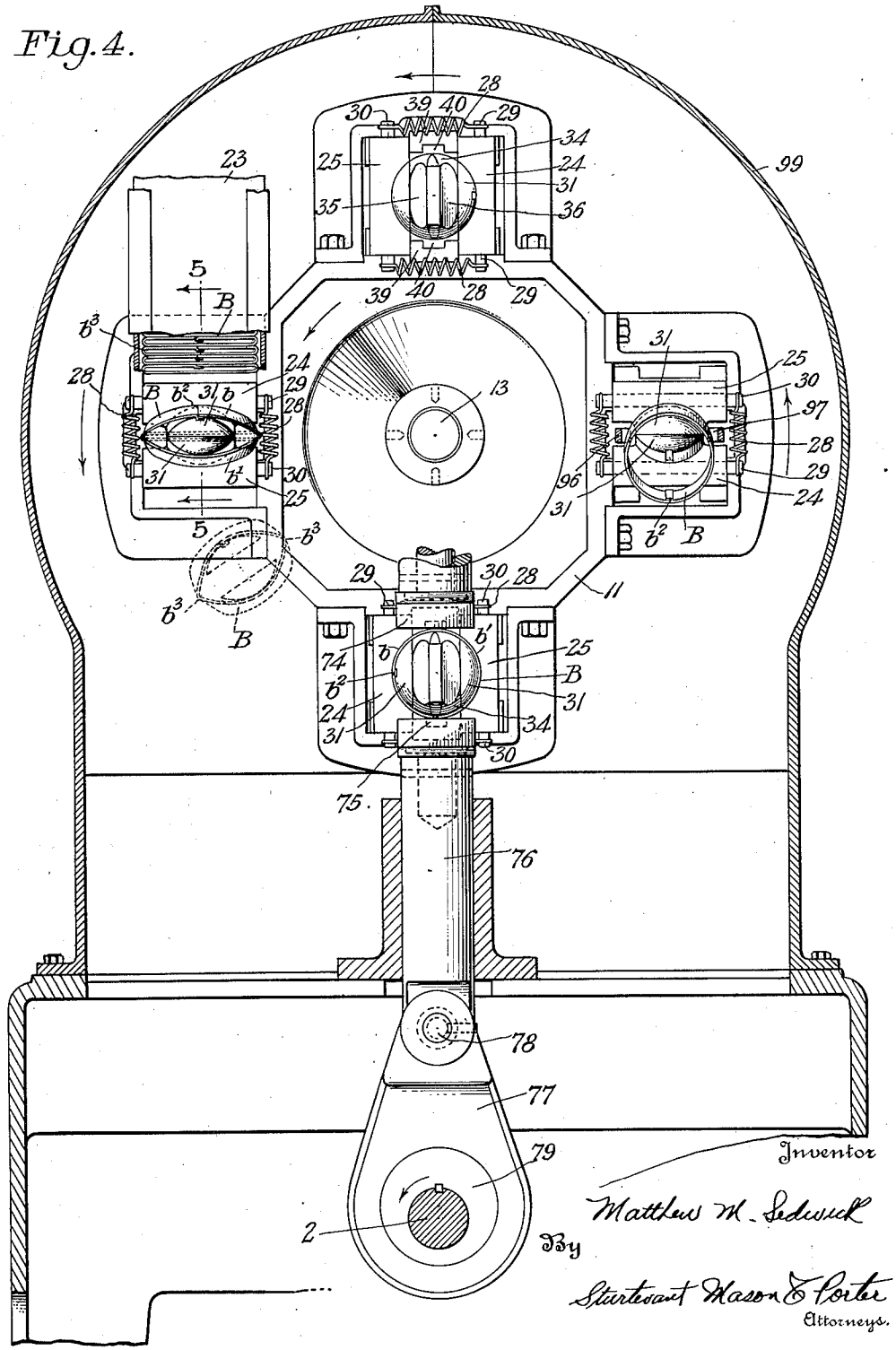
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MACHINE FOR SHAPING METAL CAN BODIES

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Fig. 4.



Dec. 18, 1934. M. M. SEDWICK 1,984,600

MACHINE FOR SHAPING METAL CAN BODIES

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Fig.5.

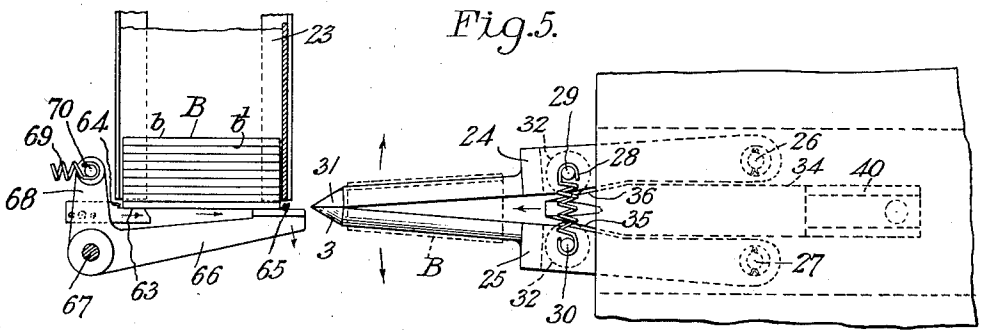


Fig.6.

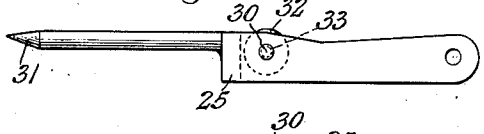
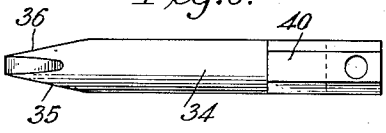


Fig.8.



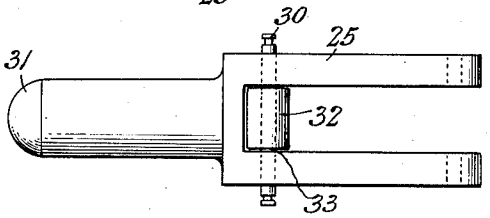


Fig.7.

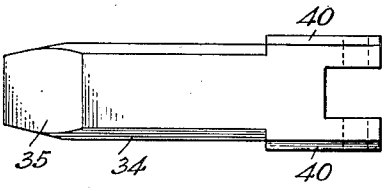
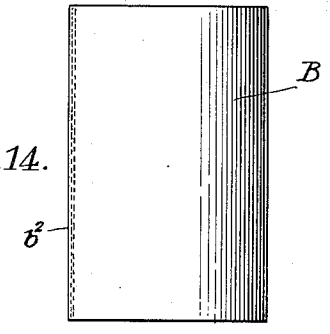


Fig.9.

Fig.14.



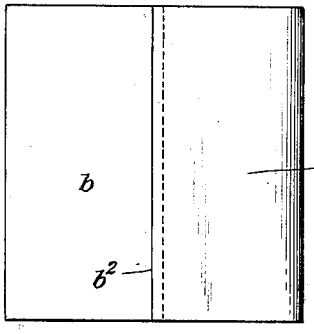


Fig.10.

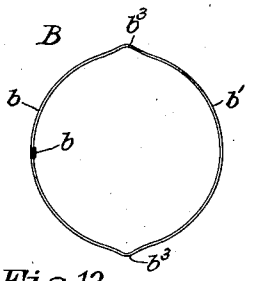


Fig.12.

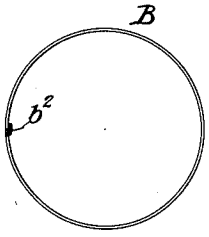


Fig.13.

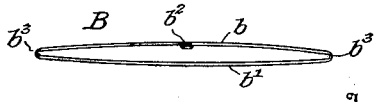


Fig.11.

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1,984,600

UNITED STATES PATENT OFFICE

1,984,600

MACHINE FOR SHAPING METAL CAN BODIES

Matthew M. Sedwick, Syracuse, N. Y., assignor to Continental Can Company, Inc., New York, N. Y., a corporation of New York

Application January 12, 1931, Serial No. 508,347

19 Claims. (Cl. 153—32)

The invention relates to new and useful improvements in a machine for shaping can bodies. In order to facilitate the shipping of can bodies constructed so as to form a cylindrical body, it is desirable to first form the bodies in a flattened elliptical shape so that they can be placed in a relatively small space for shipment. The present invention has to do with a machine for the shaping of a can body initially formed so that it is relatively flat in cross section, into cylindrical form.

An object of the invention is to provide a machine adapted to receive a can body which as formed has a flattened elliptical shape in cross section, and which is provided with means for expanding said can body into cylindrical shape and also with means for bumping the can body in the region of the side edges or elliptical ends for shaping said body into a true cylindrical form.

A further object of the invention is to provide a machine of the above type wherein the can bodies are automatically placed on expanding mandrels, automatically shaped and bumped while on said mandrels and automatically discharged from said mandrels after said body has been changed into cylindrical shape.

A still further object of the invention is to provide a machine of the above type having a plurality of mandrels movable intermittently to the station where the can bodies are placed thereon, then to the bumping station and finally to the discharge station.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings which show by way of illustration one embodiment of the invention—

Figure 1 is a view partly in side elevation and partly in section showing a machine embodying the improvements;

Fig. 2 is a plan view of the machine with parts broken away to show portions of the expanding mandrels;

Fig. 3 is an end view of the machine;

Fig. 4 is a view partly in section on the line 4—4 of Fig. 1 showing more or less diagrammatically the expanding mandrels, the loading station, the bumping station and the discharge station;

Fig. 5 is a view on the line 5—5 of Fig. 4, showing diagrammatically the expanding mandrel and the stack holder for the can bodies, also the manner of loading the can body on to the mandrel;

Fig. 6 is a detail in side view showing one section of the mandrel;

Fig. 7 is a plan view of the same;

Fig. 8 is a side view of the cam rod for expanding the mandrel;

Fig. 9 is a plan view of the same;

Fig. 10 is a side view of the can body as initially formed in its flat substantially elliptical shape;

Fig. 11 is an end view of the same;

Fig. 12 is an end view of the can body after it is expanded and before it is bumped;

Fig. 13 is an end view of the can body after it has been expanded and bumped and is in its final cylindrical shape, and

Fig. 14 is a side view of the can body in its final cylindrical shape.

In order to facilitate the shipping of can bodies which, when formed into cans, are cylindrical, it has been desirable to initially construct the can body in a flattened elliptical shape in cross section. The can body is bent or formed into a flat cross sectional shape and the side edges thereof are seamed together in the usual manner. The can bodies so formed may be placed one flat on another, and thus the can bodies in large quantities can be stored in a comparatively small space for shipment. After the can body has been shipped to the place where it is to be used, then it is shaped into cylindrical form, flanged and the ends attached thereto. The present invention has to do with a machine for shaping the initially formed flat can body into a cylindrical form. The machine includes a magazine into which the flat can bodies are placed and from which they are fed, one at a time, to the machine for shaping the same into cylindrical form. A turret mounted for rotation about a horizontal axis is provided with a series of collapsible mandrels. A can body is slid on to the mandrel, from the magazine, and while it is being loaded on to the mandrel, the turret remains stationary. Then the turret is rotated so as to bring the can body on the mandrel to the bumping station, and during the rotation of the turret, the mandrel is expanded so as to change the flat can body into substantially cylindrical form. In the region at the side edges of the flattened can body, the metal is slightly out of true cylindrical shape, and the can body is, therefore, brought to a bumping station, wherein bumping dies engage the can body on the mandrel in the region of the side edge portions of the flattened can body, and during this bumping operation, these portions are changed

into true cylindrical shape conforming to the cylindrical shape of the designed can body.

The turret remains stationary while the can body is being bumped. The turret then carries the mandrel to the discharge station and while it is moving from the bumping staion to the discharge station, the mandrel is collapsed so as to permit the can body to be readily removed therefrom, and it is automatically stripped from the mandrel and discharged from the machine.

Referring more in detail to the drawings, the invention is shown as embodied in a machine which includes a supporting bed 1 in which a main operating shaft 2 is mounted. The shaft is driven from a belt wheel 3 and is controlled by a suitable friction clutch 4 which is shifted by a lever 5. A link 6 connected to the lever 5 is also connected to a depending arm 7 on a rock shaft 8. The rock shaft 8 is provided with hand levers 9 and 10, one at each side of the machine. These levers are at the front or operative end of the machine, so that the operator standing at either side may readily shift the clutch for controlling the operation of the machine.

Mounted on this bed 1 is a supporting frame in which is mounted for rotation a turret 11. The turret 11 includes a central sleeve 12 mounted on a shaft 13 which is journaled in a bracket 14 at one end thereof and a bracket 15 at the other end thereof. These brackets are carried by the supporting bed. The turret 11 is attached to this sleeve 12 and rotates with the shaft. The shaft is intermittently rotated by means of a Geneva stop motion, which includes a wheel 16 attached to the shaft and having radial slots therein in which a roller 17 carried by a wheel 18 engages for turning the turret through one stop motion. The turret is held from rotation by a locking wheel 19. The wheels 18 and 19 are carried by a stub shaft 20 to which is attached a gear 21. This gear 21 meshes with a gear 22 on the main actuating shaft 2. This Geneva stop motion may be of any desired form, the essential feature being that the turret shall be rotated through a certain angular motion and then be brought to a standstill where it is held in fixed position while certain operations take place in the machine. The machine as designed, has a Geneva stop motion which rotates the turret through ninety degrees and then stops the turret.

Mounted on the turret are a series of units for receiving and expanding the can body into cylindrical form. The can body and the steps which it passes through in forming the same into cylindrical shape is illustrated in Figures 10 to 14, inclusive. The can body B, as shown in Figures 10 and 11, has a flattened elliptical shape in cross section. The two side walls b and b^1 are substantially flat and parallel. The edges are joined in a side seam indicated at b^2. The side edge portions of the can body, as indicated at b^3, b^3, are sharply rounded. The can body is made in the form shown in Figures 10 and 11, on a body maker which folds the blank about a shaping horn. The machine forms hooks at the ends of the blank which are interlocked, bumped together and finally soldered so as to complete the side seam. The can body thus formed is shipped to the place where the cans are to be used. By making the can bodies in this form, they may be stacked flat, one on another, and thus the space occupied by the can bodies greatly reduced from that occupied by a cylindrical can body. The can body thus shaped is placed on a mandrel which is expanded so as to form the body into the shape illustrated in Fig. 12. The body walls b and b^1 are substantially cylindrical, as thus shaped, but the side edge portions b^3, b^3 are still curved about a radius very much shorter than the radius of the cylindrical can body. The can body thus expanded, is then presented to a bumping station, where dies operate upon the edge portions b^3, b^3, and form said edge portions into a true cylindrical shape conforming to the cylindrical shape of the can body. The can body thus shaped is flanged and the ends attached in the usual manner. The finished cylindrical can body is shown in edge view in Fig. 13, and in side view in Fig. 14.

The cam bodies are stacked in a stack holder 23 and are fed, one at a time, from the stack holder to an expanding mandrel which forms a part of each shaping unit carried by the turret. There are four of these shaping units on the turret. Said shaping units are all similar in construction. Each shaping unit consists of two outer sections of a mandrel 24 and 25. These sections are pivoted respectively at 26 and 27 to the turret. A pair of springs 28 engaging a pin 29 on the section 24, and a pin 30 on the section 25, normally presses the two sections toward each other. Each section is provided with a tapered end 31, and these two tapered ends, when in contact with each other, form a cone-shaped entering end for directing the can body on to the mandrel. Each outer section is also provided with a roller 32 pivoted at 33, and so disposed in the outer section as to project slightly beyond the inner face of the section. The mandrel also is provided with a central section 34. This central section 34 is provided with cam-shaped ends 35 and 36. The central section lies between the two outer sections, and when moved endwise between these two sections, the cam faces 35 and 36 will engage the rollers 32 on the outer sections of the mandrel, and force said sections outwardly. The central section 34 of the mandrel, and the outer sections 24 and 25 are so shaped that when the central section 34 has been moved to the left so as to expand the mandrel, as viewed in Fig. 1, produces a substantially cylindrical surface, conforming to the inner cylindrical surface of the can body.

The central section 34 of the mandrel is mounted so as to slide endwise in suitable guide blocks 39, 39. These guide blocks are provided with grooves extending lengthwise thereof, and the mandrel section 34 is provided with ribs 40, 40 which engage these grooves in the blocks 39, 39. The rollers 32 make contact with the cam faces 35 and 36, and this greatly facilitates the movement of the expanding section 34 of the mandrel.

The inner end of the section 34 of the mandrel is forked, and a link 41 is connected to a pin 42 passing through this forked end, and thus the link is joined to the central mandrel section. This link 41, at its inner end, engages a crank pin 43 carried by an arm 44. Mounted for rotation with the turret is a sleeve 45 which is provided with four radially projecting hubs. On each hub is a sleeve 46 and the arm 44 is attached to this sleeve 46. Also secured to the sleeve 46 is a bevel gear 47, which meshes with a fixed bevel gear 48 attached to the end bracket 14. The crank arms 44 are so timed that the central section of the mandrel is at the extreme end of its outer movement and the mandrel expanded in the shaping unit at the upper side of Fig. 4. As

the turret rotates, the bevel gear 47 traveling on the stationary gear 48 will cause the crank arm 44 to turn through an angle of one hundred and eighty degrees when the turret is moving from one stop position to the next stop position, and therefore, when the shaping unit is in the position indicated at the left in Fig. 4, the central section has moved inward to its inner extreme position and the mandrel is collapsed or contracted to the position shown in Fig. 5. As the turret moves through another angle of ninety degrees, the crank arm 44 is caused to rotate through an angle of one hundred and eighty degrees and bring the inner section to its extreme outer position, and the mandrel is fully expanded. Again, as the turret turns through an angle of ninety degrees to the position shown at the extreme right in Fig. 4, the mandrel is collapsed. This is the discharge station where the shaped can body is stripped from the mandrel while the station at the extreme left of Fig. 4, is the station where the flat can body is forced on to the mandrel. The station at the bottom position in Fig. 4, is the bumping station, and the station at the top in Fig. 4, is the idle station.

The can bodies, as noted above, are placed in the stack holder 23. This stack holder is positioned so that the lower end thereof is directly opposite the shaping unit at the left of Fig. 4. The turret comes to a standstill with the mandrel at this position, and the mandrel is collapsed ready to receive a can body from the stack holder. The can bodies are stripped from the stack holder by a feed slide 49. This feed slide 49 is mounted in a bracket 50, so that it can slide in a direction substantially in alinement with the axis of the mandrel, and beneath the stack holder 23. The slide is moved back and forth by means of a shaft 51 which is mounted in a supporting bracket 52 carried by the frame of the machine, and this shaft is provided with a gear 53 at its lower end which meshes with a gear 54 on a cross shaft 55. The cross shaft 55 carries a gear 56 which in turn meshes with a gear 57 on the end of the main shaft 2. On the upper end of this shaft 51 is a crank 58 which is connected to a link 59, and the link 59 in turn is connected to a pin 60 attached to the feed slide 49. The feed slide is provided with two spaced supporting and stripping fingers 61 and 62. These fingers are bolted to the ends of the feed slide and each finger has a supporting face 63 which terminates in a shoulder 64 at its inner side. The can bodies in the stack rest on these two fingers and a forward supporting finger 65. This forward supporting finger, as shown in Fig. 2, is located directly in front of the mandrel and serves to guide with certainty the can bodies stripped from the stack on to the tapered end of the mandrel. The supporting finger 65 is carried by an arm 66 which is pivoted at 67. The forward end of the feed slide is cut away centrally thereof to provide a space for an upwardly projecting arm 68 formed as a part of the arm 66. A spring 69 is attached to a pin 70 carried by the arm 68. The other end of this spring engages a post 71 on the supporting bracket for the feed slide. This spring normally tends to lift the outer end of the arm 66 and the supporting finger 65 carried thereby. A stop screw 72 carried by a bracket 73 is adapted to engage the pin 70 and limit the swinging movements of the arm 66. By adjusting this stop screw, the outer end of the arm 66 may be properly spaced so as to insure the can body as it is stripped from the stack holder registering with the mandrel and passing over the tapered ends 31, 31 of the sections of the mandrel. The feed slide directly in rear of the shoulder 64 is slightly tapered and this shoulder is of sufficient height so that it engages the end edge of the lowermost can body only. The next can body as it falls on to the upper face of the feed slide will be supported thereby so that the stack is supported by the feed slide as the lowermost can body is being moved endwise on to the mandrel. As the can body moves on to the mandrel, the tapered end thereof will cause the can body to begin its expansion, and the finger 65 can yield downwardly so as to permit the free movement of the can body on to the mandrel. The side walls of the can body which is formed of elliptical shape and then flattened in storage, naturally tend to spring away from each other, and therefore, as soon as the can body is moved from beneath the stack, the side walls separate so as to facilitate the entering of the wedge end of the mandrels. After the can body has been placed on the mandrels as indicated in Fig. 5, then the turret turns to an arc of ninety degrees, which brings the mandrel having received the can body to the bumping station. The mandrel as it passes from the position shown at the left in Fig. 4, to the position shown at the bottom of Fig. 4, is expanded. This is due to the fact that the gear 47 traveling on the stationary gear moves the central expanding section of the mandrel. In dotted lines, the mandrel is shown as partly expanded, and the opening of the can body on its way from this station at the left of Fig. 4 to the station at the bottom of said figure.

When the can body reaches the bumping station, then the edge portions are bumped so as to form the body into a uniform cylindrical shape, as referred to above. This is accomplished by two bumping dies 74 and 75. The bumping die 75 is carried by a rod 76 mounted for reciprocation in the frame of the machine. Said die is detachably connected to the upper end of said rod 76. The lower end of the rod 76 is connected to an eccentric strap 77 by means of a pin 78. The eccentric strap is forked, and the pin passes through the forked ends and through the lower end of the rod 76. Mounted on the shaft 2 is an eccentric sleeve 79. Surrounding this eccentric sleeve 79 is a holding eccentric sleeve 80 which is secured to the first-named eccentric sleeve by a bolt 81. The bolt 81 passes through a slot in a flange 82 carried by the sleeve 80. An eccentric strap engages these eccentric sleeves which form the operating eccentric for moving the rod 76 carrying the bumper. By adjusting the sections of the sleeve, the extent of movement imparted to the bumper in an upward direction toward the mandrel can be varied. The bumping die 74 is carried by a bracket arm 83. The bracket arm 83 is rigidly attached to a rod 84 mounted for vertical reciprocation in suitable bearings carried by the frame. This rod 84 is connected to an eccentric strap 85 cooperating with an eccentric 86 attached to the shaft 2. This eccentric is constructed for adjustment in a manner similar to that described in connection with the eccentric which operates the lower bumping die. The eccentrics are timed so that as the lower die moves upward, the upper die moves downward. When the mandrel reaches the position between the bumping dies, the side edges of the central

sections 34 of the mandrel are in alignment with the bumping, and it is on this section that the edge portions of the can body to be bumped are located. The bumping dies striking the end portions of the body force the same so as to cause the metal therein to conform to the shape of the outer faces of the central section of the mandrel. Thus it is that the can body by the bumping of these side edge portions is brought into a true cylindrical form throughout.

After the can body has been bumped, the turret is then turned through another angle of ninety degrees, and while it is passing through this angular movement, the mandrel is collapsed by the withdrawing of the central section. This releases the can body so that it can be readily stripped from the mandrel sections. In order that the can body may be positively stripped from the mandrel, a stripping means has been provided which includes a reciprocating slide 87 mounted for reciprocating movement on a bracket 88. This slide is moved back and forth by means of a link 89 connected to a pin 90 attached to the slide. The link 89 at its other end is connected to a crank 91 which is carried by a shaft 92 (see Fig. 2). The shaft 92 is mounted in a supporting sleeve bearing 93 and carries a bevel gear 94 at its lower end. This gear meshes with a bevel gear 95 carried by the cross shaft 55. Attached to the inner end of the slide 87 are two stripping hooks 96 and 97. These stripping hooks are spaced from each other. The crank 91 is so timed that the stripping hooks 96 and 97 are at the inner end of their stroke when the mandrel with the can body thereon is moving to the position at the right in Fig. 4. Thus it is that the can body is carried between the hooks so that the inner hook ends thereof overlie the inner edges of the shaped can body. While the turret dwells at this station, the slide 87 is retracted, and the can stripped from the mandrel. The same is true as to the feeding-in station. The crank operating the feed slide is timed so that when the mandrel remains stationary at the feeding-in station, the feed slide moves forward and places the can body on the mandrel. When the can body is withdrawn from the mandrel, it is dropped into a chute 98 and passes out of the machine. In order to protect the operator, the machine is provided with a suitable closing covering 99 which also covers the mandrels, and the operating parts for the feed slides are also shielded and covered by the supporting bracket therefor. There is a hinge cover plate 100 on top of the feed slide and also a hinge cover plate 101 on top of the stripping slide which may be raised in order to give access to the moving parts beneath the same.

From the above it will be apparent that a machine has been provided which operates to shape a can body which is initially formed so that it has a substantially flattened elliptical shape in cross section. The can bodies are taken from the stack holder where they may be readily stacked in this flat condition, one at a time, and placed on the expanding mandrel, which as the turret carrying the same rotates, is expanded to shape the can body into cylindrical form. Inasmuch as the can body is formed in this flat condition, the metal between the side edge portions thereof has not been bent beyond its elastic limit, and therefore, it is smooth and unbroken. The edge portions have, of course, been sharply curved in the forming of the body. The expanding of the mandrel readily shapes into cylindrical form all of the body portion between these side edge portions which were sharply bent in the initial forming of the can body. The bumping dies engaging these edge portions will form therein the true cylindrical shape of the can body, and thus it is that the can body is finally shaped into a cylindrical form which is of true cylindrical shape, smooth and free from flat sections throughout the entire extent thereof.

While the machine is shown and described as intermittently operated and stopped while the loading of the can body on the mandrel takes place, and also while the can body is bumped, it will be understood that from certain aspects of the invention, the turret carrying the can bodies and the mandrel, may be continuously operated instead of intermittently operated.

It is obvious that changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

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

1. A machine for forming cylindrical can bodies comprising an expansible means adapted to enter a can body of flat cross-sectional shape, means for operating said expansible means for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, and reciprocating means for simultaneously bumping the side edge portions into the cylindrical form given said side walls.

2. A machine for forming cylindrical can bodies comprising a collapsible mandrel adapted to enter a can body of flat cross-sectional shape, means for operating said collapsible mandrel for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, and reciprocating means for simultaneously bumping the side edge portions while on the mandrel into the cylindrical form given said side walls.

3. A machine for forming cylindrical can bodies comprising an expansible means adapted to enter a can body of flat cross-sectional shape, means for operating said expansible means for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, means for placing a can body on said expanding means, reciprocating means for simultaneously bumping the side edge portions into the cylindrical form given the side walls, and means for stripping the can body from the expanding means.

4. A machine for forming cylindrical can bodies comprising a collapsible mandrel adapted to enter a can body of flat cross-sectional shape, devices operating upon said mandrel for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, and reciprocating means for simultaneously bumping the side edge portions while on the mandrel into the cylindrical form given the side walls.

5. A machine for forming cylindrical can bodies comprising a rotatable turret, a series of shaping units carried thereby, each including an expansible means adapted to enter a can body of flat cross-sectional shape, means for operating said expansible means for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, means for placing a can body on said expanding

means, reciprocating means for simultaneously bumping the side edge portions into the cylindrical form given the side walls, and means for stripping the formed cylindrical body from said expanding means.

6. A machine for forming cylindrical can bodies comprising a rotatable turret, a series of shaping units carried by said turret, means for rotating said turret intermittently, each shaping unit including an expanding mandrel, means for placing a can body of flat cross-sectional shape on the expanding mandrel whereby said can body as the turret rotates can be expanded into cylindrical form in the region between the side edge portions thereof, reciprocating means for simultaneously bumping the side edge portions while said turret is at rest into the cylindrical form given said side walls, and means for stripping the formed cylindrical can body from said expanding means.

7. A machine for forming cylindrical can bodies comprising a rotatable turret, means for rotating said turret intermittently, a series of shaping units carried by said turret, each shaping unit including a mandrel having outer movable sections and an inner section adapted to move between said outer sections for expanding the mandrel, and means operating during the rotation of the turret from one set position to another for expanding said mandrel for shaping a can body thereon and for contracting said mandrel when the turret is moved to the next set position whereby the can body is released.

8. A machine for forming cylindrical can bodies comprising a rotatable turret, means for rotating said turret intermittently, a series of shaping units carried by said turret, each shaping unit including a mandrel having outer movable sections and an inner section adapted to move between said outer sections for expanding the mandrel, means operating during the rotation of the turret from one set position to another for expanding said mandrel for shaping a can body thereon and for contracting said mandrel when the turret is moved to the next set position whereby the can body is released, and means for bumping the side edge portions of the can body while on the expanded mandrel.

9. A machine for forming cylindrical can bodies comprising a rotatable turret, means for rotating said turret intermittently, a series of shaping units carried by said turret, each shaping unit including a mandrel having outer movable sections and an inner section adapted to move between said outer sections for expanding the mandrel, means operating during the rotation of the turret from one set position to another for expanding said mandrel for shaping a can body thereon and for contracting said mandrel when the turret is moved to the next set position whereby the can body is released, means for feeding a can body on to said mandrel at the set position of the turret where the mandrel is collapsed, and means for removing the can body from the mandrel at the set position where the mandrel is collapsed.

10. A machine for forming cylindrical can bodies comprising a rotatable turret, means for rotating said turret intermittently from one set position to another, a series of shaping units carried by said turret, a stack holder for can bodies of flat cross-sectional shape, means for feeding a can body from the bottom of the stack endwise on to the shaping unit, said feeding means including a yielding finger for supporting the end of the can body passing on to the shaping unit, and an adjustable stop for determining the position of said supporting finger.

11. A machine for forming cylindrical can bodies comprising a rotatable turret, means for rotating said turret intermittently from one set position to another, a series of shaping units carried by said turret, a stack holder for can bodies of flat cross-sectional shape, means for feeding a can body from the bottom of the stack endwise on to the shaping unit, said feeding means including a feed slide having spaced supporting fingers, each of which is provided with a shoulder for stripping the lowermost can body from the stack, a yielding finger for supporting the end of the can body to be passed on to the shaping unit, and a stop associated with said yielding finger for determining the set position thereof whereby the can body may be alined for movement on to the shaping unit.

12. A machine for forming cylindrical can bodies comprising a rotatable turret, means for intermittently rotating said turret from one set position to another, a series of shaping units carried by said turret, each including a mandrel, each mandrel having outer sections pivotally supported and yieldingly moved into contact with each other, the free ends of said sections being tapered to form a cone-shaped entering end, on to which a can body of flat cross-sectional shape may be passed, said mandrel having a movable central section with cam faces at the forward end thereof adapted to pass between said outer sections for moving said outer sections away from each other, and thus expanding the mandrel, said mandrel, when expanded, being substantially cylindrical in form whereby the flattened can body may be expanded into substantially cylindrical form.

13. A machine for forming cylindrical can bodies comprising a rotatable turret, means for intermittently rotating said turret from one set position to another, a series of shaping units carried by said turret, each including a mandrel, each mandrel having outer sections pivotally supported and yieldingly moved into contact with each other, the free ends of said sections being tapered to form a cone-shaped entering end, on to which a can body of flat cross-sectional shape may be passed, said mandrel having a movable central section with cam faces at the forward end thereof adapted to pass between said outer sections for moving the outer sections away from each other, and thus expanding the mandrel, said mandrel, when expanded, being substantially cylindrical in form whereby the flattened can body may be expanded into substantially cylindrical form, and a bumping means adapted to engage the side edge portions of the can body on the expanded mandrel for giving to the can body a uniform cylindrical shape.

14. A machine for forming cylindrical can bodies comprising a rotatable turret, means for intermittently rotating said turret from one set position to another, a series of shaping units carried by said turret, each including a mandrel, each mandrel having outer sections pivotally supported and yieldingly moved into contact with each other, the free ends of said sections being tapered to form a cone-shaped entering end, on to which a can body of flat cross-sectional shape may be passed, said mandrel having a movable central section with cam faces at the forward end thereof adapted to pass between said outer sections for moving said outer sections away from each other, and thus expanding the mandrel, said mandrel,

when expanded, being substantially cylindrical in form whereby the flattened can body may be expanded into substantially cylindrical form, a crank associated with each shaping unit having a link connection to the central section of the mandrel, and means operated by the rotation of the turret for rotating said crank for expanding and contracting the mandrel.

15. A machine for forming cylindrical can bodies comprising a rotatable turret, means for imparting an intermittent step by step rotation to said turret, a series of expanding mandrels carried by said turret and adapted to receive a can body of flat cross-sectional shape for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, and a bumping means including opposed bumping dies adapted to simultaneously engage the side edge portions for bumping the same into the cylindrical form given said side walls.

16. A machine for forming cylindrical can bodies comprising a rotatable turret, means for imparting an intermittent step by step rotation to said turret, a series of expanding mandrels carried by said turret and adapted to receive a can body of flat cross-sectional shape for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, a bumping means including opposed bumping dies adapted to simultaneously engage the side edge portions for bumping the same into the cylindrical form given said side walls, a rod carrying each dumping die, an eccentric strap connected to each rod, and an eccentric associated with each strap for simultaneously moving said bumping dies into engagement with the can body.

17. A machine for forming cylindrical can bodies comprising a rotatable turret, means for imparting an intermittent step by step rotation to said turret, a series of expanding mandrels carried by said turret and adapted to receive a can body of flat cross-sectional shape for expanding the side walls of the can body into cylindrical form in the region between the side edge portions thereof, a bumping means including opposed bumping dies adapted to simultaneously engage the side edge portions for bumping the same into the cylindrical form given said side walls, a rod carrying each bumping die, an eccentric strap connected to each rod, an eccentric associated with each strap for simultaneously moving said bumping dies into engagement with the can body, and means whereby the throw of the eccentrics may be varied for varying the working position of the bumping dies.

18. A machine for forming cylindrical can bodies comprising a rotatable turret, means for intermittently rotating said turret from one set position to another, a series of shaping units carried by said turret, means for placing can bodies on the shaping units, and means for stripping the can bodies from the shaping units including a stripping slide, spaced stripping hooks carried thereby and disposed and timed so that the can body is carried between said stripping hooks for engagement thereby when the turret reaches a set position for discharging the can body.

19. A machine for forming cylindrical can bodies comprising a rotatable turret, means for intermittently rotating said turret from one set position to another, a series of collapsible mandrels carried by said turret, means for expanding and contracting said mandrels during the rotation of said turret from one set position to another, means for placing a can body of flat cross-sectional shape on the expanding mandrel while at one set position, means for bumping the side edge portions of the can body into the cylindrical form given the side walls at another set position of the turret, and means for stripping the shaped can body from the collapsed mandrel at another set position of said rotatable turret.

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