

May 6, 1924.

1,493,075

B. HIRSCHHORN

BAG CLOSING MACHINE

Original Filed March 22, 1919

4 Sheets-Sheet 1

Fig. 1.

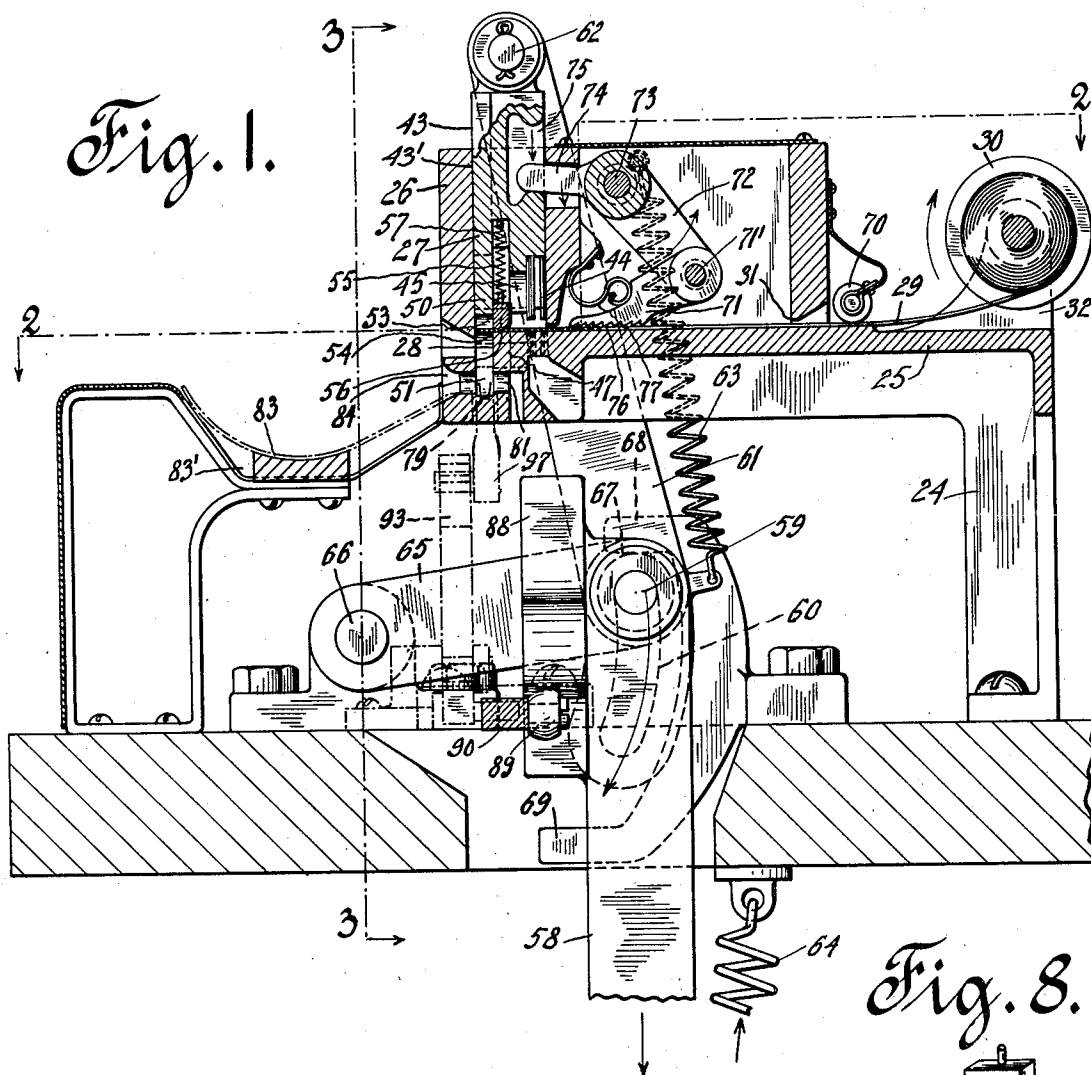


Fig. 8.



Fig. 5.

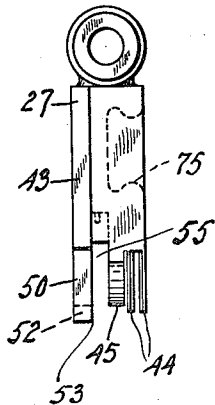


Fig. 6.

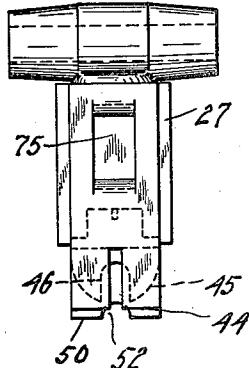
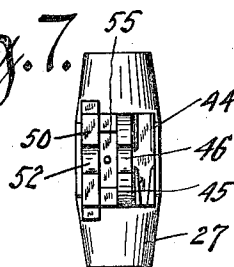


Fig. 7.



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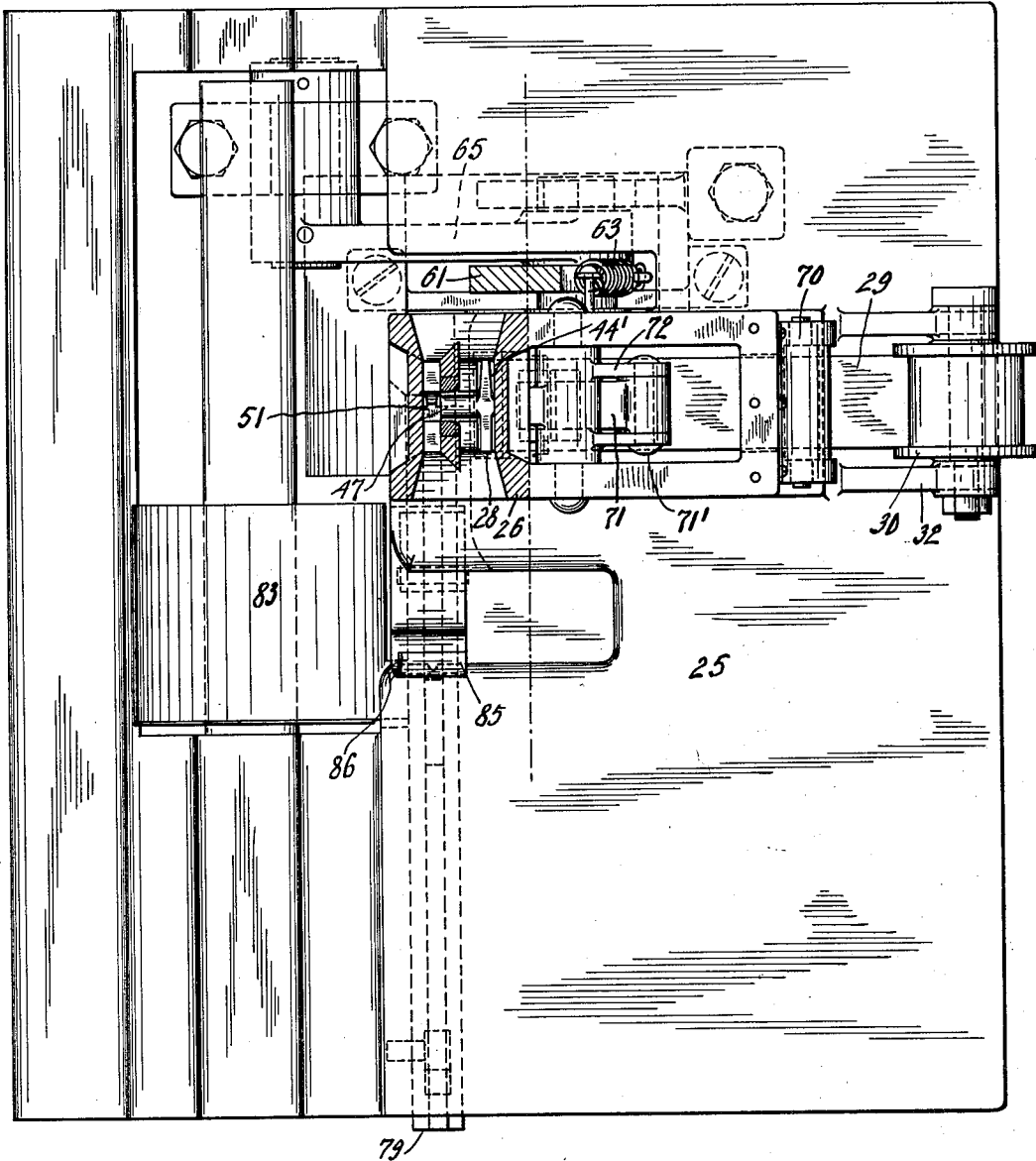


Fig. 2.

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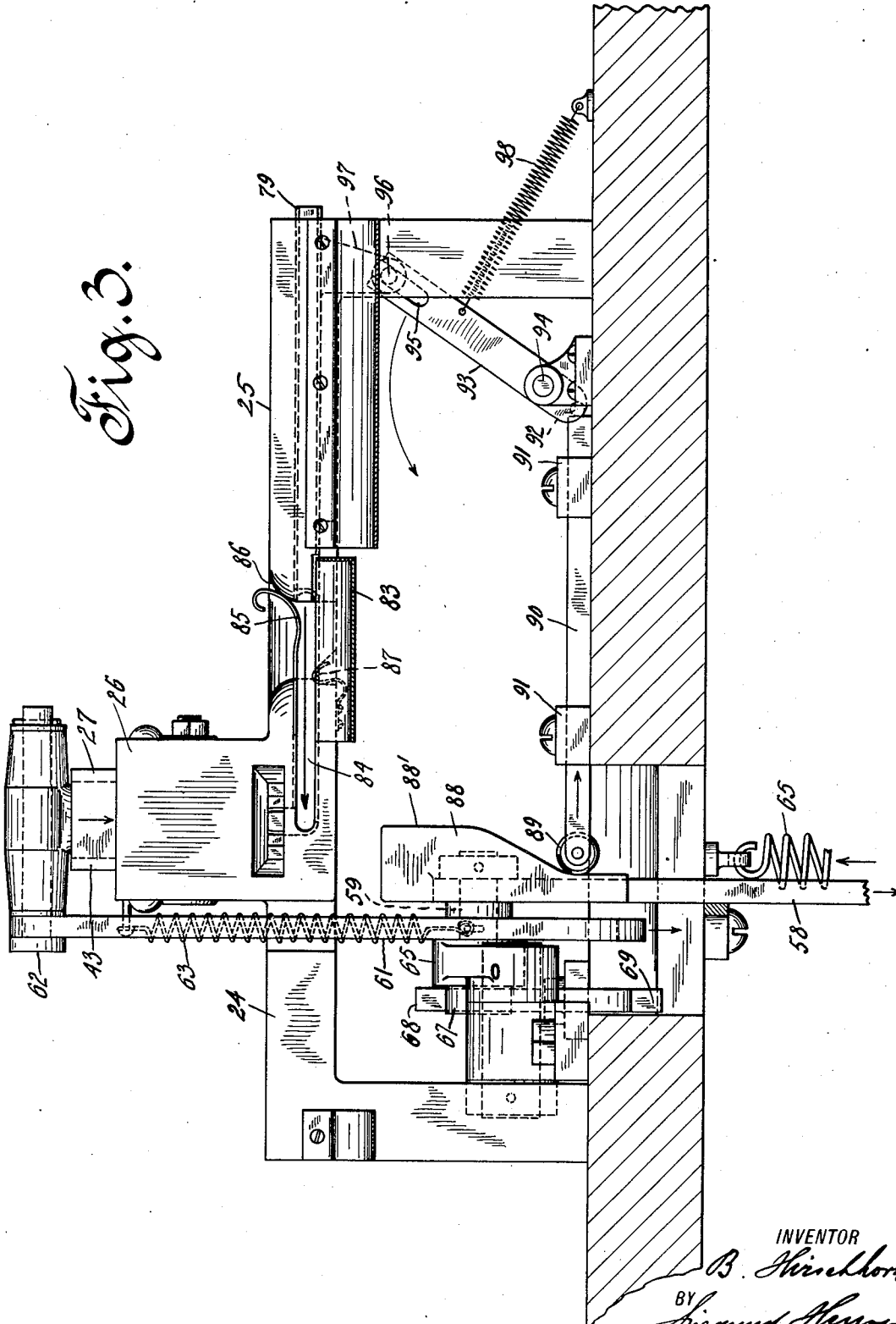
1,493,075

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BAG CLOSING MACHINE

Original Filed March 22, 1919 4 Sheets-Sheet 3

Fig. 3.



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BAG CLOSING MACHINE

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4 Sheets-Sheet 4

Fig. 9.

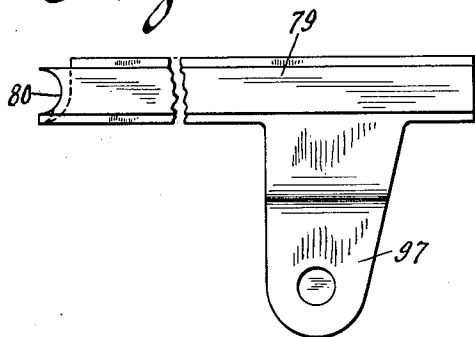


Fig. 10.

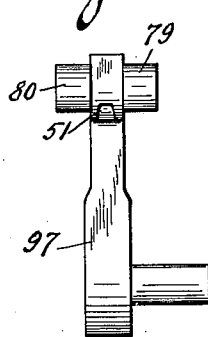


Fig. 11.

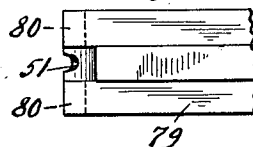


Fig. 12.

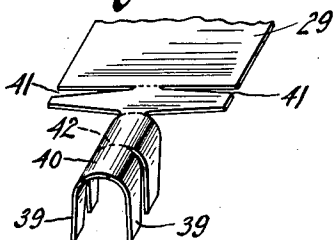


Fig. 13.

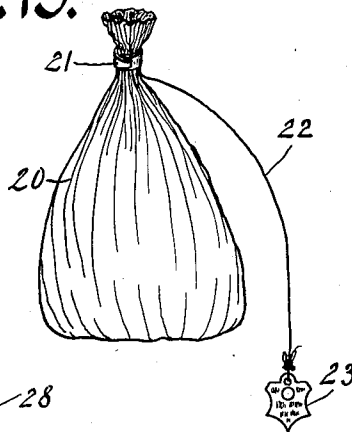
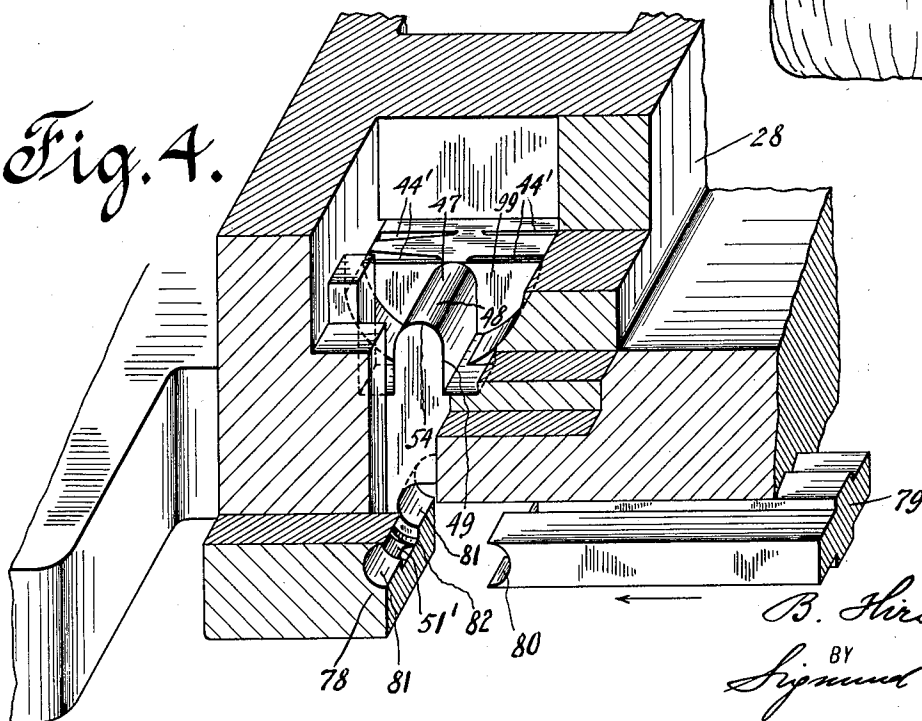


Fig. 4.



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UNITED STATES PATENT OFFICE.

BENJAMIN HIRSCHHORN, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO MILLIE PATENT HOLDING CO. INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BAG-CLOSING MACHINE.

Application filed March 22, 1919, Serial No. 284,420. Renewed March 29, 1924.

To all whom it may concern:

Be it known that I, BENJAMIN HIRSCHHORN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Bag-Closing Machines, of which the following is a specification.

The present invention relates to improvements in machines for closing bags. It pertains more particularly to a machine for closing bags of the type described in an application for U. S. Letters Patent, Serial No. 261,867, filed by me on November 9, 1918. In the said application a bag is described constituting a cartridge for percolating or extracting the flavor from tea-leaves or coffee, said cartridge comprising a bag having its mouth drawn into folds, in combination with a metal strip that encircles and compresses said folds.

The main object of the present invention is to provide a simple and easily operable mechanism, whereby the mouth of an already filled bag is closed by drawing or gathering the same into folds and applying thereto a metallic band, that is shaped to assume the form of a ring, embracing the folded portion of the bag below its mouth, so as to prevent escaping of the contents.

Another object of the invention is to provide a bag closing machine of the character mentioned which is substantially automatic in its operation.

With these and other objects in view, which will more fully appear as the nature of the invention is better understood, the same consists in the combination, arrangement and construction of parts hereinafter described, pointed out in the appended claims and illustrated in the accompanying drawings, it being understood that many changes may be made in the size and proportion of the several parts and details of construction within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

One of the many possible embodiments of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical longitudinal section taken through a machine constructed in accordance with the present invention;

Fig. 2 is a section taken on line 2—2 of Fig. 1; Fig. 3 is a section taken on line 3—3 of Fig. 1; Fig. 4 is a perspective view of the female die of the machine; Fig. 5 is a side elevation of the male die of the machine; Fig. 6 is a front elevation thereof; Fig. 7 is a bottom plan view of the same; Fig. 8 is a perspective view of a presser foot co-operating with the female die; Fig. 9 is a front elevation of the fold gathering device of the machine, provided with a portion of the female die; Fig. 10 is a side elevation thereof; Fig. 11 is a top plan view of a portion of the same; Fig. 12 is a perspective view of a blank strip of metal with two bag fasteners formed thereon, but not yet severed therefrom; and Fig. 13 is an elevation of a finished product made on the machine.

In order to clearly understand the machine, it is thought advisable to first describe the product made thereon. The product shown in Fig. 13 of the drawings comprises a bag 20 of open-mesh textile fabric, such as for instance cotton, and of a size to contain just sufficient tea-leaves or coffee for a single brewing. The mouth of the bag is closed by drawing or gathering the same into folds, and applying thereto a metallic band 21, that is shaped to assume the form of a ring, embracing the folded portion of the bag below its mouth, thereby holding the folds under compression, so as to prevent escaping of the contents. For the purpose of facilitating the handling of the cartridge, there is secured thereto a flexible means, for instance a string 22, to which is attached at its free end a handle 23. This string serves also as the means for suspending the cartridge from the receptacle, such as a tea-pot or coffee-pot, in which the extraction is to take place. The string is secured to the cartridge by placing it against the folds around the bag mouth, before the band 21 is formed to constitute the ring-shaped closing means for the bag.

The machine comprises a frame 24, including a horizontal table portion 25. From this table rises a head 26, in which is mounted to slide vertically a male die 27, the specific construction of which will be described hereinafter. This die co-operates with a female die 28, the latter being formed in the table 25. These dies form and apply the metallic

bands 21 to the bags, the bands being formed from a blank strip 29 of sheet metal, that is wound upon a reel 30, said strip being fed, by means hereinafter to be described, above the table 25 through a slot 31 in the head 26 toward the said dies. The reel 30 is mounted in bearings 32, which rise from the table 25.

Before describing the operation of the dies, the general way of forming and applying the bands 21 will be disclosed. These bands are stamped from the blank strip 29 and, before the final shaping operation, consist each, as appears from Fig. 12 of the drawings, of a substantially U-shaped body, comprising parallel legs 39, connected by a curved web 40. In forming these bodies, a pair of punches stamp out or cut away the material between the legs, whereby spaces 41 are formed between the same, and a second pair of dies bend the legs 39 downwards. A third die severs the body so formed along the dotted line 42 and applies the same to the bag by shaping it into a ring. Attention is called to the fact that one of the legs 39 of the U-shaped body is narrower than the other, for a purpose hereinafter to be described.

Referring now to the male die, it will be observed that it includes a square shank 43, fitting a similarly-shaped bore 43' in the head 26, whereby it is prevented from turning. On the underface of the shank are formed punches 44, which co-act with properly shaped recesses 44' on the female die, said punches serving to form the spaces 41 between the U-shaped bodies. These punches are, when the male die is in its uppermost position (Fig. 1), disposed a substantial distance above the female die. In front of the punches there is formed upon the die shank a bending-die 45, that is disposed somewhat higher than the said punches and having in its underface a recess 46, conforming to the outer faces of the U-shaped bodies shown in Fig. 12 of the drawings. This die co-operates with an anvil 47 on the female die, the upper face of said anvil being rounded as shown at 48, while its sides are vertical and plane, as indicated at 49. As the die 45 is forced toward the anvil, the legs 39 of the flat band (Fig. 12) are engaged thereby and gradually bent onto the anvil, whereby the bands assume a U-shape. After this operation, an applying die 50, upon the die shank 27, severs a bent band from the strip, and forces it downwards over the already gathered folds of the mouth of the bag, as will hereinafter appear, its legs 39 being bent and shaped by a semi-circular recess 51 in the female die, so that they overlap each other. The shaping die 50 is provided in its underface with a semi-circular recess 52, which is of the size of the recess 51 mentioned, and forms with the latter a complete

circle. The severing operation is performed by the rear edge 53 of the shaping die, in co-operation with the front edge 54 of the anvil 47. The strip 29 is advanced by a mechanism, hereinafter to be described, within the reach of the several dies.

As appears from Figs. 1 and 5 of the drawings, there is a recess formed in the die shank between the dies 45 and 50, as shown at 55. In this recess is loosely mounted a presser foot 56, that straddles the anvil 47 in front of the bending-die 45, said presser foot being held on the said anvil by a spring 57.

The male die is actuated from a treadle (not shown), which is connected with a bar 58, that extends into the frame 24 and carries a pin 59, the latter being seated in an arc-shaped slot 60 in the lower end of a link 61, the upper end of which is pivoted at 62 to the die shank 43. A spring 63, in engagement with the machine frame and the said link, has a tendency to keep the die shank in its upper position, shown in Fig. 1 of the drawings. A spring 64, one end of which engages the bar 58 and the other end the machine frame, has a tendency to keep the said bar in its raised position (Fig. 1). The pin 59 extends into one end of a link 65, the other end of which is fulcrumed at 66 to the machine frame. The pin 59 carries furthermore a roller 67, which is adapted to abut against fixed stops 68 and 69, the stop 68 limiting the upward movement of the bar 58 and the elements connected therewith, and the stop 69 the downward movement thereof.

The blank strip 29 of sheet metal passes from the reel toward and under a spring-pressed roller 70, which holds the same in engagement with the upper face of the table 25. The strip is fed to the dies by a pawl 71, which is pivoted at 71' to a bell-crank lever 72, the latter being fulcrumed at 73 to the head 26, its arm 74 projecting into a recess 75 in the die shank. Upon the underface of the pawl are provided prongs 76 which are forced by means of a spring 77 against the strip 29, said spring being attached to the head 26 and bearing against the pawl 71. Upon the downward stroke of the die shank, the arm 74 of the bell-crank lever is forced downwards, whereby the pawl moves backwards. Upon the upward stroke of the die shank, the pawl moves forward and feeds thus the material the proper distance toward the die. Attention is called to the fact that the pawl moves backwards after the strip has been engaged by the dies, so that a retrograde movement of the strip, upon the backward movement of the pawl, is prevented.

As above mentioned, with the applying-die cooperates a female die, in the form of a semi-circular recess 51. One-half of this recess is formed in a fixed portion 78 of the ma-

chine frame, while the other half, denoted by the numeral 51', is formed in a horizontally slidable bar 79. This bar is provided on each side of the recess 51' with a semi-circular notch 80, said two notches being in registering position with semi-circular notches 81 on the sides of the fixed section of the recess 51. When the notches 80 and 81 meet, each set of the same forms a cylindrical bore for holding the mouth of the bag, gathered in folds, in operative relation to the ring-band applying means. The fixed portion of the recess 51 is provided with a centrally disposed groove 82, that is adapted to accommodate the narrower leg 39 of the band 21, thereby permitting the same to overlap the wider leg of the said band.

The bar 79 serves, in co-operation with the frame portion 78, as the means for drawing or gathering the bag mouth into folds. For this purpose there is attached to the bar 79 a bag support 83, that is slidable in a trough-shaped cavity 83' in the table portion of the machine frame. From the notches 81 extends toward the right hand side of the frame 24 (Fig. 3) a horizontal slot 84, part of which is limited by a spring 85, adapted to abut against a projection 86 on the machine frame. The bag and the string 22 placed upon the same are drawn manually between the said stop and spring into the slot 84 and are placed upon the bag support 83, the bag mouth being partly gathered by hand as it is drawn into the slot, it abutting against a stationary spring 87, that projects into the slot. The final gathering is performed by the bar 79, which is actuated from the bar 58. For this purpose, there is attached to the last-mentioned bar a cam 88, against which bears an anti-friction roller 89 upon a horizontal slide 90, the latter moving in guide 91 upon the machine frame. The slide bears against a pin 92, that is carried by one end of a lever 93, the latter being fulcrumed at 94 to the machine frame. The other end of this lever is provided with a longitudinal slot 95, in which is seated a pin 96, that is mounted upon a projection 97 on the bar 79. A spring 98, secured at one of its ends to the lever 93 and at its other end to the machine frame, has a tendency to keep the anti-friction roller 89 continuously in engagement with the cam 88 and also to hold the bar 79 in its outer position, shown in Fig. 3 of the drawings. The cam 88 is so shaped that, during the downward movement of the bar 58, it causes the bar 79 to move inwards, thereby gathering the mouth of the bag into folds. When the bar 58 moves upwards, the spring 98 returns the bar 79 to its outer position. Attention is called to the fact that the gathering operation is finished before the die shank 43 starts on its downward stroke. This is due to the fact that the link 61 is provided with the

slot 60, allowing the bar 58 to move a substantial distance downwards before it takes with it the link 61 and the die shank 43 connected with the latter. As appears from Fig. 1 of the drawings, the pin 59 contacts with the lower edge of the slot 60 before the bar 58 has finished its downward stroke, the said downward stroke being limited by the roller 67 abutting against the fixed stop 69. This stop is disposed at a distance from the lower edge of the slot 60, when the link 61 is in its raised position, which corresponds to the downward stroke of the die shank.

The operation of the machine is as follows:—When the parts are in the positions shown in the several figures of the drawings, that is to say when the bag support 83 is in its outer position, a filled bag, with its mouth flat, is drawn between the spring 85 and projection 86 into the slot 84, until it abuts against the spring stop 87. In this manner the bag mouth is partly gathered into folds, the width of the bag being larger than the distance between the spring stop 87 and projection 86. The bag is extended into the slot so that its mouth projects a little in rear of the bar 79. As now the bar 58 is depressed, the cam 88 thereon forces, by the intermediary of the slide 90 and lever 93, the bar 79 toward its inner position until it abuts against the frame portion 78, whereby it causes the mouth to be gathered and drawn into folds, as it is carried along by the support 87. The bar 79 rests in this position until the bar 58 has reached the end of its downward stroke for the reason that a substantial portion of the cam 88 is vertical, as clearly shown at 88'. Before the bar 58 reaches its lowermost position, but after the bar 79 has reached its innermost position, the link 61 is caused to move downwards, whereby the punches 44, bending-die 45 and applying-die 50 are forced toward the female die and the pawl 71 is caused to move backwards. The punches, in co-operation with the female die, stamp or cut the strip 29 to form the spaces 41 (Fig. 12), and the bending-dies force the leg portions 39 of the material previously stamped substantially at right angles to the body portion thereof. Simultaneously with the punching and bending operations, the applying die moves downwards, whereby a U-shaped body, formed at a previous downward stroke of the die shank, is severed from the strip and caused to move over the gathered mouth of the bag, that is held within the notches 81 and 80. As this body moves downwards, it is caused to assume a ring shape by the female die 51, co-operating with the male die 50. The treadle is then released, whereby the bar 58 moves upwards, allowing the gathering bar 79 to move outwards. The operator in the meantime removes the fin-

ished product from the machine. While the die shank 43 moves upwards, the pawl 71 feeds the strip 29 the required distance forwards. The cycle of operation now described is then repeated.

As has been mentioned above, there is a recess 55 provided between the bending-die 45 and applying-die 50, and within this recess is disposed a presser foot 56. This arrangement becomes necessary due to the fact that the gathered mouth bag must be held at both sides of the applying die, the gathering bar 79 being for this purpose fork-shaped at its acting end, and so is also its stationary counter part on the machine. One prong of the fork-shaped end of the bar 79 is disposed immediately below the recess 55. The presser foot 66 serves mainly to prevent a deformation of the already U-shaped member of the metallic strip 29, as the strip is fed forward. The backward movement of the strip, as the pawl moves backwards, is partly prevented by this presser foot, but also by vertical faces 99 in rear of the anvil 47.

What I claim is:—

1. A bag closing machine, comprising a metal strip feeding means, co-acting dies for forming a portion of the strip into a band of substantially U-shape, means for gathering the mouth of a bag into folds and bringing the same in operative relation to

the U-shaped band, and co-acting dies for severing the U-shaped band from the strip, forming the band into ring shape and applying the same to said bag so as to encircle and compress said folds.

2. A bag closing machine, comprising a metal strip feeding means, coacting dies for forming a portion of the strip into a band of substantially U-shape, means for gathering the mouth of a bag into folds and bringing the same in operative relation to the U-shaped band, and co-acting dies for severing the U-shaped band from the strip, forming the band into ring shape and applying the same during the process of formation to said bag so as to encircle and compress said folds.

3. A bag closing machine, comprising a metal strip feeding means, coacting dies for forming a portion of the strip initially into a band of substantially U-shape, coacting stationary and movable elements for puckering the mouth of the bag and bringing the same into operative relation to the U-shaped band, and coacting dies for forming the band into ring-shape and applying the same to said bag so as to encircle and compress the puckered mouth thereof.

Signed at New York, in the county of New York and State of New York, this 17th day of March, A. D. 1919.

BENJAMIN HIRSCHHORN.