March 5, 1940. I. NEWMAN 2,192,502

SEAMING MACHINERY

Filed May 24, 1938 2 Sheets-Sheet 1

Fig. 1.

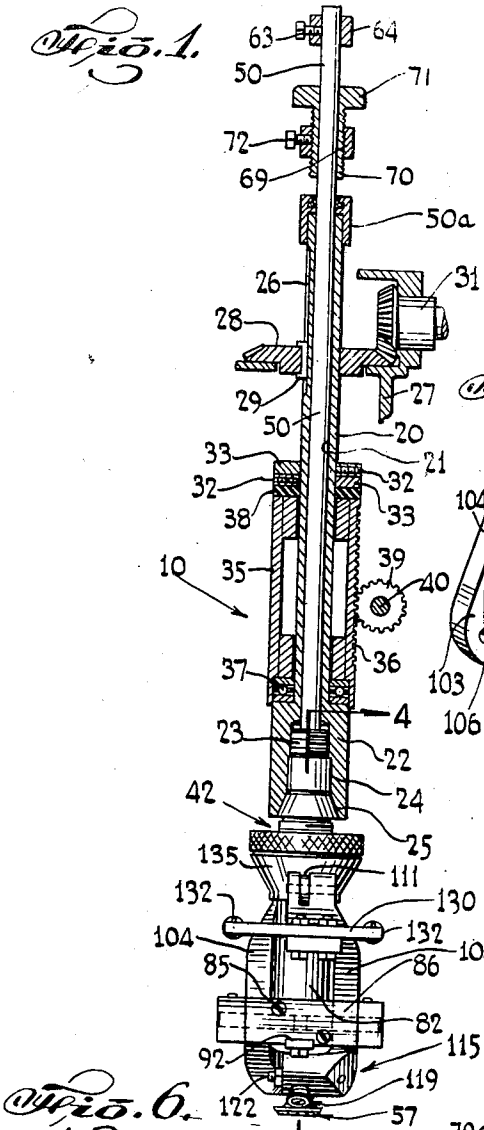


Fig. 2.

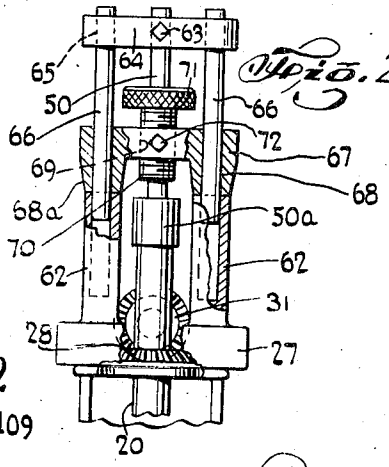


Fig. 9.

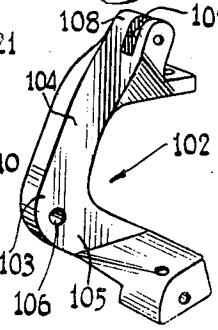


Fig. 3.

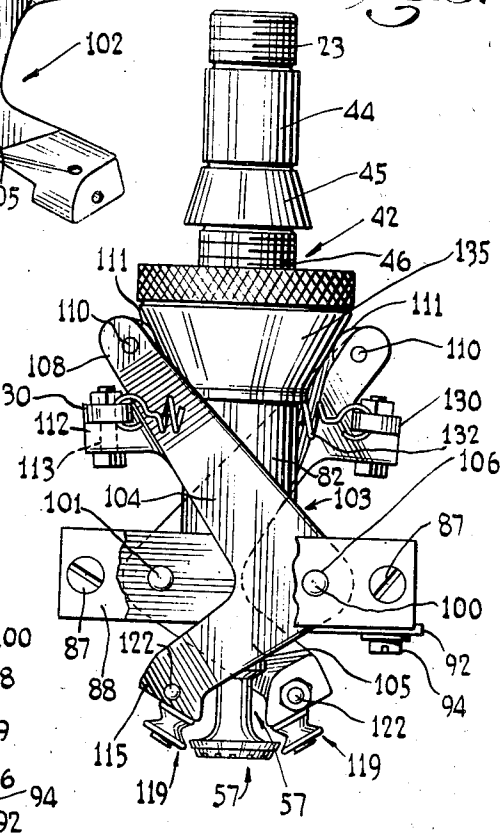
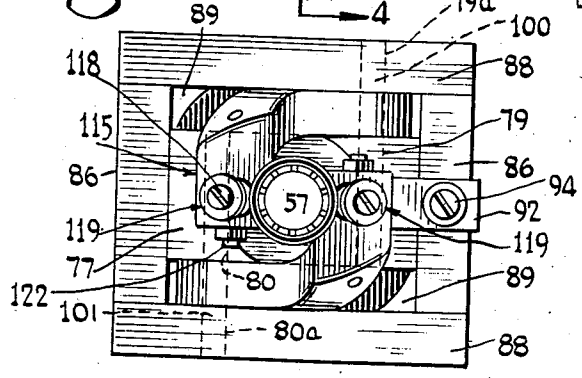


Fig. 6.



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SEAMING MACHINERY

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Fig. 4.

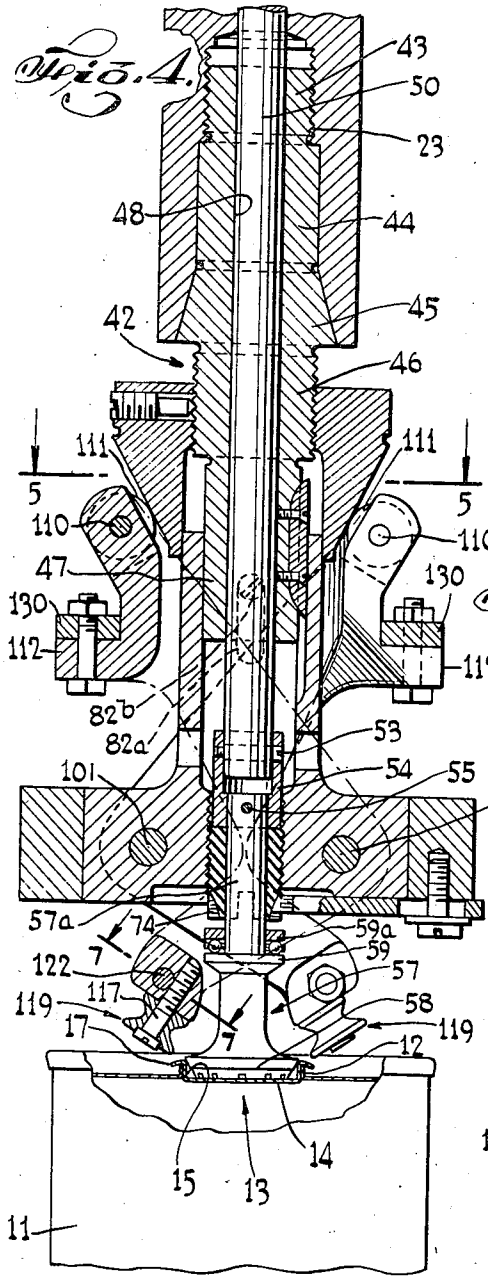


Fig. 5.

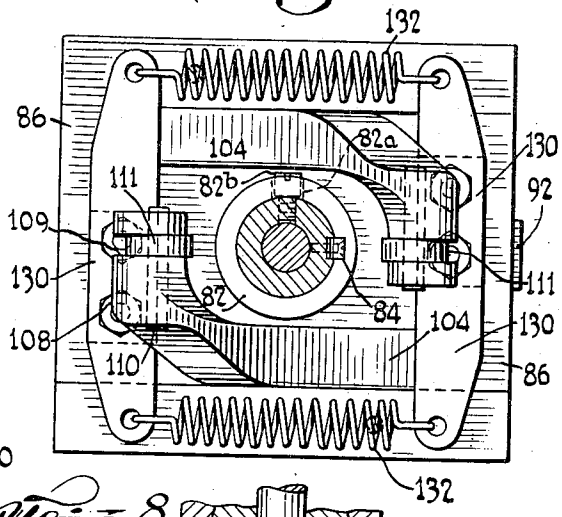


Fig. 8.

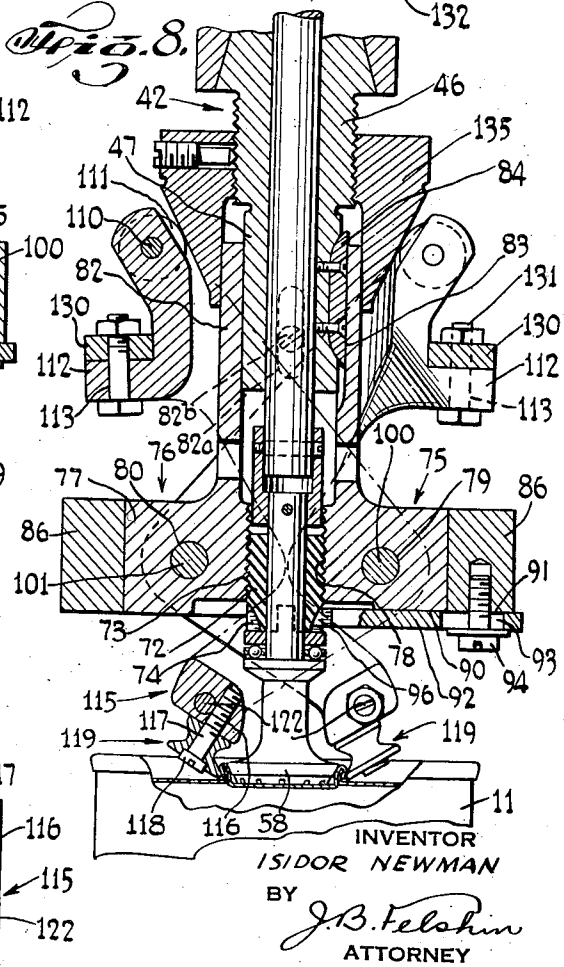
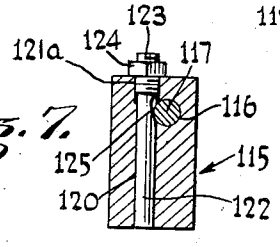


Fig. 7.



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2,192,502

UNITED STATES PATENT OFFICE

2,192,502

SEAMING MACHINERY

Isidor Newman, New York, N. Y.

Application May 24, 1938, Serial No. 209,840

9 Claims. (Cl. 113—24)

This invention relates to seaming machinery. It is particularly directed to a device for seaming a cap to the neck of a can.

In previous seaming devices, such as shown in my Patent No. 1,490,339, issued April 15, 1924, the pivoted lever carrying the seaming roller was so mounted as to swing the roller toward the cap or cover to be seamed to the neck of the can, in such a way as to raise or lift the flange of the cap, thus creating a poor seal. It is therefore an object of this invention to provide, in a seaming device, means to force the flange of the cap or cover downwardly, during the seaming operation, thereby eliminating any empty space between the upper edge of the can neck and the cap or cover seamed thereto.

A further object of this invention is to provide a device of the character described, including a pivoted lever carrying a seaming roller adapted to seam the flange of the cap against the neck of the can, the lever being so arranged that upon rotating the lever to produce the seaming operation, the roller will press the flange of the cap downwardly, over the outer surface of the neck of the can, as well as radially inwardly, whereby to produce a strong seam between the cap and the neck, and a good seal for the can.

Another object of this invention is to provide in a device of the character described, a vertically movable plunger adapted to seat on the inside of the cap during the seaming operation, and improved adjustable means to limit downward movement of the plunger relative to the cap so that the plunger will properly seat on the cap.

Still another object of this invention is to provide in a device of the character described, having a lever carrying a pin, and a seaming roller rotatably mounted on the pin, improved means to lock said pin against movement.

A still further object of this invention is to provide a strong, rugged and compact device of the character described, which shall be relatively inexpensive to manufacture, easy to manipulate, smooth and positive in operation, and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible illustrative embodiments of this invention:

Fig. 1 is an elevational view of a seaming device, embodying the invention, with parts in cross-section;

Fig. 2 is a front, elevational view of the upper portion of the structure shown in Fig. 1;

Fig. 3 is a front, elevational view of a portion of the seaming device;

Fig. 4 is an enlarged, cross-sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 4;

Fig. 6 is a bottom plan view of the device shown in Fig. 3;

Fig. 7 is a cross-sectional view taken on line 7—7 of Fig. 4;

Fig. 8 is a view similar to Fig. 4, but showing the rollers in seaming position; and

Fig. 9 is a perspective view of one of the levers supporting the seaming roller.

Referring now in detail to the drawings, 10 designates a seaming device embodying the invention. For the purpose of illustration, there is shown in the drawings, a can 11, provided with an upstanding cylindrical neck 12, and a cap blank 13 inserted into the neck to be seamed by device 10 to said neck.

The cap 13 has a circular bottom wall 14, an upwardly extending cylindrical neck portion 15, contacting the inner surface of the neck 12 of the can, and an outwardly extending downwardly inclined flange 17, disposed just above the upper rim edge of the neck of said can.

In Fig. 8 there is illustrated the position of the device 10 when seaming the flange 17 of the cap, onto the neck 12 of the can, in the manner to be described hereinafter.

The device 10 comprises an elongated vertical spindle 20, formed with a through opening or bore 21. Said spindle has an enlarged portion 22, at its lower end, formed with an enlarged internally screw threaded portion 23, at the lower end of the bore 21. Extending from the internally screw threaded portion 23 is a smooth cylindrical bore 24, from which there extends a conical opening 25, at the lower end of the enlarged portion 22 of spindle 20. Said spindle 20 is furthermore formed on the outer face thereof, and adjacent the upper end thereof, with an elongated key slot 26.

Means is provided to rotate the spindle 20. To this end, there is provided a fixed frame 27, on which is rotatably mounted a bevel gear 28, received on the spindle 20 and splined thereto by

a key 29, slidable in the keyway 26. The bevel gear 28 may be rotated in any suitable manner, for example, by a gear 31 meshing therewith and mounted on the frame 27, and connected in any suitable manner to an electric motor or any other motive power.

Means is provided for reciprocating the spindle 20. To this end, there are fixed to said spindle, by set screws 32, collars 33 spaced above the enlarged portion 22 of said sleeve. Interposed between the collars 33 and said enlarged portion 22 of the spindle 20, is a sleeve 35, rotatably receiving the spindle, and formed with a longitudinal rack portion 36. Interposed between sleeve 35 and said portion 22 of the spindle, is a thrust bearing 37. An anti-friction washer 38 may be interposed between the sleeve 35 and the collars 33. Meshing with the rack 36 is a pinion 39 on a shaft 40 mounted on a suitable frame. The pinion 39 may be oscillated either manually or automatically in any suitable well known manner.

It will now be understood that the spindle may be rotated and reciprocated concurrently.

Screwed within the lower end of the spindle 20 for rotation and reciprocation therewith, is a member 42 having a screw threaded portion 43, engaging the internally screw threaded portion 23 of the spindle; a portion 44 within the bore 24, and a conical portion 45 within the conical opening 25 of said spindle. Extending from the portion 45 of member 42 is an externally screw threaded portion 46, and extending from said externally screw threaded portion, is a cylindrical portion 47. Member 42 is formed with a through bore 48 of the same dimension as, and coaxial with, the bore 21 of spindle 20.

Slidably extending through said spindle and member 42, is a rod 50 extending above the upper end of the spindle and below the lower end of member 42. At the upper end of spindle 20 is an oil cup 50*a* to lubricate rod 50.

Attached to the lower end of the rod by a pin 53, is a tubular coupling member 54, and attached to the coupling member 54, by pin 55, is a plunger 57 having a shank 57*a*, coaxial with said rod and having a frusto-conical head 58, at the lower end of the shank, adapted to be received within and seated on the cap 13 when the rod 50 is lowered during the seaming operation. The plunger 57 is formed with a shoulder 59, above the head, carrying a thrust bearing 59*a*, for the purpose hereinafter appearing.

Means is provided for holding rod 50 against rotation, and adjustably limiting downward movement of the plunger so as to properly seat the same on the cap 13. To this end, the fixed frame 27 is formed with a pair of parallel vertical upwardly extending sockets 62 open at the top. Fixed to the upper end of rod 50 in vertically adjusted position, by a set screw 63, is a cross-head 64 formed at the ends thereof with a pair of vertical openings 65, aligned with the sockets 62. Extending into the opening 65 and fixed to the cross-head 64 by a force fit or in any other suitable manner, are a pair of parallel vertical pins 66 slidably extending into the sockets 62.

Slidably mounted on the pins 66 is a cross-head 67 having parallel vertical openings 68 slidably receiving said pins, and having downwardly projecting portions 68*a* resting on the upper ends of the sockets 62. Said cross-head 67 has a central screw threaded opening 69 in which is screwed a tubular sleeve 70 having a central bore to slidably receive the rod 50. The screw 67 is provided with a knurled head 71, and may be fixed to the cross-head 67 in various adjusted positions by a set screw 72.

It will now be understood that rod 50 is held against rotation, and screw 70 acts as a stop to limit downward movement of said rod. The downward limit of movement of said rod 50 and plunger head 58, may be adjusted by rotating the screw 70 within opening 69 to properly seat the head of the plunger on the cap 13.

Means is provided to seam the flange 17 of the cap to the neck of the can when the head 58 of the plunger is seated on said cap. To this end, there is slidably mounted on the shank 57*a* of the plunger 57, a tubular sleeve 72 having external screw threads 73. Said sleeve is interposed between the thrust bearing 59*a* and the coupling 54 and has a limited sliding movement or lost motion on said shank. At the lower end thereof, tubular sleeve 72 is formed with a plurality of equiangularly spaced radial notches 74, for the purpose hereinafter appearing.

Mounted on the sleeve 72 is a body 75. Said body 75 comprises an inverted T-shaped member 76 having a horizontal substantially rectangular portion 77 formed with a central vertical screw threaded opening 78 within which the sleeve 72 is screwed. Said portion 77 is formed with a pair of parallel horizontal through openings 79 and 80, disposed on opposite sides of the screw threaded opening 78. Extending upwardly from said rectangular portion 77, is a sleeve portion 82, slidably receiving the portion 47 of member 42. On the inner surface thereof, said sleeve portion 82 has a longitudinal keyway 83, receiving a key or spline 84, fixed to said portion 47 of member 42, whereby to prevent rotation of the body 75 relative to said member 42, but permitting limited reciprocation of said member relative to said body, for the purpose hereinafter appearing. Said sleeve 82 has a pair of similar, opposite, longitudinal slots 82*a*; and fixed to said portion 47 of member 42 are a pair of radial pins or screws 82*b* projecting into said slots.

It will now be understood that when the spindle is lifted, it will carry the member 42 upwardly therewith until the pins 82*b* engage the upper ends of the slots 82*a*. Further upward movement of the spindle will lift the body 75, and hence the tubular member 72, which, after some slight movement contacts the bottom end of the coupling member 54 to lift the rod 50 and plunger 57 off the cap of the can.

Fixed to the outer ends of the rectangular portion 77, as by screws 85 are similar, parallel, horizontal members 86 projecting to opposite sides of said portion; and fixed to the ends of said members 86, as by screws 87, are horizontal, parallel members 88 forming slots 89 with said rectangular portion. The underside of said portion 77 is formed with a longitudinal slot 90, and the underside of one of the members 86 is formed with a slot 91 communicating with slot 90.

Disposed within the slots 90 and 91 is a key 92 formed with an elongated slot 93, through which extends a screw 94, screwed to said member 86 for fixing said key to body 75. The key 92 has a portion 96 projecting into one of the notches 74. By loosening the screw 94, the key 92 may be moved to the right, looking at Fig. 8 of the drawings, to disengage the portion 96 thereof from notch 74. Screw 72 may then be rotated to adjust the same relative to the member 76. Thereafter, the key 92 may then again

be moved inwardly into engagement with one of the notches 74, and the screw 94 then again tightened.

One of the members 88 has an opening 79a, aligned with the opening 79 of said portion 77; whereas the other member 88 has an opening 80a, aligned with the opening 80 of said portion. Received within the openings 79, 79a and traversing one slot 89, is a pin 100 disposed on one side of the plunger 57; and extending through the openings 80, 80a and traversing the other slot 89, is a pin 101, parallel to said pin 100, and disposed on the other side of said plunger.

Pivoted on the pins 100 and 101 are a pair of similar, symmetrically disposed levers 102, one of which is illustrated in Fig. 9 of the drawings. Since the levers are similar and symmetrically disposed, one with respect to the other, one only of said levers will be described in detail.

Each lever 102 has an L-shaped portion 103, disposed in the plane of, and extending through one of the slots 89. Said L-shaped portion 103 comprises an upwardly extending arm 104 and a downwardly extending arm 105. The portion between said arms is formed with an opening 106 to receive the pin 100.

It will be noted that the pin 100 is disposed on one side of the plunger 57, and the arm 104 is inclined upwardly toward the other side of the plunger, and the arm 105 is inclined downwardly toward the other side of said plunger.

Extending from the upper end of the arm 104, toward a plane passing through the axis of the plunger and disposed parallel to the slots 89, is a portion 108 formed with a slot 109 carrying a horizontal pin 110 traversing said slot, and disposed parallel to pivot pin 100. Pins 110 and 100 of each lever 102, are located on opposite sides of the plunger 57, as shown in Figs. 3, 4 and 8.

Rotatably mounted on the pin 110 is a roller or wheel 111, projecting beyond said slot on the inside of portion 108, for the purpose hereinafter appearing.

Portion 108 of each lever is also provided with a horizontal ledge 112, formed with a pair of screw threaded openings 113, for the purpose hereinafter appearing.

At the lower end of arm 105 is a portion 115, disposed below portion 77 of member 76, and extending at right angles to the slots 89, and on the opposite side of plunger 57 to pin 100. Looking at Fig. 3 of the drawings, it will be seen that portions 103 of the levers 102 are parallel to one another, that portions 108 are parallel to one another, and that the bottom end of the plunger is disposed between the portions 115 of the levers. Portions 115 of the levers 102, are likewise parallel to one another, and extend in opposite directions.

The portion 115 of each lever 102, is provided with a downwardly and outwardly inclined screw threaded opening 116, disposed in a vertical plane, passing through the axis of the plunger and located between the slots 89. Screwed within opening 116 is a stud or screw 117 having, at its lower end, a head 118, spaced from said portion 115. Rotatably mounted on said screw 117, and held thereon by the head 118, is a seaming roller 119.

Means is provided for retaining the stud 117 against accidental movement or loosening with respect to the lever. To this end, portion 115 of each lever is formed with a horizontal through opening 121, disposed at right angles to the screw threaded opening 116, and having an enlarged portion 121a at one end. The axes of said openings are offset one from the other, but said openings communicate where they overlap at their intersection. Extending within the opening 120, is a pin 122 having a screw threaded portion 123, at one end, projecting into said enlarged opening 121a, and receiving a nut 124 contacting one end of said portion 115. Pin 122 is formed with an inclined cut away portion 125, adjacent the opening 116. The stud 117 projects into the notch or cut away portion 125. By tightening the nut 124, the pin 122 will be moved longitudinally of the opening 120 to move the inclined surface of the notch 125 against the screw 117 to hold said screw against movement. Upon loosening the nut 124 to permit the pin 122 to shift within the opening 120, screw 117 will be released to permit the same to be turned within or unscrewed from the opening 116.

It will be noted that the seaming rollers 119 are disposed on the diametrically opposite sides of, and adjacent, the head 58 of plunger 57.

Means is provided to rotate the levers 102 about pins 100, 101, in such direction as to move the seaming rollers 119 away from the plunger head. To this end, there are fixed to the ledges 112 of the levers, cross bars 130. Said cross bars may be fixed to said ledges by bolts 131 passing through the openings 113 in said ledges. The ends of the cross bars 130 may be interconnected by coil springs 132, normally pulling the upper ends 108 of the levers toward each other, and moving the lower ends of the levers and rollers 119 away from each other.

Means is provided to rotate the levers in opposite directions to bring the seaming rollers 119 toward the head of the plunger, for pressing the flange 17 of the cap 13, downwardly and against the neck 12 of the can, as the body 75, together with the levers 102, rotates about the axis of spindle 20. To this end, there is screwed to the screw threaded portion 46 of member 42, a conical member 135 slidably receiving the sleeve 82 and interposed between, and contacting the rollers or wheels 111, at the upper ends of the levers. Upon moving the spindle 20 downwardly, the cone shaped member 135 will move downwardly with member 42 and together with the spindle and plunger, until the plunger is seated on the cap of the can and the cross head 64 contacts the screw 70 to limit the downward movement of the rod 50. When the plunger seats on the can, body 75 moves a little further until screw 72 contacts the thrust bearing 59a. Thereafter, body 75 cannot move downwardly, and further movement downwardly of the spindle will cause the cone 135 to move down on the sleeve 82, to spread the upper ends of the levers apart to rotate said levers, and move the seaming rollers downwardly and inwardly to seam the flange 17 of the cap to the neck 12 of the can.

It will now be understood that spindle 20, member 42, body 75 and cone 135 rotate during the seaming operation, while the rod 50 and plunger 57 are stationary. Since each lever has its pivotal point on one side of the axis of the plunger, and its seaming roller is located on the opposite side of said plunger, rotation of said lever during the seaming operation will move the seaming roller 119 downwardly, as well as inwardly, so as to pull the flange 17 downwardly over the neck 12 to make a strong seam and a good seal.

In prior constructions where the pivotal con-

nection for the lever is on the same side of the plunger as the seaming roller carried thereby, as shown in my Patent No. 1,490,339, issued April 15, 1924, rotation of the lever although moving the seaming roller inwardly toward the axis of the plunger does not move said roller downwardly as in the present construction, to aid in pulling the flange of the cap downwardly over the neck of the can.

In the present construction wherein the seaming rollers are moved downwardly upon rotating the levers, the flange of the cap is urged or pressed in a downward direction over the cap of the can so as to embrace a larger area of the neck and thus produce a tighter and stronger seam.

After the seaming operation is completed, upward movement of the spindle will cause movement of the conical member 135 upwardly relative to the body, to permit the springs 132 to rotate the upper ends of the levers toward each other and the rollers 119 away from the flange 17. When the pin 82*b* reaches the upper end of the slot or groove 82*a*, the body 75 will also be moved upwardly to carry the plunger out of the cap.

By placing the pivot for each lever on one side of the vertical rod 50 and the seaming roller of said lever on the other side of the vertical rod, a downward thrust will result at the point of contact between the seaming roller and the flange of the cap. I have found that good results are obtained when the levers are so constructed that the angle formed by the intersection of the axis of the rod 50 with a plane passing through the pivotal axis of one of the levers and the point of contact of the roller on said lever with a cap on the plunger, is greater than twenty-five degrees, as shown on the drawings.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

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

1. In a seaming device, a rod, a plunger at the lower end of said rod, a body rotatably mounted on said rod, a lever pivoted on said body about an axis perpendicular to said rod and disposed on one side of said rod, a seaming roller on said lever and disposed on the other side of said rod, means to rotate said body about said rod, means for rotating said lever about its pivot, means to reciprocate said rod, and adjustable means to limit longitudinal movement of said rod in one direction, the angle formed by the intersection of the axis of said rod with a plane passing through the pivotal axis of the lever and the point of contact of the roller with a cap on said plunger, being greater than twenty-five degrees.

2. In a device for seaming the flange of a cap to the neck of a can, a rod, a plunger at the lower end of said rod, a body rotatably mounted on said rod, means for rotating said body, a lever pivoted to said body about an axis perpendicular to the axis of said plunger and disposed on one side of said plunger, said lever having an L-shaped portion disposed in a plane parallel to the axis of said plunger and perpendicular to the pivotal axis, said L-shaped portion comprising an upwardly inclined arm and a downwardly inclined arm extending from the pivotal axis for said lever on one side of said plunger to the opposite side of said plunger, said upwardly inclined arm carrying a pin at the upper end thereof, disposed parallel to said pivotal axis, said plunger being disposed between said pivotal axis and pin, a wheel rotatably mounted on said pin and disposed in a plane passing through the axis of said plunger, said downwardly extending arm having a portion at the lower end thereof disposed parallel to said pivotal axis, said plunger being interposed between said portion and said pivotal axis, a seaming roller rotatably mounted on said portion on a downwardly and outwardly inclined axis, disposed in a plane passing through the axis of said plunger, and means slidably mounted relative to said body and engaging said wheel to rotate said lever for moving said seaming roller against the flange of the cap to seam the same to the neck of the can.

3. In a seaming device, a rod, a plunger at the lower end of said rod, a body rotatably mounted on said rod, means for rotating said body, a lever pivoted to said body, said lever being formed with a screw threaded opening, a screw screwed within said opening, a seaming roller rotatably mounted on said screw, said lever being formed with an opening perpendicular to said screw threaded opening and communicating therewith, a pin within said last mentioned opening and formed with an inclined notch, said screw projecting into said notch, and means for moving said pin longitudinally to press the inclined surface of said pin at said notch against said screw to retain the same against movement.

4. In a seaming device, a rod, a plunger at the lower end of said rod, a body rotatably mounted on said rod, means for rotating said body, a lever pivoted to said body, said lever being formed with a screw threaded opening, a screw screwed within said opening, a seaming roller rotatably mounted on said screw, said lever being formed with an opening perpendicular to said screw threaded opening and communicating therewith, a pin within said last mentioned opening and formed with an inclined notch, said screw projecting into said notch, and means for moving said pin longitudinally to press the inclined surface of said pin at said notch against said screw to retain the same against movement, said plunger being disposed between the pivotal axis of said lever and said seaming roller.

5. In a seaming device, a rod, a plunger at the lower end of said rod, a body rotatably mounted on said rod, means for rotating said body, a lever pivoted to said body, said lever being formed with a screw threaded opening, a screw screwed within said opening, a seaming roller rotatably mounted on said screw, said lever being formed with an opening perpendicular to said screw threaded opening and communicating therewith, a pin within said last mentioned opening and formed with an inclined notch, said screw projecting into said notch, means for moving said pin longitudinally to press the inclined surface of said pin at said notch against said screw to retain the same against movement, said plunger being disposed between the pivotal axis of said lever and said seaming roller, means for reciprocating said rod and plunger, and means for adjustably limiting movement of said rod and plunger in one direction.

6. In a seaming device, a rod, a plunger on

said rod, a body rotatably mounted on said rod, means for rotating said body, a pair of similar, symmetrically disposed levers pivoted to said body on parallel axes, perpendicular to said rod, and disposed on opposite sides of said rod, a seaming roller on each lever, said rod being disposed between the pivotal axis and seaming roller of each lever, the seaming rollers of said levers being disposed on diametrically opposite sides of said plunger, a wheel rotatably mounted on each lever about a pin parallel to the pivotal axis for said lever, said rod being disposed between the pivotal axis and pin of each lever, said wheels being disposed on diametrically opposite sides of said rod, means for rotating said levers about their axes to move said rollers away from each other and from said plunger, and a member slidably mounted relative to said body and interposed between and contacting said wheels for rotating said levers about their pivotal axes in such direction as to move the seaming rollers toward each other and toward said plunger, the angle formed by the intersection of the axis of the rod with a plane passing through the pivotal axis of each lever and the point of contact of the roller on said lever with a cap on said plunger, being greater than twenty-five degrees.

7. In a seaming device, a rod, a plunger on said rod, a body rotatably mounted on said rod, means for rotating said body, a pair of similar, symmetrically disposed levers pivoted to said body on parallel axes, perpendicular to said rod, and disposed on opposite sides of said rod, a seaming roller on each lever, said rod being disposed between the pivotal axis and seaming roller of each lever, the seaming rollers of said levers being disposed on diametrically opposite sides of said plunger, a wheel rotatably mounted on each lever about a pin parallel to the pivotal axis for said lever, said rod being disposed between the pivotal axis and pin of each lever, said wheels being disposed on diametrically opposite sides of said rod, means for rotating said levers about their axes to move said rollers away from each other and from said plunger, a member slidably mounted relative to said body and interposed between and contacting said wheels, for rotating said levers about their pivotal axes in such direction as to move the seaming rollers toward each other and toward said plunger, means for longitudinally moving said rod and plunger, and adjustable means to limit longitudinal movement of said rod and plunger in one direction, the angle formed by the intersection of the axis of the rod with a plane passing through the pivotal axis of each lever and the point of contact of the roller on said lever with a cap on said plunger, being greater than twenty-five degrees.

8. In a seaming device, a rod, a plunger on said rod, a body rotatably mounted on said rod, means for rotating said body, a member mounted on said body for sliding movement axially of said rod, a lever pivoted to said body about an axis disposed on one side of said rod, a seaming roller on said lever disposed on the opposite side of said rod, said member being formed with an inclined annular surface, means on said lever disposed on the same side of the rod as the seaming roller and contacting said inclined surface, and means for causing axial movement of said member relative to said body for rotating said lever.

9. In a seaming device, a rod, a plunger on said rod, a body rotatably mounted on said rod, means for rotating said body, a member mounted on said body for sliding movement axially of said rod, a lever pivoted to said body about an axis disposed on one side of said rod, a seaming roller on said lever disposed on the opposite side of said rod, said member being formed with an inclined annular surface, means on said lever disposed on the same side of the rod as the seaming roller and contacting said inclined surface, means for causing axial movement of said member relative to said body for rotating said lever, and adjustable means to limit longitudinal movement of the rod and plunger in one direction.

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