

(No Model.)

4 Sheets—Sheet 1.

J. A. STEWARD.
SEAMING SHEET METAL VESSELS.

No. 570,147.

Patented Oct. 27, 1896.

Fig. 1.

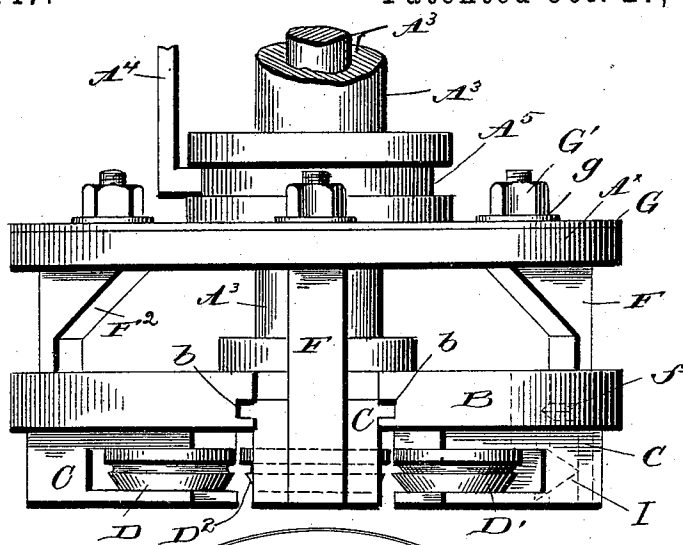
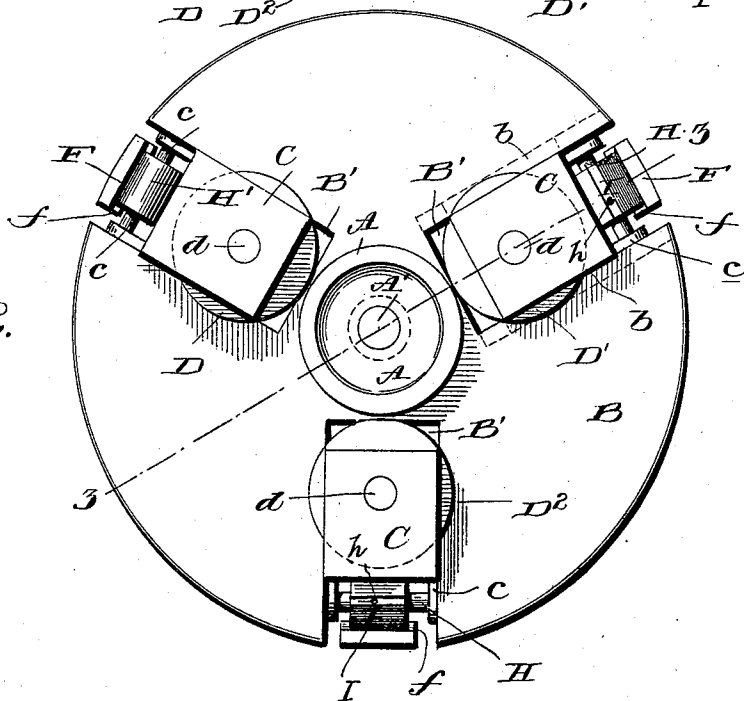


Fig. 2.



Witnesses:

L. C. Hills
E. A. Bond

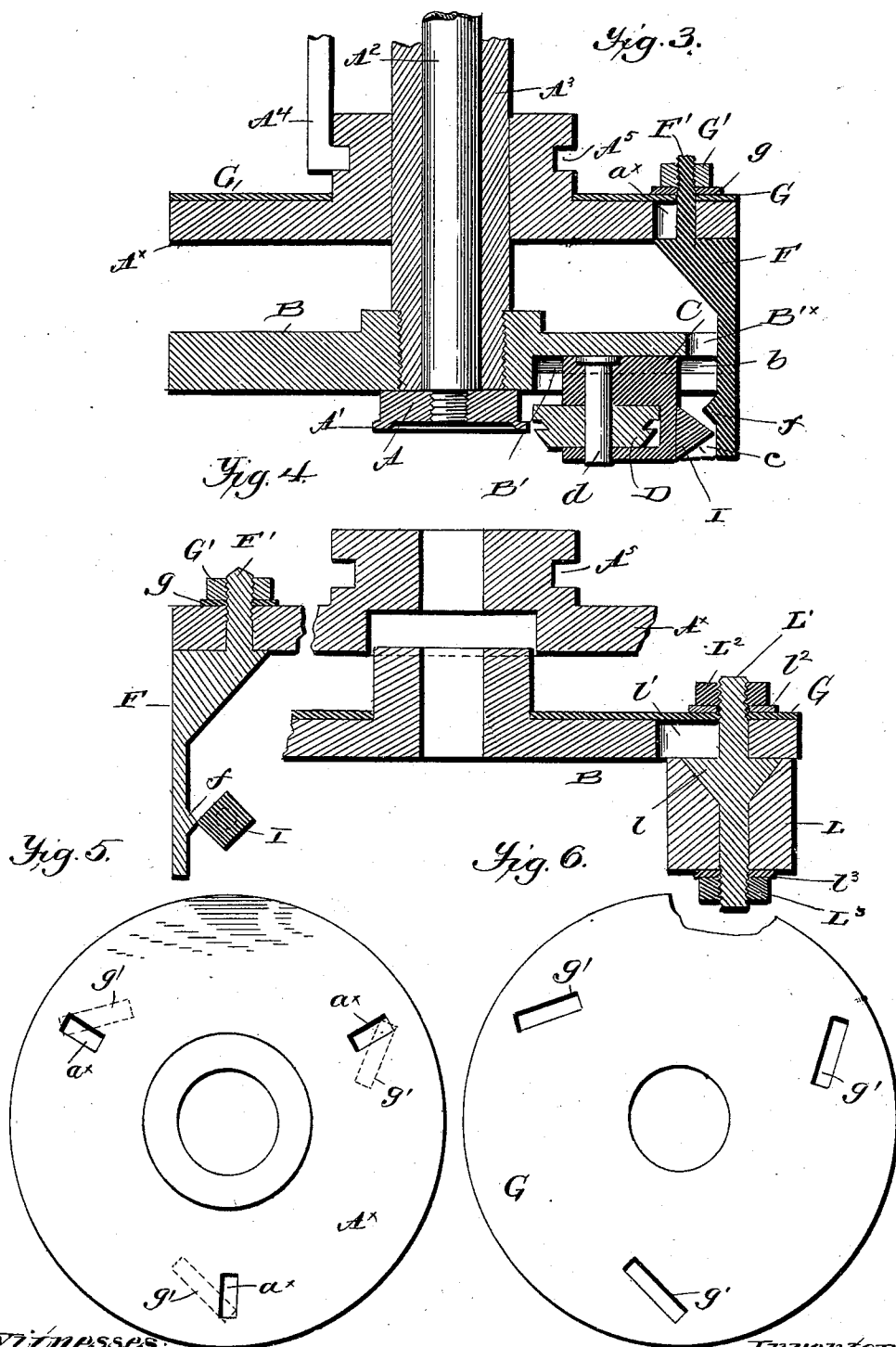
Inventor:

John A. Steward
By E. B. Stocking
Atty.

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Fig. 7.

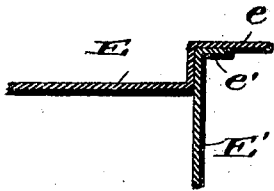


Fig. 8.

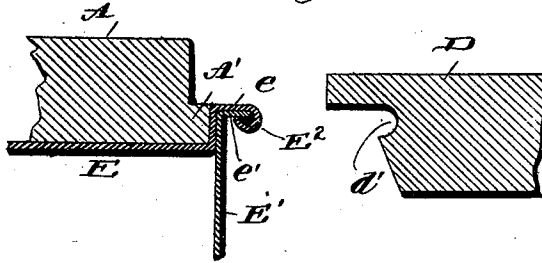


Fig. 9.

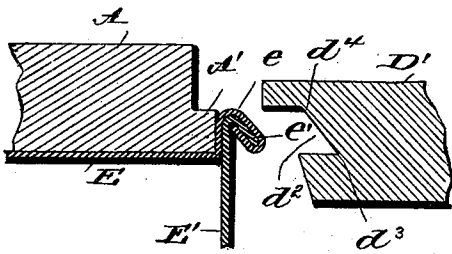


Fig. 10.

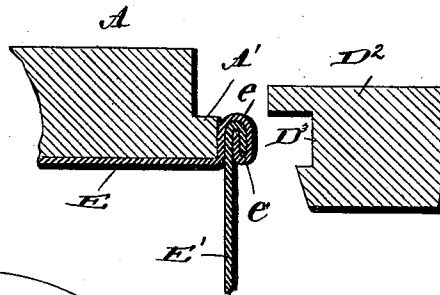
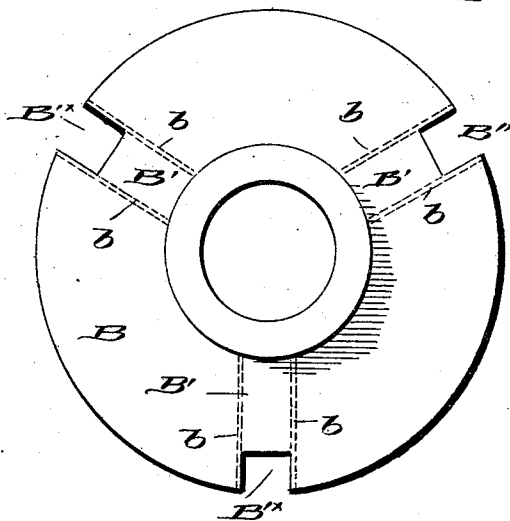


Fig. 11.



Witnesses:

L. C. Hills.
C. A. Bond

Inventor:

John A. Steward
by E. B. Steward
att'y

J. A. STEWARD.
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Fig. 15.

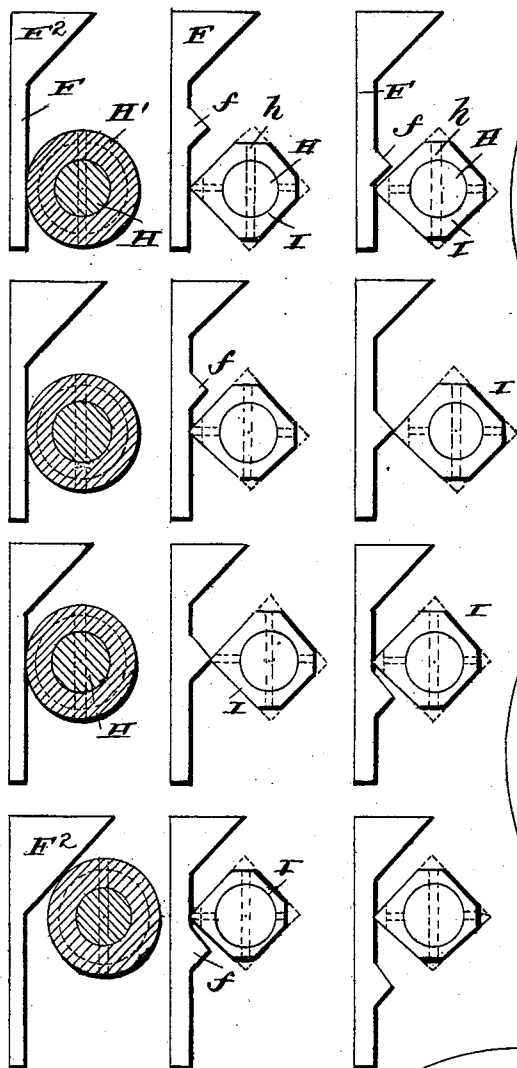


Fig. 12.

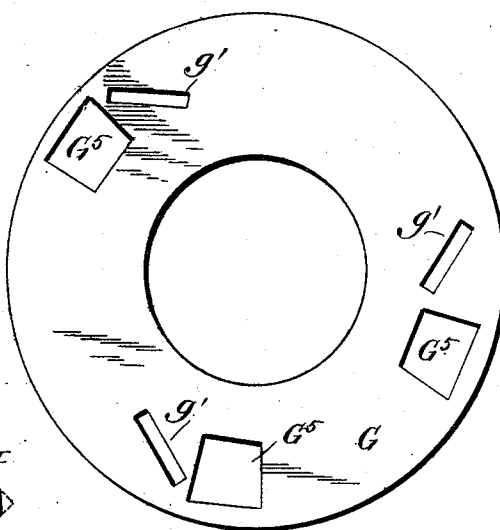


Fig. 13.

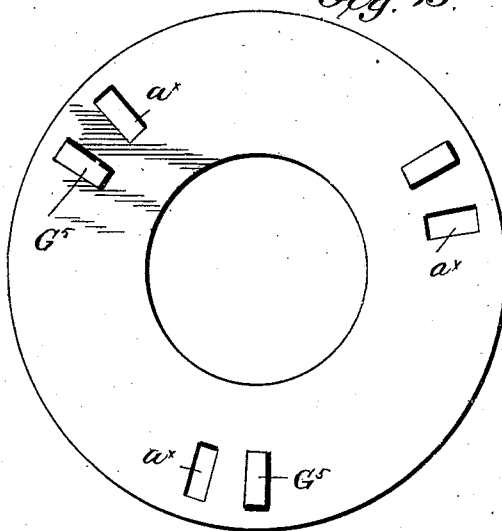


Fig. 14.

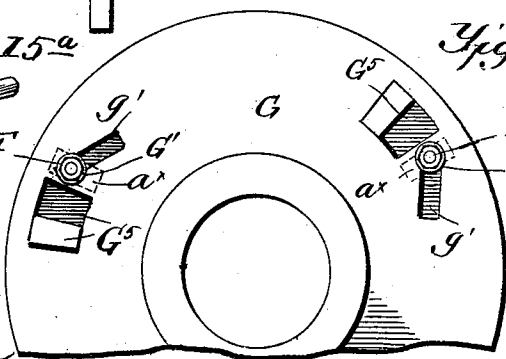
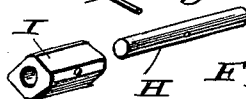


Fig. 15a



Witnesses:

L. C. Mills.
E. R. Bond

Inventor:
John A. Steward.
By E. R. Stocking
Atty.

UNITED STATES PATENT OFFICE.

JOHN A. STEWARD, OF CLARENDON, VERMONT.

SEAMING SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 570,147, dated October 27, 1896.

Application filed June 19, 1895. Serial No. 553,352. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. STEWARD, a citizen of the United States, residing at East Clarendon, in the county of Rutland, State of Vermont, have invented certain new and useful Improvements in Seaming Sheet-Metal Vessels, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in mechanism for seaming sheet-metal vessels, such as cans for containing fruits, vegetables, paints, and various other substances.

15 It has for its object, among others, to provide a simple and cheap construction whereby adjustment of the parts is provided to permit of wide range for the power ends and fulcrum-points of the die-blocks or levers for different sizes of cans.

20 A further object is to provide improved mechanism for seaming the sheet-metal vessels hermetically and in the peculiar construction of the seaming-dies whereby the desired ends are attained. I aim at improvements in the details of construction of the mechanism as a whole.

25 Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the appended claims.

30 The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

35 Figure 1 is a side elevation of a modified form of the seaming-head and its accessories. Fig. 2 is a bottom plan of the preferred form. Fig. 3 is a vertical section through Fig. 1, the section being on a line corresponding to the line 3 3 of Fig. 2. Fig. 4 is a sectional detail of a modified form which will be more particularly hereinafter referred to. Fig. 5 is a plan of one portion of the reciprocatory head. Fig. 6 is a similar view of another portion of the reciprocatory head. Fig. 7 is a sectional detail showing a portion of the can-body and top as it appears before the first step in seaming. Fig. 8 represents the same after the first seaming-tool has performed its operation, a portion of the tool being shown to illustrate its configuration. Fig. 9 shows the parts af-

ter the second step of the seaming operation with a portion of the tool which performs such step shown in its relative position. Fig. 10 shows the parts after the completion of the seaming operation with the operative portion of the last seaming-tool illustrated in position. Fig. 11 is a top plan of the plate of the seaming-head seen in Fig. 1. Fig. 12 is a plan of a modified form of one of the adjusting-disks of the reciprocatory head. Fig. 13 is a like view of another form of the disks or plates. Fig. 14 is a top plan of a modified form of the reciprocatory head complete with its adjustable disks with a portion broken away. Fig. 15 illustrates the cam-supports and cams and presser-rolls and the wedge-fingers, showing the action of the latter upon the former during the different stages of their movements. Fig. 15^a is a perspective detail showing one of the cams removed from its shaft, its shaft and pin.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the seaming-disk, which is non-revoluble, as is also the seaming-annulus A' thereon, the said disk being carried by and in this instance shown as detachably mounted upon the stationary shaft A² within the hollow revoluble shaft A³, which carries the seaming-head B and its accessories, hereinafter described. The means for giving motion to the various parts is not herein illustrated, as it may be of any approved form, such, for instance, as is illustrated in my Patent No. 519,594, it being deemed necessary simply to state in this connection that the necessary vertical reciprocatory movement is given to the head A² and its wedge-fingers, hereinafter described, through the medium of the fork A⁴ working in an annular groove A⁵ of said head, as seen in Figs. 1 and 3.

The seaming-tools are carried by the head B, which is fixedly secured to the lower end of the hollow revoluble shaft A³, preferably by means of a screw-thread, as seen in Fig. 3, so as to permit of its being removed when necessary by removal of the disk A, as will be readily understood by reference to said Fig. 3. This head is provided with three equally-spaced radial slots B', as seen in Figs. 2, 3, and 11, which are arranged upon the under

side of the head, as seen best in Fig. 3, and are provided with suitable guides or ways *b* for suitable guides or means upon the movable carriages *C*, which are adapted to be moved in and out toward and from the center of the head by vertical reciprocatory means, which will soon be described. Each of these carriages supports and carries a seaming-tool *D*, *D'*, or *D²*. These seaming-tools are mounted to revolve upon vertical spindles *d*, suitably supported in the carriages *C*, which latter are chambered, as seen best in Fig. 3, for this purpose. Each seaming-tool has its periphery of a different contour from the other and adapted to perform each its own step in the seaming of the can. The seaming-tools are mounted in the head *B*, which is properly timed in its revolutions so as to bring acting portions of said tools into operative position automatically and consecutively, the reciprocatory means being also timed and adjusted in a manner which will soon be described to perform its function in this connection.

I deem it best to now call attention to Figs. 7, 8, 9, and 10, in which views I have illustrated portions of the seaming-tools, showing their peripheral grooves and their configuration and the manner in which they operate.

In Fig. 7 the can-head *E* is shown in position within the upper end of the can-body *E'*, which latter is provided with a horizontal flange *e'*, and the former with a flange *e* overlapping said flange *e'*, as seen in Fig. 7.

In Fig. 8 the first step in the seaming operation has been performed by the seaming-tool *D*, which has an annular groove *d'*, which is substantially circular in form with respect to a right section of the tool and adapted to perform what I term the "curling" operation, as the said seaming-die is brought into contact with that portion of the can head or cover which extends beyond the flange *e'* of the can-body, the uppermost projecting portion of the seaming-tool moving over and resting upon the flange *e* of the cover or head and a portion of said flange projecting beyond the flange *e'* of the can-body being forced into said groove and curled under said flange *e'*, as shown in Fig. 8, in which the seaming-tool *D* is supposed to have been brought into contact with the can and performed its step in the operation.

In Fig. 9 is shown a portion of the seaming-tool *D'*, which performs the second step, and which is provided with a peripheral groove *d²*, which is substantially angular in form with respect to a right section of the seaming-tool, the angle *d³* of said groove being acute, while the angle *d⁴* is obtuse. In this view this seaming-tool has already performed its function by flattening the curl or roll *E²*, produced in the first step, as seen in Fig. 8, bringing the flange *e'* of the body and the overlapping flange *e* of the can cover or head into close and absolute engagement, and also depressing the outer portion and thereby bringing the parts in such position as to

facilitate the third seaming step or operation which is accomplished by the seaming-tool *D²*, having the peripheral groove *d³*, which is substantially rectangular with respect to a right section of the tool and adapted to flatten out the incomplete seam shown in Fig. 9, bringing the parts into close engagement and producing the complete hermetical seal or seam seen in said Fig. 10.

The radial slots or grooves of the head *B* at their outer ends extend through the head to form vertical grooves *B' X*, as seen in Figs. 3 and 11, for the reciprocatory movement of the wedge-fingers, which serve to give to the carriages and the seaming-tools carried thereby the necessary radial movement to cause them to perform functions for which they are designed.

As above described the head *A X* is reciprocated vertically by mechanism not herein shown, and this head carries the wedge-fingers *F*, each having upon its inner face a tapered projection *f*, which, as seen in Figs. 3 and 4, is substantially V-shaped, the said wedge-fingers having an upwardly-extending shank *F'*, which, as seen in Fig. 3, is screw-threaded and passes through an opening *a x* in the head *A X* and through an opening in the plate *G*, mounted upon the upper face of said head *A X*, and is provided with a nut *G'* and a washer *g*, all as clearly shown in Fig. 3. There are three of these wedge-fingers, one for each of the seaming-tools, and these wedge-fingers have their projections so located as to operate at predetermined periods upon the adjustable cam-blocks. The shafts *H* are mounted in lugs *c* on the carriages *C*, as shown best in Fig. 2, and the cam portions or blocks *I* thereof adjustably mounted upon said shafts *H*, being secured thereto by the removable pins *h*, which hold the said cam portions rigidly upon the cam-shaft by passing through the cam portions or blocks and through the ends of the shafts *H*. These cam-blocks have each face or point with a different bearing-surface, as indicated in Fig. 15, so that by removal of the pin and adjustment of the blocks the same may be adjusted for different sizes of cans.

It will thus be seen that by simply removing the pin *h* each of the working angles or points of the cam-blocks may be brought into position for engagement with the projections on the wedge-fingers and provide a cheap and easy adjustment for wear. The presser-roll *H'* is cylindrical and rotates upon the shaft *H*.

I may sometimes employ instead of the substantially rectangular portions I hereinbefore described a triangular portion *I*, as seen in Figs. 1 and 3, which may be used, where the cans are all to be made of one size, for an indefinite length of time and adjustment is not necessary.

The wedge-finger which acts upon the presser-roll *H'* is not provided with the cam projection *f* between its ends; but the upper inclined portion *F²* thereof serves as the part

which engages and actuates said cylindrical presser-roll, as seen in Fig. 15, in which figure I have illustrated the action of the wedge-fingers and the cam-blocks in the different stages of their operation, showing how the same are actuated one after the other according to predetermined periods, so that the different steps above described and shown in Figs. 7, 8, 9, and 10 will be performed and the hermetical sealing accomplished.

It will be understood that the cam-block on the right in Fig. 15 first is actuated to bring its seaming-tool into contact with the head of the can, then the next is thus actuated, and after these two have performed their functions then the cylindrical and revoluble presser-roll H' is brought into engagement with the inclined portion F² of the wedge-finger, this being done after the first two steps of the seaming operation have been accomplished and the last preceding cam-block I has receded from engagement with its wedge-point.

The upper set of views in Fig. 15 represent the normal position of the wedge-fingers and the shafts H before the engagements which produce the seaming operations are commenced. The next set of fingers in order represents the cam-block I passing over the projection *f*. This is the position of the shaft H when the first step of the seaming operation is completed and the seaming-tool D is in full engagement with the can-head. The next set of views represents the cam-block after it has passed over the projection *f* of the wedge-finger into its normal position, the next cam-block which actuates the seaming-tool D' just passing over the projection *f*, which is the position of the power end of the die-lever carrying the seaming-tool D', when the second step of the seaming operation is completed and the seaming-tool D' is in full engagement with the can-head. The next set of views represents the cam-blocks of the seaming-tools D and D' passed over the projections of their respective wedge-fingers into their normal position and the seaming-roll H' in engagement with the inclined portion F² of its wedge-finger, which position is that of the shaft carrying the seaming-tool D² when the third step of the seaming operation has been performed and the seaming-tool D² is in full engagement with the can-head and the hermetical sealing of the can thus accomplished.

In my Patent No. 519,594 hereinbefore referred to no provision is made for adjustment for different sizes of cans; but in order to provide for each size of can it is necessary to furnish a separate head. In the present instance I have devised means for adjustment of wide range for the wedge-fingers to reduce the great expense attending the providing of separate heads for each size of can and also to provide against the labor and expense of changing the seaming-heads for each and every different size of can.

The wedge-fingers F have their shanks F' passed through the slot *a x* of the head A X and through slots *g'* in the plate G, which is, as above stated, mounted upon the upper face of the head A X and sleeved about the hub thereof, as shown best in Fig. 3. These slots are arranged tangentially, as seen in Fig. 6, and the adjustment of these wedge-fingers in or out for different-sized cans is accomplished by the loosening of the nuts G' on the shanks of said wedge-fingers and then giving the said plate or disk G a rotary movement in the one direction or the other according to whether it is desired to bring the wedge-fingers in or out, the movement of the said disk G determining the adjustment of the wedge-fingers, the shanks F' of which move in the radial slots *a x* of the head A X, and when in their adjusted positions they are there secured by tightening of the nuts. Fig. 5 represents a top plan of the head A X with the position of the slots *g'* in the plate G represented by dotted lines to better indicate their positions relatively to the radial slots *a x* of the head A X.

In Fig. 4 I have shown a modification in which the head B and the head A X are adapted to be mounted upon the same shaft, the latter to reciprocate through the same means as before described in connection with Figs. 1 and 3, the wedge-fingers being mounted in the head A X in substantially the same manner as before described. In this view the block L is shown mounted upon the bolt L', having the conical portion *l* fitting a corresponding socket in the block and passing through the slot *l'* in the head B and through the adjusting-disk G, receiving a nut L² upon its upper end, between which nut and adjusting-disk is a washer *l*², while upon the lower end of the bolt is a nut L³ with an interposed washer *l*³, by which means adjustment for wear is provided, as well as radial adjustment for different-sized cans. Referring now to Figs. 12, 13, and 14, which show modifications of the adjusting-disk, the adjusting-disk G is shown in Figs. 12 and 14 with its slots *g'* and with the openings G⁵ for the passage of the wedge-fingers F for their adjustment with the shafts H.

From the above description it will be seen how adjustment may be readily and quickly made not only to compensate for wear but to adapt the machine for cans of varying sizes as well as to material of different thicknesses. Simply a rotatable adjustment of the adjusting-disk G and the tightening of the nuts is all that is necessary.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as new is—

1. The combination with a seaming-head, of a movable head and a series of seaming-tools mounted in non-pivoted supports and provided with a non-pivoted part in the path

of the vertically-reciprocatory device to be engaged thereby whereby the tools may be reciprocated radially in fixed guides on the head, substantially as specified.

5 2. The combination with the seaming-head, of a rotatable head, rotary and radially-reciprocatory seaming-tools carried thereby, non-pivoted supports for said tools, and a
10 for engaging a non-pivoted part on said tools for giving the reciprocal motion thereto, substantially as specified.

3. The combination with the seaming-head, of a rotatable head, rotary and radially-reciprocatory seaming-tools carried thereby,
15 non-pivoted supports for said tools, a vertically-reciprocatory head carrying means for engaging a non-pivoted part on said tools for giving the reciprocal motion thereto, and
20 means for adjustment of the parts for different-sized cans, substantially as specified.

4. The combination with a head having radial slots, of the rotatable adjusting-disk having slots angularly disposed and openings for
25 the passage of wedge-fingers, and vertically-movable wedge-fingers adjustable radially by the rotation of said disk, substantially as specified.

5. The combination with a head having
30 radial slots, of the vertically-reciprocatory wedge-fingers, a rotatable adjusting-disk having slots angularly disposed, and openings for the passage of the wedge-fingers, and means carried by said disk adapted to be actuated by the rotation of the disk to adjust
35 the wedge-fingers radially, and means for holding the parts in their adjusted positions, substantially as specified.

6. The combination with the cam-supporting shafts and the cam-blocks carried thereby,
40 of the vertically-reciprocatory wedge-fingers having inclined portions and tapered projections between said inclined portions and the ends of said fingers, substantially as specified.

7. The combination with the cam-supporting shafts and the adjustable cam-blocks carried thereby, of the vertically-reciprocatory
45 wedge-fingers having inclined portions, and double tapered projections between the in-

clined portions and the ends of the fingers, 50 substantially as specified.

8. The combination with the cam-supporting shafts and the horizontally-reciprocatory carriages and seaming-tools, of the adjustable cam-blocks and vertically-reciprocatory
55 wedge-fingers having inclined portions near their upper ends and tapered projections on their inner faces between said inclined portions and the lower ends of the fingers, substantially as specified. 60

9. The combination with the rotary head and the radially-reciprocatory and rotary seaming-tools, of the cam-supporting shafts and adjustable cam-blocks and the vertically-reciprocatory wedge-fingers having V-shaped
65 projections, substantially as specified.

10. The combination with the rotary head and the radially-reciprocatory and rotary seaming-tools, of the cam-supporting shafts and adjustable cam-blocks, the vertically-reciprocatory wedge-fingers having V-shaped
70 projections, and means for adjusting the same, substantially as specified.

11. The combination with the head having radial grooves with guideways, of the carriages mounted to slide in said ways, the seaming-tools rotatably mounted in said carriages, the cam-supports with their cam-blocks and the vertically-reciprocatory
80 wedge-fingers mounted to work through openings in the head and provided with V-shaped projections, substantially as specified.

12. The combination with the head and the radially-reciprocatory carriages, of the rotary seaming-tools mounted in said carriages,
85 the cam-supports, the adjustable cam-blocks thereon, the vertically-reciprocatory wedge-fingers having inclined portions, the head carrying the same, and the rotatable adjusting-disk for adjusting said fingers radially on
90 the head, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. STEWARD.

Witnesses:

FAYETTE VAUGHAN,
THOS. C. ROBBINS.