J. E. ABRAMS.

MECHANISM FOR SEAMING SHEET METAL VESSELS.

APPLICATION FILED AUG. 21, 1908.

930,913.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

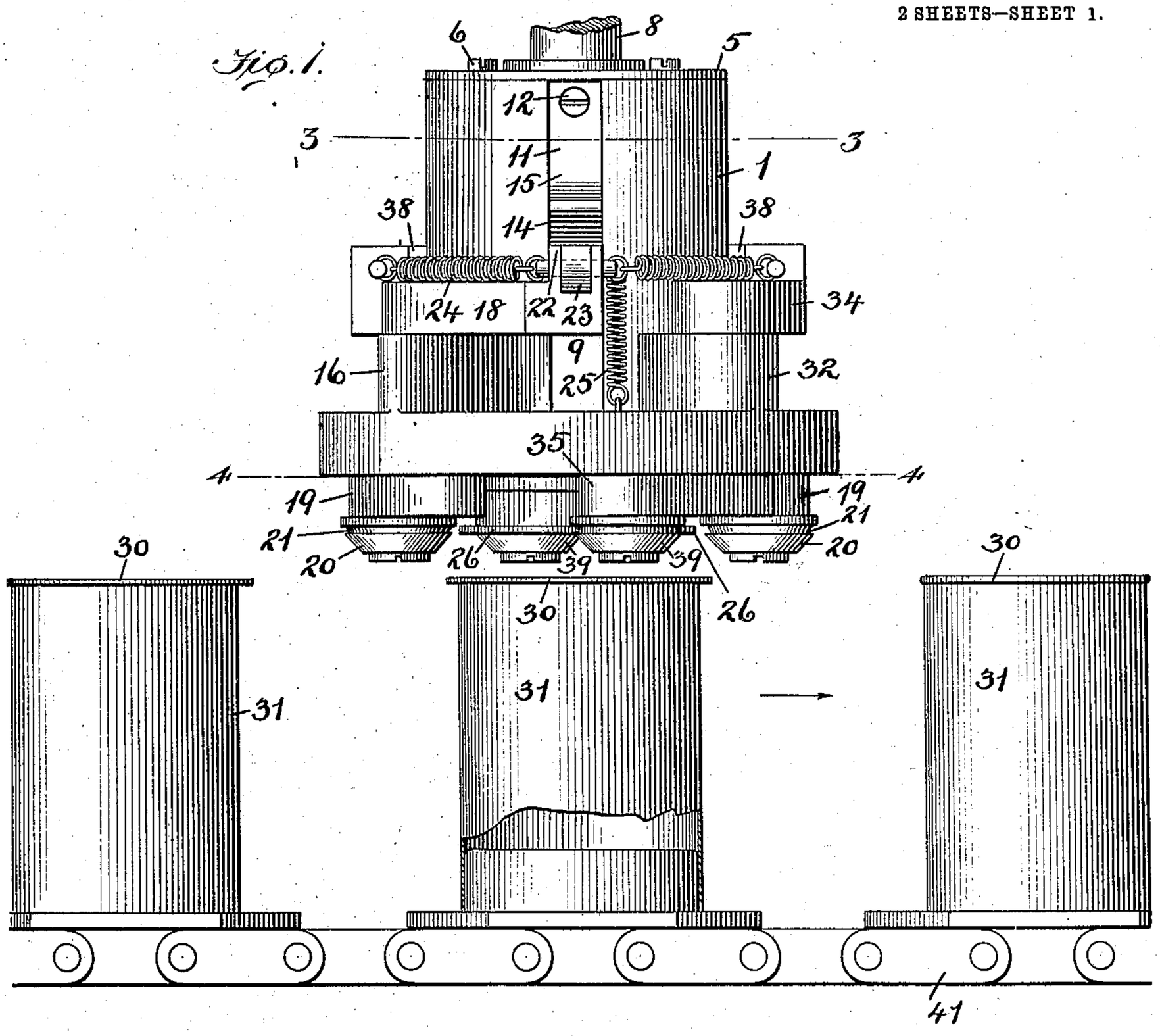
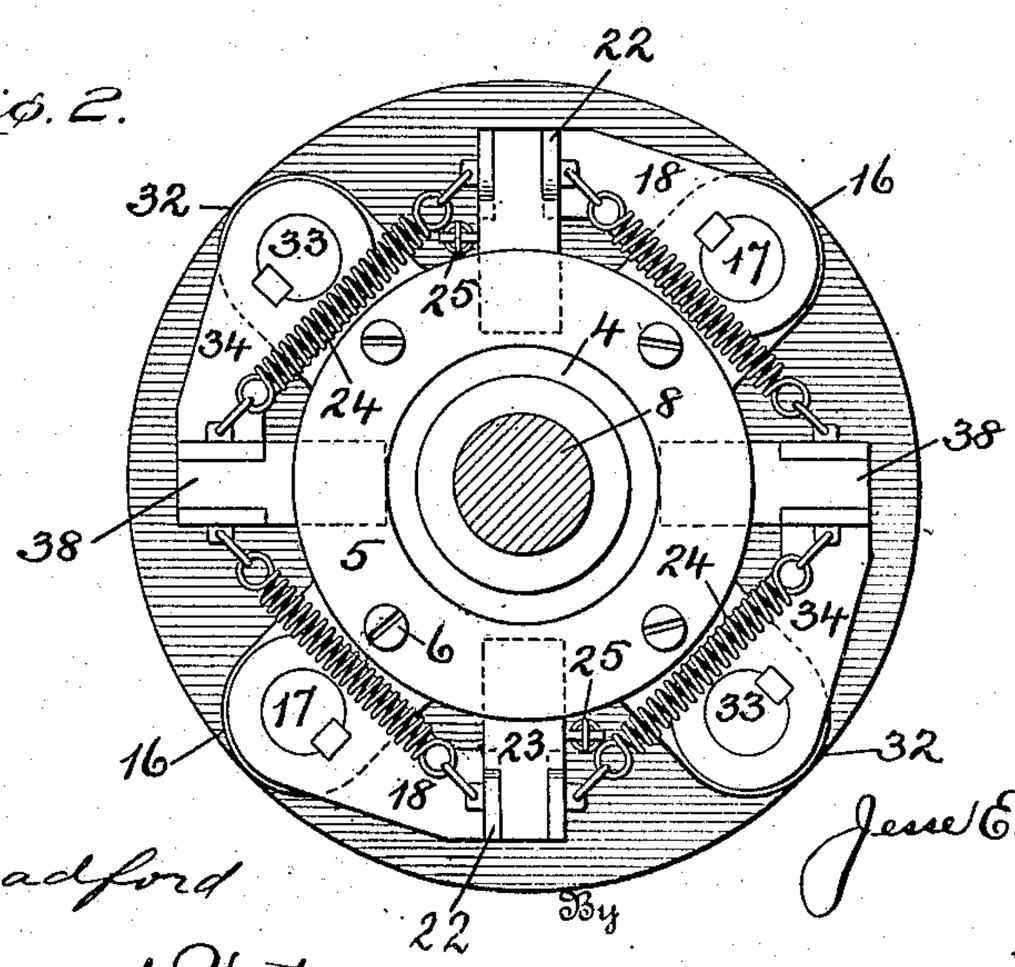


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

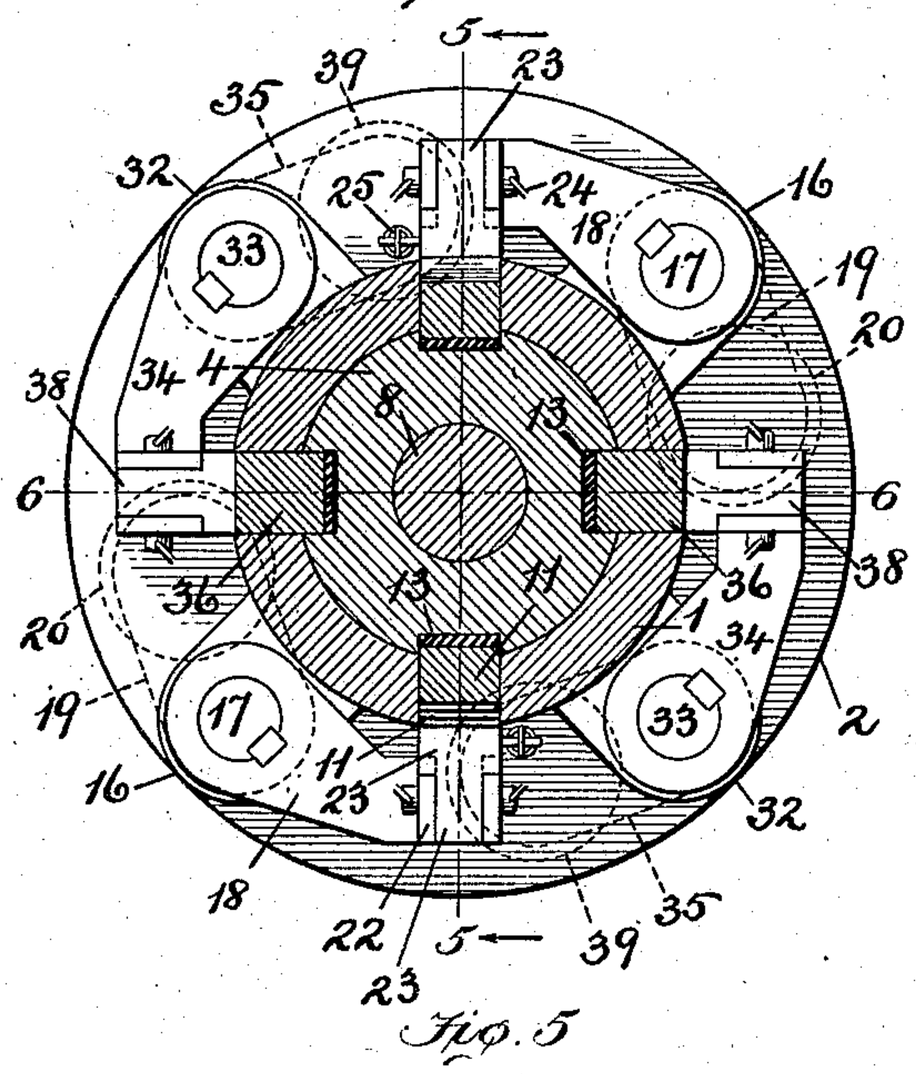


Fig. 5

Fig. 4.

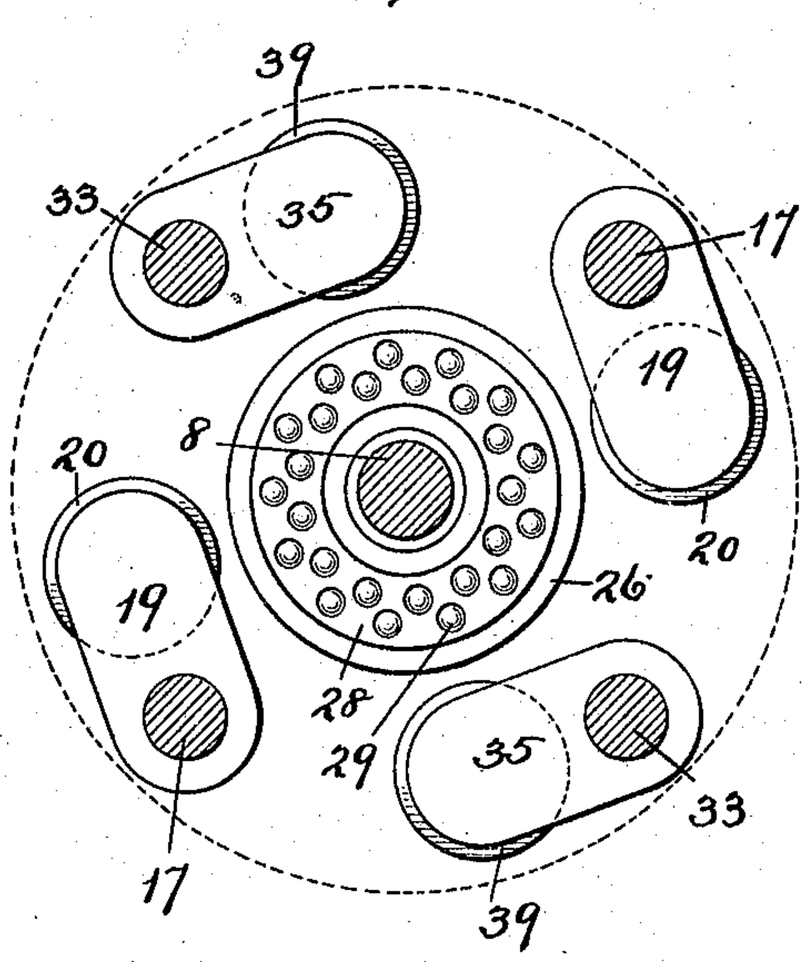
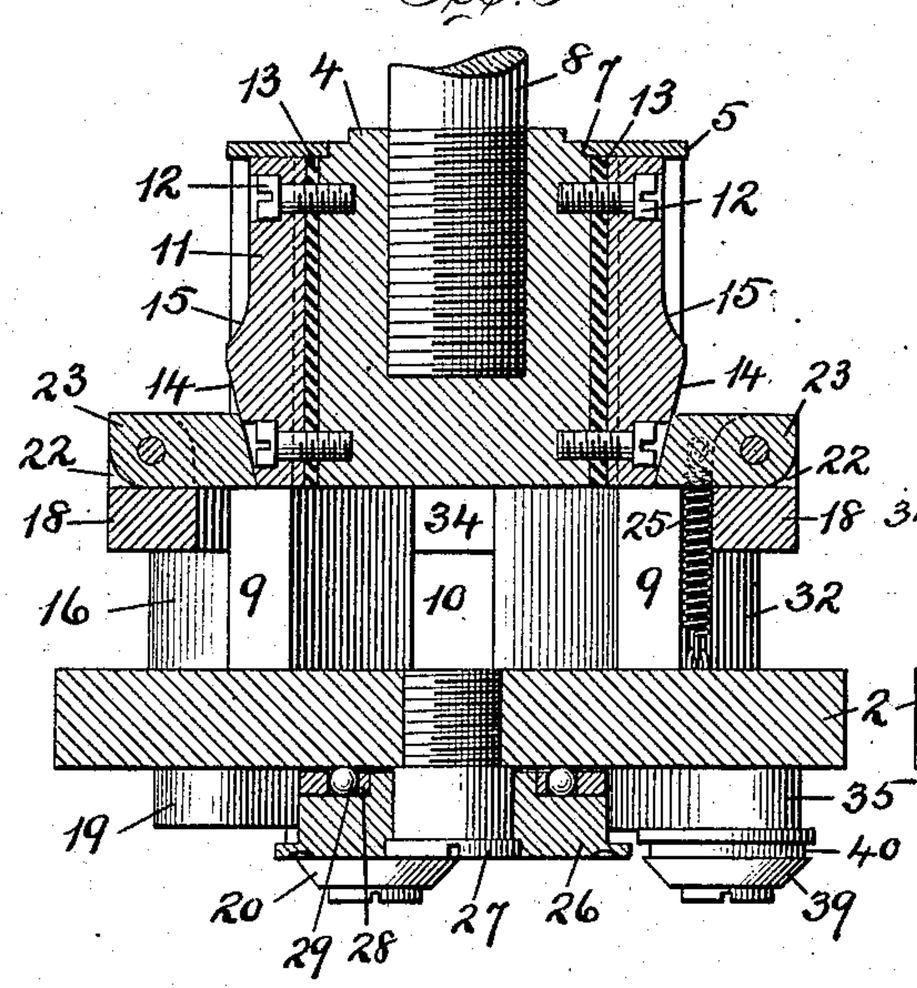


Fig. 6.



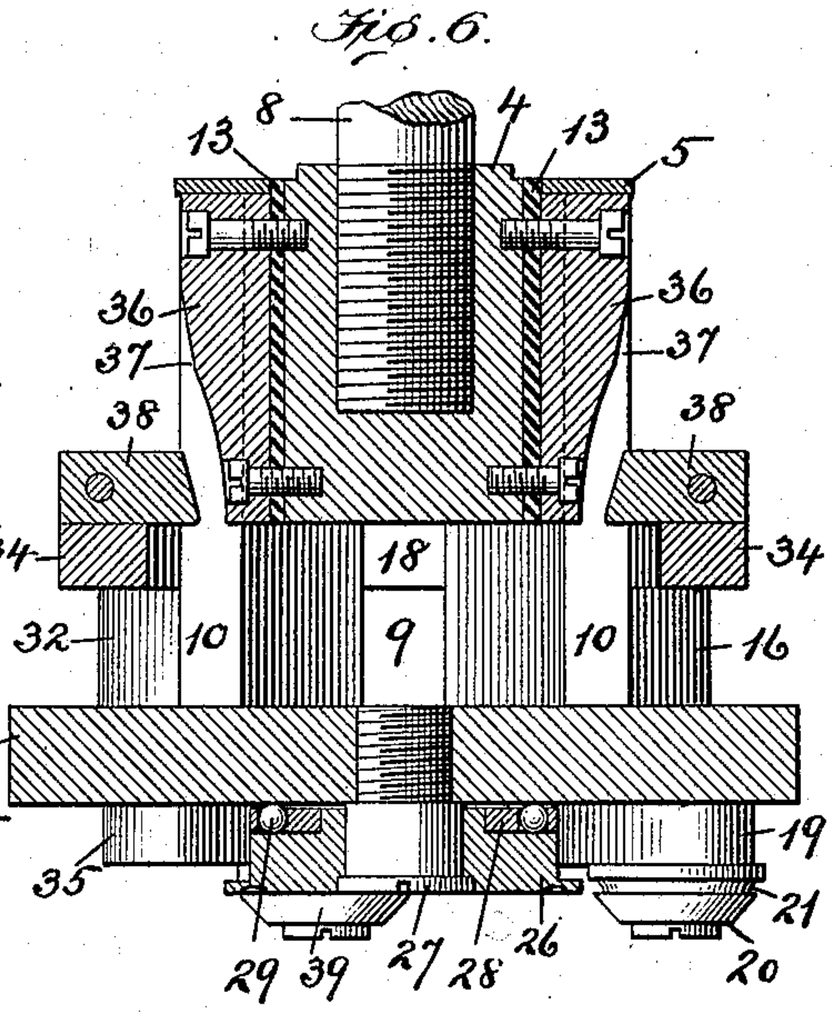


Fig. 7.

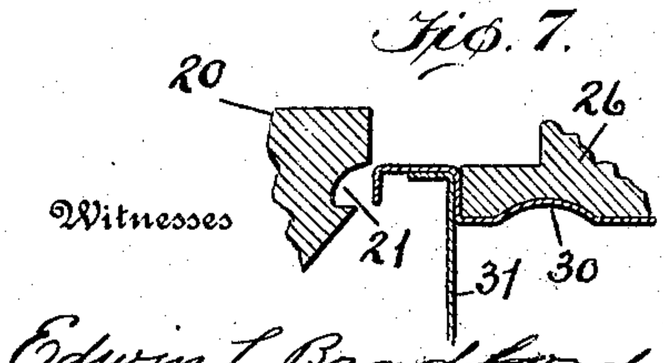


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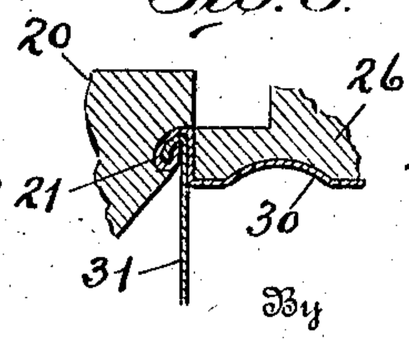
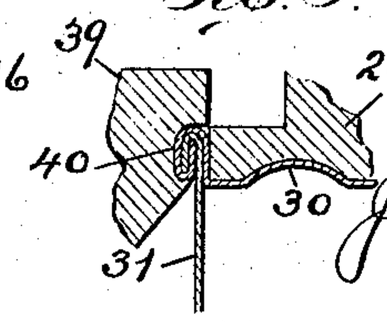
Fig. 8.



By

Fig. 9.



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UNITED STATES PATENT OFFICE.

JESSE E. ABRAMS, OF BALTIMORE, MARYLAND, ASSIGNOR TO CONTINENTAL CAN COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF NEW JERSEY.

MECHANISM FOR SEAMING SHEET-METAL VESSELS.

No. 930,913. Specification of Letters Patent. Patented Aug. 10, 1909.

Application filed August 21, 1908. Serial No. 449,646.

To all whom it may concern:

Be it known that I, JESSE E. ABRAMS, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Mechanism for Seaming Sheet-Metal Vessels, of which the following is a specification.

This invention relates to an improved mechanism for seaming sheet-metal vessels and has particular reference to a machine for double-seaming the bodies to the heads or ends of sheet-metal cans, by folding or rolling the margin of the head and the end of the can-body together, thus forming a joint that will be effective without the use of solder.

One object of the invention is to provide an improved construction of machine that will first make a preliminary formation in the seam and then a final formation to complete the seam.

Another object is to provide a seam-forming device having a preliminary roller and a finishing roller and to operate said rollers so that one roller will perform a preliminary operation on the flanges and the other roller will perform the finishing operation.

Another object is to provide an improved construction of seam-former having a plurality of seaming rollers and to actuate the rollers so that they will be brought into straight contact with the edges to be seamed.

Another object is to generally improve the construction of seamers to better adapt them to perform their operations with a minimum amount of wear.

The accompanying drawings illustrate the invention in which,

Figure 1, is a side elevation of the complete machine the same being shown in position above a traveling can-body support which presents the bodies to receive the heads or ends. Fig. 2, is a top plan view of the machine. Fig. 3, is a sectional plan view of the same,—the section being taken on the line 3—3 of Fig. 1. Fig. 4, is a similar view of the roller-carrying levers and rollers,—this section being taken on the line 4—4 of Fig. 1. Fig. 5, is a central vertical section through the device,—the section being taken on the line 5—5 of Fig. 3. Fig. 6, is a similar section but at right angles to the section shown in Fig. 5, and this section is taken on the line 6—6 of Fig. 3. Fig. 7, shows on a large scale a portion of a can body and head or end applied thereto and also shows a fragment of the preliminary bending roll ready to be brought into engagement to effect the first or preliminary bend. Fig. 8, is a similar view but showing the roller in engagement and the preliminary bend made, and Fig. 9 is a detail of the finishing roller and shows the position the metal takes when the seam is finished.

In the drawings the numeral, 1, designates a circular or other shaped shell having a horizontal base, 2, and a plurality of integrally-formed bearings immediately on top of the base. The shell is preferably circular on its inside and a circular head, 4, fits snugly therein and a circular plate, 5, is attached to the upper end of the shell by means of screws or bolts, 6, and the upper circular edge, 7, of said plate projects over the upper end of the circular head and sustains the shell, base and bearings in a pendent position from the upper surface of said circular head.

A shaft, 8, depends from a suitable driving mechanism that will cause it to revolve and also to be reciprocated vertically and the lower end of said shaft enters the upper side of the circular head, 4, and sustains the head and shell in a pendent position over a can-body support, which will presently be described.

The shell is provided with vertical slots, 9, which are diametrically opposite each other and at right angles to the slots, 9, it is provided with other vertical slots, 10, which are also diametrically opposite each other. It is therefore to be understood that the shell has four vertical slots, two of which have position at right angles with respect to the other two slots. All of these slots, in the present instance extend from the circular plate, 5, down to the horizontal base plate, 2.

In the slots, 9, and extending vertically therein I place cam-plates, 11. These plates are secured to the side of the circular head, 4, so as to be carried thereby but the bolts or screws, 12, which secure them to said head do not rigidly engage the plates because I interpose a packing, 13, between the inner sides of the plates and the heads whereby at a certain period in the seaming operation the plates may have the capability of yielding inwardly slightly toward the head as will presently be

explained. The cam-plates, 11, see particularly Fig. 5 have an upwardly and outwardly inclined face, 14, at their lower ends and an inwardly curved surface, 15, above the outwardly-inclined face.

In the operation of the device the head and cam-plates have a downward movement independently of the shell and base and this movement is provided for the purpose of operating certain preliminary rollers to perform the first step in the seaming operation as will now be described.

At diametrically opposite sides, the base is provided on its upper side with bearings, 16, through which a vertical shaft, 17, extends and has bearing, and the upper end of each shaft carries a rock arm, 18, which extends circumferentially about the shell in one direction, while the lower ends of said shafts carry rock arms, 19, which extend in a direction substantially reverse to the direction of the arms, 18. It is to be understood from the foregoing description that each shaft, 17, carries an arm, 18, at its upper end and another arm, 19, at its lower end and that the two arms extend in opposite directions from said shaft so that one may be said to project forwardly while the other projects rearwardly. The free end of each lower arm, 19, carries a loose roller, 20, having a circumferential seaming groove, 21.

It will be noted that the shafts, 17, have a vertical position and the arms, 18, and, 19, at opposite ends thereof each have a horizontal position and further that the rollers, 20, on the arms, 19, also have a horizontal position. It will therefore be seen that if the shaft is rocked or oscillated the arms and rollers will be swung in and out in a horizontal plane. This movement is provided so that the rollers may be moved horizontally to engage and operate on the flanges and the movement is effected through the action of the vertical cam plates, 11, as will now be described.

The arms, 18, at the upper ends of the rock shafts, 17, extend around the shell, 1, as clearly seen in Figs. 1, 2 and 3, and the free ends of said arms terminate or have position at the outer side of the cam-plates, 11. These free ends of said arms are provided with upwardly-extending lugs, 22, which pivotally sustain a dog, 23.

By reference to Fig. 5, it will be seen that the dogs have an inner beveled end which contacts with the outwardly-inclined face, 14, of the vertical cam plates, 11, and in the normal position, when the cam-plates are elevated, the inclined or beveled-end of the dogs are at the lowermost end of said cam-plates. When in this position the free end of each arm, 18, is in toward the shell as far as it can go, and it is held in this position by means of coiled springs, 24. It will therefore be understood that the working faces of the dogs and cam-plates are held in yielding contact by means of the said coiled springs. It will also be seen by reference to Figs. 1, 2 and 5 that the pivoted dogs, 23, are yieldingly held down by means of vertical-extending coiled springs, 25.

Below the base-plate, 2, I provide a circular disk or head, 26, which is secured to the under side of the base plate by means of a screw, 27, or other suitable device that will permit it to remain stationary during the revolution of the base-plate.

Between the circular disk and base-plate I preferably interpose an anti-friction bearing which comprises a circular perforated plate, 28, having balls, 29, in the perforations,—the balls bearing on the bottom side of the base and on the top side of the disk while the plate, 28, merely serves to keep the balls spaced.

In the operation, the entire device is first lowered until the disk, 26, rests upon the can, 30, that is to be attached to the body, 31, at which time the body will sustain the weight of the shell; the base and the parts carried thereby. The shaft, 8, and circular head, 4, at the lower end thereof are forced down inside the shell, which is then supported by the body, and in moving down the head, 4, carries the cam plates, 11, with it so that as the cam-plates pass down over the beveled end of the pivoted dogs the latter will be forced outwardly or away from the shell and against the action of the springs, 24. This outward movement of the dogs throws the free ends of the arms, 18, outward; rocks the shaft, 17, and throws the rollers, 20, on the arms, 19, inwardly and in contact with the metal, as clearly seen in Fig. 8. During this operation the shell, base, and all parts of the device are revolved by the shaft, 8, and the rollers, 20, will perform a preliminary bending operation on the seam, and while this preliminary operation is carried on for a predetermined period or number of revolutions, the shaft, 8, circular head, 4, and cam-plates, 11, are lowering and gradually forcing the rollers, 20, inwardly about the can head and body. When however the cam-plates are lowered sufficiently to enable the dogs, 23, to pass from the outward inclined surface, 14, onto the inward inclined surface, 15, the dogs will be retracted sufficiently to throw the rollers, 20, out of contact with the preliminarily formed seam and the further downward movement of the shaft, 8, and head, 4, will operate other devices that will finish or complete the seam. These devices will therefore now be described.

By reference to Fig. 2 it will be seen that in addition to the bearings, 16, the base plate is provided with bearings, 32, which have position at diametrically opposite sides and at right angles with respect to the bearings,

16. Shafts, 33, extend vertically through the said bearings and carry arms, 34, and, 35, at opposite ends thereof,—the arms, 34, being at the upper end and extending in one direction and the arms, 35, at the lower end of the shafts and extending in an opposite direction. The free end of each arm, 34, has position confronting the vertical slots, 10, and cam-plates, 36, are attached to the circular head and travel vertically in said slots and said cam-plates have a beveled working face, 37, at their upper ends. A packing of rubber or other suitable material similar to the packing, 13, is also interposed between these cam-plates and the head the purpose of which will be presently described. The free ends of the arms, 34, carry inwardly-projecting cam-blocks, 38, which differ from the dogs, 23, in that they have no movement independent of the arms which carry them. These blocks project into the slots, 10, and in the normal inoperative condition, have position below the working face, 37, of the cam-plates, 36. The coiled springs, 24, that hold the arms, 18, in toward the shell also serve to keep the arms, 34, and the cam-blocks, 38, carried thereby, pressed toward the shell. It will therefore be seen that the arms, 34, are to be moved horizontally by the action of the cam-plates, 36, on cam-blocks, 38, and that the movement of the said arms in one direction will cause the shafts, 33, to be rocked so as to throw the lower arms, 35, in an opposite horizontal direction, and as said latter arms loosely carry the finishing rollers, 39, with circumferential grooves, 40, to shape the finished seam said rollers will be thrown into operative contact with the partly formed seam when the head, 4, has been lowered sufficiently to bring the working faces, 37, of the cam-plates into contact with the blocks, 38. After the rollers, 20, have made the preliminary seam formation and the dogs, 23, are passing onto the inwardly extending surface, 15, of the cam-plates, 11, so as to retract the said rollers, 20, the cam-block, 38, will be brought into contact with the working face, 37, of the cam-plates, 36, and the finishing rollers, 39, will then be brought into contact with the seam by the further downward movement of the head, 4, and shaft, 8, and the seam completed.

The interposition of the packing between the cam-plates, 11, and, 36, and the circular head, 4, serves a useful function in that during the revolution of the rollers, 20, or, 39, about the cam-body and head, the rollers must pass over the lapped edges of the body which form the longitudinal side seam of the cam, and at said seam there is more metal than at other points in the body. Unless provision is made to take up the shock on the rollers while they ride over the seam, some part of the seamer will be subjected to that shock at each revolution of the head, and I have found in practice that by placing a packing behind the cam-plates noise and wear are both avoided.

In practice the can bodies with the heads applied, ready for seaming are preferably placed on a conveyer, 41, and thereby successively moved to the seamer.

Having thus described my invention what I claim and desire to secure by Letters Patent is,—

1. In a device of the character described the combination with a shell, of a head movable in the shell, cam-plates carried by the head, cushioning means between the cam-plates and head, rollers sustained by the shell and levers operating between the cam-plates and rollers.

2. In a seaming machine the combination with a vertical shaft, of a head at the lower end of said shaft and movable therewith; cam plates carried by said head; a shell encircling the head and suspended therefrom and having vertical slots through which the cam plates in the head may project; vertical shafts carried by the shell; two rock arms on each shaft and one arm of each shaft projecting into the path of the said cams and the other arm of each shaft carrying a seaming roller.

3. In a seaming machine the combination with a hollow shell having a base plate with slots extending vertically in the shell above the base plate, of vertical shafts extending through the base of the shell and carrying a rock arm above said plate and another arm below said plate; a roller mounted on each arm at the lower ends of said shafts; a head movable vertically in the shell; cam plates carried by said head and projecting outwardly in the slots of the shell for operating the rock arms on the upper ends of the vertical shafts.

4. In a seaming machine the combination with a vertical shaft, of a head at the lower end of said shaft and rigid therewith; cam plates extending vertically at the side of the head and movable therewith; a shell fitting over the head and suspended therefrom and having vertical slots through which the vertical cams on the inclosed head may project,—said shell also having a horizontal base plate, a revoluble disk carried at the bottom side of the suspended shell; a plurality of shafts extending through the base plate; a rock arm on the upper end of each shaft and movable by the cams on the inclosed head; an arm on the lower end of each shaft and a roller on each of said latter arms.

5. In a seaming machine the combination with a vertical shaft, of a head at the lower end of said shaft and rigid therewith; cam plates extending vertically at the side of the head and movable therewith; a yielding packing between the cam plates and head; a shell encircling the head and suspended from

the latter and having vertical slots through which the cam plates project; rock-arms carried by the shell; rollers on said arms, and means operating between the cam plates and rock arms for swinging the latter.

6. In a device of the character described the combination with a shell having a base plate and a plurality of slots extending vertically therein above the base-plate, of a head movable in the shell above the base plate, a plurality of cam-plates carried by the head and projecting into the slots of the shell, arms pivotally mounted beneath the base plate, a roller carried by each of said arms, means on the upper side of the base plate to coact with the cam-plates in the slots, and means operating between said latter means and the pivoted arms to move the rollers in a horizontal plane.

7. The combination with a reciprocating head, of a shell suspended from said head and having a plurality of vertical slots, cam-plates carried by said head and projecting through the slots of the shell whereby to lock the head and shell in rotary engagement, a base plate carried by the shell below the head, rock-shafts passing through the base plate, arms on the upper ends of the rock-shafts and carrying projections at their ends that enter said slots and engage the cam-plates, arms on the lower ends of the rock-shafts, rollers on said latter arms, and a disk at the bottom side of the base plate between said rollers.

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

JESSE E. ABRAMS.

Witnesses:

FELIX R. SULLIVAN,

G. FERDINAND VOGT.