No. 623,802. Patented Apr. 25, 1899.

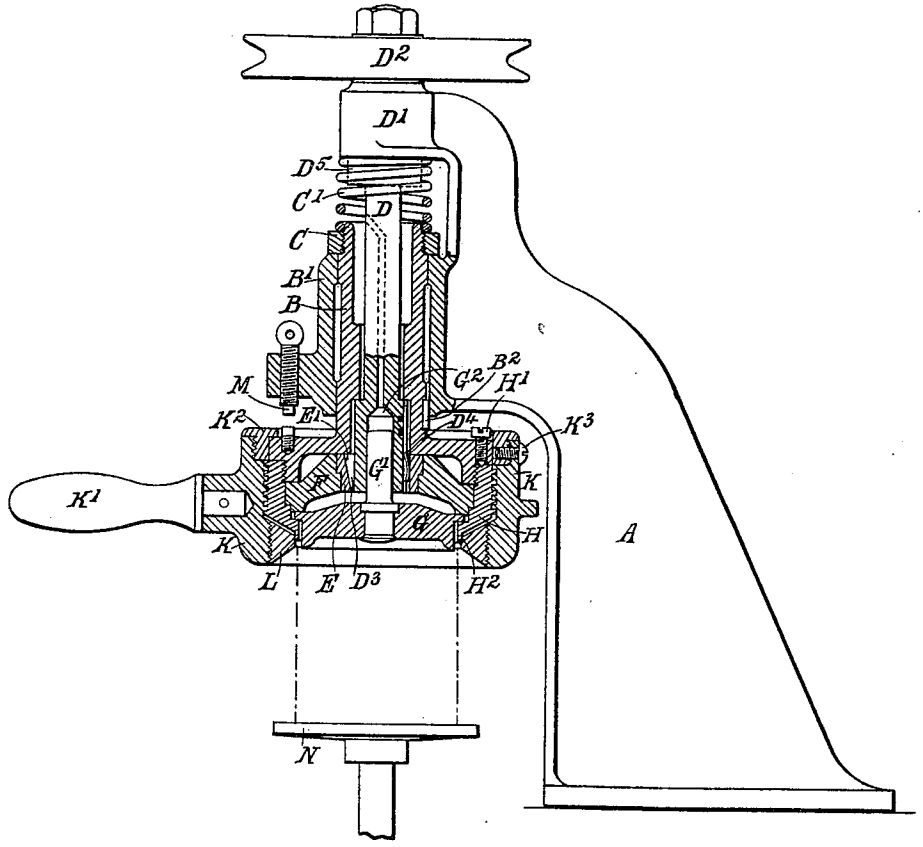
C. F. MENDHAM.

MACHINE FOR HERMETICALLY CLOSING CIRCULAR SEAMS OF SHEET METAL CANS.

(Application filed Jan. 5, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses
Philip N. Tildew.

Inventor
Conrad F. Mendham
By James L. Norris.
Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 2.

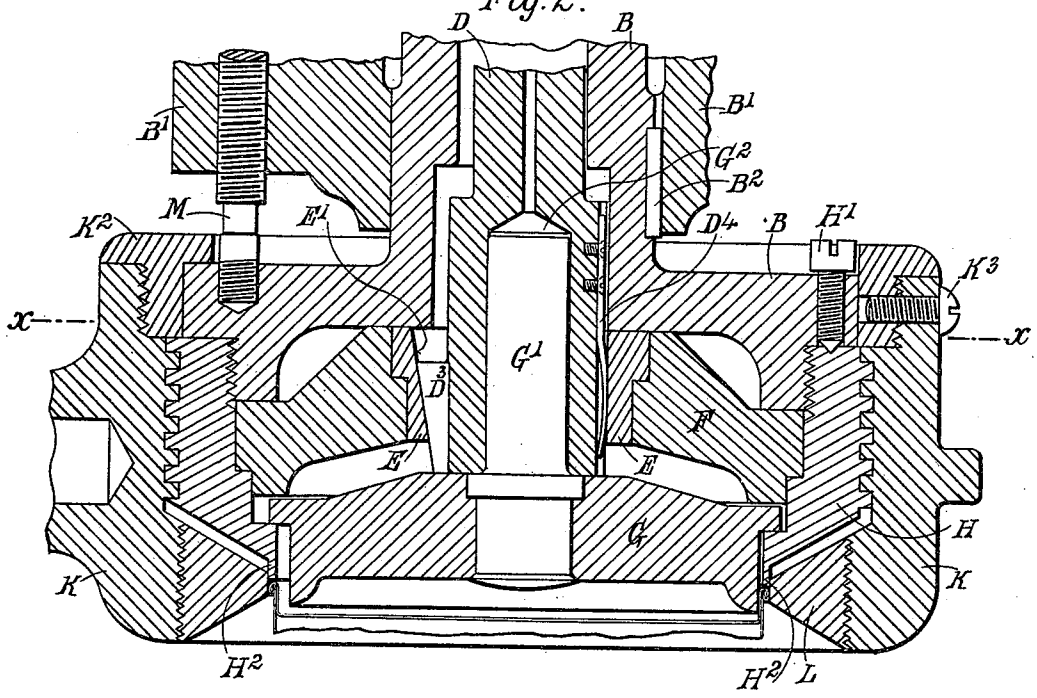
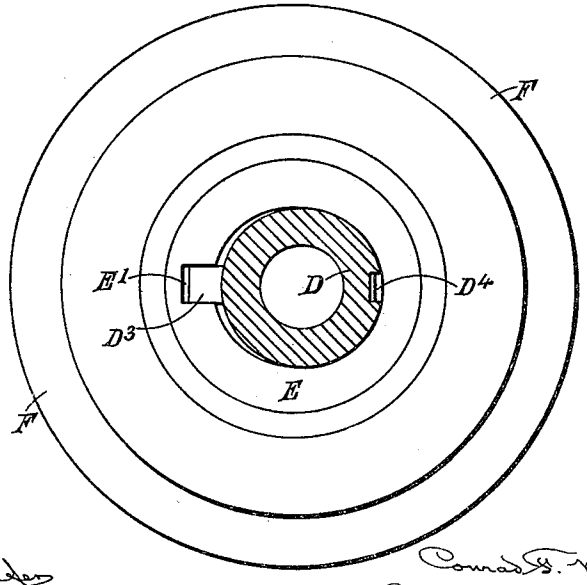


Fig. 3.



Witnesses
A. B. Keeler
Philip N. Gilden

Inventor
Conrad F. Mendham
By James L. Norris.
Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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C. F. MENDHAM.

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(No Model.) 4 Sheets—Sheet 3.

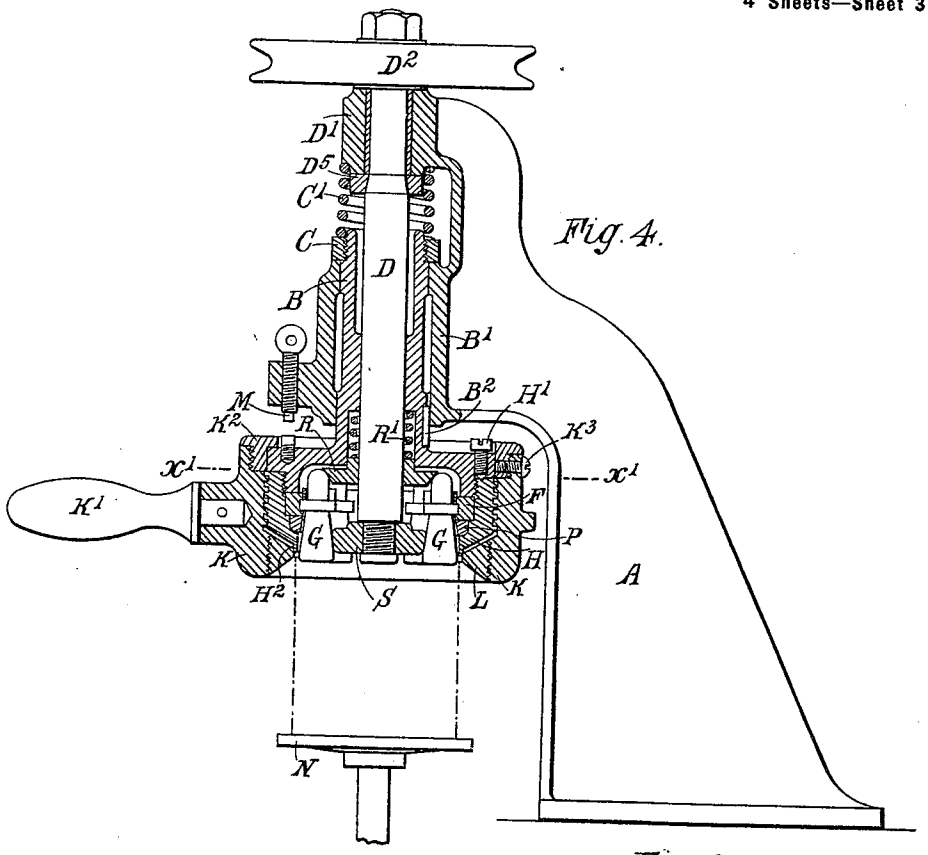


Fig. 4.

Fig. 6.

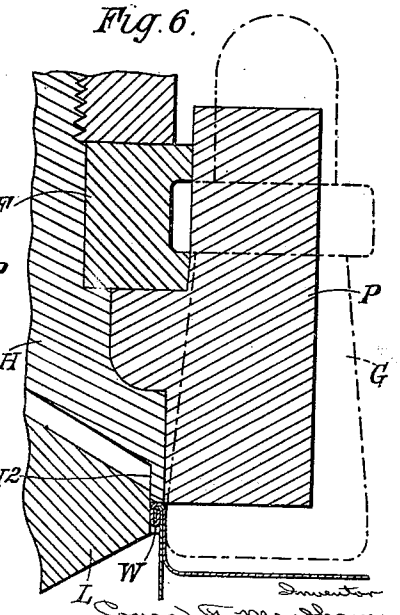
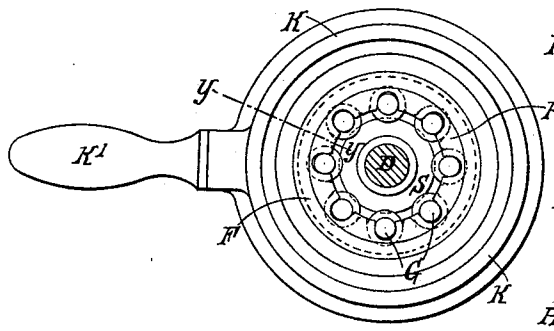


Fig. 5.



Witnesses
Philip N. Tilden

Inventor
Conrad F. Mendham
By James L. Norris.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 623,802. Patented Apr. 25, 1899.

C. F. MENDHAM.

MACHINE FOR HERMETICALLY CLOSING CIRCULAR SEAMS OF SHEET METAL CANS.

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(No Model.) 4 Sheets—Sheet 4.

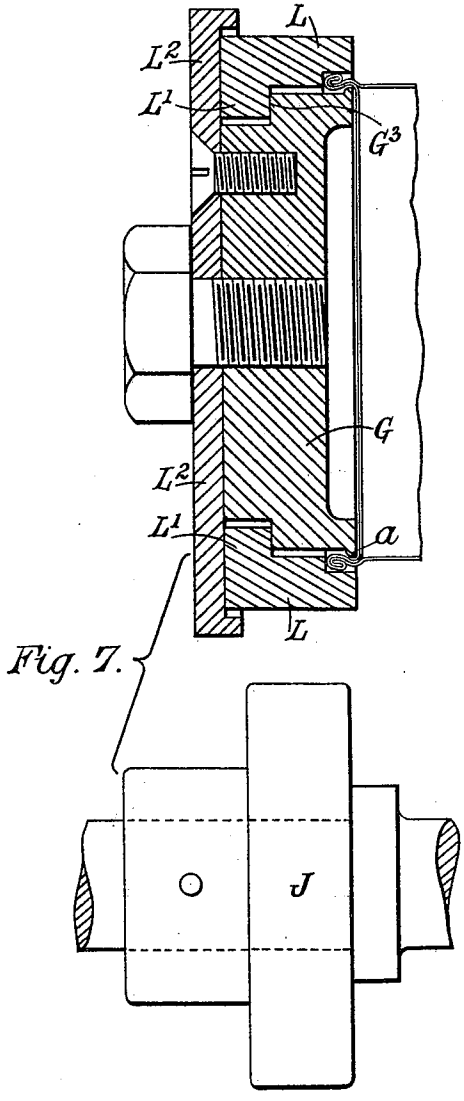


Fig. 7.

Witnesses.
H. B. Taylor
Robert Ewett.

Inventor.
Conrad F. Mendham
By James L. Norris
Atty

THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CONRAD F. MENDHAM, OF LONDON, ENGLAND.

MACHINE FOR HERMETICALLY CLOSING CIRCULAR SEAMS OF SHEET-METAL CANS.

SPECIFICATION forming part of Letters Patent No. 623,802, dated April 25, 1899.

Application filed January 5, 1899. Serial No. 701,259. (No model.)

To all whom it may concern:

Be it known that I, CONRAD FIELD MENDHAM, engineer, a subject of the Queen of Great Britain, residing in South Norwood, London, England, have invented certain new and useful Improvements in Machines for Hermetically Closing the Circular Seams of Sheet-Metal Cans and Like Vessels, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional side elevation of one form of my improved machine, showing the relative positions of the parts before the can to be operated upon is pressed upward against the tool. Fig. 2 is a sectional elevation, drawn to an enlarged scale, showing the parts in the relative positions which they assume when the said can is pressed upward. Fig. 3 is a plan, partly in section, on the line $x\,x$, Fig. 2. Fig. 4 is a similar view to Fig. 1, showing another form or modification of my improved machine. Fig. 5 is a plan, partly in horizontal section, on the line $x'\,x'$, Fig. 4. Fig. 6 is a transverse section through the roller-cage on the line $y\,y$, Fig. 5, drawn to an enlarged scale. Fig. 7 is a section of another form of my improved tool, showing also in elevation a roller to be used therewith.

My invention relates to an improved machine for making a hermetically-closed joint around the circular seams of sheet-metal cans or like vessels by rolling, compressing, or squeezing together the interengaging flanges or folded parts forming such seams, so as to bring the touching surfaces thereof into very intimate contact.

My improved machine is chiefly intended for use in the manufacture of cans, drums, or similar sheet-metal vessels for containing explosive or inflammable materials in the closing whereof the use of a hot soldering-iron would be a source of danger. The said machine is, however, also useful for closing cans containing food or other articles of a perishable nature.

My said invention partly consists in the combination of a die-ring and a roller or disk within the same, one of which is capable of a limited lateral movement relatively to the other, means for rotating said roller or the die-ring, and means to move said roller or die-ring laterally to cause it to assume an eccentric position relatively to the other part, and thus squeeze the seam between the two parts.

My said invention also partly consists in the combination of the die-ring, a roller therein, between which and said die-ring the seam to be operated is inserted, and a releasing device for disengaging the tool from the can or like vessel when the joint has been completed; and my said invention further comprises other combinations and arrangement of parts, as hereinafter more particularly described, and pointed out in the claims.

Referring to the drawings, A is a standard supporting a bearing B′, through which passes a sleeve B, longitudinally movable therein, but restrained from rotation by means of a feather B^2.

C is a collar limiting the motion of the sleeve B in a downward direction and normally held by the yielding spring C′ against the end of the bearing B′.

D is a rotatable spindle extending through and working freely in the sleeve B and mounted in a suitable bearing D′. This spindle is provided with a pulley D^2 or other convenient means for driving it and with a thrust-collar D^5, both firmly secured to or forming part of the spindle D. Being held thus, this spindle can only have a rotary motion. On the lower end of the central spindle D is mounted a bush E, which is rotatable in a ring F and is made with a tapered keyway E′ to receive a tapered feather D^3 on the said spindle D, forming an operative connection between these two parts. The hole through the bush E is enlarged on the side opposite to the keyway E′, so as to permit the spindle to take up a position eccentric to the bush, a flat spring D^4 keeping the parts concentric while not in operation.

The ring F is held in place in the lower end of the sleeve B by a shell H, screwed upon a flange on the said sleeve and secured thereon by a set-screw H′. An external screw-thread formed upon the shell H receives a ring K, which carries the die-ring L and is provided with a handle K′ for rotating it, and thereby raising it to release the can, as hereinafter described. A roller G is mounted upon a short spindle G′, which fits within a socket-bearing G^3 in the lower end of the spindle D. This roller is free to rotate independently,

being held loosely between the ring F and a shoulder on the shell H.

An adjustable set-screw M is provided in an extension of the standard A for limiting the upward motion of the sleeve B and its adjuncts.

N is a vertically-moving table for supporting the work and pressing the same upward against the tool.

For securing the top or bottom to the sides of a cylindrical can or other vessel the said can or the like, with the joint folded in any suitable manner, is placed upon the table N, which is then raised and pressed upward, so as to bring the seam to be closed within the die-ring L and force the upper end of the work against the extension H^2 of the shell H, which is thus lifted, together with the sleeve B and its adjuncts, the socket-bearing G^2 being made sufficiently long to permit the roller G to be lifted with the sleeve B relatively to the spindle D, which latter is prevented from rising by means of the thrust-collar D^5 pressing against the under side of the bearing D'. The lifting of the sleeve B causes the bush E, with its taper-keyway E', to slide over the taper-feather D^3, whereby the spindle D is moved laterally and carries the roller G to a position eccentric to the die-ring, as shown in Figs. 2 and 3. The roller G is then caused to rotate with the spindle D, so that the said roller is pressed successively against all points around the circumference of the seam and squeezes the material between it and the die-ring. The roller being free to rotate independently of the other parts will acquire a rolling motion and pass over the work without sliding upon or injuring the surface thereof. This operation expands the layers of the material successively, so that the outermost one fits closely within the die-ring, and the contiguous surfaces in the seam are forced very tightly against one another and remain so on account of the rolling and expanded force being applied only from the inner side of the seam. The handle K is then turned to move the die-ring up past the extension H^2 of the shell H, and thus release the work. The die-ring is then restored to its original position relatively to the shell H, the adjustable guard-ring K^2, which is secured in any desired position by means of the set-screw K^3, limiting the downward motion of the ring K by coming in contact with the lower flange of the sleeve B.

I sometimes modify the construction of my improved machine by arranging the die-ring in such a manner that it can be caused to rotate while held in an eccentric position relatively to a ring or disk within it, between which and the said die-ring the seam to be operated upon is squeezed. In this case the required pressure is applied laterally to the said die-ring by means of a revolving roller pressed against the periphery thereof. An arrangement of this kind is shown in Fig. 7, in which the die-ring L is caused to rotate while forced into an eccentric position relatively to a disk or roller G within it. For this purpose the said die-ring is supported by means of a flange L', engaging between a shoulder G^3 on the roller G and a back plate L^2, secured to the said roller, so as to be capable of moving radially relatively to the said roller. When the parts G L L^2 are caused to revolve and pressure is applied to the exterior of the ring L by means of a roller J, the seam to be operated upon will be squeezed between the roller G and die-ring L, so as to affect the closure of the joint in a fluid-tight manner. In this arrangement the inner disk or roller G is provided with a circumferential projection or rib *a*, so that in the operation of the machine it will press the metal outward from the inside, so as to form an external bead just below the joint, and thus more effectually render the same fluid tight.

In Figs. 4, 5, and 6 I have shown a modification of my improved machine, in which a cage P is rotatably mounted in the collar F and is divided into separate compartments, each containing a roller G. A cone-faced thimble R, sliding on the spindle D, is pressed downward by a spring R' upon the upper ends of the rollers in such a manner as to force their lower ends inward away from the die-ring L. The said rollers G, of which there may be any convenient number, are preferably made cone-shaped and are arranged to be pressed outward by a cone-faced collar S, fixed upon and rotated by the spindle D. The work is thrust upward into the machine, as above described, lifting the rollers G, so that they are forced laterally by the tapered surface of the collar S, which has no vertical motion, against the work and roll around upon it, carrying with them the cage P. The object of this cage is to keep the rollers equidistant and separate from each other. The other parts operate in the manner above described. A suitable outline may be given to the die-ring faces and the rollers to obtain a beaded or corrugated closed seam, according to requirements, in which case the die-ring is made up in parts or sections.

What I claim is—

1. The combination of a die-ring and a roller or disk within the same, between which the seam to be operated upon is inserted, one of these parts being capable of a limited lateral movement relatively to the other, means for rotating one of said parts and means for moving the rotary part laterally to cause it to assume a position eccentric to the other part and thus squeeze said seam by exerting a rolling force on the inner surface thereof, substantially as described.

2. The combination of a die-ring, a roller within said die-ring, means for rotating said roller and means for moving said roller laterally, while it is rotating, so as to bring it into a position eccentric to said die-ring, substantially as described.

3. The combination of a die-ring and a

roller within the same, between which the seam to be operated upon is inserted, and means to move said die-ring longitudinally relatively to said roller to release said seam, substantially as described.

4. The combination of a die-ring, a sleeve to which said die-ring is attached, a rotary spindle extending through said sleeve and having a taper feather and a socket at its lower end, a roller within said die-ring fixed on a short spindle extending into the socket in said spindle, a ring held in the lower end of said sleeve and a rotary bush in said ring having a taper keyway to receive the taper feather on said spindle, said sleeve and its adjuncts being movable longitudinally upon said spindle and said spindle being capable of lateral movement in said bush, substantially as described.

5. The combination of a die-ring and a roller or disk within the same, between which the seam to be operated upon is inserted, one of these parts being capable of a limited lateral movement relatively to the other, and said roller or disk having a circumferential projection or rib to form an external bead below the joint, means for rotating one of said parts and means for moving the rotary part laterally to cause it to assume a position eccentric to the other part and thus squeeze or squeeze and expand said seam, substantially as described.

6. The combination of a die-ring, a roller within the same between which and said die-ring the seam to be operated is inserted, a shell supporting said roller and an adjustable ring screwed upon said shell and carrying said die-ring, whereby said die-ring can be moved longitudinally relatively to said roller and shell to release said seam, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CONRAD F. MENDHAM.

Witnesses:
EDMUND S. SNEWIN,
WM. V. BROWN.