Nov. 9, 1926. 1,606,086

P. KRUSE

MACHINE FOR BOTTOMING CUPS

Filed Feb. 12, 1926 3 Sheets-Sheet 1

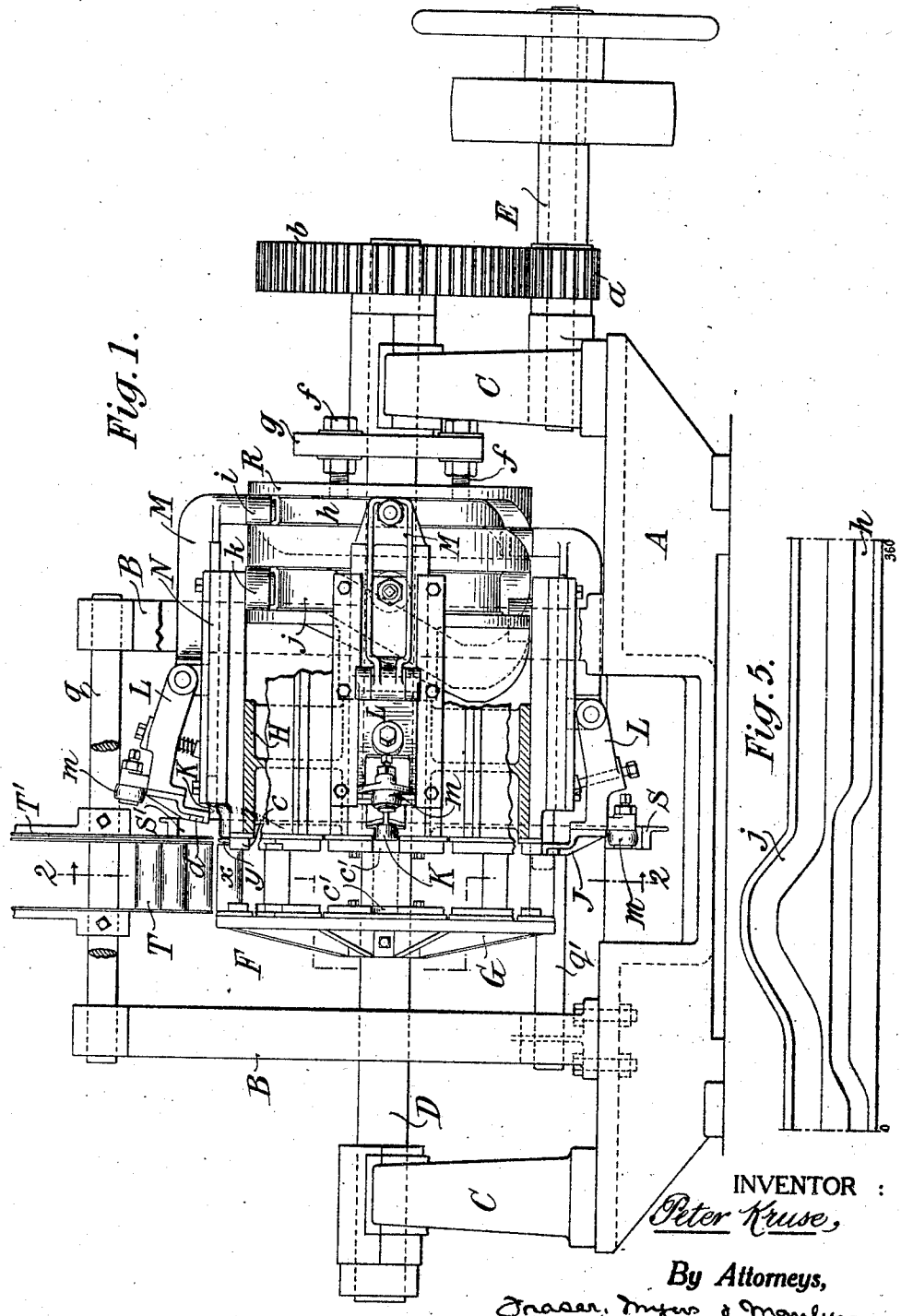


Fig. 1.

Fig. 5.

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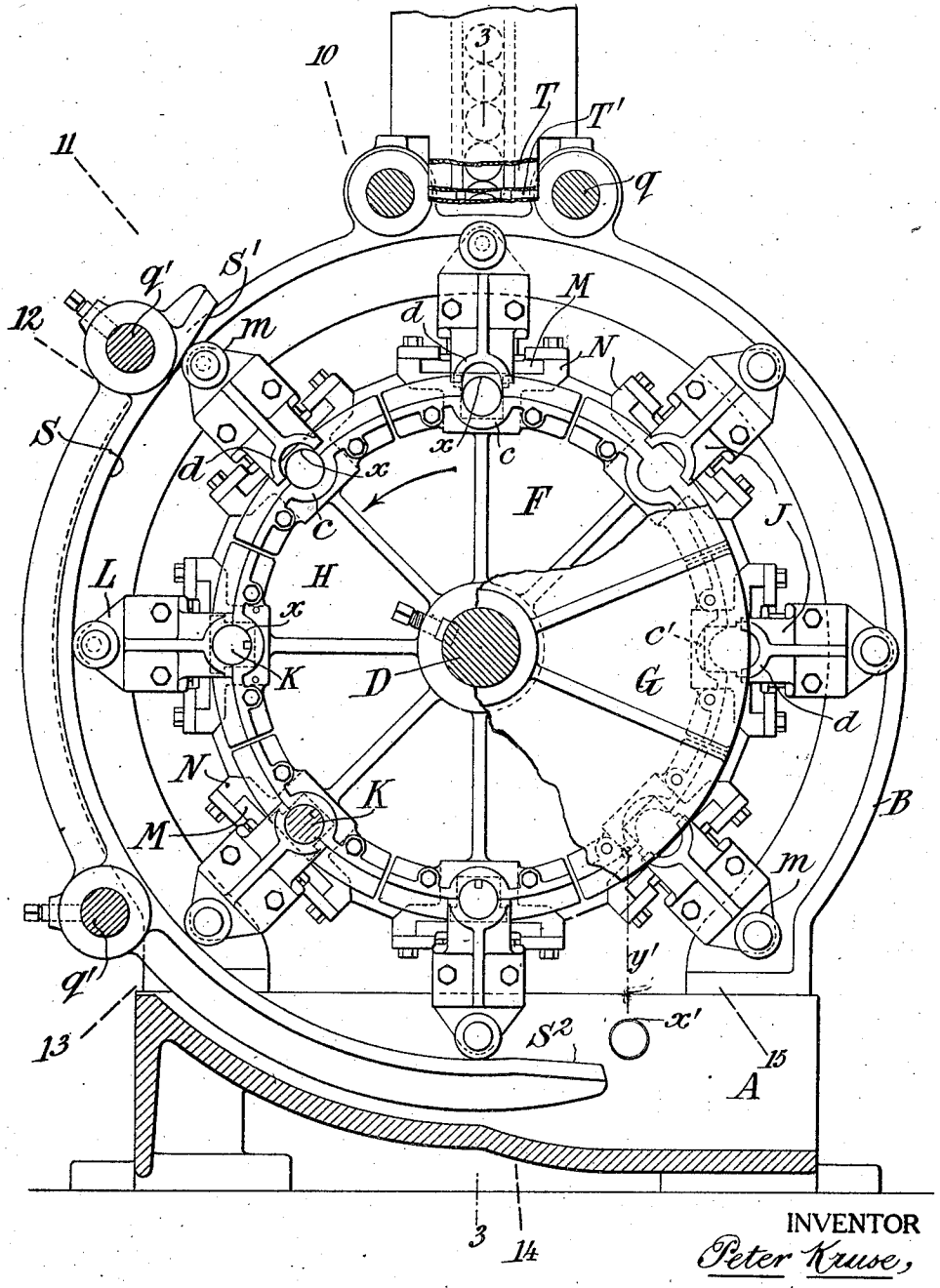
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Fig. 2.



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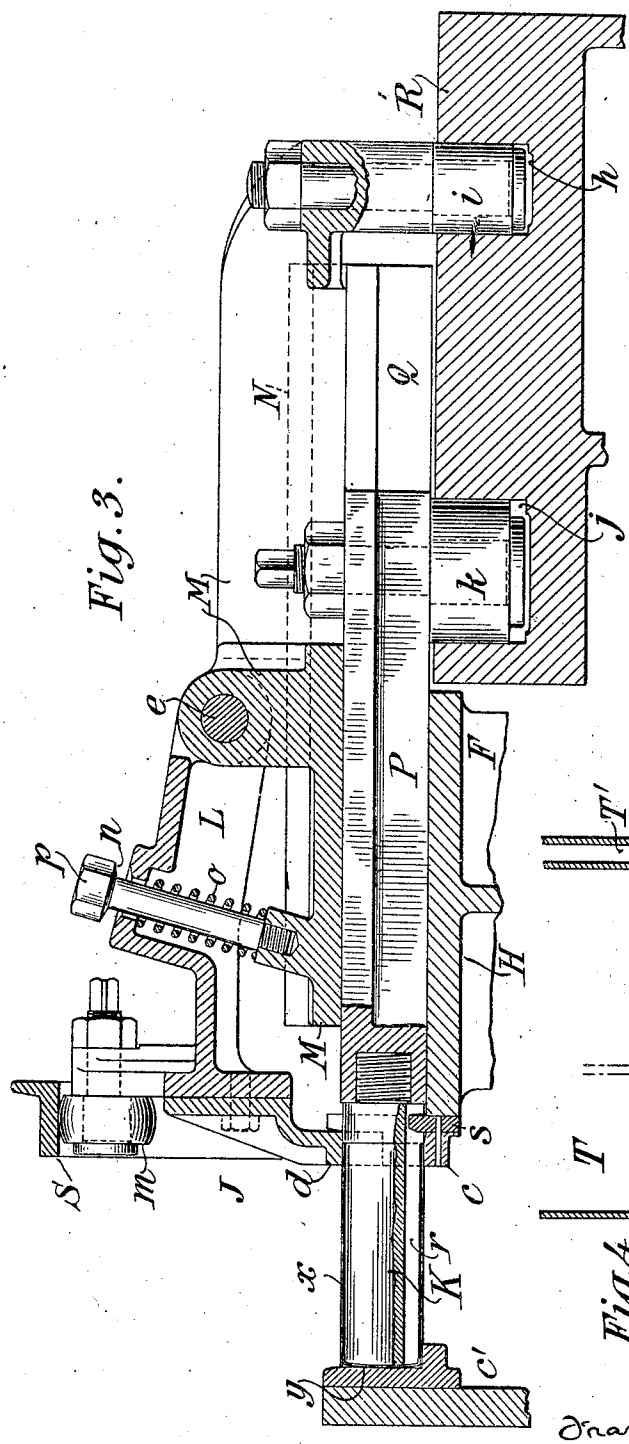


Fig. 3.

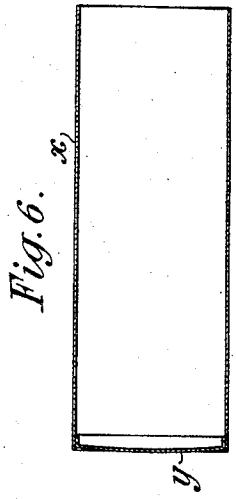


Fig. 6.

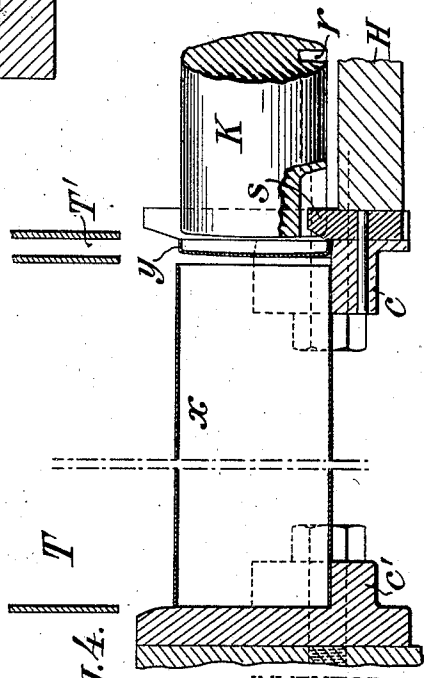


Fig. 4.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR BOTTOMING CUPS.

Application filed February 12, 1926. Serial No. 87,851.

This invention provides a machine for applying bottoms to tubular bodies in the nature of can bodies, whereby to form a cup-shaped article having tubular sides and an inserted disk-like bottom. The operation is analogous to that of bottoming can bodies, and the machine might be applied for that purpose, but is especially designed for applying bottoms to zinc battery cups such as are used as the negative element in dry cells. Such battery cups are commonly made by bending a sheet of zinc into tube form with a lap seam, soldering the seam to form a tubular body, and then inserting (with or without solder) a disk-shaped bottom which is applied in and from the bottom end of the cup. Such disk-shaped bottoms necessarily, in order to make a good connection, have an upturned annular flange which makes a tight fit within the tubular body. Heretofore the bottoms have usually been inserted within the body to a distance equal to the projection of the flange, which facilitates the insertion of the bottom, but has the disadvantage that the zinc forming the flange, and an equal portion of the end of the body, is unavailable for battery purposes and is wasted.

The present invention provides for introducing a flanged bottom from the opposite end of the body (being the end which ultimately will be the open end of the cup) and pushing it entirely through the body until its disk portion occupies a position substantially coinciding with the bottom end of the body.

The invention is characterized by the provision of means for holding the successive tubular bodies and means for engaging a bottom fed into alignment with the body and forcing it, by the operation of a long stroke plunger, entirely through the length of the body.

A suitable and the preferred embodiment of the invention is illustrated in the accompanying drawings, wherein,—

Figure 1 is a side elevation, partly broken away.

Fig. 2 is an end elevation of the machine, certain portions being in section, taken in the plane of the line 2—2 in Fig. 1.

Fig. 3 is a fragmentary elevation on a larger scale, showing one of the bottoming elements, the plane of the section being on the line 3—3 in Fig. 2.

Fig. 4 is a fragmentary view on a still larger scale, showing the parts just before the occurrence of the bottoming stroke.

Fig. 5 is a development of the stationary cams by which the requisite bottoming movements are secured.

Fig. 6 is a longitudinal mid-section of the finished cup or can.

The particular construction of machine shown in the drawings will now be described.

On a suitable base A are mounted standards B, B and bearing pillars C, C, the latter carrying bearings for a main shaft D which is driven from a driving shaft E through suitable gearing such as a pinion *a* and gear *b*. Fast on the shaft D are the parts constituting a rotary carrier F. This carrier includes a disk G and a main body H. On the body H are mounted any suitable number of bottoming elements each comprising a body holder J and a plunger K. Each body holder consists of a member *c* immovably attached to the body portion H of the carrier, and a movable clamping portion *d* adapted to co-operate with the portion *c* to clamp the body, and itself mounted on a movable part L which is capable of receiving movements in two different directions, as will be described, and which is best constructed as a pivoted arm or lever hung by a pin *e* on a slide M which is movable in longitudinal slideways N formed in the body portion H of the carrier. Each plunger K is mounted on a slide P which is movable in a slideway Q carried on said body portion H of the carrier.

The slides M and P are moved in direction parallel with the axis of the shaft D by any suitable mechanical movement, these being most simply formed as cams. For this purpose a stationary cam cylinder R is mounted coaxially with the shaft D, being held fast in any suitable way, as, for example, by means of bolts *f* engaging a stationary disk *g* which is mounted fixedly upon one of the shaft bearings. The cam cylinder R has a cam groove *h* engaging a roller *i* carried on the slide M; it has another cam groove *j* engaging a roller *k* carried by the slide P.

The clamping members L are moved radially inward by means of a fixed cam S, the inner face of which engages rollers *m* carried by the members L. They are pressed outwardly by springs *o* (Fig. 3),

whereby their rollers are held in engagement with the cam S when in contact therewith, and when beyond the ends of the cam, are thrown out to their utmost position, which is limited by a shoulder n formed by the head of a bolt or stud p.

The can bodies x are delivered through an upright feed chute T, and the bottoms y are delivered through another feed chute T'. These feed chutes are constructed in any usual or suitable way, being conveniently made of plate metal supported on transverse rods q extending between the upright frames B, B. The cam S is conveniently supported on other bolts q' between said uprights.

The disk G forming part of the carrier F carries can body supports c' which correspond to the supports c.

In operation the tubular bodies x are fed down successively (by any suitable feeding means, not shown) from the feed chute T and dropped onto the supports c, c' of the carrier. Simultaneously with the dropping of each body a bottom y is dropped down from the chute T'. Fig. 4 shows the position of the parts before the plunger stroke, the bottom y being in alignment with the body x, and the plunger K having been previously drawn back far enough to leave ample room for feeding down the bottom y. As the carrier F revolves (for example, in the direction of the arrow in Fig. 2), the body and bottom are carried first idly until the radial line intersecting their axis arrives in approximation to the position indicated by the line 10 in Fig. 2, whereupon the slide M begins to move forward, and when it has reached the position approximating that indicated by the line 11, its forward motion ends and the roller m of the clamping member L encounters the inclined or cam-shaped end portion S^1 of the cam S, which forces the roller and member L inwardly, thereby causing the clamping jaw d to engage the entering end of the tubular body, as shown in Fig. 3. Since the clamping parts c and d are each semi-circular and fit closely to the exterior of the tubular body, their effect when pressed together is to bring the tubular body to a true circle if it has been at all distorted therefrom, and present it in perfect alignment with the bottom y and plunger K. Thereupon when the parts have advanced to the position approximately indicated by the line 12 in Fig. 2, the plunger K begins to move forward, enters within the flange of the bottom y, and pushes this bottom before it into the entering end of the tube x, and by thereupon executing a long stroke pushes the bottom entirely through the tube x to the position indicated at y in Fig. 6. This long stroke of the plunger occupies the time while the parts are traveling from the position indicated by the radial line 12 to that indicated by the radial line 13 in Fig. 2; thereupon (or after a short pause) the plunger begins to recede (which it may do more rapidly since this is an idle stroke) and it may complete its return stroke, for example, by the time the parts have reached the position shown approximately by the line 14; then, or soon thereafter, the clamping member L begins to open by its roller running out on the portion S^2 of the cam S, after which the slide M is retracted by a longitudinal movement to its original position. As the body holder thus opens and releases the finished cup x', the latter drops freely out, since its holding means is now in an inverted position. This release of the finished cup or can may occur when the parts have reached approximately the position indicated by the line 15, so that it may fall out through the path y' and drop clear of the end of the cam S.

Thus the machine operates essentially by suitably gripping the tubular body, centering and rounding its entering end, aligning therewith the disk-shaped bottom, forcing this bottom by the movement of a plunger into the entering end of the tubular body, and by a continuation of the plunger stroke corresponding to the length of the body, carrying the bottom entirely through the body and leaving it within the extreme farther end of the latter, whereupon the plunger is withdrawn and the holding means are opened to release the completed cup or can.

The flange of the bottom may be made a sufficiently tight fit with the interior of the body so that no other uniting means is required; or the parts may be afterward soldered together.

The plungers K are shown as united to the slides P by having a screw shank which is screwed into a threaded socket in the slide; to prevent possible unscrewing, the plunger is formed with a groove r which is engaged by a key s carried on the body member H of the carrier.

The cam grooves h, j are shown in the development (Fig. 5) of the cylinder R; it is to be understood, however, that the relative movements of these parts may be varied as desired, provided only that the operations described be performed in their proper operative sequence.

The inventive ideas herein set forth may be carried into effect by other mechanical movements, no novelty being claimed for the particular combination of moving parts herewith illustrated, apart from the performance of their essential functions. Thus the invention may be modified to a certain extent within the scope of the appended claims.

I claim as my invention:—

1. A machine for bottoming cups comprising means for holding a tubular body,

and a plunger adapted to force a bottom through the body from one end to the other.

2. A machine for bottoming cups comprising means for holding a tubular body, including centering means adapted to bring the entering end of the body to true form, and a plunger aligned therewith adapted to engage a bottom in intervening position and force it through the body to the opposite end of the latter.

3. A machine for bottoming cups comprising a support onto which a tubular body may be fed, clamping means movable against the body to hold it against such support, and a plunger adapted to force a bottom through the body from one end to the other.

4. A machine for bottoming cups comprising a support onto which a tubular body may be fed, clamping means movable over the entering end of the body and movable against it to confine it against such support, and a plunger adapted to force a bottom through the body from one end to the other.

5. A machine for bottoming cups comprising a rotary carrier, a plurality of means carried thereby for holding tubular bodies, a plurality of plungers adapted to force bottoms through such bodies from end to end, and means adapted during the rotation of said carrier to impart movements to said elements.

6. A machine for bottoming cups comprising a rotary carrier, a plurality of clamping means carried thereby for holding tubular bodies, a plurality of sliding plungers carried thereby, each adapted to force a bottom through the body from one end to the other, and stationary cams engaged by the moving parts for imparting to them their several movements.

7. A machine for bottoming cups comprising a rotary carrier, a plurality of clamping means carried thereby for holding tubular bodies, each of said clamping means having a portion immovably fixed to the carrier, and a member mounted on the carrier and relatively movable to engage and clamp the entering end of a body, a plurality of sliding plungers carried by said carrier, and driving means adapted during the rotation of the carrier to impart the operative movements to said parts.

In witness whereof, I have hereunto signed my name.

PETER KRUSE.