(No Model.) 2 Sheets—Sheet 1.

C. CHESWRIGHT.

MACHINE FOR PERFORATING THE SIDES OF CAPSULES FOR BOTTLES.

No. 345,365. Patented July 13, 1886.

Fig. 3.

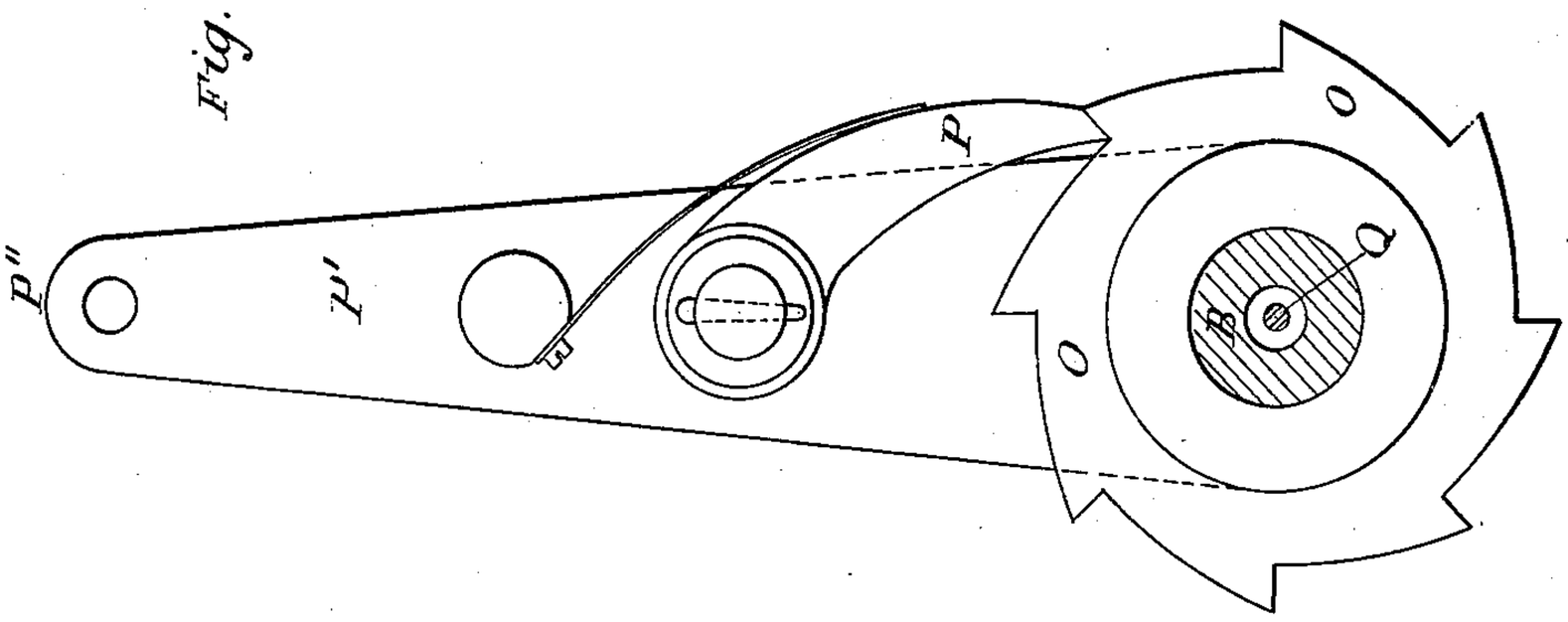
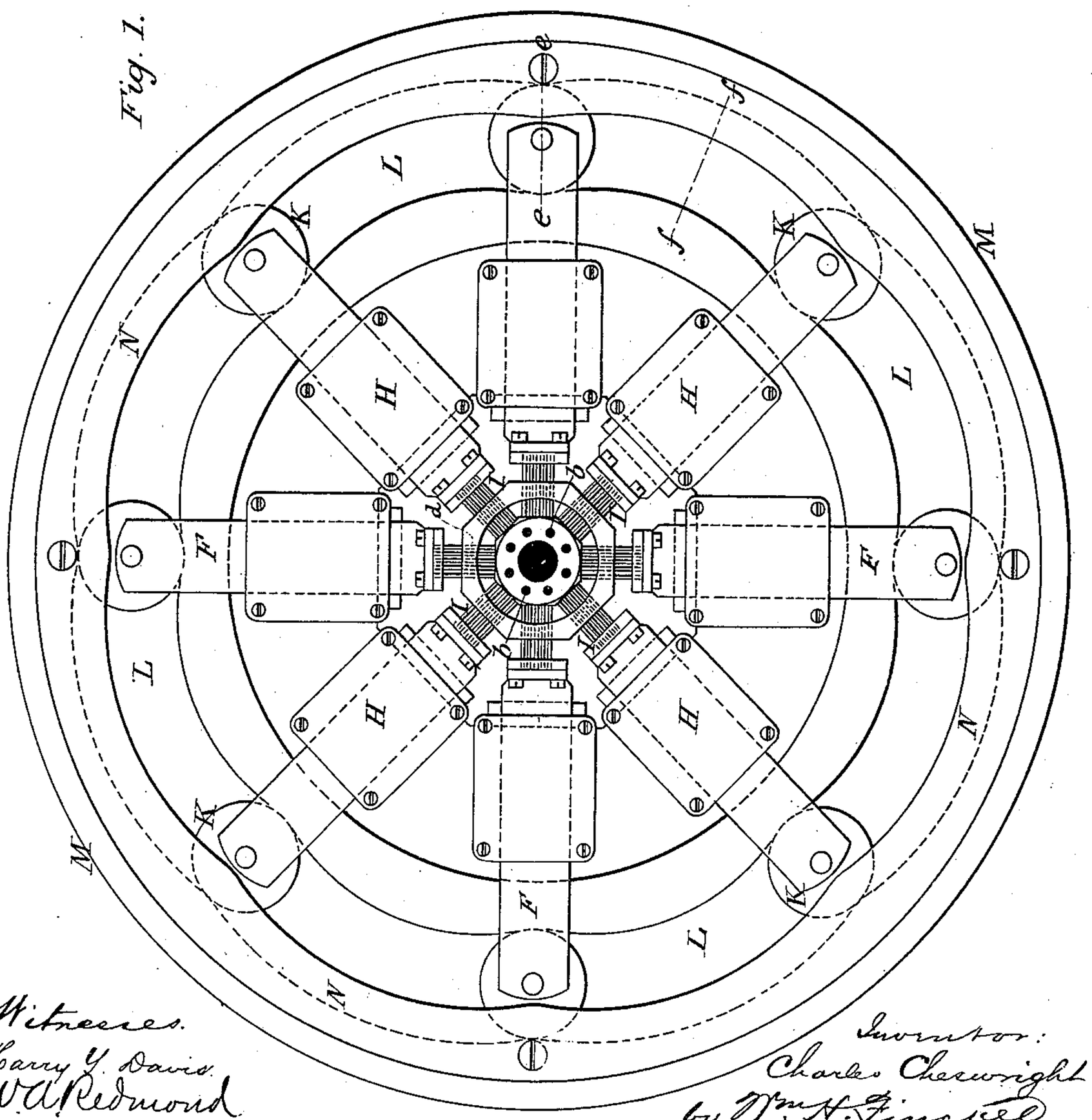


Fig. 1.



Witnesses.
Harry Y. Davis.
W. A. Redmond

Inventor:
Charles Cheswright
by Wm. H. Finckel
his Atty.

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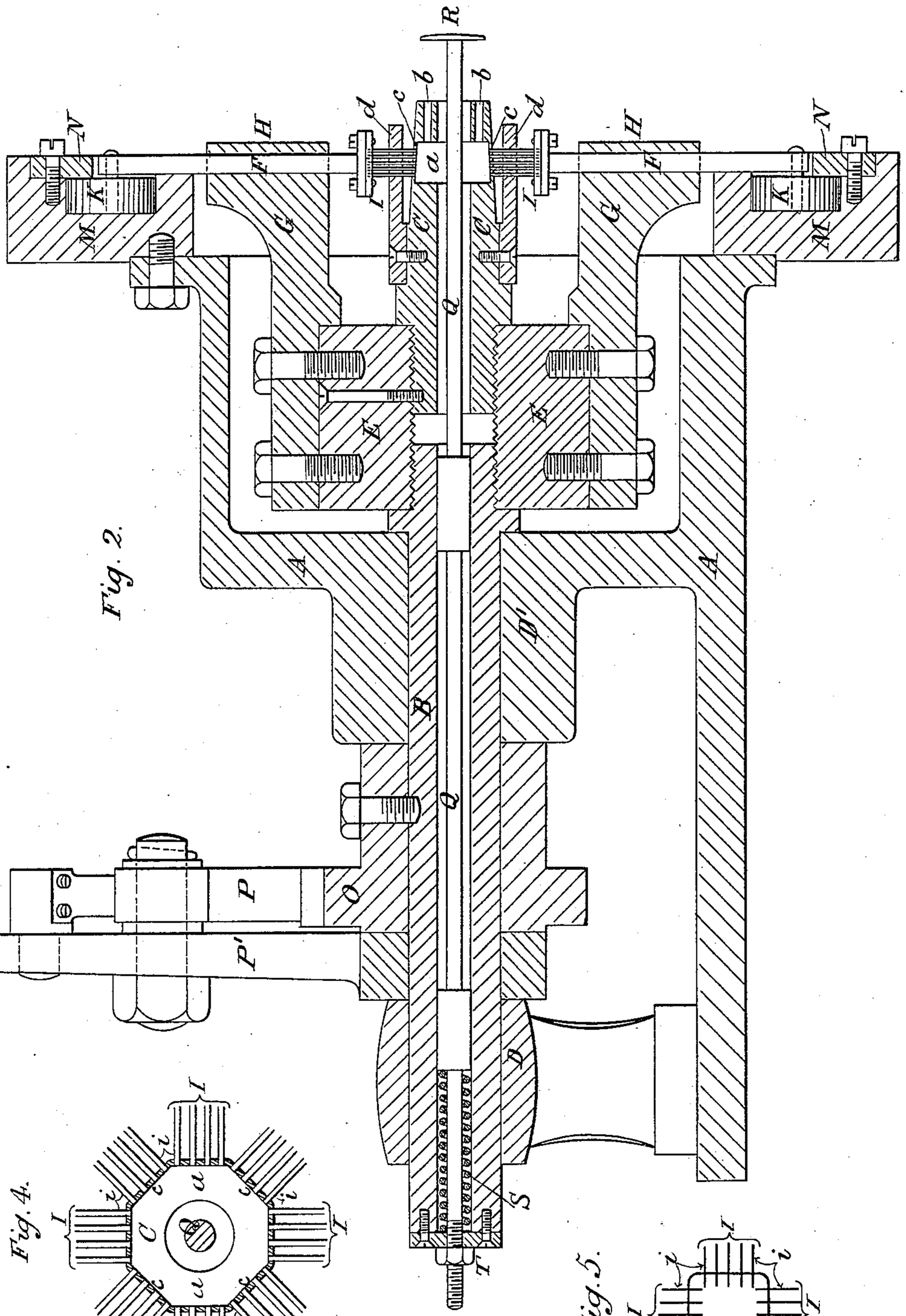

Fig. 2.

Fig. 4.

Fig. 5.

Witnesses.
Harry Y. Davis.
W. A. Redmond

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UNITED STATES PATENT OFFICE.

CHARLES CHESWRIGHT, OF LEITH VILLA, PARKHURST ROAD, COUNTY OF MIDDLESEX, ENGLAND.

MACHINE FOR PERFORATING THE SIDES OF CAPSULES FOR BOTTLES.

SPECIFICATION forming part of Letters Patent No. 345,365, dated July 13, 1886.

Application filed April 13, 1886. Serial No. 198,779. (No model.) Patented in Austria-Hungary May 26, 1886.

To all whom it may concern:

Be it known that I, CHARLES CHESWRIGHT, a subject of her Majesty the Queen of Great Britain and Ireland, residing at Leith Villa, Parkhurst Road, in the county of Middlesex, England, manufacturer, have invented new and useful Improvements in Machinery or Apparatus for Perforating the sides of Capsules for Bottles and Similar Receptacles, of which the following is a specification.

This invention relates to further improvements upon the machine for perforating the sides of soft-metal capsules for the necks of bottles and other like receptacles described in the specification to my English patent bearing date the 12th of June, A. D. 1882, No. 2,749, and illustrated by Figs. 8 and 9 of the drawings thereunto attached; and it consists, essentially, in the combination, with a hollow flat-sided or polygonal-shaped mandrel receiving an intermittent rotary motion, of a series of converging slides revolving with the mandrel and corresponding in number with the flat sides on the mandrel, each slide carrying at its inner end a group of punches or perforators corresponding to holes or perforations in the respective sides of the mandrel, the punches being so spaced round the flat-sided mandrel as to produce perforations equidistant from each other all round the capsule at one operation by the simultaneous action of all the groups of punches. The said slides are forced inward and outward by a face-cam groove in a stationary plate, along which travel anti-friction rollers mounted on the outer ends of the several slides. By my present improved arrangement the operation of perforating is performed in a much more expeditious and efficient manner than by the apparatus or means hitherto employed for that purpose. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of my improved perforating-machine, showing the several converging slides in their inward position—that is to say, with their punches or perforators entered into the perforated sides of the central mandrel. Fig. 2 is a longitudinal vertical section of the same machine, taken along the axis of the mandrel. Fig. 3 is a detail side elevation of the pawl, lever, and ratchet-wheel for giving motion to the said machine; and Fig. 4 is a full-sized transverse section of the mandrel and the inner ends of the punches, showing the equidistant spacing of the punches all round the mandrel. Fig. 5 is a diagram of an old arrangement of punches.

Similar letters refer to similar parts throughout the several views.

A is the fixed bracket or standard of the machine, bolted to any convenient work bench or table.

B is a spindle turning in the bearings D D′, to one end of which spindle is secured a hollow laterally-perforated mandrel, C, said spindle and mandrel being disposed centrally in the machine and having an intermittent rotary motion imparted thereto. This mandrel receives the capsule to be perforated, and is flat-sided or of polygonal form, say, for facility of description, having eight sides, as shown in the drawings. Each flattened side is perforated to correspond with the size and spacing of the perforations to be produced round the sides of the capsule. E is a solid block fixed on the spindle B. In combination with the said central hollow flat-sided perforated mandrel C, I employ as many converging slides F F (each carrying a group of punches) as there are flattened perforated sides to the mandrel, the several slides working in the outer ends of arms G G, which are secured to the block E, and which arms are provided with caps or cover-plates H, so as to constitute guides for the said slides. In order to afford facility for the ready removal and replacement of the hollow flat-sided perforated mandrel and the corresponding converging slides F F, I prefer to make the mandrel proper, C, separate from the spindle B, and to screw or otherwise fix it into the guide-block E, as shown in Fig. 2. This mandrel is, by preference, made slightly tapering toward its outer or front end, and it is formed with an internal cavity or chamber, *a*, for the reception of the punchings or fragments which escape through the apertures *b* in the front end thereof as it rotates.

c c, Fig. 2, are the thin flat perforated sides of the mandrel.

d is a perforated guide, fixed to the mandrel so as to surround the same and to turn along

therewith, in order to protect the ends of the punches or perforators of each group of punches I I, attached to the inner ends of the slides F, and to guide them accurately into the corresponding holes in the sides of the mandrel. The slides F are caused to travel round along with the guides G and mandrel C by an intermittent motion, so that the group of punches or perforators mounted on the inner end of each slide shall always work in its own set of perforations in the corresponding lateral face of the mandrel.

K K are anti-friction rollers working freely along the stationary-face cam-groove L, formed in the disk or plate M, which is secured to the front of the standard of the machine, as shown more clearly in Fig. 2. The said cam-groove consists of a series of connected short curves or arcs, approaching toward the center of the machine at their junctions on the radial dotted line *e e*, and receding away from the center at the middle of their length on the radial dotted line *f f*. Thus on rotating the mandrel along with its converging or radial slides to the extent of one of the said curves or undulations—say one-eighth of a revolution in the arrangement illustrated in my drawings—the slides will all be forced inward and outward together, thereby completing the lateral perforating of the capsule on the mandrel at each eighth of a revolution of the same.

N is a removable ring placed over the rollers K, and screwed to the face of the cam, in order to keep the said rollers in their grooves. When it is required to change the mandrel for one of a different size or shape, the ring N is removed; also, the caps or cover-plates H of the guides G, so as to release the several slides F, when the mandrel C, together with its punch-guide *d*, can be unscrewed from the block E, to be replaced by a fresh mandrel and punch-guide and corresponding set of slides and punches.

O is a ratchet-wheel fixed on the spindle B, having as many teeth as there are perforated sides to the mandrel.

P P′ is an ordinary pawl and lever, engaging into and driving the ratchet-wheel so that at each movement to the extent of one tooth of the ratchet-wheel the mandrel and its converging slides will describe one-eighth of a revolution, the rollers K and slides F during such movement being caused to travel outward and inward once and to repeat the movement on passing along each of the several curves of the cam-groove in succession. The lever P′ may be worked either by hand direct or through a connecting-rod attached thereto at P″, and receiving a longitudinal reciprocating motion from any suitable driver.

Through a longitudinal bore in the center of the spindle B there is inserted a sliding rod, Q, acted upon by a helical or other spring, and carrying a button or releaser, R, at its front end, just outside the end of the mandrel, said button being forced outward from the mandrel by the action of the spring S, thereby serving to release or push off each capsule as fast as it is perforated. On placing a fresh capsule on the mandrel it is passed over the releaser-button R, and is pushed inward along with it, and maintained in that position by the thumb or finger of the attendant during the operation of perforating until the capsule is ready to be discharged by the outward movement of the releaser R on the withdrawal of the finger of the attendant. The throw of the releaser can be adjusted by the nut T.

I am aware that rotating perforated flat-sided mandrels have been proposed, in combination with separate groups of punches corresponding to the number of flat sides on the mandrel, for perforating the sides of capsules; but the said groups were brought into action in succession, or one at a time, and, moreover, owing to the smallness of the angle between each two flat sides of the mandrel, it was found impracticable to so space the punches as that all the punches of the various groups, while working at right angles to their corresponding sides of the mandrel, should work equidistant from each other all round the mandrel without interference between the outer punches of each two adjoining groups. Consequently a wider space had to be left between each group of punches at the junctions of the several flat sides of the mandrel to permit of the free action of the outer punches of the groups. The result was that corresponding non-perforated portions of the capsule were left at the several junction-angles of the mandrel, and these portions could only be perforated by shifting the capsule round the mandrel, after the first action of the punches, to a sufficient extent to bring the unperforated part under the action of the punches at their second stroke, whereby much time was lost and the equidistant spacing of the perforations circularly round the capsule was, even by those means, rendered uncertain and difficult. Now, by the adoption of a mandrel having, say, eight flat sides, as shown in the full-sized transverse section in Fig. 4, the junction-angle between any two contiguous flat sides will be more obtuse, and as the groups of punches must work at right angles to their corresponding flat sides of the mandrel, facility is thereby afforded for spacing all the punches of the various groups I equidistantly from each other all round the mandrel, there being no extra space left between the outer punches, *i i*, of two adjoining groups than between the punches constituting the groups themselves. This will be clearly understood on comparing the diagram Fig. 5 of a flat-sided mandrel and punches arranged on the old system with my present improved form and arrangement of mandrel and punches shown at Fig. 4. In Fig. 5 a wider space is necessarily left between the outer punches, *i i*, of two adjoining groups, I, than between the punches in the groups themselves, whereas in Fig. 4 no such increase of space is necessitated.

In order to avoid as much as possible the marking or creasing of the capsule longitudi-

nally between each group of punches, the apices of the junction-angles between the several flat sides may be slightly rounded.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. A polygonal-shaped mandrel, in combination with groups of punches working at right angles to the flat sides thereof and spaced equidistantly around the same, as and for the purpose specified, and illustrated by Fig. 4 of the drawings.

2. The combination, in a machine for perforating the sides of capsules for bottles and similar receptacles, of the intermittently-rotating hollow mandrel C, having perforated flat sides, and the intermittently-reciprocating converging slides F, carrying groups of punches I, as set forth.

3. The combination, in a machine for perforating the sides of capsules for bottles and similar receptacles, of the intermittently-rotating mandrel C, rotating guides G, and converging punch-carrying slides F, as set forth.

4. The combination, in a machine for perforating the sides of capsules for bottles and similar receptacles, of the intermittently-rotating mandrel C, reciprocating converging slides F, carrying groups of punches I and anti-friction rollers K, with the stationary face cam-groove L, as set forth.

5. The combination, in a machine for perforating the sides of capsules for bottles and similar receptacles, of the hollow spindle B, ratchet-wheel O, pawl P, and lever P′, with the mandrel C, reciprocating converging slides F, and self-acting releaser R, as specified.

6. The combination, in a machine for perforating the sides of metallic capsules for bottles and similar receptacles, of a rotating hollow mandrel having one or more of its sides flattened and perforated, a series of converging slides worked by cam-grooves, each slide carrying a group of punches or perforators working through the perforations in each of the corresponding flattened sides of the mandrel, and a self-acting releaser for pushing off the perforated capsule, as specified.

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