(No Model.) 2 Sheets—Sheet 1.

C. A. WIECHERT & R. GABRIELSKY.

L. F. WIECHERT, Administratrix of C. A. WIECHERT, deceased.

MACHINE FOR MAKING VIALS.

No. 401,670. Patented Apr. 16, 1889.

FIG. 2

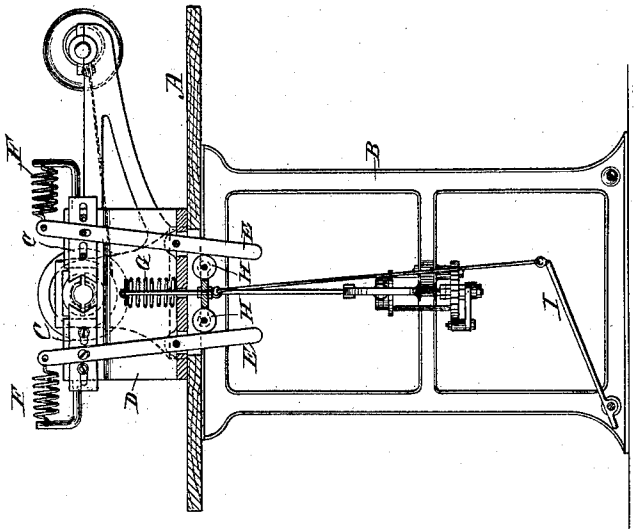
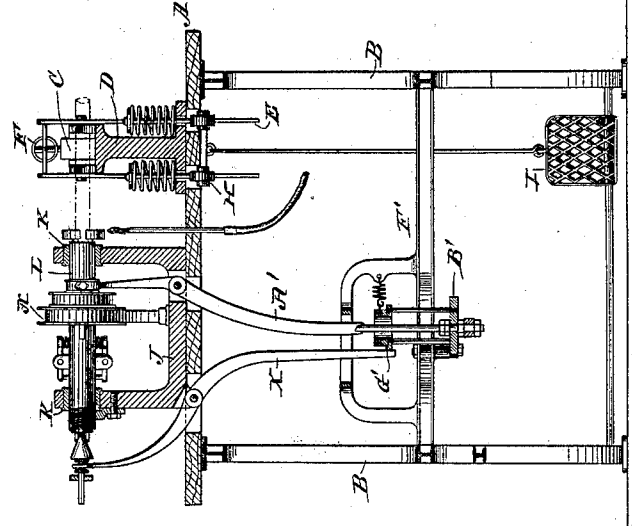


FIG. 1



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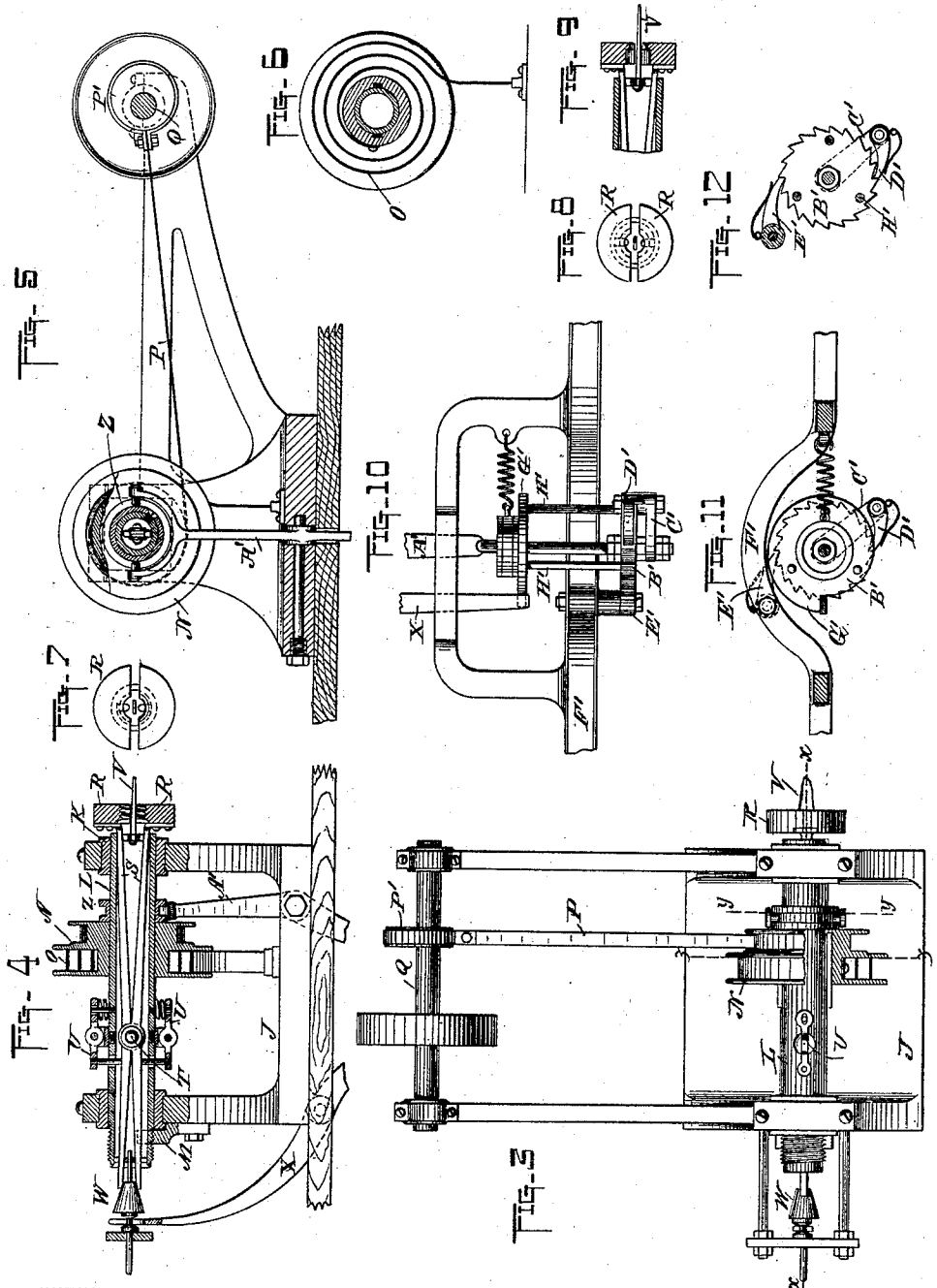
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UNITED STATES PATENT OFFICE.

CHARLES A. WIECHERT AND RICHARD GABRIELSKY, OF BROOKLYN, NEW YORK; LIZZIE F. WIECHERT ADMINISTRATRIX OF SAID CHARLES A. WIECHERT, DECEASED.

MACHINE FOR MAKING VIALS.

SPECIFICATION forming part of Letters Patent No. 401,670, dated April 16, 1889.

Application filed June 18, 1888. Serial No. 277,469. (No model.)

To all whom it may concern:

Be it known that we, CHARLES A. WIECHERT, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, and RICHARD GABRIELSKY, a subject of the Emperor of Prussia, now residing in Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Machine for Making Vials, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to mechanical means for automatically forming the necks of homeopathic vials, or such vials or small bottles that are usually made from glass tubing. Heretofore the necks of such vials have been formed by hand with the aid of hand-tools. Such method of making the vials produces at the best, vials the necks of which are irregular and vary from each other. This is particularly undesirable in the case of vials having screw-thread necks designed to receive threaded metal caps as covers. With such vials the irregularity that occurs by reason of the hand-formed necks results in the caps therefor fitting too tightly or too loosely, and hence they imperfectly close the vials and many vials are rendered useless. Furthermore, the production of these vials by hand, whether screw-necked or plain, is slow and requires specially skilled workmen.

It is the object of our invention, therefore, to produce vials the necks of which, whether plain or threaded, are formed by mechanical means adapted to automatically and regularly shape such necks.

Our invention will be described as embodied in one form of machine, the parts that are regarded as new being set forth in the claims to follow this description.

Figure 1 of the drawings is a side elevation view of the machine with the bed-plate and supports in partial section. Fig. 2 is a similar end elevation view of the machine. Fig. 3 is a plan view. Fig. 4 is a longitudinal section through the dies and connected parts, plane *x x* of Fig. 3. Fig. 5 is a cross-section on *y y* of Fig. 3. Fig. 6 is a cross-section on plane *z z*. Fig. 7 is a detail face view of the screw-thread dies. Figs. 8 and 9 are face and sectional views of a die adapted to produce plain or unthreaded necks. Fig. 10 is a detail view of the shipping parts beneath the bed-plate. Figs. 11 and 12 are detail views of parts of the same.

Referring to the views in detail, A is the bed-plate of the machine, and B is the supporting-frame thereof. At one end of this bed-plate is the shipping or tube-holding device. This consists of two oppositely-arranged sliding jaws, C C, supported in ways in the top of the T-support D, and having angular faces adapted to center the glass tubing when they close upon it. A piece of such tubing is shown in dotted lines in Fig. 1. These jaws are connected to the levers E E, which levers are pivoted to the bed-plate, and are provided with springs F F, fastened to arms projecting from the support D, whose office is to tend to hold these levers and the jaws C C in the retracted or open position. Between the lower ends of these levers is a spring-actuated slide-rod, G, which carries two cam-rollers, H H, bearing upon the ends of the levers. To this slide-rod is attached the treadle I, which, when borne down by the operator's foot, causes the gripping-jaws to close upon the glass tube and hold it, and when released is lifted into its upper or operable position by the expansion of the spring of the cam slide-rod G.

J is a bracket fixed upon the bed A, and carrying in suitable slide-bearings, K K, the thread-cutting-die cylinder L. This cylinder is exteriorly threaded at its outer end, and this threaded portion of it engages the threaded semicircular collar M, which is removably attached to the bracket J, and the office of which is to cause the cylinder L to move longitudinally whenever it is revolved. This die-cylinder carries the spring-retracting winding-drum N, which revolves with the cylinder, but is feathered upon the same, so that the cylinder has longitudinal motion through it. This drum is provided with a spiral spring, O, attached at one end to the axis of the drum and at the other end to the

bracket J. A belt, P, is at one end attached to the drum in like manner; but is wound around it in a direction opposite to that of the spring O, the other end of this belt being attached to the strap of an eccentric, P′, on the main or driving shaft Q.

It will now be seen that as the main shaft revolves the cam thereon will, through the first half of its revolution, pull upon the drum-belt and cause the drum to revolve, and thereby wind up the spring within the same, and during the second half of the revolution of the cam this belt will be loosened and rewound upon the spring-drum as it revolves in the opposite direction under the stress of its wound-up spring. This action will also cause the die-cylinders to revolve with the spring-drum in like manner, and the cylinder, by reason of its engagement with the fixed threaded collar upon the supporting-bracket, will during a single revolution of the main shaft be projected forward through its bearings toward the glass-tube supports and backward from the same.

R R are the duplicate halves of the neck-forming dies, which dies may be interiorly threaded, as shown in Figs. 4 and 7, to form screw-threaded necks upon the vials, or they may be shouldered, as seen in Figs. 8 and 9, to form plain or shouldered necks, and obviously they may be otherwise shaped in accordance with the form of neck desired for the vials. The opposite parts of these dies are carried upon the inner ends of the cross-levers S S, which levers are supported at their pivoted junction T to and within the die-cylinder.

U U are two spring-pressure arms pivotally supported upon the outer side of the die-cylinder, and, passing through openings in the cylinder, bear upon the levers S, so as to tend to keep their inner ends and the levers of the dies R open.

V is a spindle designed to enter the tubing when in the dies and support and center that end of the same, and help to prevent it collapsing when heated and being operated upon by the dies.

W is a conical or wedge-shaped plunger located between the outer ends of the die-levers, the office of which is to move forward between these levers, and thereby close the dies. This plunger is adjustably supported upon the upper end of the lever X, which lever is pivoted to the bed-plate and extends to beneath the same, where is located the die operating—that is, opening and closing—mechanism. This mechanism consists of parts, and is actuated as follows:

Z is a grooved collar fixed upon the die-cylinder and having all the motions thereof. The upper forked end of a lever, A′, engages this collar, and this lever is pivoted at its fulcrum-point to the bed-plate. Upon the lower end of this lever is hung the ratchet-wheel B′, which is free to revolve on the lever. The lever also carries fixed to it the ratchet-arm C′, which supports the spring ratchet or dog D′, and which engages the ratchet-wheel, as also does the spring-ratchet E′, supported on the cross-bar F′ of the frame of the machine.

G′ is a cam whose axis coincides with that of the ratchet-wheel B′, and upon which it is rigidly supported by the posts or connecting-rods H′, and it is upon the edge or periphery of this cam that the lower end of the lever X bears, it being held to contact therewith by the spring-levers U, that close the die-levers S.

As the die-cylinder goes forward toward the tubing, it impels the upper end of the ratchet-wheel lever in the same direction, which causes the ratchet-wheel to be forced against the ratchet E′, and thereby partially revolved, the ratchet D′ meanwhile holding the ratchet-wheel and cam at whatever position they are turned to. As cam G′ is thus turned, it forces out the lower end of lever X, and thereby pushes the plunger W between the die-levers and partly closes the dies. When the die-cylinder again goes forward, this cam will again be partly turned and the dies will be brought yet closer together, and so on until the cam has made a complete revolution, when the die-actuating lever will pass from the higher to the lower portion of the cam-surface, and the dies will be opened to their fullest extent. It is to be understood that one such revolution of the cam is effected during the operation of forming the neck of one vial.

The operation of forming a screw-neck for a vial will now be readily understood. Briefly it is as follows: The tubing from which the vial is to be formed will be first properly heated and then put in the tube-supports and clamped, the heated end of the tube extending to or near to the front face of the dies, and the supporting-spindle projecting from the dies being within this end of the tube. The machine will now be put into operation, whereupon the dies will advance with a spiral motion over the heated end of the tube and very gradually close thereon to a small extent. Then the dies will be withdrawn along the same spiral path, but without closing, and this operation will be repeated, the dies closing more and more for each reciprocation until a thread has been formed of proper size and depth, when the dies upon retreating will open to their fullest extent, and the tube may be removed with the neck completely finished. Another properly-heated tube may now be inserted in the clamp and the operation repeated, it being usual to have one tube heating while another is being operated upon. As a neck is formed upon one tube, this tube will be heated at a point below the formed neck, the neck portion separated from the body of the tube, and the heated portion thereof closed in to form the bottom of the vial, after the manner well understood by those skilled in such glass work.

When plain necks are to be formed, dies corresponding to the shape of neck required

will be used, the operation of the machine being the same as described for screw-necks.

I have described this machine as used for making vial-necks; but it is obvious that it can be used to produce such necks or other similar formations upon glass tubes when they are to be used for other purposes than for making vials.

What is claimed as new is—

1. In a machine for shaping glass tubes, the combination of a support for holding the heated glass tube and separable dies adapted to shape the tube and having spiral reciprocation thereon.

2. In a machine for shaping glass tubes, the combination of a support for holding the heated tube, and intermittingly-closing dies adapted to receive the tube and shape the same and having spirally-reciprocating motion upon the tube.

3. In a machine for shaping glass tubes, the combination of a support for holding the tube and separable opening and closing dies for shaping the tube, which are carried upon a spirally-reciprocating support, whereby the dies are longitudinally reciprocated and at the same time gradually closed on the tube.

4. In a machine for shaping glass tubes, the combination of a tube-holding support, separable automatically-closing and spirally-reciprocating dies adapted to shape the tube, and a support for the heated end of the tube arranged within the dies and supporting the heated end of the tube as it is being shaped by the dies.

5. In a machine for shaping glass tubes, the combination of opening and closing spirally-reciprocating shaping-dies and an internal support for holding the heated end of the tube while it is being properly operated upon by the dies.

6. In combination, the tube-shaping dies mounted upon the levers S and within the spirally-reciprocating cylinder L, the lever A′, operated by the said cylinder, the ratchet B′ and cam G′, and the lever X, provided with the wedge W, arranged substantially as and for the purpose set forth.

7. In combination, the screw-threaded-die-carrying cylinder L, the collar M, the spring-drum N, longitudinally movable on the said cylinder, and the eccentric connection P P′, with the driving-shaft Q, all arranged substantially as and for the purpose set forth.

8. In combination, the spirally-reciprocating cylinder L, the dies R and levers S, the spring-levers U, the support V, and the die-closing wedge W, all arranged substantially as and for the purpose set forth.

9. In combination, the reciprocating die-carrying cylinder L, the wedge W and lever X, the collar Z and lever A′, the ratchet-wheel B′ and ratchets D′ E′, and the cam G′, all arranged substantially as and for the purpose set forth.

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Witnesses:
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FRANK E. HARTLEY.