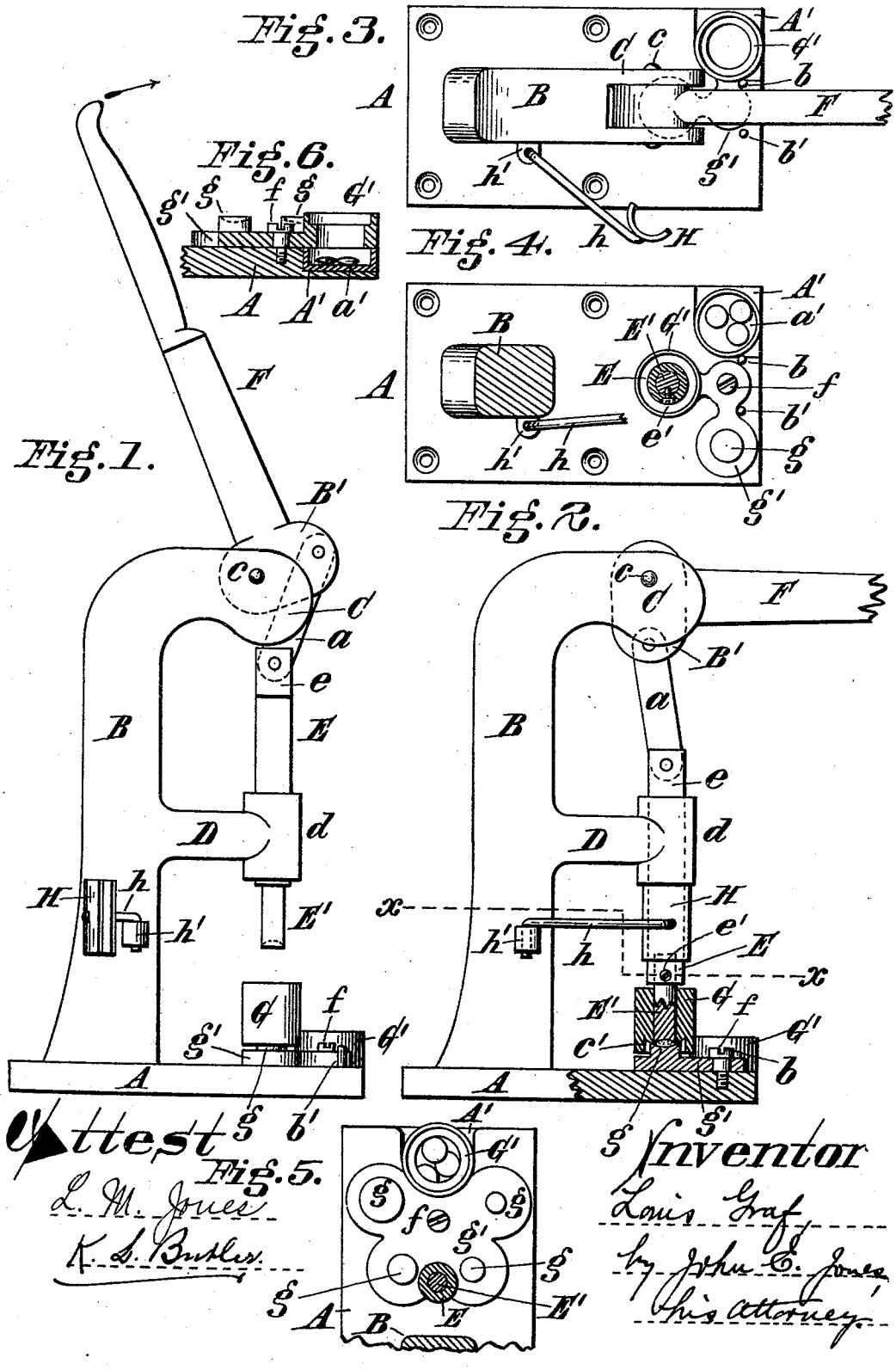
(No Model.)

L. GRAF.

MACHINE FOR MAKING MEDICINAL TABLETS.

No. 543,599. Patented July 30, 1895.



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UNITED STATES PATENT OFFICE.

LOUIS GRAF, OF CINCINNATI, OHIO.

MACHINE FOR MAKING MEDICINAL TABLETS.

SPECIFICATION forming part of Letters Patent No. 543,599, dated July 30, 1895.

Application filed March 30, 1895. Serial No. 543,792. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GRAF, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for Making Medicinal Tablets and the Like, of which the following is a specification.

My invention relates to that class of apparatus known as "pill machines or molds," in which a lever-press having compressing-dies, to suit the size and shape of the pill or other similar medicament in solid form, are used to make said medicaments by cold compression; and my invention consists in the novel features of arrangement, construction, and adaptation of parts, such as are hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my machine, showing a tablet molding or compressing apparatus therein, the lever being raised and ready for the operating downstroke to form a tablet and the mold-stripper device being shown thrown backward or to one side into the position it assumes when the suppository-molds are in the press; Fig. 2, a view similar to Fig. 1, but with the lever (shown broken off) depressed and the parts as they appear when forming a tablet, the die or mold devices and press-base or bed-plate being shown broken and in section, and said mold-stripper device being shown in place, loosely embracing the plunger for automatically removing the mold cylinder or barrel from the male die as the latter rises; Fig. 3, a plan of Fig. 2, except that the mold-stripper is thrown part way back, as in Fig. 1; Fig 4, a sectional plan on line $x\,x$ of Fig. 2, but with the bottom-die turn-table swung to the left, with the tablet-carrier cup under the plunger and mold-barrel and with the mold-stripper arm shown broken off; Fig. 5, a broken plan view of the press-base or bed-plate, showing part of the standard and the plunger in section, and especially showing a turn-table having a number of bottom dies of different sizes thereon for use in making different sizes of tablets and including an open-bottom tablet-carrier cup, the latter being in discharging position over a receiving-box at the fore center of said base instead of at one corner, as in the preceding views; and Fig. 6, a broken longitudinal section of the press-base and the multiple-bottom-die turn-table, (seen in Fig. 5,) taken on a line with the center of the tablet-carrier cup.

A represents the horizontal base or bed plate of the press portion of my invention, B an upright or standard on the rear end of said base, and C an overhanging forked arm projecting forwardly from the upper end of said standard.

D is a horizontal arm projecting forwardly from the middle of the standard and having at its fore end a hollow vertical guide-box d.

E represents a vertical plunger-stock moving in the guide-box d and having at its upper end a fork e, in which latter one end of a link a is pivotally connected, the other end of said link being pivotally connected to the forwardly-projecting forked cam B′, which forms the fore portion of a transverse bar constructed at the inner end of a hand-lever F. Hand-lever F is pivotally mounted at its said inner end in the forked arm C of the standard, a pin c being passed horizontally through the upper portions of the cheeks of said forked arm C and the rearwardly-projecting portion of the said transverse bar at the inner end of the hand-lever, all as best seen in Figs. 1, 2, and 7.

E′ is a plunger-die having its lower end concaved to suit the size and shape of the tablet to be made and being detachably mounted at its upper end in a socket provided in the lower end of the plunger-stock E. A screw e' is used to sustain said plunger-die in the stock.

G represents the mold barrel or cylinder, and g the bottom die, having a tablet form or concavity to correspond to that of the plunger-die aforesaid. In the first four figures I show the bottom die mounted on a right-angled turn-table g', the latter being pivotally secured by means of a screw f to the bed-plate, and free to be swung in either direction horizontally to bring said bottom die in line with the plunger-die alternately with an open-bottom upper-shouldered carrier-cup G′, constructed at the other end of said turn-table.

A′ is a recess or open socket made in the right fore corner of the bed-plate to receive a tablet-box a', the latter being placed therein for convenience in ready filling and to avoid handling the tablets as much as possible, said tablets being delivered thereto by

means of the carrier-cup G′ in the swinging of the turn-table to and from the compressing or plunger-molding position.

b and *b′* are upright pins at the fore end of the bed-plate, adjacent to the hub of the turn-table, to obviate unnecessary movement of said turn-table and to serve as stops to positively and readily bring the bottom die and the delivery-cup into their active working positions.

The notched circular turn-table, (seen in Fig. 5) carries four bottom dies progressing in size to suit different sizes or weights of tablets desired. The carrier-cup in this form delivers its contents to a box set in a socket at the fore center of the bed-plate.

H is a plate mounted at the outer end of an arm *h*, the latter in turn being pivotally mounted at its downwardly-bent inner end in a lug or projection *h′* on the side of standard B below the guide-arm D. This plate is semicircular in cross-section to correspond to the plunger-stock, and when swung into active position under guide *d* it serves as a stripper for the mold-barrel to readily remove the latter from the plunger-die in its upstroke.

In Fig. 2 I show a special form of mold-barrel, in which the bottom is constructed with a circular countersunk recess or shoulder *c′* of greater diameter than the central bore of the barrel, the bottom of said shoulder retreating in a curved line to suit the curve or concavity of the bottom die. This shoulder enables the barrel to readily adapt itself to the bottom die when the plunger-die has partially entered the central bore, and the use of said barrel in connection with all the bottom dies of the turn-table (seen in Fig. 5) is possible and very readily accomplished without sticking or any of the contents of the mold escaping during compression. Instead of having the tablet-box receptacle at the corner in this form, I provide a central recess or open socket A′, which answers the same purpose, as aforesaid.

In the operation of the tablet device the requisite quantity or weight of powder or medicament is inserted in the open mold-barrel, which has been previously placed over the bottom die, and then the lever is brought forward, lowering the plunger-die and compressing the said powder into solid tablet form, as seen in Fig. 2. (A few finished tablets are shown in plan and elevation, respectively, in Figs. 4, 5, and 6.) The lever is then partly raised, carrying the plunger with the mold-barrel and tablet upward. The operator then swings the turn-table to the left to bring the carrier-cup G′ under said plunger for receiving the mold-barrel in its shouldered upper portion, when the tablet is then dropped therefrom in the further full raising of the lever and automatic stripping of the mold-barrel from the plunger. The turn-table is then swung to the right to deliver the finished tablet to the box at the corner or in the center, as the case may be, and then the turn-table is again swung to the left to bring the bottom die into working line with the plunger. The stops *b* and *b′* on the fore end of the bed-plate serve to check the movements of the turn-table (seen in Figs. 1, 2, 3, and 4) at the proper places for making, receiving, and delivering the tablets; but these stops are, of course, omitted in the multiple-die form of turn-table, (seen in Fig. 5 and 6,) where the operator must use skill to some extent to stop the respective dies at the proper place under the plunger for the compressing operations.

The lever device shown I prefer, as the transverse bar or cam construction at its inner hinged end, and the link connection between the cam and the plunger, and the pivotal points of said transverse-bar, being at either side the central axial line of the lever, make a very powerful and effective means of securing a quick, proper, and full compression at each downstroke.

I claim—

1. In a machine or apparatus for making medicinal tablets and the like, the combination of a bed-plate; a standard mounted thereon; a plunger having a male-die and sliding in a guide-way constructed on said standard; an operating-lever suitably connected with the upper end of said plunger; a female mold-device on the bed-plate comprising a barrel or cylinder and one or more bottom-dies; a turn-table mounted on the bed-plate forward of the path of the plunger and having said one or more bottom-dies mounted thereon and which are brought under said path of the plunger or upper die; and a stripper-arm having a stripper-plate thereon, and projecting from the standard in the upward path of the mold-barrel; the whole being constructed, arranged and adapted to operate substantially as herein set forth.

2. In an apparatus for making medicinal tablets and the like, the combination with a male plunger-die and suitable driving mechanism therefor, of a female mold-device comprising a barrel or cylinder and a turn-table having one or more bottom-dies and a tablet carrier or delivery cup mounted thereon, substantially as herein set forth.

3. In an apparatus for making medicinal tablets and the like, the combination with a male plunger-die and suitable driving-mechanism therefor, of a female mold-device comprising a barrel or cylinder and a turn-table having a bottom-die and a tablet carrier or delivery-cup mounted thereon, and a pair of stops for said turn-table whereby the latter is readily and accurately checked in proper working position, substantially as herein set forth.

In testimony of which invention I have hereunto set my hand.

LOUIS GRAF.

Witnesses:
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