No. 639,919. Patented Dec. 26, 1899.

A. COLTON.

TABLET MAKING MACHINE.

(Application filed Mar. 6, 1899.)

(No Model.)

Fig. 1.

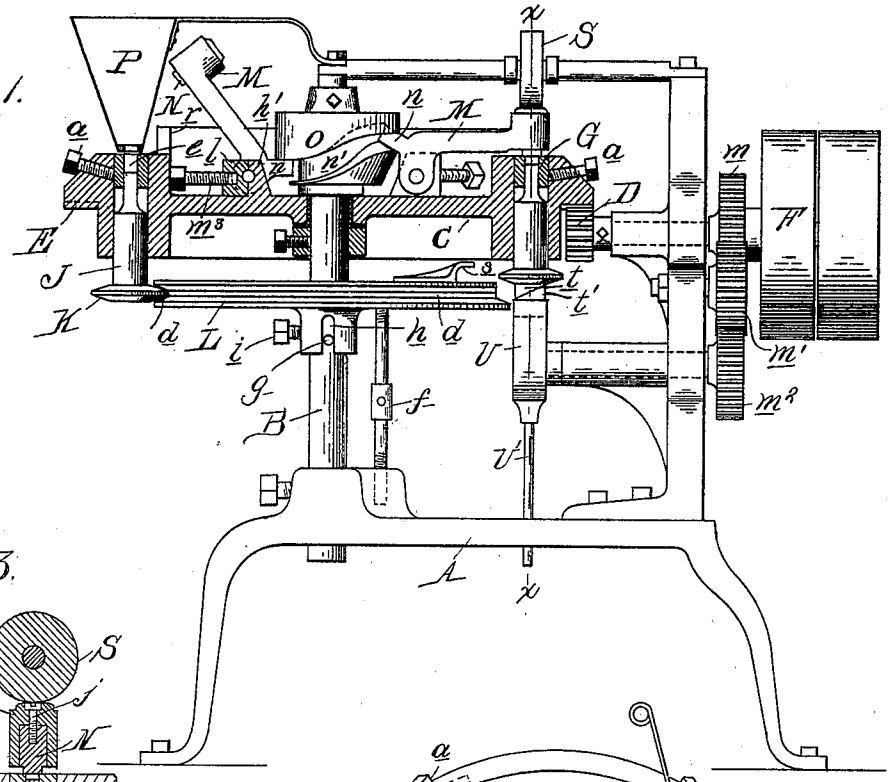


Fig. 3.

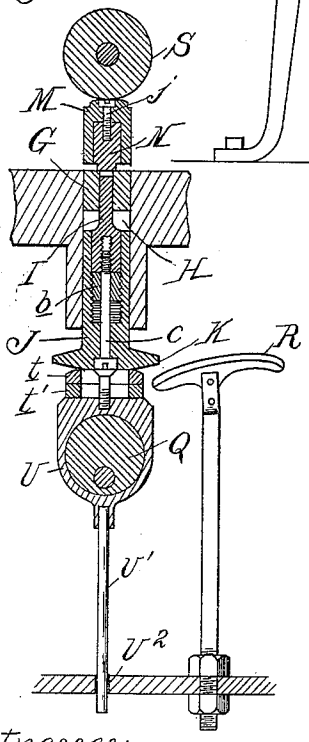
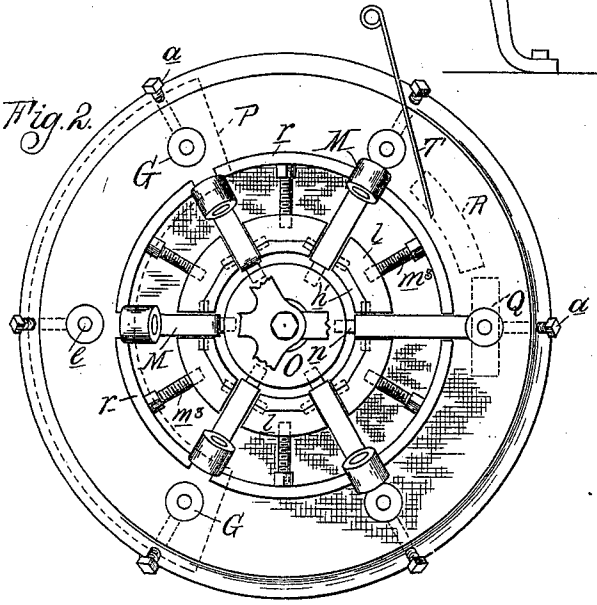


Fig. 2.



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UNITED STATES PATENT OFFICE.

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TABLET-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 639,919, dated December 26, 1899.

Application filed March 6, 1899. Serial No. 707,855. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR COLTON, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Tablet-Making Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to that class of machines adapted for compressing measured amounts of powdered drugs into solid form known as "tablets," "troches," or "lozenges;" and the object of the invention is to produce a simple construction adapted to do the work very expeditiously and the construction of which provides simple adjustments for changing the shape, size, or weight of the tablet and its degree of compression, all as more fully hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is a side elevation with the hopper and the rotary table carrying the dies shown in vertical section. Fig. 2 is a plan of the rotary table carrying the dies. Fig. 3 is a vertical cross-section on line *x x* in Fig. 1.

A is the supporting-frame and base. B is a vertical standard secured therein. C is a rotary table supported thereon free to revolve in a horizontal plane upon the standard.

D is a drive-pinion meshing with a circular gear E on the rim of the table C and adapted to impart rotary motion thereto by applying power to the pulley F on the shaft of the pinion.

G are bushings constituting the die-boxes in which the powder is compressed. They are removably secured by set-screws *a* in vertical openings H, extending through the table and spaced at equal distances apart and at equal distances from the center.

I are compressing-dies projecting into the die-boxes from beneath. Each compressing-die comprises a die-holder J, which is formed with a socket which receives the shank of the die proper and has a screw-plug *b*, which forms an adjustable seat therein. By means of a clamping-screw *c*, passing through the die-holder and plug *b*, the die is firmly secured in the socket vertically adjustable.

K is an enlarged head formed on the lower end of each die-holder, and L is a disk fast upon the standard and formed with a peripheral groove *d*, into which the head of the die-holder engages and by means of which the die-holder and die are maintained normally in position to form a receptacle *e* of any desired depth in the top of the die-box.

The cam-disk L is vertically adjustably secured upon the standard by an adjusting-screw *f*, which at the opposite ends has right and left hand threads engaging into the disk and base, respectively, whereby the turning of said adjusting-screw raises or lowers, the disk being guided by the guide-pin *g*, engaging into a vertical slot *h* and fastened in position by the set-screw *i*.

M are arms or die-holders radially hinged upon the table at their inner ends and each carrying at its outer end the counter-die N, removably secured thereto by the screw *j*.

The die-holders M are removably hinged by being formed with hinge-pins engaging into half-bearings formed in the standing flanges *h'* of the table and in the removable bearing-blocks *l*, held in position by the screws m^3, all so arranged that loosening the screws m^3 the bearing-blocks *l*, and with them the die-holders, may be taken off.

The die-holders M are formed with heel extensions *n*, which engage into a cam-groove *n'* formed in the cam O, which is stationarily secured upon the standard B, all so arranged that in the rotation of the table the die-holders M are alternately raised and lowered, so that in its lowest position, as shown to the right of Fig. 1, the counter-die in the end of the die-holder will rest upon the die-box beneath and close the aperture therein on top, while its raised position, as shown on the left of Fig. 1, lifts it out of the way of the hopper P. This hopper P receives the powdered drug to be compressed. It is stationarily secured in position from any suitable part of the frame. It is of circular shape, as shown in dotted lines in Fig. 2, and its bottom, which is provided with holes, is supported directly above the path in which the die-boxes travel, so that they become filled with the powdered drug level with the top thereof as they pass underneath the hopper in the rotation of the table.

Q is an eccentric receiving motion from the drive-shaft through the intermeshing gear-

wheels m m' m^2. The eccentric revolves within a strap U, held in position by a guide-rod U', which passes through a guide-bearing U^2, all in such manner that the eccentric causes the strap U to rise and fall. Upon the top of the strap are secured two wedge-blocks t t' in any manner that will permit an adjustment in height. This eccentric and strap effect the compressing of the powder in the die-box by pressing each of the compressing-dies successively upward as it passes over in the rotation of the table, the counter-die being at the same time pressed down upon the die-box to close the same on top.

The cam-groove d of the cam-disk L is cut away at the place where the compression occurs, so as to release the head K of the die-holder and allow it to be pressed upwardly by the eccentric, which makes a complete revolution in the interval between the passage of each die.

R is a guide-rail suitably supported from the frame of the machine in the path of the head of the compression-dies in such manner that after the compression-die has been acted on by the eccentric Q it will cause the compression-die to be lifted up farther and expel the tablet from the die-box, the counter-die at the time being lifted up by the action of the cam O. After the tablet is expelled the compressing-die drops back and reëngages with the disk. A suitable guide-rail or a raised lip s may be arranged, however, to draw it back positively in case it should stick.

S is a roller journaled in fixed position above the table in such manner that it will lock each counter-die in position upon the die-box during the act of compression.

T is a scraper extending over the top of the table in position to scrape the same, and thereby remove the tablet after being expelled from the die-box.

In the operation of the machine it will be seen that the compressing-dies are maintained in their normal position by the cam-disk L. Therefore in raising or lowering this disk the receptacle in the die-box is made shallower or deeper, and thus the amount of powder for each tablet can be accurately gaged by the adjusting-screw f. The degree of compression is regulated by adjusting the wedges t t' to raise or lower the height of the strap; but any other means for accomplishing this end may be used.

The construction of the compressing-dies permits a very accurate adjustment, so that all tablets may be made accurately alike, and as the dies I N and die-boxes G are detachable different sets may be used, and thus different sizes and forms of tablets can be produced with the same machine.

The counter-dies have no other function than that of closing the die-boxes during the act of compression, as they do not and are not intended to enter at all into the die-boxes. To guide the arms and lock them in position against any lateral movement while passing under the roller S, the table is provided with a standing flange r, which is notched to receive the die-holders of the counter-dies.

My machine may be run at relatively high speed, and it is thus capable of having a large output.

What I claim as my invention is—

1. In a tablet-making machine, the combination of a rotary table, a concentric series of die-boxes in said table near its periphery, a supply-hopper stationarily mounted above the table, a series of compressing-dies in vertical guide-bearings in the table below the die-boxes, means for vertically guiding said compressing-dies and actuating the same during the travel of the table to compress the tablet, a series of coacting counter-dies carried by arms radially hinged upon the table and adapted to close the top of the die-box.

2. In a tablet-making machine, the combination of a rotary table having a concentric series of vertical openings near its periphery die-boxes secured in the top of said openings, a supply-hopper stationarily secured above the table, compressing-dies in guide-bearings below the die-boxes, means for operating said dies by the movement of the table, a series of radially-hinged arms carried by the table, each arm having a counter-die adapted to close the opening on top of the die-box and coöperate with the compressing-die therein, and means for raising and lowering the arms in the movement of the table.

3. In a tablet-making machine, the combination of the vertical standard and its supporting-base, the table journaled on said standard means for rotating the same around the axis of the standard, a series of die-boxes carried by said table, a series of compressing-dies, mounted in guide-bearings in said table below the die-boxes and a disk vertically adjustably secured on the standard below the table and formed with a peripheral groove for vertically guiding the compressing-dies, said compressing-dies having peripheral flanges at their lower ends engaging into said groove.

4. In a tablet-making machine, the combination of the supporting-base and its vertical standard, the rotary table journaled on said standard, a series of die-boxes secured in vertical openings in the table concentric therewith, a supply-hopper stationarily supported above the table, a series of compressing-dies mounted in the openings in the table below the dies, and a disk secured on the standard below the table and having a peripheral groove for guiding the compressing-dies, said dies being composed of the die proper and a holder having a socket in which the die is vertically adjustably secured and a head on the lower end of the die formed with a peripheral flange adapted to travel in the groove of the disk.

5. In a tablet-making machine, the combination with the rotary table and the die-boxes removably secured therein, of compressing-dies mounted in vertical guide-bearings in

said table below the die-boxes and composed of the die proper adapted to engage into the die-box and of a holder J formed with a socket having the adjusting screw-plug *b* and a clamping-screw *c* and the head K on the lower end of the holder.

6. In a tablet-making machine, the combination of the supporting-base and vertical standard secured therein, of the rotary table journaled thereon, the die-boxes secured in said table concentrically therewith, the compressing-dies in vertical guide-bearings in the table below the die-boxes and formed with peripheral flanges at the lower ends, the disk L adjustably sleeved upon the standard and means for vertically adjusting the disk upon the standard.

7. In a tablet-making machine, the combination of the rotary table, a series of die-boxes secured in said table, a supply-hopper stationarily mounted above the table, compressing-dies secured in vertical guide-bearings in the table beneath the die-boxes, means for holding said dies in normal position in the revolution of the table, a revolving eccentric arranged beneath the path of the compressing-dies for actuating the same, arms radially hinged upon the table and having heel extensions, a fixed cam having a cam-groove into which said heel extensions engage to raise and lower said arms, and counter-dies secured in said arms and adapted to close the die-boxes on top.

8. In a tablet-making machine, the combination with the rotary table and the series of die-boxes and compressing-dies carried thereby, of counter-dies N adapted to close the die-boxes and coöperate with the compressing-dies, arms radially hinged upon the table and carrying the counter-dies, means for raising and lowering said arms, the roller S stationarily mounted above the table in the path of the counter-dies and coöperating therewith, the eccentric Q stationarily mounted below the table in the path of the compressing-dies and the strap U upon said eccentric.

9. In a tablet-making machine, the combination with the rotary table and the series of die-boxes and compressing-dies carried by said table, of the arms or die-holders M radially hinged upon the table and carrying the counter-dies, the standing flange *r* formed with notches into which the arms are adapted to engage, the standing flange *h'* having half-bearings for the hinge-pins of the arms, the removable bearing-blocks *l* having complementary half-bearings, the heel extension *n* of the arms, and the cam O having cam-groove *n'* into which said heel extensions engage.

10. In a tablet-making machine, the combination of a rotary table carrying a series of die-boxes and coöperating compressing and counter dies below and above said die-boxes respectively, of the hinged arms carrying the counter-dies, the grooved disk guiding the compressing-dies, and the revolving eccentric Q having the strap U held in guide-bearings and means for adjusting the height of the strap.

11. In a tablet-making machine, the combination of a rotary table carrying a series of die-boxes and coöperating compressing and counter dies below and above said die-boxes respectively, of the hinge-arms M carrying the counter-dies, the standing flange of the table *r* having notches to receive the arms, the roller S, the cam O, the heel extensions *n* of the hinged arms engaging with said cam, and the hopper P.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR COLTON.

Witnesses:
OTTO F. BARTHEL,
V. D. KINNER.