

No. 785,402.

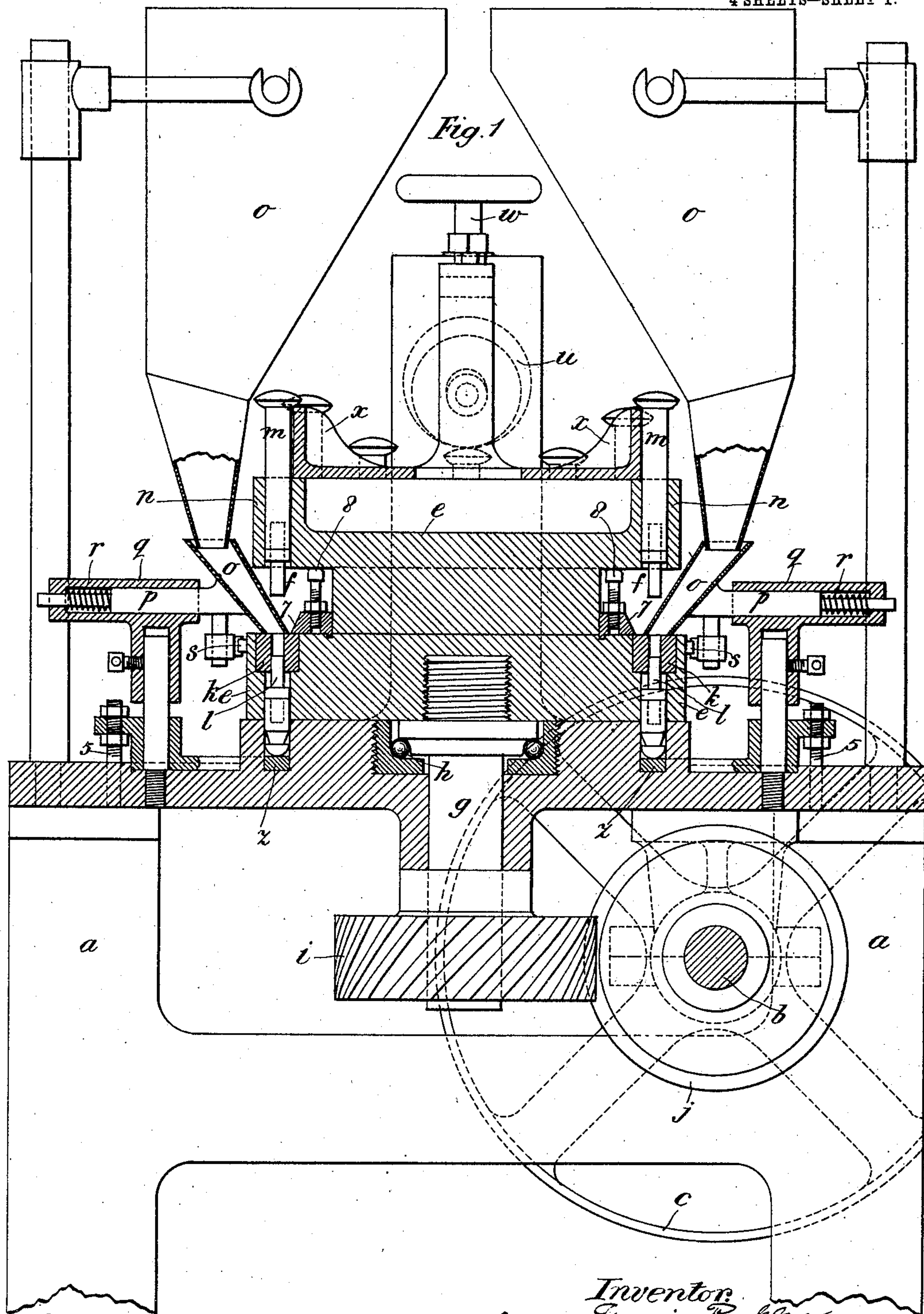
PATENTED MAR. 21, 1905.

J. F. BUCKLEY.

MACHINERY FOR THE MANUFACTURE OF TABLETS FOR MEDICINAL  
OR OTHER PURPOSES.

APPLICATION FILED JUNE 23, 1903.

4 SHEETS—SHEET 1.



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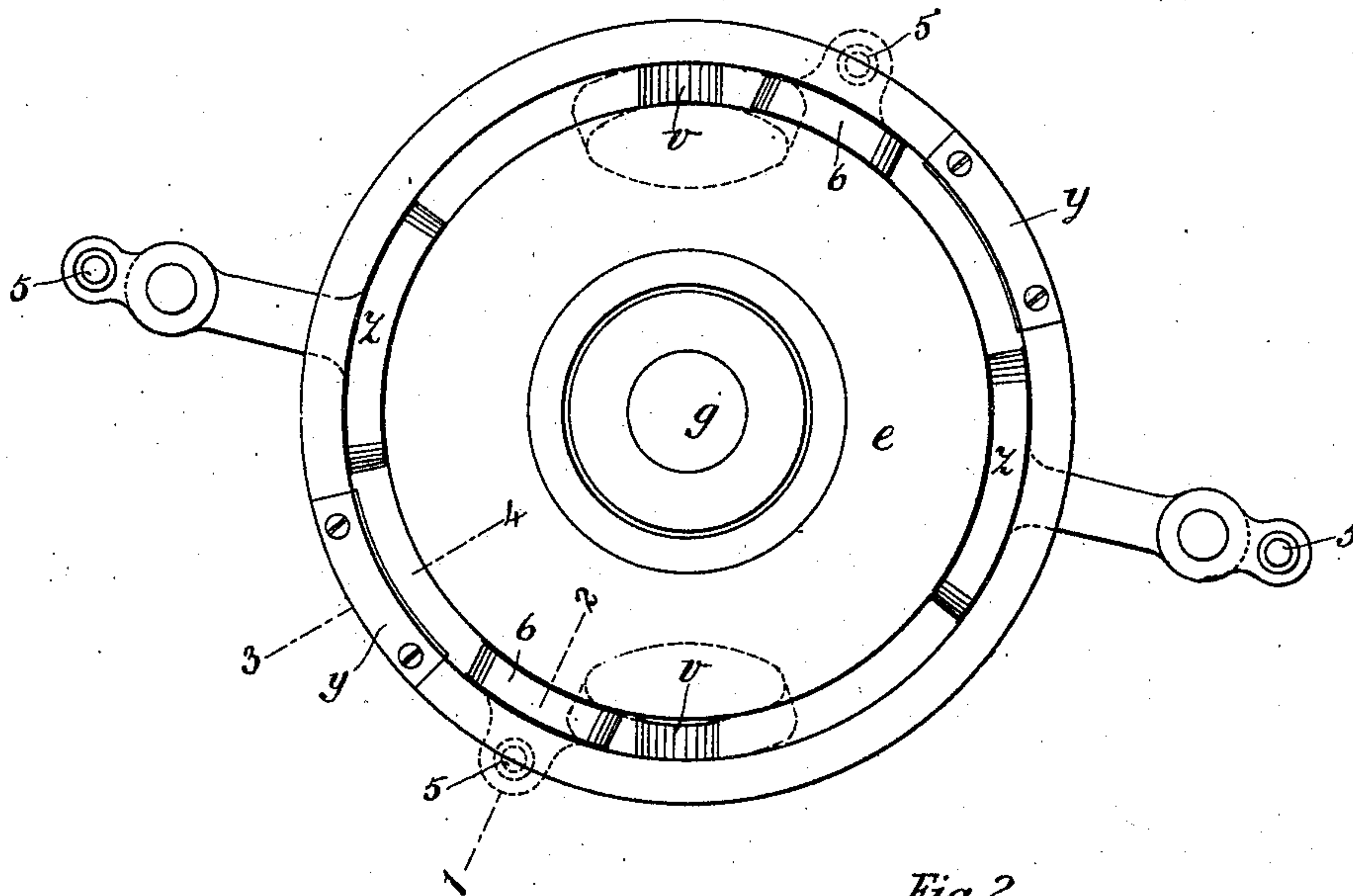
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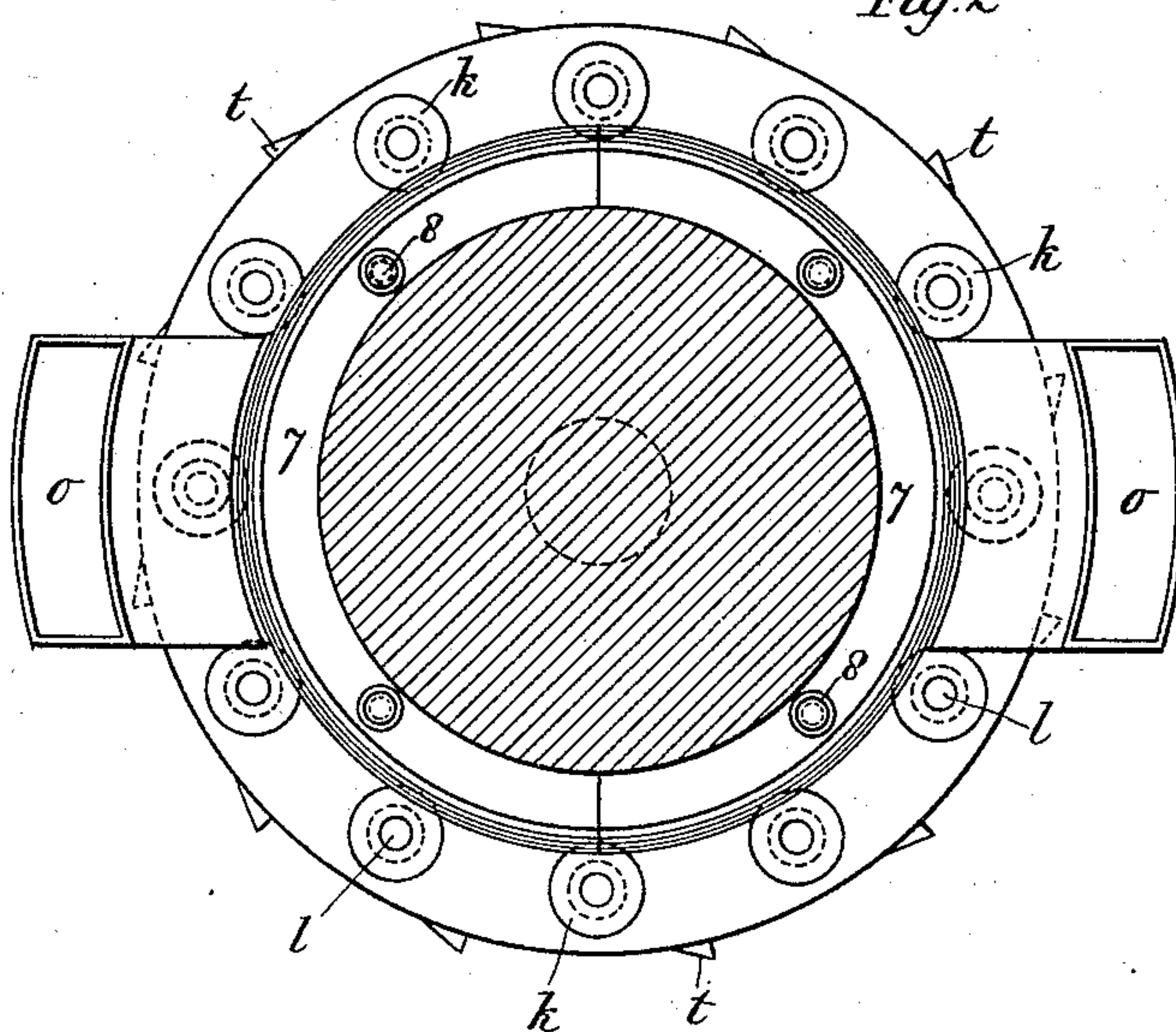
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4 SHEETS—SHEET 2.

*Fig. 3*



*Fig. 2*



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4 SHEETS—SHEET 3.

Fig. 8.

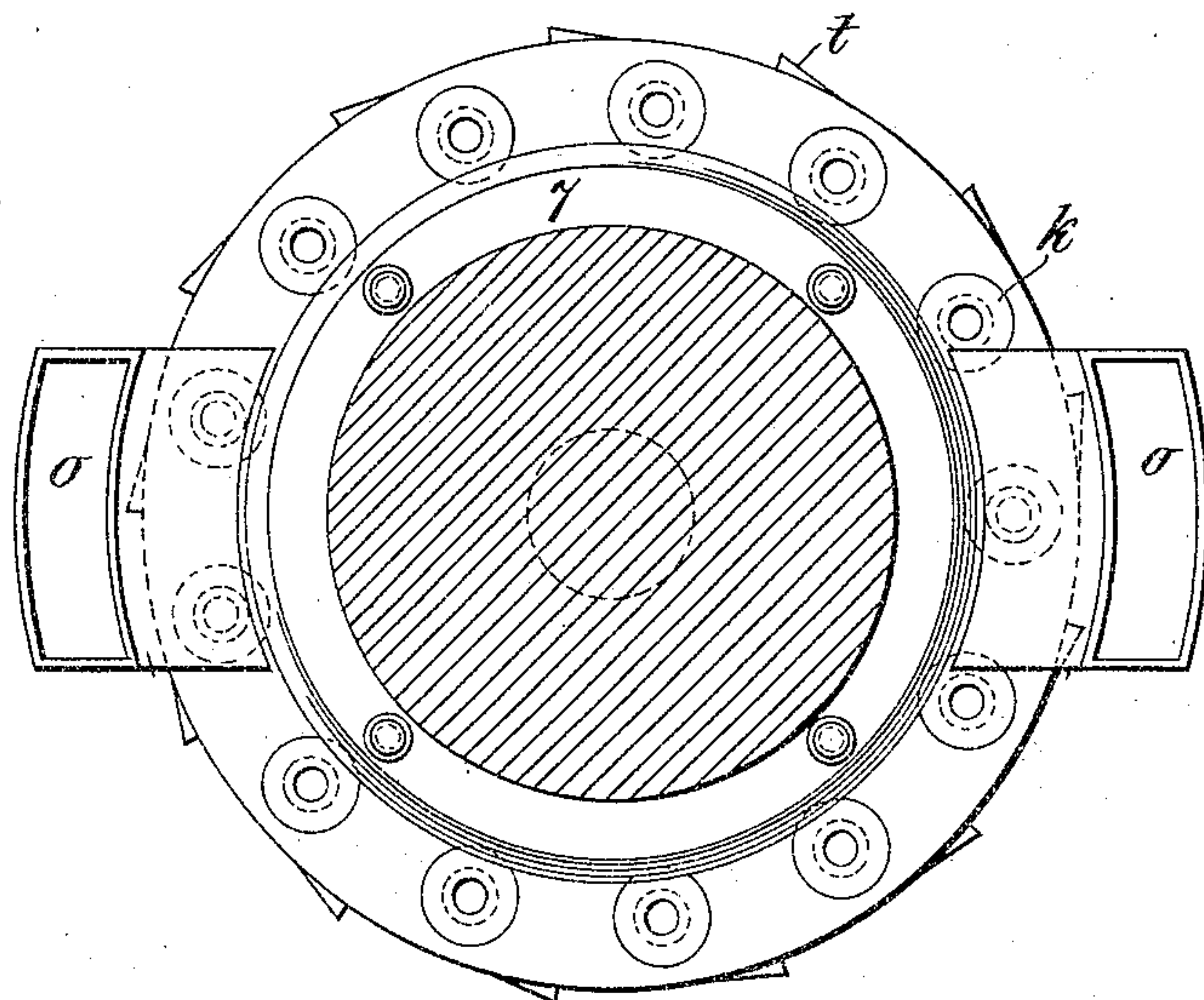


Fig. 4.

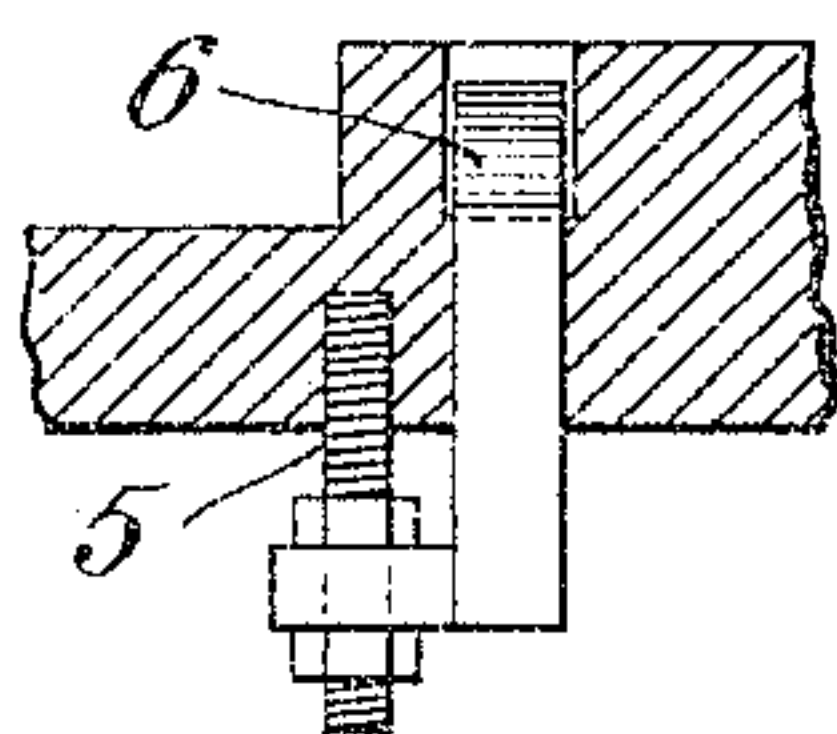


Fig. 5.

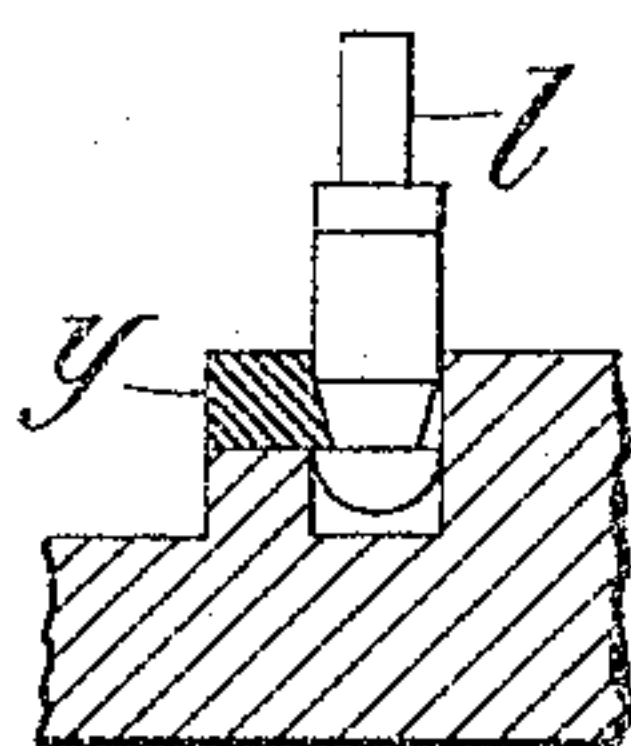
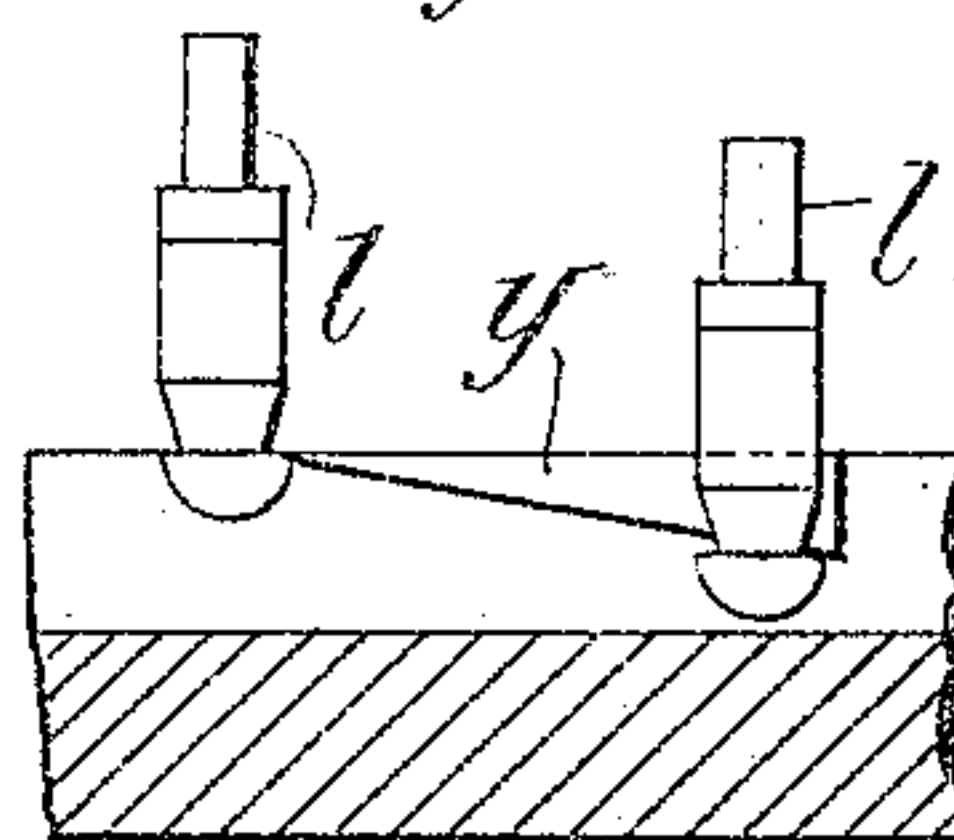


Fig. 6.



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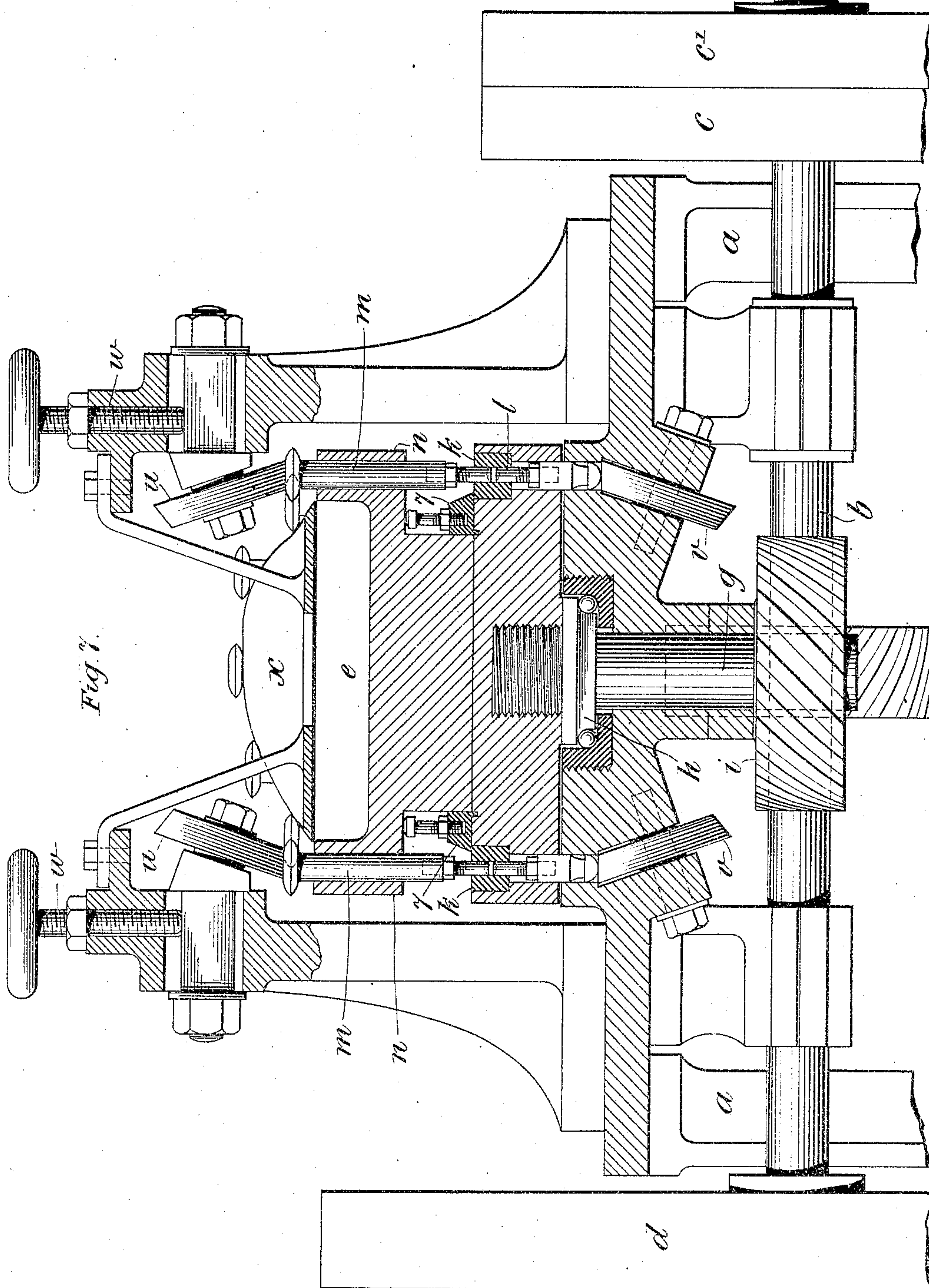
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

JAMES FRANCIS BUCKLEY, OF DARTFORD, ENGLAND, ASSIGNOR TO  
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MACHINERY FOR THE MANUFACTURE OF TABLETS FOR MEDICINAL OR OTHER PURPOSES.

SPECIFICATION forming part of Letters Patent No. 785,402, dated March 21, 1905.

Application filed June 23, 1903. Serial No. 162,720.

*To all whom it may concern:*

Be it known that I, JAMES FRANCIS BUCKLEY, a subject of the King of Great Britain, and a resident of 27 Highfield road, Dartford, in the county of Kent, England, have invented certain new and useful Improvements in Machinery for the Manufacture of Tablets for Medicinal or other Purposes, of which the following is a specification.

The present invention has reference to that class of machine for making tablets which comprises a rotating table carrying a number of dies or molds and corresponding plungers or punches advancing into the same at a certain point in the rotation of the table to compress the material for the tablets previously introduced.

In carrying out this invention a rotating mold-table with punches and rollers for driving the punches into the molds at predetermined points are employed; but the invention is directed to the construction and arrangement of the parts in such a manner that the machine will be capable of a high rate of speed and will turn out a much greater quantity of tablets in a given time than has hitherto been attained.

In the accompanying drawings I have shown a tablet-making machine embodying my invention.

Figure 1 is a front elevation, partly in section. Fig. 2 is a plan view of the rotating mold-table with the upper part removed. Fig. 3 is a plan view of the base-plate which underlies the lower punches. Figs. 4, 5, and 6 are detail views of the lower punches hereafter to be described, Fig. 4 being a section on line 1 2 of Fig. 3, Fig. 5 a section on line 3 4 of the same figure, and Fig. 6 a side view. Fig. 7 is an elevation, partly in section, at right angles to Fig. 1 and with certain parts removed; and Fig. 8 is a plan view of the table similar to Fig. 2, but containing an odd instead of an even number of dies.

$a$  is the main framing of the machine, and  $b$  a driving-shaft supported in bearings therein.

$c$ ,  $c'$ , and  $d$  are respectively fast and loose pulleys and a fly-wheel on the driving-shaft.

$e$  is the mold-table, preferably made in two parts so formed and fixed together as to provide a circumferential cavity or channel  $f$ . The table  $e$  is mounted on the summit of the vertical shaft  $g$ , which has a ball-bearing for its collar at  $h$ . The shaft  $g$  is driven by the shaft  $l$  through spiral gear-wheels  $i$   $j$ , keyed, respectively, thereon, or a worm and worm-wheel may be employed, if preferred.

$k$  represents the dies, which are arranged in a circle in the circumferential cavity  $f$  in the table  $e$  and have advancing and retiring bottoms consisting of vertically-sliding punches  $l$ . These punches  $l$  are made adjustable longitudinally not only to compensate for wear, but to regulate the quantity of the material to be contained in each tablet and the degree of compression to be imparted. Overhanging the dies and arranged to work in an exact line therewith are the upper punches  $m$ , which coöperate with the lower punches  $l$  to compress the material in the dies. These punches  $m$ , like those below, are adjustable longitudinally to compensate for wear and to regulate compression. The upper punches are mounted in vertical guides  $n$ , situated in the overhanging portion of the rotating table  $e$ , and they are caused to descend into the dies only when the compressing stroke is to be made.

Resting on the mold-table directly in the path of the dies are the mouths of hoppers  $o$ , which contain material to be compressed into tablets. The lower portions of these hoppers are separate from the upper parts and are supported by rods  $p$ , sliding in horizontal sockets  $q$ .

$r$  represents springs within the sockets  $q$ , which push the rods  $p$  outward and keep the tappets  $s$ , carried thereby, in contact with the edge of the rotating table  $e$ .

$t$  represents projections set at intervals on the table edge, which impart to the rods  $p$  a sliding movement and to the hoppers a rocking movement in order to insure a delivery of material into all the dies in turn as they come beneath the hoppers before reaching the operative position of the punches.

The punches are brought together to com-



press the material in the dies by conical rollers *u v*, mounted on inclined axles and arranged above and below the table, so that the ends of the punches meet them as they are  
 5 carried round by the table and are thereby driven inward a fixed distance. The employment of conical rollers mounted on inclined axles is desirable in order to avoid lateral friction between the roller-surfaces and the  
 10 punch ends. The upper rollers *u* are adjustable by means of the screws *w*, so as to increase or diminish the length of the stroke of the punches *m*, as desired. The ends of the punches are furnished with heads by means  
 15 of which the said punches may be positively withdrawn after their compressing strokes are completed while fresh material is being supplied to the dies.

For effecting the withdrawal of the upper  
 20 punches *m* from the dies an inclined surface *x*, carried by brackets attached to the framing, is employed. (See Fig. 7.) The retirement of the lower punches *l* a proper distance in the dies is effected by an inclined surface *y*,  
 25 (see Figs. 3, 5, and 6,) against which the inner portion of the heads bear as the table rotates. The lower punches *l* are supported at their normal level during the feeding of the material by fixed underlying plates *z*, Fig. 3,  
 30 against which their ends in succession bear. The heights of these plates *z* are adjustable by means of screws and nuts 5. (See Fig. 1.) Before retiring to the normal level after compressing the tablets the lower punches are  
 35 caused to rise to the surface of the table following the withdrawal of the upper punches, thereby ejecting the tablets from the dies. This is effected by curved surfaces 6, set in the path of the heads of the punches. (See  
 40 Fig. 3.) It is preferred that the punches *l* should not retire to their normal level after ejecting the tablets until the dies are actually beneath the hopper, so that in filling the material to be compressed may follow the punches  
 45 down into the dies without resistance from imprisoned air.

A machine embodying these improvements may be constructed of any convenient size—that is to say, it may be made to operate at  
 50 one, two, three, or even four points at each rotation of the mold-table.

In the accompanying drawings I have shown a double-acting machine, with hoppers delivering material at two points and with two sets  
 55 of compression-rollers, &c., placed to operate the punches twice at each revolution of the table.

The machine may be contrived to operate the two sets of punches simultaneously, or, if  
 60 preferred, the dies may be so placed (see Fig.

8) that the strokes of the punches follow one another, while the same number are delivered each rotation.

A machine such as is above described operating at two points in each revolution of the  
 65 table will be capable of an output of about one thousand tablets per minute without unduly hurrying the mechanism, and, moreover, the tablets produced cannot fail to be identical in density, weight, and size, which is very  
 70 important in tablets used for medicinal purposes.

It will be understood that by making the dies in detachable blocks fitted to the rotating table the dies may be changed for others of  
 75 different size when tablets of different dimensions are required to be made. In the accompanying drawings I have shown the dies dropped into sockets in the table and secured by a divided ring or collar 7, which is itself  
 80 held by screws 8. The bodies of the punches will remain the same; but their acting ends will be made detachable from the bodies, so that sizes to correspond with the size of the dies may be the more easily employed. A  
 85 means for adjusting the length of the punches is thus also provided.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A machine for compressing tablets comprising a rotating table having dies arranged therein, upper and lower punches sliding in guides in alinement with the dies and with one another, hoppers with loose ends delivering into the dies and means for shaking said ends,  
 90 stationary conical rollers for bearing on the heads of said punches, inclined axles for said rollers so set that the path of rotation of the latter is in the circle described by the punch-heads, inclined guides for withdrawing the  
 95 punches from the dies, and a rising surface for operating the lower punches to eject the tablets when compressed, all arranged and operating substantially as described.

2. In a machine for compressing tablets having a rotating die-table and delivery-hoppers for the dies, the combination of movable ends for the hoppers, horizontal sliding supports for said ends, springs for thrusting said supports toward the table and tappets on the edge  
 100 of the table for acting on said supports to produce a jogging movement of said ends, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two  
 110 subscribing witnesses.

JAMES FRANCIS BUCKLEY.

Witnesses:

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H. D. JAMESON.