

(No Model.)

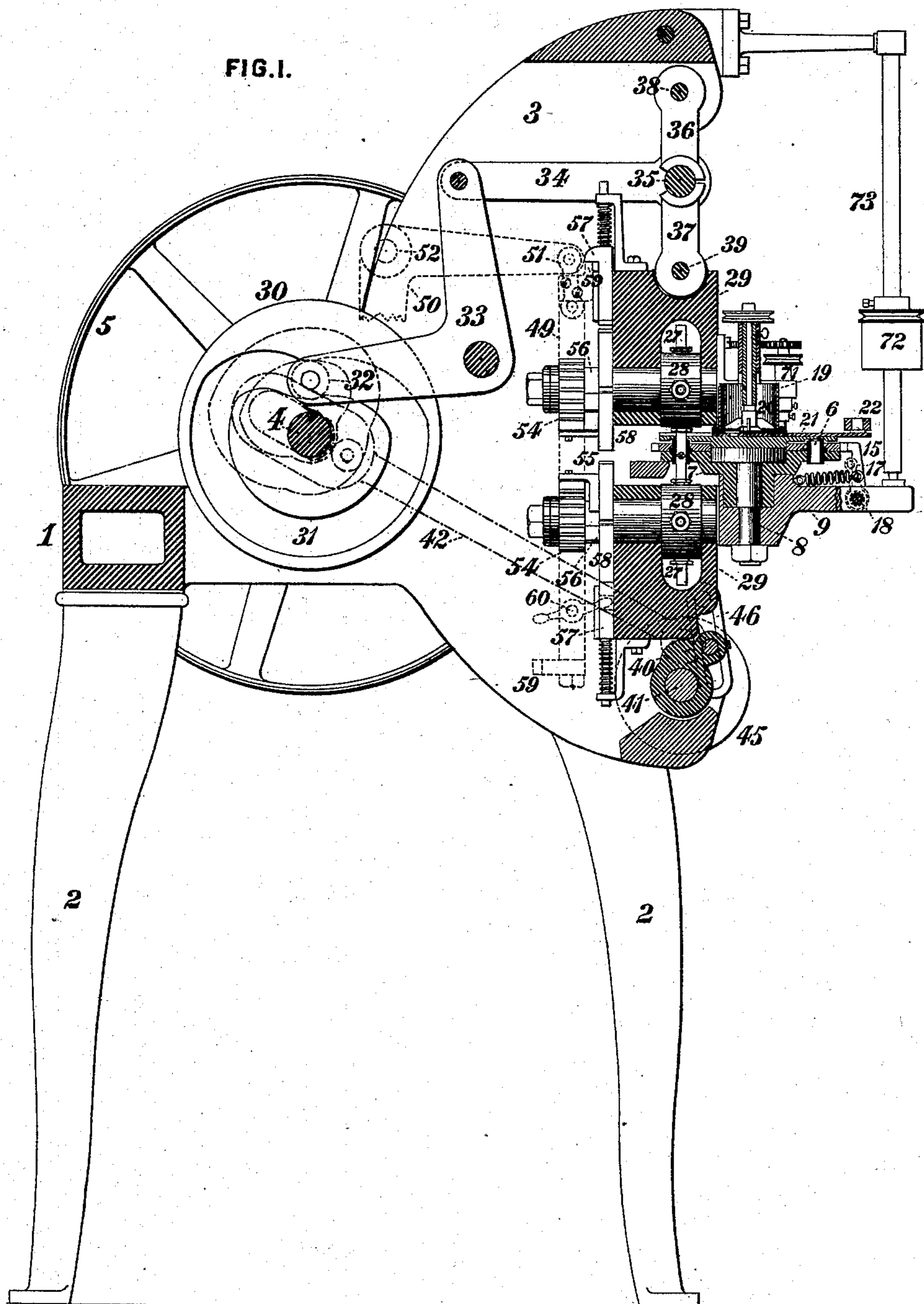
3 Sheets—Sheet 1.

J. H. GILL.

MACHINE FOR THE MANUFACTURE OF COMPRESSED PILLS, LOZENGES, &c.

No. 251,678.

Patented Dec. 27, 1881.



WITNESSES:

Geo. A. Vaillant.
Geo. T. Kelly.

INVENTOR

J. H. Gill,
by Collier & Bell,
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(No Model.)

3 Sheets—Sheet 2.

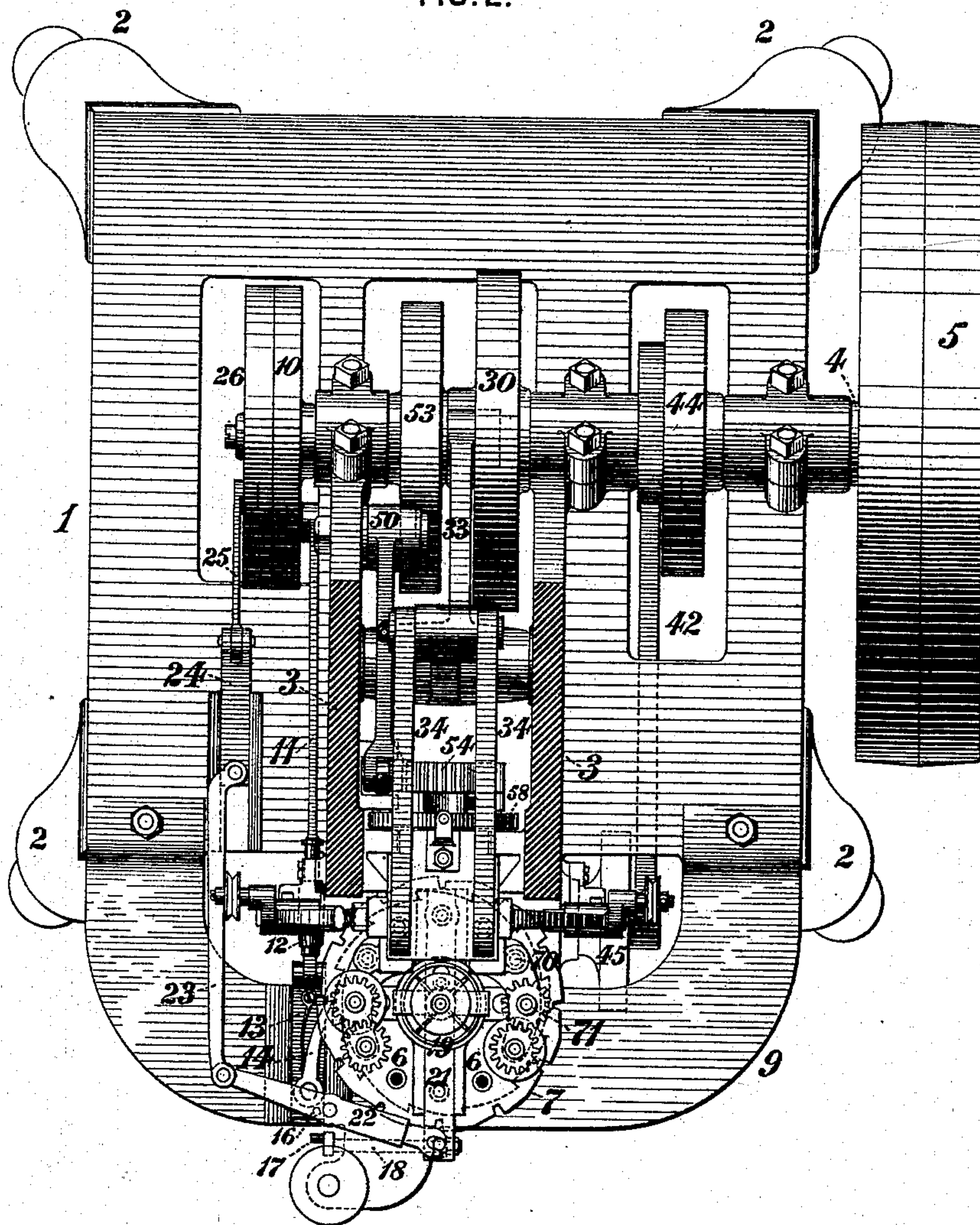
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FIG. 2.



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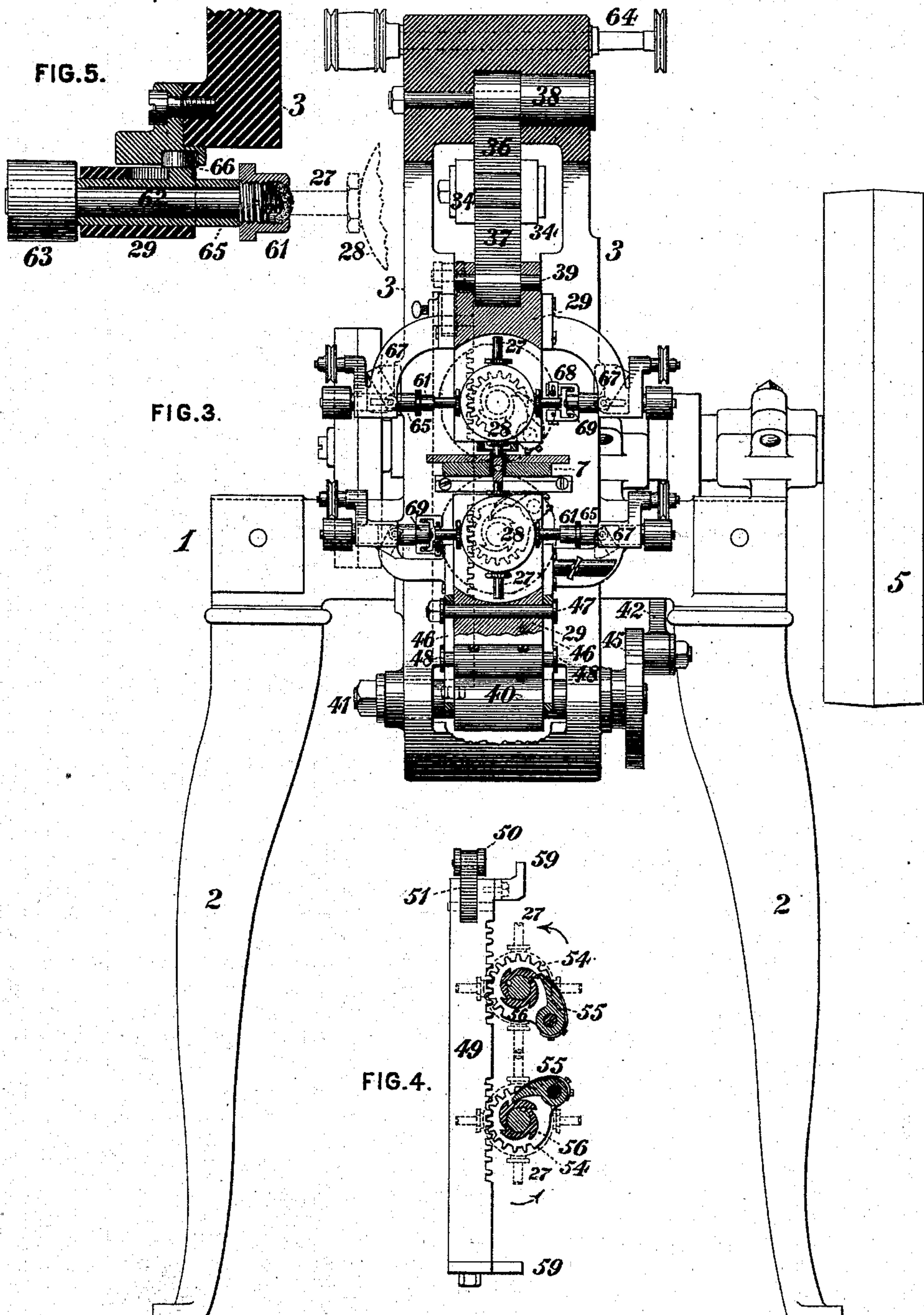
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UNITED STATES PATENT OFFICE.

JABEZ H. GILL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENT, TO JOHN WYETH & BROTHER, OF SAME PLACE.

MACHINE FOR THE MANUFACTURE OF COMPRESSED PILLS, LOZENGES, &c.

SPECIFICATION forming part of Letters Patent No. 251,678, dated December 27, 1881.

Application filed December 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, JABEZ H. GILL, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Machines for the Manufacture of Compressed Pills, Lozenges, &c., of which improvements the following is a specification.

My invention relates to machines of the class in which pills, tablets, lozenges, or the like are formed by the compression of pulverized materials between dies or plungers, and comprehends improvements upon certain features of the machine set forth in Letters Patent of the United States No. 215,452, granted and issued to Henry Bower (as my assignee) under date of May 20, 1879.

The object of my present invention is to provide improved facilities for the cleaning and lubrication of the pressing-dies and the reduction of the wear thereof by the employment of a multiple series in lieu of a single pair of dies, to admit of the application of increased compressive force to the material operated upon, and to so combine the operative members as to insure the accurate and timely performance of their several functions and the formation of thoroughly compacted and uniformly sized and shaped pills thereby.

To these ends my improvements consist in certain devices and combinations, including a carrier-disk or mold-wheel provided with a series of molds; mechanism for intermittently rotating said disk and retaining the same stationary during the intervals in which the pills are formed; a pair of die-heads, each provided with a series of plungers or pressing-dies, and mounted, with the capacity of rotation, in a reciprocating block or slide; cams, connecting-rods, and toggle joint mechanism imparting reciprocating movements to the blocks or slides carrying the die-heads; lubricators and cleaners adapted to be applied successively to the several dies of the die-heads; mechanism by which said die-heads are intermittently rotated, so as to be presented in turn to the lubricators and cleaners and retained in proper position during the intervals between their rotatory movements to admit of the entrance of one of the dies of each into a mold of the carrier-disk for the pressing of a pill; and an

ejector and a cleaner for the molds of the carrier-disk.

The improvements claimed are hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a vertical central section through a machine for manufacturing compressed pills embodying my improvements; Fig. 2, a plan or top view of the same, with the vertical members of the frame in section; Fig. 3, an end view, partly in section, at right angles to Fig. 1, the bracket which supports the carrier-disk being removed; Fig. 4, a view partly in elevation and partly in section illustrating details of the mechanism for rotating the die-heads; and Fig. 5, a horizontal section, on an enlarged scale, through one of the lubricators and its bearing.

The working parts of the machine are mounted upon a substantial metallic frame composed of a bed plate or table, 1, resting upon legs or supports 2, and having a pair of vertical standards, 3, upon its upper surface. A horizontal driving-shaft, 4, is mounted in bearings upon the table 1 and carries a pulley, 5, through which power for the operation of the machine is transmitted from a suitable prime mover.

The pulverized ingredients to be formed into pills are compressed within cylindrical molds 6, which are arranged in a circular series and at equal distances apart, around and near the periphery of a carrier-disk or mold-wheel, 7, mounted so as to rotate freely upon a vertical stud or stem, 8, secured in a bracket, 9, projecting from the front of the table 1. The carrier-disk and its molds, which are substantially similar in construction to those described and shown in Letters Patent No. 215,452, before referred to, are intermittently rotated by means of a cam, 10, on the driving-shaft 4, said cam having a suitably-formed groove on one of its sides, in which groove works a roller upon one end of a rod, 11, the opposite end of which is coupled, with the capacity of adjustment, through a right-and-left-handed screw-connection, 12, or otherwise, to a slide, 13, fitted in guides on the bracket 9, and having a pawl, 14, pivoted to its top, said pawl engaging ratchet-teeth on the periphery of the carrier-disk and serving to move the latter a fraction of a revolution during each traverse of the slide

13 toward the driving-shaft 4, the carrier disk remaining stationary during the traverse of the slide in the opposite direction. The carrier-disk is held during its intervals of rest by a spring-detent, 15, which engages notches in the periphery of the disk, and is withdrawn therefrom previous to each impulsion of the disk by the pawl 14 by means of a pin, 16, on the slide 13, which strikes an arm, 17, on one end of a shaft, 18, to the opposite end of which the detent 15 is secured.

The pulverized ingredients are supplied to the molds from a feed-hopper, 19, provided with a stirrer, 20, by a reciprocating feed-slide, 21, which is operated by a double-armed lever, 22, coupled by a connecting-rod, 23, to a slide, 24, fitted to reciprocate in guides on the table 1, and connected to a rod, 25, the opposite end of which carries a roller fitting in a groove on one side of a cam, 26, on the driving-shaft 4. The feed-hopper, stirrer, and feed-slide are substantially similar in details of construction and mode of operation to those of Letters Patent No. 215,452, and not constituting, *per se*, part of my present invention, need not be herein specifically set forth.

The material supplied to the molds of the carrier-disk is compacted therein by dies or plungers 27, which are secured in and project radially from the peripheries of two die-heads, 28, mounted, with the capacity of rotation, in bearings on blocks or slides 29, which are fitted to reciprocate between guides on the standards 3 of the frame above and below the carrier-disk. Reciprocating movement is imparted to the upper block by a cam, 30, on the driving-shaft, said cam having a side groove, 31, in which fits a roller, 32, upon an arm of a bell-crank lever, 33, journaled in the standards 3. The opposite arm of the lever 33 is coupled by a pair of connecting-bars, 34, to a toggle-joint composed of a joint-pin, 35, and toggle-arms 36 37. The arm 36 is pivoted to a stud, 38, on the standards 3, and the arm 37 to a pin, 39, on the upper of the blocks 29. The upward traverse of the lower block, 29, is effected by a cam, 40, secured upon a horizontal shaft, 41, and bearing against the lower side of the block 29, the shaft 41 being vibrated in its bearings by a connecting-rod, 42, one end of which carries a roller fitting a groove, 43, in a cam, 44, on the driving-shaft 4, and which is coupled at its opposite end to a crank, 45, on the shaft 41. The downward traverse of the lower block, 29, is facilitated by its own gravity, supplemented, if necessary, by a spring or weight, and is assured by a pair of slotted links, 46, connected to a pin, 47, on the block 29, pins 48 on the cam 40 entering the slots of the links.

The die-heads 28 are rotated after each compressing operation for a portion of a revolution sufficient to move a different pair of dies into position. In the instance shown, there being four dies in each head, the heads will be rotated one-fourth of a revolution, and such rotation is effected when the blocks and heads are at or

adjacent to the extremity of their vertical traverse farthest from the carrier-disk, the lubrication and cleaning of the dies, to be presently described, being performed during the compressing operation. The die-heads are rotated by means of a rack, 49, to which vertical reciprocation is imparted by a bell-crank lever, 50, one arm of which is connected by a link, 51, to the upper end of the rack 49, and which is vibrated about the axis of its bearing-pin 52 by the connection of a roller upon its opposite arm with a side groove in a cam, 53, on the driving-shaft 4. A segmental gear, 54, is mounted loosely upon the shaft of each of the die-heads, and a pawl, 55, is pivoted to each of the gears 54 and engages the teeth of a ratchet, 56, made fast upon the shaft of said gear. The upward traverse of the rack 49 rotates the gears and pawls without imparting movement to the heads, and the downward traverse of the rack rotates the heads for a quarter of a revolution in the direction of the arrows, Fig. 4, by the induced pressure of the pawls 55 upon the ratchets 56.

The die-heads 28 are prevented from rotating while their dies are being presented to the carrier-disk by spring-detents 57, which engage notches in the periphery of disks 58 on the shafts of the die-heads, the detents being withdrawn therefrom in season to admit of the rotation of the heads by fingers 59 on the rack 49, the upper of which fingers acts directly upon the adjacent detent and the lower upon one arm of a rock-shaft, 60, in the frame, the opposite arm of which enters a slot in the detent of the lower head, the detents being thereby moved, as required, in opposite directions, to be withdrawn from the notches of the respective disks by a single movement of the rack, and being thereafter forced into said notches by their springs. During each pressing operation the ends of one of the dies 27 of each head which are subsequently to operate are lubricated and their peripheries cleaned in the following manner: Hollow cylindrical lubricators 61 are secured upon the ends of stems 62, arranged to rotate as well as receive reciprocating movement, adjacent to the upper and lower die-heads, 28, respectively. The outer ends of the lubricators are closed by sections of sponge or analogous porous material adjustably pressed up to the end openings, so as to permit of the escape of a limited quantity of the lubricant as the lubricators are presented successively to the dies of the heads in the rotation of the latter. The stems 62 carry pulleys 63, around which are passed belts from a shaft, 64, which is in turn rotated by a belt from the driving-shaft 4, and the lubricators and stems are moved endwise in the blocks 29 of the die-heads, so as to be alternately brought up to and withdrawn from the ends of the dies 27. To this end the stems 62 are fitted to rotate in sleeves 65, having the capacity of end motion in their bearings in the blocks 29, each of said sleeves having a roller, 66, on one of its sides fitting an inclined groove, 67, on the standards 3 of

the frame. By such construction it will be seen that the stems and lubricators are moved inwardly toward the dies as the blocks and die-heads are moved toward each other to effect the compression of a pill, and are correspondingly moved outwardly and away from the die-heads to permit of and in correspondence with the separation of the latter after the completion of the pressing operation.

10 The cleaners 68, by which the peripheries of the dies are freed from extraneous matters that may adhere to them, are plates of wood, leather, or similar material, adjustably secured to stems 69, which are fitted to bearings in the blocks 29, and adapted to rotate and move endwise therein, so as to be alternately presented to and withdrawn from the several dies, similarly to the lubricators hereinbefore described. A lubricator and a cleaner are provided for each of the die-heads, and are located on opposite sides thereof, respectively, all being in this instance rotated from the shaft 64.

The finished pills are expelled from the molds by an ejector, 70, and foreign matters which may adhere to the inner surfaces of the molds are removed therefrom, after the expulsion of the pills, by mold-cleaners 71, (one or more,) the same being steel rods wrapped with some suitable covering material, and mounted so as to rotate in bearings in an arm or bracket projecting from the block 29 of the upper die-head, to which arm the ejector 70 is secured, so that the ejector and cleaners are inserted in and removed from the molds by the reciprocating movements of said upper block. The mold-cleaners are rotated by a belt from a pulley, 72, on a vertical shaft, 73, which is in turn rotated by a belt from the driving-shaft 4.

40 I claim as my invention and desire to secure by Letters Patent—

1. The combination, in a machine for the manufacture of compressed pills, &c., of a carrier-disk or mold-wheel, two series of pressing-dies or plungers, and mechanism by which different pairs of said dies are successively inserted in and withdrawn from the molds of the carrier-disk, substantially as set forth.

2. The combination, in a machine for the manufacture of compressed pills, &c., of a carrier-disk or mold-wheel, two die-heads, each provided with a peripheral series of pressing-dies or plungers, and mechanism for reciprocating said die-heads toward and from the carrier-disk and imparting partial rotation to the die-heads, substantially as set forth.

3. The combination, in a machine for the manufacture of compressed pills, &c., of a carrier-disk or mold-wheel, a die-head provided with a peripheral series of pressing-dies or plungers, and mounted, with the capacity of

rotation, in a block or slide, a pair of toggle-joint arms, one of which is coupled to said block and the other to a bearing on the frame of the machine, a cam fixed upon a driving-shaft, and a lever vibrated by said cam and coupled to the joint-pin of the toggle-arms, substantially as set forth.

4. The combination, in a machine for the manufacture of compressed pills, &c., of a carrier-disk or mold-wheel, a die-head provided with a peripheral series of pressing-dies or plungers, and mounted, with the capacity of rotation, in a block or slide, mechanism for rotating said die-head, and a lubricator and a cleaner, each adapted to act successively upon the several dies as presented thereto by the rotation of the head, substantially as set forth.

5. The combination, in a machine for the manufacture of compressed pills, &c., of a carrier-disk or mold-wheel, two die-heads, each provided with a peripheral series of pressing-dies or plungers, and mounted, with the capacity of rotation, in a block or slide, mechanism for reciprocating said blocks toward and from the carrier-disk, a rack reciprocated by a driving-shaft and engaging segmental pinions fitting loosely upon the shafts of the die-heads, pawls pivoted to said pinions and engaging ratchets fixed upon the shafts of the die-heads, spring-detents adapted to lock the die-heads in position by engaging notched disks on their shafts, and fingers or projections secured to the reciprocating rack and acting intermittently to withdraw the detents from the notches of the disks, substantially as set forth.

6. The combination, in a machine for the manufacture of compressed pills, &c., of a frame, a driving-shaft, a carrier-disk or mold-wheel journaled on a stem in the frame, mechanism for intermittently rotating said carrier-disk, a pair of blocks or slides fitted in guides in the frame above and below the carrier-disk, respectively, each carrying a die-head and series of pressing-dies or plungers, mechanism by which reciprocating movement is imparted to said blocks from the driving-shaft, mechanism for intermittently rotating said die-heads, lubricators and cleaners adapted to operate successively upon the several pressing-dies, and an ejector and a cleaner secured to one of the die-head blocks, and acting respectively to eject the finished pills and to remove foreign matters from the molds of the carrier-disk, these members being combined for joint operation, substantially as set forth.

JABEZ H. GILL.

Witnesses:

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