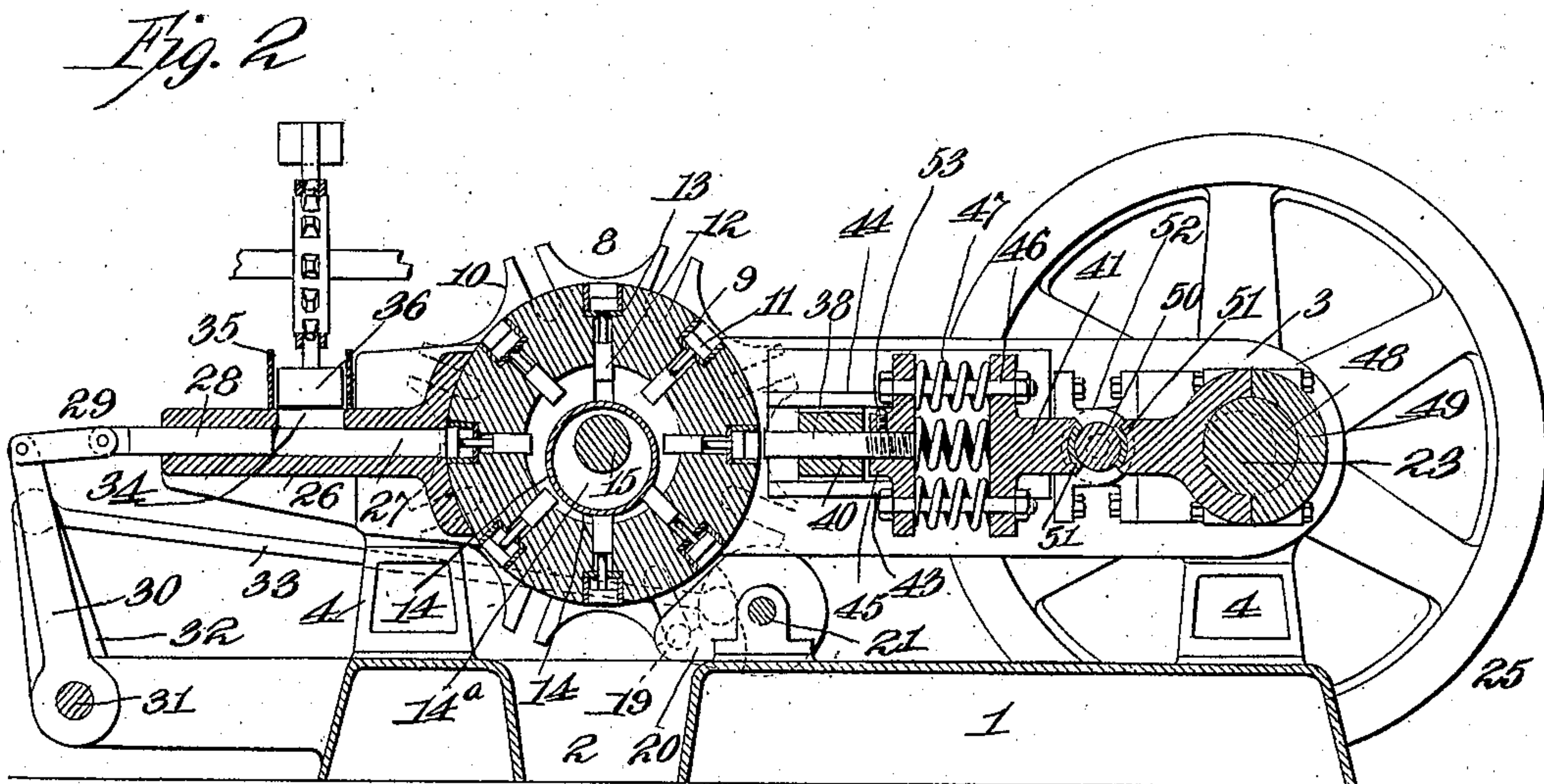
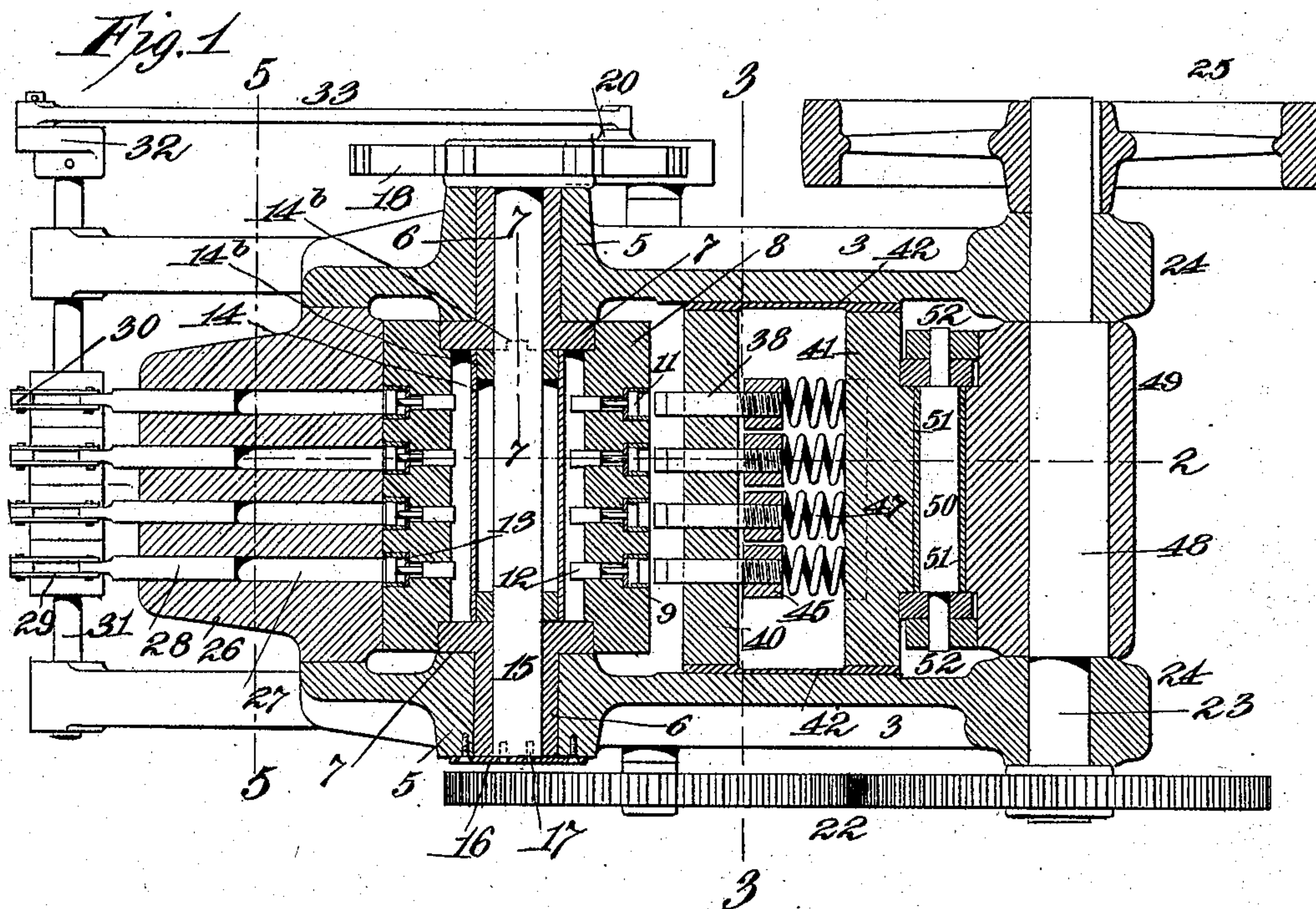


No. 815,647.

PATENTED MAR. 20, 1906.

W. SIMPKIN.
BRIQUETING MACHINE.
APPLICATION FILED APR. 30, 1903.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3

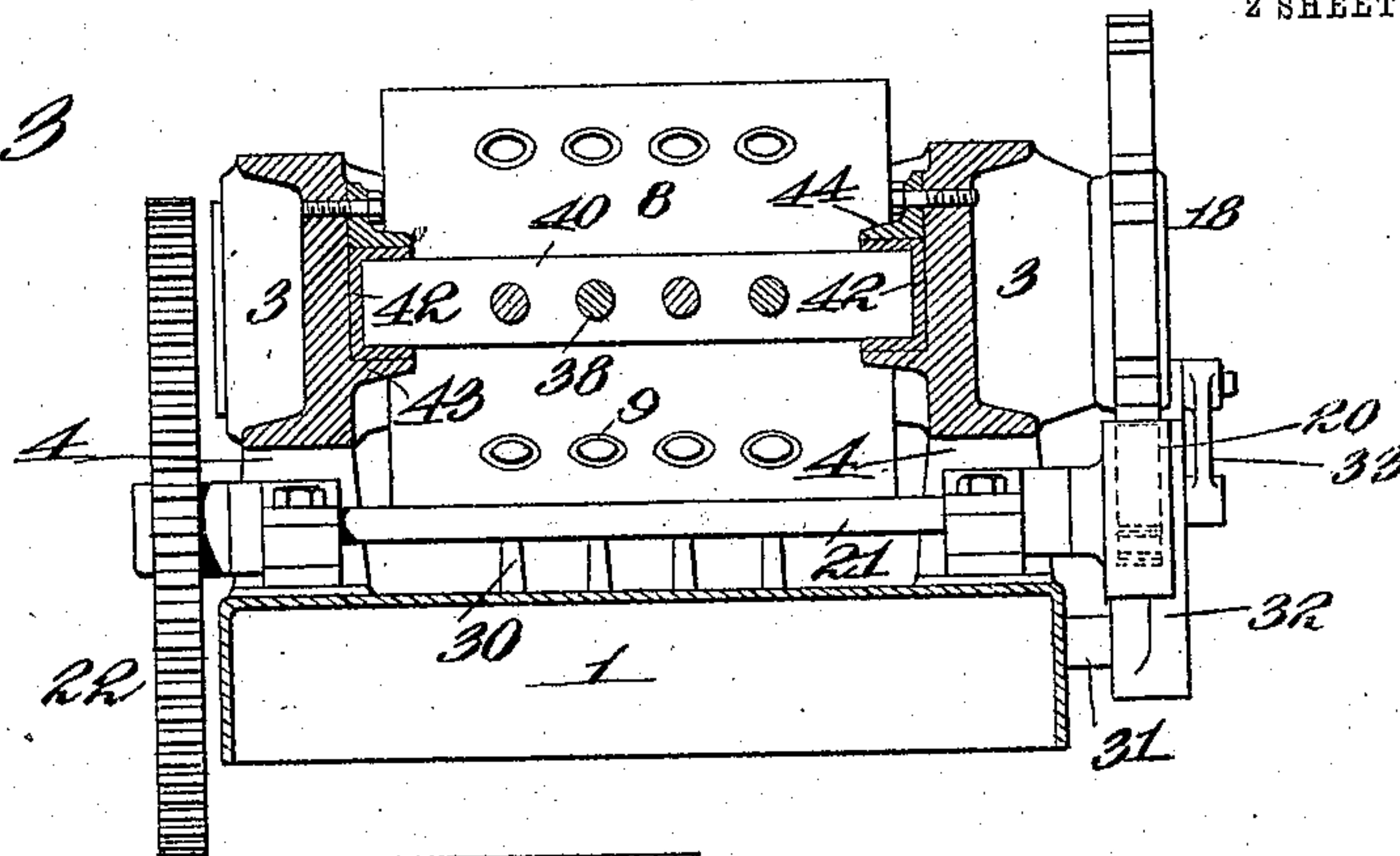


Fig. 4

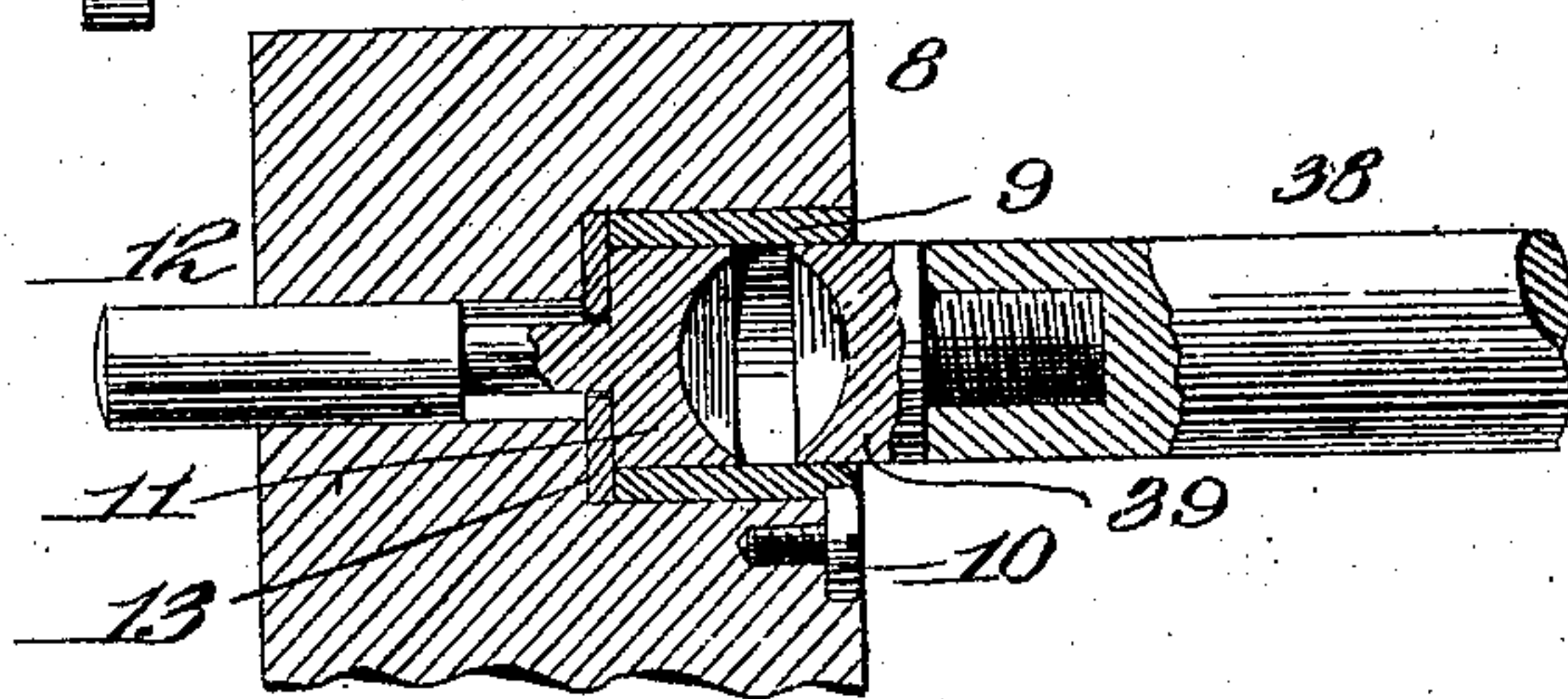


Fig. 5

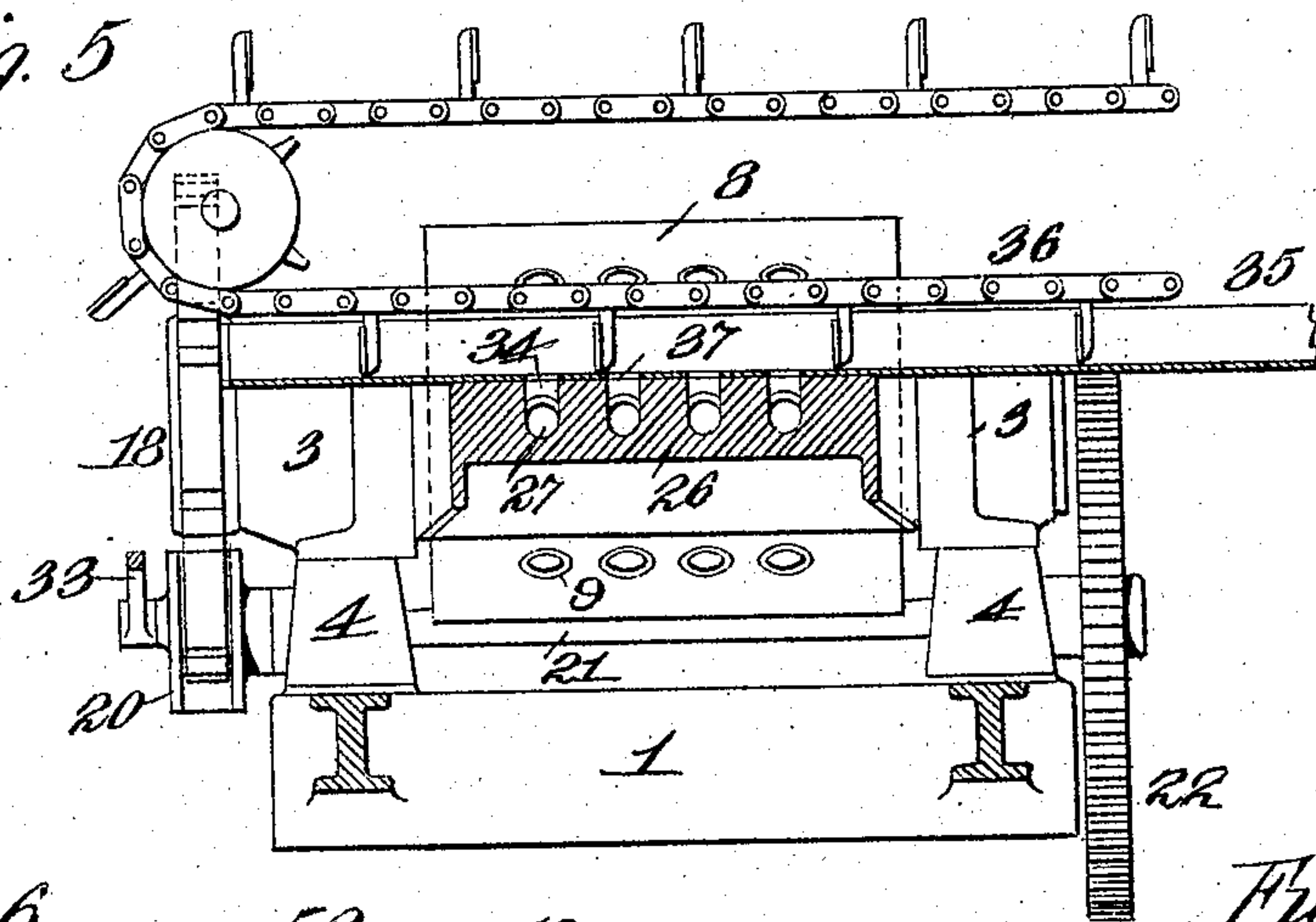


Fig. 6

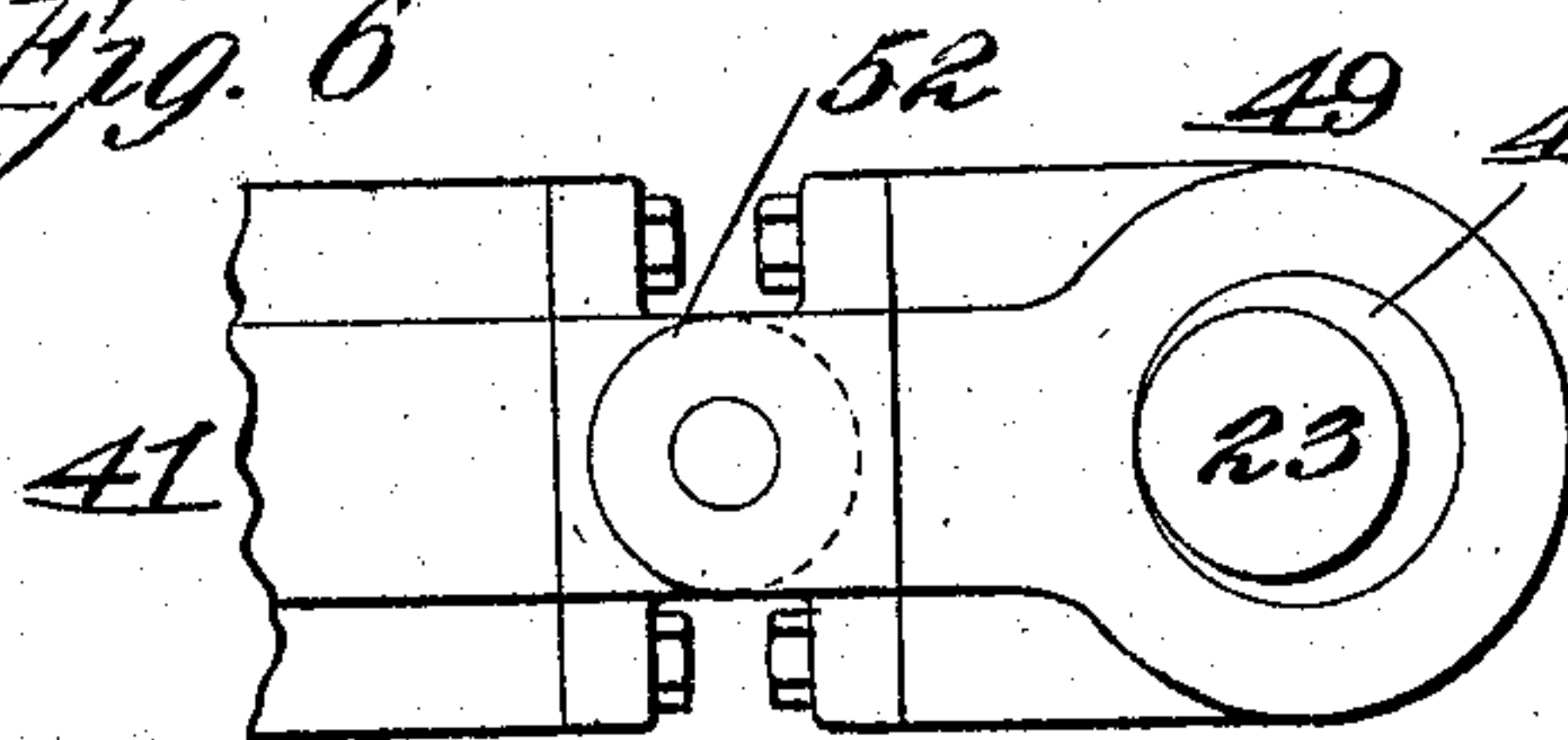
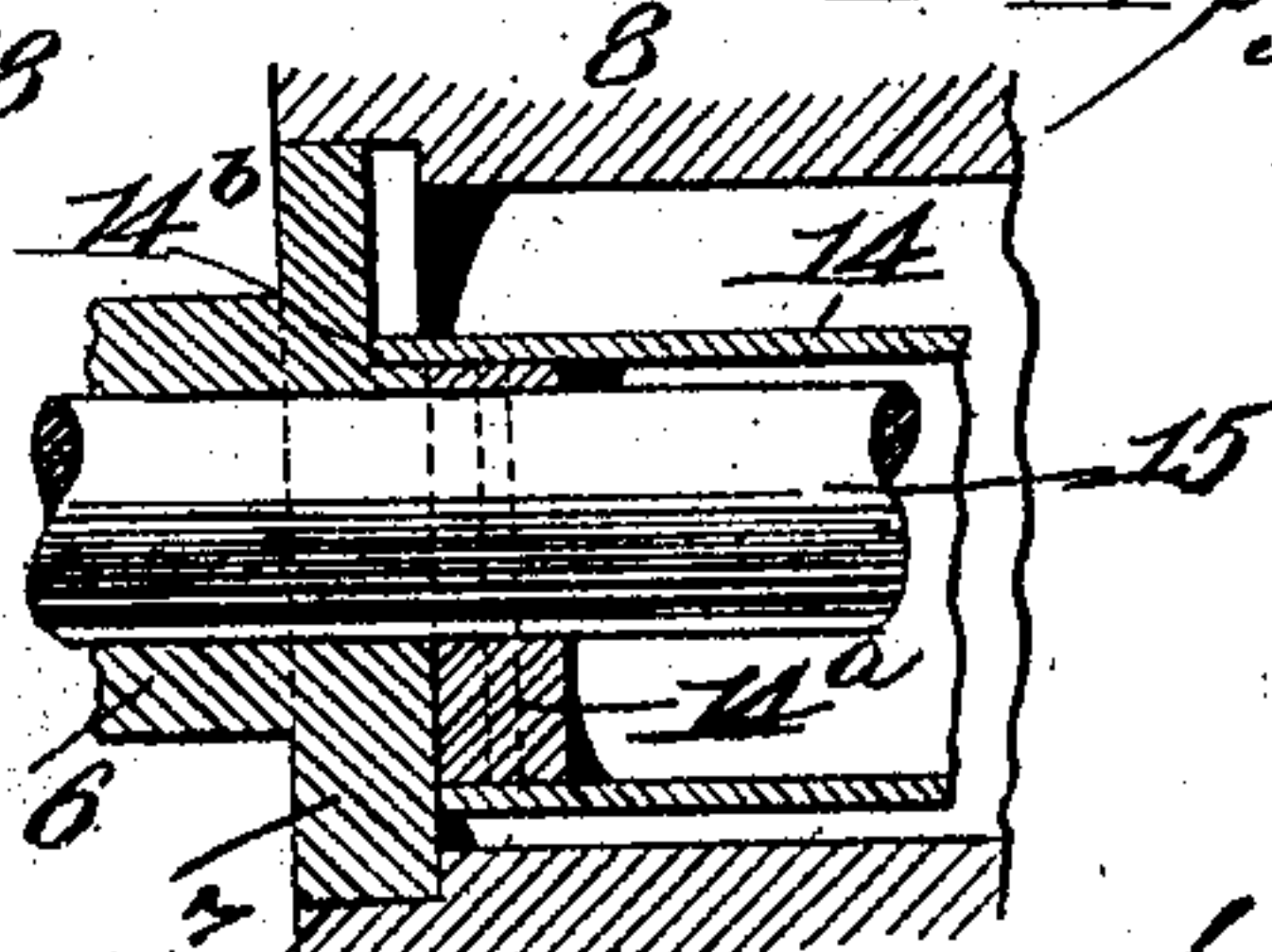


Fig. 7



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UNITED STATES PATENT OFFICE.

WILLIAM SIMPKIN, OF ORANGE, NEW JERSEY.

BRIQUETING-MACHINE.

No. 815,647.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed April 30, 1903. Serial No. 155,089.

To all whom it may concern:

Be it known that I, WILLIAM SIMPKIN, a citizen of the United States, residing at Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Briqueting-Machines, of which the following is a description.

My invention relates to improvements in machines for briqueting plastic masses, and the device has been designed particularly for producing combustible briquets from a mixture of pulverized coal or coal-dust and a suitable binding substance.

My objects are to provide a machine for the purpose which is simple in construction, strong and durable in use, and capable of effective and rapid operation, whereby briquets can be produced in large quantities and at low cost and shall at the same time in the case of coal be sufficiently dense to compete successfully in all respects with the best qualities of natural fuel.

In order that the invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a horizontal section through the briqueting-machine, illustrating the same as being provided with four compressing-plungers; Fig. 2, a longitudinal section on the line 2 2 of Fig. 1; Fig. 3, a section on the line 3 3 of Fig. 2; Fig. 4, a detailed section, on an enlarged scale, illustrating the construction of one of the molds and one of the plungers for cooperation therewith; Fig. 5, a section on the line 5 5 of Fig. 1; Fig. 6, a detailed side view of the connection between the spring-block and eccentric-strap, and Fig. 7 a section on the line 7 7 of Fig. 1. In all of the drawings corresponding parts are indicated by the same reference-numerals.

The foundation of the machine comprises a heavy cast base or bed 1, formed with an opening 2 therein, through which the finished briquets are discharged. The side frames 3 3 are supported on the bed by short pedestals 4. These side frames are formed with bearings 5, in which are mounted sleeves 6 6, carrying disks 7 on their inner ends within the bearings 5. These disks carry a very heavy mold-wheel 8, provided with a series of radial molds, as shown. Each mold is provided with a bushing 9, (see Fig. 4,) secured in place by the fillister-head screw 10, whereby any one of the bushings may be re-

moved when worn. Mounted in each mold is an ejecting-cup 11, having a preferably concaved face, as shown, and formed with an integral stem 12, having a cut-away portion, as shown. Surrounding the cut-away portion of the stem is a split washer 13, which constitutes practically the bottom of each mold and is retained in place by the bushing thereon. The function of this washer is to limit the travel of each ejecting-cup, as will be obvious. The stem of each ejecting-cup projects through the wall of the mold-wheel, as shown, and is adapted to cooperate with an ejecting-cylinder 14, eccentrically mounted within and with respect to the axis of the mold-wheel. This cylinder is mounted on eccentrics 14^a, secured to the stationary shaft 15 adjacent to the disks 7. Said shaft is secured at one end to a plate 16 by means of pins 17, and the plate in its turn is bolted or otherwise fastened to the adjacent bearing 5, as shown. At one end the cylinder 14 is provided with a longitudinally-projecting lug 14^b, which works in a radial groove in the face of the adjacent disk 7, Fig. 7. This method of mounting the ejector-cylinder will cause it to rotate at the same speed as the mold-wheel 8, thus preventing rubbing between the cylinder and stems 12 of the ejecting-cups. At the same time the stationary eccentrics 14^a will cause the cylinder 14 to approach the periphery of the mold-wheel at the lowermost point of its revolution, thus forcing the ejecting-cup outwardly to eject the finished briquet from the mold.

An intermittent or step-by-step movement is imparted to the mold-wheel by any suitable mechanism. The preferred arrangement for the purpose comprises a star-wheel 18, keyed to one of the sleeves 6 and whose radial slots are successively engaged by a pin 19, carried between a pair of crank-arms 20, mounted on a shaft 21. The crank-arms project from a disk having that portion of its periphery between the arms cut away to permit the star-wheel to revolve when the crank-pin is in engagement with one of the radial slots of the wheel, while the completed part of said disk locks the star-wheel against rotation when the crank-pin is out of engagement with the slots. This arrangement corresponds with the well-known Geneva-stop movement and is utilized in many arts in which an element requires to be rotated intermittently and be locked during the pe-

riods of rest. The shaft 21 is driven, through spur-gears 22, from a heavy driving-shaft 23, mounted in bearings 24 at the front of the side frames. A heavy fly-wheel 25 is keyed
5 to the driving-shaft and receives the driving-belt.

Immediately behind the mold-wheel and co-operating closely with its periphery is a casting 26, secured between the side frames and
10 having longitudinal passages 27 therein, with which the several molds are adapted to successively register as the mold-wheel is intermittently rotated. Mounted in each of these passages or channels is a feeding-plunger 28,
15 connected by a link 29 to an arm 30 on a rock-shaft 31, mounted in bearings at the back of the base 1. The rock-shaft is provided at its end with an arm 32, which connects by a link 33 to a pin on one of the disks 20, so that each
20 time the shaft 21 rotates the feeding-plunger 28 will be given a complete forward-and-backward movement. The pulverized material is fed to the several channels 27 through transverse passages 34, to which it is supplied in any suitable way. In the drawings
25 I illustrate a feed-trough 35, having a scraper-conveyer 36 therein and from which a number of openings 37 communicate with the transverse openings 34. It will be understood, of course, that instead of the scraper-conveyer any other arrangement may be employed for feeding the pulverized material
30 through the trough 35—for example, a screw conveyer of any approved type.

Coöperating successively with the several molds during the periods of rest of the mold-wheel are a number of pressure-plungers 38, each having a removable head 39, provided, preferably, with a concaved inner face corresponding with the like face of the ejecting-cups 11, whereby the resulting briquets will
40 each be in the form of a very short cylinder with convexed ends. The compressing-plungers 38 are mounted in a guide-bar 40, so as to be capable of movement independent of the same. The guide-bar 40 is connected to a spring-block 41 by side members 42, whereby the spring-block, guide-bar, and side members will constitute practically an open frame.
50 This frame is supported on shelves 43, which are integral with the side frames of the machine, and gibs 44 are bolted to the side frames to maintain the guide-bar and spring-block in their proper position relative to the mold-wheel. The end of each plunger 38 is screwed into a block 45, each of which blocks is connected to the spring-block 41 by bolts 46, around which are coiled springs 47. By adjusting the bolts 46 the distance between
55 the blocks 41 and 45 can be accurately regulated. The plungers 38 are reciprocated by an eccentric 48, formed on the shaft 23 and with which coöperates a split eccentric-strap 49. Mounted between one element of this
60 eccentric-strap and the spring-block 41 is a

heavy pin 50, the eccentric-strap and block being provided with bushings 51, which receive the thrust of the compression strains. Engaging the pin 50 are eyeblocks 52 on the eccentric - strap and spring - block, respectively, and by means of which the return
70 stroke of the spring-block is effected, it being understood that on the compression-stroke the strains are imposed on the bushings 51 and not on said eyeblocks. A locking-screw
75 53 may be engaged with each of the plungers 38 to prevent them from working loose during the operation.

In the bricking of pulverized material by means of my improved apparatus I proceed
80 as follows: The material is supplied to the trough 35 and by means of the scraper-conveyer or equivalent device therein is fed through the chutes 37 into each of the passages 27 to fill the latter. Power being applied to the belt-wheel 25, the shafts 23 and 21 will be rotated at the same shaft speed, thereby intermittently turning the mold-wheel and bringing a set of molds successively in position in front of the channels 27
90 and successively bringing another set of molds in line with the plungers 38. The turning of the shaft 21 operates the feeding-plungers 28, and the charge of material in each of the channels 27 will be forced into the
95 molds, driving the ejecting-cups 11 therein to their innermost positions. The pressure applied to the material by the feeding-plungers is only sufficient to compact the mass and make it coherent. At the same time that
100 this operation is taking place the plungers 38 are forced into the molds to apply an enormous pressure to the material therein, so as to complete the briqueting operation. By employing the springs 47 it will be obvious
105 that any one or more of the plungers may yield slightly on encountering an abnormally large amount of material in the molds. When both sets of plungers are being retracted, the mold-wheel is advanced another step in its
110 movement and these operations are repeated. As the different molds move toward their lowermost positions the stems 12 of the several ejecting-cups will engage the cylinder 14, forcing the ejecting - cups outwardly and
115 ejecting the finished briquets, which fall through the opening 2 in the bed. It will be obvious that when the plungers become worn and require readjustment this can be readily accomplished by removing the gibs 44 and
120 swinging up the spring-block 41 and guide-bar 40, after which an adjustment of the plungers with respect to the blocks 45 or an adjustment of said blocks with respect to the spring-block can be effected.

The apparatus is very simple in construction and in actual use has been found to perform its functions efficiently and economically.

Having now described my invention, what 130

I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a briqueting-machine, the combination with an intermittently-movable mold-wheel of an eccentric-shaft, an eccentric thereon, a spring-block connected to said eccentric, a plunger coöperating with the mold a star-wheel carried by the mold-wheel, a driving-shaft, a crank on the driving-shaft, a pin on said crank coöperating with said star-wheel, an elastic connection between said plunger and spring-block, and means for adjusting the plunger with respect to the spring-block and a guide-bar carried by said spring-block for supporting the plunger, substantially as set forth.

2. In a briqueting-machine, the combination with a mold-wheel, of an eccentric-shaft, an eccentric thereon, a spring-block connected to said eccentric, a plunger coöperating with the mold, an elastic connection between said plunger and spring-block, and a guide-bar carried by said spring-block for supporting said plunger, substantially as set forth.

3. In a briqueting-machine, the combination with a mold-wheel, of an eccentric-shaft, an eccentric on said shaft, a spring-block, a guide-bar connected to said spring-block, a plunger mounted in said guide-bar, an elastic connection between said plunger and spring-block, stationary guides for supporting the spring-block and guide-bar, and removable gibs for maintaining said spring-block and guide-bar on said guides, substantially as set forth.

4. In a briqueting-machine, the combination with a mold-wheel, of a spring-block, means for reciprocating the same, a guide-bar connected to said spring-block, a plurality of plungers in said guide-bar, and independent elastic connections between each of said plungers and the spring-block, substantially as set forth.

5. In a briqueting-machine, the combination with a mold-wheel, of a spring-block, means for reciprocating the same, a guide-bar connected to said spring-block, a plurality of plungers in said guide-bar, independent elastic connections between each of said plungers and the spring-block, and means for independently adjusting said plungers with

respect to the spring-block, substantially as set forth.

6. In a briqueting-machine, the combination with a mold-wheel, of an eccentric-shaft, an eccentric on said shaft, a spring-block, a plunger connected to said spring-block, a compression-pin between said eccentric and spring-block, and eyeblocks between said eccentric and spring-block, substantially as set forth.

7. In a briqueting-machine, the combination with a mold-wheel, of an eccentric-shaft, an eccentric on said shaft, a spring-block, a plunger connected to said spring-block, a compression-pin between said eccentric and spring-block, eyeblocks between said eccentric and spring-block, and bushings on the eccentric and spring-block engaging said compression-pin, substantially as set forth.

8. In a briqueting-machine, the combination with mold-wheel carrying a plurality of radial molds, an ejecting-cup in each mold, and a plunger for compressing the material in each mold, of a cylinder mounted in the interior of the mold-wheel and revoluble therewith and engaging on its periphery with means for operating the ejecting-cups, substantially as set forth.

9. In a briqueting-machine, the combination with a mold-wheel carrying a plurality of radial molds, an ejecting-cup in each mold, and a plunger for compressing the material in each mold, of a cylinder mounted on stationary eccentrics within the mold-wheel and revoluble with the same for operating the ejecting-cups, substantially as set forth.

10. In a briqueting-machine, the combination with a mold-wheel carrying a plurality of radial molds, an ejecting-cup in each mold, and a plunger for compressing the material in each mold, of a cylinder mounted on stationary eccentrics within the mold-wheel, a radial slot in the interior of said mold-wheel, and a lug projecting from the cylinder engaging said radial slot, substantially as set forth.

This specification signed and witnessed this 24th day of November, 1902.

WILLIAM SIMPKIN.

Witnesses:

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H. D. JAMESON.