

No. 631,446.

Patented Aug. 22, 1899.

C. W. SMITH.  
COMPRESSING MACHINE.

(Application filed Dec. 30, 1897. Renewed Jan. 23, 1899.)

(No Model.)

2 Sheets—Sheet 1.

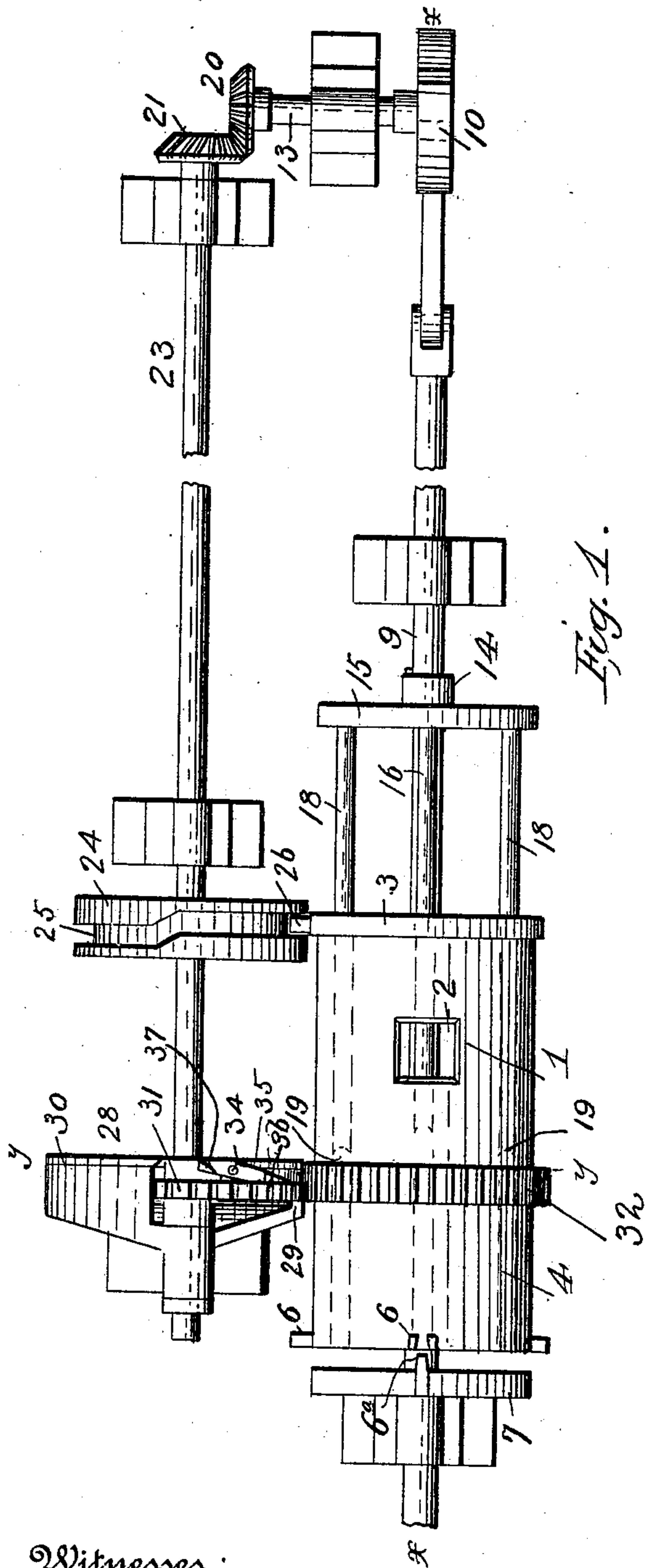


Fig. 1.

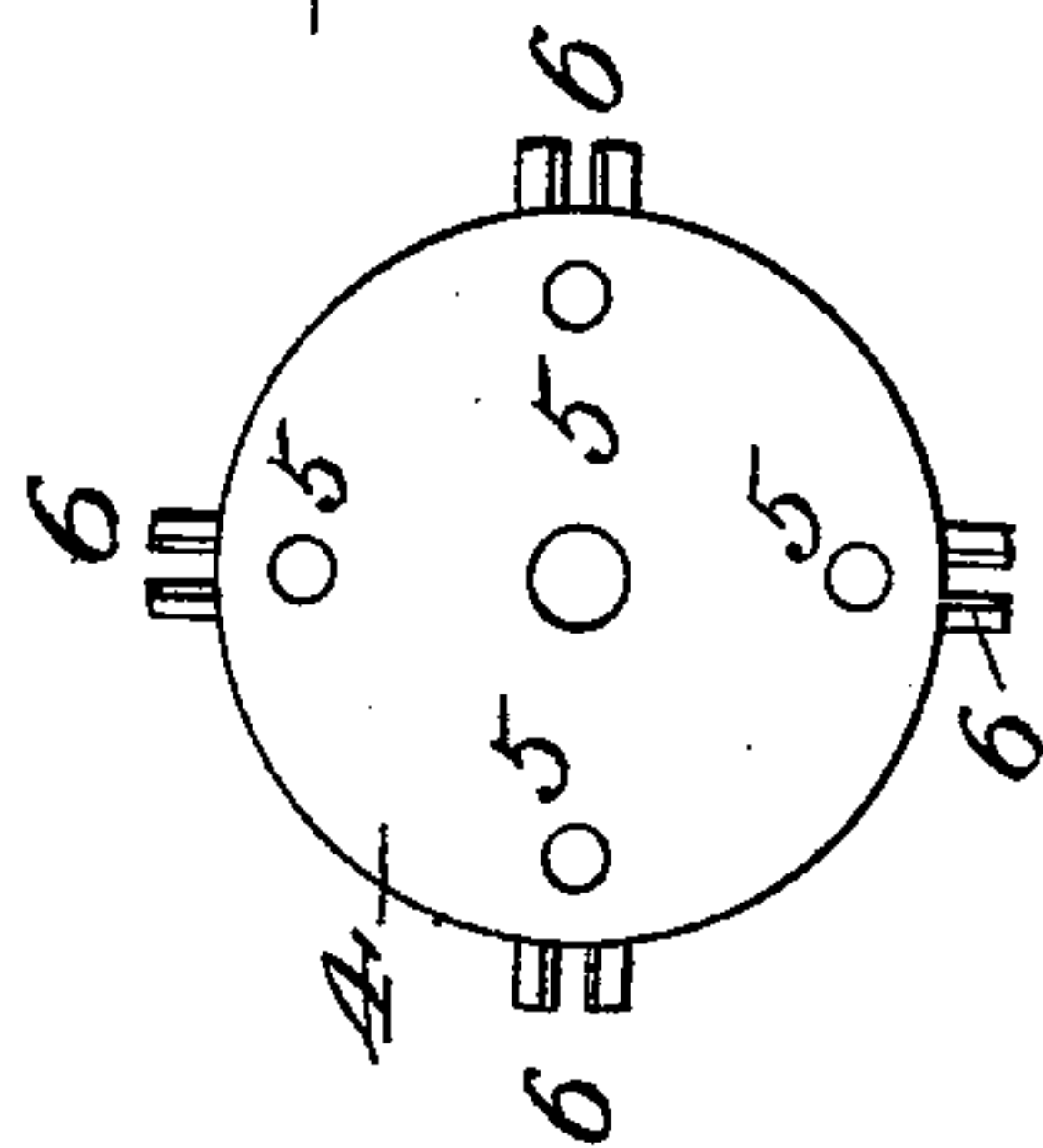


Fig. 5.

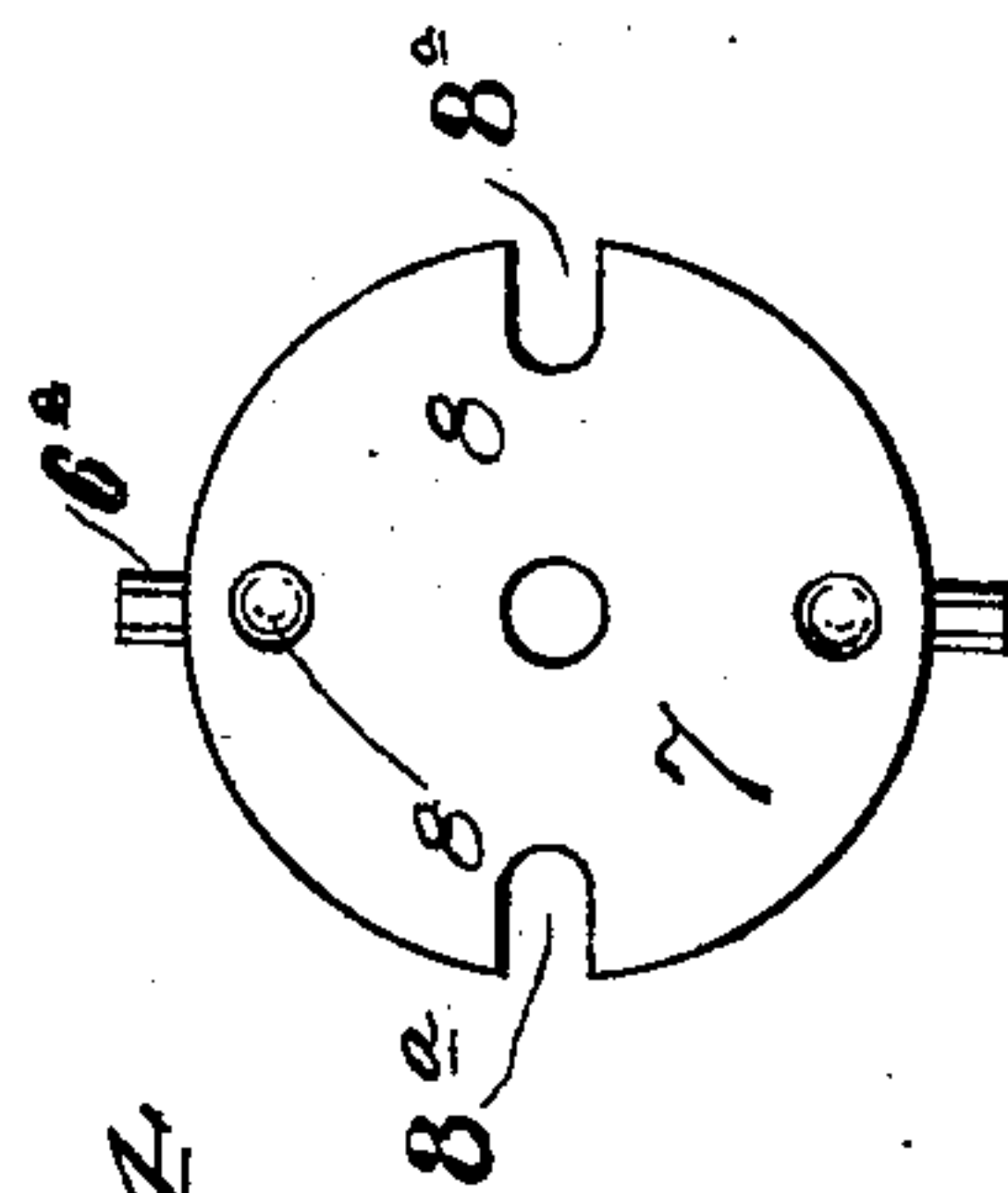


Fig. 4.

Witnesses:  
F. J. Durand.  
Emmett Jones

Inventor:  
Charles W. Smith  
By Lewis C. Caggs & Co.  
Attorneys.

No. 631,446.

Patented Aug. 22, 1899.

C. W. SMITH.  
COMPRESSING MACHINE.

(Application filed Dec. 30, 1897. Renewed Jan. 23, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.

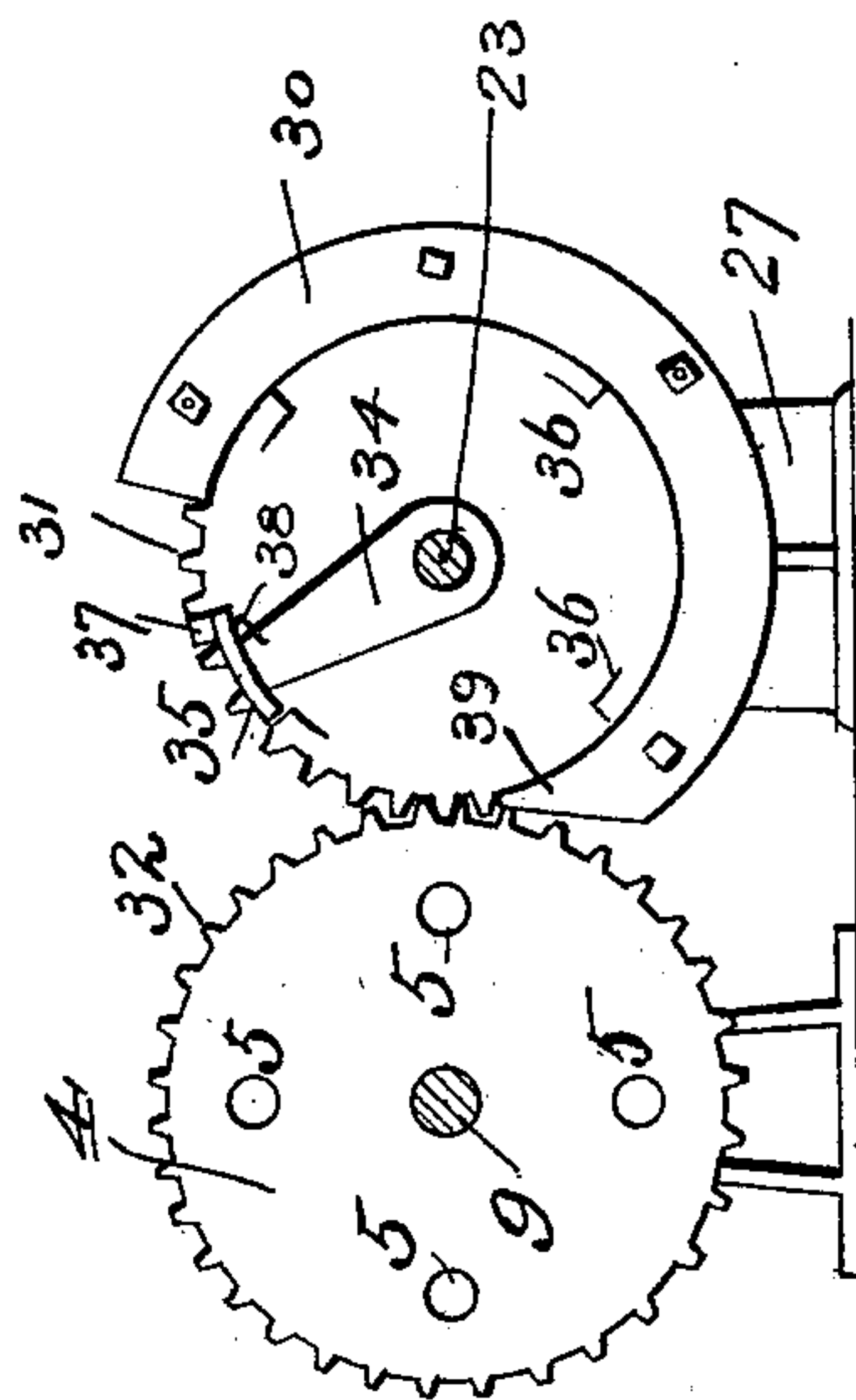
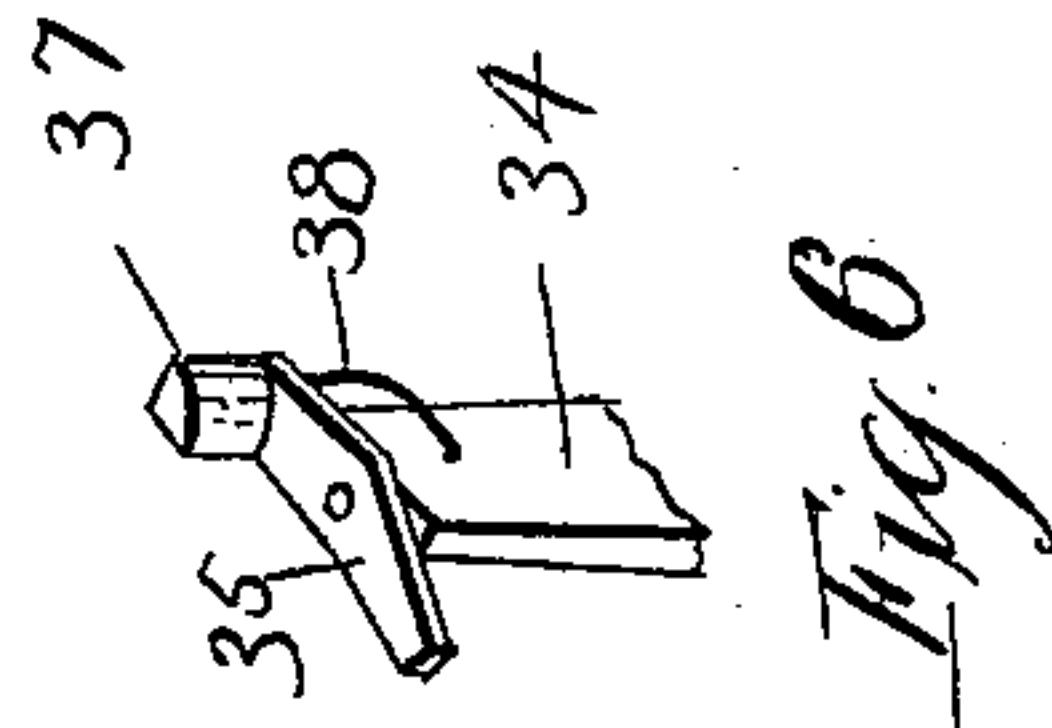
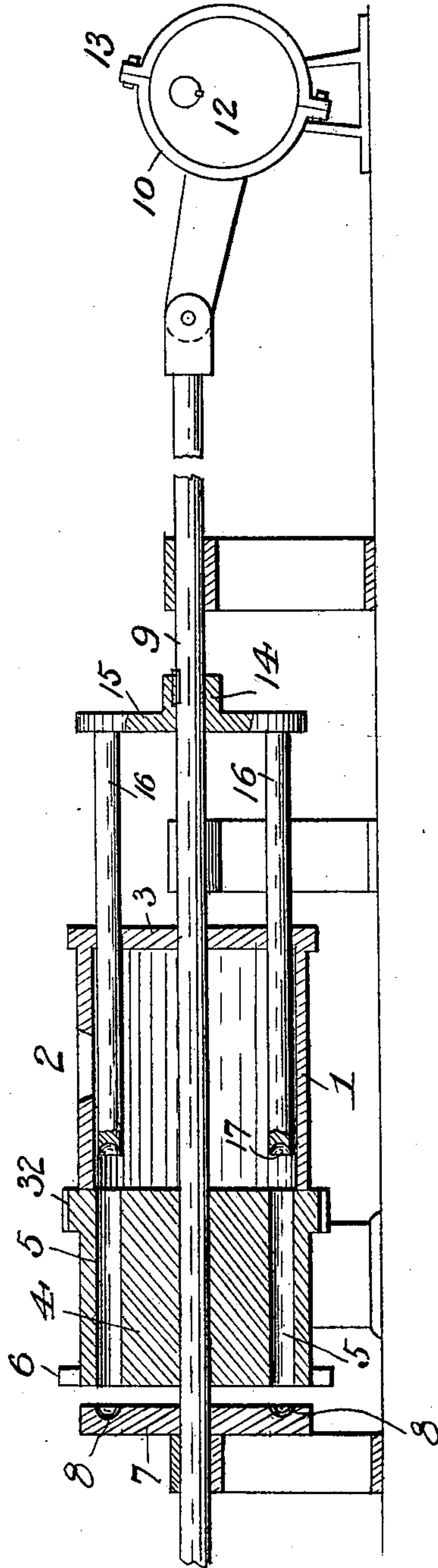


Fig. 3.

Witnesses:  
*F. L. Durand*  
*Samuel H. Jones*

Inventor:  
*Charles W. Smith*,  
by *Louis Daggner & Co.*  
Attorneys



# UNITED STATES PATENT OFFICE.

CHARLES W. SMITH, OF MOLINE, ILLINOIS, ASSIGNOR TO JAMES F. ROBINSON, OF ROCK ISLAND, ILLINOIS.

## COMPRESSING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 631,446, dated August 22, 1899.

Application filed December 30, 1897. Renewed January 23, 1899. Serial No. 703,204. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. SMITH, a citizen of the United States, and a resident of Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Compressing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to machines for compressing plastic material into cylindrical blocks or eggetes and is designed more especially for compressing artificial fuel consisting of a mixture of coal-dust and heated pitch, although it may be employed for compressing other materials, if desired.

The object of the invention is to provide an improved construction of the compressor by which artificial fuel or other material may be compressed into blocks in a rapid and efficient manner; and it consists in the novel construction and combination of parts hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a plan view of a compressor constructed in accordance with my invention. Fig. 2 is a central longitudinal section on the line *x x*, Fig. 1. Fig. 3 is a transverse section on the line *y y*, Fig. 1. Fig. 4 is a face view of the stationary die at the outer end of the machine. Fig. 5 is a similar view of the longitudinally-movable and rotatable die located at the end of the longitudinally-movable cylinder. Fig. 6 is a detail view showing the crank or arm and pawl which rotate the cylinder.

In the said drawings the reference-numeral 1 designates a horizontally-movable cylinder having an opening 2 in its upper side, through which the mixture is fed thereto. This cylinder is closed at the outer end by a head 3, and at the other end is connected therewith a laterally-movable and rotatable die 4. This die is formed with four openings 5, extending from end to end thereof, and its outer end is provided with lugs 6, with which engage lugs

6<sup>a</sup> on a stationary die 7, formed with two diametrically opposite concave or semispherical recesses 8, which form one of the rounded ends of the compressed block, and with two opposite peripheral slots 8<sup>a</sup>, which receive the compressed blocks as they are expelled from the die 4. Passing through said dies and cylinder-head is a longitudinally-movable but non-rotatable shaft 9, connected with an eccentric-strap 10 of an eccentric 12, secured to a transverse driving-shaft 13. Keyed to this shaft is a hub 14 of a flange or disk 15, to which is secured two opposite inwardly-extending compressing-plungers 16, the inner ends of which are concaved or formed with semicylindrical recesses 17 and two alternately-arranged expelling-plungers 18, also formed with concavities 19. These plungers 16 and 18 are similar in construction, with the exception that plungers 18 are somewhat longer or extend beyond the plungers 16 at the inner ends.

Secured to the driving-shaft 13 is a beveled gear 20, which meshes with a corresponding gear 21 on a rotatable longitudinal shaft 23. This shaft 23 is provided with a wheel 24, fixed thereto, formed with a peripheral cam-groove 25, with which engages a roller 26, journaled to a peripheral stud on the cylinder-head 3, the construction and arrangement being such that at the proper time the cylinder 1 and die 4 will be moved away from the stationary die 7, as seen in Fig. 1. The said cylinder is movable longitudinally on the shaft 9, but is non-rotatable, while the die 4 is so connected with the cylinder as to move longitudinally therewith and is also rotatable on said shaft by means hereinafter described.

The numeral 27 designates a standard, to which is secured a circular bracket 28, in which shaft 23 is journaled, said bracket being formed at the rim or periphery with a cylindrical flange 29, to the outer edge of which is bolted a broken guide-ring 30 for a purpose hereinafter described.

Loosely journaled on the shaft 23 is a cog-wheel 31, which meshes with a corresponding cog-ring 32, secured to the inner end of the die 4. This ring 32 is wider than the wheel



31, so as to permit it to move laterally or longitudinally with the die without throwing it out of mesh with said wheel.

Fixed to shaft 23 is an arm or crank 34, to the outer end of which is pivoted a pawl 35, adapted to engage with projections or lugs 36 on the cog-wheel 31. The other end of this pawl is formed with a projection 37, which engages with a lug 39 on the guide-ring 30 and throws the pawl out of engagement with said lugs. The numeral 38 designates a spring secured to said arm or shaft and engaging with one end of said pawl, so as to throw the latter into engagement with one of the lugs 36 when the pawl passes out of engagement with the guide-ring.

The operation is as follows: The mixture or plastic material is fed to the cylinder 1 through the opening 3 from a mixing-machine or other source of supply, and the compressor is set in motion, the die 4 being pushed tightly against the stationary die 7 by the cylinder and cam-wheel, the lugs 6<sup>a</sup> engaging with lugs 6 to hold the die 4 against rotation, so that the openings therein shall be in coincidence or alinement with the recesses and slots, respectively, of the stationary die, as seen in Fig. 2. The plungers 16 and 18 will be now moved forward by the shaft 9, the eccentric, and the driving-shaft, plungers 16 forcing a portion of the material in the cylinder into the openings in the die 4, which are in alinement with the concave recesses in die 7 and compressing it therein. At the same time plungers 18 will force the blocks previously compressed out of the other openings in said die 4 into the slots in die 7. The plungers will then be withdrawn from the die 4 by the further movement of the eccentric. While such movements are taking place shaft 23 is rotating, so that by the time the plungers are withdrawn from said die the cam wheel and roller will move the cylinder and die 4 away from die 7, so as to disengage the lugs 6 from lugs 6<sup>a</sup>, as seen in Fig. 1. By this time the pawl 35 of the arm or crank 34 will have passed out of engagement with the upper end of the broken guide-ring 30, and the spring 38 will throw the pawl into engagement with one of the projections or lugs 36, which will rotate the cog-wheel 31, which in turn will correspondingly rotate the cog ring or rim 32, causing die 4 to make a quarter-revolution, so that the openings therein containing the compressed blocks will be brought opposite the slots in the die 5 and the openings from which the compressed blocks have been expelled opposite the concave recesses in die 7. The pawl 35 will now have reached the lug 39 at the lower end of the guide-ring, when the projection 37, engaging therewith, will depress the same, causing its other end to be moved outward and thrown out of engagement with said lug or projection 36 and will not again engage with one of said lugs or projections until it again passes the upper end

of the guide-ring 30. When said pawl has passed the said lug 39, the cam-wheel 24 will move the cylinder 1 and die 4 forward, so that lugs 6 will engage with lugs 6<sup>a</sup> of die 7 and the die 4 be prevented from rotating. The expelling-plungers 18 are so constructed that when they are withdrawn from the die they will barely clear the latter, so that upon their next forward stroke they will not carry any material into the die. The object of reciprocating the die 4 and cylinder 1 is to disengage the same from the stationary die 7, so as to allow the die 7 to be rotated.

While I have shown four plungers and four openings in die 4, I do not wish to be limited to this number, as more may be employed if found convenient or desirable.

Having thus fully described my invention, what I claim is—

1. In a compressing-machine, the combination with the longitudinally-movable cylinder, the longitudinally-movable and rotatable die having a series of openings extending therethrough and the stationary die formed with alternately-arranged recesses and peripheral slots, of the alternately-arranged compressing and expelling plungers of different lengths and means for reciprocating the same, substantially as described.

2. In a compressing-machine, the combination with the longitudinally-movable cylinder, the longitudinally-movable and rotatable die having a series of openings extending therethrough and provided with lugs at the outer ends, and the stationary die formed with alternately-arranged concave recesses and peripheral slots, and with lugs adapted to engage with the lugs of said movable die, of the alternately-arranged compressing and expelling plungers of different lengths formed with concave recesses in their free or inner ends, the reciprocating shaft with which said plungers are connected, and means for reciprocating said cylinder and movable die, and means for rotating said movable die, substantially as described.

3. In a compressing-machine, the combination with the longitudinally-movable cylinder, the stud connected therewith, the roller, the longitudinally-movable and rotatable die having a series of openings extending therethrough and provided with lugs at the outer end, the stationary die formed with alternately-arranged recesses and peripheral slots and provided with lugs engaging with the lugs of the movable die, of the alternately-arranged compressing and expelling plungers of different lengths, the reciprocating shaft connected therewith, the rotatable wheel formed with a peripheral cam-groove with which said roller engages, means for rotating said wheel and reciprocating said shaft, and means for rotating said movable die, substantially as described.

4. In a compressing-machine, the combination with the longitudinally-movable cylinder,



the stud secured thereto, the roller on said stud, the longitudinally-movable and rotatable die having a series of openings extending therethrough, the lugs at the outer end of said die, the stationary die formed with alternately-arranged concave recesses and peripheral slots and the lugs engaging with the lugs on said movable die, of the alternately-arranged plungers of different lengths formed with concave recesses in their inner ends; the reciprocating shaft with which said plungers are connected, the eccentric connected with said shaft, the driving-shaft, the bevel-gear secured to said shaft, the bevel-gear meshing therewith, the longitudinal shaft, the wheel secured thereto having a peripheral cam-groove with which said roller engages, and means for rotating the movable die, substantially as described.

5. In a compressing-machine, the combination with the longitudinally-movable cylinder and means for reciprocating the same, the longitudinally-movable and rotatable die having a series of openings extending therethrough, the cog-ring secured to the inner end of said die, the lugs at the outer ends thereof, and the stationary die formed with recesses and peripheral slots and with lugs adapted to engage with the lugs on said movable die, of the alternately-arranged compressing and expelling plungers of different lengths, the reciprocating shaft connected therewith, the longitudinal rotatable shaft, the loose cog-wheel thereon meshing with said cog-ring, the projections or lugs on said cog-wheel, the crank or arm secured to said rotatable shaft, the pawl pivoted thereto adapted to engage with said projections or lugs and means for throwing said pawl into and out of engagement with said projections or lugs, substantially as described.

6. In a compressing-machine, the combination with the longitudinally-movable cylinder and means for reciprocating the same, the longitudinally-movable and rotatable die connected therewith having a series of openings extending therethrough the cog-ring at the inner end of said die, the lugs at the outer end thereof, and the stationary die formed with recesses and peripheral slots and with lugs adapted to engage with the lugs of said movable die, of the alternately-arranged compressing and expelling plungers, the reciprocating shaft connected therewith, the rotatable longitudinal shaft, the loose cog-wheel thereon meshing with said cog-ring, the projections or lugs on said wheel, the crank or arm secured to said rotatable shaft, the pivoted spring-actuated pawl one end of which is adapted to engage with said projections or lugs and provided with a projection at the

other end and the broken guide-ring, substantially as described.

7. In a compressing-machine, the combination with the longitudinally-movable cylinder, the stud and roller connected therewith, the longitudinally-movable die having a series of openings extending therethrough, the cog-ring at the inner end thereof, the lugs at the outer end, the stationary die formed with recesses and peripheral slots and the lugs adapted to engage with the lugs on said movable die, of the alternately-arranged compressing and expelling plungers of different lengths, the reciprocating shaft connected therewith, the rotatable longitudinal shaft, the wheel thereon formed with a peripheral cam-groove, the loose cog-wheel engaging with said cog-ring at the inner end of the movable die, and fixed crank on said rotatable shaft, the projections or lugs on said cog-wheel, the spring-actuated pawl pivoted to said crank, one end of which is adapted to engage with said projections, the projection at the other end thereof, and the broken guide-ring, substantially as described.

8. In a compressing-machine, the combination with the longitudinally-movable cylinder, the stud and roller connected therewith, the longitudinally-movable and rotatable die having a series of openings extending therethrough, the cog-ring at the inner end thereof, the lugs at the outer end, the stationary die formed with alternately-arranged concave recesses and peripheral slots, and the lugs adapted to engage with the lugs of the movable die, of the alternately-arranged compressing and expelling plungers of different lengths formed with concave recesses in the inner ends, the wheel or disk at the outer end thereof, the reciprocating shaft connected therewith, the eccentric-strap and eccentric, the transverse driving-shaft, the bevel-gear secured thereto, the longitudinal rotatable shaft to which said last-mentioned gear is secured, the wheel fixed thereto formed with a peripheral cam-groove, the loose cog-wheel engaging with said cog-ring at the inner end of the movable die, and fixed crank on said rotatable longitudinal shaft, the projections or lugs on said cog-wheel, the spring-actuated pawl one end of which is adapted to engage with said projections or lugs and having a projection at the other end, and the broken guide-ring, substantially as described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

CHARLES W. SMITH.

Witnesses:

F. W. RANK,  
JOHN A. REED.