No. 749,328. PATENTED JAN. 12, 1904.

M. SALZMANN.

PRESS.

APPLICATION FILED DEC. 29, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

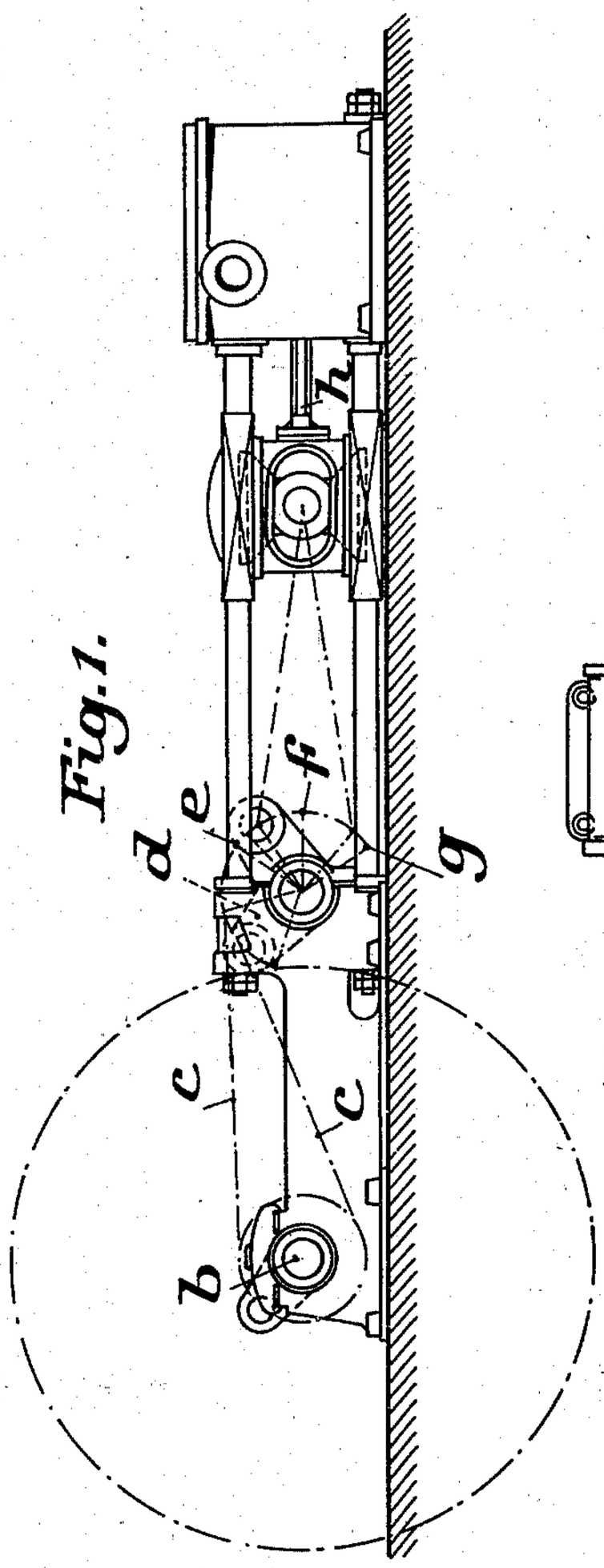
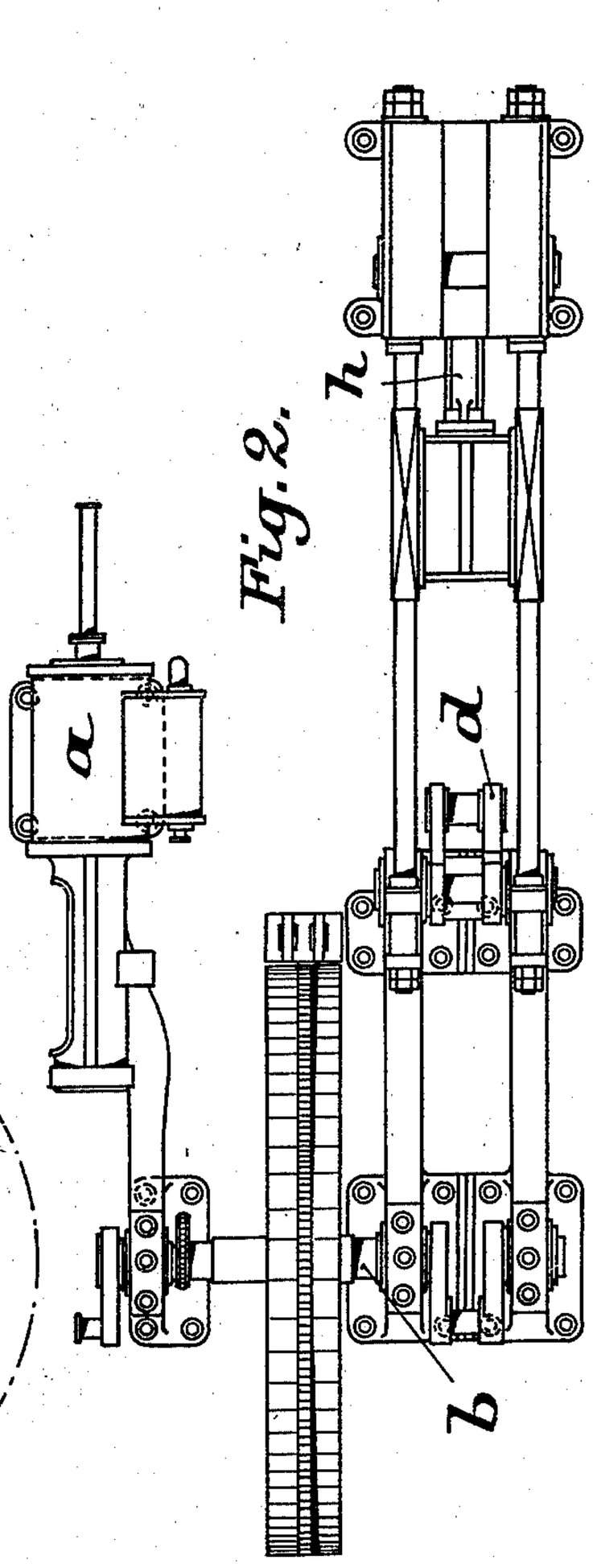


Fig. 2.



WITNESSES

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Fig. 3.

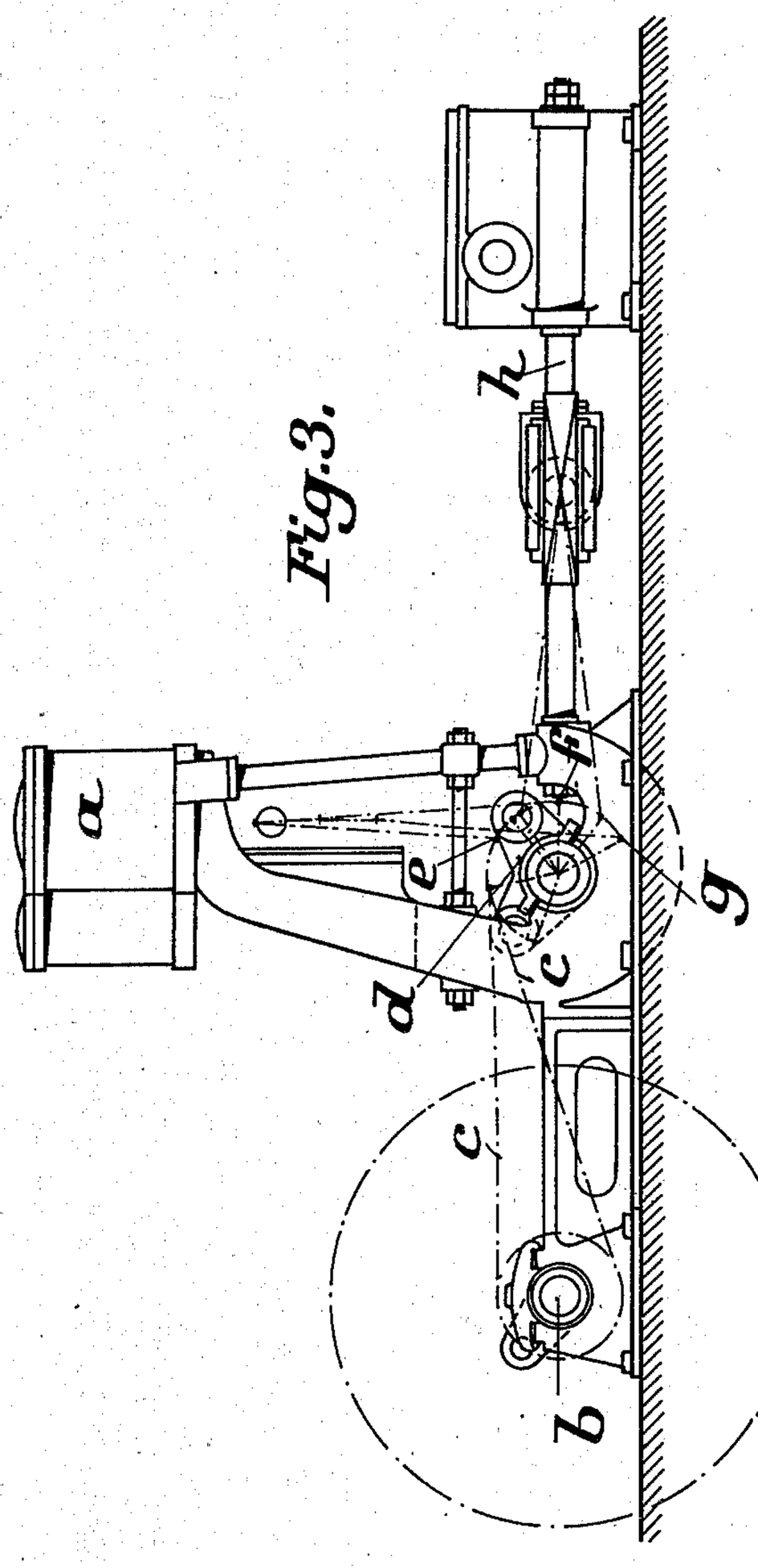
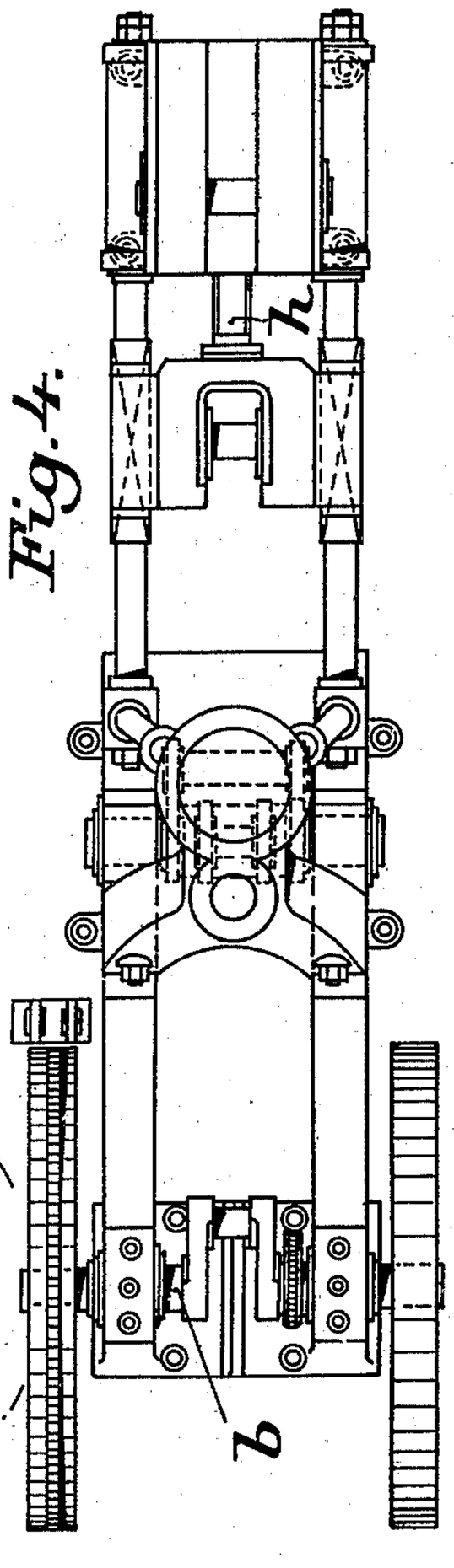


Fig. 4.



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UNITED STATES PATENT OFFICE.

MAX SALZMANN, OF MAGDEBURG-BUCKAU, GERMANY

PRESS.

SPECIFICATION forming part of Letters Patent No. 749,328, dated January 12, 1904.

Application filed December 29, 1902. Serial No. 137,021. (No model.)

To all whom it may concern:

Be it known that I, MAX SALZMANN, manager, a subject of the King of Prussia, German Emperor, residing at 82 and 83 Schönebeckerstrasse, Magdeburg-Buckau, Prussia, Germany, have invented a new and useful Improvement in Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the presses commonly used for the forming of briquets every revolution made by the steam-engine corresponds to a stroke of the press, one half of the revolution moving the piston of the press forward and exerting pressure, while the other half causes the back stroke of the piston, and therefore does not work. In consequence of this manner of working it is necessary to give the cylinder of the steam-engine a larger filling of steam for the forward stroke of the piston, by which the pressing is done, than for the back stroke, which does no work. In the machines commonly used the press-bar is moved by a very strong forcing-bar attached to an extremely strong crank-shaft mounted in bearings as near together as possible, on the ends of which two fly-wheels with crank-disks are placed. These crank-disks are connected by pitmen and a cross-piece with the piston-rod of the steam-engine.

In consequence of the extremely high pressure which it is necessary to employ in the making of briquets great friction is produced in the bearings of the press, which are thereby subjected to a considerable strain, and hitherto it has been practically impossible to work without cooling the bearings by water. In spite of the cooling appliances, or rather because the supply of water was insufficient, these bearings were very often found to be heated, causing stoppages of some length. By the negligence of the workman in charge fractures have also occurred in the head of the press-bar. This could happen the more easily, as the accessibility of the parts in question left much to be desired, considerable danger being even incurred in attending them. The number of revolutions of the press, and thereby its output, being, however, limited by the speed of the piston and the circumferential velocity of the fly-wheels, it is still further diminished by the above-mentioned inconveniences. Presses of this kind usually make from one hundred to one hundred and twenty revolutions per minute. In exceptional cases they make as much as one hundred and thirty revolutions for a short time; but this can only be done at the risk of damaging the working parts of the machine or of the general safety.

In the press invented by me all the above-mentioned inconveniences are avoided and at the same time a considerable commercial advantage is obtained, this engine being able to do twice the amount of work with a single press-head while making a given number of revolutions than was hitherto realized and at the same time utilizing more fully the power furnished by the steam-engine or the driving-motor.

In the accompanying drawings two modifications of my invention are shown.

Figure 1 is a longitudinal vertical section of the press with its driving-engine placed horizontally. Fig. 2 is a plan of the same press. Fig. 3 is a longitudinal vertical section of a press having its driving-motor in vertical position. Fig. 4 is a plan of the same press.

In the press shown in Figs. 1 and 2 the steam-engine or motor *a* drives the crank-shaft *b*, on which a fly-wheel is placed, and the crank-shaft is connected by guide-rods *c* with an oscillating crank *d* and moves it back and forth. The crank D is of larger radius than the crank on the fly-wheel shaft, whereby it is oscillated to and fro for each complete rotation of the fly-wheel shaft. I have shown the crank-pin *e* at a point substantially ninety degrees from the crank *d*, so that it oscillates up and down between the positions *e*, *f*, and *g* for each to-and-fro motion of the crank *d*. As the pin of the oscillating crank *d* moves from *e* to *f* the piston *h* of the press executes its forward stroke, by which pressure is exerted, and as the pin passes from *f* to *g* the piston executes its back stroke, by which no work is performed, the driving-engine *a* and the crank-shaft *b* having made one half revolution during these two movements of the

piston *h*. In the same manner the backward movement of the oscillating crank from *g* to *f* makes the piston *h* move forward, thereby exerting pressure, and the oscillating crank continuing its movement from *f* to *e* the piston performs its back stroke, by which no work is done. The motor *a* or the crank-shaft *b* has completed during these two movements of the piston the second half of its revolution. Therefore it is obvious that a single revolution of the crank-shaft *b* causes the piston to move backward and forward twice, and therefore to exert pressure twice.

In the press shown in Figs. 3 and 4 the motor *a* causes the oscillating crank *d* to rise and fall by the rising and falling action of its piston. The forward stroke of the piston of the press exerting the pressure is brought about in the same way as that shown in Figs. 1 and 2 during the movement of the oscillating crank from *e* to *f* and the back stroke of the piston, by which no work is done, by the movement of the oscillating crank from *f* to *g*. In the same way the upward movement of the oscillating crank from *g* to *f* and from *f* to *e* causes the piston of the press to exert a second pressure and make the backward stroke. For the purpose of storing the surplus energy and of overcoming the dead-point of the rotation the oscillating crank *d* is connected by a pitman *c* with the crank-shaft *b*, on which either one or two fly-wheels are arranged. Thus during one stroke of the piston of the motor *a*, corresponding to one revolution of the crank-shaft *b*, pressure is twice exerted by the press. The motor *a* may be connected in any other way with the oscillating crank *d*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a device of the class described, the combination of a press, a plunger therefor and guides for the plunger, a transverse shaft and operative connections from said shaft to said plunger for imparting to the latter a double reciprocation for each single vibration of the shaft, and power devices acting on said transverse shaft with a maximum efficiency at the center of movement of the latter, as and for the purpose set forth.

2. In a device of the class described, the combination of a press, a plunger therefor and guides for the plunger, a transverse shaft and operative connections from said shaft to said plunger for imparting to the latter a double reciprocation for each single vibration of the shaft, and a plurality of power devices acting on said transverse shaft with a maximum efficiency at the center of movement of the latter, as and for the purpose set forth.

3. In a device of the class described, the combination of a die member, a plunger, a pair of transverse shafts one of which is arranged to continuously rotate, and having a connecting-rod arranged to vibrate the second transverse shaft through a limited arc of movement, and operative connections from said second transverse shaft with said plunger for imparting to the latter a double reciprocation for each single rotation of the first-named shaft, as and for the purpose set forth.

4. In a device of the class described, the combination of die members, a plunger, guides for the plunger, a motive-fluid cylinder, a fly-wheel, and operative connections for rotating the latter, an auxiliary transverse shaft, a connecting-rod for vibrating the latter, and operative connections from said shaft for imparting to said plunger a double reciprocation for each rotation of the fly-wheel, as and for the purpose set forth.

5. In a device of the class described, a plunger-press and a fly-wheel shaft, an intermediate transverse shaft having cranks, a steam-cylinder, and connecting-rods leading respectively from said cranks to the press, the cylinder, and the fly-wheel shaft, the cranks being disposed to impart a double reciprocation to the plunger for each single reciprocation of the other connecting-rods, as and for the purpose set forth.

6. In a device of the class described, a plunger-press and a toggle-lever connection for operating the same, motive-power connections for actuating said toggle-joint levers, and fly-wheel connections acting at a maximum efficiency at the center of movement of the toggle-joint levers, as and for the purpose set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

MAX SALZMANN.

Witnesses:
SARAH C. MCKELLIP,
JAMES L. A. BURRELL.