

(No Model.)

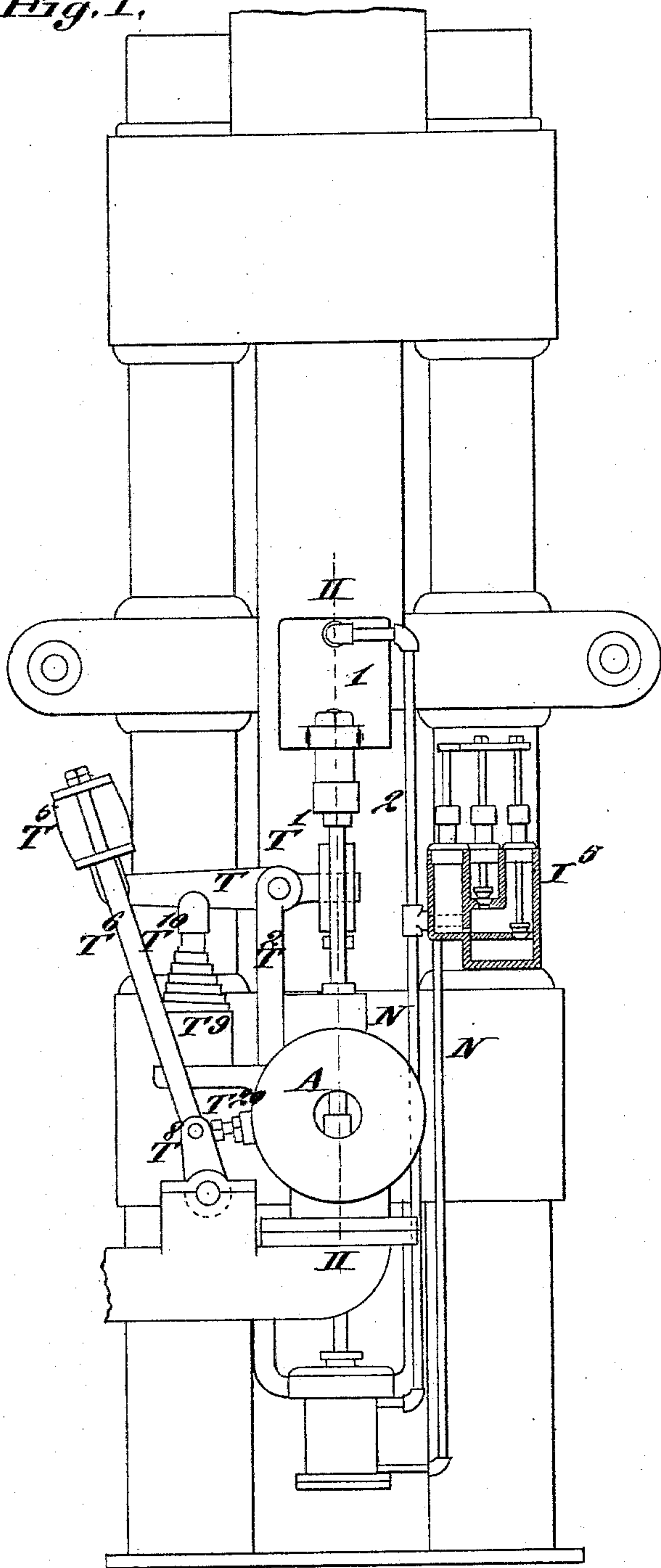
2 Sheets—Sheet 1.

W. N. GRAVES.  
HYDRAULIC BRICK MACHINE.

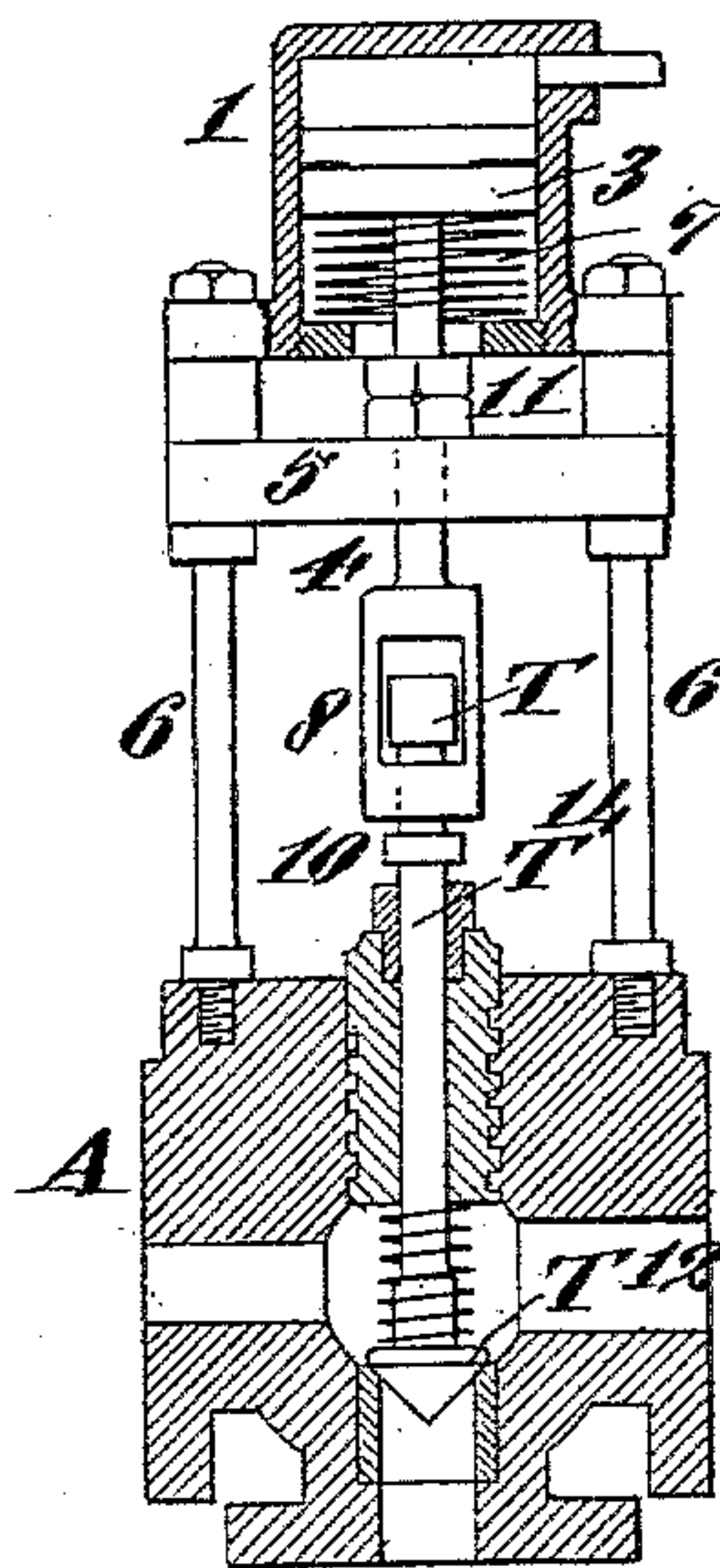
No. 565,113.

Patented Aug. 4, 1896.

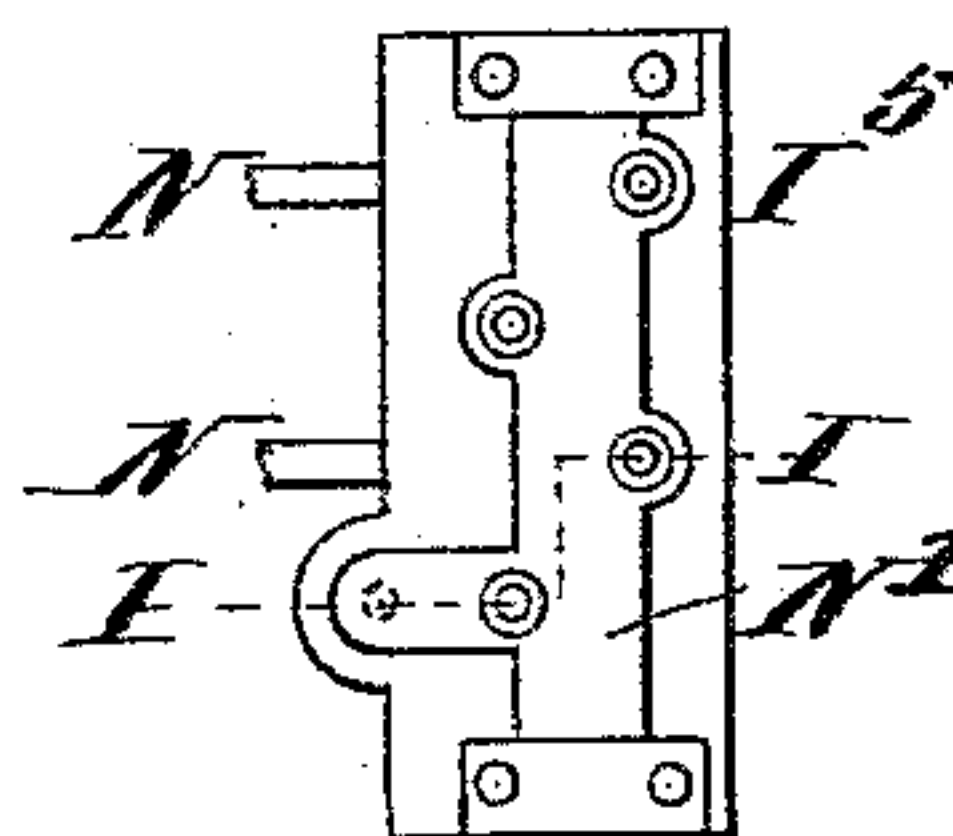
*Fig. I.*



*Fig. II*



*Fig. III*



*Attest:*  
*Charles Pickles*  
*Stanley Stoner*

*Inventor:*  
*Willis N. Graves*  
*By Wright & Bond*  
*Attys*

(No Model.)

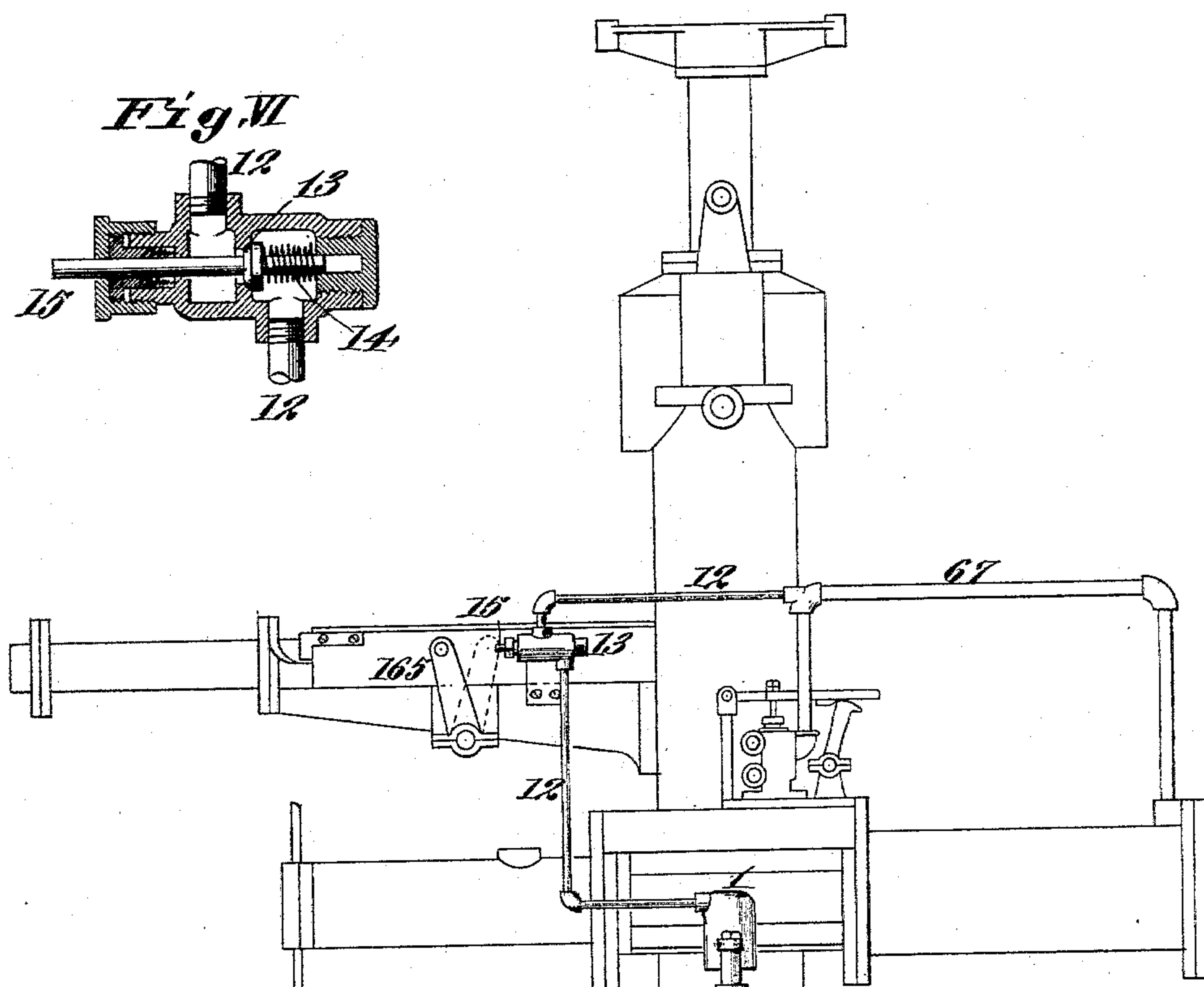
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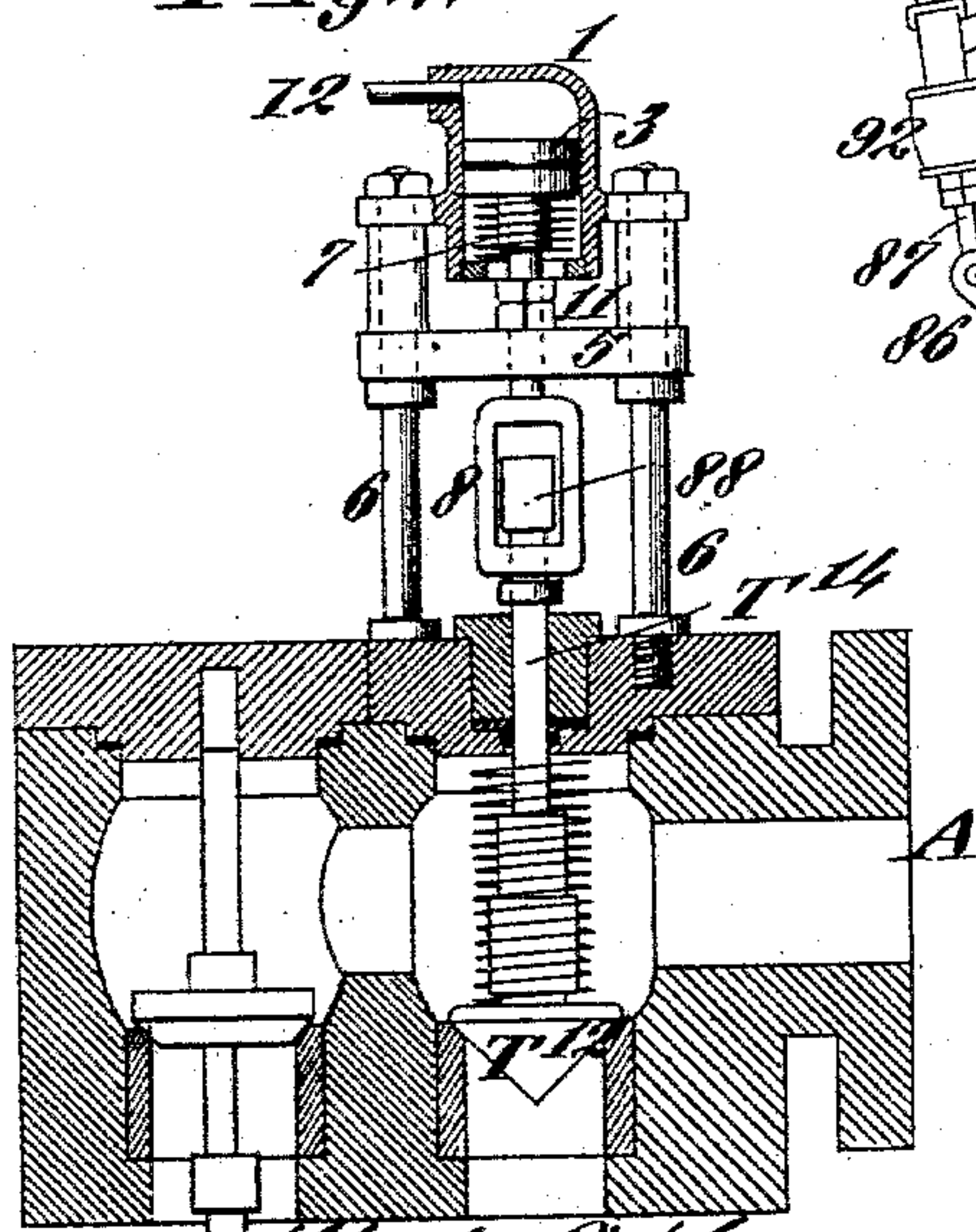
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*Fig. IV.*



*Fig. V.*



Attest: Charles Pickles  
Stanley Stoner

Inventor:  
Willis N. Graves  
By *Wright & Bro*  
Attys



# UNITED STATES PATENT OFFICE.

WILLIS N. GRAVES, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE HYDRAULIC PRESS BRICK COMPANY, OF SAME PLACE.

## HYDRAULIC BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,113, dated August 4, 1896.

Application filed January 13, 1896. Serial No. 575,347. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIS N. GRAVES, of the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Hydraulic Brick-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In making bricks of different kinds of clay, considerable difference exists in the speed with which the bricks can be ejected from the mold after the pressing is completed, without danger of their bursting, owing to air, under high pressure, being confined within the clay of the bricks. With some clays the bricks can be quickly ejected from the mold without danger of their being injured by the escape of the confined air, the clay being sufficiently porous to permit a free escape of the air. If the bricks were ejected with this speed when made of other clays, they would burst under the confined-air pressure before the air could escape through the pores, and the speed with which the bricks can be ejected varies with different kinds of clay. Some clays require but a slightly-slower movement in the ejection of the bricks than the clays that permit of the bricks being ejected as quickly as possible, while other clays require the bricks to be ejected considerably slower to avoid danger of bursting. It has been the practice, to avoid this bursting, to slow down the machinery as a whole, so that the bricks will not be ejected too rapidly. This is expensive, as it materially lessens the daily capacity of the press.

The object of my invention is to provide means for regulating, at will, the speed with which the bricks are ejected, while at the same time the remainder of the apparatus is allowed to run at full speed, and thereby the full capacity of the press maintained. This I do by the mechanism shown in the drawings, in which—

Figure I is an elevation, part in section, of a brick-press provided with my improvement, the part that is shown in section being taken on line I I, Fig. III. Fig. II is a detail vertical section taken on line II II, Fig. I. Fig. III is a top view of the valve-chest. Fig. IV is an elevation showing my improve-

ment applied to what is known as a "pony" press. Fig. V is part in section and part in elevation, showing the part to which my improvement relates and the low-pressure valve of the lower-ram cylinder. Fig. VI is an enlarged vertical section of the valve which admits water to the cylinder that operates upon said valve that admits low-pressure water to the lower-ram cylinder.

Figs. I to III of the drawings show my improvement applied to the general class of hydraulic brick-machines shown and described in my Patent No. 326,288, issued September 15, 1885, and I have designated the parts in this application by the same reference-letters used to designate them in said patent, T<sup>12</sup> representing the valve T<sup>12</sup> of said patent, N N representing the pipes N N of said patent, N' representing the rock-shaft N' of said patent, and I<sup>5</sup> representing the valve chest or box I<sup>5</sup> of said patent, this chest or box being provided with the same valves as in the said patent.

The valve T<sup>12</sup> is at the proper time completely closed and held closed by the same mechanism as illustrated and described in the patent referred to, and I have applied the same reference-letters to these parts, so far as they are shown, as are used in the said patent, without further describing the various parts here, reference being made to said patent for a description of these parts.

My present invention relates to a mechanism for partially closing the valve T<sup>12</sup> in advance of the movement of the mechanism consisting of the lever T and its coacting parts of said patent, so that the valve T<sup>12</sup> is partially closed to cause a reduced flow of low water-pressure to cause the bricks to be ejected from the mold more slowly than they would be ejected if this valve remained fully open until closed by the lever T, which action takes place when the bricks have been entirely ejected. This mechanism for partially closing the valve T<sup>12</sup> consists of a cylinder 1, connected at its upper end by a pipe 2 to one of the pipes N. Within the cylinder 1 is a piston 3, having a rod 4 extending through a cross-head 5, supported by rods 6, which also support the cylinder 1. Beneath the piston 3 is a coiled spring 7, which acts to raise the piston when the water-pressure



in the pipe 2 and the upper part of the cylinder 1 is removed. On the lower end of the rod 4 is an open head 8, that receives the upper end of the stem  $T^{14}$  of the valve  $T^{12}$ . The stem  $T^{14}$  has a collar 10 beneath the head 8. The end of the lever T fits in the opening in the head 8, as shown in Fig. II, and is adapted to bear upon the upper end of the stem  $T^{14}$ .

When the valve that admits water to the pipe N is opened, (which is the time that low water-pressure is admitted to raise the lower ram and eject the bricks,) water passes through the pipe 2 into the cylinder 1 above the piston 3, causing the piston to descend, and moving the valve  $T^{12}$  toward a closed position, the valve being moved by the head 8, coming against the collar 10. The valve is not entirely closed by the piston 3, but is only closed sufficiently far to allow the passage of an amount of water through the valve  $T^{12}$  that will cause the lower plunger to move upwardly at the desired rate of speed to eject the bricks as quickly as it can be done without danger of their exploding or bursting. The amount of movement of the valve  $T^{12}$  must be regulated to suit the kind of clay being handled, for, as stated, some clays require a slower ejection of the bricks than others. This regulation of the movement of the valve  $T^{12}$  by the piston 3 is effected by a nut and jam-nut 11 on the rod 4 above the cross-head 5, these nuts being adjusted up or down according to the amount of movement it is desired that the piston 3 shall produce on the valve  $T^{12}$ . This forms a very effective and simple means for regulating the movement of the valve  $T^{12}$  by the piston 3.

When the bricks are ejected, the lever T and its mechanism operates as described in said patent, and the valve  $T^{12}$  is forced shut by the lever bearing on the upper end of the stem  $T^{14}$ , the lever forcing the collar 10 away from the head 8, as shown in Fig. II.

In Figs. IV to VI, I have shown my invention applied to a different form of mechanism for finally closing and holding closed the valve  $T^{12}$ . In Fig. V there are shown the same parts as are illustrated in Fig. II. The mechanism for closing and holding closed the valve  $T^{12}$  in this modification consists of a crank 86 on a shaft 85, the crank being connected by a rod 87 to one end of a lever 88, pivoted to the housing of the valve  $T^{12}$ . The rod 87 is provided with a suitable spring-cushion 92. When the shaft 85 is rocked, the toggle formed by the crank 86 and rod 87 act to depress the inner end of the lever 88, which, as shown in Fig. V, engages the stem of the valve  $T^{12}$ , and the valve is thus forced to and held in its closed position. When the shaft 85 is rocked in the other direction, the valve is released. 67 represents a pipe forming a communication between the low-pressure cylinder of the machine and the main valve-chest.

12 represents a pipe forming a communication between the pipe 67 and the cylinder 1, and water passing through this pipe 12 acts

upon the valve  $T^{12}$  through the medium of the piston 3, as already described with reference to Fig. II. In this form of press the water-pressure is removed from pipe 67 before the lower plunger has ejected the bricks from the mold, so that it becomes necessary to entrap the water in cylinder 1 to hold the valve  $T^{12}$  in the position to which it has been moved by the piston 3, and this is accomplished by means of a valve 13, located in pipe 12. (See Figs. IV and VI.) This valve is normally held to its seat by a spring 14, but when water-pressure is admitted to pipe 12 the valve 13 opens and allows the passage of the water to the cylinder 1. As soon, however, as the water-pressure is removed in pipe 67 the spring 14 closes the valve 13 and the water-pressure is held in cylinder 1. To release the water-pressure in cylinder 1 after the bricks have been ejected, I employ a crank or arm 165. This arm is moved by the charger, and as the charger advances a projection thereon comes against the stem 15 of the valve 13 and opens the valve, releasing the water-pressure in cylinder 1 and permitting the water to be forced from the cylinder 1 by means of the spring 7, which raises the piston 3.

I claim as my invention—

1. In a hydraulic brick-machine the combination of upper and lower rams, a valve for admitting water to raise the lower ram to eject the bricks, and means for partially closing said valve to diminish the speed of the lower ram in ejecting the bricks, and mechanism for fully closing said valve after the bricks have been ejected, substantially as set forth.

2. In a hydraulic brick-machine the combination of upper and lower rams, a valve for admitting water to raise the lower ram to eject the bricks, and adjustable means for partially closing said valve to diminish the speed of the lower ram in ejecting the bricks, whereby the valve may be moved a greater or lesser distance, and mechanism for fully closing said valve after the bricks have been ejected, substantially as set forth.

3. In a hydraulic brick-machine the combination of upper and lower rams, a valve for admitting water to raise the lower ram to eject the bricks, and means for partially closing said valve to diminish the speed of the lower ram in ejecting the bricks, and mechanism for fully closing said valve after the bricks have been ejected; said means consisting essentially of a cylinder, a water-pipe communicating with the cylinder, a piston located in the cylinder, a spring beneath the piston, a rod depending from said piston and adapted to bear against the stem of said valve, a cross-head through which said rod passes, and a nut on said rod adapted to arrest the downward movement of said piston by coming against said cross-head, substantially as set forth.

WILLIS N. GRAVES.

In presence of—

GEO. H. KNIGHT,  
E. S. KNIGHT.