

(No Model.)

3 Sheets—Sheet 1.

J. BEGGS & T. A. GORDON.  
HYDRAULIC BRICK MACHINE.

No. 475,747.

Patented May 31, 1892.

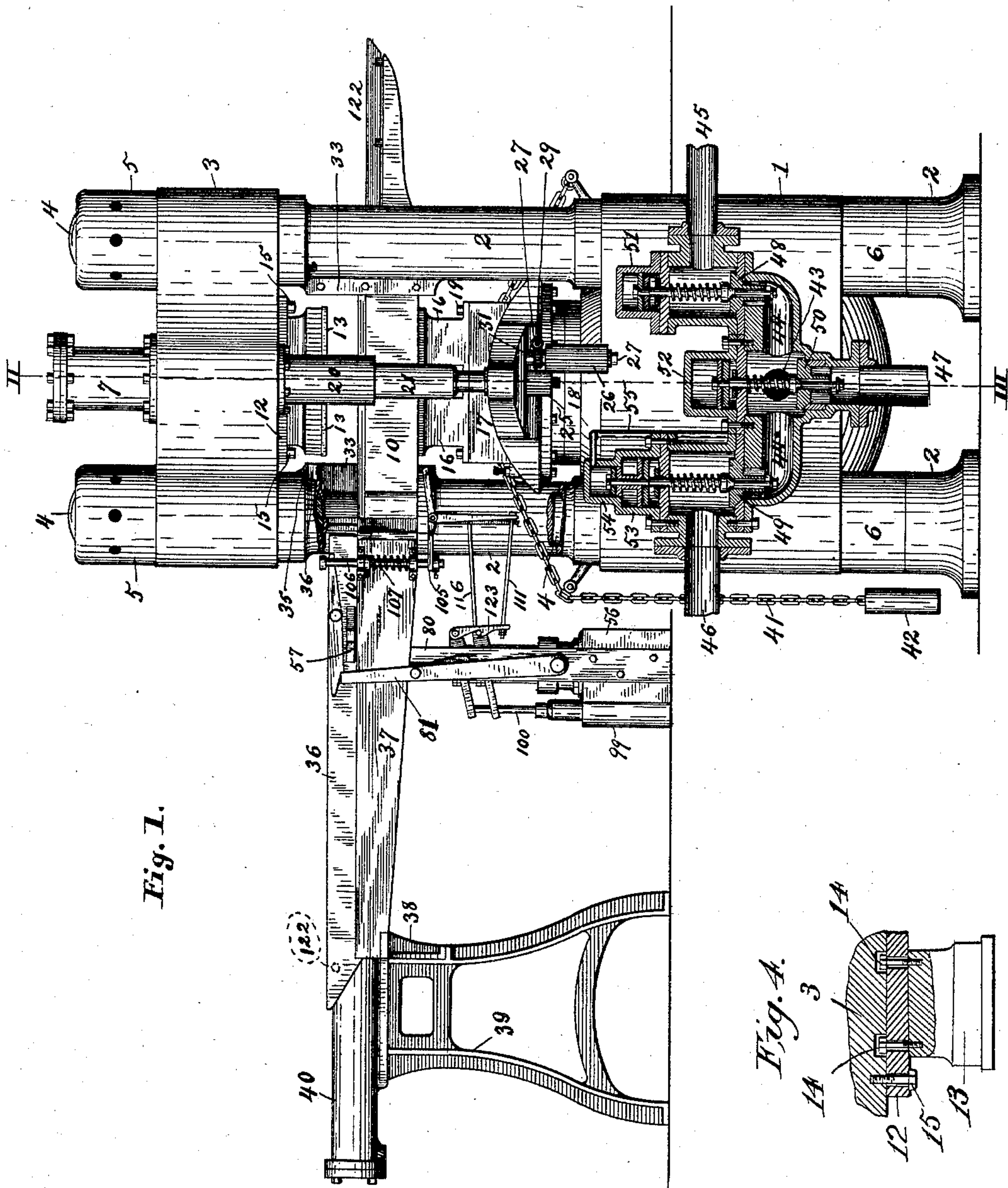


Fig. 1.

Fig. 4.

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Fig. III.

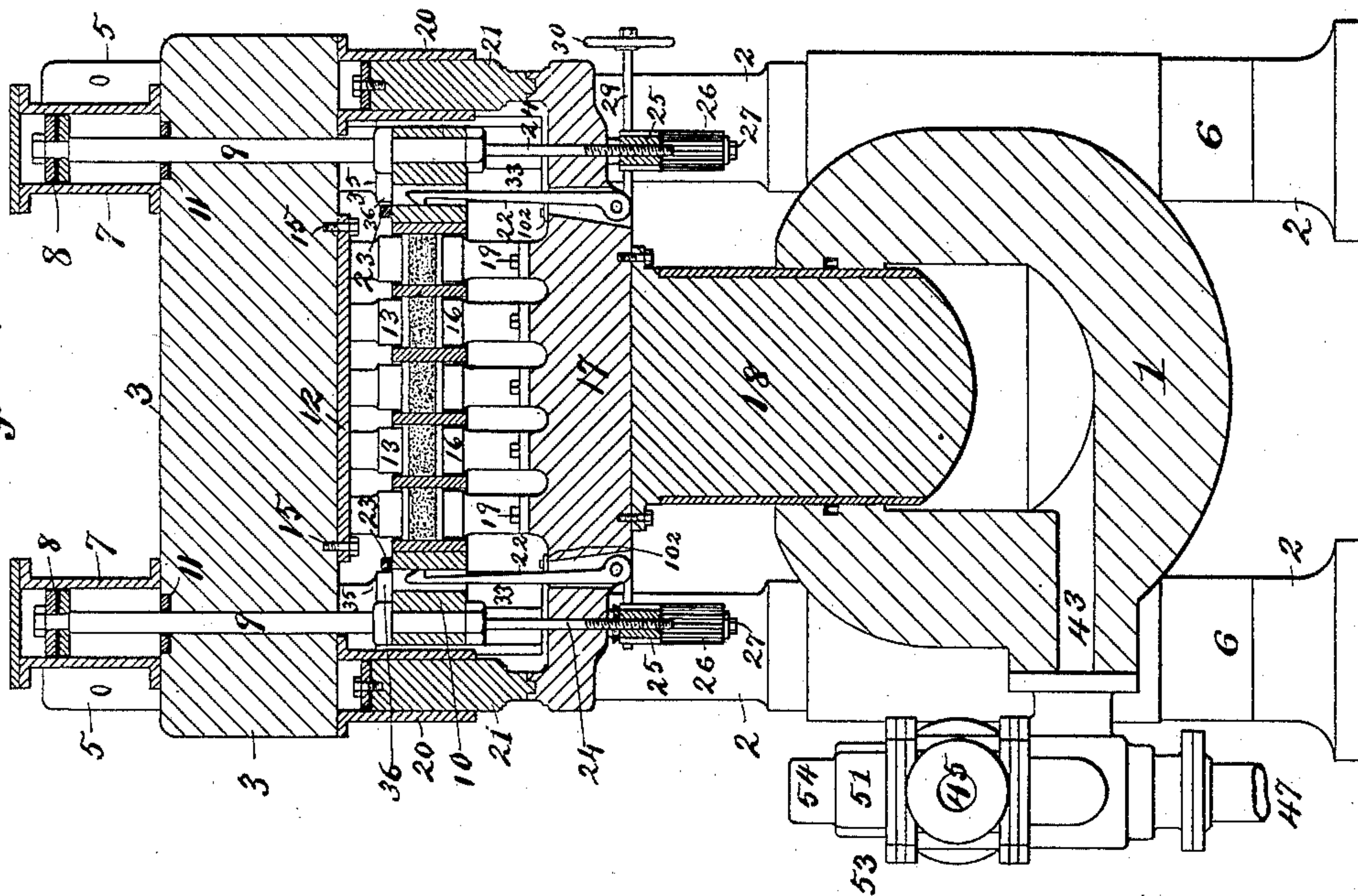
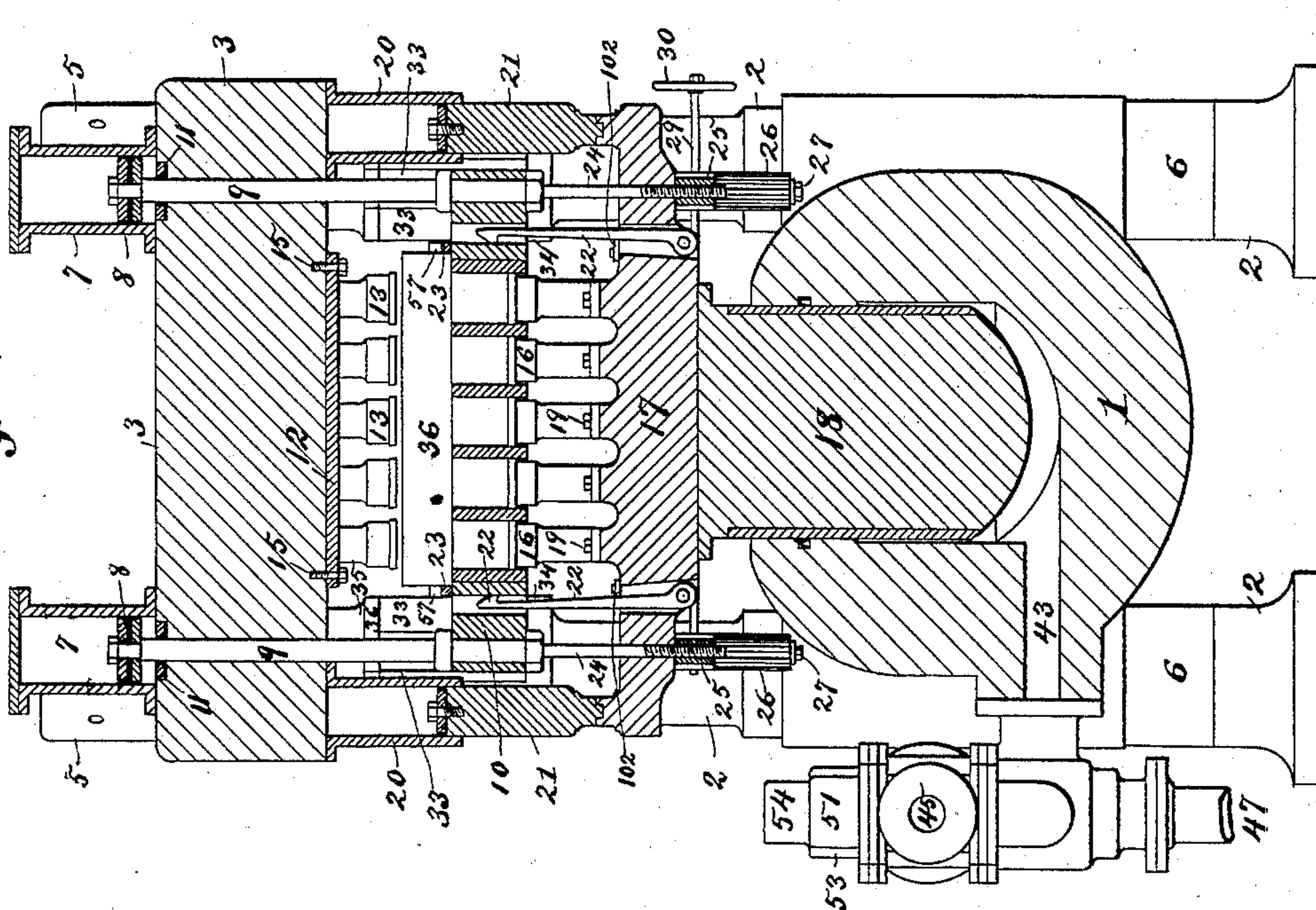


Fig. II.



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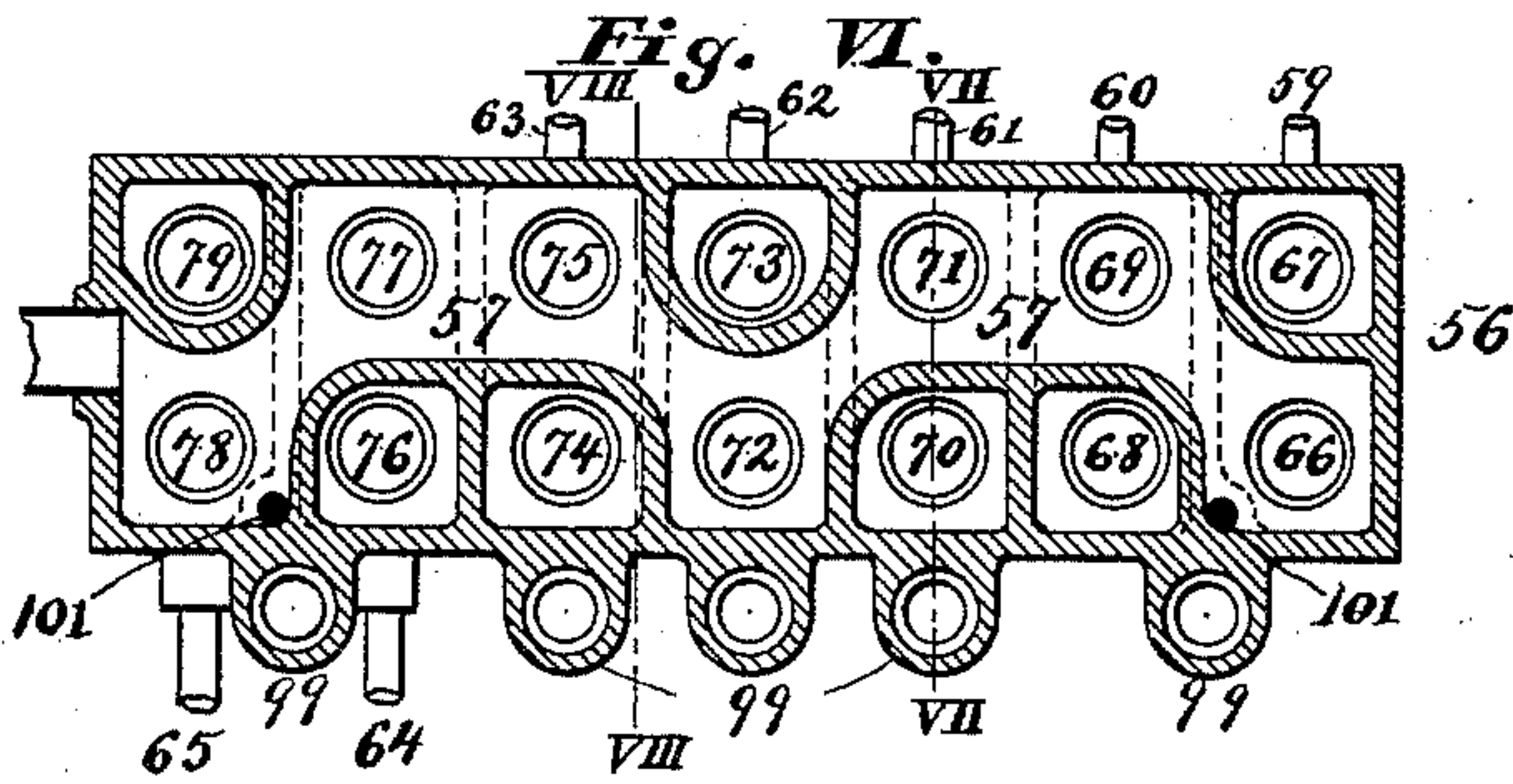
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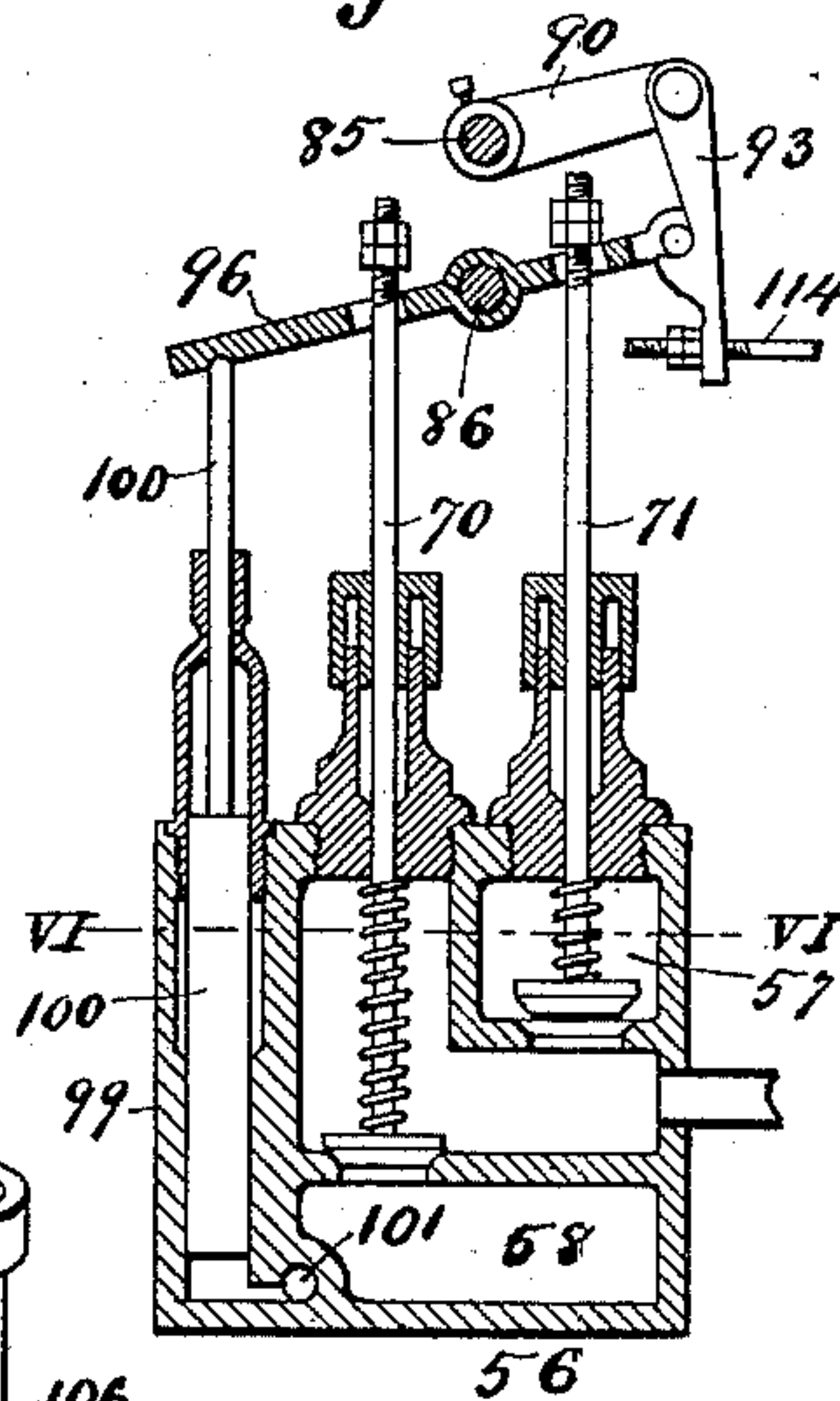
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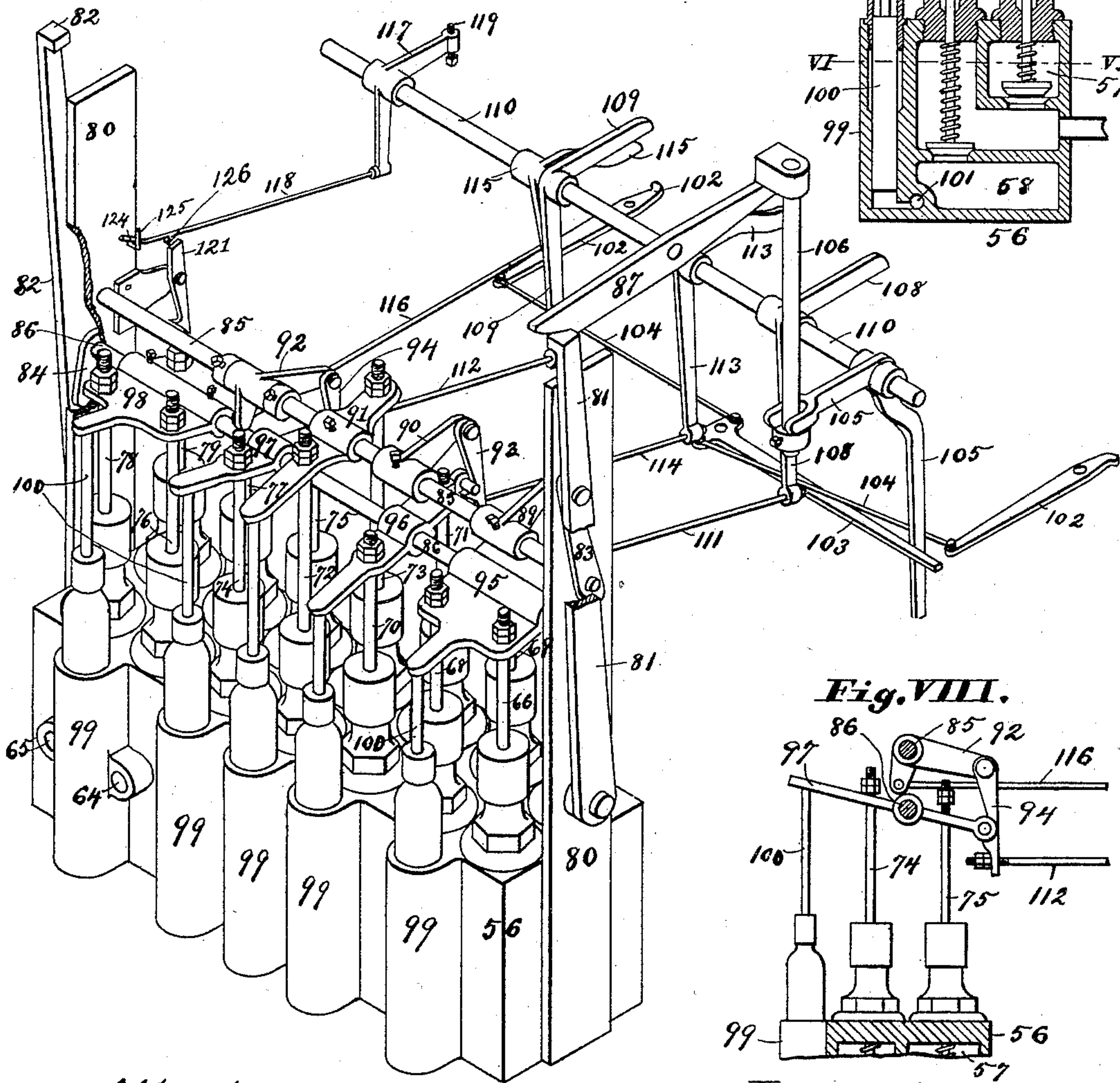
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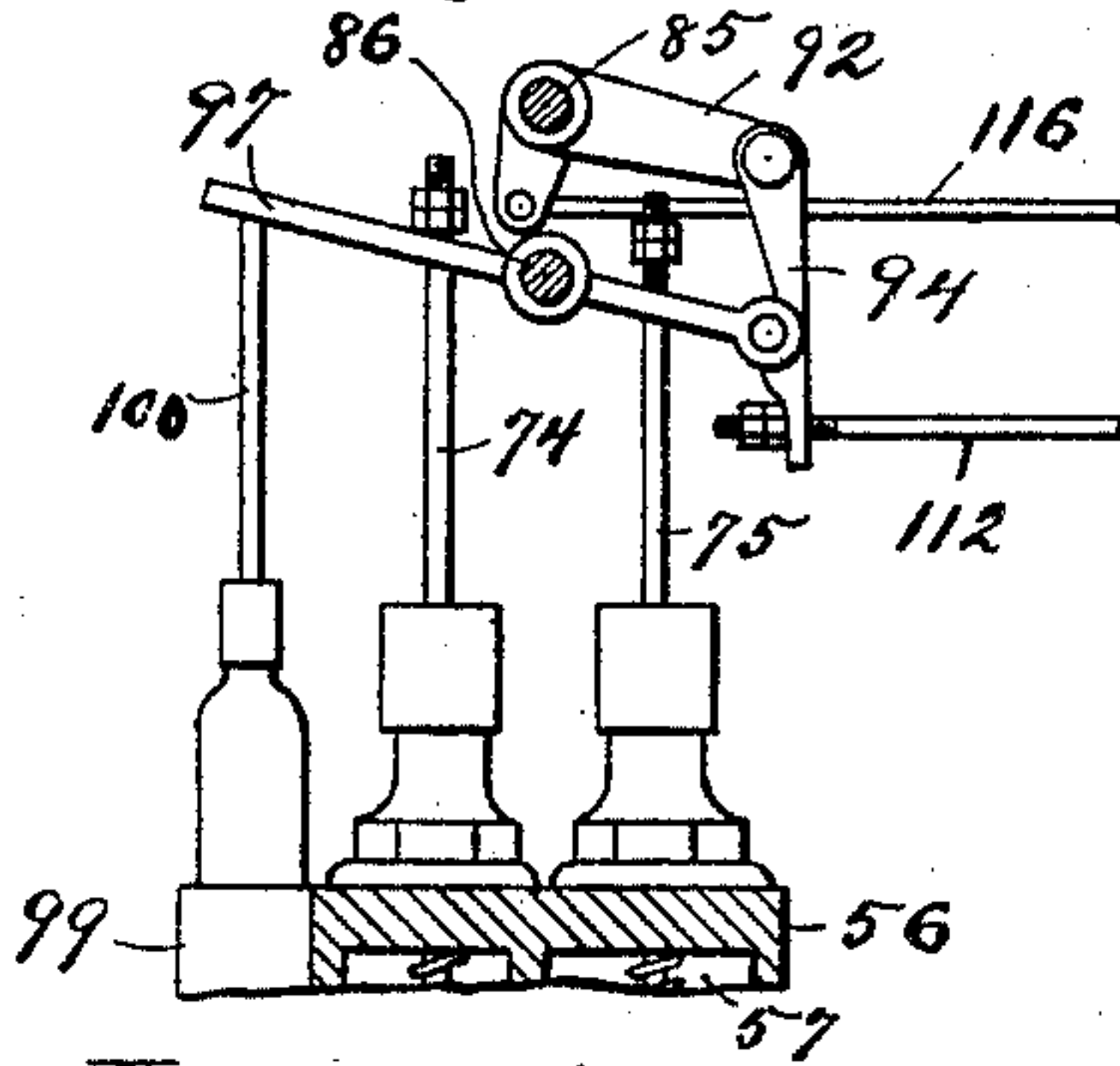
**Fig. VII.**



**Fig. V.**



**Fig. VIII.**



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# UNITED STATES PATENT OFFICE.

JOHNSTON BEGGS AND THOMAS A. GORDON, OF ST. LOUIS, MISSOURI.

## HYDRAULIC BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 475,747, dated May 31, 1892.

Application filed August 12, 1891. Serial No. 402,487. (No model.)

*To all whom it may concern:*

Be it known that we, JOHNSTON BEGGS and THOMAS A. GORDON, both residing in the city of St. Louis and State of Missouri, have invented a new and improved form of Hydraulic Brick-Press, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to that class of brick-presses which form bricks by the compacting of dry clay by heavy pressure, using hydraulic power to get the necessary pressure. Heretofore it has been usual to make the molds in such presses stationary and have two sets of plunger-heads on the plungers of two hydraulic rams, the one above and the other below, which work in the molds, the upper plunger-head moving out of the mold a sufficient distance to permit the brick to be forced out by the lower plunger-head and the charger to bring a fresh supply of clay, and at the same time to push the finished brick out onto a table, where it may be conveniently reached.

In some cases one or both of the hydraulic cylinders have been replaced by mechanisms of various kinds; but in all cases both plunger-heads moved and the molds remained stationary.

In our invention we make the upper plunger-head stationary and cause the molds and the lower plunger-head to move to make the brick. This we accomplish by connecting the pistons from two double-acting hydraulic cylinders with the mold-frame and providing hooks that will suspend the main plungers, so that the top of the lower mold-plate is on a level with the top of the mold-frame when the hooks are in engagement, and also adjustable distance-blocks which limit the distance that the main plunger can move down from the mold-frame, and hence fix the amount of clay that enters into the composition of a brick. The charger-box and cylinder are of the usual construction, but with a longer stroke, as it is necessary with the moving mold-plate to push the bricks entirely off the plate on one side and to back the charger clear off on the other.

Referring to the drawings, Figure I is a side elevation of the press with the main valves shown in section. Figs. II and III are sec-

tions on the line II III of Fig. I, showing the parts in two different positions—namely, in Fig. II they are just ready to make a press of brick, and in Fig. III they have just finished pressing the brick which is still in the mold. Fig. IV is a detail of the upper plunger-head. Fig. V shows a perspective view of the small valve-box and connections. Fig. VI is a horizontal section of the valve-box on line VI VI of Fig. VII, while Figs. VII and VIII are transverse sections of the box on lines VII VII and VIII VIII, respectively, of Fig. VI.

For a clearer understanding of the machine we see that the main cylinder 1 is supported upon four posts 2 2, which continue upward and carry the upper frame 3. Through these posts pass binding-bolts 4 4, which take the strain of the press and are tightened up by the nuts 5 5 and 6 6, the nuts 6 6 themselves forming a part of the posts 2 2. Upon the upper frame 3 are mounted the two double-acting cylinders 7 7, within which work the pistons 8 8, which are made tight by a double cup-leather packing and are connected by the rods 9 9 with the mold-frame 10 10. There is a cup-leather packing around the rods 9 9 at 11 11 to prevent leakage. The upper frame 3 also supports a plate 12 12, upon which are fastened the upper plunger-heads 13 13 by the bolts 14 14, which pass through holes in the plate somewhat larger than the body of the bolts and which have their heads recessed in the upper frame 3. The object of this arrangement is to form an easy and expeditious way of setting the heads 13 13 in position relatively to the molds. This is done by first placing the heads within the molds, then placing the plate 12 12 on them and fastening them together by the tap-bolts 14 14, after which they are all raised together, the molds being in the position shown in Fig. III, so as to retain the heads in their proper location, and the plate 12 12, fastened to the upper frame 3 by the tap-bolts 15 15, which also have enlarged holes through the plate 12 12. The lower plunger-heads 16 16 are bolted to the head 17 of the main ram-plunger 18 by the tap-bolts 19 19. The cylinders 20 20, hung from the upper frame 3, are constantly under pressure, which, acting on the plungers 21 21, tends constantly to force them down and with them the lower ram and all connected with it.



Two hooks 22 22, adapted to latch over the charger-guides 23 23 on the mold-frame 10, are pivoted in the main ram-head 17. The lower end 24 of the piston-rods 9 9 pass through the mold-frame 10, to which they are securely fastened, and also through the ram-head 17 and are threaded. Nuts 25 25 are screwed thereon and limit the downward movement of the head 17. These nuts are pinions and gear with the long pinions 26 26, which are mounted on the ram-head 17 by the studs 27 27. The upper end of the pinions 26 26 are turned down and a screw-gear 31 cut thereon, which meshes with screws 28 on the shaft 29, upon which is the hand-wheel 30. The movement of the hand-wheel 30, acting through the shaft 29, screw-gearing 28 31, and pinions 26, turns the pinion-nuts 25 25 and raises or lowers the ram-head 17, as the case may be, and therefore governs the amount of clay entering the molds 32. The mold-plate 10 slides in guides 33 33 on the posts 2 2. When in its lower position, it rests on the shoulders 34 34 on these posts 2 2 and its upward movement is limited by similar shoulders 35 35. Liners 36 36 of any desired thickness may be inserted between the mold-frame 10 and the shoulders 35 35 to adjust the limit of the upward movement of the mold-plate, or screws might be used for the same purpose. The guides 23 serve to guide the charger-box 36 when it is moved forward. The charger-box 36 carries wedges 57 for releasing the hooks 22 22 and is supported on brackets or ways 37, the top of which are on a level with the top of the mold-plate 10 when in its lower position. The outer ends of these ways 37 are supported by a cross-arm 38 of a stand 39, which also supports the charger-cylinder 40. The ordinary drag-chains 41, stretched by weights 42, keep the clay from accumulating between the lower plunger-heads 16. The interior of the main cylinder 1 communicates by the passage 43 with the chamber 44. Communicating with this chamber 44 are the high and low pressure pipes 45 and 46 and the exhaust-pipe 47; but communication is controlled by the valves 48, 49, and 50, respectively. These valves are all double—that is, the main valve has an opening through its center, which is closed by a small valve on the stem, which has a limited movement before the main valve is opened. The high-pressure and exhaust valves 48 and 50 are worked by the small cylinders 51 and 52, while the low-pressure valve 49 is worked by the cylinder 53, but has a smaller cylinder 54 of exactly the diameter of the valve-opening, the upper end of which communicates through the pipe 55 with the chamber 44 and operates to balance any pressure that may be brought under the valves. These valve-cylinders 51, 52, and 53, as well as the charger-cylinder 40 and the mold-frame cylinders 77, are controlled by valves in the valve-box 56. There are fourteen valves in this box 56, arranged as shown in Figs. V, VI, and VII.

The upper chamber 57 is connected with the low-pressure supply and the lower chamber 58 to the exhaust, while the intermediate portion is divided by cross-walls into seven compartments, which communicate by the pipes 59, 60, 61, 62, 63, 64, and 65 to the various cylinders. 59 and 60 are connected with the upper and lower ends of the mold-plate cylinders 7 7, 61, 62, and 63 with the low-pressure, exhaust, and high-pressure valve-cylinders and 64 and 65 with the charger-cylinder. The valves 66, 69, 71, 72, 75, 77, and 78 are pressure admission-valves, while 67, 68, 70, 73, 74, 76, and 79 are exhaust-valves. The stems of these valves pass up through stuffing-boxes in the top of the valve-box and also through levers, whereby they are moved, the nuts on top allowing for an adjustment of the throw of the valves within the movement of the lever. These valves are moved as follows: Mounted upon standards 80 at either end of the valve-box 56 are two levers 81 and 82, which are connected by the cranks 83 and 84 with the rock-shafts 85 and 86. A pin 122 in the side of the charger-box strikes against the lever 82 at the end of the forward movement of the charger-box and rocks the shaft 86, which is then held in position by the hook 121 till released and returned to the position shown in Fig. V, as hereinafter described.

Upon the charger-box is mounted a latch 87, so that at the end of the backward movement of the charger-box this latch 87 contacts with the lever 81 and rocks the shaft 85. Upon the shaft 85 are fixed the arms 89, 90, and 91, while the bell-crank lever 92 is loosely mounted thereon. Upon the ends of the levers 89, 90, and 92 are mounted hooks 123, 93, and 94, which engage with pins in the levers 95, 96, and 97, swinging on the shaft 86 and so as to raise said levers and operate the valves connected with them in one direction. The lever 98 is fastened to the shaft 86 and rocks with it. Upon the back of the valve-box are cylinders 99, within which work pistons 100. The lower end of these cylinders are in communication with the chamber 57, through the passage 101, and the pressure therein tends constantly to force the pistons up and to rock the levers connected therewith whenever the levers are released by their respective hooks or latches. Upon the ram-head 17 are mounted two levers 102 102, so that they bear against the inside faces of the hooks 22 22. With these is connected the lever 103, also mounted on 17, by the rods 104 104. The long arm of this lever 103 bears against one arm of a bell-crank lever 105, the other arm of which pulls down on a pin 106, which is normally held up by the spring 107 and operates to move the latch 87 and release the arm 81 when the hooks 22 22 engage with the mold-frame. The bell-crank levers 108 and 109, mounted on the bar 110, which also supports the lever 105, operate to disengage the hooks 123 and 94, through the rods 111 and 112, whenever the ram-head 17 reaches the end of its upward



stroke and contacts with them. The bell-crank 113, mounted on the same bar 110, is moved by the ram-head when part way up and releases the hook 93 by means of the rod 114. The bell-crank 115 is operated at the same time and rocks the lever 92 through the connecting-rod 116. The mold-frame on reaching its lowest position contacts with the screw 119 in the end of the bell-crank 117 and pushes the rod 118. The end of this rod 118 is bent at 124 and rides in a hook 125, and it has a projection 126, adapted to catch on the hook 121. The pushing of the rod 118, as above, operates to move the hook 121 and releases the lever 98, permitting the piston 100, connected therewith, to rock the shaft 86 and throw the lever 82 into the position shown in Fig. V. After the hook 121 has been operated the rod 118 passes farther, rides upon the hook 125, and releases the hook 121, permitting the hook 121 to return to its position ready to again hold the lever 98. The set-screw 119 in the end of the lever 117 permits of adjustment. The other levers are adjusted by means of their connecting-rods and also by set-screws or contact-pieces on the parts by which they are moved.

The operation of the machine is as follows: Everything being in the position shown in Figs. I, II, and V, pressure is turned on, and the valves 69, 71, and 78 being open the mold-plate pulls up on the main ram-head, the main low-pressure valve is opened, and the ram and mold-plate move upward together, the charger-box being held back. When the mold-plate reaches the limit of its stroke, it stops and the ram-head passes on until it contacts with the levers 113 and 115, releasing the hook 93 and raising the lever 92, thus opening the valves 70 and 75 and closing 71 and 74. This permits the pressure to close the low and open the high pressure valve and complete the pressing of the brick. Upon reaching the upper limit of its stroke the ram has contacted with the levers 108 and 109, and thus opened the valves 66, 68, and 74 and closed 67, 69, and 75. The high-pressure valve is thus closed and the ram remains stationary and pressure is removed from below the mold-plate pistons 8 8 and brought to bear above them, stripping the mold-plate down from off the brick. When the hooks 22 catch over the mold-plate, the movement operates the latch 87, releasing 81 and rocking the shaft 85. This opens the valve 72, and hence opens the exhaust and the ram moves down with the mold-plate until the plate rests in its lower position and the ram hangs by the hooks. When this has been done, the arm 117 has been moved and the charge started forward by the consequent reversal of the valves 76, 77, 78, and 79, the cams 120 separate the hooks 22, and the ram drops, assisted by the pressure in the small cylinders 20. A fresh supply of clay is thus placed in the mold and the bricks pushed out on the table 122. At the end of the forward movement of the

charger the lever 82 is struck and the valves 76, 77, 78, and 79 return to their former location, which movement returns the charger-box to its starting-point and the latch 87 returns the lever 81, and consequently the shaft 85 and the levers and valves connected therewith, to their original position, when the parts are ready to start over again and make another press of brick.

We claim and desire to protect by Letters Patent—

1. In a hydraulic brick-press, the mold-frame 10, piston-rods 9, pistons 8, cylinders 7, and a stationary upper and movable lower plunger-head.

2. In a hydraulic brick-press, the hand-wheel 30, shaft 29, screw-gearing 27 31, pinions 26, pinion-nuts 25, screw-bolts 24, the mold-plate 10, and lower plunger 17, as above described, and shown in drawings.

3. In a hydraulic brick-press, the movable mold-plate and lower plunger-heads in connection with the hooks 22 22.

4. In a hydraulic brick-press, the movable mold-plate, lower plunger, and hooks 22 22, in connection with wedge-blocks 57 57 on the charger-box 36.

5. In a hydraulic brick-press, the mold-frame 10, rods 9, pistons 8, and cylinders 7, in connection with the rods 24, nuts 25, and plunger-head 17.

6. In a hydraulic brick-press, the movable mold-frame 10, and plunger-head 17, in connection with the rods 24 and nuts 25.

7. In a hydraulic brick-press, the movable mold-frame 10, rods 24, adjusting-nuts 25, the plunger-heads 17 16, and the hooks 22, substantially as described, and shown on drawings.

8. In a hydraulic brick-press, the stationary upper plunger-heads, movable mold-plate, and lower plunger-head, rods and nuts for adjusting the amount of clay used, and hooks adapted to suspend the lower plunger-head with the face level with the top of the mold-plate.

9. In a hydraulic brick-press, the movable lower plunger-head and hooks 22, in connection with the mold-frame, and guides and stops for the same.

10. In a hydraulic brick-press, the stationary upper plunger-heads, movable lower plunger-heads, hooks 22, and movable mold-plate having guides 33 and stops 34 and 35.

11. In a hydraulic brick-press, the movable lower plunger, adjusting-screws 24 and nuts 25, and the movable mold-plate provided with suitable guides and stops.

12. In a hydraulic brick-press, the stationary upper plunger-heads, movable lower plunger-heads, hooks 22, adjusting-screws 24 and nuts 25, and the movable mold-frame having suitable guides and stops.

13. In a hydraulic brick-press, the cylinder 1, plungers 18 17, plungers 21, and cylinder 20.

14. In a hydraulic brick-press, the main cylinder, movable plunger, return-cylinders, and



plungers, in connection with the hooks and movable mold-frame.

15. In a hydraulic brick-press, the stationary plunger-heads, movable mold-frame, movable plunger, adjusting-screws 24 and nuts 25, hooks 22, and the charger and wedge-blocks thereon.

16. In a hydraulic brick-press, the stationary plunger-heads, movable mold-frame, engines connected therewith, movable plunger, adjusting-screws 24 and nuts 25, hooks 22, charger with wedge-blocks thereon, and return-cylinders and plungers.

17. In a hydraulic brick-press, the box supplied with valves, rock-shaft for operating the charger-valves, downwardly-projecting crank on said shaft, lever operating said crank, the charger-box, and pin inside of charger-box for operating said lever.

18. In a hydraulic brick-press, the box supplied with valves, rock-shaft for operating said valves, crank and lever to rock said shaft in one direction, latch for retaining it in position when so rocked, and the connecting-rod and bell-crank to release said latch by contact with the mold-frame.

19. In a hydraulic brick-press, the box supplied with valves, lever for operating valves controlling main high-pressure valve, hook for operating said lever, bell-cranks and connecting-rod for raising such hook by contact of main plunger when partly up, and bell-crank and connecting-rod for releasing said hook by main plunger at the end of its stroke.

20. In a hydraulic brick-press, the box supplied with valves, shaft for operating valves controlling the main exhaust-valves, upwardly-projecting crank on said shaft, lever operating such shaft, and latch on the charger-box moving said lever.

21. In a hydraulic brick-press, the box supplied with valves, shaft for operating valves controlling the main exhaust-valve, crank and lever for operating said shaft, latch on the charger-box for moving said lever, pin for

releasing said latch, spring for holding said pin out of engagement with said latch, bell-crank for operating said pin, lever for operating said bell-crank, and connecting rods and levers for operating such lever by the closing of the hooks 22 22.

22. In a hydraulic brick-press, the box supplied with valves, lever for operating the valves controlling the main low-pressure valve, arm on shaft for operating valves controlling the main exhaust-valves, hook connecting said arm with said lever, and connecting-rod and bell-crank for releasing said hook by the contact of the main plunger when partly up.

23. In a hydraulic brick-press, the box supplied with valves, lever for operating the valves controlling the movement of the mold-frame, arm on shaft for operating valves controlling main exhaust-valves, hook connecting said arm with said lever, and connecting-rod and bell-crank for releasing said hook by the contact of the main plunger at the end of its stroke.

24. In a hydraulic brick-press, a box supplied with valves, shaft for operating valves controlling the main exhaust-valve, crank and lever for operating said shaft, latch on charger-box for operating said lever, levers for operating valves controlling main low-pressure valve and those controlling the movement of the mold-frame, arms on said shaft and hooks connecting them to the last-named levers, and connections for releasing said hooks by the movement of the main plunger, the one when it is part way up and the other at the end of its stroke, also connections for releasing said latch by the closing of the hooks 22.

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