A. T. BOSSERT.

GENERATOR OF HYDRAULIC POWER FOR PRESSES, &c.

APPLICATION FILED JAN. 16, 1911.

1,038,524.

Patented Sept. 17, 1912.

4 SHEETS—SHEET 1.

Fig. 1.

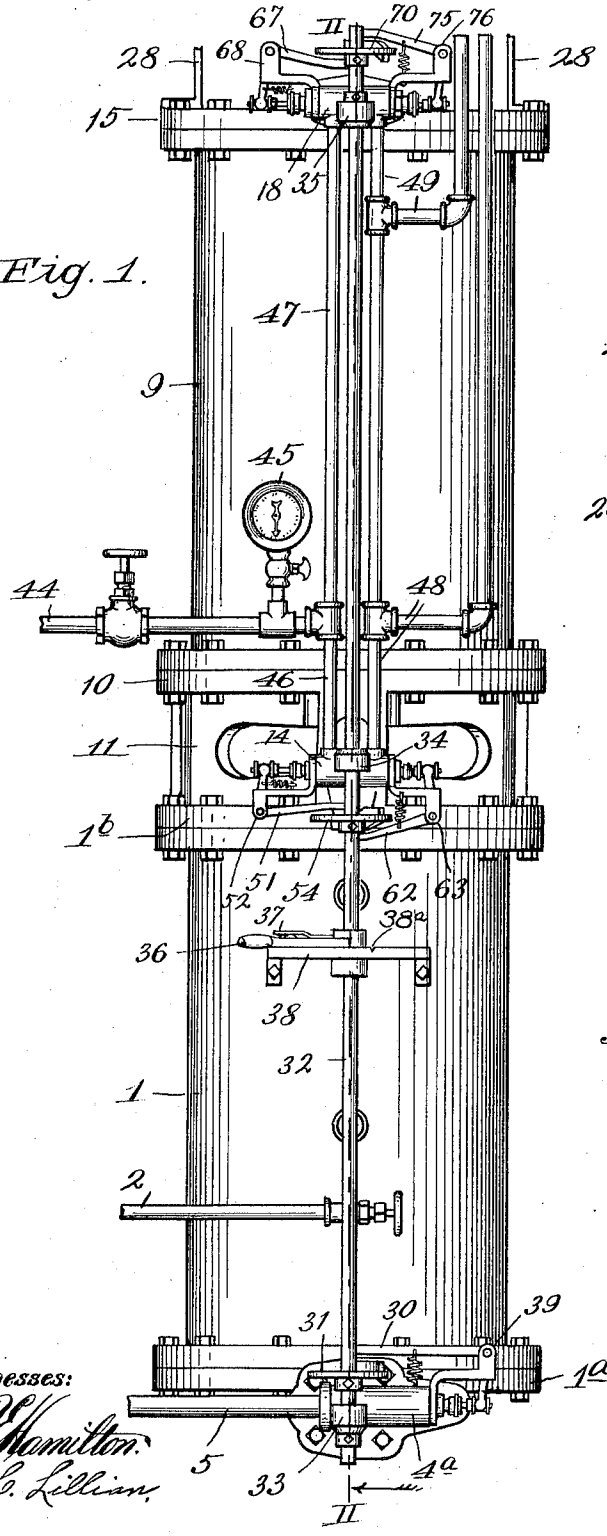


Fig. 3.

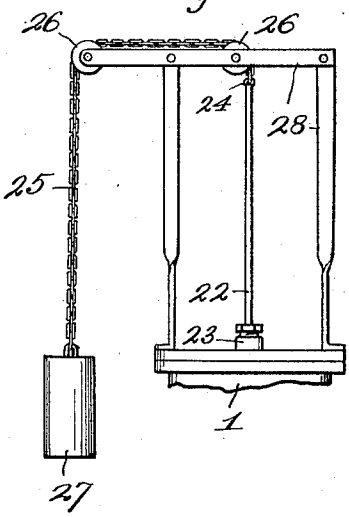
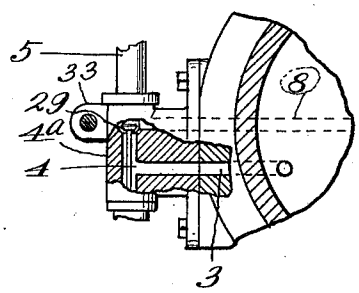


Fig. 4.



Witnesses:

R. Hamilton.

E. C. Lillian.

Inventor,

A. T. Bossert,

By F. G. Fischer,

Atty.

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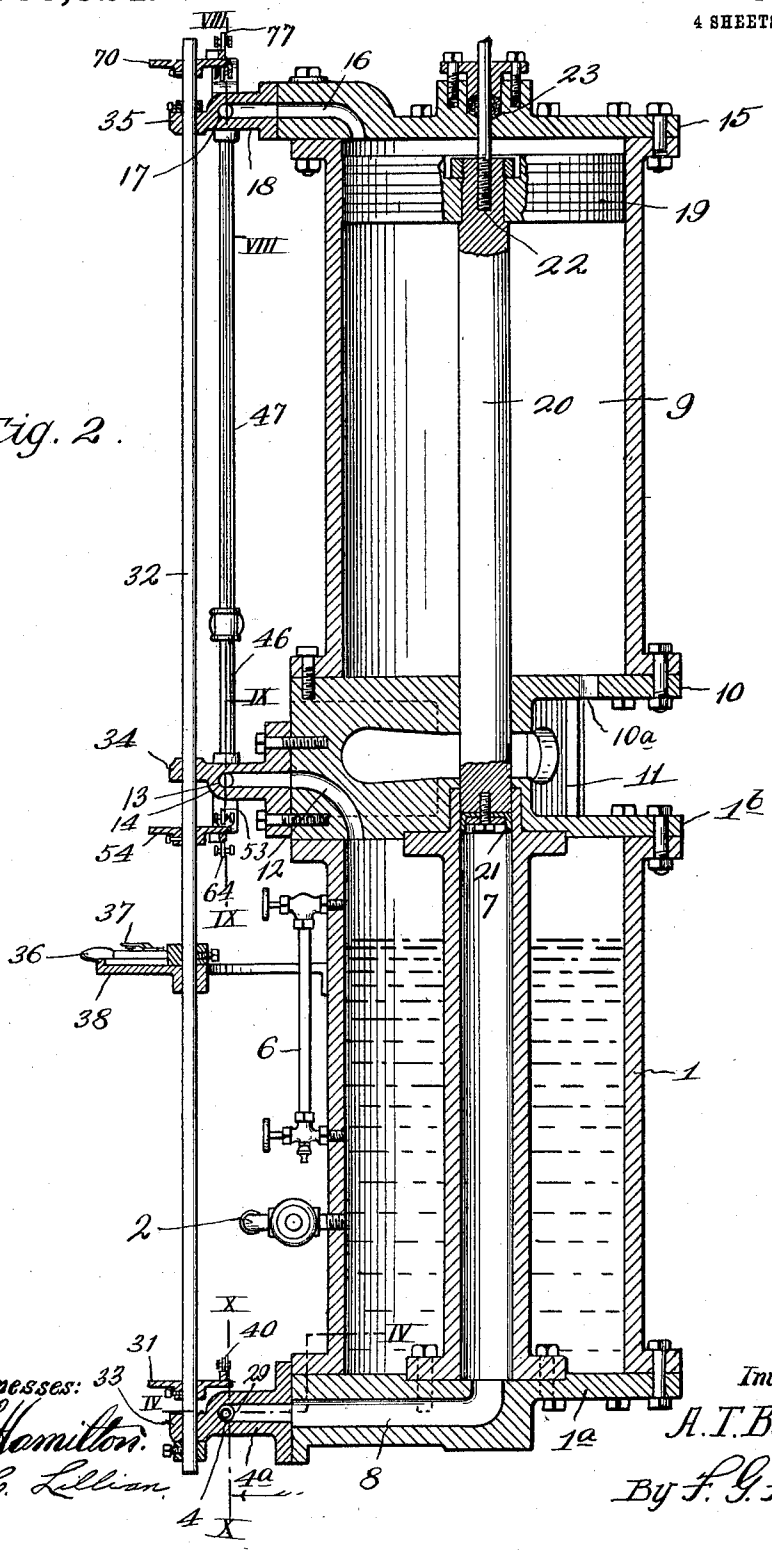
4 SHEETS—SHEET 2.

Fig. 2.



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R. E. Hamilton.
E. C. Lillian.

Inventor,
A. T. Bossert,
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4 SHEETS—SHEET 3.

Fig. 5.

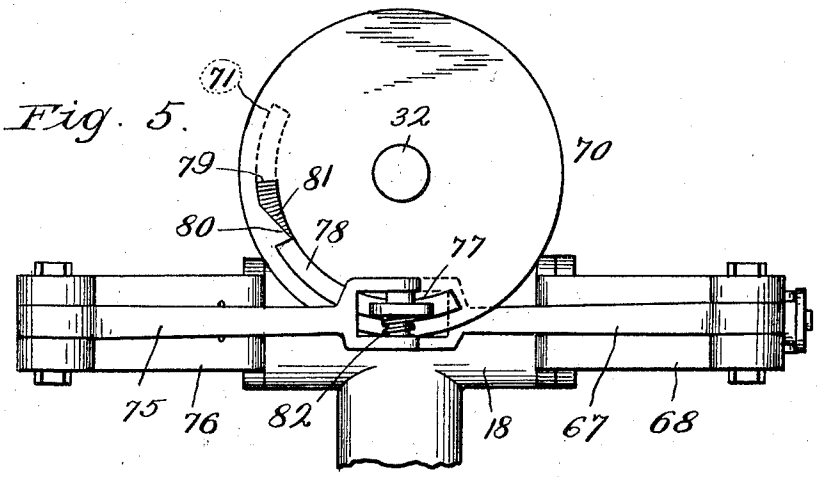


Fig. 6.

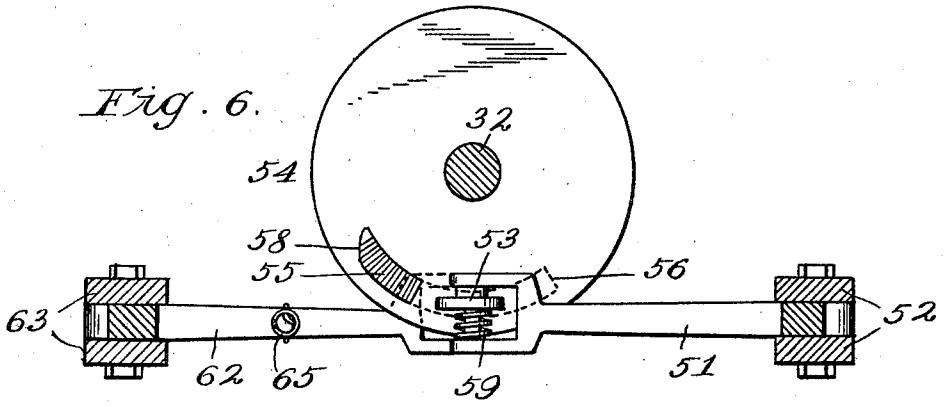
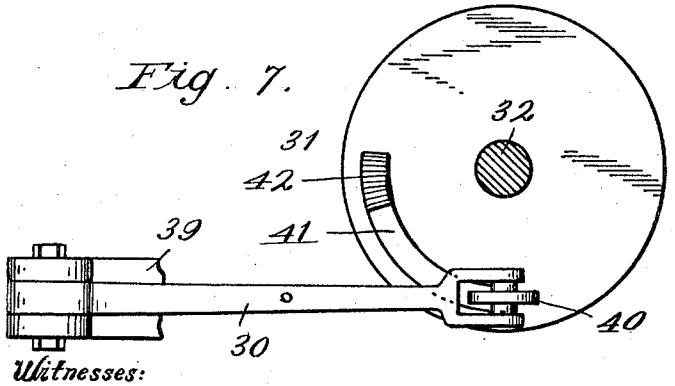


Fig. 7.



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4 SHEETS—SHEET 4.

Fig. 8.

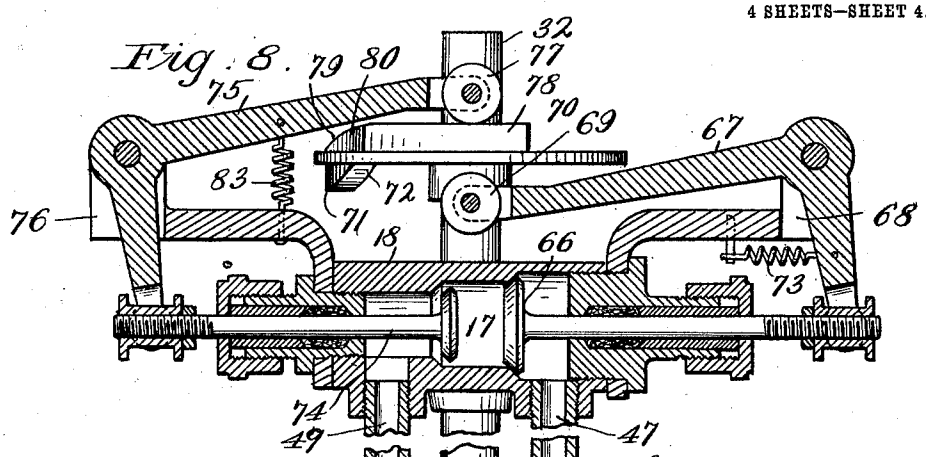
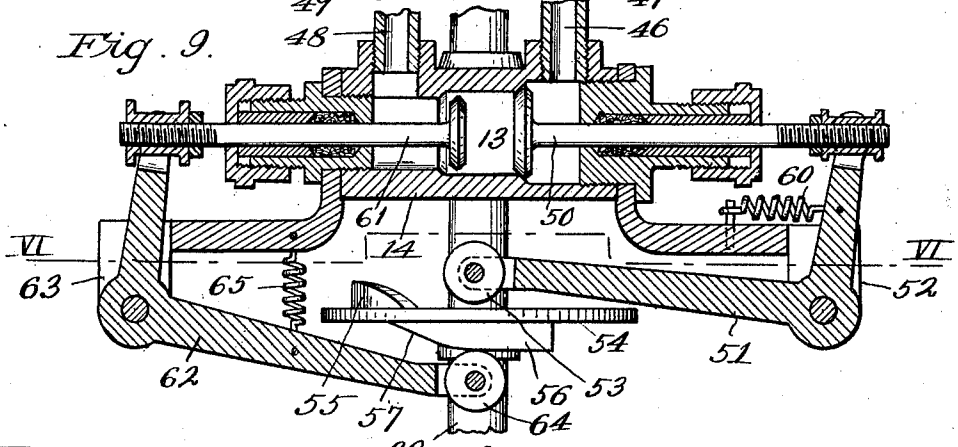


Fig. 9.



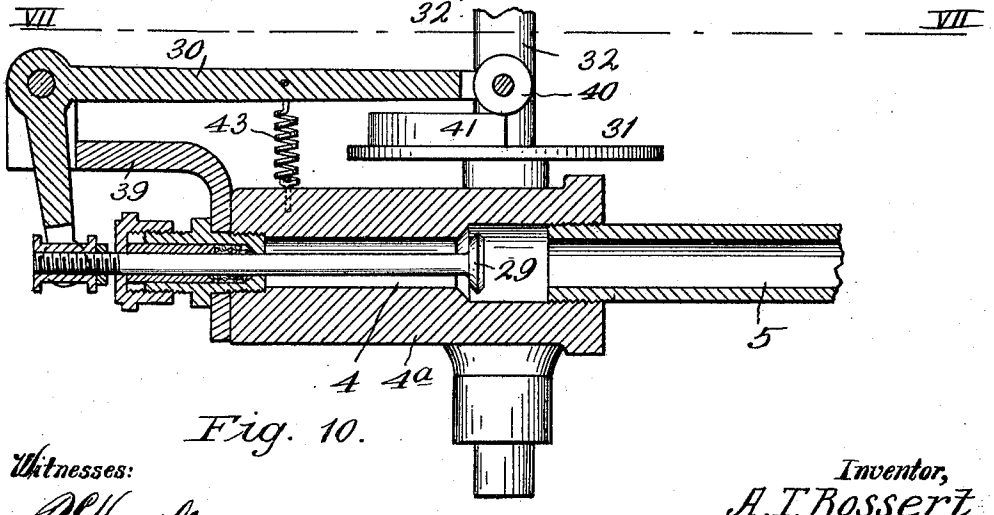


Fig. 10.

Witnesses:

R. S. Hamilton

E. C. Lillian

Inventor,

A. T. Bossert,

By F. G. Fischer,

Atty.

UNITED STATES PATENT OFFICE.

ALBERT T. BOSSERT, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF TO SMITH & SONS MANUFACTURING COMPANY, OF KANSAS CITY, MISSOURI.

GENERATOR OF HYDRAULIC POWER FOR PRESSES, &c.

1,038,524. Specification of Letters Patent. **Patented Sept. 17, 1912.**

Application filed January 16, 1911. Serial No. 602,984.

To all whom it may concern:

Be it known that I, ALBERT T. BOSSERT, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Generators of Hydraulic Power for Presses, &c., of which the following is a specification.

My invention relates to a generator of hydraulic power for presses, etc., and one of my objects is to provide a generator of this character for actuating hydraulic-presses, trip-hammers, and like machinery.

A further object is to provide an individual generator for each machine, which is rapid in operation and economical in the use of power.

Other objects of the invention will hereinafter appear, and in order that said invention may be fully understood reference will now be made to the accompanying drawings, in which:

Figure 1 is a front elevation of my improved generator. Fig. 2 is a vertical central section of the generator on line II—II of Fig. 1. Fig. 3 is a broken elevation of the upper portion of the generator, and a counterweight for raising a piston and a plunger employed in carrying out the invention. Fig. 4 is an irregular horizontal section on line IV—IV of Fig. 2. Fig. 5 is a plan view of a valve mechanism employed in controlling the operation of the generator. Figs. 6 and 7 are horizontal sections on lines VI—VI and VII—VII, of Figs. 9 and 10, respectively, showing valve mechanisms employed in controlling the operation of the generator. Figs. 8, 9 and 10 are vertical sections on lines VIII—VIII, IX—IX and X—X, respectively, of Fig. 2, showing valve mechanisms for controlling the operation of the generator.

1 designates a low-pressure cylinder, supplied with suitable motive fluid such, for instance, as water through a valve-controlled pipe 2, and having in its lower head 1^a a port 3, communicating with a pipe 5, which conducts the motive fluid to the point of use, such, for instance, as the cylinder of a hydraulic-press.

6 designates a gage to indicate the level of the water in cylinder 1.

7 designates an intensifier cylinder arranged centrally within cylinder 1, and communicating at its lower end with a valve-casing 4^a through a port 8 in the lower head 1^a of cylinder 1.

9 designates a cylinder arranged immediately above cylinder 1, the upper head 1^b of which is connected to the lower head 10, of cylinder 9 by a spider 11, preferably formed integral with said heads, and having a port 12, communicating with the upper part of cylinder 1, and a valve-chamber 13 in a casing 14, secured to spider 11. Head 10 has a port 10^a communicating with cylinder 9 and the outer atmosphere. The upper head 15 of cylinder 9 is provided with a port 16, communicating with said cylinder and a valve-chamber 17 within a casing 18, secured to head 15.

19 designates a piston reciprocably-arranged within cylinder 9, and provided with a depending intensifier plunger 20, reciprocably-arranged in the intensifier cylinder 7, the lower end of said plunger being provided with a flexible cup 21, to form a water-tight joint between it and the bore of cylinder 7.

22 designates a rod secured to the upper end of plunger 20 and extending through a stuffing-box 23 in cylinder-head 15. Rod 22 has an eye 24, at its upper end engaged by a cable 25, running over a pair of sheaves 26, and attached at its lower end to a counterbalance 27, to raise the piston and the plunger on their upward stroke. Sheaves 26 are mounted on a frame 28, on the head 15.

29 designates a back-pressure valve to control communication between port 3 and pipe 5, and between port 8 and valve-chamber 4. Valve 29 is controlled by a bell-crank lever 30, which in turn is controlled by a cam plate 31, fixed to a vertical rock-shaft 32, journaled in bearings 33, 34 and 35, on valve-casings 4^a, 14 and 18, respectively. Shaft 32 is controlled by a hand-lever 36, provided with a latch 37, adapted to coact, in holding said valve in any of its adjusted positions, with a sector 38 secured to the adjacent side of cylinder 1. Bell-crank lever 30, is pivotally-secured to a bracket 39, provided at its free end with a roller 40, adapted to travel on the raised cam 41, of cam plate 31, the rear end 42, of said cam being inclined to permit the roller to readily ascend from the lower level thereon. A retractile-spring 43, connected at its ends to valve-casing 4^a and lever 30 accelerates the

action of the back-pressure valve 29 when roller 40 drops from the abrupt forward end of cam 41.

44 designates an air, or other fluid, supply-pipe, provided with a pressure-gage 45, and leading to branch-pipes 46 and 47, communicating with valve-chambers 13 and 17, having exhaust-pipes 48 and 49, respectively, leading therefrom.

50 designates an inlet-valve to control communication between chamber 13 and branch-pipe 46, said valve in turn being controlled by a bell-crank lever 51, pivotally-mounted on a bracket 52, and provided at its free end with a roller 53, controlled by a cam plate 54, provided at its upperside with a cam 55, and at its underside with a track 56, having an inclined rear end 57. Cam 55 inclines forwardly and has a high beveled rear end 58, to prevent roller 53 from ascending said rear end when the cam is turned backward. An expansion spring 59 is interposed between one side of roller 53 and the adjacent side of the bifurcated end of lever 51 to normally hold said roller in the path of cam 55. Cam plate 54, like cam plate 31, is fixed to the rock-shaft 32. Action of valve 50 is accelerated by a retractile spring 60, attached at its ends to lever 51 and bracket 52.

61 designates an exhaust-valve to control communication between chamber 13 and branch-pipe 48, said valve being actuated by a bell-crank lever 62, pivotally-mounted on a bracket 63, and provided at its free end with a roller 64, controlled by cam plate 54. The action of valve 61 is accelerated by a retractile spring 65, attached to lever 62, and bracket 63.

66 designates an inlet-valve to control communication between chamber 17 and branch-pipe 47, said valve in turn being controlled by a bell-crank lever 67, pivotally-mounted on a bracket 68, and provided at its free end with a roller 69, controlled by a cam plate 70, provided at its underside with a cam 71, having an inclined front end 72, so that roller 69 may readily traverse the same. The closing action of valve 66 is accelerated by a retractile spring 73, attached to lever 67 and bracket 68.

74 designates an exhaust-valve, to control communication between chamber 17 and exhaust-pipe 49. Valve 74 is controlled by a bell-crank lever 75, pivotally-mounted on a bracket 76, and provided at its free end with a roller 77, controlled by cam plate 70 and a cam 78, integral with the upper side of said cam plate. Cam 78 has an inclined rear end 79, so that roller 77 may readily ascend the same. Said cam also has a cavity 80 in one side of its inclined portion, the beveled surface 81 of which switches roller 77 laterally off the cam when said roller contacts with the beveled surface 81. When roller 77 is thus switched off the cam 78, it drops upon the cam plate 70 and closes valve 74. Lateral movement of roller 77, when switched off the cam 78 is permitted by an expansion spring 82, interposed between one side of said roller and the adjacent side of the bifurcated terminal of lever 75, said spring normally holding the roller in the path of cam 78. The closing movement of valve 74 is accelerated by a retractile spring 83, attached to lever 75 and bracket 76.

Preliminary movement of the hydraulic press-ram (or other machine being actuated by my generator) is obtained by admitting compressed air, or other fluid under pressure, through port 12 upon the water in cylinder 1, which is accomplished by drawing lever 36 to notch 38[a], in sector 38, to open inlet-valve 50 and close exhaust-valve 61. This movement of the valves being had by cam 55 raising roller 53 and cam 56 passing from beneath roller 64, so that the latter may be drawn upward by spring 65. When the resistance of the work on the hydraulic press-platen equalizes the pressure of the fluid in cylinder 1, final pressure is exerted by admitting compressed, or other fluid under pressure, upon piston 19, through port 16. As piston 19 descends it carries plunger 20 therewith, which forces the water outward from the intensifier cylinder 7, and thereby exerts intense pressure on the press-ram. Pressure is admitted to cylinder 9 by throwing lever 36 to the end of its movement to the right. This closes exhaust-valve 74 and opens inlet-valve 66, by turning cam plate 70 until cavity 80 coincides with roller 77, permitting the same to drop, and cam 71 depresses roller 69. Just prior to this action of valves 66 and 74, the admission of pressure to cylinder 1, is cut off by closing inlet-valve 50, which is accomplished by turning cam plate 54 until cam 55 passes from beneath roller 53. Back-pressure valve 29 closes immediately after valve 50, to prevent the water from flowing backward into cylinder 1, this movement of valve 29 being accomplished by turning cam plate 31 until cam 41 passes from beneath roller 40, which is drawn downward by spring 43. To release the pressure and restore the cams and valves to their normal position, shown in Figs. 5 to 10, inclusive, lever 36 is drawn back to its initial position. This operation opens back-pressure valve 29 and permits the press-ram to descend and force the water back to its normal level in cylinders 1 and 7. At the same time, piston 19 and plunger 20 are raised by the counterbalance 27, the piston forcing the motive fluid in the upper portion of cylinder 9 out through port 16, which is permitted by the opening of exhaust-valve 74, through the intermediacy of roller 77 and cam 78, the inlet-valve closing

just prior to the opening of the exhaust-valve 74. Valve 50 remains in closed position when lever 36 is moved back to initial position, because the beveled end 58, of cam 55, engages and moves roller 53 laterally, so that said cam may pass the roller without raising the same. Exhaust-valve 61, however, is opened by cam 56 depressing roller 64, to permit the air in cylinder 1 to be expelled through port 12 before the ascending water in said cylinder.

I claim—

1. In a generator of the character described, a low-pressure cylinder containing motive fluid, an intensifier cylinder containing motive fluid and arranged within the said low-pressure cylinder, a valve to admit pressure to the low-pressure cylinder to force fluid therefrom, an intensifier plunger to force the fluid from the intensifier cylinder, and means to conduct the motive fluid to the point of use.

2. In a generator of the character described, a low-pressure cylinder containing motive fluid, an intensifier cylinder containing motive fluid and arranged within said low-pressure cylinder, means to admit pressure to the low-pressure cylinder to force fluid therefrom, a valve to exhaust pressure from said low-pressure cylinder, and an intensifier plunger to force the fluid from the intensifier cylinder.

3. In a generator of the character described, a low-pressure cylinder containing motive fluid, an intensifier cylinder containing motive fluid and arranged within said low-pressure cylinder, a valve to admit pressure to the low-pressure cylinder to force fluid therefrom, a valve to exhaust pressure from said low-pressure cylinder, cams to actuate said valves, an intensifier plunger to force the fluid from the intensifier cylinder, and means to conduct the motive fluid to the point of use.

4. In a generator of the character described, a low-pressure cylinder containing motive fluid, an intensifier cylinder containing motive fluid and arranged within said low-pressure cylinder, a valve to admit pressure to the low-pressure cylinder to force fluid therefrom, a valve to exhaust pressure from said low-pressure cylinder, cams to actuate said valves, an intensifier plunger to force the fluid from the intensifier cylinder, means to conduct the motive fluid to the point of use, a valve to control communication between the low pressure cylinder and said conducting means, a cam for actuating said valve, and means for simultaneously actuating said cams.

5. In a generator of the character described, a low-pressure cylinder containing motive fluid, an intensifier cylinder containing motive fluid and arranged within said low-pressure cylinder, means to admit pressure to the low-pressure cylinder to force fluid therefrom, an intensifier plunger to force a third cylinder in which the plunger operates, a piston on the plunger reciprocably-arranged in the third cylinder, means to admit pressure upon said piston, and means to exhaust said pressure.

6. In a generator of the character described, a low-pressure cylinder containing motive fluid, an intensifier cylinder containing motive fluid and arranged within said low-pressure cylinder, means to admit pressure to the low-pressure cylinder to force fluid therefrom, an intensifier plunger to force fluid from the intensifier cylinder, means to conduct the motive fluid to the point of use, a third cylinder in which the plunger operates, a piston on the plunger reciprocably-arranged in the third cylinder, a valve to admit pressure upon said piston, a valve to exhaust said pressure upon the piston, and cams for actuating said valves.

In testimony whereof I affix my signature, in the presence of two witnesses.

ALBERT T. BOSSERT.

Witnesses:
F. G. FISCHER,
E. C. LILLIAN.