(No Model.) 2 Sheets—Sheet 1.

J. L. STEITZ.

AIR PUMP FOR FORCING BEER.

No. 516,410. Patented Mar. 13, 1894.

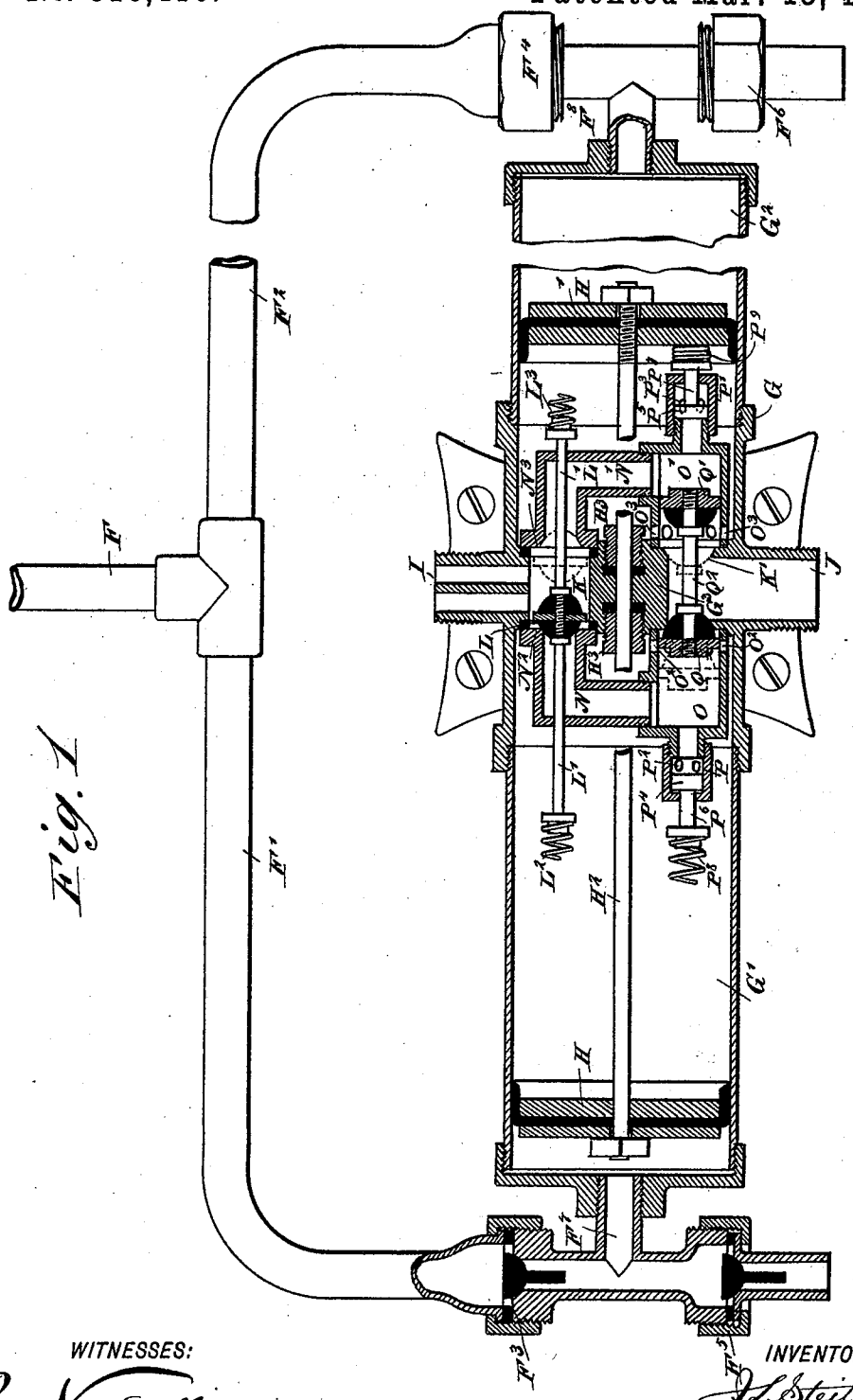

Fig. 1.

WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR

J. L. Steitz

BY Munn & Co

ATTORNEYS.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

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Fig. 1

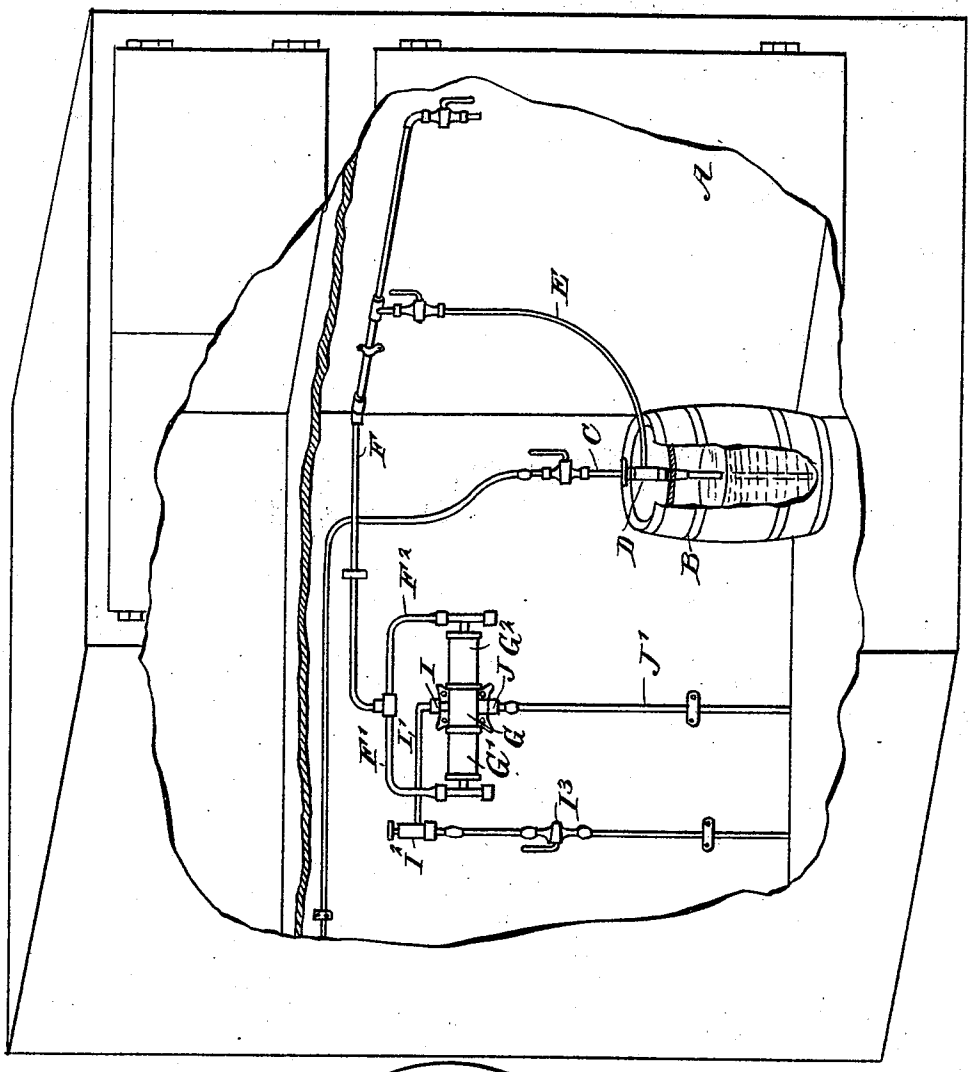
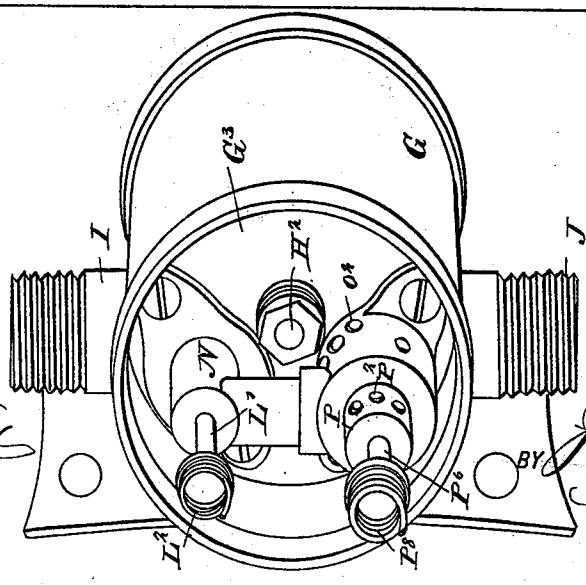


Fig. 2



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WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN LEWIS STEITZ, OF CHICAGO, ILLINOIS.

AIR-PUMP FOR FORCING BEER.

SPECIFICATION forming part of Letters Patent No. 516,410, dated March 13, 1894.

Application filed May 10, 1893. Serial No. 473,713. (No model.)

To all whom it may concern:

Be it known that I, JOHN LEWIS STEITZ, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Air-Pump for Forcing Beer, of which the following is a full, clear, and exact description.

The invention relates to that class of devices known as pneumatic beer pumps, used for forcing beer and other liquids from a keg or barrel to a faucet to draw off the liquid.

The object of the invention is to provide a new and improved air compressor, which is simple and durable in construction, very effective in operation, and arranged to automatically pump the beer from the keg to the bar faucet, the said air compressor being driven by water under pressure.

The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a perspective view of part of the improvement; and Fig. 3 is a reduced perspective view of the improvement as applied.

As illustrated in Fig. 3, the ice box A contains the keg B, from which the liquid is to be forced through a pipe C to the bar or other place, to permit of drawing off the liquid in small quantities, as called for. The pipe C passes through a bung D driven into one head of the keg B, and the said bung is connected with a pipe E through which passes compressed air into the bung and through the latter to the inside of the keg B, to exert a pressure on the liquid contained in the keg to force the said liquid through the pipe C to the faucet from which it is to be drawn. The pipe E is connected with an air supply pipe F, arranged within the ice box A and connected with two branch pipes F′ and F^2, containing the air outlet valves F^3 and F^4, respectively, and the air inlet valves F^5 and F^6 respectively, as plainly shown in Fig. 1. The branch pipe F′ between its valves F^3 and F^5, is connected by a short branch pipe F^7, with the outer end of a cylinder G′, held on one end of a casing G, secured to a wall of the ice box A, as shown in Fig. 3. The other branch pipe F^2 is likewise provided with a branch pipe F^8 between its valves F^4 and F^6, and this branch pipe F^8 is connected with the outer end of a second cylinder G^2, also secured to the casing G and arranged directly opposite the cylinder G′. In the cylinders G′ and G^2 operate the pistons H and H′, respectively, connected with each other by a piston rod H^2, mounted to slide in suitable stuffing boxes H^3, secured to a central partition G^3, arranged transversely in the casing G. See Figs. 1 and 2. The casing G is provided with a water inlet I, and a water discharge J, leading into longitudinally-extending bores K and K′, respectively, formed in the partition G^3, as plainly illustrated in Fig. 1. The inlet I is connected with a pipe I′, connected with a suitable source of water supply and containing a water pressure regulating device I^2, of any approved construction, and a valve I^3, for turning on and cutting off the water whenever desired. The discharge J is connected with a pipe J′, extending to the outside of the ice box A and discharging the water into a convenient receptacle, sewer or other place.

In the bore K operates a valve L, adapted to connect pipes N and N′ with the ends of the bore K, the said pipes being for this purpose provided at the bore K with valve seats N^2 and N^3, respectively, as shown in Fig. 1. The valve L is secured on a longitudinally-extending valve stem L′, mounted to slide in the walls of the pipes N and N′, the outer ends of the said stem carrying springs L^2 and L^3, adapted to be engaged by the inner faces of the pistons H and H′ respectively, so as to shift the stem L′ and its valve L whenever the corresponding piston moves in contact with the corresponding spring L^2 or L^3. The pipes N and N′ are preferably L-shaped and connect at their lower ends with cylinders O and O′, respectively, secured in the partition G^3 and leading into the ends of the bore K′ connected with the outlet or discharge J.

On the outer ends of the cylinders O and O′ are arranged the cylinder caps P and P′, respectively, provided near their inner ends with apertures P^2 and P^3, respectively, opening into the cylinders G′ and G^2 near the inner ends thereof. In the cylinder caps P and

P′ operate the piston valves P^4 and P^5, respectively, secured on the stems P^6 and P^7, respectively, extending outwardly through the ends of the caps P and P′, and carrying at their outer ends, springs P^8 and P^9 respectively, adapted to be engaged alternately by the pistons H and H′. The piston valves P^4 and P^5 are adapted to close or open the openings P^2 and P^3 respectively, so as to connect and disconnect the cylinders G′ and G^2 and the cylinder caps P and P′ respectively.

In the cylinders O and O′ are arranged the pistons Q and Q′, respectively, secured on a piston rod Q^2, extending centrally through the bore K′, the said pistons Q and Q′ being adapted to be seated at the inner ends of the cylinders O and O′ on seats formed at the partition G^3. Near the inner ends of the cylinders O and O′ are arranged openings O^2 and O^3 respectively, leading to the cylinders G′ and G^2 respectively, so as to connect the latter with the cylinders O and O′ respectively, whenever the corresponding piston Q or Q′ is in an outermost position.

The operation is as follows:—When the several parts are in the position as illustrated in Fig. 1 and water passes under pressure through the supply pipe I′ to the inlet I, then the water passes into the bore K connected at its right hand side with the pipe N′, the other end of the bore being closed to the pipe N by the valve L. The water passes through the pipe N′ into the cylinder O′ and exerts a pressure therein on the piston Q′ so as to shift the latter to the left, thus causing a like movement of the other piston Q in the cylinder O, whereby the openings O^2 are opened and water contained in the cylinder G′ can flow through the openings O^2 into the inner end of the cylinder O and the bore K′ to the outlet J. At the same time water in the cylinder O′ can pass through the now uncovered openings O^3 into the cylinder G^2 to start the piston H′ on its outward movement and thereby causing the other piston H to move inward as the water recedes from the cylinder G′. When the piston H′ has left the end of the now uncompressed spring P^9, then the pressure of the water in the cylinder O′ causes an outward sliding of the piston P^5 carrying on its stem P^7 the said spring P^9. The outward movement of the piston P^5 causes an opening of the openings P^3 so that the water can also flow from the cylinder O′ into the inner end of the cap P′ and through the openings P^3 into the inner end of the cylinder G^2, so as to exert its pressure therein on the piston H′ to move the latter outward to the end of its stroke. The piston H′ during this movement forces the air contained in the cylinder G^2 out through the pipe F^8 into the pipe F^2, and past the valve F^4 to the pipe F connected with the interior of the barrel B by the pipe E and bung D, so that the pressure of the air in the said barrel or keg causes the liquid to flow through the pipe C to the bar to be drawn off. It is understood that the valve F^6 is seated during the compressing period and is unseated on the return stroke of the piston H′ to draw in the air in order to fill the cylinder G^2. Now, while the piston H′ moves outward by the pressure of the water, as above described, the other piston H moves inward to discharge the water in the cylinder G′, as above described and at the same time, the said piston H draws in air through the valve F^5 and branch pipe F^7 to fill the outer end of the said cylinder G′. When the piston H′ nears the end of its outermost stroke, the piston H nears the end of its innermost stroke and thus comes in contact first with the spring P^8, thus causing an inward sliding of the stem P^6 and valve P^4 to close the openings P^2, and then the piston H comes in contact with the spring L^2 on the stem L′, so as to cause the latter to slide to the right to unseat the valve L from the seat N^2. The piston H does not move the valve L entirely from the left to right-hand end of the bore K. The action of the pistons H and H′ is very slow, and therefore is not sufficient to drive the valve L entirely from one seat to the other. The valve L is designed to slide the way the water is flowing when unseated or not held by the pressure against one seat or the other. For example, the piston H moves to the right until it comes in contact with the spring P^8 on the piston valve P^4, it closes the valve P^4, then by compressing the spring P^8 moves far enough to the right to come in contact with the spring L^2 on the valve rod L′ and unseat the valve L;—the valve P^4 being closed and the piston Q in the cylinder O being outward as shown by dotted lines. There can be no immediate flow of water through the pipe N after the valve L is unseated; while the piston valve P^5 in the cylinder G^2 being open the water, for an instant after the valve L is unseated, continues to flow entirely to the right, and consequently as soon as the valve L is unseated the flow of water carries it to the right-hand end of the bore K, closing the pipe N′ and opening the pipe N. The springs L^2 and L^3 are intended to assist in the working of the valve L. The piston H or H′ upon coming in contact with one of them compresses it enough before unseating the valve L to drive the valve L about half-way from one seat to the other where it is immediately caught by the water and carried the rest of the way. The water now entering the bore K by the pipe I passes through the pipe N into the cylinder O and exerts its pressure therein on the piston Q, so as to move the latter to the right to the position shown in Fig. 1, whereby the other piston Q′ moves outward in the cylinder O′ and opens the apertures O^3, so that the water in the inner end of the cylinder G^2 can flow through the said openings O^3 into the inner end of the cylinder O′ and to the bore K′ to be discharged through the outlet J. At the same time water can pass through openings O^2 into the cylinder G′ to move the piston H outward. When the pis-

ton H has moved sufficiently to the left to leave the spring P^8, then the piston valve P^4 is moved outward by the pressure of water in the cylinder O, to open the apertures P^2 to permit water to flow into the inner end of the cylinder G′ to assist in finishing the outward stroke of the piston H, and the inward stroke of the piston H′. The outward movement of the piston H forces the air contained in the outer end of the cylinder G′, through the pipe F^7 and past the valve F^8 to the pipe F′ and pipe F, so as to keep up pressure in the keg or barrel B to force the liquid therein through the pipe C to the bar. The piston H′ on the inward movement first acts on the spring P^9 to cause the piston valve P^5 to close the openings P^3, and then starts the valve L from the seat N^3, so that the flowing water forces the valve home onto the seat N^2, and water again passes from the bore K through the pipe N′ to the cylinder O′ and the above described operation is repeated. It will be seen that by this arrangement the compressor is automatically and continuously actuated until the water pressure ceases. The springs P^8 and P^9 are intended to act as cushions on the piston valves P^4 and P^5 so that the piston H or H′ may, on its inward stroke, first close the piston valve P^4 or P^5, and then by compressing the spring move far enough inward to come in contact with the spring L^2 or L^3 on the valve rod L′ and unseat the valve L. For example, the piston H moves to the right until it comes in contact with the spring P^8 on the piston valve P^4; it closes the valve P^4 and then by compressing the spring P^8 the piston H can move far enough to the right to come in contact with the spring L^2 on the valve rod L′ and unseat the valve L. After the valve L has opened the left-hand end of the bore K, the water enters the cylinder O through the pipe N and forces the piston Q to the right far enough to close the left-hand end of the bore K′ and open the openings O^2, through which the water passes into the cylinder G′ and exerts a pressure on the piston H, causing it to slide to the left. After the piston H has moved far enough to the left to relieve the compressed spring P^8, the pressure of water in the cylinder O forces the piston valve P^4 outward, opening the openings P^2 and allowing the water to escape freely through them into the cylinder G′ to finish the outward stroke of the piston H. By reference to the drawings it will be seen that the openings O^2 in the cylinder O are placed far enough outward to allow the piston Q to partially pass them on its inward stroke so as to connect the cylinder G′ with the pressure of water from the cylinder O through the openings O^2. The openings O^3 in the cylinder O′ are placed the same as the openings O^2 in the cylinder O.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In an apparatus of the class specified, the combination, with a casing and cylinders, G′ G^2, supported thereon, and provided with a water inlet and discharge and the rigidly-connected pistons, H H′, adapted to work in said cylinders, of the valve attachment consisting of the following parts, namely, the bore or chamber, K, angular pipes, N N′, and discharge cylinders, O O′, all connected as specified, and the latter cylinders having openings, O^2 O^3, leading into cylinders, G′ G^2, cylinder caps P P′ on the ends of cylinders O O′, and having apertures P^2 P^3 controlled by piston valves P^4 P^5 the valve, L, arranged in chamber, K, and springs attached to its stem, and the pistons, Q Q′, arranged in chambers O, O′, all operating as shown and described.

2. In an apparatus of the class described, the combination with a casing, supporting two cylinders, provided with a water inlet and a water discharge, opening into the bores formed in the partition of the said casing, of a valve arranged in the bore of the water inlet, pipes connected with the ends of the said bore, cylinders connected with the said pipes and provided with openings leading to the said first named cylinders, and pistons arranged in the said last named cylinders and connected with each other by a common piston rod passing through the bore for the water discharge, the said second cylinders also opening into the said water discharge bore, substantially as shown and described.

3. In an apparatus of the class described, the combination with a casing supporting two cylinders provided with a water inlet and a water discharge, opening into the bores formed in the partition of the said casing, of a valve arranged in the bore of the water inlet, pipes connected with the ends of the said bore, cylinders connected with the said pipes and provided with openings leading to the said first named cylinders, pistons arranged in the said last named cylinders and connected with each other by a common piston rod passing through the bore for the water discharge, the said second cylinders also opening into the said water discharge bore, and connected pistons arranged in the said first named cylinders and adapted to shift the valve in the bore connected with the water inlet, substantially as shown and described.

4. In an apparatus of the class described, the combination with a casing supporting two cylinders provided with a water inlet and a water discharge, opening into the bores formed in the partition of the said casing, of a valve arranged in the bore of the water inlet, pipes connected with the ends of the said bore, cylinders connected with the said pipes and provided with openings leading to the said first named cylinders, pistons arranged in the said last named cylinders and connected with each other by a common piston rod passing through the bore for the water discharge, the said second cylinders also opening into the said water discharge bore, connected pistons arranged

in the said first named cylinders and adapted to shift the valve in the bore connected with the water inlet, cylinder caps held on the second set of cylinders and provided with openings leading to the first named cylinders, and piston valves fitted to slide in the said caps and adapted to be actuated by the said pistons in the first named cylinders, substantially as shown and described.

5. In an apparatus of the class described, the combination with a casing supporting two cylinders provided with a water inlet and a water discharge, opening into the bores formed in the partition of the said casing, of a valve arranged in the bore of the water inlet, pipes connected with the ends of the said bore, cylinders connected with the said pipes and provided with openings leading to the said first named cylinders, pistons arranged in the said last named cylinders and connected with each other by a common piston rod passing through the bore for the water discharge, the said second cylinders also opening into the said water discharge bore, connected pistons arranged in the said first named cylinders and adapted to shift the valve in the bore connected with the water inlet, a cylinder cap held on the second set of cylinders and provided with openings leading to the first named cylinders, piston valves fitted to slide in the said caps and adapted to be actuated by the said pistons in the first named cylinders, and springs held on the outer ends of the stems of the said piston valves, substantially as shown and described.

JOHN LEWIS STEITZ.

Witnesses:
ALEX. J. STREET,
PT. J. V. SCHNELL.