(No Model.)

2 Sheets—Sheet 1.

B. OBENCHAIN.

BEAM PUMPING ENGINE.

No. 335,475. Patented Feb. 2, 1886.

Fig: 1.

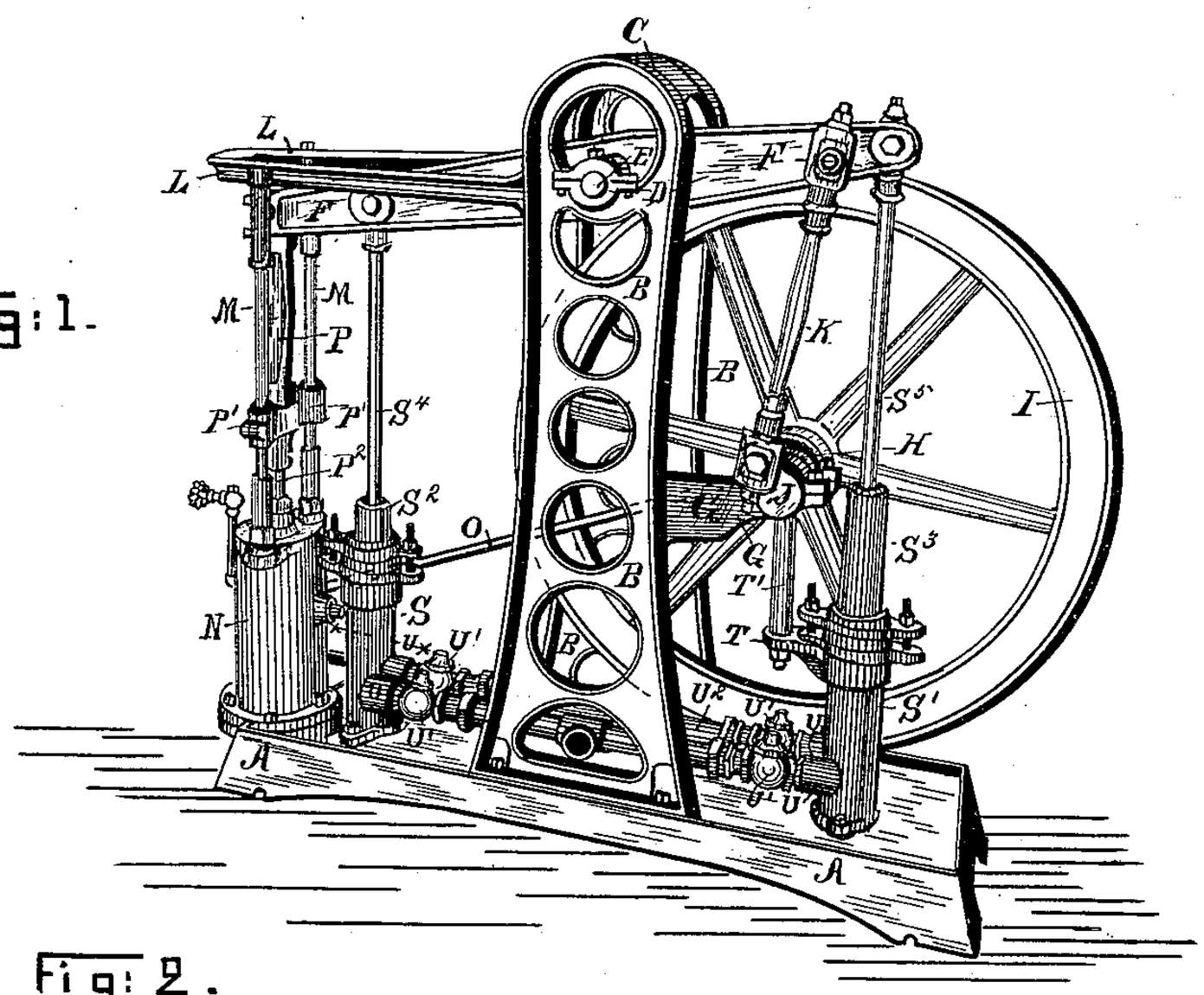
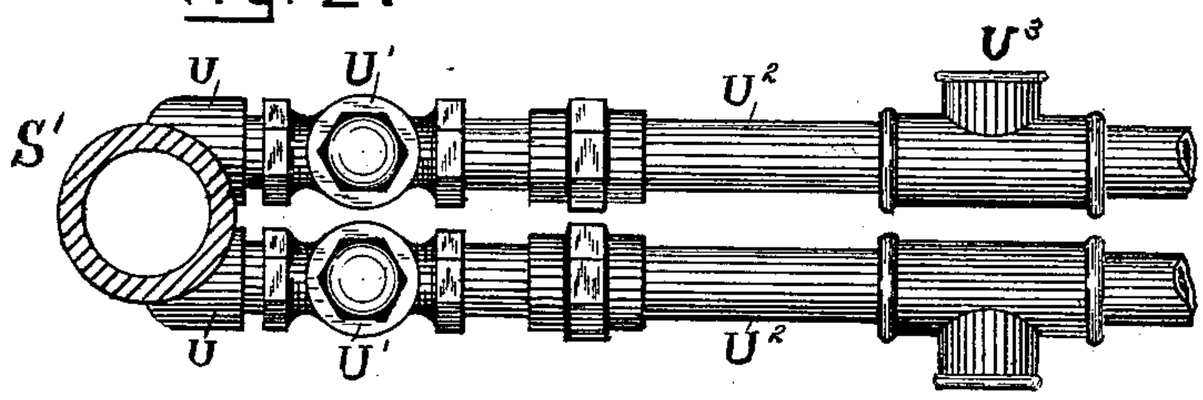


Fig: 2.



Witnesses:

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J. C. Perry.

Inventor.

Bruce Obenchain.
By A. C. Whitney.
Atty

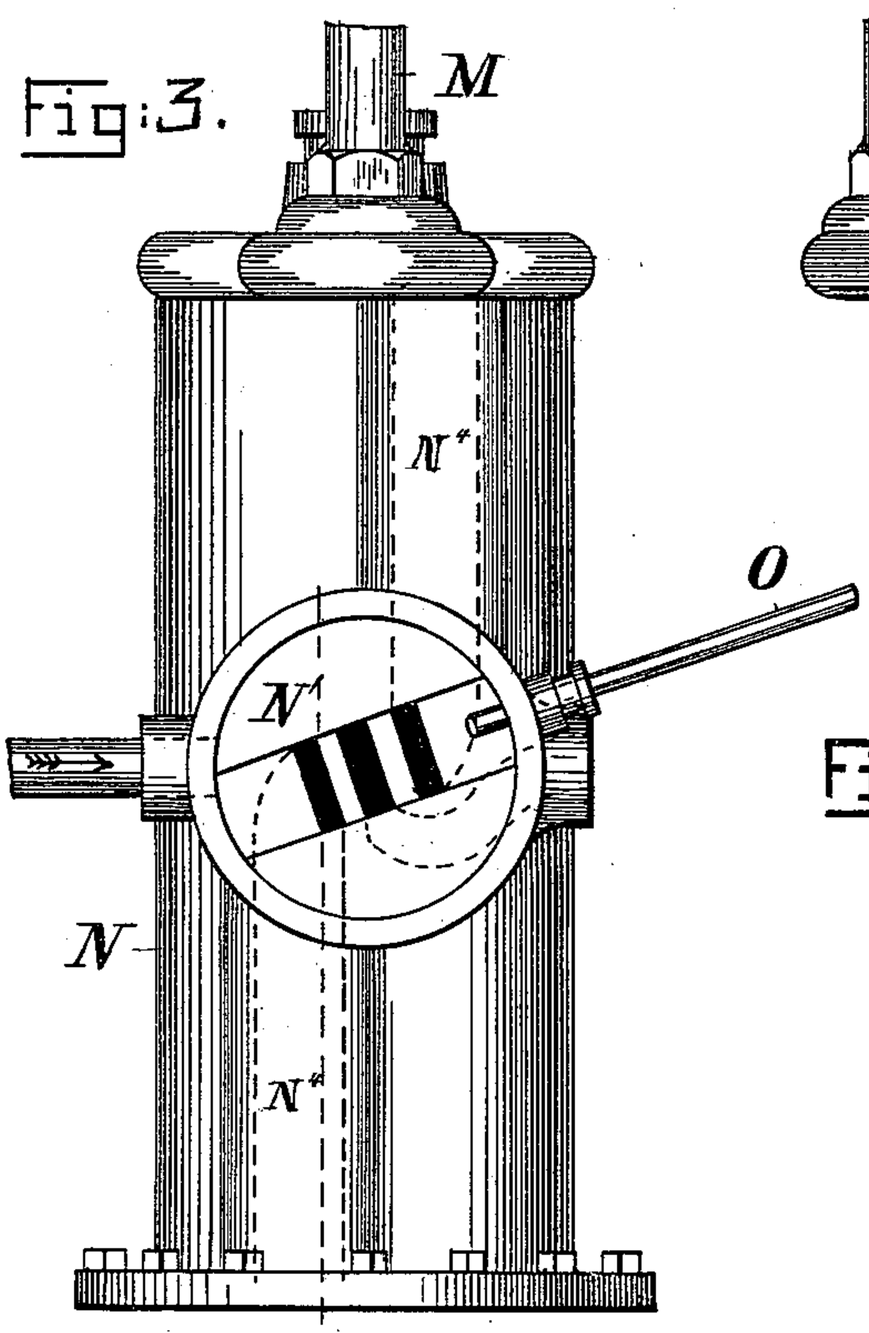
(No Model.) 2 Sheets—Sheet 2.

B. OBENCHAIN.

BEAM PUMPING ENGINE.

No. 335,475. Patented Feb. 2, 1886.

Fig: 3.



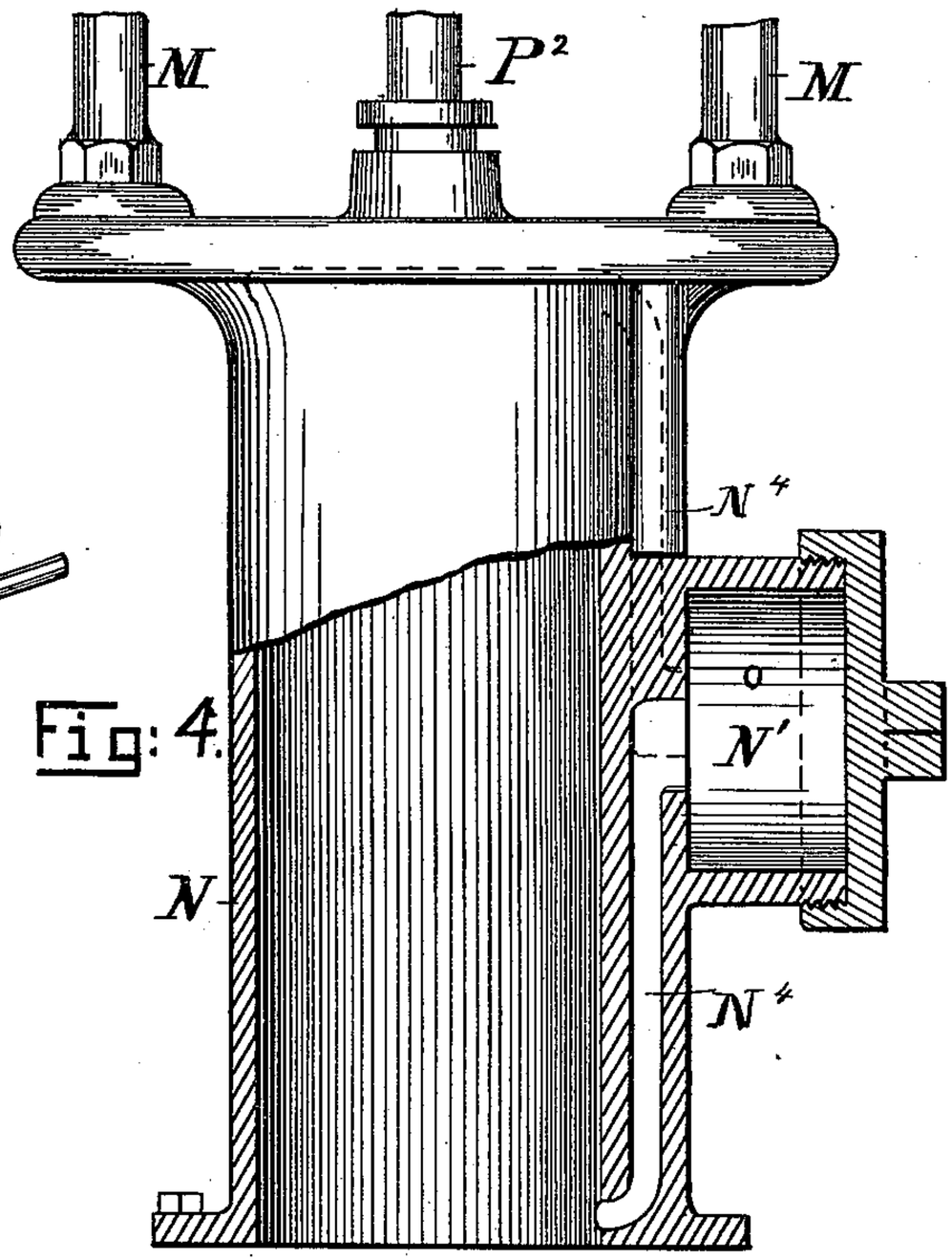


Fig: 4.

Fig: 5.

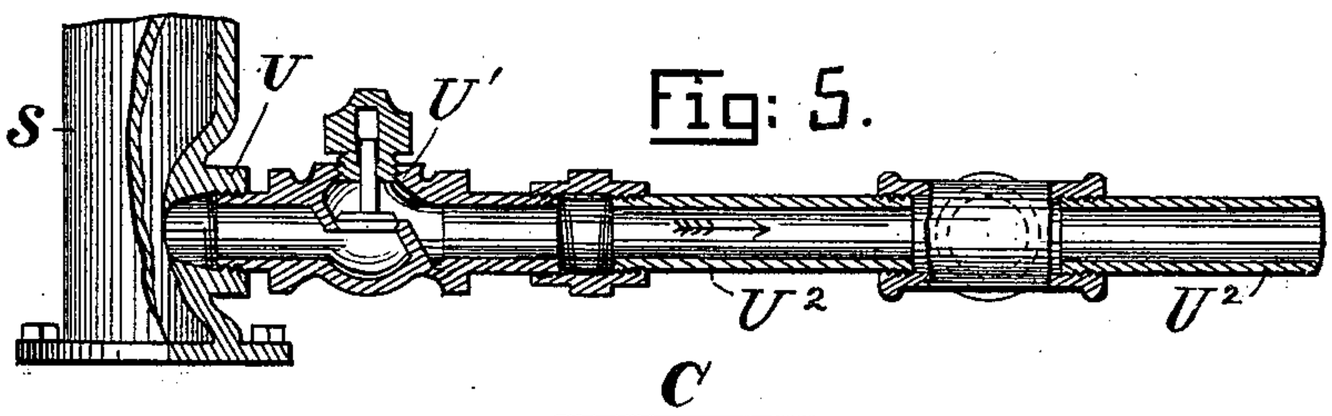
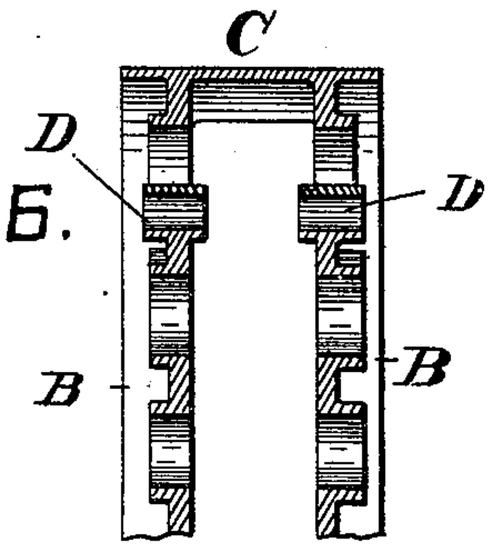


Fig: 6.



Witnesses

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UNITED STATES PATENT OFFICE.

BRUCE OBENCHAIN, OF SPRINGFIELD, OHIO.

BEAM PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 335,475, dated February 2, 1886.

Application filed September 1, 1884. Serial No. 141,912. (No model.)

To all whom it may concern:

Be it known that I, BRUCE OBENCHAIN, of the city of Springfield, county of Clark, and State of Ohio, have invented certain new and useful Improvements in Beam Pumping-Engines, of which the following is a specification.

This invention relates to pumps, and is especially intended as an improvement upon that class known as "steam-doctors" or "beam-pumps," such as are used for marine purposes, as boiler-feeders, &c.

Heretofore with steam doctors or pumps of this description, wherein two single-acting plunger-pumps were used, the pump-cylinders were each provided with check-valves, the casings of which were cast to and formed a part integral with the said pump-cylinders, piping forming the connection between the check-valves and pumps. This, as will be noticed, was not only expensive to construct, but was of great inconvenience and expense to the user in that should the check-valves get out of order it either necessitated a new pump-cylinder or considerable expense and trouble to repair the old one.

The chief object of my invention is to connect the two pumps by removable check-valves of suitable material of a standard or marketable pattern, the pump-cylinders being specially constructed to attain this end, thereby providing a cheap and substantial connection between the two pumps and permitting the parts thereof to be easily removed should they get out of order and new ones substituted without the employment of skilled labor, the said valves and connections being of a kind purchasable at any place where engine or plumber fittings are sold. This, as will be noticed, is a matter of great desideratum to users of pumps, as it permits them to do their own repairing, and without much expense, should any of the pump-connections become inoperative or injured in any manner.

Another object of my invention is to provide a direct connection between the valve of the steam-chest or its stem and the main crank-shaft of the pump by means of one connecting-rod, to thereby obviate the use or intervention of strap or other joints, rocking shafts, &c., between the valve and connecting-rod, the valves and ports in the steam-chest being arranged at an inclination to the steam-cylinder corresponding substantially to the inclination of a line drawn directly from the center of the said valve or valve-stem to the center of the main crank-shaft.

Another object of my invention is the special construction and arrangement of parts relatively thereto of the main supporting standards of the pump to secure the maximum of strength and rigidity with minimum of material, and consequently expense.

By the arrangement and construction hereinafter more fully shown and described I am enabled to produce a light and substantial pump, and one which may be repaired, if necessary, by unskilled labor.

Figure 1 of the drawings represents in perspective a doctor or beam pump having two single-acting plunger-pumps connected together and constructed in accordance with my invention, as are also the supporting-standards and working parts of said pump. Fig. 2 is a cross-section on dotted line *x x*, Fig. 1, of the pumps, it showing a plan view of the pump-connections. Fig. 3 is a front elevation of the steam-cylinder and steam-chest, the cap of the steam-chest being removed; Fig. 4, a side elevation of the same, partially in section; Fig. 5, a side elevation of the pump-connections, showing the discharge-valve and pipe-sections, partially in section; and Fig. 6, an enlarged sectional view of a portion of the supporting-standard.

The base A or bed-plate is and may be of any suitable material and construction, it being herein shown as oblong in shape, and of a width suitable to contain the working parts.

Bolted to the bed-plate A, near the center of its length and at either side, are two vertical supporting-standards, B B, connected together at their upper ends by means of a cap or hood, C, the said cap being provided with a depending flange, by which it is bolted to the standards B, the said standards at their upper ends (and the hood) being preferably circular in shape. These standards B, of cast metal, are **I**-shaped in cross-section—that is to say, each is provided with a thin central web, having a flange extending entirely around and projecting at both sides of said web, said web

having portions cut away, as shown in the drawings, each of said openings having strengthening-flanges, as shown.

At the upper ends of the standards B are journal-boxes D, the lower portions of which are formed a part with the said standards B, said journal-boxes forming a bearing for the shaft E of the rocking beam F.

At a suitable distance above the lower end of the standards B, and bolted thereto, are brackets G, which extend out at right angles to the said standards, and form a bearing for the main crank-shaft H of the balance or fly wheel I, the said crank-shaft being connected to the rocking beam F by a crank, J, and pitman, K, of usual construction.

At the opposite side of the standards B, and rigidly secured thereto, is an extended supporting-arm, L, of a width equal to the width of the bed-plate, or substantially so, open at the center to permit the movement of the rocking beam, and provided at its extreme ends with guide-rods M, which extend downward, and are rigidly connected to the steam-cylinder N, which is provided with a steam-chest having a slide-valve of usual construction, said slide-valve being located in said steam-chest at an angle to the steam-cylinder, the said angle substantially corresponding to the pitch of a line drawn directly from the center of the said valve to the center of the main crank-shaft, the said valve being connected to the said crank-shaft by means of a connecting-rod, O, and eccentric, said connecting-rod being pivoted to the valve-stem directly.

As will be noticed in the drawings, (see Fig. 4,) the ports of the steam-chest communicate with the steam-cylinder at its upper and lower ends through steamways N^4, which extend upon the outside of the cylinder from the ports to the desired place of communication, the operation of the piston being as usual, the steam being admitted into the cylinder through the steam-pipe N^5, as in steam-pump cylinders of ordinary construction, the only difference in my cylinder and steam-chest being the provision of the ducts or ways N^4, whereby the steam may be communicated to the ends of the cylinder, while the valve operates in a line at an angle to the length of said cylinder, whereby the valve-stem may be connected to the valve-rod O, (which is attached to the main shaft by means of the usual eccentric,) without the use of strap-joints, &c.

In so far as the steam cylinder and chest above described may include patentable invention it will form the subject-matter of a separate application.

The piston (not shown) is of ordinary construction, and is connected to the rocking beam by means of a pitman, P, connected with a cross-head, P′, that slides on the guide-rods M, to direct the movement of the piston and prevent lateral movement of the same, said cross-head being secured to the upper end of the piston-rod P^2. The said piston-chamber or steam-cylinder is provided with the usual inlet and exhaust ports, they being of a well-known kind, and the principle of operation of the several parts being that embodied in all steam-engines of ordinary construction it is unnecessary to define more particularly their relative operation.

Bolted to the bed-plate A, one at either end, are two single-acting plunger-pumps, S S′, provided with the ordinary straight plungers, S^2 S^3, said plungers being connected to the rocking beam F by means of the plunger-rods S^4 S^5. The pump-cylinders are provided with the usual stuffing-boxes. The pump-cylinder S′ is provided at its upper end with a lug or projection, T, to which a rod, T′, is bolted, the said rod at its upper end being bolted to one of the crank-shaft-supporting brackets G, this, as will be noticed, forming a rigid connection between the pump-cylinder-supporting standard and bracket, and consequently the fly-wheel and base-plate. At the lower end of the two pump-cylinders are slightly-projecting bosses U, two to each cylinder, the said bosses being cored out and screw-threaded. Screwed into each of the said bosses are check-valves U′, preferably of the globe-pattern, and of a standard and marketable kind, they being connected together by means of piping U^2, the said piping being preferably in two interchangeable sections connected together at the center by hollow T-joints U^3, which T's form the inlet and discharge ports for the pump, the check-valve of one pump being connected, as will be understood, to the one directly opposite of the opposite pump. The supporting-standards B are preferably smaller in width at their upper ends than at their base, which gives them a wide bearing upon the base-plate, and in consequence of their shape in cross-section, heretofore described, great strength is secured with the minimum amount of material.

By the arrangement and construction of the pump-connections as described much expense is saved in the manufacture of said pump, as it does away with valves formed as a part with the pump and other specially-constructed connection-pieces, and permits the use of check-valves and other parts of a common standard and marketable pattern, which is also of great benefit to the user of pumps, as it permits them to do their own repairing should any of the said parts get out of order, it being simply necessary for them to remove by unscrewing the inoperative piece or pieces and screw on or substitute new ones, which may be bought at any place where steam-fittings are sold.

The operation of the pumps (being on a principle common to ordinary single-acting plunger-pumps) will be obviously apparent, and therefore will not need further description.

By the arrangement of the valves in the steam-chest as described, and the connection being direct from the valve-stem to the crank-shaft, I am enabled to do away with strap-

joints or other compensating connections between the valve-stem and connecting-rod, which is of great advantage, as it insures a direct and positive movement of the valves, simplifies the construction and operation of the parts, and consequently cheapens the cost of manufacture.

I am aware that single-acting plunger-pumps of beam pumping-engines have been provided with check-valves and pipes connecting the pumps together; but such check-valves have been formed, so to speak, a part with the pump-cylinders, which was necessarily an expensive construction, and was of more or less inconvenience to the user, and such construction I do not desire to claim.

Reference being had to Fig. 3, it will be noticed that the steam-chest shown in dotted lines is circular in form, and that the ports communicating with the steam-chest and steam-cylinder are set at an angle to the steam-cylinder, the portion between the steam-cylinder having a plane surface next the steam-chest, to form a seat for the valve, which is of the ordinary slide-valve pattern, the stem of the slide-valve being directly connected to the valve-rod O, which is attached to the main shaft by means of the usual eccentric, the angle of the valve and ports being, as before described, equal to the pitch of a line drawn directly from the valve-stem to the center of the crank-shaft.

The steam inlet and exhaust ports, being of usual location relative to the steam-chest, are not shown.

I am not aware that pumps of this description have heretofore been provided with removable check-valves and interchangeable connection-pieces. Therefore

What I claim as new, and desire to secure by Letters Patent, is—

In a beam pumping-engine, the vertical plunger-pumps S S′, each having two projecting internally-screw-threaded bosses, preferably parallel to each other, as shown in the drawings, and each boss having a longitudinal opening communicating with the interior of the pump to which it belongs, in combination with the check-valves U′, screwed into said bosses, the two series of horizontal pipe-sections U^2, having externally-screw-threaded ends and connecting the valves of one pump with the valves of the other pump through which they communicate with the pumps, as set forth, and the inlet and discharge ports U^3, one for each series of pipe-sections with which they are connected, said ports being located preferably midway between the pumps, all constructed and arranged substantially as shown and described.

In witness whereof I have hereunto set my hand and seal at Springfield, Ohio, this 26th day of August, A. D. 1884.

BRUCE OBENCHAIN. [L. S.]

Witnesses:
P. J. CLEVENGER,
N. E. C. WHITNEY.