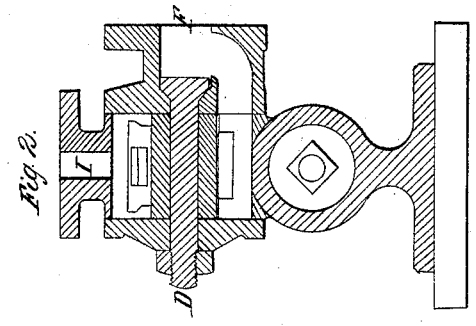
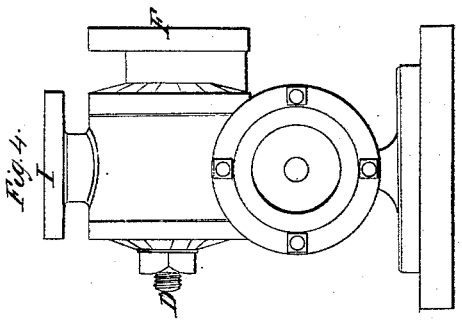
Worthington & Baker.

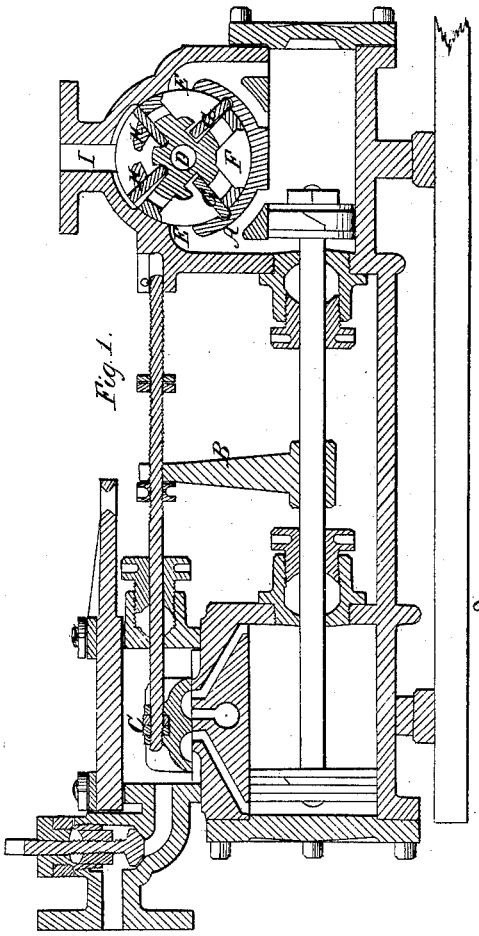
Pumping Engine.

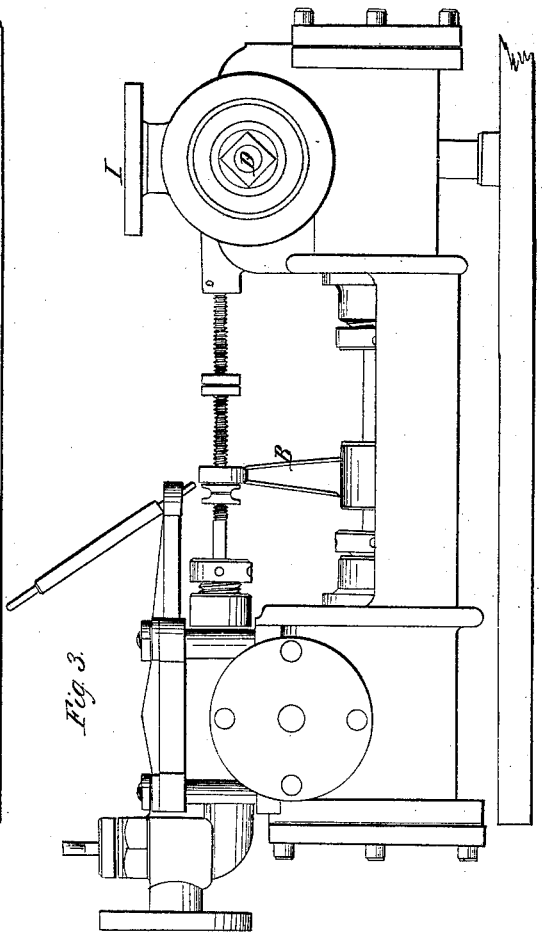
No. 6274.

Patented Apr. 3. 1849.









UNITED STATES PATENT OFFICE.

H. R. WORTHINGTON AND WM. H. BAKER, OF NEW YORK, N. Y.

METHOD OF INSURING THE ACTION OF THE VALVES IN DIRECT-ACTION PUMPING-ENGINES.

Specification of Letters Patent No. 6,274, dated April 3, 1849.

To all whom it may concern:

Be it known that we, HENRY R. WORTHINGTON and WILLIAM H. BAKER, of the city, county, and State of New York, have invented certain new and useful Improvements in the Manner of Constructing a Direct-Action Pumping-Engine; and we do hereby declare that the following is a full and exact description thereof.

1st. In September 1844 HENRY R. WORTHINGTON, one of the undersigned, obtained Letters Patent for throwing the steam valve of a direct action pumping engine by means of a spring. In the specification it is stated that "the movement of this valve has ordinarily been produced by attaching a projecting pin to the piston rod, or to a rod connected therewith; which pin was at the proper time made to strike a lever on the valve stem, and thereby move the steam valve in the proper direction for the alternate admission of steam to the opposite side of the piston. When the engine is thus arranged, the momentum of the moving parts is depended on for continuing the motion of the valve beyond the steam ports or openings; but it has been found in practice with all engines of this description, that the momentum is frequently insufficient for this purpose, as the motion is often extremely slow."

In our improved manner of constructing the machine the momentum and expansion of the steam is made to conspire to carry the valve the full distance through which it should pass in the following manner; dispensing entirely with the use of a spring or weight or any other similar device: Instead of the ordinary water ways, or passages for a double acting pump, two openings may be made into each end of the cylinder, coming together into one main opening, as seen in the drawing Figure 1 at A, A. Now when the piston moving from right to left, arrives nearly at the end of the stroke (the point where it is represented in the drawing Fig. 1) the resistance is suddenly reduced, for the reason that the piston passes between the two openings and allows the fluid, pressed before it, to pass with little or no obstruction behind it in the direction of the arrow. When the resistance is thus suddenly relieved, the momentum of the moving parts and the expansion of steam within the cylinder acting through the arm B on the piston rod serves to push the steam valve C with quickness and certainty entirely over the openings. Several ways for thus relieving the resistance will occur to a mechanic, as for example the cutting of longitudinal grooves or recesses in the pump cylinder, over which the piston may pass—or connecting the two ends of the pump chamber together by a pipe in which a cock shall be opened and shut at the proper time by means of the motion of the engine. Or a valve may be put in the piston itself, so contrived as to let the fluid pass through it. Again, when the water valves are so constructed as to be moved by the machine in an arbitrary manner independent of gravity, which for example may be done by employing a valve similar to a common slide valve; this valve may be so made as to allow the water to pass around it, and thus afford the required relief to the resistance.

The method first described is plainly to be preferred from its simplicity, and is found to answer well practically. Under any arrangement, the simple result to be attained is that of relieving or reducing the resistance against the pump piston at or near the end of the stroke so as to allow either momentum or expansion or both conjoined to act through the intervention of proper mechanical connections upon the steam valve and give it the required motion.

2nd. Our improved pump valves shown at G G and H H Fig. 1 are arranged around a common center with their seats forming the radii of a circle. This center piece or "spider" is cast separate so as to allow of the faces being planed up and properly fitted, after which it is fitted into the external ring or case. The passages should be carried up to the center line as shown at E E in order to keep the lower or suction valves G G covered with water, even though the valves themselves should be leaking. The water comes in at F Figs. 1, 2, and 4, lifts the flat valve G and passes through the opening E and A, into the cylinder, while at the same time, the water forced out by the piston, is passing through the force valve H and out at I. On reversing the motion of the piston, the contrary effect takes place, as in any double acting pump. By unscrewing the bolt that passes from side to side through the center hole D Fig. 2, an attendant may instantly and easily get at all the

valve of his pump, and thus avoid the inconvenience usually attending the performance of this important duty.

Having thus described our improvements, what we claim as new and desire to secure by Letters Patent is—

1. The removing or reducing the resistance against the pump piston in direct action steam pumps at the proper time in the stroke, by effecting a connection between the water on both sides of the piston, in order to allow either the momentum of the moving parts, or the expansion of the steam already within the cylinder, or both conjointed to act as explained to throw the steam valve across the ports with certainty, whether at high or low speeds.

2. We claim the method herein described of effecting the before mentioned and claimed object, namely, by making two passages into each end of the cylinder, across one of which the piston is forced, opening by this means free communication between the two ends of the cylinder.

New York.

HENRY R. WORTHINGTON.
WILLIAM H. BAKER.

Witnesses:
A. WORTHINGTON,
HENRY S. W. RANDOLPH.