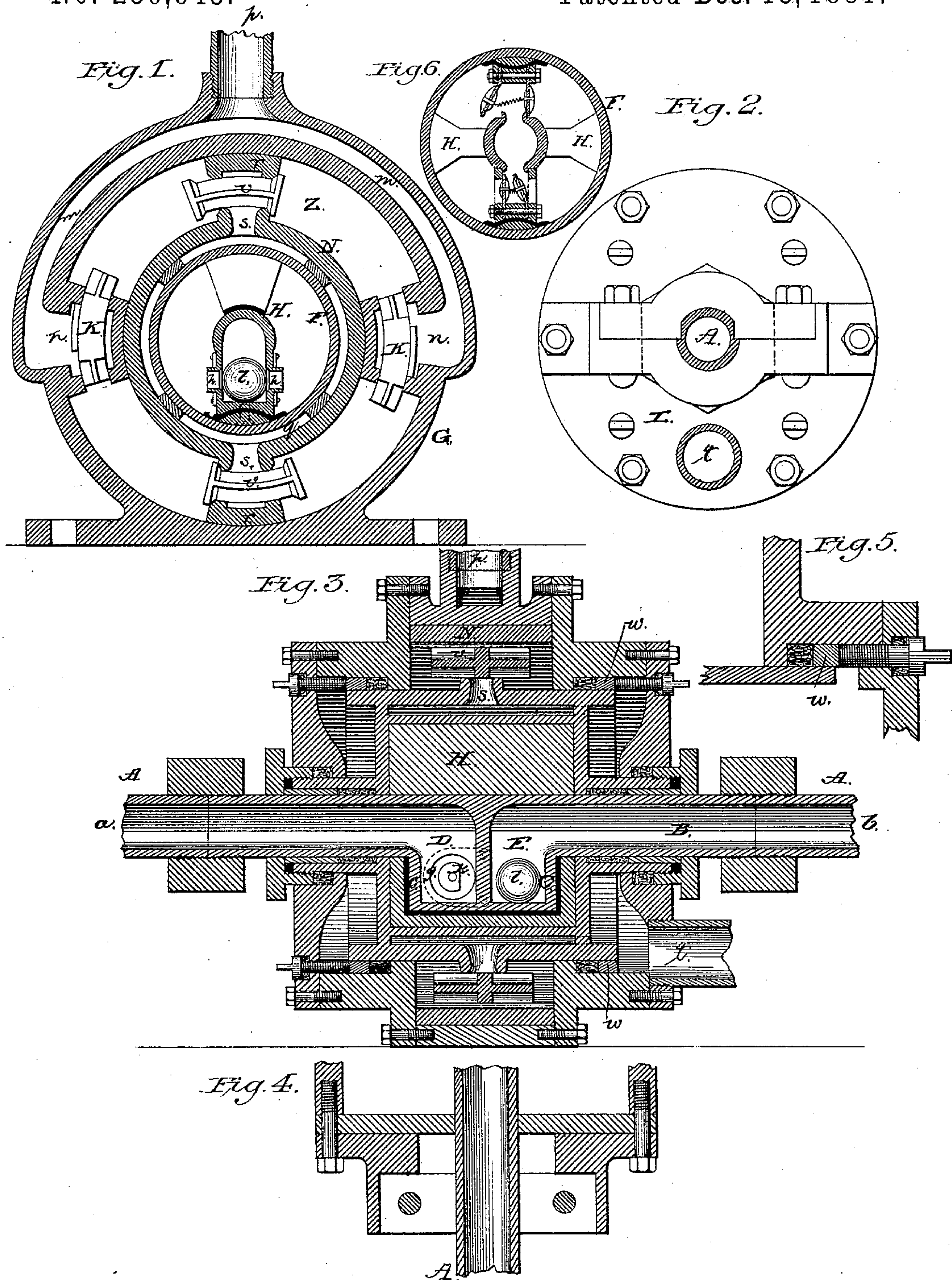


(No Model.) A. G. BRUST & W. H. DOUGLAS.

DOUBLE ACTING STEAM PUMP.

No. 250,643.

Patented Dec. 13, 1881.



WITNESSES

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UNITED STATES PATENT OFFICE.

ALBERT G. BRUST AND WILLIAM H. DOUGLAS, OF WASHINGTON, D. C.

DOUBLE-ACTING STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 250,643, dated December 13, 1881.

Application filed April 30, 1881. (No model.)

To all whom it may concern:

Be it known that we, ALBERT G. BRUST and WILLIAM H. DOUGLAS, citizens of the United States, resident at Washington, in the county of Washington, District of Columbia, have invented certain new and useful Improvements in Double-Acting Steam-Pumps; and we do hereby declare the following to be a full, clear, and exact description of the invention, such

as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a transverse vertical section of the pump. Fig. 2 is an end view of the hold-fast. Fig. 3 is a longitudinal vertical section. Figs. 4, 5, and 6 are details.

This invention has relation to double-acting steam-pumps for use in connection with water-supply pipes; and it consists in the construction and novel arrangement, in combination with a vibratory pump-cylinder, of an enveloping steam-chest and a vibratory piston-carrying cylinder, all as hereinafter shown and described.

In the accompanying drawings, the letter A designates any ordinary water-supply pipe, in the length of which is arranged a section, B, having recesses and valves, with reference to which the portion *a* of the main pipe becomes the supply and *b* the discharge, the intermediate section, B, being connected thereto by means of threaded unions or other water-tight couplings. This intermediate section, B, is provided with a chambered projection, C, preferably on each side, to prevent straining and jarring in the vibration. The supply-chamber D and discharge-chamber E are independent, and are provided with valve-openings *g* and *h* and valves *k* and *l*, the general principles of the construction of this portion of the machine being similar to those of the double-acting pump for which Letters Patent were granted to us, dated March 29, 1881.

F represents the working or vibratory water-cylinder, carrying the internal sector piston or pistons, H, working on the cylindrical bearing-surface of the valved section B. The cylinder F turns easily on its axis-bearings at the ends of the valve-section, and as it is vibrated the

water is drawn from the supply portion *a* of the main pipe and forcibly discharged through the section *b*.

G indicates the outer steam case or cylinder, the inner wall of which is designed to be concentric with the water-cylinder F. This steam-cylinder is provided with the steamways *m* and valve-chambers *n*, for the reciprocating valves K, which are preferably made in curved or arc form, as shown in the drawings. The steam-case G is designed to be firmly secured or connected to a base, bracket, or other support, and is provided with a supply-pipe, *p*, for the steam, the outlet *t* for the exhaust being arranged in one of the heads L of the steam-case.

The interior wall of the steam-cylinder is indicated at N. This wall may be cast with or bolted to the water-cylinder F, and, in either case, between the two cylinders, N and F, is located the exhaust-passage *q*, which receives steam from the chambered pistons *r* through the openings *s*. These pistons *r* project from opposite sides of the cylinder N outward to the inner wall of the outer case, G, while the valve-chambers *n* of said case project inward to the cylinder N, and said valve-seats *r* and valve-chambers *n* are designed respectively to move in steam-tight relation to the wall of said case and that of said cylinder during the vibration of the latter. The chambered pistons *r* of the cylinder N are provided with valves *v*, which are preferably of curved or arc form, and are designed to have a reciprocating movement in their seats, so that as each valve is pushed it closes the opening in one side of the chambered piston and opens that in the opposite side. The cylinder N is designed to have vibratory movement on bearings *w* in the end plates or heads of the case G, and suitable packings are provided for the joint. Packings and stuffing-boxes are also located on the pipe-section B, for the end bearings of the vibratory cylinders.

In the operation of this machine it will be observed that the steam, entering the steam-chambers Z through the steamways *m* and valve-chambers *n* of the case G, closes the valves *v* of the chambered pistons *r*, and, acting on these pistons, moves them in the circular chambers Z until the opposite ends of their

valves *v* come in contact with the projecting ends of the valves *K* of the valve-chambers *n*. This action pushes said projecting ends into the valve-chambers and opens these valve-chambers on the contact side, closing them on the opposite side. At the same time the valves *v* of the pistons are moved in the reverse direction by the excess of steam-pressure, closing the chambers of said pistons on the contact side and opening them on the opposite side. The direction of the steam-supply is now changed by the reciprocation of the valves, and the movement of the pistons is reversed. In this manner the cylinder *N* is vibrated and vibratory action is communicated to the water-cylinder *F*, thereby expanding and contracting alternately its water-chambers and forcibly moving the water from the supply portion of the main pipe through the discharge portion of the same.

Having described this invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, with a valved water-pipe and circumscribing vibratory piston-cyl-

inder, of a surrounding steam-case having inwardly-projecting valved chambers, and an inner steam-cylinder wall having chambered and valved pistons, and the steam and exhaust ways, substantially as specified.

2. The combination, with a fixed outer steam-case and a fixed water-supply pipe, of a vibratory water-cylinder within the steam-chest, the chambered steam-pistons, and valved chambers of the steam-case and their reciprocating valves, substantially as specified.

3. The combination, with an axial water-pipe and its circumscribing vibratory pumping-cylinder, of valved pistons connected to said pumping-cylinder, and an outer fixed steam-case having chambered valve-seats and valves connected therewith, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

ALBERT G. BRUST.
WM. H. DOUGLAS.

Witnesses:

WM. C. DERBY,
ROBT. FARNHAM.