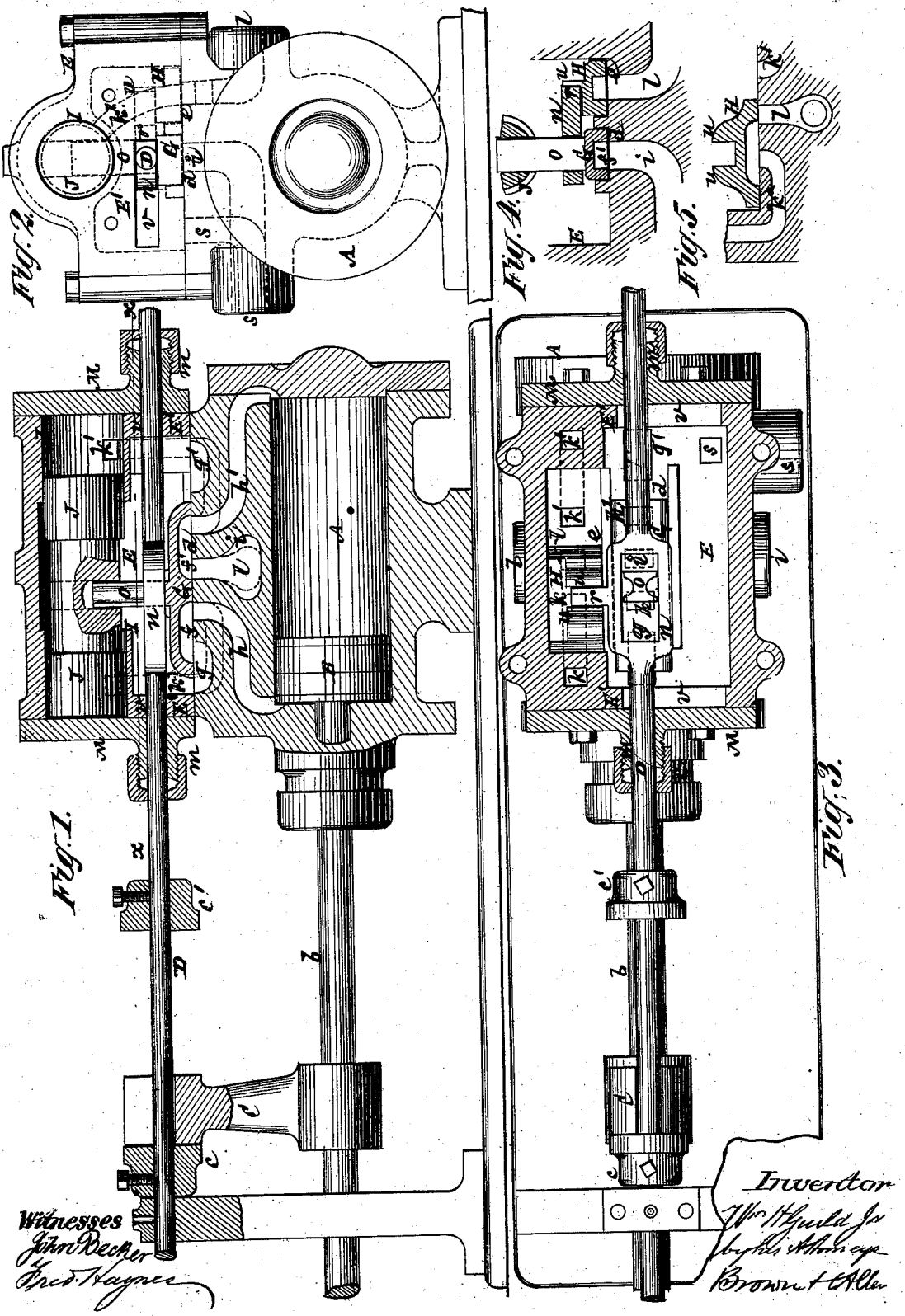
W. H. GUILD, Jr.

STEAM-PUMPS.

No. 194,672. Patented Aug. 28, 1877.



UNITED STATES PATENT OFFICE.

WILLIAM H. GUILD, JR., OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. **194,672**, dated August 28, 1877; application filed May 8, 1877.

To all whom it may concern:

Be it known that I, WILLIAM H. GUILD, Jr., of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Steam-Pumps, which improvements are fully set forth in the following specification and accompanying drawing.

This invention relates to steam-pumps having a direct action, and in which an auxiliary valve is used to assist in throwing the main valve by which the steam-piston is controlled or reciprocated.

The invention consists in a valve-chest constructed with transversely-arranged slots in its ends, in combination with a valve-rod of peculiar construction for directly controlling both the main valve and auxiliary valve, whereby increased facility is afforded for the introduction of said valve-rod within the chest, or removal therefrom when necessary, and for establishing or breaking the working-connection of said rod with said valves.

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of a direct-acting horizontal steam-pump having my invention applied. Fig. 2 is a rear end view of the same with the back cover of the valve-chest removed. Fig. 3 is a horizontal section, mainly on the line *x x*. Fig. 4 is a transverse section in part, in illustration of the main and auxiliary valves in their relation with certain ports; and Fig. 5 a longitudinal section in part, in illustration of the auxiliary valve and ports controlled by the latter.

A is the steam-cylinder of the pump, and B its working-piston, the rod *b* of which gives motion to the plunger of the pump. C is an arm or tappet on the rod *b*, by which motion is communicated through adjustable stops *c c'* to the valve-rod D.

E is the valve or steam chest of the engine, to which steam is admitted by an inlet, *s*; G, the main valve, and H the auxiliary valve. These valves are independent of each other, and work side by side on separate fixed seats or faces *d e*, so that they are not affected in their action by unequal wear, and their seats may be independently dressed.

One and the same valve-rod D, however, serves to start the main valve and to reciprocate the auxiliary valve by which the throw of the main valve is completed, as hereinafter described.

The main valve G is of a **B** or double-**D** construction, having duplicate cavities *f f'*, which, accordingly as they are alternately brought over front and back cavities *g g'* in the seat *d* and passages *h h'*, leading to the opposite ends of the cylinder A, or alternately over either of said end passages *h h'* and an exhaust-passage, *i*, alternately admit the steam to, and exhaust it from, opposite ends of said cylinder to reverse the motion of the piston B.

The auxiliary valve H is of a single-**D** construction, and serves to control passages *k k'*, leading to opposite ends of a transversely-bisected cylinder, I I, and an exhaust-passage, *l*. This cylinder I I is arranged within the valve-chest E, and contains an elongated piston, J, by which the throw of the main valve in opposite directions alternately is completed, accordingly as steam is admitted to, or exhausted from, opposite ends of the cylinder I I by the auxiliary valve. The action of these two valves G and H is such that they both travel in the same direction as each other and as the main piston B to reverse the stroke of the latter, and so that when the auxiliary valve H is admitting steam to the front or rear end of the valve-piston J the main valve G is admitting steam to the opposite end of the working-piston B, the auxiliary valve, however, having a constant positive motion, while the main valve has an intermittent one, and is only started by the valve-rod D, and its throw completed by the action of the auxiliary valve.

The valve-rod D, which thus controls both valves, is made in one piece, and without any shackling or loose connection between the valves, thus doing away with any liability of the valves working or getting loose, so as to interfere with their proper relative action by reason of irregular wear or irregular action of the means used to communicate a positive motion to the valves during a rapid or irregular working of the pump. To this end the valve-rod D is extended through both end covers M M of the valve-chest, and through guides or stuffing-boxes *m m* thereon, and is furthermore constructed, within the valve-chest, with a yoke, *n*, which receives through

it a stem, *o*, that projects from the back of the main valve G, and, entering a hole in the valve-piston J, forms a direct or constant connection between said valve and its piston. As the tappet C shifts the valve-rod by its action on or against either stop *c* or *c'*, one end of the yoke *n* strikes the stem *o* to start the main valve G, and cause its piston J to partially expose that one of the passages *k k'* which, by the action of the auxiliary valve H, admits steam to one end of the valve-piston J to complete the throw of the main valve, while the steam is being exhausted by the auxiliary valve through the other one of said passages *k k'*, connecting with the opposite end of the cylinder I I. The auxiliary valve H is operated by the valve-rod D in a positive and continuous manner by an arm or projection, *r*, on said rod, arranged to closely fit or enter a jaw or slotted projection, *u*, on the back of the auxiliary valve.

To provide for entry and removal of the valve-rod D, when constructed as described, within and from the valve-chest E, and to facilitate the connection and disconnection of the valves, the ends E' E' of the valve-chest are made with slots *v* through them in a transverse direction relatively to the valve-seats large enough to admit the yoke *n* and arm *r* through them, and providing for the turning of the valve-rod when making or breaking its connection with the valves.

I claim—

The valve-chest E, provided with transversely-arranged slots *v v* in its ends, in combination with the valve-rod D, constructed with a yoke, *n*, and arm *r* for operation of the main and auxiliary valves, substantially as specified.

WM. H. GUILD, JR.

Witnesses:

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