W. B. SNOW.

DUPLEX PUMPING-ENGINES.

No. 194,480. Patented Aug. 21, 1877.

Fig. 1.

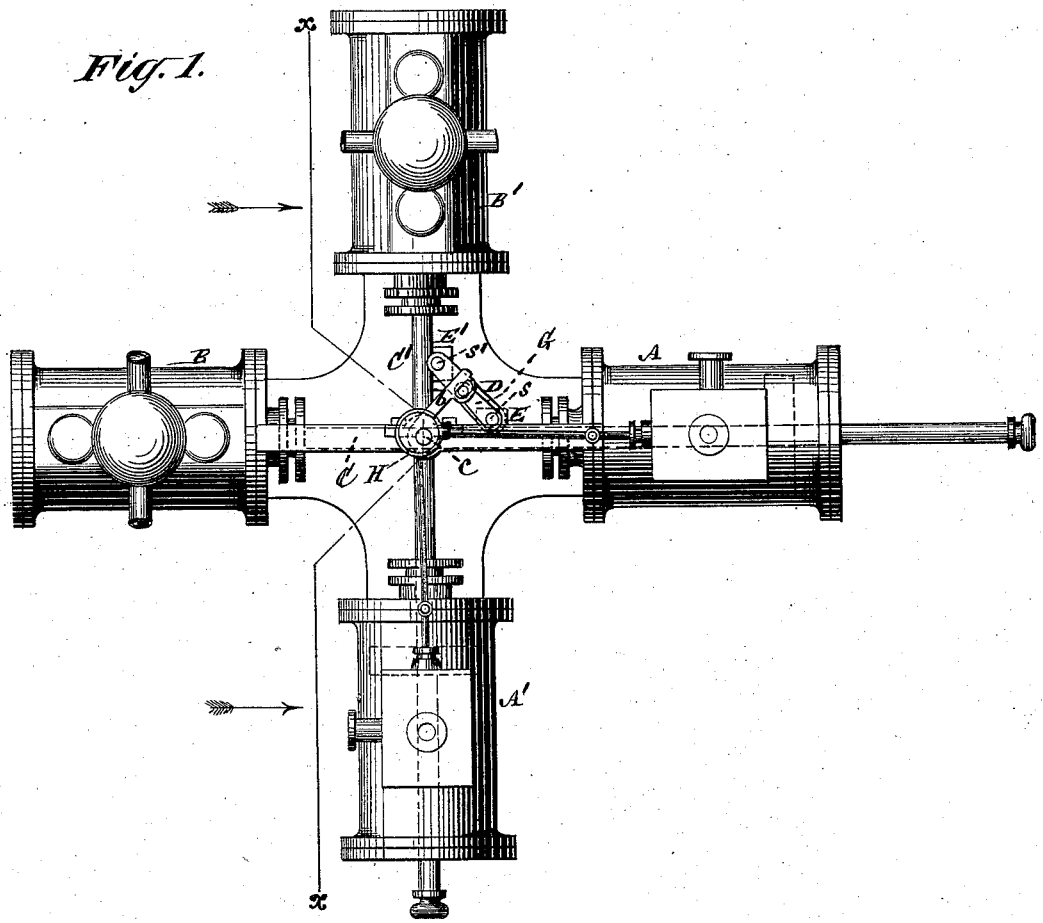
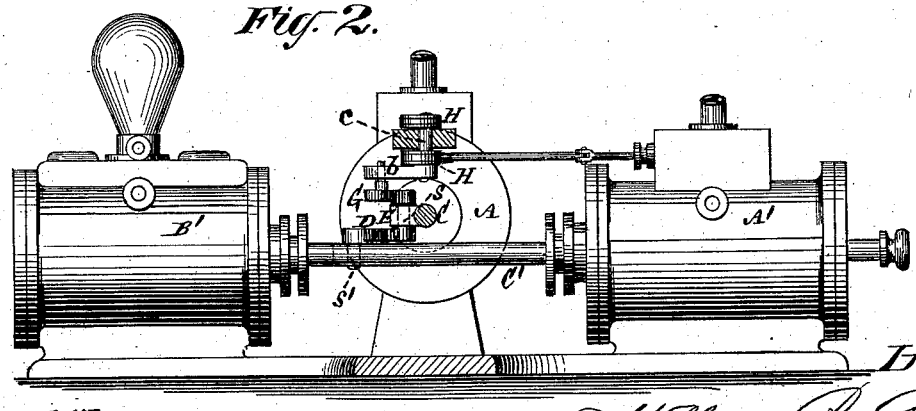


Fig. 2.



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WILLIAM B. SNOW, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN DUPLEX PUMPING-ENGINES.

Specification forming part of Letters Patent No. **194,480**, dated August 21, 1877; application filed July 21, 1877.

To all whom it may concern:

Be it known that I, WILLIAM B. SNOW, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Duplex Pumping-Engines, of which the following is a description, reference being had to the accompanying drawing, which forms part of this specification.

The invention consists in a combination, with the piston-rods of two pumping-engines arranged to cross or pass each other at right angles, of a revolving link having no fixed shaft or center of motion, and connected at its opposite ends with said rods, whereby the two engines are made to work in unison in like manner as if said rods were connected with a crank or cranks having a fixed axis or shaft.

The invention also consists in the piston-rods of two pumping-engines, arranged to cross or pass each other at right angles, and a revolving link connected at its opposite ends with said rods, of a crank and eccentrics, operated by the latter for giving motion to the valves of the engine, said crank deriving its motion from either axis or pivot of the revolving link, as hereinafter described.

Figure 1 represents a plan of a horizontal duplex pumping-engine constructed in accordance with my invention, and Fig. 2 a vertical section of the same on the line *x x*.

A A′ are two steam-cylinders of my improved duplex pumping-engine, and B B′ the pumping-cylinders thereof. C C′ are the rods which connect the pistons of the steam-cylinders with the pistons of their respective pumping-cylinders. Said steam-pumps or duplicate pumping-engines are so combined in relation with each other that the axial lines of the cylinders of the two engines and of their piston-rods lie in planes which cross or pass each other at right angles, and so that the steam and pumping cylinders of either engine are on opposite sides of said intersecting planes, with the piston-rods C C′ of either engine out of level with or to one side of each other, to permit of said rods crossing or passing one another.

These rods C C′ are connected with each other by a revolving link, D, working at its one end by a pivot or pin, *s*, in a block or cross-head, E, on the rod C, and working at its opposite end by another pivot or pin, *s′*, in a corresponding block or cross-head, E′, on the rod C′. This revolving link, which has no fixed shaft, and is arranged to rotate between the rods C C′, is one-half the length of the stroke of either engine.

By this combination two engines, or the piston-rods thereof, are connected by a revolving link in crossing or passing and at right-angled relations with each other, and so that either axis of the revolving link alternates with the other in the movement of the combined engines. By such combination, also, the two engines are caused each to control the other in perfect unison without the aid of a crank-shaft, connecting-rods, or fly-wheels, and, when working, produce a constant and even flow of liquid, both pumps being connected so that the same inlet and same outlet are common to both.

The unison of action of the two engines is maintained at all points throughout the revolution of the link D, one engine-piston being at the end of its stroke when the other is at half-stroke, and changing these positions in relation with each other as perfectly as if the pistons were connected to a shaft having cranks at right angles with each other.

Attached to either axis or pivot *s* or *s′* of the revolving link D is a crank, G, which serves, by means of an arm, *b*, to give rotary motion to a stud or shaft, *c*, on which are eccentrics H H for operating the valves of the two engines.

I claim—

1. The combination, with the piston-rods C C′ of the two pumping-engines arranged to cross or pass each other, as described, of the revolving link D, having no fixed shaft or center of motion, and connected at its opposite ends with said rods, substantially as specified.

2. The combination, with the crossing or passing piston-rods C C′ of the two pumping-engines and their connecting revolving link D, of the crank G and the eccentrics H H, operated by the latter for giving motion to the valves of said engines, essentially as described.

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Witnesses:
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