(No Model.)

J. HENSHALL, Dec'd.

I. A. HENSHALL, Administratrix.

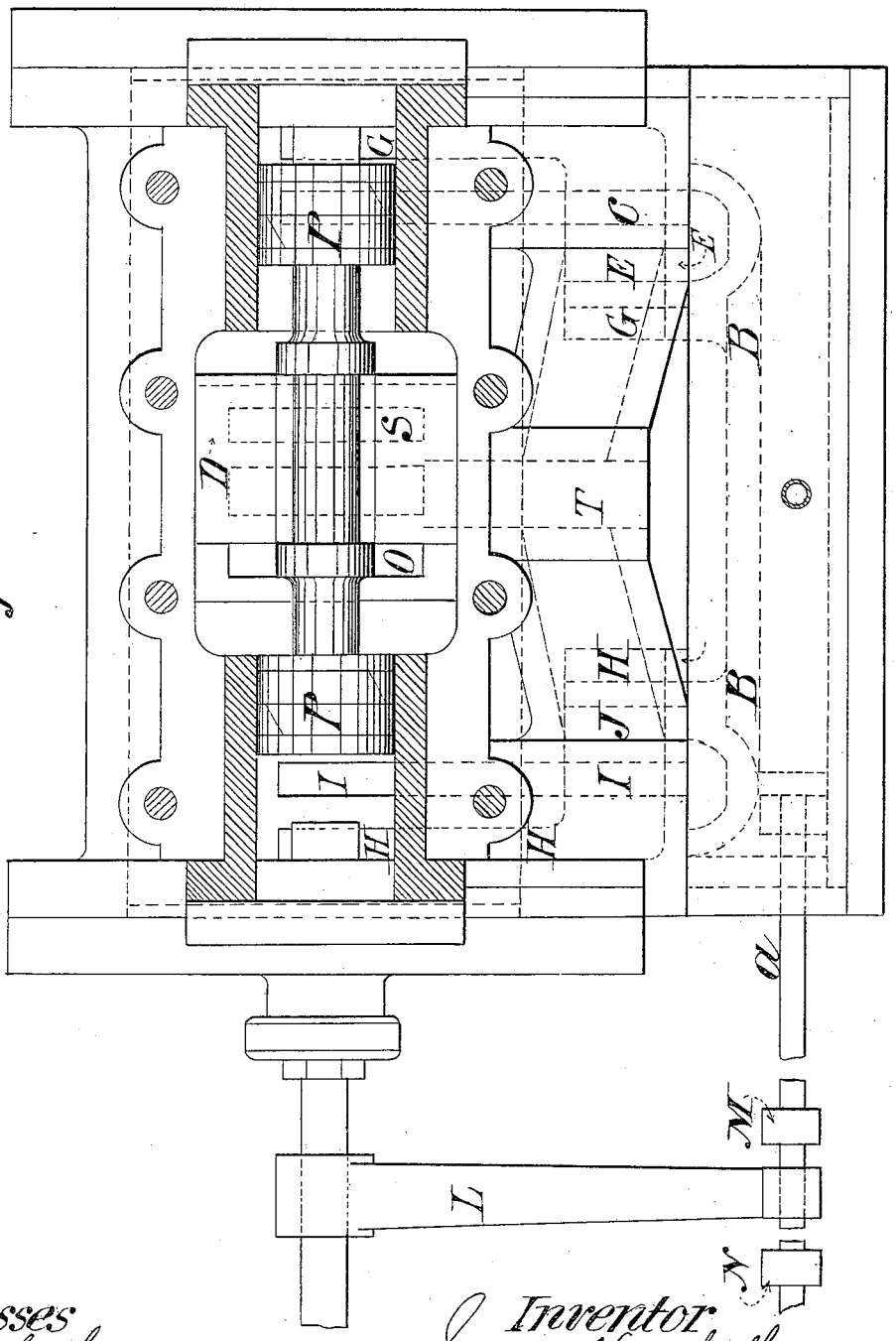
STEAM PUMP.

4 Sheets—Sheet 1.

No. 262,293.

Patented Aug. 8, 1882.

Figure 1



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(No Model.) J. HENSHALL, Dec'd. 4 Sheets—Sheet 2.

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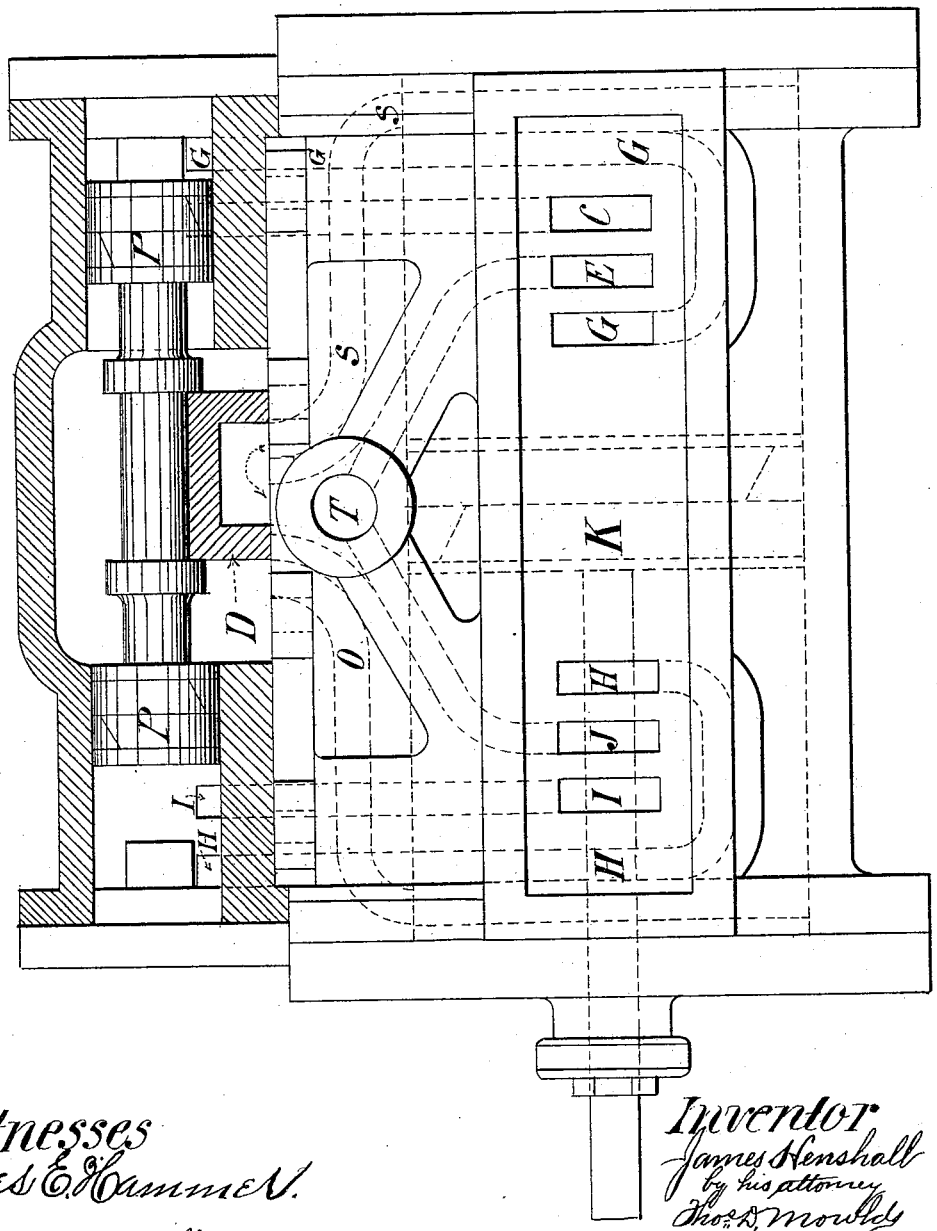
STEAM PUMP.

No. 262,293. Patented Aug. 8, 1882.

Figure 2



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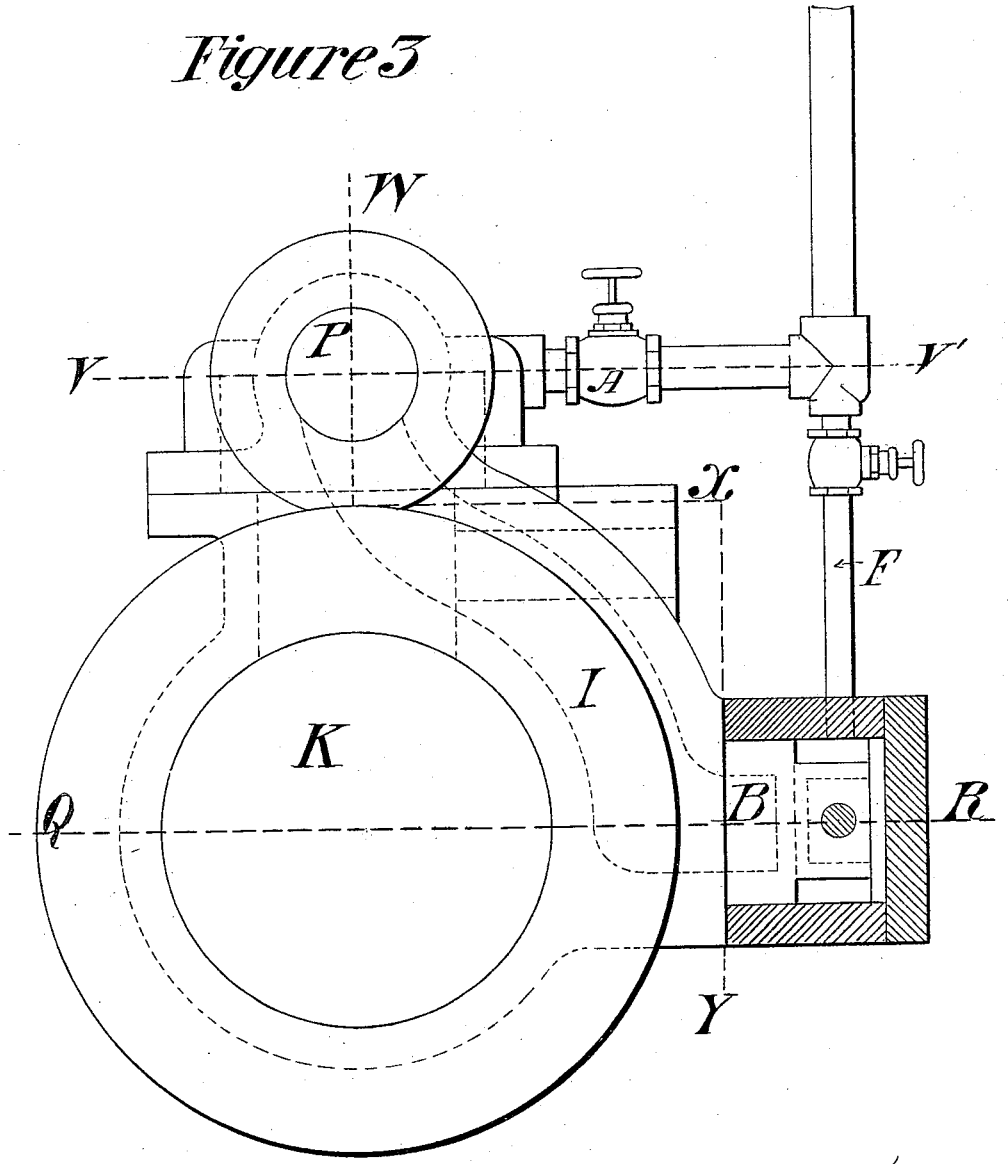
(No Model.) J. HENSHALL, Dec'd. 4 Sheets—Sheet 3.

I. A. HENSHALL, Administratrix.

STEAM PUMP.

No. 262,293. Patented Aug. 8, 1882.

Figure 3



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(No Model.) J. HENSHALL, Dec'd. 4 Sheets—Sheet 4.

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STEAM PUMP.

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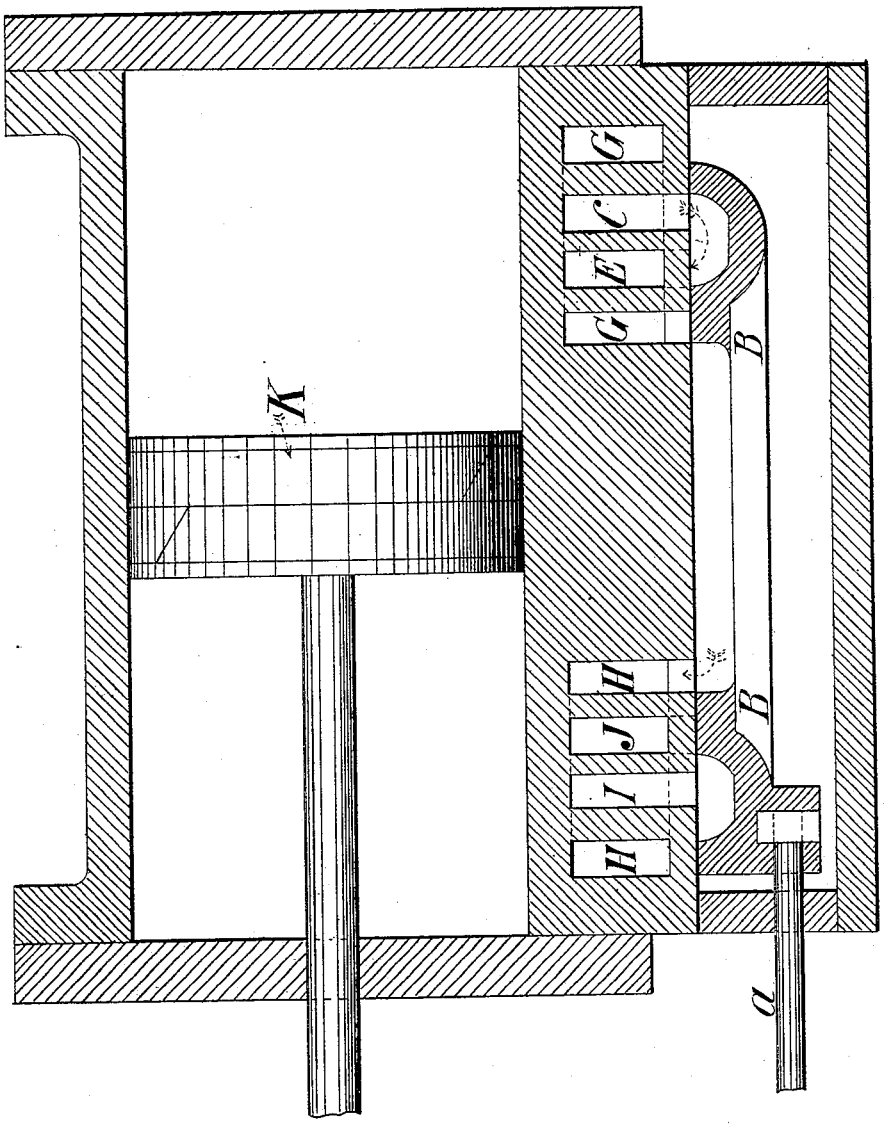

Figure 4

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UNITED STATES PATENT OFFICE.

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STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 262,293, dated August 8, 1882.

Application filed April 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES HENSHALL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has relation to direct-acting steam-pumps; and the object is to provide means to prevent the sticking of supplemental or small piston when the speed of the pump is slowed down.

Heretofore in this style of pump the same steam operated both small and large pistons, and when the pressure of steam was reduced and the pump slowed down the small piston was likely to stick. This difficulty is entirely overcome when the steam is introduced into both cylinders through separate and independent pipes, thus being able to regulate the pressure on either cylinder without reference to the other. When the pump is slowed down and the steam in the main cylinder reduced, if necessary, the full pressure of steam may be retained on the small or supplemental piston, and all danger of sticking is avoided, no matter how slow the main piston is moving. I attain this object by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan showing a horizontal section through small cylinder on line V V′. (See Fig. 3.) Fig. 2 is an elevation, and shows a vertical section through small cylinder and steam-chest on line W X Y. (See Fig. 3.) Fig. 3 is an end elevation with cylinder-heads, and also the end of the steam-chest, removed, showing small independent slide-valve B. Fig. 4 is a horizontal section on line Q R, (see Fig. 3,) and shows a section through the slide-valve B in connection with the pump-driving piston K.

Referring to the drawings, P represents the piston in the small or supplemental cylinder; K, the pump-driving piston in the main cylinder.

O and S are two steam-ports leading from the small to the large cylinder in the direction indicated by the dotted lines.

D is the main valve, situated in the supplemental cylinder. This valve opens and closes the ports O and S.

B B is a slide-valve in a steam-chest situated on the side of the main cylinder.

I J H and G E C are steam-ports on the side of the large cylinder, at either end thereof.

L is an arm attached to the rod of the piston K.

a is the valve-rod, attached to the valve B B.

N and M are collars or stops on valve-rod *a*.

T is the exhaust for both large and small cylinders.

A is a steam-pipe conveying the steam into the small cylinder, from whence it passes to the large or main cylinder, to move the main piston.

F is another and independent pipe conveying steam into the steam-chest on the side of the main cylinder, from whence it passes to the small or supplemental cylinder at either end of the supplemental piston.

The mode of operation is as follows: Steam being introduced into the main cylinder at a point in front of the main piston K, the said piston is forced to the right and the arm L, attached to the piston-rod, comes in contact with the collar M and moves the valve B B, thus opening the steam-port G and allowing the steam to pass through the port, in the direction indicated by the dotted lines, up into the small cylinder, forcing the small piston from right to left, moving the main valve D, and opening steam-port S, thus allowing the steam which has entered the small cylinder through the pipe A to enter and pass through the open port S into the main or large cylinder at the end thereof back of the piston K, thus causing it to move from right to left. At the same time the exhaust-steam at the opposite end of the small piston is forced down the open port I, in the direction shown by the dotted lines, under the valve B, into the port J, and out the main exhaust T. The reverse motion is as follows, viz: The main piston K moving from right to left, the arm L comes in contact with the collar N, moving the valve B B, thus opening the port H and allowing the steam to pass through said port up into the small cylinder, forcing the small piston from left to right, moving the

valve D, closing the port S, and opening the port O, thus allowing the steam from the pipe A to pass down the open port O into the main cylinder in front of the large piston K, causing it to move from left to right. At the same time the exhaust-steam from the small piston is being forced down the open port C, under the valve B, into the port E, and out the main exhaust T.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a steam-pump, the combination of the piston of main valve, having separate induction and eduction ports, with auxiliary valve having its steam-port and exhaust-ports, substantially as described.

2. In a steam-pump, the main pump-driving cylinder, having ports H J I and E C G, in combination with the valve B B, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES HENSHALL.

Witnesses:
OTIS EGAN,
THOMAS D. MOWLDS.