

No. 667,660.

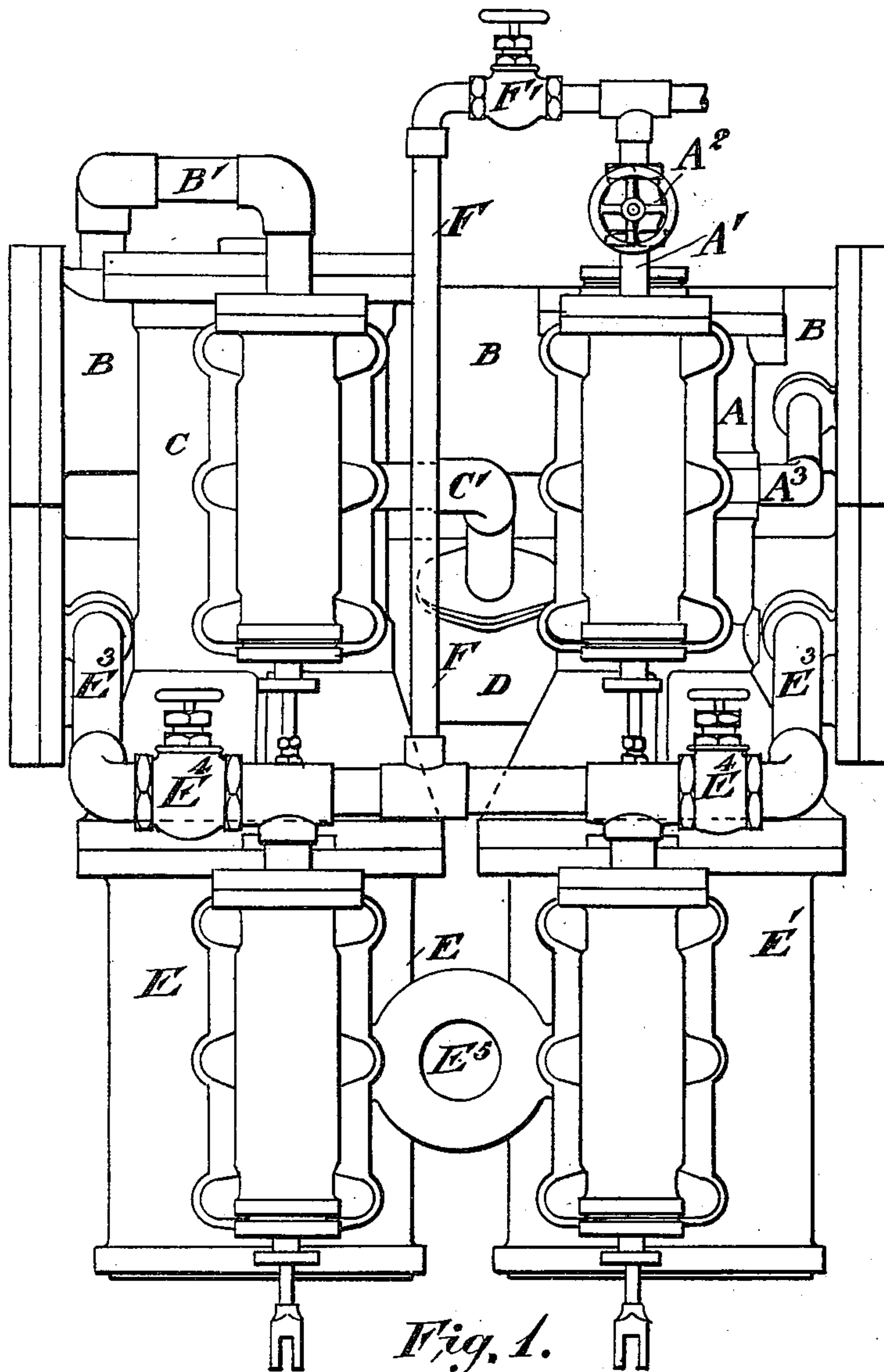
Patented Feb. 5, 1901.

W. J. P. MOORE.
DUPLEX PUMPING ENGINE.

(Application filed Sept. 27, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Attest
Walter Donaldson
H. L. Mordant

Inventor
William James Perry Moore
by Wm. Spear
Atty.

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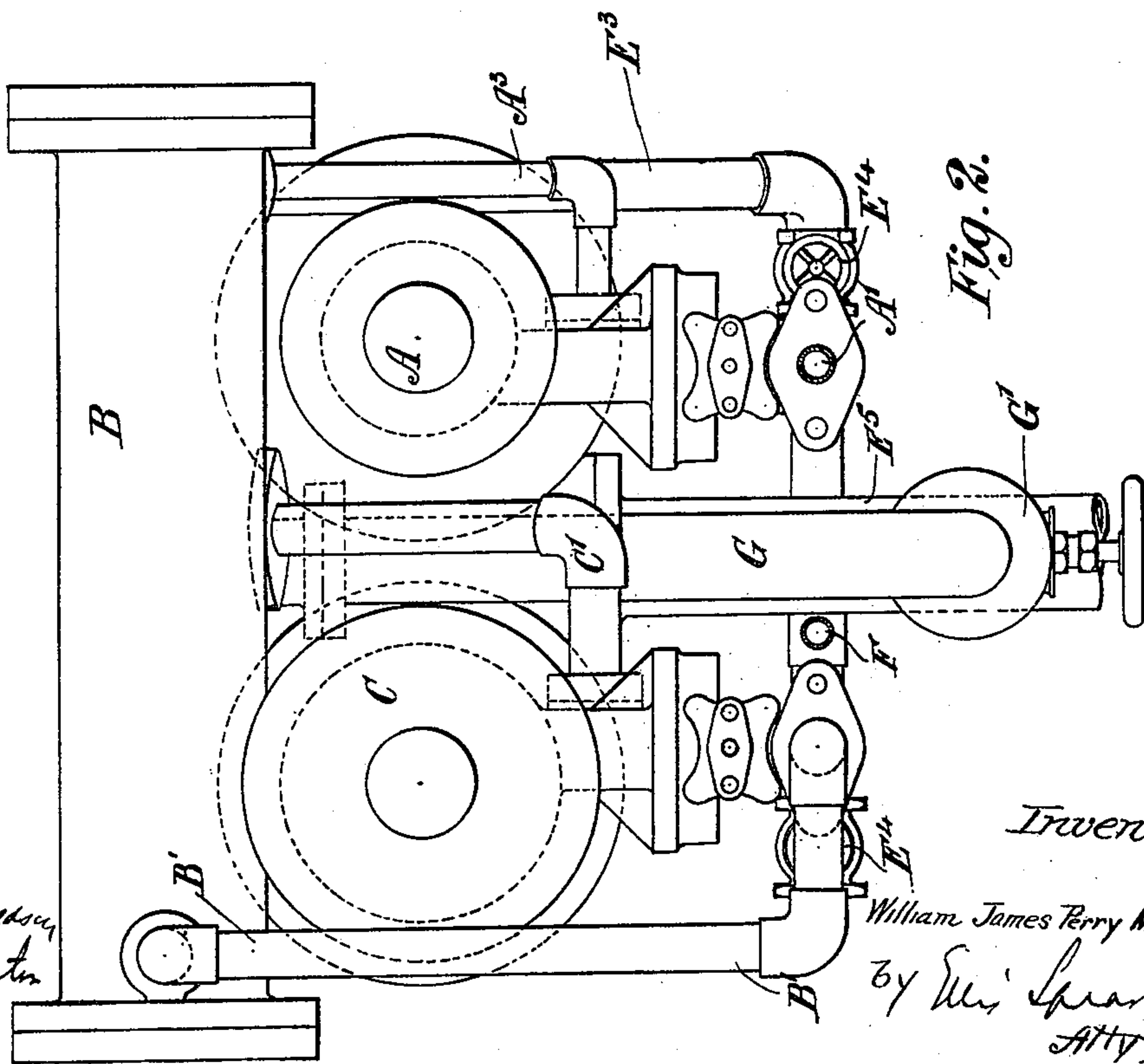
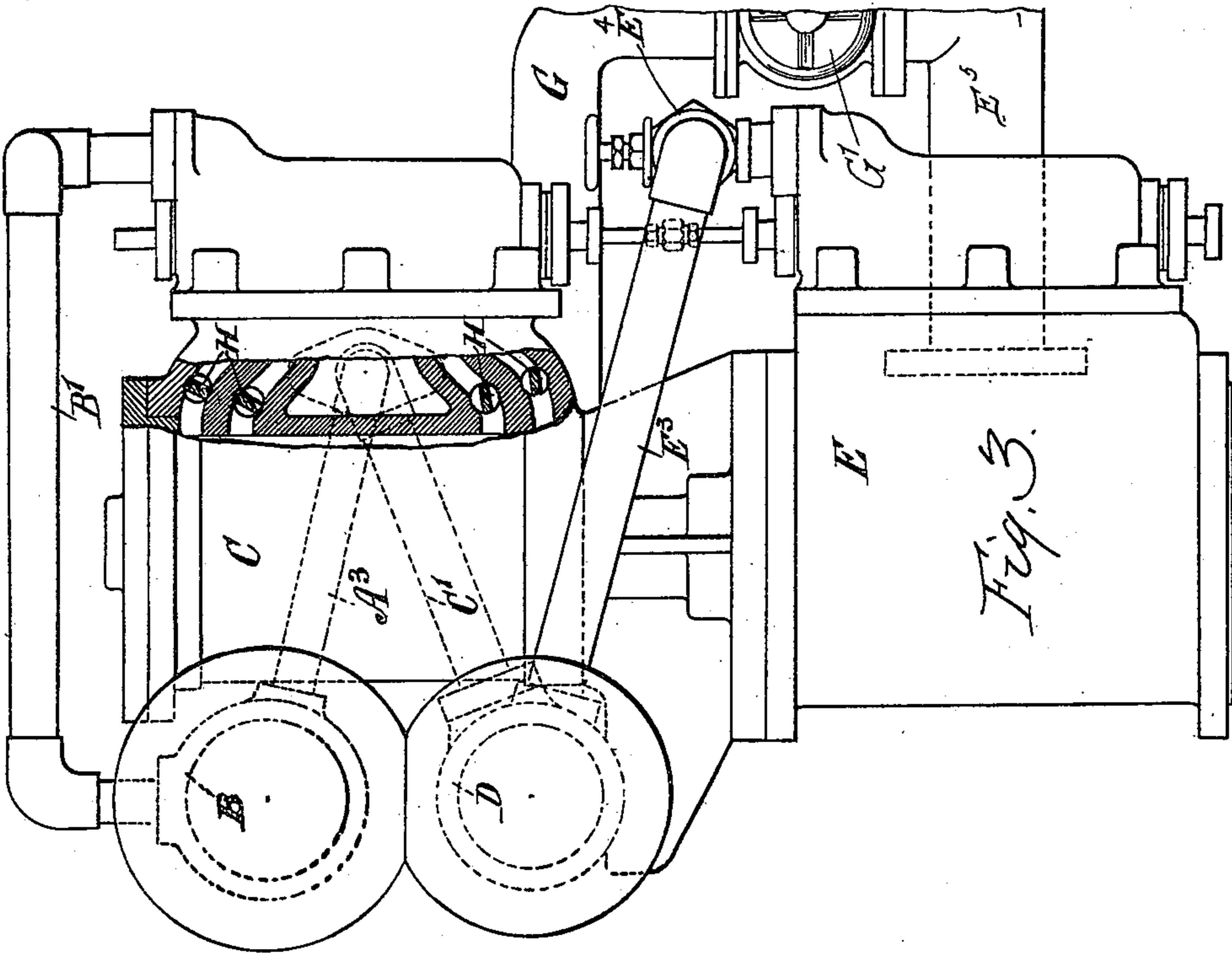
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2 Sheets—Sheet 2.



Attest
M. L. McDonald,
J. L. Wright.

Inventor

William James Perry Moore

by Wm. Spear
Att'y.

UNITED STATES PATENT OFFICE.

WILLIAM JAMES PERRY MOORE, OF LONDON, ENGLAND.

DUPLEX PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 667,660, dated February 5, 1901.

Application filed September 27, 1900. Serial No. 31,267. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JAMES PERRY MOORE, engineer, a citizen of the United States of America, residing at 7 Sloane street, London, W., in the county of Middlesex, England, have invented certain new and useful Improvements in Connection with Duplex Pumping-Engines, (for which I have made application for Letters Patent in Great Britain, No. 3,747, and dated February 26, 1900,) of which the following is a specification.

This invention relates to improvements in connection with the construction and arrangement of steam pumping-engines of the type known as "duplex," the object of the invention being, primarily, to dispose the steam-cylinders in such a manner as to admit of an efficient arrangement for obtaining a triple expansion of the steam employed as the motive power of the pumps, and, secondarily, to so dispose the steam-piping and connections that either the high and intermediate cylinders may be both cut out and the live steam passed directly to the low-pressure cylinders, thus working as a single pump, or that the live steam may be passed through the high and intermediate cylinders and then exhausted into atmosphere or condenser, the low-pressure cylinders being entirely shut out, thus making the machine a cross-compound.

In the two accompanying sheets of explanatory drawings, Figure 1 is a front elevation of the steam-cylinders and valves. Fig. 2 is a plan, and Fig. 3 a side elevation, of the same arrangement.

In carrying my invention into effect in one convenient manner I mount my steam-cylinders, with the water barrels or chambers oppositely disposed to them, on the frame or entablature of the pump, placing two steam-cylinders for actuating the plunger of each pump. I arrange these cylinders in the form of one high-pressure cylinder A on the one side, which takes live steam by a pipe A', provided with a cock A², and discharges its exhaust by a pipe A³ into a receiver or intermediate chamber B, from which the steam passes to the primary cylinder C on the other side by a pipe B', the exhaust from this second or primary cylinder C being discharged by a pipe C' into a receiver or second intermediate chamber D, from which the steam

passes by pipes E³ E³, controlled by cocks E⁴ E⁴, to supply the final cylinders E E' of each of the combinations, having a common exhaust E⁵, open either to atmosphere or condenser. Thus primarily on the one pump I have the steam acting originally with its initial pressure in the cylinder A, and on its companion cylinder E', alined with it, I have the steam which has been exhausted from the second cylinder C of the series, while on the other pump the cylinders are proportioned to receive first the exhaust from cylinder A, while its companion cylinder receives the exhaust from the second intermediate receiver D, similarly to the manner in which the larger cylinder C' on the other pump works, it being in the combination formed by the final and the high-pressure cylinder, the numerical disposition of the cylinders on each pump being, so far as the sequence of the use of the steam is concerned, on the pistons as 1 and 3 for the one pump and 2 and 3 for the other pump.

I arrange a by-pass pipe F, provided with a cock F' in order to allow the live steam, when so desired, to pass directly to the low-pressure cylinders E E', so as to work as a single pump, the high and intermediate pressure cylinders and receivers B and D being cut out by the closing of the cock A² and also of the cocks E⁴ E⁴. This arrangement is clearly shown in Fig. 1.

When it is desired to utilize only the high and intermediate pressure cylinders as the working cylinders the low-pressure cylinders may be entirely cut out (thus making the engine a cross-compound) by closing the cocks E⁴ E⁴ and exhausting either through or around the receiver D the exhaust-steam passing away by a by-pass pipe G, provided with a cock G' and connected to the common exhaust-pipe E⁵, as shown on Figs. 2 and 3. This pipe G is omitted from Fig. 1 to prevent confusion.

I arrange controlling-valves H in the ports of one or more of the cylinders (shown in section on the intermediate pressure-cylinder in Fig. 3) for the purpose of regulating the admission of the steam into or the emission of the steam from the said cylinder or cylinders. These valves are preferably small hand-plug valves recessed in the cylinder-ports, as shown in Fig. 3. I arrange my intermediate

receiver for receiving the exhaust from the primary or second cylinder of the series and for supplying it to the final cylinders of the combination between the cylinders or in any
5 convenient position. I employ any well-known form of slide, piston, or other valves for controlling the admission and exhaust steam from the cylinders, and I arrange my
10 cylinders with connections and fittings to suit the type of framework which is to be constructed and the form and type of pump and fittings which are to be used in connection therewith.

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

1. In combination in a duplex steam-pump, a primary steam-cylinder, a receiver connected therewith to receive its exhaust-steam,
20 an intermediate cylinder connected with said receiver to be supplied with steam therefrom, a second receiver connected with the intermediate cylinder to receive the exhaust therefrom, two final or low-pressure cylinders
25 connected with the second receiver to be supplied with steam therefrom, a steam-supply pipe, a by-pass extending from the supply-pipe to the final or low-pressure cylinders, and

valves for cutting off the high-pressure and intermediate cylinders from the steam-supply, substantially as described. 30

2. In a duplex steam-pump and in combination, a primary steam-cylinder, a receiver connected therewith to receive the exhaust-steam therefrom, an intermediate cylinder
35 connected with the receiver to be supplied with steam therefrom, a second receiver connected with the intermediate cylinder, two final or low-pressure cylinders connected with the second receiver to be supplied with steam
40 therefrom, a final exhaust-pipe connected with the final or low-pressure cylinders, valves for cutting off communication between the final or low-pressure cylinders and the second receiver and a by-pass exhaust-pipe between
45 the intermediate cylinder and the final exhaust-pipe whereby the intermediate cylinder may be caused to exhaust while the low-pressure cylinders are cut out, substantially as described. 50

In witness whereof I have hereunto set my hand in presence of two witnesses.

WM. JAMES PERRY MOORE.

Witnesses:

W. M. HARRIS,
A. W. MATHYS.