

No. 834,217.

PATENTED OCT. 23, 1906.

P. F. ODDIE.
DUPLIX VALVE GEAR.
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Fig.1.

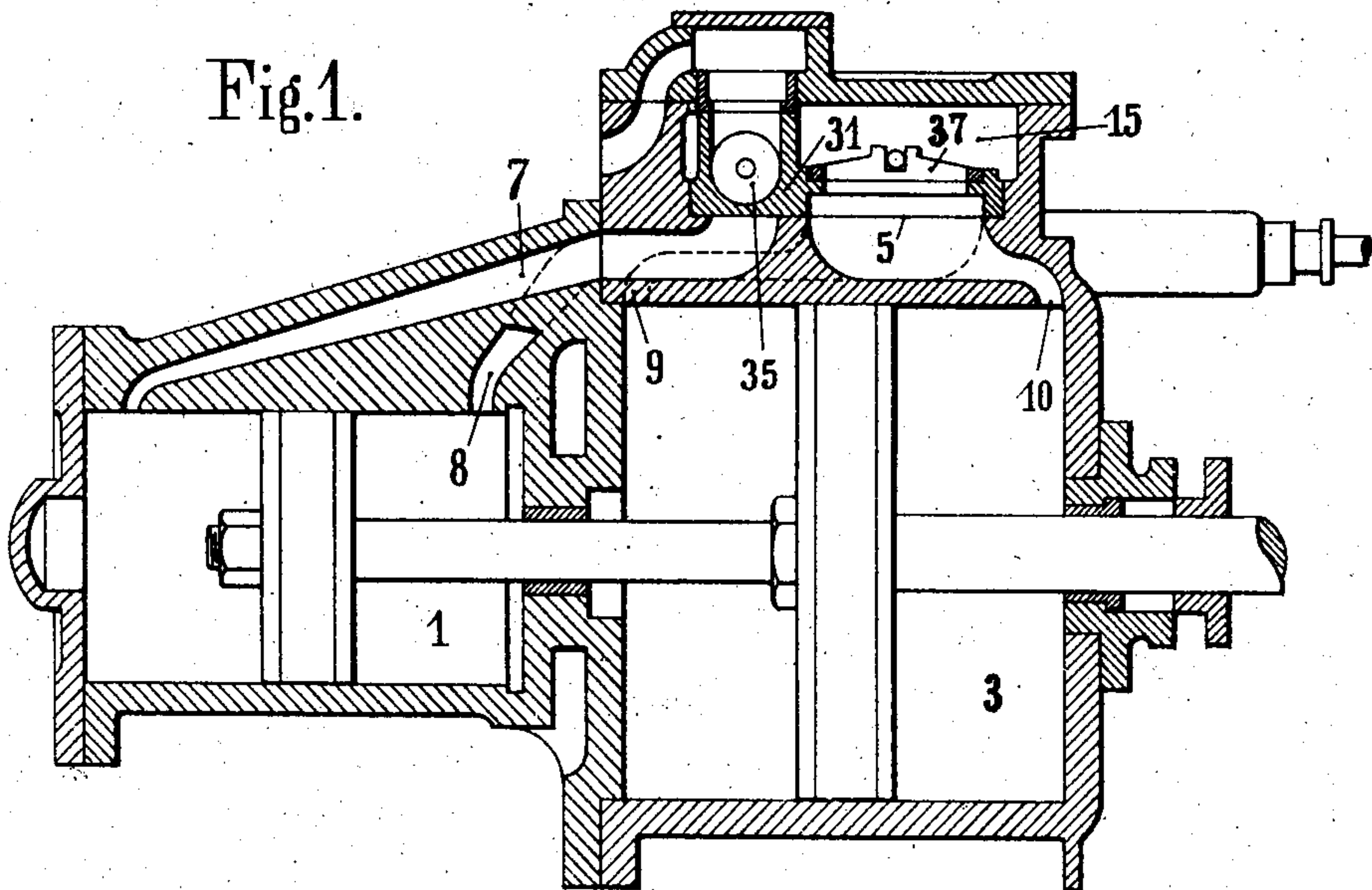
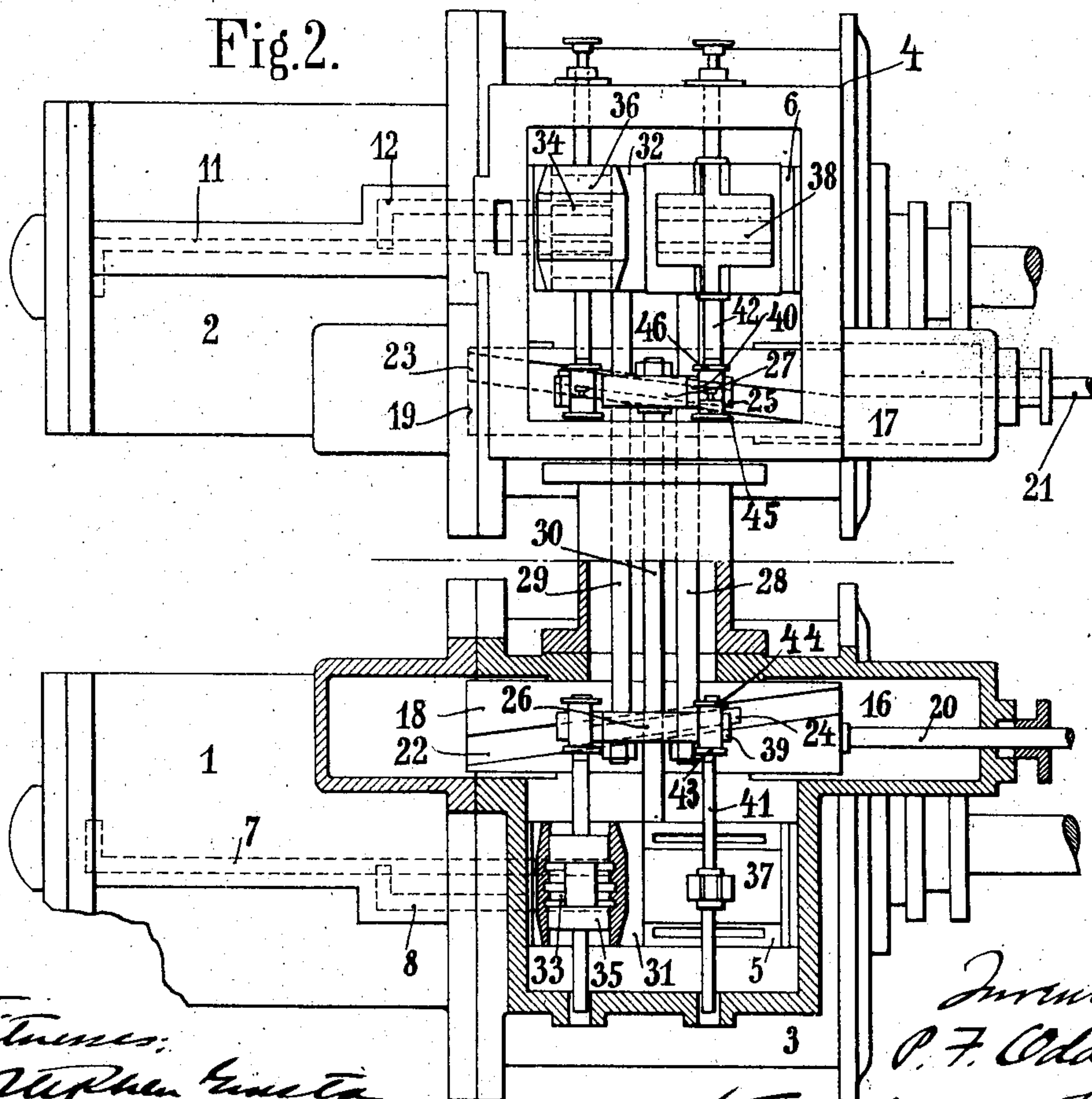


Fig.2.



Witnesses:
Stephen K. Latta
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Inventor:
P. F. Oddie
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UNITED STATES PATENT OFFICE.

PHILIP FRANCIS ODDIE, OF LONDON, ENGLAND.

DUPLEX VALVE-GEAR.

No. 834,217.

Specification of Letters Patent.

Patented Oct. 23, 1906.

Original application filed August 31, 1904, Serial No. 222,904. Divided and this application filed January 19, 1906. Serial No. 296,879.

To all whom it may concern:

Be it known that I, PHILIP FRANCIS ODDIE, a subject of the King of Great Britain and Ireland, and a resident of Wimbeldon, London, England, have invented new and useful Improvements in Duplex Slide-Valve Gears, of which the following is a specification.

My invention has for its object the production of a simple form of a duplex slide-valve gear which is especially suitable for use with high-pressure steam. It is particularly designed for such pumps as are known under the name "tandem compound duplex pumps."

It is generally known that it was impossible formerly without the arrangement of a special compensating device to obtain even only the smallest expansion in the case of duplex pumps by the arrangement of the expansion-valves. The reason of this is that as soon as the drop in pressure corresponding to the expansion passes beyond the water-pressure the piston remains standing.

By means of the present invention a much higher expansion can be obtained in the cylinder of a compound pump than was hitherto possible, the reasons being as follows: It is characteristic of the motion of the duplex pump that when the first piston has passed over about two-thirds of its stroke the main slide-valve of the second piston is reversed—that is, the latter allows the exhaust-steam of the previous stroke to escape. Now as according to my invention this exhaust-steam enters into a common chamber it follows that the pressure in this chamber is increased. This increase of the pressure will naturally immediately act on the low-pressure piston of the first cylinder pair and will thereby compensate the resulting decrease of pressure corresponding to the expansion of the steam in the high-pressure cylinder. The steam is thereby already cut off from the high-pressure cylinder, so that the first piston pair can complete its stroke, which in the case of systems as hitherto arranged was not possible. In this manner, according to my invention, it is not only possible to make a valve-gear of great simplicity for duplex pumps the slide-valve and controlling-gear of which are not exposed to the high pressure, but also to obtain a greater economy by a much better utilization of the expansion in

the high-pressure cylinders than was hitherto possible in the case of other compound duplex pumps without a compensating device.

According to the present invention I arrange the high and low pressure valve-gear only in one valve-chest and use only one main valve for the high and low pressure cylinder. This common valve-chest forms a receiver for the steam before passing into the low-pressure cylinder.

Referring to the drawings, Figure 1 is a longitudinal section through a compound tandem duplex pumping-engine according to my invention. Fig. 2 is a plan of the same, showing the valve-gear for the high and low pressure cylinders in position.

The compound tandem duplex pumping-engine has the high-pressure cylinders 1 2 and the low-pressure cylinders 3 4. Each low-pressure cylinder is provided with a valve-face 5 6, having ports and passages 7 8, 9 10, and 11 12 and two other passages corresponding to the passages 9 and 10, communicating with the ends of the cylinders, these valve-faces being situated in a chamber 15. Recesses 16 17 are formed in each low-pressure cylinder, adjacent to the valve-face, in which blocks 18 19 are located, these blocks being driven by arms on the piston-rods, which are connected with the rods 20 21. Cross-heads 26 27, having inclined projections 24 25, engage in inclined slots 22 23, formed in the blocks. Each cross-head is connected by suitable rods or connecting-pieces 28 29 30 to each main distributing-valve 31 32 of the opposite cylinder. These main valves are formed with recesses 33 34, into which the steam or working fluid is admitted.

It is essential that one sliding block and one driving-piece and one main valve are only necessary for each high and low pressure cylinder, as the main valve for both the high and low pressure cylinder has the same motion and is situated in the common chamber 15, which forms the receiver for the steam before passing into the low-pressure cylinder. The expansion-valves 35 36 for the high-pressure cylinders are constructed according to my former patent, No. 818,907, the arrangement being such that each cross-head actuates the main valve of the opposite cylinder and the expansion-valve of its own, and vice versa.

The expansion-valves 37 38 may be fitted to control the admission of steam into the low-pressure cylinder, driven from extra jaws 39 40 and rods 41 42 on the cross-heads 5 and capable of being regulated with nuts or washers 43 44 45 46 in a similar manner to that described for the expansion-valves of the high-pressure cylinder in the said former application. The expansion-valves for the 10 low-pressure cylinders take the form of flat valves working on the back of the main valves, as owing to the comparatively low pressure in the receiver 15 the friction of their movement is inconsiderable.

15 In operation steam is admitted directly into the cylindrical recesses in the main valves between the expansion piston-valve heads and having performed work on the high-pressure piston is exhausted into the 20 chamber 15 and from thence led into the low-pressure cylinder and having expended its energy on driving the larger piston forward is then allowed to escape into the exhaust.

25 Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

In a duplex pumping-engine, the combination of a pair of high-pressure cylinders, a piston and piston-rod for each cylinder, a 30 main valve for each cylinder, said main valves operating in a common chamber into which the steam exhausts and being formed with recesses or cavities, expansion or cut-off valves located in said recesses or cavities, a 35 second pair of cylinders and ports, channels and main valves for admitting the steam discharged from the main cylinders to the second pair of cylinders, and afterward for discharging it into the atmosphere or a con- 40 denser, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 8th day of January, 1906.

PHILIP FRANCIS ODDIE.

Witnesses:

ALFRED NUTTING,
R. F. WILLIAMS.