

(No Model.)

2 Sheets—Sheet 1.

J. FIELDING.
VALVE GEAR.

No. 518,593.

Patented Apr. 24, 1894.

FIG. 2.

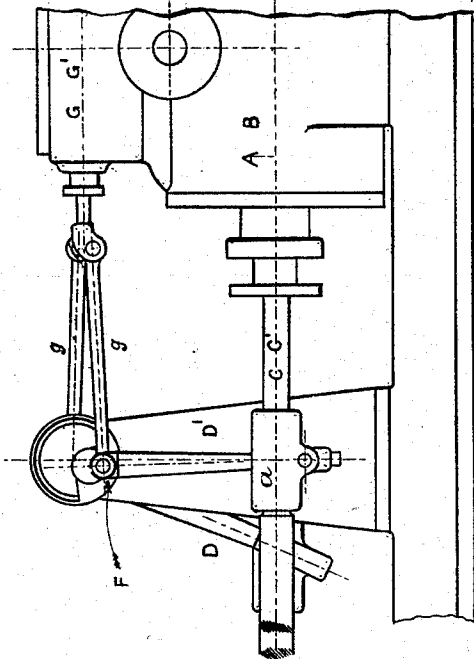


FIG. 2^a

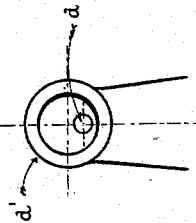


FIG 1

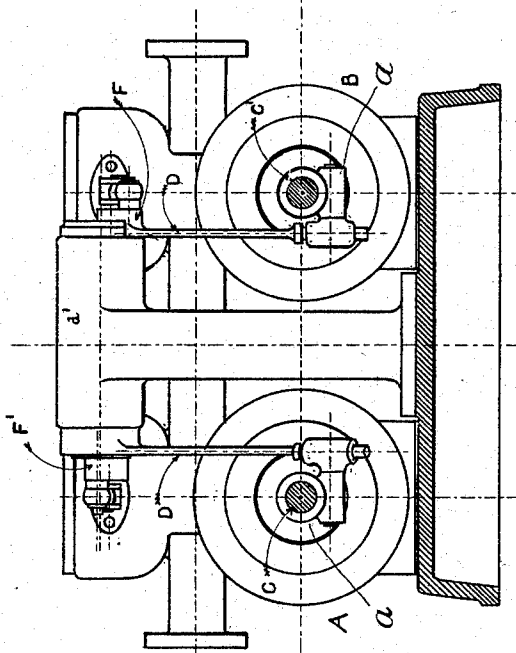
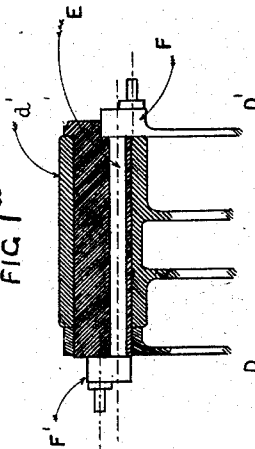


FIG 1^a



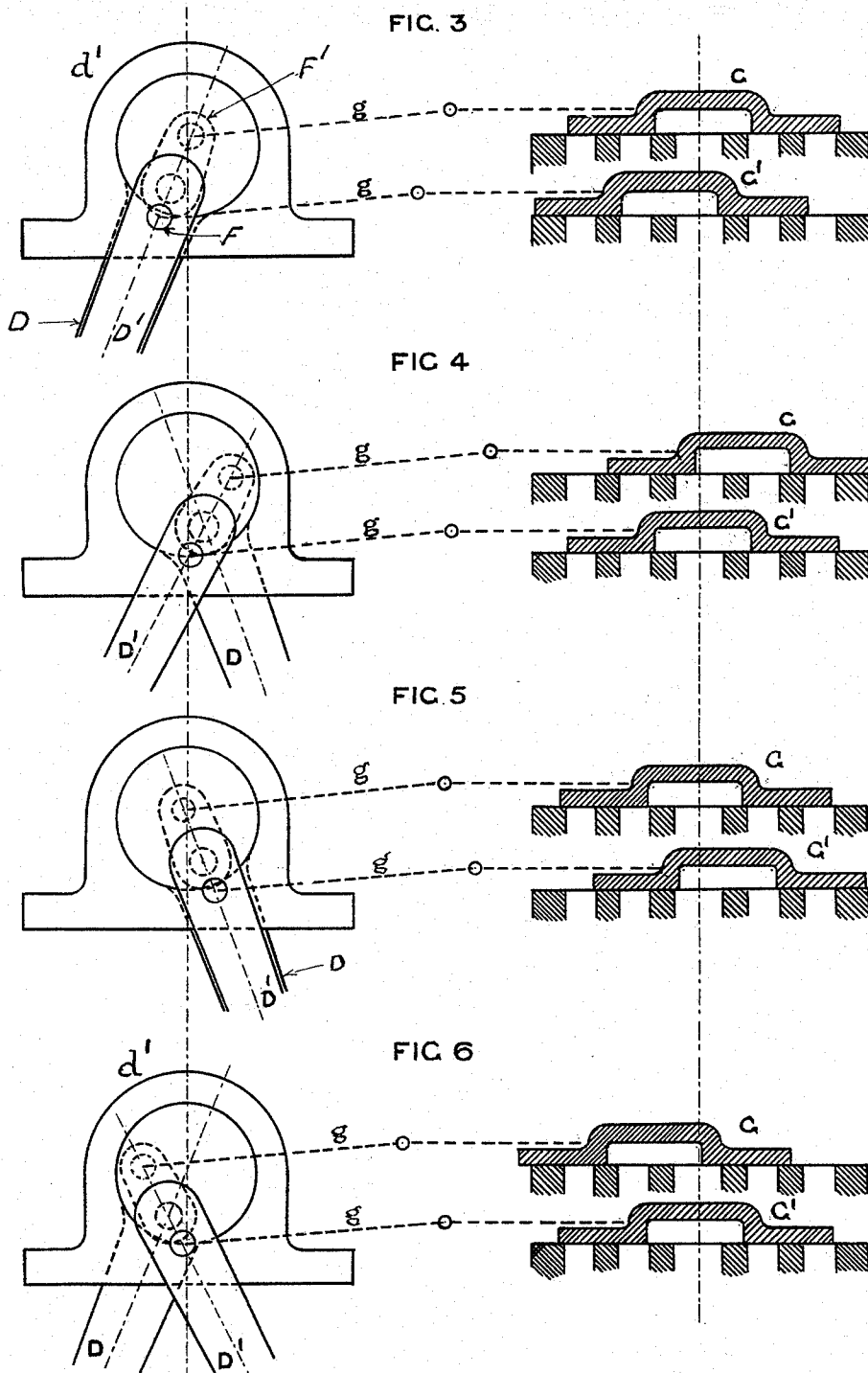
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UNITED STATES PATENT OFFICE.

JOHN FIELDING, OF GLOUCESTER, ENGLAND.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 518,593, dated April 24, 1894.

Application filed October 24, 1893. Serial No. 489,056. (No model.) Patented in England August 1, 1893, No. 14,733.

To all whom it may concern:

Be it known that I, JOHN FIELDING, of Gloucester, in the county of Gloucester, England, have invented certain new and useful
5 Improvements in Valve-Gear, (patented to me in England August 1, 1893, No. 14,733;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in
10 the art to which it appertains to make and use the same.

My invention relates to an improvement in valve gear for duplex pumping engines, the object of the same being to overcome a well
15 known and material defect in the working of duplex pumps as ordinarily constructed and it consists in the parts and combinations of parts as will be more fully described and pointed out in the claims.

20 In the accompanying drawings Figure 1 is a view in end elevation partly in section of an engine embodying my invention. Fig. 1^a is a view in section through the cylindrical bearing and showing the shaft therein. Fig.
25 2 is a side view of the parts shown in Fig. 1. Fig. 2^a is an end view of the parts shown in Fig. 1^a, and Figs. 3, 4, 5 and 6 are views showing the movements of the valves.

In duplex pumps as ordinarily constructed,
30 they are under some conditions liable to work short strokes, thus reducing their pumping capacity without a corresponding reduction in the consumption of steam. This defect arises from the action of the ordinary valve
35 gear which causes each piston to reverse the valve of the opposite cylinder as it passes the half stroke; therefore as the valves are usually without lap, it is quite possible to have the piston make such short strokes that the
40 pumping capacity may be reduced to a minimum without a corresponding reduction in the consumption of steam.

The steam cylinders A and B are placed side by side and are so combined as to act reciprocally upon the steam valves of each other.
45 The piston rods C and C' each carry a cross head *a* one of which connects with lever D and the other with lever D'. The lever D is provided at its upper end with a cylindrical
50 enlargement or boss which forms a movable bearing *d* which latter may be integral with

the lever or keyed thereto, and is mounted in a bearing *d'* rigidly secured in position to any convenient portion of the apparatus. This boss extends transversely across the apparatus, and as the piston C to which lever D is
55 connected, is reciprocated, it will be seen that the boss is given a semi-rotary movement in its bearing. This boss is provided as shown with an eccentrically located hole for the passage of shaft E, which latter is located parallel to the axis of the boss and in the same line radially as lever D.

Secured to shaft E is the second swinging lever D' which latter is connected at its lower
65 end to the cross head carried by the piston rod C'. This shaft E is provided at either end with two short levers F F', placed in a line with lever D' and opposite to each other. These levers operate the valves G and G' by
70 means of the connecting links *g* or their equivalent. As these levers stand opposite each other and are on opposite sides of the axis of shaft E, it follows that they move in opposite directions as the lever D' vibrates. The result
75 of this arrangement is that each valve, G and G', receives a compound movement partly due to that of the eccentric hole in the boss of the lever D, and partly to that of one of the short levers F F' upon the shaft E. The
80 action of the gear is such that each piston reverses the valve of the opposite cylinder from full port open at one end to a slight lead opening at the other end, while it moves the valve of its own cylinder from the lead opening to
85 full port opening. The movement of the parts is clearly shown in Figs. 3 to 6. These four figures show the positions occupied by the gear at the commencement of each of the four strokes which form the cycle.

90 In Fig. 3 the valve G is traveling from left to right just opening the left hand steam port and the right hand exhaust while valve G' is at the extreme left hand of its stroke the right hand steam and the left hand exhaust
95 ports being fully open. Now by moving lever D, which as before stated is actuated by one of the piston rods, the boss *d* is turned in its bearing which shifts shaft E to the right,
100 (without turning the said shaft) into the position shown in Fig. 4. In this figure valve G is shown with its left hand steam and right

hand exhaust open, while valve G' has traveled also from left to right enough to open left hand steam port and the right hand exhaust slightly. The piston rod which actuates lever D' now moves from left to right carrying with its lever D', and the latter actuating shaft E and short levers F F' moves the valve G from right to left and the valve G' from left to right as shown in Fig. 5 the positions then being the reverse of those shown in Fig. 3, now the movement of lever D from right to left brings the parts into the positions shown in Fig. 6 where they are exactly the reverse to those shown in Fig. 4. The next movement of D' from right to left completes the cycle of movement and brings the parts into the positions shown in Fig. 3.

By the above arrangement of parts the valves are so connected and operated that their reversal cannot take place until their operating pistons have completed their full stroke.

It is evident that many slight changes might be resorted to in the relative arrangement and construction of parts without departing from the spirit and scope of my invention; hence I would have it understood that I do not restrict myself to the exact construction of parts herein described.

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

1. In a double cylinder engine the combination with two cylinders and a valve and piston rod for each cylinder of a shaft mounted eccentrically in a movable bearing, means connecting one of the piston rods and shaft means connecting said movable bearing with the other piston rod, and means connecting

the valves with the shaft, substantially as set forth.

2. In a double cylinder engine, the combination with the cylinders valves and piston rods, of a movable bearing a lever actuated by one of the pistons for giving said bearing a semi-rotary motion a shaft eccentrically mounted in said movable bearing and provided with short levers, devices connecting said short levers and valves and means actuated by the other piston rod for rocking the shaft, substantially as set forth.

3. In a double cylinder engine, the combination with the cylinders valves and piston rods, of a cylinder boss or bearing a lever attached to said boss or bearing and engaging one piston rod, a shaft eccentrically mounted in said boss or bearing, a lever connected to said shaft and actuated by the other piston rod, and devices connecting the shaft and valves, substantially as set forth.

4. In a double cylinder engine, the combination with the cylinders, valves and piston rods, of a cylindrical boss or bearing, a lever attached thereto and actuated by one of the piston rods, a shaft eccentrically mounted in said boss or bearing and provided with short levers so located as to move in opposite directions as the shaft is rocked, a lever connected to said shaft and actuated by the other piston rod, and links connecting the short levers and valves, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN FIELDING.

Witnesses:

G. G. BAKER,

FRANK B. FIELDING.