

(No Model.)

J. R. MAXWELL.

VALVE MECHANISM FOR DUPLEX STEAM PUMPS.

No. 318,641.

Patented May 26, 1885.

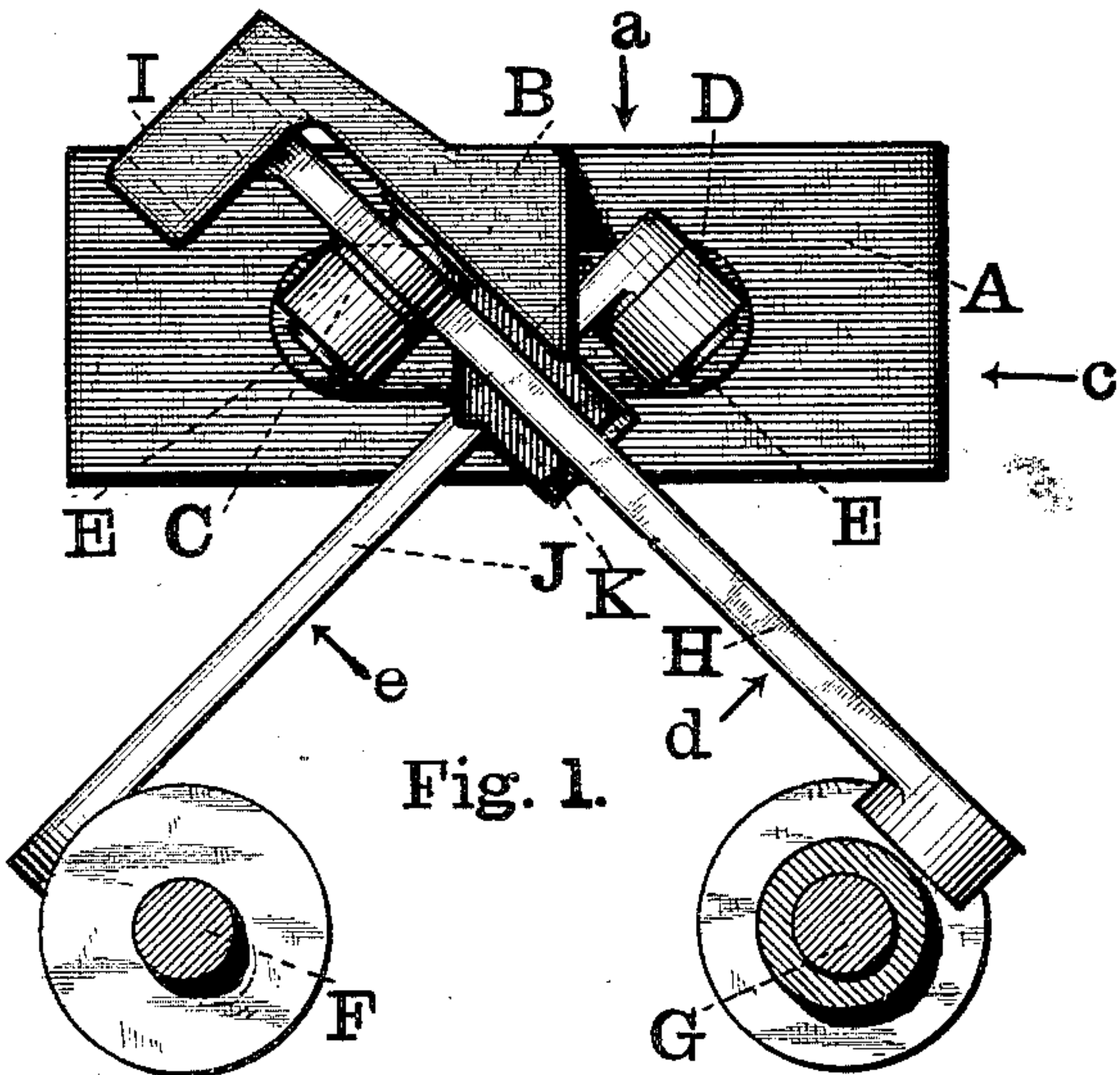


Fig. 1.

Fig. 4.

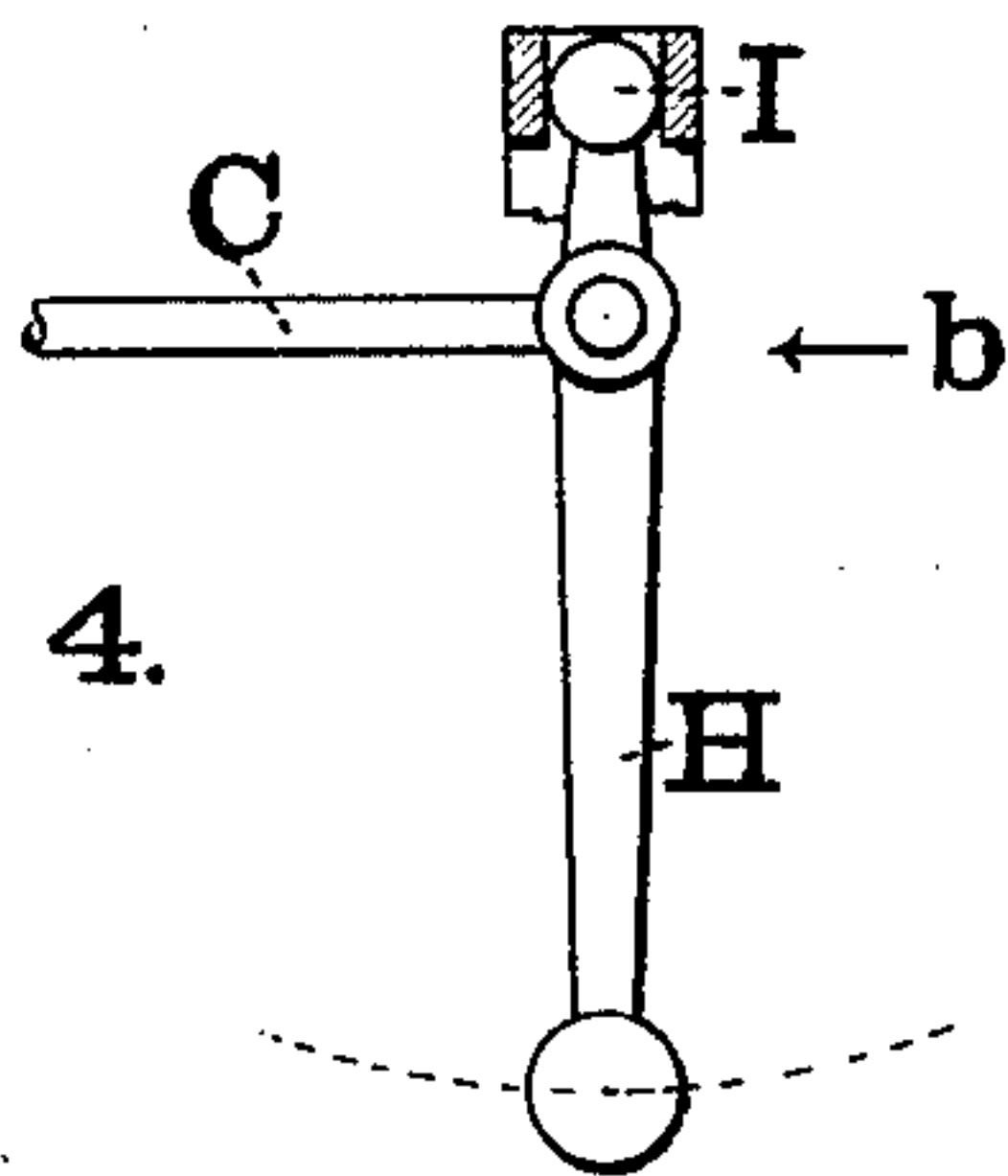


Fig. 5.

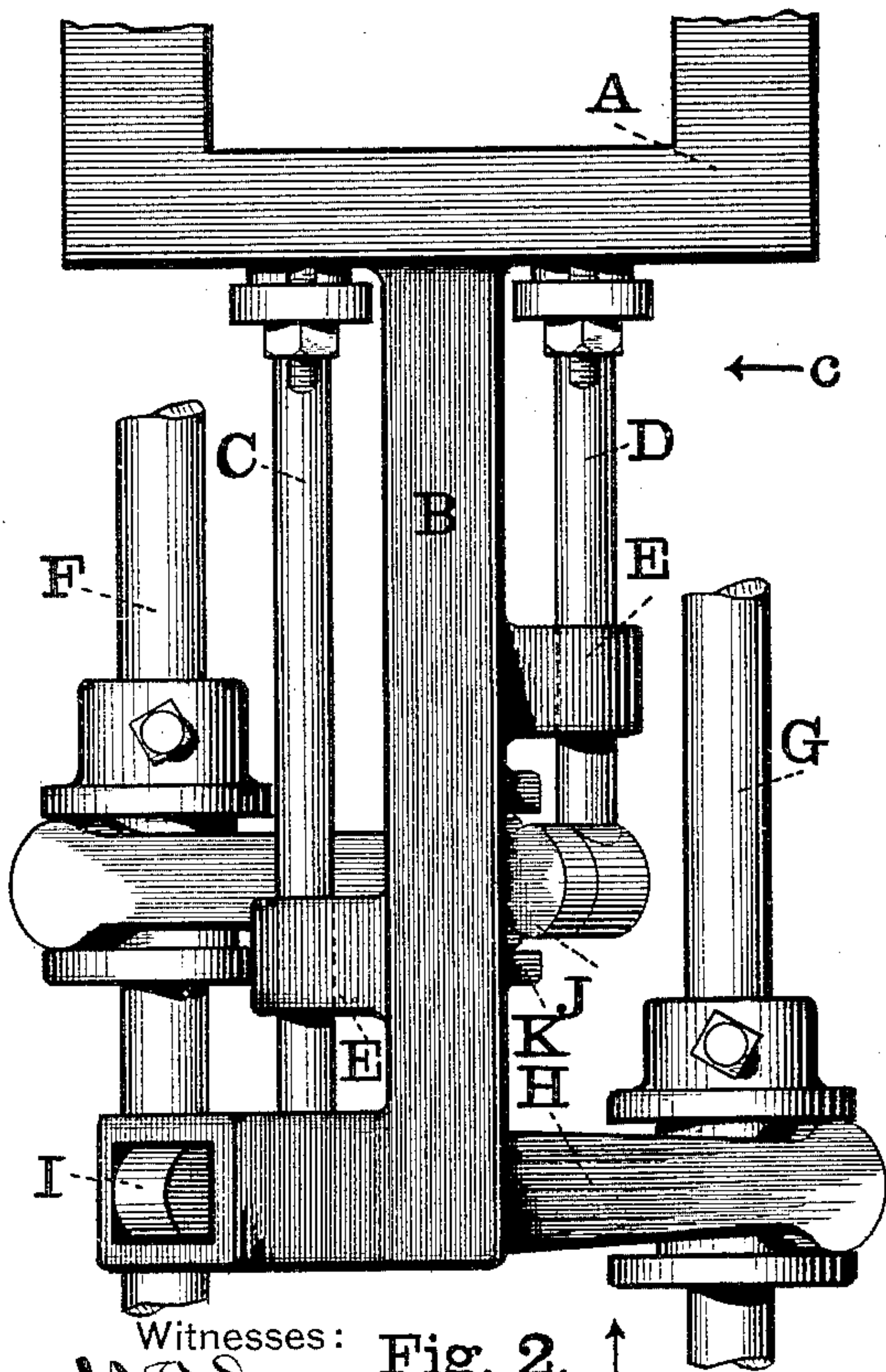
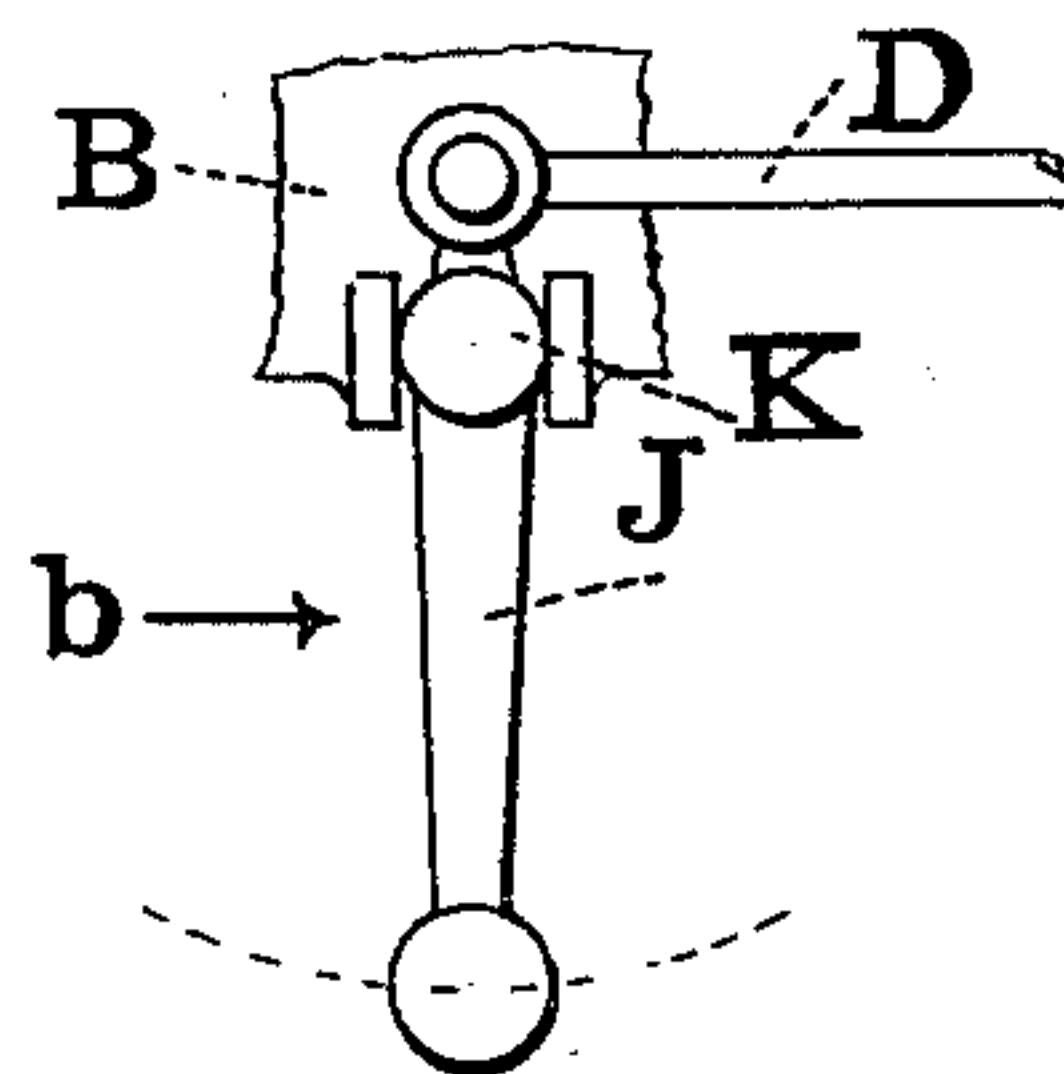


Fig. 2.

Witnesses:
W. S. Seward.
W. E. Gardner.

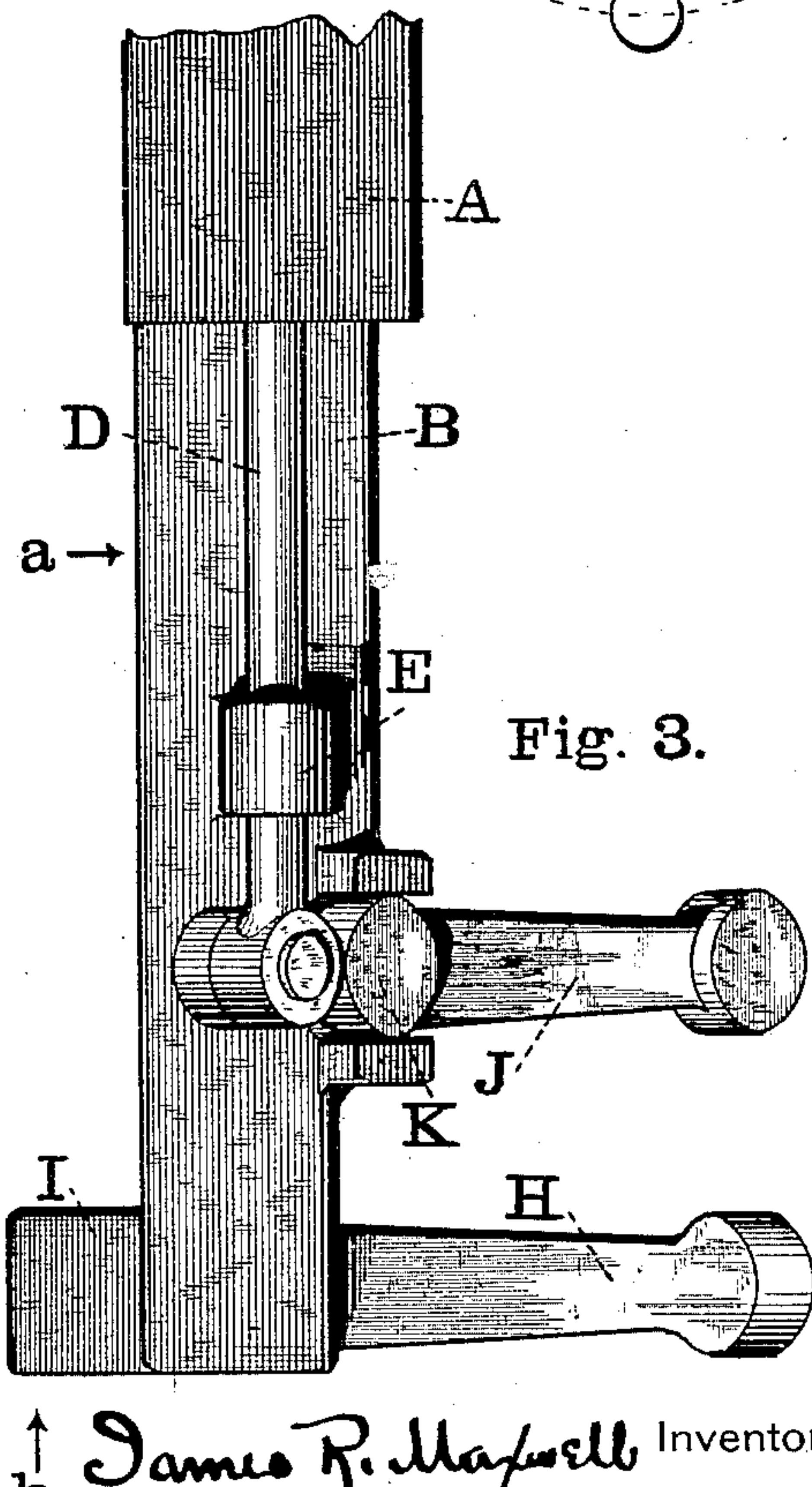


Fig. 3.

James R. Maxwell Inventor
by *James M. See*
Attorney

UNITED STATES PATENT OFFICE.

JAMES R. MAXWELL, OF HAMILTON, OHIO, ASSIGNOR TO THE GORDON & MAXWELL COMPANY, OF SAME PLACE.

VALVE MECHANISM FOR DUPLEX STEAM-PUMPS.

SPECIFICATION forming part of Letters Patent No. 318,641, dated May 26, 1885.

Application filed February 7, 1885. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. MAXWELL, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Valve Mechanism for Duplex Steam-Pumps, of which the following is a specification.

In what are termed "duplex steam-pumps" two steam-engines are placed closely side by side, and the valve of each engine is actuated by the piston-rod of the other engine, the transmission between piston-rods and valve-stems being effected by means of levers. In most duplex steam-pumps both slide-valves are alike, being generally in the well-known **D** form. In such case the transmitting-levers through which the valves receive their motion must be of different order—for instance, one being a lever of the first order, the other a lever of the second order. In cases where one of the valves is a **D**-valve and the other a **B**-valve the transmitting-levers may be of identical order.

My invention relates to the arrangement of mechanism for transmitting motion from the piston-rods to the valve-stems of duplex steam-pumps.

My improvement will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is an end view of a device illustrating my improvements, the direction of view being indicated by the arrows *b* on other figures; Fig. 2, a plan of the same, direction of view being indicated by arrow *a* on other figures; Fig. 3, a side view of the same, direction of view being indicated by arrow *c* on other figures; Fig. 4, a face view of the lever **H**, the direction of view being indicated by arrow *d* on Fig. 1; Fig. 5, a face view of lever **J**, the direction of view being indicated by arrow *e* on Fig. 1. Fig. 3 is best viewed by turning the sheet so the levers project downward.

In the drawings, **A** represents the usual steam-chest, intended to contain both slide-valves; **B**, the bracket projecting forward from the front of the steam-chest between the valve-stems; **C**, one of the usual valve-stems; **D**, the other valve-stem; **E**, lugs for guiding the valve-stems, projecting from the sides of the bracket; **F**, one of the usual piston-rods of the machine; **G**, the other piston-

rod; **H**, a diagonally-disposed lever of the second order of levers, adapted to transmit motion from the piston-rod **G** to the valve-stem **C**; **I**, the fulcrum-bearing of the lever **H**, formed by a mortise in the arm at the end of the bracket and engaged by the upper end of the lever; **J**, another diagonally-disposed lever of the first order of levers, adapted to transmit motion from the piston-rod **F** to the valve-stem **D**; and **K**, the fulcrum-bearing of this lever, formed by a pair of jaws, between which engages the fulcrum-boss of the lever.

The two levers are disposed in planes intersecting each other, one lever being disposed in advance of the other, in order that they may not interfere with each other. The reciprocating motion of the piston-rod **F** is transmitted through the lever **J** to the valve-stem **D**, and the reciprocating motion of the piston-rod **G** is transmitted through the lever **H** to the valve-stem **C**, the motions and effects being such as is common and well known in connection with duplex steam-pumps. The valve-stems, being guided in the lugs **E**, partake of reciprocating motions in a right line, and the piston-rods also, as usual, reciprocate in a right line. The lower ends of the levers, instead of being provided with the usual link attachments, are provided with cylindrical swells engaging grooved collars secured to the piston-rods.

As the points of valve-stem attachment of the levers move in a right line, it is obvious that the fulcrum-points of the levers, and also the ends which engage the piston-rods, must approach and recede from the plane of the valve-stems during the oscillations of the levers. This movement of approach and recession is permitted at the lower end of the levers by a sliding of the end swells in their grooves, and at the fulcrum-point by the sliding of the fulcrum-bosses in their seats, in an obvious manner. The valve-stems are provided with the usual eyes, and the valve-stem points of the levers have projecting journals cast upon them, which the eyes engage. In the case of the lever **H** it will be seen that the lever is supported in position by its engagement with the valve-stem, which is placed underneath the lever, and by the collar of the piston-rod **G**, which is also underneath the lever, and the same may be said of the lever **J**.

Upon the back of the lever H, directly opposite the eye of the valve-stem C, a finished bearing-spot is provided to rub against the finished bearing-surfaces on the under side of the arm which carries the fulcrum-mortise I. A side bearing is thus provided for the lever to keep it into neat side engagement with the eye of its valve-stem. The lever J in a similar manner is provided with a finished side bearing-spot to the rear of its fulcrum-point engaging the finished bottom of the seat between the jaws which it engages. By this arrangement a snug fitting of parts is secured with a trifling amount of machine finish, and the system permits of a ready construction of parts upon the interchangeable plan of machine manufacture.

The advantage resulting from the combination of the different features of this simple improvement may be well comprehended when I explain that I transmit the motions from the two piston-rods to the two valve-stems by means of two simple levers of exceedingly cheap construction, while previous constructions adapted for precisely the same ends have involved the use of links, two-part levers, rock-shafts, studs, nuts, &c., forming an aggregate of twenty-six pieces.

I claim as my invention—

1. In a valve-operating mechanism for duplex steam-pumps, the combination, with two piston-rods and two valve-stems, of two diagonally-disposed levers arranged in planes intersecting each other, substantially as and for the purpose set forth.

2. In a valve-operating mechanism for duplex steam-pumps, a steam-chest, a bracket projecting from the front thereof, and two diagonally-disposed levers arranged in planes intersecting each other and fulcrumed in supports in said bracket, combined substantially as and for the purpose set forth.

3. In a valve-operating mechanism for duplex steam-pumps, the combination of a steam-chest, two valve-stems, a bracket projecting outward from the steam-chest between the two valve-stems, a pair of diagonally-disposed levers arranged in planes intersecting each other, fulcrum-supports for the levers upon the bracket, and guiding-lugs for the valve-stems, projecting from the sides of the bracket, substantially as and for the purpose set forth.

4. In a valve-operating mechanism for duplex steam-pumps, the combination, with two valve-stems and two piston-rods, of a diagonally-disposed lever of the first order and a diagonally-disposed lever of the second order, the two levers being arranged in planes intersecting each other, substantially as and for the purpose set forth.

5. In a valve-operating mechanism for duplex steam-pumps, the combination, with two valve-stems and two piston-rods, of a pair of levers diagonally disposed in planes intersecting each other, journals projecting from the levers into engagement with eyes on the valve-stem, fulcrum-bosses on the levers engaging fulcrum-jaws, and fulcrum-bosses on the ends of the levers engaging grooved collars upon the piston-rods, substantially as and for the purpose set forth.

6. In a valve-operating mechanism for duplex steam-pumps, a pair of valve-stems arranged to reciprocate in right lines, a pair of piston-rods arranged to reciprocate in right lines, and a pair of levers, one engaging each valve-stem and the piston-rod which actuates it, the levers being attached to the valve-stem, as set forth, so that such attaching-point of each lever moves in a right line with its valve-stem, and attached to their fulcrum-supports and to the piston-rod which drives them in such manner, as set forth, that the piston-rod points and fulcrum-points are capable of approach and recession with reference to the point of valve-stem attachment, substantially as set forth.

7. In a valve-operating mechanism for duplex steam-pumps, the combination of steam-chest A, bracket B, valve-stems C D, provided with eyes, guide-lugs E, piston-rods F and G, provided with grooved collars, and levers M and J, provided with journals engaging the eyes of the valve-stems, with fulcrum-bosses, and with end swells engaging the grooved collars, and the jawed fulcrums I and K, formed on the bracket B, substantially as and for the purpose set forth.

JAMES R. MAXWELL.

Witnesses:

J. W. SEE,
W. A. SEWARD.