

H. FORBES.
VALVE GEAR.

APPLICATION FILED APR. 3, 1908.

953,993.

Patented Apr. 5, 1910.

2 SHEETS—SHEET 1.

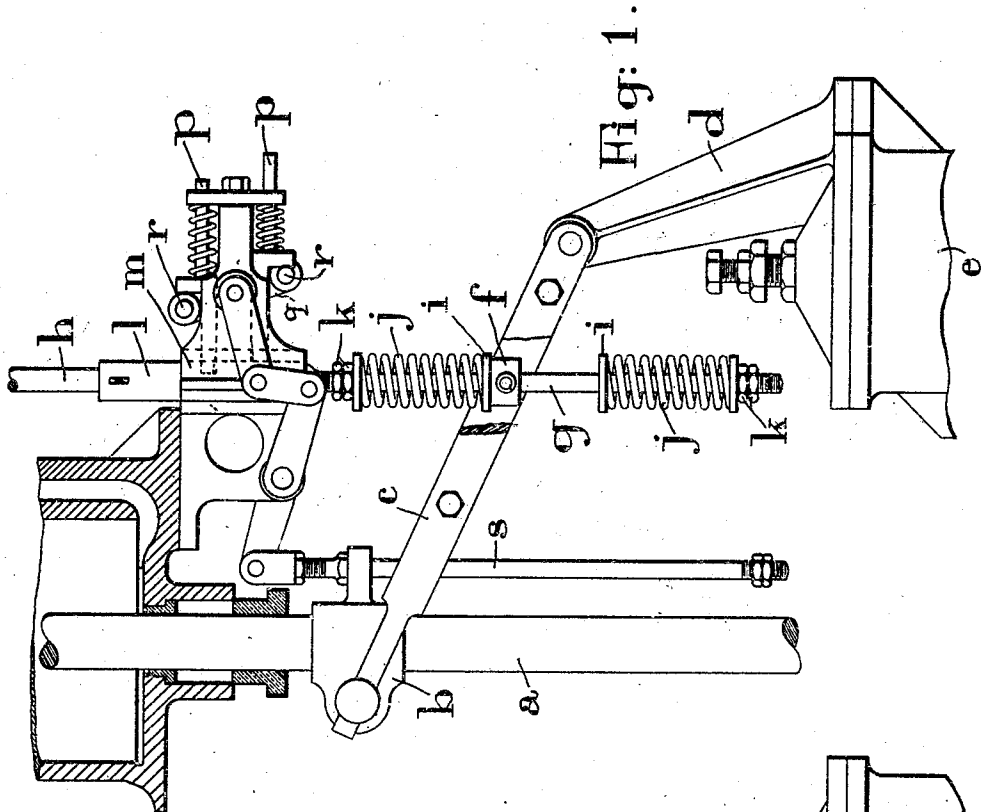


Fig: 1.

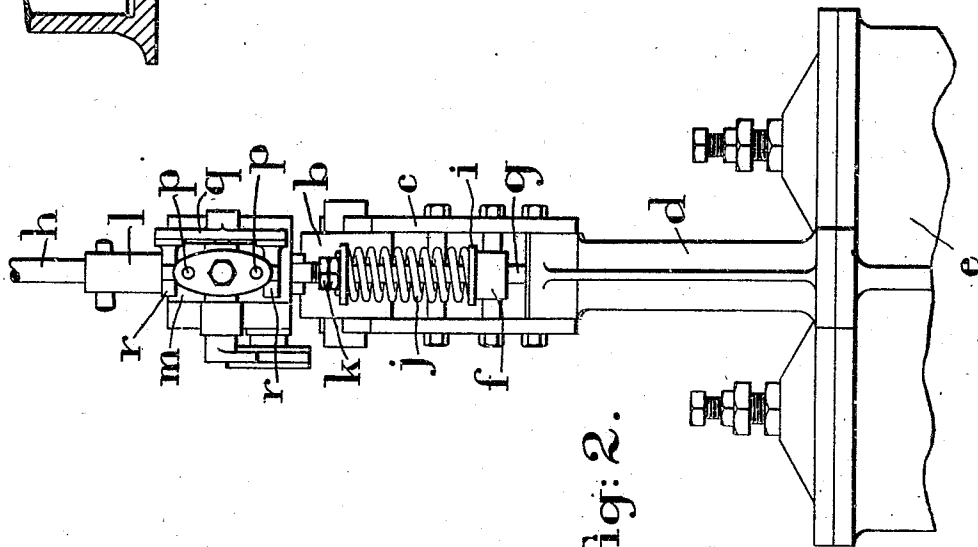


Fig: 2.

WITNESSES

W. P. Burke

E. D. Spring

INVENTOR

Henry Forbes
[Signature]
ATTY

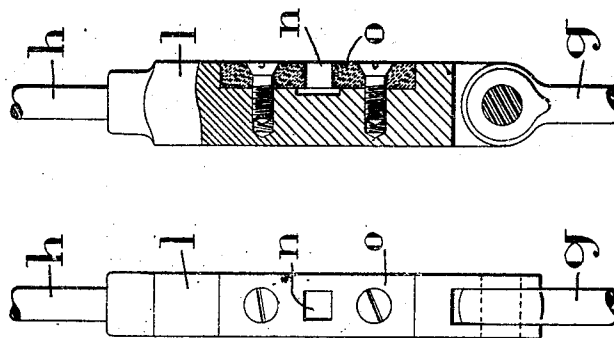
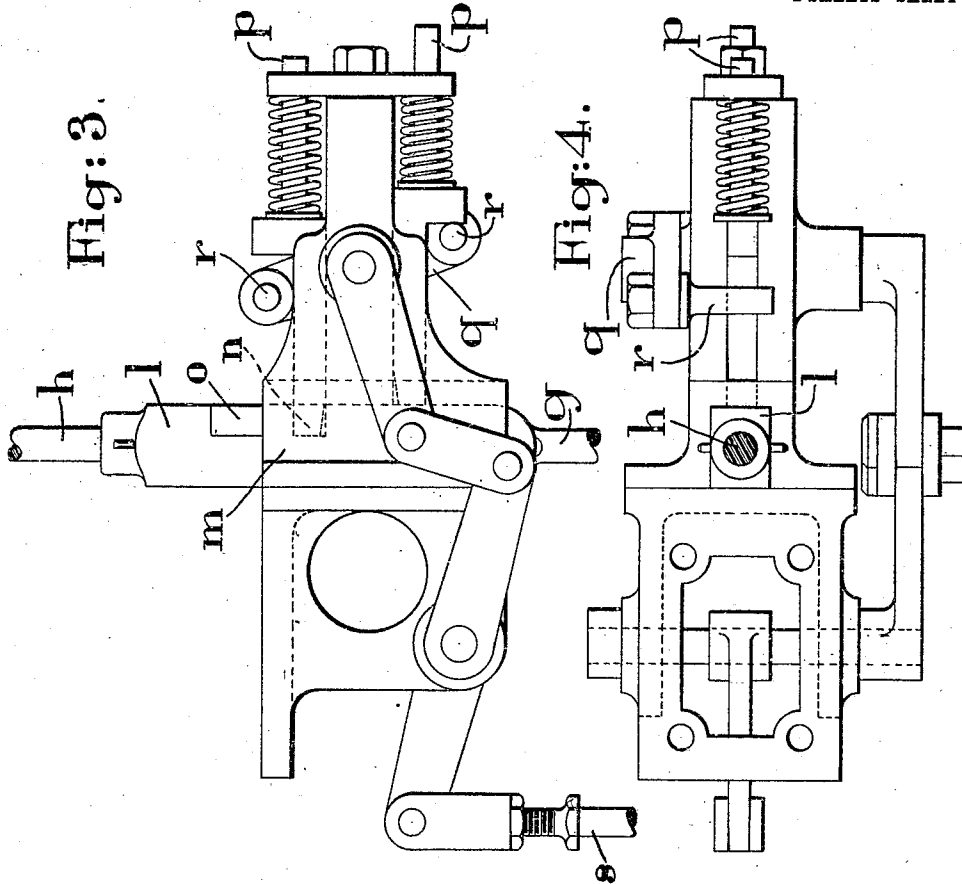
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UNITED STATES PATENT OFFICE.

HENRY FORBES, OF SOUTHAMPTON, ENGLAND.

VALVE-GEAR.

953,993.

Specification of Letters Patent.

Patented Apr. 5, 1910.

Application filed April 3, 1908. Serial No. 424,907.

To all whom it may concern:

Be it known that I, HENRY FORBES, a subject of the King of Great Britain and Ireland, residing at Southampton, Hampshire, England, have invented new and useful Improvements in and Relating to the Valve-Gear of Direct-Acting Pumping-Engines and the Like, of which the following is a specification.

10 This invention relates to the valve gear of direct acting pumping engines and the like and has for its object the arrangement and construction of valve mechanism whereby the valve of the operative cylinder can be operated directly by the main piston rod
15 without any intervention of an auxiliary cylinder and in such a way as to get a wide adjustment of point of cut-off and at the same time a rapid cut-off action.

20 I am aware that attempts have been made to effect the operation of the main valve direct from the main piston by various means but the deficiencies in action and objectionable mechanical features which have
25 been obtained in known apparatus are entirely obviated by my invention.

In order that the invention may be the better understood I will now proceed to describe the same in relation to the accompanying drawing, reference being had to the letters and figures marked thereon.

30 Figure 1 is a part sectional side view of the mechanism of a pumping engine fitted with my improved valve gear. Fig. 2 is a front view of same. Fig. 3 is a detail view of the valve spindle release device. Fig. 4 is a plan of same. Fig. 5 is a front view and side sectional elevation of valve rod showing the locking recess.

40 On the piston rod *a* is mounted a cross-head *b* to which is connected an oscillating lever *c* pivoted on a bracket *d* carried by the pump valve box *e*. The lever *c* carries a collar *f* which embraces the rod *g* which is
45 connected to the ordinary valve spindle *h*. Upon the rod *g* above and below the collar *f* are arranged washers *i*, spiral springs *j* and adjusting nuts *k*. The valve spindle *h* is provided at its lower end with an enlarged
50 portion *l* which is supported slidingly in a guide bracket *m*. This part *l* has a recess *n* preferably formed in a hardened detachable plate *o*.

Upon the bracket *m* are slidingly mounted

two spring pressed bolts *p*, the inner ends 55 of which are adapted to engage with the recess *n* when either one or other bolt is opposite the said recess. A trip lever *q* is pivotally mounted on the bracket and has pins *r* adapted to co-act with a projecting
60 portion on the bolts *p*. The lever *q* is operated by levers, link gear and adjustable draw-bar *s* from the crosshead *b*.

The operation of the gear is as follows:— It is assumed that the valve is locked by the 65 upper bolt *p* as shown in Fig. 1 in position for one of the ports to be full open to take steam, the main piston begins its stroke and the crosshead *b* moving the operating lever *c* compresses the lower spring *j* on the rod
70 *g* of the valve spindle *h* as the piston nears the end of its stroke and reaches the desired point of cut-off, the crosshead *b* engages one of the nuts on the draw bar *s* of the tripping gear which in turn withdraws the bolt
75 *p* from the recess *n* and allows the compressed spring *j* to move the valve to the opposite end of its stroke where it is again automatically held in position by the lower
80 bolt *p* until the corresponding point of cut-off on the return stroke. Thus the main engine will continue to operate its own valve in a direct manner so long as motive fluid is supplied so as to move its own main
85 piston.

The point of cut-off and the spring pressure necessary for moving the valve can be varied by adjusting the regulating nuts on the draw bar *s* and rod *g* respectively.

It is obvious I may substitute for the 90 spiral springs any equivalent means for storing and giving out the energy from the main piston rod.

It will be recognized that the construction is very simple and the operation of the 95 mechanism is such as to preclude any risk of damage to the engine when working under abnormal conditions.

Having now described my invention, what I desire to claim and secure by Letters Pat- 100 ent is:—

A valve gear for direct acting pumping engines, comprising an oscillating lever adapted to be oscillated by the main piston rod, a valve operating rod having a recess *n* 105 therein, adjustable springs located one above and one below the oscillating lever and adapted to be compressed by said lever,

spring pressed rods, one of which normally
engages with the recess in the valve rod, a
lever adapted to withdraw one or the other
of the spring controlled rods from the recess
5 in the valve rod, a series of links connected
to said lever, and adjustable releasing means
operated by a main piston rod and con-
nected to said links.

In testimony whereof I have signed my
name to this specification in the presence of 10
two subscribing witnesses.

HENRY FORBES.

Witnesses:

JOHN HENRY SELLERS,
CHARLES CATTS.