

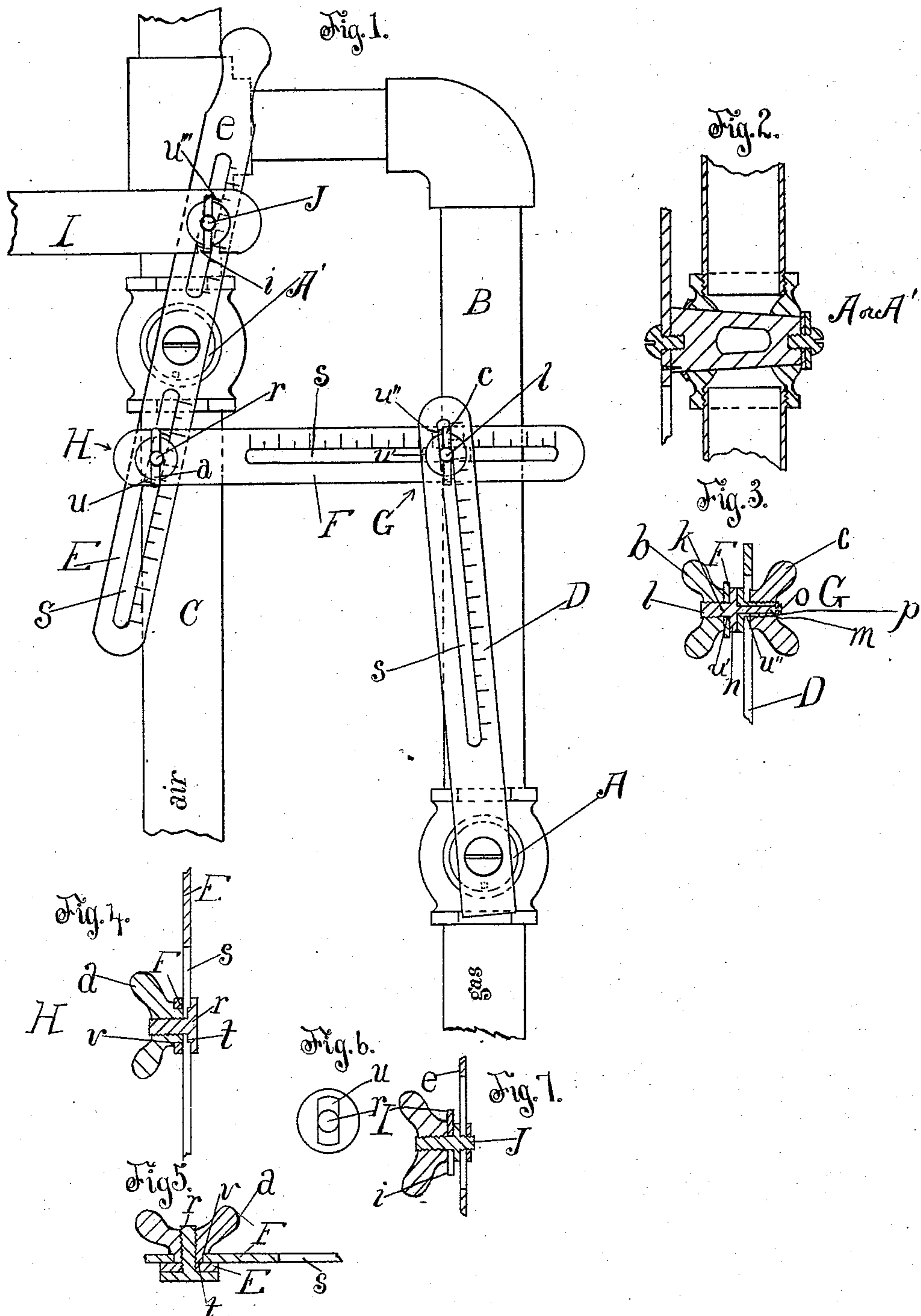
(No Model.)

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VALVE CONTROLLING MECHANISM FOR GAS ENGINES.

No. 456,256.

Patented July 21, 1891.



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UNITED STATES PATENT OFFICE.

HENRY C. FLETCHER, OF PASADENA, CALIFORNIA.

VALVE-CONTROLLING MECHANISM FOR GAS-ENGINES.

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To all whom it may concern:

Be it known that I, HENRY C. FLETCHER, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Valve-Controlling Mechanism for Gas-Engines, of which the following is a specification.

The object of my invention is to provide a simple and effective mechanism which can be accurately adjusted to deliver to the supply-pipe the exact proportion of gas and air required to secure the highest explosive quality of gas and air mixture, and to so arrange the mechanism that the volume of the mixture delivered may be easily increased or diminished by hand or automatic governor, according to the work done by the engine, without changing the quality of the mixture.

My invention, broadly stated, consists of the combination of the air-pipe and gas-pipe of an ordinary gas-engine, a valve controlling the air-pipe, a valve controlling the gas-pipe, and adjustable intermediate proportioning operative mechanism connecting such valves.

My invention also includes the special mechanism described herein and illustrated in the accompanying drawings.

Figure 1 is a plain elevation of my improved mechanism. Fig. 2 illustrates the valves in mid-section. Fig. 3 is a cross-sectional view of the doubly-adjustable clamp G for securing the gas-valve-operating arm and the connecting-rod together. Fig. 4 is a cross-section of the clamp H transverse to the connecting-rod. Fig. 5 is a section of the clamp H transverse to the air-valve arm E. Fig. 6 is a view of the clamp-screw r. Fig. 7 is a section of a fragment of the handle with governor-rod attached.

A A' are the gas and air valves, the same being ordinary cocks, as illustrated in Fig. 2.

B is the gas-pipe.

C is the air-pipe.

D is the graduated gas-valve arm.

E is the graduated air-valve arm.

F is the graduated adjusting connecting-rod secured to the valve-arms D and E by suitable adjusting pivotal clamps, as G and H.

It is obvious that the means for clamping the

connecting-rod F to the arms E and D are capable of many mechanical variations, only two of which are here illustrated.

The arm E is provided with means for attachment to the governor-rod I.

J is a pin fixed to the handle or arm e of the valve-arm E.

The governor-rod I is provided with a notch i, which fits upon the pin J, so that the governor-rod may be connected with or disconnected from the valve mechanism, as may be desired, to enable the mechanism to be operated by hand in starting or stopping the engine. The pin J is adjustable longitudinally of the arm e to allow perfect adjustment between the governor-rod and the valve mechanism.

The connecting-rod F is pivotally connected with the valve-arms E and D by the pivot-clamps G and H, which admit of the axial and lateral adjustment of the several parts upon each other. The doubly-adjustable pivot-clamp G consists of the stem k, provided with the oblong-based screw l, the arbor m, and the intermediate flange n, the flanged journal-screw o, secured upon the arbor m by the washer p, and the thumb-nuts b and c. By screwing the thumb-nut b the connecting-rod is clamped to the stem k, and by screwing the thumb-nut c the arm D is clamped to the flanged journal-screw o. By this means the arm and rod are pivoted together, but are prevented from lateral or axial displacement.

The pivot-clamp H consists of the oblong-based flanged screw r, extending through the slot s in the arm E and through the pivot-hole v in the rod F, and the thumb-nut a, provided with the bearing-arbor t, of a length slightly greater than the thickness of the valve-arm E. The oblong bases uu' u'' of the screws r, l, and o fit the respective slots s in E, F, and G to hold the screws from turning. The valve-operating arms are arranged to project from their respective valves substantially toward each other, so that when the connecting-rod is moved along the arms its distance from one of the valves will increase as its distance from the other decreases, so that the movement of one valve may be diminished and the movement of the other valve in-

creased, and yet allow the connecting-rod to remain substantially at right angles to such arms.

In operating gas-engines it is found difficult to always secure accurate proportionment of the air and gas, because of differences in the quality of gas. By means of my invention I am enabled to accurately and easily adjust the supply mechanism to produce the exact proportional mixture of gas and air necessary to produce the most effective explosion. In practice when the engine is first connected with the supply of gas the proportions of air and gas desired are determined by actual trial in the following manner: Suppose the governor-rod I to be disconnected from the mechanism and the clamps G and H to be tightened, but not set in the proper position. Loosen the thumb-nuts *a* and *c* and hold the connecting-rod F in the position deemed nearest correct by the operator. Then the thumb-nut *c* is tightened to hold one end of the connecting-rod F to the arm D, and the thumb-nut *a* is tightened to hold the other end of the connecting-rod F to the arm E. Then the thumb-nut *b* is loosened and the fly-wheel of the engine is turned, and the two valves are regulated by the hand until explosions occur to drive the engine, and the two valves are then set in position to deliver the smallest amount of air and gas that will produce an explosion to drive the engine when working without resistance. The thumb-nut *b* is then tightened to secure the arm D and the rod F together, and the mechanism connecting the valves is then moved to open the valves until the air-valve is wide open. Then loosen the thumb-nut *b* and move the gas-valve arm D back and forth to determine the position it should occupy to develop the greatest explosive force. If this is the same position it occupied when last set at the time the valves were nearly closed, the thumb-nut *b* is then tightened and the engine is ready for operation; but if the position is changed to deliver a larger proportion of gas then the nuts *a* and *c* are loosened and the rod is moved toward the gas-valve and from the air-valve, so that the movement of the gas-valve is increased relative to the movement of the air-valve. The thumb-nuts *a* and *c* are then tightened, the valves are again nearly closed, and are again regulated by hand to deliver the smallest amount of air and gas to produce an explosion. The thumb-nut *b* is then tightened and the mechanism is again moved to fully open the air-valve. If the proportions are found to be still inexact, the operation is repeated until the mechanism is so adjusted that the proportions will be correct whether the air-

valve is fully or only slightly open. The governor-rod I is then connected with the mechanism, and the engine is ready for operation.

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

1. The combination of the pipes, the valves controlling such pipes, the longitudinally-slotted valve-operating arms, the longitudinally-slotted connecting-rod, and means for pivotally clamping the connecting-rod to the valve-operating arms.

2. The combination of the pipes, the valves controlling such pipes, the valve-operating arm D, the valve-operating arm E, provided with arm *e* and pin J, the connecting-rod F, adjustable pivot-clamps connecting the rod with the arms, and the governor-rod.

3. The combination of the pipes, the valves controlling such pipes, the valve-arms, the connecting-rod, the adjustable pivot-clamps connecting the rod with the arms, the adjustable pin secured to one of the arms, and the governor-rod.

4. The combination of the pipes, the valves controlling such pipes, the valve-operating arms arranged to project from their respective valves substantially toward each other, the connecting-rod, and adjustable means for pivotally clamping the rod to such arms.

5. The combination of the pipes, the valves controlling such pipes, the slotted valve-operating arms arranged to project from their respective valves substantially toward each other, the slotted connecting-rod, a pivotal clamp arranged to clamp the rod to one of the arms, the stem *k*, provided with the screw *l*, the arbor *m*, and intermediate flange *n*, the flanged journal-screw *o*, secured upon the arbor, and the thumb-nuts *b* and *c*.

6. The combination of the pipes, the valves controlling such pipes, the slotted valve-operating arms D and E, arranged to project from their respective valves substantially toward each other, the slotted connecting-rod F, provided with the pivot-hole, the oblong flanged screw *r*, extending through the slot in the arm E and through the pivot-hole in the rod F, the thumb-nut *a*, provided with the bearing-arbor *t*, of a length slightly greater than the thickness of the valve-arm E, the stem *k*, provided with the screw *l*, the arbor *m*, intermediate flange *n*, the flanged journal-screw *o*, secured upon the arbor, and the thumb-nuts *b* and *c*.

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