

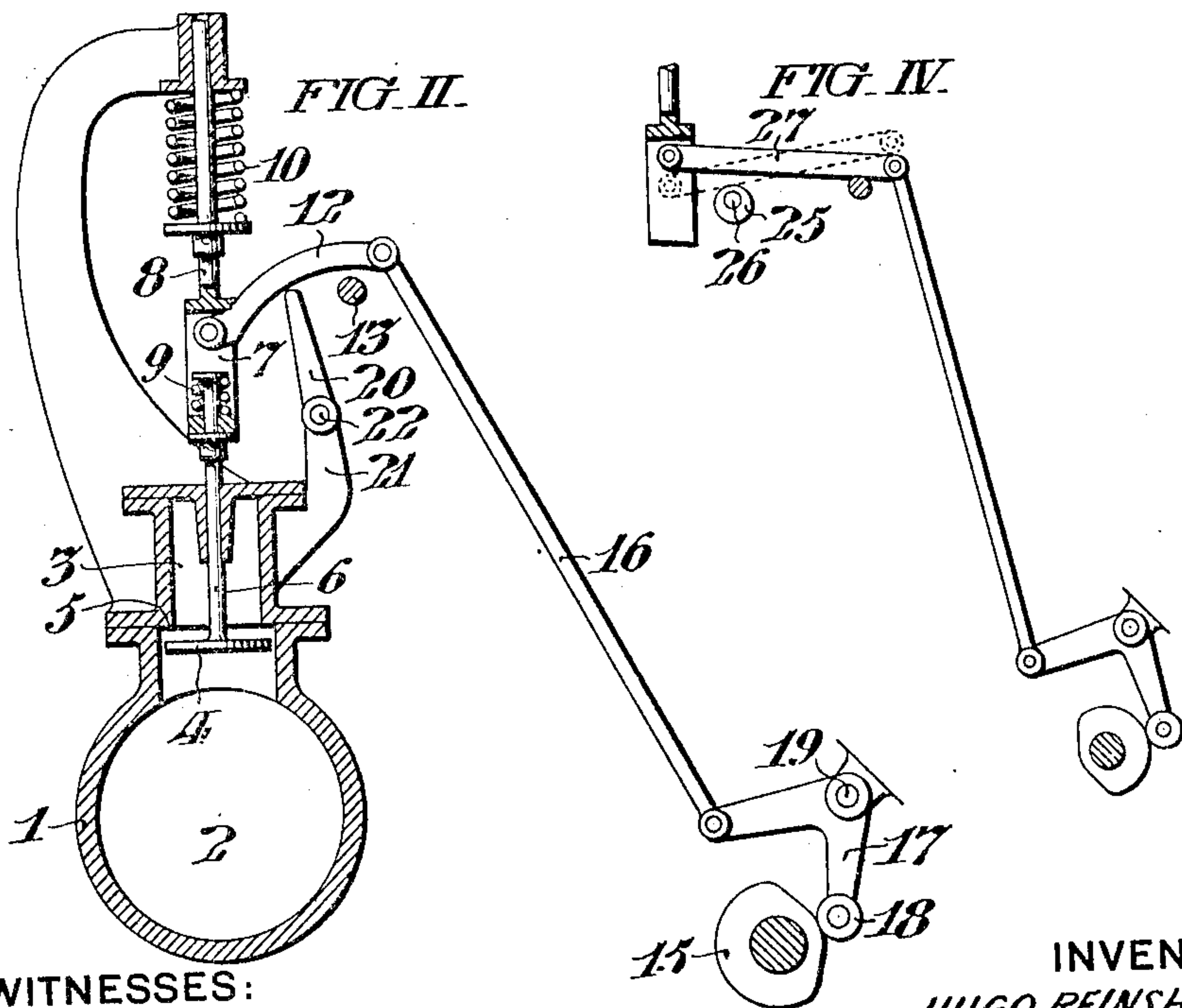
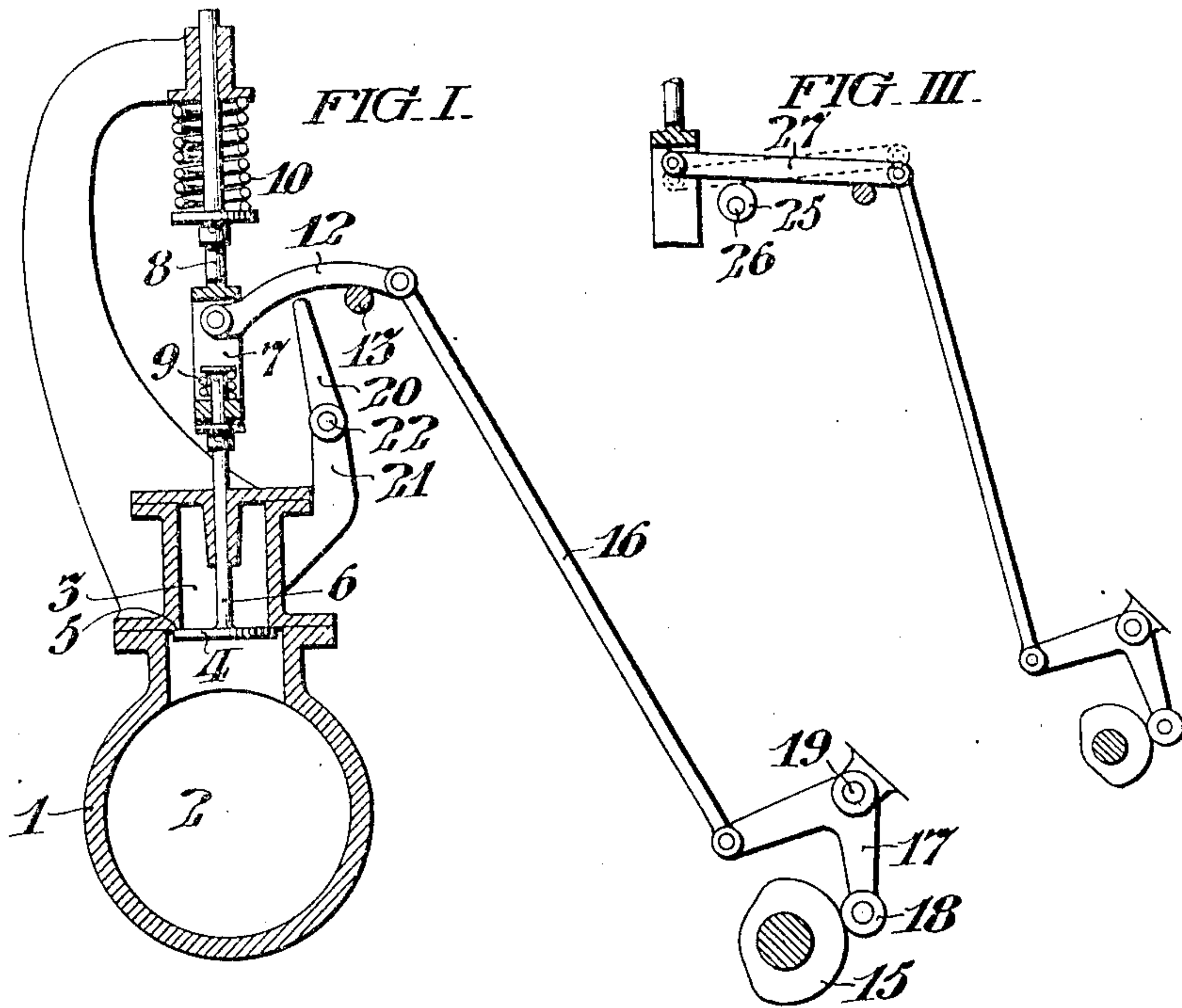
No. 876,236.

PATENTED JAN. 7, 1908.

H. REINSHAGEN.

INLET VALVE MECHANISM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED OCT. 27, 1905.



WITNESSES:

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Attys



# UNITED STATES PATENT OFFICE.

HUGO REINSHAGEN, OF COLOGNE, GERMANY, ASSIGNOR TO THE OTTO GAS ENGINE WORKS, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## INLET-VALVE MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

No. 876,236.

Specification of Letters Patent.

Patented Jan. 7, 1908.

Application filed October 27, 1905. Serial No. 284,627.

*To all whom it may concern:*

Be it known that I, HUGO REINSHAGEN, of Cologne, Germany, have invented certain new and useful Improvements in Inlet-Valve Mechanism for Internal-Combustion Engines, whereof the following is a specification, reference being had to the accompanying drawings.

My improvements are particularly applicable to engines which are governed by changing the fulcrum of a lever which either directly or indirectly operates the inlet valve, whereby the period of opening or closing of the valve or both, and consequently the quantity of each charge admitted is automatically predetermined.

It is the object of my invention to provide means to relieve the movable fulcrum of said lever from pressure during the time when the valve is closed so that it can be moved by the governor, and, as hereinafter described, this is effected by a cam and connections which hold the lever on a stationary fulcrum during said time and thereby sustain the stress of a spring which normally tends to open the valve.

My invention comprises the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings, Figure I, is a diagrammatic sectional view, showing valve mechanism embodying my invention, operatively connected with an inlet valve, the latter being in closed position. Fig. II, is a view similar to Fig. I, but showing the inlet valve open. Figs. III, and IV, show a modified form of my invention wherein the movable fulcrum is afforded by an eccentric which is rotated by the action of the governor. Fig. III, shows the position of the eccentric when the engine is running idly or with a light load, and the valve is open only to a small extent, and Fig. IV, shows the eccentric in position for running the engine under full load.

Referring to Figs. I, and II; the engine casing 1, inclosing the combustion chamber 2, has the inlet 3, which is controlled by the valve 4, fitted to the seat 5. Said valve 4, is provided with the stem 6, connected by the spring yoke 7, with the stem 8. The spring 9, is arranged to press the valve 4, on its seat and the spring 10, tends to always open said valve.

The mechanism which relieves the valve

from the tension of said spring 10, while the valve is closed, comprises the lever 12, which is then held on the fixed support 13, as shown in Fig. I. Said lever 12, is operatively connected with the cam 15, by the rod 16, and bell crank lever 17, the latter being provided with the roller 18, for engagement with said cam. It may be observed that the fulcrum 19, of said lever 17, is stationary.

The proportions of the parts above described are such that as long as the roller 18, is in contact with the largest circumference of the cam 15; the valve 4, is held upon its seat 5, by said cam, under pressure of the spring 9, and, said springs 9, and 10, can only expand and permit the valve 4, to open when the roller 18, passes from the greater to the less radius of the cam 15.

Adjoining the fixed fulcrum 13, of the lever 12, is the movable fulcrum 20, which is conveniently an arm, arranged to be oscillated in the bearing 21, on the shaft 22, by the governor. It may be observed that during the time when the valve 4, is closed, said movable fulcrum 20, is relieved from pressure of the lever 12, and the spring 10; so that it is possible for the governor to shift said support 20.

It is to be understood that at the beginning of the opening movement of the valve 4, the lever 12, changes from the fixed fulcrum 13, to the movable fulcrum 20, and the valve is consequently opened for such periods and to such an extent as is predetermined by the relative position of said movable fulcrum 20. Although the movable fulcrum 20, above described is arranged to be shifted in the direction of the length of the lever 12, it is to be understood that it may be otherwise constructed and arranged; for instance, as shown in Figs. III, and IV, the movable fulcrum is afforded by the eccentric 25, on the shaft 26, the latter being arranged to be rotated by the governor. It may be observed that in Fig. III, said eccentric 25, is so rotated as to afford a fulcrum for the lever 12, differing in location from that afforded in the position of said eccentric shown in Fig. IV.

Fig. III, shows the position of the eccentric 25, corresponding with the operation of the engine while running idly or under a light load, (when the valve 4, is open only a small extent,) and Fig. IV, shows the position of



the eccentric 25, corresponding with the operation of the engine under full load, the valve being then open to its full extent.

It may be observed that the spring 9, is not  
 5 an essential element of the mechanism and may be omitted, in which case the arrangement may be such that the movement of the cam 15, merely presents the valve 4, upon its seat 5, where it is forced by the internal fluid  
 10 pressure.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein, without  
 15 departing from the essential features of my invention.

I claim:—

1. In an internal combustion engine, the combination with a valve; of a spring tending to open said valve; a lever provided with  
 20 means to close said valve; a movable fulcrum for said lever in operative connection with the engine governor; and, an auxiliary fulcrum for said lever; so located that said  
 25 movable fulcrum is relieved for actuation by the governor when the valve is closed, substantially as set forth.

2. In an internal combustion engine, the combination with a valve; of a spring tending to open said valve; a lever provided with  
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means to close said valve; a movable fulcrum for said lever, comprising an eccentric in operative connection with the engine governor; and, an auxiliary fulcrum for said lever; whereby said movable fulcrum is relieved for actuation by the governor when the valve is closed, substantially as set forth. 35

3. In an internal combustion engine, the combination with an inlet valve provided with a stem; of a spring yoke connected with  
 40 said stem; a spring between said yoke and stem permitting relative movement thereof; a spring in operative relation with said yoke, tending to open said valve; a lever pivoted at one end to said yoke and operatively connected at its other end with a cam; a stationary fulcrum for said lever, intermediate  
 45 of its ends; and, a movable fulcrum for said lever intermediate of its ends, in operative connection with the engine governor; whereby said movable fulcrum is relieved for actuation by the governor when the valve is closed  
 50 substantially as set forth.

In testimony whereof, I have hereunto signed my name at Cologne, Germany, this  
 13th day of October, 1905. 55

HUGO REINSILAGEN.

Witnesses:

BESSIE F. DUNLAP,  
 LOUIS VANDORN.