

No. 890,674.

PATENTED JUNE 16, 1908.

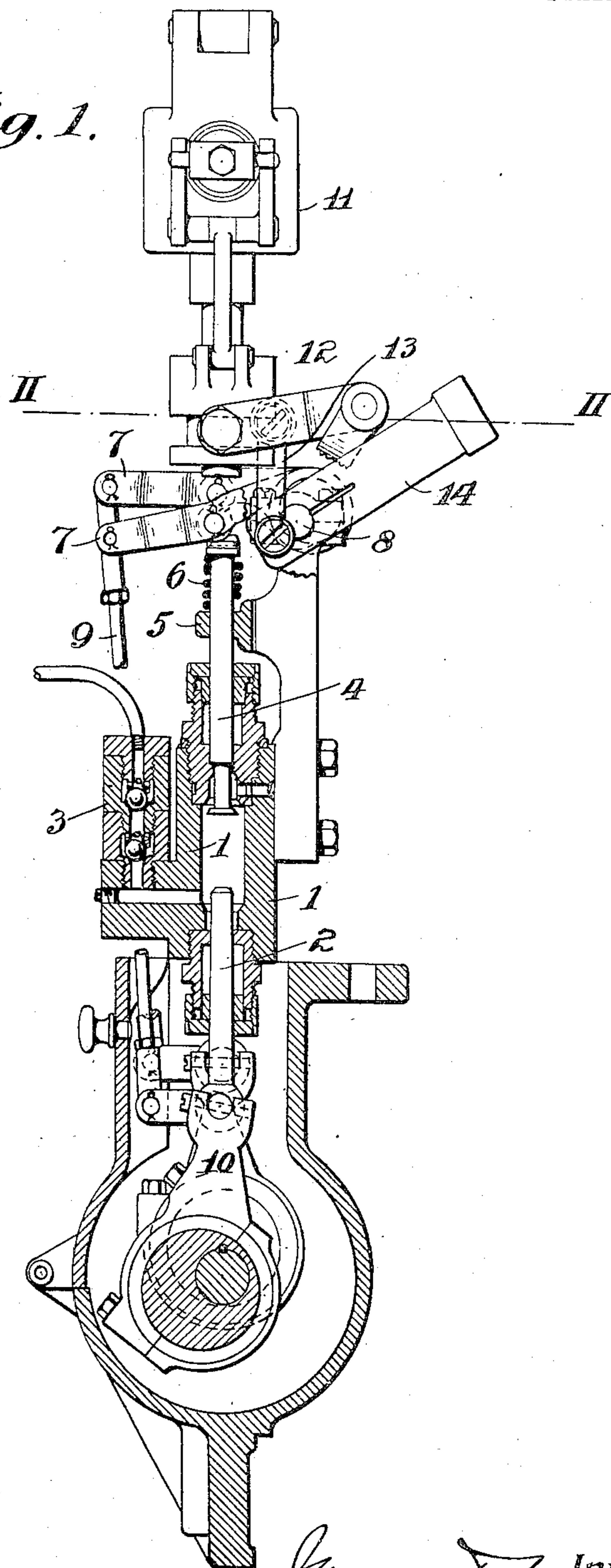
J. D. MACPHERSON.

SAFETY DEVICE FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED AUG. 25, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



Attest:

Edgewood Engine
H. S. Hines

Inventor:

J. D. Macpherson
by *Arthur J. Macpherson* Attys.

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2 SHEETS—SHEET 2.

Fig. 2.

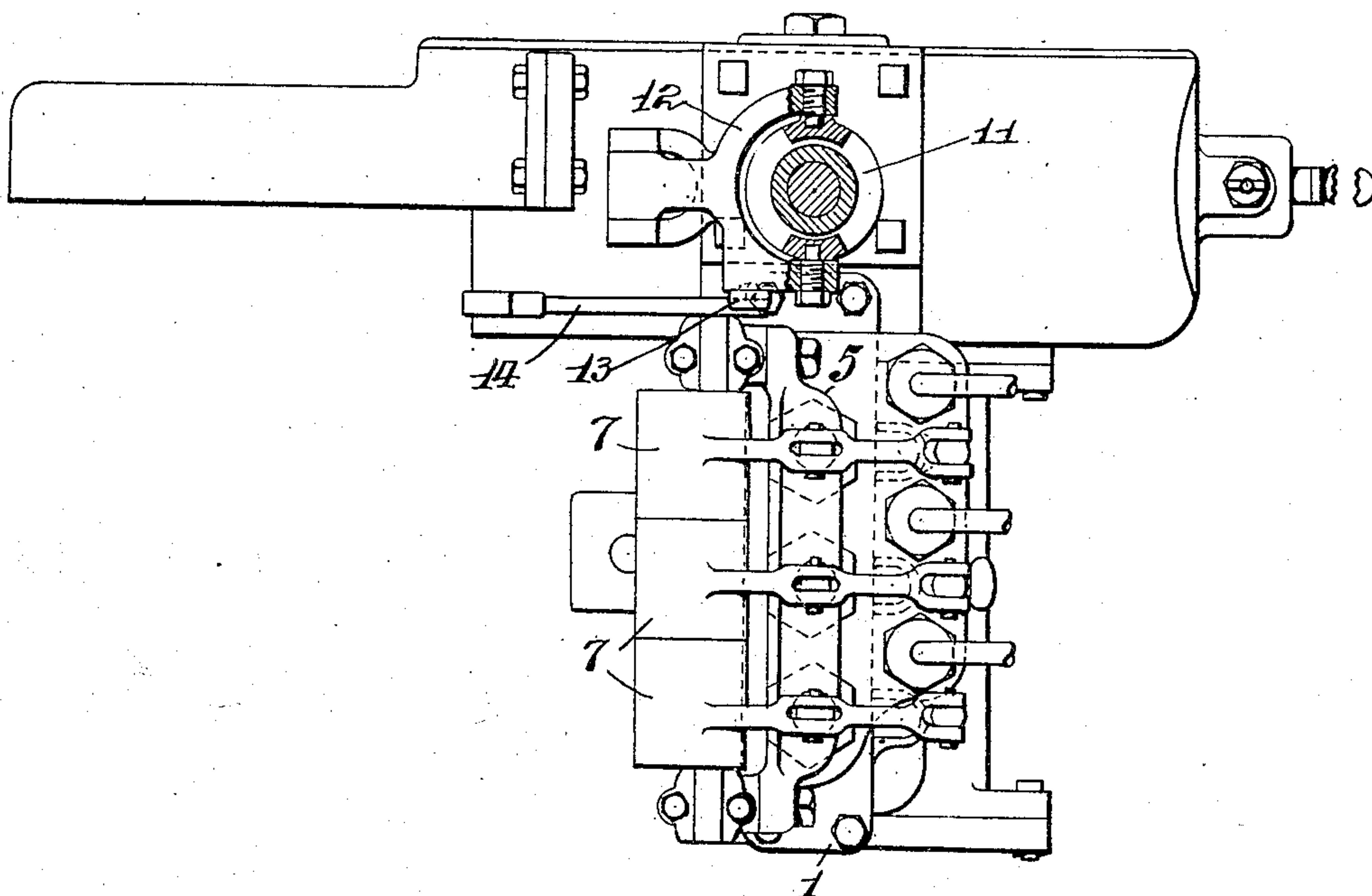
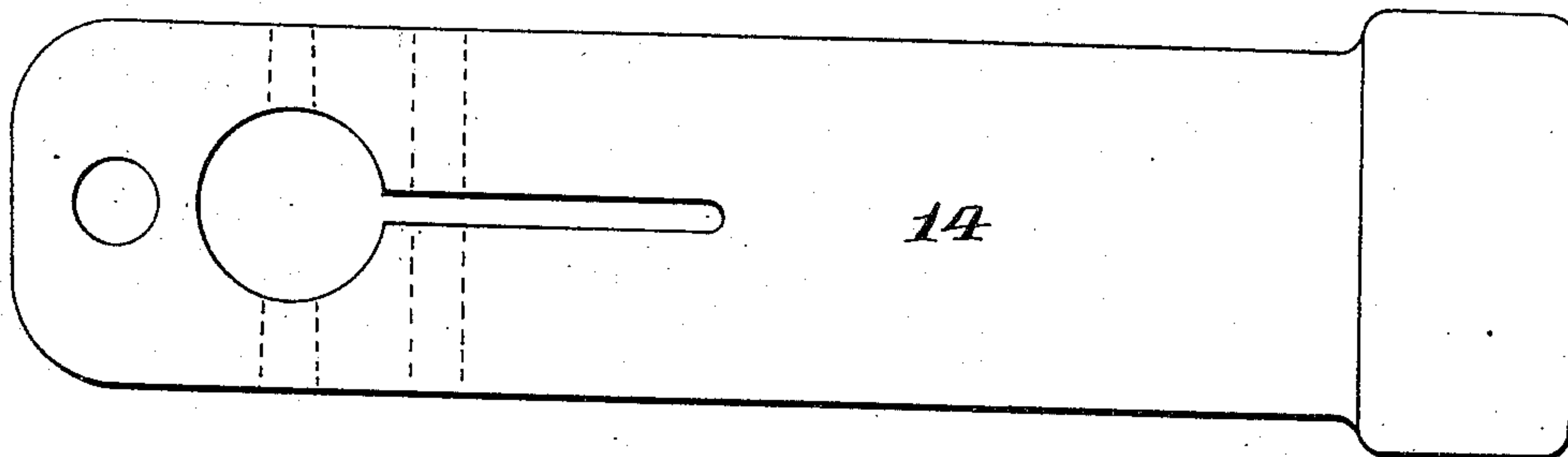


Fig. 3.



Attest:

Edgeworth Lyne

H. G. Minner

J. D. Macpherson Inventor:

by *W. H. Macpherson*

Attys.

UNITED STATES PATENT OFFICE.

JAMES D. MACPHERSON, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN DIESEL ENGINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SAFETY DEVICE FOR INTERNAL-COMBUSTION ENGINES.

No. 890,674.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed August 25, 1906. Serial No. 331,969.

To all whom it may concern:

Be it known that I, JAMES D. MACPHERSON, a citizen of the United States, and residing in the city, county, and State of New York, have invented certain new and useful Improvements in Safety Devices for Internal-Combustion Engines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and concise specification.

My invention relates to safety devices for internal combustion engines, and more particularly to engines which employ fuel pumps automatically controlled in respect of delivery of fuel in accordance with the load on the engine. In the fuel pump to which my invention is specially suited the induction valves of the pumping mechanism are actuated by oscillating valve levers, mounted on a shiftable fulcrum, and the control of the pump is effected by a centrifugal governor driven by the engine, which raises or lowers the said fulcrum and thereby controls the time and period of the valve operations.

The purpose of the invention is to render the fuel pump inoperative upon the failure of its controlling means, as by the accidental disconnection of the governor from the fulcrum rock-shaft, such as might occur in various ways but is most common to occur from the working loose of screw-threaded connections.

In the accompanying drawings, Figure 1 is a side elevation of a three cylinder fuel pump such as used on Diesel engines, with the central pumping cylinder and adjacent parts in vertical section and containing my invention; Fig. 2 is a plan view thereof with the governor in horizontal section on the line II—II of Fig. 1; and Fig. 3 is an enlarged detail of the safety device.

The pumping apparatus comprises, briefly, a cylinder forging 1, provided with one or more cylinder bores as the case may be, three in the present instance, and containing pumping plungers 2 working in the lower ends thereof. The eduction valve mechanism is shown at 3 and the induction valves 4, with their packings, are shown at the top of the cylinders with their valve-stems extended vertically upward and guided by the cross-bar 5, of a bracket, secured to the back of the cylinder forging 1. A spiral spring 6 located between the cross-bar 5 and the heads of the extensions, serves to keep the induction

valves 4 in their closed positions. The several extended valve-stems are actuated by the rollers of the oscillating valve-actuating levers 7, which are mounted upon an enlarged eccentric portion of the rock-shaft 8, the latter being carried in the bracket, and the front ends of the three levers are connected by the rods 9 with the crank-mechanism 10 which operates the pumping plungers.

The engine governor 11, of ordinary construction, is connected by means of the governor lever 12 and link 13 with the rock-shaft 8 and is adapted to rock the same in its bearings and thereby effect a shifting of the fulcrum support of the valve actuating levers 7 as above outlined, and, depending upon the speed of the governor, the time and period of the engagement of the levers with their respective valve-stems will be greater or less, so that the amount of fuel delivered through the eduction valve mechanism to the engine will be in accordance with the requirements of the latter.

In case of the accidental disconnection of the governor from the rock-shaft 8, the control of the latter upon the pump valves will obviously be lost and serious injury to the entire plant may ensue if the attendant does not happen to be on hand. By my invention, however, I overcome this liability of accident by applying to the means which connect the governor with the valve-actuators a weighted safety device arranged to exert a constant pressure on the said connecting means in a direction tending to render the valve mechanism inoperative, so that upon the occurrence of such a disconnection the device itself assumes control and brings about the slowing down or stoppage of the engine. In the specific form shown, this device consists of a flat bar 14 which is suitably bored and slotted so that it can be rigidly connected or pinned to the end of the rock-shaft 8. Its shorter arm constitutes a crank for the rock-shaft, to which crank-arm the lower end of the link 13 is pivotally connected. Its other end extends upwardly in about the position shown in Fig. 1 and preferably terminates in an enlargement which serves as a weight exerting a normal tendency on the rock-shaft to turn it in a right-handed direction, or so as to depress the fulcrum of the valve-levers 7. The depression of the shifting fulcrum upon the disconnection of the governor will so lower the valve

actuating levers as to prevent the closure of the induction valves on the upward strokes of their plungers, and consequently no fuel will be pumped by the apparatus and the engine will stop for lack of fuel.

It will be understood that I do not confine my invention to the specific form or arrangement of the weighted crank-arm, nor indeed do I confine my invention to the use of a weight as the means for rendering the valve mechanism inoperative, inasmuch as it is obvious that a spring could serve the same purpose with equal effect.

Having described my invention, what I claim and desire to secure by Letters Patent is as follows:

1. In a fuel pump for internal combustion engines, a shifting fulcrum and valve actuating means mounted thereon, in combination with an engine governor controlling the position of said fulcrum, and a safety device acting upon said shifting fulcrum and adapted to shift it to its inoperative position upon the failure of said governor.

2. In a fuel pump for internal combustion

engines, a rock-shaft forming a shifting fulcrum and valve actuating means carried thereon, in combination with a weighted crank arm on said rock-shaft and an engine governor connected to said arm and adapted to shift the fulcrum therethrough, the weight of said arm being arranged to shift the fulcrum to inoperative position upon the disconnection of said governor therefrom.

3. In a fuel pump for internal combustion engines, having a shiftable rock-shaft fulcrum and valve controlling means mounted thereon, a safety attachment adapted to be connected to said rock-shaft and having one end adapted to serve as a weight and the other adapted to serve as crank arm to be connected with an engine governor.

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

JAMES D. MACPHERSON.

Witnesses:

THEODORE LUCAS,
HUGO FRIEDRICH.