

L. A. MERK.  
VALVE MECHANISM FOR EXPLOSIVE ENGINES.  
APPLICATION FILED MAY 31, 1907.

903,748.

Patented Nov. 10, 1908.

FIG. 1

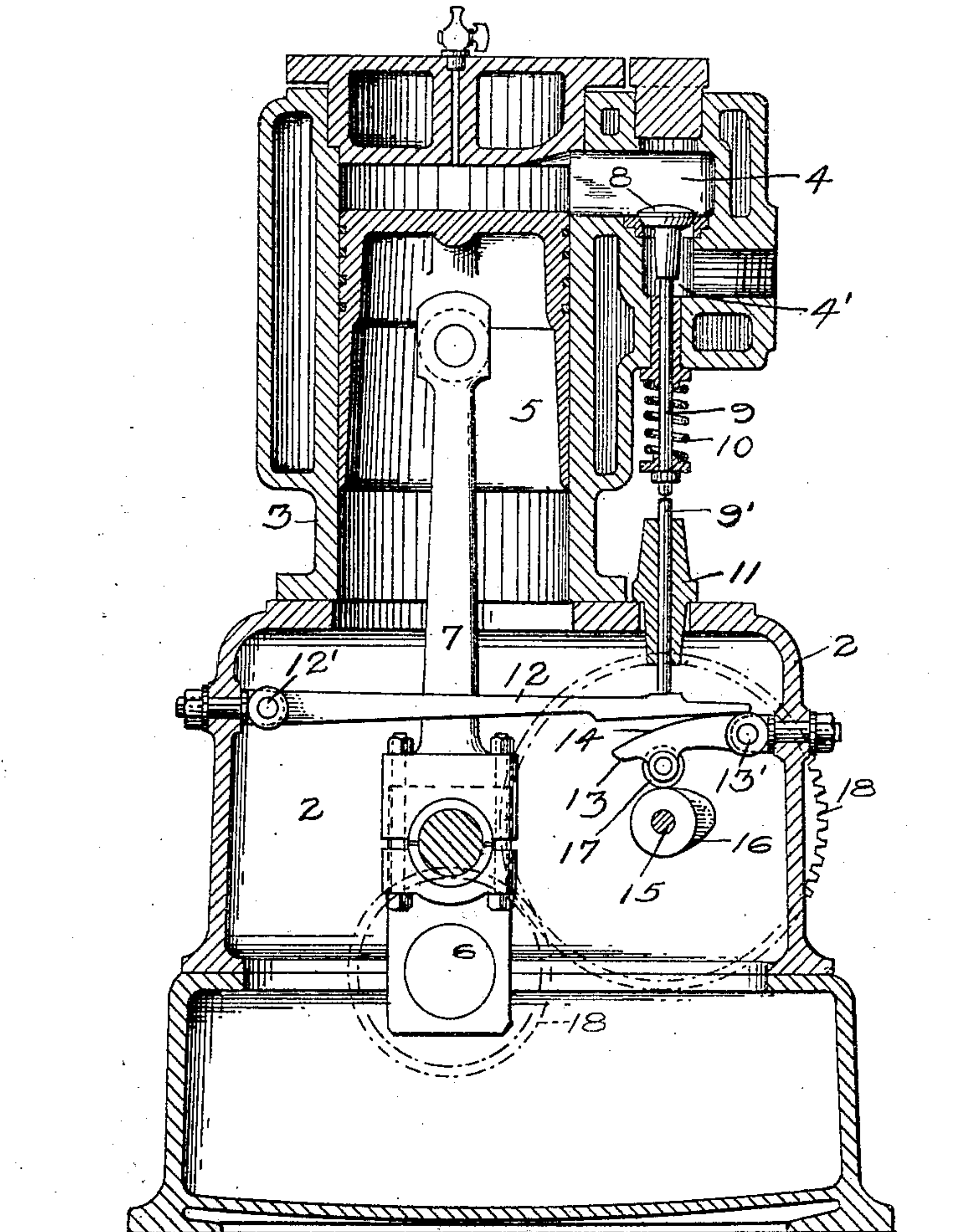
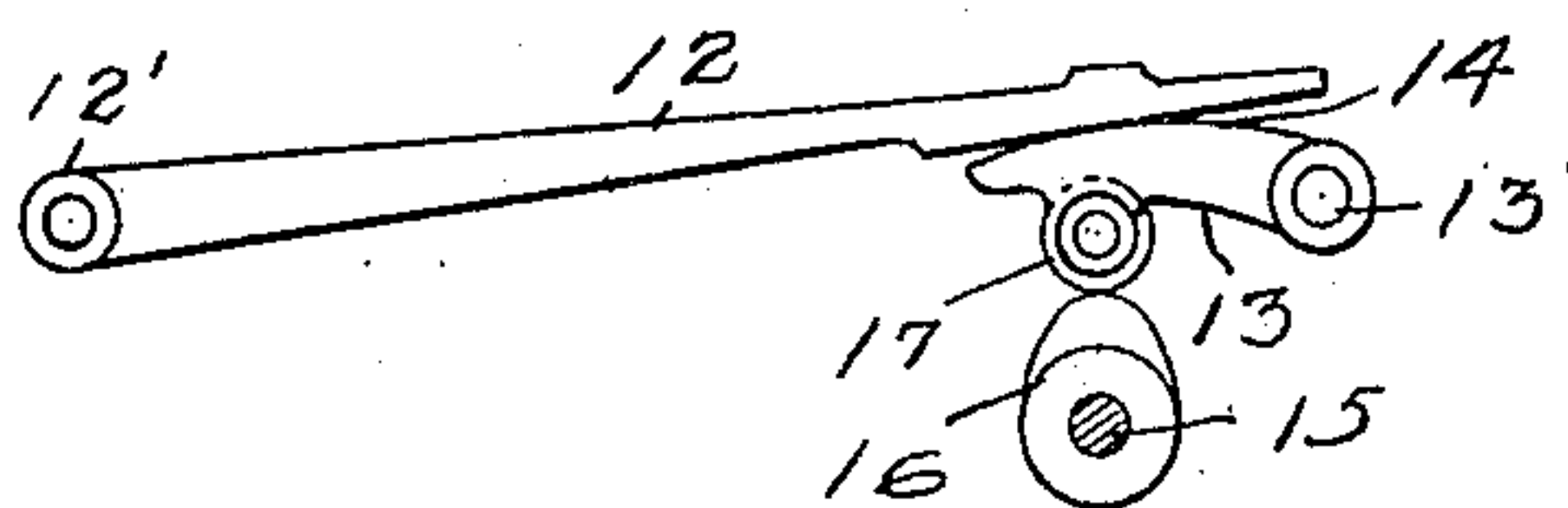


FIG. 2



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## VALVE MECHANISM FOR EXPLOSIVE-ENGINES.

No. 903,748.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed May 31, 1907. Serial No. 376,474.

*To all whom it may concern:*

Be it known that I, LAWRENCE A. MERK, a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Valve Mechanism for Explosive-Engines, of which the following is a specification.

One object of this invention is to arrange the valve actuating mechanism of an explosive engine within the crank chamber whereby it is kept clean and constantly lubricated. Also with the mechanism inclosed its operation is noiseless and it is protected from injury and derangement to which it is liable when exposed.

A further purpose is to provide valve actuating mechanism of improved construction.

This invention is here shown applied to a vertical explosive engine, Figure 1 of the accompanying drawings being a vertical sectional view of such an engine equipped with the improvement. Fig. 2 is a detail view, illustrating the movement of the valve operating levers.

Referring to the drawings, 2 designates the crank chamber, 3 the cylinder, and 4 the laterally extending valve chamber of a vertical explosive engine of usual construction. 5 is the piston, 6 the crank shaft, and 7 the pitman. As mechanism of the same form and arrangement operates both the inlet and exhaust valves, the inwardly and upwardly opening valve 8 may control either the inlet or the exhaust of the cylinder. Stem 9, depending from the valve through the lower portion 4' of valve chamber 4, carries spring 10 which holds the valve normally seated and closed. Extension 9' of the stem is engaged by the lower extremity of the latter and projects through sleeve or guide 11 into the upper part of crank chamber 2. While stem 9 and extension 9' might be one continuous or unbroken stem, when in two parts the mechanism may expand and contract without disturbing the valve, the latter always moving positively to its seat when closing.

The lower extremity of valve extension 9' bears downwardly on the vertically swinging lever 12, fulcrumed at one end of the wall of chamber 2, as indicated at 12'. Beneath the lever and fulcrumed at 13' to the opposite wall of the chamber is lever 13, having the rounded or rocker-like upper face 14 engaging lever 12. Also within chamber 2 is cam shaft 15, carrying cam 16 which oscillates lever 13, the latter being preferably provided with roller 17 which rides on the cam. Gearing 18 may connect shafts 6 and 15 in the usual manner.

With the valve closed, as in Fig. 1, lever 12 engages the curved upper edge of lever 13 approximately in line vertically with fulcrum 13'. As lever 13 is raised by the cam, edge 14 has a rolling contact with lever 12, the point of contact shifting from fulcrum 13' and toward fulcrum 12', with the result that at first, when the greatest pressure is being overcome—that encountered when moving the valve from its seat—the movement is slow, but as lever 13 rises the movement is of increasing rapidity until the valve is fully open. And when closing, the valve recedes toward its seat, rapidly at first, but at a diminishing speed which causes it to seat noiselessly and without an appreciable jar. Much wear and breakage of the valve and its actuating mechanism is thus prevented. With the valve actuating mechanism within the crank chamber a direct and positive action is had, and the parts are preserved from injury and dirt and are maintained constantly lubricated by the splashing of the oil within the chamber.

While the invention is here shown applied to a vertical engine, it may be differently embodied without departing from the spirit and scope of the appended claim. Also, the invention is not restricted to the form and arrangement of valve actuating levers here shown.

I claim:—

In an explosive engine, the combination of a crank case, a cylinder, a spring-closed valve for the cylinder having a stem projecting into the crank case, a lever fulcrumed

at one side of the crank case and swinging toward and from the valve stem, the face of the lever adjacent the valve stem curved in rocker form from its fulcrumed end toward its free end, lever actuating means, and a second lever fulcrumed at the opposite side of the crank case and extending toward and overlapping the rocker-face of the first men-

tioned lever and in engagement with the valve stem.

In testimony whereof I affix my signature in presence of two witnesses.

LAWRENCE A. MERK.

Witnesses:

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