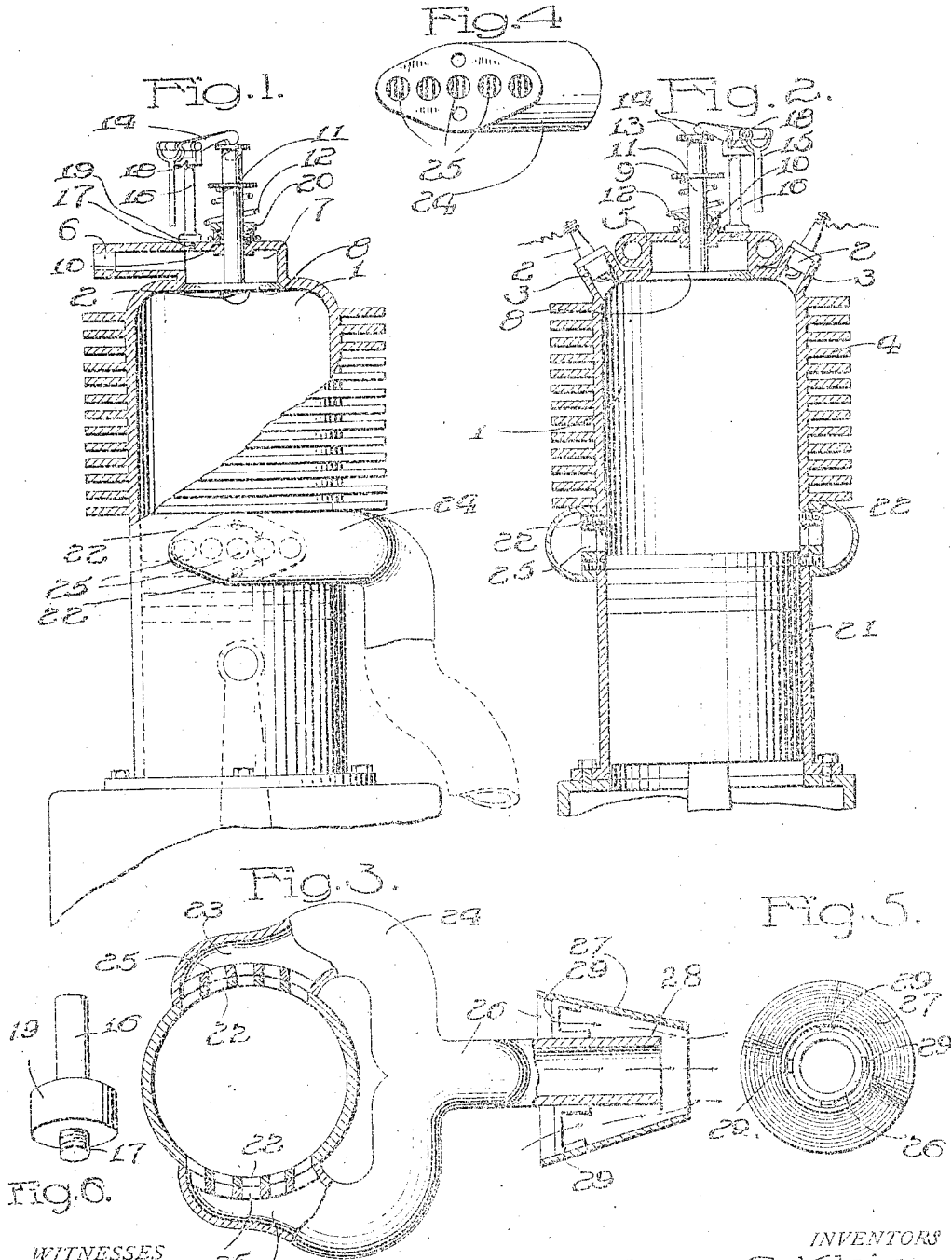


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GASOLENE ENGINE.  
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1.101,699.

Patented June 30, 1914.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

ANDREW CHARLES KLEIN AND STEPHEN LUDWIG KLEIN, OF READING, PENNSYLVANIA.

## GASOLENE-ENGINE.

1,101,699.

Specification of Letters Patent.

Patented June 30, 1914.

Application filed April 30, 1912. Serial No. 694,088.

*To all whom it may concern:*

Be it known that we, ANDREW C. KLEIN and STEPHEN L. KLEIN, citizens of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Gasolene-Engines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to explosive engines, and has particularly for its object the production of an engine without crank case compression or extra cylinder to compress the charge before entering the combustion cylinder, and an efficient exhaust mechanism therefor, whereby an efficient means has been produced for removing the burned gases from the cylinder.

Another object of this invention is the production of an efficient means carried by the outer end of the exhaust discharge whereby the suction of passing air will cause an efficient means for drawing the burned gases from the cylinder of the engine.

The present device is especially adapted for use upon moving vehicles since unless the vehicle is in motion, the suction means carried by the outer end of the exhaust pipe will not operate.

In the drawings: Figure 1 is a side elevation of a portion of the engine partly in section. Fig. 2 is a vertical section through the explosive cylinder showing the arrangement of the spark plugs. Fig. 3 is a transverse sectional view through the explosive cylinder at the exhaust ports. Fig. 4 is a plan view of one end of the exhaust pipe showing the arrangement of the ports. Fig. 5 is an end view of the exhaust nozzle. Fig. 6 is a detail perspective view of the lower end of the supporting standard for the valve trigger.

Referring to the drawings by numerals it will be seen that 1 designates the explosive cylinder and for the purpose of insuring an efficient explosion two spark plugs 2 are employed, said plugs being fitted in the upwardly extending sleeve portions 3 formed upon the upper end of the engine. The explosive cylinder is provided with the usual radiating rings 4. An auxiliary casing 5 is carried by the upper end of the cylinder 1, and to this casing is connected the fuel supply inlets 6, said supply inlet communicating

with the compartment 7 formed in the casing 5. This casing communicates with the explosive cylinder 1, and is normally closed by means of a disk-valve 8. This disk-valve is supported by means of a stem 9 which stem passes through a boxing 10. The sleeve 9 carries a collar 11, and between this collar 11, and the upper end of the casing 5 is interposed a tension coil spring 12. A head 13 is formed upon the upper end of the stem 9, and upon this head rests the outer end of the trigger 14. The rear end of the trigger 14 is connected to a rod 15 which may be operated by any suitable means for causing the end to depress the plunger 9, and cause the valve 8 to open for relieving compression whereby the engine may be easily started. A trigger 14 is supported by means of a standard 16, said standard 16 having a depending threaded portion 17, which threaded portion fits in the upper end of the casing 5. This trigger 14 is supported by means of a yoke portion 18 carried by the upper end of the standard 16. The standard 16 is provided with a broad flat base 19 which forms an efficient support for the standard and braces the same against lateral swing upon the casing 5.

It will be seen that the overhanging flange 20 of the boxing 10 will prevent the accidental removal of the lower end of the coil spring 12 from its seat.

The exhaust ports of the cylinder are formed at the extreme lower end of the stroke of the piston 21 upon each side as indicated at 22. These exhaust ports communicate with the ends 23 of the exhaust pipes 24 which ends 23 are provided with apertures 25 for communicating with the apertures 22. The pipes 24 terminate in a common exhaust discharge pipe 26, which pipe carries at its outer end a funnel shaped hood 27. This hood is supported upon the outer end of the pipe 26 by means of brackets 29. The hood 27 is so placed upon the exhaust pipe 26 as to have the wide end near the front and tapered toward the open end of the pipe 26. It should, of course be understood that this pipe 26 may be so formed as to have the funnel shaped hood 27 carried in the most convenient place upon the vehicle so that the same will be freely engaged by the passing air.

From the foregoing description, it will be seen that, owing to this construction, as de-

scribed, as soon as the piston 21 reaches its lower extreme stroke, the exhaust gases will rush out through the apertures 22, out through the pipe 26, and be discharged from the outer end 28. When the vehicle is traveling, a suction through the pipe 28 will be caused by the rush of the air through the funnel hood 27, thereby efficiently drawing the exhaust from the exhaust pipe 26. It should, however, be understood that the discharge apertures formed in the cylinder are of sufficient size and number to allow a great quantity of the exhaust gases to pass there-through thereby eliminating the necessity of applying any additional suction means, such as a pump or the like. Of course, as soon as the exhaust is drawn from the cylinder after the explosion, the new gases will be admitted into the explosive cylinder by reason of the fact that the valve will yield and cause the fresh gases to pass into the explosive cylinder ready for the new explosion. The spring 12 is of the conical spiral type as illustrated for causing the same to be very sensitive thereby insuring rapid operation of the valve.

The rocker arm 14 and valve mechanism described are adapted to relieve compression to make the starting of the engine easy. As stated above this rocker arm may be oper-

ated through a push rod of the ordinary type which may be operated from the handle of the motorcycle, or may be so placed upon an automobile as to be convenient when cranking the machine.

What is claimed is:—

An engine of the class described comprising a cylinder provided with sets of openings in the side walls thereof, a pipe provided with branches communicating with openings in said cylinder upon opposite sides thereof, said branches of said pipes extending beyond the sides of said cylinder to facilitate the cooling of the exhaust as the same passes from said cylinder, a tapering hood, brackets secured to the outer end of said pipe and engaging the inner face of said hood for holding the same in spaced relation relative to said pipe, and said hood projecting beyond the outer end of said pipe to facilitate the passage of air through said hood and pipe as the exhaust is discharged from said pipe.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

ANDREW CHARLES KLEIN.  
STEPHEN LUDWIG KLEIN.

Witnesses:

PETER KLEIN,  
DANA LUIGARD.