O. H. KRATZE.

GAS ENGINE.

No. 39,448. Patented Aug. 4, 1863.

Fig. 1.

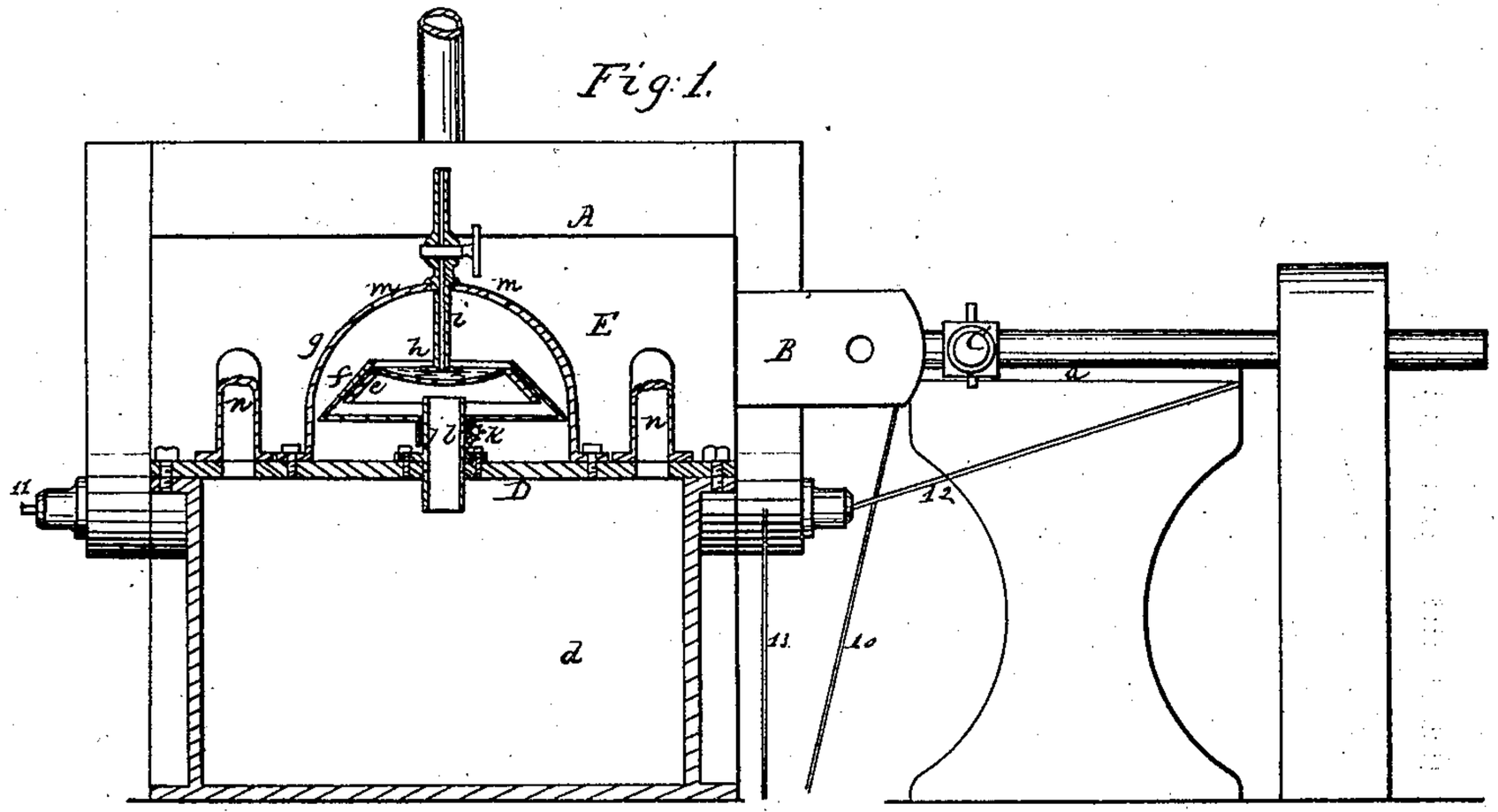
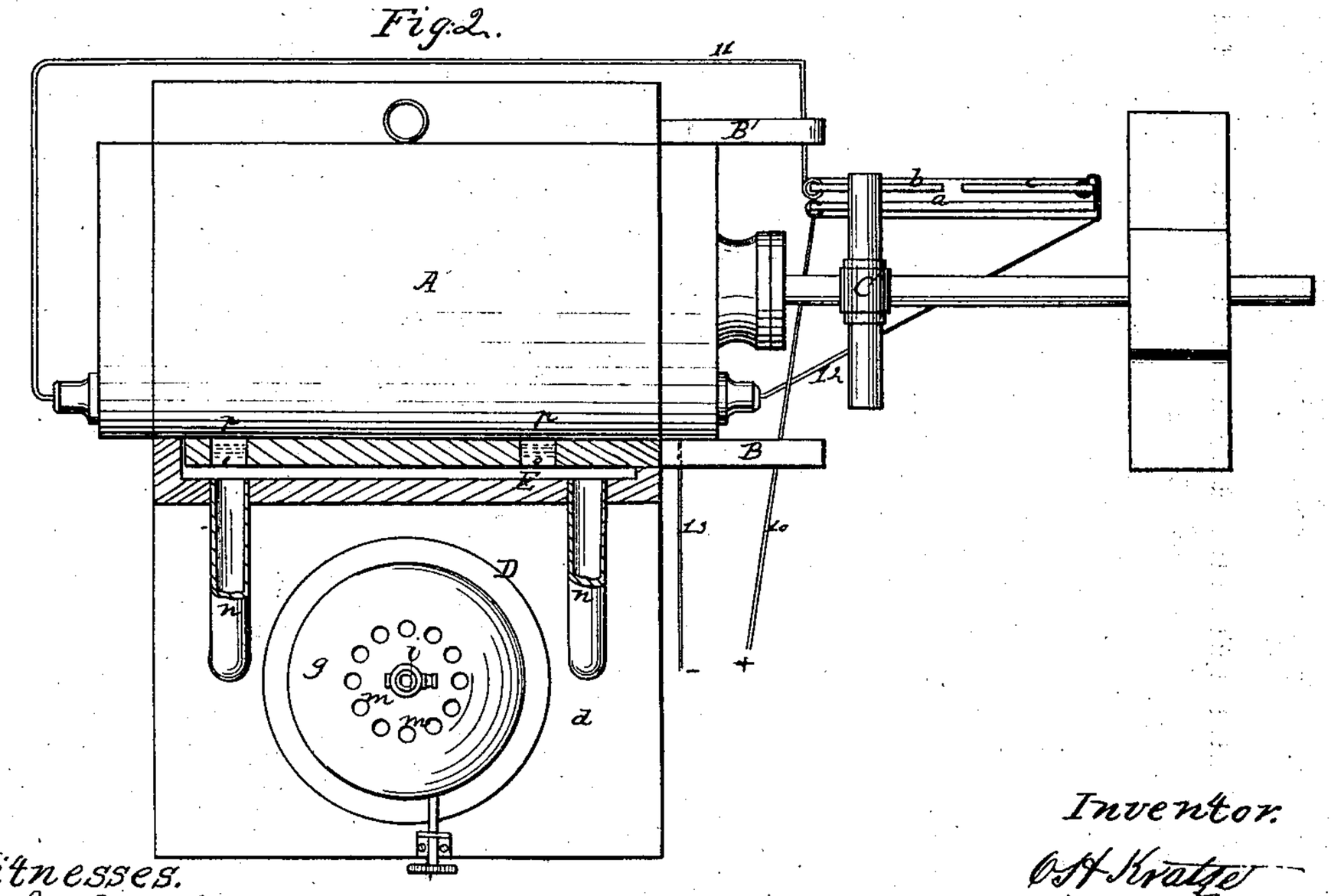


Fig. 2.



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IMPROVEMENT IN GAS-ENGINES.

Specification forming part of Letters Patent No. **39,448**, dated August 4, 1863.

To all whom it may concern:

Be it known that I, OSCAR H. KRATZE, of Leipsic, in the Kingdom of Saxony, have invented a new and useful Improvement in Gas-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention. Fig. 2 is a plan or top view of the same, partly in section.

Similar letters of reference in both views indicate corresponding parts.

The object of this invention is to use petroleum or other hydrocarbon liquids for the purpose of giving motion to the piston of an ordinary cylinder without the use of a furnace.

The invention consists in the arrangement of a double cone, the inner cone being provided with a concave top, and its surface being covered with cloth or other absorbent material, and the outer cone being made adjustable, in combination with the cylinder in such a manner that by the suction of the reciprocating piston in the cylinder a current of air is caused to pass through between the two cones where it is brought in contact with the liquid spread over the absorbent surface of the inner cone, and thereby saturated with the vapors of said liquid, and that a mixture of air with vapor is thereby produced capable of being ignited by an electric current.

The invention consists, finally, in the arrangement of one or more layers of wire-gauze in the induction-ports of the cylinder, between it and the gas-mixer, and in such a manner that the fire is prevented burning back.

To enable those skilled in the art to make and use my invention, I will proceed to describe it.

A represents an ordinary steam-cylinder, provided with a piston of the ordinary construction. Said cylinder is surrounded by a water-jacket to prevent it getting overheated, and it is furnished with two slide-valves, B B′, one controlling the induction and the other the exhaust. These slide-valves obtain motion from eccentrics on the crank-shaft in the ordinary manner. The motion of the piston is produced by igniting a mixture of hydrocarbon vapor and atmospheric air in the cylinder by an electric current which passes from a suitable battery through the wires 10, 11, 12, and 13, according to the position of the cross-head C. This cross-head is in metallic contact with metal strips *a b c*, and the strip *a* connects, by means of the wire 10, with the positive pole of the battery. The strip *b* connects, by the wire 11, with one, and the strip *c*, by the wire 12, with the opposite end of the cylinder, and the wire 13 leads from some portion of the cylinder to the negative pole of the battery.

In the position shown in Fig. 2 of the drawings the electric current passes through the wires 10, 11, and 13, and if the piston reaches the opposite end of its stroke the current passes through the wires 10, 12, and 13, and by these means the mixture of air and hydrocarbon vapor is alternately ignited in one end of the cylinder and then in the other.

D is the gas-mixer, which consists of a reservoir, *d*, and two cones, *e f*, one inside the other, and both inclosed in a dome, *g*. The inner cone, *e*, is open at the base and provided with a concave top, *h*, to receive petroleum or other hydrocarbon liquid admitted through a pipe, *i*. The surface of the cone *e* is covered with cloth or other absorbent material, which takes up the liquid contained in the concave top by capillary attraction and spreads it over a large evaporating surface. The outer cone, *f*, is open at the top and closed at the bottom, and it slides up and down on the pipe *j*, which leads to the interior of the reservoir *g*. Its position is regulated by a pinion, *k*, and rack *l*, and by lowering or raising said cone the passage between the two cones is diminished or enlarged, and thereby the velocity with which the air passes through said passage is increased or diminished. The dome *g* is perforated with holes *m* to admit an unlimited supply of atmospheric air. The reservoir *d* communicates, by means of pipes *n*, with the valve-chamber E, in which the slide-valve D moves, and by moving the slide-valve the two ends of the cylinder are alternately brought in communication with the gas-mixer. The induction-ports *o* in the slide-valve or in the cylinder are provided with one or more layers, *p*, of wire-gauze to prevent the fire burning back from the interior of the cylinder to the reservoir *d*.

The operation is as follows: The atmospheric air, in passing through between the cones *e f*, takes up a quantity of vapor from the liquid absorbed by the cloth or other material covering the surface of the inner cone, and on reaching the cylinder this mixture of air and vapor is ignited by the electric current, and the piston begins to move. During its motion it sucks in the air and a current is created through the passage between the cones, causing a quick evaporation of the hydrocarbon liquid and facilitating the formation of the proper mixture of vapor and air. The reservoir *d* is thus charged with this mixture, and on the return stroke a sufficient quantity of the mixture is formed to produce the desired motion. The passage between the cones *e f* is regulated according to the specific gravity or degree of evaporation of the hydrocarbon liquid used, and it can be adjusted so nicely that hydrocarbon liquids of different gravity can be used.

By using the vapors of hydrocarbon liquids in contradistinction to gas the fuel required for the purpose of producing the gas is saved and the hydrocarbon liquid is directly applied as motive power.

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

1. The arrangement of the cone *e*, covered with some absorbent material, in combination with the adjustable cone *f* and cylinder A, constructed and operating in the manner and for the purpose substantially as described.

2. The arrangement of one or more layers of wire-gauze in the induction-ports, substantially as and for the purpose set forth.

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