

(No Model.)

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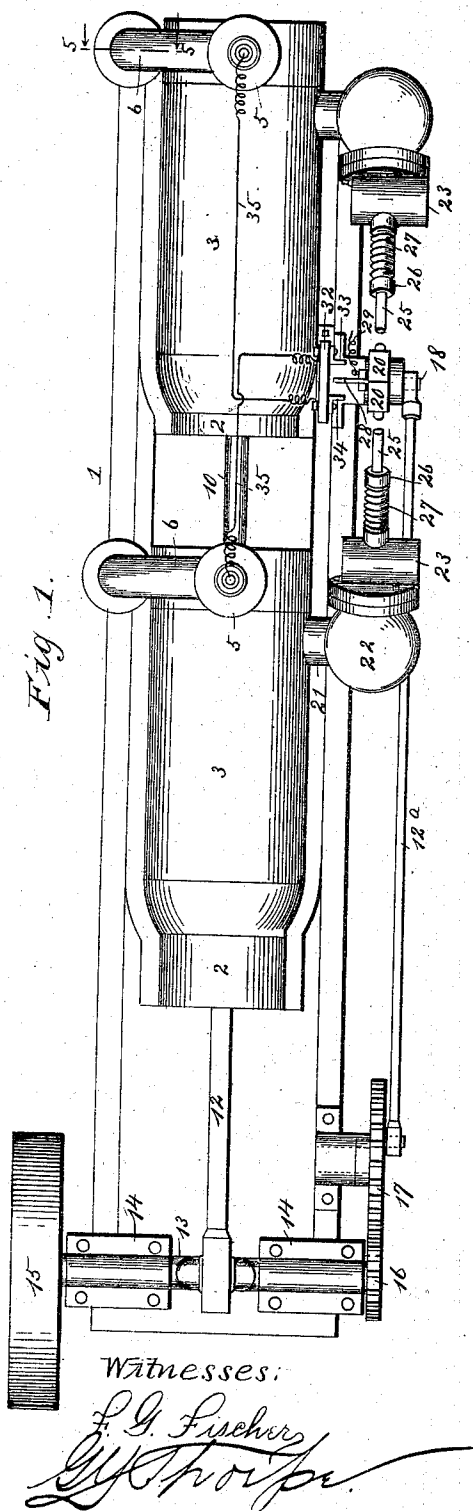
J. A. HOCKETT.

GASOLENE TRACTION ENGINE.

No. 559,030.

Patented Apr. 28, 1896.

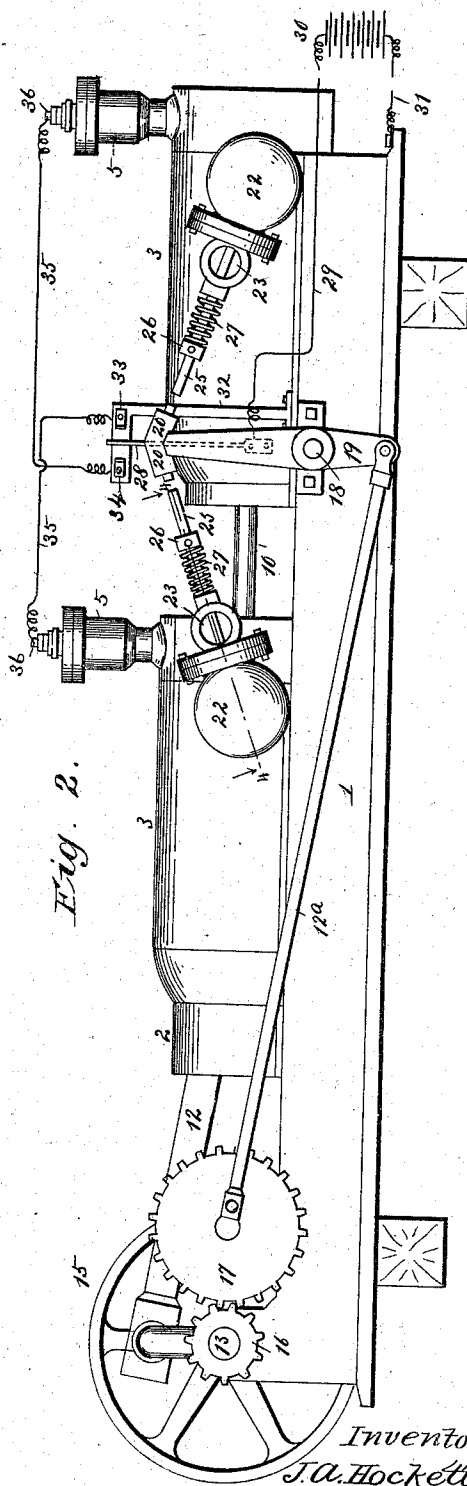
Fig. 1.



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Fig. 2.



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2 Sheets—Sheet 2.

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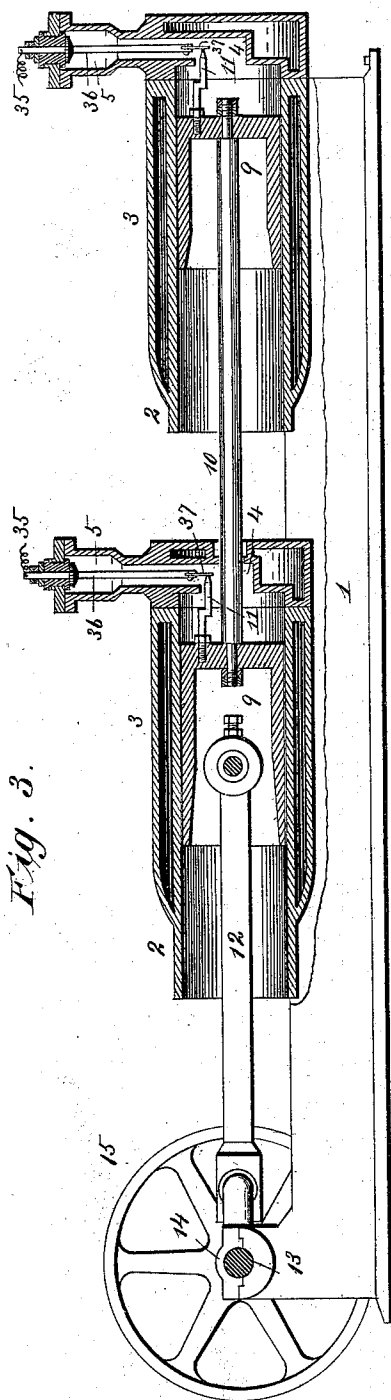


Fig. 3.

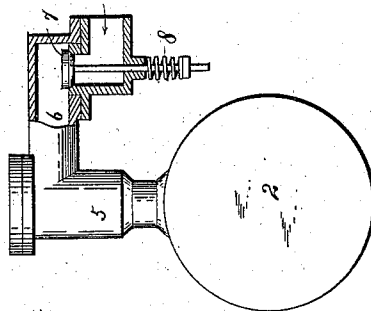


Fig. 5.

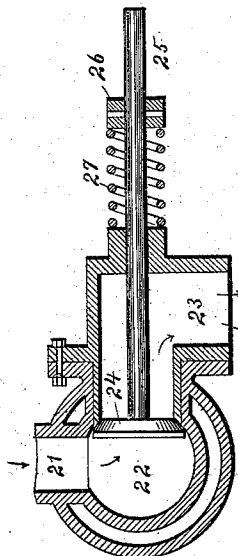


Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES A. HOCKETT, OF STERLING, KANSAS.

GASOLENE TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 559,030, dated April 28, 1896.

Application filed September 6, 1895. Serial No. 561,709. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. HOCKETT, of Sterling, Rice county, Kansas, have invented certain new and useful Improvements in Gas-
5 oline Traction-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to gas-engines; and
10 my object is to produce an engine of this type embodying two cylinders arranged tandem, each with its component mechanism, and two pistons connected to a single crank-
15 shaft, whereby an explosion may occur with each outward stroke of the piston, thereby permitting a much lighter balance-wheel to be employed and diminishing the weight of the engine in other particulars. Such construction embodied in traction-engines, for
20 instance, will be found to possess great advantages over the ordinary steam traction-engine for farming and analogous purposes, because of the comparatively light weight of my improved gas-engine.

25 With this object in view the invention consists in certain peculiar and novel features of constructions and organizations of parts, as will be hereinafter described, and pointed out in claims.

30 In order that the invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a top plan view of a gas-engine
35 embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal section of the engine. Fig. 4 is a section taken on the line 4 4 of Fig. 2. Fig. 5 is a section taken on the line 5 5 of Fig. 1
40 and showing the end of the cylinder in elevation.

In the said drawings, 1 designates the base of the engine.

2 2 designate cylinders, which are arranged
45 tandem and longitudinally of the base, the open end of one being adjacent to the closed end of the other. 3 designates the water-jacket of said cylinders.

4 designates the gas-chambers wherein the
50 explosion takes place. 5 designates the vertical gas-passages which communicate with said chambers.

6 designates the inlet-passages for gas and air. 7 designates the controlling-valves of said passages. 8 designates springs arranged
55 upon the stems of said valves and adapted to hold the valves with a yielding pressure upon their seats.

9 designates the plungers within the cylinders, and 10 the rod which connects said
60 plungers. 11 designates contact-pins, which project from said plungers for a purpose to be hereinafter explained. 12 designates the pitman, which connects one of said plungers
65 in the customary manner with the crank-shaft 13, journaled transversely in bearing-boxes 14 at one end of the base. 15 designates a fly-wheel upon one end of said shaft, and 16 a gear-wheel or pinion upon the other end.

17 designates a larger gear-wheel, which is
70 mounted upon a stub-shaft or stud projecting from the base in any suitable manner, and said wheel meshes with the pinion 16.

At one side of the engine, and preferably
75 near the open end of the foremost cylinder, a stub-shaft 18 projects horizontally from the base, and mounted to rock or oscillate thereon is the walking-beam 19. The lower end of said walking-beam is pivotally connected by a
80 pitman 12^a with a crank-arm projecting axially from the gear-wheel 17. At its upper end the walking-beam is provided with downwardly-divergent lateral projections or pins 20, the object of which will hereinafter appear. Communicating with the cylinders adjacent
85 to their explosion-chambers, preferably, and at equal distances from the axis of the walking-beam 19, are the exhaust-pipes 21, which communicate at their outer ends with the
90 chambers 22. From said chambers said exhaust-passages continue in the form of the passages 23. 24 designates valves which control the escape of gas through said passages and are arranged in the customary manner, so that the explosion will cause them to bear
95 more firmly upon their seats.

25 designates the stems of the valves, 26 collars secured thereon, and 27 springs which encircle said stems and bear at their opposite
100 ends against the casing of the exhaust-passage and said collar in order to hold said valves against their seats with yielding pressure.

28 designates a spring-arm, which is secured rigidly to but is insulated from the walking-

beam above its pivot, and 29 designates a conductor which connects said spring-arm with one pole of an electric battery 30 or other source of electrical supply.

31 designates a conductor which places the other pole of the battery in electrical communication with the metallic base of the engine.

32 designates a metallic standard or bracket, which is bolted rigidly to the base, as shown in Fig. 2, or in any other suitable manner.

33 and 34 designate contact-plates, which are secured rigidly to and carefully insulated from the bracket 32 at opposite sides and in the path of the spring-arm 28, and 35 designates conductors which electrically connect said contacts with the vertical pins 36. Said pins extend vertically downward in the passages 5 and are carefully insulated from the engine. At their lower ends they carry the depending spring-plates 37, which project into the explosion-chambers proper and are adapted to be contacted by pins 11 each time the plungers reach the forward limit of their stroke or movement.

The general operation is as follows: The gas is admitted periodically by the unseating of the valves 7 in the usual or any preferred manner. This is immaterial in this instance and forms no part of my invention. The mingled gas and air enters both chambers 4 at the same time, and as the plungers advance the explosive mixture is compressed therein in the customary manner, and as said plungers reach their forward limit of movement the pins 11 come in contact with the contact-spring 37. At the same instant the walking-beam causes one or the other of the pins 20 at its upper end to come into forcible contact with one of the valve-stems 25 and the spring-arm 28 to contact with the contact-plate 33 or 34, as the case may be, which is electrically connected to the pin 36 of the cylinder provided with the valve engaged by the walking-beam, so that a circuit is completed. Said circuit includes the battery, the conductor 31, the base of the engine, the said cylinder, the plunger therein, its contact-pin 11, contact-spring 37, rod 36, conductor 35, one of the plates 33 or 34, the spring-arm 28, and the conductor 29, back to the opposite pole of the battery. Immediately the circuit is completed it is again broken, and that before the exhaust-valve passage is open, in order that the explosion which immediately occurs, by the spark which is made by the breaking of the circuit between the pin 11 and contact-spring 37, may force the cylinders outward. After the full expansion of the gas, which is practically instantaneous, the pressure of the walking-beam against the valve-stem 25 occurs and the valve 24 is opened to permit the exhausted gas to escape from the cylinder, and as the walking-beam rocks in the opposite direction and removes pressure from the valve-stem 25 the spring reseats the valve automatically and instantaneously, so that it is ready for the next charge of explosive mixture.

As the walking-beam rocks in the opposite direction and reaches the end of its movement the cylinders again move forward and cause the pins 11 to again contact with the plates 37, and the spring-arm 28 comes in contact with the opposite plate of the bracket 32, and is therefore in electrical connection with the pin of the plunger in the other cylinder. Immediately the separation of the pins 11 and the plates 37 takes place a spark is made, as before, and the explosion occurs, the pistons again move outward, and the other exhaust-valve passage is opened to permit the exhausted gas to escape. All the succeeding operations are repetitions of the one described.

From the above description it will be apparent that I have produced a gas-engine which embodies the desirable features enumerated in the statement of invention, and which is comparatively simple, durable, and inexpensive of manufacture.

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

1. A gas-engine, comprising a pair of cylinders arranged tandem, plungers therein, inlet-valve passages communicating therewith, exhaust-valve passages communicating therewith, pins projecting from the plungers, electrical conductors extending through the inlet-valve passages, plates electrically connected thereto, a walking-beam, an electrical battery electrically connected to the base of the engine, a contact-plate carried by the walking-beam and insulated therefrom and electrically connected also to the said battery, and means to operate said plungers and to rock said walking-beam, whereby the circuit will be completed and broken and the exhaust-valves opened, substantially as described.

2. A gas-engine, comprising a pair of cylinders arranged tandem, plungers therein connected together, a crank-shaft, a pitman connecting the same with one of the plungers, inlet-valves for the cylinders for the admittance periodically of an explosive mixture, exhaust-valves for the cylinders, a walking-beam operatively connected to the crank-shaft, and adapted alternately to open the exhaust-valves of the cylinders, substantially as described.

3. A gas-engine, comprising a pair of cylinders arranged tandem, plungers therein, a rod connecting the plungers, a crank-shaft, a pitman connecting the same with one of the plungers, a walking-beam geared to said crank-shaft, inlet-valve passages for an expansive mixture communicating with the cylinder, exhaust-valve passages connected to said cylinder, valves therefor, and springs holding them yieldingly upon their seats, so that under the pressure of the walking-beam they may be alternately opened, substantially as described.

4. A gas-engine, comprising a pair of cyl-

inders arranged tandem, plungers therein, a rod connecting said plungers, valve-controlled inlet-passages for an explosive mixture connected to said cylinders, exhaust-
5 valves for the explosive mixture connected with said cylinders, a crank-shaft, a pitman connecting the same with one of the plungers, a walking-beam geared to the crank-shaft, a spring contact-arm carried by and insulated
10 from the walking-beam, contact-plates at opposite sides of the same, conductors electrically connected to said plates and projecting into the cylinder, pins projecting from
said cylinder, a source of electrical supply
15 having one pole connected to said spring-arm of the walking-beam and the other to the base of the engine, all arranged substantially as and for the purpose described.

5. A gas-engine, comprising a pair of cylinders arranged tandem, inlet-valve-controlled passages for an explosive mixture connected to the cylinders, exhaust-valve-con-

trolled passages also communicating with the cylinders, plungers therein provided with pins, a rod connecting the plungers, a bracket,
25 insulated contact-plates secured thereto, conductors insulated from the engine and extending downward into the cylinders, conductors connecting the same with said contact-plates, a walking-beam, pins projecting
30 from the same to alternately open the exhaust-valves, a spring-arm insulated from and carried by said walking-beam, an electric battery, conductors connecting the same with said spring-arm and with the base of the
35 engine, and means to reciprocate said plungers and said walking-beam, substantially as and for the purpose described.

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

JAMES A. HOCKETT.

Witnesses:

JOHN GUTTERY,
E. H. LEES.