

No. 654,996.

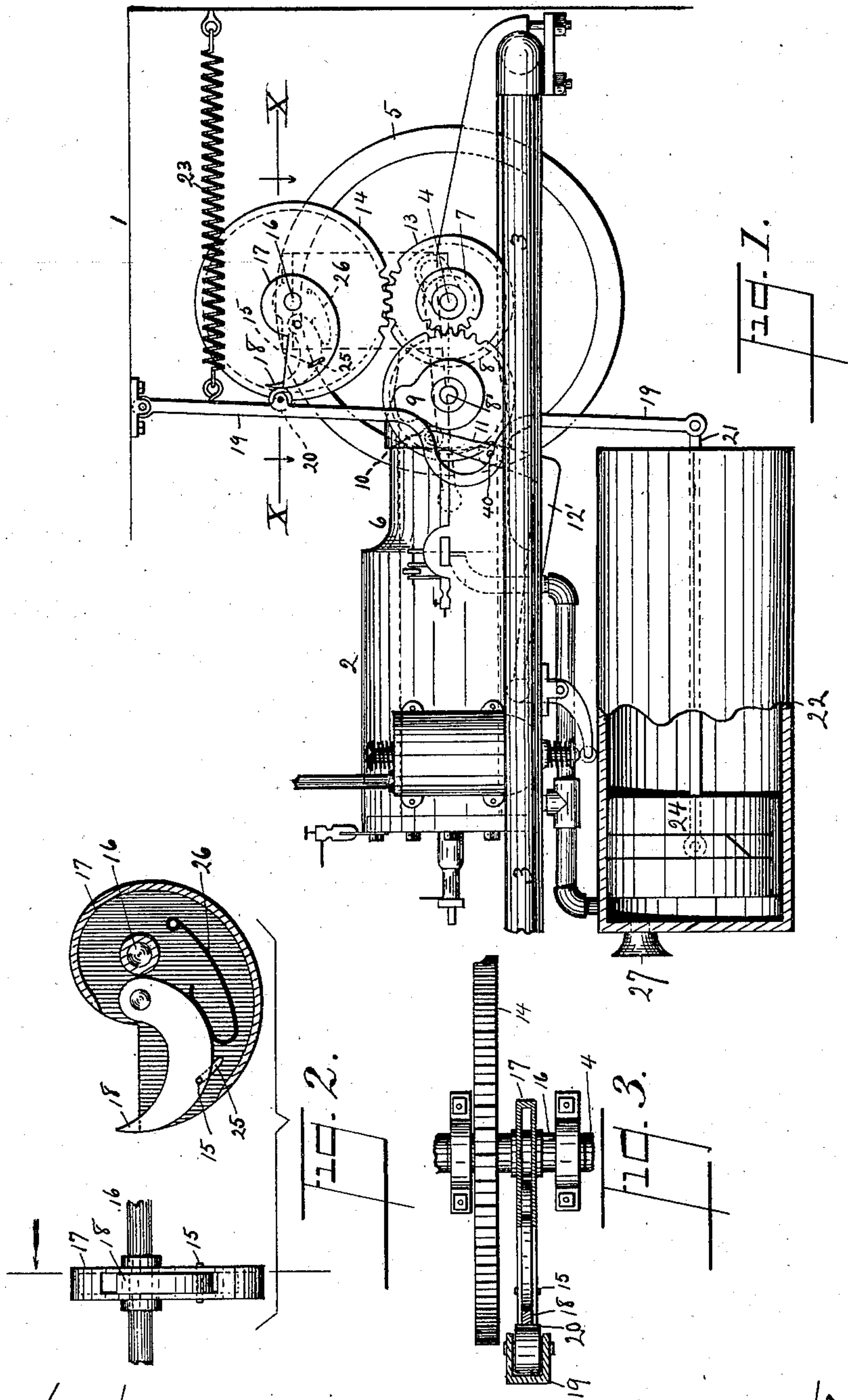
Patented July 31, 1900.

S. MESSERER.
GASOLENE MOTOR.

(Application filed June 8, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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INVENTOR

STEPHEN MESSERER

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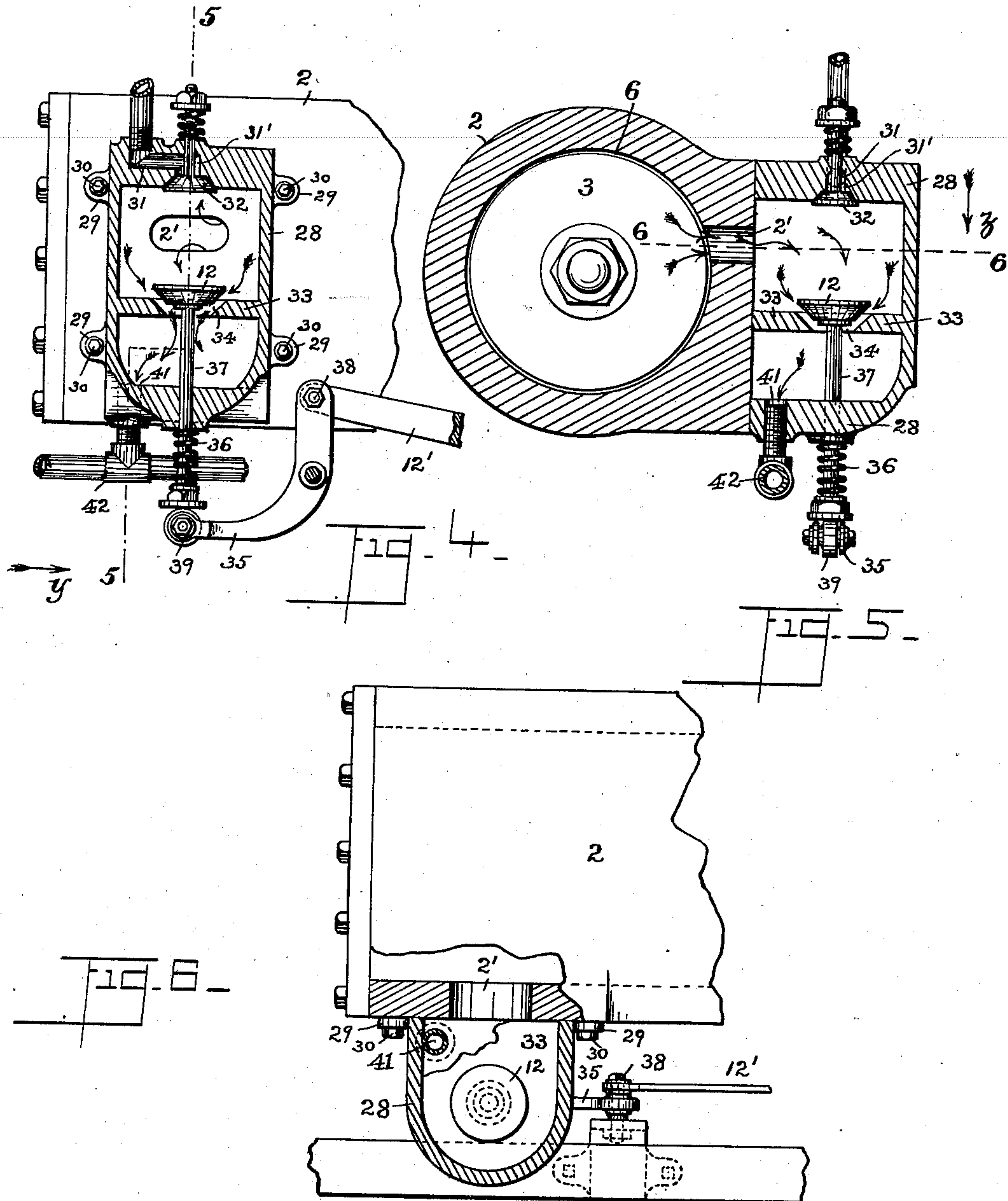
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WITNESSES:

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UNITED STATES PATENT OFFICE.

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GASOLENE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 654,996, dated July 31, 1900.

Application filed June 8, 1899. Serial No. 719,862. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN MESSERER, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Gasolene-Motors, of which the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in gasolene-motors and other engines; and it consists in the combination, with an explosion-cylinder, of a second or auxiliary cylinder connected thereto, a piston placed in said second cylinder, and a suitable mechanism for retracting the piston in the auxiliary cylinder so as to form a partial vacuum therein just as the discharge from the explosion-cylinder takes place, and a suitable mechanism for slowly returning the piston to position, and thus slowly force the burned gases therefrom, all of which will be more fully described hereinafter.

The invention consists, furthermore, in the novel arrangements and combinations of the various parts, as well as in the details of the construction thereof, all of which will be fully set forth in the accompanying specification and then finally embodied in the clauses of the claim.

The primary object of this invention is to provide a means for receiving the exhaust-gases from the explosion-chamber of the gasolene-motor, and thus prevent the exhaust-gases from being discharged directly into the atmosphere and causing objectionable noises.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of one form of gasolene-motor, showing my invention applied thereto, the muffler being represented partly in section. Fig. 2 represents an edge view and a vertical section of a cam employed with my present invention, and Fig. 3 is a section taken through line *x x* in said Fig. 1. Fig. 4 is a side elevation of a portion of the explosion chamber or cylinder of the engine

and a vertical representation of a valve-casing connected therewith, illustrating one arrangement of the discharge-port from the cylinder into said casing; also, the arrangement of an intake or induction valve, as well as the exhaust or relief valve, and portions of a bell-crank lever for actuating said exhaust or relief valve. Fig. 5 is a vertical cross-section of the various parts represented in said Fig. 4, said section being taken on line 5 5 in Fig. 4 and looking in the direction of the arrow *y* in said figure. Fig. 6 is a horizontal section of said valve-casing, taken on line 6 6 in Fig. 5, looking in the direction of arrow *z*, the cylinder of the engine being represented in top view, except a portion, which is broken away and illustrates in section a representation of the side wall of the cylinder with its exhaust-port leading into the valve-casing, the exhaust-valve in this view being illustrated in plan, but a portion of a dividing-wall in which the valve-seat is arranged being broken away to illustrate the outlet from said casing for the exhaust-gases into the auxiliary chamber or cylinder.

Similar numerals of reference are employed in all of the said above-described views to indicate corresponding parts.

In said drawings, 1 represents any suitable framework to which the gasolene-motor 2 is secured. Upon the crank-shaft 4 is secured the fly-wheel 5, and connected to this crank-shaft in the usual manner is a piston 3 in the explosion-chamber 6. Also secured to the crank-shaft 4 is a pinion 7, which meshes with a gear-wheel 8, placed upon the shaft 8', and which wheel is provided with a cam 9 upon one side. This cam serves to operate a bell-crank lever 11, which is crank-shaped and is pivoted at 40. At its upper end this bell-crank lever is provided with a friction-roller 10, where it comes in contact with the cam 9. That portion of the lever below this pivot 40 is much greater than that above it, and this lower portion 12' has secured to its outer end a bell-crank lever 35 for operating the spring-actuated stem 37 of a valve 12 upon the side of the exhaust connected with the engine-cylinder. The said roller 10 remains at all times in contact with the cam, and at each revolution of the cam the upper end of

the lever 11 is forced forward, so that the bell-crank lever 35 is operated.

As will be seen from an inspection of Figs. 4, 5, and 6 of the drawings, the cylinder 2 is provided in one side at or near its forward end with a port 2', through which the expended gases are forced by the return of the piston 3 in said cylinder 2 into a suitably-constructed valve-casing 28, suitably secured to the side of the cylinder 2 by means of lugs 29 and screws or bolts 30, substantially as illustrated. Said valve-casing 28 is provided with an intake or duct 31, which communicates with a duct 31', normally closed by a spring-actuated valve 32, which is opened by suction from the moving piston 3 in the cylinder 2 and allows of the admission of the gas to be exploded. The arm or lever for raising the exhaust or relief valve 12, normally resting on the valve-seat 34 in a dividing-wall 33 in said valve-casing 28, against the action of a spring 36, which encircles the valve-stem 37, is indicated by the reference-numeral 35, as clearly indicated in Figs. 4 and 6. The said lever 35 is pivotally connected with the bell-crank lever 12' at 38 and is preferably provided at its lower end with a roller 39, which is in operative engagement with the lower end of the valve-stem 37 for raising the valve 12 in the manner previously stated. Also secured to the crank-shaft 4 is a gear-wheel 13, which meshes with a gear-wheel 14, secured to the shaft 16, and to which shaft 16 is also secured a cam 17, which as it sweeps around strikes against the friction-roller 20 upon the lever 19. This lever 19 is pivoted at its upper end to the under side of the framework 1 and has secured thereto a spring 23 for the purpose of returning the lever to its initial position after having been operated by the cam 17. The said lever 19 has pivoted to its lower end the piston-rod 21, and this rod is in turn secured to the piston 24, which works in a cylinder 22 for muffling the sound of the exhaust. Also pivoted upon the cam 17 and having its outer edge projecting through the outer end of the cam is an auxiliary cam 18, which is provided with a pin 15, which extends into and projects through a slot 25 in the side of said cam 17. This auxiliary cam 18 is held pressed outward by means of a spring 26, so that the outer end of the cam 18 is made to always project through the opening near the extreme outer point of the cam 17, and thus come in contact with the roller 20 upon the lever 19. By bearing against the said roller the cam-surface of the cam 17 during the rotation of the shaft 16 forces the lever 19 slowly forward until the said cam-surface has fully passed the roller; but the moment the point of the cam 17 slips from the roller 20 the spring 23 suddenly jerks or pulls the lever 19 backward, and thus permits the spring 23 to withdraw the piston 24 suddenly from the inner end of the cylinder 22, and thereby create a vacuum

or a partial vacuum into which the exhaust from the explosion-chamber 6 of the cylinder 2 is received. As will be seen, the point of the cam 18 extends beyond the point of the cam 17, and thus serves to keep the lever 19 pressed forward after the cam 17 has passed beyond it. The same effect can be produced by extending the point of the cam 17 upward, so as to take the place of the point of the cam 18; but the use of the two cams is preferred. The piston being withdrawn just in time to receive the exhaust passing in the direction of the arrows in Figs. 4 and 5 from the exhaust-port 2' into the casing 28 through the raised exhaust-valve 12 into an outlet 41 and suitable pipe connection 42 into the inner end of the cylinder 22, the sound of the exhaust is entirely deadened. The gradual action of the cams 17 and 18 upon the lever 19 serves to force the piston 24 slowly back toward the closed end of the cylinder, and thus the discharged gas slowly passes out through the discharge 27 without any noise.

By means of the construction here shown the exhaust-gases are never discharged directly into the atmosphere, where they make sufficient noise to frighten animals, and thus render a gasoline-motor unfit for use upon public vehicles of the various kinds. The discharge being received in a vacuum or partial vacuum, completely deadens every sound and the objection to a gasoline-motor upon a car or public vehicle of any kind is entirely done away with.

From the above description it will be evident that I have devised a simply constructed and operative mechanism which is efficient and is especially adapted for many uses in gas or vapor engines of the various kinds, whether for stationary work or for propelling vehicles.

I am aware that changes may be made in the several arrangements and combinations of the mechanism and the parts thereof, as well as in the details of the construction of such parts, without departing from the scope of my invention. Hence I do not limit my invention to the exact arrangements and combinations of the mechanism as herein described, and illustrated in the accompanying drawings, nor do I confine myself to the exact details of the various parts thereof.

Having thus described my invention, what I claim is—

1. In a gas or vapor engine, the cylinder of the engine, having an exhaust-port, a vacuum chamber or cylinder provided with means for allowing the exhaust-gases to be expelled, a valve-casing at one side of the engine-cylinder in communication with the discharge-port of said cylinder, and also in communication with said vacuum-chamber, and a piston placed in the vacuum-chamber, combined with means for suddenly forcing the piston outward as the discharge takes place in the cylinder, and means for slowly returning the pis-

ton in the vacuum-chamber so as to expel the gases through the opening in the end of the vacuum-chamber, substantially as described.

2. In a gas or vapor engine, the cylinder, a vacuum-chamber connected thereto to receive the discharged gases, a piston placed in the vacuum-chamber, said chamber being provided with a discharge-opening through one end, and means for suddenly drawing the piston outward as the discharge in the cylinder takes place, combined with a pivoted lever, connections between the lever and said piston, and a cam arranged to engage said lever for returning the piston and thereby expelling the exhaust-gases from said vacuum-chamber, substantially as set forth.

3. In a gas or vapor motor, the explosion-cylinder, a piston working therein, a crank-shaft and means connected with and operated from said shaft for operating the said piston, a pinion upon said shaft, a gear-wheel with which the pinion meshes, and having a cam formed thereon, combined with a bell-crank lever pivotally attached to said explosion-cylinder, and a roller-carrying lever or arm pivotally connected with said bell-crank lever, a valve-chamber at one side of said explosion-cylinder, an exhaust-valve therein, a vacuum chamber or cylinder, a connection between the two cylinders, a valve-casing in which the valve is placed, an auxiliary cylinder into which the discharged gases are received, a piston in said cylinder, and means for withdrawing the piston, substantially as shown.

4. In a gas or vapor motor, an explosion-cylinder, an auxiliary cylinder connected thereto for receiving the discharged gases, means for connecting the two cylinders, an exhaust-valve, and mechanism for operating it, combined with a piston placed in the cylinder for receiving the exhaust-gases, a pivoted spring-held lever for operating the piston in one direction, a rigid cam which bears against said lever, and an auxiliary spring-actuated cam carried by the rigid cam, which also bears against the lever, substantially as described.

5. In a gas or gasoline motor, an explosion-cylinder, an auxiliary cylinder connected thereto for receiving the exhaust-gases, a connection between the two cylinders, the ex-

haust-valve, and a mechanism for operating it, combined with a piston placed in the auxiliary cylinder, a pivoted spring-held lever for operating the piston in one direction, a shaft 16, a rigid cam 17 on said shaft, said cam having a slot, an auxiliary spring-actuated cam connected thereto and provided with a pin which extends through said slot in the side of the rigid cam, substantially as set forth.

6. In a gas or vapor motor, an auxiliary cylinder for receiving the exhaust-gases, a piston therein, a spring-held lever for operating said piston in one direction, a shaft 16, a rigid cam on said shaft, in engagement with said spring-held lever, and an auxiliary spring-actuated cam connected with said first-mentioned cam, substantially as and for the purposes set forth.

7. In a gas or vapor engine, the combination, with an explosion-cylinder, a piston working therein, a crank-shaft and means connected with and operated from said shaft for operating said piston, of a valve-casing at one side of said cylinder, an exhaust-port between said cylinder and said valve-casing, an exhaust-valve in said valve-casing having a stem extending from said casing, a pinion on said crank-shaft, a gear-wheel with which said pinion meshes, a cam on said gear-wheel, a pivoted bell-crank lever operated by said cam, and an actuating arm or lever pivoted to said bell-crank lever in engagement with the end of the valve-stem extending from said valve-casing, an auxiliary cylinder or vacuum-chamber connected with said valve-casing for receiving the discharged gases from said valve-casing, a piston in said auxiliary cylinder or vacuum-chamber, and means connected with the piston in said auxiliary cylinder or vacuum-chamber for advancing said piston, and a spring connected therewith for retracting said piston, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 11th day of April, 1899.

STEPHEN MESSERER.

Witnesses:

OSCAR A. MICHEL,
KATE DOHM MICHEL.