

W. H. SMITH & F. V. DE COPPET.
Ammoniacal Gas Engines.

No. 141,242.

Patented July 29, 1873.

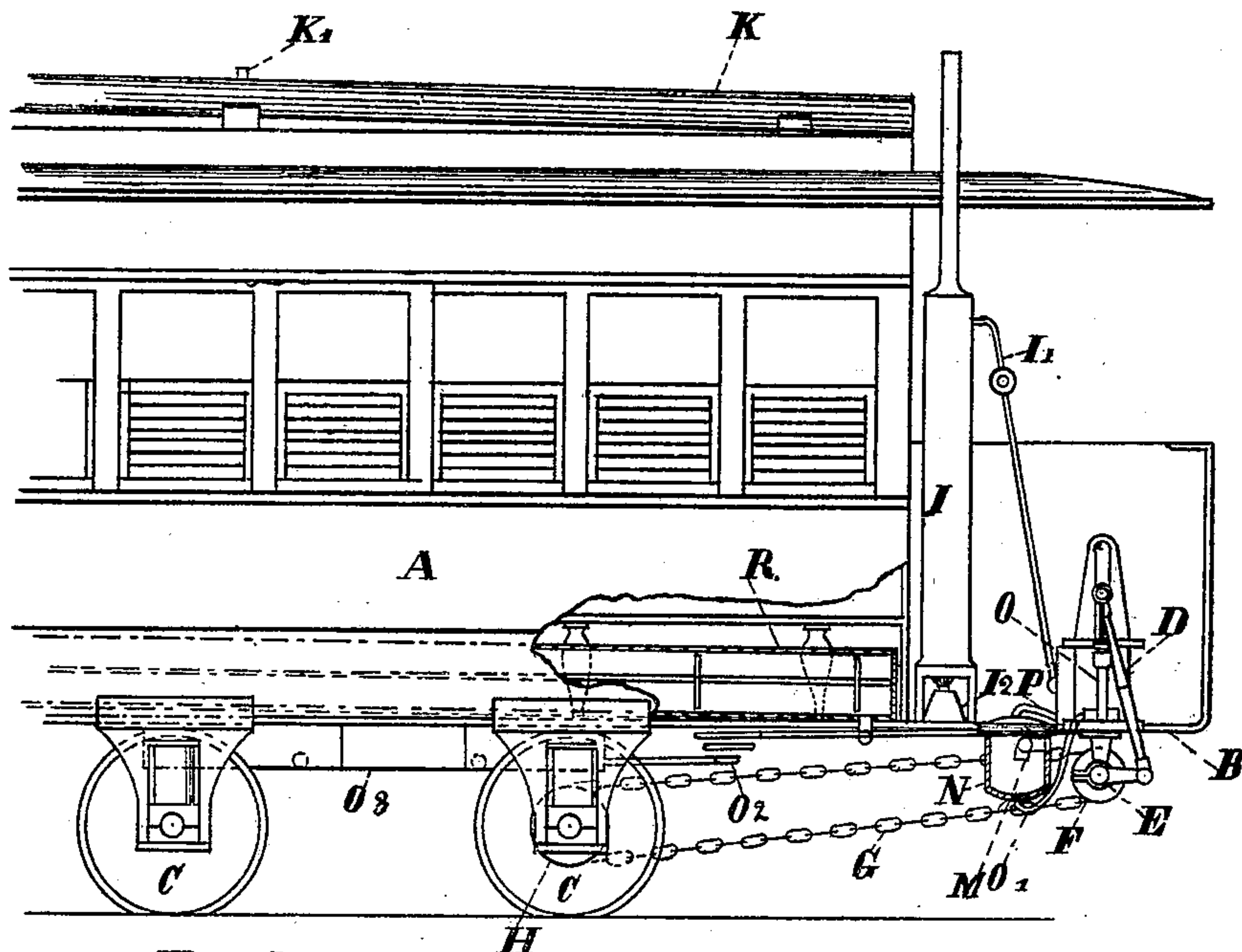


Fig. 1

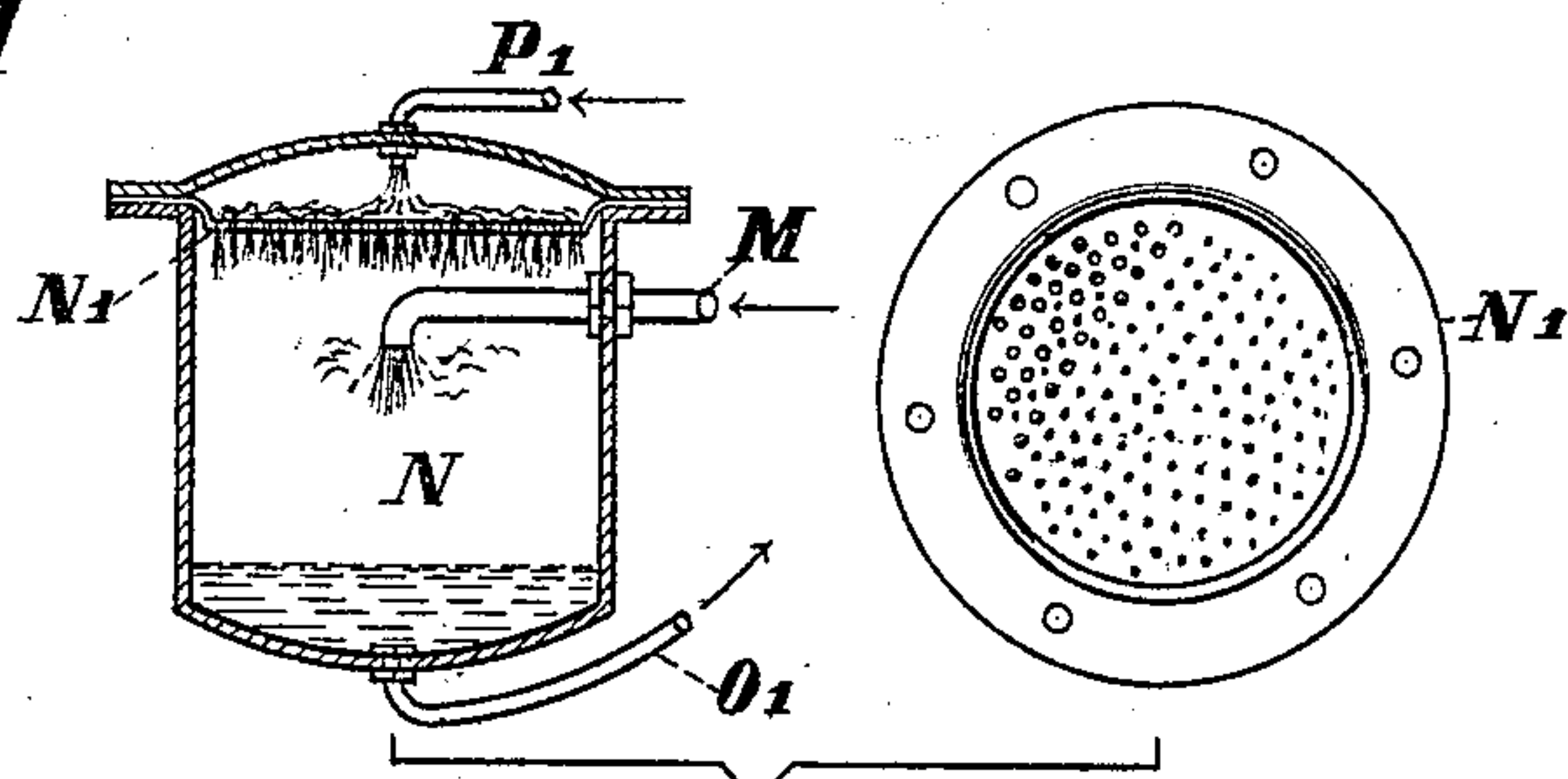


Fig. 3.

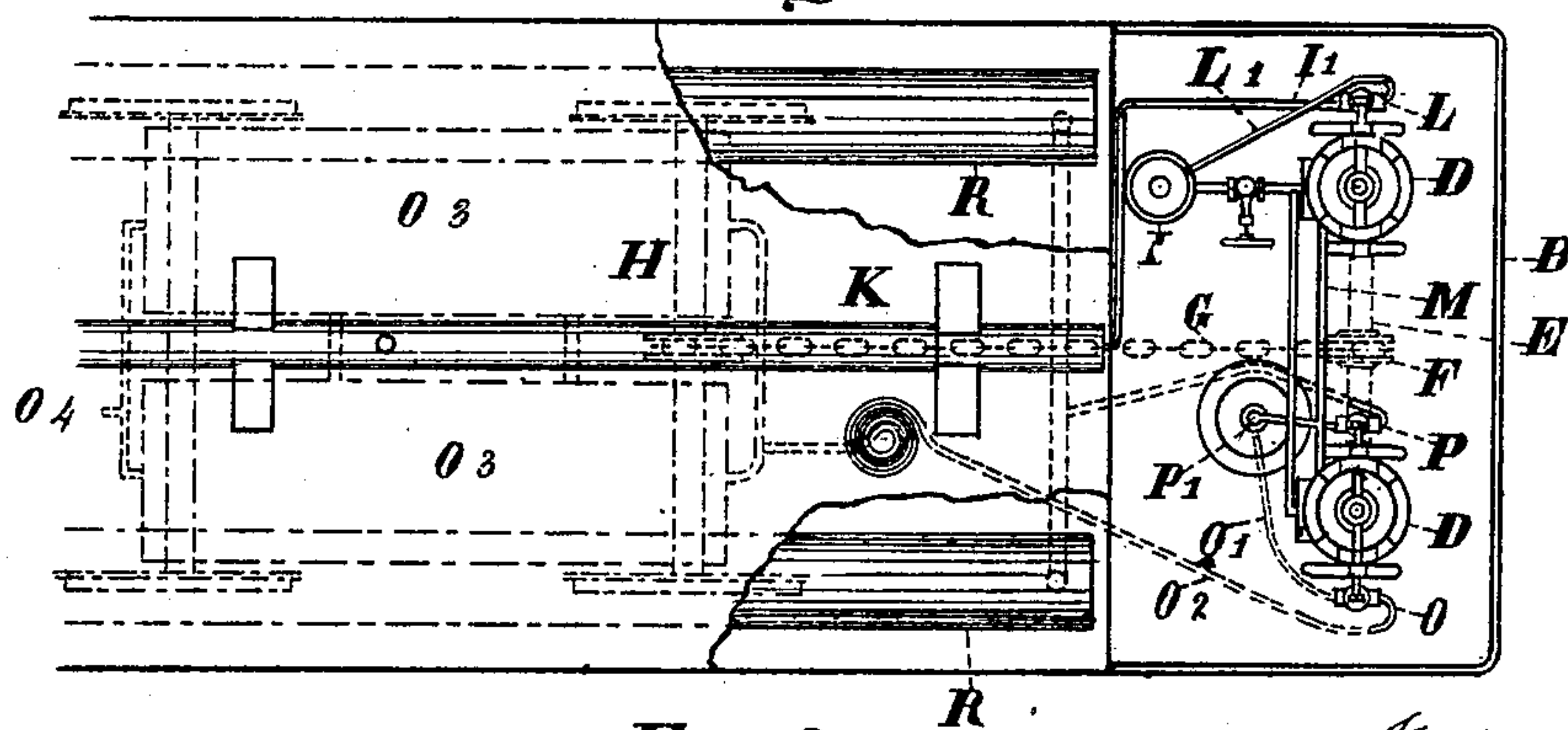


Fig. 2.

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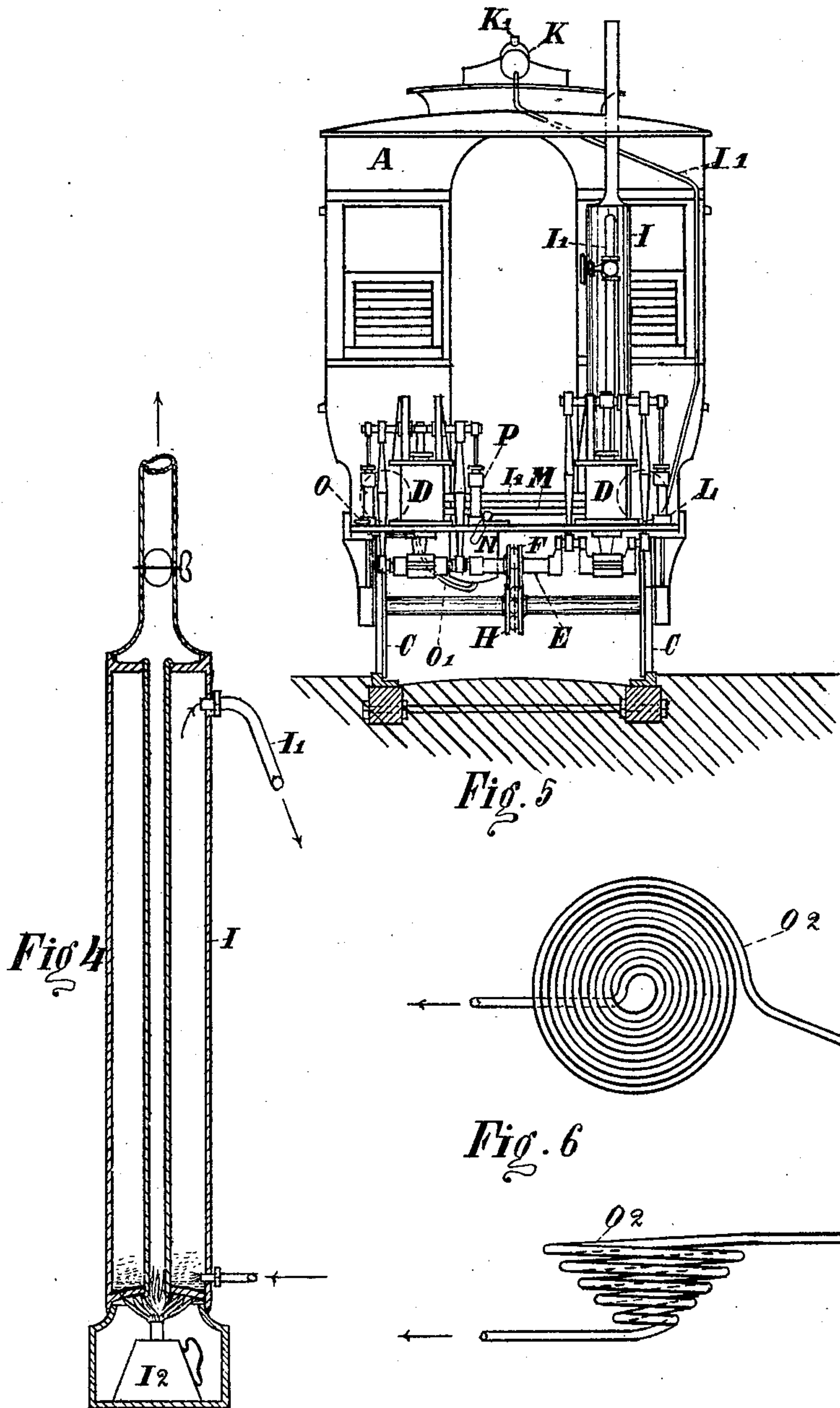
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Francis V. De Coppet,
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UNITED STATES PATENT OFFICE.

WILLIAM H. SMITH, DECEASED, (LUCYNTHA SMITH, ADMINISTRATRIX,) AND
FRANCIS V. DE COPPET, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN AMMONIACAL-GAS ENGINES.

Specification forming part of Letters Patent No. **141,242**, dated July 29, 1873; application filed
February 5, 1873.

To all whom it may concern:

Be it known that we, WILLIAM H. SMITH and FRANCIS V. DE COPPET, of the city of New Orleans, State of Louisiana, have invented certain new and useful Improvements in Ammoniacal-Gas Engine; and do hereby declare the following to be a clear and exact description of the same, reference being had to the accompanying drawings with the letters of reference marked thereon and made part of this specification, in which—

Figure 1 is a side elevation of a railway-car, with a portion of its side broken away to show the improvement when attached to it as a motor. Fig. 2 is a plan view. Fig. 3 is a vertical sectional view of the condenser and its attachments. Fig. 4 is a vertical sectional view of the artificially-heated chamber or vaporizing-vessel with its heating attachments. Fig. 5 is an end view of a car with the invention attached. Fig. 6 is a plan and side view of a pipe to connect the pump and tank used for storing the condensed vapor.

The object and purpose of this invention are to develop an expansive vapor medium, to be applied as motor force or power, by causing the production of vapor only in the quantity sufficient for immediate use at the time when the same is required, by injecting, by mechanical means, a sufficient quantity of liquid anhydrous ammonia into an artificially-heated chamber or vaporizing-vessel in regulated quantities, so adjusted as, when vaporized, to produce sufficient vapor, of sufficient expansive force, to perform the labor or secure the force necessary to operate the motor, as, for example, to accomplish a stroke or a half stroke of an engine of the character of a steam-engine; also, in the condensing of the artificially-heated vapors in a jet-condenser, in about the same manner as is done in a condensing steam-engine, and in the emptying out of the condensed vapor in liquid form from the condenser, and storing it in a suitable receptacle, by mechanical means, at each stroke or half stroke of the engine.

Like letters indicate like parts in all of the figures.

A represents a railway-car. B represents

the platform of a car. D represents a motor-engine. E represents the crank or driving shaft of the engine. F represents a suitably-grooved driving-wheel, secured onto the driving or crank shaft. C represents the car wheels and axles, and on one of these axles is placed another grooved wheel like the grooved wheel on the crank or driving shaft, and in traction line with each other. G represents an endless chain, running over and connecting the two grooved wheels together. I represents the artificially-heated chamber or vaporizing-vessel. I¹ represents the pipe conveying the artificially-heated vapors from the heated chamber or vaporizing-vessel to the engine. I² represents a lighted lamp or gas-jet. K represents a reservoir containing liquid anhydrous ammonia. K' represents an opening in the reservoir, through which it is charged. L represents a lift and force pump, which is connected with the ammonia-reservoir by a suitable supply-pipe. L' represents the discharge-pipe, through which the liquid ammonia is injected, by the force-pump, into the artificially-heated chamber or vaporizing-vessel. M represents a pipe through which the vapors are exhausted into the condenser. N represents the condenser. N' represents a perforated plate placed inside and near the top of the condenser, to spray or divide the injection water in jets. P represents a lift and force pump for drawing water through a suitable supply-pipe from the water-reservoirs, and by the same stroke inject it into the condenser through pipe P'. R R represent water-reservoirs used for carrying water for condensing purposes. O represents a lift and force pump for pumping the condensed vapors in liquid form from the condenser through pipe O¹, and by the same stroke send it on through pipe O² into the storing-tank O³ O³.

The construction is as follows: The engine can be of any of the well-known varieties, of the horizontal or vertical engines, and of any approved kind of valve or valve-motion. The artificially-heated chamber or vaporizing-vessel can be constructed of iron or steel, and of any shape or size, but with strength of con-

struction sufficient to resist an expansive force of two hundred pounds to the square inch, and with the artificial heating arrangements so manageable that any desired temperature can be attained, maintained, or suppressed at will.

The operation is as follows: The reservoir K is charged with liquid anhydrous ammonia, and the reservoirs R R are charged with water. Then light the lamp or gas-jet I², placing it under the chamber or vaporizing-vessel I to heat it by artificial means. Then adjust and regulate the different supply-cocks, and give the engine a revolution by hand, which will cause the pump L to be actuated to draw a regulated quantity of liquid anhydrous ammonia from the reservoir K, and by the same stroke inject it into the artificially-heated chamber or vaporizing-vessel I, where it will be instantly converted into vapor artificially heated and of great expansive force. It is then admitted, through pipe I¹, into the engine D, thus causing the engine-piston to be moved to make a stroke or a half stroke, and the vapor will then be exhausted from the engine into the condenser, the same as is done in a condensing steam-engine; and the pump P will be drawing the required amount of water from reservoirs R R, and by the same stroke inject it into the condenser N through the perforated plate N', and it will be instantly condensed or absorbed by the water, and is then pumped out from the condenser by pump O and stored in the tank O³ O³, from whence it will be drawn off at a proper time and place for regeneration and liquefaction previous to use again and continuously.

It can readily be seen that our improvement is quite different from all others, viz: We can obtain and maintain any desired temperature or expansive force that may be desired, and with a degree of exactness under all rates of speed and resistance to be overcome; and the condensing of the vapors will be uniform and regular at all times, for the condensing water is variable in quantity and so regulated at each stroke to suffice for condensing the amount of vapor just exhausted from the engine into the condenser, and a vacuum or partial vacuum will be formed in the condenser and maintained there with but slight variation while the engine is in motion; and

What we claim as new and useful, and desire to secure by Letters Patent, is—

1. The combination of the artificially-heated chamber or vaporizing-vessel I with pipe I¹ and pump L, all constructed substantially as described, and for the purposes set forth.

2. The combination of the artificially-heated chamber or vaporizing-vessel I with pipe I¹, engine D, exhaust-pipe M, and condenser N, all constructed substantially as described, and for the purposes set forth.

3. The combination of the pump P with water-reservoir R R, condenser N, pump O, and storing-tank O³ O³, all constructed substantially as described, and for the purposes set forth.

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Witnesses:

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