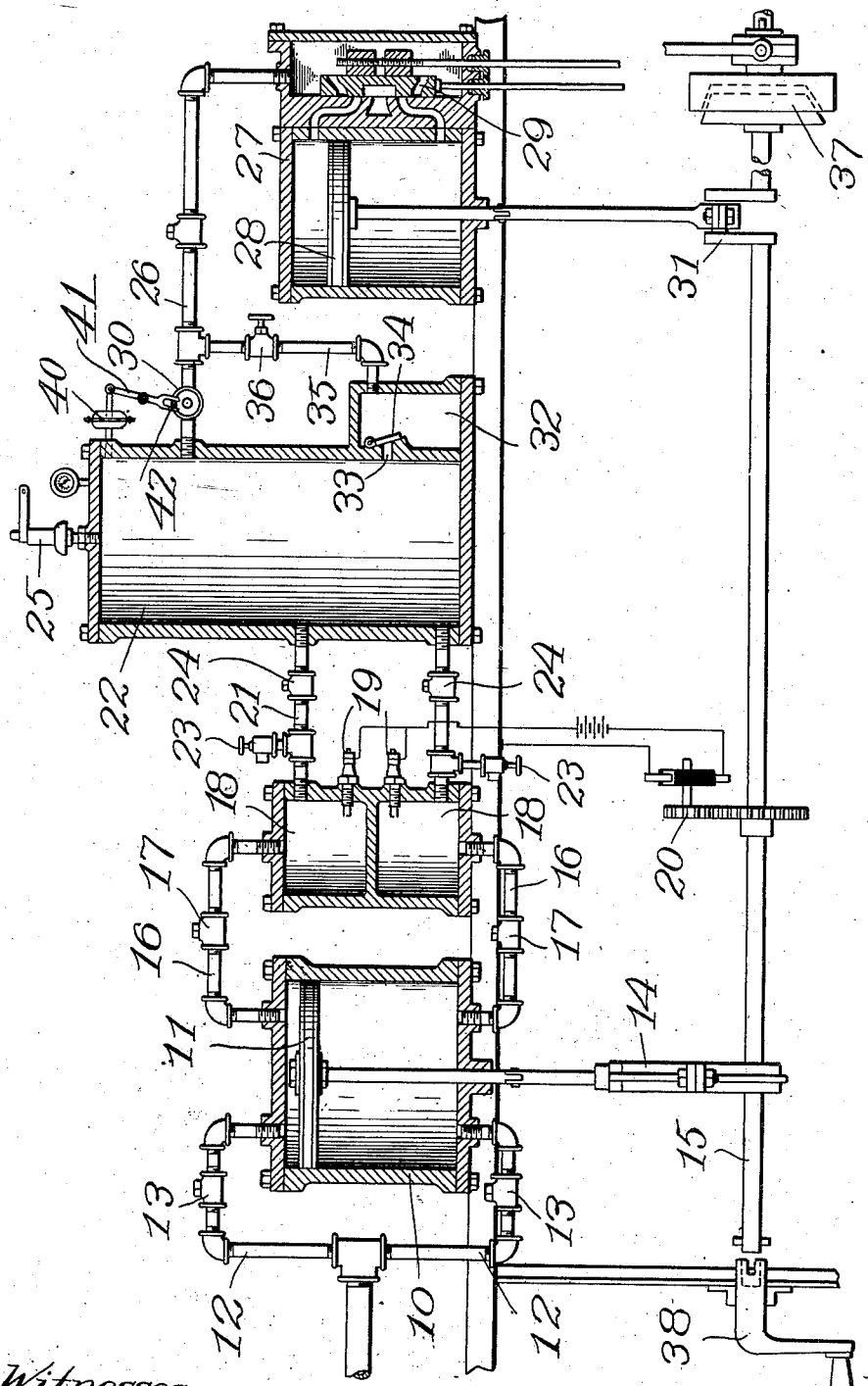
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APPARATUS FOR PRODUCING POWER.

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Witnesses.

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APPARATUS FOR PRODUCING POWER.

1,074,209. Specification of Letters Patent. Patented Sept. 30, 1913.

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To all whom it may concern:

Be it known that I, SYLVANUS B. ROY, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Apparatus for Producing Power, of which the following is a specification.

This invention relates to an apparatus or plant for producing power for general purposes, but it is especially adapted for automobiles.

The principal objects of the invention are to provide an arrangement and combination of mechanism by which gaseous or vaporous fuel can be compressed, exploded, and used for propelling an engine in such a way as to permit of the operation of the engine both forward and backward and at varying speeds without the use of speed change gearing or reversing gearing; to provide such an arrangement with means whereby the engine can be started after having been stopped for some time without going through the entire cycle of operations necessary in the usual running of the device and in fact to provide a construction in which an engine operating like a steam engine can be employed without the use of a boiler or other steam making mechanism, but in place thereof the force of exploded gaseous or vaporous fuel can be used without some of the complications of the ordinary gas engine.

The invention also involves certain features of construction and relative arrangements of parts of the mechanism by which these results are secured, and also a new method of generating power.

In its application to automobiles the invention provides for starting at any time without the use of an expensive self starter, and for running at various speeds and backward without the gearing now in common use.

Reference is to be had to the accompanying drawings in which the figure is a longitudinal, central, sectional view of a plant for producing power in accordance with this invention.

The invention is shown in the figure in a simple form in which a compressor is employed comprising a cylinder 10 and a double acting piston 11. The two parts of this compressor draw in the fuel from any convenient source of supply through pipes 12 provided with check valves 13, as is well understood. The piston preferably is operated from an eccentric 14 on the main shaft 15 of the device. Each part of the compressor delivers its compressed product through passages 16 provided with check valves 17 into receptacles 18. These are separated from each other and provided with igniting devices shown in the form of spark plugs 19 operated by gearing 20 on the main shaft 15 or elsewhere as desired. Each of these receptacles is connected by a pipe 21 with a relatively large receiving tank 22. The inlet to each of these pipes is provided with a puppet valve 23 and they are also provided with check valves 24. The receiving tank is shown as having a safety valve 25 and gage.

A pipe 26 leads from the tank 22 to a cylinder 27 which is provided with a double-acting piston 28 and with a valve mechanism 29, such as ordinary steam or compressed air engines are provided with. The pipe 26 is also provided with a hand operated valve 30 for cutting the engine off from the receiving tank when desired. The piston of the engine is connected with a crank 31 on the main shaft 15 for operating the same.

The receiving tank 22 is provided with a surplus tank 32 connecting with it through a passage 33 having a check valve 34 therein. This surplus tank is also provided with a pipe 35 having a hand operated valve 36 therein for connection with the valve of the engine. The main shaft is provided with a clutch 37 and a crank 38 as is usual in gas engine automobiles.

In operation the rotation of the main shaft, whether caused by the crank or by the engine, results in reciprocating the piston 11 and alternately compressing charges of gaseous fuel in the opposite ends of the compressor and forcing them into the receptacles 18. In these receptacles they are exploded, but it will be obvious that the timing of the explosion will not need to be as exact as in the gas engines now in common use. It is sufficient if the explosions occur often enough to keep the gases in the receiving tank over a certain minimum pres-

sure as indicated by the gage. As long as this is the case these gases are free to be turned into the valve mechanism of the engine, and the engine can be operated and controlled in the same manner as any ordinary steam or compressed air engine to turn the shaft 15 and run the compressor and supply such additional power as may be necessary. These results are secured without the intervention of the gearing, which is a source of constant trouble with the gas engines used in automobiles.

When it is desired to start the engine after it has been stopped, the pressure in the receiving tank 22 may be found too low to operate the engine. This may occur from various causes, such as leakage from the large tank 22 or from the various pipes, check valves and other fittings connected therewith, or the engine may have been stopped on account of failure of pressure in the receiving tank due to failure of the fuel supply or to defects in the compressing mechanism. While any of these various causes may operate to reduce the pressure of the receiving tank, the surplus tank will have been filled with gases at the highest pressure occurring in the receiving tank during the operation of the engine and the probability of leakage from the valves 33 and 36 is much less than from the numerous connections to the tank 22. To start the engine from the surplus tank the valve 30 is turned to shut off communication between the engine and the receiving tank, and the valve 36 is opened to permit the gases from the tank 32 to operate the engine a few turns. Even in case of failure of this method of starting the machine can be started by the usual cranking operation, without any danger of a "back kick," provided the valve 30 is closed. For the purpose of automatically closing this valve when the pressure in the tank 22 goes below a predetermined minimum any kind of valve controlling device can be used. A diaphragm 40 is shown connected with the tank 22 working, when there is an abnormally low pressure in the tank, to operate a link 41 so as to turn the throttle lever 42 and close the valve 30.

It will be seen, therefore, that by this invention, the advantages of the ordinary steam or compressed air engine are secured without the disadvantages involved in the production of steam. At the same time the advantages of the gas engine are secured as far as they relate to the production of the desired power from that convenient form of fuel, without the usual disadvantages such as the presence of the gearing and the necessity for an additional self-starter. Moreover, when it is necessary to use excessive power, as in going up hill the setting back of the spark is not only unnecessary, but impossible, so that source of inefficiency is dispensed with, and the engine works at full efficiency under extreme conditions.

Although I have illustrated and described only one form in which the invention can be carried out, I am aware of the fact that many modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims.

Therefore, I do not wish to be limited to the exact mechanism shown and described, but

What I do claim is:—

1. In a device of the character described, the combination of a compressor for fuel in the form of gas or vapor, a receiver for receiving the compressed fuel therefrom, means for exploding the fuel in said receiver, a receiving tank for receiving the exploded fuel from the receiver, an engine connected up to operate the compressor and having valve mechanism by which the exploded fuel from the receiving tank can be introduced into it to run it either forward or backward, and means connected with said receiving tank for starting the engine independently of the receiving tank.

2. In a device of the class described, the combination of a compressor, a receptacle for receiving compressed gases or vapors therefrom, means for exploding said gases or vapors in the receptacle, a receiving tank for receiving the exploded gases or vapors from the receptacle, an engine connected with said receptacle to be operated by the fuel therefrom, means connected with the engine for operating the compressor, a surplus tank connected with said receiving tank, means whereby said tank can be supplied constantly with gases or vapors under pressure from the receiving tank but cannot give up its charge thereto, and means for connecting the engine with the surplus tank for starting the engine independently of the receiving tank.

3. In a device of the class described, a fuel receptacle, means for exploding the fuel in the receptacle, a receiving tank for the gaseous products of the explosion, an engine connected to be operated by said gases, a surplus tank connected with said receiving tank by a passage having a check valve therein, connections from said surplus tank to said engine, and means whereby upon decrease of pressure within said receiving tank below a predetermined minimum, the connection between said receiving tank and said engine shall be automatically closed.

4. In a device of the class described, a fuel receptacle, means for exploding the fuel in the receptacle, a receiving tank for the gaseous products of the explosion, an en-

gine connected to be operated by said gases, connections between said tank and said engine, and means operable on said connections to automatically close them upon reduction of pressure in the receiving tank below a predetermined minimum.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

SYLVANUS B. ROY.

Witnesses:
C. FORREST WESSON,
E. M. ALLEN.