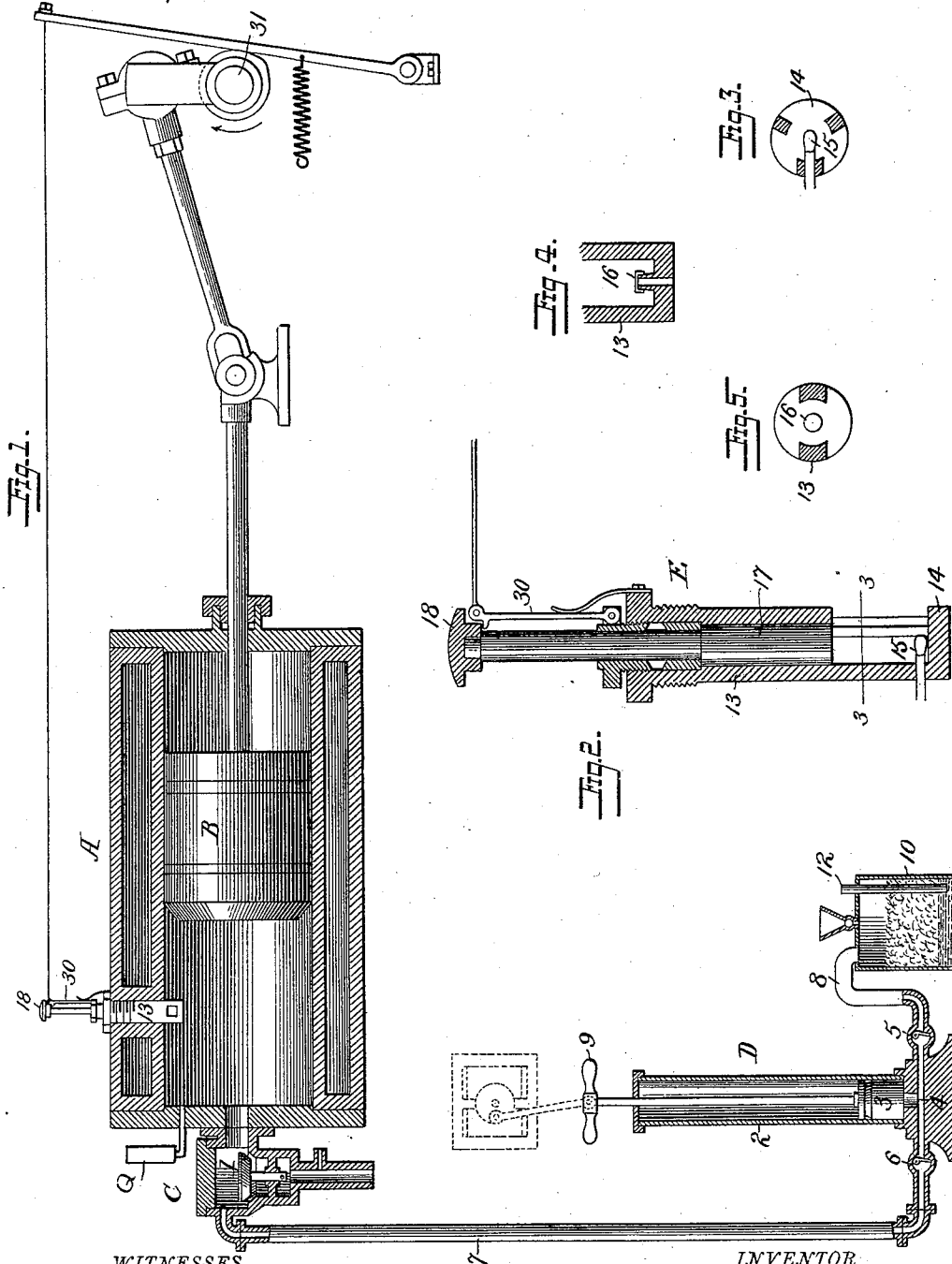


(No Model.)

J. CHARTER.
GAS ENGINE.

Patented Apr. 5, 1892.

No. 472,106.



WITNESSES

Geo. G. Hinkel
Chas. S. McArthur

INVENTOR

John Charter
By Foster Freeman
Attorney's.

UNITED STATES PATENT OFFICE.

JOHN CHARTER, OF STERLING, ILLINOIS.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 472,106, dated April 5, 1892.

Application filed January 2, 1891. Serial No. 376,473. (No model.)

To all whom it may concern:

Be it known that I, JOHN CHARTER, a citizen of the United States, residing at Sterling, in the county of Whiteside and State of Illinois, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

My invention relates to that class of engines that are operated by the explosions of charges of explosive mixtures introduced and ignited at suitable intervals; and my invention consists of means, fully set forth hereinafter, for effecting the charging and igniting of the charges independently of the operations of the engine to facilitate the starting of the same from a position of rest.

In the accompanying drawings, Figure 1 is a sectional elevation of sufficient of a gas-engine provided with my improvements to illustrate the same. Fig. 2 is an enlarged section of the ignitor. Fig. 3 is a transverse section on the line 3 3, Fig. 2. Figs. 4 and 5 are sectional views illustrating another form of ignitor.

The cylinder A, the piston B, inlet-valve I, and casing C, containing the same, and exhaust-port valve and other features of the engine are constructed in any usual or suitable manner, and any suitable igniting device is provided, so that charges of explosive-gas mixture are admitted into the cylinder behind the piston at suitable intervals and are there exploded, generating the power that moves the piston. In gas-engines having these features difficulties have always been encountered, especially with large engines, in starting the same, it being necessary to revolve the crank-shaft in the first instance by hand or some outside power, so as to draw in a charge of mixture, and, further, to impart by hand such a speed to the shaft as will cause it to be carried by momentum across the dead-center, so that when the charge is ignited the pressure will come against the piston already in motion. These operations in large engines sometimes require the labor of several men in starting, and frequently necessitate repeated efforts before the engine can be got into automatic operation. To overcome these objections I provide means for independently charging and special means

for igniting the charges, so that a charge may be forced by hand into the cylinder and may then be ignited, preferably independently of the main igniting device Q, so as to explode said charge and impart the initial movements to the piston.

Different charging and igniting means adapted to be operated by hand may be used to carry out my invention. The charging apparatus will depend in its construction upon the character of the gas used and the size of the engine, &c.

In Fig. 1 I have shown a charging apparatus D in the form of a pump having a cylinder 2, piston 3, channel 4, and self-closing inlet and discharge valves 5 6, with a discharge-pipe 7 leading to the valve-casing C or to any suitable port communicating with the explosion-chamber of the engine, the inlet-valve 5 being in a pipe 8, which receives the gas or a mixture of air and gas from any suitable source. The pump may be operated by any suitable independent power when its size is such as to demand it. For instance, it may be connected by a pitman with a stud upon the armature-shaft of an electric motor, as indicated in dotted lines, Fig. 1. For most purposes, however, I prefer to operate the charging device by hand, the piston-rod having a handle 9, by means of which the piston may be readily reciprocated, so that at one stroke to draw in the mixture, the valve 6 closing, and at the next to force it out into the cylinder A, the valve 5 closing. Where natural or artificial gas already prepared can readily be had, the pipe 8 may communicate with the gas-pipe and a sufficient quantity of pure gas may be forced into the cylinder A to make an explosive mixture with the air already there contained, or the said gas may be combined with the air in a suitable reservoir or valve 10, communicating with the pipe 8. When, however, natural or artificial gas already prepared cannot be had, I make use of a carburetor of any suitable construction. For instance, the casing 10 is supplied with filamentary or fibrous material, which is saturated with a fluid of suitable volatile character, and the air is introduced through a pipe 12 at such point as to pass through the fluid or impregnated material, as a result of

the exhausting action of the pump, which thus receives at its upstroke a mixture of air and gas.

By means of an independent charging apparatus as above described a suitable charge may be forced into the cylinder A while the engine is at rest, care being taken to have the crank off the dead-center, and this charge is forced under a suitable pressure to insure the best results, without, however, having such excessive pressure and without furnishing so "sharp" a mixture as will result in too quick a combustion, so as to avoid sudden strains when the piston is in a stationary position.

Q is any form of ignitor suitable for igniting the charges when the engine is running.

The independent ignitor E may be an electrical or flame ignitor; but I prefer to use a percussive ignitor having an anvil and hammer, between which a detonate may be exploded by percussion. Thus a short tube 13 is tapped into an opening in the cylinder A, said tube being open at the side within the cylinder and closed at the bottom to form an anvil 14, on which may be placed a friction-match 15 or a percussion-cap 16, as shown in Figs. 4 and 5. A hammer 17 slides in the tube, the stem sliding through a packing-box at the end of the tube and terminating in a head 18, which may be struck by the hand to bring the hammer against the detonator to explode the latter and ignite the charge.

It will be evident that in some cases the charging device may be used in connection

with the regular ignitor instead of providing the engine with a separate independent ignitor and that the auxiliary ignitor may be used with an engine in which the charge is drawn in by the movement of the piston. Where desired, the auxiliary ignitor may be acted on automatically as the operator turns the fly-wheel to start the engine. Thus the hammer may be supported by a pivoted arm 30, Figs. 1 and 2, which is withdrawn by the action of a cam on the main shaft 31 when the parts are in position for the charge to ignite.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination, with a gas-engine and its ignitor and charging means, of a hand-pump and carburetor for charging the combustion-chamber while the engine is stationary and a hand-operated ignitor consisting of a hammer and anvil, substantially as described.

2. The combination of a gas-engine and an auxiliary ignitor provided with a hammer and anvil, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN CHARTER.

Witnesses:

MINTA BOWEN,
D. L. MILLER.