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The diagram consists of two side-by-side cross-sectional views of a mechanical device. The left view shows a vertical rectangular housing (A) containing several horizontal plates or membranes (B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z). The right view shows a similar housing (A') with a curved bottom section (D') and a central vertical channel (H'). Various components are labeled with letters and numbers, indicating their positions and functions within the assembly.

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STARTING DEVICE.

1,003,861.

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To all whom it may concern:

Be it known that I, LUCIAN H. APPELMAN, a citizen of the United States, residing at Clermont, in the county of Fayette and State of Iowa, have invented certain new and useful Improvements in Starting Devices; and I do hereby declare the following to be 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.

This invention relates to starting devices for gasolene and other internal combustion engines; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a longitudinal section through a starting device constructed according to this invention. Fig. 2 is a side view of the same.

A is a small mixing cylinder or vessel provided with a screwthreaded portion *b* at one end, or with other suitable fastening devices, for attaching it to the intake pipe of an internal combustion engine of any approved construction.

B is a plate or valve which closes the other end of the cylinder A. This plate is pivoted to the cylinder A by a pin *c* so that it can be opened or closed as desired.

The part *b* is screwed onto the end portion of the air intake pipe so that the chamber A forms a short extension on the end of the intake pipe, and when the plate or valve B is open the chamber A is of no effect in the ordinary working of the engine and its carbureter.

D is a second cylinder or vessel for fuel provided with a laterally projecting sleeve *d* which is journaled on a tubular branch or trunnion C which projects laterally from the cylinder A. A set-screw E is screwed into one side of the sleeve *d*, and its point works in a circumferential groove *e* in the trunnion C so that the two cylinders cannot become separated.

The cylinder D has a small tube F which projects within it from one end thereof, and which partially overlaps the tubular trunnion.

G is a plate or valve which is pivoted to the cylinder D by a pin *g*, so as to close the outer end of the tube F when required.

H is a can for holding gasolene or other inflammable liquid. This can is suspended

over the free end portion *d'* of the fuel cylinder D by means of pivot pins *h*, an annular space *i* being formed around the top of the can, between it and the cylinder. The can H has also a short air tube *j* which projects upwardly from its bottom under the bottom of the cylinder D.

In using the starting device, the mixing cylinder A is secured to the intake pipe of the engine in any convenient position, and the fuel cylinder D is turned on the trunnion so that it hangs vertical. A sufficient quantity of gasolene or other similar liquid is poured through the tube F into the cylinder D, care being taken not to fill the cylinder D so that the liquid runs through the trunnion. Gasolene is also poured into the can H, and is ignited after closing the two valves B and G.

The gasolene burns in the cup, and the flame issues around the top of the cup, and heats the gasolene in the fuel cylinder D. When sufficient gasolene has been converted into vapor the valve G is opened, and the engine fly-wheel is spun around by hand, the gasolene valve of its carbureter being closed, and the ignition current being switched on so as to form sparks at the sparking plug. Air enters through the valve G and mixes with the vapor in cylinder A and is drawn into the engine cylinder, and the mixture is ignited therein. When the engine has attained a sufficient speed the valve B is opened and the gasolene supply is turned on at the carbureter.

The successful operation of the device depends upon a suitable quantity of air being drawn through the tube F, which is of prearranged size, to mix with the gasolene vapor in the cylinder A to form a suitable inflammable mixture, and in practice it is found to do this successfully, and without in any way interfering with the normal running of the engine.

This device is devised specially for use in cold weather.

What I claim is:

1. In a starting device, the combination, with a mixing cylinder provided with means for securing it to the intake pipe of an engine and having also an air inlet valve and a laterally projecting tubular branch, of a fuel cylinder connected to the said branch and provided at one end with a tube which projects crosswise of the said branch and

having also a valve for closing the said tube, and means for heating the other end portion of the fuel cylinder.

2. In a starting device, the combination, 5 with a mixing cylinder provided with means for securing it to the intake pipe of an engine and having also an air inlet valve and a laterally projecting tubular trunnion, 10 of a fuel cylinder pivoted to the said trunnion and provided at one end with a tube which projects crosswise of the said trunnion and having also a valve for closing the said tube, and means for heating the other end portion of the fuel cylinder.

3. In a starting device, the combination, 15 with a mixing cylinder provided with means for securing it to the intake pipe of an engine and having also an air inlet valve

and a laterally projecting tubular trunnion, 20 of a fuel cylinder pivoted to the said trunnion and provided at one end with a tube which projects crosswise of the said trunnion and having also a valve for closing the said tube, and a can for inflammable matter suspended around the other end portion 25 of the fuel cylinder and provided with an inlet for air to support combustion in the can, an annular passage for flame being also formed between the said can and fuel cylinder. 30

In testimony whereof I have affixed my signature in the presence of two witnesses.

LUCIAN HEWITT APPELMAN.

Witnesses:

JOHN NELSON,

JOHN PETERSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."