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MOISTENER FOR INTERNAL COMBUSTION ENGINES.

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1,220,307. Patented Mar. 27, 1917.

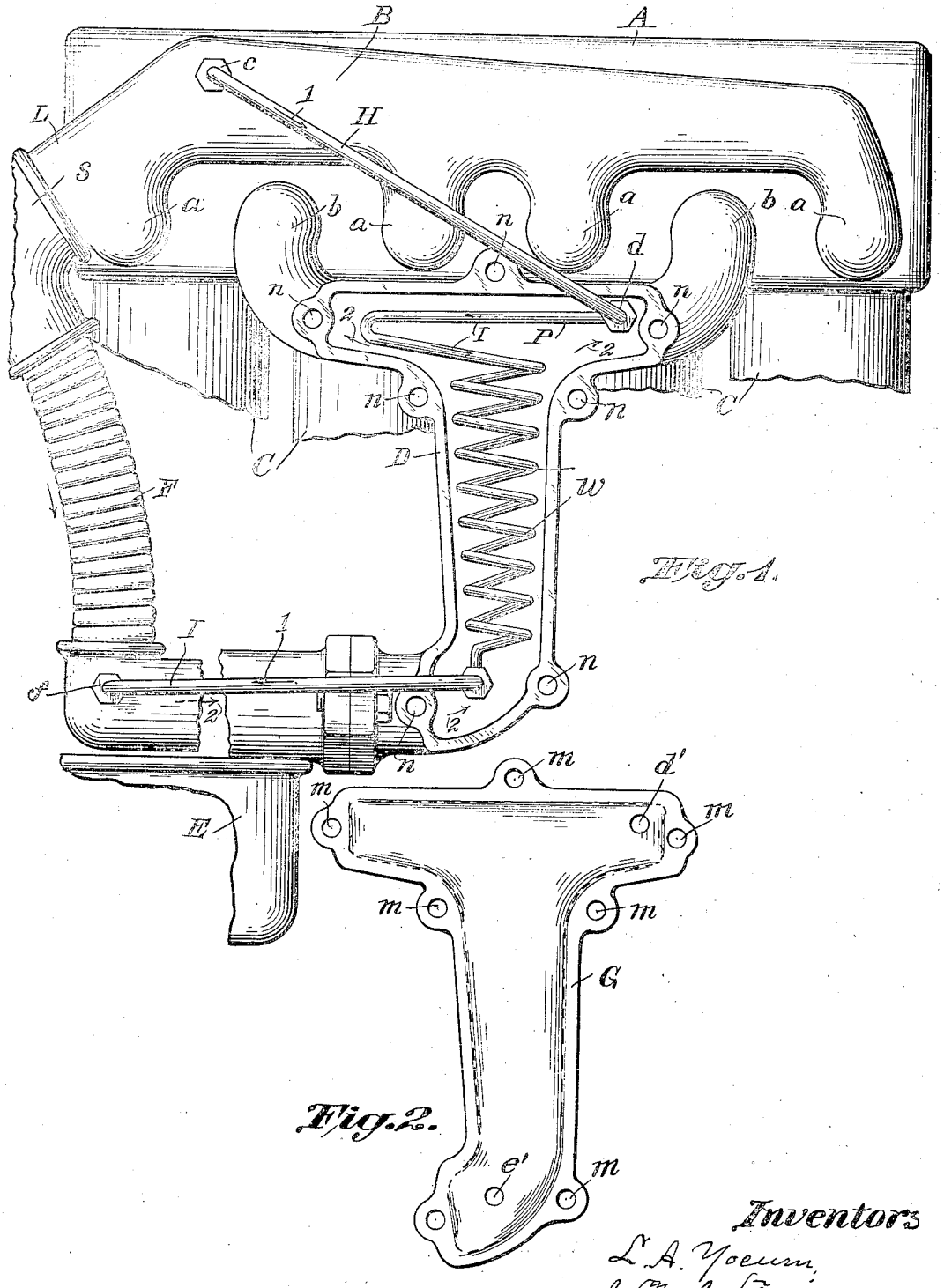

Fig. 1.

Fig. 2.

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Application filed June 19, 1916. Serial No. 104,605.

To all whom it may concern:

Be it known that we, LINCOLN A. YOCUM and WILLIAM A. LEWIS, citizens of the United States, residing at Wooster, in the county of Wayne and State of Ohio, have invented a new and useful Moistener for Internal-Combustion Engines, of which the following is a specification.

Our invention relates to improvements in internal combustion engines. Its main object is to provide improved means for producing and supplying moisture to the cylinders of such engines, and its condensation and transmission from waste gases in the exhaust pipe to the chambers of the cylinders, automatically, to give greater elasticity to the exploding gases within the cylinders, and thus increase the efficiency of such engines.

It consists of the novel means set forth for securing and utilizing the exhaust gases passing through the exhaust pipe to facilitate and increase the explosion in the cylinders by withdrawing and condensing a part of said gases and conveying and mixing the resultant fluid therefrom with the usual intake mixtures, conveying the fluid to the usual hot-air intake pipe, and thence to the carbureter, where and whereby it is combined with the explosive mixture, whether from gasolene, kerosene, alcohol or other explosive compounds ordinarily used in internal combustion engines, or which may be so used for the purpose. It further consists of the novel means set forth hereafter, comprising the use of condensing coils, as of a still, with suitable nipples connecting such coils with the exhaust pipe, in such manner as to convey gases escaping therethrough to the intake manifold, where the greatest number of convolutions of coils are located, and thence conveying the condensed fluid or spray therefrom to the hot-air intake pipe, and thence to the carbureter, and through the intake manifold to the cylinder chambers, to intensify the explosion therein; and finally, it consists of means for readily placing and securing said condensing coils within the usual intake manifold, and making them readily accessible for inspection or removal, all as hereinafter fully set forth and stated in the appended claims.

Our invention is illustrated by the accompanying drawings, in which similar letters and figures of reference indicate like parts.

Referring thereto, Figure 1 is a side elevation of a part of an ordinary internal combustion engine, as used in automobiles, deemed sufficient to illustrate our invention, which is embodied therein, the cover plate of the intake manifold thereof being removed for better illustration, part of the carbureter being also cut away as unnecessary for the purpose.

Fig. 2 is a detail view of the cover plate removed from the intake manifold shown in Fig. 1. Referring to the drawings, A is the body of an ordinary four cylinder internal combustion engine, as commonly used in automobile construction; B is the exhaust pipe thereof; C, C, the upper chambers of the several cylinders; D, the stationary portion of the intake manifold; G, the cover plate of the latter, detached; E, the upper portion of the carbureter, such as commonly used on such engines; and F, the usual hot-air intake pipe, leading from the adjacent end L of the exhaust pipe B, by the usual and well known connection S. The usual exhaust vents are indicated by the letters *a a;* and the vents for gases leading into the cylinder chambers C are indicated by the letters *b b; n n* are apertures for the admission of threaded bolts to secure the cover plate G solidly in position upon the fitted surface of the intake manifold, the apertures *m m* of the former, registering with the corresponding apertures *n n* of the latter, in the usual well known way of securing plates together so as to leave the interior thereof hollow, and admit of access thereto, at pleasure.

H is a small diameter pipe connected to the exhaust pipe B by a nipple *c*, and leading downwardly to one of the pipes leading from the upper part of the intake manifold D, to which it is solidly connected through the perforation *d'* in the cover plate thereof, by means of the threaded nipple *d*, and also to the pipe P within the hollow of the manifold; W is an extended convolution of coils of pipe of like diameter to the pipe P, with which it connects at its top, and thence extends downwardly through the hollow of the intake manifold to near its lower end, where it terminates and passes out through the aperture *e'* of the plate G to which it is solidly connected by a threaded nipple *e*, and to the extension pipe I, which connects with the lower end of the hot-air intake pipe F by a threaded nipple *f*.

It is apparent that by the removal of the

cover plate G from the front surface of the intake manifold D, and disconnecting the said nipples of the pipe, access is obtained to the interior of the manifold, for placing the pipe coils therein, or removing the same readily.

The main object of our invention being to supply moisture automatically to the cylinder chambers of the engine by condensation of a part of the waste gases which escape naturally through the exhaust pipe B and thence transmitting the said gases in such manner as to liquefy them in their passage, and re-mix the condensed liquid with the other intake mixtures and add dampness thereto as they pass to the cylinders, the means for accomplishing this desired result will be readily understood, without a showing of other operative parts of an internal combustion engine, or explaining the functions of carbureters and intake manifolds and hot air intake pipes, cylinder chambers, and vents connected therewith for passage of gases, in the usual and well known way. Our device is connected therewith in such manner that it may be employed in any of the different forms and kinds of internal combustion engines in common use.

Its location and connections are such as to utilize sufficient of the waste moisture which usually escapes through the exhaust pipe by force of the explosions, the intense heat generated thereby converting such moisture naturally into superheated steam, which rushes outwardly through the nipple *c* and thence through the pipes H and P and passes through the coil convolutions W located within the hollow of the intake manifold, as aforesaid, and is therein condensed sufficiently by the draft of air and explosive mixtures which envelop said coils in passage from the carbureter to the cylinder chambers, to form a spray which is drawn therefrom through the pipe I into the hot air intake F, where the moisture therefrom is automatically mixed with the explosive mixtures on their way to the cylinder chambers, as aforesaid. The passage of said moisture from the exhaust pipe B to the hot air intake pipe F is indicated by the arrows 1 1, and the direction of the passage of the moisture taken into the hot air intake pipe F, and thence through the intake manifold to the cylinder chambers, is indicated by the arrows 2 2.

Thus the passage of the moisture is seen to be entirely automatic, and its generation and flow commences as soon as the engine starts, and contributes a constant supply from what has heretofore gone to waste.

Having thus fully described our invention what we claim as new and desire to secure by Letters Patent is—

1. In an internal combustion engine having a plurality of cylinder chambers, an intake manifold, a carbureter, an exhaust pipe, and a hot air intake pipe, the combination with the intake manifold, of a pipe having a plurality of convolutions within the hollow body of said intake manifold, the upper end of said pipe leading to and opening into said exhaust pipe, and the lower end of said pipe leading to and opening into said hot air intake pipe, substantially as set forth and for the purpose specified.

2. In a device of the character described, the combination with the hollow body of the intake manifold, of a slender pipe having a plurality of coils within said hollow, a like pipe joined to said coils and to the rear part of the exhaust pipe of the explosive engine, nipples at the ends of said connecting pipe to detachably secure its connections, a like pipe joined to the opposite end of said coils and to the hot air intake pipe of the engine, nipples at the ends of said connecting pipe to detachably secure said junctions, and means for opening and closing the body of said intake manifold to receive said coils and secure the same gas tight therein, substantially as set forth.

3. In an internal combustion engine, a self moistening device for conveying moisture to the cylinders thereof, comprising a pipe leading from the exhaust pipe of the engine to the hot air intake thereof, in its course passing through the intake manifold of the engine in a series of coils suspended within the hollow body of said manifold, and means for opening and closing said body to receive said coils, substantially as set forth.

4. In an internal combustion engine, a device for automatically conveying moisture to the cylinders thereof with its explosive mixtures, comprising a slender pipe having a plurality of coils inclosed within the hollow body of its intake manifold, and connected outwardly at one end with an opening into the exhaust pipe of the engine, and outwardly at the opposite end with an opening into the hot air pipe thereof.

5. In an engine of the class described, a device for automatically taking moisture from the products of combustion in process of escaping as exhaust gases, and liquefying the latter, and conveying the liquid as a spray to the intake explosive mixtures, and thence to the cylinder chambers of the engine, comprising a gas conducting pipe having a series of convolutions within the hollow body of the intake manifold, and extensions therefrom, at one end, to an opening into the exhaust pipe of the engine, and at the other, to an opening into the hot air intake pipe and carbureter of the engine, substantially as set forth.

6. In an engine of the class described, a self moistening device for conveying and liquefying escaping exhaust gases, comprising a gas pipe having a series of convolu-

tions inclosed within the hollow body of the intake manifold, and connected by pipe extensions to the exhaust pipe and to the hot air intake pipe, respectively, of the engine.

7. In an engine of the class described, a device for liquefying and conveying escaping exhaust gases to the cylinder chambers of the engine automatically, comprising a gas pipe having a series of coils removably inclosed within the hollow of the intake manifold, said coils connected outwardly at both ends by pipes leading to openings into the exhaust pipe and the carbureter of the engine, respectively, substantially as set forth, and means for removably inclosing said coils.

In witness whereof we have hereunto set our hands this 19 day of May A. D. 1916.

LINCOLN A. YOCUM.
WM. A. LEWIS.

In presence of two witnesses:
O. M. YOCUM,
HIRAM B. SWARTZ.

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