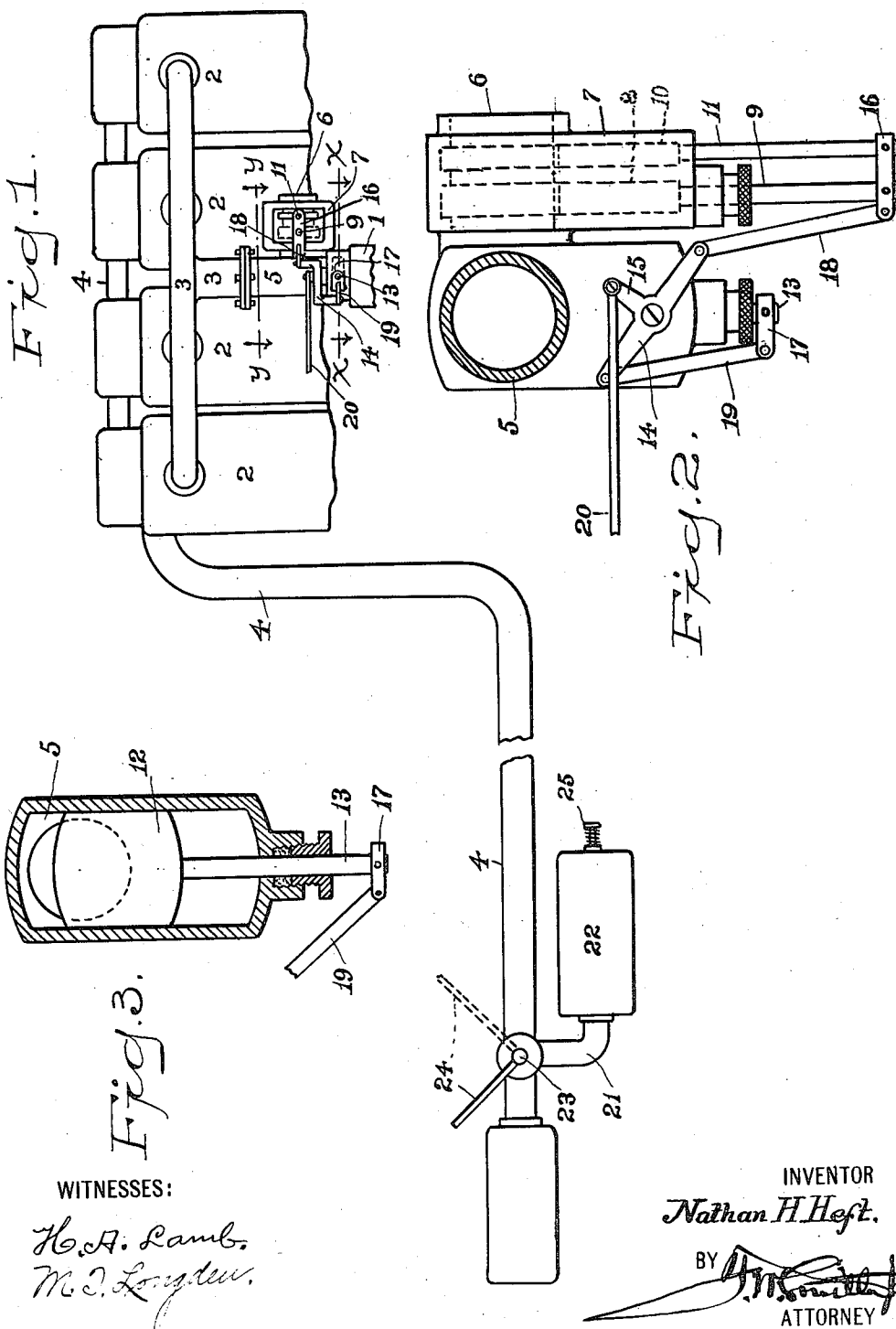


N. H. HEFT.
 ATTACHMENT FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED JUNE 15, 1909.

953,382.

Patented Mar. 29, 1910.



WITNESSES:

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UNITED STATES PATENT OFFICE.

NATHAN H. HEFT, OF BRIDGEPORT, CONNECTICUT.

ATTACHMENT FOR INTERNAL-COMBUSTION ENGINES.

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Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed June 15, 1909. Serial No. 502,252.

To all whom it may concern:

Be it known that I, NATHAN H. HEFT, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Attachments for Internal-Combustion Engines; 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.

My invention relates to certain improvements in attachment for internal combustion engines, and has for its objects to cool and scavenger the cylinders with fresh air, to brake the engine by the compression of air alone in the cylinders while the automobile is descending an incline, and to store pure air under compression in a reservoir especially provided on the automobile for that purpose whereby tires may be readily filled with air at sufficient pressure.

With these ends in view my invention consists in the combination and arrangement of parts hereinafter fully described and then particularly pointed out in the claims which conclude this description.

In the accompanying drawing Figure 1 is a schematic broken elevation illustrating my improvement as applied to an internal combustion engine. Fig. 2 a section at the line *y, y*, of Fig. 1, and Fig. 3 a section at the line *x, x*, of Fig. 1.

Similar numerals of reference denote like parts in the several figures of the drawing.

Heretofore, it has been common to brake the engine of an automobile by cutting out the spark so that the engine would work against the compression, and in this respect my improvement does not bring about the performance of any new function, but my improvement contemplates the cutting off of the gas supply when a machine is descending a hill, and scavenging and cooling the engine solely by fresh air unmixed with any gas whatsoever, and nothing else but fresh air is compressed in the cylinders during this time, and after the cylinders have been sufficiently cleared my invention provides for the closing of the exhaust outlet and the storing of the compressed air in a tank that is carried by the automobile so that the inflation of inner tubes may be effected by means of a connection between this air stor-

age reservoir and the valve of such tube, all of which will be readily understood by reference to the following description:—

1 represents the carbureter of any ordinary construction, 2 the cylinders, 3 the intake pipe and 4 the exhaust pipe, all of such parts being ordinary in construction and application.

5 is a casing which is interposed between the intake 3 and carbureter 1 and is securely bolted or otherwise secured in such relation, said casing being open at the upper and lower ends, so that it will be clearly understood that there is a direct communication through this casing between the carbureter and the intake, said casing being, therefore, for all practical purposes, a part of the intake itself, and this casing is provided with an inlet 6 at the side for direct communication with the outside air.

Any suitable valve casing 7 is formed integral with or is rigidly secured to this inlet, and a valve 8 (shown in dotted lines at Fig. 2) carried by a stem 9 is provided whereby communication between the casing 5 and inlet 6 may be opened or closed, and a similar valve 10 (also shown in dotted lines at Fig. 2) is provided within the casing 7 and is carried by the stem 11, whereby the outer mouth of the inlet 6 may be opened or closed, for the purpose presently to be explained.

It is not deemed necessary to enter into any detailed description of these valves or their seats within the inlet 6 since they are very ordinary in this respect, and, moreover, the sectional view shown at Fig. 3 will answer perfectly as to the construction and operation of these valves.

The bottom of the casing 5 is provided with a valve 12 which is mounted on a stem 13, and this valve is operated to open or close communication with the carbureter for the purpose presently to be explained. Pivoted upon the base of the casing 5 is a rocker bar 14 which is provided at or about its central portion with a crank 15.

16 is a clip secured to the outer ends of the valve stems 9, 11, and 17 is also a clip secured to the outer end of the valve stem 13, and the extremities of the rocker bar 14 are connected with these clips 16, 17, by means of links 18, 19, whose extremities are pivoted to said clips and to the ends of said rocker bar.

20 is a rod having its outer end pivoted to the extremity of the crank 15, so that it will be clear that when said rod is thrust outwardly the rocker bar will be swung and the parts will be carried to the position shown at Fig. 2, that is to say, the valves 8, 10, will be opened while the valve 12 will be closed, and the reverse movement of this rod will operate to close these valves 8, 10, and open the valve 12, it being essential that the valves in the inlet should always be open when the valve in the casing 5 is closed, and vice versa, that the valves in the inlet should be closed when the valve in said casing is open.

21 is a short pipe which leads from the exhaust 4, at any suitable point beyond the cylinders 2 into an air reservoir tank 22, and 23 is the stem of a two way valve located at the point of junction between said exhaust and pipe 21. 24 is a lever secured to the stem 23, and by throwing this lever in one direction the exhaust pipe is closed and the passage from the exhaust pipe through the pipe 21 to the tank 22 is opened, while the throwing of this lever 24 in the opposite direction will close said passage and will leave the exhaust pipe open.

When an automobile equipped with my improvement is about to descend an incline of any material length, the rod 20 is operated to open the valves 8, 10, and close the valve 12, and as the machine descends the incline fresh air will be circulated through the cylinders and discharged at the end of the exhaust pipe, and, at any desired moment, the lever 24 is operated to close the exhaust pipe and to open the passage to the air tank 22, and thereafter the air compressed in the cylinders will enter this tank, which latter is guarded by any suitable check valve (not shown).

25 is any ordinary pop valve in the tank 22, whereby the latter may be relieved in the event that the pressure therein becomes too great.

After the cylinders have been sufficiently scavenged by the fresh air the lever 24 is operated to close the valve in the exhaust pipe whereby the air compressed in the cylinders will be delivered directly into the tank 22, and immediately prior to the time when it becomes necessary to fire a compressed charge, said lever is operated to close the inlet to said tank and to open the exhaust pipe.

Of course it will be readily understood that the rod 20 and lever 24 may be operated by any suitable and ordinary instrumentalities within convenient reach of the hand or foot of the operator, and I have not deemed it necessary to show such instrumentalities since they are very ordinary and within the range of the usual mechanical skill.

The valve 10 merely operates as a dust cap to exclude dirt or other foreign matter from the inlet when my improvement is not operating, so that there can be no accumulation of such foreign matter which might pass into the cylinders when the valve 8 is opened. When this valve 8 has been opened and the valve 12 closed, the compression within the cylinders will act as a brake to the engine, and it is not necessary to cut out the spark since there will be no gas within the cylinders. In fact, when the exhaust is closed by the operation of the lever 24, the back pressure in the exhaust pipe will act against the exhaust valves in the cylinders, thereby greatly increasing the resistance to the action of the engine, but should it become necessary to increase the speed of the engine while the clutch is still engaged, it is merely necessary to operate the lever 24 so as to open up the exhaust more or less and thus relieve the pressure in the exhaust pipe itself.

My improvement may be applied to any style of internal combustion engine irrespective of the number of cylinders. There are many ways in which the valves in my improvement may be operated, all of which are very ordinary and do not involve invention, and therefore I do not wish to be limited to the particular arrangement of rocker bar and connecting links shown and described.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A combined scavenging and air compressing apparatus, comprising, in combination with a gas engine, a casing interposed between the intake and the carbureter, a gas supply valve operative between said casing and said carbureter, a valve controlling an air inlet in said casing, a secondary valve also controlling said inlet, and means for simultaneously closing said gas supply valve and opening said secondary and air inlet controlling valve.

2. A combined scavenging and air compressing apparatus, comprising, in combination with a gas engine, a casing interposed between the intake and the carbureter, a gas supply valve operative between said casing and said carbureter, a valve controlling an air inlet in said casing, a secondary valve also controlling said inlet, an air tank located in the exhaust, a two way valve controlling the admission of air either through said exhaust or into said tank, and means for simultaneously closing said gas supply valve and opening said secondary and air-inlet controlling valve.

3. A combined scavenging and air compressing apparatus, comprising, in combination with a gas engine, a casing interposed

between the intake and the carbureter, a slide valve operative between said casing and said carbureter, a second slide valve controlling an air inlet in said casing, a third slide valve acting conjunctively with said second valve to protect said air inlet, a rock-lever connection whereby said slide-valve between said casing and said carbu-

reter is closed when said second and third valves are opened.

In testimony whereof I affix my signature
in presence of two witnesses.

NATHAN H. HEFT.

Witnesses:

F. W. SMITH, Jr.,

M. T. LONGDEN.