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POWER SYSTEM

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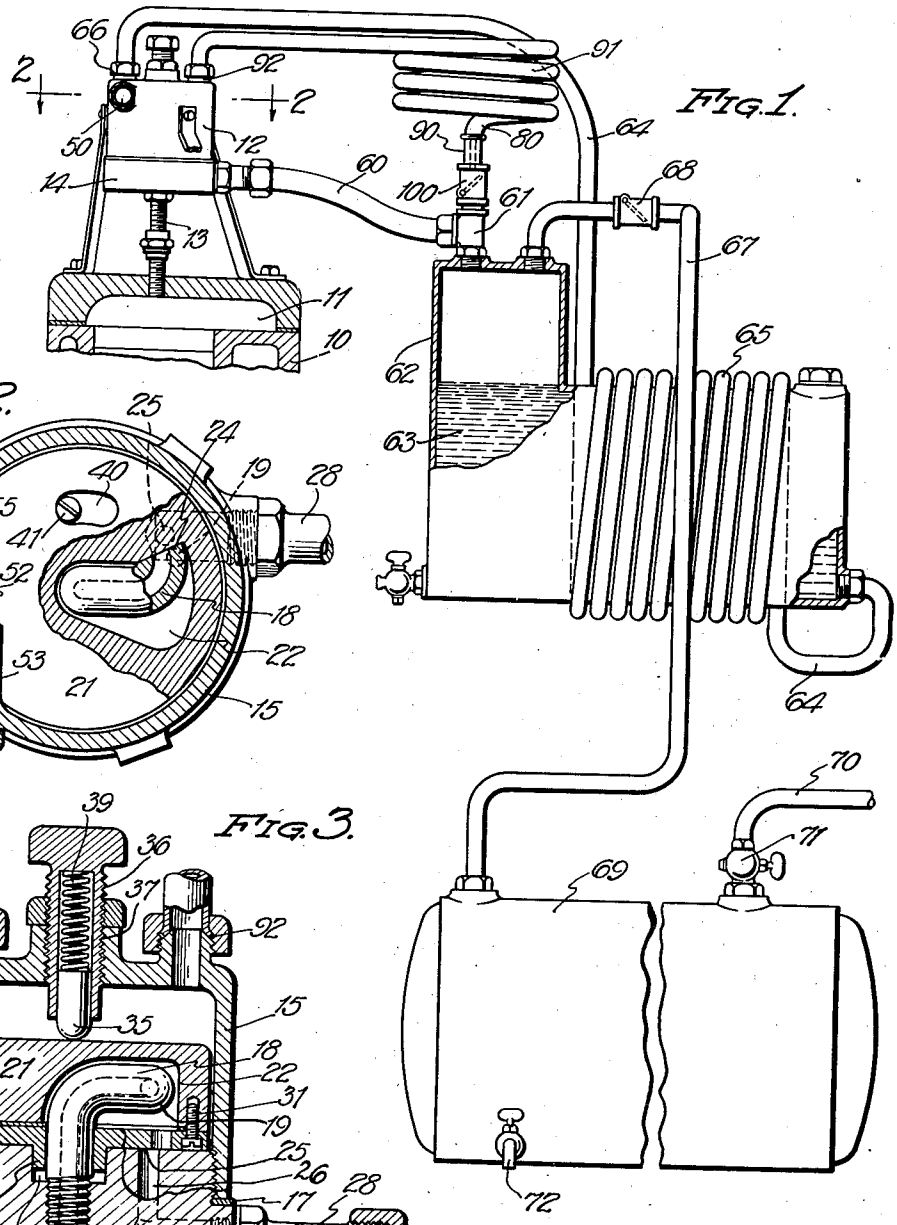


FIG. 1.

FIG. 2.

FIG. 3.

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POWER SYSTEM

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This invention relates to new and useful improvements in power systems.

In its present embodiment the invention has been illustrated as an apparatus for use in connection with internal combustion motors for the purpose of storing or accumulating power to be subsequently used for various purposes about a motor vehicle, and particularly for the operation of brakes and similar accessories.

It is one object of the invention to provide a new and improved apparatus by means of which gases may be taken from internal combustion motors and stored for subsequent use.

I am aware that such devices have been heretofore contemplated and attempted. However, all such devices with which I am familiar have experienced great difficulty in maintaining low enough temperatures to render the device operative. In all such devices, excess temperatures have prevented operation of the parts and in some instances have completely burned out certain of the parts, rendering the entire apparatus inoperative for the purpose intended.

It is a further object of this invention so to construct an apparatus of the afore-mentioned character that the gases, which gases are necessarily of high temperature, will not in any way damage the apparatus, therefore rendering the same capable of highly efficient operation at all times.

It is a further object of the invention so to construct the device that the same will be automatic in its operation.

With these and incidental objects in view, the construction and combination of parts, the essential elements of which are set forth in the appended claims, and a preferred form of embodiment of which is hereinafter shown with reference to the drawing which accompanies and forms a part of this specification.

In the drawing,

Figure 1 is a diagrammatic view partly in section illustrating an apparatus constructed in accordance with the present invention,

Figure 2 is a detail horizontal sectional view on an enlarged scale taken substantially on the line 2—2 of Figure 1, and;

Figure 3 is a vertical sectional view taken substantially through the center of the take-off element of the apparatus.

Referring to the drawing by reference character, 10 designates an internal combustion motor, the firing chamber of which is designated 11. 12 designates a power take-off device which will be hereinafter described in detail, and this power take-off device has communication with the compression or firing chamber 11 of the internal combustion motor 10 by a suitable pipe or the like 13.

By reference to Figure 3 it will be apparent that the power take-off device comprises a base member 14 into which the pipe section 13 is threaded. This base section carries a housing 15 which is threaded as at 16 to the base section, and a suitable gasket 17 is provided to form a gas tight joint between the base member 14 and the housing 15.

The reference numeral 18 designates a nozzle which extends laterally from the pipe section 13 and has an angularly disposed end 19, as best illustrated in Figure 2.

Mounted within the housing 15 and seated upon the base member 14 which forms a bearing therefor, there is a valve member 21. This valve member 21 is provided with a cut-out chamber 22 to permit of free movement of the valve member 21 about the nozzle 18, heretofore mentioned. The chamber 22 is so constructed as to provide a flat face 24 adapted to seat against the end of the nozzle 18 to close the same, as illustrated in Figure 2.

This valve member is adapted to open and close an opening 25 which forms the open end of a passage 26, which in turn is enlarged as at 27, and which communicates with a length of pipe 28 for a purpose to be hereinafter described. Secured to the bottom face of the valve member 21 there is a packing member 30 the securing means being preferably screws or bolts 31, and this member has an extension 32 which surrounds the pipe 13, and is positioned in recess 33 in the base member 14, all of which structure provides a mounting for the valve member 21, which mounting will permit of free oscillation of the valve 21 and at the same time provide a gas tight joint between the valve member 21 and the base member 14, the top face of the base member 14 forming a seat for the valve member 21. Additional means is provided to aid in maintaining the valve member 21 upon its seat, and this consists of a spring pressed plunger 35 mounted in a suitable housing 36 adjustably mounted as at 37 in the top wall of the housing 15. By adjustment of the housing 36 relative to the top wall of the housing 15, the tension of a spring 39 which is interposed between the plunger 35 and the bottom wall of the housing 36, the pressure exerted by the spring pressed plunger 35 upon the valve member may be regulated. The valve member is also provided with

an arcuate slot 40 in which is received a screw 41 to limit the oscillating movement of said valve member 21. Mechanical means is provided to operate the valve member 21 in one direction, and this means consists of a threaded housing 50 having threaded engagement with the housing 15 as at 51. Mounted in the housing 50 there is a plunger 52, and interposed between the inner end of the plunger 52 and the bottom wall of the housing 50 there is a coil spring 53. Thus, as the valve member 21 is oscillated to the left in Figure 2, by the pressure of gases generated in the chamber 11, through the medium of a screw or similar stop 55, the plunger is moved to place the spring 53 under compression. This stored up energy in the spring 53 tends to return the valve member to its initial position of rest, after the same has been moved to the left or in a counter-clockwise direction in Figure 2 by pressure of the gases generated in the chamber 11.

Leading from the power take-off device and connected to the pipe 28, there is a pipe line 60 which terminates at a coupling 61, which in turn is carried by a suitable receptacle 62. This receptacle carries a volume of cooling fluid 63 which is preferably water, and leading from the receptacle 62 there is a pipe line 64 which is passed around the receptacle 62 to form a series of coils 65 from which the pipe line 64 leads to a point 66 on the power take-off device, as best illustrated in Figure 3.

Leading from the receptacle 62 there is a pipe line 67 which includes a check valve 68, and this pipe line discharges into a receptacle 69 having an outlet 70 controlled by a valve 71, which receptacle also has a drain-off cock 72.

Leading from the coupling 61 there is a pipe line 80 which has a section 90 therein which is of considerably reduced internal diameter to form a constricted passage in the pipe line 80. This pipe line 80 is formed with a series of coils 91 and is connected as at 92 to the power take-off device, as best illustrated in Figure 3.

The device operates in the following manner.

Let's assume that the device is cold and that there is no stored pressure in the receptacle 69. Upon starting of the internal combustion motor, and upon firing of the charges in the firing chamber 11 thereof, the pressure will pass upwardly through the pipe section 13 and be discharged from the nozzle 18. When the gases are discharged from the nozzle 18 they impinge upon the wall 24 and oscillate the valve 21 in a counter-clockwise direction. This movement of the valve 21 uncovers the opening 25 and permits the gases to pass from the chamber 22, through the passage 25 and through the pipe line 60 to the receptacle 62. Upon attaining a predetermined pressure in the receptacle 62, said pressure forces open the check valve 68 and the gases pass to the receptacle 69 where they may be stored under pressure for use, they being taken from this receptacle through the pipe line 70. The pipe line 60 is of larger diameter than the remaining pipe lines which construction insures the passage of the gases to the receptacle 62, which latter will, in all installations, be located at a level below that of the motor cylinders.

As the pressure builds up in the receptacle 62 the cooling fluid is forced through the pipe line 64 and the several coils 65 thereof, and is discharged into the housing 15 directly upon the valve member 21 to prevent overheating thereof. This cooling fluid accumulated in the upper part of the housing 15 is, by reason of the pressure in the receptacle 62, forced outwardly through the pipe line 92 and through a check valve 100 into the receptacle 62. This last mentioned action, however, takes place only when there is no pressure being introduced into the pipe line 60. When the valve member 21 is moved to the left in Figure 2, the spring 53, by reason of engagement of the stop 55 with the plunger 52, is placed under pressure so that as the pressure in the firing chamber 11 is reduced, this spring 53 may push forwardly the plunger 52 to move the valve member back to position where it closes the opening 25. It is after the opening 25 has been closed by this return movement of the valve member that the cooling fluid seeps from the coil 91 through the constricted passage 90 by the check valve 100 into the receptacle 62.

From the foregoing it will be apparent that the present invention provides a new and improved power system, and particularly a new and improved hot gas take-off device together with means for cooling the same to prevent its temperature rising sufficiently high to render the device inoperative.

While the invention has been illustrated in its preferred form it is to be understood that it is not limited to the specific construction shown and that it may be practiced in other forms without departing from the spirit thereof.

Having thus described the invention, what is claimed as new, is:

1. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and a source of gases under pressure, means for discharging gases from said housing and means operated by gases entering the housing for controlling the discharge of gases therefrom, said last mentioned means also serving to cut off communication between the housing and the source of gases under pressure.

2. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and an intermittent source of gases under pressure, and means operated by each intermittent impulse of gas introduced into said housing for admitting gases to the housing and controlling the discharge of gases therefrom.

3. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and an intermittent source of gases under pressure, means operated by each intermittent impulse of gas introduced into said housing for admitting gases to the housing and controlling the discharge of gases therefrom, and means for introducing a cooling medium directly into said housing and into the presence of said controlling means.

4. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and a suitable gas generating means, means for admitting impulses of gas into said housing, means for discharging gas from said housing, and a valve member within the housing and operable by the impulse of the incoming charges of gas for controlling the admission of gas to and the discharge of gas from the housing.

5. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and a suitable gas generating means, means for admitting impulses of gas into said housing, means for dis-

charging gas from said housing, a valve member within the housing and operable by the impulse of the incoming charges of gas for controlling the admission of gas to and the discharge of gas from the housing, and means for cooling said housing.

6. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and a suitable gas generating means, means for admitting impulses of gas into said housing, means for discharging gas from said housing, a valve member within the housing and operable by the impulse of the incoming charges of gas for controlling the admission of gas to and the discharge of gas from the housing, and means for introducing a cooling medium directly into said housing.

7. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and a suitable gas generating means, means for admitting impulses of gas into said housing, means for discharging gas from said housing, and a valve member within the housing and operable by the impulse of the incoming charges of gas for controlling the admission of gas to and the discharge of gas from the housing, said valve member comprising an oscillating disk.

8. A power take-off device of the type described comprising a housing, means for establishing communication between said housing and a suitable gas generating means, means for admitting impulses of gas into said housing, means for discharging gas from said housing, and a valve member within the housing and operable by the impulse of the incoming charges of gas for controlling the admission of gas to and the discharge of gas from the housing, said valve member comprising an oscillating disk and including means for limiting its oscillating movement.

9. A power take-off device comprising in combination with an internal combustion motor, means having communication with one of the cylinders of said motor for receiving impulses of gases therefrom, said means comprising a housing, an intake pipe leading from one of the cylinders of the internal combustion motor to the housing, an oscillating disk valve mounted in said housing, a nozzle closely adjacent said oscillating valve and adapted to be closed thereby, said valve being adapted to open said nozzle upon each impulse of gas introduced into the housing, mechanical means for moving said valve to nozzle closing position and means controlled by said valve for discharging gas from said housing.

10. A power system of the type described, comprising in combination, a power generating element, a power take-off device having communication therewith, a power storage element, a pipe line connecting said power take-off device with the power storage element, a cooling fluid receptacle interposed in said line between the power take-off device and the power storage unit, and having communication with the pipe line aforementioned and means for conveying cooling fluid from the cooling fluid receptacle to the power take-off device.

11. A power system of the type described comprising in combination, a power generating element, a power take-off device having communication therewith, a power storage element, a pipe line connecting said power take-off device with the power storage element, a cooling fluid receptacle interposed in said line between the power take-off device and the power storage unit and forming a part of said pipe line, and means connecting the cooling fluid receptacle to the power take-off device whereby to introduce cooling fluid from the cooling fluid receptacle to the power take-off device.

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