

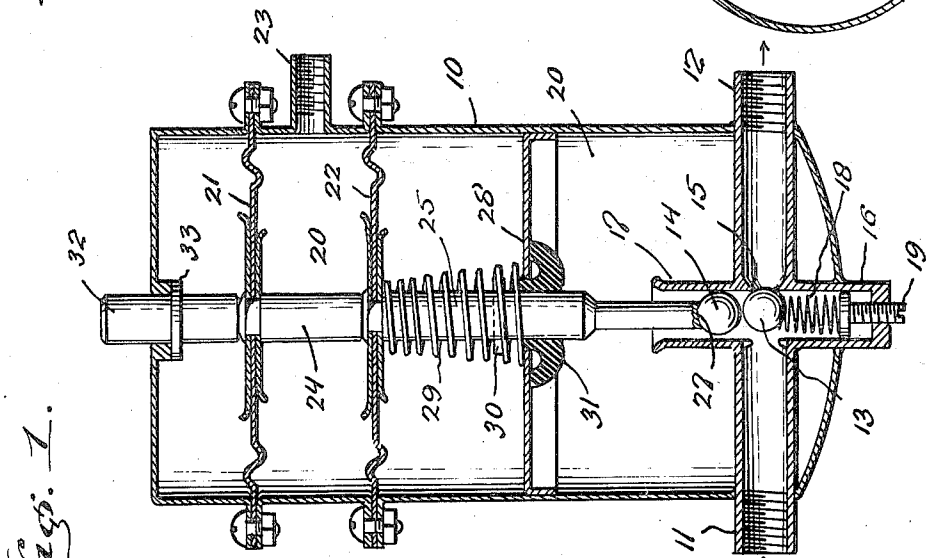
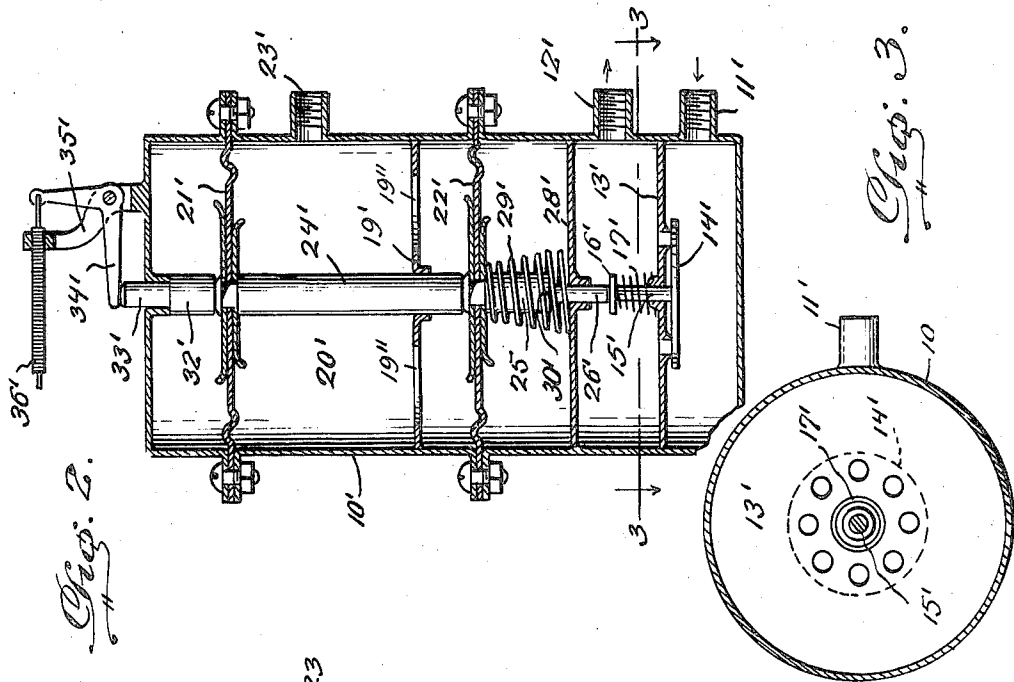
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OIL SUPPLY INDICATING MECHANISM FOR INTERNAL COMBUSTION ENGINES

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OIL SUPPLY INDICATING MECHANISM FOR
INTERNAL COMBUSTION ENGINES

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3 Claims. (Cl. 123—196)

The present invention comprehends the provision of a means for automatically stopping the operation of an internal combustion engine, when the oil supply therefor has become substantially exhausted, thus making it necessary to replenish the oil supply before the engine can be again safely operated at its normal or maximum speed.

The invention provides a means for the above mentioned purpose operable under the influence of fluid pressure, and functions to automatically cut off the supply of fuel to the engine, due to a change in the fluid pressure below normal.

In carrying out the invention, I contemplate a means for the purpose above stated, which is normally maintained inactive by the fluid pressure in the oil supply system of the engine, and rendered operable due to a change in the oil pressure incident to the oil supply becoming substantially diminished, so that the engine is automatically stopped before serious or costly damage results thereto, and at the same time indicating the necessity of replenishing the oil supply.

In accordance with the present invention, I have devised a construction of means for the above mentioned purpose, which permits the engine to be started, after it has been automatically stopped by virtue of an insufficient supply of oil therefor, so that the engine can be operated with care and at a low speed without serious damage thereto, until an opportunity is found to replenish the oil within a reasonable time.

More specifically stated, the invention is in the nature of an attachment for an internal combustion engine, capable of being easily and cheaply installed, and operated with maximum efficiency to automatically cut off the fuel supply to the engine, incident to the reduction in the oil pressure of the oil supply system therefor.

The nature and advantages of the invention will be better understood when the following detail description is read in connection with the accompanying drawing, the invention residing in the construction, combination and arrangement of parts as claimed.

In the drawing forming part of this application like numerals of reference indicate similar parts in the several views and wherein:

Figure 1 is a sectional view through one embodiment of the invention.

Figure 2 is a similar view through another modified construction.

Figure 3 is a sectional view on line 3—3 of Figure 2.

Before entering into a detail description of what is herein illustrated, I desire to have it understood that the invention is designed for use with the conventional automobile engine, Diesel, marine, stationary or any type of engine that uses liquid fuel, and its general application is contemplated by the claims.

Referring to the drawing in detail, I have illustrated in Figure 1 a construction admirably adapted for use with an engine of the Diesel type, wherein the vacuum in the fuel line is considerable. In this embodiment of the invention the flow of fuel can be easily and definitely cut off, incident to a change in the oil pressure of the oil supply system for the engine, irrespective of the relatively high pressure in the fuel supply line.

In this embodiment of the invention, 10 indicates a casing which may be of any desired character, size or configuration found suitable for the purpose intended. The casing is preferably made up in sections flanged and suitably bolted together as shown. The casing is adapted to be connected in the fuel line for the engine, 11 indicating the connection for the fuel line leading from the fuel tank, while 12 indicates the connection for the suction line leading to the conventional fuel pump. The flow of fuel through the casing and fuel line is controlled by a suitable valve, and in a manner to be hereinafter described, whereby the fuel supply to the engine is automatically cut off, when the oil supply for the engine has become substantially exhausted.

While various types of valves may be employed for this purpose, I preferably use a valve of the type shown, which has been found to be highly efficient in controlling the flow of fuel through a fuel line under considerable vacuum, that is where the fuel supply is adapted to be automatically cut off incident to the reduction of the oil pressure in the oil supply system for the engine. In other words, the construction is such that the valve can be readily opened under the influence of fluid pressure within the casing 10, and very definitely closed in the absence of such pressure. The valve preferably consists of a pair of balls arranged one above the other and indicated at 13 and 14 respectively. The lower ball 13 constitutes the valve proper and normally engages its seat 15 when there is no oil pressure within the casing 10. The lower ball valve 13 operates in a suitable

tubular guide 16 which projects a slight distance beneath the casing 10, while the upper ball valve 14 operates in a suitable guide 17. Positioned within the valve guide 16 is a suitable spring 18 which normally holds the ball valve 13 effectively seated when there is no oil pressure within the casing 10. Associated with the ball valve guide 16 is an adjustable element 19 by virtue of which the spring 18 can be properly tensioned for the purpose intended.

The casing includes an air-tight chamber 20 defined by the intervening space between the diaphragms 21 and 22 respectively. These diaphragms may be of any suitable character and secured within the casing 10 in any suitable manner, but are preferably bolted between the flanged sections thereof as illustrated. The air-tight chamber 20 of the casing is adapted to communicate with the oil pressure line of the oil supply system of the engine through the inlet connection 23.

Carried by the diaphragm 21 and depending centrally therefrom within the fluid pressure chamber 20 is a shaft 24 arranged in direct alignment with a similar shaft 25 which depends centrally from the diaphragm 22. The shaft 25 slides through an opening in a stationary guide disk 28 suitably supported within the casing, and spaced an appreciable distance below the diaphragm 22. The lower end of this shaft 25 is slightly reduced and operates within the guide 17 for the uppermost ball valve 14 which it contacts. The lower extremity of the shaft 25 is also slightly concaved as at 27 to accommodate itself to the ball valve 14.

Surrounding the shaft 25 is a spring 29 bearing against the guide disk 28 therefor and also against the adjacent diaphragm 22, normally holding the latter and shaft 25 elevated in the absence of oil pressure within the chamber 20 as illustrated in Figure 1. A stop pin 30 is carried by the shaft 25 and adapted to engage the guide disk 28 therefor, and thus limit the downward movement of the shaft under the influence of oil pressure in the chamber 20 in a manner to be hereinafter described. Surrounding the shaft 25 and the opening in the guide disk 28 therefor is a suitable seal 31 which contacts the under side of the guide disk 28 to prevent any suction in the lower end of the casing from moving the diaphragm 22 downwardly under normal conditions, during the operation of the engine.

Located within the upper part of the casing 10 is a manually operable pin 32 of substantially the same diameter as the adjacent shaft 24 which it contacts in axial alignment therewith. The pin slides through an opening in the top of the casing, and is adapted to be manually operated by any suitable means, either by hand or foot from a remote point for emergency purposes as will be hereinafter set forth. The pin includes a stop flange 33 which limits the upward movement of the pin when the component parts are in normal position as shown in Figure 1.

In practice, when the oil supply for the engine is normal and engine stopped, the component parts of the invention normally occupy the positions illustrated in Figure 1. In this view it will be noted that the ball valve 13 is engaged against its seat 15, while the shafts 24 and 25 with their respective diaphragms are normally elevated. Now, when the engine is started, oil pressure enters the chamber 20 through the

inlet 23. This pressure moves the diaphragm 22 and its shaft 25 downwardly against the tension of the spring 29, the shaft 25 engaging the ball valve 14, which in turn engages the ball valve 13 moving the latter away from its seat 15. The fuel then flows around the ball valves unrestricted to the fuel pump (not shown). The component parts remain in this position as long as there is sufficient oil pressure within the chamber 20. However, should the oil supply for the engine become substantially diminished, the pressure in the chamber 20 is correspondingly reduced, thereby permitting the spring 29 to function which elevates the diaphragm 22 and its shaft 25. When this occurs the spring 18 immediately moves the ball valve 13 within the fuel line to a position where it is forced against its seat 15 by suction in the fuel line. Thus, the fuel supply for the engine is automatically cut off and the engine caused to stop. This obviously indicates that the diminished oil supply must be replenished before the engine can be again safely operated at a normal or maximum speed.

However, after engine has been automatically stopped in the manner described, it may be found necessary or desirable to operate the engine at a comparatively low speed, until an opportunity is had to replenish the oil supply therefor, within a reasonable time. This is particularly true where the invention is used in connection with automobile engines. For the purpose of restarting the engine under such a condition, the emergency pin 32 is adapted to be operated in any suitable manner from a remote point. Manifestly, when the parts occupy the positions shown in Figure 1, the fuel supply for the engine is cut off, but it is only necessary to move the emergency pin downwardly, whereupon the shafts 24 and 25 are also moved downwardly as a unit, thus opening the valve to permit free flow of fuel to the engine. Of course, after the diminished oil supply has been replenished, the pin 32 is released to permit normal operation of the diaphragm under the influence of the oil pressure as above set forth.

In Figures 2 and 3 I have illustrated another form of the invention, which is especially adapted for use in conjunction with automobile engines. The construction and mode of operation of this form of the invention is the same as that described in connection with Figure 1, with the exception of the type of valve employed for controlling the flow of fuel through the fuel line.

In this embodiment of the invention, 10' indicates the casing having inlet and outlet ports 11' and 12' respectively. Located within the casing between said ports is a perforated disk 13' constituting the stationary part of the type of valve employed. The valve proper is in the nature of a disk 14' of a size to properly cover the perforations in the disk 13' when the valve is closed. The valve includes a stem 15' which slides through an opening in the disk 13', and is flanged at its upper end as at 16'. A spring 17' surrounds the valve stem and functions to normally maintain the valve 14' closed.

The casing is provided with an air tight oil pressure chamber 20' by the intervening space between the upper and lower diaphragms 21' and 22' respectively. These diaphragms can be of any suitable character, and secured within the casing in any desired manner. The casing is, however, preferably made up in sections, be-

tween which the diaphragms are bolted or otherwise secured. The inlet connection for the oil pressure chamber is indicated at 23'.

Depending centrally from the diaphragm 21' is a shaft 24' which slides through a suitable guide 19' and terminates directly above the diaphragm 22' in axial alignment and contacting engagement with the adjacent end of the shaft 25'.

The shaft 25' depends centrally from the diaphragm 22' and includes a reduced lower end 26' which slides through an opening in a guide disk 28' therefor. This reduced extremity of the shaft 25' contacts the flange 16' of the valve stem 15' so as to move the valve to an open position, against the tension of spring 29' in a manner to be presently set forth. By virtue of the reduced extremity 26' the shaft 25' is provided with a stop shoulder 30' to limit the downward movement of the shaft.

Located directly above in axial alignment and contacting engagement with the shaft 24' is a manually operated pin 32'. This pin includes a reduced stem 33' which slides through an opening in the top of the casing. The pin 32' is thus formed with a stop shoulder which limits the upward movement of the pin as shown. The pin 32' is used to open the valve 14' manually as the occasion might require, to permit operation of the engine during the absence of oil pressure from the chamber 20'. The pin 32' is of course adapted to be operated from a remote point, and while any suitable means may be employed for this purpose, I preferably use a bell crank lever 34' pivoted on a bracket 35' rising from the top of the casing. One branch of the lever engages the adjacent end of the stem 33' of the pin 32', while the other branch of the lever is connected with an operating element 36'. Manifestly, the lever 34' is operated from a remote point, and this may be done either by hand or foot.

The operation of this form of the invention is the same as that set forth in connection with Figure 1. When the fuel supply for the engine is sufficient, and the engine not in operation, the valve 14' is normally seated as shown in Figure 2.

In practice, with the valve 14' normally seated, and the engine started, oil pressure enters the chamber 20', and this pressure moves the diaphragm 22' and its shaft 25' downwardly against the valve, thus moving the latter to an open position against the tension of the spring 17'. However, should the oil supply for the engine become substantially exhausted, the pressure in the chamber 20' is correspondingly reduced, thus allowing the spring 29' to elevate the diaphragm 22' and its shaft 25'. When this occurs, the spring 17' moves the valve 14' to its closed position, whereupon the fuel supply for the engine is automatically cut off and the latter caused to stop, thus indicating that the oil supply must be replenished before the engine can be again safely operated at normal speed.

In case of emergency, or where the circumstances warrant the running of the engine at a comparatively low speed, until an opportunity is found to replenish the oil supply, use is made of a manually operated pin 32'. This pin is adapted to be controlled from a remote point in any suitable manner, and manifestly when it is moved downwardly within the casing, it effects an opening of the valve 14', irrespective of the absence of oil pressure from the chamber 20'. As the pin 32' contacts the shaft 24', and the lat-

ter in turn engages the valve stem 16' these parts are moved downwardly as a unit to open the valve 14' incident to the operation of the lever 34'. The pin 32' may be held in this position by any suitable means, but after the oil supply for the engine has been replenished, the pin 32' is released to permit the valve 14' to be subsequently automatically controlled by the oil pressure for the engine as above described.

While it is believed that from the foregoing description the nature and advantages of the invention will be readily apparent, I desire to have it known that I do not limit myself to what is herein illustrated or described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What is claimed is:

1. The combination with a fuel supply line, of a casing having inlet and outlet passages communicating with said line, spaced upper and lower diaphragms located within said casing and defining a pressure chamber, an apertured guide disk fixed within the casing and spaced beneath said diaphragms, a normally seated valve controlling the passage of fuel through said inlet and outlet passages of the casing, and a normally elevated spring influenced valve operating rod carried by and depending from the lowermost diaphragm and slidable through said guide disk to automatically open said valve incident to the movement of said lowermost diaphragm under pressure.

2. The combination with a fuel supply line, of a casing having inlet and outlet passages communicating with said line, spaced upper and lower diaphragms located within said casing and defining a pressure chamber, an apertured guide disk fixed within the casing and spaced beneath said diaphragms, a normally seated valve controlling the passage of fuel through said inlet and outlet passages of the casing, a normally elevated spring influenced valve operating rod carried by and depending from the lowermost diaphragm and slidable through said guide disk to automatically open said valve incident to the movement of said lowermost diaphragm under pressure, a second rod depending from the uppermost diaphragm in end to end contacting engagement with said valve operating rod, and a manually operated plunger mounted in the top of said casing in axial alignment and contacting engagement with said second mentioned rod for manually opening said valve.

3. The combination with a fuel supply line, of a casing having aligned inlet and outlet tubular connections for said fuel line, a tubular guide rising from the juncture of said connections, a similar guide depending therefrom, a normally seated spring influenced ball valve located between said connections and movable in said depending guide, a second ball valve movable in the first mentioned guide and in contacting engagement with the normally seated valve, spaced upper and lower diaphragms located within said casing and defining a pressure chamber, an apertured guide disk fixed within the casing and spaced beneath said diaphragms, a normally elevated spring influenced valve operating rod carried by and depending from the lowermost diaphragm and engaging the adjacent ball valve, whereby the normally closed valve is automatically opened incident to the movement of said lowermost diaphragm under pressure.

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