Nov. 18, 1930. R. C. HOPKINS 1,781,874

OIL STRAINER

Filed Nov. 2, 1928

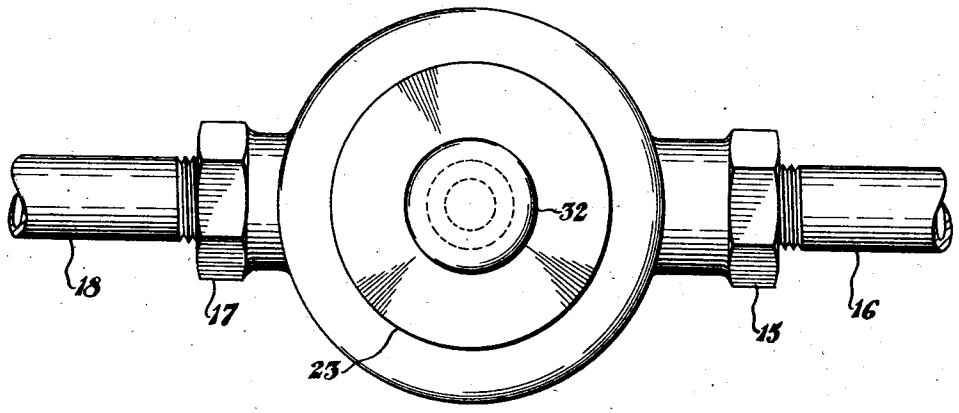


Fig. 1

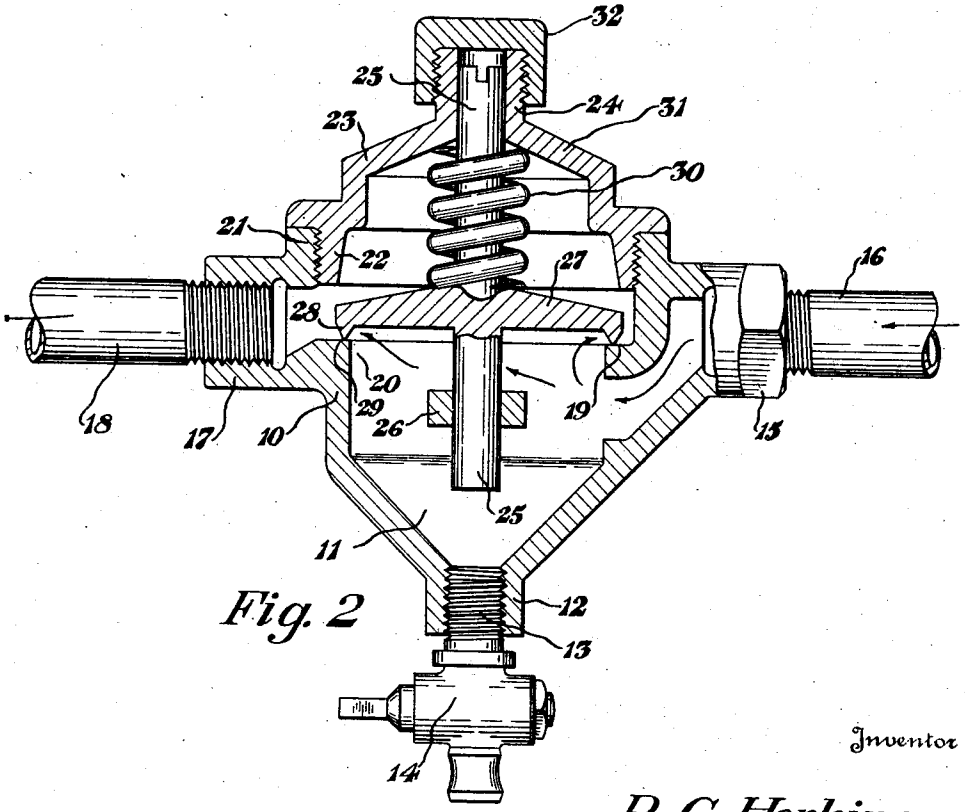


Fig. 2

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UNITED STATES PATENT OFFICE

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OIL STRAINER

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The invention relates to a valve type oil strainer especially adapted for use in the oil lines in shops, factories and the like where fuel oil is burned in furnaces or kilns.

In the burning of fuel oil considerable difficulty has been experienced in flowing the sludge and heavy settlings of the oil through the usual needle valve which controls the flow to the burner, these heavy settlings and sludge frequently plugging up the needle valve.

Oil mills and sludge grinders have been produced by applicant for grinding up these heavy settlings and sludge to overcome the plugging up of the needle valves but there are many installations where the user does not want to go to the extra expense of providing an oil mill or sludge grinder in the line.

The object of the present improvement is to provide a simple and inexpensive oil strainer arranged to be connected in the line in front of the regulating valve for the purpose of straining the sludge and heavy settlings from the oil before they reach the needle valve, thus preventing clogging of the valve and providing for a continuous uniform flow of oil to the burner.

The above and other objects may be attained by providing a housing having inlet and outlet connections at opposite sides thereof and a sludge chamber and drain cock in its lower portion, a disk valve with a peripheral cutting edge, normally seating upon a flat valve seat, intermediate the inlet and outlet connections, by means of a spring or the like, and arranged to be raised by the pressure of the incoming oil, sufficiently to permit the oil to pass between the cutting edge of the valve and the valve seat.

This opening of the valve is so slight that the effect is to strain the oil as it passes between the cutting edge of the valve and the valve seat, the heavy settlings and sludge settling to the bottom of the sludge chamber where they may be removed from time to time through the drain cock.

An embodiment of the invention is illustrated in the accompanying drawing, in which

Figure 1 is a plan view of the improved oil strainer; and

Fig. 2, a vertical longitudinal section through the same.

Similar numerals refer to similar parts throughout the drawing.

The device includes a housing 10, preferably having the downwardly tapered sludge chamber 11 formed therein and terminating in a depending internally threaded neck 12 into which is screwed the threaded nipple 13 of a drain cock 14 of any usual construction.

An internally threaded inlet neck 15 is formed at one side of the housing for connection of the inlet pipe 16 leading from a pump or other source of fuel oil under pressure and a similar outlet neck 17 is formed at the opposite side of the housing for connection of the outlet pipe 18 by means of which the oil is conveyed from the strainer to a burner provided with any usual form of regulating valve, ordinarily of the needle valve type.

An annular flat valve seat 19 is formed in the housing intermediate the inlet and outlet necks and so arranged that all of the oil passing from the inlet to the outlet of the housing must pass upward through the central opening 20 within the valve seat which has an area in cross section many times the area of the inlet pipe 16.

The upper side of the housing may be provided with the internally threaded annular boss 21 within which is screwed the depending threaded flange 22 of the cover or top 23.

This cover is provided at its upper end with the neck 24 within which is slidably mounted the upper end portion of the valve stem 25, the lower portion thereof being slidable within the crossbar 26 formed in the housing.

The valve 27 is rigidly mounted or integrally formed upon the valve stem and is in the form of a disk having an area slightly greater than the area of the opening 20, and having the depending annular flange 28 preferably of cross sectional V-shape and terminating in the cutting edge 29 adapted to rest upon the flat valve seat 19.

This cutting edge of the disk valve is normally held in contact with the valve seat as

by means of the coil spring 30 located around the upper portion of the valve stem and interposed between the valve disk and the upper wall 31 of the cover 23. The neck 24 of the cover may be externally threaded to receive the internally threaded cap 32 for normally enclosing the structure.

In the operation of the device, oil enters from the inlet pipe 16, under pressure of a pump or the like, and passes into the interior of the housing. The only way in which the oil can pass out of the housing and flow to the burner is by setting up a pressure under the disk valve sufficient to raise the same from its seat, permitting a flow of oil between the cutting edge of the valve and the valve seat. The oil that passes through this valve is discharged through the outlet pipe 18, passing through the usual regulating valve to the burner.

The opening of the disk valve, by the oil pressure underneath the same, is so slight that the effect is to strain the oil, as it passes between the cutting edge of the valve and the valve seat, the heavy settlings and sludge which cannot pass through the valve settling to the bottom of the sludge chamber where they may be removed from time to time through the drain cock.

It should be noted that the valve has a self-cleaning feature in that when the valve might become clogged or plugged by a great many heavy settlings or sludge, the pressure of oil from beneath will be sufficient to raise the valve a trifle higher, allowing particles of heavy matter to pass therethrough.

Although this may cause temporary inconvenience at the burner, the same will not last for any considerable length of time but is soon over and immediately when the heavy particles are released, the valve will return to a normal operative position, straining the oil as above described.

It should be understood that the valve seat must be ground in so that there is a perfectly tight fit with the valve around the entire cutting edge, thus providing for uniform straining of all oil passing through the device.

I claim:

1. An oil strainer including a housing having inlet and outlet openings, a valve seat between the inlet and outlet openings and having a central opening many times larger than the area of the inlet opening forming the only communication between the inlet and outlet, a spring pressed disk valve having a cutting edge normally seated upon the valve seat and adapted to be raised a predetermined distance by pressure of the incoming oil so as to permit passage of the oil between the cutting edge and valve seat and prevent passage of sludge in the oil, and a sludge chamber beneath the valve seat.

2. An oil strainer including a housing having an annular valve seat therein located in a horizontal plane, an oil inlet communicating with the housing beneath the valve seat, an oil outlet communicating with the housing above the valve seat, there being a valve opening forming a communication between the inlet and outlet openings within the valve seat, said valve opening having an area in cross section many times the area of the inlet opening, a disk valve having an area slightly greater than the valve opening above the valve seat provided with a depending annular cutting edge normally seated on the valve seat, and spring means for normally holding the valve seated on the seat, the pressure of the spring means being correlated to the oil pressure in the line whereby oil under pressure entering the inlet opening will slightly raise the valve to provide a slight annular opening between the cutting edge and valve seat for permitting the passage of oil therethrough but preventing the passage of heavy settlings and sludge contained in the oil.

3. An oil strainer including a housing having an annular valve seat therein located in a horizontal plane, an oil inlet communicating with the housing beneath the valve seat, an oil outlet communicating with the housing above the valve seat, there being a valve opening forming a communication between the inlet and outlet openings within the valve seat, said valve opening having an area in cross section many times the area of the inlet opening, a disk valve having an area slightly greater than the valve opening above the valve seat provided with a depending annular V-shaped cutting edge normally seated on the valve seat, and spring means for normally holding the valve seated on the seat, the pressure of the spring means being correlated to the oil pressure in the line whereby oil under pressure entering the inlet opening will slightly raise the valve to provide a slight annular opening between the cutting edge and valve seat for permitting the passage of oil therethrough but preventing the passage of heavy settlings and sludge contained in the oil.

In testimony that I claim the above, I have hereunto subscribed my name.

ROBERT C. HOPKINS.