Nov. 26, 1935. J. J. HAWXHURST 2,022,284

OIL BURNER

Original Filed Sept. 23, 1930

Fig. 1.

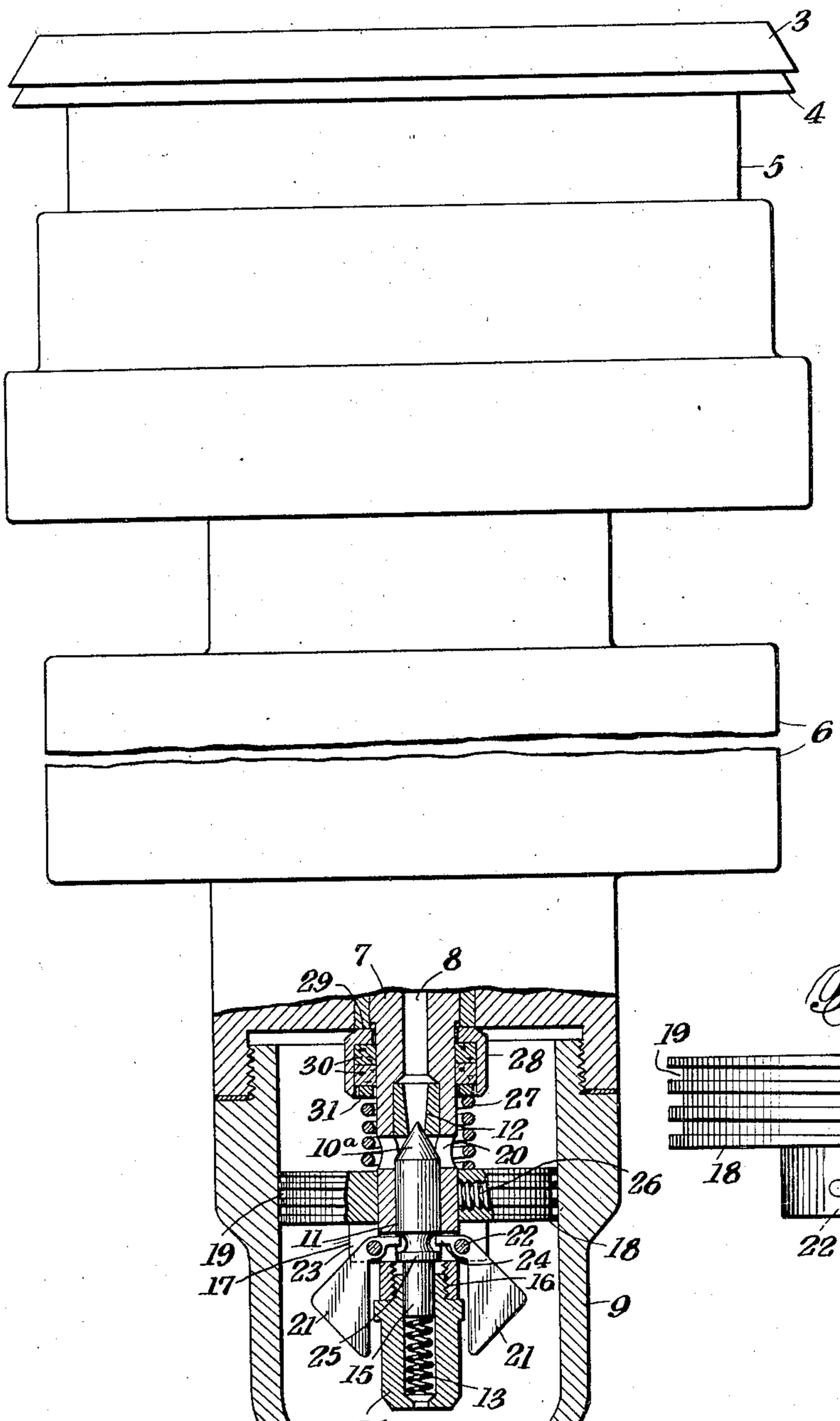
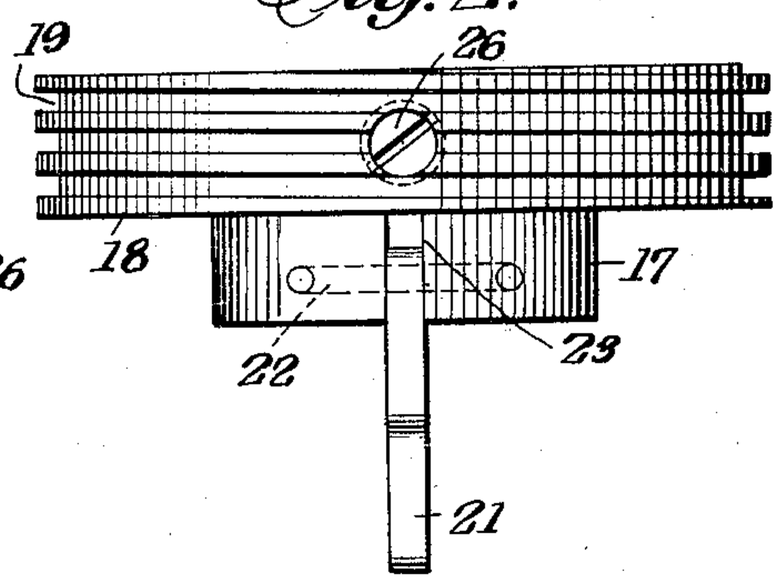


Fig. 2.



JOHN J. HAWXHURST
INVENTOR

BY Philip S. McKean
ATTORNEY

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OIL BURNER

John J. Hawxhurst, Brooklyn, N. Y., assignor to Hayward Manufacturing Company, Inc., Brooklyn, N. Y., a corporation of New York

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7 Claims. (Cl. 103—40)

This invention relates to oil burners or apparatus generally similar to that disclosed in Patent No. 1,935,318 of November 14, 1933 (application filed September 23, 1930, Ser. No. 483,779), of which the present invention is a division.

Special objects of the invention are to provide an automatic shut-off for the fuel, which can be depended upon to close off the fuel flow when the burner shuts down or if the motor stops unintentionally or loses proper operating speed and to supply such a shut-off in a practical inexpensive form, directly applicable to the motor.

Further objects of the invention are to combine in a single unit, an automatic shut-off valve and impeller readily attachable direct to the motor shaft.

Other objects and the various novel features of the invention by which the desired objects are attained will appear in the course of the following specification.

In the drawing accompanying and forming part of this specification, one practical embodiment of the invention is illustrated and it is to be understood that the structure may be modified with respect to this present illustration, all within the true spirit and broad scope of the invention.

Fig. 1 in the drawing is a broken outline elevation of a burner structure, like that of the patent above identified, with the valve and impeller mechanism at the lower end of the same appearing in vertical section.

Fig. 2 is an enlarged side elevation of the impeller and governor valve unit.

In Fig. 1, only an outline of the upper portion of the burner is indicated, comprising an atomizer head made up of atomizer discs **3**, **4**, overstanding a stationary burner head **5**, at the top of an electric motor **6**.

The shaft of the motor is designated **7**, extending vertically and having a passage **8**, extending upwardly therethrough as an oil supplying conduit to the atomizer head on the upper end of the shaft.

The lower end of the tubular motor shaft is surrounded and enclosed by a well or chamber **9**, to which the oil supply piping **10** may be connected.

Admission of oil to the hollow motor shaft is controlled in the present invention by a self-closing bevelled pointed valve **10***a*, slidingly positioned in the lower cylindrical guide portion **11** of the shaft and cooperating with a valve seat bushing **12**, seated up in the shaft ahead of the cylindrical valve guiding part **11**.

The valve is thrust upward to its seat by spring **13**, engaging the lower end of the same and housed within a cap **14**, into the upper end of which the stem portion **15**, of the valve has a free sliding fit.

For mounting purposes, the spring enclosing and supporting cap **14** has a screw engagement at **16**, in the lower end of the motor shaft **7**. The impeller **18** is shown as having an oil feeding screw **19**, in the rim of the same, cooperating with the wall of the surrounding well to force oil into the upper portion of the chamber where, when the valve is retracted, it can pass through side ports **20**, up through the tubular shaft.

The retraction of the valve is effected automatically by centrifugally operating weighted levers **21**, shown as pivoted at **22**, in guide slots **23**, cut in the hub **17** of the impeller, said levers having angular extensions **24**, at the upper ends of the same for engaging shoulder **25** on the valve.

The closing force of the automatic shut-off valve is controlled by the strength of spring **13**. The weight of the centrifugally operating valve retracting levers **21**, may be fixed to open the shut-off valve when the motor reaches a proper operating speed and to permit automatic closure of this valve when the motor falls below that proper operating speed. Consequently, the oil supply to the atomizer head will be automatically shut off whenever the burner stops or drops below a predetermined operating speed.

The impeller is shown as adjustably secured over the lower tubular valve guiding portion of the motor shaft by set screw **26** and in its proper secured position on the shaft it operates to lift the oil positively up through the hollow motor shaft to the atomizer. The governor valve may be set to close quickly and before the lift or pressure created by the impeller, as it comes to rest can force out any oil at the atomizer head. This lifting action of the impeller also is desirable because of the fact that the centrifugal weights have the effect of agitating or stirring up the oil in the chamber and the impeller serves to correct this condition, definitely feeding the oil through the inlet ports and up the hollow shaft.

The oil lifting impeller disc has an additional purpose in the present disclosure and that is to serve as an abutment for the spring **27**, which holds the cup **28**, of the oil seal in rotative engagement with the lower end bearing **29** of the motor. This oil seal cup contains one or more

compressible washers **30**, in sealing engagement with the shaft and an end compressing washer **31**, directly engaged by the spring **27**. The setting of the impeller disc on the motor shaft thus determines the tension of the oil seal spring and the impeller may therefore be adjusted one way or the other on the shaft for the purpose of properly setting the oil seal.

The oil supply well **9** is shown as tapered at its lower end as at **32**, and the oil supply line is shown brought into the well through a hub portion **33**, rising from the center of the well, thus providing in effect an annular trough or gutter **34**, for collection of any solid matter which may be taken out on removal of the drain plug **35**. It will be noted that the centrifugal weights are hung so that as they drop down with the motor shaft coming to rest, they may exert a lifting effect on the valve to close the same, which is desirable in case of weakening of the valve closing spring.

What is claimed is:

1. A device of the character disclosed, comprising in combination, a vertically disposed hollow shaft motor, a liquid supply well enclosing the lower end of said hollow shaft, the motor having a lower shaft bearing exposed to said supply well, an oil sealing ring surrounding said shaft and rotatably engaging the lower end of said shaft bearing, compressible packing carried by said ring and engaging the shaft, a spring surrounding the shaft and acting on said packing and ring, a centrifugally opening valve on the shaft below said sealing ring and spring and controlling entrance from said well to the lower end of the hollow motor shaft and a common support for said motor seal spring and said centrifugal valve mechanism having securing means by which the same may be adjustably secured on the shaft in position to properly mount the centrifugal valve and serving as an abutment for tensioning the motor seal spring.

2. A device of the character disclosed, comprising in combination, a vertically disposed hollow shaft motor, a liquid supply well enclosing the lower end of said hollow shaft, the motor having a lower shaft bearing exposed to said supply well, an oil sealing ring surrounding said shaft and rotatably engaging the lower end of said shaft bearing, compressible packing carried by said ring and engaging the shaft, a spring surrounding the shaft and acting on said packing and ring, a centrifugally opening valve on the shaft below said sealing ring and spring and controlling entrance from said well to the lower end of the hollow motor shaft and a common support for said motor seal spring and said centrifugal valve mechanism, said common support having securing means by which the same may be adjustably secured on the shaft in position to properly mount the centrifugal valve and as an abutment for tensioning the motor seal spring, said support consisting of a pump member for forcing liquid into the lower end of the hollow motor shaft under control of the centrifugally opening valve.

3. In apparatus of the character disclosed, the combination of a motor having an upright tubular shaft, an oil supply chamber enclosing the lower end of said shaft, said shaft having a valve seat in said lower end portion of the same, a movable valve element on said lower end portion of the shaft in cooperative relation to said valve seat and governor weight means within said oil supply chamber, carried by and rotating with said motor shaft and connected with said valve element to effect opening movement of the same under influence of centrifugal force generated by rotation of the motor shaft and whereby said motor shaft will be effective to serve as an oil conduit only when the motor is actually in operation.

4. A device of the character disclosed, comprising in combination, a vertically disposed hollow shaft motor, a liquid supply well enclosing the lower end of said hollow shaft, the motor having a bearing surrounding the shaft and exposed to said supply well, an oil sealing ring surrounding said shaft and rotatably engaging the lower end of said bearing, compressible packing carried by said ring and engaging the shaft, a spring surrounding said shaft and operating to hold said sealing ring yieldingly and rotatably in sealing engagement with said bearing, a centrifugally opening valve on the shaft below said sealing ring and controlling entrance of liquid from said supply well into the lower end of said hollow motor shaft and pump means driven by said shaft for forcing liquid up through said hollow motor shaft under control of said centrifugally opening valve.

5. A device of the character disclosed, comprising in combination, a rotary tubular shaft forming a liquid conduit, a liquid supply well enclosing one end of said tubular shaft, a stationary sealing bearing about said shaft and exposed to said liquid supply well, an oil sealing ring surrounding said shaft and rotatably engaging the adjacent end of said stationary sealing bearing, compressible packing engaging said ring and carried by the shaft, a spring surrounding the shaft and operating to hold said oil sealing ring rotatably and yieldably engaged with said stationary sealing bearing, a centrifugally opening governor valve on the end of said tubular shaft and entirely within the liquid supply well and pump means operated by said tubular shaft for forcing liquid through the same under control of said centrifugally opening governor valve.

6. A device of the character disclosed, comprising in combination an upright tubular rotary shaft forming a liquid conduit, liquid supply connections to the lower end of said shaft and including a liquid supply well enclosing the lower end portion of said upright tubular shaft, pump means operated by said shaft for forcing liquid from said liquid supply well up through said upright tubular rotary shaft, a centrifugally opening governor valve on the lower end of said upright rotary tubular shaft located entirely within said enclosing liquid supply well for permitting liquid flow created by the pump up through the shaft during rotation of the latter and for automatically closing the lower end of the shaft to the liquid supply well upon the shaft slowing down or ceasing to rotate and a self-adjusting rotary seal between said tubular motor shaft and liquid supply well for holding liquid pumped to said well by said means and trapped by the closing of said governor valve.

7. A device of the character disclosed, comprising in combination a motor having an upright rotating tubular shaft forming a substantially vertical liquid conduit, a liquid supply chamber surrounding and enclosing the lower end portion of said tubular motor shaft, a stationary sealing bearing on said motor about that portion of the shaft projecting into said liquid supply chamber, an oil sealing ring, means adjustably mounting said ring in rotative sealing engagement with said stationary sealing bearing,

a valve carried by the shaft and controlling communication between said liquid supply chamber and the substantially vertically extending conduit in said motor shaft and centrifugal governor mechanism on the lower end portion of the shaft enclosed by and operating within said liquid supply chamber and connected with said valve to open the latter when the motor is operating and to close off communication between the liquid supply chamber and the motor shaft conduit when the motor is at rest.

JOHN J. HAWXHURST.