March 6, 1951 W. P. ELLIS 2,544,144

OIL BURNER PUMP

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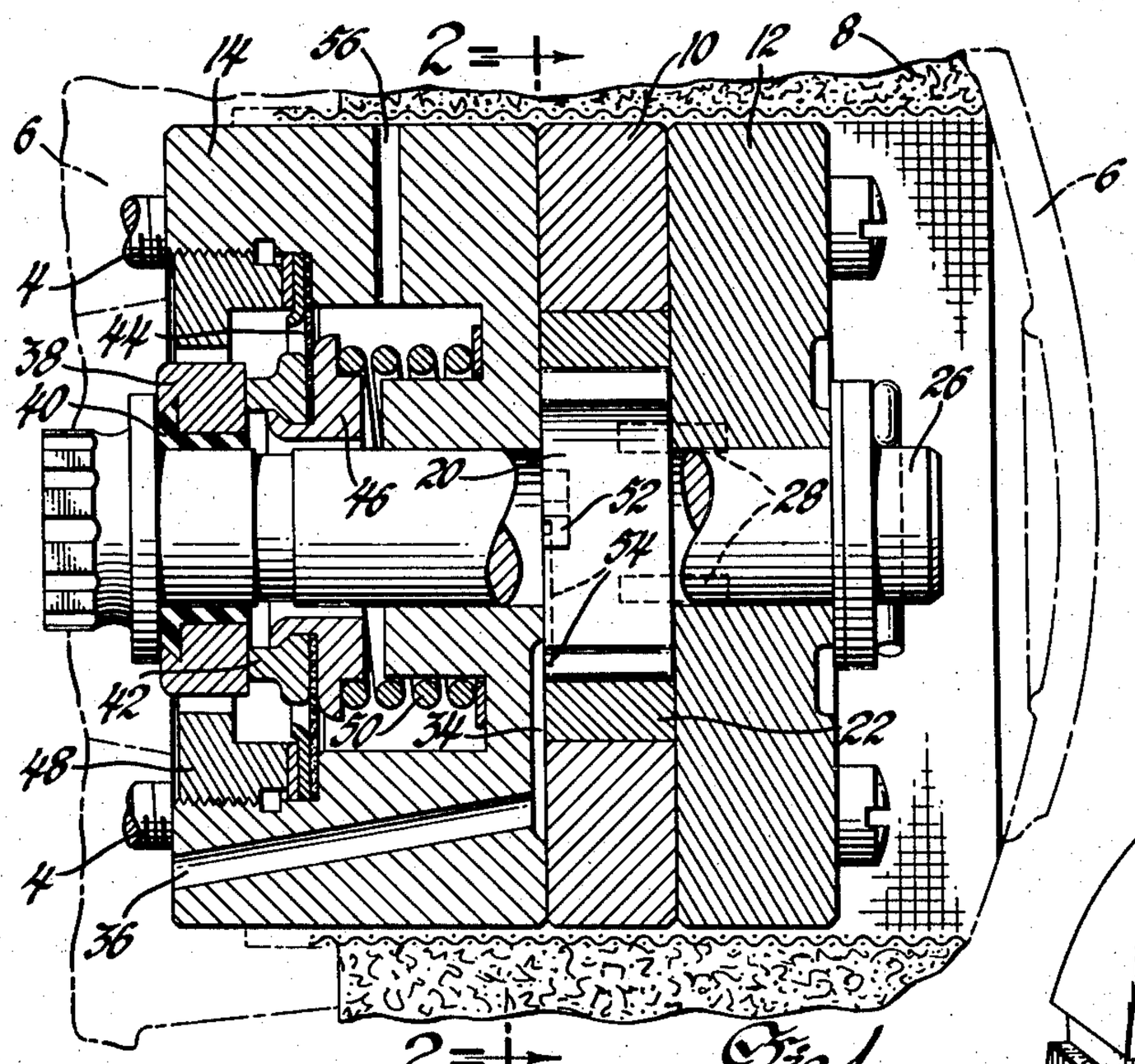

Fig. 1

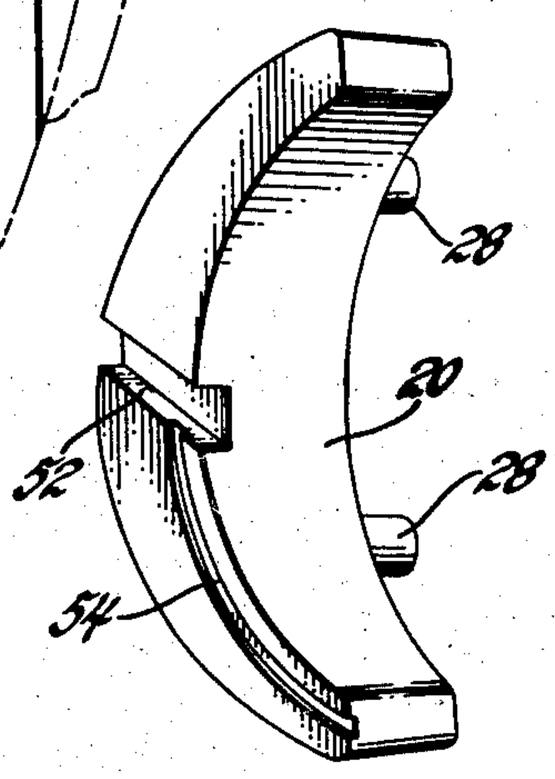

Fig. 3

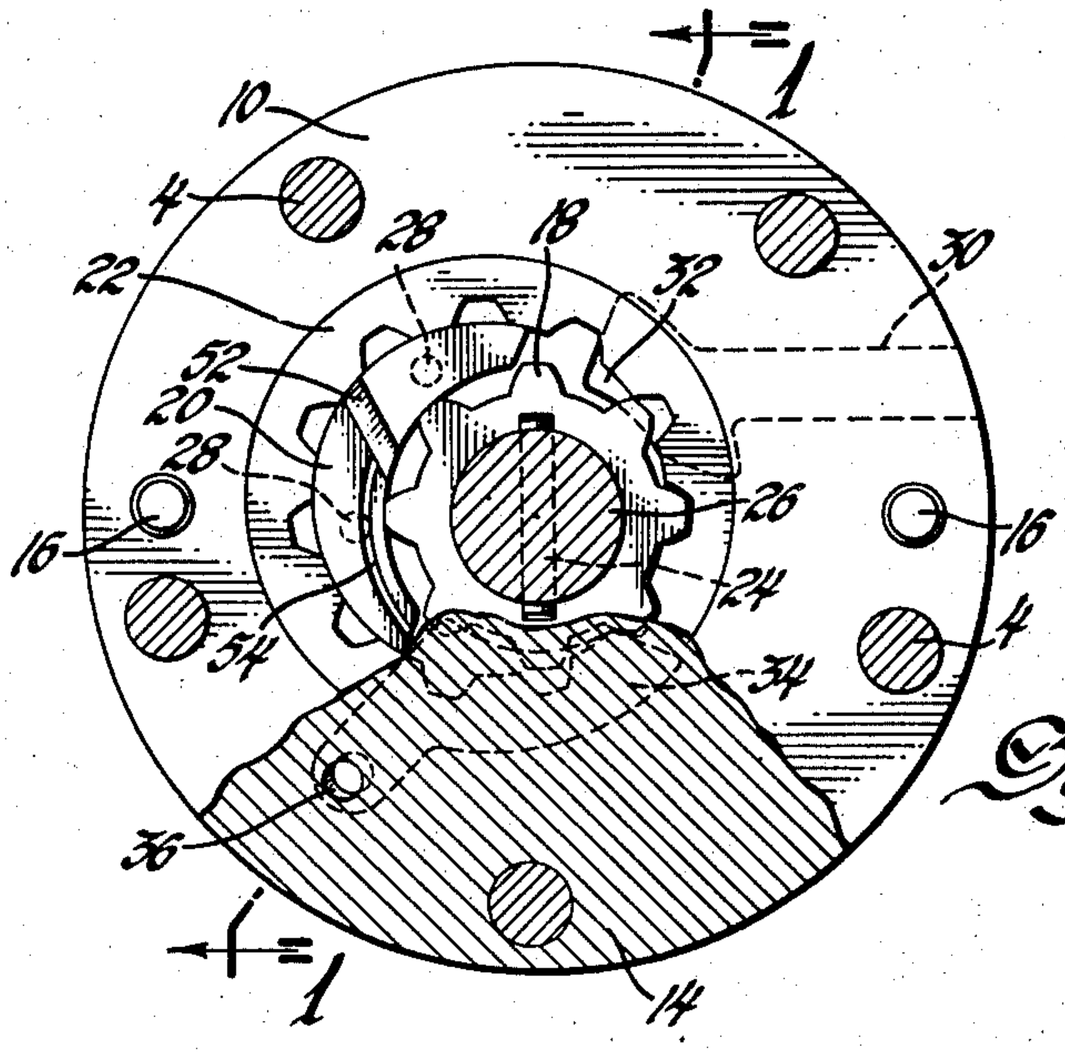

Fig. 2

Inventor
William P. Ellis

By Spencer, Willits, Helwig & Baillio
Attorneys

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OIL BURNER PUMP

William P. Ellis, Palo Alto, Calif., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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2 Claims. (Cl. 103—126)

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This invention relates to certain improvements in the construction of a rotary pump such as may be used in various applications but is particularly adapted for the supply of fuel oil under pressure in an oil burner.

The principal object is to provide a rotary pump construction which will operate both quietly and efficiently in installations requiring operation against pressure with a relatively high lift or vacuum.

According to the present invention, as embodied in an oil burner pump wherein the pump discharge is controlled by pressure actuated means, some of the pumped oil is by-passed or bled back from the high pressure side or outlet of the pump to a point between the intake and outlet to make sure that the recesses in the pumping elements will be completely filled with oil.

In the type of rotary pump disclosed herein, the crescent between the pinion and internal gear is provided with passages to place the pump outlet in communication with the pumping recesses in the pinion and internal gear between the ends of the crescent.

Other objects and features of the invention will be apparent from the following description of the embodiment shown in the accompanying drawings, in which:

Fig. 1 is a fragmentary, longitudinal section of an oil burner pump unit taken substantially on line 1—1 of Fig. 2 with parts broken away to better illustrate the present invention.

Fig. 2 is a cross section of the pump unit taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a detached, enlarged perspective view of the pump crescent.

Referring first to Fig. 1, the present invention has been shown as incorporated in a self-contained oil burner pump unit such as disclosed in Patent No. 2,346,398 to Henry C. Rohr et al. This pump unit, which includes the pumping elements, pump shaft and pump shaft sealing means, is adapted to be detachably secured, as by screws 4, within a housing indicated diagrammatically in dot and dash lines at 6. As is more fully shown in the above patent, the housing provides a space around the pumping elements which is in communication with the source of fuel oil with an annular filter 8 to filter the oil supplied to the pump intake.

The pump unit includes a pump body in the form of a circular plate 10 which is clamped between end plates 12 and 14 with dowels 16 to axially align the plates during assembly. The

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oil pump per se is generally conventional and comprises the pinion 18, crescent 20 and internal gear 22. The internal gear is eccentrically located with reference to the pinion and is journaled within the pump body plate 10 and adapted to be rotated by the pinion 18 which has diametrically opposite slots to receive the ends of a drive pin 24 passing through the pump shaft 26. The crescent 20 is interposed between the pinion and internal gear and fixed in this relative location by spaced pins 28 which interengage with the crescent and the end plate 12, as shown in Fig. 1 in which the pinion and a portion of the pump shaft have been removed to better illustrate certain details of the crescent to be hereinafter described.

To provide an intake for the pump, the face of the end plate 12 which contacts the pump body plate 10 may be formed with a groove or channel 30, as shown by dotted lines in Fig. 2, extending from the periphery thereof to a recess 32 in the end plate 12 adjacent the intake area of the pump gears. The outlet for the pump may consist of a recess 34 in the face of the end plate 14 which contacts the pump body plate 10 with this recess adjacent the discharge area of the pump gears and communicating with an outlet passage 36 extending through the end plate 14.

Upon rotation in a counter-clockwise direction as viewed in Fig. 2, the pump elements operate in known manner to draw oil through the intake channel 30 and recess 32 into the expanding space between the pinion and internal gear, carry the oil along the crescent in the pumping recesses formed between the crescent and the spaces between the teeth of the pinion and internal gear, and then discharge the oil under pressure from the contracting space between the pinion and internal gear into the outlet recess 34 and passage 36. In accordance with conventional oil burner practice, as disclosed for example in the above mentioned Patent No. 2,346,398, the discharge of oil from the pump may be controlled by a pressure regulator valve which prevents the delivery of oil from the pump to the oil burner nozzle until it exceeds some predetermined pressure so that the pressure of oil at the pump outlet will be relatively high.

The pump shaft 26 is adapted to be coupled to the shaft of an electric motor and a pump shaft sealing means may be provided to prevent leakage along the shaft. This sealing means may be conveniently located within an annular recess in the end plate 14 and includes a hardened collar 38 secured to the shaft by suitable

sealing material 40 to rotate therewith with a sealing ring 42 to engage the collar 38. The ring 42 is secured to a flexible diaphragm 44 by a member 46 with the periphery of the diaphragm secured to the end plate 14 by a screw-threaded clamp ring 48. A spring 50 between the member 46 and the end plate 14 maintains the ring 42 in sealing contact with the collar 38 and a vent passage 56 may be provided in the end plate 14 to prevent any accumulation of undesired pressure in the space between the end plate and sealing contact surfaces.

Proceeding now to a description of the present invention as embodied in the foregoing oil burner pump construction, the pump crescent 20 is to be provided with passages to place the pump outlet in communication with the pumping recesses in the pinion and internal gear between the ends of the crescent. These passages are shown herein as consisting of grooves or slots 52 and 54 formed in the face of the crescent which contacts the end plate 14 with the slot 52 extending diagonally across an intermediate portion of the crescent and the slot 54 extending arcuately from the slot 52 to the end of the crescent which is at the outlet side of the pump.

It will be noted that the diagonal slot 52 is deeper and wider than the arcuate slot 54 and the ends of the slot 52 will communicate with the pumping recesses formed between the crescent and the spaces between the teeth of the pinion and internal gear as they move by the ends of this slot during rotation of the pinion and internal gear as will be apparent from the showing in Fig. 2. Therefore, during operation of the pump, the arcuate slot 54 and diagonal slot 52 will be kept full of oil under pressure from the outlet side of the pump and oil will be supplied therefrom to the pumping recesses to fill any voids therein and also compress any air bubbles so that the pumping recesses will be practically completely filled with oil under pressure.

Although disclosed herein as incorporated in an oil burner pump wherein the present invention has been found to be especially desirable as eliminating noise that is otherwise encountered in installations involving a relatively high lift, it will be understood that the invention is not limited to this particular use but may be embodied in rotary pumps for various other applications.

Many changes and modifications in the detailed construction and arrangement of parts disclosed herein are also contemplated as within the scope of the present invention. As examples thereof, the passages in the crescent could be interiorly or otherwise formed therein, or fluid could be supplied under pressure to fill the pumping recesses by providing suitable passages

in the side plates or other parts instead of utilizing the crescent for such passages.

I claim:

1. A rotary pump including an internal gear, a pinion disposed eccentrically within said gear and meshing at one side therewith, a fixed crescent interposed between said internal gear and pinion to provide pumping recesses between said crescent and the spaces between the teeth of said internal gear and pinion, a fluid intake adjacent one end of said crescent, a fluid outlet adjacent the other end of said crescent, and passages in said crescent to place said outlet in direct communication with said pumping recesses to supply fluid under pressure to said recesses, said passages including a slot extending diagonally across said crescent between the ends of said crescent and an arcuate slot in said crescent extending from said first slot to the end of said crescent which is adjacent said outlet.

2. A rotary pump including an internal gear, a pinion disposed eccentrically within said gear and meshing at one side therewith, a fixed crescent interposed between said internal gear and pinion to provide pumping recesses between said crescent and the spaces between the teeth of said internal gear and pinion, end plates engaging opposite sides of said gear, pinion and crescent, a fluid intake in one of said end plates adjacent one end of said crescent, a fluid outlet in one of said end plates adjacent the other end of said crescent, and passages to place said outlet in direct communication with said pumping recesses between the ends of said crescent to supply fluid under pressure to said recesses, said passages being formed by slots in a side of said crescent which is in engagement with one of said end plates and comprising a first slot extending transversely across said crescent between the ends thereof and a second slot extending longitudinally from said first slot to the end of said crescent which is adjacent said fluid outlet.

WILLIAM P. ELLIS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,689,587	Holmes	Oct. 30, 1928
2,159,720	Wahlmark	May 23, 1939
2,232,983	Wahlmark	Feb. 25, 1941
2,309,683	Wahlmark	Feb. 2, 1943
2,346,398	Rohe et al.	Apr. 11, 1944

FOREIGN PATENTS

Number	Country	Date
325,849	Germany	Mar. 3, 1917
331,054	Great Britain	July 3, 1930