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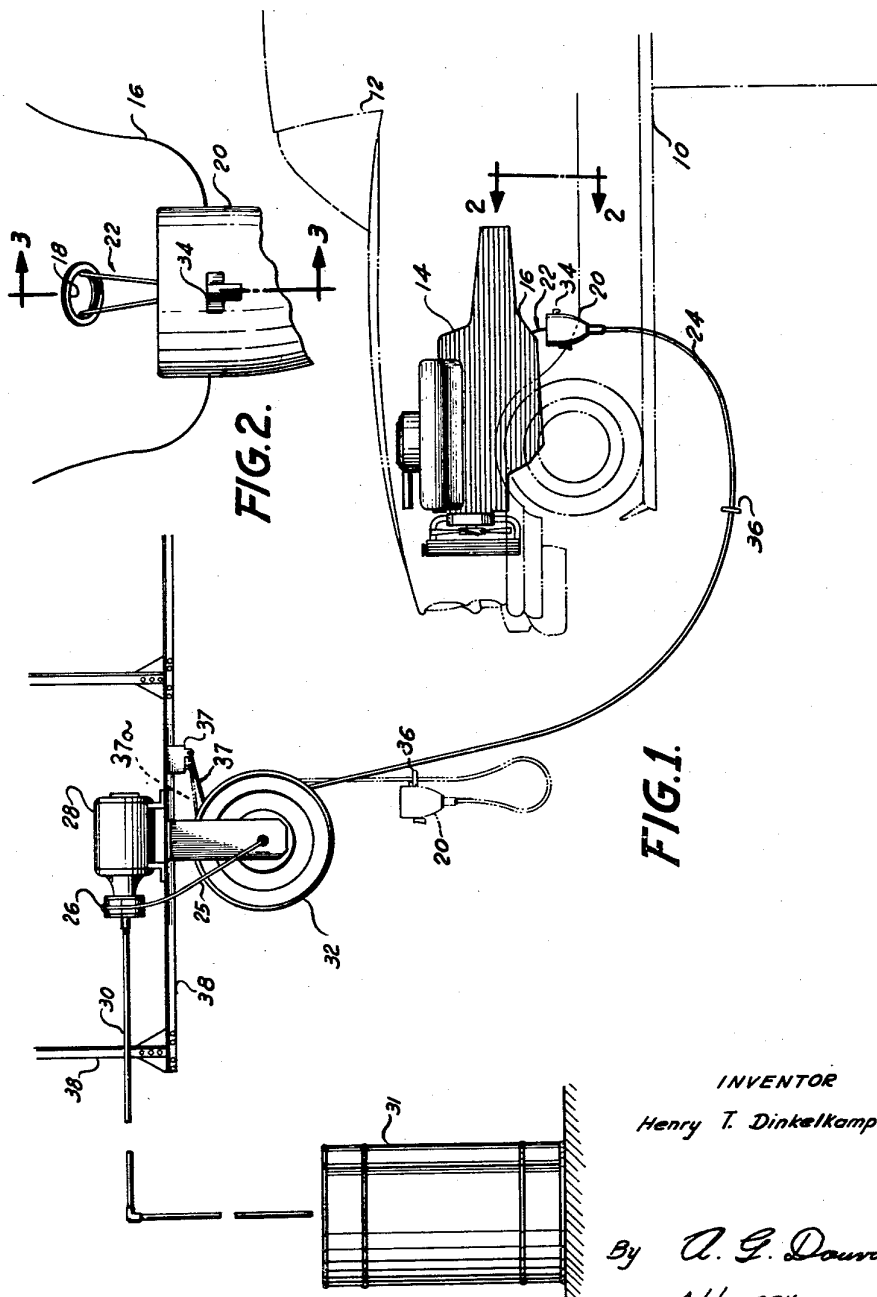
H. T. DINKELKAMP

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PUMP CONTROL ARRANGEMENT FOR A DRAINAGE APPARATUS

Original Filed Sept. 25, 1961

2 Sheets-Sheet 1



INVENTOR
Henry T. Dinkelkamp

By *A. G. Dumas*
Attorney

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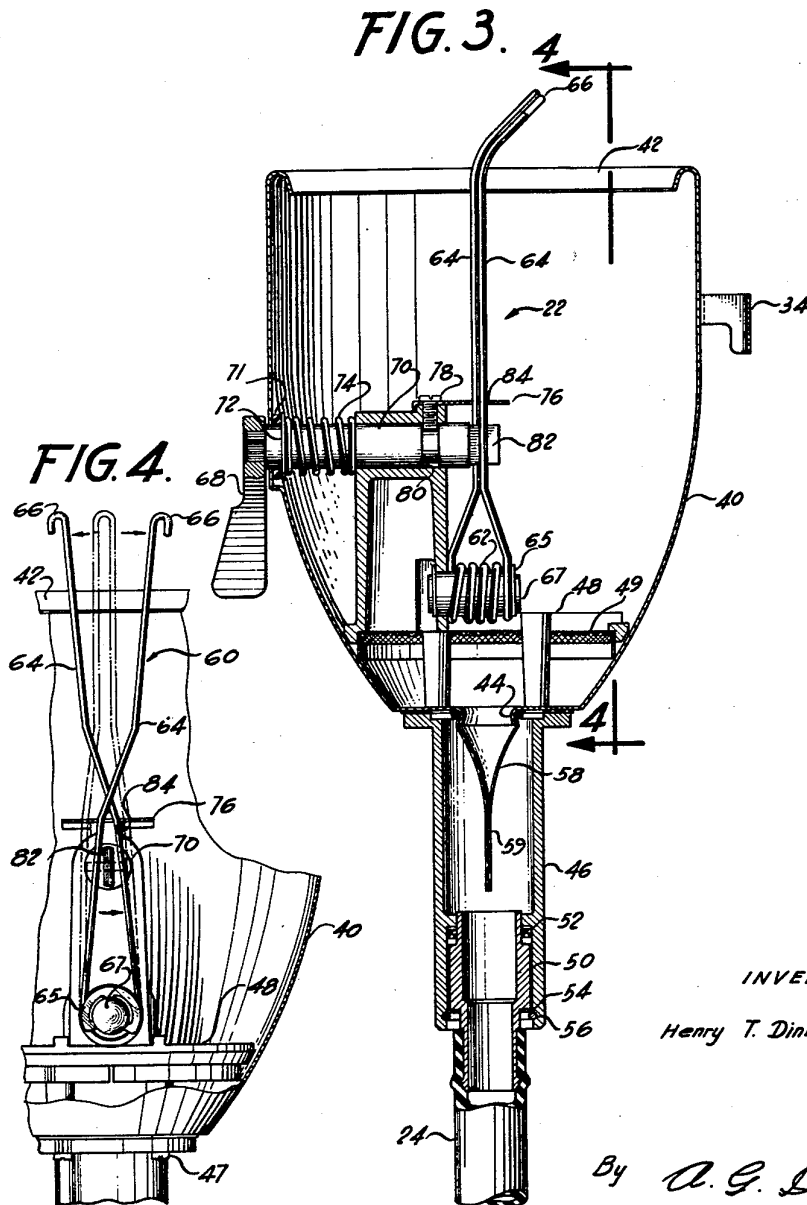
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PUMP CONTROL ARRANGEMENT FOR A DRAINAGE APPARATUS

Henry T. Dinkelkamp, Mount Prospect, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill., a corporation of Virginia

Original application Sept. 25, 1961, Ser. No. 140,559, now Patent No. 3,140,756, dated July 14, 1964. Divided and this application June 2, 1964, Ser. No. 372,055

The portion of the term of the patent subsequent to July 14, 1981, has been disclaimed

4 Claims. (Cl. 184-1.5)

This invention relates to oil or fluid drainage apparatus for crank cases, transmission enclosures, gear boxes and other similar devices having a drain opening, and more particularly, to apparatus of the type including a receiving vessel supported in general vertical alignment below the drain opening to collect drainage therefrom and is a division of application Serial No. 140,559, filed September 25, 1961, now U.S. Patent No. 3,140,756.

Present commercial drainage apparatus generally includes a receiving vessel or funnel, a waste drum and appropriate interconnecting piping between the funnel and drum. The waste drum, piping and funnel are supported as a unit below the drain opening and can be either stationary or portable. The funnel is moved to a catching position aligned below the drain opening and supported there either by telescopic or goose neck piping secured to the waste drum. The oil or fluid collected in the funnel is conveyed by gravity through the piping to the drum, thus requiring that the drum be lower than the funnel and thus the drain opening.

Both the stationary and portable systems have basic practical drawbacks since the drainage apparatus requires an appreciable amount of valuable supporting floor area. Also, the apparatus being located on the floor is more susceptible to damage.

Accordingly, an object of this invention is to provide oil or fluid drainage apparatus for a device of the type described which requires substantially no supporting floor area below the device.

A particular feature of this invention is drainage apparatus having a catching vessel supported directly and solely from the device.

Another feature of this invention is drainage apparatus having a receiving funnel, a waste drum, a suction pump and an interconnecting hose means between the funnel, drum and pump operable to communicate fluid collected in the funnel to the drum independently of the relative heights thereof.

These and other objects and features will be more fully appreciated upon a perusal of the following specification which includes the accompanying drawings, wherein:

FIG. 1 is an elevational view of the subject invention in a typical operative arrangement draining an automotive vehicle;

FIG. 2 is an end elevational view of a portion of the apparatus as seen from lines 2-2 of FIG. 1;

FIG. 3 is a longitudinal cross-sectional view of the receiving vessel as shown generally from lines 3-3 of FIG. 2; and

FIG. 4 is an elevational view partly in section from lines 4-4 of FIG. 3.

Referring now to the drawings, and particularly to FIGS. 1 and 2, a typical garage automotive hoist 10 shown in phantom supports an automotive vehicle 12. The vehicle 12 includes an internal combustion engine 14 having at its lower portion an oil pan 16 having therein an oil drain opening 18 (FIG. 2).

A receiving funnel or vessel 20 is supported from the engine 14 by means of a hook assembly 22 insertable into oil drain opening 18. The oil receiving vessel 20 com-

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municates through hose 24 and conduit 25 to suction pump 26 powered by electric motor 28. The pump 26 is connected by appropriate piping 30 to a waste oil drum 31 conveniently located at some remote place in the garage. When not in use, the hose 22 is withdrawn on reel 32 to an out-of-the-way retracted position as shown in phantom in FIG. 1.

Latch 34 on the cup 20 is supported by mating receiving eyelet 36 on hose 24 at the appropriate location. A limit switch 37 mounted adjacent the reel 32 is actuated by rotary movement of lever 37a adapted to ride on the hose 24 as it is carried on the reel. The limit switch 37 is adjusted to start the operation of motor 26 and thus the pump 28 automatically upon unreeling of the hose from the reel. The pump 26, motor 28, reel 32, conduit 25 and piping 30 are all supported by angle structure 38 suspended from the ceiling (not shown) of the garage above both the garage floor (not shown) and engine 14.

The operation of the oil drainage apparatus can be readily understood. The oil is discharged from the oil drain opening 18 of the engine to the oil receiving vessel 20 supported solely from the engine by hook assembly 22. The suction pump 26 creates a partial vacuum in interconnecting hose 24 to draw the collected oil in vessel 20 through the hose to the pump. The oil is then discharged through piping 30 to the waste oil drum 31.

The attractiveness of this type oil drainage system is at once readily appreciated since all of the associated apparatus is located above valuable often used floor area of the garage proximate the hoist 10.

Referring now to FIGS. 3 and 4, the oil receiving vessel 20 includes a funnel-shaped bowl 40 having a large open upper portion 42 which converges to a smaller flanged opening 44 at its lower portion. A hollow handle 46 is disposed annularly of the opening 44 and secured to the bowl 40 by appropriate bolts 47 threaded into pivot structure 48 located within the bowl 40. A screen assembly 49 secured beneath the pivot structure 48 prevents passage of large objects through the opening 44 and subsequently to the hose 24 and pump 26.

A hose coupling 50 sealed within the handle 46 by annular gasket 52 has appropriate connection to the flexible hose 24. The hose coupling 50 is held within the cup handle by direct abutment with washer 54 secured in place by spring washer 56 received within a recess of handle 46. A rubber check valve 58 is received over the flanged opening 44 and consists of a hollow flexible tube reshaped to a flat normally closed check 59. The weight of the oil in vessel 20 is sufficient to open the flattened check 59 for through flow while any reverse flow of the oil in handle 46 closes the check 59.

The hook assembly 22 includes a spring steel wire 60 shaped to an intermediate helical portion 62 and scissor arms 64 extending therefrom and terminating in hooks 66. A pin 67 secured to the pivot structure 48 pivotally mounts the spring at helix 62. Spring retainer 65 on the free end of the pin 67 holds the spring 60 on the pin against the structure 48. The scissor arms 64 are biased by helix 62 to cause the hooks 66 to become misaligned (as shown in FIG. 4) in the expanded configuration.

An actuating arm 68 is keyed to shaft 70 mounted rotatably in pivot structure 48 and extending through the side wall of bowl 40. Appropriate gasket means including an O-ring gasket 71, a slip washer 72 and a spring 74 interposed between washer 72 and pivot structure 48 seals the bowl 40 to prevent leakage of oil therefrom. A retainer plate 76 is secured by bolts 78 to the pivot structure 48, the bolts 78 additionally being received in recess 80 of shaft 70 to restrict axial movement of the shaft.

A flattened portion or cam 82 at the inner end of shaft 70 is between the scissor arms 64 aligned beneath the retainer plate 76. The retainer plate 76 has a slot 84

elongated in the direction of movement of the spring arms 64 which receives the arms to limit the movement thereof. The cam 82 is operable upon rotation of the shaft 70 to bias the scissor arms 64 against the retainer plate 76 at the ends of slot 84, as can be seen in phantom in FIG. 4. In this position the hooks 66 at the free ends of the scissor arms 64 coincide with one another to present a smooth outside contour for easy insertion into drain opening 18 (FIG. 2). Rotation of the actuating arm 68 releases the cam 82 from the arms 64 to permit expansion of the helical portion 62. The scissor arms 64 thereby move outwardly adaptable to engage the periphery of the oil opening 18.

In a typical operation of the subject invention and after the vehicle is raised on the hoist 10, the garage serviceman withdraws the receiving vessel 20 and hose 24 from the reel 32 which causes limit switch 37 to start the suction pump 26. The hook assembly 22 on the receiving cup 20 is placed in the unlocking position as shown in phantom in FIG. 4. Holding the receiving vessel 20 in general vertical alignment below drain opening 18, the serviceman will loosen the drain plug (not shown) from the vehicle engine 14. The drain plug is allowed to fall into the receiving vessel at which time the oil will also flow into the vessel. After the initial surge, the serviceman can conveniently insert the hook ends of spring arms 64 into the oil drain opening 18 and rotate the actuating arm 68 to release the arms. The expanded hook assembly 22 will engage the periphery of the oil drain opening 18 to support from the engine the oil receiving vessel 20 to collect the balance of the draining oil. After the engine is drained the handle 68 is rotated to expand the hook assembly 22, whereupon upward movement of the vessel 20 disengages the hooks 66 from the opening 18. The oil receiving vessel 20 can then be returned to its inoperative position supported by latch 34 on the reel 32 which also automatically stops the pump 26.

Thus, it is obvious that with the oil drainage apparatus, as shown in this invention, the oil can be drained from a vehicle engine without any apparatus supporting structure located on the garage floor below the vehicle. Furthermore, since the suction pump supplies the moving power for the drained oil, the waste oil drum can be located at any remote location. The versatility of this invention both as to simplicity of apparatus and to increased available floor area is readily shown.

It will be obvious to those skilled in the art that various modifications can be made in the subject invention without departing from the teaching thereof. Similarly the subject invention can be effectively used on transmission enclosures, gear boxes, presses, or other fluid confining devices. Accordingly, it is desired that the invention be limited by the appended claims.

What is claimed is:

1. Drainage apparatus of the type wherein a motor driven suction pump is carried on a support structure for pumping fluid from a fluid-receiving funnel either detachably suspended in a position beneath a fluid drain opening for receiving a fluid flowing through said opening or retracted from said position, and wherein conveying means are provided for passing fluid from the outlet

of said pump to a remotely located waste drum, the improvement comprising a reel carried by said support structure, a hose connected between said funnel and the inlet of said pump and either reeled in successive convolutions upon said reel while retracting said connected funnel toward said reel or unreeling from said reel to permit said funnel to be detachably suspended beneath said opening, a lever arm engaged by one of said hose convolutions in response to the reeling of said one hose convolution on said reel and disengaged therefrom in response to the unreeling of said one hose convolution from said reel, and an electrical switch closed in response to the disengagement of said lever arm from said one convolution for operating said motor driven pump to pump fluid from said funnel through said hose and inlet for passage to said waste drum and opened by said lever arm to prevent operation of said motor driven pump in response to the engagement of said lever arm with said one convolution.

2. A combination comprising a reel carrying a hose adapted to be either reeled in successive convolutions on said reel or unreeling from said reel, a pump adapted to be operated for passing fluid through said hose, a lever engaged with one of said hose convolutions in response to the reeling of said hose and disengaged from said one convolution in response to the unreeling of said hose, and an electrical switch controlled by said lever for operating said pump in response to the disengagement of said lever from said one convolution and controlled by said lever for terminating operation of said pump in response to the engagement of said lever with said one convolution.

3. A combination comprising a reel carrying a hose adapted to be either reeled in successive convolutions on said reel or unreeling from said reel, a pump adapted to be operated for passing fluid through said hose, a switch operating device movable independently of said reel and engaged with one of said hose convolutions in response to the reeling of said hose and disengaged from said one convolution in response to the unreeling of said hose, and an electrical switch operated in response to the disengagement of said device from said one convolution for operating said pump.

4. A combination comprising a reel carrying a hose adapted to be either reeled in successive convolutions on said reel or unreeling from said reel and extended to a position for transmitting a fluid between said position and another position, means movable independently of said reel for engagement with one of said hose convolutions and disengaged from said one convolution in response to the unreeling of said hose, and an electrical switch controlled by said means for enabling the passage of said fluid through said hose in response to the disengagement of said means from said one convolution.

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LAVERNE D. GEIGER, *Primary Examiner*.