July 27, 1965 H. T. DINKELKAMP 3,196,982

PUMP CONTROL ARRANGEMENT FOR A DRAINAGE APPARATUS

Original Filed Sept. 25, 1961 2 Sheets-Sheet 1

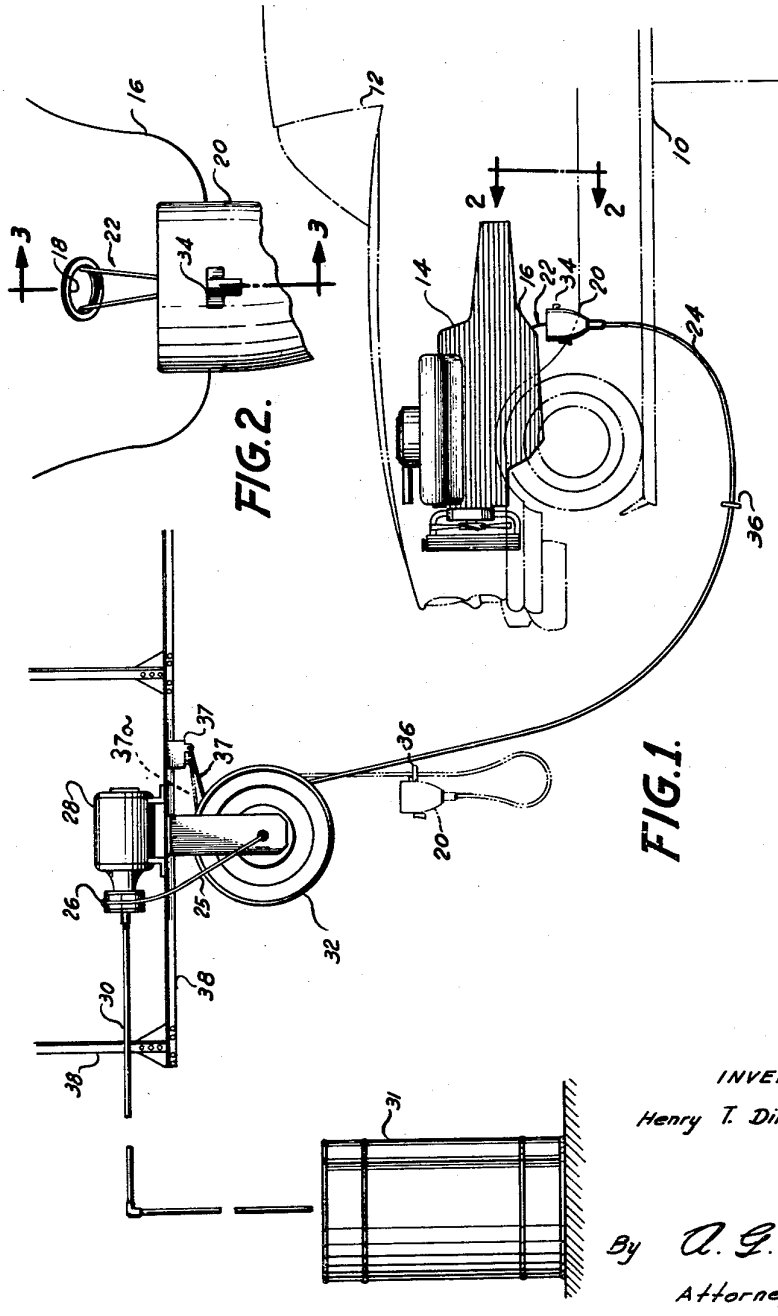

FIG. 2.

FIG. 1.

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FIG. 3.

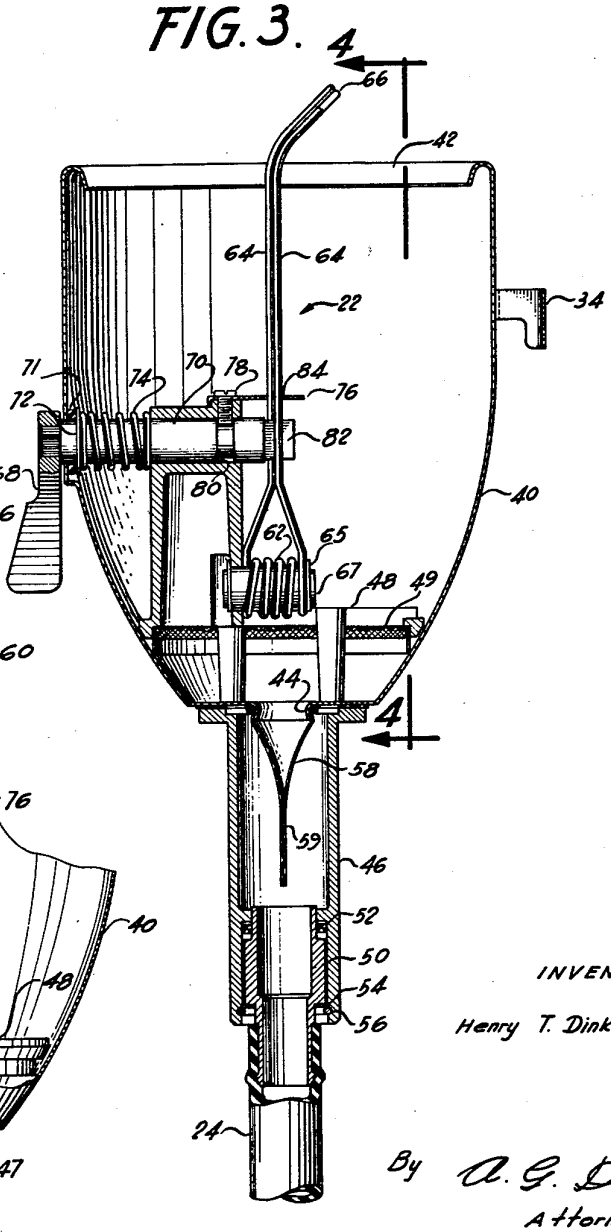
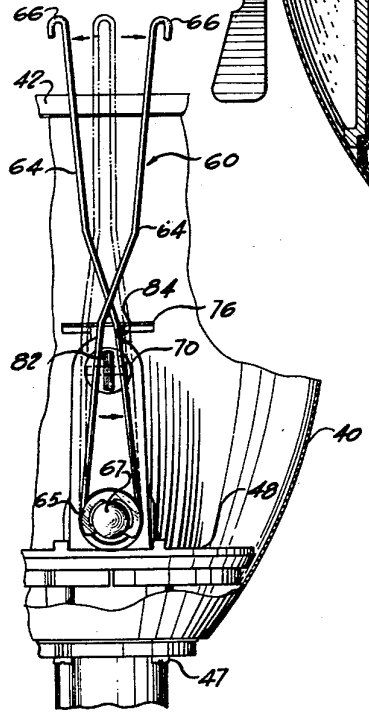


FIG. 4.



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3,196,982

PUMP CONTROL ARRANGEMENT FOR A DRAINAGE APPARATUS

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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** communicates 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 **37***a* 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 preshaped 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 confiining 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 unreeled 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 unreeled from said reel, a pump adapated 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 unreeled 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 unreeled 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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