

[54] **STRAINER ARRANGEMENT FOR THE OIL
SUMP OF INTERNAL COMBUSTION
ENGINES**
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abandoned.
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[51] Int. Cl. **F01m 1/10**
[58] Field of Search 210/168; 184/6 R,
184/106, 6.21, 6.24, 6.25; 123/196 A

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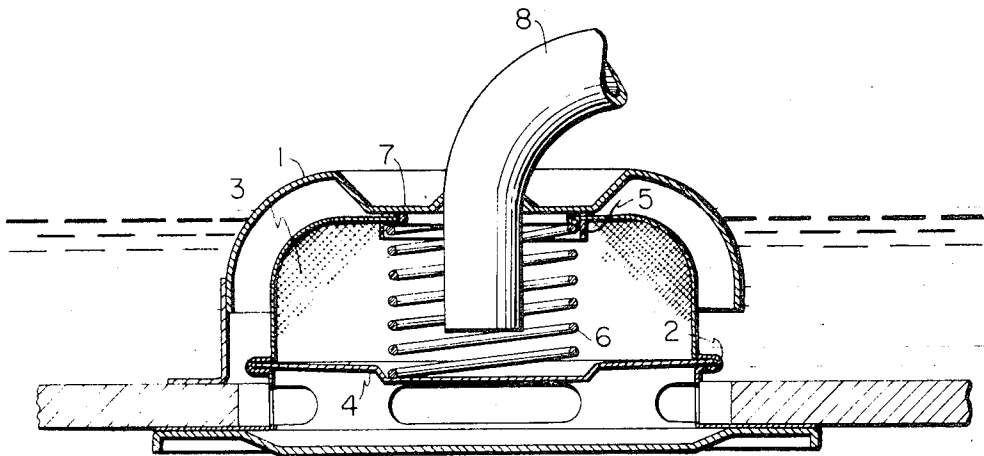
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[57] **ABSTRACT**

A strainer for the oil sump of an internal combustion engine in which the strainer is composed of a wire net and has a body portion. The strainer surrounds a suction pipe with a closing member for the strainer and a spring in the strainer to normally press a border of an opening of the net against the closing member and to permit inward opening against the force of the spring when the wire net is blocked.

3 Claims, 3 Drawing Figures



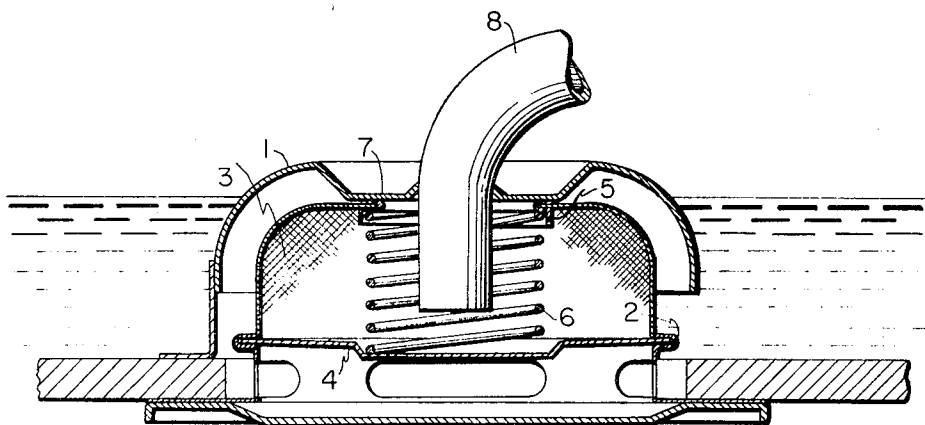


FIG. 1

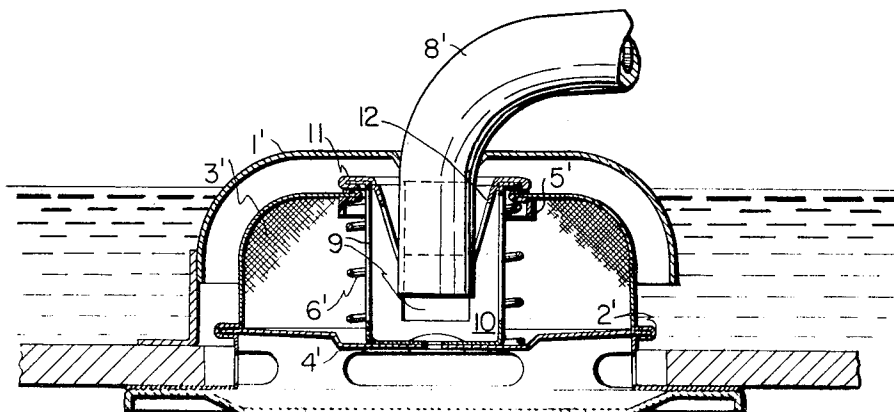


FIG. 2

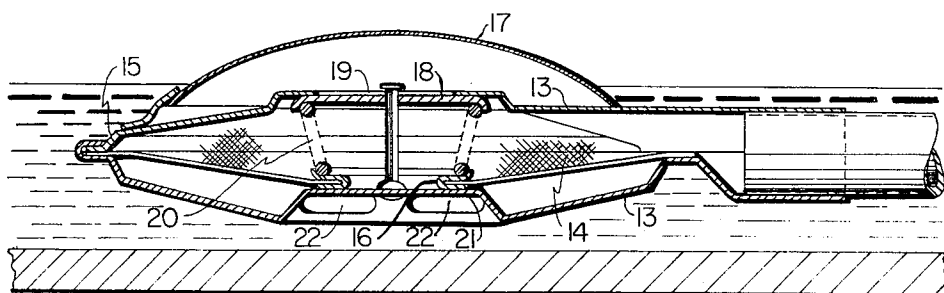


FIG. 3

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STRAINER ARRANGEMENT FOR THE OIL SUMP OF INTERNAL COMBUSTION ENGINES

This is a continuation of application Ser. No. 760,102, filed Sept. 16, 1968 and now abandoned.

This invention relates to a strainer arrangement for the oil sump of internal combustion engines with a draining device surrounding the end of the suction pipe on all sides.

In the case of extreme cold and of low load vehicle motors in short distance travel, it is possible for a quantity of water of combustion to gather in the oil sump, which then forms an emulsion with the oil. If this emulsion cools down slowly, then the water will have an opportunity to settle on the bottom of the oil sump. The water may then form a layer of ice thereon, which closes the suction opening of the straining devices, in case the opening is directed downward and if, in addition, it is arranged at a short distance from the bottom. In the case of rapid cooling, the small water particles can form into ice crystals even while in suspense, which may plug up even large surface strainers. These phenomena are particularly critical in the case of motors which, because of their design or of their ground clearance, have a low oil level in their oil sump.

Strainer devices, with a bell arranged above the strainer device, are known in themselves and they have for their purpose that the removal of oil take place as much as possible without sucking in air, even in the case of viscous oil or even if the vehicle travels across rough roads or sharp curves. It is true that in that case oil, even though unintentionally, in the case of bending or distortion of the strainer surfaces, is guided by means of the bell to the higher strainer surfaces, not yet necessarily wetted down with oil. In the case of plugging up of these surfaces however, one must count with difficulties in the oil supply or even with damage to the strainer.

The invention has for an object to make a strainer system of the initially mentioned kind that functions safely even in extreme cold, and it consists in that the wall of the strainer system, away from the bottom of the sump, is developed in such a way that it will open inwardly against the force of a spring. At the same time, the strainer system will effectively be arranged with the part facing away from the bottom of the sump to be inside a bell, which dips with its edge into the oil. In case the strainer is stopped up by ice crystals, etc., the spring urged walls of the strainer system will open, because of a higher inside under pressure, and unfiltered oil will flow in until the ice is melted. Thus the oil supply will never be interrupted.

In the case of installations with a perpendicularly attached suction pipe, effectively a pot-shaped wire net closed on the bottom by a surface or floor will be provided, which has been equipped on the side of the bell with a collar, placed around the suction pipe with some play, or clearance and which fits against a collapsed part of the bell pointing downward, by means of a spiral spring provided between the collar and the cover. This design is particularly suitable for new constructions, where the possibility still exists to give any desired shape to the bell, so that the shutting off of the strainer system toward the outside can be accomplished by collapse of the bell.

For subsequent installation, on the other hand, the spring loaded collar of the wire net will fit advantageously against a flange of a casing, which is then

united with the bottom portion. Thus the wire net will also be relieved of the force of the spring in its storage state.

For installations with lateral connections for the suction pipe and of particularly small or flat construction, it will be advantageous to provide a lens-shaped sheet metal housing, which is equipped with a plate fitting from inside against a bell-shaped recess and below with a wire net, shaped like an annular disk, and which fits with a collar against parts of the sheet metal housing. At the same time, the collar and the plate are braced against each other by one joint of the spiral spring. The advantage of this design is in the fact that both the wire net as well as the plate are resiliently movable inward. In the case of plugging up of the wire net, the latter opens up, but in case it is prevented from doing so because of being ice formation, since the motor had been turned off for some time, oil can still reach the inside of the strainer by way of the upper recess which is open in any case.

Further objects will be apparent from the following description when considered in connection with the accompanying drawing in which;

FIG. 1 is a vertical cross-section through a strainer system with a perpendicularly connected oil suction pipe,

FIG. 2 is a cross-section of a second strainer system, and

FIG. 3 is a cross-section of a third strainer system with a lateral connection for the oil suction pipe.

The drawing as to the figures show each time a portion of an oil sump of a vehicle motor.

The straining arrangement according to FIG. 1 consists of a bell casing 1, dipping with its edge into the oil and attached to a suction pipe 8, and the actual strainer system 2, which is composed of a wire net 3, which is pot-shaped, and a lower bottom member 4. The wall of the wire net 3 on the top of the bell has been provided with a collar 5, placed loosely around the suction pipe 8, the collar being pressed by a spiral spring 6 against a collapsed or depressed part 7 of the bell 1, directed downward, so that in the normal operating condition only filtered oil is sucked in. If in the case of very cold weather the entire surface of the wire net 3 is gradually plugged up by ice crystals, and to be sure starting out from the lower area, then the collar with the wire net 3 attached thereto will move downward because of the increasing under pressure, so that a path is opened up for the oil.

The functional difference of the installation according to FIG. 2 with that according to FIG. 1 is easily recognizable. Therefore, the parts corresponding to those of FIG. 1 have been given the same reference characters with prime additions to the numbers. It is stressed that according to FIG. 2, a casing 10, united with the bottom portion 4' and provided with oil passages 9, serves the purpose of closing the strainer system 2' on all sides and, to be sure, with the aid of a flange 11, against which collar 5' fits, and of an adjoining funnel 12 in which is placed the suction pipe 8'.

In the case of the installation according to FIG. 3, there are two paths by way of which unfiltered oil can reach the strainer system 15, consisting of a lens-shaped, bipartite sheetmetal housing 13 and a wire net 14 having the shape of an annular disk, in special instances. One path leads below by a collar 16 in case the wire net 14 is clogged up by ice crystals and is lifted up

as a result of the under pressure. The other part leads on top, opposite the bell 17, into the inside of the strainer and, to be sure by a recess 19 in the housing wall, closed at first by a plate 18. This path has been provided for the case that the movement of the strainer is blocked by a solid layer of ice on the bottom of the sump. The plate 18 and the collar 16 are braced against each other by means of a spiral or frusto-conical shaped spring 20. At the same time the collar 16 is pressed against a collapsed or depressed part 21 of the housing wall pointing inward. The collapsed part 21 has oil inflows 22 which carry the oil below the wire net 14.

All of the structures illustrated by FIGS. 1 to 3 may be round when viewed in plan, but of course they can be made in other suitable configurations as desired. The various parts of the structure can be made of any suitable metal or alloy and also copper, aluminum, stainless steel, tin, etc., may be used including various alloys.

I claim:

1. A device for the oil sump of internal combustion engines comprising, a strainer consisting of a wire screen and a body portion, said strainer surrounding the end of a perpendicularly related suction pipe along its periphery, a spring located in said strainer arranged to weigh upon a border of a by-pass opening in said wire screen and to press the border of the opening against a rigidly mounted closing member provided for the strainer and at the outer side thereof, said screen being deformable in the area of the opening and moving away from said closing member against the force of said spring when said screen is blocked thereby opening said by-pass opening for the passage of the oil to the inside of said screen, the device including a bell casing dipping into the oil in the sump with its edge and overlapping a portion of said screen at the outer side thereof, said body portion comprising a bottom cover on said screen which, together with said screen, is shaped in the form of a pot, a sealing collar located along the border of the screen opening and lying on said inner and outer sides of said screen, said closing member comprising a depression in said bell casing extending toward said screen, and said spring bearing against said collar.

2. A device for the oil sump of internal combustion engines comprising, a strainer consisting of a wire screen and a body portion, said strainer surrounding the end of a perpendicularly related suction pipe along its periphery, a spring located in said strainer arranged to weigh upon a border of a by-pass opening in said

wire screen and to press the border of the opening against a rigidly mounted closing provided for the strainer and at the outer side thereof, said screen being deformable in the area of the opening and moving away from said closing member against the force of said spring when said screen is blocked thereby opening said by-pass opening for the passage of oil to the inside of said screen, the device including a bell casing dipping into the oil in the sump with its edge and overlapping a portion of said screen at the outer side thereof, said body portion comprising a bottom cover on said screen which, together with said screen, is shaped in the form of a pot, a sealing collar located along the border of the screen opening and lying on said inner and outer sides of said screen, said closing member comprising the flange of a casing member which is located within said collar and surrounds said pipe end along its said periphery, said casing having slots therein and being secured to said bottom cover, means on said casing tightly engaging said pipe end, said collar bearing against said flange and said spring bearing against said collar.

3. A device for the oil sump of internal combustion engines comprising a strainer composed of a wire net portion and a body portion, the strainer surrounding an end of a suction pipe on all sides, a spring in the strainer arranged to weigh upon a border of an opening of a wire net portion and to press the border of the opening against a rigidly mounted closing member provided for the strainer and at the side of the opening facing away from the spring, the net being deformable in the area of the opening and moving away from the closing member against the force of the spring, when the wire net portion is blocked, said device including a bell casing dipping into the oil in the sump with its edge and overlapping a part of the strainer facing away from the bottom of the sump, the body portion of said strainer being in the form of a lens-shaped sheet metal housing with the suction pipe arranged horizontally at the side of the housing and in which said wire net portion is a disk-shaped wire net portion and is provided with the opening, the border of which is equipped with a collar fitting under stress by means of a spiral spring against a collapsed part of a first housing wall serving as a closing member arranged below said wire net portion and provided on its periphery with inlets for the oil, a second housing wall facing away from the bottom of the sump having a second opening of the strainer and a plate closing the opening and forced by the spiral spring.

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