

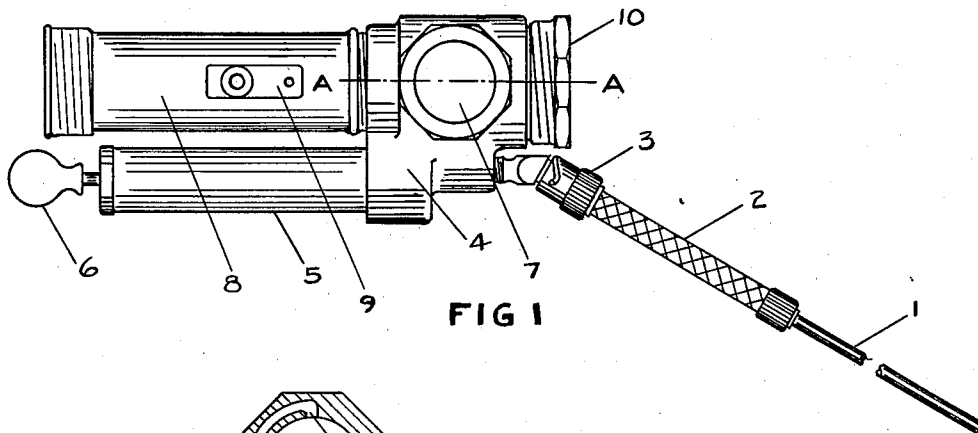
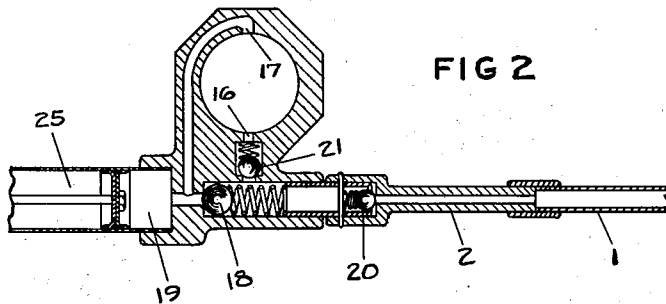
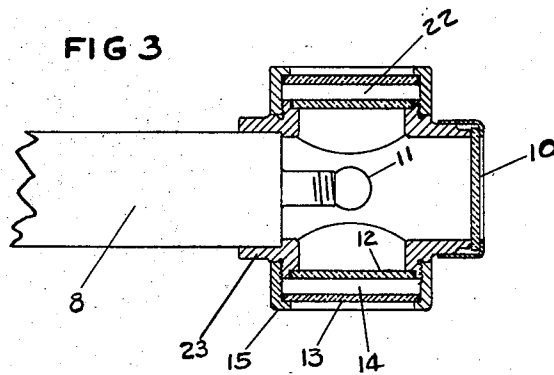
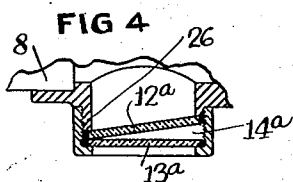
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DEVICE FOR INSPECTING LIQUIDS

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DEVICE FOR INSPECTING LIQUIDS

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9 Claims. (Cl. 88—14)

This invention relates to the inspection of translucent liquids and is particularly adapted for visually checking the condition of the lubricating oil in the crankcase of an automobile engine.

It is not now customary for the gasoline filling station operator to follow any definite or effective method of increasing his sales of oil by replacing that in the crankcase, although facilities for changing oil are provided at most stations. Extensive advertising campaigns attempt to teach the car owner that oil should be changed at definite intervals—but the station operator is greatly handicapped in persuading the owner to do so. It is a familiar experience to have the operator hold a dripping gauge stick before the eyes of the owner or even rub oil between his fingers to emphasize its condition, but these methods are of very limited effectiveness, and fulfill none of the basic requirements of modern sales methods.

The following means and method have been developed to be of maximum practical value in establishing a system whereby the operator of a gasoline filling station may quickly and easily place before the eyes of the prospective customer a sample of oil actually removed from the crankcase of his car. It must be realized that the effectiveness of my system in increasing the sale of lubricating oil is directly related to the extent to which actual inspections are made. Maximum results are to be expected if every automobilist stopping at the filling station is allowed to examine a sample of the oil from his engine. While such intensive use of the method may not be possible it is the desire to make tests on as many cars as possible. It will be evident that the ability to accomplish maximum results over an extended period of time is dependent upon a number of factors, very careful consideration having been given by me to the procedure as well as the tools for obtaining best results.

From the viewpoint of the operator, the equipment necessary must be simple in operation, convenient to handle, and require very little time and effort in use, otherwise there will be a definite tendency on his part to neglect its use.

From the standpoint of the car owner, the time necessary for placing the sample before his eyes must be so short that he will not have any feeling of time being wasted nor will he express any objection to the test despite the fact that similar checks may have been made but a short time previously. The inspection must be made without the necessity of the owner leaving his seat in the car, and the equipment used shall be light in

weight, easily handled without danger of soiling the hands, and must clearly show the condition of the oil. To better check the oil in question it is desirable to have a standard for comparison and this may be provided in another chamber whereby both new and used oils may be seen under similar conditions.

An object of my invention therefore is to provide an easy, clean, and effective visual method of disclosing the condition of lubricating oil.

Another object is to provide equipment for readily removing the oil sample from the crankcase of an automobile, placing it in a convenient closed inspection chamber, and later discharging it from said inspection chamber.

Another object is a system whereby the oil in the chamber after inspection need not be returned to the crankcase from which it was obtained but will be automatically discharged into the next crankcase to be tested upon charging of the inspection chamber from said second supply.

A further object is to provide a single passage sampling tube of sufficiently limited dimensions as to be readily inserted into the small, gauge-stick opening in the crank case of the usual motor car.

Another object is to arrange the oil flow through the sampling tube, pumping means, and inspection chamber so that the oil in said chamber will be promptly replaced by oil from the crankcase.

A further purpose is to provide lighting means which will be useful in aiding the operator to remove the sample from the crankcase as well as to make the inspection practical under all conditions of outside light, by transmitted light through the oil.

A still further object is to provide chambers for one or more additional samples of oil on the inspection device for comparative purposes.

Another object is to build various portions of the device removable or demountable so that the inspection may be made with maximum convenience.

Yet another object is to use the special equipment described in a systematic method of procedure which will insure maximum results in the increased sale of oil.

Further objects will appear as the description proceeds. Referring to the drawing wherein similar numbers refer to the same part in all views.

Figure 1 is a side view of the assembled device.

Figure 2 is a diagrammatic layout of the pumping mechanism showing the disposition of the pump, inspection chamber and valve means controlling the oil flow.

Figure 3 is a top section view taken along the lines of section A—A of Fig. 1 showing the position of the lighting means and the location of the oil sampling chambers.

- 5 Fig. 4 shows a modified form of the oil sample chamber.

The various parts of the device shown in Fig. 1 are identified as follows. 1 is rigid tube of suitable length and preferably not exceeding $\frac{1}{4}$ inch in diameter adapted to be inserted in the small gauge opening leading to the crankcase, through which the oil sample is obtained and any excess oil returned to the engine. 2 is a short piece of flexible tubing attached at one end to sample tube 1 and provided at the opposite end with easily detachable locking means to the pumping mechanism. 4 is the valve mechanism and support for pump cylinder 5—both portions to be described in detail later. Pump handle 6 20 when reciprocated with tube 1 inserted in the oil supply, removes a sample and delivers it to the glass lined inspection chamber 7. Oil previously occupying the chamber is delivered to the cylinder and thence back to the crankcase upon the return stroke of the pump. 8 is the battery chamber of the lighting member with control means in the switch 9. When the light is turned on the rays not only light the inspection chambers but also pass forward through the head member in the manner of a conventional flash light serving to assist the operator in handling the sampling tube.

Figure 3 shows the head member construction. The inspection chamber is provided with connections for entry and exit of oil from space 14. Both front and back walls are of glass to allow passage of light rays from the lamp 11 for examination of the oil within the chamber. The threaded cover 15 unscrews from the head member 23 for purposes of cleaning. Glass members 12 and 13 are sealed to their respective supports. Chamber 22 is of similar construction except no special provision is made for replacing the oil which is done by opening the chamber manually. 45 Member 8 including light 11 can be unscrewed from the head member, as may also the light window 10.

Figure 4 discloses a preferred form of construction for the inspection chamber wherein the oil sample proper is of varying thickness. It is found in practice that oil which is in very bad condition may be nearly opaque to light when the distance through the oil is appreciable. Under these circumstances a thinner layer must be inspected. With the arrangement disclosed in Figure 4 a constantly widening thickness is provided. The same design likewise provides a ready and convenient standard for visually comparing the light transmitting qualities of various oils. With a scale marking extending across the varying section of the chamber it is possible to quickly classify the specimen by determining the point where no more light is passed.

With continued reference to Figure 4, chamber 65 14a is of wedge shape in section and is defined by glass 12a, which seats against an inclined surface 26 provided on the head, and glass 13a, which is held in place in a manner similar to glass 13 in Figure 3.

70 Reference to Figure 2 shows a preferable form of valve mechanism and the functioning will now be explained. When the sampling tube is attached, means within its head forces ball check 20 from its seat and keeps it open. Upon re-

moval of the tube, check 20 closes preventing any loss of oil. With the sample tube in position and upon moving piston 25 outwardly in chamber 19 the vacuum created causes oil to flow up the sample tube, past valve 20 driving open check valve 21 upon entering the chamber. Entry port 16 and exit port 17 are positioned in the chamber in such manner that no air will be trapped and all old oil quickly replaced by the new. In the actual assembly the exit 17 is positioned farther to the left than shown in Fig. 3 in order to be at the top when the device is held pointing somewhat downward in actual operation. Upon the return stroke piston 25 discharges the contents past valve 18 (check 16 preventing any return through the inspection chamber,) and thence down the sample tube 1 to the crankcase. In this manner each double stroke brings new oil to the chamber and discharges the old. Cylinder 19 however must have sufficient displacement to effectively discharge most of the old oil through tube 1 at each stroke otherwise an internal circulation would be set up and poor results obtained.

The normal procedure in actual practice will now be explained. Upon lifting the hood and after inspecting the gauge to determine the oil level, the sample tube is entered into the gauge opening, with the assistance of the light when needed. Two or three quick strokes of the pump fill the inspection chamber with the oil in question. The operator then quickly removes the sample tube from the head member, placing it aside for the moment, turns on the lamp inside if not already lighted, and holds the device in a convenient position for examination by the seated motorist. The contrast between the condition of the oil actually existing in the motor and the new oil in the other sample chamber, emphasizes the importance of a change. In some cases a third inspection chamber containing oil at the stage requiring change—may be desirable. When the examination is concluded the operator replaces the sampling tube and the device is ready for the next test. The oil remaining within is automatically discharged into the crank-case of the following machine when the next sample is obtained. While it is true that the effectiveness of my device in practical operation may logically be attributed to the novel constructions already described I would like to emphasize the importance of coordinating the method with the equipment in producing the best results. Without speed and ease in handling from the point of view of the operator, and a prompt and interesting presentation to the customer, the value of the means would be considerably impaired. Consequently it is not my desire to be limited to the exact construction specified but to be granted protection on both means and method within the limitations of the following claims.

I claim:

1. In an oil testing device, an assembly comprising a transparent-walled chamber; pump means, having a reciprocable plunger, for pumping an oil sample from an oil source to said chamber, and illuminating means for passing light through said chamber for visually indicating the degree of transparency of said oil sample, said pumping means and said illuminating means comprising a pair of elongated bodies disposed in closely adjacent side-by-side relationship and forming a rigid part of said assembly, said assembly being compactly related

and of comparatively light weight and having a portion which may be grasped by one hand of an operator for supporting the assembly during the testing operation and having said plunger disposed so that it may be grasped by the other hand of the operator.

2. The device described in claim 1, wherein said illuminating means comprises at least one electric light bulb, and means are provided in a rigid part of said assembly for supplying an electric current to said electric bulb.

3. In a portable oil testing device, a body member having a transparent-walled oil sample chamber, means for filling said chamber with oil, said body member also having an opening therein; a cylindrical light unit having an electrical light bulb at one end thereof, and means for securing said cylindrical unit to said body with its axis in alignment with said opening, and with said bulb in registry with said oil sample chamber, for projecting light rays through the latter, said oil sample chamber being of disc-like configuration and whose axis is substantially normal to, and intersects the axis of said light unit.

4. In a fluid testing device, a body member providing a transparent-walled fluid sample chamber adapted to have light rays passed there-through, a reciprocable pump operably associated with said member; a conduit for placing one portion of said chamber in fluid communication with said pump; means for placing another portion of said chamber in fluid communication with an inlet port and said pump; and means for causing fluid to flow through said chamber when said pump is reciprocated in one direction and for causing fluid to flow directly from said pump to said inlet port when said pump is reciprocated in the opposite direction.

5. In a portable oil testing device, a body member having a transparent-walled oil sample chamber, means for filling the said chamber with oil, comprising a reciprocable pump having a cylinder connected to and extending away from said body member, said body member also having an opening therein, a cylindrical light unit having an electric light bulb at one end thereof, and means for securing said cylindrical unit to said body with its axis in alignment with said opening, and with said bulb in registry with said oil sample chamber, for projecting light rays through the latter, said light unit and said pump being disposed in closely adjacent, side-by-side relationship with their axes substantially parallel, thereby producing a compact device which may be readily manually grasped.

6. In a portable device for withdrawing and

testing oil samples from automobile crank cases, said device comprising a pump having an elongated conduit connected thereto and extending away from said device, said device also comprising a body providing at least one transparent-walled chamber which said pump is operable to fill with the oil to be tested, and a single lighting means, carried by said device, and operable to project light rays through said chamber to impart luminosity to the sample therein, said lighting means also being operable to project light rays away from the device in the same general direction as said conduit, whereby the openings in said crank cases may be readily located and said conduit introduced thereinto.

7. A portable oil testing device comprising an elongated light unit adapted to be manually grasped for carrying out the testing operation and having at least one light bulb at one end thereof, a hollow body member rigidly carried by said light unit and enclosing said light bulb, said body member providing at least two substantially disc-shaped, transparent-walled oil testing chambers disposed in alignment with said light bulb and adapted to have light rays simultaneously passed therethrough, the axes of said chambers being disposed substantially normal to the longitudinal axis of said light unit, said chambers being disposed substantially parallel to each other and being offset substantially equal distances from the axis of said light unit and said light bulb.

8. The device described in claim 7, wherein said body member is provided with a window disposed normal to the axis of said light unit and in alignment with said light bulb, said window being located beyond said transparent-walled chambers and operable to allow light rays to be projected from said light bulb in a direction substantially parallel to the axis of said lighting unit, for facilitating locating oil sample sources.

9. A portable oil testing device comprising an elongated light unit adapted to be manually grasped and supported by hand for carrying out the testing operation and having at least one light bulb at one end thereof, a hollow body member carried by said light unit and enclosing said light bulb, said body member providing two transparent-walled oil testing receptacles disposed in proximity to said bulb and adapted to have light rays simultaneously passed there-through, one of said receptacles being closed to define a chamber for containing oil of a predetermined transparency, said light unit containing a battery and having a circuit for selectively energizing said bulb.

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