Sept. 5, 1933. R. JOHN 1,925,254

LUBRICATING OIL TESTING DEVICE

Filed May 11, 1931

Fig. 1.

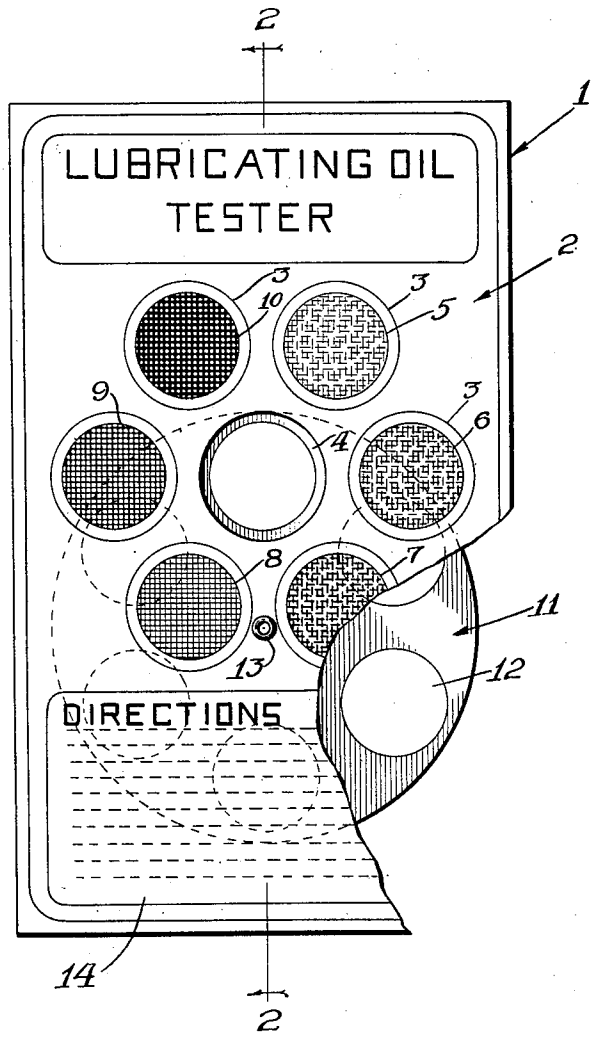
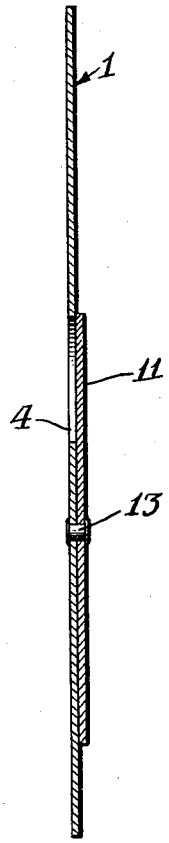


Fig. 2.



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LUBRICATING OIL TESTING DEVICE

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4 Claims. (Cl. 88—14)

This invention relates to improvements in a method and means for making quantitative determinations of extraneous matter in lubricating oils which may indicate the qualitative lubricating value of said oils.

One of the objects of the present invention is to provide a method and means so simple, quick and reliable that any user may at any time determine within a relatively short time the condition of the lubricant as it then exists irrespective of any single cause of deterioration. Further, the user may be advised either as to the need of immediately changing the lubricant or flushing the crank case and changing the lubricant, or merely adding more lubricant; or if none of these steps are advisable, the user may gain an approximate idea of how soon the lubricant will require attention.

When a full charge of fresh lubricating oil is placed in the crank case of a thoroughly cleaned internal combustion engine or in similar lubricant containers used with automotive engines it has certain useful characteristics which gradually deteriorate with use. This deterioration comes about through dilution of raw gasoline from the cylinders and with water sometimes formed as a product of the combustion; through the constant pounding of the bare surfaces against the thin films of lubricant disposed between them; and from the addition of carbon and metallic grit which inevitably follow the breaking down of the lubricating value of the oil from any cause.

It is apparent that while some oils are capable of a greater degree of dilution without impairment than others, and that while certain types of oil are more resistant to destruction by pounding than others, the general value of oil as a lubricant can be very closely appraised by the determination of the amount of carbonaceous or other solid material which it contains.

It is also apparent that while some automotive engines can safely operate over a relatively great period of time which may correspond more or less to two or three thousand miles with the usual automobile, other types of engines utilized in conjunction with motor cars cannot be operated safely with the same oil over a greater distance than five hundred miles or less, the danger point depending on so many conditions that no hard and fast rule can safely be based on the mileage traveled.

Accordingly my invention is particularly directed to a method and means of determining the qualitative lubricating value of the lubricating oil used in the crank case of an internal combustion engine or the like, by the quantitative determination of the foreign materials contained within the lubricating oil.

Further objects and advantages of my invention will be apparent from the accompanying drawing and following detail description.

In the drawing, Fig. 1 is a front elevational view, parts being broken away, of a lubricating oil testing card.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Referring in detail to the drawing, 1 indicates a card which may be provided with a surface 2 of bibulous material such as blotting paper, filter paper or the like. The card 1 may take any desired configuration and may be of any desired dimensions. A plurality of areas 3 may be provided upon the face 2 of the card 1, the central portions of which may be colored as will be hereinafter more fully described. The central portion of the card may be provided with an aperture 4 the purpose of which will hereafter appear.

If desired the areas 3 may be disposed around the aperture 4 as a center and the area 5 may be colored to indicate the color of new or unused lubricating oil. It has been found that the color of said oil when absorbed by a bibulous surface such as the face of the card 1, is more or less yellow. The next adjacent area 6 may correspond to the color of lubricating oil which has been slightly used and may take a deeper yellowish hue which may approximate a fawn or buff color. The next adjacent area 7 may indicate the color of a lubricating oil which has seen more use than that represented by the colored area 6. The color of the area 7 may be described as a drab or brownish gray. The next adjacent area 8 may indicate the color of a lubricating oil which contains material quantities of foreign matter such as carbon, grit, metallic particles and the like. The color of the area 8 may approximate a dark gray. The next adjacent area 9 may comprise a reproduction of the color of a lubricating oil which contains a large proportion of foreign materials which oil would become injurious to the metallic portions of an internal combustion engine such as the bearings, cylinder walls and the like. The color of area 9 may approximate a dark gray, almost black.

The next adjacent area 10 may represent lubricating oil used to such an extent and containing such a great proportion of impurities that the lubricating value is substantially nil and repre-

sents an oil which, if used, would prove ruinous to the moving elements of an internal combustion engine.

A second card 11, having a bibulous surface similar to the surfaces of the card 1, may be rotatably mounted upon the rear portion of the card 1. The card 11 may, if desired, comprise a circular disk provided with a plurality of circular areas 12 which, upon rotation of the card 11 about the axis 13 which may comprise a rivet or the like, may appear through the aperture 4 and be visible from the front face of the card 1.

It is to be understood, of course, that I do not wish to be limited to a rotatably moving card 11 inasmuch as the same may be slidably disposed upon the rear portion of the card 1 and may be provided with a plurality of areas similar to the area 12 which, upon slidable movement of the card, may appear through the aperture 4. In addition, the areas 12 do not necessarily have to take a circular form inasmuch as the same may be of any desired configuration. The areas 12 preferably are white or colorless.

It is to be further understood that the surface of the card 1 instead of being of a bibulous or absorbent character, may be provided with a more or less hard finish or hard coating so long as the colored areas 5 to 10 inclusive truly represent the color of lubricating oils at various stages of use.

In utilizing my invention, a dab of crank case oil taken from the crank case by touching the finger to the detachable measuring rod usually found in combustion engine crank cases, or to oil extracted in any other convenient manner, may be touched to the area 12 appearing through the aperture 4, thereby coloring said area. The color of the blot or dab upon the area 12 may then be readily compared with one of the colors in the areas 5 to 10, and a percentage of foreign materials contained within the body of the oil from which the sample was extracted can be determined by such comparison.

The lower portion of the card may, if desired, be provided with a space 14 which may contain directions as to the use of the card 1 and the proper interpretations of the various colored areas thereon.

For instance, if the blot or sample contained upon the area 12 appearing through the aperture 4 corresponds to the color of the area 5, by referring to the directions, the user may find that the oil is in substantially perfect condition. If the color of the sample contained upon the area 12 appearing through the aperture 4 corresponds to the color of the area 6 under the legend 6 contained in the directions, the user may find that the oil is still good. If the sample corresponds to the color of the area 7 under the legend 7 within the space 14, the user may find that the oil is still good but the same must be changed soon. If the sample corresponds to the color of the area 8, the user may be advised to change the oil immediately. If the color of the sample upon the area 12 corresponds to the color of the area 9, the use may by reference to the directions be advised to change the oil immediately and flush the crank case. If the color of the sample upon the area 12 corresponds to the color of the area 10, the user may be advised that danger exists and the oil should be changed immediately and the crank case flushed. It is to be understood, of course, that the directions contained within the space 14 may be varied as desired, for instance, instead of directions addressed to the lay motorist as illustrated above, the percentages of foreign materials contained in the oil may be enumerated and may correspond to the various colors in the areas 5, 6, 7, 8, 9 and 10.

It can readily be seen that when a test has been made utilizing one of the areas 12 upon the card 11, the card 1 may be subsequently used by rotating the card 11 until a clean or fresh surfaced area 12 appears through the aperture 4. It can readily be seen that the card 11 may contain a plurality of such areas, the number of which may determine the number of tests which may be performed with a single card 1.

In the preparation of the color gradations 5, 6, 7, 8, 9 and 10, actual dabs or samples of lubricating oil at various stages of disintegration may be used, said stages of disintegration being previously determined by microscopic examination and the viscosity, fluidity and tenacity may be determined. By taking averages of lubricants run under varying conditions and by extracting samples at different periods during the runs, it has been found possible to prepare a relatively great number of distinguishable colors, each representing a different degree of deterioration of the lubricating oil, but for practical purposes a relatively smaller number of color gradations from the pure, unused oil to that which has reached the danger point is sufficient.

Having made the color gradations by the method hereinbefore described, the same may be reproduced by means of half tone process in one or more colors or by using varied tints of blended inks. The actual color gradations appearing upon the test card may be printed by letter press, lithograph or gravure.

Many modifications of my invention will be apparent to those skilled in the art and various means may be devised for carrying out said invention without departing from the spirit thereof, for instance, a plurality of moving or rotating cards 11 may be mounted upon the same rivet 13 and when one of said cards has been completely used, that is, when all of the areas 12 contained upon said card have been utilized, said card may be removed from the rivet thereby exposing another card having clean or fresh areas 12.

A further modification may comprise printing or otherwise coloring a plurality of areas upon the rotatable or movable card which may upon rotation of the card appear in sequence through the aperture 4. In this case the areas 3 would be plain white and in utilizing a card of this type, the samples would be deposited upon the front portion of the card whereas the rotatable or movable card would be rotated or otherwise moved to bring in sequence the colored area contained upon said movable card into registering relation with the aperture 4 until a color would appear through said aperture which would correspond to the color of the sample upon the face of the card.

I claim as my invention:

1. A unitary lubricating oil testing device comprising, in combination, a stationary and a movable surface, a plurality of areas upon each of said surfaces, the areas upon the stationary surface being colored to represent the color of lubricating oil containing predetermined quantities of foreign materials, the areas upon the other surface being adapted to absorb a quantity of lubricating oil which may be compared as to color with said colored areas, said stationary card concealing certain of the areas upon said movable card.

2. A unitary lubricating oil testing device which comprises, in combination, a stationary and a movable card, a plurality of colored areas upon the stationary card representing the color of lubricating oils containing predetermined quantities of foreign materials and a plurality of areas upon the movable card having bibulous surfaces for absorbing a quantity of lubricating oil which may color said areas, which color may be compared with the colored areas upon the first card, said stationary card concealing certain of the areas upon said movable card.

3. A lubricating oil testing device comprising, in combination, a card, a plurality of colored areas upon said card representing the colors of lubricating oil containing predetermined quantities of foreign materials, said card being provided with an aperture, a second card movably mounted upon the rear of said first card, a plurality of white areas upon said second card which, upon movement of said second card may singly appear through the aperture in the first card, each of said areas upon said second card adapted to absorb a quantity of lubricating oil which may color said areas, which color may be compared with the colored areas upon the first card.

4. A lubricating oil testing device comprising in combination a card provided with an aperture, a plurality of differently colored areas or fields upon said card adjacent said aperture substantially representing the colors of lubricating oil in successive stages of contamination, a second card movably mounted on one face of said first card, a plurality of relatively colorless areas upon said second card which upon movement of one of the cards may appear in seriatum through the aperture in the first card, each of said relatively colorless areas having a bibulous surface for absorbing lubricating oil which may color said areas.

ROBERT JOHN.