Nov. 17, 1931. B. S. TESCHNER 1,831,980

VISCOSIMETER

Filed Nov. 29, 1927

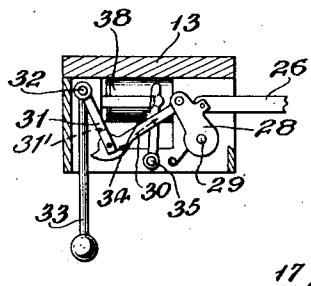

Fig. 2.

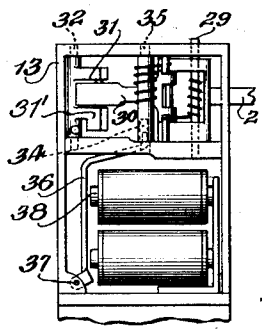

Fig. 3.

Fig. 1.

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UNITED STATES PATENT OFFICE

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VISCOSIMETER

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This invention relates to an oil testing apparatus of the viscosimeter type, and has for its object, to generally improve such structures by simplifying their construction, to the end that the operations to be performed by the operator at the time of making the test, may be reduced to a minimum.

A further object of the invention, resides in the use of a heater, which will raise the temperature of the bath more uniformly, and, therefore, more rapidly than heaters heretofore employed in such devices.

Another object of the invention, consists in combining with a viscosimeter, an electrically operated stirrer which will create a circulation of the liquid in the bath, and thus aid in the more uniform and more rapid heating, thereof.

A further object of the invention, consists in the employment of a thermostat, in conjunction with the heater, whereby, the bath may be maintained at a constant temperature.

A still further object of the invention, resides in combining with the oil tube, a stopcock and stop watch, together with a mechanism, whereby, both the stopcock and stop watch may be simultaneously operated at the time of making the test.

Other objects and advantages of the invention will be apparent from the following description, when taken in connection with the accompanying drawings, in which

Figure 1 is a perspective view of the apparatus, with parts broken away to more clearly disclose the interior construction.

Figure 2 is a horizontal section through the switch box, and

Figure 3 is a front elevation of the box, with the front plate removed so as to show the interior construction.

Referring to the drawings in greater detail, the numeral 1, designates the supporting legs of the viscosimeter, on which is mounted a jacket or casing 2, adapted to serve as a container for a liquid used in heating the liquid to be tested. This container 2, is of the double wall type and preferably has a filling of heat insulating material disposed within the space between the double walls.

Mounted centrally within the container or bath 2, is a tube 3, which receives the liquid to be tested. This tube extends through the bottom of the container for the bath; a suitable liquid proof joint being provided, and has associated with the lower end, thereof, a stopcock 4, provided with an operating arm or lever 5. The upper end of the tube 3 is provided with an enlargement 6, which will permit of the insertion of a pipette or the like for removing excess material, so that the head of liquid may be the same for all tests. Mounted in the enlargement 6, is a metal gauze cap 7, which serves as a support for a thermometer 8. This cap may be removed when it is desired to fill the tube 3.

The bath 2, is preferably heated by an electric heating coil 9, which is substantially flat and disposed horizontally within the casing, so as to uniformly heat the liquid of the bath. The coil 9 is provided with the binding posts 10, which are electrically connected with the control switch 11. Also connected in this circuit, is a thermostat 12, positioned within the bath, and which serves to shut off the current to the coil 9 when the temperature of the bath reaches the point for which the thermostat is set. This arrangement of the thermostat, of course, provides for maintaining a uniform temperature of the bath, and consequently results in a more accurate heating of the liquid to be tested.

Mounted within the bath 2, is a stirrer 14, provided with a vertical shaft 15, on which is mounted a spiral gear 16. This gear meshes with a similar gear 17, on the shaft of the motor 18. The stirrer 14, will, of course, cause a circulation of the liquid in the bath, thereby, affording a more rapid and more uniform heating thereof, and being electrically operated, will require no attention by the operator.

Also associated with the bath, is a gauge 19, a charging funnel 20, a thermometer 21, and a drain-cock 22 for use in cleaning out the bath from time to time as desired.

For timing the flow of liquid being tested, a stop watch 23, of any preferred type as, for instance, that shown in the patent to Gunn, No. 503,416, may be employed. This watch is mounted on the frame 1, and its control

lever 24, is connected by means of link 25, with the lever 5 of the valve 4. This lever 5, is associated with control box 13, by link 26, and arm 28, fixed to a spring-pressed shaft 29, which arm is in turn connected by links 30 and 31 with a shaft 32 provided with a control rod or handle 33. When the handle or rod 33 is moved to the right, (Figs. 1 and 2), the links 31 and 30 will be moved into alignment, thereby swinging levers 5 and 24, arm 28, and links 25 and 26 to the right, so as to open valve 4 and set the stop watch 23 in motion. The parts are held in this position, until released, by means of a detent 34 rigidly connected to the spring-pressed shaft 35. This detent 34 is adapted to engage lug 31′ on the link 31, and is operatively connected to an armature or keeper 36 pivoted at 37 to the interior of box 13 and associated with an electro-magnet 38. By this arrangement, it will be apparent that the spring-pressed detent 34 may be moved to the right, (Fig. 2), by energizing the magnet 38, thus releasing the links 30 and 31 and permitting the spring-pressed arm 28 to restore the train of levers to normal position, thereby closing the valve 4, and resetting the stop watch 23.

Disposed below the valve 4, is a receiver flask 39, provided with a gauge mark 40, which indicates 60 c. c. capacity.

In the operation of the device, either oil or water may be poured through funnel 20 until the gauge glass 19 indicates that the bath is fully charged. The current is then turned on through the coil 9 and motor 18, so as to heat the bath, and also create a circulation of the liquid within the bath. When the thermometer 21 reaches the temperature at which the viscosity of the oil in tube 3 is to be ascertained, the thermostat 12 is set, so that the heat will be constant at the desired temperature. As soon as the oil in the tube 3 reaches the same temperature as the bath, as indicated by thermometer 8, the arm 33 is moved to the right, so as to open valve 4, and set the stop watch 23 in motion. The oil will flow from the tube 3 into flask 39, and when it reaches the graduation 40, indicating 60 c. c., the button 11 is pressed so as to energize the magnet 38 and restore the parts to normal position as heretofore indicated. The operator can then take the reading of the stop watch, and then prepare for the next test.

From the foregoing description, it will be obvious to those skilled in the art, that I have greatly improved devices of the present character by reducing the operations necessary at the time of taking the test, to an absolute minimum, namely, pressing lever 33, watching the liquid rise in flask 39 to the desired height, and then pressing button 11. It will also be apparent that by reason of the heating coil extending over substantially the entire area of the bath, the stirrer 14 and the thermostat 12, I am enabled to quickly and uniformly raise the temperature of the bath to the proper degree, and maintain it there, so long as the apparatus is to remain in operation.

In accordance with the patent statutes, I have described what I now believe to be the preferred embodiment of the invention, but it will be understood that the same is subject to various changes and modifications, all of which it is intended to include within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A viscosimeter including a tube for holding the liquid to be tested, a valve for the discharge end of said tube, a lever for operating said valve, a stop watch, a lever for starting said stop watch, means for simultaneously operating said levers, a detent for holding said levers in active position, and means for releasing the detent.

2. A viscosimeter including a tube for holding the liquid to be tested, a valve for the discharge end of said tube, a lever for operating said valve, a stop watch, a lever for starting said stop watch, spring pressed means normally holding said levers in inactive position, means for moving said levers to active position, and releasable means for holding said levers in active position.

3. A viscosimeter including a tube for holding the liquid to be tested, a valve for the discharge end of said tube, a stop watch, mechanically operated means for simultaneously opening said valve and setting the stop watch in operation, a detent for holding said mechanically operated means in operative position, and electrically operated means for releasing said detent.

4. A viscosimeter including a tube for holding the liquid to be tested, a valve for the discharge end of said tube, a stop watch, mechanically operated means for simultaneously opening said valve and setting the stop watch in operation, a spring for returning said parts to normal position, a detent for holding said parts in operative position, and electrically operated means for releasing said detent.

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