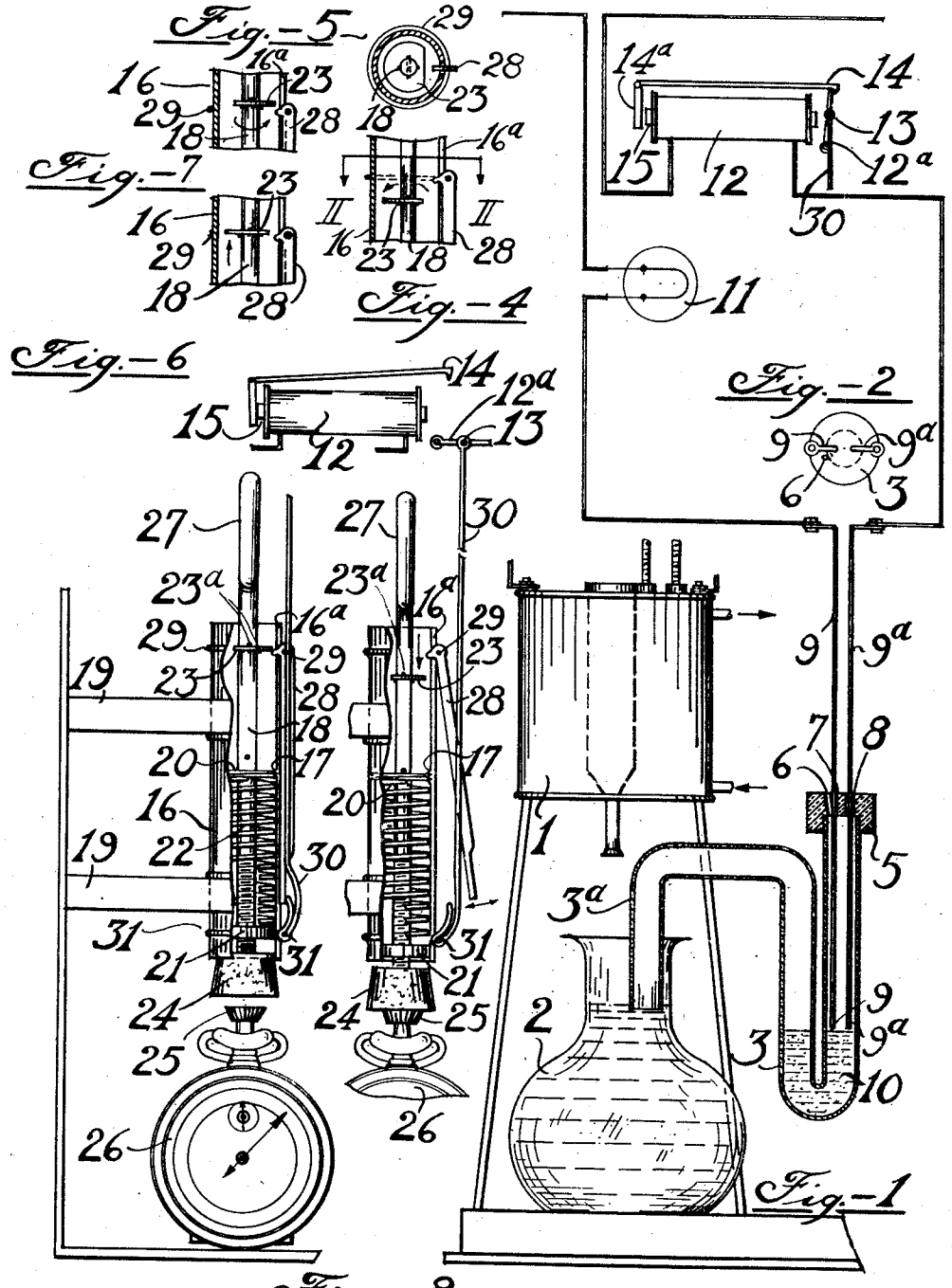
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AUTOMATIC VISCOSITY DEVICE

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AUTOMATIC VISCOSITY DEVICE

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2 Claims. (Cl. 265—11)

This invention relates to an automatic indicating device combined with a viscosimeter used in measuring the viscosity of liquids, in particular when used with flow viscosimeters.

An object of this invention is to provide a device for viscosimeters which will automatically indicate the viscosity of a liquid without the attention of the operator once the liquid starts to flow.

The invention will be best understood by reference to the accompanying drawing which somewhat diagrammatically illustrate a suitable apparatus partly in side elevation and partly in cross section for practicing the invention.

Fig. 1 is a front view partly in section of a viscosimeter together with an automatic time indicating device constructed in accordance with the invention,

Fig. 2 is a top view of contact terminals,

Fig. 3 is a front view of a stop watch and a vertical sectional view of a plunger at rest,

Fig. 4 is a detailed section of a plunger, in its released position, just prior to resetting.

Fig. 5 is a cross section area along the lines II—II of Fig. 4.

Fig. 6 is a detailed section of a plunger in raised position before resetting.

Fig. 7 is another view of the plunger showing it in position to engage a trigger.

Fig. 8 is a stop watch and a vertical sectional view of plunger in action.

Referring to the drawing, numeral 1 is a viscosimeter which may be an Engler, Redwood, Saybolt, or any other viscosimeter of similar type, with a viscosimeter flask 2 which is graduated to hold a definite quantity of liquid.

A manometer gage 3, consisting of a U tube with both ends open and one turned a right angle and extending outwardly and again depending downwardly is held in a position so that the end depending downwardly is just below the level of the top of the liquid in viscosimeter flask 2 when it contains a given volume of liquid. An insulator 5 is provided on the other end of the manometer gage 3 with a vent hole 6, and openings 7 and 8 for passage of electric wires 9 and 9a whose ends terminate in a fixed position in one leg of the U tube 3. Electric current is provided by means not shown, for the electric circuit that may pass through electric wires 9 and 9a and a lamp 11 of about 40 watts. A telephone or drop annunciator 12 is in the electric circuit on which the drop element 12a carries a pin 13 forming a pivot connection for a wire 30. The drop element 12a is held in position by a notch lever bar 14, whose end weight 14a comes in contact with an energized magnet 15 on the opposite end.

A metal cylinder 16 is held in position by clamps 19, having an interior threaded section 17, and inside of the metal cylinder is found a threaded washer 20 which is held in a position by the threaded section 17. A plunger 18 is provided inside of the cylinder and has the lower end threaded to support a round nut 21 and this round nut in turn supports a spiral spring 22. On the upper part of plunger 18 is found a round washer 23 supported by pin 23a and of which about one-half has been cut away close to the outer periphery of the plunger 18 and the other part extends outwardly at right angles to the plunger 18.

A cork 24 is provided which is held in position by friction in the lower part of cylinder 16 and above the stem 25 of stop watch 26. The plunger 18 terminates in the upper end in the eyelet 27. A trigger 28 is held in position and pivoted on the side of the metal cylinder 16 by means of a wire 29. The cylinder 16 is slotted on the side 16a so that the point of the trigger may set a substantial distance within the metal cylinder 16. This trigger 28 is also held in position by a wire 30 which is connected to pin 13 of the element 12a, on the drop annunciator 12, and to a wire 31 which is held in position at the lower part of cylinder 16.

The apparatus is first set up by filling the viscosimeter flask tube to the calibrated height with a liquid, and tube 3 is set in position so that if the flask is filled to the desired height a part of the tube 3a extends below the level of the liquid. In the U tube 3 is found a salt solution 10, or any other liquid that will conduct a current, and above the level of the salt solution in one leg of the U tube 3 are 2 electric terminals 9 and 9a, the ends of which are at a slight level above the level of the salt solution.

These electric terminals are held in position by means of insulator 5 and are in circuit with an electric current so that if pressure is exerted on the salt solution in the U tube the level of the salt solution will rise forming a contact with terminals and electric current will pass through a telephone switch-board drop 12 and thereby release drop element 12a and pin 13. The plunger 18 in metal cylinder 16 is set in position by drawing upwardly by means of eyelet 27 so that the spring 22 is held at a tension between the nut 21 and the washer 23. While the spring is at a tension the plunger 18 is rotated so that the

washer **23** is supported by trigger **28** and held in a set position (see Fig. 3). Trigger **28** is held in position by wire **30** which is held at a tension by being fastened on pin **13** on drop element **12***a*.

In operating this device the liquid in viscosimeter **1** is started to run into an empty viscosimeter flask **2** and at the start of the flow of liquid the stop watch **26** is started. As the liquid fills the viscosimeter flask **2**, the end of the tube **3***a* is covered and a pressure is exerted on the salt solution in tube **3** which raises the level of the salt solution in one of the legs of U tube **3** so that an electric circuit is closed allowing the current to act on the telephone switch-board drop, moving the bar **14** upward so that drop element **12***a* and pin **13** are released and at the same time the tension on wire **30**, which allows the lower end of trigger **28** to move outwardly from its position and causing the upper end to slip away from under washer **23**.

On release of the washer **23** from the support **28**, tension of the spring moves the plunger **18** downwardly and forces the cork **24** against the stem **25** of the stop watch and stops the watch from registering any further, and the reading on the dial of the stop watch registers the viscosity.

By means of this automatic viscosimeter device the personal element which generally leads to different readings is removed so that viscosities may be determined more accurately. The constant attention of the operator is likewise not required as once the apparatus is started to operate no further attention is required save taking the final reading.

Variations in form, operating means, dimensions and relative arrangement of parts which do not materially affect the mode of operation or result are intended to be included within the scope of this invention.

I claim:

1. In an apparatus for making viscosity determinations, a flask and a timing device, a U-tube, an extension of one leg thereof positionable within the flask, electric contacts positioned within the other leg of said tube, means connected to the electric contacts and including an electric circuit for stopping the registering of the timing device, and an electric current conducting liquid in the U-tube immediately below the contacts, whereby the rise of liquid in the flask above a predetermined level will compress the gas in the extended leg of said U-tube displacing the conducting liquid upwardly in the other leg to close the electrical circuit and cause the means to stop the registering of the timing device.

2. Apparatus according to claim 1 in which the means connected to the electrical contacts for stopping the registering of the timing device comprises a tubular casing rigidly suspended over the timing device, a plunger in the casing, a spring associated with the casing and with the plunger and compressed when the plunger is drawn upward, a trigger pivotally mounted to the casing engaging the plunger in its raised position, said trigger being actuated by a switchboard drop, included in the electrical circuit, to release the plunger which engages the timing device in such manner as to interrupt the registering thereof.

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