

F. KAHRS, DEC'D.

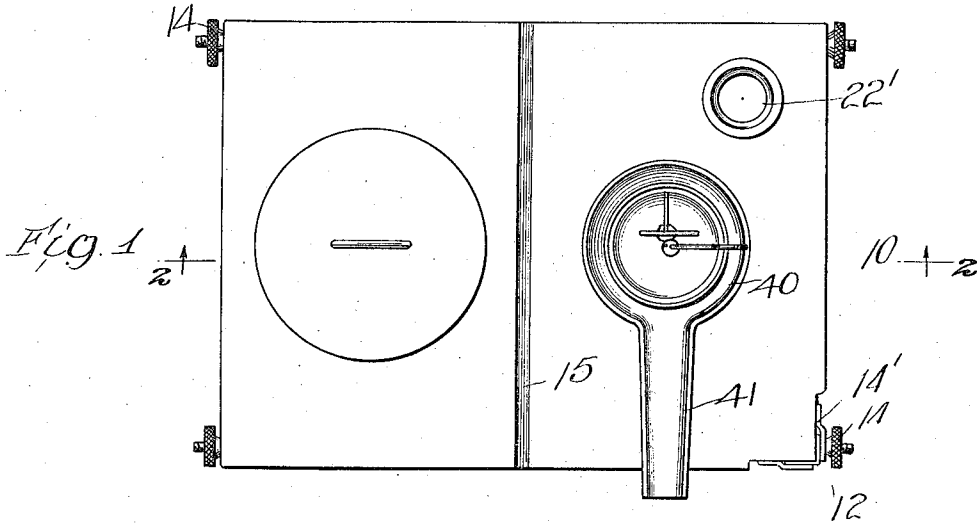
M. KAHRS, EXECUTRIX.

VISCOSIMETER.

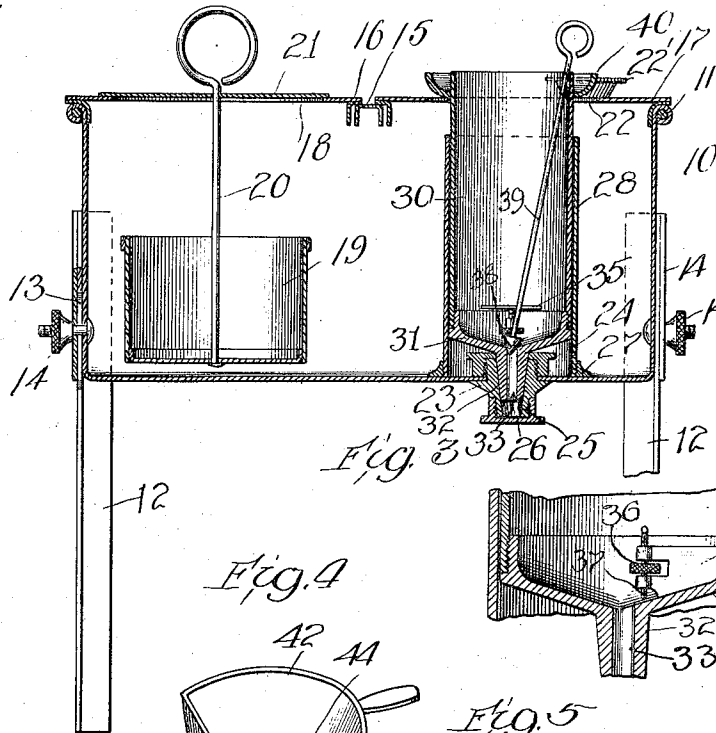
APPLICATION FILED FEB. 5, 1910.

1,062,159.

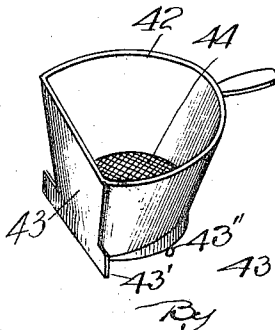
Patented May 20, 1913.



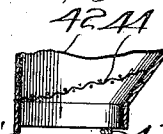
*Fig. 2*



*Fig. 4*



*Fig. 5*



Witnesses:  
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# UNITED STATES PATENT OFFICE.

FRIMAN KAHRS, OF EAST HADDAM, CONNECTICUT; MARIE KAHRS EXECUTRIX OF  
SAID FRIMAN KAHRS, DECEASED.

## VISCOSIMETER.

1,062,159.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed February 5, 1910. Serial No. 542,252.

*To all whom it may concern:*

Be it known that I, FRIMAN KAHRS, a citizen of the United States, residing at East Haddam, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Viscosimeters, of which the following is a specification.

My invention relates to improvements in viscosimeters or appliances for determining the body-flow of liquids and has for its general object to provide a simple, cheap, efficient, and easily operated instrument of the character described.

One of the special objects of my invention is to provide a viscosimeter in which substantially the entire material of the body undergoing test, and the entire test passage through which the tested material passes, will be under a practically uniform heat condition.

Another object of the invention is to provide a construction in which the reading level within the receptacle for the test material is visible from the outside and the reading is taken by the level-gaging part breaking through the surface of the material.

A further object is to provide a construction in which the reading is taken from the open upper end of the material receptacle unobstructed by the interposed body.

Other objects are to provide for removal and replacement of the measuring receptacle in its bath without disturbing or emptying the bath, to provide for ready changing of the aperture in the receptacle, to provide for protection of the bath from contamination by overflowing material from the receptacle, and to provide for the effecting of easy and accurate filling, leveling, and other manipulations incident to the operation of viscosimeters, and to improve the construction in general and detail.

In the drawings, Figure 1 is a plan view of a viscosimeter embodying my invention; Fig. 2 is a central vertical section there-through on the line 2—2 of Fig. 1; and Fig. 3 is a fragmentary section enlarged of a nozzle and guide; Fig. 4 is a perspective view of the filter; and Fig. 5 is a detail cross section through its bottom portion.

In the embodiment of my invention shown, I provide a sheet metal casing, 10, generally of rectangular construction; with

a beaded upper edge, 11, such casing being preferably mounted on adjustable legs, 12, of any suitable construction, such as small angle bars slotted as at 13 for engagement with thumb screws, 14, carried by the casing, the legs being vertically guided in clips, 14'. On these legs may be set the casing above a Bunsen burner, or other heat supplying source, not shown.

The open top of the casing 10 is divided transversely by a bridge, 15, to afford support for the adjoining edges of two cover members, 16 and 17, each flanged to fit in its appropriate half of the top opening. The cover 16 has therein an opening, 18, of suitable dimensions to permit the passage of a dipper, 19, mounted on a stem handle, 20, the stem carrying a cap, 21, which, when the dipper is lowered into the opening 18, covers the opening and supports the dipper at proper level within the interior of the casing. The other cover member, 17, has therein an opening, 22, for the materials receptacle and a thermometer-receiving opening, 22'. The bottom of the tank below the middle of the cover has made there-through a suitable small opening, affording passage to a nozzle-receiving bushing, 23, having a screw-threaded part projecting into the interior of the casing and receiving a clamping nut, 24, which also affords a solid shoulder for the reception of the materials receptacle to be described. The nozzle bushing 23 at its outer end is exteriorly threaded, as at 25, to receive a cap, 26.

Concentric with the nozzle bushing, 23, upon the inner surface of the bottom of the casing is mounted a threaded annulus, 27, which may be brazed, soldered, or otherwise secured to the bottom, the interior threads of the annulus 27 receiving an exteriorly threaded guiding cylinder, 28, extending to a suitable height in the casing. The guide member, 28, provides an annular vertical guide and support for a cylindrical receptacle, 30, which extends up through the opening, 22, in the cover 17 when in operating position. The upper end of the receptacle 30 is open, or the receptacle is otherwise arranged to afford a view of its contents from above the surface level. The lower end of the receptacle is provided with a detachable head, 31, screw-threaded therein, and from the head projects a central nozzle extension 32 having a properly cali-

brated measuring aperture, 33, extending therethrough, the nozzle being arranged to extend into the nozzle bushing, 23, to a point somewhat above the bottom thereof.

5 These parts may be of any suitable materials, but for the materials receptacle I prefer to use a white metal with a burnished surface for good light reflecting qualities, or otherwise construct the receptacle to insure ample interior lighting. Obviously

10 any number of heads, 31, with different sized nozzle apertures, 33, may be provided, the heads being interchangeable and the nozzles all having preferably approximately

15 the same outside diameter.

Upon the head, 31, is provided a thin radial fin, 34, on which is mounted the reading bar, 35. The bar 35 may be permanently secured in position and may be

20 adjustable, as indicated, in the specific construction shown adjustment being effected by a nut, 36, working in the slot in the fin and engaging a threaded stem, 37, of the bar, 35.

38 indicates a stopper for the nozzle aperture 33 mounted on a stem, 39, of a length suitable to extend out of the receptacle for manual operation.

The receptacle at its upper end carries

30 a dished ring or rim, 40, having a channeled extension, 41, leading past a side of the casing. In conjunction with the apparatus described I provide a filling strainer, 42, preferably in the form of a funnel, having a flat side, 43, extending down to form

35 a scraper, 43', which with a parallel wire, 43'', may support the strainer on the top of the receptacle, 30, said funnel having detachably located therein, a filtering body,

40 44, preferably of fine wire fabric and preferably disposed at an angle to the horizontal, as shown in Fig. 5.

In the operation of the viscosimeter, the casing is filled with water which is brought

45 to the desired temperature the heat of the water being of course imparted to the metal structure immersed therein or containing the water and so heating the relatively large metal mass constituting the permanent nozzle bushing as well as the immersed materials receptacle and the material therein. Thus substantially all of the operating parts are brought to and may be maintained at a practically uniform temperature and

50 throughout its entire traverse of the receptacle and guide aperture, the liquid undergoing test is under uniform temperature conditions. This heating of the nozzle structure is here possible because no reading

60 is to be taken through the nozzle, and it need not, therefore, be exposed or transparent. In filling the materials receptacle, the cap 26 is removed and the stopper, 38, inserted to close the gage aperture or passage, 33. The material to be measured is

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then filtered through the filter dipper into the receptacle 30 to completely fill the same and the convex top heap of a heavy liquid may be removed by using the flat edge, 43' of the filling filter as a straight edge and sweeping the surplus material off with it

70 into the channel rim 40 from which such excess material flows out through its channel extension 41 to any suitable receptacle disposed to receive it. Thus the liquid within the measuring receptacle may be brought

75 to a perfect level. The stopper 39 is then removed from the measuring aperture and the time of the flow is taken as usual, the reading of the final limit of flow of the liquid being taken as observed from above,—in this instance,—through the open end of the materials receptacle and being gaged by the time when the reading bar 35 breaks through

80 the surface of the material. The smooth burnished walls of the receptacle and relatively wide open top give ample light and an unobstructed view aperture for the purpose, and I have found this arrangement for reading to be accurate and satisfactory in

85 many particulars. In cleaning the materials receptacle, where materials removable by water have been tested, water from the bath may be used to flush the receptacle without disturbing its temperature, the dipper, 19, being used to convey the water from the bath to the materials receptacle.

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It will be obvious that all of the parts of the structure are simple, easy of manufacture, may be readily put together and taken

100 apart, may be made interchangeable in different instruments, and facilitate commercial or scientific use of the device.

What I claim is:

1. In a viscosimeter, a materials receptacle

105 having a bottom delivery outlet, and a wide open horizontal top opening through which the upper surface of the materials therein contained is visible at any level, said opening constituting the upper reading level, a

110 radial web in the bottom of said receptacle extending from one side thereof inwardly, a vertical stem movably mounted upon the inner edge thereof, a gage member upon the upper end of said stem at a level above the

115 web but considerably below said reading level, the lower end of said stem being screw-threaded, and a screw for micrometer adjustment of said gage member to determine an exact lower reading level.

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2. In a viscosimeter, a materials receptacle having a bottom delivery opening and a horizontal top opening of the full width of the receptacle interior, said opening constituting the upper reading level and being the

125 opening through which to view the descending surface of the material when the viscosimeter is in operation, a suitable gage located centrally within the receptacle near its bottom visible from said wide top opening

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ing when it breaks through the descending surface of the material, and a radial web extending from a wall of said receptacle inwardly and tending to prevent rotation of the material around said bottom outlet, said web lying wholly below the reading level determined by said gage.

3. In a viscosimeter, a materials receptacle comprising a cylinder open at its top end and having its top edge arranged to indicate the upper reading level, a nozzle detachably secured to the lower end of said cylinder, and a lower reading gage member carried by said nozzle member and located adjacent the axis of the cylinder.

4. In a viscosimeter, a water tank, a materials receptacle penetrating said water tank provided with a nozzle opening through the water tank, and a body of material of good heat conductivity surrounding said nozzle throughout the length to impart thereto the water heat.

5. In a viscosimeter, a heating tank having alining top and bottom openings, a heat conductive nozzle bushing in the bottom opening, a receptacle extending through the top opening provided with a bottom gage nozzle entering and terminating within the nozzle bushing.

6. In a viscosimeter, a tank having alining top and bottom openings, a nozzle bushing in the bottom opening, a receptacle extending through the top opening provided with a bottom nozzle entering the nozzle bushing, and a detachable closure for the lower end of the nozzle bushing.

7. In a viscosimeter a water tank, a receptacle supported in said water tank having a nozzle opening through the bottom of the tank, the top of said receptacle extending above the opening, and a channel

member surrounding the projecting top of the receptacle for receiving an overflow therefrom, said channel member having its top edge below the top of the receptacle and having a spout extension projecting beyond the edge of the tank.

8. In a viscosimeter, a water tank, a materials receptacle therein provided with a delivery outlet and a filling opening, a cover for the water tank having an opening therein for a dipper, a dipper arranged within the tank, and a plate carried by the dipper for closing said opening in the cover.

9. In a viscosimeter, a heating tank having an apertured heat conducting bushing a receptacle in the tank having an apertured gage nozzle seated in and terminating within said bushing aperture, the nozzle aperture being of less diameter than the bushing aperture.

10. In a viscosimeter, a tank having a taperingly apertured bushing in its bottom, a receptacle within the tank having a tapering nozzle extending into the bushing aperture but terminating above the bottom level of said bushing aperture, and contacting with the bushing.

11. In a viscosimeter, a tank having an apertured bushing in its bottom, a receptacle within the tank having a nozzle extending into the bushing aperture but terminating above the bottom level of said bushing aperture, and contacting with the bushing, and a closure for the bottom of the bushing aperture.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

FRIMAN KAHRIS.

In the presence of—

GEO. T. MAY, Jr.,

MARY F. ALLEN.