June 19, 1923. 1,459,262

C. R. RODE

VISCOSIMETER

Filed Nov. 22, 1920

Fig. 1.

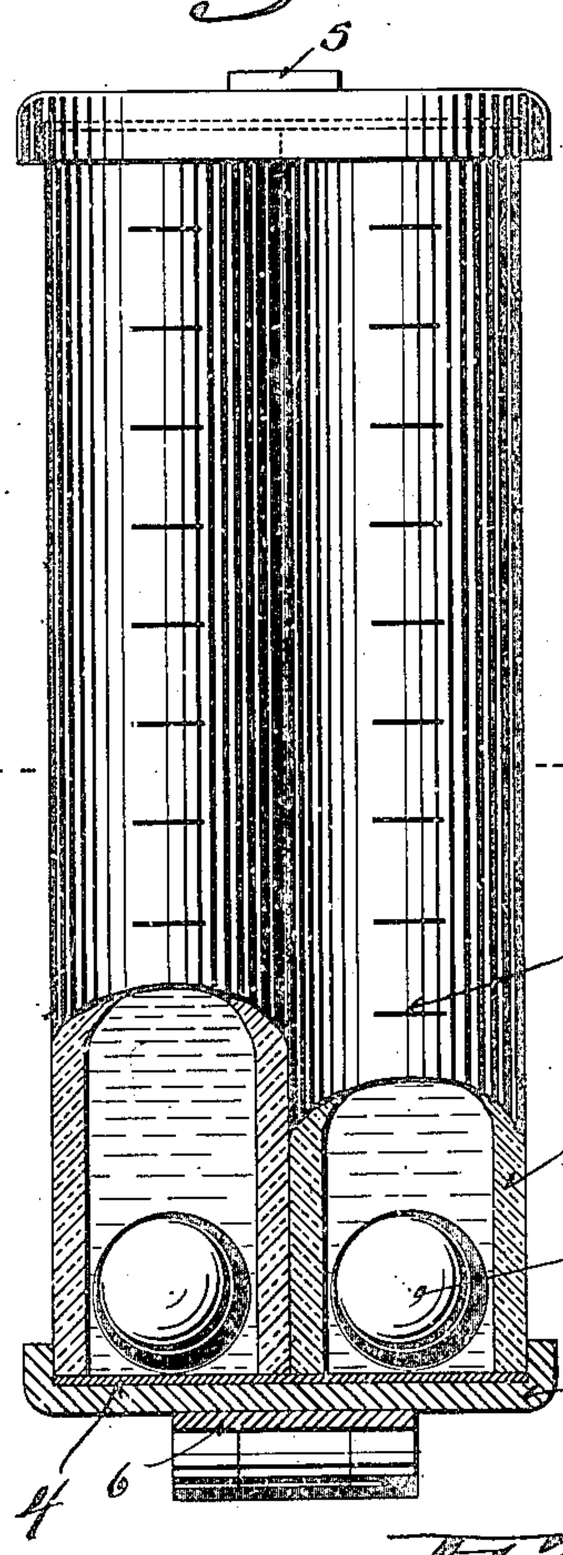


Fig. 2.

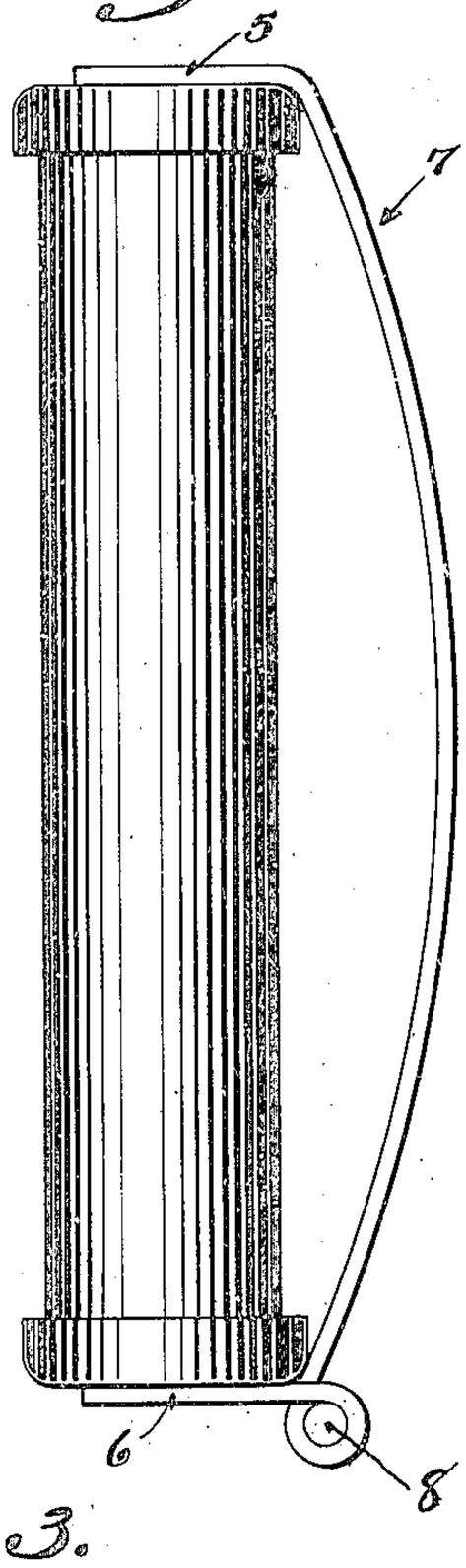
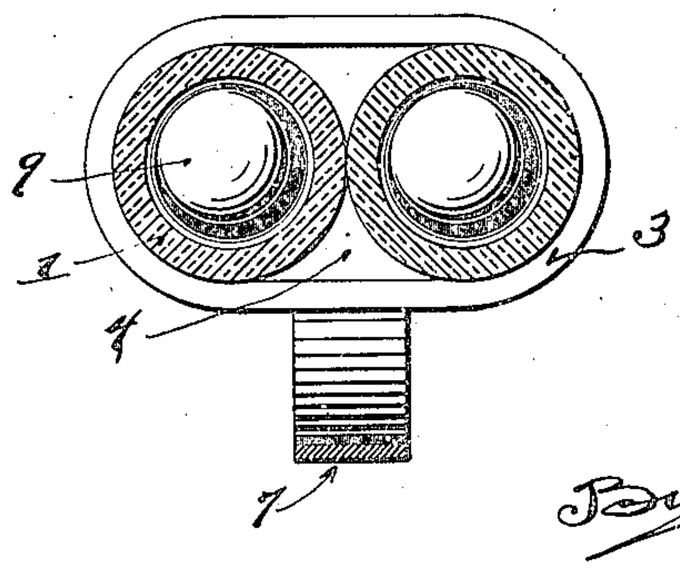


Fig. 3.



Witness:
R. C. Weber

Inventor
Charles R. Rode
By Young & Young
Attorneys:

Patented June 19, 1923. 1,459,262

UNITED STATES PATENT OFFICE.

CHARLES R. RODE, OF LIMA, OHIO.

VISCOSIMETER.

Application filed November 22, 1920. Serial No. 425,697.

To all whom it may concern:

Be it known that I, CHARLES R. RODE, a citizen of the United States, and resident of Lima, in the county of Allen and State of Ohio, have invented certain new and useful Improvements in Viscosimeters; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to new and useful improvements in devices for obtaining the relative viscosity or body of different liquids, most especially oils.

The primary object of this invention is to provide a simply constructed viscosimeter which can be readily operated by the average person for testing the characters of different types of oils and the like.

An additional object of the invention is to provide a device of this character whereby the relative viscosity can be readily obtained by observing the passage of an object through a body of the liquid which is to be tested.

A further object of the invention is to provide a simply constructed viscosimeter, which can be formed of one or more transparent tubes having suitable non-buoyant objects therein, and provided with end closures held in place by an improved combined resilient retaining member and handle.

With these general objects in view, the invention resides in the novel features of construction, combination and arrangement of parts which will be hereinafter more particularly described and claimed.

In the accompanying drawings:

Figure 1 represents a side elevational view of a device constructed in accordance with the invention, parts thereof being broken away and shown in section.

Figure 2 is likewise an elevational view, but taken substantially at right-angles to Figure 1.

Figure 3 is a transverse sectional view on the plane of the line 3—3 of Figure 1.

Referring more particularly to the illustrated embodiment of the invention, it may be seen that the same includes one or more (two being shown) transparent tubes 1 open at their opposite ends and provided with graduations 2 for forming a suitable scale. All of the tubes forming a single device are of the same internal diameter and length so that they will contain the same quantities of liquids. A closure cap 3 is disposed over the corresponding ends of the tubes 1, the liquid therein being retained against leakage by packing plates 4.

One of the closure caps may be secured to the adjacent ends of the tubes, but the other is removable to permit the tubes to be filled and emptied. In both cases the caps are preferably secured to the laterally extending opposite end portions 5 and 6 of a retaining strip 7. The portion of the strip between the laterally extending ends 5 and 6 is outwardly bowed or arcuate as shown in Figure 2, thus procuring a considerable resiliency and forming a simple, yet efficient handle. Additional flexibility and resiliency of the retaining strip 7 is obtained by the hinged structure 8 which connects the handle portion and the end portion 6.

Any suitable object may be placed in each of the tubes 1 for movement by the action of gravity through the liquid therein from one end to the other. In the preferred form of the invention spherical members 9 are used, the same being of a diameter only slightly less than the inner diameter of the tubes. These spherical members or balls cooperate with the graduations 2, which are formed from each of the tubes 1.

There are various ways of using the principles of the invention, these depending particularly on the number of tubes which are employed. For instance, if one tube is used the liquid to be tested is placed therein together with the ball 9 and the ends closed. With the ball resting on one of the closures, the tube is quickly inverted and the length of time it requires for the ball to settle to the bottom is noted, and this time compared with standard figures which have been prepared from oils of different standards of viscosity under similar conditions will show the relative viscosity of the tested liquid.

When two of the tubes are employed as in the accompanying drawing, one of the tubes may be filled with an oil of known viscosity while the other tube is filled with a quantity of oil of unknown viscosity. After the closures are in place the tubes are inverted as before and the balls permitted to settle to the bottoms thereof. The difference in the speed of movement of the balls will determine the relative viscosity of the two liquids. Any other combination of tubes may be used for carrying out different features of testing.

I claim:

1. In a meter of the class described, the

combination of a pair of like tubes arranged in a common holder with their axes parallel, one containing a fluid of a given standard viscosity, the other adapted to contain the fluid to be tested, and an identical non-buoyant object in each tube, whereby the relative viscosity of the fluids may be determined by the relative times of transit of said objects through said tubes.

2. In a meter of the class described, a plurality of like tubes secured adjacent and parallel to each other, one containing fluid of a given standard of viscosity, the other adapted to contain a fluid to be tested, a closure for each end of each tube, and identical non-buoyant objects, one being disposed in each tube, and movable thru the fluid therein, said objects being adapted to travel from corresponding ends of the tubes to the other ends and thru the fluids to determine the relative viscosity of the latter.

3. In a meter of the class described, a tube adapted to contain a fluid to be tested, a non-buoyant object in said tube movable from one end to the other through the fluid therein, a closure for each end of the tube, a resilient retaining member having its opposite ends engaged with the closures and its intermediate portion outwardly bowed to procure resiliency and to form a handle.

In testimony that I claim the foregoing I have hereunto set my hand at Lima, in the county of Allen and State of Ohio.

CHARLES R. RODE.