J. F. STEIGER.

RECORDING HYDROMETER.

APPLICATION FILED MAY 20, 1912.

1,067,073. Patented July 8, 1913.

Fig. 1.

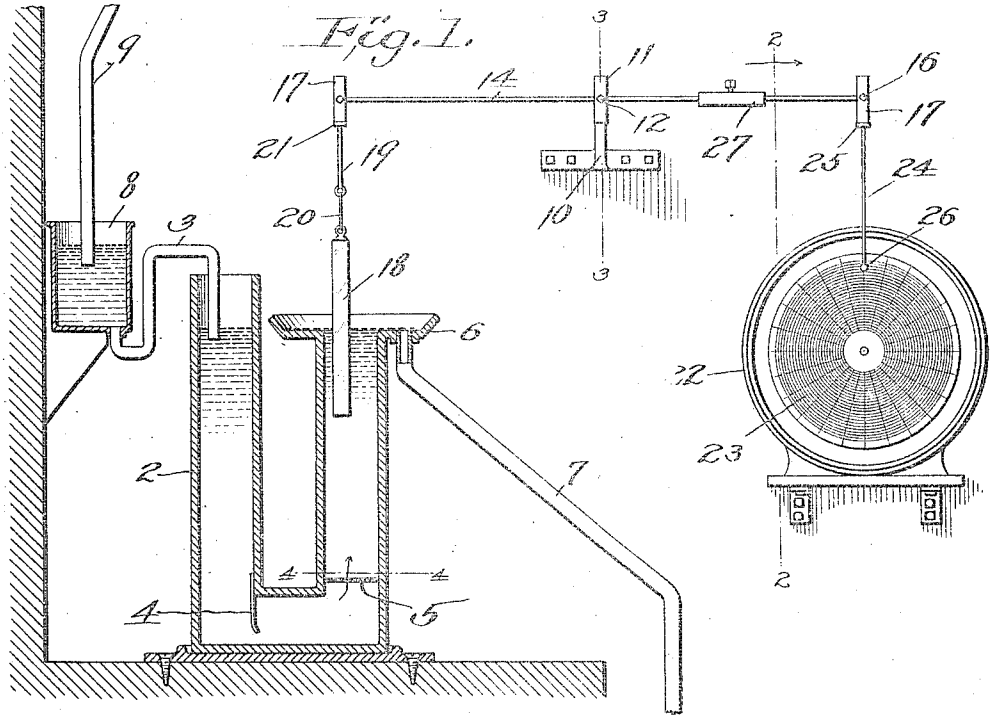


Fig. 2.

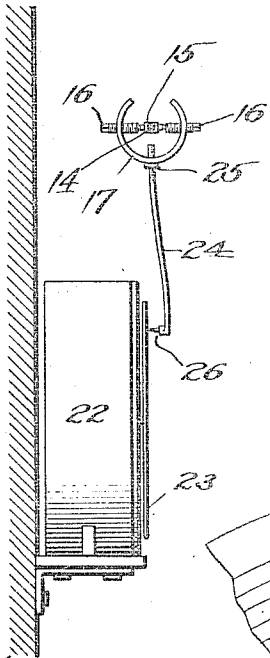


Fig. 3.

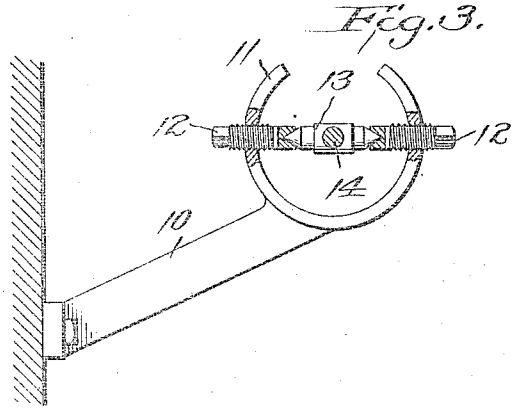
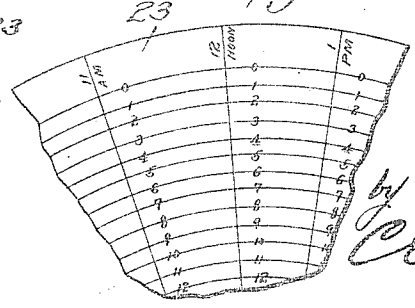


Fig. 4.



Witnesses

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RECORDING-HYDROMETER.

1,067,073 Specification of Letters Patent. **Patented July 8, 1913.**

Application filed May 20, 1912. Serial No. 698,544.

To all whom it may concern:

Be it known that I, JACOB F. STEIGER, a citizen of the United States, residing at East St. Louis, in the county of St. Clair and State of Illinois, have invented a new and useful Improvement in Recording-Hydrometers, of which the following is a specification.

This invention relates to a recording hydrometer designed to record the strength of liquid passing through a by-pass connected with the tank from which said liquid is drained. By means of this construction it can be readily ascertained what the average specific gravity of the liquid employed runs during the day. Such a device will be useful in refineries and other manufacturing plants where the specific gravity of a liquid will indicate its strength.

The invention consists of the novel features of construction hereinafter described, pointed out in the claims and shown in the accompanying drawings, in which,

Figure 1 is a side elevation partly in section illustrating a simple form of the invention. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a face view of a portion of the dial.

In these drawings, 1 represents a suitable tank adapted to contain the liquid to be tested. Arranged adjacent said tank is an upright U-shaped tube 2, which may be of glass, and leading from the tank and discharging into one leg of the tube downwardly is a small pipe 3. In the bow portion of the tube 2 and in the lower portion of the first mentioned leg is a baffle plate 4, which serves to thoroughly mix the liquid, as otherwise the lighter portion would pass through the bow portion and rise upwardly in the other leg of the tube leaving the heavier portion to settle in the lower part of the tube.

In order to diminish velocity of the flow and cause the liquid to pass slowly and evenly through the tube a perforated plate 5 is placed in the second mentioned leg of the tube, said plate having perforations of a diameter of one thirty-second of an inch. This last mentioned leg is provided at its upper end with a suitable annular drain cup 6, and slightly shorter in length than the first mentioned tube. The liquid overflowing into the drain pipe 6 will drain back to the pipe through a pipe 7.

In order that the vibrating pressure often caused by a pump may be obviated, I prefer to interpose a small supplemental tank 8 and run a pipe 9 from the pump to the small tank 8 and then angle the pipe 3, forming it U-shaped as shown in Fig. 1. In this manner the pump vibrations are eliminated from the liquid in the U-shaped tube 2.

Arranged upon a wall or other suitable support is a bracket 10 which carries a semicircular ring 11 at its free end and threaded adjustable bearing blocks 12 are arranged in said ring, and a suitable bearing block 13 has its pointed ends mounted in needle bearings formed in the inner ends of the blocks 12. This block 13 carries a rod 14, said rod being adapted to swing vertically as the block 13 rocks upon its bearings. At each end of said rod are bearing blocks 15, one of which is shown in Fig. 2, and said blocks terminate in needle points which rest in bearings formed in adjustable threaded plugs 16, and said plugs are threaded through opposite sides of a semicircular ring 17. The ring 17 and the parts connected therewith are substantially similar to the ring 11 with the exception that the ring 11 is carried at the end of a fixed bracket 10, whereas the rings 17 are hung upon the ends of the rod 14, and therefore swing vertically with said rod. The ring 17 which is in vertical alinement with the shorter leg of the tube 2 supports a hydrometer 18 of any desired type, the same being preferably connected to the ring by a rod 19 threaded into the lower portion of the ring and terminating at its lower end in an eye, and a thin wire 20 connects the eye with the hydrometer with the eye of said ring. A suitable lock nut 21 is employed in connection with the threaded portion of the rod. Arranged in vertical alinement with the other ring 17 is a suitable clock 22 provided with a rotatable dial 23. This ring also carries a depending rod 24 the upper end of which is threaded into the ring to allow for adjustment and is secured by a suitable nut 25. This rod is slightly curved outwardly and at its lower end a suitable pen 26 or marking device of any kind, which is adapted to bear upon the face of the dial 23. It will be noted that the rod 14 is above the dial and the slight curvature given to the rod 24 is sufficient to cause the point to always bear upon the dial 23. As shown in Figs. 1 and 4 this dial is laid off in segments each of

which represents a certain duration of time, as for example one hour.

The time is suitably designated in the margin of the dial, as in Fig. 4, and the dial is also provided with a number of concentric circles, the outer one of which is marked zero and the remainder of them are numbered consecutively, and in ordinary practice will run as high as 33. Between the bracket 10 and the ring 17 above the clock dial an adjustable weight or counter-balance 27 is placed upon the rod 14. It will be noted therefore that by threading the rods 17 and 24 I provide for adjustment of the hydrometer and pen, and by providing the weight 27 I allow for the counter-balancing of such adjustment or for any other fluctuation which might make it necessary to balance the rod 14 and the parts suspended therefrom.

To operate, start and adjust the recorder, liquid is admitted to the small tank 8 and through the pipe 3 into the tube 2. The intake leg of the tube is higher than the other one in order to allow foam to settle. The liquid is thoroughly mixed by the baffle plate 4 as otherwise the higher portion of the liquid would pass through the upper portion of the bow while the heavier portion would settle in the bottom of the bow portion of the tube. The perforated plate 5 breaks the upward rush of the liquid and removes any vibrations which might be caused by discharge of the liquid from the pipe 3 and rod which might affect the rise and fall of the hydrometer. The dial upon the clock is assumed to make one rotation every twenty four hours. In starting the device, I prefer to find the specific gravity of the liquid with an ordinary hydrometer, the steady flow of liquid is then started through the hydrometer, and the same adjusted in accordance with the test made by the ordinary hydrometer. Having secured a steady flow the weight 27 is adjusted to balance the tendency upon the part of the liquid to lift the hydrometer to a greater height than it should normally rest. It will then accurately record upon the dial the different changes in the specific gravity of the liquid during the day's run.

What I claim is:—

1. In a device of the kind described a U-shaped tube, one leg of which is of a less height than the other, and the upper end of which is provided with an annular drain cup, a perforated plate arranged in and adjacent the lower end of the said leg, and a depending baffle plate carried by the other leg and extending downwardly partly across the bow portion of the tube.

2. A device of the kind described comprising a U-shaped tube, a small tank arranged adjacent the intake leg of the tube, said intake leg being the higher, an inverted U-shaped pipe leading from said tank and discharging downwardly into the upper end of said intake leg, a cup carried by the upper end of the other leg of the tube, a drain pipe leading from said cup, and a supply pipe discharging into said smaller tank, said smaller tank eliminating vibrations from a pump and passing the liquid by gravity to the intake leg of the tube.

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Witnesses:
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