2 Sheets—Sheet 1.

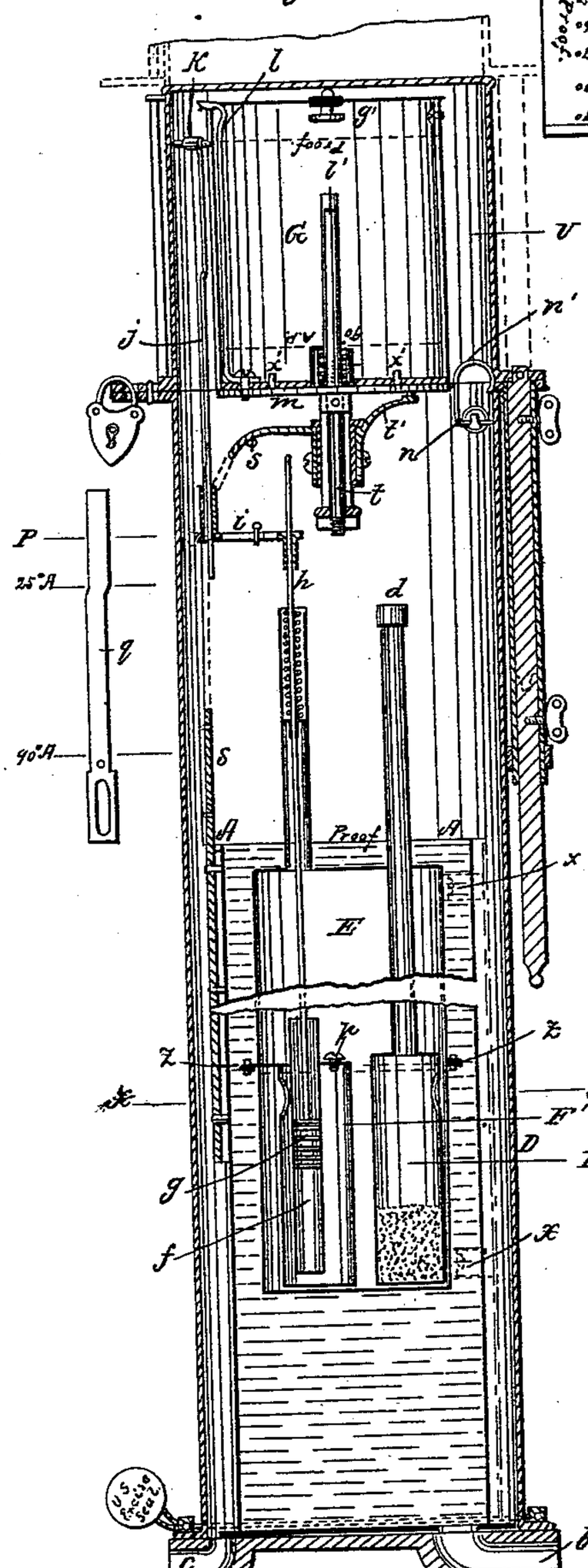
W. MONT STORM.

Proof Meter and Register for Alcoholic Spirits and other Liquids.

Patented May 7, 1867.

No. 64,456.

Fig: 1.



Witnesses:

Jas. F. Hughtman

C. J. Ferguson.

Fig: 3.

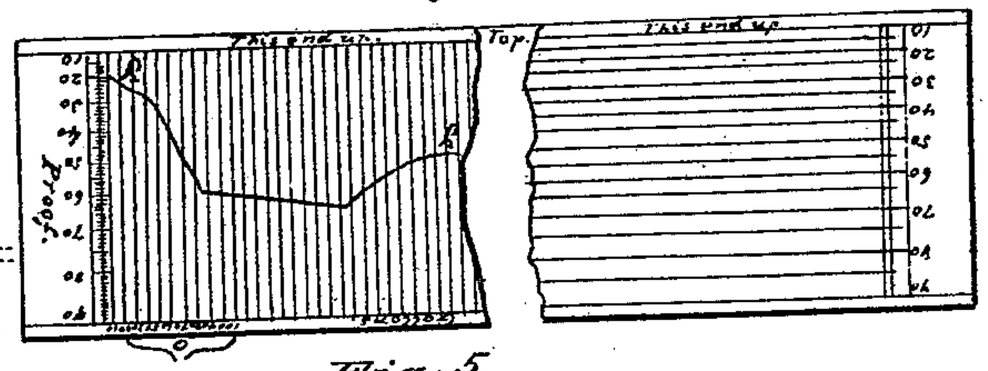


Fig: 5.

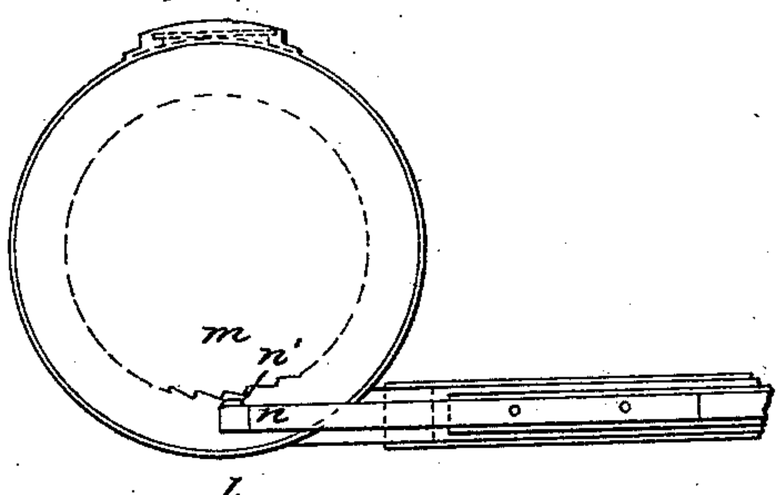


Fig: 4.

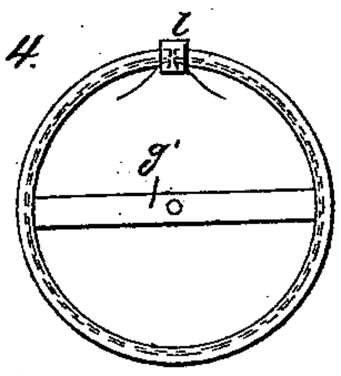


Fig: 7.

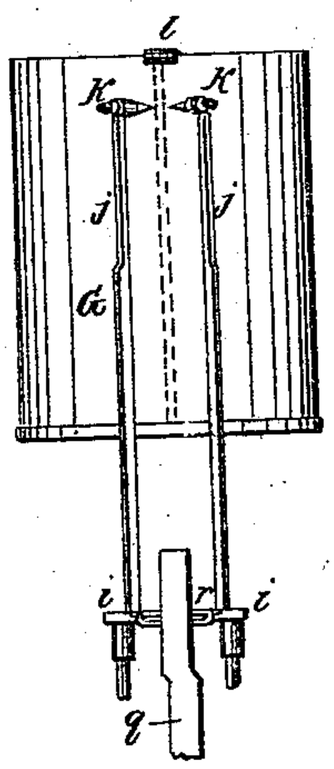


Fig: 2.

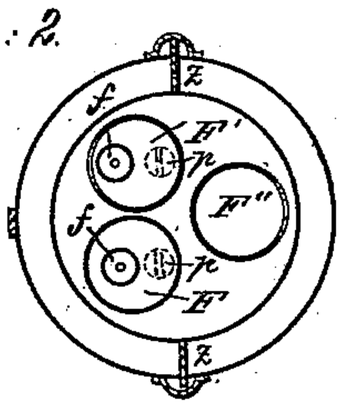
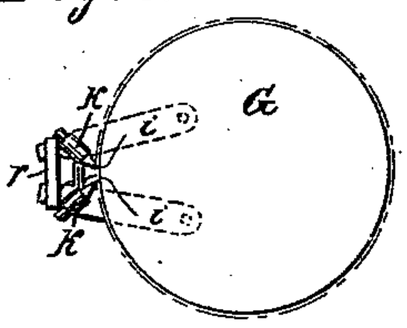


Fig: 6.



Inventor:

W. Mont Storm.

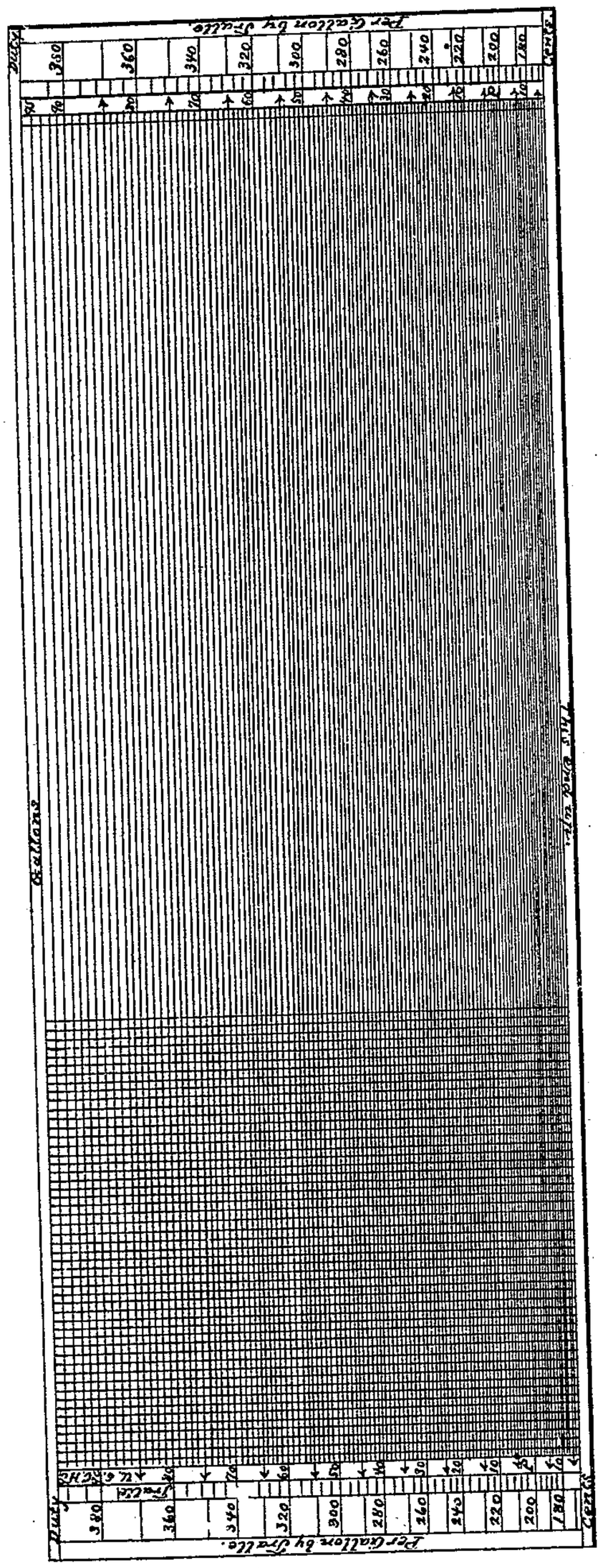
2 Sheets—Sheet 2.

W. MONT STORM.

Proof Meter and Register for Alcoholic Spirits and other Liquids.

No. 64,456. Patented May 7, 1867.

Fig. 2.



Witnesses:
Jas. L. Wightman.
C. J. Ferguson.

Inventor:
Wm. Mont Storm.

United States Patent Office.

WILLIAM MONT STORM, OF NEW YORK, N. Y.

Letters Patent No. 64,456, *dated May* 7, 1867.

IMPROVED PROOF METER AND REGISTER FOR ALCOHOLIC SPIRITS AND OTHER LIQUIDS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM MONT STORM, of the city, county, and State of New York, have invented a new and useful instrument which I term a Proof Meter and Register. It is intended to be attached to the worm of a still, and measure the strength by the specific gravity (and temperature) of the alcoholic liquors as they flow from it (the still.)

Figure 1 is a vertical central section of my instrument as a whole. The details may be variously modified without affecting the principle of my invention or instrument. A A is what I term a "well," into which, to overflowing, (for there is no other outlet,) a portion of the liquor passing through the worm of the still passes by the passage *b*. This vessel or "well" it will be perceived will always be full when in operation, as it can only be discharged by overflowing, and hence give a constant height or depth of the liquor at the moment of being tested by the automatic operation of the instrument. After overflowing from A the liquor passes down between it and the outer case D, (which encloses the entire working apparatus,) and escapes to any given receiving vessel by the passage *c*, to join with the main current passing from the still. In the well A is a float, E, arranged to rise and fall in guides, so that it may not turn or rock on its vertical axis. These guides consist of wings *x x*, Figure 2, on the float E, projecting into covered slots in the body of the well A, as seen. The same is shown at right angles to its proper position in fig. 1, in red. The bottom of E is closed perfectly tight by having screwed to it a plate, *z*, from which depend three cylinders, F F′ F″, figs. 1 and 2, the latter being a ballast-chamber, into which shot, sand, or mercury, for instance, may be poured through the tube, closed with a loose cap, *d*, to balance the parts supported by the float E. F F′ are filled with alcohol, and have projecting into each a smaller tube, *f*, which contains again a tight-fitting but easy-moving piston, *g*, from each of which projects upward a stem, *h*, which carries a horizontal arm, *i*, which again carries, as shown, (projecting upward,) a spring stem, *j*, at the upper extremity of which is a "holder" or socket to carry a small "indelible" pencil, *k*, which bears against a paper having on it certain printed lines, the purpose of which will be hereafter explained, and which paper is wrapped round a drum, G, substantially after the manner of that of a manometer used for taking diagrams from steam engines; the ends of such paper, which are represented by Figure 3, passing through a slit in the side of G, and being there held by the spring *l*, as will be understood by the drawings, fig. 1 and fig. 4, the red line in the latter figure representing the paper. Now this drum G is supported upon a horizontal ratchet-wheel, *m*, fig. 1 and fig. 5, in such manner that it must turn with *m*, (by means of two pins *x′ x′* projecting from *m* through its bottom,) but may be lifted from it and temporarily removed from the apparatus to take off and put on the diagrams, fig. 3, from time to time, as may be necessary. The ratchet-wheel *m* is driven by means of the rod *n* and pawl *n′*, it, in turn, being operated by the motion of some part of a quantity meter, or, in other words, a meter through which the liquor from the worm of the still passes first, and then a portion of which is led through the instrument herein described, substantially in the manner already explained, such meter being adjusted to receive and deliver at each double stroke a fixed number of gallons, say ten, and as at each double stroke it is to move the ratchet-wheel *m* one notch, each notch would represent ten gallons, and the vertical lines on the diagram, (see fig. 3,) being the same distance apart as the teeth on the ratchet-wheel *m*, the marks left by the pencils *k* crossing a given number of vertical lines on the diagram (fig. 3) would record a corresponding number of gallons that had passed from the still through the quantity meter, said lines having printed opposite them on the margin the number of gallons they represent, as at O, fig. 3. The diagram has further a series of horizontal lines printed upon it, which correspond to the degrees of a hydrometer, the float of which is constituted by E and which has been duly graduated. Now it will be perceived that the rise and fall of E carrying the pencils will mark the varying specific gravity and strength of the liquor passing through A upon the diagram, even if the pencils were fixed to E, provided the liquor were of a constant temperature, (the standard for excise purposes being 60° Fahrenheit,) but as an increase of temperature in liquor containing a given amount of alcohol would dilate the latter and decrease its specific gravity, E would sink and indicate a higher proof, and hence more alcohol in the liquor than would be the truth. By the law, in testing liquor for the excise the hydrometer is used to obtain its specific gravity, and then immediately the thermometer to ascertain its temperature, according to which a deduction or addition of a certain percentage is made to the indication of the hydrometer, according as the temperature of the liquor is above or below 60° Fahrenheit. For example,

for liquor which by the hydrometer exhibits strength ranging from 10° below proof, New York State standard scale, to 25° above proof, a deduction from the indications of the hydrometer of 7° of the hydrometer is made for every 20° of temperature above 60° Fahrenheit, and a corresponding addition for every 20° below 60° Fahrenheit, and when by the indication of the hydrometer the strength of the liquor is anywhere between 25° above proof and 100° above proof, (which would be pure alcohol,) a deduction or addition is correspondingly made of 6° of the hydrometer. Now F F′ being filled with alcohol, say at 60° Fahrenheit, (by removing screw *p*, figs. 1 and 2,) the alcohol will by its expansion, due to any increase of the temperature above 60° Fahrenheit of the liquor passing through, lift up the plungers G as will be understood, carrying upward the pencils, thus correcting the error, as will be hereinafter explained, that would be caused by the simultaneous sinking of E, and thus the indication of a higher "proof" (as explained) than the percentage of alcohol in the liquor would warrant. The quantity of alcohol in the vessel F and lower portion of the tube *f* is so proportioned as to elevate the piston *g* and its pencil *k* a distance, for every 20° Fahrenheit above 60°, equal to seven times the space embraced by the degree of mean length between 10° below proof to 25° above on the hydrometric scale to which the instrument and diagram have been adjusted, which therefore will cause a line to be drawn on the diagram showing the true average strength of the liquor as closely as by the present practice in testing. F′ is so proportioned as to lift its pencil through a distance equal to six times that of space embraced by the degree of mean length between 25° above proof to 100° above. Now as both pencils must not be in contact with the diagram at the same time, (as erroneously shown in Figure 6, which is a plan view of them,) the arms *i*, (see figs. 1, 6, and 7,) near their ends, bear against a guide or shifter shown separate but opposite to its proper position by *q*, fig. 1, and are held in contact with it by a spring, as the India-rubber band *r*, fig. 6. Now as E rises and falls, whichever pencil is in contact will be thrown out and the other into contact at 25° above proof by a horizontal movement of the arms *i* caused by the crook or offset in *q* at this point of the scale. *q* is supported against the standard S, which supports the wheel *m*, and its axle *t′* is a "detent" friction-pawl to prevent the wheel *m* from retrograde movement by the friction of *n′* as it draws back. The cover U of the apparatus is so arranged that it must be lifted vertically till its bottom clears the top of G, when it may be swung around horizontally out of the way. When in place U bears upon a set-screw in a cross-bar, *g′*, in G, (see figs. 1 and 4,) and holds it down upon wheel *m*, but when U is lifted the spring *v*, in a recess around the supporting spindle *v′* of the drum G, (see fig. 1,) lifts the latter a short distance, causing the pencil to make a vertical mark on the diagram, showing the precise point where the meter stopped, and preventing fraud by lengthening or shortening the diagram line the pencils had drawn. It will be perceived that the works of my apparatus cannot be reached, except G and the pencils, without removing case D, which is sealed at the bottom in the manner shown, and as will be understood, as also the object. D being independent, on its removal all working parts will be left in their relative positions for inspection.

The drawing shows my instrument half size of that I propose for use. The scale on the diagram, fig. 3, also is only represented from 10° to 90° above "proof," but is shown full size by Figure 8, sheet No. 2, and can receive the record, in one revolution of the drum G, of fifteen hundred and seventy gallons, but as it is infinitely improbable that the pencils would follow the same line on a second revolution, as the gravity of the liquor would not be the same at the same points, the diagram could without confusion be permitted to be carried twice around, receiving two "scores," and recording thirty-one hundred and forty gallons. I should have the connection between this instrument and the quantity meter "sealed" in the manner shown for D, the outer case, and I should have the connecting tube and case D well jacketed with a poor conductor of heat to prevent a loss of temperature in the liquor after leaving the quantity meter till it had left the "proof" meter. The diagram is to be placed on the drum G with the scale upside down, because, as will be seen, the higher the float and pencils are the greater will be the specific gravity of the liquor, and its "proof" and strength lower. It will be evident that not only the form but the motion of the parts of my instrument may be modified without changing the nature of the invention; for instance, the pencils could be arranged to revolve, and drum G could be carried up and down by the float E, &c. The paper used should be "sized" or otherwise prepared so that the warm vapor that would surround it should not soften it to an objectionable degree. My instrument, by slight changes of form and construction, may be used for various purposes, such as a proof meter and register for hydrocarbons, or as a salinometer, &c. I have anticipated the use of a third pencil that should mark on the diagram (say in red) the rise and fall of the temperature of the liquor passing through the instrument independently of the other pencils, and constituting a regular thermometer. It is supposed that each distillery using my instrument is visited each day by some authorized person who opens the instrument, takes off the diagram, numbers and dates it, &c., and replaces a clean diagram on the drum G, sees that the pencils are in proper order and position, &c. The pencil-holders, I should have remarked, are "tapped" with a screw-thread on their interior, so that the pencils may be screwed in or out, and thus adjusted to a nicety in regard to their contact with the diagram. A number of diagrams having been collected by such authorized person, they are supposed to be delivered at the internal revenue office, where there shall be a party or parties who calculate their value in regard to excise duty. Thus, suppose the black line *y y* to be the mark left by the pencils on the diagram, (see fig. 3.) It commences at 20° above proof and runs up to 60° above proof while passing over seven and a half of the vertical lines, denoting, therefore, seventy-five gallons. The mean proof of these seventy-five gallons is therefore 40°. In the margin of the diagram, (sheet No. 2,) is a convenient scale to refer to for the tax or duty on the said seventy-five gallons, which is four cents per degree of Tralle's scale, there shown. The calculation of the value of the remainder of the line *y y* will be understood from the above example.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is as follows:

1. I claim the float E acting as a hydrometer, and carrying a pencil or pencils or any equivalent, in combination with the drum G, covered with paper or some equivalent, rotating in contact with such pencil or pencils

or their equivalents, so that they shall describe a line denoting the varying specific gravity of the liquor flowing through the instrument.

2. I claim the diagram, figs. 3 and 8, in combination with my instrument having the hydrometer scale in horizontal lines upon it, and vertical lines to denote gallons, &c., as explained.

3. I claim having the pencils, independently of their rise and fall with the hydrometer or float E, acted upon by changes of temperature, substantially in the manner and for the purpose described.

4. I claim the use of two pencils acting in the manner and for the purpose explained.

5. I claim the use of the overflowing "well" A for the purpose described.

6. I claim the application of the spring *v*, or any equivalent device, for the purpose set forth.

Finally, I claim my instrument as a whole, its parts being constructed and operating together substantially in the manner and for the purpose explained.

WM. MONT STORM.

Witnesses:

JAMES GORTON, Jr.,

JAS. G. WIGHTMAN.