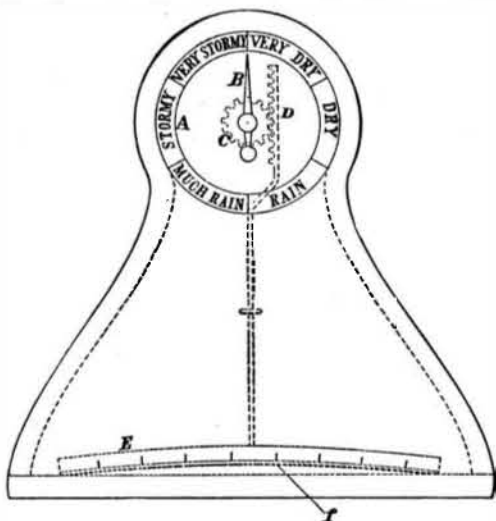


## IMPROVED BAROMETERS.

By EDMUND C. WAGNER, Fort Seneca, O.

A is a dial, with "dry," "very dry," etc., marked in margin. B, indicator made to revolve by the gearing C and D. The under part of the spring E is made of some close-grained, hard wood, not susceptible to dampness or moisture, and laid lengthwise with the grain, and very thin. The upper part *f* is composed of some soft, spongy wood, very susceptible to dampness or moisture, and about three times as thick as the under part, laid crosswise with the grain—that is, the grain of the under part and the upper part forming right angles—with two or more slots or grooves running through the upper part *f* of the spring lengthwise to admit the atmosphere. In the presence of moisture in the atmosphere, which precedes



all rains, the upper part of the spring immediately absorbs the moisture, thus causing it to swell or stretch, while the under part will remain comparatively the same, and the spring will commence to bulge or raise up in the middle, thus moving the gearing C and D, which moves the hand around on the dial toward "rain," etc. In the absence of moisture, the upper part will begin to contract or shrink, and the hand will move backward toward "dry," etc.

It is a well-known fact that moisture penetrates wood much more rapidly from the ends than from the sides; hence the slots or grooves *g*, cut lengthwise through the spring and across the grain of the soft or porous part *f*, by this means exposing to the action of the atmosphere more surface than could be done in any other way.

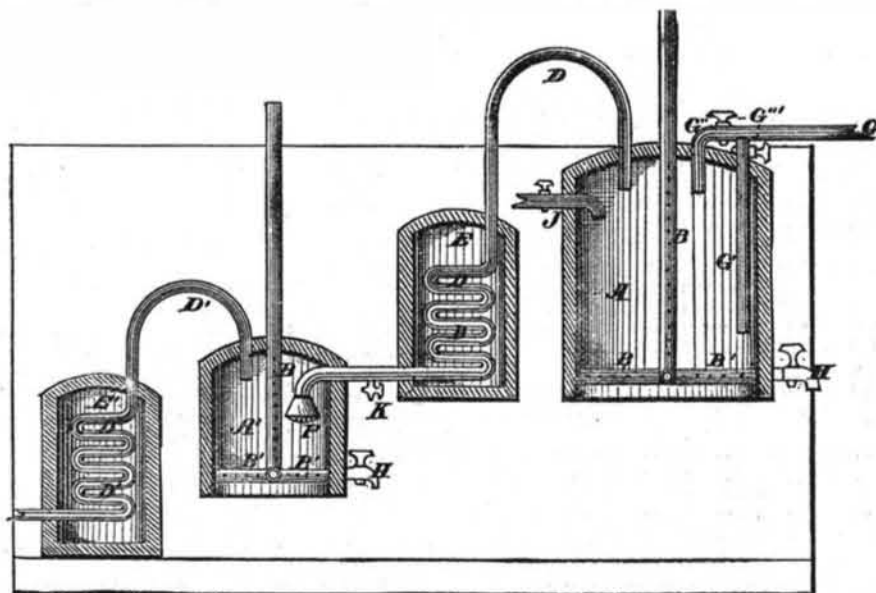
It will be seen from the foregoing that Mr. Wagner's device is a hygrometer; not, as he supposes, a barometer.

## SEPARATION OF PETROLEUM PRODUCTS.

By JAMES COLE, JR., Cleveland, O.

APPARATUS for effecting a separation of crude petroleum into various distillates, the operation being continuous.

The still A being charged with the liquid, such as petroleum or any one of its distillates, or the residual product left after a partial distillation of petroleum, steam is passed through the pipes B B', which we will suppose to be perforated, as shown. As the liquid warms, the lighter and more volatile products will be volatilized and passed over, the very lightest passing over with a very moderate heat, and, as the heat is increased, the heavier and more condensable products successively vaporize and pass over. If steam or air blast through the pipe G is employed, these volatilized products, as soon as they separate from the liquid, are instantly caught up and carried out of the still. As these products pass forward through the pipe D, the heaviest of them are condensed in the condenser E, and fall as a liquid into the second still, while the lighter portions pass on through the pipes D', etc. That which



## SEPARATION OF PETROLEUM PRODUCTS.

falls into the still A<sup>1</sup> may pass through a rose, F, so as to drop in form of spray through an atmosphere which has been sufficiently heated to vaporize and drive out all except the very heaviest of the liquid product, which will remain in the still A<sup>1</sup>. The volatilized products continue on forward through the pipe D' and the condenser E' of more power than the first, and here the next heaviest grade is condensed and falls in like manner, preferably through a rose into the third still, where a still lighter heat is applied, or may be, leaving a certain grade of liquid, and passing the vaporized or lighter products still further forward, and so on. The result is that in the still A<sub>1</sub> is left a heavy oil suitable for burning-fluid, and for other purposes where the liquid is required to stand a high fire-test, being entirely devoid of those very light and highly volatile and inflammable products that will vaporize and cause explosion when a very slight heat is applied.

In the still A<sup>1</sup> is a lighter oil of higher gravity, of lower fire-test, but still devoid of the lighter and more explosive and

more highly volatile products. The still A<sup>2</sup> contains a still lighter product of still higher gravity, and so on, as far as the process is carried.

By carefully grading the successive degrees of heat in the successive stills, this process may be carried to any extent desired, and the original oil may be separated into a large number of slightly different grades; or, in the same set of stills, any one of the grades that has been collected as above may be treated in like manner, and be separated into separate and distinct grades.

By faucets H the products remaining in the several stills may be drawn off as collected, and by a feed-pipe, J, the still A may be supplied with fresh liquid as rapidly as distilled, and thus the process may be made continuous, and all the different grades may be produced and collected simultaneously, and by a single operation.

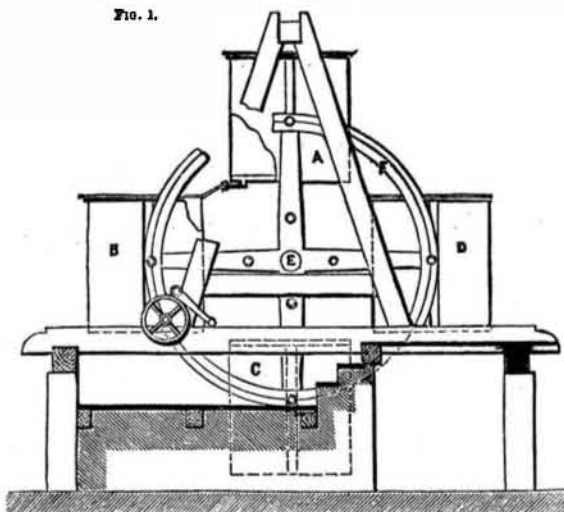
Faucets K may be located at suitable points for drawing off and testing the products at any point.

## EXTRACTION OF POTASH FROM WOOL IN THE GREASE.

THE apparatus represented in the subjoined cut is the invention of Mr. H. Fischer, engineer, of Hanover, and it is claimed for it that it gives as concentrated a lye as possible, and requires little labor.

Four vats, A, B, C, D, are suspended between two rings, F, which are movable on the axis E, and oscillate freely on the axis to which they are suspended. One of the rings, F, is fitted with a toothed corona, or crown wheel, with which is connected a small crank, which is so arranged that a single laborer can set the whole apparatus in motion. In Fig. 1, it will be seen that the reservoir, A, has a false bottom, and is fitted with a cock and tube, by means of which the lye is run off into the vat B. Figs. 3, 4, 5, and 6 show the working of the apparatus. The figures placed by the side of the numerals I., II., etc., which represent water, show how many

FIG. 1.



times that same water has served to wash the wool in its passage through the apparatus; in the same manner the letters *o*, *p*, *q*, which refer to the wool, are accompanied by figures indicating how many times each portion has been already washed by the water; *o*, representing raw wool; *o*<sub>1</sub>, wool once washed, and so on. In Fig. 6, in A, is wool already washed four times.

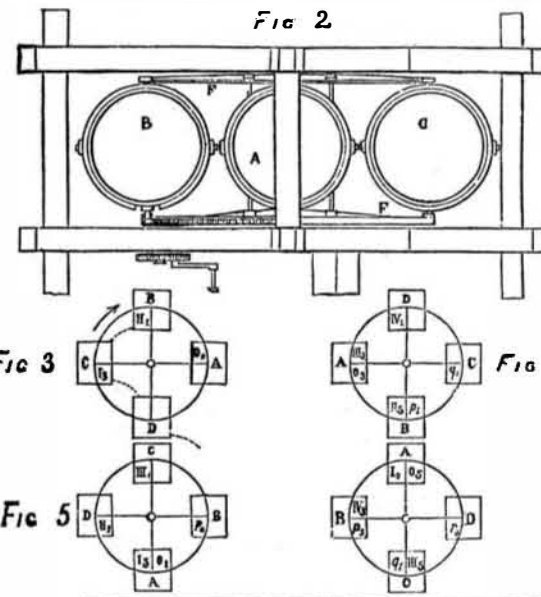
The operation is as follows:

1. Fill A with pure water, I<sub>0</sub>; then, at the end of a certain time—
2. The water I<sub>0</sub> is turned into the vat B, and the apparatus moved till B occupies the place of A.
3. Empty A, and fill it with raw wool *o*<sub>0</sub>; turn into vat C the water I<sub>1</sub>, and the pure water, II<sub>0</sub>, into B.
4. Run off the water, I<sub>1</sub>, from C into D, and II<sub>1</sub> from B to C; then turn the apparatus one quarter round (Fig. 5).

5. Direct the water, I<sub>1</sub>, from D to A on the raw wool, *o*<sub>0</sub>, and II<sub>1</sub> from C to D, and turn the pure water III<sub>0</sub> into C; empty the vat B, and fill it with raw wool, *p*, *o*.
  6. Let off the water, I<sub>2</sub>, from A into a reservoir; II<sub>2</sub> from D to A; and III<sub>2</sub> from C to D; then turn the apparatus for the third time (Fig. 4).
  7. The water II<sub>1</sub> is turned from A to B, III<sub>1</sub> from D to A, and D is filled with fresh water, IV<sub>0</sub>. Discharge the exhausted wool from C, and fill it with fresh wool *q*, *o*.
  8. The water II<sub>2</sub> passes from B to the reservoir III<sub>2</sub>, from A to B, and IV<sub>1</sub> from D to A; then the apparatus is turned for the fourth time.
  9. The water III<sub>2</sub> is directed from B to C on to the raw wool *q*, *o*, IV<sub>2</sub> from A to B, to wash the wool *p*, for the third time; and, as before (see 1.), pure water is turned into A on the wool *o*; D is then filled with raw wool *r*, *o*, and so on.
- The water I is thus successively in contact with the wool in the vats A, B, C, D, and A and II in B, C, D, A, B, etc., so

that the operation is repeated five times. Except for the transport of the wool, one man suffices for the work.

According to Maumné, a fleece weighing four kilogrammes contains 600 grammes of grease, in which is 198 grs. of pure carbonate of potash; and, according to data published since, 1000 kilogrammes of wool yield 140 to 180 kilos. of dry salt, or 70 to 90 kilos. of potash. Fuchs only gives 300 grammes of grease per fleece. At the wool-washing works of Dühren, near Hanover, they only get 152 kilos. of raw potash out of 5 tons of wool, and it contains 80 per cent of carbonate. In



1867, Maumné & Rogeltet produced at their works at Rheims and Elbœuf 150 tons of pure potash from grease, and there are similar works at Roubaix, Antwerp, Verviers, Liège, Bruges, Hanover, Dühren and Brême.—*Textile Manufacturer.*

## AN IMPROVED ASPIRATOR.

By R. H. RICHARDS.

THE arrangement of this improved form of aspirator is shown in the figure.

A glass tube should be bent of the form represented. This is essential, as it serves to break up the water jet into foam and thus start the suction.



I find a hydrant pressure of about 20 pounds on the square inch, equivalent to 40 or 50 feet column of water, will easily exhaust to within 1 mm. of the tension of aqueous vapor, and will cause a flask of water to effervesce as the dissolved air is disengaged.—*Chemical News.*

## NEW THEORY OF LATENT HEAT.

By M. LE GENERAL FAVE.

THE substance which fills space, and which we call ether, without knowing whether it is simple or multiple, transmits the solar heat to the planets. This heat is a vibratory movement which the ether communicates to ponderable matter, and which has a speed of translation so considerable that we may ask if the heat coming from the sun does not exert a repulsive force upon each planet. Transparent bodies are traversed by radiant heat in a greater or less degree. That is, the vibratory movements of the ether intercommunicate in the whole interior of the transparent body without being transmitted, at least directly to the ponderable matter. Thus, transparent bodies are constituted with ether interposed in their interstices. It is known that a body which has passed from the solid to the liquid state, or from the liquid to the gaseous, has absorbed latent heat, and yet the molecules doubtless have not changed their vibratory speed when the solid, liquid, or gas has been brought to the same temperature. What, then, is the latent heat, that is to say, the movement insensible to the indications of the thermometer? We believe that every thing may be explained; that the liquid contains, to a larger degree than the solid, interposed ether, which vibrates in unison with the ponderable matter. On this hypothesis, the gas would contain yet more constitutive ether than the liquid. The transparency of liquids and the facility with which gases give passage to radiant heat, are facts favorable to this explanation.—*Comptes Rendus.*