

(No Model.)

E. E. MURPHY & W. BERKEL.
APPARATUS FOR MAKING VINEGAR.

No. 432,190.

Patented July 15, 1890.

Fig. 1

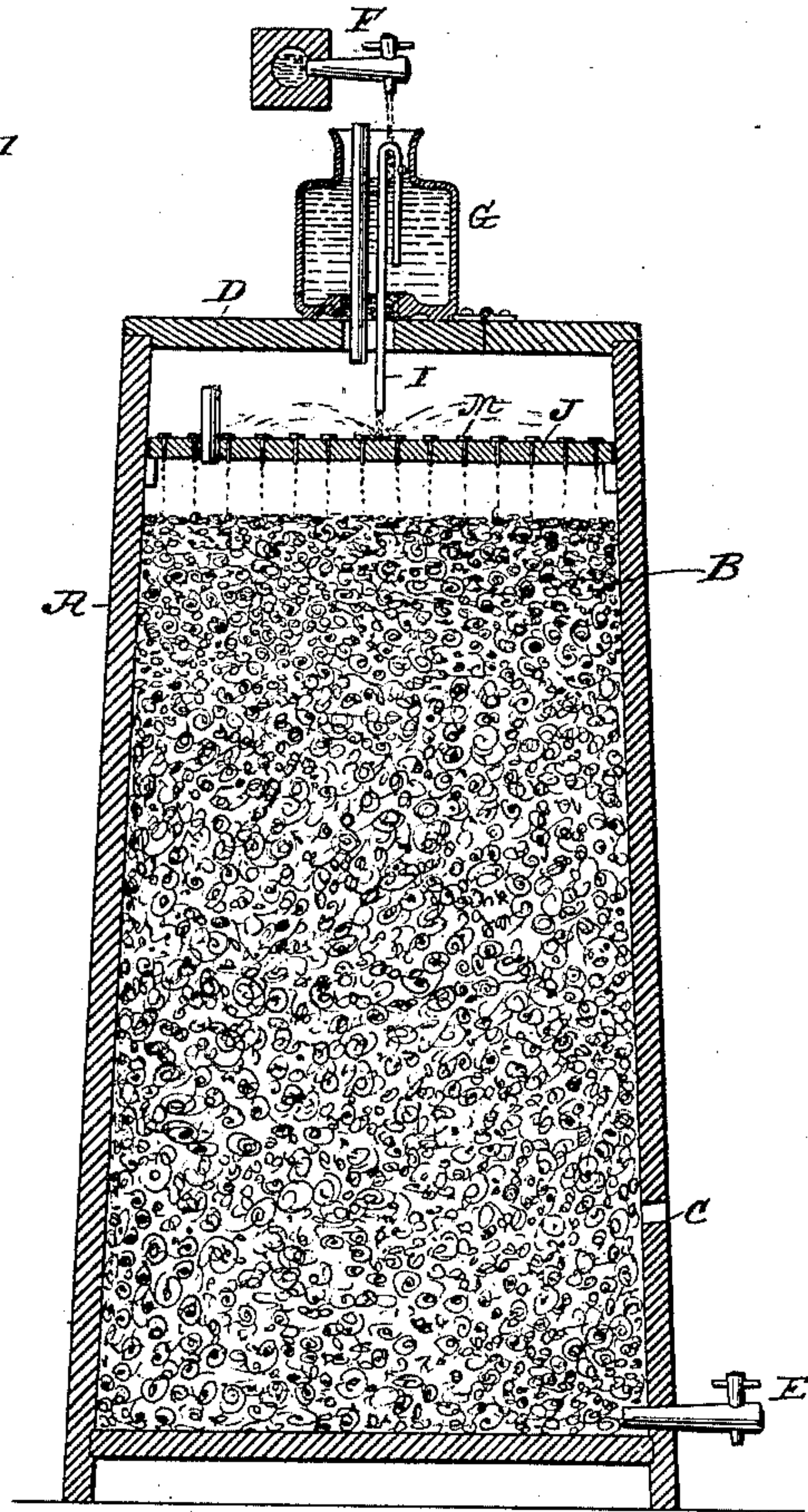


Fig. 2

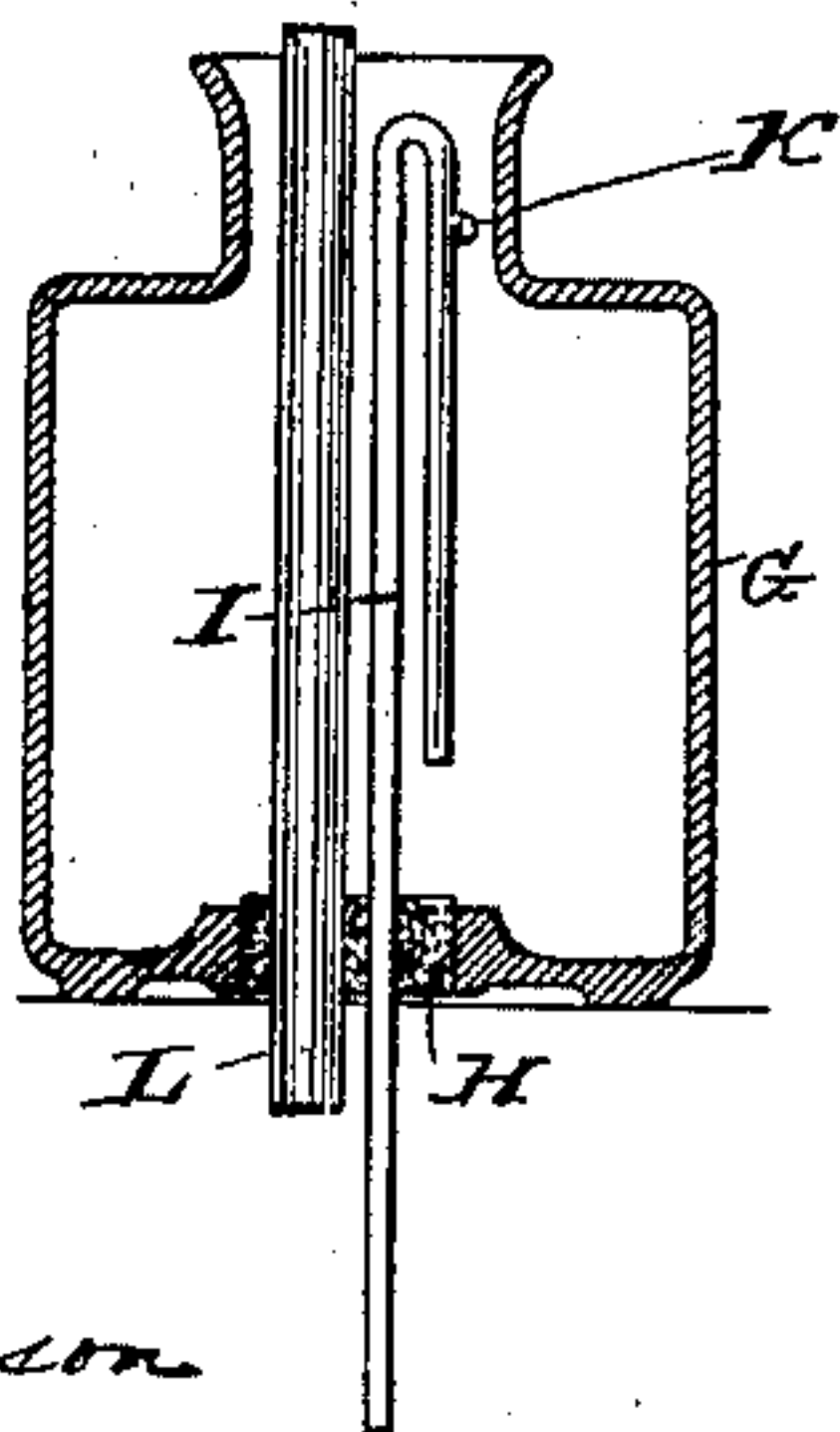
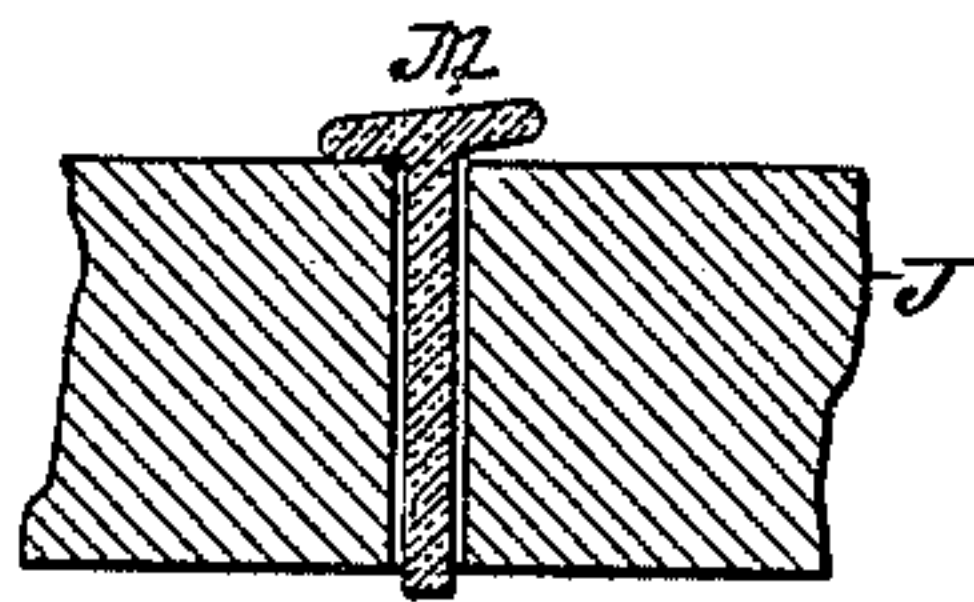


Fig. 3



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APPARATUS FOR MAKING VINEGAR.

SPECIFICATION forming part of Letters Patent No. 432,190, dated July 15, 1890.

Application filed September 3, 1889. Serial No. 322,901. (No model.)

To all whom it may concern:

Be it known that we, EDWARD E. MURPHY and WILLIAM BERKEL, residing at East Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Making Vinegar, of which the following is a full, clear, and exact description.

The present invention relates to improvements in apparatus for producing vinegar by what is known as the "quick process;" and it relates particularly to an improved automatic stillatitious and vapor-condensing feed for such apparatus, as well as to improved means for diffusing the liquid to be acetified in the graduator.

It has heretofore been common to supply vinegar-graduator by a small but continuous feed. With such a feed the conditions within the graduator are maintained without change and the flow of the supply is regular and causes no disturbance or fluctuation in the process of acetification. We have found that this condition does not result in the best and most economical work and that it is desirable to regularly alter or change the conditions existing within the graduator, so as to prevent a continuous or unchangeable state of the vapors and the diffused liquid undergoing acetification—that is to say, it is desirable that the supply of liquid to the graduator shall be in small quantities repeated at short intervals.

The first feature of invention therefore consists of a vinegar-graduator provided with an automatically-acting intermittent feed device.

It is also essential to the best exposure of the liquid to the air passing through the graduator that the liquid be spread out over the shelf or shelves therein in a thin film and subdivided as it passes to the shavings into as minute drops as possible. Heretofore it has been common to make such shelves of wood or similar material and to provide them with openings or tubes for freely conducting the liquid to the shavings in the lower part of the graduator. We have found, however, that it is far more desirable to cause the liquid while working through the shelf to pass over as large a surface and to be reduced to as

nearly a film-like condition as possible. To this end the second feature of invention consists of a graduator provided with a perforated distributing-shelf, upon which the liquid is received and which has its perforations loosely filled by the stems of headed glass plugs, the heads of which are beveled on their under faces or inclined to the plane of the shelf. In the manufacture of vinegar by the common forms of such apparatus there is a material loss by evaporation and by the carrying off of the vapors of the liquid being acetified. This loss is due to two causes—first, to evaporation by reason of the temperature at which the graduator is kept to insure the proper degree of fermentation, and, second, to the escape from the graduator of the vapors in the upper parts thereof, which are carried out by the air, which is necessarily kept circulating from the bottom to and out of the top of the graduator.

The third feature of invention consists of a draft-tube or other air-exit passage leading from the top of, and for permitting the air to pass out of, the graduator, which passage or air-exit is surrounded by the liquid being supplied to the graduator, so as to produce condensation and return to the graduator of the vapors carried by the air.

In the drawings, Figure 1 represents a central vertical section of a vinegar-graduator embodying our improvements. Fig. 2 shows in enlarged form a vertical section of the automatic feed-reservoir and the condensing air-outlet tube. Fig. 3 shows an enlarged section of the distributing-shelf of the graduator, taken through one of the glass plugs.

Referring to these views in detail, A represents the body of the graduator; B, the shavings or similar material in the same; C, the air-inlet; D, the hinged lid; E, a tap for drawing off the contents, and F a source of supply of the liquid to be converted into vinegar.

G is the feed-reservoir, which may be a vessel of any suitable material, and is removably supported on the top of the graduator. In the bottom of this reservoir is fixed by any suitable means, as the plug H, one leg of the glass siphon I, and this leg extends down through the top of the graduator to just above the distributing-shelf J. The other leg of the

siphon reaches to or just below the middle of the reservoir, and the bend of the siphon is just below the top of the neck or opening into the reservoir. A short distance below this bend and in the short leg of the siphon is a hole K, sufficiently large to admit air, but not to admit the liquid.

L is the condensing air-outlet tube. This tube is secured in the plug H of the reservoir G, and extends through the opening in the hinged lid of and to within the graduator. Its upper end is shown as at substantially the same height as the neck of the reservoir, but it may be farther extended; also, though we have shown this tube as straight, it may be otherwise shaped, as in the form of a worm, or it may be composed of parts of different sizes exposing large areas of condensing-surfaces.

M represents headed glass plugs loosely fitting in holes in the shelf J. The inner faces of their heads are in contact with the upper surface of the shelf, but the heads are beveled on one side or otherwise inclined to the plane of the shelf, so as to permit the stock to readily flow under them to their stems. This shelf may be of wood or of other material—such as glass or a substance readily cleaned and not undesirably affected by the liquid being acetified. The plugs project somewhat below the under surface of the distributing-shelf, so that the liquid will drop from their tips.

The action of the apparatus is as follows: It is to be understood that the supply-faucet is adjusted so that a small stream is continuously running into the reservoir. The reservoir fills to the top of the siphon or until the liquid therein runs over into the longer leg. When this takes place, the siphon, by an action well understood, begins to draw off the contents of the reservoir at a rate corresponding to the size of its bore. After the level of the liquid descends to below the air-vent in the siphon, and usually not until the level is near or at the end of the short leg of the siphon, small quantities of air will enter the vent and bubbles be formed in the ascending column, so that when the level is at the end of the short leg the ascending column of liquid is broken and flows back into the reservoir, thus emptying the siphon. Were it not for this vent, when the flow to the graduator ceases the short leg would remain filled with a column of liquid, and upon the level in the reservoir rising the siphon would be at once started and would draw off a little of the liquid and there would result a too frequent intermitting or dribbling action that would prevent the reservoir filling; but by the use of the vent the short leg of the siphon is emptied each time the reservoir is discharged, and the siphon will not be again brought into action until the reservoir is again filled. By these means the feed to the distributing-shelf is intermittent, or consists of defined quantities of liquid quickly deliv-

ered upon the shelf at regularly-recurring intervals. This feeding the liquid to the distributing-shelf is important, for when the liquid is thus delivered upon the shelf it is in quantity sufficient to insure it being spread entirely over the shelf, so as to make the distribution uniform. The liquid flows with force enough to slightly move the plugs, and not only to relieve them of any possible clogging that they may have undergone, but to start anew the flow of the liquid around them and through the holes in the shelf. This feed is important, also, in the respect that by reason of its intermittent character the vapors that collect in the tops of the graduator are more or less condensed or absorbed and carried back through the shavings, so that there is less waste by evaporation than is experienced with the common form of feed-graduator. Furthermore, this kind of feed tends to prevent sluggishness in the fermenting action, the formation of stoppages, and the dragging effect of capillary attraction. The transmission throughout is of a pulsatory kind, that assists to a proper circulation of air and preserves the highest activity of action, and, as might be expected, accelerates acetification and materially lessens the time of the process as a whole. The operation of the feed does not, however, wholly reduce the vapors that may be carried off by the draft of air out of the graduator, and the condensation-tube is therefore made use of. This tube, arranged as described, is subjected to the cooling effect of the rising and falling body of liquid in the reservoir, and so is kept at a temperature that causes, practically, all the vapor carried by the air passing through it to be condensed and returned to the graduator, thus effecting a considerable saving of the liquid being acetified. This condensing-tube may be arranged in various other ways to have the effect designed for it, and we do not limit ourselves to this special arrangement, though it is believed that this arrangement of the tube, in connection with the reservoir, is the most practical and economical. The reservoir serves to permit impurities and foreign substances in the liquid to settle and be collected in the bottom thereof, thereby reducing the tendency of the shelf and its plugs to become clogged, and producing a pure and clear final product. The plugs in the distributing-shelf have the essential function of spreading the liquid out in a film-like form as it works through the holes in the shelf—that is, the plugs being of glass and non-absorbent, the liquid spreads over them without adhesion and in the form of minute drops or films. This of course results in the liquid being greatly subdivided and so that it is distributed in minute drops very evenly over the shavings below the shelf. This construction of the shelf and the plugs also permits their being readily cleaned of any matter that may collect on and around them. The top of the shelf may be brushed over with

a stiff brush and all sediment will be removed, and this brushing will move the plugs in their places, so as to free them if stuck and so as to work out any collections between their stems and the walls of the perforation in the shelf. By these means we produce a self-acting apparatus that needs little attention, and that produces pure and clear vinegar in less time and with less loss in bulk, and hence more economically, than any of the common forms of apparatus known to us.

We are aware that it has been proposed to use glass tubes fixed in the shelf to conduct the liquid through the shelf, and we do not claim any such construction; nor do we broadly claim glass as a material to make such conductors of. We only claim in this respect glass plugs when used as and for the purposes herein described.

What is claimed as new is—

1. In a vinegar apparatus, the combination, with a graduator, of an intermittent siphon arranged to supply the graduator, as and for the purpose set forth.

2. In a vinegar apparatus, the combination, with a graduator, of a reservoir adapted to continuously receive liquid from a source of supply and provided with a siphon connect-

ing the reservoir and the graduator, which siphon is constructed and arranged to automatically and intermittently discharge the liquid collected in the reservoir to the graduator.

3. In a vinegar apparatus, the combination, with a graduator, of an air-exit condensing-tube, whereby the vapors carried by the air are condensed and returned to the graduator, as set forth.

4. In a vinegar apparatus, the combination, with a graduator, of an air-exit condensing-tube extending out the top of the graduator and through a reservoir of the liquid supplied to the graduator, as and for the purpose set forth.

5. The combination, in a vinegar-graduator, of a perforated distributing-shelf located within and near the top, and headed glass plugs M, loosely suspended in the perforations of the shelf and having the under faces of their heads inclined to the plane of the shelf, as and for the purpose set forth.

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