J. KLEIN.

APPARATUS FOR MIXING MASH.

APPLICATION FILED JULY 12, 1915.

1,156,409. Patented Oct. 12, 1915.

Fig. 1.

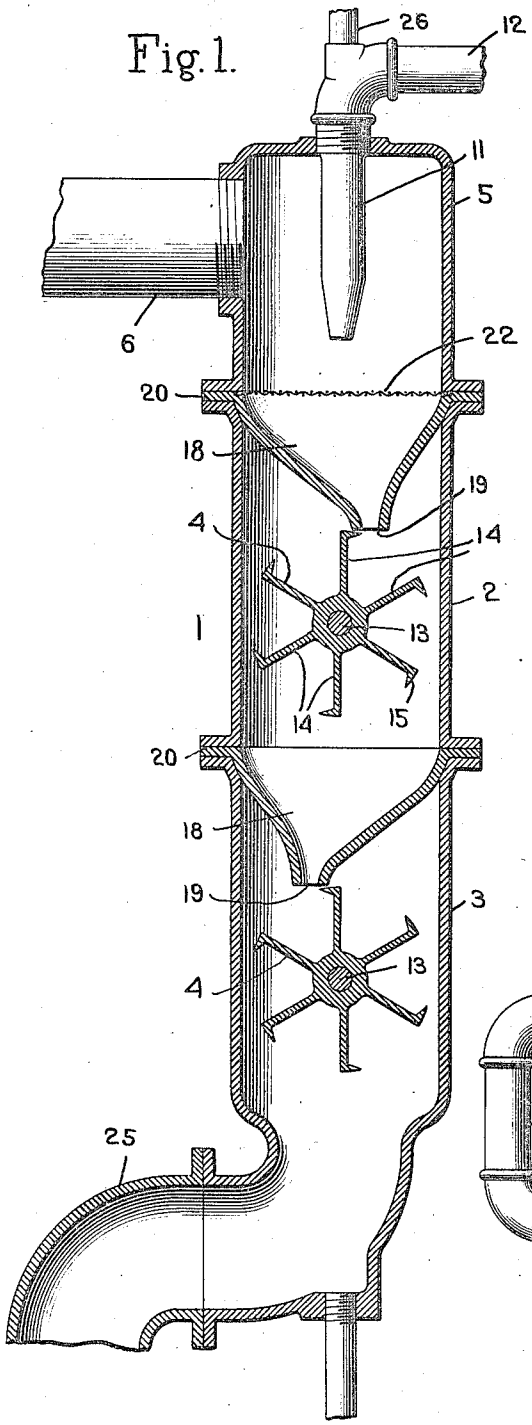


Fig. 2.

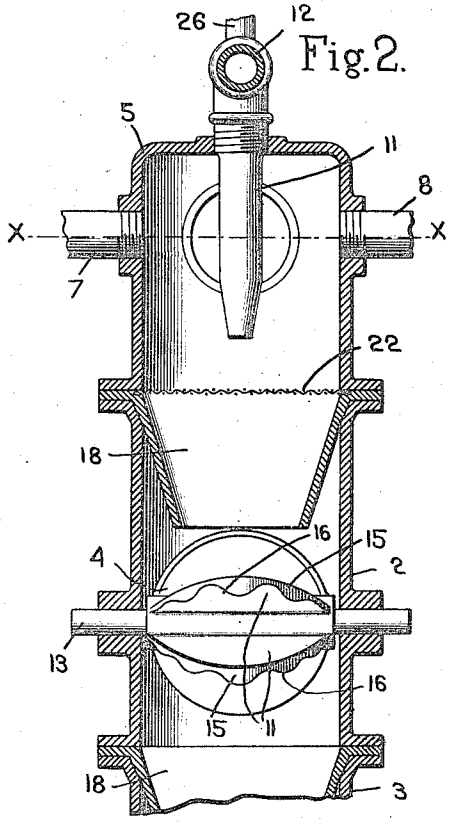
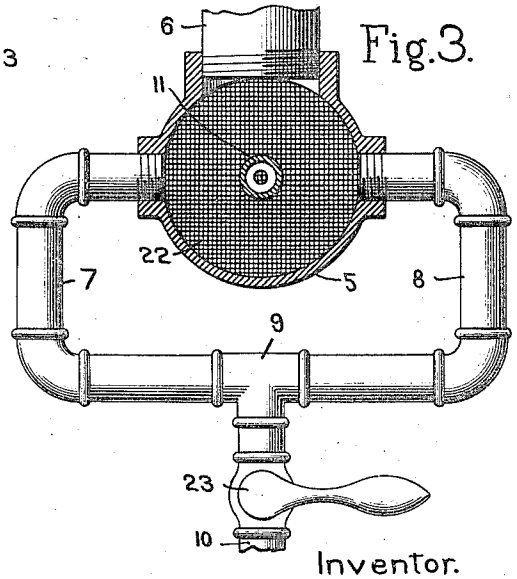


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MIXING MASH.

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To all whom it may concern:

Be it known that I, JULIUS KLEIN, a citizen of the United States, residing at Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Apparatus for Mixing Mash, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object to provide a novel and simple apparatus for efficiently mixing so-called mash, such as is used in the making of alcohol. This mash is made by mixing together molasses and water in proper proportions and then adding yeast so as to cause the entire mass to ferment thereby to change the sugar in the molasses into alcohol. Owing to the different characteristics of water and molasses, it is difficult to effectively and thoroughly mix them together, and unless they are thoroughly mixed, a good product will not result.

This invention aims to provide a simple apparatus which will thoroughly mix the molasses and water, and in order to give an understanding thereof I will now describe a selected embodiment, after which the novel features will be pointed out in the appended claim.

Figure 1 of the drawings is a vertical section of a device embodying my invention; Fig. 2 is a vertical section through the upper end of Fig. 1 taken at right angles to the sectional view of Fig. 1; Fig. 3 is a transverse section on the line *x*—*x*, Fig. 2.

My improved apparatus comprises a sectional conduit having provision for introducing the water and molasses to be mixed into the upper end thereof, each section of the conduit having a freely-rotatable bladed mixing element, and means interposed between the sections to direct the liquids being mixed onto the mixing elements thereby to cause them to rotate. This sectional conduit is shown generally at 1 and it comprises a plurality of sections 2, 3, each of which has the rotatable bladed mixing element 4 therein. Only two such sections are shown herein, but any number may be employed, depending upon the requirements of use. At the upper end of the conduit is an end section 5, into one side of which a pipe 6 enters through which the molasses is delivered.

7 and 8 designate two pipes connected by the T 9 with a supply pipe 10 and through which hot water is delivered to the end section 5. The two pipes 7 and 8 enter the end section 5 diametrically opposite each other and at right angles to the molasses-delivery pipe 6. Extending vertically through the end section 5 and preferably situated axially thereof is a nozzle 11 connected to a water supply pipe 12 through which cold water may be admitted.

The mixing elements 4 are each rotatably mounted on a shaft 13 extending diametrically of the conduit, and each element comprises a plurality of blades 14 having a semi-circular periphery to correspond with the circular shape of the conduit. Each blade is formed at its edge with the flange 15, the edge of which flange is serrated, as shown at 16 in Fig. 2. Situated between each of the sections and immediately above each rotatable mixing element is a spout section 18 which is shaped to present a delivery spout, the egress end 19 of which is at one side of the axial line of the conduit so that the material delivered through the spout will be delivered onto the rotatable elements 4 at one side thereof, thus causing them to be rotated. Each spout element 18 is shown as formed at its upper end with a flange 20 that is clamped between the ends of the conduit sections, said conduit sections being secured together in any suitable way, as by means of bolts, not shown. The spout elements 18 have a staggered relation, that is, the egress end of one spout element is on one side of the axial line of the conduit and the egress end of the next adjacent spout element is on the opposite side of said axial line.

22 is a screen interposed between the end section 5 and the conduit section 2 for the purpose of screening the liquids and preventing any foreign matter from passing through the conduit.

In using the device the molasses is delivered through the pipe 6 in proper quantities and water is delivered through the pipes 7 and 8 and nozzle 11. The relative amounts of hot and cold water which are delivered through the pipes 7 and 8 and the nozzle 11 will depend upon the temperature. In cold weather more hot water will be used, while in warm weather it may not be necessary to use any hot water, and cold water may be delivered through the pipes 7 and 8.

26 designates a steam pipe connected to

the nozzle 11 to deliver steam thereto and in case it is desired to further heat the material, a proper quantity of steam may be admitted through the pipe 26.

The molasses and water become partially mixed in the end section 5 and pass through the screen 22 into the first spout section 18. The partially-mixed liquid is delivered from this spout section 18 onto the mixing element 4 underneath and because of the non-axial location of the egress end 19 of the spout section the flow of the liquid from the spout section will cause the element 4 to rotate. The serrated flanges 15 are on the forward edges of the blades 14 so that the rotation of the element causes the serrated edge of the flanges to cut through the stream of molasses and water issuing from the spout section 18, thereby facilitating the mixing operation. The liquids are then delivered through the next spout section onto the next rotatable mixing element which is rotating in the opposite direction, and by this means a thorough mixing of the liquids results. The liquids when mixed are delivered from the discharge passage 25 into a suitable receptacle. The steam admitted through the pipe 26 may also be used for sterilizing the apparatus when it is not in use.

I claim:

A mash-mixing device comprising a sectional conduit, bladed mixing elements rotatably mounted in said sections, the blades of said elements having serrated flanges at their peripheries, spout elements interposed between the sections and arranged to deliver the liquid passing therethrough and having their egress ends situated at one side of the axial line of the conduit, and means to introduce molasses and water to the upper end of the conduit.

In testimony whereof, I have signed my name to this specification.

JULIUS KLEIN.