April 7, 1953 A. HOCK 2,633,992

SPARGER

Filed April 28, 1947 4 Sheets-Sheet 1

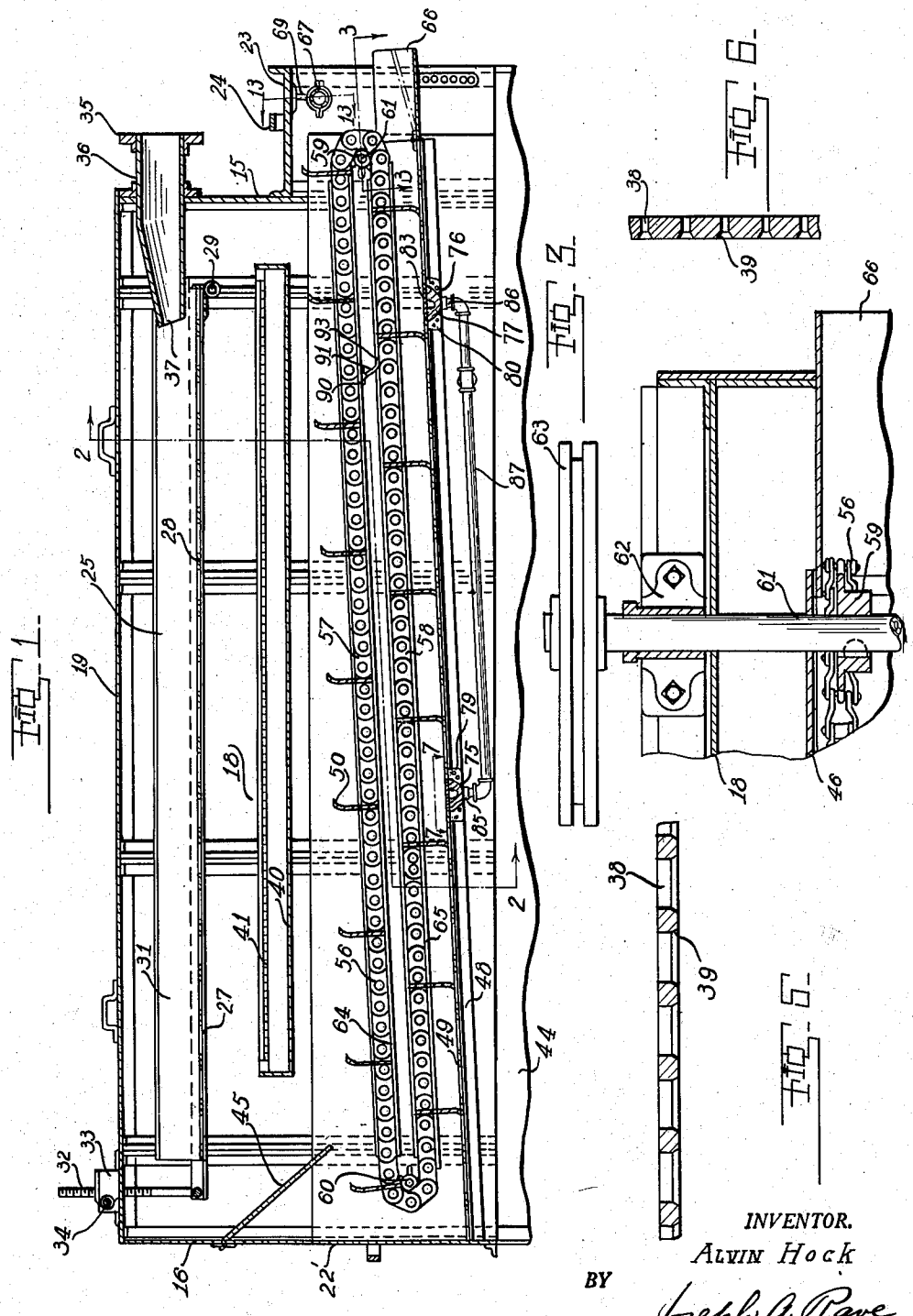


FIG. 1

FIG. 2

FIG. 3

FIG. 4

INVENTOR.
ALVIN HOCK

BY

Joseph A. Rave
Atty.

April 7, 1953 A. HOCK 2,633,992

SPARGER

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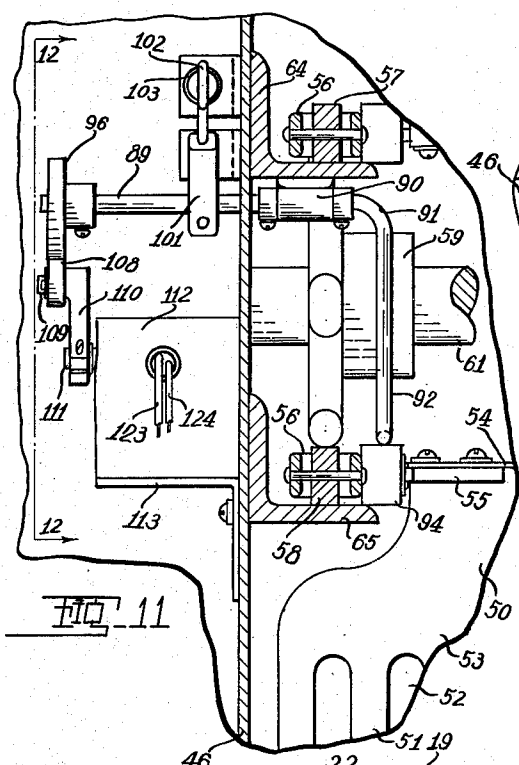


FIG. 11

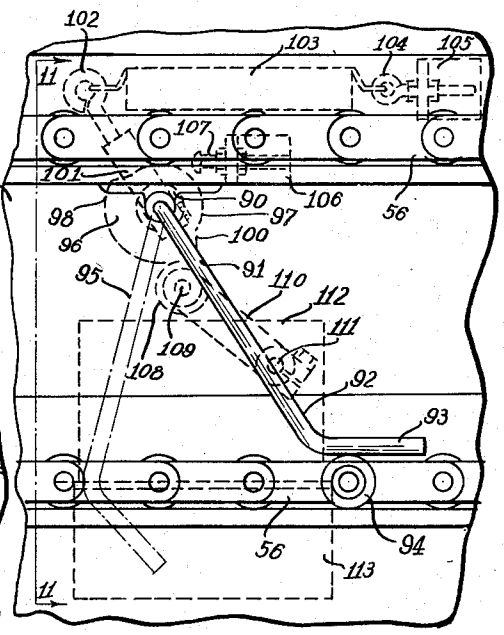


FIG. 10

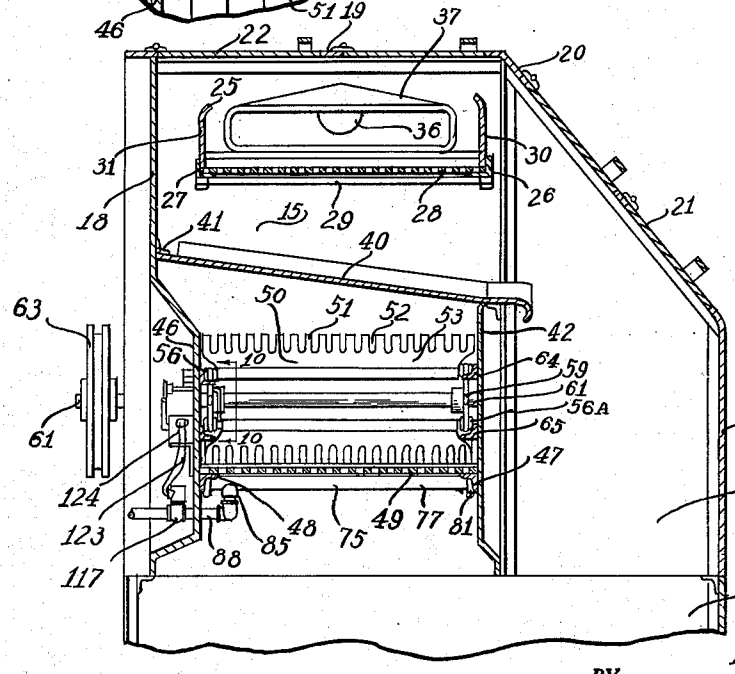


FIG. 2

INVENTOR.
ALVIN HOCK
BY
Joseph A Rave
Atty.

April 7, 1953 A. HOCK 2,633,992

SPARGER

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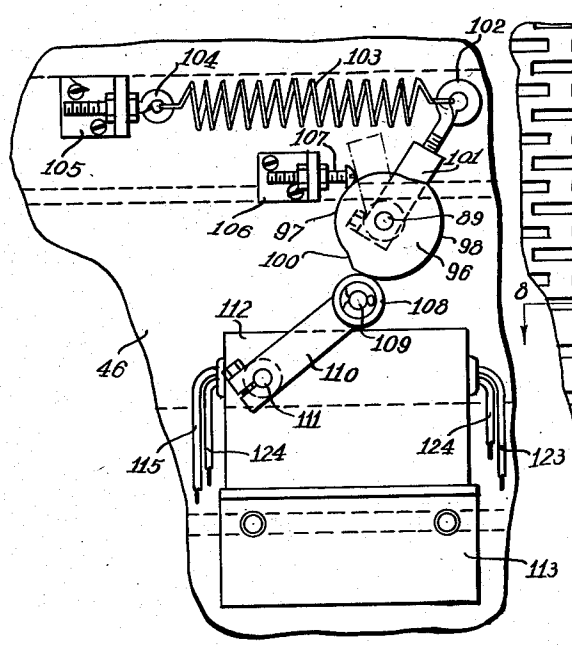
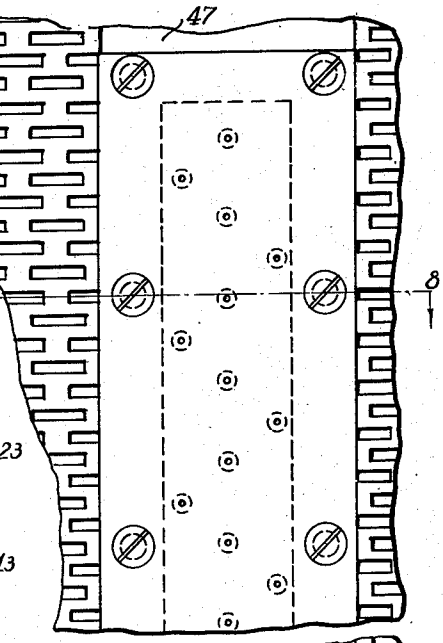


FIG. 12.



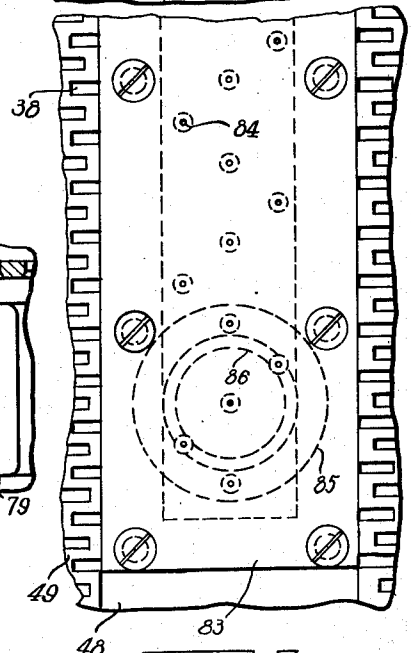


FIG. 7.

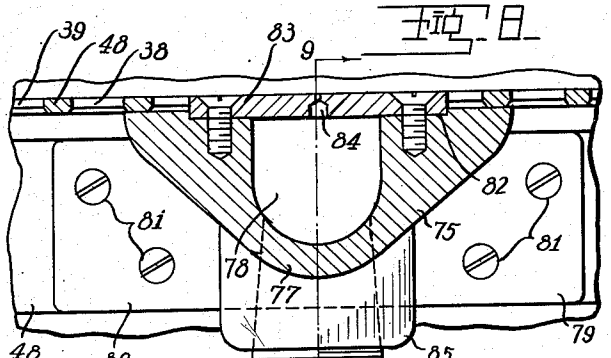
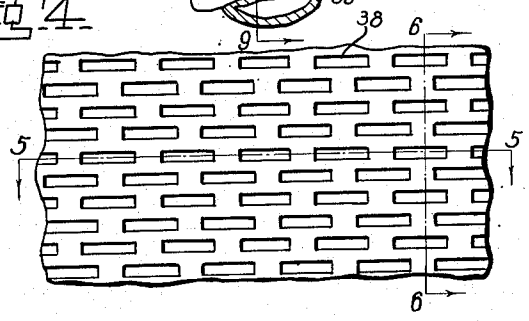


FIG. 8.

FIG. 4.



INVENTOR.
ALVIN HOCK
BY
Joseph A. Rave
Atty.

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SPARGER

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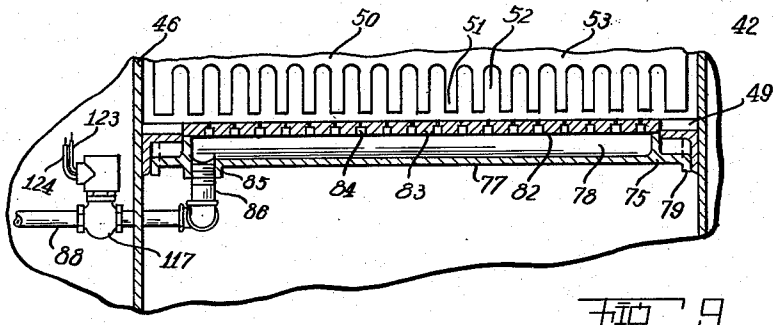


FIG. 9

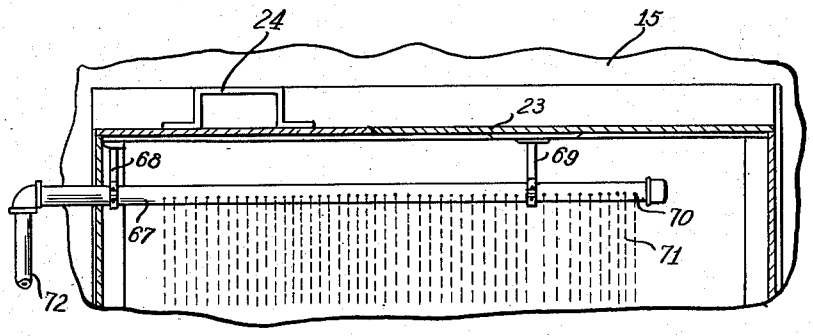


FIG. 13

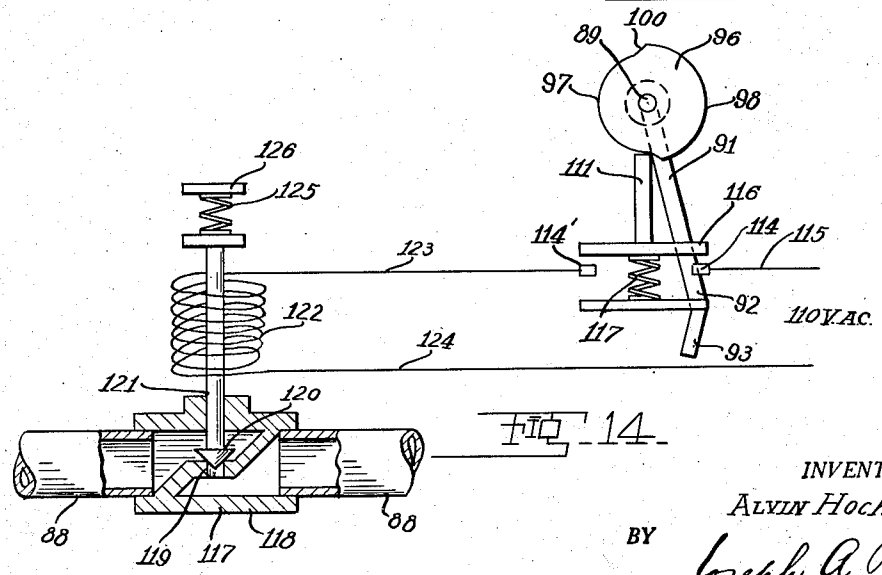


FIG. 14

INVENTOR.
ALVIN HOCK
BY
Joseph A Pave
Atty.

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UNITED STATES PATENT OFFICE

2,633,992

SPARGER

Alvin Hock, Cincinnati, Ohio

Application April 28, 1947, Serial No. 744,488

13 Claims. (Cl. 210—150.8)

1

This invention relates to improvements in a straining device particularly a device for straining wort to obtain the syrup from which beer is made.

The device disclosed in this application is an improvement on applicant's pending application Serial No. 708,261, filed November 7, 1946, and specifically pertains to an improved means for sparging the hop flowers and cereals forming a part of the wort from which the syrup is strained. It is to be understood however that the device of the present invention is not limited to the straining of wort but may be employed wherever it is desired to strain a liquid from a solid.

It is therefore the principal object of the present invention to provide in a strainer an improved means for sparging the material being strained.

Another object of the present invention is the provision of a sparging device for use with strainers that intermittently operate thereby effecting the sparging only when desired as distinguished from sparging devices that are substantially constantly actuated.

A still further object of the present invention is the provision of a sparging device for strainers that are automatically operated to sparge or wash the solid particles in a mixture being strained only at the time that a sparging or washing operation is most conducive to desired results.

It is also an object of the present invention to provide a sparging device for sparging solid particles such as hop flowers and cereals which are used in the manufacture or brewing of beer and are therefore subject to forming pockets that do not readily drain and wherein said solid particles are agitated or turned over so that when normally hard to drain pockets are positioned so that drainage readily takes place either by gravity or through the agency of a sparging medium.

A still further object of the present invention is the provision of a device for accomplishing the foregoing objects which is substantially simple in construction, economical to produce consistent with the results to be obtained, and fully automatic in operation.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification considered in conjunction with the accompanying drawings forming a part thereof and it is to be understood that any modifications may be made in the exact

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structural details there shown and described, within the scope of the appended claims, without departing from or exceeding the spirit of the invention.

In the drawings:

Fig. 1 is a longitudinal sectional view through a strainer of the present invention embodying the improvements of the present invention.

Fig. 2 is a transverse sectional view through the strainer as seen from line 2—2 on Fig. 1.

Fig. 3 is an enlarged fragmentary sectional view through one end of the strainer as seen from line 3—3 on Fig. 1.

Fig. 4 is an enlarged fragmentary plan view of a plate which constitutes the strainer plate of the strainer.

Fig. 5 is a fragmentary longitudinal sectional view through Fig. 4 as seen from line 5—5 on said Fig. 4.

Fig. 6 is a fragmentary sectional view through the strainer plate of Fig. 4 taken at right angles to the section of Fig. 5 on line 6—6 on said Fig. 4.

Fig. 7 is an enlarged fragmentary plan view of the improved sparger of the present invention as seen for example from line 7—7 on Fig. 1.

Fig. 8 is a transverse sectional view through the sparger of the present invention as seen from line 8—8 on Fig. 7.

Fig. 9 is a longitudinal sectional view through the sparger of the present invention taken at right angles to Fig. 8 on line 9—9 on said Fig. 8.

Fig. 10 is an enlarged elevational view of the control mechanism for the sparger as seen from line 10—10 on Fig. 2.

Fig. 11 is a transverse sectional view through the sparger control mechanism taken at right angles to Fig. 10 as seen from line 11—11 on Fig. 10.

Fig. 12 is an elevational view of the sparger operating mechanism as seen from line 12—12 on Fig. 11.

Fig. 13 is an enlarged transverse sectional view of the sparging mechanism as heretofore employed and which is supplementary to the improved sparger of the present invention and which section is taken on line 13—13 on Fig. 1.

Fig. 14 is a diagrammatic view of the electrical circuit involved in the automatic control of the sparger of the present invention.

Throughout the several views of the drawings similar reference characters are employed to denote the same or similar parts.

As was noted above this invention pertains to improvements in a straining mechanism or device for straining liquid from mixtures that con-

tain solid particles such as the straining of syrup from wort in which is suspended the hop flowers and cereals employed in the manufacture or brewing of beer. As was further noted above this invention pertains to improvements on applicant's pending application Serial No. 708,261 which was filed November 7, 1946.

As illustrated in Fig. 1 the improved strainer of the present invention includes a housing having ends 15 and 16 together with a front 17 and a back 18. The said housing is closed by a top comprising a flat portion 19 and an inclined portion 20. Said top portions 19 and 20 are respectively provided with doors 21 and 22 whereby access to the interior of the housing is afforded through the said housing top sections. The housing end wall 16 is likewise provided with a door or doors 22' to permit access to the interior of the housing from said end thereof. Adjacent the other end 15 an extension housing 23 is provided having on its top a door 24 whereby access to the interior of the housing from the said end is permitted. From the foregoing it will be noted that the housing can be readily entered for purposes of cleaning the same and maintaining it in a sanitary condition.

Within the housing is a strainer trough indicated in its entirety by the reference numeral 25 and which strainer trough 25 comprises longitudinal members 26 and 27 conveniently formed as angles. The angles 26 and 27 are suitably spaced from one another and retained in said spaced position to receive a strainer plate 28, and which strainer plate, due to its size and weight is formed of a plurality of relatively short plates laid edge to edge in forming the bottom of the strainer trough 25. In the inner end of the strainer trough 25 is mounted a hinge member or bar 29 between the side walls of the housing which, as will later be made clear, is for purposes of facilitating flow through the trough 25. In order to complete the trough 25 the upstanding or vertically disposed legs of angles 26 and 27 each has, respectively secured to it a strainer trough side 30 and 31.

The other end of the strainer trough 25 is supported by vertical adjustment and each of the trough angles 26 and 27 projects beyond the strainer bottom or plate 28 and is pivotally connected to the lower end of an adjusting screw 32. Each adjusting screw 32 has a threaded connection with a nut interiorly of a housing 33 supported by the top portion 19. There are two adjusting screws, nuts and housing 33 which are adapted to be simultaneously adjusted by an actuating shaft 34 extending transversely of the device and supported on the top 19.

The material to be strained, wort for example, is brought from the brewing kettle by way of a pipe, not shown in the drawings, connected through flange coupling 35 to the intake nozzle 36. The nozzle 36 has its discharge end elongated as at 37 in Fig. 2 so as to spread the incoming wort across the bottom or strainer plate 28 of the trough 25.

The trough 25, illustrated in the drawings as substantially horizontal, may be adjusted to have an upward or downward inclination depending upon the amount and rate of delivery of the material or wort through the nozzle 36. In other words if the rate of delivery is rapid and the material flows to the discharge end thereof at a rate which does not permit sufficient initial drainage the adjusting screws 32 may be actuated to effect an upward inclination of the said trough 25 thereby dissipating some of the force or movement of the material so that the proper drainage is effected through the strainer plate or plates 28. On the other hand if the rate of flow through the nozzle 36 is such that the material does not reach the discharge end of the trough the adjusting screws 32 are actuated to downwardly drain the material and thereby supplement the rate of flow in the trough.

The bottom or screen 28 of the trough 25 may take any suitable or desirable form insofar as draining apertures therein are concerned, preferably, taking the form illustrated in Figs. 4, 5 and 6 which is in the nature of elongated apertures 38 of quite narrow width and having an outward flare 39 on the underside of the said strainer plate. This construction is not new with applicant but has been found to be very efficient in operation.

The trough 25 may be designed as the initial straining station and the flow from said trough is intercepted by a deflector plate 40. The deflector plate 40 is a solid sheet or plate and has its one end hingedly mounted at 41 to the strainer housing back wall 18. The free end of the deflector plate 40 rests on the upper end of housing intermediate wall 42 which extends longitudinally of the strainer housing and is located substantially beneath the forward side of the strainer trough 25 all as seen in Fig. 2. The deflector plate 40 discharges into the space 43 between the housing front wall 17 and intermediate wall 42 and which space 43, in turn, empties into the receiving tank 44 on the upper end of which the strainer is mounted. Instead of hinging the deflector plate 40 at 41, this plate 40 may have its inner end removably secured to the housing wall 18 since with either a hinged connection or a removable one the underside of said plate can be readily cleaned as can the housing and parts located therebeneath as will be later made clear.

The wet solid material, or specifically, the solid particles and remaining liquid being strained passes from the strainer trough 25 between the adjusting screws 32 and discharges against the end wall 16 but preferably is received by a deflector plate 45 to be directed to the second straining station or trough located immediately below the trough 25. The second straining trough effects the final drainage of the syrup or liquid from the wort or other material being processed and is in direct communication with the tank 44.

The second or lower strainer trough conveniently has its sides formed by the strainer housing intermediate wall 42 and a second intermediate wall or an inset portion 46 of the strainer back wall 18. The said walls 42 and 46 each have secured to them angle irons 47 and 48 which extend longitudinally of the strainer housing and at an upward angle. Mounted on the angle irons 47 and 48 is a strainer plate 49, again conveniently formed of a plurality of plates abutting against one another for the full length of the housing. The wet solid material, or specifically, the solid particles and remaining liquid being strained is adapted to be power actuated upwardly of the strainer plate or bottom 49 and any suitable or desirable means may be employed for this purpose preferably however use is made of the means illustrated in the drawings and to be presently described.

The wet material, or specifically, the solid particles and remaining liquid being strained is actuated relative to the strainer plate 49 by a series of constantly moving rakelike members 50 which are equally spaced from one another. The rake

like members 50 are each provided with a series of slots 52 thereby providing rakelike teeth 51 between adjacent slots. The said rakelike members 50 above the teeth 51 are provided with a body portion 53 having its upper end turned to form a flange 54 through which the said rakes are attached to a carrier 55 secured to and extending from spaced links of endless link chains 56 and 56a, each as shown most clearly in Fig. 1 in connection with link chain 56 has an upper reach 57 and a lower reach 58 which are determined by sprockets 59 and 60, at opposite ends of the strainer housing. The sprockets 59 may be termed the driving sprockets while the sprockets 60 are the idler or driven sprockets. The sprockets 59 are secured to a driving shaft 61 suitably journaled in bearings located exteriorly of the strainer housing and one of which bearings is illustrated in Fig. 3 and indicated by the reference numeral 62 and disclosed one end of shaft 61 projecting beyond this bearing 62 to receive a pulley 63 illustrated as of the groove type to receive a driving belt from driving motor (not shown).

From the foregoing it will be noted that rotation of the shaft 61 and the sprockets 59 effect a continuous movement of the chain reaches 57 and 58 with a corresponding continuous movement of the rakes 50. The rakes 50 are so designed as to have a substantially scrapping contact with the strainer trough bottom or plate 49 for pushing the solid particles thereon upwardly of said strainer plate 49. In order to support the reaches 57 and 58 of the chains 56 and 56a the trough forming sides 42 and 46 are each provided, in alignment with one another, with angle irons 64 and 65 with the angle irons 64 supporting the upper chains reaches 57 while the angle irons 65 support the lower chains reaches 58.

The rakes 50 are adapted to discharge the material from the strainer trough bottom or plate 49 into a discharge chute 66 from which the solid particles are received in a suitable receptacle, not shown or are otherwise disposed of likewise not shown. Prior to the discharge of said solid drained or spent material from the discharge chute 66 a sparging operation may be performed by any type of spray and which spraying operation as illustrated in the drawings comprises the use of a pipe 67 suitably mounted as by hangers 68 and 69 disposed within the strainer housing extension 23. The sparging pipe 67 is provided with a plurality of openings 70 whereby a spray 71 is directed against the spent hop flowers or other material being drained. In order to supply the sparging pipe 67 with a sparging medium it is connected by a pipe 72 with a sparging medium, usually water.

The foregoing description briefly sets forth construction disclosed in applicant's above identified pending application. The method and means for sparging as disclosed in said application and just described has been the practice for some years but the best results have not been obtained thereby. The material is primarily of a nature that has a tendency to adhere and pack and thereby form pockets within the body of the material that are not readily drained. The tumbling of the material as effected by the rakelike members 50 opens up some of the pockets but not all of them. The sparging mechanism to be presently described effectively disburses the said bunched particles to thereby open up the pockets and effect a more complete tumbling and exposition of the material.

Accordingly, the sparging device of the present invention contemplates the use of one or more sparging mechanisms located beneath the bottom or strainer plate 49 of the lower strainer trough; there being two such devices illustrated in the drawings and indicated in general by the reference numerals 75 and 76. The sparging devices 75 and 76 are substantially identical in construction and it is deemed sufficient if but one of them be described in detail.

Accordingly, the sparging device 75 comprises a body member 77 of a length substantially equal to the width of the lower strainer trough and therefore of a length substantially equal to the width of the trough bottom or plate 49. The body member 77 is provided with a channel 78 substantially the full length thereof and is provided on its ends with ears 79 and 80 which engage the angle irons 47 and 48 to which they are attached as by screws 81. The body member 77 is provided on its upper end with a recess 82 receiving a plate 83 provided throughout its length with a series of small diameter apertures or holes 84. The apertures or holes 84 are counterbored from the bottom face of the plate 83 to give them the effect of pressure nozzles for a purpose presently to be described. Intermediate the ends of the body member channel or duct 78 the body member 77 is provided with a depending lug 85 suitably threaded to receive a pipe nipple 86. The pipe nipple 86 is connected with a pipe 87 which conveniently extends to the second sparging mechanism 76. The pipe 87 is in turn connected with a supply pipe 88 which may go to the same source of sparging medium that the supply pipe 72 is connected with or may be a different source of sparging medium.

The sparging devices 75 and 76 are so constructed that the upper surface of their respective perforated plates 83 is flush with the upper surface of the trough bottom or strainer plate 49. In practice the sparging mechanisms 75 and 76 are located to be between two of the strainer plates that form the said trough bottom 49 and the perforated plates 83, therefore, each have abutting its opposite longitudinal edges one of the individual strainer plates that make up the trough bottom or strainer plate 49.

The flow through the pipe 88 may be effected at spaced intervals, that is, may have a flow therethrough and through the sparging devices 75 and 76 only at such times as material is lying over their plate 83 or in the act of being passed thereover. For this reason the said flow through the pipe 88 and the sparging devices 75 and 76 take place when the rakes 50 are respectively in the approximate position relative to the sparging devices 75 and 76 as illustrated in Fig. 1. In other words the material being conveyed or pushed along the strainer trough bottom or strainer plate 49 extends a comparatively short distance but ahead of it wherefore the sparging is effected during the time that the said rakes 50 move from approximately the position illustrated to a position just beyond the sparging devices 75 and 76.

In order to effect this intermittent operation use is made of a control device such for example as illustrated in Figs. 10 and 11 which comprises a crank 91 having a shaft portion 89 journaled in a bearing 90 secured to and depending from the angle iron 64 that supports the upper reach of the endless chain 56. The crank 91 from one

end of the shaft 89 has depending therefrom an arm 92 the lower end of which is outwardly bent as a finger 93. The finger 93 is adapted to lie in a plane just inwardly of the endless chain 56. At suitable and appropriate points the chain 56 is provided with a roller 94 which moves in the plane of the finger 93.

In operation the rollers 94 are positioned so as to pick up the fingers 93 when it and its arm 92 are in the phantom line position 95 in Fig. 10 and to actuate the arm 95 from this phantom line position to the solid line position. The finger 93 is of such a length that it retains the arm 92 in the solid line position for the desired length of time to permit the above described movement of the rakes 50 from their illustrated positions with respect to sparging devices 75 and 76 to a position beyond said sparging device and it is contemplated by way of example that this will permit the said rakes to cover a distance of from one fourth to one third of the distance between adjacent rakes, as this is substantially the distance ahead of each rake that the material extends.

Mounted on the shaft 89 is a cam shaped roller 96 which as seen in Fig. 12 has a peripheral low portion 97 and a peripheral high portion 98 with a connecting rising peripheral portion 100 between them. In addition the shaft 89 has secured thereto and projecting therefrom an arm 101 provided at its outer end with an eye 102 to which is connected one end of coil spring 103. The other end of the spring 103 is connected to a similar eye 104 carried by a bracket 105 conveniently secured to the outer face of the inset strainer housing wall 46.

The spring 103 tends to rotate the crank 91 to a position for retaining crank arm 92 in the phantom line position 95, and it is against the resistance of the spring 103 that the crank is actuated through the engagement of its finger 93 with the roller 94. In order to limit the movement of the crank 91 by the spring 103 and to dispose the crank 91 in the phantom lines position the strainer housing inset wall 46 has secured to it a second bracket 106 carrying an adjustable abutment 107, to be engaged by the arm 101 as illustrated in phantom line in Fig. 12.

Engaging with the periphery of the cam 96 is a roller 108 freely rotatably mounted at 109 to the end of an arm 110. The arm 110 is secured to a shaft 111 extending through the housing 112 of an electric switch. The electric switch is carried by a bracket 113 secured to the outer surface of the strainer housing inset wall 46.

The electric switch is diagrammatically illustrated in Fig. 14 and comprises contacts 114 and 114' with the former of which is connected a wire 115 that extends from a commercial electric voltage source such for example 110 volts A. C. The electric switch further contemplates a switch plate 116 adapted to bridge the contacts 114' and 114 and which switch plate 116 is connected with the electric switch shaft 111 to be thereby actuated. The switch plate 116 is yieldably biased as by spring 117 tending to open the switch contacts 114' and 114.

The electric switch is electrically connected with a magnetically operated valve 117 illustrated in elevation in Fig. 9 and diagrammatically illustrated in cross section in Fig. 14. As shown in Fig. 14 by valve 117 comprises a valve body 118 having interiorly thereof a valve seat 119 with which cooperates valve member 120. The valve member 120 is connected with a magnetically actuated plunger 121 which constitutes or forms

the movable core of a solenoid coil 122. The solenoid coil 122 has its one end connected by a wire 123 with the electric switch contact 114. The solenoid coil 122 has its other end connected by a wire 124 with the commercial electric voltage. The valve stem or plunger 121 is spring biased as by a spring 125 which abuts on one end with the plunger 121 and on its other end with a fixed abutment 126 and which spring 125 tends to maintain the valve 120 in a closed position as illustrated in Fig. 14.

The operation of the sparging mechanism of the present invention is believed obvious from the foregoing description since when the rakes 50 approach the positions illustrated in Fig. 1 a chain roller 94 actuates the crank 91 from the phantom line position of Fig. 10 to a position approximating the full line illustration thereof in said Fig. 10, thereby, through its shaft 89, actuating the cam 96 to the position where its larger peripheral portion 98 engages the roller 108 and thereby through the arm 110 and shaft 111 forces the switch plate 116 into engagement with switch contacts 114' and 114. The bridging of the contacts 114' and 114 complete the electric circuit to thereby energize solenoid coil 122 causing the valve stem or plunger 121 to be actuated against the resistance of the spring 125 and thereby unseat the valve 120 and permitting a flow through pipe 88, pipe 87 and nipples 86 into the sparging housing channels 78. This flow, as noted above is timed to occur when the hop flowers or other materials being strained is passing over the sparging plate 83 so that the sparging medium engaging the under side of the said hop flowers or other materials causing same to be substantially upwardly actuated and to be substantially turned over. At the same time the hop flowers and other materials are separated from one another to break up any pockets that may have been formed between these portions during their movement from the entrant end of the strainer. The sparger operates so long as the hop flowers or other material is being moved over their plates or until the rakes, which are actuating the hop flowers, or other material, has passed thereover at which time the chain roller 94 has reached the position to permit the crank 91 to assume the phantom line position 95 of Fig. 10 thereby bringing the low peripheral portion of the cam 96 into operation relative to the roller 108. The spring 117 associated with the electric switch separates the switch plate 116 from the contacts 114' and 114 thereby breaking the electric circuit and de-energizing the solenoid coil 122. The de-energization of the solenoid coil 122 permits the spring 125 to expand and return the valve 120 to its seat 119 and stop flow through the solenoid controlled valve 119. As was noted above there is a separate control roller 94 on the chain 86 for each rake member 50 and is so positioned with respect to one another that the sparging device 75 and 76 are actuated as each rake member approaches them for pushing the hop flowers or other materials thereacross.

From the foregoing it is believed now evident that there has been provided a device that will accomplish the objects initially set forth.

What is claimed is:

1. In a straining and sparging device of the class described the combination of a strainer trough having a perforated bottom, means for moving material to be strained along the perforated bottom to permit drainage from said material, means at spaced intervals below said trough perforated bottom sparging the material

upwardly through the trough bottom perforations and separating the particles of the material during the movement thereof relative to the said sparging and separating means, means for actuating said sparging means, and control means operable by the material moving means for operating the sparging means actuating means.

2. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom, power actuated spaced means for moving material to be strained along the trough perforated bottom, a sparging and separating means including a perforated plate forming part of the trough perforated bottom and operable on the material brought thereto by the spaced material moving means upwardly of the trough perforated bottom, and means for intermittently actuating said sparging and separating means when the spaced material moving means is moving the material over the sparking and separating means perforated plate.

3. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom, power actuated spaced means for moving material to be strained along the trough perforated bottom, a sparging and separating means including a perforated plate forming part of the trough perforated bottom and operable on the material brought thereto by the spaced material moving means upwardly of the trough perforated bottom, and means for intermittently actuating said sparging and separating means when the spaced material moving means is moving the material over the sparging and separating means perforated plate, comprising a sparging medium supply pipe, an electro-magnetic control valve in said pipe, and an intermittently actuated switch for effecting and controlling the operation of the electro-magnetic valve.

4. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom, power actuated means for moving material to be strained along the trough perforated bottom, a sparging and separating means including a perforated plate forming part of the trough perforated bottom and operable on the material upwardly of the trough perforated bottom, means for intermittently actuating said sparging and separating means, comprising a sparging medium supply pipe, an electro-magnetic control valve in said pipe, an intermittently actuated switch for effecting and controlling the operation of the electro-magnetic valve, and means associated with the power actuated material moving means for operating the switch.

5. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom to permit drainage therethrough, means for moving material to be drained along the perforated bottom, including a plurality of rakelike members, endless chains at the opposite sides of said rakelike members for effecting the movement thereof, a sparger below the trough perforated bottom, and means carried by said endless chains for intermittently actuating the sparger.

6. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom to permit drainage therethrough, means for moving material to be drained along the perforated bottom, including a plurality of rakelike members, endless chains at the opposite sides of said rakelike members for effecting the movement thereof, a sparger below the trough perforated bottom, means carried by said endless chains for intermittently actuating the sparger, said rakelike members adapted to actuate the material to be drained across the sparger, and said actuating means for the sparger being positioned on the chains for operation when successive rakelike members are within the vicinity of the sparger.

7. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom to permit drainage therethrough, means for moving material to be drained along the perforated bottom, including a plurality of rakelike members, endless chains at the opposite sides of said rakelike members for effecting the movement thereof, a sparger below the trough perforated bottom, means carried by said endless chains for intermittently actuating the sparger, said intermittent operation of the sparger being for an appreciable period of time and said actuating means being retained in operative position for the said appreciable length of time.

8. In a straining and sparging device of the class described, the combination of a strainer trough including a perforated trough bottom, and a sparger below and intermediate the ends of the perforated trough bottom extending transversely thereof including a perforated plate having its upper surface in the plane of the perforated bottom, and a channeled body member depending below the perforated plate from which a sparging medium is upwardly projected through the perforated plate.

9. In a straining and sparging device of the class described the combination of a strainer trough including a perforated trough bottom, a sparger below and intermediate the ends of the perforated trough bottom extending transversely thereof including a perforated plate having its upper surface in the plane of the perforated bottom, a channeled body member depending below the perforated plate from which a sparging medium is upwardly projected through the perforated plate, a sparging medium supply pipe connected with the channel of the body member, and means in said supply pipe intermittently operable for effecting intermittent upward projection of the sparging medium.

10. In a straining and sparging device of the class described the combination of a strainer trough including a perforated trough bottom, a sparger below and intermediate the ends of the perforated trough bottom extending transversely thereof including a perforated plate having its upper surface in the plane of the perforated bottom, a channeled body member depending below the perforated plate from which a sparging medium is upwardly projected through the perforated plate, a sparging medium supply pipe connected with the channel of the body member, means in said supply pipe intermittently operable for effecting intermittent upward projection of the sparging medium, power actuated means for moving material along the trough perforated bottom to permit drainage from said material, and control means for the supply pipe flow means operable by the material moving power actuated means.

11. In a straining and sparging device of the class described the combination of a strainer trough including a perforated trough bottom, power actuated means for moving material along the trough bottom, a sparger below and intermediate the ends of the perforated trough bot-

tom extending transversely thereof including a perforated plate having its upper surface in the plane of the perforated bottom, a channeled body member depending below the perforated plate from which a sparging medium is upwardly projected through the perforated plate, a sparging medium supply pipe connected with the channel of the body member, and means in said supply pipe intermittently operable for effecting intermittent upward projection of the sparging medium, including an electro-magnetic valve, and a switch intermittently operable by the material power actuated moving means for controlling the operation of the magnetic valve.

12. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom relative to which material moves, a pair of sparging devices below and intermediate the ends of the perforated trough bottom extending transversely thereof, each including a perforated plate having its upper surface in the plane of the upper surface of the trough perforated bottom and each perforated plate having a body member depending therefrom, each of said body members having a channel longitudinally thereof communicating with the apertures in its perforated plate, a common sparging medium supply pipe for said body members channels, and intermittently operable means in the common supply pipe for controlling and effecting an intermittent flow of the sparging medium through the supply pipe and sparging body members channels when the material is in operative relation to the sparging devices perforated plates.

13. In a straining and sparging device of the class described the combination of a strainer trough including a perforated bottom, a pair of sparging devices below and intermediate the ends

of the perforated trough bottom extending transversely thereof each including a perforated plate having its upper surface in the plane of the upper surface of the trough perforated bottom and each perforated plate having a body member depending therefrom, each of said body members having a channel longitudinally thereof communicating with the apertures in its perforated plate, a common sparging medium supply pipe for said body members channels, intermittently operable means in the common supply for controlling and effecting an intermittent flow of the sparging medium through the supply pipe and sparging body members channels, power actuated means for moving material along the strainer bottom to permit drainage from said material, and control means operable by said material moving means for operating the sparging medium flow means in the sparging supply pipe.

ALVIN HOCK.

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