(No Model.)

L. S. KUHN.

BEER MASH TUB.

No. 313,430. Patented Mar. 3, 1885.

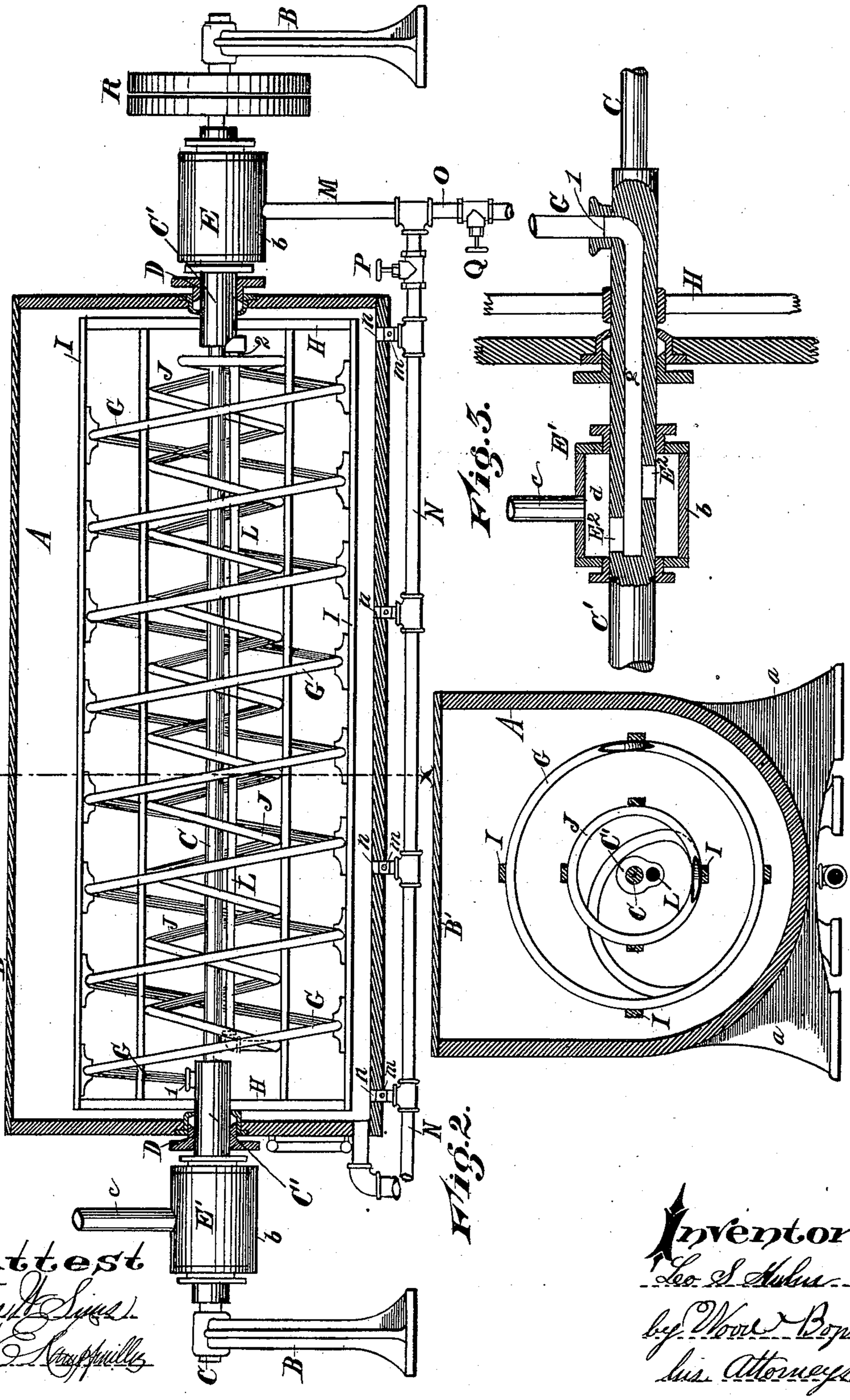

Fig. 1.

Fig. 3.

Fig. 2.

Attest

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UNITED STATES PATENT OFFICE.

LEO S. KUHN, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO GEORGE F. AHLERS AND ISAAC A. HOFFMAN, OF SAME PLACE.

BEER-MASH TUB.

SPECIFICATION forming part of Letters Patent No. 313,430, dated March 3, 1885.

Application filed May 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, LEO S. KUHN, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Beer-Mash Tubs, of which the following is a specification.

My invention relates to improved devices for cooking and cooling mashes.

The object of my invention is to provide suitable means for uniformly cooking and rapidly cooling mashes in the same vessel. This I accomplish by the novel construction and combination of devices hereinafter described and claimed, reference being made to the accompanying drawings, illustrating my invention, in which—

Figure 1 represents a side elevation of my improvement; Fig. 2, a section on line *x x*, Fig. 1. Fig. 3 is a detail sectional elevation of the union coupling-joint.

A represents a trough-shaped tub; *a*, legs for supporting the same.

B represents journal-brackets.

C represents a shaft journaled in the brackets B B, and passing longitudinally through the receptacle A, which is preferably made with a semicircular bottom to facilitate the uniform stirring of the mash.

B′ represents a loose cover, which can be raised when the device is used to cool a mash.

D D represent journal-bearings in the ends of the tub A.

E E′ represent the union-coupling water-joints, loosely mounted, respectively, on the enlarged end portions, C′ C′, of the shaft C, such joints each comprising a cylinder, *b*, arranged to create an annular water-chamber, *d*, around the part C′ of the shaft, and communicating by ports E^2 with a longitudinal channel, *g*, formed within the enlarged shaft ends C′. A water-supply pipe, *c*, is in communication with the exterior chamber, *d*, of the coupling-joint E′. The shaft ends C′ are arranged to revolve in bearings D D, secured in the ends of the cylinder, and to such shaft ends, within the tub, are rigidly secured the heads H H, which are connected at or near their peripheries by a series of longitudinal wings, I. A pipe, G, is coiled longitudinally in the tub around the shaft C, and at its end number 1 it communicates with the inner end of the passage-way *g* in the shaft end C′. This coil of pipe is supported by the wings I, and after being coiled to the other shaft end, C′, it is coiled longitudinally in a reverse direction to form an inner coil, J, which extends back to or near the end number 1 of the coil G, and thence is carried straight back through the coil J, its end number 2 being in communication with a longitudinal passage-way in the other shaft end, similar to the one *g*, so as to place the pipe L and coils G and J in communication with the interior of the union coupling-joint E, which latter is provided with an escape-pipe, M.

N represents a pipe passing horizontally along under the tub A, and *n* branch pipes connected by T-couplings to pipe N, and interiorly to the tub A.

m represents check-valves placed in branch pipes *n* to prevent the escape of the mash.

O represents a waste-pipe which taps into pipe M.

P is a cock for shutting off the pipe N, and Q a cock for shutting off the waste-pipe O.

The inlet and outlet connections through the shaft ends C′ to pipe G are both illustrated by Fig. 3, one being in reverse position to the other.

My device, as represented in the above drawings, is adapted to both cooking and cooling the mash. When it is desired to be used for cooking, cock P is opened and cock Q turned to cut off the waste-pipe O. Steam is introduced through the supply-pipe *c*, through the union-coupling E into the outside coil, G, whence it is passed through said coil and thence back through the smaller coil J; thence back through pipe L, through union-joint E; thence through pipe M into pipe N; thence through branch pipes *n* into the interior of the tub A.

In order to more uniformly heat the mash, power is applied through pulley R to revolve shaft C, together with the stirring-coils G J and wings I, which thoroughly agitate and mix the mass, securing a uniform heating of the charge.

The shape of the coils is adapted to secure

a uniform mixture and heating of the mass, as the coil G has a tendency to move the mass in one direction, and the reverse coil J, being of the opposite spiral, has a tendency to move the mass in the opposite direction, while the wings I and the coil give a rotary motion to the mass, thus securing a uniform agitation and distribution of heat or cold introduced into the coils. When it is desired to cool the mass, cock Q is opened and cock P closed. A stream of cold water is supplied by pipe *c*, which passes through the coils G J and out through the coupling E, and thence out the waste-pipe O. This mode of circulating a current of cold water through a series of coiled pipes cools the mass very rapidly and uniformly. The coils are revolved as the water is passed through them, and present a continual change of cool surface to the contents of the mass, carrying off the heat very rapidly, and with a comparatively small amount of water.

One of the advantages secured by the use of this compound coil is that the arrangement of the coil upon the revolving shaft is such that a very small amount of head of pressure is required to obtain a circulation of the water, as the action of the coil is such as to draw the water through the coils, and the thorough agitation of the mass, by the coils moving through it, secures the maximum amount of cooling effect with the least amount of water. This method of arranging the coils also facilitates the rapid expulsion of the water from the coil when it is desired to change from cold water to steam.

Another advantage arising from the use of steam is that the moving spiral coil prevents the condensation of the steam and the alternate mixture of air and condensed water, which would be otherwise liable to occur; and, should condensation of steam take place, the revolution of the coils is such as to carry off the water.

I have shown the tub A of semi-cylindrical form with a cover upon the top. It may, however, be used in different-shaped vessels, as in a cylinder provided with man-holes or escape-pipes; but the form here shown I deem the best.

I do not wish to limit myself to the means here shown for supporting the coils in order to revolve them through the mass, as the structural part of the device may be variously modified without affecting the principle of my invention.

This form of tub with its revolving coil has the additional advantage of being quickly cleaned or washed by introducing water into the interior and revolving the shaft and coil to carry off the refuse.

I claim—

1. The combination, with a mash-tub, of an inner and outer coil of pipe, the coils of which extend in reverse directions, with connections for passing a fluid through the coils, and means for revolving the same on their horizontal axes, so that said coils act on the material to move it longitudinally in reverse directions, substantially as described.

2. The combination, with a mash-tub, of two connected coils of pipe arranged one within the other, and the coils extending in reverse spiral lines, a horizontal shaft, heads secured thereto, wings carried by the heads and connected with the outer coil, connections for passing a fluid through the coils, and means for revolving the coils, substantially as described.

3. The combination, with the mash-tub, of the horizontal shaft, the outer coil, G, the inner reverse coil, J, the longitudinal pipe L, encircled by the inner coil, and connections for passing a fluid through the coils and pipe, substantially as described.

4. The combination, with a mash-tub, of the revolving horizontal shaft having channeled end portions, the stationary union-joints having interior annular chambers in communication with the channels, the inlet and outlet pipes connected with the chambers, respectively, the coiled pipe arranged horizontally around and revolving with the shaft, and connected at its ends, respectively, with the channels in the shaft, the horizontal pipe connected with the outlet-pipe of one of the chambers, and branch pipes connecting the horizontal pipe with the interior of the mash-tub, substantially as described.

In testimony whereof I have hereunto set my hand.

LEO S. KUHN.

Witnesses:
JOS. W. SIMS,
M. E. MILLIKAN.