

No. 645,835.

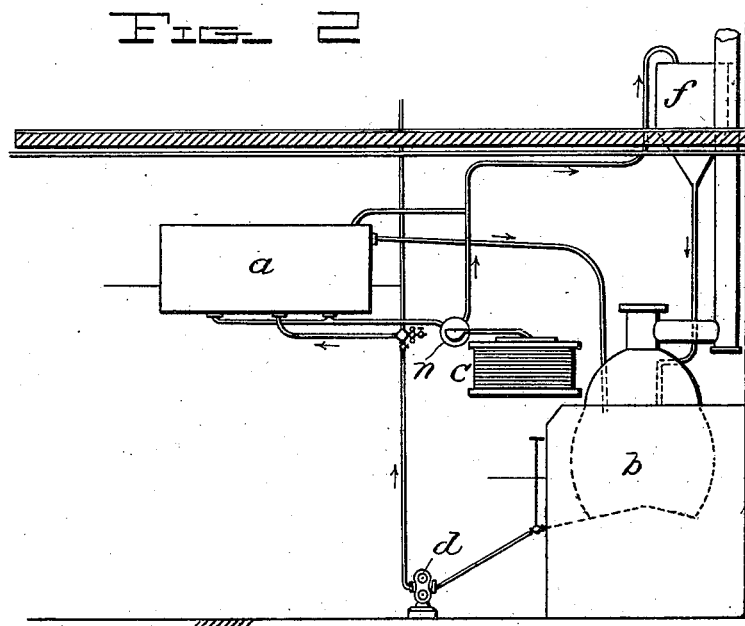
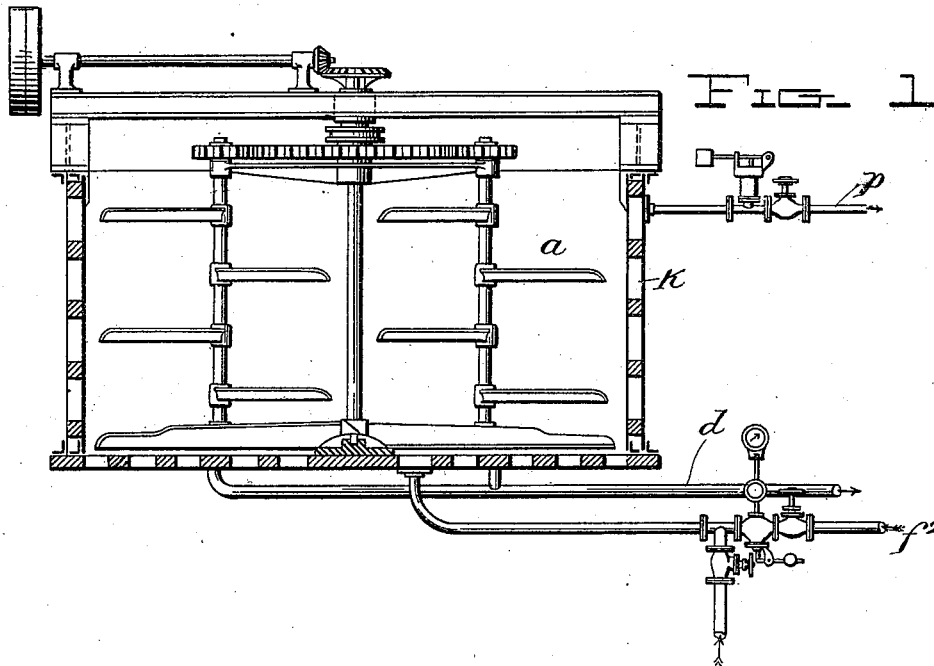
Patented Mar. 20, 1900.

C. SCHMITZ.

PROCESS OF PRODUCING WORT FROM MALT FLOUR.

(Application filed Mar. 1, 1897.)

(No Model.)



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## PROCESS OF PRODUCING WORT FROM MALT-FLOUR.

SPECIFICATION forming part of Letters Patent No. 645,835, dated March 20, 1900.

Application filed March 1, 1897. Serial No. 625,631. (No specimens.)

*To all whom it may concern:*

Be it known that I, CORNELIUS SCHMITZ, brewer, a subject of the King of Prussia, Emperor of Germany, residing at Boppard, in the Province of Rhineland, Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Processes of Producing Wort from Malt-Flour, of which the following is a specification, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of the stirrers, the driving and connecting gearing and shafts, the draw-off wort-pipe, the water-supply pipe, the steam-pipe, its cock and indicating-gage, the water-outlet pipe, and the wort-discharge pipe, the mash-tun being shown in vertical section to disclose the double walls of the same. Fig. 2 is a side elevation of the apparatus, showing the mash-tun, the brewer's copper, the cooler, the infusion vessel, the pump, and the pipes leading from the brewer's copper to the pump and showing also in section the compartments in which the brewing apparatus is located.

The invention relates to an improved process of producing wort from malt meal or flour, the mode of practicing the process being hereinafter fully described and claimed.

In carrying out my improved process I have illustrated a form of apparatus known to me; but I am fully aware that other and possibly better forms of such an apparatus may be employed, my invention relating to an improved process, and one form of apparatus being necessary to illustrate said process.

My improved process is essentially as follows: The mash is mixed with water of 35° centigrade and very gradually heated up to 65° or 66° centigrade. Then a portion of the wort, rich in diastase, is drawn off, and the mash remaining in the mash-tun is heated to the boiling-point and then boiled.

In order to gradually heat the original mash as above described from 35° to 60° or 65° centigrade, it is necessary to circulate an inclosed stream of hot water around the mash-tun *a* in such a manner that as the water thus circulated becomes cooled it is con-

stantly conducted back to the boiler and after having been reheated is conducted back to the mash-tun.

The mash-tun *a* is provided with double walls having spaces *k* between them, Fig. 1, so that the space within the mash-tun *a*, which contains the original mash, is surrounded by an outer space inclosed between said double walls, said space being connected by a supply-pipe and a waste-pipe with the brewer's copper *b*, as shown. By means of the pump *d*, connected with the water-supply pipe, the water is caused to circulate between the mash-tun and the brewer's copper in such a manner that the water heated in the brewer's copper is conducted to the mash-tun *a*, imparting a part of its heat to the mash left therein, and after parting with its heat flows back to the copper *b* and is reheated therein, this process being repeated as often as may be necessary. The mash that remains in the mash-tun is again heated by the water circulating in the pipes up to 75° centigrade and is then clarified, as by settling or filtration, at a temperature from 94° to 98° centigrade, then cooled to from 69° to 65° centigrade and saccharified at that temperature. From two and one-half to two and three-quarter hours should elapse from the commencement of the mashing until a temperature of 75° centigrade has been reached. When this temperature has been reached, the mash should be boiled as long as may be necessary within the judgment of the attendant. When the necessary boiling has been completed, the boiled mash is left to stand from fifteen to twenty minutes, and then the wort is drawn off to the copper *b*, and subsequently the wort, which is obtained by sparging the grains with hot water, is also drawn to the same copper *b*, both worts having been cooled by their passage through the cooler *c* to about 69° or 65° centigrade. In the copper *b* saccharification is effected by the addition of the solution, strong in diastase, which has been heretofore drawn off and which has been kept in the vessel *f*, connected with the copper *b*, until this time, and then the wort is boiled with hops in the usual way.

To recapitulate, the malt-flour is first mixed

with water at a temperature of 33° centigrade in a vessel (not shown) and placed in the mash-tun *a*. A circulation of hot water is kept up to and fro between the brewer's copper *b* and the jacket *k* of the mash-tun *a*, whereby the mash is gradually heated or raised to a temperature of about 65° or 66° centigrade. From one-tenth to one-eighth of the infusion so formed is pumped by suitable connections through the clarifying vessel *n*, containing the filter or the like, and thence up to the vessel *f*, which is provided with a cock *f'* in its bottom. The residual mash in the tun *a* is now heated by the hot-water circulation before referred to to about 75° centigrade. This is done gradually and occupies usually about two and one-half to two and three-quarter hours. Steam is now let from the pipe *f*<sup>2</sup> into the jacket *k* of the mash-tun and the mash boiled from fifteen to twenty minutes. Then the wort is tapped therefrom, being at a temperature of from 98° to 94° centigrade, running off quite clear and readily even though the finest malt-meal has been employed. The grains remain behind in a nearly-dry or partly-dry condition. The wort so drawn off is led through the cooler *c* to the copper *b*, in which it gradually cools down to 69° or 65° centigrade, whereupon the infusion that has hereinbefore been pumped into the vessel *f* is let down therefrom and effects the saccharification of any starch contained in the wort which has been placed therein. When the saccharification is complete—that is, when

the test of iodine no longer turns the wort blue—the wort is heated to the boiling-point, as in ordinary brewing, and after hops have been added is boiled.

This process has the advantage that all of the starch present in the malt is, with the exception of one sixty-ninth ( $\frac{1}{69}$ ) per cent. converted into sugar, while in all the processes hitherto known on an average of five to six per cent. of the starch remains unconverted.

Having thus fully described my invention, I claim—

The herein-described process of producing wort from malt-flour, consisting in mixing the mash with water of 35° centigrade gradually heating the same up to 65° or 66° centigrade; then drawing off a part of the wort, rich in diastase; gradually heating the remaining mash up to the boiling-point and then boiling the same; drawing off and then clarifying the fluid portion of the same at a temperature from 94° to 98° centigrade; then cooling the liquid down to 69° or 65° centigrade and then saccharifying the starch which still remains therein, by the addition of the fluid, rich in diastase, which has been previously drawn off from the mash, substantially as specified.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CORNELIUS SCHMITZ.

Witnesses:

NICOLAUS MASSINGT,  
WILLIAM H. MADDEN.