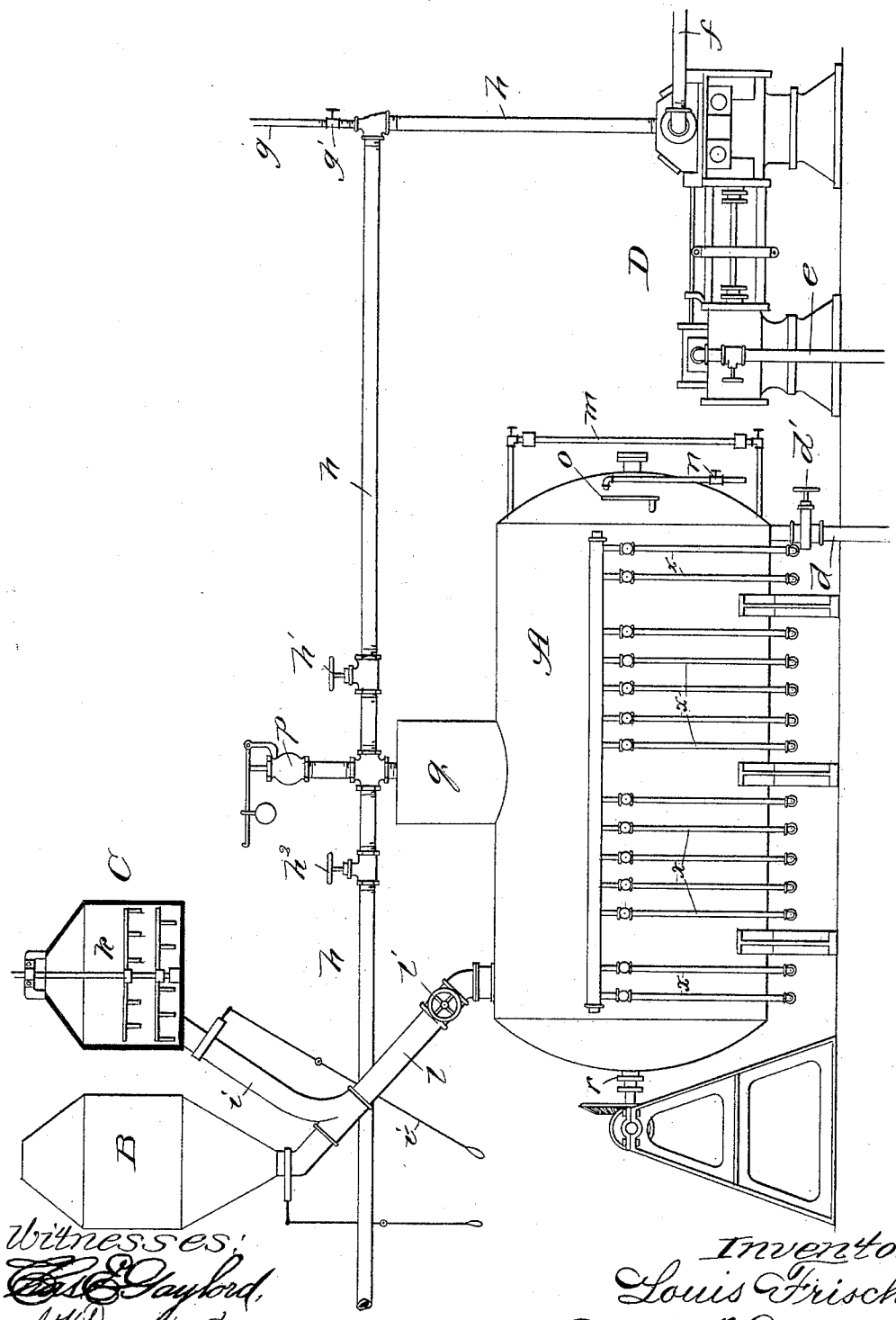
(No Model.)

L. FRISCH.

PROCESS OF BREWING ALE, BEER, AND PORTER.

No. 411,242. Patented Sept. 17, 1889.



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UNITED STATES PATENT OFFICE.

LOUIS FRISCH, OF CHICAGO, ILLINOIS.

PROCESS OF BREWING ALE, BEER, AND PORTER.

SPECIFICATION forming part of Letters Patent No. 411,242, dated September 17, 1889.

Application filed April 4, 1889. Serial No. 306,023. (No model.)

To all whom it may concern:

Be it known that I, LOUIS FRISCH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in the Process of Brewing Beer, Ale, and Porter, of which the following is a specification.

My improvement relates to that portion of the process of making beer, ale, and porter known as the "mashing step," in which the cereal employed is boiled, the malt added, the starch of the cereal converted into sugar, and the dextrine obtained from the malt.

The object of my improvement is to obtain, compared with the mashing as hitherto practiced in brewing, a materially-increased yield from the rice, corn, or other cereal containing the starch to be converted and from the malt.

In the practice of my improvement I employ the apparatus illustrated, by way of a diagram, in the accompanying drawing, in which—

A is the boiler, of desired capacity, supported in horizontal position, and containing a rotary shaft *r*, inserted longitudinally through it and actuated by suitable mechanism, which shaft is provided inside the boiler with radial arms, (not shown,) affording an ordinary form of stirrer. The steam-dome *q* of the boiler may be provided with a safety-valve *p*, though I prefer to dispense with it, and at one end of the boiler are a thermometer *o*, a draw-off cock *n*, through which to obtain from time to time samples to be tested, thereby to ascertain the condition of the contents of the boiler, and a suitable gage *m*.

B is a hopper from which to introduce the cereal to be mashed into the boiler, with which the hopper communicates through a conduit *l*, provided with a valve *l'*; and C is the receptacle for the malt-mash, containing, as usual, a stirrer *k*, and communicating through a conduit *i*, having a valve controlled from the rod *i'*, with the conduit *l*.

D is a vacuum-pump, of ordinary or any suitable construction, communicating with the steam-dome *q* through a pipe *h*, the communication being controlled by a valve *h'*, and that of the pipe with the outer air by a valve h^2; and *g* is a pipe having a valve *g'*, and leading from a suitable water-supply or pump (not shown) into the vertical part of the pipe *h*, the discharge from the pump being through a pipe *f*. The steam for driving the pump is admitted (from a suitable ordinary generator, not shown) through the pipe *e*.

To practice my improvement, the desired quantity of rice, corn, or other cereal is introduced through the hopper B and conduit *l* into the boiler A and mashed therein at a temperature of about 30° Reaumur, more or less, while all the valves and the man-hole (not shown) controlling communication with the boiler are tightly closed, and steam is admitted into the boiler from the supply through the pipes *x*, controlled by suitable valves. The stirring is continued while the pressure of steam in the boiler rises, until the temperature of the contents of the boiler reaches, under the pressure, 119° Reaumur, more or less, when the stirring and further introduction of steam are arrested. To attain this temperature the operation is continued for about from forty to fifty minutes. The contents of the boiler should be then permitted to rest for a short period—say about twenty minutes—when the valve h^2 is opened and the steam allowed to blow off through the pipe *h*, first slowly and afterward more and more rapidly from the boiler until the thermometer *o* indicates a reduction in the temperature to about 85° Reaumur. The valve h^2 is then closed and the valve *h'* opened, and the pump D is actuated to produce a vacuum in the boiler to lower the temperature of the mash to about 59° Reaumur, or to such degree as will cause the subsequently-introduced malt to effect the desired conversion when the action of the pump D is stopped and the respective valves closed. While the vacuum is being produced, water should be passed through the pipe *g* into the pipe *h* to condense the steam passing through it, which, with the water, passes off through the pipe *f*.

During the twenty minutes or so resting period, hereinbefore referred to, a malt mash is prepared at a temperature of about 38° Reaumur in the receptacle C, the quantity of malt being such as will contain sufficient diastase to convert all the starch of the cereal mash in the boiler into sugar if allowed to work a sufficiently long time. Of the whole

amount of malt and cereal for an entire brew I prefer to employ about three-fifths of the former to two-fifths of the latter. After the stoppage of the vacuum-pump the stirrer in the boiler A is again actuated and the contents of the receptacle C admitted into the boiler on opening the valve in the conduit *i*. The mashing in the boiler A is continued for a short period—say, twenty minutes, more or less—during which samples are taken through the draw-off cock *n* and tested (with iodines) for starch. When the testing shows the presence of but little unconverted starch, steam should be again admitted, first in small quantity, through the pipes *x* into the boiler A, and the temperature of the contents is thereby gradually raised to about 60° Reaumur, and subsequently, by opening wide the valves in the pipes *x* to let in a greater flow of steam, to about 70° Reaumur, the purpose of thus raising the temperature being to be enabled to introduce the mash, as hereinafter described, from the boiler into the large mash-tub in a hotter condition, whereby the temperature of the contents of that mash-tub may be raised sufficiently high for effecting the conversion of the remainder of the starch in the mash-tub without requiring for the attainment of the required temperature (58° to 60° Reaumur) of the contents of that mash-tub that an excessive quantity of hot water be introduced therein. The supply of steam is then shut off, and the entire contents of the boiler are transferred through a pipe *d*, controlled by a valve *d'*, into the ordinary large mash-tub, (not shown,) in which a mash of malt has been previously prepared in the following manner: About two-thirds of the additional quantity of malt required is mashed, in a usual way, in the large mash-tub to which the pipe *d* leads, at a temperature, say, of 50° Reaumur, or thereabout, the object of this malt-mashing being to effect conversion of the remainder of the starch hereinbefore referred to as being shown by the iodine test to be left in the first mash, and the object being further, of course, to utilize the malt in the production of the wort. When the contents of the boiler A and of the aforesaid large mash-tub have been intermixed in the latter, the additional one-third of the required quantity of malt is introduced into the said tub to dominate the cereal aroma of the mash by a malt aroma, when boiling or very hot water may, if required, be let into the combined mash in a manner to raise it gradually to a temperature of from 58° to 60° Reaumur, more or less, the contents of the tub being in the meantime continually stirred. The mash is then finished, the stirrers are stopped, and after a lapse of, say, about twenty minutes the contents of the tub are ready to be drawn off to the kettle, and subsequently treated in the common and well-known manner practised in the manufacture of beer, ale, and porter.

If desired, instead of introducing the malt as a previously-prepared mash in any of the steps hereinbefore recited it may be introduced dry, though I prefer first to mash it.

I find that by my improved process the greatest possible yield practically obtainable from the cereals and malt is obtained, which is a material gain over the process of mashing as hitherto practiced in the manufacture of beer, ale, and porter.

Any suitable cereal may be treated by my improved process to obtain the advantages it affords without previous preparation, except corn, from which the skin and heart should be previously removed, and which should be ground by some process which will avoid loss of starch, all of which, if possible, should be retained.

What I claim as new, and desire to secure by Letters Patent, is—

1. In the manufacture of beer, ale, and porter, the process of preparing the mash, which consists in mashing the cereal and boiling it under steam-pressure, removing the steam-pressure and lowering the temperature of the mash to a degree at which the diastase of malt will effect the desired conversion, mixing malt with the cooled cereal mash and stirring the mixture until the desired quantity of saccharine matter has been produced, and finally drawing off into a mash-tub and adding more malt to the mash, substantially as and for the purpose set forth.

2. In the manufacture of beer, ale, and porter, the process of preparing the mash, which consists in mashing the cereal and boiling it under steam-pressure, allowing the mash to rest, then removing the steam-pressure, then producing a vacuum on the mash, mixing malt with the cereal mash, and stirring the mixture until the desired quantity of saccharine matter has been produced, raising the temperature of the mixture, drawing off into a mash-tub, and adding more malt, substantially as and for the purpose set forth.

LOUIS FRISCH.

In presence of—
M. J. BOWERS,
J. W. DYRENFORTH.