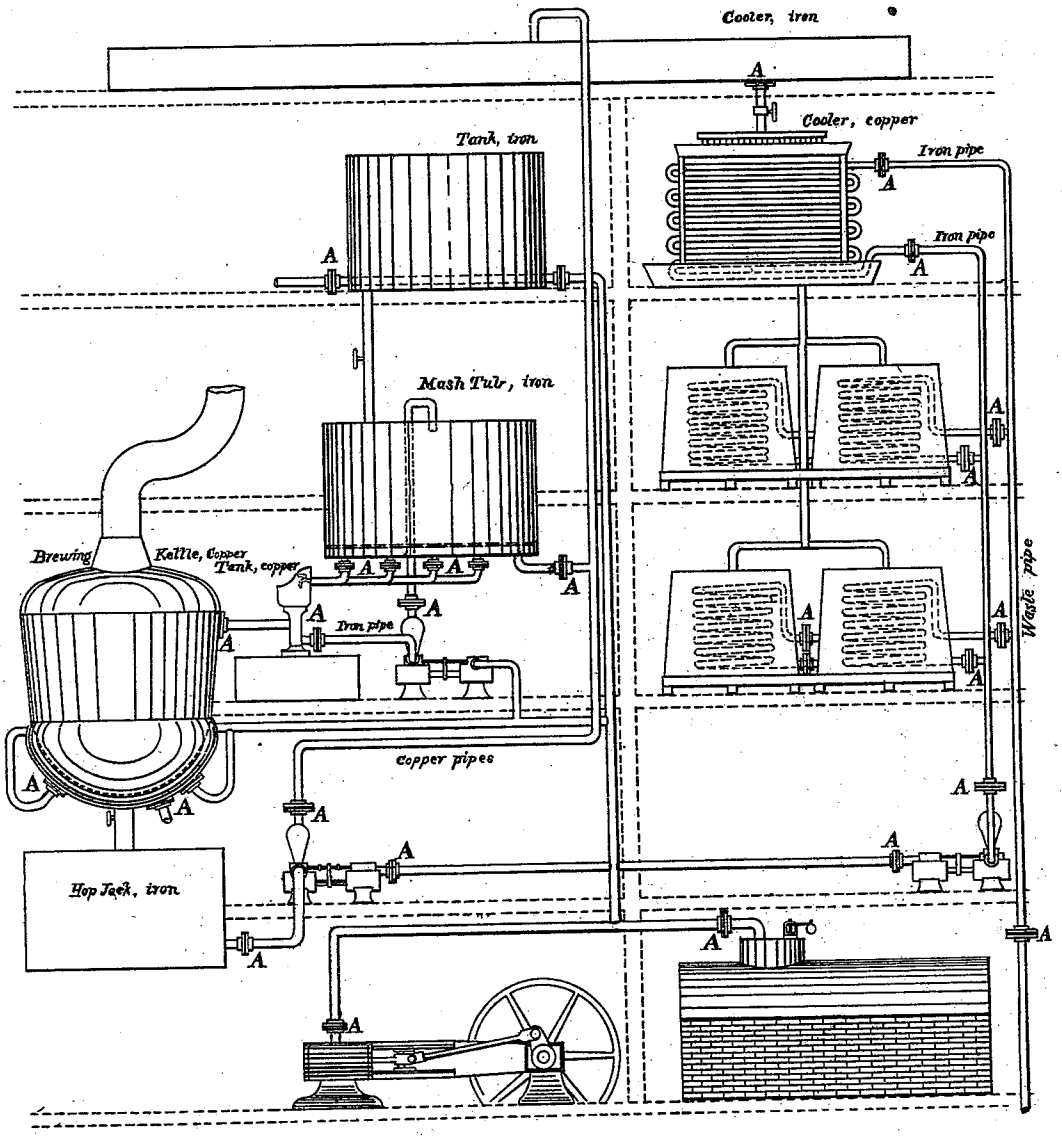
2 Sheets—Sheet 1.

H. STRATER, Jr. & H. H. RUETER.

Preventing Galvanic Action in the Manufacture of Malt Liquors.

No. 213,142 **Patented Mar. 11, 1879.**



Attest;

Dan'l L. Smith,

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2 Sheets—Sheet 2.

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Fig. 1.

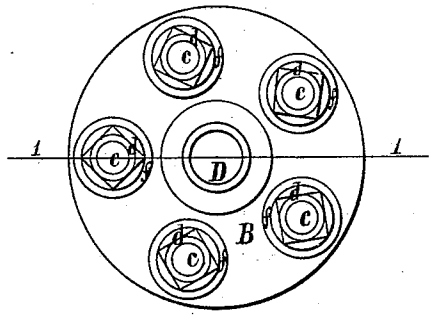


Fig. 2.

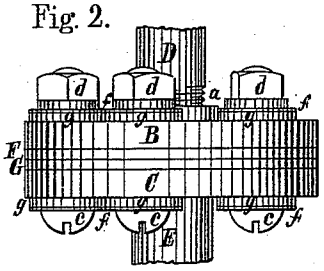


Fig. 3.

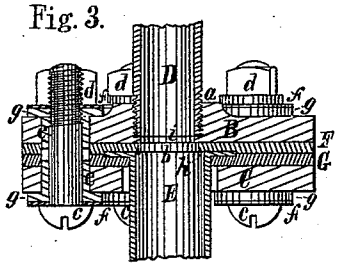
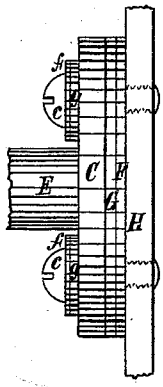


Fig. 4.



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UNITED STATES PATENT OFFICE.

HERMAN STRATER, JR., AND HENRY H. RUETER, OF BOSTON, MASS.

IMPROVEMENT IN PREVENTING GALVANIC ACTIONS IN THE MANUFACTURE OF MALT LIQUORS.

Specification forming part of Letters Patent No. **213,142**, dated March 11, 1879; application filed February 1, 1879.

To all whom it may concern:

Be it known that we, HERMAN STRATER, Jr., and HENRY H. RUETER, both of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Method and Device for Preventing Galvanic Action and Transmission of Electric Currents in the Manufacture of Fermented Malt Liquors and other manufactured products, which method and device are fully described in the following specification, reference being had to the accompanying drawings.

Our invention relates especially to the apparatus and equipment for the manufacture of lager-beer, ale, and other fermented malt liquors; and it consists in making part or all of the necessary connections between the parts of said apparatus and equipment—such as steam-boilers, steam-worms, kettles, engines, pumps, coolers, refrigerators, temperators, swimmers, tanks, tubs, vats, and tuns, and piping connected therewith—which may be acted on chemically by the liquids and ingredients contained therein, and by their contact create galvanic action, or which may serve as a medium for the passage of electric currents arising from galvanic action or other causes, by means of one or more substances which are non-conductors of electricity, and shall prevent actual contact of different metallic parts, and prevent or impede the passage of electric currents; and it further consists in the connection or coupling, hereinafter described, wherein a substance or substances are introduced to provide the desired insulation.

In the drawings, Sheet 1 shows several of the more prominent parts of the apparatus and equipment employed in a brewery, located in a general way in such relation to each other as is required, and illustrates the occasion for, and some of the places where, our insulating-connections should be introduced. Sheet 2 shows one of our couplings, Figure 1 being a face view, Fig. 2 a side view, and Fig. 3 a view of a section taken on line 1 1 in Fig. 1; and Fig. 4 shows how the side of a vessel may take the place of one of the flanges.

It is well known that where certain different metals—as, for instance, iron and copper—are brought in contact with each other, and with substances that may act chemically on them, there occurs galvanic action, and that currents of electricity are created, which in their turn increase or facilitate the chemical action. In the brewing of fermented malt liquors—such as beer and ale—as also in the manufacture of other articles—as sugar—it is desirable, for obvious reasons not necessary here to particularize, to make some parts of the apparatus or appliances of one metal—as iron—and to make other parts of another metal—as copper. The liquids employed, even the water or steam in the engine, pumps, pipes, boilers, or kettles, but more especially of the beer or ale, &c., in their several stages of manufacture, being more or less acidulous, are such as to cause chemical action on the vessels or pipes. Galvanic action is notably great when the different metals are in actual contact; or, in other words, the chemical action, or destruction of the metals, is greatly increased by such contact. Furthermore, the uninterrupted close connection of the several metallic parts, whether of the same or different metals, greatly facilitates or makes possible the transmission of the currents of electricity generated.

The deleterious effect shows itself mainly during the process of the fermentation of the wort, in the action of such galvanic agency or electric currents upon the healthy condition and propagation of the yeast-cells, rendering an even and normal fermentation and attenuation, upon which the good quality of the product depends more than upon any other part of the process of brewing, a matter of great uncertainty and often of impossibility. There is no reason to doubt that the wort is injuriously affected by such galvanic or electric action during other stages of the process by the creation of, and contact with, salts of copper and iron, and in other ways, which hurtfully affect the brilliancy, flavor, and keeping qualities of the resulting beer or ale.

Not only do these facts appear theoretically true, but actual and extensive experiments made by us have demonstrated them to what appears an absolute certainty. Breweries which have heretofore been unable to produce beer and ale of the desired quality, and into which we have recently introduced our method

of insulation and fitted with our non-conductors, are now turning out beer and ale satisfactory in every respect.

Our method is the employment of insulating connections between parts of the apparatus and equipment—that is, connections in which a substance which is a non-conductor of electricity is introduced, and which shall intervene between two adjacent metals of different kinds or of the same kind. In this manner, as illustrated on Sheet 1, where the insulating-connections are shown in several places, (marked A,) the direct contact of two different metals, and the transmission of elective currents, however created, are avoided.

Various forms of insulating-connections, differing in detail from the one we illustrate on Sheet 2, and describe below, might be used. The employment of any insulating connections or couplings to systematically produce the results we attain would embody our invention.

The connection or coupling which we have invented and desire to use, as one of simple construction and easy application, has the two flanges B and C. One of the flanges, B, connects directly with a pipe, D, by a suitable joint, as by means of the screw-threads *a*. There is an annular space between the other pipe, E, and the flange C, through which the pipe passes. Between the flanges B and C are two rings, F and G, or disks having the central opening or passage-way, *b*, made of a substance or substances that are non-conductors of electricity. The flanges and rings are held in place and pressed together by screws or bolts *c* and nuts *d*. Between the bolts or screws *c* and the flanges B and C are the tubes *e*, which are of a non-conducting substance or substances; and between the heads and nuts of the bolts, or the washers *f* thereunder, and the flanges B and C are the rings or washers *g*, also of a substance or substances non-conductors of electricity. On the pipe E is formed a flange, *h*, which rests between the insulating-rings F and G, and is held as shown. A shoulder, *i*, prevents the pipe D from entering too far into the flange B.

It will be seen that the pipes D and E are insulated one from the other, as far as the passage of electricity is concerned, as are also the flanges B and C. The pipe E might connect directly with the flange C, as the pipe D does with the flange B, and the insulation between the pipes be complete, the insulating-rings, as shown in case of the one, F, and the shoulder *i* preventing the ends of the pipes coming in contact.

The coupling, as shown, is especially suitable, since it may be used where a pipe is connected to a vessel, in which case one of the pipes, as D, could be dispensed with, and in place of the flange B would be the side H of the vessel. So, also, two vessels might be connected together without the intervention of pipes, the flanges B and C being employed, or the sides of the vessels taking the place of these flanges.

When the coupling is used to connect two pipes, or a pipe and a vessel, or two vessels, of the same kind of metal, to simply prevent the passage of electric currents the metallic parts of the coupling may be made of one metal; but when contact between two different metals is to be obviated, the idea will be more perfectly carried out by having each of the flanges B and C of the same metal as the pipe or vessel to which it is directly joined.

Our method and device for insulation are also adapted to the apparatus for manufacturing sugar and other products, to prevent galvanic action and the passage of electric currents.

We claim as our invention—

1. In breweries and other manufactories where galvanic action is caused or electric currents are generated or conducted in a manner substantially as set forth, one or several parts of the apparatus, equipment, or appliances when separated from actual contact with, or electrically insulated from, one or several other parts of the apparatus, equipment, or appliances, substantially as and for the purpose hereinbefore set forth.

2. The flanges B and C, joined by bolts or screws *c*, and electrically insulated one from the other by the intervention of a substance or substances that are non-conductors of electricity, as done by the rings F and G and tubes *e* and washer *g*, substantially as hereinbefore described.

3. The combination of the insulated flanges B and C, pipe D, and pipe E, having the flange *h*, substantially as hereinbefore described.

4. A coupling having the two flanges B and C, one or both of the flanges having a shoulder, *i*, substantially as and for the purpose hereinbefore set forth.

HERMAN STRATER, JR.
HENRY H. RUETER.

Witnesses:
EDW. DUMMER,
FRANCIS A. STRATER.