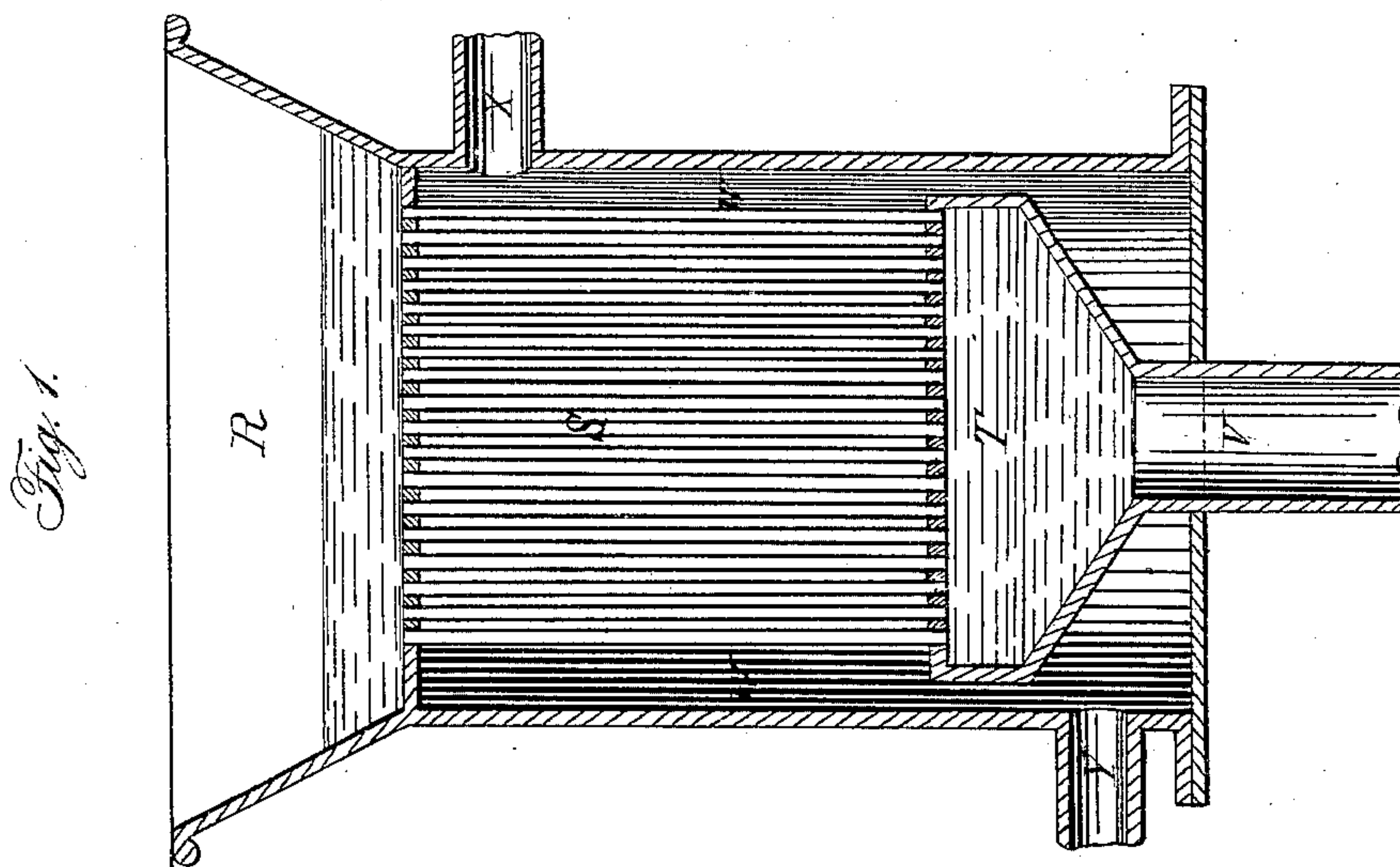
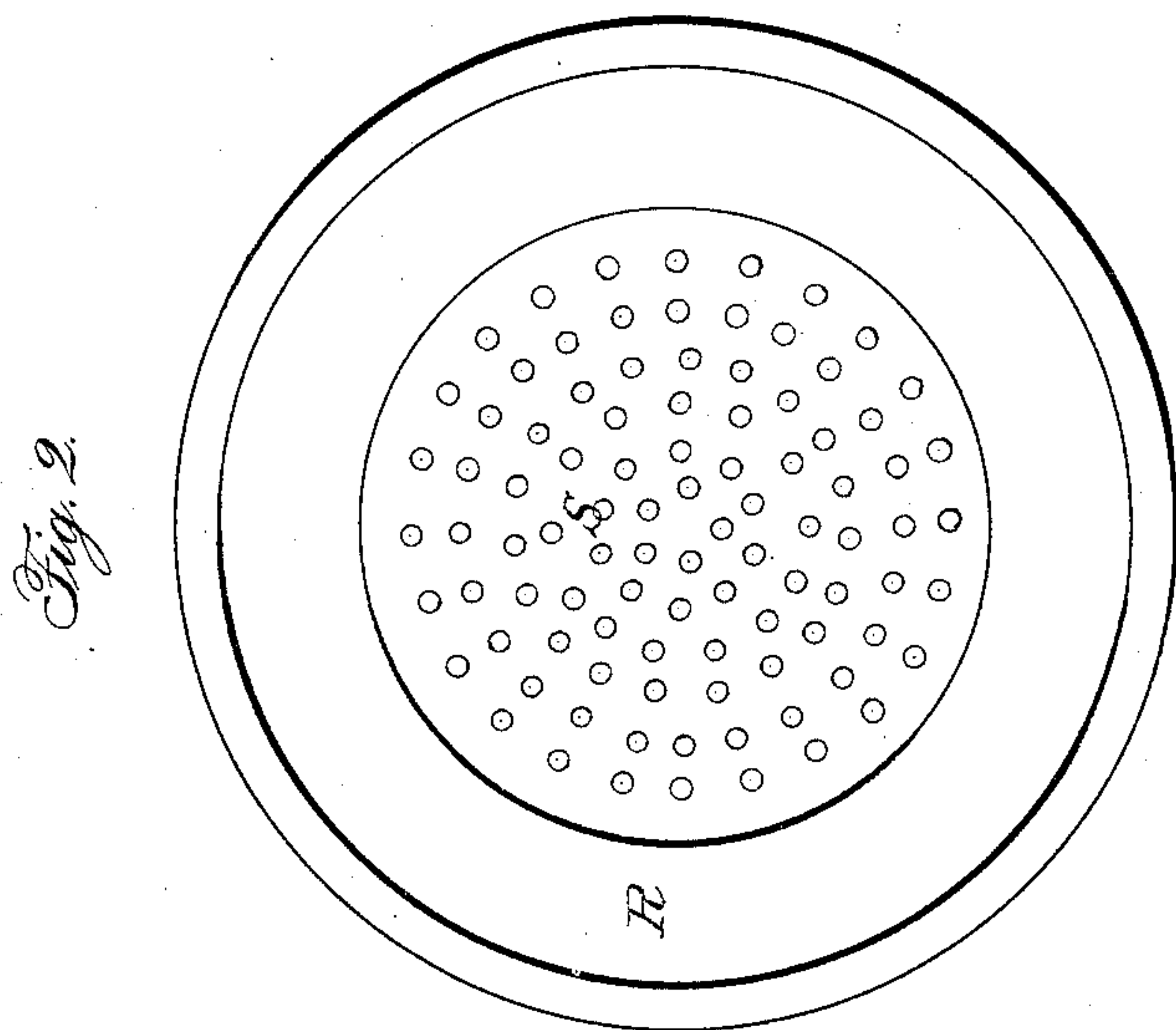


H. BESSEMER.  
Evaporating Pan.

No. 9,618.

Patented Mar. 15, 1853.



# UNITED STATES PATENT OFFICE.

HENRY BESSEMER, OF BAXTER HOUSE, COUNTY OF MIDDLESEX, ENGLAND.

## IMPROVEMENT IN HEATERS FOR SUGAR-SIRUP.

Specification forming part of Letters Patent No. 9,618, dated March 15, 1853.

### *To all whom it may concern:*

Be it known that I, HENRY BESSEMER, of Baxter House, Old St. Pancross Road, in the county of Middlesex, England, have invented or discovered a certain new and useful Apparatus or Improved Heater for Rapidly Heating Concentrated Sirups; and I do hereby declare that the same is fully described and represented in the following specification, reference being had to the accompanying drawings, which make a part of the same.

When evaporation of sugar-sirup is carried on at a very low temperature—say 150° Fahrenheit, or thereabout—it will be necessary to raise the temperature of it previous to crystallization, and as all high temperatures if long-continued are injurious to sirups, I expose the saccharine fluid to a moderate temperature in small or divided streams, so that a minute's exposure to heat will bring it up to the requisite temperature. The apparatus for effecting this operation is represented in the drawings above mentioned, wherein—

Figure 1 is a vertical section, and Fig. 2 a plan of the apparatus.

In the same, R is a copper vessel or "heater" open on the top, and having a flat bottom, in which a great many small tubes, S, are inserted. These tubes are connected to the top of a conical chamber, T, which is placed below the vessel R, and terminates in a spout, U. The tubes S are inclosed in a separate closed chamber, W, into which steam is admitted by a pipe, X, and allowed to pass off by a pipe, Y.

When sirup is poured into the upper part, R, it will commence to flow down the small tubes S. The heat of the steam acting on the exterior of such tubes, will bring the sirup up to the required temperature. The fluid sirup will then flow off at the spout U, and thus the operation of heating the sirup in small successive portions may continue, each portion thereof being only subjected to its action for a very short time.

In the above invention it will be seen that

the power of gravity is employed to cause the sirup to rapidly flow through the tubes S. This is a convenient and cheap way of forcing the fluid through the small tubes. A forcing-pump may be substituted; but this would involve expense of constructing and working it. Gravity, however, produces the desired effect without such expense.

I am aware that in locomotive-engines water has been heated by standing in tubes exposed to the flame or direct heat of a furnace. Now, such a mode of heating will not answer for the treatment of the saccharine sirup, as the heat of a furnace is not susceptible of regulation, as is that from steam, the latter not burning the sirup or injuriously heating it, as would the former.

I have discovered that the heat of steam applied to sirups in manner described, in connection with the action of gravity, produces advantages in rapidly heating the sirup unattainable by any process where the sirup is passed through pipes heated by direct heat or the flame of a furnace. It is therefore that I expressly disclaim the mode of heating water by allowing it to flow through or stand in tubes heated by the direct heat of a furnace, but base my invention on—

The above-described method of treating saccharine sirup by means of the apparatus represented in Figs. 1 and 2, as there arranged and constructed to operate for the purpose set forth, by the power of gravity and steam, the same consisting of a combination of the receiving-vessel R, the series of tubes S, the chamber T, and its pipe U, and the steam-chamber W, having induction and eduction pipes, as specified.

In testimony whereof I have hereto set my signature this 30th day of December, A. D. 1852.

HENRY BESSEMER.

Witnesses:

JOSEPH MAYNETT,  
JOHN R. DARKER.