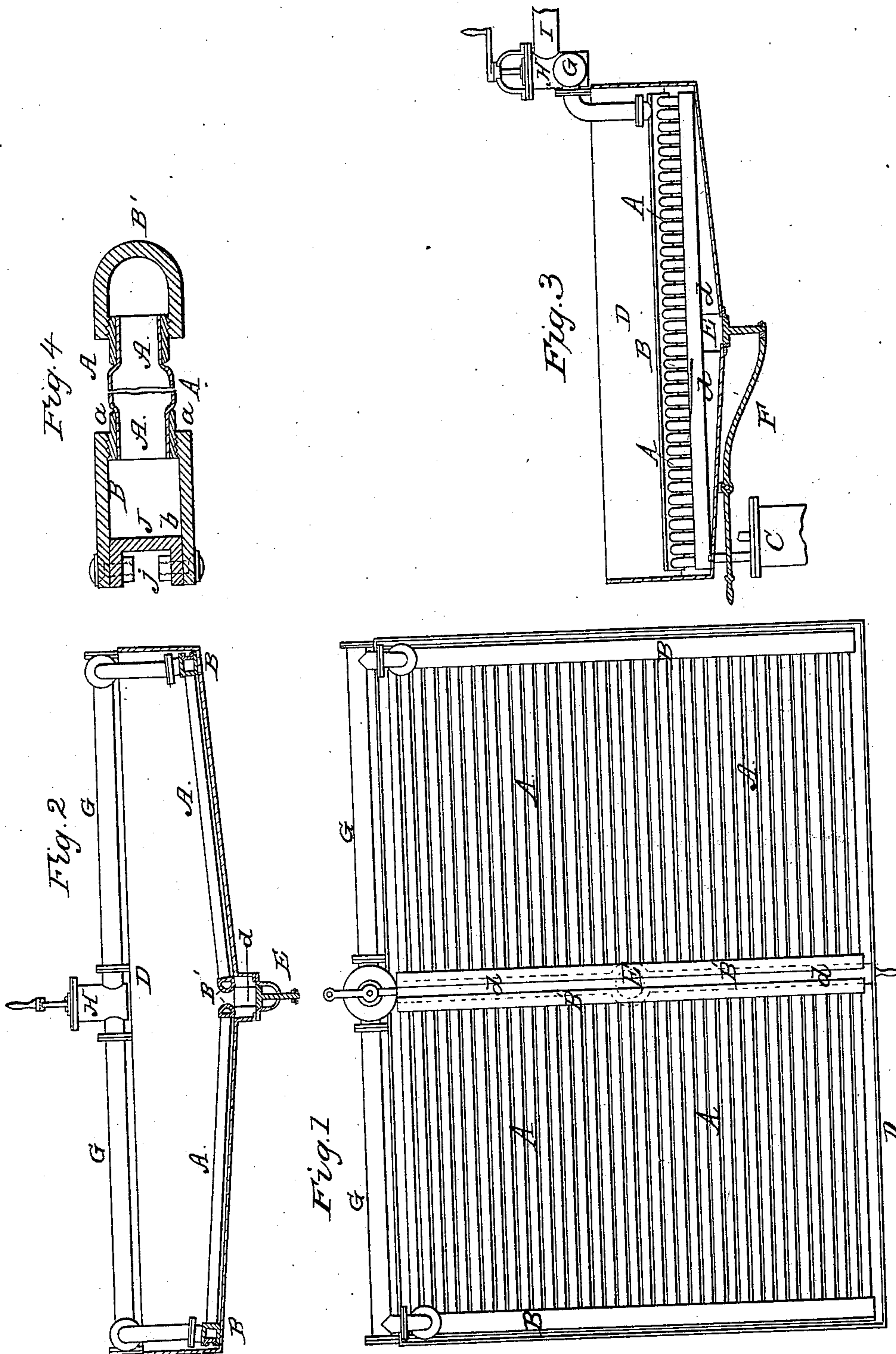


MAPES & COX.  
Evaporating Pan.

No. 4,352.

Patented Jan'y 7, 1846.





# UNITED STATES PATENT OFFICE.

J. J. MAPES AND W. A. COX, OF NEW YORK, N. Y.

## IMPROVEMENT IN EVAPORATING-PANS.

Specification forming part of Letters Patent No. 4,352, dated January 7, 1846.

*To all whom it may concern:*

Be it known that we, JAMES J. MAPES and WILLIAM A. COX, of the city of New York, in the State of New York, have invented a new and Improved Apparatus for Heating, Evaporating, and Concentrating Fluids by the Heat of Steam; and we do hereby declare that the following is a full and exact description thereof with reference to drawings hereto annexed, illustrating our invention.

This apparatus may be applied to the making of sugar, the distillation of the various spirits and essential oils, concentrating solutions of salts and extracts of dye-woods, heating animal and vegetable oils for purification, and, in short, to the heating, evaporating, or concentrating of all liquids of whatever nature, or to the heating of atmospheric air for drying processes.

It consists of a series of short straight pipes, A, of copper or other metal, communicating at each end with a metallic box or tube, B B', running the whole length of the series—an arrangement which offers the least possible obstruction to the circulation of the steam and permits the pipes A to be laid at such an inclination as will insure the immediate running off of the condensed water as it forms. Steam is admitted from the boiler or vessel in which it is generated into the box B, with which the raised ends of the pipes communicate, from whence it passes into and fills the pipes, and there yields up its heat, which, being transmitted through the copper or material of the pipes, heats or evaporates the fluid surrounding them. The water formed by condensation of the steam flows into the box B' at the lower ends of the pipes, from whence it is conducted away either to waste or into a cistern for resupplying the steam-boiler. The pipes are inclined not less than an inch or three-fourths of an inch in a foot, the inclination being greater as the length of the pipes is greater, as it is important that the water should not be suffered to accumulate in them, owing to the injurious effect it has upon their evaporating-power. In order that the condensed water may be got rid of without letting steam escape, there may be connected with the box B' some one of the many contrivances for this purpose now in use—for example, a vessel, C, in which is a ball-cock, so arranged as to let off the water only.

To enable others to make and use our inven-

tion in the most efficient manner, we will proceed to describe the mode in which we construct an evaporator and pan for the purpose of boiling a solution of sugar.

The pan D (see drawings annexed) contains two series of copper pipes, A A, a little less than five feet in length. The bottom of the pan has an inclination from the ends toward the middle of about one inch to the foot, and as the pipes rest upon the bottom they have a like inclination. Across the middle of the pan is a gutter, d, which receives the sirup as it runs down the bottom and conducts it to the center, where the discharge-valve E is placed. The discharge-valve is controlled by a lever, F, which permits of its being raised from the outside. The steam-boxes B B of both series connect to one steam-pipe, G, in which is a stop-valve, H, for shutting off the steam, and connected with this stop-valve is the pipe I, leading from the steam-boiler. The boxes for the steam and condensed water are of cast-brass. The steam-box B is rectangular. (See Fig. 4 for a cut section of boxes and pipes, enlarged size.) One side has openings in it, into which the pipes are screwed. The other side is closed by a cap, J. The cap is also rectangular, and resembles a box having only the top, bottom, and one side, and when in place looks like a box of smaller dimensions fitted into the side of one of larger dimensions. The inside of the top and bottom of the box and the outside of the top and bottom of the cap are planed, to make a better joint, and in planing the box a rabbet or shoulder, b, is left upon the top and bottom, against which the cap comes. Red lead or some suitable substance is put in the joint, and the surfaces are brought together by screw-bolts j, passing through the cap and box. The water-box B', the form of which is not essential, but for convenience is made semi-elliptical, is cast entirely closed, except the openings into which the pipes screw and an opening in the under side and near one end, through which the condensed water is led away. The pipes A are formed in the usual way by rounding up a piece of copper of the proper width and length and brazing the edges together. The ends of the pipes are drawn in a little, and have brass collars a a brazed upon them, upon which the screw-thread is cut. The end which screws into the water-box is so much smaller than the other end as to permit

t to pass through the hole in the steam-box into which the other end fits, and the pipe is screwed into both boxes at the same time.

The form of the cap above described for closing the steam-box is preferable to any other which we have used, for two reasons. It forms a joint impervious to water and steam, and it permits the apparatus to lie close to the bottom of the pan, by which means a small charge of sirup can be boiled. It is an established fact in sugar-making that the less the quantity of juice or sirup operated upon and the shorter the time it is under treatment the better will be the result, both as to quantity and quality.

We claim—

The employment within an evaporating-pan of a series of inclined tubes, in combination with an upper and lower box or tube, the former communicating with the upper end of the series of inclined pipes for the admission of steam to them, and the latter with the lower end of the series for the discharge of steam and water produced by condensation, substantially as described.

JAS. J. MAPES.  
WM. A. COX.

Witnesses:

T. B. WAKEMAN,  
JOHN W. CHAMBERS.