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THE

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PRINCIPLES

OF

WARMING AND VENTILATING

PUBLIC BUILDINGS,

DWELLING-HOUSES, MANUFACTORIES, HOSPITALS,
HOT-HOUSES, CONSERVATORIES, &c.

AND OF CONSTRUCTING

FIRE-PLACES, BOILERS, STEAM-APPARATUS, GRATES,
AND DRYING-ROOMS;

WITH

REMARKS ON THE NATURE OF HEAT AND LIGHT,

&c. &c. &c.

By THOMAS TREDGOLD,

CIVIL ENGINEER, &c.

THIRD EDITION.

TO WHICH IS NOW ADDED,

AN APPENDIX,

By T. BRAMAH, CIVIL ENGINEER,

COMPRISING

OBSERVATIONS ON HEATING BY MEANS OF WARM WATER, WITH
DESCRIPTIONS OF VARIOUS APPARATUS IN USE.

LONDON:

M. TAYLOR (NEPHEW AND SUCCESSOR TO THE LATE J. TAYLOR),
1 WELLINGTON STREET, STRAND,
REMOVED FROM HIGH HOLBORN.

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16. In order to compare the effects of different kinds of fuel, some convenient measure of effect should be adopted; not only for the purpose of lessening the trouble of calculation, but also to render it more clear and intelligible. I shall, therefore, without regarding the measures of effect employed by others, adopt one of my own, which I have found useful in this and other inquiries of a similar nature.

I take as the measure of the effect of a fuel, the quantity, in pounds avoirdupois, which will raise the temperature of a cubic foot of water one degree of Fahrenheit's thermometer.

PLATE III.

THE figures 7 and 8 shew the most simple and effective Method of joining Steam-pipes. The joint is held together by the screw-bolts *a a a a*. See arts. 124, 125.

Fig. 9 is an inverted syphon, through which the water passes as it is produced by the condensation of the steam in the pipes, and runs off into a drain by a continuation of the pipe *C*. To let the air out of the pipes, when the steam is let in, there is a small pipe and stop-cock, *E*, which may be made self-acting by fixing a lever handle to the stop-cock, and a connecting-rod from the lever to an eye fixed in the wall. By this simple addition, the cock will always be open when the pipes are cold, and gradually close as they become of the temperature of the steam. See art. 130, where a rule for the diameter of the waste-pipe is given.

Fig. 10 is a steam-trap, for the condensed steam to escape as it condenses. When water accumulates in the box, it floats the hollow copper cylinder *D*, and runs away through the pipe *F*, into a drain, the stop-cock and pipe at *S* being added for letting out the air; and may be made self-acting, as described above. See art. 131. In this trap there is sufficient space in the box to allow the water to separate from the air; when this is not the case, both water and air will often issue from the air-pipe in letting in the steam.

Fig. 11 shews a means of applying the force of the steam in the pipes for raising the condensed steam to a higher level. The valve *C* should be rendered nearly as light as the same bulk of water. It may be useful in some instances where there is not sufficient drainage for applying the preceding methods. See art. 132.

Fig. 12 is a perspective sketch of a side-table, of marble or stone, to contain a mass of pipes in a hall, a staircase, or a gallery. The open brass-work is to admit air to the pipes to be heated, and to allow it to return to the room. The form and disposition of things of this kind may be infinitely varied; the figure will perhaps be sufficient to illustrate the principle alluded to in arts. 119, 135. In every contrivance for heating air, the immediate rise of the hot air in a vertical jet should be avoided; its motion should be either horizontal or inclined downwards, so as to diffuse it as much as possible.

Fig. 9.

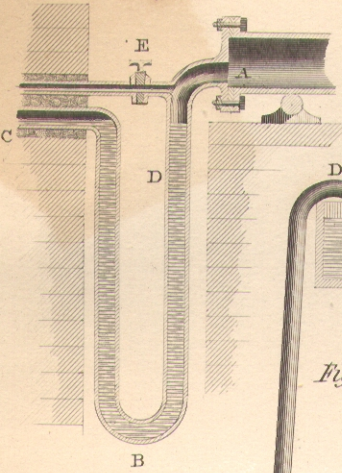


Fig. 8.

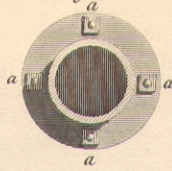


Fig. 7.

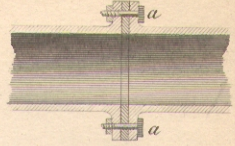


Fig. 11.

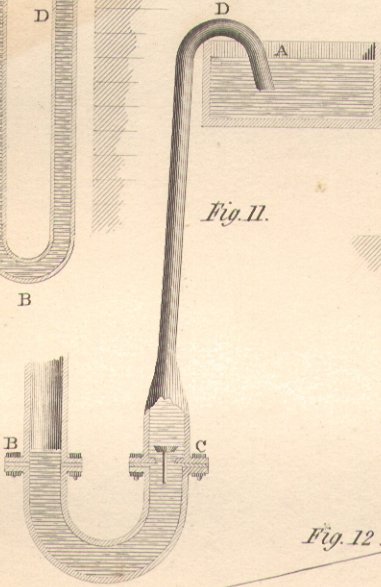


Fig. 10.

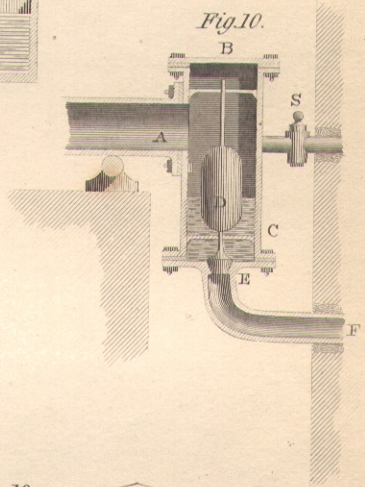


Fig. 12.

