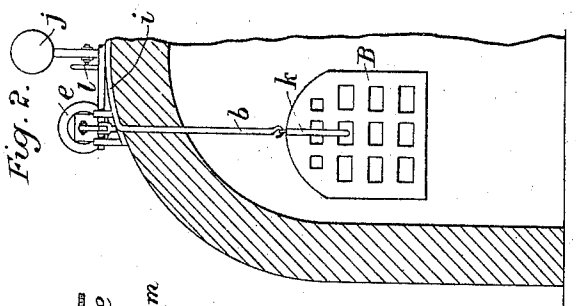
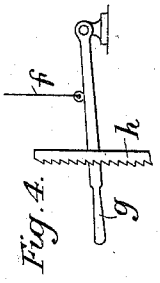
No. 608,059. Patented July 26, 1898.

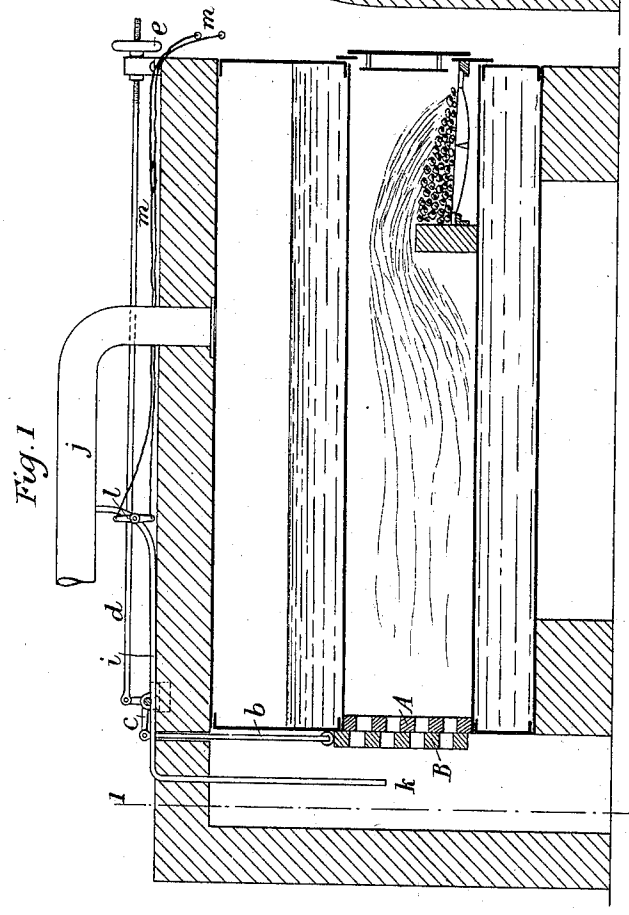
W. S. MacKENZIE & W. CROSLAND.

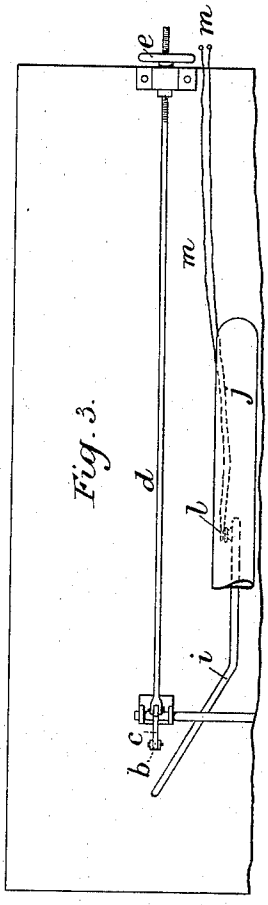
FURNACE FOR STEAM BOILERS.

(No Model.) (Application filed Dec. 28, 1897.)









WITNESSES—
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UNITED STATES PATENT OFFICE.

WILLIAM S. MACKENZIE, OF NORMANTON, AND WILLIAM CROSLAND, OF MILNTHORPE, ENGLAND.

FURNACE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 608,059, dated July 26, 1898.

Application filed December 28, 1897. Serial No. 663,964. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM SCOBIE MACKENZIE, surgeon, residing at The Orchard, Normanton, and WILLIAM CROSLAND, engineman, residing at Woodthorpe Lane, Milnthorpe, in the county of York, England, subjects of the Queen of Great Britain and Ireland, have invented certain Improvements in or Connected with Furnaces for Steam-Boilers or other Purposes, of which the following is a specification.

This invention has for its object to provide means in connection with steam-boiler furnaces or other furnaces whereby increased heating effect is obtained, smoke and combustible gases are efficiently consumed, and fuel is economized.

According to this invention there is provided in the flue or passage by which the products of combustion pass toward the chimney a perforated fire-brick structure or plate. It is preferably placed in the flue or passage—in the case of a boiler-flue at the end thereof farthest from the fireplace or furnace proper and flush with the end of the boiler, as illustrated at A in the accompanying drawings, wherein—

Figure 1 is a longitudinal section; Fig. 2, a vertical section on the line 1 2, Fig. 1; Fig. 3, a plan and Fig. 4, a detail.

A similarly-perforated structure or plate B, of fire-brick, is mounted in a frame or otherwise and provided with means for moving it so that the perforations therethrough can be made to coincide with the perforations through the fixed fire-brick structure or so that the solid portions of the one close or partially close the perforations through the other. These means for operating the part B may be of any suitable kind. For example, the said part B may be connected by a rod *b* to one arm of a bell-crank lever *c*, turning on a center on the top of the boiler-setting and having its other arm connected to a rod *d*, extending to the front of the furnace and there passing through a nut in the wheel *e*, so that it may be drawn forward to raise the part B or moved back to lower the said part B by rotating the wheel *e* in one or the other direction; or the part B may be operated by a rope *f*, passing over pulleys and attached to a device, such as a lever *g*, which can be moved up and down and retained in any position by engaging with the toothed bar *h*, as illustrated by Fig. 4. The movable part B may be provided with a counterpoise, so as to facilitate its operation, and by adjusting it the rate of combustion can be regulated as required. As the products of combustion pass through the perforations of the structures A and B the said products are very effectually consumed, as the said structures become highly heated and cause the combustion of the smoke and gases as they pass therethrough at a rate regulated by the adjustment of the movable part. A steam-jet or steam-jets may be employed in proximity to the said structures, preferably on the side farthest from the fire, to aid the draft and assist the combustion of smoke or unconsumed gases. An arrangement for this purpose is shown as consisting of a steam-pipe *i*, supplied with steam from the boiler by the dome-pipe *j* and terminating in a jet or jets at *k* and provided at *l* with a valve by which the passage of steam can be controlled by the ropes or rods *m*, led to the front of the boiler.

Although we have named fire-brick, the structures may be made of any substance which will stand the heat.

We claim—

1. In combination with furnaces for steam-boilers or for other purposes, perforated structures of brick or other material, one situated in the flue or passage by which the products of combustion pass from the furnace to the chimney and the other movably mounted and provided with means for operating it so that it can be caused to obstruct or partially obstruct or leave free the perforations in the first-named structure, whereby the said perforated structures are highly heated and serve to consume the smoke and unconsumed gases as the same pass therethrough, substantially as hereinbefore described.

2. In combination with furnaces for steam-boilers or for other purposes, perforated structures of brick or other material situated in the flue or passage by which the products of combustion pass from the furnace to the chimney and the other movably mounted and provided with means for operating it so that it

can be caused to obstruct or partially obstruct or leave free the perforations in the first-named structure, and means for applying steam in proximity to the said structures, whereby the said perforated structures are highly heated and serve to consume the smoke and unconsumed gases as the same pass therethrough, substantially as hereinbefore described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

W. S. MACKENZIE.
WILLIAM CROSLAND.

Witnesses:
HARRY TOPHAM,
WILLIAM HILLS.