J. FLETCHER.

Brass Melting Furnace.

No. 204,309. Patented May 28, 1878.

FIG. 2.

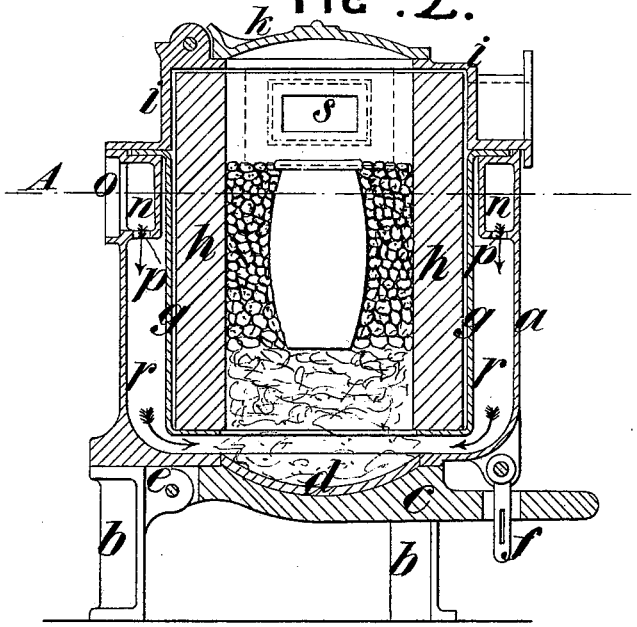


FIG. 1.

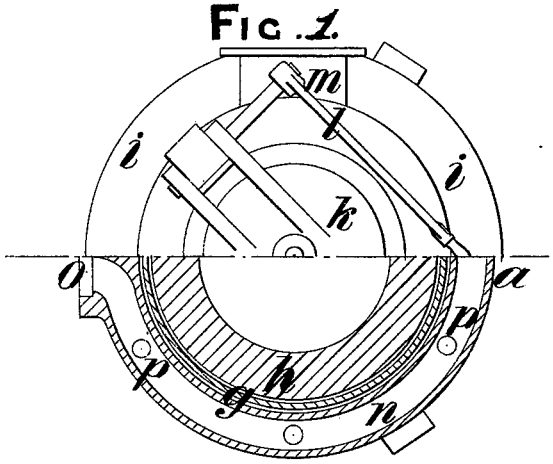
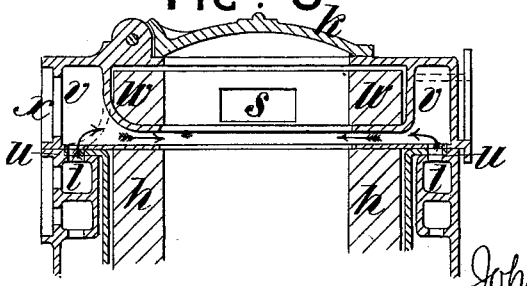


FIG. 3.



Harry A. Crawford
Harry Smith
Witnesses

Inventor,
John Fletcher
by his Attorneys
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UNITED STATES PATENT OFFICE.

JOHN FLETCHER, OF ASHTON-UNDER-LYNE, GREAT BRITAIN.

IMPROVEMENT IN BRASS-MELTING FURNACES.

Specification forming part of Letters Patent No. **204,309**, dated May 28, 1878; application filed March 21, 1878; patented in England, February 2, 1877.

To all whom it may concern:

Be it known that I, JOHN FLETCHER, of Ashton-under-Lyne, in the county of Lancaster, Kingdom of Great Britain, brass-founder, have invented Improvements in Furnaces for Melting Brass and other Metals, of which the following is a specification:

The invention, for which an English patent, No. 441 of 1877, has been granted to me, relates to the furnaces employed in the melting of brass, gun-metal, and other metals and alloys. In the construction of such furnaces an inner shell surrounded by an outer casing is employed. The said inner shell is lined internally with a refractory material. The outer casing is formed in two parts, the upper part surrounding the said inner shell. The lower part is hinged to the upper part, and is provided with a filling or lining of refractory material, which forms the bottom of the interior of the furnace. The inner casing is so suspended within the said casing as to leave an annular space or passage for the flow of air between the furnace-bottom and the lower end of the inner shell and lining. The air to supply the furnace is forced into a space between the shell and casing, at one or more places, at or near the upper end of the said space, and, flowing downward, enters the furnace through the aforesaid annular passage. In some cases the furnace is constructed to admit air above the crucible. In cases wherein a forced draft is not employed air is admitted at or near the upper end of the outer casing, the draft being induced by a chimney, as is usual. A cover is adapted to the furnace in cases wherein the use of a cover is advisable. The hinged lower part of the outer casing is secured by suitable fastenings, and when the furnace is to be cleared out the said part is unfastened, so that it can turn on its hinges to discharge the ashes and cinders and scoria.

Referring to the drawings, Figure 1 represents a plan of the improved furnace, one-half of the figure being a plan showing a portion of the furnace top and cover, the other half being a section on the line A in Fig. 2, which latter figure represents a vertical section taken at the center of the furnace.

In the said figures, *a* is an outer casing, which in the example is formed of cast-iron, but may be wholly or partially formed of wrought-iron or other suitable material. The said casing is mounted upon or formed with three or more feet, only two feet, *b b*, being represented in the drawings. In lieu of these feet, the casing may be supported upon brick pillars, or otherwise so sustained as that there shall be a clear space below the said casing. To the lower part of the said casing is hinged a metal door, *c*, which is lined with a fire-clay concave disk, *d*, or is coated or lined with a refractory material, the said concave disk forming the bottom of the furnace. The said door is hinged at *e*, and is secured, when shut, by means of a key, *f*, which is passed through a slot in a bolt which is hinged to the casing. The method of securing the door may be varied as considered to be most suitable; also, in place of hinging the door, it may be arranged to be raised and lowered or be withdrawn horizontally.

An inner shell, *g*, is placed within the outer casing, and is sustained by a flange which rests upon the top of the casing. This shell may be formed of wrought-iron, or of cast-iron, or other suitable metal. In the example it is supposed to be made of wrought-iron. The lower edge of this shell is flanged inward, and this flange sustains the lining *h* of the furnace. This lining, by preference, consists of a cylinder of fire-clay or refractory material; but it may be built up of fire-clay bricks or lumps, or of bricks, blocks, or segments of refractory material. Upon the top of the outer casing a cap, *i*, is fitted to rest, or is bolted or secured to the said casing. This cap is provided with a cover or door, *k*, which is hinged to the cap, and is arranged to be opened and closed by means of a hand-lever, *l*, which is fastened to the joint-pin of the hinge. The said cover may also be lined with refractory material. The said cap is also formed with a branch or outlet, *m*, which is suitably formed to connect with a flue or passage leading to a chimney or outlet for the smoke and gases. Around the outer casing is formed an annular passage, *n*, which is formed with an inlet-opening, *o*, which is arranged to be connected with a pipe, through which a blast of air can be conveyed from a fan or blower. If

preferred for any reason, the said blast or supply of air may be admitted at more than one point in the circumference of the furnace. The air forced into the passage *n* is permitted to flow through openings *p p*, formed in the bottom of the said passage, into the annular space *r* between the outer casing and the inner shell, which said space entirely surrounds the inner shell.

In some cases the fan or blower may be dispensed with, and the natural draft produced by a chimney be depended upon to supply the furnace with air. The fire is contained within the lining *h*, within which is placed the crucible holding the metal to be melted, as indicated in Fig. 2. The air forced into the passage *n* flows through the space *r*, and through the space between the bottom of the inner shell and the furnace-bottom, into the fuel at the lower part of the fire. In its passage the air becomes heated by contact with the shell and casing, and the cooling of the crucible and fire is prevented, and at the same time overheating of the lining, shell, and outer casing is also prevented.

An opening, *s*, is formed in the upper part of the lining *h*, and the products of combustion and the fumes from the melted metal flow through this opening to the outlet *m*. In cases wherein the furnace is not connected with a chimney, and the escaping gases and smoke will not be objectionable, the gases and fumes may be permitted to escape through the top of the furnace.

Fig. 3 illustrates other modifications which may be made. In some cases it is advisable to be able to regulate the working of the furnace by admitting air to the space above the crucible. Fig. 3 indicates two methods of doing this. According to one method, an upper air-passage, *t*, is formed around the furnace, and communicates with the space below the cover K by means of openings *u*. In the other case an annular passage, *v*, is formed in the cap *i*, which is provided with a separate lining, *w*, of refractory material. The said passage is supplied with air through a branch, and the air flows through a narrow space between the linings *w* and *h*.

If preferred, the cover *k* may be arranged to be raised and lowered, instead of being hinged to the cap.

When a forced draft is not used the passage *n* may be dispensed with, and the air be admitted through perforations in the outer casing; also, the shell *g* may be dispensed with, and the lining *h* be sustained upon pillars or feet, or may be formed with a flange to rest on the top of the outer casing; but the arrangement illustrated is considered to be the most suitable.

When it is necessary to clear away the ashes and dross from the furnace, the door or bottom *c* may be opened or lowered, and the ashes and dross be discharged or raked out.

I claim—

The combination, in a brass-melting furnace, of the outer casing *a* and closed bottom *b* with the inner lining *g h*, forming, with the outer casing, an annular air-chamber, *r*, and leaving a free space entirely around that portion of the fuel between the lower end of said lining and the bottom of the furnace, all substantially as set forth.

JOHN FLETCHER.

Witnesses:

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