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E. CAMPBELL.

SMELTING FURNACE.

APPLICATION FILED JULY 8, 1902.

NO MODEL.

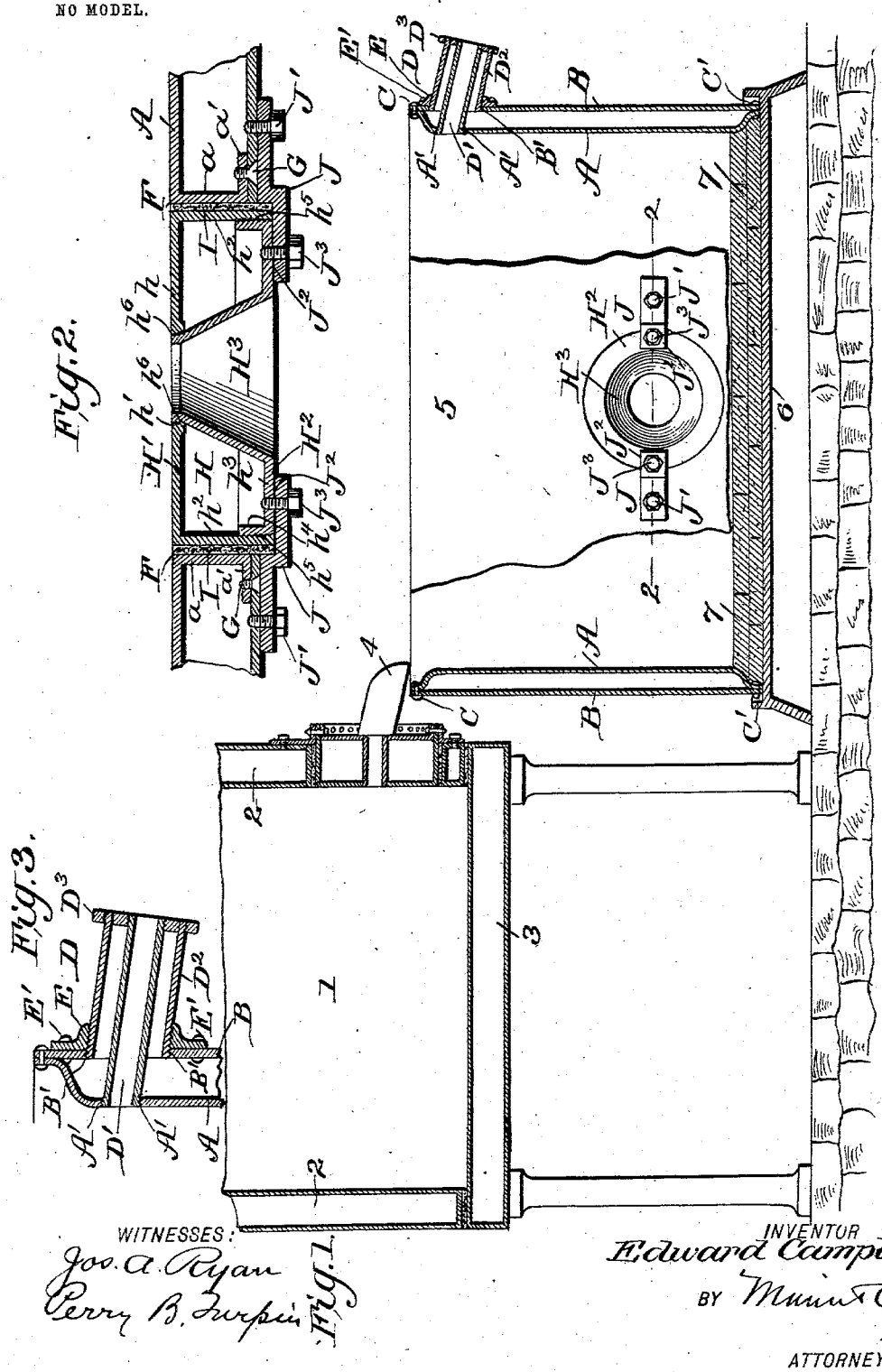


Fig. 2.

Fig. 3.

Fig. 1.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 730,610, dated June 9, 1903.

Application filed July 8, 1902. Serial No. 114,848. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CAMPBELL, a subject of the King of Great Britain, residing at Rossland, in the Province of British Columbia, Dominion of Canada, have made certain new and useful Improvements in Smelting-Furnaces, of which the following is a specification.

My invention is an improvement in smelting-furnaces, and relates particularly to the water-jacketing construction of the furnace and to the novel construction of the receiver, including the tapping-jacket and slag-spout; and the invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of an apparatus embodying my invention. Fig. 2 is a detail horizontal section on about line 2 2 of Fig. 1, and Fig. 3 is a detail sectional view illustrating the slag-spout.

By my invention I aim to construct the smelting-furnace of wrought-iron, replacing all cast-iron water-jackets, rings, &c., with flanged wrought-iron jackets and to avoid seams and rivets inside of the receiver where the molten metal comes in direct contact therewith.

In carrying out my invention I seek to avoid all rivets in positions where they will be exposed directly to the molten metal, to avoid the undue expansion of the various parts of the receiver and its slag-spout and tapping-hole, dispense with brick lining at the inner side of the receiver, avoid all castings, save much time in making repairs by the improved means for jacketing the tapping-hole, and also avoid the explosions due from contact of the molten metal with water resulting from the burning away of rivets, and generally to provide a water-jacketed receiver which will be more durable than those ordinarily constructed, will cost less for repairs, and which can be repaired with more facility than the ordinary constructions.

The furnace 1 has its side walls 2 and base-wall or bottom 3 water-jacketed, as shown in Fig. 1, and has a spout 4, which conveys the molten mass from the furnace to the receiver 5. The receiver 5 rests on a cast-iron base 6, which is protected by two rows of fire-brick 7, which also protect the rivets which unite the lower edges of the inner and outer plates A and B of the wall of the receiver. These plates A and B are spaced apart to form the water-receiver and are drawn together at their upper and lower edges and secured at such edges by the rivets C and C'. As will be seen from Fig. 1, the lower rivets C' are protected by the fire-brick 7.

In forming the slag-spout D the inner plate A is perforated at A' and the outer plate B at B', the openings A' and B' being in alinement and the opening B' larger than the opening A', so the opening A' may receive the inner tube D' of the spout D and the outer opening B' the water-jacketing shell D^2 of said slag-spout, the tube D' being fitted into the opening A' and the tube D^2 being fitted into the opening B' and threaded in a collar E, which is secured by bolts E' to the outer plate B and encircles the openings B', as shown in Fig. 2. The space between the tubes D' and D^2 is suitably closed at its outer end by a ring D^3 and communicates at its inner end with the water-jacketing space between the plates A and B. By the described construction the slag-spout is held securely in place, is water-jacketed, and all rivets are dispensed with where they would be subject to the direct action of the molten metal within the receiver.

The construction of the tapping-jacket 6 is shown in detail in Fig. 2. In this construction an opening F is provided in the walls of the receiver for the tapping-jacket, the inner plate A being provided with an outwardly-projecting wing *a*, surrounding the opening F and having at its outer edge a flange *a'*, which laps beneath the outer plate B and is secured thereto by rivets G, as shown in Fig. 2. The tapping-jacket H' is formed with the inner section H and the outer section H^2. The inner section H' is made in the form of a cup, with the inner plate *h* having a central opening *h'* and the rim-plate h^2, which fits in the opening F and is spaced apart sufficiently therefrom to permit the asbestos packing I to be fitted around the tapping-jacket and between the same and the adjacent walls of

the furnace. The outer section H^2 is composed of the outer plate h^3, having the flanges h^4 at its outer edge threaded at h^5 into the outer end of the cup-section H′ and the inwardly-tapering central conical tube H^3, which is threaded at its end at h^6, into the opening h' in the plate h of the section H′. This forms a water-jacketed tapping-jacket in which no rivets are used in a position where they will be exposed to the action of the molten metal and a jacket which can be conveniently constructed and repaired. The tapping-jacket is secured to the body of the receiver by means of the angle-brackets J, bolted at J′ to the body of the receiver and overlapping at J^2 the outer edge of the tapping-jacket and are bolted at J^3 to the said tapping-jacket, thus securing it firmly in place and at the same time permitting its convenient removal for any desired purpose.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a receiver for use in connection with smelting-furnaces, of the inner and outer plates spaced apart forming the water-jacket and provided with an opening for the tapping-jacket, the inner plate being provided with an outwardly-projecting wing surrounding said opening and at its outer edge with the flange underlying the outer plate, the rivets securing such flange and outer plate together, the tapping-jacket fitting in the opening in the side of the receiver, and composed of the inner cup-shape section having a central opening, and the outer section having an outer plate provided with an edge flange threaded into the outer end of the cup-section and also provided with an inwardly-tapering central tube threaded in the central opening in the cup-shape section, and means for securing the tapping-jacket in connection with the body of the receiver, substantially as set forth.

2. The combination with the body of the receiver having an opening for the tapping-jacket, of the tapping-jacket fitting in said opening and comprising the inner cup-shape section having its base-plate provided with a central opening, and the outer section threaded at its outer edge into the cup-shape section and provided with a central tube threaded at its end in the central opening of the base-plate of the cup-section, and means for securing the tapping-jacket in place in the receiver, substantially as set forth.

3. The combination of the receiver-body having an opening for the tapping-jacket, the tapping-jacket fitting in said opening and having a discharge-opening and a water-jacket around the same, and the connecting device for securing said jacket having portions overlapping the tapping-jacket and the body of the receiver and secured, substantially as set forth.

4. The combination of the body or wall having an opening for the tapping-jacket and comprising the inner and outer plates spaced apart forming a water-space, the inner plate being provided with an outwardly-projecting wing extending to the outer plate and surrounding and forming the outer wall for the opening of the tapping-jacket and provided at the outer edge of said wing with a projecting flange lapping along the outer plate and secured thereto substantially as set forth.

5. The combination with the inner and outer jacketing wall-plates, spaced apart and provided with openings, the opening in the inner wall-plate leading to the interior of the receptacle, of the spout-tube held at its inner end in the opening in the inner plate, and extending thence outwardly through the opening in the outer plate, and a jacketing-tube surrounding the outer extension of the spout-tube and secured at its inner end in the opening of the outer wall-plate, substantially as set forth.

6. The combination with the receiver having inner and outer wall-plates spaced apart forming a water-jacket and provided in said plates with openings in line with each other, the opening in the outer plate being larger than that in the inner plate, a collar secured on the outer plate surrounding the opening therein and threaded internally, the spout-tube secured at its inner end in the opening in the inner plate and extending thence outwardly through the opening in the outer plate, and the jacketing-tube surrounding the spout-tube and threaded at its inner end in the collar surrounding the opening in the outer plate, substantially as set forth.

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Witnesses:
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