June 27, 1933. L. DE A. BEDELL ET AL 1,915,398

METHOD OF MAKING A THREE-PIECE DOOR FRAME

Filed Jan. 27, 1928 2 Sheets-Sheet. 1

Fig. 1.

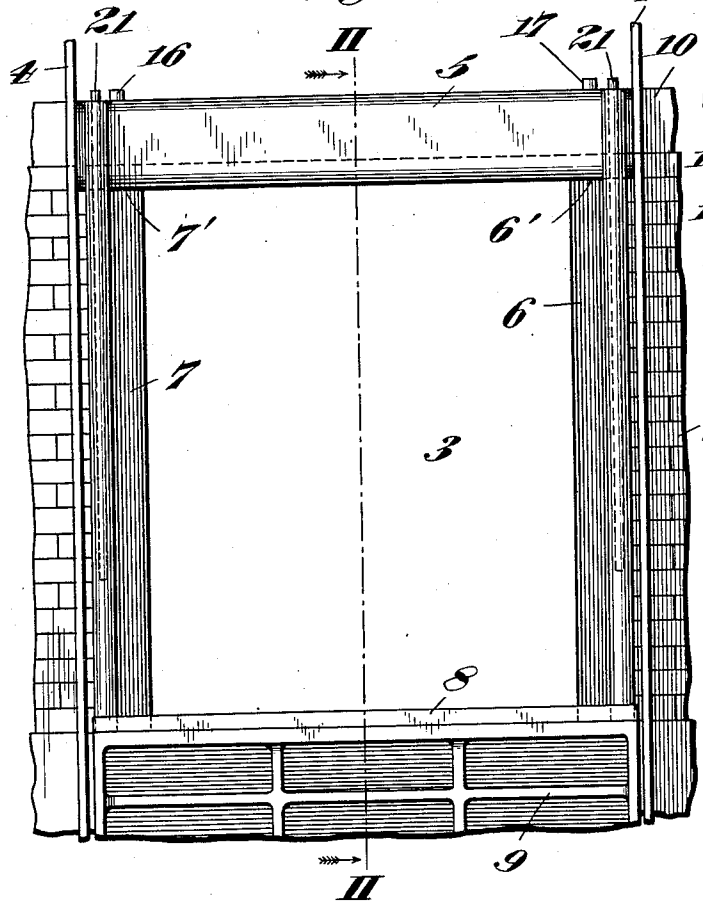


Fig. 2.

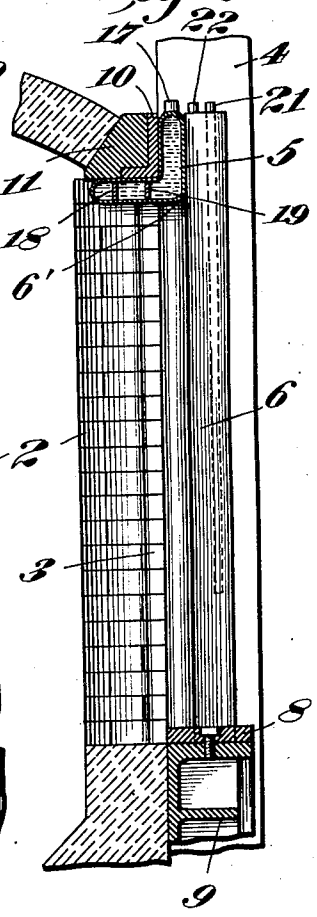
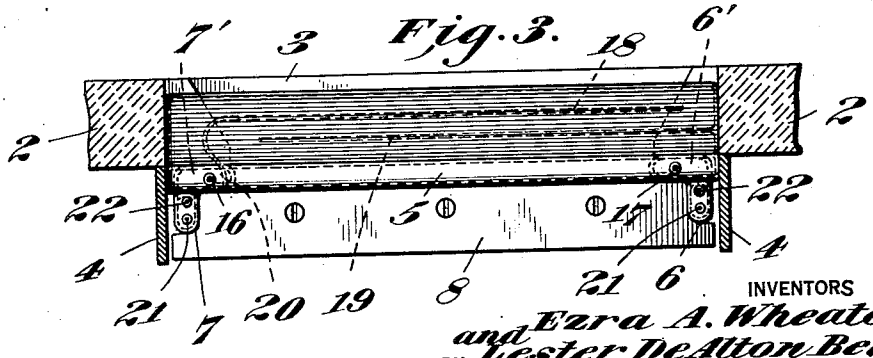


Fig. 3.



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Fig. 4.

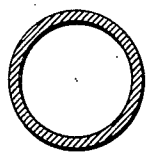


Fig. 5.



Fig. 6.

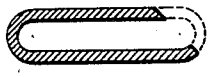


Fig. 7.

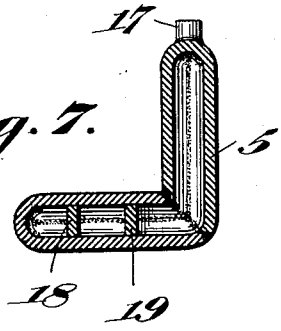


Fig. 8.

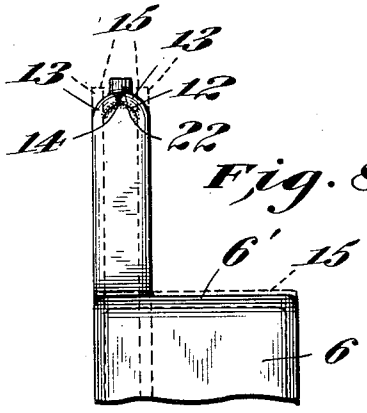


Fig. 9.

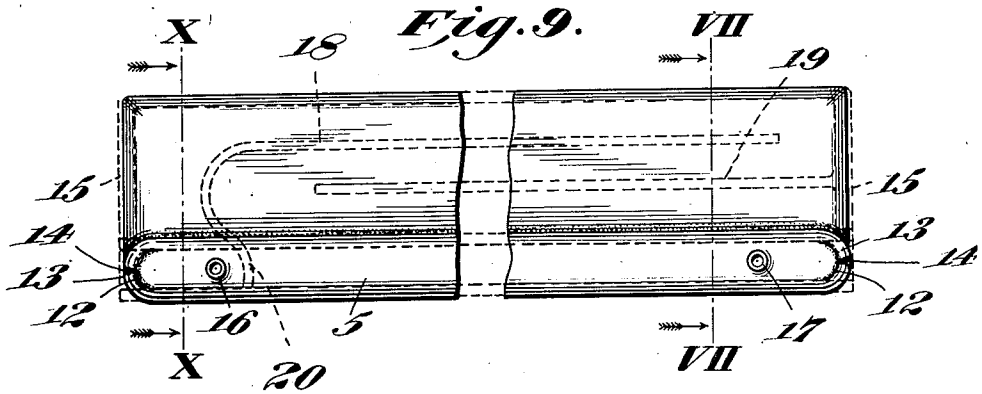
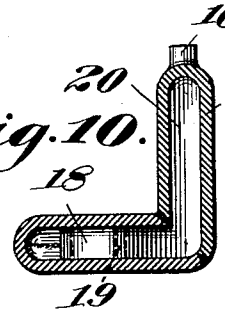


Fig. 10.



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UNITED STATES PATENT OFFICE

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METHOD OF MAKING A THREE-PIECE DOOR FRAME

Application filed January 27, 1928. Serial No. 250,034.

This invention relates to furnace door frames and particularly to water cooled frames, primarily intended for use in open hearth and similar furnaces.

An object of the invention is to provide an improved door frame constructed from sections of standard pipe, flattened and welded together and provided with means for circulating the water.

Another object is to provide L-sections formed of flattened pipe and a novel means of joint between the pipe sections, whereby a strong, durable and water tight joint is provided.

The novel features will be more fully understood from the following description and claims taken with the drawings, in which:

Fig. 1 is a front elevation of a portion of a furnace side wall having a door frame embodying our invention;

Fig. 2 is a sectional view taken on the line II—II of Fig. 1;

Fig. 3 is a top view of the door frame and a section of the furnace side wall;

Fig. 4 represents a cross section of a pipe before flattening;

Fig. 5 shows a cross section of the pipe after flattening;

Fig. 6 is a sectional view of a flattened pipe with the edge portion cut away preparatory to welding to a similar section;

Fig. 7 is a sectional view of the top member made of two flattened sections welded together, taken on the line VII—VII of Fig. 9;

Fig. 8 is an elevation of the top portion of the left hand side member looking from the inside of the furnace;

Fig. 9 is a plan view of the top member showing the water circulating plates; and

Fig. 10 is a sectional view of the top member comprising two flattened sections welded together, taken on the line X—X of Fig. 9.

Referring to the drawings: 2 designates the furnace side wall which is of usual construction and is provided with the doorway 3. The usual door frame plates 4 are provided to strengthen and support the doorway.

The door frame consists of a top member 5 and side members 6 and 7. The side members are removably held in position by the plate 8 at the bottom of the door, which is cut out to receive the bottom ends of the side members 6 and 7. The plate 8 is secured to the casting 9 which forms a part of the furnace frame. The upper ends of the side members may be secured to plates 4 by any suitable means. The top lintel member 5 is positioned against and underlying the skewback support 10 and skewback 11, and is supported by the offset portion 6′ and 7′ of the side members, 6 and 7 respectively.

Each section of the door frame is made up of two pieces of flattened pipe having their edges cut away to form a miter as shown in Fig. 6. The mitered edges of the pieces are matched to form an L-section and welded together in the manner shown in Fig. 7. The ends of the joined sections are closed by slitting the edges along the inside faces of the pipe and cutting out to form an upwardly rounded central portion 12 as shown in Fig. 8, over which the upstanding side portions 13 are bent until their edges abut, forming an open V-portion 14. The joints thus formed at points 12 and 14 are then closed by welding in the customary manner. The dotted lines 15 lying beyond the ends of the sections as shown in Figs. 8 and 9 represent the length of the pieces before the ends are closed in.

At the top edge of the vertical leg of the top member as shown in Figs. 9 and 10 are provided pipe connections 16 and 17 communicating with the interior of the leg. These connections are preferably welded to the pipe sections.

Within the vertical and horizontal legs of the top member are placed baffles 18 and 19 to cause the cooling water to flow from the supply connection 16 in a downwardly direction, thence in a tortuous course along the rear edge of the section, where the heat is most intense, to the discharge connection 17. The baffle 18 is preferably of a single piece of metal bent in the form of a hook at one end, with an end portion 20 extending into the vertical section. The baffles are placed in position through the open ends of the sections and are tack welded in place before the ends are closed.

In the construction of the side members 6 and 7, offset portions 6′ and 7′, respectively, are formed near their top end to provide a support for the top member 5. This is accomplished by making one section shorter than the other, otherwise their construction is similar to the top member heretofore described, with the exception of the water circulating means. In the arrangement shown a supply pipe connection 21 leads downwardly within each of the leg members 6 and 7. At the upper ends of said members are provided discharge connections 22 communicating with the interior of the legs.

A door frame constructed according to this invention has distinct advantages over frames as ordinarily made, the joints are all welded, and therefore, are stronger than other forms of joints, and the frame being made from standard pipe has the advantage of providing comparatively thin walls of greater strength than is possible in the cast metal frames ordinarily used and more reliable. The construction provides a minimum number of joints and it will be noted that joints are remote from the portion of the frame which is directly exposed to the heat of the furnace and that portion which is exposed to such heat is substantially free from joints. The three members being independent of each other, any one of them can be renewed when necessary without disturbing the remainder of the frame. Owing to the inward projection above the door opening, the exposed surface of which is constantly supplied with cooling water, and cools the bottom portion of the skewback and skewback support. The inside edges of the side members 6 and 7 protect the brickwork to the rear thereof and the outwardly projecting portions form a guide for the door. The circulating system of the top member 5 is of an improved form, causing the incoming cooling water to be conducted to that portion of the frame which is exposed to the most intense heat.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and we desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art, or as, are specifically set forth in the appended claims.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. The method of manufacturing water cooled door frames, providing a pair of U-shaped members, placing the marginal edges of the legs of one member in contiguity with the corresponding edges of the other member, welding said edges together to constitute fluid tight joints, providing fluid inlet and outlet openings in the wall of the container thus formed, attaching partition members within said container to provide a tortuous passageway for fluid passing from the inlet to the outlet openings, utilizing the material at the ends of the container to close said ends by cutting the material to form projecting end and side portions, bringing the said portions together, and welding the joints formed thereby.

2. The method of forming water cooled door frame members, a hollow water cooled lintel member extending transversely over the door opening of the furnace, said lintel member formed from a pair of flattened pipe sections, cutting off one of the longitudinal side edges of each pipe section to form a mitered edge, arranging the mitered longitudinal edges of the pipe sections together in angular relation to each other, welding the mitered edges together, forming fluid inlet and outlet openings in the wall of the lintel member, attaching longitudinal baffle members within the walls of the lintel member, and then bending over the ends of each pipe section until the edges abut and then welding the bent ends together to form a water tight joint.

3. The method of forming water cooled furnace door members, a pair of separate side frames, a lintel member, said lintel member extending transversely over the door opening and supported on the side members and formed from a pair of flattened pipe sections, cutting off one of the longitudinal side edges of each pipe section to form a mitered edge arranging the mitered longitudinal edges of the pipe sections together in angular relation to each other, welding the mitered edges together, forming fluid inlet and outlet openings in the wall of the lintel member, attaching longitudinal baffle members within the walls of the lintel member, and then bending over and securing the ends of the sections together to make a water tight joint.

4. The method of manufacturing water cooled door frame members, which consists in forming each of the lintel and side frame members from a pair of pipe sections by cutting off one of the longitudinal side edges of each pipe section to form a mitered edge, arranging the longitudinal flattened pipe sections with their mitered edges together in angular relation to each other, welding the mitered edges together, forming fluid inlet and outlet openings in the wall of the lintel member, tack welding a plurality of longitudinally arranged baffle members within the walls of the lintel member, then bending over the ends of each pipe section until their edges abut and then welding the bent ends together.

5. The method of manufacturing water cooled door frame members which consists in forming a lintel member from a flattened pair of pipe sections by cutting off one of the longitudinal side edges of each pipe sec-

tion to form a mitered edge, arranging the longitudinal flattened pipe sections with their mitered edges together in angular relation to each other, welding the mitered edges together in angular relation to each other, forming fluid inlet and outlet openings in the wall of the lintel member, attaching a plurality of aligned baffle members within the walls of the lintel member, removing a portion of the material from the ends of the pipe sections to form projecting side portions, bending the ends of the projecting side portions over until their edges meet and then welding the bent over ends together to form water tight joints.

6. The method of manufacturing water cooled door frame members which consists in forming each of the side frames from a flattened pair of pipe sections of different lengths by cutting off one of the longitudinal side edges of each pipe section to form a mitered edge, arranging the longitudinal flattened pipe sections with their mitered edges together in angular relation to each other with one end of each pipe section in alignment with the opposite end with one of the other ends of the sections extending beyond the other to form an offset end, welding the mitered edges together, removing a portion of the material from the ends of the sections to form projecting side portions, bending the ends of the projecting side portions over until their edges meet, welding the bent over ends together to form water tight joints forming fluid inlet and outlet openings in each of the extending portions of the side frame members, inserting a fluid supply pipe into each of the inlet openings of the side frame members until its lower end terminates adjacent to the lower ends of the side frame members, securing the upper ends of the fluid supply pipes to the extending portions of the side frame members, and then securing a fluid discharge connection to each of the outlet openings formed in the extending portion of each of the side frame members.

7. The method of manufacturing water cooled door frame members, which consists in forming the lintel portion from a flattened pair of pipe sections by cutting off one of the longitudinal side edges of each pipe section to form a mitered edge, arranging the longitudinal flattened pipe sections with their mitered edges together in angular relation to each other with their ends flush with each other, welding the mitered edges together in angular relation to each other, forming fluid inlet and outlet openings in the wall of the lintel member, tack welding a plurality of baffles within the walls of the lintel member, removing a portion of the material from the ends of the pipe sections to form projecting side portions bending the projecting side portions over until their edges meet, welding the bent over ends together to form water tight joints, forming the door side frames each from a pair of pipe sections of different lengths by cutting off one of the longitudinal side edges of each pipe section to form a mitered edge, arranging the longitudinal flattened pipe sections with their mitered edges together in angular relation to each other with one end of each pipe section flush with the other, and the other end having one end of the sections extending beyond the other to form an offset end, welding the mitered edges together, removing a portion of the material from the ends of the pipe sections to form projecting side portions, bending the ends of the projecting side portions over until their edges meet, welding the bent over ends together to form water tight joints forming fluid inlet and outlet openings in each of the extending portions of the side frame members, inserting a fluid supply pipe into each of the inlet openings of the side frame members until its lower end terminates adjacent to the lower ends of said members, securing the upper ends of the supply pipes to the extending portions of the side frame members, and then securing a discharge connection to the outlet openings formed in the extending portion of each of the side frame members.

8. The method of manufacturing water cooled door frame members, which consists in forming a lintel portion from a flattened pair of pipe sections by cutting off one of the longitudinal side edges of each pipe section to form a mitered edge, arranging the longitudinal flattened pipe sections with their mitered edges together in angular relation to each other, welding the mitered edges together in angular relation to each other, forming fluid inlet and outlet openings in the wall of the lintel member thus formed, attaching baffle members within the walls of the lintel member to provide a tortuous passageway for fluid passing from the inlet to the outlet openings, removing a portion of the material from the ends of the pipe sections to form projecting side portions, bending the ends of the projecting side portions over until their edges meet and then welding the bent over ends together to form water tight joints.

9. The method of forming water cooled furnace door frame members, a lintel member formed from a pair of flattened pipe sections, cutting off one of the longitudinal side edges of each pipe section to form a mitered edge, arranging the mitered longitudinal edges of the pipe sections together in angular relation to each other with their ends flush with each other, welding the mitered edges together, forming fluid inlet and outlet openings in the wall of the lintel member, attaching longitudinal baffle members in spaced relation to each other within the walls of the lintel member, bending over the ends of each

pipe section until the edges abut, welding the abutting edges together to form a water cooled joint, and then mounting a skewback support and skewback upon the lintel member.

In testimony whereof we hereunto affix our signatures.

LESTER DE ALTON BEDELL.
EZRA A. WHEATON.