

S. J. BOOTH, J. TERREAUULT AND W. L. BURN.

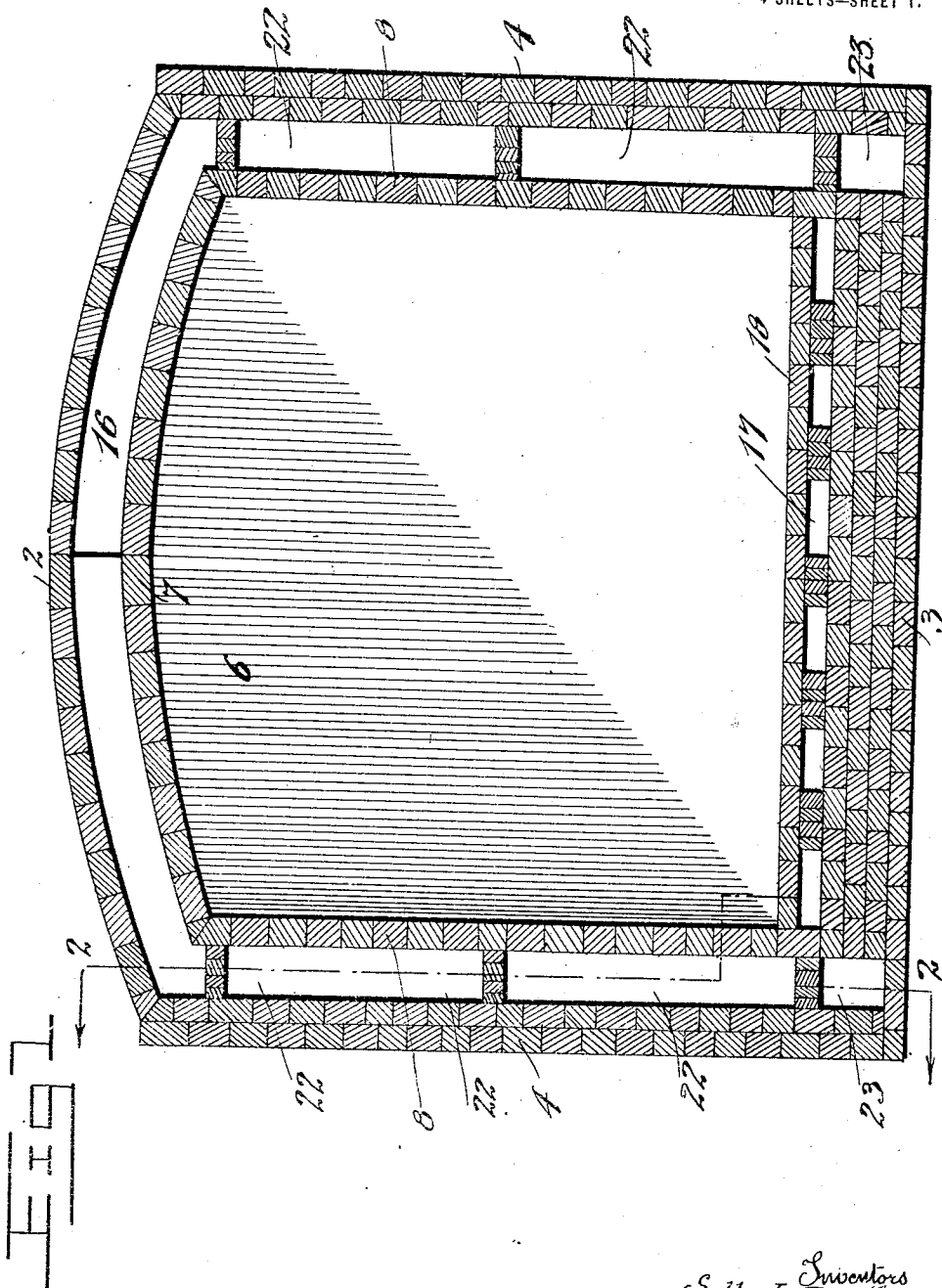
ANNEALING OVEN.

APPLICATION FILED JUNE 20, 1919.

1,364,694.

Patented Jan. 4, 1921.

4 SHEETS—SHEET 1.



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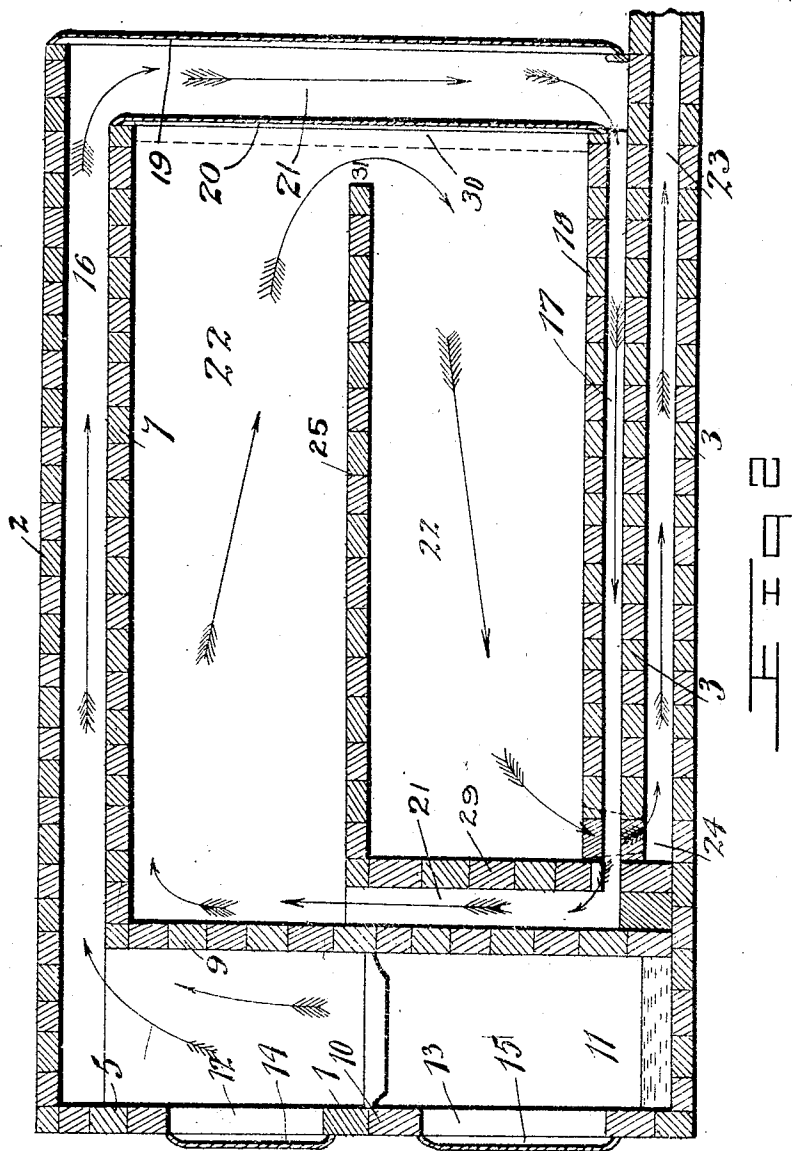
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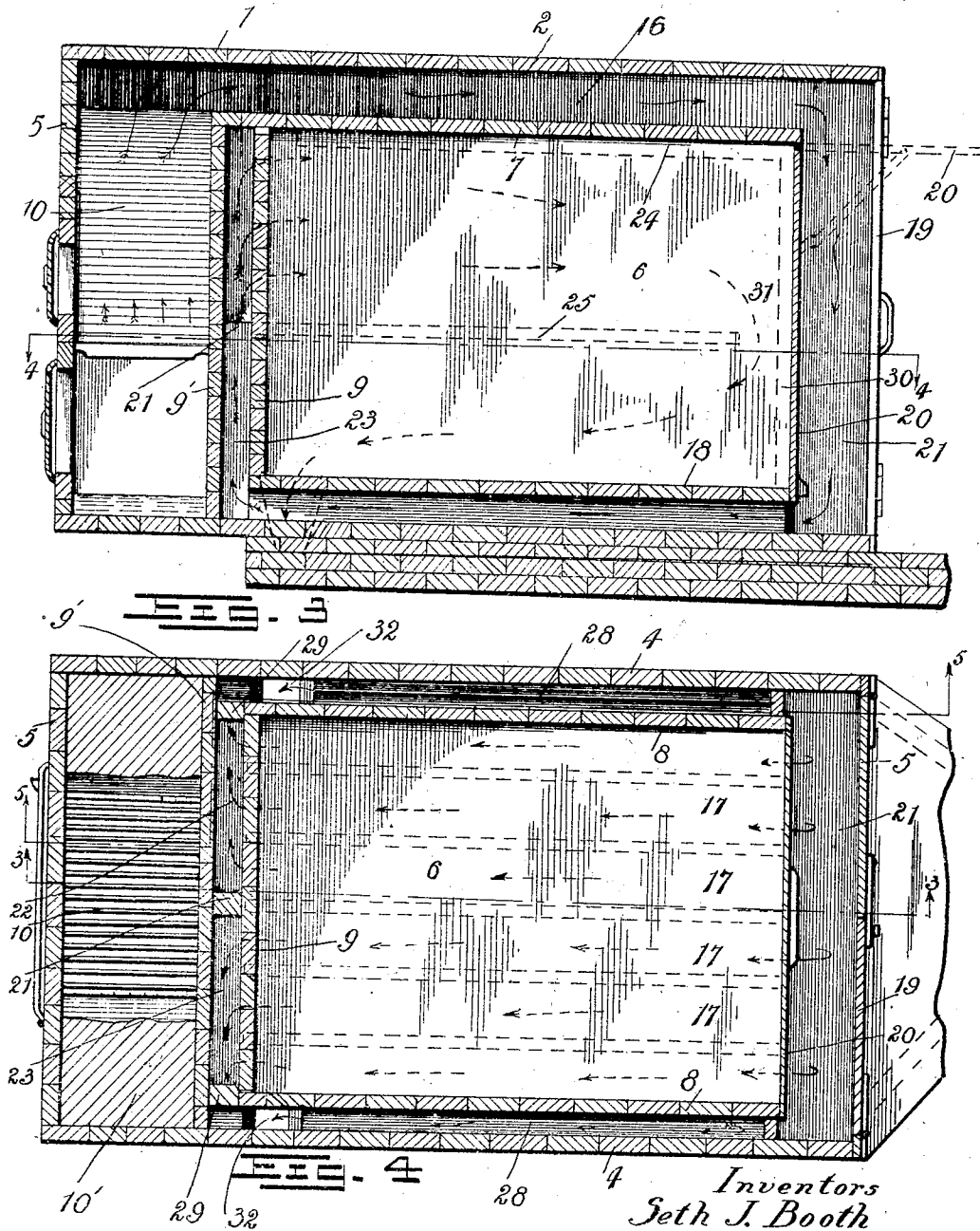
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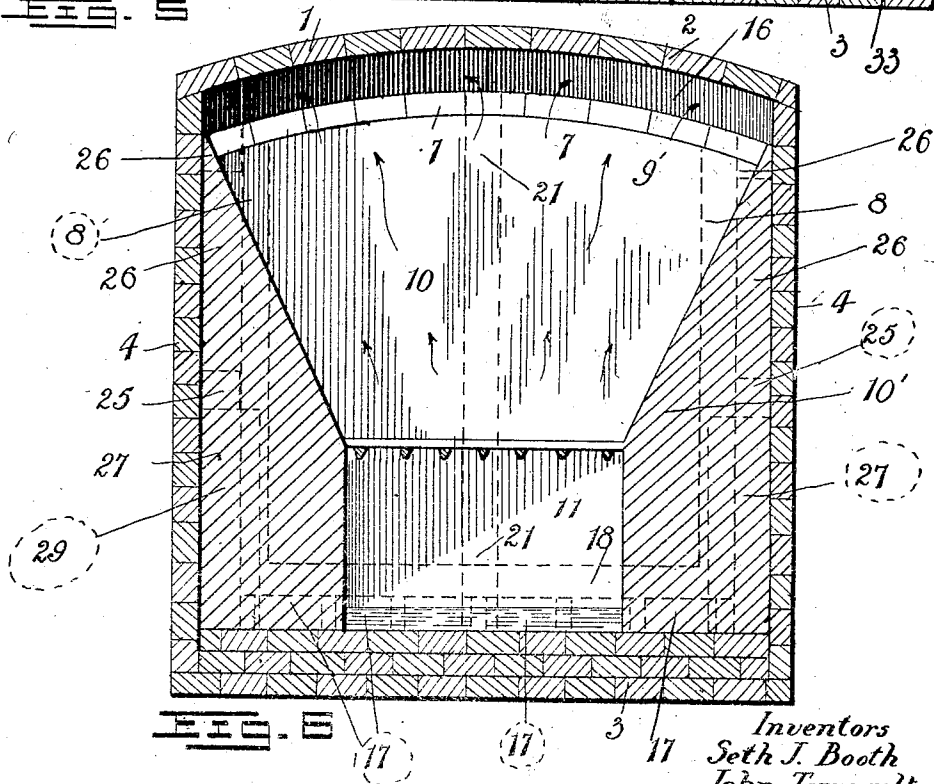
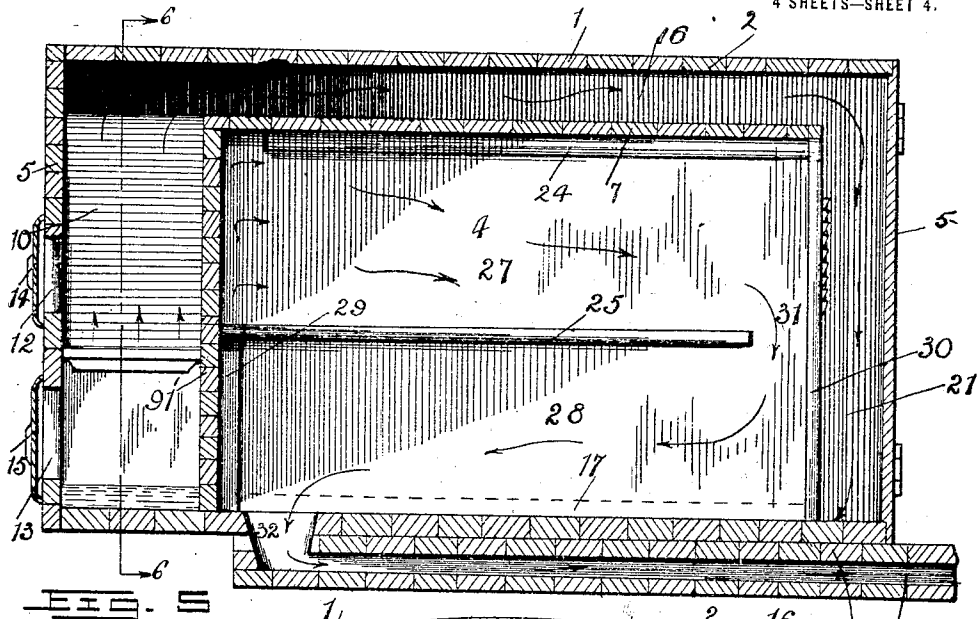
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UNITED STATES PATENT OFFICE.

SETH J. BOOTH, JOHN TERREAULT, AND WILFRED L. BURN, OF MONTREAL, QUEBEC, CANADA.

ANNEALING-OVEN.

1,364,694.

Specification of Letters Patent.

Patented Jan. 4, 1921.

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To all whom it may concern:

Be it known that we, SETH J. BOOTH, JOHN TERREAULT, and WILFRED L. BURN, all British subjects, residing at Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Annealing-Ovens; and we do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention has relation to annealing ovens or furnaces and more particularly pertains to an apparatus for annealing malleable casts.

The principal object of the invention contemplates the provision of means, for heating malleable substances, so as to remove their brittleness and at the same time to render them tough and more or less elastic.

A further object of the invention is to provide a furnace by the construction of which and the novel arrangement of the flues, the malleable casts are heated to a high temperature and then cooled very gradually.

A further object of the invention is to provide a furnace, wherein the malleable casts may be more quickly annealed than has heretofore been possible in the present art.

Another object is to provide a system of heat circulation to afford greater concentration of the heat and the resultant circulation to completely surround the annealing chamber within a continuous flow of heat.

With the above and other objects in view which will hereinafter appear as the description continues, the invention consists of the novel features of construction, combination and formation of parts as will be hereinafter more fully described and particularly pointed out in the appended claim.

In the accompanying drawings has been shown a simple and preferred form of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details herein exhibited, but the right is hereby reserved to any changes, alterations or modifications to which recourse may be had that come within the scope of the claims without departing from the spirit of the invention or sacrificing the efficiency of the same.

In the accompanying drawings:

Figure 1 is a vertical sectional view

through the center of the improved furnace; and,

Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1.

Fig. 3 is a vertical longitudinal section through the center of the furnace;

Fig. 4 is a plan longitudinal section on line 4—4 of Fig. 3;

Fig. 5 is a vertical longitudinal sectional view on line 5—5 of Fig. 4; and,

Fig. 6 is a vertical section on line 6—6 of Fig. 5, illustrating the fire box construction.

Referring now more particularly to the accompanying drawings wherein like and corresponding parts are designated by similar reference characters throughout the several views.

In the general process of annealing, the metal is subjected to continuous heating for about two weeks, so as to remove the brittleness therefrom and at the same time to render the metal more or less elastic. The desired results are obtained by heating the casts to a high temperature and then cooling very gradually and by the use of our improved furnace the heat is caused to circulate through flues entirely surrounding the annealing chamber.

In the drawings the numeral 1, designates the furnace proper, having top, bottom, side and end walls, 2, 3, 4 and 5. The top of the furnace is of arched construction in cross section and the bottom 3 comprises a relatively thick wall, while the side walls 4 may be formed of two or more thicknesses of fire brick.

An annealing oven 6, is disposed within the furnace 1 and comprises top and side walls 7 and 8, and a rear wall 9. A rear wall 9 is spaced from the end wall 5 of the furnace 1 and forms the fire box 10 and ash pit 11. Entrance openings 12 and 13 communicate with the fire box 10 and ash pit 11 and doors 14 and 15 are adapted for closing the same and carry suitable damper arrangements.

The fire box 10, more particularly illustrated in Fig. 6 has its side walls 10' above the grate, disposed outwardly at an angle to their point of connection with the wall 9' and said wall 9' is likewise spaced from the top wall 2 of the furnace. The top wall 7, of the annealing oven 6, likewise of arched construction is spaced from the furnace top

wall 2, to form a flue 16, communicating with the fire box 10 and extending longitudinally of the furnace over the said annealing oven 6.

5 The thick base wall 3, is provided with the flue openings 17, extending beneath the bottom 18, of the annealing oven 6. The front open ends of the furnace and annealing oven are provided with doors 19 and 20 having the usual hinge connection with the furnace
10 side wall 4 and the oven top wall 7 and the space between the doors 19 and 20, forms a vertically extending flue 21, which latter communicates at its upper and lower ends with the upper flue 16 and the base flues 17.

15 A wall 21' connects the annealing chamber rear wall 9 and the wall 9' at the rear of the fire box 10 and ash pit 11 and the space between said walls is divided thereby to form two vertical flues 22 and 23.

20 The side walls 4 of the furnace are formed with horizontally extending walls 24 and 25, the former being spaced from the top wall of the furnace and blocking the space between the furnace side walls 4 and the side walls 8 of the annealing chamber at this point. The upper part of the wall 9 of the annealing oven 6 is formed with outwardly extending end portions 26 which en-
25 gage the side walls 4 of the furnace and the inner ends of walls 24, resultantly flues 27 and 28 are formed between the side walls 4 and 8 of the furnace and annealing oven 6, being separated by the horizontal walls 25.

30 Walls 25 at their inner ends are connected to the short vertical walls 29 and walls 25 extend forwardly of the furnace, being spaced at their extreme ends from the vertical walls 30 which latter are connected at the top to the horizontal walls 24. In this manner communicating passages 31 are formed, which connect flues 27 and 28. Flues 28 communicate with the exhaust openings 32 lead-
35 ing to the flues 32 in the base of the furnace and said flues 33 at each side of the furnace base, converge together and form a single flue, not illustrated, which leads to the chimney, likewise not illustrated.

40 In this manner the caloric current arising from the fire box 10, by virtue of the angular wall construction 26 of said box, will spread in a continuous and unbroken sheet and enter the flue 16 between the top wall 2 of the furnace and the top wall 7 of the annealing
45 oven. This caloric current will then pass through flue 16, and downwardly through flue 21, between doors 19 and 20. The current will pass through the flues 17 under the annealing oven to the vertical flues 22 and 23, then upwardly through the horizontal
50 flues 27, downwardly through the passages 31 to the lower flue 28. The heat current then passes out through the openings 32 into the chimney flues 33.

55 In this manner, every part of the anneal-

ing oven is enveloped by a continuous current of heat, and further by the provision of the chimney flues in the base of the furnace, means are provided for utilizing the maximum heat value, and the heat in its travel to the chimney acts to maintain the temperature at the base of the furnace, whereas if the exhaust was from the top of the furnace, considerable heat value would be lost.

70 In operation, the malleable casts are placed within the oven 6, then these doors 19 and 20 are closed and screw fastenings are tightened to hermetically seal the doors, so that no heat can escape from the flue 21, formed by the doors. A soft coal fire with natural draft is started in fire box 10, and heat generated in the fire box will attain the approximate temperature required to anneal different malleable casts in from four to five days, and the heat will circulate through the
75 flues as described in Fig. 2, so that a flow of heat is constantly circulated around the annealing oven 6, during which time the malleable casts are subjected to such heating treatment and are allowed to cool for approximately three or four days, so as to
80 remove their brittleness and at the same time renders them tough and elastic.

85 By the novel arrangement of the flues as stated, the heat is maintained at a uniform degree and circulated all around the annealing oven and we are enabled to anneal malleable casts in a much shorter time than is necessary by the use of the ordinary furnace, which latter takes two weeks or more for the
90 annealing operation.

95 It is obvious that different heating temperatures may be maintained in the annealing oven, according to the heat required to anneal the different castings, but it is never necessary to seal up the furnace over nine
100 days.

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

110 A heating or annealing furnace comprising a base, a top, end and side walls, an intermediate wall arranged within said furnace and spaced from said top to form a fire box, an oven comprising a base, top, side
115 and end walls arranged within said furnace, the top wall of said oven being arched and spaced from the top wall of said furnace to form one continuous flue having one end communicating with said fire box, the front
120 end wall of said oven being spaced from the front end wall of said furnace to provide a continuous vertical front flue having one end communicating with said top flue, the base of said furnace having a plurality of longitudinal extending flues formed therein
125 which communicate with the lower end of said vertical front flue, the rear wall of said oven being spaced from side intermediate wall of the furnace to provide two vertical
130

rear flues, having their lower ends in communication with said base flues, said side walls of said oven being spaced from the side walls of said furnace, longitudinally extending partitions arranged between said side walls to provide two horizontally extending communicating flues at each side of the oven, said side flues communicating with the upper ends of said vertical rear flues and an

exhaust flue communicating with said side 10 flues substantially as and for the purpose specified.

In witness whereof we have hereunto set our hands.

SETH J. BOOTH,
JOHN TERREAULT,
WILFRED L. BURN.