No. 728,459. PATENTED MAY 19, 1903.

P. B. HARRISON.

FURNACE.

APPLICATION FILED MAR. 19, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 2.

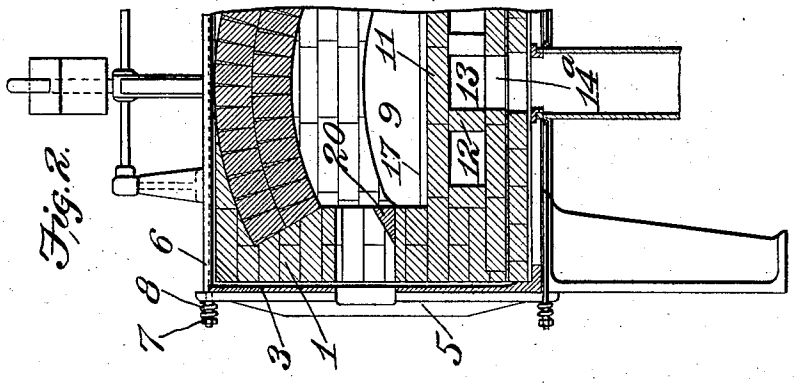
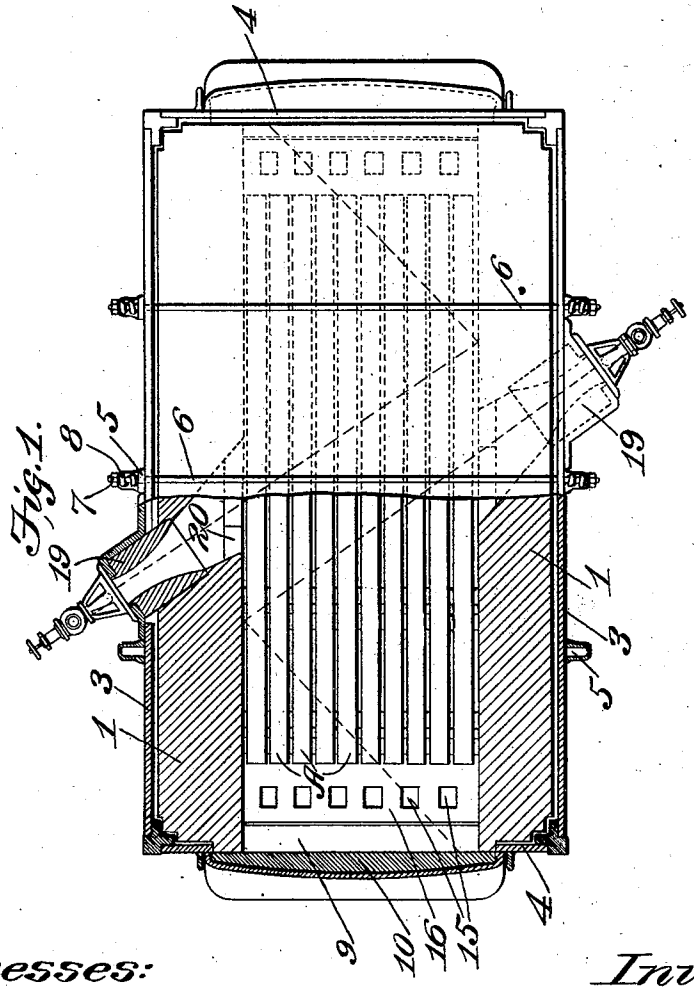


Fig. 1.



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Inventor:

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

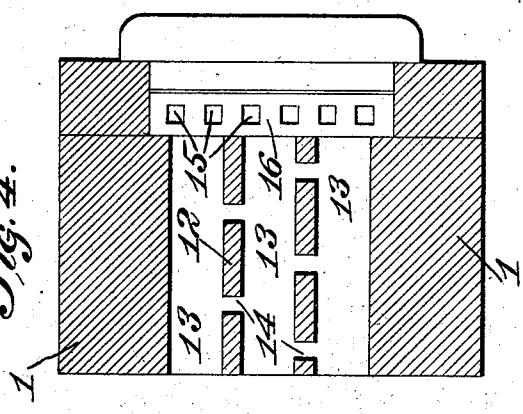
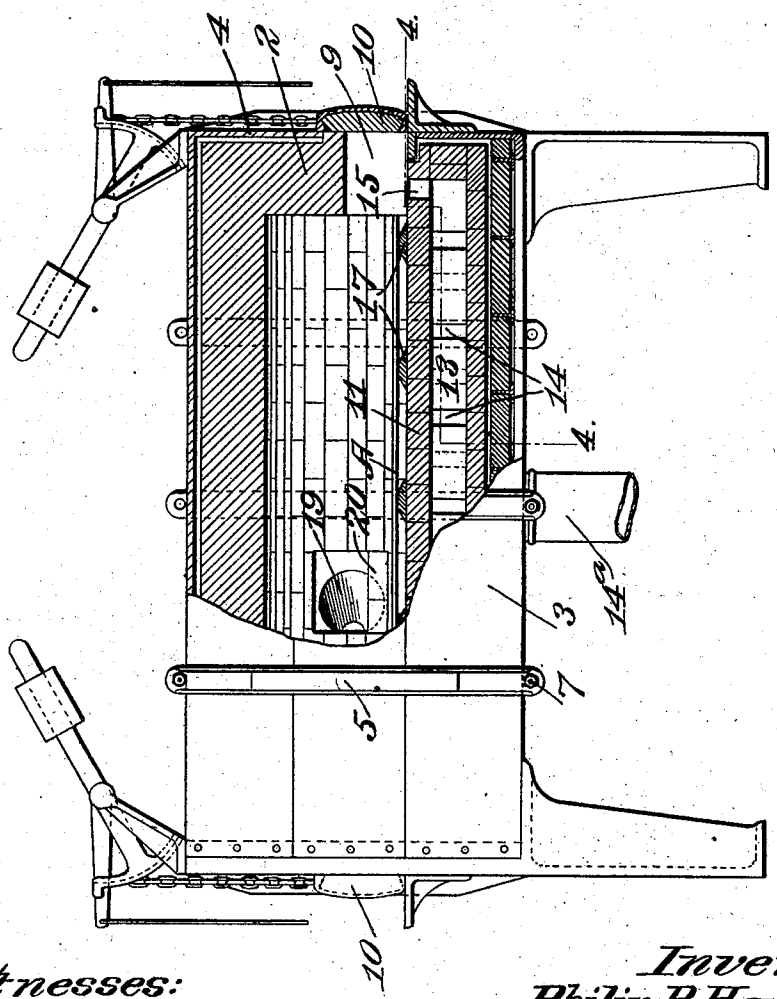


Fig. 3.



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No. 728,459. Patented May 19, 1903.

UNITED STATES PATENT OFFICE.

PHILIP B. HARRISON, OF CHICAGO, ILLINOIS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 728,459, dated May 19, 1903.

Application filed March 19, 1902. Serial No. 98,933. (No model.)

To all whom it may concern:

Be it known that I, PHILIP B. HARRISON, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Furnaces, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view, partly in section. Fig. 2 is a view in central transverse sectional elevation. Fig. 3 is a longitudinal elevation, partly in central section; and Fig. 4 is a fragmentary top plan view on the line 4 4 of Fig. 3.

My invention relates to furnaces, and more particularly to "bulldozing" furnaces, as they are called, in which oil or the like is employed as fuel.

My primary object is to produce a large zone of combustion and to so feed the oil that it does not contact with the bars or other material being heated. Further objects are to enable the draft in the furnace to be regulated in order to properly distribute the heat and to provide efficient means of tying the furnace-plates together.

To these ends and also to improve generally upon apparatus of the character indicated my invention consists in the various matters hereinafter described and claimed.

Referring now more particularly to the drawings, 1 represents the side walls of the furnace; 2, the end walls; 3, outer side plates, and 4 outer end plates. Buckstaves 5 extend vertically upon the outer sides of said side plates and project above and below the top and bottom of the furnace, the projecting ends of said staves receiving tie-rods 6, and about the ends of said tie-rods and interposed between the buckstaves and the nuts 7 are coiled springs 8, each of which exerts a pressure of about five hundred pounds. In this manner the furnace is firmly tied together, the springs compensating for expansion and contraction.

The furnace is provided with the usual end openings 9, which are closed by gates 10, of customary construction, and has a floor 11, which is supported above the bottom furnace-wall by short vertical walls or partitions 12. Said walls produce escape flues or passages 13 below the furnace-floor, and these passages intercommunicate through openings 14, formed in the walls 12, the central passage opening into a downtake-flue 14^a. Draft-openings 15 in the threshold-plates 16 at the ends of the floor communicate with the several passages 13, and in this manner the heated products of combustion from the combustion-chamber of the furnace pass through said openings and circulate in the space under the floor, thereby causing the floor to be uniformly heated from both sides. Any desired openings 15 can be covered and the draft thus altered in such manner that the heat is kept evenly distributed, it being customary when openings are to be closed to cover the same with plates of any suitable kind.

Relatively narrow supports 17 extend at intervals across the furnace-floor, and the bars A or other articles to be heated are placed upon these, and thus held in such position that the heat can readily reach all sides of them.

The oil or other fuel is admitted to the combustion-chamber through D-blocks 19, inserted in the side walls of the furnace, the nozzles or openings through said blocks extending obliquely with relation to the longitudinal line of the furnace-walls, whereby the incoming fuel enters the combustion-chamber through one wall and is directed obliquely toward the opposite wall.

The incoming fuel becomes fully ignited after it has traveled an appropriate distance from the wall through which it was admitted, and the flame is directed forcibly against the opposite wall and striking the same at an angle is deflected therefrom, as indicated by broken lines in Fig. 1. The openings in the opposite D-blocks are inclined inwardly toward opposite ends of the furnace. Across the lower wall of each fuel-inlet opening is a deflector 20, which has an upwardly and inwardly inclined or beveled face and extends parallel to the longitudinal axis of the furnace, and therefore obliquely across the inlet-opening, said deflector being conveniently formed of tiles or bricks. A portion of the incoming fuel strikes this deflector and is scattered, being thrown upwardly and later-

ally in the combustion-chamber in a manner which will at once be apparent. This deflection of the fuel serves to prevent the same from coming in contact with the articles being heated, (thus preventing the formation of scale upon iron bars and the like by reason of the spraying of the same with oil,) and, furthermore, it increases the zone of the combustion by more widely spreading the oil or other fuel, the zone of direct heat being augmented not only by reason of the fuel deflected by the deflector 20, but also by the flame deflected from the side walls of the furnace, as previously explained.

The present furnace has, therefore, burning fuel over a large portion of the combustion-chamber, whereby the fuel is utilized to the best advantage, spraying of the articles to be heated is prevented, the articles to be heated are so supported that the heat can readily reach them upon all sides, the floor of the furnace is heated from below as well as above, the draft can be regulated to effect necessary or desired distribution of the heat, and the side walls of the furnace are tied together in a manner which holds them securely in position, but permits expansion and contraction without loosening the joints.

I am aware that many minor changes in the construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. In a furnace, a bottom wall, a floor spaced therefrom, and a plurality of partition-walls between said floor and bottom wall and dividing the space into escape-flues, said partition-walls having staggered openings which afford communication between said flues; substantially as described.

2. In a furnace, a combustion-chamber having opposite walls, and means for directing fluid fuel from each wall across the said chamber to the opposite wall and obliquely thereto, the respective streams of fuel being directed toward opposite ends of said chamber; substantially as described.

3. In a furnace, a combustion-chamber having walls, a fuel-supply nozzle for directing fuel into said chamber in a line oblique to said walls, and an inclined deflector arranged obliquely with respect to said nozzle and extending in front of the same and over only a portion of the zone in which fuel from said nozzle is directly discharged, whereby said deflector serves to spread and change the course of a portion only of the entering fuel; substantially as described.

4. In a furnace, a fuel-inlet, and a deflector which is oblique to the line of direction of the incoming fuel and is in the path of and extends over only a portion of the zone covered by the said incoming fuel, said oblique deflector having a fuel-engaging face which inclines with respect to the oblique line including said deflector, whereby a portion of the incoming fuel is deflected both laterally and vertically with respect to the line of the remaining portion of the fuel; substantially as described.

5. In a furnace, a wall having a fuel-inlet oblique thereto, a nozzle in said inlet and also oblique to said wall, and an inclined deflecting-surface across the lower portion of the fuel-opening and in the path of a portion of the incoming fuel, said deflecting-surface being within the lines of the wall and obliquely disposed with respect to the line of direction of the incoming fuel; substantially as described.

6. In a furnace, a fuel-inlet, and a deflector extending over only a portion of the zone filled by the incoming fuel and arranged obliquely in the path of the incoming fuel, said deflector having a beveled face upon which a portion of the incoming fuel strikes; substantially as described.

7. In a furnace, a combustion-chamber, means for directing fuel obliquely thereinto, and a deflector across the path of the incoming fuel substantially parallel to the longitudinal axis of the furnace, said deflector having a beveled face; substantially as described.

8. In a furnace, the combination with a combustion-chamber whose side walls are provided with obliquely-arranged fuel-openings, of means arranged in the path of the incoming fuel to deflect upwardly and laterally the part of said fuel coming in contact therewith, and escape-flues leading downwardly from each end of the combustion-chamber; substantially as described.

9. In a furnace, a combustion-chamber having opposite walls, means for directing fuel from one side of said chamber across the same and obliquely to the opposite wall, and a deflector intermediate the said walls for deflecting a portion of the incoming fuel vertically and laterally; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 14th day of March, 1902.

PHILIP B. HARRISON.

Witnesses:
E. T. WALKER,
CHARLES F. HUNTOON,