W. R. SMITH.

APPARATUS FOR BAKING OR CURING PATENT LEATHER, &c.

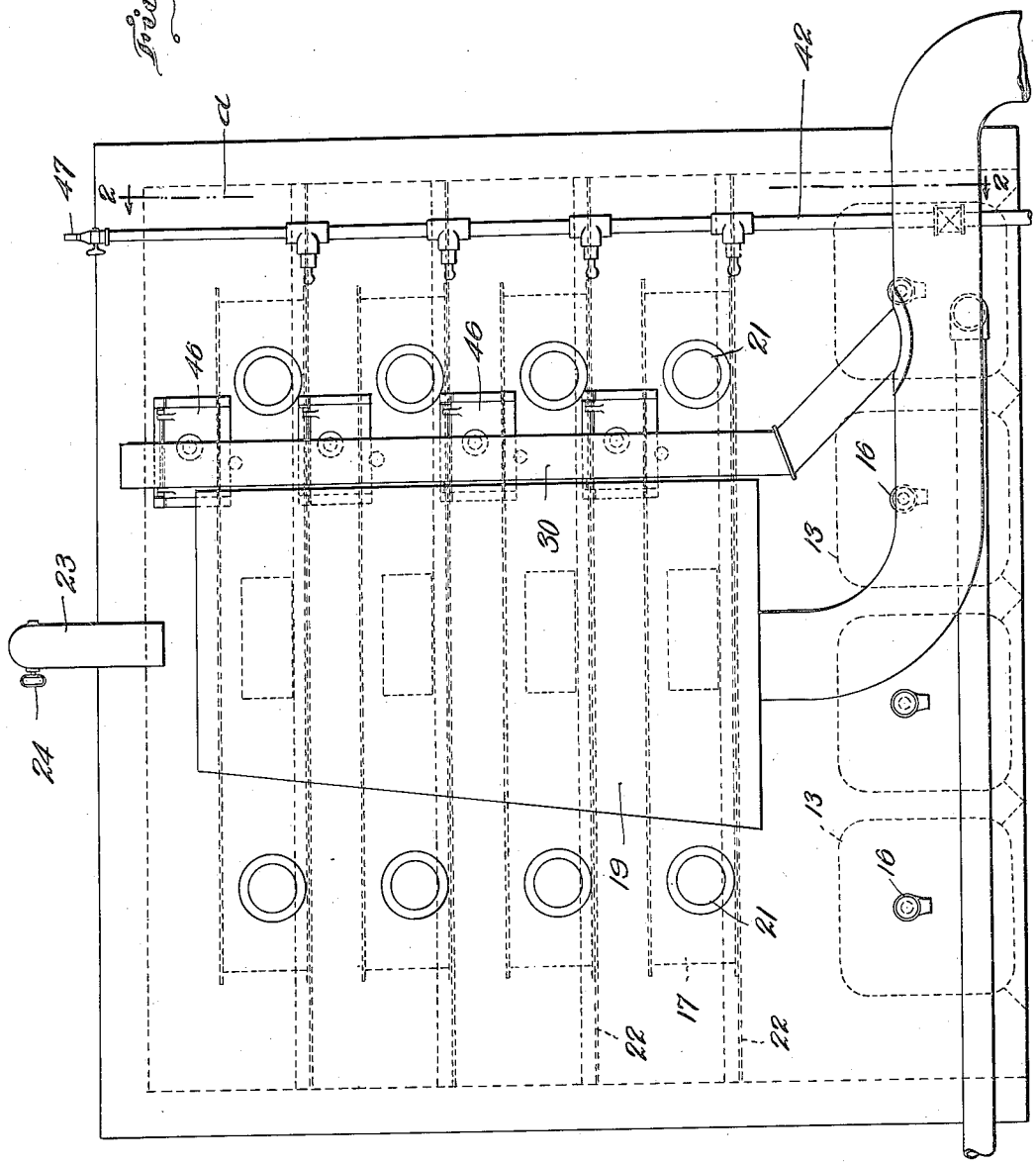
APPLICATION FILED DEC. 6, 1911.

1,045,623.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



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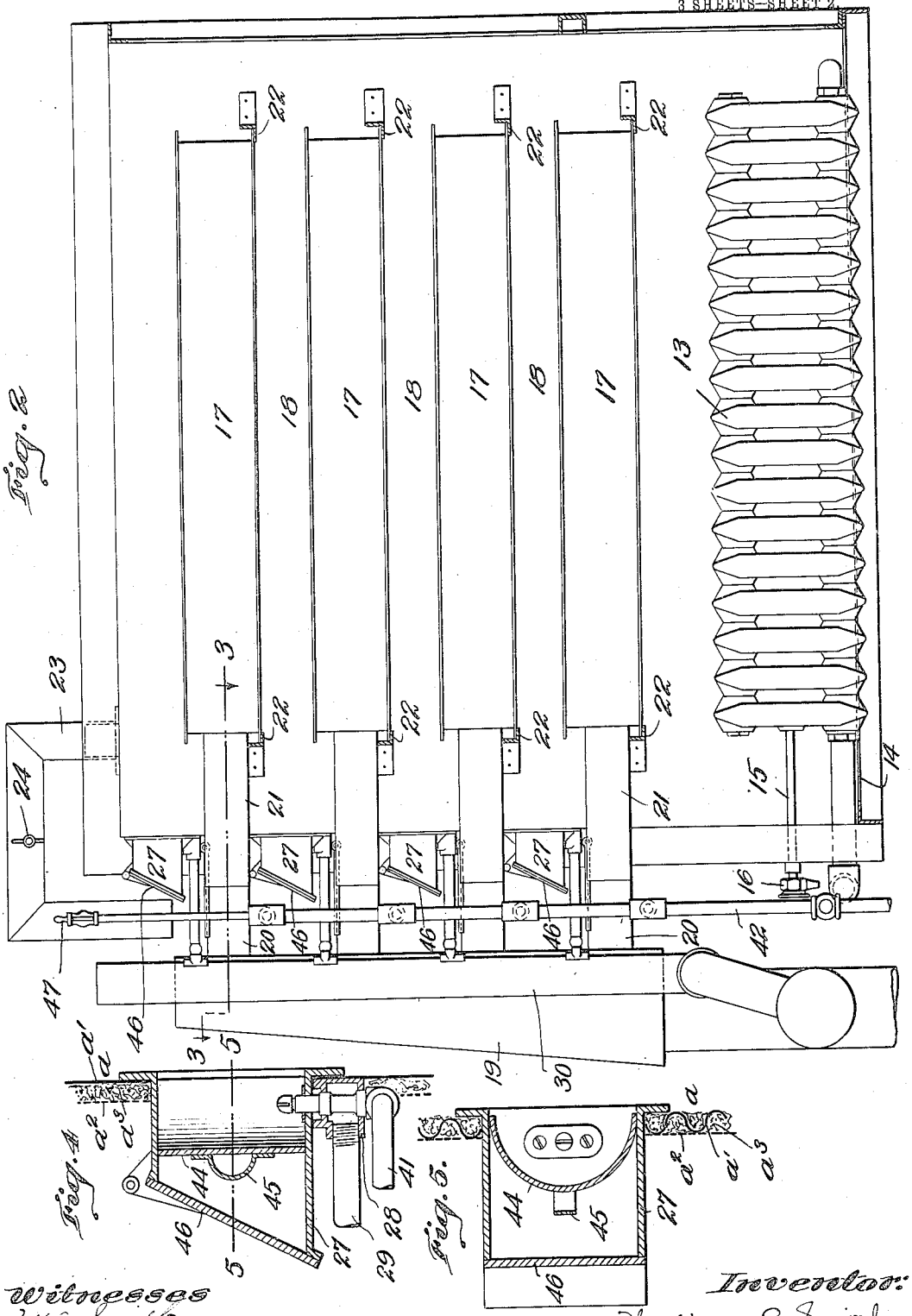

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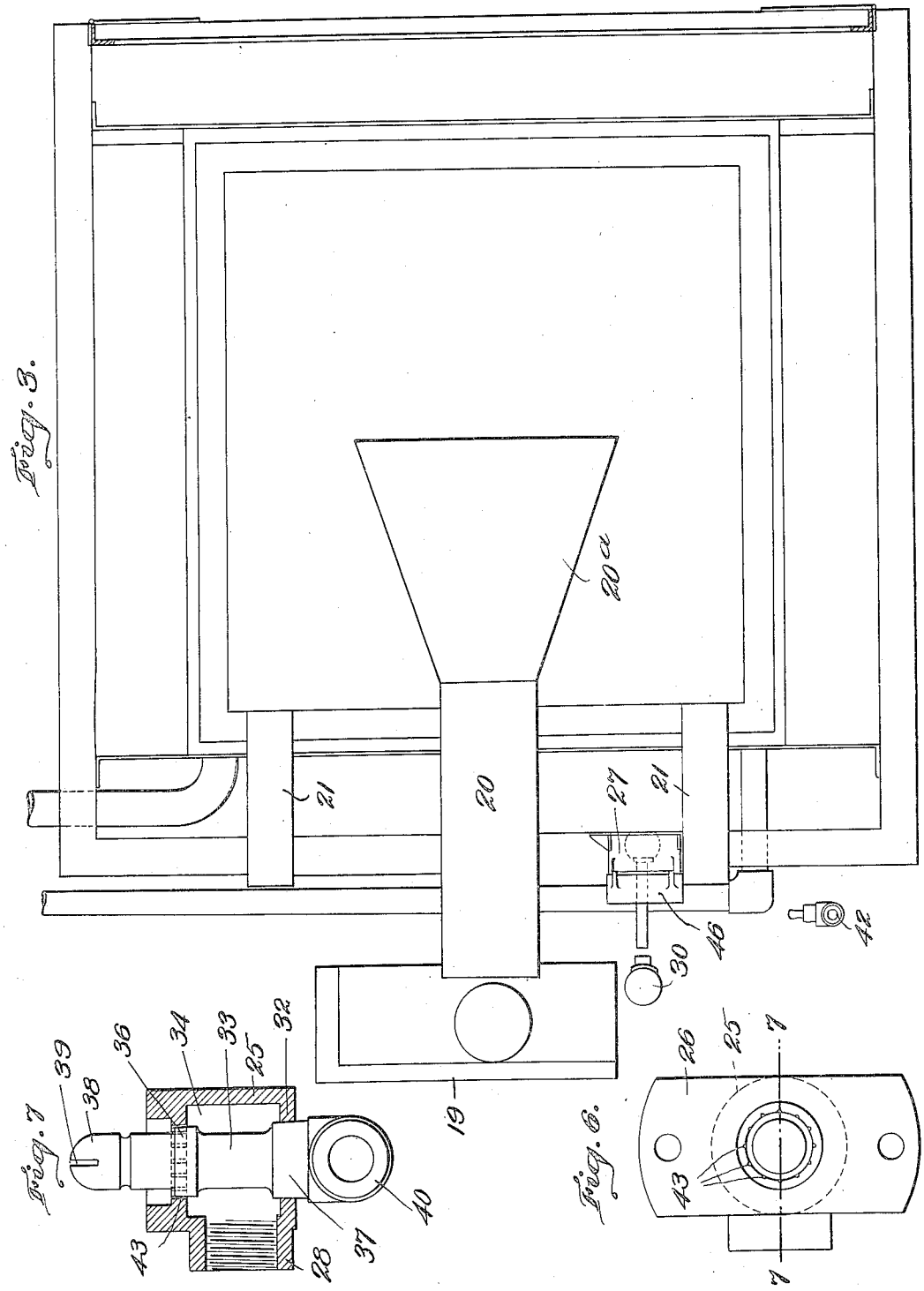

Fig. 3.

Fig. 7.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BAKING OR CURING PATENT-LEATHER, &c.

1,045,623. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed December 6, 1911. Serial No. 664,301.

To all whom it may concern:

Be it known that I, WILLIAM R. SMITH, a citizen of the United States, and resident of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Apparatus for Baking or Curing Patent-Leather, &c., of which the following is a specification.

This invention relates primarily to apparatus for baking or curing the glossy coating which is formed by applying a suitable composition to the grain side of leather and subjecting said coating to a sufficient degree of heat to vulcanize or harden the same, the product being the well known patent leather of commerce. The degree of heat required is such as to injuriously affect the leather by rendering it brittle and liable to crack.

In Letters Patent of the United States No. 732,129, granted June 30, 1903, I have disclosed a process of coating leather and other materials, which consists in protecting the back side of the piece of prepared material from heat while the coating on the front side is being vulcanized, said process being carried out by placing the material on a protecting bed which is adapted to prevent the injurious action of heat upon the leather, preferably by making said bed the upper side of an air chamber having means for the admission and exit of a current of cool air, and internal means for circulating the air.

In Letters Patent of the United States No. 774,971, dated November 15, 1904, I have disclosed an apparatus for carrying out the above-mentioned process, the same including a baking chamber having a series of artificial lights capable of giving high actinic rays, and adapted to act on the coating of a piece of leather contained in said chamber in a manner equivalent to the action of solar light, the source of artificial light shown by said patent being incandescent electric lamps. Such lamps, while furnishing the desired actinic effect, do not materially affect the temperature of the air in the chamber, the main source of heat being independent of the lamps which do not constitute a substantial part of the heating means.

The apparatus of the present invention includes a series of protecting beds located in a casing or oven having a primary heater located below the beds, the arrangement being such that air raised to a vulcanizing heat is circulated through the oven in contact with the coated surfaces of articles such as sheets of leather supported by the beds.

The apparatus also includes a series of gas burners emitting open flames in contact with the circulating air, and adapted not only to direct high actinic rays upon the coated surfaces upon the beds, and thus supply an equivalent of solar light directed on patent leather cured in the open air, but also to additionally heat the air in the oven, and facilitate vulcanization, the burners collectively constituting a secondary heater. The said burners are, in accordance with my invention, supplied with air which is forced against the external surfaces of the burner flames to satisfy combustion, and compensate for the lack of oxygen in the air due to the high temperature to which it is raised, the formation of soot due to the unsatisfied combustion being thus prevented.

The apparatus also includes means for causing a constant outflow of air from the upper portion of the oven for the purpose of maintaining a circulation, said means having provision for practically equalizing the temperature in the upper and lower portions of the oven.

To these and other related ends the invention consists in the improvements which I shall now proceed to describe and claim.

Of the accompanying drawings forming a part of this specification,—Figure 1 represents a rear elevation of an apparatus embodying my invention. Fig. 2 represents a section on line 2—2 of Fig. 1. Fig. 3 represents a section on line 3—3 of Fig. 2. Fig. 4 represents a vertical section of one of the boxes or containers hereinafter mentioned. Fig. 5 represents a section on line 5—5 of Fig. 4. Fig. 6 represents a plan view of one of the gas burners. Fig. 7 represents a section on line 7—7 of Fig. 6.

The same reference characters indicate the same or similar parts in all the figures.

In the drawings, *a* represents a casing or oven of rectangular form, the walls of which are preferably nonconductors of heat, each wall being preferably composed of an inner layer *a'*, Fig. 5, of corrugated sheet metal, an outer member a^2 of expanded metal (represented by the heavy broken lines) at the outer side of the member *a'*, and a fill-

ing a^3 of cement or plaster interposed between the members a' and a^2. One wall of the oven is adapted to be closed practically air tight by a suitable door which permits access to the interior of the oven. In the lower portion of the oven is a primary heater preferably composed of a plurality of steam radiators 13 having suitable inlet and outlet pipes extending through opposite walls of the oven, the primary heater having sufficient radiating surface to raise the temperature of the air in the oven to 180° F. more or less. The bottom of the oven is provided with small openings 14, Fig. 2, for the admission of air. Each radiator preferably has an air outlet pipe 15 extending through the rear wall of the oven and provided with a pet cock 16.

Supported by transverse bars 22 in the oven, above the primary heater, are a series of horizontal air chambers 17 arranged in a vertical tier and separated by air spaces 18 through which the heated air has a free circulation. The upper surfaces of the air chambers constitute beds adapted to support sheets of coated leather, and cool air under pressure is circulated through the chambers, so that their upper surfaces are kept cool and protect the under sides of the sheets, their upper sides which are coated with enamel being exposed to contact with the heated air.

At the exterior of the oven is a vertical air conduit 19 which communicates with a source of supply of cold air such as a blower and is provided with branches 20 extending into the chambers 17, and having flaring terminals 20^a, Fig. 3, within the chambers. Each chamber has two air outlet pipes 21 extending through the rear wall of the oven. The upper surfaces of the chambers may be provided with any suitable means for confining the leather sheets smoothly thereon. The top of the oven is provided with an air outlet pipe 23, for the slow escape of heated air, and the maintenance of a circulation through the space 18. Said pipe is preferably extended horizontally and downwardly, as shown by Fig. 2, so that the air, which escapes through the downwardly extended end, is retarded sufficiently to cause a back pressure in the oven. The result of this is that while a constant and very slow and gentle circulation (which is desirable) is maintained, the temperature of the upper and lower portions of the oven is practically equalized. The pipe 23 is also provided with a damper 24 to regulate the retardation and back pressure.

The gas burners, which constitute the secondary heater and direct high actinic rays upon the coated surfaces of the sheets of leather, are arranged in a vertical series each burner coinciding with one of the air spaces 18 and being so located that its rays extend through said spaces and upon the leather sheets at the lower sides thereof. The preferred construction of the said burners is shown by Figs. 6 and 7, each burner being composed of a casing 25 having ears 26, which are secured to the bottoms of sheet metal boxes or containers 27, attached to the rear wall of the oven and opening into the latter. The casing 25 has an internal air chamber and a nipple 28 to which is attached a horizontal branch air pipe 29 communicating with a vertical air pipe or conduit 30, there being a series of branch pipes 29 as shown by Fig. 2. The vertical air conduit 30 is preferably a branch of the conduit 19 and receives air from the same source of supply. The casing 25 is provided with annular inwardly projecting seats 31, 32, forming with the burner, pillar 33 next described, an annular air chamber 34 surrounding the pillar and communicating with the nipple 28. The seats 31 32 are tapered and adapted to have a tight frictional fit on tapered enlargements 36 37 on the pillar 33. Said pillar is tubular and adapted to conduct gas, and has a refractory tip 38 of any suitable material such as lava, the tip having a slit or gas outlet 39. The tip may be of any suitable construction adapted to burn acetylene or other heating and illuminating gas, which is admitted through a branch or nipple 40 at the lower end of the pillar, said branch being connected by a length of flexible tubing 41 with a vertical gas conduit 42 having suitable nipples formed to connect with the series of flexible tubes 41, these constituting branches of the gas conduit.

The upper seat 31, in the burner casing 25, is provided with a series of small grooves 43, Figs. 6 and 7, which constitute air outlets adapted to deliver small jets of air upwardly against the outer surface of the gas flame burning at the tip 38. These air jets unite and form an annular jet surrounding the flame, and supplying sufficient oxygen to satisfy combustion, so that a brilliant and hot flame issues from each burner, and the formation of soot due to unsatisfied combustion is prevented.

I prefer to provide one gas burner for each air space 18, the capacity of the burners being such that they collectively raise the temperature of the air considerably above that imparted by the primary heater, thus facilitating the vulcanization or curing of the coatings. At the same time, the actinic rays of light from the gas flames are directed upon the coated surfaces of the leather sheets, with the result above stated.

The pillars 33 are adapted to be quickly inserted in and removed from the casings 25, so that the tips 38 may be readily cleaned and renewed, the flexible branches 41 permitting free manipulation of the pillars, and the seats and enlargements on the cas-

ing and pillar permitting the quick engagement and removal of the pillars.

The effect of the light rays is augmented by reflectors 44, Figs. 4 and 5, placed in the boxes 27, behind the burners. Each reflector is a curved piece of sheet metal having a bright reflecting concave inner surface. The reflectors are removably inserted in the boxes 27, and each is provided with a handle 45 to facilitate its insertion and removal. The boxes are provided with hinged inclined doors 46 at their outer ends. The gas conduit 42 is provided with a pilot burner 47 at its upper end which is opened before the apparatus is operated to liberate any mixture of gas and air that may have accumulated in the gas conduit 42.

It is obvious that the described apparatus may be used in the treatment of materials other than patent leather.

I claim:—

1. An apparatus of the character stated comprising, in combination, a baking chamber or oven, an air heater in the lower portion of the oven, a series of supporting beds located above the heater and separated by spaces through which the heated air circulates, said beds being provided with means for protecting the under sides of articles placed upon them from injury by the heat, and a hot air outlet at the upper portion of the oven, having means for retarding the escape of air and thereby not only maintaining a circulation of air in the oven, but also practically equalizing the temperature in the upper and lower parts of the oven.

2. An apparatus of the character stated comprising, in combination, a baking chamber or oven, an air heater in the lower portion of the oven, a series of supporting and protecting beds located above the heater and separated by spaces through which the heated air circulates, gas burners within the oven adapted to emit open flames in contact with the air in the oven, whereby said air is additionally heated, and means for supplying air to the burners to satisfy combustion, and thereby maintain a relatively high temperature and prevent the formation of soot.

3. An apparatus of the character stated comprising, in combination, a baking chamber or oven, an air heater in the lower portion of the oven, a series of supporting and protecting beds located above the heater and separated by spaces through which the heated air circulates, gas burners within the oven adapted to emit open flames in contact with the air in the oven, whereby said air is additionally heated, means for supplying air to the burners to satisfy combustion, maintain a relatively high temperature and prevent the formation of soot, and means for maintaining a circulation of air in the oven and for practically equalizing the temperature in the upper and lower portions of the oven.

4. An apparatus of the character stated comprising, in combination, a baking chamber or oven, an air heater in the lower portion of the oven, a series of supporting and protecting beds located above the heater and separated by spaces through which the heated air circulates, gas burners coinciding with the spaces between the beds and adapted to emit luminous open flames in contact with the air in the oven, and to direct rays of light upon the upper surfaces of articles on the beds, and means for supplying air to the external surfaces of said flames to satisfy combustion, maintain a relatively high temperature and prevent the formation of soot.

5. An apparatus of the character stated comprising, in combination, an oven, an air heater in the lower portion of the oven, a series of horizontal air chambers located above the heater, the upper surfaces of said chambers constituting supporting beds over which the heated air circulates, a chamber-supplying air conduit having branches entering said chambers, air outlets being provided from the chambers to the exterior of the oven, a series of gas burners within the oven, each having a gas burning tip, and a series of air passages surrounding the tip and adapted to direct air against the external surfaces of gas flames emitted by the burner tips, to maintain a relatively high temperature and prevent the formation of soot, and a burner-supplying air conduit having branches communicating with the air passages of the burners.

6. An apparatus of the character stated comprising, in combination, an oven, an air heater in the lower portion of the oven, a series of horizontal air chambers located above the heater, the upper surfaces of said chambers constituting supporting beds over which the heated air circulates, a chamber-supplying air conduit having branches entering said chambers, air outlets being provided from the chambers to the exterior of the oven, a series of gas burners within the oven, each having a gas burning tip, and a series of air passages surrounding the tip and adapted to direct air against the external surfaces of gas flames emitted by the burner tips, to maintain a relatively high temperature and prevent the formation of soot and a burner-supplying air conduit having branches communicating with the air passages of the burners, each burner including a fixed socket and a pillar carrying the burner tip and removable from said socket, and the branches of the burner-supplying air conduit having flexible portions coupled to said pillars, and permitting the removal of the pillars from the sockets.

7. An apparatus of the character stated

comprising, in combination, a baking chamber or oven, having a vertical series of boxes in one of its walls, gas burners in said boxes, reflectors removably inserted in the boxes behind the burners, and a series of supporting beds in the oven separated by air spaces which coincide with said boxes, the burners and reflectors being arranged to direct light rays on the surfaces of articles supported by the beds.

In testimony whereof I have affixed my signature, in presence of two witnesses.

WILLIAM R. SMITH.

Witnesses:
C. F. BROWN,
F. R. COBB.