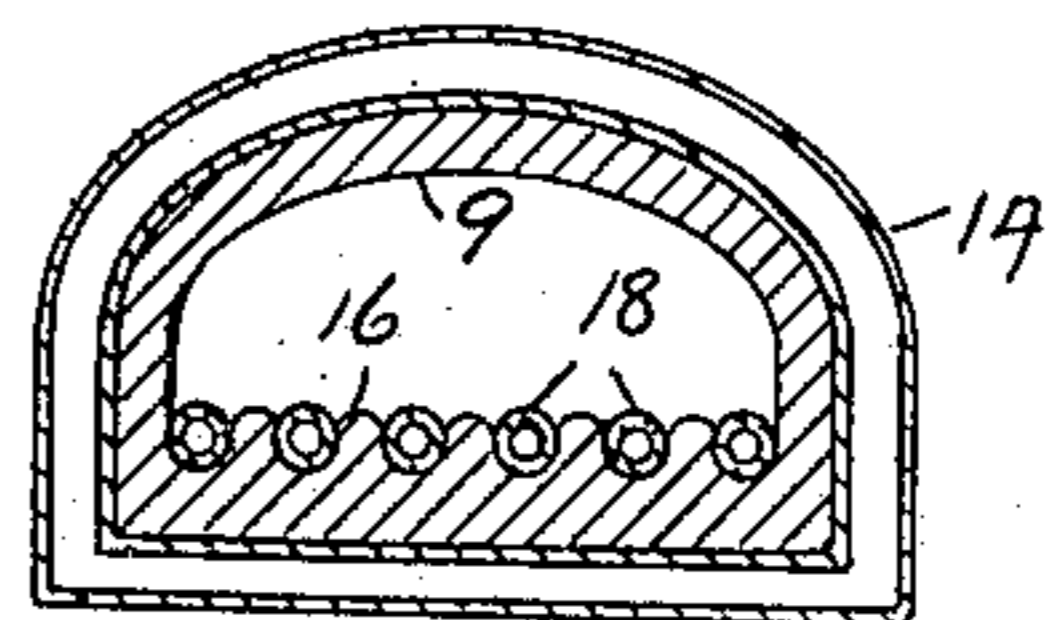
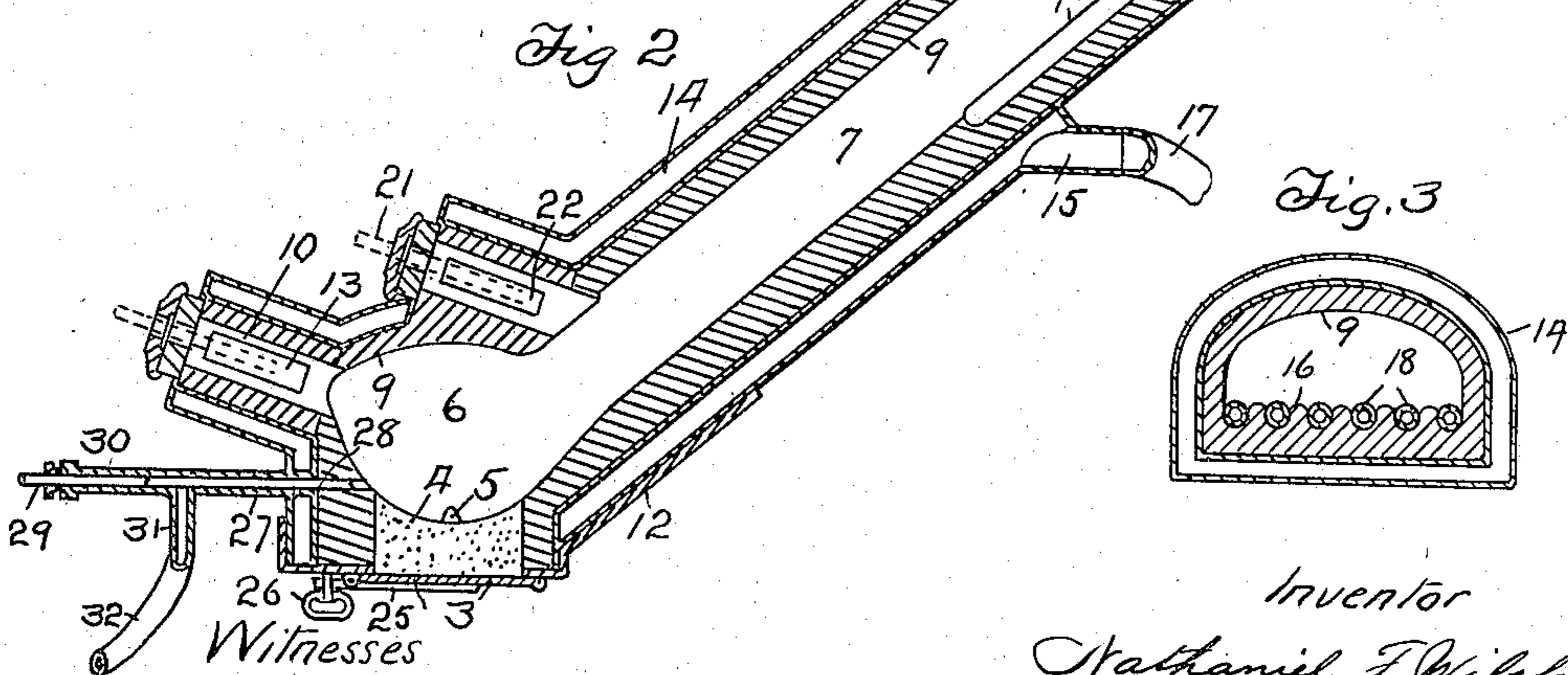
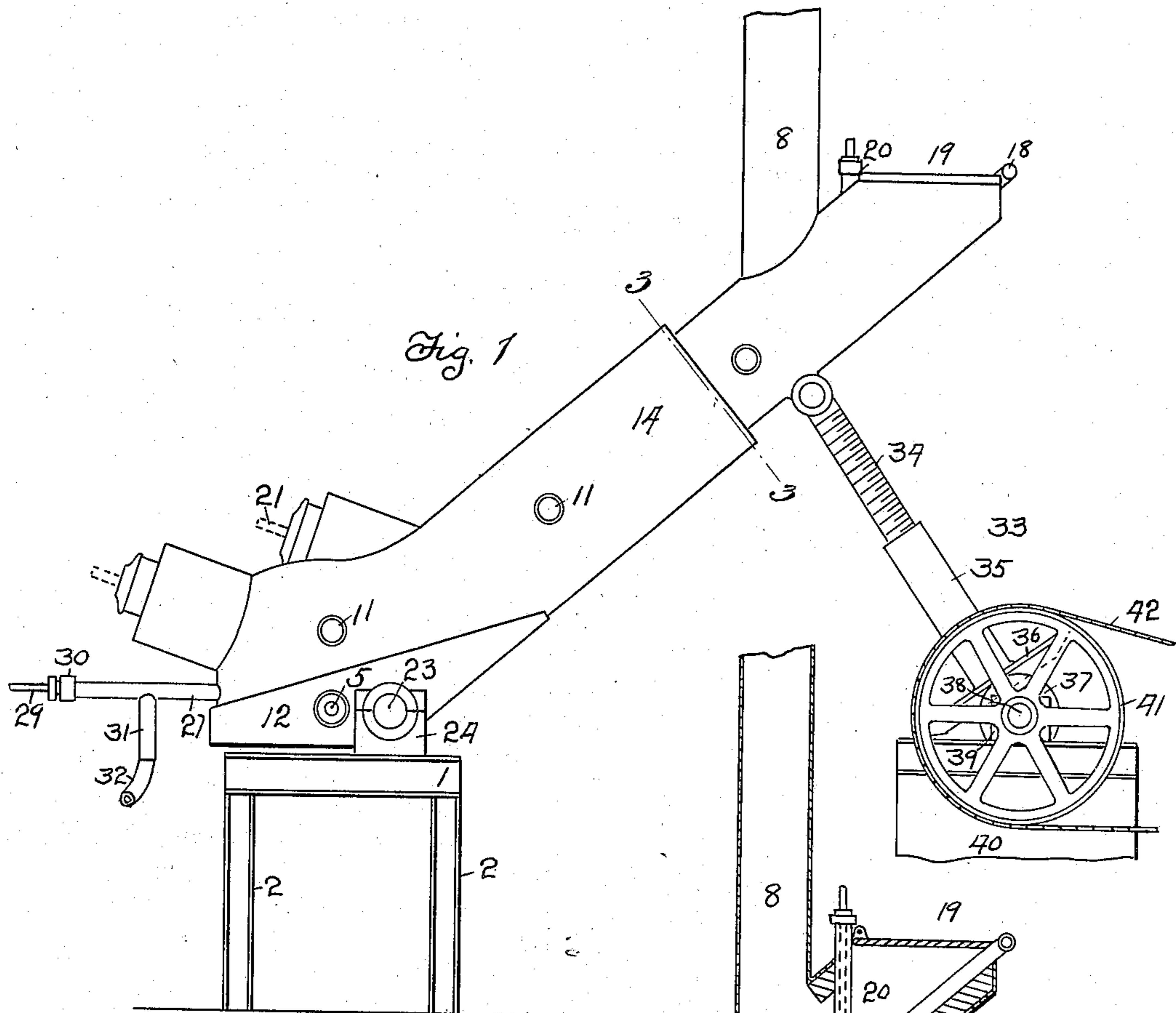


N. F. WILSHIRE.
CUPOLA.
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924,025.

Patented June 8, 1909.



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CUPOLA.

No. 924,025.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, NATHANIEL F. WILSHIRE, a citizen of the United States of America, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a certain new and useful Cupola; and I do hereby declare the following to be 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.

This invention relates to cupolas, and more particularly to those adapted to be used with liquid or gaseous fuel.

One object of the invention is to provide, in a cupola of this description, means to support the material being melted, roasted or smelted; it being understood that fuel of the character described cannot act as a support, as can the fuel in the case where coke or other solid fuel is used.

Another object of the invention is to provide means for varying, at will the inclination of the cupola.

A further object of the invention is to make provision for passing a blast of air through the metal bath to reduce the carbon to a desired amount.

With the above and other apparent objects in view, the invention may be embodied in the form herein described, and illustrated in the accompanying drawings, in which,

Figure 1 is a side elevation of a construction embodying the invention. Fig. 2 is a longitudinal sectional view of the cupola. Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

As shown in the drawings, a frame 1 is supported upon columns 2, and is provided with downwardly opening doors 3 supporting a basin 4 formed of suitable refractory material, said basin having outlets or tapholes 5 (only one of which is shown) which may be opened and closed by the means usually employed and known to those skilled in the art.

Supported on frame 1 is a chamber 6 having an extension 7, the inclined floor of which forms a support for the material to be melted or otherwise treated by heat. To the upper end of extension 7 is connected a chimney 8.

The chamber 6 may be lined with refractory material 9, and provided with an extension 10 which may have an opening therein for the introduction of any suitable form of hydro-carbon or gas burner; the position of

the burner being indicated by dotted lines. At each side of extension 10 may be positioned a twyer 13, communicating with an air jacket 14 surrounding a major portion of chamber 6 and its extensions 7 and 10. Said air jacket has an inlet 15 to which may be attached a flexible conduit 17 communicating with any source (not shown) of supply of air under pressure.

Extension 10 forms a combustion chamber wherein the fuel is mixed with the air entering through the inlets 13. One or more burners 21, having twyers 22 associated therewith, may be located on extension 7 intermediate of the junction of said extension with chamber 6, and chimney 8. The floor of extension 7 may be provided with a series of ribs 16, more clearly shown in Fig. 3, and the upper part of said floor may be protected from abrasion by a plurality of water-tubes 18. A gate 19 is provided to close the upper portion of extension 7; there being also a gate 20 (provided, or not, with water conduits) to prevent the escape of gases from said extension when gate 19 is opened. Any number of suitably located peep-holes 11 may be provided in the cupola. To the lower portion of the cupola is secured a cradle 12 of cast metal or the like, having trunnions 23 on both of its sides; which trunnions are fitted in bearings 24 on the frame 1. The doors 3 are preferably hingedly secured on the bottom of cradle 12, and may be held in closed position by the swinging bar 25, which bar in turn may be locked in position by any suitable means, latch being shown for the purpose.

In order to pass a blast of air through the bath of molten metal, a pipe 27 may be fitted in the lower front portion of the cupola to communicate with a duct 28, which latter passes through the lining to the chamber 6. A rod 29 fitting in the pipe 27 and passing through a stuffingbox 30 in the head of the pipe, allows of the removal by an operator of the fireclay, or the like, in the duct 28, when it is desired to operate with the air blast; the rod being pushed rearwardly through the pipe and duct for the purpose of such removal. The pipe 27 has a fitting 31 to which is attached a flexible conduit 32 connected with a suitable source (not shown) of air under pressure.

In order to move the cupola to vary its

inclination, the device 33 shown in Fig. 1 is preferably employed. It consists of a screw-shaft 34 trunnioned at the bottom of the upper end of the cupola and fitting in an internally-threaded sleeve 35 which has a bevelgear 36 secured to the lower end thereof. In mesh with the bevelgear 36 is a bevel-pinion 37 keyed on shaft 38 which journals in a bearing 39; the latter being secured on top of a concrete pedestal 40. The shaft 38 has secured thereto a pulley 41 which may be driven from a suitable source (not shown) of power by sprocket-chain 42.

It is obvious that the floor of extension 7 may have any configuration necessary to modify the rate of progress of the unmelted or the plastic material toward the bath. This configuration will depend largely upon the character the material assumes at different temperatures, and may be such as to give a steeper slope at the point or points where the rate of movement of the material requires to be accelerated.

A general description of the construction of the cupola having been given, its mode of operation will now be described. A quantity of material, say pig iron, having been deposited upon the floor of extension 7, gates 19 and 20 are closed and one or more of the burners started. The flame from the burners impinges upon the material in the lower part of the cupola and passes upwardly in the direction of the arrow to chimney 8. As the material melts it collects in the basin 4. Gate 19 may be opened to insert more material in the upper part of extension 7, after which said gate may be closed and gate 20 opened, whereupon the material slides down until it meets with the unmelted material remaining upon the floor of extension 7; it being understood that the inclination of the cupola may be varied at will and so adjusted by means of the device 33 that there may be a tendency to downward movement, by gravity, of the material upon the floor of extension 7. Should it be desired to reduce the amount of carbon in the molten material, an air blast may be passed through it while the material is being melted and collecting in basin 4; or the air blast may be operated after most or all of the material has been melted; it being understood that the blast may be discontinued when the desired constituency of the molten material is attained, which can be determined approximately from the appearance of the flame on the molten bath seen through the peepholes.

It will be readily apparent that the inclination of the cupola may be adjusted to pile up the molten material in front of air duct 28, or otherwise. Also it will be understood that oxygen may be supplied from the twyers uncovered by molten material, whereby may be developed heat resulting from combustion of the carbon-monoxid which is formed

when the air blast passes through the metal bath in basin 4.

It is to be understood that the term cupola is to be interpreted in a broad sense to comprehend other devices for treating material by confined heat.

I claim:

1. In combination, a cupola provided with an inclined support for material, and means exterior to the cupola to move the same at will to adjust the inclination of said support.

2. In a cupola, a chamber having an inclined support for material therein, a basin below said support, means for heating said material, and means on the exterior of the cupola to move the same at will to adjust the inclination of said support.

3. In a cupola, an inclined support for material, protecting means associated with a portion thereof, means to direct heat upon said material, and means to adjust the inclination of said support.

4. In a cupola, an inclined support for the material being melted, means to adjust the inclination of said support, means to direct heat upon said material, and means for passing air through the material when melted.

5. In a cupola, a heating chamber, an inclined material support therein, an air jacket, twyers connected to said air jacket and communicating with said chamber, means to supply air under pressure to said jacket, means for adjusting the inclination of the cupola, and means for passing air through the material when melted.

6. In a cupola, an inclined support for the material being melted, means to direct heat upon said material, and means for passing air through the material when melted.

7. In a cupola, a chamber having an inclined material support therein, a basin for molten material below said support, means for directing heat on the material, means to adjust the inclination of the cupola, and means for passing air through the molten material.

8. The combination with a cupola, provided with an inclined support for material, a basin below said support, and means to direct heat upon said material, of means operable at will to move the cupola to adjust the inclination of said support.

9. The combination with a cupola, provided with an inclined support for material, and means to direct heat upon said material, of means on the exterior of the cupola to move it to adjust the inclination of said support at will.

10. The combination with a cupola having therein an inclined support for material, of pivotal means associated with said cupola, and means operable at will for moving the cupola on said pivotal means to adjust the inclination of said support.

11. The combination with a cupola having

therein an inclined support for material and
a basin below said support, of pivotal means
associated with said cupola, and means on
the exterior of the cupola for moving it on
5 said pivotal means at will to adjust the incli-
nation of said support.

In testimony whereof, I have signed my
name to this specification in the presence of

two subscribing witnesses at Los Angeles
county of Los Angeles, State of California, 10
this 6th day of July A. D. 1908.

NATHANIEL F. WILSHIRE.

Witnesses:

ANNA B. DESSAU,
ALEX. H. LIDDERS.