

No. 865,659.

PATENTED SEPT. 10, 1907.

J. SCOTT.
SINTERING ORES.

APPLICATION FILED NOV. 13, 1906.

2 SHEETS—SHEET 1.

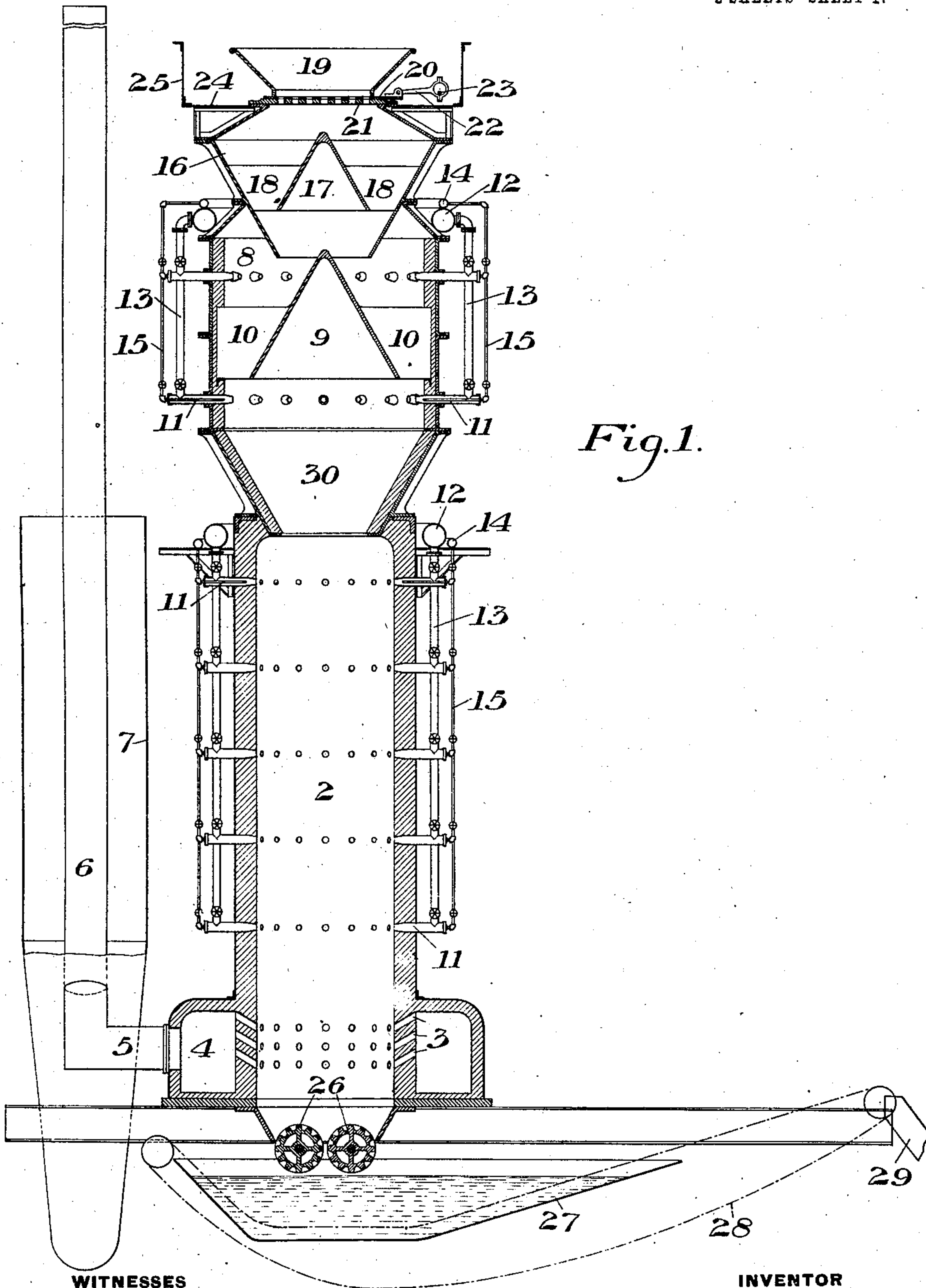


Fig. 1.

WITNESSES

W. W. Swartz
R. A. Balderson

INVENTOR

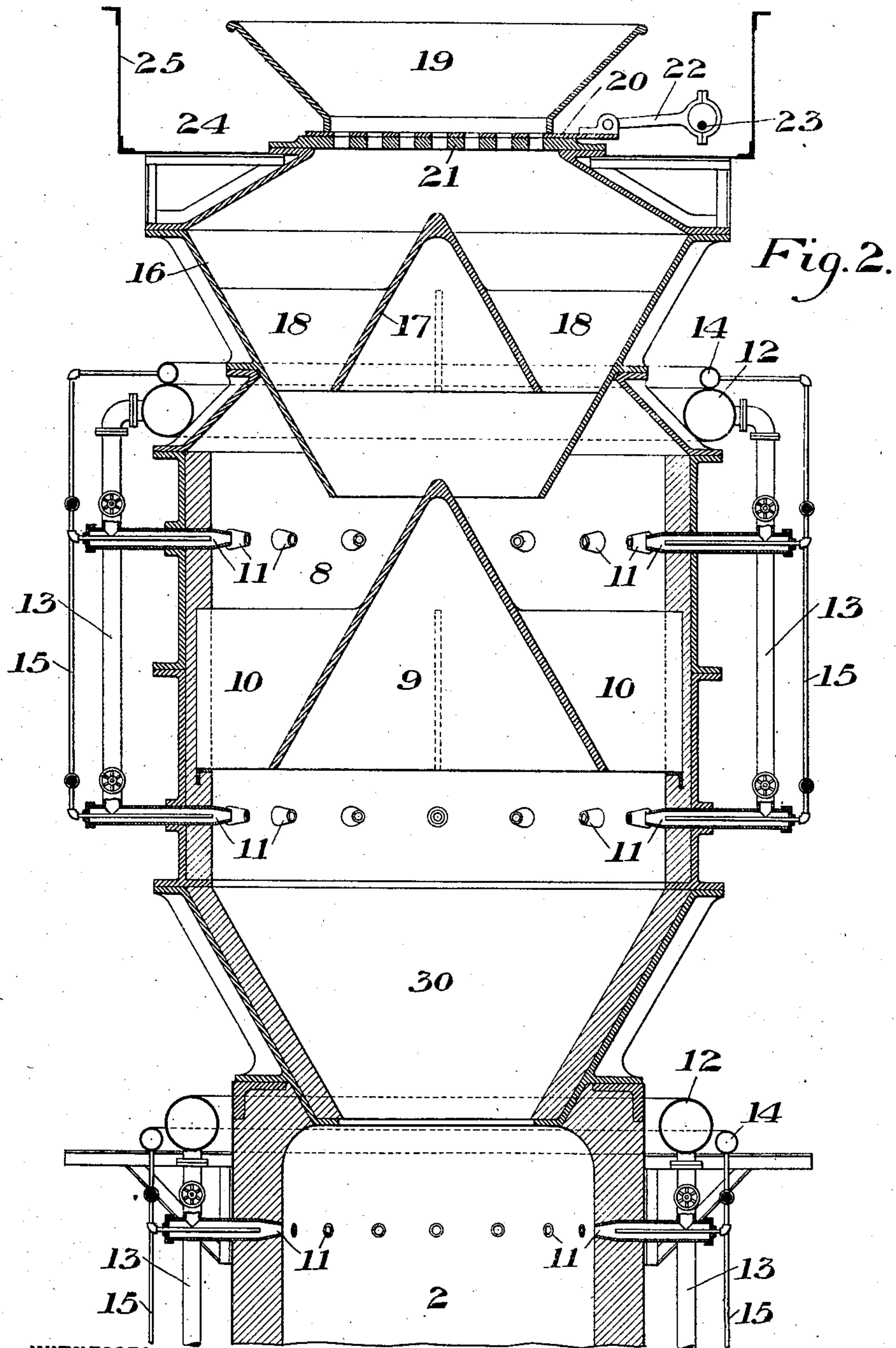
James Scott
by Balderson & Swartz
his attys

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W.W. Swartz
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UNITED STATES PATENT OFFICE.

JAMES SCOTT, OF PITTSBURG, PENNSYLVANIA.

SINTERING ORES.

No. 865,659.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed November 13, 1906. Serial No. 343,181.

To all whom it may concern:

Be it known that I, JAMES SCOTT, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Sintering Ores, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional side elevation showing one form of my improved apparatus; and Fig. 2 is a partial sectional view showing the upper part on a larger scale.

My invention relates to the agglomerating or sintering of finely divided ores, especially the flue dust of blast furnaces; and is especially designed to improve upon the method and apparatus set forth in my co-pending application No. 338,738, filed October 13, 1906.

In carrying out my invention, I drop the finely divided ore or flue dust in a shower through a furnace chamber, into which burners project in annular series at different levels, the heat being so regulated that the ore will be partially fused and sintered during its drop through this chamber. The burners substantially provide annular sheets of flame at different levels, through which the showering ore must drop. The bottom of the chamber is preferably provided with a feed-out device, which will aid in forming the partially fused material into lumps and discharge them. I preferably feed out these lumps or masses into a water bosh, from which they may be carried into a car or receptacle, preferably by means of a conveyer which passes through this water bosh.

In order to retard the descent of the showering ore I employ baffles or retarding devices, particularly in the upper part of the apparatus, whereby the ore is more fully exposed to the action of the flame and heat, and the sintering action more completely obtained.

In the drawings, in which I show a preferred form of my apparatus, 2 represents a vertical cylindrical furnace chamber which may be built in the ordinary form or a metal shell with refractory lining, such chamber having an annular series of outlet openings 3 near its lower end for the products of combustion which pass through to the annular chamber 4 from which the pipe 5 leads to the stack 6. I have shown this stack as located within an annular drying chamber 7 in which the dust or ore may be heated and dried, and from which it may be taken to the top of the sintering apparatus. Above the chamber 2 is provided a supplemental chamber 8 which is also preferably formed of a metal shell or shells with refractory lining, this containing a conical baffle 9 supported on spider arms 10.

Both the chambers 8 and 2 are heated by annular rows of burners 11 supplied by gas from a gas main 12 having depending valved branches 13; and with air from an air main 14 having depending valved branch pipes 15. The supply of gas and air to each burner may

thus be controlled so that the annular sheets of flame at different levels may be controlled and regulated as to direction and volume.

At the top of the chamber 8 I preferably mount a hopper 16 of upwardly-flaring form within which is mounted a conical baffle 17 of similar form to the baffle 9, this being carried on spider arms 18. The material is fed in the top of the hopper from the feed hopper 19 by means of a slotted valve or gate 20 moving over the slotted bottom 21 of the hopper 19. For reciprocating this valve or gate I have shown an eccentric rod 22 leading from a constantly-driven shaft 23. I have also shown a platform 24 carried on the upper hopper and having a surrounding hand rail or inclosure 25.

The bottom of the furnace is formed by an annular hopper plate having an opening closed by corrugated rollers 26. These rollers are driven by any suitable connection, and as they turn in opposite directions toward each other they serve to compact and form the partially fused material into lumps as they feed it out. I preferably mount these rollers on yielding bearings so as to avoid breaking them and provide for the discharge of larger or smaller lumps. Below the furnace bottom I preferably mount a water bosh 27, through which extends a conveyer 28, this conveyer leading to a chute 29 from which the material is discharged into a car. The lumps or masses of partially fused material are fed into the water bosh, and thereby cooled, and are then fed out to the car, by which they may be taken to the blast furnace or other point of use.

In the use of the apparatus, the feed-slide at the top of the furnace is reciprocated at a substantially uniform rate of speed, and thereby the flue dust or fine ore is dropped through the chamber at a substantially uniform rate. As the material drops through the preliminary heating chamber 8 it is distributed by the baffles or deflectors 17 and 19, through the hopper 16, and is also retarded in its descent, so that a greater period of time is provided for the sintering action of the flames. The carbon of the flames also assists in the agglomerating action. The heat of the furnace both in the preliminary chamber and the main furnace may be regulated in any desirable manner, and as the showering ore descends its temperature is increased until it is partially fused before reaching the bottom.

The connection of the chamber 8 to the chamber 2 is preferably of hopper shape, as shown at 30, so that the ore is again distributed and retarded somewhat as it enters the main furnace chamber. This partially fused material is continuously fed out by the corrugated rollers, in the form of clinker or sintered lumps. If the flue dust is wet, or for any reason needs drying, this is carried out by the heat from the stack of the furnace itself. The draft is preferably downward through the furnace, as shown, thus avoiding injury to the feeding-in device, and improving the action.

The advantages of my improved structure arise from the use of the retarders or baffles which serve not only to retard the showering ore or flue dust, but to distribute it evenly in annular form. The dust or ore is preheated to a considerable extent before it enters the main sintering chamber, so that it will become sintered before it drops upon the feed-out rollers at the bottom.

Retarding devices may also be used in the main furnace chamber; a deflector with plain faced rolls may be used instead of the corrugated feed-out rolls; and many other changes may be made in the form and arrangement of the parts without departing from my invention.

I claim:—

1. In apparatus for sintering ores, an open vertically extending furnace chamber having a movable feeding device at the top arranged to shower the ore, burners arranged at different levels and a compacting and feeding out device at the bottom of the chamber; substantially as described.
2. In apparatus for sintering ores, a vertically extending furnace chamber having a feeding device at the top arranged to deliver the ore in a shower within the chamber, burners at different levels projecting into the chamber and a water bosh into which the sintered material is fed; substantially as described.
3. In apparatus for sintering ores, an open vertically-extending furnace chamber having burners projecting

thereinto at different levels, a preheating furnace having retarding devices at the top of the main furnace chamber, and a feeding-out device at the bottom for the partially fused material; substantially as described.

4. In apparatus for sintering ores, a vertically-extending furnace chamber having retarding devices in its top portion at different levels therein, and burners surrounding its top portion; substantially as described.

5. In apparatus for sintering ores, a vertically-extending furnace chamber having a preliminary heating chamber at its top, retarding devices in said preliminary heating chamber, and a feeding device arranged to shower the ore down into the preliminary heating chamber; substantially as described.

6. In apparatus for sintering ores, a main furnace chamber, a preheating chamber above it having a retarding device, and hopper mechanism arranged to continuously feed and retard the ore being dropped through the preheating chamber; substantially as described.

7. In apparatus for sintering ores, a vertically extending furnace chamber having a feeding device at the top arranged to deliver the ore in a shower within the chamber, burners at different levels projecting into the chamber, a water bosh into which the sintered material is fed, and a conveyer arranged to carry the material out of the water bosh; substantially as described.

In testimony whereof, I have hereunto set my hand.

JAMES SCOTT.

Witnesses:

JOHN MILLER,
H. M. CORWIN.