

No. 822,502.

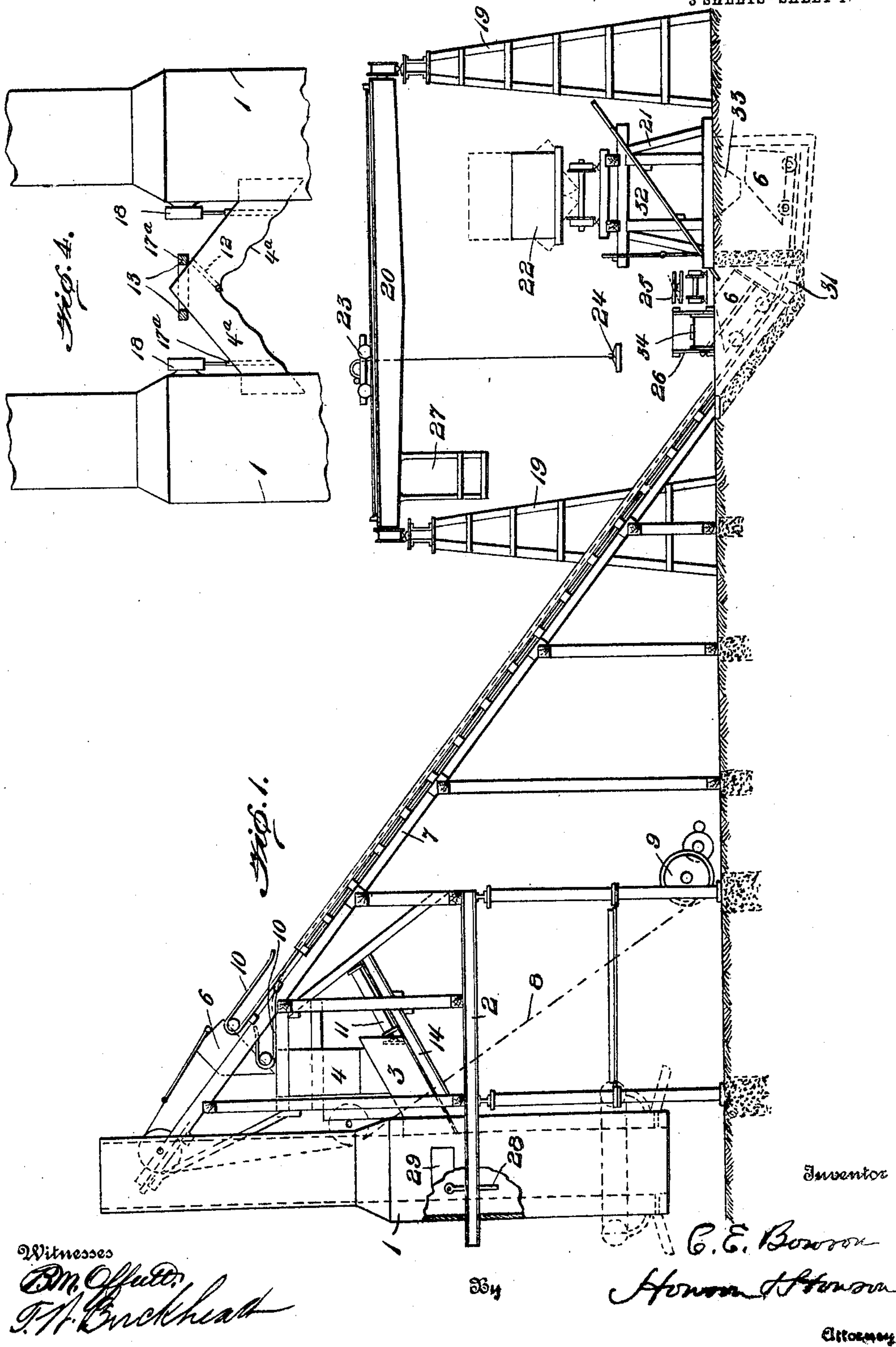
PATENTED JUNE 5, 1906.

C. E. BOWRON.

CHARGING MECHANISM FOR CUPOLA FURNACES.

APPLICATION FILED JAN. 26, 1906.

3 SHEETS—SHEET 1.



No. 822,502.

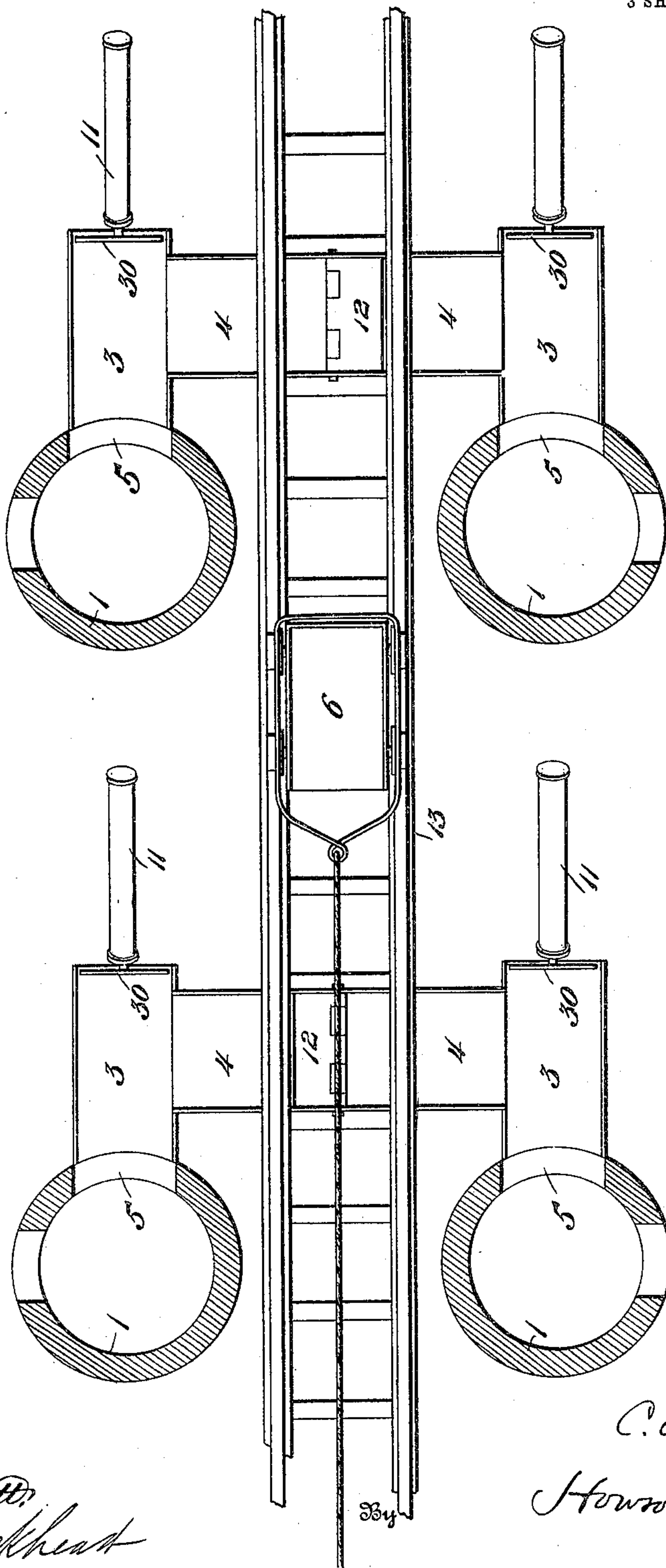
PATENTED JUNE 5, 1906.

C. E. BOWRON.
CHARGING MECHANISM FOR CUPOLA FURNACES.

APPLICATION FILED JAN. 26, 1906.

3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

B. M. Offutt
J. H. Birchhead

Inventor

C. E. Bowron

Howson & Howson

Attorneys

No. 822,502.

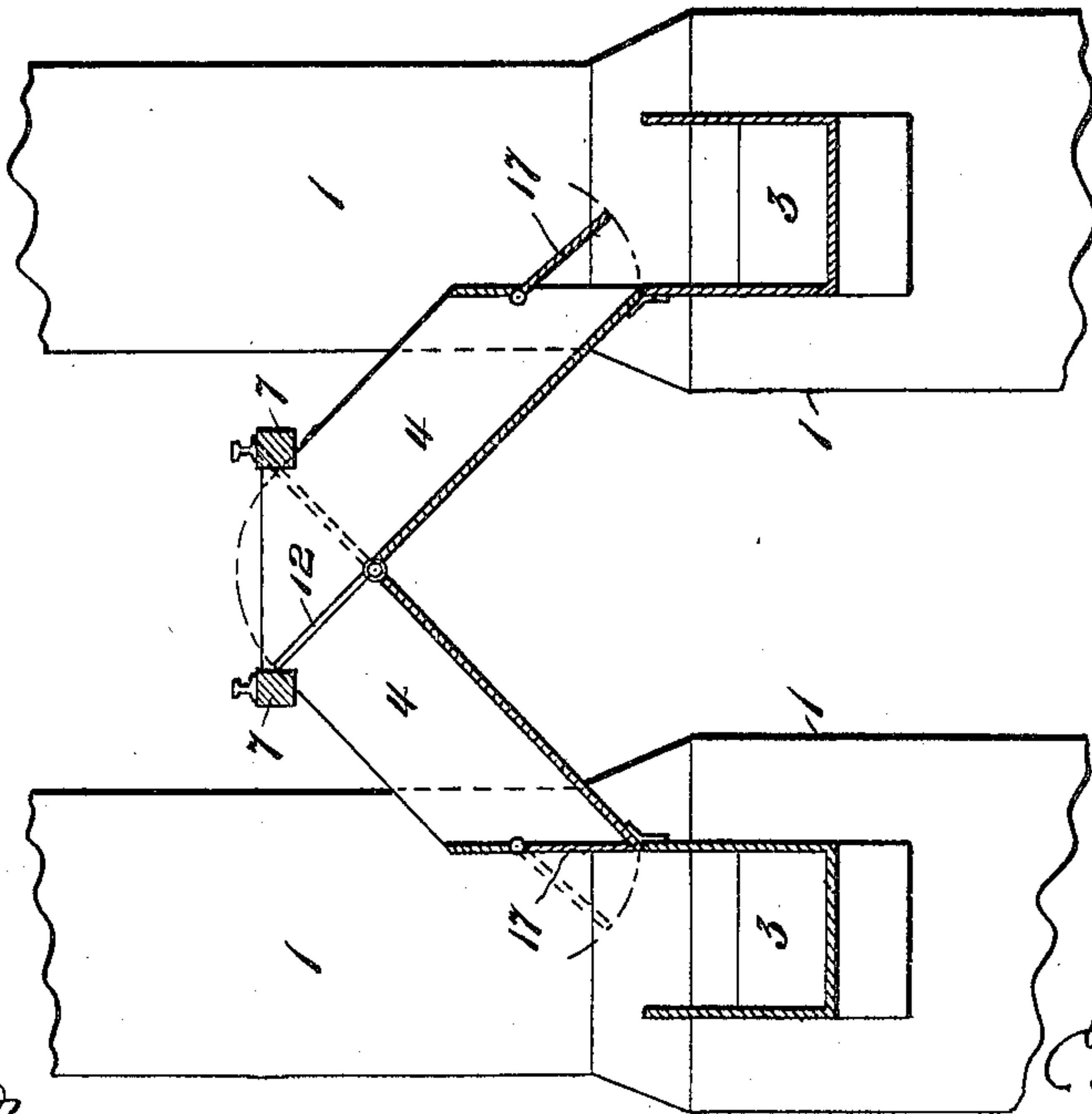
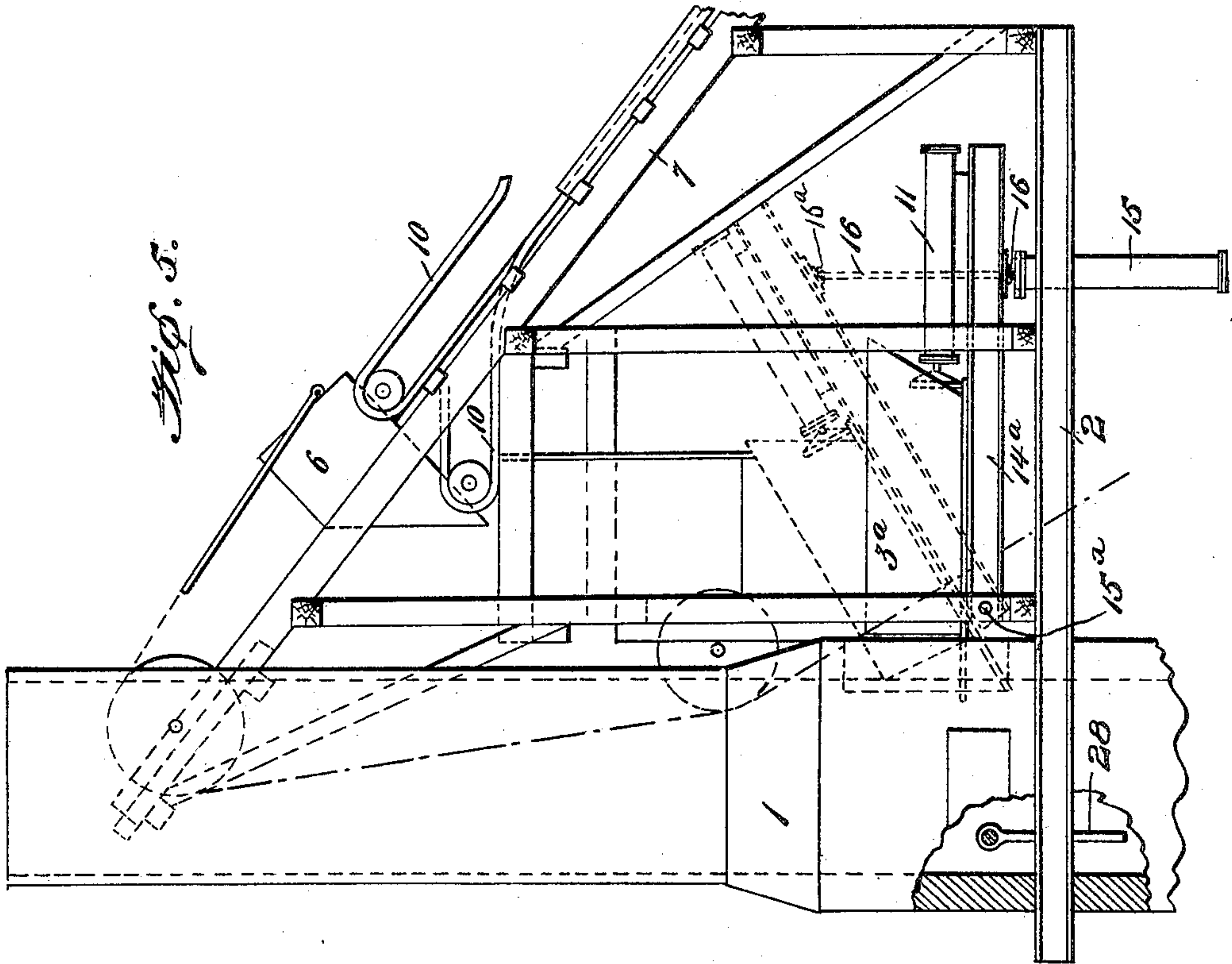
PATENTED JUNE 5, 1906.

C. E. BOWRON.

CHARGING MECHANISM FOR CUPOLA FURNACES.

APPLICATION FILED JAN. 26, 1906.

3 SHEETS—SHEET 3.



Witnesses
B. M. Offutt
J. H. Birchhead

By

Inventor
C. E. Bowron
Henry H. Brown
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. BOWRON, OF BIRMINGHAM, ALABAMA.

CHARGING MECHANISM FOR CUPOLA-FURNACES.

No. 822,502.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed January 26, 1906. Serial No. 298,021.

To all whom it may concern:

Be it known that I, CHARLES E. BOWRON, a citizen of the United States, and a resident of Birmingham, county of Jefferson, State of Alabama, have invented certain new and useful Improvements in Charging Mechanism for Cupola-Furnaces, of which the following is a specification.

My invention relates to mechanism for charging cupola and other like furnaces, and more especially to improvements in such charging mechanism which will effect the proper charging of raw materials into such furnaces without the intervention of manual labor now usually required for this purpose.

My object is to provide a charging mechanism for cupola or other like furnaces adapted to deliver raw materials to such furnaces in the most expeditious, economical, and efficient manner without the intervention of manual labor other than that required to start and stop a hoisting mechanism for conveying the charge to the charging-chute or dump of the said furnace.

With this and other objects in view my invention consists in the novel construction of charging mechanism and details thereof, as hereinafter described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a charging mechanism applied to a pair of cupola-furnaces. Fig. 2 is a top plan view thereof with two additional furnaces added to show the application to a series of pairs of such furnaces, omitting the stock-yard structure of Fig. 1. Fig. 3 is an end elevation of two of the furnaces shown in Fig. 2. Fig. 4 is a similar view of a modified form thereof, and Fig. 5 is a side elevation of a further modified form of the charging device.

Referring to the drawings, in which the same reference characters relate to the same or corresponding parts in all the views, the numeral 1 indicates cupola-furnaces, which in the larger foundries are preferably arranged in pairs, so that they can be worked alternately, one furnace on one day while the other of the pair is being repaired. Each of the cupola-furnaces is provided with a lateral opening or charging door 5, through which the material is discharged from an inclined chute 3, arranged to receive the material from an upper chute or hopper 4. Into

the latter chute the said material is delivered from a skip-car 6, traveling upon an inclined or skip hoist 7, over which it is traversed by any suitable hoisting mechanism, such as a rope or cable 8, operated by a hoisting-drum mechanism 9 of any well-known type. Any other suitable means may be used for traversing the car 6 over its tracks—such as steam, air, hydraulic-pressure operated engines of common type, or electric motors—if desired. This car is automatically dumped by any suitable well-known dumping mechanism at the top of the incline, as the tipping devices 10. (Shown in Figs. 1 and 5.)

When arranged in pairs, the bins or chutes 4 are preferably provided at the upper junction with a flap door or gate 12, which can be swung to either side, so as to admit material into one or the other of the hoppers or chutes 4 according to the cupola which is in use. The chutes or hoppers 4 are inclined sufficiently to permit the material when dumped or delivered therein to pass into the cupola-furnace by gravity, the lower end of said chutes being preferably provided with a door or gate 17, swinging loosely upon a pivotal support and acting in a measure to check any tendency to sudden descent of material into the cupola, and as a further provision against the abrupt delivery of material into the cupola, which would have a tendency to injure the lining of said furnace, I preferably provide baffle-plates 28, pivotally supported on the inside of said furnace.

As a further means of forcing the material from the chute 3 into the furnace I may use a pusher 30, operated by any suitable means, such as a power-cylinder 11, having an operating-piston therein connected to the pusher 30 and actuated by any suitable motive-fluid pressure—such as air, steam, or hydraulic—said power-cylinder and chute 3 being supported upon a fixed frame or platform 14, located above the platform 2, as shown in Fig. 1. The lower platform 2 serves as a part of the framework and at the same time is a means wherein the operator may, as occasion requires, inspect the interior of the furnace through the inspection-door 29 and introduce therethrough such tools as may be needed for repairing the interior of the furnace.

In order to better regulate and control the feed of the material of whatever nature to the furnace, I preferably arrange the chute

and its cooperating pusher or ram 30 upon a hinged platform 14^a, as shown in Fig. 5, pivotally supported at 15^a on the framework and adapted to be raised and lowered by an actuating-ram 15, whose rod 16 is pivotally attached to the said supporting-platform 14^a, the pivot-pin having a sliding connection with said platform, as shown at 16^a, Fig. 5. By this construction the chute 3^a and its cooperating ram 11 may be raised to any desired inclination and the feed of material to the furnace regulated accordingly. If desired, the said chute and cooperating ram may be used in the horizontal position shown in full lines in the said Fig. 5.

Instead of delivering the material from the upper chutes or hoppers 4 into the lower chutes 3, communicating directly with the furnace, I may omit the latter chutes, as shown in Fig. 4, connecting the chutes 4^a directly with the furnace. In this case, as well as in the others, if desired, the bottoms of the said chutes may be curved or broken in profile, as shown, so that the said bottom may act as a check of the desired degree to the rapid descent of material into the furnace.

Instead of the swinging valves 17 closing the lower ends of the chutes 4 I may employ vertically-operating valves or gates 17^a, slidably mounted in the lower ends of said chutes and actuated by suitable mechanism, such as rams 18, mounted upon the sides of the furnaces, by which means a quantity of material may be dumped into the chute and drawn therefrom, as desired, by opening the said gates or valves.

In order to assemble the materials for delivery to the skip-car 6, I preferably employ a traveling crane 20, mounted upon suitable tracks supported upon trestles 19 and commanding the stock-yard. A trolley 23 is mounted upon the crane 20 and carries a lifting-magnet 24, adapted to raise material—such as iron, for example—from the transporting-cars and deposit it at any point of the stock-yard and transfer it therefrom to the transfer-cars 25, traveling upon suitable tracks leading to the skip-hoist pit 31 or to a bin 26, located in a suitable position to discharge into the skip-car 6 in the pit 31. This bin and others of like nature, if required, may be utilized to receive material while the skip-car is at the top of the skip-hoist, and from which said material may be readily discharged into the skip-car through suitable gates 34.

As an additional assemblage means the elevated track 21 is arranged to transport cars 22, loaded with certain of the materials, such as coke or the like, to a suitable bin for receiving the contents of the car 22, located between the trestles 19 of the traveling crane 20. If it is desired to increase the capacity of such bin for receiving the contents of the material from said cars, the pit in which the skip-car 6 receives its charge may be extend-

ed, as shown by dotted lines, so that the skip-car may pass under the bin and receive its load through a chute 33.

By employing two chutes, the upper one of which is at a fixed angle, the lower chute may be adjustably supported, as above described, or in any other equivalent way, so that the materials may be caused to slide gently therefrom by gravity into the furnace or forced therefrom by mechanical means, as the pusher, when the chute is adjusted on a very slight angle, or horizontal, or by a combination of these modes of operation.

By the arrangement of chutes or hoppers in pairs the plant is made economical in operation, as the one charging device acts for charging two cupolas or furnaces and alternately, as desired, while one of the pair is being overhauled or repaired, and by providing the several chutes or hoppers with removable or false bottoms of suitable material, such as cast-iron, the said bottoms can be removed and replaced without much trouble or expense when worn out and without derangement of the whole plant.

Furthermore, it will be seen that the union of the inclined hoist and self-dumping car at the top thereof with the chutes and hoppers arranged to direct the material to the desired cupola or furnace makes it unnecessary to have any other attendance than that needed to start and stop the hoisting mechanism, the latter of which may be so arranged to further facilitate the operation as to automatically stop by the employment of any well-known automatic stopping devices for such mechanism, which operates when the car reaches the top of the hoist and dumps automatically.

While I have shown the preferred forms of my invention, it is to be understood that changes may be made in the details thereof without departing from the spirit and scope of said invention, the essential features of which are enumerated in the claims hereto appended and in varying breadths.

I claim as my invention—

1. In a charging mechanism for cupola-furnaces, the combination with a furnace having a lateral feeding door or opening, of an inclined way extending above said opening, a car traveling upon said way, means for dumping said car when it reaches a point above said opening, a chute for receiving material from said car, and a chute below the said chute adapted to receive material therefrom and direct it into the furnace through said opening, substantially as described.

2. In a charging mechanism for cupola-furnaces, the combination with a furnace having a lateral feeding door or opening, of an inclined way extending above said opening, a car traveling upon said way, means for dumping said car when it reaches a point above said opening, a fixed chute arranged to

receive material from said car, a pivotally-supported chute below the said fixed chute communicating with the furnace through said opening, and means for adjusting said chute to different angles, substantially as described.

3. In a charging mechanism for cupola-furnaces, the combination with a furnace having a lateral feeding door or opening, of an inclined way extending above said opening, a car traveling upon said way, means for dumping said car when it reaches a point above said opening, a chute arranged to receive material from said car, a second chute below the same and communicating with the furnace through said opening or door, and a pusher operating in said chute to force the material therefrom into the furnace through said opening, substantially as described.

4. In a charging mechanism for cupola-furnaces, the combination with a furnace having a lateral feeding door or opening, of an inclined way extending above said opening, a car traveling upon said way, means for dumping said car when it reaches a point above said opening, a chute arranged to receive material from said car, a second chute below the same and communicating with the furnace through said opening, a pivotally-supported platform or base upon which said chute is mounted, a pusher slidably mounted in said chute, and means for actuating said pusher to force the material from said chute through the opening into the furnace, substantially as described.

5. In a charging mechanism for cupola-furnaces, the combination with a plurality of cupolas arranged in pairs each provided with lateral doors or openings, a track between said pairs above the doors, an incline hoist leading to said track, a skip-car traveling thereon, chutes leading to each cupola below said track arranged to receive material from

the car, mean for dumping the car, and a gate between the chutes of each pair for directing material to the desired cupola, substantially as described.

6. In a charging mechanism for cupola-furnaces, the combination with a plurality of such furnaces arranged in pairs each provided with a lateral door or opening, of an inclined hoist extending upwardly to a point between the pairs of cupolas and above said doors, a skip-car traveling thereon, means for dumping said car above the doors, chutes communicating with each cupola into which the car discharges, a gate or valve between the chutes of a pair adapted to close one chute and divert material through the other, and gate-valves for closing the ends of the chutes at or near the doors of the cupolas, substantially as described.

7. In a charging mechanism for cupola-furnaces, the combination with a plurality of such furnaces arranged in pairs each provided with a lateral door or opening, of an inclined hoist extending upwardly to a point between the pairs of cupolas and above said doors, a skip-car traveling thereon, means for dumping said car above the doors, chutes communicating with each cupola into which the car discharges, a gate or valve between the chutes of each pair adapted to close one chute and divert material through the other, gate-valves for closing the ends of the chutes at or near the doors of the cupolas, and means for opening and closing said valves, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. BOWRON.

Witnesses:

E. B. PENNINGTON,
K. A. CONVILLE.