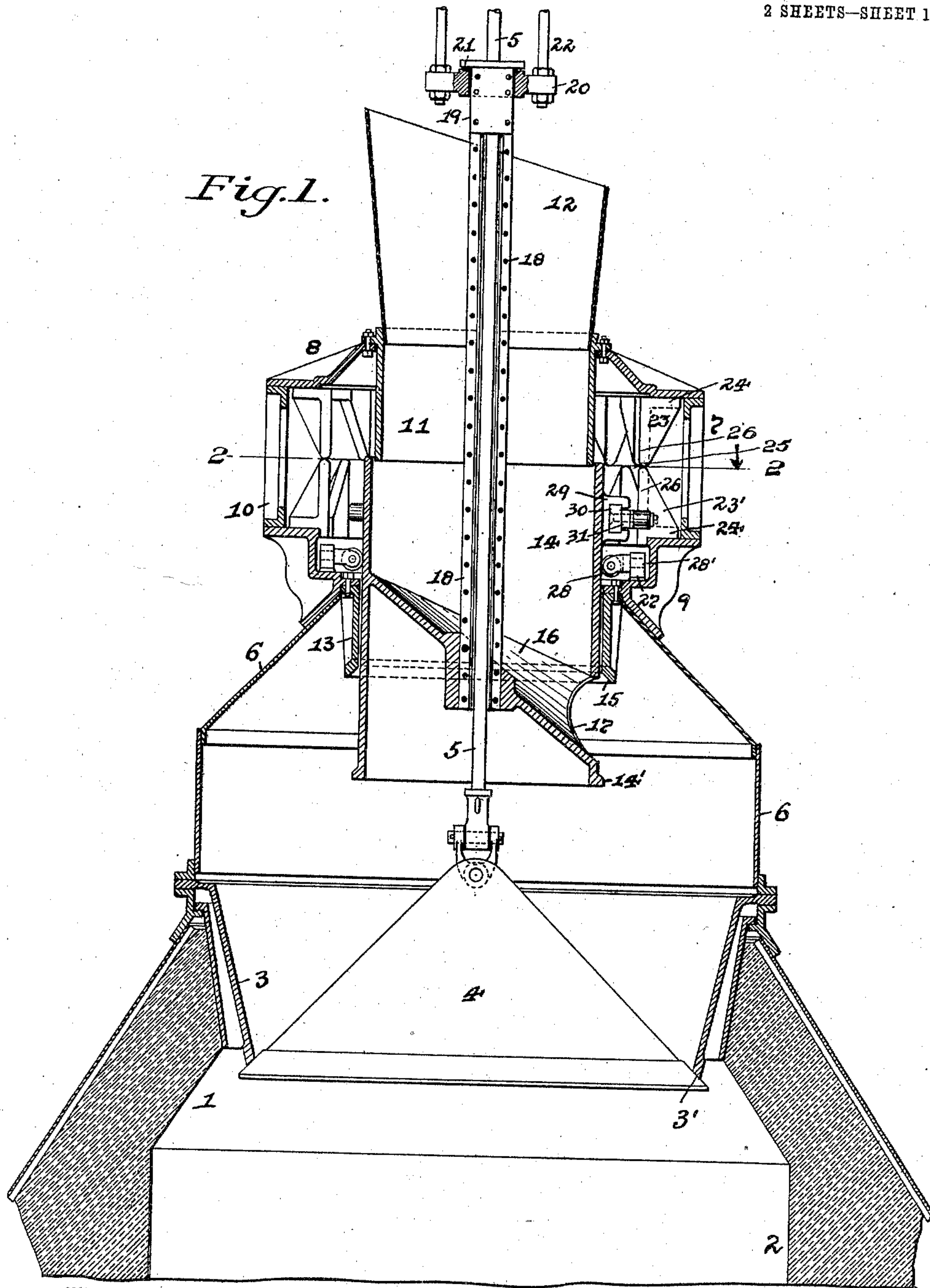


C. H. BRADLEY.
BLAST FURNACE.
APPLICATION FILED NOV. 19, 1909.

967,602.

Patented Aug. 16, 1910.

2 SHEETS—SHEET 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

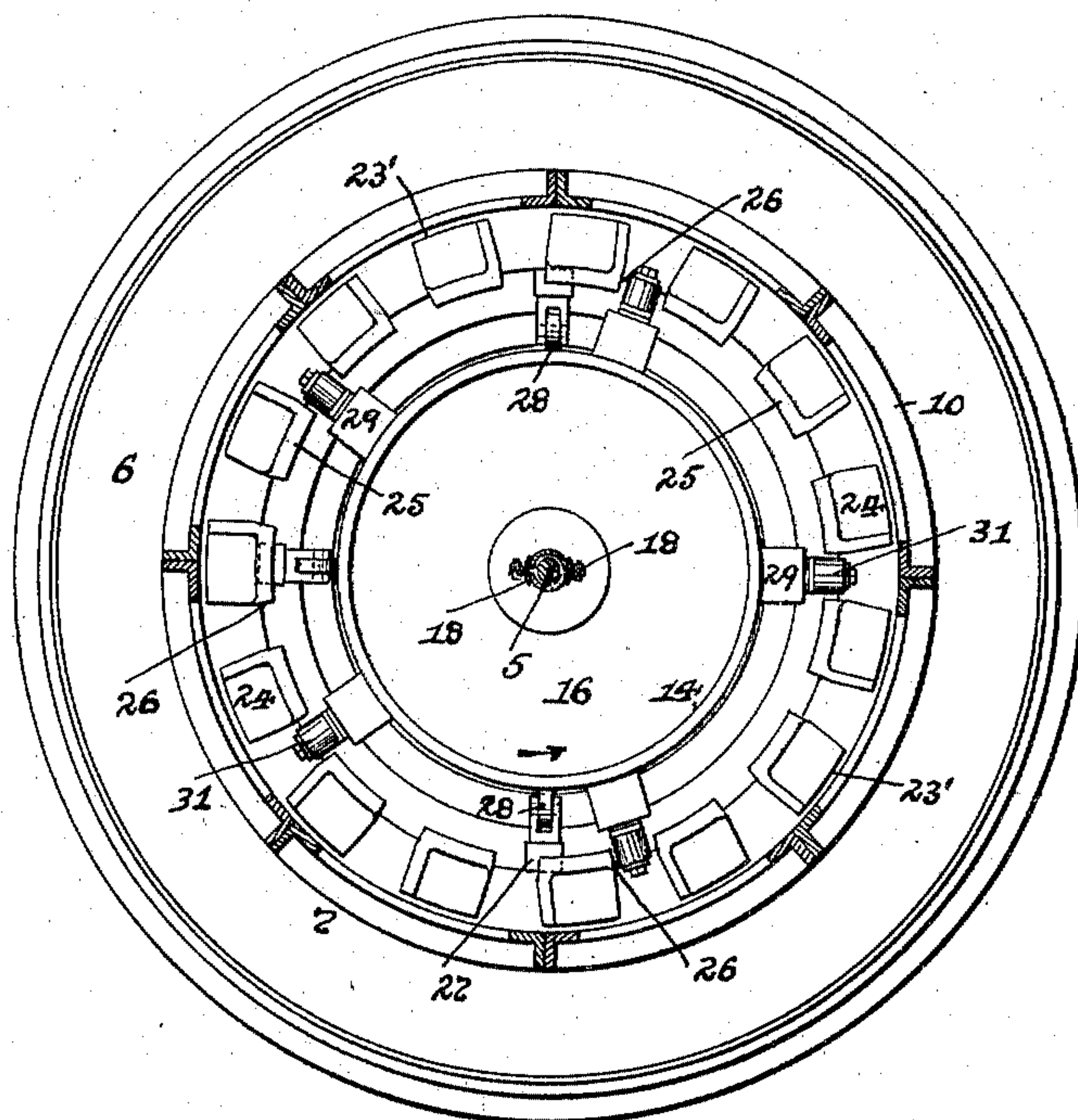
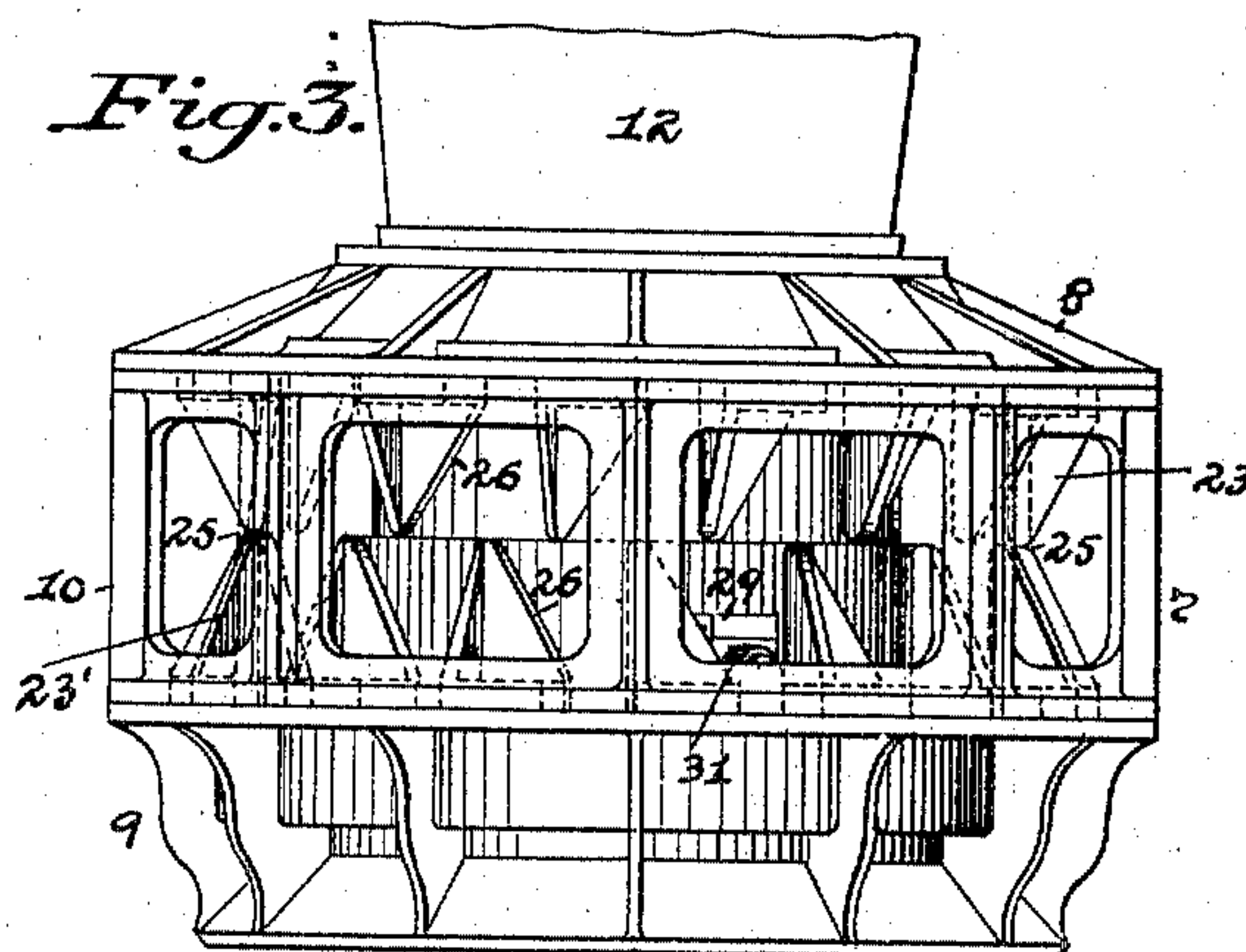


Fig. 3.



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UNITED STATES PATENT OFFICE.

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BLAST-FURNACE.

967,602.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES H. BRADLEY, a resident of Ensley, in the county of Jefferson and State of Alabama, have invented a new and useful Improvement in Blast-Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to blast furnaces and has special reference to blast furnaces having a bell means for sealing same and for receiving materials to be charged into such furnace.

The object of my invention is to provide a cheap, simple and efficient distributing device for such class of blast furnaces, in which is provided means for sealing the same when the lower bell is opened, which means can easily be applied to such furnaces, and will enable the placing and distribution of the materials used within the furnace on the lower or main bell so that they can be lowered into the furnace from such bell when desired and will also enable the sealing of the furnace above the main bell when such bell is lowered.

My invention consists, generally stated, in the novel arrangement, construction and combination of parts, as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct and use my improved blast furnace, I will describe the same more fully, referring to the accompanying drawing, in which—

Figure 1 is a vertical central section of the top portion of a blast furnace having my invention applied thereto. Fig. 2 is a sectional plan of the same on the line 2—2 Fig. 1 and looking in the direction of the arrow. Fig. 3 is a side view of a portion of the same.

Like symbols of reference herein indicate like parts in each of the figures of the drawings.

As illustrated in the drawings, 1 represents the upper end of the main or body portion 2 of an ordinary blast furnace having the ring 3 within the same for engaging with the main bell 4 to form a seal 3' between the lower end of the same and said bell when such bell is in its closed position, as shown in Fig. 1. The bell 4 is connected in the usual manner to the lower end of the vertical rod 5 extending through and above

the distributing device of the furnace, as hereinafter described, and is operated in the usual manner by the ordinary devices connected to its upper end.

Connected to the upper end 1 in the usual manner is the ordinary casing or cover 6 for supporting the distributing device 7 at its upper end, which distributing device is formed of the upper and lower head castings 8 and 9 having the inclosing ring 10 of open sections between and connected to the same for supporting the head 8 and guiding ring 11 and hopper 12 hereinafter described. Extending down from the upper head 8 and connected thereto is the upper guiding ring 11 and projecting up from the upper end of said guiding ring is the receiving hopper 12. Within the cover 6 and connected to the lower head 9 is the lower sealing and guiding ring 13, which extends down from said head and acts to guide the cylindrical distributing receptacle 14 within the same, as well as acting to form a seal at 15 between the lower end of the same and said receptacle when such receptacle is in its closed position, as hereinafter described. Within the receptacle 14 is the inclined chute 16, which extends across and forms the bottom of said receptacle, said chute being preferably scoop shaped and of same width as the inside diameter of said receptacle at vertical center line of the same. This chute 16 also decreases in width and leads into an opening 17 at the lower end of the same and formed in the side of said receptacle for intermittently discharging the materials from the receptacle 14 when it is lowered, as hereinafter described. Connected to the chute 16 and centrally of the same is the vertical casing 18, which leads up from said chute around the main bell rod 5 and is connected to a head 19. This head 19 is revolvably mounted on a sleeve 20 located above the hopper 12 by the ball bearing connection 21, and such sleeve extends around the rod 5, casing 18 and head 19, and forms part of the usual operating rods 22 extending above said hopper.

Projecting down from the upper head 8 are the blocks 23 and projecting up from the lower head 9 are the blocks 23', and these blocks 23 and 23' are suitably ribbed and removably connected to heads 8 and 9 in any suitable manner by their base portions 24. The blocks 23 and 23' are preferably thirty (30) in number, fifteen (15) being

mounted on the head 8 and fifteen (15) being mounted on the head 9, and the blocks on one head are so arranged that they stagger with the blocks on the other head. The opposite ends of the blocks 23 and 23' from the bases 24 are pointed, as at 25, while extending from such pointed ends to the base portions 24 on said blocks and on the same side of each of the same is the tapered or inclined face 26, and such faces are all inclined in one direction. Mounted on the lower head 9 are the bearings 27, which are each provided with a caster 28 for engaging with the exterior face on the wall of the receptacle 14, and such caster is preferably journaled in its bearing 27 away from the center line of the caster, as at 28', in the usual and well known manner. Extending out from the exterior face of the wall on the receptacle 14 are the hooked projections 29, each pair of which are adapted to support a bearing block 30 slidingly mounted within the same and having a roller 31 journaled therein. These rollers 31 are preferably five (5) in number and are each adapted to engage with the inclined faces 26 on the blocks 23 and 23'.

The use and operation of my improved blast furnace is as follows:

With the main bell 4 raised by its rod 5 in the usual manner to its highest position and against its seal 3' on the ring 3, as shown in Fig. 1, such bell is ready to catch and sustain the materials delivered thereto from the distributing device 7, and then afterward to be fed into the body 2 of the furnace. This delivering of the materials to the bell 4 is accomplished by raising the receptacle 14 through the usual devices connected to the upper end of the rods 22, to which the casing 18 carrying the receptacle 14 is attached, and during such raising of said receptacle the rollers 31 on the same will engage with the inclined faces 26 on the upper blocks 23 to revolve said receptacle one-half the number of degrees desired, such as in the direction of the arrow shown in Fig. 2, as well as the casing 18 and the head 19 on the sleeve 20. By this turning of the receptacle 14 in the raising of the same, the opening 17 in such receptacle is rotated to another position from that shown in Fig. 1, and is closed by the guiding and sealing ring 13 in the raised position of such receptacle. In such raised position the receptacle 14 is sealed at 15 by a projecting ring 14' at its bottom being against the ring 13 and is ready for the reception of the material therein, which is dumped through the hopper 12 into the same and in the usual manner from cars raised from the bottom of the furnace. After the materials have been thus dumped into the receptacle 14 it is lowered through the devices connected to the rods 22 carrying such receptacle through

the casing 18, and in such lowering the receptacle is revolved the remaining number of desired degrees in the same direction through the rollers 31 on the same engaging with the inclined faces 26 on the lower blocks 23', so that the opening 17 in said receptacle 14 will again be rotated to another position, and as soon as such opening passes the lower end of the ring 13 in such lowering of said receptacle the material in the same will be ejected therefrom and down the inclined chute 16 onto the bell 4. The shifting or rotatable movement of the receptacle 14 is accomplished with only one-half of the distance desired in the raising of the same and the balance is accomplished in the lowering of the same.

In the vertical movements of the receptacle 14, as well as in the rotatory movement of the same it is guided by the ring 13 fitting around the same and by guiding ring 11 on the lower end of the hopper 12 within the same, and in such movements the said receptacle will travel on the casters 28 mounted on the lower head 9. The different kinds of materials that are generally used as stock for the furnace are thus each dumped into the receptacle 14 and delivered onto the bell 4 by the raising and lowering of said receptacle and by the intermittent rotating of the said receptacle in such raising and lowering movements of the same. When such an amount of these materials is thus delivered onto the bell 4, such bell can be lowered by its rod 5 in the usual manner through the devices connected to the upper end of said rod and such materials thereby allowed to slide down the same into the furnace, after which said bell can be again raised to its closed position and the vertical raising and lowering and rotating of the receptacle 14 repeated in the delivering and placing of the materials on the said bell, so that these operations can be carried on continuously.

It will thus be seen that my improved blast furnace has a charging and distributing device for the stock or materials which combines both the upper bell and receptacle ordinarily employed, which will do away with a number of parts and devices usually found in this class of machinery, as well as eliminating complex and complicated operating devices for the same, and thereby cheapening the cost of manufacture and maintenance of these furnaces. The stationary inclined blocks being formed separately and of cast metal can be easily renewed when broken or worn, as well as the other operating parts of the device, and the inclined devices are ventilated and visible through the open inclosing ring frame, so that any difficulty therein can be seen at a glance and thereby easily and quickly remedied.

The number of inclined blocks and rollers

therefor shown and described are considered the most practical for distributing the stock when the three materials ordinarily employed are used as such stock, and it is evident that any number of such blocks and rollers can be used.

Various modifications and changes in the design, construction and operation of my improved blast furnace may be resorted to, without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as my invention and desire to secure by Letters Patent is—

1. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, and means for rotating said receptacle to distribute the stock therefrom onto said bell in the lowered position of said receptacle.

2. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, and inclined means for rotating said receptacle to distribute the stock therefrom onto said bell in the lowered position of said receptacle.

3. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, and inclined block means adapted to engage with said receptacle for rotating the same to distribute the stock therefrom onto said bell in the lowered position of said receptacle.

4. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, and means on said receptacle adapted to engage with inclined blocks around the same for rotating said receptacle in distributing the stock therefrom onto said bell in the lowered position of said receptacle.

5. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, and rollers on said receptacle adapted to engage with inclined faces on stationary blocks around the same for rotating said

receptacle in distributing the stock therefrom onto said bell in the lowered position of said receptacle.

6. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, means for rotating said receptacle to distribute the stock therefrom onto said bell in the lowered position of said receptacle, and roller means for engaging with the exterior of said receptacle in its movements.

7. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, means for rotating said receptacle to distribute the stock therefrom onto said bell in the lowered position of said receptacle, and casters mounted in bearings by journals off their centers for engaging with the exterior of said receptacle in its movements.

8. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, said receptacle having an inclined bottom chute attached thereto and leading to an opening in the side of said receptacle, and means for shifting said receptacle to distribute the stock therefrom through said opening and onto said bell in the lowered position of said receptacle.

9. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, said receptacle having an inclined bottom chute leading to an opening in the side of said receptacle, and inclined block means for rotating said receptacle to distribute the stock therefrom through said opening and onto said bell in the lowered position of said receptacle.

10. In a blast furnace, the combination with the main bell, of a vertically and rotatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, said receptacle having an inclined bottom chute leading to an opening in the side of said receptacle, and inclined block means adapted to engage with said receptacle for rotating the same to distribute the stock therefrom through said opening and

onto said bell in the lowered position of said receptacle.

11. In a blast furnace, the combination with the main bell, of a vertically and rotary movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, said receptacle having an inclined bottom chute leading to an opening in the side of said receptacle, and means on said receptacle adapted to engage with inclined blocks around the same for rotating said receptacle in distributing the stock therefrom through said opening and onto said bell in the lowered position of said receptacle.

12. In a blast furnace, the combination with the main bell, of a vertically and rotary movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, said receptacle having an inclined bottom chute leading to an opening in the side of said receptacle, and rollers on said receptacle adapted to engage with inclined faces on stationary blocks around the same for rotating said receptacle in distributing the stock therefrom through said opening and onto said bell in the lowered position of said receptacle.

13. In a blast furnace, the combination with the main bell, of a vertically and ro-

tatory movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, said receptacle having an inclined bottom chute leading to an opening in the side of said receptacle, means for rotating said receptacle to distribute the stock therefrom through said opening and onto said bell in the lowered position of said receptacle, and roller means for engaging with the exterior of said receptacle in its movements.

14. In a blast furnace, the combination with the main bell, of a vertically and rotary movable cylindrical receptacle above said bell adapted in its raised position to be sealed and receive the stock for the furnace and in its lowered position to deliver the stock, said receptacle having an inclined bottom chute leading to an opening in the side of said receptacle, means for rotating said receptacle to distribute the stock therefrom through said opening and onto said bell in the lowered position of said receptacle, and casters mounted in bearings by journals off their centers for engaging with the exterior of said receptacle in its movements.

In testimony whereof, I, the said CHARLES H. BRADLEY, have hereunto set my hand.

CHARLES H. BRADLEY.

Witnesses:

I. H. HOOD,

KATE McDONOUGH.