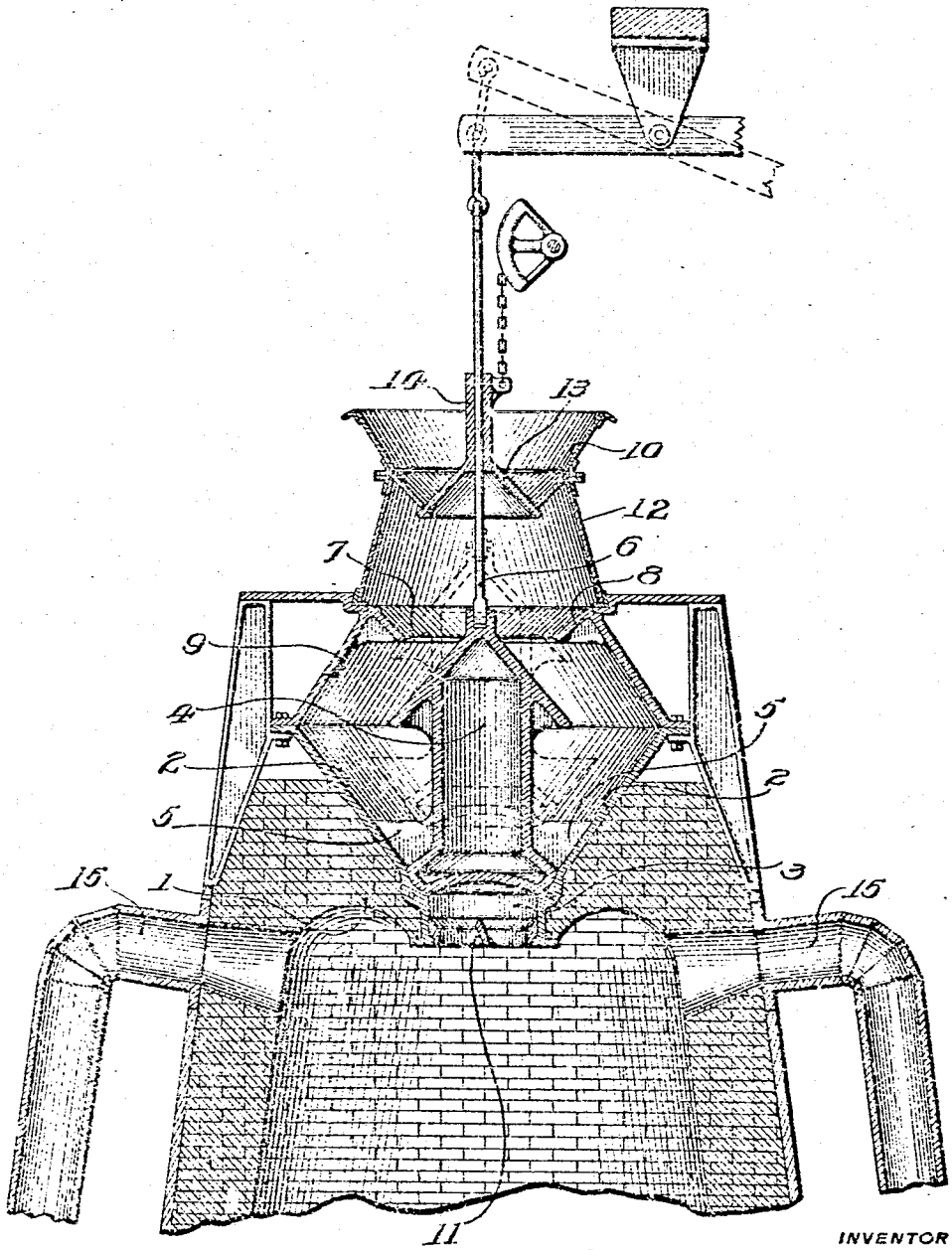
No. 896,012. PATENTED SEPT. 8, 1908.

M. J. SHANNON.

CHARGING APPARATUS FOR BLAST FURNACES.

APPLICATION FILED MAR. 11, 1908.



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CHARGING APPARATUS FOR BLAST-FURNACES.

No. 898,012. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed March 11, 1908. Serial No. 420,317.

To all whom it may concern:

Be it known that I, MARTIN J. SHANNON, a citizen of the United States, and a resident of Steelton, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Charging Apparatus for Blast-Furnaces, of which the following is a specification.

My invention relates to improvements in blast furnace tops and charging apparatus and the objects of my invention are to thoroughly mix the charge before feeding it to the furnace and to furnish a top which will be substantially gas tight at all times.

In an application for patent on charging apparatus for blast furnaces, No. 381,392 filed by me on June 29, 1907, I have shown and described a means for mixing and for evenly distributing the charge to a blast furnace. In my present invention I prefer to use the same mixing and distributing means shown in my former application, viz, a toothed plug sealing a charging hole placed centrally above the furnace and a distributing plate in or below this hole for scattering the charge evenly over the furnace top when the plug is lifted. The sealing plug when seated over the charging hole seals it and its top is arranged, when it is fully lifted, to engage and seal an opening in the top of the chamber or hopper in which the plug is placed. Above the chamber or hopper carrying the sealing plug I preferably place another hopper the bottom of which I close with a bell which may be operated entirely independently of the sealing plug. The purpose of the latter arrangement is to completely seal the top of the furnace during movements of the sealing plug when the latter is lifted from its seat.

My invention is illustrated in the accompany drawings which show, in central vertical sectional elevation, the upper part of a blast furnace fitted with my improved top.

1 represents the brick or masonry work at the top of the furnace. 2 a hopper furnished with a throat or opening 3 which is placed centrally of the furnace top.

4 is my mixing and sealing plug the lower end of which is adapted to make a tight joint with the lower end of the hopper 2. The plug 4 is furnished with arms or teeth 5. A rod 6 attached to the upper part of plug 4 is used to lift the latter when the furnace is to be closed.

So far my present invention is similar to my former one.

The top of the main hopper 2 is furnished with a circular opening 7 the sides of which are preferably formed by inwardly and downwardly inclined flanges 8 of a casting 9 which is carried by the top of the main hopper 2. The top of the sealing plug is, when it is lifted, adapted to engage and make a tight joint with the lower edge of the flange 8 and to this end the top of the plug is preferably conical in form.

10 is a hopper, carried upon walls 12 that are carried by the top of the casting 9, the bottom of which is closed by a bell 13 the stem 14 of which is hollow and through which passes the rod 6 which is attached to plug 4. Any suitable and well known means may be employed to lift and lower the bell 13 and plug 4.

In operation the charge is first dropped into hopper 10 the bell 13 of which is tightly seated against its bottom. At the proper time the bell 13 is lowered and the charge falls down upon the flange 8 of the casting 9 to the conical top of the plug 4 from which it falls to the hopper 2 and distributes itself practically evenly around the plug 4. As soon as the hopper 10 is emptied the bell 13 is lifted sealing the bottom of hopper 10. When it is desired to charge the furnace the plug 4 is lifted the teeth 5 tearing through and thoroughly mixing the charge in hopper 2, and the charge falls through the opening 3 to the furnace. The opening 3 may or may not be furnished with the deflecting plates 11, described in my former application, for more evenly distributing the charge over the top of the contents of the furnace. During the lifting and lowering of the plug 4 there will be an interval when gases can pass through holes 3 and 7; the bell 13, however, will prevent their escape to the air.

In all blast furnaces there are at times so called explosions of gas. The even distribution of the charge with my device is designed to do away with this but should such explosions occur they will partly expend their force by lifting the heavy plug 4, which acts as a spring in such cases and gives the accumulated gas time to seek and pass off through the gas downtakes 15 which lead to the stoves, to gas engines, or other places where the gases are utilized. The closed top arrangement that I have shown is particu-

larly useful in cases where it is desired to conserve all of the gases generated by the furnace for any of the uses to which said gases may be put.

Having thus described my invention I claim as new and desire to secure by Letters Patent:—

1. The combination with a blast furnace, of a hopper having openings at its top and bottom, and a sealing plug within said hopper, adapted when lowered to close off the bottom opening and when raised to close off the top opening in said hopper.

2. The combination with a blast furnace, of a hopper having at its top an opening surrounded by an inwardly projecting flange and at its bottom an opening, and a sealing plug having a conical top within said hopper, said plug being adapted when in a lowered position to close off the bottom of said hopper and when in a raised position to close off its top.

3. The combination with a blast furnace, of a hopper having an opening in its top and an opening in its bottom, a sealing plug within said hopper adapted when lowered to close off the bottom opening and when raised to close off the top opening, a second hopper placed above said first hopper, a bell for closing the discharge end of said hopper, walls for carrying said second hopper, and means, operated independently of one another, for operating said sealing plug and bell.

4. The combination with a blast furnace, of a hopper having an opening in its top and bottom, a sealing plug within said hopper adapted when lowered to close off the bottom opening and when raised to close off the top opening, an operating rod centrally attached to the upper end of said sealing plug, a second hopper placed above said first hopper, walls upon which said second hopper is carried, a bell, the stem of which is hollow and through which the operating rod of said plug passes, for closing the lower end of said second hopper, and means for operating said bell.

MARTIN J. SHANNON.

Witnesses:
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