Oct. 4, 1932. J. P. GRILLI 1,881,272

BLEEDER VALVE

Filed May 13, 1929

Fig. 1

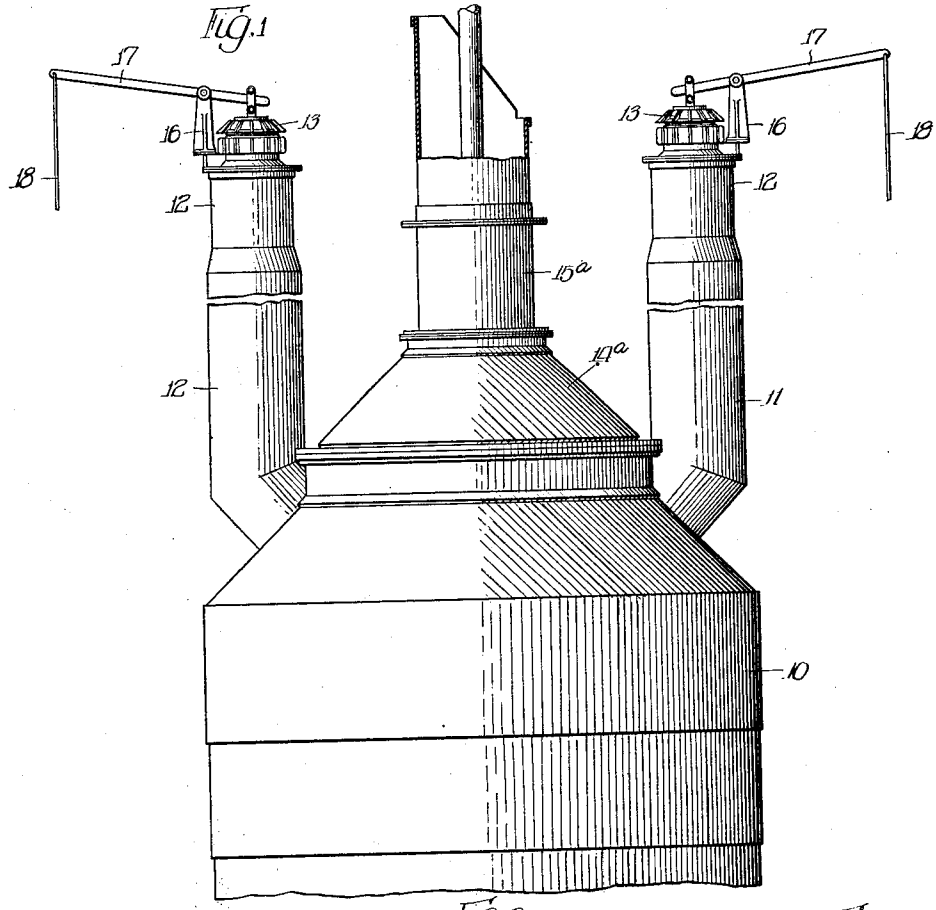


Fig. 2

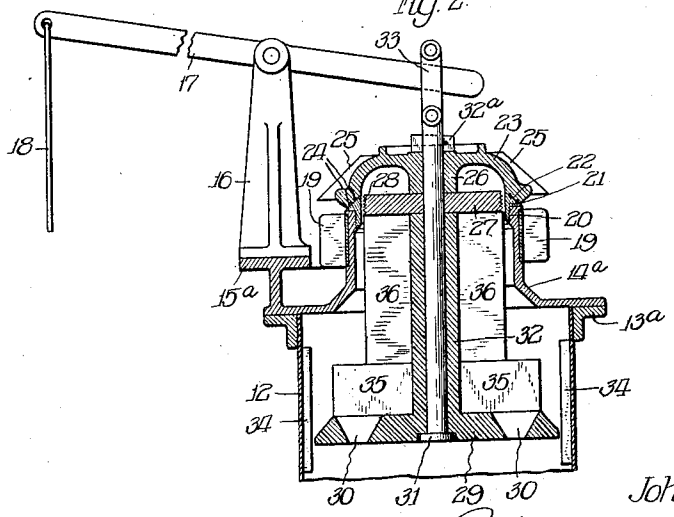
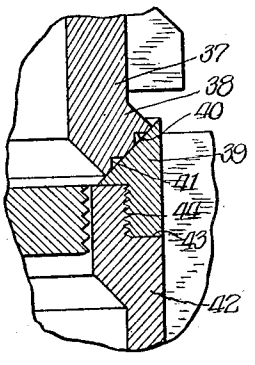


Fig. 3



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UNITED STATES PATENT OFFICE

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BLEEDER VALVE

Application filed May 13, 1929. Serial No. 362,559.

My invention relates to bleeder valves for blast furnace, and has particular reference to a valve construction having cooling means associated therewith so the temperature of the gas is reduced to substantially the dew point, thereby providing for a sealing mixture in the bleeder valve which effectually seals the valve against leakage of the gas from the blast furnace.

Another and further object of my invention is the provision of a bleeder valve having means associated therewith to prevent the escape of coke, limestone and the like, should an explosion take place in the blast furnace during its operation and thereby blow pieces of coke, limestone and the like out of the bleeder valve which might result in injury to some of the operators of the furnace.

Another and further object of my invention is the provision of a valve having a labyrinth sealing arrangement within which dust and the fluid mixture resulting from the condensate formed from the gas, form a sealing member in addition to the usual sealing means provided by the valve on its seat, so that in effect a double valve is provided to prevent the escape of gas from the blast furnace.

Another and further object of my invention is the provision of a bleeder valve having a removable seat therein and which is adapted to be changed to provide a smooth seating surface for the valve should the seat become channeled by reason of the escape of gas and particles of dust between the valve and its seat.

Another and further object of my invention is the provision of a bleeder valve comprising a valve member having a circumferentially extending groove in the valve portion thereof adapted to catch dirt and form an effective sealing means between the valve member proper and its seat.

These and other objects of my invention will be more fully and better understood by reference to the accompanying sheet of drawing, and in which—

Figure 1 is a diagrammatic view of the top of a blast furnace showing my improved bleeder valve in position on the uptakes of a blast furnace;

Figure 2 is a vertical sectional view through one of the valves; and

Figure 3 is a fragmentary view showing a modified form of valve member and valve seat.

Referring now specifically to the drawing and in which like reference characters refer to like parts throughout, the top of a blast furnace shell 10 is shown having a pair of uptakes 11 and 12 respectively on the outer ends of which a pair of bleeder valves 13, 13 are placed. The usual housing 14 is shown over the charging apparatus of the blast furnace, with a housing 15 shown at the top through which the coke or limestone and the like is charged into the furnace.

Referring particularly to Figure 2, and in which the upper end of the uptake 12 is illustrated, an angle 13^a is attached to the upper end of the uptake 12 and upon which a valve casing $14a$ is seated, the said valve casing being secured to the angle 13^a in any approved manner. At one side of the valve casing $14a$ is provided an extension $15a$ upon which a bracket 16 is mounted, upon the upper end of which a lever 17 is positioned, to the outer end of which a cable 18 is attached which extends downward to a point adjacent the ground for the purpose of opening the bleeder valve, thereby allowing the gas to escape from the furnace during the blowing down operation.

The valve casing 14 has a plurality of cooling fins 19, 19 placed around the outer circumference of the valve and extending outward therefrom in a radial direction, these cooling fins being in spaced relation with each other and projecting outward so that the heat is radiated away from the valve casing

14 through the fins 19. The casing 14 at its upper end is internally threaded at 20 and has a seat 21 secured thereto with the said seat having a sloping outer surface 22 preferably extending in a downward direction. A valve member 23 is provided which has an inclined face adapted to cooperate with the sloping surface 22 of the valve seat 21 and which has a pair of circumferentially extending grooves 24, 24 therein open on the side adjacent the valve seat, and which are adapted to catch dust, moisture and the like and provide an effective sealing medium between the valve 23 and the seat 21.

The valve 23 has a plurality of cooling fins 25, 25 placed therearound on its outer periphery adapted to function in a similar manner to the fins 19 which are attached to the valve casing 14, thereby conducting the heat away from the valve and causing its temperature to remain sufficiently low so that the gases coming in contact with the valve are partially condensed, moisture thereby being formed which, combining with the dust, assists the sealing of the bleeder valve. The valve 23 has a downwardly extending portion 26 centrally located on its underside with a labyrinth disc 27 being positioned against the outer surface of the portion 26, this member having a labyrinth outer edge 28 for the purpose of affording a seal between the inner side of the valve seat 21 and the member 27.

A baffle 29 is provided having inverted cone-shaped openings 30, 30 therein with a rod 31 projecting through a trunnion portion 32 on said baffle 29, the said rod 31 extending upward through the valve member 23 and member 27 with the key 32*a* being provided which holds the valve members 23 and 27 and the baffle 29 in fixed relation with each other.

A link 33 is provided through which the inner end of the lever 17 extends through which the valve may be opened by the cable 18 when desired. On the inner sides of the uptake 12 is provided a plurality of vertically extending guides 34, 34 which coact to retain the baffle 29 in proper position in the uptake 12. Mounted upon the coke baffle 29 is a plurality of guides 35, 35 which extend radially from the member 32 across the face of the coke baffle 29 upon which a pair of guide members 36, 36 are mounted which form guides for the labyrinth disc 27. These members 36, 36 may be keyed to the portion 32 and in effect form guides for the labyrinth disc and also for the valve member 23 so that this member is properly seated with respect to the valve casing 14. The members 35 also engage against the valve casing 14 thereby preventing the valve from opening too great a distance or blowing completely off the top of the uptake should an explosion take place within the furnace. The inverted cone-shaped openings 30, 30 in the coke baffle 29 allow the gases to pass upward to the valve but prevent pieces of coke, limestone or the like from lodging in the baffle 29 as might result if the walls of these openings were vertical instead of being inclined as shown.

In Figure 3 is illustrated a modified form of valve member having a valve member 37 with an upturned annular portion 38 adapted to coact with the seat 39, having an inwardly inclined face, the portion 38 having a pair of sealing grooves 40, 41 extending thereabout which perform the same function as the sealing grooves 24 heretofore described.

The valve casing 42 has a shoulder portion 43 formed thereon and is externally threaded at 44 to engage the valve seat 39 and hold it in position in the same manner as heretofore described.

It will thus be understood that a bleeder is provided which provides effective cooling means through the fins which are secured to the valve casing and also to the valve seat, by means of which the heat from the gases is radiated to the atmosphere thereby reducing the temperature of the gases within the valve to below dew point so that when the gases are condensed they mix with the air, coke dust and the like, and form a sealing means between the valve member 23 and its seat and also around the labyrinth outer edges of the member 27 so that the valve is thereby effectually sealed.

Should an explosion take place inside of the furnace, the force of the gas being exerted against the baffle 29 and also the labyrinth member 27 will cause the valve to lift thereby allowing the gas to escape and relieving the pressure of the gas in the furnace without damage to the furnace itself.

In case it is desired to release the gas in the furnace during the blowing down operation, the valves are lifted by means of the cables 18 attached to the lever 17 so that the gas passes freely out of the uptakes 11 and 12. Upon the cables being released the valve automatically returns to closed position and is properly centered by the guides 34 attached to the side of the uptake 12 and also the guides 35 and 36.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

I claim:

1. A bleeder valve comprising in combination a casing, a valve member, and a disc member extending substantially across the area of the casing, the said disc member having a serrated outer edge.

2. A bleeder valve comprising in combination a casing, a valve member, and a disc member extending substantially across the

area of the casing, the said disc having a plurality of circumferentially extending grooves in its outer edge.

3. A bleeder valve comprising in combination a casing, a valve member, and a disc member extending substantially across the area of the casing, the said disc having a labyrinth passage between the casing and the said disc.

4. A bleeder valve comprising in combination a casing, a valve member mounted thereon, a plate coke baffle having truncated openings therein, guide members on said baffle, and means whereby the said coke baffle is secured to said valve member.

5. A bleeder valve comprising in combination a casing, a valve member mounted thereon, a plate coke baffle having truncated openings therein, guide members on said baffle, the said baffle having inverted cone-shaped openings therein, and means whereby the said coke baffle is secured to said valve member.

6. A bleeder valve comprising in combination a casing, a valve member mounted thereon, a circular plate coke baffle having truncated openings therein, guide members on said baffle, the said baffle having openings therein of smaller cross sectional area at their lower sides than at their upper sides, and means whereby the said coke baffle is secured to said valve member.

7. A bleeder valve comprising in combination a casing, a valve member, cooling fins in said casing and said valve member, a labyrinth disc, a coke baffle, guides on said baffle, and means whereby the said valve, coke baffle and disc are secured together.

8. A bleeder valve, comprising in combination a casing member, a valve member adapted to seat on said casing, a labyrinth disc, a plate coke baffle extending substantially cross the said casing, guides on said coke baffle, guides on said casing, and means whereby the said coke baffle and said valve member are secured together.

9. A bleeder valve, comprising in combination, a casing, a removable valve seat in said casing, a valve member, a labyrinth disc member mounted adjacent said valve seat, a plate coke baffle having truncated openings therein, means whereby the said coke baffle, the disc member and said valve are secured together, guide members on said coke baffle, and cooling fins on said valve and said casing.

Signed at Chicago, Illinois, this 4th day of May, 1929.

JOHN PHILLIP GRILLI.