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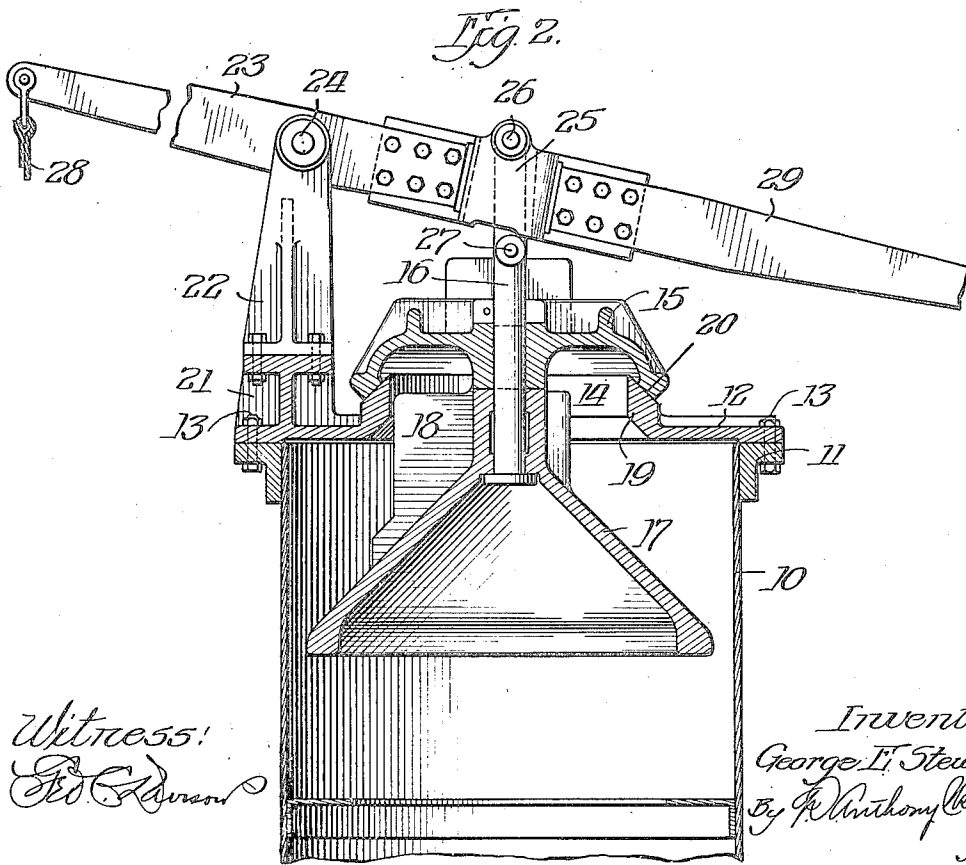
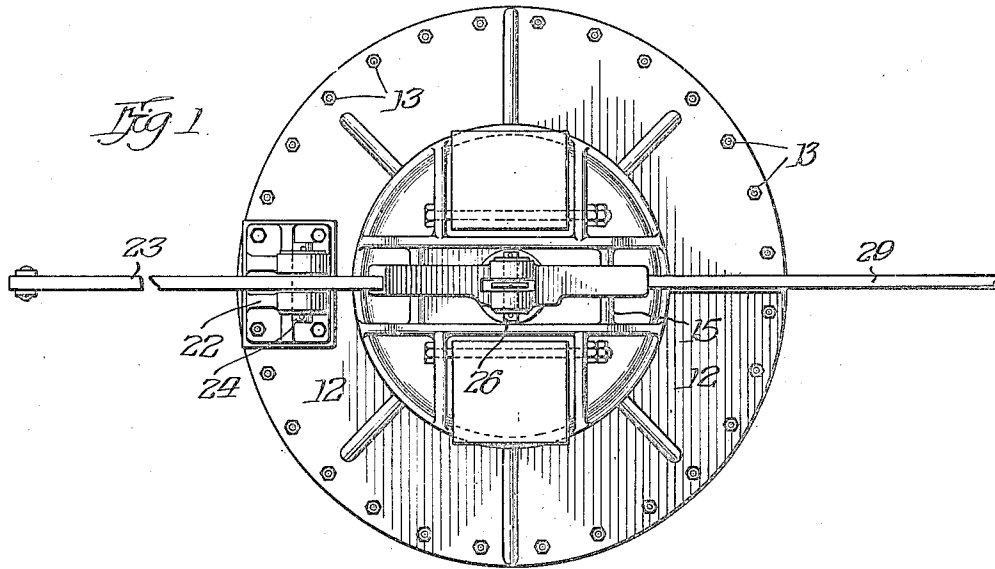
1,464,116

G. E. STEUDEL

EXPLOSION VALVE

Filed Nov. 25, 1921

2 Sheets-Sheet 1



Witness:
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Inventor:
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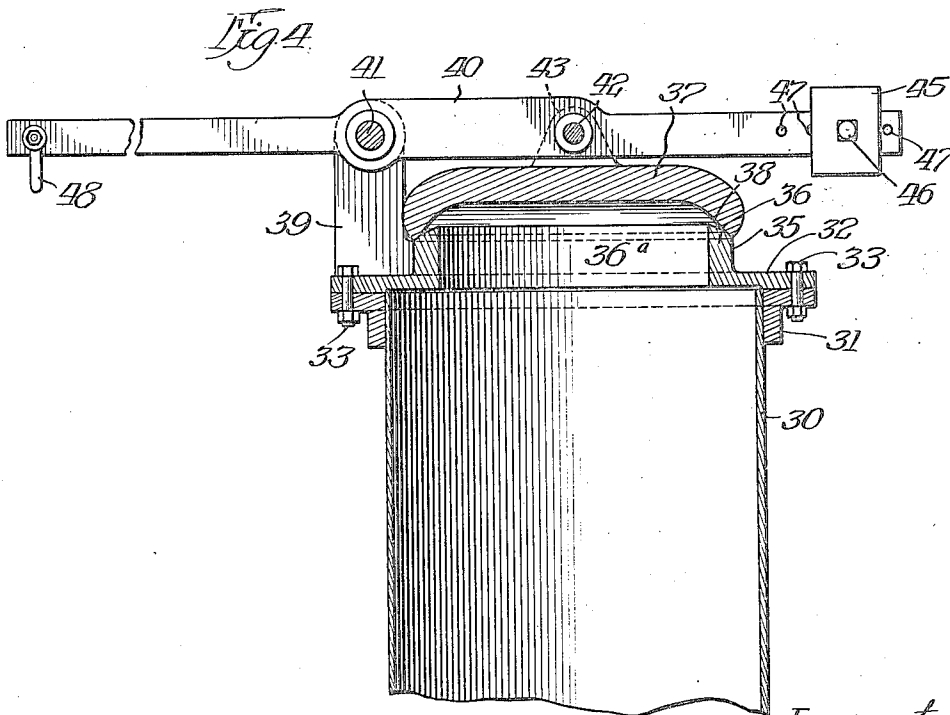
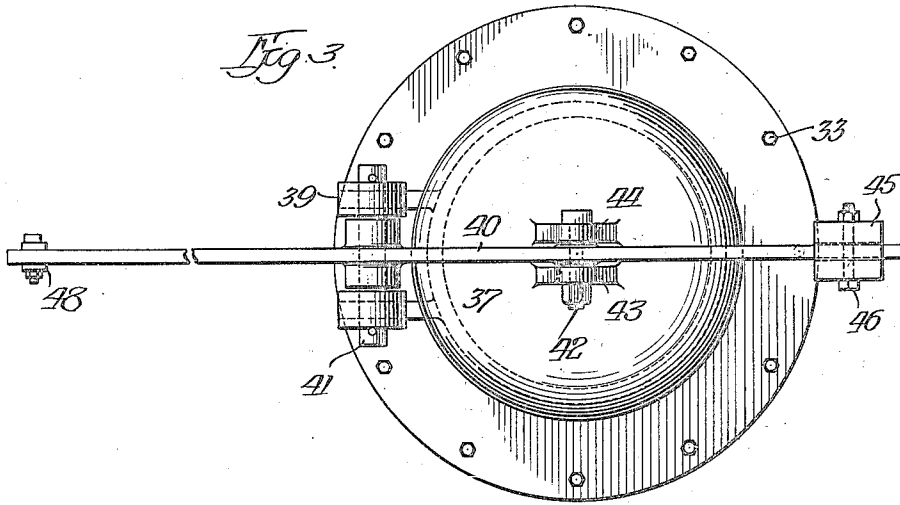
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Filed Nov. 25, 1921

2 Sheets-Sheet 2



Witness:

Ed. A. ...

By

Inventor
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UNITED STATES PATENT OFFICE.

GEORGE E. STEUDEL, OF MILWAUKEE, WISCONSIN.

EXPLOSION VALVE.

Application filed November 25, 1921. Serial No. 517,775.

To all whom it may concern:

Be it known that I, GEORGE E. STEUDEL, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Explosion Valves, of which the following is a specification.

My invention relates to explosion valves for use on blast furnaces, and has particular reference to a valve of this type wherein the valve is seated on the outer periphery of the member forming the valve seat so that cinders, dust and dirt and other material which blows through the valve does not cut openings or channels in the valve seat or in the face of the valve itself, thus allowing gas, smoke and dust to escape therefrom.

A further object of my invention is the provision of an explosion valve having the valve in contact with the seat on the outer periphery of the seat member, so that a ledge is formed between the valve and the inner edge of the seat member which becomes filled with dust and dirt and thus effectually provides a sealing means for these valves which prevents the escape of gas and dust or dirt through the valves.

It will be understood that these explosion valves are usually placed at the upper end of a pipe which is secured to the downcomer from the furnace, the said pipe extending up high enough above the top of the furnace so that gas or dust escaping therefrom will not injure workmen at the top of the furnace. The purpose of these explosion valves is similar to that of a safety valve on a steam locomotive, and they are further designed to take care of any increase in pressure due to slips or explosions which more or less frequently occur in blast furnace operations and are designed to be lifted by the increase in the pressure and allow the gases to escape, whereupon the valves are seated again by their own weight or by the assistance of counter-weights secured thereto.

In my improved invention the valves have an outside seat so that when these explosions and slips occur in a blast furnace the gas is compelled to change its direction to escape from the furnace, and also the dust, cinders and the like must change their di-

rection before passing out from the valve seat, and thus a large amount of their force is lost. In this manner the necessity of replacement of these valves is materially lessened. The life of the valves is therefore increased, resulting in an increased tonnage of the furnace, because when these valves are changed the blast has to be taken off the furnace and its operation stopped, so that a material loss in production occurs. Should the valves leak slightly because of not being seated properly, the leak will shortly be stopped by dust particles falling in the pocket formed between the valve and the inner marginal edge of the seat, which soon becomes caked, thus effectively sealing the leak. As soon as the valve is blown up from its seat this caking is also blown away, but as soon as valve becomes seated again a new caking or seat forms around the inner marginal edge so that the valves are always effectually sealed.

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

Figure 1 is a plan view of my improved valve.

Figure 2 is a vertical sectional view of the valve shown in Figure 1.

Figure 3 is a plan view of a modified form of valve; and

Figure 4 is a vertical sectional view of the valve shown in Figure 3.

Referring now specifically to Figs. 1 and 2 of the drawings, a pipe 10 is shown which is usually attached to the downcomer of a blast furnace (not shown) and which has an annular angle member 11 at the upper end thereof to which a member 12 is secured by means of bolts 13. An opening 14 is provided which is adapted to be closed by a dome shaped valve 15 which is held suspended over the opening 14 by means of a bolt 16, to the lower end of which a cone shaped member 17 is suspended from the bolt 16, the member 15 being secured to the bolt 16 by a key or other suitable means and thus is held in proper position. The purpose of the member 17 is to prevent stones, coke or other particles from blowing out through the opening 14 and thus resulting

in injury to the workmen around the furnace, whereas the gas easily escapes around the lower edge of the member 17 and out through the opening 14. The member 12 has a vertically extending portion 19 integral therewith, on the outer side of which a valve seat 20 is formed, the seat extending diagonally and upon which the dome shaped member 15 contacts, thus forming a seat on the outer side of the projection 19 so that gas escaping from the furnace strikes against the dome shaped member 15 and changes its direction before passing downward between the seat 20 and the valve 15. The member 12 also has a projection 21 thereon, to which a bracket 22 is secured and which has a lever 23 pivotally mounted at the upper end thereof by means of a bolt 24. This lever has a member 25 secured thereto by means of a bolt 26, the said member extending downward, and is secured to the member 16 by means of a bolt 27. A cable 28 is provided at the outer end of the lever 23 so that if desired the valve 15 may be lifted and the gas allowed to escape from the pipe 10. Secured to the opposite side of the member 25 is a lever 29, to which a counterweight may be secured if desired, which effectually assists in holding the valve 15 in closed position.

In Figures 3 and 4 is shown a modified form of my invention, sometimes called a "bleeder" type of valve, in which the pipe 30 has an angle 31 extending circumferentially around its upper portion and to which a member 32 is secured by means of bolts 33. The member 32 has a projecting portion 35 with an opening 36 therein, the upper surface of the portion 35 being inclined downwardly and outwardly and forming a seat 36 for the valve 37, which is a dome shaped member and seats at the outer portion of the projection 36^a so that a small space 38 is formed between the upper inner edge of the member 35 and the valve 37, within which dust and dirt collect and form an effective seal for closing any leaks between the valve 37 and the seat 36. A bracket 39 is secured to the member 32 in any approved manner and has a lever 40 pivotally mounted thereon by means of a bolt 41 and which is secured directly to the valve 37 by means of a bolt 42 which extends through lugs 43 and 44 cast integrally on the valve 37. The lever 40 extends across the top of the valve member 37 and has a counterweight 45 adjustably secured thereto by means of a bolt 46 which extends through holes 47 in the outer end of the lever 40, so that varying pressures can be maintained upon the valve member 37. A small clevis 48 is provided at the outer end of the lever 40 and by means of which the valve may be opened, thus allowing the furnace gases to escape as desired, or, in case of an explo-

sion or the development of an excessive quantity of gas in the furnace, the valve 37 will be blown up, allowing the gas to escape, whereupon it will be returned to its former position by its own weight, assisted by the action of the counterweight 45. It will also be understood that the dust and dirt lodged in the groove 38 effectually seal the valve against small leaks in the same manner as described in the other form of valve, the essential difference between these forms being the omission of the cone shaped member suspended from the valve to prevent stones, coke and the like being blown upward against the valve and through said valve. This type of valve is usually placed on top of the dust catcher or standpipes so that there is not so much danger of lumpy material being blown therethrough.

In the operation of the device it will be understood that they are placed in position upon the upper ends of pipes which are secured to the downcomers or dust-catchers or to any other place desired on the furnace equipment, and upon the gas pressure being increased inside of the furnace the valves will be lifted, allowing the gas pressure to escape until the pressure is substantially equal to that of the valves plus the counterweights, whereupon the valves will be returned into seated position and the valves closed.

It will also be understood that the caking of the dust and dirt takes place around the inner edge of the valve seat and thus effectually seals the valve against small leaks and effectually closes the valve each time it is opened.

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 for blast furnaces comprising a valve seat and a valve seated on the outer periphery thereof.

2. A bleeder valve for blast furnaces comprising a valve seat having an outwardly inclined face, and a valve seated on the outer periphery thereof.

3. A bleeder valve for blast furnaces comprising a valve seat having an outwardly inclined face, and a valve seated thereon, the said valve contacting with the seat a slight distance from the inner marginal edge of the said seat.

4. A bleeder valve for blast furnaces comprising a valve seat having an outwardly inclined face, a valve seated thereon near the lower edge of said face whereby a ledge is provided on the marginal edge of the said

seat adapted to catch dust from the furnace whereby the said valve is sealed.

5 In combination with a blast furnace, a bleeder pipe secured thereto, a valve seat having outwardly inclined face secured to a valve adapted to contact with the outer marginal edge of said face, and a counter-

weight secured to said valve adapted to return the same in closed position against pressure upon said valve.

Signed at Milwaukee, Wisconsin, this 12th day of November, 1921. 10

GEORGE E. STEUDEL.