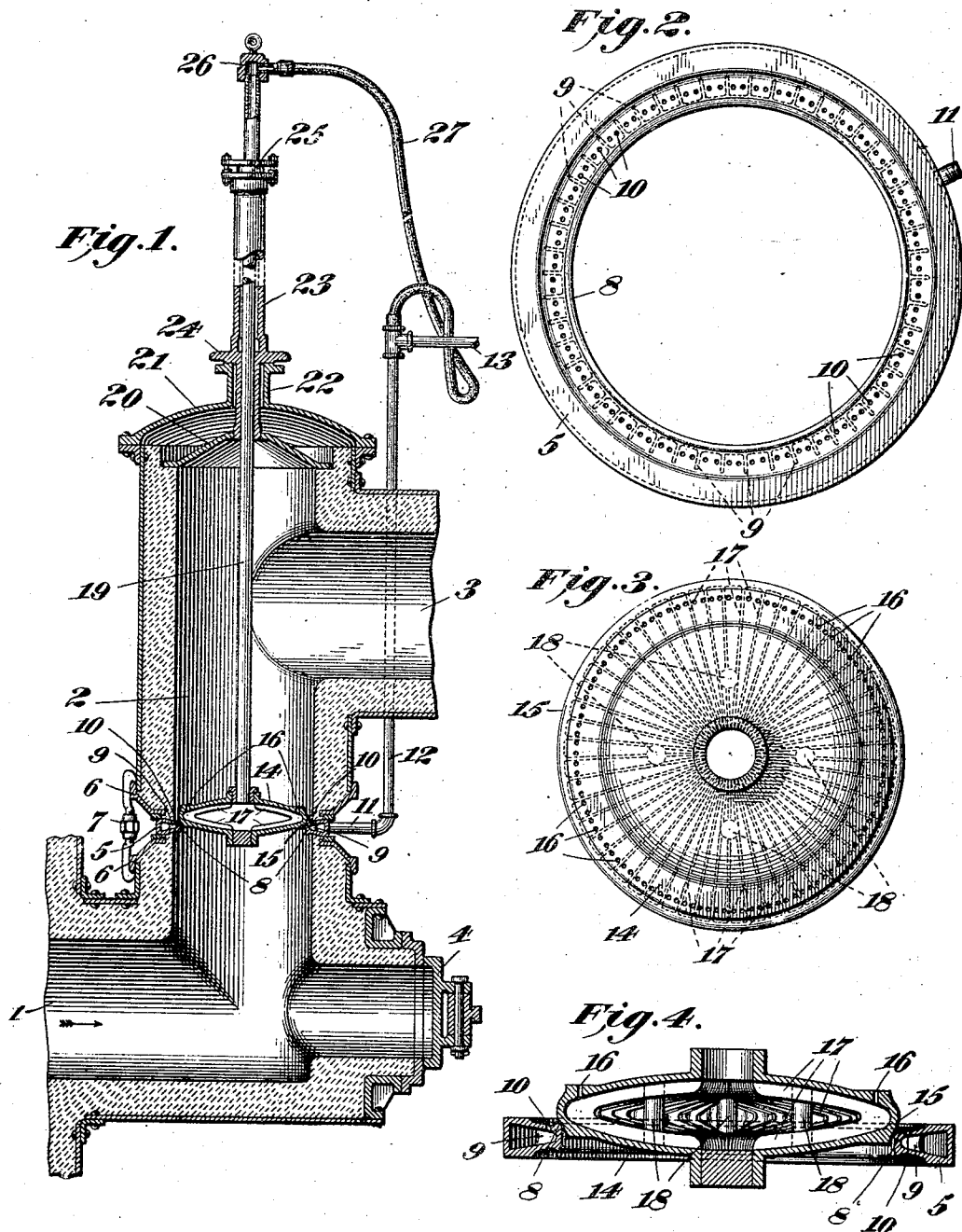


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HOT BLAST VALVE.

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HOT-BLAST VALVE.

1,323,328.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, EDWIN E. SLICK and FREDELLIA H. MOYER, citizens of the United States, and residents of the borough of Westmont, in the county of Cambria and State of Pennsylvania, (whose post-office addresses are Johnstown, Pennsylvania), have invented certain new and useful Improvements in Hot-Blast Valves; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to valves which are subjected to heat and which should preferably be cooled in order to maintain a tight connection between the valve portion and its seat, the seat also being preferably similarly cooled. Our valve is of the puppet type, having a seat of annular form and the valve itself is of the mushroom type and hollow, and also provided with a hollow stem for the purpose of admitting cooling fluid to the valve. Cold or cool air or gas is supplied through the hollow stem to the interior of the puppet-valve and is discharged through small openings provided in the valve shell, thence into the passage which the valve is intended to regulate, which passage is carrying heated air or what is known as hot-blast or other heated gases. By discharging the cooling air or gas, which has been heated by contact with the valve, into the hot air or gases in the pipe or passage which is controlled by the valve, the construction is simplified and at the same time provides a further supply of hot air or gases for the purpose intended.

We have shown our valve as adapted for use in connection with a hot blast apparatus for blast furnaces, but wish it understood that it may be used for any other purpose to which it is adapted. The valve is provided with an annular seat-ring which is also cooled by supplying cold air or gases thereto, and also is provided with holes or openings adapted to discharge the air or gases into the hot blast passage after it has cooled the seat, where it forms part of the air or gas supply.

Referring now to the annexed sheet of drawings which forms a part of this specification and in which like characters denote like parts:—

Figure 1 is a vertical sectional elevation

of a valve chamber with my invention applied thereto, parts being shown broken away to more clearly illustrate the same; Fig. 2 is a top plan view of the annular valve seat-ring drawn on a larger scale than shown in Fig. 1; Fig. 3 is a top plan view of the valve detached, drawn on the same scale as Fig. 2; and Fig. 4 is a vertical transverse sectional elevation through the valve and valve seat-ring.

Referring now to the characters of reference on the drawings:—1 is a flue or pipe leading from a hot blast stove or other apparatus adapted to supply heated air or gases, this being the inlet portion of the apparatus, 2 is the outlet portion of the valve chamber in an upright portion of said flue or pipe, and 3 is a branch of the pipe or flue or a continuation of the outlet portion, leading from the outlet portion of the valve chamber 2, through which heated gases are adapted to pass when the valve is opened, said flue 3 leading to and connected with the blast main of a blast furnace or other apparatus adapted to use heated gases. 4 is a door adapted to provide access to the interior of the flue 1 and the valve chamber 2, 5 is an annular seat-ring which is made hollow as illustrated, for the purpose of allowing cooling fluid or air to pass therethrough, to keep it cool and thereby maintain its shape and the seat in the proper condition for fitting tightly against the puppet-valve portion. The upper part of the valve chamber 2 is separable from the lower part, as illustrated, and the seat-ring is clamped between these two parts and held in position by means of the clamping rings 6 and a plurality of clamps 7, which, as shown, are provided with hook-ends and sleeve nuts having right and left threads adapted to be screwed on the ends of said hooks to secure the clamp rings in position. By this means the seat-ring may be placed in position or taken out when desired. On the seat-ring 5 and formed integral therewith are the valve seats 8, which as shown, are beveled or slightly rounded in order to contact closely with the seat portion of the valve which rests upon them, the valve being tapered and adapted to wedge itself firmly in position, as shown, in order to make a tight closure. Within the valve seat are provided the radial ribs 9 to strengthen it and in the upper surface of said seat are the perforations

10, which are adapted to discharge the cooling fluid from the interior of said valve-seat into the outlet portion of the valve chamber 2. A pipe 11 is connected with the valve seat-ring 5, as illustrated, which pipe is connected to the upright pipe 12 by means of an elbow, as shown, and is also connected to the supply pipe 13 which is adapted to supply cool air or other gases from any suitable source of supply, not shown. 14 is a valve which is of the double mushroom type, formed hollow, the edges 15 of which are formed tapering and adapted to wedge themselves firmly against the portions 8 of the valve-seat to form a tight closure. The valve is also provided with a plurality of small openings 16 which are adapted to discharge the cooling air or gases from the interior of the valve into the valve chamber 2. The valve is also provided with radial ribs 17 for the purpose of strengthening it structurally and also with reinforcing posts 18. The hollow valve stem 19 is secured to the valve, as illustrated, and projects upwardly through a suitable stuffing box, as shown. The top of the valve chamber is provided with a double cover, the inner portion of which is 20, the outer cover is 21, the bushing 22 being formed integral with the latter for the purpose of receiving the lower portion of the annular guide 23 which serves to guide the valve stem in its upward and downward movement. A flange 24 is provided on the guide 23 and at the upper part of the guide 23 is a stuffing box provided with a gland 25 in order to utilize any usual form of packing to make the valve stem tight. The valve stem 19 is hollow and at its upper end is provided with pipe connecting means 26 secured thereto, to which is attached the flexible pipe connection 27, which in turn is connected with the pipe 13 through which cooling air or gases may be supplied from any suitable source.

Our valve in operation is subjected to high temperatures owing to the hot air or gases which pass over and by it and in order to prevent its destruction or warping by heat, we prefer to cool it by means of cool air or gases of the same general character as those which are passing through the valve chamber, and we simplify the structure by supplying said gases into the valve itself and into the valve seat and discharging the same into the valve chamber. This conduces to simplicity of construction and economy and the cool air or gases are used for the same purpose as that of the gases or air used in passing through the flues and valve chamber.

When the valve 14 is in closed position as illustrated in Fig. 1, a current of air or of gas of the same character as that which passes by the valve, when opened, is supplied by means of the pipe 13 and connec-

tions to the interior of the valve 14 and passes outwardly therefrom through the holes 16 into the outlet portion 2 of the valve chamber and thence through the outlet passage 3 into the hot blast main, this fluid thus cooling the valve while being heated to substantially the same temperature as that of the portions with which it has been in contact.

Similar cooling fluid is also passed through the valve seat ring 5 and issues outwardly therefrom through the perforations 10 into the same outlet portion 2 of the valve chamber and thence through the connecting outlet passage 3 into the hot blast main, the cooling air or gases used, being of the same general character as that which passes by the valve and are heated to approximately the same temperature during their cooling action as that of the valve seat.

When the valve 14 is opened the cooling fluid may still be passed through the valve in the same manner and also through the valve seat, but the quantity admitted through the valve may then be less, as the valve when open will be in the upper portion of the valve chamber and out of the current of hot gases, so that it will not need so much cooling.

Although we have shown and described our invention in considerable detail, we do not wish to be limited to the exact details of construction specified, but we may use such substitutions, modifications or equivalents thereof as are embraced within the scope of our invention as pointed out in the claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. A hollow valve, means for supplying cooling fluid to the interior thereof and openings in said valve adapted to permit the discharge of said fluid therefrom into the outlet portion of the valve chamber.

2. A hollow valve of puppet form and a hollow annular valve seat adapted to cooperate therewith, means for supplying cooling fluid to the interior portions of said valve and valve seat, and openings in the same adapted to discharge said fluid into the outlet portion of the valve chamber.

3. A valve provided with fluid cooling means and openings in said valve adapted to discharge said fluid into the outlet portion of the valve chamber.

4. A hollow valve seat provided with means for supplying cooling fluid to the interior thereof and openings in said valve seat adapted to discharge said cooling fluid into the outlet portion of the valve chamber.

5. A hollow puppet-valve of mushroom type provided with a hollow stem, means for supplying cooling liquid to the interior through said hollow stem and openings in

said valve adapted to discharge said fluid into the outlet portion of the valve chamber.

6. A hollow valve adapted to control a supply of hot gases, a valve chamber in
5 which said valve is mounted, means for supplying cooling fluid to the interior of said valve, openings in said valve adapted to discharge the cooling fluid into the outlet

portion of the valve chamber, the cooling fluid being of the same general character as 10 the other fluid passing through said chamber.

In witness whereof, we have hereunto affixed our signatures.

EDWIN E. SLICK.

FREDELLIA H. MOYER.