

No. 667,797.

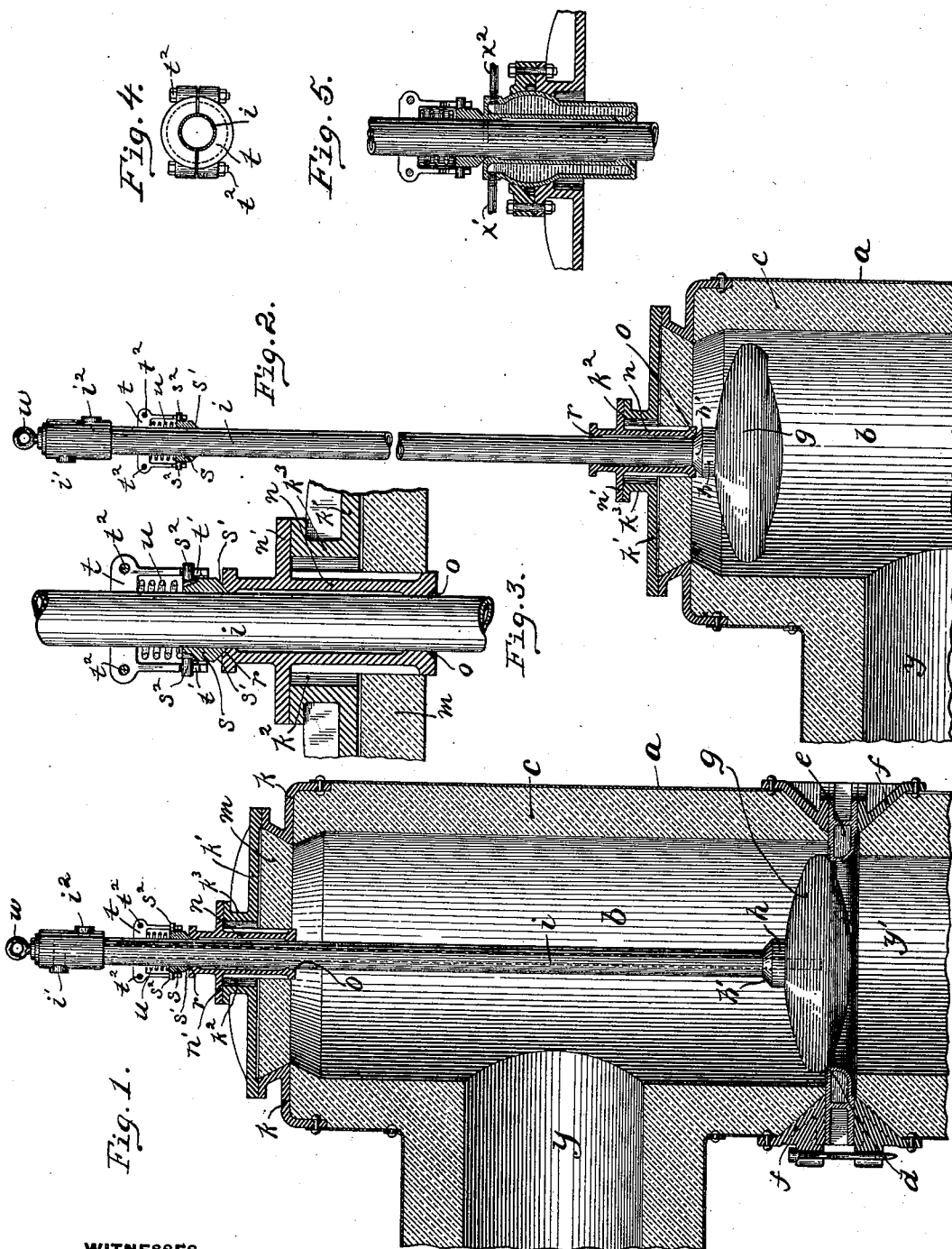
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J. SCOTT.

BLAST STOP FOR HOT BLAST VALVES.

(Application filed Dec. 13, 1898.)

(No Model.)



WITNESSES

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BLAST-STOP FOR HOT-BLAST VALVES.

SPECIFICATION forming part of Letters Patent No. 667,797, dated February 12, 1901.

Application filed December 13, 1898. Serial No. 699,118. (No model.)

To all whom it may concern:

Be it known that I, JAMES SCOTT, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Blast-Stops for Hot-Blast and Chimney Valves on Blast-Furnace Stoves; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to hot-blast and chimney valves for use in connection with blast-furnace stoves. These valves are located in chambers adjacent to the blast-furnace stoves, and communication between said chambers and stoves is controlled by said valves. It has been customary to employ a valve with a hollow cast-iron stem which passes up through a suitable stuffing-box at the upper ends of the valve-chambers. Owing to the presence of dust and other gritty particles which collect within the flues of the stoves and the pipes leading thereto, when the blast is turned on this dust and gritty material is blown with great force against the top of the valve-chamber and attacks the stuffing-box through which the valve-stem passes. This sand-blast action wears out the stuffing-box and develops leaks which allow the air to escape.

The object of my invention is to shield the guide or stuffing-box from this sand-blast action and so increase the life of said stuffing-box, as well as prevent loss of gas or air through leakage.

My invention comprises, generally stated, in connection with a suitable valve chamber and seat, a valve adapted to move to and fro, the stem of said valve passing through a suitable guide-bushing in said chamber, said guide-bushing having a seat at one end thereof adapted to receive a stop carried by said valve-stem, whereby the guide-bushing is protected against the action of the sand-blast above referred to.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a valve-chamber with my invention applied thereto. Fig. 2 is a like view of a portion of said chamber, showing the valve in its elevated position. Fig. 3 is an enlarged view of the guide-bushing and the stop on the valve-stem engaging therewith. Fig. 4 is a plan view of

the device for attaching the upper stop to the valve-stem. Fig. 5 is a view of a different form of guide-bushing.

Like letters indicate like parts in each of the figures.

I have illustrated my invention as applied to the hot-blast valve of a blast-furnace stove, although it is just as well adapted for use in connection with a chimney-valve.

The reference-letter *a* designates the outer metal shell or casing of the valve-chamber *b*, and *c* the inner lining of refractory material. At the lower end of the valve-chamber is the annular valve-seat *d*, which consists of a water-cooled box *e* with suitable connections for maintaining a proper circulation of water therein. This water-box *e* is secured within the walls of the valve-chamber by means of the clamping-rings *f*, said rings in turn being riveted to the metal plates *a*.

The valve *g*, which rests on the valve-seat *d*, is preferably hollow, and on its upper face, formed integral therewith, is the stop or projection *h* with the conical or beveled face *h'*. The stem *i* is preferably made hollow, a section of wrought iron or steel pipe being suitable for the purpose. By having the stem made of hollow wrought iron or steel the heat conductivity of same is reduced and it will remain at a lower temperature. The upper end of said valve-stem has the inlet and outlet connections *i'* *i''*, to which suitable pipes are attached for carrying a cooling liquid to and from said stem. The liquid passes down through an inner pipe (shown in dotted lines) into the hollow valve *g*, thence up the stem, and out the outlet *i''*. This is a common form of construction, however, and forms no part of the present invention. The lower end of the stem *i* is threaded and screws into the valve.

The top of the valve-chamber *b* is composed of the flanged ring *k*, secured to the plates *a*, and the top plate *k'*. This top plate *k'* has the central opening *k''*, with the flanged neck *k'''*. The refractory material *m* protects the top from the intense heat.

A guide-bushing *n* has the flange *n'*, which rests upon the neck *k'''* of the top plate *k'* and to which it is secured. The guide-bushing *n* passes through the opening *k''* in the top plate *k'*, and around the lower end of said guide-bushing is the seat *o*, which corresponds substantially with the beveled face *h'* of the stop

or projection *h*. At the opposite or outer end of the guide-bushing *n* is the seat *r*, adapted in the closed position of the valve *g* to receive the beveled face *s'* of the stop or projection *s*, secured to the stem *i* without the valve-chamber *b*. This stop *s* has the studs *s*², which enter the slots *t'*, formed in the two-part clamp *t*. The clamp *t* when arranged at the proper position on the stem *i* is tightened by means of the bolts *t*² and rigidly secured to said stem. A spring *u* is interposed between the stop *s* and the clamp *t*, which acts to create a downward pressure on said stop.

At the upper end of the stem *i* is the connection *w*, by means of which said stem may be connected to suitable mechanism for raising and lowering the valve.

The flue *y* leads to the blast-furnace and the flue *y'* leads from the blast-stove.

I will now describe the operation of my invention. When the valve is in the position shown in Fig. 1, the hot blast coming from the stove is cut off. In this position of the valve *g* the stop *s* will be in engagement with the outer end of the guide-bushing, the beveled or conical end *s'* of said stop fitting in the corresponding seat *r* of the guide-bushing. When the valve is closed, the back pressure from the blast-furnace will accumulate in the chamber *b*. The stop *s* prevents the escape of the gas in case there should be any leakage of air through the lower end of the guide-bushing. The stop *s* is located at such a point on the stem *i* that when the valve *g* is seated the stop *s* will be forced into the seat *r* with sufficient pressure to form a tight joint. The pressure of the spring *u* when compressed will aid in holding the stop *s* and make a tighter joint. When, however, the valve *g* is raised to allow the hot blast to pass from the stove to the blast-furnace, said valve is elevated until the stop *h* is brought up into the position shown in Fig. 2, with its beveled or conical end *h'* fitting into the seat *o* at the inner end of the guide-bushing *n*. In this manner the inner end of said guide-bushing is sealed and the escape of air through leakage is avoided. At the same time the guide-bushing is shielded from the action of the dust and gritty particles carried into the chamber by the blast, which has practically the same effect as a sand-blast and would attack the guide-bushing if exposed. By the use, however, of the stop *h* this is avoided and leakage of the hot air through the guide-bushing prevented.

In Fig. 5 I have shown a modified form of guide-bushing which is hollow, with water connections *x'* *x*² leading to and from said box, whereby a constant circulation of a cooling liquid is maintained within the box. The bushing comprises a cast hollow member having a spherical formation intermediate its ends, the plates for supporting it being suitably curved on concave lines, so as to firmly hold said bushing in place, but allow adjustment thereof to aline the same with the valve-

stem *i*. The connection between the bushing and the valve-casing is substantially a ball-and-socket.

By the term "guide-bushing" I wish to include any suitable form of guide for the valve-stem and through which it passes.

It is manifest that the several parts of my invention may be changed or modified within the scope of the claims without affecting the spirit of my invention and that it may be applied to other valves about a blast-furnace plant where applicable.

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

1. In blast-valves, a valve-chamber having a valve-seat therein, a valve, a valve-stem, an elongated guide-bushing through which said guide-stem passes, said guide-bushing having a spherical portion intermediate its ends and a seat in the end thereof, a stop carried by the valve-stem adapted to engage said seat, and a concave socket for engaging the spherical portion of the guide-bushing, substantially as set forth.

2. In blast-valves, a casing provided with an opening, a valve-chamber and a valve-seat therein, a valve, a valve-stem, a guide-bushing for the valve-stem projecting through the opening in the casing, means for removably securing said guide-bushing in the opening in the casing, said guide-bushing having hollow walls, and water connections leading to the interior of said guide-bushing.

3. In blast-valves, a valve-chamber having a valve-seat therein, a valve, a valve-stem, a guide-bushing through which said valve-stem passes, said guide-bushing having seats at opposite ends, a stop on the valve-stem in position to engage the lower guide-bushing seat when the valve is raised to its uppermost position and a spring-pressed stop mounted on the valve-stem in position to engage the upper guide-bushing seat when the valve is seated, substantially as set forth.

4. In blast-valves, a valve-chamber having a valve-seat therein, a valve, a valve-stem, a guide-bushing through which said valve-stem passes, a clamp on said valve-stem, a stop supported by said clamp and a spring between the stop and the clamp, said stop being adapted to engage the outer end of said guide-bushing, substantially as set forth.

5. In blast-valves, a valve-chamber having a valve-seat therein, a valve, a valve-stem, a guide-bushing through which said valve-stem passes, a clamp on said valve-stem, said clamp having slots therein, a stop having studs engaging said slots, and a spring interposed between said stop and clamp, said stop being adapted to engage the outer end of said guide-bushing, substantially as set forth.

In testimony whereof I, the said JAMES SCOTT, have hereunto set my hand.

JAMES SCOTT.

Witnesses:

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