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BLOW-OFF VALVE

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This invention relates to blow off valves and consists mainly of improvements toward making it practically impossible for the hot water to escape from the boiler by reason of parts of the discharge valve having become damaged, and in general to secure a most economical as well as reliable discharge of the undesirable contents of steam boilers.

It has been found that mud, grit and other objectionable matter can be removed from the boiler with the least possible loss of hot water if the discharge valve is opened comparatively very often, for instance every two hours, and then for a short period of time, for instance not longer than from one second to two seconds at a time.

To carry through this method of blowing off to advantage, more particularly with a maximum attainable degree of reliability and safety in view of the desired rapidity of discharge, and should a part of the device become over-stressed and damaged, I arrange the shell or housing of the valve in sections, for instance in such a manner that the section which is secured to the boiler encloses a spring-seated safety valve so as to function entirely independent from any other part of the valve, whilst the discharge valve is directly or indirectly held or confined in the outlet section, which latter is inserted between the discharge pipe line and the inlet or boiler section and structurally forms the weakest part of the device so as to be adapted and able to yield and even break if stressed excessively, thereby breaking the force of the stress impulse and protecting the safety valve against any interference with its important function.

The passage connecting the boiler with the discharge pipe line includes, about midway, a chamber through which the boiler contents pass in a direction substantially at right angles to that through the inlet and outlet section or passage, thereby preventing vibrations of the boiler and humming.

The annular chamber confined by and between the two valves, the intermediate valve chamber, is normally entirely disconnected from the inlet and the outlet passages which are contained in separate sections, from which follows, that the discharge valve and the outlet section may be dismantled whilst the boiler is under full steam pressure, the safety valve within the inlet section functioning independent of any other section or part of the valve, being self-contained.

The different valve sections are held together, for instance by a set of four bolts each of which is equidistant from the next one, or by two sets,

enabling the device to form either a straight-way or an angular valve. Similarly, the operating lever may be caused to extend so as to be most conveniently actuated from a number of directions; furthermore, the discharge valve may be more or less permanently held down to its seat in a simple manner to prevent any undesired action of the same.

The operating lever consists of two parts yieldably joined by a bolt and a pin, which latter may become severed through too sudden or violent an actuating force impulse, thus protecting the valve against such a cause of trouble.

The two valves being arranged head-on, and in line with each other and loosely operatively connected, their seats may be ground in simultaneously, under full steam pressure, by turning the stem of the discharge valve.

One way of carrying out the invention is fully described in the following specification and illustrated in the accompanying drawing, in which—

Figure 1 is a section through the middle of the valve, partly in view,

Figure 2 being a top view, on a reduced scale.

Referring now to the drawing, the valve is sectioned as follows:—

The inlet or boiler section *a*, into the central opening of which a ring, as *b*, is screwed to form the seat for the safety valve *c* so as to completely confine the same in its section, spring *v* holding the valve to its seat.

The outlet section *d* is secured to the boiler section by means of four bolts, as *e*, each of which is equidistant from the next two. The walls *m* of the outlet section or passage are considerably thinner and less resisting than the walls *n* of the boiler section or inlet passage.

The middle section *h* is centrally located and held in the outlet section *d* and contains the discharge valve *i* with its seat and the stem or spindle, and in line with the safety valve.

The bonnet section *j* rests on the middle section *h* but is secured to the outlet section *d* by means of four bolts, as *f*, each of which is equidistant from the next two.

The two-part operating lever is hinged to the bonnet section with its shorter part *k* which is forked at its free end to tension spring *g*, by means of bolt *q* and nut *r*, and has at its other end a socket, as *l*, to which is connected the extension *w* by the bolt *o* and a locking pin, as *p*, adapted to be severed by too sudden or violent an actuating force impulse.

The head of the safety valve is provided with radial pins *s* to engage the ribs *t* on the head of

the discharge valve, whilst to the end of the stem of the same a squared head *u* is secured.

In operation, on actuating the lever extension *w*, for instance by means of a pedal or a chain, not shown, against the tension of the springs *g* and *v*, the discharge valve *i* is opened and simultaneously the safety valve *c*, as rapidly as desired. Should however the actuating force impulse be so sudden or violent as to be liable to cause damage, this excess of force will be spent in cutting the locking pin *p* in the perforation *x*, whereupon the lever extension *w* will swing limitedly around the bolt *o*. The locking pin, for instance a cotter pin, of suitable strength, of which one may be held in reserve in the perforation *y* of the socket *l*, is quickly replaced without in the least interfering with the operation of the device.

On the other hand, if an excessive stress is transmitted to the valve by or through the discharge pipe line so as to seriously damage the outlet section and the discharge valve, the safety valve will not be affected thereby, being self contained and confined in a section of comparatively rugged structure.

Thus, as long as the inlet section is intact, all of the other parts of the device, without exception, may be taken off or become damaged and inoperative without interfering with the function of the safety valve.

To convert the device from a straight way valve as shown into an angle valve, the outlet section is brought into the position *d'* or *d''*, as shown by the dotted lines, Fig. 2, the bolts *e* being equidistant, each from the next two. On the other hand, if the bonnet section is turned 90° on the middle or outlet section, the operating lever *w* may extend in a direction as shown by the dotted lines *w'* or *w''*, the bolts *f* also being equidistant. Furthermore, the lever extension *w* may be yieldably held in the socket *l* at right angles to part *k* by placing pin *p* in the perforation *y* of the socket, as shown by the dotted lines *z*.

By turning nut *r* so as to force the head of bolt *q* against the bonnet section *j*, the discharge valve is effectively locked.

I do not wish to be restricted to constructional features as shown as I may, for instance, prefer to arrange the seat of the safety valve directly on the inlet section, integral therewith, instead

of on a ring as shown, in which case the safety valve is introduced into its section through a perforation opposite the valve seat. I may also hold all the sections of the valve together by only one set of bolts, instead of two, and the middle section may be arranged in one piece with the outlet section.

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

1. In a device of the class described having in a casing a check valve in axial alinement with a main valve, means for substantially simultaneously operating the valves comprising a lever hinged to the casing and engaging the stem of the main valve, an extension of the lever pivotably held thereon and a pin or rivet for yieldably interlocking said lever with its extension adapted to be sheared off by too violent an actuating force impulse, to thereby protect the device.

2. In a device of the class described having in a casing a check valve in axial alinement with a main valve, means for substantially simultaneously operating the valves comprising a lever hinged to the casing and engaging the stem of the main valve, and means for limiting the opening movement of the valve stem and also for altogether preventing the lever from operating the valves, comprising a recess at or near one of the ends of the lever, a recess opposite thereto in the bonnet section of the casing, a bolt passing through both recesses having a head at one end and a nut at the other end for screwing the said head toward and onto the bonnet section against the tension of a spring to control the movements of the valve stem.

3. In a device of the class described having in a casing a check valve in axial alinement with a main valve, means for substantially simultaneously operating the valves comprising a lever hinged to the casing and engaging the stem of the main valve, a spring exteriorly held within a recess on the casing for closing the main valve, a bolt for transmitting the closing force of the spring to the end of the lever and a nut on the said bolt for regulating the closing force of the said spring, and a second spring interiorly held within a recess of the check valve for closing the latter.

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