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P. C. KANGIESER

1,553,940

RELIEF VALVE

Filed April 28, 1924

Fig. 1.

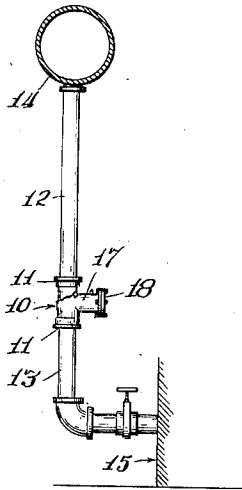


Fig. 2.

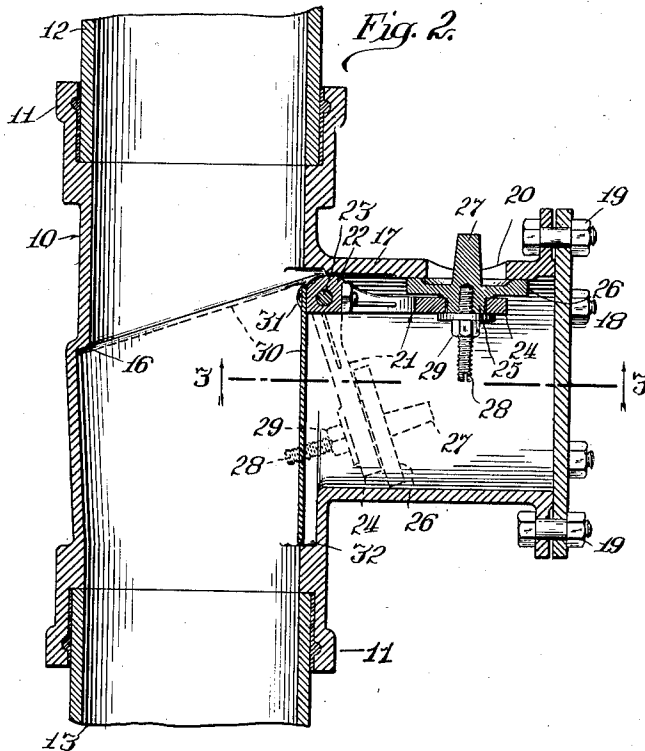


Fig. 3.

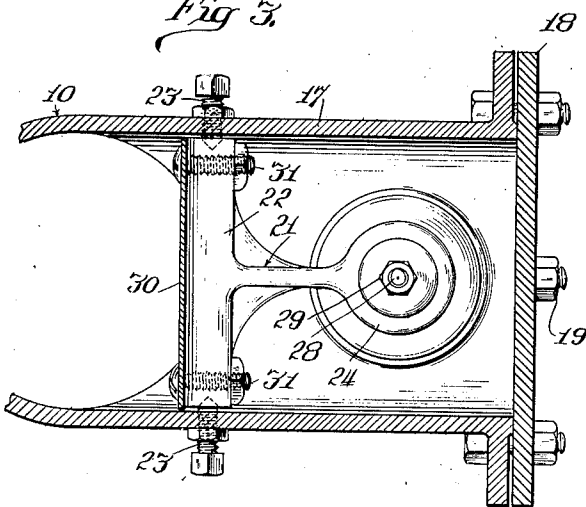
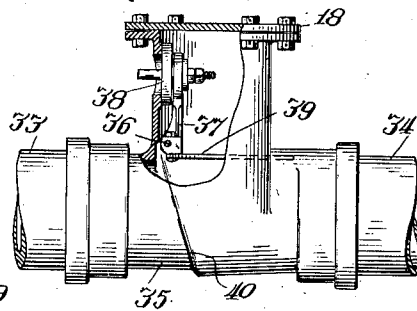


Fig. 4.



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UNITED STATES PATENT OFFICE.

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RELIEF VALVE.

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To all whom it may concern:

Be it known that I, PAUL C. KANGIESER, a citizen of the United States, and a resident of Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Relief Valves, of which the following is a description, reference being had to the accompanying drawing, which forms a part of my specification.

My invention relates to relief valves more particularly intended for use in the blast pipes of furnaces or forges; the object of the invention being to provide a safety relief valve whereby the accumulation of gas in the main air trunk lines is prevented after the air supply or blast is shut off.

My improved relief valve is more especially intended to be installed in the respective branch lines leading from main air or trunk line to the forges or furnaces and is preferably located as near the forges or furnaces as practicable and yet at the same time a suitable distance from the floor and the point where the branch line connects with the furnace or forge.

My invention is intended for use in connection with furnaces or forges where coal, coke or gas is employed as a fuel; the function of the valve being to prevent the accumulation of gas and consequently eliminate the possibility of explosion resulting from static discharges or back fire from the furnaces or forges; the relief valve in practice being preferably employed in a vertical position, if possible, and at a suitable elevation to permit proper and easy observation by the operator.

The objects and advantages of my invention will be more fully comprehended from the detailed description of the accompanying drawing, wherein:

Figure 1 is a more or less schematic illustration of the application of my invention to a blast or branch line leading to a furnace.

Figure 2 is a vertical sectional view of the invention shown installed in the adjacent ends of a branch line; the valve being shown in closed position.

Figure 3 is a detail sectional view taken substantially on the line 3—3 of Figure 2 looking in the direction of the arrows.

Figure 4 illustrates the application of my invention to a horizontally disposed branch line; a portion being shown broken away and in section to disclose the internal construction and position.

In the exemplification of the invention as disclosed in the first three figures of the drawings, it comprises a suitable housing or shell 10, somewhat in the nature of a T-connection, the main or air conveying portion being of any suitable cross-sectional configuration and preferably made cylindrical at the ends which are enlarged as at 11, 11 to receive the ends of the pipes 12, 13; the pipe 12 leading up to and being connected with the main air trunk line shown at 14 in Figure 1; while the lower pipe 13 leads to and is suitably connected with the furnace or forge; a portion whereof is indicated at 15 in Figure 1.

The inner perimeter of the connection or housing 10 is offset midway between the ends to provide a suitable shoulder, as at 16 in Figure 2, which preferably extends about the inner surface of the coupling or connection 10; and this offset or shoulder is also preferably formed in an inclining manner so as to slope downwardly from a point adjacent to the upper part of the laterally extending portion or extension 17 of the coupling member for reasons apparent from the hereinafter described operation.

The extension 17, which is preferably rectangular in cross section, has its outer end provided with a suitable closure plate 18 which is removably secured in place by means of bolts and nuts as at 19; the end of the extension 17 being made sufficiently large to enable insertion of the valve elements hereinafter described.

The extension 17 on its upper side is provided with a suitable sized opening 20 whereby an outlet to the atmosphere is afforded for the gases which may return or flow back from the forge or furnace after the air blast has been shut off.

The extension 17, adjacent to the point of its connection with the main part or air conveying portion of the coupling member 10, and on the inner side thereof, has one end of an arm 21 pivotally secured thereto; the arm 21 preferably terminating in the

transversely disposed hub portion 22 into which set screws 23 extend. These set screws 23 (which may be replaced by a single pin) are screwed through suitable openings in the sides of the extension 17; or the arm may otherwise be secured in place.

The opposite end of the arm 21 is shown slightly enlarged as at 24 and is provided with an opening to receive a boss 25 formed on one face of a disc or plate 26 which latter is of construction and size suitable to completely close the opening 20 when the furnace or forge is in operation. The closure plate or disc 26 on its upper side is preferably provided with an extended portion or boss 27 of size sufficient to permit it to protrude through the opening 20 to an extent sufficient to act as a pilot or means whereby the operator at a distance from the furnace may observe the position of the valve mechanism.

The disc or closure plate 26 is shown suitably secured to the free end of the arm 21 by means of an elongated threaded member 28 and washer and nut as shown at 29.

The pivoted end of the arm 21 is provided with a disc or plate 30, suitably secured thereto and extending substantially at right angles to the arm; as for example by the screw bolts 31 in Figure 3. This plate or closure 30 is made somewhat larger than the internal diameter of the extension 17 so as to overlap and cover the passage from the main portion or shell 10 into the extension 17; and for that reason the wall of the coupling or housing 10, adjacent to the extension 17 is preferably offset as at 32 to receive the free end of the plate or disc 30.

The internal surface of the housing 10 and the diameter of the plate or disc 30 are formed to permit the latter to freely swing into the main portion of the shell or housing 10 and to come into abutting or seating relation with the offset or shoulder 16 and thereby close off the passage or communication between pipes 12 and 13.

The casing of the valve may be made of cast metal, except possibly so far as the plates 18 and 30 and the threaded stem 28 are concerned; and the ends 11 and 12 of the casing may be made any size to suit the diameter of pipe to which it is to be applied; these ends being shown preferably enlarged and shouldered to readily receive the ends of pipe of light sheet metal and the joints between the pipes and casing caulked with suitable material, such as lead wool, to effect an air tight connection.

In practice, the casing of my improved relief valve is preferably installed as shown in Figures 1 and 2, and the construction is such that when the air blast is on, namely when the air under pressure is flowing through the main trunk line 14 and into the branch line 12, the pressure of the air on

the plate or disc 30 will cause arm 21 to swing on its pivotal connection and move the disc or plate 26 over the opening 20 in the extension 17, while plate 30 will assume the substantially vertical position shown in full lines in Figure 2. The passage from pipe 12 through shell 10 to pipe 13 is thereby opened and the air allowed to flow to the furnace, as indicated by the arrows, while the escape of air into the atmosphere will be prevented by the closure plate 26. With the mechanism in this position, the extension or pilot 27 will be clearly visible through the opening 20 of the extension 17 and the operator will be able to observe the proper operation and positioning of the relief valve.

It is apparent that my improved relief valve may be installed in air lines differently disposed from that shown in Figure 1; as for example in Figure 4 I illustrate the invention applied to a horizontally arranged air line comprising the sections 33, 34, wherein the air is coming from a suitable main trunk line, through section 33, thence through the casing 35 and into section 34 which connects with the furnace or forge.

The construction is substantially similar to the construction previously described; except that the pivotal point 36 of the arm 37 by preference is arranged so that weight of the free end of the arm with plate 38 and the weight of the plate 39 will be disposed toward what may be termed the inner side of the vertical plane of the pivotal axis, in order that the valve will swing from the full line position to the dotted line position when the blast of air is shut off from the branch line 33-34. The casing 35, like casing 10, is also provided with a shoulder 40, on the interior, which may be formed by off-setting the side walls as shown, or otherwise, to provide a seat for plate 39 and therefore limit the swing of the mechanism so that plate 39, like plate 30, cannot become wedged in its closed position; while at the same time a closing seat is provided.

In either construction, it is evident that release of air pressure on plate 30 or 39 will allow the composite valve mechanism to swing into the dotted line position, shutting off the flow of gas from the furnace or forge into pipe section 12 or 33, while at the same time opening the casing to the atmosphere by means of port 20, because closure plate 26 or 38 will then have swung downwardly away from the port, as the arm and plate or disc 26 or 38 overbalance the weight of plate 30 or 39; free outflow of the gas being possible because of the skeleton or comparatively narrow form of the arm 21 or 37; the gases flowing into the shell or casing being deflected by the plate 30 in Figure 1 or 39 in Figure 4.

The end of the extension 17 of the casing is preferably closed by a removable cover plate 18, so as to enable easy assembly, repair and adjustment of the valve mechanism.

I have shown the valve mechanism with the threaded stem 28 in order that additional weights may be applied when necessary to properly counterbalance the device.

I have shown what I believe to be the simplest adaptations of my invention and the methods of installation and have described the invention in terms employed merely as terms of description and not as terms of limitation, as structural modifications are possible and may be made, without, however, departing from the spirit of my invention.

What I claim is:

1. A valve of the character described, comprising a shell adapted to be inserted between two sections of an air line and permit flow therethrough, said shell being provided with a laterally disposed extension provided with an outlet, and a pair of plates arranged at an angle to each other corresponding with the angle to which the extension is disposed from the main portion of the shell, said plates being provided with a common pivotal point so as to permit one plate to swing transversely of the main portion of the shell to close passage therethrough, while the other plate is adapted to swing into a position substantially parallel with one side of said extension to close said outlet.

2. A valve of the character described, comprising a main shell adapted to be inserted between two sections of an air line and permit flow therethrough, one side of the shell being provided with an extension arranged in communication with the shell interior and provided with an outlet port, angular means pivotally mounted at an intermediate point in the shell so as to permit one side of the means to swing transversely of the shell to close the passage therethrough, while the other side of the means is adapted to swing into said extension and to close said port when the first side is disposed substantially parallel with the longitudinal axis of the shell.

3. A valve of the character described, comprising a shell adapted to be inserted between two sections of an air line, said shell being provided with an extension on one side having an open end and a port in one side wall thereof, a removable closure for said open end, and pivoted means arranged at the juncture of the extension and the main shell, said means comprising a port closing plate and a shell closing plate, the plates being disposed at an angle to each other, so that when the port closing plate is in port uncovering position, the other

plate is in shell closing position, said means being arranged to automatically swing into said last mentioned position.

4. In a valve of the character described, a shell adapted to be inserted between two sections of an air line, said shell having an extension, projecting from one side thereof, provided with an outlet port, a removable end wall for said extension, means pivotally mounted in the shell at the juncture of the extension and main part of the shell, said means comprising a port closing portion and a shell closing portion, the two portions being disposed at an angle to each other, and means within the shell proper for providing a seat for a portion of the means.

5. A valve of the character described, comprising a shell adapted to be inserted in a feed line and having a main passage therethrough and an outlet port communicating with said passage, a valve pivotally mounted in the shell, one part of the valve being adapted to control the main passage, while the other part is adapted to control said outlet port, the relation between the two parts of the valve being such that said port is closed when said passage is open and vice versa, the first mentioned position of the valve being controlled by the pressure of the medium flowing into the shell, while the second position is gravity controlled when said medium is shut off, and regulable means for controlling the automatic operation of the valve.

6. A valve of the character described, comprising a shell adapted to be inserted in an air feed-line and having a main passage therethrough provided with a shoulder and a chamber off-set from said passage, the chamber being provided with an outlet port, one wall of the chamber being removable, and a two part valve pivotally mounted in said shell, the one part being adapted to close off the main passage and seatable on said shoulder, while the other part is adapted to close said port, said last mentioned part comprising a removable port closing plate provided with a pilot portion adapted to extend through the port when said valve is in port closing position and a weight-retaining member, the relation between said parts of the valve being such that the pressure of the air flowing through the main passage will move the first mentioned part parallel with said passage into open position while the second mentioned part is held in port closing position and to automatically swing the first mentioned part against said shoulder into passage closing position while the second mentioned part swings away from said port and establishes communication between one end of said passage and the chamber with the shell exterior when the air pressure has been shut off.

7. A valve of the character described, comprising a substantially T-shaped shell, two legs or ends whereof are adapted to receive the ends of a pair of air line sections and provide communication therebetween while the other leg or end is provided with a closure and with a port in one side thereof, a pair of plates arranged at an angle to each other corresponding with the angle at which the last mentioned leg is disposed from the first mentioned legs, said plates being mounted on a common axis at the juncture of the legs or ends so that one plate will be swung transversely of and close the passage through the shell while the other plate will swing into a position substantially parallel with one side of the last mentioned leg or end and close said port, the relation between the plates being such that when the second mentioned plate is in port closing position the first mentioned plate is in shell-passage opening position parallel with one side of the shell and vice versa, and regulable means secured to the port closing plate for controlling the automatic operation thereof.

PAUL C. KANGIESER.