

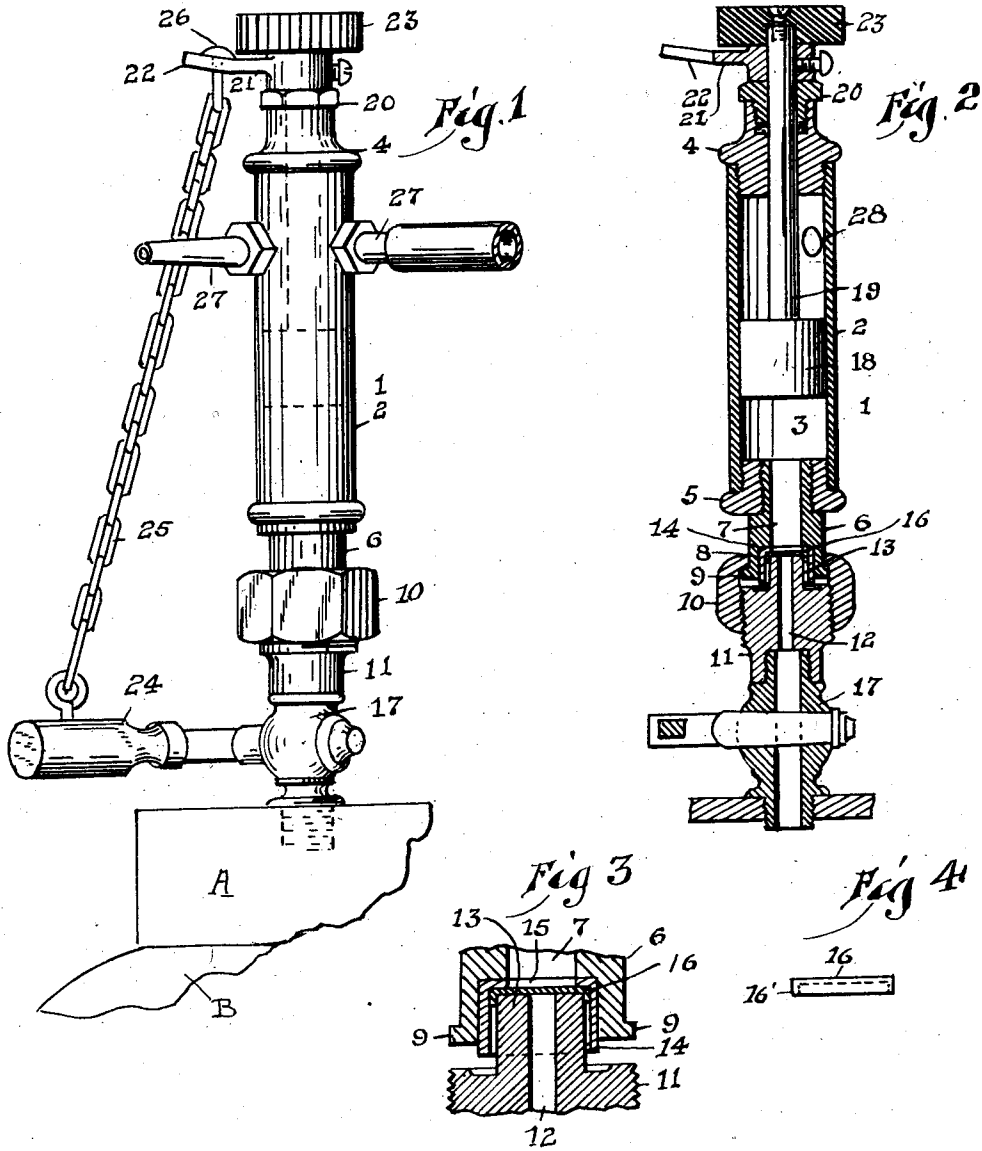
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AUTOMATIC SAFETY APPLIANCE

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AUTOMATIC SAFETY APPLIANCE.

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My invention relates to an automatic safety appliance, and while primarily intended for use in connection with the steam generator of a vulcanizing apparatus, it will be obvious that the device may be employed in connection with any other mechanism wherein it is found to be applicable.

Important objects of the invention are to provide a device of the character described which will serve all of the purposes of an ordinary safety valve without permitting the escape of any steam; which will function automatically to shut off the fuel supply to the associated steam generator; and which embodies novel means for effecting its operation when the steam pressure exceeds a predetermined amount.

Further objects of the invention are to provide a device of the type stated, which is simple in its construction and arrangement, strong, durable and efficient in its use and comparatively inexpensive to install and manufacture.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of the novel construction, combination and arrangement of parts hereinafter described and illustrated in the accompanying drawing, but it is to be understood that changes, variations and modifications may be resorted to that come within the scope of the claims hereunto appended.

In the drawing wherein like numerals of reference designate corresponding parts throughout the several views:

Figure 1 is a side elevational view of my improved appliance mounted on the boiler cap of the steam generator, the latter being broken away.

Figure 2 is a vertical cross sectional view thereof.

Figure 3 is a cross sectional of the connecting sleeves and associated parts partly broken away.

Figure 4 is a side view of the diaphragm.

My improved appliance is mounted on the steam reservoir cap A of a steam boiler or generator B in the manner of an ordinary safety valve of the usual construction.

The automatic safety appliance comprises an elongated, vertically disposed body portion 1 consisting of a cylinder 2 provided with a bore 3, and formed with internally threaded ends. An apertured plug 4 is

threadably secured in the upper end of the cylinder 2, and an apertured plug 5 is threadably secured in the lower end thereof.

An upper connecting sleeve 6 is threadably secured in the apertured plug 5. The sleeve 6 is provided with a bore 7 having an enlarged lower portion 8. The lower end of the sleeve 6 is formed with a peripheral annular flange 9 for the engagement of the connecting nut 10 mounted on the sleeve 6.

An externally threaded lower connecting sleeve 11, is associated with the upper connecting sleeve 6, and the two sleeves 6 and 11 are joined together by the connecting nut 10 on the principle of an ordinary pipe union connection.

The sleeve 11 is provided with a bore 12 and the upper end thereof is formed to provide a reduced neck 13, which extends into an inverted cup 14 loosely mounted in the enlarged bore portion 8 of the sleeve 6. The top of the cup 14 is provided with an aperture 15 registering with the sleeve bore 7.

A circular diaphragm 16 including a depending peripheral flange 16' overlaps the upper end of the neck 13 and seats against the lower face of the top of the cup 14. The diaphragm 16 is securely held in position between the top of the cup 14 and the upper end of the neck 13, when the nut 10 is adjusted to join the sleeves 6 and 11, in the manner hereinbefore described.

The diaphragm 16 is constructed from thin sheet copper or any other suitable material, and is adapted to be ruptured or broken when the pressure of the steam thereagainst exceeds a predetermined amount. The construction of the sleeves 6 and 11 together with the associated connecting nut 10 permits of the convenient replacement of a diaphragm 16 in the event one is broken in the operation of the device in the manner stated.

A throttle valve 17 connects the lower sleeve 11 with the steam reservoir cap A, and is normally maintained in the open position as shown in Figures 1 and 2 of the drawing.

A piston 18 is slidably mounted in the cylinder bore 3, and is fixed to the lower end of the piston rod 19. The latter extends through the apertured plug 4 and is provided with a stuffing box 20 arranged in the top of the plug 4.

A laterally disposed arm 21, having a bifurcated outer end 22, is adjustably connected adjacent to the upper end of the rod 19. A non-metallic head 23 is fixed to the top of the rod 19. Normally the piston 18 and the associated rod 19 are in the lowered or depressed position shown in Figures 1 and 2 of the drawing.

The throttle valve 17 is provided with an operating lever 24 which extends in the horizontal direction when the throttle valve 17 is in the open position.

A chain 25, provided with a head 26, connects the outer end of the lever 24 with the arm 21. The bifurcated end 22 of the arm 21 engages the chain head 26 and establishes a detachable connection therewith.

In the use of my improved appliance it is intended to connect the same in the fuel supply conduit by means of a pair of connectors 27 which are fixed in ports 28 formed adjacent to the upper end of the cylinder 2 and communicating with the bore 3 of the latter. By this arrangement all of the fuel supplying the steam generator B must pass through the upper end portion of the cylinder bore 3.

In practice the operation of my improved appliance is as follows: Assuming that all parts of the device are in the positions shown in Figures 1 and 2 of the drawing, the throttle valve 17 is in the open position with the lever thereof extending in the horizontal direction. The diaphragm 16 is unbroken, and the piston 18 and associated rod 19 are in the lowered or depressed position allowing the free passage of the fuel through the upper portion of the cylinder bore 3, and through the ports 28 and conduit connectors 27. When the pressure of the steam exceeds the predetermined amount capable of being withheld by the diaphragm 16, the latter will break, thereby permitting of the escape of the steam into the lower portion of the cylinder bore 3. The entrance of the steam into the cylinder bore 3 will force or drive the piston 18 upwardly thereby closing the ports 28 and shutting off the fuel supply and consequently extinguishing the fire heating the steam generator B. As the throttle lever 24 is connected to the arm 21 by the chain 25, the upward movement of the arm 21 will cause the shifting of the lever 24 to the vertical position thereby closing the valve 17 and shutting off the passage of the steam therethrough.

The frictional engagement of the piston 18 in the cylinder bore 3 and the frictional engagement of the rod 19 in the stuffing box 20 is sufficient to maintain the piston 18 in the elevated position until the latter is depressed manually, and does not require the the pressure of steam to hold the piston 18 in the fuel closing position.

After a diaphragm 16 is blown out in the

manner above stated, a new diaphragm is inserted, and the piston 18 is depressed, and the throttle valve 17 is shifted to the open position, thereby placing the appliance in condition for subsequent operation.

In the use of my improved appliance, the excessive steam pressure will immediately extinguish the fire heating the steam boiler, thereby preventing liability of explosion. Further, no steam escapes in the operation of my improved appliance, thereby entirely eliminating annoyance, noise, inconvenience, and damage commonly caused by the escape of steam in the operation of an ordinary pop or safety valve.

What I claim is:

1. A safety appliance for a steam generator comprising an elongated body portion provided with a bore and adapted to be communicably mounted on the steam reservoir of the generator, said body portion provided with a pair of ports communicating with said bore and being adapted to communicate with the generator fuel supply conduit for passing the fuel through the bore of said body portion, a steam control valve carried by said body portion, a diaphragm constructed to withstand a predetermined amount of steam pressure mounted in said body portion and constituting a partition transversely dividing said bore, and means actuated by the passage of steam through said diaphragm for simultaneously closing said pair of ports to shut off said fuel and for closing said control valve to shut off the steam from said body portion.

2. A safety appliance for a steam generator comprising an elongated body portion provided with a bore and adapted to be communicably mounted on the steam reservoir of the generator, said body portion provided with a pair of ports communicating with said bore and being adapted to communicate with the generator fuel supply conduit for passing the fuel through the bore of said body portion, a steam control valve carried by said body portion, a diaphragm constructed to withstand a predetermined amount of steam pressure mounted in said body portion and constituting a partition transversely dividing said bore, a piston slidably mounted in said bore and actuated by the passage of steam through said diaphragm to close said pair of ports to shut off said fuel, and means operated by the movement of said piston for closing said control valve to shut off the steam from said body portion.

3. In combination, a safety appliance of the character described comprising an elongated body portion provided with a bore and adapted to be communicably mounted on the steam reservoir of a steam generator, said body portion provided with a pair of ports communicating with said bore and be-

ing adapted to communicate with the generator fuel supply conduit for passing the fuel through the bore of said body portion, said pair of ports disposed adjacent to the upper end of said body portion, a steam control valve connected to the lower end of said body portion, a diaphragm constructed to withstand a predetermined amount of steam pressure replaceably mounted in said body portion and constituting a partition transversely dividing said bore, a piston slidably mounted in said bore and disposed between said diaphragm and said pair of ports, a rod fixed to said piston and extending through the upper end of said body portion, a laterally disposed arm

having a bifurcated outer end fixed to the upper end of said rod, said control valve including an operating lever, a member connecting said lever with said arm and detachable from the latter, the passage of the steam through said diaphragm shifting said piston vertically in said bore closing said pair of ports to shut off said fuel and simultaneously therewith shifting said control valve to the closing position shutting off the steam from said body portion, substantially as described and for the purpose set forth.

In testimony whereof I affix my signature.

CHARLES A. HOWE.