M. J. KULLA.

SAFETY VALVE.

APPLICATION FILED JAN. 15, 1913.

1,072,334. Patented Sept. 2, 1913.

Fig. 1.

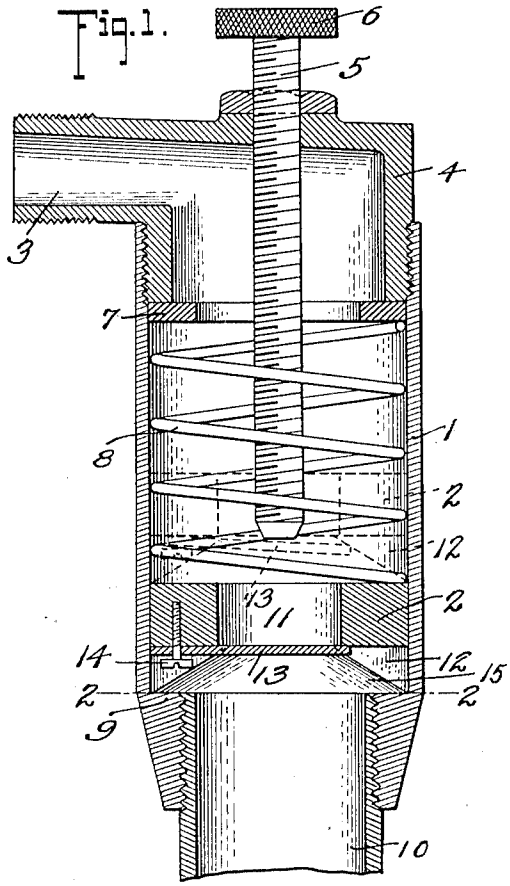


Fig. 2.

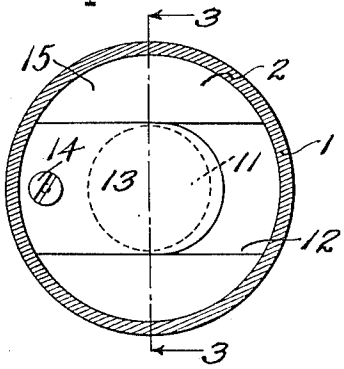
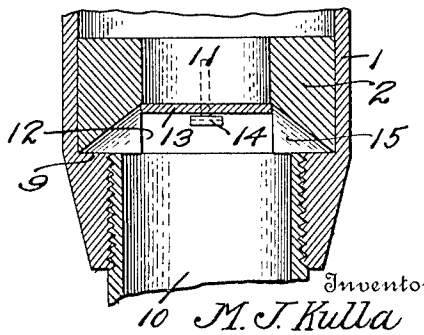


Fig. 3.



Witnesses

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SAFETY-VALVE.

1,072,334. Specification of Letters Patent. Patented Sept. 2, 1913.

Original application filed October 25, 1912, Serial No. 727,756. Divided and this application filed January 15, 1913. Serial No. 742,300.

To all whom it may concern:

Be it known that I, MICHAEL J. KULLA, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Safety-Valves, of which the following is a specification.

This invention relates to improvements in safety alves, and the object in view is the production of a device of this kind which is particularly characterized by its sensitiveness.

With this and further detail objects in view, as will hereinafter in part become apparent and in part be stated, the invention comprises a reciprocally mounted valve seat, a casing inclosing the valve seat, a pressure fluid supply for said casing, a check valve sustained by the valve seat and cooperating with said valve seat, and means in the path of the check valve adapted to interrupt progress thereof while permitting continued movement of the seat.

The invention comprises certain other novel constructions, combinations and arrangements of parts as will hereinafter appear and subsequently be specifically claimed.

In the accompanying drawing: Figure 1 is a longitudinal, vertical, central section through a structure embodying the features of the present invention. Fig. 2 is a transverse section taken on the plane indicated by line 2—2 of Fig. 1. Fig. 3 is a fragmentary vertical section taken on the plane indicated by line 3—3 of Fig. 2, the plane being substantially at right angles to the plane of the section seen in Fig. 1.

Referring to the drawing by numerals, 1 indicates a casing inclosing and slidingly sustaining a valve seat 2, the latter snugly fitting within the bore of the casing while reciprocally mounted therein and adapted to slide longitudinally of the casing. The valve seat 2 is ground or otherwise constructed to fit the walls of the bore of casing 1 sufficiently snugly to avoid leakage. An exhaust pipe 3 communicates with the upper portion of the casing 1 for delivering exhaust pressure fluid therefrom, and in the specific embodiment illustrated the exhaust pipe is formed integral with a cap 4 which is threaded into the upper end of the casing 1 for closing the same. A set screw 5 is threaded in the cap 4 and extends downwardly longitudinally of the casing 1 and is preferably disposed substantially centrally therein. The set screw 5 is provided with an operating head 6 which may be knurled or otherwise formed for facilitating manual manipulation. A washer 7 is arranged within the casing 1 in position for engaging the annular shoulder produced by the lower end of the cap 4, and a spiral spring 8 has its upper end resting against the washer 7, the lower end of said spring engaging the valve seat 2 and pressing it downwardly normally into engagement with a shoulder 9 formed of the material of the casing 1. The lower end of the casing is engaged by or threaded onto a pressure fluid pipe 10 which leads from a boiler or other supply of pressure fluid.

The valve seat 2 is formed with a preferably centrally disposed bore 11 and with a transverse notch or recess 12 crossing the bore, a check valve 13 being arranged within the notch 12 and adapted to find a seat therein against the material of the valve seat for closing the bore 11. A bolt or pin 14 loosely engages one end of the check valve 13 for allowing free movement thereof while retaining the valve against disconnection from its seat. The under face of the valve seat 2 is preferably concaved, as indicated at 15, and the area of the valve seat 2 exposed downwardly or toward the pipe 10 is greater than the area of the valve 13.

The set screw 5 is disposed in line with the central portion of the bore 11 so that the valve seat 2 may pass upwardly beyond the lower end of the screw and thus allow the valve 13 to come in contact with such lower end. In operation, when the pressure becomes sufficiently great to move the valve seat 2 to this extent against the pressure of the spring 8, the upward movement of the valve seat will be stopped by such contact until the contained pressure becomes sufficiently high to further overcome the pressure of the spring 8, and to move the valve seat against the resistance of the pressure on the check valve. When this occurs the excess area of exposed surface of the valve seat will cause the valve seat to travel on upwardly while the check valve remains stationary, being retained against movement by its contact against the end of the set screw 5 whereby the bore 11 of the valve seat will be exposed and the pressure fluid permitted to escape and thus to be discharged out

through the pipe 3, this discharge continuing until the pressure is reduced sufficiently for the valve seat to recover its normal position by being thrown downwardly by the spring 8. It is obvious, of course, that in lieu of the use of the spring 8 the valve seat 2 may be formed of greater weight, but I find in practice that the employment of the spring adds to the resiliency and effective quick action of the parts.

It is of course obvious that the set screw is adapted to be adjusted longitudinally for altering the point at which exhaust will occur so that the pressure within the container with which the improved safety valve is connected may be effectively regulated. That is to say, when the set screw is adjusted inwardly, toward the valve 13, the reduction in travel of valve 13 necessary to cause the valve to contact with the inner end of the set screw incident to such adjustment will be accompanied by a proportionally less resistance of spring 8, and the valve 13 may thus be opened by a further movement of seat 2 under less contained pressure than would be required had the valve 13 been moved a greater distance incident to outward adjustment of the set screw 5 as such additional outward travel of valve 13 would be accompanied by a proportional increase in the resistance of spring 8 so that with each longitudinal adjustment of set screw 5 the degree of contained pressure requisite for opening valve 13 will be proportionally varied.

This application is a division of my application for patent for improvements in valve mechanisms, filed October 25th, 1912 and designated by Serial Number 727,756, the subject-matter herein claimed relating to the safety valve as the subject-matter divided from said application.

Having thus described the invention, what is claimed as new is:

1. In a safety valve, the combination, with a casing, of a valve seat reciprocally mounted therein and adapted to be moved longitudinally of the casing by fluid under pressure, a spring arranged in the casing and engaging the valve seat and pressing the same in a direction opposing movement under pressure fluid, the valve seat being formed with an aperture and with a transverse notch crossing the aperture, a check valve connected to the valve seat within the notch and adapted at times to close the aperture, and a set screw sustained by the casing and extending in line with the aperture and in position for engaging the check valve for interrupting movement thereof with the valve seat while leaving the valve seat free for further movement under the influence of fluid under pressure.

2. In a safety valve, the combination, with a casing, of a valve seat reciprocally mounted therein and adapted to be moved longitudinally of the casing by fluid under pressure, a spring arranged in the casing and engaging the valve seat and pressing the same in a direction opposing movement under pressure fluid, the valve seat being formed with an aperture and with a transverse notch crossing the aperture, a check valve connected to the valve seat within the notch and adapted at times to close the aperture, and a set screw sustained by the casing and extending in line with the aperture and in position for engaging the check valve for interrupting movement thereof with the valve seat while leaving the valve seat free for further movement under the influence of fluid under pressure, the set screw extending through and beyond the casing and being formed with means for effecting manual adjustment thereof for varying the degree of pressure requisite for shifting the check valve from its seat.

In testimony whereof I affix my signature in presence of two witnesses.

MICHAEL J. KULLA.

Witnesses:
H. Z. BLENKHORN,
JOHN POLLARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."