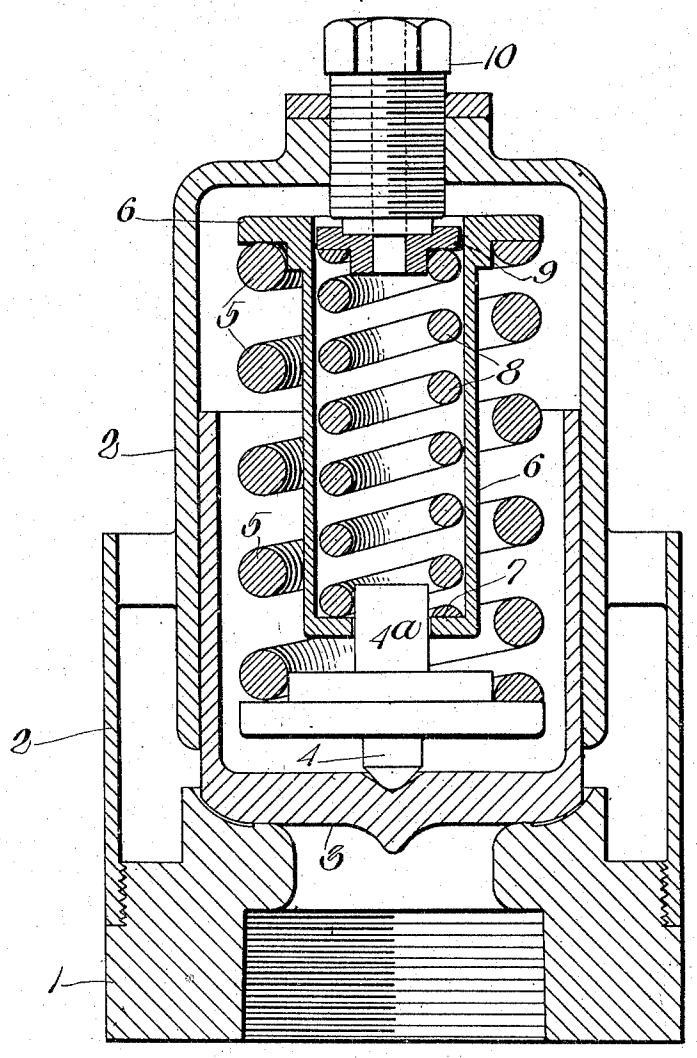
G. H. CLARK.

SPRING.

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1,308,165. Patented July 1, 1919.



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UNITED STATES PATENT OFFICE.

GEORGE H. CLARK, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO CROSBY STEAM GAGE & VALVE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SPRING.

1,308,165. Specification of Letters Patent. **Patented July 1, 1919.**

Application filed August 15, 1916. Serial No. 115,070.

To all whom it may concern:

Be it known that I, GEORGE H. CLARK, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Springs, of which the following is a specification.

This invention relates to that form of safety valve in which the valve disk is held to its seat by a spiral spring confined between the top of the valve disk and an abutment therefor in the valve casing.

Heretofore it has been the custom to confine the spring, so employed, between the valve disk and a fixed member (head bolt) of the valve structure, thereby permitting the compression of the spring, but no bodily movement thereof, the result being that the free or movable lower end of the spring so confined, when the spring is being compressed, has a certain limited range of movement and the valve disk controlled thereby is similarly limited in its movement.

To increase this range of movement of the lower end of the spring and of the valve disk controlled thereby, which is the object of this invention, I release the upper end of the spring from its engagement with the fixed member (head bolt) and dispose within the spring a second spring of the same character in such manner as to secure for the outer spring a bodily movement simultaneous with and in the same direction as its movement by compression.

The invention is illustrated by the accompanying drawing which is a vertical, central, sectional view of a safety valve comprising in combination the valve base 1 threaded for attachment to a boiler, valve casing 2 secured to said base, valve disk 3 seated on the base, pintle member 4 engaging the valve disk and supporting the spring 5, the upper end of which spring supports the spring chamber 6 suspended therefrom and disposed within the coils of said spring, said spring chamber 6 being open at the top and being furnished at the bottom with an annular flange 7, through and in loose engagement with which projects the upper extension 4^a of the pintle member 4. Within the spring chamber 6 is disposed the spring 8 with its lower end resting on the annular flange 7 and its upper end engaging the cap 9 surmounted by the adjustable head bolt 10 in threaded engagement with the casing 2.

With this arrangement of the springs any force compressing either spring compresses the other and, as shown in the drawing, the head bolt 10 has been screwed down into the casing 2, thereby compressing spring 8, lowering spring chamber 6 and compressing spring 5, resulting in a pressure upon the valve disk of say 200 lbs. to the square inch; and any pressure greater than this below the valve disk will raise said disk, thereby still further compressing spring 5, raising the spring chamber 6 and compressing spring 8, the raising of the spring chamber 6 permitting spring 5 to rise bodily, thus increasing the distance the valve disk 3 rises from its seat and thereby the extent to which the valve opens.

When a safety valve is equipped with a compound spring of the character described, the required lift of the valve disk may be obtained with a valve casing of considerably less height and correspondingly less cost than would be otherwise required.

I claim:

In a safety valve of the character described, in combination, a valve casing; a valve disk seated therein; a helical spring surmounting the valve disk; a chamber open at the top, suspended from the upper end of said spring and extending downwardly encircled by the coils of said spring; and a second helical spring disposed in said chamber and confined between the bottom thereof and an abutment in the casing, all so arranged that, when the valve disk rises from its seat, compression of the outer spring raises said chamber thereby compressing the inner spring.

In testimony whereof I have affixed my signature.

GEORGE H. CLARK.

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