(No Model.)

G. H. CROSBY.

SAFETY VALVE.

No. 306,385. Patented Oct. 14, 1884.

Fig. 1.

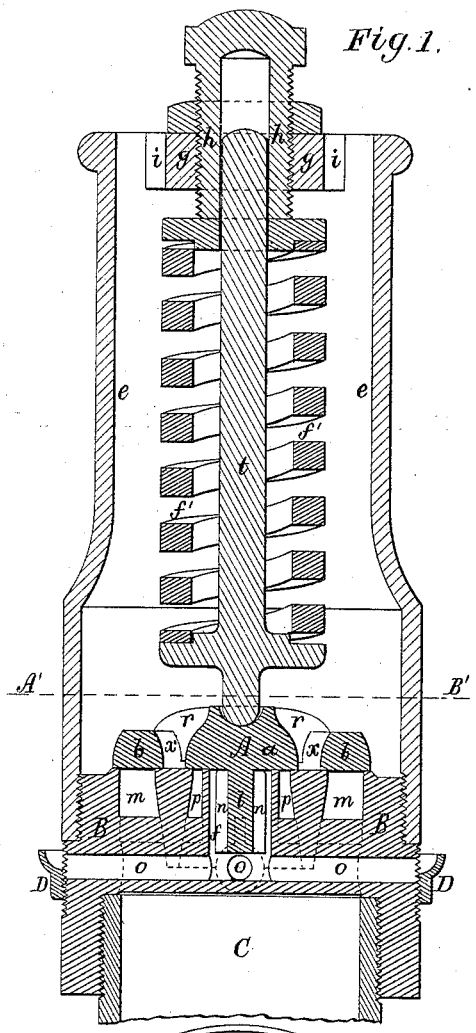


Fig. 3.

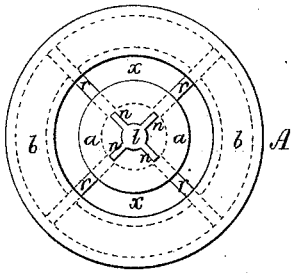


Fig. 2.

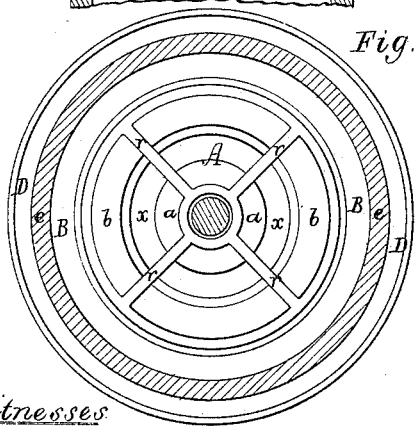
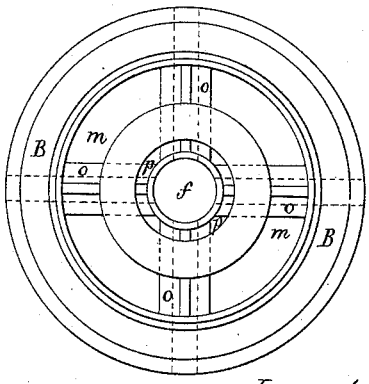


Fig. 4.



Witnesses
S. N. Piper
E. B. Pratt

Inventor.
Geo. Hannibal Crosby.
by R. N. Eddy atty.

UNITED STATES PATENT OFFICE.

GEORGE HANNIBAL CROSBY, OF SOMERVILLE, MASSACHUSETTS.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 306,385, dated October 14, 1884.

Application filed May 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HANNIBAL CROSBY, of Somerville, in the county of Middlesex, of the Commonwealth of Massachusetts, have invented a new and useful Improvement in Safety-Valves for Steam-Boilers; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a vertical section of a safety-valve provided with my invention, the nature of which is defined in the claim hereinafter presented. Fig. 2 is a horizontal section on line A′ B′ of Fig. 1. Fig. 3 is an under side or bottom view of the valve. Fig. 4 is a top view of the valve-seat base.

In such drawings, A denotes the valve, which is a compound one, it being composed of a disk or central part, *a*, and a surrounding annulus, *b*, connected by radial arms *r*, there being a space or opening, *x*, between the said parts *a* and *b*, and concentric therewith. The valve has extended from it or from its central part, *a*, a guide-stem, *l*, having radial wings *n*, to bear against the periphery of the central passage, *f*, of the seat-base B, in order to guide the valve in its vertical movements. The valve-spindle *t*, pivoted to the valve, is provided, as usual, with the spring *f′*, for forcing it downward, and there is around such spring a case, *e*, that projects upward from the base B, and is open at top, except in there being provided with a stationary nut, *g*, through which a screw, *h*, for contracting the spring *f′*, passes and engages. The nut is held in place by a series of arms, *i*, projecting from it to the case *e*, all of which is common to various safety-valves in use. The valve-seat base B has in it a series of four passages, *o*, radiating from the lower part of the central passage, *f*, and besides such central passage there is underneath the valve portion *a* an annular passage, *p*, going down through the base, and there is also underneath the valve portion *b* an annular passage, *m*, which also goes down through the base, such passages *m* and *p* being open at their lower ends to allow steam from the boiler, or a pipe, C, leading therefrom, to pass upward into and through the said passages and to the valve. An annular gate, D, on the base, by being screwed upward thereon, serves to cover, or more or less uncover, the outer ends of the passages *o*, in order to regulate the escape of steam therefrom. The valve virtually rests on four annular seats concentric with each other, there being two of them directly underneath the ring portion *b* of such valve. Such valve will be held down upon its seats by the spring *f′*, the tension of which may be increased by screwing down the screw *h*. The valve areas between the seats are what the steam-pressure ordinarily acts on to overcome the resistance of the spring. The areas directly covering the seats will not be acted on by the steam until the valve may have risen from the seats. When the pressure under the valve is nearly to the degree required, the valve will open or rise slightly, and the steam will escape across the seats, part of it going upward through and around the valve, and the rest passing down the central passage of the base B, and into and through the radial passages *o*, from whence it will be deflected upward by the ring D. On the valve rising, the extra surface of it exposed to the steam will cause the power to force the valve upward to be suddenly increased, in order to overcome the increasing resistance of the spring as such spring may be contracted. This sudden increase of power on the valve will quickly force it upward against the said increasing power of the spring, and thus rapidly relieve the boiler of steam, the valve subsequently slowly settling back upon its seats.

By raising the gate D, so as to diminish the escape of steam through the central passage, *f*, and the passages *o*, leading therefrom, the pressure on the valve may be diminished, from which it will be seen that by such gate the said pressure may be varied or diminished more or less, as occasion may require.

I do not herein claim a single disk-valve provided with a guide, in combination with a valve-seat base having a central passage to receive the guide, and also having passages radiating from such passage to the periphery of the base, and provided with an adjustable annular gate, and having between the valve-seats a passage concentric with the central passage, and to lead steam to the valve, such being shown in an application for a patent recently made by me, and numbered 117,694.

I have combined therewith the additional annulus *b* and the annular passage *m*, arranged in the valve and seat-base in manner as represented, such rendering the safety-valve more efficient in operation, and better in several respects.

I therefore claim—

The valve A, provided with central guide, the disk portion *a*, and the concentric ring *b*, arranged and connected essentially as described, in combination with the valve-seat base B, having the central and radial passages, *f* and *o*, and gate D, and also the two steam-passages *m* and *p*, concentric with the said central passage, and arranged beneath the valve, all being substantially as specified and represented.

GEORGE HANNIBAL CROSBY.

Witnesses:
R. H. EDDY,
E. B. PRATT.