# G. F. Morse
## Safety Valve.

No. 94,703. Patented Sept. 14, 1869.

Fig. 5.

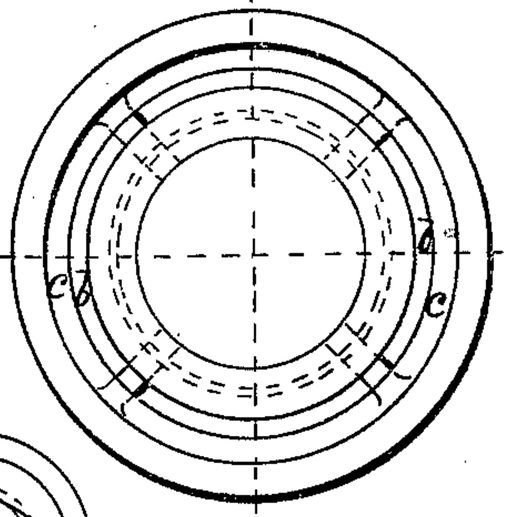



Fig. 3.

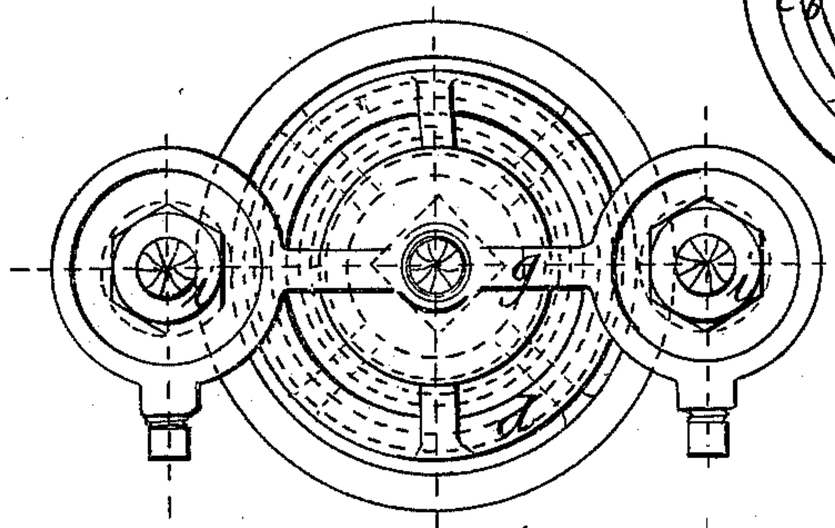



Fig. 6.

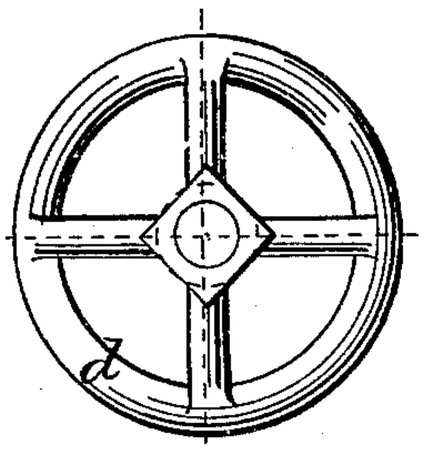



Fig. 1

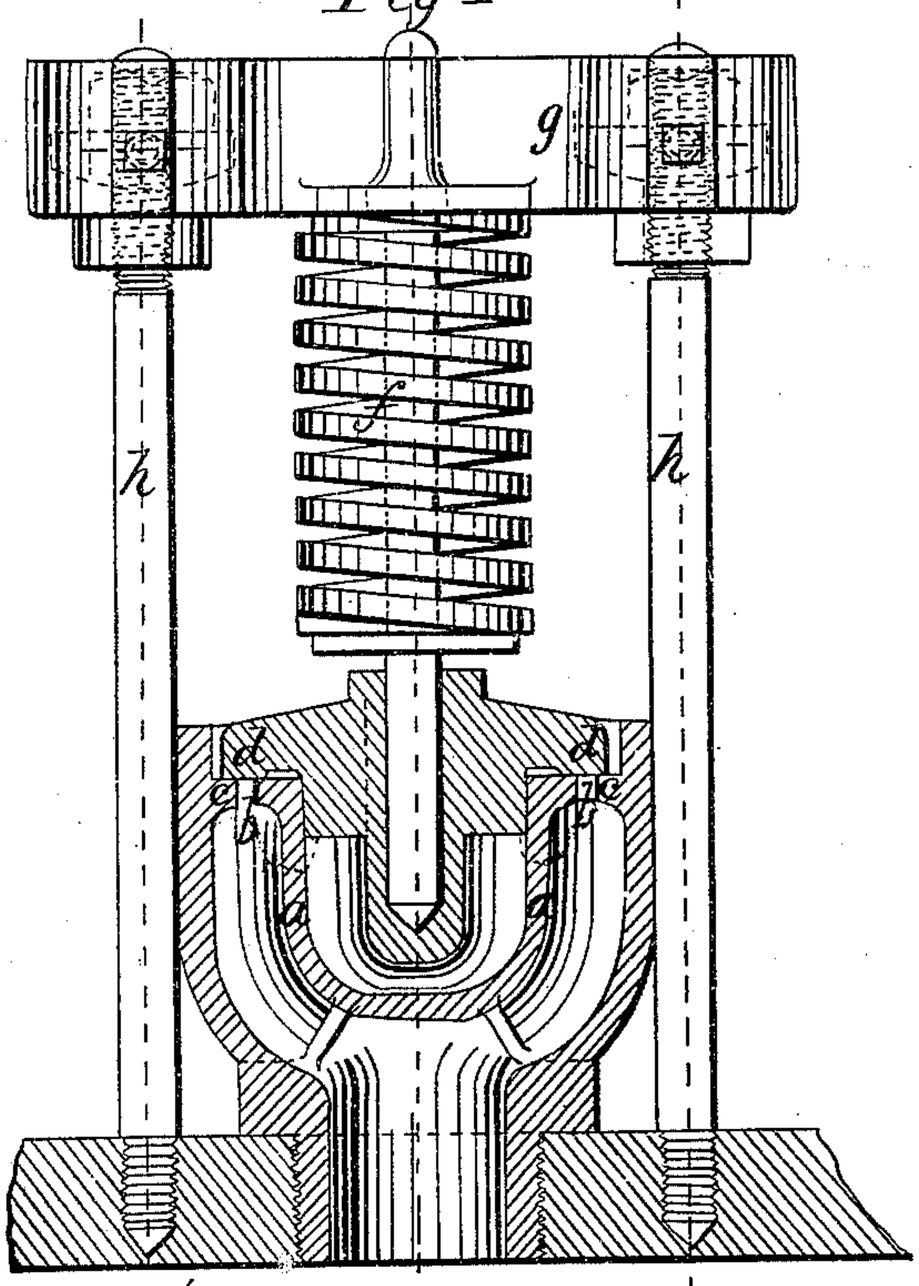



Fig. 4.

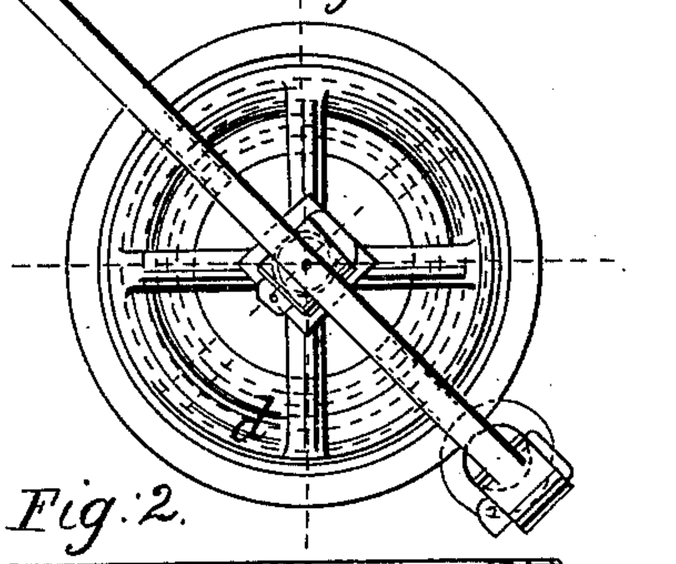
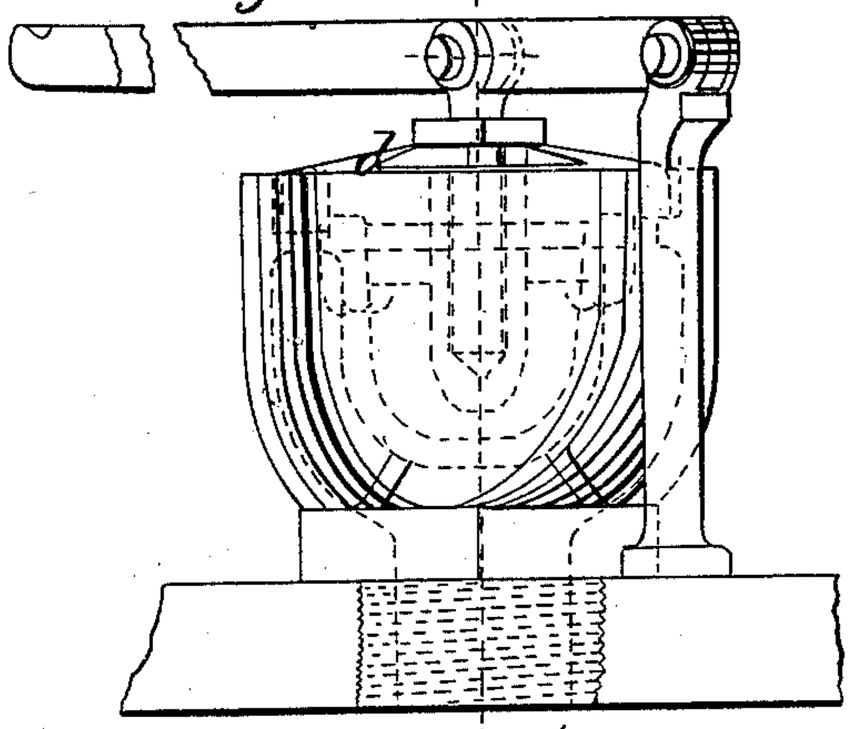



Fig. 2.




Witnesses:
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# UNITED STATES PATENT OFFICE.

GEORGE F. MORSE, OF PORTLAND, MAINE.

## IMPROVEMENT IN STEAM SAFETY-VALVES.

Specification forming part of Letters Patent No. **94,763,** dated September 14, 1869.

*To all whom it may concern:*

Be it known that I, GEO. F. MORSE, of Portland, in the county of Cumberland and State of Maine, have invented a new and useful Annular Safety Valve and Guard; and I hereby declare the following to be a full, clear, and exact description thereof, which will enable others to make and use my invention, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side sectional elevation of the valve and a side elevation of the guard, &c.; Fig. 2, a perspective view of the valve when an arm and weight are used instead of spring. Fig. 3 is a top plan of Fig. 1; Fig. 4, the same of Fig. 2. Fig. 5 is a top view of the annular opening; Fig. 6, the same of the valve.

The purpose of my invention is to provide a safety-valve which requires a less weight or a less rigid spring to sustain the necessary pressure.

It also has for its object so to construct the guard of the valve as to render it in effect a lock-valve.

In the ordinary safety-valves the opening for the escape of the steam is according to the distance the valve is raised from its seat multiplied by the circumference of the opening; yet the valve receives a pressure equal to the whole area of the opening, thus requiring heavy weights or very stiff springs to be used to keep the valve closed against the requisite pressure. By the annular opening and annular valve much the larger part of this pressure is relieved from the valve, because the central portion of the common opening is filled by a casting which is united to and forms a part of the valve-seat, being made of such size as to leave an annular opening as large as the maximum opening for escape ever required from the valve. *a* shows this casting. This relief from pressure enables the annular safety-valve to be used with a much lighter weight or a much more sensitive spring than the ordinary valve, with the same amount of opening for escape.

*b* shows the annular opening; *c*, the valve-seat; *d*, the valve. The annular valve also gives nearly double the opening for the escape with the same amount of lift that the ordinary valve does, as the steam can issue from the inner as well as the outer edge of the ring. (See Figs. 4 and 6.) For this reason the annular valve is of great value as a pump-valve, or any other valve requiring a large opening and a small amount of lift. Fig. 1 shows the valve held by a spring *f*.

*g* is the guard, and *h h* rods holding and supporting the same. The rods are fitted with guarded nuts *i*, and these nuts also are for adjusting the guard *g*. These nuts are let into sockets to such depths that an ordinary wrench cannot turn them, and are also made of such form that it is necessary to construct a wrench especially to operate them. This wrench being in the possession of the master mechanic or chief-engineer alone for the purpose of adjusting the bar or guard *g* makes the valve practically a lock-valve, as the pressure exerted by the spring *f* can then only be regulated by him.

This annular valve can be used with any of the ordinary applications for locking safety-valves. The construction is clearly indicated in Fig. 1.

What I claim as my invention, and desire to secure by Letters Patent, is—

The annular safety-valve *d*, with annular opening *b* for steam escape, constructed as herein described.

GEO. F. MORSE.

Witnesses:

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