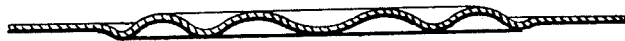


E. H. ASHCROFT.  
Steam Pressure Gage.

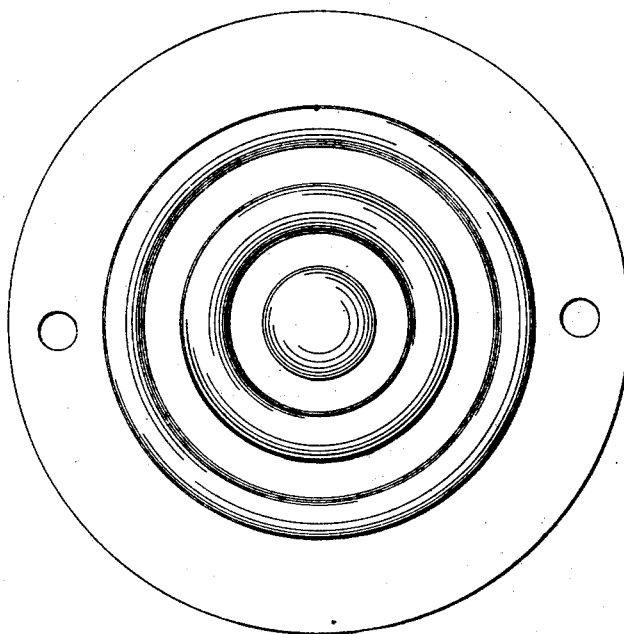
No. 45,685.

Patented Jan. 3, 1865.

*Fig: 2.*



*Fig: 1.*



*Witnesses:*

*W. B. Crosby*  
*F. Gould.*

*Inventor.*

*E. H. Ashcroft.*

# UNITED STATES PATENT OFFICE.

EDWARD H. ASHCROFT, OF LYNN, MASSACHUSETTS.

## STEAM-PRESSURE GAGE.

Specification forming part of Letters Patent No. **45,685**, dated January 3, 1865.

*To all whom it may concern:*

Be it known that I, EDWARD H. ASHCROFT, of Lynn, in the county of Essex and State of Massachusetts, have invented an Improved Corrugated Disk-Spring; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My invention relates to the construction of disk or plate springs, such as are used in certain well-known steam gages. These springs are formed in a lathe by chucking a metallic disk, generally of sheet brass, against the face of a chuck-plate having concentric undulations on its face, to the surface of which the disk, as it rotates, is bent by pressure of a burnishing-tool, having not only an advance or advance-and-retreat movement, but a lateral or radial movement, so as to cause the rear face of the rotating disk to conform to the face of the chuck-plate by the pressure and radial movement of the tool. The action of the tool not only produces this change of form, but hardens and solidifies the face against which it operates, so as to give a temper to the spring. This operation, however, hardens only one face of the disk; and my invention consists in a corrugated disk-spring having both faces hardened or tempered.

Figure 1 is a representation of one of these springs, and Fig. 2 a central cross-section of the same.

The operation of producing the improved spring is as follows: The metallic plate from

which the spring is to be formed having been chucked in the lathe on a chuck-plate, the face of which is corrugated radially in the form desired for the spring, longitudinal and lateral movement is then imparted to the burnishing-tool, producing the concentric concavities and convexities in the disk, conforming to the concavities and convexities in the face of the chuck-plate, the action of the tool in effecting this change of form and this and subsequent pressure of the tool producing the desired hardening or tempering of the disk-surface. After one face of the disk is thus finished the disk is removed from the chuck-plate, and another chuck-plate having been substituted for the one first used, the face of which corresponds to the hardened face produced on the disk, the disk is again bolted to this chuck-plate, with the other face presented for the operation of the burnishing-tool, such operation hardening and tempering this face similarly to the other.

It will be readily understood that the spring, thus finished, by the application of the hardening process to both faces increases the integrity of the spring, rendering it much more serviceable than the spring tempered upon only one face.

I claim—

A corrugated disk-spring hardened or tempered, substantially as set forth.

In witness whereof I have hereunto set my hand this 6th day of October, A. D. 1864.

E. H. ASHCROFT.

Witnesses:

J. B. CROSBY,  
F. GOULD.