

H. BELFIELD.

Improvement in Steam-Gauge Cases.

No. 131,651.

Patented Sep. 24, 1872.

Fig. 1.

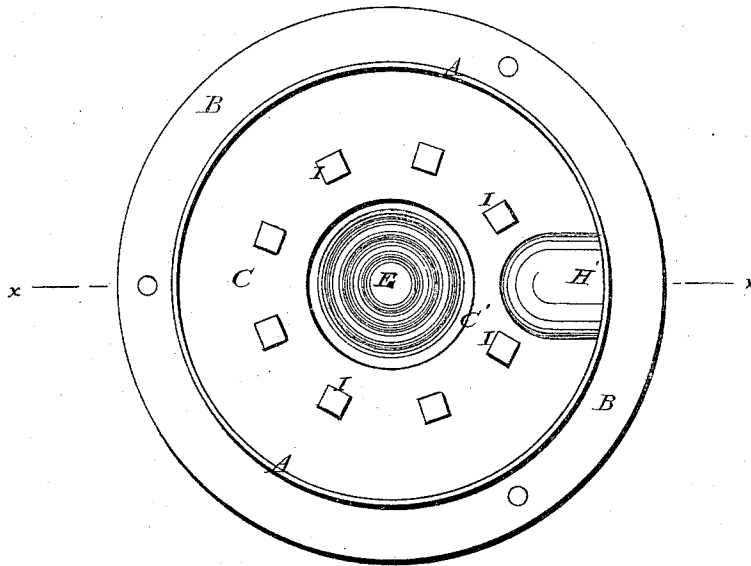
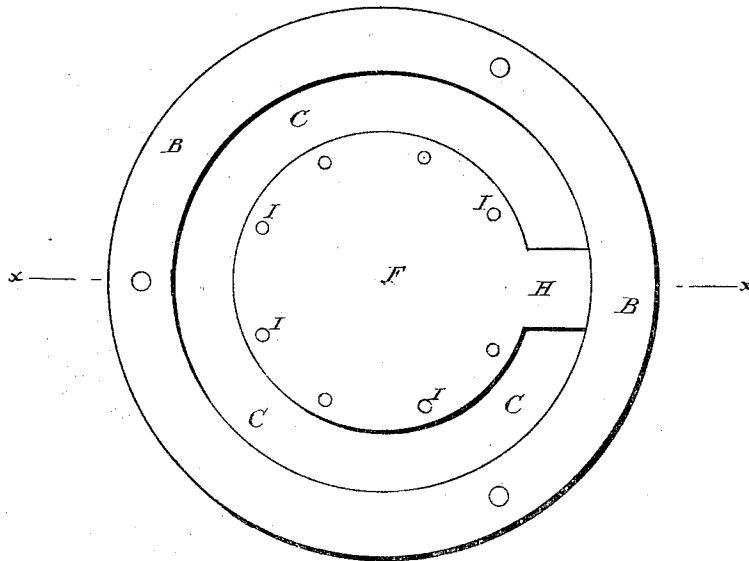


Fig. 2.



Witnesses

E. H. Poole
John B. Young

Inventor,

Henry Belfield by
Chandler and Co. his
attys.

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Fig. 3.

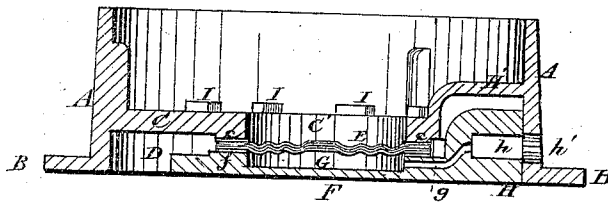


Fig. 4.

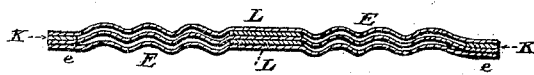


Fig. 6.

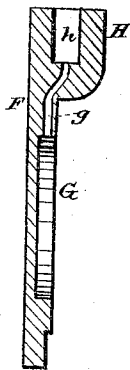
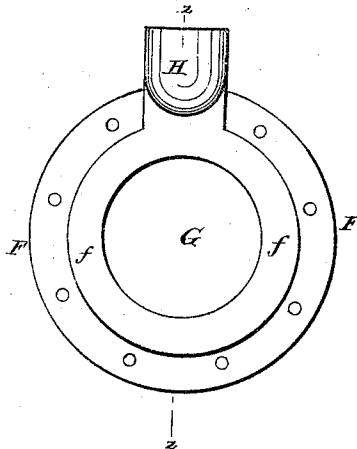


Fig. 5.



Witnesses.

W. H. Poole.
John R. Young

Inventor

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UNITED STATES PATENT OFFICE.

HENRY BELFIELD, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM-GAGE CASES.

Specification forming part of Letters Patent No. 131,651, dated September 24, 1872.

To all whom it may concern:

Be it known that I, HENRY BELFIELD, of Philadelphia, in the county of Philadelphia and in the State of Pennsylvania, have invented certain new and useful Improvements in Steam-Gages; and do hereby declare that the following is a full, clear, and exact description thereof, references being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a plan view of the front side of the casing with the dial and recording mechanism removed; Fig. 2 is a like view of the rear side of said casing; Fig. 3 is a central cross-section of the same on lines *xx* of Figs. 1 and 2; Fig. 4 is an enlarged central section of the corrugated diaphragms; Fig. 5 is a plan view of the inner side of the back plate; and Fig. 6 is a central section of the same on the line *zz* of Fig. 5.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement in a class of steam-gages in which the pressure of steam is transmitted to the recording mechanism through or by means of one or more corrugated metallic diaphragms; and it consists in the combination of the open recessed back of the casing, the recessed back plate, and the corrugated diaphragm, substantially as and for the purpose hereinafter specified.

In the annexed drawing, A represents the exterior wall of the casing, made open at its front side and provided at its rear side with a flange, B, which extends radially outward and affords means whereby the device may be secured to or upon a suitable supporting surface. The back C of the casing is set sufficiently forward from the rear edge of the same to form a recess, D, while through the center of said back is provided a circular opening, C', which corresponds in diameter with the corrugated portion of the metallic diaphragms E. Upon the rear side of said back, and surrounding said opening, is provided a raised concentric bearing, *c*, upon which the plane edges *e* of said diaphragms rest when the same are in position. Fitted to or within the recess D is a circular disk or plate, F, which has a diameter equal to or about two-thirds the diameter of said recess, and is provided with a raised concentric bearing, *f*, that corresponds in dimen-

sions to or with the bearing *c*. The plate F within the bearing *f* is sunk somewhat below the outer portion of said plate so as to form a recess, G, which communicates laterally, by means of a duct, *g*, with a hollow boss, H, that is attached to the lower edge and inner side of said plate. As the boss H is entirely within the line of the rear side of the plate F, provision for its reception is made by forming a corresponding recess, H', within the contiguous portion of the back C, while an opening, *h*', passing outward through the casing A, and coinciding with the opening *h*, which passes through said boss, permits access to be had thereto when the said plate is in position. A series of bolts, I, passing through the back C into the plate F, outside of the bearing *f*, connect the latter to or with the casing and insure their relative positions. The casing is now ready for the diaphragms E, which are placed over the opening C', with their plane edges *e* between the bearings *c* and *f*, in which position they are firmly secured by the inward pressure of the bolts I, and form a steam-chamber of the recess G, except where outward communication is had through the passage *g* and opening *h*, which openings, by means of a pipe attached to the boss H and connected with the boiler, afford ready access for steam into said chamber. It will seen that the only points at which steam could escape from the chamber G are between the diaphragm E and bearing *f*, and at the joint between the steam-pipe and the boss H, and as both of said joints are entirely outside of the main portion of the casing, and separated therefrom by the joint between the diaphragm and bearing *c*, it is entirely impracticable that any steam or water should pass into said casing to injure the operating mechanism or obscure the covering glass, as is common in gages of this class.

While possessing the advantages enumerated, the usual circular form of the casing is preserved and all separate and independent boxes or casings for the diaphragms rendered unnecessary.

Much difficulty is usually experienced in combining two or more diaphragms so as to cause them to act with uniformity upon the recording mechanism and to permit the dial to be equally spaced, as from their peculiar shape and the manner of constructing them

perfect uniformity cannot be secured and their contiguous surfaces made to bear with equal pressure at all points. To remedy this defect, I place between the bearing-flanges *e*, of the diaphragms, a concentric ring of sheet metal, *K*, so as to separate the corrugated portions of said diaphragms and allow them to act with freedom, and between their centers I place small metal plates *L*, which have a sufficient thickness to produce a slight outward strain upon said parts and to cause them to remain in contact. As thus arranged, it will be seen that outward pressure upon the rear diaphragm will be instantly communicated through its central portion to those in front, and through the latter to the operating-lever, and that as said parts are always in contact at their centers while the remainder of each is free to act independently of the others, the outward motion of the combined diaphragms must correspond in degree with the pressure of the steam. In some instances it will be found that the natural set of the diaphragms will afford just

the required clearance of their corrugated portions or the necessary bearing of their centers, in which event the ring *K* or disk *L* may be omitted, but by their judicious employment the tension of the combined diaphragms can be made as uniform and regular as though but one of the latter was used.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

The casing *A*, provided with the open recessed back *C*, the corrugated diaphragm *E*, and the back plate *F*, provided with the recess *G* and hollow boss *H*, when said parts are constructed and combined, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of February, 1872.

HENRY BELFIELD.

Witnesses:

W. C. BUCHANAN,
THOS. S. STOUT.