

J.B.Eads & H.Fladd.

PATENTED JUL 25 1871

Pressure Gauge.

117394

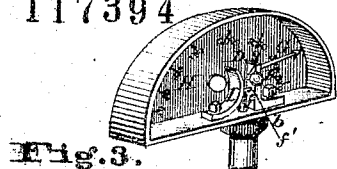


Fig. 3.

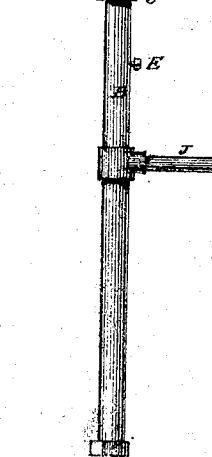
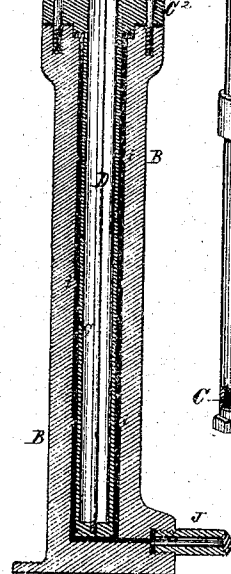
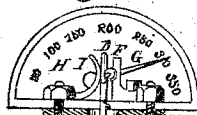


Fig. 1.

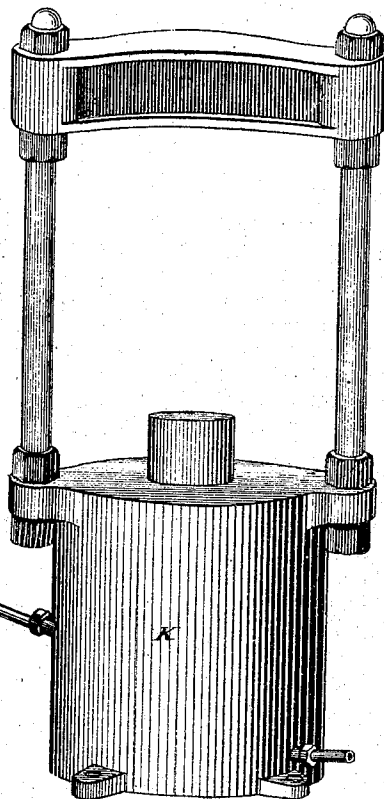
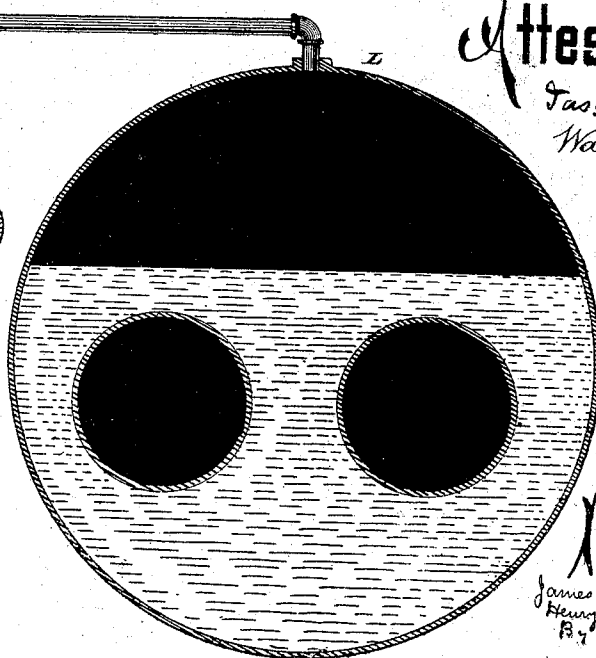


Fig. 2.



Attest.

Gas L. Swin
Walter Allen

Inventors.

James B. Eads
Henry Fladd
By Wright & Bond
Attys.

UNITED STATES PATENT OFFICE.

JAMES B. EADS AND HENRY FLAD, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN PRESSURE-GAUGES.

Specification forming part of Letters Patent No. 117,394, dated July 25, 1871.

To all whom it may concern:

Be it known that we, JAMES B. EADS and HENRY FLAD, both of the city and county of St. Louis and State of Missouri, have invented a certain new and useful Pressure-Gauge, of which the following is a specification:

Our invention consists in a gauge in which the pressure is applied so as to stretch or contract, within the limits of its elasticity, a metallic rod or tube, to indicate, by connection therewith of a suitable index, the degree of pressure.

In carrying out our invention we have succeeded satisfactorily with the pressure applied to either increase or diminish the length of the resistant rod or tube. The principle, now first applied to pressure-gauges, is that the elongation or contraction of a metallic rod by pressure is always in proportion to the amount of pressure within the limits of the elasticity of the metal. For instance, if a pressure of one hundred pounds causes an elongation of one-hundredth ($\frac{1}{100}$) of an inch a pressure of one thousand pounds will cause an elongation of one-tenth ($\frac{1}{10}$) of an inch, and ten thousand pounds of one (1) inch.

Figure 1 is a perspective view of our gauge applied to a hydraulic ram. Fig. 2 shows the gauge in elevation applied to a steam-boiler, shown in transverse section. Fig. 3 is an axial section of a modified form.

A is the foot-plug of a heavy metallic cylinder, B, smoothly bored out at the upper end to receive a tightly-packed piston, *c*, upon a tension-rod, C, screwed fast into the foot-block A, the cylinder being broken away at bottom and near the top to show the connection of rod C and the piston. From the upper side of the piston extends a rod, D, which passes up through the head *b* of the tube. E is a shifting-screw to allow the escape of air from beneath the piston if desired. F is a standard attached to the top of the cylinder or tube B. The vertical face of the standard is concave in transverse section, its edges projecting beyond its central part and forming the track of the shaft or roller *g* of the indicator-finger G, whose point travels before the vertical scale-plate H. The roller or shaft of the finger is interposed between the standard F and the rod D, and as the rod D is raised by the pressure beneath the piston the roller *g* is turned and carried up the face *f* of the standard, and the point of the index-finger carried around before the graduated arc of the scale-plate. The rod D is pressed against the index-roller by a spring, I, so as to make the

action of the rod upon the roller certain. *f'* are two studs serving as a zero rest, in a horizontal position, of the roller *g*. J is a pipe communicating with the interior of the cylinder B and of the hydraulic ram K, so that the water or other liquid in the cylinder B is always at the same pressure as that in the ram. In Fig. 2 the pipe J has a chamber, *j*, containing liquid to receive upon its surface the pressure of steam from the boiler L.

In the application of our invention to practical use we have arranged the apparatus in various ways, in some of which the pressure acted as a compressor, as in the modification shown in Fig. 3, in which the cylinder B is closed at the top by the head C² of a cylinder C, packing being applied beneath the head to render the connection perfectly tight. The cylinder or tube C is open at the top for the passage of the rod D, whose lower end is attached to the lower end of the cylinder C. *i* are small teats upon the inner side of the cylinder B to prevent the bending of the cylinder C under pressure. In this form of gauge the pressure acts against the bottom of the cylinder C to shorten the same, the rod D acting upon the indicator in the same manner as shown in the other figures. In another modification the piston has been attached to the lower end of the tube C, the pressure acting beneath the piston to shorten the tube, the piston working in a separate cylinder, forming an extension of the cylinder B, and the air being admitted into the latter around the tube C and above the piston. In another modification the liquid under pressure is admitted into a tube, which is lengthened as the pressure increases, and whose elongation is indicated by a rod attached to the moving end of the tube and operating an index-finger or equivalent device.

We claim—

1. The provision in a pressure-gauge of a rod or tube C, operating substantially as and for the purpose set forth.

2. In connection with the rod or tube C, the rod D, finger G *g*, guide or track F, and spring I, substantially as and for the purpose set forth.

In testimony of which invention we have hereunto set our hands.

JAS. B. EADS.
HENRY FLAD.

Witnesses:

SAML. KNIGHT,
GEO. C. FABIAN.