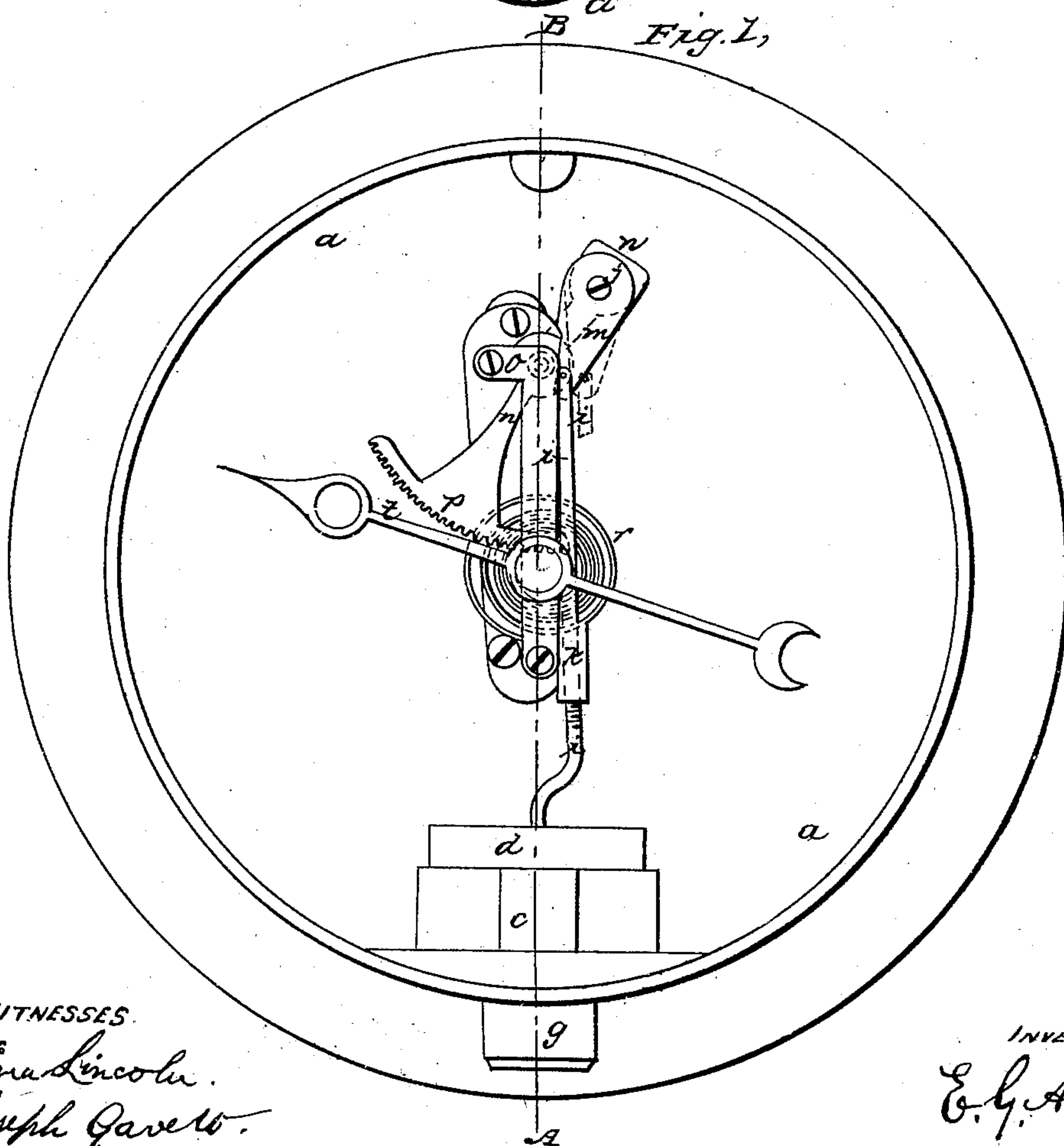
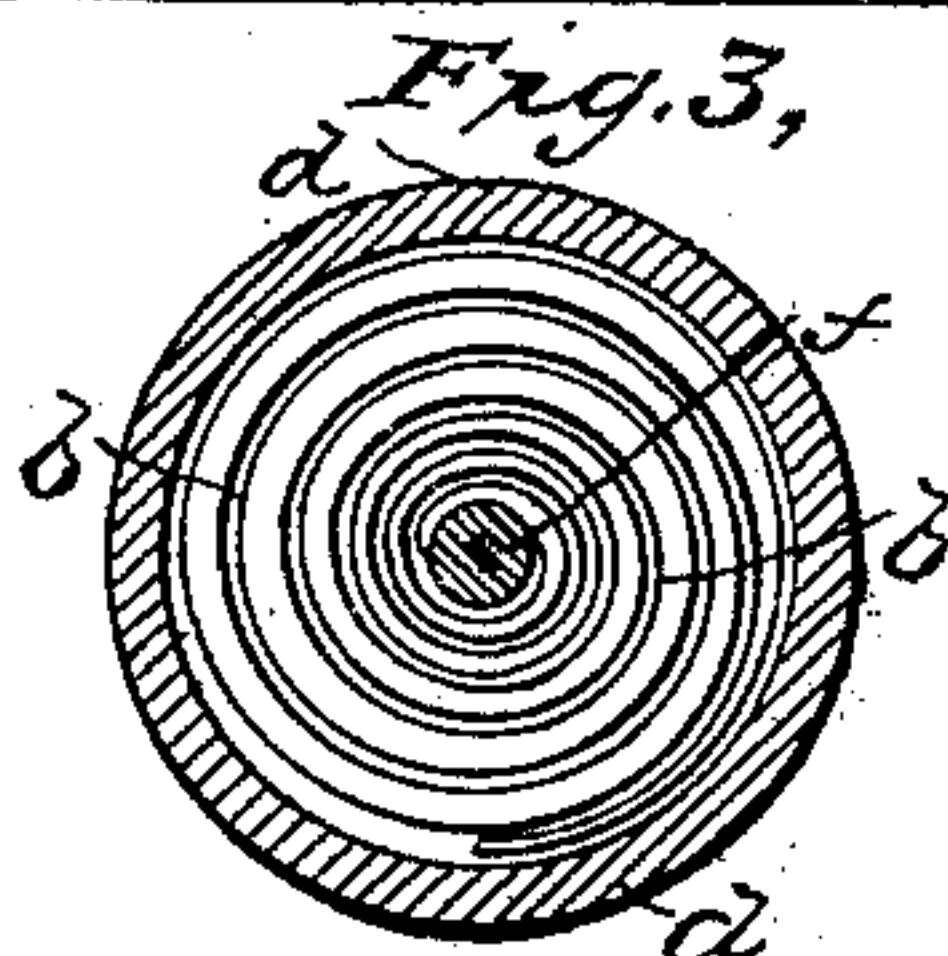
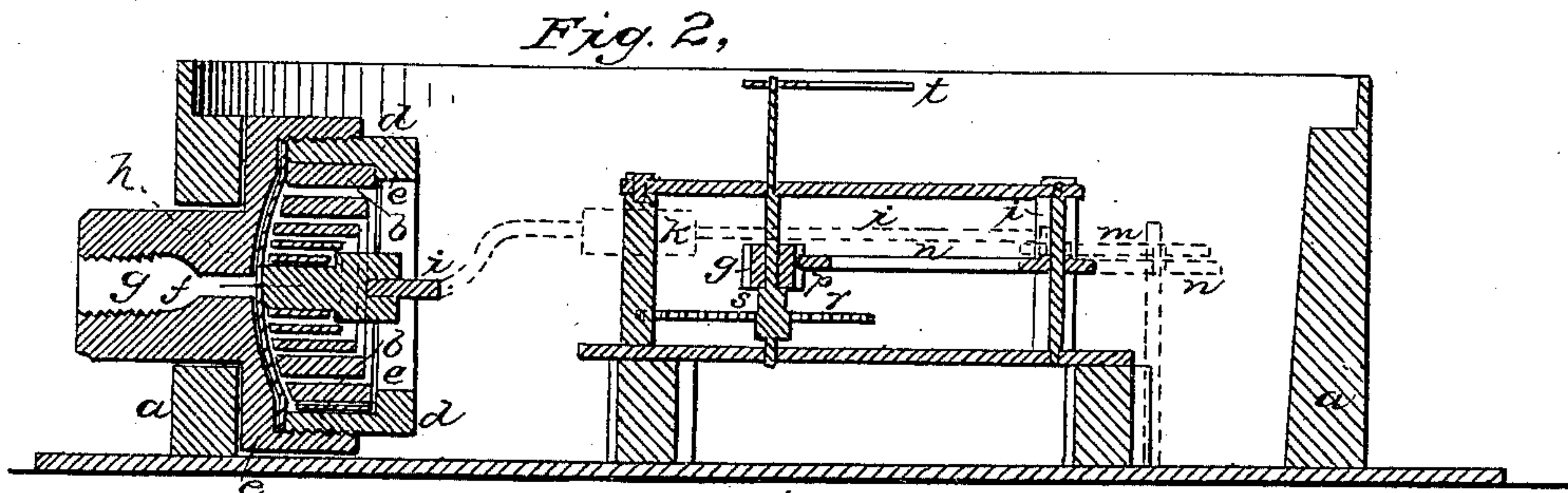


E. G. ALLEN.

Steam Gage.

No. 18,526.

Patented Oct. 27, 1857.



WITNESSES.
E. Lincoln.
Joseph Gaveto.

INVENTOR.
E. G. Allen.

UNITED STATES PATENT OFFICE.

E. G. ALLEN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HENRY O. ALLEN, OF MALDEN, MASSACHUSETTS.

STEAM-PRESSURE GAGE.

Specification of Letters Patent No. 18,526, dated October 27, 1857.

To all whom it may concern:

Be it known that I, E. G. ALLEN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Steam-Gages, and that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

The figures of the accompanying plate of drawings represent my improvements.

Figure 1, is a plan or top view of my improved steam gage with the oval plate removed. Fig. 2 is a transverse vertical section of the same taken in the plane of the line A B, Fig. 1. Fig. 3 is a detail view to be hereinafter referred to.

In a spring steam gage it is very essential that the spring upon which the steam acts should be held perfectly firm in order to accurately indicate the pressure, for as the motion of the spring is largely multiplied on the shaft of the indicator, any little variation in the play of the spring would produce a greatly increased variation at the indicator, and cause an incorrect register of the pressure. It is also vitally essential that the elastic force of the spring should be allowed to act freely and without friction. These two desirable features are secured by my improvements, the first desideratum being effected by using a volute spring, the peculiar construction of which will be hereinafter described, and holding its outer coil between two box-couplings rigidly screwed together, so as to prevent play in any direction, while the second requisite is obtained by leaving the whole of the spring, except the outer coil thus held, perfectly free to act, a disk of rubber or other elastic substance being so arranged in the box-couplings, as to communicate the pressure of the column of steam equally to every part of the spring.

Another feature of my improvements consists in the adjustment of the indicating lever, by changing the length of one arm, and varying in consequence the leverage and the degree of movement transmitted from the spring to the indicator, whereby

the gage can be easily corrected in case of error, adapted to high or low pressure engines, or to heavy or light weights, without varying the construction of the gage.

a a in the drawings represents the box in which the devices whereby the movement of the spring is transmitted to the indicator are placed, the dial plate being removed.

b b is a volute spring, Figs. 2 and 3, placed in two box-couplings *c* and *d*. These couplings are firmly screwed together, a shoulder *e* of the coupling *d* being thus brought to bear upon the outer coil of the spring, and holding it rigidly, so as to prevent any play or friction between the spring and the box-couplings, while at the same time the remaining portion of the spring is left perfectly free to act. The volute spring *b b* is of peculiar shape, as it has an increasing width and thickness, as shown in Fig. 3, from its center to its circumference. By giving the spring this peculiar shape it will receive at all times, very nearly the same degree of play or movement from a stated number of pounds pressure, at whatever degree of compression of the spring, the addition of the said number of pounds pressure be applied. The outer coil of the spring being held by the shoulder *e* of the coupling *d*, the inner or smallest coil is positioned to a central short shaft or piston *f*.

Steam is admitted through the short tube *g*, forming a part of the box-coupling *c*, and in order that the pressure of the steam may be exerted equally upon all portions of the spring *b b*, a disk or diaphragm of rubber *h*, Fig. 2, or other suitable elastic material is inserted between and held by the two box-couplings *c* and *d*, in such a manner as to entirely cover the rear surface of the spring.

From the foregoing description it will be seen that by the manner of holding the spring in place by its outer coil, by means of two box-couplings screwed together, there is no possibility of any play or friction between the spring and the devices by which it is held in place, while at the same time, the remaining portion of the spring is left entirely free to act. The importance of these results will be apparent from the statements hereinbefore made.

I will next proceed to describe the devices which form the medium for communicating the movement of the spring, produced by

the pressure of the steam, to the indicator:—
 To the short shaft or piston *f*, before referred to, is attached a connecting rod *i i* shown in Fig. 1, and by red lines in Fig. 2,
 5 formed in two parts, but united by a nut *k*, a right and left threaded screw being cut upon the ends of the divided connecting rod *i i*, upon which screwthread the nut *k* can be turned in either direction for the purpose
 10 of lengthening or shortening the rod *i i*. The rod *i i* is attached by a pivot joint *l* to a short arm *m*, attached to the sector shaped arm *n*, (turning upon a bearing at *o*) by a set screw *j*. Thus the connecting rod *i i*
 15 and arm *m*, form the long arm of a lever of which the sector shaped arm *n* is the short arm and *o* the fulcrum. By means of the screw *j* the arm *m* can be set at any desired angle with the sector shaped arm *n*, as shown
 20 in Fig. 1, thereby, (the rod *i i* being lengthened or shortened accordingly, as before explained) increasing or diminishing at pleasure the lever power brought to bear upon the indicator. The end of the sector shaped
 25 arm *n* terminates in a geared arc *p*, that engages with a pinion *q* retracted by a coiled spring *v*. The pinion *q* is attached to the

spindle *s* upon which is fastened the indicator *t*. From this description it will be seen that the movement of the volute spring *b b* is imparted to the indicator through the lever *i, m, n* and pinion *q*, and that the play of this lever,—which controls the adjustment of the indicator whereby the gage is readily corrected in case of error, and also adapted
 35 to all degrees of pressure,—is made greater or less, by changing the position of the arm *m*, and turning the nut *k* in either direction on the right and left threaded screw on the connecting rod *i i*. 40

Having thus described my improvements, what I claim as my invention, and desire to secure by Letters Patent is—

The volute spring as set forth which increases both in width and thickness from its center to its circumference, in combination with a disk of rubber or other elastic material substantially in the manner, and for the purpose specified. 45

E. G. ALLEN.

Witnesses:

ESAU LINCOLN,
 JOSEPH GOVETT.