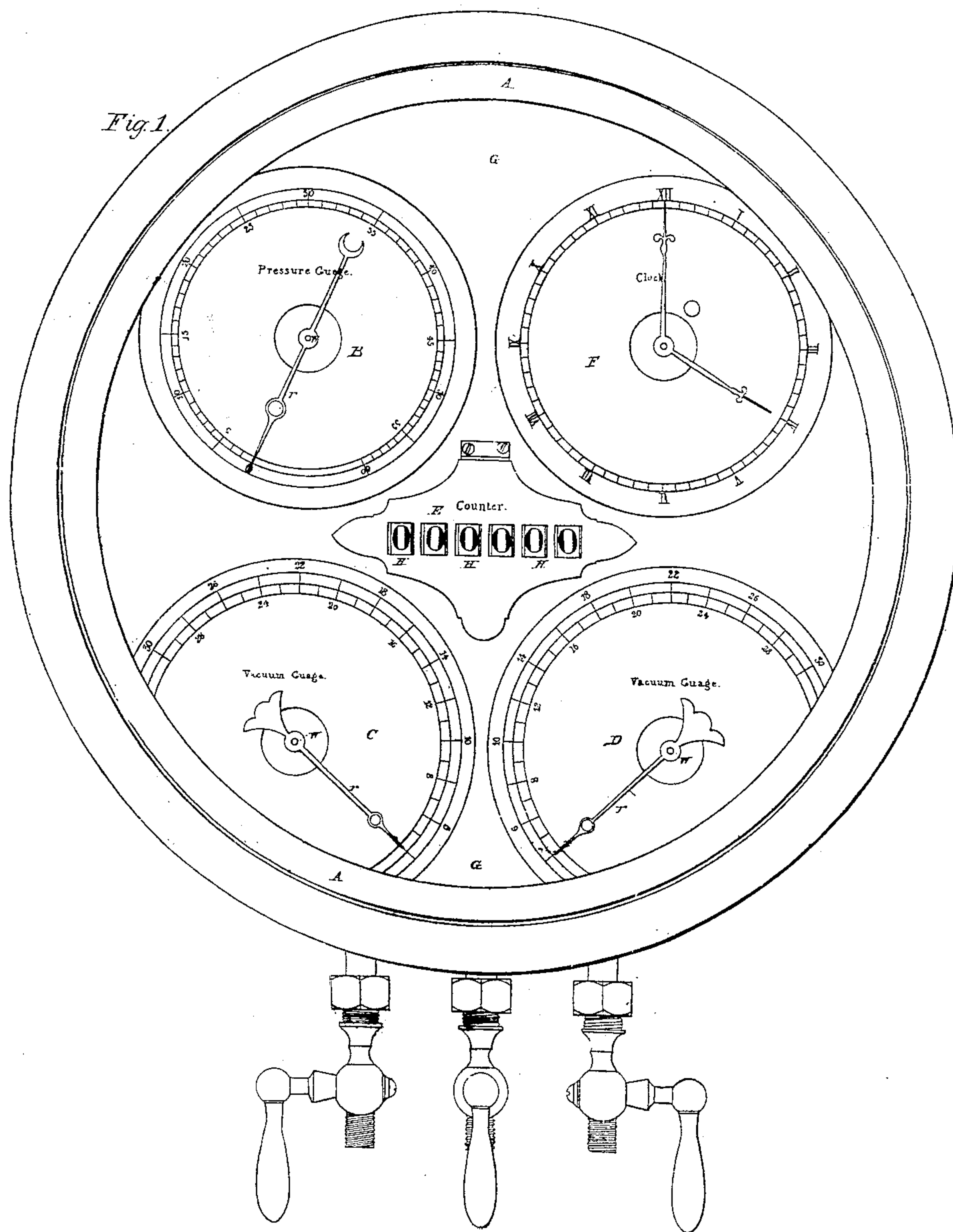


E. G. ALLEN.

Pressure Gage.

No. 26,152.

Patented Nov. 22, 1859.



Witnesses
Alfred H. Brown
Albert H. Brown

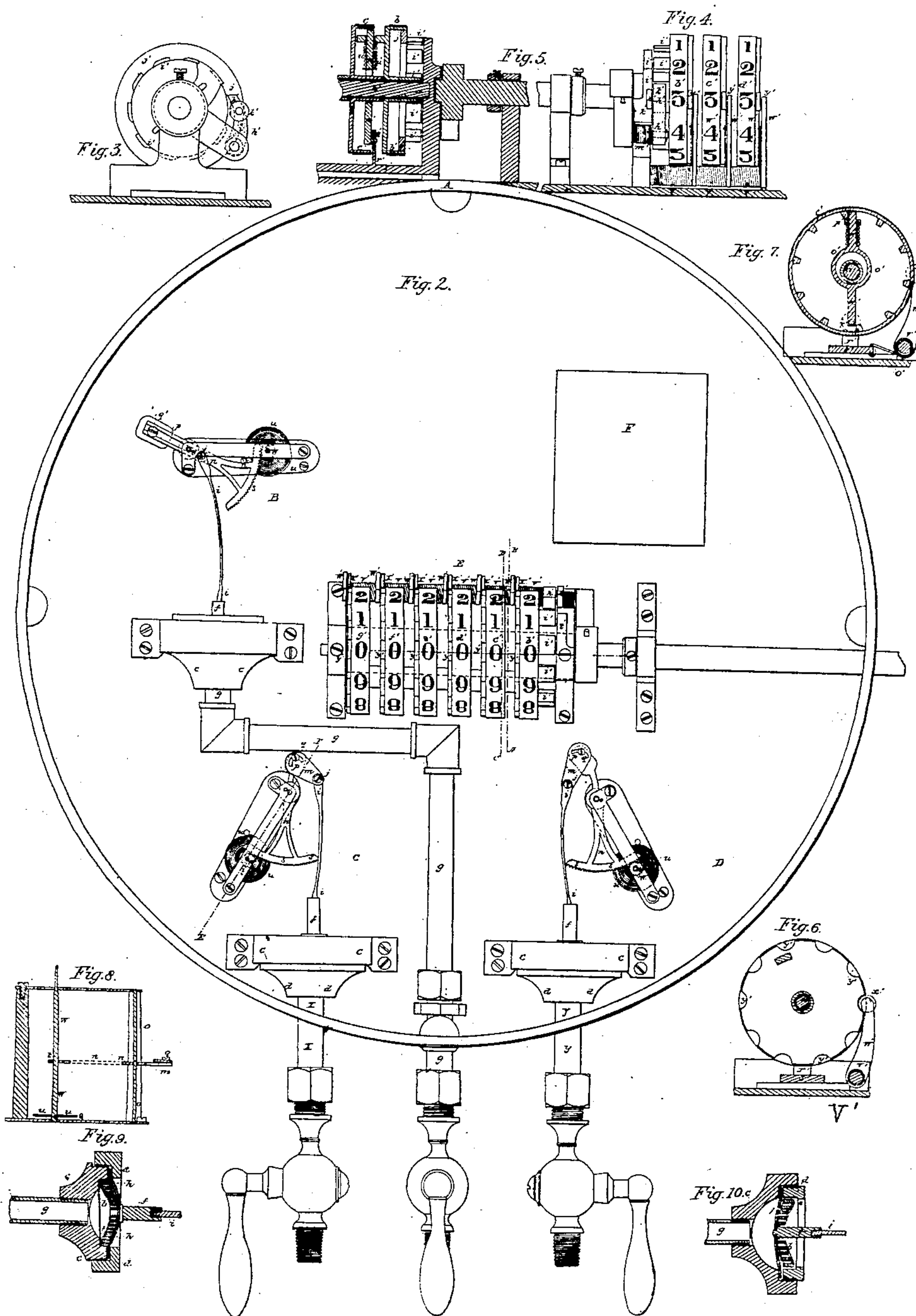
Inventor
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UNITED STATES PATENT OFFICE.

E. G. ALLEN, OF BOSTON, MASSACHUSETTS.

COMBINATION STEAM-GAGE.

Specification of Letters Patent No. 26,152, dated November 22, 1859.

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 as a new and
5 useful Article of Manufacture—a Combination Gage and Indicator—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
10 forth the nature and principle of my improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters
15 Patent.

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

Figure 1 Plate 1, is a view of the face of
20 the appaartus. In Plate 2, Fig. 2 is a top view of the apparatus representing the dial plate removed. Fig. 3 is a view of one end of the "counter" cylinder. Fig. 4 is a side view of a portion of the same. Fig. 5 is a
25 longitudinal vertical section of same. Fig. 6 is a section taken in the plane of the line A B Fig. 2. Fig. 7 is a section taken in the plane of the line C D Fig. 2. Fig. 8 is a longitudinal vertical section of a portion
30 of the vacuum gage apparatus taken in the plane of the line E F Fig. 2. Fig. 9 is a sectional view showing the spiral spring and rubber disk of the vacuum gage. Fig. 10 is a similar view of the pressure gage.

35 In the use of large steam engines especially marine engines, have heretofore been employed pressure gages, for indicating the pressure of steam in the boiler, vacuum
40 gages by which the amount of condensing power applied to the cylinder is regulated, a counter for registering the number of revolutions of the propelling wheel or wheels and a clock for indicating the exact time,
45 these all being inserted in separate cases independent of each other, supported by separate standards and each furnished with its own set of cocks, couplings, pipes &c. The very great expense of these different
50 gages &c. which are indispensable for the use of the engineer and the cost of putting them up and especially the large space which they occupy are serious objections to their use.

55 The present invention consists in combining in one instrument, having but one case and one dial plate, so as to constitute a new

article of manufacture, a pressure gage, one or more vacuum gages, a counter for registering the number of revolutions of the propelling wheel and a clock for indicating
60 the exact time. By this arrangement but one case and one set of couplings, standards &c. are required, thereby diminishing the cost of manufacture nearly fifty per cent., while the saving of space is a great item
65 and moreover much greater convenience for reference is afforded to the engineer, as he has to inspect one instrument instead of several in separate localities as has heretofore been necessary. 70

I will now proceed to describe in detail the construction of the pressure, and vacuum gages and counter.

A A represents the case or box in which the pressure gage B, vacuum gages C and
75 D, counter E, and the clock F are placed.

G represents the top plate or main dial or face upon which the graduated circles or dial plates of the respective gages B, C, and D are marked or secured in any proper
80 manner, and also the face or dial of the clock F. The top plate G has also openings H H by which the figures of the counter cylinder can be read at pleasure.

The pressure gage B, is constructed in the
85 following manner. *b b* is a volute spring, Fig. 10, 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
90 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 portions of the spring are left perfectly free to act. The volute
95 spring *b b* is of peculiar shape, as it has an increasing taper both from its center and its outer circumference. By giving the spring this peculiar shape, it will receive at all times very nearly the same degree of play
100 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 *b* being held by
105 the shoulder *e* of the coupling *d*, the inner or smallest coil being fastened to a central short shaft or piston *f*. Steam is admitted to the spring *b b* through the tube *g* which is attached to the box coupling *c* and in order
110 that the pressure of the steam may be exerted equally upon all parts of the spring *b b*

a disk or diaphragm of rubber *h* or other suitable elastic material Fig. 10 is inserted between and held by the two box couplings *c* and *d* in such a manner as to entirely
5 cover the rear surface of the spring.

The devices by which the movement of the spring produced by the pressure of the steam is communicated to the indicator are the following; To the short shaft or piston
10 *f* is attached a connecting rod *i i*. The rod *i i* is attached by a pivot joint *j* to a short arm *m* attached to the sector shaped arm *n* by means of a slot *p* and set-screw *q*; lengthening or shortening the connecting rod *i i*
15 and thereby increasing or diminishing the lever power brought to bear upon the indicator *r* Fig. 1. The end of the sector shaped arm *n* terminates in a geared arc *s* that engages with a pinion *t* retracted by a coiled
20 spring *u*. The pinion *t* is attached to the spindle *w*, upon which is fastened the indicator *r*. It will be seen from this description that the movement of the volute spring *b b* is imparted to the indicator *r* through
25 the levers *i i* and *n*, thereby indicating the exact pressure of the steam upon the spring *b b*. The vacuum gages C and D are constructed in a manner precisely similar with the exception that the volute spring and rub-
30 ber disk or diaphragm are necessarily reversed in position; the pipes *x* and *y* being the connections.

The recording of the revolutions of the propelling wheels, is effected by means of a
35 "counter," the operation of which will now be explained. *a' a'* is a longitudinal shaft upon which the sectional disks *b', c', d', e', f'* and *g'* turn with an intermittent rotary motion. These sectional disks are divided
40 into ten equal parts, indicated by figures from 0 to 9 inclusive. The disk *b'* upon each revolution of the propelling wheel is moved one notch at a time by means of a
45 pawl *h'* which engages with the teeth *i'* of the disk *j'*, the pawl *h'* having attached to it a friction roller *k'* that moves over a circular plate *l'*; the pawl *h'* has a reciprocating rotary motion given to it by devices
50 connected with the shaft which connects with the paddle wheel; the friction roller *k'* being kept up to the circular plate *l'* by means of a spring *m'* which also causes the pawl *h'* to spring back when the sectional
55 disk *b'* has revolved one notch, so that it may be ready again to engage with the teeth *i'* of the disk *j'* and to revolve the disk *b'* one more notch upon the next revolution of the paddle or propelling wheels. This operation takes place with the sectional

disk *b'* until it has turned nine of the
60 notches, when one end of a shaft *n'* attached to a cam *o'* is made to engage with a tooth *p'* of the next disk *c'*, by means of a wheel *q'* attached to the other end of the shaft *n'*
65 which, when the sectional disk *b'* has revolved the nine notches, as above stated, travels over the projection *r'* attached to the bottom plate *s'* of the stand of the
70 counter gage. Upon the next revolution of the paddle wheel the sectional disk *c'* is revolved one notch in conjunction with the disk *b'* by means of the rod *n'* which is interlocked with it as above described; the
75 rod *n'* is then disengaged from the disk *c'* by means of a spring *u'* attached to the rod *n'*, which causes the rod *n'* to be so disengaged from the tooth *p'* of the disk *c'*,
80 when the wheel *q'* has passed over the projection *r'* of the bottom plate *s'*. The disk *b'* only, is then revolved nine notches, when the same operation takes place with regard
85 to the disk *c'* as has been above described and causes it to move one more notch. These operations take place with regard to the two disks *b'* and *c'*, until the sectional
90 disk *c'* has itself revolved nine notches, when the next disk *d'* is revolved in conjunction with the two disks *b'* and *c'* one notch, by means of similar devices as have
95 been herein before described. It will be evident without further explanation, that the same movements will be successively received by the remaining disks *e' f'* and *g'*.

The spiral spring *u'* attached to a standard *w'* in conjunction with the wheel *x'*
100 having its axis in the standard *w'* and the circular opening *y'* in the periphery of one side of the sectional disks *b' c' d' e' f' g'*, and *g'* serve to retain and to hold the said disks firmly in their places, when they are not in motion.

The working parts of the clock F need not be particularly described as they are precisely similar to those of ordinary clocks in
105 use.

I claim—

The combination and arrangement of the several instruments requisite to enable the engineer to regulate the proper working of
110 steam machinery, substantially as herein set forth, the said instruments being inserted in one case and having the hands or other indicators upon one face or dial plate in the manner and for the purposes specified.

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Witnesses:

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