(No Model.) 4 Sheets—Sheet 1.

F. W. BACON.

ADJUSTABLE STAND FOR OPERATING STEAM INDICATORS.

No. 261,519. Patented July 25, 1882.

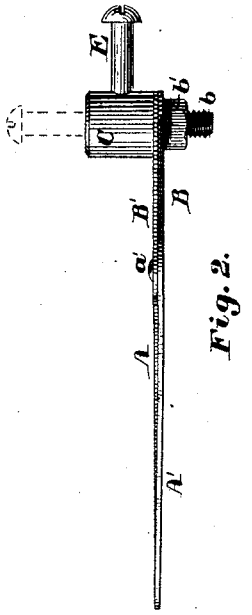


Fig. 2.

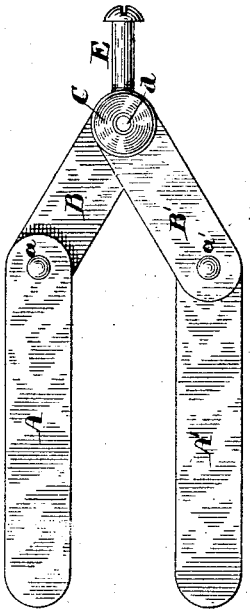
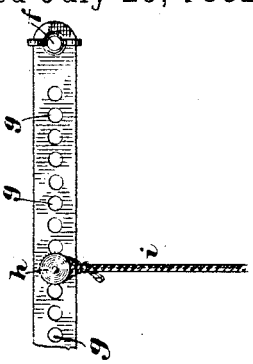


Fig. 1.



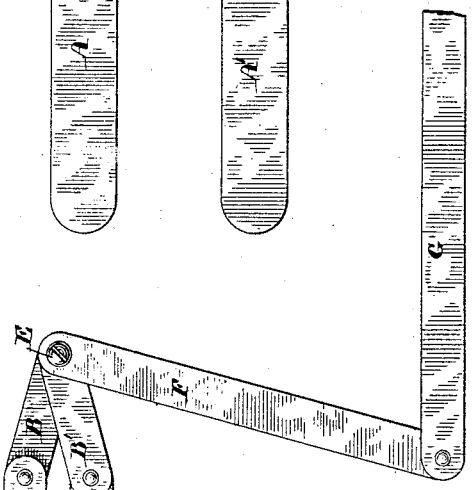
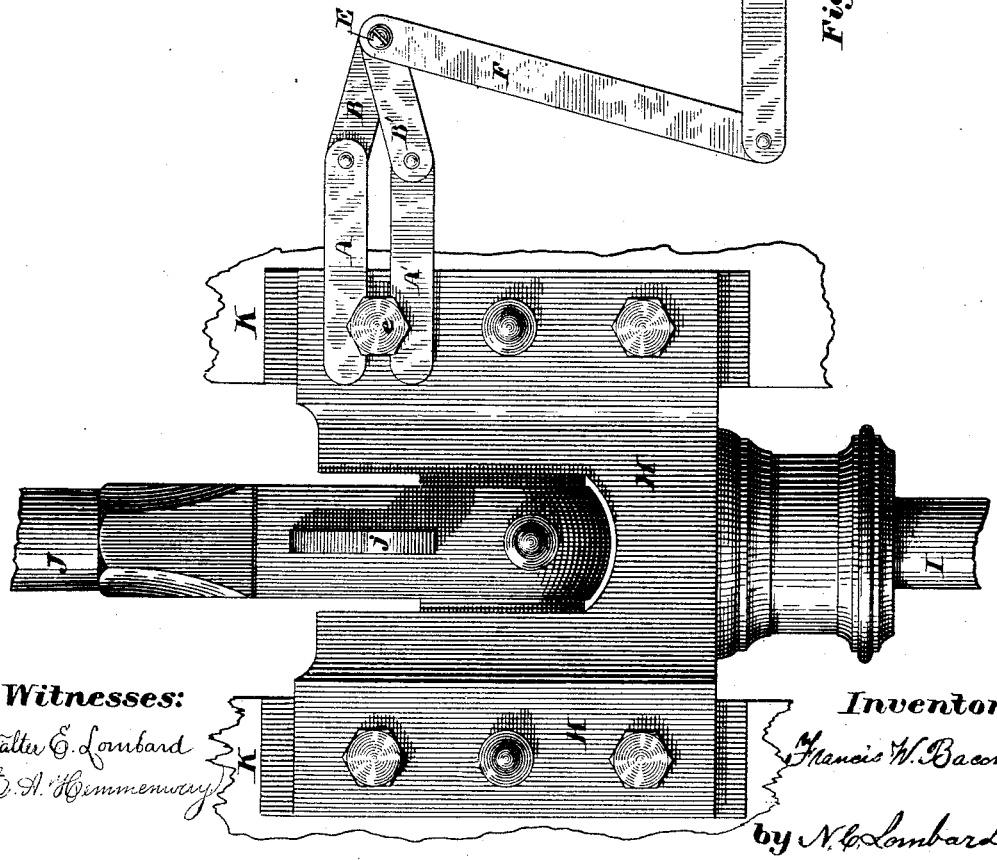


Fig. 3.



Witnesses:

Walter E. Lombard

E. H. Hemmenway

Inventor:

Francis W. Bacon

by N. G. Lombard

Attorney.

(No Model.) 4 Sheets—Sheet 2.

F. W. BACON.

ADJUSTABLE STAND FOR OPERATING STEAM INDICATORS.

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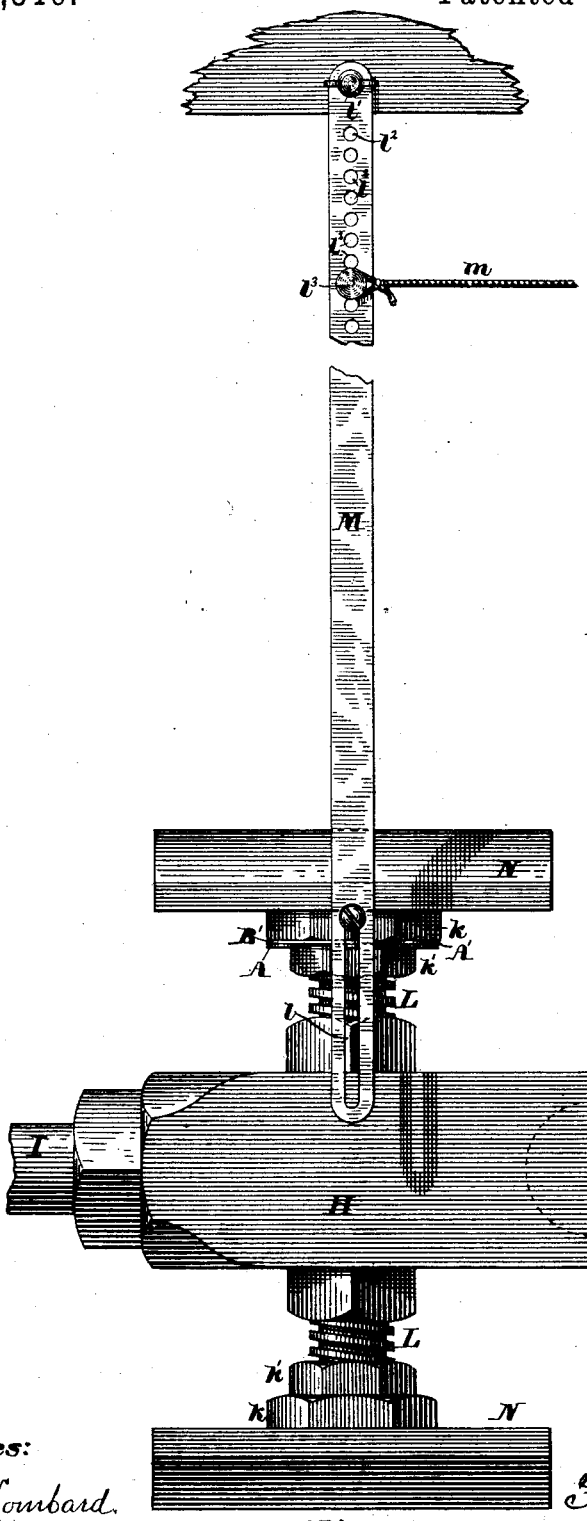

Fig. 4.

Witnesses:
Walter E. Lombard.
E. A. Hemmenway.

Inventor:
Francis W. Bacon
by N. C. Lombard
Attorney.

(No Model.) 4 Sheets—Sheet 3.

F. W. BACON.

ADJUSTABLE STAND FOR OPERATING STEAM INDICATORS.

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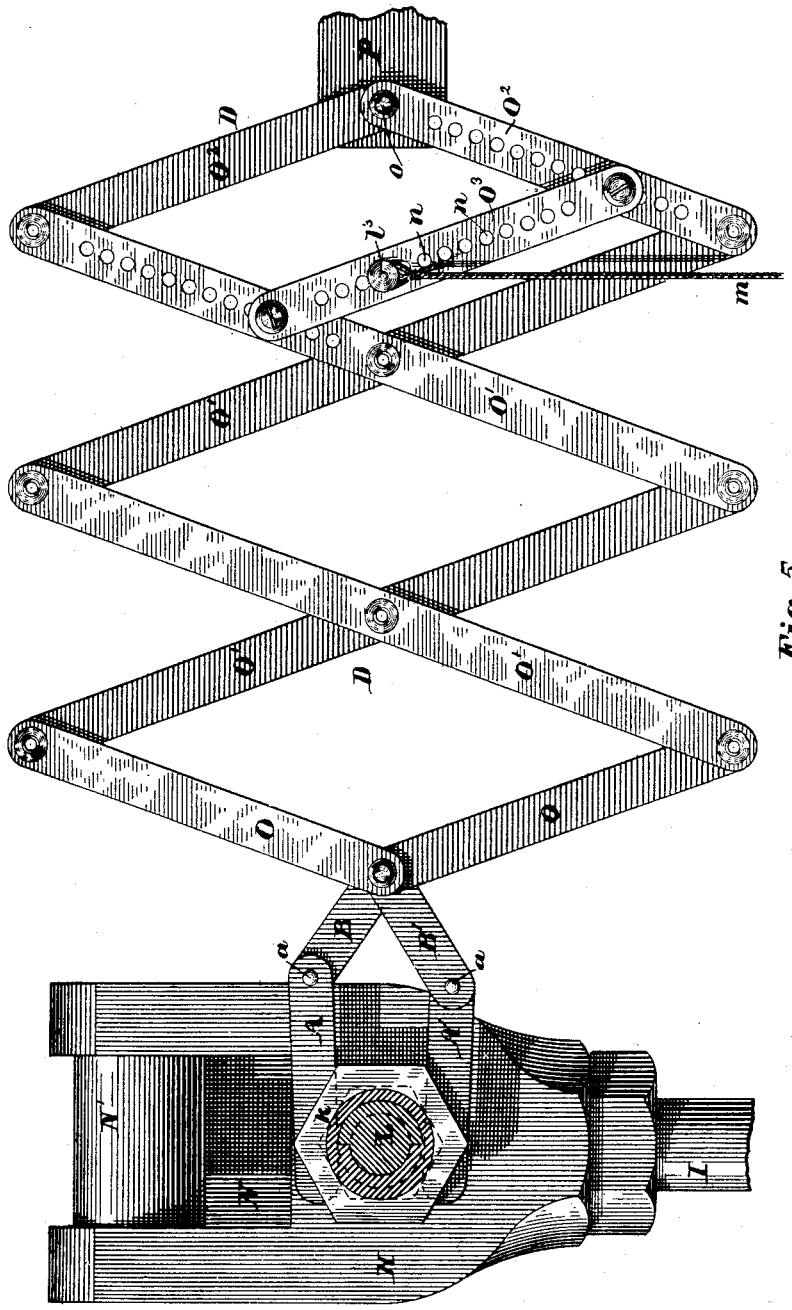

Fig. 5.

Witnesses:

Walter E. Lombard.

E. A. Hemmenway.

Inventor:

Frances W. Bacon

by N. C. Lombard

Attorney.

(No Model.) 4 Sheets—Sheet 4.

F. W. BACON.

ADJUSTABLE STAND FOR OPERATING STEAM INDICATORS.

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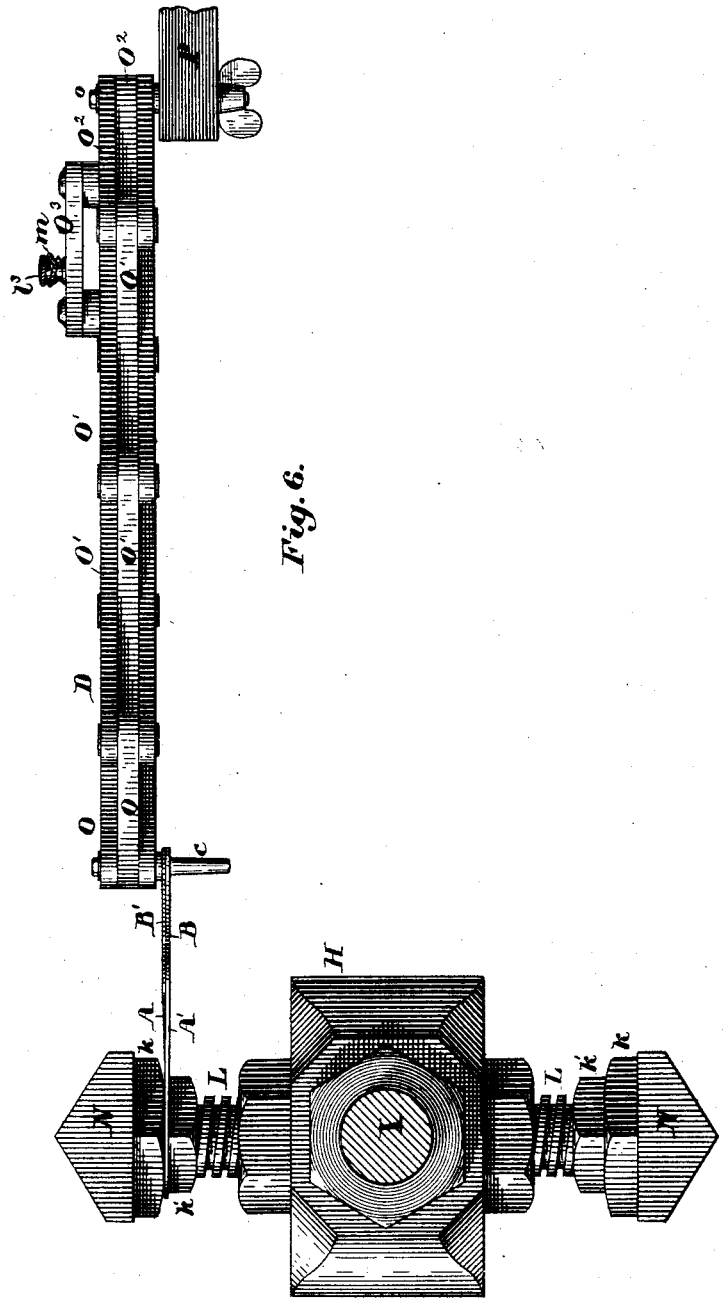

Fig. 6.

Witnesses:

Walter E. Lombard.

E. A. Hemmenway.

Inventor:

Francis W. Bacon

by N. C. Lombard

Attorney.

UNITED STATES PATENT OFFICE.

FRANCIS W. BACON, OF BOSTON, MASSACHUSETTS.

ADJUSTABLE STAND FOR OPERATING STEAM-INDICATORS.

SPECIFICATION forming part of Letters Patent No. 261,519, dated July 25, 1882.

Application filed April 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS W. BACON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Adjustable Stand or Arm for Operating Indicators for Steam-Engines, of which the following, taken in connection with the accompanying drawings, is a specification.

In the business of applying the indicator to steam-engines for the purpose of ascertaining the power being developed thereby a serious difficulty has been experienced in finding a convenient and cheap means of connecting the indicator with the cross-head or other part of the engine that moves in unison with the piston. There are a great variety of steam-engines in use, which vary materially in size, design, and location of parts, and, as a consequence, when an engineer is called upon to test the power of an engine by means of the steam-indicator, he knows nothing as to what will be required to make the necessary connection to the working parts till he sees the engine, which may be miles from any machine-shop. When he arrives on the spot and views the engine he sees at a glance what is required, but the means are not at hand for supplying the want, and he is compelled to suspend operations altogether, or wait till a suitable stand or arm can be forged and sent from a distant machine or blacksmith shop, adapted to be secured upon the cross-head or other suitable moving part of the engine. The stand thus obtained serves the desired purpose for that particular case; but there is not more than one chance in ten of its ever being used again, for the reason that the next engine requires a different stand or arm, or it must be attached by a different bolt, which will not fit the hole in the stand or arm before used. Another objection to the stand or arm so obtained is that it is necessarily heavier than is desirable for a tool to be carried from place to place, especially when it is almost certain not to be available oftener than once in ten times.

To obviate this difficulty and produce a light, portable, and adjustable stand or arm which may be securely attached to the cross-head of any steam-engine by clamping it beneath the binding-nut of the screw for adjusting the shoe or gib of the cross-head, or beneath the head of any convenient bolt, is the object of my invention; and it consists of four pieces of sheet or thin bar metal jointed together in such a manner that the two free ends of two of said pieces may be inserted under the binding-nut or head of a screw, one upon either side of the screw or bolt, and held firmly by screwing down said nut or bolt, whatever may be the size of the bolt or screw, while the center joint serves as the means of imparting motion to the lever, which transmits the motion of the cross-head or other part of the engine to the indicator-cylinder.

It further consists of the combination, with two jointed arms, of a central fulcrum-pin provided with a large head or hub, and with two threaded sockets or holes at right angles to each other, and a screw-pin fitted to and adapted to be interchangeably used in either of said holes, as will be more fully described.

It further consists in the combination, as a means of operating a steam-indicator, of a jointed adjustable stand or arm, and a pantograph pivoted at one end to a fixed support and connected at its other end by means of a conical pin to said stand or arm, as will be described.

Figure 1 of the drawings is a plan of my adjustable stand or arm with the large headed fulcrum-pin applied thereto. Fig. 2 is a side elevation of the same. Fig. 3 is a plan of the same applied to an engine having a horizontal cross-head, and to working an indicator-cylinder through the medium of a horizontal lever. Fig. 4 is an elevation of a Corliss cross-head with my improvement applied thereto, and adapted to working the indicator-cylinder through the medium of a vertical or pendent lever; and Fig. 5 is a sectional plan of the same Corliss cross-head with my improvement applied thereto, and adapted to working the indicator-cylinder through the medium of a pantograph. Fig. 6 is an elevation of the cross-head and pantograph looking in the direction of the movement of the cross-head and toward the crank-shaft end of the engine.

A A′ and B B′ are two pairs of thin metal plates pivoted together at *a* and *a′*, the opposite ends of the shorter plates, B and B′, being each provided with a hole to receive the screw-shank *b* of the hub C, or the tapering stud or

pin *c* of the pantograph D. When the hub C is used it is firmly secured to the links or plates B B′ by means of the nut *b*′, as shown in Fig. 2. The hub C is provided with a threaded hole, *d*, in its end, and with a corresponding hole in its side, each adapted to receive the screw-pin E, as shown in Fig. 2.

One method of using my invention is illustrated in Fig. 3, where it is applied to a horizontal cross-head, being firmly secured thereto by inserting the plates A and A′ beneath the binding-nut of the set-screw *e*, and screwing said nut down hard thereon. The screw-pin E is passed through a hole in the link F and inserted in the hole *d* in the end of the hub C, the opposite end of said link F being pivoted to the movable end of the radius-arm G, pivoted at *f*, and provided with a series of holes, *g*, to receive the pin *h*, to which the cord *i* for operating the cylinder of the indicator (not shown) is attached.

H is the cross-head; I, the piston-rod; J, the connecting-rod; *j*, the gibs, and K the slides.

In Fig. 4 my invention is shown applied to a Corliss cross-head, the adjustable stand being clamped between the adjusting-nut *k* and the binding-nut *k*′, the plate A being inserted between said nuts upon one side of the screw L and the plate A′ upon the other side of said screw L. In this case the screw-pin E is inserted in the hole in the side of the hub C after having been passed through the slot *l* in the lower end of the pendent lever M, pivoted at *l*′, and provided with a series of holes, l^2, to receive the pin l^3, to which is attached one end of the cord *m*, which leads to and operates the indicator. (Not shown.)

The cross-head shown in Fig. 4 is of that kind used in the Corliss horizontal engine, having one slide directly above the other, and is provided with adjustable shoes N N, which may be moved toward or from each other by means of the screws L and nuts *k* and *k*′. I is the piston-rod, and the connecting-rod embraces the pin N′. (Shown in dotted lines.)

Figs. 5 and 6 illustrate the application of my invention to the same Corliss cross-head, in combination with a pantograph, as a means of transmitting the motion of the cross-head to the indicator-cylinder, in which A A′ and B B′ are the jointed links or plates of my adjustable stand. H is the cross-head proper; I, the piston-rod; N′, the wrist-pin, to receive the connecting-rod, (not shown;) O, O′, O^2, and O^3, the several bars of the pantograph, of usual construction, and *m* the cord for operating the barrel of the indicator, to which it is connected at one end, and at the other end to the pin l^3, which may be placed in either of the holes *n* in the bar O^3, according as the bar O^3 is adjusted upon the perforated bars O′ O^2 to give the required stroke to the cord *m*. The two bars O^2 are pivoted together and to some fixed object, as P at *o*, and the two bars O O are pivoted together by the pin *c*, which projects below the under side of the lower bar O, and is tapered to serve as a ready means of connecting the pantograph to the adjustable stand, said pin being inserted through the holes in the outer ends of the plates B and B′, as shown in Fig. 6, the hub C not being used or required when the pantagraph is used.

It is essential to the proper working of this device, when applied to the pantograph, that the pin l^3 should be in line with the pivots *o* and *c*, and at the proper distance from the pivot *o* to give the necessary endwise movement to the cord *m* when the cross-head H is reciprocated, and to this end the bar O^3 may be adjusted along the bars O′ and O^2, to which it is secured, and at the same time the pin l^3 may be adjusted along the bar O^3 to maintain its position in line between the pivots *o* and *c*.

By the use of this adjustable or jointed stand, in combination with the pantograph or radius arm or lever, I am able to readily apply the indicator to any style of engine, however situated, without waiting for special fittings to be made for every new case. The stand is comparatively inexpensive, so light and portable that it can easily be carried in the coat-pocket, and may be readily adjusted to the three-and-one-half-inch screw of the cross-head of a large size Corliss engine, or to the small set-screws on small-sized cross-heads of other styles of engines.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A portable adjustable stand composed of the four links or plates A, A′, B, and B′, pivoted together, substantially as and for the purposes described.

2. The combination of the links or plates A, A′, B, and B′, pivoted together, as set forth, the hub C, provided with two threaded holes at right angles to each other, and the screw-pin E, fitted to and adapted to be interchangeably used in either of said threaded holes, substantially as described.

3. As a means of operating the barrel of a steam-indicator, the combination of the links or plates A, A′, B, and B′, pivoted together in pairs, a pantograph pivoted at one end to a fixed support, and provided at the other end with the tapering pin *c*, as a means of connecting it to the links B and B′, the pin l^3, and the cord *m*, all constructed, arranged, and adapted to operate substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 10th day of April, A. D. 1882.

FRANCIS W. BACON.

Witnesses:
E. A. HEMMENWAY,
WALTER E. LOMBARD.