(No Model.)

2 Sheets—Sheet 1.

J. EMERSON.

DYNAMOMETER.

No. 452,602. Patented May 19, 1891.

Fig. 1.

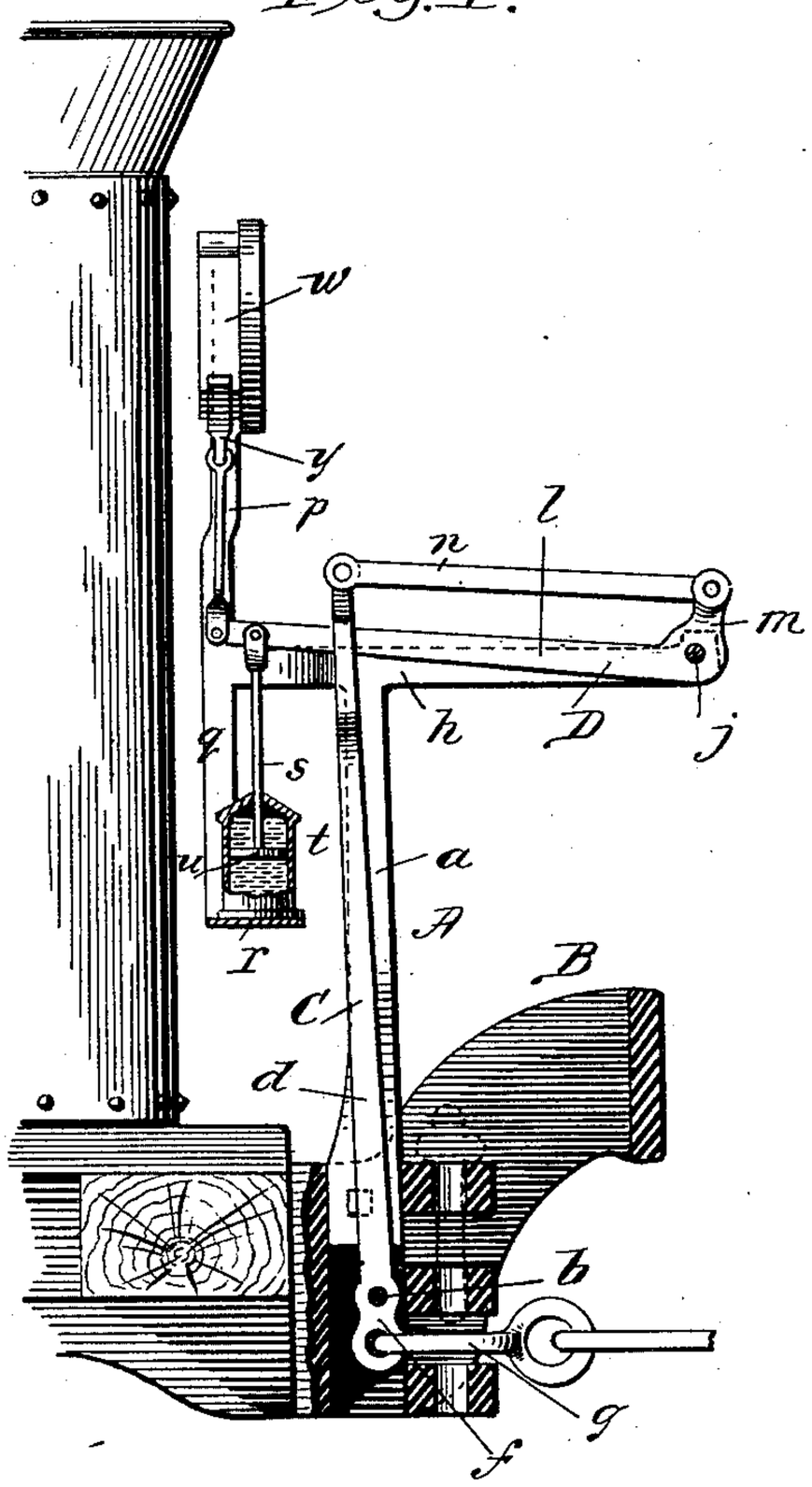


Fig. 2.

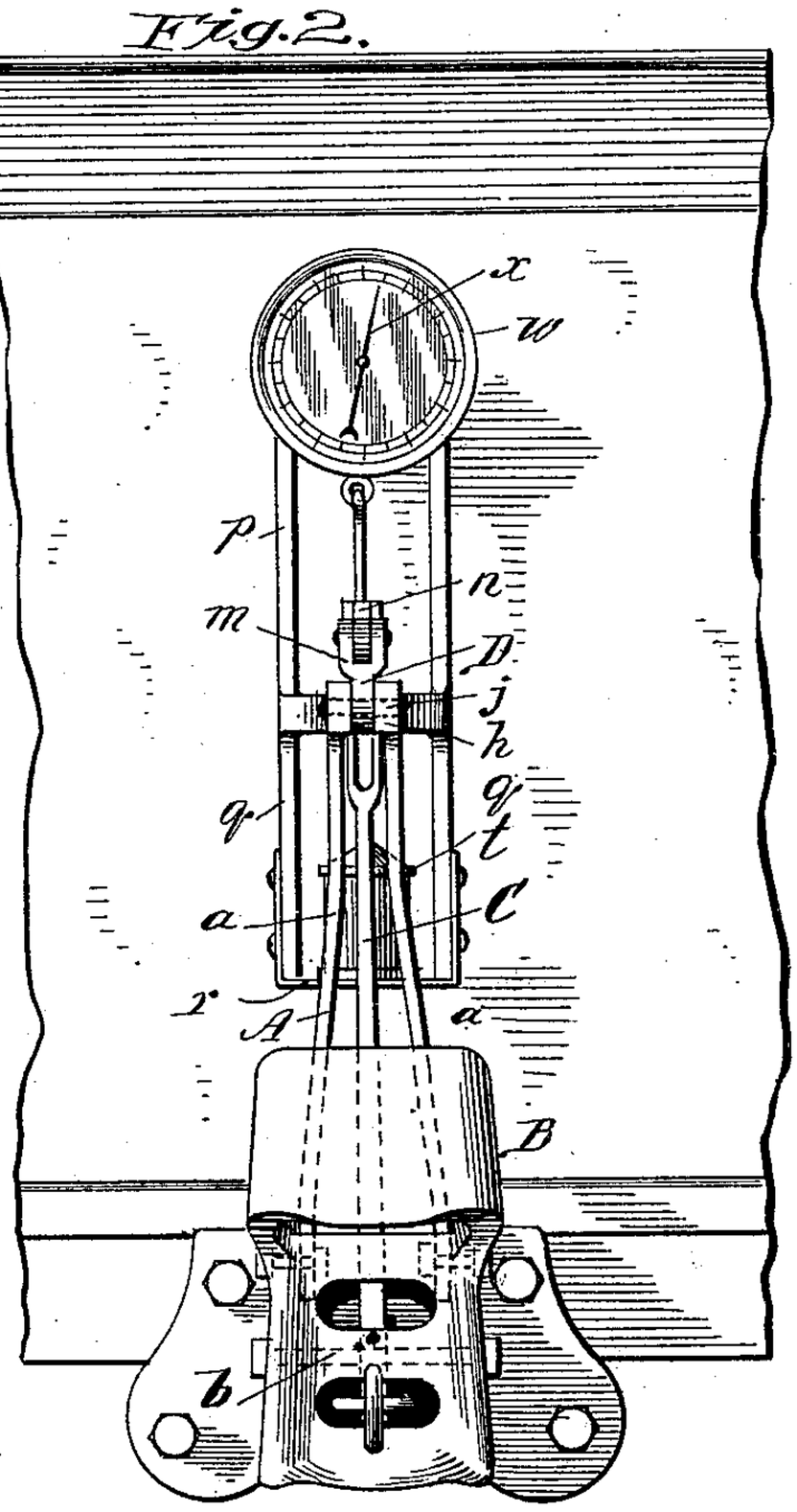


Fig. 3.

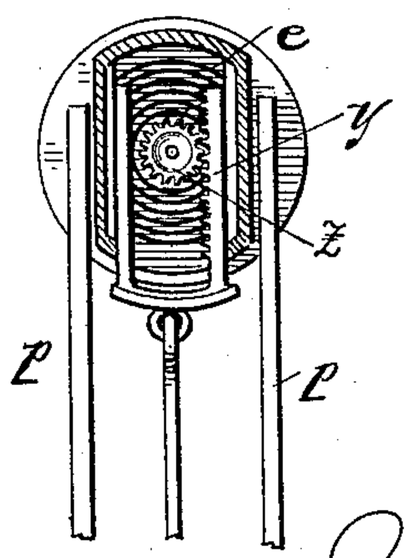
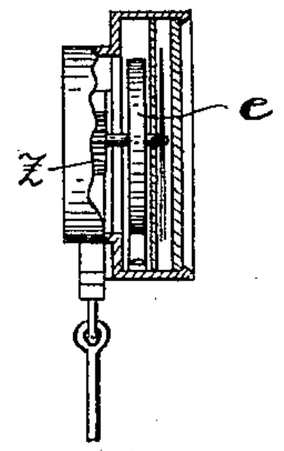


Fig. 3a.



Witnesses:

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Inventor,

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(No Model.) 2 Sheets—Sheet 2.

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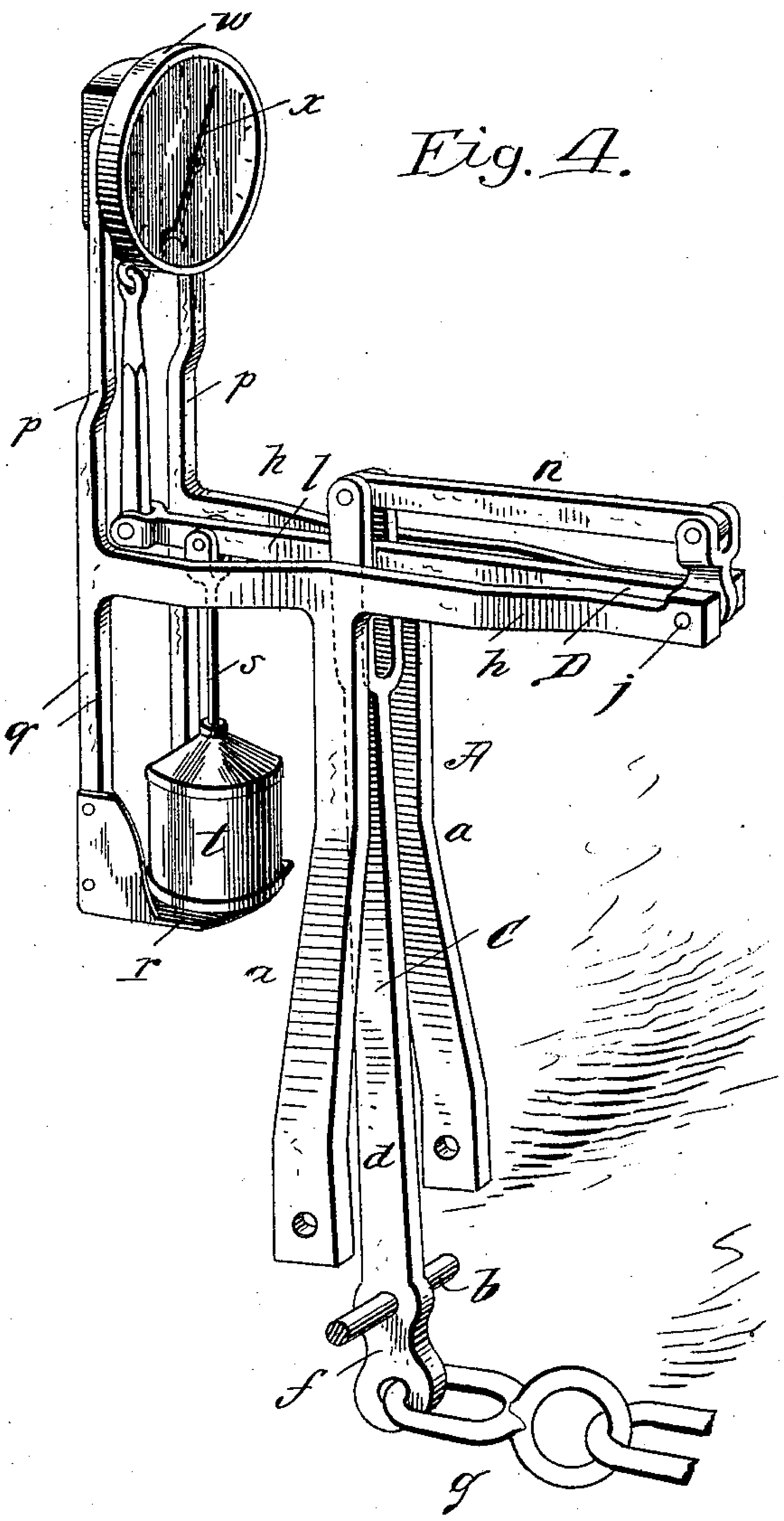
DYNAMOMETER.

No. 452,602. Patented May 19, 1891.

Fig. 4.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES EMERSON, OF WILLIMANSETT, MASSACHUSETTS.

DYNAMOMETER.

SPECIFICATION forming part of Letters Patent No. 452,602, dated May 19, 1891.

Application filed June 5, 1890. Serial No. 354,312. (No model.)

To all whom it may concern:

Be it known that I, JAMES EMERSON, a citizen of the United States, residing at Williamansett, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Dynamometers, of which the following is a specification.

This invention relates to improvements in dynamometers especially designed for use in relation to bodies which are adapted for straight-away movements, to indicate the amount of power or force necessary to move the body. For instance, the dynamometer may be applied on the tender of a locomotive in such a manner that a portion thereof may serve as the draw-bar of the locomotive to which the car may be coupled, so that the draft necessary to be exerted by the locomotive to move the car or train may be indicated by the dynamometer.

The invention consists in the construction and combination of parts, substantially as will hereinafter more fully appear, and as specified in the claim.

Referring to the accompanying drawings, Figure 1 is a sectional elevation taken across the rear end portion of the locomotive-tender, and showing the dynamometer applied thereon. Fig. 2 is an elevation directly at the end of the tender, showing a view of the dynamometer, as seen at right angles to the view Fig. 1. Fig. 3 is a sectional and face view at the upper portion of the dynamometer. Fig. 3^a is a sectional elevation of the parts shown in Fig. 3, as seen at right angles thereto. Fig. 4 is a perspective view of the dynamometer detached from the locomotive-tender.

In the drawings, A represents the frame, which is adapted for the support of the levers and other parts constituting the essentials of the power-scale, and said frame consists of a couple of opposing T-shaped standards *a*, which by their lower extremities are rigidly bolted to the draw-head B, or other suitable part of the locomotive. A pin or shaft *b* of sufficient diameter is passed transversely through the draw-head, on which a vertical lever C is pivotally mounted, said lever having its upper arm *d* several times as long as the lower arm *f*. The lower arm is provided with an eye for the reception of the link *g*, which, in the illustration here presented, forms the draw-bar. Supported on and between the rear extremities of the cross-bars *h* of said T-standards is a pin *j*, on which an angular lever D is pivotally hung at its elbow. The long arm *l* of said lever extends horizontally forward, and is many times as long as the short arm *m*, which is vertically extended a short distance above its pivot. A link *n* is connected to and extended horizontally between the upper extremity of the long arm of said lever C and the short arm of said elbow-lever D. The forward ends of said cross-bars *h* of the T-standards support vertical bracket-arms *p p*, which extend upwardly therefrom, and also pendent arms *q q*, which are united by the cross-platform *r*, on which is placed the dash-pot *t*, the piston *u* playing in which is carried on the lower end of the rod *s*, which by its upper end is pivotally connected to the lever-arm inside of its forward extremity. A case *w* is supported on the upper ends of said bracket-arms *p*, having a graduated dial-face at its rear side. The arbor supported in said case at its outer end is provided with a pointer *x*, while at its inner end it has a pinion *z*, with which the teeth of a rack-bar *y* engage, which rack-bar is linked or connected to the long arm of said angular lever. The piston and dash-pot applied with relation to one of the movable arms insure an equability of motion which in practice is most advantageous. When the form of scale such as indicated in the drawings is employed, a spring *e* is applied on the arbor of the pinion *z*, as in weighing-scales of an ordinary construction which is in general use, although the scale-indicator might be constructed on the plan of a beam-scale, in which case no spring would be necessary, such latter plan, however, not being deemed the most advantageous.

It will be readily understood that the force or power required to be exerted by a locomotive to move a car or cars is transmitted through the combination of levers described swinging them more or less against the resistance to their movement, (which element or agent of resistance may be constituted by a spring, as aforesaid,) according as the power in transmission is greater or less. A feature

which may be mentioned as incidental to the construction illustrated consists in the availability for indicating the power necessary either to draw the train as the locomotive travels forwardly, or to push the train on the backing of the locomotive. Of course, however, to insure this capability, the resistance applied on the lever *l* must be the same as to its either direction of movement, and therefore it must be observed that the piston *u* in the dash-pot must be arranged to move as freely in the one direction as in the other.

What I claim as my invention is—

The combination, with a suitable part of a conveyance or locomotive, of the frame A, secured thereon, and consisting of the opposing T-standards having at one end of the cross-arms thereof the bracket-arms *p p*, and the hangers *q q*, supporting the piston dash-pot, the vertical lever C, comprising long arm *d* and short arm *f*, to which latter the draft is to be applied, the long and short armed angular lever D, pivotally supported at its elbow in the extremities of said cross-arms, the link *n*, connected to the long arm of said primary lever and to the short arm of said angular lever, a dial-faced case supported on said bracket-arms, provided with the spring-restrained arbor having the pointer and pinion, a rack-bar connected to the long arm of said angular lever and engaging said pinion, substantially as described.

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Witnesses:
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