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(No Model.)

A. E. BROWN.

MACHINE FOR WEIGHING TRAVELING LOADS.

No. 399,487.

Patented Mar. 12, 1889.

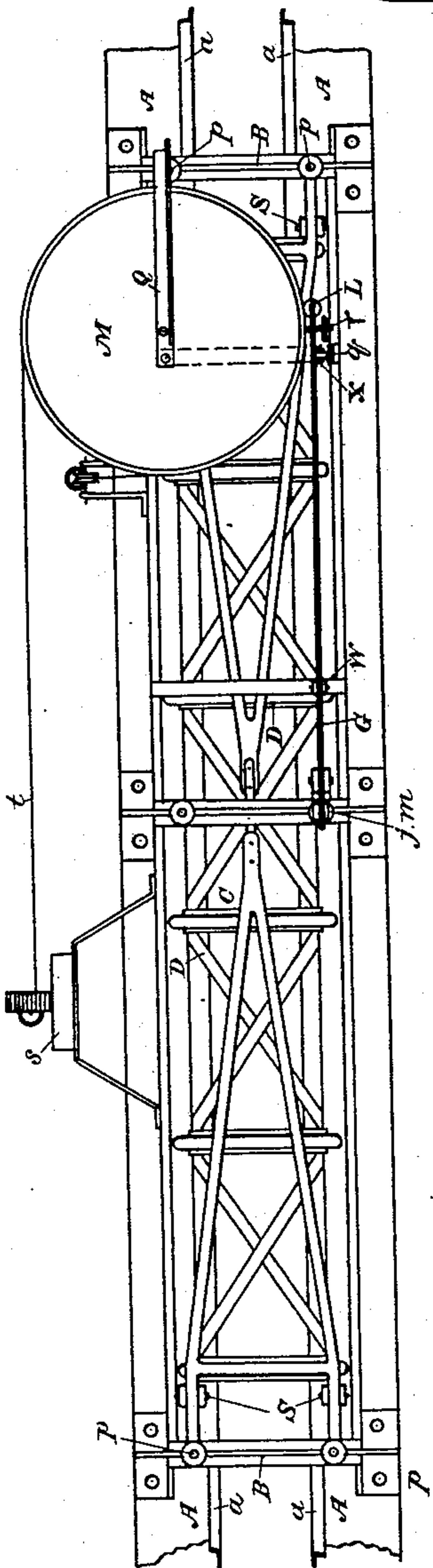


Fig. 1.

Fig. 2.

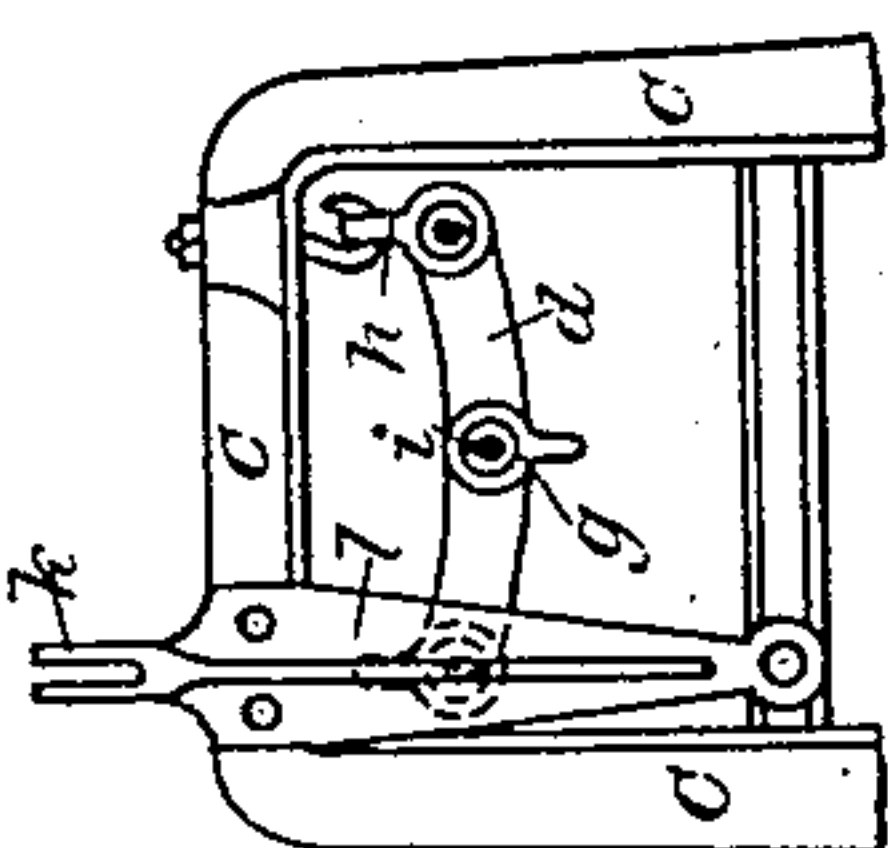


Fig. 3.

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UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO.

MACHINE FOR WEIGHING TRAVELING LOADS.

SPECIFICATION forming part of Letters Patent No. 399,487, dated March 12, 1889.

Application filed March 5, 1887. Serial No. 229,807. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Weighing Traveling Loads; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention relates to certain new and useful improvements in a machine or apparatus for weighing materials (and in the case shown adapted especially to the weighing of traveling trucks or loads in the use of hoisting and conveying machines) according to a novel method or system made the subject of United States Letters Patent granted to me August 9, 1887, No. 368,063, in which said new method will be found fully described.

To enable those skilled in the art to which my present invention relates to make and use my novel machine for practicing my said new system of weighing, I will now proceed to more fully describe the same, referring by letters to the accompanying drawings, which form part of this specification, and in which I have illustrated my invention carried out in that form in which I have successfully practiced it, and which is the best now known to me.

In the drawings, Figure 1 is a side view or elevation of one of my improved machines, such as I have made and used in connection with a rigid tramway hoisting and conveying machine. Fig. 2 is a top view of the same. Fig. 3 is an end view, and Fig. 4 a partial vertical cross-section at line $x x$ of Fig. 1.

In the several figures the same parts will be found designated by the same letters of reference.

A A are the track-beams or elevated tramway in connection with which I have practiced my present invention. At suitable distances apart on said tramway are erected and securely supported two metallic arches, B B, and also an intermediate arch, C, and at the locality between the arches B B the inner upper edges of the track-beams A are chamfered off, as most clearly seen by reference to Fig. 3.

D is a cage-like weighing-platform composed, as shown, of a series of metallic arches

connected together by longitudinal brace-bars, (the whole being suitably cross-braced to give the cage rigidity,) and the lower inner ends of the arch-like pieces have securely fastened to them angle-irons n , (see Fig. 3,) which form a continuation of the interrupted track-irons a of the tramway. These track-irons n are adapted to receive and support the wheels O O of the conveying-machines (shown at II) whenever the same may travel or pass from the track $a a$ of the tramway onto and over the track $n n$ of the platform or cage D. At Fig. 3 the wheels of the machine are shown as traveling upon the track-irons of the platform D. This track-platform is suspended at four points, and near each end by suspension-loops s , which are hung upon hooks that are suspended at their eyes upon the knife-edged supports b of two levers or scale-beams, E, that are in turn hung upon knife-edges at their outer ends, and which are supported at their adjacent and inner ends upon similar knife-edged supports, in a manner to be presently explained. These levers or scale-beams E are each supported at the outer end upon knife-edged bearings c , which rest and bear in loops that are hooked into fixed suspender-rods p , that depend from the tops of the metallic arches B, all as best seen by reference to Fig. 1. The inner and adjacent ends of said scale-beams E are supported by knife-edges e and e^2 , which have their bearings in the eyes of the loop or link f , the upper end of which is hooked into a pivoted link, g , that in turn rests upon a knife-edge, i , (see Fig. 4,) which is permanently secured to the middle part of the lever-arm d , one end of which is suspended by an articulation at h from the top of the metallic frame C, and the other end of which is connected with a hook, m , to a loop which passes over the knife-edged journal J of the scale-beam G. This scale-beam G is pivoted at k by a knife-edged journal in the upper end of a stand, l , which is securely bolted to and projects a short distance above the middle arch or metallic frame, C, and between this pivotal connection k and the end of the longer arm of the scale-beam G said scale-beam is pivoted by the knife-edged journal w to a loop or link, which is hooked to the upper end of a strong spiral spring, I, the

lower end of which is anchored to a fixed part of the frame-work of the apparatus.

M is an indicator or register wheel, which is mounted to turn freely with or upon a vertical shaft, P, having a suitable step-bearing at its lower end and an upper bearing provided in the end of an angle-iron or bracket, Q, the vertical leg of which is securely bolted to one of the metallic arches B. This drum is rotated continuously with a uniform motion by any suitable means, preferably by clock mechanism, such as shown at S, through the medium of a driving band or cord, *t*, which, after having passed partially around the periphery of said drum M and thence over an idler at *r*, is provided at its lower end with a weight, *u*. This drum is designed to carry on its periphery an indicator-card or slip of paper, upon which are to be recorded, in a manner to be presently explained, the lines which indicate and register the weight or weights of the loads which may be placed upon the platform D, or which may travel over the same, and also the standard line or lines, by comparison of which, according to my system, the record of the load or loads weighed is to be ascertained. The outer end of the scale-beam G is connected by a suitable rod or piston, as shown at Fig. 1, with a dash-pot at L, designed to operate preferably with atmospheric air.

q is a vertical guide bar or way, against the inner face of which travels an anti-friction roller, *x*, that is mounted to turn freely on a stud secured in a stand that projects laterally from the outer side or face of the scale-beam G near its outer end, for a purpose to be presently explained.

r is a marker device or pencil, suitably mounted near the end of beam G at a point about coincident with a radius of the wheel M—that is, at right angles to the vertical plane in which the beam G lies.

In the working or operation of the machine so far described the placement upon or passage over the suspended platform D of any weight or load causes said platform to be slightly depressed, and in its descent it pulls upon the pivoted levers E E through the media of the connecting links or loops *s* and the knife-edged pivots *e*, causing the inner and adjacent ends of said levers E to pull down through the media of the knife-edged pivots *e* and *e*² upon the link *f*, which in turn exerts a downward pull through its connection at *g* on the knife-edged pivot *i* of the cross-lever *d*. This lever *d*, being articulated, as before described, at one end, is caused to slightly descend at its other end, thus pulling downwardly through the media of the bar *m* and knife-edged pivot *j* the shorter end of the scale-beam *g*, thus causing the outer or longer end of said scale-beam to ascend, and in this upward movement of the outer end of said scale-beam the pencil or marker device *r* is caused to draw in a nearly-vertical direction a line or mark upon the periphery or indicator card of the drum M. As this drum revolves continu-

ously, the line drawn will be slightly oblique, and when the load shall have been removed from or shall have passed entirely over the platform D the resumption by all the parts of their original positions will cause the marking device to draw a slightly-oblique descending line, the loop end of which will of course be at the same level as that in which the line first made began. As the marker device or pencil *r* remains continuously in contact by suitable spring-pressure with the periphery of the drum M or the paper placed thereon, said pencil will of course continue to mark in a horizontal direction on the drum-paper until the mechanism may be again operated by another load applied to or passing over the platform D.

During the operation just described the scale-beam G, when operated by the weight of a load on the platform D, is moved against the pulling tendency or resistance of the powerful coil-spring I, and it is this spring which acts as a motor when the platform shall have been relieved of its load to bring all the parts back to their original positions.

As in suddenly placing a load on the platform D, or suddenly causing a loaded car or truck to pass thereover, there is exerted a great tendency to effect a sudden jarring and vibration of all the parts, which would naturally tend to obstruct an even movement of the marking device, and which might operate to throw the long end of the scale-beam either above or below the exact limits to which the dead-weight of the load should cause it to move, I have combined, as already described, with the outer end of the scale-beam G a dash-pot, L, the function and effect of which is to prevent any sudden vibration of the long end of the scale-beam G without preventing said end from moving in either direction to the fullest extent to which the weight on and the releasement of the weight from the platform should move the scale-beam for the purpose of making a true registration of the amount of gravity of the load passing over the platform.

To avoid any possible vibration of the long end of the scale-beam G laterally, that might operate to and injuriously affect the perfect working of the spring-pencil or elastic marking device, I have provided a vertical guide or bar, *q*, and the small anti-friction roller *x*, mounted on one side of the scale-beam G, as shown and described, the function and effect of which devices are to cause the anti-friction roller to bear with little or no impediment to the motion of the scale beam against the inner face of the vertical bar *q* and to steady and hold the scale-beam laterally during its upward and downward movements.

It will be observed that the knife-edges or pivotal points of each one of the levers E, as well as those of the scale-beam G, are placed exactly in a right line, and this is an important and indispensable feature in the construction of my machine, although directly

opposite to the principle of construction necessarily and properly involved in scales or weighing contrivances in which the operation involves the balancing of some lever or beam in the operation of measuring the weight. In my machine, as there is no balancing of any of the beams or levers, but the registering operation, in order to be correctly done, must be effected by the action of vibrating parts, in which the leverage must remain exactly the same during their movements, this arrangement of the pivotal points exactly in line is of the utmost importance.

In the practical use of my machine so far, especially for the purposes for which I have employed it—namely, for ascertaining the separate and collective weights of a series of loaded trucks or cars passing over a bridge or tramway and of the empty returning cars, (in order to ascertain the aggregate weight of material delivered over the tramway within a given time)—I have adopted a system of depressing the platform periodically—say at morning, noon, and evening of each day—by the passage over it of what I call a “standard weight”—that is, a load of accurately-ascertained gravity—and then, by a comparison of the marks registered by the action on the platform of all the loaded and empty cars passing over during the day with either one of the marks made by the passage of the standard weight, (or with an average as to the lengths of said three marks, provided any variation between them appear,) I have ascertained the exact weights of the aggregate gross loads passing over the platform, and also the aggregate of the tare loads returned, a subtraction of one from the other of which of course shows accurately the amount of material that may have been delivered over the platform within a given time.

So far as the main or generic features of novelty involved in my machine are concerned, it is of course immaterial whether it be used in the way I have employed it or in some other manner or under entirely different circumstances. I therefore wish it to be understood that I do not limit myself in this application to a form of machine such as shown and described, and which is more especially adapted to be used for the purposes to which I have happened so far to have practically applied my invention. It may be found quite practicable for other purposes—for instance, such as for the purposes of hay and other stationary platform-scales embodying the primary or generic features of my present invention in a machine of quite different form and very different in its detailed construction from that shown and described. In any such modification of my machine, however, it will be indispensable to its accurate operation that the platform-sustaining system of levers have their pivotal connections arranged in line on each lever, and that some sort of device, either stationary or movable, be employed for the purpose of registering the extent of move-

ment of the long arm of the scale-beam G, and that some sort of standard measure or load be employed with which to draw comparison of the marks registered by weighing other loads for the purpose of ascertaining exactly the gravity of said other loads in substantially the manner hereinbefore explained.

In another application filed simultaneously with this, Serial No. 229,808, in which I have shown and described the same machine which constitutes the subject-matter of this application, I have set up certain specific claims on said machine, and I wish it to be understood that I set up no claim or claims in this application for any of the specific matters which may be covered by the claims of said other case.

Having now so fully explained the construction and operation of my improved weighing apparatus in that form in which I have successfully used it, what I claim, broadly, in this case, and desire to secure by Letters Patent, is—

1. In a weighing-machine specially adapted to weigh and record the weights of loads passing over a railway, the combination of the following instrumentalities, arranged and operating in substantially the manner hereinbefore set forth—viz., first, a suitable depressible platform provided with tracks which form continuations of those of the railway upon which the load to be weighed is supposed to travel and suitably supported in the proper relationship to said railway; second, the system of supporting-levers forming the connecting means between said depressible platform and its means of support, the final one of the series of said levers constituting the weight-indicating beam, and being arranged to move (by the depression of the depressible platform) in opposition to the resistance of a suitable spring; third, the marking device arranged at the end of the longer arm of said final one of the series of levers and operating to make marks of lengths corresponding with those of the movements of the end of said lever, and, fourth, a suitable surface for the registration thereon of the marks so made by the device at the end of said lever.

2. The combination of the following instrumentalities, all arranged and operating together in substantially the manner and for the purposes hereinbefore set forth: first, the railway over which the traveling loads to be weighed are supposed to travel; second, the depressible platform provided with rails which form continuations of the rails of said railway, and which is suspended from suitable supports in the proper relationship to said railway; third, the marking-beam G and an intermediate system of levers connected therewith and with each other, and operating to connect the said depressible platform with its means of support, and, fourth, a dash-pot applied to one of the levers, (preferably to the end of the longer arm of the final lever G,) and connected with some stationary part of

the apparatus, and operating, as specified, to prevent the marking device of the lever G making any movement beyond the point up to which it should move, in order to make a mark that will correctly indicate the weight exerted upon the depressible platform by the load being weighed, and to thus prevent any inaccuracy in the registration of the lines or marks employed for estimating the aggregate weight of the loads passed over the depressible platform.

3. In a weighing apparatus or contrivance adapted specially to the weighing of traveling loads, the combination of, first, the depressible platform D, suspended from suitable supports, and having its track arranged substantially in line with that of the railway over which the loads to be weighed are supposed to travel; second, a suitable supporting-frame operating to sustain the suspended and depressible platform; third, a resistant

spring connected at one end to the final one of the system of levers and at the other end to some stationary portion of the apparatus, and, fourth, a system of levers, each one of which has its pivotal or fulcrum points (or knife-edge bearings) arranged in a right line, in order that each and every one of said levers may work at all times with the same degree of leverage, and the final one of which system of levers operates to produce a record of marks, the various lengths of which correspond substantially with the variable movements of its longer arm, the said combination as a whole being and operating in the manner and for the purposes hereinbefore set forth.

In witness whereof I have hereunto set my hand this 31st day of August, 1886.

ALEXANDER E. BROWN.

In presence of—

E. T. SCOVILL,

CHAS. W. KELLY.