(No Model.)

W. J. MILLER.

WEIGHING SCALES FOR SUSPENSION TRAMWAYS.

No. 411,507. Patented Sept. 24, 1889.

FIG. 1.

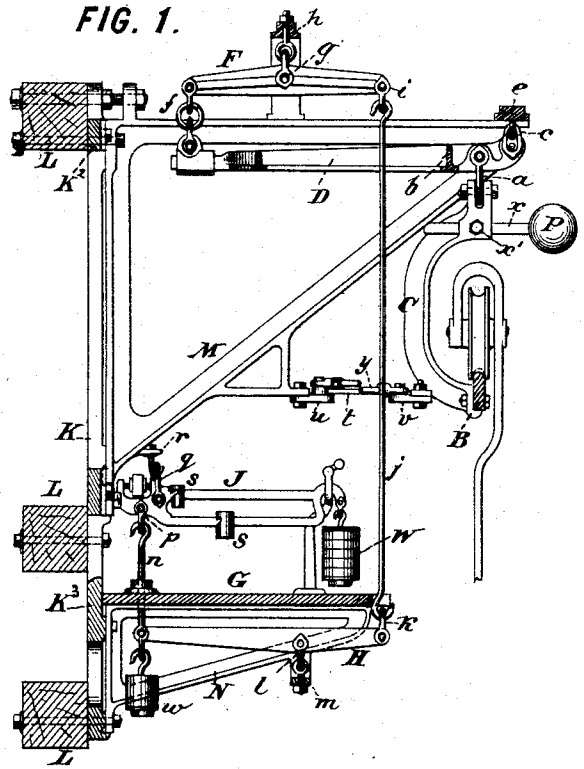


FIG. 2.

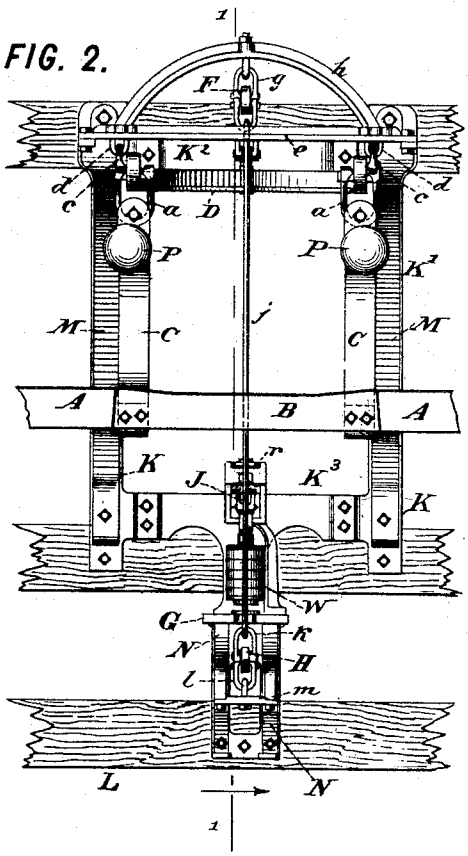


FIG. 3.

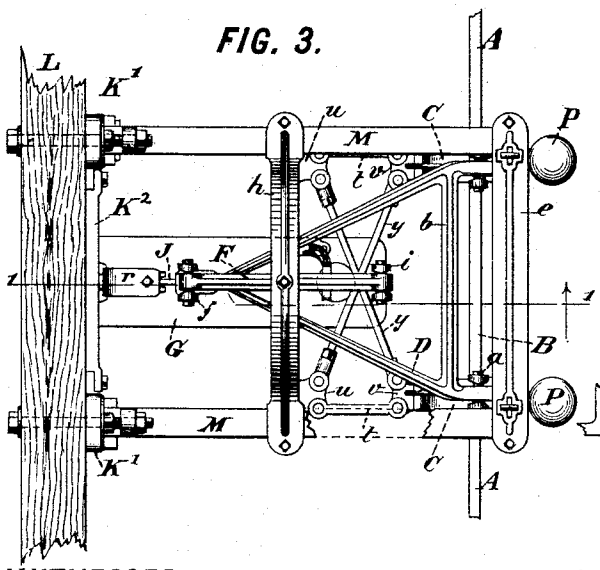


FIG. 4.

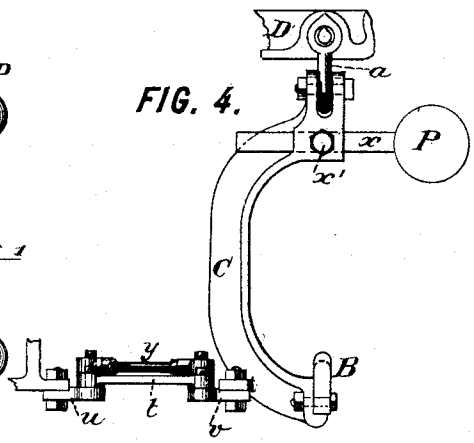


FIG. 5.



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WEIGHING-SCALES FOR SUSPENSION TRAMWAYS.

SPECIFICATION forming part of Letters Patent No. 411,507, dated September 24, 1889.

Application filed July 1, 1889. Serial No. 316,224. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. MILLER, a citizen of the United States, residing in Mamaroneck, Westchester county, State of New York, have invented certain new and useful Improvements in Weighing-Scales for Suspension Tramways, of which the following is a specification.

This invention relates to scales for weighing goods which are being carried by trolleys running on overhead rails, such as are used in slaughter-houses, foundries, packing-establishments, &c. It is usual with such scales to construct a short section of the track-rail or track separate from the adjoining fixed sections or rails and to suspend this section from the system of compound levers ordinarily used in weighing-scales. The trolley is run onto this movable section of rail, so that its weight hangs suspended from the weighing-levers, and while in this position it is weighed, after which the trolley is pushed along on the track. Scales of this character as heretofore constructed have either been very complicated or else have been wanting in sensitiveness by reason of the friction of the devices employed to resist the side-thrust to which the movable section of the rail is liable, whereby it tends to move out of line with the fixed rails.

My invention aims to simplify the weighing apparatus and avoid any such side-thrust, and thereby render the apparatus sensitive by the elimination of the friction that has heretofore been encountered in overcoming such thrust.

In the accompanying drawings, Figure 1 is a side elevation of my improved scale, partly in vertical section, taken generally in the plane of the lines 1 1 in Figs. 2 and 3. Fig. 2 is a front elevation of the apparatus. Fig. 3 is a plan thereof. Fig. 4 is a fragmentary elevation, on a larger scale, looking in the same direction as Fig. 1. Fig. 5 is a plan and side elevation of a detail on the same scale as Fig. 4.

The fixed rails of the overhead tramway or track are shown at A A in Figs. 2 and 3. No means for supporting them is here shown, as that forms no part of my invention. Between these rails is the movable section of rail B, which is fixed to two bent frames C C, which are carried back of the vertical plane of the rail sufficiently far to avoid interfering with the trolley during the passage of the latter. The position of the trolley is indicated in full lines in Fig. 1. The upper ends of the frames C C are arranged directly over the rail B and are hung by links *a a* from the terminal lever D of the series of compound levers of the scale. This lever D is of approximately the shape of a letter **A** in plan, as shown in Fig. 3, being formed with two arms at its fulcrumed end, which reunite in a single arm at the opposite end of the lever, being preferably strengthened by a cross-brace *b*. The front ends of the two arms of the lever D are fulcrumed by being hung by links from eyes *d*, attached to a cross-bar *e*, forming part of the fixed frame-work. The rear or front end of the lever D is hung by links *f* from a lever F, which is fulcrumed at its middle by means of a link *g*, suspended from and attached to an arched frame *h*, constituting also part of the fixed frame-work. From the opposite or front end of the lever F is hung a link *i*, and a rod *j* engages this link and is connected through a link *k* at its bottom end with a lever H. This lever is fulcrumed by a link *l* to a cross-piece *m*, constituting a portion of the fixed frame-work, and its rear end is jointed to a rod *n*, from which is hung a weight *w*, and which rod extends up through a table or plate G, and is hung by a link *p* from the scale-beam J, which is fulcrumed to a link *q*, hung from a track *r*, forming also part of the fixed frame-work.

The scale-beam J has the usual adjustable weights *s s*, and is counterweighted at its front end by weights W in the ordinary manner. All the link-connections referred to are constructed with knife-edge bearings in the manner well understood and commonly practiced in the construction of weighing-scales. The weight hanging from the movable rail B is transmitted through the frames C C to the lever D, and thence through the system of compound levers to the scale-beam J in a well-understood manner.

The fixed frame-work consists of a flat rectangular base-frame K, bolted to three horizontal tie-bars L L L, or to other suitable

support. The base-frame K consists of two vertical side bars K′, extending from the upper to the middle tie-bar L of an upper cross-bar K^2, connecting the upper ends of the vertical bars, and of a lower T-shaped frame or plate K^3, the horizontal part of which extends between the lower ends of the bars K′ K′, while the vertical part extends down and at its lower end is bolted to the lower tie-bar L. Two main brackets M M are bolted to the frame K and support the cross-bar *e* at their outer ends and the arched cross-bar *h* at their middles. Two smaller brackets N N are bolted to the lower or vertical part of the T-shaped frame K^3 and support the plate G and the cross-bar *m*.

In scales of this character the movable rail B requires to be so mounted or guided that it is incapable of moving or swinging out of line with the rails A A, as otherwise the trolleys would run off the track. To prevent this, various arrangements of stays have been adopted. In my improved scale the stays for preventing this lateral swinging consist of rods *t t*, which are arranged preferably in a horizontal plane and extending in directions at right angles to the longitudinal direction of the rail B. The respective rods *t t* connect with the respective ends of the rail B in order to prevent displacement of either end thereof. The rods extend between the track-plates *u u*, connected to the main brackets M M, respectively, and plates *v v*, connected to the frames C C, respectively. These plates *u* and *v* are all alike, one of them being shown detached in Fig. 5. Each plate has two pins *u′*, projecting vertically from it. The stay-rods *t* are formed with eyes at their ends which drop over these pins, that at one end engaging the pin of the plate *u* and that of the other the pin of the plate *v*. The eyes are made with V-edges to reduce the friction to the minimum, and there is sufficient looseness or lost motion between the eyes and pins to admit of a slight degree of swaying of the rail B in order not to bring the bearing-surfaces of the eyes and pins into frictional contact until the swaying motion of the rail reaches its limit.

For preventing longitudinal swaying movement of the rail B, which would bring the two ends into contact with the ends of the ascending fixed rails A A and thereby cause friction which would impair the sensitiveness of the scale, one or two longitudinal tie-bars *y y*, (two being employed by preference, as shown,) each of which connects by an eye at one end with one of the pins *u′* on one of the bracket-plates *u*, and extends thence diagonally to the bracket *v* at the opposite end of the rail B, with which bracket-plate its opposite end connects in the same manner. There is the same lost motion in these tie-bars to permit the rail B to hang and swing freely within certain limits.

Because of the necessary curving of the frames C C to the rear, taken in connection with the necessity of arranging the rail B as nearly as possible directly beneath its points of suspension at the links *a a*, the center of gravity of the suspended structure C C B is necessarily to one side of the vertical plane in which the rail is suspended, and it results from this that the rail B tends normally to swing out of lateral line with the rails A A, and consequently exerts a continual stress upon the stay-bars *t t*, which stress is not overcome but is more or less reduced in proportion by the additional weight superposed upon the rail B when the trolley is run onto it for weighing. To the extent that this side-thrust induces friction it interferes with the accuracy of the weighing. This has been a fruitful source of difficulty heretofore, and several complicated structures have been devised for overcoming it, such as the extending of the top of the frame C C to both sides after the manner of a T-frame and suspending both ends thereof by links from terminal levers D of the weighing apparatus, there being two of these levers instead of one, and the levers being turned with their free ends toward each other, being fulcrumed on axes extending transversely of the plane of the rail B instead of parallel therewith. According to my invention I overcome this difficulty in a very simple manner by providing counter-weights P P for the frames C C connected thereto through the medium of sliding rods *x*, as best shown in Figs. 1 and 4, adjustable out or in to vary the distance of the counter-weight from the pivotal plane, and fastened by set-screws *x′*. By the proper adjustment of these counter-weights the center of gravity of the suspended structure B C C P P can be brought exactly into the vertical plane of suspension, so that the rail B will tend to hang exactly in line with the rails A A, and will exert no side-thrust whatever against the stays; hence the scale is rendered as sensitive as possible and all friction heretofore introduced to attain such sensitiveness is avoided. This counterbalancing of the suspended structure of which the rail B forms part is the most important feature of my invention.

My invention admits of the stays, or at least the stays *t t*, being entirely omitted, since the rail B tends always to return to a position in line with the rails A A; or any other construction of stops to limit the lateral sway of the rail B may be substituted for the specific construction embodied in the stays *t t*.

It will be understood that my invention may be applied if one of the fixed rails A be omitted, the scale in such case being arranged at the terminals of the track or of a switch therefrom.

I claim as my invention the following defined novel features and combinations, substantially as hereinbefore specified, namely:

1. The combination, with the fixed rails of a tramway and a system of compound levers, of a movable rail and a supporting-frame therefor suspended beneath the terminal le-

ver of the compound-lever system in such manner as to be free to move or sway laterally, and said frame counterbalanced to cause the movable rail to gravitate to a position directly beneath its point of suspension.

2. The combination, with the fixed rails of a tramway and a system of compound weighing-levers, of a movable rail, two supporting-frames for the opposite ends thereof bent to one side of the vertical plane of the rail and suspended directly thereover from the terminal lever of the compound-lever system, and a counter-weight for said frame projecting to the opposite side of the vertical plane of the rail and connected to the frames through the medium of an adjustable connection, whereby its position may be shifted to bring the center of gravity of the suspended rail and its frames into the vertical plane of the rail and thereby cause the movable rail to gravitate to a position directly beneath its points of suspension.

3. The combination, with the fixed rails A A of a tramway and a terminal lever D and scale-beam J of a compound-lever weighing system, of a movable rail B, its suspension-frames C C, links *a a*, suspending them from the lever D, and counter-weights P P, adjustably connected to said frames through the medium of bars *x x*.

4. The combination, with the fixed rails of a tramway and a system of compound weighing-levers, of a movable rail and its supporting-frames suspended beneath the terminal lever of said compound-lever system and counterbalanced to bring the center of gravity of the suspended structure in the vertical plane of the movable rail, and stay-bars connecting the movable rail to a fixed part in order to limit its swaying movement and retain it in line with the fixed rails.

5. The combination, with the fixed rails of a tramway, of a movable rail B, its suspension-frames C C, terminating over it and counterbalanced to bring their center of gravity into the vertical plane of the movable rail, and the terminal lever D of the system of compound weighing-levers formed with two arms spread apart at their fulcrumed ends and suspended on a fulcrum-axis extending parallel with the vertical plane of the movable rail, and the suspension-frames of said rail connected to said arms of the lever adjacent to their fulcra and the arms of the lever united at its opposite or free end and there connected to the next lever of the compound-lever system.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM J. MILLER.

Witnesses:
GEORGE H. FRASER,
JNO. E. GAVIN.