July 4, 1933. K. AIHARA 1,917,080

WEIGHING DEVICE FOR WAGONS

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FIG 1

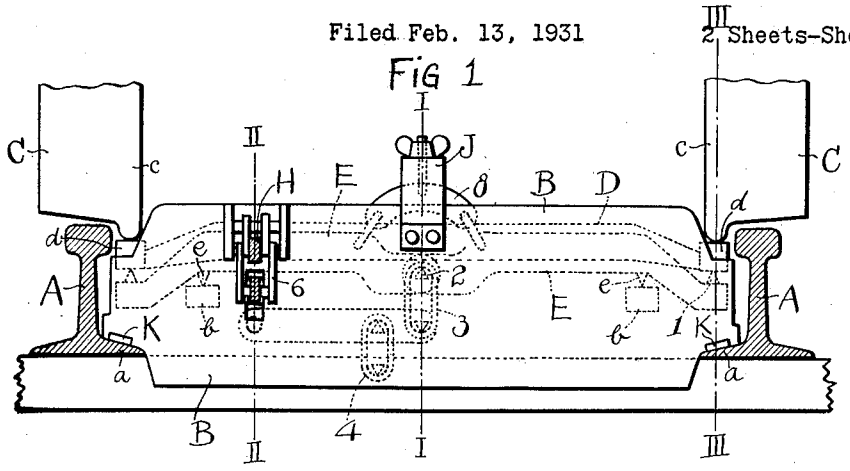


FIG. 2.

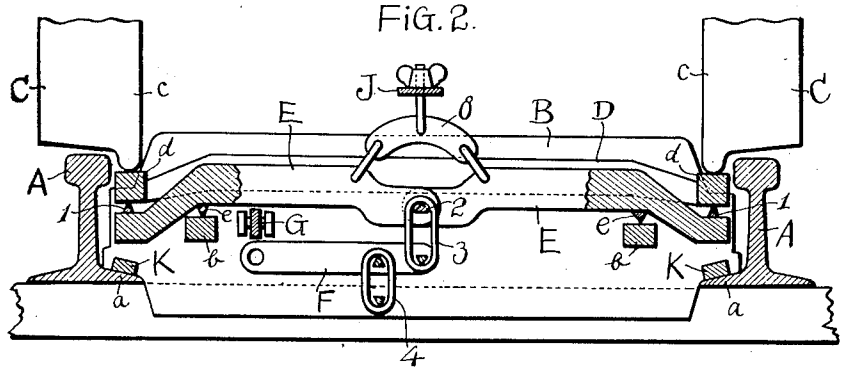
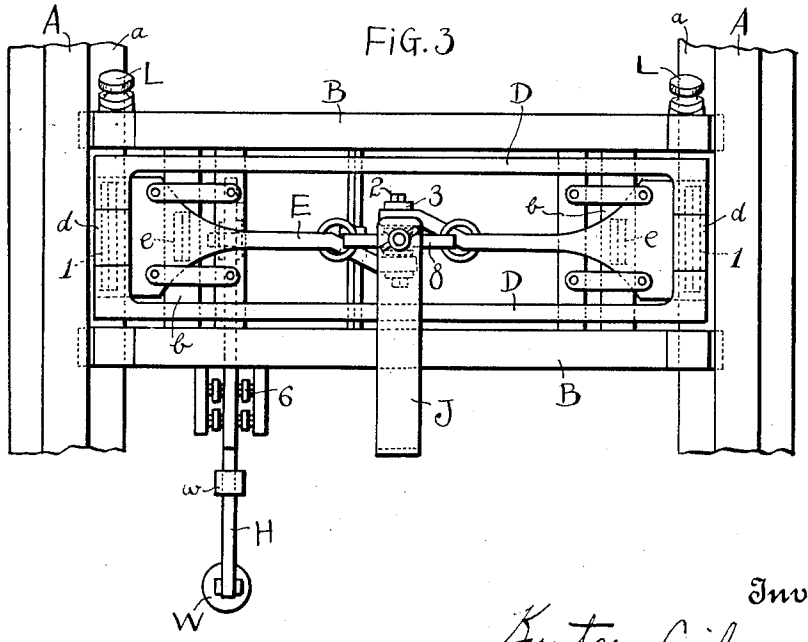


FIG. 3



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WEIGHING DEVICE FOR WAGONS

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FIG. 4

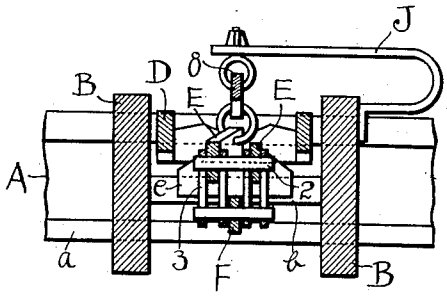


FIG. 5

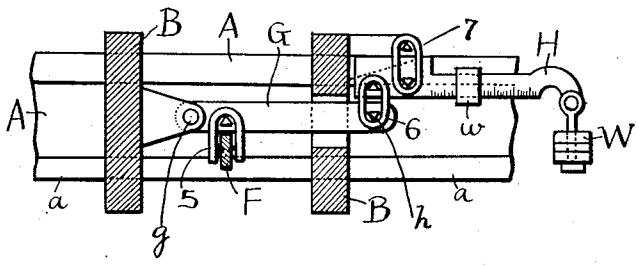
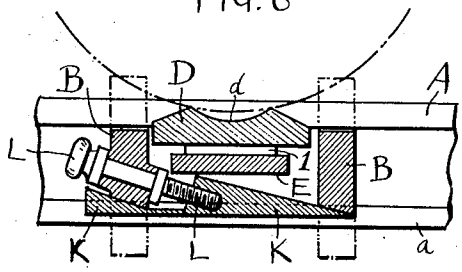


FIG. 6



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UNITED STATES PATENT OFFICE

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WEIGHING DEVICE FOR WAGONS

Application filed February 13, 1931, Serial No. 515,620, and in Japan March 6, 1930.

The present invention relates to an improvement in or relating to a device for weighing the load of a railway coach or wagon, consisting generally in making use of the established parallel rails, by providing a resting frame extending between the said rails in such manner that the loads acting on each side of the wheels after balancing by a rectangular receiving frame are transmitted to two main levers extending towards the centre of the device where the adjacent ends of the levers overlap and are pivotally connected together and where the loads are thus concentrated into a single load.

According to the other feature of the invention the action of the two main levers is controlled under the action of a balancing spring, and the rectangular receiving frame is limited in action in a very small degree by regulating wedges, so that the device may be of considerably reduced size, while despite the small size it may be employed for weighing such heavy loads as loaded railway cars or wagons.

Heretofore it has been necessary for such weighing purposes to build an underground chamber for arranging a hoisting machine and a weighing machine. The present invention, instead of such arrangement, provides instead a simple handy device that can be easily placed in position, which will not obstruct the railway track against the passage of railway cars or wagons and by which a very accurate weighing may be effected in spite of the device being of such comparatively small dimensions.

The accompanying drawings illustrate one example of carrying out the present invention, in which:

Fig. 1 is an elevation,

Fig. 2 is a central sectional elevation;

Figure 3 is a plan thereof; and

Figures 4, 5 and 6 are sections taken on lines I—I, II—II and III—III of Fig. 1 respectively.

Referring to the drawings, A, A are the two parallel rails of a railway track, formed with bases *a*, *a*; B, B are the two main beams of the main frame connected to each other by the intervening bars *b*, *b* respectively connected at their end portions to the respective adjacent end portions of the respective beams B, B to complete the main frame structure. The main beams B, B are so formed that in use the lower faces of their respective end portions will rest on, and be supported by, the said bases *a*, *a* of the respective rails A, A of a railway track as illustrated; C represents the car or wagon wheels, each formed with the usual guide flange or projecting rim *c*; D is a load supporting frame of rectangular form, the two ends *d*, *d* of which are respectively disposed adjacent the respective rails A, A in the path of travel of the rims *c* of the wheels C respectively traversing the respective rails A. Each said end *d* of said frame D is of inverted V shape and provided in the centre with a recess to receive the projecting rims of the wheels. E, E are the two main levers, each pivoted or fulcrumed at *e* on the corresponding connecting bar *b* of the main frame, and have ends to support the abutting ends *d*, *d*.

The inner ends of the main levers E overlap and are pivotally connected together by knife edge pivot pins 2 and have their outer ends disposed beneath the respective ends *d* of the supporting frame D. Knife edge supports or fulcrums 1 mounted on or supported by the upper face portions of the respective extreme outer end portions of main levers E being centrally disposed beneath the respective end *d*, respectively serve to yieldingly and rockably support the same. As to each lever E it is to be noted that the fulcrum point *e* supported on the corresponding rod *b* is disposed between the outer fulcrum point 1 and the inner pivotal connection point 2, so that each main lever E rocks in a vertical plane about its fulcrum *e* in accordance with the weight or thrust exerted on the fulcrum 1 on the one hand as opposed by the weight or mechanism on the other hand. Rings 3 passing about the knife edge pivot pin 2 and a similar knife edge extending through a connection lever F serve to connect the knife edge 2 with the usual scale beam H through intervening connecting ring 5, lever G and link 6, the lever G being pivotally mounted as at *g* to one of the main frame members B and extending through the other frame member B and the scale beam H having a fulcrum point *h* supported by means of a ring 7 extending about or encircling said fulcrum or knife edge *h* and a corresponding knife edge or fulcrum point disposed above the same and supported by a bracket extending from the last mentioned main frame member B. Weights W and *w* are provided as usual for cooperation with

each other and with the scale arm H for indicating the weight of a particular loaded car or wagon. The lever F is connected intermediate its points of connection with the lever G and the pivot pin 2, to one or both of the main frame members B for swinging movement in a vertical plane by means of a ring or rings 4 embracing knife edge pivots respectively extending through said lever F and between said members B.

J is a balancing spring, secured at one end to a part of the machine frame and at the other end connected through a hanger 8 to the first levers E, so that the latter may be pressed up to compensate for the error which might occur in weighing. K are wedges placed on the points of the rail bases which the ends of the resting frame are brought in contact. The rotation of a bolt L acts to adjust the height of the resting frame.

The operation of the device as constructed above is as follows: The main frame B is disposed between rails A, A at any desired place where the weighing is to be performed. The two ends of the resting frame rest stably on the bases *a*, *a* of the rails. Corresponding to the shape of the rails and of the wheels the bolts L are rotated as required, causing the wedges K to advance and retreat, whereby the height of the main frame is adjusted, the ends *d* of the supporting frame D are slightly projected upward of the rails, the wheels are induced to rotate and by displacing themselves, to ride on the ends *d*, and thus the wheels may be detached from the rails.

The weights W, *w* are increased or reduced, then the load carried by the front part of the wagon, or by the axle of the wheel at the back of the wagon is transmitted through the two wheels onto the supporting frame D, when the said load acts, through the first, second, third, and fourth levers, E, F, G and H, upon the weights W, *w*, so that the load may be weighted. Simultaneously the balancing spring J acts at the central part where the main levers E are connected together, so as to pull them up through the medium of the lever 8. By this means the accuracy in weighing is easily obtained, and also the device according to the invention may be so reduced in size that it may suitably be accommodated between the rails at any desired places.

It is to be noted that the means for mounting the main frame between the rails, must be of the same width as the span between the rails, and also must not project considerably from the tramp surface of the rail. The main frame, being supported on the inclined surfaces of the bases of the rail, is subjected to two opposite forces acting toward the centre at the ends of the resting frame, and under this condition the latter is kept in a more stable position.

It should be appreciated that the means consisting of the two main levers, which press the wheel upwards through the rectangular supporting frame on which the projecting rims of the wheel are resting, is adapted for such purposes as follows: The loads acting upon the two wheels carried by an axle on each side are first received by the rectangular supporting frame, and thence transmitted through the main levers and concentrated at the point of connection of said main levers E, and as a load so concentrated, it may further be transmitted to the second, third, and fourth levers, in the order. By this means also it is assured that the weighing device according to the invention may be prevented from receiving unbalanced weights which break its accuracy, since the load, after equalized by the rectangular supporting frame is transmitted to the main levers E.

The compensating means comprising the balancing spring may act so to limit the scope of action of the various levers mentioned that the device forming the object of the invention may easily be disposed between the rails so that it will not impede or obstruct the passage of railway cars or wagons over the track. Of course, the said means is also for making possible for a weighing device of such small size as in the invention to weigh a considerable load, without inaccuracy.

It may also be understood that the wedges are for making the scope within which the various levers act, as small as possible, when the wheel is pressed up. It is sufficient for such purpose if the abutting ends are raised up slightly over the height of the rail, while this is adjustably done under the compensating action due to the balancing spring.

I claim:

1. A weighing device comprising a main frame adapted to be disposed between the rails of a railway track with the respective end portions of said frame in overlapping relation with respect to, and adapted to be supported by, the respective opposed inner base flanges of the respective rails of said track, two main levers respectively fulcrumed in said main frame between their respective inner and outer end portions, and means connecting the adjacent inner end portions of said main levers for relative swinging movement, the respective outer end portions of said levers being located closely adjacent to, and below the level of the treads of, the respective adjacent rails and adapted to receive the thrust of the weight of the car wheels and the loads carried thereby, in combination with counterpoise and weight indicating mechanism and an element for connecting said connecting means with said mechanism.

2. A weighing device comprising a main

frame adapted to be disposed between the rails of a railway track with the respective end portions of said frame in overlapping relation with respect to, and adapted to be supported by, the respective opposed inner base flanges of the respective rails of said track, two main levers respectively fulcrumed in said main frame between their respective inner and outer end portions, means connecting the adjacent inner end portions of said main levers for relative swinging movement, the respective outer end portions of said levers being located closely adjacent to, and below the level of the treads of, the respective adjacent rails and adapted to receive the thrust of the weight of the car wheels and the loads carried thereby, and resilient means tending to move the main levers to normal position, in combination with counterpoise and weight indicating mechanism and an element for connecting said connecting means with said mechanism.

3. A weighing device comprising a main frame adapted to be disposed between the rails of a railway track with the respective end portions of said frame in overlapping relation with respect to, and adapted to be supported by, the respective opposed inner base flanges of the respective rails of said track, two main levers respectively fulcrumed in said main frame between their respective inner and outer end portions, means connecting the adjacent inner end portions of said main levers for relative swinging movement, the respective outer end portions of said levers being located closely adjacent to, and below the level of the treads of, the respective adjacent rails and adapted to receive the thrust of the weight of the car wheels and the loads carried thereby, wedge blocks adapted to be interposed between the lower faces of the respective end portions of said main frame and the upper faces of the corresponding base flanges of the respective rails, and means mounted in said main frame for adjusting said blocks to adjust said main frame in a vertical direction with relation to said rails, in combination with counterpoise and weight indicating mechanism and an element for connecting said connecting means with said mechanism.

4. A weighing device comprising a main frame adapted to be disposed between the rails of a railway track with the respective end portions of said frame in overlapping relation with respect to, and adapted to be supported by, the respective opposed inner base flanges of the respective rails of said track, a supporting frame having its ends disposed adjacent to the said rails respectively and so located in a vertical direction as to be adapted to be engaged by the peripheral faces respectively of the wheels of a car on said track, two main levers respectively fulcrumed in said main frame between their respective inner and outer end portions, means connecting the adjacent inner end portions of said main levers for relative swinging movement, fulcrum points interposed between the upper faces of the respective outer end portions of said levers and the lower faces of the respective end portions of said supporting frame and respectively rockably supporting the latter, and resilient means tending to move the main levers to normal position, in combination with counterpoise and weight indicating mechanism and an element for connecting said connecting means with said mechanism.

5. A weighing device comprising a main frame adapted to be disposed between the rails of a railway track with the respective end portions of said frame in overlapping relation with respect to, and adapted to be supported by, the respective opposed inner base flanges of the respective rails of said track, a supporting frame having its ends disposed adjacent to the said rails respectively and so located in a vertical direction as to be adapted to be engaged by the peripheral faces respectively of the wheels of a car on said track, two main levers respectively fulcrumed in said main frame between their respective inner and outer end portions, a pin pivotally connecting the adjacent inner end portions of said main levers, the respective outer end portions of said levers supporting the respective end portions of said supporting frame, in combination with counterpoise and weight indicating mechanism and means for connecting said pin with said mechanism.

6. A weighing device comprising a main frame adapted to be disposed between the rails of a railway track with the respective end portions of said frame in overlapping relation with respect to, and adapted to be supported by, the respective opposed inner base flanges of the respective rails of said track, a supporting frame having its ends disposed adjacent to the said rails respectively and so located in a vertical direction as to be adapted to be engaged by the peripheral faces respectively of the wheels of a car on said track, two main levers respectively fulcrumed in said main frame between their respective inner and outer end portions, a pin pivotally connecting the adjacent inner end portions of said main levers for relative swinging movement, the respective outer end portions of said levers supporting the respective end portions of said supporting frame, and resilient means tending to move the main levers to normal position, in combination with counterpoise and weight indicating mechanism and means for connecting said connecting means with said mechanism.

In testimony whereof I affix my signature.

KYUTARO AIHARA.