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DEVICE FOR REDUCING AMOUNT OF ENERGY REQUIRED FOR PROPULSION OF WHEELED VEHICLES.

APPLICATION FILED JUNE 1, 1910.

1,000,564. **Patented Aug. 15, 1911.**

Fig. 1

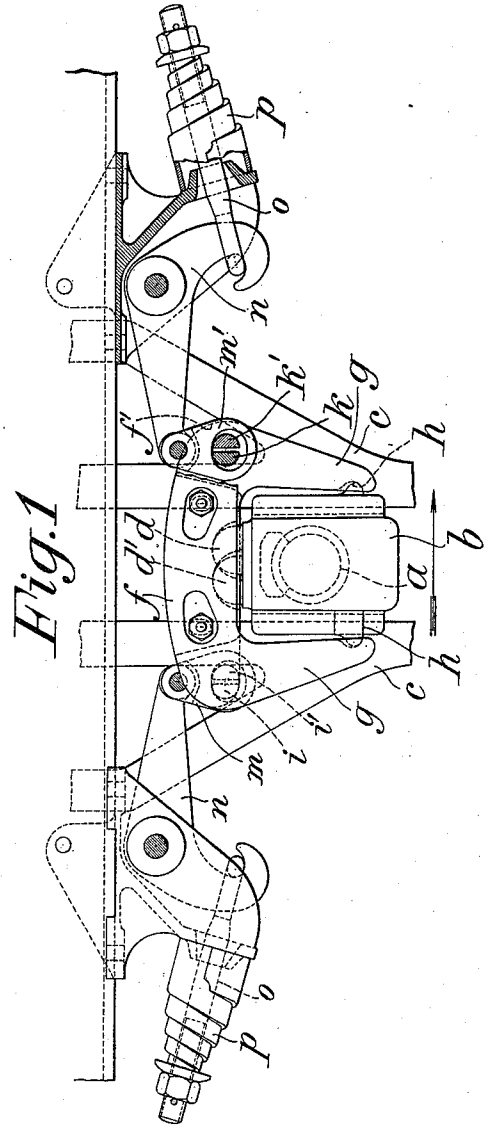
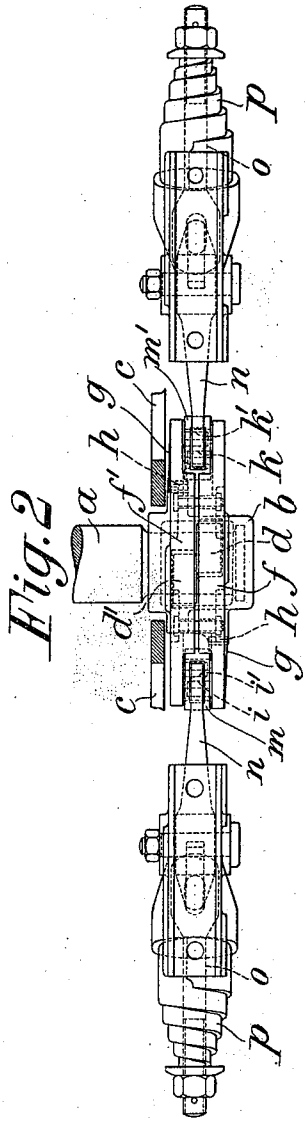


Fig. 2



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DEVICE FOR REDUCING AMOUNT OF ENERGY REQUIRED FOR PROPULSION OF WHEELED VEHICLES.

1,000,564. Specification of Letters Patent. **Patented Aug. 15, 1911.**

Application filed June 1, 1910. Serial No. 564,370.

To all whom it may concern:

Be it known that I, COLOMAN STEFAN, subject of the King of Hungary, residing at Vienna, Austria-Hungary, have invented certain new and useful Improvements in Devices for Reducing the Amount of Energy Required for the Propulsion of Wheeled Vehicles, of which the following is a specification.

This invention relates to a device which can be mounted on railway and tramway cars and by means of which the energy required for the propulsion of such driven or drawn vehicles can be reduced by a constant assistance rendered to the tractional power.

This device chiefly consists in providing for each axle box generally two symmetrically arranged levers, each of such levers having unequal arms and either one or the other of said levers becoming operative according to the direction of driving; said levers being adapted to take up the pressure of the load and to transmit it to a point on the circumference of the axle of the carriage, situated in front, as regards the direction of traveling of the axis of the axle, so that a portion of the said load pressure acts on the axle or on the vehicle wheel secured to the same, as a tangential force in the direction of the rolling movement of the said wheel and thus assists the tractional power driving said axle. The ends of each of the levers are suspended in such manner that the carriage axle which is driven and is therefore in advance of the carriage frame as compared with its normal position relatively to the same, can effect a shifting of a lever relatively to its points of suspension and that the load pressure is transmitted to that of the two levers which in accordance with the direction of driving is to become operative without the lever in question losing its support on the axle box. The tendency of the axle box, due to the bearing pressure of the lever on the same acting in a one-sided manner to effect a tipping movement in the direction of driving, which would interfere with the free mobility of the axle box in its bearing fork, is counteracted by the component of the load pressure which is acting on the longer arm of the lever, bringing about an oscillation of the lever and thus pressing a downward extension of the said longer arm laterally against the axle box. This pressure acts, relatively to the latter, in opposition to the bearing pressure and the couple of forces thus produced keeps the axle box in its proper position.

The drawing shows by way of example a construction of such a device for tramcars, in Figure 1 in side elevation and in Fig. 2 in plan.

The carriage axle a secured to the vehicle wheel is mounted in the usual manner in the axle box b which is guided in the bearing fork c of the carriage frame. On the axle box, on the upper face of the same are provided two projections d and d' situated in different vertical planes and arranged at opposite sides of the vertical plane passing through the axis of the axle. These projections form supporting and pivoting points for two similar levers f and f' arranged symmetrically relatively to each other, each of which is formed with two arms of unequal length, the longer one being provided with a downwardly projecting arm marked g. On each lateral cheek of the axle box b is provided a projection h forming a bearing or support for the corresponding arm g. The levers f f' are provided at each of their ends with pins i k or i' k' which project laterally from the levers inward toward each other and project in couples, namely the pins i i' and the pins k k', through elongated holes that are provided in links m m' projecting between the levers. These links take up the load pressure and for this purpose are pivoted in a suitable manner, for instance by means of levers n, rods o and springs p, to the car frame. In the position of rest of the vehicle, they rest on the couples of pins i i' and k k' and transmit the load pressure to the levers and, by means of the latter to the axle box.

When the car axle a is advanced by a tractional force for instance in the direction of the arrow, it travels in advance of its normal position relatively to the car frame, owing to the inertia of the latter. During the said advance, the links m m' are oscillated about their pivotal points on the levers n in the direction of the movement of the car, and accordingly the said links will now bear only against the pins i k of the lever f which is also moved in the direction of driving by the said oscillation, while the pins i' k' of the other lever

f' become free, so that the latter is not affected by the load pressure. The load pressure which is acting at the pivotal points of the levers n is transmitted by the lever f to its supporting projection d on the axle box and as the said projection is situated in front (relatively to the direction of movement) of the axis of the axle, the load pressure will act on the axle box or on the car wheel eccentrically to the latter and exercise a turning action on the same in the direction of driving, the projection d rolling in the recess of the lever f within narrow limits. This tipping movement of the axle box is limited by the projection g on the lever f, against which projection bears when the axle box is oscillated the lateral projection h situated on the lateral cheek of the axle box, which is at the rear, as regards the direction of traveling. This action of the load pressure is exercised at each vibration and shock which owing to the unevenness of the track and to the rail joints acts on the axle. Impulses quickly following each other, are then exercised eccentrically on the axle and in the downward direction and act on the said axle so as to turn it, while at the same time the springs p are compressed by means of the links m m' and levers n; the expansion of the said springs slowly taking place after each shock. These impulses continuously taking place at short intervals act on the car axle in the direction of traveling and therefore, reduce the energy required for its propulsion. When the vehicle is traveling in the opposite direction, the same process takes place, but by means of the other lever *i. e.* f' and of the axle box projection d' as well as of the pins i' k', so that as before the amount of energy required is reduced.

In the case of a car that is being drawn or pulled the carriage frame at starting, travels in advance of its normal position relatively to the wheel axle, owing to the inertia of the latter and of its wheels. In order to enable the device to be utilized also in this case, the pins i k are interchanged with the pins i' k', that is to say, the pins i, k are mounted on the lever f' and the pins i' k' on the lever f, so that when the traction is again exercised in the direction of the arrow, the transmission of the load pressure is effected to the pins i' k' and by the latter, to the lever f which in the same way as described in the preceding case for a motor driven car, acts on the bearing d or on the axle box.

It is obvious that in cars in which only one direction of traveling need be considered, for instance in automobiles, one of the two levers f f' together with the parts belonging to it, may be omitted.

Claim.

1. In a device of the character described, the combination with an axle box, a lever pivoted intermediate its ends on said box in advance of the center of the axle in the direction of travel, and means at the ends of said lever to sustain the load.

2. In a device of the character described, the combination with a vertically movable axle box having slight lateral play of a lever pivoted on said box laterally of the vertical plane through the axis of the axle and having an extension engaging the side of the box, and yielding means to load the ends of said lever.

3. In a device of the character described, the combination with a vehicle body or frame and a substantially vertically slidable axle box having lateral play of a lever pivoted intermediate its ends and eccentrically on said box and having a downward extension engaging the side of the box, links pivoted at one end on the ends of the lever, and spring-held levers between the body or frame and said links.

4. In a device of the character described, the combination with a slidable axle box having lateral play of a pair of levers pivoted on said box to opposite sides of its center thereby uniformly loading it, each of said levers having a downward extension engaging a side of said box, means to load the ends of said levers including means to shift the load from one lever to the other in accordance with the direction of lateral movement of said box.

5. In a device of the character described, the combination with a slidable axle box having lateral play of a pair of levers pivoted on said box at opposite sides of its center, each lever having a downward extension engaging a lug on a side of the box and said levers presenting lever arms of unequal length on opposite sides of their pivot points, a pin projecting from each end of said levers, links engaging the two pins at each end of said levers and a spring-held lever connected to each link.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

COLOMAN STEFAN.

Witnesses:
JOSEF RUBURCEN,
AUGUST FUGGER.