

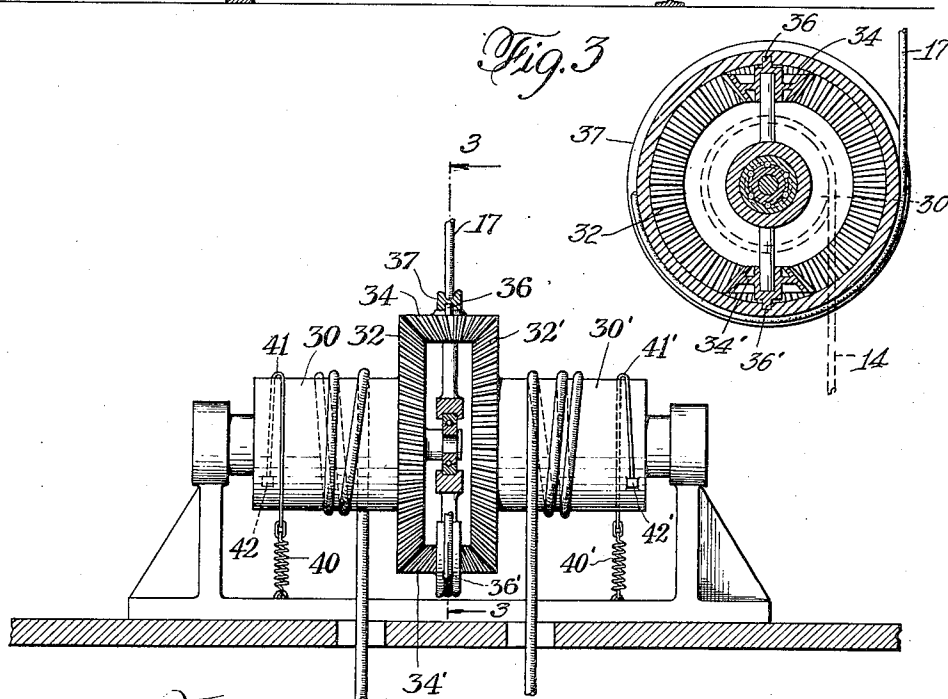
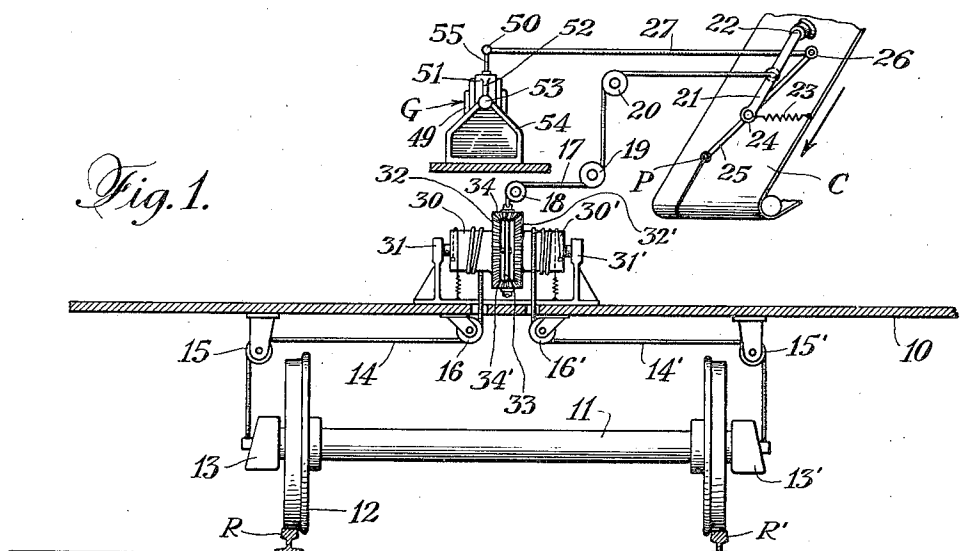
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TRACK RECORDER MECHANISM

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TRACK RECORDER MECHANISM

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This invention relates to track recorder mechanism and more particularly to mechanism for giving a representation of differences in elevation between the rails of a track. Such devices are usually mounted upon a recorder car adapted to travel along the track and said car is provided with cables extending downwardly on either side into engagement with a journal box at each side of one of the car axles. Any inclination of the axle due to differences in elevation between the rails of the track will cause said cables to operate differentially upon a suitable difference in elevation representation mechanism.

The difficulty inherent in the above general method of determining differences in elevation between the rails of a track resides in the fact that there is relative movement between the recorder car body and the truck axle on which said body is mounted by reason of the spring suspension, and such movement causes operation of the difference in elevation representation mechanism when the car-body moves relative to the axle in the same manner as when said axle moves in response to differences in elevation between the rails of a track. Thus an error is introduced unless some means can be found for correcting for vertical bounce and inclination of the recorder car body whereby the representation mechanism will represent only difference in elevation between the rails of the track.

It is the principal object of my invention, therefore, to provide an arrangement of mechanism whereby the movements of the recorder car body will not affect the difference in elevation representation mechanism which will therefore represent only differences in elevation between the rails of a track.

Further objects and advantages of this invention will become apparent in the following detailed description thereof.

In the accompanying drawing,

Fig. 1 is a vertical section through a recorder car having my invention applied thereto, portions of said car having been removed and certain of the elements being shown diagrammatically.

Fig. 2 is an enlarged view of a portion of the mechanism shown in Fig. 1.

Figure 3 is a section taken substantially on the line 3—3 of Fig. 2.

Referring to the drawing, my recorder mechanism is shown as mounted upon a recorder car comprising car body 10 and a truck, one axle 11 of which is shown carrying wheels 12 and supported in journal boxes 13, 13' on the truck frame,

not shown. The purpose of the recorder mechanism is to record differences in elevation between the rails R, R' of a track. For this purpose cables 14, 14' are attached to the journal boxes 13, 13' and are led over rollers 15, 16 and 15', 16', fixed to the underside of the car body and thus by way of a differential mechanism (to be described hereinafter) to operate a cable 17, passing over a plurality of guide rollers 18, 19 and 20 mounted on the car body to actuate a lever 21 universally pivoted at 22. Such actuation of lever 21 by cable 17 is against the action of a spring 23. Said lever 21 is pivoted at its end 24 to a pen arm 25 carrying pen P and pivoted at 26 upon a link 27 which is held fixed by a gyroscope G to be described hereinafter.

The cables 14 and 14' extend over rollers 30 and 30' and are wrapped around the same in opposite directions, said rollers being journaled at one end in brackets 31, 31' and carrying at their inner ends bevelled gears 32, 32' of a differential mechanism. Between said bevelled gears 32, 32' there is mounted a spider 33 which carries the differential gears 34, 34' which are pivoted for rotation on pivots 36 and 36' within a pulley 37 to which cable 17 is fixed. The said rollers 30 and 30' are normally biased to rotate in opposite directions by means of springs 40 and 40' acting on cables 41, 41' oppositely wound upon the said rollers 30 and 30' and fixed at their other ends at 42, 42' to the respective rollers.

The action of the mechanism will now become clear. If the axle 11 tilts in response to difference in elevation between the rails R and R', one of the cables 14, 14' will wind up on its roller while the other one will unwind, but since the cables are wound in opposite direction on their rollers this will cause both rollers to rotate in the same direction to carry the differential around as a unit. This will cause pulley 37 to be rotated and hence cable 17 to be moved in one direction or the other to operate lever 21 and pen arm 25 to cause pen P to make a record upon a continuously moving chart C.

In case the car body 10 bounces vertically with respect to axle 11, both cables 14 and 14' will wind on their rollers to an equal degree simultaneously, and since they are wound oppositely on their respective rollers said rollers will rotate in opposite directions to cause differential pinions 34 and 34' to rotate upon their pivots 36 and 36' and therefore will not cause any rotation of pulley 37 or movement of cable 17, and hence will not actuate pen P.

In the event that the car body 10 tilts with

respect to axle 11, the said tilt does not affect pen P by reason of the following action: As hereinbefore described, link 27 is pivoted at one end 26 to the pen arm 25 and at its other end 50 it is pivotally connected to a gyroscope which holds said pivot 50 fixed in space. The gyroscope is contained within a casing 49 which is pivotally mounted for movement about a horizontal axis within a vertical ring 51 which is in turn pivotally mounted for movement about a vertical axis in ring 52, said ring being pivotally mounted for movement on a horizontal axis 53 within a fixed bracket 54. Such a gyroscope has three degrees of freedom, i. e., freedom of movement around three axes, and therefore maintains its position in space so that the fixed post 55 connected to ring 52, and hence pivot 50, will be held fixed in space. If the car body tilts, the post 55 will remain vertical and the car body will thus tilt around pivot 50 and link 27. As the car body tilts, it carries with it the chart C but the link 27 remains fixed in space, thus causing pivot 26 to move with respect to the chart C in a direction opposite to the movement of the car body and hence will cause pen P to operate on chart C around the pivot 24 in the same direction as the car body movements. By suitably proportioning the parts, pen P may be caused to move to a degree proportional to said car body movements. Thus, the pen P will follow the chart C as the car body tilts and to the same degree, so that pen P remains fixed relative to chart C irrespective of the car body movements. With this construction it will be seen that when the car body 10 tilts with respect to axle 11, cables 14 and 14' will wind or unwind over rollers 30 and 30' in the same direction to cause rotation of pulley 37 and movement of cable 17 which would ordinarily actuate pen P but by reason of the fact that link 27 is held fixed in space the said pen P is operated in an opposite direction equal to the angular movement which would be imparted to the pen by reason of the movement of cable 17 caused by said car body tilt. Therefore pen P remains unaffected by said car body tilt. Similarly, if axle 11 and car body 10 both tilt at the same time, only the tilt of axle 11 will be transmitted to pen P because the tilt of the car body does not affect pen P, as hereinbefore described.

In accordance with the provisions of the patent statutes, I have herein described the principle and operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other equivalent means. Also, while it is designed to use the various features and elements in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a track recorder system comprising a car body mounted on trucks having axles, a difference in elevation representation mechanism within the car body and means whereby differences in elevation between the rails of the track actuate said mechanism, said means including a differential mounted on said car body and having side gears and a pinion, cables connecting said side gears with the respective ends of one of said truck axles, and a connection between said pinion and said mechanism.

2. In a track recorder system comprising a car body mounted on trucks having axles, a difference in elevation representation mechanism within the car body and means whereby differences in elevation between the rails of the track actuate said mechanism, said means including a differential mounted on said car body and having side gears and a pinion, cables connecting said side gears with the respective ends of one of said truck axles, said cables being so connected to said side gears that relative vertical movement between said axle and said car body rotates said side gears equally and oppositely, and a connection between said pinion and said mechanism.

3. In a track recorder system comprising a car body mounted on trucks having axles, a difference in elevation representation mechanism within the car body and means whereby differences in elevation between the rails of the track actuate said mechanism, said means including a differential mounted on said car body and having side gears and a pinion, cables connecting said side gears with the respective ends of one of said truck axles, said cables being oppositely connected to said side gears so that relative vertical movement between said axle and said car body rotates said side gears equally and oppositely, and a connection between said pinion and said mechanism.

4. In a track recorder system comprising a car body mounted on trucks having axles, a difference in elevation representation mechanism within the car body and means whereby differences in elevation between the rails of the track actuate said mechanism, said means including a differential mounted on said car body and having side gears and a pinion, cables connecting said side gears with the respective ends of one of said truck axles, a pulley connected to said pinion for movement therewith around the axis of said side gears, and a cable connection between said pulley and said mechanism.

5. In a track recorder system comprising a car body mounted on trucks having axles, a difference in elevation representation mechanism within the car body and means whereby differences in elevation between the rails of the track actuate said mechanism, said means including a differential mounted on said car body and having side gears and a pinion, cables connecting said side gears with the respective ends of one of said truck axles, a pulley connected to said pinion for movement therewith around the axis of said side gears, said pinion being rotatable about its axis in said pulley, said cables being oppositely connected to said side gears so that relative vertical movement between said axle and said car body rotates said side gears equally and oppositely to rotate said pinion around its axis in said pulley, and a connection between said pulley and said mechanism.

6. In a track recorder system comprising a car body mounted on trucks having axles, a difference in elevation representation mechanism within the car body and means whereby differences in elevation between the rails of the track actuate said mechanism, said means including a differential mounted on said car body and having side gears and a pinion, cables connecting said side gears with the respective ends of one of said truck axles, a pulley connected to said pinion for movement therewith around the axis of said side gears, said pinion being rotatable about its axis in said pulley, said cables being oppositely connected to said side gears so that relative vertical movement

between said axle and said car body rotates said side gears equally and oppositely to rotate said pinion around its axis in said pulley, and a cable connected at one end to said pulley and at its
5 other end to said mechanism.

7. In a track recorder system comprising a car body mounted on trucks having axles, a difference in elevation representation mechanism within the car body and means whereby differences in
10 elevation between the rails of the track actuate said mechanism, said means including a differential mounted on said car body and having side gears and a pinion, cables connecting said side

gears with the respective ends of one of said truck axles, said cables being so connected to said side gears that relative vertical movement between said axle and said car body rotates said side gears
5 equally and oppositely to rotate said pinion about its own axis, inclination of said axle causing unequal rotation of said side gears to revolve said pinion about the axis of said side gears and a connection between said pinion and said mechanism
10 whereby revolution of said pinion about the axis of said side gears actuates said mechanism.

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