Sept. 22, 1931. J. R. M. TISDALE 1,824,179

RECORDING DEVICE

Filed June 7, 1929 2 Sheets-Sheet 1

Fig. 2.

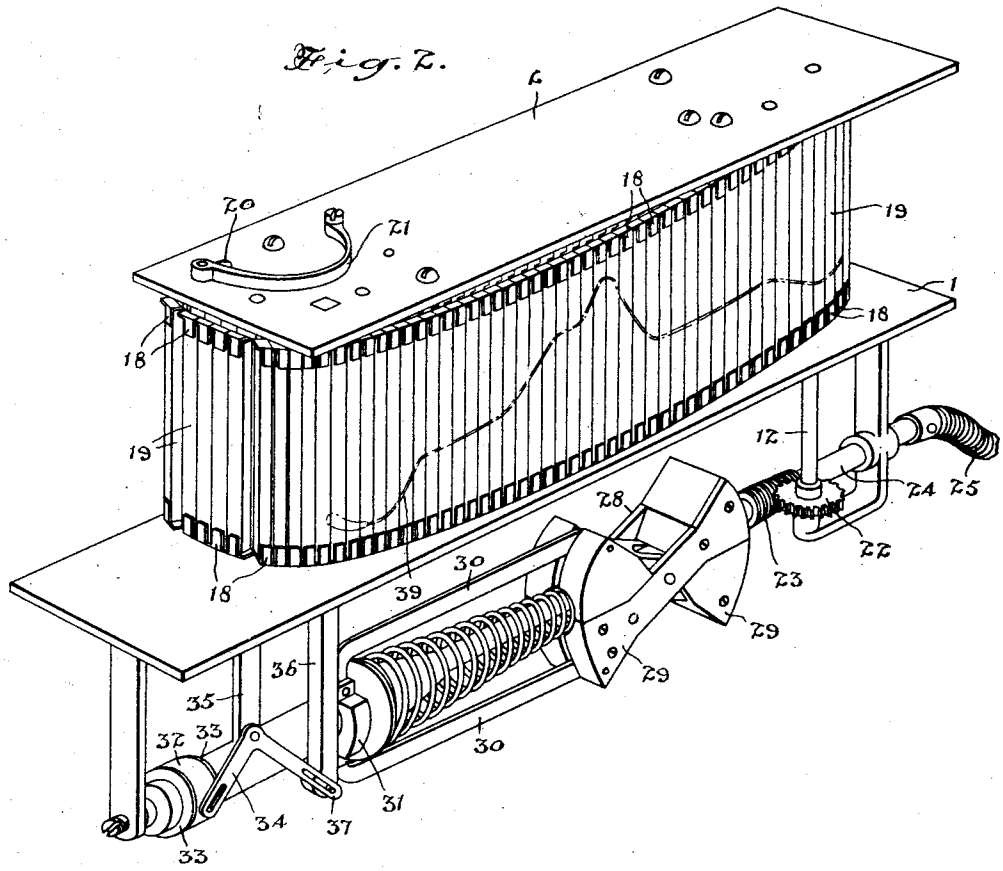
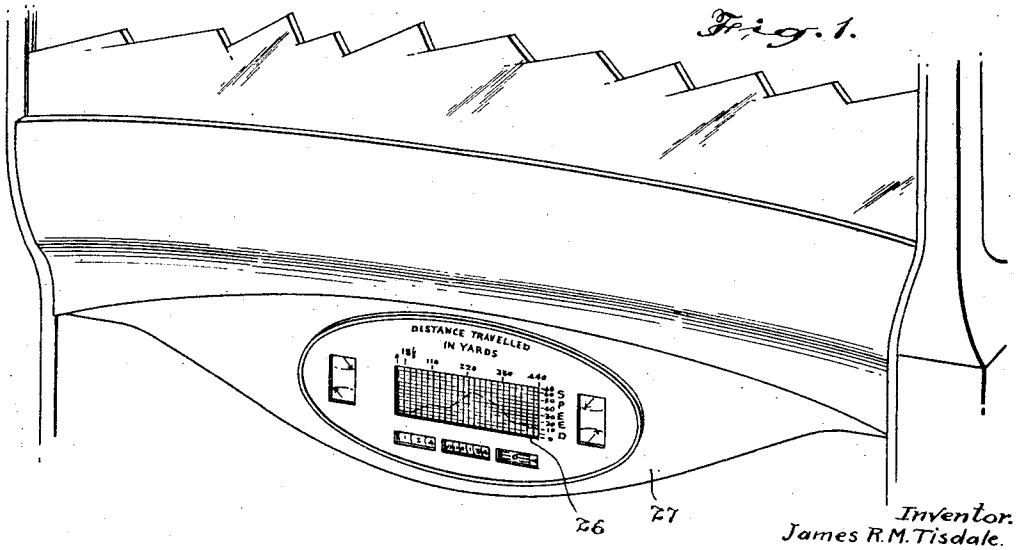


Fig. 1.



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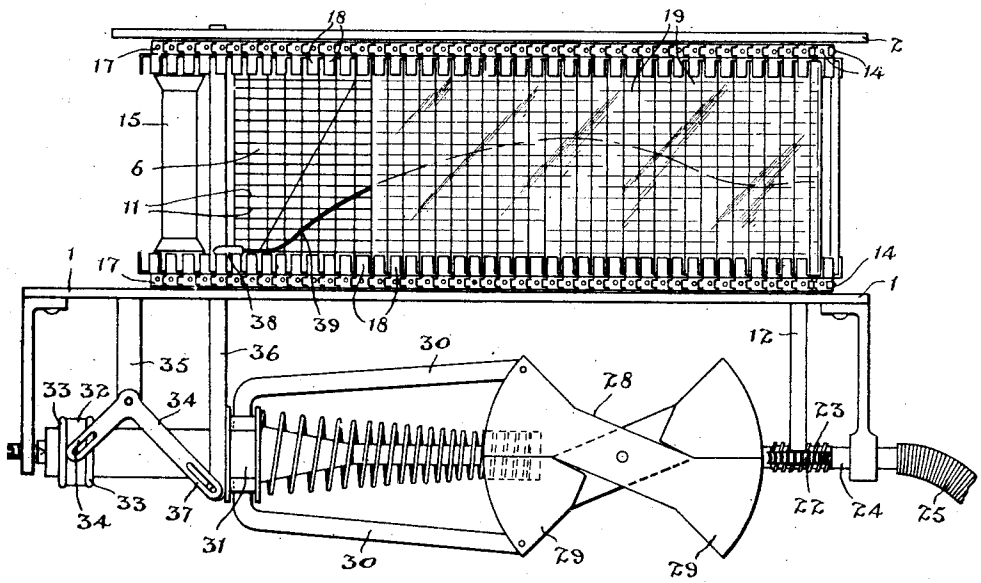


Fig. 3.

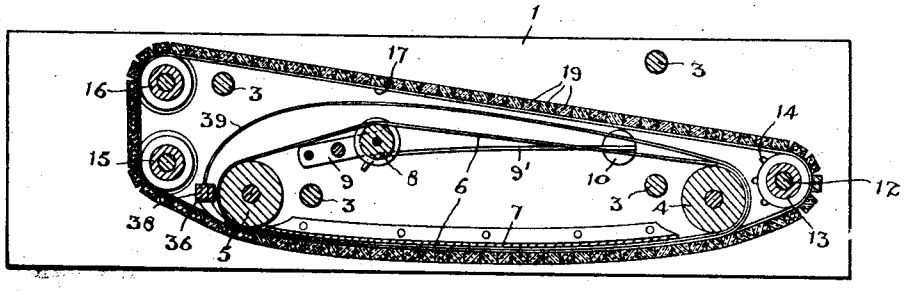


Fig. 4.

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1,824,179

UNITED STATES PATENT OFFICE

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RECORDING DEVICE

Application filed June 7, 1929. Serial No. 369,056.

The principal objects of this invention are to produce a device which will present an accurate record of performance in a definite period and will be applicable for use in connection with various forms of mechanisms but is particularly applicable to motor vehicles to provide a record of the travelling speed over a certain predetermined distance.

A further object is to provide a simple compact and durable mechanism which will function accurately in automatically recording a performance of the vehicle.

The principal feature of the invention consists in the novel arrangement of a pair of travelling belts and an endless marking element together with means for placing the marking element between said belts in accordance with the variations in one of the factors to be recorded.

In the drawings, Figure 1 is a perspective view of the instrument board of a motor car showing the preferred arrangement of the apparatus.

Figure 2 is an enlarged perspective detail showing the arrangement of the various elements of the recording mechanism.

Figure 3 is a front elevational view of the device illustrated in Figure 2 with a portion of the outer belt of the recorder removed.

Figure 4 is a plan view of the recorder device with the top plate removed and in part section.

In the form of the invention herein illustrated a pair of plates 1 and 2 are rigidly spaced apart by suitable studs 3.

Journalled between the plates 1 and 2 and arranged adjacent to each end thereof are a pair of rollers 4 and 5, around which extends a flexible endless belt 6.

A plate 7, preferably slightly curved in its length, extends between the rollers 4 and 5 and forms a guiding face over which the endless belt moves, said plate ensuring the smooth operation of the belt.

The belt is held taut around the rollers 4 and 5 and over the plate 7 by a suitable tension device herein shown in the form of a roller 8 mounted in the swinging frame 9 pivoted between the plates 1 and 2 and held in engagement with the inner side of the endless belt 6 by a spring arm 9 secured at one end to a stud 10 secured in the plate 1.

The surface of the belt 6 is preferably marked with a plurality of spaced lines 11 running parallel and longitudinal of the belt. These lines form the longitudinal graph lines, the spaces between them representing, in a device applied to a motor vehicle, speed of travel in miles per hour. The cross lines represent distances of 100 feet in length of travel of the vehicle. A shaft 12 journalled in the plates 1 and 2 between the roller 4 and the outer end of the plate has mounted thereon a roller 13 which is provided with sprocket teeth 14 at either end.

A roller 15 is rotatably mounted between the plates 1 and 2 between the roller 5 and the other end of the plates and a third roller 16 is journalled between the plates 1 and 2 to the rear of the roller 15.

A pair of endless sprocket chain belts 17 extend around the rollers 13, 15 and 16 at the top and bottom and these engage the sprocket teeth on the roller 13 and are driven thereby.

Each link of the chain belt 17 is provided with a pair of spaced lugs 18 and strips 19 of glass or other suitable transparent material are fastened between the lugs 18 and extend transversely between the two chain belts across the surface of the belt 6.

The spindle of the roller 16 extends through slots 20 in the plates 1 and 2 and bowed springs 21 hold the roller under tension against the chain belts 17, maintaining a uniform tension and contact against the surface of the belt 6 over the plate 7.

The frictional contact of the chain belts 17 with their connecting strips 19 engaging the surface of the belt 6, carries the belt 6 over the plate 7 at a uniform speed with the chain belt.

The shaft 12 is here shown provided with a worm wheel 22 secured on its end extending below the plate 1 and engaging a worm 23 carried on a horizontal shaft 24 which is

connected by a suitable flexible shaft 25 to operate in harmony with the speed of the vehicle, and the ratio of the drive connection is such that the belt travelling over the plate 6 will travel the visible distance while the vehicle is travelling over a fixed distance.

The device is preferably arranged so that the face of the travelling belts will be visible through the opening 26 in the instrument board 27 and the length of the opening may be marked by suitable distance divisions.

A suitable form of fly ball governor 28 is mounted on the shaft 24 and the pivotal centrifugally operated members 29 are connected by the arms 30 to move the sleeve 31 loosely mounted on the shaft 24 in a longitudinal direction.

A collar 32 loosely mounted on the sleeve between the flanges 33 is provided with a pin extension which engages the slotted end of a bell crank lever 34 which is pivotally mounted on a fixed bracket 35.

A bar 36 is slidably mounted in the plates 1 and 2 and extends across the space between said plates and the lower end thereof is connected to the slotted end 37 of the bell crank lever 34.

The lever 34 is so proportioned in relation to the movement of the sleeve 31 on the shaft 24 through the action of the governor member that the travel of any point on the bar 36 will have a maximum movement of the width of the scaled portion of the belt 6.

The bar 36 is provided with an eye 38 which extends close in to the roller 5 between the outer surface of the belt 6 and the inner surface of the transparent belt strips 19 carried by the chain belt.

An endless cord or fine chain 39 is rove through the eye 38 and passes loosely around the belt 6 and is free to be moved up and down in accordance with the movement of the eye 38 carried by the bar 36.

It will be seen that as the speed of the vehicle varies the position of the eye 38 will vary in relation to the transverse width of the belt 6 and the parts are so proportioned and arranged that the position of the eye in relation to the miles per hour indication on the belt 6 will be such that the eye will accurately follow these indications and will be an accurate speed indicator.

It will be readily understood that as the means for driving the chain belt 17 and the means for operating the governor member 28 are both connected to a common source of movement operating in conjuction with the driving mechanism of the vehicle, the belts will move a definite distance lengthwise in a definite distance of travel irrespective of speed but the bar 36 will be operated transversely of the belt back and forth in accordance with the variation in speed and as the bar 36 is thus moved the eye 38 feeds the endless cord 39 in between the belts so that for the visible distance of the device the cord will lie in a graph line in accordance with the varying speed of the vehicle and will be visible through the transparent outer belt.

It will thus be readily appreciated that a continuous record is kept always visible so that the speed of the vehicle for the last quarter mile, half mile, or mile, whatever the instrument may be designed for, will be shown upon the face of the belt.

The cord 39 is free at each end of the points of contact between the belt 6 and the transparent strips 19 of the belts 17 and the light cord or chain follows the transverse movement of the eye guide 38 carried by the bar 36 quite freely and as the eye moves transversely it lays the cord in between the two converging belt members which thus hold it in a graph position;

The advantages of a device of this kind will be readily appreciated as when carried on vehicles of any kind absolute proof of the speed of the vehicle up to the point of stopping for the last of a definite distance is available and in case of accident there can be no dispute as to speed. This will be a remarkable advantage in the operation of commercial vehicles as well as being distinctly desirable on all forms of vehicles.

The use of the device is not, however, confined to vehicular operation as it can be applied to various other commercial uses to provide a graph instantly readable covering a predetermined period, whether of time or distance.

For instance, the device can be applied to a steam plant to indicated boiler pressures over a certain period of time, the belts being driven by a suitable clock mechanism instead of by a speed or distance travel shaft and the graph controlling member will be operated by a pressure responsive device.

It will also be understood that the actual construction of the device may be varied very considerably without departing from the spirit of the invention which is to provide a pair of movable surfaces to operate in close proximity to hold a variable member in a placed relation therebetween throughout a certain distance of travel.

What I claim as my invention is:—

1. A recording device, comprising a transparent movable member, a surface arranged in close association with said member, an endless indicator element adapted to be laid between said movable member and said surface and to be held thereby in a visible position, and a variable element operating to place said indicator member between said surfaces.

2. A recording device, comprising an endless movable transparent member, a sup-

porting surface arranged in close proximity to the inner face of said endless member, an endless flexible marking element adapted to be engaged by and held in adjusted positions between said transparent member and said supporting surface, and a variable member operating in transverse relation to the direction of movement of said endless member said variable member having a guide engaging the endless marking element and guiding it between said supporting surface and transparent member.

3. A recording device, comprising a pair of endless belts arranged to move in close proximity for a predetermined distance, one of said belts being transparent, an endless flexible marking element extending between said closely related portions of the endless belts, and a variable element operatively engaging said marking element and placing it between said moving belts.

4. A recording device, comprising an endless belt divided by transversely spaced longitudinal markings, a transparent belt arranged in close proximity to the aforesaid belt for a predetermined length, a flexible endless marking element arranged between the aforesaid belts and adapted to be gripped thereby in their engaging length, a transversely movable member operatively engaging said flexible endless marking member and adapted to lay it between the aforesaid belts, and variable means for operating said transverse member.

5. A recording device, comprising a rigid surface, a roller arranged at each end of said rigid surface, an endless belt extending over said rigid surface around said rollers, rollers spaced beyond the aforesaid rollers, an endless belt extending over the latter rollers and in juxtaposition to the aforesaid belt over the rigid surface, a narrow flexible endless cord arranged between said belts and adapted to be gripped between the juxtaposed portions, and a variable member movable transversely of said belts and arranged between the same and guiding said flexible marking member in between the converging portions of said belts.

6. A recording device, comprising a frame having a pair of plates rigidly spaced apart, a rigid surface extending between said plates for a portion of the length of the frame, rollers arranged at the ends of said plates, rollers spaced beyond the ends of said plates and beyond the aforesaid rollers, an endless belt extending around the rigid surface and the inner rollers, an endless belt arranged in close proximity to the inner belt over the rigid surface and extending around the outer rollers, sprocket means for driving said belts, a flexible marker member extending between said belts, and a variable means for moving said marker member from side to side of said belt.

7. A recording device, comprising a frame having an endless belt arranged between the sides thereof, an endless belt of greater length than the aforesaid belt operating in close proximity with a portion of the length thereof and having a transparent central portion, markings arranged on the inner belt dividing its width, a flexible endless marker arranged between said belts, variable means for placing said marker between said belts, and means for driving the outer belt.

8. A recording device, comprising a frame, a fixed surface arranged between the sides of said frame, rollers arranged between the sides of the frame at each end of the fixed surface, rollers arranged between the sides of the frame beyond the aforesaid rollers, a sprocket on one of said latter rollers, a spricket chain extending around the sprocket roller and its mating roller, a transparent belt connected with said sprocket, a belt divided transversely extending over the rigid surface and around the inner rollers and having a portion operating in close proximity with the inner side of the transparent belt, an endless flexible marking member arranged between the aforesaid belts and encircling the inner belt, a transversely movable guide member through which the flexible marking member passes, and variable means for operating the means for guiding said marker.

9. A recording device, comprising an endless belt having longitudinal markings spaced transversely to represent a variable indication, a transparent endless belt extending over the aforesaid belt in close proximity therewith for a limited distance, a flexible marking member arranged between said belts, a transversely movable member engaging the latter flexible marking member and adapted to lay it between the aforesaid belts, and means including a resilient element for operating the transversely movable member in unison with the movement of said belts.

10. A recording device, comprising a frame, a pair of spaced rollers extending between said frame, an endless belt extending around said rollers and having graduation markings dividing its transverse width, a transparent endless belt of greater length than the aforesaid belt and extending around same, means for holding the latter belt in close proximity to the former belt over a limited distance, a shaft operatively connected with the latter belt, a shaft supported from the frame operatively engaging the aforesaid shaft, a transversely operable member mounted in said frame, an endless flexible marking member arranged between said belts and guided by the transversely movable member, and means operated by the second shaft for operating said trans-

versely movable member in relation to the speed thereof.

11. A recording device, comprising a frame, a graduated endless belt arranged between the sides of the frame, a transparent belt encircling the aforesaid belt and arranged in close proximity thereto for a limited distance, an endless marking member extending between said belts, a transversely slidable member in said frame adapted to guide said marking member, a shaft arranged longitudinally of the frame, a fly ball governor arranged on said shaft, means connected with the fly ball governor adapted to move the transverse member in relation to the speed of the governor, and means connected with said shaft for operating said belt in relative relation.

12. A recording device, comprising a frame, a shaft mounted on said frame, a shaft extending across said frame and operatively connected to the aforesaid shaft, a sprocket wheel mounted on the latter shaft, rollers mounted between the sides of the frame, a pair of sprocket chains extending around said sprocket and said rollers, a plurality of transparent bars connected between the links of the adjacent chain belts, an endless belt arranged inside of said transparent belt, means for supporting the inner belt in close proximity to the outer belt, a flexible indicator endless member encircling the inner belt, and means operating transversely of the frame and operatively engaging the first-mentioned shaft to effect the transverse travel to operate the placing of the flexible marker member.

13. A recording device, comprising a frame, rollers mounted between the sides of said frame, an endless belt having a plurality of parallel markings extending longitudinally thereof and representing graphically miles per hour, a transparent flexible belt arranged outside the aforesaid belt and disposed in close co-operative relation with a portion of the latter belt, a guide transversely arranged in said frame, an endless marker member encircling the inner belt and extending through said guide and adapted to be placed by said guide between said belts, means regulated by the speed of the operation of the mechanism for effecting the placing of said guide member, means operatively connected with the mechanism for regulating the travel of said belts, and means for synchronizing the movement of said driving means.

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