

May 23, 1933.

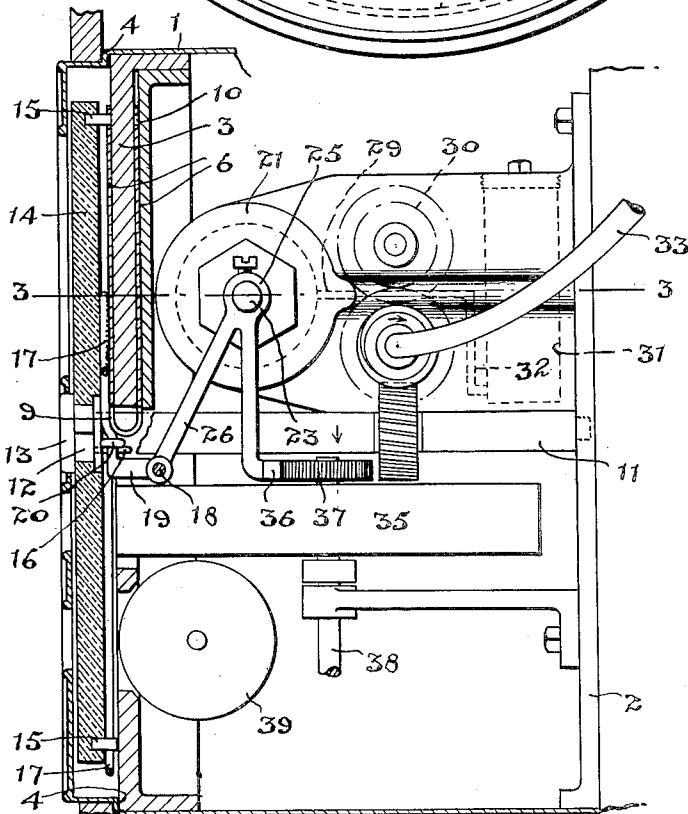
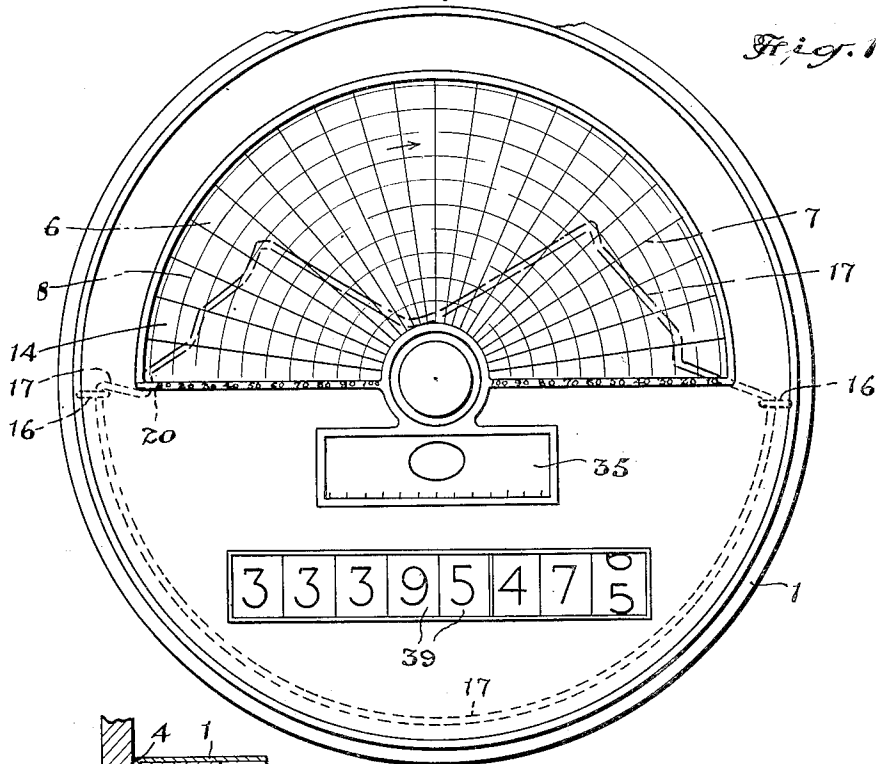
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1,910,191

RECORDING DEVICE

Filed July 30, 1931

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

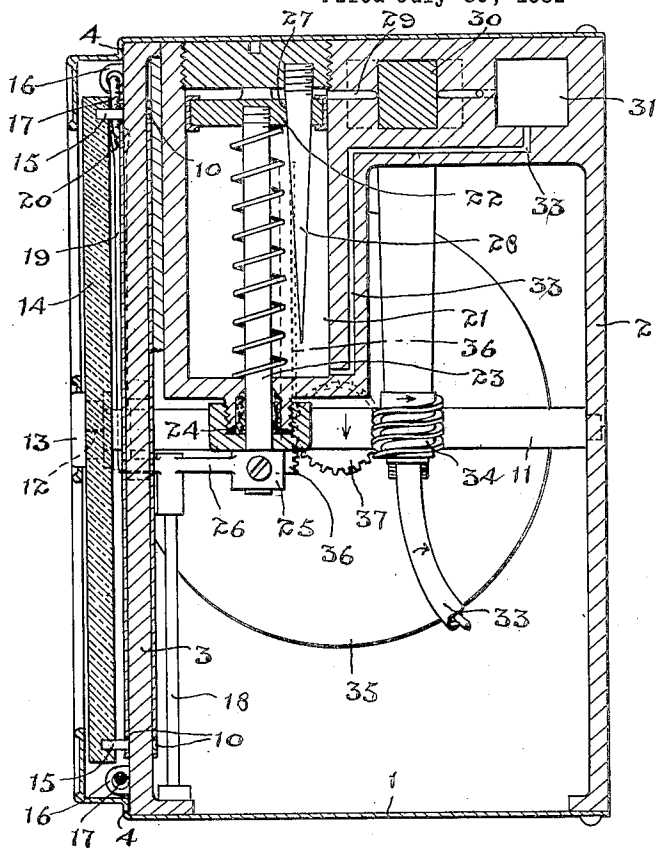


Fig. 3.

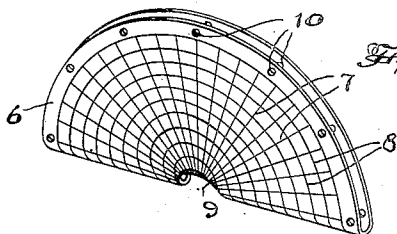


Fig. 5.

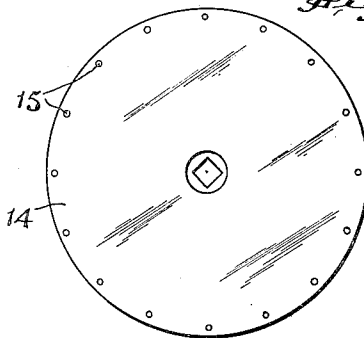


Fig. 7.

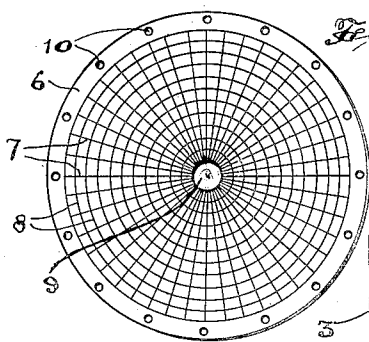


Fig. 6.

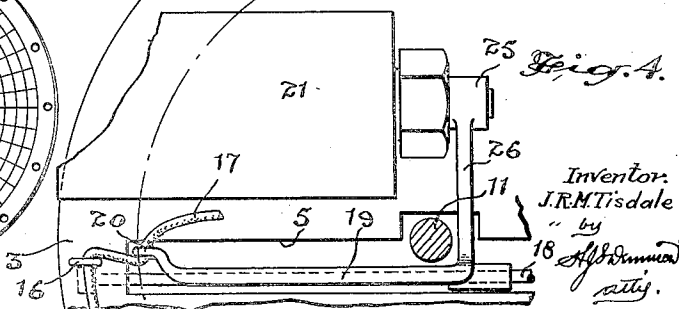


Fig. 4.

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# UNITED STATES PATENT OFFICE

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## RECORDING DEVICE

Application filed July 30, 1931. Serial No. 554,006.

The principal objects of this invention are to provide a device which will present an arcuate record of the movement of a mechanism to which it is applied and which is particularly applicable to motor vehicles, providing a record of the travelling speed of the vehicle over a predetermined distance.

A further object is to devise a compact and durable mechanism which will be easily applied to the mechanism with which it is to be used and which will function automatically in recording the performance of the mechanism.

The principal features of the invention consist in the novel construction and arrangement of a transparent moving element and a flexible disc moving therewith and operatively connected with the mechanism, the variations in movement of which are to be recorded, together with an endless marking element arranged partly between said flexible disc and transparent member, and means for locating the marking element in between said members, such means comprising a travelling element in the form of a reciprocating member operated in relation to a variable element of the measured device having an eye through which the endless marking element passes to be laid between the movable members.

In the accompanying drawings, Figure 1 is an enlarged face view of the recording device.

Figure 2 is a vertical mid-section and elevational view of the device.

Figure 3 is a horizontal sectional view of the device taken on the line 3—3 of Figure 2.

Figure 4 is an enlarged elevational detail of the travelling means for locating the marking element.

Figure 5 is a perspective detail, on a reduced scale, of the flexible disc member on the surface of which a graph scale is marked.

Figure 6 is a plan view of the member illustrated in Figure 5, laid flat.

Figure 7 is a reduced elevational view of the inner face of the glass disc.

In the form of the invention herein shown a substantially cylindrical sheet metal casing 1 is mounted on a circular base 2 and a flanged

disc 3 is secured therein against the annular shoulder 4.

A transverse slot 5 is formed in the disc 3 at or slightly above the centre, said slot extending for the major part of the width of the disc.

A disc 6 of leather or suitable flexible fabric is provided with an arrangement of radial graph lines 7 and concentric graph lines 8 and has a circular hole 9 in the centre. This flexible disc is doubled transversely as shown in Figure 5 and is threaded through the slot 5 in the disc or well 3 so that one-half of the flexible disc is on the outer side of the upper half of the disc 3 and the other half is disposed on the inner side thereof.

Holes 10 are formed in the flexible disc described adjacent to its periphery, said holes being spaced at regular distances apart in a concentric path.

A shaft 11 is arranged axially of the casing 1 and extends through the centre of the fixed disc 3 and its outer end is formed with a squared portion 12 and a head 13. A glass disc 14, provided with a squared hole in the centre thereof is mounted on the squared end of the shaft and is turned thereby. Pins 15 forming part of or secured in the glass disc 14 are spaced apart distances equal to the spacing of the holes 10 in the flexible disc. These pins engage with the holes in the flexible disc and drive it so that it slips around the upper edge of the slot 5 in the disc 3 and there is always one-half of the surface in close co-operative proximity to the inner face of the glass disc as it rotates.

Eyes 16 are fixed on the disc 3 adjacent to the ends of the slot and an endless flexible cord 17 is rove through same.

A rod 18 is arranged close to the inner side of the disc 3 below the slot 5 and on this rod is slidably mounted an arm 19 which extends horizontally and parallel with the rod 18 and has an eye 20 on its extremity through which the cord 17 is rove. This eye extends close to the doubled edge of the disc 6 and directs the cord in between the glass disc and the adjacent semi-circular portion of said disc.

Within the casing 1 and preferably forming a part of the base 2 is a horizontally ar-

ranged cylinder 21 in which a piston 22 operates. The rod 23 of the piston extends from the inward end of the cylinder through a gland 24 and it has mounted on its outer end  
 5 a fork member 25, one branch 26 of which is connected to the arm 19 carrying the eye 20.

The piston 22 is formed with a tapered hole 27 therethrough through which a taper pin  
 10 28 secured to the cylinder end extends. The diameters of the taper pin and hole are such that as the piston moves toward the inner end of its cylinder the passage around the taper pin increases in area and permits the  
 15 flow of fluid therethrough in an increasing ratio.

A port 29 in the outward end of the cylinder casing directs fluid thereinto to force the piston toward the inner end. This port leads  
 20 from a gear pump 30 mounted in the main casing structure which is part of the base. The pump draws a supply of fluid from a sump 31 in the casing and a return duct 32 connects the inward end of the cylinder with  
 25 the sump so that fluid flowing through the piston orifice returns to the sump and passes again, under the action of the pump, to the pressure side of the piston.

The pump is operated by a flexible shaft  
 30 33 which is connected by suitable means to the drive shaft of the motor car or other mechanism.

A worm 34 on the pump shaft meshes with a worm gear on the shaft 11 and the gear  
 35 structures are such that the glass disc is rotated slowly but in direct ratio to the number of revolutions of the drive shaft of the machine, and in a motor car, to the distance travelled.

The pump 30, its ports and the cylinder  
 40 are so designed that the fluid pumped into the cylinder moves the piston in direct ratio to the speed of movement of the shaft, or the vehicle. The leak port provided in the  
 45 piston, which alters as the piston moves, permits the piston to remain stationary at any place in its travel while the speed of the shaft or vehicle remains constant, but it moves back and forth in accordance with  
 50 the variation in speed.

The direct result of the operation of this piston is that the reciprocating eye moves  
 across the exposed portion of the flexible disc and lays the cord between the operating  
 55 glass disc and said exposed portion of the flexible disc and indicates at any moment the speed of movement. The respective discs, being operated in accordance with distance travelled, carry the cord so placed, by the  
 60 travelling eye, without alteration in its graph position until released from between said discs at the side opposite to the eye member for placing same.

It will thus be seen that the flexible cord  
 65 forms a graph, continuously changing at

the ends, but recording always, for a predetermined movement of the machine to which it is applied, an accurate record of the speed achieved in such movement.

The device when applied to an automobile  
 70 maintains a constant record of the speed travelled over a predetermined distance prior to the point at which the record is being made.

As the piston member operates directly in  
 75 ratio to speed, a speed indicating drum 35 is operated thereby through the medium of a gear rack 36, connected to the fork attachment to the piston, and a gear 37 secured to the drum spindle 38.

A suitable arrangement of registering  
 80 discs 39 is provided, which may be operated in any suitable manner from the drum spindle 38 to register the revolutions of the shaft of the mechanism being recorded on  
 85 the distance travelled.

It will be understood from this description that the mechanism is of an extremely simple  
 90 nature and it will not readily become disabled. Further, it is quite inexpensive to construct, and it may be placed in any suitable location on the machine so as to be readily visible.

When a motor vehicle is equipped with this mechanism, the graph shows at a glance  
 95 the speed of travel at any instant and the speed travelled for the last half or quarter mile is recorded thereon.

What I claim as my invention is:

1. A device adapted to indicate and record  
 100 the performance of a mechanism in respect to distance of travel and speed, comprising a rigid transparent disc rotatably connected with a mechanism, the speed of which is to be recorded, a circular flexible disc having  
 105 a semi-circular portion thereof supported in close co-operative association with the surface of said disc and moving in unison therewith, a flexible endless marking element arranged between said disc and its co-operating  
 110 movable surface and held thereby in a visible position, and means operated by the variable movement of the device, the speed of which is being recorded, for placing said marking element as the movement of the co-  
 115 operative members progresses.

2. A device adapted to indicate and record the performance of a mechanism in respect  
 120 to distance of travel and speed, comprising a rigid transparent disc driven at a speed proportional to the speed of the device, the speed of which is to be indicated, a flexible circular disc doubled into semi-circular form and having one semi-circular part thereof  
 125 supported in close co-operative association with a semi-circular part of said disc, means for driving said rigid and flexible discs so that the parts arranged in close association  
 130 move in unity, an endless marking element arranged between the closely associated por- 130

tions of the aforesaid members, and means operable by the variable movement of the device for placing said marking element between said co-operative semi-circular disc portions as their movement progresses, said placing device being operated in relation to the speed of movement.

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3. A device adapted to indicate and record the performance of a mechanism in respect to distance of travel and speed, comprising a rigid transparent disc driven at a speed proportional to the speed of the device, the speed of which is to be indicated, a thin flexible circular disc doubled around a supporting wall and having one semi-circular portion supported by said wall in close co-operative association with a semi-circular part of said rigid transparent disc, said flexible circular disc having equally spaced holes disposed in a concentric path, and pins extending from said rigid disc entering the holes in said flexible disc to drive the latter in unison therewith.

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4. A device adapted to indicate and temporarily record the performance of a mechanism, having an endless graph cord or the like, comprising retaining means between which said graph cord is adapted to be placed, said retaining means comprising in part a rigid flat plane disc of transparent material rotatably supported behind which the cord is adapted to be placed and in part means co-operative with a semi-circular portion of the disc to temporarily support the placed portions of the cord in its graph form, means for positioning said cord between said flat plane disc and said retaining means in accordance with the speed of operation of the mechanism to which said device is attached, and means for rotating said flat plane disc in accordance with the distance travelled.

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5. A device adapted to indicate and temporarily record the performance of a mechanism having an endless graph cord or the like, comprising retaining means between which said graph cord is adapted to be placed, said retaining means comprising in part a rigid flat plane disc of transparent material rotatably supported behind which the cord is adapted to be placed in part means co-operating with a semi-circular portion of the disc to temporarily support the placed portions of the cord in its graph form, means for positioning said cord between said flat plane disc and said retaining means in accordance with the speed of operation of the mechanism to which said device is attached, means for rotating said flat plane disc on its axis in accordance with the distance travelled, and means forming an operative drive connection between said rotating disc and said temporary supporting means to effect their operation in unison.

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