No. 819,618. PATENTED MAY 1, 1906.

B. F. TEAL.

APPARATUS FOR RECORDING THE MOVEMENTS OF VEHICLES.

APPLICATION FILED AUG. 9, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

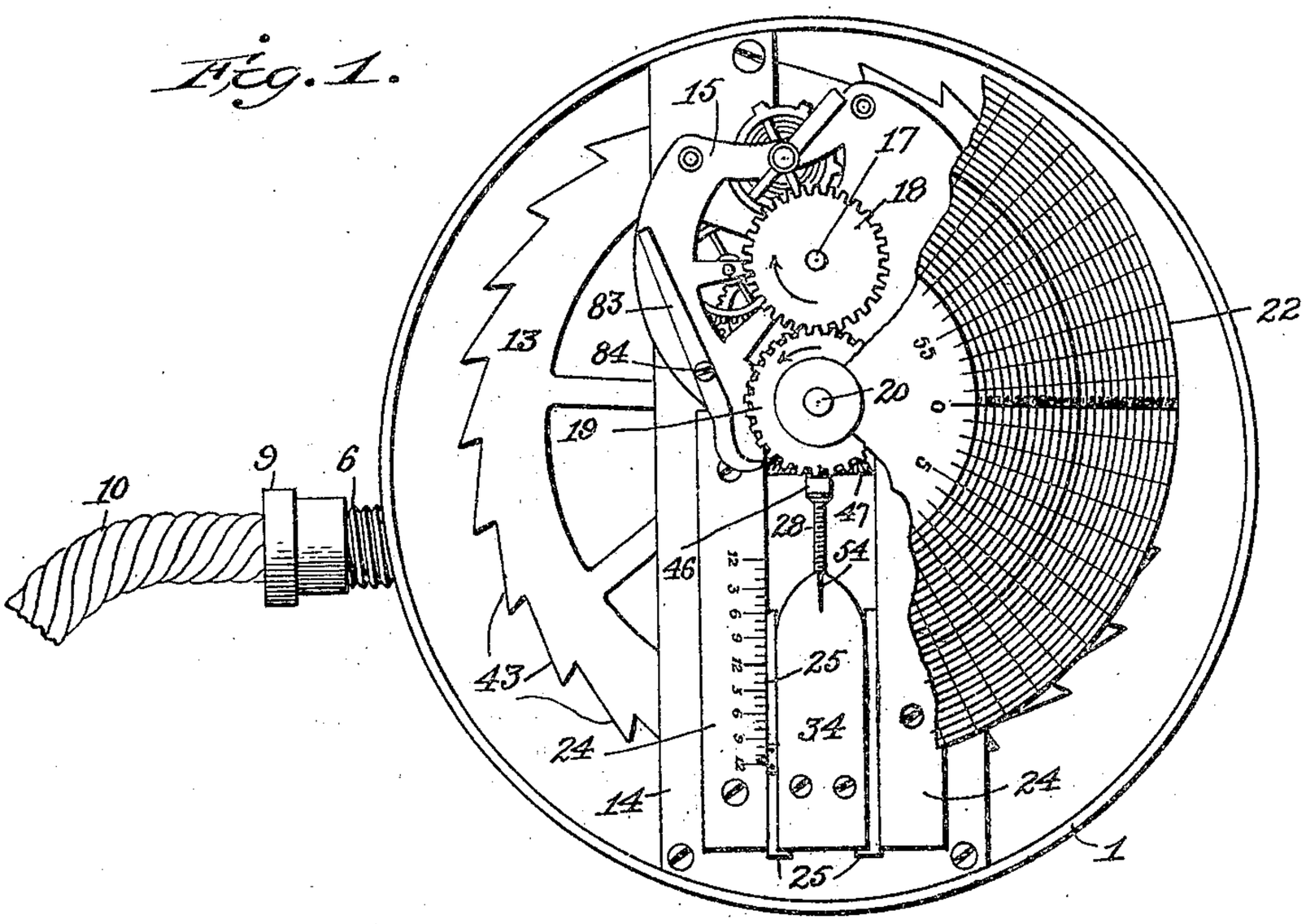
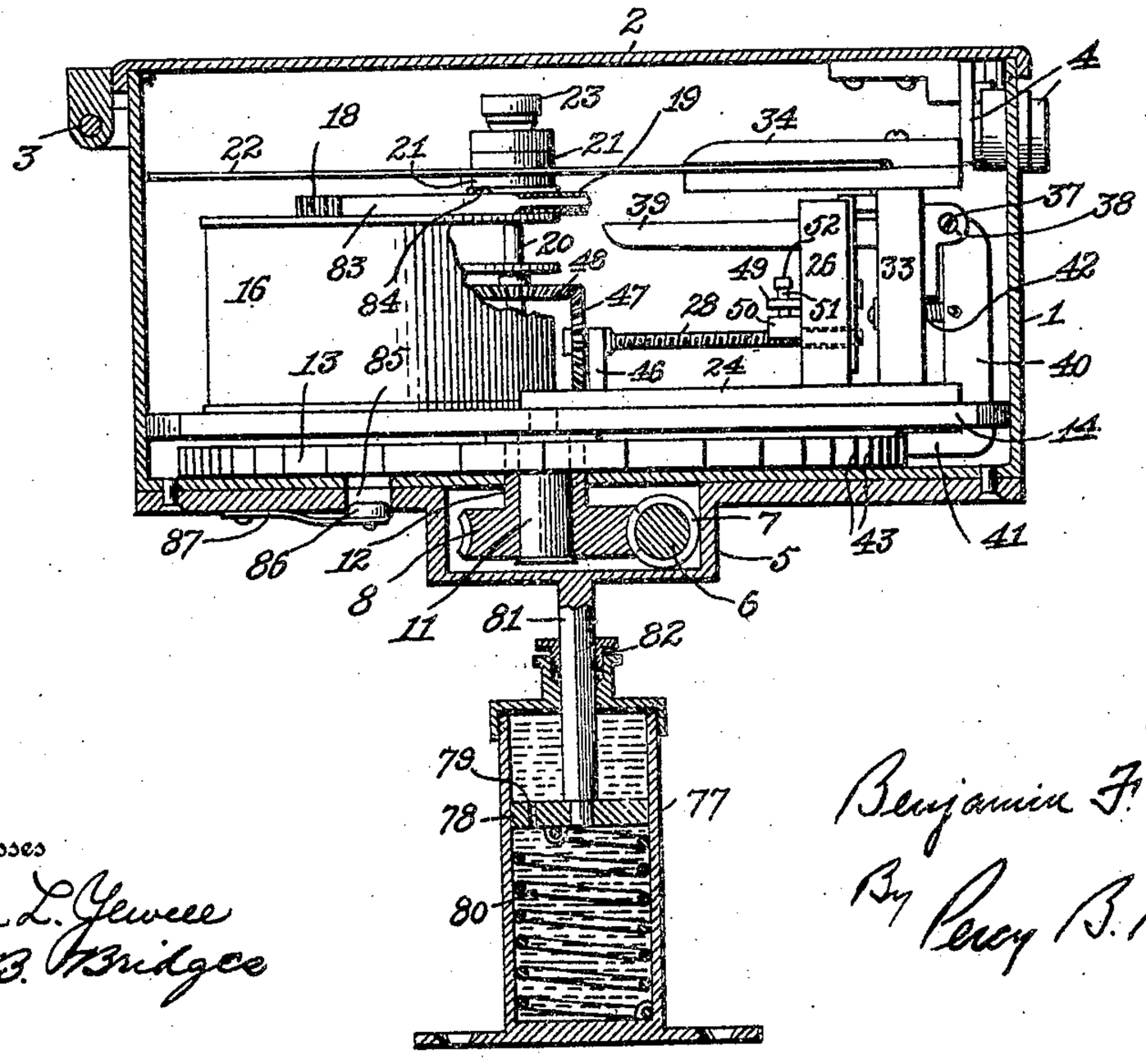


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

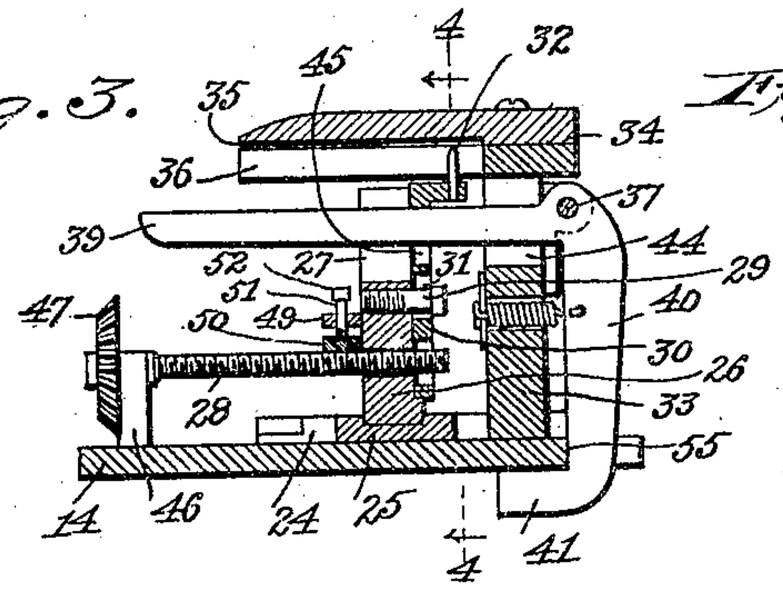


Fig. 4.

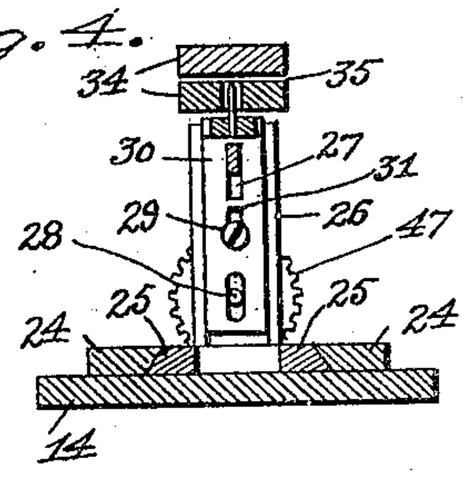


Fig. 5.

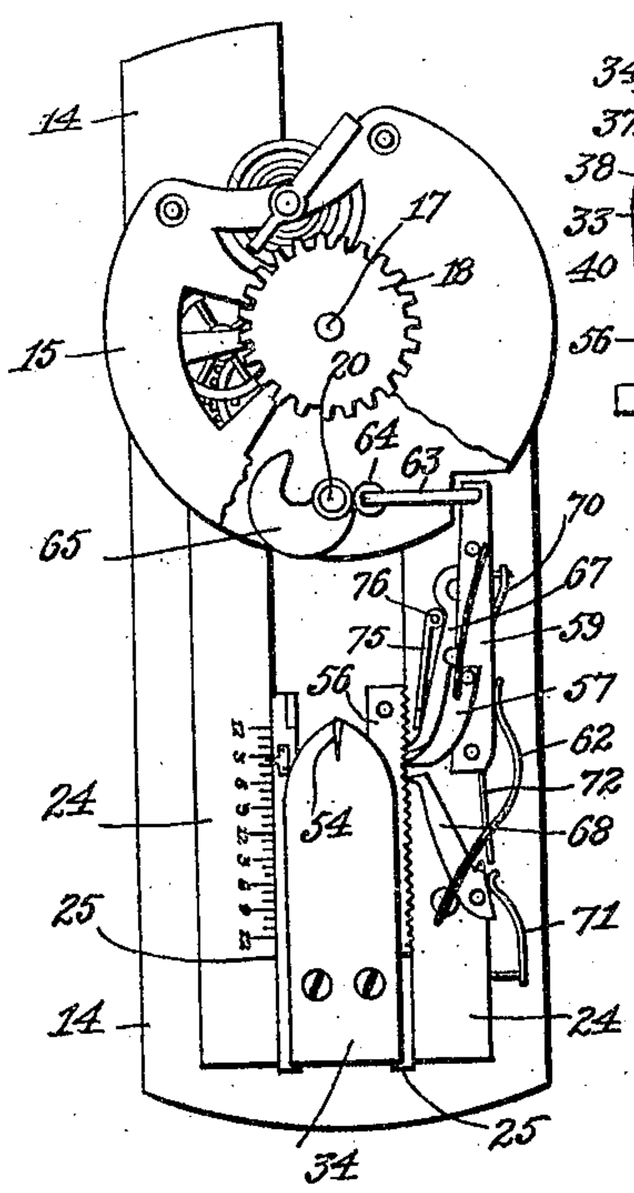


Fig. 6.

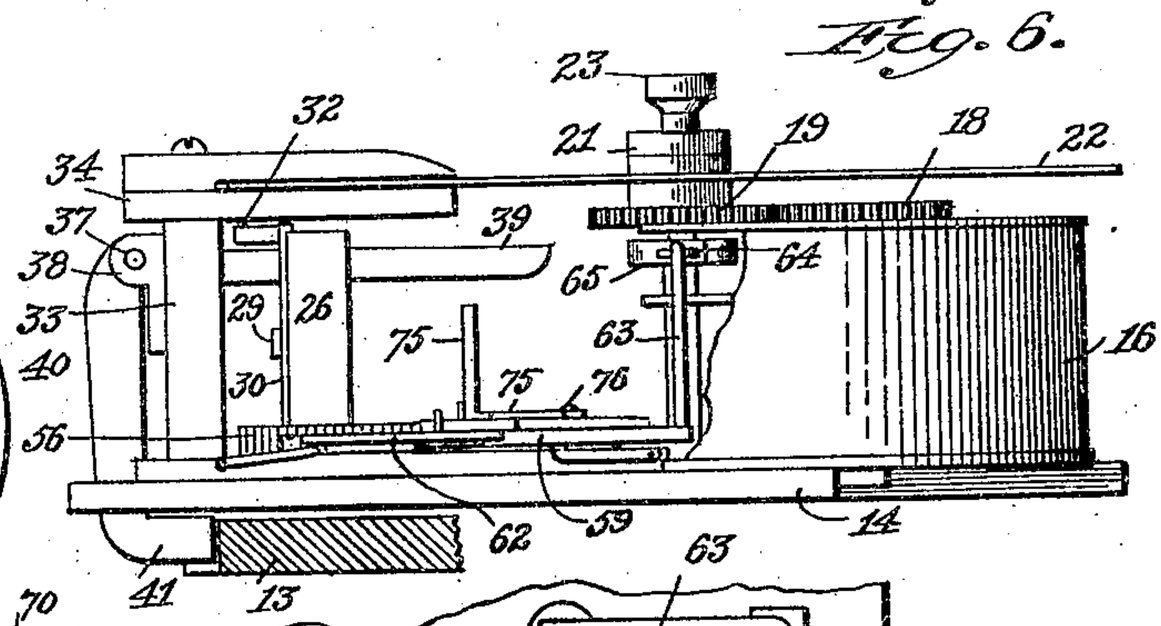
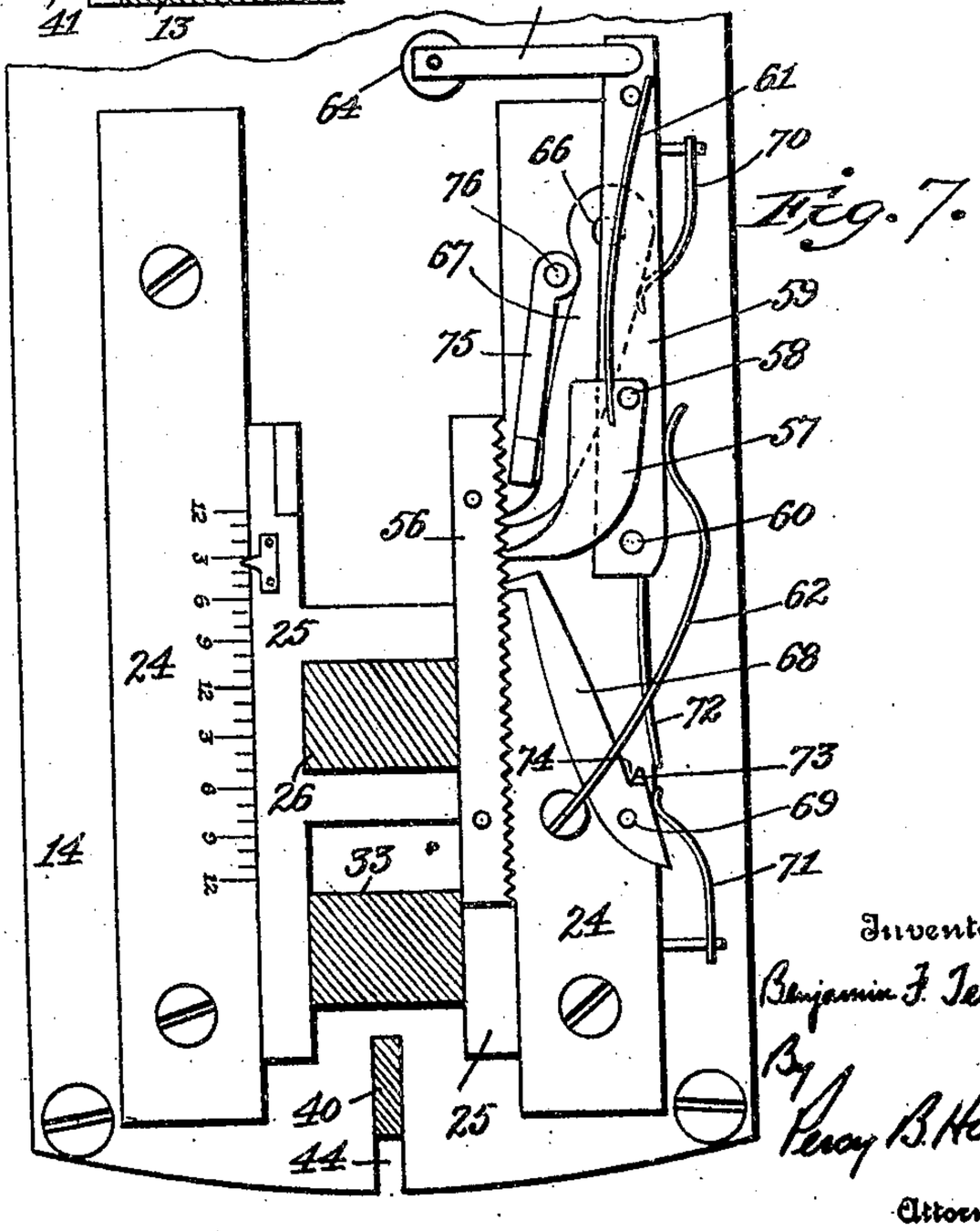


Fig. 7.



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UNITED STATES PATENT OFFICE.

BENJAMIN FRANKLIN TEAL, OF GLENSIDE, PENNSYLVANIA.

APPARATUS FOR RECORDING THE MOVEMENTS OF VEHICLES.

No. 819,618. Specification of Letters Patent. Patented May 1, 1906.

Application filed August 9, 1905. Serial No. 273,390.

To all whom it may concern:

Be it known that I, BENJAMIN FRANKLIN TEAL, a citizen of the United States, residing at Glenside, in the county of Montgomery, State of Pennsylvania, have invented new and useful Improvements in Apparatus for Recording the Movements of Vehicles, of which the following is a specification.

My invention relates to apparatus for recording the movements of vehicles, and more particularly to that class of such apparatus wherein a record-surface is marked in points or dots, and has for its primary object to provide an improved construction wherein the marker will be forced into contact with the record-surface and will instantly recede from said contact-point, thereby obviating any danger of interfering with the synchronous movement of said record-surface.

A further object of my invention is to provide means for shifting the relative positions of the marker and record-surface, either constantly or at predetermined intervals, whereby a series of spaces on the record-surface will receive impressions from the marker.

Still another object of my invention is to provide an improved means for supporting the recorder on the vehicle whereby all shocks or jars received by the vehicle while in motion will be neutralized.

A still further object of my invention is to provide means for temporarily locking the clock-train or time movement while placing thereon or removing the record-surface, so that the act of screwing or unscrewing the fastening means for said record-surface will not derange said clock-train or time movement.

A still further object of my invention is to provide a record surface or disk spaced concentrically to indicate periods of time, such as hours, and spaced radially to indicate subdivisions of the time indicated by the concentric spacing, such as minutes, said disk being adapted to register a plurality of hours—*e. g.*, twenty-four hours—one for each concentric spacing, whereby said disk may be rotated once an hour and yet register for twenty-four hours, thus permitting an indication on said disk by the marker at very frequent intervals.

These objects I accomplish in the manner and by the means hereinafter pointed out and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a top plan view of my improved apparatus, the lid of the casing being removed and the record-disk being partially broken away. Fig. 2 is a central vertical sectional view of the casing, the interior parts being shown in side elevation. Fig. 3 is a detail vertical sectional view of the marker and the parts operating the same. Fig. 4 is a detail sectional view taken on the line 4 4, Fig. 3. Fig. 5 is a detail top plan view of the clock-train and marking mechanism removed from the casing and illustrating a modified construction of feed mechanism for the marker. Fig. 6 is a side elevation of the construction shown in Fig. 5. Fig. 7 is an enlarged horizontal sectional view of the marking mechanism shown in Fig. 5.

Similar numerals of reference denote corersponding parts in the several views.

In the said drawings the reference-numeral 1 denotes the casing of the apparatus, the same being provided with a cover 2, hinged thereto at 3 and retained and locked in its closed position, preferably water-tight, by a suitable lock 4.

Permanently bolted to the under side of the casing 1 is a casing-plate 5, inclosing and forming a water-tight bearing for the shaft 6, which is formed into a worm-shaft 7 at its inner end engaging and operating the worm-wheel 8 and preferably screw-threaded at its outer end to receive the coupling 9 of a flexible shaft 10, that is rotated from one of the vehicle-hubs in any suitable manner. The worm-wheel 8 is mounted to freely rotate on a spindle 11 and is formed with a hub 12, extending through the base of the casing 1 and carrying a cam-wheel 13 at its inner end. The inner end of said spindle 11 is screwed into a base-plate 14, fixed in the casing 1 above the cam-wheel 13.

Mounted on the base-plate 14 is a clock-train 15 of any suitable construction, which may or may not be inclosed in a casing 16, as desired. Fixed to the minute-hand staff 17 of said clock-train is a gear-wheel 18, meshing in turn with a similar gear-wheel 19, mounted on a staff 20, adapted to receive the clamps 21, holding a paper dial 22, which is held in fixed position on said staff by screw-nut 23 engaging the threaded upper end of staff 20, whereby said disk will rotate with gear-wheel 19 and staff 20 and may be readily removed therefrom and replaced by a fresh disk.

Fixed to the base-plate 14 are two guideways 24, slidably receiving therein a plate 25, carrying a vertical post 26, slotted at its up-

per end at 27 and provided with an aperture to permit the passage of a screw-shaft 28, hereinafter described. Loosely bolted to post 26 through bolt 29 is a plate 30, said plate having a free vertical movement in a vertical recess in said post limited only by the elongated slot 31 through which the bolt 29, engaging said plate with said post, passes, all as best seen in Figs. 3 and 4. Said plate 30 is extended horizontally and outwardly at its upper end, said horizontal extension carrying a pointed tempered-steel marking or piercing pin 32.

Fixed to the base-plate 14 outwardly from post 26 is a vertical support 33, having bolted thereto at its upper end the bifurcated plate 34, adapted to receive the record-disk 22 in its bifurcation 35, said plate extending inwardly toward the clock-train 15 and having the under arm of its bifurcation slotted longitudinally at 36 to receive the marking or piercing pin 32, as shown in Fig. 3.

Pivoted at 37 to a bracket 38 on the support 33 is a bent lever comprising the upper horizontal arm 39, the vertical portion 40, and the lower horizontal arm 41. Said lever is normally drawn toward the support 33 below its pivot 37 by spring 42 and has its lower horizontal arm 41 in constant contact with the cammed periphery 43 of cam-plate 13, as shown in Fig. 2. The upper horizontal arm 39 of said lever passes freely through a slot 44 in support 33, through elongated slot 45 in plate 30, and then through the slot 27 in post 26, extending some distance inwardly toward the clock-train 15.

The screw-shaft 28 is supported to rotate in a bracket 46 and carries at its inner end a miter-gear 47, meshing with a similar miter-gear 48 on staff 20. Carried by a bracket 49 on the post 26 is a screw-threaded half-block 50, adapted to normally rest on and engage the screw-shaft 28, said block 50 being engaged and supported by bracket 49 through pin 51, passing freely through said bracket and carrying a nut 52 at its upper end, whereby said block 50 may be lifted slightly manually to disengage it from screw-shaft 28.

From the above description the operation of my improved device will be understood as follows: Assuming the time to be midday, the post 26 is first moved to its innermost position by raising nut 52 and block 50 manually so as to disengage the latter from screw-shaft 28 and then sliding said post and its plate 25 inward, said innermost position being indicated at "12" on the scale marked on one of the guideways 24. Upon releasing nut 52 the block 50 will reëngage the screw-thread of shaft 28, and with the disk 22 located to have its line marked O register with the indicating-kerf 54 on the top of bifurcated plate 34 the device is ready for a run, in this instance, of twenty-four hours. I prefer to provide the cam-wheel 13 with teeth or cams 43, each indicating one forty-eighth of a mile, so that as the vehicle moves and its motion is imparted to said cam-wheel, through flexible shaft 10, worm-shaft 6, and worm-wheel 8, the passage of each cam 43 past a given point will show a distance traveled of one forty-eighth of a mile. Now as the inner end of the lower horizontal arm 41 of the lever pivoted at 37 is kept in constant contact with the periphery of cam-wheel 13 through spring 42 during the passage of each cam 43 past said arm the latter will be carried gradually outward and then abruptly forced inward by said spring 42 when released by each of said cams, this resulting each time in a gradual downward movement of the free end of arm 39 of said lever and a consequent abrupt upward movement thereof, said upward movement being limited, however, by contact of the vertical arm 40 of said lever with base-plate 14 at 55 or at any other suitable point. Now as the plate 30, carrying the marking or piercing pin 32, is freely movable vertically and rests on and is supported by the arm 39 it follows that as the latter moves downward gradually it will be followed by said plate, which plate will be subsequently thrown upward by impact each time the arm 41 is released by a cam 43, the result being that the disk 22 will be pierced with a pin-point for each one forty-eighth of a mile traveled by the vehicle; but it will be observed by reference more particularly to Fig. 3 that even when said arm 39 is in its uppermost position the marker or piercer 32 does not project into the slot 35 of plate 34. It follows, therefore, that each time the plate 30 is forced upward by the arm 39 the piercer or marker 32 after contacting with and marking the disk 22 will instantly and automatically fall to the position shown in Fig. 3, thereby causing but an instantaneous contact between said piercer or marker and the disk 22 and obviating any possibility of said piercer or marker remaining in engagement with said disk with a resulting strain on and possible derangement of the clock-train 15. Now while this intermittent marking of the disk 22 is occurring the clock-train is constantly rotating staff 20, which not only imparts its movement to disk 22, giving the latter a rotation once an hour, but also imparts its motion to screw-shaft 28, which in turn acts on post 26 through block 50 to gradually force said post 26 outward synchronously with the movement of the disk 22, the threads of the screw-shaft 28 and the block 50 being so arranged that said post is moved a distance equal to one of the spaces on the scale on guideway 24 for each rotation of the disk 22. The result of this movement is that the piercer or marker 32 will begin marking the disk 22 at the extreme inner circle on said disk and will pursue a circular course with gradually-increasing radius until at the completion of one rotation

of the disk it will have reached the line separating spaces marked "1" and "2," which movement will be kept up until the outer edge of the disk is reached, thus covering twenty-four hours and giving an accurate record of the movements of the vehicle, its rates of movement, and its stops during that period. Thus the disk being divided by concentric circles into twenty-four spaces, indicating hours, and by radial lines into sixty spaces, indicating minutes, pin points or marks thereon close together will indicate rapid speed of the vehicle as well as the exact time of occurrence, pin points or marks well spaced apart will indicate slow speed as well as the time of occurrence, and an absence of pin points or marks will indicate a stoppage as well as its time and duration, it being understood that the speed of the vehicle at any time may be readily calculated by the time consumed between pin points or marks, each indicating one forty-eighth of a mile of travel.

In Figs. 5, 6, and 7 I have illustrated a modified construction of the feed mechanism for the post 26 and the marking or piercing pin 32, in which the same remains fixed during each rotation of the disk 22 and at the expiration of each rotation is moved outwardly one step, covering a distance marked "one hour" on the scale 53 and on said disk. This result I accomplish by dispensing with screw-shaft 28 and miter-gears 47 and 48 and by fixing to the plate 25 a rack 56, having in normal engagement therewith an actuating-pawl 57, pivoted at 58 to plate 59, which in turn is pivoted at 60 on the guideway 24. A spring 61 normally forces said pawl toward the rack, while a spring 62 performs a similar function for the plate 59. Mounted upon the free end of said plate 59 is a bent arm 63, carrying at its upper horizontal end a friction-roller 64, that contacts with cam 65, mounted on staff 20. Pivoted to guideway 24 at 66 beneath plate 59 is a holding-pawl 67, a similar pawl 68, pivoted at 69, performing the same function in the opposite direction, said pawls being forced inward by the springs 70 and 71, respectively. Projecting from the pivoted end of plate 59 is a spring-arm 72, adapted when the other end of plate 59 is moved outward by cam 65 to move inward and by sliding over incline 73 on pawl 68 to engage in shoulder 74, formed in pawl 68. With this construction, therefore, the rack 56, and consequently the post 26 and its parts, are normally still, the pawls 67 and 68 retaining said rack fixed. Now as the point O on disk 22 approaches the indicating-kerf 54 in plate 34 the cam 65 through arm 63 will gradually move plate 59 outward on its pivot 60 until pawl 57, carried thereby, has moved inward one tooth of rack 56. At the same time spring-arm 72 of plate 59 will slip over incline 73 and engage in shoulder 74 in pawl 68, the result being that when cam 65 releases arm 63, which happens the instant the point O on disk 22 reached the indicating-kerf 54, the sudden movement of plate 59 under stress of spring 62 will cause the end of spring-arm 72, engaging pawl 68, to move outward, carrying with it said pawl sufficiently far to disengage the latter from rack 56, whereupon spring-arm 72 will spring out of or disengage from said shoulder 74 and permit the pawl 68 to return. In the meantime, however, the movement of plate 59 has caused pawl 57 thereon to move rack 56 and its attached parts, such as post 26 and plate 30, one tooth or step outwardly, so that pawl 68 on its return to said rack will engage the next innermost tooth, this operation being repeated for each rotation of disk 22, or, in other words, each hour. In order that the rack 56 and its attached parts may be retracted at the end of each outward limit of movement—that is to say, every twenty-four hours—to operate on a fresh disk 22, I provide a crank-arm pivoted at 76 to guide 24, the vertical extension of which lies in the path of pawls 57 and 67, so that a manual movement of said crank-arm outwardly on its pivot will force pawls 57 and 67 away from engagement with rack 54, thereby permitting said rack and its parts to be slid inward to its limit of movement ready for a fresh outward step-by-step movement.

In Fig. 2 I have shown an improved means to be interposed between the casing 1 and the vehicle-frame for compensating for the shocks and jars received by the vehicle in its movements, the same consisting of a cylinder 77, which is to be bolted or otherwise fixed to the supporting-point on the vehicle, said cylinder being filled with oil or other suitable fluid and having therein a piston 78, apertured at 79, a coiled spring 80 being interposed between the under side of said piston and the bottom of said cylinder and fastened both to said piston and the cylinder, as shown. Fixed to the piston 78 is a piston-rod 81, passing through stuffing-box 82 and attached in any suitable manner to the under side of casing 1, the same being shown as formed integral with the casing-plate 5, thus supporting said casing 1 and its parts. This construction is, in effect, a dash-pot, the spring 80 taking up initially any shocks or jars and the friction of oil in its passage through aperture 79 effectually preventing any rebound or vibration from said spring.

In Fig. 1 there is shown a lever 83 pivoted intermediate its ends at 84 on the top of the clock-train 15 and having one end adapted to be engaged with the gear-wheel 19. The function of this lever is by its manual engagement with said gear-wheel 19 when a disk 22 is to be taken off or put on to permit the manipulation of screw-nut 23 without affecting the clock-train 15, said lever firmly holding gear-wheel 19 against movement.

In order to provide for periodically wind-

ing the clock-train 15, I provide an aperture 85 in the casing 1 opposite the winding-stem of said clock-train and close said aperture at other times by a rounded machined button 86, maintaining the same in position by means of a spring-arm 87, attached to the casing 1, as shown in Fig. 2, the same affording a moisture-tight closure.

I wish to be distinctly understood not to limit myself to the exact details of construction hereinbefore shown and described, as the same may be varied in many particulars without departing from the spirit of my invention, as will be readily understood.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for recording the movements of vehicles, a record-surface holder, means for constantly moving said holder at a predetermined speed, a marker, and a lever adapted to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever.

2. In an apparatus for recording the movements of vehicles, a record-surface holder, means for constantly moving said holder at a predetermined speed, a marker, a lever adapted to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever, and means for causing said lever to operate in unison with the movement of the vehicle.

3. In an apparatus for recording the movements of vehicles, a record-surface holder, means for constantly moving said holder at a predetermined speed, a marker, a lever adapted to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever, and a cam-wheel moving in unison with the movement of the vehicle for causing said lever to operate at intervals governed by the movement of the vehicle.

4. In an apparatus for recording the movements of vehicles, a record-surface holder, means for constantly moving said holder at a predetermined speed, a marker freely movable to and from a contact area and also adjustable with respect to said area to lie opposite the different points in the latter, a lever lying in the path of adjustment of said marker and adapted at all times to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever, and means for causing said lever to operate in unison with the movement of the vehicle.

5. In an apparatus for recording the movements of vehicles, a record-surface holder, means for constantly moving said holder at a predetermined speed, a marker freely movable to and from a contact area and also adjustable with respect to said area to lie opposite to different points in the latter, a spring-impelled lever pivoted intermediate its length and having one end lying in the path of adjustment of said marker and adapted at all times to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever, and a cam-wheel moving in unison with the movement of the vehicle and contacting with the opposite end of said lever for actuating the latter at intervals governed by the movement of the vehicle.

6. In an apparatus for recording the movements of vehicles, a record-surface holder, means for constantly moving said holder at a predetermined speed, a marker, a screw-shaft for shifting said marker transversely to the line of movement of said holder, and a lever adapted to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever, said lever being actuated at intervals governed by the movement of the vehicle.

7. In an apparatus for recording the movements of vehicles, a rotary record-surface holder, means for constantly rotating said holder at a predetermined speed, a marker, a screw-shaft for shifting said marker radially with respect to said holder to successive recording-points, and a lever adapted to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever, said lever being actuated at intervals governed by the movement of the vehicle.

8. In an apparatus for recording the movements of vehicles, a rotary record-surface holder, mechanism for constantly rotating said holder at a predetermined speed, a marker freely movable to and from a contact area and also movable parallel and radially with respect to said area, a screw-shaft operated by the record-surface rotating mechanism for moving said marker radially and synchronously with the rotation of the record-

surface holder, a spring-impelled lever adapted to cause said marker to approach the contact area, said marker having motion toward the contact area after said lever has ceased to move, whereby the marker may be brought to the contact-point by a motion independent of the motion of the lever, and a cam-wheel moving in unison with the movement of the vehicle and contacting with said lever for actuating the latter at intervals governed by the movement of the vehicle.

9. In combination with an apparatus for recording the movements of vehicles, a casing containing said apparatus, a cylinder fixed to the vehicle and adapted to be filled with a fluid, such as oil, a piston movable in said cylinder and provided with an aperture for the passage of the fluid in said cylinder, a piston-rod connected with said piston and with the casing whereby the latter will be supported, and a coiled spring in said cylinder on the side of the piston opposite to the casing and connected both with said piston and with the cylinder, said spring combining with the movement of the fluid in said cylinder through the aperture in the piston to compensate to the casing for shocks and jars experienced by the vehicle while in motion.

10. In an apparatus for recording the movements of vehicles, a time movement, such as a clock-train, a staff in gear therewith and adapted to removably receive record-disks, mechanism for recording the movements of the vehicle on said record-disks, and a lever adapted to engage the gear-teeth and hold said staff to prevent movement thereof while the record-disks are being removed from or placed on said staff.

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

BENJAMIN FRANKLIN TEAL.

Witnesses:
CHAS. GREINER,
R. LANGE.