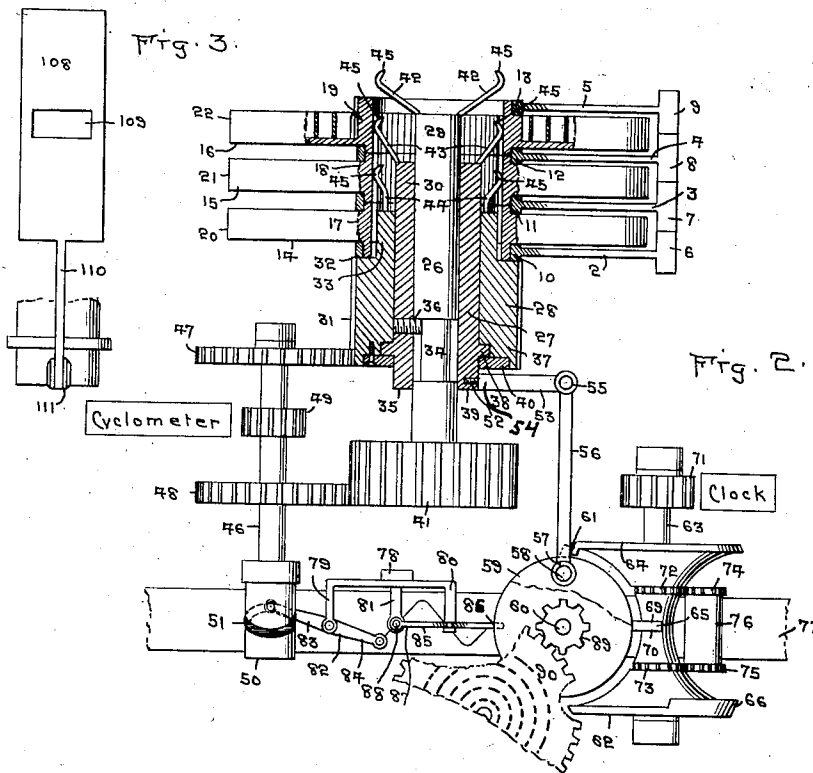
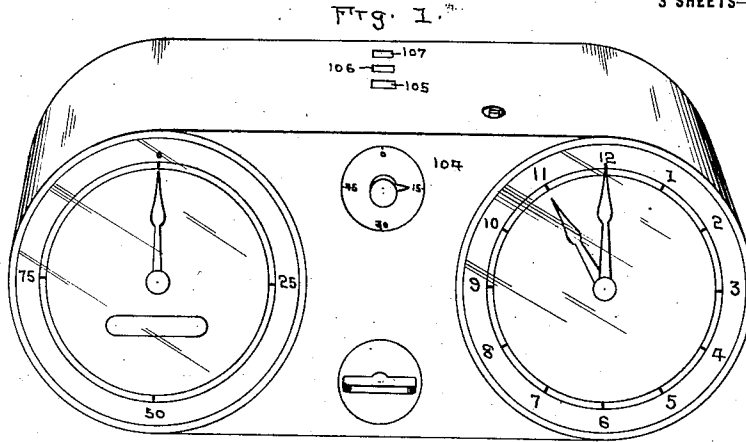


K. FITZPATRICK.
SPEEDOMETER.
APPLICATION FILED MAR. 27, 1915.

1,237,497.

Patented Aug. 21, 1917.
3 SHEETS—SHEET 1.



— Kirby Fitzpatrick — Inventor

Witness
Thomas R. Rhy

By *Oslo R. Singleton*
Attorney

APPLICATION FILED MAR. 27, 1915.

Patented Aug. 21, 1917.

3 SHEETS—SHEET 2.

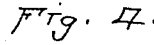


Fig. 5.

Witness

Thomas Riley

68  Inventor
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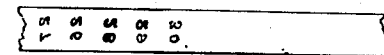
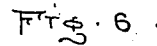
Ogle R. Singleton.

Attorney

SPEEDOMETER.

1,237,497.

3 SHEETS—SHEET 3.



Fr 5. 7.

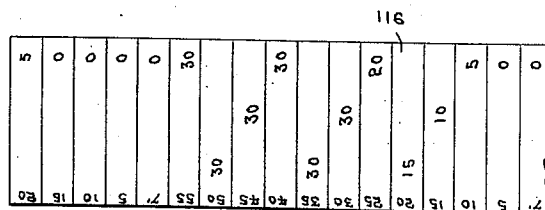


Fig. 8

Fig. 8
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 $\mathbb{R}_1$

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UNITED STATES PATENT OFFICE.

KIRBY FITZPATRICK, OF OKLAHOMA, OKLAHOMA.

SPEEDOMETER.

1,237,497.

Specification of Letters Patent.

Patented Aug. 21, 1917.

Application filed March 27, 1915. Serial No. 17,385.

To all whom it may concern:

Be it known that I, KIRBY FITZPATRICK, a citizen of the United States, residing at Oklahoma city, in the county of Oklahoma and State of Oklahoma, have invented certain new and useful Improvements in Speedometers, of which the following is a specification.

This invention relates to a new and useful improvement in speedometers, more especially to that class which is used on automobiles and locomotives.

The object of the invention is to produce a device which when in use will show at all times the exact speed at which the machine is running and make a permanent record thereof.

The invention consists in combining a speedometer with a register for a permanent record of the rate of speed.

In the annexed drawings:

Figure 1 is a perspective view of the case containing the speedometer mechanism with the invention.

Fig. 2 is a longitudinal section through the mechanism of the device and showing the parts in one position.

Fig. 3 is a detail plan view.

Fig. 4 is a longitudinal section through part of the mechanism of the device showing the parts in another position.

Fig. 5 is a similar view of the parts in a third position.

Fig. 6 is an enlarged perspective view of a preferred form of device for registering the speed.

Fig. 7 is a detail view of part of a disk.

Fig. 8 shows a portion of tape, marked by this preferred form of register.

In these drawings:

The numeral 1 represents a holder, consisting of several, in the present instance, four, frames 2, 3, 4 and 5, resting on feet 6, 7, 8 and 9 and having at their tops the annular bearings 10, 11, 12 and 13, the feet touching one another, but the main parts of the frames and the bearings being spaced apart. In the spaces among the frames, are located the three cup-shaped disks 14, 15 and 16, having hollow hubs 17, 18 and 19 which rest, so as to turn in the bearings 10, 11, 12 and 13. These cup-shaped disks 14, 15 and 16 have the rims 20, 21 and 22 on which are placed numerals in regular spaced order from 1 to any desired number, such as 30, the numbers and spacing and the order be-

ing identical on the three rims. Each disk has within it a coiled spring, one end of which is secured to the disk and one end to a bearing the location of the spring being such as to return the disk to position when rotated as will be described.

Passing centrally within the hubs 17, 18 and 19 are the central shaft 26, a cylindrical box 27 surrounding the shaft 26 and a cylindrical sleeve 28 surrounding the box 27. The shaft 26 has an extension 29 beyond the inner end of the box 27 and the box 27 has an extension 30 beyond the inner end of the sleeve 28. This sleeve 28 has its outer end formed as a gear wheel 31 and with a shoulder 32 forming a reduced end 33 on the inner end of the sleeve 28.

The shaft 26 has a reduced portion 34 within the outer end 35 of the box 27 and a pin 36 passing through the box 27 and within the latter holds the shaft and box so that the shaft may rotate in the box but both be moved together lengthwise, and yet with end play between them. The sleeve 28 has in its outer end 37 around its bore, two circular recesses of different sizes. In the smaller and inner recess is held a collar 38 on the outside of the outer end 39 of the box 27. A plate 40 is secured in the outer and larger recess to the end 37 of the sleeve 28 and resting against the collar 38 holds the box 27 and sleeve 28 so that the latter may rotate on the former and both be movable together endwise. On the outer end of the shaft 26 is placed a gear wheel 41. Secured to the inner ends 29, 30 and 33 of the shaft 26, box 27 and sleeve 28 is a pair of springs placed at the ends of a diameter. These springs 42, 43 and 44 have ends 45, and the elasticity of these springs is such that when they are within the hubs of the disks they bear with a constant pressure upon the inside of these hubs. Adjacent to the shaft, box and sleeve is another shaft 46 having gear wheels 47 and 48, engaging the gear wheels 31 and 41, the latter being narrower than the former. The shaft 46 also has a pinion 49 for engagement with any mechanism such as a cyclometer, for turning shaft 46. This shaft has one end enlarged and in the outer surface of this enlarged end is cut an oblique circumferential groove 51.

To the outer end 39 of the box 27 is secured the inner end 52 of a bar 53, the outer end 54 of which is pivoted to the end 55 of a rod

56, the other end 57 of which is pivoted to the pin 58 of a disk 59 fastened on a shaft 60. This disk 59 has at its edge a projection 61 which extends out radially from the disk and also extends out sidewise so as to have a portion out of the plane of the disk. Adjacent to the disk 59 is a spool 62 upon a shaft 63. This spool has the three projections 64, 65 and 66, the first and third at the ends and the second at the middle. The projections 64 and 66 (Fig. 4) are made under-curved, having recesses 67 and 68. The projection 65 extends partially around the middle of the spool and has flat sides 69 and 70. The shaft 63 has a gear wheel 71 for connection with a clock. The size of the spool 62, the disk 59, the projections 61, 64, 65, 66, the shape, size and location of the projections are all so adjusted that there will be one revolution of the disk in a given period of time. The action of the construction will be hereafter explained. The spool 62 is also provided with two sets 72 and 73 of gear teeth which mesh with gear wheels 74, 75 of any ordinary set of feed rollers 76. Through these rollers in the usual way is to be passed and fed any ordinary strip of tape 77. To the side of the disk 59 opposite to the spool is located a frame 78 having at its ends the two arms 79 and 80, and at its middle a guide 81. In the arm 79 is horizontally pivoted a lever 82, one end 83 of which bears in the oblique groove 51 of the shaft 46 and the other 84 carries a marker. In the arm 80 is vertically pivoted a lever 85, one end 86 of which is in the path of the projection 61 of the disk 59 and the other end 87 of which carries a stylus 88 passing down through the guide 81. On shaft 60 of the disk 59 is keyed a pinion 89 which is engaged by a toothed wheel 90 to which movement is given by a spring, the direction being such as to turn the projection 61 on the disk 59 from the projection 64 to the projections 65 and 66 and back to the projection 64.

The apparatus described is to be placed in the case 104 (Fig. 1) so that the disks 14, 15 and 16 shall be in line with the three openings 105, 106 and 107 in the top of the case 104.

If desired, within the case at the top and under these openings 105, 106 and 107, may be placed a shutter 108 having a hole 109. This shutter has a stem 110 connected by a rod 111 with the box 27 so that the shutter 108 and the box 27 may move together.

With the parts located as indicated in Fig. 2, power is to be applied at the pinion 49, the clock connected with gear wheel 71 being in motion and the spring of the toothed wheel 90 wound for action. As indicated in Fig. 2, the springs 42, 42 on the end of the shaft 26, hereafter called "the solid clutch", are out of contact with their disk 16, the springs 43, 43 of the box, hereafter called

"the brake", are in contact with the outer disk 16, and the springs 44, 44 of the sleeve 28, hereafter called "the hollow clutch", are in contact with the middle disk 15. The inner solid clutch 26 is for the outer disk 16, the middle brake 27 is for all the disks and the outer hollow clutch 28 is for the middle disk 15, and the inner disk 14 and the lengths of the two clutches and the brake are so adjusted that these parts will have their due endwise movements to perform their functions. As the shaft 46 is rotated through the wheels 48 and 41 and 47 and 31, the solid clutch 26 and the hollow clutch 28 are rotated. The springs 44, 44 of the hollow clutch 26 being in contact with the disk 15 cause the latter to turn, winding up its inner spring (shown in section in disk 16). As this occurs, the clock turns the shaft 63 and the spool 62. By this movement, the projection 64 at the end of the spool 62 is moved away from the projection 61 of the disk 59 and the latter is released. The spring of the toothed wheel 90 turns this wheel and, through the pinion 89 and shaft 60, the disk 59, until the projection 61 comes into contact with the projection 65 at the middle of the spool 62, momentarily checking the movement of the disk 59. As this disk 59 is thus partially turned, through the rod 56 and the bar 53, it draws down the brake 27 and with it the hollow clutch 28. The solid clutch is not affected by this movement as the pin 36 and reduced portion 34 of the solid clutch 26 permits endwise play between the brake 27 and the solid clutch 26. This brings the several parts to the position shown in Fig. 4. Here the springs 42, 42 of the solid clutch 26 are still out of contact with their disk 16, the springs 43, 43 of the brake 27 have been moved out of contact with the disk 16 and into contact with the disk 15 and the springs 44, 44 of the hollow clutch 28 have been moved out of contact with the disk 15 and into contact with the disk 14. As the spool 62 continues to turn, the projection 65 thereon is moved away from the projection 61 of the disk 59 and the latter is released. The toothed wheel 90 then turns the disk 59 until the projection 61 of the latter comes in contact with the projection 66 at the other end of the spool 62, momentarily checking the movement of disk 59. As the disk 59 is thus again partially turned, through the rod 56 and bar 53, it draws the brake 27, and with it both the hollow clutch 28 and the solid clutch 26, the pin 36 of the brake 27 having reached the end of its traverse along the reduced portion 34 of the solid clutch 26, on the first partial movement. As this second partial movement takes place, the parts are moved from the position shown in Fig. 4 to the position shown in Fig. 5. Here the springs 42, 42 of the solid clutch 26 are brought into contact with the disk 16, the

5 springs 43, 43 of the brake 27 have been moved out of contact with the disk 15 and into contact with the disk 14, and the springs 44, 44 of the hollow clutch 28 have been moved out of contact with the disk 14. As soon as the spool 62 is further turned so as to move its projection 66 from the projection 61 of the disk 59, the latter is at once returned until the projection 61 again is caught by the projection 64.

10 The several actions thus described, produce a rotary movement of the solid and hollow clutches, not the brake, with an intermittent endwise movement of the three parts, the brake and hollow clutch have two endwise movements in one direction; the brake, hollow clutch and solid clutch having one endwise movement in the same direction and all three having together one endwise movement in the other direction. As these movements take place, the disks 14 and 15 are rotated by the clutch 28 and the disk 16 is rotated by the clutch 26, and the brake 27 holds the three disks in the desired position. This mechanism is placed within the speedometer case 102, with the disks 14, 15 and 16 in line with the openings 103, 104 and 105, the shutter 106 being in place between the rims of the disks and the openings of the case.

As the disks are rotated by the clutches, the numbers upon the rims of the disks pass under the openings in the case. The adjustment of the parts is such that when a clutch comes to the limit of its throw, it passes from the disk which it has turned and the brake immediately catches that disk and holds it temporarily at the opening. At the same time, the shutter is so moved as to bring its hole at the opening for this disk and close the other two. As soon as the brake is released from this disk, the spring of the latter returns it to position, another disk is turned, a number on this disk brought to the opening, the shutter is moved so as to disclose this number and the operation continues. The rotation of the two clutches is coincident with the speed of the machine. The endwise movement is controlled by the clock. The latter is regular and constant whatever the speed. The parts are adjusted so that this endwise movement shall take place at certain predetermined intervals. Each clutch will be rotated a certain distance in each interval, and hence will turn its disk a certain distance in that interval. The numbers of the disk brought to the opening indicates the distance traveled in the interval. As the parts described are in action, the spool 62 feeds the tape 77 through the rollers 76. The end 83 of the lever 82 moving in the oblique groove 51 of the shaft 46 causes the marker carried by the end 84 of the lever 82 to make an angular line on the surface of

the tape, there being an angle for each revolution. As the disk 59 is moved from the projection 66 to the projection 64, the projection 61 passing under the end 86 of the lever 85 forces the stylus 88 down and marks the tape 77. The shaft 46 is to be geared to the cyclometer so as to turn once in any given space, for example, one mile. As the marker indicates on the tape the revolutions of the shaft 46 and the stylus the time between similar phases of the angular line, there is registered the speed of the machine and a permanent record is made.

The construction already described is that found in an application for patent, filed by me, June 17th, 1914, Serial Number 845,596, but there are no claims herein which are in that application.

I shall now proceed to describe a modification of the present invention, not found in that application, but which is my preferred form. This form is shown in Sheet III of the present drawings. In this form, the registering is done directly by the disks 14, 15 and 16, without any intervening mechanism. These disks have upon a portion of their peripheries, numerals in regular order from 1 to any desired number, such as 30, the number and spacing and the order being identical on the three rims. Each of these disks 14, 15 and 16 also has upon a portion of its periphery raised figures in regular order, corresponding with the first set of numerals but arranged in order reversed to that of the first set. This second set is to be placed on the rims in such position relative to that of the first set, that when a numeral is at one of the openings 105, 106, or 107 at the top of the case 104, an identical raised figure will be at the bottom of the vertical diameter of the disk, that is, at the lowest point of the disk. Underneath the disks 14, 15 and 16 and in proximity thereto is an ordinary type-writer ribbon 112, placed in the plane of the disks and as wide as the combined width of the disks. This ribbon 112 is placed upon rollers 113, 114 and 115, the first supporting it at one side of the disks 14, 15 and 16 and the two rollers 114 and 115 feeding it as is done in a type-writer. Parallel with and under the ribbon 112 is placed a tape 116, carried by a supporting roller 117 and feed rollers 118 and 119. Under this tape 116, there are three hammers 120, 121 and 122, held side by side in suitable pivots 123. These hammers 120, 121 and 122 have ends 124 with heads 125 which are just in line with the vertical diameter of the disks 14, 15 and 16, that is, immediately below and in line with the raised figures on the disks, as these figures come to the lowest point on the disks. To the pivots 123 are secured an end 126 of springs 127, the free ends 128 of which bear on the under side of the ends 124 of the

hammers 120, 121 and 122. The other ends 129 of the hammers 120, 121 and 122 carry rollers 130, 131 and 132, journaled vertically in these ends 129. In the line of these rollers 130, 131 and 132, there is placed a large roller 133, having at one end the gear wheel 134 for engagement with the time mechanism, which controls the shifting mechanism for the indicator, and connected with the feed rollers, 118 and 119, by suitable gearing. In line with each roller 130, 131 and 132, the roller 133 is provided with a recess 135. This recess is made with an abrupt edge 136 and a bottom 137, sloping upwardly from this edge 136 to the main surface of the roller 133. These recesses are so placed on the roller 133 that as the roller 133 is turned, the abrupt edges 136 of these recesses first come to the rollers 130, 131 and 132. These recesses 135 are placed so as to be obliquely around the roller 133, not any two recesses being in line lengthwise of the roller. These recesses 135 are so located around the roller that the rollers 130, 131 and 132 fall into the recesses at the proper interval, permitting the springs 127 to act.

The tape 116 is shown in detail in Fig. 8, which shows a portion of the tape, ruled so that each space represents five seconds and the distance through which this tape travels during the period of five seconds, the numbering in the present instance beginning at 7 o'clock on this evening; 5, 10, 15, etc., seconds up to 7 o'clock, 1 minute and 20 seconds. The other members will be hereafter explained.

Operation of form shown in Sheet III will now be explained. The disks 14, 15 and 16 are moved just as are the same disks in the other form. This brings to the top at the holes 105, 106 and 107 (Fig. 1) the numerals upon the upper part of the disks. At the same time, coincident raised figures are brought to the bottom of the vertical diameters or lowest parts of the disks. The ribbon 112 and tape 116 are moved under the disks, the ribbon by any well known mechanism, and the tape through connections with the time mechanism. As this occurs, the time mechanism turns the large roller 133. As this roller 133 turns and the recesses 135 come under the rollers 130, 131 and 132, these rollers fall off the abrupt edges 136 into the recesses, permitting the springs 127 to move the ends 124 of the hammers 120, 121 and 122 upwardly causing the hammer heads 125 to strike the tape 166 and the ribbon 112 on the raised figures at the bottom of the disks 14, 15 and 16, making an impression of these figures upon the tape.

In Fig. 8, as already stated, is shown a portion of the tape. The registration on this tape would indicate that the register was thrown into gear at 7 o'clock, and that

it stayed idle until 5 seconds after 7 and the next 5 seconds was going at the rate of 5 miles an hour, the next 5 seconds at 10 miles an hour, and the next 5 seconds at 15 miles an hour, and then 20, 30 miles, etc. Of course, the register figures are not in a straight line, for the reason that they are made by the different disks and therefore make a diagonal line.

Having described my invention what I claim is:

1. The combination of a speed indicator, provided with several sets of figures, indicating speed in miles per hour, means for the constant operation of the speed indicator, adapted to operate each of the several sets of figures consecutively, a tape, a ribbon and hammers to impress upon the tape the figures on the indicator.

2. The combination of a speed indicator consisting of several indicator parts, each of which is provided with a set of figures indicating speed in miles per hour, means for the constant operation of the speed indicator, adapted to operate each of the several sets of figures consecutively, a tape, a ribbon and several hammers to impress upon the tape the figures on the several indicator parts of the speed indicator respectively.

3. The combination of a speed indicator having several disks, each disk having on its periphery raised figures indicating speed in miles per hour, means for the constant operation of the speed indicator, adapted to operate each of the several disks consecutively, a tape and ribbon placed in juxtaposition with the raised figures on the disks and hammers to impress upon the tape the figures on the disks.

4. The combination of a speed indicator provided with raised figures indicating speed in miles per hour, means for the constant operation of the speed indicator, adapted to operate each of several sets of the figures consecutively, a tape, a ribbon, hammers having heads in position to force the tape and ribbon against the figures, means to force the heads against the tape, and means to release the hammers to permit their heads to be forced against the tape.

5. The combination of a speed indicator provided with raised figures indicating speed in miles per hour, means for the constant operation of the speed indicator, adapted to operate each of several sets of the figures consecutively, a tape, a ribbon, hammers having at one end heads in position to force the tape and ribbon against the figures and having at the other end rollers, a roller arranged in line under the rollers of the hammers and provided with recesses for the rollers of the hammers and springs for forcing the heads of the hammers against the tape.

6. The combination of a speed indicator
provided with raised figures indicating
speed in miles per hour, means for the con-
stant operation of the speed indicator,
5 adapted to operate each of several sets of
the figures consecutively, a tape, a ribbon,
hammers having heads in position to force
the tape and ribbon against the figures,
means to force the heads against the tape,
10 means to release the hammers to permit

their heads to be forced against the tape,
and a timing mechanism attached to such
releasing means.

In testimony whereof I affix my signa-
ture in presence of two witnesses.

KIRBY FITZPATRICK.

Witnesses:

M. B. BREWER,
W. V. BIGGS.