H. M. BAKER, Jr.

GEARING.

APPLICATION FILED AUG. 27, 1908.

942,609. Patented Dec. 7, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

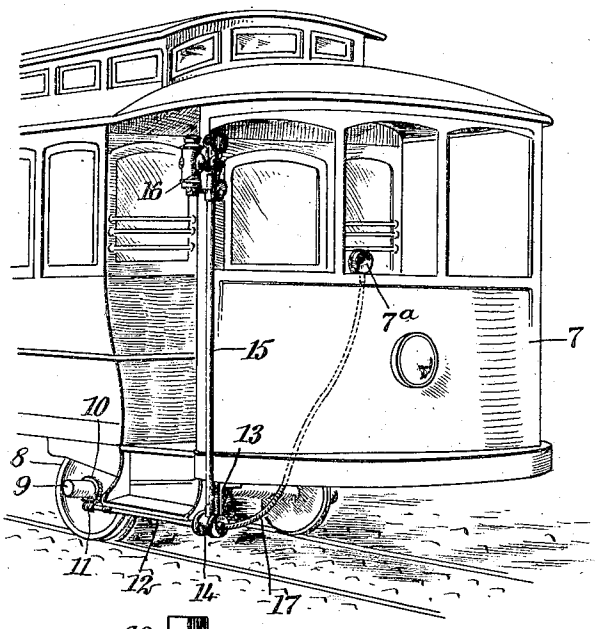


Fig. 7.

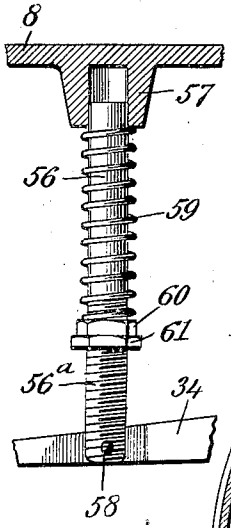
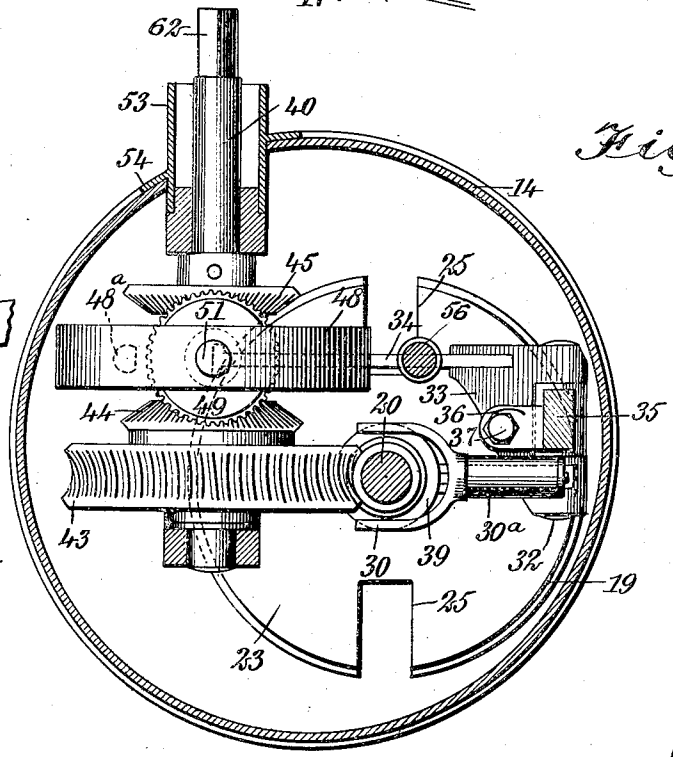


Fig. 2.



WITNESSES

Geo. W. Naylor
Walton Harrison

INVENTOR

Hayden M. Baker Jr.

BY Munn & Co.

ATTORNEYS

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3 SHEETS—SHEET 2.

Fig. 4.

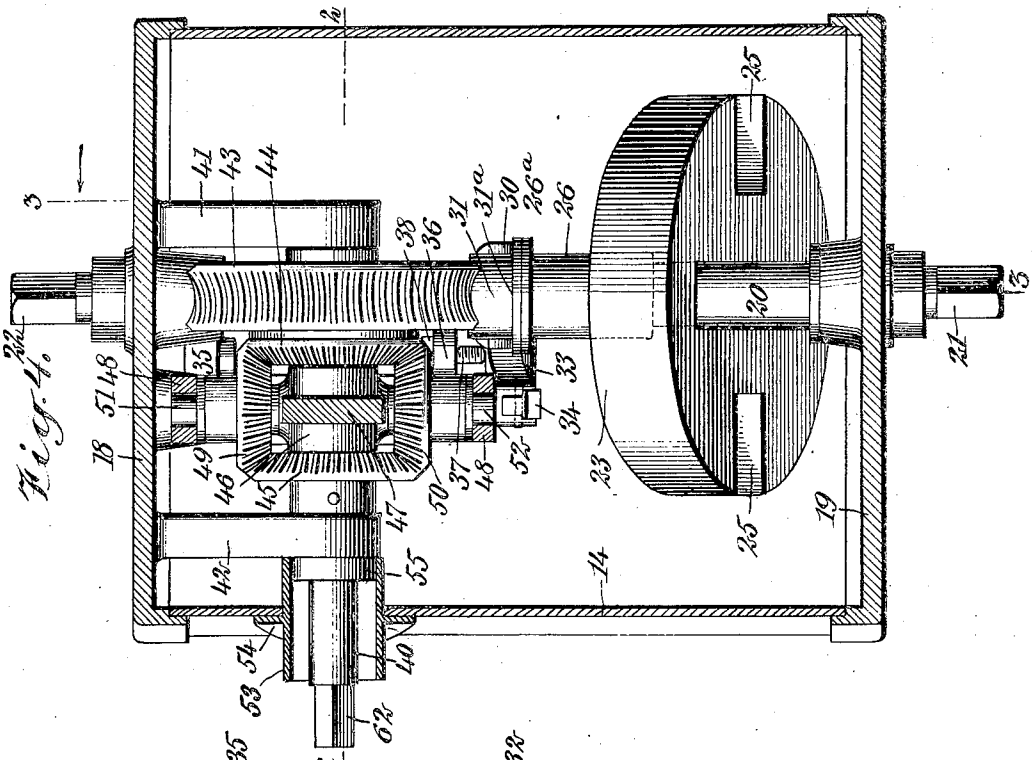
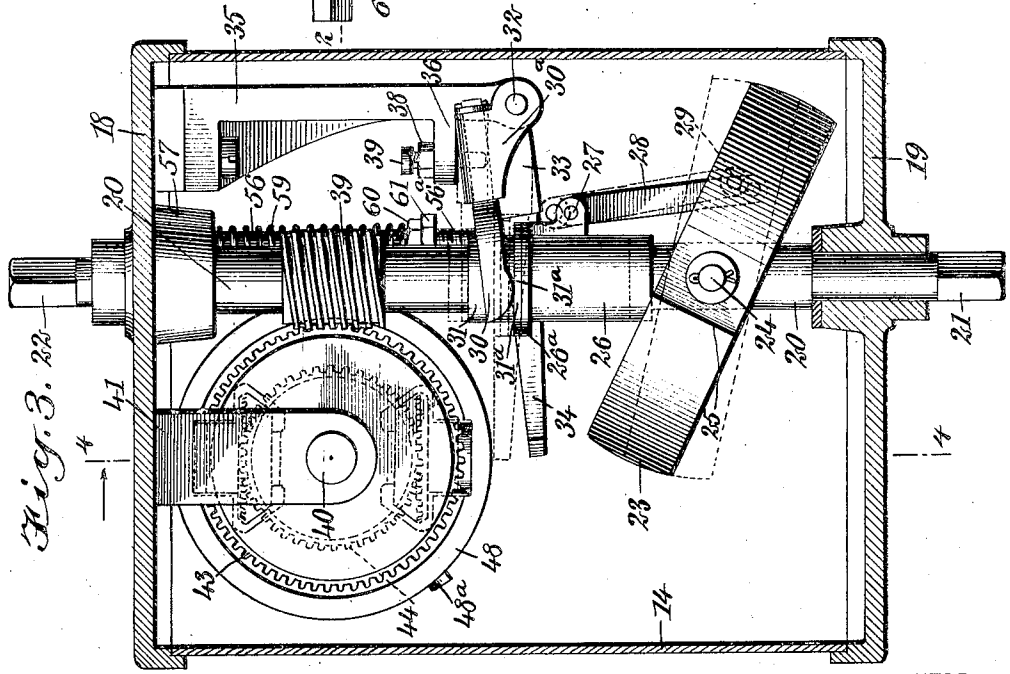


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 6.

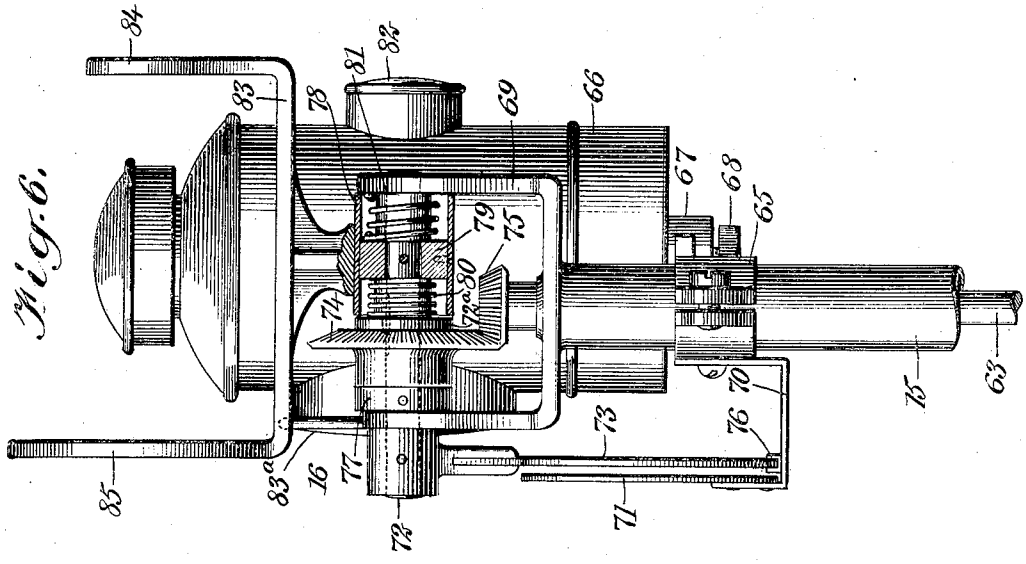
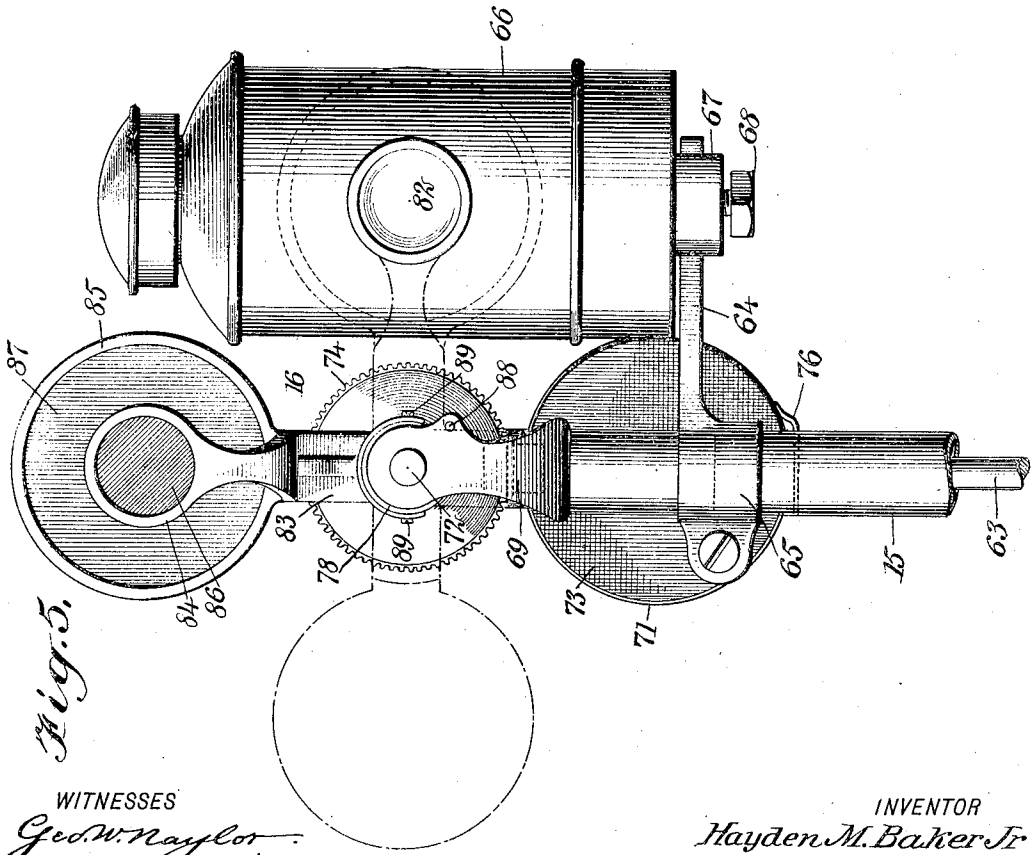


Fig. 5.



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ATTORNEYS

UNITED STATES PATENT OFFICE.

HAYDN MOZART BAKER, JR., OF NEW YORK, N. Y.

GEARING.

942,609. Specification of Letters Patent. Patented Dec. 7, 1909.

Application filed August 27, 1908. Serial No. 450,439.

To all whom it may concern:

Be it known that I, HAYDN M. BAKER, Jr., a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Gearing, of which the following is a full, clear, and exact description.

My invention relates to speed-controlled signaling mechanism, my more particular purpose being to provide a device in which a predetermined speed in a revoluble member forces into or out of action a visual signal so that a person may, by glancing at the signal, tell whether the speed is above or below a predetermined critical point.

My invention further comprehends a device in which a predetermined speed in a driving shaft actuates a governor and, through mechanism controllable by movements of this governor, affects the operative connections from a driving shaft to a driven shaft.

My invention further relates to means for adjusting the delicacy of the mechanism just mentioned.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary perspective showing my device as applied upon the front end of a car and used in such manner as to actuate a visual signal whenever the speed of the car exceeds a predetermined critical degree; this view further showing how a speedometer of ordinary construction may be connected with the movable parts and driven thereby; Fig. 2 is an enlarged vertical section upon the line 2—2 of Fig. 4, and showing the casing and a part of the gearing employed in my improved speed-controlled mechanism. Fig. 3 is a vertical section upon the line 3—3 of Fig. 4, looking in the direction of the arrow and showing the gearing, a speed-controlled governor associated with the gearing for the purpose of rendering certain portions of the gearing idle or active, according to the degree of speed; Fig. 4 is a vertical section upon the line 4—4 of Fig. 3, looking in the direction of the arrow and showing substantially the same mechanism as that appearing in Fig. 3; Fig. 5 is an enlarged side elevation of the signal which is actuated by the speed-controlled mechanism shown in Figs. 3 and 4; Fig. 6 is a view partly in front elevation and partly in section, showing substantially the same mechanism as that appearing in Fig. 5; and Fig. 7 is a detail showing a pawl and its accompanying parts for stopping rotation of a portion of the gearing in order to temporarily change the action of the gearing, thereby operating the visual signal.

A car is shown at 7 and is provided with a track wheel 8 mounted upon an axle 9. This axle is provided with a worm gear 10 which meshes with a worm 11, the latter being mounted upon a revoluble shaft 12. The car carries a bracket 13 which supports a casing 14 in which are mounted several gear members and other parts hereinafter described.

Extending upwardly from the casing 14 is a tube 15 which leads to a visual signal 16 for indicating whether the car is running at or over a predetermined speed. A flexible shaft 17 which derives its power from the shaft 12 is connected with a speedometer 7^a which may be of ordinary construction and is used for indicating the speed of the car. The casing 14 is provided with heads 18, 19, and revolubly supported by these heads and extending through the casing is a shaft 20 provided with angular ends 21, 22 for enabling it to be readily coupled with other revoluble parts, as hereinafter described.

A centrifugal governor 23, having the form of a disk, is mounted upon a pin 24, the latter extending diametrically through the shaft 20 as will be understood from Fig. 3. The disk is provided with slots 25 into which the ends of the pin 24 project slightly. A sleeve 26 encircles the shaft 20 and is provided with annular flanges 26^a. Connected with the sleeve 26 by aid of a pivot pin 27 is a link 28. This link is connected with the governor 23 by aid of a pivot pin 29. A fork 30 engages a sleeve 31 which is provided with a flange 31^a, this flange being integral with the sleeve 31. The fork 30 is supported by a bracket 30^a, the latter being mounted upon a stub shaft 32 and adapted to rock. Connected with this stub shaft is an arm 33 and a pawl 34 the purpose of which is hereinafter explained. The shaft 32 is supported upon a bracket 35, the latter being mounted rigidly upon the head 18. The bracket 35 is provided with a lug 36 through which extends a threaded bolt 37. Encircling this threaded bolt and engaging

the lug 36 is a locking nut 38 for holding the threaded bolt rigidly in position. The bolt 37 serves as a limiting stop for the arm 33 and consequently prevents the pawl 34 and the fork 30 from moving in excess of predetermined limits controllable by adjustment of the bolt 37.

A worm 39 is mounted upon the shaft 20 and, of course, turns therewith. Mounted upon the head 18 and projecting inwardly therefrom are hangers 41, 42 which support a shaft 40. A worm gear 43 turns freely upon the shaft 40 and is connected rigidly with a bevel gear 44 preferably integral with it. Disposed adjacent to the bevel gear 44 is another bevel gear 45 secured rigidly upon the shaft 40, as will be understood from Fig. 4. Intermediate the bevel gears 44, 45 is a hub 46 mounted loosely upon the shaft 40. Radiating from the hub 46 are two spokes 47 which support a rim 48. Two bevel gears 49, 50 mesh with the bevel gears 44, 45 and are mounted upon stub shafts 51, 52 which radiate from the shaft 40 and are secured to the rim 48. The stub shafts 51, 52 and the rim 48 together constitute a type of wheel. Mounted upon the outer surface of this wheel is a tooth 48^a (see Fig. 3) so positioned that under proper conditions this tooth may engage the outer or free end of the pawl 34, thereby stopping rotation of the rim 48.

A sleeve 53 (see Fig. 4) is provided with a flange 54 and is mounted upon the casing 14 so as to engage a reduced portion 55 of the hanger 42. This sleeve is useful for facilitating the coupling of the shaft 40 to other revoluble parts. A slide rod 56 works in a bearing 57 (see Fig. 7) and is provided with a threaded portion 56^a. This slide rod is connected by a pivot pin 58 with the pawl 34 and is raised and lowered by movements of this pawl. A spiral spring 59 encircles the slide rod 56 and engages the bearing 57. Mounted upon the threaded portion 56^a of the slide rod is a nut 60 which is engaged by another nut 61. By turning the nut 60 the tension of the spring 59 may be adjusted at will and the nut 61 simply locks the nut 60. The operator, by adjusting these nuts, may vary the sensitiveness of the pawl 34 as controlled by the governor 23. For instance, by so adjusting the nuts 60, 61, as to tighten the spring 59 and thus increase its pressure downwardly upon the nut 60, the pawl 34 is not easily brought into the path of travel of the tooth 48^a. Similarly, if the spring 59 be relaxed by an adjustment of the nuts 60, 61, very little effort upon the part of the governor is necessary in order to bring the pawl 34 into the path of the tooth.

The shaft 40 (see Fig. 2) is provided with an angular end 62, and connected with the latter is a shaft 63 which extends axially through the tube 15. Mounted upon the tube 15 near its top is a bracket 64 held upon it by a clamping collar 65. A lantern is shown at 66 and is provided at its bottom with a clamp 67 having a clamping bolt 68 for securing the lantern upon the bracket 64. Mounted rigidly upon the upper end of the tube 15 is a fork 69 serving, to some extent, the purpose of a hanger. Mounted upon the clamping collar 65 is a bracket 70 which supports a shield 71 having the form of a disk.

Supported by the fork 69 is a rocking shaft 72 and mounted rigidly upon this rocking shaft is a leaf 73 painted or otherwise colored so as to be readily seen from a distance. Mounted loosely upon the shaft 72 is a bevel gear 74 which meshes with a bevel pinion 75, the latter being keyed rigidly upon the upper end of the shaft 63. A spring pawl 76 is mounted upon the bracket 70 and forms a limiting stop for preventing excessive travel of the leaf 73 and consequently of the shaft 72. Splined upon this shaft is a washer 72^a, which turns with the shaft but is movable slightly in the general direction of the axis thereof. A set collar 77 is mounted rigidly upon the shaft 72. A barrel 78 (see Fig. 6) is provided with a disk 79 secured within it, this disk being rigid relatively to the shaft 72. A compression spring 80 of spiral form encircles the shaft 72 and engages the disk 79 and also the washer 72^a, the pressure of the spring tending to force these two members apart. The washer 72^a prevents the compression spring 80 from winding up or otherwise being displaced. A torsion spring 81 is connected at one of its ends to the disk 79 and at its other end to the fork 69. The purpose of this torsion spring is to retract the barrel 78 and in doing this to restore the shaft 72 to a predetermined position after its displacement therefrom by a quarter of a turn. The tension of the spring 81 is sufficient to hold the shaft 40 and the gear 45 stationary at all times when the rim 48 is free to rotate.

The lantern 66 is provided with a bull's eye 82 through which light passes. Secured rigidly to the barrel 78 is a yoke 83 carrying spectacles 84, 85, the spectacle 84 being adapted to cover and uncover the bull's eye 82. The lantern 66 is further provided with an illuminating face 83^a which is covered and uncovered by the spectacle 85. The spectacles 84, 85 are provided with colored panes 86, 87, of glass or other transparent material, through which the light may pass. Whenever the bevel gear 74 is turned in a clockwise direction, according to Fig. 5, the torsion spring 81 is wound because the shaft 72 turns a quarter of a revolution in a clockwise direction. This lowers the spectacles 84, 85. A stop pin 88 (see dotted lines, Fig.

5) prevents further rotation. The spectacles remain in this position so long as rotation of the gear 74 continues. This gear being pressed by the spring 80 against the set collar 77, as above described, develops during the time the rotation of the gear continues sufficient friction to hold the shaft 72 in the position described, and in doing this the torsion spring 81 is kept under increased tension. As soon, however, as the rotation of the gear wheel 74 stops, the torsion spring 81 has a chance to recover its normal position and in doing this it turns the shaft 72 backward by a quarter of a turn so that the spectacles 84, 85 assume the position indicated by full lines in Fig. 5.

For convenience the mechanism as shown in Fig. 5 may be considered as representative of the normal condition of the apparatus.

The operation of my device is as follows: The parts being arranged as above described, and motion being communicated to the car 7, the rotation of the car wheel 8 causes the worm gear 10 to turn the worm 11 and consequently the shaft 12. This causes the shaft 20 to rotate positively and at a speed proportionate to that of the car. The speedometer 7[a] is thus actuated so as to indicate at all times the speed of travel of the car. The rotation of the shaft 20 causes the centrifugal governor 23 to change its position slightly, as indicated by dotted lines in Fig. 3. The link 28 moves the sleeve 26 axially along the shaft 20 for a little distance and the sleeve 26 moves the sleeve 31 correspondingly, thus moving the fork 30 and causing the shaft 32 to rock slightly. This compresses the spring 59 which, as above explained, has been adjusted to such tension as to give it an apportionate degree of sensitiveness. Subject to this sensitiveness of the spring 59 the pawl 34 (being rigid upon the shaft 32) rocks a little, as indicated by dotted lines in Fig. 3, thereby coming into the path of the tooth 48[a]. The rotation of the shaft 20 causes the worm 39 to turn the gear wheel 43 so that the rotation of the bevel gear 44 is constant and positive, these parts turning loosely on the shaft 40 which is now stationary. The motion of the bevel gear 44 tends to turn the pinions 49, 50, each upon its own axis. The bevel gear 45 is not entirely free to turn, being restricted by the action of the torsion spring 81 (see Fig. 6). The bevel gears 49 must have a tendency to perform planetary movements, or in other words, to rotate bodily around the shaft 40 as a center. Up to this time the shaft 40 is stationary, and consequently the gear 45 is at rest. With the bevel gear 44 and the disk 48 turning, but at different rates of speed, and the gear 45 stationary, this gear is liable to be turned whenever a little extra pressure is placed upon it. The normal condition of the apparatus is thus maintained, the visual signal now appearing as indicated by full lines in Fig. 5. When, however, the speed increases until the pawl 34 moves into the path of the tooth 48[a], the rotation of the disk 48 is stopped. This being done, the bevel pinions 49, 50 are unable to move bodily around the axis of the shaft 40 as a center, but are nevertheless free to rotate each upon its own individual axis. This being so, they communicate rotary motion to the bevel gear 45 so that it turns positively, but in a direction opposite that of the gear 44. The shaft 40 and the gear 44 now turn in opposite directions. The turning of the bevel gear 45 causes the shaft 63 to rotate and this causes the bevel pinion 75 to turn the bevel gear 74. This bevel gear, because of its frictional engagement with the set collar 77 which is rigid upon the shaft 72, causes this shaft to turn as above described, thereby winding the torsion spring 81. A quarter turn of the shaft 72 having been made and the shaft being unable to rotate further because of the limiting stop afforded by the pin 88 (see Fig. 5), the gear wheel 74 simply slips idly upon the set collar 77, the effect of the rotation of the bevel gear 74 being merely to prevent the torsion spring 81 from immediately turning the shaft 72 backward. The spectacles 84, 85 being lowered (see dotted lines, Fig. 5) by this quarter revolution of the shaft 72, the operator is apprised that the speed of the vehicle is exceeding the predetermined limit allowed for it. He therefore slows down the motion of the car, or takes other appropriate action related to the excessive speed. Whenever the speed of the car is reduced to a point within its limits, so that the governor 23 rights itself, as indicated by full lines in Fig. 3, the pawl 34 is removed from the path of the tooth 48[a], and the rim 48 is now left free to turn. The instant the rim 48 is thus left free to turn, the application of power is necessarily cut off from the bevel gear 45 and consequently the rotation of the bevel gear 74 (Fig. 6) is stopped. The torsional spring 81 thereupon turns the shaft 72 backward a quarter of a turn so as to restore the spectacles to their normal position indicated by full lines in Figs. 5, 6. In doing this, the shaft 40 and gear 45 being suddenly freed from restraint are momentarily turned in the same direction as the rim 48.

In practice the operator merely adjusts the tension of the spring 59 to represent a predetermined critical speed limit, and whenever the spectacles 84, 85 are lowered, as indicated by dotted lines in Fig. 5, he slackens the speed until the spectacles are raised. If the lantern 66 is lighted, the operator merely observes the color of the light, and in this way is apprised whether the

speed of the car exceeds a predetermined limit.

While for convenience I show the speed-controlled mechanism as connected with a semaphore having moving parts, I do not limit myself to this particular application, for obviously the invention may be employed upon speed-controlled mechanism connected with any sort of device to be actuated suddenly whenever the speed exceeds a predetermined limit.

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

1. The combination of a revoluble shaft, a governor mounted thereupon, a sleeve encircling said shaft and connected with said governor, a rocking shaft, mechanism connecting said sleeve with said rocking shaft so as to cause the same to rock in consequence of changes of speed of said governor, a pawl connected with said rocking shaft and adapted to be shifted in position, and gearing connected with said shaft and driven thereby, said gearing including a revoluble member provided with a tooth, said tooth being so positioned as to engage said pawl whenever the latter occupies a predetermined position controllable by the speed of said governor, and mechanism connected with said revoluble member and controllable thereby, said last-mentioned mechanism being driven by said shaft whenever said revoluble member is stopped by said pawl.

2. The combination of a revoluble driving shaft, a governor connected therewith, a pawl connected with said governor and controllable by movements thereof, gearing connected with said driving shaft and driven thereby, said gearing including a revoluble member provided with a tooth for engaging said pawl, said pawl being so positioned as to partially obstruct the path of travel of said tooth when said pawl occupies a predetermined position controllable by the speed of said governor, and mechanism connected with said revoluble member and controllable thereby, said mechanism being driven by said shaft whenever said revoluble member is stopped by said pawl.

3. The combination of a revoluble driving shaft, a revoluble driven shaft, a governor connected with said revoluble driving shaft, a pawl connected with said governor and actuated by motions of the same, gearing disposed intermediate said driving shaft and said driven shaft, and mechanism including a revoluble member provided with a portion for engaging said pawl when the latter occupies a predetermined position, the position of said gearing intermediate said driven and said driving shafts being adapted to change when said pawl is engaged by said portion of said revoluble member.

4. The combination of a revoluble driving shaft, a governor mounted thereupon, a pawl connected with said governor and controllable thereby, a revoluble driven shaft, gearing for connecting said driving shaft with said driven shaft, said gearing including planetary gear wheels meshing together, and a revoluble member for supporting said planetary gear wheels, said revoluble member being provided with a tooth for engaging said pawl and thus stopping the rotation of said revoluble member for the purpose of changing the operative relation between said driven shaft and said driving shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HAYDN MOZART BAKER, Jr.

Witnesses:

Walton Harrison,

John P. Davis.