

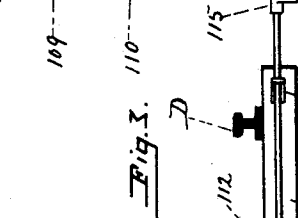
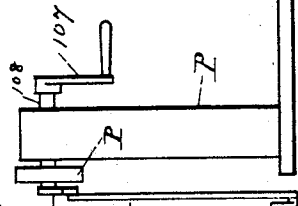
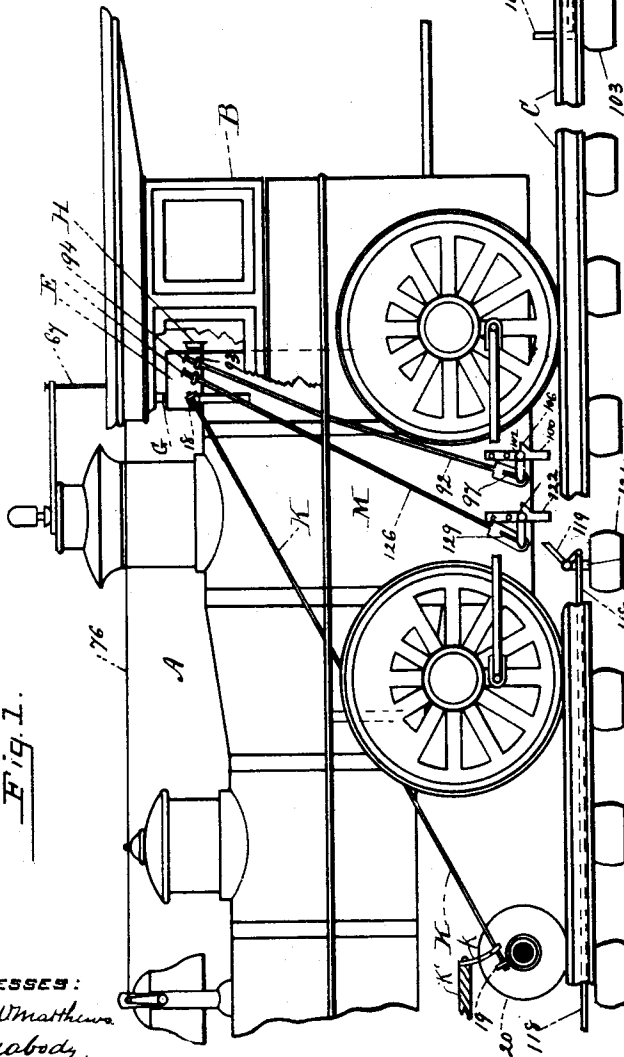
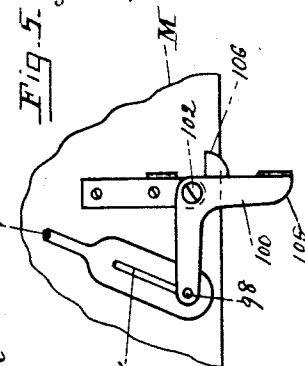
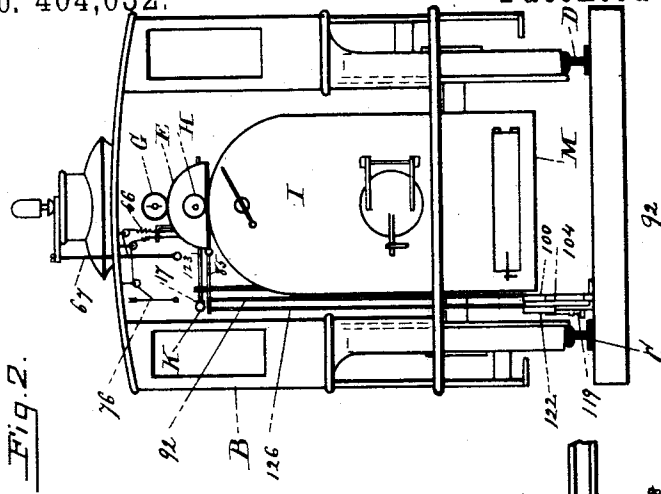
(No Model.)

5 Sheets—Sheet 1.

H. L. CURRIER.
DEVICE FOR INDICATING AND RECORDING THE SPEED, &c., OF
RAILROAD TRAINS.

No. 404,032.

Patented May 28, 1889.



WITNESSES:
Robert W. Matthews
E. J. Peabody.

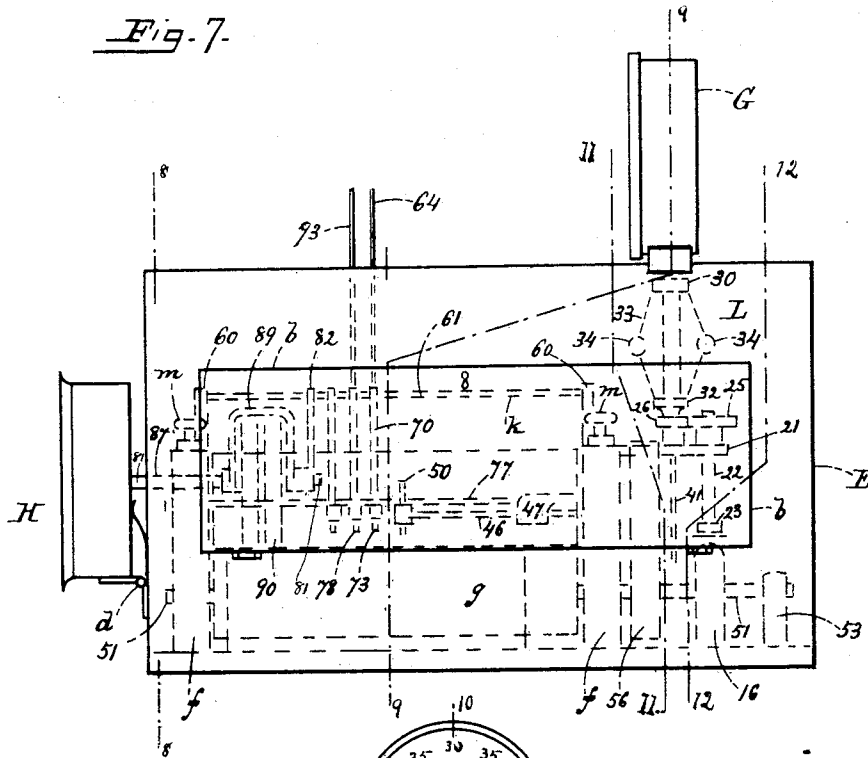
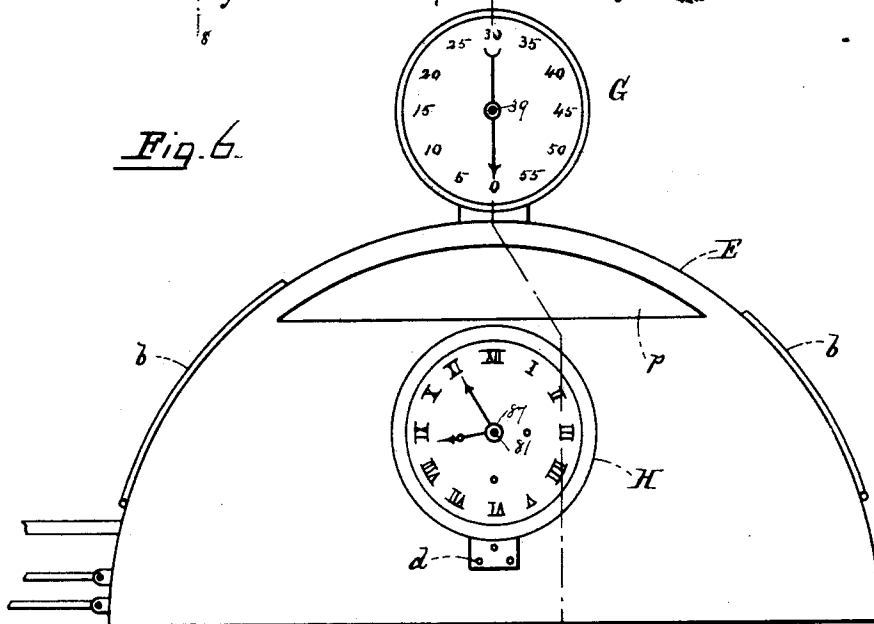
INVENTOR:
Herbert L. Currier
PER C. A. Shaw & Co.
ATTY'S.

H. L. CURRIER.

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Fig. 7.Fig. 6.

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(No Model.)

5 Sheets—Sheet 3.

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No. 404,032
Fig. 8.

Patented May 28, 1889.

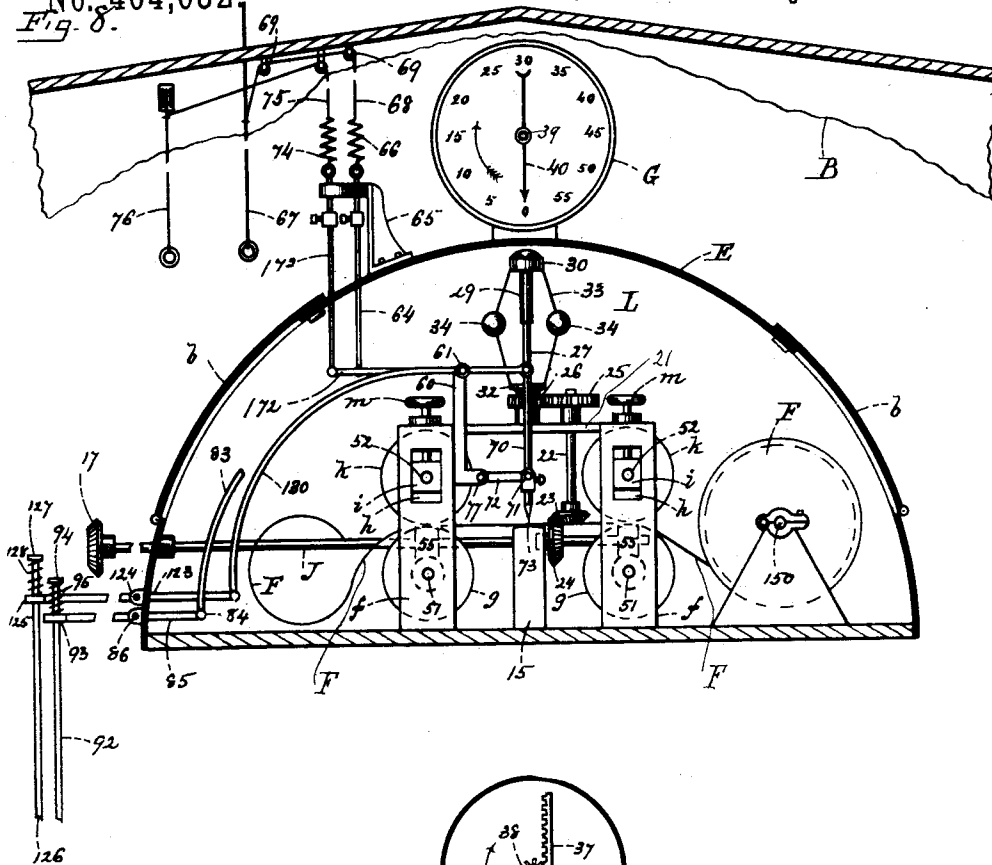
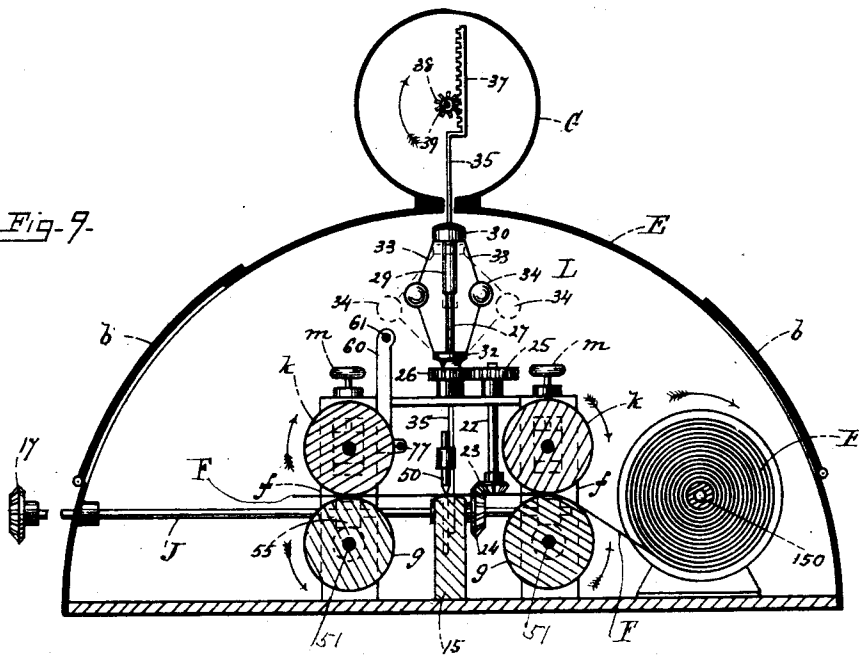


Fig. 7.



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DEVICE FOR INDICATING AND RECORDING THE SPEED, &c., OF
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Fig. 13.

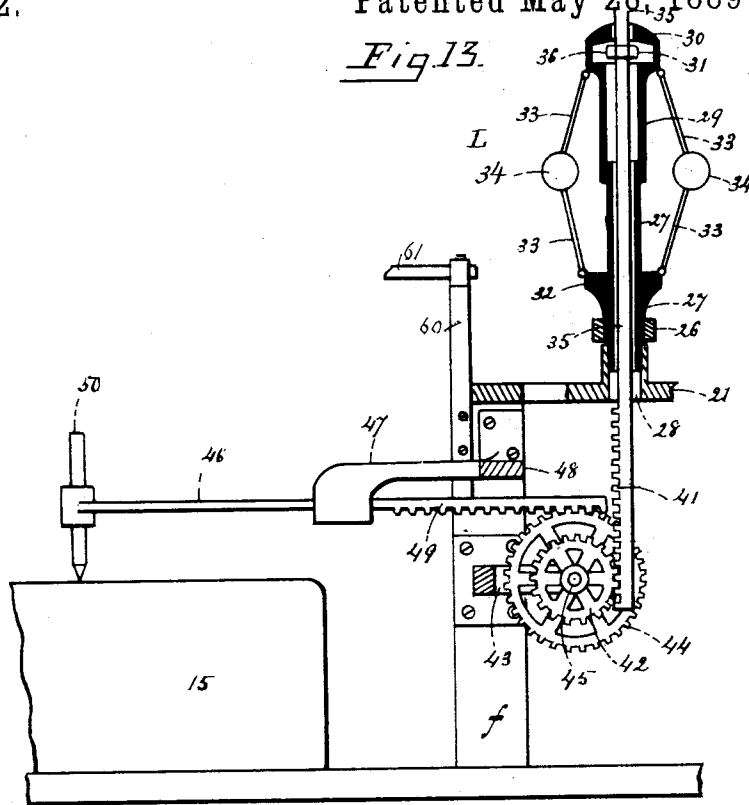
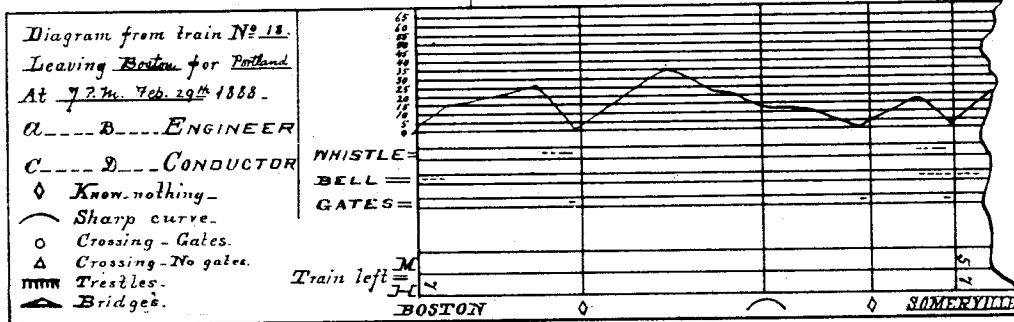


Fig. 14.



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UNITED STATES PATENT OFFICE.

HERBERT L. CURRIER, OF LYNN, MASSACHUSETTS.

DEVICE FOR INDICATING AND RECORDING THE SPEED, &c., OF RAILROAD-TRAINS.

SPECIFICATION forming part of Letters Patent No. 404,032, dated May 28, 1889.

Application filed May 12, 1888. Serial No. 273,662. (No model.)

To all whom it may concern:

Be it known that I, HERBERT L. CURRIER, of Lynn, in the county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Devices for Indicating and Recording the Speed, &c., of Railway-Trains, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a locomotive-engine provided with my improvement, the track, a portion of the engine, and the cab being represented as broken away; Fig. 2, a rear end elevation of the same, the track being shown in vertical section; Fig. 3, a vertical section of the railway-track, showing a crossing-gate in end elevation; Fig. 4, a section taken on the line 4 4 in Fig. 3, the gate being shown in side elevation and broken off; Fig. 5, an enlarged sectional view showing certain details of construction; Fig. 6, an enlarged front elevation of the register, showing the indicating-dial and clock, the actuating-rods being represented as broken off; Fig. 7, a side elevation of the same; Fig. 8, a vertical longitudinal section taken on line 8 8 in Fig. 7, the cab being shown in section and broken away; Fig. 9, a vertical longitudinal section taken on line 9 9 in Fig. 7; Fig. 10, a vertical transverse section taken on line 10 10 in Fig. 6; Fig. 11, a vertical longitudinal section taken on line 11 11 in Fig. 7; Fig. 12, a sectional view taken on line 12 12 in Fig. 7, illustrating certain details of construction; Fig. 13, an enlarged sectional view showing the working of the governor, and Fig. 14 a diagram showing a portion of the record-strip enlarged.

Like letters or figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates to apparatus for indicating to the engineer the speed at which a railway-train is traveling and at the same time recording the rate of speed at all points of the route, the sounding of the whistle and bell on the locomotive, the position of the

gates at the crossings, and the time of leaving each station; and it consists in certain novel features, as hereinafter fully set forth and claimed, the object being to produce a simple and effective device of this character.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation:

In the drawings, A represents the locomotive; B, the cab; C D, the railway-tracks; E, the case containing the recording apparatus; F, the recording-slip; G, the indicating-dial, and H the clock.

The locomotive, cab, and tracks are of the ordinary form and construction.

The case E is hemi-cylindrical in form, and is preferably composed of boiler-iron to prevent it from being broken in the event of an accident. The case is disposed in the cab B just above the boiler I (see Fig. 2) for convenience, and is provided with a thick plate of glass, *p*, in its front, Fig. 6, if desired, and with a door, *b*, on each side, having a lock for securing it.

The clock H is hinged at *d* (see Figs. 6 and 7) to the front face of the case E, and the speed-indicating dial G disposed on top of said case at the rear portion thereof. Two pairs of standards, *f*, are disposed within the case E, on each side of the center thereof. Two longitudinal shafts, 51, are journaled horizontally in the lower portions of said standards, and feed-rolls *g* are journaled on said shafts 51. (See Figs. 8, 9, and 11.) The standards *f* are provided in their upper parts with slots *h*, (see Fig. 8,) and sliding journal-blocks *i* are disposed in said slots. Two longitudinal shafts, 52, are journaled at their opposite ends in said sliding blocks and carry the upper feed-rolls, *k*, which coact with the lower feed-rolls, *g*. (See Figs. 8, 9, and 11.) Tension-screws *m* are disposed in the tops of the standards and engage the journal-blocks *i* for the purpose of regulating the pressure of the rolls *k* on the rolls *g*.

The recording-slip F, hereinafter described, is wound onto a spool which is journaled within the case E, its free end passing between each set of feed-rolls *k g* (see Figs. 8 and 9) and over a vertically-arranged block or table,

15, (see Figs. 8, 9, and 10,) disposed centrally between the standards *f*. A horizontally-arranged main driving-shaft, J, (see Figs. 8, 9, and 10,) is journaled in the side of the case and in a standard, 16, (see Figs. 7 and 10,) at the rear of said case.

The shaft J is provided with a beveled gear, 17, on its outer end, which intermeshes with a similar gear, 18, on the upper end of an inclined shaft, K, (see Fig. 1,) leading to one of the small wheels 20 on the forward trucks of the locomotive, a worm-gear, 19, on the lower end of said inclined shaft intermeshing with a worm on the axle of said wheel, as shown in Fig. 1, the mechanism within the case E being actuated thereby. The lower end of the shaft K is supported in a bracket, *k*, attached to the frame *k'* of the forward truck. A horizontally-arranged arm, 21, (see Fig. 10,) projects rearward from one of the rear standards *f*, and a vertical shaft, 22, is journaled in the outer end of said arm, said shaft being provided with a beveled gear, 23, which intermeshes with a like gear, 24, on the shaft J. On the upper end of the vertical shaft 22 is a gear, 25, (see Figs. 8 and 10,) intermeshing with a pinion, 26, on the lower end of a centrifugal governor, L, said governor being similar to those ordinarily employed for governing a steam-engine. The lower portion of the governor L consists of a tube, 27, (see Fig. 13,) which is fitted to rotate in an opening, 28, in the arm 21. The upper section of the governor consists of a tube, 29, which is fitted to slide closely over the tube 27, and is provided on its upper end with a cap, 30, having an interior annular chamber, 31. The cap 30 and an annular flange, 32, on the lower end of the tube 27 are connected by rods 33, hinged, respectively, thereto, said rods being centrally connected with centrifugal balls 34 in the usual manner.

A vertically-arranged rod, 35, is loosely disposed in the tubes 27 and 29, and is provided with a fixed collet, 36, within the chamber 31 of the cap 30. (See Fig. 13.) The upper end of the rod 35 is provided with a rack, 37, which intermeshes with a gear, 38, (see Fig. 9,) on a shaft, 39, carrying the index-finger 40 of the dial G, in the usual manner. (See Figs. 6 and 8.) The lower end of the rod 35 is provided with a rack, 41, (see Figs. 10 and 13,) which intermeshes with a small cog-wheel, 42, journaled on a shaft, 45, in an arm secured to a cross-bar, 43, (see Figs. 10 and 13,) connecting the rear standards *f*, a large cog-wheel, 44, being fixed on a sleeve which constitutes an extension of the hub of the wheel 42, journaled on said shaft 45. A rod, 46, is fitted to slide horizontally in the outer end of an arm, 47, (see Figs. 10 and 13,) which arm is secured to a cross-bar, 48, (see Fig. 11,) connecting the rear standards *f*. The inner end of said rod 46 is provided with a rack, 49, intermeshing with the large cog-wheel 44, and in its opposite end is disposed a vertically-adjustable pencil, 50, the point of which rests upon the

recording-slip F as it passes over the table 15, said pencil being employed to record on said slip the speed at which the train is traveling throughout the entire trip in a manner hereinafter specified.

The shafts 51 of the rolls *g* are extended rearward, their outer ends being journaled in short vertical standards 53. (See Figs. 10 and 12.) On the shafts 51, between the standards *f* and 53, respectively, are disposed worm-gears 54, (see Figs. 10 and 12,) which intermesh with worms 55 on the driving-shaft J. A gear, 56, (see Figs. 10 and 11,) is secured to each of the shafts 51, which intermeshes with a corresponding gear, 57, on each of the shafts 52, thereby causing all of the feed-rolls *k g* to rotate in unison when the main shaft J is revolved.

The recording-slip F (see Fig. 14) consists of a strip of paper, at one end of which is printed the number of the train, the places between which it runs, the time at which the train is scheduled to leave, the date, names of the engineer and conductor, and a key to certain symbols employed to indicate crossings, bridges, &c., between the stations. On the upper portion of the slip is printed a set of parallel longitudinal lines, which are numbered consecutively with every fifth numeral from nought to the number in miles per hour at which the locomotive is capable of traveling, which in the present example is shown as sixty-five. Below the set of lines described are printed two parallel longitudinal lines inclosing a space which is designated by the word "Whistle," other similar spaces being formed on the slip, designated by the words "Bell," "Gates," and "Train left $\frac{1}{2}$," respectively. On the lower edge of the slip are printed at intervals the names of the stations on the route and the symbols signifying curves, bridges, &c., as they occur, a transverse line being printed across the longitudinal lines on said slip at right angles thereto, beginning at each station-name and each symbol.

As the apparatus thus far described relates only to indicating and recording the speed of the train, the action of the pencil 50 on the upper set of numbered lines on the slip and of the dial G will first be explained.

Upon starting the train the inclined shaft K is caused to rotate by the worm on the axle of the wheel 20 of the locomotive-truck, thereby setting in motion the main driving-shaft J, which revolves the vertical shaft 22 and causes the lower tube, 27, of the centrifugal governor L to rotate. As said tube revolves, the centrifugal balls 34 are thrown outward, as shown by the dotted lines in Fig. 9, thus forcing the tube 29 downward over the tube 27, causing the cap 30 to engage the collet 36 on the rod 35 and force said rod downward, thereby setting in motion the gears 42 and 44 and the rod 46, which carries the pencil 50 backward and forward over the numbered parallel lines on the slip F. The shaft J at the same time sets

in motion the feed-rolls *k g* by means of the gears 56 and 57, worm-gears 54, and worms 55 on said shaft, the slip F being continuously fed between said rolls and over the table 15, under said pencil 50, which traces an irregular line thereon, as shown in Fig. 14, over the numbered parallel lines described, the course of said pencil on the slip being governed by the rate of speed with which the train moves and actuates the shaft J. When the rod 35 is forced downward, as described, it causes the index-finger 40 to revolve on the dial G by means of the gears 37 and 38. The number of revolutions in a mile made by the worm on the axle of the wheel 20 of the locomotive-truck being known, the intermediate gearing is so formed and the centrifugal governor L so adjusted that the dial G will indicate to the engineer at any moment the exact speed at which the train is running. The revolutions of the feed-rolls *k g* being adjusted in the same manner and the distance between the parallel lines on the slip F placed to correspond therewith, it will be obvious that the points of intersection between the irregular line on said slip and the parallel lines will constitute a record showing the exact rate of speed at all points on the trip. For example, the irregular line in the drawings starts at the nought-line at its intersection with the transverse line which extends across the slip from the word "Boston," being the starting-point of the train. From this point, as the train advances, the irregular line is gradually traced upward to the parallel line numbered 25, showing that the train at this point has attained a speed of twenty-five miles per hour. From this point it rapidly leads back to the nought-line, which it intersects just before it is crossed by a transverse line leading from a lozenge-shaped symbol, which upon reference to the key will be shown to indicate a "know-nothing" crossing, or place at which the train is compelled to stop, thus registering the fact, for examination by the proper officials at the termination of the trip, that the required stop had been made.

It will be obvious that in case of accident or other sudden stopping of the train the irregular pencil-line will be drawn directly from the line showing the rate of speed at the time of the accident to the nought-line, and thus record the exact place at which said accident happened.

A vertically-arranged bracket or arm, 60, (see Fig. 10,) is secured to each of two corresponding standards, *f*, and journaled in the top of said brackets is a horizontally-arranged shaft, 61. Pivoted horizontally on said shaft is a lever, 63, and hinged to the outer end of said lever is a vertically-arranged rod, 64, (see Fig. 8,) which passes through the case E, and is fitted to slide vertically in a bracket, 65, secured to the top of said case. To the upper end of the rod 64 is fastened a coiled spring, 66, which is connected with the ordi-

nary whistle-pull, 67, by a cord, 68, passing over pulleys 69, secured to the top of the cab B. To the inner end of the lever 63 is hinged a downwardly-projecting rod, 70, (see Fig. 10,) the lower end of said rod being pivoted at 71 to the outer end of a horizontal bar, 172, secured to a horizontal shaft, 77, (see Figs. 8 and 10,) journaled in the lower ends of the brackets 60. A pencil, 73, is fixed in a socket at the pivot 71 in position to have its point engage the slip F in the space between the parallel lines marked "Whistle" on said slip, when the whistle-pull is operated, and the pivoted levers and bars described are actuated thereby, thus indicating on said slip the places at which the whistle is sounded throughout the trip. A similar lever, 72, is pivoted on the rod 61, and has a vertical rod, 173, hinged to its outer end, and which passes upward through the case E and the bracket 65, the rod 173 being provided with a spring, 74, and a cord, 75, connecting said spring and the ordinary bell-pull, 76. A pencil, 78, (see Fig. 10,) is connected with the lever 172 by a system of bars pivoted to said lever and the shafts 61 and 77 in the bracket 60 in the same manner as the pencil 73, said pencil 78 being adjusted over the spaced marked "Bell" on the recording-slip F, so that when the bell-pull 76 is operated said pencil will mark on said slip, as it passes over the table 15, the exact places on the route at which the bell is sounded.

The clock H is hinged at *d* to the front of the case E, as described, (see Fig. 10,) and is sustained in a vertical position by a flat spring, 80, secured to said case. The main shaft 81, which bears the minute-hand of the clock in the usual manner, is extended rearward through said case, its rear end being journaled in the lower end of a vertical rod, 82. An elastic curved lever, 83, (see Fig. 8, in which said lever is shown as broken off,) is pivoted on the shaft 61, (see Fig. 10,) its inner end being hinged to the upper end of the vertical rod 82 and its lower end hinged at 84 to the inner end of a horizontally-arranged lever, 85, pivoted at 86 in the wall of the case E.

The sleeve 87, (see Fig. 10,) inclosing the arbor or main shaft 81 of the clock and carrying the hour-hand thereof, in the usual manner, is extended rearward through the front of the case and is journaled in the lower end of one arm of an inverted-U-shaped truss-bar, 89, (see Fig. 10,) the opposite end of said bar being fastened to the lower end of the vertical rod 82, in which the shaft 81 is journaled. Secured to the shaft 81, between the arms of the U-shaped bar 89, is a circular disk, 90, provided on its periphery with type figures or numerals from 1 to 60, arranged consecutively to represent the minutes in an hour. A disk, 91, numbered in like manner from 1 to 12, is secured to the inner end of the sleeve 87 between the arms of the U-shaped bar 89, the numerals thereon rep-

resenting hours. An inclined rod, 92, (see Figs. 1 and 8,) passes preferably down through the cab B by the fire-box M of the locomotive. The upper end of the rod 92 passes through an eye, 93, in the outer end of the horizontal lever 85 and is provided with a cap or flange, 94, a coiled retracting spring, 95, being disposed on said rod between said flange and eye. The lower end of the rod 92 (see Figs. 1 and 5) is provided with a vertical slot, 97, in which a pin, 98, is fitted to slide, said pin being secured in the end of a horizontal arm of a bell-crank lever, 100, pivoted at 102 to the fire-box M, the vertical arm of said lever projecting downward toward the road-bed.

Secured to a tie, 103, (see Fig. 1,) near the rail C, is a vertically-arranged bar, 104, adapted to engage the vertical arm of the lever 100 as the train starts from each regular stopping-place or station, the lower end of said arm being beveled, as shown at 105 in Fig. 5, to enable it to slip over the top of said bar, a stop, 106, being provided on said arm to prevent said lever from being turned too far. When the lever 100 engages the bar 104, as described, the vertical rod 92 is pulled downward by said lever, forcing the spring-lever 83 upward and causing the rod 82, pivoted to the inner end of said lever, to be forced downward. As the rod 82 descends, the shaft 81 and sleeve 87 of the clock H are carried downward by said rod, thereby forcing the type-figures on the disks 90 and 91 into contact with the recording-slip F, passing over the table 15, as above described. The disk 90 strikes the slip F in the longitudinal space marked "M" and the disk 91 in the space marked "H" on said slip, the numbers imprinted by said disks respectively showing the time, as indicated by the clock H, at which the train started. For example, the slip F, as represented in Fig. 14, shows that train No. 18, between "Boston" and "Portland," scheduled to leave at "7 p. m., Feby. 29, 1888," left Boston on time at seven o'clock, and left "Somerville," the next succeeding station, at five minutes after seven.

The crossing-gates P (see Figs. 3 and 4) are of the form and construction common in gates of this description, and are operated by a crank, 107, and counterbalanced by weight P'. To the outer end of the crank-shaft 108 is secured a downwardly-projecting arm, 109, and pivoted by its upper end to said arm is a vertically-arranged rod, 110. A horizontally-arranged rod, 112, is journaled in brackets 113, secured to a tie, 114, the inner end of said rod being pivoted by means of a crank-lever, 115, to the lower end of the vertical rod 110. To the outer end of the rod 112 is fixed a crank-lever, 116, the upper end of said lever being pivoted at 117, Fig. 4, to one end of a horizontal rod, 118, arranged along the web of a rail, C. (See Figs. 1 and 4.) A bell-crank lever, 119, is pivoted to a standard, 120, on a tie, 121, one arm of said lever being pivoted to the outer end of the horizontal rod 118 and

the other arm projecting upward above said track (see Fig. 1) in position to engage an arm of a bell-crank lever, 122, pivoted to the fire-box M in the same manner as the lever 100. A horizontal lever, 123, (see Fig. 8,) is pivoted at 124 in the side of the case E in the same manner as the lever 85, and is provided on its outer end with an eye, 125. An inclined rod, 126, similarly disposed to the rod 92, passes through said eye and is provided with a cap, 127, and a coiled retracting-spring, 128, disposed around it between said cap and eye. The lower end of the rod 126 is provided with a slot, 129, (see Fig. 1,) in which a pin on the horizontal arm of the lever 122 slides in the same manner as the pin 98 in the slot 97 of the rod 92, already described. To the inner end of the lever 123 is pivoted the lower end of a curved elastic lever, 130, (see Fig. 8,) said lever 130 being secured to the shaft 61 in the same manner as the lever 82. A vertical rod, 131, is pivoted to the inner end of the lever 130, (see Fig. 10,) the lower end of said rod being pivoted to the outer end of a bar (not shown) corresponding to the bar 72, secured to the shaft 77. A pencil, 132, is secured in a socket at the pivotal point of said bars in the same manner as the pencils 73 and 78, already described, the point of said pencil being in position to engage the slip F in the space marked "Gates" as the slip passes over the table 15. The rod 118, disposed along the web of the rail C, is of sufficient length to enable the gates P to be lowered and throw an arm of the lever 119 into the path of the lever 122 on the approaching train. When the lever 122 engages the lever 119, as described, the rod 126 is pulled downward, causing the elastic lever 130 to be pushed upward and thus force the point of the pencil 132 down onto the slip F in the gate-space of said slip, thereby recording the fact that the gates were properly closed when the train passed.

It will be understood that the apparatus described is to enable the proper officials of the road to ascertain if the engineer, fireman, and gate-men have properly performed their duties.

The record on the diagram or slip F, as shown in Fig. 14, reads as follows: "Train No. 18 left Boston for Portland on time at 7 o'clock in the afternoon of February 29, 1888. The bell was rung at starting. The whistle was sounded before reaching the first 'know-nothing' crossing and the train stopped there, the highest rate of speed attained thus far being twenty-five miles per hour. The train attained a speed of thirty-five miles per hour between the crossing stated and a sharp curve following. A stop was made at the next crossing and the gates were properly lowered; but neither the whistle nor bell was sounded, there being no marks in the proper spaces near the transverse line running from the lozenge-shaped symbol indicating the second crossing. The train stopped at 'Somerville,'

the whistle being sounded before reaching the station and the bell rung upon arriving and departing therefrom." The gates are shown to have been lowered, and the slip indicates that the train left said station at five minutes past seven o'clock.

Having thus explained my invention, what I claim is—

1. The combination of a record-slip, actuating mechanism therefor connected with an axle of the train, a shaft provided with two gear-wheels, a horizontally-sliding rod provided with a rack at one end which is engaged by one of said gear-wheels and with a pencil-holder at the opposite end for carrying a pencil to inscribe said record-slip, a centrifugal governor comprising upper and lower intersliding tubes, arms hinged thereto and balls on said arms, the upper tube being provided with a cap having an interior chamber and the lower tube with a pinion, a vertical rod extending through said tubes and provided with a collet on its upper part within said chamber and with a rack at its lower end which engages the other of said gear-wheels, and mechanism for actuating said pinion connected with an axle of the train.

2. The combination of a record-slip, actuating mechanism therefor connected with an axle of the train, a shaft provided with two gear-wheels, a horizontally-sliding rod provided with a rack at one end which is engaged by one of said gear-wheels and with a pencil-holder at the opposite end for carrying a pencil to inscribe said record-slip, a centrifugal governor comprising upper and lower intersliding tubes, arms hinged thereto and balls on said arms, the upper tube being provided with a cap having an interior chamber and the lower tube with a pinion, a vertical rod extending through said tubes and provided with a collet on its upper part within said chamber and with a rack at its lower end which engages the other of said gear-wheels, mechanism for actuating said pinion connected with an axle of the train, an indicator, and a rack on the upper end of said vertical rod and engaging a pinion of the indicator for actuating the index-finger thereof.

3. In a device of the character described, the combination of a case, a record-slip within said case, mechanism actuated by a wheel of the train for moving said slip, a clock hinged to said case, the main shaft or arbor and sleeve thereof being extended and journaled in said case, two disks disposed, respectively, on said shaft and sleeve and provided with type-numerals on their peripheries, a track provided with a fixed vertically-arranged bar, and adjunctive mechanism on the train adapted to engage said bar and cause said disks to be forced against the slip and their numerals imprinted thereon, substantially as specified.

4. In a device of the character described, the combination of a locomotive, a track, a case, a record-slip within said case, mechanism

actuated by a wheel on the locomotive for moving said slip, a clock hinged to said case and having its main shaft and sleeve journaled therein, two disks provided with type-numerals on their peripheries and respectively secured to said shaft and sleeve, a horizontal lever pivoted in said case, a curved elastic lever connecting said horizontal lever and shaft, a bell-crank lever pivoted to said locomotive, a vertically-arranged rod connecting said bell-crank lever with said horizontal lever, and a bar secured to the track in position to engage an arm of said bell-crank lever as the train passes over the same, substantially as set forth.

5. In a device of the character described, the combination of a case, a record-slip within said case, feed-rolls for said slip, mechanism actuated by a wheel of the train for rotating said rolls, a pencil disposed within said case, a track, a crossing-gate for said track, mechanism operated by said gate, whereby a bar is thrown into a vertical position on said track when the gate is lowered, and adjunctive mechanism on the locomotive adapted to be tripped by said bar and cause said pencil to indent said slip, substantially as specified.

6. In a device of the character described, the combination of a case, a record-slip within said case, feed-rolls for said slip, mechanism for actuating said feed-rolls driven by a wheel on the train, a pencil, a horizontal lever pivoted in said case, a curved elastic lever connecting said horizontal lever and pencil, a bell-crank lever pivoted to the locomotive, an inclined rod connecting said horizontal lever and bell-crank lever, a track, a crossing-gate, and mechanism operated by the gate to throw a bar upward on said track when the gate is lowered in position to engage said bell-crank lever and cause the pencil to indent the slip as the train passes the gate, substantially as set forth.

7. In a device of the character described, the combination of a case, a record-slip within said case, feed-rolls for said slip, mechanism for actuating said feed-rolls driven by a wheel of the train, a pencil disposed within said case, a track, a crossing-gate operated by a crank, a rod disposed horizontally on said track, a lever pivoted to said crank and rod, a bell-crank lever pivoted to a tie and to the outer end of said rod, so that an arm thereof will project above the track when said gate is lowered, and mechanism disposed on the locomotive in position to be tripped by said bell-crank lever as the train passes and cause said pencil to indent said slip, substantially as specified.

8. The combination, with a railway-vehicle, of a time-recorder comprising a record-slip, mechanism actuated by a wheel of the vehicle for moving said slip, a disk provided with type-numerals indicating hours adapted to print on said slip, a disk provided with type-numerals indicating minutes, also adapted to print on said slip, a clock for rotating said

disks, a fixed bar projecting from the road-bed, and mechanism on the train adapted to be tripped by said bar for causing said disk to imprint said slip.

- 5 9. In a device of the character described, the combination of a record-slip, a pencil adapted to mark or indent said slip, mechanism actuated by a wheel of the train for moving said slip, a crossing-gate, a bar connected
10 with said gate and adapted to be thrown into

position to engage mechanism on the train inclosing said gate, and adjunctive mechanism on the train adapted to engage said bar as the train passes it and cause said pencil to indent said slip, substantially as set forth.

HERBERT L. CURRIER.

Witnesses:

O. M. SHAW,

E. M. SPINNEY.