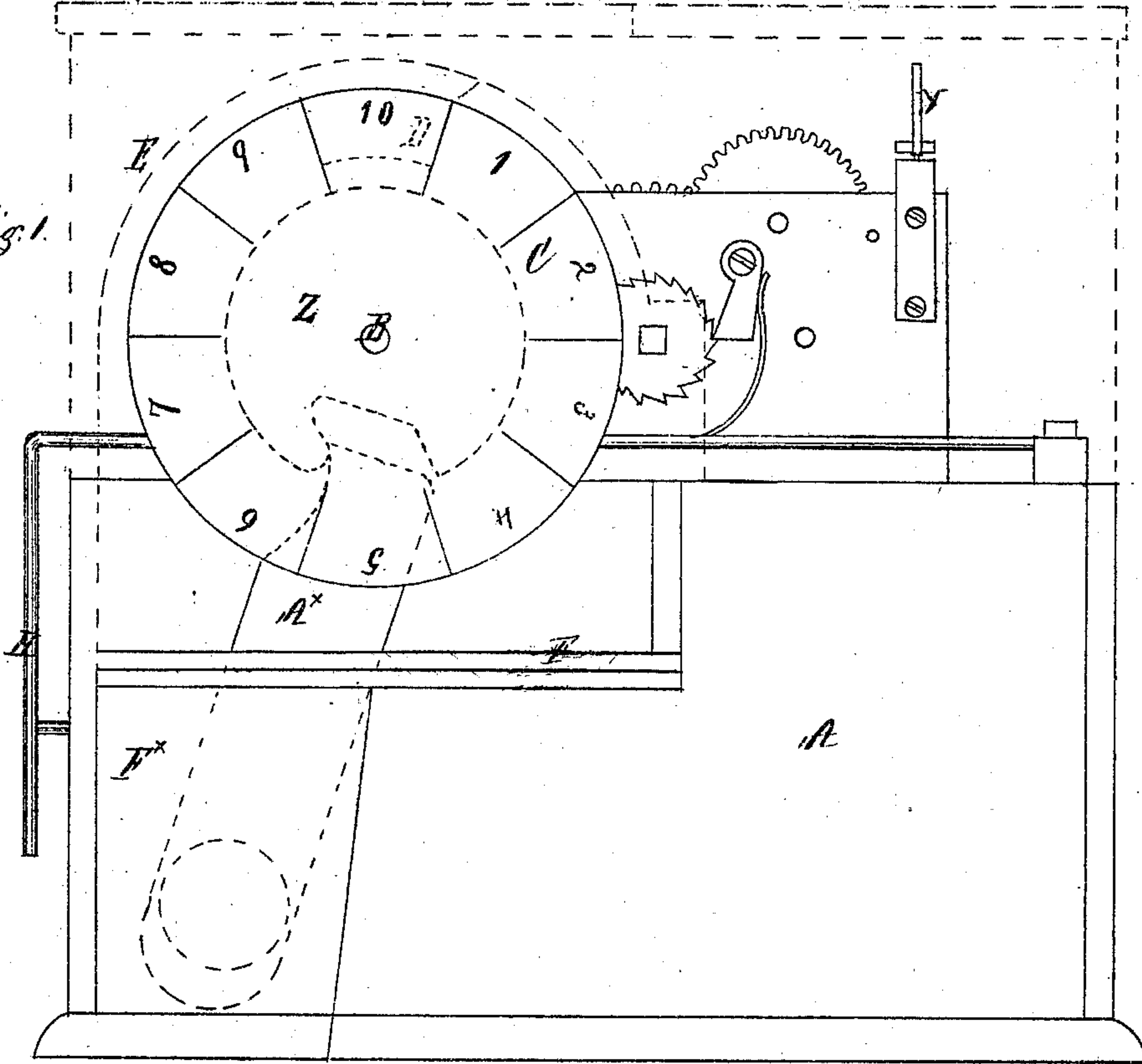


**G. B. CUMMINGS.**  
**Railroad Time-Signals.**

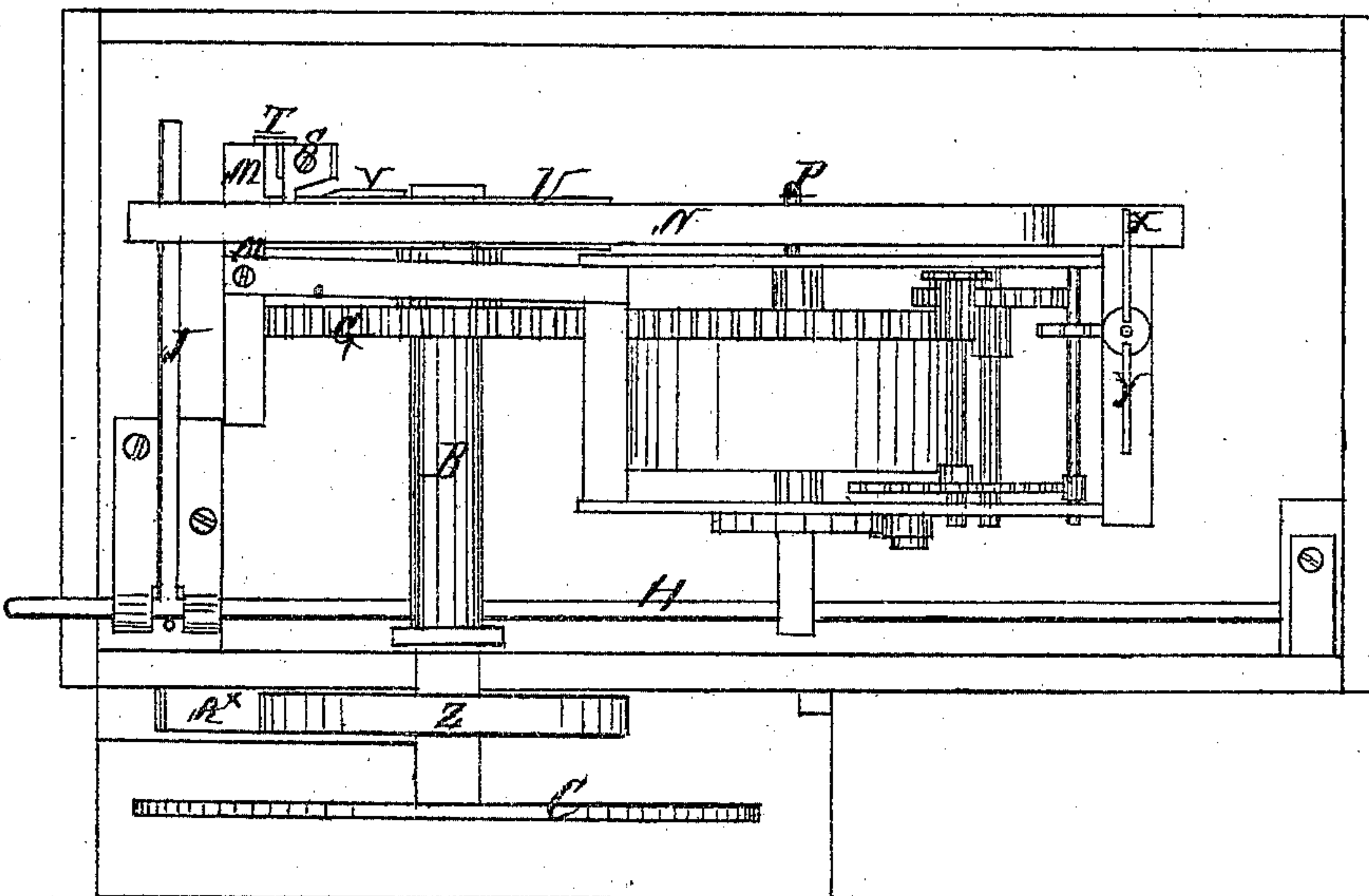
No. 143,405.

Patented Oct. 7, 1873.

*Fig. 1.*



*Fig. 3.*



Witnesses  
Lemuel P. Deane,  
W. J. Cambridge.

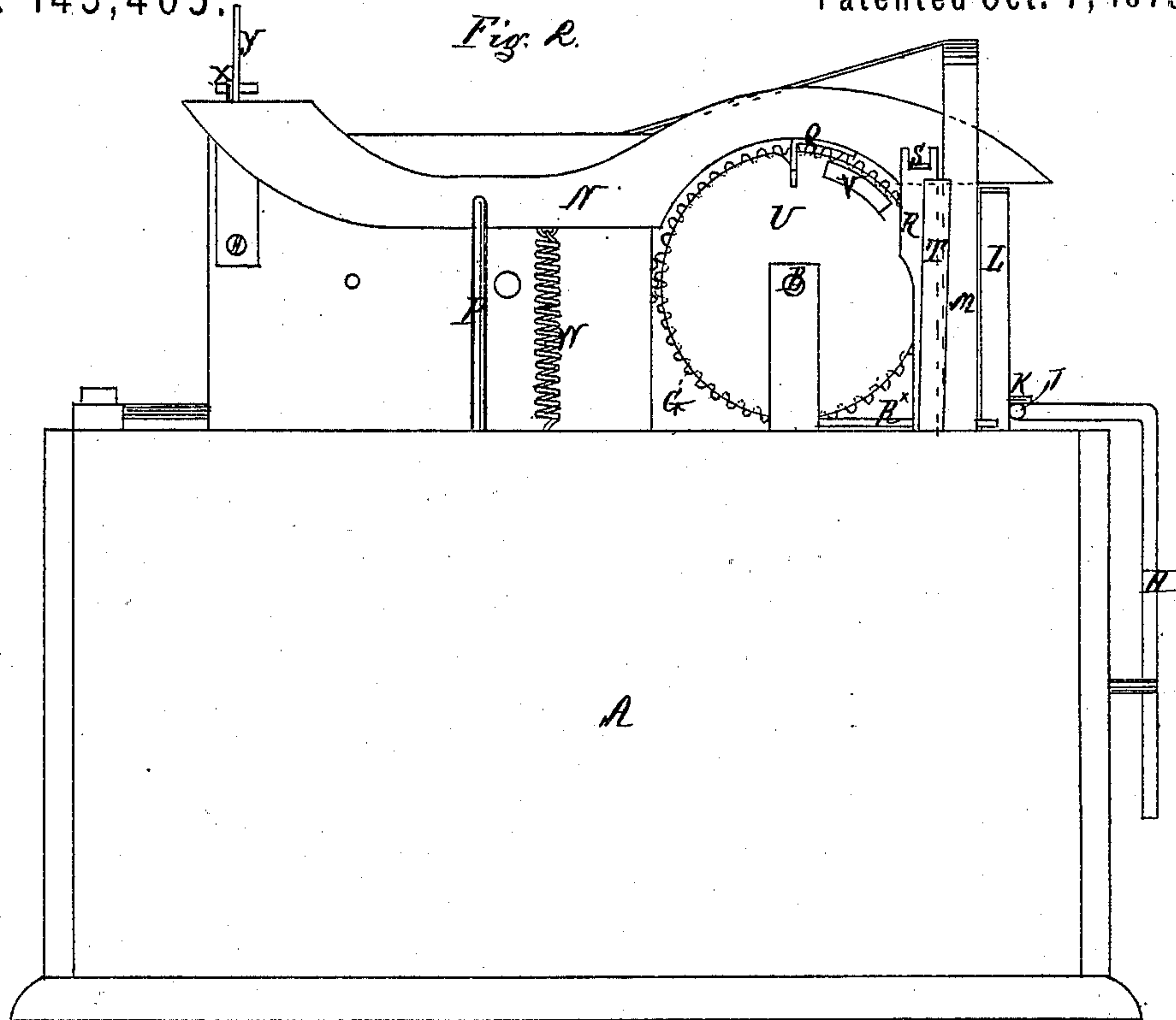
Inventor;  
George Benjamin Cummings

**G. B. CUMMINGS.**  
**Railroad Time-Signals.**

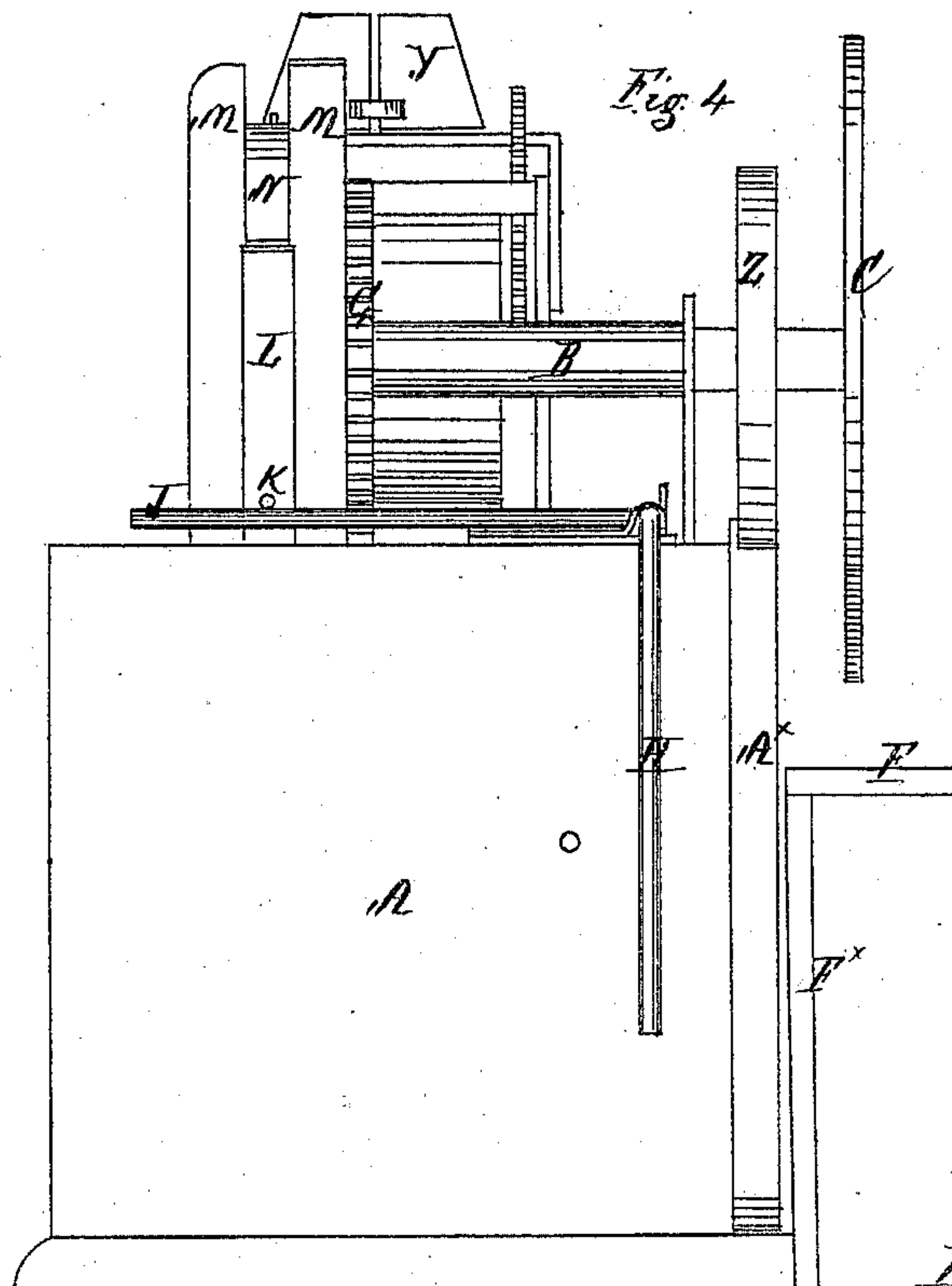
No. 143,405.

Patented Oct. 7, 1873.

*Fig. 2.*



*Fig. 4*



Witnesses  
Samuel P. Deane  
W. J. Cambridge

Inventor;  
George Benjamin Cummings



# UNITED STATES PATENT OFFICE.

GEORGE BENJAMIN CUMMINGS, OF CAMBRIDGE, MASSACHUSETTS.

## IMPROVEMENT IN RAILROAD TIME-SIGNALS.

Specification forming part of Letters Patent No. **143,405**, dated October 7, 1873; application filed June 21, 1872.

*To all whom it may concern:*

Be it known that I, GEORGE BENJAMIN CUMMINGS, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Railroad-Signal; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, with letters of reference marked thereon.

The nature of my invention is that of a signal, visible to the eye by night and by day, which signal is operated automatically, (without action of the station-master or of parties on the train,) by the passage of a train, by means of a projection from the top or the side of the locomotive; and the object is to give notice of the passage of a previous train, and of the time which has elapsed since that passage, up to the period of (say) ten minutes, (when the appearance of the signal is altered, and it ceases its notification of danger,) and thus to secure greater safety on railroads to life, limb, and property.

Figure 1 is a view from one side of my invention. Fig. 2 is a view from the other side. Fig. 3 is a view from above. Fig. 4 is an end view.

In the drawings, A, Figs. 1, 2, and 4, is the support of the machinery, made for convenience in the form of a box. The top part of the box is supposed to be removed in the drawings, but is represented in dashed lines in Fig. 1. B, Figs. 1, 2, 3, and 4 is the main shaft, which bears at one of its ends the dial C, Figs. 1, 3, and 4. This is a circular disk of glass, marked near its periphery, (see Fig. 1,) with ten equidistant lines, (somewhat like the dial of a watch,) and between each two lines a figure of the Arabic numerals, one to ten. The center of this dial is of wood or metal, which bears the glass. The latter is colored red, except at the point where the figure ten comes, at which point it is white or fully transparent. The red portion of the dial is translucent only. The dial rotating with the rotation of the main shaft, the figure which is at the moment uppermost is presented to view at the aperture D, Fig. 1, of the dial-box E, Fig. 1, which forms a part of the upper portion of the box A. This dial-box is supported by the top of the box A, and also by the shelf F and box F<sup>x</sup>,

seen in Figs. 1 and 4. The rotation of the main shaft B and the dial C is effected through the cog-wheel G, Figs. 2, 3, and 4, which cog-wheel is actuated by another, the latter forming part of a series of cog-wheels moved by the uncoiling of a spring, to which part of the apparatus is attached an appropriate ratchet, detent, pawl, and spring. (Seen in Fig. 1.) This part of the machinery being, except in one particular, identical with any ordinary motive clock-work, (more especially that used in the unwinding of strips of paper for the electric telegraph,) it has not been thought necessary to give a more special description of it, except in the particular above referred to. I use either a spring or a weight to communicate motion to my device. The motive power being thus at any moment available, the rotation of my dial C is thus governed. H, Figs. 1 and 4, is a rod or arm projecting from one side of my apparatus, and is called the striker-rod. (I sometimes make this rod H with an elbow-joint, which permits the lower portion to bend without actuating the rod on the application of pressure in one direction.) This rod H is disposed perpendicularly, and at a point, seen in Fig. 1, is bent at right angles and passes horizontally lengthwise of the box A, over the top of the same at one side, as seen in Fig. 3, having at each end of the box an appropriate bearing, as seen in Figs. 1 and 3. This striker-rod bears, attached to it at one end, the lifting-rod J, Figs. 3 and 4, which is disposed at right angles to the rod H, and passes at its farther end beneath a catch or projecting short shaft K, Figs. 2 and 4, attached to the lower portion of the lifter L, Figs. 2 and 4, which is a slab of wood, square or nearly so, in horizontal section, whose lower end slides down through an aperture in the floor of the lower part of the box A, being thus kept in place, and whose upper portion, armed at its end with a leather buffer, (see its top in Figs. 2 and 4,) slides up and down against the end side of the stop-lever guides M M, Figs. 3 and 4, (M, Fig. 2,) which are two upright posts proceeding from the floor of the box A. N, Figs. 2, 3, and 4, is the stop-lever, a slab of wood, of shape as shown in Fig. 2, which is supported by an upright rod, P, bent at the top at right angles, Figs. 2 and 3, (on which it partially rotates,)



which rod proceeds perpendicularly from the floor of the box A, as seen in Fig. 2. This stop-lever N is cut away in a circular form at its lower edge at the right-hand end, as seen in Fig. 2, and bears nearly at the center of the line of curvature, a piece of metal, Q, fastened to its lower edge, Fig. 2, called "the stop." The extreme right-hand end of the stop-lever N passes between, and is guided, as it moves up and down, by the two stop-lever guides M M. R, Fig. 2, is the holder, being an upright post of wood, moving, in partial rotation, upon the bearing R<sup>\*</sup>, Fig. 2, by which it is supported, and carrying at its top a projection, S, seen in Figs. 2 and 3, which extends toward the stop-lever N. This holder R is pressed forward toward the stop-lever N by a spring, T, Figs. 2 and 3, which proceeds upward from the floor of the box A. U, Figs. 2 and 3, is a circular disk of wood or metal, borne by the main shaft B. It is called "the stop-wheel," and has on its periphery, (which is otherwise smooth,) a notch, (see Fig. 2,) whose right-hand side is radial or perpendicular, while its left-hand side forms a curved inclined plane. This stop-wheel bears at V, Fig. 2, upon its side, near the periphery, a cam. W, Fig. 2, is a spiral spring, called the stop-lever spring, fastened at its lower end to the floor of the box A, and at its upper end to the lower edge of the stop-lever N. The left-hand end of the stop-lever N bears, (see Figs. 2 and 3,) a peg, X, projecting perpendicularly upward, called the regulator-stop. Beyond the farther side of the stop-lever N, is seen in Fig. 4, (see also Figs. 1, 2, and 3,) a fan-regulator, Y, of the usual construction, operated by the clock-work hereinbefore adverted to, and so placed as that when the right-hand end, in Fig. 2, of the stop-lever N falls the rising of the other end places the regulator-stop X directly in the line of horizontal rotation of the fans of the fan-regulator, and stopping this rotation arrests the motion of the clock-work. Z, Figs. 1, 3, and 4, is a circular disk of wood or metal borne by the main shaft B, near its right-hand end, in the end view of the whole device, shown in Fig. 4. This is called the semaphore-wheel, and it bears at one point of its periphery, which is otherwise smooth, a notch of peculiar shape, seen in dotted outline in Fig. 1. A<sup>\*</sup>, Figs. 1 and 4, is a slab of wood, called the semaphore-arm, which is borne beneath the semaphore-wheel and hangs, by the side of the box A, downward from a horizontal shaft, peg, or rivet proceeding from the side of the box A. I sometimes make this arm of a bent wire, with wire net-work in the intervening space, to secure lightness in the arm and less resistance to the wind. The upper end of this semaphore-arm, shaped as seen in Fig. 1, projects upward into the notch before mentioned in the semaphore-wheel. (See Fig. 1.) The lower part bears, as seen in Fig. 1, a circular figure painted thereon, of any desirable color, the object of which is to make the semaphore-arm more conspicuous and distinguishable.

And the operation of the invention is as follows: The clock-work being wound up and the transparent portion of the dial at the figure 10 being uppermost and exposed to view through the aperture D of the dial-box, (see Fig. 1,) and the whole device being in the position shown in the drawings, the passage of a locomotive is supposed to push, by means of the striking of a projection from the top or side of the engine, upon the side of the striker-rod H, (see Fig. 4,) to move it to the left. The lifting-rod J, being thus raised at one end, presses up the catch K, raising it and the lifter L, the top of which latter (and its buffer) presses up one end of the stop-lever N, thus raising the stop Q, (see Fig. 2.) The regulator-stop X, at the left-hand end, in Fig. 2, of the stop-lever N is thus lowered, and interposes no obstacle to the rotation of the fan-regulator Y, and the clock-work is thus set in motion, rotating, by means of the cog-wheel G, the main shaft B and all it bears. The dial rotates slowly, the clock-work being so graduated (preferably by means of a greater or smaller optional change of inclination from the perpendicular of the wings of the fan-regulator Y, when I so construct my fan-regulator) that a minute of time elapses before the figure 1 on the dial is presented to view at the aperture D. The presentation to view of each figure shows the lapse of that number of minutes since the commencement of the rotation of the dial. (It should be mentioned that some railroad superintendents desire to have a greater or less time than ten minutes elapse between the passages of their trains. In that case I increase or diminish the obliquity of the wings of my regulator-fan, and divide my dial into a greater or less number of segments, altering my figures in conformity. All the dial being of red glass, except where the figure 10 is placed, and a lighted lamp being placed behind the dial, the red appearance of the dial discovers instantly to the approaching engine-driver, who runs the train succeeding to that which has set the signal, that less than ten minutes has elapsed since the passage of the preceding train. If he wishes to know how many minutes, he has but to look at the number in view. When one revolution of the dial is completed the rotation is stopped, by means hereinafter described, and the transparent portion of the dial, with its figure 10, being exposed to view, it is indicated that the previous train is ten minutes ahead. This part of my device is more especially useful at night, and also to notify the time since the passage of the preceding train.

I am now to describe my day-signal. With the rotation of the shaft B the semaphore-wheel also rotates. That part of the notch in this wheel which is to the left, as seen in Fig. 1, near the periphery, impinging upon the left-hand upper corner of the semaphore-arm A<sup>\*</sup>, presses it to the left, thus raising the lower end of the arm till the said arm assumes a horizontal position. The plain smooth edge of the wheel Z pressing, in rotation of the latter, up-



on the corner of the arm, after the notch has quitted it, maintains the arm in a horizontal position until, the rotation of the semaphore-wheel being completed and the ten minutes elapsed, the notch in the wheel is again presented to the top of the semaphore-arm, which slips into it, and the farther end of the arm falls and is hidden behind the box F<sup>x</sup>, the non-appearance of the semaphore-arm indicating to the eye of the succeeding engine-driver that no train has passed within ten minutes.

I am now to describe how the cessation of the exhibition of the two danger-signals is caused when the upward passage of the lifter L has pressed up the right-hand end (in Fig. 2) of the stop-lever N. The spring T presses the projection S at the top of the holder R under the lower edge of the stop-lever N, thus holding up the latter. As soon as the rotation of the stop-wheel U commences the side cam V presses back the holder R, when the stop-lever N, drawn down by the spring W, falls, and the lower end of the stop Q rests upon the smooth edge of the stop-wheel U, until, the ro-

tation of the latter being completed, the stop Q falls again into the notch seen in Fig. 2, and the rotation of the stop-wheel, the main shaft B, the dial, and the semaphore-wheel is stopped. At the same time the left-hand end, in Fig. 2, of the stop-lever N being raised, the regulator-stop X is presented to a wing of the fan-regulator Y, in the line of its rotation, and, through the undescribed cog-wheels connecting the fan-regulator with the clock-work, the motion of the clock-work is stopped.

I claim—

1. The combination and arrangement of the shaft B, stop-lever N, stop-wheel U, and stop Q with an intermittently-revolving indicator, when constructed substantially as described.

2. The combination and arrangement of the shaft and stop devices named in claim 1 with the semaphore-arm and the semaphore-wheel Z, when constructed substantially as described.

GEORGE BENJAMIN CUMMINGS.

Witnesses:

LEMUEL P. JENKS,  
WILLIAM H. VAUGHN.