(No Model.) 2 Sheets—Sheet 1.

E. FONTAINE.

RAILWAY TIME SIGNAL.

No. 413,932. Patented Oct. 29, 1889.

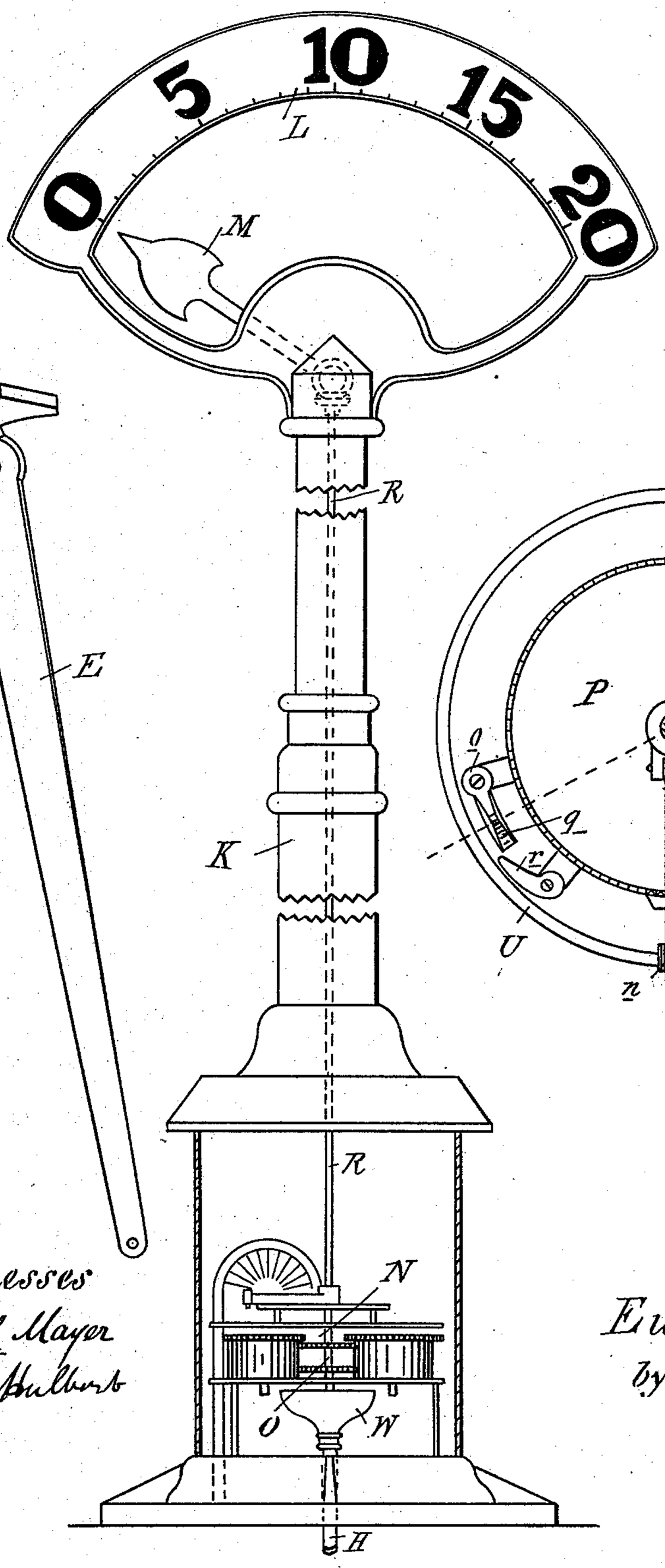

Fig. 1

Fig. 5

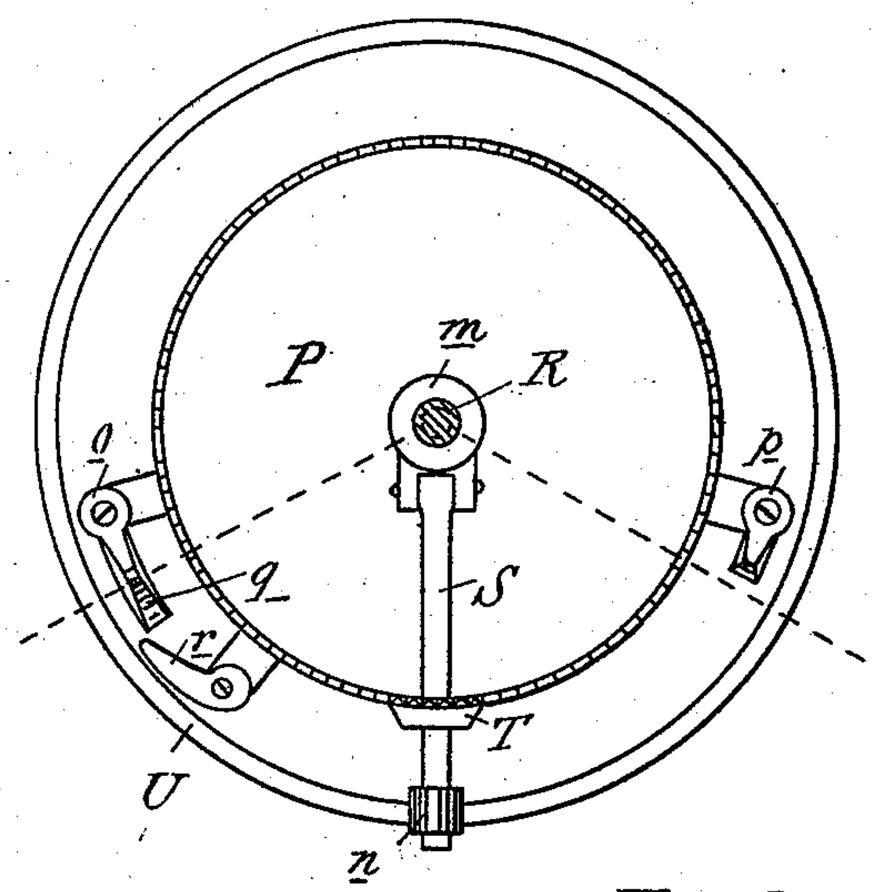

Fig. 3

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(No Model.) 2 Sheets—Sheet 2.

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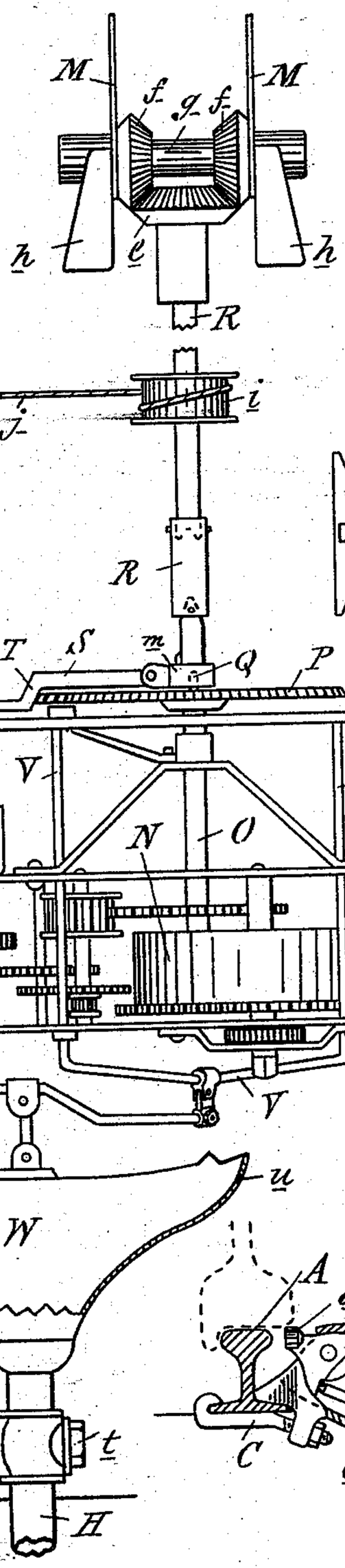
Fig. 2



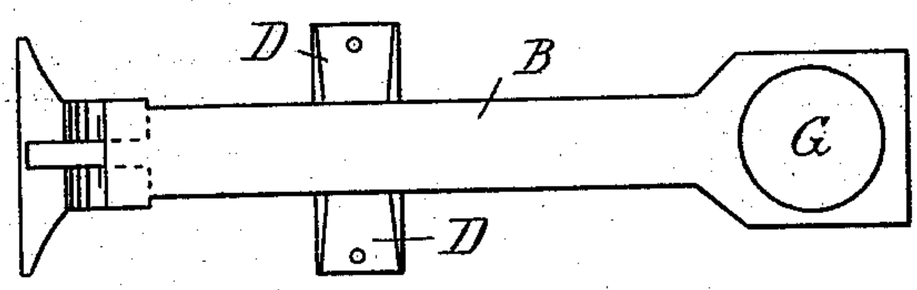
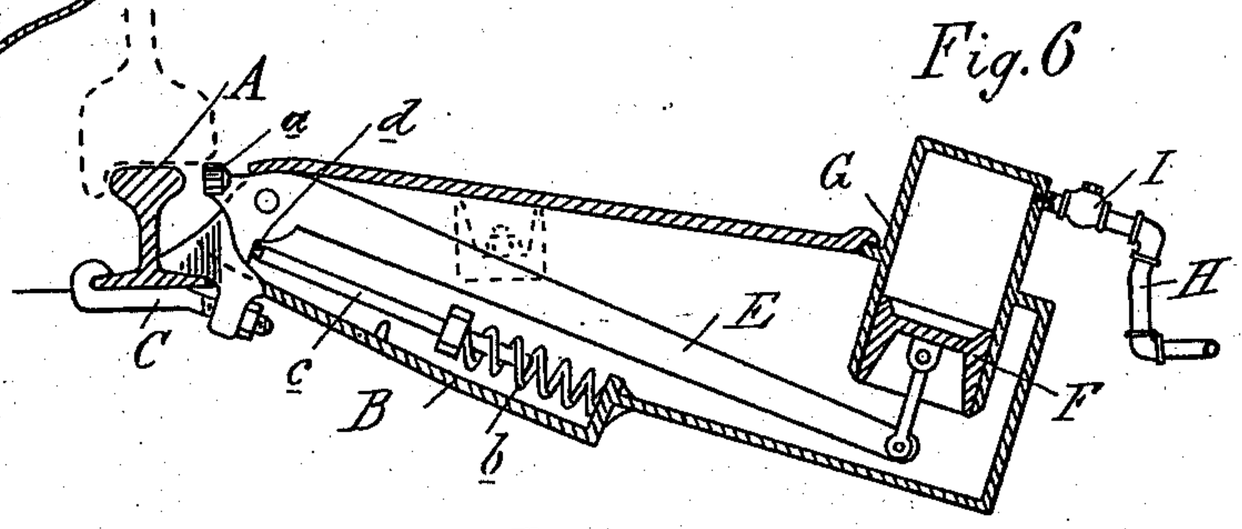


Fig. 4

Fig. 6



Witnesses
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UNITED STATES PATENT OFFICE.

EUGENE FONTAINE, OF AUBURNDALE, OHIO.

RAILWAY TIME-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 413,932, dated October 29, 1889.

Application filed December 10, 1888. Serial No. 293,095. (No model.)

To all whom it may concern:

Be it known that I, EUGENE FONTAINE, a citizen of the United States, residing at Auburndale, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Railway Signaling Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in time-signals for railroad-trains of the character designed to indicate the length of time since the last train has passed the signal, whereby the frequent railroad accidents resulting from collisions between two trains following too closely upon each other are sought to be most effectually prevented with ordinary vigilance on the part of the train people.

To this end my invention consists of a time-indicator having a clock-dial, with index-hands operated by clock-work, displayed at a certain station or point on the track, so as to be plainly visible to the engineer of an approaching train, and this time-indicator is provided with an automatic stopping device after it has indicated a maximum time interval—say twenty minutes, which ought to be sufficiently ample to allow the preceding train to pass out of the reach of danger. With this indicator is combined a retracting device, whereby the index-hands are automatically set back to zero by the action of a lever, which is controlled by a passing train and operates an air-pipe, which compresses the air and acts through the medium of the diaphragm to throw the resetting device of the index-hand into action, all as more fully hereinafter set forth, and described in the accompanying drawings, in which—

Figure 1 is an elevation of my improved device, taken in a plane at right angles across the track. Fig. 2 is an enlarged elevation of the operating mechanism partially shown in Fig. 1. Fig. 3 is a detached plan of the enlarged disk and locking-lever. Fig. 4 is a plan of the casing inclosing the actuating-lever. Fig. 5 is a detached perspective view of the actuating-lever. Fig. 6 is a vertical longitudinal section through the actuating-lever and casing.

A are the track-rails.

B is a casing or box secured in fixed relation to one of the rails in any suitable manner, as, for instance, shown in the drawings, wherein C is a rail clip or chair detachably connecting the inner end of the box to the rail, and D are the flanges on the sides of the box for additionally fastening the box to suitable sleepers. Within the box is pivotally mounted, free to operate, the lever E, the short end of which projects through a suitable aperture in the inner end of the box into such proximity to the rail as to be actuated by the tread of a car or locomotive wheel. This lever (shown detached in Fig. 5) is provided with the head *a* parallel to the track, and having the upper face formed convex to avoid obstructing the wheel. A spring is suitably connected to this lever to retract it into its normal position and maintain it there, and this spring has to be strong enough to prevent the actuation of the lever by a person stepping on the exposed head or trying to tamper with it otherwise. Preferably I arrange a coil-spring *b*, seated with one end against an offset in the casing and engaging at the other end with a tension-rod *c*, which abuts against a shoulder *d* on the lever. The free end of the lever E carries a piston F, which operates in an air-cylinder G. This cylinder is secured in any suitable manner to the box B, and in such relation to the lever E that the actuation of the latter will cause the piston to be reciprocated in the cylinder.

H is a pipe connected with the cylinder at one end and communicating therewith to form an outlet for the compressed air when the piston is actuated within the cylinder. This pipe is provided with a check-valve I, and is made partly flexible or provided with a universal joint or right-angled bends to compensate for expansion and contraction and to permit of making the ordinary repairs to the track without dismounting the pipe.

K is a signal-post placed alongside of the track, to support upon its upper end, at a suitable height, a time-signal, which consists of an arc of a circle L and the index-hands M, which point on the dials formed on the face of the arc of a circle and capable to register a suitable time interval—say twenty minutes—subdivided in the usual manner and numbered at intervals of five minutes, so as to be

readily legible at a distance. To permit of reading at night, the dials may be painted with illuminating-paint, or other provision may be made therefor. Preferably I provide the post with two time-signals, as described, exactly corresponding with each other, but placed in a reverse manner to each other on top of the post, so that one serves for trains coming in one direction and the other for trains coming in the opposite direction. This signal-post is preferably hollow to form a suitable housing for the operating mechanism inclosed therein, to protect it against the weather and form a safeguard to prevent tampering, access being had to the inside by a suitable door. In the base of this signal-post, which is enlarged and supported upon a suitable foundation, a clock mechanism N is mounted, adapted to revolve the main shaft O. To the upper end of this shaft is secured a notched disk P, so as to revolve with the shaft O, and in the center of this disk is formed a step Q, which forms a bearing for the lower end of the vertical shaft R, which extends to the top of the signal-post and is provided at its upper end with a beveled pinion *e*, which engages with the beveled pinions *f*, which are loosely mounted upon the transverse shaft *g*, one carrying the index-hand M for one dial and the other the index-hand of the other dial, and a counter-weight *h* is secured to each index-hand to balance its weight exactly, or nearly so.

The vertical shaft R is preferably made in sections, to be readily mounted and dismounted and to compensate for expansion and contraction, and secured upon it is a grooved pulley *i*, around which passes the cord or chain *j*, which passes over another grooved pulley *k*, and carries a weight *l*. To the lower end of the shaft is secured a collar *m*, which carries the hinged dog S, extending radially on top of the disk P, and provided with a toothed offset T, adapted to engage into any of the notches of the disk P. The free end of this dog S is provided with a roller *n*, which is adapted to travel on an annular guide-rail U, which is vertically movably supported below the disk P in any suitable manner, such as by the vertical guide-posts V. Two stops *o* and *p* are mounted in the plane in which the dog S is carried by the disk P, and in such relation to said dog as to limit its movement between these two stops, the stop *p* forming a positive abutment to mark the starting-point of the dog S, and the stop *o* the terminating-point of its travel, and operated by means of an inclined plane formed upon its forward end, which, when the dog strikes against it, gradually lifts its free end and disengages it from the disk P, and a back stop *r*, preferably consisting of a light spring, operates in connection with the stop *o* to lock the dog S in its disengaged position. The stops *o* and *p* may be secured upon a flange formed in connection with the guide-rail U, or may be supported by a suitable frame secured to the frame of the clock mechanism.

The pipe H, which connects with the air-cylinder, leads to an air-chamber W, housed within the signal-post. This air-chamber is closed on its upper side by a diaphragm Y, which is centrally connected to the lever Z, the free end of which is secured to a rising and falling frame V, all so arranged that the upward expansion of the diaphragm under the air-pressure will lift up the lever Z, and thereby cause the frame V to rise. A check-valve *t* is secured in the pipe H below the air-chamber, and a small vent *u* is provided in the air-chamber.

In practice, the parts being arranged and constructed as described and shown, they are intended to operate as follows: The operation of the clock mechanism revolves the notched disk P, and, through the medium of the dog S engaging thereon, the shaft R is revolved, and motion is transmitted to the beveled pinions *f*, on top of the signal, which carries the index-hands M, thereby carrying each one in the direction necessary to form a time-indicator on its respective dial in minutes, as in the usual manner with the minute-hand of a clock. At the time the index-hands have arrived at the end of the prescribed time interval—say twenty minutes—the dog S encounters the incline *q* of the stop *o*. This disengages the dog S from the disk P, and the back stop *r* arrests it in said position. Thus, while the clock-movement is running along, the index-hands M are arrested at the end of the time interval marked on the dials. Should a train now approach the time-signal, the lever E will be actuated by the tread of the first wheel, which strikes it in such a manner as to cause the piston to expel the air from the air-cylinder and force it through the pipe H into the air-chamber W. The air in the air-chamber, thus becoming compressed, lifts up the diaphragm Y, and, through the connection with the lever Z, the frame V, carrying the guide-rail U, is pushed upwardly. This movement is sufficient to disengage the dog S, the free end of which projects above the rail to disengage from the back stop *r*, and allows the weight *l*, through the connection described, to reverse the shaft R to carry the index-hands back to zero, in which position the dog S is arrested by the stop *p*, and thereby the weight *l* is suspended from further action. Should a train approach the signal at any time before the index-hands have reached their time limit, the operation will be similar, as the actuation of the lever E will in the same manner raise the guide-rail U, and thereby disengage the dog S from the notched disk P and unlock the shaft R from the shaft O, rendering it free to be reversed under the action of the weight *l*, until the index-hands have been returned to their zero position. The air compressed in the air-chamber W gradually escapes from the vent *u* and restores the diaphragm gradually to its normal

position, in which the clock-movement is again free to carry the index-hands. This movement is accelerated by the weight of the frame V and lever Z, which press on the center of the diaphragm. The check-valve I in the connecting-pipe H prevents the compressed air from rushing back into the air-cylinder, and therefore the lever E will have a comparatively slow movement in returning to its normal position, as some time is required to destroy the vacuum formed in the cylinder. This action prevents the passing train from thumping the lever E every time a wheel passes over the inner end of the lever, and the device is therefore not liable to be injuriously affected by a repetition of the action of every wheel.

All the parts of my device are constructed in a substantial manner and well protected from malicious interference and atmospheric influences.

Suitable provision is made for winding the clock-movement, and as the movement never stops, no matter how the device operates, a prescribed time limit for winding is necessary, and the danger of the clock-movement being neglected, or its liability to become inoperative by repeated stops, is thereby avoided.

The manner of connecting the box which contains the actuating-lever with the operating device of the signal-post, and the manner of connecting the box which contains the operating-lever with the track-rail, permit of attending to the necessary repairs to the track without disturbing the device.

By counterweighting the index-hands the weight *l* for retracting the index-hands need be but comparatively light, so as not to interfere with a portion of the clock mechanism.

The air-chamber W is funnel-shaped, so as to admit of actuating a comparatively large diaphragm with a relatively small amount of compressed air.

I do not claim the operating or controlling of a time-signal by means of a lever acted on by the passing train; nor do I claim the use of compressed air as the vehicle for transmitting motion from said lever and the signal, as these devices have been employed heretofore.

My invention consists in actuating the time-signal by clock mechanism through an intermediate connection which contains a clutch mechanism controlled by the passing train, substantially in the manner and by the means described.

What I claim as my invention is—

1. A railway time-signal of the kind described, comprising an air-compressing device operated by a passing train, an air-receiving chamber communicating therewith and provided with a rising and falling diaphragm, a signal-dial mounted on the post, actuating clock mechanism for operating the index-hand of said dial, a clutch in the actuating-shaft of the clock mechanism controlled by the rising and falling diaphragm of the air-receiving chamber to engage and disengage said clutch, and a retracting-weight or its equivalent for the index-hand, substantially as described.

2. In a time-signal, the combination, with an air-compressing device and its actuating-lever operated by a passing train, of a signal-dial mounted on a hollow post, actuating clock mechanism mounted in the base of said post, a shaft operated by said clock mechanism and provided with an extension into the top of the post and operating the index-hand of the dial, an intermediate clutch mechanism consisting of the notched disk revolving with the shaft of the clock mechanism, and the hinged dog on the extension of said shaft, a rising and falling guide-rail on which said dog is adapted to travel, an air-receiving chamber provided with a rising and falling diaphragm, and an actuating-connection of said diaphragm with the rising and falling guide-rail, substantially as described.

3. The combination, with the hollow signal-post, of the clock mechanism mounted in the base thereof, and with the actuating-shaft in line with the axis of the post, a stop formed on the upper end of said shaft, an extension of said shaft into the top of the post and supported on said stop, the clutch mechanism between said shaft and its extension, the beveled pinion secured to the upper end of said shaft-extension, the transverse shaft carrying the beveled pinions engaging with the beveled pinion on the extension of the shaft, the index-hands secured to said transverse shaft, and the dials mounted on top of the post, substantially as described.

4. The combination, with the lever E, operated by a passing train to control the time-signal, of the box B, inclosing such lever and provided with an aperture through which the inner end of said lever projects into proximity to the rail, and the rail-clip C, securing the inner end of such box to the rail, substantially as described.

5. The combination, with the lever operated by a passing train to control the time-signal, of the box B, inclosing such lever, the rail-clip C, securing the box to the rail, the piston F, carried by the free end of the lever, and the air-cylinder G, secured in an aperture of the box, substantially as described.

6. The combination, with the shaft O of the actuating clock mechanism of the signal, of the notched disk P, secured thereto, the step Q, formed thereon, the shaft-extension R, supported thereon, the hinged dog S, adapted to engage with the notched disk P, the fixed zero-stop *p*, the fixed disengaging-stop *o*, and the back stop *r*, substantially as described.

7. The combination, with the shaft O of the clock mechanism of the signal, of the notched disk P, revolving therewith, the step Q, formed on said shaft, the shaft-extension R, supported thereon and operating the index-hand of the signal-dial, the hinged dog S, adapted to en-

gage with the notched disk, the rising and falling guide-rail U, the fixed zero-stop *p*, and the weight *l* and its connection with the shaft R, to retract the index-hand, substantially as described.

8. The combination of the shaft O of the clock mechanism of the signal, the notched disk P, revolving therewith, the step Q, formed on said shaft, the shaft-extension R, supported thereon and operating the index-hand of the signal-dial, the hinged dog S, adapted to engage with the notched disk, the rising and falling guide-rail U, the fixed zero-stop *p*, the fixed disengaging-stop *o*, the back stop *r*, and the weight *l* and its connection with the shaft R, to retract the index-hand, substantially as described.

9. The combination, with the shaft O of the actuating clock mechanism of the signal, of the notched disk P, secured thereto, the shaft-extension R, adapted to revolve independently of the shaft of the clock mechanism, the dog S, secured to said shaft and adapted to engage with the notched disk, the rising and falling guide-rail U, on which said dog is adapted to travel, the vertical frame V, carrying said guide-rail, the air-receiving chamber W, the rising and falling diaphragm Y, and the lever Z, bearing upon the center of said diaphragm and operating the frame V, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 30th day of October, 1888.

EUGENE FONTAINE.

Witnesses:
J. PAUL MAYER,
P. M. HULBERT.