(No Model.) 2 Sheets—Sheet 1.

E. FONTAINE.

RAILWAY TIME SIGNAL.

No. 413,825. Patented Oct. 29, 1889.

Fig. 1

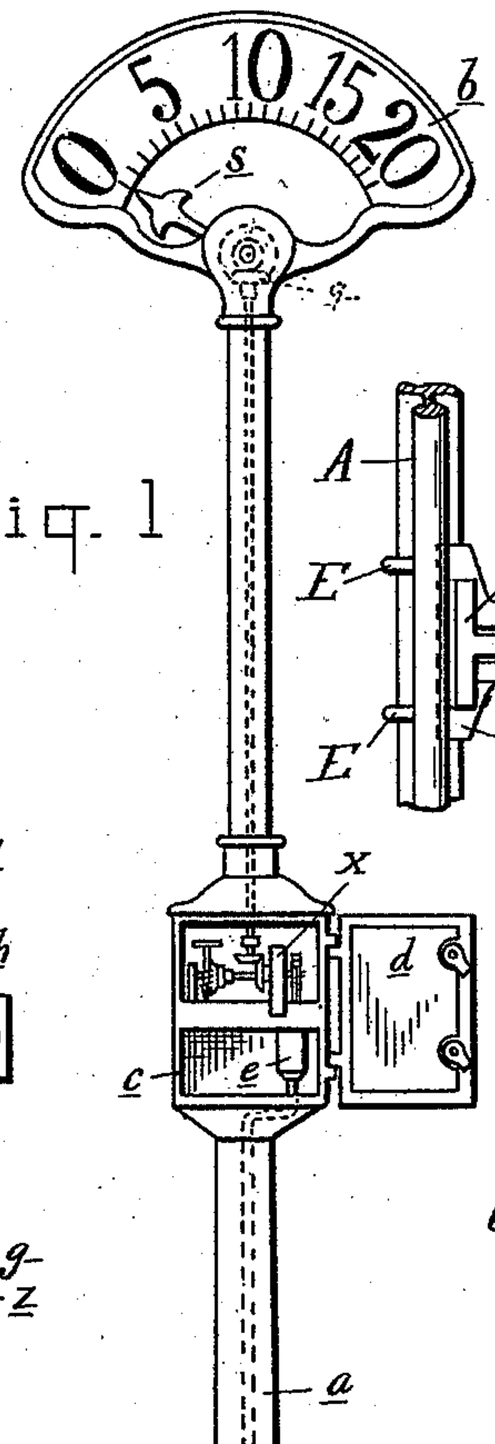


Fig. 2

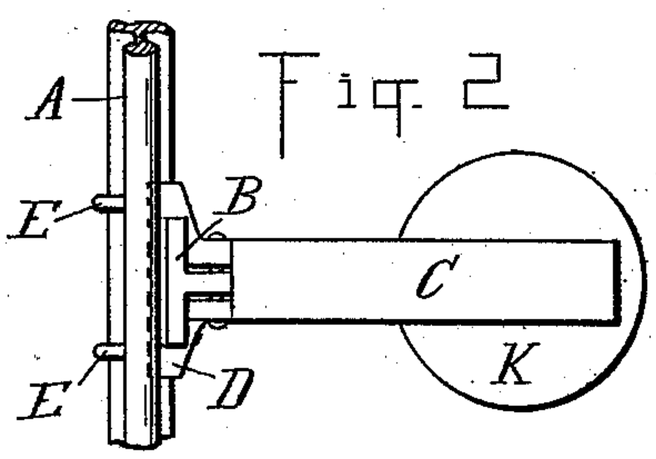


Fig. 3

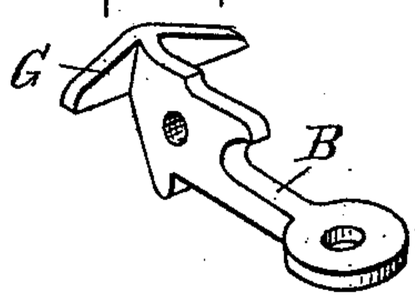
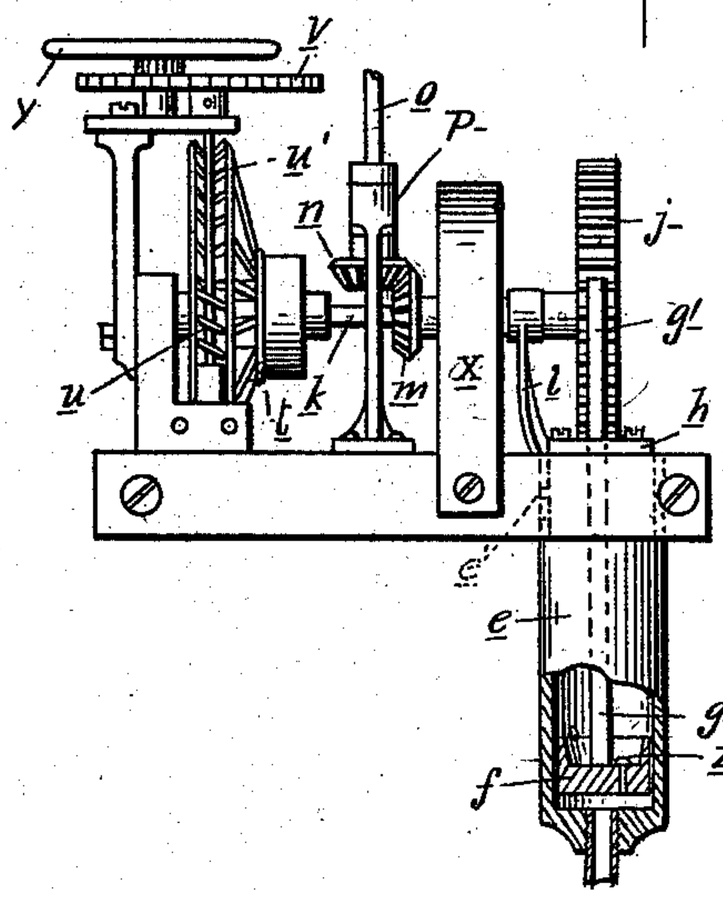
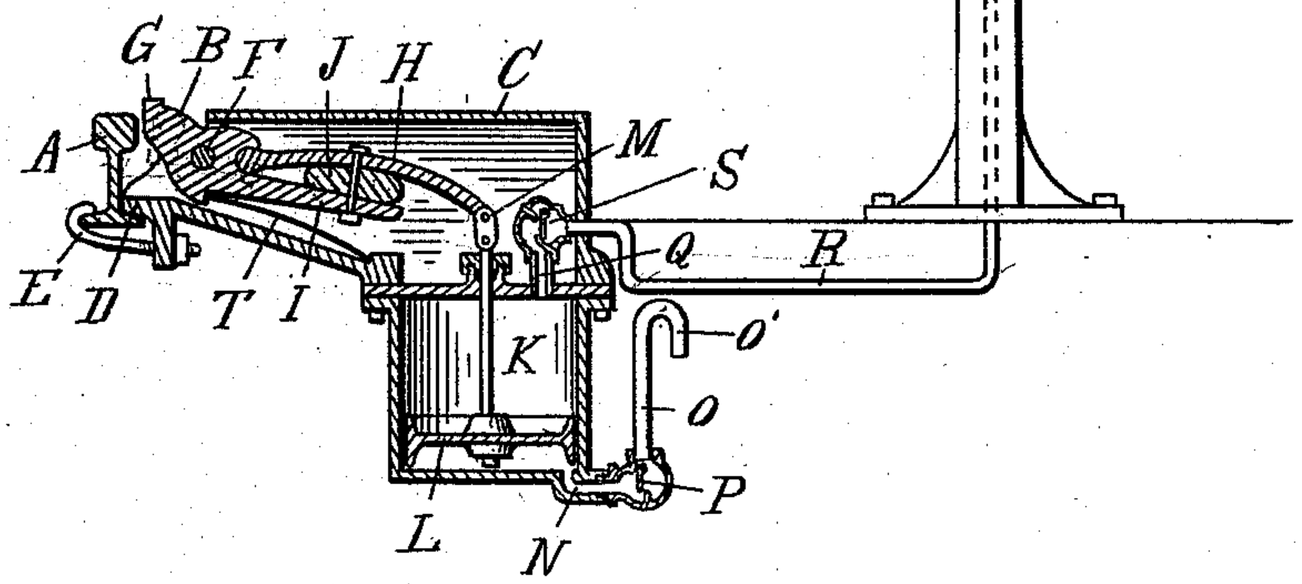


Fig. 4





Witnesses:
P. M. Hulbert
J. Paul Mayer

Inventor:
Eugene Fontaine
By Thos. S. Sprague & Son
Atty.

(No Model.) 2 Sheets—Sheet 2.

E. FONTAINE.

RAILWAY TIME SIGNAL.

No. 413,825. Patented Oct. 29, 1889.

Fig. 5

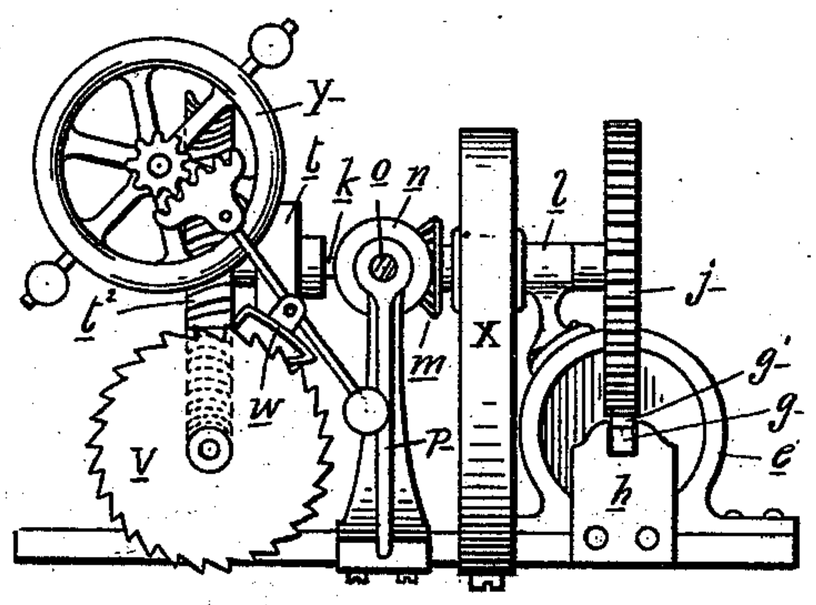
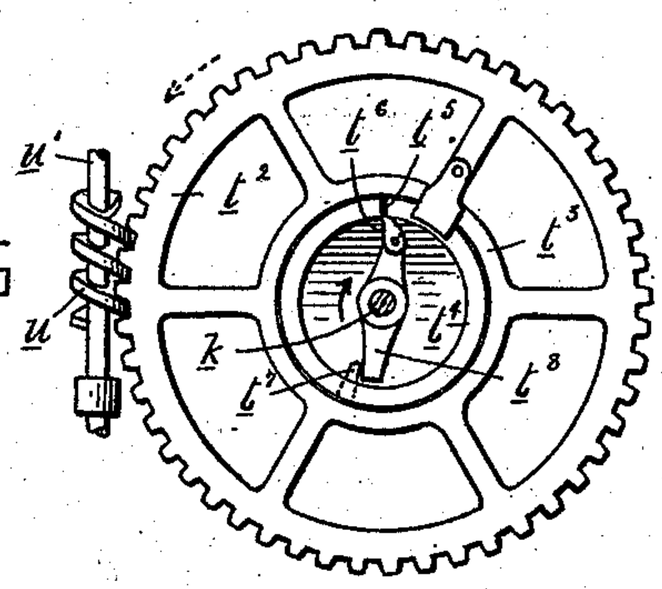


Fig. 6



Witnesses:
P. M. Hulbert
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Inventor:
Eugene Fontaine
By Thos. S. Sprague & Son
Att'y.

UNITED STATES PATENT OFFICE.

EUGENE FONTAINE, OF AUBURNDALE, OHIO.

RAILWAY TIME-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 413,825, dated October 29, 1889.

Application filed March 9, 1889. Serial No. 302,672. (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 Automatic Time-Signals, 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 railway-trains; and it relates more specifically to that class of time-signals designed to indicate the length of time since the last train has passed the signal, whereby the engineer in charge of the train following thereafter may keep at a safe distance behind, and thus avert a possible collision arising from the trains following each other too closely.

To this end my invention consists of the following arrangement and combination of parts, to wit: a minute-dial at the desired station or point on the track so as to be plainly visible to the engineer of an approaching train and provided with an index-hand arranged to indicate the time elapsed up to a certain number of minutes—say twenty—which may be regarded as a sufficient time allowance for the preceding train to be out of reach of danger, a clock-work impelled by a spring to operate the index-hand of the dial, a lever projecting into proximity to a rail to be operated by the passing train, an air-compressing device actuated by said lever to compress the air, an air-receiving cylinder into which said compressed air is forced to actuate a piston therein, and gear-connection from said piston to the index-hand to set the latter back to zero and to simultaneously wind the clock-spring, all as more fully hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of my improved time-signal. Fig. 2 is a plan of the lever and its housing. Fig. 3 is a detached perspective view of a portion of the lever. Fig. 4 is an enlarged elevation of the clock mechanism and the connections therewith. Fig. 5 is a plan of Fig. 4. Fig. 6 is an elevation of the friction-clutch in the clock mechanism, and Fig. 7 is a vertical central cross-section through the dial.

A is one of the track-rails.

B is a lever inclosed in a housing C.

D is an abutment in the housing to support it on the foot of the rail.

E are hook-bolts to clamp the housing to the rail.

F is the fulcrum-pin of the lever, secured in the side walls of the housing.

G is a head formed at the free end of the lever parallel to the rail and in close proximity thereto, with its upper face convex or oppositely inclined to avoid obstructing the wheel.

H is the long arm of the lever, made slightly elastic by engaging its inner end movably in a socket formed in the body of the lever and bolting it to a stub-arm I, with an elastic cushion J interposed between.

K is an air-cylinder secured to the under side of the housing of the lever.

L is the piston of the cylinder.

M is a link pivotally connecting the piston-rod to the long arm of the lever.

N is an induction-port. O is an induction-pipe communicating therewith.

P is an inwardly-opening check-valve in the induction-pipe.

Q is the eduction-port of the cylinder.

R is an eduction-pipe leading to the signal.

S is an outwardly-opening check-valve in the eduction-pipe, and T is a spring abutting at one end against a fixed abutment of the housing to normally keep the lever in the position shown in Fig. 1.

The parts of the device thus far described are intended to operate as follows: Normally the head G on the short arm of the lever projects above the top of the rail, under the action of the spring T, and in this position the piston L is at the bottom of the air-cylinder K. Now, if a train should pass on the rail A, the flange of the first wheel of the train in striking the head G will depress it, and thereby actuate the lever to raise the piston, thus expelling the air in the upper end of the piston through the eduction-port Q into the eduction-pipe R, the space underneath the piston being filled by air drawn in through the induction-port N, to which the induction-pipe O is connected for the purpose of preventing dust or sand from being drawn into

the cylinder, and this induction-pipe is preferably provided at its upper end with the hood or neck O′. The tendency of the spring T naturally tends to immediately restore the normal position of the lever as soon as the wheel has passed; but this is prevented by the check-valve P in the induction-pipe, which prevents the air below the piston from escaping out of the cylinder. Thus the lever is held in its depressed condition long enough to prevent it from being repeatedly acted on by every wheel in the train. To allow it to go back to its normal position after the train has passed, I make the piston L fit the cylinder K non-air-tight, so that the piston may slowly return to its normal position under the tension of the spring T by allowing the air underneath the piston to find its way gradually to the top of the piston as it descends. To prevent the violent actuation of the piston, the long arm of the lever H is made slightly elastic, in the manner described.

The whole device, as shown and described, is placed between two ties in the rails, and all but the head of the lever is covered by the housing to prevent its being tampered with, and for the same purpose the spring T is made heavy enough to prevent the lever from being depressed, except under the great weight of a train passing over. The manner of securing the housing to the rail keeps the head of the lever in its relative position to the rail under all changes of the track.

The construction and operation of the other parts of the device are as follows:

a is a hollow post in close proximity to the track and supporting on top the minute-dial *b* at a convenient height to be readily seen and read by the engineer of the approaching train.

c is a small box, forming a part of the post, at a suitable height from the ground convenient for inspecting.

d is the door of the box, provided with a suitable locking device.

e is an air-receiving cylinder open on top and connected at the bottom with the pipe R, leading from the air-compressing device afore described. *f* is a movable piston in that cylinder. *g* is its piston-rod, passing through a vertical guide *h* in the upper end of the piston and carrying a rack-bar *g′* upon one side.

j is a gear-wheel engaging with the rack-bar. *k* is the horizontal arbor of a clock mechanism, upon which said gear-wheel is secured. *l* is a bearing in which said arbor is journaled.

m is a bevel-pinion secured on the arbor *k*. *n* is a bevel-pinion meshing therewith.

o is a vertical signal staff or shaft extending into the top of the post and having the bevel-pinion *n* secured to its lower end.

p is a vertical bearing for the lower end of the shaft.

q is a bevel-pinion on the upper end of the shaft.

r and *r′* are two bevel-pinions loosely journaled upon the horizontal shaft r^2 and engaging with the bevel-pinion *q* on opposite sides.

s and *s′* are the index-hands carried by the pinions *r* and *r′* upon opposite sides of the dial.

t is a friction-clutch consisting of the fast member or dog *t′* and the loose member or worm gear-wheel t^2. As shown in Fig. 6 in detail, the loose member t^2 has an annular flanged hub t^3, in which the expansion-ring t^4 is engaged. This expansion-ring is divided at t^5, and the fast member or dog *t′* engages with a wedge-shaped hinged nose t^6 between the severed ends, and a fixed stop t^7, projecting inwardly from the expansion-ring, engages with the tail t^8 of the dog when the latter is revolving in the direction of the arrow shown in Fig. 6.

The operation of the clutch will be readily understood from this description to be as follows: If the arbor-shaft *k* revolves in the direction of the arrow shown in full lines, the dog will merely carry the loose ring; but if it revolves in the opposite direction its wedge-shaped nose will expand the ring within the flange t^3, and thereby carry the worm gear-wheel or loose member with it. The latter engages with a worm *u* on the shaft *u′*, which is journaled in vertical bearings and carries at its upper end the escape-wheel *v* of an escapement *w*. *y* is the balance-wheel controlling the escapement. The combination last described forms a clock mechanism, the impelling force of which is supplied by a clock-spring *x*, secured in its eye to the arbor or to a winding-drum on the same, and with its free end to the frame of the clock mechanism.

The parts being arranged and constructed as shown and described, they are intended to operate as follows: The compressed air from the air-compressing cylinder K, expelled by the passing of the train in the manner afore described, is forced through the eduction-pipe R into the air-receiving cylinder *e*, the piston of which is thereby quickly forced upward, and by the engagement of its piston-rod into the gear-wheel *j* will revolve the arbor *k* and communicate motion, through the medium of the bevel-pinions *m n*, to the shaft *o*, which in turn communicates motion, through the bevel-pinions *q r r′*, to the index-hands *s* and *s′*, which are thereby set at zero on the respective sides of the dial. At the same time with the actuation of the index-hands the clock-spring *x* is wound, but the clutch is thrown out of gear during the action of winding. As soon as the piston has been pushed out to its farthest limit, (at which the index-hands are set at zero,) the force of the spring in unwinding will throw the clutch into gear, and, controlled by the clock mechanism, the arbor *k* will revolve in the opposite direction and communicate its motion to the index-hands

of the dial to indicate the time thereon, in minutes, elapsing since the train has passed the signal. The piston in the air-cylinder *e* gradually descends correspondingly to the advance of the index-hand on the dial, and is in its lowest position when the index-hands have arrived at their limit of time, thus arresting the motion of the arbor *k* and stopping the clock mechanism. As soon as another train passes the operation is repeated.

It will obviously make no difference in the operation of the device if the index-hands have only advanced a fraction of the time indicated on the dial, as at any time the passing of the train will force a fresh quantity of air from the cylinder K into the air-receiving cylinder *e*, and thereby expel the piston again to its highest position in which the index-hands are reset at zero. At the same time the clock-spring receives a corresponding amount of winding.

A vent *e'* is provided in the cylinder to permit the escape of the compressed air when the piston is expelled, and to prevent the air in the cylinder *e* from resisting the descent of the piston the latter is either made to fit the cylinder non-air-tight, so as to permit the gradual escape of the air, or a little air-valve *z* is made in the piston, which closes while the piston is forced out, but allows the gradual escape as the piston descends.

What I claim as my invention is—

1. In an automatic railway time-signal, a signal-actuating lever pivotally fulcrumed, and having a short arm extending into proximity to the rail and a resiliently-jointed long arm connected to the signaling devices, substantially as described.

2. In an automatic railway time-signal, the lever B, having a jointed long arm and actuated by the passing train on its short arm, and provided with the elastic cushion *j* in its long arm, substantially as described.

3. The combination, with the rail, of the signal-actuating lever B, provided with the cross-head G, arranged parallel to the rail, and with the resiliently-jointed arm consisting of the integral arm I, the arm H, fulcrumed thereon, and the elastic cushion J, secured between, substantially as described.

4. The combination, with the rail, of the signal-actuating lever B, the housing C, in which said lever is fulcrumed, and the clip E, securing the housing to the rail, substantially as described.

5. The combination, with the signal-actuating lever operated by a passing train and consisting of two parts resiliently jointed together, of an air-compressing device consisting of a cylinder and a piston operated by said lever, and of induction and eduction ports upon opposite ends of the cylinder, whereby the device operates as a dash-pot, substantially as described.

6. The combination, with the signal-actuating lever operated by the passing train, of the air-cylinder K, the piston L, actuated by said lever and operating non-air-tight in said piston, the induction-valve communicating with one end of said cylinder, and the eduction-valve S, communicating with the opposite end of the piston, substantially as described.

7. The combination of the signal-actuating lever B, provided with the cross-head G and the arm H, the housing C, inclosing said lever and provided with the abutment D, the clamp-bolts E, securing said housing to the rail, the air-compressing cylinder K, secured to the housing, and the piston L, connected to the lever, substantially as described.

8. The combination, with the rail, of the lever B, provided with the cross-head G and the resiliently-jointed arm H, the housing C, in which said lever is fulcrumed, the abutment D of the housing fitted onto the rail, the clips E, securing the housing to the rail, the spring T, the air-cylinder K, secured to the housing, the piston L, the link M, connecting the piston-rod and the arm H of the lever, the induction-port N, the induction-valve P, the induction-pipe O, the eduction-port Q, the eduction-valve S, and the eduction-pipe R, all combined and arranged to operate substantially as described.

9. The combination, with the lever consisting of two parts resiliently jointed together and the air-compressing device actuated by the passing train, of the air-receiving cylinder, the rising and falling piston in said cylinder, the gear mechanism connecting it with the index-hand, the vent and automatically-operating valve for the escape of the compressed air from the cylinder after the piston is forced up, and the air-relief for the receding piston, substantially as described.

10. The combination of the air-receiving cylinder *e*, the piston *f*, actuated by the passing train, the piston-rod *g*, provided with a rack-bar, the clock mechanism provided with the actuating-spring and adapted to wind on its arbor, the gear-wheel *j*, engaging with the rack-bar, the gear mechanism connecting the index with the arbor of the clock mechanism, and the clutch *t* on the arbor, substantially as described.

11. The combination of the index-hands *s* on opposite sides of the signal-dial, the shaft r^2, the bevel-pinions *r r'*, journaled upon said shaft and carrying the index-hands, the intermeshing bevel-pinion *q*, the vertical shaft *o*, carrying the said pinion, the bevel-pinion *n* on the lower end of said shaft, the clock mechanism, the arbor *k* of the clock mechanism, and the bevel-pinion *m* on said arbor, engaging with the bevel-pinion *n*, substantially as described.

12. The combination, with the actuating-lever operated by a passing train and its air-compressing device actuated by said lever, of the hollow post *a*, provided with the box *c*, the time-signal mounted on top of said post, the air-receiving cylinder *e*, provided with the piston *f*, the pipe R, connecting the air-receiving cylinder with the air-compressing de-

vice, the clock mechanism mounted in the box *c*, the gear mechanism connecting the arbor *k* of said clock mechanism with the piston of the air-receiving cylinder, and the signal-staff and gear mechanism connecting said arbor with the index-hands, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 22d day of January, 1889.

EUGENE FONTAINE.

Witnesses:
J. PAUL MAYER,
A. B. EATON.