2 Sheets—Sheet 1.

H. H. FORD.

TIME-SIGNAL FOR RAILWAYS.

No. 172,873. Patented Feb. 1, 1876.

Fig. 1.

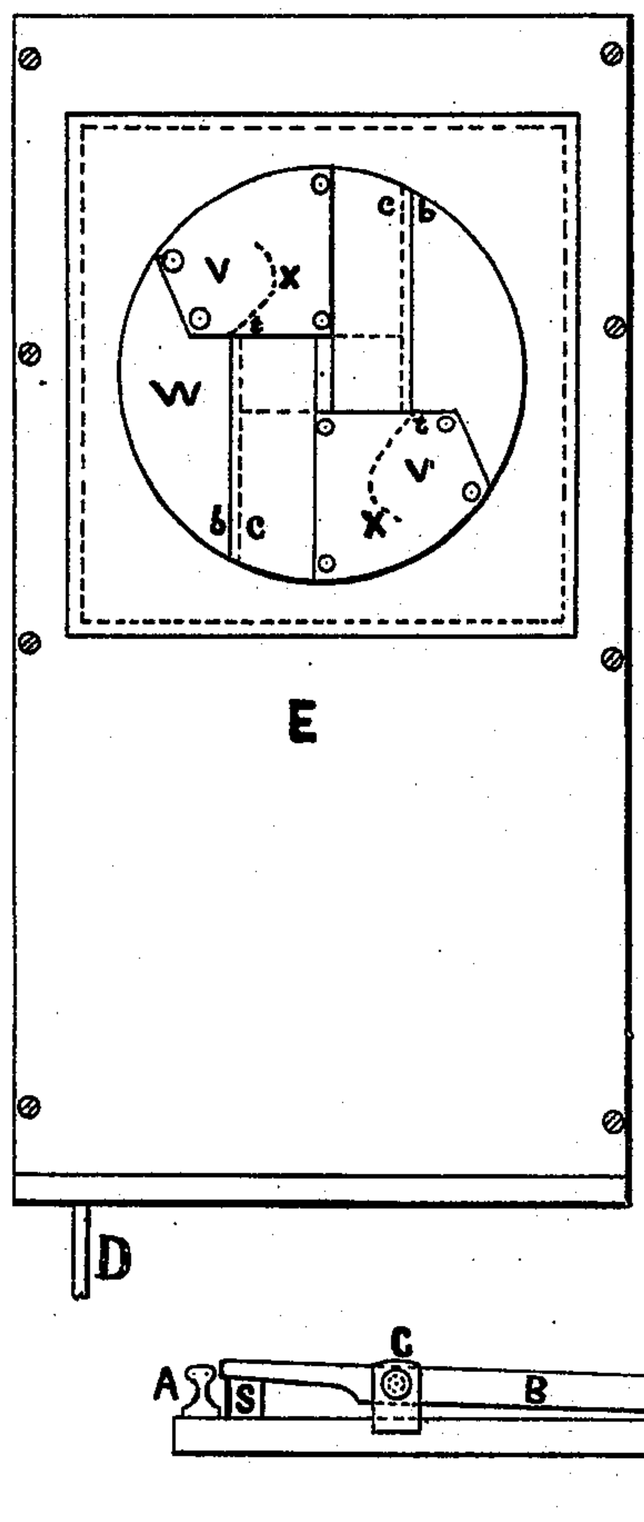


Fig. 2.

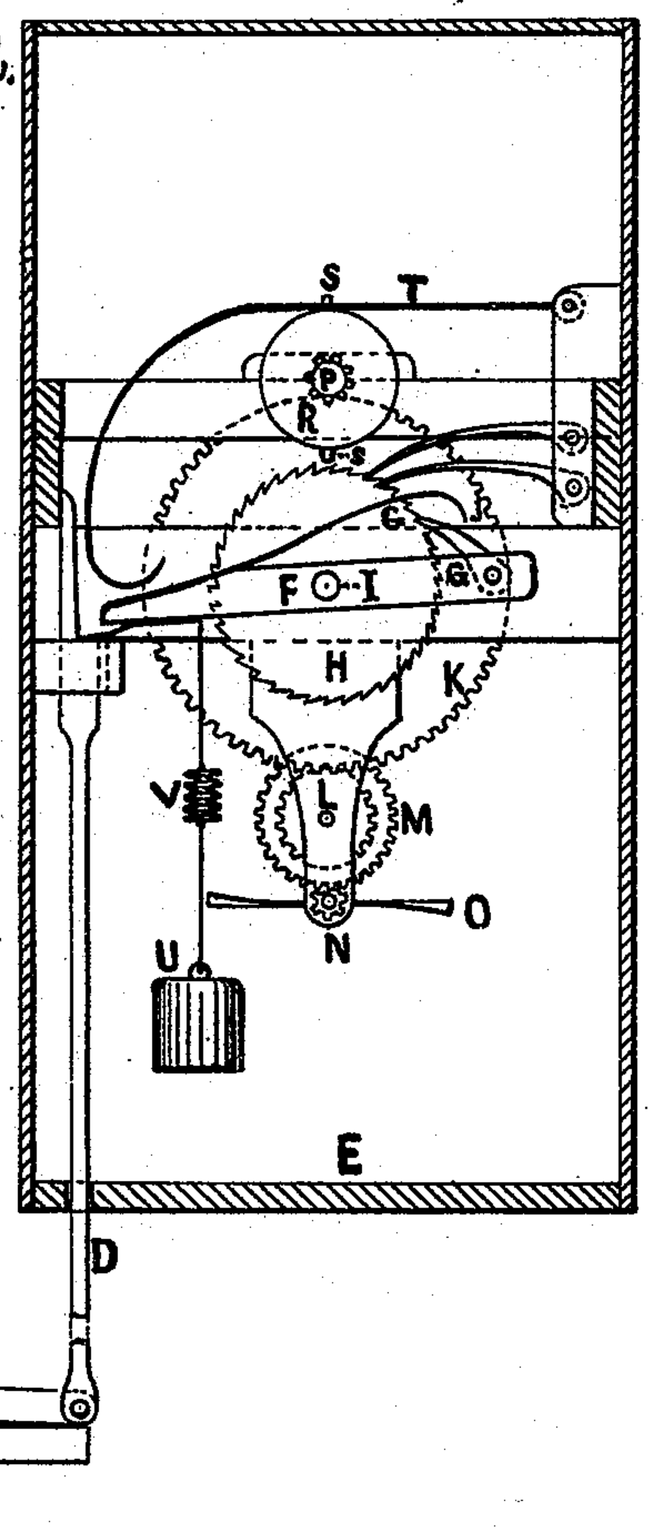


Fig. 4.

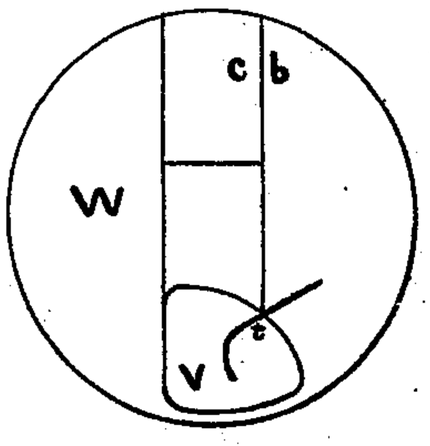


Fig. 5.

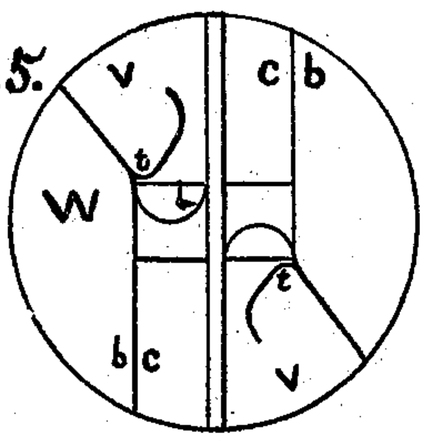


Fig. 6.

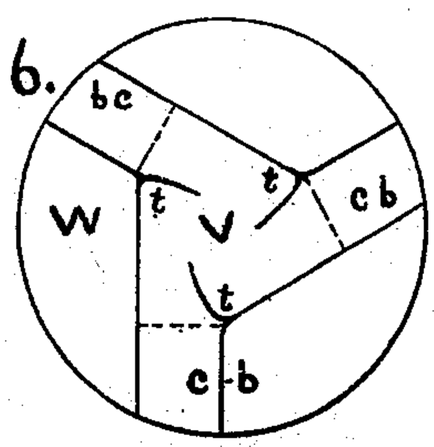
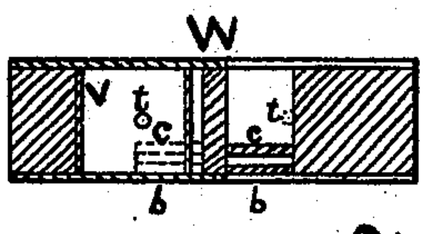


Fig. 3.



WITNESSES.

H. S. Talbot

Chas. E. Harvey

INVENTOR.

Hiram H. Ford

Per Sylvenus Walker

Atty

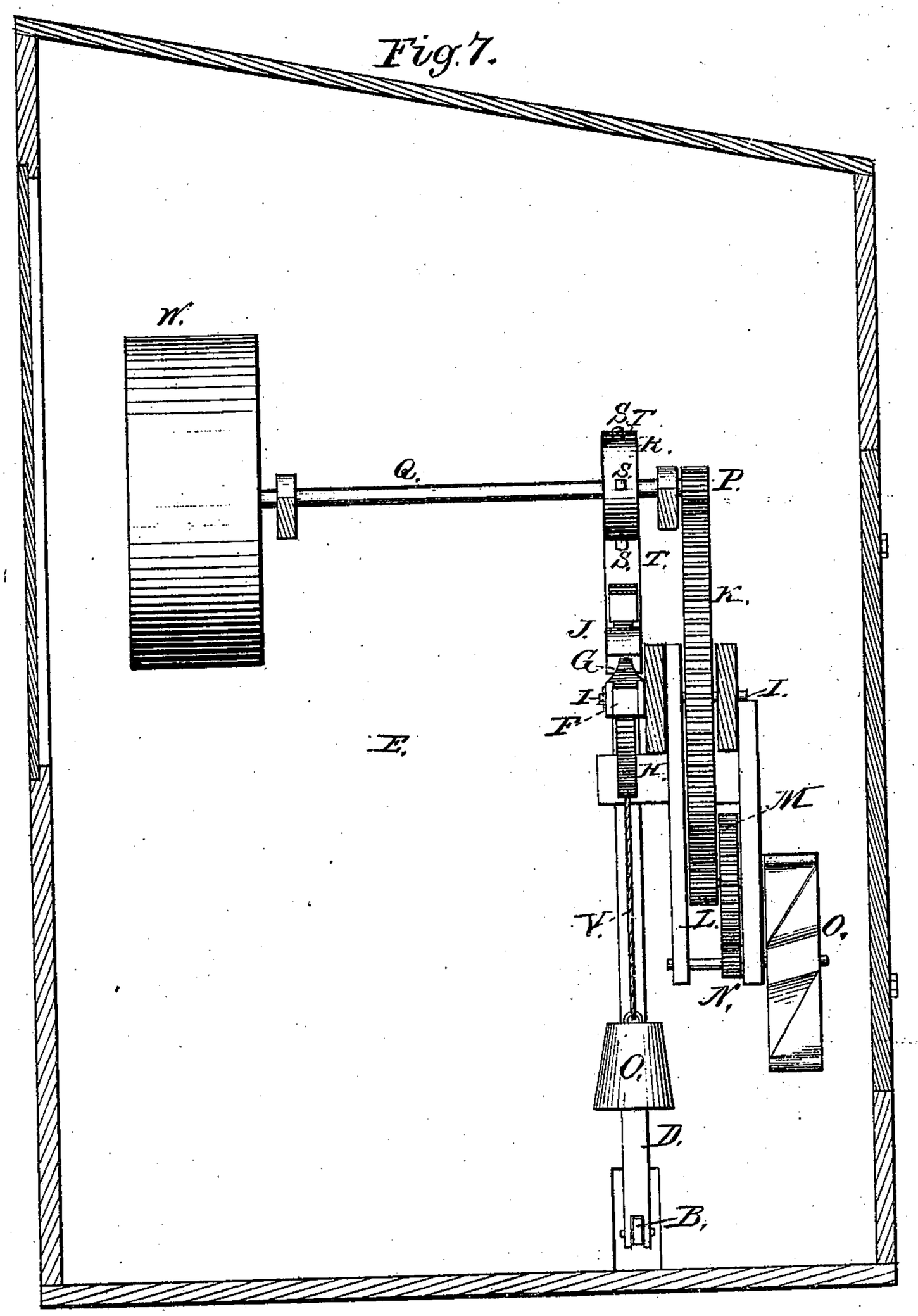
2 Sheets—Sheet 2.

H. H. FORD.

TIME-SIGNAL FOR RAILWAYS.

No. 172,873. Patented Feb. 1, 1876.

Fig. 7.



Witnesses.

H. H. Talbot

Chas E. Harvey

Inventor:

Hiram H. Ford

Per Sylvenus J. Walker

Atty.

UNITED STATES PATENT OFFICE.

HIRAM H. FORD, OF SANFORD, MAINE, ASSIGNOR OF ONE-HALF HIS RIGHT TO HORACE M. FORD, OF BOSTON, MASSACHUSETTS, AND IVORY H. FORD, OF GREAT FALLS, NEW HAMPSHIRE.

IMPROVEMENT IN TIME-SIGNALS FOR RAILWAYS.

Specification forming part of Letters Patent No. **172,873**, dated February 1, 1876; application filed March 19, 1875.

To all whom it may concern:

Be it known that I, HIRAM H. FORD, of Sanford, in the county of York and State of Maine, have invented certain new and useful Improvements in Automatic Railway Time-Signals, of which the following is a specification:

The object of my invention is to provide a cheap, simple, and certain means of automatically signaling to the next train the length of time or number of minutes intervening between the passing of a train and the next succeeding one to pass any point where such signal is located until sufficient time has elapsed to prevent collision between such trains; and it consists in an automatic revolving signal-wheel, provided with one or more chambers containing dry sand or similar material, which may be seen through the two sides of such wheel, which are provided with glass panes, so as to show the number of minutes by means of graduation-marks and figures upon said wheel indicating the length of time since the last revolution, or since it was partially revolved by the passing of a train, so as to cause the sand or other material to run from one chamber to another in said wheel, passing through a small hole in a hard-metal partition intervening between the chamber or chambers and the passage extending between the glass signal plates or panes. A lamp or light is provided within the inclosing-case to show its action by night. The signal-wheel is moved or revolved by means of a hinged lever, that has one end placed near the side of the rail, and projecting a slight distance above the top of the same, so that, when the wheels of a train pass over and depress the same, its opposite end is raised, which connects with an upright rod, which, when raised, strikes the end of a horizontal bar provided with double pawls engaging into a toothed wheel, which, when revolved, is held by dogs from turning in the wrong direction. Such movement is communicated to the signal-wheel by means of suitable gear-wheels, which revolve it the required distance, when the horizontal bar is brought to its former position by means of a weight or spring, and the lever extending from the side of the rail is returned to its position by means of a rubber spring. When the train has passed the sand runs from the dark chamber of the signal-wheel into the light-space between the glass plates, and it being of a different color, or opaque, shuts off the view of the light through the same as fast as it fills, the time being indicated by the marks and figures how long it has been running until full, or the point is reached when the next train can proceed safely.

Figure 1 is a front elevation, showing the revolving signal-wheel within the case. Fig. 2 is a vertical section, showing the interior operating mechanism. Fig. 3 is a sectional view of signal-wheel. Fig. 4 is a plan view of same with one chamber. Fig. 5 is a similar view with two chambers. Fig. 6 is a modification with three signal-glasses.

A is the rail, of usual construction. B is a hinged lever, pivoted in the box C by a bolt passing through the same. Within this box is a rubber or other suitable spring, S. D is an operating-rod, hinged to the longer end of the lever B, and extending upward to the case E, through the bottom or side of which it is permitted to slide freely. Its upper end is provided with a rubber spring to prevent concussion when brought in contact with the end of the horizontal bar F, which may have a spring attached to its under side where the operating-rod D strikes. To the opposite end of bar F is attached one or more pawls, G, which engage into the ratchet or toothed wheel H, which is provided with a suitable shaft, I, revolving in bearings. The bar F is pivoted upon the shaft I, and extends a short distance beyond the periphery of the toothed wheel H at both sides, and is provided with a guard, J, to keep the pawl G in contact with wheel H. To the opposite end of shaft I is secured a large gear-wheel, K, to the under side of which is geared a pinion, L, whose shaft carries gear-wheel M, which drives pinion N upon a shaft revolving a regulating-fan, O, all of which are mounted in a suitable frame. At the top of the large gear-wheel K is a small pinion, P. Upon its shaft is secured drum R, provided with one or more stops, which en-

gage with the hinged detent T, whose free end curves downward and rests upon the top of the horizontal bar F near its end, against which the upper end of the vertical operating-rod D strikes when acted upon by a passing car-wheel, which disengages the detent T from the stop by raising it up. This allows shaft Q to revolve, the same being set in motion by a weight, U, attached to a spring-cord, V, attached to the horizontal bar F. To the opposite end of shaft Q is secured the signal-wheel W, which is provided with one or more dark chambers, V, into which fine sand or similar material is placed; or, if desirable, any suitable liquid may be employed to accomplish the same object. This signal-wheel W is provided with a curved metal partition, X, extending partially across the chamber V. As this signal-wheel W is revolved in the right direction the sand within the chambers V passes through a small hole, *t*, in the partition X, when this chamber V is at the top of signal-wheel W, as shown in Fig. 1, and runs down gradually into the space between the glass plates *b c*, which extend to the opposite side of the signal-wheel W. This sand or liquid commences to fill the shallow or thin space between the glass plates *b c*, and obscures the view or light which previously shone through the same. This action continues, and the time or number of minutes it takes it to fill up to a given point is indicated by marks and figures upon the face of the signal-wheel W. Now, if this wheel W is revolved, say, one-half way round, this sand or material falls to the dark chamber V′, while that in the now upper chamber V commences to run as before, until all has passed to the lower side of the wheel W, into the space between the glass plates *b c*, thus shutting off the light or view through the same, thereby signaling to the next train that the one previously passing has been gone, or passed the signal, a certain length of time, or long enough for the next one to proceed without liability of collision with the preceding one. If desirable, the signal mechanism may be slightly modified, so as to be wound up by hand; then the action of a passing train would simply raise the detent T and permit the signal-wheel W to revolve as before, by means of a suitable weight or spring being wound up, which sets in motion the several gear-wheels to communicate the desired motion at the proper time to the signal.

Having thus described my invention, what I claim is—

1. In combination with a rail, A, of a railway, the hinged lever B, box C, spring S, vertical operating-rod D, horizontal bar F, pawl G, ratchet-wheel H, gear-wheels K and M, pinions P and L, shaft Q, drum R, stops, detent T, and signal-wheel W, constructed with one or more chambers, V, having the curved metal partition X, provided with a small hole, *t*, which permits sand or other material to run down between the glass plates *b c*, all being constructed to operate substantially in the manner described, as and for the purposes set forth.

2. The revolving signal-wheel W, as constructed with one or more chambers, V, curved partitions X, provided with a small hole, *t*, said wheel being made to revolve by any suitable means, so as to cause liquid, sand, or other material placed in said chambers V to run to and from the same into the space between the glass plates *b c*, substantially in the manner described, as and for the purposes set forth.

HIRAM H. FORD.

Witnesses:

SYLVENUS WALKER,

WM. P. SPENCE.