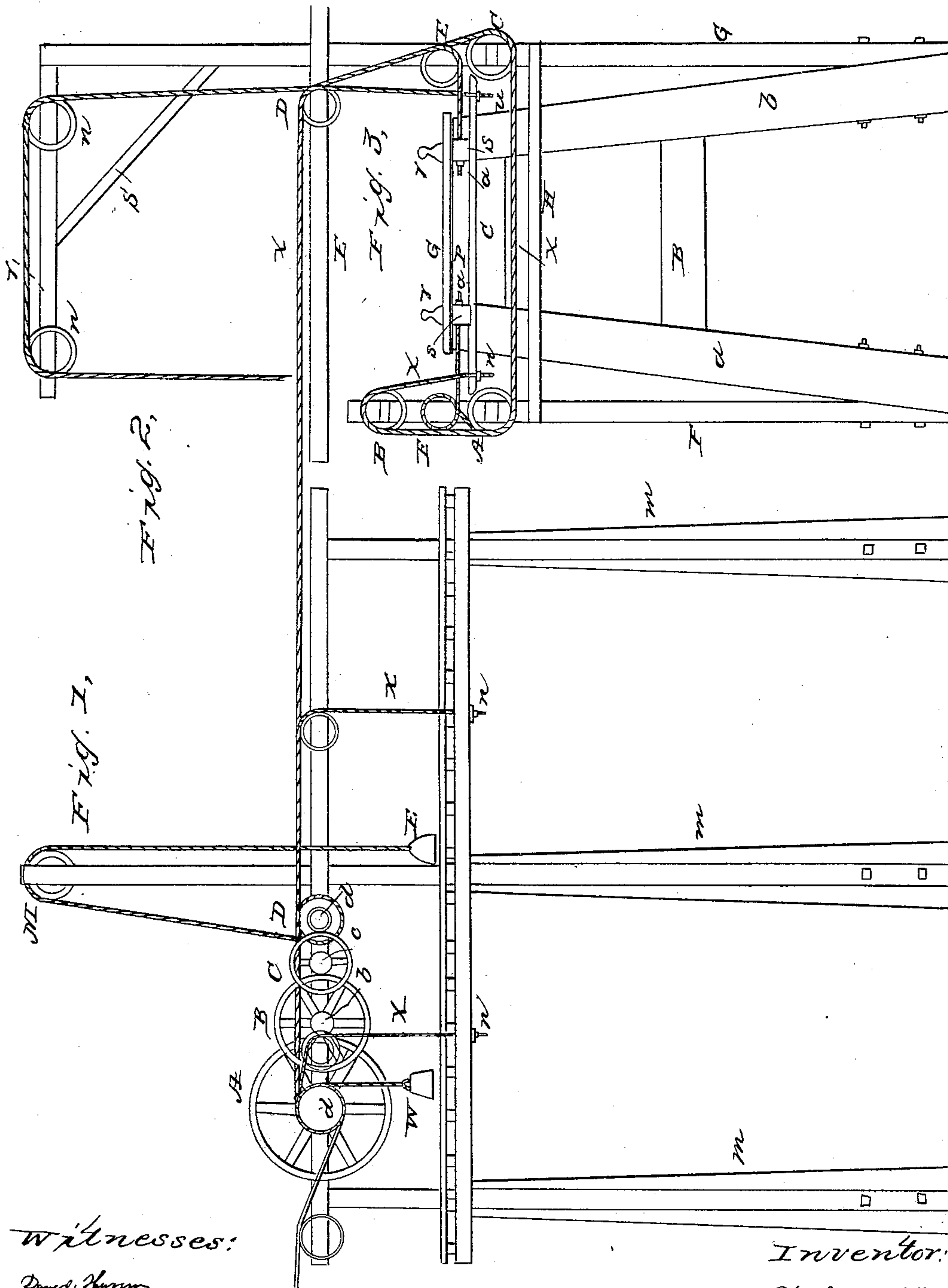


P. F. MILLIGAN.  
Railroad Signal.

No. 53,651.

Patented April 3, 1866.



Witnesses:  
David Hyman  
J. A. Tucker

Inventor:  
John Francis Milligan

# UNITED STATES PATENT OFFICE.

PATRICK FRANCIS MILLIGAN, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVED RAILWAY-SIGNAL.

Specification forming part of Letters Patent No. 53,651, dated April 3, 1866.

*To all whom it may concern:*

Be it known that I, PATRICK FRANCIS MILLIGAN, of Washington, in the county of Washington and District of Columbia, have invented a new and useful Improvement in my Compound High-Water and Deflection Indicator for Bridges, Culverts, &c., on Railroads, patented on the 18th day of December, 1860; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view, Fig. 2 a transverse section, and Fig. 3 a top transverse sectional view, of the old claim for guarding both sides of the bridge, &c., in which the series of wheels A B C D and pinions *b c d*, axle *a*, chains *x x*, and lamp E, Fig. 1, constitute the parts by which the deflection-lamp gives the desired signal, and which is explained in the original specification.

In Fig. 2, *a b C B* represent the abutment or piers of a bridge trestle-work or other support for a railroad-track, E being the side piece, and H a transverse brace keeping the uprights F G parallel with each other. S S are the two main timbers or girders which cross the spans of a bridge or culvert, and P is a light bar crossing under them to receive the two long iron screws with top *a a* and *n n*.

C is the cross-tie, and *r r* the two iron rails. *x x x x* is a continuation of the same chain, running from the axle *a* of the series of wheels in Fig. 1 and over the pulley D, taking the iron screw *n* at D. Again, a chain linked on passes over the pulley C and under the timbers of the bridge, over the pulley A, and up to the pulley B, over which it passes, and down again to the other iron screw *n*. Also, two chains start from the iron screws *a a* and over the pulleys E F, linking onto the main chain at A F.

In Fig. 3, *r* is a horizontal bar, supported by the brace S, and holding two pulleys, over which the chain *x* had to pass, and taking the two iron screws *n n*, in which case the framework had to be sufficiently high to allow a train of cars to pass under it.

To enable others skilled in the art to construct and apply my improvement, I will proceed to describe its construction and operation.

In order to more thoroughly guard a railroad-track and have the machine capable of being applied not only to bridges, culverts, trestle-work, &c., but to apply it to any part of the track where there may be danger of a washing away or shifting to either one side or the other, having the machine, as in the original patent, applied to either side of the track, I erect on the other side a suitable frame-work along the edge of the track, which need not be over two feet over the level thereof, as at F, Fig. 2, H being a transverse brace to the timber G, E being a side piece running parallel with the track. From the axle *a* of the series of wheels in Fig. 1 I carry a chain, *x*, over the pulley D, taking the eye of an iron screw with top passing loosely through the light bar P under the girders of the track-frame. This guards this side from deflection, being unnoticed; but to guard the other side and seemingly suspend the track on both sides, I link the chain at the pulley D, and passing it over the pulley C and under the track to the pulley A, over which it goes, up to the pulley B, and over it down to the iron screw *n* in the other end of the light bar P. It will be seen that a weight suspended from this end of the chain will have the same effect on the axle *a* of the series of wheels in Fig. 1 as if suspended from said axle, less the friction. By this both sides of the bridge are guarded without the great expense of raising frame-work to allow the trains to pass.

Again, I pass two iron screws through the side girders *s s*, or through a timber made fast to the ends of the cross-ties, where the machine is applied to the track to guard against land-slides, and they pass loosely. To these I link a chain, *s*, and pass it over the pulley F, and a chain, *r*, and pass it round the pulley E and linked to the main chain at A and F respectively. Now, in case the track washes to the left the chain at F will act, and if it moves to the right the chain at A will act. Thus the signal-light E, Fig. 1, acted on by the series of wheels A B C D and pinions *b c d* and axle *a*, is equally effected by the action of the chains *x x* at the iron screws *n n* and by the action of the chains *r s* at the iron screws *a a*. These screws have screw enough to allow for the contraction of the chain in cold weather or the natural deflection of a bridge while a train is passing over it.

Where the part of the track supposed to



wash away might be thought too light to run the deflection-lamp, I suspend a weight, W, from the axle *a* of the wheel A of the series in Fig. 1.

I do not claim as my present improvement any part or parts of my original claim; neither do I claim any of the parts of said improvement when applied for any other purpose whatever; but

What I do claim, and desire to secure by Letters Patent, is—

In combination with the frame-work on both sides of the railroad-track, the chains *s* and *x* and their supporting-pulleys and bolts, whereby they are attached to the timber-supports beneath the railroad-track, the whole constructed and arranged as herein described and set forth.

PATRICK FRANCIS MILLIGAN.

Witnesses:

DAVID FLYNN,  
J. A. NECKER.