

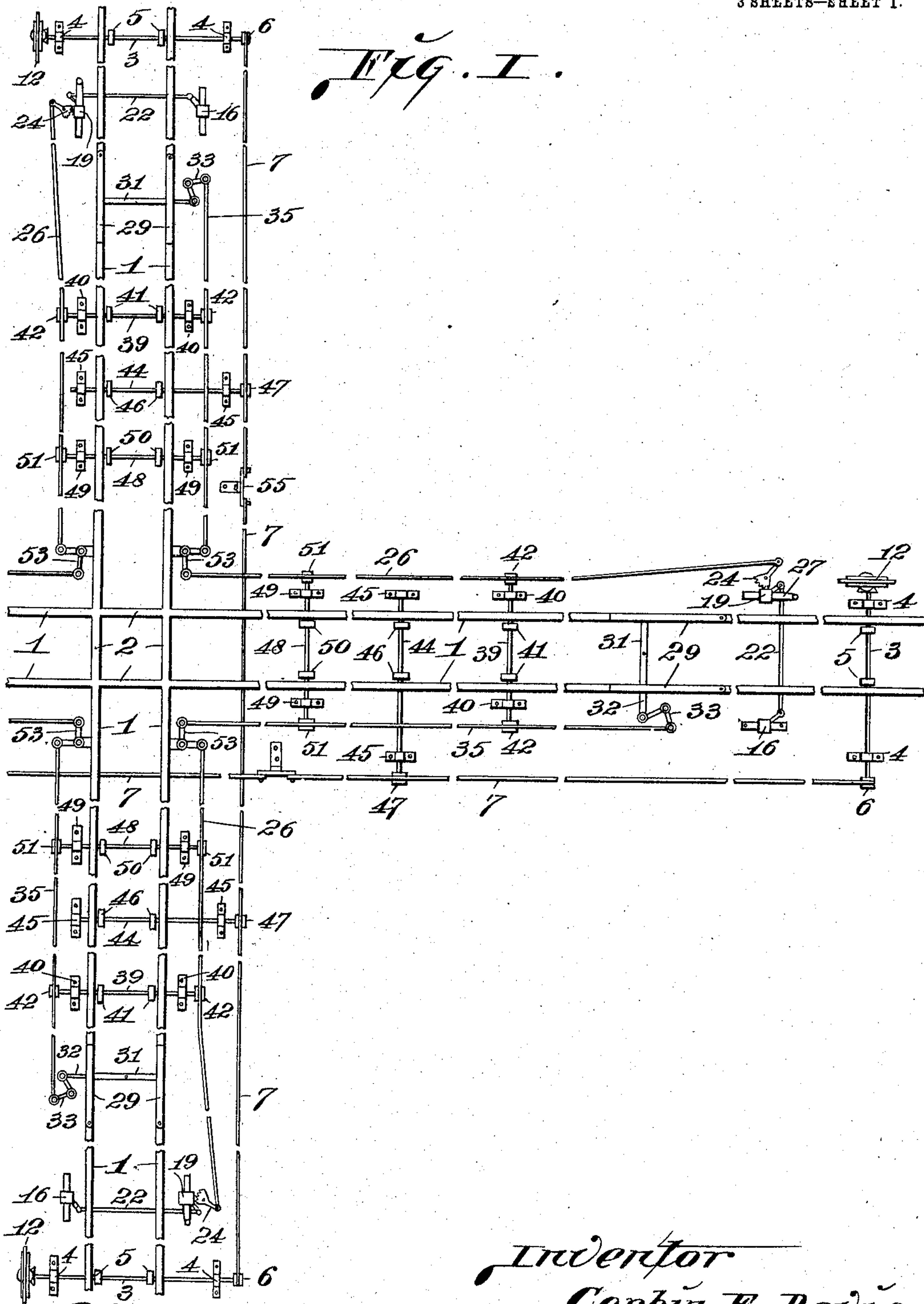
No. 780,783.

PATENTED JAN. 24, 1905.

C. E. DAVIS.  
RAILWAY CROSSING AND SIGNAL.

APPLICATION FILED JULY 26, 1904.

3 SHEETS—SHEET 1.



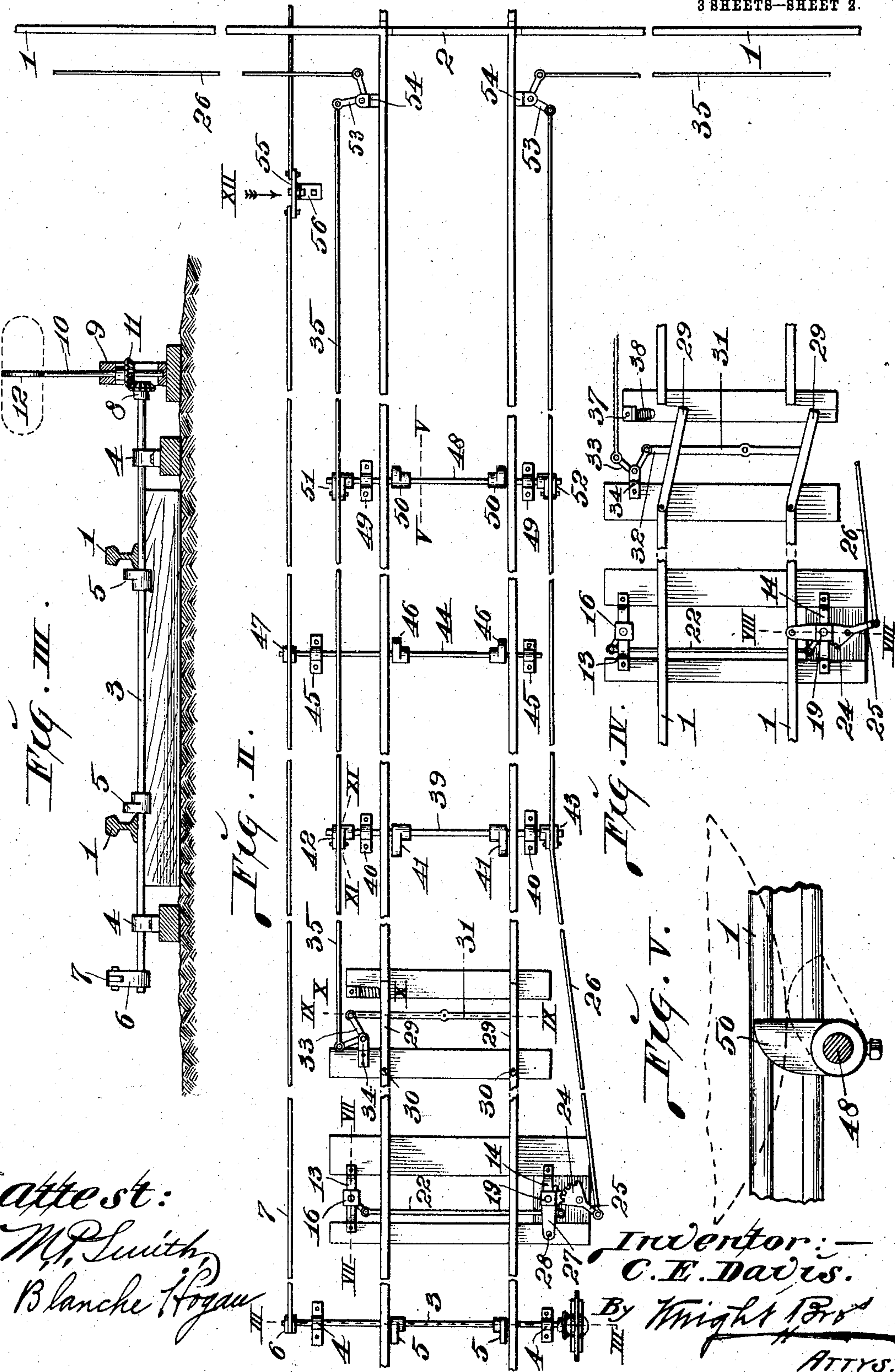
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RAILWAY CROSSING AND SIGNAL.

APPLICATION FILED JULY 25, 1904.

3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. VI.

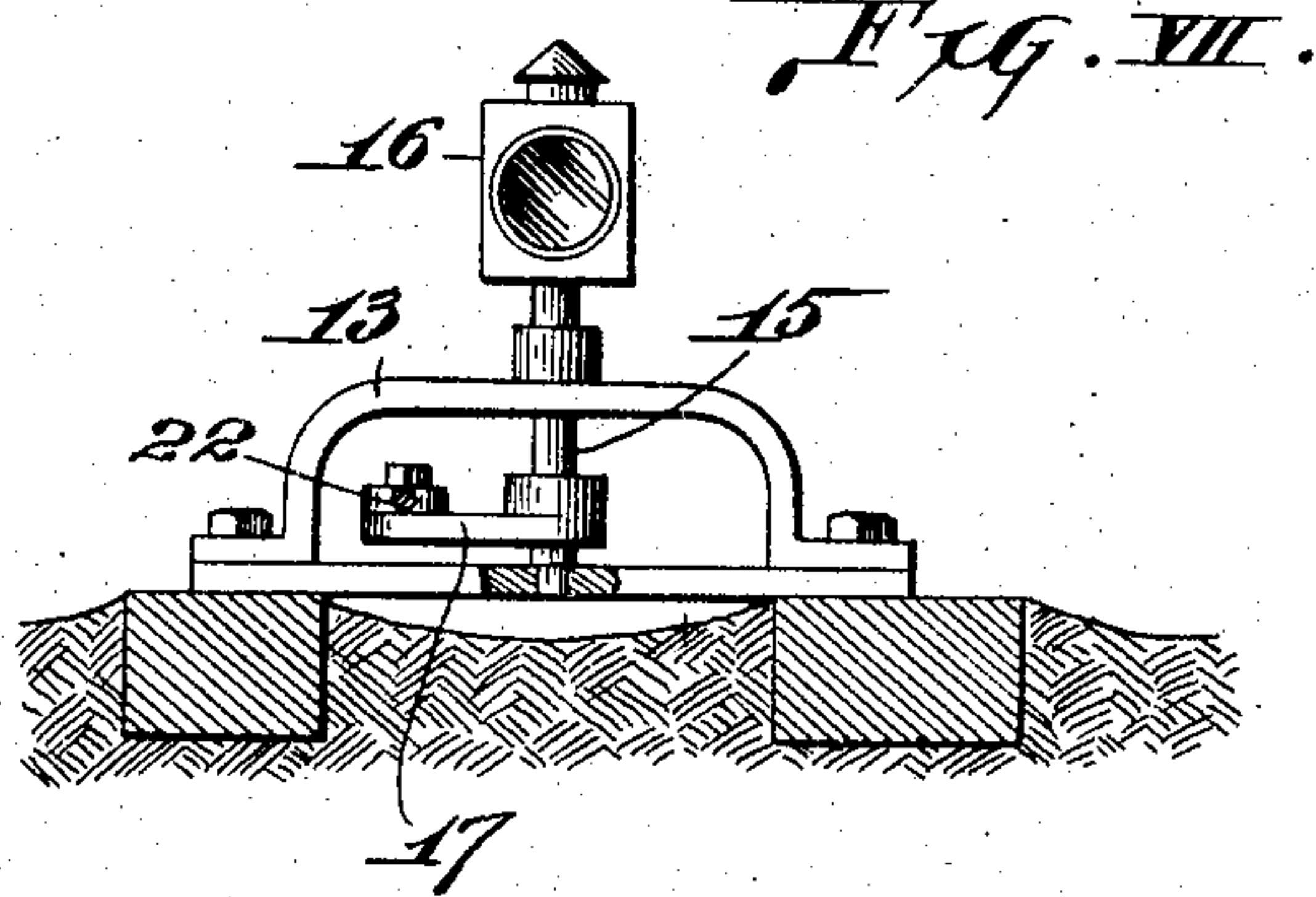
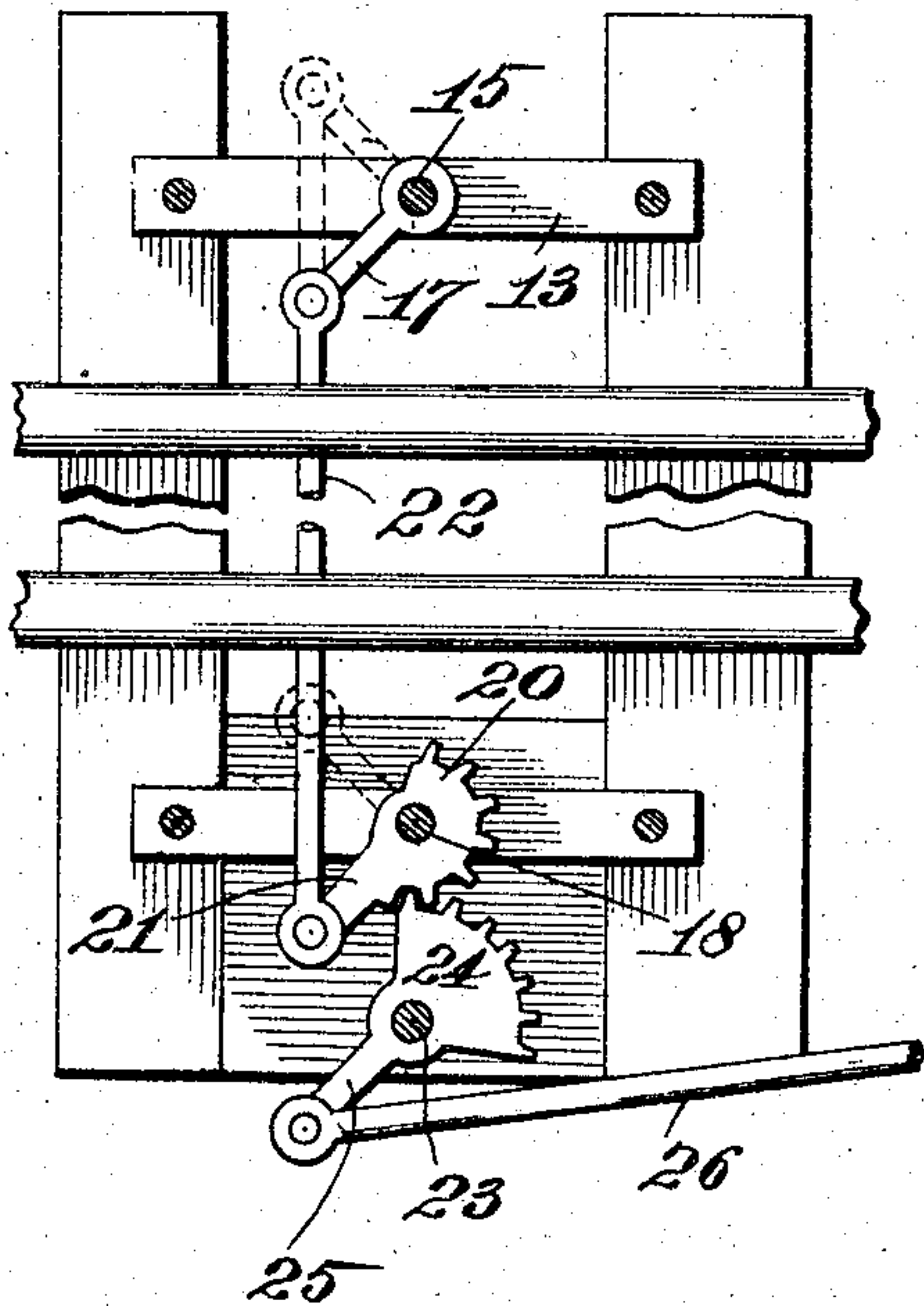


Fig. VIII.

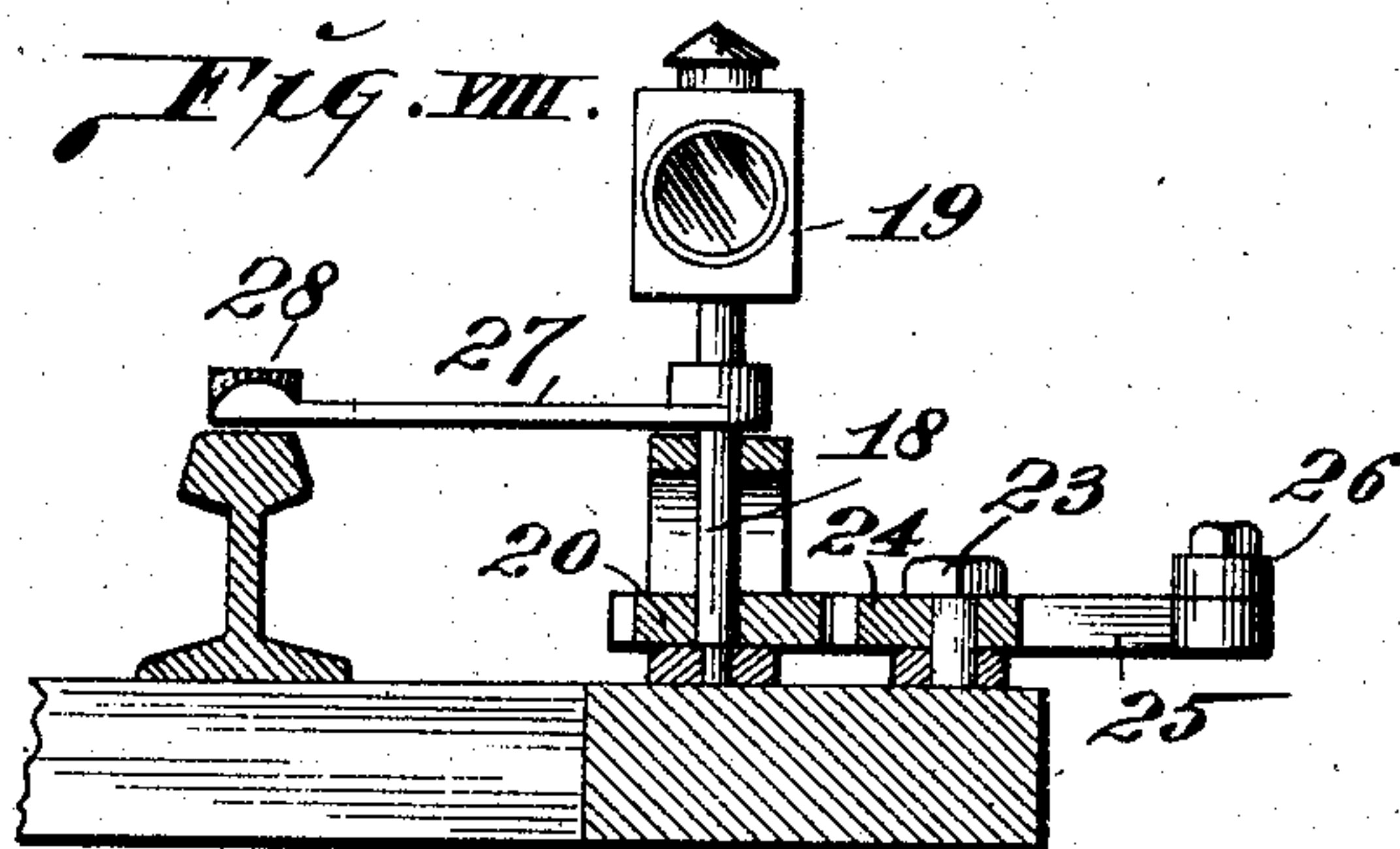


Fig. IX.

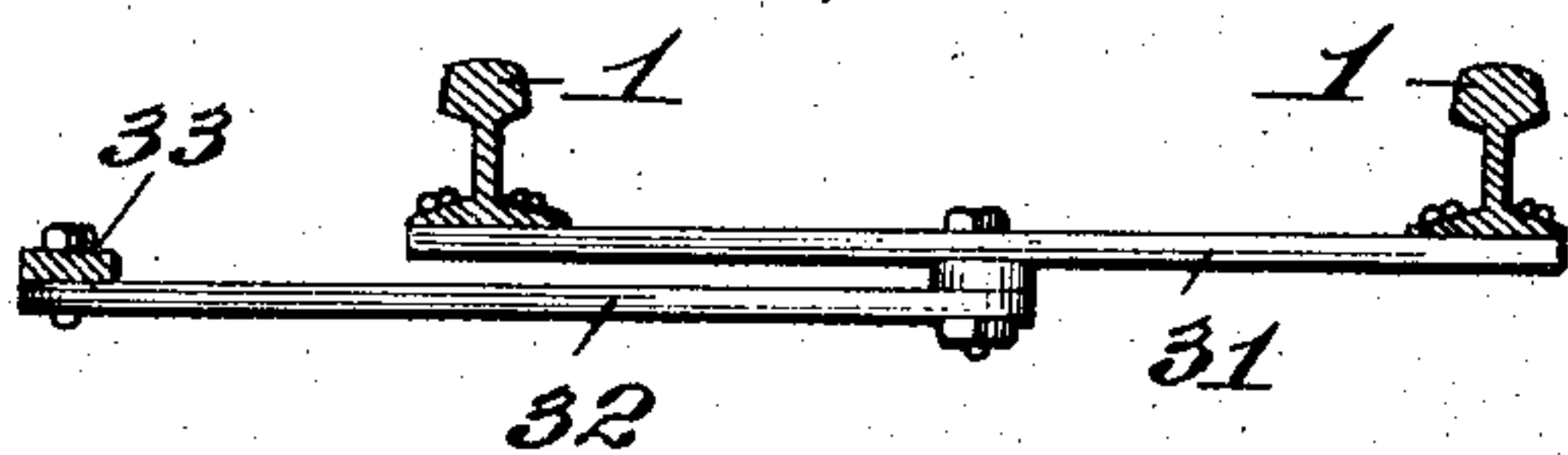


Fig. X.

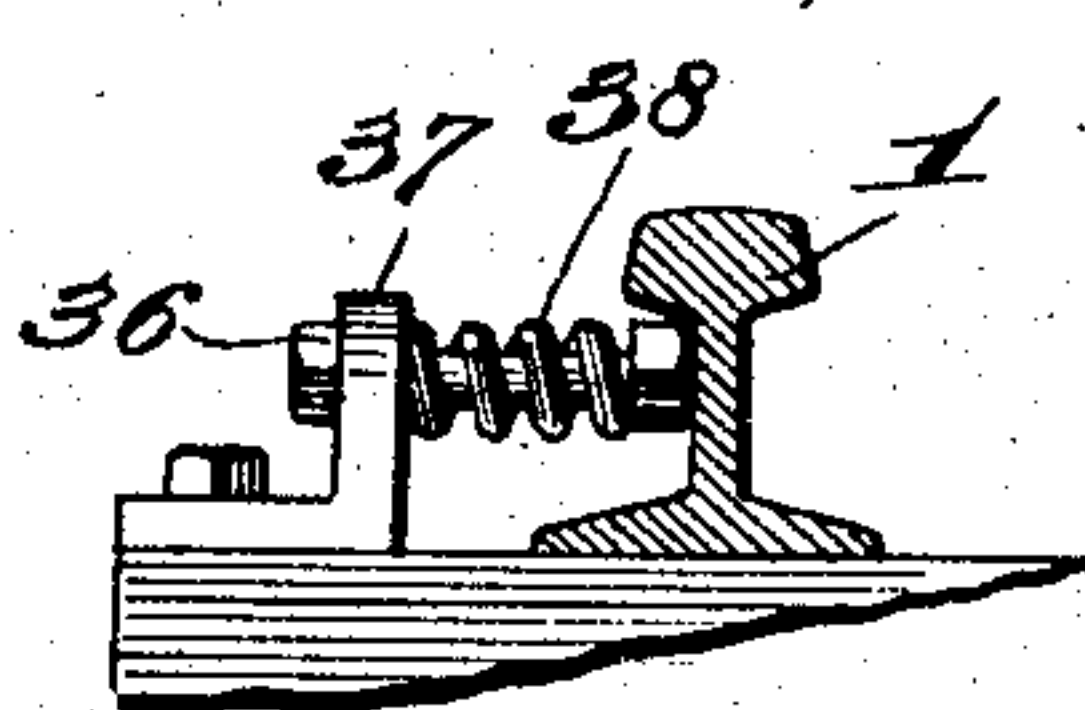


Fig. XI.

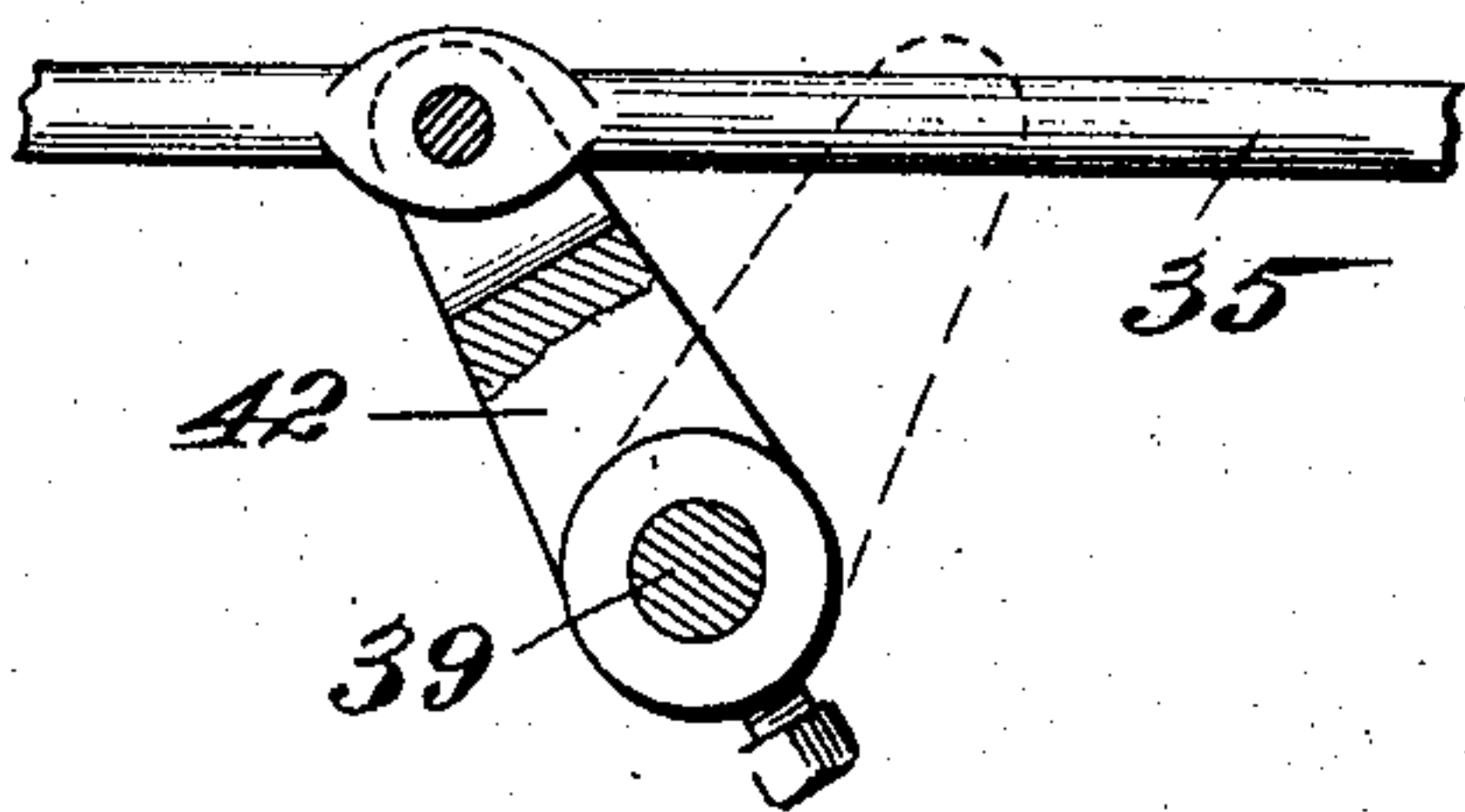
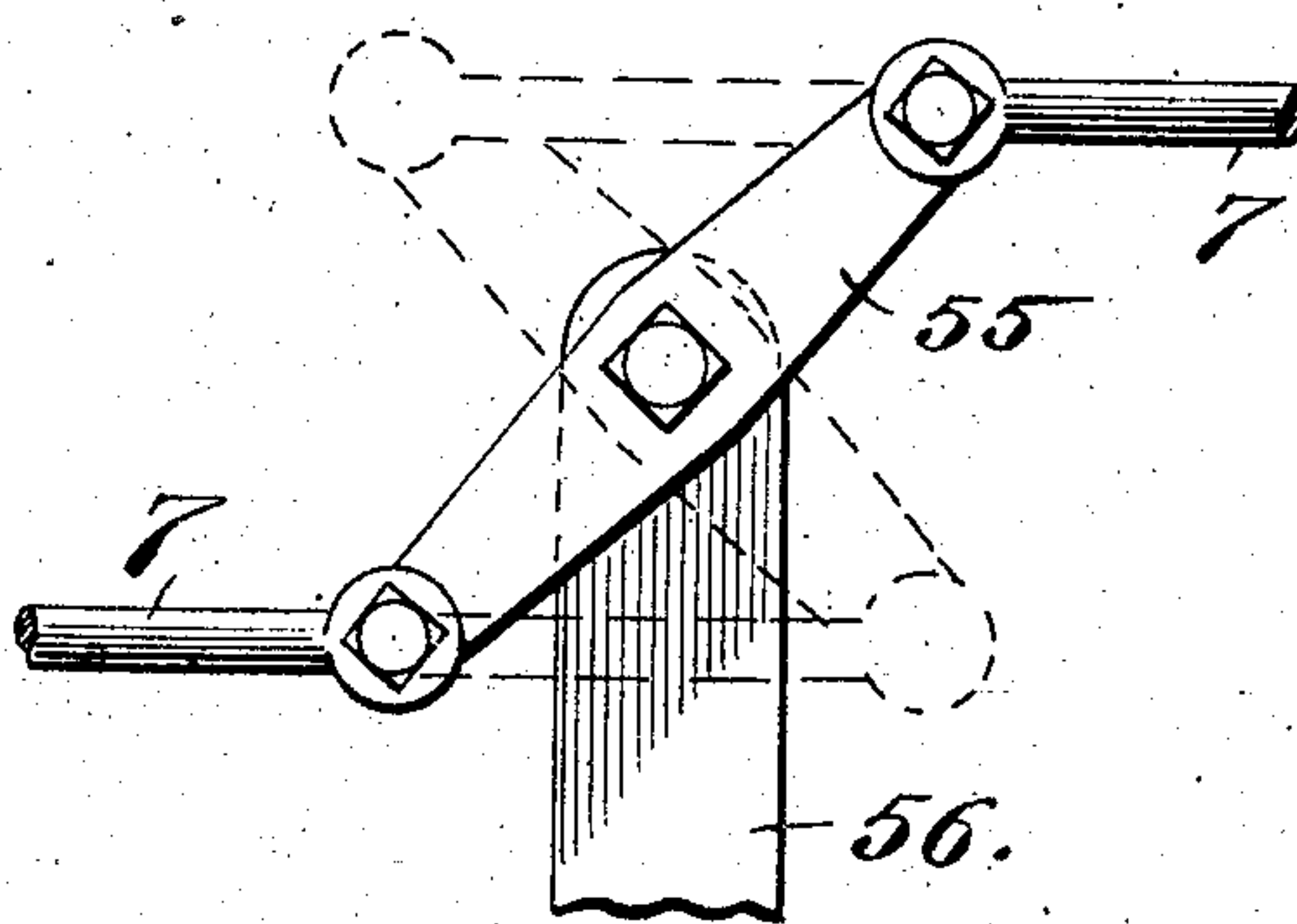


Fig. XII.



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# UNITED STATES PATENT OFFICE.

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## RAILWAY CROSSING AND SIGNAL.

SPECIFICATION forming part of Letters Patent No. 780,783, dated January 24, 1905.

Application filed July 25, 1904. Serial No. 218,119.

*To all whom it may concern:*

Be it known that I, CORBIN E. DAVIS, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Railway Crossings and Signals, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a combined railway crossing and signal of that class wherein it is impossible for more than one train to approach and pass the crossing at a time.

The object of my invention is to equip a railway-track with means whereby a set of danger-signals are displayed on all four sections of the crossing whenever a train approaches said crossing from any direction.

A further object of my invention is to provide means whereby a train will be derailed if it should approach the crossing while any of the sections of said crossing covered by the signal are occupied by the first train approaching said crossing.

A further object of my invention is to equip a railway-crossing with a warning-signal for the purpose of warning the engineer of a following train against approaching the crossing before the first train has reached the main signal and derailing operating mechanism.

Figure I is a plan view of a railway-crossing of my improved construction, the same being provided with the derailing-switches and the signals, parts of said crossing being broken away. Fig. II is a plan view of one arm or section of the track adjacent the crossing and showing the switch-shifting and signal-turning mechanism adjacent thereto. Fig. III is an enlarged cross-section taken on line III III, Fig. II. Fig. IV is a plan view of that portion of the railway-track in which the derailing-switch is placed and showing said switch shifted into the danger position. Fig. V is an enlarged section taken on line V V, Fig. II, and showing one of the arms that is struck by the car-wheels to accomplish the shifting of the various signals and derailing-switch. Fig. VI is an enlarged plan view, parts being broken away and illustrating a signal and torpedo shifting mechanism. Fig.

VII is an enlarged section taken on line VII VII, Fig. II. Fig. VIII is an enlarged detail section taken on line VIII VIII, Fig. IV. Fig. IX is an enlarged transverse section taken on line IX IX, Fig. II. Fig. X is an enlarged detail section taken on line X X, Fig. II. Fig. XI is an enlarged detail section taken on line XI XI, Fig. II. Fig. XII is an enlarged detail view looking in the direction indicated by the arrow XII.

1 indicates the main track-rails and 2 the crossing-rails, the same being laid in the ordinary manner. It will be understood that all of the four sections or arms of the crossing are equipped with the same devices. Therefore the following description will be confined to one section or arm. At a point on each section or arm a sufficient distance from the crossing beneath the rails of said track is arranged a transverse shaft 3, which is journaled in suitable bearings 4. Adjustably positioned on this shaft 3 just inside of each track-rail is an upwardly-projecting arm 5, that is arranged to be struck by the flanges of the car-wheels in passing over the track. On one end of the shaft 3 is detachably fixed an upwardly-projecting arm 6, to the upper end of which is pivotally connected one end of a rod 7, that lies parallel with the track-rails and terminates at a point adjacent the crossing of said track-rails. On the opposite end of this shaft 3 is fixed a beveled pinion 8. Rigidly positioned adjacent this pinion 8 is a frame or bracket 9, in which is vertically arranged and journaled a shaft 10, carrying a beveled pinion 11, that meshes with the pinion 8. The upper end of this shaft 10 is provided with a plate 12, which normally lies parallel with the track, which position indicates "safety," and which plate when turned at right angles to said track, as indicated by dotted lines, Fig. III, indicates "danger" and serves as a warning to the engineer of a train approaching the signal so turned. Arranged adjacent the track-rails a suitable distance from the warning-signal just described is a pair of bracket-bearing frames 13 and 14. Vertically positioned and journaled in the bearing 13 is a shaft 15, the upper end of which is provided with a four-sided signal 16, pref-



erably in the form of a lantern, two of its opposite sides being painted red and provided with red bull's-eyes or plates of glass, thus forming danger-signals. Secured to the shaft 5 15 within the bearing-frame 13 is a horizontally-projecting arm 17.

Vertically disposed and rotatably arranged within the bearing-frame 14 is a shaft 18, provided on its upper end with a four-sided signal 19, similar to the signal 16 previously described. Fixed upon the shaft 18 within the bearing-frame is a segmental gear 20, from which projects laterally an arm 21. A transversely-arranged rod 22 is pivotally connected 15 at its ends to the ends of the arms 17 and 21. Suitably journaled upon a pin 23 adjacent the bearing-frame 14 is a segmental gear 24, that meshes with the gear 20, previously mentioned, and integral with this gear 24 is an arm 25, to the outer end of which is pivotally 20 secured one end of a rod 26, that lies parallel with the railway-track and on the opposite side from the rod 7, this rod 26 terminating at a point adjacent the crossing-rails 2. Carried by the shaft 18 above the bearing-frame 25 14 is an arm 27 of such a length that when turned into a position at right angles to the track-rails its free outer end occupies a position directly over the ball of the rail adjacent the frame 14. This arm 27 carries on its outer 30 end a torpedo 28 or similar alarm, said arm normally lying parallel with the track-rails and only being swung around so as to bring the torpedo onto the track-rails when the signals 16 and 19 are turned to the danger position. 35

The derailing-rails are positioned in the track a suitable distance from the signals 16 and 19, said rails being pivotally held at their 40 rear ends 30 and the forward ends of said rails being connected by a transverse bar 31. Pivotally connected to the bar 31 is a rod 32, that extends out to the side of the track on the opposite side from that on which the rod 26 is 45 located, and the free end of this rod 32 is pivotally connected to the end of one arm of a bell-crank 33, the same being pivoted at 34 and the end of its opposite arm being pivotally connected to a rod 35, that extends parallel with the railway-track. The free end of 50 one of the derailing-rails 29 normally rests against the bolt 36, that is carried by a suitable bearing 37, and said bolt is provided with an expansive coil-spring 38, that, together 55 with said bolt 36, forms a buffer and stop for the rails 29 when the same are turned to their proper position in line with the track-rails.

Located a suitable distance from the derailing-rails and beneath the track-rails is a transversely-arranged rod 39, that is journaled in 60 suitable bearings 40 and which carries a pair of upwardly-extending arms 41 in every way similar to the arms 5, previously mentioned. These arms 41 are positioned immediately 65 against the insides of the track-rails 1, and

both sets of the arms 5 and 41 normally lie horizontal and project in a direction away from the crossing-rails 2, the purpose of this arrangement being hereinafter disclosed. One end of the shaft 39 carries an upwardly-projecting arm 42, that is pivotally connected at 70 its upper end to the rod 35, and the opposite end of said rod 39 carries a similar arm 43, that is pivotally connected to the rod 26. Located a suitable distance from the rod 39 is a rod 44, the same being rotatably arranged in 75 suitable bearings 45 and provided with a pair of upwardly-projecting arms 46, similar to the arms 5 and 41, previously mentioned, with the exception that said arms 46 are so arranged 80 that they project toward the crossing-rails 2. One end of this rod 44 is provided with an arm 47, the upper end of which is pivotally connected to the rod 7. Located a suitable distance from the rod 44 is a transversely-arranged rod 48, which is rotatably arranged in 85 suitable bearings 49 and provided on the inside of the track-rails 1 with the arms 50, similar to the arms 46, previously mentioned, and projecting toward the crossing-rails 2. The pairs 90 of arms 46 and 50 normally occupy vertical positions, as seen in Figs. II and V, they being in this position when the track is open or free from trains with the signals indicating "safety." One end of this rod 48 is connect- 95 ed, by means of an arm 51, to the rod 35, and the opposite end of said rod 48 is connected, by means of an arm 52, to the rod 26. All the rods 26 and 35 terminate at points adjacent the crossing-rails 2, and each adjacent 100 or corresponding pair of said rods have their ends pivotally connected to the ends of the arms of bell-cranks 53, which bell-cranks are horizontally disposed and held to operate in suitable bearings 54. These bell-cranks 53 105 are so arranged that all the rods 26 and 35 have a simultaneous and corresponding movement—that is, they all move at the same time inwardly toward the crossing-rails 2 or outwardly therefrom. 110

The rod 7 on one section or arm of the crossing is in direct alinement with the corresponding rod on the opposite section or arm of the crossing, the inner ends of these rods meeting adjacent one corner of the crossing and 115 being pivotally connected to the ends of a short lever 55, that is pivotally held at its center to a bracket 56. (See Fig. XII.) This arrangement causes a corresponding movement of said rods 7—that is, they move simultaneously to and from one another; but the warning-signal and mechanism to which the rods 7 are attached on one straight track are not affected by the movement of the like mechanism of the opposite straight track. 120 125

The operation of my improved crossing and signal is as follows: When both of the tracks of my improved crossing are open or "safe," the various parts are in position, as shown in Figs. I and II. The warning-signals 12 lie 130



parallel with the tracks, the various sets of arms 5 occupy horizontal positions pointing away from the crossing, the signals and lanterns 16 indicate "safety," the derailing-rails 5 are in alinement with the track-rails, the various sets of arms 41 occupy horizontal positions pointing away from the crossing, and the various sets of arms 46 and 50 all occupy vertical positions. A train approaching the crossing on any track runs along over the arms 5, (the same being down and not affected by the wheels of the train,) over the derailing-rails, over the arms 41, (they being down and unaffected by the wheels.) When the first wheels on the engine of the train strike the arms 46, the same are swung downwardly and toward the crossing, as indicated by dotted lines in Fig. V, this movement slightly rocking the shaft 44 and in turn moving the rod 7 toward the crossing. This movement is imparted to the shaft 3 by means of the beveled gearing 8 and 11. The warning-signal 12 is turned at right angles to the track, as illustrated by dotted lines in Fig. III, which is the danger position.

It will be understood that by reason of the rods 7 being connected by the lever 55 the movements just described will be imparted to the corresponding mechanism on the opposite section or arm of the crossing, thus throwing the warning-signal 12 on said opposite section. This movement throws the arms 46 of the opposite section downwardly and the arms 5 of said section upwardly to be engaged by the wheels of the train as they pass off from the opposite section. Both warning-signals 12 on one straight section of track now being turned to the danger position will warn the engineer of a train approaching the crossing on the straight section of track that the crossing is already occupied by a train. The first train after passing over the arms 46 moves on toward the crossing, and the wheels engage against the arms 50, mounted on the shaft 48, moving the same downwardly toward the crossing-rails 2, and thus slightly rocking said shaft 48. This movement causes the rods 26 and 35 to move inwardly toward the crossing-rails 2, and by reason of the meeting ends of each pair of said rods 26 and 35 being connected by the bell-cranks 53 all of said rods 26 and 35 will be likewise moved inwardly toward the crossing-rails. This movement necessarily imparts a slight rotary motion to all of the shafts 39, and the arms 41, carried thereby, which have heretofore occupied horizontal positions pointing away from the crossing-rails, will be swung upwardly into vertical positions. The ends of the rods 35 being connected to the bell-cranks 33 will shift said bell-cranks into the position seen in Fig. IV, and the derailing-rails will be swung or shifted laterally out of alinement with the track-rails on the various sections of the crossing. The rods 26 being connected to the arms

25 of the segments 24 will slightly rock said segments, and they in turn will move the segments 20, in turn shifting the rods 22, and thus rotating all the vertical shafts 15 and 18. These parts are so arranged that said vertical shafts will be rotated one-quarter of a turn and the signals and lanterns 16 and 19 will be turned one-quarter of the way around and from the safe to the danger positions. This movement also swings all of the arms 27 around at right angles to the track, with the torpedoes 28, carried by the ends of said arms, directly over one of the track-rails of each arm or section of the crossing. As the parts now stand the crossing is occupied by a train, and the engineer of a train approaching from either direction on the straight track occupied by the first train will be warned that the crossing is occupied by a train by the positions of the warning-signals 12. The engineer of a train approaching the crossing from any direction will be warned that said crossing is occupied by a train by the danger positions of the signals and lanterns 16 and 19. Should these signals be disregarded and the train run forward toward the crossing, the torpedo on the track on which said train is running will be exploded, giving a further warning to the engineer of said train, and should both these warnings be disregarded the following or approaching train will pass onto the derailing-rails 29, and thus be derailed before it collides with the first train on the crossing. The first train after passing the crossing travels over the sets of arms 50 and 46, which now occupy horizontal positions out of the way of contact with the flanges of the wheels of the train, having been moved to these positions, as hereinbefore described, and said train passes on and the wheels thereof contact with the arms 41, which now occupy vertical positions. Said arms are depressed or moved into horizontal position by the wheels of the train and all of the rods 26 and 35, the arms 50, the derailing-rails 29, and the signals and lanterns 16 and 19 and various connections are moved into their normal or safety positions. The train now passes on over the derailing-rails past the signals and lanterns 16 and 19, and the wheels of said train contacting with the arms 5 depress the same, and as a result thereof both warning-signals 12 on the straight track over which the train is passing and the various connections are moved to their normal or safety positions and the train passes away from that portion of the track adjacent the crossing which is covered by the signal system. It is not necessary to have the warning-signals 12 on one straight track actuated by the mechanism that operates said signals on the crossing-track, owing to the fact that these signals are only necessary for a train approaching the first train onto said crossing from either direction. These signals 12 prevent head or



rear end collisions, while the signals and lanterns 16 and 19, together with the torpedoes and the derailing-rails 29, prevent collisions at the crossing.

5 The signals of my improved crossing are positive and automatic in operation, depending entirely upon the wheels of the train for actuation, and said signals are so arranged as to be reset to the safety position by the train  
10 passing away from the crossing, and collisions at a crossing equipped with my improved signals are impossible.

I claim as my invention—

1. In a railway crossing and signal, derailing-rails arranged in each section of the track  
15 adjacent the crossing, and means whereby all of the derailing-rails are shifted as a train passes over any one of the track-sections, substantially as specified.

2. In a railway crossing and signal, derailing-rails arranged for operation in each of the sections of track adjacent the crossing, means whereby all of the derailing-rails are shifted  
20 after a train passes onto any section of the crossing inside of said derailing-rails, and means whereby said derailing-rails are returned to their normal positions when said  
25 train passes off from the section of track in which said derailing-rails are positioned, substantially as specified.

3. In a railway crossing and signal, a pair of signals arranged adjacent the track of each section of the crossing, derailing-rails arranged in each section of the track, and means  
30 whereby all of the signals and derailing-rails are shifted as a train passes over any one of the track-sections, substantially as set forth.

4. In a railway crossing and signal, a pair of signals arranged adjacent each of the sections  
40 of the track adjacent the crossing, a pair of de-

railing-rails positioned for operation in each of the sections of track adjacent the crossing, means whereby all of the signals and derailing-rails are actuated as a train approaches the crossing, and means whereby all of said  
45 signals and derailing-rails are returned to their normal positions as a train leaves the crossing, substantially as set forth.

5. In a railway crossing and signal, a pair of warning-signals arranged on each track at  
50 opposite sides of the crossing, connections whereby each pair of the warning-signals are simultaneously operated as a train approaches the crossing, means whereby each pair of  
55 warning-signals is returned to the normal position as the train leaves said crossing, a pair of signals arranged adjacent the track of each section of the crossing, and means whereby  
60 each pair of said last-mentioned signals are actuated as a train approaches and leaves the crossing, substantially as set forth.

6. In a railway crossing and signal, a pair of warning-signals arranged on each track at  
65 opposite sides of the crossing, connections whereby each pair of the warning-signals are simultaneously operated as a train approaches the crossing, means whereby each pair of  
70 warning-signals is returned to the normal position as the train leaves said crossing, a pair of signals arranged adjacent the track of each section of the crossing, a pair of derailing-rails arranged in each track-section adjacent the crossing, and means whereby the second-  
75 mentioned pair of signals and the derailing-rails are shifted as a train approaches and leaves the crossing, substantially as set forth.

CORBIN E. DAVIS.

In presence of—

W. R. O'SULLIVAN,

WM. C. BOLM.