No. 813,311. PATENTED FEB. 20, 1906

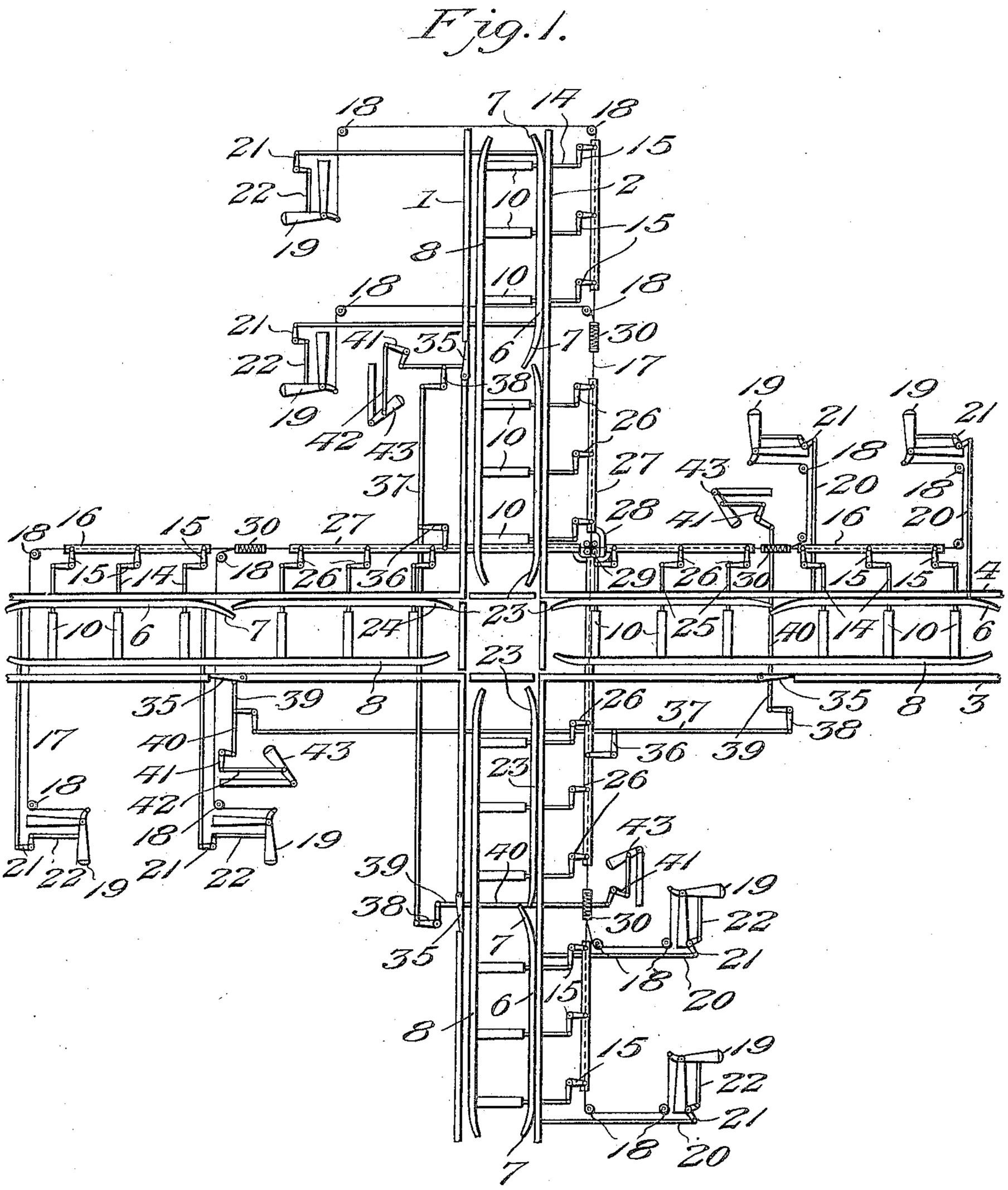
G. W. LANCASTER.

RAILWAY CROSSING.

APPLICATION FILED JULY 19, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

Edwin L. McKee

C. C. Hines.

Inventor

George W. Lancaster.

By Victor J. Evans

Attorney

No. 813,311. PATENTED FEB. 20, 1906.

G. W. LANCASTER.

RAILWAY CROSSING.

APPLICATION FILED JULY 19, 1905.

3 SHEETS—SHEET 2.

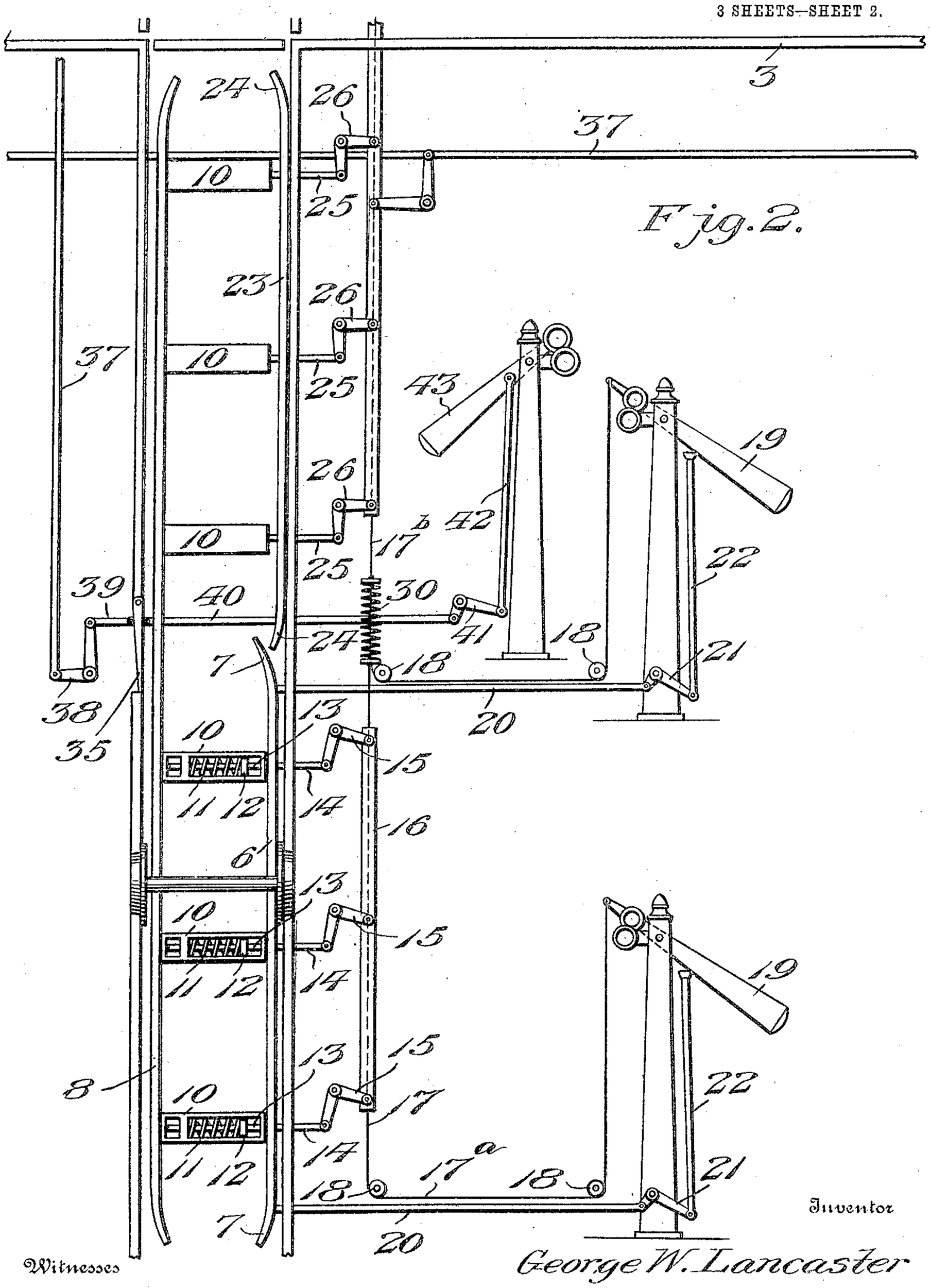


Fig. 2.

Witnesses

Edwin L. McKee

C. C. Hines.

Inventor

George W. Lancaster

By Victor J. Evans

Attorney

No. 813,311. PATENTED FEB. 20, 1906.

G. W. LANCASTER.

RAILWAY CROSSING.

APPLICATION FILED JULY 19, 1905.

3 SHEETS—SHEET 3.

Fig. 3.

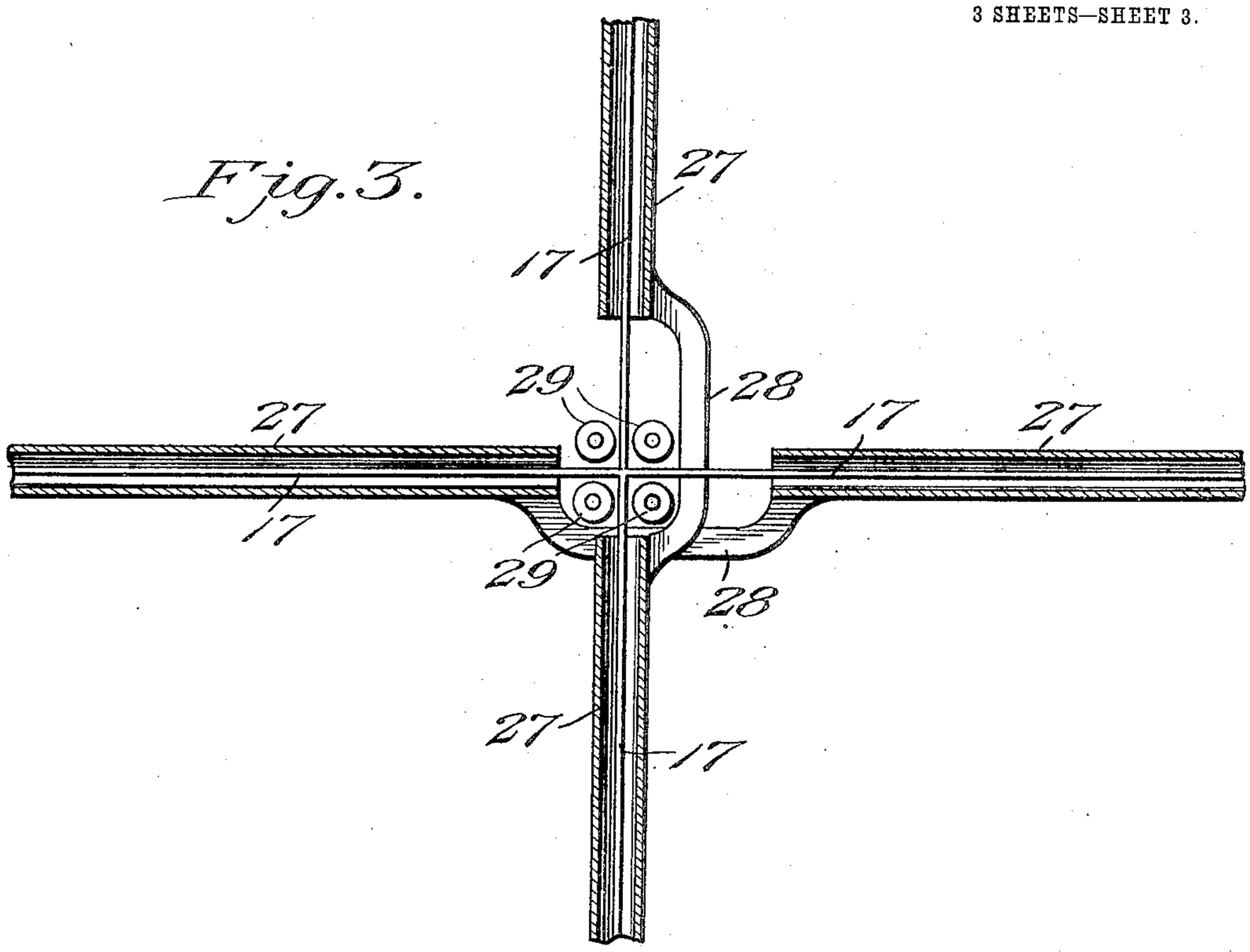
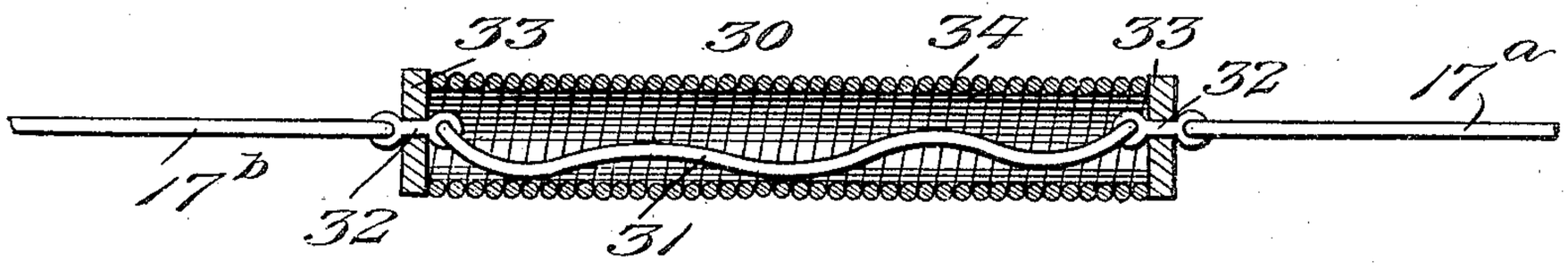


Fig. 4.



Witnesses

Edwin F. McKee

C. C. Hines.

Inventor

George W. Lancaster

By Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

GEORGE W. LANCASTER, OF PETERSBURG, VIRGINIA.

RAILWAY-CROSSING.

No. 813,311. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed July 19, 1905. Serial No. 270,389.

To all whom it may concern:

Be it known that I, GEORGE W. LANCASTER, a citizen of the United States, residing at Petersburg, in the county of Dinwiddie and State of Virginia, have invented new and useful Improvements in Railway-Crossings, of which the following is a specification.

This invention relates to railway-crossings, one object of the invention being to improve and simplify the construction of safety-crossings and provide effective means to prevent a train upon one track colliding with a train upon an intersecting track.

Another object is to provide an improved construction of signaling and derailing mechanism operatively arranged and connected in such manner as to reduce liability of collision to the minimum.

In the drawings hereto annexed and forming part of this specification, Figure 1 is a diagrammatic view of the railway-crossing embodying the features of the invention. Fig. 2 is a diagrammatic plan view of the devices associated with one pair of track-rails, on an enlarged scale. Fig. 3 is a horizontal section through the adjacent ends of the guide-tubes at the point of intersection of the controlling-wires, showing also the guide-rollers for said wires; and Fig. 4 is a longitudinal section through the expansible section of one of the controlling-wires.

Referring now more particularly to the drawings, the numerals 1 and 2 designate the rails of one track, which are intersected by rails 3 and 4 of another track. These rails are mounted in the ordinary manner upon ties or sleepers. (Not shown.) Extending parallel with the rails 1 and 4 of each track is a pair of movable supplemental rails 6, the two supplemental rails of each track being disposed on opposite sides of the crossing. Each of the supplemental rails 6 is formed with inwardly-bent ends 7. The supplemental rails 6 are adapted to be forced away from the adjacent track-rails 1 or 4 by the flange of a car-wheel, as indicated in Fig. 2, and the movement of each supplemental rail serves through suitable mechanism, hereinafter described, to actuate a set of signals to indicate to the engineer of a train approaching the crossing on either track whether or not another train is approaching the crossing on the intersecting track.

Disposed opposite each of the movable supplemental rails 6 is a stationary supplemental guard-rail 8. Connected in any suitable manner with each of the said rails 8 is a set or plurality of casings 10, said casings being supported preferably upon the ties or sleepers. Located in each of the casings 10 is a coil-spring 11, as shown in Fig. 2, bearing at one end against one of the walls of the casing and at the other end against the head 12 of a rod 13, connected with the adjacent movable supplemental rail 6. The set or plurality of coil-springs 11 serves as automatic means for holding the movable supplemental rails against the adjacent track 1 or 4, as the case may be.

Attached to each of the movable supplemental rails 6 is a set or plurality of rods 14, which are connected with a set or plurality of bell-crank levers 15, attached in turn to a connecting rod or tube 16, which adapts them to move in unison under the movement of the rail 6. The tube 16 may be mounted in suitable guides for movement toward or from the adjacent track-rail 1 or 4, as the case may be, and serves as a guide for the passage of a signal-controlling wire, cord, or like flexible connection 17, which extends therethrough. Each wire 17, of which four are used to actuate signals arranged alongside each track at each side of the crossing, passes at one end over suitable guide sheaves or rollers 18 and is connected with the short arm of a semaphore-signal arm 19. Each movable supplemental rail 6 is operatively connected with the long arm of the signal 19 by means of an actuating-rod 20, connected with a bell-crank lever 21, which is connected in turn with the lower end of a rod 22, the upper end of which is yoked to embrace or is otherwise movably connected with the signal-arm 19, so as to normally maintain said arm in a horizontal position. Each supplemental rail 6 may be operatively connected with a single semaphore 19 or with two semaphores, as shown in the present instance.

The movable supplemental rails 6 are disposed in practice some distance from the crossing or point of intersection of the tracks, and between each of said rails 6 and the crossing is a similar movable supplemental rail 23, having inwardly-curved ends 24 and connected to the stationary guard-rail 8 in a manner similar to the rail 6 by spring-actuated rods which normally maintain it in contact or close proximity to the adjacent track 1 or 4, as the case may be. The rail 23 has attached thereto a series of rods 24, connect-

ed to bell-crank levers 26, which are in turn attached to a tubular connecting-rod 27, arranged in alinement with the tubular connecting-rod 16 and through which the controlling-wire or flexible connection also extends. One of the tubes 27 extends beneath the track-rails 3 and 4 and another beneath the track-rails 1 and 2, and the inner ends of the four tubes 27 are arranged in close relation adjacent to the point of intersection of the rails 2 and 4, the alining tubes being connected and braced by bracing-arms 28. Between the proximal ends of the tubes 27 the four controlling-wires or flexible connections 17 are joined, so as to be moved in unison and extend between four guide-rollers 29, so disposed as to form antifriction-guides therefor in any direction of movement of said wires. Each wire or flexible connection 17 is provided with an expansible section 30, each expansible section comprising a normally slack member 31, joined at its ends by eyebolts 32 to the portions or sections 17^a 17^b of the wire 17. Fixed to the eyebolts 32 are heads 33, between which and surrounding the slack member 31 is a coiled contractile spring 34, which is connected at its ends to said heads and serves to normally draw them together, thus holding the section 31 slack. These expansible sections 30 of the several wires are provided to permit of the actuation of the signal arm or arms 17 by a train approaching the crossing on one section of either track without affecting the remaining signal-arms, as will be hereinafter described.

One of the movable supplemental rails 23 of each track is connected with derailing-switches 35, arranged in the sections of the other track at opposite sides of the crossing through the connecting-rod 27, attached thereto by means of a bell-crank lever 36, to which said rod 27 is attached, said bell-crank lever being in turn operatively attached to a connecting-rod 37, attached by bell-crank levers 38 to rods 39, which are connected with the said derailing-switches 35, so that when the rail 23 of either section of either track on either side of the crossing is moved outwardly by the flange of a locomotive or car wheel the derailing-switches in the sections of the other track will be opened. Each derailing-switch 35 is connected by a rod 40 with a bell-crank lever 41, which is in turn attached by a rod 42 to a signal-arm 43, which indicates by its position whether or not the switch 35 is open.

Constructed as above described the operation of the signal and derailing mechanism is as follows: When a train approaches the crossing on the track-rails 1 2, the flanges of the wheels will force the supplemental rails 6 away from the adjacent rail 1, thus actuating the bell-crank levers 15, which will draw upon the adjacent controlling-wire 17, whereby motion will be communicated to all four wires 17, as will be readily understood, this operation causing the expansible sections 30 of all wires to be drawn out or expanded to render the slacking portions 31 taut. At the same time the movement of the movable rails 6 will transfer motion to the rods 20, which, if the way is clear for the passage of the train over the crossing, will pull down the signaling-arms 19, thus indicating to the engineer the fact that the way is clear. The wheels will next come in contact with and force the movable supplemental rail 23 away from the rail 2, thus operating the rod 37, which will throw open the derailing-switches 35 in the track-rails 3 and 4, so that a train approaching the crossing over these rails will be derailed and a collision prevented between the same and the train traveling over the crossing on the rails 1 and 2. The adjoining outturned ends 7 and 24 of the movable rail-sections 6 and 23 are preferably so arranged as to contact when the rail 23 is moved away from the rail 2, so that as long as the wheels of the train are in contact with said rail 23 both rails 6 and 24 will be held open or away from the track-rail 2, thus maintaining the signal on the side of the crossing from which the train approaches in a set position until the train passes over the crossing to indicate to the engineer of a following train the near presence of the train ahead. Upon the outward movement of the rail-sections 6 and 23 all the signal-controlling wires 17 are drawn upon in a manner readily understood and their expansible sections 30 expanded until the slack members 31 are drawn taut, and as these wires are connected to the short arms of the semaphore-signals 19 it will be readily understood that while the sections 17^a of the wire 17 adjacent to and immediately operated by the particular rail 6 will permit the semaphore arm or arm connected therewith to drop the taut condition of all the remaining controlling-wires 17 will prevent the remaining signal-arms from dropping owing to the resistance they oppose to the downward movement of said arms. Hence the engineer of a train approaching the crossing on the track-rails 1 and 2 will be enabled to determine whether or not a train is approaching the crossing on the track-rails 3 and 4, as the failure of the adjacent signal-arms to drop when the movable rail 6 is operated by the wheels of his train will indicate that one of the movable rails 6 between the tracks 3 and 4 has been previously operated by a train approaching the crossing on said track, thus enabling him to apply the brakes in time to prevent a collision. This is due to the fact, as previously explained, that the operation of any one of the wires 17 while permitting the adjacent signaling-arms to drop will result in the expansible sections of all other wires being drawn taut, thus preventing all the other signal-arms from dropping. The position of

the signal 43 will also indicate to the engineer of the train on tracks 1 and 2 whether or not the switches 35 therein are open. If, however, the engineer approaching the crossing on rails 1 and 2 should not perceive or should disregard the warning given by the failure of the associated semaphore-arms to drop, his train will be derailed owing to the fact that the derailing-switches 35 in the tracks 1 will have been previously opened by the actuation of one of the movable rails 23 between the tracks 3 and 4 by the wheels of the other train. Thus liability of collisions between trains at the crossing will be reduced to a minimum.

Having thus described the invention, what I claim as new is—

1. The combination with intersecting pairs of railway-tracks, of a pair of supplemental rails parallel with one of the tracks of each pair on opposite sides of the intersecting point, automatic means for holding said supplemental rails against the adjacent tracks, signals controlled by said supplemental rails, a pair of derail-switches upon each pair of tracks, and means operable subsequent to and independent of the rails on one pair of tracks for opening the derail-switches upon the other pair of tracks.

2. The combination with the rails of intersecting tracks, of a pair of supplemental rails in each track on each side of the point of crossing, automatic means for holding said rails in a prescribed position to be moved by the wheels of a car, signals controlled by one of the rails of each pair of supplemental rails, a derail-switch in each track on each side of the point of crossing, and means operated by the other rail of each pair of supplemental rails whereby the movement of the said supplemental rail on either side of the crossing in either track will open the derail-switches in the other track.

3. In a railway-crossing, the combination with the rails of intersecting tracks, of signal and switch operating rails in each track on each side of the point of crossing, derailing-switches in the tracks, the switches of one track being operatively connected with the switch-operating rails of the other track, signals alongside each track on opposite sides of the point of crossing, said signals being connected with said switch-operating rails, and means for preventing the operation of the other signals when any one signal is operated.

4. In a railway-crossing, the combination with the rails of intersecting tracks, of derail-switches in the tracks on opposite sides of the point of crossing, switch-arms associated with the tracks on opposite sides of the point of crossing, a switch and a signal operating rail in each track on each side of the crossing, automatic means for maintaining said rails in a prescribed position for operation by the wheels of a car, flexible connections between the series of signals for resisting the operation of said signals, expansible devices in said connections for permitting the operation of any one signal when the others have been operated, and connections between the switch-operating rails of one track and the derailing-switches of the other track.

5. In a signaling and derailing system for railway-crossings, the combination with the rails of intersecting tracks, of signals for said tracks, train-operated means controlling said signals, and derailing means between said signal-controlling means and crossing, for derailing a train running past a danger-set signal.

6. The combination with intersecting pairs of railway-tracks, of a pair of supplemental rails parallel with one of the tracks of each pair on opposite sides of the intersecting point, automatic means for holding said supplemental rails against the adjacent tracks, signals controlled by said supplemental rails, a pair of derail-switches upon each pair of tracks, means operable subsequent to and independent of the rails on one pair of tracks for opening the derail-switches upon the other pair of tracks, and a signal associated with each derail-switch.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. LANCASTER.

Witnesses:
R. P. MAYER,
R. W. LEWIS.