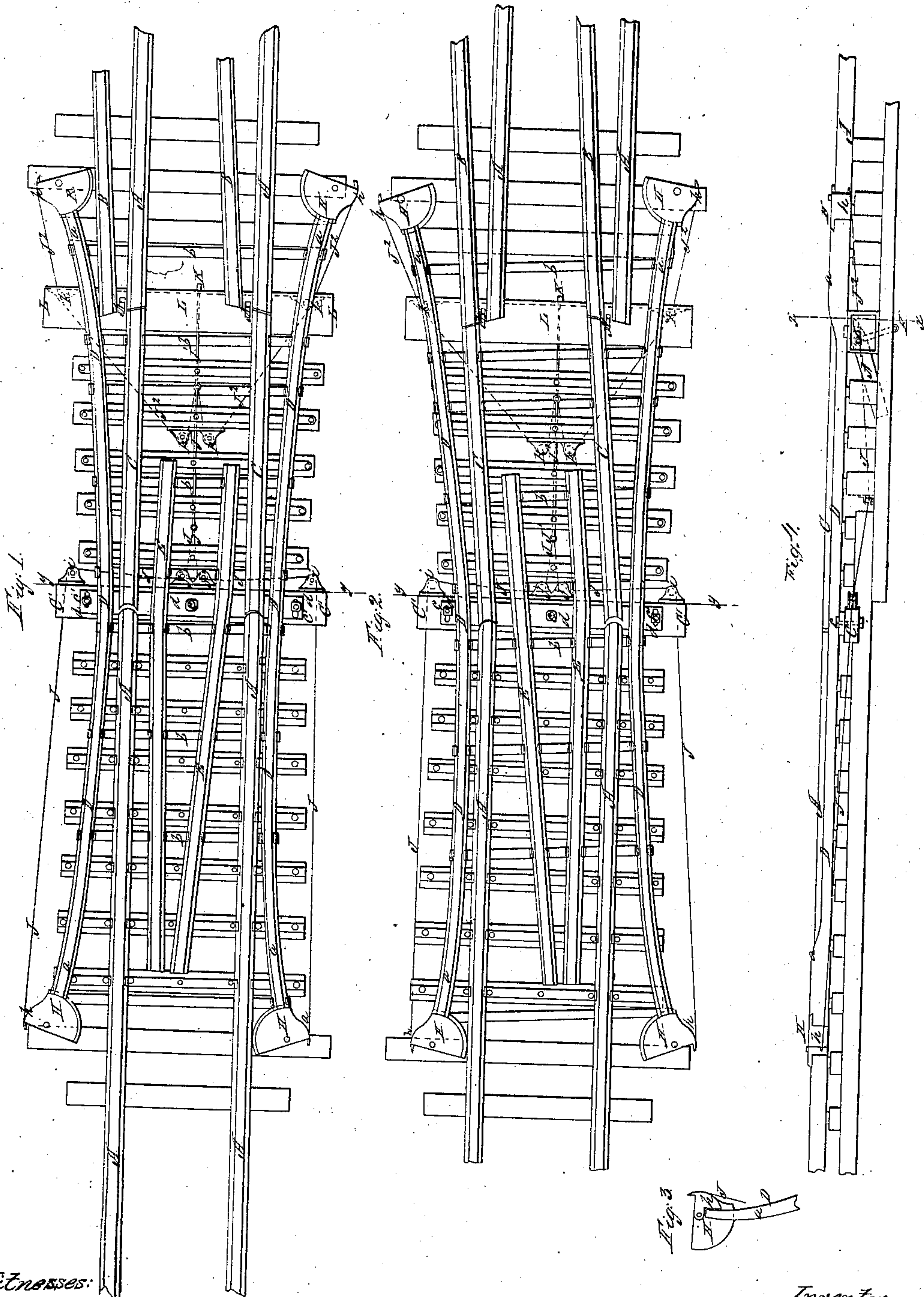


W. F. Serjeant,  
Railroad Switch,

N<sup>o</sup> 68,315,

Patented Aug. 27. 1867.



Witnesses:

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Fig. 5.

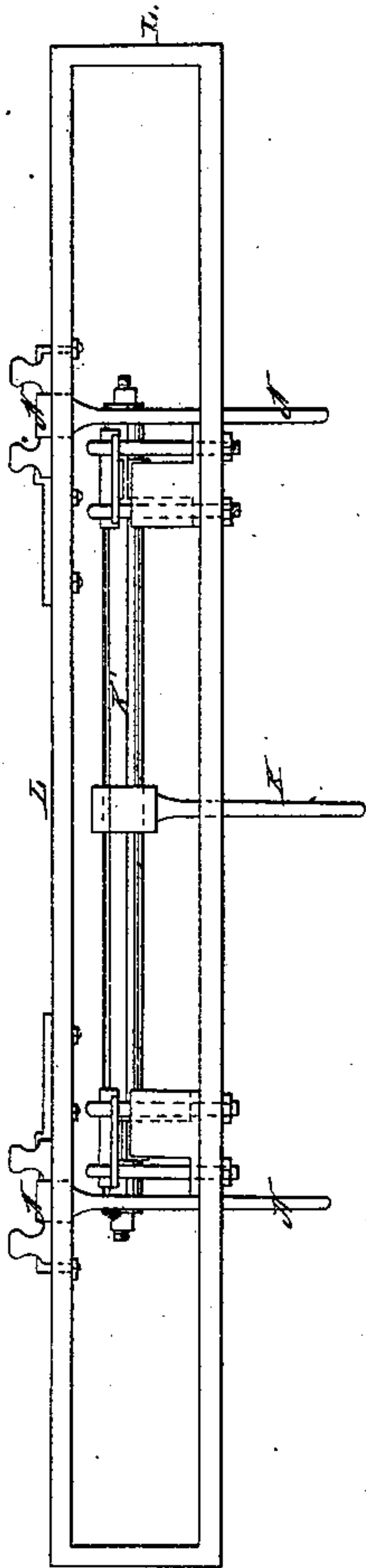


Fig. 6.

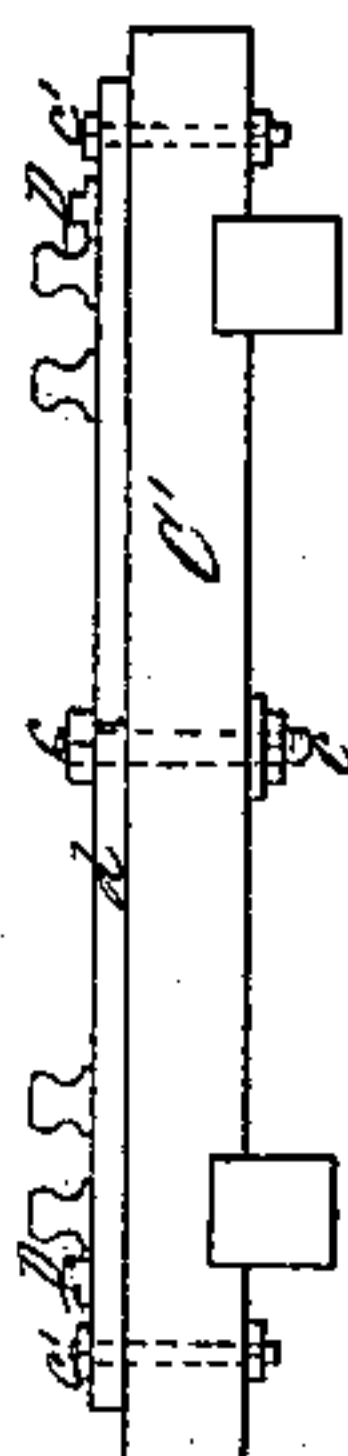


Fig. 7.

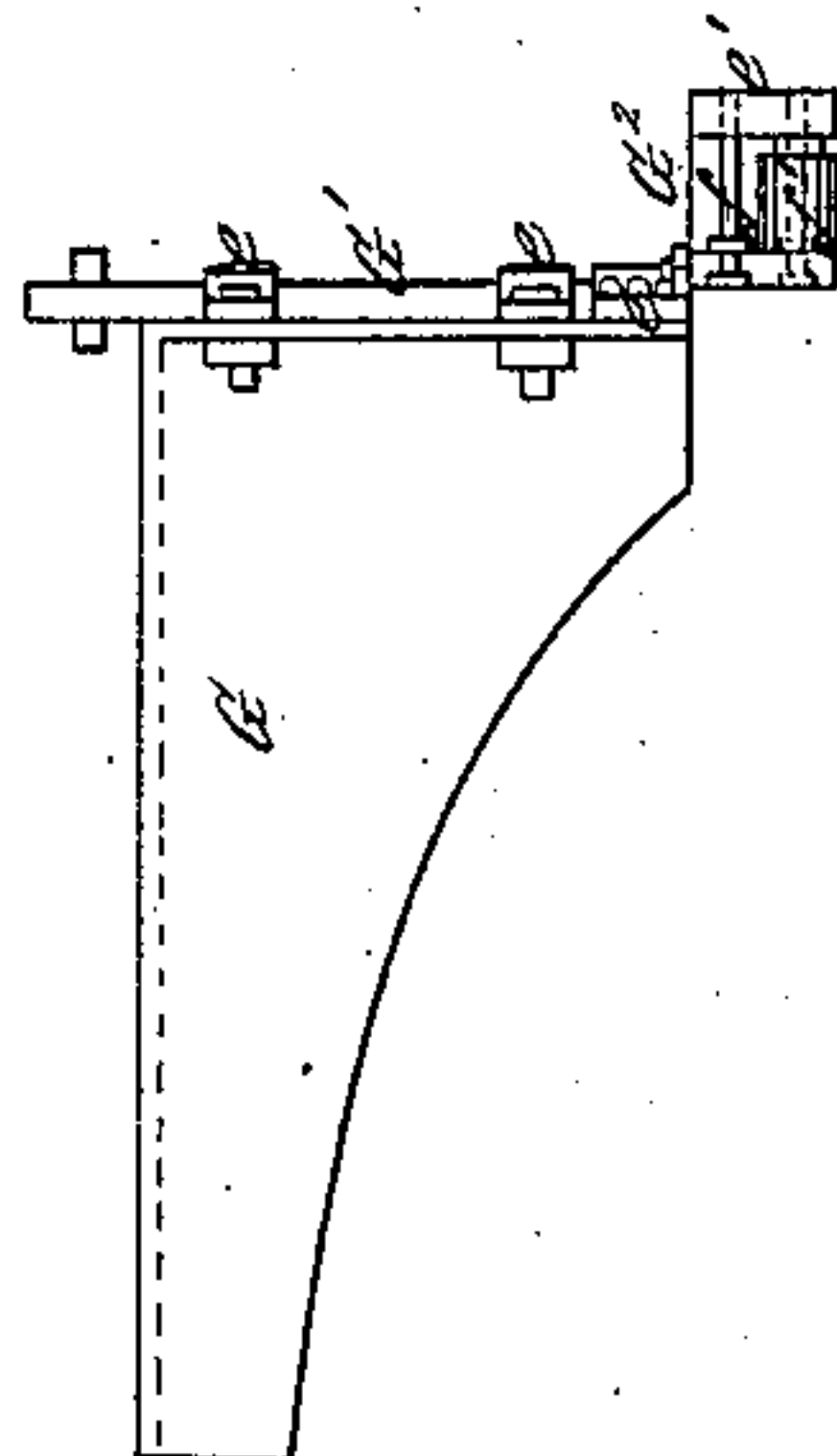


Fig. 8.

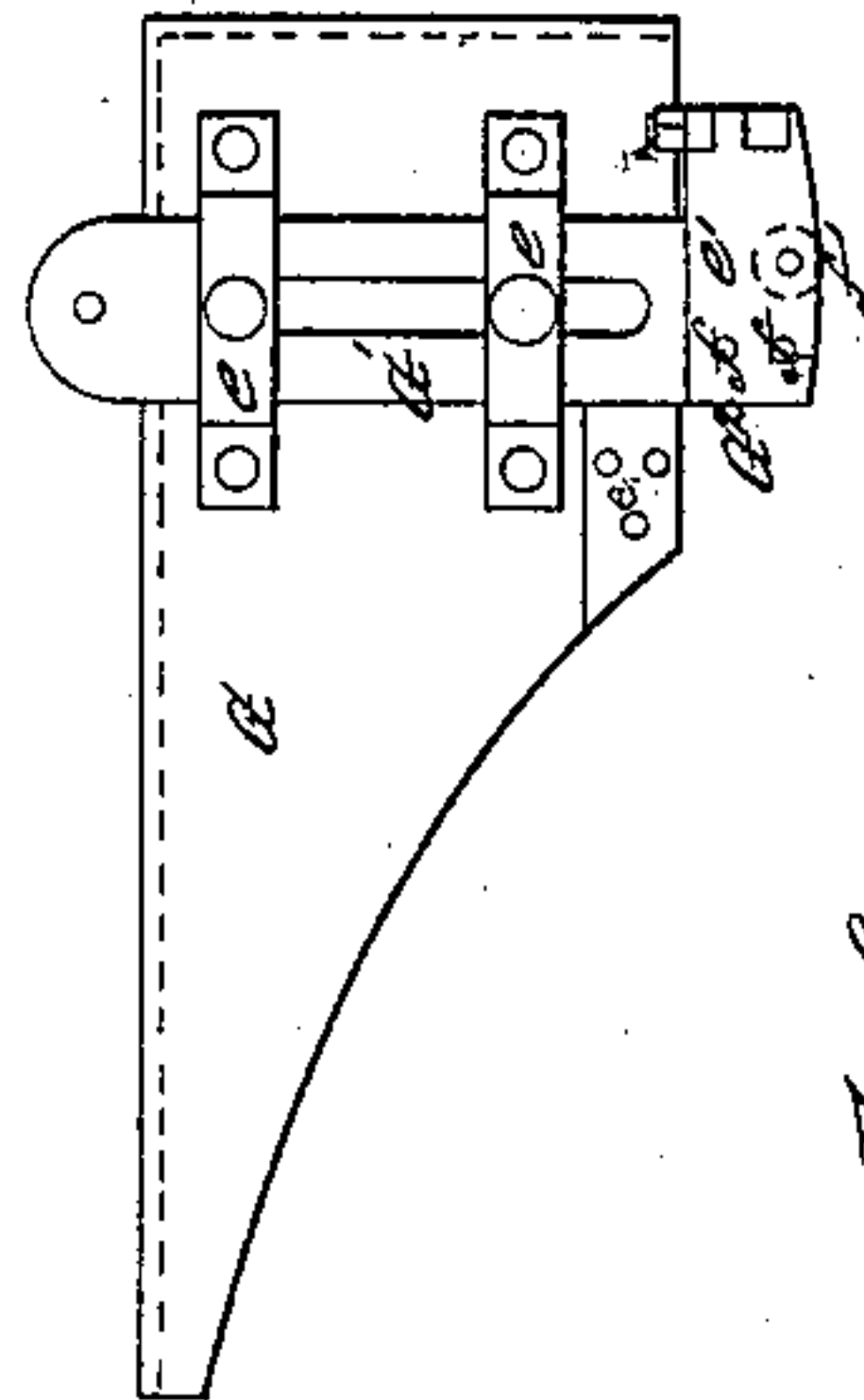
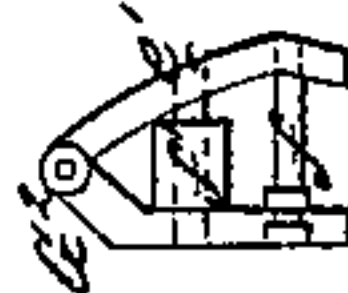


Fig. 9.



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# United States Patent Office.

WILLIAM F. SERJEANT, OF ST. LOUIS, MISSOURI

*Letters Patent No. 68,315, dated August 27, 1867.*

## IMPROVED RAILWAY SWITCH.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, W. F. SERJEANT, of the city of St. Louis, in the county of St. Louis, and State of Missouri, have invented a new Combination Railroad Switch; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, sheet 1, is a plan view of the improved switch, showing the switch-rail sections locked in position, in line with the main track.

Figure 2 is a similar view of the same parts, showing the switch-rail sections locked in position, in line with a siding or turn-out.

Figure 3 is a bottom view of one of the keys for operating the locks.

Figure 4 is an elevation of one side of the switch, shown in fig. 1.

Figure 5 is an enlarged sectional view of the lock frame, taken in the vertical plane indicated by line *x x* in fig. 4.

Figure 6 is a transverse section taken through the track in the vertical plane indicated by red line *y y* in figs. 1 and 2.

Figures 7 and 8 are views showing the construction of one of the switch-keys, its guides and supports, which are applied to the train for effecting the unlocking and the moving of the switch-rails.

Figure 9 is an enlarged horizontal section of a switch-key.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel and useful improvements on the construction and operation of railroad switches, whereby perfect safety of trains passing and repassing over a switch is secured, without the attendance of switchmen at those points of a road where sidings or turn-outs are required. My invention contemplates the employment upon the train of contrivances which are under the control of the engineer and brakeman, in conjunction with a switch which is so constructed that when the train is moving forward the engineer, upon his engine, shall have the same power of controlling the switch as a faithful switchman has under the old method; and in reversing or moving the train backward, the brakeman at the rear end of the train, or rearmost car, shall be able to change or adjust the switch with equal facility. The great object of my invention is, therefore, to so construct a switch and the devices which are employed to operate it, that a person upon a moving train shall perform the office of switchman, thereby affording greater security of life and property upon railroads, and diminishing the force necessary under the old system of managing a road.

The nature of my invention consists mainly in providing movable or switch-rail sections with arms or levers of such length and form as to be acted upon laterally by means of shoes or keys upon the front end of a locomotive, or upon the rear end of the rearmost car in a train, and thus caused to adjust or change the switch-rails from the main track line to the siding, or *vice versa*, as circumstances shall require; said shoes or keys being so arranged, constructed, and applied that they shall be convenient to the person or persons having charge of them, and entirely under the control of such person or persons, as will hereinafter be explained.

The invention further consists in the employment of an automatic, double-locking contrivance at every switch, which shall safely and securely lock the switch-rails in place, both when they are in line with the main track and in line with a siding or turn-out; said locking device being connected to the switch levers and dependent upon the action of the keys or shoes upon the train for its operation, so that trains passing in either direction over the switch will, at the pleasure of the engineer or a brakeman, as the case may be, effect the desired change of the switch-rails with certainty; and all liability of accident from carelessness or absence of "station switchmen" will be avoided; and whilst this is the case the operation of the switch by hand can be effected with the same facility as with the old form of switch, as will be hereinafter described.

The following description will enable others skilled in the art to understand the construction and operation of my invention, and the mode which I prefer to adopt in carrying it into effect.

In the accompanying drawings A A represent the rails of the main track; B B the rails of the siding or turn-out, and C C the intermediate movable switch-rails, which may be arranged and supported upon cross-ties and sleepers in the usual well-known manner.



On the outside of the switch-rails C C, and secured thereto by means of wrought-metal plates, or in any other suitable manner, are the horizontal levers or arms D D, by means of which the said switch-rails are moved. These levers D D extend some distance beyond the ends of their switch-rails on both sides of the main-track and siding-rails, so that they will be acted upon by a train approaching the switch-rails from either direction, and the latter adjusted properly before running upon them, as will be hereinafter further explained. The ends of the levers D D terminate in outwardly curved portions, *a a a*, which are also constructed with their upper surfaces inclined toward the switch-rails C C, and elevated a short distance above the plane of the rail surfaces, as shown in fig. 4, sheet 2. The extreme ends of these curved enlargements, *a*, are reduced to a proper size to receive and form bearings for segment barrel-levers, which operate latches or locking-bolts, as will be hereinafter explained. These levers D D, as well as the switch-rails C C, are connected together and strengthened by means of transverse girders or tie-rods *b*, which, by means of gripping-jaws upon them, hold the said levers and switch-rails firmly together, and prevent liability of lateral spreading or contraction. I afford additional strength and rigidity to said movable parts by means of the intermediate rail sections E E, which are also guard-rails, and which are firmly clamped, bolted, or otherwise secured to them, and extended some distance on each side of the pivoted ends of the switch-rails, so as to slide laterally upon the cross-ties or upon metallic ties bolted thereon, as shown in figs. 1 and 2. The switch-rails C C, and also those parts which I have above described as being attached to them, are pivoted to the cross-tie C' by means of a through-pin, *c*, shown in figs. 1, 2, 3, and 6, which pin passes vertically through a plate, *d*, lying upon said cross-tie, thus forming the axis of motion for the switch-rails and their levers. On both sides of said pivot *c*, and outside of the rails, the plate *d* is again connected to the cross-tie C' by means of vertical pins *c' c'*, which pass through oblong slots through said plate and also through the cross-tie. These slots through plate *d* are curved concentric to the axis of the centre-pin *c*, so as to allow the free ends of the switch-rails to vibrate from the ends of the rail sections A A of the main track to the ends of the rail sections of the siding, as shown in figs. 1 and 2. The ends of the siding and main-track rails are formed so as to make close joints with the ends of the switch-rails when the latter are adjusted into line therewith. The plate *d* may be secured in any suitable manner to the movable sections, so as to move with them and afford additional strength at the joints. A single central pivot, *c*, for the switch-rail and its levers might be found to answer the purpose, but for greater security and substantialness I prefer to employ the auxiliary attachments at the outer ends of the plate *d*, which would prevent accident should the centre-pin break.

It will be seen that the switch-rails, and also their levers D D and strengthening rails E E, all vibrate about the centre-pin *c*, and all move at one and the same time when acted upon by a lateral thrust or pressure for adjusting or readjusting the switch.

Having thus described the manner of constructing and laying down the rails at the switch, I will now describe the method of adjusting the switch-rails to the positions required by a train approaching the switch in either direction.

In figs. 7 and 8, G represents a frame or support, which is secured in a vertical plane to the side and front end of a locomotive frame, so as to project forward thereof. To this frame a slide, G<sup>1</sup>, is applied, which is held firmly in place by means of guides and straps *e e*, or by other suitable devices, which will prevent its lateral displacement. Upon the lower end of this slide G<sup>1</sup> a shoe, G<sup>2</sup>, is suitably applied, consisting of an outer convex plate, *e'*, which is hinged at its front end, as shown in fig. 9, so that by means of adjustable expansion screw-bolts *f f* the shoe can be increased or diminished in width to compensate for the wearing of its outer surface, and also to adapt it to operate with precision. In horizontal section this shoe G<sup>2</sup> is of a tapering or wedge shape, its wings diverging from its front hinged edge, and curved on their lower edges so as to have the shoe turn up in front and rear. To this shoe a small wheel or anti-friction roller, *f'*, is applied with its axis transversely to the line of rails, and its periphery, at the lowest point, projecting slightly below the base of the shoe, as shown in figs. 7 and 8. Other means than those shown may be adopted for expanding and contracting the shoe G<sup>2</sup>. This shoe I have denominated a "key," for the reason that it not only serves for giving the required lateral movements to the switch-rails, but it also serves to unlock and lock these rails, as will be hereinafter explained. The slide G<sup>1</sup>, with its key, G<sup>2</sup>, has a free vertical play, and is raised or lowered by a lever or chain or other suitable means applied to its upper end, and placed in a convenient position to the engineer. It is to be lowered upon approaching a switch, so as to rest upon the rails or lie between the rails and levers in front of the foremost truck-wheels. Two of such contrivances are to be employed upon a locomotive, one on each side thereof, so that the engineer can bring the right or left-hand key into action, as circumstances may require. The rear end of the rear car may also have the keys applied to it, if it is desired to change a switch when the train is moving backward. The key-carrying frames upon the cars or coaches may be made removable, so that they can be readily taken from one car or coach and applied to another. The shoes or keys upon the cars are to be operated by a brakeman, or other person appointed for the purpose, by means of levers or other contrivances similar to those at present in use for operating brakes. The keys are located upon a car or locomotive in such relation to the outwardly curved ends *a* of the switch-levers D D, that the keys will, when depressed, press upon the inner faces of said curved ends and move the levers and their switch-rails laterally about the centre pivot *c*. The keys G<sup>2</sup> being of a wedge or tapering form, and the ends of the levers D being curved outward, there will be no injurious shock or concussion produced by the sudden contact of the keys with the levers if the train is moving at a slow rate of speed. If the engineer should fail to elevate a key immediately after it has acted upon a switch-lever, such key will pass on unobstructedly over the upper surface of the opposite end of such lever, the roller *f'* coming into action in such event so as to roll freely over said elevated surface.

The second part of my invention consists in providing a simple and efficient means whereby the switch-rails



will be automatically locked firmly in place, both when they are in line with the siding or turn-out and when in line with the main-track rails. This object is effected in the following manner: On the termination of each end of each one of the switch-levers D D a segment, H, is pivoted by a vertical pin, the straight edge of which segment is in or nearly in a line at right angles to the line of track, and the curved edge of which is bevelled and fitted under an overhanging portion of the lever D, so as to be held down firmly in place, but allowed to move freely about its axis or pivot. The upper surface of each segment H is flush with the elevated surface of the enlargement *a*, to which it is pivoted, as shown in fig. 4. Each segment lever H is constructed with a quarter barrel, *k*, for taking up its respective chain, J, when acted upon by a key, G<sup>2</sup>, on the passing train, as clearly shown in the drawings, sheet 1. The chain J proceeds forward and passes around a pulley, *i*, at one end of the cross-tie C', thence toward the middle of this cross-tie and around pulley *j*, and thence to an arm or "spanner," K, which is keyed to the middle of a transverse rock-shaft, K'. Rods J' may be used at intermediate points instead of chains, as shown in fig. 3, sheet 1. The segment-levers H, which are nearest the siding or turn-out rails, are connected to the arm or spanner K by means of chains and rods J<sup>2</sup>, the former passing around pulleys *k k*, suitably arranged. Thus it will be seen that by pressing the inner end or long arm of either one of the four segments H toward the switch-rails, such segment will cause the rock-shaft K' to turn about its axis. This rock-shaft is supported in bearings in a suitable manner within a box-frame, L, which is secured down upon the sleepers, as shown in the drawings, and which forms a hollow cross-tie upon which the free ends of the switch-rails have their bearings and lateral sliding vibration. To the rock-shaft K', I suitably secure two locking levers N N, the lower or longer arms of which are inclined and loaded, as shown in the drawings. The upper and shorter arms of levers N play through slots, which are made vertically through the upper plate of the frame L, and form locking abutments for holding the free ends of the switch-rails firmly against lateral thrust and displacement. The locking portions of levers N are arranged in such relation to the ends of the siding or turn-out rails, and the rails of the main track upon the frame L, as to lock the switch-rails when in line with either track. The weights upon the longest arms of the levers N will, by their own gravity when released, effect the locking of the switch-rails when the latter are in proper position to be locked.

I do not confine my invention to the form and particular construction of the locking levers herein shown, as I shall adopt such form in carrying my invention into practice as will be found best adapted to the purpose. The pillow-blocks and journal-boxes for the rock-shaft K' may be constructed in any suitable manner which may be found most convenient, and which will afford the greatest strength and durability, and also facility of access for lubricating and repairing.

It will be seen from the above description of the operation of the shoes or keys G<sup>2</sup> upon the ends of the switch-levers D D, that the vertical ends of said shoes will first act upon the segments H to unlock the switch-rails, after which these rails will be moved laterally in place by the pressure of the outer wings *e'* of the keys upon the inner faces of the levers D. When the keys have released the segment levers H, and the free ends of the switch-rails are moved to their proper places, the weights upon the locking levers N N will fall, thus throwing up the locks, and at the same time taking up the slack in the switch-chains and bringing the segment lever last acted upon by a key into proper position, as shown in sheet 1 of the drawings. If desirable, a spring may be applied in a suitable manner to each segment, H; for the purpose of insuring its return to a proper position after it has been acted upon by a switch-key. I prefer, however, to effect this object solely by the weights upon the locking levers, as springs are liable to injury when exposed to extremes of temperature. Should it be found desirable to pass over the switch without greatly diminishing the speed of the train, this can be done by lengthening the side-switch levers D D from the centre-pin *c*, increasing the weights upon the locking levers N N, and applying to the straight edge of each one of the segment levers H a half-elliptic leaf spring or other suitable spring for modifying the blows of the keys upon the segments and switch levers.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A double-locking automatic railroad switch, which is constructed in the manner and upon the principles substantially as herein set forth.

2. The longitudinal levers D D, arranged on both sides of the track, and extended alongside of the siding or turn-out, said levers being provided with segment levers H, and constructed so as to be acted upon by keys G<sup>2</sup> upon a moving train, and caused to change the switch at the pleasure of the engineer, substantially as described.

3. The expansible keys G<sup>2</sup>, constructed substantially as and for the purposes described.

4. The anti-friction roller *f'* applied to the key G<sup>2</sup>, substantially as and for the purpose described.

5. The combination of segment levers H, the switch levers D D, and the connection of such segment levers with locking devices, so that the switch-rails shall be automatically locked and unlocked, as well as changed from right to left by means substantially as described.

6. The locking levers N N applied to a rock-shaft K', and connected by means of chains and rods with devices applied to the switch-rail levers, substantially as described.

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Witnesses:

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