(No Model.) 3 Sheets—Sheet 1.

J. R. & J. W. JONES.

DISTANT SWITCH SIGNAL WIRE COMPENSATOR.

No. 573,882. Patented Dec. 29, 1896.

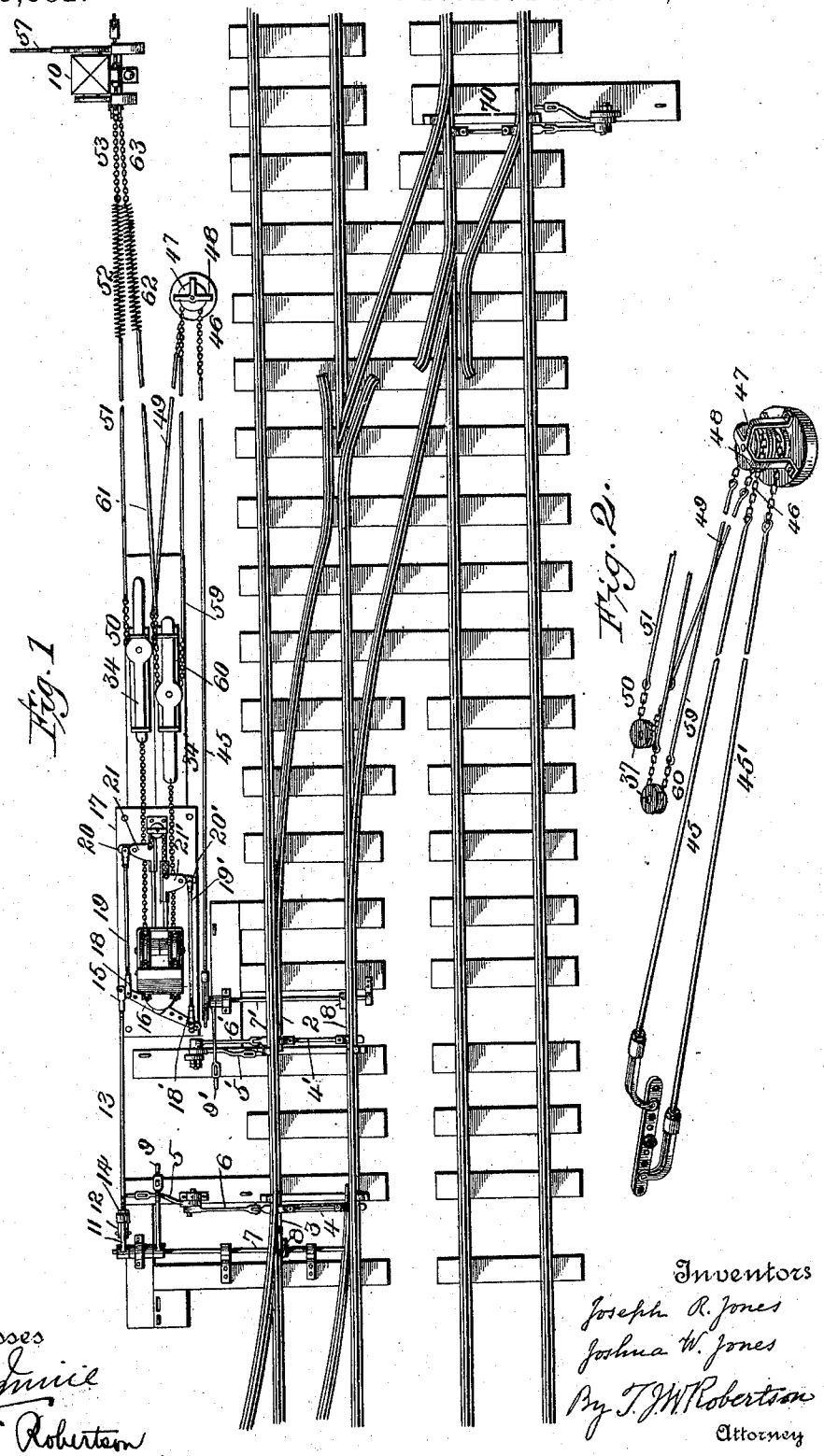

Fig. 1.

Fig. 2.

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Fig. 3.

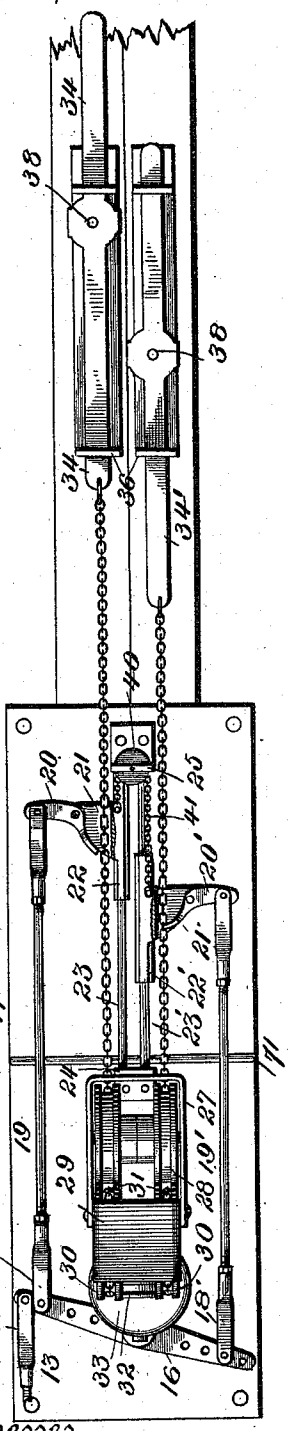
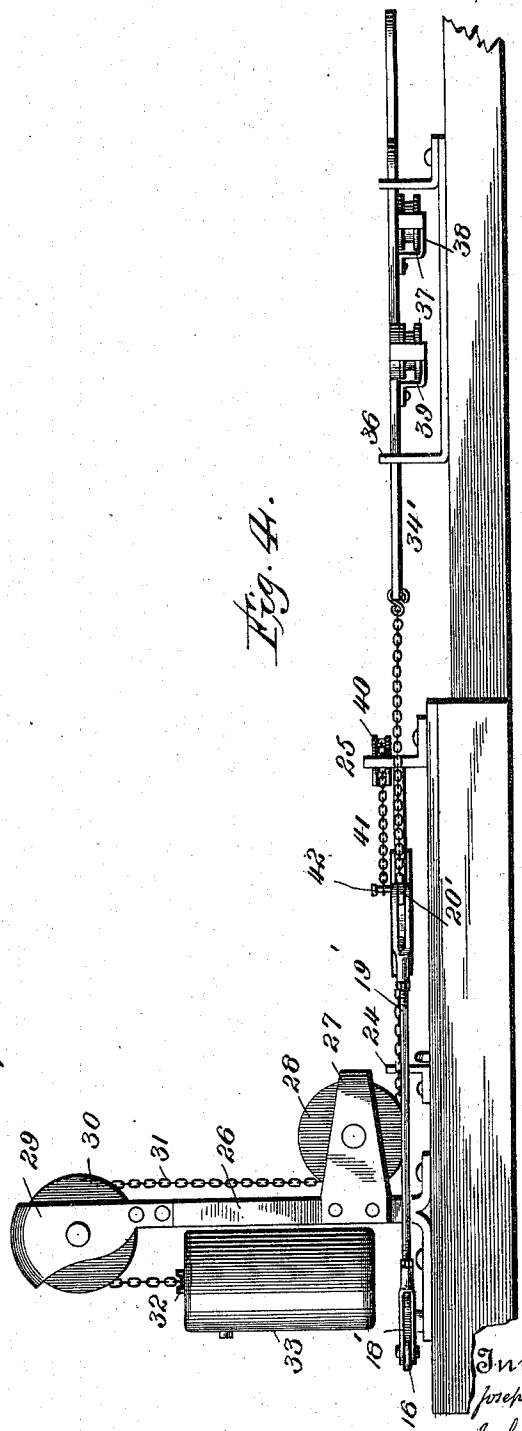


Fig. 4.



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DISTANT SWITCH SIGNAL WIRE COMPENSATOR.

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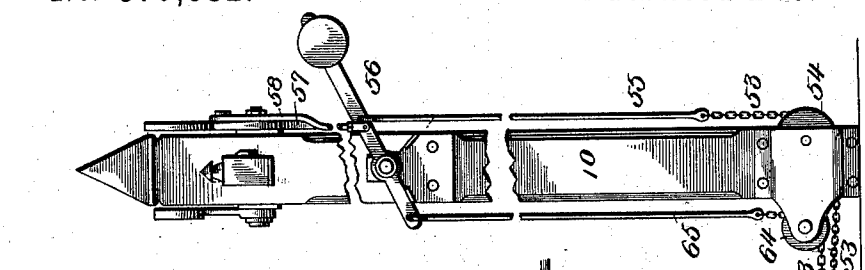

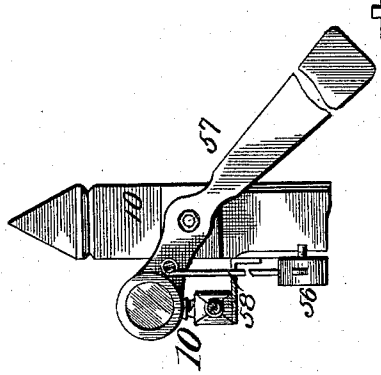

Fig. 10.

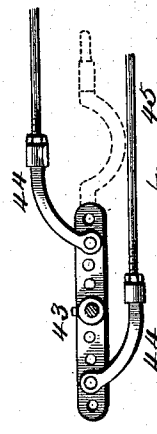

Fig. 9.

Fig. 7.

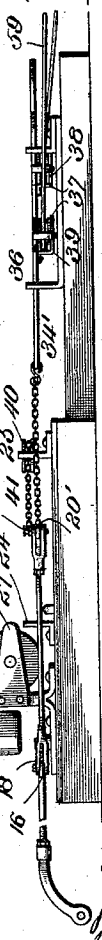

Fig. 5.

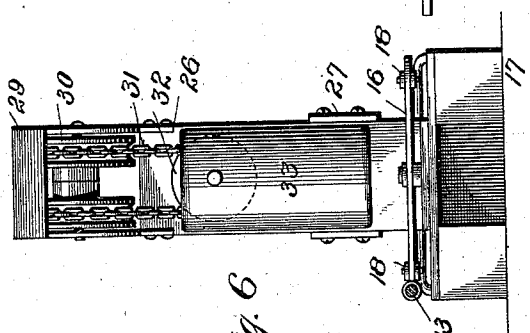

Fig. 6.

Fig. 8.

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UNITED STATES PATENT OFFICE.

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DISTANT-SWITCH SIGNAL-WIRE COMPENSATOR.

SPECIFICATION forming part of Letters Patent No. 573,882, dated December 29, 1896.

Application filed February 29, 1896. Serial No. 581,325. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH R. JONES, of Philadelphia, in the county of Philadelphia, and JOSHUA W. JONES, of Harrisburg, in the county of Dauphin, State of Pennsylvania, citizens of the United States, have invented a certain new and useful Improvement in Distant-Switch Signal-Wire Compensators, of which the following is a specification, reference being had to the accompanying drawings.

This improvement relates to that class of compensators in which a weight and clutch are employed to compensate for the expansion and contraction of the wires, and it is especially applicable to signals and switches to obtain accuracy in throwing signals and the opening, closing, and locking of switches, thereby insuring safety to trains, which with the appliances commonly used is impossible to accomplish without constant adjustment to suit the various states of the weather. As the expansion of wire from the lowest to the highest temperatures to which signal-wires are exposed is about seven inches to a thousand feet, and as some signals are more than a thousand feet from the operator, and as the semaphore-arm only travels about five and a half inches at the point where the wire connects, it will readily be seen how imperfect the working of the present system is. To produce accurate and positive results in moving signals or switches under all conditions of temperature and at any distance from the lever, however remote, by an apparatus which cannot easily get out of order, is the object of this invention; and to these ends it consists in the construction hereinafter more particularly described and then definitely claimed at the end hereof.

In the accompanying drawings, Figure 1 is a plan of part of a railroad-track provided with our improvement. Fig. 2 is a perspective view of part of the compensator connections. Fig. 3 is a plan of the compensator on a larger scale. Fig. 4 is an elevation of the same. Fig. 5 is an elevation of the compensating device and the semaphore with parts broken out to bring the figure within the compass of the sheet. Fig. 6 is an end view of the compensating device. Fig. 7 is a side view of a modification, showing the compensating-weight sunk in the ground. Figs. 8 and 9 are details which will be more fully referred to hereinafter. Fig. 10 is a side view of the top of the semaphore at right angles to that in Fig. 5.

Referring now to the details of the drawings by figures, 1 represents the track-rails running, for example, to the west; 2, switch-rails for the other or second track running east; 3, switch-rails for a siding or third track; 4 4′, the switch-bars connecting the switch-rails; 5 5′, the switch-levers; 6 6′, the connecting-rods between the switch-levers and switch-bars; 7 7′, the locking or detector bars, provided with cams 8 8′ for locking the switch-rails, and levers 9 9′ for operating said locking-bars.

All of the above are of the ordinary style or may be of any approved construction, and hence do not need any detailed description.

At a suitable distance from the operating devices is set a semaphore-post 10, with the ordinary attachments in common use on semaphores, and which will be more fully described hereinafter.

On the locking-bar 7 is mounted a single arm 11, to which is pivoted the curved slotted jaw 12, into which is screwed the rod 13, having jam-nut 14, and whose other end is screwed into another jaw 15, pivotally connected to a lever 16, (see Figs. 1 and 3, particularly the latter,) fulcrumed on the base-plate 17. The opposite ends of this lever are pivotally connected to slotted jaws 18 18′ on rods 19 19′, having at their other ends similar slotted jaws pivotally connected to the dogs 20 20′, (see detail Fig. 8,) pivoted in the jaws 21 21′ of the slides 22 22′, running on guide-rods 23 23′, supported at each end by angle-plates 24 and 25, which are bolted to the base-plate. The rods 19 19′ are provided with right and left threads, and the jaws 18 are threaded to correspond, so that the acting length of the rods may be adjusted at pleasure.

Bolted to the base-plate is a standard 26, carrying the bracket 27, in which are mounted the pulleys 28, and on it is bolted the bearing 29 for the pulleys 30. Under and over

these pulleys 28 and 30 passes a chain 31 to a pulley 32, set in a recess in a weight 33. The opposite ends of this chain, after passing through the jaws 21, are connected to slides 34 34′, running in suitable guides 36. Each of these slides is supplied with a pulley 37, (see Fig. 4,) mounted on an axle 38, supported by said slide and a bracket 39, connected thereto.

On the top of the plate 25 is mounted a pulley 40, around which passes a short chain 41, whose opposite ends are connected to the slides 22 by small bolts 42, said chain being so arranged that as one slide 22 moves away from the plate 25 the other slide moves in the opposite direction until it is stopped by coming in contact with the plate 25, and as the rod connected to the dog still keeps up its motion for a short distance the point of the dog moves away from the chain, thus releasing the same, as shown in Fig. 3.

On the locking-bar 7′ nearest the compensating devices is set a double-armed lever 43, (shown best in Fig. 9,) to which are pivoted the curved slotted connections 44, attached to the wires 45 45′, both of which are connected to chains 46, which, after passing around pulleys 47, set in suitable bearings 48, are connected to other wires 49, which in turn are connected to other chains, the under one of which, 50, after passing around the pulley 37 on the slide 34, is connected to another wire 51, attached to one end of a spring 52, (see Fig. 1,) whose other end is connected to a chain 53, passing under and around a pulley 54 (see Fig. 5) at the base of the semaphore-post, and connects with a wire or rod 55, attached to and operating the weighted lever 56, which raises the semaphore-blade 57 by means of the wire 58. The wire 45′ is connected by one of the chains 46 to the wire 59 and passes over the wire 49 and connects with a chain 60, passing around a pulley 37 on the slide 34′, connected with a wire 61, attached to one end of a spring 62, whose other end is attached to a chain 63, passing under and around a pulley 64 (see Fig. 5) at the base of the semaphore-post, and is connected to a wire 65, attached to the short arm of the weighted lever 56, operating the blade 57.

The operation is as follows: Supposing both of the switches to be closed, leaving the track clear, and it is desired to open the switch to a siding or third track, the lever 9 is thrown over, thereby operating the arm 11, which operates the rod 13 and the lever 16, which in turn operates the rods 19 19′, connected to the dogs 20 20′, and as these are connected to the slides 22 22′ the latter, with the dogs, are moved in opposite directions. As the dog 20 is pulled by the rod 19 it closes upon the chain and thus clamps it fast to the slide, so that as the latter moves it carries with it the slide 34 and its pulley 37, around which is the chain 50, and thus the slide 34 as it moves pulls down the weighted lever 56, thereby throwing the blade of the semaphore to the "danger" position. At the time the lever 9 is thrown over, the cam 8 (which normally locks the switch in the closed position) is also thrown over, thus leaving the switch free to move, and it can now be thrown open by reversing the position of its lever 5, and this when done causes the switch-rail to move over the cam 8, thus preventing any movement of the lever 9 and locking the semaphore-blade in the "danger" position. If now it is desired to also open the other switch to transfer a train from the west-bound track to the east-bound one, the lever 7′ is thrown over and it operates the locking-bar which moves the cam 8′, thus unlocking the switch-rail 3, which can now be operated by throwing the switch-lever 5′. The blade having been set at the "danger" position before the opening of the switch to the siding, and said switch being still open, the blade is still at the "danger" position, and provision has therefore to be made so that while the moving of the lever 7′ usually operates the blade it will now have no effect on it. For this purpose we use the springs 52 62, which are so graduated in strength that they are of sufficient power to operate the semaphore-blade without expanding, but when said blade is already set and the lever 7′ is to be moved to unlock the switch to the east-bound track without affecting the semaphore-blade the springs yield sufficiently to allow of the movement of said lever.

When the switches and semaphore have been operated as above described, both the switches are open and the blade is at the "danger" position, but either of the switches can be closed without affecting the position of the blade, which will invariably remain at the "danger" position until both switches are closed.

Should it be desired to open the switch to the east-bound track alone when the siding-switch is closed and the semaphore-blade down, the switch is first unlocked by throwing over the lever 9′, which carries with it the two-armed lever 43, thus operating the wires 45 49, and through them the semaphore-blade, setting the same at the "danger" position, after which the switch 2, being now unlocked, may be operated by throwing the lever 5′ in the usual manner.

Referring now more particularly to the compensating devices, it will be seen that as one or the other of the dogs is always out of contact with the chain when the apparatus is at rest, leaving the wire free to expand or contract; any expansion or contraction of the wires will thus always be kept normal by said weight.

We have shown at 70 in Fig. 1 a switch for transferring trains from the second or east-bound track to the west-bound track, but as there is no claim for anything in said switch as being new it is unnecessary to describe it. Of course such a switch should be also provided with our improvement, but it is un-

necessary to describe or show the same, as it would be merely a duplication of what has already been described.

In some places it will be advisable to sink the compensating-weight below the surface. Such an arrangement is shown in Fig. 7, in which 71 represents a cylinder partly sunk in the ground and having an enlarged part 72, resting on the base-plate 17, which has an aperture to receive the cylinder. Pulleys 30′ are mounted on a shaft 72, set in the cylinder, and the chain 31 passes over the pulleys 30′ to the compensating-weight 33, hung by said chain in the cylinder. Over the top of the cylinder is set a cap 73, by which the weight and pulleys are covered.

It will be clear from the above description that our improvement can be used to as great advantage where there is either one or two switches, and when there are two they can be moved in conjunction with each other or singly, as the case may require. For instance, side-tracking or shunting cars to the siding from the main track will only require one switch. So, also, in the case of crossing over one main track to the other; but in case of crossing over and going onto a siding, or the reverse, two switches are necessary, which it can be seen can be connected to a single semaphore.

It will also be seen that with our improvement there is no danger from open switches if the engineer pays proper attention to the signals, as it is impossible for either switch to be open without the blade being at the "danger" position, for even if the wires from any cause were to break the weighted lever would set the blade at the "danger" position.

We regard as very important the interposition in the wires leading to the semaphore of springs made of sufficient strength to operate the blades, and yet yielding enough to allow of the movement of the locking device of a second switch when another switch has been previously opened and the blade consequently already set at the "danger" position.

We have shown the arms 11 and the arms of the levers 16 and 43 as provided with a series of holes, so that the rods, &c., connected thereto may have their motion changed by shifting the pivot-pins from hole to hole, as desired, to produce the required effect on the blade.

On the base-plate 17 is shown a bar 71, which will act as a support for the rods 19 19′ and the chain 31 should they sag, but we do not regard this as essential to our invention.

What we claim as new is—

1. The combination of a signal and two switches, each switch having a shaft carrying locking-cams and means for operating the signal, with mechanism for operating the switch after the locking-shaft has been operated, intermediate connections between the switch mechanism and the signal arranged to set said signal at the "danger" position when either switch is unlocked, and clutches to take up the slack in said connections substantially as described.

2. The combination of a signal and two switches, each switch having a shaft carrying locking-cams and means for operating the signal, with mechanism for operating the switch after the locking-shaft has been operated, intermediate connections between said mechanism and the signal constructed to hold said signal at the "danger" position until both switches are closed, and clutches to take up the slack in said connections substantially as described.

3. The combination with two switches and their locking and operating mechanism, of a signal, wires for operating said signal connected with said mechanism, and a spring forming part of the connection between the signal and locking and operating mechanism, to allow of the signal remaining at the "danger" position after one of the switches has been closed, substantially as described.

4. The combination with two switches and the locking mechanism thereof and a signal common to both, of the slides 34, 34′ having pulleys 37, the pulleys 47, connections between the signal and the locking mechanism passing around said pulleys 37 and 47, and a compensating device connected with said slides to allow for contraction or to take up the slack of the wires in expansion, substantially as described.

5. The combination with a switch and the locking mechanism thereof, and a signal therefor, of the slides 34, 34′ having pulleys 37, the pulleys 47, connections between the signal and the locking mechanism passing around said pulleys 37 and 47, and a compensating device connected with said slides to allow for contraction or to take up the slack of the wires in expansion, substantially as described.

6. The combination in a compensating device, of the weight 33, the chain 31 passing around suitable guide-pulleys through the jaws 21, carrying the dogs 20 and connected with the slides 34, 34′ having pulleys for the signal-operating wires, the weight 33 suspended from said chain, and means substantially as described for operating said dogs and jaws, as set forth.

7. The combination in a compensator, of the lever 16, the rods 19, 19′ connected to said lever, the dogs 20, 20′ connected to said rods, the horizontally-moving slides 22, 22′ working on suitable guides, and having the jaws 21, 21′ carrying the dogs 20, 20′, the chain 41 passing around pulley 40, and having its opposite ends connected to the slides 22, 22′, the chain 31 having its end connected through intervening devices with the wires for operating the signal, and the weight 33 suspended by said chain 31, substantially as described.

8. In a compensator, the combination with slides carrying the clutching-dogs, means for operating said dogs, a compensating weight suspended on a chain connected with the signal-operating wires and acted on by the dogs,

of a chain having its opposite ends connected to the slides, and a pulley around which said chain passes, substantially as described.

9. In a switch-wire compensator, the combination of the wires or rods thereof, with a lever as 43 having a series of holes to allow of change of throw, and a curved slotted connection 44 between said wires and lever pivotally connected to the lever, substantially as described and shown.

In testimony whereof we affix our signatures in the presence of two witnesses.

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JOSHUA W. JONES.

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