

(No Model.)

C. H. JACKSON.

RAILWAY SWITCH AND SIGNAL LOCKING APPARATUS.

No. 255,998.

Patented Apr. 4, 1882.

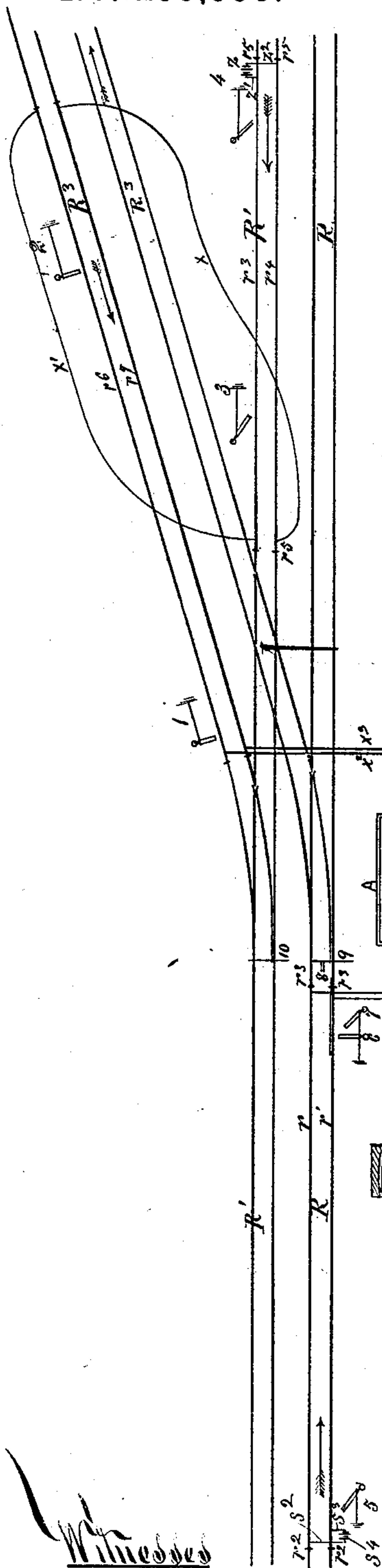


Fig. 1.

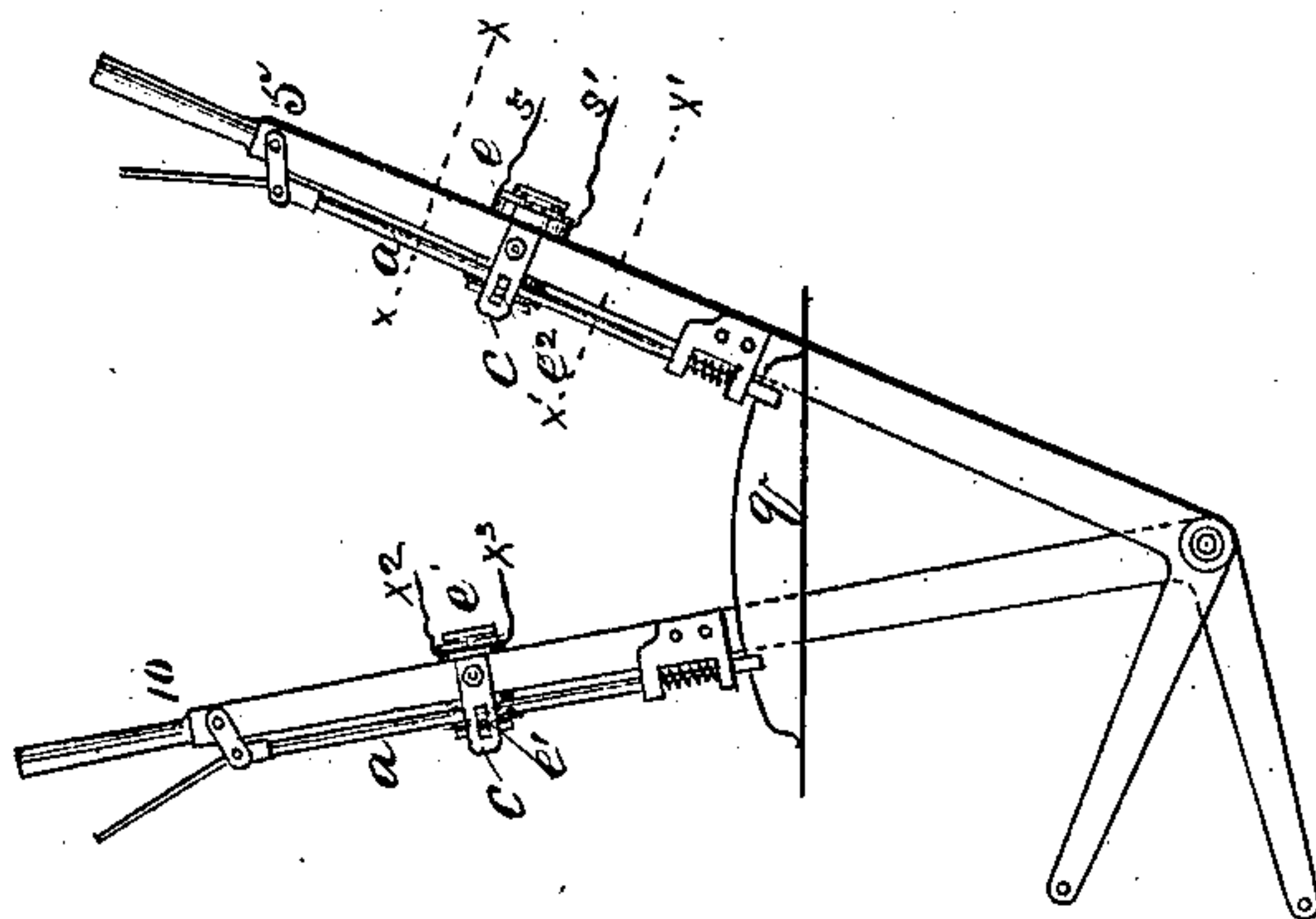


Fig. 2.

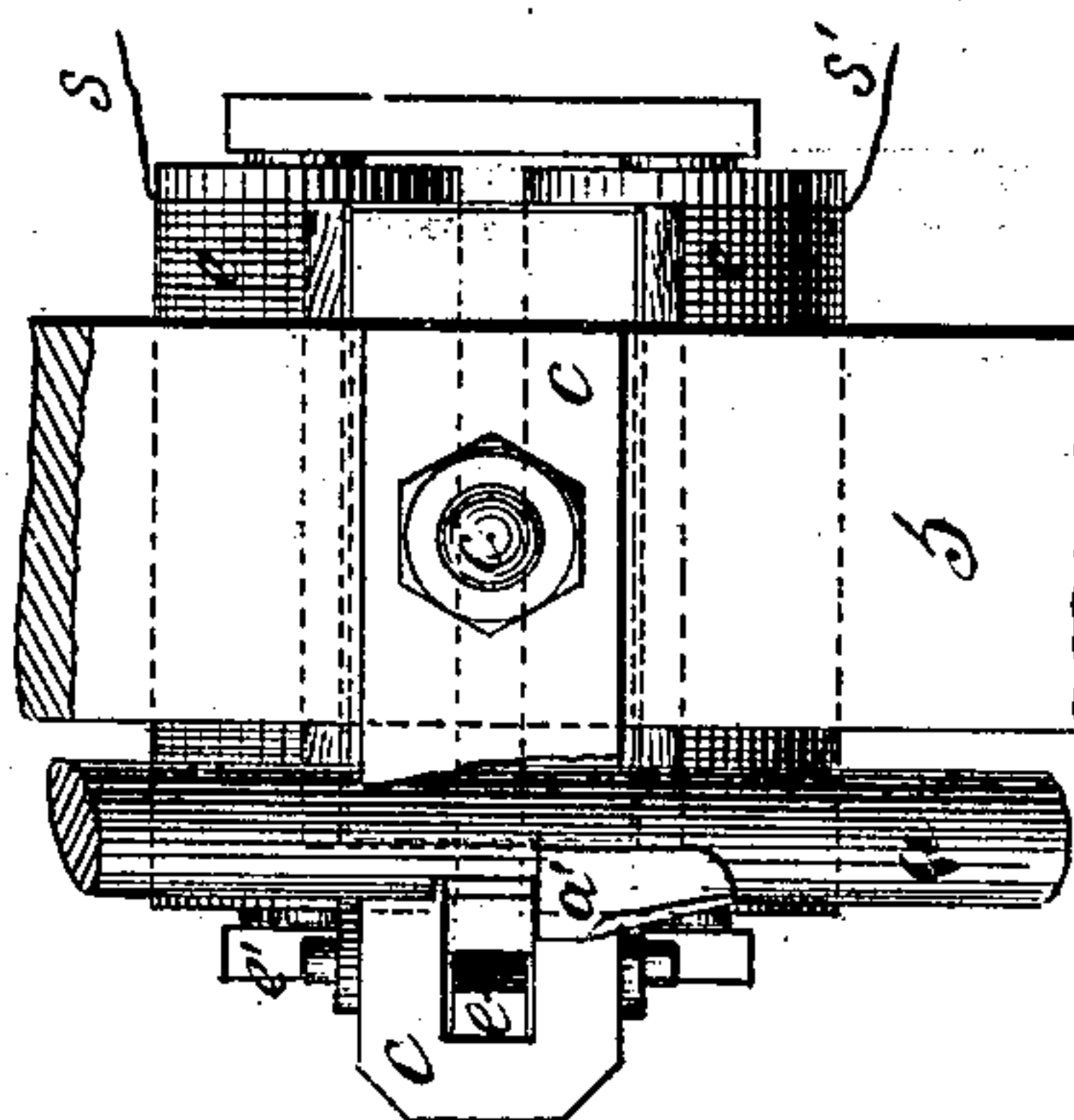


Fig. 2.

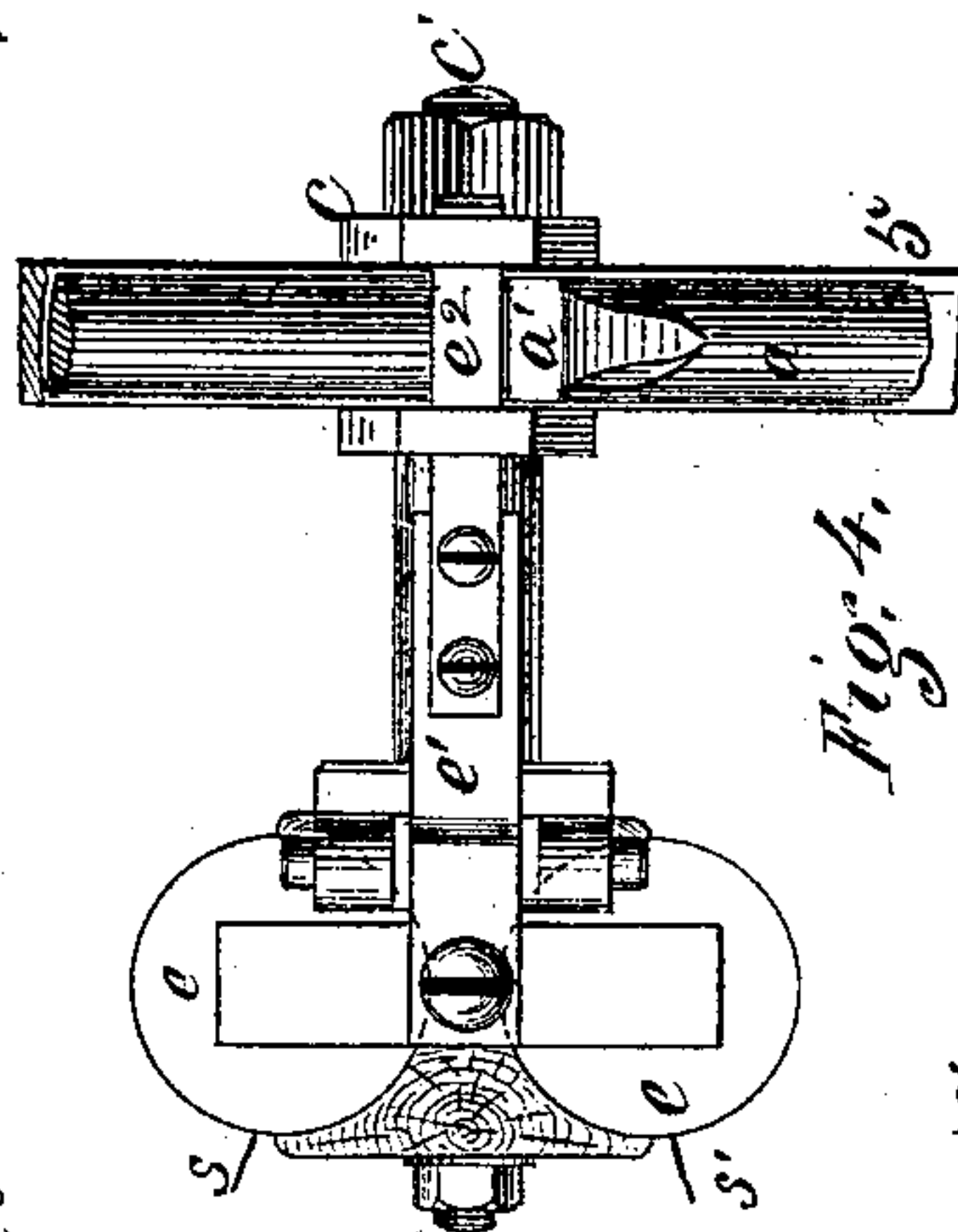


Fig. 4.

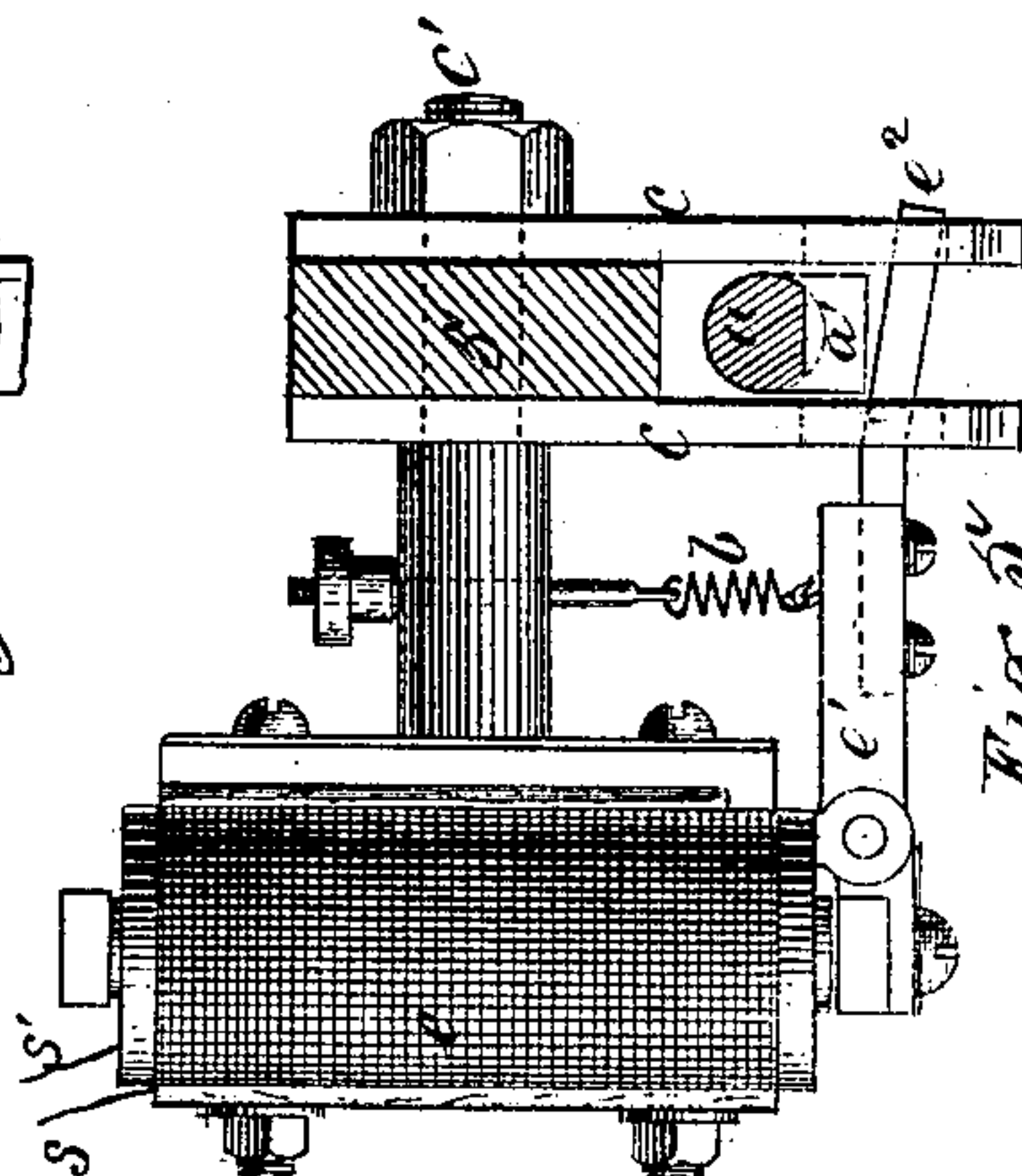


Fig. 2.

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RAILWAY SWITCH AND SIGNAL LOCKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 255,998, dated April 4, 1882.

Application filed January 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, CALEB H. JACKSON, of Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Railway Switch and Signal Locking Apparatus; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—
like letters indicating like parts—

Figure 1 is a diagram or plan view, illustrating the manner of applying my present invention to a double-track junction. Fig. 2 is a detached view in side elevation of two electrically-locked switch and signal actuating levers. Fig. 3 is a detached view, to an enlarged scale, of that part of the apparatus situated between the lines xx and $x'x'$ of Fig. 2, the left-hand end of the front clip-plate being broken away. Fig. 4 is an edge view of Fig. 3, looking from the left; and Fig. 5 is a top end view of Fig. 3.

For convenience of description I have illustrated my present invention in connection with a Saxby & Farmer interlocking apparatus and a Robinson electric track-circuit. Thus in Fig. 1 a system of Saxby & Farmer interlocking switch and signal levers such as represented in Fig. 2 is arranged in a cabin at A in convenient proximity to the system of switches and signals to be operated, which in this case are applied to or along a double track, RR' , and branch tracks or sidings $R^2 R^3$. Suitable connections (not shown in the drawings) are to be provided for actuating home signal 1 of the branch lines by means of lever 1, distant signal 2 by lever 2, home and distant signals 3 and 4 of main line to the right of the junction by levers 3 and 4, home and distant signals 7 and 5 of main line to left of junction by levers 7 and 5, and starting-signal 6 by lever 6; also, the switches 9 and 10 may in like manner be operated by levers 9 and 10, and a switch-locking bolt and safety-rail, 8, (see patent 131,788,) may be actuated by lever 8. Preferably the apparatus thus referred to is to be provided with the Saxby & Farmer or other suitable interlocking devices, so that the setting of the distant or other predetermined signal shall lock the switches and other signals (so far as may be necessary or desirable) in the proper positions; and in illustrating my present inven-

tion I will assume the presence of a Saxby & Farmer interlocking-machine, or other machine of substantially like function, so organized that after switch 9 is properly set or adjusted and locked by a suitable locking-bolt at 8, (which is to be done by properly moving levers 9 and 8,) then the home signal 7 may be set to "safety" by the lever 7, which latter will at the same time work interlocking gear to lock the bolt or switch, or both. Then the lever 5 is shifted to set the distant signal at "safety," and in doing so it locks the lever 7 of home signal 7; but in such a system thus organized the possibility still remains that after an incoming train has passed the distant signal, and has not reached the home signal, or the station or switch or other point to be protected, the operator may, through carelessness or otherwise, reverse the distant signal so passed by and unlock and reverse his home signal or set the signal 7 to "danger," and having thus unlocked his switch-shifting apparatus may reverse his switch directly in the face of the approaching train, and at a time too late to prevent danger of disaster.

In order to obviate this danger I have combined the Robinson closed track-circuit (see Reissue No. 5,958) with a signal-shifting lever in such manner that the short-circuiting of the track-circuit by an approaching train will drop or operate a detent, so as to cause it to engage in some way the signal-shifting lever, and thereby render it impossible, while the train is approaching, to change the home signal or other apparatus (if any) locked thereby. Such construction of apparatus I have still further improved by so organizing it that the catch-rod ordinarily employed on such apparatus, or on switch or locking-bolt levers, shall be thus locked, and as the catch-rod is often employed to effect preliminary locking or interlocking, or to effect some other desirable function in the working of signals or switches, I thus effectually prevent any and all changes in the setting or adjustment or locking or interlocking of signals or switches in the apparatus, which then should be set and locked after the train has passed beyond the control of the distant signal and before it has passed the point to be protected.

In describing various applications of my invention I will first illustrate its use with the distant-signal lever 5, for so long as this lever

is locked it will be impossible to change the setting of the home signal, or of any other appliances locked directly or indirectly thereby.

The lever 5, Figs 2 to 5, is furnished with the catch-rod a , which, in the Saxby & Farmer system, is employed to hold the levers in position when set, as well to effect what is commonly known as "preliminary interlocking." By means of any suitable clip, c , and bolt c' , or other fastening device, I secure to the lever an electro-magnet, e , and prolong the tail end e^2 of its armature e' , so that such tail-piece, passing through holes in the clip-plates c , may come just outside the catch-rod a and have a short range of motion to and from such catch-rod. A shoulder or stop, a' , is made on the catch-rod a in such position that when the catch-rod a is down, with its end in a notch of the quadrant q , the tail piece e^2 of the armature may, under the action of a spring, b , swing in just above such stop a' . From Fig. 5 it will now be seen that when the electro-magnet is excited or magnetized the armature will be drawn to its poles, and the tail-piece e^2 will be clear of the stop a' , and also that when the electro-magnet is demagnetized the retractile spring b will cause the tail-piece e^2 to swing in above the stop a' , and so by locking the catch-rod a to lock the lever 5, and so long as the devices so remain to prevent all possibility of unlocking and reversing the home signal or switch or otherwise interfering with or changing adjustments already made.

In order to cause the electro-magnet and spring to operate in this way, so as to secure the result above referred to, I connect the poles of the magnet by wires s s' with the opposite lines of track-rails, r r' , and by the usual electric connections from rail to rail extend the circuit so formed to any desired distance, but ordinarily to a point at or beyond the distant or other predetermined signal, 5, and there complete the circuit by the usual wire-connections, s^2 s^3 , to a battery, s^4 . This gives me what I have above spoken of as the Robinson closed track-circuit, suitable means of insulation having been inserted at r^2 r^3 , &c. It will now be seen that so long as there is no train on the section of track thus insulated and electrically connected into a closed circuit the electro-magnet e will be excited, so as by depressing its armature to swing the tail-piece e^2 clear of the stop a' , so that the operator may adjust his switches and signals as occasion may require; but having set his switches for the reception of a train approaching on track R from the left, and having locked his switch by lever 8 and shifted signals 7 and 5 to "safety," he loses all control of the switch as soon as the train or any part of it enters on the track-circuit described, because the wheels and axle, connecting electrically the opposite lines of rails, r r' , make a short circuit and cut out the electro-magnet e from battery action. Hence the magnet, being demagnetized, releases its armature and the spring b draws the tail-piece e^2 over the stop

a' and the lever 5 is locked, and cannot be unlocked by any normal action of the apparatus, or any part thereof, until the train shall have passed entirely off the insulated track-section. Hence after the train has passed the distant signal 5, so as to be no longer under its control, the home signal is automatically locked thereby, as well as the locking bolt and switch, so as to prevent the possibility of changing the home signal or the switch from the proper position which it receives preparatory to the reception of the train, as supposed; and such locking effect is continued as long as may be necessary, according to the length of the insulated track-section, and preferably till the train has come to or passed that point at which its presence renders the movement of the switch otherwise impossible or undesirable.

I have also illustrated in the drawings the same improvement as applied to switch-lever 10, the switch of which is not furnished with the locking-bolt; and in this use of it I have illustrated an arrangement of track-circuits, such that a train approaching from the right on either R' or R^3 will lock the catch-rod of the switch-lever 10 in the manner described. The devices on the switch-lever are the same as already described and operate in the same way. The rail track-circuit formed by the rails r^3 r^4 is insulated at its ends, as at r^5 , from a point at near or back of the distant signal 4 of that track, and a like track-circuit, r^6 r^7 , is made on the branch R^3 by like means. The rails r^3 and r^4 are placed in electrical connection by wires x x' with the rails r^6 r^7 , respectively, the ends of the former remote from the battery z being connected with the ends of the latter remote from the electro-magnet on the switch-lever, and the opposite ends of the latter being connected by wires x^2 x^3 with the opposite poles of the electro-magnet e on lever 10. The battery z is also connected with the rails r^3 r^4 by wires z' z^2 . It will now be seen that when an approaching train enters either section r^3 r^4 or r^6 r^7 it makes a short circuit, so as to cut off the electro-magnet e of the lever 10 from the action of the battery z , with the result of locking the catch-lever a of lever 10 in the manner and with the result already described with reference to lever 5. Hence here, as before, the switch 10 cannot be shifted after the train shall have passed the distant signal 4 or 2, as the case may be.

Railroad men sometimes prefer that the distant signal (say 5, for illustration) should, when at "danger," be simply cautionary to an incoming train, so that the train may proceed with caution, but be fully prepared to stop in case the home signal 7 is found to be at "danger." In such use the wires s s' may be connected with the electro-magnet on lever 7, as indicated by dotted lines, so that if a train passes a distant signal at "danger" (under the rules supposed) the signalman will have his signals and switches locked, so as to compel the train to come to a full stop before the

switch is reached; or, still better, the wires $s s'$ may be connected with the electro-magnets of both levers 5 and 7, so that in the case supposed both signals 5 and 7 will be locked by the action of the incoming train, and its rear will also be protected as against a following train.

If the locking of the signals 7 and 5 be deemed unimportant, provided the switch 9 is locked, the wires $s s'$, Fig. 1, instead of going to an electro-magnet on the signal-lever 5 or 7, may make like connection with a like magnet on the switch-lever 9, or, better still, on the locking-bolt lever 8, if such be used, so as to prevent effectually the shifting of the switch while the train or any part thereof occupies any part of the track-circuit. In fact, the apparatus described for locking the catch-rod may be applied on electric circuits generally; and as I believe that I am the first to lock or unlock by electrical action the catch-rod of switch or signal or locking-bolt levers, I claim the combination of devices which do that work, without limitation as to whether the circuit is formed by track-rails wholly or in part, or by wires wholly or in part, or as to how or by what means the circuit is closed or broken, or whether the locking is effected by the making or breaking of the circuit.

The skilled constructor will have no difficulty in so making the connections that the locking described may be effected by the closing of a circuit, when so desired.

I also believe that I am the first to combine a closed track-circuit with the signal-moving lever of an interlocking-machine by an interposed electrically-actuated lock in such manner as that after a train has entered the sec-

tion the function or functions above described as appertaining to such construction can be attained.

I claim herein as my invention—

1. The combination of an electro-magnet and catch-rod of a railway switch, signal, or lock-bolt lever with reference to the locking and unlocking of the latter by the former, substantially as set forth.

2. The combination of a track-circuit, a switch, signal, or bolt moving lever, a catch-rod, and an electro-magnet arranged to lock and unlock the catch-rod, substantially as set forth.

3. In combination with the signal-moving lever of an interlocking-machine, a normally-closed track-circuit and an interposed electrically-actuated lock suitably arranged for the locking of the lever on the short-circuiting of the track-circuit, substantially as set forth.

4. In combination with a switch-shifting lever, 10, an electro-magnet and lock, and a combined track and wire circuit, $R' R^3 x x'$, which shall include sections of two tracks, substantially as set forth.

5. In combination with a closed track-circuit, a home and distant signal, the levers for operating them, and an electrically-actuated lock on each lever, when the electro-magnets of both locks are actuated at the same time by the same battery, substantially as set forth.

In testimony whereof I have hereunto set my hand.

CALEB H. JACKSON.

Witnesses:

R. H. WHITTLESEY,
GEORGE H. CHRISTY.