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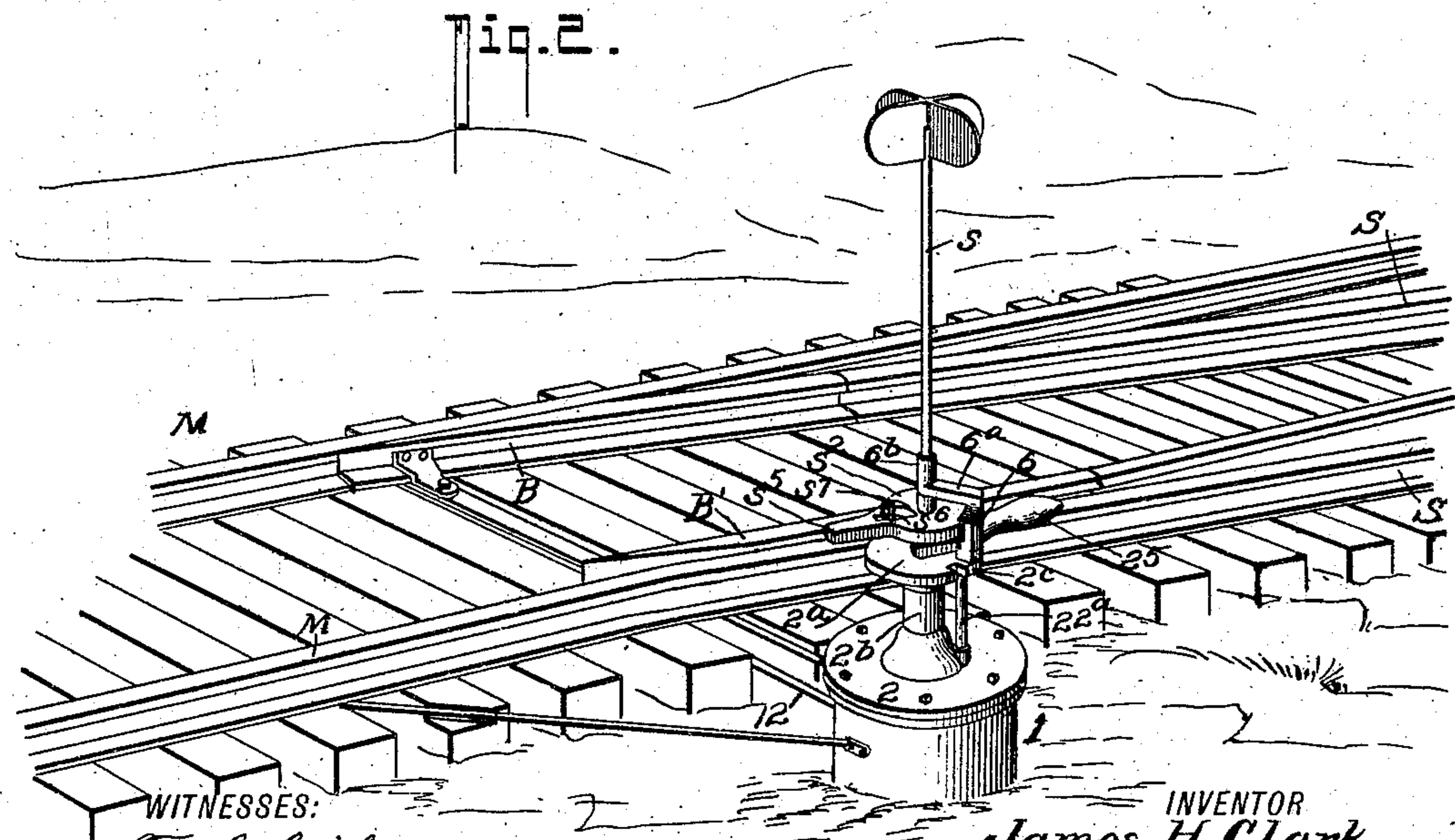
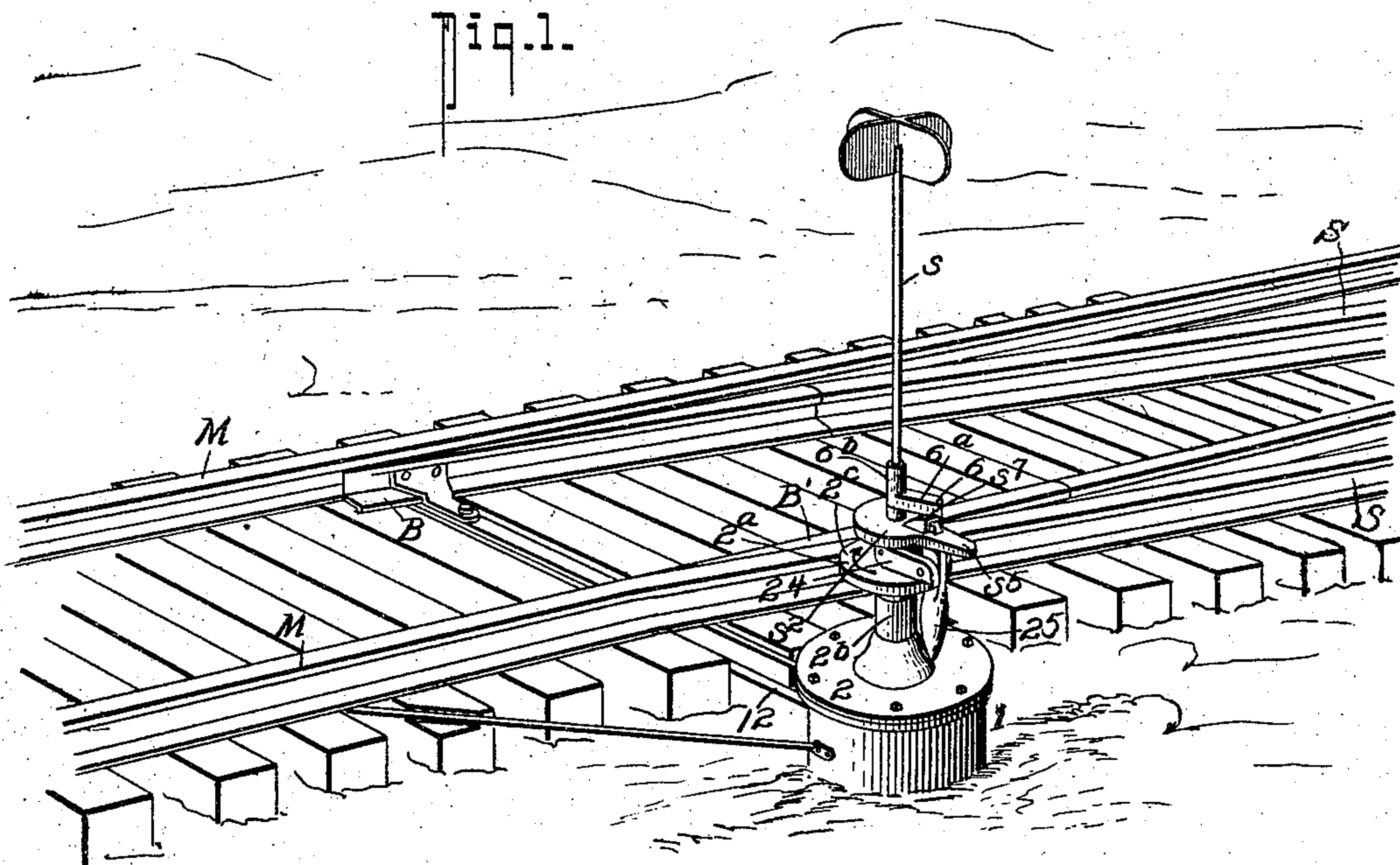
PATENTED MAR. 21, 1905.

J. H. CLARK.

RAILWAY SWITCH SETTING AND LOCKING MECHANISM

APPLICATION FILED MAY 18, 1904.

3 SHEETS—SHEET 1.



WITNESSES:

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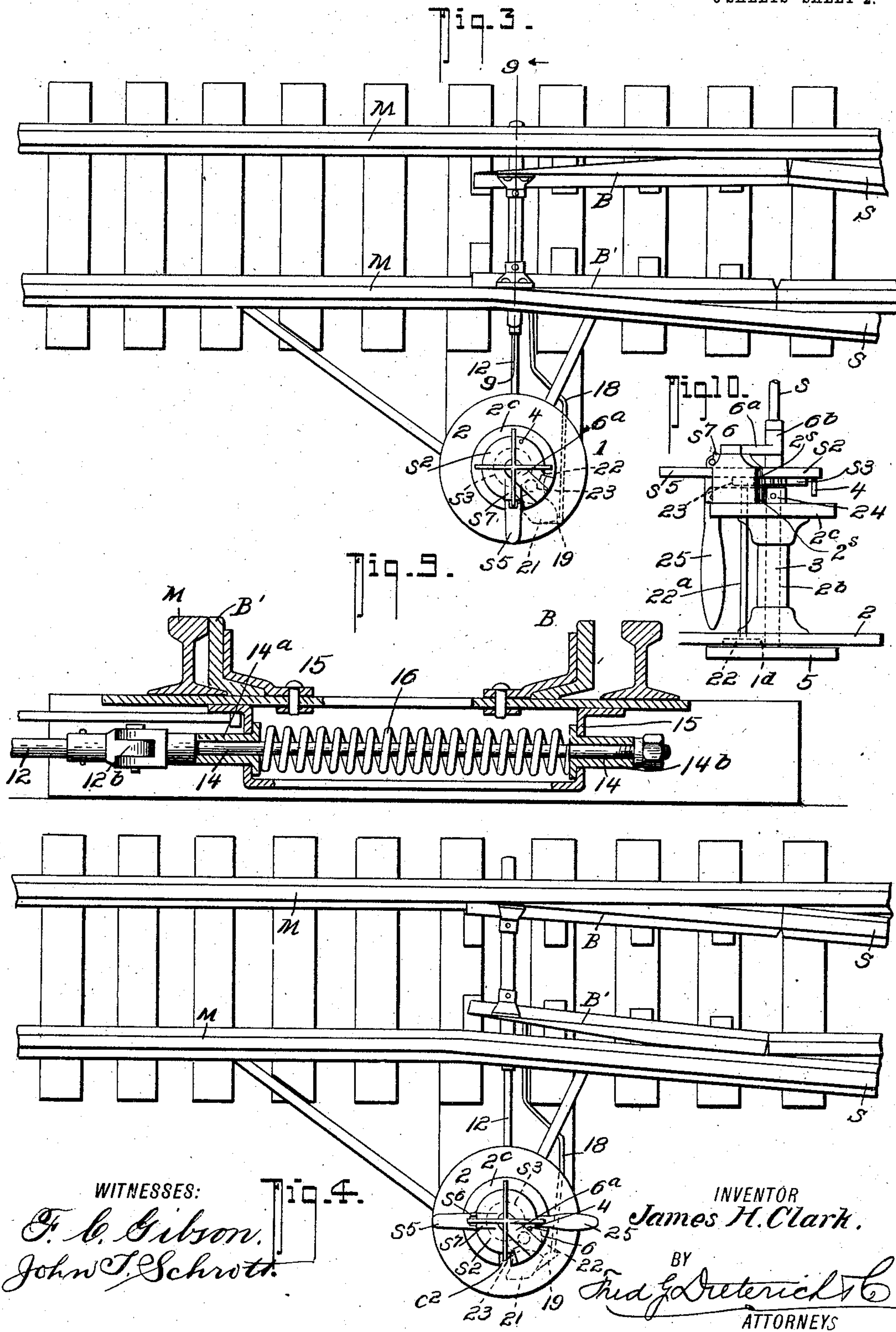
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APPLICATION FILED MAY 19, 1904.

3 SHEETS—SHEET 2.



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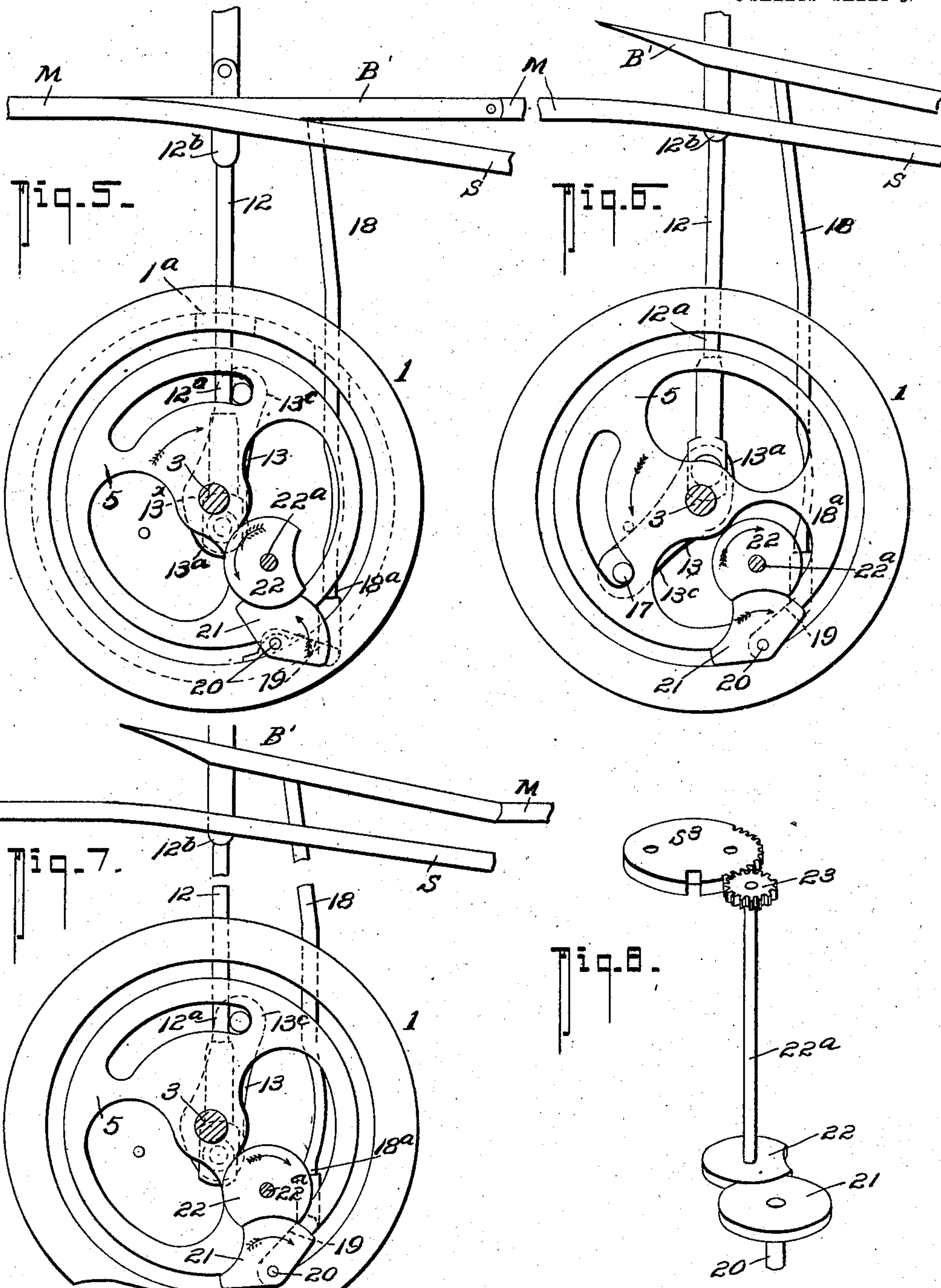
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UNITED STATES PATENT OFFICE.

JAMES H. CLARK, OF RICHMOND, VIRGINIA, ASSIGNOR OF ONE-HALF TO
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RAILWAY-SWITCH SETTING AND LOCKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 785,088, dated March 21, 1905.

Application filed May 19, 1904. Serial No. 208,690.

To all whom it may concern:

Be it known that I, JAMES H. CLARK, residing at Richmond, in the county of Henrico and State of Virginia, have invented a new and
5 Improved Railway-Switch Setting and Locking Mechanism, of which the following is a specification.

My present invention relates to that type of switch-setting mechanisms that are manually
10 set by the switchman; and it primarily has for its object to provide a simple, inexpensive, and durable mechanism of the character stated which can be conveniently actuated by the operator to throw the switch to its closed or
15 normal position and to its open position—that is, in line with the siding—in a positive manner and which when adjusted to set the switch in its closed or safety position can be quickly locked to hold the said switch to the latter
20 position.

My present invention also comprehends as an essential element a means for locking the switch to its set position when closed capable of being properly operated only when the
25 switch is set to the main line or normal after the tongues have been completely closed or moved to their proper position, whereby to effect the normal or closed adjustment thereof, special means being also provided that
30 serve as a detector device for showing up any neglect or failure of the switch-operator should he fail to fully and completely set the switch-tongues to their closed or safety position.

My present invention also embodies a special coöperative arrangement of parts which form a portion of my complete switch mechanism adapted when the switch-tongues are at the normal or main-line position to provide
40 for a sufficient automatic yielding of the switch-tongues to their open position in case of a car or engine backing up the siding and whereby the said automatic opening of the switch-tongues is effected by the flanges of the wheels as the wheels pass over the switch-
45 points without disturbing the switch and the signal-blade-setting mechanism, in which the said parts also operate to automatically return the switch-tongues to the main-line or normal

position after the wheels pass over the switch- 50
points in backing.

In its more subordinate features my invention consists in certain details of construction and peculiar combination of parts, all of which will be hereinafter fully described, 55
pointed out in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view which illustrates my improved switch mechanism with 60
the switch in its normal or closed position. Fig. 2 is a similar view, the switch being set to its open or siding position. Fig. 3 is a plan view of my improved switch setting and locking mechanism, parts being shown in the po- 65
sition illustrated in Fig. 1, and the correlation of the switch-rod cam and the cam on the gear-equipped rod that coacts with the detector or supplemental switch-tongue-moving member being shown in dotted lines. Fig. 4 70
is a similar view, the several parts being shown in their correlative position when the switch-tongues are at their open or siding position. Fig. 5 is a plan view of the pot or casing in which the crank mechanism controlled 75
by a manually-operated rotary shaft is located, the cap with the semaphore or signal devices mounted thereon being removed and the several parts shown being in the position they appear when the switch is closed or at 80
normal. Fig. 6 is a similar view of the said parts when the switch is open or set for the siding. Fig. 7 is a view which shows the several parts when the switch-tongues are improperly set to their closed position—that is, 85
when the tongue is held spread from the main rail by ice or other matter. Fig. 8 is a detail view showing the correlation of the cam device on one of the throw-rods and the coacting cam device on the geared rod mounted on 90
the signal-stand. Fig. 9 is a cross-section of the switch-tongue connections, taken on line 9 9 of Fig. 5. Fig. 10 is a detail side elevation of the signal-setting devices, the stand-
ard, and the main shafts, with the actuating- 95
disk 5, hereinafter specified.

In the practical application of switch throwing or setting means, manually operated, in

which the switch is moved to its closed or its open position by distinct manual shifting operations, it frequently occurs when setting the switch to its closed position that by reason of snow, ice, and other matter getting between the switch-tongue and the rail, the tongue fails to close up full and complete against the main or fixed rail, thereby leaving the point of the switch open enough to permit the flange of a passing wheel to spread the switch-tongue and by reason thereof frequently derail the train. In my present invention I have provided a setting mechanism which includes a signal, which after the switch has been opened and then returned to its closed or main-line position will always show "danger" until the switch has been perfectly closed—that is, with its tongue-point firmly moved against the fixed rail—and by reason of which should the switch-tongues have been hastily returned to their closed position and by reason of snow, ice, and other causes be not positively in contact with the main rail a danger-signal remains, means being also provided in my construction of switch mechanism whereby it is made absolutely impossible to lock the switch-tongue point close against the fixed or main rail unless the closed adjustment of the switch-tongue is absolutely tight and complete, thus providing, as it were, a detector device, which should the switchman for any reason fail to lock the switch it indicates such condition by reason of the danger side of the semaphore or signal-blade showing up, and at the same time it notifies the engineer or train crew that the operator last at the switch failed to do two required duties—that of perfectly adjusting the switch and that of having failed to lock the said switch.

In the practical application of my present invention the switch-rails B B' are arranged adjacent the main rails M and the siding-rails S S in the usual manner. The switch-throwing mechanism presently described is connected with the switch tongues or rails B B' in such manner as to shift the two rails in unison; but the connection between the said rails and the signal-actuating means is such that the switch-tongues can be readily spread laterally against the spring tension that holds them to their closed or normal position by reason of the wheel-flange engaging therewith during the operation of returning the switch to its closed or normal position even under an incomplete or improper return or setting of the switch-tongues to their normal position.

Along the side of the track and disposed laterally from the switch-tongue points is buried or otherwise located a pot or casing 1, within which is located the crank devices that form a part of the switch-shifting mechanism and which are normally covered by a cap-piece 2, that forms the base of the signal-stand 2^a, which comprises a hollow standard 2^b, surmounted by an integral circular top 2^c, which

is centrally apertured for the passage of the main turn-shaft 3 and the lower end of which extends through the base or cap 2 and carries at the lower extremity a crank-actuated disk 5, which is provided with a segmental slot, the purpose of which will presently appear.

6 designates a bracket-piece which is fixedly secured to or projected normally from the top plate 2^c, and it includes a horizontal portion 6^a, that projects radially over the plate 2^c and is formed with a vertically-extended tubular bearing 6^b, disposed in the axial line of the hub or standard 2^b and in the upper end of which is mounted the shaft *s*, which carries the conventional type of signal-blade (or semaphore-arm, if desired) having the usual white or "safety" and red or "danger" faces, and at its lower end the said shaft *s* carries a pinion *s*³ and is fixedly connected with a disk *s*², having a pendent lug 4 at its periphery, the purpose of which will presently appear. The disk *s*² also has a laterally-projecting arm *s*⁵ and a slot *s*⁶ in radial alinement with the said arm *s*⁵, which slot is protected by a housing *s*⁶, integral with the disk *s*³.

12 designates a connecting-rod that projects laterally from the casing 1, and the inner end 12^a of the said rod passes through the horizontally-elongated slot 1^a in the side of the casing 1, and the said inner end 12^a is pivotally connected to a short arm 13^a of a crank member 13, fulcrumed at 13^x on the bottom of the casing 1 in the axial line of the shaft 3. The outer end of the rod 12 has a flexible connection 12^b, that joins the said rod 12 with a second rod 14 in a yoke-frame 15, pendently and fixedly secured to two switch-tongues, (see Fig. 9,) and in the said frame 15 the rod 14 has a limited longitudinal slide motion, the reason for which will presently appear. A stout coil-spring 16 is disposed about the rod 14 between the collars 14^a 14^b, fixedly secured to the said rod. The crank 13, before referred to, (see Fig. 5,) has a long arm 13^c, that carries an upwardly-projecting stud-finger 17, that projects up into the segmental slot 5^a of the disk 5.

18 designates a rod that projects from the casing 1 and connects at its outer end with the switch-tongue adjacent the casing 1 and its inner end 18^a extended into the said casing 1 beyond the center or axial point thereof, and it is pivotally connected to a crank-arm 19, which is fixedly secured to a rock-shaft 20, disposed vertically within the casing 1. At the upper end the shaft 20 carries a crescent-shape cam 21, that moves in a horizontal plane within a cored recess 1^d in the under side of the cap-piece 2, and the said cam 21 is arranged to coact with the wiper-cam 22, mounted upon the lower end of a rod 22^a, that projects from the cap-plate 2, in which it has a bearing, up through the top 2^c of the hollow standard, in which latter it also has a bearing, and the said rod at its upper end carries a pinion 23, which

meshes with the pinion upon the lower end of the signal-shaft *s*, the purpose of which will presently appear.

The main switch-actuating shaft 3 extends 5 above the top plate or piece 2^c, and to the projecting end of the said shaft is connected an actuating device which consists of a short bar 24, apertured to receive the upper part of the shaft 3, to which it is keyed, and having its 10 outer end bifurcated to receive the handle-piece 25, which projects radially from the cap-piece 2^c and is fulcrumed in the end of the bar 24 in such manner that it will drop by gravity to interlock with a radial slot *c*² in the plate 2^c 15 when the parts are in the position shown in Fig. 1—that is, when the switch-tongues are at their normal position and the semaphore or signal-blade is at “safety,” whereby to lock the several parts in their closed or normal po- 20 sition.

So far as described the manner in which my invention operates can be best explained as follows: Assuming the switch to be in its normal or closed position and the parts ar- 25 ranged as shown in Fig. 1, and it is desired to set the switch for the siding, the operator first brings the handle 25 to a horizontal position to clear the slot or notch *c*² in the cap-piece 2^c and form a locked engagement with the de- 30 tector devices. The handle *s*⁵, which is now released, is then turned in the direction indicated by the arrow on Fig. 1 until the lug 4, that projects down from the disk *s*², engages with and is stopped by a suitable projection 35 2^s on the bracket or frame piece 6, which stops further movement of the said handle *s*⁵ and the signal-blade-carrying shaft *s*, that is controlled thereby. So far as described it will be noticed that the operator imparts a quarter-revolution 40 to the signal-blade-carrying shaft *s* and thereby turns the semaphore signal-blade to the danger position prior to actuating the setting mechanism for throwing the switch-tongues to their siding or shifted position. When the 45 handle *s*⁵ is turned to the limit of its movement, as indicated, the cam 22 on the lower end of the shaft 22^a assumes such position relatively to its mate 21 on the upper end of the shaft or stem 20 to now permit of a free move- 50 ment of the switch-throwing devices, which operation is then effected in the following manner: After the signal-blade has been set to the danger position, as stated, the operator moves the handle 25 in the direction indicated 55 by the arrow in Fig. 1, and thereby rotates the main shaft 3, together with the disk 5, on the lower end thereof, which latter (the disk) in its movement in the direction indicated by the arrow in Fig. 5 then engages the standard 60 13^a, that projects up from the long arm of the crank 13, and carries said crank 13 over to the position shown in Fig. 6, and as the said crank 13 is thus moved the arm 12 is forced inward, and the switch-tongues are thereby 65 positively swung to their open or siding posi-

tion, as indicated in Fig. 2. To return the switch-tongues to their normal or main-line position, the handle 25 is moved back to its first position until it comes into line with the radial notch *c*² and interlocks therewith, and 70 thereby adjusts the switch to its locked or normal position. During the return movement of the handle 25 the signal or semaphore blades still remain at the danger position, for the reason that the shaft that carries the said blades 75 during the movement of the handle 25, just explained, is not actuated, and hence the slotted portion of the disk *s*² on the lower end of the signal-shaft is out of radical alinement with the handle 25 and the said handle cannot be 80 swung into a locked engagement with the detector devices. To permit of locking the said handle, the detector devices, and the switch-tongues to their normal or main-line position, it is now necessary that the operator manu- 85 ally turn the signal-carrying shaft with its disk *s*² at the bottom thereof so as to bring the radial slot in the disk *s*² into alinement with the handle 25. This latter motion of the signal- 90 shaft—that is, of returning the signal to its safety position—in my construction of switch mechanism cannot, however, be effected un- 95 less the switch-tongues are properly closed against the main-line tracks—that is to say, should the said switch-tongues be held slightly open at the end by reason of snow, ice, bolts, 100 or other foreign matter lodging between the said tongues and the rails the signal-carrying shaft and the devices for rotating the same cannot be operated, for the reason that the 105 cam upon the lower end of the rod or shaft 22 is thereby held from movement in the direction indicated by the arrow on Fig. 7 by the opposing cam that now interlocks there- 110 with. By reason of the peculiar construction and arrangement of the two coacting cams 115 and the means for adjusting them, controlled by the movement of the rod 18 and the switch-tongues, it becomes necessary for the opera- 120 tor to first remove the foreign matter between the said switch-tongues and the rails to permit of a complete movement of the said switch-tongues up against the main rails to 125 effect a proper closing or setting of the switches, it being also understood that when closing the switch-tongues tightly against the main line the rod 18 is further moved out- 130 wardly and by reason thereof shifts the cam controlled thereby to such a position as to permit of the free movement of the opposing cam and the rotation of the rod or shaft 22, thereby allowing for bringing the disk on the lower end of the signal-carrying shaft, so that its radial slot can be properly brought into alinement with the handle 25 to allow the said handle 25 to gravitate into a locked connection with the radial slot *c*² on the member 2^c and into a locked connection with the radial slots on the disk on the lower end of the signal-shaft, and when the handle 25 is thus ad-

justed it can be readily held in said position by means of an ordinary padlock.

By providing the peculiarly-constructed means for connecting the two switch-tongues, including the rod 14 and the spring 16, as hereinbefore described, my switch mechanism is also adapted when the switch-tongues are at their normal or main position to provide for an automatic yielding of the switch-tongues to an open position in the event of a car or engine backing up the siding when the signal-blades are still set at the danger position, and this advantageous result is effected by reason of the flanges of the wheels, as the said wheels pass over the switch-points, wedging between the said points and the main rails, and thereby spreading the switch-points away from the main rails against the tension of the spring 16, it being understood that such action of throwing open the switch-points is accomplished without disturbing the switch and the signal-blade-setting mechanism, it being manifest that after the wheels have passed over the switch-points the spring 16 will act to automatically return the said switch-points to the main-line or normal position.

From the foregoing, taken in connection with the accompanying drawings, it is thought that the complete operation, construction, and advantages of my invention will be readily understood by those skilled in the art to which it appertains, and it will be understood that in my construction of switch mechanism a detent or locking means is provided which positively prevents the signal from being shifted from its danger to its safety position so long as the switch-tongues remain improperly set, thus providing, as it were, a detector means whereby not only the switch operator can readily detect an incomplete throw of the switch-tongues, but in event of the operator after throwing the tongues back to their normal position failing to properly lock the same the signal will remain at "danger," and thus not alone notifying an approaching train as to an improper setting of the switches, but also that the operator who last threw the switch failed to lock the same to its set position.

While I have shown and described a manually-operated means for setting to the siding, it is manifest that the same might be likewise actuated by automatic means controlled by the approaching train, it being also understood that in that event the resetting or returning of the switch is also automatically effected.

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

1. In a switch and signal actuating mechanism of the character described, means for shifting the switch-tongue, said means including a throw-lever, a lock for holding said throw-lever from operation, a signal-setting

means including a lever, said means cooperating with said switch-tongue-shifting means, and said signal-setting means adapted when adjusted to set the signal to either position, to release the aforesaid lock whereby to permit of actuating the switch-shifting means, as set forth.

2. In a switch mechanism of the character described, the combination with the tongues, a throw-bar that connects the two tongues, a detent for holding the switch-tongues from movement, and a signal-setting device, the said detent being arranged to be tripped by the movement of the said signal-setting device when the same is shifted to bring the signal to danger as specified.

3. In a switch mechanism of the character described, a manually-operated means connected with and adapted to shift the switch-tongues, a signal device arranged to be set to its danger position independent of the movement of the aforesaid manually-operated means, a detent for holding the switch-setting means from operation arranged to be freed when the signal is set to a danger position substantially as shown and described.

4. In a switch mechanism as described, means for setting the switch-tongue, in combination with signal-actuating means, and cooperating therewith, a detent from automatically holding the signal-actuating means for operation during a partial or incomplete shifting or closure of the switch-tongue, said detent adapted to interlock the switch-tongue-setting means and the signal-actuating means when the switch-tongue has been completely shifted, substantially as shown.

5. In a switch mechanism of the character described, in combination with the switch-tongues; a manually-operated means for shifting the tongues, a manually-actuated signal-setting means, a detent for holding the signal-setting means from operation, connections that join the said detent with the switch-tongues arranged to trip the said detent only after the tongues have been fully and completely shifted for the purposes specified.

6. In a switch-actuating means of the character described, in combination with the switch-tongues and a lock for holding said tongues to their normal or safety position, of a signal, means for holding said signal to its safety or normal position, said means including a member for interlocking with the switch-throwing devices when returned to their normal or safety position, and a detent for holding the said signal devices from being returned to their normal or safety position, a trip mechanism connected with the detent and the switch-tongues adapted to release the said detent only upon the complete shifting of the switch-tongues to their normal or safety position for the purposes specified.

7. A combined switch and signal actuating means which comprises a throw-bar connected

with the switch-tongues, a manually-operated means for shifting said throw-bar, means for setting the signal to its danger position, and to its normal or safety position, a detent for locking the said supplemental means from operation, and trip devices coöperatively joined with the switch-tongues arranged to release the said detent when the switch-tongues reach the limit of their complete movement to their normal or safety positions as set forth.

8. In a switch mechanism of the character described, the combination with the tongues, the throw-bar, a manually-operated means for shifting said bar, said means including a sweep-handle 25, a rotary signal, a detent for locking the signal from turning back to its normal or safety position, and connections that join the said detent and the tongues, said connections being arranged to release the detent after the tongues have been returned to their complete normal or safety position for the purposes specified.

9. In a switch mechanism of the character described, the combination with the tongues, the casing, the crank member 13 mounted within the casing, the throw-rod 12 that joins the crank 13 with the tongues, the main shaft journaled in the casing provided with a means for engaging the crank 13 and turning it, of a signal comprising a rotary shaft carrying the signal-blades mounted on the casing in the axial line of the main shaft 3, a disk pinion carried by the signal-shaft, the shaft 22 having a pinion that meshes with the aforesaid disk pinion, a cam on the lower end of the said shaft 22, the shaft 19 mounted in the casing, a cam on the said shaft for engaging with the cam on the shaft 22, the two cams being arranged to lock the shaft 22 from rotation during one adjustment thereof, the sweep-lever 25 mounted on the shaft 3, means for rotating the signal independent of the movement of the lever 25 when the aforesaid two cams are adjusted to permit the rotation of the shaft 22 and means controlled by a movement of the switch-tongues for setting the

said cams to allow for the rotation of the shaft 22, all being arranged substantially as shown and described.

10. In a switch mechanism as described, in combination with the switch-tongues; of a means for shifting the said tongues to the main-line or normal position and also to the siding position, a detent, a detector device that coöperates with the said detent and signal that is actuated by the movement of the said detector device, and connection joining the said detent device and the said detector adapted when the signal is moved to its danger position to release the detent for the purposes specified.

11. In a switch and signal actuating mechanism as described, a manually-actuated means for shifting the switch-tongues, a spring for holding the said tongues to their main-line or normal position, a lock for holding the said means from operation, and a signal-setting means adapted when adjusted to set the signal to danger position to release the aforesaid lock whereby to permit of actuating the switch-shifting means as set forth.

12. In a switch and signal actuating mechanism of the character described, in combination with a pair of switch-tongues spring-held to their normal or main-line position, means for shifting the said switch-tongues, a lock for holding the said means from operation, and a signal-setting means adapted when adjusted to set the signal to danger position to release the aforesaid lock whereby to permit actuating the switch-shifting means as set forth, the said spring mechanism for the switch-tongues being arranged to permit of the switch-tongues being moved open by a wheel-flange passing over them and the adjacent rails while the switch-setting mechanism is locked as set forth.

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Witnesses:

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EDWD. HATTON, Jr.