No. 613,827. Patented Nov. 8, 1898.

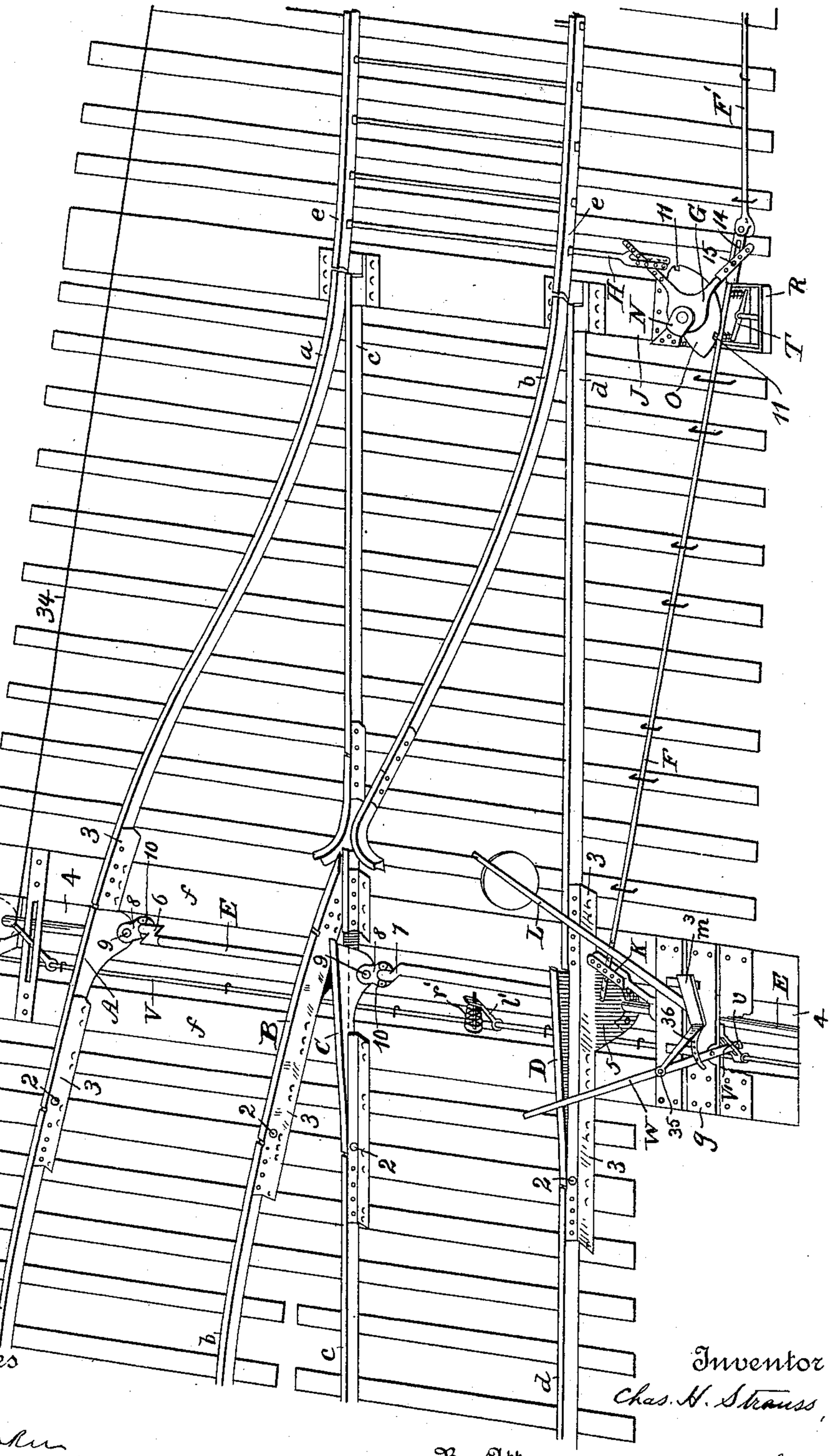
C. H. STRAUSS.

SELF ACTING RAILWAY SWITCH.

(Application filed Mar. 18, 1898.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.



Witnesses

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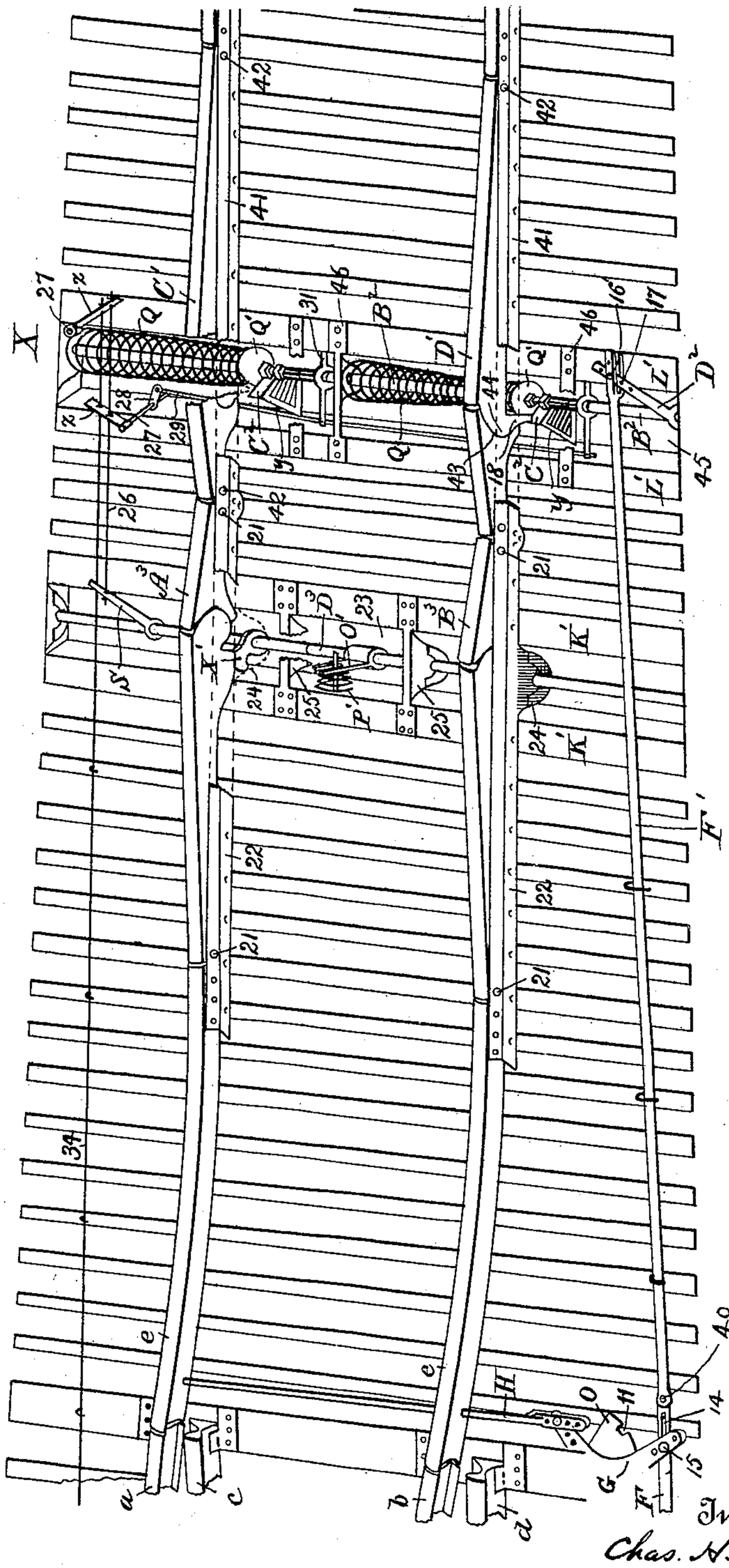
SELF ACTING RAILWAY SWITCH.

(Application filed Mar. 18, 1895.)

(No Model.) 5 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 5 Sheets—Sheet 3.

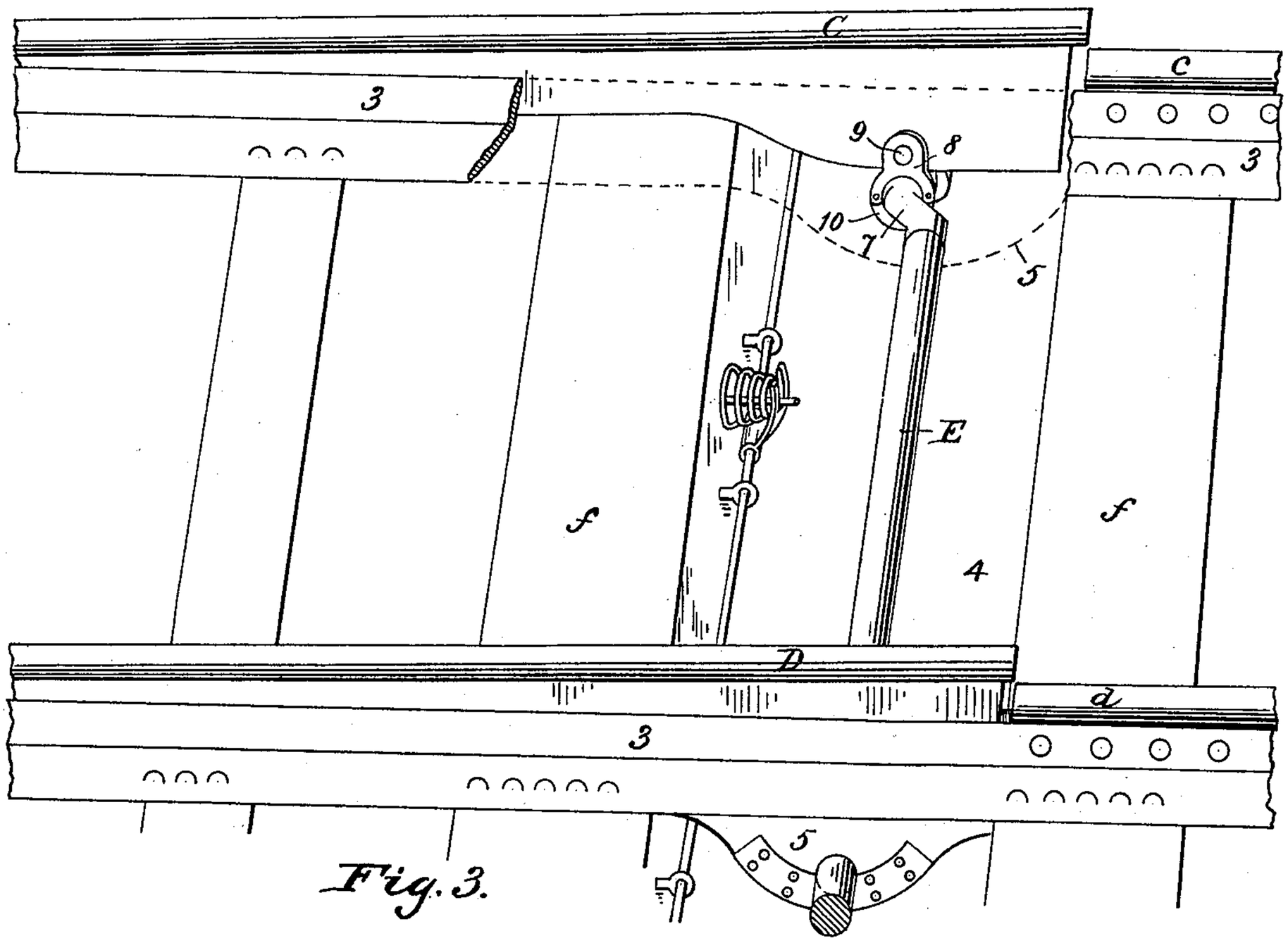

Fig. 3.

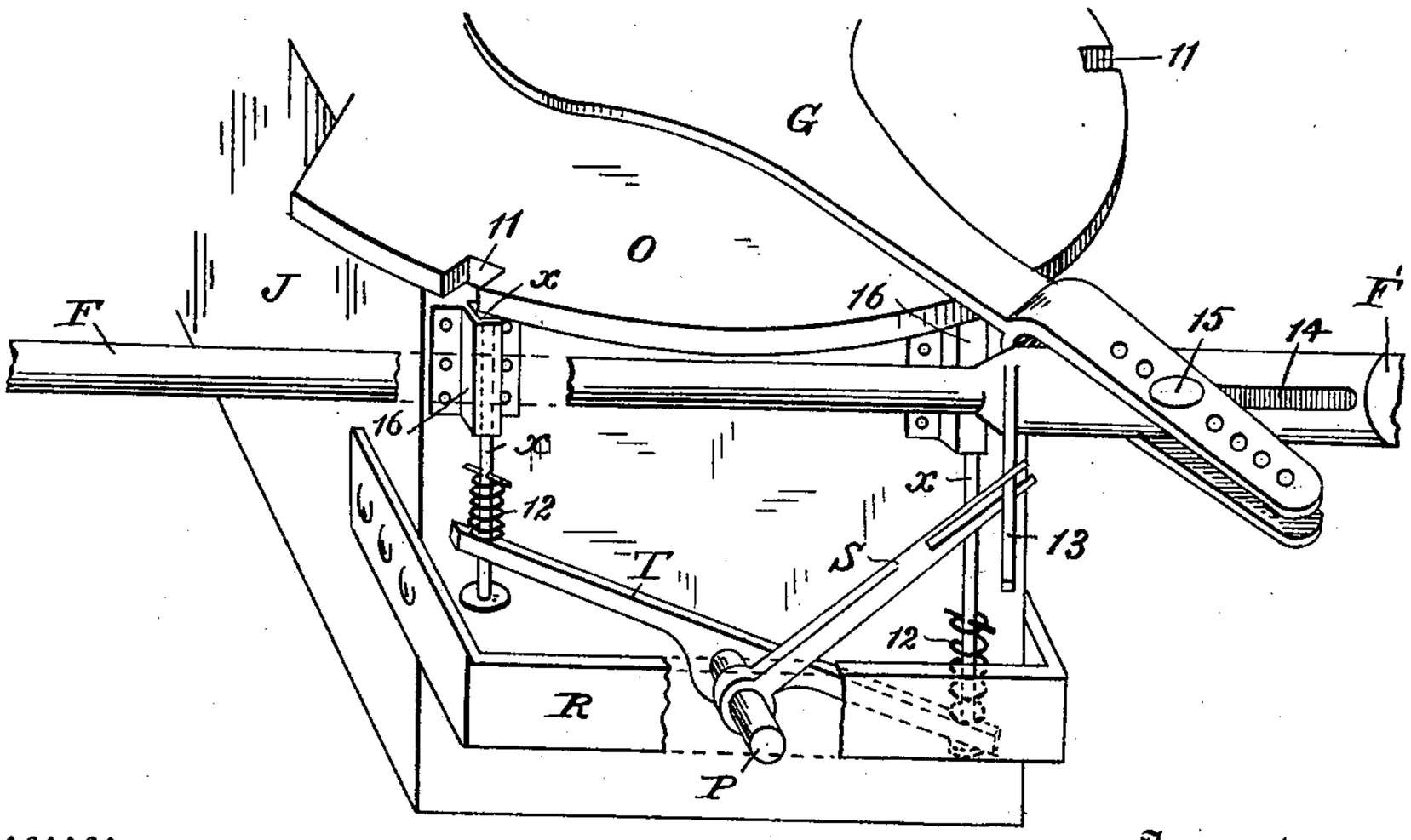

Fig. 4.

Witnesses

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SELF ACTING RAILWAY SWITCH.

(Application filed Mar. 18, 1898.)

(No Model.) 5 Sheets—Sheet 4.

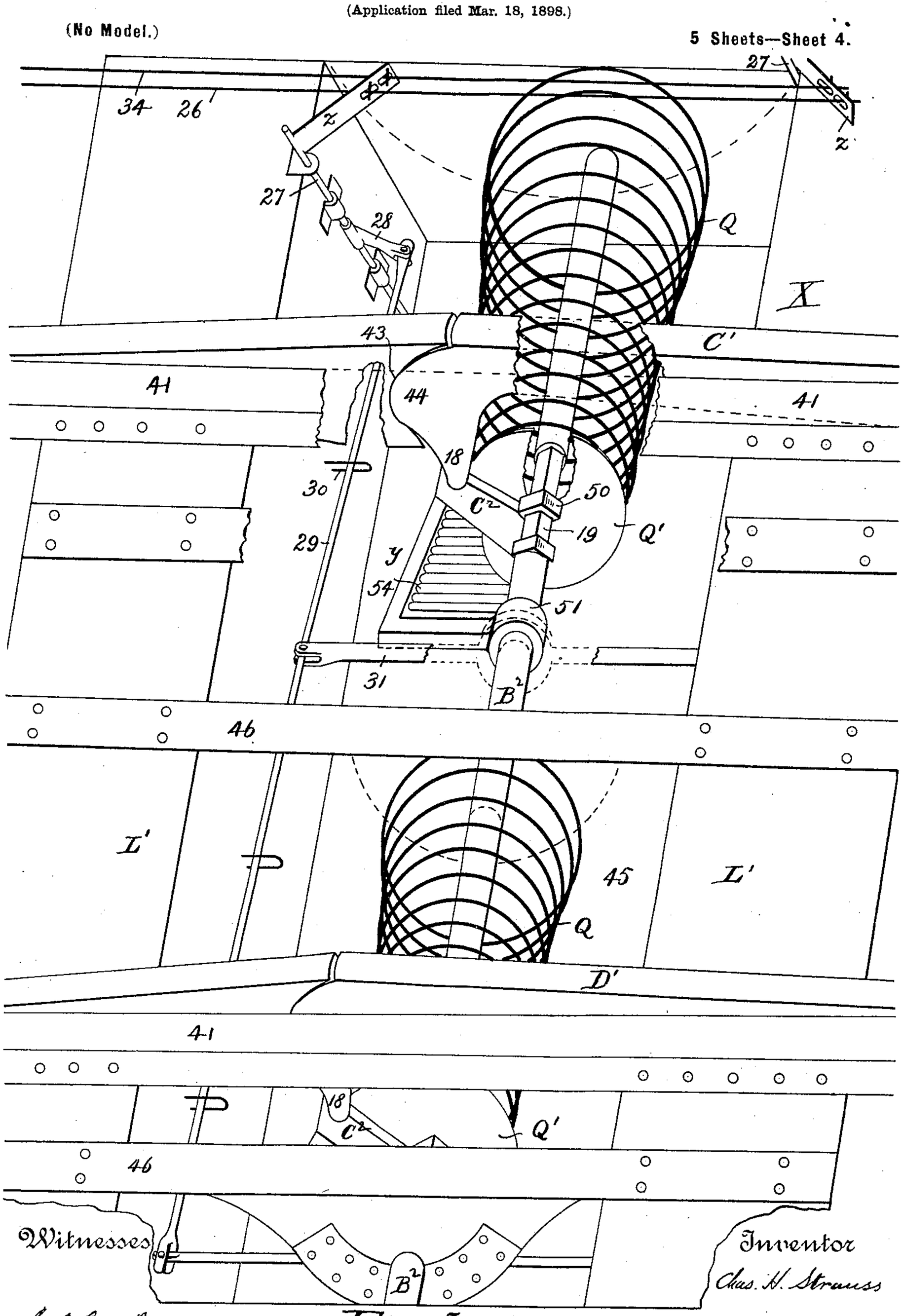

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Fig. 5.

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(Application filed Mar. 18, 1898.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 6.

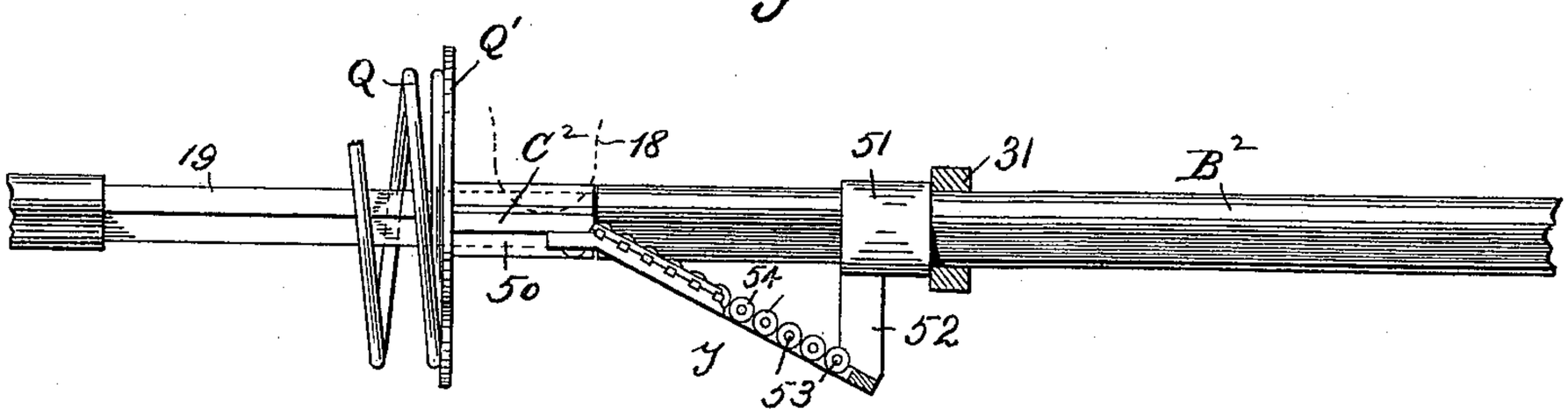
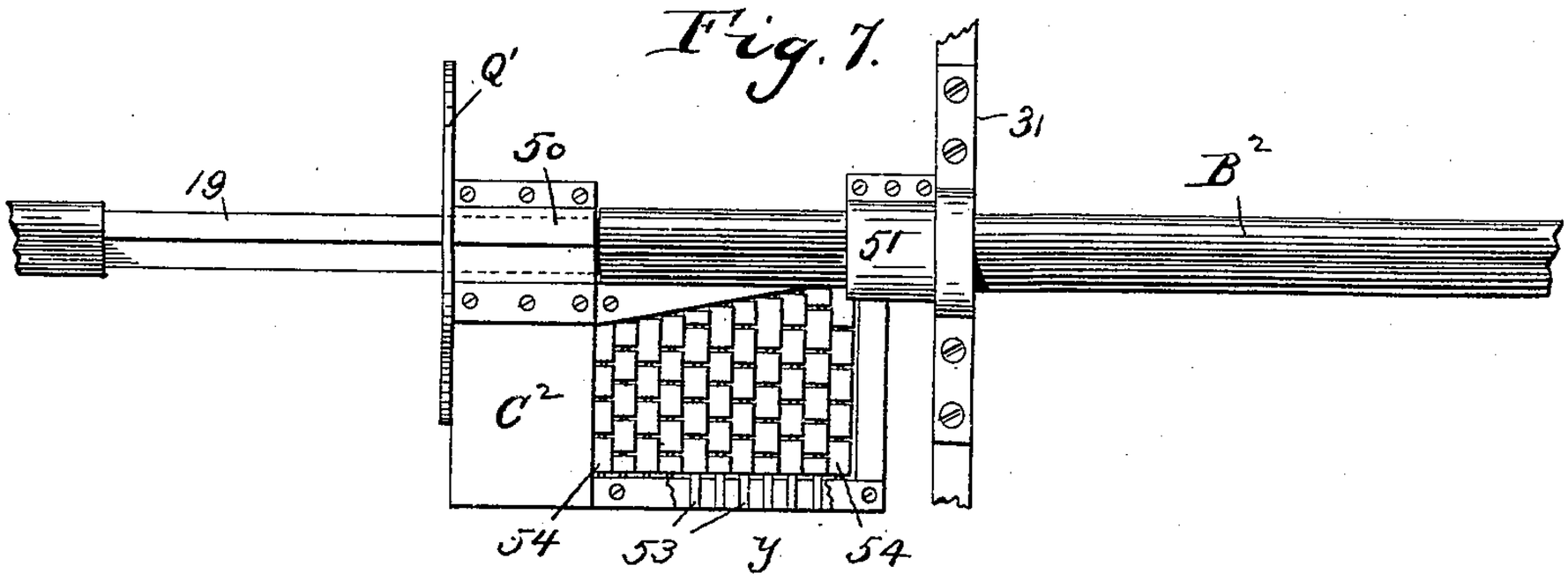


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES H. STRAUSS, OF SEATTLE, WASHINGTON.

SELF-ACTING RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 613,827, dated November 8, 1898.

Application filed March 18, 1898. Serial No. 674,347. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. STRAUSS, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Self-Acting Railway-Switches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to prevent loss of life and property by rendering it impossible for a train, car, or engine to run through an open switch; also to reduce the labor and expense of switching. This is accomplished by providing the movable or switch rails with mechanism arranged to be inevitably operated by the passing engine or car on either a main or side track before said rails are reached and in such manner that said mechanism will be set or arranged ready for operation by a car or engine on the other of said tracks. Thus at all times it is true of each track either that it is in proper communication with the switch-rails without any operation of the latter or the operating mechanism is set, so that it and the switch-rails must necessarily be properly actuated and adjusted by the car or engine before the latter reaches the switch-rails.

It is a further object of my invention to insure that a train may follow the main track in the direction opposite to that above referred to without any manual operation of the switch. Thus a train in either direction will automatically set the switch for the main track, a manual operation of the switch or switch-controlling mechanism being necessary only when it is desired to run a train from the main upon the side track.

With such objects in view the invention consists in the parts and combinations thereof hereinafter set forth and claimed.

In order to make the invention more clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect without limiting my improvements in their practical applications to the particular construction which for the sake of illustration I have delineated.

In said drawings, Figure 1 is a perspective view of portions of a main and side track with switch mechanism embodying a portion of my invention. Fig. 2 is a similar view, which may be considered as the right-hand prolongation of Fig. 1, of a track and switch mechanism embodying the other portion of my invention. Fig. 3 is a perspective view, on a larger scale, of the movable rails or levers and contiguous parts actuated thereby, forming a part of the mechanism shown in Fig. 1. Fig. 4 is a similar view of the switch-rail actuating and locking devices, also shown in Fig. 1. Fig. 5 is a perspective view, on a larger scale, of a portion of the switch mechanism shown in Fig. 2. Fig. 6 is an elevation, partly in section, of a portion of the mechanism shown in Fig. 5 for automatically elevating the rail-sections. Fig. 7 is a plan view of the same, the actuating-spring being omitted.

Referring to the drawings, *c d* indicate the main track and *a b* a side track adapted to communicate therewith by switch-rails *e*.

A B and C D are vertically-movable levers belonging, respectively, to the side and main tracks and adapted to be depressed by the weight of a passing engine or car. These levers preferably consist of sections of the rails about ten feet long pivoted at 2 between and vertically guided by heavy fish-plates 3, securely fastened to the track-rails and ties.

E is a rock-shaft arranged transversely to the tracks and mounted in a culvert or space 4 between timbers *f*, being preferably supported in bearings 5, formed by depending flanges of the fish-plates. The inverted caps of said bearings are separate from the fish-plates, as seen in Fig. 3, and removable.

6 6 are bends or crank-arms formed in or attached to the shaft E for connection with the levers A B, and 7 7 are similar but opposite bends or cranks for attachment to the levers C D. Such connection is effected by links, Fig. 3, each consisting of a pair of yokes 8, one on each side of the lever and pivoted thereto at 9, and an intermediate semicircular collar 10, arranged between and bolted to the yokes 8, the yokes and collar together surrounding and forming a bearing upon the wrist of a crank 6 or 7 of the shaft E.

The parts above described are so constructed and connected with each other that when one pair of levers, as C D, is elevated,

say, six inches, the other pair will be level with the rails. (See Fig. 1.) The switch-rails *e* are connected with the shaft E by any suitable mechanism, one form of which is hereinafter described, in such manner that they communicate or connect the main track with the rails which have their levers depressed. If a train passes along the latter rails toward the switch, say from left to right along the side track *a b* in Fig. 1, it will find the latter set ready for receiving said train on the main track. If the train pass along the track, say *c d*, the levers of which are elevated, it will depress the latter, turn the rock-shaft E about ninety degrees, move the switch-rails *e* into line with the track upon which the train is advancing, and elevate the other levers A B ready for a reverse actuation of the switch by a train on the side track. It is thus evident that for trains moving on either the main or side track toward the single track safety from accident by means of a misplaced switch is automatically insured and without loss of time from stopping the train or expense of manual labor.

L is a hand switch-lever fixed on the rock-shaft E and adapted for use in the ordinary way when desired to throw the switch manually.

F is a rod pivoted to an arm K, fixed on the shaft E and extending near the switch-rails *e*. Here it is connected with a horizontally-oscillating bell-crank G, pivoted in or on plate N, fixed on the head-block J. The other arm of the part G is connected by the switch-rod H with the rails *e*. Thus either movement of the shaft E is transmitted to the switch-rails. The parts H, G, F, and K are all, or some of them, provided with series of pivot-holes, as illustrated, for the proper adjustment of the throw of the switch-rails.

In order to provide against accidental displacement of the switch-rails, a further portion of my invention (illustrated in Fig. 4) comprises a lock for the rails in either of their adjusted positions. Referring to said figure, O is a lock-plate connected and turning with the bell-crank G and having two or more locking recesses or shoulders 11. *x x* are keys mounted in loose bearings in opposite arms of a lever T, supported by springs 12 and adapted to be forced by the oscillation of the lever T against the under side of the plate O and as one of the recesses 11 comes, by the turning of the plate, over the elevated key to engage said recess and hold the plate, the part G, the rod H, and consequently the rails *e* from movement. The keys slide in fixed bearings 16 on the block J. The lever T is mounted on a horizontal axis P, held in the block J and bracket R on the latter, and is operated by a lateral arm 13 on the rod F engaging by a sliding cam action a slotted arm S on the lever T or its axis.

In order that the engaged key *x* may be disengaged from the plate O before the bell-crank lever G is operated, I provide what may be termed a "lost motion" in the connection of the rod F with said lever. A convenient means for this purpose is a slot 14 in said rod, engaged by the bolt 15 of the lever. This allows the rod F to slide relative to the lever without operating it, in the meantime by such movement actuating the lever T and releasing the key. When the end of the slot reaches the bolt 15, the switch, now unlocked, will be thrown, as already described. As shown in Fig. 3, the switch is not quite locked, a little further movement of the rod F to the right and turning of the plate O being necessary to allow the elevated key *x* to spring it into its notch.

I will now describe the means constituting a further part of my invention, independent of which the devices above described may be usefully employed, whereby an engine, car, or train coming toward the side track (from the right in the drawings) may automatically throw the switch if not already properly set so as to give a clear through-track and prevent any accident from the train taking the siding or becoming derailed by a half-open switch.

Referring especially to Figs. 2 and 5, X is a switch-controlling mechanism connected with the switch-rails by a rod F′, preferably through the mechanism already described, which comprises the rod F and bell-lever G. To this end the rod F′ is pivoted at 40 to said rod F and is adapted to reciprocate the latter. By this means the rod F′ is also connected directly with the locking devices *x*, and the mechanism X is adapted to preliminarily operate them. The mechanism X, while it may take various forms, is constructed, preferably, as follows:

C′ D′ indicate two sets of levers or equivalent switch-operating parts situated beyond or on the other side of the switch-rails *e* from the tracks *a b c d* and consisting, preferably, of rail-sections mounted between fish-plates 41 in the manner already described with reference to the levers A B. The levers of each set are pivoted between said fish-plates at 42 and extend toward one another, and at their meeting-point one of the levers is formed with a recess 43, extending horizontally across the end of the lever, and the other with a corresponding projection 44, which fits loosely within said recess, so that as the levers oscillate vertically between the fish-plates on their pivots 42 they are virtually connected and compelled to move together.

In the construction illustrated one of the levers is pointed and the other formed with a correspondingly-curved recess.

B^2 is a rock-shaft extending transversely to and beneath the levers C′ D′, being contained within a depression or culvert 45 below the track and between beams or blocks L′. Said shaft is mounted in suitable bearings at the ends of the culvert or in depending flanges of

plates 46, the flanges, with their bearings for the shaft, being constructed as already described in connection with the parts 5.

D^2 is an arm fixed on the shaft B^2 and extending above the culvert, where it is pivotally connected at 16 with the said rod F′. This connection is adapted for adjustment to regulate the throw of the rod F′ by means of a series of holes 17 in the arm, in any of which the pivot 16 may be fitted.

C^2 indicates a pair of cams or arms fitted upon the rock-shaft B^2, so as to be capable of longitudinal movement thereon, but prevented from rotation, as by being mounted upon a squared portion 19 of the shaft said cams are engaged by downwardly-extending fingers 18 on one or the other of the levers of each of the sets C′ and D′, whereby the depression of said levers when the cams are beneath them will cause the rocking of the shaft B^2 and actuation of the switch-controlling mechanism and switch-rails.

Q indicates springs preferably mounted around the shaft B^2 and engaging directly, or indirectly through plates Q′, with the cams C^2 to press them toward their normal position beneath the track-levers.

The foregoing being the preferred construction of the secondary switch-controlling mechanism, its practical operation is as follows: When a car or train approaches the switch upon the main track in a direction to run either upon the side track *a b* or to continue upon the main rails *c d*, (coming from the right in Fig. 2,) the wheels of the train will run upon and depress the levers C′ D′, depress the cams C^2, turning the shaft B^2 and arm D^2, move the rod F′ to the left, and set the switch-rails *e* for the main track. If the switch-rails are already set for the main or through track, the levers C′ D′ will be already depressed and not necessary to be operated. When it is desired to run such a train upon the side track *a b*, provision, hereinafter described, is made for a manual setting of the switch.

It is desirable to provide means for rendering the secondary switch-controlling mechanism X inoperative, so that when a train approaches the levers C′ D′ from the other side (from the left in Fig. 2) it will either not find the levers C′ D′ elevated or if it depresses them will not cause any change of position in the switch-rails. To this end I provide a third mechanism for controlling the mechanism X, and comprising, preferably, the following parts:

A^3 B^3 indicate two sets of levers of similar construction and arrangement to those already described set in the track between the levers C′ D′ and the switch-rails. These levers are pivotally mounted at 21 in heavy fish-plates 22, which latter, like all the fish-plates described, are securely bolted to the sleepers and culvert-blocks.

D^3 is a rock-shaft mounted beneath the levers A^3 B^3 in a depression or culvert 23, formed between beams or blocks K′. This shaft is mounted in bearings 24, formed on the fish-plates 22, and also in such other auxiliary bearings 25 as may be found desirable.

X′ indicates arms fixed upon the shaft D^3 and beneath and engaged by the under side of the levers A^3 B^3, whereby the depression of the latter levers will cause a turning of the rock-shaft. S is an arm fixed upon said rock-shaft, extending out of the culvert and connected by a rod 26 with horizontal oscillating arms *z*. The latter arms are fixed upon the upper ends of vertical rock-shafts 27, mounted in suitable bearings at the sides of the culvert 45, and have fixed upon them oscillating arms 28. Pivotally attached to the latter are horizontal rods 29, supported loosely in guides 30 on the sides of the culvert.

31 indicates yokes carried by the rods 29 and passing around or inclosing the shaft B^2.

y indicates brackets mounted and adapted to slide upon the latter shaft and connected with the cams C^2, whereby the longitudinal movement of said yokes and brackets will shift the cams out from under the levers C′ D′.

Whenever a train approaches the levers C′ D′ from the direction of the switch-rails it will depress the levers A^3 B^3, turning the rock-shaft D^3 and arm S, and through the parts 26, *z*, 27, 28, 29, 31, and *y*, moving the cams C^2 out from under the levers C′ D′ and preventing the actuation of the shaft B^2 when the train reaches the last-mentioned levers. The switch-rails *e* thus remain undisturbed. The cams C^2 remain removed from under the levers so long as there is weight upon the latter, and these levers are sufficiently long that some of the wheels of the train will be upon some portion of the levers until the last truck of the train has passed. When the train has passed, I provide for a lifting of the levers C′ D′. This is preferably effected by the cam action of the parts C^2 or *y* upon the under side of the projections 18, the engaging surface of one of said parts being formed on an inclined plane. To facilitate this operation, antifriction devices may be provided, such as, in the construction illustrated, rollers 54, mounted in the bracket *y*.

Where a train approaches the switch to run upon the side track *a b* and the switch is set for the main track, a manual operation is necessary to throw the switch for the side track. This is done by the hand-lever L, already described. In order, however, that the weight of the train upon the levers C′ D′ may not throw the switch-rails for the main track, I provide a manually-operated mechanism for effecting the same result as the levers A^3 B^3. This mechanism comprises a rock-shaft V, mounted in the culvert 4 and having a slotted arm V′. This arm is engaged by a pin *v* in the lower end of a hand-lever W, which latter is preferably mounted on one of the plates *g*. When the lever W is moved to the right, the action of the pin *v* on the inclined arm V′ turns the shaft V to the left. 33 is an arm fixed on the shaft V and connected by a rod

34 with the arms *z*, Fig. 2, and, when the hand-lever W is moved to the right in Fig. 1, serving to detach the cams C^2 from the track-levers C′ D′ in the same manner in which they are detached by the levers A^3 B^3 when the train comes from the left.

m^3 is a plate pivotally connected at 35 with the lever W and adapted to engage the plate *g* or the timber *f* when the shaft V has been turned the proper distance to detach the cams C^2. When so thrown, it may be temporarily held in position by placing the foot upon the plate m^3 while the lever L is operated in case the switch-rails are set for the main track and require to be changed.

36 is a forked arm attached to the plate m^3 and having a series of holes and a pin whereby the plate may be adjusted on the lever W to properly limit its throw.

l′ is an arm fixed on the shaft V and pressed to the right by a spring *r*′, so as to keep the shaft in its normal position, turned to the right, with the lever W to the left, except when the lever W is intentionally operated.

P′ and O′ are a similar spring and arm similarly controlling the shaft D^3, Fig. 2, and tending to lift the levers A^3 B^3.

The connections of the rods 26 and 34 with the levers *z* are loose, so that either rod may be pulled to operate the levers without disturbing the other rod, Fig. 5.

Referring especially to Figs. 6 and 7, one mode of constructing the lever-lifting devices is illustrated on a larger scale. 50 is the square bearing portion of the cam C^2, which fits and slides on the square part 19 of the shaft B^3. 51 is a sleeve which also slides on the shaft and is connected with the bracket *y* by an arm 52. Said bracket comprises a frame in which are fitted and supported shafts 53, carrying a series of independent rollers 54 for engaging the lever-finger 18 and lifting by the longitudinal movement of the bracket *y* under the stress of the spring Q the levers or rail-sections C′ D′.

It will be understood that a set of devices such as are shown in Figs. 6 and 7 is provided for the levers C′, and another set of similar devices on the same shaft B^2 is provided for the levers D′.

I claim—

1. The combination with a plurality of tracks having switch-actuating parts or levers, and the switch-rails, of actuating mechanism connecting said parts with the switch-rails, a second set of switch-actuating parts or levers beyond the switch-rails, mechanism connecting the latter levers with the switch-rails, and a third set of levers connected with the mechanism of said second set whereby the second set of levers may be rendered inoperative.

2. The combination with the rock-shaft B^2 and the levers C′ D′, of the sliding cams C^2, brackets *y* carrying rollers, and means for reciprocating said cams and brackets.

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

CHARLES H. STRAUSS.

Witnesses:

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