

No. 740,356.

PATENTED SEPT. 29, 1903.

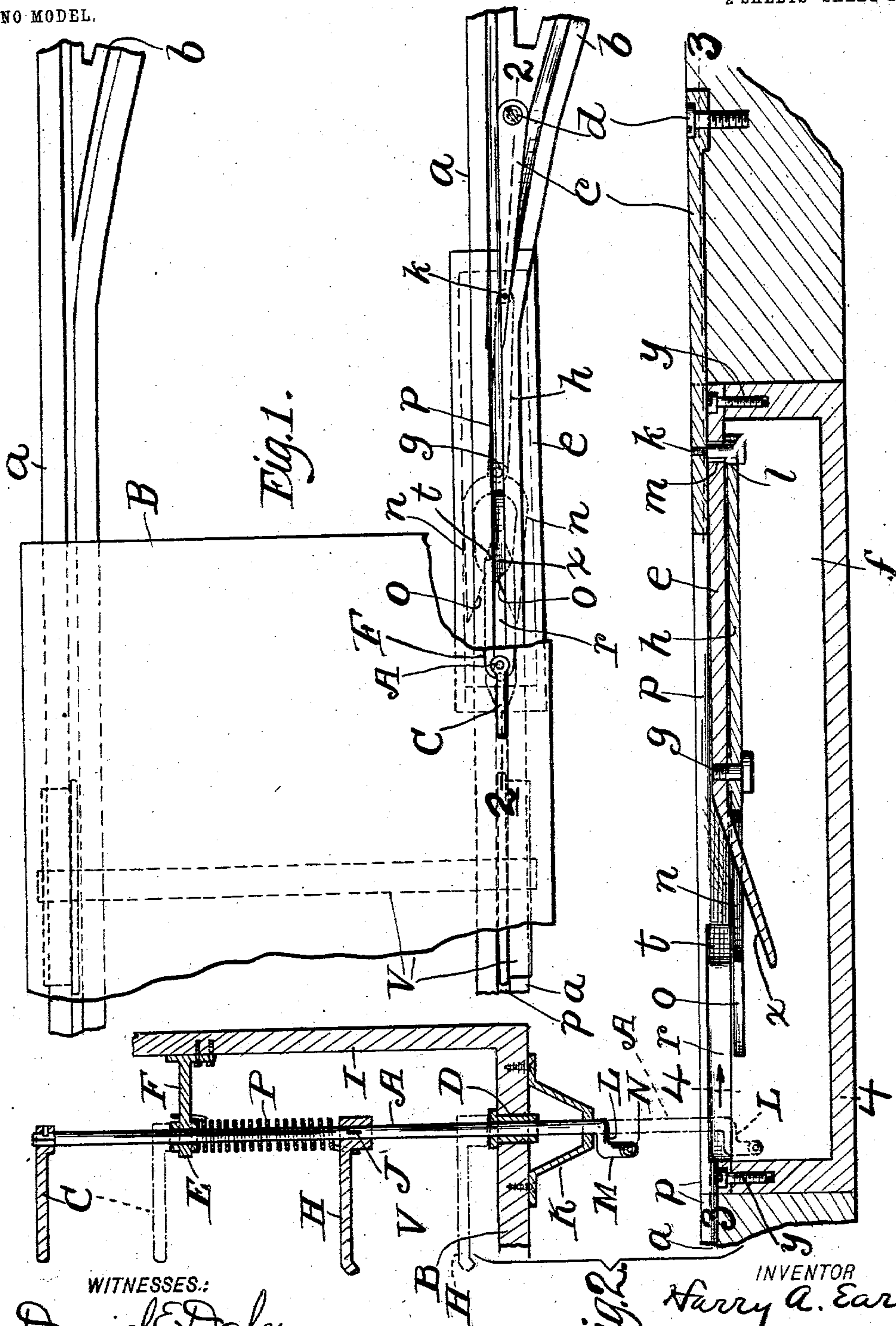
H. A. EARL.

SWITCH TONGUE OPERATING MECHANISM.

APPLICATION FILED FEB. 20, 1903.

2 SHEETS—SHEET 1.

NO MODEL.



WITNESSES.:

Daniel E. Daly.
 G. M. Hayes

INVENTOR

Harry A. Earl

AY

Synch & Worr
his ATTORNEYS

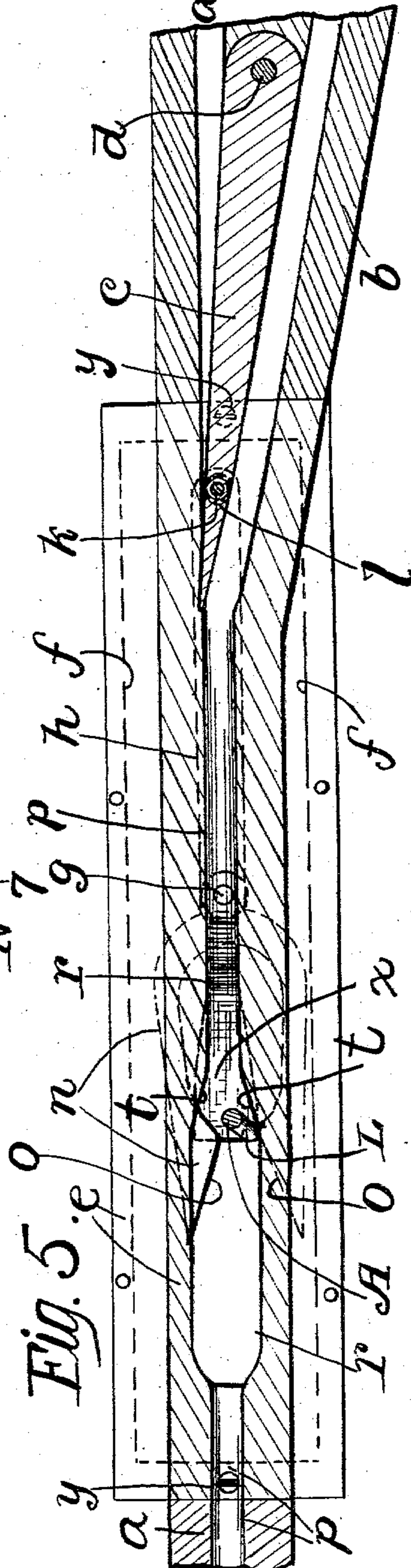
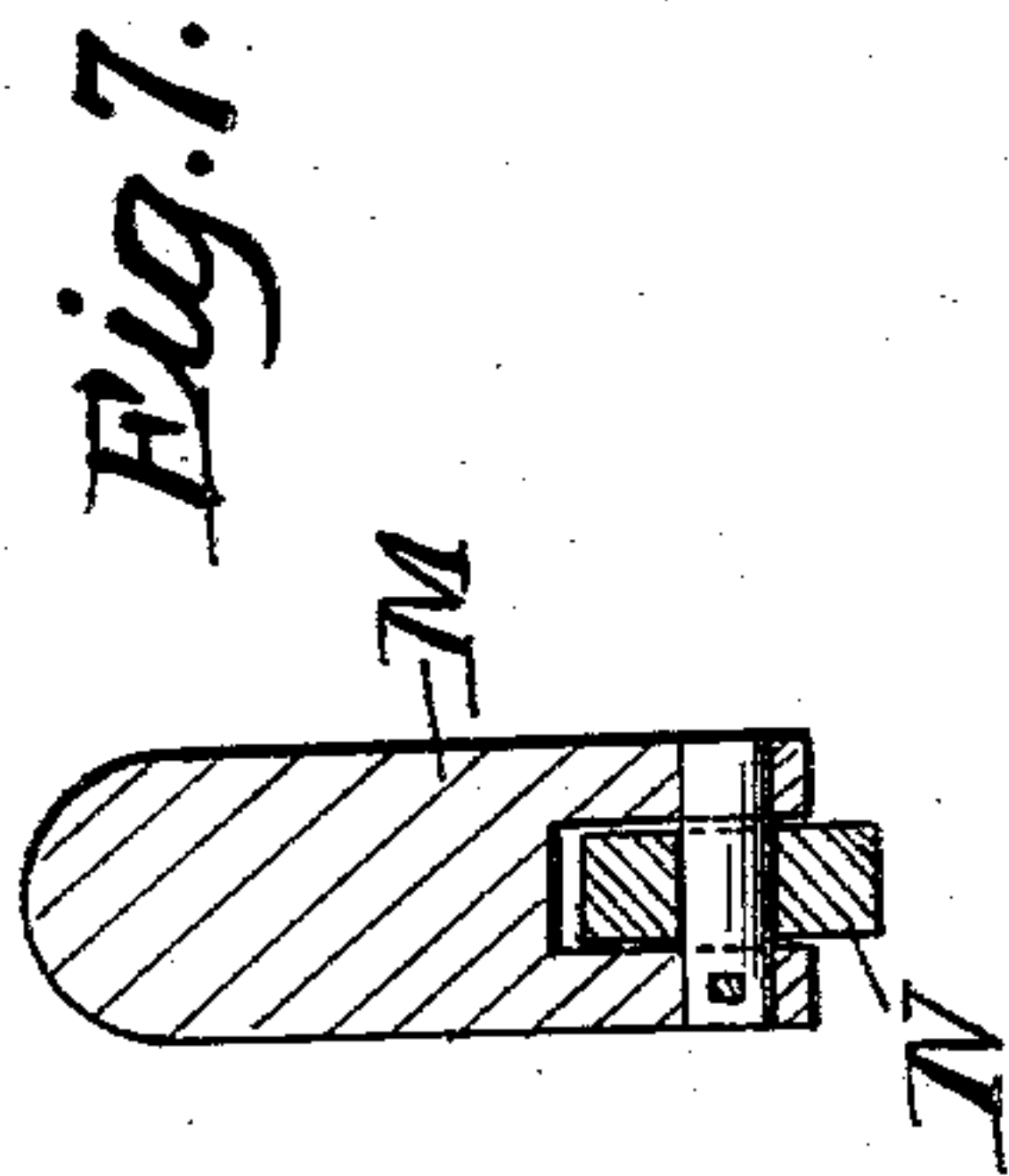
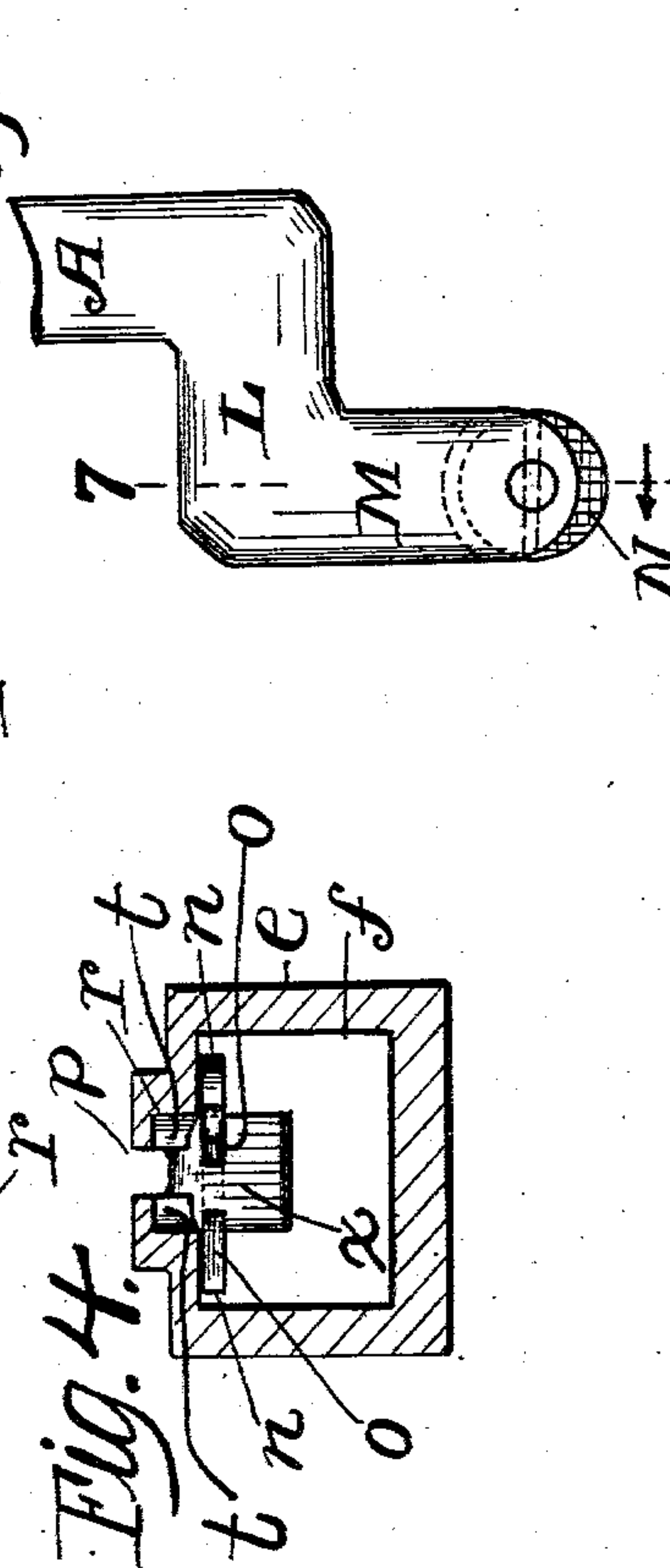
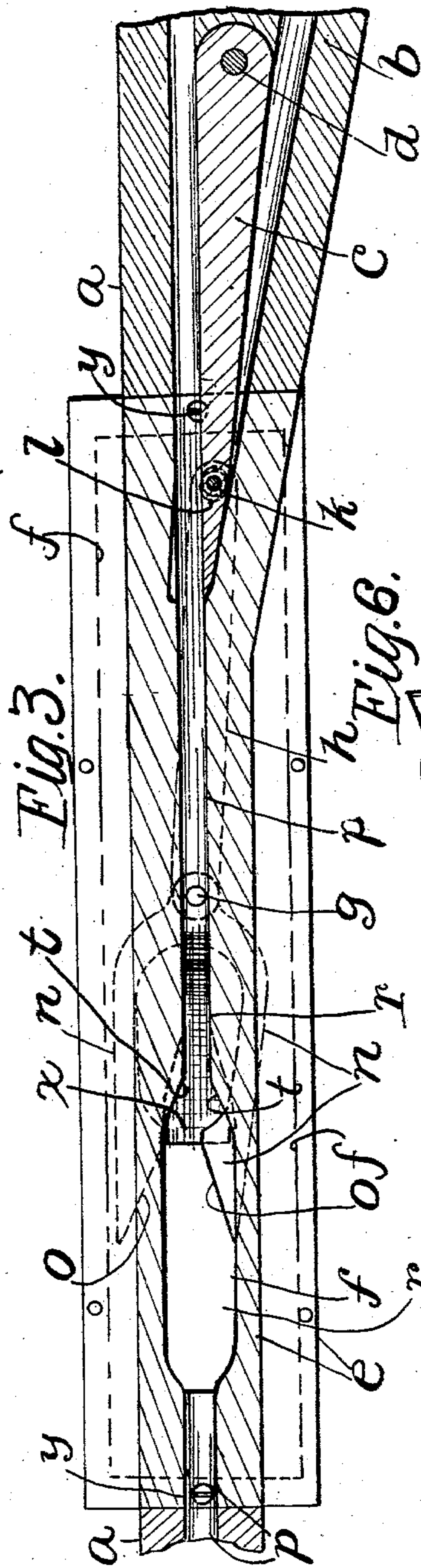
H. A. EARL.

SWITCH TONGUE OPERATING MECHANISM.

APPLICATION FILED FEB. 20, 1903.

NO-MODEL.

2 SHEETS—SHEET 2.



WITNESSES:

Daniel E. Daly.
G. M. Hayes.

INVENTOR

INVENTOR
Harry A. Earl

BY

Synchrover
his ATTORNEYS

UNITED STATES PATENT OFFICE.

HARRY A. EARL, OF CLEVELAND, OHIO, ASSIGNOR TO WILLIAM F. HAFLEY
AND HAZEL EARL, OF CLEVELAND, OHIO.

SWITCH-TONGUE-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 740,356, dated September 29, 1903.

Application filed February 20, 1903. Serial No. 144,277. (No model.)

To all whom it may concern:

Be it known that I, HARRY A. EARL, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Switch-Tongue-Operating Mechanism; and I 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 pertains to make and use the same.

This invention relates to improvements in switch-tongue-operating mechanisms.

The object of this invention is to provide simple, reliable, and convenient mechanism whereby a switch-tongue may be readily operated from a car or vehicle while the said vehicle is in motion.

With this object in view and to the end of realizing other advantages hereinafter appearing this invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a top plan illustrating a portion of a main track, the end of a side track, a switch-tongue, a portion of a car or vehicle moving upon the main track from a direction opposite to the direction in which the said tongue points and mechanism whereby the said tongue can be operated from the said vehicle while the latter is in motion. Fig. 2 is a side elevation, largely in vertical section, on line 2 2, Fig. 1. Fig. 3 is a top plan, in horizontal section, on line 3 3, Fig. 2. Fig. 4 is a transverse vertical section on line 4 4, Fig. 2, looking in the direction indicated by the arrow. Fig. 5 is a top plan corresponding with Fig. 3, except that in Fig. 5 the switch-tongue-operating lever is shown as having been actuated by the lever-operating shaft of the car or vehicle, and the lower portion of the said shaft is also shown. Fig. 6 is a side elevation of the lower portion of the shaft instrumental in actuating the switch-tongue-operating lever. Fig. 7 is a vertical section on line 7 7, Fig. 6. Figs. 2, 3, 4, and 5 are drawn on a larger scale than Fig. 1, and Figs. 6 and 7 are drawn on a still larger scale.

Referring to the drawings, *a* designates the rails of a main track, *b* the rails of a branch or side track, and *c* an ordinary switch-tongue, pivoted vertically at its rear end, as at *d*, to any suitable support. The tongue *c* in Figs. 1, 2, and 3 is shown in line with one of the rails of the main track and in Fig. 5 in position to switch or guide a car or vehicle from the main track onto the side track.

The main track comprises a rail-section *e*, which extends from in under the switch-tongue *c* in the direction in which the said tongue points and a suitable distance beyond the forward or free end of the tongue. The rail-section *e* is provided interiorly with a chamber *f*, which extends longitudinally of the said rail-section.

A lever *h* is arranged within the chamber *f* and extends longitudinally of the said chamber. The lever *h* is fulcrumed vertically, as at *g*, near its central portion and centrally between the ends of the chamber *f* to the top wall of the said chamber. The lever *h* is operatively connected at one end with the forward end of the switch-tongue *c*, and a pivotal pin *k*, which establishes operative connection between the said lever and the switch-tongue, has preferably a screw-threaded upper end and is screwed into a correspondingly-screw-threaded hole formed in the said tongue, and removably attached, therefore, to the tongue. The pin *k* extends from within the engaging hole *l* in the lever *h* through the top wall of the chamber *f*, and the said hole is elongated longitudinally of the lever to accommodate the lateral swinging of the lever during the actuation of the switch-tongue, and the top wall of the chamber *f* is slotted, as at *m*, to accommodate the location of the said pin during the operation of the lever.

The lever *h* is bifurcated forwardly of the fulcrum of the lever, and the two arms *n* of the bifurcated forward portion of the said lever extend forwardly of the said fulcrum and are arranged approximately parallel and longitudinally of the upper portion of the chamber *f*. Each arm *n* is provided at its forward or outer end with an incline *o*, which faces forwardly and laterally inwardly. Obviously,

therefore, the two inclines *o* of the lever-arms *n* diverge forwardly or outwardly longitudinally of the lever.

The rail-section *e* forms a case containing the lever *h*, and the interior chamber *f* of the said case is wide enough to accommodate the location and operation of the bifurcated portion of the lever.

The rails of the tracks, including the rail-section or case *e*, are grooved on top and longitudinally, as at *p*, to form a way for the flanges of the wheels of cars or vehicles propelled or driven on said tracks, and the top wall of the chamber *f* is slotted vertically and longitudinally, as at *r*, to accommodate the extension into the said chamber of a vertically-arranged shaft *A*, which is employed in the operation of the lever *h* and carried by the forward end of the car or vehicle *V*, shown approaching the switch-tongue in Figs. 1 and 2. The shaft *A* extends through the floor *B* of the forward vestibule or platform of the vehicle *V*, having lateral bearing in a vertically-arranged box *D*, which is secured to the said floor. The shaft *A* has lateral bearing also, a suitable distance above the floor *B*, in a vertically-arranged box *E*, which is formed upon a bracket *F*, rigidly secured to the vertically-arranged dashboard or wall *I* of the vestibule or platform. The shaft *A* extends a suitable distance above the bracket *F* and at or near its upper extremity is operatively provided with a hand-lever *C* for oscillating or turning the shaft. The shaft *A* is provided a suitable distance above the floor *B* and below the bracket *F* with a laterally-projecting pedal-forming arm *H*, which is fixed to the shaft, preferably by a key *J*. The shaft *A* also has lateral bearing in a hanger *K*, which is secured to the under side of and depends from the floor *B*. The shaft *A* is provided at its lower end and below the hanger *K* with a laterally-projecting arm *L*. The shaft-arm *L* is provided at its outer end with a depending member *M*, which at its lower end bears a horizontally-arranged roller *N*. The shaft *A* is shiftable vertically and is held in its upper and normal position by a spiral spring *P*, which is coiled upon the shaft between the bracket *F* and the pedal *H*, being attached at its upper end to the said bracket and at its lower end to the said pedal. Obviously, therefore, the shaft *A* is lowered against the action of the spring *P* upon bearing downwardly upon the pedal *H*, which is within convenient reach of the foot of the motorman or operative of the car or vehicle.

The lever *C*, pedal *H*, and shaft-arm *L* are in the normal position of the shaft *A* arranged parallel with the slot *r*, which is formed in the top wall of the case *e* and arranged below and communicates with the way *p* in the top of the said case. The shaft *A* is small enough in cross-section to render it capable of entering the way *p* and of passage into the chamber *f* of the case *e* through the slot *r*. As a

car or vehicle *V* approaches the forward end of the slot *r* the motorman or operative of the vehicle lowers the shaft *A* by placing his foot and bearing downwardly upon the pedal *H*, so as to lower the shaft and bring the lower and roller-bearing end of the shaft into the adjacent groove or way *p* ready for passage through the slot *r* into the chamber *f* as soon as the said end of the said shaft has passed to and over the forward end of the said slot, and the operative as soon as the shaft *A* has been lowered into the said chamber oscillates or turns the shaft in the required direction, as will hereinafter more clearly appear. In the lower position of the shaft *A* the pedal *H* rests upon the box *D*, which therefore forms a stop to limit the downward movement of the shaft.

In dotted lines, Fig. 2, the shaft *A* is shown in its lower position, with its arm *L* arranged within the slot *r*. The slot *r* extends from a point near the forward side of the fulcrum *g* of the lever *h* at the inner ends of the arms *n* of the said lever forwardly a suitable distance beyond the outer or free ends of the said arms. The slot *r* from a point adjacent the inner or rear ends of the inclines *o* forwardly to and a suitable distance beyond the forward or outer ends of the said inclines is wider next below the connected way *p* than the said way and extends laterally of the said way in both directions, and consequently in under the tread of the rail-section or case *e*. The slot *r* therefore accommodates an oscillation of the shaft *A* in either direction in the lower position of the shaft, in which position the shaft-arm *L* is in position partially in the said slot below the said way *p* and partially in the chamber *f* below the said slot, and the top wall of the chamber *f* may be said to be cut away to accommodate the lowering of the shaft into the said chamber and to accommodate the oscillation of the shaft in its lower position. The incline-forming outer end of the one or the other arms *n* of the lever *h* extends in under the slot *r*, according as the lever is in the one or the other of its two positions, and the incline-forming end of the outer arm *n* or the incline-forming end of the inner arm *n* of the said lever extends in under the said slot, according as the switch-tongue is in position in the line of the main track, as shown in Figs. 3 and 4, or in position to switch or guide a car or vehicle from the main track onto the side track, as shown in Fig. 5.

The arrangement of the parts is such that the incline *o* of the lever-arm *n* which projects in under the slot *r* shall be in the path of the outer end of the shaft-arm *L* when the shaft *A* is oscillated in the direction of the said arm upon actuating the shaft into its lower position, and the operative of the vehicle *V* upon lowering the shaft into its lower position preparatory to the operation of the lever *h* by the shaft-arm *L* will oscillate the shaft in the one direction or the other, accord-

ing as the one or the other of the arms n of the said lever projects in under the slot r .

The slot r is gradually reduced widthwise in both directions, as already indicated, where it becomes wider than the connected way p , and each side wall of the said slot at a point where the said slot is increased in width forms, therefore, a stationary laterally and inwardly facing incline t , which slopes forwardly and laterally outwardly. The inclines t , formed upon opposite side walls of the slot r , converge, therefore, in the direction of the rear end of the slot and are arranged between the inner ends of the inclines o and the rear end of the said slot, and the arrangement of the parts is such that the said inclines t are arranged in the path of the upper portion of the shaft-arm L when the shaft A has been oscillated laterally in the lower position of the shaft, and consequently the shaft A is positively oscillated into the position required to accommodate the withdrawal of the said shaft from its lower position, being thus operated by the one or the other incline t , according as the shaft-arm has operated upon the one or the other of the lever-arms n .

The top of the rail-section or case e at the bottom of the way p of the said case is provided with a stationary upwardly-facing incline x , which is arranged longitudinally of the said case between the lever-arms n and slopes downwardly and forwardly from a point in close proximity to the forward side of the fulcrum g of the lever h . The incline x is arranged in the path of the roller N of the shaft-arm L when the shaft is in its lower position, and the arrangement of the parts is such that the incline x shall have commenced to operate upon the shaft and begun to lift the said shaft immediately upon or somewhat before the completion of the operation of the shaft by the one or the other of the inclines t .

The spring P , acting to retain the shaft in its upper and normal position, as already indicated, obviously is placed under torsional strain in oscillating the shaft preparatory to the operation of the lever h and then acts to oscillate the said shaft into its normal position, and the shaft may be manipulated by the operative of the vehicle V in returning the said shaft into its normal position; but in any event the side inclines t and the upwardly-facing central incline x afford means for positively effecting a return of the said shaft into its normal position upon the operation of the lever h by the said shaft.

The upper portion of the case e consists, preferably, of a piece which is removably secured by means of screws y to the lower portion of the said case.

What I claim is—

1. The combination, with the main track, a branch or side track, and the vertically-pivoted switch-tongue arranged in line with a rail of the main track, or in position to switch a car or vehicle from the main track onto the side track, according as the tongue is in the

one or the other of its two positions, and the said rail comprising a case-forming rail-section which extends from in under the switch-tongue a suitable distance forwardly of the said tongue and has an interior chamber, of a lever arranged within and longitudinally of the said chamber and fulcrumed to the top wall and centrally between the ends of the said chamber, which lever is slotted vertically and longitudinally at its rear end and bifurcated longitudinally forwardly of its fulcrum and has each arm of its bifurcated portion provided with a forwardly and laterally inwardly facing incline, so that the inclines of both arms diverge forwardly; a vertically-arranged pivotal pin extending through the aforesaid slot in the lever and attached to the switch-tongue; a vertically-arranged and vertically-shiftable shaft carried by the car or vehicle moving upon the main track in the direction of the side track, which shaft is provided, at its lower end, with a laterally-projecting arm; means acting to retain the shaft in its upper and normal position, and the arrangement of the parts being such that the said shaft-arm shall be in position to engage the one or the other of the aforesaid inclines according as the shaft is oscillated in the one or the other direction when the shaft is in its lower position, and the switch-tongue shall be in line with the main track or in position to switch onto the side track according as the one or the other of the said inclines shall be in position to be engaged by the aforesaid shaft-arm, and the top wall of the aforesaid case being slotted to accommodate the location and operation of the aforesaid lever.

2. The combination, with the main track, a branch or side track, and a movable switch-tongue arranged in line with a rail of the main track, or in position to switch a vehicle from the main track onto the side track, according as the tongue is in the one or the other of its two positions, said rail comprising a case-forming rail-section which extends from in under the switch-tongue a suitable distance forwardly of the said tongue and has an interior chamber, of a lever arranged within and longitudinally of the said chamber and adapted to swing in a horizontal plane, which lever is operatively connected, at its rear end, to the switch-tongue and bifurcated longitudinally forwardly of its fulcrum and has each arm of its bifurcated portion provided with a forwardly and laterally inwardly facing incline so that the inclines of both arms are oppositely arranged and diverge forwardly; an upright vertically-shiftable shaft carried by the vehicle moving upon the main track in the direction of the side track and provided, at its lower end, with a laterally-projecting arm; means acting to retain the shaft in its upper and normal position, and the arrangement of the parts being such that the said shaft-arm shall be in position to engage the one or the other of the aforesaid inclines according as the shaft is oscillated in the one

or the other direction when the shaft is in its lower position, and the switch-tongue shall be in line with the main track or in position to switch onto the side track according as the one or the other of the said inclines shall be in position to be engaged by the aforesaid shaft-arm, and the top wall of the aforesaid case being slotted to accommodate the location and operation of the aforesaid lever.

3. The combination, with the main track, a branch or side track, and a movable switch-tongue arranged in line with the main track, or in position to switch a car or vehicle from the main track onto the side track, according as the tongue is in the one or the other of its two positions, of a lever arranged longitudinally of the main track and adapted to swing in a horizontal plane, which lever is operatively connected, at its rear end, with the switch-tongue and bifurcated longitudinally forwardly of its fulcrum and has each arm of its bifurcated portion provided with a forwardly and laterally inwardly facing incline so that the inclines of both arms diverge forwardly, and an upright vertically-shiftable shaft carried by the vehicle moving upon the main track in the direction of the side track, which shaft is provided with a laterally-projecting arm instrumental in the operation of the aforesaid lever, and the arrangement of the parts being such that the said shaft-arm shall be in position to engage the one or the other of the aforesaid inclines according as the shaft is oscillated in the one direction or the other when the shaft is in its lower position, and the switch-tongue shall be in line with the main track or in position to switch onto the side track according as the one or the other of the said inclines shall be in position to be engaged by the aforesaid shaft-arm.

4. The combination, with the main track, a branch or side track, and a movable switch-tongue arranged in line with the main track, or in position to switch a car or vehicle from the main track onto the side track, according as the tongue is in the one or the other of its two positions, of a lever arranged to swing in a horizontal plane below and operatively connected with the switch-tongue, which lever extends a suitable distance forwardly of the tongue and is bifurcated longitudinally forwardly of its fulcrum and has each arm of its bifurcated portion provided with a forwardly and laterally inwardly facing incline, and means carried by the vehicle moving upon the main track in the direction of the side track and instrumental in the operation of the aforesaid lever, and the arrangement of the parts being such that the said lever-operating means shall be capable of being brought into engagement with the one or the other of the aforesaid inclines and that the switch-tongue shall be in line with the main track or in position to switch onto the side track according as the one or the other of the said

inclines shall be in position to be engaged by the aforesaid lever-operating means.

5. The combination, with the main track, a branch or side track, and a movable switch-tongue arranged in line with a rail of the main track, or in position to switch a car or vehicle from the main track onto the side track, according as the tongue is in the one or the other of its two positions, said rail comprising a case-forming rail-section which extends from in under the switch-tongue a suitable distance forwardly of the said tongue and has an interior chamber; a lever arranged to swing horizontally within and extending longitudinally of the said chamber, which lever is operatively connected with the switch-tongue and is bifurcated longitudinally forwardly of its fulcrum and has each arm of its bifurcated portion provided with a forwardly and laterally inwardly facing incline so that the inclines of both arms of the bifurcated portion of the lever are oppositely arranged and diverge forwardly; an upright vertically-shiftable shaft carried by a vehicle moving upon the main track in the direction of the side track and provided with a laterally-projecting arm terminating at its outer end in a depending member; means acting to retain the shaft in its upper and normal position, and the arrangement of the parts being such that the aforesaid shaft-arm, in the lower position of the shaft, shall be in position to engage the one or the other of the aforesaid inclines upon the oscillation of the shaft in the one or the other direction, and the top wall of the aforesaid case being slotted to accommodate the passage of the shaft into its lower and operative position and to accommodate the operative connection between the aforesaid lever and the switch-tongue, of two stationary side inclines formed interiorly of the aforesaid case and arranged at opposite sides respectively of the path of the shaft adjacent the rear ends of the different inclines respectively of the lever and converging rearwardly, and another downwardly and forwardly sloping stationary incline arranged between the stationary side inclines and in position to be engaged by the lower end of the aforesaid depending member of the shaft-arm in the lower position of the shaft, substantially as and for the purpose set forth.

6. The combination, with the main track, a branch or side track, and a movable switch-tongue arranged in line with the main track, or in position to switch a car or vehicle from the main track onto the side track, according as the tongue is in the one or the other of its two positions; a lever arranged to swing horizontally below the switch-tongue and extending longitudinally and forwardly of the tongue, which lever is operatively connected with the said tongue and is bifurcated longitudinally forwardly of its fulcrum, and has each arm of its bifurcated portion provided

with a forwardly and laterally inwardly facing incline, so that the inclines of both arms of the said bifurcated portion diverge forwardly; an upright endwise-shiftable shaft 5 carried by a vehicle moving upon the main track in the direction of the side track and provided with a laterally-projecting arm having a depending member; means acting to retain the shaft in its upper and normal position, 10 and the arrangement of the parts being such that the aforesaid shaft-arm in the lower position of the shaft shall be in position to engage the one or the other of the aforesaid inclines upon the oscillation of the shaft in the 15 one or the other direction, and the switch-tongue shall be in line with the main track or in position to switch onto the side track according as the one or the other of the said inclines shall be in position to be engaged by 20 the said shaft-arm, of two stationary side inclines arranged at opposite sides respectively of the path of the shaft adjacent the rear ends of the different inclines respectively of the lever and converging rearwardly, and another 25 downwardly and forwardly sloping stationary incline arranged between the stationary side inclines and in position to be engaged by the aforesaid depending member of the shaft-arm in the lower position of the shaft, substantially as and for the purpose set forth. 30

7. The combination, with the main track, a branch or side track, and a movable switch-tongue arranged in line with the main track, or in position to switch a car or vehicle from 35 the main track onto the side track, according as the tongue is in the one or the other of its two positions, of a lever arranged to swing in a horizontal plane and extending from in under the switch-tongue forwardly, which lever 40 is operatively connected with the said tongue and provided forwardly of its fulcrum with a laterally and forwardly facing incline; an up-

right endwise-shiftable shaft carried by a vehicle moving upon the main track in the direction of the side track and provided, at its 45 lower end, with a laterally-projecting arm arranged to engage the aforesaid incline upon oscillating the shaft in the required direction when the shaft is in its lower position, and a stationary side incline arranged rearwardly 50 of the incline of the aforesaid lever and in position to be engaged by the aforesaid shaft-arm when the shaft has been oscillated as aforesaid in the lower position of the shaft.

8. The combination, with the main track, 55 a branch or side track, and a movable switch-tongue arranged in line with the main track, or in position to switch a car or vehicle from the main track onto the side track, according as the tongue is in the one or the other of its 60 two positions, and a lever arranged to swing in a horizontal plane and extending from in under the switch-tongue forwardly, which lever is operatively connected with the said tongue and provided, forwardly of its ful- 65 crum, with a forwardly and laterally facing incline, of an upright endwise-shiftable shaft carried by a vehicle moving upon the main track in the direction of the side track, and provided, at its lower end, with a laterally- 70 projecting arm arranged to engage the aforesaid incline upon oscillating the shaft in the required direction when the shaft is in its lower position, and a suitably-applied spring acting to retain the shaft in its upper and nor- 75 mal position.

In testimony whereof I sign the foregoing specification, in the presence of two witnesses, this 14th day of February, 1903, at Cleveland, Ohio.

HARRY A. EARL.

Witnesses:

C. H. DORER,
TELSA SCHWARTZ.