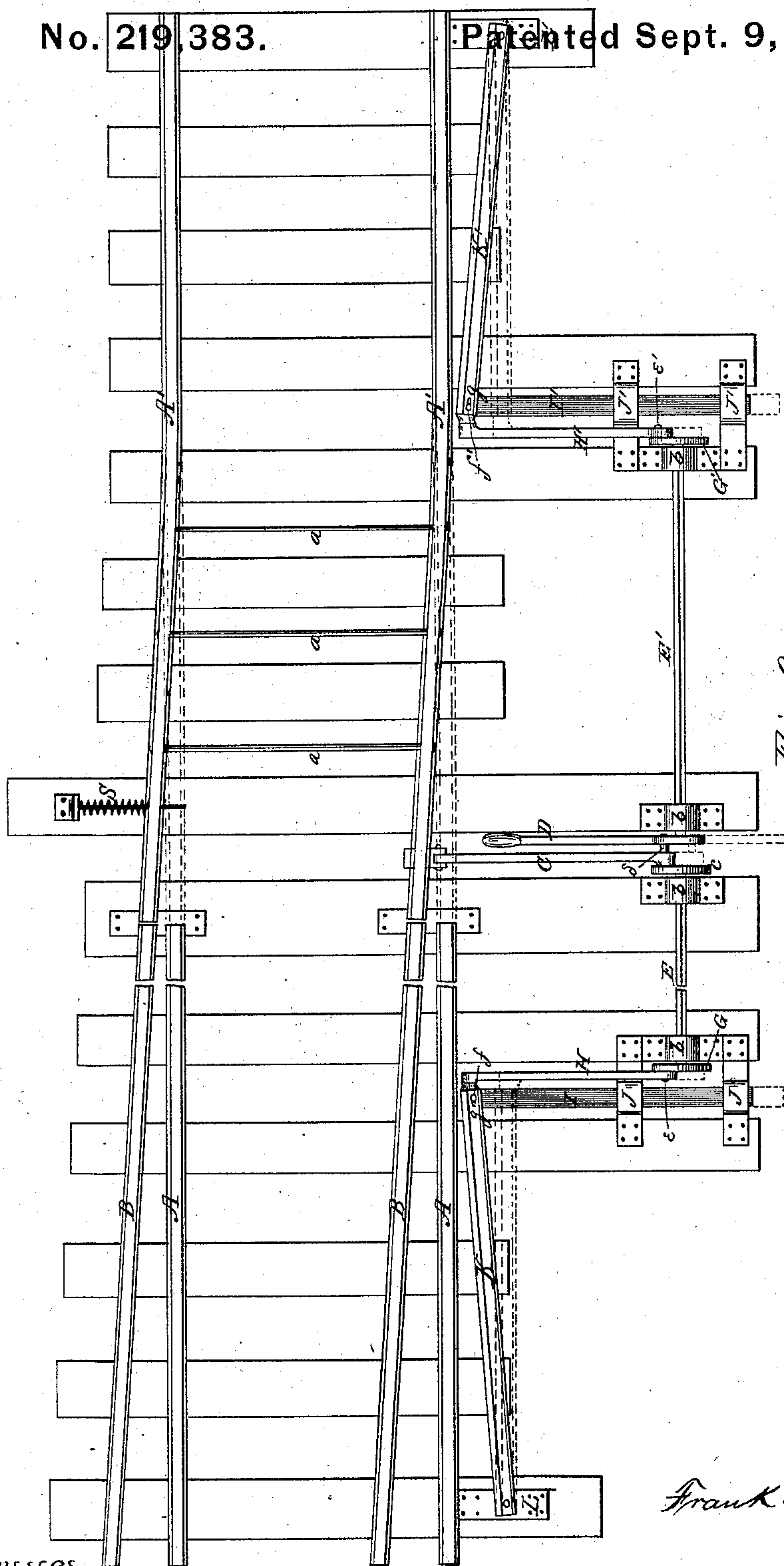


F. L. BRIDGES.  
Railway-Switch.

No. 219,383.

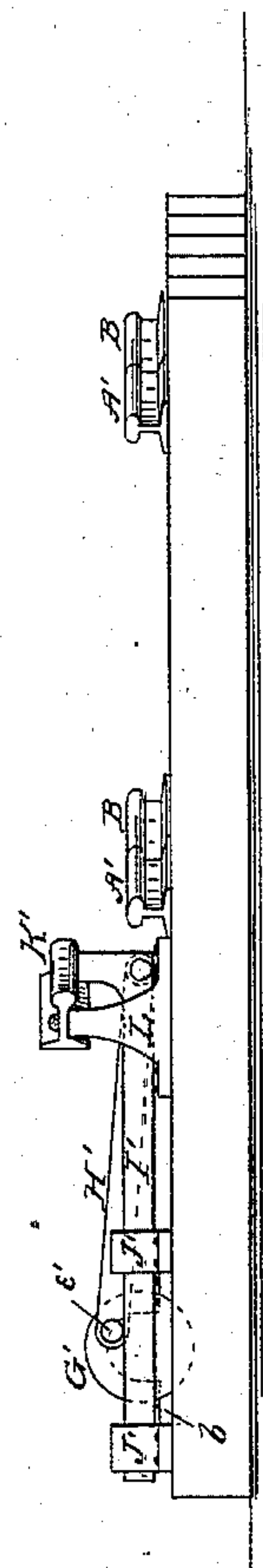
**Patented Sept. 9, 1879.**



Witnesses:

F. A. Peabody.  
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Fig. 2.



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by Connolly Broderick &  
Attorneys

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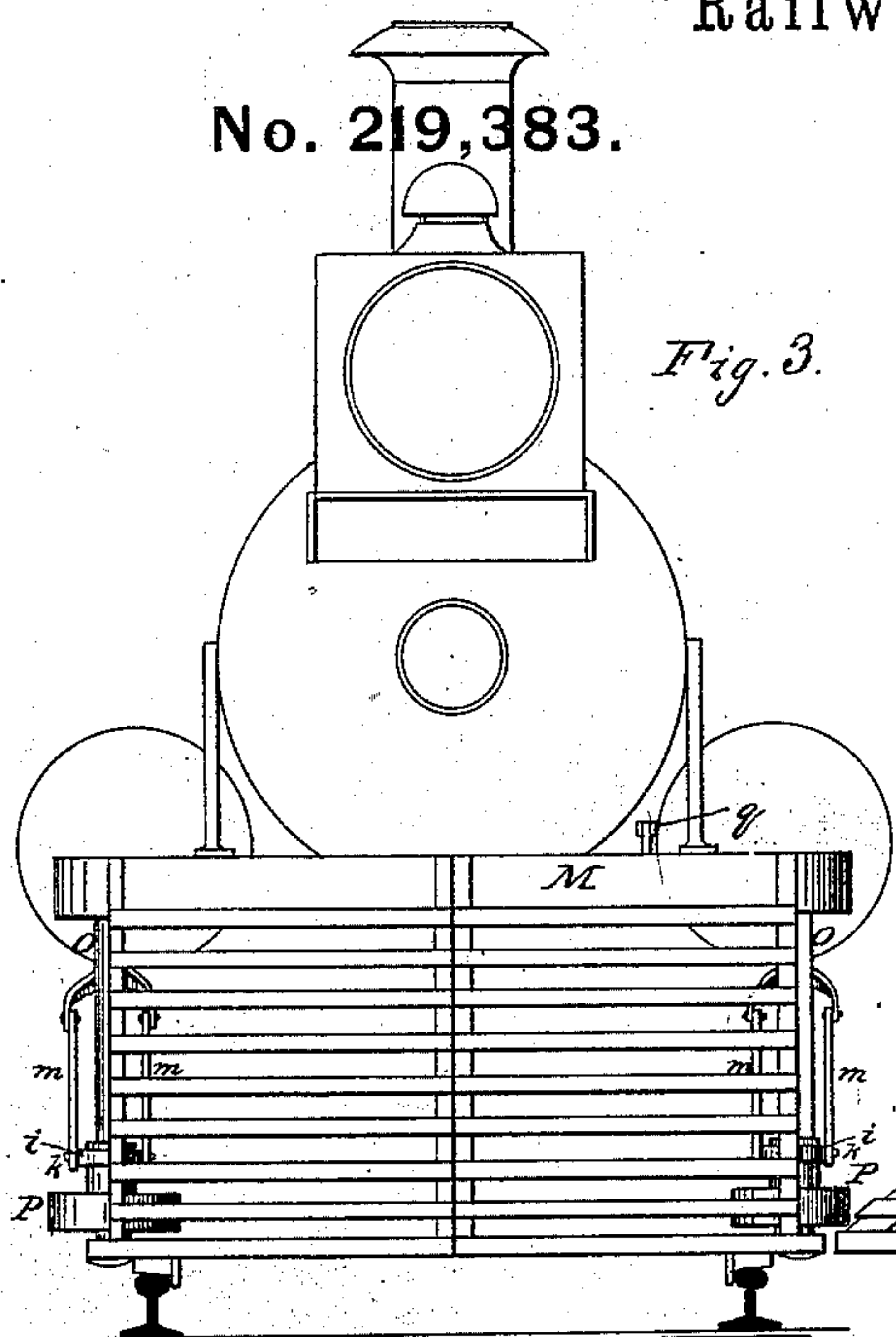


Fig. 3.

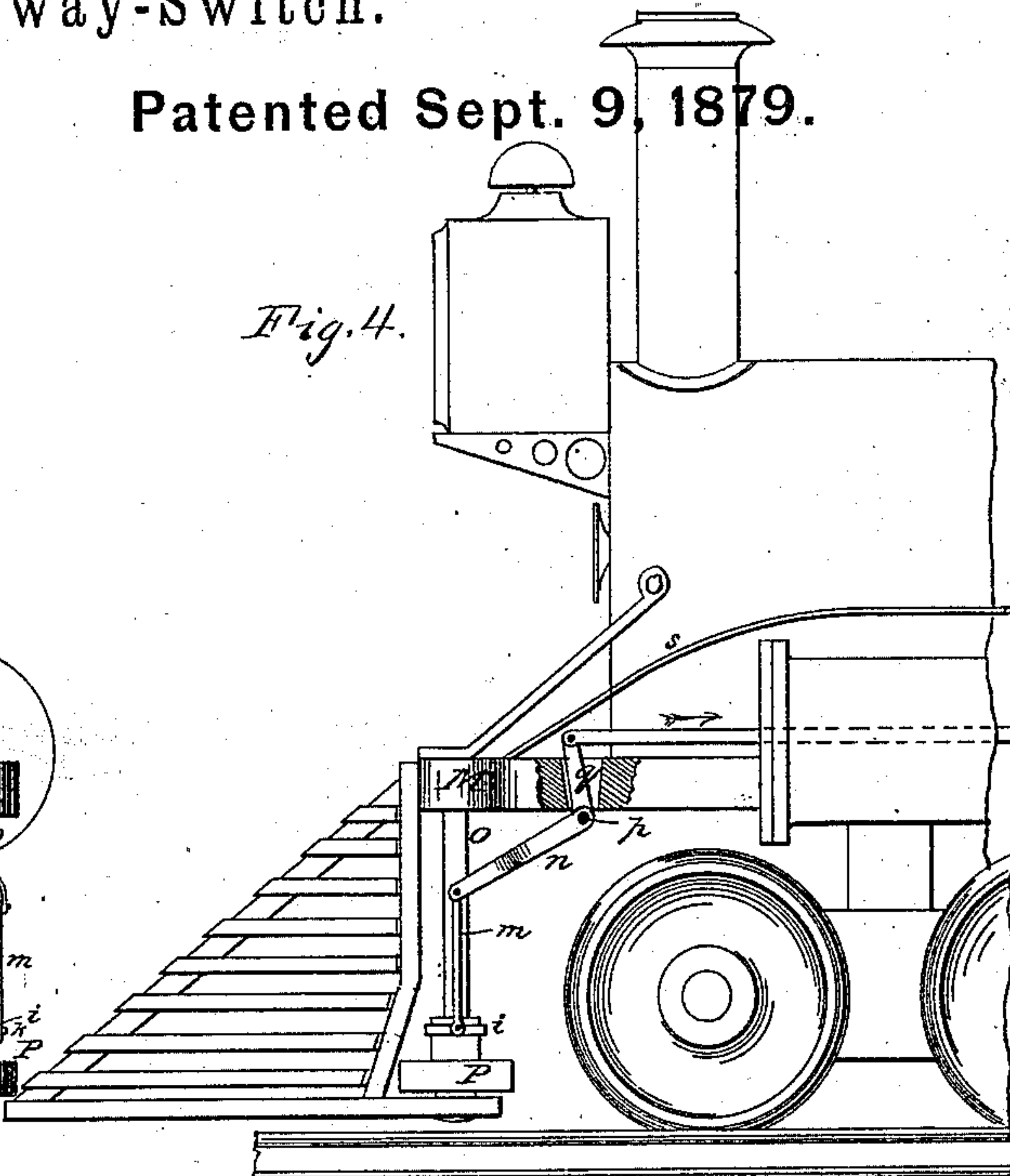


Fig. 4.

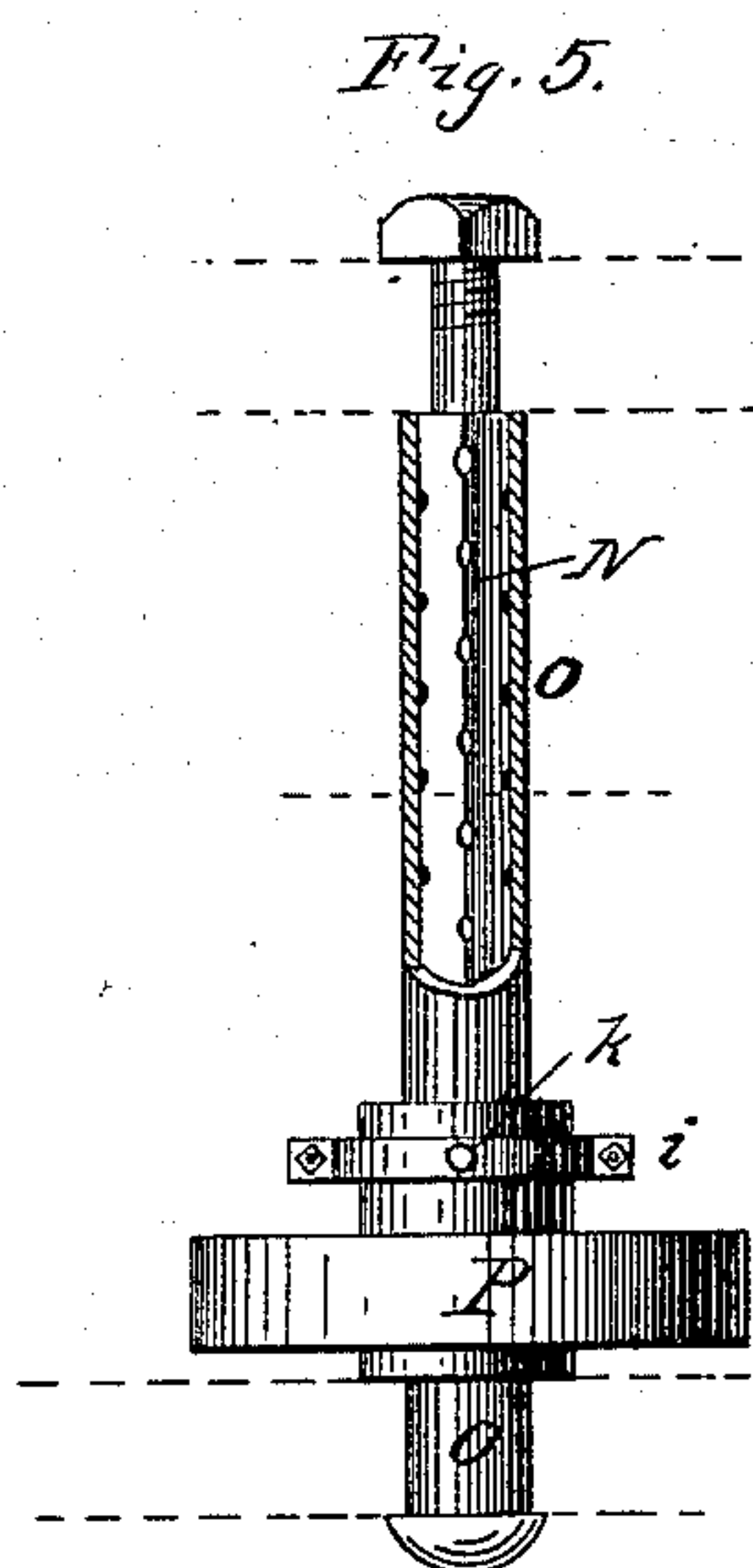


Fig. 5.

Fig. 7.

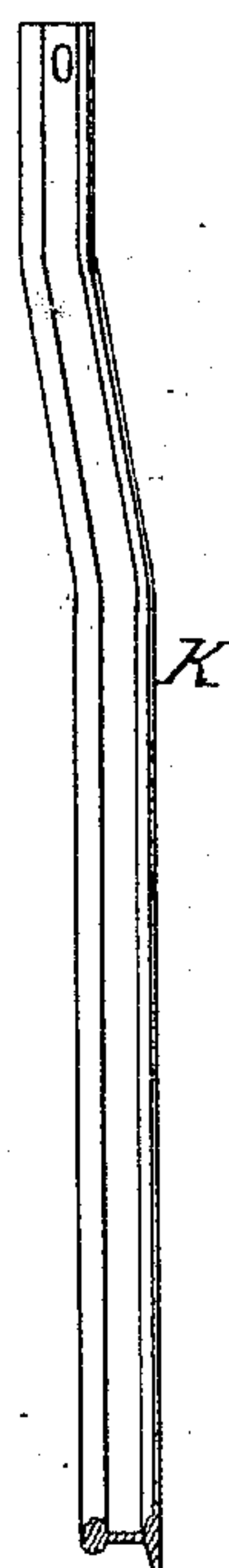
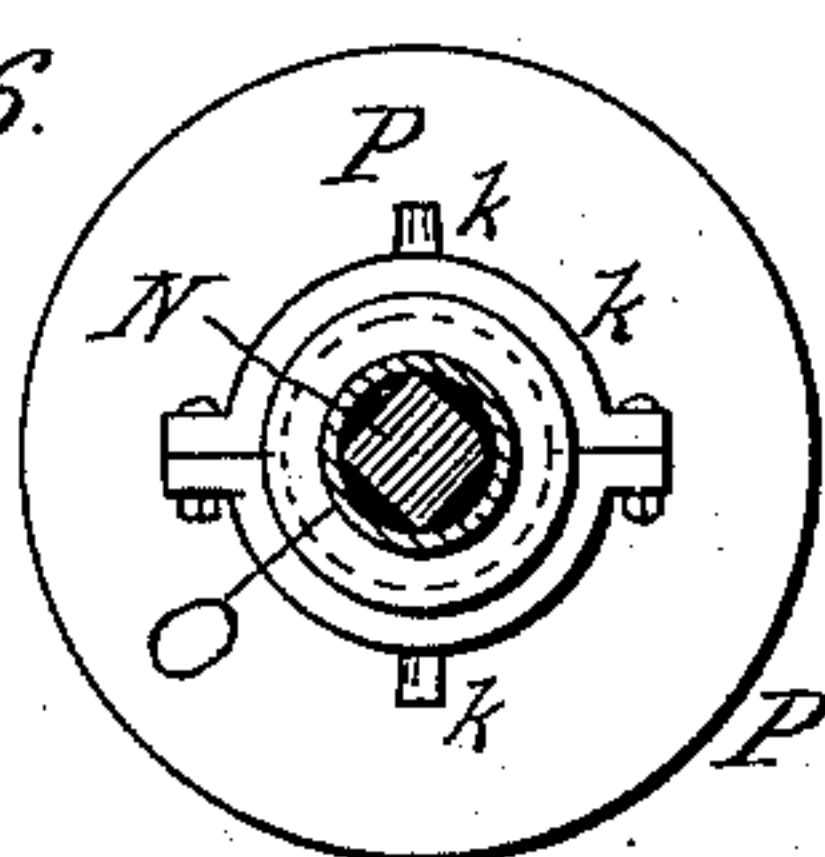


Fig. 6.



Witnesses  
J. A. Pollock.  
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# UNITED STATES PATENT OFFICE.

FRANK L. BRIDGES, OF BRADDOCK'S, PENNSYLVANIA.

## IMPROVEMENT IN RAILWAY-SWITCHES.

Specification forming part of Letters Patent No. **219,383**, dated September 9, 1879; application filed May 2, 1879.

*To all whom it may concern:*

Be it known that I, FRANK L. BRIDGES, of Braddock's, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Safety Attachments for 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a plan view of a switch with my attachments. Fig. 2 is an end view of same. Fig. 3 is a front view of engine with my attachments. Fig. 4 is a side view of same. Figs. 5, 6, and 7 are details.

My invention relates to the construction of devices for attachment to the switches and rolling-stock of railroads, for the purpose of affording absolute security to trains and passengers.

My invention consists in the construction, novel arrangement, and combination of devices hereinafter described, as specifically set forth in the claims.

My object is to so arrange the devices that the switch, if set for a siding, will be completely under the control of the engineer, so that at will he can permit his train to take the siding or throw the switch for the main line in one direction, and if going in the other direction he can set the switch for the main, and thus prevent his train from running off the open ends of the main line; also, to effect these operations by day or night without the assistance of signal-lanterns or danger-lights of any description.

I will describe my invention as applied to a common square-cut switch, though it is equally adaptable to all styles of switches.

A A designate the main rails, and A' A' the points or movable parts thereof capable of being aligned therewith or set over to the turnout or siding rails B B.

The usual way of accomplishing this movement is to tie the rails A' A' together with bridle-rods *a* for about half their length, the remainder being spiked to the ties, and effecting the throw by a suitable rod and crank-lever. This I do not change.

The switch-rails are thrown by the rod C and crank-lever D. I connect the lever D and rod C to a double shaft, E E', extending in both directions, and journaled in blocks *b* on the ties or extensions therefrom. Lever D and shafts E E' are connected, not on a common axis, but by means of an eccentric or circular crank, *c*, whose axis is that of the shafts, and whose wrist *d* is connected to the lever D and rod C, as shown. Thus nothing prevents the switch from being set by hand.

At the extreme ends of the shafts E E', respectively, similar circular cranks G G' are connected thereto, and to the wrists *e e'* thereof are attached crank-rods H H', which extend toward the main rails, and at a point short of the same are pivoted to the slide-bars I I', which are fitted in suitable guides J J' on the ties, as shown.

The outer ends of bars I I' are attached, by means of pins *f f'* and slots *g*, to the horizontal rails K K', which extend alongside the main-line rails at a height of six or eight inches therefrom, and in a direction away from the switch-opening, and which are, at their far ends, pivoted on blocks L L'.

The cranks and rods are relatively so located that when the switch is set for the main line both rails K K' lie parallel therewith; but when set for the siding they are thrown inwardly in a position inclining horizontally toward the main-line rails in the direction of the switch.

This construction gives the same arrangement on both ends of the switch, and any body moving in either direction on the main line which can come in contact with the inclining rails K K' will push them aside, and thereby, through the medium of the bars, cranks, and shafts before described, will exert a pull on the rod C and throw the points for the main line. This will occur no matter in what direction the body may be moving.

It next becomes necessary to furnish devices to place these operations under the immediate control of the engineer. I proceed then as follows: To the bumper M of the engine I attach a square shaft, N, having notches in its edges, (see Fig. 5,) and passing down to and through the bottom bar of the pilot, being retained in place by nuts, keys, or other means. Outside



this shaft N, I place a tubular shaft, O, held in place by the bumper and the bottom of the pilot. On this is placed a loose horizontal friction-wheel, P, one on each side of the pilot, having the loose collar *i* on its hub, with pins *h*, to which are attached links *m*, connecting with cranks *n* on a shaft, *p*, which is arranged transversely on the engine-timbers. Another crank, *q*, at an angle with cranks *n*, is attached to shaft *p*, and, by suitable rods or connections, the crank *q* may be operated by the engineer in his cab. By one motion he elevates the wheels P, and by a reverse motion he depresses them. This movement enables him to lower the wheels P to strike and operate the rails K K' when required, or to elevate them in order to enter a siding, said wheels P, when lowered, rolling against rail K, and when elevated passing along above without touching the rails K.

The tubular shaft O is fitted with a steam-pipe, *s*, from the steam-dome, so that steam passes in, and by reason of notched shaft N circulates around inside the bearing of the wheels P, thereby preventing them from freezing in cold weather.

Pipe *s* may pass through the cab, and have a valve, in order to be under control for mild weather.

An outlet for the steam is constructed at the bottom of shaft O, and may be connected to the smoke-stack or ash-box, or it may remain open.

The circular cranks *c* G G' also perform an important function. Being circular, if dirt, stones, ice, or caked snow should get under them, no harm arises, because their edges always revolve in the same plane, and no peripheral projections exist for the obstructions to catch. Such is not the case with simple cranks, for these, in order to work, must have an open space below for play, and if a train depended for safety upon the operation of the cranks when ice, stones, or other obstructions got under the cranks, it would be thrown from the rails by the failure and inability of the cranks to revolve.

A special object may be attained in making the long shafts E E' of square or prismatic section. Being so long, and it being necessary that the crank-wrists should always be similarly disposed, if they be round, as now is the case in this class of switches, an accidental twist of the shaft cannot be seen except by a careful examination; but by the use of a square shaft the slightest twist can be instantly detected. Obviously any prismatic or fluted form is the equivalent of square.

The work of the various devices may be lessened by attaching a coiled spring, S, to the movable rails of the switch, the movement of these in being set for the siding acting to compress the spring, so that when the first movement of the cranks takes place the expansion of the spring assists them.

When an engine starts out on the trip the engineer lowers his safety-wheels, and if any switch be misplaced, no matter in which direction he may be running, it will be righted without further attention from him.

A gong can be attached to the switch or in the cab, and suitable devices arranged so that the gong will be struck every time a misplaced switch is righted, day or night, thus notifying the engineer, who can then report the facts to his superiors.

In order to throw the switch at such points where all trains are required to move slowly—as on bridges or their approaches or short curves—I modify the form of rails K to that shown by Fig. 7, the main portion being straight, then inclining rapidly, and continuing on straight again. When the safety-wheel strikes such a rail it first acts slowly on the long straight part, and then mounts the steep incline, which throws the switch quickly while the engine is moving but a foot or two.

I am aware that it is not new or original with me to provide for the automatic adjustment of a switch by means of a roller on a vertical axis attached to the locomotive and under the control of the engineer. I do not, therefore, broadly claim a mechanical organization adapted to such function.

I claim as new and desire to secure by Letters Patent—

1. The combination, with the switch-rails A' A' and rod C, of shafts E E', cranks *c* G G', wrists *d e e'*, rods H H', bars I I', guides J J', and horizontal pivoted operating-rails K K', elevated above the main rails and at one side thereof, substantially as described.

2. The combination of horizontal operating-rails K K', rods H H', slide-bars I I', and guides or keepers J J', substantially as shown.

3. The combination of wheel P, tubular shaft O, prismatic notched shaft N therein, and a steam-pipe, *s*, leading from the steam-space of the boiler, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of April, 1879.

FRANK L. BRIDGES.

Witnesses:

J. H. McCUNE,

EDWARD J. BORLAND.