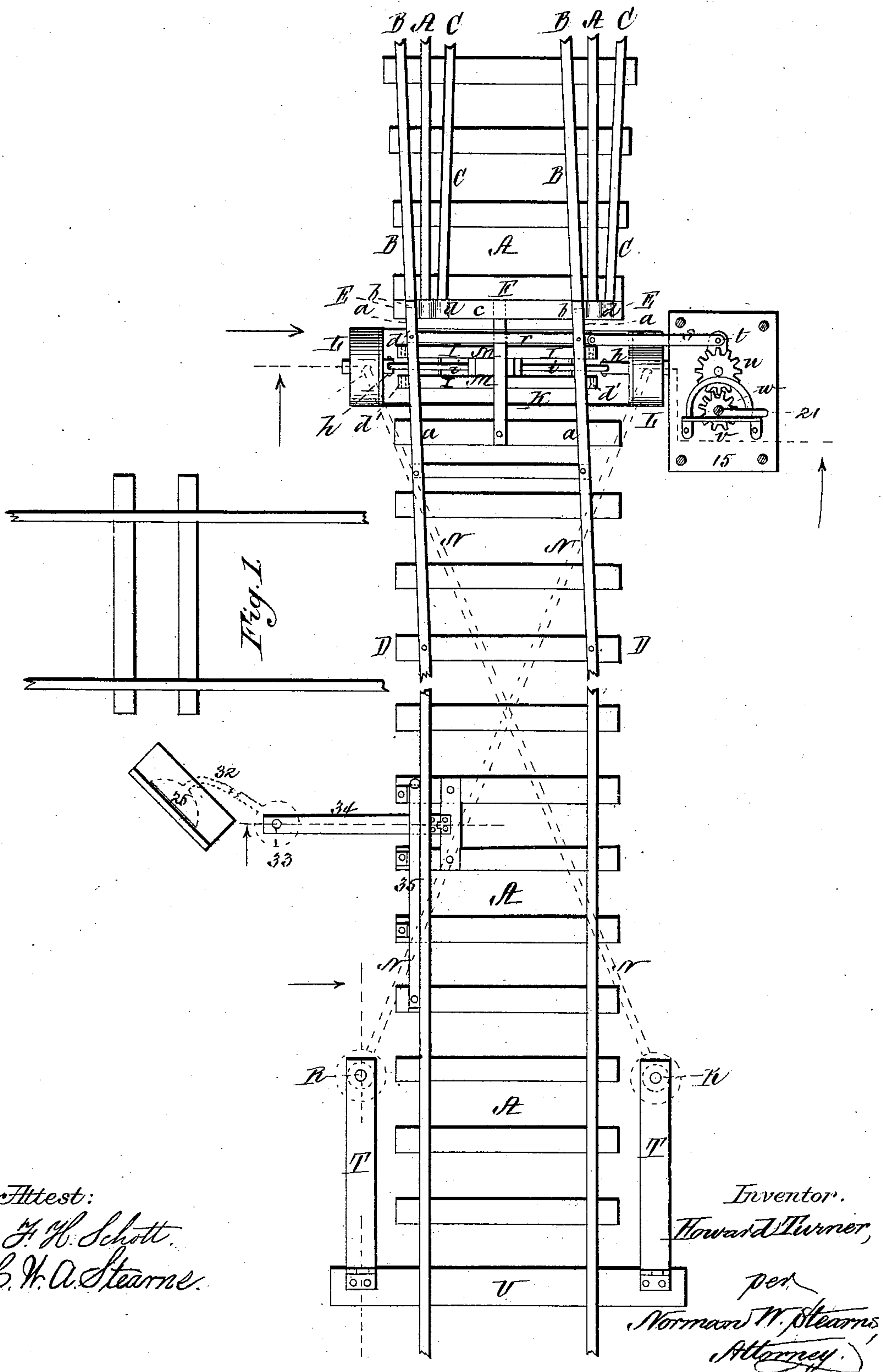


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Pneumatic Railroad Switch and Signal Apparatus.  
No. 226,637. Patented April 20, 1880.



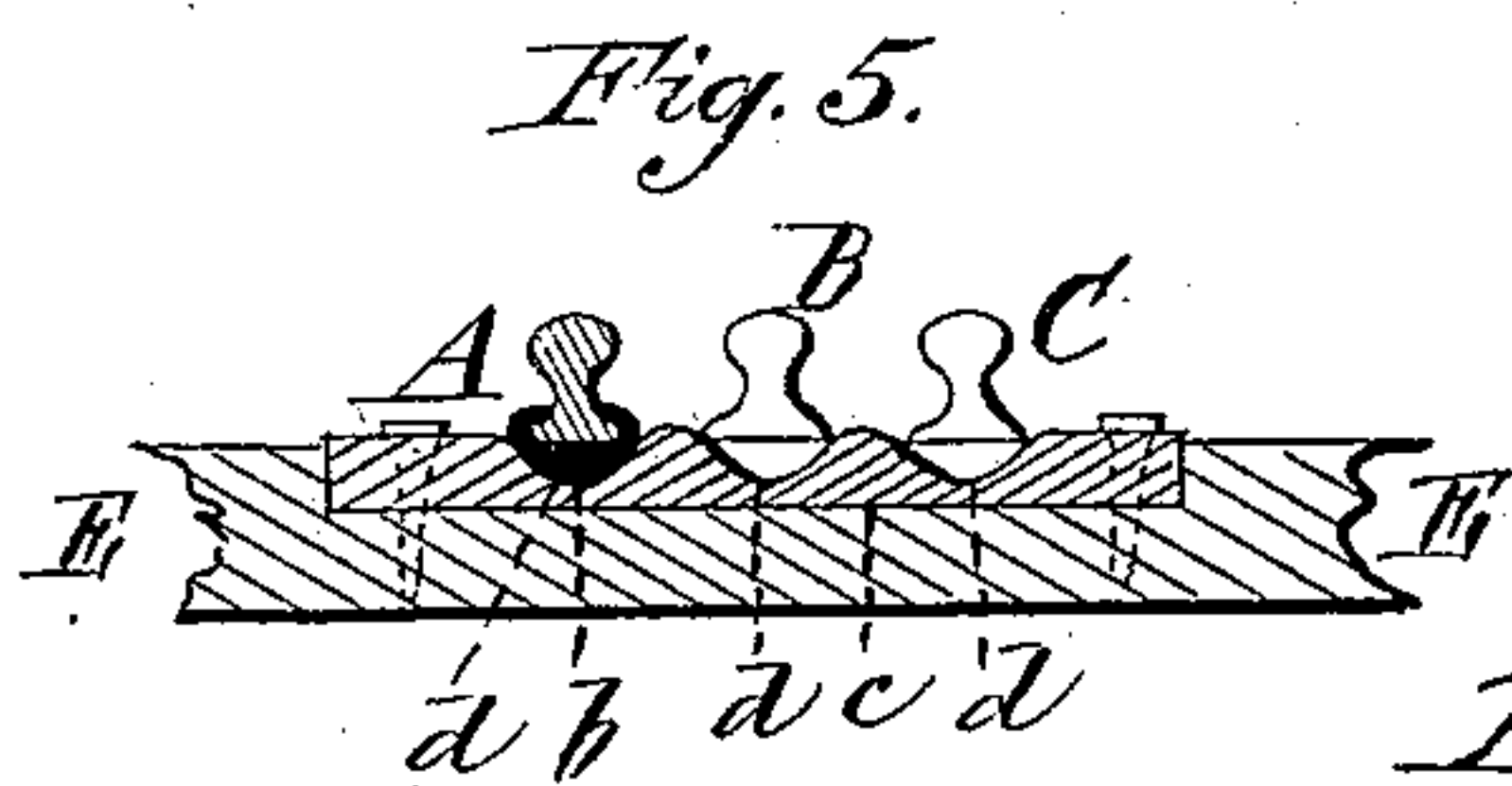
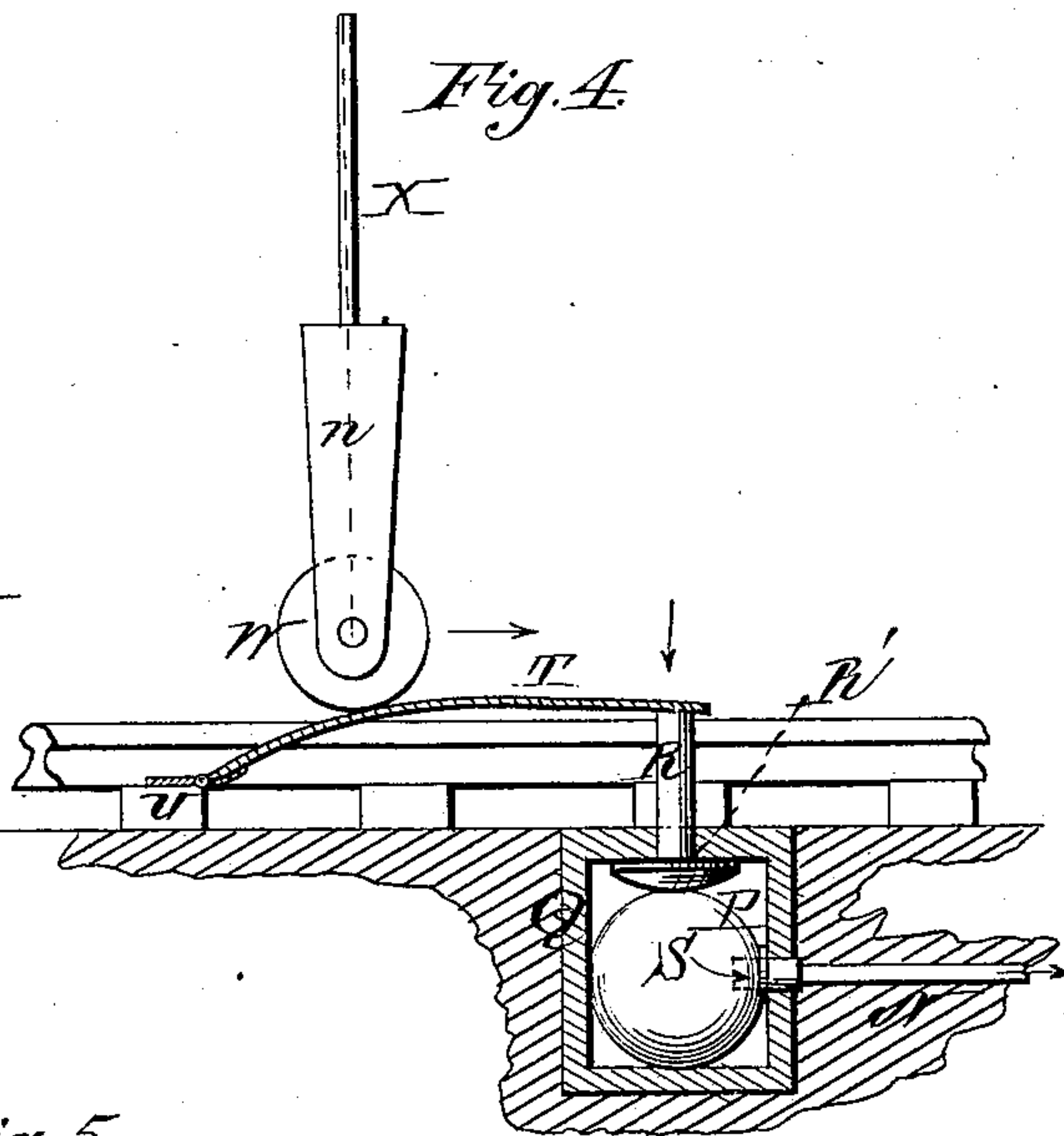
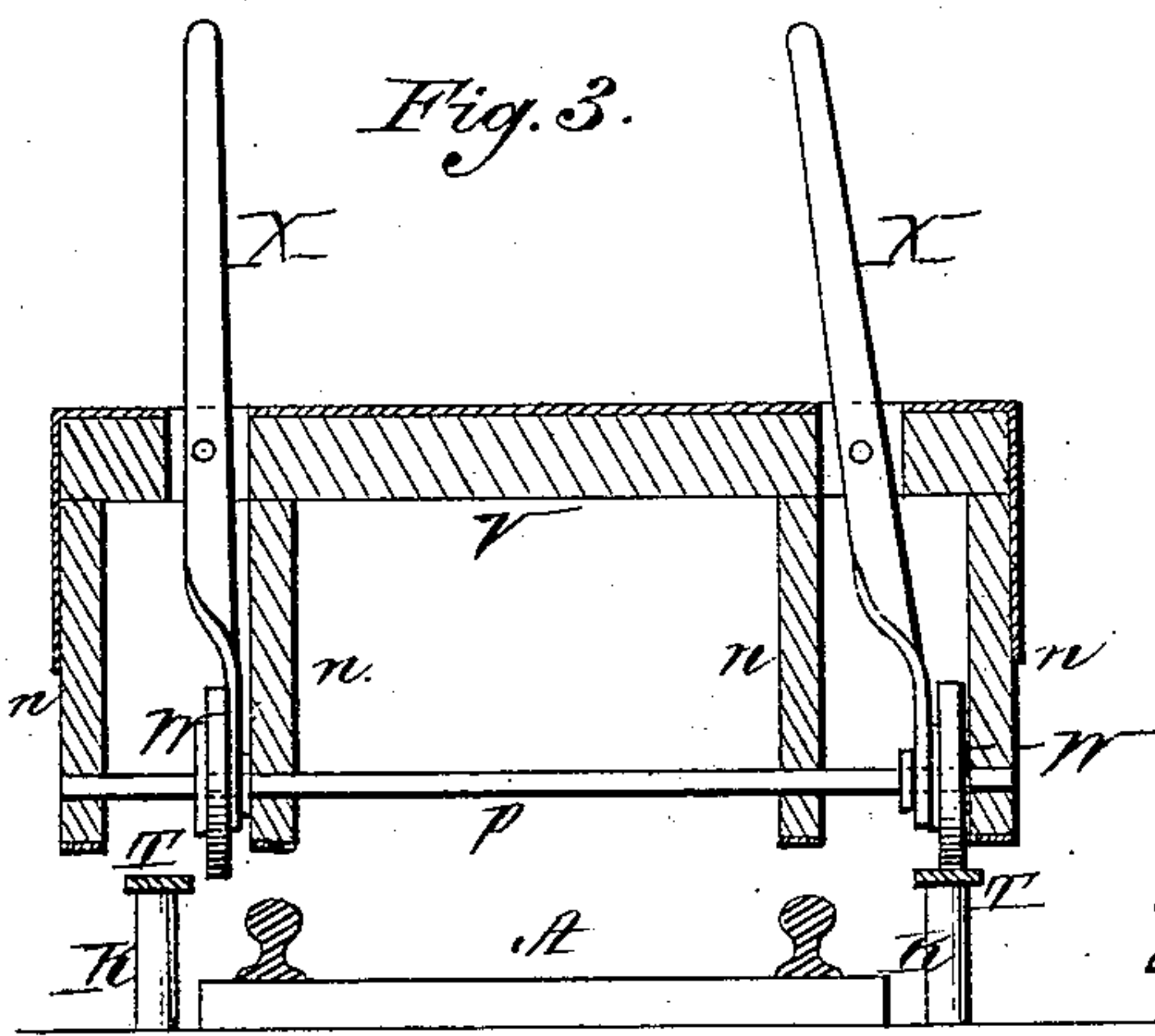
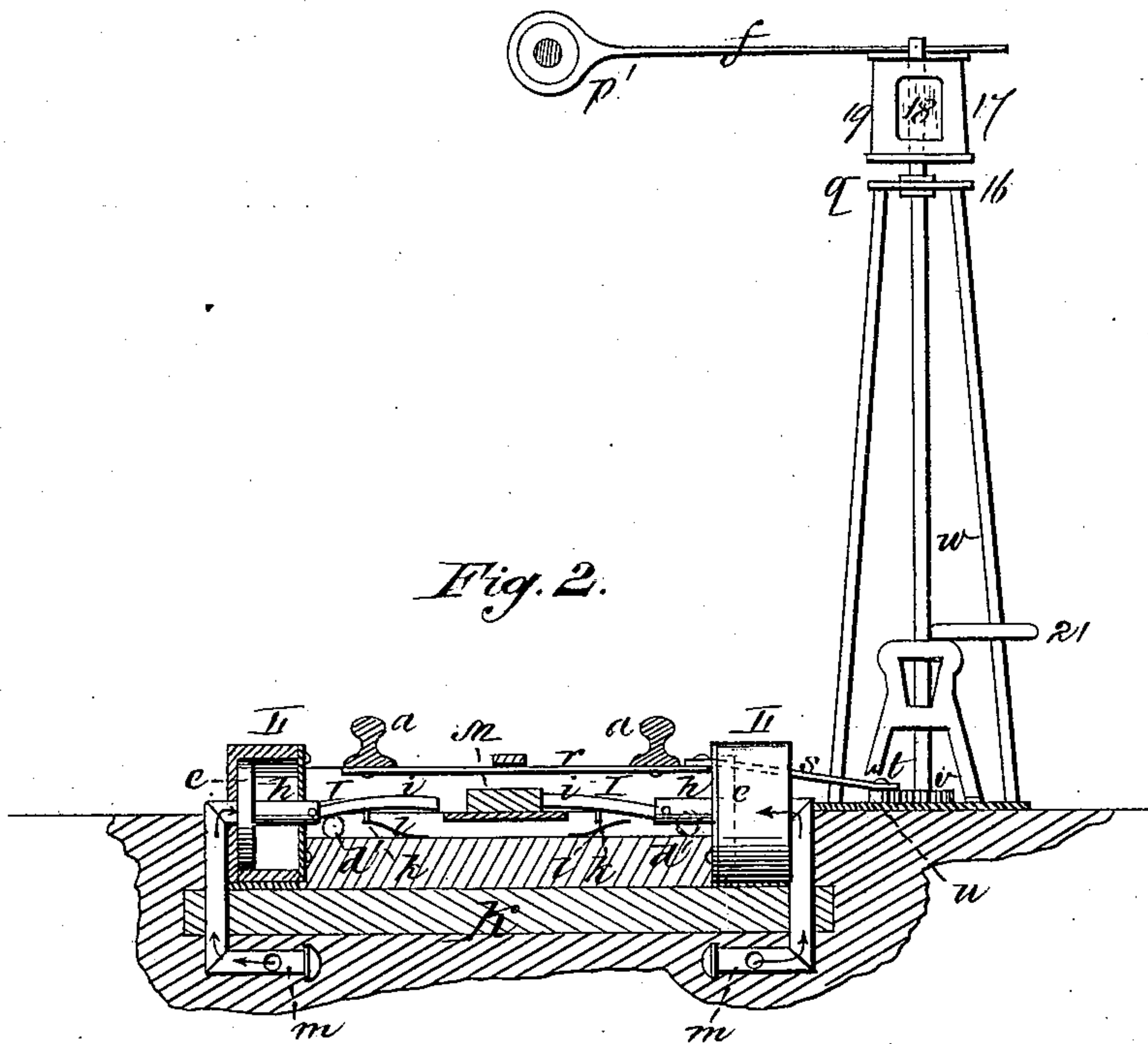
Attest:  
J. H. Schott  
C. H. A. Stearns.

Inventor.  
Howard Turner,  
per  
Norman W. Stearns  
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# UNITED STATES PATENT OFFICE.

HOWARD TURNER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO ROSWELL W. TURNER, OF SAME PLACE.

## PNEUMATIC RAILROAD SWITCH AND SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 226,637, dated April 20, 1880.

Application filed November 7, 1879.

*To all whom it may concern:*

Be it known that I, HOWARD TURNER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a Pneumatic Railroad Switch and Signal Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of a portion of a railroad-track and its switch with my pneumatic apparatus applied thereto. Fig. 2 is a transverse vertical section through the air receivers or drums and mechanism actuated thereby for throwing the free ends of a pair of switch-rails of the main track to the right or left to bring them into line with the track desired. Fig. 3 is a transverse vertical section through a pair of wheels to be attached to the engine-truck, and by which the compressing device for throwing the switch is operated. Fig. 4 is a vertical longitudinal section through one of my air-compressors; Fig. 5, sectional detail to be referred to.

My present invention consists in pneumatic apparatus operated by a passing train for setting the switches and signal apparatus of railroad-tracks, now to be described in such terms as will enable others skilled in the art to understand and apply the same.

In the said drawings, A A represent a section of a single main track, the rails *a a* of which are intended to be thrown to the right or left to form a continuous connection with two branch tracks or sidings, B C. The fixed inner ends of these rails *a a* are pivoted to a stationary sleeper or cross-tie, D, while their movable ends, provided with rolls or rounded shoes *b b*, rest with the force due their gravity on a stationary sleeper, E, contiguous to the stationary sleeper F, to which are secured the rails with which the connection is to be formed.

To the upper surface of the stationary sleeper E is secured a metal plate, *c*, provided at each end with notches or grooves *d*, Fig. 5, in line with and corresponding in number (three) with those of the ends (three) of the rails of the tracks A B C, into line with which are brought the movable rails *a a* from time to time. The movable

rails *a a* of the main track, which are to be thrown from left to right, and vice versa, to form the switch, are secured at a short distance from their outer ends to a pair of sleepers, I I, provided with rolls *d' d'* on their under sides, in order that they may be moved transversely with the roadway, in a manner now to be described. Underneath these movable sleepers I I is built a solid foundation, K, provided with a smooth upper surface for the rolls *d' d'* to move on. At each end of this foundation is located a circular air receiver or drum, L, having a piston, *e*, to the outer end of the rod *h* of which is pivoted an arm, *i*, provided on its under side with a projection, *k*, which rests on an inclined guide, *l*, and keeps the arm *i* in line with the upper portion of a block, M, Fig. 2, connecting the two movable sleepers I I, for a purpose now to be explained.

With an orifice or pipe, *m*, entering each air receiver or drum L on the outer side of its piston, communicates one end of a metal pipe, N, Fig. 1, of small diameter, which extends quite a distance underground along each side of the main track A, at a short distance therefrom, the other extremity of this pipe connecting with an air-compressor, P, located in a tight box, Q, Fig. 4, under the road-bed, outside of the rail and on the opposite side of the track to that where is placed the drum L, with which the other end of the pipe N communicates. The piston R' of this compressor is fitted snugly therein, and is made to descend by the pressure of a plunger, R, thereon against the resistance of a spring, the pipe N being arranged to connect the compressor with the mechanism operating the switch, and the air being compressed by the downward pressure of the plunger R, which enters the top of the receiver and is secured to one end of a curved lever, T, pivoted at its other end to a sleeper, U, the two levers T being placed close to the track, on opposite sides thereof and parallel thereto.

When the parts are in their normal position, with the plungers up, the upper surface of each curved lever T is above the level of the tops of the adjacent rails.

When the rails *a a* of the main track A are to be thrown into line with the rails of either



of the branch tracks B C, I employ the following mechanism: Secured transversely under the engine is a heavy frame, V, provided on each side with a pair of hangers, *n*, between  
 5 which and on a shaft, *p*, extending through them, revolves a wheel, W, of rawhide, leather, or other suitable material, which is moved outward by the lower end of a shipper-lever, X, the upper end of which projects up into a position conveniently accessible to the attendant  
 10 on the engine, who, when he wishes the switch thrown to the right to cause the switch-rails *a a* of the main track A to be brought into line with the right-hand branch track C, simply grasps the upper end of the right-hand  
 15 shipper-lever X and draws it in, which brings the right-hand wheel W into line with and depresses the right-hand curved lever T, which operates its compressor P, and drives air through its connecting-pipe N into the left-hand receiver or drum L with sufficient force  
 20 to push its rod *i* to the right against the block M, and cause the sleepers I I to move on their rolls in the same direction, carrying with them the rails *a a*, to be connected with those of the  
 25 right-hand branch track C, the rolls or rounded shoes *b* on the under side of the ends of the movable rails *a a* assisting them into the grooves *d* of the metal plate *c* on the stationary sleeper E under them, the weight of the  
 30 rails *a a* being sufficient to keep them from being accidentally moved out of this position. The switch is thus operated and properly set before the arrival of the engine thereto, and  
 35 the position of the rails is made known to the engineer beyond a possible doubt by means of a signal, *p'*, located on a post or tower, *q*, at one side of the road, and operated in the following manner:

40 Under the throw-rails *a a*, near their ends, is secured a cross-bar, *r*, to one end of which is pivoted one end of an arm, *s*, the other end of which is pivoted to a crank-pin, *t*, of a horizontal toothed wheel, *u*, which actuates a pinion, *v*, on the lower end of an upright shaft,  
 45 *w*, which has its bearings in a base-plate, 15, at its bottom, and in a platform, 16, near its top, the upper end of the shaft being secured to a lantern, 17, showing alternate red and  
 50 green lights 18 19, which are respectively brought into positions to be seen at night by the engineer to convince him of the way the switch is set.

For a day-signal the following device is employed: The extreme upper end of the shaft  
 55 *w* has secured thereto a slender horizontal rod, *f*, which is provided at its outer end with a colored circular plate, *p'*, which, by the switch-connecting mechanism just described,  
 60 is made to swing into three positions, which

correspond to the three positions of the switch, viz: first, in a line parallel with the main trunk of the road when the switch is set for the passage of the train over the main track A A; second, in a line pointing in toward the  
 65 tracks and at right angles thereto when the main track connects with the left branch track B; and, third, pointing out from the tracks and in a line at right angles thereto when the switch-rails are all right with the right branch  
 70 C, thus giving the engineer due notice if the switch is not properly set, so that the train can be checked in time and danger averted.

This signal mechanism is intended to be protected by an inclosure to prevent persons  
 75 from tampering therewith; but the switch may be operated by a hand-lever, 21, controlled by a proper lock, when, in making up a train, too much time would be lost for the engine to  
 80 move back to the curved levers T and air compressors thereunder, as they are located at considerable distances from the switch end of the rails.

The compressors are to be located at such distance from the switch that the longest train  
 85 may pass by it before reaching one of them. As soon as a train has passed onto one of the sidings its locomotive soon arrives at other compressors, when the proper one will be operated by one of the depressing-wheels W of the  
 90 frame V, in order again to set the switch right for keeping the main track open.

All of the pipes, drums, and other connecting mechanism which would suffer by exposure to rain, snow, ice, dirt, or by persons desiring to tamper therewith, are intended to be  
 95 suitably protected by boxes or other covering.

The application of my invention for operating switches, annunciators, and other signals for railroads will be found in practice to be efficient, successful, and reliable at all times.

I claim—

1. The air-receivers L L, with their pistons *e*, piston-rods *h h*, and presser-arms *i i*, in combination with one or more movable sleepers, I I, to which the free ends of the throw-rails *a a* are secured, constructed to operate  
 105 as and for the purpose described.

2. The stationary sleeper E, with its plate *c*, provided with notches or grooves *d*, in combination with the throw-rails *a a*, provided with rolls or rounded shoes *b b*, and a pneumatic mechanism for operating the switch, substantially as described.

Witness my hand this 18th day of October, 1879.

HOWARD TURNER.

In presence of—

C. W. TURNER,

GEORGE F. MEARS.