(No Model.) 2 Sheets—Sheet 1.

F. E. KINSMAN.

APPARATUS FOR CONTROLLING THE MOVEMENT OF RAILWAY TRAINS OR VEHICLES.

No. 520,062. Patented ~~May 22, 1894~~.

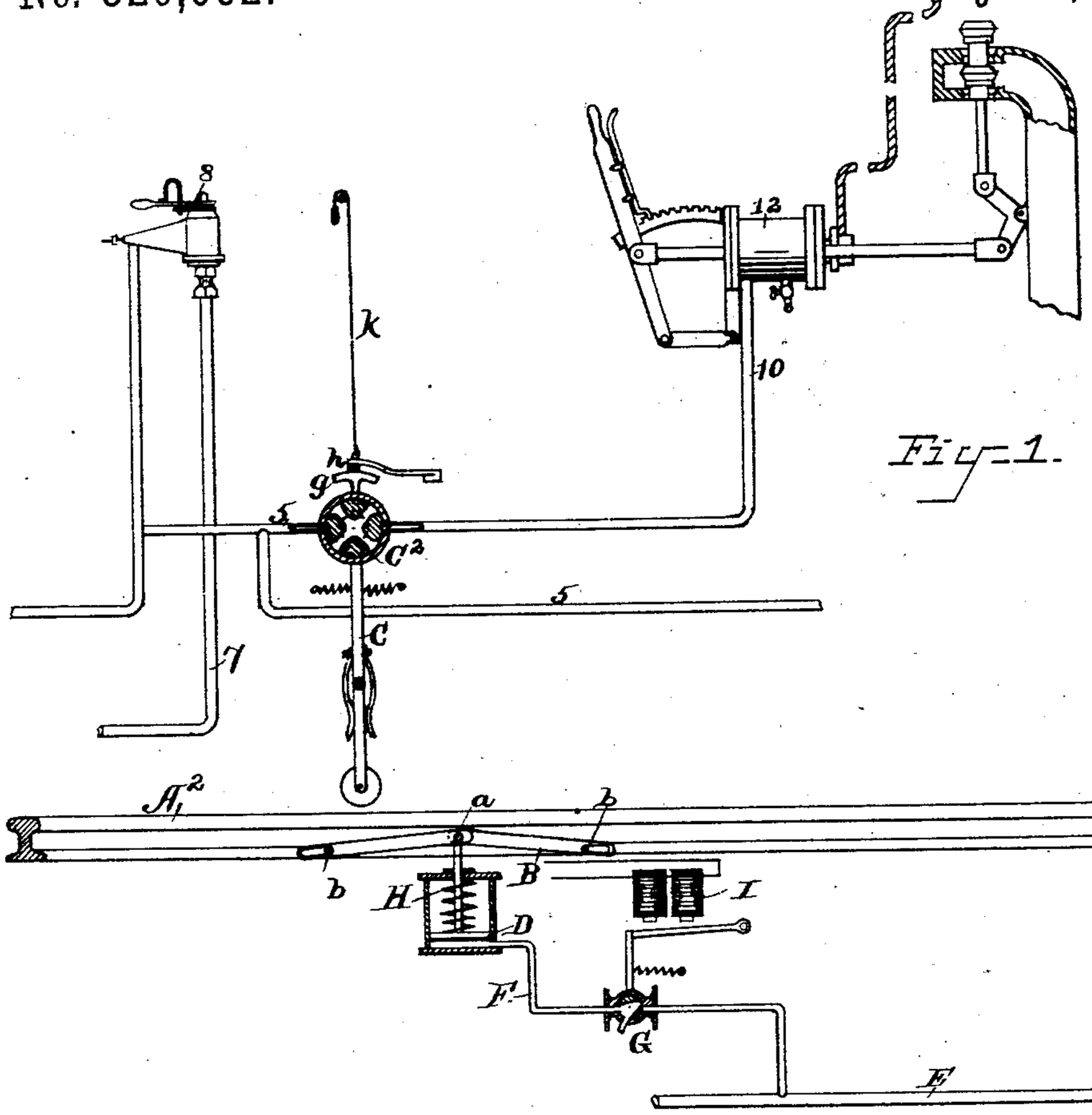

Fig. 1.

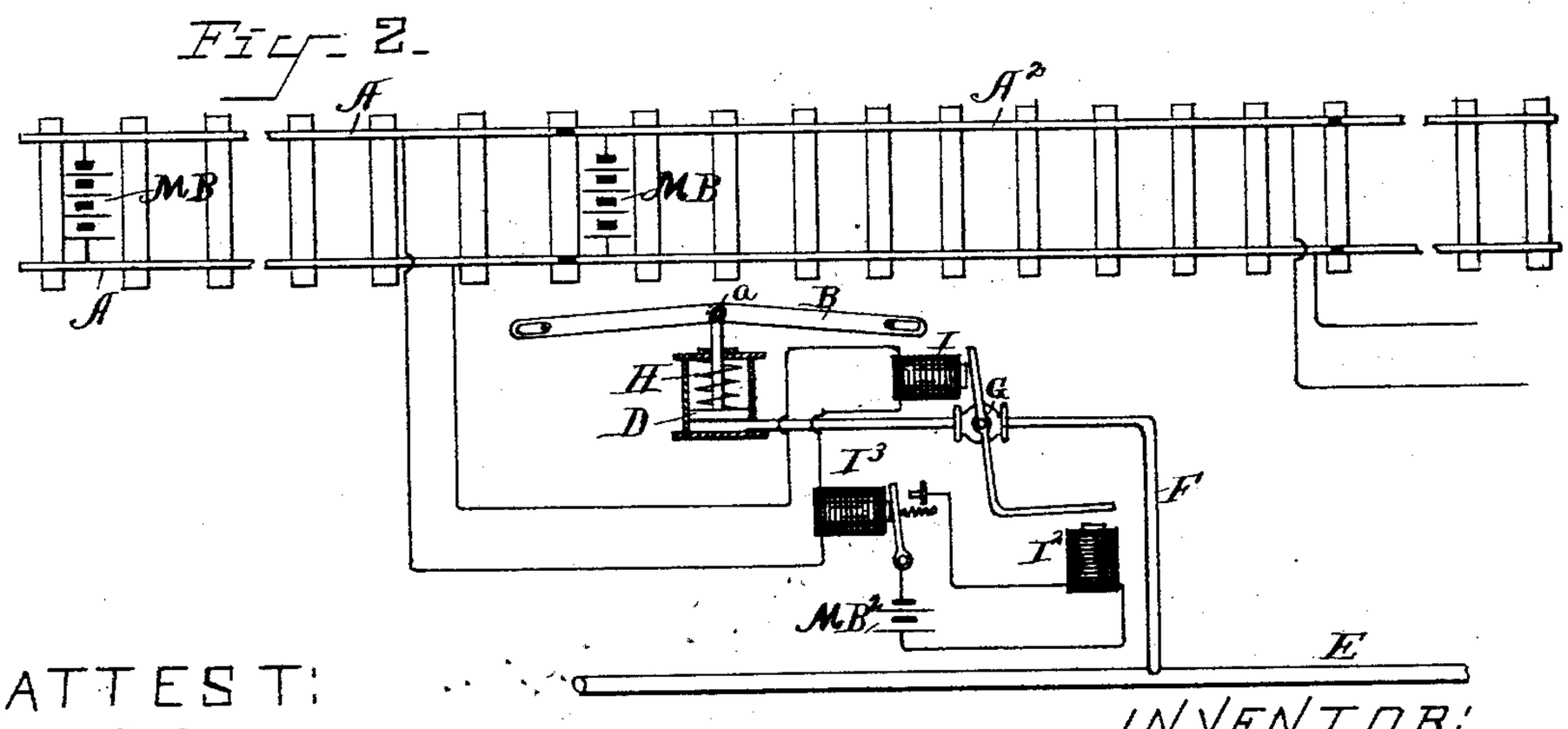

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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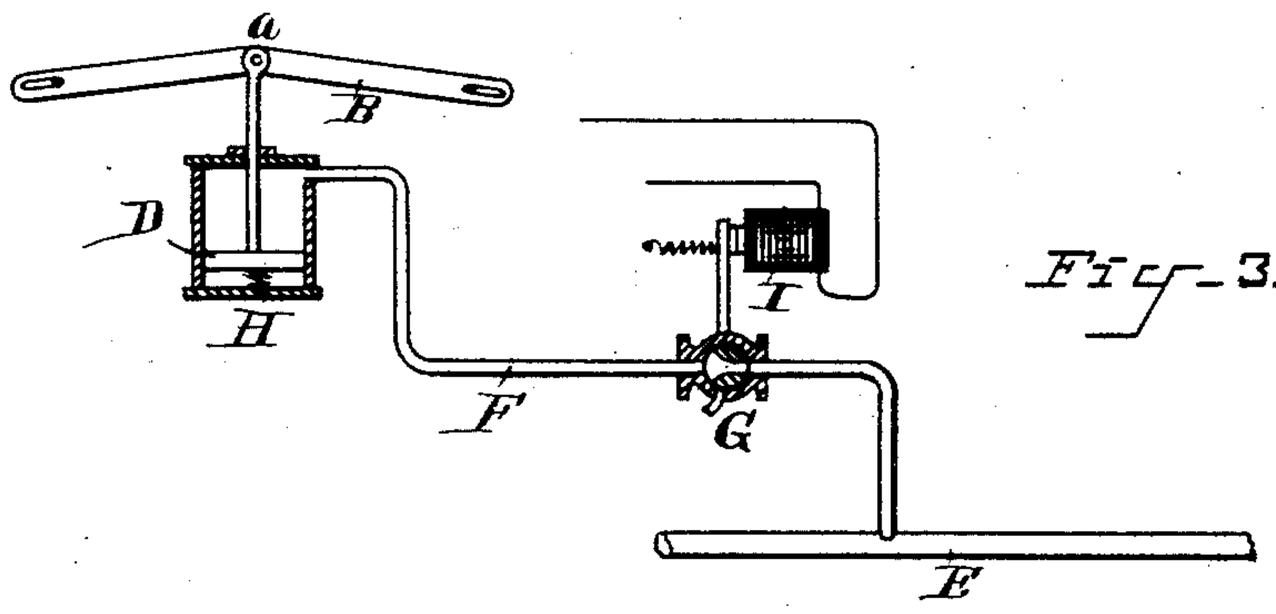

Fig. 3.

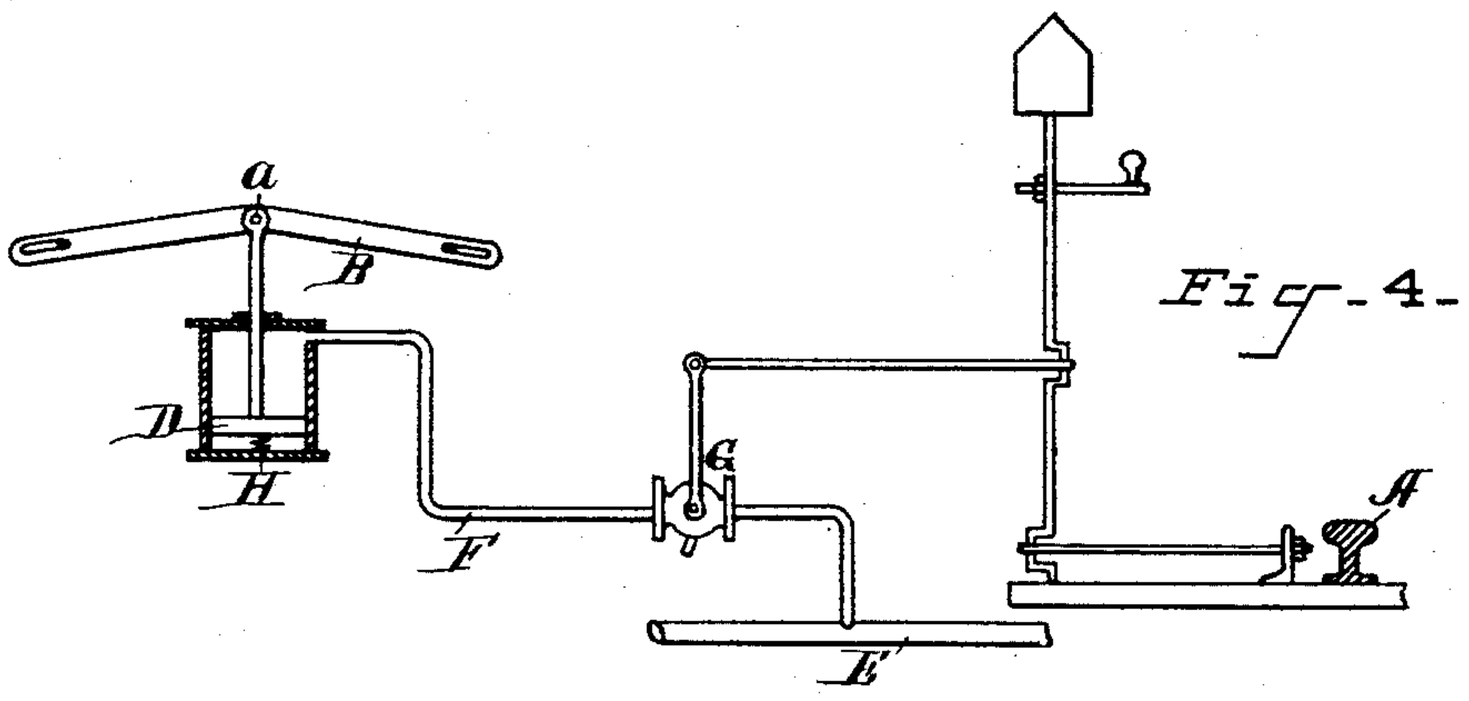

Fig. 4.

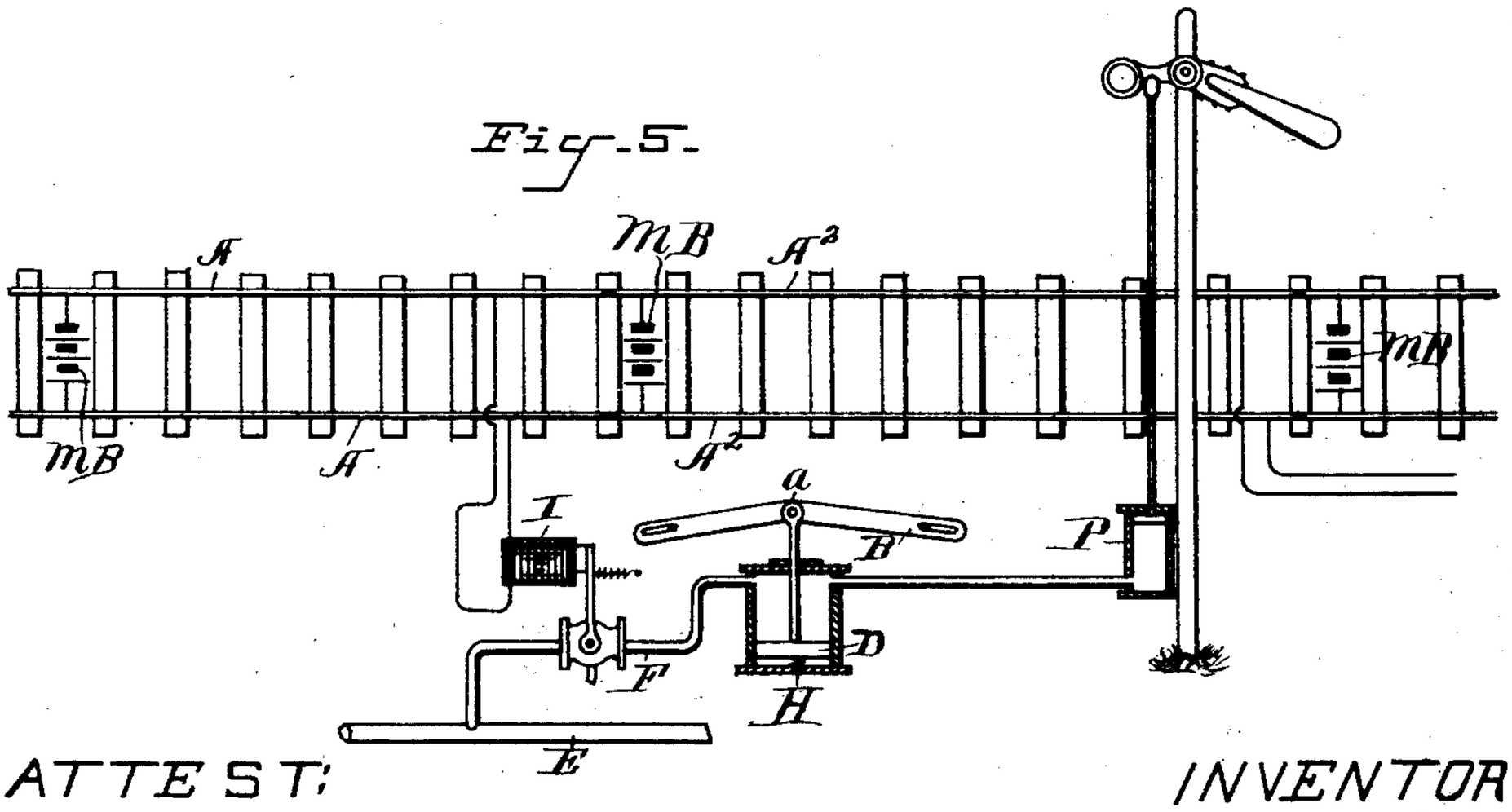

Fig. 5.

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APPARATUS FOR CONTROLLING THE MOVEMENT OF RAILWAY TRAINS OR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 520,062, dated May 22, 1894.

Application filed June 23, 1893. Serial No. 478,563. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. KINSMAN, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented a certain new and useful Apparatus for Controlling the Movement of Railway Trains or Vehicles, of which the following is a specification.

My invention relates to apparatus for controlling the movement of railway cars or vehicles, and more particularly to that class of said apparatus wherein a device upon the line of way operates as a trip for an arm or similar device which is carried by the car or vehicle and is operated by engagement with said trip in such manner as to apply the brakes and cut off the motive power, either or both, through the intervention of suitable devices.

My present invention relates to means for moving the trip into and out of position for engagement of the arm according as the conditions may require that the vehicle be brought to rest or that it be allowed to proceed without delay, and consists essentially in the combination with the trip device, of a source of fluid pressure operating on said trip device through a piston or similar fluid pressure apparatus, and a valve controlling the fluid pressure so as to move the trip device into and out of operative position as conditions may require.

My invention consists further in the combination with the trip, of a fluid pressure device operating normally to hold the trip in inoperative position, and a spring or similar retractive device, such as a weight constantly tending to move the trip into position for engagement by the arm on the car or vehicle, whereby in case of failure of the pressure, the device will assume the danger position and accident from such failure be thereby avoided.

My invention consists also in the details and the combinations of apparatus whereby, under certain conditions, a car or vehicle may be brought automatically to rest when danger requires.

In the accompanying drawings:—Figure 1, is a general side elevation and partial section of an apparatus embodying my invention. Fig. 2, illustrates a modification in the arrangement of the magnets and circuits. Fig. 3, is a further modification in which the pressure of the fluid employed for operating the trip serves to normally hold the trip out of position for engagement by the controlling arm on the vehicle. Fig. 4, shows how the valve controlling the pressure on the operating devices of the trip may be governed by the position of a railway switch. Fig. 5, is a general diagram illustrating an improved block signal apparatus in which the trip actuated by fluid pressure is employed.

In Fig. 1, A, indicates the rail of a railway track and B, B, the levers of a device which operates as a trip for engagement of an arm carried by the car or vehicle. Any suitable trip or mechanical obstruction adapted to operate the arm, when moved by the vehicle into engagement with it, may be employed, but I prefer to use that herein shown consisting of a pair of levers B, B, hinged together at *a*, where they are connected to the operating mechanism of the fluid pressure apparatus and free to move at their opposite pivotally supported ends as shown so that the ends where they are hinged together may, without obstruction, be moved freely up and down, or sidewise as the construction of the arm on the vehicle may require, in order that said arm may be operated when it engages the trip. In the present instance the trip levers move vertically and the end of the controlling arm C, upon the vehicle rides upon the upper inclined surface of the trip. When the trip is raised into position for engagement, the arm C, as will be seen will be operated when it is moved in either direction. The pivotally supported ends of the levers B, may be carried, as shown, by pins *b*, that engage with slots in the levers. These levers may be supported on the rail as indicated in Fig. 1, or in any other suitable way.

To move the trip I employ any suitable preferred pressure apparatus as, for instance, the piston D, the rod of which is connected with the trip levers as shown.

E, is a pipe supplied with air, gas, water or other fluid under pressure, and communicating with the cylinder of the piston D, by a pipe F, in which is a valve G. The spring H, properly applied to the piston or piston rod serves to hold the trip depressed under

normal conditions, and the valve G is so constructed that when it is turned it will open the connection between the cylinder and the pipe E, and the fluid pressure will thereupon operate piston D, and throw the trip into position to be engaged by the arms C, on the vehicle. The arm C, serves through suitable mechanism, as will be presently described, to cut off the motive power or apply the brakes, or both. When the valve G, stands in normal position shown, it cuts off connection between the cylinder and pipe E, and opens a vent between the cylinder and the atmosphere thereby allowing the fluid employed in any previous operation of the trip to escape from the cylinder, so that the retractor H, may withdraw the trip from operating position. I prefer to employ the pressure of air, gas or other aeriform fluid for operating on the piston and holding it in position to be engaged by the arm C, and thereby furnish an elastic cushion at the time of impact of arm C upon the trip.

To control the position of the trip, an electro-magnet I, may be employed, the armature of which, as shown, stands as a catch or detent to obstruct the movement of an arm attached to the valve G. The arm being under the influence of a spring 3, the action of the magnet I, in withdrawing its armature will release the valve arm and permit the valve to change its position so as to apply the fluid pressure and thereby set the trip. The circuit for the magnet I, may be in turn controlled by any of the devices or circuits used in electric railway signaling or in the controlling of the movement of trains.

As shown in Fig. 2, the magnet might be in the circuit through an insulated section of railway track forming one section of a block system, one end of said section being connected to the opposite poles of the battery or other generator of electricity M, B, while the two rails of the other end are connected with the terminals of magnet I. The presence of any train upon the section A, will shunt current from the normally charged magnet I, which, in this instance, has its armature so connected with the valve that when the magnet loses its power the valve will open and apply fluid pressure. The trip device, as will be well understood, could be placed at some point on the track far enough removed from section A, to automatically bring an approaching train or vehicle to rest before it could reach the section A.

In Fig. 2, the valve G, stands in position to cut off the fluid pressure and the magnet I, holds it in such position. To assist in throwing it to position for applying the fluid pressure and thereby setting the trip, I use a supplemental electro-magnet I^2, whose condition, by suitable devices, is made to change with that of magnet I. When the magnet I, loses its power, magnet I^2, is energized and by operating upon an arm of the valve lever tends to retract the armature of I, in a direction to open the valve. To energize magnet I^2, a supplemental battery M, B^2, may be employed whose circuits are controlled through the back contacts of a relay or electro-magnet I^3, in the circuit with I. Any other means may be employed for energizing magnet I^2, when magnet I, loses its power.

It is obvious that with the arrangement shown the trip would fail to be set in case the fluid pressure in E, should accidentally fail. To provide for this contingency I prefer to employ the arrangement illustrated in Fig. 3. In this instance valve G, normally stands in position to open the communication between E, and the cylinder of piston D, and the pressure is applied at the opposite side of the piston or in such way as to normally hold the trip levers B, depressed or in inoperative position. The spring or other retracting device H, operates upon the relief of the fluid pressure to set or throw the trip into position to be engaged by the arms. In the operation of this apparatus the magnet I, normally holds the valve G, in position to apply the fluid pressure. When the magnet I, loses its power, the retractor of the valve arm throws the valve and cuts off fluid pressure and at the same time opens the vent to allow the fluid in the cylinder of D, to escape. The spring H, thereupon sets the trip. It will be obvious that the same action would take place if the pressure supply should accidentally fail from any cause.

The fluid used for operating the trip may be supplied in any convenient and desirable manner. Instead of controlling the position of the valve from an electro-magnet it may be controlled from the operative parts of a switch stand, as indicated in Fig. 4, the valve being preferably arranged to apply fluid pressure to hold the trip down when the main track is in condition to allow the passage of a train. When the switch is thrown to the side track the valve operates in the same manner as the valve in Fig. 3, to set the trip levers which are located at proper position on the track to bring the vehicle to rest before it reaches the siding or switch.

In Fig. 5, A, A, indicate the rails of a section of a block system, the section A, being any desired length and insulated from neighboring sections as from the sections A^2, A^2, contiguous thereto. The magnet I, is in the closed circuit over the section A, and through the generator of a source of electricity and is normally charged. The failure of the magnet I, to maintain its power either by breakage of the rail section A, or by the presence of a train on said section so as to short circuit the current from magnet I, will cause the armature of said magnet to drop back and valve G, to thereby cut off the pressure supplied from pipe E, to the cylinder or piston B, the armature of the magnet being, as will be obvious, attached to the arm of the valve.

The valve stands normally in position to allow the fluid pressure to operate on the piston in a manner to keep the trip depressed. When the valve is turned by the retractor or other device the pressure is cut off and a vent or exhaust will be established as in Fig. 3, so that the spring or other positively acting power may move the piston D, and bring the trip into position to be engaged by the controlling arm on the vehicle moving on section A^2, on reaching some point near the section A, sufficiently far removed therefrom, however, to bring the vehicle to rest before it reaches section A. The same pipe or connection which operates upon the piston D, may supply pressure, as shown, to a cylinder P, whose piston is connected to a semaphore arm beside the track, the fluid pressure serving in this case to hold said semaphore arm in safety position. Under this condition it is obvious that the setting of the trip to bring the vehicle to rest will be attended by the setting of the semaphore to danger position. The semaphore may be located sufficiently far in advance of the trip to permit the engineer to obey the signal before the engine reaches the trip.

The trip arm C, may operate upon suitable devices for applying the brakes, whether on electrical or other railways, or cutting off the motive power, such devices being modified according to the nature of the motive power or the brake system employed. In the present instance I have shown the controlling arm as forming an arm for the valve C^2, which is in a pipe or connection 5, leading from the train pipe of an ordinary air brake system.

7 is a pipe leading from the reservoir, and 8, is the ordinary engineer's brake valve. The pipe 5, may also communicate as shown with the cylinder of the locomotive brake which is normally held off by the air pressure acting in opposition to a spring which applies the brakes when the pressure is relieved.

10, is a connecting pipe between pipe 5, and a cylinder 12, in which the air pressure may operate to throw the throttle of the steam locomotive. The piston is connected to the throttle valve rod and the engineer's throttle valve lever is combined therewith in the manner described in my Patent No. 492,402, dated February 28, 1893, or in any other desired way. As will be obvious the pressure provided through 10, may operate upon any means for cutting off the motive power. The cylinder 12, is provided with a suitable vent as in the patent referred to so that when the piston is moved to some extent under the air pressure supplied through pipe 10, a vent will be opened so that the brakes will be applied. The valve C^2, is arranged to open the connection between 5 and 10, when the arm C, is turned in either direction. The arm C, may be provided with some suitable safety joint and with an anti-friction roller. Centering springs *d*, *d*, are also provided for returning the arm to a vertical position and retaining it there till tripped. After the arm is tripped and the valve thereby opened it is retained in that position by means of the prolongation thereon, *g*, and a stiff spring catch, *h*, until the engineer pulls on the cord *k*, and releases it.

What I claim as my invention is—

1. The combination with a trip on the line of way and a controlling arm carried by a vehicle, of a source of fluid pressure, a piston or other fluid pressure device for actuating said trip, and a valve controlling the fluid pressure device so as to move said trip into and out of position for engagement by the arm.

2. The combination with an arm on the vehicle controlling the movement thereof and a trip on the line of way, of a fluid pressure device for operating said trip normally tending to hold the trip in inoperative position, and a spring or other retractor constantly tending to move the trip into position for engagement by the arm on the vehicle.

3. The combination, substantially as described, of the power and brake controlling arm carried by the vehicle, a trip on the line of way movable into and out of position for engagement by said arm, an insulated section of railway track, a generator of electricity connected to one end thereof, and a controlling electro-magnet governing the position of the trip and connected to the other end of said insulated section and on a normally closed circuit through the line of rails and generator, as and for the purpose described.

4. The combination with the trip device on the line of way and the controlling arm carried by the vehicle, of a source of fluid pressure, actuating devices operated by the fluid pressure for moving the trip, an electro-magnet controlling the valve of the pressure supply, and a supplemental retractor for the armature of said magnet consisting of a supplemental electro-magnet whose condition varies with the condition of the main magnet, as and for the purpose described.

5. The combination, substantially as described, of the trip on the line of way, a power or brake controlling arm carried by the vehicle and adapted to engage with the trip, a source of fluid pressure, a piston operated by said fluid pressure and normally holding the trip in inoperative position, a valve controlling the pressure, and an electro-magnet normally holding the valve in position proper for keeping the trip in inoperative position.

6. The combination, substantially as described, of an insulated section of railway track, a source of electricity having opposite poles connected to opposite rails of the track at one end of the section, an electro-magnet connected into the circuit at the opposite end of the section, a source of fluid pressure, a trip device provided with means for moving it by fluid pressure into and out of position

for engagement by a brake or power controlling arm on the vehicle, a semaphore arm provided with means for moving it by fluid pressure, and a valve governed by the electro-magnet controlling the pressure on the trip and semaphore.

Signed at New York, in the county of New York and State of New York, this 21st day of June, A. D. 1893.

FRANK E. KINSMAN.

Witnesses:
WM. H. CAPEL,
T. F. CONREY.