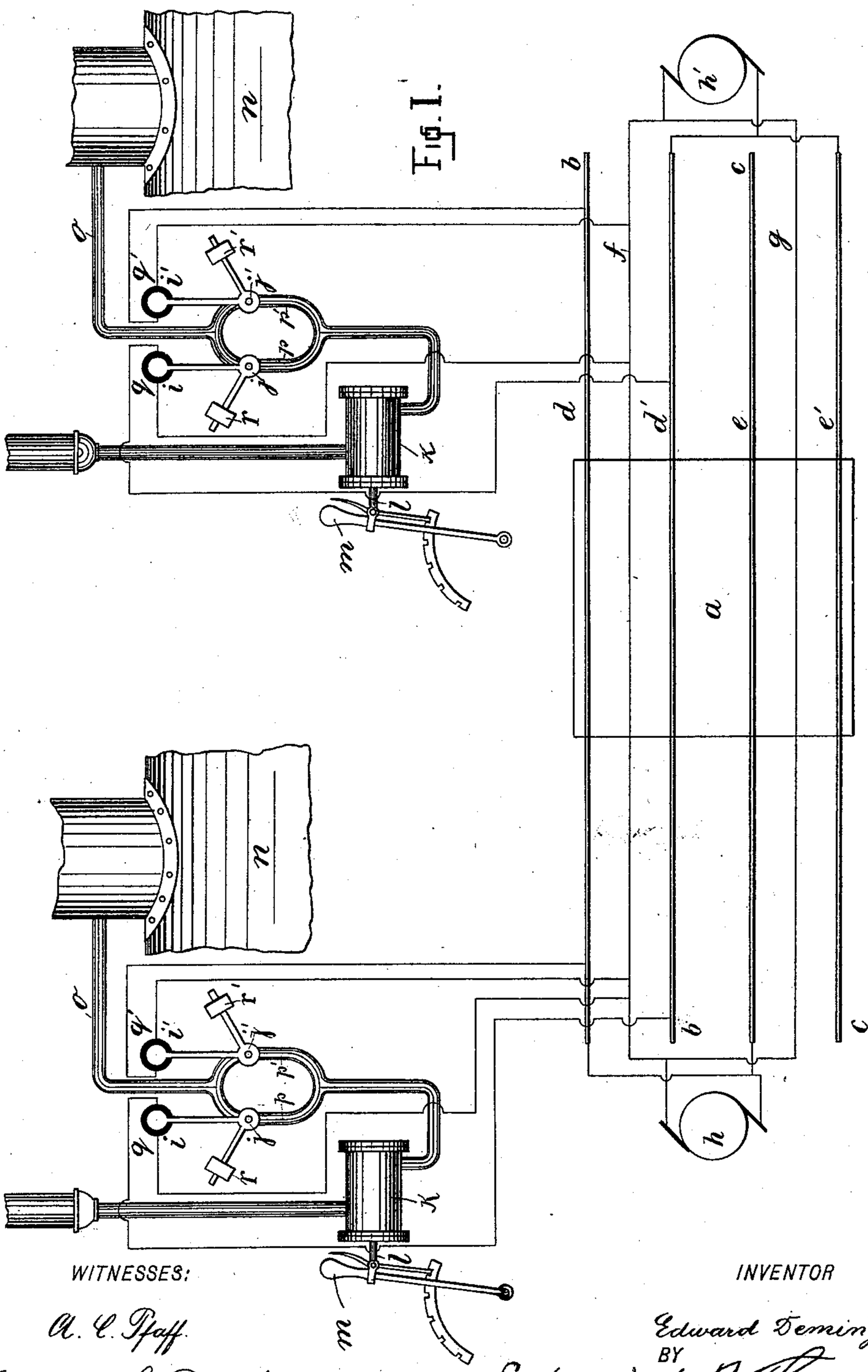
(No Model.) 2 Sheets—Sheet 1.

E. DEMING.

ELECTRIC SAFETY SYSTEM FOR RAILWAY DRAWBRIDGES.

No. 539,576. Patented May 21, 1895.

Fig. 1.



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

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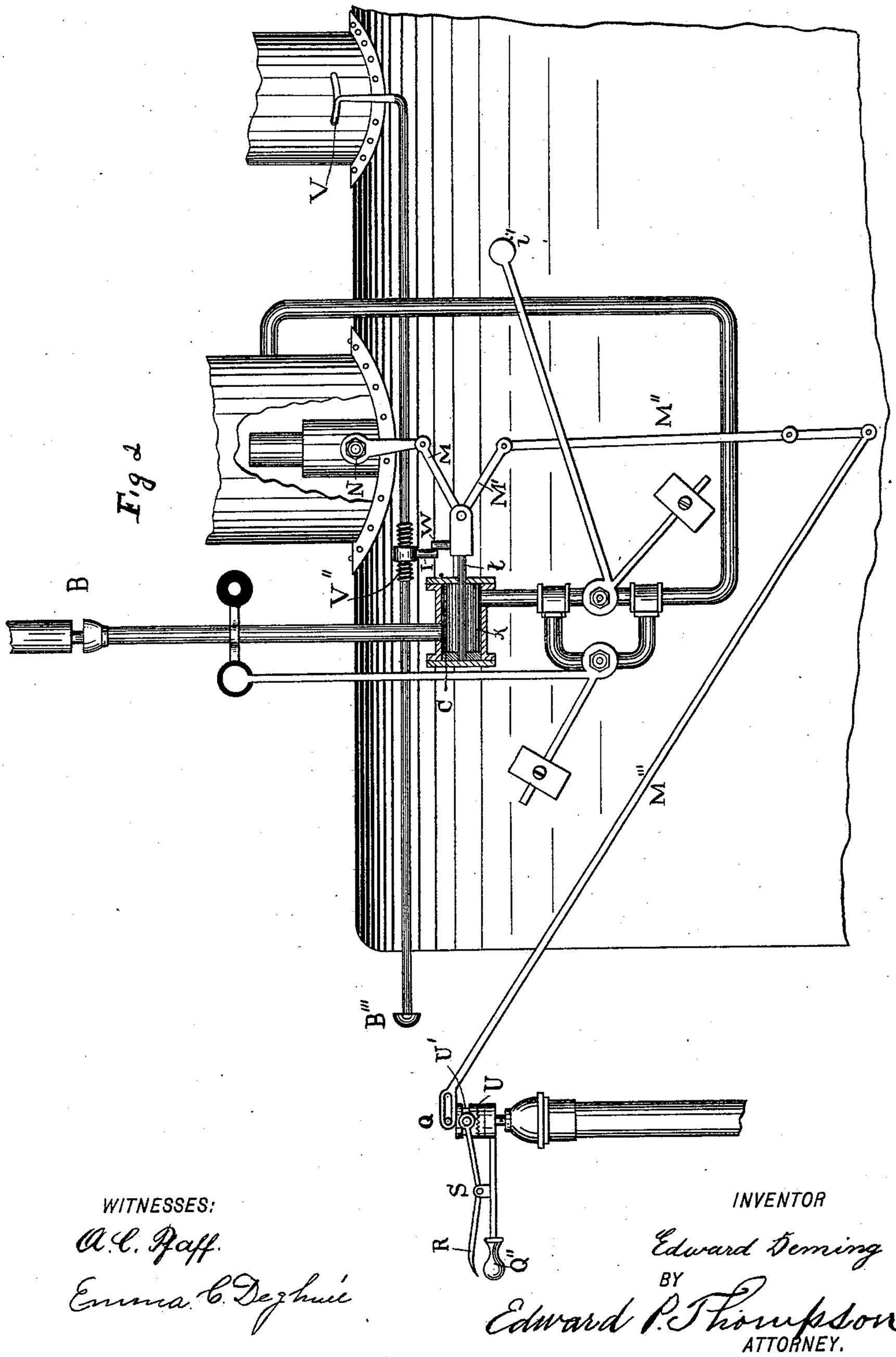

Fig 2

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UNITED STATES PATENT OFFICE.

EDWARD DEMING, OF BROOKLYN, NEW YORK.

ELECTRIC SAFETY SYSTEM FOR RAILWAY-DRAWBRIDGES.

SPECIFICATION forming part of Letters Patent No. 539,576, dated May 21, 1895.

Application filed April 4, 1894. Serial No. 506,303. (No model.)

To all whom it may concern:

Be it known that I, EDWARD DEMING, a citizen of the United States of America, and a resident of Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Electric Safety Systems for Railway-Drawbridges, (Case No. 11,) of which the following is a specification.

In my former patents I have shown constructions for automatically stopping railway trains when approaching within a dangerous distance of an open draw bridge. See, for example, my patent of May 26, 1891, No. 452,873. The present invention relates particularly to an improvement upon the invention set forth in said patent. It provides an organization whereby with any number of railway tracks, and two electric generators located at the opposite ends of the bridge and at any distance therefrom, any number of trains approaching the bridge from either direction will be automatically stopped, when within a dangerous distance, by the mere opening of the bridge.

The invention is described by reference to the accompanying drawings.

Figure 1 shows the electric circuits and a typical representation of the mechanism of two locomotives upon opposite sides of the drawbridge, which is also shown. Fig. 2 shows a complete mechanism for stopping the train when one of the magnets is demagnetized. It is not a typical arrangement, as in Fig. 1, because it is taken from an actual model and shows exactly how the throttle may be cut off; also, how the air-brake valve may be closed and how the whistle may be blown. Further, it shows the device in an abnormal state, whereas in Fig. 1 the mechanism is shown in its normal condition.

In Fig. 1 the description ends substantially with the piston rod *l*. Fig. 2 shows the levers which connect with this piston rod for the purpose of operating the motive power of the engine.

In the drawings, I represent the bridge by *a*, and two tracks by *b*, and *c*, which cross the bridge in the usual manner. Each track has the two usual rails *d*, *d'*, and *e* and *e'*, and each track has respectively a middle rail *f*, and *g*. When the bridge is in the closed position the tracks and third rails are electrically continuous across the bridge, *a*. When the bridge is opened the electric circuits are interrupted.

h, and *h'* are electric generators whose poles are connected to respective rails in the following manner: The poles of the generator *h*, are respectively connected to two outside rails, *d*, and *e*, of different tracks and the central rails *f*, and *g*, of the two tracks. The poles of the generator, *h'*, are connected respectively to the remaining side rails, *d'*, and *e'*, and the remaining central rails *f*, and *g*. Each locomotive is provided with a pair of magnets, *i* and *i'*, which may be adapted to receive widely variable currents. The magnets of the locomotive on any track are in circuit with the central rail, and the side rails of the track upon which the locomotive is located, in such a manner that whether the locomotive is approaching the bridge from either direction the circuits of at least one of the magnets will be interrupted when the bridge is opened. This is explained by following the circuits through one of the locomotives—for example, that upon the left-hand end of the bridge. The magnet *i*, is connected to the central rail *f*, and the side rail *d'*. The magnet *i'* is connected to the side rail *d*, and the central rail *f*. When the bridge *a*, is opened, the circuit of the generator *h'*, which is on the right hand side of the bridge, will be cut off with respect to the magnet *i'*, which normally holds open the steam valves *j'*, causing the train to stop. The magnet *i*, will still be energized and its armature will not fall and the valve which it controls will not be opened.

In order to understand how the train is stopped when the valve *j'*, is opened, the mechanism is thus explained.

k, is a steam cylinder containing a piston *l*, which when pushed forward will operate the handle *m*, which may typically represent either the handle of an air brake valve or throttle valve or any kind of mechanism by which the power of a moving train is overcome. For example, it might be a circuit closer, if the locomotive were electric.

n, is a boiler adapted to generate steam. It is connected by a pipe *o*, with the cylinder *k*.

In branches p, and p' are located valves j and j'. When either is opened, it is evident that the steam from the boiler n, will enter the cylinder k, which will be the direct cause through the medium of the piston l, and handle m, for stopping the train. The magnets i, and i', have armatures q, and q', which are carried upon arms radiating from the valves j, and j'. The arms are weighted by weights r, and r', so that when the magnets are demagnetized the weights will fall and open the valves j, and j'.

Referring to Fig. 2, I may explain how the details of the mechanism on the locomotive operate for the purpose of applying the brakes, closing the throttle, blowing the whistle and sanding the track. I will commence at the piston rod l, which is the same as shown in Fig. 1. It connects with the throttle valve through the connecting rod M. The valve is at N. The armature i' has fallen and admitted steam to the cylinder k, and the piston has moved to the left, thereby closing the said throttle valve. The piston rod l, also connects with the connecting rod M', which connects either M'', M''' with the handle Q, of the air brake valve. M'' is a connecting rod. On account of the piston rod having been pushed, the steam brake handle Q, has been pushed so as to apply the brake. The brake valve is also operative by the engineer directly by hand, because the handle Q'' for turning the valve is connected to the handle Q, by roughened or serrated surfaces U. When the handle Q'', is turned, the handle R, must at the same time be forced downward around the pivot S, so that the serrations will be separated, and yet the handle Q'' may be turned around for operating the valve, independently of affecting the handle Q, because a portion of it is grooved by U', and because the handle R, carries a pin which slides in said groove. The piston rod is also adapted to move the sand box valve handle V, because there is provided a projection W, upon the piston rod which moves in the path of the projection I, upon the handle V. The projection I, is adjustable on the screw V'', cut upon the handle V. When the piston rod moves to the left, as it has done, the projection W, meets the projection I, and moves it to the left, thereby properly operating the sand box valve.

The handle V, is provided with a knob B''', so that in starting the train, for example, the engineer may operate the sand box independently of the automatic arrangement.

The whistle B, is operated by the steam which escapes from the cylinder k, after the piston has passed the point where the whistle pipe C, enters the cylinder.

I claim as my invention—

1. The combination with a draw bridge and with tracks crossing the same, of third rails or electric conductors, also crossing the same, different generators upon the opposite sides of the bridge, the one being connected to the central rails and the side rails of different tracks, and the other generator being connected also to the central rails and to the remaining side rails of different tracks, locomotives arranged to approach the bridge upon the tracks from different directions, a pair of magnets upon each locomotive, having armatures which independently control the motive power of the locomotive, and connect respectively any circuit with the central conductor and different side rails.

2. The combination with locomotives, of magnets thereon in independent electric circuits, a draw bridge in said circuits, generators for said circuits, connected thereto at points beyond the locomotives measured from the bridge, the said locomotives being on opposite sides of the bridge, and means controlling the motive power of the locomotives and controlled by either of the magnets.

3. The combination with locomotives, of magnets on each in independent electric circuits which are normally closed, a drawbridge in said circuits, generators connected to the circuits at points beyond the locomotives measured from the bridge, and means controlling the motive power of the locomotives and controlled by either of the said magnets.

4. The combination with a draw bridge and locomotives located on opposite sides thereof, and all connected in closed electric circuits, of a pair of magnets on each locomotive and included in the circuits, pistons controlling the motive power of the locomotives, and armatures of the magnets controlling the steam valves which communicate with steam cylinders which contain said pistons, each cylinder having two separate valves in different steam pipes each controlled by an armature of one of the said magnets.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 29th day of March, 1894.

EDWARD DEMING. [L. S.]

Witnesses:
ROBERT S. CHAPPELL,
EDWARD P. THOMPSON.