W. H. EMMONS & J. H. LEE.

Improvement in Automatic Safety Gates for Railways.

No. 124,561. Patented March 12, 1872.

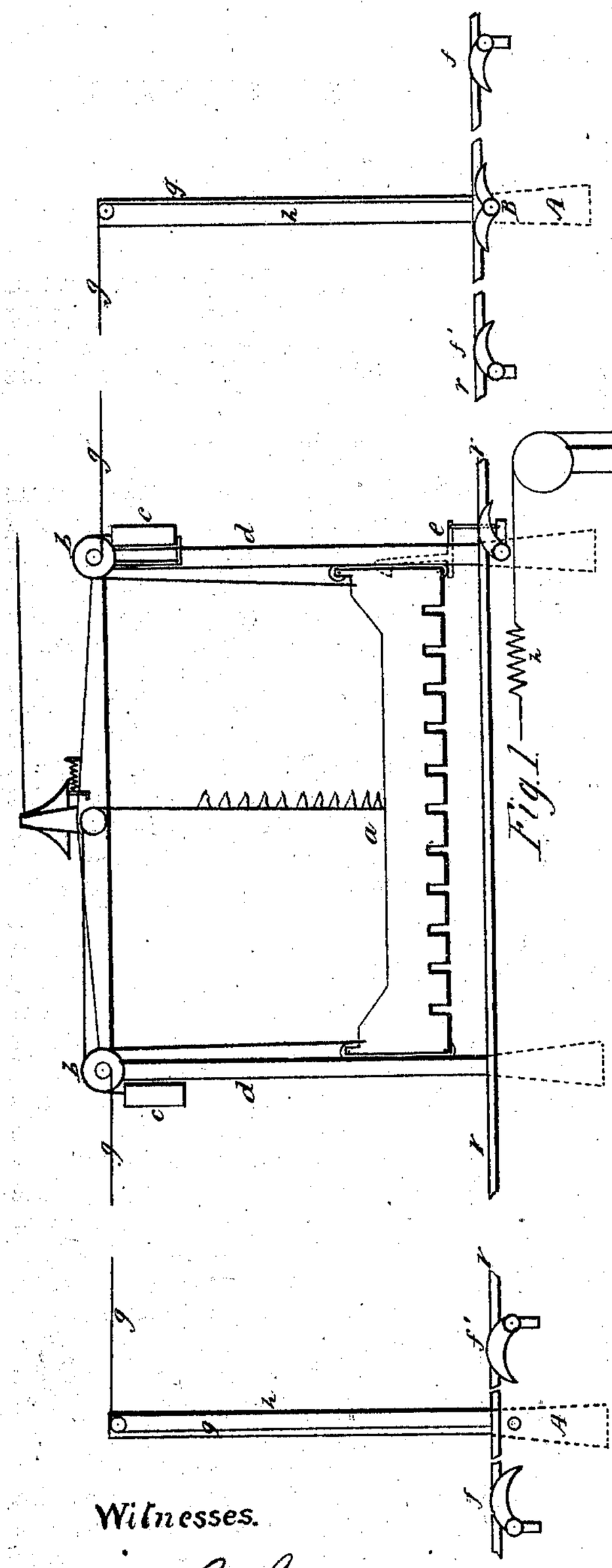

Fig. 1.

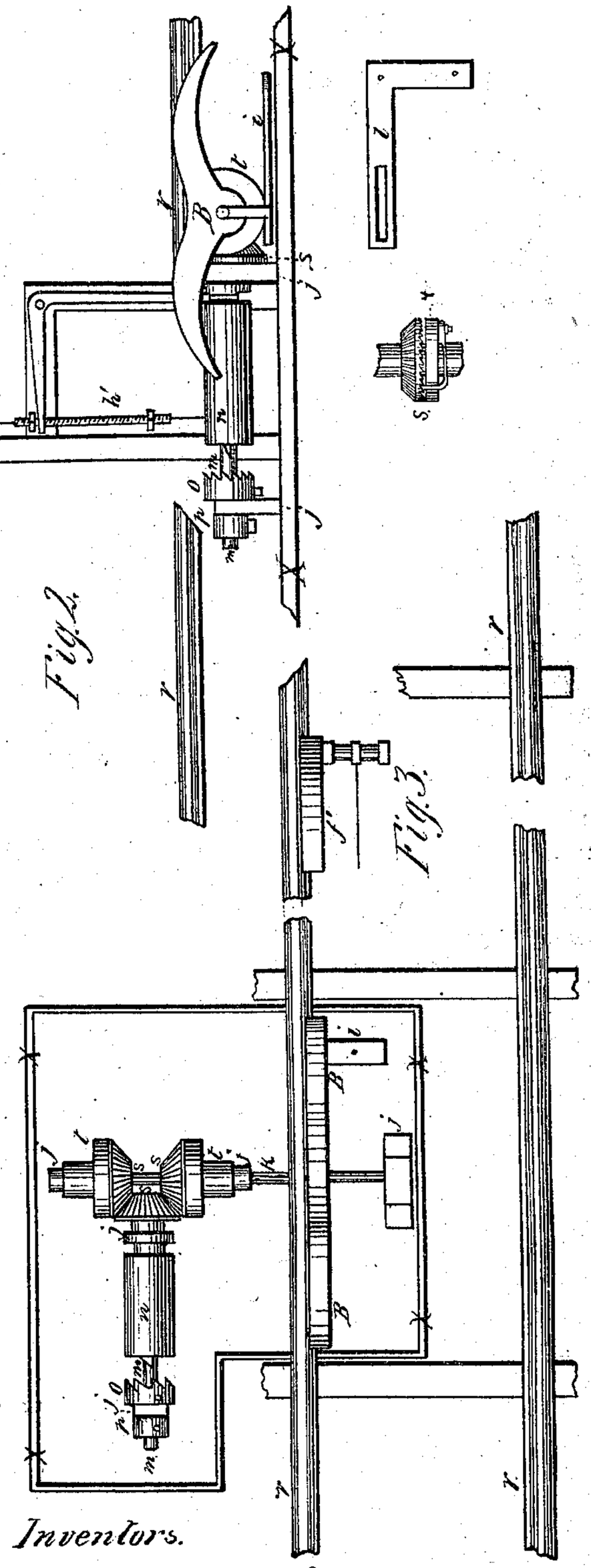

Fig. 2.

Fig. 3.

Witnesses.

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IMPROVEMENT IN AUTOMATIC SAFETY-GATES FOR RAILWAYS.

Specification forming part of Letters Patent No. 124,561, dated March 12, 1872.

We, WILLIAM H. EMMONS, of the city, county, and State of New York, and JOHN HOWARD LEE, of the city of Boston, county of Suffolk and State of Massachusetts, have invented a Safety-Gate, to be used at railway crossings, automatical in action, of which the following is a description, reference being made to the accompanying drawing forming a part of this specification.

This invention consists of the closing of gates at or near railway crossings by automatical acting machinery, worked by engines or cars, at safe and convenient distances from crossing; and also the opening of the gates when the engines or cars are passing or have passed the crossing. The objects of the invention are to prevent accidents to persons and animals on streets and roads when crossing railways; to give greater assurance of safety to passengers; to save railroad companies the costs of damages resulting from accidents at crossings; and the salaries of flagmen or gatemen by dispensing with their services.

Description of Drawing.

Figure 1 shows a closed gate, *a*, to the right and left of which are posts A A, to which is to be attached the hoisting machinery. *b b* are pulleys, over which, in grooves, runs cord or wire, connecting the gate and the weights *c c*. *d d* are the gate-posts. At *e* is a catch and lever arrangement for holding and releasing the gate, and a somewhat similar catch above connected with the first for holding the weight. *f f* are levers for moving the rocking lever B sidewise to or from the track. *g g* are cords or wires, the ends of which connect the hubs of the pulleys *b b* to the hoisting apparatus. *h* is a spiral spring, and *r* the track or rail. Fig. 2 shows a side view of the hoisting apparatus; Fig. 3, a plan of the same. B is a rocking-lever. *i* is a right-angled lever, connected with cords or wires to the levers *f f'*, which move B to and from the rail *r*. *n* is a loose drum or cylinder on the shaft *m*. *o* is a toothed hub or collar fastened to the shaft. *j j* are standards or bearings for the shafts *k* and *m*. *p* is a collar. *s s* are bevel-gears, loose, on shaft *k*, Fig. 3; and *s*, on shaft *m*, is tight. *t t*, hubs or collars, are fast to shaft *k*. *x x* is the bottom of a box in which to place the machinery. In Fig. 2 *h'* is a rod with a screw cut on each end, with nuts for adjusting and for moving the lever *l*, the lower end of which is fitted in the groove of the drum *n*.

Construction.

In its construction, the gate should be as light as is consistent with a proper degree of strength. It can be made of wood or iron, or both. The pulleys *b b* are grooved for the cords or wires which connect the gate to the weights. If the hoisting apparatus on each side of the gate connect only with one weight, which is, perhaps, the better way, the pulley on that side ought to have a hub considerably smaller in its diameter than its body, with a flange on the outer end, and with sufficient width inside for as many coils of cord as when unwound will raise the weight the required distance. These pulleys can be of cast-iron. The object of the small hub on the end of the pulley is to enable the drum to wind up a less length of cord than the distance the weight is to be raised; thus insuring the raising of the weight by the action of the wheels even of a locomotive alone on the lever B. This could also be done by increasing the diameter of the drum. The united weight of the two weights *c c* should be enough greater than that of the gate to raise the gate, and also, through the agency of the lever *l*, to slide the drum *n* so that it will clutch into the toothed collar *o*. The weights can be blocks of iron, or boxes of wood or iron filled with any heavy substance. The rocking-lever B of cast or wrought iron should be very strong; it is to move on the shaft *k*, to and from the rail. The shaft can be square at this place, or, if round, can have a heavy key set into it; the shaft *k*, of wrought-iron or low-steel, passes under the rail. *j j* are the bearings in which *k* runs or turns. *s s* are bevel or miter gears, loose on *k*. On their backs are ratchet-teeth. These gears can be cast. The flanged hubs or collars *t t* of cast-iron are fastened to the shaft. Through the flanges are holes or slots for dogs or catches, which are to be pressed by springs, so as to catch into the teeth on the backs of the gears. The catches should be of steel or case-hardened iron. The shaft *m*, of iron or steel, turns

in the bearings *j j*. The gear *s* is fastened to *m*, as is also the hub *o*, which has ratchet-teeth on its face. Both gear and hub can be of cast-iron. The drum *n* may be hollow and of cast-iron, or may be an iron hub filled up with wood; near one end is a groove, on the other end one or more teeth. The levers *f f'*, of cast-iron, are on a shaft, and are placed one on each side of the hoisting gearing at the distance from each other of the length of a long train of cars, and are connected to the lever *i* by wires. The lever *i* should be strong; it has a slot in one arm, in which, when in position, moves an arm or pin, projecting from the bottom of B, Fig. 2. The spiral spring *h* can be of steel or brass; two springs might be used, or even more. This spring is interposed to relieve the wire from the strain of a sudden jar or jerk. A box of iron or wood, *x*, should be used to protect the machinery.

A bell at the crossing can be rung by means of a wire connecting with a lever similar to *f f'*, and placed at sufficient distance to ring the bell before the gate begins to descend, if desired. The bell may also be rung by a flat band (with ribs similar to ratchet-teeth on its outer surface) moving over a pulley, and with the aid of a spring a lever or hammer may be made to strike a bell, as may be desired. Also, the bell can be rung, as desired, by employing electro-magnetism.

The descent of the gate may require to be regulated, which can be done by a pendulum-lever or balance-wheel escapement, similar to clock and watch movements. The bell could also be attached to this arrangement.

Two gates, one on each side of the track or tracks, can be moved together by the cords *g* of each gate being joined to each other at some distance from the gate, thence connected with the hoisting-gear, as in the case of a single gate.

A signal can be displayed by movements similar to any of the methods by which a bell can be rung. The hoisting part of the invention might consist of a rack, moved by hooks, which are moved by arms jointed to a straight arm or lever on the shaft *k*, outside of the track, and parallel to the lever B. On the rack must be dogs to throw the hooks in and out of gear with the rack. The hooks and springs must be on collars, on studs, and held by friction-nuts and washers.

Operation.

It will be perceived, by an inspection of the drawing, that when an approaching train of cars arrives at *f*, Fig. 1, the lever *f* is pressed down by the flanges of the wheels, thus moving the rocking-lever B (by means of lever *i*, which is connected with lever *f* by wire) toward the rail, so that as the wheels pass the lever B it is rocked up and down, and as the hubs *t t*, Figs. 2 and 3, are fast to the shaft *k*, while the gears *s s* on this shaft are loose, and the intermediate gear *s* is fast on shaft *m*, a continuous rotary motion is given to the shaft *m* by means of catches on the hubs *t t*, pressed by springs into the ratchet-teeth on the backs of the gears *s s* on *k*. It will also be seen that when the gate is up the weights *c c* are down, and the rod *h'*, Fig. 2, is drawn up so that the nuts on its lower end are pressed against the lever *l*, which has its lower end fitted in the groove of the drum *n*, thus moving the drum, which is loose on the shaft *m*, so as to clutch into the collar *o*, which is fast to *m*, thus winding up a cord which connects the drum with the rod *h'*, drawing it down and raising the weight *c*, Fig. 1, by the cord or wire *g*. The weight is held up by a catch. Now, the gate being heavier than the other weight *c*, the gate descends and is held by the catch at *e*. When the drum has wound up a sufficient length of cord to raise the weight the required distance, the nuts on the upper end of the rod *h'* are pressed down upon the upper part of the lever *l*, thus moving the drum from the clutch *o*. Thus the drum is left free to unwind, and is thereby enabled to be again thrown into gear by the weight, when the weight and gate are released by the train arriving at *e*. After the train has passed the gate, and before it has arrived at the other hoisting-machine, which is supposed to be at A, Fig. 1, at the left of the gate, it passes and moves the lever *f'*, also seen at *f'*, Fig. 3, thus moving B from the rail, so that B shall not be rocked up and down, and allowing the gate to remain open. Without this provision the gate would be closed again by the same train.

It will be seen that in the case of a train moving with great rapidity the springs *h h* relieve the wire or cords to a great extent from the sudden strain occasioned by the raising of the weight by the machinery.

Claims.

We claim as our invention—

1. We claim the combination of the different parts of the mechanism of the hoisting apparatus, consisting of the lever B, shaft *k*, bevel or miter gears *s s s*, collars *t t*, with catches and springs, shaft *m*, drum *n*, collar or hub *o* with lever *l*, and connected with cord or wire with the rod and nuts *h'*, substantially as and for the purpose hereinbefore set forth.

2. We claim the mechanism for moving the lever B to and from the rail, consisting of the levers *f' f*, and (connected with them by cord or wire) the right-angled lever *i*, substantially as and for the purpose hereinbefore set forth.

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