(No Model.)

J. F. SMALL.

RAILWAY GATE.

No. 599,020. Patented Feb. 15, 1898.

Fig 1

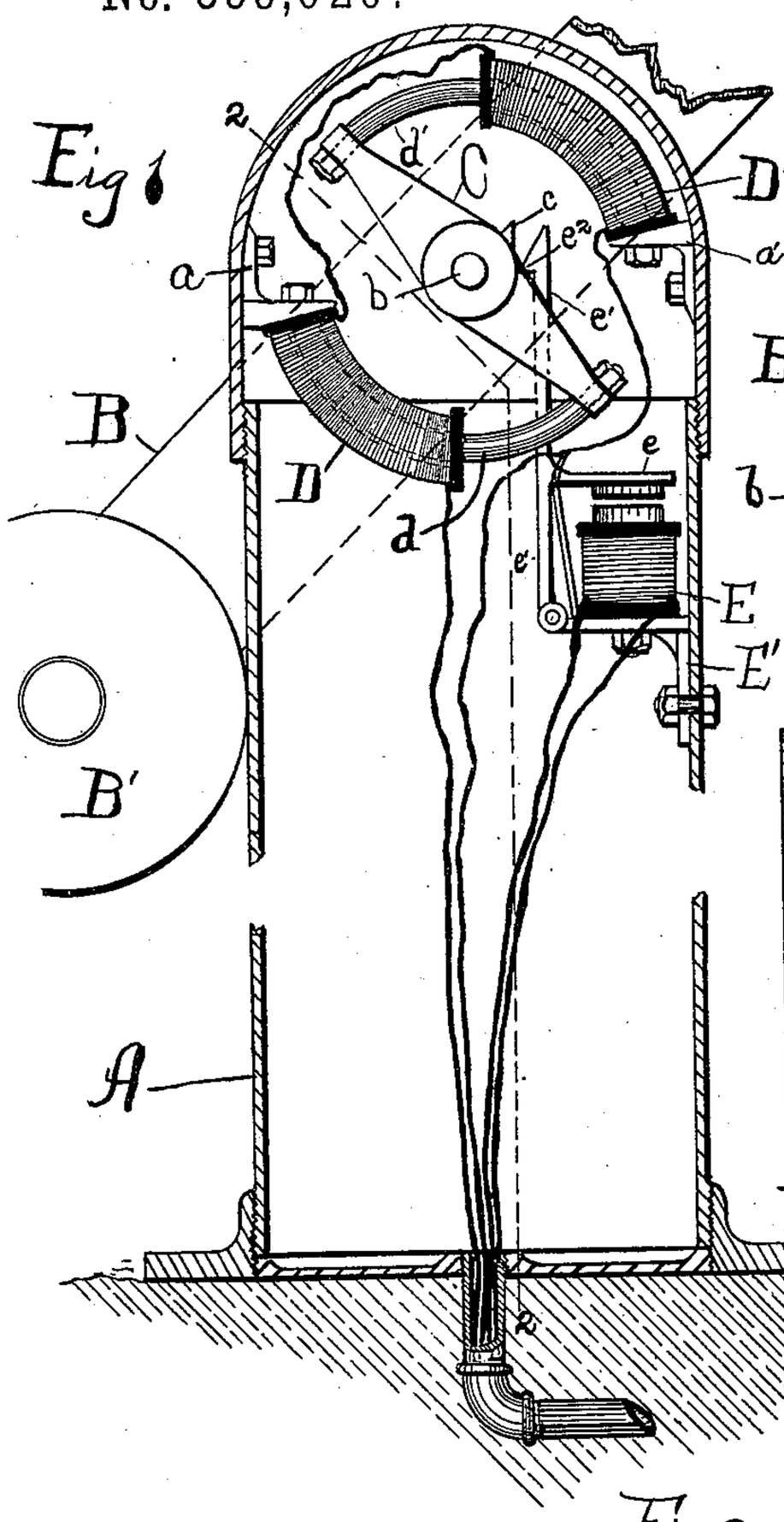


Fig 2

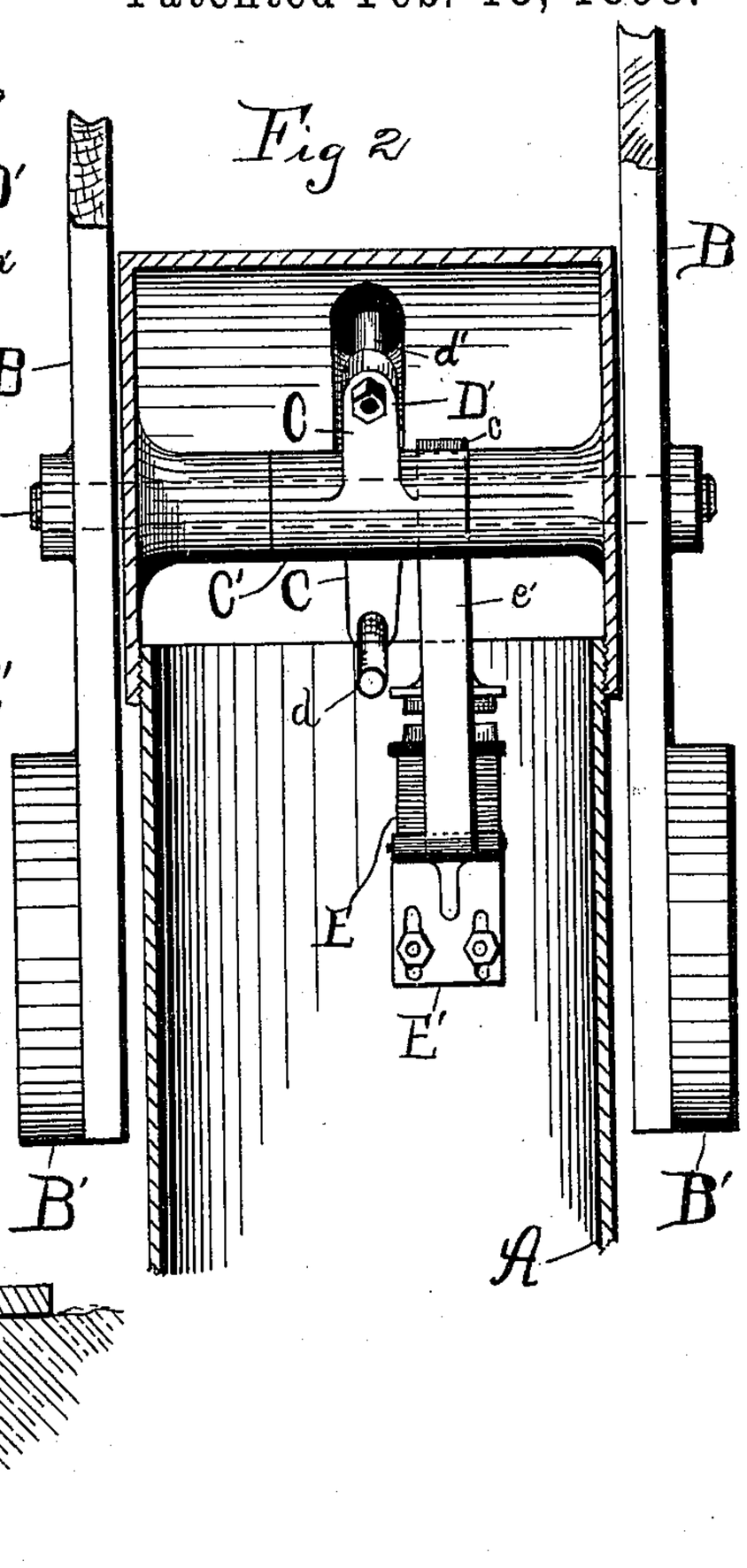
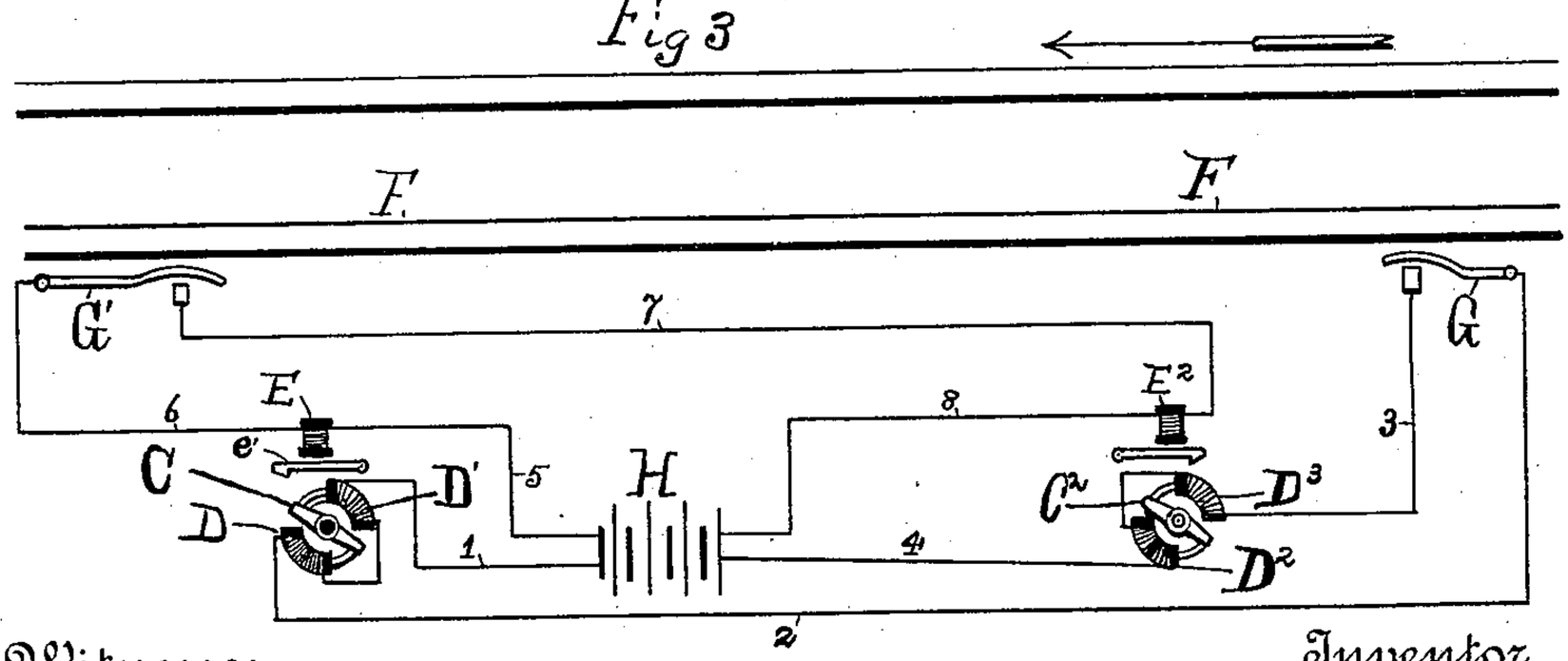


Fig 3



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RAILWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 599,020, dated February 15, 1898.

Application filed March 19, 1895. Serial No. 542,330. (No model.)

To all whom it may concern:

Be it known that I, JOHN FRANCIS SMALL, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Railway-Gates, of which the following is a specification.

The object of my invention is to provide simple, reliable, and efficient electrical means for operating railway-gates; and my invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a sectional elevation of a gate post or pillar, showing my mechanism in position; Fig. 2, a sectional elevation taken on the irregular line 2 2 of Fig. 1, and Fig. 3 a diagrammatic view of a railway-track and electrical circuits when my gate is designed to be operated automatically by moving cars.

In erecting my improved gate I first construct a hollow post or pillar A of the proper shape and dimensions to accommodate the operative parts hereinafter set forth. An ordinary gravity gate-arm B, provided with a counterbalance B′, is suitably journaled or mounted in the post. A double lever or rock-arm C is provided with a hub or sleeve C′, whereby it may be rigidly though adjustably secured to the gate-arm shaft.

At proper points within the post I secure hangers or brackets *a a′*, to which are secured curved solenoids D D′, respectively, arranged on the arc of a circle, of which the lever C might constitute a diameter and the shaft *b* the center. As shown in Fig. 1, these solenoids extend from their brackets in a reverse direction. On one free end of the lever C, I bolt or otherwise securely attach a solenoidal core *d*, corresponding in curvature to that of its solenoid D. Upon the other end of the lever I mount a similar solenoidal core *d′*, adapted to enter the solenoid D′.

Upon the lever I provide, preferably, a lug or projection *c*, adapted by engaging with suitable catch mechanism to retain the gate-arm in a lowered position independent of the action of the solenoids. This mechanism consists of a suitable electromagnet E, mounted upon a bracket E′ within the post and controlling the pivoted armature *e*, which is provided with a right-angled upright piece *e′*, having a projection or shoulder e^2 at its free end, which extends in the path of travel of the lug *c*.

I prefer to employ double solenoids, as shown in the drawings, although a single one of sufficient strength will be found practical. In case of the use of double solenoids I prefer to couple or join them in series by means of conductors leading from a suitable source of electric supply. The solenoids are arranged in a normally open circuit, which may be closed by a gate-tender or automatically by means of the moving cars themselves.

In Fig. 3 I have shown the electrical circuits which may be used to operate the gates in an automatic manner. At suitable distances at either side of the railway-crossing and contiguous to the rail F of the track are placed ordinary circuit-closers G G′, operated by passing cars. The posts and accompanying parts heretofore described are generally four in number at each crossing, and in Fig. 3 I have shown the operative parts of two of them, the construction of all being similar. The two solenoids D^2 and D^3 in the right-hand gate, Fig. 3, magnet E^2, and the lever C^2 correspond to the solenoids D D′, magnet E, and lever C, respectively, of the other gate. The solenoids are located in a circuit composed of conductors 1, 2, 3, and 4, circuit-closer G, and battery H. The magnet E is interposed in a circuit composed of conductors 5, 6, 7, and 8, circuit-closer G′, and battery H.

As before stated, the gate may be operated in any manner by closing the solenoid-circuit; but I will proceed to describe its preferred method of operation—that is, automatically by the movements of the cars upon the track. Assuming that a car is approaching the crossing from the right, Fig. 3, the circuit-closer G will be operated and the solenoids energized, whereby the cores will be attracted or sucked into the solenoids. The gate-arm will therefore be rocked in a positive manner to a lowered position, so as to extend over and guard the crossing. As soon as the gate-arm has been rocked sufficiently the lug *c* will engage the shoulder e^2 and be locked thereby in such lowered position independent of the solenoids. When the train or car has reached and actuated the circuit-closer G′, the mag-

net will become energized and attract its armature *e*, thereby releasing the catch and permitting the gate-arm to resume its normal substantially upright position.

My gate-operating mechanism possesses many advantages and is positive and reliable in operation. One principal feature is the attachment of the mechanism direct to the bearing-shaft of the gate-arm, so that the solenoids have a heavy and immediate purchase thereupon. Moreover, by slight mechanical changes in structure the arms of the lever C may be made longer, so as to increase the leverage to the extent desired. Furthermore, the parts are so constructed and disposed as to constitute a simple and compact gate devoid of overhead or underground connections except the electrical conduits for the wires.

For the purpose of clearness and brevity I have shown and described a normally upright gate-arm with its mechanism arranged in a normally open circuit; but it is obvious that it may be arranged in a normally closed circuit in connection with a gate-arm whose uninfluenced position is over the crossing. I do not therefore limit myself in any respect to the use of a normally open circuit.

Although I have described more or less precise forms and details of construction, I do not intend to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit of my invention.

I claim—

1. In a railway-gate, the combination of a pivoted gate-arm, a lever-arm secured directly thereto, a curved solenoid, a correspondingly-curved core mounted upon the lever-arm and electrically-controlled means for holding the gate in a lowered position independent of the solenoid.

2. In a railway-gate, the combination of a gate-arm provided with a bearing-shaft, a lever-arm rigidly secured directly to the shaft, a curved solenoid arranged in an electrical circuit, a correspondingly-curved core mounted upon the lever-arm, and catch mechanism adapted to retain the gate-arm in a lowered position independent of the solenoid.

3. In a railway-gate, the combination of a gate-arm provided with a bearing-shaft, a double lever-arm rigidly secured directly to the shaft, curved solenoids arranged in an electrical circuit, correspondingly-curved solenoidal cores secured upon the free ends of the lever-arm, catch mechanism adapted to retain the gate-arm in a lowered position independent of the action of the solenoids and electrically-controlled means for disengaging the catch mechanism.

4. In a railway-gate, the combination of a pivoted gate-arm provided with a bearing-shaft *b*, a double lever-arm C rigidly secured directly to the shaft, curved solenoidal cores *d d'* arranged upon the lever-arm, correspondingly-curved solenoids D, D' arranged in the path of travel of the cores, a lug or projection *c* arranged upon the lever-arm, an armature-lever *e'* provided with a shoulder e^2 adapted to engage the lug and a magnet E adapted to operate the armature-lever and disengage the parts.

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