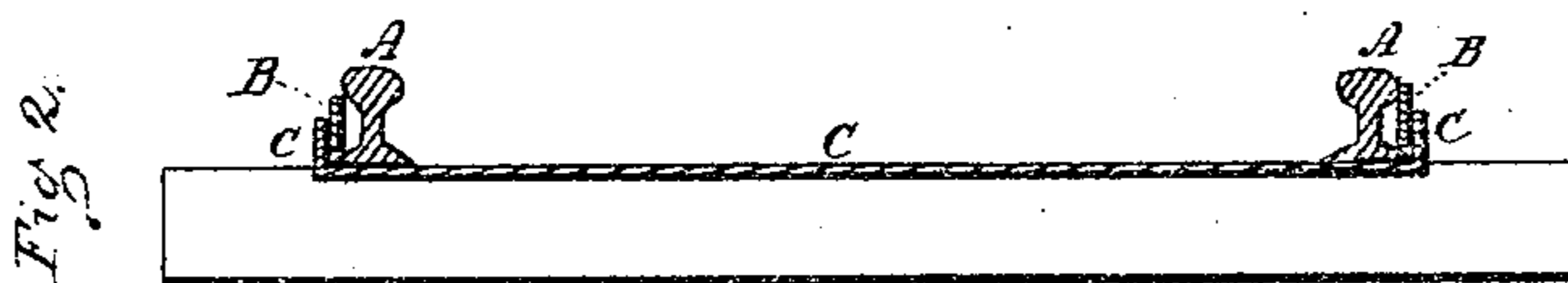
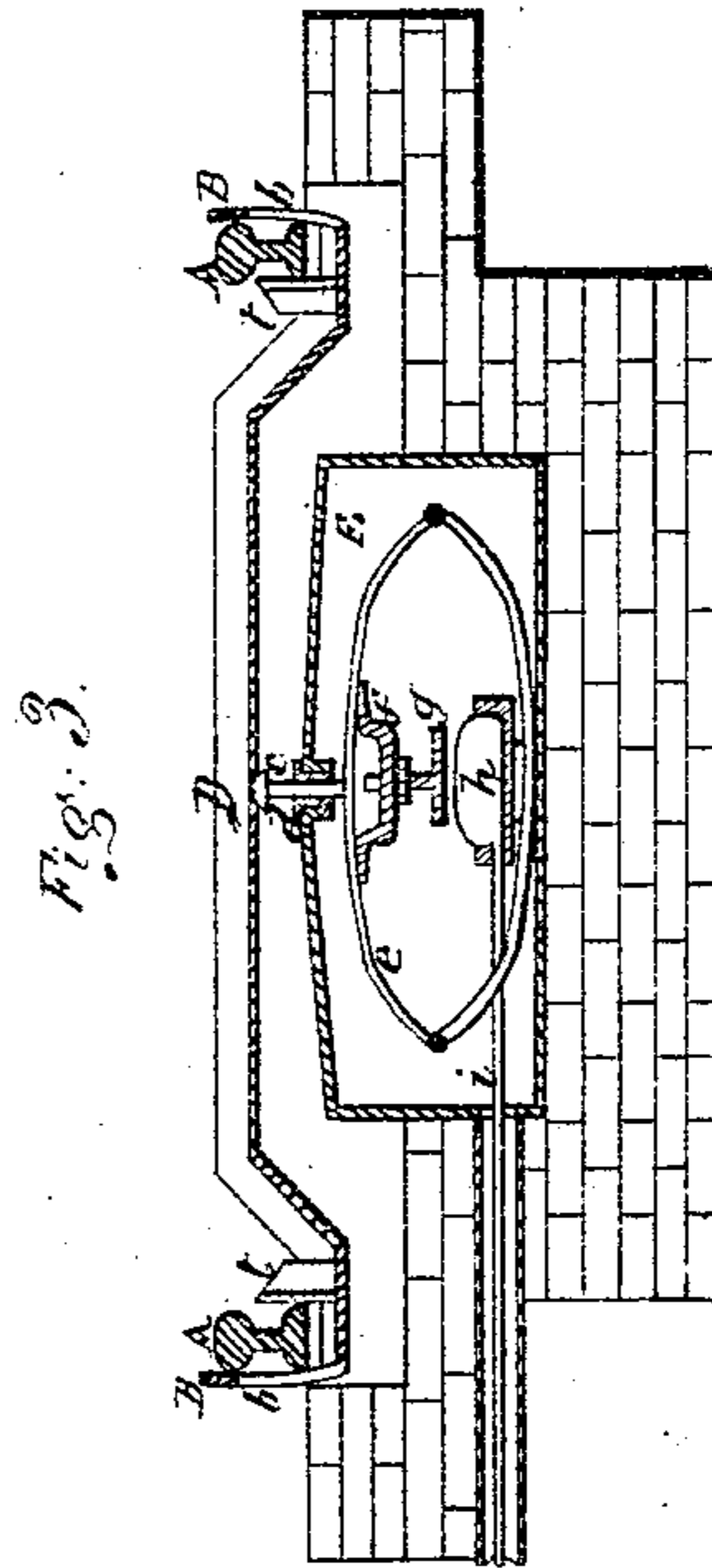
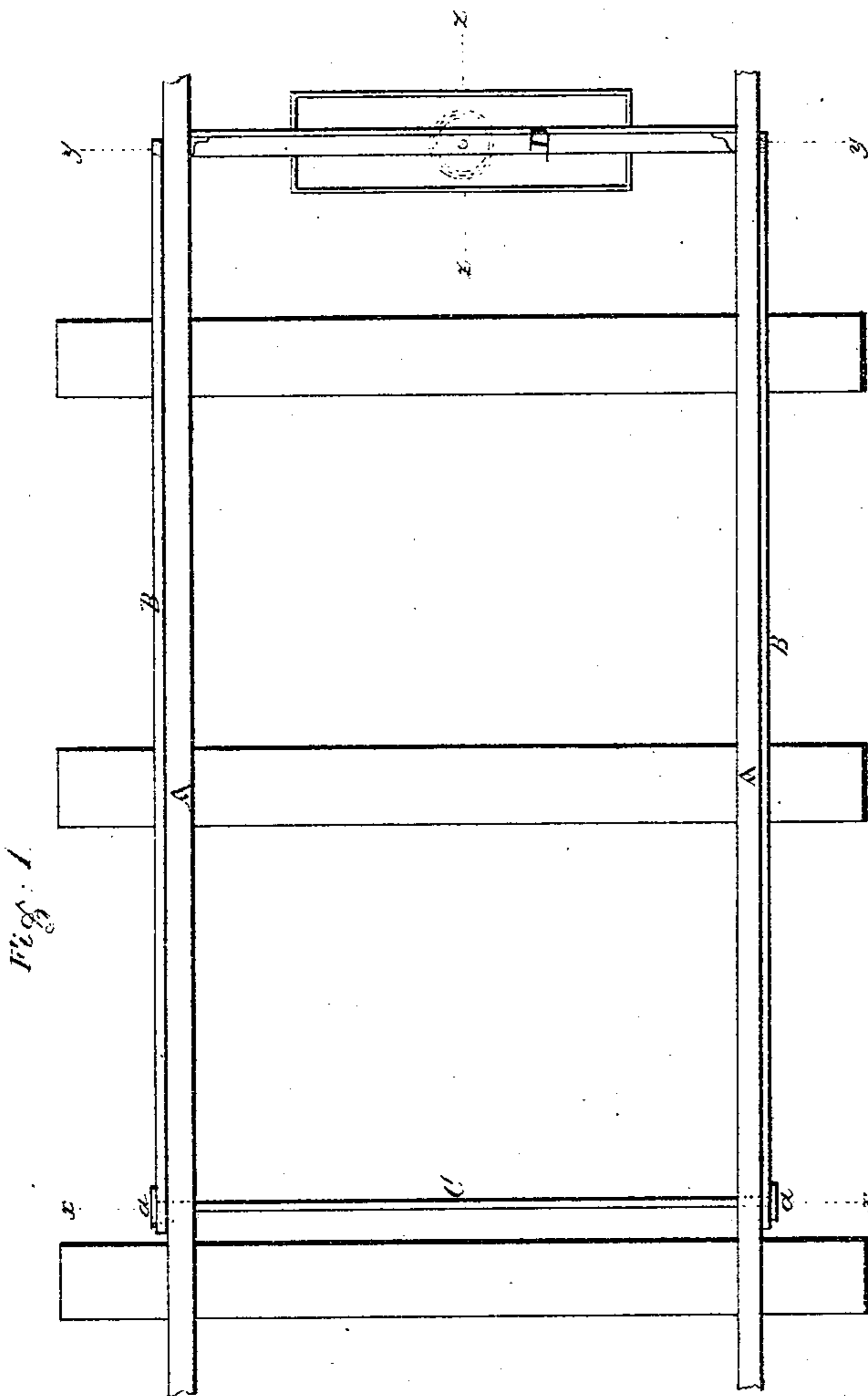


A. BERNSTEIN.

Electro-Pneumatic Railway Signal Apparatus.

No. 153,800.

Patented Aug. 4, 1874.



Witnesses:

J. West Wagner,  
J. W. Williams

Inventor:

Alex. Bernstein.  
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His Attorneys.

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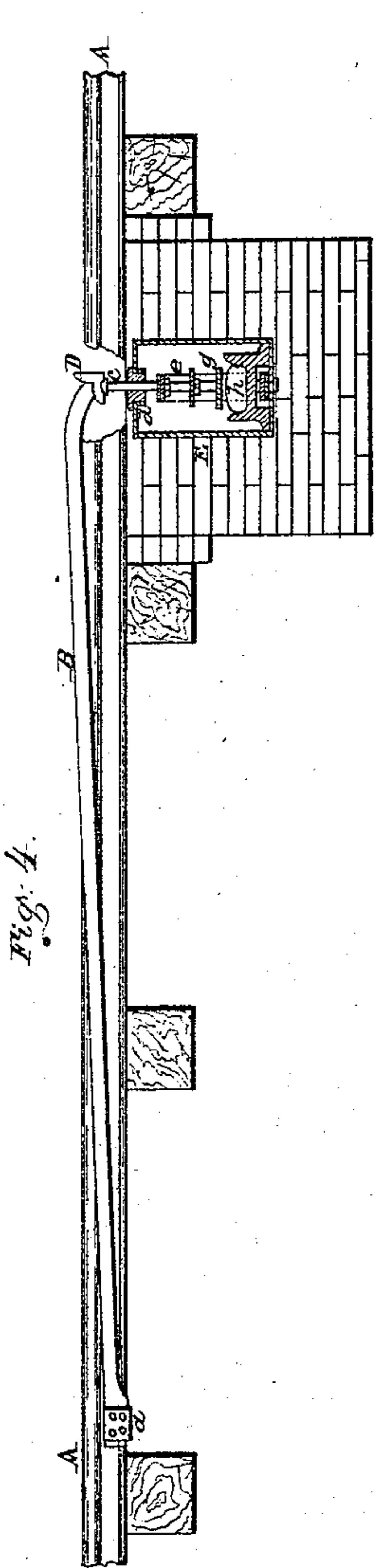
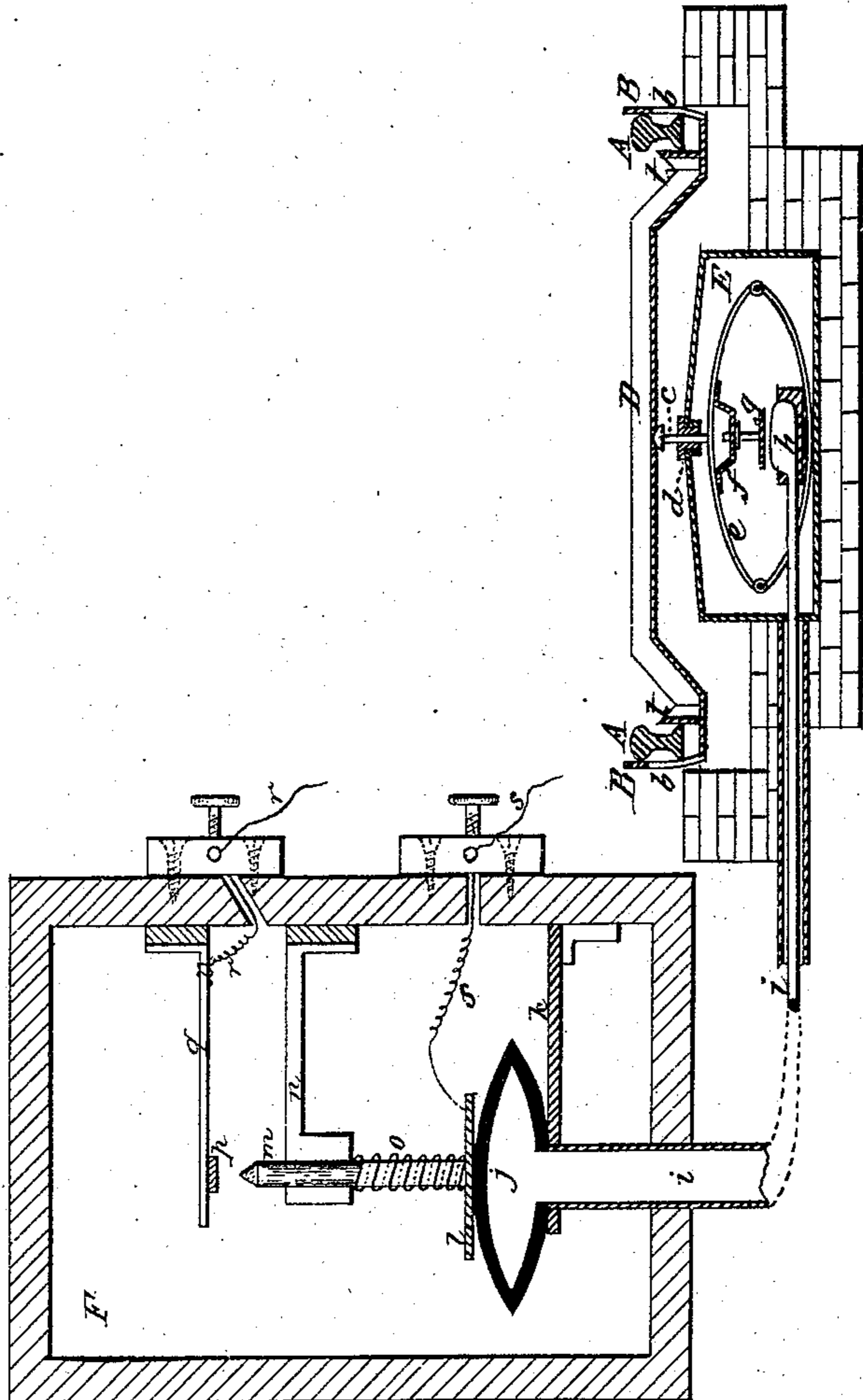


Fig. 4.



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# UNITED STATES PATENT OFFICE.

ALEX BERNSTEIN, OF BERLIN, PRUSSIA.

## IMPROVEMENT IN ELECTRO-PNEUMATIC RAILWAY SIGNAL APPARATUS.

Specification forming part of Letters Patent No. **153,800**, dated August 4, 1874; application filed March 17, 1873.

*To all whom it may concern:*

Be it known that I, ALEX BERNSTEIN, of Berlin, in the Kingdom of Prussia, have invented certain new and useful Improvements in Automatic Electro-Pneumatic Train-Annunciators, of which the following is a specification:

The object of my invention is the automatic closing or forming of a circuit of an electric telegraphing stream by a passing railroad-train, the wheels of which operate a pneumatic apparatus situated at about eight or ten minutes' ride from the station, which apparatus, being connected by wires to an alarm-signal of any suitable kind within or near the station-building, closes at each operation, by a pair of wheels, the electric circuit, which, in the normal position of the operative parts of the apparatus, is broken, and through which the approaching train is announced on the alarm-signal; and my invention consists in a railway signal apparatus, the combination, with a pneumatic apparatus, consisting, essentially, of two air retainers or bulbs, distant from each other upon the track, and connected by a tube, and operated by the passing train, of an electrical circuit-closer operated thereby, the air-motor being forced alternately to expand the one to bring into action the circuit-closer, and the other to put and hold the operating devices in proper positions to receive the action of the train, the air-retainers being thus in turn expanded and contracted, and made the direct means to operate the circuit-closer, and thereby dispense with electric batteries and circuit-breakers arranged along the track; and, further, in the construction and arrangement of the several parts of the electro-pneumatic apparatus and parts belonging to it, which are operated on by a passing train, as hereinafter more fully described.

In the accompanying drawings, Figure 1, Sheet 1, represents a plan or top view of a portion of a railroad-track to which my invention has been applied. Fig. 2, Sheet 1, represents a cross-section in line *x x*, Fig. 1. Fig. 3, Sheet 1, represents a cross-section in line *y y*, Fig. 1. Fig. 4, Sheet 2, represents a cross-section in line *z z*, Fig. 1; and Fig. 5, Sheet 2, represents a sectional view of the apparatus by means of which the electric cir-

cuit is formed and broken, and the pneumatic apparatus as connected therewith.

Like letters of reference indicate like parts in the several figures.

A A in the drawings represent the rails of a portion of a railroad-track at a distance of from eight to ten minutes' ride from the next station. Pivoted to the rails at *a*, by means of a cross-bar, C, are curved side rails B, the pivoted ends of which are below the level of the surface of the rails A, while the highest point of their curve rises above the level of the rails about one-half inch; and these curved side rails, being flat, lie so close to the rails A that the wheels of a railroad-car passing over the rails A must also pass over and depress the protruding curved portion of the side rails B. The free ends of these rails B are secured to the upwardly-bent arms *b* of a bow-shaped cross-piece, D, which latter is held by a pin, *c*, on which it rests with its center, while the pin *c*, passing through a stuffing-box, *d*, in the cover of a case, E, is supported centrally by the upper leaves of a double bow-spring, *e*, the lower leaves of which are centrally secured on the bottom of case E, which case, constructed of metal or any other suitable material, is properly and firmly embedded in masonry. From the under side of the upper leaves of the spring *e* is suspended a hanger, *f*, through which a rod passes downwardly, terminating in a plate, *g*. This plate *g*, which is made adjustable, as to height, by means of a nut surrounding its rod, is held suspended over a bag, *h*, made of any suitable flexible material, preferably thin india-rubber, and filled with air, and which bag is supported in a solid case, beyond which, however, it protrudes upwardly. A small pipe, *i*, of lead or other suitable material, extends outwardly from said bag *h*, and leads into a case, F, (shown in Fig. 5,) extending upwardly through its bottom, and terminating in a second thin india-rubber bag, *j*, which is supported on a side brace, *k*, and in turn supports a plate, *l*, from which rises centrally a pin, *m*, which, passing through a guide-brace, *n*, terminates in a platina point. A coiled spring, *o*, surrounding the pin *m*, and bearing with its upper end against the lower side of brace *n*, and with its lower end against the

plate *l*, forces the plate downwardly on the bag *j*, and keeps the platina point of pin *m* out of contact with a platina plate, *p*, suspended, directly over the point, from a strip of metal, *q*, which strip is secured to the inside wall on either side of case *F*. The two wires *r* and *s* of the electric circuit connect with the platina plate *p* and the plate *l*, respectively, and when the parts are in their normal positions, as shown in the drawings, the circuit is broken, as the point of pin *m* and the platina plate *p* are out of contact with each other. The wires *r* and *s* connect with an electric alarm-signal at the station, but when a train passes over the rails *A* and *B* the latter are depressed by the wheels, and in turn depress the cross-piece *D*, pin *c*, upper leaves of bow-spring *e*, and thus force the plate *g* upon the india-rubber bag *h*, by means of which pressure the air in bag *h* is compressed, and forced through pipe *i* into the india-rubber bag *j*, expanding the latter. The expansion of the bag *j* forces upwardly the plate *l* and pin *m*, overcoming the spring *o*, (which, of course, must not be strong enough to resist this pressure,) and thus brings the platina point of pin *m* in contact with the platina plate *p*, thereby closing the electric circuit, sounding the alarm at the station, and thus announcing the train. As soon as the wheel has passed over and left the rail *B*, the bow-spring *e* forces the pin *c* and cross-piece *D*, and with it the curve of rails *B*, upwardly, and relieves the pressure of the plate *g* upon the bag *h*. The air again expands in the latter, and causes the bag *j* to collapse, when the spring *o*, pressing upon the plate *l*, forces it and pin *m* downwardly out of contact with the platina plate *p*, thus again breaking the electric circuit.

It will thus be seen that each pair of wheels, by passing over the rails *B*, once connect, and once again break, the circuit. Thus the number of wheels, and, consequently, that of the cars of a train, may be accurately known before its arrival.

In order to insure an equal depression of both ends of cross-piece *D*, and to prevent a side motion of the same, uprights *t* are secured on this piece *D*, just inside of the rails *A*, and bearing against them, thus forming steadying-braces.

To prevent the operation of the pneumatic apparatus by reason of a person or an animal accidentally stepping on one of the side rails

*B*, or their otherwise accidental depression on one side, I form the head of the pin *c*, which supports the cross-piece *D*, semicircular, or, rather, semi-globular, and allow it to play freely in a correspondingly-shaped depression in the under side of the piece *D*. Thus, when one end of piece *D* is accidentally depressed by an accidental depression of the corresponding rail *B*, the consequence will only be a corresponding elevation of the other end, and not a depression of pin *c*, over and on the head of which the piece *D* has free play.

By regulating the height of the plate *g* above the bag *h*, the degree of pressure required or desired to operate the pin *m* can be regulated at pleasure.

Having described my invention, I claim—

1. In a railway signal apparatus, the combination, with the pneumatic apparatus, consisting, essentially, of the air-bulbs *j* and *h*, and connecting-tube *i*, and operated by a passing train, of an electrical circuit-closer operated thereby, substantially as and for the purpose described.

2. The combination of the side rails *B* with the cross-piece *D*, and the bow-spring *e* with its hanger *f* and adjustable plate *g*, as a means of operating the pneumatic apparatus, essentially as described.

3. In combination with the rails *B*, cross-piece *D*, and spring *e*, the pieces *t*, arranged to prevent a side movement of the cross-piece, essentially as described.

4. In a railway signal apparatus, the combination of two side rails, *B*, to be acted on by the wheels of a car, and a connecting bridge-piece, *D*, centrally pivoted, substantially as and for the purpose described.

5. In combination with the pneumatic apparatus, the depressing devices, and spring *e*, the adjustable plate *g* to regulate the degree of pressure on the bag *h* and the power required to operate the pin *m*, and thus connect the circuit, essentially as described.

6. The combination of the rails *B*, cross-piece *D*, pin *c*, bow-spring *e*, hanger *f*, adjustable plate *g*, rubber bag *h*, metal tube *i*, rubber bag *j*, plate *l*, pin *m*, spring *o*, and platina plate *p* on the metal strip *q*, and the wires *r s* of an electric alarm-signal, all arranged and operating essentially as described.

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Witnesses:

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