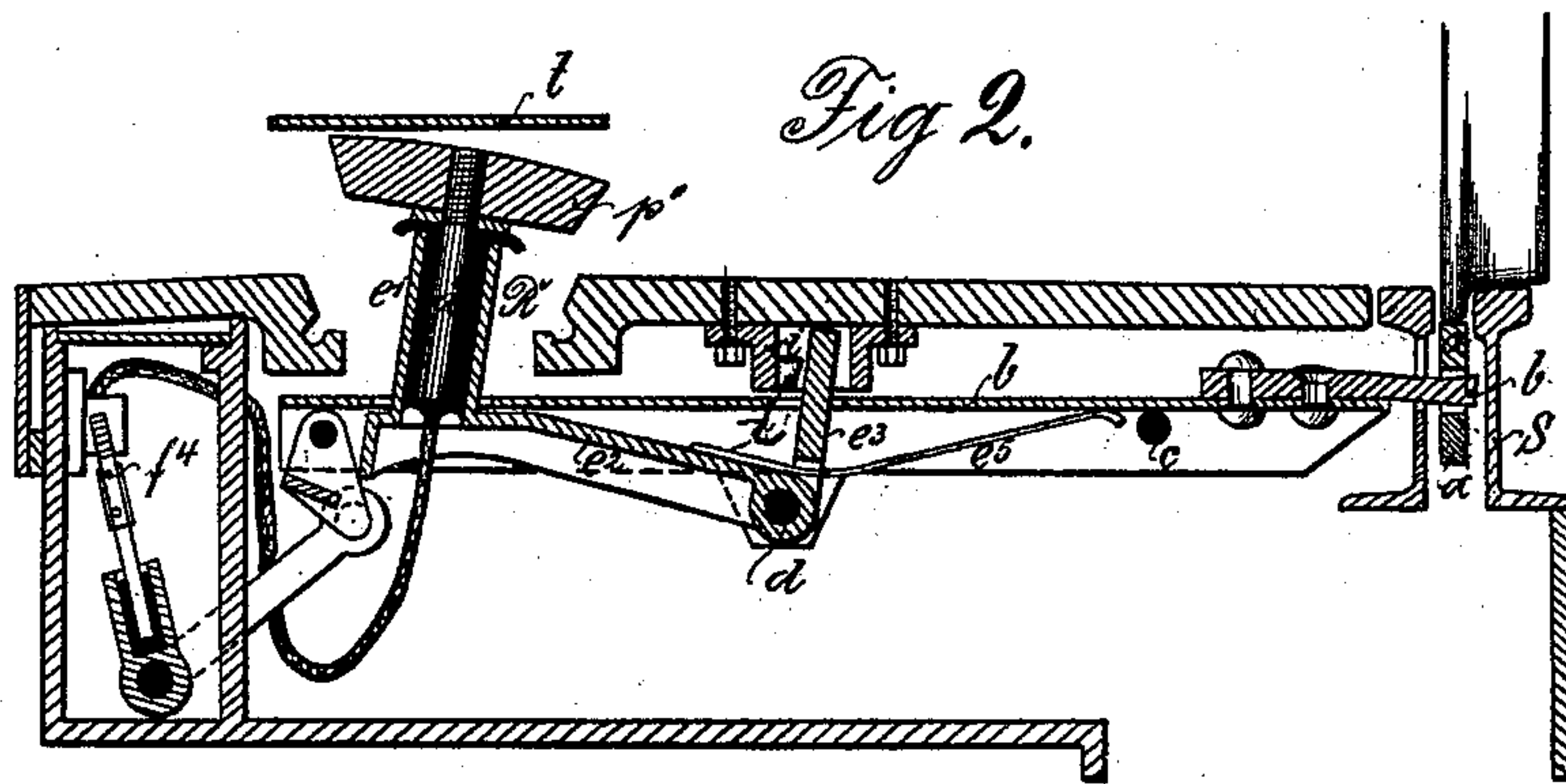
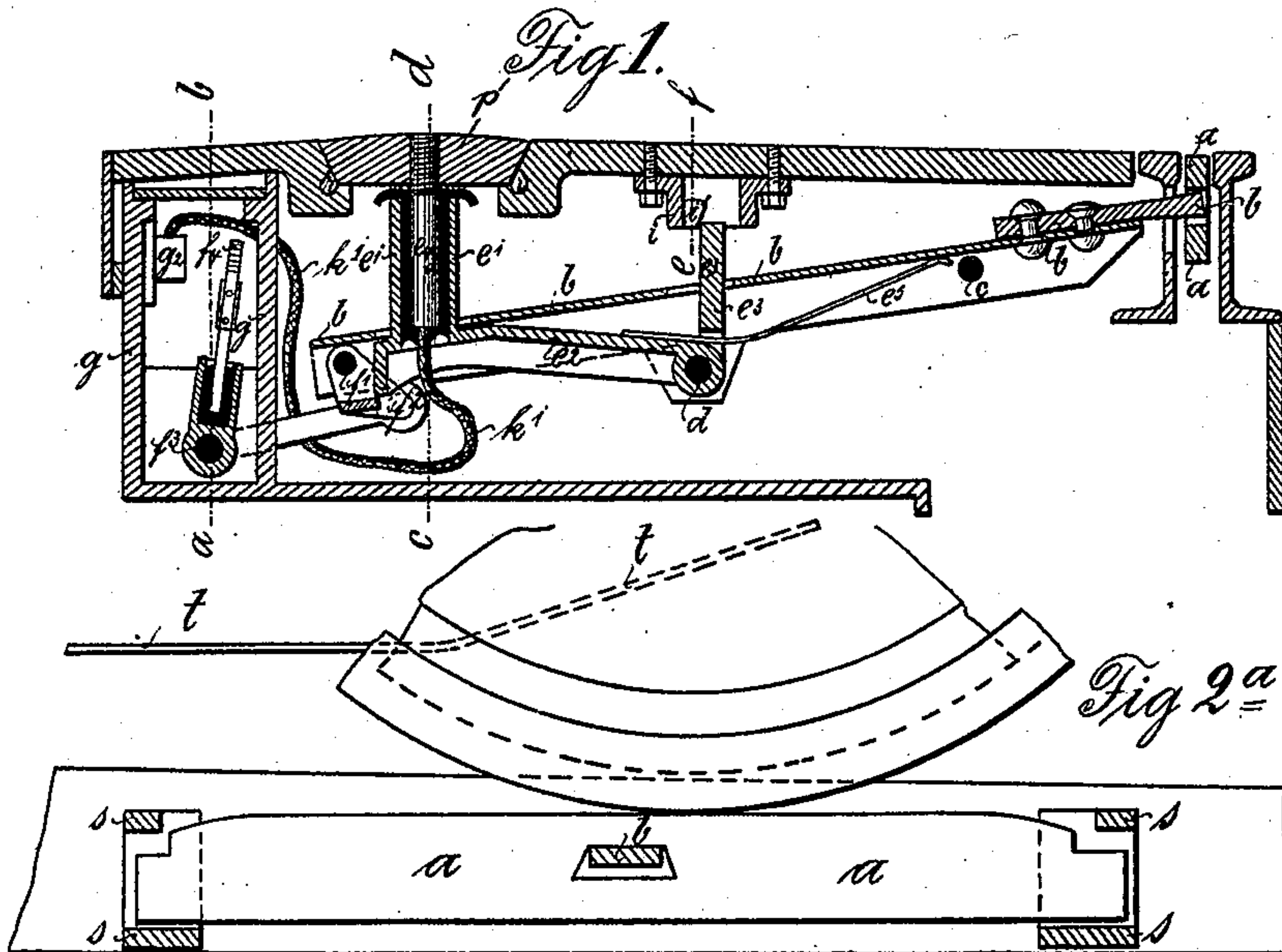
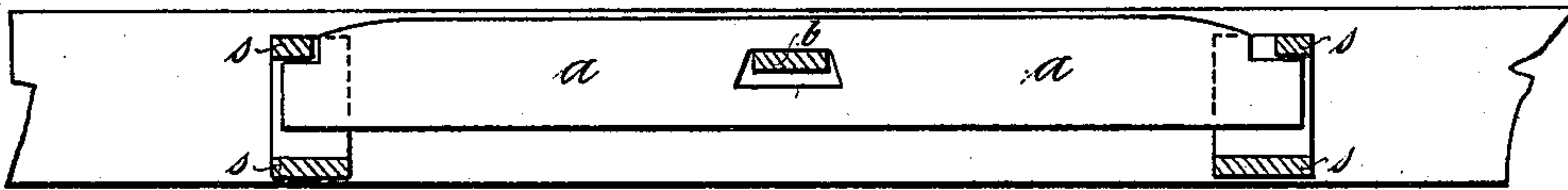


P. LUCAS.
CLOSED CONDUIT ELECTRIC RAILWAY.

No. 539,184.

Patented May 14, 1895.

Fig 1^a



Attest
Wm. S. Hall
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

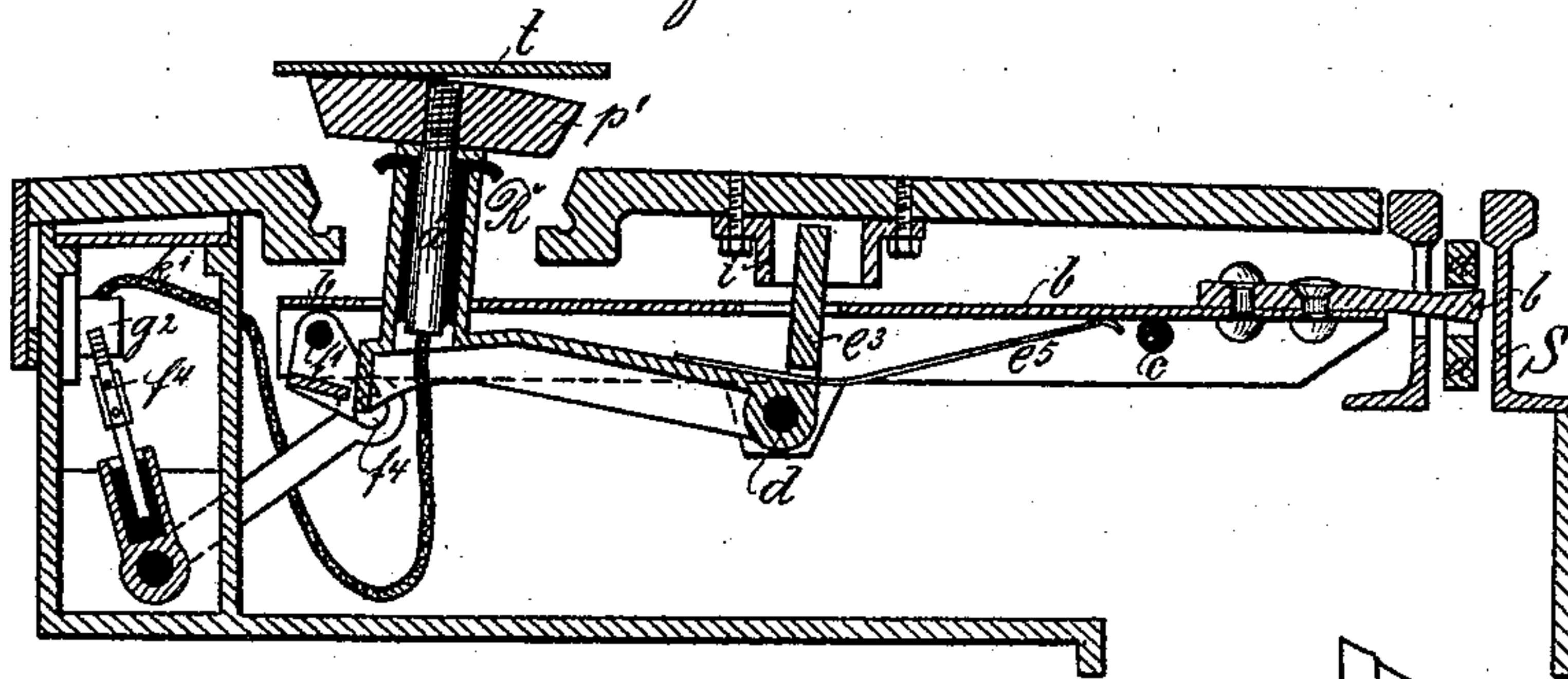


Fig. 7.

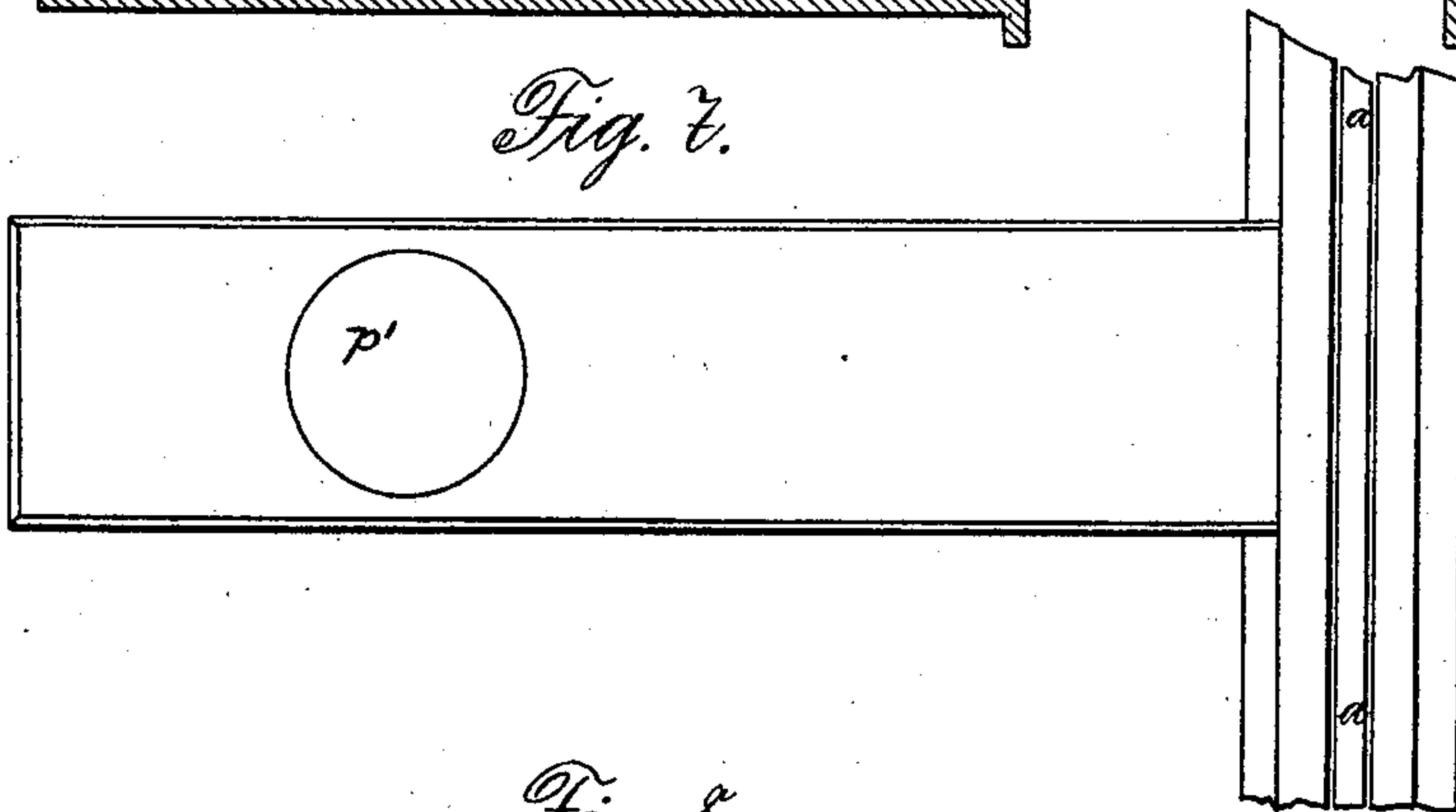


Fig. 8.

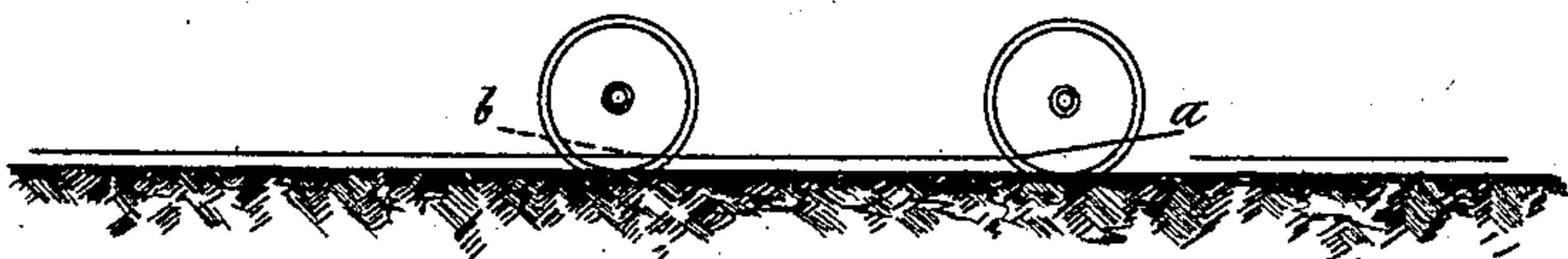
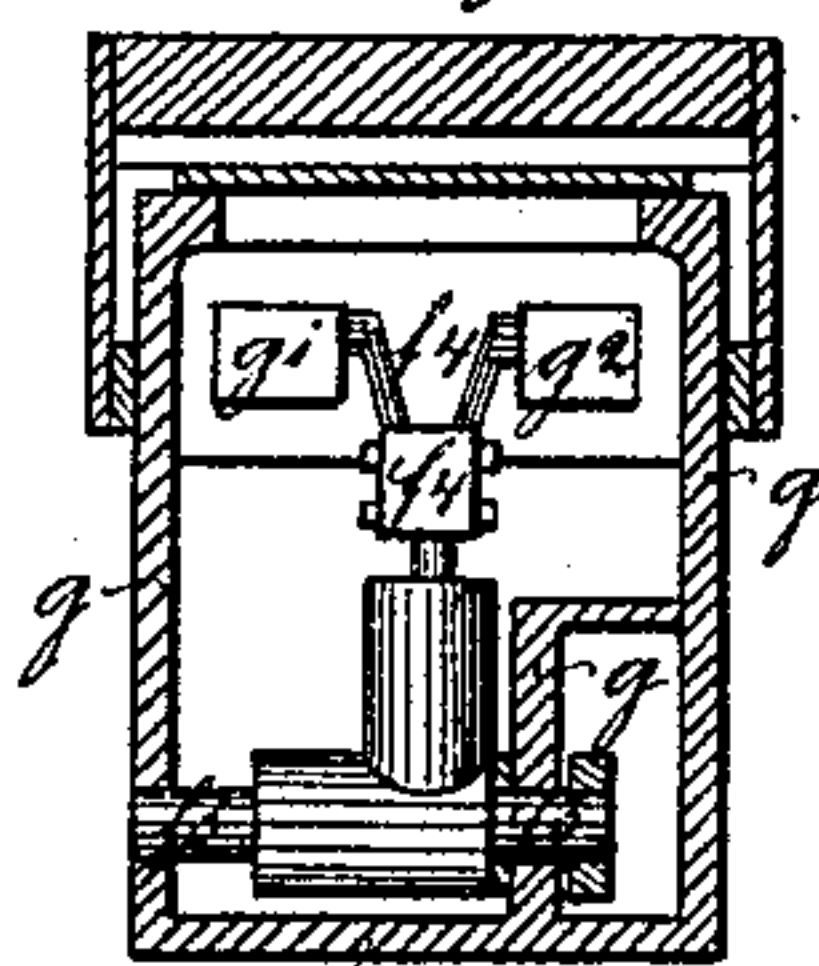


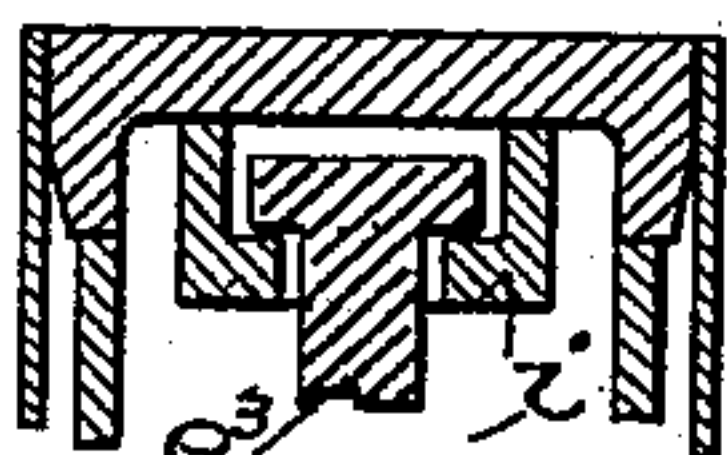
Fig. 4.



Section a-b

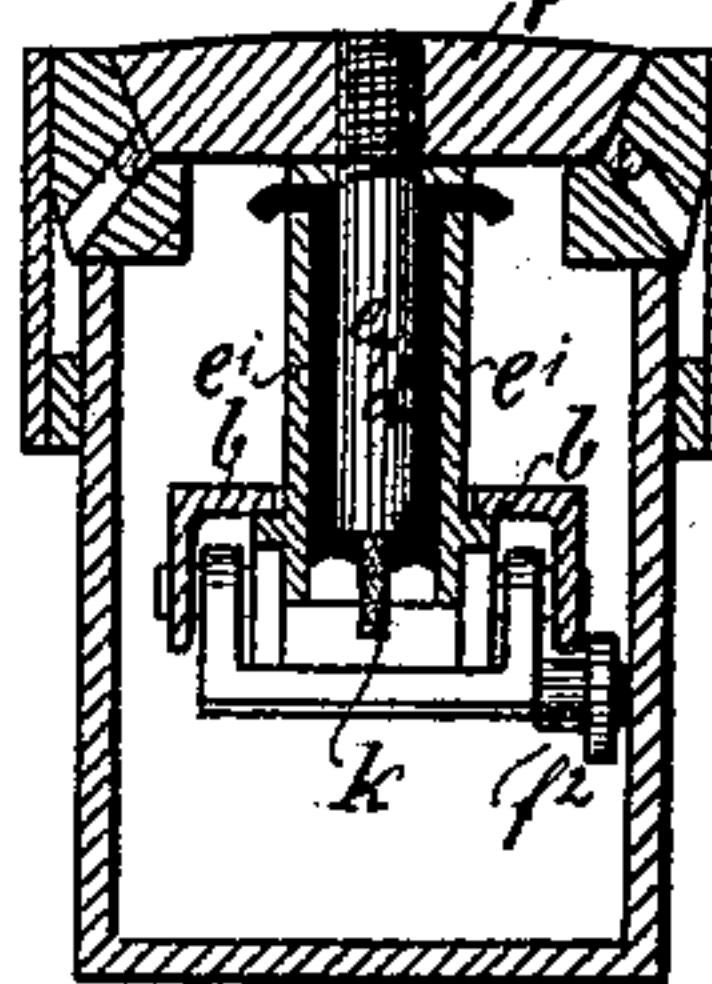
Attest
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J. L. Martin

Fig. 6.



Section e-f

Fig. 5.



Section c-d

Inventor
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by Richard Co

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UNITED STATES PATENT OFFICE.

PAUL LUCAS, OF BERLIN, GERMANY.

CLOSED-CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 539,184, dated May 14, 1895.

Application filed June 23, 1894. Serial No. 515,666. (No model.) Patented in Belgium March 12, 1894, No. 108,976, and in Germany June 15, 1893, No. 76,141.

To all whom it may concern:

Be it known that I, PAUL LUCAS, engineer, a subject of the King of Prussia, German Emperor, and a resident of 9 Göben Street, Berlin, W., in the Kingdom of Prussia, German Empire, have invented certain new and useful improvements in apparatus for supplying or transmitting the electric current from subterranean electric tracks, lines, conduits, or trenches, of which the following is a specification.

This invention has been patented to me in Belgium under date of March 12, 1894, No. 108,976, and in Germany under date of June 15, 1893, No. 76,141.

I have illustrated the invention in the accompanying drawings, in which—

Figure 1 is a cross-section of a road-bed, showing the parts in normal position. Fig. 1^a is a detail showing the depressible bar. Fig. 2 is a view similar to Fig. 1, showing the vertical upon the depressible bar. Fig. 2^a is a detail of the depressible bar in the position shown in Fig. 2. Fig. 3 is a view similar to Fig. 2 after the wheel has passed from the depressible bar. Figs. 4, 5 and 6 are detail views of the casing containing the conductor and connector mechanism. Fig. 7 is a plan view of the apparatus. Fig. 8 is a conventional view showing the wheels of a truck with the contact-strip.

The apparatus shown in Figs. 1 to 8 of the drawings for transmitting the electric current from subterranean electric conduits, lines or tracks, operates safely and in all conditions of weather without any loss of current even should the apparatus designed for forming the contact be filled with water and even in cases in which the water is one per cent. and over above the ground. This apparatus enables the carriages to be moved forward and backward according as required and to pass readily over crossings.

The apparatus consists of a current supplying device or transmitter and of a receiver. The latter is placed below the vehicles and consists of an insulated horizontal metallic bar *t* Figs. 2, 2^a, 3 and 8 which is about twenty-five per cent. wide and is bent up (in the proportion of one to five) at a distance of about twenty per cent. behind the axle of the fore-

most wheel. The transmitter is placed between the rails at intervals of from four to eight meters and is contained in a chamber *g* of rectangular shape in plan and the upper surface of which is level with the roadway (see Fig. 7), and it is arranged as follows:—In one of the rails (of Haarman's section) is placed at a distance of five millimeters below its upper edge a slide bar or rail *a* having a length of eighty per cent. and which can be depressed a depth of twenty-five per cent. The stops *s* prevent this bar from being depressed or raised any farther. The depressible rail *a* bears centrally upon the lever *b* consisting for the greatest part of an E-iron (see Fig. 1) and divided by the fulcrum *c* in the proportion of one to three. The lever *b* is connected with the tube or sleeve *R* turning upon the point *d* and formed of the parts *e'*, *e*² and *e*³. This tube or cylinder carries in its tubular bore *e'* the projection *a'* of the round plate *p'* insulated against *e'* and electrically connected with the contact chamber *g* by a flexible cable *k'* which is covered with water tight india rubber. The part *e*² is fixed at the top. It may also project downwardly only, when the connecting piece *f'*, *f*² is loosened, that is to say, when *f*² is pulled to the left. The lever arm *e*³ is of T-shape at its upper end as shown in Fig. 6, and the arms of the T are arranged to ride over shoulders *i'* in the part *i* secured to the cover in such manner that it can be hooked in when raised and turned to the left as hereinafter described. The contact chamber is a closed and water tight receptacle wherein are arranged two insulated metallic blocks *g'* and *g*² likewise insulated relatively one to the other, and one of which, the block *g'*, is electrically connected with the cable *k* and thereby with the plate *p* while the other block is similarly connected with the main cable which conveys the electric current. These two metal blocks are electrically connected together by thrusting the contact arm *f*⁴ between them. This arm is actuated by the movement of the lever *b*. *e*⁵ is a spring.

The apparatus operates as follows: Fig. 1 of the drawings shows the apparatus at rest. When the carriage passes over the apparatus or distributor the front wheel comes in contact, by means of its flange thirty milli-

meters high, with the depressible rail a , the
 latter is depressed down to its lowest depth
 and raises the lever fulcrumed at c and with
 it the tube or cylinder connected thereto. At
 5 the same time the contact arm f^4 is connected
 through the action of f' and f^2 with the me-
 tallic blocks g', g^2 . The apparatus assumes
 now the position shown in Fig. 2, while the
 lever e^3 is only held by the spring e^5 . The
 10 turning of the lever f^2, f^3, f^4 , causes the plate
 p' to be connected with the main cable. As
 the carriage rolls on the inclined part of the
 receiver t depresses the plate p' a distance of
 two per cent. and the lever arm e^3 which has
 15 entered the part i is thrown to the left until
 its arms or projections engage with the shoul-
 ders i' and thus the plate p is pressed against
 the receiver t Fig. 3 as long as the receiver t
 is directly over the plate. After the carriage
 20 is gone, the depressible rail a and the whole
 mechanism return in their original position
 of the rest as shown in Fig. 1. The lever $f',$
 f^2 , which appears unnecessary, only fulfills
 its object when the plate p is fixed by frost
 25 for instance and it requires the whole power
 of the depressing wheel to raise the plate.
 The grooves r, r , receive the permeating rain
 water and convey it away.

This apparatus is particularly suitable for
 30 carriages built on bogies in which the sup-
 port or bearing of the outer wheels is very
 large so that the receiver can have a great
 length. Ordinary carriages may be fitted
 with special front wheels, or the receiver must
 35 be raised at a or b (Fig. 8) according as the
 carriages move to the right or to the left.

Having now described my invention, what
 I claim as new, and desire to secure by Letters
 Patent, is—

1. In a closed conduit system for electric 40
 railways, the combination of the continuous
 closed casing, having stationary contacts ar-
 ranged at intervals, the conductor located in
 said casing, the series of rocking arms carry-
 ing each a contact electrically connected with 45
 the conductor, a series of vertically movable
 plates in the road bed, electrically connected
 with the stationary contacts in the casing, the
 rocking levers having one end arranged to be
 depressed by the car, and connections from 50
 said levers for simultaneously raising the
 plates and rocking the arms within the casing
 to connect the plates with the conductor sub-
 stantially as described.

2. In combination the casing containing the 55
 series of stationary contacts, the conductor
 therein, the levers b arranged to be rocked by
 the car, the supplemental levers pivoted to
 the levers b and carrying contact plates, elec-
 trical connections from said plates to the sta- 60
 tionary contacts, switches within the casing
 having arms extending outside the casing, and
 the link connections from said arms to the
 levers b substantially as described.

In witness whereof I have hereunto signed 65
 my name in the presence of two subscribing
 witnesses.

PAUL LUCAS.

Witnesses:

W. HAUPT,

JOHN MATTES, Jr.