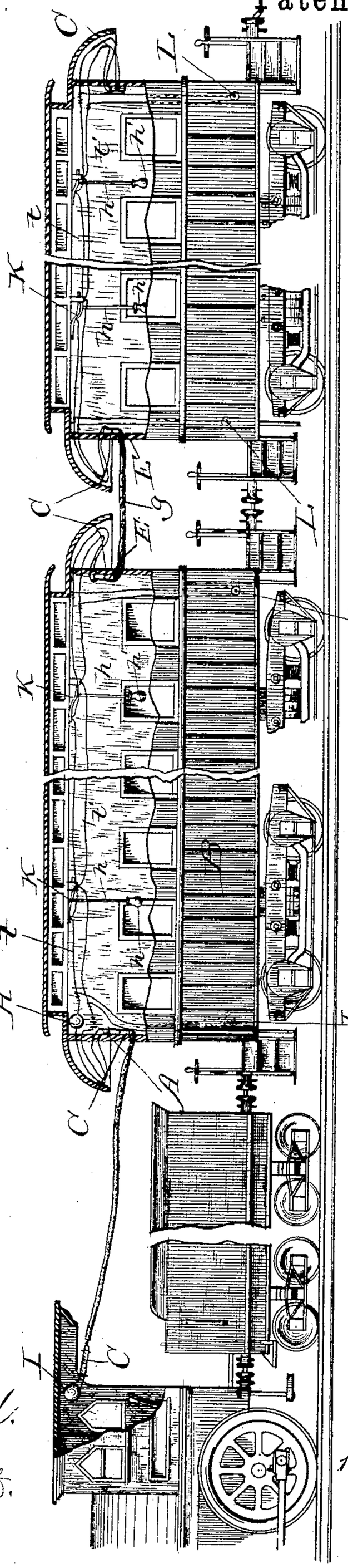
(No Model.)

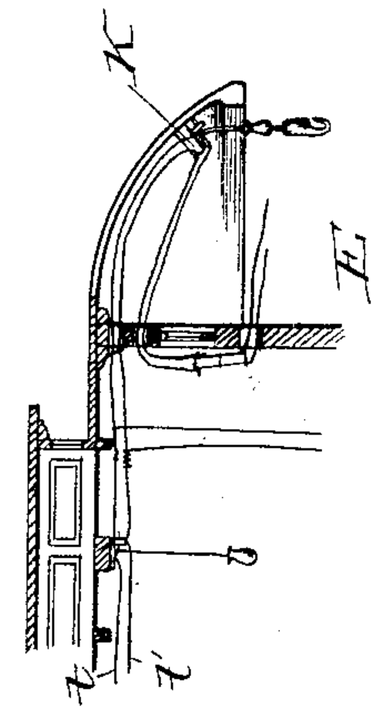
3 Sheets—Sheet 1.

J. D. FEE.

SIGNALING DEVICE.

No. 332,336. Patented Dec. 15, 1885.





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Att'ys.

(No Model.)

J. D. FEE.

3 Sheets—Sheet 2.

SIGNALING DEVICE.

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Fig. 3.

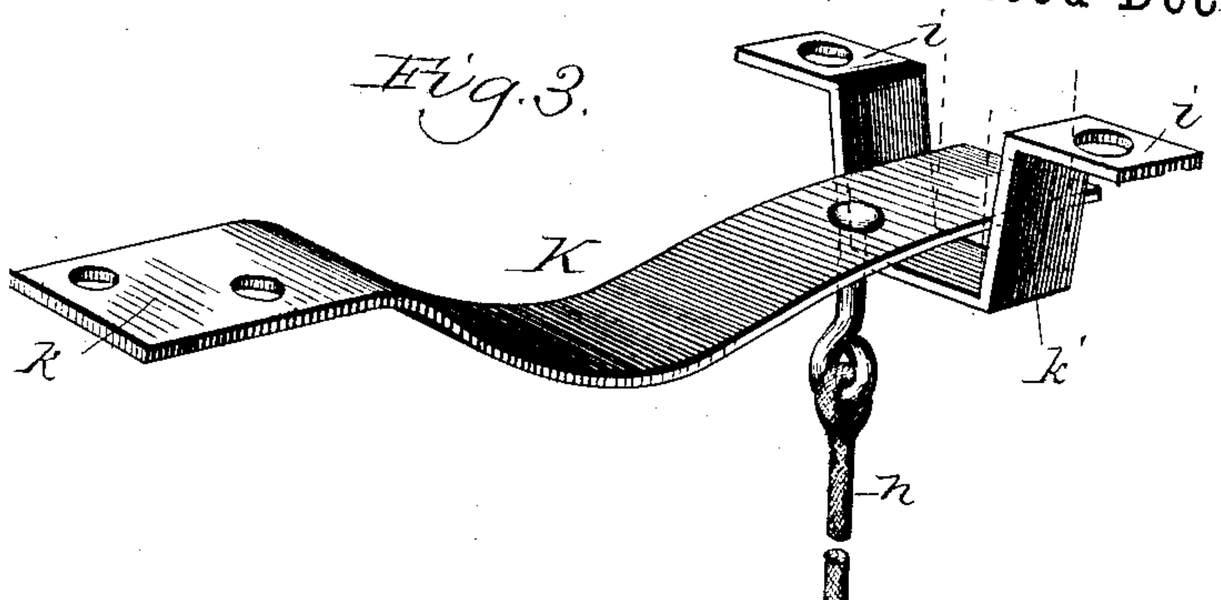


Fig. 4.

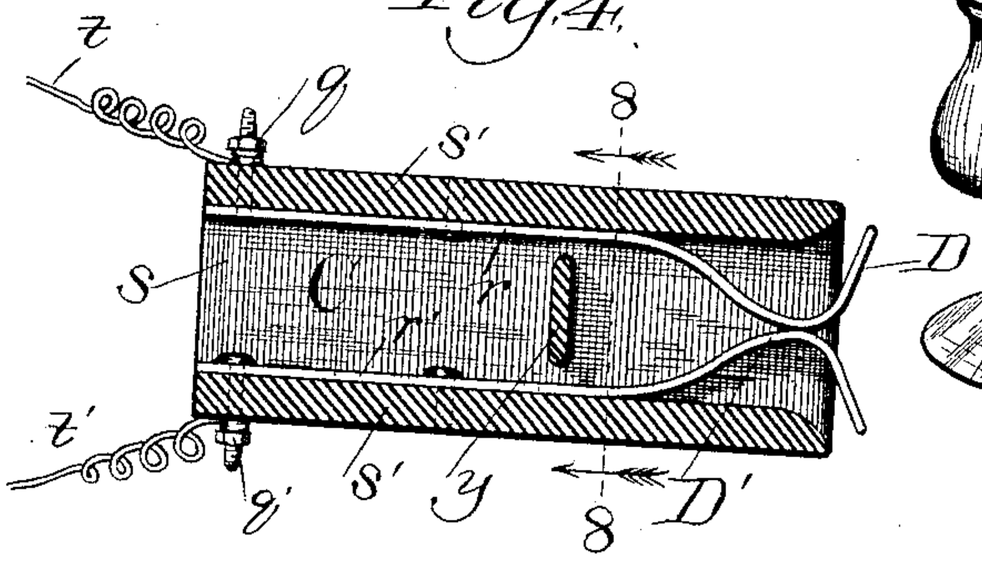


Fig. 5.

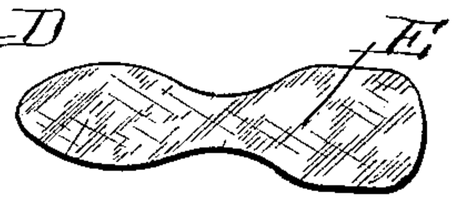


Fig. 6.

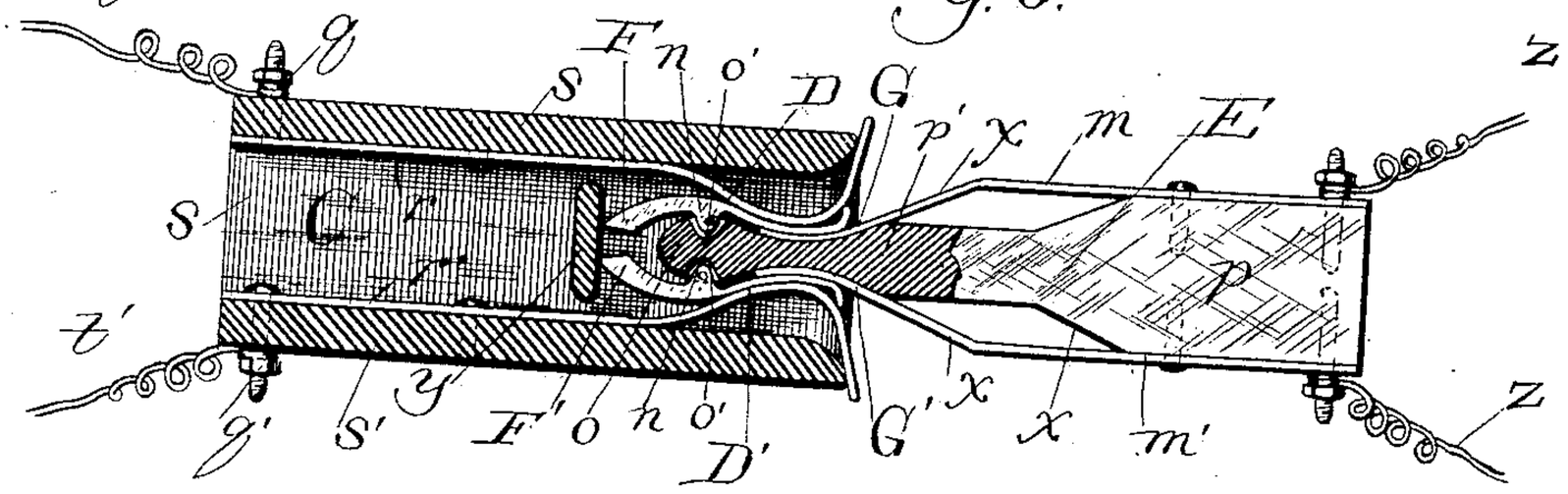


Fig. 7.

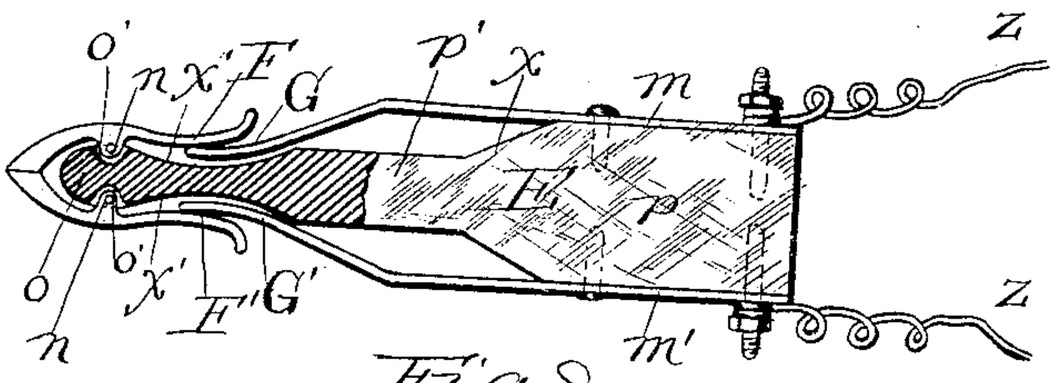
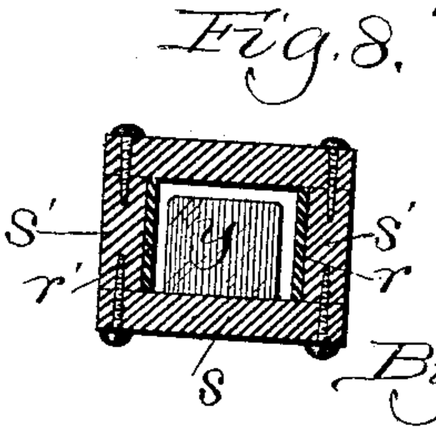


Fig. 8.



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(No Model.)

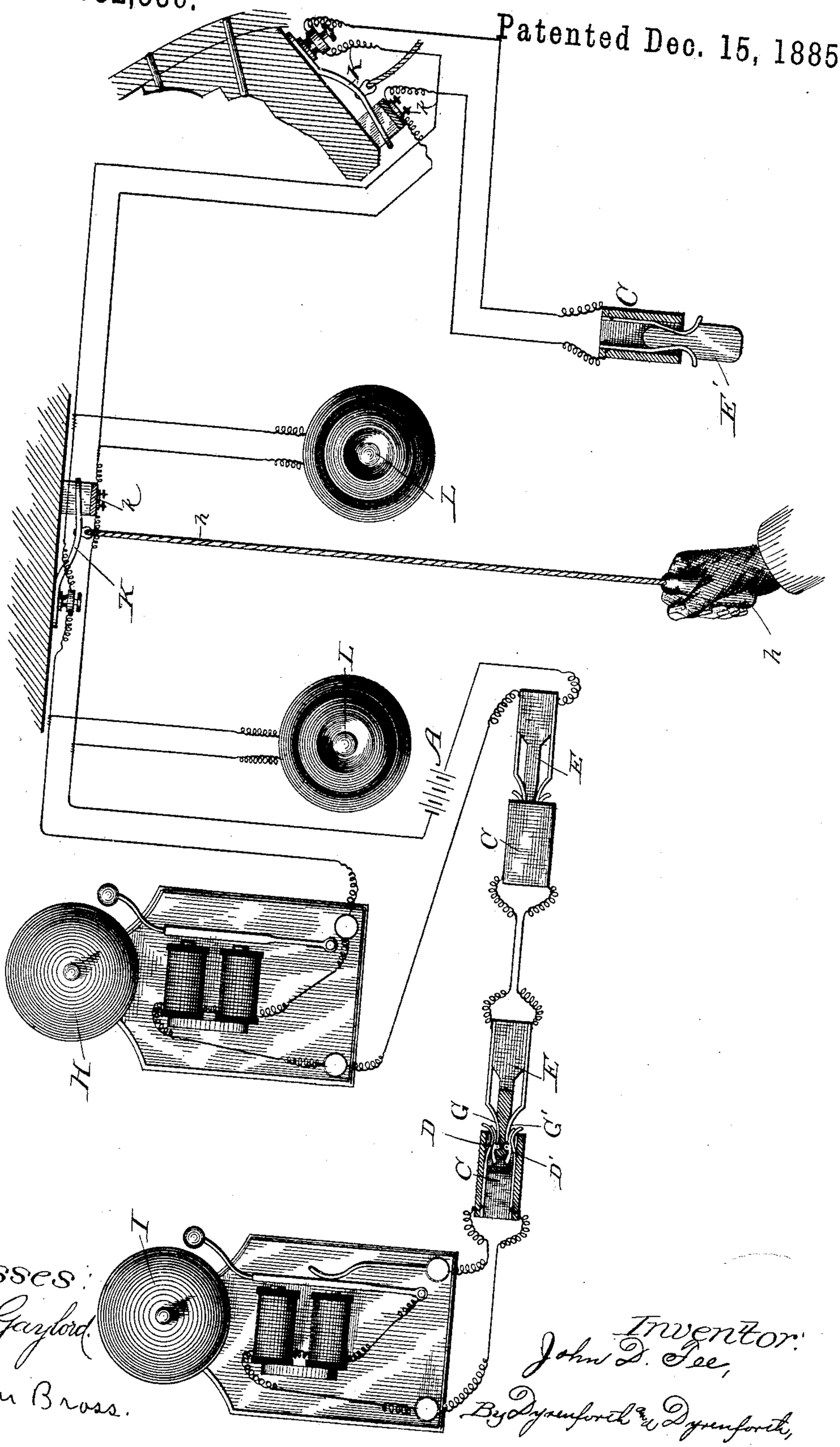
J. D. FEE.

3 Sheets—Sheet 3.

SIGNALING DEVICE.

No. 332,336. Patented Dec. 15, 1885.

Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN D. FEE, OF CHICAGO, ILLINOIS.

SIGNALING DEVICE.

SPECIFICATION forming part of Letters Patent No. 332,336, dated December 15, 1885.

Application filed October 13, 1884. Serial No. 145,336. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. FEE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and Improved Signaling Device; and I hereby declare the following to be a full, clear, and exact description of the same.

My improvement is designed particularly for use upon railroad-cars, in which connection it is intended to take the place of the common bell-rope, to provide in lieu of the latter a more perfect and easily-accessible signaling medium, besides operating, as will hereinafter be particularly described, as a means for preventing accidents, and for locating the responsibility for an accident whenever one shall occur.

My improvement relates to the forms of signaling devices comprising a bell located in the locomotive-cab, and actuated by an electric current conducted over wires in normally-open circuit, supplying the place of the common bell-rope and provided with means for automatically closing the circuit to notify the engineer in case the connection of the wires between the cars shall be broken by the separation of the latter, and means operated by hand to close the circuit for the purpose of signaling the engineer.

It is the object of my invention to provide means more effective in their operation to accomplish the purposes above set forth than any hitherto employed, whereby also the consequences of a failure of a signal to reach the engineer shall be rendered avoidable, and whereby the consequences of failure on the part of the engineer or other responsible employé on the train to obey the instructions conveyed to him by a signal may infallibly be charged to whoever is responsible for them.

To these ends my invention consists in the particular construction of the mechanism employed to effect the connection between the separate cars in a train, of the conducting-wires in open circuit, and to produce the automatic closing of the circuit under the circumstances hereinbefore referred to, and in a signal-producer in one car actuated by the electric current when the circuit is closed, which current then actuates a signal-producer in the locomotive-cab, the opening and closing of the circuit by the sounding of which actuates the first-named signal-producer on the return-circuit, and in providing an extra circuit-closer to which the bell-rope of a car or cars added to the train and unprovided with my improvement may be attached.

My invention further consists in certain details of construction and combinations of parts, all as hereinafter particularly set forth.

Referring to the drawings, Figure 1 shows a side elevation, partly in section, of a portion of a locomotive with a tender and cars having each a portion broken vertically away toward its center attached, the whole representing a train provided with my improvement; Fig. 2, a sectional view of one end of a car provided with my improvement, and showing a modification; Fig. 3, a perspective view of my improved circuit-closer; Fig. 4, a plan view, partly in section, of my automatic circuit-closer; Fig. 5, plan view of a detail comprising a blank; Fig. 6, a plan view, partly in section, showing the means employed for maintaining the circuit in a normally-open condition; Fig. 7, a similar view, showing the device forming part of Fig. 6 as an automatic circuit-closer; Fig. 8, a sectional view taken on the line 8 8 of Fig. 4, viewed in the direction of the arrows, and showing a detail; and Fig. 9, a diagrammatic view of my improved device.

A is a battery, located within a baggage-car, B, and having a circuit comprising insulated wires *t t'*, leading from it along the ceiling of the car to the openings commonly provided at the ends of cars for the passage of the bell-rope, where above each such opening on the inner side of the end of the car is secured to lie vertically an automatic circuit-closer, C. The circuit-closer C comprises a block, *s*, of insulating material having side pieces, *s'*, secured one upon each longitudinal edge, to provide flanges, on the inner side of each of which a metal strip, *r* and *r'*, is secured by screws, and by bolts *q* and *q'*, which serve as binding-posts for the connection of the wires *t* and *t'* with the strips *r* and *r'*, to cause the latter to form a continuation of the circuit. A strip, *y*, is provided upon the block C, to serve a purpose hereinafter described. The free ends of the strips *r* and *r'*, which project beyond—*i. e.*, when the circuit-closer C is in position

below the end of the block *s*—are bent inward toward each other and outward at their extremities, as clearly shown in Fig. 4 of the drawings, to produce springs D and D′, which are normally in contact with each other.

E is a combined circuit-opener and automatic circuit-closer, comprising a block, *p*, of insulating material, beveled on each edge toward one end, as shown at *x*, and having an extension, *p′*, made concave on each lateral edge, as shown at *x′*, toward its extremity, which is formed into a head, *o*, below which recesses *o′* are formed, one on each side, on one surface of the extension *p′*, to receive the ears *n* of the springs F and F′, hereinafter to be described. Metallic strips *m* and *m′* are secured, one upon each lateral edge of the part *p*, and are bent toward their extremities to conform to the concavities *x′*, and provide springs G and G′. The securing medium for the strips *m m′* comprises screws, and also bolts *l* and *l′*, which, like the bolts *q* and *q′*, serve the purpose of binding-screws, to which the wires are connected to continue the circuit. The springs F and F′ are pivotally secured within the recesses *o′*, formed upon the part *p*, and are normally in contact with each other at their forward extremities, as shown in Fig. 7, owing to the expanding action of the springs G and G′ upon their opposite extremities, and over which they lie.

H is a preferably single-tap electric bell in circuit within the baggage-car B, and I is a vibrating electric bell placed in the circuit and located in the locomotive-cab. The insulated wires *t* and *t′* of the circuit may, for their protection from exposure, be inclosed within rubber tubing between the baggage-car and locomotive, as shown.

K is a hand circuit-closer, by means of which the device may be operated from within the car, and push-buttons L, of ordinary construction, are provided externally upon the sides of each car, within easy access, to permit the operation of the device from without. If desired, to prevent tampering by meddlesome persons with the circuit-closer placed externally upon the sides of the cars, the push-buttons may be omitted and the circuit closed by the conductor through the medium of his punch inserted for the purpose.

The circuit-closer comprises a bent flat spring, *k*, Fig. 3, secured toward one end to the ceiling of the car, or to some other stationary object conveniently located, and has one wire of the circuit connected to it, and an angular metallic bar, *k′*, bent to the form shown to produce flaring sides, thereby to prevent contact of the edges of the spring *k* with them when operated, and flanges *i*, provided with openings to admit the screws by means of which it is secured in position. To the part *k′* the other wire of the circuit is connected. A cord, *h*, provided at its hanging extremity with a handle, *h′*, is secured to the spring *k* toward its free extremity, to afford accessible means for operating the circuit-closer K.

The operation of my device is as follows: In making up the train the automatic circuit-closers C, which occupy positions, as hereinbefore stated, inside the car, preferably over the bell-rope openings, are connected together from the front end of one car to the rear end of another, or vice versa, by the circuit-openers E, of which two are connected, one at each extremity of insulated wires attached to the metallic strips *m* and *m′* upon each circuit-opener, as shown at *z* in Figs. 6 and 7, and inclosed in rubber tubing *g*. The connection of the circuit-openers E with the automatic circuit-closers is effected by inserting the head *o* of one circuit-opener E to a distance controlled by the stop *y*, between the springs D and D′ of the automatic circuit-closer C, at one end of one car, whereby the rear ends of the springs F and F′ are compressed upon the forward ends of the springs G and G′, affording the necessary metallic connection to produce the circuit, and separating the forward extremities of the springs F and F′ to render the circuit open. The other circuit-opener E, connected with the first-named, as hereinbefore described, upon the opposite extremities of the wires *z*, is then passed through the opening for the bell-rope in the adjoining car, and attached to the circuit-closer C, there placed in position, and so on throughout the train. The automatic circuit-closer C at the end of the last car of the train is provided with a blank, E′, preferably of the form shown in Fig. 5 of the drawings, which is inserted between the springs D and D′ to keep the circuit normally open.

Suppose, now, to cite first an unusual occurrence in which my device will be effective, but one which constitutes, when such occurrence does happen, one of its most important purposes, that a car or several cars in a moving train shall become, from any cause, detached. The effect will be to produce withdrawal of the circuit-opener E from between the springs D and D′ of the automatic circuit-closer C, or of the springs D and D′ of the circuit-closer C, attached to the separated car or first of the number of separated cars, from their embrace of the springs F and F′ of the circuit-opener E. In either instance the circuit will be closed—in the first named by the contact of the springs D and D′ with each other, and in the second by the contact of the extremities of the springs F and F′—when the circuit-opener E will become an automatic circuit-closer, and the bell H will ring with a single tap, notifying the people in the baggage-car of the occurrence, and the clapper of the bell I will be caused to vibrate, notifying the engineer to stop the train, and by the vibrations of the clapper of the bell I that of the single-tap bell H will, on the return-circuit from the bell I, vibrate, to notify those in the baggage-car that the engineer's bell has operated, and thus in case of

failure on the part of the engineer to act upon the signal be enabled to prove, in case of accident, that the responsibility rests upon the engineer. Should it happen, for any reason, that the bell in the locomotive does not sound, the single tap of the bell H will have notified the people in the baggage-car that there is something wrong, and failure to hear the expected ringing of their own bell on the return-circuit will suggest the miscarriage of the signal to the engineer, when it will be their duty immediately to notify him of the signal by word of mouth.

A modification is shown in Fig. 2 of the drawings, which is designed to permit my improved signaling device to be operated from cars added to a train provided with my device when such added cars are unprovided with the same. This comprises an extra hand circuit-closer, K, in every respect similar to that shown in Fig. 3 of the drawings, but placed underneath the hood over the platform of each car and connected in the circuit *t t'*, and provided with a pendent bell-cord coupling, *f*, of common construction, attached to the under surface of the spring *k* toward its free end, to which a similar coupling upon the end of the bell-rope of the foreign car may be attached. By pulling the bell-rope in an added car the circuit will be closed and a signal given.

Ordinarily the signal is effected by pulling upon a hanging cord, *h*, within a car, or by pressing upon a push-button, L, without a car. The push-button mechanism is provided particularly for the sake of convenience to the conductor, who may, after a stop, operate the signaling device to notify the engineer to start without having to board the train for the purpose.

Other devices besides electric bells may be employed for the purpose of producing the desired signals, and such are included within the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. A signaling device comprising in combination the following elements in a normally-open electric circuit, viz: a signal-producer, H, a signal-producer, I, an automatic circuit-closer, C, a combined circuit-opener and automatic circuit closer, E, and means, substantially as described, for closing at will the normally-open electric circuit, the whole being constructed and arranged to operate as and for the purpose set forth.

2. In a signaling device for railroad-cars, an automatic circuit-closer, C, comprising a block, *s*, of non-conducting material, having a suitable stop, *y*, and side pieces, *q q'*, and metallic strips *r r'*, secured to the inner sides of the said side pieces, the said strips being bent toward their extremities inward toward each other to form springs D D', normally in contact with each other, substantially as described.

3. In a signaling device for railroad-cars, the combination, with the automatic circuit-closer C, of a combined circuit-opener and automatic circuit-closer, E, comprising a block, *p*, of non-conducting material, beveled on each edge toward one extremity to provide an extension, *p'*, made concave on each lateral edge toward its extremity, which is provided with a head, *o*, and metallic strips *m m'*, secured longitudinally upon the lateral edges of the said block *p* and bent toward their extremities to conform to the said concave portions, and provide springs G G' and metallic springs F F', pivotally secured upon the said extension to lie over the springs G G', whereby their forward extremities are maintained normally in contact with each other, the whole being constructed and arranged to operate substantially as described.

4. A signaling device for railroad-cars, comprising in combination the following elements in a normally-open electric circuit, viz: a single-tap electric bell, H, a vibrating electric bell, I, an automatic circuit-closer, C, a combined circuit-opener and automatic circuit-closer, E, means inside and upon the external sides of each car for closing at will the said normally-open electric circuit, and a hand circuit-closer, K, underneath the hood of each car, provided with means for the attachment of a bell-rope to it, the whole being constructed and arranged to operate substantially as and for the purpose set forth.

JOHN D. FEE.

In presence of—
EPHRAIM BANNING,
DOUGLAS DYRENFORTH.