

(No Model.)

4 Sheets—Sheet 1.

J. B. STRAUSS.
ELECTRIC TRAIN SIGNAL.

No. 463,395.

Patented Nov. 17, 1891.

FIG. 1.

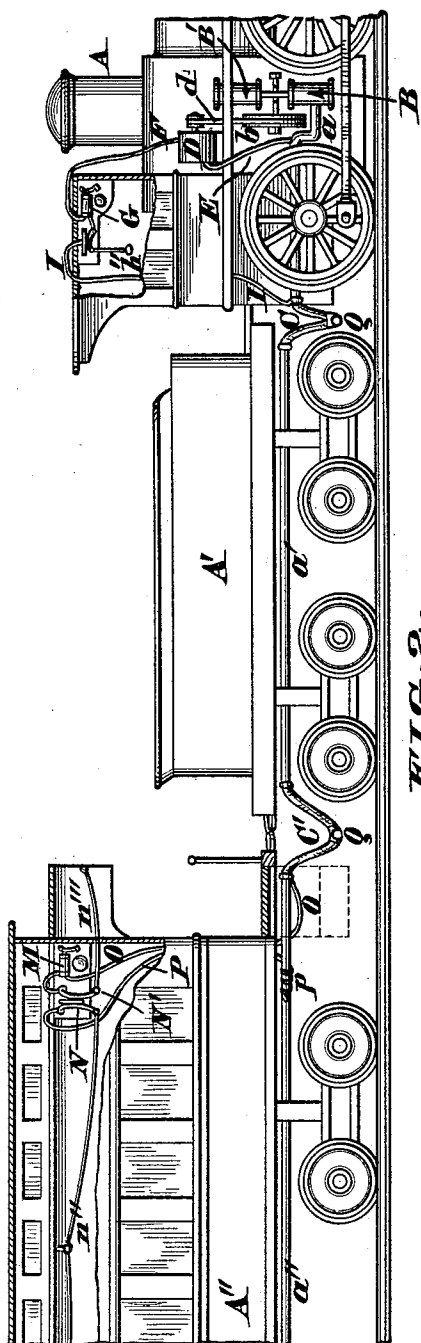
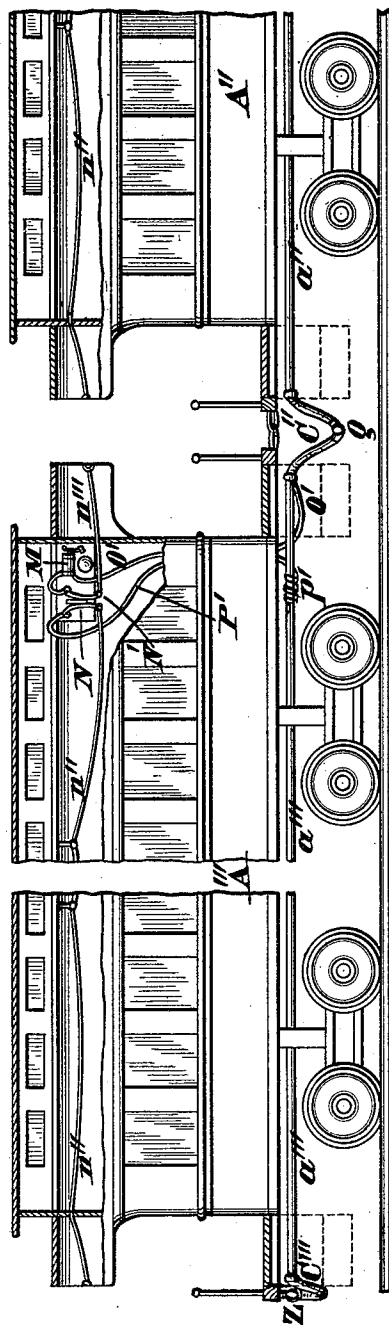


FIG. 2.



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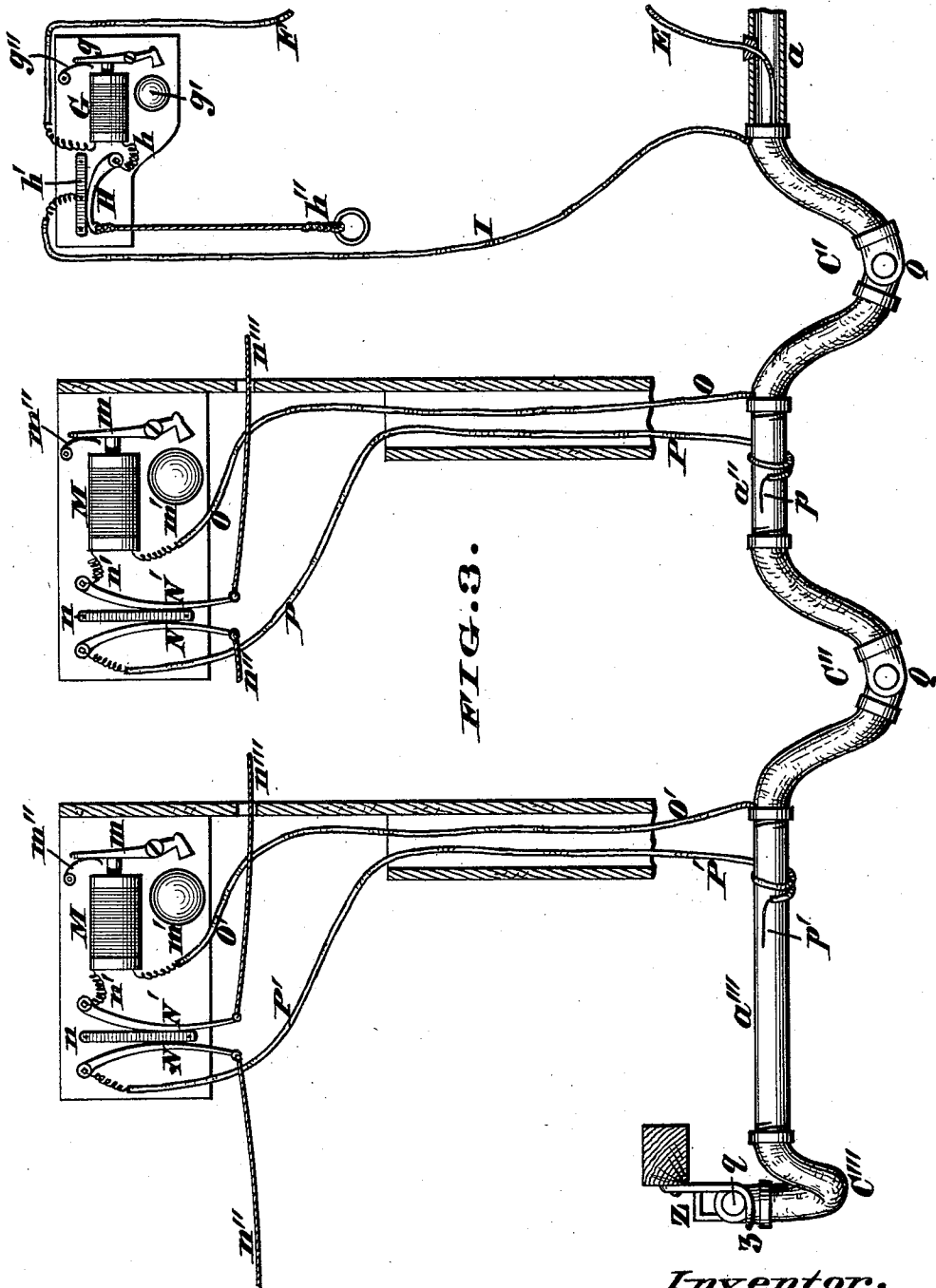
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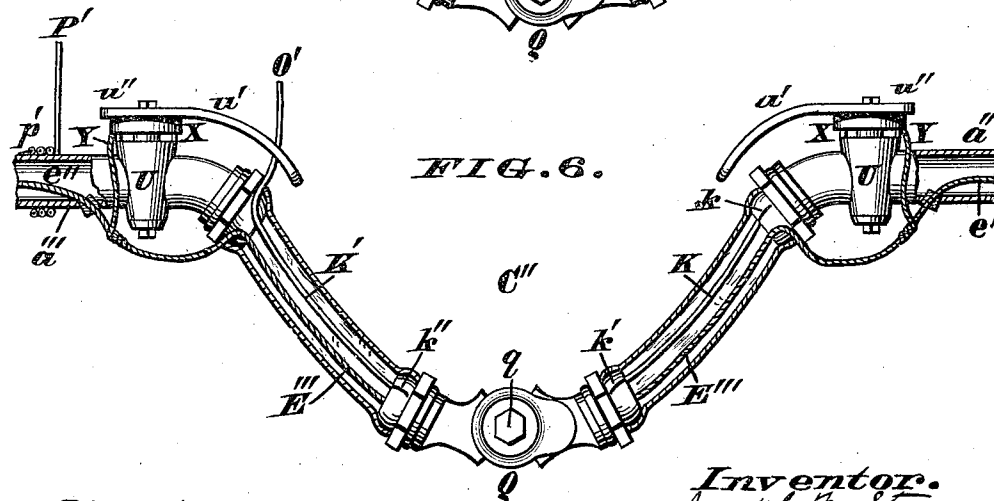
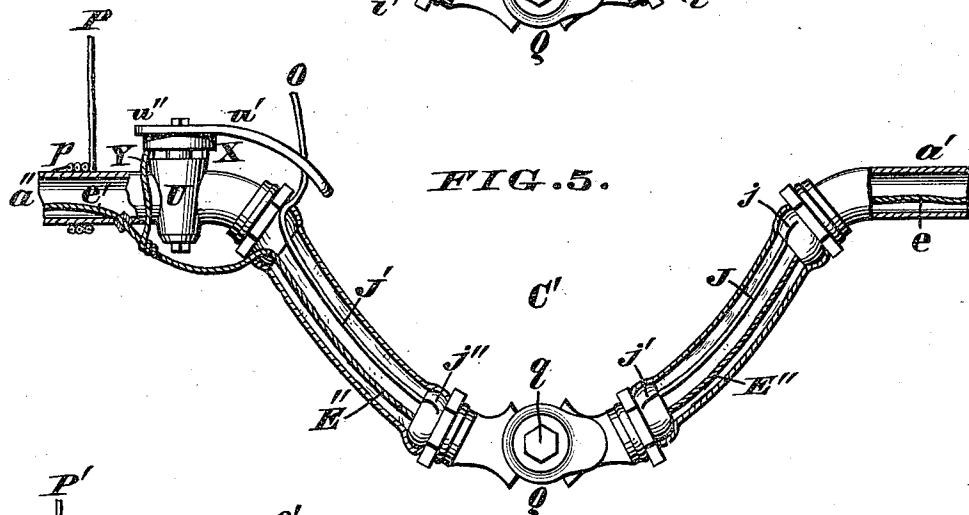
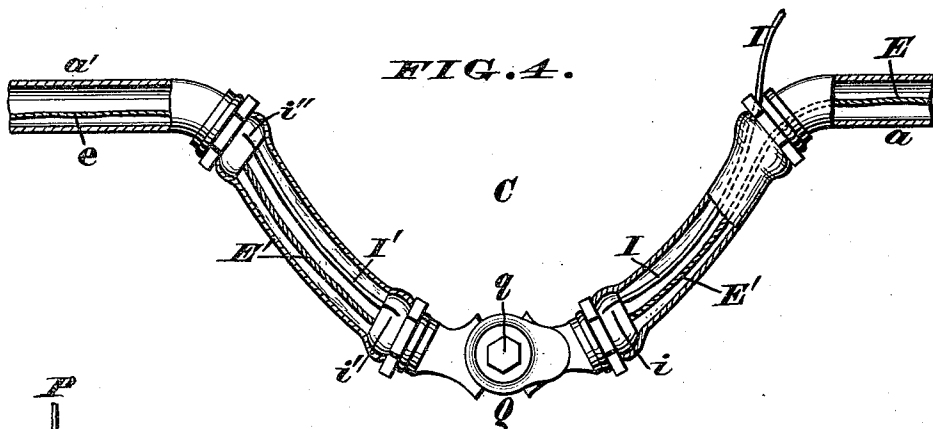
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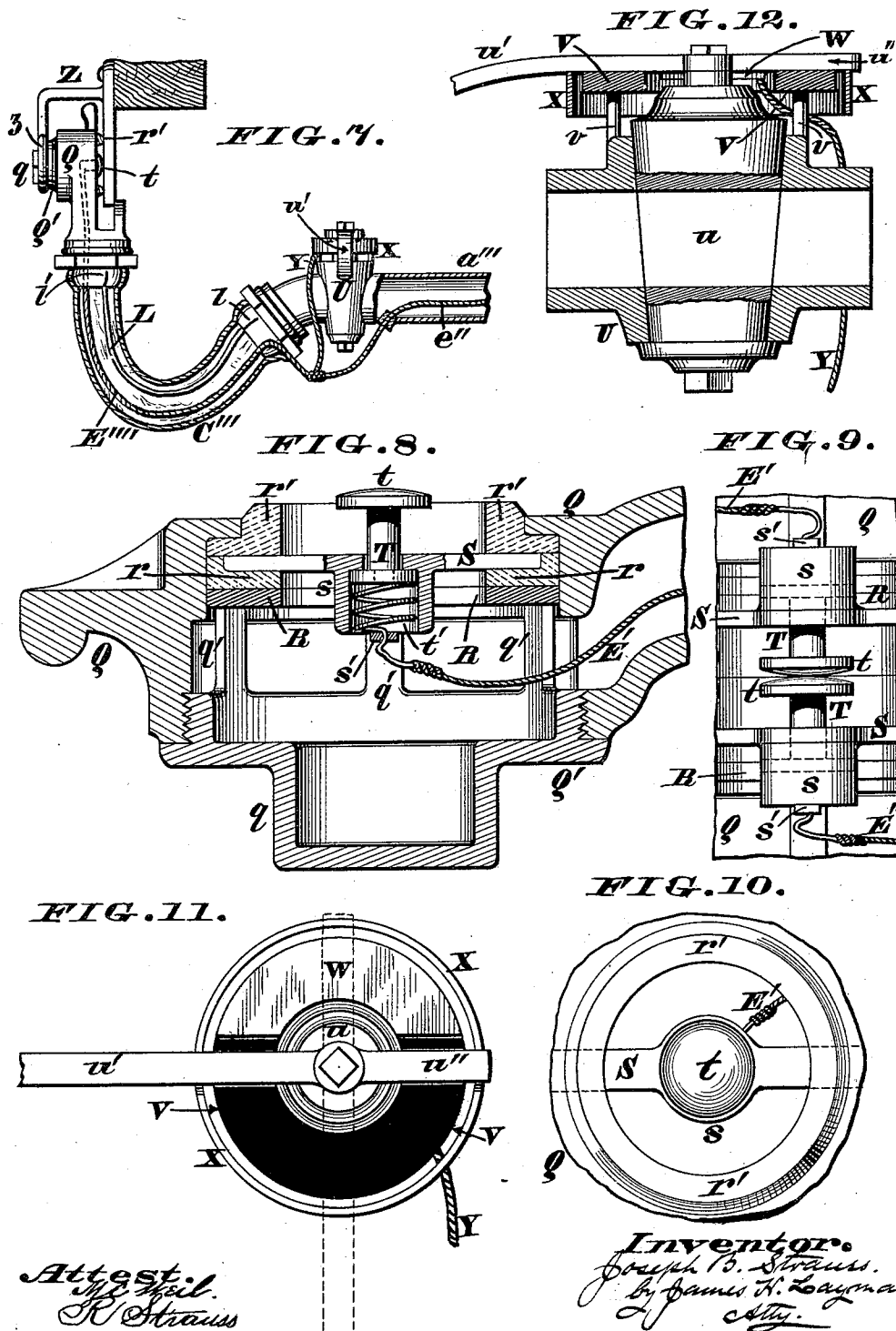
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UNITED STATES PATENT OFFICE.

JOSEPH B. STRAUSS, OF CINCINNATI, OHIO.

ELECTRIC TRAIN-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 463,395, dated November 17, 1891.

Application filed July 20, 1891. Serial No. 400,121. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. STRAUSS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Electric Train-Signals; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form part of this specification.

This invention relates to those electric brakes which make use of the air-pipes of a train for conducting one of the operative currents; and my improvements comprise certain novel features in the construction of the circuit-makers, bell-ringers, coupling-contacts, and air-cocks, the details thereof being hereinafter more fully described, and then pointed out in the claims.

In the annexed drawings, Figure 1 is a sectionized side elevation of the front portion of a train provided with my improvements, the details of the pipe-couplings not being rigidly adhered to. Fig. 2 is a similar view of the rear portion of said train. Fig. 3 is an enlarged elevation of the signaling devices of the locomotive and two cars, the air-pipe of the tender being omitted from this illustration to show that the train can be coupled directly to the locomotive. Fig. 4 is an enlarged section of the hose-coupling that unites the air-pipes of the locomotive and tender. Fig. 5 is a similar section of the hose-coupling that unites the air-pipes of the tender and the first passenger-car. Fig. 6 is a similar section of the hose-coupling that unites the air-pipes of the first and second passenger-cars. Fig. 7 is a similar section showing the coupling-box at the rear end of the last car suspended within the "dummy," the air-cock in front of said coupling being closed. Fig. 8 is an enlarged axial section through one of the coupling-boxes of the air-pipe hose. Fig. 9 is a similar section of the central portion of a pair of these coupling-boxes brought together, so as to afford an electrical contact with the interior wires that traverse the air-pipes. Fig. 10 is a plan of the central portion of one of said coupling-boxes. Fig. 11 is a plan of one of the cocks attached to the

air-pipes. Fig. 12 is a vertical section of said cock in its open position.

The general arrangement of my signaling apparatus is seen in Figs. 1 and 2, which illustrations represent a train consisting of a locomotive A, tender A', front car A'', and a rear car A''', *a, a', a'', and a'''* being customary air-pipes that communicate with the brakes in the usual manner. Of these pipes the first one *a* is applied to the locomotive and leads from a pump B or other air-compressor, which pump is driven by a steam-engine B', having in this case a fly-wheel *b*. Furthermore, these air-pipes may be joined together by any flexible connections C C' C'' C''' and coupling-boxes Q, although it is preferred to use a special box for this purpose, the construction of which will be presently described.

D represents a dynamo driven by a belt connection *d* from the fly-wheel *b* and having attached to one pole an insulated wire E and to its other pole another insulated wire F. Wire E enters the air-pipe *a* and forms part of the internal circuit of said pipe and its couplings and boxes, while the wire F, with its attachments, is in communication with the circuit that uses the pipes as a conductor. This wire F, as more clearly seen in Fig. 3, leads to an electro-magnet G, fitted in any convenient part of the locomotive-cab, which charged magnet attracts a pivoted armature-lever *g* to it and thereby prevents said lever striking the gong *g'*, which it normally tends to do on account of the spring *g''* bearing against said lever in the manner shown, or otherwise arranged to produce the same result.

h is a wire connecting the magnet G with a spring H, which normally presses against a bar or plate *h'*, a cord *h''* being provided to enable the engineer to pull this spring away from said bar whenever he desires to signal the attendants of the cars or to test the circuit.

I is an insulated wire leading from the contact-bar *h'* and then carried down into the first piece of hose-coupling C and soldered to the box of the same, as shown at *i* in Fig. 4. This wire is supplemented by another wire I' in the second piece of hose-coupling, one end of said wire being soldered to the box at *i'*

and the opposite end being soldered at i'' to the tender-pipe a' , by which arrangement said box affords a metallic connection between said wires I and I' .

5 J is a wire inserted in the first piece of hose-coupling C' and having its front end soldered to pipe a' at j and its rear end soldered to the box of said coupling at j' .

J' is the counterpart of this wire soldered to the coupling-box at j'' and then carried up into the first car at O .

10 K is a wire inserted in the first piece of hose of the coupling C'' and having its front end soldered to the rear end of pipe a'' , as at k , while its other end is soldered at k' to the box of said coupling. K' is the counterpart of this wire soldered to the box at k'' and then carried up into the second car at O' .

15 L in Fig. 7 is an insulated wire soldered at front, as at l , to the rear end of air-pipe a''' , while its other end is soldered at l' to the box of coupling C''' . This system is carried out with every car in the train, thereby forming an uninterrupted metallic circuit from the first pipe a to the last coupling C''' and its box Q . The wire E , that enters the pipe a , is carried through the two pieces of hose of the coupling C at $E' E'$, thence along pipe a' at e , thence through the hose of coupling C' at $E'' E''$, and along the pipe a'' at e' . From this pipe the wire traverses the hose of coupling C'' at $E''' E'''$, thence along pipe a''' at e'' , its last section E'''' then traverses the hose C''' and terminates at the box of the same, as seen in Fig. 7. Consequently these wires E, E', E'', E''' , and E'''' and their contact-pieces T form a continuous metallic circuit through the pipes from the locomotive to the last coupling-box of the train, 20 except where said wires are necessarily carried outside said pipes, for the purpose of avoiding the air-cocks. The signaling devices of the first car consist, as seen in Fig. 3, of a magnet M , a pivoted armature-lever m , a gong m' , and spring m'' , the circuit-breaker of this car being composed of a contact bar or plate n , pressed against on opposite sides by springs $N N'$, one of which N' is joined to magnet M by a wire n' , the free ends of these springs having two sections of cord $n'' n'''$ attached thereto, in order that the circuit may be readily broken from either the front or back part of the car.

25 O is a wire having its upper end connected to magnet M , its lower end being a continuation of the wire J' , as represented in Fig. 5.

30 P is a wire having its upper end attached to the spring N , and its lower end wrapped around the pipe a'' , and then soldered there to at p . The signaling devices of the second car are exact duplicates of the above, and require no further description, except to state that the wire O' is a continuation of the wire K' , and the other wire P' is soldered to the pipe a''' at p' . Furthermore, these wires are housed within tubes or other casings of the

cars to prevent their insulating material being injured.

The preferred method of making a speedy and certain contact for the internal wires of the signaling system is seen in Figs. 8, 9, and 10, where Q represents the metallic box or shell of a hose-coupling of substantially the same construction as described in the patent issued to G. Westinghouse, Jr., December 22, 1874, No. 157,951, to which reference may be had for more specific details. This box Q has a cap Q' screwed into it, the latter being provided with an external nut q and a series of internal lugs q' , that press against a ring R , and thereby clamp the opposite ends of a bridge-bar S between a pair of rubber or other non-conducting gaskets $r r'$, the outer one of which r' projects slightly beyond the general level of box Q . Bridge-bar S has a short cylinder s , with a cross-bar s' at one end, and this cylinder is traversed by a piston T , having a contact-button t at its outer extremity, the piston being advanced by a coiled spring t' , to which one of the inner wires, as E' , is attached. 75 80 85 90

$U U U U$ represent air-cocks at the opposite ends of the pipes attached to the passenger-cars, and u in Fig. 12 shows a ported plug of one of said cocks, which plug is turned by a metallic lever u' . This lever rests snugly upon an insulated or non-conducting ring V , secured to the shell of the cock by supports v , and having a metallic contact-plate W , that extends almost half-way around said ring, as seen in Fig. 11. 95 100

X is a cylindrical guard hoop or fender attached to the under side of handle u' , which fender is usually closed at top and serves to protect the attachments of the cock. 105

Y is a wire connecting the contact-plate W with one of the inner wires, as E' .

Z is a dummy attached to each end of a passenger-car and having a hook z , which engages around the nut q of the last coupling-box, as indicated in Fig. 2, and more clearly seen in Fig. 7. When a train equipped with my signaling system is properly coupled together, a continuous inner circuit is formed from the dynamo D to the dummy Z on account of the wires $E E'$, &c., being electrically connected by contact of the various metallic buttons $t t$ of the boxes $Q Q$, one of such contacts being seen in Fig. 9. Furthermore, the suspension of the last coupling-box within the dummy causes the packing-ring r' to press so tightly against the main plate of said dummy as to prevent dust, stones, and other obstructions entering the air-pipes $a a'$, &c. Again, this suspension of the last box forces its button t against the dummy-plate, and thereby establishes an electrical communication between the interior contact-maker of the coupling-box and the exterior shell of said box; or, in other words, the circuit, which would otherwise be broken at the end of the train, is automatically completed or closed by the 110 115 120 125 130

simple act of hanging the last box in its appointed place. Therefore there is an uninterrupted outer circuit extending from the dummy Z through the pipes, wires, and boxes to the dynamo D, except where the wires of this circuit are necessarily carried through the hose connections of the couplings, the two circuits being connected by said dummy. The box being thus suspended in the dummy and the springs H N N' in their normal positions, as shown, let it be supposed the dynamo is so arranged as to compel the outgoing current to traverse the wire I and its connections and the incoming current to return along the wire E and its attachments, and that the power thus induced in the magnets G M M is sufficient to overcome the tension of the springs $g'' m'' m''$ and hold the armature-levers $g m m$ in the positions represented in Fig. 3. Evidently the entire system is now a "closed" but inoperative circuit, although it is ready to sound a signal the instant said current is broken at any point—as, for example, by the conductor or brakeman pulling either of the cords n'' or n''' . If the cord n'' is pulled, the current is broken by severing the contact between spring N and plate n , while a pull on the other cord n''' produces the same result with the spring N'; or, if the engineer wishes to test the circuit or signal the train-men or to alarm the passengers in case he is attacked by robbers, a pull on the cord h'' is all that is necessary to break contact between the spring H and plate h' , and thus ring the proper signal. It will thus be seen that an alarm can be sent either forward or backward of the train, as occasion requires, and the instant the circuit is broken at any point all the bells or gongs in the train simultaneously repeat the signal. If an accident should happen to the dummy or the last hose-coupling be severed from pipe a''' , the rear cock U, being closed, forms an electrical communication between the outer and inner circuits by means of lever u' , contact-plate W, and branch wire Y, which devices operate as follows: Reference to Fig. 11 shows that this metal plate W does not extend halfway around the insulated or non-conducting ring V, and is connected to the inner circuit by a branch wire Y. On this plate W rests an extension u'' of the cock-lever u' , which lever forms a part of the outer circuit that is conducted along the material of the pipes. When cock U is closed, as seen in Fig. 7, this lever stands at a right angle to the pipe and its extension u'' makes close connection with the contact-plate W, as indicated by dotted lines in Fig. 11, and unites the outer and in-

ner circuits; but when the lever is in line with the pipe, as seen in Fig. 12, it is out of contact with the metal plate W and there is no cross-connection between the outer and inner currents of the system. By attaching a cap or cover to the fender X it would be converted into a hood capable of protecting the electrical parts of the cock from dust and moisture.

The above is a description of the preferred arrangement of my electric signaling system; but in some cases it may be necessary to omit the inner set of wires that run through the pipes and form said inner circuit by wrapping its insulated wires around the air-pipes or running them along the latter, although care must be taken to prevent this current interfering in any manner with the current that uses the metal of said air-pipes as its conductor. Finally, the right is reserved of using a "storage-battery" or other generator instead of a dynamo, and of placing the generator on the tender or other part of the train.

I claim as my invention—

1. In an electric train-signal, a circuit-breaker consisting of a contact-piece n , springs N N', bearing against opposite sides of the same, and wires O P, communicating with said springs, as herein described.

2. In an electric train-signal, a combined circuit-breaker and bell-ringer consisting of a magnet M, pivoted armature-lever m , gong m' , spring m'' , contact-piece n , springs N N', bearing against opposite sides of the latter, a wire n' , connecting said magnet and the spring N', a wire O, attached to said magnet, and another wire P, secured to the spring N, all as herein described, and for the purpose stated.

3. An electric coupling-box provided with an ordinary non-conducting packing-ring r' , a special non-conducting packing-ring r , an insulated bridge-bar S, clamped between these rings $r r'$ and having a cylinder s , a piston T and spring t' , fitted within said cylinder, and a contact-piece t , carried by said piston and normally projecting beyond the level of said box, for the purpose stated.

4. The combination, in an electric train-signal, of cock U, ported plug u , lever $u' u''$, attached to said plug, non-conducting plate V, and contact-piece W, as herein described, and for the purpose stated.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH B. STRAUSS.

Witnesses:

JAMES H. LAYMAN,
MICHAEL G. HEINTZ.