No. 882,089. PATENTED MAR. 17, 1908.

B. F. WOODING.

ELECTRICAL SIGNALING APPARATUS.

APPLICATION FILED JAN. 4, 1907.

4 SHEETS—SHEET 1.

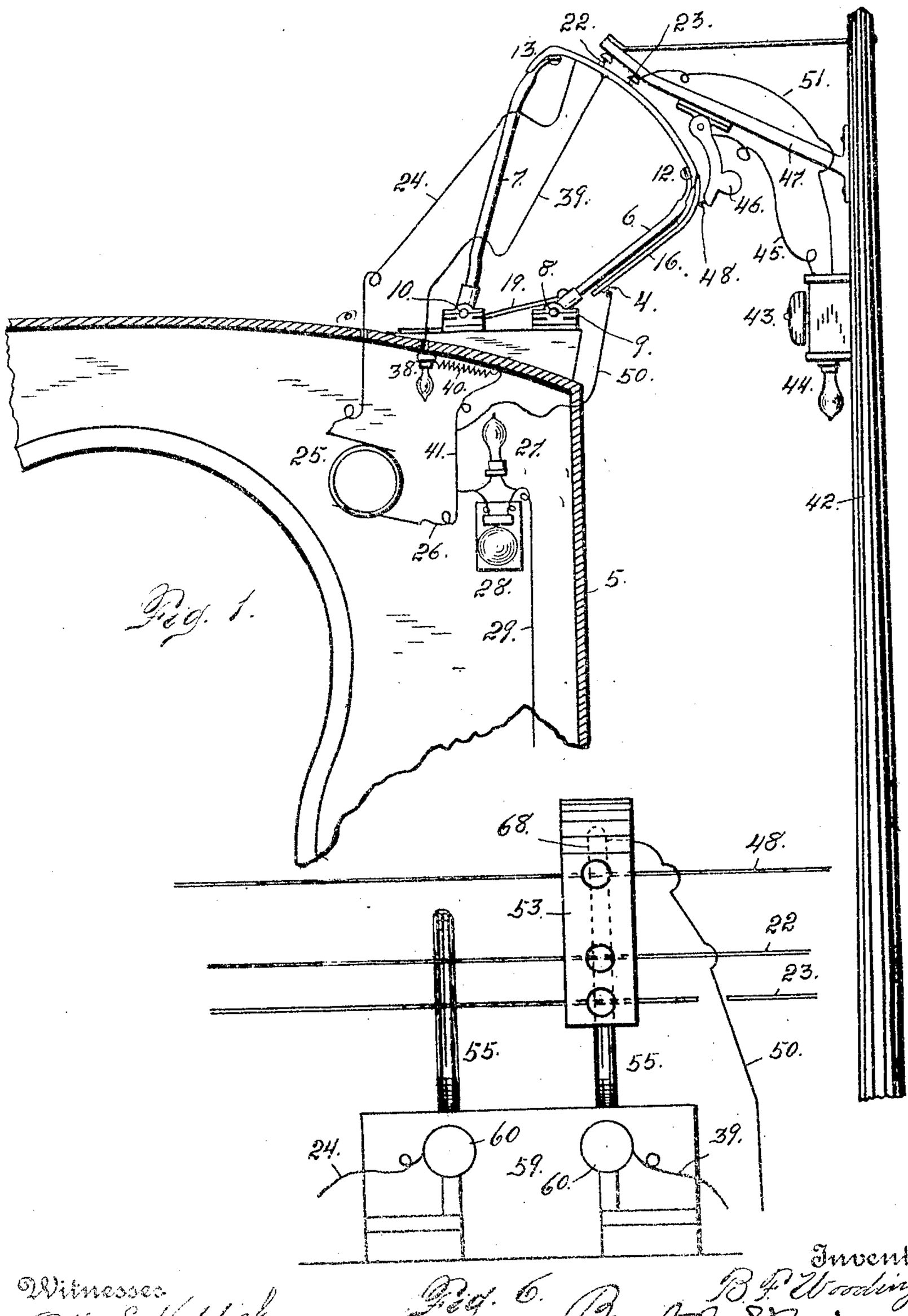

Fig. 1.

Fig. 6.

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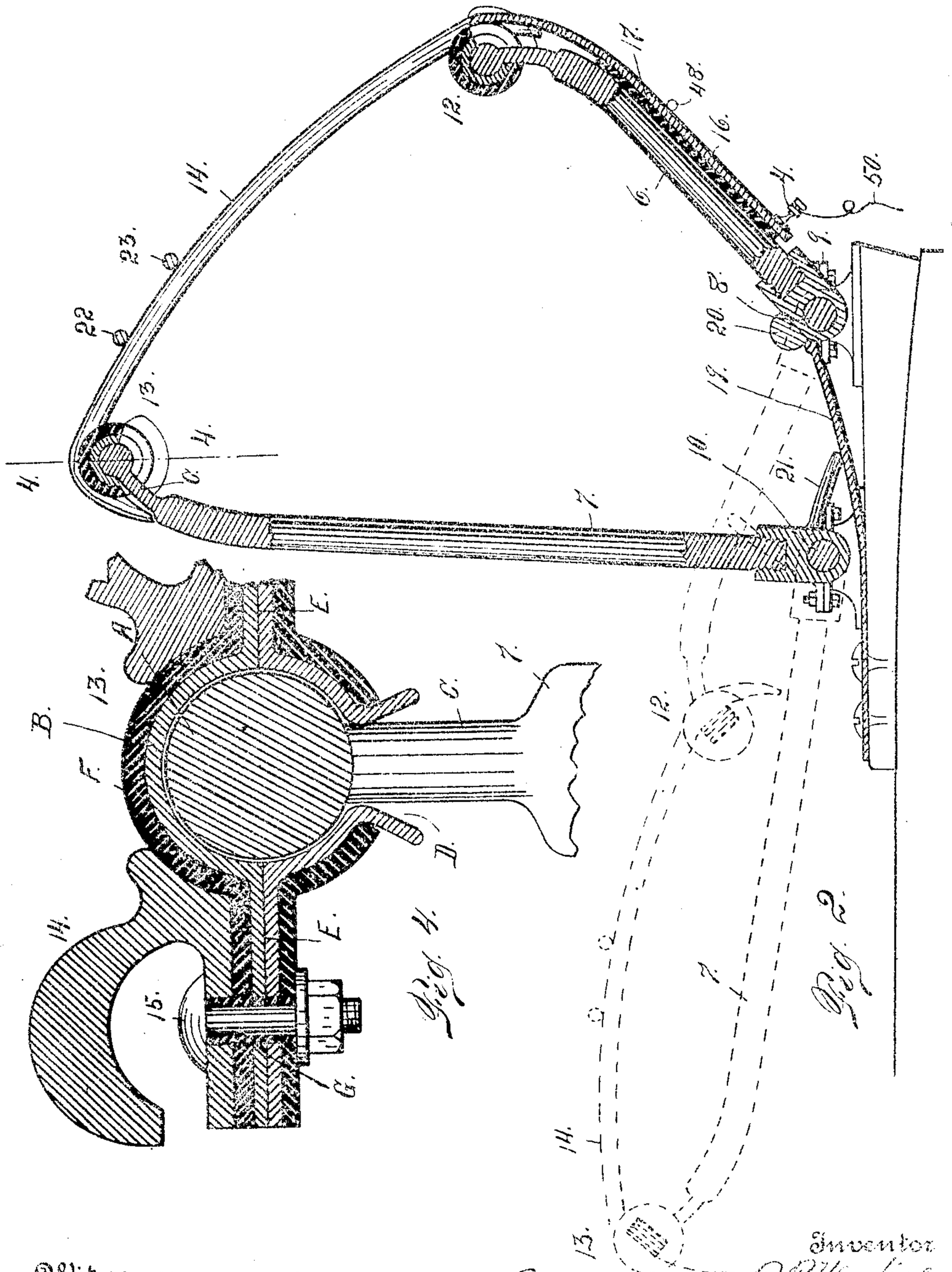

Fig. 4.

Fig. 2.

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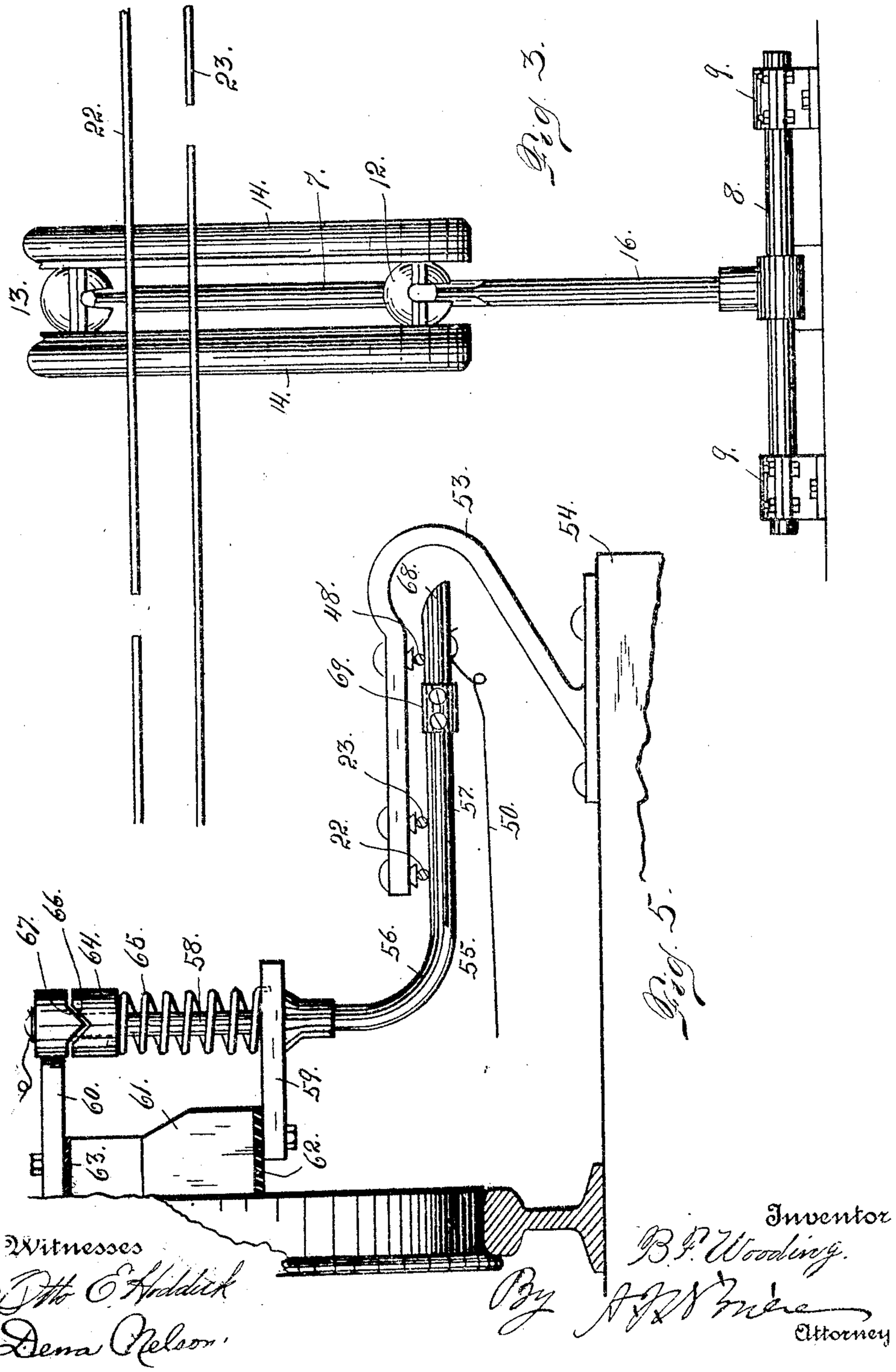

Fig. 3.

Fig. 5.

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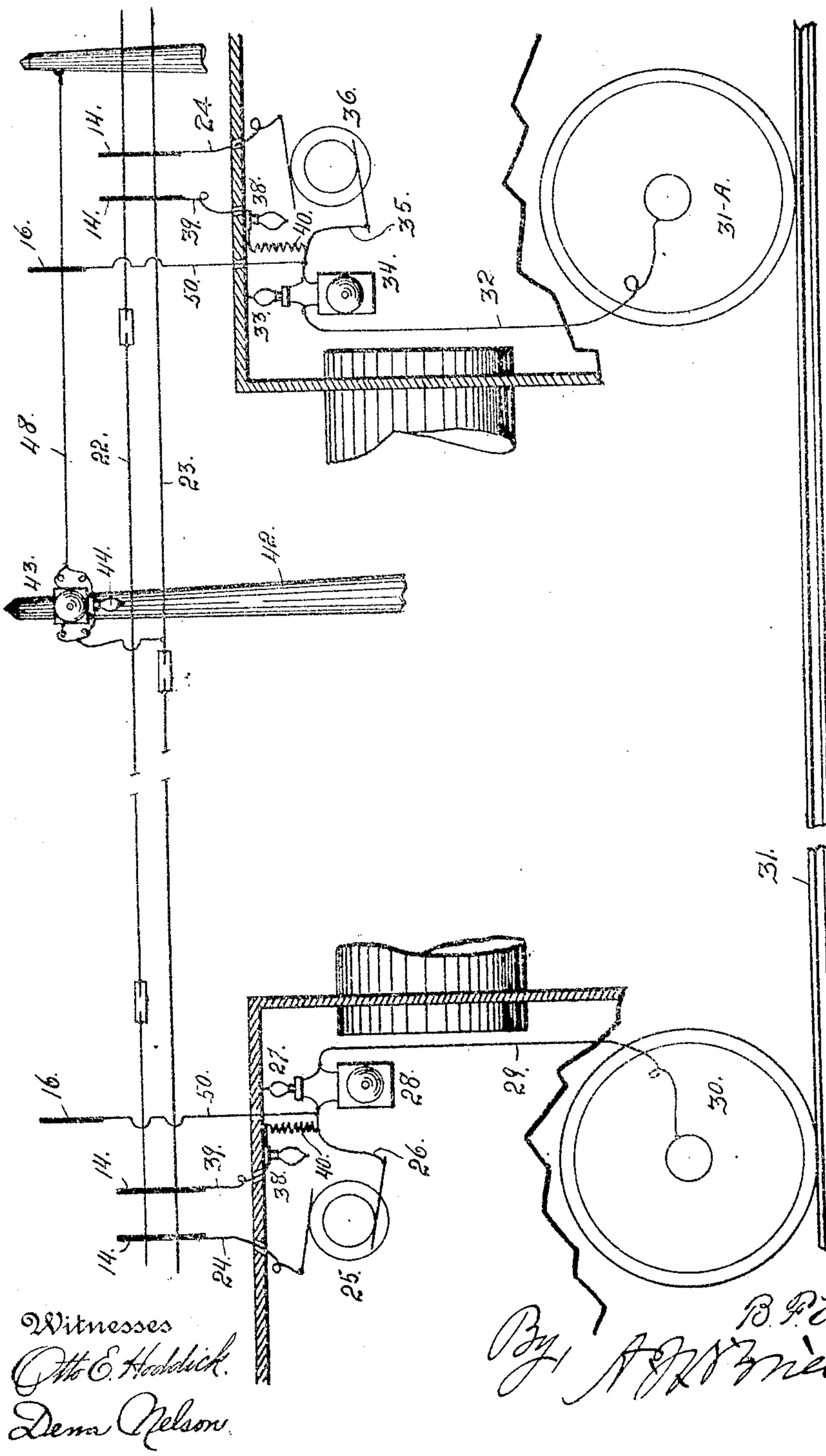

Fig. 1.

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UNITED STATES PATENT OFFICE.

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ELECTRICAL SIGNALING APPARATUS.

No. 882,089. Specification of Letters Patent. Patented March 17, 1908.

Application filed January 4, 1907. Serial No. 350,840.

To all whom it may concern:

Be it known that I, BENJAMIN F. WOODING, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Electrical Signaling Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electrical signaling apparatus being more especially intended for use in connection with railroad trains.

The invention includes apparatus for signaling between trains when the latter have approached within a given distance or have reached the same block whereby the electrical current is completed through signaling conductors suitably arranged. Provision is also made for constantly maintaining a pilot light in a cab of each engine; also for giving local signals as either train passes a station.

An important feature of my improved apparatus consists in a folding contact mounted upon the train and having sufficient range of movement, to allow it to accommodate itself to varying conditions resulting from the swaying movement of the train and also because of the difference in height of the signal conductors. This contact is also adapted to fold downwardly upon the engine or other part of the train with which it is connected, making it practicable to pass through tunnels and still remain in operative shape.

Having briefly outlined my improved construction, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is an elevation of my improved apparatus. Fig. 2 is an enlarged detail view illustrating the folding contact shown in two positions, one in full lines and the other in dotted lines. Fig. 3 is a view of the contact looking toward the left in Fig. 2, assuming that the contact is in the upright or full line position. Fig. 4 is a sectional view in detail taken on the line 4—4 Fig. 2, the parts being shown on a larger scale. Fig. 5 is a view showing another form of contact. Fig. 6 is a top plan view of the construction shown in Fig. 5.

The same reference characters indicate the same parts in all the views.

Referring first to Figs. 1 to 4 inclusive, let the numeral 5 designate a part of the train as the cab of the locomotive upon which are mounted two arms 6 and 7. The lower extremity of the arms 6 is rigidly connected with a shaft 8 journaled in boxes 9 mounted on the cab. The lower extremity of the arm 7 is made fast to a shaft 10 suitably journaled on the cab. The upper extremities of the arms 6 and 7 are connected by means of ball and socket joints 12 and 13 with two separated contact members 14. These joints 12 and 13 are substantially of the same construction. The construction of the joint 13 which is shown in Fig. 4 will be explained in detail and from it the construction of the joint 12 will be readily understood. The upper or ball extremity of the arm 7 will be designated A and the inclosed metallic socket as B. This socket is open as shown at D to allow the reduced portion C of the arm 7 to pass through. This opening is sufficiently elongated to allow the arm 7 to assume the dotted line position in Fig. 2. The socket B is provided on opposite sides with flanged parts E to which the members 14 are secured by means of bolts 15. The metallic socket and its parts E are covered with insulating material F, whereby the two arms 14 are insulated from each other. The bolt 15 which forms the connection between each arm 14 and the flanged part of the socket, is also surrounded by insulating material G. In this way the two arms 14 are completely insulated from each other. They are also permitted a slight transverse rocking movement, as well as a folding movement to allow the contact as an entirety to assume the position shown by dotted lines in Fig. 2. The members 14 are at the same time completely insulated from the arms 6 and 7. The folding contact is provided with an auxiliary contact comprising a plate 16 mounted on the arm 6 and insulated therefrom by a layer 17 of insulating material interposed between the parts 6 and 16. This plate 16 is also insulated from the contact members 14. The only function of this contact plate 16 is to engage a wire 48 and give local signals at stations as hereinafter explained.

The folding contact considered in its en-

tirety is normally held in the upright position or that shown by full lines in Fig. 2 by a spring 19 acting on the base of the arm 6 which is provided with a stop 20 against which the free extremity of the spring bears. The lower extremity of the arm 7 is provided with a projection 21, which engages the plate 19 and forms a stop to prevent the folding contact from moving farther toward the right after it has assumed the upright position.

In describing the use of the folding contact it must be assumed that one of these contacts is mounted on each train for instance on the cab of each locomotive. It must also be assumed that signaling conductors 22 and 23 are suitably supported along the track in such a manner as to be engaged by the members 14 of the contact. These conductors 22 and 23 are arranged in blocks or composed of sections having their adjacent extremities insulated from each other; these insulating joints of the two conductors being arranged in staggered relation as will be readily understood in view of the state of the art and therefore need not be further described in detail. When the two trains reach the same block, or are in such position that their folding contacts engage the same block of the conductors 22 and 23, the current may be said to pass from one of the members 14, through a conductor 24 (see Fig. 1), to one pole of the source of electricity 25 mounted on the train, thence from the other pole of the said source through a conductor 26 to a signal light 27 and a bell 28, and thence through a conductor 29 to the ground or to the rails of the track, since the grounding of the current in its passage from one train to another is usually accomplished by utilizing the rails of the track, the current passing through the wheels of the locomotive. This will be better understood by reference to Fig. 7 which is a diagrammatic view illustrating the circuits. After leaving the signaling apparatus by way of the wire 29, the current passes to the wheel 30 of one locomotive, thence to a track 31, and thence to a wheel 31^A of another locomotive and thence through a conductor 32 to the signal light 33 and bell 34 in the cab of the other locomotive, and thence through a conductor 35 to one pole of a generator or electrical source 36 of the other locomotive and thence from the opposite pole of said source through a conductor 32 to the signaling contact member 14, and thence to the signaling conductors 22 and 23.

In order that the engineer in each cab may be sure that the apparatus is constantly in working order, a pilot light 38 is maintained in the cab of each locomotive. This light which in the drawing is shown to be an incandescent lamp, receives its current from one of the members 14 through a conductor 39 to the lamp, thence through a resistance coil 40 to a conductor 41 leading to one pole of the electrical source on the train (see Fig. 1) and thence from the opposite pole of said source through the conductor 24 to the other contact 14. For the purposes of this specification it is assumed that the two conductors 24 and 39 are connected with different contacts 14, that is to say the conductor 39 is connected with one of these contacts and the conductor 24 with the other contact. This assumption is entirely consistent, since for signaling purposes either of the members 14 is sufficient. Hence in arranging the pilot light circuit it becomes practicable to utilize the conductor 24, by connecting the same with one of the members 14, while the conductor 39 is connected with the other member 14.

As heretofore intimated, provision is made for giving a local signal by each train every time the train passes a station. For this purpose a suitable support as a pole 42 may be erected at each station and provided with signaling devices, as a bell 43 and a light 44. A conductor 45 leads from these signaling devices to a contact member 46 carried by an arm 47 mounted on the pole and engaging a wire 48 suitably supported, the said wire also being engaged by the contact plate 16 every time the train passes a station. From a binding post 4 on the plate 16 leads a conductor 50 to a wire 41 within the cab of the engine, the current being thence completed through the wire 26 (see Fig. 1) electrical generator 25, the conductor 24, one of the contact members 14, the signaling conductor 23, and a conductor 51, to the local signaling mechanism 43 and 44.

It will be understood that the signaling conductors 48 are short conductors arranged at the stations only and are arranged to be engaged by the plate 16 of each folding contact. This is well illustrated in Fig. 7 of the drawing in which an additional pole designated 52 is illustrated for supporting one extremity of the wire 48, thus insulating that extremity of the wire from the signaling conductors and preventing any local signals being given except while trains are passing the stations as heretofore explained.

In the form of construction shown in Figs. 5 and 6, the signaling wires 22 and 23 are mounted upon a bracket 53 secured to a suitable support 54 alongside the track. The signaling contact is designated 55 and consists of a pair of arms each having a bend 56, a horizontal member 57 and a vertical member 58, the latter being journaled in supports 59 and 60, mounted on a part 61 of the train and insulated therefrom as shown at 62 and 63. Splined on the upper extremity of the arm 58 is a stop 64 to which is connected the upper extremity of a coil spring 65 whose lower extremity is made fast to the support

59. The stop 64 is provided with a V-shaped groove 66 in its upper face which is engaged by a tongue 67 of counterpart shape. The member 57 of the contact arm normally occupies a position approximately at right angles to the direction of the track. When, however, this arm meets an obstruction, it is free to swing rearwardly within given limits. As it does so, the stop 64 is forced downwardly on the member 58 by virtue of the cam action incident to the tongue and groove connection between the parts 64 and 60. As soon as the obstruction ceases to act on the contact, the tension of the spring 65 returns the arm 57 to its normal position. The tongue and groove connection between the parts 64 and 60, also serves to prevent the contact from swinging out of position under the influence of its spring 65, when making the return movement after an obstruction has forced the arm 57 rearwardly or caused it to change its position as heretofore explained.

The arm 57 of the contact is provided with an extension 68 which engages the wir 48 for local signaling purposes. This exten. n 68 corresponds with the plate 16 of the other form of contact, and the conductor 50 leading from the extension 68 performs the same function as the conductor 50 in the other forms of construction. The extension 68 is insulated from the part 57 by an insulating connection 69.

The two contacts 55 (see Fig. 6) correspond with the two contact members 14 of the other form of construction. In other words the contacts 55 are insulated from each other for pilot light purposes and the conductors leading therefrom (see Fig. 6) are designated 39 and 24 the same as in Fig. 1 of the drawing.

It is evident that my improved apparatus is adapted for use where there is only one train, assuming that any other means be employed for closing the signaling circuit through the one train. It is evident that various means may be employed for closing the circuit through the signaling devices of the train and which may be substituted or employed instead of the other train.

Wherever the term station or stations has been employed in connection with the explanation of the local signaling mechanism, it must be understood that the term is of sufficient scope to cover dangerous crossings or any other points where it may be necessary to give signals as trains pass.

Having thus described my invention, what I claim is:

1. In electrical signaling apparatus for railways, the combination with line conductors arranged along the track, a source of electricity mounted on the train, and signaling devices also mounted on the train, of a contact carried by the train and connected to close the circuit between the said conductors and the signaling devices, the said contact consisting of two arms pivotally connected with the train to permit a swinging or folding movement, and a contact member having a ball and socket connection with both of said arms, the said contact member being insulated from the said arms, and arranged to engage the line conductors.

2. In electrical signaling apparatus, the combination with line conductors forming a block signaling system, a source of electricity mounted on the train, and signaling devices also mounted on the train, of a contact carried by the train and connected to close the circuit between said conductors and the signaling devices, the said contact including two members insulated from each other and connected to engage the line conductors, the inner extremities of said contacts being provided with V-shaped grooves which are engaged by tongues of counterpart shape for the purpose described, a pilot lamp located on the train and connected with a source of electricity and connections between the said lamp and the two contact members, whereby the circuit is constantly closed through the lamp.

3. In electrical signaling apparatus, the combination with line conductors arranged along the track and forming a block signaling system, a source of electricity mounted on the train, and signaling devices also mounted on the train, of a contact carried by the train and connected to close the circuit between the line conductors and the signaling devices, said contact consisting of two arms pivotally connected with the train to permit a swinging or folding movement, a contact member having a ball and socket connection with both of said arms and adapted to engage the line conductors, and an auxiliary contact carried by the main contact but insulated therefrom, local signaling mechanism arranged at intervals along the track, and connections between the said mechanism, the line conductors and the auxiliary contact whereby the circuit is closed through the local signaling devices each time the train passes.

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

BENJAMIN F. WOODING.

Witnesses:
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A. J. O'BRIEN.