

No. 766,952.

PATENTED AUG. 9, 1904.

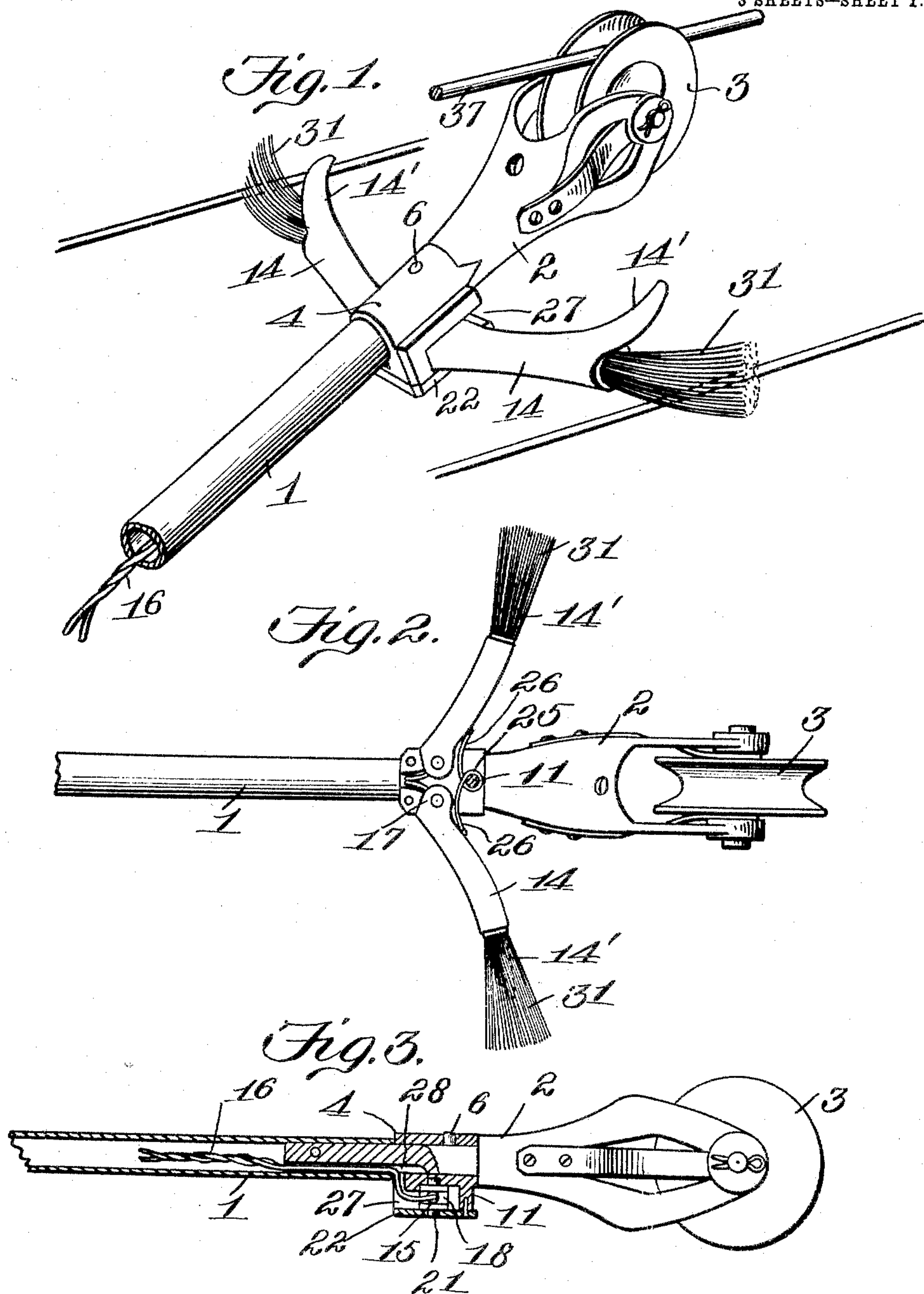
J. D. KEEN.

ELECTRICAL CONTACT DEVICE FOR INTERMITTENTLY ESTABLISHING
CIRCUITS ON MOVING CARS.

APPLICATION FILED MAR. 18, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:
C. D. Hesler.
James L. Morris, Jr.

Inventor
Jefferson D. Keen
By
James L. Morris, Jr.
Att'y.

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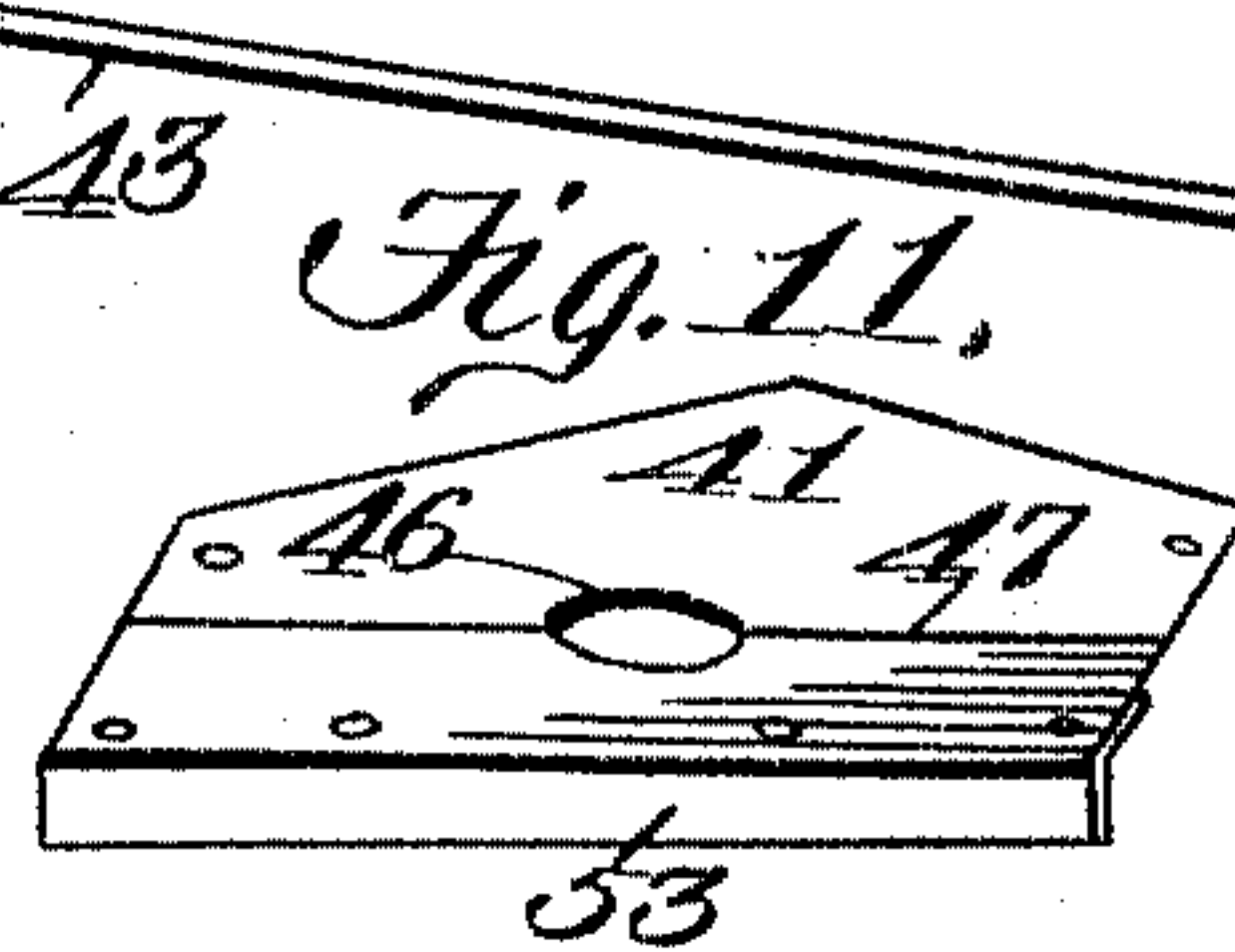
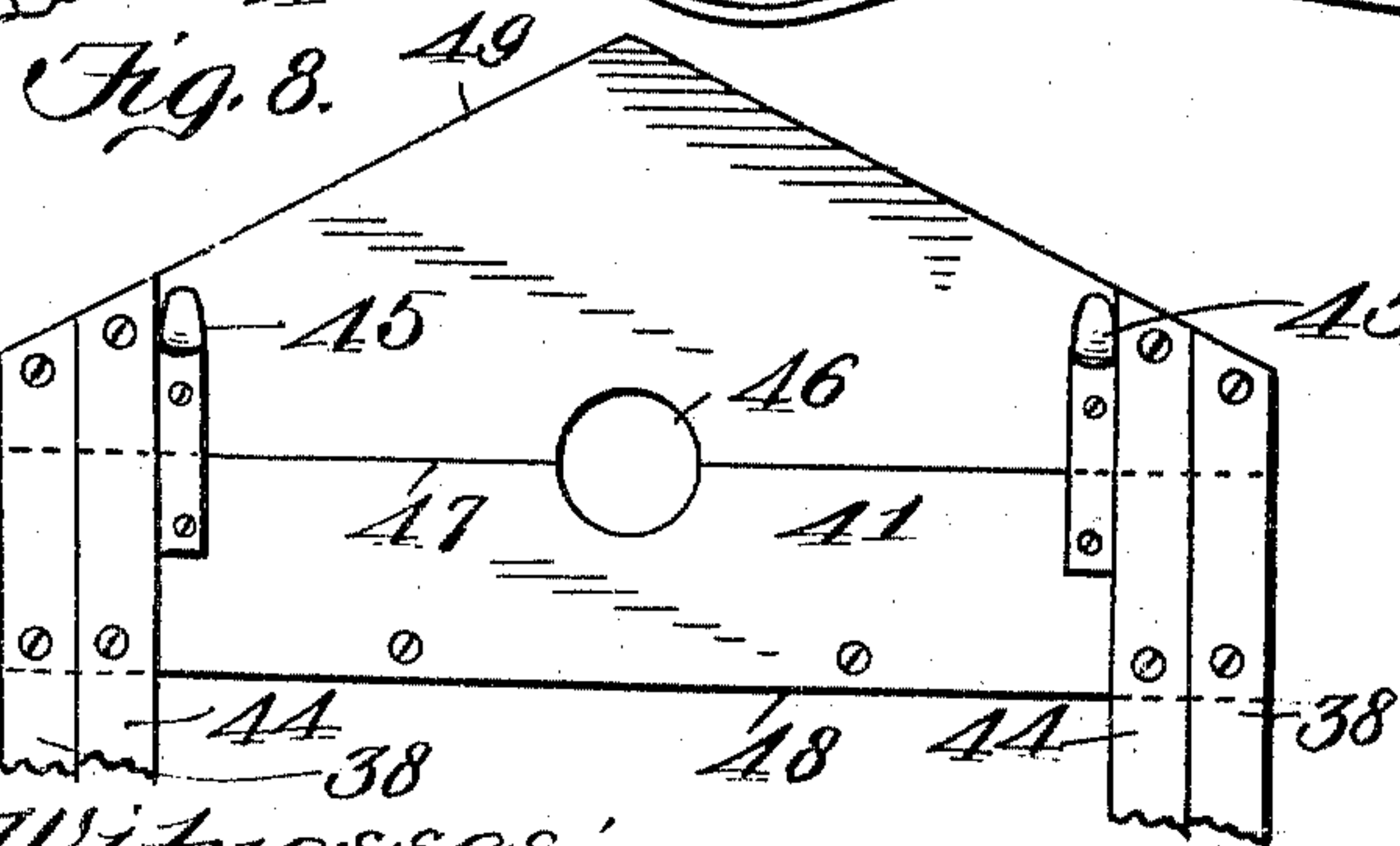
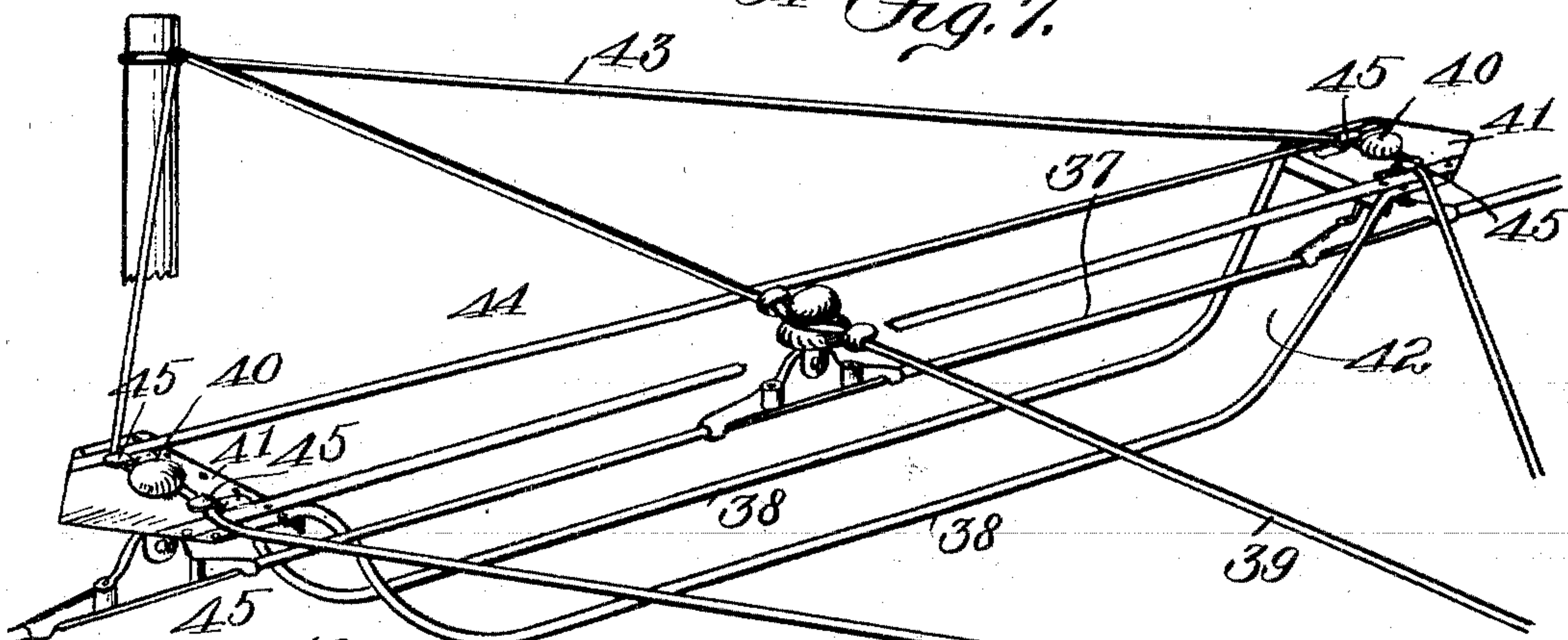
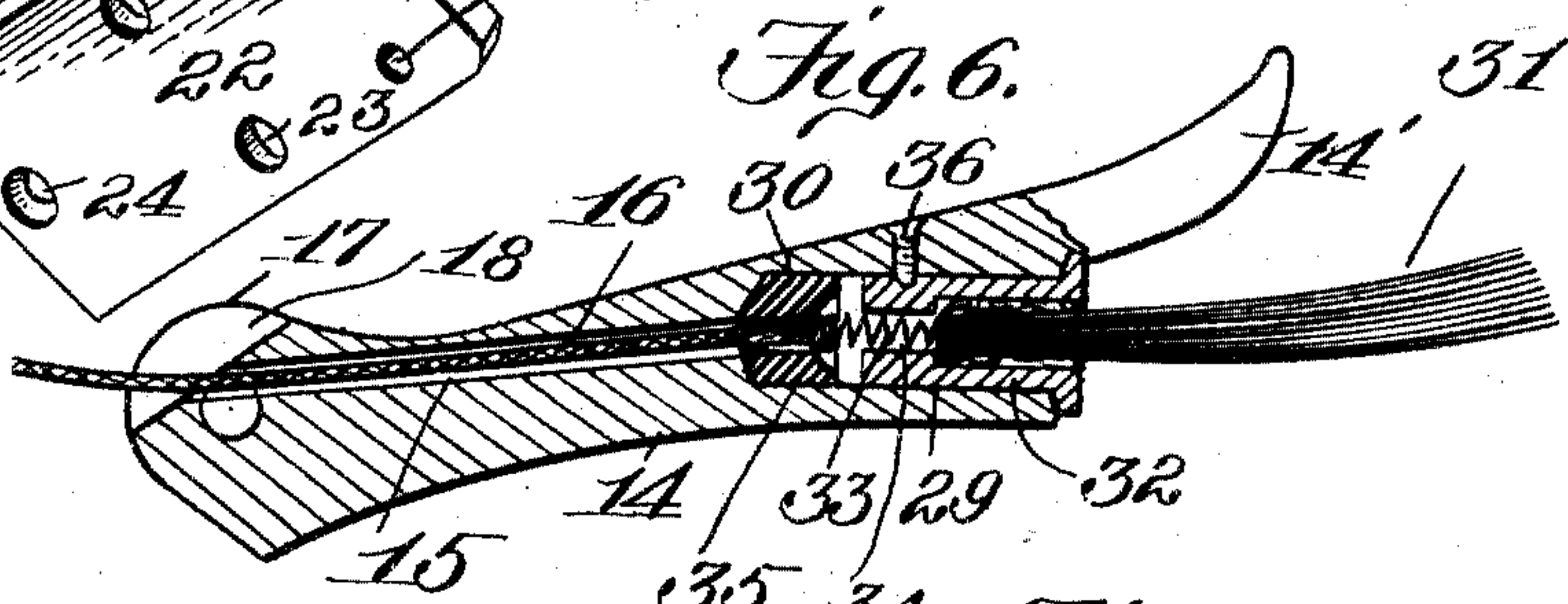
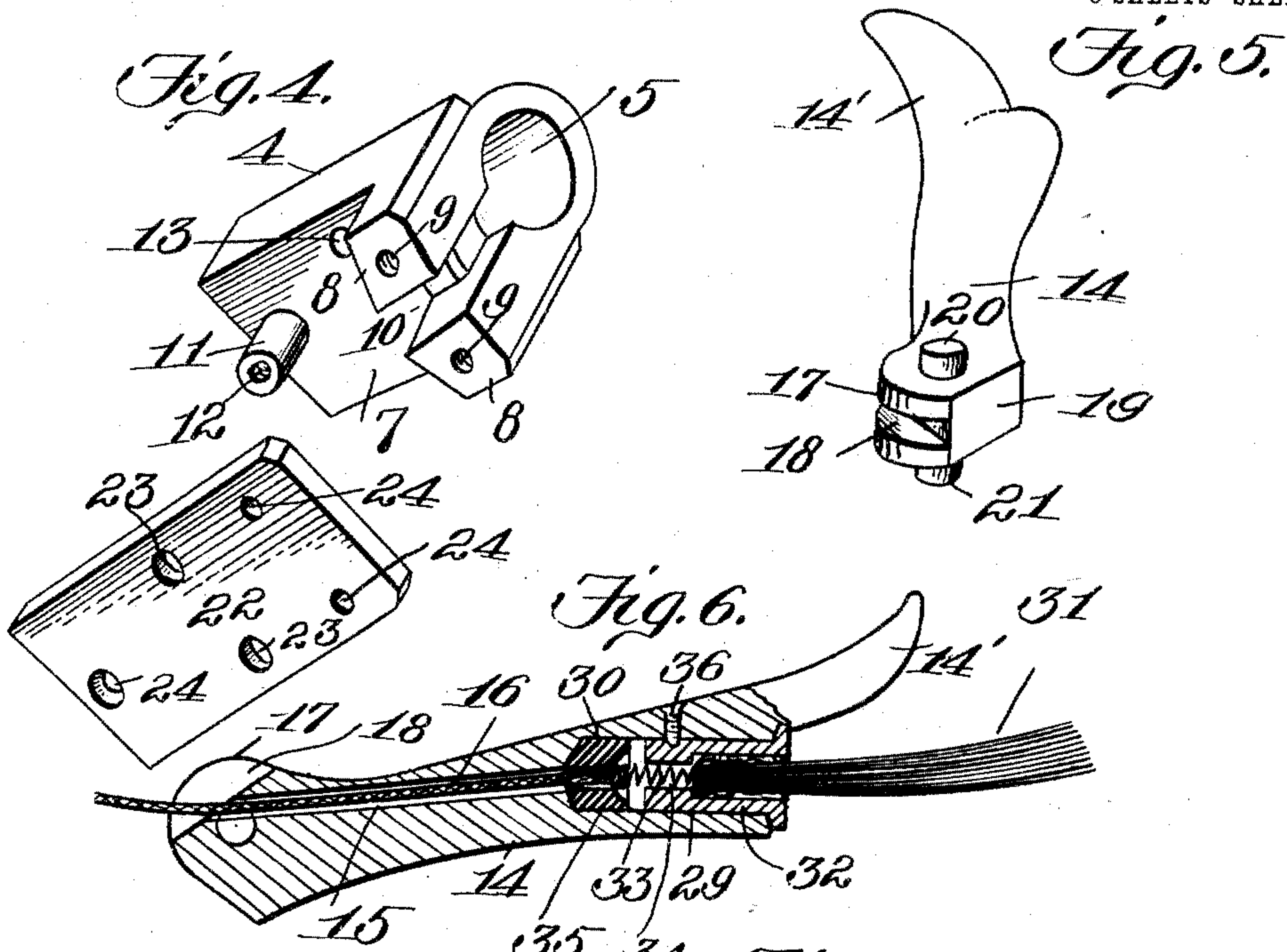
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3 SHEETS—SHEET 2.



Witnesses:
C. S. Kessler,
James L. Norris, Jr.

Inventor
Jefferson D. Keen
By
James L. Norris
attys.

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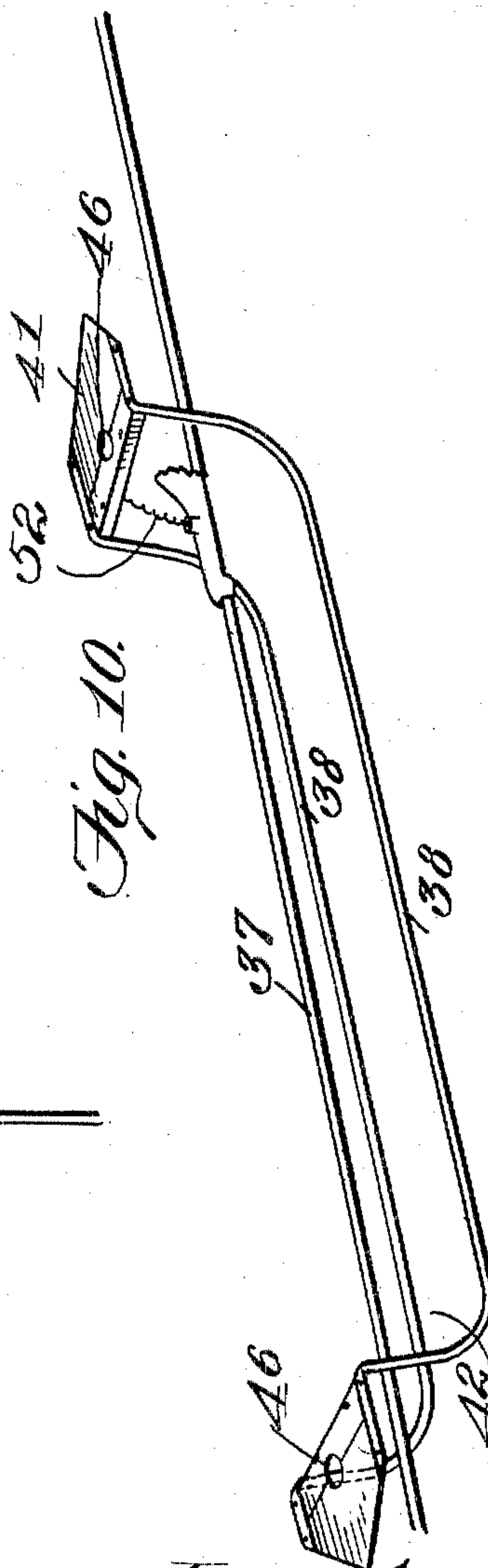
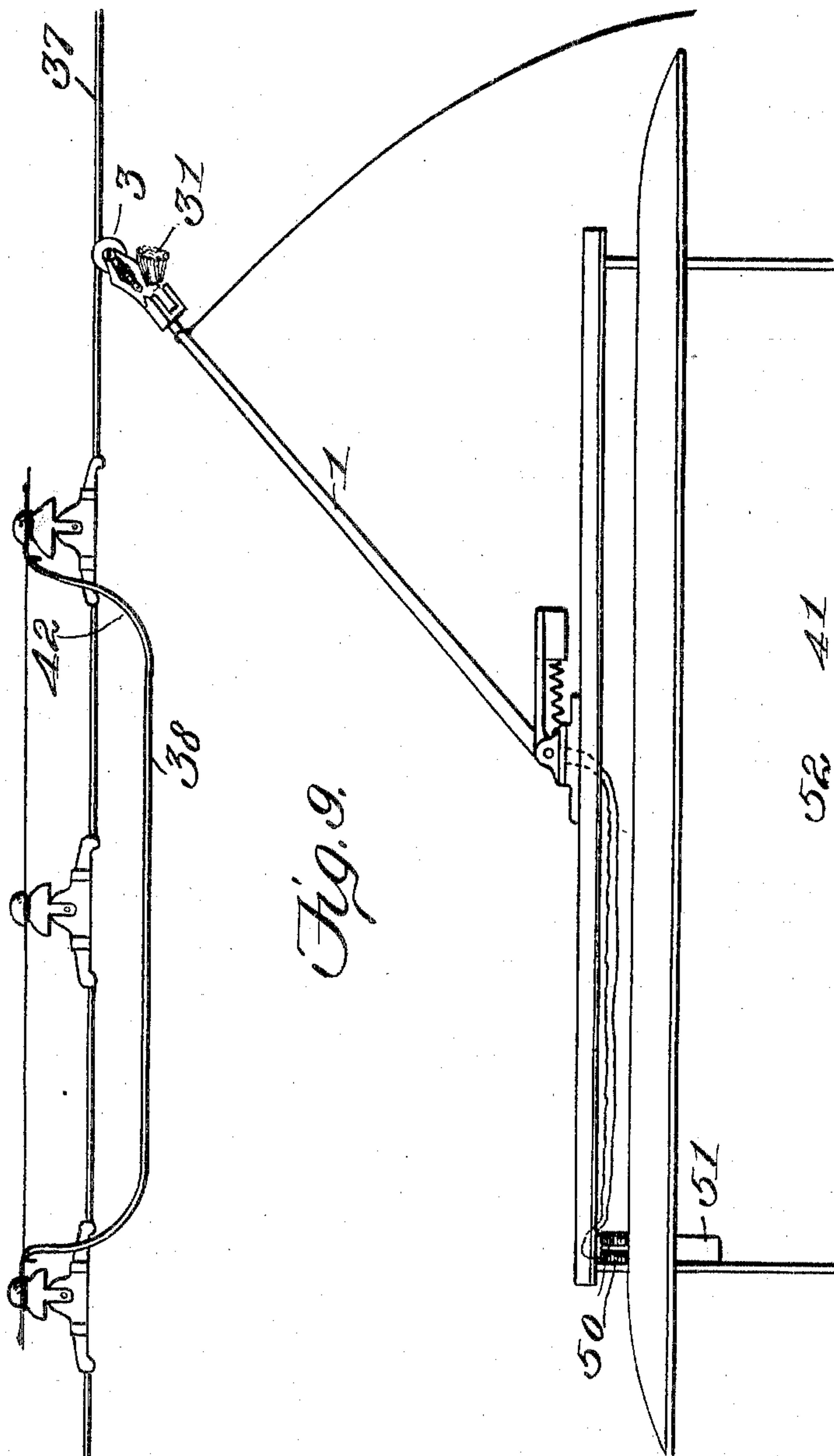
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NO MODEL.

3 SHEETS—SHEET 3.



Witnesses:
C. D. Kessler,
James L. Norris, Jr.

Inventor
Jefferson D. Keen
By James L. Norris,
Attorney

UNITED STATES PATENT OFFICE.

JEFFERSON D. KEEN, OF CINCINNATI, OHIO, ASSIGNOR TO THE ELECTRIC INDICATOR COMPANY, OF LOUISVILLE, KENTUCKY, A CORPORATION OF KENTUCKY.

ELECTRICAL CONTACT DEVICE FOR INTERMITTENTLY ESTABLISHING CIRCUITS ON MOVING CARS.

SPECIFICATION forming part of Letters Patent No. 766,952, dated August 9, 1904.

Application filed March 18, 1904. Serial No. 198,748. (No model.)

To all whom it may concern:

Be it known that I, JEFFERSON D. KEEN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Electrical Contact Devices for Intermittently Establishing a Circuit on a Moving Car, of which the following is a specification.

This invention relates to an electrical contact device for intermittently establishing a circuit on a moving car, and has for its object to provide a device of this character in which the contact parts proper are carried by hinged arms which are permitted to yield under spring-pressure in order the more readily to pass an obstacle should such by reason of accident or otherwise be presented in the course of travel of the contact devices.

A further object of the invention resides in a novel manner of arranging a series of contact-bridges at predetermined intervals along the track.

Still further objects of the invention relate to details of construction and to combinations and operations of parts, all as hereinafter clearly set forth.

That which I claim as my invention will be specifically indicated in the claims following the specification.

In order that the invention may be clearly understood, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is a perspective view showing the upper part or harp of a trolley-pole having my improved contact devices applied thereto. Fig. 2 is a view looking at the under side of the device as represented in Fig. 1, the plate of the ferrule or housing in which the contact-arms are pivotally mounted being removed. Fig. 3 is a longitudinal sectional view through a portion of Fig. 2 to illustrate the manner of passing the wire from the trolley-pole or other support through the contact-arms. Fig. 4 is a detail perspective view of the ferrule in which the contact-arms are pivoted. Fig. 5 is a detail view of one of the contact-arms. Fig. 6 is a longitudinal sec-

tional view through one of the contact-arms, illustrating the manner of mounting the conductor-wires and contact-brush therein. Fig. 7 is a perspective view illustrating one of my contact-bridges and the means of supporting the same in its normal position on the trolley-wire. These contact-bridges when engaged by the contact-brushes serve to complete the intermittent current. Fig. 8 is a detail view of one of the metal abutment-plates which support the contact-rails. These two plates and their appurtenances, with the rails connecting them, constitute the contact-bridge shown in Fig. 7. Fig. 9 is a view, partly in elevation and partly in section, illustrating my improvements applied to the car of an overhead-trolley system; and Fig. 10 illustrates conventionally a modification. Fig. 11 is a detail illustrating the construction of one of the abutment-plates.

In the drawings I have illustrated my invention as applied to an overhead-trolley system, in connection with which it will likely find its widest use; but I wish it understood that the invention is not limited to such application, since it could be applied to cars in which the electrical contact is made beneath the car, as is frequently done on elevated roads. The invention is also not restricted to use on electric cars of any description, as, with the exception of the modified construction shown in Fig. 10, in which the current is shunted from the trolley-wire, the device could be used on steam railroads. With such reservation in view I will now describe the invention in its application as illustrated in the drawings.

The numeral 1 indicates a trolley-pole provided with a head or harp 2 and a wheel 3, these parts being of the ordinary construction.

4 indicates a ferrule secured on the trolley-pole and engaging the harp 2 in the ordinary manner to prevent the latter from turning. This ferrule is shown in detail in Fig. 4. As shown, said ferrule has a longitudinal bore 5, into which the trolley-pole is to be inserted and secured by means of a screw or rivet 6. The portion of this ferrule lying on the under

side of the trolley-pole is provided with a flat side 7, from one end of which project lugs 8, provided with screw-threaded apertures 9, between which lugs is a space or slot 10. At the opposite end of the ferrule a circular lug 11 projects from the flat side 7 and is provided with a screw-threaded aperture 12. Between the lugs 8 and the lug 11 are located near opposite sides of the ferrule 4 in the flat side 7 circular recesses 13, the purpose of which will presently appear.

14 indicates the contact-arms, one of which is shown in detail in Fig. 5 and in section in Fig. 6. The arms 14 are identical in construction, and a description of one will apply to the other. These arms have, preferably, the curved form shown more clearly in Figs. 1, 2, 5, and 6, a horn-like tip 14' extending out over the brush 31 to catch the trolley-wire in case the trolley-wheel jumps off, and thus protecting the brush and also keeping the trolley-pole from flying above the wire. Each arm is provided with a longitudinal bore or passage 15, through which extend insulated conductor-wires 16. As shown in Figs. 2 and 5, the arm 14 is provided at its inner end with a rounded portion 17, through which extends a slot 18, the channel 15 for the conductor-wires terminating at one end in this slot. The inner end of the arm 14 is also provided with a flat side 19 and with two circular lugs 20 21, which latter afford pivot bearings or journals for the arm. In mounting the arms 14 in the ferrule 4 one of the lugs 21 is inserted in one of the apertures 13 and the corresponding lug on the other arm is inserted in the other aperture 13, and a cover or plate 22, having circular apertures 23, is then applied to the ferrule in such manner that the apertures 23 will receive the lugs 20, and by this means the arms 14 will be hinged or pivotally mounted in said ferrule. The plate 22 is also provided with apertures 24, through which screws are passed into the respective apertures 9 and 12 for securing the plate 22 to the ferrule.

25 indicates a spring (shown only in Fig. 2) which is coiled around the lug 11 of the ferrule and provided with two projecting ends 26, which bear against the upper sides of the arms 14, so as to hold them normally in the extended position. (Shown in Figs. 1 and 2.) When in position in the ferrule, the flat side 19 of each arm is adapted to abut against the inner face of the corresponding lug 8, said lugs serving to thus limit the outward movement of said arms.

As will be seen from Fig. 1, an open-ended space 27 is provided between the flat side 7 and the plate 22 at the end of the ferrule, having the lug 11, so that the arms 14 may be swung in against the trolley-harp. The curved tip 14' prevents the brush from touching the trolley-harp.

The insulated conductor-wires 16 pass outward from the trolley-pole through a slot 28,

formed in the end of the ferrule 4 between the lugs 8, and then pass through the recess or slot 10, and said wires are then inserted, respectively, into the channels 15 of each arm. As shown by Fig. 6, the outer end of each arm 14 is provided with an enlarged cylindrical recess 29, in the bottom of which is mounted a cup or disk 30, of insulating material, and one of the wires 16 passes through the passage 15 and through disk 30, where its end 35 is knotted.

31 indicates contact-brushes, preferably made of phosphor-bronze wire, each brush being cemented in a socket-piece 32, of insulating material, and at its inner end being in electrical contact with or electrically connected to a spring 33, which projects through an opening 34 in the bottom of the socket-piece 32, so that when the socket-piece 32 is inserted into the recess 29 of the arm 14 the wire spring 33 will bear firmly against the knotted end 35 of the conductor-wire 16, so that electrical connection will be established between said wire and the brush 31. The socket-piece 32 is held within the arm-recess 29 by means of a screw 36.

By providing the rounded portion 17 and the recess 18 in each arm 14 and by having the passage 15 for the conductor-wire terminate in the recess 18 I provide for permitting movement of the arms 14 without bending to any considerable extent the wire 16, as will be more clearly apparent from the sectional view in Fig. 6. It will be seen that if the wires 16 were continued to the inner end of the arms 14 without the provision of the recess 18 the wire 16 would be bent at a sharp angle each time the arms 14 were swung inward, and thus in time said wires would be broken.

As one embodiment of my invention I contemplate establishing a circuit at certain predetermined intervals by means of the contact-brushes 31 to operate a device located on the car for indicating the station or street-crossings. To this end at a suitable point between each two stations I provide a contact-bridge 42, having on each side of the trolley-wire 37 and parallel therewith a contact-rail 38. For this purpose I secure on the upper side of the trolley-wire 37 on each side of an ordinary guy-wire 39 an insulated support 40, around each of which the metal abutment-plates 41, which hold the contact-rails 38 in place, are bolted. Additional guy-wires 43 from pole to pole hold the metal abutment-plates 41 in their normal horizontal plane by means of ordinary clamp-hooks 45, bolted to the plates 41. For additional strength and longitudinal rigidity of the contact-bridge 42 two straight metal rails 44, whose ends are bolted securely to the plates 41 just inside the contact-rails 38, pass the entire length of the contact-bridge 42. The relative position and the manner of bolting these rails and clamp-hooks are shown

more clearly in Fig. 8. The contact-rails 38, as shown, extend a considerable distance below the trolley-wire 37 and are held in a substantially fixed position relative to said wire by means of the devices 41, one of which is shown in detail in Fig. 8. Each of these devices comprises a flat metal plate 41 in sections secured around the upper end of an insulator 40 by bolting through the ends of 38, 44, and 45, respectively, as shown in Fig. 8.

In order that plate 41 may be fitted snugly around the neck of the insulator-bulb 40, it is made in two parts, joined at the line 47, extending from the circular aperture 46 to either side parallel to the line of the plate's inner edge 48. The outer edge 49 of the plate 41 presents an obtuse angle with outward point to throw off the brunt of a blow from a trolley-pole if it swings above the trolley-wire. Additional strength and lateral rigidity is given to plate 41 by the strip of angle-iron 53, running along the inner edge 48 of said plate and bolted to the under side of it, as shown in Fig. 11.

In the preferred embodiment of the invention the wires 16, which are in electrical contact with the brushes 31, are connected in circuit with the indicator or other device 51, mounted on the car, through a battery 50. Thus in operation and as will be seen more clearly from Figs. 1 and 9 as the trolley passes along the section of wire 37, provided with the contact-bridge 42, the brushes 31 will pass along on the contact-rails 38, and thus establish a circuit through the battery, and the resultant current is utilized to operate the indicator or other devices 51 located on the car. As the trolley passes beyond the contact-bridge 42 the brushes 31 pass off the contact-rails 38, and thus break the circuit.

An important feature of the invention is in constructing the arms 14 so as to adapt them to swing inward toward the head of the trolley, the purpose of this being to prevent any of the guy-wires or the contact-bridges 42 being torn away by the trolley should the wheel 3 run off the trolley-wire 37, as frequently occurs. It will be seen that if the trolley should leave the wire when the contact-bridges 42 are reached at either end the arms 14 would simply be pressed back toward the head of the trolley and allow the arms 14 to pass the obstruction, and as soon as said obstruction had been passed the spring 25 would at once restore the arms 14 to their normal position. The same operation would occur should one or both the arms 14 strike a guy-wire 39 or the inner part of a switch-frog or any other fixed part of the overhead construction.

While I have illustrated conventionally in Fig. 9 an arrangement in which a local circuit is established for operating an indicator, advertising device, or similar structure on the car, I wish it understood that the invention is not concerned with the particular work done

by the electric current, as said current might be used for operating a switch or for any other purpose whatsoever to which it may be applied in connection with cars of any description; also, as shown in Fig. 10, instead of employing the brushes 31 and the contact-rails 38 for establishing a local circuit on the car I may shunt the current from the trolley-wire 37 by electrically connecting the wires 38 with said wire 37, as indicated at 52. In this case of course one of the wires from the battery would be grounded.

As stated above, the contact device 31 forming the subject-matter of this application may be used in connection with ordinary steam-railroad trains as well as with an electrically-propelled car. In such application the contacts 38 would be arranged at any point adjacent to the line of travel of the train, either above or at the side of the same or beneath the train, and the contact-brushes simply be used to complete a local circuit through the train in the same manner as indicated in Fig. 9. It will also be apparent that it is not essential that the contact-brushes should be carried by a trolley-pole, as said brushes could be carried in any suitable manner by the car and at any suitable point thereon and arranged to cooperate with the contact-rails 38, correspondingly located, without departing from the spirit of my invention and without making any change therein except such as would be adopted by the ordinary mechanic in changing the location of the parts.

As the brushes 31 wear out they may be removed by loosening the screws 36 and new brushes inserted.

Having thus described my invention, what I claim as new is—

1. An electrical contact device for use on cars comprising, in combination with contact-pieces located exterior to the car, pivoted arms carried by the car, metallic brushes mounted in said arms and adapted to make contact with said contact-pieces in the travel of the car, and insulated wires extending into said arms and in electrical contact with said brushes, said wires being arranged to establish a circuit when the brushes engage said contact-pieces.

2. An electrical device for use on cars comprising, in combination with contact-pieces located exterior to the car, pivoted arms carried by the car and having conductor-wires mounted therein, and metallic brushes removably secured in said arms and adapted to make contact with said contact-pieces in the travel of the car, to establish a circuit.

3. An electrical contact device for use on cars comprising, in combination with contact-pieces located exterior to the car, pivoted arms carried by the car each of which has a conductor-wire extending into the same, and metallic brushes removably secured in said arms, and a spring carried by said brushes

and in electrical contact therewith and adapted to bear against the end of said conductor-wire when the brushes are secured in position, said brushes being adapted to make contact with
5 said contact-pieces in the travel of the car, to establish a circuit.

4. An electrical contact device for use on cars comprising, in combination with contact-pieces located exterior to the car, pivoted
10 arms carried by the car and having metallic brushes mounted therein adapted to make contact with said contact-pieces in the travel of the car, and wires electrically connected to said brushes and leading through said arms
15 into the car and arranged in circuit with a battery carried by the car.

5. An electrical contact device for electric cars, comprising, in combination with a conductor, a contact-bridge carrying two parallel
20 contact rails or wires located on opposite sides of said conductor, a member carried by the car and adapted to maintain electrical contact with said conductor, spring-controlled pivoted arms carried by said member, and brushes
25 mounted in said arms and adapted to make contact with said rails in the travel of the car, to establish a circuit.

6. An electrical contact device for use on electric cars and comprising, in combination
30 with the trolley-wire a contact-bridge carrying two parallel contact rails or wires and supported therefrom, spring-controlled pivoted arms mounted on the trolley-pole of the car, metallic brushes mounted in said arms and
35 adapted to make contact with said contact rails or wires in the travel of the car, and conductor - wires leading from said brushes through the trolley-pole to the car, and arranged to establish an electric circuit when
40 said brushes make contact with said contact rails or wires.

7. An electrical contact device of the character described, comprising, in combination

with the trolley, a ferrule thereon, and spring-controlled arms pivotally mounted in said ferrule and provided at their outer ends with contact-brushes. 45

8. An electrical contact device of the character described, comprising, in combination with the trolley-pole, a ferrule thereon, spring-controlled arms pivotally mounted in said ferrule, and contact-brushes removably secured in the outer ends of said arms. 50

9. An electrical contact device of the character described, comprising, in combination with the trolley-pole, a ferrule thereon, spring-controlled arms pivotally mounted in said ferrule, conductor - wires leading through the trolley and into said arms, and contact-brushes removably secured in said arms and adapted
60 to make electrical contact with said wires.

10. An electrical contact device for use on electric cars, comprising, in combination with the trolley-wire, and supported therefrom by insulators, a contact-bridge carrying two abutment-plates and two parallel contact-rails, two
65 guy - wires supporting said contact - bridge, abutment-plates with clamping devices to engage said guy-wires for supporting said contact-bridge, and spring-controlled arms pivotally mounted on the trolley of the car and carrying
70 brushes adapted to make contact with said contact-wires in the travel of the car, and wires in electrical contact with said brushes and leading through said arms to the trolley
75 and arranged to establish an electrical circuit when said brushes are in contact with said contact-rails.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 80

JEFFERSON D. KEEN.

Witnesses:

A. Z. BOYLE,

R. C. TWAY.