No. 763,223. PATENTED JUNE 21, 1904.

C. C. VANDER VALK.

SAFETY DEVICE FOR STRONG CURRENT OVERHEAD CONDUCTORS.

APPLICATION FILED SEPT. 10, 1903.

NO MODEL. 5 SHEETS—SHEET 1.

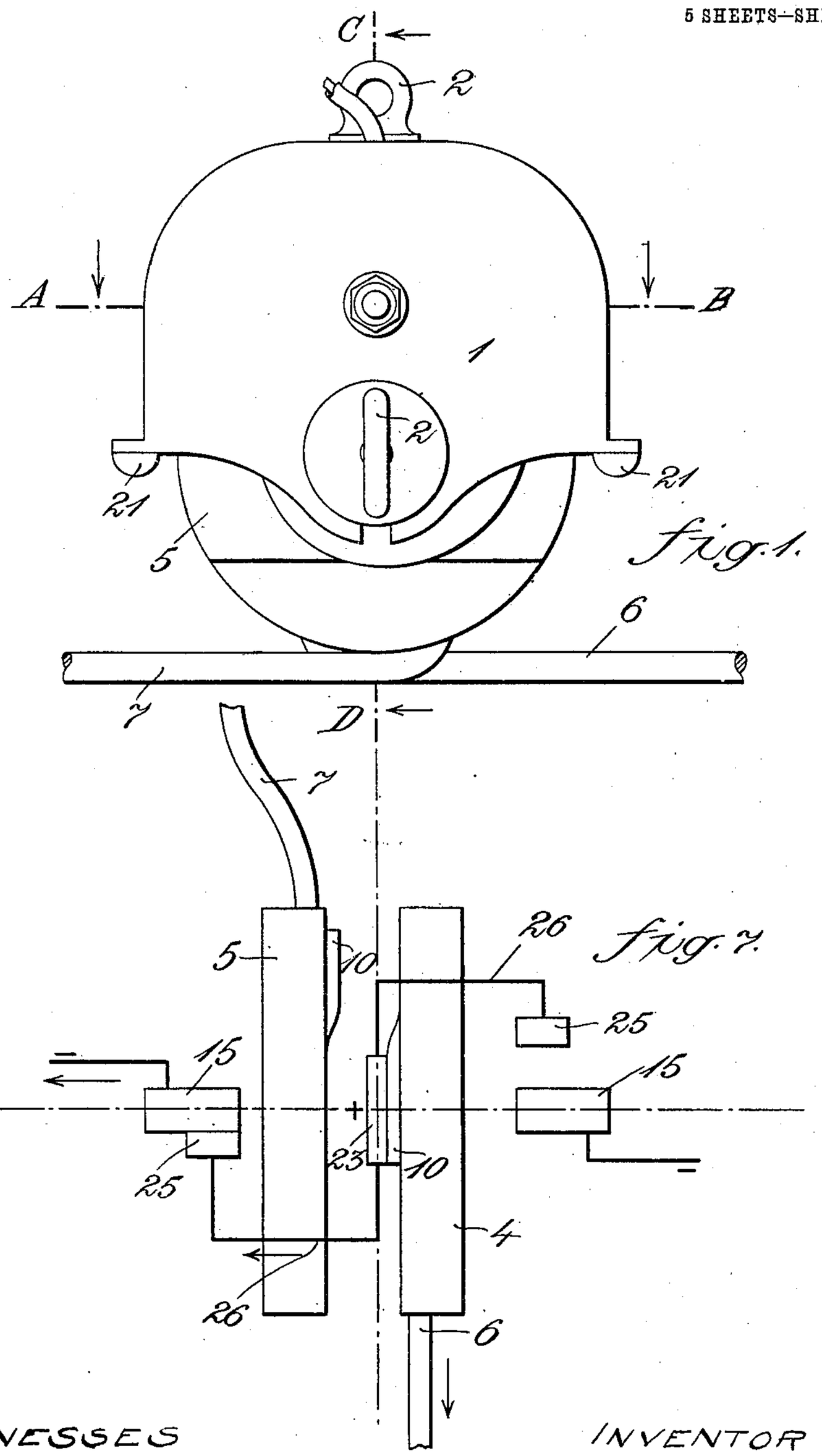

fig. 1.

fig. 2.

WITNESSES

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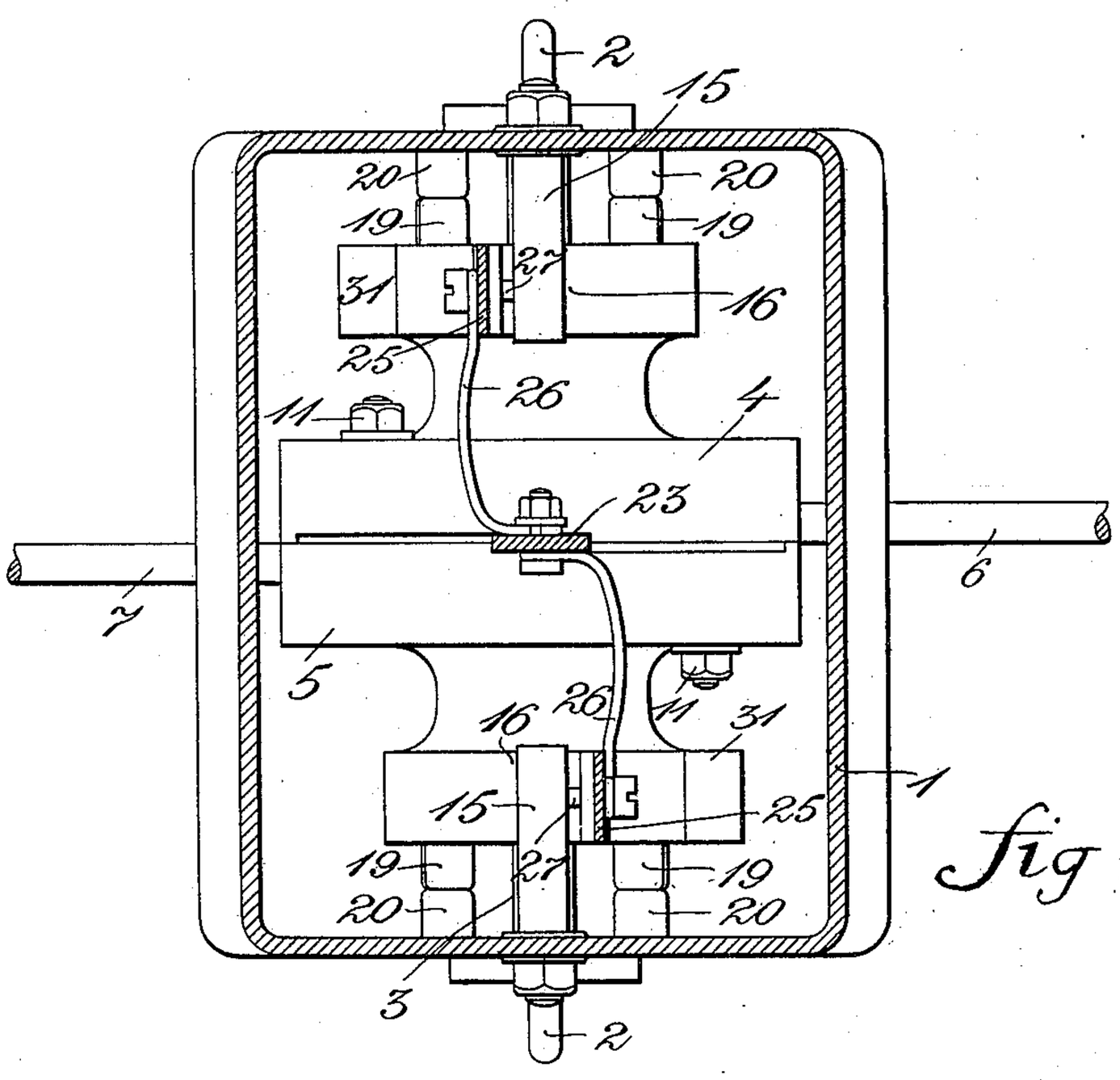

Fig 2

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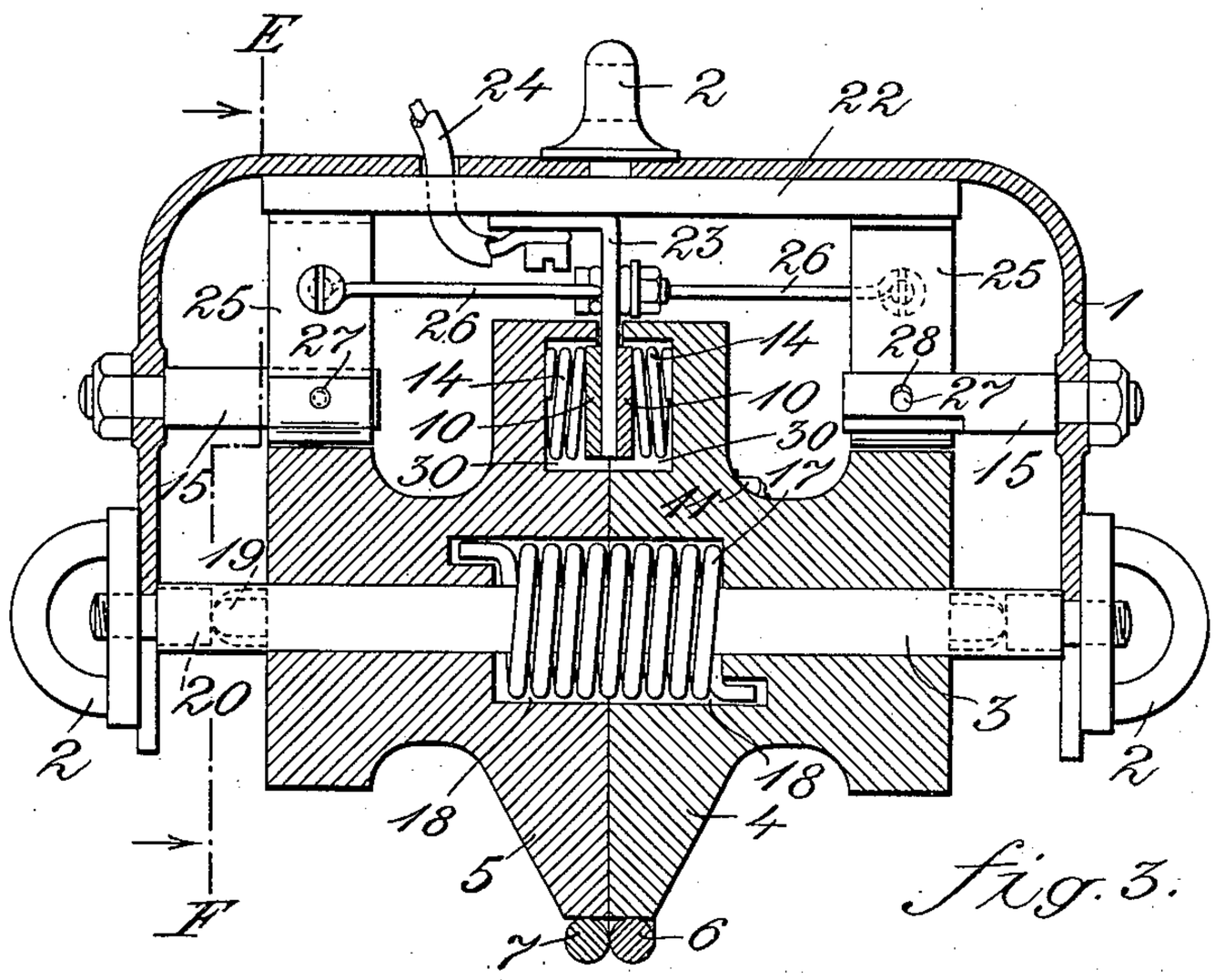

Fig. 3.

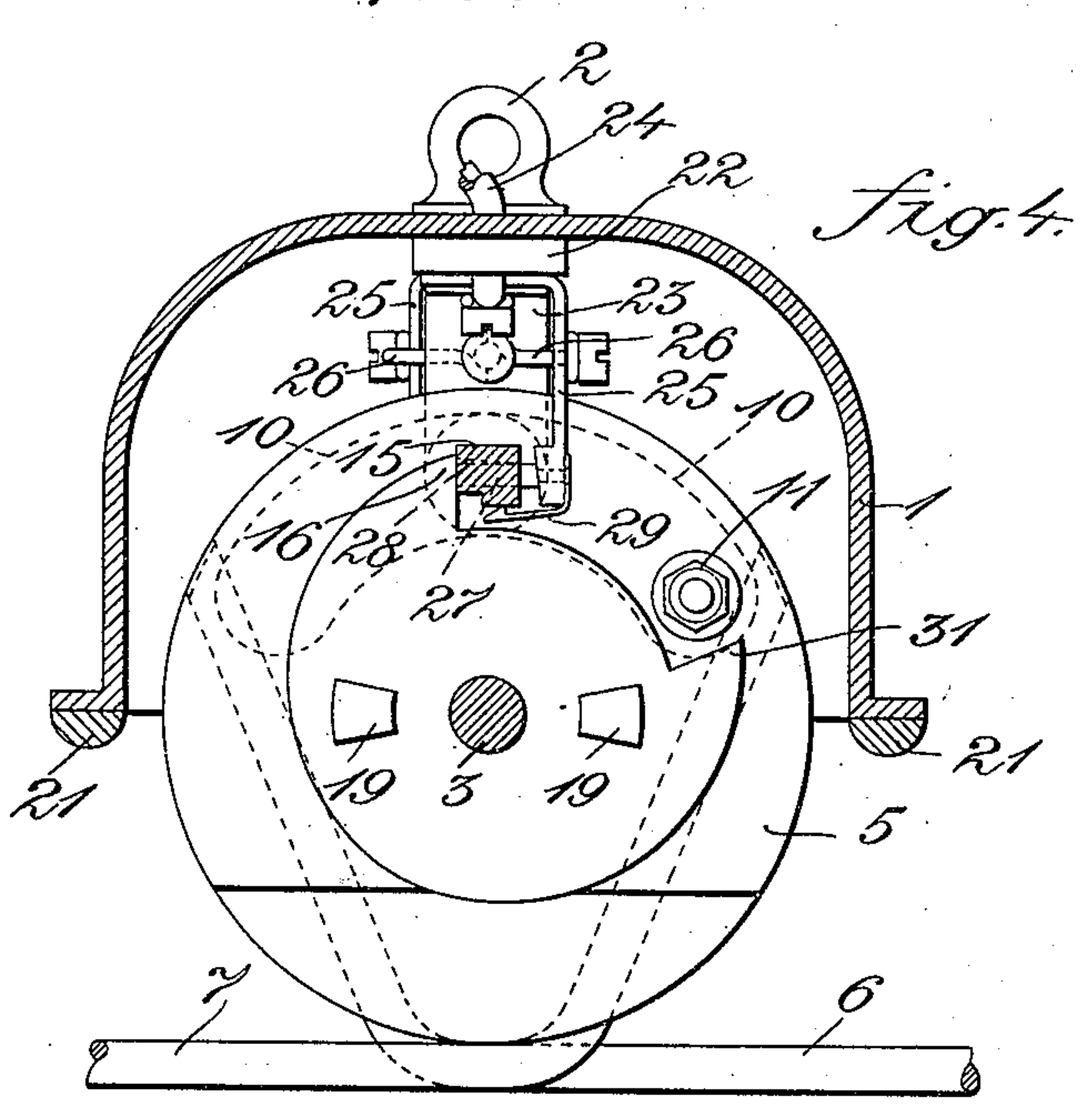

Fig. 4.

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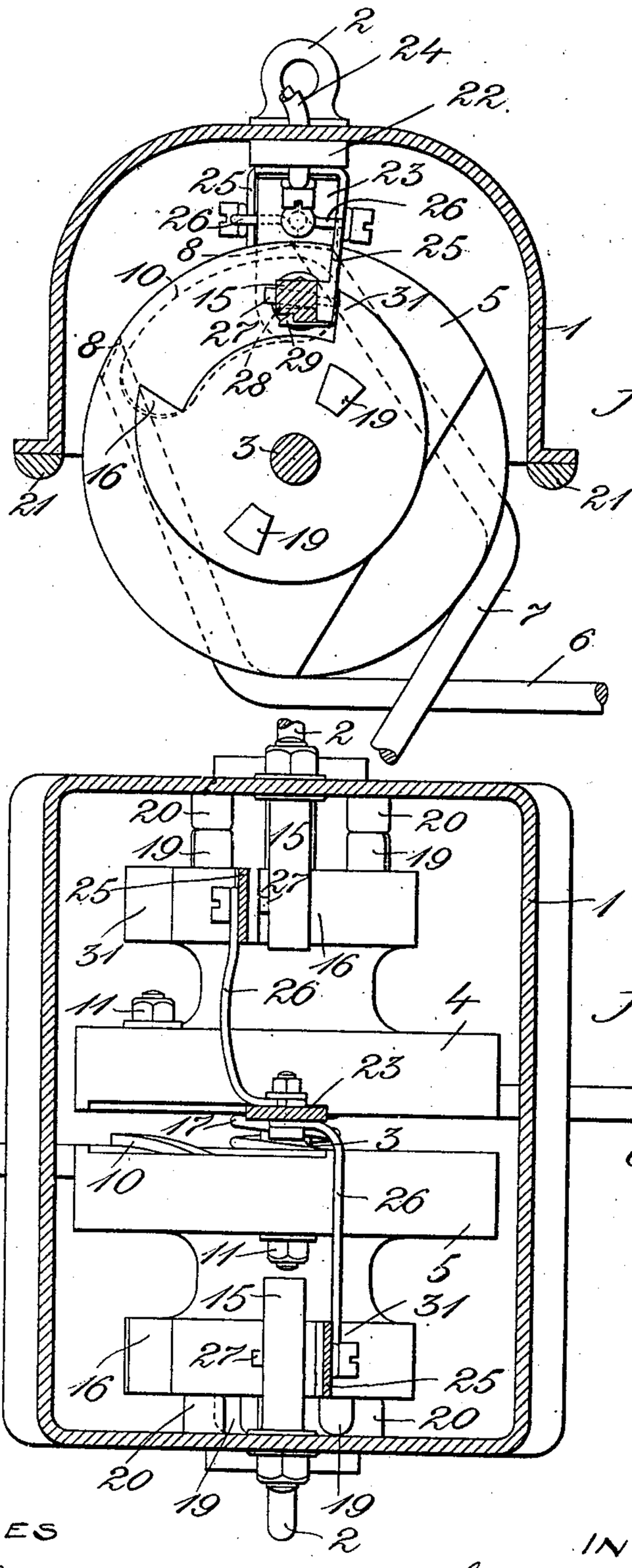

fig. 5.

fig. 6.

WITNESSES

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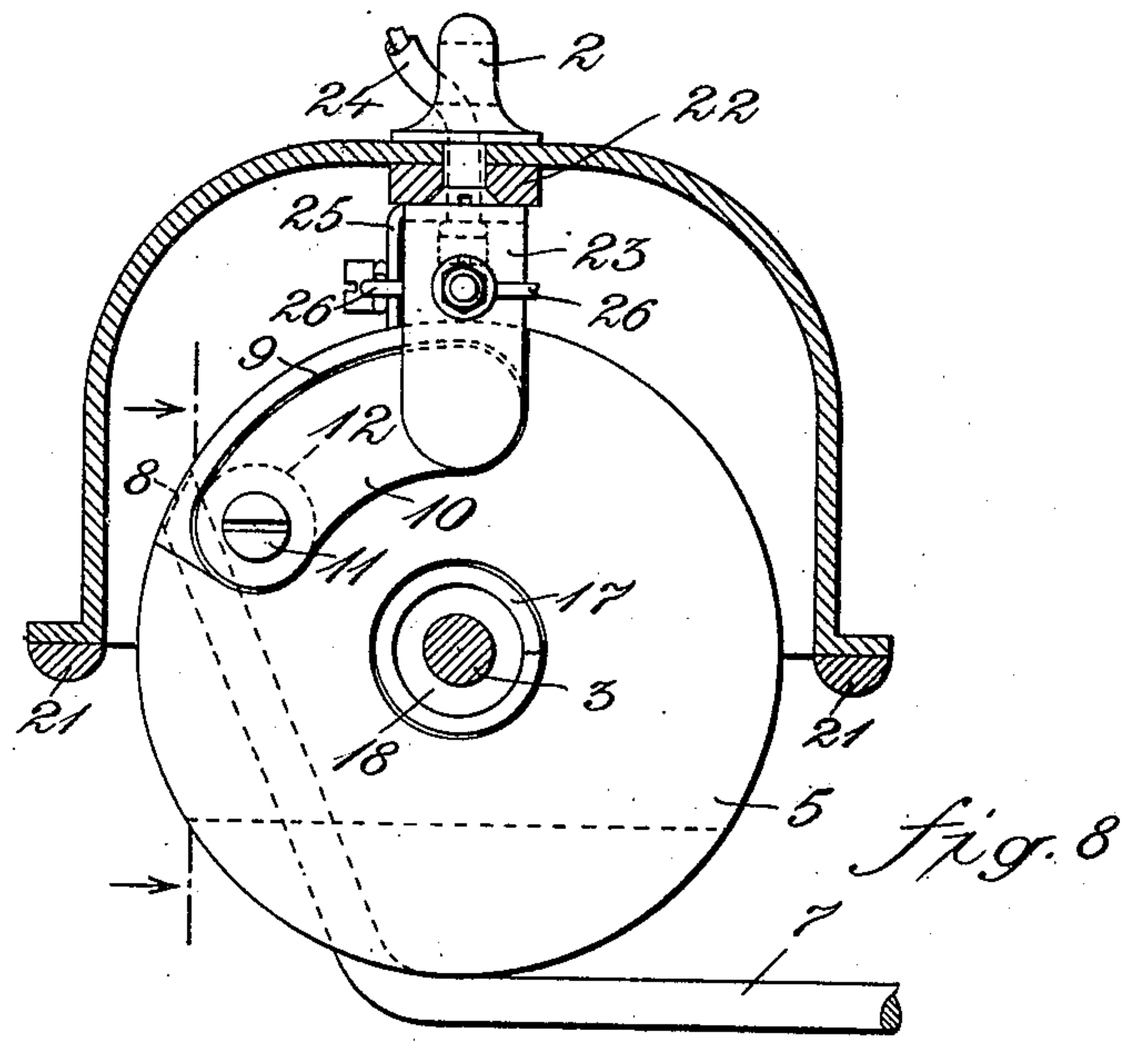

fig. 8

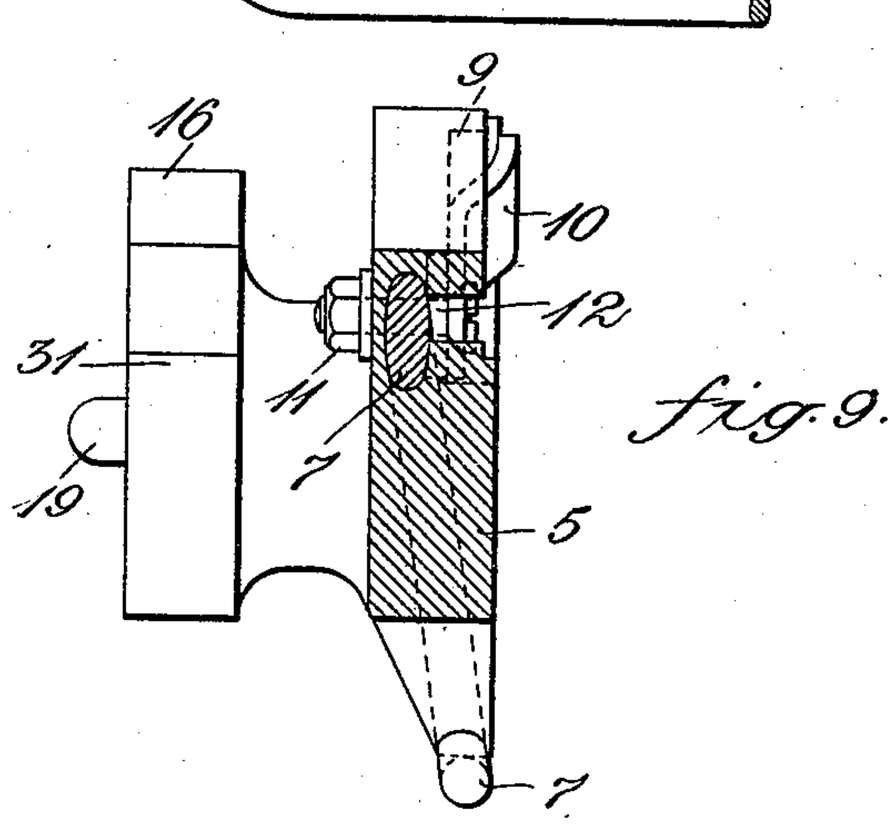

fig. 9.

WITNESSES

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No. 763,223. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

CHRISTIAN C. VAN DER VALK, OF VOORBURG, NEAR THE HAGUE, NETHERLANDS.

SAFETY DEVICE FOR STRONG-CURRENT OVERHEAD CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 763,223, dated June 21, 1904.

Application filed September 10, 1903. Serial No. 172,665. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN CORNELIS VAN DER VALK, a subject of the Queen of the Netherlands, residing at Voorburg, near The Hague, Netherlands, have made new and useful Improvements in Safety Devices for Strong-Current Overhead Conductors, of which the following is a specification.

The present invention relates to a safety device for strong-current overhead conductors; and its object is to prevent accidents occurring on a conductor breaking through the falling wire carrying the current coming in contact with men, animals, or objects.

The essential feature of the new safety device is that on the conductor breaking two contacts of the device are separated in consequence of the wire being no longer in a state of tension, so that no current flows through the broken wire connected with the device.

The invention is shown in the accompanying drawings, in which—

Figure 1 is an elevation of the device, the conductors being in a state of tension. Fig. 2 is a section on the line A B, and Fig. 3 a section on the line C D, of Fig. 1. Fig. 4 is a section on the line E F of Fig. 3. Fig. 5 is a view corresponding to Fig. 4, the one conductor being broken. Fig. 6 is a view corresponding to Fig. 2, the one conductor being in broken condition. Fig. 7 is a diagram illustrating the course of the current in Fig. 6. Figs. 8 and 9 are detail views of parts to be hereinafter referred to.

1 is a casing adapted to be secured to a conductor-pole or the like by means of the eyes 2 or other means.

3 is a shaft mounted inside the casing 1 and carrying two pulleys 4 5, of porcelain, ebonite, or like non-conducting material and capable both of rotating and axially sliding on the shaft. The conductor is divided into two parts 6 7 at the place where the device is inserted, and each of the two wires 6 7 is connected to one of the pulleys 4 5 by being introduced into a hole 8 in the same. The abutting sides of the pulleys are provided with recesses 9, each containing a contact-strip 10, of brass or the like. By means of a screw-bolt 11 one end of each brass strip 10 is pressed against the end of the wires 6 7, respectively, a metal washer 12 being inserted, if desired. The other end of each brass strip 10 is pressed, by means of a spring 14, located in the recesses 9, against a contact-strip 23, which is secured to a non-conducting fillet 22 of the casing 1 and connected to the feeder 24, conducting to the device and supplying the line with current. The connection of the strip 10 to the wire end 6 (or 7) by means of a screw-bolt 11 renders soldering of the parts unnecessary. If there is no feeder 24, the contact-strip 23 is dispensed with and the strips 10 pressed together at their free ends.

The conductors 6 7 are secured to the pulleys 4 5 in such manner that the latter when the conductors are in a state of tension have the tendency to turn in opposite directions. Such rotation of the pulleys is limited by pins 15 on the casing 1, against which the shoulders 16 of the pulleys abut. When the conductors 6 7 are in taut condition, the free ends of the strips 10 lie one against the other, Fig. 4, so that the current passes from one conductor to the strip 10 connected with it, thence to the other strip 10, and finally through the conductor connected to the latter.

A powerful spiral spring 17, located in central recesses 18 in the pulleys 4 5, tends to turn the latter in directions opposite to those in which the taut conductors 6 7 tend to rotate them and at the same time endeavors to force the pulleys apart in axial direction.

The pulleys are prevented from turning by the tension of the conductors, and the axial sliding is hindered by projections or blocks 19 on the pulleys which abut against counter-blocks 20 on the casing 1.

To prevent the conductors 6 7 contacting with the casing 1, the lip of the latter may be provided with strips 21 of non-conducting material.

The manner of operation of the device is as follows: If one of the conductors 6 7 breaks, the pulley 4 or 5 connected with such conductor will be rotated by the spiral spring 17, and immediately the block 19 has slid off the block 20 the said pulley will also slide on its

shaft 3, so that the contact-strips 10 are separated and the broken conductor removed from the other one. The extent of rotation of the pulley is limited by the shoulder 31, which strikes the pin 15 of the casing 1. The broken conductor is thus entirely disconnected from the remaining conductor and no current passes through it, so that all danger is avoided of the falling wire injuring persons or animals or damaging objects by electric current passing through it.

To provide for cases in which owing to the above-described device failing to act electrical contact remains between the unruptured and the broken part of the line, a special device is provided. On the conductor breaking this second device causes a contact connected to the undisturbed part of the line, in consequence of the broken part being no longer in a state of tension, to make electrical connection with a contact connected to the earth-line. In this manner even when the first-described device fails to act the current will not flow through the broken conductor and thence through a person or the like struck by the same, for the current will flow to earth over the path of least resistance—that is, it will flow through the two contacts, which, as just above mentioned, are closed on rupture of the conductor and thence through the wire which grounds one of these contacts. By this means also the rupture of the conductor will be indicated by the safety devices at the central station in consequence of the short-circuiting which occurs, so that the damaged conductor can be at once repaired.

In addition to the contact-strip 23 two contact-springs 25 are secured to the insulating-fillet 22, and both of these springs in consequence of its resilience endeavors to bear against one of the pins 15, which are provided to limit rotation of the pulleys 4 5 and which may advantageously be of square section. Each of the pins 15 acts as contact and is connected by the casing 1, the eyes of the latter, the pole, &c., with the earth or with the tram-rails. The contact-springs 25 are connected with the contact-strip 23 of the feeder by wires 26.

When the conductors 6 7 are unbroken, the shoulder 16 of the pulleys 4 5 bears against the corresponding pin 15. Each spring 25 carries a pin 27, of insulating material, passing through a hole 28 of the pin and pressing against the shoulder 16, so as to prevent the spring 25 contacting with the pin 15, Fig. 4.

Immediately the conductor (for example, the wire 7) breaks the pulley 5 will rotate, so that the shoulder 16 is removed from the pin 15, whereby the pin 27 loses its support, and the spring 25 will by reason of its resilience press against the pin 15, Fig. 5, whereby electrical contact is established. This contact between the parts 15 25 is insured by the shoulder 31 of the pulley 5 abutting against the spring 25. Proper contact is further insured by a catch 29, of insulating material, which is secured to the spring 25 and engages behind the pin 15. Naturally the catch may be secured to the pin 15 and grip behind the spring 25, if such construction be preferred. Thus the current, as Fig. 7 shows, will in this case flow from the contact-strip 23 of the feeder through the wire 26 on the left of Fig 7, then through the casing 1 and through the suspension means and line or other suitable conductor to earth or to the tram-rails.

The contact-spring 25 may also be so constructed that it remains apart from the pin 15 in uninterrupted condition of the conductors 6 7 without the employment of the pin 27 and on operation of the device is brought in contact with the pin 15 by the shoulder 31. The arrangement of the pin 27 above described, however, is to be preferred, since contact between the parts 15 25 results also in consequence of very slight rotation of the pulley 5—that is to say, when the latter has turned so far that the retreating shoulder 16 allows the pin 27 to pass through the hole 28 until the parts 15 25 strike together.

Should there be no feeder 24 and contact strip 23, each contact-spring 25 which is set in operation by one of the pulleys 4 5 will be connected by the wire 26 with the contact-strip 10 or conductor 6 or 7 of the other pulley. In this case on one of the wires 6 7 breaking the current will not pass from the contact-strip 23 connected with the feeder, but from the unruptured wire 6 or 7 and the contact-strip 10 connected with such, in the manner described—that is to say, through the wire 26, contacts 25 and 15, casing 1, &c., to earth.

Instead of a spring 25 insulated from the casing 1 being provided the contact 25 may be connected directly to the pulley 4 or 5 and on rotation or axial sliding of the pulley be brought in connection with a suitable contact 15 on the casing 1.

Having thus described my invention, I declare that what I claim, and desire to secure by Letters Patent, is—

1. In strong-current overhead lines, the combination of a casing, a shaft mounted in the same, two pulleys turning and sliding axially on said shaft and each having attached to it an end of the divided conductor, mutually-abutting contact-pieces on the pulleys, each connected with one of the conductor ends, stops on the casing preventing rotation of the pulleys by the conductors, a spring acting on the pulleys counter to the pull of the conductor and tending to separate the abutting contact-pieces by axially sliding the pulleys, and stops preventing such sliding when the conductors are unruptured, all substantially as described.

2. In strong-current overhead lines, the combination of a casing, a shaft mounted in the same, two pulleys turning and sliding axi-

ally on said shaft, and each having attached to it an end of the divided conductor, contact-pieces on the pulleys, each connected with one of the conductor ends, a contact-strip connected with the feeder held between said contact-pieces, stops on the casings preventing rotation of the pulleys by the conductors, a spring acting on the pulleys counter to the pull of the conductors and tending to separate the feeder and contact-pieces by axially sliding the pulleys, and stops preventing such sliding when the conductors are unruptured, all substantially as described.

3. In strong-current overhead lines, the combination of a casing, a shaft mounted in the same, two pulleys turning and sliding axially on said shaft and each having attached to it an end of the divided conductor, mutually-abutting spring-controlled contact-pieces on the pulleys, a screw connecting each of said contact-pieces with the adjacent conductor end, stops on the casing preventing rotation of the pulleys by the conductors, a spring acting on the pulleys counter to the pull of the conductors and tending to separate the abutting contact-pieces by axially sliding the pulleys, and stops preventing such sliding when the conductors are unruptured, all substantially as described.

4. In strong-current overhead lines, the combination of a casing, a shaft mounted in the same, two pulleys turning and sliding axially on said shaft and each having attached to it an end of the divided conductor, mutually-abutting contact-pieces on the pulleys, each connected with one of the conductor ends, grounded stops on the casing, preventing rotation of the pulleys by the conductors, a spring acting on the pulleys counter to the pull of the conductors and tending to separate the abutting contact-pieces by axially sliding the pulleys, stops preventing such sliding when the conductors are unruptured, and a second pair of contact-pieces in electrical connection with the conductor ends and making electrical contact with the grounded stops on rupture of the conductor, all substantially as described.

5. In strong-current overhead lines, the combination of a casing, a shaft mounted in the same, two pulleys turning and sliding axially on said shaft and each having attached to it an end of the divided conductor, mutually-abutting contact-pieces on the pulleys, each connected with one of the conductor ends, grounded stops on the casing preventing rotation of the pulleys by the conductors, a spring acting on the pulleys counter to the pull of the conductors and tending to separate the abutting contact-pieces by axially sliding the pulleys, stops preventing such sliding when the conductors are unruptured, contact-springs insulated from the casing and in electrical connection with the conductor ends and making electrical contact with the grounded stops on rupture of the conductor, and means 29 for locking the said contact-springs and grounded stops after contact, all substantially as described.

In witness whereof I have hereunto signed my name, this 24th day of August, 1903, in the presence of two subscribing witnesses.

CHRISTIAN C. VAN DER VALK.

Witnesses:

AUGUST SIEGFRIED DOCEN,

HENRI JEAN ARNAUD BOISSEVAIN.