

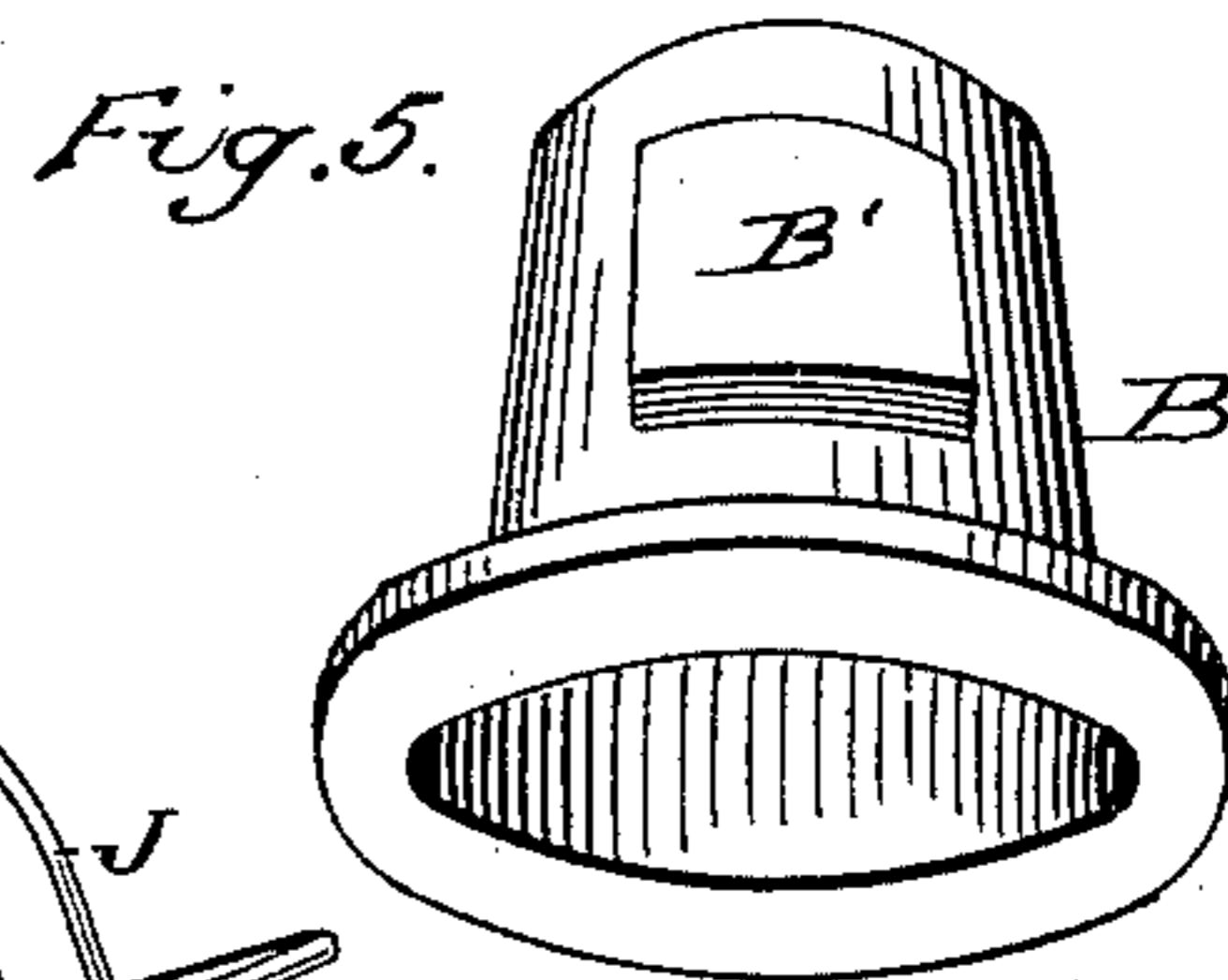
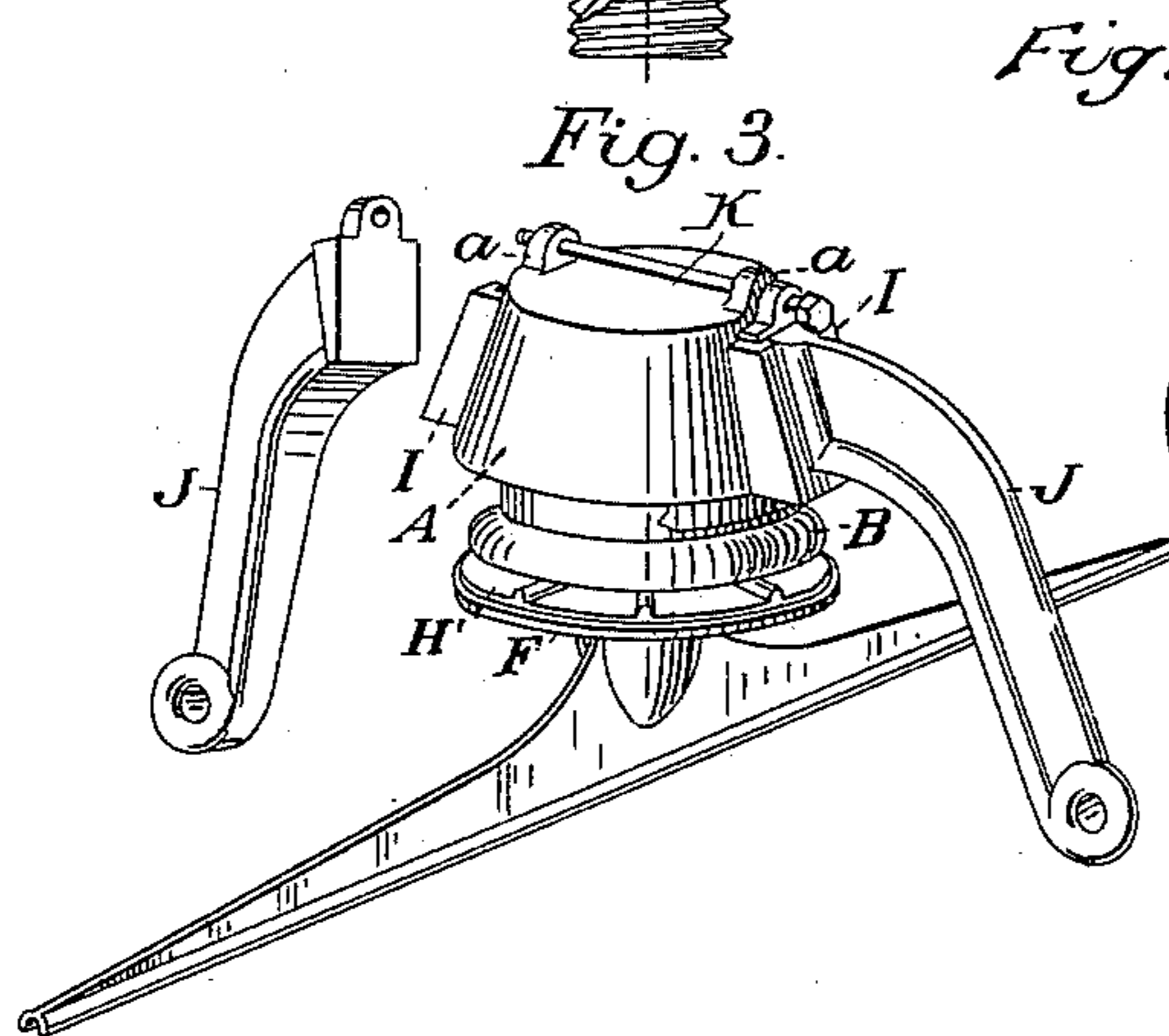
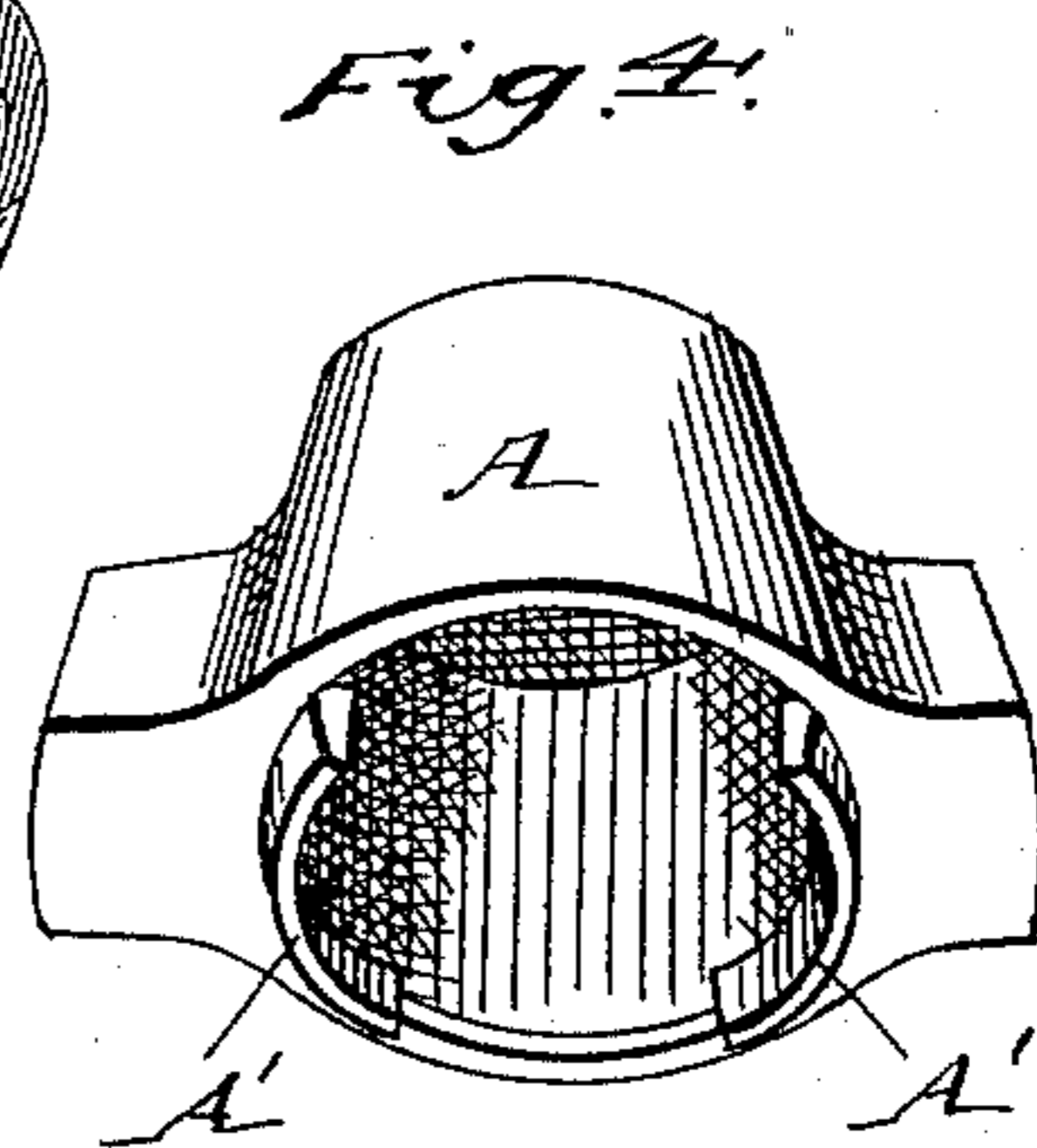
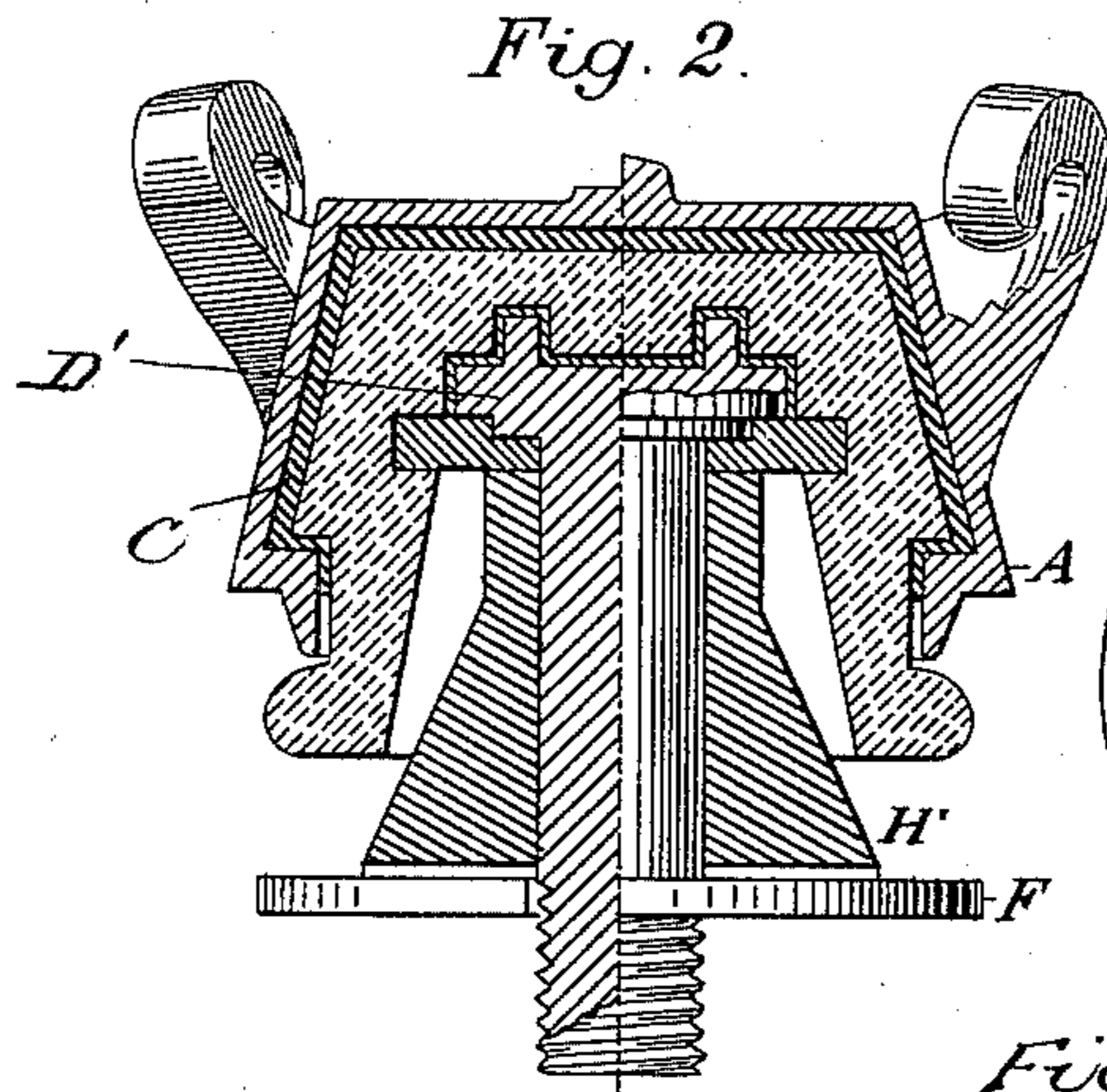
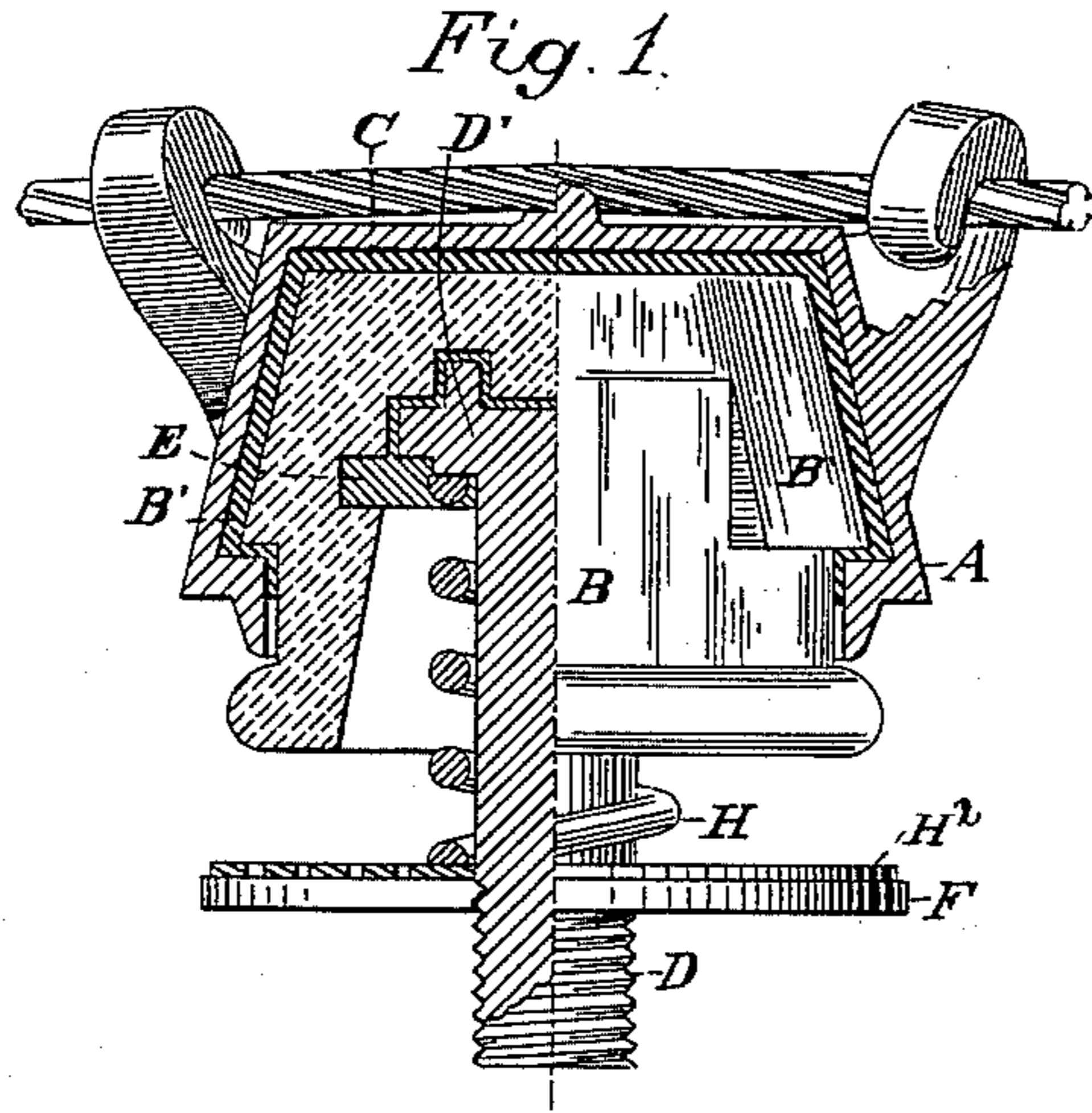
No. 612,929.

Patented Oct. 25, 1898.

W. C. KEITHLY.
INSULATOR AND HANGER FOR ELECTRIC RAILWAYS.

(Application filed Jan. 26, 1898.)

(No Model.)



Witnesses,
J. H. Stone
E. A. Brandau

Inventor,
Willie C. Keithly
By *Dewey Strong & Co.*
attys

UNITED STATES PATENT OFFICE.

WILLIE C. KEITHLY, OF SAN FRANCISCO, CALIFORNIA.

INSULATOR AND HANGER FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 612,929, dated October 25, 1898.

Application filed January 26, 1898. Serial No. 668,048. (No model.)

To all whom it may concern:

Be it known that I, WILLIE C. KEITHLY, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Insulators and Hangers for Electric Railways; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in insulators and hangers by which the trolley-wires of electric railways are suspended.

It consists, essentially, of an improved construction of the porcelain insulator and means for securing it within the exterior metal cap, means for securing the bolt from which the trolley-wire is suspended within the interior of the insulator, means for protecting the insulator from damage by the upward spring of the trolley-pole, and means for suspending the whole device and in details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is an interior view of the device. Fig. 2 is a vertical section showing a modification. Fig. 3 is a perspective view. Fig. 4 is a perspective view of the cup. Fig. 5 is a perspective view of the insulator removed.

The object of my present invention is, first, to secure the porcelain insulators within the exterior metal cup of the hanger in such a manner that in case of the insulator becoming cracked the insulating compound, by which it is surrounded, will still prevent loss of current in that direction, and, secondly, in a novel means for securing the metal bolt within the insulated cup and a spring-pressed plate or equivalent elastic rubber cone by which the danger of breakage of the insulator by a sudden stroke of the trolley-pole is avoided.

The exterior metal cup A is made, as here shown, conical in shape, and the interior has inwardly-projecting lugs or flanges A' upon the opposite sides, as shown in Fig. 4. The hollow porcelain insulator B has a similar exterior shape, but not entirely filling the interior of the cup. It also has lugs B', which when turned at right angles with the lugs A' allow the insulator to be inserted into the interior of the metal cup. It may then

be turned so that the lugs B' are in line with the lugs A', and it will thus be prevented from being pulled out. There will be, as shown, a space entirely around this insulator, and this space is filled with any suitable hard insulating compound C, which will prevent any contact of the porcelain insulator with the metal, so that if by accident the insulator should become cracked the exterior compound surrounding it will still prevent any escape of the electric current through the walls of the cup and cap. The insulator is made of porcelain, cast, as here shown, with an exterior projecting bead or flange at the bottom, which stands slightly below the bottom of the conical cap. The interior of the porcelain cup B has channels made in it in the bottom, and also an annular horizontally-grooved channel E.

D is the metal bolt, having a head shaped as shown at D' and approximately fitting the bottom of the porcelain cup, but leaving a sufficient space around it for a metal filling, which may be any soft easily-fusible metal.

H is a spring surrounding the bolt. The inner end rests against the head of the bolt, and when the metal is poured into the cup it flows around the bolt-head and the inner end of the spring and, filling the grooves and channels, forms a perfect lock to hold the bolt and spring in position.

F is a metal plate centrally bored to fit upon the bolt D, and its upper surface contacts against the spring H, the plate being held in place by the bolt D when it is screwed into the lug on the trolley-wire.

In some cases I have found it advisable to substitute an elastic rubber cone H' for the spiral spring. In this case the cone diverges downwardly and outwardly, so that its base rests upon the plate F. A circular rubber washer H² may be used with the spiral spring, if desired, in place of cone H'. This plate may be made with perforations through it, and the cone or rubber washer may have ribs formed radially, transversely, or otherwise on the upper surface, so that there will be an air-space between the rubber and the surface of the plate.

The divergence of the cone serves as a watershed in case of rain. The object of the spring and plate is to present the plate down-

wardly, so that in case there should be any sudden upward blow of the trolley, which might otherwise strike the insulator if it should become disengaged from the wire, it will by this device strike the plate, and the elastic spring above the plate relieves the shock and largely prevents the danger of breakage of the insulator.

The metal cap is here shown as having exterior channeled lugs upon opposite sides, as shown at I.

J are arms having ends made to slip into and interlock with the grooved channels of the lugs, these arms projecting downwardly and outwardly and having holes or other connections at the lower and outer ends for the attachment of the transverse wires which support the hangers at points where the trolley-wire is to pass around curves.

The object in having the hanger-arm carried downwardly, as shown, is to bring the connection with the transverse wire approximately opposite to the trolley-wire itself, so that if a single transverse connected wire is employed exterior to the curve the pull upon it will be essentially in the line of the trolley-wire, which will pull in the opposite direction as it passes around the curve, and this serves to retain the hanger in a vertical position, preventing it from tipping over on account of the side strain.

If it be found desirable to use two of the arms J, they are fitted into the channeled lugs upon the opposite side of the cap, and both may be secured by a single bolt passing through holes made in the upper ends of the arms J, one of said openings being screw-threaded, and a screw-threaded bolt K may pass through the hole from one side and screw into the one upon the opposite side.

Upwardly-projecting lugs *a* upon opposite sides of the top of the cup and in line with the holes in the arms are perforated, so that the bolt will also pass through these lugs, and the arms are thus locked to the cap, but can at any time be easily removed by removing the bolt. The arms J can also be secured by single locking-screws, taking the place of the longer bolt.

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

1. An insulator and hanger for electric railways consisting of a hollow cap substantially in the form of a frustum of a cone having interior lugs, a correspondingly-shaped hollow insulator with exterior lugs adapted to engage those of the cap, said insulator having a less diameter than the interior of the cap and a filling of insulating compound surrounding the insulator within the channel thus formed.

2. An insulator and hanger for electric railways consisting of a hollow cap substantially in the form of a frustum of a cone, having interior lugs, a correspondingly-shaped insulator having lugs upon the exterior adapted to engage and lock with those of the interior

of the cap when the insulator is turned, a filling of insulating compound surrounding the insulator between it and the exterior cap, and a bolt centrally secured within the insulator and depending therefrom for the attachment of a trolley-wire.

3. An insulator and holder for electric railways consisting of a cap substantially in the form of a frustum of a cone, an insulator fitting and secured within said cap, said insulator having interior grooves or channels, a bolt having a head approximately fitting said grooves or channels and a metal filling for the grooves and channels in which the head of the bolt is embedded and locked.

4. An insulator for the hangers of electric railways consisting of a hollow porcelain cap, an exterior metal cap and means for locking the insulator within said cap with a surrounding insulating compound, a hanger-bolt having projecting flanges upon its head, corresponding grooves or channels within the insulator into which said head is fitted, and a surrounding body of metal in which the head is embedded, and by which it is locked within the insulator.

5. An insulator and hanger for electric railways of the character described, having a depending bolt, the upper end of which is locked within the insulator, a protecting-plate surrounding said bolt below the insulator and an elastic spring interposed between the plate and the insulator.

6. An insulator and hanger for electric railways of the character described having a bolt centrally fixed to the interior and depending below the bottom of the insulator, a plate surrounding said bolt having a diameter sufficient to protect the insulator from upward blows, a spring interposed between the plate and the insulator surrounding the bolt and diverging outwardly toward the periphery of the plate.

7. In an insulator and hanger of the character described a bolt having the upper end secured within the interior of the insulator, a protecting disk or plate surrounding the bolt below the insulator, a conical diverging elastic spring surrounding the bolt resting upon the plate, said plate having ribs and perforations whereby a current of air may be admitted between it and the spring.

8. An insulator or hanger for electric railways comprising an insulator with depending bolt fixed therein, an exterior cap within which the insulator is secured, said cap having channeled lugs upon opposite sides, arms, the upper ends of which are adapted to interlock with said lugs, the lower ends having attachments for transverse wires approximately in line with the suspended trolley-wire.

9. In an insulator and hanger for electric railways of the character described, the exterior metal cap having channeled lugs upon the opposite sides and arms, the upper ends of which are formed to interlock with the channels of said lugs, the lower ends having

attachments for transverse supporting-wires
approximately in line with the suspending
trolley-wire, means for detachably securing
the arms to the cap consisting of screws or
5 bolts passing through holes in the arms and
interlocking with the cap substantially as de-
scribed.

In witness whereof I have hereunto set my
hand.

WILLIE C. KEITHLY.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.