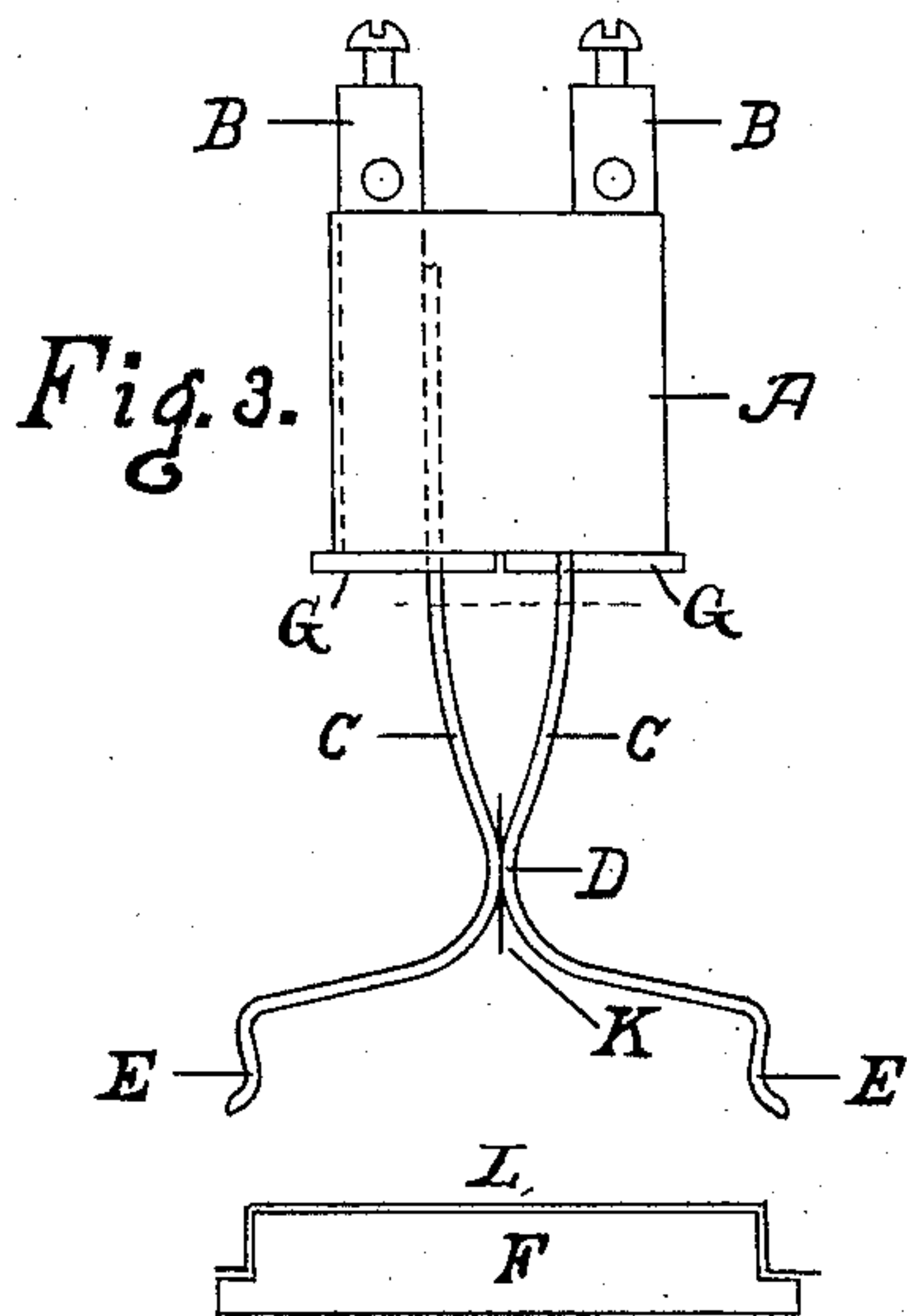
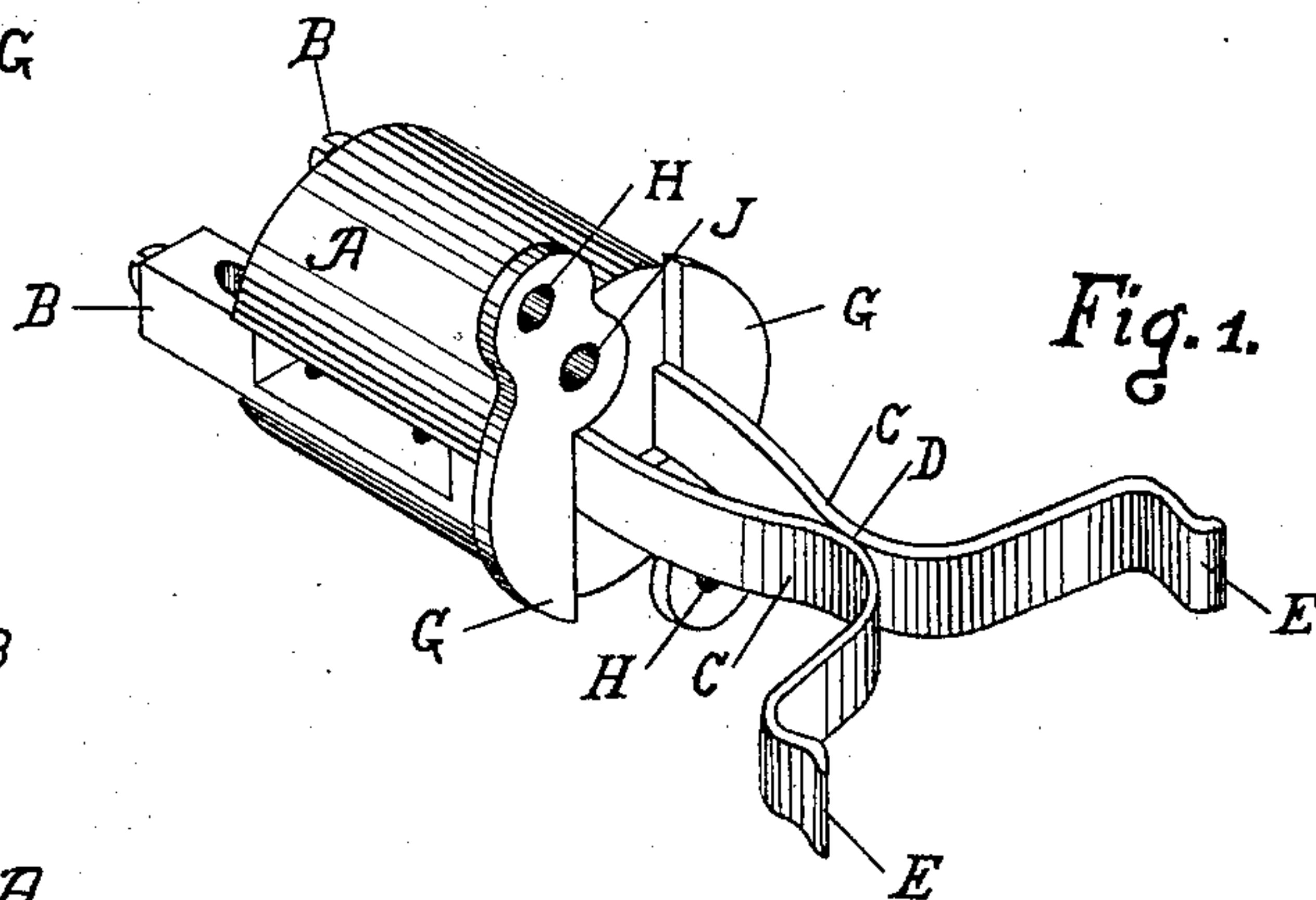
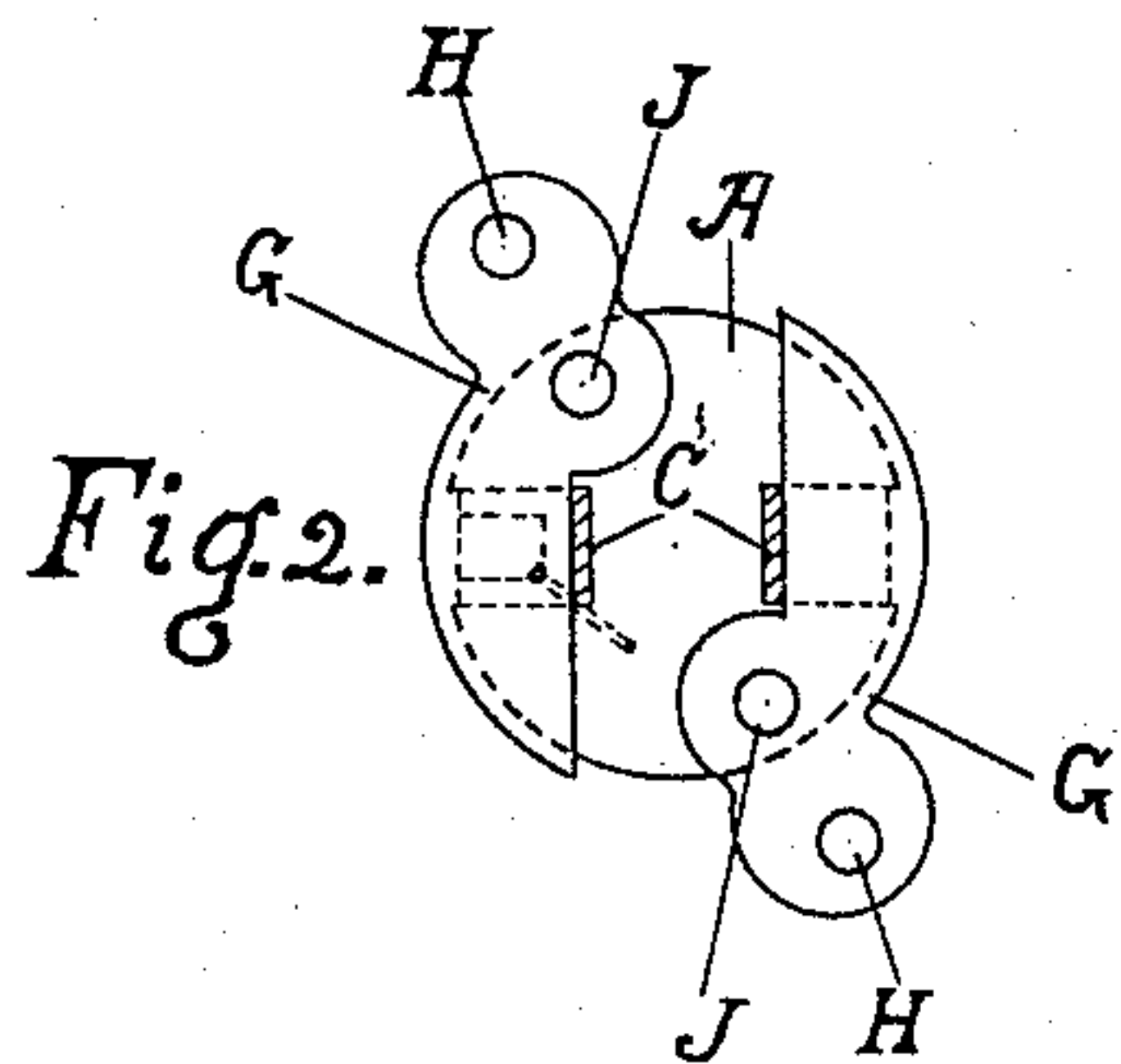


(No Model.)

J. W. SEE.
LIGHTNING ARRESTER.

No. 407,454.

Patented July 23, 1889.



James W. See

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LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 407,454, dated July 23, 1889.

Application filed February 18, 1889. Serial No. 300,312. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. SEE, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

This invention has to do with lightning-arresters intended for use in connection with telephone and telegraph lines and the like, and adapted upon the passage of the intense currents due to a lightning-stroke to either short-circuit the current to earth or to open the circuit, so as to prevent the passage of the damaging current beyond the point of application of the arrester.

My improved lightning-arrester is adapted for use with a single line, and groups of the arresters may be arranged and added to at will to suit lines in numbers.

The invention will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a lightning-arrester exemplifying my improvements; Fig. 2, an end elevation of the same, showing the springs in vertical transverse section; and Fig. 3, a plan of the same, showing paper-resistance D in place and showing foil-block F detached.

In the drawings, A indicates a cylindrical plug of wood or hard rubber or analogous insulating material; B, a pair of binding-posts attached to the plug and projecting from the rear end thereof and presenting themselves at the front end thereof, these binding-posts being illustrated as consisting of square pieces of metal tacked into longitudinal grooves in the periphery of the plug, the binding-posts being provided at their projecting end with ordinary wire-receiving features; C, a pair of flexible springs projecting forwardly from the plug, each electrically connected at its rear end with one of the binding-posts, the drawings showing the binding-posts as having square bodies seated in square grooves in the plug and connecting with the springs by clamping the rear ends of the springs between their inner faces and the backs of the grooves in the plug; D, a contact at the forward ends of the springs; E, a clip formed upon a side prolongation of the front end of

each of the springs; F, a block of wood or other non-conducting material adapted to be grasped by the clips E when the springs are separated, so as to be open at D; G, a metallic flange on the front end of each of the binding-posts, these flanges seating against the front end of the plug and projecting beyond the periphery of the plug to form a stop-flange thereto; H, a hole through each of the flanges G, adapted to permit the passage of an ordinary wood-screw; J, two holes extending endwise through the plug; K, a slip of paper or other insulating or high-resistance material interposed between the springs at the contact D, and L the foil-facing of the foil-block.

The device may be inserted in a hole in a board and held in place by wood-screws in the holes H. For a number of lines a group of the lightning-arresters—one for each line—may be secured in a properly-perforated board. Such boards so provided with lightning-arresters may be mounted on or alongside the operating-table of the telephone-exchange, or on the wall of the exchange or telegraph office, or on the house-top fixtures, or on the pole which supports the wires, or in the ordinary connection-box on the pole. Such perforated boards may, obviously, be arranged to receive any desired number of the lightning-arresters, and as many lightning-arresters may be immediately applied as are at present needed, and lightning-arresters may be added as occasion requires.

In employing the device the line to be protected is brought to one of the binding-posts B, and from there continued on to the instrument or elsewhere. The other binding-post is connected by wire to earth. Normally the springs make contact at D. Consequently, under the conditions recited, the line would be put to earth through the contact. A slip of paper or other thin piece of high-resistance material is now inserted between the springs at the contact D. This cuts off the earth-connection. A lightning-stroke, following the well-known law with such intense currents, will seek a short path through a high resistance rather than a short path through a low resistance, and will, instead of following the line beyond the lightning-arrester, cut through the paper slip to the opposite spring to find

its way to earth. The effect of the stroke will be to burn a minute hole in the paper; but the circuit will still be left open at the paper. This will be the case under ordinary circumstances; but a lightning-stroke of extra high tension will effect such a complete destruction of the paper between the springs that the springs will come into contact and close the circuit to earth. When this occurs, subsequent strokes will find direct metallic connection to earth through the spring-contacts; but obviously a metallic connection has been established which may interfere with the proper action of the line and instruments. After the storm a new paper will be inserted at the contact. In practice I have found that a slight shifting of the paper is all that is necessary to destroy the short-circuiting at the contact. The papers may, if desired, be utilized as a lightning-record. The papers before insertion may bear the line-numbers, and after a storm they may be removed and dated and replaced by new papers properly numbered. The perforations in the paper indicate in a general way the lightning effects. They at least show what lines among a group receive strokes sufficient to perforate the papers and which lines do not, and the character of the perforations gives some information as to the comparative force of the discharges. In some localities where, while making automatic provision for safety from lightning-strokes, it is the practice to at once connect all lines with earth upon the approach of a heavy storm the present device is of special value. The papers furnish the automatic protection, and upon the approach of the storm the papers may be removed, leaving the line in metallic connection with earth.

In some cases, where these arresters are mounted in perforated boards, it may be desirable to make the connections at the rear of the board by wires coming up at the rear of the boards, or by wires coming up at the front of the board; or it may be desired to make the connection at the front of the boards by wires coming up the front of the board or up the rear of the board. If the wires come up the rear of the board and rear connection is wanted, they are inserted directly in the rear ends of the binding-posts B. If the wires come up the rear of the board and a front connection is wanted, the wires are passed forwardly through the holes J and their ends are put under the wood-screws, which will be inserted in the holes J and screwed into the board to hold the lightning-arrester in place. If the wires come up the front of the board and a front connection is wanted, the ends of the wires will be held direct by the screws, which will be in the holes H. If the wires come up the front of the boards and a rear connection is wanted, the wires will be passed rearwardly through the holes J, and their ends connected into the rear ends of the binding-posts B.

Thus far explanation has been made only

of the device when employed as a means for branching the line to earth as a measure of protection. Some electricians are strongly in favor of the "safety-catch" system, in which the destructible section inserted directly in the line is caused to be destroyed by the effect of damaging currents, and thus effect an absolute cut-off of the line. Safety-catches are often constructed by inserted in the line two spring-clips holding a piece of wood or similar non-conductor between them, this piece of wood being covered by gold-foil. Ordinary currents find a conductor in the gold-foil; but damaging currents destroy the foil and open the line, which remains open until the foil is restored. My improved lightning-arrester provides also for this system of protection.

It is the ordinary foil-block in common use, and it is to be covered or provided, as usual, with gold-foil or the like. This block, with its foil, when inserted between the clips E, opens the contact D. When the foil-block system is employed, the lightning-arrester is not to be connected to earth. The line is brought to one of the binding-posts B and continued on from the other binding-post. Consequently the foil on the block forms an essential part of the circuit. The damaging current destroys the foil and leaves the line open. The line may be restored to working condition by restoring the foil, or the line may be permanently or temporarily at once restored to continuity by removing the foil-block and permitting the contact D to close.

I claim as my invention—

1. In a lightning-arrester, the combination, substantially as set forth, of a cylindrical plug of insulating material, a pair of binding-posts rigidly attached thereto, and a pair of metallic springs mounted on said block and adapted to make contact with each other and connected one to each of said binding-posts.

2. In a lightning-arrester, the combination, substantially as set forth, of a cylindrical plug of insulating material, a pair of binding-posts attached thereto, and a pair of metallic springs tending toward each other and connected one to each binding-post and provided with side extensions having clips.

3. In a lightning-arrester, the combination, substantially as set forth, of a cylindrical plug of insulating material, a pair of binding-posts attached thereto, and a pair of metallic springs adapted to make contact with each other and provided with side extensions having clips and connected one with each of the binding-posts.

4. In a lightning-arrester, the combination, substantially as set forth, of a cylindrical plug of insulating material, a pair of binding-posts disposed within said plug and projecting to the rear thereof, and a pair of metallic springs tending toward each other and connected one with each of the binding-posts and projecting from the front of the plug.

5. In a lightning-arrester, the combination, substantially as set forth, of a plug of insulating material provided with two longitudinal grooves, a binding-post secured in each 5 of said grooves, and a metallic spring clamped in each of said grooves between the binding-posts and plug.

6. In a lightning-arrester, the combination, substantially as set forth, of a plug of insulating material, a pair of binding-posts at- 10 tached thereto and projecting to the rear thereof, a metallic flange attached to each binding-post at the front of the plug and provided with a hole adapted to receive an at- 15 taching-screw, and a metallic spring connected with each binding-post at the front of the plug.

7. In a lightning-arrester, the combination, substantially as set forth, of a plug A, of insulating material, provided with holes J, a 20 pair of binding-posts B, attached to the plug and projecting to the rear thereof, a metallic spring connected to each binding-post at the front of the plug, and a metallic flange G, connected with the front end of each binding- 25 post and provided with hole H to receive an attaching-screw.

JAMES W. SEE.

Witnesses:

W. A. SEWARD,
R. S. CARR.