

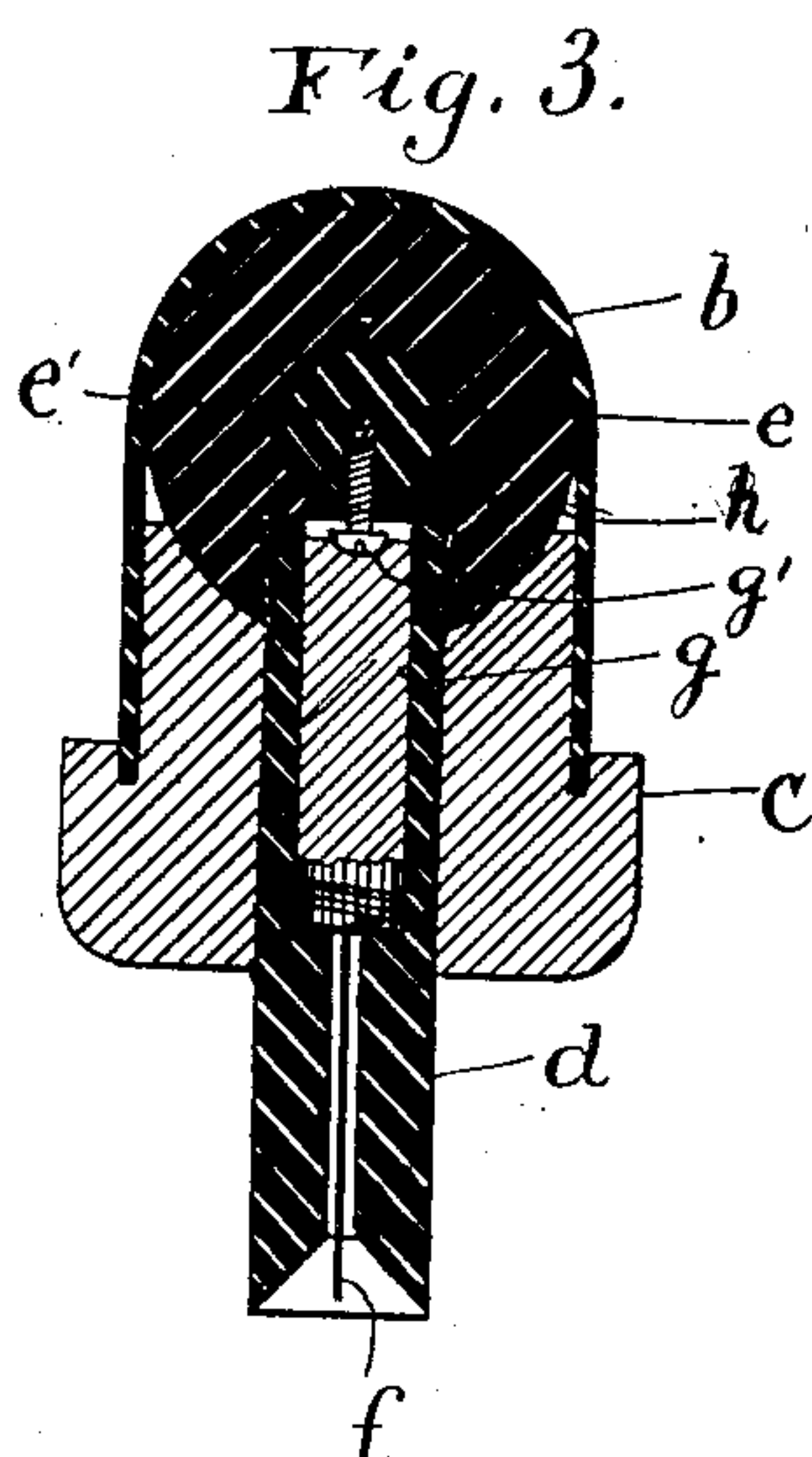
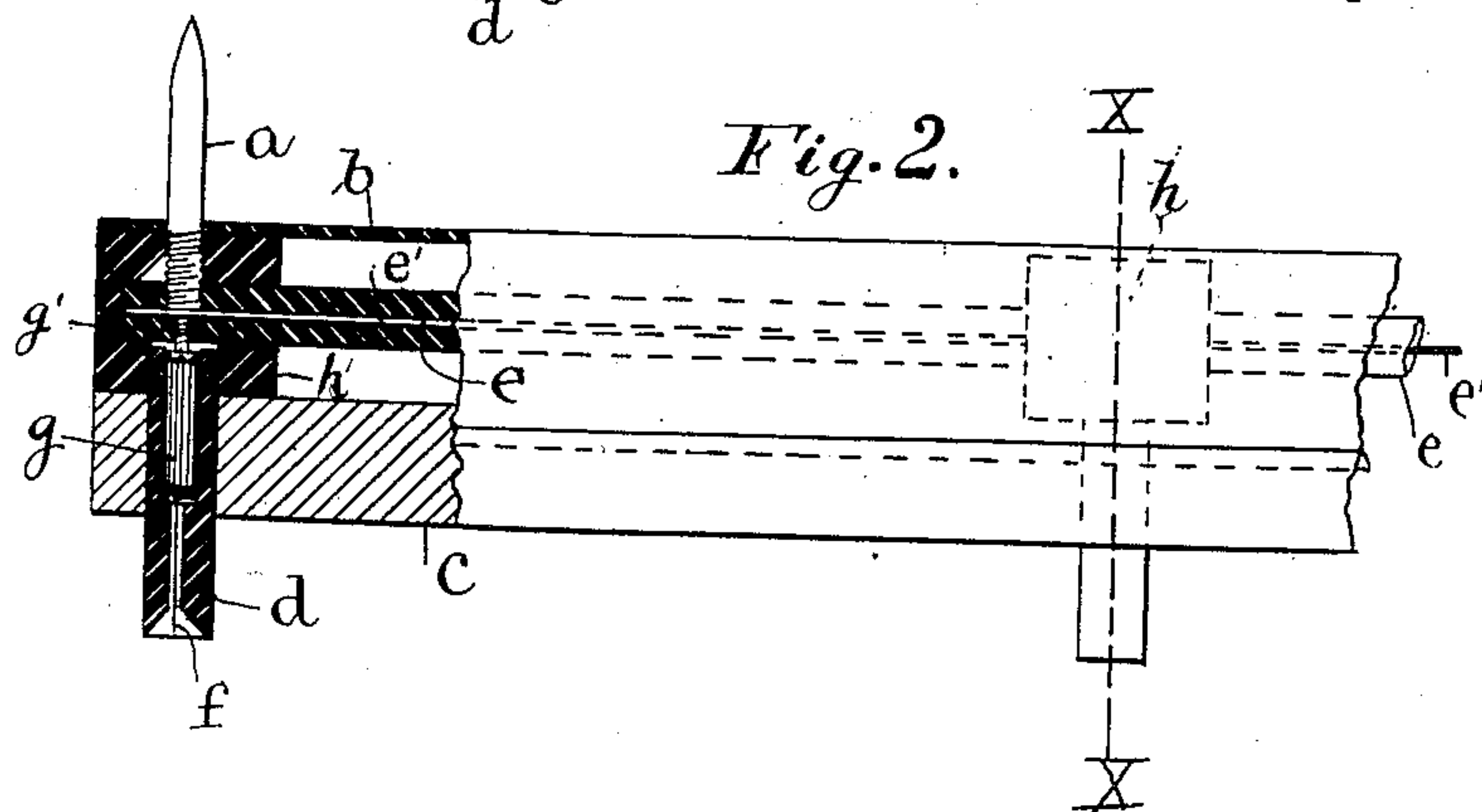
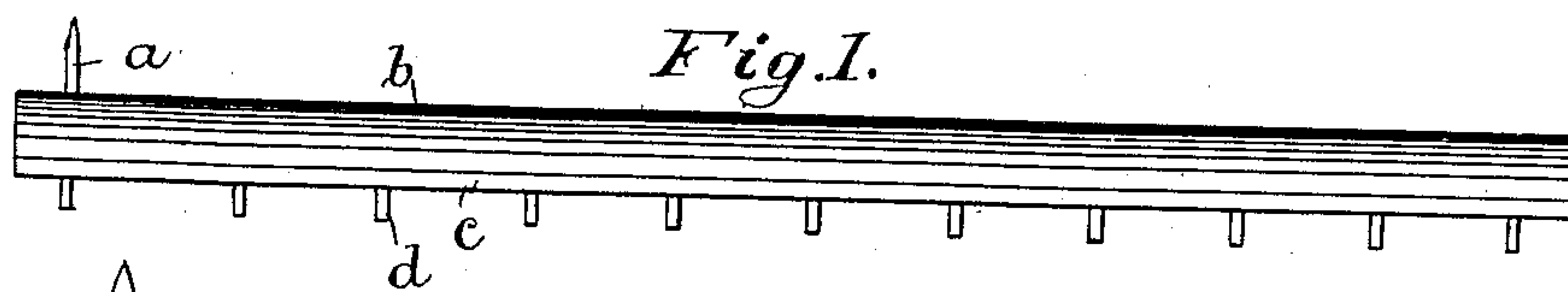
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PATENTED FEB. 4, 1908.

W. H. CHAPMAN.

CONDUCTOR FOR DISCHARGING HIGH VOLTAGE ELECTRIC CHARGES.

APPLICATION FILED MAY 18, 1906.



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UNITED STATES PATENT OFFICE.

WILLIAM H. CHAPMAN, OF PORTLAND, MAINE.

CONDUCTOR FOR DISCHARGING HIGH-VOLTAGE ELECTRIC CHARGES.

No. 878,272.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed May 18, 1906. Serial No. 317,427.

To all whom it may concern:

Be it known that I, WILLIAM H. CHAPMAN, a citizen of the United States of America, and a resident of Portland, Maine, have
5 invented certain new and useful Improvements in Conductors for Discharging High-Voltage Electric Charges, of which the following is a specification.

My invention relates to a conductor for
10 discharging high voltage electricity into or through the air and it is designed to be used in treating paper, yarn, roving and other material in the process of manufacture or manipulation for removing the static elec-
15 tricity with which such material becomes charged.

In the practical application of my process of removing static electricity as set forth in my Patent No. 777,598 and other similar
20 processes, I make use of a charge of high voltage electricity which is discharged into the air from a series of fine wires terminating in the open air where they are necessarily exposed. If they come into contact with a
25 human body a disagreeable shock is experienced which, while it may not be dangerous is decidedly annoying and something that owners of mills object to. There is also danger of fire, particularly in textile mills
30 where masses of cotton are liable to be set on fire by sparks from the terminal wires.

In the case of paper mills, printing presses &c. the discharging conductors may generally be located or protected so that there is
35 little or no danger of operatives coming into contact with the wires, but in textile mills where the terminal wire must be at a distance from the work and exposed to contact with the persons of the operatives or liable to
40 come in contact with masses of cotton or other fiber, then the apparatus is liable to become dangerous and annoying.

The object of my present invention is to so construct the discharging or radiating con-
45 ductors that they will be unable under any circumstances to give off a spark or shock that would be able to produce a fire on any inflammable material or which would be noticeable when touched by a human body.

My invention is founded on the fact that if
50 a section of relatively high resistance material of the right conductivity be introduced into the conductor immediately back of the discharging point where the electric ions are
55 thrown off into the air, leaving a short piece of wire or other conductor of small volume

on the outside of such resistance material, then no perceptible shock or spark will be produced when any body comes in contact with such point. In the practicable applica-
60 tion of this principle I preferably make use of a tube of hard rubber or other insulating material in which is inserted a plug of high resistance material connected at one end with the discharging terminal which may be a
65 fine wire, the other end of the plug being connected with the regular conductor through which the high voltage charge is transmitted to one or more of these discharging points. I have found from experience that a small
70 amount of resistance inserted in the line near the discharge point renders the spark more dangerous as regards fire than when there is no obstruction of the current but when the resistance runs up into millions of ohms, then
75 I get the effect aimed at, namely the full measure of discharge into the open air with the full voltage while reducing the amount of electricity given off when contact is made with a solid body to so small a quantity that
80 its effect is scarcely perceptible to the touch and produces no dangerous spark. A slight glow is the only noticeable effect and the quantity that might discharge instantaneously is proportionate to the bulk of the
85 wire or conductor which is outside of the resistance section.

In the case of the conductors which I use in practice this discharging section is made up of an inch or so of very fine wire and is
90 consequently incapable of storing but a very small charge. After the resistance reaches say 1,000,000 or 2,000,000 ohms it becomes effective and there is a wide range reaching
95 up to 50,000,000 or more within which it is equally effective when I have 10,000 volts in my conductor. Above this limit the current is reduced too much for the process to be efficient. The resistance plug should be of
100 material which will not readily melt from the small amount of heat developed and it should of course have the proper amount of resistance to come within the limits above specified. I have found an excellent material for this purpose to be asbestos paper
105 impregnated with paraffin, rolled into a plug and inserted into the hard rubber tube.

The discharging wire is wound around one end with its outer end terminating in the open air and the other end of the plug abuts
110 against a screw or other metal part which is in contact with the main conductor.

I illustrate my invention by means of the accompanying drawing in which:—

Figure 1 is a side elevation of my charging conductor or "inductor" as I term it, Fig. 2 is a part central longitudinal section and part elevation and Fig. 3 is a cross section taken through one of the discharging points as at $x x$, Fig. 2.

The "inductor" is made up of a heavily insulated cable e in which is the wire conductor e' . Strung along on this cable at suitable intervals there is a series of hard rubber spools or cylinders h having central openings just large enough to admit the passage of the cable. A screw threaded opening in the under side of each cylinder admits the screw threaded end of a tube d of suitable insulating material, preferably hard rubber. As here shown, the inner or upper end of this tube d has a comparatively large central bore or opening in which is inserted a plug g of suitable high resistance material preferably as above pointed out, of asbestos paper impregnated with paraffin and rolled into a plug. At the lower or outer end of the tube the bore is reduced in diameter and extending through this opening is the fine discharging wire f one end of which is wound around the lower end of the plug g and the other end terminates in the open air at or near the end of the tube d .

The upper end of the plug g impinges against the head of a screw g' which is screwed into an opening in the cable and impinges against the main conducting wire e' . The length of the plug g is such that a spark cannot pass from one end to the other around the outside of it and it should not be so long as to make the resistance too great. Thus a connection is made between the conducting wire e' and the terminal wire f passing through the screw g' and the plug g of high resistance material. At the end of the inductor the cylinder h is closed at one end so that the cable does not extend entirely through it and passing through an opening in the upper side is a suitable stud a by which the main wire is connected with the line from which the current is taken.

In order to properly support the cable and its connections so that they may be applied to textile and other machines, I provide a supporting bar c preferably of wood, with a longitudinal groove in its upper side in which lie the various cylinders h and the parts are secured in place by a casing b preferably of "fiber" or other insulating material which is secured to the bar c on each side and extends up over the cylinders holding them firmly in place. Openings in the bar c allow the tubes d to pass through and to project below the surface of the bar. The inductor as thus made up may be of any length desired, the discharge points may be of any distance apart and the whole may be secured

to the machinery in any desired position according to the work to be done. In the case of mule spinning machines the inductor is placed 18 inches or more above the rolls where they will be out of the way of the operatives who are about the machines and for printing presses and paper machines they may be placed close to the work. In any event the danger of setting fire or giving unpleasant shocks is entirely obviated by the use of the section of high resistance material while there is no diminution of the effectiveness of the electric charge.

It will be understood that there are numerous other forms in which my broad invention may be embodied aside from that here shown which shows the practical form which I have worked out for a special use.

The invention may be applied to a single terminal or to cases as where in my work it is necessary to provide for numerous radiating points along a single inductor and it may be used for any purpose where it is desired to produce the electric ions or to radiate high voltage electricity into the air.

The section of high resistance material while it is shown as near the end of the terminal wire, may be some distance back if the body of the wire is not sufficient to accumulate a dangerous quantity of electricity.

1. A conductor for discharging high voltage electricity into the air, having one or more discharging points, each of which has inserted between it and the source of supply a section of material having relatively high resistance which will limit the quantity of electricity of high voltage which will pass in an instantaneous discharge.

2. A conductor for discharging high voltage electricity into the air having one or more fine discharging points, said conductor having a section adjacent to each discharging point composed of material with a relatively high resistance located between the conductor and the discharging point which will allow a limited quantity of electricity of high voltage to pass in an instantaneous discharge.

3. In a conductor for discharging high voltage electricity into the air, the combination of a main conductor and branches extending therefrom terminating in fine discharging points each of said branches having a section composed of material with a relatively high resistance which will allow a limited quantity of electricity of high voltage to pass in an instantaneous discharge.

4. In a conductor for discharging high voltage electricity into the air, the combination of an insulated or protected main conductor, one or more tubes of insulating material secured to and extending laterally from said main conductor, a plug of high resistance material in said tube electrically connected at its inner end with said main conductor and a fine discharging wire con-

connected to the outer end of said plug and terminating in the open air.

5. In a conductor for discharging high voltage electricity into the air, the combination of an insulated main conductor or cable, a cylinder through which said cable passes having a screw threaded opening in the side thereof, a tube of insulating material having a threaded end adapted to engage said threaded opening, a plug of high resistance material in said tube electrically connected by its inner end with the main conductor and a fine discharging wire connected with the outer end of said plug and terminating
15 in the air.

6. In a conductor for discharging high voltage electricity into the air, the combination of an insulated main conductor or cable,

a series of cylinders through which said cable passes, each having a screw threaded
20 opening in its side, a tube of insulating material having a threaded end adapted to engage said threaded opening, a fine discharging wire in said tube, its inner end connecting with the main conductor and its outer end
25 terminating in the air, a supporting bar on which said cylinders rest having openings through which said tubes pass and a casing secured to said bar on each side and extending over and inclosing said cylinders and
30 cable.

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