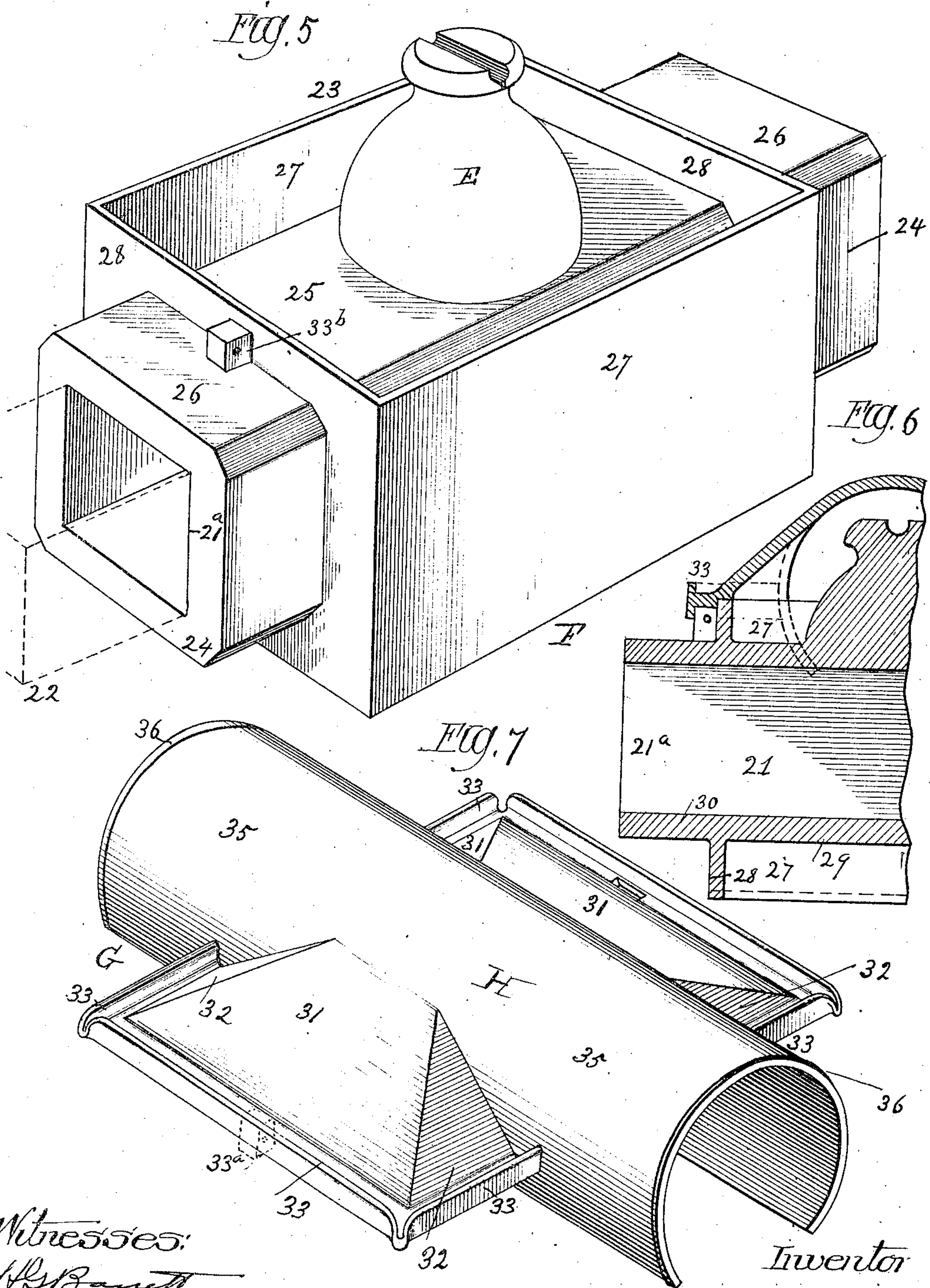


J. K. SODEN.
HIGH TENSION INSULATOR.
APPLICATION FILED JULY 15, 1907.

912,501.

Patented Feb. 16, 1909.
3 SHEETS—SHEET 2.



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FIG. 8

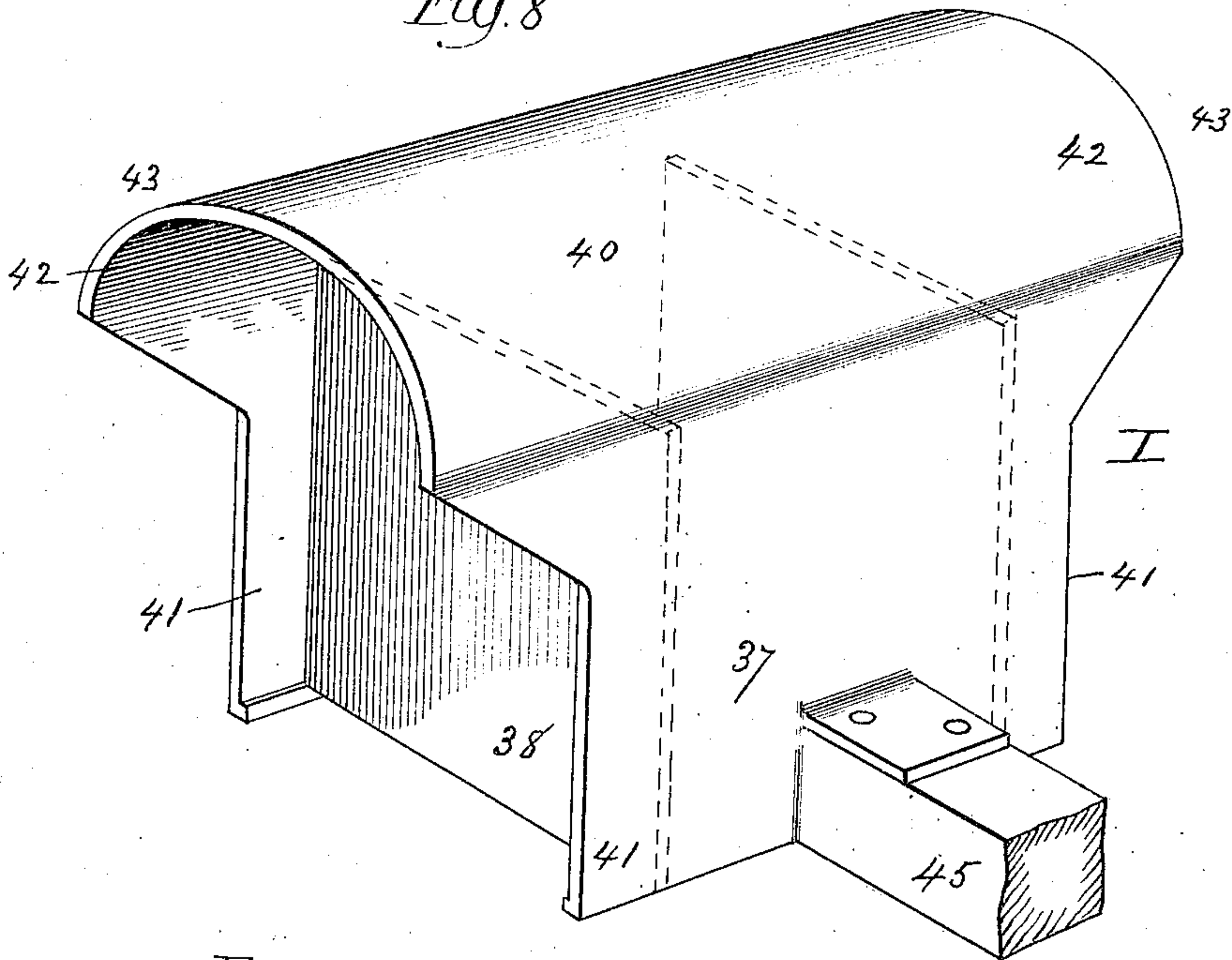


FIG. 10

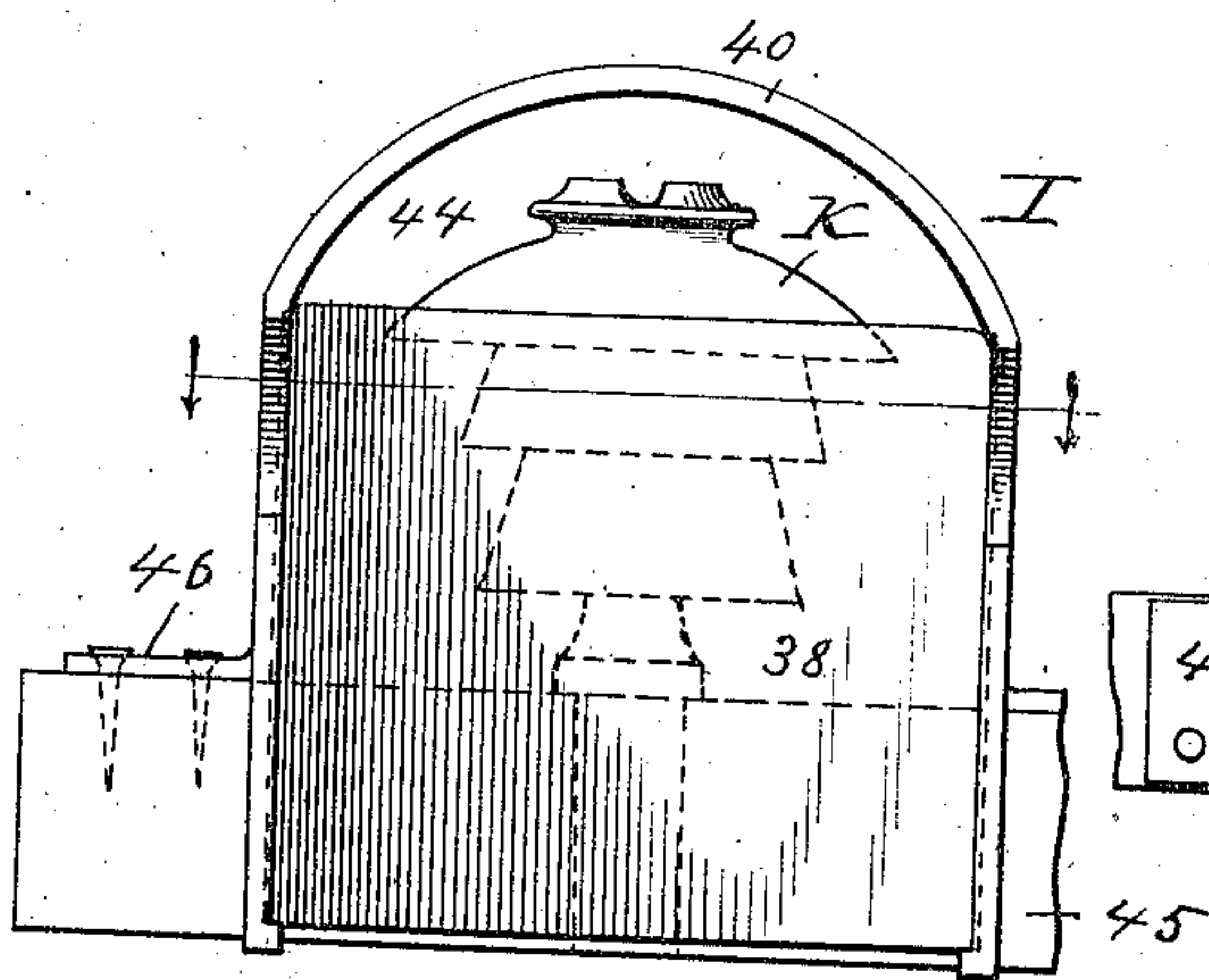
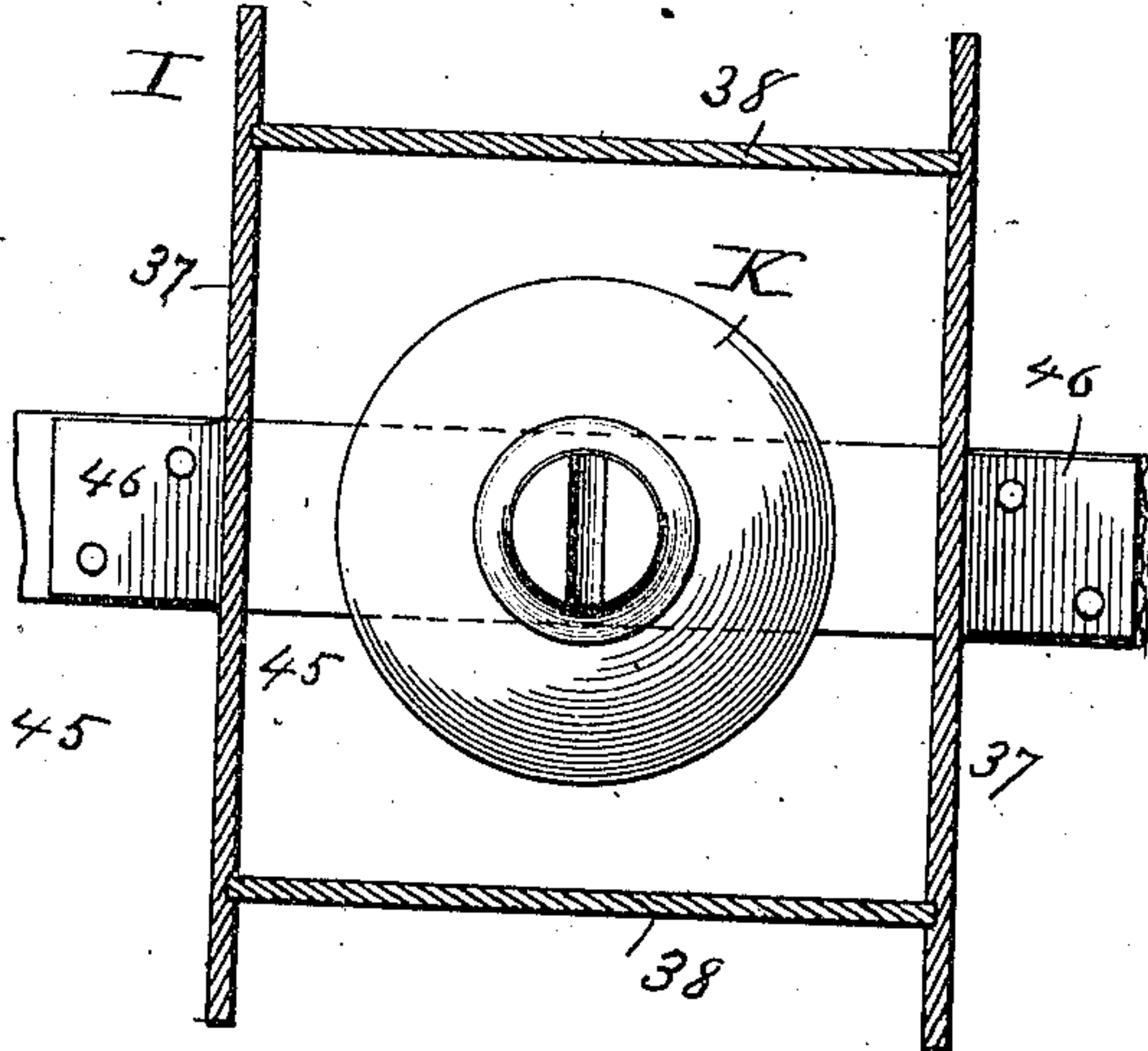


FIG. 9



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UNITED STATES PATENT OFFICE.

JOHN K. SODEN, OF CHICAGO, ILLINOIS.

HIGH-TENSION INSULATOR.

No. 912,501.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN K. SODEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in High-Tension Insulators, of which the following is a specification.

Where conducting wires or cables are employed for carrying currents of high potential, great difficulty has been experienced in preventing loss of current as by leakage more particularly due to wet surfaces during rainy or moist weather, and where the insulators are exposed to such weather conditions. This leakage takes place by arcing from the cables to some supporting member and where a film of moisture has collected upon the surface of the contact or supporting insulator, material loss of energy and destructive effects are manifest.

The objects of my invention are, to provide a high tension insulator adapted for conducting wires and cables, and involving effective resistance to puncture and surface arcing; to increase the surface resistance of the dielectric material; to insure dryness of the surface resistance and thereby increase the resistance against surface arcing; to effectively maintain a higher surface resistance on the conducting wire or cable and adjacent to the point of contact on the insulator; to reduce the bulk of a high tension insulator for supporting a wire or cable carrying a current of given potential by increasing the electrical resistance; to provide a mechanically strong construction; to provide a composite structure which can be readily cleaned, and to involve simplicity of construction.

In a high tension insulator involving the several matters of my improvement, the insulator of contact which supports the conducting wire or cable, and the portion of such conducting wire or cable contacting with and adjacent to such insulator, are confined within a chamber and exposed therein to a body of circulating air which absorbs and carries off any moisture which otherwise might collect on the surface of either or both such members. The contact or supporting insulator being thus kept free from the collection of moisture thereon can be reduced in superficial area, it being understood that in cases where the supporting insulator is subject to the collection of moisture thereon, it becomes necessary to increase its superficial area so as to increase the resistance to leak-

age. The contact or supporting insulator and the wire or cable at the point of contact therewith and to a desirable extent at opposite sides thereof are absolutely shielded from weather conditions such as rain and snow, and the air chamber ports are also likewise protected. The body of air within the chamber circulates through a space about the supporting insulator and wire or cable thereon contacting therewith and adjacent thereto, and a considerable length of the wire or cable extending out from each side of the chamber is also shielded from such weather conditions and thereby kept dry.

In the accompanying drawings: Figure 1 is a side elevation of a high tension insulator embodying the principles of my invention. Fig. 2 is a vertical central section on a plane at right angles to the plane of Fig. 1, the pin being shown in elevation. Fig. 3 is a section on the line 3—3 in Fig. 1. Fig. 4 is a top plan view of the lower portion of the housing or jacket. Fig. 5 is a perspective portion of a high tension insulator embodying my invention but of somewhat different form. Fig. 6 is a longitudinal section on a vertical central plane of a portion of the complete device understood to comprise the parts shown in Figs. 5 and 7. Fig. 7 is the upper portion which forms a cover for the lower part or body portion shown in Fig. 5. Figs. 8, 9 and 10, illustrate another form of high tension insulator embodying my invention, Fig. 8 being a perspective view; Fig. 9 a transverse section through the lower portion, and Fig. 10 an end view showing the insulator of contact in dotted lines.

The drawings illustrate several forms of high tension insulators embodying certain principles of my invention common to all. Certain features of improved construction are also common to all of these forms, while on the other hand, the several forms or constructions thus shown, also respectively involve separate and distinctive features of improvement.

In the form or construction illustrated by the first four figures of the drawings, A indicates the insulator member or contact insulator to which a conducting wire or cable is understood to be attached in any usual or suitable way. This contact insulator is screwed upon the upper threaded end of the pin B which for a portion of its length below its threaded portion enlarges diametrically to a point where the enlarge-

ment terminates to form a shoulder 2. The shoulder 2 bears upon a supporting arm 3, and the remaining stem portion 4 of the pin below its shoulder 2 extends and is fitted within a suitable bore or socket in the arm. The contact insulator A is provided with two relatively spaced concentric and pendent flange portions or petticoats 5 and 6, the outer petticoat being formed to extend somewhat below the level of the lower edge of the inner petticoat, and the annular dry air space 7 between the two petticoats being of inverted V-shape in cross section, so that the inner walls of the two petticoats relatively diverge downwardly. The central bottom portion of the contact insulator is also provided with an annular dry air space 8 surrounding portion 9 of the pin and formed by a recess having as its annular surrounding wall the inner side of the inner petticoat 6, the horizontal area of the recess being such as to leave between the inner petticoat and portion 9 of the pin the annular dry air space 8. This construction of contact insulator increases the surface without materially increasing the section of such member, and it also provides the dry air spaces 7 and 8, the latter of which provides an air jacket around a portion of the pin. The bottom of this annular air space or chamber is formed by an insulating washer 8^a which is fitted upon portion 9 of the pin and held with its circular marginal portion under and in juxtaposition to or against the bottom annular edge of the inner petticoat 6, and in this way, the washer 8^a which may be of rubber or of other suitable insulating material, surrounds the pin at a point between the inner petticoat and a jacket for the pin portion below the washer, and it also forms a bottom for the annular recess 8, as hereinafter more particularly described. The contact insulator A to which the conducting wire or cable is attached, is arranged within a ventilated and weather protected air space or air chamber 10, having opposite lateral ports or openings arranged for the incoming and outgoing wire or cable portions and protected from rain and snow, and also employed for the purpose of inducing ventilation, and as an adjunct to these lateral ports regarded as ventilating openings located at opposite sides of the air chamber, the latter is also provided with a suitable area of base portage preferably formed by a plurality of ports or openings. The ventilated air chamber within which the contact insulator is thus confined, is provided by a jacket or housing C, which is adapted to inclose and protect the contact insulator and joints from undesirable weather conditions, and which is open at certain points to provide weather protected ports for securing ventilation and for the passage of the conducting wire or cable which is supported by

the contact insulator free from contact with the housing. The housing chamber also provides a dry or substantially dry air space about the contact insulator and the conducting wire or cable, and it also extends below the latter, and by reason of the circulation of air within the housing, a film of moisture on the contact insulator is prevented. The wire or cable emerges from the housing without contact therewith, and the housing is also provided with guards or hoods which shield a considerable extent of each wire or cable portion extending from the housing space or chamber. By means of such construction, the contact insulator is kept suitably dry and by excluding rain or snow from the housing space or chamber, and the wire or cable, (as hereinafter more particularly described) leakage, sparking and arcing are effectively prevented. For convenience of manufacture and handling, the housing is preferably divided with two separable parts, to wit: a lower or base portion C' and an upper portion C².

The lower or base section or portion C' of the housing is constructed with an annular wall 11, forming the lower wall portion of the air chamber 10, and having a spider like bottom portion adapted to provide segmental bottom ports or openings 12 communicating with the air chamber. These air inlets are within the circumference of wall 11, and while forming openings between the chamber 10 and the open air, they open downwardly and hence will not permit the entrance of rain or snow. This lower portion has a pair of radial bottom arm or web portions 13 between certain openings 12 and formed with offsets or notched portions for fitting the longitudinal upper corner portions of the arm 3 as in Fig. 3, in which 14 14 indicate these offsets or notched portions for engaging the arm and steadying the housing thereon. The central portion 15 of the spider like bottom of the lower part of the housing forms a raised central bearing or collar portion which is bored or centrally open to receive and jacket a portion of the pin B above the arm 3, as illustrated, and upon the end of this jacket or collar portion 15 is seated the rubber disk 8^a hereinbefore referred to. It will therefore be seen that the insulating washer or disk 8^a surrounds the pin at the bottom of air chamber 8 in the contact insulator, and is interposed between the inner petticoat and the bottom part of the lower portion of the housing thereby insulating one from the other. In case of the employment of suitable material the inner petticoat can be cemented directly to the upper end of the central base portion 15, and in such case washer 8^a may be reduced in diameter or altogether dispensed with, the part 15 being of course made higher than shown, or the inner petticoat dropped lower

down. The disk 8^a where used may be of any other suitable insulating material, and where the material is of porcelain or the like, the inner petticoat can be cemented to such disk or washer. The two portions C' and C² of the housing have matching lugs 16 and 17, respectively, and these lugs are temporarily secured together by bolts and nuts.

The upper housing portion is provided with opposite side openings 18 and 19 relatively arranged to accommodate the incoming and outgoing conducting wire or cable portions which are applied to the contact insulator and which extend through these side openings without contact with the housing. These openings 18 and 19 also provide ventilating ports which coact with the lower ports 13 in promoting circulation of air within the housing chamber 10.

The ports 18 and 19 are protected from snow and rain and other unfavorable weather conditions, by a pair of oppositely extending guards or hoods D, D', projecting laterally from the housing at points to extend over and shield the ports, and to render these guards or hoods effective, they can be made of inverted V-shape in cross section or of other similar contour for shielding the ports and also for shielding portions of the wire or cable extending out from such openings, whereby the wire or cable to a suitable extent out from its point of entry and exit, will be protected from weather conditions and kept dry. To further increase the efficiency of these guards or hoods, each one of them has upon its marginal outer end portion a rib or bead 20, whereby water in place of running off the hood in direction to fall on the wire or cable portion will be shed downwardly to and off the bottom edges of the hoods, so as to drip to the ground at opposite sides of the hood and arm. It will also be observed that the portion C² of the housing has a concavo-convex or dome-shaped contour so as to freely shed water and that as the arch shaped guards or hoods project outwardly from the top thus formed, drip from the outer surface of the hoods or guards will be outside the vertical planes in which the sides of the arm 3 are located.

From the foregoing it will be seen that the insulator member or contact insulator is surrounded by a ventilated air space containing a surrounding air jacket, and that the cable or wire is not in contact with the housing. Also that the contact insulator is subject to the circulation of air for the purpose of preventing the accumulation thereon of a film of moisture and that a body of air is interposed between such insulator and the wall and top of the chamber formed by the housing. Also that the circulation is naturally upward; that the ports or openings are all protected; that the conducting wire or cable is not in contact with the housing, and is pro-

ected from snow, rain or the like to a considerable extent out from the housing; that the lower portion of the housing is insulated from the contact insulator; that the pin is also amply protected, and that the portion 70 of the wire attached to the insulator is also fully protected from moisture and other objectionable weather conditions.

In the form illustrated by Figs. 5, 6 and 7, the contact insulator portion for the conducting wire or cable is arranged within a ventilated chamber having lateral outlets for the passage of the conductor and the circulation of air, and these outlets are protected by guard or hood portions similar to the guard or guard or hood portions in preceding figures. In Figs. 5, 6 and 7, however, the contact insulator portion E is shown integral with a base portion F adapted to receive and cover the supporting arm and formed with an upper part chamber and downwardly extending side air passages, the whole being capable to be made in one piece, and being completed as a hood or jacket by a top portion or cover for enlarging the ventilating chamber and protecting the contact insulating portion and suitable portions of the conducting wire or cable. The base F as shown, is a rectangular block of insulating material having a central longitudinal opening 21 extending from end to end of the block and having terminal portions 21^a thereof extended through projections 24 24, respectively on opposite ends of the block. This opening is adapted to receive and fit the supporting arm 22 which is shown in dotted lines in Fig. 5. The upper portion of the block is recessed to form the lower part 23 of a chamber, the bottom wall 25 being shown on a level with the top portions 26 of the end projections 24. The block or base portion F is also provided with two opposite vertical air passages for the upward circulation of air, and as a convenient arrangement, the base is made with four vertical side walls 27, 27, 28, 28, and the projecting portions 24 are in effect extended between the end walls 28, 28, thereby forming between such end walls a longitudinal body portion having a top 25, and sides and bottom, respectively in alinement with corresponding parts of the end projections. This arrangement leaves vertical passages between sides of such longitudinal middle portion and the inner faces of the side walls 27, 27, as will be readily understood, it being observed that in Fig. 6, the bottom wall of the hollow longitudinal middle portion is indicated by reference numeral 29, in alinement with the bottom wall 30 of one of the end projections 24. The contact insulator E rises centrally from the bottom 25 of recess 23 and is partially contained therein. The upper portion G of the hood or jacket consists of a marginally guttered roof having downwardly and outwardly slanting por-

tions 31, 32, which direct water into the marginal gutters 33, the gutters being suitably sloped to corner outlets. This substantially pyramidal shaped roof is intersected by a hood portion H, which has its end portions 34 projected beyond the roof, so as to form guard or hood portions for protecting the cable or wire. The upper jacket or roof portion can be detachably secured to the base portion by any desired or suitable fastening device, and when in place, the part H which is transversely arch-shaped or part cylindric, forms with the remaining roof portion the upper part of a jacket or chamber of which the lower portion is provided by base F. The hood portion H is transverse to the arm 22, when the insulating device is applied, and the end hood portions 35 protect the chamber from the entry of rain and the like, and also protect portions of the wire or cable adjacent or near to the chamber. Each end of the hood H is also beaded as at 36, so as to prevent matter dripping down onto the wire or cable conductor. During use air circulates up through the base passages and within the chamber and thence out through one or the other or both of these upper ports formed by hood H for the wire or cable and for such circulation of air. It will therefore be apparent that while the form shown in Figs. 5, 6 and 7, comprises certain structural matters constituting improvements and not present in the form shown in preceding figures, nevertheless that both of such forms comprise in common certain principles and matters of construction, which render the insulator suitable for currents of high voltage and which avoid leaks and other troubles heretofore well known.

In the form shown in Figs. 8, 9 and 10, I indicate a casing or housing having opposite upright sides 37, and upright partition ends 38 set within and back from the arched top 40 so that the ends of the latter project beyond the ends 38 to form flange like side guards 41 at each end, and also hood portions 42 projecting out from each end of the structure. Each hood portion 42 is also provided with a marginal end bead or guard portion 43 to prevent water from dripping down onto the wire or cable. The ends or end partitions 38 are formed to leave spaces 44 between their upper edge and the arch-like top 40 for the circulation of air and passage of the conducting wire or cable, the contact insulator K for supporting such conducting wire or cable being arranged within the housing and shown constructed of the petticoat type. In this form the sides 37 are notched to receive a cross bar or arm 45 and the housing is provided with lugs or ears 46, which are secured down upon the bar or arm in any suitable way. One or both of the ends 38 can be removed and replaced when so desired, and for such

purpose it can be detachably held in place in any suitable way, as for example, by separable joints of any desired character. The housing is without bottom and hence, air can circulate upwardly and thence pass out through the end openings 44. The guards or hood portions 42 protect the openings 44 and also protect the wires, and a dry air chamber with an air space between the housing and the contact.

In Figs. 5, 6 and 7, the gutter cover portion seats on sides 27 and 28 and can be secured in any suitable way, for example, by lugs 33^a (dotted lines Fig. 7) having bolt holes for bolts which attach them to similar lugs 33^b on the end portions of the base.

What I claim as my invention is:

1. A high tension insulator constructed with an insulator of contact; a housing or jacket surrounding the insulator of contact and not in electrical contact therewith, the jacket being constructed with a ported base portion to admit air at its lower portion for an upward circulation of air about the insulator of contact and being laterally ported higher up to establish such circulation of air.

2. A high tension insulator constructed with an insulator of contact for supporting conducting wires or cables; a surrounding jacket or housing forming an air space about the insulator of contact and having opposite lateral openings forming passages for the wire or cable portions and also forming upper ventilating ports, the housing or jacket being also provided with lower air ports for permitting and inducing the upward circulation of air about the insulator of contact.

3. In a high tension insulator, a housing or jacket inclosing an insulator of contact to protect the same from weather conditions and having side openings for the conducting wire or cable portions, and laterally extending hoods for protecting said openings and also for protecting parts of the wire or cable portions which extend out from said openings, the hoods or guards being out of electrical contact with the wire or cable portion.

4. The combination with the insulator of contact and a jacket or housing containing the same and provided with lateral openings through which the cable or wire portions extend without contact, the jacket or housing being provided with laterally extending hoods for protecting the side openings and suitable lengths of the conducting wire or cable extending from said openings, the hoods being also provided at their outer end portions with transverse beads or ridges and adapted to shed water at points remote from the wire or cable portions referred to, and also to protect a suitable portion of an arm or cross piece upon which the insulator may be supported.

5. The combination with an insulator of

contact for supporting a conducting wire or cable of a housing or casing forming a chamber in which the insulator of contact is arranged, said housing or casing being provided with oppositely arranged openings in parallel lines to permit the passage of wire or cable portions to and from the insulator of contact, said casing being also provided with laterally projecting guards or hoods for protecting said openings from weather conditions.

6. The combination with an insulator of contact arranged upon a vertical pin, of a hood or casing forming a chamber in which the insulator of contact is arranged and separated from the walls of said chamber by an air space which is protected from rain, the housing or casing being divided into upper and lower portions, and having the bottom of its lower portion provided with a central upturned portion fitting and forming a protecting portion around a part of the pin between the insulator of contact and such arm or cross piece as the pin may be secured to.

7. The combination with an insulator of contact having pendent petticoats, of a housing or casing inclosing the insulator of contact and forming a ventilated air space about the same, the bottom of the lower portion of the jacket or housing being provided with ports for the admission of air, and also forming a centrally arranged pin protecting portion which rises toward the insulator of contact and which protects such pin as may be employed, from moisture.

8. In a high tension insulator, an insulator of contact for supporting a conducting wire or cable; a housing or casing having a dome-shaped or substantially dome-shaped upper portion and formed with lateral openings in parallel lines respectively at opposite sides

for the passage of portions of a conducting wire or cable attached to and supported upon the insulator of contact, said dome-shaped upper portion of the housing being also provided with transversely curved or arch-shaped hoods for protecting the lateral openings and portions of the conducting wire or cable which emerges through said openings without contact with either the housing or the hoods, the transverse section of the hoods being greater than the areas of the side openings and being also adapted in conjunction with the top portion of the housing to form a water shedding roof.

9. An insulator constructed with a base of one piece and having a longitudinal opening for receiving a supporting bar or arm, and also having a cover formed with hood portions and slanting and gutter roof portions respectively at opposite sides of the hood portions.

10. The combination with an insulator of contact having pendent petticoats, of a housing or casing inclosing the insulator of contact and forming a ventilated air space about the same, the bottom of the lower portion of the jacket or housing being provided with ports for the admission of air, and also forming a centrally arranged pin protecting portion which rises toward the insulator of contact and which protects such pin as may be employed, from moisture, and a washer of rubber or other suitable insulating material between the top of said pin protecting portion and the lower edge of the inner petticoat of the insulator of contact.

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