Sept. 20, 1927. 1,642,670

C. H. DAVIS ET AL

PROTECTIVE GARMENT

Filed July 19. 1924 2 Sheets-Sheet 1

Fig. 1

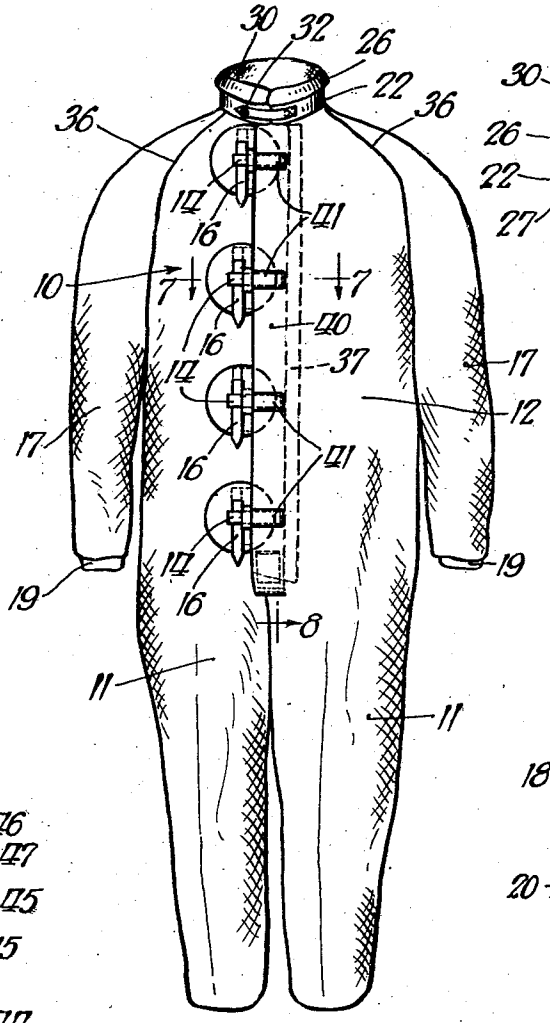


Fig. 2

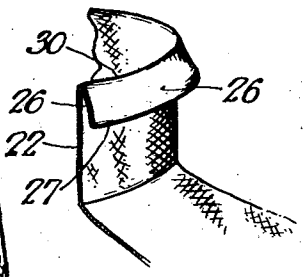


Fig. 3

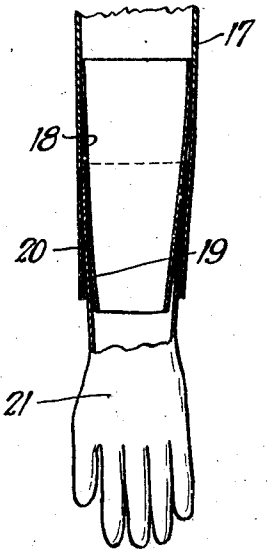


Fig. 8

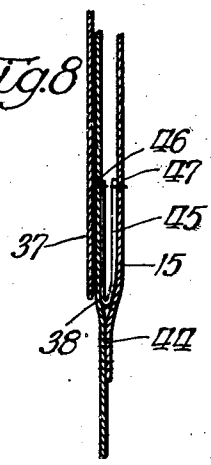
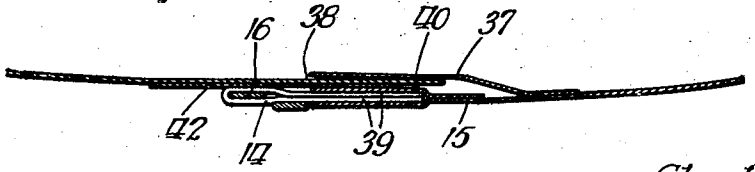


Fig. 7



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Filed July 19, 1924 2 Sheets-Sheet 2

Fig. 4

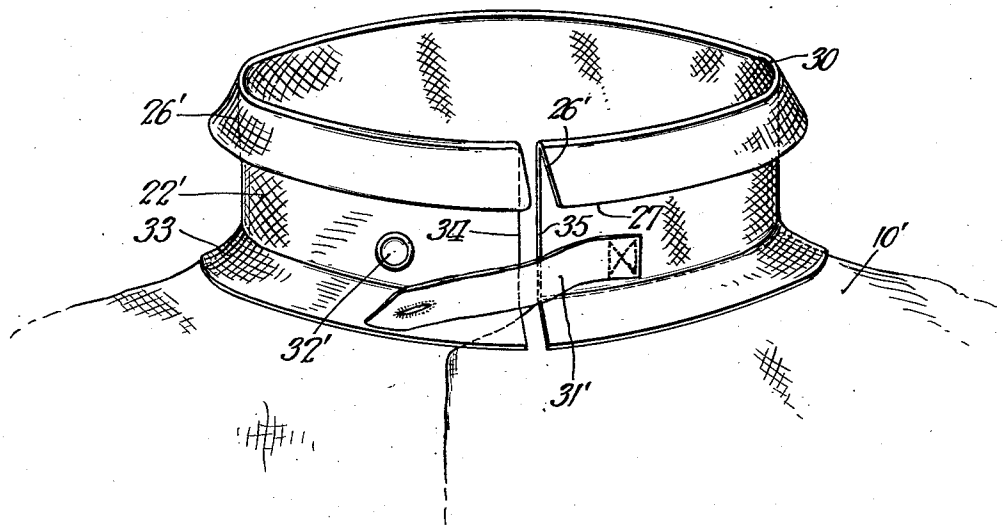


Fig. 5

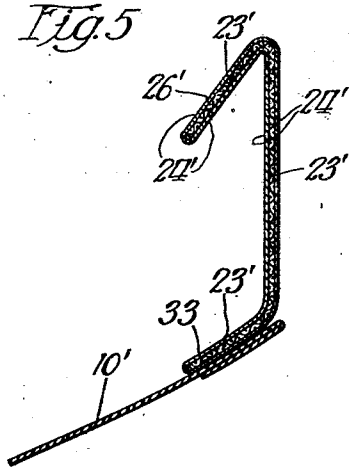
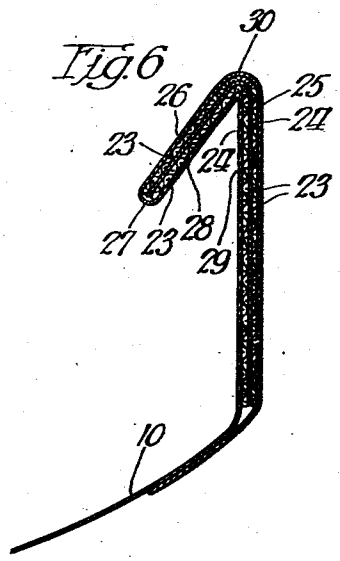


Fig. 6



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Patented Sept. 20, 1927. 1,642,670

UNITED STATES PATENT OFFICE.

CHARLES H. DAVIS AND HENRY W. LUECK, OF CHICAGO, ILLINOIS.

PROTECTIVE GARMENT.

Application filed July 19, 1924. Serial No. 727,043.

Our invention relates to protective garments and more particularly to a garment for protecting the wearer against electrical shock.

It is a purpose of our invention to provide a garment which will protect the wearer from electrical shock, particularly in wet weather.

As is well known, water will conduct electricity and a material that ordinarily serves as an insulator will conduct electricity over the surface thereof when water is on the same due to the fact that the water acts as the conductor. In the case where work has to be done on electrical wiring in stormy weather, it often is very dangerous for the line man or other worker because of the fact that a shock may be given him, due to the conduction of the current along a wet surface, which may be only slight or may be great enough to injure or cause him to fall to the ground or, in losing his balance, make a grab for high tension wires which would cause severe injury or death due to the shock received from these.

In cases where a lineman is electrocuted or seriously burned because of coming in contact with high tension wires, it is very often the case that instead of grasping the wires through ignorance or intentionally the wires are grasped by the man due to the fact that he is thrown off his guard because of being startled by a comparatively minor shock obtained in the manner set forth above. It is the purpose of our invention to provide a garment that is so made as to avoid the possibility of shock due to moisture practically entirely.

One of the places where a shock is most readily received is at the neck when the usual rubber coat is wet, due to the fact that the current travels along the wet surface of the rubber garment up the neck thereof and then jumps to the neck of the wearer giving him a shock which may be very slight or severe, depending upon whether a high or low tension conductor is contacted with. It is, accordingly, a purpose of our invention to provide a garment with a neck portion so constructed that the current can not travel to the edge thereof adjacent the neck from other portions of the garment, or to provide a neck encircling portion or collar that may be a portion of or detachable from a garment such that the current will not travel, when the garment is wet, from said garment to the edge portion of said neck encircling member adjacent the neck of the wearer.

Preferably, the neck encircling portion is provided with a flaring apron or flange-like member that projects from the main body portion of the neck member a sufficient distance at the free edge thereof that if both the flange portion or apron portion and the body portion of the collar are subjected to moisture, such as rain, the spacing between the edge portion of the apron or flange from the body portion of the collar-like member will be such that the current will not jump from the main body portion of the neck to the flange or apron portion and due to the fact that the underside of the apron or flange and the opposite portion of the main body portion of the neck are dry, no current will pass from the main body portion of the garment over the neck encircling member to the edge portion of the neck adjacent the neck of the wearer.

Another cause of shock in wet weather is due to the fact that the ordinary rubber rain coat, worn by linemen and others climbing poles, does not protect the wearer sufficiently below the waist and in climbing over cross arms and similar members the wearer of a coat causes the same to be forced upwardly above his knees so that the garments he wears under the raincoat will become wet above the knees up to and including the crotch portion and will cause a shock to be transmitted to the corresponding portions of the body if the legs of the wearer come in contact with a live current carrying part. In order to avoid this cause of shock we have provided a protective garment that completely covers the ordinary garments of the wearer beneath the same, made of rubberized material, which in itself is non-conducting.

Further, to prevent moisture from entering the sleeve of the coat member of the garment, which would cause current to travel from the rubber gloves worn by the lineman or other person wearing a garment of this character to a wet coat under the garment, thus giving the wearer a shock, the sleeves of our improved garment are provided with a portion that has an inner and an outer layer or ply secured together so as to form a water tight joint substantially at or near the elbow thereof, said double portion extending to the ends of the sleeves and being adapted to receive the cuff or gauntlet portion of a gauntlet glove between the inner

and outer plies thereof, thus preventing the travelling of water from the surface of the glove into the sleeve and causing the inside of the sleeve to always remain dry.

It is another purpose of the invention to provide a garment of the character described with fastening devices of insulating and waterproof material, to thus prevent travelling of the electric current from the outer surface of said garment into the interior thereof through the fastening devices and securing means therefor.

Other objects and advantages of the invention will appear as the description of the accompanying drawings proceeds. However, we desire to have it distinctly understood that we do not intend to limit ourselves to the exact details shown or described but that we intend to include as part of our invention all such obvious changes and modifications of parts as would occur to a person skilled in this art and as would fall within the scope of the claims.

In the drawings:

Fig. 1 is a front elevational view of our improved garment;

Fig. 2 is an enlarged view partly in perspective and partly in section of the collar portion of our improved garment;

Fig. 3 is a fragmentary enlarged view partly in section and partly in elevation of the sleeve portion of our improved garment, showing the rubber glove or gauntlet in cooperative relation thereto;

Fig. 4 is an enlarged perspective view of the improved collar or neck encircling member showing the form thereof that is detachable from the garment mounted on a rubber protective garment or coat-like member;

Fig. 5 is an enlarged sectional view of the collar shown in Fig. 4;

Fig. 6 is an enlarged sectional view of the collar shown in Fig. 2;

Fig. 7 is a fragmentary section taken on the line 7—7 of Fig. 1; and

Fig. 8 is a similar view taken on the line 8—8 of Fig. 1.

Referring in detail to the drawings, the improved garment comprises a member 10 made of rubber or of fabric covered with a sufficient coating of rubber to act as an electrical insulator, having leg portions 11 and a body portion 12. The body and leg portions are made of a continuous piece of material, forming a garment that is all in one piece. The garment 10 is provided with suitable means for closing the same along the opening at the front thereof comprising loops 14 secured to the overlapping portion 15 of one of the free edges of the garment and tongues 16 secured to the other free edge portion thereof.

The garment 10 is provided with sleeves 17 and, as indicated in Fig. 3, said sleeves 17 are provided with an inner ply or layer of rubber which may, if desired, be provided with suitable reinforcing material embedded in the same but which is preferably quite flexible so as to provide an annular pocket 19 between the outer sleeve portion 17 and the inner ply 18 to receive the gauntlet or cuff portion 20 of a rubber glove 21. The garment is also provided with a neck portion 22 which is preferably in the form of a military style collar which conforms closely to the neck of the wearer and is preferably of sufficient stiffness so as to hold its shape and prevent the same from dropping down on to the adjoining portion of the garment. The stiffening may be obtained by forming a comparatively thick collar of rubber with fabric reinforcement which may be of one or more plies and may be molded to shape, although if the collar is cut properly it may not be necessary to mold the same as it will, when closed, hold its proper shape due to the circumference of the various annular portions thereof.

In Fig. 6 one form of construction for the collar is shown in which the collar 22 is provided with a plurality of plies 23 of fabric which are coated with a heavy coating of rubber 24, preferably a ply of rubber 25 being also provided between the plies of fabric 23. The plies of rubber 24 merge into the material of the coat 10, as clearly shown in Fig. 6, so as to form an integral collar. The collar is provided with an apron or flange portion 26, as shown in Figs. 1 and 2, which is considerably larger in circumference at the free edge 27 thereof than the adjoining portion of the collar 22, thus spacing the free edge 27 of the flange portion 26 from the main body portion 22, a considerable distance, as clearly shown in Fig. 6. The spacing is preferably about one inch.

It will be clear from Fig. 6 that the reinforcing plies and the rubber plies 24 and 25 extend into said flange or apron. The flange or apron is preferably of sufficient stiffness so as to stand out, as shown, from the main body portion of the collar, but it is evident that even if not molded to shape and even if not made very stiff the apron of the collar will, even if made of ordinary rubberized material, stand out from the main body portion thereof if cut so as to have a larger circumference at the free edge portion than at the portion thereof joining with the main body portion.

It will be seen that with the construction shown in Figs. 1 to 3 inclusive and Fig 6, if water runs down the surface of the garment there will always be a dry portion at the collar due to the fact that the moisture will drop from the free edge 27 of the flange or apron 26 and the underneath surface 28 of said apron or flange will remain dry. Also, the portion 29 of the upstanding portion 22 will be dry due to the protection

afforded by the apron 26. Thus, current will not be able to travel along the outer surface of the collar portion 22 to the edge 30 adjacent the neck of the wearer because there will be no moisture for conducting the same from the outer surface of the upstanding portion 22 to the outer surface of the flange or apron portion 26.

Any suitable fastening means such as the strap 31 may be provided for the collar 22, said strap engaging with a suitable fastening member 32 such as a button. The strap 31 should be placed a sufficient distance from the flange or apron 26 so that the same can not get under the flange or apron 26 and bridge the gap between the upstanding portion 22 of the flange or apron 26 as the strap 31 might be damp or wet thus becoming a conductor of current.

Instead of making the collar 22 a portion of the garment it may be made a separate member such as 22′ shown in Fig. 4, the member 22′ being then provided with a suitable flange or apron portion 33 that is adapted to overlap the portion of the rubber protective coat or garment over which the same is placed. In case a detachable collar 22′ is provided, a collarless garment may be provided for wearing with said collar or the ordinary collar on the garment may be placed inside the collar 22′. In Fig. 4 the flange 33 is shown as lapping over the portion of the garment 10′ adjoining the neck portion thereof and the collar 22′ is shown as being provided with an apron or flange portion 26′ corresponding to the apron or flange 26, being made in substantially the same manner as the collar 22, it being understood that any number of plies may be used in either the collar 22 or 22′. However, in the drawings, the collar 22′ is shown as comprising a single ply of fabric 23′ coated with heavy plies of rubber or other insulating material 24′ on both sides thereof, said reinforcement 23′ extending into both the aprons 33 and 26′. A strap 31′ having a buttonhole co-operating with a button 32′ is used for holding the collar in closed position in the form shown in Fig. 4, the strap 31′ and the strap 31 operating in the same manner.

While the edges 34 and 35 of the collar are shown as being separated in Fig. 4, it is, of course, preferred that the same are closely adjacent when the collar is closed, as shown in Fig. 1, thus forming a substantially water tight collar.

It will be noted from Figs. 1 and 3 that the inner ply 19 of the sleeve 17 preferably is slightly longer than the outer sleeve portion, thus making it easier to insert the gauntlet or cuff portion 21 into the sleeve. It will further be noted from Fig. 1 that the sleeves 17 are of what is known as the raglan type. That is, the seams extend upwardly in converging relation toward the base of the collar, thus avoiding an upwardly projecting seam of the shoulder that might accidentally engage with the apron 26 of the collar.

Referring now to Figs. 8 and 9, it will be seen that the edge 15 of the garment forms an outer flap and that an inner flap 37 is secured thereto, said flap being made of rubber or rubberized fabric. The edge 38 of the garment is received between said flaps, this arrangement preventing the entrance of water at the opening in the front of the garment.

The loop members 14 each have a pair of parallel end portions 39 secured between the ply 15 and the flap 40 by means of stitches 41. The tongues 16 are provided with tapered ends 42 and are secured to reinforcing patches 43 in any suitable manner, said patches 43 being secured to the edge 38 in any suitable manner. The members 14, 40, 16 and 43 are made of waterproof flexible material such as rubberized fabric, and due to the construction of, and materials of said fastening devices, all danger of current passing to the interior of the garment due to the fastening devices is avoided.

In order to prevent tearing out of the stitches 44 when the edge 38 is secured to the edge 15 adjacent the crotch, a reinforcing patch 45 is secured to said edges by means of the stitches 46 and 47, said patch taking all the strain at this point when the garment is being put on and taken off. The flap 37 is free at its lower end as will be clear from Fig. 8 to permit this construction.

Having thus described our invention, what we desire to claim and secure by United States Letters Patent is:

1. In a garment for protecting the wearer against electrical shock, an upstanding collar having an outer surface of di-electric material and a waterproof apron of less width than said collar having a surface of di-electric material depending therefrom, the free edge of said apron being spaced a substantial distance from said collar.

2. In a garment for protecting the wearer against electrical shock, an upstanding collar having an outer surface of di-electric material and an integral waterproof apron having a surface of di-electric material depending therefrom, the free edge of said apron being spaced a substantial distance from said collar and from the body portion of said garment whereby the upper surface of said apron and the outer surface of said body portion are insulated from each other when both surfaces are wet.

3. In a garment for protecting the wearer against electrical shock, an upstanding collar having an outer surface of di-electric material and an integral waterproof apron having a surface of di-electric material de-

pending therefrom, the free edge of said apron being spaced a substantial distance from said collar and from the body portion of said garment whereby the upper surface of said apron and the outer surface of said body portion are insulated from each other when both surfaces are wet, said apron being provided with plies of reinforcing fabric therein.

4. In a garment for protecting the wearer against electrical shock, a stiff neck embracing portion having a surface of insulating material and a stiff apron having an insulating waterproof surface depending from the top edge thereof, the lower edge of said apron being free of and spaced from said neck embracing portion to provide a dry zone on the outside of said neck embracing portion, said garment having a pair of sleeves each having a surface of di-electric material and a lining of di-electric material secured to said sleeve intermediate the ends thereof and extending to the open end thereof to form a water tight annular open ended pocket in said sleeve.

5. A garment for protecting the wearer from electric shock comprising a body portion having a surface of waterproof insulating material, a stiff upstanding collar thereon having a surface of waterproof insulating material and an apron extending downwardly and outwardly from the top edge of said collar and having a surface of waterproof insulating material, said apron being of less width than said collar whereby the free lower edge thereof is spaced, above and insulated from said body portion.

6. In a garment for protecting the wearer against electrical shock an upstanding collar adapted to completely enclose the neck of the wearer and having an outer surface of di-electric material, and a waterproof apron of less width than said collar having a surface of di-electric material depending therefrom, the free edge of said apron being spaced a substantial distance from said collar, said apron throughout its width extending completely around the collar, to provide a dry zone completely around the outside of said collar.

In witness whereof, we hereunto subscribe our names this 26th day of June, A. D. 1924.

CHARLES H. DAVIS.
HENRY W. LUECK.