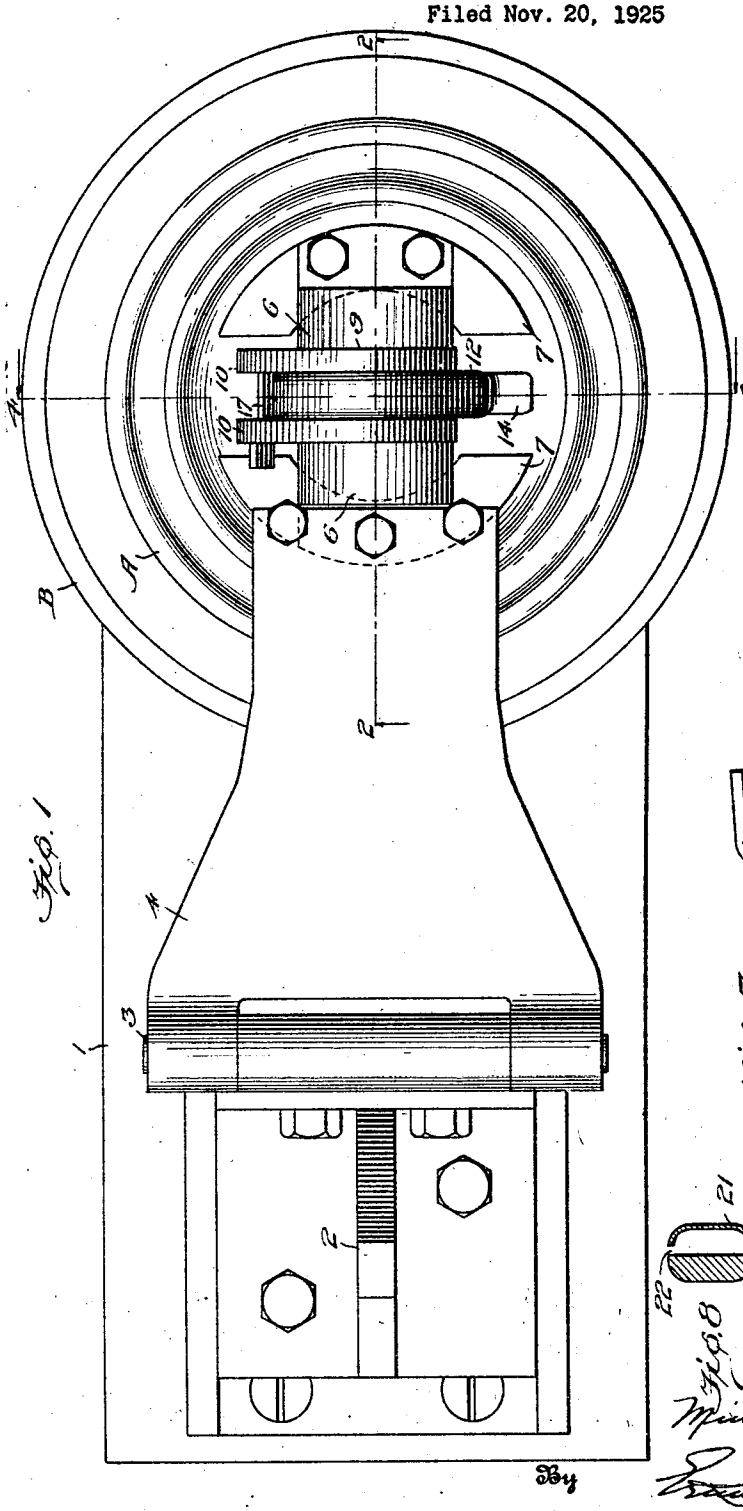
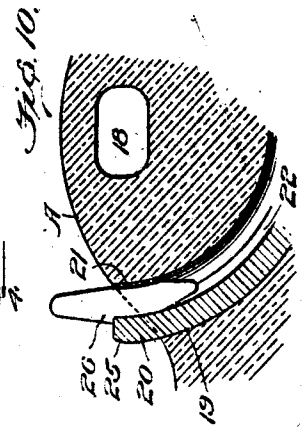
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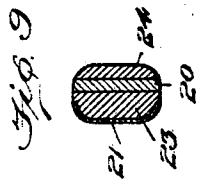
M. F. H. GOUVERNEUR

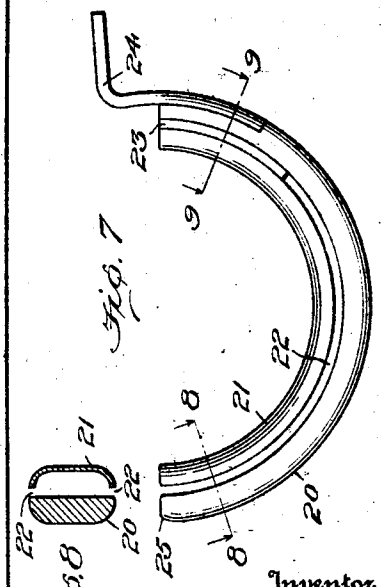
METHOD AND DEVICE FOR CUTTING HOLES IN INSULATORS

Filed Nov. 20, 1925 3 Sheets-Sheet 1









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Maurice F. H. Gouverneur

By

Attorney

Jan. 1, 1929. 1,697,423

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METHOD AND DEVICE FOR CUTTING HOLES IN INSULATORS

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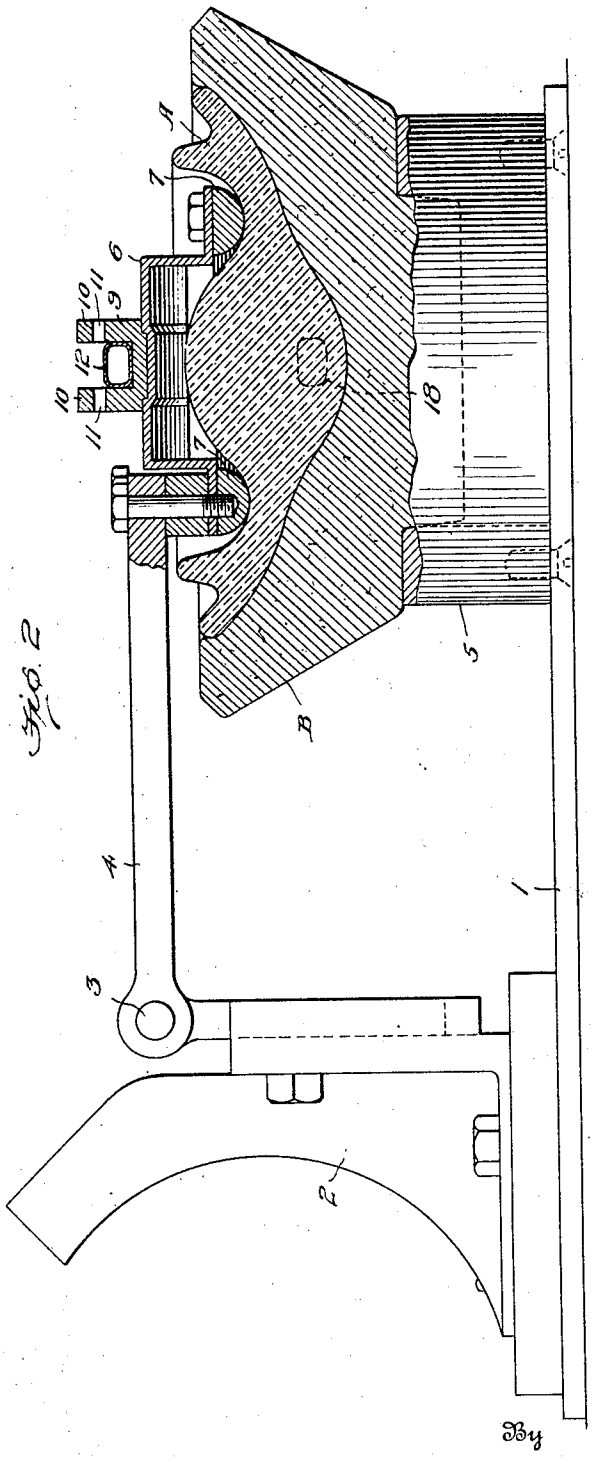


Fig. 2

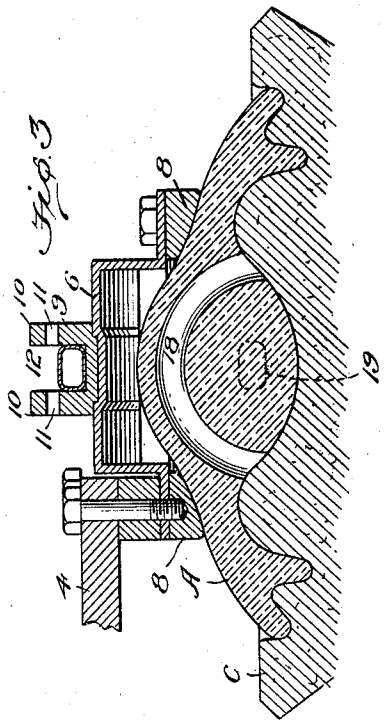


Fig. 3

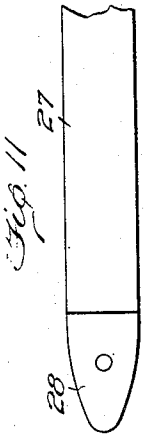


Fig. 11

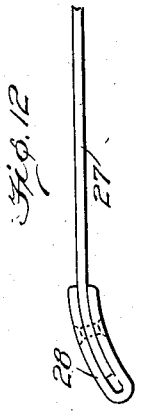


Fig. 12

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M. F. H. GOUVERNEUR

METHOD AND DEVICE FOR CUTTING HOLES IN INSULATORS

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Fig. 4.

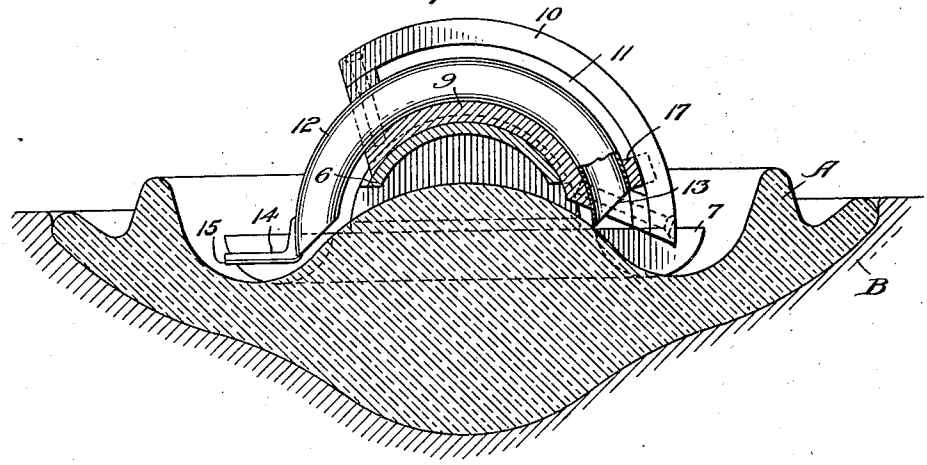


Fig. 5.

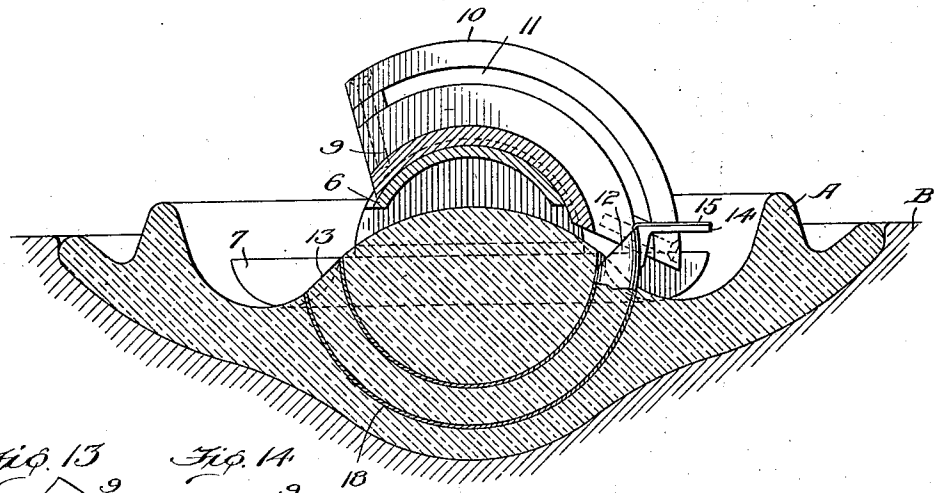


Fig. 13.

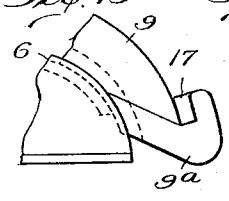


Fig. 14.

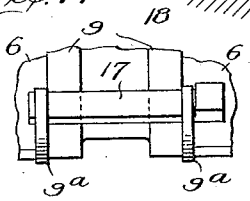


Fig. 6.

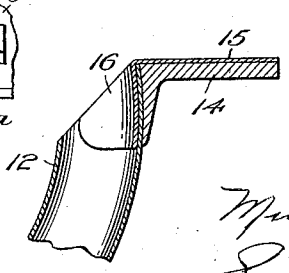




Fig. 15.

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Patented Jan. 1, 1929. 1,697,423

UNITED STATES PATENT OFFICE.

MINOR F. H. GOUVERNEUR, OF BALTIMORE, MARYLAND, ASSIGNOR TO LOCKE INSULATOR CORPORATION, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

METHOD AND DEVICE FOR CUTTING HOLES IN INSULATORS.

Application filed November 20, 1925. Serial No. 70,430.

This invention relates to devices used in the making of insulators, particularly those of the Hewlett type having interlinking curved passages therein for the reception of suspension elements such as links.

The object of the invention, generally stated, is to provide a device adapted to be disposed upon a still plastic molded insulator and embodying cutting means whereby the material of the insulator may be cut out to define the necessary curved passages.

The object of the invention, more specifically stated, is to provide a device of this character disposable upon an individual insulator and including guide means for a movably mounted cutter adapted to be forced through the insulator material to form a curved passage both ends of which open out at the same side of the insulator body, means being provided for positively holding the cutter to its guide throughout the movement so as to insure uniformity in the size of the passage at all points.

Another object of the invention is to provide a device of this character embodying a support carrying the guide and cutter means, the arrangement being such that successive insulators acted upon will all have the passages therein at the same position, the support being moreover quickly and easily movable into or out of operative relation to the insulator so that the work of cutting insulators may be carried out expeditiously.

A further object of the invention is the provision of a device of this character so constructed as to operate upon either the top or the bottom of an insulator without necessitating any changes in the relative position of the parts, this being of material advantage inasmuch as one curved passage must have its ends opening out to the top while the other has its ends opening out to the bottom.

Another object of the invention is the provision of an auxiliary or finishing tool adapted to be inserted through the passage subsequent to the removal of the cutter therefrom, this tool being expansible so that when drawn back through the passage it will forcibly wipe and compress or pack the wall of the passage and not only exert a smoothing action thereon but heal any cracks or tears resulting from the action of the cutter.

An additional object of the invention is the provision of cutting apparatus embodying the above mentioned characteristics and so constructed and arranged that the necessary passages in an insulator may be cut with precision without requiring any extraordinary degree of skill as provision has been made for reducing likelihood of error and spoiling of the insulators.

Another object is to provide an improved method for cutting holes in insulators.

To the attainment of the foregoing and other objects and advantages, the invention preferably consists in the arrangement and combination of parts and the details of construction to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings in which:

Figure 1 is a top plan view of the device in action,

Figure 2 is a vertical cross section taken on the line 2—2 of Figure 1, the major portion of the supporting structure being shown in side elevation, the device being shown in engagement with the underside of an insulator arranged in inverted position;

Figure 3 is a sectional view similar to Figure 2 showing the device arranged upon the top of an insulator for cutting the lower passage,

Figure 4 is a vertical cross section taken on the line 4—4 of Figure 1, the cutter being in initial position,

Figure 5 is a similar view but showing the cutter as having been forced through the insulator,

Figure 6 is a detail sectional view through the handle end of the cutter,

Figure 7 is a side elevation of the finishing or wiping tool,

Figure 8 is a cross section through the free end portion of the wiping tool, the view being taken on the line 8—8 of Figure 7,

Figure 9 is a cross section through the handle end portion of the wiping tool, the view being taken on the line 9—9 of Figure 7,

Figure 10 is a fragmentary vertical section through an insulator with the wiping tool in position and expanded,

Figure 11 is a plan view of a different finishing tool,

Figure 12 is a side elevation thereof,

Figure 13 is a fragmentary side elevation showing a slight modification,

Figure 14 is a front elevation of the structure shown in Figure 13, and

Figure 15 is a fragmentary section through

one end of the cutter showing a slight variation.

Referring more particularly to the drawings the letter A designates an insulator of the Hewlett type which is to be provided with the curved interlinking passages for the reception of the usual suspension links provided for connecting a plurality of such insulators in strings. The passages are to be cut while the insulator is still in a plastic condition and for this reason I have shown mold members B and C for supporting the insulator at different stages of the work, the upper surfaces of these respective mold members conforming, respectively, to the top and undersides of the insulator.

In carrying out the invention use is made of a supporting structure here represented as including an arm or the like 1 secured to a bracket structure 2 to which is pivoted, at 3, an arm 4 which carries the cutting mechanism to be described. The arm or support 1 carries a collar or socket 5 in which the mold member B or C, as the case may be, is mounted. By this means insulators to be cut may be located at the exact proper position to be acted upon by the cutting mechanism so that all the insulators may be uniform.

The cutting mechanism comprises a saddle member 6 carried by the arm 4 and of such shape and construction as to accommodate the bulge at the top or the bottom of the insulator. The saddle member carries bearing shoes or plates 7 or 8 of such cross sectional configuration as to bear conformingly upon the bottom or top surfaces of the insulator, as the case may be. In Figure 2 the shoe members or plates 7 are represented as engaging the undersurface of the insulator which is in an inverted position, the shoe members being located inwardly of the usual depending skirt with which insulators of this type are ordinarily equipped, whereas in Figure 3 I have illustrated the shoe members 8 bearing upon the top surface of the insulator which is in normal or upright position. Quite obviously the different types of shoe members or plates are interchangeable depending upon which passage is to be cut in the insulator.

The saddle member 6 has suitably secured thereto or carries a channeled guide 9 including side flanges 10 formed preferably with arcuate slots 11 for a purpose to be described. The guide 9 accommodates a cutter 12 which is arcuate in shape and which is rotatable about the saddle member while in contact with the guide. The curvature of this cutter must of course correspond to the desired curvature of the passage to be cut in the insulator. This cutter is represented as being of tubular or shell-like formation with one end beveled off or inclined as shown at 13 to correspond substantially to the surface of the insulator at the point where the cutter will emerge therefrom after being forced therethrough in a manner to be explained. At its other end the cutter carries a suitable handle which, in the present instance, is represented as including a laterally extending member 14 to which is secured a reinforcement 15 which has a portion 16 secured within the cutter, the parts being united by any suitable means such as welding or brazing.

As stated above the cutter is rotatable with respect to the saddle member and is guided in its movement by the member 9. To offset any tendency of the cutter to leave the guide, I preferably provide a retaining element 17 which may, in actual practice, be a strip of suitable material headed at one end and inserted through the slots 11 in the side flanges 10 of the guide 9. The engagement of this retaining element with the upper or outer surface of the cutter will hold the cutter closely to the guide during its movement, thus insuring accuracy of direction.

In the operation, the mold B or C carrying the insulator is placed in position within the holder 5, the proper shoes 7 or 8 are applied to the saddle member and the arm 4 is swung down to bring the shoes in contact with the insulator. The cutter 12 is placed in position upon the guide 9 and the strip or retaining element 17 inserted in place through the slots 11. This initial position of the cutter is illustrated in Figure 4. The operator then grasps the handle 14 and rotates the cutter about the saddle member, the cutter entering and passing through the material of the insulator to form a passage therethrough. It may be advisable to place a small pad of rubber or the like, not shown, against the insulator at the point where the end of the cutter will emerge, the purpose being to insure a clean cut and prevent tearing of the material. The final position of the cutter is shown in Figure 5 and just before reaching this position it may be necessary to remove the retaining strip 17 so that the cutter may travel the full distance necessary to make a complete cut. Subsequently to this the cutter is drawn back or in the opposite direction so that it will be withdrawn from the insulator. The material cut out of course remains in the cutter from which it may be extruded by any suitable implement.

After one passage has been thus cut, the insulator is placed upon a mold of the other type so that the other surface will be uppermost and is then placed in position as before except that it should be rotated through an arc of 90° for the reason that the second passage to be cut is transverse with respect to the first. This second position is illustrated in Figure 3. The parts being thus arranged the arm 4 is swung down into place and the cutter operated as above described to cut the second passage. It makes no difference

which passage is cut first though Figures 2, 4 and 5 show the device as cutting the upper passage 18 first, Figure 3 showing the cutting of the lower passage 19, represented by dotted lines.

Instead of using the guide means 10 above described, I may simply provide comparatively small hook-like elements 9ª suitably secured upon opposite sides of the guide 9 and with which the retaining element 17 cooperates as indicated in Figures 13 and 14, the advantage in this modification being that the device is made slightly less cumbersome. Another point of variation which might be resorted to, is the provision of sharp edges 12ª at the cutting end of the tool or cutter 12, the sharpening being done from the inside of the tubular cutter, thereby making the entrance slightly flaring as indicated in Figure 15, it being evident that sharpening of the edge will facilitate forcing the cutter through the insulator, the resultant passage being possibly smoother than if the end of the cutter be formed more blunt as indicated in Figure 5.

An important feature of the invention is the provision of an auxiliary tool for wiping and smoothing the walls of the passages which might possibly, under some circumstances, be left slightly rough by the cutter. This tool is shown in detail in Figures 7 to 10 inclusive and is represented as comprising an arcuate member 20 of solid construction and an arcuate member 21 of shell-like construction having its edges spaced from the edges of the member 20 to provide slots or slits 22 which are closed at one end by a reinforcing filler 23 secured between the members 20 and 21. A handle 24 is suitably mounted at this same end. The other end preferably has its corners rounded off as indicated at 25. The precise construction of this tool might of course be varied, the principal feature being that it is capable of being expanded as by means of a wedge member 26, shown in Figure 10, inserted between the members 20 and 21 at the free ends thereof.

Assuming that a passage has been cut, the cutter is removed and this auxiliary tool placed in position upon the guide 9 and moved through the passage so that its free end will project as shown in Figure 10. The wedge-member 26 is then inserted in place and the tool rotated back to its initial position. The expansion of the tool resulting from the introduction of the wedge will cause the tool to wipe forcibly against the walls of the passage, thus compressing the material and effectually healing any tears or pits which might result from any cause. It might be well to mention that in the cutting and finishing or wiping operations oil may be used to insure smoothness of action and to assist in proper conditioning of the passage walls.

Instead of the wiping tool, use may be made, if preferred, of the device shown in Figures 11 and 12, or if desired this tool may be used in addition to the other, this detail being immaterial. This tool consists of a strap or strip 27, preferably of plush or other material having a soft nap, this strip being equipped at its ends with suitable finger holds 28. If this implement is employed it is inserted through the passage and drawn manually back and forth to smooth and polish the passage walls.

After the passages have been formed and finished, the insulator may be sponged, trimmed or otherwise treated while still held in its supporting mold on the arm 1, the arm 4 carrying all the cutting mechanism being swung back on its pivot 3 so as to be entirely out of the way.

By means of the device disclosed an insulator may be accurately cut to define the necessary interlinking passages and owing to the peculiar arrangement of the guide and cutter together with the retaining element which confines the cutter closely to the guide it is evident that likelihood of error is reduced to the minimum so that there will be fewer insulators miscut and consequently spoiled. Owing to the smoothing of the passage walls and healing of any tears or the like there will be less danger of cracking during drying and furthermore the passage walls will be in such condition as to engage more conformingly with whatever suspension links are used. As the mechanism is carried by the supporting arm it is evident that successive insulators may be placed in position and cut uniformly and rapidly, the only change necessary to be made for cutting the upper and lower passages being the changing of the shoes or guide plates which rest upon the insulator.

While I have shown and described the preferred embodiment of the invention, it should be understood that this disclosure is merely illustrative as I reserve the right to make all such changes in the details of construction as will not depart from the spirit of the invention or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

1. In an insulator hole cutter, a stationary support, means for mounting an insulator temporarily thereon, a movable support swingable into engagement with the insulator, and a cutting mechanism carried by the movable support adapted to be brought into engagement with the insulator and forced therethrough in a curved path.

2. In an insulator hole cutting device, means for supporting an insulator temporarily in fixed position, a movable support mounted on said means and located above the insulator, means on the movable support, adapted to be brought into engagement with

the insulator, and a cutter movably mounted on said last named means and adapted to pass in a curved path through the material of the insulator.

3. In an insulator hole cutting device, a relatively stationary support, means on said support for supporting an insulator in temporarily fixed position, a relatively movable support carried by the stationary support, a guide on said movable support adapted to be brought into engagement upon an insulator, and a cutter slidably mounted upon said guide and rotatable with respect thereto to enter and pass through the material of the insulator in a curved path.

4. In an insulator hole cutting device, a relatively stationary support, means on said support for supporting an insulator in temporarily fixed position, a relatively movable support carried by the stationary support and swingable with respect thereto, a guide on said movable support adapted to be brought into engagement upon an insulator, and a cutter slidably mounted upon said guide and rotatable with respect thereto to enter and pass through the material of the insulator, the guide being of a channel nature and said cutter being embracingly engaged thereon.

5. In an insulator hole cutting device, a relatively fixed support, means for temporarily mounting an insulator thereon, a relatively movable support hingedly mounted on the fixed support and swingable toward or from the insulator, bearing means on said movable support adapted to rest upon the surface of the insulator, a guide carried by the movable support, and a curved cutter slidably mounted on said guide and movable in an arcuate path to pass through the material of the insulator for forming a curved passage therethrough.

6. In a device for cutting curved passages in insulators, a swingably mounted member adapted for disposition upon an insulator, a guide mounted on said member, and a curved tubular cutter restrained against movement longitudinally of the guide and rotatable with respect thereto to pass through the insulator in a curved path.

7. In a device of the character described, a member carrying elements disposable selectively against the top or bottom surface of an insulator, a guide carried by one element, and a curved tubular cutter slidably mounted upon the guide and rotatable thereabout in a curved path to enter and pass through the material of the insulator.

8. In a device of the character described, a member carrying upper and lower elements disposable selectively against the top or bottom surface of an insulator, a guide carried by the upper element, a curved tubular cutter slidably mounted upon the guide and rotatable thereabout in a curved path to enter and pass through the material of the insulator, and means for restraining the cutter against radial movement with respect to the guide.

9. In a device of the character described, an element disposable against the surface of an insulator, a channeled guide carried by said element, a tubular curved cutter slidably mounted upon the guide and movable thereabout in an arcuate path to pass through the material of the insulator, and means traversing the guide for restraining the cutter against radial movement with respect thereto.

10. In a device of the character described, an element disposable against the surface of an insulator, a channeled guide carried by said element, a tubular curved cutter slidably mounted upon the guide and movable thereabout in an arcuate path to pass through the material of the insulator, and means traversing the guide for restraining the cutter against radial movement with respect thereto comprising an element, the sides of the guide being formed with arcuate slots for the passage of said last named element.

11. In a device for cutting curved passages in insulators, a saddle member equipped with bearing elements disposable against the surface of an insulator, a guide on said saddle member having slotted flanges, a tubular curved cutter slidably mounted upon the guide and rotatable thereabout, and a retaining member passing through the slots and bearing against the outer periphery of the guide for limiting movement thereof to an arcuate path.

12. In a device of the character described, an element disposable against the surface of an insulator in plastic condition, guide means carried by said element, a cutter removably mounted on the guide means and rotatable thereabout to pass through the material of the insulator in an arcuate path, a spreader adapted to be mounted upon said guide and insertable through the passage formed by the cutter, and means for expanding the spreader, the spreader being rotatable with respect to the guide for forcibly wiping the walls of the passage.

13. In an apparatus of the character described embodying means for cutting a curved passage through an insulator in plastic condition, wiping means for the passage comprising a curved expansible member insertable through the passage, and means for expanding the member whereby upon subsequent retraction thereof through the passage the passage walls will be forcibly wiped and compressed.

14. In an apparatus of the character described, means for cutting a curved passage through an insulator, and finishing means for smoothing the walls of the passage including a tool insertable through the passage, and means for expanding the tool whereby

upon retraction thereof through the passage it will compressingly wipe against the walls.

15. In an apparatus of the character described, means for cutting a curved passage through an insulator, and finishing means for smoothing the walls of the passage including a tool insertable through the passage, and means for expanding the tool whereby upon retraction thereof through the passage it will compressingly wipe against the walls, said tool being formed as a curved split body equipped at one end with a handle.

16. The method of forming a curved passage in an insulator consisting in cutting a passage and subsequently compressing and wiping the walls of the passage to heal tears and pits therein and render the surface smooth.

17. In a device of the character described, an element disposable against the surface of an insulator, a guide carried by said element, a tubular curved cutter slidably mounted upon the guide and movable thereabout in a curved path to pass through the material of the insulator, and means for restraining the cutter against radial movement.

18. The method of forming a curved passage in an insulator comprising cutting a passage while the material is in a plastic condition, and subsequently compressing the walls of the passage to render the surface smooth.

19. The method of forming a curved passage in an insulator in plastice condition, comprising cutting a passage and subsequently wiping the walls thereof to render the surfaces smooth.

20. In an apparatus of the character described, means for cutting a curved passage through an insulator in plastic condition, a curved expansible member insertable through the passage, and means for expanding the member whereby upon subsequent withdrawal thereof through the passage the passage walls will be forcibly wiped and compressed.

21. Means for smoothing the walls of a curved passage formed in an insulator in plastic condition, comprising a curved tool insertable through the passage, and means for expanding the tool whereby upon subsequent withdrawal thereof through the passage the walls of the passage will be frictionally engaged, compressed and wiped.

22. Means for smoothing the walls of a curved passage formed in an insulator in plastic condition, comprising a curved tool insertable through the passage, and means for expanding the tool whereby upon subsequent withdrawal thereof through the passage the walls of the passage will be frictionally engaged, comressed and wiped, said tool being longitudinally split, and the expanding means comprising a wedge insertable within the end of the tool.

23. In an apparatus for forming curved passages in insulators in plastic condition, the combination of guide means adapted to be positioned upon the top or bottom of an insulator in centered relation thereto, a curved tubular cutter movable circumferentially of the guide and adapted to be forced through the insulator in a curved path, and a tool insertable through the passage and adapted to be expanded whereby upon subsequent withdrawal through the passage it will compressingly engage and wipe the walls thereof.

24. In a device of the character described, stationary supporting means for a mold carrying an insulator in plastic condition with one surface of the insulator exposed, a swingably mounted arm carried by the support, bearing means on the arm adapted to seat upon the exposed surface of the insulator, a stationary guide carried by the arm, and a tubular cutter slidable upon said guide circumferentially thereof and adapted to be forced through the insulator in a curved path.

25. In a device of the character described, stationary supporting means for a mold carrying an insulator in plastic condition with one surface of the insulator exposed, a swingably mounted arm carried by the support, bearing means on the arm adapted to seat upon the exposed surface of the insulator, a stationary guide carried by the arm, and a tubular cutter slidable upon said guide circumferentially thereof and adapted to be forced through the insulator in a curved path, said bearing means conforming substantially to the area of the insulator contacted thereby.

In testimony whereof I affix my signature.

MINOR F. H. GOUVERNEUR.