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W. H. SMITH

APPARATUS FOR UNDERCUTTING PIN HOLES IN THE CENTER SHELLS OF INSULATORS

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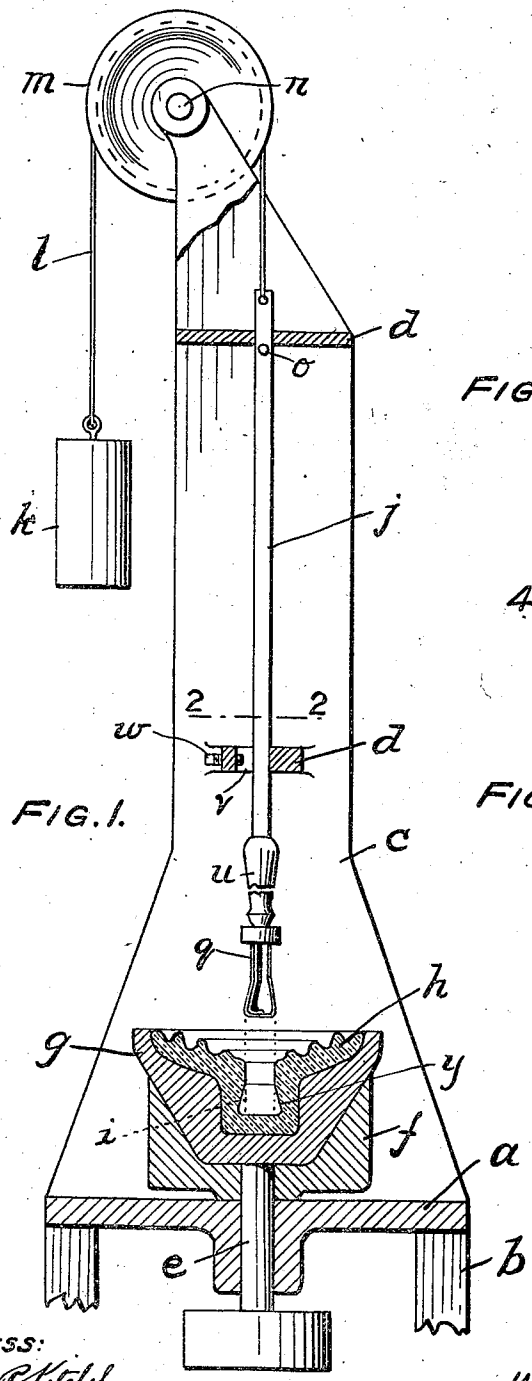


FIG. 1.

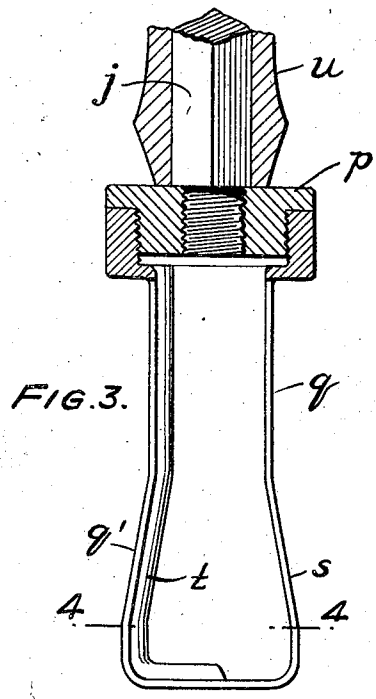


FIG. 3.

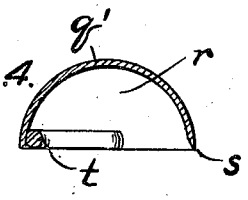


FIG. 4.

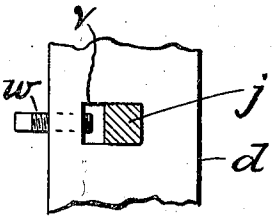


FIG. 2.

WITNESS:

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BY

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR UNDERCUTTING PINHOLES IN THE CENTER SHELLS OF INSULATORS.

Application filed January 11, 1927. Serial No. 160,508.

My invention relates to mechanism for use in connection with the production of insulators and more particularly for use in undercutting the center pin hole formed in the center shell of insulators of the suspension type.

As is well known, insulators and more particularly insulators of the suspension type, include as an element a center shell of non-conducting material, usually porcelain. The center shell is formed with an apron and a head portion over which fits and to which is adapted to be secured a cap, usually of metal and provided with means enabling it to be secured to a support. The head portion is provided with a pin hole or other insulator, within which a pin, adapted to be connected with a cable clamp, is secured. In the usual construction, the pin is secured within the pin hole by means of cement, the cement being keyed to the pin and usually bonded or keyed to the porcelain of the center shell.

In certain types of insulators the interior of the pin hole, more especially adjacent its upper end, is grooved to permit the cement to key or undercut to form a tapered surface to permit the cement to key and upon which the load strains are directed. An insulator of the latter mentioned type is, for example, shown in the application for patent of David H. Osborne, filed December 10, 1926, Serial No. 153,757, and my present invention will be described more particularly in connection with an embodiment for undercutting the pin hole and forming a tapered surface such as is provided in the Osborn insulator, though it will be understood that I do not intend that my invention shall be limited to the formation of any particular undercut, since the mechanism embodying my invention may be utilized for the formation of various forms of undercuts and grooves within the pin hole without departing from the essence of my invention.

Having now indicated in a general way the nature and purpose of my invention I will proceed to a detailed description thereof with reference to the accompanying drawing in which is illustrated a preferred embodiment and in which:

Figure 1 is a sectional view partly broken away of a device embodying my invention, a cutting tool thereof being illustrated as turned out of normal position to show the cutting portion thereof.

Figure 2 is a fragmentary view partly in section showing a detail of construction of the device illustrated in Figure 1.

Figure 3 is detail view partly in section showing a cutting tool and support therefor in the same position as in Fig. 1.

Figure 4 is sectional view taken on line 4—4, Figure 3.

In the drawings *a* indicates a bench or table supported by legs or supports *b*, while *c* indicates a post or upright member supported from table *a* and connected to a similar post or upright by means of cross members *d*.

A vertical shaft *e* extends upwardly through the table *a*, between the posts *c*. At a point beneath the table the shaft *e* is provided with a pulley for the reception of a driven belt by which the shaft may be rotated and has secured to its upper end, above the table, a cup *f* for the reception of a mold *g*, within which is the center shell *h* of an insulator.

The center shell as formed in the mold *g* is provided with a cylindrical pin hole indicated by the dotted line *i*, Figure 1. As will be noted, if desired the cup *f* may be formed to receive the center shell directly if it has been previously removed from the mold and further, it will be noted that if the shaft *e* be rotated the center shell will be rotated.

Extending vertically through apertures in the cross members *d* is a rod *j* the upper end of which is connected to counter weight *k*, through the medium of a cord *l*, which passes over a pulley *m*, on a shaft *n*, supported by posts *c*. The counter weight lifts the rod *j* to a position determined by the engagement of a stop *o*, on the rod, with the under side of the upper cross member *d*.

The lower end of the rod *j* is reduced and threaded for the reception of a tool head *p* having a reduced threaded portion upon which is threaded the shank of a cutting tool *q*. The cutting tool *q* is curved and preferably semicircular in cross section, though it may be more or less than semicircular and is provided with an enlarged tapering head *q'* having a closed end *r* and having a

cutting edge *s*. Adjacent the edge of the tool opposite to the cutting edge is formed an internal rib or bead *t*, which extends for a distance along the edge of closed end *r*. A handle *u* is provided on the rod *j* adjacent tool head *p*.

The aperture *v* in the lower cross member *d* through which the rod *j* passes is made in one direction substantially larger than the rod and the aperture in the upper cross member receives the rod loosely so that the rod and the tool supported thereby may be moved laterally a distance fixed by an adjustable stop *w* projecting into the aperture *v*.

When the rod *j* is in normal position, the tool *q*, which is made of a size to freely enter the pin hole in the center shell as formed by molding, is positioned above and in line with the pin hole, as indicated by the extensions of the dotted lines *i*, Figure 1.

To effect the undercutting of a center shell *h* supported, as indicated, and rotated, by rotation of shaft *e*, the tool is entered in the pin hole until its closed end *r* bears on the bottom of the pin hole. The tool is then gradually moved laterally out of center into the hole causing the cutting edge of its head *q* to cut in the wall. The tool is moved laterally until stopped by the engagement of rod *j* with stop *w* which results in the production of the undercut indicated at Figure 1. It is to be understood that the tool *q*, for clarity, is shown as rotated on its own axis in Figs. 1, 3 and 4. It is clear that in operation that the cutting edge *s* is positioned so that it is caused to cut when the rod *j* is moved laterally, that is, it is placed forwardly of the general direction of lateral rod movement during cutting.

During the operation the shaving taken off by the cutting edge is guided and caused to be retained within the body of the tool by the rib *t* so that the shaving may be removed from the hole with the tool. The closed end *r* of the tool serves to smooth or iron the bottom of the pin hole and the edge opposite the cutting edge serves to smooth or iron the wall of the hole during the cutting operation.

After the undercut *y* is completed the tool may be readily removed from the hole by merely moving it laterally to normal position centrally of the hole and raising it.

It will be obvious that if it be desired to form grooves within the pin hole or form it otherwise than by undercutting as described above, such may be accomplished by suitable change in the form of the cutting edge of the tool *q*.

It will now be noted that by virtue of my invention there is provided a tool by which the interior of the pin hole of a center shell may be undercut, grooved or otherwise formed, with ease and simplicity and with the production of a smooth finished surface.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In apparatus for undercutting the pin holes of center shells for insulators, in combination, a support for a center shell and a cutting tool supported for vertical and transverse movement relative to said support, and means associated with said tool for preventing the material removed from interfering with the cutting edge of said tool.

2. In apparatus for undercutting the pin holes of center shells for insulators, in combination, a support for a center shell, a cutting tool supported coaxially with the axis of said support and adapted for movement vertically and transversely relative its axis, and means associated with said tool for preventing the material removed from interfering with the cutting edge of said tool.

3. In apparatus for undercutting the pin holes of center shells for insulators, in combination, a rotatable support for a center shell, a cutting tool supported coaxially with the axis of said support and adapted for movement vertically and transversely relative its axis, said tool having a hollow form with one cutting edge and another ribbed edge, whereby material being cut is prevented from interfering with the cutting edge of said tool and whereby said material may be removed when said tool is removed.

4. A tool for undercutting the pin holes of center shells for insulators comprising a curved body portion provided with an enlarged head, one edge of which is adapted to act as a cutting edge.

5. A tool for undercutting the pin holes in center shells for insulators comprising a body and a tapered head, said head being curved in cross section and having a maximum separation of the edges approximately equal to the diameter of the pin hole to be undercut.

6. A tool for undercutting the pin holes in center shells for insulators comprising a body and a tapered head, one edge of which is adapted to act as a cutting edge, said head being semicircular in cross section and having its maximum diameter at a point spaced from its free end and approximately equal to the diameter of the pin hole to be undercut.

7. A tool for undercutting the pin holes of center shells for insulators comprising a curved body portion provided with a tapering head having one of its edges formed into a cutting edge and a rib extending within the head adjacent its other edge.

8. A tool for undercutting the pin holes of center shells for insulators comprising a curved body portion provided with a taper-

ing head having one of its edges formed into a cutting edge and a rib extending within the head adjacent its other edge and within the body.

9. In apparatus for undercutting the pin holes of center shells for insulators, in combination, a rotatable support for a center shell, a vertically and transversely movable tool support and a tool, comprising a curved body and an enlarged head one edge of which is adapted to act as a cutting edge, secured to said support.

10. In apparatus for undercutting the pin holes of center shells for insulators, in combination, a rotatable support for a center shell, a vertically and transversely movable tool support and a tool, comprising a curved body and an enlarged head one edge of which is adapted to act as a cutting edge, secured to said tool support, said tool support being normally positioned so that the tool secured thereto will be supported substantially coaxially with the pin hole in a center shell supported by said rotatable support.

In testimony of which invention, I have hereunto set my hand, at Norristown, Pa., on this 21st day of December, 1926.

WILLIAM HENRY SMITH.