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INSULATOR KNURLING DEVICE

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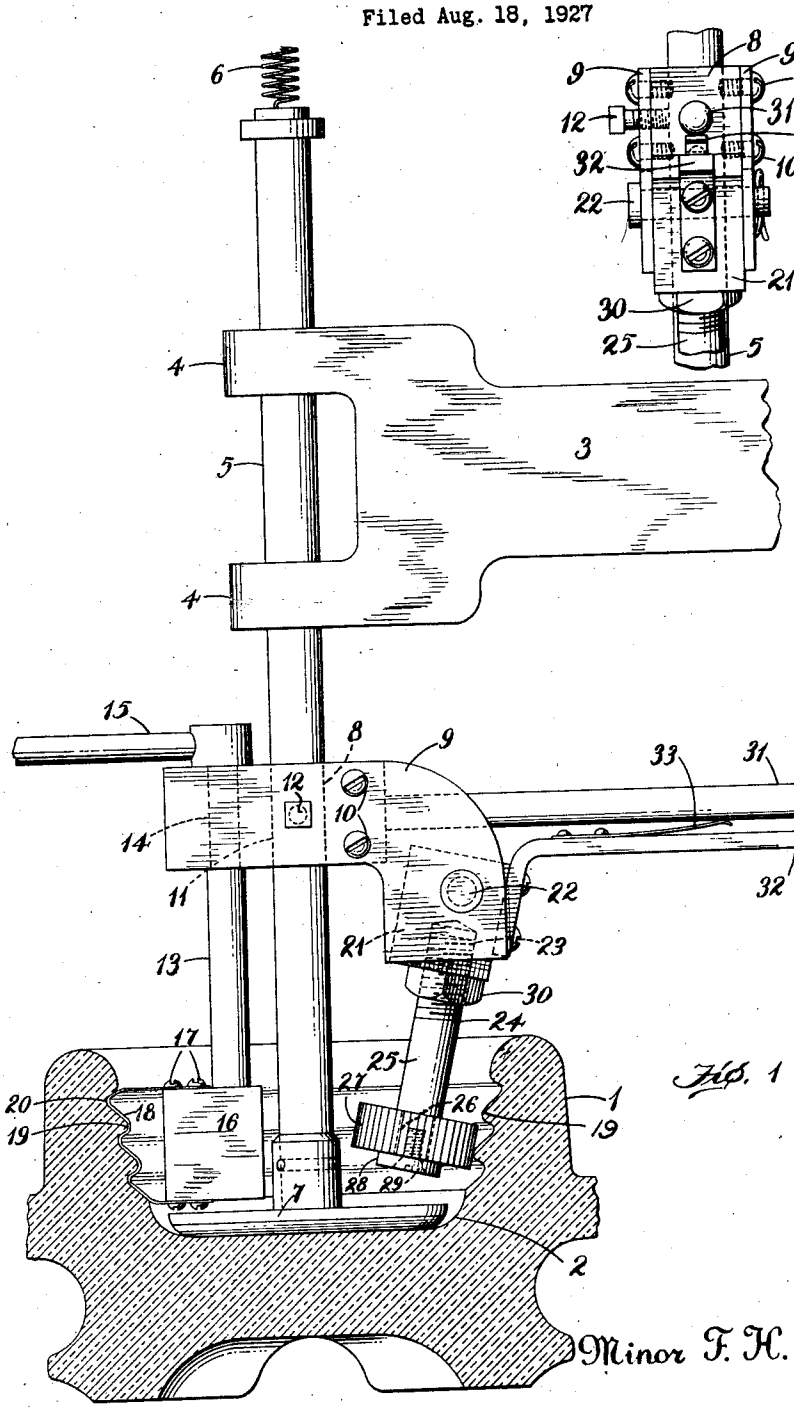


Fig. 2

Fig. 1

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INSULATOR-KNURLING DEVICE.

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The invention relates to means for knurling the wall of the socket or recess in an insulator unit so as to provide means whereby the cement employed for securing the unit to an adjacent one or to a pin, post or the like may have an efficient grip which will resist torsional strains.

It is well known in the art that it is a common practice to provide or form the wall of the socket or recess in an insulator with a series of horizontally extending alternating ridges and grooves, the term "horizontal" meaning that these ridges and grooves extend circumferentially or at right angles to the longitudinal axis of the unit. The purpose of these ridges and grooves is to provide means with which the cement may lock so that one unit will be held firmly to the next adjacent one or to an element such as a post or the like in such manner as to resist separation by relative longitudinal movement. However, it is highly desirable that the construction be such that there will be adequate resistance to torsional strains. It has been proposed to provide grooves extending longitudinally of the unit and one method of accomplishing this has been to employ a knurl mounted on a suitable handle and operated manually by a workman, the knurl being pressed against the wall of the recess or socket while the insulator unit is rotated, the knurl acting to provide grooves in one or more of the circumferential ridges. A disadvantage of such a method is that reliance is placed solely upon the skill of the workman and the trueness or accuracy of his eye and judgment and it therefore follows that the units are not uniform as regards the location of the knurled band and the depth of the grooves.

It is with the above facts in view that I have designed the present invention which has for its object the provision of a machine or mechanical means by which the knurling may be effected not only more quickly and easily than can be done by hand but also far more accurately so that variations in individual units will not occur.

An important object of the invention is to provide a knurling or grooving device adapted to be directly associated with the mechanism for forming the recess wall with the alternating circumferential ridges and grooves so that the circumferential grooving or ridging and the knurling may be carried out in immediate succession, thereby avoiding loss of time in changing from one tool or machine to another.

Another object of the invention is to provide a machine of this character so constructed that the movement of the knurling element with respect to the wall of the recess is limited, thereby limiting the depth of the grooves formed.

Another object of the invention is to provide a device of this nature which is adjustable in so far as the position of the knurl with respect to the top or bottom of the recess is concerned, so as to make it certain that the knurl will engage upon one of the circumferential ridges, this feature also making it possible to position the knurl in such manner that it may be caused to contact with two of the ridges as might be found advisable in the case of very large units compelled to withstand severe torsional strains.

Another object is to provide a device of this character which may be built right onto the circumferential groove and ridge cutter though operating independently thereof, the combining of the two devices in a unitary structure reducing the cost of the equipment necessary to finish the insulator in this respect.

An additional object is to provide a device of this character which will be simple and inexpensive to manufacture, easy to use, positive in action, efficient and durable in service, and a general improvement in the art.

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

Figure 1 is a side elevation of the device showing it in association with a ridge and groove cutter mechanism and in operative relation to an insulator unit, and

Figure 2 is an end elevation of the device looking at it from the right hand side of Figure 1.

Referring more particularly to the drawing, the numeral 1 designates an insulator unit or shell which, in ordinary practice, may or may not be mounted within a holder but

which is carried by a rotatable platform, the holder and platform not being shown as they are old and well known and form no part of the present invention. The exact type of shell or unit is immaterial though it is of course of the variety having a recess 2 therein adapted to receive the projection or stem portion on an adjacent unit or to receive a supporting post or the like. The platform above referred to and not illustrated forms part of a circumferential ridge and groove cutting machine, certain portions of which are illustrated for the purpose of explaining the mounting and use of the device forming the subject matter of this application. Such a machine includes a frame 3, only a small portion of which is illustrated, which frame has superposed bearings 4 thereon through which is slidable a shaft 5 preferably provided at its upper end with a spring device 6 tending to draw it upwardly. However, the mounting of this spring device is not illustrated as it is non-essential. At its lower end the shaft 5 has swivelled thereon a disk-like pad 7 adapted to seat upon the bottom of the recess 2 of the insulator unit and of course to rotate as the insulator is rotated. By swivelling the pad upon the shaft the former may rotate with the insulator while the latter remains stationary with respect thereto.

While it is conceivable that my knurling device may be built and mounted upon the shaft 5 by itself, it is preferable that it be combined with a ridge and groove cutter, this arrangement being of manifest convenience. I have therefore disclosed the two devices as having a common mounting here represented as including a block-like member 8 mounted between side plates 9 suitably secured thereto, as for instance by means of the screws 10, the block member having a bore 11 therethrough for the passage of the shaft 5. The block member with the side plates thereon may be mounted in any desired adjusted position along the shaft 5 and may be so held as by the set screw 12 for a reason to be described. The circumferential ridge and groove cutting device is represented as including a shank 13 having a reduced stem portion 14 journaled through the block member 8 and equipped thereabove with a handle 15 whereby the shank may be rocked back and forth to a desired extent. At its lower end the shank 13 carries a block-like support 16 to which is secured in any suitable manner, as by screws 17, the cutter 18 which in actual practice may be simply a thin strip of metal bent into a serrated form so that it will be capable of cutting alternating ridges and grooves 19 and 20 in the wall of the recess 2. The rotatability of the shank 13 permits the cutter 18 to be swung into or out of engagement with the wall of the recess as will be readily apparent.

The essential feature of the present invention lies in the provision of means for knurling one or more of the ridges 19 formed by the cutter 18, and in carrying this out I have shown a block-like member 21 pivoted at 22 between the side plates 9 so as to be capable of vertical swinging movement. This block-like member is preferably formed with a threaded socket 23 within which is screwed the threaded end 24 of a stub shaft 25 having a reduced end portion 26 on which is journaled a knurl wheel 27 held in place in any suitable manner as for instance by means of a retaining washer 28 and screw 29. A lock nut 30 is preferably provided on the threaded end 24 to jam against the lower face of the block-like member 21 for the purpose of positively securing the stub shaft 25 against rotation after it has been adjusted to extend to the desired degree beyond the block member. Adjustment of the stub shaft 25 to bring the knurl wheel 27 into proper relation to the ridge or ridges 19 to be cut consists in screwing the stub shaft into or out of the socket 23 to bring the knurl in the proper position, and the lock nut is of course tightened when such position is ascertained.

A suitable handle 31 projects laterally from the block member 8, and a suitable handle 32, here shown as of angular shape, is secured to the block member 21 in such position that it extends adjacent but in slightly spaced relation to the handle 31. Resilient means such as the leaf spring 33 is preferably interposed between the handles 31 and 32 for the purpose of normally urging the block member 21 and shaft 25 toward the shaft 5 so that the knurl will be out of engagement with the insulator. It is generally customary to provide a spring of the same or a different nature in association with the circumferential groove and ridge cutting device for the purpose of normally holding the cutter thereof out of engagement with the insulator unit but this last named feature is not illustrated as it is of no importance in the present instance.

In the operation, the insulator either alone or within a form, not shown, is placed upon the rotatable platform, likewise not shown, and the shaft 5 is moved downwardly, as for instance my pressing upon the handle 31, to bring the pad 7 into engagement with the bottom wall of the recess 2. In machines of this general type the insulator holding form is of course properly centered upon the platform so that the axis of the unit 1 will coincide with that of the shaft 5. After the shaft 5 has been thus moved downwardly into proper position, the operator grasps the handle 15 and turns the shank 13 and block 16 to bring the cutter 18 into engagement with the wall of the recess 2. Of course the insulator is in a "green" state and the cutter 18 will cut out the plastic material and form the ridges 19 and grooves 20. It is of course to be as-

sumed that the necessary adjustments have previously been made in regard to the knurl 27 so that it will be in the proper position with respect to the grooves formed by the cutter 18. After the circumferential alternating ridges and grooves have been cut the handle 15 is turned or permitted to turn into such position that the cutter 18 will be withdrawn from engagement with the unit. The operator then simply grasps the handles 31 and 32 and squeezes them together against the resistance of the spring 33. When this is done the block member 21 carrying the stub shaft 25 will be swung downwardly and outwardly away from the shaft 5, the knurl 27 then coming into engagement with one or more of the ridges 19 so that as the insulator is rotated a knurled band, or band consisting of a series of longitudinal grooves, will be formed. In view of the fact that the handle member 32 has a very limited movement with respect to the handle 31, it is apparent that the depth of the knurled grooves will be limited and will be or at least should be uniform in all the units worked on by this machine. After the knurling has been effected the operator simply releases his grip upon the handles 31 and 32 so that the spring 33 may swing the knurl into inoperative position. The shaft 5 is then permitted to move upwardly to bring the entire mechanism above the top of the insulator, and the latter is removed from the supporting platform. It is of course immaterial whether or not the insulator is mounted directly upon the platform or is maintained within a holder. Generally, at least in the case of insulators of comparatively small size, a holder may be unnecessary but in case of very large sizes where there might be more or less danger of the outstanding skirt sagging or warping, a holder would be advisable. However, this is immaterial one way or the other.

From the foregoing description and a study of the drawing it will be apparent that I have thus provided a simply constructed and very easily operated machine which will effect a great saving of time and labor in the manufacture of insulators. Furthermore the work will be more accurate as there is no dependence placed upon the eye or judgment of an operator, the different movements being positively limited so that all units made by the mechanism should be uniform. It is believed that the construction, operation and advantages will be readily apparent to one skilled in the art without further explanation.

While I have shown and described the preferred embodiment of the invention, it should be understood that the disclosure is merely an exemplification of the principles involved as the right is reserved to make all such changes in the details of construction as will widen the field of utility and increase the adaptability of the device provided such changes constitute no departure from the spirit of the invention or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

1. In a machine for working upon an insulator unit having a recess therein, the combination of means disposable within the recess and operable to cut alternating ridges and grooves in the wall thereof when the insulator is rotated, and means adjacent said means for knurling certain of the ridges.

2. In a machine for working upon an insulator unit having a recess therein, the combination of means disposable within the recess and operable to cut alternating ridges and grooves in the wall thereof when the insulator is rotated, means adjacent said means for knurling certain of the ridges, and a common support for both of said means, the first and second named means being operated successively.

3. In a machine for working upon an insulator unit having a recess therein, the combination of a support, a rockable element carried thereby and carrying a cutter adapted to be brought into engagement with the wall of the recess to form alternating ridges and grooves circumferentially thereof, a supporting element pivoted to said support and carrying a knurl, and means for moving said pivoted supporting element to bring the knurl into engagement with one or more of the ridges.

4. In a machine of the character described for working upon an insulator unit having a recess therein, the unit being rotated, comprising a supporting member adapted to be engaged within the recess, a horizontally swingable cutter carried by the support engageable with the wall of the recess for forming alternating circumferential ridges and grooves, and a vertically swingable member carried by the support and equipped with a knurl engageable with certain of the ridges for forming grooves therein transversely thereof.

5. In a machine of the character described for working upon an insulator unit having a recess therein, the unit being rotated, comprising a supporting member adapted to be engaged within the recess, a horizontally swingable cutter carried by the support engageable with the wall of the recess for forming alternating circumferential ridges and grooves, a vertically swingable member carried by the support and equipped with a knurl engageable with certain of the ridges for forming grooves therein transversely thereof, and spring means normally holding the knurl in inoperative position.

6. In a device of the character described, a support adapted to be inserted within a recess in an insulator unit, the unit being adapted to rotate, means carried by the support for

cutting circumferential alternating ridges and grooves in the wall of the recess, and successively operable means carried by the support for forming a series of grooves transversely of one or more of the ridges.

7. In a machine for working upon an insulator having a recess therein, the insulator being adapted to be supported and rotated, a support adapted to be engaged within the recess and to remain stationary while the insulator is rotated, means carried by the support for forming alternating ridges and grooves circumferentially of the wall of the recess, a vertically swingable member carried by the support, a stub shaft carried by said pivoted member, a knurl journaled on said stub shaft, and handle members carried by the first named support and the pivoted support for swinging the latter to bring the knurl into engagement with one or more of the ridges.

8. In a machine for working upon an insulator having a recess therein, the insulator being adapted to be supported and rotated, a support adapted to be engaged within the recess and to remain stationary while the insulator is rotated, means carried by the support for forming alternating ridges and grooves circumferentially of the wall of the recess, a vertically swingable member carried by the support, a stub shaft carried by said pivoted member, a knurl journaled on said stub shaft, and handle members carried by the first named support and the pivoted support for swinging the latter to bring the knurl into engagement with one or more of the ridges, and means for adjusting the degree of extension of the stub shaft with respect to the pivoted support.

9. In a machine for working upon an insulator unit having a recess therein, supporting means disposable within the recess, and means carried by said means and operable to form a knurled area in the recess wall.

10. In a machine for working upon an insulator unit having a recess therein with the wall of the recess formed with a ridge, the combination of means disposable within the recess, and means carried by said means and movable into engagement with the ridge for knurling the same.

11. In a machine for working upon an insulator unit having a recess therein, the combination of supporting means disposable within the recess, a member movably mounted upon said supporting means, a knurl carried by said member, said movable member being shiftable to bring the knurl into engagement with the recess wall.

In testimony whereof I affix my signature.

MINOR F. H. GOUVERNEUR.