June 13, 1944. R. J. KENT 2,351,435

PLUG CUTTING TOOL

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FIG. 1

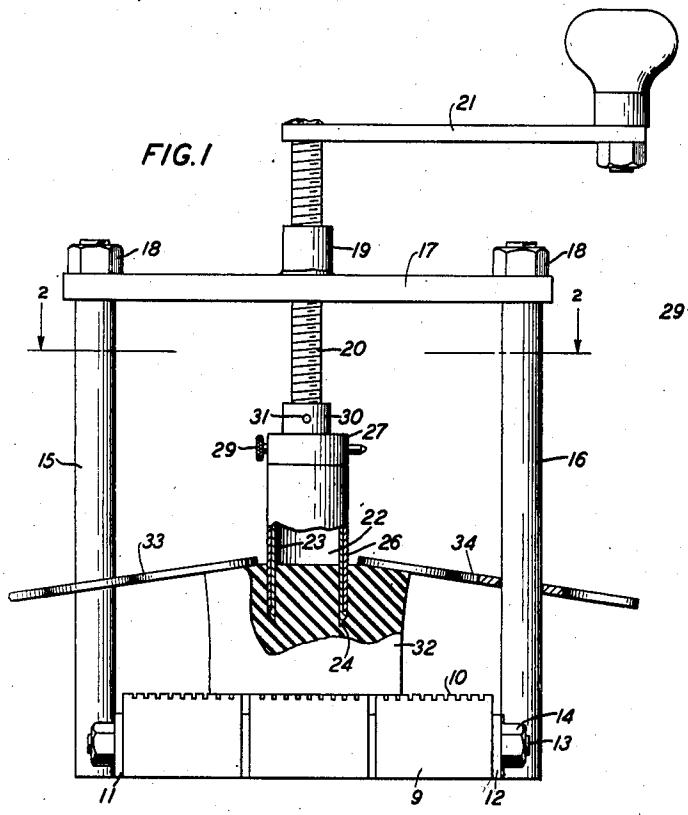

FIG. 3

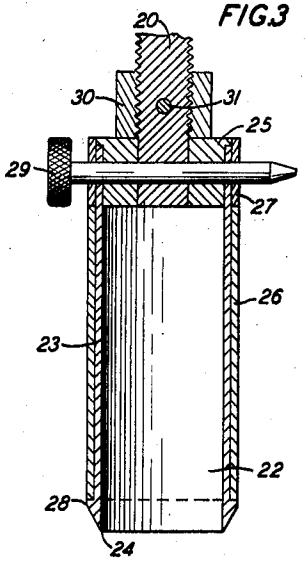

FIG. 2

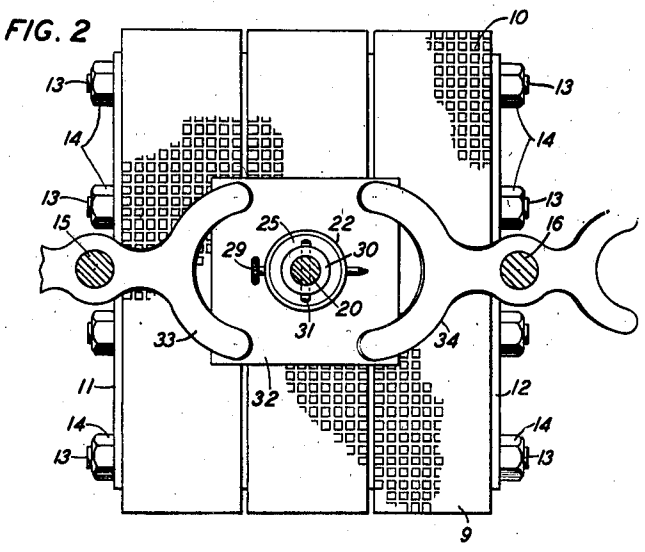

FIG. 4

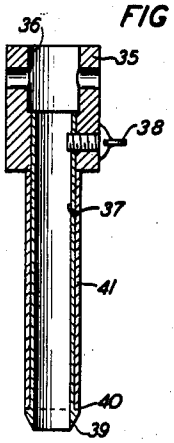

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FIG. 5

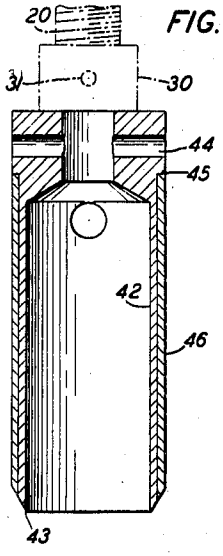


FIG. 6

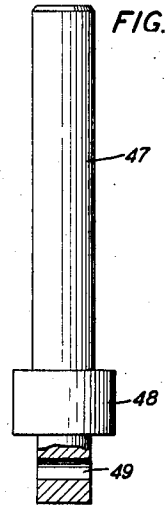
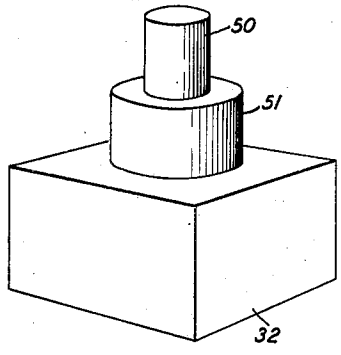


FIG. 7



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Patented June 13, 1944 2,351,435

UNITED STATES PATENT OFFICE

2,351,435

PLUG CUTTING TOOL

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Application May 30, 1942, Serial No. 445,226

3 Claims. (Cl. 164—86)

This invention relates to boring tools and more particularly to a tool for cutting cylindrical bushings or plugs from rubber or material having characteristics similar to that of rubber.

The object of the present invention is the provision of a tool for accurately cutting out from blocks of resilient material, various sizes of bushings or plugs which eliminates the binding between the cutter and the material worked upon as the cutter progresses into the material.

In an effort to reduce, to a minimum, the amount of tin-bearing solder used in making joints in lead-covered cable, various types of joints have been proposed. One of these joints is disclosed in W. C. Kleinfelder, Serial No. 441,333, filed May 1, 1942, which utilizes bushings of resilient material confined between the inner wall of the sleeve which covers the splice and the outer wall or sheath of the lead-covered cable. It is with the bushings of resilient material used in this type of joint that this invention is primarily concerned and more particularly to the tool for cutting the bushings out of blocks of resilient material.

In accordance with the preferred form of this invention, there is provided two cylindrical or tubular members, one position within the other with a slight clearance therebetween. The inner tubular member is rotated by means of a suitable handle affixed thereto while the outer tubular member remains stationary. As the two members are forced downwardly into the block of resilient material the inner member rotates and cuts into the material, while the outer member does not rotates but follows down closely and prevents the material from binding the inner tubular member.

The features of my invention will be more readily understood from the following detailed description made with reference to the accompanying drawings of which:

Fig. 1 is a front elevational view with a portion of the cutter and the block of resilient material shown in section;

Fig. 2 is a top plan view taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged longitudinal sectional view of the cutter shown in Figs. 1 and 2;

Fig. 4 is an enlarged longitudinal sectional view of a cutter having a smaller diameter;

Fig. 5 is a longitudinal sectional view of a modified type of cutter;

Fig. 6 is an enlarged view partly in section of a spindle for holding the cutter in an ordinary brace when the mechanism of Figs. 1 and 2 is not used; and

Fig. 7 is a perspective view of a block of resilient material after a bushing and plug has been cut therefrom but before it has been removed.

In the preferred form of my invention as shown in Figs. 1 and 2, there is provided a base member 9 constructed preferably of wood or some other similar material and having its upper face provided with a series of corrugations 10 to provide a non-slipping surface. The base member 9 is provided with metal side plates 11 and 12 and is strengthened by means of the reinforcing rods 13 which project through the side plates 11 and 12 and are secured in place by means of the nuts 14.

As shown in Fig. 1 there is secured to the side plates 11 and 12, by welding or some other suitable means, a pair of diametrically opposed upstanding rods or supports 15 and 16. Bridging these supports and secured to the tops thereof by means of the nuts 18 is a yoke member 17 which has centrally located thereon the internally threaded sleeve 19. This sleeve projects some distance above the yoke 17 to provide a substantially long threaded section. Positioned in the sleeve 19 is a threaded spindle 20 the upper end of which is provided with an operating handle 21 to effect the rotation of the spindle. Located on the opposite or lower end of the spindle 20 is a core cutting device 22. This device as shown in Fig. 1, and more in detail in Fig. 3, comprises an inner tubular member 23 having at its lower portion a beveled or knife cutting edge 24 and in its upper end a shouldered bushing 25. Surrounding the member 23 with a slight clearance therebetween is an outer tubular member 26 which is confined between the band or shoulder 27 on the top of the member 23 and the shoulder 28 on the bottom. The cutting device 22 is secured to the lower end of the spindle 20 by means of the pin 29 which passes through apertures in the spindle 20, the bushing 25, inner tube 23 and band 27.

The threaded collar 30 bears against the top of the bushing 25 and is prevented from rotating, independently of the spindle 20, by means of the pin 31. Thus, the torque applied to the spindle 20 by the rotation of the handle 21 will cause the rotation of the inner cutting tube 23 while the outer tube 26 does not rotate but is merely carried downward as the inner tube progresses.

As shown in Figs. 1 and 2, the block of resilient material 32, to be worked upon, is held in

position by means of the arms 33 and 34, which are positioned on the members 15 and 16 and are locked in place due to the angular relation between the members 15 and 16 and the apertures in the members 33 and 34, which is maintained by the upward pressure of the block 32 which has been slightly compressed by the members 33 and 34.

In order that cores may be cut from the block of resilient material having diameters slightly less than the spindle 20 a modified type of holding means for the cutting device is shown in Fig. 4. As shown in Fig. 4, there is provided a sleeve or bushing 35 provided with an upper bore 36 which is adapted to accommodate the end of the spindle 20 in a manner similar to that as heretofore described with respect to the device 22. The bushing 35 is provided with a reduced bore at its lower end to accommodate the cutter tube 37, which is held in place by means of the wing screw 38, which, like the inner cutter tube 23 heretofore described, is provided with a cutting edge 39 and a shoulder portion 40. Like the device 22 an outer tube 41 is also provided between the lower edge of the bushing 35 and the shoulder portion 40.

In the modified core cutter shown in Fig. 5, the cutting tube is made integral with the means for securing it to the spindle and comprises an inner tube 42 having a cutting edge 43 at its lower end and a centrally bored head at its upper end to accommodate the spindle 20 and a transverse bore 44 to accommodate the pin 29. A shoulder 45 is provided against which the upper end of the outer tube bears when pressure is applied to the cutter by means of the spindle 20. As shown in Fig. 5, the lower edge of the outer tube 46 is also provided with a beveled edge to facilitate its passage through the block of resilient material.

In those instances where it is desired to use a hand brace or a similar tool to rotate the core cutter an adapter or spindle 47, as shown in Fig. 6, is provided. This spindle is preferably constructed from one piece of material and is provided with a shoulder portion 48 and a transverse bore 49 located at its lower end for securing it to the top portion of the core cutter.

In the operation of the tool shown in Figs. 1 and 2 a block of resilient material 32 is placed in position on the base 9 with the clamps or holding members 33 and 34 in firm engagement therewith to prevent movement or displacement. Due to the novel construction of these members the block 32 will be firmly held in place without any supplemental means. After the proper size of core cutter has been fitted to the end of the spindle 20, the handle 21 is rotated clockwise, which causes the cutting edge 24 of the inner tube 23 to engage the surface of the block 32. As the handle 21 is rotated the spindle 20 is caused to travel downward thereby rotating the inner tube 23 of the device 22 and at the same time applying considerable downward pressure thereto.

As the device 22 proceeds downward into the block 32, due to the downward pressure and rotary motion applied to the inner tube 23, as shown in Fig. 1, the outer tube 26 which does not rotate and is interposed between the rotating tube 23 and the resilient material, causes the resilient material of the block to be held out of contact with the rotating inner tube 23, except for that small portion at the bottom which forms the cutting edge. After the device 22 has completely passed through the block of resilient material 32 it is removed and a core section as shown at 50 in Fig. 7 is the result.

After the core section 50 has been cut from the block 32 the device is removed and replaced with a device of the same construction but of substantially larger size. The size of the cutter will depend upon the size of the bushing required for the particular job. The operation with regard to the cutting out of the core 50 as described heretofore is repeated until the device 22 has passed completely through the block 32. The cutter is then removed and a bushing 51, as shown in Fig. 7, is the result.

While I have shown and described the preferred form of my invention, it is to be understood that various changes and modifications may be made therein without departing from the spirit of the invention and I am only limited by the scope of the appended claims.

What is claimed is:

1. A tool for cutting circular plugs and the like from resilient material which comprises an inner tubular member, a knife edge at the lower end of said member, means at the upper end of said member for attaching means thereto for imparting a downward pressure and a rotary motion to said inner member, and an outer tubular member telescopically fitted over said inner cutting member and free to rotate thereon.

2. A tool for cutting circular plugs and the like from resilient material which comprises an inner tubular member, a knife edge at the lower end of said member, a shoulder adjacent said knife edge, means at the upper end of said member for attaching suitable means thereto for imparting a downward pressure and a rotary motion to said inner member, a shoulder on said inner member adjacent the top thereof and an outer tubular member telescopically fitted over said inner member and confined between the shoulders on said inner member.

3. A tool for cutting circular plugs and the like from resilient material which comprises an inner tubular member, a knife edge at the lower end of said member, apertured closure means on the upper end of said inner tube for attaching suitable means thereto for imparting a downward pressure and a rotary motion to said inner tube, a shoulder on the upper end of said inner tube, and an outer tubular member telescopically fitted over said inner member and extending substantially the full length of said inner member, the top of said outer member bearing against said shoulder and having a beveled edge at its lower end in alignment with the knife edge of said inner tubular member.

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