March 14, 1950 J. WEBER, JR., ET AL 2,500,724

BUTTON BLANKING MACHINE

Filed Jan. 17, 1944 3 Sheets-Sheet 1

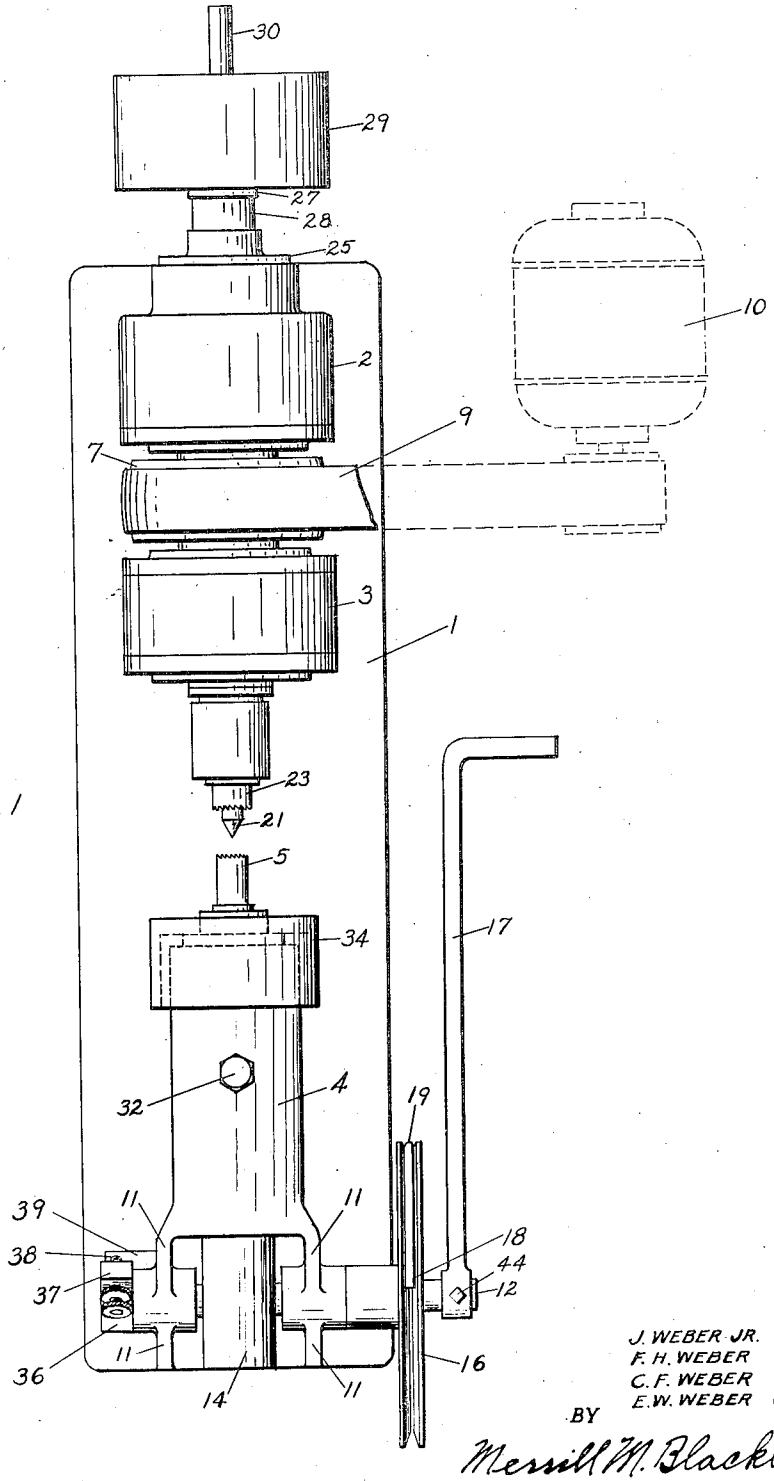


FIG. 1

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BUTTON BLANKING MACHINE

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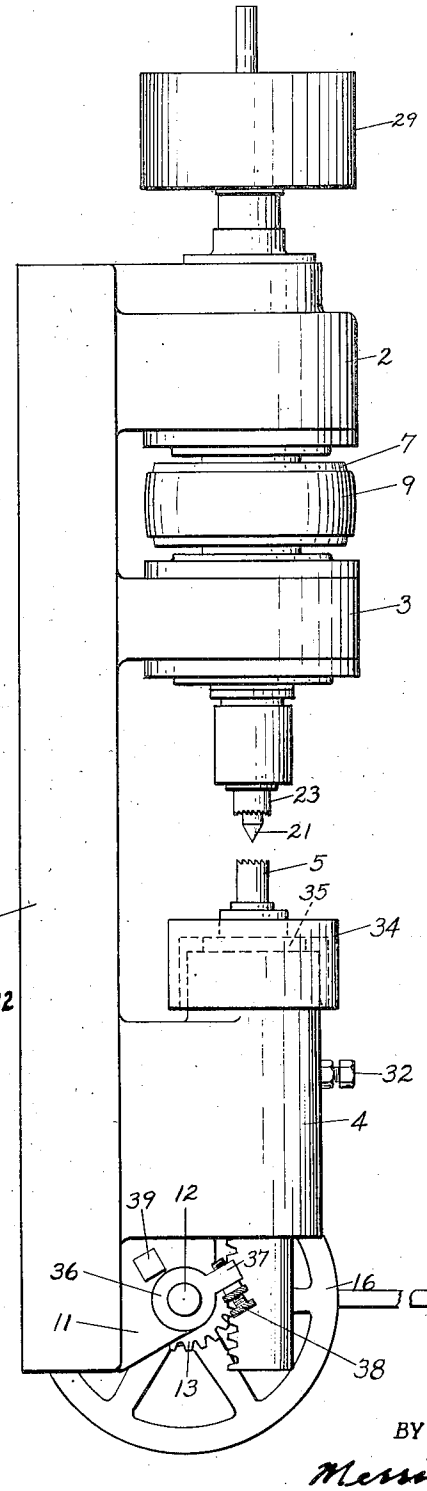


FIG. 2

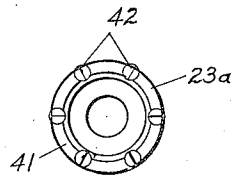


FIG. 6

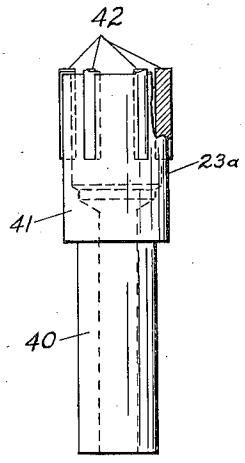


FIG. 5

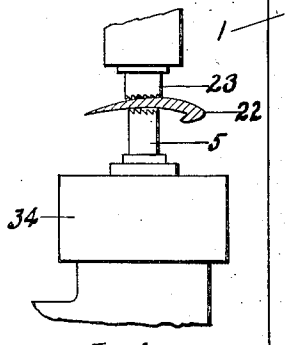


FIG. 4a

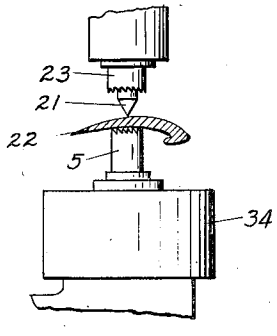


FIG. 4

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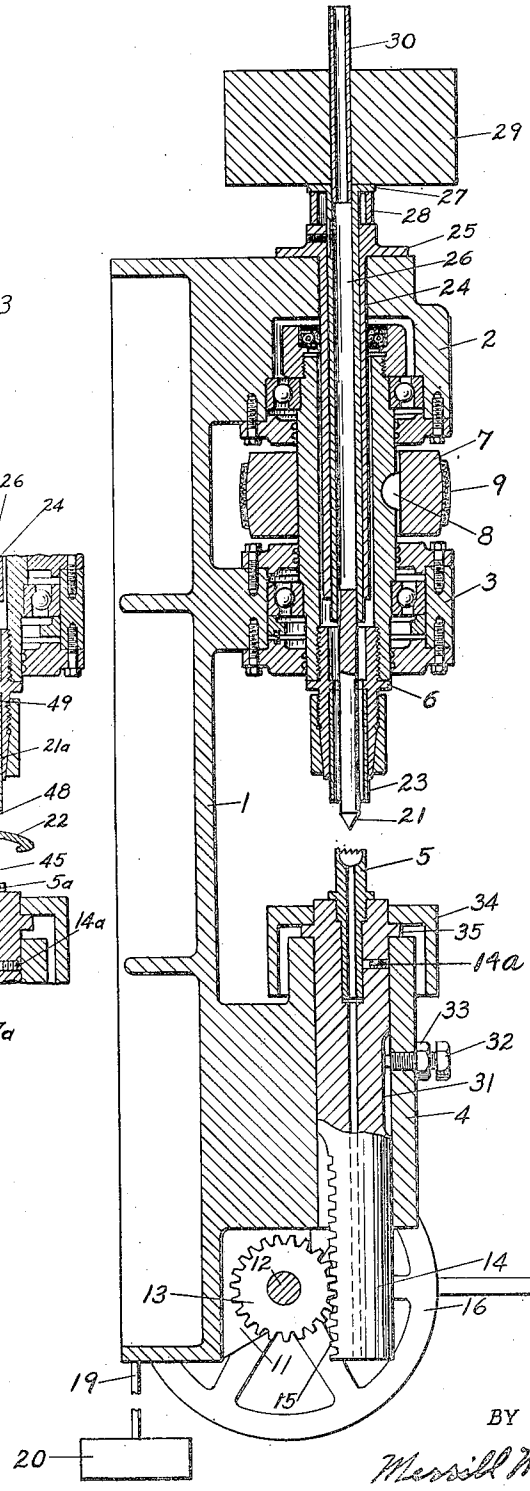
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BUTTON BLANKING MACHINE

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FIG. 3



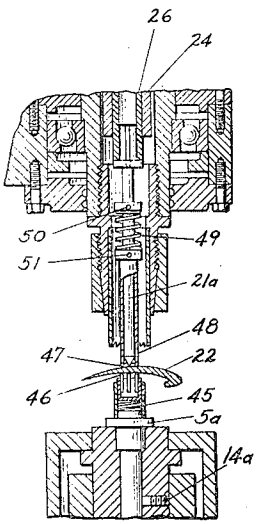


FIG. 7a

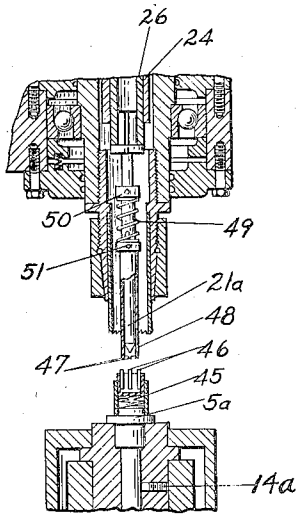


FIG. 7

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UNITED STATES PATENT OFFICE

2,500,724

BUTTON BLANKING MACHINE

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Application January 17, 1944, Serial No. 518,642

2 Claims. (Cl. 79—16)

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The present invention relates to a method of forming substantially circular blanks from roughly flat material and to a new apparatus for performing the method. This method is intended more especially for the making of button blanks from mollusk shells, although it can obviously be used with other materials and for producing circular blanks intended for other purposes than the making of buttons.

Among the objects of this invention are increased utilization of raw materials in a way to reduce wastage to a minimum; the provision of a new apparatus which is so constructed that it will grip and hold the work material in a definite position, while being worked on, so that the blanks produced from the work material will have a substantially cylindrical surface when severed from the material; the provision of an apparatus which will hold the work material against movement in any direction other than longitudinally with reference to the cutting element so as to reduce to a minimum the amount of breakage of cutting elements; the provision of an apparatus of the character indicated which will hold the work material against movement in any direction but longitudinally with reference to the cutting element and will eliminate the necessity for the operator to manually hold the material, thus running the risk of injury to his hands; the provision of an apparatus of the character indicated in which the cutting element can be easily exchanged for another one of a different size so that blanks of different sizes may be cut by the same machine without the making of radical changes in the machine; and such further objects, advantages, and capabilities as will hereafter appear and as are inherent in the structure disclosed herein. Our invention further resides in the combination, construction, and arrangement of parts illustrated in the accompanying drawings and, while we have shown therein what is now regarded as the preferred embodiment of this invention, together with a modification thereof, we desire that the same be understood as illustrative only and not be interpreted in a limiting sense.

In the drawings annexed hereto and forming a part hereof,

Fig. 1 illustrates a front view of this machine with the driving motor shown in broken lines and the driving belt broken away, the motor and belt being illustrative merely of any suitable driving means for the rotating spindle;

Fig. 2 represents a side view of the structure shown in Fig. 1;

Fig. 3 represents a vertical longitudinal central section, looking in the same direction as in Fig. 2;

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Fig. 4 is a fragmentary elevation showing how the work material is gripped and held by the work-holding elements;

Fig. 4*a* shows the structure of Fig. 4 in a different operative position;

Fig. 5 represents, in elevation, partly broken away, the preferred type of eroding means for cutting the blanks from the work material;

Fig. 6 represents a plan view, in reverse, looking down upon the structure shown in Fig. 5;

Fig. 7 shows a modified form of holding means; and

Fig. 7*a* shows the structure of Fig. 7 in a different operative position.

Reference will now be made in greater detail to the annexed drawings for a more complete description of this invention. Basically, this machine comprises a supporting member 1, a pair of bearing supports 2 and 3, and a support 4 for a work-holder 5. A rotatable spindle 6 has a drive pulley 7 secured thereto in driving relation by means of a key 8. Around the pulley 7, as shown, is a drive belt 9 which is arranged to be driven by an electric motor 10.

Webs 11 connect the main support or backbone 1 of the apparatus and the work-holder support 4 and furnish supporting means for the shaft 12 carrying the pinion 13 by means of which the lower work-holder 5 may be raised or lowered. This lower work-holder 5, as shown in Fig. 3, is carried in a socket in the upper end of the vertically movable bar 14, provided along one side with a rack 15 which meshes with the teeth of the pinion 13. A grooved pulley 16 is secured adjacent the outer end of the shaft 12 and between this and the end of the shaft is secured, in any suitable manner, a crank 17 by which the shaft may be manually rotated. At its end 18, a rope or cable 19 is secured to the pulley 16, extending over the top thereof and downwardly on the back side to a weight 20 (see Fig. 3). The amount of this weight may be adjusted in any suitable manner, as by placing auxiliary weights on top of it around the cable 19. This weight is sufficient to cause the bar 14 to be normally lifted toward its upper position. By grasping the handle 17 and pulling it toward him, the operator may lower the bar 14 and the work-holder 5 carried thereby to the position shown in Fig. 3, in which the work material may be inserted between the lower holder 5 and the upper holder 21.

In Fig. 4, the work material 22 is shown between the work-holders 5 and 21, with the lower holder 5 raised until the work material is engaged and held between the holders 5 and 21.

In this position, the work material is held down against the top of the holder 5 and is prevented from moving in any direction with reference thereto, to the holder 21, or to the saw 23. At 23a, in Figs. 5 and 6, is shown the preferred form of saw which is a modification of that shown at 23.

At 24 is shown a tubular member provided at its upper end with a flange 25 which rests upon the arm 2 and supports the tubular member immovably within the arm and inside of the spindle 6. Within the tubular member 24 is a second tubular member 26 which is slidable vertically therein. This second or inner tubular member is provided at its upper end with a flange 27 which may rest on the top of a cylindrical stop 28 and have its downward movement limited thereby to any desired extent, since stops of various lengths may be used. The upper work-holder 21 has its upper end tapered slightly and fitting in the lower end of the tubular member 26. This definitely and positively positions the member 21, laterally, with reference to the saw 23, or 23a. The same end can be accomplished by having the upper end of 21 screw-threaded into the lower end of member 26. The saw is held in a chuck mounted in the lower end of the spindle 6 and forms a continuation thereof. The upper end of the holder 21 is laterally grooved to make it possible to force air through the saw 23 to clear out cuttings from the work material.

In order to insure that the upper holding member 21, when not serving to hold the work, as in Fig. 4, will normally be at its lowermost position, means 29, shown in the present drawings as a weight, is mounted on a hollow member 30 projecting upwardly from the upper end of the tubular member 26. Of course this could be replaced by a spring but the definite weight is regarded as preferable to a spring. The mass of the weight 29 can be adjusted in any suitable manner, as by adding or subtracting auxiliary weights, so as to get the desired pressure of the work-engaging member 21 on the work material 22. The extension 30 is hollow so that air can be blown therethrough to blow away dust from the cutting area, as indicated above, if a hose is attached to the end of the extension.

A groove 31 is or may be formed in the bar 14 to receive a reduced end of the bolt 32 which projects into this groove and is held in adjusted position by means of the lock nut 33. This bolt 32, cooperating with the lower end of groove 31, serves to limit the upward movement of the bar 14 and to prevent disengagement between the pinion 13 and rack 15. It may, if desired, be omitted. The opening through the center of the bar 14 may be used either to suck the dust away from the cutting region or, if connected with a blower, it may serve for the blowing of the dust away from this region. Around the upper end of the bar 14 is closely fitted a cap 34 which rests on the flange 35 and extends downwardly to serve as a shield for keeping the dust from getting in between the support 4 and the bar 14, just under the flange 35 when the bar 14 carrying holder member 5 is moved upwardly.

The lower holder member 5 fits in the bar 14 tightly enough so that rotation of the saw 23, or 23a, will not cause the holding member 5 to rotate in the bar 14. However, a screw-threaded opening is formed in the upper end portion of the bar 14 and, as shown in Fig. 3, has a metallic plug therein which is forced

against the stem of holder member 5 by a headless set screw 14a.

The weight 29 is sufficiently heavy to hold the work material definitely positioned on the work-holder 5 and yet it is not so heavy that the weight 20, acting through the cable 19 and pulley 16, cannot push the bar 14 upwardly and lift the weight 29. Sufficient force should also be exerted to cause the requisite cutting pressure between the eroding tool or saw 23 and the work material so that the desired cutting will take place. When the cutting has been completed and the upper end of the holding member 5 is just within the lower end of the cutting member 23 and severance of the work material has taken place, the operator may grasp the handle 17 and pull it toward him, thus lowering the bar 14 and the holder member 5. At this time the work material will surround the upper end of member 5 and it must be lifted up and separated from the holder. If there is sufficient work material left for the cutting of another blank, the work material may be moved so that the blank, when cut, will be full size, when severed from the work material. This may be repeated as many times as there is sufficient uncut material in the stock for the furnishing of blanks of desired shape or size. Each time after the work material has been re-positioned, the handle 17 is allowed to move upwardly and the weight 20 causes the pulley 16 to force the lower holder 5 and the work material against the upper holder 21. This motion is continued until the work engages the cutter 23, and this, then, begins the cutting operation which is continued until the blank is severed from the work material. The work holders hold the work material and the blank, both before and after severance takes place. Mechanical operating means may be substituted for the manual means 17 for operating the holder member 5.

A collar 36 is secured to the end of shaft 12 and has an arm 37 projecting therefrom which has an adjustable screw 38 extending transversely therethrough to engage with a stop 39. This limits the downward motion of the weight 20 and the upward motion of the lower holding member 5.

It is preferable to have the lower holding member 5 proportioned with reference to the cutting tool 23 so that the former will just fit inside of the latter without contacting the same. Hence, if one has been cutting a 24-line button and changes to a 10-line button, it is necessary to put in a holder 5 of smaller diameter. On the other hand, if the change is from a 10-line to a 24-line, then it is desirable to change to a larger holder so as to support the pressure closer to the cutting tool and thus prevent shattering of the work material.

Inasmuch as the structure of the bearing head is not involved in the claims and for construction purposes appears to be perfectly clear, the same will not be described in detail. Similarly, the chuck holding the cutting tool 23 in place appears not to need detailed description.

The cutting tool 23a, shown in Figs. 5 and 6, comprises a mounting spindle 40 and a hollow cylindrical body 41 integral therewith, and also cutting elements 42. The body 41 has openings drilled longitudinally thereof and then the wall thickness is reduced both internally and externally so that the cylindrical cutting elements 42 project both within and outside of the body 41. These elements should project very slightly be-

yond the end of the cylindrical body because they are very hard and brittle. Having been mounted in the body, they are brazed or otherwise metallically united thereto so that they will be rigidly held thereby. The ends are then cut so that they are slightly stepped and have a sharp cutting edge extending substantially radially of the body member. This makes an excellent eroding tool which can be used for a whole day without resharpening, which is not true of the ordinary cylindrical steel button saw.

It is of course obvious that, because of the set-screw **44**, shown in Fig. 1, the handle **17** can be adjusted on shaft **12** to any convenient position. It is also obvious that, because of the adjustability of the stop-screw **38**, the upper limit position for the lower holding member **5** may be adjusted as desired.

In Fig. 4, the mollusk shell **22** is shown in cross-section for the purpose of showing how the inner face rests flat upon the serrated upper end of the lower holding member **5** so that it will be held rigidly against lateral or rocking movement when engaged by the upper holding member **21**.

Fig. 7 shows a modified form of the work holders in which the lower work holder **5***a* is hollow and has a light spring **45** therein for forcing upwardly a longitudinally movable contained unit so that its upper end, provided with a plurality of points, may protrude beyond the outer rigid peripheral edge of the lower holder. As this rises, the spring yields and permits the rigid part to engage the face of the work material. The points **46** of the lower holder, cooperating with corresponding points **47** at the end of a sleeve **48** surrounding an upper rigid holding member **21***a*, serve to prevent any rotation of the blank as the lower holder withdraws from the eroding means when the blank is severed from the stock. The sleeve **48** is reciprocable on the holding member **21***a* and is held down yieldingly by a spring **49**, the upper end of which bears against a collar **50** secured to holder member **21***a*. The auxiliary holding member **48** has a slot and pin connection or other equivalent means for preventing relative rotation of the parts **21***a* and **48**, as shown at **51**, and permitting relative sliding motion thereof. It will therefore be seen that the members **46** and **48** cooperate in preventing undesirable rotation of the blank as the eroding means and the lower holder separate.

One or more grooves may be formed in the upper end portion of member **21***a* to permit air to be blown through the tubular member **26** whereby to blow dust away from the cutting end of the eroding tool. Another advantage of the present construction is that it makes possible cutting closer to the edge of the work material than when holding tongs are used to position and hold the work, thus making it possible to produce a greater yield of completed work from a ton of work material.

Besides being used for the cutting of blanks, this machine may be used for the forming of holes in metallic plates or other material.

While a specific relationship of parts is disclosed herein, it is to be understood that the parts may be reversed so that what is now the lower work holder will become the upper one and vice versa.

While we have shown what is now regarded as the preferred embodiment of this invention, we desire it understood that various modifications can be made within the spirit and scope of the

appended claims and we therefore do not wish to be limited to the specific structures shown.

Having now described our invention, we claim:

1. In a blanking machine, the combination of an approximately cylindrical blanking saw, rotatable about its longitudinal axis, work-holding means, provided with at least one work-engaging point, extending axially through said saw and reciprocable longitudinally therein, said means having its work-engaging end normally extending beyond the end of the saw, means for normally holding said work-holding means protruded beyond the end of the saw, said work-holding means comprising a reciprocable spindle and a spring-pressed sleeve surrounding the spindle and normally protruding beyond the same, a second work-holding means facing the saw and the first work-holding means and reciprocable longitudinally toward and away from the same, means for holding the second work-holding means in a position to grip work between itself and the first work-holding means, and means to retract the second work-holding means from the first work-holding means to permit removal of work from between the two work-holding means and insertion of work between them.

2. In a blanking machine having a supporting frame-work provided with a longitudinal aperture, a supporting tube, flanged at its upper end, rigidly mounted in said aperture with the flange resting solidly against the upper part of the frame-work so that said tube is held against vibration and longitudinal motion therein, a sleeve mounted on said tube and capable of rotary motion around the tube, spaced anti-friction bearings mounted in said framework and holding said sleeve against vibration, whereby to assist in holding the tube steady, and a longitudinally movable shell holding member held steady within the tube, the sleeve having a chuck at its lower end within which a cylindrical saw is fixed.

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