March 16, 1943. J. WEBER, JR., ET AL 2,313,981

SELF-SHANK BUTTON DRILLING MACHINE

Filed March 21, 1940 7 Sheets-Sheet 1

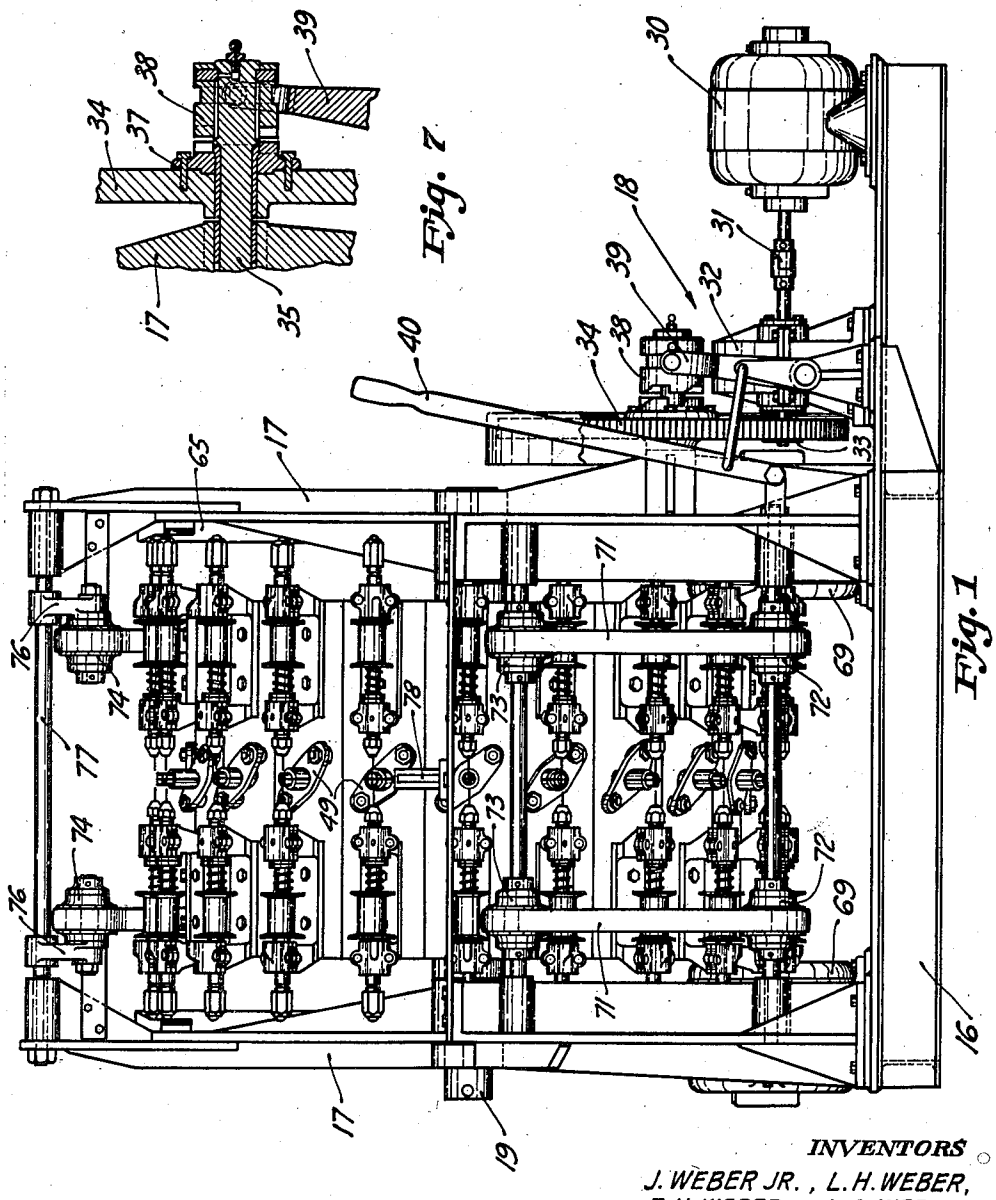


Fig. 1

Fig. 7

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SELF-SHANK BUTTON DRILLING MACHINE

Filed March 21, 1940 7 Sheets-Sheet 2

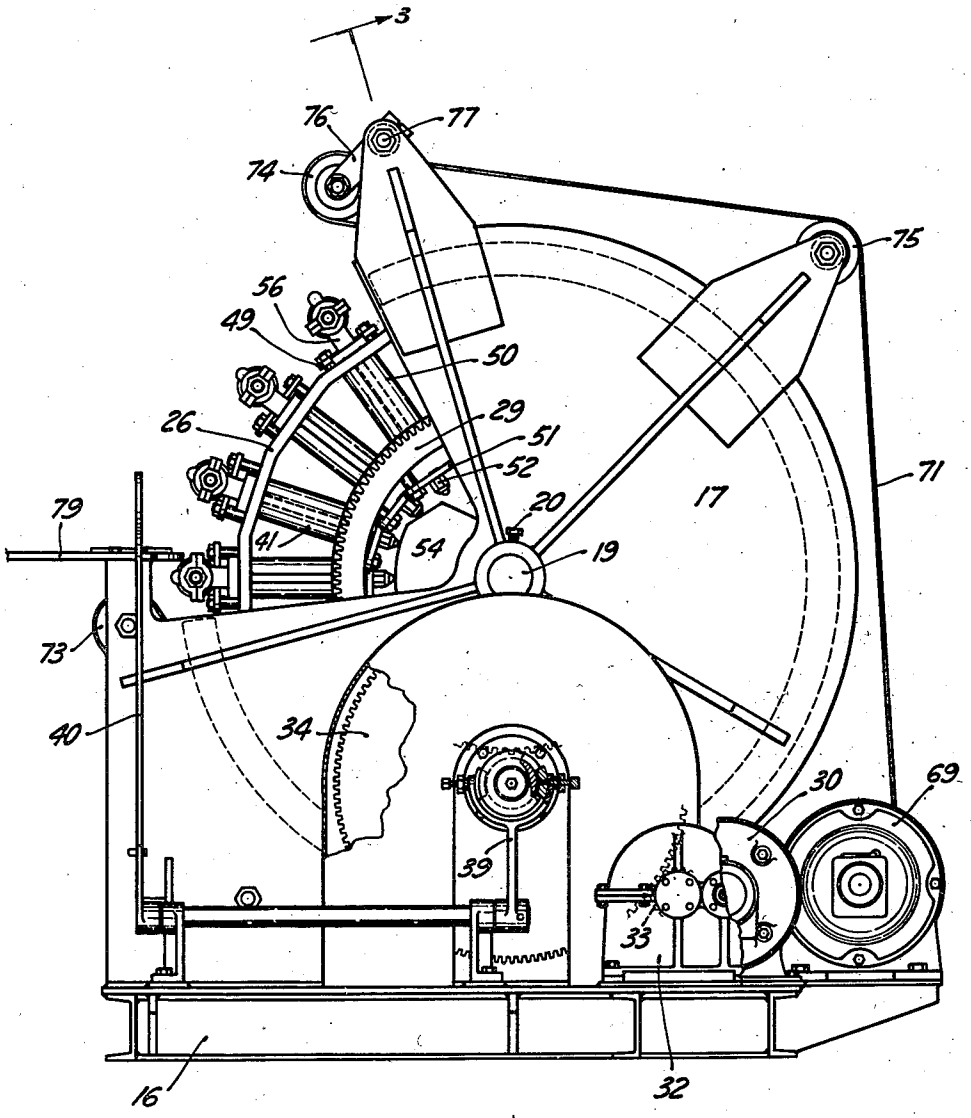


Fig. 2

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SELF-SHANK BUTTON DRILLING MACHINE

Filed March 21, 1940 7 Sheets-Sheet 3

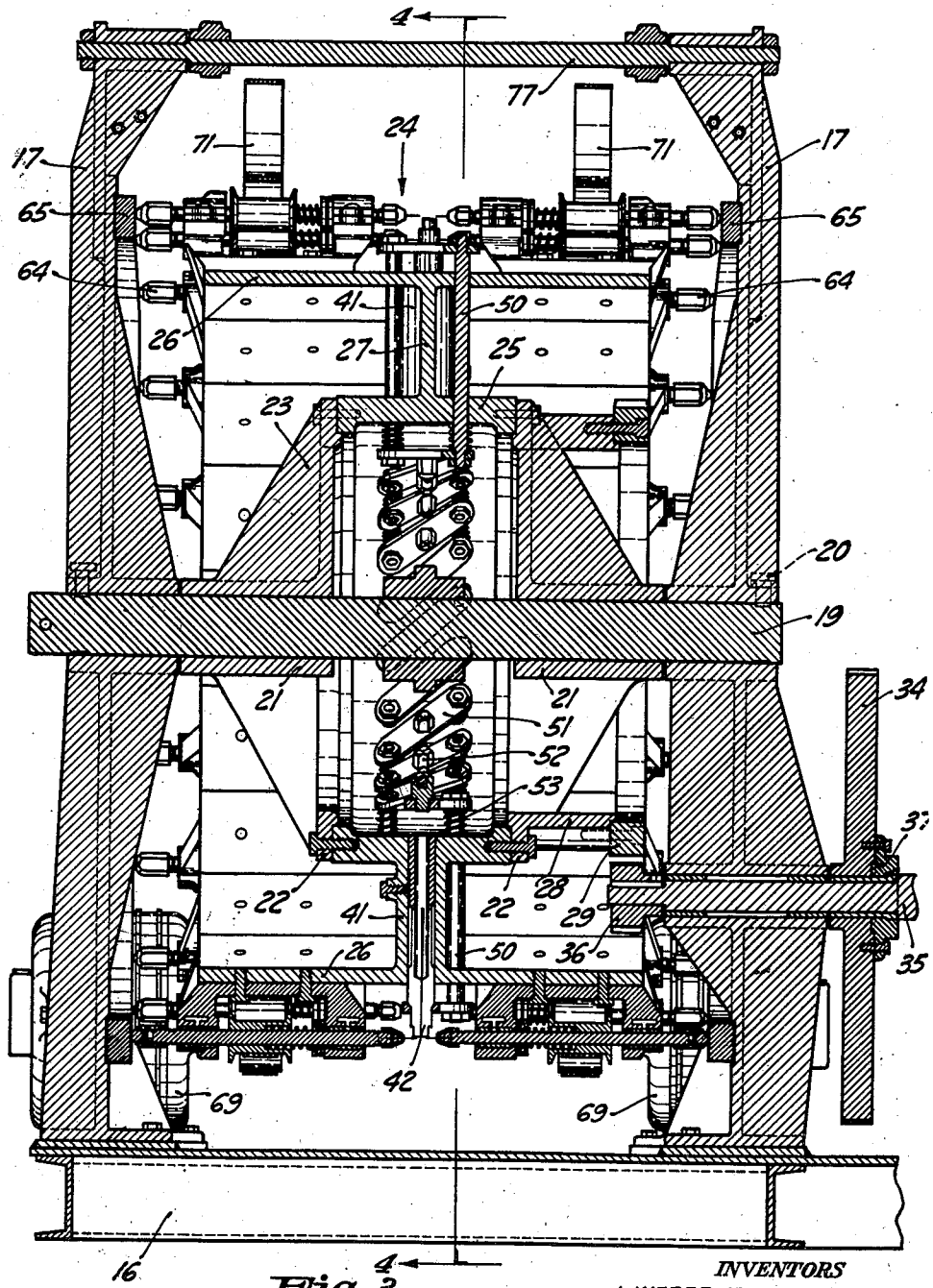


Fig. 3

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SELF-SHANK BUTTON DRILLING MACHINE

Filed March 21, 1940 7 Sheets-Sheet 4

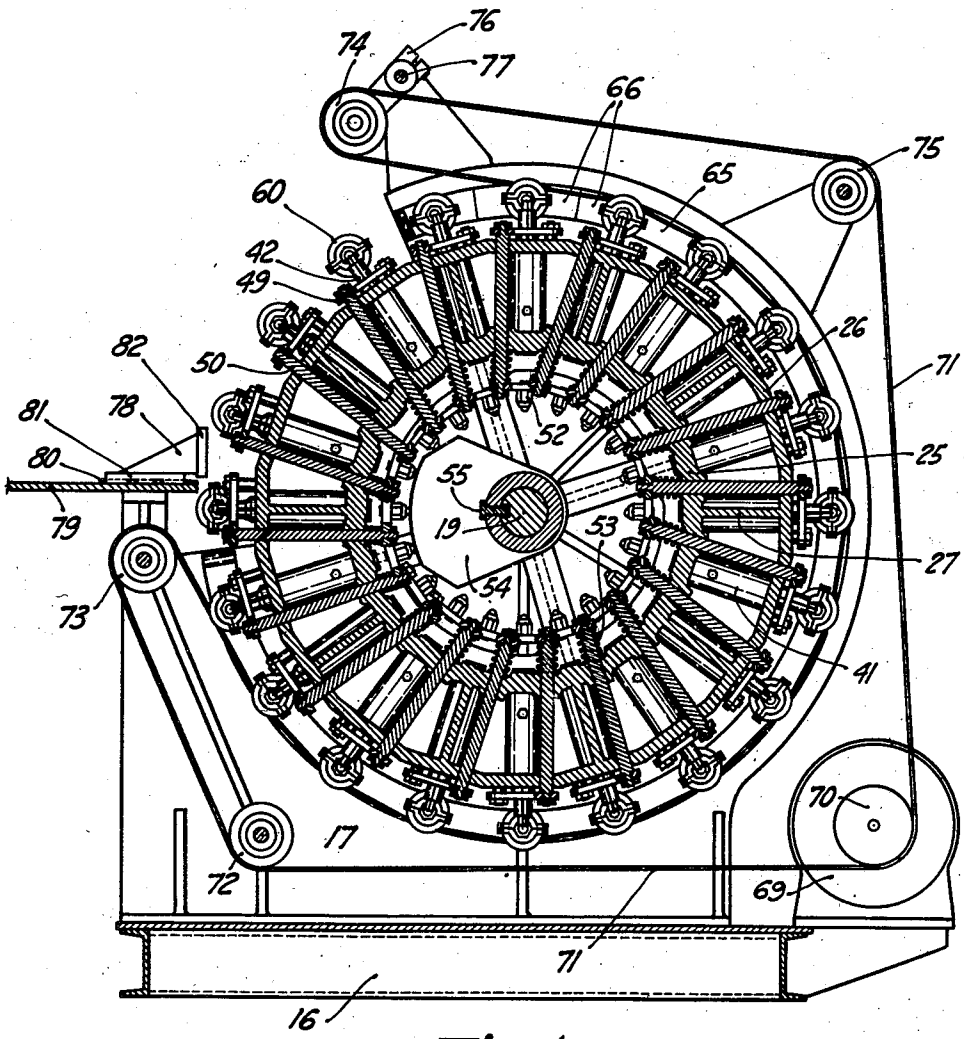


Fig. 4

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SELF-SHANK BUTTON DRILLING MACHINE

Filed March 21, 1940 7 Sheets-Sheet 5

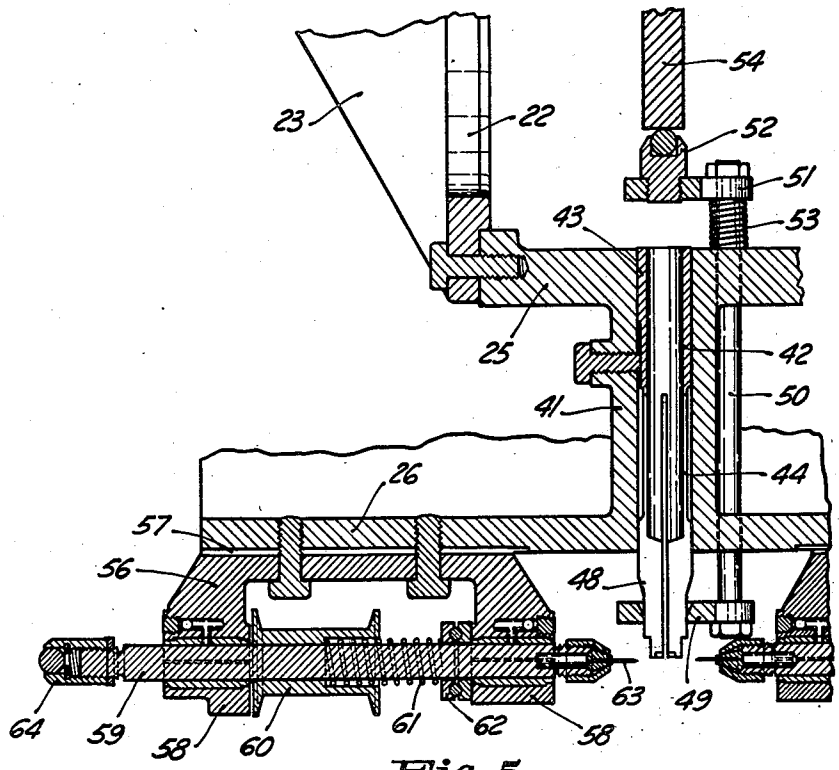


Fig. 5

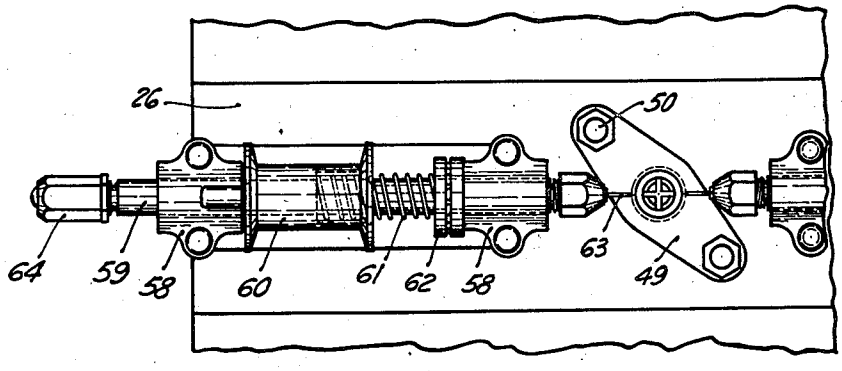


Fig. 6

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SELF-SHANK BUTTON DRILLING MACHINE

Filed March 21, 1940 7 Sheets-Sheet 6

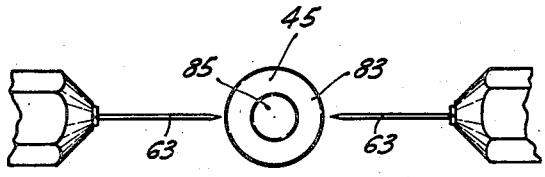


Fig. 10

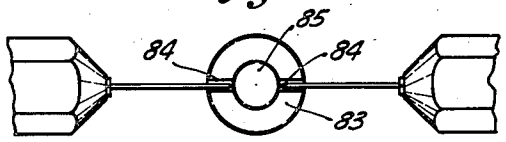


Fig. 11

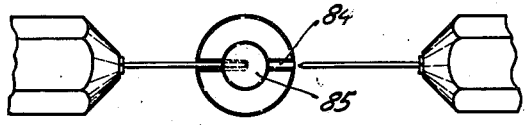


Fig. 12

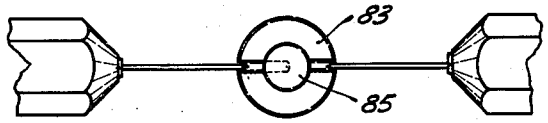


Fig. 13

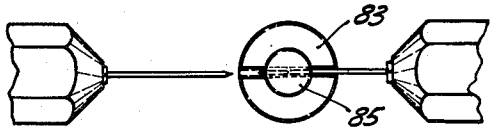


Fig. 14

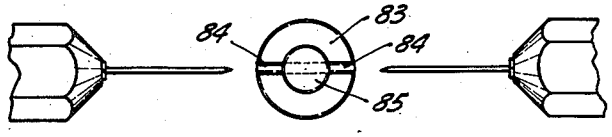


Fig. 15

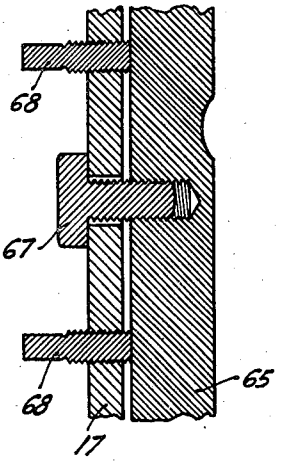


Fig. 8

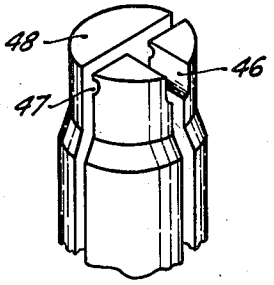


Fig. 9

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SELF-SHANK BUTTON DRILLING MACHINE

Filed March 21, 1940 7 Sheets-Sheet 7

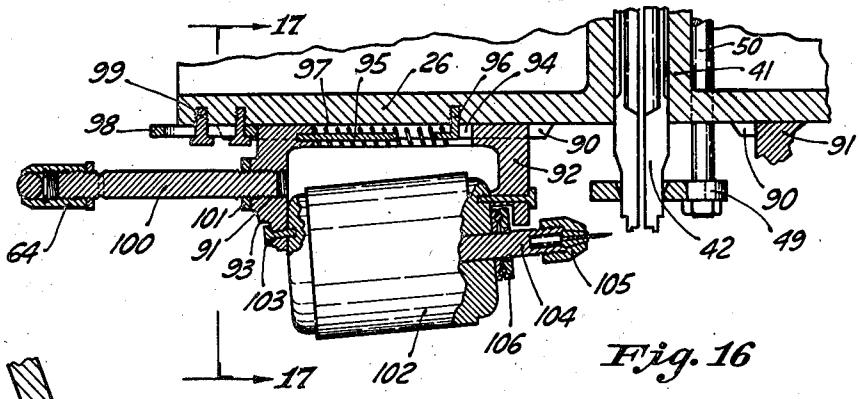


Fig. 16

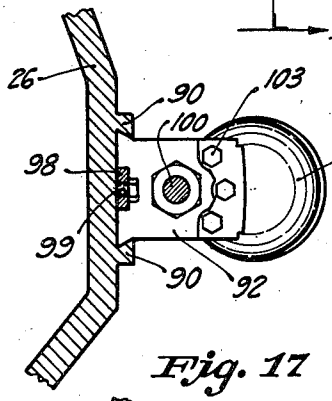


Fig. 17

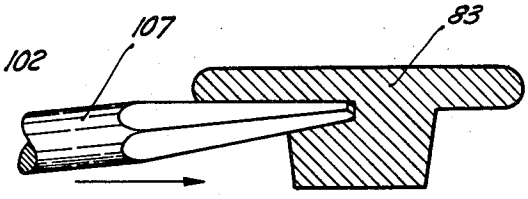


Fig. 18

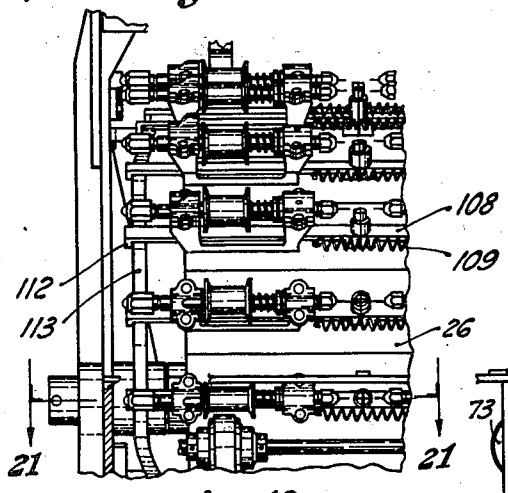


Fig. 19

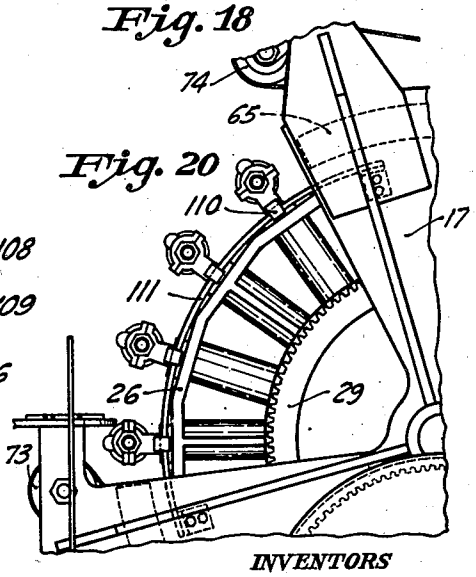


Fig. 20

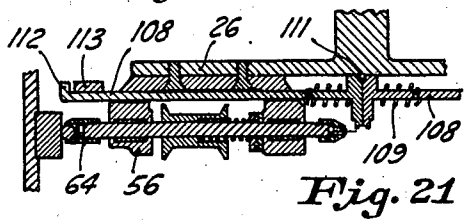


Fig. 21

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Patented Mar. 16, 1943

2,313,981

UNITED STATES PATENT OFFICE

2,313,981

SELF-SHANK BUTTON DRILLING MACHINE

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Application March 21, 1940, Serial No. 325,144

3 Claims. (Cl. 79—11)

The present invention relates to the art of drilling blanks in the manufacture of self-shank buttons. In particular, in accordance with this invention, there is provided a drilling machine which we have found to be particularly suited to the high speed drilling of such buttons. Also, there is provided a new process of drilling self-shank buttons, to which process the present machine is particularly adapted.

By this invention it has been found possible to produce this type of buttons in this country. Prior to this invention and that disclosed in our copending application, Serial No. 309,860, filed December 18, 1939, also directed to a machine for drilling self-shank buttons, virtually all of the buttons of this type used in this country have been imported. These imported buttons come from countries having a very low wage scale and are probably produced by hand tools. Thus, notwithstanding the fact that the inventors have been engaged in the button manufacturing business for many years, we are unaware of any machines ever having been made which have been suitable for drilling such buttons commercially.

In designing button drilling machinery, we have found unlooked for difficulties. We have found that the machine operates much more satisfactorily when both the drill chuck and the button chuck are carried by a single body member. This apparently reduces relative movement between the two from that when there are two synchronously moving body members.

Further, we have found that it is of advantage in the operation of the machine, particularly in improving the accuracy of drilling, to have the button chuck jaws non-movable along the axis of the button chuck in such drilling machines as have the axis of the button chuck generally perpendicular to the axis of the drill chuck. Such a machine is sufficiently accurate as to produce both hand-sewing buttons and machine-sewing buttons.

Other objects and advantages will be apparent as the description proceeds.

The method comprising the present invention involves the steps of simultaneously moving a pair of drills, positioned on opposite sides of the axis of a self-shank button blank and generally perpendicular thereto, toward said axis, the drills being positioned along the axis so as to contact the rear surface of the head and thereby groove the back of the button blank, then continuing motion of one of the drills into and partially through the shank of the button blank and retracting and maintaining the other drill out of contact with the button blank, and finally retracting the drill which has drilled partially through the shank and moving the other drill into and the remainder of the way through the shank. As well as passing the other drill the remainder of the way through, this drill may be passed all the way through the shank to clear the hole and eliminate any offset. The rate of passage through the shank for clearing and for eliminating offset may be greater than during drilling proper and thereby increase production.

This invention is illustrated in the accompanying drawings which show embodiments thereof and in which,

Fig. 1 is a front elevation of a machine embodying the present invention;

Fig. 2 is a right end elevation of the machine shown in Fig. 1;

Fig. 3 is a section on the line 3—3 in Fig. 2;

Fig. 4 is a section substantially on the line 4—4 in Fig. 3;

Fig. 5 is a fragmentary section on a plane passing through the central axis of the drum and through the central axis of one of the drill shafts showing, in detail, one of the chuck and drill assemblies;

Fig. 6 is a detail elevation of one of the chuck and drill assemblies;

Fig. 7 is a detail of the box clutch assembly for driving the drum and of the mounting for the drum;

Fig. 8 is a detail section of a portion of the cam track for operating the drills and of the adjusting means therefor;

Fig. 9 is a detail of an alternative form of chuck jaw for the machine comprised within this invention;

Figs. 10 to 15 constitute a timing schedule illustrating the sequence of drilling operations preferred in the practice of this invention;

Fig. 16 is a fragmentary section through the central shaft and through one of the drill chucks and shows a modified form of drill chuck arrangement in which an independent motor is used to drive each drill. Also this figure illustrates a modified positioning of the axis of the drill whereby the drill both makes the hole and reams it to a tapered shape;

Fig. 17 is a section on the line 17—17 in Fig. 16;

Fig. 18 is a detail of a drill as shown in Fig. 16 during drilling operation on a blank, showing the blank in section;

Fig. 19 is a fragmentary elevation of a ma-

chine equipped with a modified form of chuck and chuck-operating cam;

Fig. 20 is a right end view of the machine shown in Fig. 19 more particularly showing the chuck-operating cam; and

Fig. 21 is a section on the line 21—21 in Fig. 19.

In the machine shown, a frame base 16 is provided upon which is mounted a pair of frame plates 17 which carry the operative parts of the mechanism. On the right hand end of the base 16, the drive mechanism 18 is mounted which, through suitable driving connections, drives the operative parts.

A shaft 19 is carried in openings in the frame plates 17 and is held by set screws 20 against rotation in the plates, the set screws allowing rotative adjustment of the shaft. A pair of bushings 21 is carried by the shaft 19 between the frame plates, to each of which is connected a ring 22 by radially positioned webs 23, the rings being concentric with the bushings. A drum 24 is secured to the rings 22 so as to rotate therewith. This drum 24 comprises a cylindrical piece 25, to each end of which one of the rings 22 may be attached, a second generally cylindrical piece 26 and a web 27 located at the mid-point of cylindrical pieces 25, 26 and perpendicular thereto which web holds the pieces in concentric relationship.

During operation, the bushings 21, rings 22, and cylindrical pieces 25, 26 rotate as a unit on the shaft 19.

A cylindrical flange 28 is formed integrally with one of the rings 22 and its associated webs 23. At the end of the flange 28 opposite the ring 22, the flange is adapted to have a ring gear 29 secured thereto, by means of which the drum 24 is rotated.

The drive mechanism 18, which as is previously stated is mounted on the right hand end of the frame base 16, includes a motor 30 which is connected through a flexible coupling 31 to a gear reduction mechanism 32, the driving gear 33 of which is in mesh with a gear 34 carried by the shaft 35. The shaft 35 is carried by bushings in one of the frame plates 17 and has secured, as by a key, to its end opposite the gear 34, a pinion 36 which meshes with the ring gear 29. The gear 34 is freely rotatable on the shaft 35 and has secured centrally thereof a box clutch member 37. A second box clutch member 38 is slidably and non-rotatably carried by the shaft 35 adjacent member 37, a yoke arm 39 engaging therewith for effecting sliding movement thereof. A clutch shifting arm 40 is pivoted to the frame for moving the yoke arm.

When the clutch is in engagement, the motor 30 will drive the drum 24 through the gear reduction mechanism, the gear 34, shaft 35, and ring gear 29.

The generally cylindrical piece 26 is in fact formed with a plurality of flat faces, each parallel to the axis of the drum and equally spaced therefrom. Each face of the drum is provided with an exteriorly opening radial socket which extends into an enlarged portion 41 of the web 27. A chuck bar 42 is positioned in each of the sockets, each chuck bar comprising a tubular portion 43 at its inner end and jaws 44 at its outer end, which jaws are integral with the tubular portion. The inner portion of each of the jaws is cut thin, whereby the jaws will flex readily. The end of each jaw may be either as shown in Fig. 5 or as in Fig 9, in either of which the drill operates at an angle with the chuck bar, and the chuck jaws hold the self-shank button blank with the axis thereof substantially perpendicularly to the axis of the drill.

In the form of the invention shown in Fig. 5, a depression is cut in the end of the chuck bar for the reception of the head of the blank 45 with the blank and chuck bar coaxial. In the form shown in Fig. 9, a notch 46, lying in a plane perpendicular to the axis of the drum, is cut in the chuck jaws. As described in our co-pending application, Serial No. 309,860, filed December 18, 1939, such a chuck may have two or more jaws. In the adaptation of this chuck to the present machine, a drilling opening 47 extends through the chuck jaws and intersects the notch 46. When a self-shank button blank is positioned with the head against the jaw 48 and the shank in the notch 46, a drill passed through the opening 47 will engage and drill through the shank of the blank. The enlargement 41 in the web 27 is provided with a set screw to allow axial adjustment of the chuck bar, whereby to drill precisely at the desired location.

The portion of the chuck jaws extending out of the socket is formed with an inclined shoulder 48. A collet 49 is positioned about the chuck jaws for movement into engagement with shoulder 48 whereby to close the chuck. Each collet is carried on the outer end of a pair of rods 50, slidable into and out of the drum, and with the inner end of each pair of rods connected by a plate 51 carrying an antifriction cam follower 52 in axial alignment with the associated chuck bar. Springs 53 are positioned about the rods 50 between the cylindrical piece 25 and the plate 51 whereby normally to hold the collet assembly in position closing the chuck. In order to have the collet assembly as much out of the way as possible, each assembly, while maintained radial of the drum, is located at an angle of 45° to the axis of the drum as best seen in Fig. 3.

As shown in Fig. 4, a cam 54 is secured non-rotatably on the shaft 19 by a set screw 55, the shaft 19 being held against rotation by set screw 20. The cam 54 is positioned in the plane of cam followers 52 and extends forwardly sufficient to open the blank holding chucks from a position slightly below horizontal to a position slightly above horizontal. As the drum is driven clockwise, as seen in Fig. 4, blanks may be inserted just above a horizontal position of the chucks and, after progressing over the top, down the back side and under the bottom, the chucks are opened in the front by the cam 54, whereupon the drilled buttons drop out. The cam 54 is of a shape not to engage the cam followers except at the front, in all other positions the collets being free to move to closed chuck position under action of springs 53.

For convenience of expression, the chucks heretofore described will be referred to hereinafter and in the claims as button chucks to distinguish them from the drill chucks hereinafter described, though it should be remembered that it is button blanks which are placed in the chucks, not, in fact, buttons.

On each of the heretofore described faces of the drum is positioned a pair of drill supports and driving means, which carry drills for movement substantially parallel to the axis of the drum. While the drills are shown in the drawings as parallel to the axis of the drum, we have found that for some classes of work it is desirable that

a slight angle be established between the drill and the axis, as by the insertion of a wedge between the drill support and the drum, or as shown hereinafter. Any angle up to a maximum of about five degrees (5°) for the purposes of this type of machine is generally perpendicular, and such is the meaning of the term "generally perpendicular" as used herein.

Referring now more particularly to Figs. 5 and 6, a pair of shaft-supporting brackets 56 is secured to the drum adjacent each button chuck. The brackets are each bolted to the drum and are provided with a longitudinal flange 57 which slidably engages in a groove in the surface of the drum, which groove is in alignment with the button chuck. Each bracket has a pair of arms 58, each of which is provided with a bushing. The bushings are in alignment for the reception of shaft 59 which is slidably and rotatably carried thereby. On the end of each shaft 59 toward the button chuck is positioned a chuck for holding a drill. These chucks may be of any desired variety, such as the standard chucks shown or, if desired, may be the well known Jacob's chuck. A flanged pulley 60 is fixed non-rotatably and non-slidably to each of the shafts 59. A spring 61 is positioned about each shaft between the pulley 60 and the bracket arm 58 adjacent the chuck, there being a thrust bearing 62 between the spring and the cooperating arm. The spring acts at all times to move the shaft 59 and the drill 63 carried thereby away from the button chuck.

At the end of the shaft 59 opposite the drill chuck is positioned a cam follower 64 in adjustable screw-threaded relation to the shaft. In cooperating relationship with the cam followers 64, a circular cam track 65 is provided on the inner face of each of the frame plates 17, the cam tracks being best shown in Figs. 4 and 8. The cam tracks are made in short sections 66, each section being secured to the frame plates 17 by one or more tie bolts 67 and held spaced therefrom by one or more spacing bolts 68. As any one of the shafts 59 is carried about the shaft 19 by the drum, the cam follower will be pressed by the cam track to move the drill toward the button chuck and, upon arriving at the discharge position at the front of the machine, the cam track allows the spring 53 to withdraw the drill.

The drill driving means is provided, in duplicate, to drive the drills on opposite sides of the machine, the details of one such driving means being best shown in Fig. 4. The drill driving means includes a motor 69 mounted on the base of the machine at the rear and provided with a pulley 70. A flat endless drive belt 71 extends below the drum from the lower side of the pulley 70 and passes below a pulley 72 located at the front of the machine and sufficiently low that the belt will clear the drum. The belt next passes around a pulley 73 in front of the machine and then follows back under the machine in driving engagement with the pulleys 60, about the pulley 74 at the upper front of the machine, back around pulley 75 and to the position of the belt heretofore described at the pulley 70. The pulley 74 is mounted on arms 76 to swing about shaft 77 as a pivot whereby the belt may be tightened as desired.

For convenience in feeding the machine and for positioning the drill gauge 78, the table 79 is mounted in front of the drum at substantially the level of the shaft 19, being secured at its ends to the frame plates 17. A bar 80 is secured to the top of the table in line with the button chucks perpendicular to the axis of the drum. The drill gauge 78 is provided with a base portion 81 which has a groove in its lower surface so as to slide over the table along the bar 80 toward the drum and an upright gauging arm 82 which extends equal distances on opposite sides of the button chucks.

One of the primary advantages of the machine above described is the small number of adjustments needed on the machine to turn out accurately gauged results and uniform product. For adjusting the machine initially, the adjustment preferably made first is the position of the button chucks. One of the chuck bars is loosened and adjusted till, if the type chuck shown in Fig. 5 is used, the drills will just pass the end of the bar or, if the type shown in Fig. 9 is used, the drills will enter the drilling opening 47, the set screw then being tightened. The gauge 78 may then be placed in position engaging the end of the chuck bar which has been so adjusted, and the others adjusted to a position in which they engage the gauge when the drum is turned, bringing each chuck bar in succession into position adjacent the gauge.

The preferably next adjustment is of the drilling means. The important factor in this adjustment is that the length from the end of the cam follower to the end of the drill be in each instance the same. If it were necessary to measure this each time a drill is replaced, operation of the machine would be greatly retarded. In this machine, then, the cam followers 64 are adjusted on their supporting shafts so that, in normal position, i. e., in the position assumed under action of the spring 61 when the cam 65 is not acting, the ends of each set of cam followers are in the same position along the shaft 19. The cam followers are then locked in position and no further adjustment thereof need ever be made. For adjusting the drills, the drill chucks are successively moved to position adjacent the table 79, whereat the drill shafts are in normal spring pressed position, and the drills are successively adjusted to a constant distance from the center plane of the button chucks as determined by the gauge 78. Subsequently, when it is necessary to replace drills, for example, after sharpening, the operator does not need to leave his position in front of the machine to obtain perfect adjustment.

The final adjustment to place the machine in operation is of the cam tracks 65. Any of a variety of adjustments may be made on these tracks to perform various drilling sequences. Figs. 10 to 15 illustrate our preferred sequence of drilling operations. In Fig. 10, the button blank and drills are in their initial or normal position before drilling commences. The cam tracks are adjusted so that both drills move inwardly and groove the back of the button blank at 84 outside of the shank. Following grooving, as shown in Fig. 12, one of the drills moves in to drill half way through the shank, and the other drill is retracted out of the way to prevent breakage of the drill in case of chipping of the button blank. Then, as shown in Figs. 13 and 14, the drill which has penetrated the shank is retracted and the other is brought up by the cam track and gradually moved into the shank. This drill should go into the shank slightly more than half way in order to clear the opening through the shank, and may be moved entirely through to avoid any offset, as shown in Fig. 14. The last drill is then

retracted from contact with the button, as shown in Fig. 15. The positions shown in Figs. 10 to 15 occur sequentially from a position just above the table to a position just below the table. Following withdrawal of the last drill, the chuck is opened and the finished button drops out.

If desired, the grooving operation may be omitted by drilling a shade farther from the face of the blank. In this event, the cam track segments are positioned so that drilling of the shank will occur all around the drum. This will allow greater speed of the drum without increasing the drilling speed since the entire active length of the machine is employed for shank drilling.

Having now described the structure and adjustment of the illustrative machine, for a better understanding thereof, the operation will now be described.

With the machine adjusted as above described, the three motors may be turned on. The motor 30 drives the drum 24 through the flexible coupling 31, speed reduction mechanism 32, gear 34, pinion 36, and ring gear 29, the motor rotating in a direction to raise the front side of the drum. The motors 69 drive the drills when positioned anywhere around the drum except the front upper quarter and a discharge space extending a short distance therebelow. The drills are driven by the belt 71 engaging the pulleys 69, which, being secured to the shafts 59, rotate both the shafts 59 and the drills 63 carried thereby. As all of the drill and button chuck assemblies work identically, the operation will be followed for one. Starting at the level of the table 79, the cam 54 presses against the cam follower 52 which, through the rods 50, holds the collet in inactive position. The operator places a self-shank button blank in the chuck while open. The cam follower then moves off of the cam 54, resulting in the springs 53 closing the chuck and holding the blank in position. The cam followers 64 then engage the cam tracks 65 which press the drills into drilling engagement with the blank, the drills moving in accordance with the setting of the cam tracks, as heretofore explained. When the button chuck arrives at a position slightly below the table 79, the cam tracks allow the springs 61 to withdraw the drills, whereupon the cam 54 again engages cam follower 52, thereby causing the button chuck to open and allowing the button to fall out.

In the form of the invention shown in Figs. 16 to 18, the machine is constructed in the same manner as in the form shown in Figs. 1 to 15, with the exception of the supports and operating means for the drills. On each face of the drum 26 are disposed two pairs of guides 90, one pair being arranged in each direction from the chuck 42, the guides being parallel to the axis of the machine. The guides 90 are undercut and are complemental to a dovetail portion of a U-shaped bracket 91 which is slidable in the guides parallel to the axis. The two arms of the U-shaped bracket stand out from the drum, the arm 92 being adjacent the chuck and the arm 93 remote therefrom. A slot 94 is provided in the base of the bracket 91 parallel to the guides, and a spring guiding pin 95 is secured in the bracket in the end of the slot distant from the chuck. A spring support 96 is secured in the drum 26 extending into the slot 94. Spring 97 is positioned upon the pin 95 and support 96 so as to normally hold the bracket away from the chuck 42. A stop 98 is adjustably secured to the drum 26 by bolts 99, this stop being positioned in the line of movement of the bracket away from the chuck, adjustment varying the normal position of the bracket.

A cam follower supporting arm 100 is threadedly secured in bracket arm 93, and may be locked in position by lock nut 101. The cam follower 64 is adjustably secured to the arm 100 in the same manner as the follower 64 is secured to shaft 59. The cam follower 64 cooperates with the drill operating cam track in the same manner as heretofore described in connection with Figs. 1 to 15.

In each bracket 91 a motor 102 is secured between the arms 92, 93 as by bolts 103. The shaft 104 of the motor is provided with a chuck 105 for holding a drill at its end adjacent the button chuck. A thrust bearing 106 is provided to take the thrust upon the shaft of the motor during drilling.

While the motor shaft 104 may be positioned parallel to the shaft 19 of the machine and a cylindrical type of drill employed as in the form shown in Figs. 1 to 15, we have shown the motor positioned in Fig. 16 so that the shaft 104 is coplanar with the shaft 19 and at an angle of about five degrees thereto.

When this form of drilling is employed, i. e., when the drill which is generally perpendicular to the axis of the button blank is, in fact, at a slight angle, a tapered reaming drill, such as drill 107, is preferably employed. With the drill placed at five degrees to the axis of button blank 83, a drill 107 is employed which drills a conical hole with an angle of ten degrees between opposite sides of the hole.

With the button chucks 42 and cam followers 64 adjusted as previously described, the drill operating cam track will then be adjusted in the form of device shown in Figs. 16 to 18, first to move both drills in toward the axis of the button to groove the back of the button adjacent the shank. One drill will then be retracted and the other will be moved to drill just slightly more than half way through. That drill will then be retracted and the drill first retracted will then be moved just slightly more than half way through the shank.

It is obvious that in initially grooving the back of the button adjacent the shank the drill 107 will cut a relatively narrow groove, but when the drill is moved on into the shank, the groove is widened by reaming without being cut deeper.

It should be understood in connection with both the form shown in Figs. 1 to 15 and with that in Figs. 16 to 18 the two drills may simultaneously drill partially through the shank, if desired, prior to alternate drilling.

In the form of the device shown in Figs. 19 to 21, a modified form of button chuck and operating cam therefor is shown. In this form, the cam 54 and collet plate 49, together with the inter-operating parts are omitted. Also, chuck bar 42 is omitted.

A pair of chuck bars 108 is slidably carried, one by each of the brackets 56 of each pair of brackets. A spring 109 connects each pair of chuck bars 108 to draw them together. Each chuck bar 108 is provided with a chuck jaw 110 attached to its inner end which cooperates with the chuck jaw of the associated chuck bar in the holding of a button. In order to center the chuck, a pin 111 is carried by the drum 26 between the chuck jaws. The outer end of each bar 108 is

provided with a finger 112 to hook outside of a cam track 113 which extends in the forward part of the machine from slightly below the center to a position just prior to commencement of drilling position. The cam tracks 113 are so shaped as to retract the bars 108 and open the chucks. When the bars 108 pass out of range of tracks 113, the springs 109 close the chucks which are centered by pins 111. The operation of this form of machine otherwise is the same as described in connection with Figs. 1 to 15. It is obvious that one of the chuck jaws may be mounted stationarily on the drum, and that the other may be movable as shown by the spring and cam.

Having now described our invention, we claim:

1. A self-shank button drilling machine comprising a button chuck having a plurality of jaws arranged about an axis, a continuously rotating body member, rotating on an axis fixed in position, said chuck being fixedly connected to said rotating body member, a collet slidably mounted on said chuck for sliding movement longitudinally thereof to cooperate with said chuck jaws in causing opening and closing movement thereof, a drill shaft carried by said body member with the shaft position generally perpendicular to the axis of the button chuck, a carrier for said drill shaft rigidly secured to said body member and holding the shaft in fixed alignment with reference to the axis of the button chuck, said drill shaft being adapted for rotation and for translation toward and from the button chuck, said drill shaft and button chuck being carried by said body member for simultaneous rotation about the axis of rotation of the body member with the axis of the drill shaft approximately perpendicular to the axis of the button chuck, the rigid mounting of the button chuck and the drill shaft eliminating substantially all relative movement of these parts other than longitudinal movement of the drill shaft transversely of the button chuck, a drill chuck, for carrying a drill, mounted on the end of the shaft proximal to the button chuck and means to move said drill shaft and the drill chuck toward and from said button chuck, timed with respect to the movement of the collet along the axis of the button chuck to move the shaft toward the button chuck subsequent to closing movement of said collet and to move the shaft away prior to opening movement of said collet, said chuck jaws being provided with means to hold the flange of a self-shank button with the axis of the button generally perpendicular to said shaft.

2. A self-shank button drilling machine comprising a support having a fixed axis about which it may rotate, said support carrying a button chuck fixedly connected thereto for rotation therewith about said axis, a drill carried by said support, means mounting said drill with its axis approximately perpendicular to the axis of a button shank held in said chuck, said chuck and said mounting means being so fixed in relative position that when said drill is rotated and longitudinally reciprocated transversely to the axis of the button shank it will cut along the under face of said button, prior to and while drilling the shank, forming on said face of the button body a needle guide groove.

3. A self-shank button drilling machine, comprising a support, a unitary body member, means mounting said body member for rotation on said support, said body member having an axially extending supporting surface, a button chuck having a plurality of jaws arranged about an axis, means immovably mounting said jaws on said supporting surface with the axis thereof extending at right angles thereto and radially of the axis of said rotating body member, said means including shanks, each of which is rigidly connected to said surface at one end and supports a jaw at the other or free end, said shanks being sufficiently resilient to allow for opening and closing movement of said jaws, a collet mounted in said body member for movement along the axis of said jaws to effect movement of said chuck jaws together and apart, bearings immovably carried by said supporting surface, a drill shaft slidably and rotatably carried by said bearings, said bearings being so constructed and arranged that said shaft is carried in a position substantially perpendicular to the axis of said button chuck and parallel to the axis of rotation of said body member, a drill chuck mounted on the end of the shaft proximal to said button chuck and aligned so that a drill carried by said drill chuck will pass through the shank of a button blank held by said button chuck, means for rotating said drill shaft, and mechanism coordinated with the rotation of said body member for sliding said drill and moving said collet in proper timed sequence.

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