

J. HORMBY.
 BUTTON MAKING MACHINE.
 APPLICATION FILED JUNE 20, 1910.

1,054,349.

Patented Feb. 25, 1913.

6 SHEETS—SHEET 1.

Fig. 1.

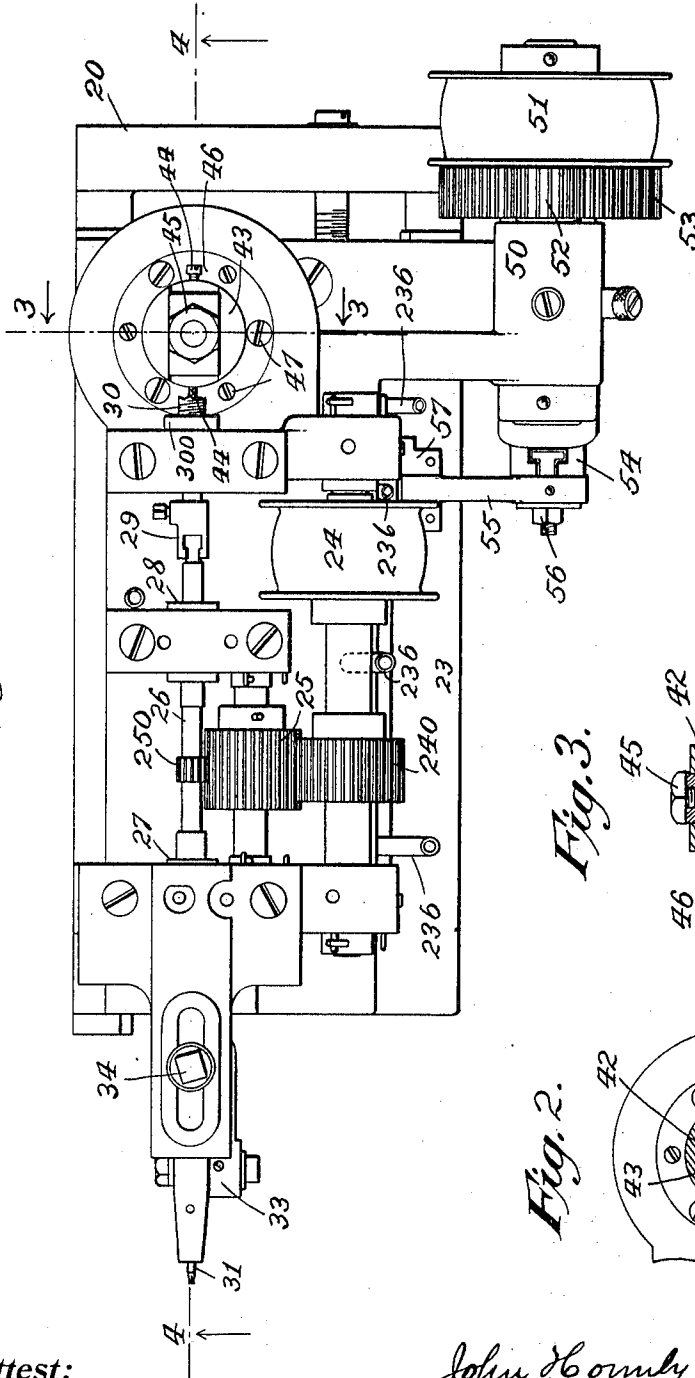


Fig. 3.

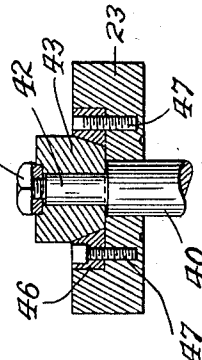
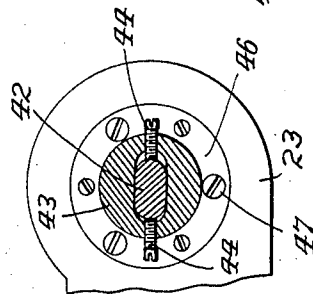


Fig. 2.



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Edgewood & Co.
W. J. McJannet

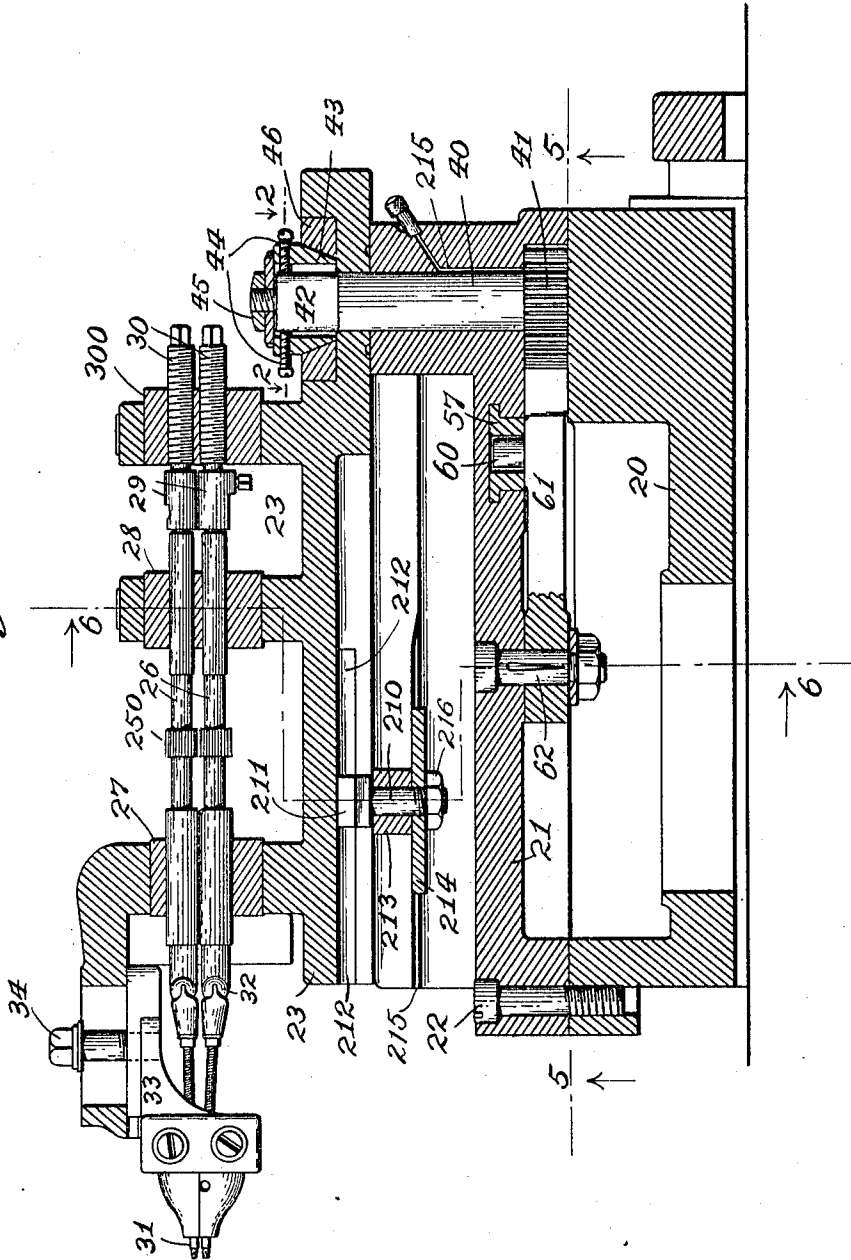
John Hormby Inventor:
 by *William R. Baird*
 his Att'y.

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 6 SHEETS—SHEET 2.

Fig. 4.



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6 SHEETS—SHEET 3.

Fig. 5.

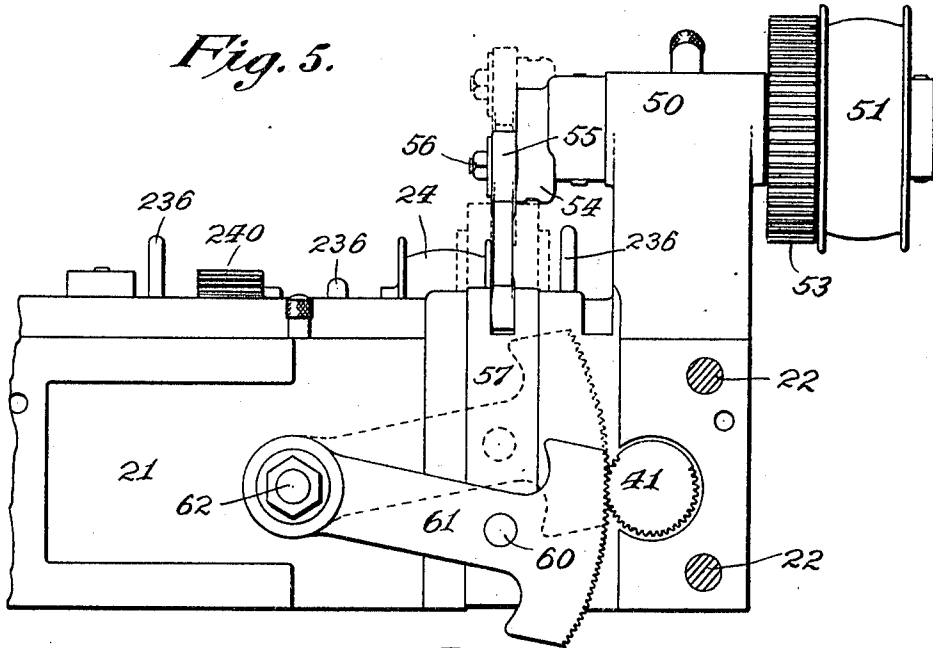
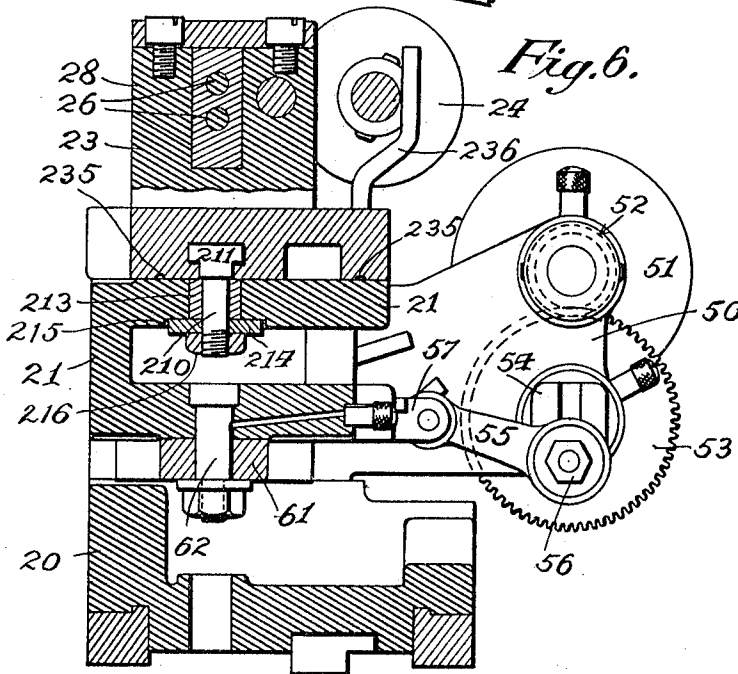


Fig. 6.



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W. B. McJannet

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 his Atty.

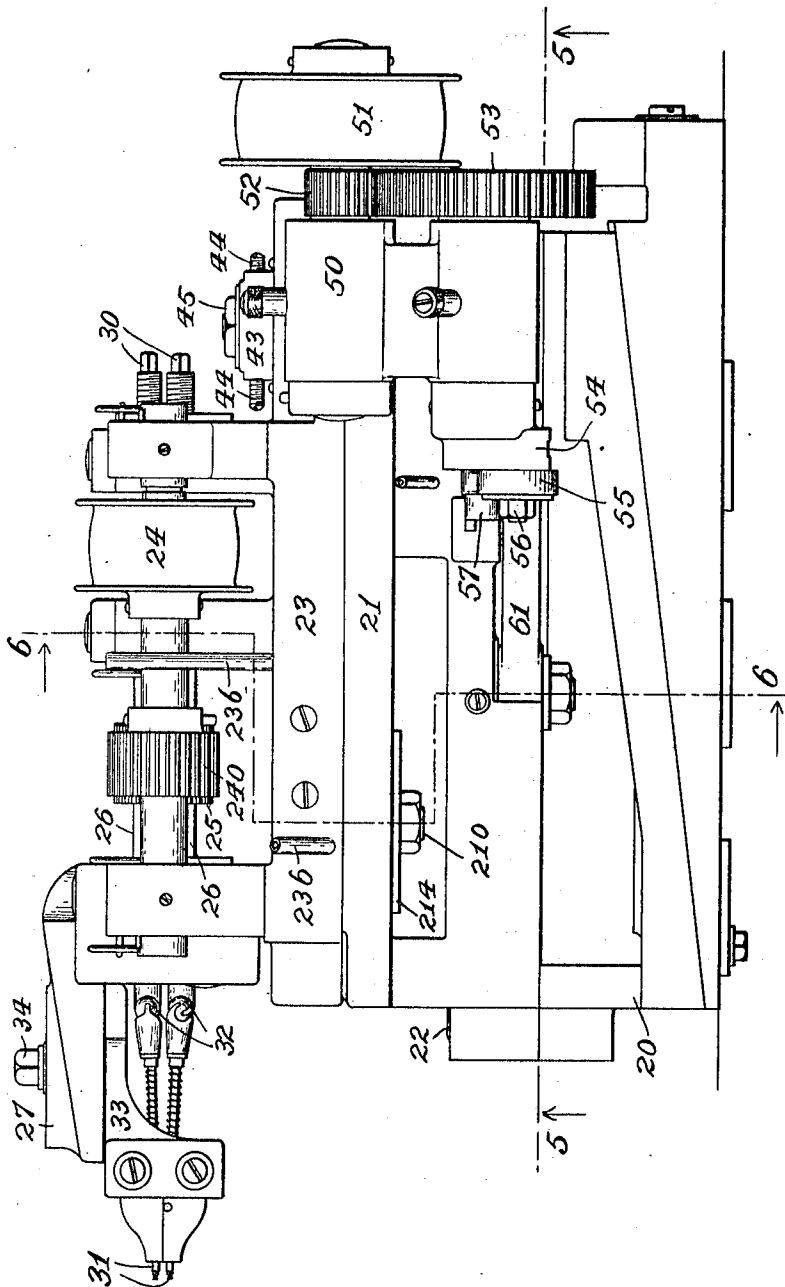
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6 SHEETS-SHEET 4.

Fig. 7.



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6 SHEETS—SHEET 5.

Fig. 8.

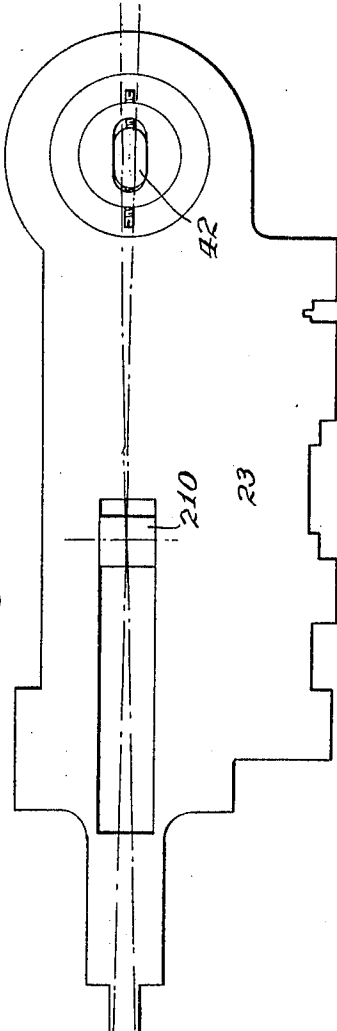


Fig. 9.

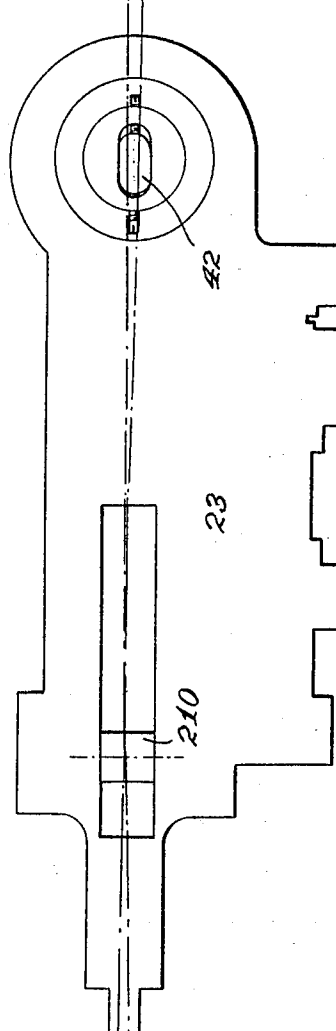
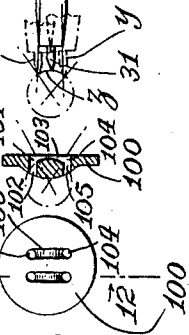


Fig. 10.

Fig. 12.

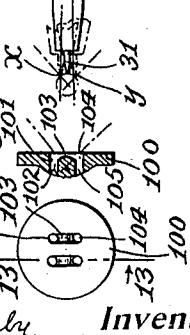


Attest:

Eaglevorth & Co.
W. M. Jones

Fig. 11.

Fig. 13.



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6 SHEETS-SHEET 6.

Fig. 14.

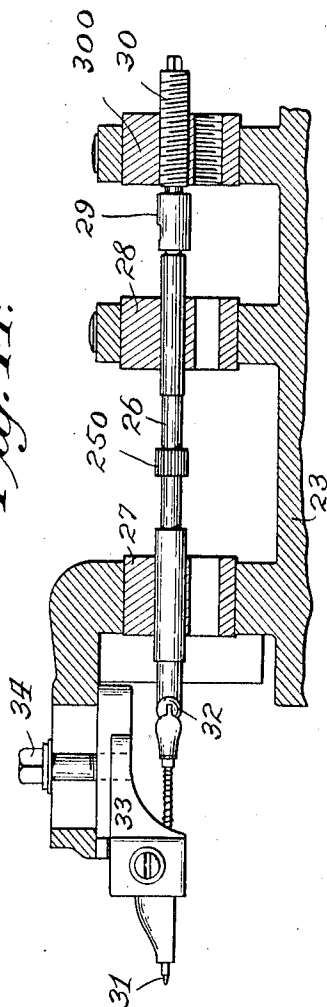
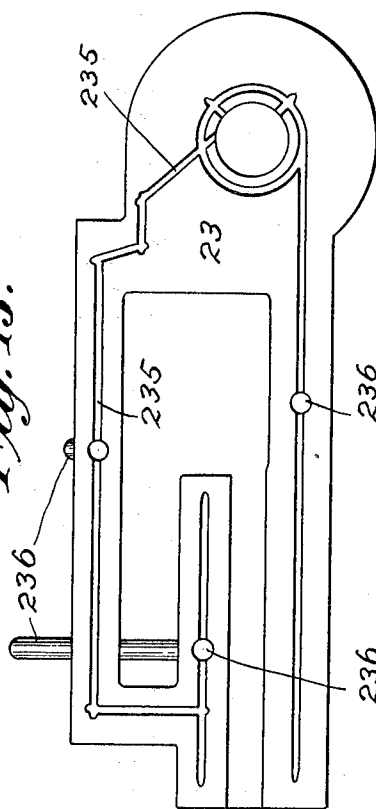


Fig. 15.



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UNITED STATES PATENT OFFICE.

JOHN HORMBY, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO THE BUTTON MACHINERY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BUTTON-MAKING MACHINE.

1,054,349.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed June 20, 1910. Serial No. 567,765.

To all whom it may concern:

Be it known that I, JOHN HORMBY, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Button-Making Machines, of which the following is a specification.

This invention relates to button making machines and its novelty consists in the construction and adaptation of the parts as will be more fully hereinafter pointed out.

In Letters Patent of the United States No. 611,811 issued to me October 4, 1898 there is described a button making machine on which the present invention constitutes an improvement. In brief the machine of the patent referred to comprises a multiple grip carrier for holding the slabs of vegetable ivory out of which the buttons are made and which carrier is mounted to revolve intermittently between a series of facing tools consisting of a rough shaping cutting tool, a fine finishing tool and a drilling and counter-sinking tool; and a series of backing tools consisting of a rough shaping cutting tool, a drilling and countersinking tool and a fine finishing and cutting out tool; and means for moving the series of tools to and from the grip carrier so that the tools are brought to operate upon both sides of the same slab simultaneously and upon each slab in the series successively. In buttons of this class it is frequently desirable to cut a groove or niche between two of the holes in the button and to provide it with rounded corners so that the thread which is used to attach the button to the garment upon which it is placed will lie in said niche and will not project above the surface of the button whereby wear and cutting of the thread is prevented.

The purpose of this invention is to provide means for cutting such groove or niche along the face of the button simultaneously with the last operation of drilling and countersinking the holes at the face of the slab and in general such means consists in providing one of the drill heads of the machine

described in that patent with a movable frame and various devices and attachments whereby the drill head is given the proper movement to accomplish the desired purpose.

In the drawings Figure 1 is a plan view of a drill head embodying the invention; Fig. 2 is a horizontal section through the eccentric bushing on the plane of the line 2—2 in Fig. 4; Fig. 3 is a vertical section through the same on the plane of the line 3—3 in Fig. 1; Fig. 4 is a vertical section of the drill head on the plane of the line 4—4 in Fig. 1 and a front elevation of the parts back of the section plane. Fig. 5 is a bottom plan view of the parts above the plane of the line 5—5 in Fig. 4; Fig. 6 is a partial side elevation and vertical section on the planes of the broken line 6—6 in Figs. 4 and 7; Fig. 7 is a side elevation of the drill head; and Figs. 8 and 9 are diagrammatic representations of the movements of the drill heads; Figs. 10 and 11 are plan views of the button disks and Figs. 12 and 13 are sectional views thereof; Fig. 14 is a longitudinal vertical section through the upper part of a drill head showing the use of a single drill; Fig. 15 is a bottom plan view of the movable drill frame showing the lubricating ducts.

In the drawings, 20 is a base plate or frame fixed to the carriage of the machine (not shown) in any suitable manner. Above this is arranged an intermediate frame 21 secured to the frame 20 by bolts 22, and which is suitably recessed to receive the parts hereinafter described. Above this in turn is arranged a movable frame 23 on which the drilling tools and their actuating mechanism are mounted. This actuating mechanism comprises a pulley 24 mounted to turn in suitable bearings and rotated by a belt (not shown), a driving pinion 240 mounted on the same shaft as the pulley, an idler pinion 25 meshing with the pinion 240 and a small pinion 250 driven by it and which latter pinion is made integral with or secured to a drill spindle 26 mounted to rotate in bearings in bearing blocks 27 and

28 secured to the movable frame. Each spindle is set in a longitudinally movable bearing 29 which in turn is mounted on the pointed end of a threaded adjuster 30 secured in a bearing block 300 also mounted on the frame. Each spindle is provided at its forward end with a drill 31 to which it is connected by a universal joint indicated at 32 and the drill member is supported in a removable nose 33 secured to the bearing block 27 by a set screw 34 or other suitable means. When more than one drill and spindle are employed the pinion 25 is adapted to mesh with all of the pinions 250 mounted on the drill spindles.

The tools and their actuating mechanism as above described differ somewhat in details of construction from the mechanism for the same purpose described in the Patent 611,811 above referred to, but do not differ in principle therefrom. It will be understood that the button blanks are brought by the multiple carrier in succession in front of the drills 31 and that the holes are countersunk and drilled in such blank in the manner described in that patent.

Arranged in a vertical recess in the frame 21 is a cylindrical barrel 40 provided at its lower extremity with a horizontal mutilated pinion 41. At its opposite extremity it is provided with an upwardly extending member 42 which is adapted to be set within a slot of a frusto-conical block 43 and which can be longitudinally adjusted with respect thereto by means of set screws 44. A nut 45 engaging the threaded upper end of the member 42 holds the block in position. The block 43 is seated snugly within a removable bushing 46 secured to the movable frame 23 by means of screws 47, or in any other desired manner. By means of the set screws 44 the block 43 can be set eccentrically with respect to the center of the barrel 40.

A pivotal connection is provided between the intermediate frame 21 and the movable tool frame 23 comprising a double T-pivot 210 having an upper head 211 adapted to slidably engage a longitudinal slot 212 formed in the lower part of the tool frame, and a sleeve member 213 and a guiding plate 214 adapted to slidably engage in a longitudinal slot 215 in the upper part of the frame 21, the lower end of the part 210 being threaded to receive a nut 216, (Figs. 4 and 6).

The described construction is such that when the barrel 40 is oscillated and the block 43 is eccentrically set with respect to the barrel 40, the entire tool frame 23 will be oscillated horizontally on the pivot 210 as a center.

The means provided to oscillate the barrel 40 are as follows:—Arranged on a bracket

50 secured to the base 20 of the device and mounted on a shaft journaled in suitable bearings therein is a pulley 51 actuated by a belt (not shown). On the pulley shaft is a pinion 52 adapted to mesh with a gear 53 mounted in suitable bearings on the base 20 and the shaft of which gear 53 is provided with a slotted crank 54 adapted to receive the adjustable end of a connecting rod 55 secured thereto by a nut 56 and which rod is pivoted at its opposite end to a link 57 adapted to slide in a recess in the frame 21 and which link is provided with an aperture to receive and engage with a pin 60 upwardly projecting from the surface of a horizontally arranged segment gear 61 adapted to oscillate on a pivot 62 secured to the lower member of the frame 21 and the teeth of which gear mesh with the teeth of the gear 41. When the pulley 51 is rotated its circular movement is converted through the described mechanism into a reciprocating movement which oscillates the segment gear 61 and consequently the barrel 40. The extent of this reciprocating movement may be varied by moving the adjustable end of the connecting rod 55 within the slotted crank 54. The position of the pivot 210 may be changed by moving it longitudinally along the members 21 and 23 and thus vary the extent of the arc through which the drill points will be moved and the position of the block 43 can be varied so that the eccentricity of movement of the frame 21 is increased or diminished as the operator may desire.

As the contacting surface between the lower side of the movable frame 23 and the upper side of the intermediate frame 21 is large, means are provided for lessening the friction between them consisting of a series of lubricating ducts 235 adapted to receive a suitable supply of oil through feeding channels 236. In a similar manner the segment gear 61 and mutilated pinion 41 are lubricated through an oil channel formed in the wall of the intermediate frame 21.

Figs. 8 and 9 are diagrams illustrating the purpose of the described device. In Fig. 8 for example the pivot 210 between the fixed and movable frame is at an extreme position toward the right. The eccentric is adjusted toward the left of its bushing. Now as the eccentric is turned or oscillated through the described mechanism the drill point will be moved say first to the right as indicated at x in dotted outline, where it will pause and cut a recess 101 in the button blank 100 joining with the recess 102 already cut by other tools to form a complete aperture. Then, as the drill point is moved toward the left it will swing along the arc z and cut the niching groove indi-

cated at 103 in the button blank and will pause at γ at the end of its arc of oscillation to cut a recess 104 which joined with the recess 105 already cut will form a complete aperture. In Fig. 9 the pivot 210 is shown at an extreme position toward the left, the eccentric remaining in the same position. This will cause the drill point to sweep through a much smaller arc as indicated.

When it is desired to use one drill instead of two the nose 33 is removed, and the bearing-blocks 27, 28 and 300 which support the drill spindles are turned upside down and a single drill spindle inserted in the upper series of bearings (see Fig. 14). The arrangement of the bearings is such that when a single drill is thus arranged its center is in the same horizontal plane as the intermediate plane between the two drills when the latter were both inserted.

As the drill points always move in an arc the bottom of the niche where it merges into the holes of the button is rounded and the thread lies snugly therein and is not cut by a sharp corner.

What I claim as new is:—

1. A button making machine comprising a drill, means for rotating the drill, means for feeding the drill forward and rearward while it rotates and means for moving the drill bodily and transversely with respect to its axis during its rotating and feeding movements.

2. A button making machine comprising a drill, means for rotating the drill, means for feeding the drill forward and rearward while it rotates and means for moving the drill bodily and transversely with respect to its axis during its rotating and forward feeding movements.

3. A button making machine comprising a drill, means for rotating the drill, means for feeding the drill forward and rearward while it rotates and means for moving the drill bodily and transversely with respect to its axis during its rotating and rearward feeding movements.

4. A button making machine comprising a drill, means for rotating the drill, means for feeding the drill forward and rearward while it rotates and means for moving the drill bodily and transversely with respect to its axis during its rotating and forward and rearward feeding movements.

5. A button making machine comprising a pair of drills, means for simultaneously rotating them and feeding them forward and rearward, and means for moving the drills bodily in parallel lines transversely with relation to their axes during their rotating and feeding movements.

6. A button making machine comprising a pair of drills, means for simultaneously

rotating them and feeding them forward and rearward, and means for moving the drills bodily in parallel lines transversely with relation to their axes during their rotating and rearward feeding movements.

7. A button making machine comprising a pair of drills, means for simultaneously rotating them and feeding them forward and rearward, and means for moving the drills bodily in parallel lines transversely with relation to their axes during their rotating and forward and rearward feeding movements.

8. A button making machine comprising a stationary frame, a frame movably mounted thereon, bearings carried by the movable frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward and means for bodily moving the movable frame during the rotating and feeding movements of the drill.

9. A button making machine comprising a stationary frame, a frame movably mounted thereon, bearings carried by the movable frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward and means for bodily moving the movable frame transversely with respect to the axis of the drill during the rotating and feeding movements of the drill.

10. A button making machine comprising a stationary frame, a frame movably mounted thereon, bearings carried by the movable frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward and means for bodily moving the movable frame transversely with respect to the axis of the drill during the rotating and forward feeding movements of the drill.

11. A button making machine comprising a stationary frame, a frame movably mounted thereon, bearings carried by the movable frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, means for bodily moving the movable frame transversely with respect to the axis of the drill during the rotating and rearward feeding movements of the drill.

12. A button making machine comprising a stationary frame, a frame movably mounted thereon, bearings carried by the movable frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, means for bodily moving the movable frame transversely with respect to the axis of the drill during the rotating and forward and rearward feeding movements of the drill.

13. A button making machine comprising a stationary frame, a frame pivotally mount-

ed thereon, bearings carried by the pivoted frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, and means for oscillating the pivoted frame during the rotating and feeding movement of the drill.

14. A button making machine comprising a stationary frame, a frame pivotally mounted thereon, bearings carried by the pivoted frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, and means for oscillating the pivoted frame transversely with respect to the axis of the drill during the rotating and feeding movement of the drill.

15. A button making machine comprising a stationary frame, a frame pivotally mounted thereon, bearings carried by the pivoted frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, and means for oscillating the pivoted frame transversely with respect to the axis of the drill during the rotating and forward feeding movement of the drill.

16. A button making machine comprising a stationary frame, a frame pivotally mounted thereon, bearing carried by the pivoted frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, and means for oscillating the pivoted frame transversely with respect to the axis of the drill during the rotating and rearward feeding movement of the drill.

17. A button making machine comprising a stationary frame, a frame pivotally mounted thereon, bearings carried by the pivoted frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, and means for oscillating the pivoted frame transversely with respect to the axis of the drill during the rotating and forward and rearward feeding movement of the drill.

18. A button making machine comprising a stationary frame, a vertical pivot carried thereby, a frame mounted on the pivot, bearings carried by the pivoted frame, a drill shaft and spindle journaled in the bearings, means for rotating and feeding the drill forward and rearward, and means for oscillating the bearing frame on the pivot during the rotating and feeding movement of the drill.

19. A button making machine comprising a stationary frame, a vertical pivot carried thereby, a frame mounted on the pivot, bearings carried by the pivoted frame, a drill shaft and spindle journaled in the bearings, means for rotating and feeding the drill forward and rearward, and means for oscil-

lating the bearing frame on the pivot during the rotating and rearward feeding movement of the drill.

20. A button making machine comprising a stationary frame, a vertical pivot carried thereby, a frame mounted on the pivot, bearings carried by the pivoted frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, and means for oscillating the bearing frame on the pivot during the rotating and forward and rearward feeding movement of the drill.

21. A button making machine comprising a stationary frame, a frame movably mounted thereon, bearings carried by the movable frame, a drill shaft and spindle journaled in said bearings, means for rotating and feeding the drill forward and rearward, means for bodily moving the movable frame during the rotating and feeding movements of the drill and means for varying the extent of said oscillation.

22. The combination of a movable tool frame, a relatively fixed supporting frame therefor, and means for automatically oscillating the tool frame with respect to the supporting frame comprising a pivot connecting the two frames, a round bushing carried by the tool frame and a rotating member eccentrically set within the bushing and means for rotating it.

23. A fixed frame, a tool carrying frame movable with respect thereto, tool actuating mechanism mounted on the tool frame, power driven mechanism mounted on the fixed frame and connections between the power driven mechanism and the movable frame whereby the latter is oscillated.

24. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing and means for rotating the block.

25. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing and means for rotating the block comprising a shaft provided with a gear, another gear meshing therewith and means for moving the second gear.

26. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing, means for rotating the block and varying its eccentricity with respect to the bushing.

27. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed

in said bushing, means for rotating the block and varying its eccentricity with respect to the bushing in combination with means for varying the position of the pivot connecting the two frames.

28. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing and means for rotating the block in combination with means for varying the position of the pivot connecting the two frames.

29. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing, means for rotating the block in combination with means for varying the extent of its rotation.

30. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing, means for rotating the block in combination with means for varying the extent of its rotation and its eccentricity.

31. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing, means for rotating the block in combination with means for varying the extent of its rotation and means for varying the position of the pivot connecting the two frames.

32. A fixed frame, a frame movable thereon, a pivotal connection between the two frames, a conical bushing in the movable frame, a conical block eccentrically placed in said bushing, means for rotating the block in combination with means for varying the extent of its rotation and its eccentricity and means for varying the position of the pivot connecting the two frames.

33. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, means for oscillating the frame while the tools carried thereby are actuated, and means for varying the extent of such oscillation as to length of radius and width of arc.

34. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot and means for varying the position of the pivot.

35. A niching or grooving device for button making machines comprising a tool

carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including an eccentric connection between the two frames.

36. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including an eccentric connection between the two frames and means for varying the position of the pivot.

37. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including an eccentric connection between the two frames and means for varying the position of the pivot and the degree of eccentricity in the connecting mechanism.

38. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including a rotating block eccentrically placed within a circular bushing in the tool carrying frame.

39. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including a rotating block eccentrically placed within a circular bushing in the tool carrying frame and means for varying the position of the pivot.

40. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including a rotating block eccentrically placed within a circular bushing in the tool carrying frame, and means for varying the extent of rotation of the block.

41. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including a rotating block eccentrically placed within a circular bushing in the tool carrying frame, and means for varying the extent of rotation of the block and means for varying the position of the pivot.

42. A niching or grooving device for button making machines comprising a tool carrying frame, mechanism for actuating the tools carried thereon, a relatively fixed frame on which the tool carrying frame is adapted to move, a pivot connecting the two frames and means for oscillating the tool carrying frame on the pivot including a rotating block eccentrically placed within a circular bushing in the tool carrying frame and means for varying the extent of its eccentricity.

43. In a machine of the character described, a tool carrying frame comprising a series of upright removable bearing blocks provided with horizontal substantially parallel bearings adapted to receive a pair of drill spindles, the brackets being of such size that when reversed the center of a drill spindle in the upper series of bearings is in the same horizontal plane as the medial horizontal plane between the pair of drill spindles before reversion.

44. In a machine of the character described, a tool carrying frame comprising a series of upright removable bearing blocks provided with horizontal substantially parallel bearings adapted to receive a pair of drill spindles, the bearing blocks being of such size that when reversed the center of a drill spindle in the upper series of bearings is in the same horizontal plane as the medial horizontal plane between the pair of drill spindles before reversion, in combination

with two drill supporting noses, one adapted for two drills, and one for one drill.

45. In combination, a stationary base frame, a tool carrying frame, an intermediate frame, means for actuating the tools, means for oscillating the tool carrying frame on the intermediate frame and means for varying the position of the center of oscillation.

46. In combination, a stationary base frame, a tool carrying frame, an intermediate frame, means for actuating the tools, means for oscillating the tool carrying frame on the intermediate frame and means for varying the position of the center of oscillation consisting of a pivot connecting the intermediate frame and the movable frame and slidably engaged with both.

47. In combination, a stationary base frame, a tool carrying frame, an intermediate frame, means for actuating the tools, means for oscillating the tool carrying frame on the intermediate frame and means for varying the position of the center of oscillation consisting of a pivot connecting the intermediate frame and the movable frame and slidably engaged with both and means for securing it at any desired point.

48. In combination, a stationary base frame, a tool carrying frame, an intermediate frame, means for actuating the tools, means for oscillating the tool carrying frame on the intermediate frame and means for varying the arc of such oscillation consisting of a round bearing in the movable frame, a vertically arranged eccentric adapted to engage therewith and means for varying the position of the center of the eccentric with respect to the center of the bearing.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN HORMBY.

Witnesses:

E. J. BOUCHER,
C. L. ELWELL.