R. McCOY.

BUTTON CUTTING AND DRILLING MACHINE.

APPLICATION FILED JUNE 11, 1909.

959,151.

Patented May 24, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

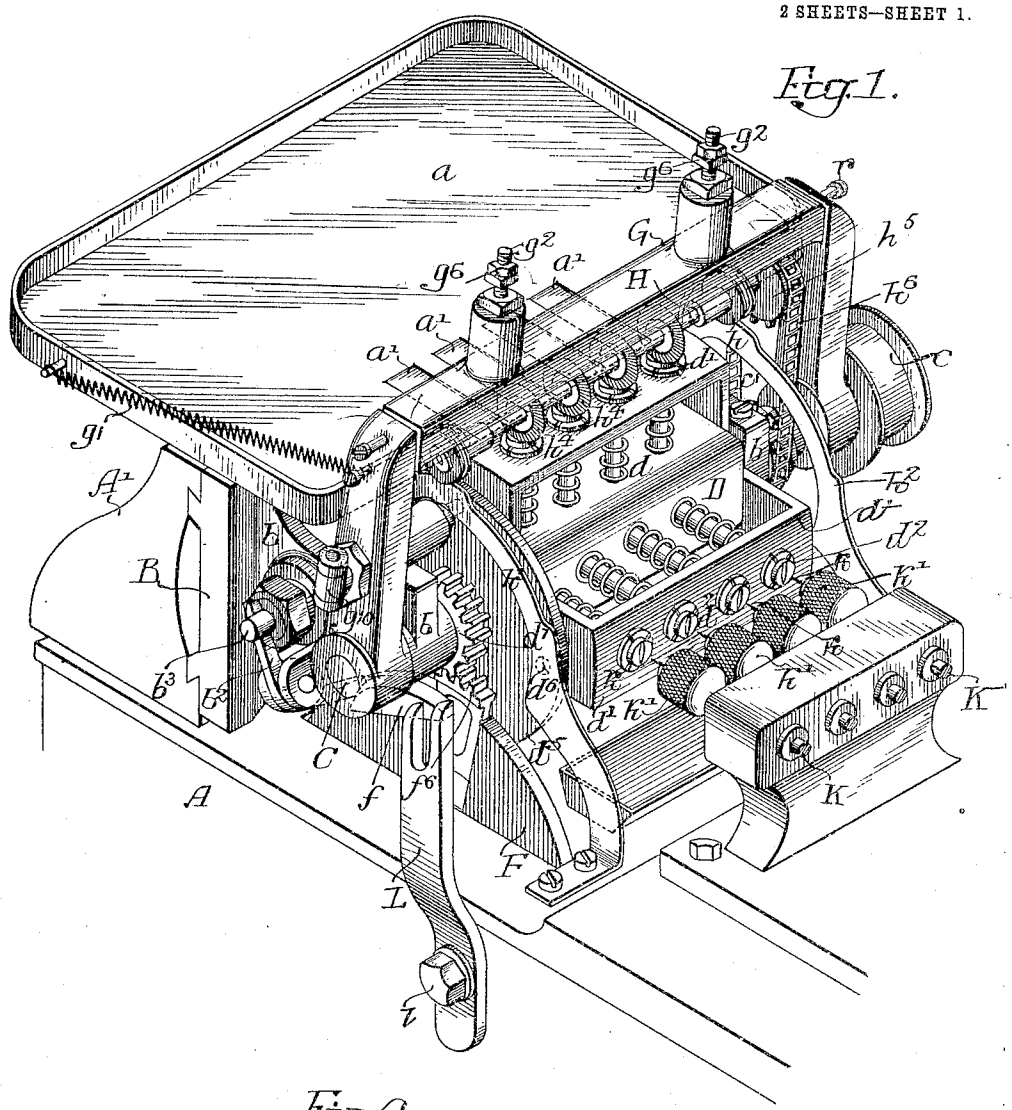
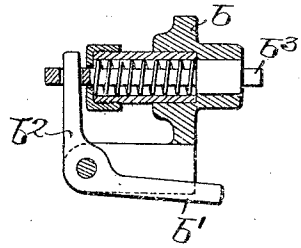


Fig. 4.



Witnesses.—
Titus H. Irons.
Wills A. Burrowes.

Inventor:—
Robert McCoy.
by his Attorneys.
Howson & Howson

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2 SHEETS—SHEET 2.

Fig. 2.

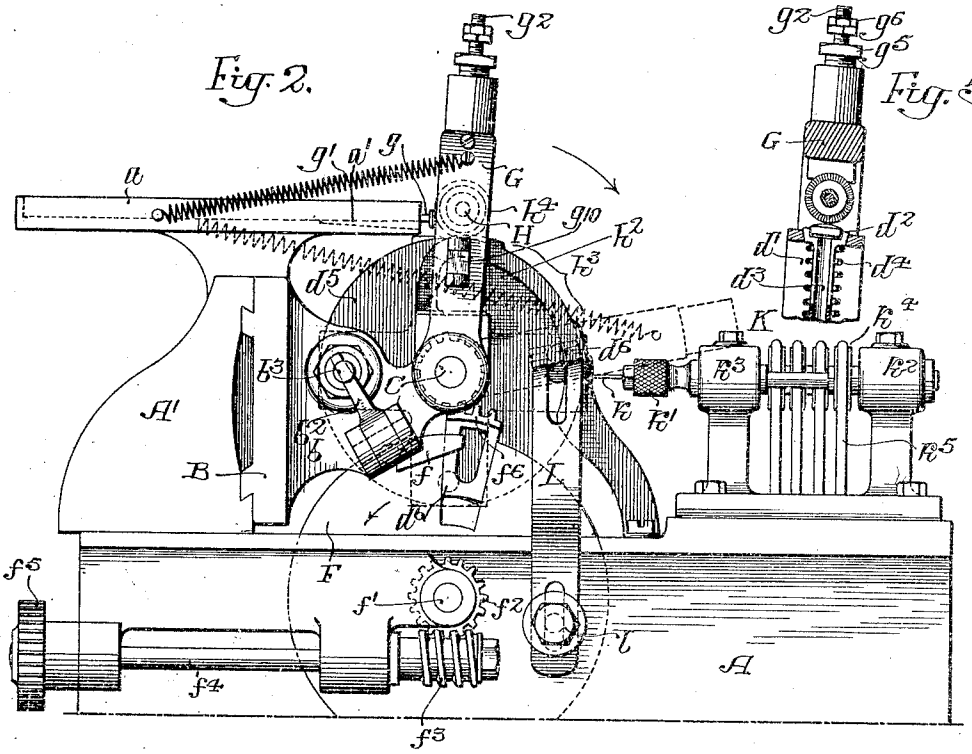


Fig. 5.

Fig. 6.

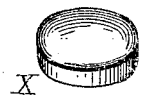


Fig. 3.

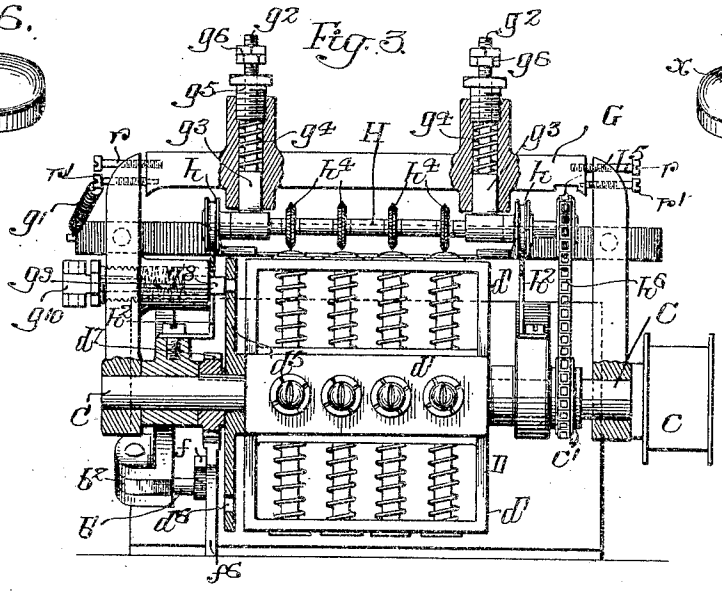


Fig. 7.

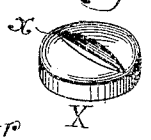
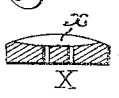


Fig. 8.



Witnesses.

Titus H. Towns.

Wills A. Burrowes

Inventor.

Robert McCoy.

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Howson & Howson

UNITED STATES PATENT OFFICE.

ROBERT McCOY, OF VINELAND, NEW JERSEY, ASSIGNOR OF ONE-HALF TO PEERLESS PEARL COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

BUTTON CUTTING AND DRILLING MACHINE.

959,151. Specification of Letters Patent. Patented May 24, 1910.

Application filed June 11, 1909. Serial No. 501,586.

To all whom it may concern:

Be it known that I, ROBERT McCOY, a citizen of the United States, residing in Vineland, New Jersey, have invented certain Improvements in Button Cutting and Drilling Machines, of which the following is a specification.

One object of my invention is to provide an automatically acting machine for cutting fish-eyes in buttons which shall be of such a nature as to be capable of use in connection with and as a part of a button drilling device.

Another object of my invention is to provide an attachment for a button drilling machine which shall be capable of automatically cutting fish-eyes simultaneously in one or any number of buttons while they are passing from the position occupied when they are fed into the chuck to the position in which they are drilled.

It is further desired to so place automatic fish-eye cutting mechanism with relation to a button drilling mechanism that the holes drilled shall necessarily occupy the proper positions in the fish-eyes:—the invention also contemplating the novel means for controlling and actuating the various parts of the cutting mechanism and its associated parts.

I also desire to provide a relatively simple, accurate and reliable fish-eye cutting apparatus capable of being attached to and used in connection with a well known form of button drilling machine without requiring material alteration of the latter.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which:—

Figure 1, is a perspective view of a portion of a button drilling machine, showing my invention as applied thereto; Fig. 2, is an end elevation of the machine shown in Fig. 1; Fig. 3, is a side elevation, partly in vertical section, showing certain detail features of the device; Fig. 4, is a section illustrating a portion of the drum holding device; Fig. 5, is a vertical section showing the detail arrangement of chucks and cutting wheels, and Figs. 6, 7 and 8, are respectively two perspective views and a vertical section showing a button in various stages of its treatment by my machine.

In the above drawings A represents a suitable frame work on which are mounted standards A′ carrying a slide B and also serving as a support for a tray or table *a*. The plate forming the slide B is carried in a vertical position, and has projecting forward from it two brackets *b* forming bearings for a shaft C. This shaft is provided at one end with a driving pulley *c* and has keyed or otherwise fastened to it a sprocket wheel *c′*;—there being loosely mounted on it between the bearings a chuck carrying structure D which for convenience I shall hereafter refer to as a drum.

A hollow body portion *d* constitutes the main part of the drum and has radiating from it four equally spaced chuck guiding brackets *d′*. These brackets, as well as the body portion, may be of any desired length so that each can accommodate a number of automatically acting button chucks d^2, each of which consists of a hollow spindle d^3 enlarged and split at its outer end so as to be capable of receiving and holding a button, and having a spring d^4 surrounding the spindle so as to act between the body *d* and the head of the chuck. Said body contains suitable automatic chuck-controlling devices operative on the spindles d^3, which, as it forms no part of the present invention, is not shown. The apparatus, however, is so constructed that the chucks of the series carried by any one bracket are in their open position when said bracket extends vertically upward, and are brought to their closed position as soon as the drum has turned an appreciable distance in the direction of the arrow, Fig. 2. Said chucks are again opened about the time that the bracket has attained its lowermost position. To one end of the drum is fixed a circular plate d^5 having in it four holes indicated at d^6 placed adjacent to its periphery 90° apart.

The bearing bracket *b* at the end of the machine adjacent to the plate d^5 carries a spring-actuated pin b^3 normally pressed toward said plate and so positioned as to be capable of entering any one of the holes d^6 to lock the plate and with it the drum in any one of four positions. The outer end of the pin b^3 is engaged by one arm of a lever b^2 carried by the bearing bracket *b* and having a second arm *b′* placed to be engaged by a cam *f* carried by a wheel F in such manner as to be capable of causing said lever to swing on its pivot and draw the pin b^3 out

of engagement with the plate d^5. This wheel F is mounted on a short shaft f' journaled in suitable bearings in the frame A and also having fixed to it a worm wheel f^2 driven by a worm f^3 on the shaft f^4. This latter is actuated through a gear wheel f^5 from any suitable source of power. Said wheel F has mounted on it a relatively short gear segment f^6 so placed as to be capable of engaging the teeth of a gear d^7 loosely mounted upon the shaft C but fixed to the drum D through the plate d^5. Also loosely carried by the shaft C is a yoke piece G having the general form of an inverted U and normally held in a substantially vertical position against stops g by means of a spring g' extending between it and some fixed part of the machine, in the present instance, one side of the table a. The intermediate or top member of this yoke piece is preferably connected to the end members thereof by screws r and may be adjusted longitudinally by screws r'; that is to say, by means of these latter screws said top member may be shifted longitudinally relatively to the other parts of the device and may be held in its adjusted position by means of the screws r. Said top member carries two spindles g^2 provided at their lower ends with heads g^3 in which are formed bearings for a spindle H extending parallel with the shaft C and having adjacent to its ends grooved guide wheels h. These spindles are normally pressed downwardly by springs g^4 confined between the heads g^3 and adjustable sleeves g^5 screwed into the yoke G. Each of the spindles g^2 has on its upper end adjustable stop nuts g^6 which limit the distance it can slide through the sleeve g^5 toward the shaft C. Each of the grooved wheels h rests upon a cam track h^2 fastened in any suitable manner to the bearing brackets b and to the main frame A; the essential part of each track being of substantially the shape of a quadrant, and having a certain length of its outer periphery, indicated at h^3, lower or nearer the shaft C than the remainder.

Upon the spindle H are any desired number of rotary cutters h^4 suitable for forming the fish-eyes x in buttons such as that indicated at X in Figs. 6 to 8 inclusive. This shaft H also carries a sprocket wheel h^5 in line with the sprocket wheel c' on the shaft C, with which it is connected by means of a suitable chain h^6. As shown in Fig. 1, each of the cutters h^4 is in a vertical plane including the center lines of a series of four of the chucks carried by the drum D, and in each of these planes is mounted a drill k held in a chuck k' mounted on a shaft K carried in brackets k^2 and k^3 and provided with a driving pulley k^4 to which power is applied by a belt k^5. It will be understood that any suitable means, not forming a part of the present invention, may be employed for advancing and retracting the drills so as to cause them to operate upon the buttons held by the various chucks, but as this machine is well known to the art, I have not illustrated it.

As shown in Figs. 1 and 3, one side of the yoke G carries an inwardly extending pin g^8 which, like the pin b^3, is capable of entering the holes d^6 of the plate d^5, though in this case it serves to lock the yoke to the drum. Said pin is normally pressed toward the plate by a spring g^9 and it has at its outer end a head g^{10} provided with a pair of rollers placed to be engaged by a cam L when the yoke has been moved a predetermined distance from its normal position. The cam has a forked shaped end and is held by a bolt l to the frame A of the machine. When these rollers of the head are brought into engagement with the cam L, the latter acts to draw the pin g^8 longitudinally outward so as to release the yoke G from the plate d^5 and hence from the drum D.

Under operating conditions, buttons are fed from the tray or table a through guideways a' and with the various parts in the positions shown in Fig. 1, the chucks of the uppermost set are in their open condition so that buttons may be passed from said guideways into them. Moreover, the drum D is locked to the frame of the machine because the pin b^3 is in one of the holes d^6 of the plate d^5, and the yoke G is locked to said plate through the pin g^8. If power be now applied to the pulley wheel c so as to turn the shaft C, the cutters h^4 are driven through the spindle H but are held above and out of contact with the buttons in their several chucks by reason of the fact that the guide rollers h are resting upon the high portions of the tracks h^2. If the shaft f^4 be turned so as to drive the wheel F in the direction shown by the arrow, Fig. 2, the cam f will come into engagement with the arm b' of the locking lever and so move the pin b^3 as to release the plate d^5. Immediately thereafter the segmental gear f^6 is brought into mesh with the teeth of the pinion d^7 so that the drum D and with it the yoke G together with their attached parts, will be swung downwardly in the direction indicated in Fig. 2. The automatic mechanism within the body d of the drum immediately thereafter acts to cause closing of the various chucks of the top set so that these grip the buttons previously placed in them and as the movement of the drum continues, the guide rollers h come into the lower portion h^3 of the tracks h^2 so that the springs g^4 force the spindle H toward the shaft C, thereby bringing the cutters h^4 into engagement with the various buttons held by the set of chucks above referred to.

The various parts are so proportioned and adjusted that the depth of cut is made as

desired, depending on the adjustment of the stop nuts g^6 on the spindle g^2, and the guide rollens finally strike the higher portion of the track h^2, so that the cutters are returned to the raised position above the chucks. Immediately thereafter, the rollers of the spindle head g^{10} engage the forked end of the cam L, with the result that the pin g^8 is pulled out of the hole in the plate d^5, thereby uncoupling the yoke G from the drum D. Under the action of the spring g' said yoke is quickly returned to its normal vertical position and shortly thereafter the segmental gear f^6 passes out of mesh with the pinion d^7 while the pins b^3 and g^8 again enter the holes in the plate d^5 so as to lock the drum to the frame and the yoke G to the drum.

The drills k are now advanced by their appropriate mechanism so as to drill one or more holes in each of the buttons, and it is obvious that since the adjustment of the various cutters h^4 relatively to each other and to the chucks may be made with the greatest nicety, said drills can be set so that they operate with the greatest accuracy at the desired point or points on the fish-eyes of the button.

If more than one hole is desired in each button, suitable mechanism is provided for periodically raising the structure carrying the drills k, but since such mechanism is old and well known to the art, it has not been illustrated in the drawings.

While said drills are acting, another series of buttons is being fed into the set of chucks now uppermost, which like the first series, are in the opened condition;—it being evident that the cutter wheels are in their raised position above the chucks owing to the fact that the grooved guide wheels on the spindle H have again come to rest on the higher parts of the tracks h^2.

The above cycle of operations is repeated as soon as the segmental gear f^6 again comes into engagement with the gear d^7.

While I have shown a machine in which there are but four chucks to a set, and hence but four cutters on the spindle H, I may, without in any way departing from my invention, employ a greater or less number of chucks and cutters.

I claim:—

1. The combination of a rotary structure having a series of chucks; a frame rotatable concentrically with said structure; means for locking the frame to the structure; means for releasing said frame from the structure; a cutter spindle, carried by the frame and rotatable therewith outside the chuck supporting structure, and substantially parallel with the axis of rotation thereof; a cutter on the spindle; a drill operative in a line substantially at right angles to said axis of rotation of the frame; with means for rotating the chuck-carrying structure to cause the chuck to be successively presented to the cutter and to the drill.

2. The combination of a drill, a series of chucks, a structure supporting said chucks, means for rotating said structure so as to successively present said chucks to the drill, a source of supply for articles to be drilled, a cutter placed to act upon articles carried by the chucks as they pass from the source of supply to the drill and bodily movable toward and from the axis of rotation of the chuck supporting structure, with a frame rotatable concentrically with the chuck-supporting structure.

3. The combination of a chuck, a drill, means for moving the chuck to present an article carried thereby to the drill, a frame, a cutter carried thereby and capable of acting on the article in the chuck, with means for detachably locking said frame to the chuck so that it moves with the same.

4. The combination of a chuck, a drill, means for moving the chuck to present an article carried thereby to the drill, a frame, a cutter carried thereby and capable of acting on the article in the chuck, means for detachably locking said frame to the chuck so that it moves with the same, and means for automatically causing the cutter to move into and out of operative position.

5. The combination of a rotatable structure, a series of chucks carried thereby, means for rotating said structure, a movable frame, a cutter carried thereby and capable of operating on objects carried by the chucks, a drill also placed to operate on said objects, means for locking together the chuck carrying structure and said frame, with means for releasing the said locking means at a predetermined time.

6. The combination of a rotatable structure, a chuck carried thereby, a movable frame, a cutter carried thereby, driving means for the cutter, means for locking the frame to the chuck carrying structure, and means for automatically releasing said locking means under predetermined conditions.

7. The combination of a movable supporting structure, a chuck carried thereby, a movable frame, a cutter movably supported thereon and capable of operating on work carried by said chuck, with a cam for governing the action of said cutter.

8. The combination of a movable supporting structure, a chuck carried thereby, a movable frame, a spindle carried by said frame and free to move toward and from the chuck carrying structure, a cutter mounted on the spindle, and means for governing the movement of the cutter toward and from the chuck.

9. The combination of a movable supporting structure, a chuck carried thereby, a

movable frame, a spindle carried by said frame and free to move toward and from the chuck carrying structure, a cutter on the spindle, means for governing the movement of the cutter toward and from the chuck, means for automatically locking the cutter frame and chuck carrying structure together, and means for releasing said locking means.

10. The combination of a rotatable drum having a plurality of series of chucks, a frame, a plurality of cutters carried thereby, driving means for said cutters, means for governing the action of the cutters upon objects carried by the chucks, and means for locking the frame to the chuck carrying structure under predetermined conditions, with a device for automatically releasing said locking means.

11. The combination of a main frame, a drum, a number of series of chucks thereon, a frame supported concentrically with the drum, cutters on said frame, means for locking the drum to the main frame and to the cutter frame, means for automatically releasing said locking means to free the cutter frame from the drum, means for causing movement of the cutters toward and from the chucks, and means for intermittently turning the drum through predetermined arcs.

12. The combination of a drill, a chuck, means for moving the chuck to present an article carried thereby to the drill, and a cutter mounted to operate on such article while it is moving toward the drill.

13. The combination of a drill, a chuck, means for moving the chuck to present an article carried thereby to the drill, and a cutter capable of moving with the chuck as well as toward and from the same while said chuck is moving toward the drill.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBERT McCOY.

Witnesses:
WILLIAM E. BRADLEY,
WM. A. BARR.