

(No Model.)

2 Sheets—Sheet 1.

D. B. SHANTZ.  
BUTTON MAKING MACHINE.

No. 511,364.

Patented Dec. 26, 1893.

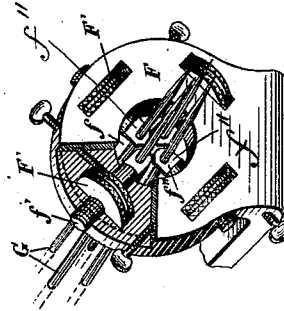
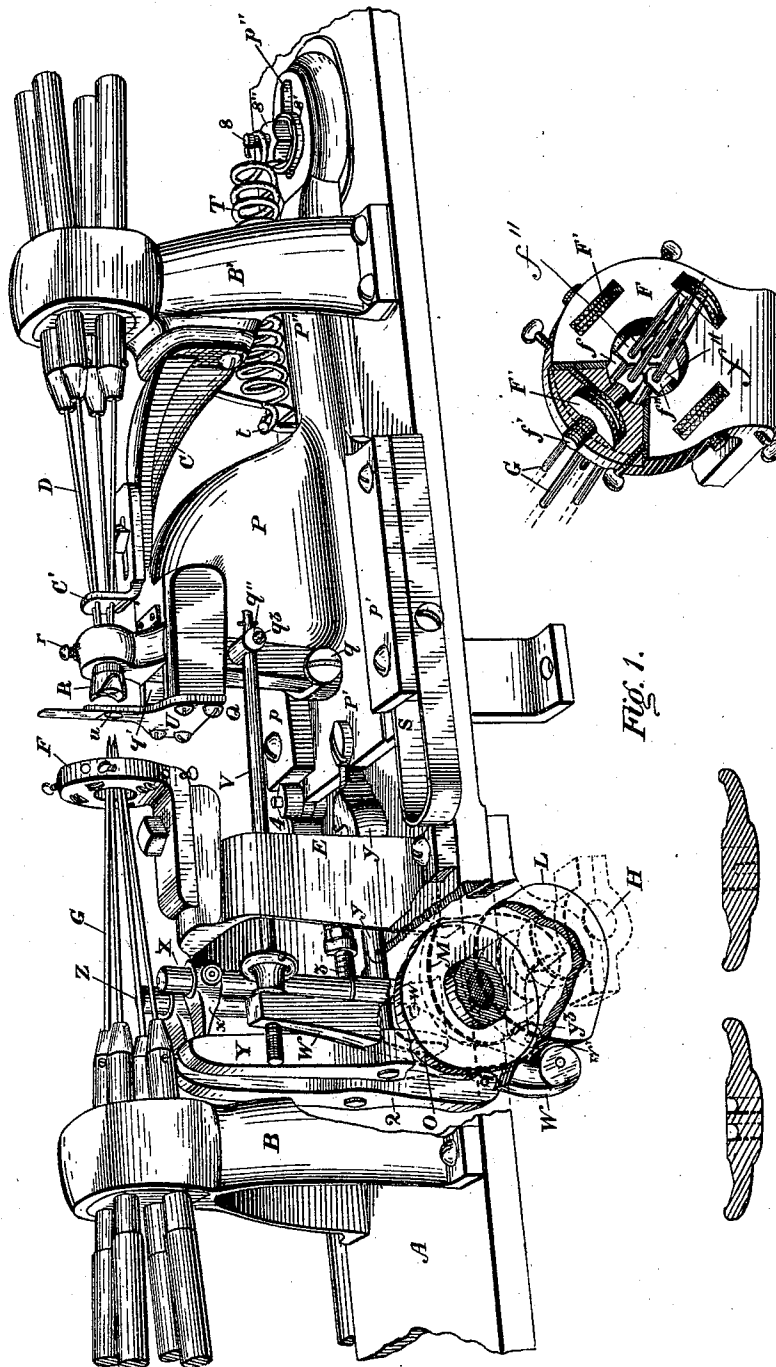


Fig. 3.



Fig. 6.

Witnesses.

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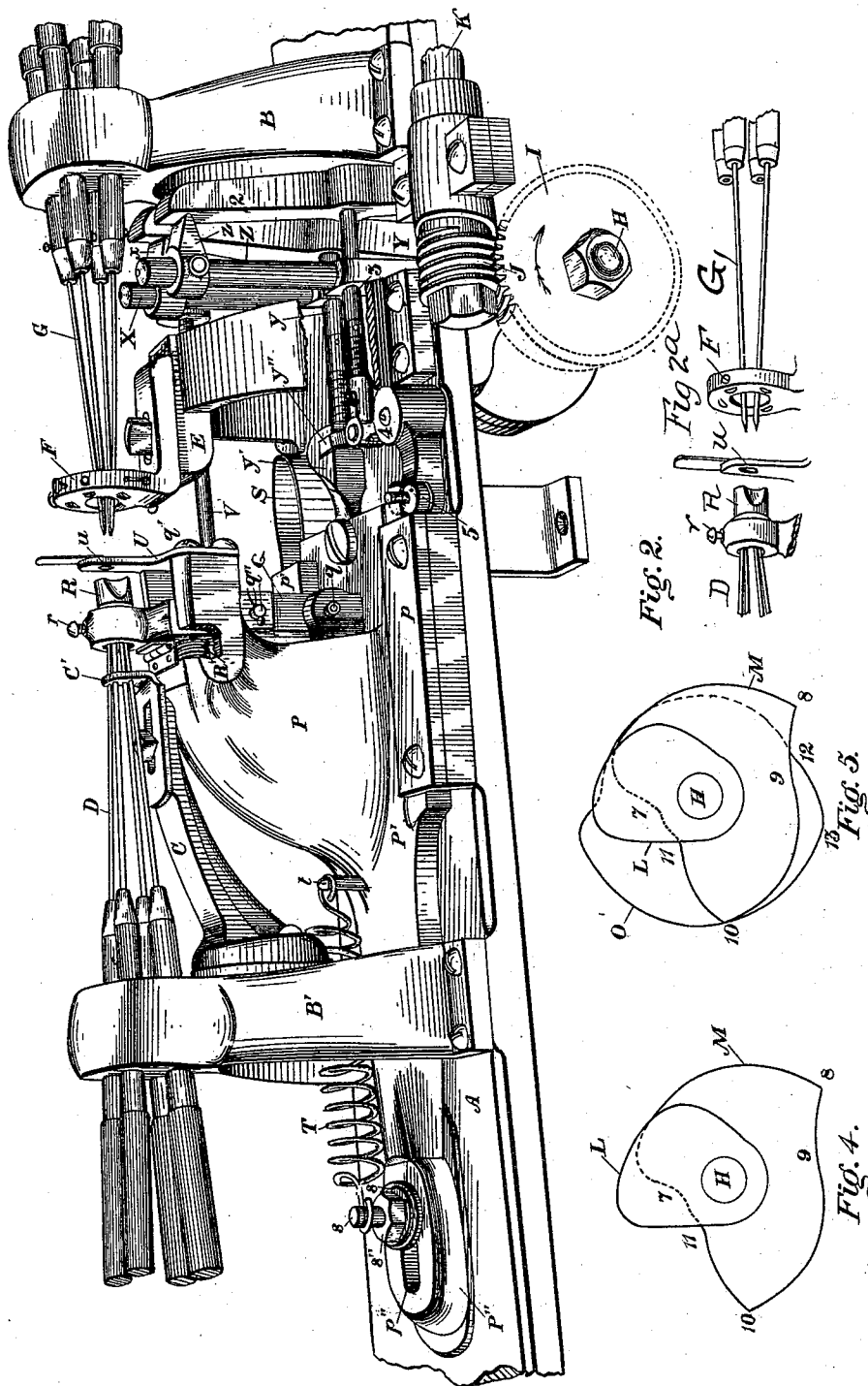
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Witnesses.  
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*W. S. Young*

Inventor.  
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# UNITED STATES PATENT OFFICE.

DILMAN BRUBACHER SHANTZ, OF BERLIN, CANADA.

## BUTTON-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 511,364, dated December 26, 1893.

Application filed September 5, 1892. Serial No. 445,094. (No model.)

*To all whom it may concern:*

Be it known that I, DILMAN BRUBACHER SHANTZ, manufacturer, of the town of Berlin, in the county of Waterloo, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Machines for Boring Holes in Buttons, of which the following is a specification.

My invention relates to improvements in machines for boring holes in buttons and similar articles manufactured chiefly from vegetable ivory and the object of the invention is to save time and labor in boring holes in buttons—first—by providing simple mechanism whereby the button is enabled to be quickly placed in position and securely held in position while it is being bored—secondly—by providing automatic means by which two or four holes may be bored and counter-sunk practically simultaneously and—thirdly—by providing automatic means by which two holes may be bored simultaneously and grooves then formed from the first two holes bored to the other two which are then bored simultaneously. The corners at the point of junction of the grooves with the holes being arranged to be rounded off automatically and it consists essentially—first—of supporting the button between an open face plate and chuck, which is secured in the end of a lever deriving an intermittent motion through its connection by a rod to a lever, the throw of which is regulated by a cam to bring the chuck close to or away from the open face plate so as to enable the button to be placed in position and held in position when so placed—secondly—of a carriage, which is brought forward so as to bring the face of the button against one set of drills by means of a link, which is connected at one end to the front of the base plate of the carriage and at the other to a lever which at the lower end derives a forward throw from a revolving cam, and is brought back so as to bring the back of the button against the other set of drills so as to counter-sink the holes of the button by a spiral spring secured at one end to the carriage and at the other to a pin secured to the frame of the machine and—thirdly—of providing one pair of drills designed to operate upon the face of the button and further in providing a pivoted bell-crank one end of which is pro-

vided with a friction roller, which abuts the side of the base plate of the carriage while the other end is connected by a rod to a lever, which derives a forward throw from a cam on the main arbor, the cam being so arranged that after the carriage has been brought forward and partially back again it will throw the lower portion of the lever forward and rock the bell-crank on its pivot and bring its free end against the base of the carriage and throw the carriage practically instantaneously to the one side so that the revolving drills passing across the button form grooves in it at the same time rounding off the grooves at the point of junction with the holes whereupon the carriage then moves forward and completes the other pair of holes, a spring being provided at the other side of the base plate so as to force the carriage back into position after the second pair of holes has been completed, so that the four holes may be now counter sunk simultaneously, the whole being arranged and constructed in detail as hereinafter more particularly explained.

Figure 1, is a perspective view of the major portion of my machine showing the parts involved in my invention. Fig. 2, is a perspective view from the opposite side of the machine. Fig. 2<sup>a</sup> is a detail perspective view showing two drills to operate on the face of the button and four drills to operate on the rear. Fig. 3, is a detail of the adjustable drill holder. Fig. 4, is a side elevation showing the relative position of the two cams when it is designed to bore four holes. Fig. 5, is a side elevation showing the relative position of the three cams when it is designed to bore two holes. Fig. 6, are enlarged sections of a button showing the holes and the peculiar formation of the groove when drilled by the two drills.

In the drawings like letters and numerals of reference indicate corresponding parts in each figure.

I have only shown a portion of the machine, the end standards near which are located the pulleys on the drill spindles being not shown but it will of course be understood that the opposite end of the drill spindles are supported in standards and that pulleys are provided for their rotation.

A, is the bed-plate of the machine and, B,

B', the standards on which are supported the inner end of the drill spindles.

C, is a bracket having an adjustable bracket C', secured on the top of it through which the free ends of the drill spindles, D', pass.

E, is a standard at the top of which is supported the adjustable drill holder, F, through which pass the outer ends of the drills G. The drill holder, F, is comprised of a circular opening *f*, and screw spindles, *f'*, which extend into the opening and have blocks, *f''* in their ends through which pass the drills, G.

F', are circular thumb nuts which are located in openings in the body of the holder F, and fit upon the screw spindles, *f'*. The screw spindles, *f'*, pass freely through holes made in the body of the holder, F, and are adjusted by turning the nuts, F', so as to give a greater or less distance apart of the holes in the button.

H, is the arbor which has secured at one end the worm wheel, I, which meshes with the worm, J, on the main driving shaft, K, of the machine. On the arbor, H, is supported the cams, L, M, and, O, which regulate the movement of the lever, Q, in the top of which is secured the retaining chuck, R, and the backward, forward, and side movements of the carriage, P.

P', is the base plate of the carriage, P, which moves in guideways, *p*, *p'*. The carriage, P, is securely held by the U-shaped spring S, so that the side of its base plate is securely held against the side of the guideway, *p*.

P'', is the rearwardly extending portion of the carriage which has a slot, *p''*, made in it as shown.

s, is a bolt which passes up through the slot, *p''*.

s', is a washer, and, s'', is a nut which is designed to keep the rearwardly extending portion, P'', upon the bed-plate, A, and yet permit of the longitudinal movement of the carriage, P.

T, is a spiral spring connected at one end to the pin *t*, on the carriage, P, and at the other end to the bolt s.

U, is a plate secured on the end of the forwardly extending upper portion of the carriage, P. The plate, U, is provided with a circular hole *u*, as shown. The chuck, R, is supported in the upper end of the lever, Q, by the set screw, *r*, and may be of any desired size or form in order to accommodate the different sizes or forms of buttons. The lever, Q, is pivoted at its lower end at *q*, and extends upwardly through the elongated opening, *q'*, made in the top of the carriage, P. *q''*, is a projection forming part of the lever Q, extending outwardly from it beneath the forwardly projecting portion of the carriage, P.

R', is a spiral spring located in a hole in the upper portion of the carriage, P, directly behind the lever, Q.

V, is a rod one end of which extends through

the projection *q''*, and is secured in position in the projection by the set screw, *q<sup>3</sup>*. The other end of the rod, V, is screwed into the upper end of the lever, W. The lever, W, is pivoted at, *w*, and its lower portion is provided with a friction roller, *w'*, which rides upon the periphery of the cam, L, secured on the arbor, H.

X, is a vertical standard having secured on it the adjustable stop, *x*, and, Y, is a lever connected by the jointed rod, *y*, to the link, *y'*, pivotally connected to the front of the base plate P'. The rod, *y*, has a threaded end which extends into a hole in the link, *y'*, and is adjustable by the nut *y''*, located between the jaws of the link as shown. The lower end of the lever, Y, has a roller pivoted in it which rides upon the cam, M.

Z, is a standard extending upwardly from the bed-plate, A, and having secured on it the adjustable fulcrum, *z*.

2, is a lever connected by the jointed rod, 3, to the bell-crank, 4, the free end of which has a friction roller, 5, which abuts the side of the base plate, P. The lower end of the lever has a friction roller pivoted in it which rides upon the cam, O. The stops, *x*, and, *z*, form fulcrums for the levers, Y, and, 2.

Having now described the principal parts involved in my invention I shall now proceed to describe the operation of my machine. The drills, D, and, G, are caused to revolve continually from pulleys on the ends of the drill spindles which are driven by belts. The cams, L, M, and, O, are also caused to revolve through worm gears, I, and worms, J, on the shaft, K. When it is desired to have the four holes bored simultaneously in the button I remove the adjustable fulcrum, *z*, from the rod, Z.

In Fig. 1, the machine is shown with the chuck open so that the button may be placed between the chuck, R, and the face plate U. The cam, L, in revolving causes the lever, W, to tilt on its pivot so as to throw the lever, Q, and chuck, R, back into the position shown in the drawings when the button may readily be inserted between the chuck, R, and plate, U. When the button has been inserted, the roller, *w'*, of the lever, W, in revolving comes upon the concentric portion of the cam and the chuck is drawn close to the plate, U, so as to securely hold the button by the spiral spring, R', located behind the lever, Q, as hereinbefore described. In this position the button is held during the major portion of the revolution of the arbor, H, that is to say during the period that the button is being drilled. As soon as the button has been securely gripped the carriage P, is caused to move forward by the central cam, M, which operates on the lever, Y, so as to give it a forward movement and the carriage a like movement, the block, *x*, forming the fulcrum upon which the lever swings. The first throw of the cam, D, from 7, to, 8, is sufficient to bring the carriage forward so that the drills will

pass through the button now securely gripped between the plate, U, and the chuck, R. The carriage is then drawn partly back by the spring, T, while the roller passes over the portion from, 8, to, 9, when the forward throw is repeated while it presses over the portion from, 9, to, 10. While the roller passes over the portion from, 10, to, 11, the spring draws back the carriage so that the back of the button comes against the drills, D, and the holes are counter sunk. The next button is inserted while the roller is passing over the concentric portion from, 11, to, 7, and the operation is repeated. Should it however be desired to make a button with grooves between the holes I place the adjustable fulcrum, *z*, on the standard Z, so that it will give the desired throw to make the requisite distance and length of groove between the holes. I remove two of the drills, G, which are in the same perpendicular on the side of the machine opposite to the gear wheel, I, as shown in Fig. 2<sup>a</sup>. The button is placed and held in position and the carriage is brought forward as hereinbefore described. The carriage is now brought part of the way back by the spiral spring, T, when the portion of the cam, O, from 12, to, 13, operates on the lever, 2, moving it outward. By the connecting arm, 3, the motion is transmitted to the bell-crank, 4, which presses sidewise upon the bed of the carriage, P, so as to throw it sidewise almost instantaneously and thereby forming a groove across the face of the button. The portion of the cam, M, from, 9, to, 10, is in the meantime moving the carriage forward. The side motion given by the cam, O, together with the receding and advancing motion given by the cam, M, form the rounded grooves across the button as shown in Fig. 6. When the roller on the lever, 2, reaches, 13, it meets the concentric portion and the lateral movement ceases while the roller on the cam, M, continues moving forward to, 10, boring the second pair of holes through, after which the four holes are counter sunk as before described.

What I claim as my invention is—

1. In a machine for boring holes in buttons and similar articles, the combination with the revolving drills, of an adjustable carriage provided with the chuck, R, secured in the upper end of the lever, Q, the plate, U, provided with a hole, *u*, the pivoted lever, W, provided with a roller, *w'*, and the rod, V, by which the levers, W, and, Q, are adjustably connected together and the cam, L, driven by the worm gearing as shown and for the purpose specified.

2. The combination with the revolving drills, the adjustable carriage provided with the chuck, R, secured in the upper end of the lever, Q, the plate, U, provided with a hole, *u*, the pivoted lever, W, provided with the roller, *w'*, the rod, V, by which the levers, W, and, Q, are adjustably connected together and the cam, M, driven by worm gearing as specified,

of the spiral spring, R, located in the upper portion of the carriage, P, behind the lever, Q, as and for the purpose specified.

3. The combination with the revolving drills and the plate U, provided with a hole, *u*, and the chuck, R, adjustable in the carriage, P, as specified, of the cam, M, levers, Y, provided at one end with the roller, *y*, and the other end swinging on the fulcrum *x*, and the rod, *y''*, connecting the lever, Y, with the front end of the carriage as and for the purpose specified.

4. The combination with the revolving drills and the plate U, provided with a hole, *u*, and the chuck, R, adjustable in the carriage, P, as specified, of the cam, M, levers, Y, provided at one end with the roller, *y*, and at the other end swinging on the fulcrum, *x*, the rod, *y''*, connecting the lever, Y, with the front end of the carriage and the spring, T, connected at one end to the pin, *s*, extending through the slot, *p''*, and at the other to the pin, *t*, on the carriage, P, as and for the purpose specified.

5. The combination with the revolving drills, the plate, U, provided with a hole, *u*, the chuck, R, adjustable in the carriage P, as specified, the levers, Y, provided at one end with the roller *y*, and at the other end swinging on the fulcrum, *x*, and the rod *y''*, connecting the lever, Y, with the front end of the carriage, of the cam, M, driven from the worm gearing as and for the purpose specified.

6. In combination, the clutch for the button, the front drills G, the rear drills D, the carriage carrying the button chuck and arranged to reciprocate longitudinally toward and from the drills and also laterally thereof and the means for operating the carriage, the said drills G comprising two drills to form two pairs of openings with the grooves between and the drills D comprising four drills arranged to counter sink at one operation the two pairs of holes formed by the two drills G, substantially as described.

7. The combination with the revolving drills, D, and revolving drills, G, and the laterally adjustable carriage, P, of the bell-crank, 4, connected by the jointed rod, 3, to the lever, 2, which derives a forward throw from the cam, O, and the means for reciprocating the carriage longitudinally as and for the purpose specified.

8. The combination with the revolving drills, D, and revolving drills, G, the carriage, P, adjustably connected to the lever, Y, by the jointed rod, *y*, and pivoted link, *y'*, and the cam M, designed to operate upon the lower end of the lever, Y, of the bell-crank, 4, connected by the jointed rod, 3, to the lever, 2, which derives a forward throw from the cam, O, as and for the purpose specified.

9. The combination with the revolving drills, D, and revolving drills, G, the carriage, P, adjustably connected to the lever, Y, by the jointed rod, *y*, and pivot link, *y'*, and the cam, M, designed to operate upon the roller at the

lower end of the lever Y, of the bell crank, 4, connected by the jointed rod, 3, to the lever, 2, which derives a forward throw from the cam, M, and the springs, s, abutting the base plate of the carriage at the opposite side to that in which the bell-crank, 4, abuts the plate as and for the purpose specified.

10. In combination, the frame, the revolving drills, the reciprocating carriage guided in ways in the frame, the driving connections for said carriage to move it toward and from the drill, the chuck having both its members carried by the reciprocating carriage to move toward and from the drills and the driving connections for said chuck for positively opening and closing the same independently of the movement of the carriage, substantially as described.

11. In combination, the revolving drills the frame, the carriage having a chuck thereon and arranged to reciprocate longitudinally toward and from the drills and also laterally in relation thereto the means for operating the carriage, longitudinally and the lever connected to the carriage and having operating connections for moving the carriage laterally substantially as described.

12. In combination, the frame the revolving drills, the reciprocating carriage movable in ways of the frame, the chuck the lever car-

rying the same and pivoted to the carriage to move therewith said chuck lever having also movement on its pivot independent of the carriage's movement, the driving connections for operating the carriage and the driving connections for positively operating the chuck lever, substantially as described.

13. In combination, the frame, the reciprocating carriage, the chuck carried wholly thereby and comprising the stationary perforated plate U and the movable member R, the front and rear sets of drills, the said chuck members R being hollow to admit the rear drills, the movable support for the hollow chuck member connected with the carriage, the means for operating the carriage and the means for operating the movable support of the chuck member, substantially as described.

14. In combination, the drills with operating means therefor the carriage carrying the chuck, said carriage having an extension slotted and pivotally connected to the frame, the means for moving said carriage longitudinally and the means for swinging the same laterally on its slotted pivotal connection, substantially as described.

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Witnesses:

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