2 Sheets—Sheet 1.

A. A. SMITH.

Button-Lathe.

No. 222,161. **Patented Dec. 2, 1879.**

Fig: 1.

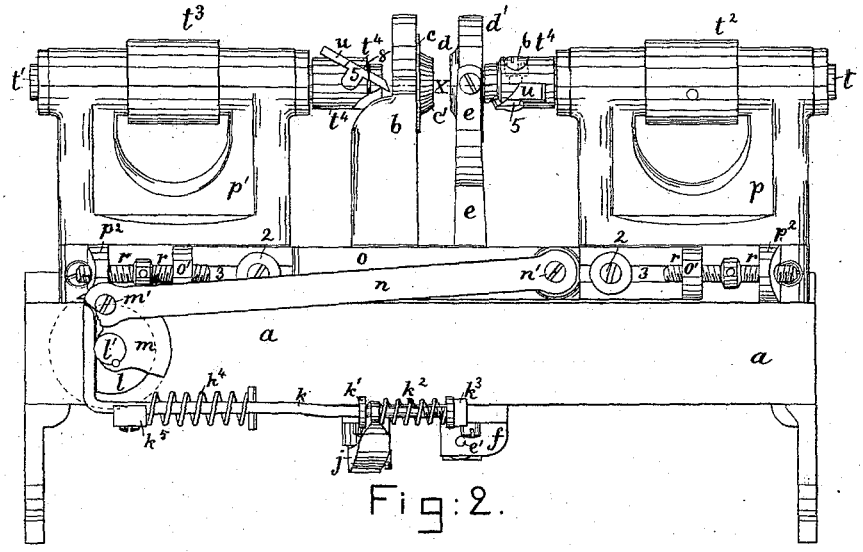


Fig: 2.

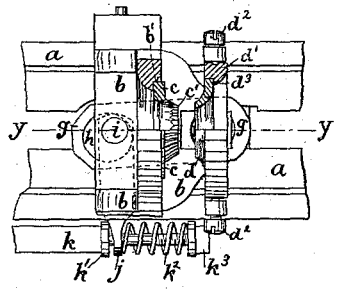


Fig: 3.

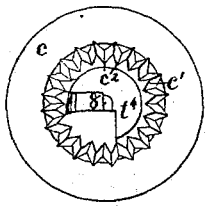


Fig: 4.

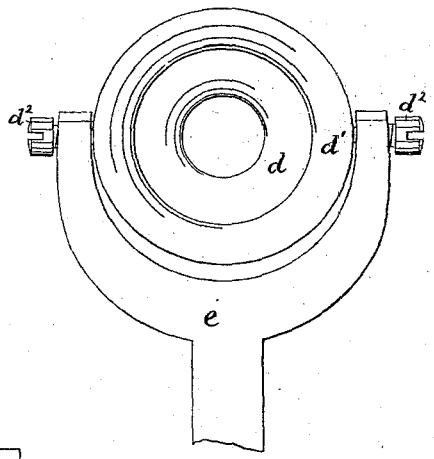


Fig: 5.

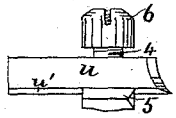
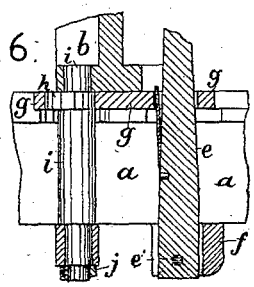


Fig: 6.



Witnesses

Jos. P. Livermore

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Inventor

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by Crosby & Gregory Attys

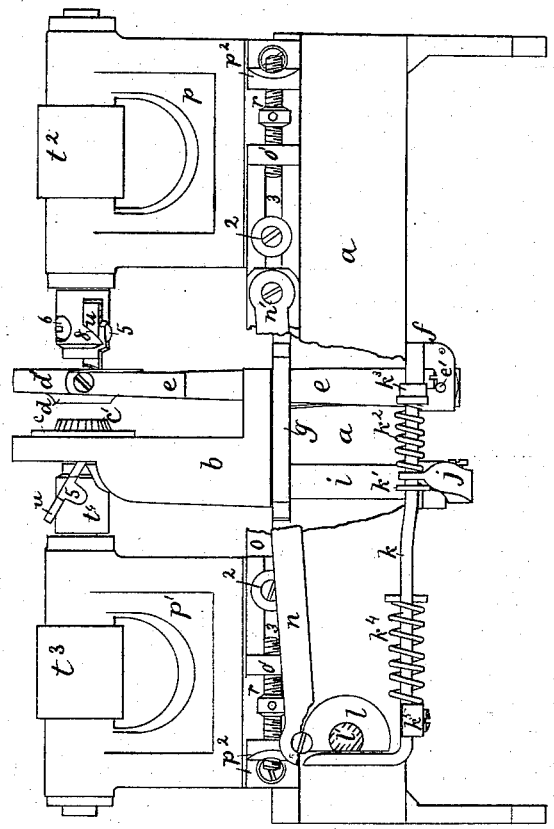
2 Sheets—Sheet 2.

A. A. SMITH.

Button-Lathe.

No. 222,161. Patented Dec. 2, 1879.

Fig. 7.



Witnesses.
Jos. P. Livermore
L. F. Connor.

Inventor.
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UNITED STATES PATENT OFFICE.

AUSTIN A. SMITH, OF LEOMINSTER, MASSACHUSETTS.

IMPROVEMENT IN BUTTON-LATHES.

Specification forming part of Letters Patent No. **222,161**, dated December 2, 1879; application filed June 9, 1879.

To all whom it may concern:

Be it known that I, AUSTIN A. SMITH, of Leominster, county of Worcester, State of Massachusetts, have invented an Improved Button-Lathe or Machine for Making Buttons, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to machines for manufacturing buttons; and it consists in a new method of manufacture of horn buttons, and in a machine devised to overcome the special difficulties in the manufacture of horn buttons by machinery.

Buttons of bone and ivory have been made by machinery; but, owing to the peculiar grain and toughness of horn, it has been found impracticable to work it by machines such as are used for bone or ivory.

According to the method now commonly followed for the manufacture of horn buttons the laminæ or thin pieces of material of the proper thickness for the button are first sawed from the tip of the horn. These laminæ are of nearly circular but irregular shape, and are next turned at their edges to a true circular shape, after which, held in a lathe by a suitable chuck, their faces are separately turned by a hand-tool to the proper shape, this latter operation requiring the laminæ to be chucked twice.

In making ivory and bone buttons by machinery the cutters employed have been set perpendicular to the face of the lamina to be cut, and thus have had a scraping or drilling action, which will not answer for horn.

My invention is shown in a machine consisting of a bed supporting near its middle portion a holding device or clamp consisting of two parts, one part being preferably a removable ring provided with a sharp fluted or scalloped edge, suitably held in an upright head or bracket rigidly fixed upon the bed, against which edge the lamina of horn, without being turned to true circular form, is pressed by the other part of the clamp, (shown as a ring hung in a forked arm,) which is pivoted near the bottom of the bed, and is automatically moved up toward the lamina to press it against the scalloped edge by an eccentric operated by a cam upon the shaft which moves the cutters up to their work just before the rotating cutter reaches the lamina. The rotating cutters are set obliquely to the face of the lamina, and are held by suitable clamps in slots at the ends of spindles which rotate in bearings in heads which are held near the ends of the bed and are free to slide thereon. These heads are adjustably connected together by a bar provided at each end with a lug, in which works one end of a right-and-left-handed screw, the other end of which engages threads on a lug attached to the cutter-carrying head. This bar is connected by a link with a crank upon a shaft operated at will by a handle or otherwise to bring the cutter-carrying heads and cutters alternately into operation. Either head may be separately adjusted by the right-and-left-handed screw to bring its knife to the right position.

By my method the laminæ, just as cut from the horn, are held in position, and both faces and edges are cut at one operation, doing away with the different operations of cutting the edges and each face separately, as by the old method.

Figure 1 is a side view of my improved button-machine; Fig. 2, a detail, showing the clamping device in top view and partly in section on the line *x*, Fig. 1; Fig. 3, a face view of the sharp-edged ring for holding the lamina of horn, showing, also, the end of the cutter and its spindle; Fig. 4, a view of the holding-ring in its forked arm; Fig. 5, a view of the knife and its holding-clamp detached; Fig. 6, a section on line *y y* of Fig. 2; Fig. 7, a side view with parts broken away.

The bed *a* supports near its middle portion the rigidly-attached bracket *b*, provided at its upper part with a circular opening suitably shouldered or counterbored, as as *b'*, to receive the ring *c* and hold it firmly without rotation. The said ring *c* is provided with a projecting sharp edge, *c'*, preferably of steel, shaped to resemble a circularly-arranged series of V-shaped scallops having sharp edges to engage and hold the lamina, the inner angles, c^2, of the said V-shaped portions terminating at points in the circumference of a circle a little larger in diameter than the button to be made, just large enough to permit the cut-

ter to pass the said angles c^2. The less the space between the said angles and the cutter the less will be the waste of material. This edge c' cuts into and holds said lamina firmly while being acted upon by the cutters. The lamina of horn is pressed and held firmly against the edge c' by a second ring, d, suitably held or seated in a grooved part, d^3, of a larger frame, d', supported upon pivots or screws d^2 in the forked arm e, the lower end of which is pivoted at e' to the cross-piece f, fastened to the rigid bed a.

At the top of bed a, and resting upon it, (see Fig. 2, and shown in section in Fig. 6,) is a link, g, provided at one end with an opening, through which the arm e passes, while the other end of the said link is formed as an eccentric-strap, to embrace the eccentric h at the upper end of the vertical shaft i, which shaft, held in suitable bearings attached to the bed a, is provided at its lower end with a laterally-extended arm, j, which, as herein shown, has at its outer end an opening to receive a part of the slide-bar k, operated by the cam l and a spring, k^4, and guided in its movement by the guide k^5, attached to the bed a.

The bar k has a shoulder, k', to move the arm j in the direction to operate the clamps or holding devices and release the lamina; but at its opposite side the arm j is directly acted upon by a spring, k^2; this spring made adjustable as to its force by a nut, k^3, and being interposed to enable the clamp, when forced together to hold a lamina to be cut, to have an opportunity to adapt itself to any ordinary variations in the thickness of successive laminæ.

The cam l is on a shaft, l', provided with a crank, or its equivalent, (here shown as a disk,) m, provided with a pin, m', to operate the link n, attached at n' to the rod o, connecting the two heads or carriages $p\ p'$.

The said rod o is adjustably attached to the heads $p\ p'$ by screws 2 passed through slots 3 in the ends of the rod o, said slots permitting longitudinal adjustment of the heads $p\ p'$ with relation to the edge c'.

The heads $p\ p'$ are provided with lugs p^2, which, by right-and-left-handed screws r, are connected with other lugs, o', on the rod o, said lugs and right-and-left-handed screws being denominated "head" or "carriage" adjusting devices, and enabling the heads, and consequently the cutters attached to the spindles $t\ t'$, to be readily adjusted with relation to the rod o, so that the said rod, being reciprocated by the link n, crank $m\ m'$, and shaft l', shall alternately advance the cutters the proper distance, one to cut into the lamina from one end, and then the other from the other side, the two cutters shaping the face and back of the button and its edges, and entering the lamina being cut to such depth that the finishing-cutter will leave the button completely free to fall easily from the lamina.

The spindles $t\ t'$ are rotated, as usual, by belts on the pulleys $t^2\ t^3$, and are provided with chucks t^4, preferably made detachable, different ones being used for large and small buttons, said chucks being provided with slots 8, at an acute angle to the axis of the spindle, the said slots extending radially to the center of the spindle, as shown in Fig. 3, so as to present the chisel-shaped cutting-edge of the cutter u in such obliquity to the surface to be cut as to enable the said cutting-edge to shave or cut the horn smoothly.

The knife is held in place by the cutter-clamping device, consisting of a screw provided with a projection, 5, which acts on the beveled side u' of the cutter, the projection being drawn against it, the shank of the cutter, by the slotted nut 6, acting against a shoulder in the chuck at the end of the spindle.

In operation, the parts being in the position shown in Fig. 1, the lamina of horn, previously sawed to the right thickness, is placed between the edge c' and the ring d of the holding device, and the shaft l' is turned by the operator by a handle or in any convenient manner, causing the cam l to slide the bar k and spring k^2 to move the arm j and turn the shaft i, which, by its eccentric h and link g, (see Figs. 2 and 6,) draws the arm e and ring d up against the lamina of horn, holding it securely just before and while the head p and its cutter are brought by the crank $m\ m'$ and connections into action upon the horn.

This form of clamp will take a very firm hold on a very narrow outer ring of horn, thus making the largest possible button from the lamina of horn; and I employ different-sized rings $c\ d$ for the different-sized buttons, the said rings being fitted to the counterbores $b'\ d^3$, and slipped into place therein when required, thus using the various laminæ sawed from the tip of the horn with the minimum of waste.

These cutters will work either way of the grain of the horn, thereby enabling me to manufacture buttons from slabs cut from the sides of the lower hollow part of the horn.

It is obvious that the rings $c\ d$ may be clamped upon the horn by the workman by a handle provided with a cam, or a screw, or any equivalent device, without the automatic device shown, consisting of the eccentric h, shaft i, arm j, bar k, and cam l.

The annular frame d' is hung on screws, to permit the ring to come to full bearing on the horn. The spring k^2 prevents the ring d from being positively moved toward the ring c with sufficient force to cut too deeply into the horn.

By completing the rotation of the shaft l' the two heads with their cutters will be brought into action on the different faces of the lamina, and they will be adjusted by the adjusting devices so that the two cutting operations will completely sever the button from the outer ring of waste material.

Just after the second cutter has completed its work, and while it is coming back from the button, the bar k again comes in contact with the

flat part of the cam *l*, allowing the clamp or holding device to open to release the ring of horn and become ready to receive a new lamina. It is obvious that when once thus adjusted the cutters will always be brought by the rotation of the shaft *l'* to the same position in the horn.

The cutter-edges may be of any figure to give the faces and edges of the buttons any desired form.

I claim—

1. In a button-machine, the combination of two sliding heads carrying the cutter-spindles, and constructed each with a lug, a slotted bar for connecting such heads, and provided with lugs at each end, and right-and-left-hand screws engaging the said lugs on the heads and bar, substantially as and for the purpose described.

2. The stationary spindles fixed in moving heads, in combination with the slotted rod or bar *o*, having lugs, the right-and-left screws, and lugs p^2, link, and crank, substantially as and for the purpose described.

3. In a button-machine, a holding-clamp consisting of two rings, one provided with a fluted or irregular edge set in a counterbored fixed standard, and the other having swivel-bearings in a forked moving arm, substantially as shown and described.

4. In a button-machine, the combination of a sharp-edged ring held in a stationary head, a ring held in a pivoted arm, and the link, eccentric, shaft, arm, and bar connected by spring therewith, and actuating-cam, substantially as described.

5. In a button-machine, the combination, with the moving member of the clamp or holder, of a link, an eccentric, a shaft, a spring-bar, and an operating-cam, substantially as and for the purpose described.

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

AUSTIN ABBOT SMITH.

Witnesses:

G. W. GREGORY,

N. E. WHITNEY.