(No Model.) 3 Sheets—Sheet 1.

G. CARLYLE.

MACHINE FOR FORMING PEARL BUTTONS.

No. 490,471. Patented Jan. 24, 1893.

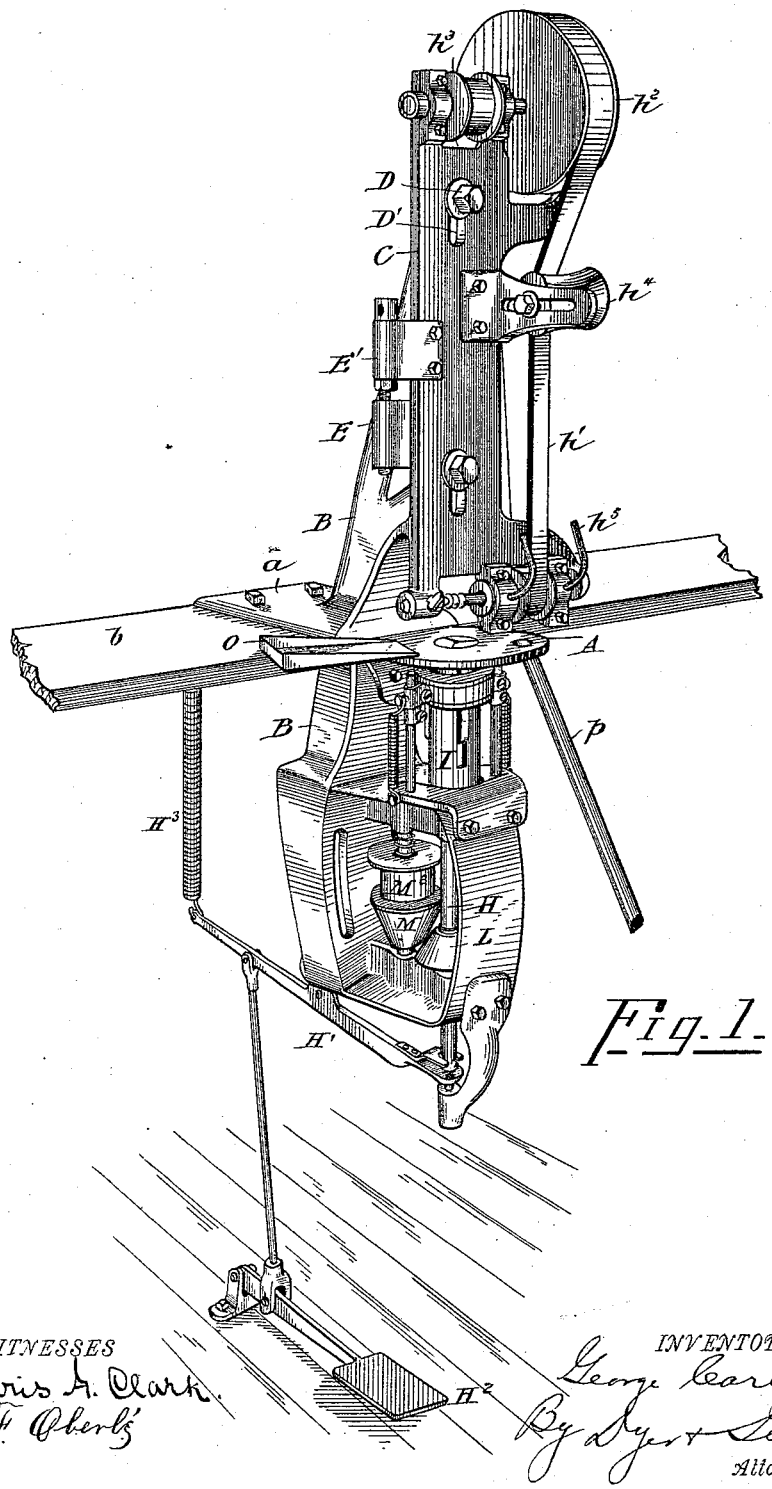

Fig. 1.

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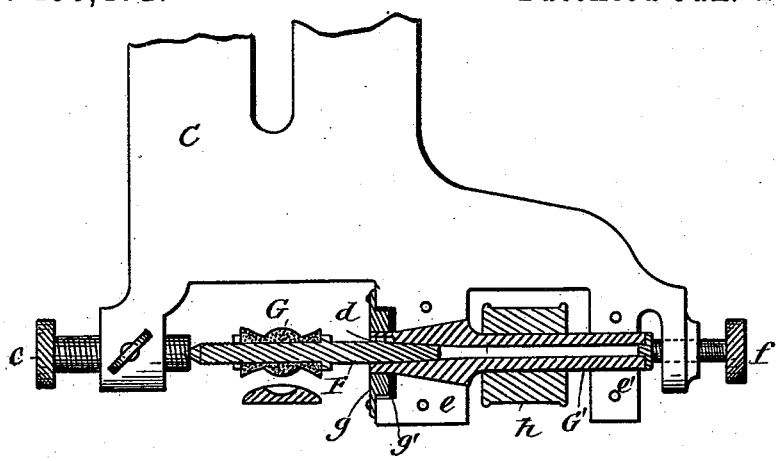
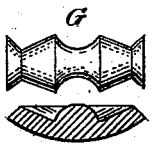
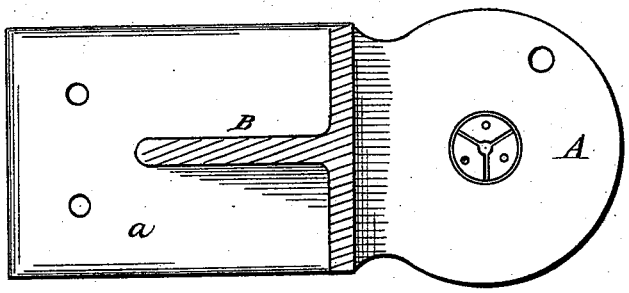


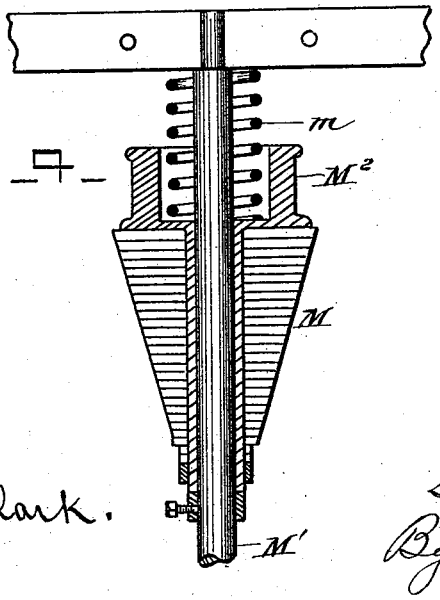
—Fig. 2—



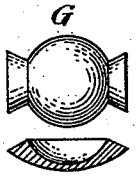
—Fig. 5—



—Fig. 3—



—Fig. 4—



—Fig. 6—

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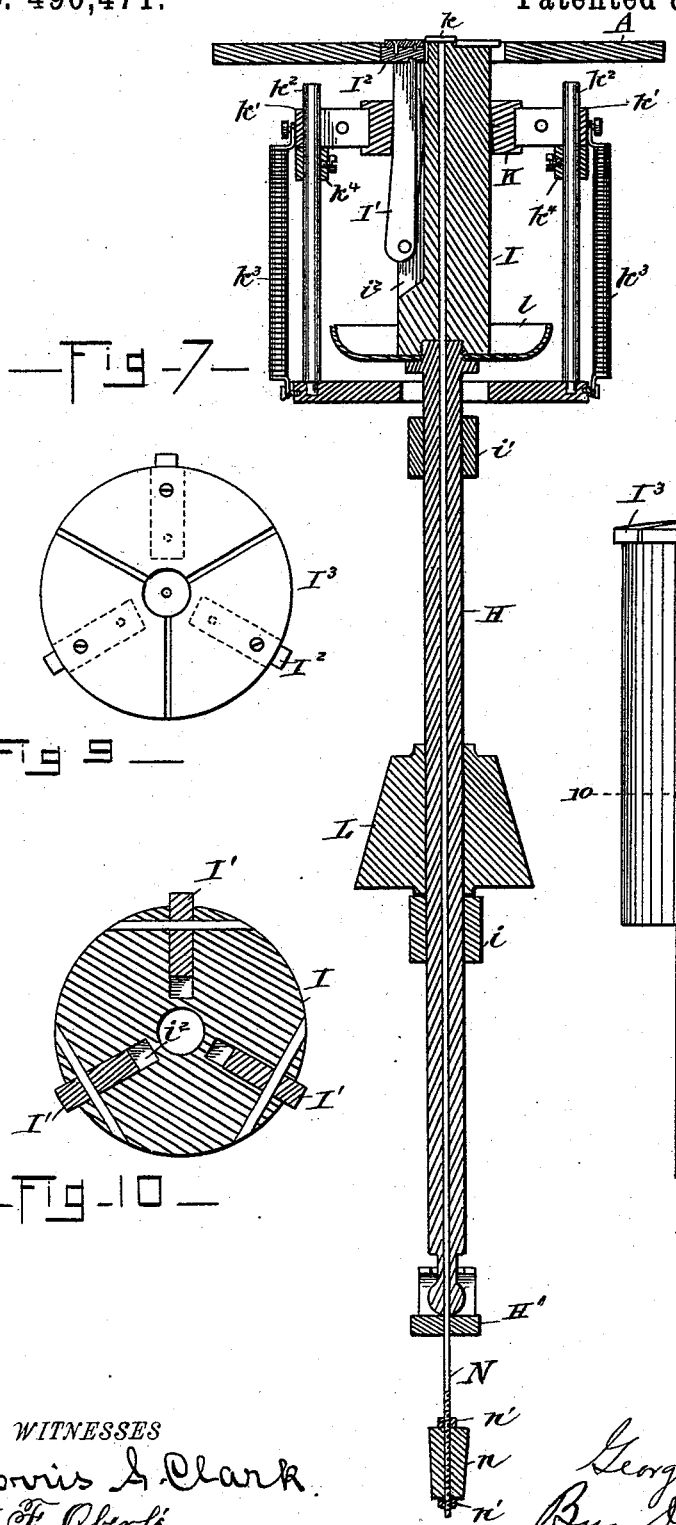
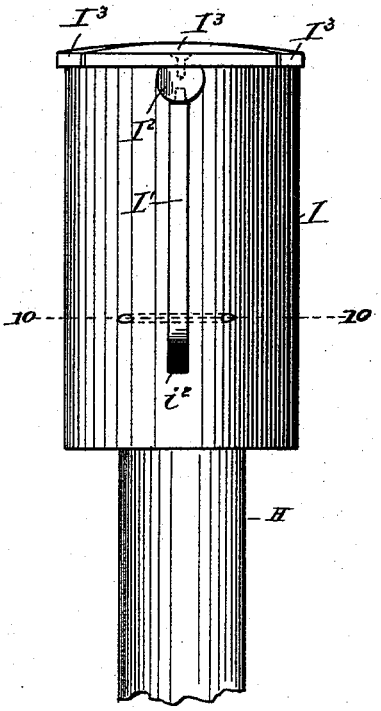


—Fig-7—

—Fig 9—

—Fig-10—



—Fig-8—

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UNITED STATES PATENT OFFICE.

GEORGE CARLYLE, OF DETROIT, MICHIGAN, ASSIGNOR TO THE STANDARD PEARL BUTTON COMPANY, LIMITED, OF SAME PLACE.

MACHINE FOR FORMING PEARL BUTTONS.

SPECIFICATION forming part of Letters Patent No. 490,471, dated January 24, 1893.

Application filed December 26, 1891. Serial No. 416,163. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CARLYLE, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a certain new and useful Improvement in Machines for Forming Pearl Buttons, of which the following is a specification.

My invention relates to that class of machines described in my patent No. 301,801, in which a chuck, holding the button-blank, and a grinding wheel, rotating in planes perpendicular to each other, are relatively movable toward and away from each other so as to give the button the desired shape by grinding, thereby greatly reducing the expense of manufacture over the ordinary method, which consists in turning the button with a cutting-tool in a lathe.

The object of my present invention is to improve the construction and arrangement of machines of this character so as to increase the facility with which the buttons may be handled and operated upon, thereby increasing the output of the machines and decreasing the cost of the product.

In the accompanying drawings forming part hereof, Figure 1 is a perspective view of a machine embodying my improvements; Fig. 2 is a section through the grinding spindle with the adjacent parts in elevation; Fig. 3 is a horizontal section of the machine taken below the grinding spindle and just above the chuck and table; Fig. 4 is a sectional view of the chuck driving friction wheel; Figs. 5 and 6 are elevations of different forms of grinding wheels with buttons in section beneath them; Fig. 7 is a vertical section through the chuck and driving spindle; Fig. 8 is an elevation of the chuck; Fig. 9 is a face view of the chuck; and Fig. 10 is a section of the chuck on line 10—10 in Fig. 8.

As will be seen from the drawings, the chuck and grinding wheel of my improved machine are located in a vertical plane, instead of in a horizontal plane as in the machine illustrated by the drawings of my patent before referred to.

A represents a horizontal table through which the chuck projects from beneath. This table is supported upon the frame B of the machine, projecting horizontally from said frame intermediate between its ends. The frame is shown as supported by a bracket *a* from a table or bench *b*. The frame B overhangs the table A and supports a plate C preferably adjustably secured thereto by means of the bolts and slots D, D′, and by the screw-connected lugs E, E′ projecting from the frame and slide respectively. The plate C forms a hanger for the grinding spindle F carrying the grinding wheel G. This spindle is carried at one end by a centering screw *c* and at the other end is tapered where it enters a tapered opening in the end of a driving spindle G′. The grinding spindle F has a stud *d* engaging with a slot in the side of the tapered opening in the driving spindle, preventing relative movement and wear of the parts. The driving spindle is mounted in two journal boxes *e*, *e′*, having a tapered bearing in the former, and is pressed into the tapered bearing toward the grinding spindle by a screw *f* at its outer end. A plate *g* and packing *g′* close the side of the tapered journal box *e* toward the grinding wheel so as to prevent dust from entering the box.

By means of the screws *c* and *f* the grinding and driving spindles can be properly adjusted and centered with relation to the chuck, while, as will be seen, the grinding spindle is made readily removable from position, so that it can be easily replaced by other spindles when the grinding wheel has worn enough to make that desirable, or when a different shape or size of grinding wheel is to be used. These grinding wheels are made of any suitable material, such as emery or corundum, and are secured on the grinding spindles as illustrated in Fig. 2 by a nut and screw-thread clamping the grinding wheel against a shoulder on the spindle. The grinding wheels are given various configurations for forming the faces and backs of pearl buttons, two shapes different from that shown in Fig. 2 being illustrated by Figs. 5 and 6. Between the boxes *e*, *e′* the driving spindle G′ is provided with a pulley *h* connected by a belt *h′* with a pulley h^2 carried by a shaft upon the top of the plate C, which shaft has another pulley h^3

connected by a belt, not shown, with the driving shaft, the pulleys and belts being arranged to give the driving spindle a high rate of speed. The belt h' is shown as running over an adjustable idler h^4 by which the belt can be tightened. Guard-fingers h^5 are provided to prevent contact with the running belt h'. By mounting the grinding spindle upon an adjustable carrying plate the position of the grinding wheel with reference to the chuck can be adjusted, so as to secure the best position for the efficient and rapid working of the machine, and also to allow that position to be changed to adapt the machine to operate with grinding wheels of different diameters and with button-blanks of different thicknesses so that buttons of various sizes and styles can be made upon the same machine.

In the frame B beneath the table A is mounted the chuck spindle H, which is stepped at its lower end on the outer end of a pivoted arm H′, and is thrown upwardly by a treadle H^2 against the tension of a spring H^3. This vertical chuck spindle passes through guiding-bearings i, i', upon the frame and carries at its upper end the chuck-head I. This chuck-head is a cylindrical block having three slots i^2 cut longitudinally in its sides at points equidistant around its circumference. Arms I′ are pivoted at their lower ends in these slots i^2 and project upwardly to points near the upper end of the chuck-head I, where they engage, by means of pins, with blocks I^2 working in radial slots in the upper end of the chuck block. To the radial blocks I^2 are secured three plates I^3 forming the gripping jaws of the chuck, these plates being shaped to leave at their inner approaching edges a circular opening to receive the button-blank. The gripping plates I^3 are removably secured to the sliding blocks I^2 by any suitable means, such as a screw and pin, as shown, so that gripping plates giving different sizes of central openings and having different thicknesses may be substituted in order to adapt the machine for forming buttons of various sizes and styles. When the chuck spindle is at the lower limit of its movement, the clamping plates I^3 are on a level with the surface of table A, or nearly so, so that the button-blanks k (Fig. 7) can be readily pushed by the fingers of the operator over the table and into the chuck opening without picking them up.

Surrounding the chuck-head I and embracing the arms I′ is a collar K grooved on its outer surface and connected by a suitable loose band with guide-blocks k' working on vertical pins k^2 and drawn downwardly by spiral spings k^3, the pins k^2 and the springs k^3 being attached at their lower ends to a stationary part of the frame, as shown in Figs. 1 and 7. The arms I′ are thrown outwardly against the collar K by springs located back of them in the slots i^2, and these arms incline outwardly below the collar K, so that when the chuck spindle is moved upwardly, the arms I′ move for a limited distance through the collar, which forces the arms inwardly until the plates I^3 clamp the button-blank, when the further movement of the arms through the collar is arrested and the collar moves upwardly with the arms against the tension of the springs k^3. When the chuck spindle drops again, the blocks k' strike stationary blocks k^4 on the pins k^2 and arrest the further downward movement of the collar before the chuck spindle reaches the limit of its downward movement, so that the arms I′ will slide to a limited distance out of the collar and will be released, throwing the clamping plates I^3 outwardly and releasing the button-blank. A cup l at the lower end of the chuck-head I is intended to receive any dust that may work down through the table around the chuck and prevent it from reaching the bearings beneath the table.

The chuck spindle H is provided above the bearing i with a conical friction wheel L. When the chuck spindle is thrown upwardly, the conical wheel L engages with another conical friction wheel M which is sleeved on a spindle M′ parallel with the chuck spindle H. The friction wheels may be made of any suitable material and construction, the wheel L being shown for illustration as made of iron, while the wheel M is built up of paper, wood, leather or similar material. The conical friction wheel M carries at its upper end a pulley M^2 which is connected by a belt, not shown, with a driving shaft. The wheel M and pulley M^2 are capable of vertical movement on the spindle M′, being pressed downwardly by a spiral spring m. The friction wheel M being constantly rotated, as explained, by connection with a power shaft, only imparts its movement to the chuck spindle when that spindle is thrown upwardly so as to bring the wheels L and M into contact, when the two friction wheels are carried upwardly together for a short distance against the tension of the spring m so as to insure a firm contact between the wheels. Passing vertically through the chuck spindle and the chuck-head is a stationary rod N, which passes at its lower end through a part n of the frame, in which it is adjustably secured by the nuts n'. This rod at its upper end projects centrally into the blank opening of the chuck, so that when the chuck drops down the rod N will free the button from the clamping plates. This rod is so adjusted at its lower end that it projects very slightly above the end of the chuck-head upon which the button-blank rests, so as not to interfere with the ready placement of the button-blank in the chuck opening, the function of the rod being only to start the button from its position when the chuck drops downwardly and prevent it from sticking in the jaws of the chuck.

A tray o is shown at the left-hand side of the table A in Fig. 1 for holding the button-blanks, although the table itself may be made large enough for that purpose. To the right-

hand side of the table is attached a discharge tube p, into which the buttons are pushed as they are slid out of the chuck and which delivers them into a proper receptacle. Dust suction pipes, not shown, are used with the machine to carry off the dust during the grinding operation, as is well understood in connection with machinery where similar operations are performed.

The operation of the machine will now be readily understood. The power connections being made to the pulleys h^3 and M^2, the grinding wheel will be rotated at a high rate of speed, while the friction pulley M will be rotated at a slower rate of speed, and the chuck will be at rest. The operator, sitting or standing in front of the machine and having the tray o filled with circular button-blanks of a definite size for the particular button for which the machine at the time is adjusted, slides one of the blanks with his fingers across the table into the circular chuck opening. The operator then depresses the treadle H^2, throwing upwardly the chuck spindle. The first effect of this movement is to cause the button-blank to be grasped by the chuck as it rises through the table A. This effect is produced by the sliding of the arms I′ through the collar K, when the chuck in its farther upward movement carries the collar along with it, the loose band around the collar permitting of the rotation of the collar with the chuck. The friction cone L on the chuck spindle then comes into contact with the friction cone M connected with the power shaft, and the chuck spindle is made to rotate in a plane perpendicular to that of the grinding wheel, or, as expressed in my patent before referred to, at right angles with the shaft of the grinding wheel. The continued depression of the treadle H^2 carries the cone-wheels up together, and the rotating pearl button-blank is brought in contact with the rotating grinding wheel which gives its surface the desired configuration. The operator then releases the treadle, the chuck spindle falls back to its position of rest, causing in this movement, first, a disconnection between the cone friction wheels, second, a release of the chuck arms from the encircling collar, and lastly, a loosening of the button from the chuck by the rod N. The operator now slides the button out of the chuck opening and moves it across the table into the discharge pipe p and at the same time or subsequently moves another button-blank into the chuck opening. The operation of the machine is then repeated.

The rapidity with which the button-blanks can be handled and operated upon and the buttons discharged, is greatly increased by the fact that the grinding wheel and chuck are located in a vertical plane so that the blanks can be brought into position and the buttons can be discharged by sliding them across a horizontal table or plate and without the necessity of picking them up. The automatic chuck, which is normally out of connection with the source of power but is brought into connection with it as it rises and grasps the button, also greatly facilitates the work of the operator.

While the features of my invention are shown in connection with a machine which is not entirely automatic but requires an operator to place and remove the blanks and to raise and lower the chuck, the several features of invention are also applicable to an automatic machine; and it is also evident that various changes in the detail of construction and arrangement of the parts can be made without departing from the spirit of my invention.

What I claim as my invention is,

1. In a pearl button forming machine, the combination with a rotating grinding wheel, of a chuck arranged with its face in a horizontal plane and a table, plate or guide over or along which the blanks are moved into the chuck opening whereby the blanks can be delivered to and removed from the chuck horizontally, substantially as set forth.

2. In a pearl button forming machine, the combination with a rotating grinding wheel, of a horizontally arranged chuck having its chucking face flush, or nearly so, with a table plate or guide over or along which the blanks are moved into the chuck opening, of means for raising such chuck above the surface of the table plate or guide to bring the blank in contact with the grinding wheel, substantially as set forth.

3. In a pearl button forming machine, the combination with a rotating grinding wheel, of a horizontally arranged chuck movable toward and away from the grinding wheel, a table, plate or guide over or along which the blocks are moved into the chuck opening and means for opening and closing the chuck operated by the movement of the chuck, substantially as set forth.

4. In a pearl button forming machine, the combination with a rotating grinding wheel, of a chuck mounted upon a vertical spindle and having a horizontal chucking face, said spindle being longitudinally movable to move the chuck toward and away from the grinding wheel, a table, plate or guide over or along which the blanks are moved into the chuck opening and means for throwing the chuck spindle into connection with the power as the chuck is moved toward the grinding wheel, substantially as set forth.

5. In a pearl button forming machine, the combination with a rotating grinding wheel, of a chuck movable toward and away from said grinding wheel, means for closing the chuck upon the blank operated by its forward movement, and means for connecting the chuck with the source of power to rotate the same as the chuck is moved forward, substantially as set forth.

6. In a pearl button forming machine, the combination with a rotating grinding wheel, of a vertical chuck spindle carrying a hori-

zontal chuck, a horizontal table or plate with whose surface the chuck is flush, or nearly so, means for moving the chuck vertically above the table or plate and toward the grinding wheel, means for opening and closing the chuck operated by its movement, and a power connection with the chuck spindle brought into operation by the forward movement of the chuck, substantially as set forth.

7. In a pearl button forming machine, the combination with the rotating grinding wheel, of a chuck movable toward and away from said wheel, arms pivoted in the chuck-head carrying the clamping plates, and a collar encircling said arms and forcing them inwardly as the chuck is moved forward, substantially as set forth.

8. In a pearl button forming machine, the combination with the moving chuck, of the pivoted arms carrying the chucking plates, the encircling collar, and the springs connecting said collar with the frame, substantially as set forth.

9. In a pearl button forming machine, the combination with the chuck movable toward and away from the grinding wheel, of a stationary rod passing through the chuck and loosening the blanks from the chuck as it moves backward, substantially as set forth.

10. In a pearl button forming machine, the combination with the rotating grinding wheel, of the automatic chuck mounted upon a movable spindle, and the cone friction wheels connecting the chuck spindle with the power as the chuck is moved forward, substantially as set forth.

This specification signed and witnessed this 19th day of December, 1891.

GEORGE CARLYLE.

Witnesses:

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GEORGE MAITLAND.