3 Sheets—Sheet 1.

G. J. Capewell,

Grinding and Polishing Buttons.

No. 57,471. Patented Aug. 28, 1866.

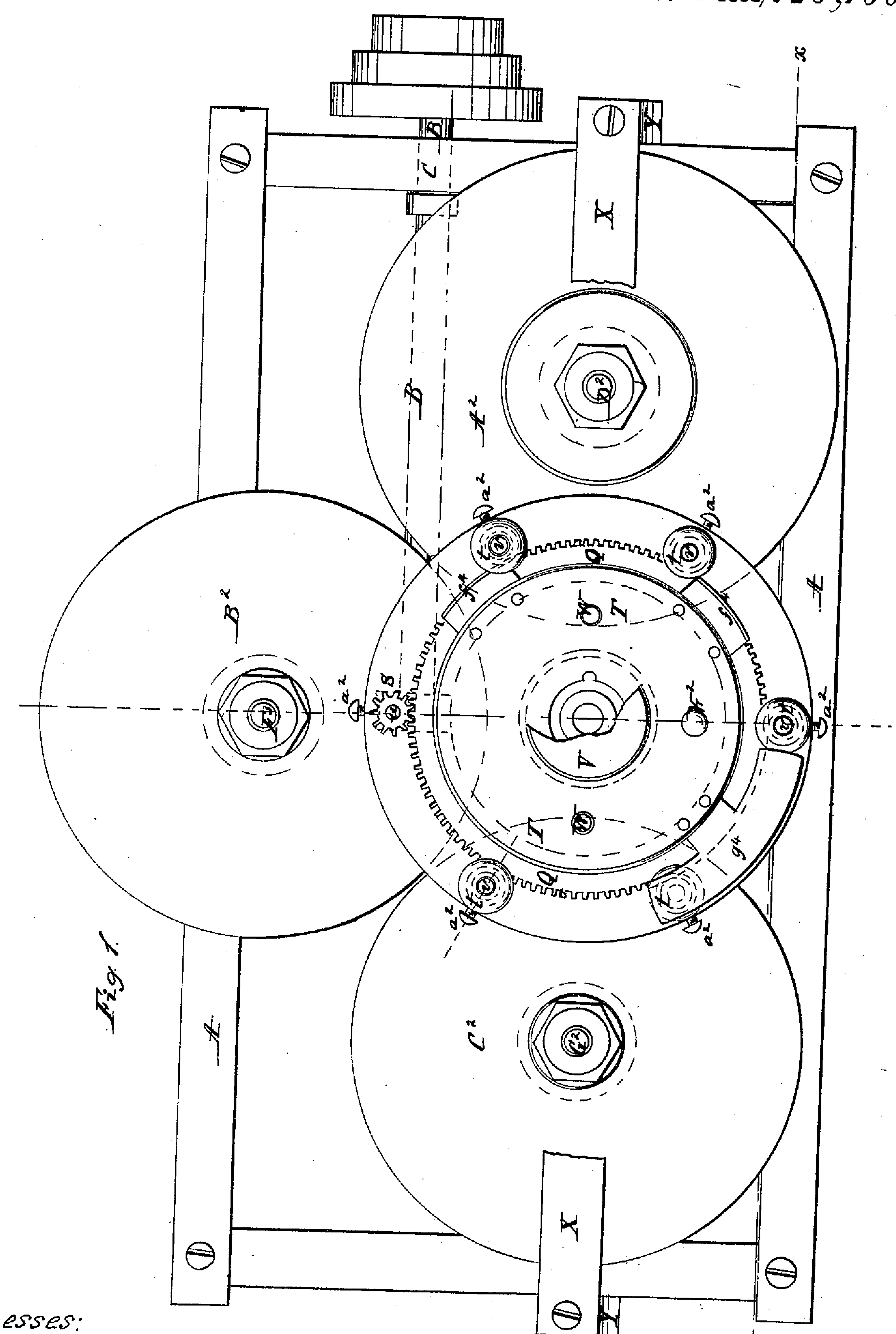

Fig. 1.

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3 Sheets — Sheet 2.

G. J. Capewell,

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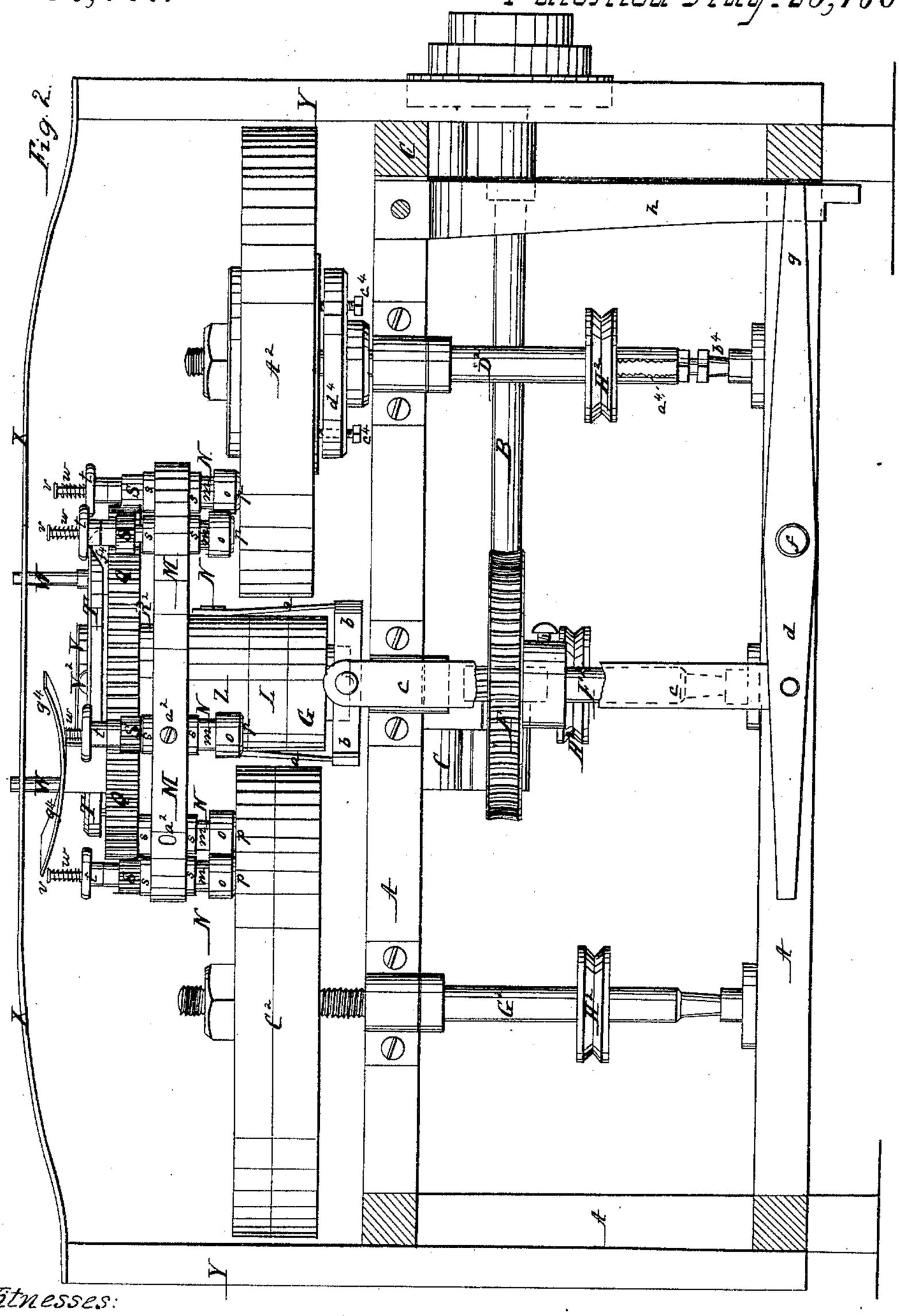

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3 Sheets—Sheet 3.

G. J. Caperell,

Grinding and Polishing Buttons.

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Fig. 6.

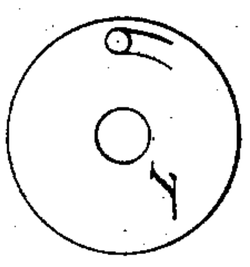


Fig. 7.

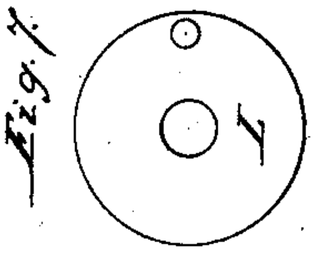


Fig. 4.

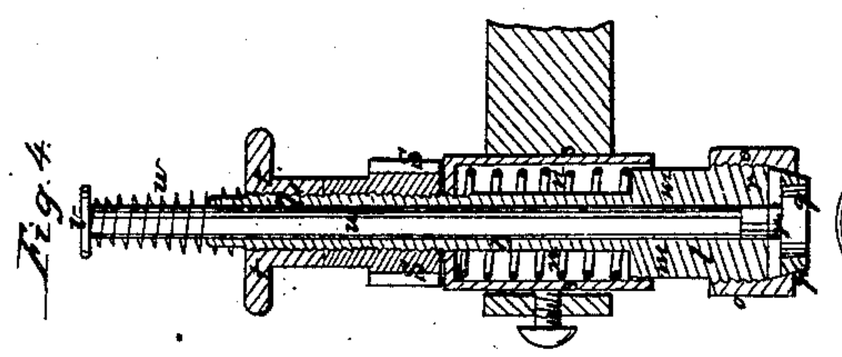
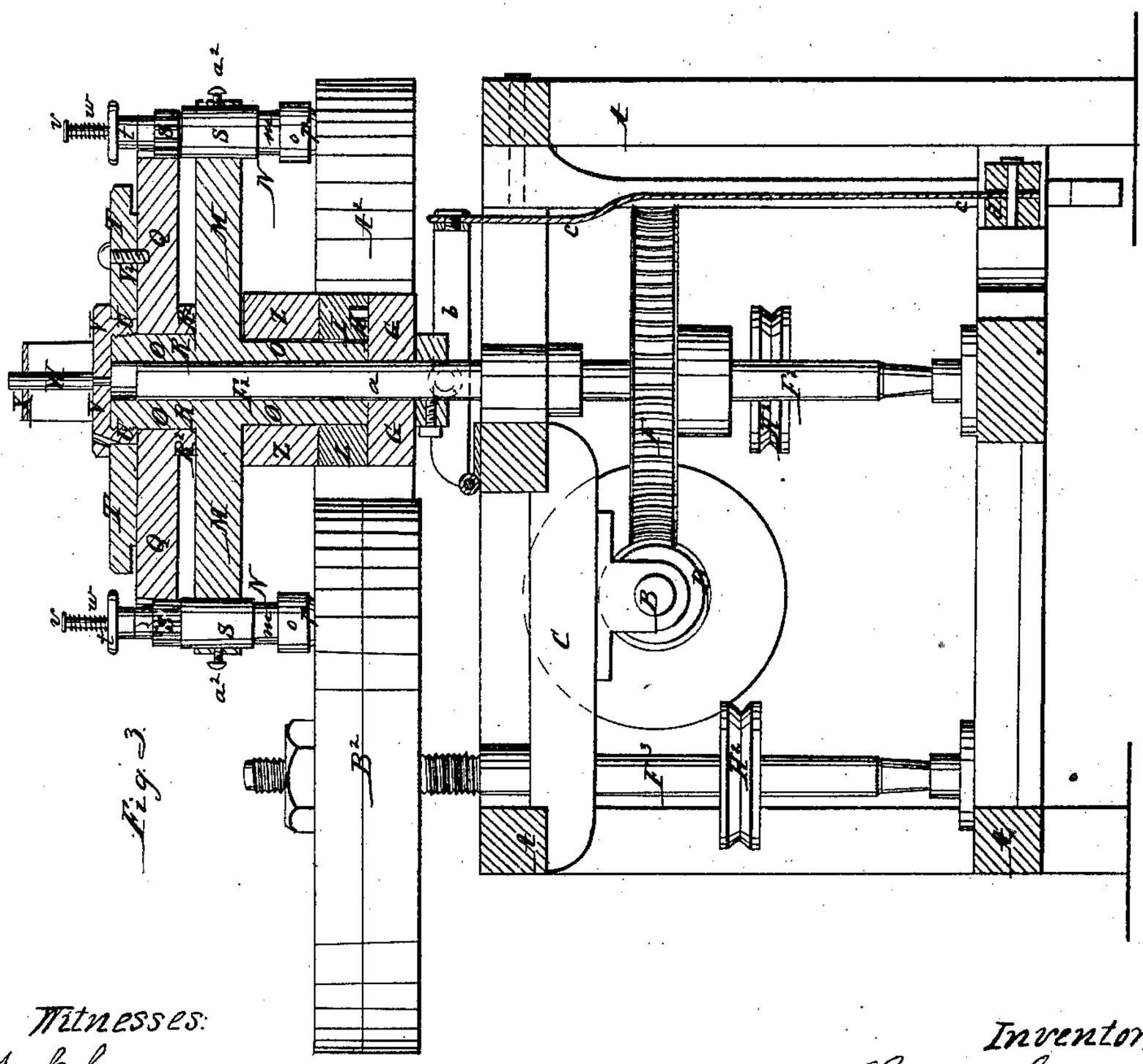


Fig. 5.

Fig. 3.



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UNITED STATES PATENT OFFICE

G. J. CAPEWELL, OF WEST CHESHIRE, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR GRINDING AND POLISHING BUTTONS.

Specification forming part of Letters Patent No. **57,471**, dated August 28, 1866.

To all whom it may concern:

Be it known that I, GEORGE J. CAPEWELL, of West Cheshire, in the county of Hartford and State of Connecticut, have invented a new and Improved Machine for Grinding and Polishing Buttons; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The present invention relates to a machine especially intended for the grinding and polishing of glass or other buttons; and in the machine a series of holders for the buttons to be ground and polished are arranged within a common head-plate, to which a rotary movement is imparted in any proper manner, bringing the buttons inserted in the holders each in turn first to the surface of the grinding stone or wheel, and then to the polishing wheels or surfaces used, which wheels at the same time are also revolved either in the same or opposite directions to that in which the holder-head moves, whereby the buttons are both ground and polished in one and the same machine, each button, after having been thus operated upon, being then removed from its respective holder and another one inserted therein to be similarly ground and polished, and so on.

In connection with the above I so arrange the button-holders within the head-plate that as it revolves a rotary movement will also be given to them, whereby in case the buttons are unevenly presented by their holders to the grinding and polishing surfaces used they will be evenly ground, as by the rotary movement of the holders the surface of the buttons are caused to be more uniformly subjected to the action of the grinding and polishing wheels than they would be were their holders fixed or made stationary in the head-plate; and, in addition to the above, the button-holders are so constructed that the buttons inserted therein will be held with an elastic or yielding but yet firm grasp, while, at the same time, as the holders are passing over the grinding and polishing surfaces, they will be held down and against them with sufficient pressure; and they are also so operated upon that, after the buttons have been ground and polished, they will be disengaged from the holders, the holders being also sufficiently raised or lifted as they pass to the grinding or polishing surfaces to clear their edges, and then lowered to the same, as will be hereinafter particularly described.

In the accompanying plates of drawings my improved machine is illustrated, Figure 1, Plate 1, being a plan or top view of the same; Fig. 2, Plate 2, a vertical longitudinal section, taken in the plane of the line *x x*, Fig. 1, Plate 1; Fig. 3, Plate 3, a transverse vertical section, taken in the plane of the line *y y*, Fig. 1, Plate 1; Fig. 4, Plate 3, a central vertical section through one of the button-holders, taken in the plane of the line *z z*, Fig. 1, Plate 1; Fig. 5, Plate 3, a view of the lower end of a button-holder; Figs. 6 and 7, Plate 3, detail views of a part of the machine.

A A in the drawings represent the frame-work, made of sufficient strength to support the various parts composing the machine and of the proper shape therefor; B, the driving-shaft of the machine, extending horizontally from one end of the frame-work to the central portion of the same, or nearly so, and turning in bearings of the cross-pieces C C. On the inner end of this shaft B is secured a worm-gear, D, engaging with the horizontal gear-wheel F, turning at each end in bearings of the frame-work A. On the upper portion of this shaft F^2 above the frame-work is fixed a horizontal disk or plate, G, resting upon and interlocking with which by a spur or stud-pin, H, is a similar disk or plate, L, attached to or forming a part of the hollow center-shaft O of the horizontal circular head-plate M, up and through which shaft O extends the vertical shaft F^2. In this head-plate M are inserted at equal distances from its center a series of button-holders, N N, which may consist of any desired number, and the peculiar construction of which will be presently explained.

Q is a horizontal circular disk or plate, placed loosely upon and over the upper portion, R, of the hollow shaft of the head-plate M resting upon a thin collar or ring, R^2, of the shaft. The periphery of this disk Q is toothed, and with it small pinion-wheels S S on the upper portion of the button-holders N N engage. T is another thin circular plate or disk, placed upon the upper surface of the toothed disk Q,

with its center portion cut out, through which loosely passes the tube portion U of the screw-cap V upon the top of the hollow shaft of the head-plate. This disk T is secured to the toothed wheel, and made, as it were, a part of the same by a set-screw, V^2, passing through it into the toothed wheel, and it has two fixed upright posts or rods, W W, at points diametrically opposite to each other, the upper ends of which posts pass loosely through a bar, X, extending lengthwise of the machine, and secured at each end to standards Y Y of the frame-work.

Z is a loose collar or sleeve surrounding the hollow shaft of the holder-head between it and its fixed disk L, to which collar, upon opposite sides, are hung vertical connecting-rods *a a*, secured at their lower ends to a horizontal frame, *b*, hinged at its inner end to the upper portion of the frame-work, and connected at its outer end by a vertical rod, *c*, with a treadle-lever, *d*, turning upon a fulcrum, at *f*, of the frame-work, by depressing the end *g* of which treadle, the holder-head plate, and all the parts connected therewith, as described, will be raised from the disk of the vertical shaft moving on the said shaft, and thus thrown out of connection with the said disk, where it is held by interlocking the notched end of the vertical swinging stop-lever *h* with the treadle at its end *g*.

Around the button-holder head, but below the same, are arranged a grinding-wheel, A^2, and two polishing-wheels, B^2 C^2, with their upper surfaces in the same horizontal plane, and, respectively, attached to vertical shafts D^2, F^3, and G^2, turning in bearings of the frame-work A. To these shafts motion is communicated in any proper manner through their pulleys H^2 H^2, thus correspondingly revolving the wheels or disks attached to them, as above stated.

The button-holders N are constructed as follows, (see Figs. 4 and 5, Plate 3:) *l* is a hollow shaft, of a length equal to that of the holder, having its lower end, *m*, somewhat enlarged, and with a screw-thread upon and around the same.

O is a screw-collar, made of an inverted conical shape at the lower portion of its inside surface, in which fits a similar conical-shaped ring, *p*, having a bent spring, *q*, around its internal periphery, secured at one end thereto. This collar is screwed on the lower enlarged end of the hollow shaft, and between the lower end of the shaft and the conical ring of the collar is placed a rubber washer or cushion, *r*, which cushion is open on its center corresponding to the hollow shaft.

s is a hollow cylinder or tube placed above the enlarged end of the hollow shaft, and incasing a portion of the same, upon the inside of which tube is placed a spiral spring, *n*, resting upon the enlarged end of the shaft, and inclosed between that and the top plate or cover of the tube *s*. Above the tube *s* the shaft has a screw-thread formed upon and around it for the remainder of its length, and on such portion is first screwed the pinion-wheel S, hereinbefore referred to, and above this wheel a screw-cap, *t*. Through the whole length of the hollow shaft, or nearly so, loosely passes a rod, *u*, with a head, *v*, at its upper end, between which and and the top of the screw-cap is a spiral spring, *w*.

The button-holders, constructed as above explained, are vertically placed within suitable sockets provided for them in their common head-plate, with their screw-caps and pinion-wheels above the plate, the latter engaged with the toothed disk above the head-plate, as before stated, and the screw-collars below the head-plate, the holders being securely held in such position, by means of set-screws a^2 inserted in the periphery of their common head-plate at the proper points therefor, the lower ends of the holders projecting sufficiently below their head-plate as to be in the same plane, or nearly so, as the upper surface of the grinding and polishing wheels, and so as to bear upon the same.

In the lower end of each one of these holders, one of the buttons to be ground and polished is placed with its eye upward, and is there firmly held by the spring *q* of the collar, which spring presses against and clasps it on its side or edge, the face of the button slightly projecting beyond the lower end of the holders, and the back side of the button resting and bearing against the rubber cushion of the collars. The holder-head is then revolved in a direction toward the grinding-stone, thus bringing to the said stone the said button-holders, one after another, from which they pass to the polishing-wheel next to the grinding-stone, and from thence to the next polishing-wheel, when, in passing from that wheel to the grinding-stone again, the buttons are removed as each holder comes to such point, and new ones inserted, and so on as long as may be desired, the grinding and polishing-wheels at the same time being revolved in an opposite direction to that of the holder-head.

By thus passing the button-holders over the grinding and polishing wheels, as explained, the buttons contained in them are subjected to the action of the same, being ground by the first wheel, and then polished and finished by the succeeding wheels, suitable polishing material being used upon the polishing-wheels therefor, the buttons being held down and against the surfaces of the wheels by the spiral springs *n* of their holders; but as the toothed disk Q is loose upon the hollow shaft *o* of the holder-head, and is secured by a set-screw to the stationary plate T above the same, it is obvious that the toothed disk Q must remain stationary as the holder-plate revolves, and as the pinion-wheels of the holders interlock with its teeth, the holders consequently must turn round or revolve in the head-plate as it moves, whereby, as they are passing over the grinding or polishing surfaces or wheels, the buttons, in lieu of passing straight across them,

are being continually turned about on the same, which, in case they should be unevenly placed in the holders, will cause them to be evenly ground, the opposite of which result would occur were the holders stationary or fixed, as is evident, without further explanation.

If, however, it is not deemed necessary or desirable to have the button-holders revolve as their common head-plate moves around, remove the set-screw V^2, thus detaching the toothed disk from the fixed plate T, which then moving in common with the head-plate, no motion of the button-holders will occur, but they will remain stationary.

In order to enable the grinding and polishing wheels to be adjusted with regard to the button-holders as their surfaces become worn from use, the lower end of their respective shafts (see the grindstone-shaft D^2 in Fig. 2, Plate 2) are made hollow for a portion of their length, into which screws the screw-shaft a^4, having a conical-shaped head or cord, b^4, which turns in a suitable bearing for it of the framework, so that by screwing the said screw-shaft out of or into the shaft D^2 the wheel upon its upper end is raised or lowered, as the case may be, and thus brought to the proper plane for the operation of the machine, the wheel being beveled by means of beveling-screws c^4 c^4 of the shaft disk or plate d^4. This adjustability of the grindstone-wheel, although above particularly described with reference to it, is intended to be applied to the polishing-wheels as well, the construction of parts being similar.

As the holders pass to the edge of the grinding and polishing wheels, in order to avoid all possibility of their abutting or striking against it, thus obstructing the operation of the machine, and also to enable the buttons to be held down with greater pressure against the grinding and polishing surfaces by their holders, I have secured at the proper points to the fixed plate T of the holder-head plate, and projecting outward therefrom in the plan of the screw-caps t of the holders, a double-inclined way or lip, f^4, over which, as the holders move around, their screw-caps pass, thus raising and lowering the holders, the inclination of the way f^4 being sufficient in height and length for the holders to clear the edges of the wheels as they pass to the same. Between the two polishing-wheels no inclined way is used, as the wheels are almost in contact with each other, and the holders slide, as it were, from one to the other.

In the space between the second polishing-wheel C^2 and the grinding-wheel, or, in other words, at that portion of the revolution of the holder-head plate, where the buttons are removed from the button-holders, and at or near the polishing-wheel, I secure to the fixed plate T of the holder-head, and projecting outward in a radial line therefrom into the plane of the holders, and above the same, a curved plate or disk, g^4, under which the holder-heads pass, and by which, suitable form being given to it therefor, the central shaft, u, of the holders are pushed down and partially through the ~~hollow~~ tube l, abutting against the button contained in such holder, and thus throwing it out of or discharging it from the same when the holder, having passed by the said curved plate g^4, the said shaft u is retracted by its spiral spring v, and another button then inserted before such holder passes to the grindstone again.

By these means an automatic discharge of the buttons from their holders as fast as ground and polished is obtained, and without interrupting the rotary movement of the holder-head, and, furthermore, saving so much hand-labor, and rendering the machine, in connection with the other movements thereof, hereinbefore explained, except so far as inserting the buttons in their holders, entirely automatic.

In addition to the mode hereinbefore explained of arranging the grinding-stone and polishing-wheels so that they can be raised or lowered, the polishing-wheels may be screwed on their spindles or shafts, a suitable screw-thread being formed on their upper ends therefor, and then held by means of a screw-nut, so that by simply loosening the nut and then turning the wheel with the hand either to the right or left it will be correspondingly raised or lowered in position, as the case may be, when it can be again securely fastened by screwing the nut firmly down and against it as before. This mode may be used in connection with that previously described or not, as may be deemed best, but it is obvious that with the above the wheels can be adjusted without changing the position of their shaft-pulleys to which the driving power is connected, which is done by the former arrangement, thus in that respect being superior thereto.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. Grinding and polishing buttons by means of a machine having suitable holders for the buttons, and so arranged and operated as to subject the buttons to the action of the grinding and polishing surfaces, substantially in the manner described.

2. Imparting a rotary movement to the button-holders while subjected to the action of the grinding and polishing surfaces, as and for the purpose specified.

3. So constructing and arranging the button-holders with regard to the machine that as the machine is operated the buttons shall be automatically delivered therefrom after having been both ground and polished, or either ground or polished, substantially as described.

4. So constructing and arranging the button-holders with regard to the machine that as the machine is operated and the button-holders in turn pass to the grinding or polishing surfaces, as the case may be, they shall be automatically so operated upon as to suffi-

ciently lift to clear the edges thereof, and thus prevent their impingement against the same, and then lowered thereto or brought to bear thereon with sufficient pressure to produce the desired grinding and polishing of their surfaces, substantially as described.

5. The combination, with a common head-plate, having a series of one or more holders, suitable for the reception of the buttons to be ground or polished, and to which head-plates a rotary or other proper movement is imparted, of the grinding and polishing wheels or surfaces, arranged and operating with regard to the said head-plate and each other, substantially in the manner described, and for the purpose specified.

6. Holding the buttons in their holders upon their sides or edges by means of a spring or other device suitably arranged therefor, and substantially as and for the purpose specified.

7. The peculiar construction of the button-holders herein described, the same consisting of the hollow shaft *l*, with its collar *o*, in which the buttons are placed and held, surrounding casing *s*, having a coiled or other suitable spring upon its inside, cap or head *t*, and center spindle *u*, passing entirely through the hollow tube *l*, with a spring, *w*, the whole being arranged together as described, and operating as the head-plate is revolved, and the upper ends of the button-holders pass over and under the fixed arms f^4 and g^4, substantially in the manner and for the purposes specified.

8. The combination of the head-plate, having arranged upon it a toothed disk, Q, and stationary plate T secured to the said toothed disk Q by means of a set-screw, V^2, or other suitable device, with the pinion-wheels S of the button-holders, arranged and operating together substantially in the manner and for the purposes described.

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