

No. 722,796.

PATENTED MAR. 17, 1903.

N. G. BAKER.

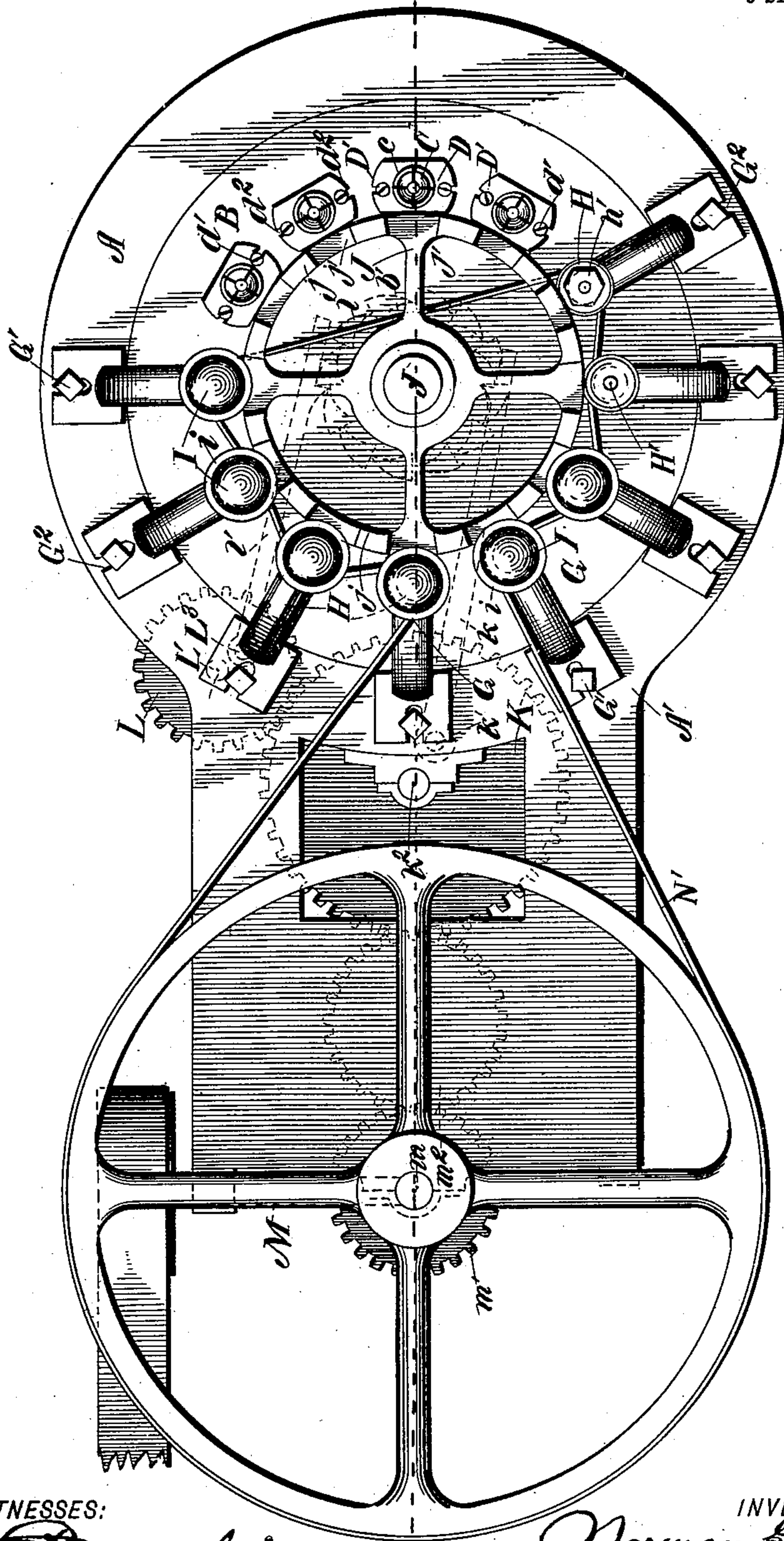
AUTOMATIC CENTERING AND DRILLING BUTTON MACHINE.

APPLICATION FILED DEC. 26, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1



WITNESSES:

James R. Mansfield
J. R. Martin

INVENTOR

Norman G. Baker.

By:

Alexander & Towell
ATTORNEYS

No. 722,796.

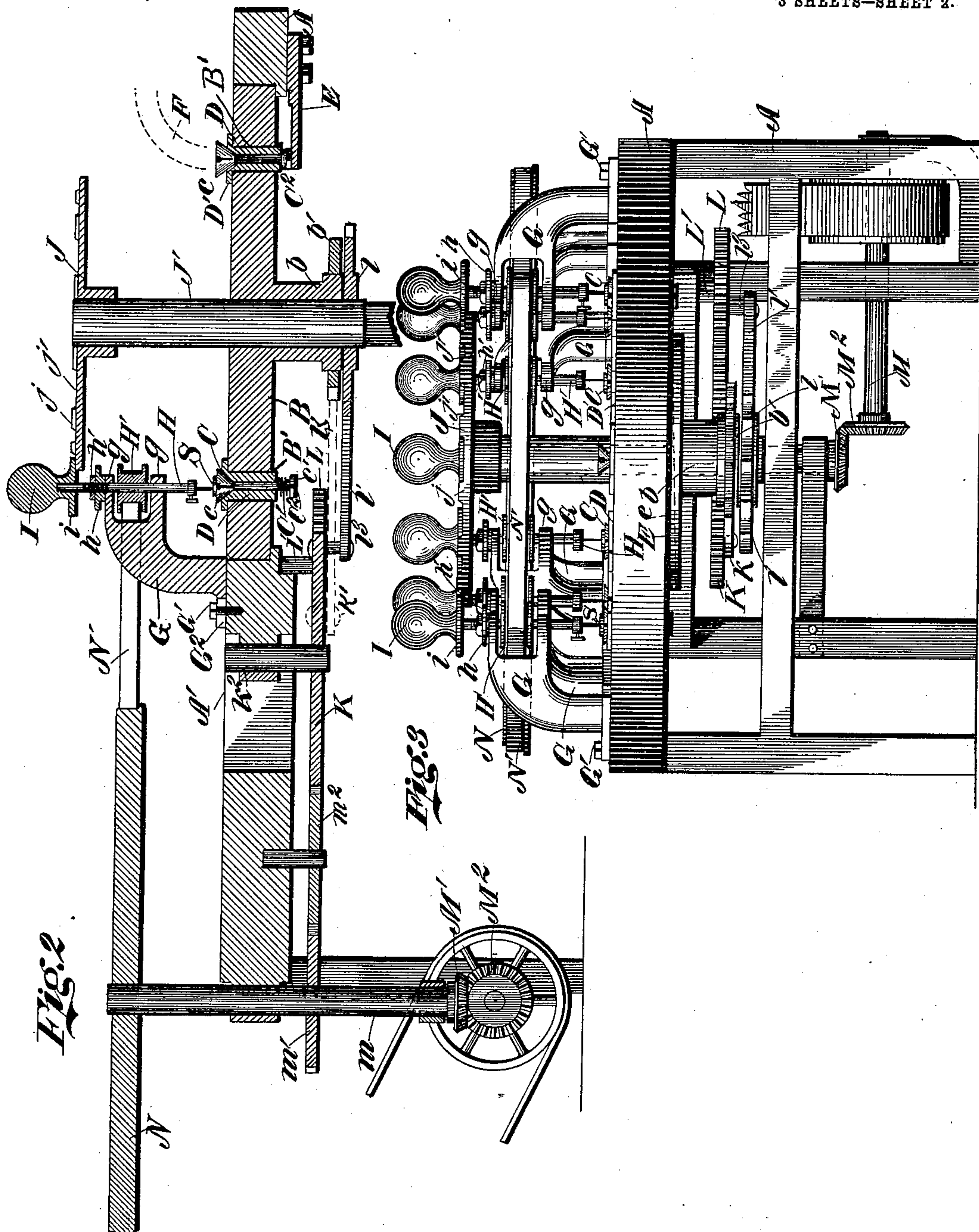
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BY
Alexander & Towell.
ATTORNEYS

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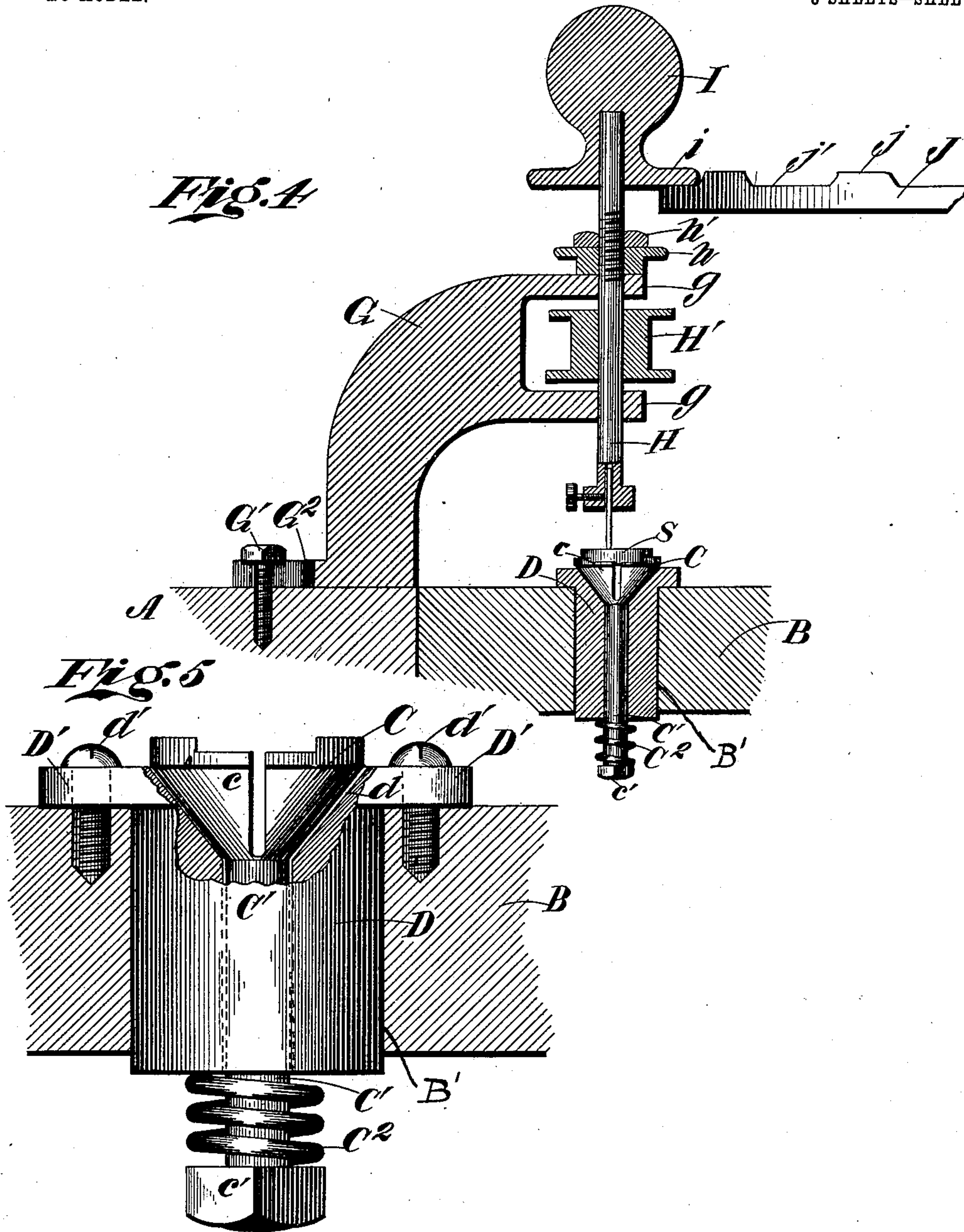
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3 SHEETS—SHEET 3.



WITNESSES:
James R. Mansfield
J. R. Martin

INVENTOR
Norman G. Baker
BY
Alexander T. Fowell
ATTORNEYS.

UNITED STATES PATENT OFFICE.

NORMAN G. BAKER, OF MUSCATINE, IOWA.

AUTOMATIC CENTERING AND DRILLING BUTTON-MACHINE.

SPECIFICATION forming part of Letters Patent No. 722,796, dated March 17, 1903.

Application filed December 26, 1902. Serial No. 136,720. (No model.)

To all whom it may concern:

Be it known that I, NORMAN G. BAKER, of Muscatine, in the county of Muscatine and State of Iowa, have invented certain new and useful Improvements in Automatic Centering and Drilling Button-Machines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in button finishing and drilling machines particularly adapted for use in the manufacture of pearl and bone buttons, the present machine being designed to operate upon previously-cut blanks so that in one passage thereof through the machine they will be centered and then have the proper or desired number of eyes or holes drilled therein, the centering and drilling operations being performed by series of different tools to which the blank is successively presented during its passage through the machine, a number of tools operating simultaneously upon as many different button-blanks, and each tool performing a predetermined part of the work of finishing a button, so that the sum of the operations of any series of related tools on a blank is a complete button ready for the polishing process. After the machine-tools are once properly adjusted the attendant during the operation thereof has merely to feed the blanks to the movable chucks as fast as the finished buttons are removed therefrom.

The invention consists in the novel construction and combination of parts hereinafter claimed, and which I will now describe with reference to the accompanying drawings, in which—

Figure 1 is a top plan view of the machine, some of the tool-supports being removed and some upper parts being broken away to show underlying parts. Fig. 2 is a vertical section on line 2-2, Fig. 1. Fig. 3 is an end view. Fig. 4 is an enlarged sectional elevation of a drill-stock and part of cam-ring. Fig. 5 is a detail view of one of the chucks and its holder detached.

Referring to the accompanying drawings, A designates the main frame of the machine, having a large central opening in which is supported a rotatable disk B, carrying a num-

ber of chucks C, (twelve being shown,) arranged in a circle and each chuck being adapted to hold a button-blank S. These chucks are of ordinary form, having a cylindrical shank and a conical split head *c*, adapted to fit into a conical recess *d* in the chuck-holders D, which are placed in openings B' in the disk B and supported therein by flanges D', resting on top of the disk B, said flanges having opposite slots *d*², through which pass fastening-screws *d'*, engaging threaded apertures in disk B, and thus securing the chucks and holders adjustably to the disk.

The stems C' of the chucks extend below the holders and disk and have enlarged flanges or nuts *c'* on their lower ends, springs C² being interposed between the said nuts and the bottoms of holders, so as to seat the chucks in the holders. At one part of their travel during the rotation of the disk the chucks are brought over a cam-plate E, attached to the feed end of frame and arranged under the disk in position to be engaged by the lower ends of the chuck-stems and force the latter upward as the chucks travel along the cam-plate, during which time the completed buttons are removed from the open chucks (by hand or by air-blast from an air-pipe F, connected with a suitable air-supply,) and the empty chucks filled with button-blanks before they move off the cam-plate. This cam-plate is arranged between the last drill and the first centering-tool, as indicated in the drawings, its receiving end being inclined, as shown at *e*.

Mounted upon the frame A, before and above disk B, are a series of tool-holders G, (eight being shown,) which are adjustably secured to the table A by means of bolts G', engaging slots G² in the bases of the holders. These tool-holders project over the disk B and are provided with vertical bearings *g* for rotating spindles H, having pulleys H' intermediate the bearings *g* and capable of vertical play in said bearings.

As shown there are eight tool-holders arranged around the disk B and so spaced that each spindle H will be directly above one of the chucks C when disk B is at rest. To the lower ends of the spindles H suitable button-finishing tools are attached, (I usually provide the first four or more spindles with centering-

tools and the last four or more with drills,) so that when a button-blank has been subjected to the action of such tools (in succession) it will be completely centered and properly drilled. The drill-holders G are so adjusted on the top A' of frame A that their drills will not operate centrally upon the blanks in the chucks C, but a little eccentrically thereof, so that the successive tools will drill holes at the proper desired places in the blanks.

The spindles H are provided with adjusting-nuts *h* and jam-nuts *h'* on their upper ends, by which the descent of the spindles is regulated, and as the tools wear the spindles are slightly lowered to compensate therefor.

On the upper ends of the spindles are weights I, provided with flanges *i*, resting upon a rotatable ring J, provided with cam projections *j*, adapted to pass under the flanges *i*, whereby the spindles are alternately raised and lowered into working position. The weights I are employed to depress the spindles when permitted by the cam-ring J, so as to properly operate upon the button-blanks. The cam-ring J is supported on a central vertical shaft J', that extends through the center of disk B, and while journaled therein is rotatable independently thereof. Said cam-ring J is provided with a series of equidistant projections or cams *j* on its upper edge, separated by depressions *j'*, (there being as many cam projections *j* as there are chucks,) by means of which the several tools are simultaneously lowered into operative position or raised during the rotation of ring J into inoperative position.

The disk B and cam-ring J are alternately given a step-by-step movement by any suitable mechanism. As shown a ratchet *b'* is fixed on the hub *b* of disk B, underneath the disk, said ratchet being engaged by a pawl *k*, which is connected to a pin *k'* on a gear K, journaled on a stud-bolt *k''*, attached to the under side of table A to one side of the disk B. A ratchet *l* is fixed to the lower end of shaft J' (below ratchet *b'*) and is operated by a pawl *l'*, connected to a pin *l''* on a pinion L, meshing with pinion K and journaled on a stud-bolt L', attached to the under side of top A', as shown. Pinion K is driven by an intermediate gear *m''* from a master-gear *m'* on a vertical shaft *m*, suitably journaled in the main frame and driven by bevel-gears M' M'' from a transverse shaft M, to which the power is applied.

On the upper end of shaft *m*, which extends above frame A, is a belt-pulley N, from which the several spindles H are driven by an endless belt N', that passes partly around each pulley H', as indicated in Figs. 1 and 2, so that all the spindles H are continuously driven at uniform speed during the operation of the machine.

Operation: The operator stands at the front (right hand) end of the machine beside the

open space between the two end tool-holders and as the chucks move past him sees that the finished buttons are removed and places blanks in the empty chucks. As the disk is revolved the chucks are stopped successively beneath each one of the series of tools designed to operate them, and in the machine shown there will be eight blanks operated upon simultaneously in different stages of completion, the last-fed blank being initially centered, the first-fed blank being finally perforated or finished, and at each movement of the disk B a completed button-blank is delivered and the finishing of another blank is commenced. After each operation of the tools the cam-ring J is shifted so as to cause its cams *j* to lift the series of spindles and withdraw the tools from the blanks, and while the tools are thus lifted the disk B is shifted so as to move the holders the distance between two adjoining tools. Then the cam-ring is first shifted so as to drop the tools into operative position, cause the cams *j* to release the spindles, and then again moved to cause the cams to lift the spindles before the disk B is again moved. The disk B is moved once after every second movement of ring J.

As the tool-holders are stationary and the chucks moved therepast, comparatively little power is required to operate the machine, and the adjustments of the parts are less liable to derangement. The tool-holders can be adjusted during the operation of the machine, so that the correct working positions of the tools can be more quickly and certainly attained.

It will be observed that the chuck-holders D are adjustable in holes B' by reason of the screws *d'* and slots *d''* and the holders G similarly adjustable on top A' by reason of the screws G' and slots G''. Thus ample facilities for adjustment of parts are provided.

As the tools wear the jam-nuts *h'* on spindles H may be loosened and nuts *h* turned so as to allow the spindles to drop a little farther and then jam-nuts *h* again tightened. This operation can be repeated as the tools wear. When the spindles have been lowered as much as it is desirable to have them, the adjusting-nuts *h* can be run down, so as to raise the spindles to first position, and the tool reset on the spindle in the ordinary manner.

In the machine shown eight buttons can be operated upon at once. By increasing the number of spindles—say by adding four more drills and four centering-tools—the disk can be revolved two steps at a time, or one-sixth of a revolution instead of one-twelfth of a revolution, so that its capacity can be doubled, and by increasing the number of spindles the capacity of the machine can be further increased, as is obvious. I therefore do not restrict myself to the specific number of drills or spindles shown in the drawings.

Having thus described my invention, what I therefore claim as new, and desire to secure by Letter Patent thereon, is—

1. In a button-machine, the combination of a traveling button-blank holder, a series of tool-holders fixed beside the path of the blank-holder, vertically-movable tools in the tool-holders and means for rotating said tools; with means for moving the blank-holder past the tool-holders successively, means for causing the tools to operate upon the blanks in the tool-holders while the latter are at rest, and a rotatable cam-ring adapted to engage and simultaneously move the tools into inoperative position prior to the movement of the blank-holder, substantially as described.

2. In a button-machine, the combination of a traveling blank-holder and means for moving it, a stationary series of tool-holders arranged beside the path of the blank-holder, vertically-movable and rotatable tools in said tool-holders adapted to successively operate upon the blank in the blank-holder, and a rotatable cam-ring having a series of cams adapted to simultaneously throw the tools into and out of operative position, the inoperative position of the tools alternating with the traveling movement of the blank-holders, substantially as described.

3. In a button-machine, the combination of a rotatable disk, button-holders mounted thereon, a series of fixed tool-holders mounted beside the disk, vertically-movable spindles in said tool-holders, carrying tools on their lower ends, means for driving said spindles, simultaneously, a rotatable cam-ring adapted to engage with and cause the alternate lifting and lowering of the spindles, means for moving the disk and means for moving the cam-ring, the movements of the ring and disk alternating, substantially as described.

4. In a button-machine, the combination of a rotatable series of blank-holders, a series of tool-holders beside the path of the button-holders, vertically-movable tools in the tool-holders, and means for simultaneously rotating said tools; with means for moving the blank-holders successively past the tool-holders, means for causing the tools to operate upon the blanks in the tool-holders while the latter are at rest, and a rotatable cam-ring adapted to engage the tool-spindles simultaneously and move the tools into inoperative position prior to the movement of the blank-holders, substantially as described.

5. In a button-machine, the combination of a rotating series of blank-holders, and means for moving them step by step, a series of tool-holders arranged beside the path of the blank-holders, and vertically movable and rotatable spindles in said tool-holders carrying tools adapted to operate upon the blanks in the blank-holders; with a rotatable cam-ring having a series of cams adapted to engage with and simultaneously raise and lower the spindles into and out of operative position, the inoperative position of the tools alternating with the traveling movements of the blank-holders, substantially as described.

6. In a button-machine, the combination of

a rotatable disk, a series of button-holders mounted thereon, a series of tool-holders mounted beside the disk, vertically-movable weighted spindles in said tool-holders, carrying tools on their lower ends, and means for driving said spindles simultaneously; with a rotatable cam-ring adapted to engage with and cause the alternate lifting and lowering of the spindles, means for moving the disk step by step, and means for moving the cam-ring step by step, the movements of the ring and disk alternating, substantially as described.

7. The combination of the rotatable disk, the series of chuck-holders therein, and the vertically-movable chucks in said holders, a stationary series of tools mounted in fixed supports above the disk, means for simultaneously rotating said tools, and a rotatable cam-ring having a series of cams adapted to engage and simultaneously raise the tool-spindles prior to the movement of the disk, substantially as described.

8. The combination of the rotatable disk carrying a series of chucks, a series of stationarily-supported tool-carrying spindles above the disk, means for rotating said spindles, a cam-ring for raising and lowering said spindles, the ratchet and gearing for imparting a step-by-step movement to the disk, and a ratchet and gearing for imparting a step-by-step movement to the cam-ring, the movement of ring and disk alternating, substantially as described.

9. The combination of the rotatable disk, the series of button-holding chucks thereon, the series of tool-holders beside the disk, the vertically adjustable and rotatable spindles in said tool-holders, the belt for driving said spindles simultaneously, a cam-ring adapted to control the rise and fall of the spindles, the ratchet and gearing for imparting a step-by-step movement to the disk, and the ratchet and gearing for imparting a step-by-step movement to the cam-ring, the movements of the ring and disk alternating.

10. The combination of the rotatable disk, the series of chuck-holders therein, and the vertically-movable chucks in said holders, a stationary series of tools mounted in fixed supports above the disk, means for simultaneously rotating said tools, and a rotatable ring having a series of cams adapted to simultaneously raise said tools prior to the movement of the disk; with the fixed cam-plate for opening the chucks, and means for imparting a step-by-step motion to the disk, substantially as and for the purpose described.

11. The combination of the rotatable disk, the series of laterally-adjustable chuck-holders therein, the vertically-movable chucks in said holders, and springs for depressing said chucks, the series of tools mounted in fixed supports above the disk, means for simultaneously rotating said tools and a cam-ring for raising said tools prior to the movement of the disk, substantially as described.

12. The combination of the rotatable disk carrying a series of chucks, a series of stationary tool-holders, tool-carrying spindles journaled in said holders above the disk, 5 means for rotating said spindles, and a cam-ring for raising and lowering said spindles; with a ratchet, pawl and gearing for imparting a step-by-step movement to the disk, and a ratchet, pawl and gearing for imparting a 10 step-by-step movement to the cam-ring, the movement of ring and disk alternating, substantially as described.

13. The combination of the rotatable disk, a series of button-holding chucks adjustably 15 mounted thereon, the series of fixed tool-holders beside the disk, the vertically adjustable and rotatable spindles in said tool-holders, the belt for driving said spindles simultaneously and weights for depressing the 20 spindles; with a cam-ring having alternate elevations and depressions adapted to control the rise and fall of the spindles, the ratchet and gearing for imparting a step-by-step movement to the disk, and the ratchet and

gearing for imparting a step-by-step movement to the cam-ring, the movements of the ring and disk alternating, substantially as described. 25

14. The combination of the rotatable disk, the series of laterally-adjustable chuck-holders therein, the vertically-movable chucks in 30 said holders, and springs for depressing said chucks, the series of tools mounted in fixed supports above the disk, means for simultaneously rotating said tools, and a cam-ring 35 for raising said tools prior to the movements of the disk; with the fixed cam-plate for opening the chucks, means for imparting a step-by-step motion to the disk, and means for imparting a step-by-step motion to the cam-ring, 40 substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

NORMAN G. BAKER.

In presence of—

E. P. ROSENBERGER,

T. R. FITZGERALD.