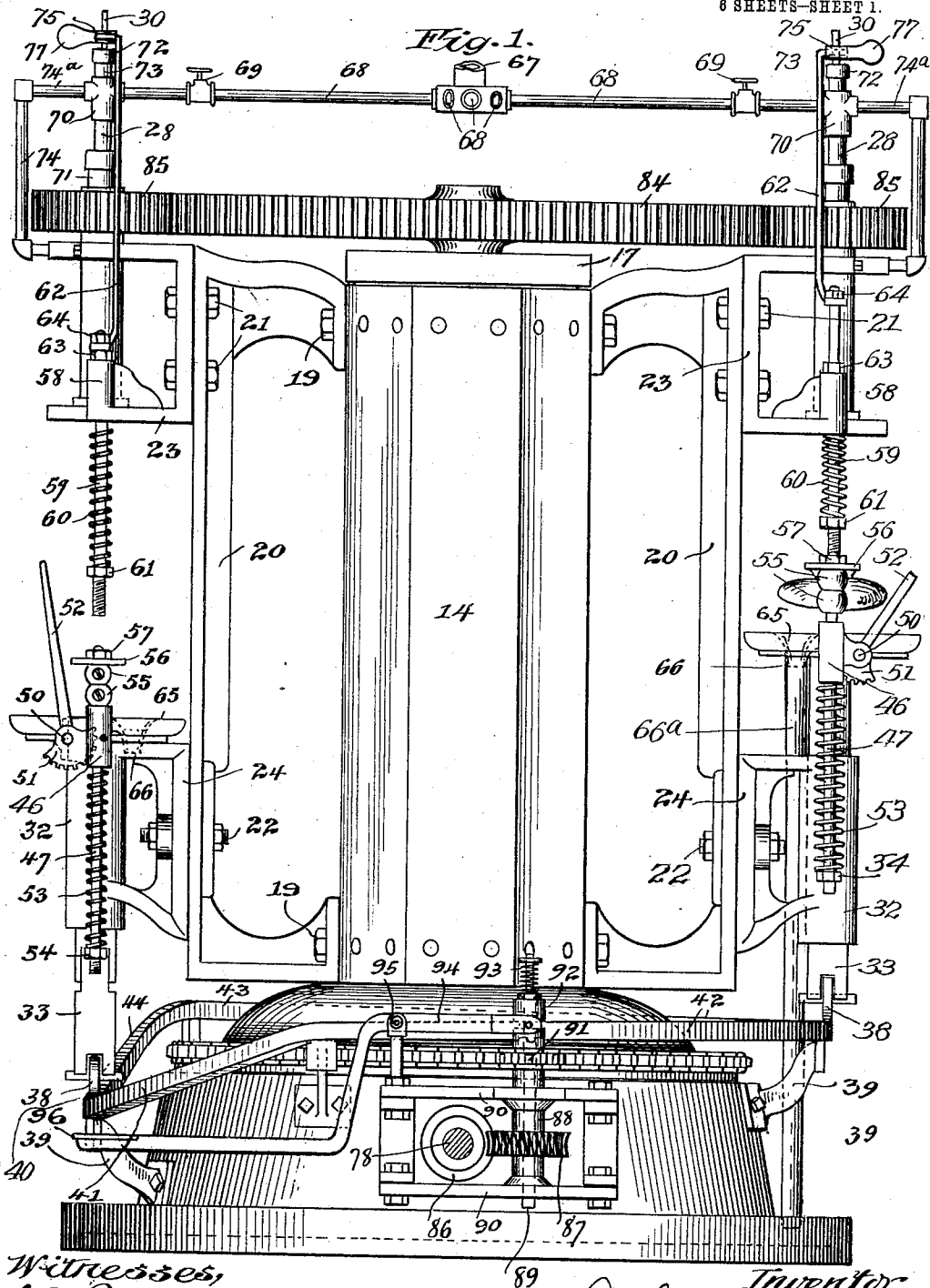


A. P. WALLACE.
MACHINE FOR CUTTING BUTTON BLANKS.
APPLICATION FILED APR. 13, 1906.

1,062,672.

Patented May 27, 1913.

8 SHEETS-SHEET 1.



Witnesses,
J. S. Mann,
S. N. Pond

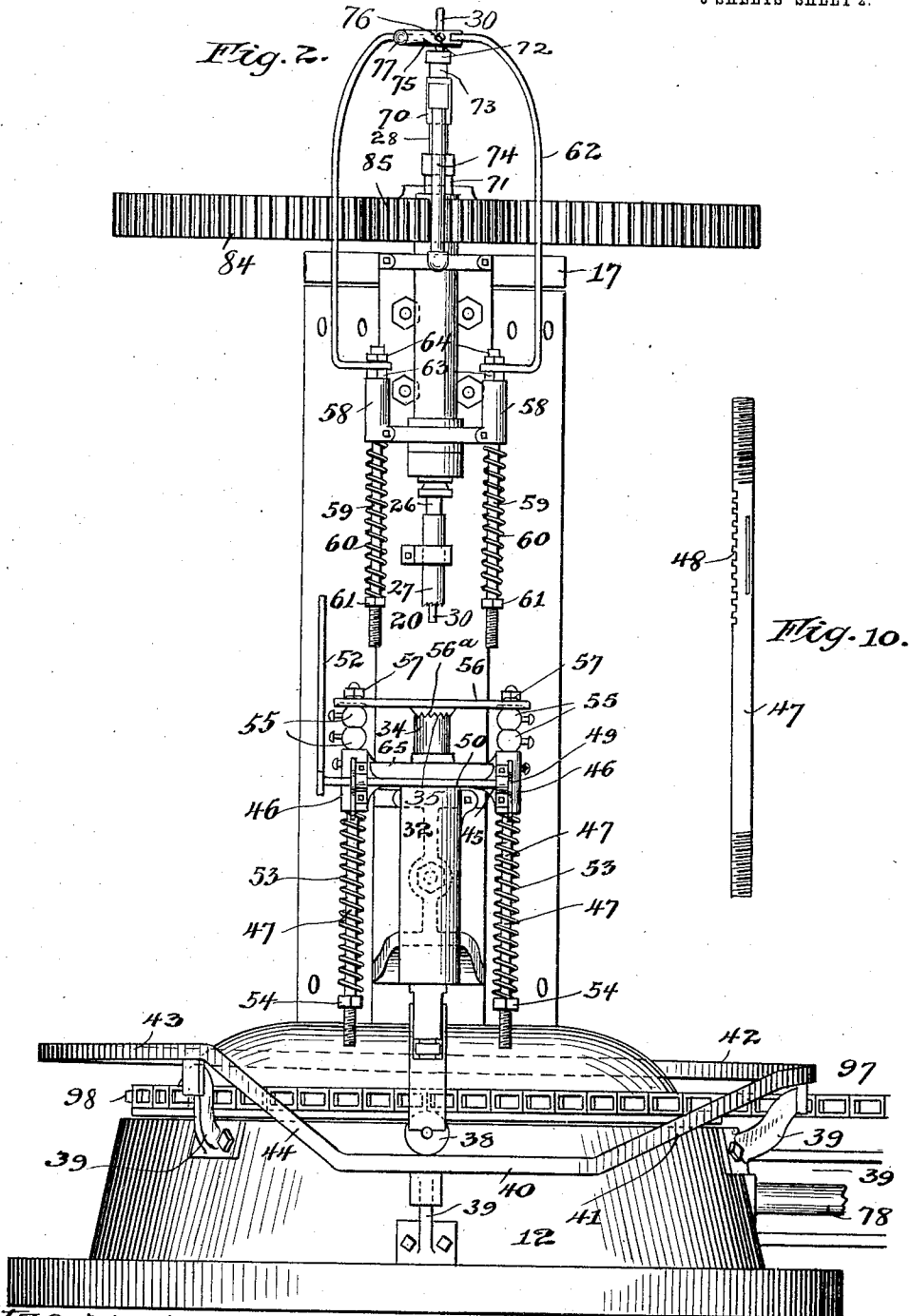
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6 SHEETS-SHEET 2.



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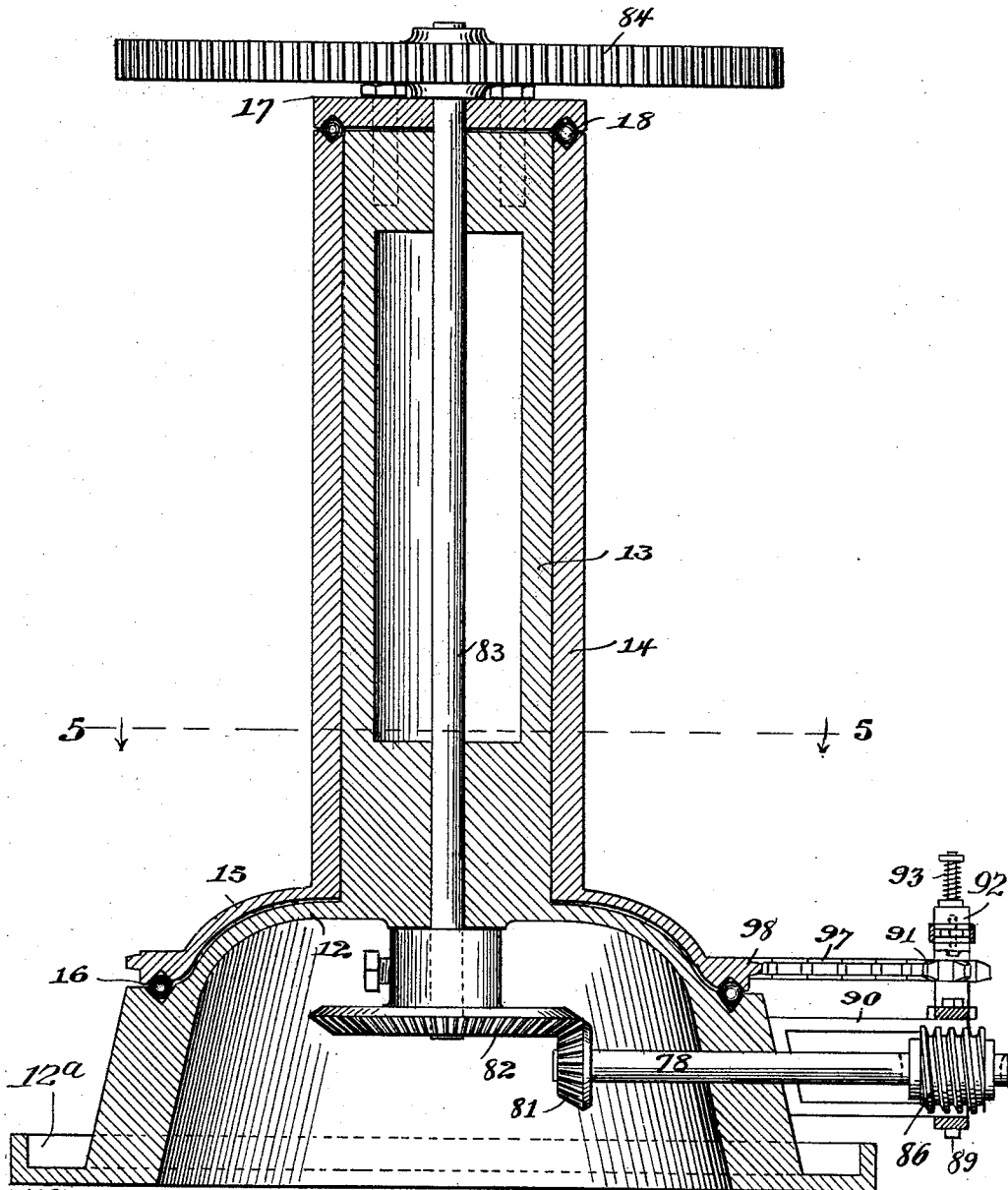
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6 SHEETS-SHEET 4.

Fig. 4.



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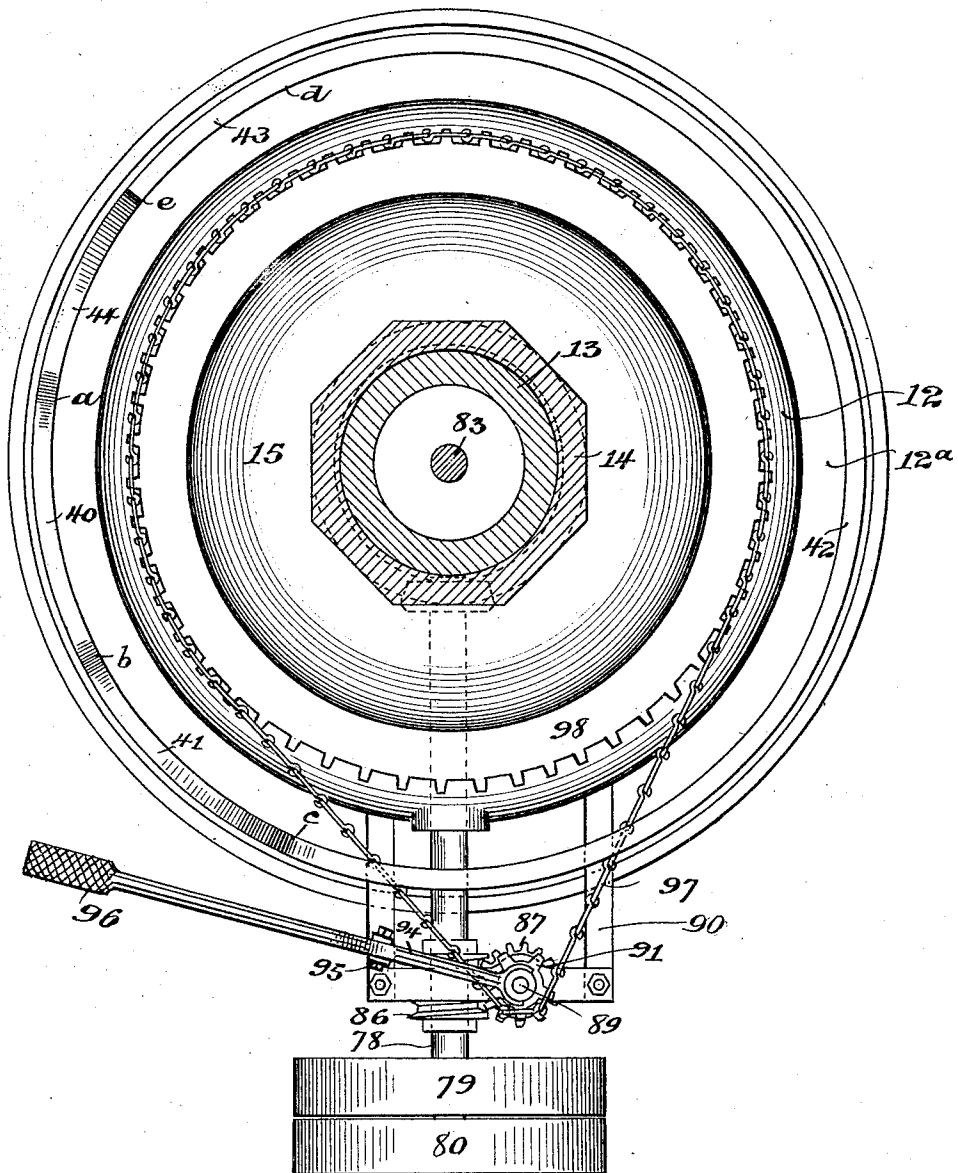
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6 SHEETS—SHEET 5.

Fig. 5.



Witnesses,
S. D. Mann
S. N. Ford

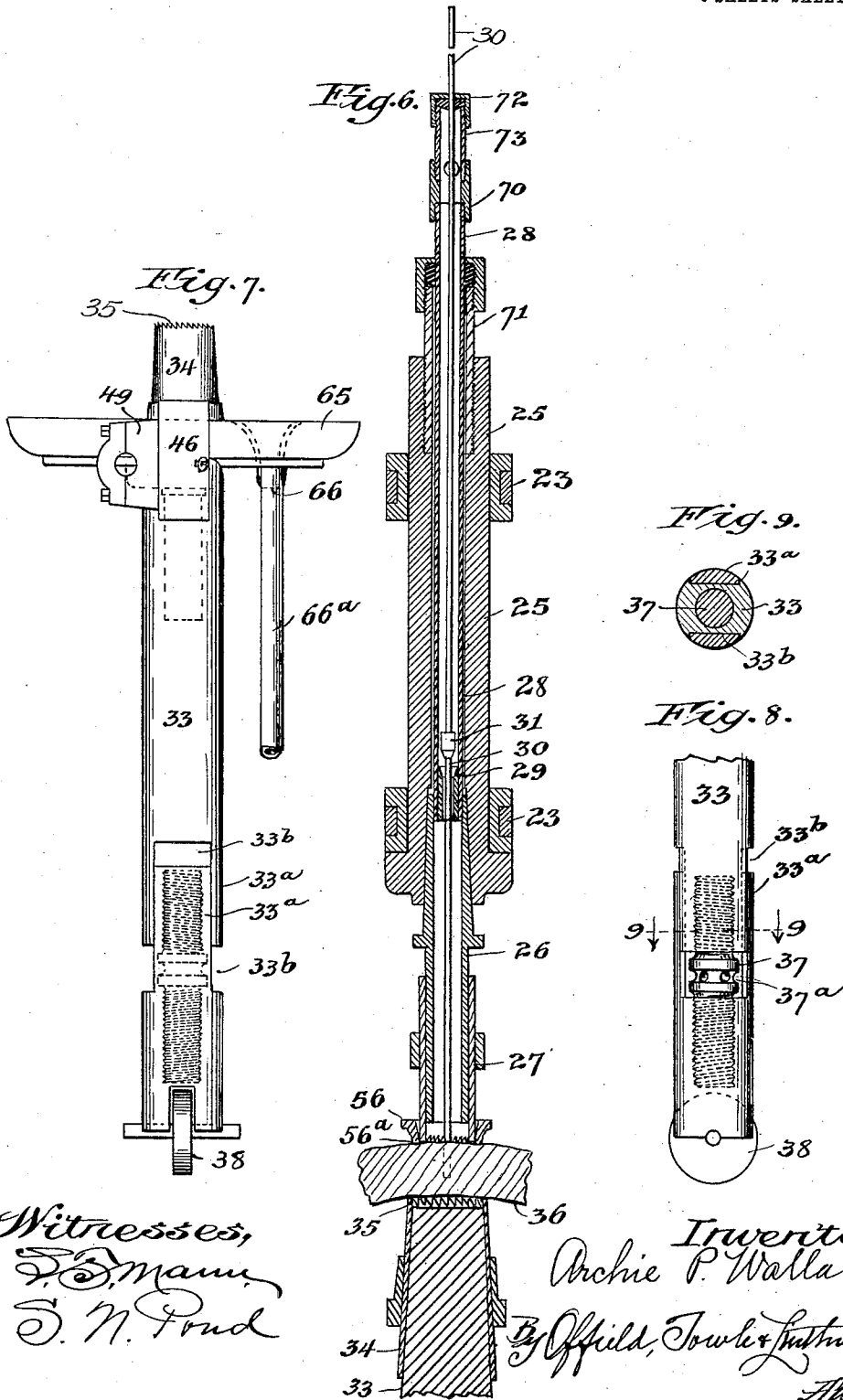
Inventor,
Archie P. Wallace,
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6 SHEETS—SHEET 6.



Witnesses,
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Inventor,
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UNITED STATES PATENT OFFICE.

ARCHIE P. WALLACE, OF KEITHSBURG, ILLINOIS.

MACHINE FOR CUTTING BUTTON-BLANKS.

1,062,672.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed April 13, 1906. Serial No. 311,546.

To all whom it may concern:

Be it known that I, ARCHIE P. WALLACE, a citizen of the United States, residing at Keithsburg, in the county of Mercer and State of Illinois, have invented certain new and useful Improvements in Machines for Cutting Button-Blanks, of which the following is a specification.

This invention relates to machines for cutting button blanks, and in its principal intended application is designed to operate upon fresh water mussel and similar shells, from which many of the so-called pearl buttons of commerce are at present extensively made. These shells are concavo-convex or meniscus-shaped, and of decreasing thickness from the hinge to the margin. The shells are of a hard, flint-like substance, and the circular blanks from which the buttons are subsequently made have heretofore been cut therefrom by means of a machine embodying as its chief elements a rotary annular saw and a block or abutment in lineal opposition thereto, against which the shell is laid, the block and shell then being moved endwise onto the saw. The general practice heretofore, so far as I am aware, has been to place the convex side of the shell against the plug and drive the saw through the shell from face to back. This method has certain objections, chief of which is the difficulty of making the sides of the blank "square" or at right angles to the so-called pearl face, which produces a slightly elliptical blank commonly known as a "mule-foot." I have discovered that this and other objections can be obviated by cutting the shell from back to face; and in Letters Patent No. 904,103, granted November 17, 1908 and No. 844,064, granted February 12, 1907.

I have disclosed and claimed, respectively, a simple form of apparatus and the novel method of cutting above referred to.

My present invention is based upon both the new method of cutting and the essential features of the apparatus disclosed and claimed in the patents aforesaid; but has for its object to provide an organized machine of relatively large capacity and entirely automatic in its action, requiring only the introduction and removal of the shells by the operator and their adjustment to different positions while in the machine.

My invention, in an approved mechanical

form, is illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevational view of the machine, with some of the parts omitted for the sake of clearness, and showing in side elevation two coöperating cutters and clamps; Fig. 2 is a similar view at right angles to the elevation of Fig. 1, and showing a single cutter and coöperating clamp or holder in face view; Fig. 3 is a top plan view; Fig. 4 is a central vertical sectional view, through the main supporting uprights of the machine; Fig. 5 is a horizontal section on line 5—5 of Fig. 4; Fig. 6 is an axial sectional view through one of the saws and its supporting and driving means, and also through the upper portion of the shell abutment and clamp; Fig. 7 is an elevational view of the movable shell supporting and clamping device; Fig. 8 is a detail view of the lower portion of the latter, illustrating a means for adjusting the length thereof; Fig. 9 is a cross-section on line 9—9 of Fig. 8; and Fig. 10 is an isolated detail of one of the clamp-actuating rods.

Referring to the drawings, and more particularly to Figs. 4 and 5, 12 designates a hollow base or pedestal having formed therein an annular trough 12^a, from which pedestal rises, preferably integral therewith, a central stationary pillar or column 13, preferably of substantial diameter to afford stability and uniformity to the movements of the rotary carrier that is mounted and guided thereon. Surrounding the pillar 13 and journaled thereon is a column 14 having a broad base 15 overlying the pedestal 12, and resting upon a series of anti-friction bearings 16, playing in oppositely formed grooves in the adjacent faces of the members 12 and 15, respectively. To the upper end of the stationary pillar 13 is bolted a cap 17, between the lower face of which and the upper end of the hollow column 14 are interposed another annular series of anti-friction bearings 18 playing in suitable grooves in the adjacent surfaces of said parts that form a guide or race-way. The outer surface of the column 14 is provided with a series of flat parallel surfaces, making said member octagonal in cross-section, as shown in Fig. 5; and to each of these surfaces is rigidly secured, as by bolts 19, radially extending brackets 20 that are practically coextensive

longitudinally with the column itself. To the outer faces of the main brackets 20 are secured, as by bolts 21 and 22, upper and lower brackets 23 and 24, respectively, that serve to support and provide bearings for the cutter or saw and the shell support and clamp, respectively.

Referring more particularly to Fig. 6, 25 designates an axially bored spindle rotatably supported in and by the upper and lower horizontal extensions of the bracket 23, which spindle has at its lower end a conical socket adapted to frictionally engage the upper end of a saw-arbor 26, on the lower end of which is clamped a longitudinally split annular saw 27. Passing axially through the spindle is an inner tube 28 provided near its lower end with a valve-seat 29; and extending coaxially through the tube 28 and saw-arbor is a small rod 30, on which is mounted a valve 31 adapted to co-operate with the valve-seat 29 to control the flow of cooling water through the tube 28 to the saw in a manner hereinafter fully described. Integral with or secured to the lateral projections of the bracket 24 is a sleeve 32, in which is slidably mounted a post 33, the upper end of which is preferably slightly tapered, as shown in Fig. 6, and has clamped thereon a short tube or sleeve 34 provided at its upper end with an annular series of teeth 35, constituting an abutment member or contact-plug for the inner or concave face of the shell, indicated at 36. The post 33 is preferably, and as herein shown, rendered extensible and contractible by being made in two sections, the adjacent ends of which are internally threaded in opposite directions, as shown in Figs. 7 and 8 and are connected by a correspondingly threaded adjustment bolt 37 having an intermediate head provided with radial holes 37^a whereby, by the application of a suitable tool, said bolt may be turned to separate or draw together the adjacent ends of the sectional post in a manner well understood. To preserve and insure the true alinement of the post sections, the adjacent ends thereof are preferably provided with interfitting longitudinal tongues and grooves 33^a and 33^b, respectively. The lower end of each post is equipped with a roller 38 that rides on a cam-track in turn supported by brackets 39 rising from the base block 12. The annular cam-track comprises a short horizontal section 40 representing its lowest portion, next to which in the direction of travel of the shell cutters is an ascending sharp incline 41, from the upper end of which extends a relatively long very gradually ascending incline 42, beyond which is a short horizontal section 43, between which and the section 40 is an abrupt descending incline 44. In the plan view, Fig. 5, I have indicated the approximate extent of these several portions,

the section 40 extending between the points *a* and *b*, the section 41 between the points *b* and *c*, the section 42 from the point *c* to the point *d*, the horizontal section 43 from the point *d* to the point *e*, and the abrupt descending portion 44 from the point *e* to the point *a*.

Rigidly secured to the post 33 above the bearing sleeve 32 is a transversely extending yoke 45 terminating at its ends in vertical bearing sleeves 46, in which latter are slidably mounted rods 47 (Fig. 10) threaded at their ends and provided on their outer sides with a rack 48. Secured to or formed integral with the sleeves 46 are forwardly projecting bosses or brackets 49 forming bearings for a horizontal rock-shaft 50, on which latter are secured segmental gears 51 (Fig. 1) engaging the racks 48 of the rods 47. On one end of the shaft 50 is keyed an operating arm or handle 52. Surrounding the rods 47 beneath the bearings 46 are springs 53 abutting at their lower ends against nuts 54, by which latter the tension of said springs is also made adjustable, the upper ends of the springs abutting against the lower ends of the upper sleeves 46. Secured on the upper ends of the rods 47 are a series of relatively thick washers 55 serving to support the ends of a clamp-plate 56, which latter has apertured ends loosely fitting over the upper ends of the rods 47, and is retained in place with capacity for a considerable degree of oscillation by nuts 57 on the threaded upper ends of the rods 47. The clamp-plate 56 has a central depending toothed clamping ring 56^a which may be integral therewith, being punched therefrom, and which lies in substantially axial alinement with the lower tooth clamp member 34.

The lower horizontal projection of the upper bracket 23 has formed thereon vertical bearings 58, in which are slidably mounted depending rods 59 surrounded by a coiled spring 60, these latter being stepped at their lower ends on nuts 61 by which their tension may be adjusted, and abutting at their upper ends against the lower ends of the bearings 58. Secured to the upper ends of the rods 59 above the bearings 58 are the lower ends of a bent wire frame 62, the function of which will be hereinafter explained; said frame being conveniently secured to the rods 59 by clamping-nuts 63 and 64.

Mounted on the yoke 45 and surrounding the abutment block 34 is a pan 65 provided with a discharge spout 66, adapted to collect and discharge the water and dust through a pipe 66^a to the trough 12^a.

Disposed centrally above the machine is a central water-inlet pipe 67 (Fig. 1) that is provided with a series of radial branches 68 (Fig. 3) each provided with a cut-off cock 69. The branch pipes 68 lead into the tubes 28 of the several cutters through T-

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couplings 70 (Fig. 6), having screw-threaded connection with the upper ends of said tubes, and a slight distance below said connection the tubes 28 have a suitably packed bearing in brass bearing sleeves 71 screwed or otherwise set into the upper ends of the saw-spindles 25. The upper ends of the T-couplings 70 are suitably closed against the escape of water, as by a packing gland 72 surrounding the valve rod or stem 30 screwed over the upper end of a short coupling 73 rising from the upper end of the T-coupling 70.

74 designates an oil-pipe leading to the upper bearing of the saw-spindle, the upper end of which, carrying the oil-cup (not shown), may be supported laterally by a short solid section 74^a screwed into the outer side of the T-coupling 70.

For the purpose of automatically opening the valve 31 controlling the flow of water to the saws as the latter move to working position on the cam-track, I provide a connection between the clamp-pressing rods 59 and the valve-stem 30, a part or element of which connection is represented by the wire frame 62. Coöperating with this wire frame is a manually operable connection herein shown as consisting of a locking dog 75 secured on the upper end of the valve-stem as by a set-screw 76, one end of said dog being forked, as shown in Fig. 2, and the other end having a laterally projecting handle 77 (Fig. 3). The upper horizontal end portion of the wire frame 62 lies directly back of the locking dog and normally presses thereagainst with a slight elastic pressure. By turning the dog through an angle of approximately 90 degrees, the forked end of the dog is carried into engagement with the wire frame, thus locking the valve-stem thereto. By turning the dog similarly in the opposite direction, such locking engagement is interrupted.

Referring now to the means for driving the machine and its several parts in properly timed relation, 78 designates the main driving shaft having fast and loose pulleys 79 and 80 (Fig. 3); on the inner end of which shaft, within the pedestal 12 is a bevel pinion 81 (Fig. 4) driving a bevel gear 82 fast on the lower end of a vertical shaft 83 journaled in the vertical pillar 13 and extending through the cap or cover 17. On the upper end of shaft 83 is a large gear 84 which, as best shown in Fig. 3, engages and drives a series of smaller gears 85 keyed on the upper end of the saw spindles 25. By this means the several saws of the series are continuously and simultaneously driven so long as the main driving shaft 78 is kept in motion.

A rotary motion is imparted to the central column 14 and the parts carried thereby from the driving shaft by means of a worm

86 on said driving shaft engaging a worm-gear 87 having a hub 88 keyed on a short vertical shaft 89 journaled in a bracket 90 projecting from the pedestal 12. Loose on the shaft 89 is a small sprocket 91 the hub of which forms one element of a clutch, whereof the other element is represented by a sleeve 92 thereabove keyed or splined on the shaft 89 and normally in driving engagement with the hub of the sprocket by means of a spring 93. A clutch-shipping lever 94 pivoted at 95 (Fig. 1) has at its opposite end a pedal 96, by the depression of which the clutch member 92 is raised out of engagement with the hub of the sprocket, thus interrupting the rotation of the latter. The small sprocket 91 is connected by a chain 97 with a large sprocket 98 formed on the periphery of the base member of the column 14. From the foregoing it will be seen that by depressing the pedal 96, the motion of the rotating frame of the machine carrying the series of cutters can be interrupted without interrupting or affecting the rotation of the individual cutters.

The operation of the several coöperating mechanisms of the machine has been to a considerable extent already indicated but the connected operation of the machine as a whole may be briefly described as follows. Assuming that the machine is empty and about to be started up, one of the shell-supporting and clamping devices will be engaging the lowest horizontal section 40 of the cam-track, as shown in Fig. 2. By depressing the handle 52 the clamp 56 is raised, and a shell is inserted between the clamping jaws 34 and 56^a, with the face or concave side of the shell resting on the teeth of the plug 34, the teeth of the upper clamp 56^a engaging the convex or back side of the shell when the handle 52 is released and the springs 53 allowed to act to draw down the clamp-plate 56, as shown in the detail view, Fig. 6. In this connection, it should be noted that the loose connection of the clamp 56 on its end supports permits said clamp to adjust itself to the irregular back surface of the shell in such a way as to obtain a maximum gripping or clamping hold thereon. The water having been turned on through the supply-pipe 67, and power having been applied to the drive-shaft, the shell-holder, thus loaded, begins to ascend the incline 41 of the cam-track, thereby carrying the holder bodily upwardly to meet the saw. Slightly before the saw engages the back of the shell, which is just before the shell-support reaches the top of the incline 41, the clamp-plate 56 contacts the lower ends of the spring-actuated rods 59, and on the continued upward travel raises said rods, with the double effect of increasing the downward pressure on the clamp-plate 56 and, through the wire frame 62 and locking

dog 75, lifting the valve-stem 30, and raising the valve 31 from its seat, thus permitting the flow of water to the saw teeth. As the roller 38 enters upon the long gradually inclined section 42 of the cam-track, the rapidly revolving saw teeth begin to enter the back of the shell and gradually cut through the latter during the travel of the roller over the cam-track section 42, during which time a continuous stream of water is supplied to the saw, thus keeping down the heat and friction and preventing injury to the saw thereby. By the time the shell carrier has reached the short horizontal section 43 of the cam-track, the saw has effected the complete or substantially complete perforation of the shell, and during the brief travel over the short horizontal section the saw turns idly, simply insuring the complete perforation and the separation of the face of the blank from the face of the shell. As the shell-carrier descends the abrupt incline 44, the saw is quickly withdrawn from the shell, and the disengagement of the clamp 56 from the rods 59 permits the springs 60 to act through the wire frame 62 and locking dog 75 in a manner to expel the blank from the saw by the lower end of the valve-stem, which acts as an ejector-rod, the blank and the saw-dust falling for the most part into the pan 65, whence the blank is removed manually, the saw-dust being washed out by the cooling water flowing down the discharge spout 66, and pipe 66^a to the trough 12^a whence it may be discharged as desired. This same operation also carries the valve 31 to its seat and interrupts the flow of cooling water while the saw is out of the shell. The shell-carrier having again reached the lowest section 40 of the cam-track, the operator, while the machine is still in motion, depresses the handle 52, thereby raising the clamp 56, quickly readjusts the shell on its contact plug to a new position, and releases the handle 52 before or by the time the shell-carrier has again started up the incline 41, whereupon the above described operations are repeated upon another portion of the shell. After the shell has been exhausted, the operator, during the travel of the shell-carrier over the section 40 of the cam-track, discards the old shell and inserts a new shell. The above-described operation takes place with each of the series of shell clamping and cutting mechanisms; said mechanisms being so disposed that while one shell-carrier is ascending the incline 41, the next succeeding shell-carrier is descending the incline 44. In case the operator is obliged to interrupt the rotation of the main revolving frame that carries the several series of cutters and clamps, he can do this by depressing the foot pedal 96, thus disengaging the driving connections of said main

frame, without interrupting the rotation of the several saws; it being desirable to maintain the continuous rotation of the latter, since to start them up while partially embedded in a shell produces a severe strain upon both the saw and the shell, with danger of injuring the saw and splitting or chipping the shell or blank. This capability of the machine to thus maintain a continuous operation of the individual saws, while permitting the bodily movement of the saws and shell-holders to be interrupted, I regard as of importance for the reasons stated. When a saw has become worn out and has to be replaced by a new one, the valve-stem 30 is disconnected from the wire frame 62 by releasing the dog 75 and raised to an extent sufficient to carry its lower end to or above the socket of the saw-arbor in its spindle, which permits the saw and arbor to be withdrawn and a new saw to be replaced; this being the purpose of the separable connection represented by the dog 75.

From the foregoing it will be seen that my invention provides an organized machine for the cutting of shell button-blanks in an accurate, rapid, and practically continuous and automatic manner; the only attention required by the operator being to supply fresh shells when needed, readjust the shells in the holders for the cutting of successive blanks from each shell, and to withdraw the exhausted shells. The provision of the heavy substantial foundation and thick central pillar or support represented by the parts 12 and 13 (Fig. 4) I regard as of importance, since it affords great stability against lateral vibration, and maintains the movements of the individual cutting and clamping mechanisms true and uniform throughout.

It will be evident that many of the minor details of the machine as described might be variously modified by those skilled in the art without departing from the principle or sacrificing any of the advantages of the invention; and hence the present illustration and description are to be understood as representing only one practical and approved form of the invention, and not necessarily as limiting or defining the bounds of the invention itself.

I claim:

1. In a machine of the character described, the combination with a pedestal and a pillar rising centrally therefrom, of a hollow column surrounding said pillar and provided with a broad base flange of substantially the diameter of said pedestal rotatably supported near its outer margin on the latter, a series of brackets projecting radially from said column, a series of tools supported by said brackets, a series of work-holders also supported by said brackets and disposed in axial alinement with said tools, a stationary

cam-track on which said work-holders are stepped, means for imparting rotation to said central column, and means for imparting rotation to said tools, substantially as described.

2. In a machine of the character described, the combination with a pedestal and a pillar rising centrally therefrom, of a hollow column surrounding said pillar and provided with a broad base flange of substantially the diameter of said pedestal rotatably supported near its outer margin on the latter, a series of brackets projecting radially from said column, a series of tools supported by said brackets, a series of work-holders also supported by said brackets and disposed in axial alinement with said tools, a stationary cam-track on which said work-holders are stepped, a driving shaft, driving connections therefrom to said hollow column, a vertical shaft mounted in and coaxially with said pillar, driving connections between said driving shaft and said vertical shaft, and driving connections between the upper end of said vertical shaft and said tools, substantially as described.

3. In a machine of the character described, the combination with a supporting frame, of a rotary annular saw mounted thereon, a shell-holder also mounted on said supporting frame in axial alinement with said saw, means for effecting a relative movement of said saw and shell-holder toward and from each other, a water supply tube within said annular saw having a valve-seat, a valve-stem within said water supply tube having a valve coöperating with said valve-seat, a spring normally forcing said valve to its seat, and means connected to said valve-stem adapted to contact said shell-holder on the approach of the latter to the saw whereby to unseat said valve, substantially as described.

4. In a machine of the character described, the combination with a supporting frame, of a rotary annular saw mounted thereon, a shell-holder also mounted on said support-

ing frame in axial alinement with said saw, means for effecting a relative movement of said saw and shell-holder toward and from each other, an ejector-rod within said hollow saw, a spring normally forcing one end of said ejector-rod out of the cutting end of the same, and means connected to the other end of said ejector-rod adapted to be contacted by the shell-holder on its approach to the saw whereby to retract the blank ejecting end of said ejector-rod within the saw during the cutting operation, substantially as described.

5. In a machine for cutting button blanks, the combination with a supporting frame, of a rotary annular saw mounted thereon, a shell-holder also mounted on said supporting frame in axial alinement with said saw, means for effecting a relative movement of said saw and shell-holder toward and from each other, a water-supply tube within said annular saw having a valve-seat, a valve-stem within said water-supply tube having a valve coöperating with said valve-seat, said valve-stem extending beyond said valve to form an ejector for the blanks to be cut, a spring normally forcing said valve to its seat, and means detachably connected to said valve-stem adapted to contact said shell-holder on the approach of the latter to the saw whereby to unseat said valve and retract said ejector within the saw during the cutting operation, substantially as described.

6. In a machine of the character described, the combination with a supporting frame, of a rotary saw mounted thereon, an extensible and contractible post slidably mounted on said frame in axial alinement with said saw, a shell-clamp carried by said post, and means for moving said post and shell-clamp bodily toward said saw, substantially as described.

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Witnesses:

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