No. 675,354. Patented May 28, 1901.

E. I. KIDD.

SHELL CUTTING MACHINE.

(Application filed May 28, 1900.)

(No Model.) 4 Sheets—Sheet 1.

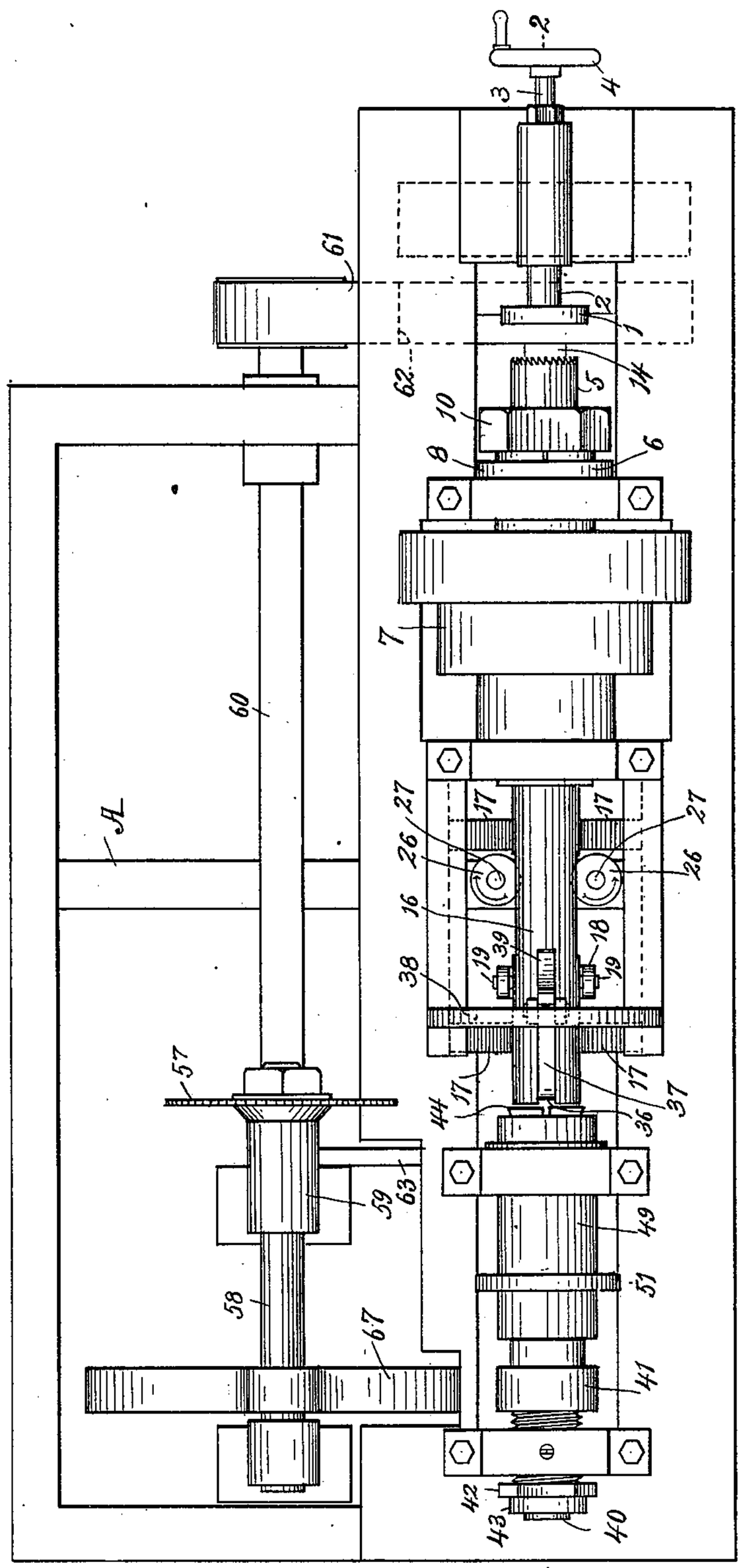

Fig. 1.

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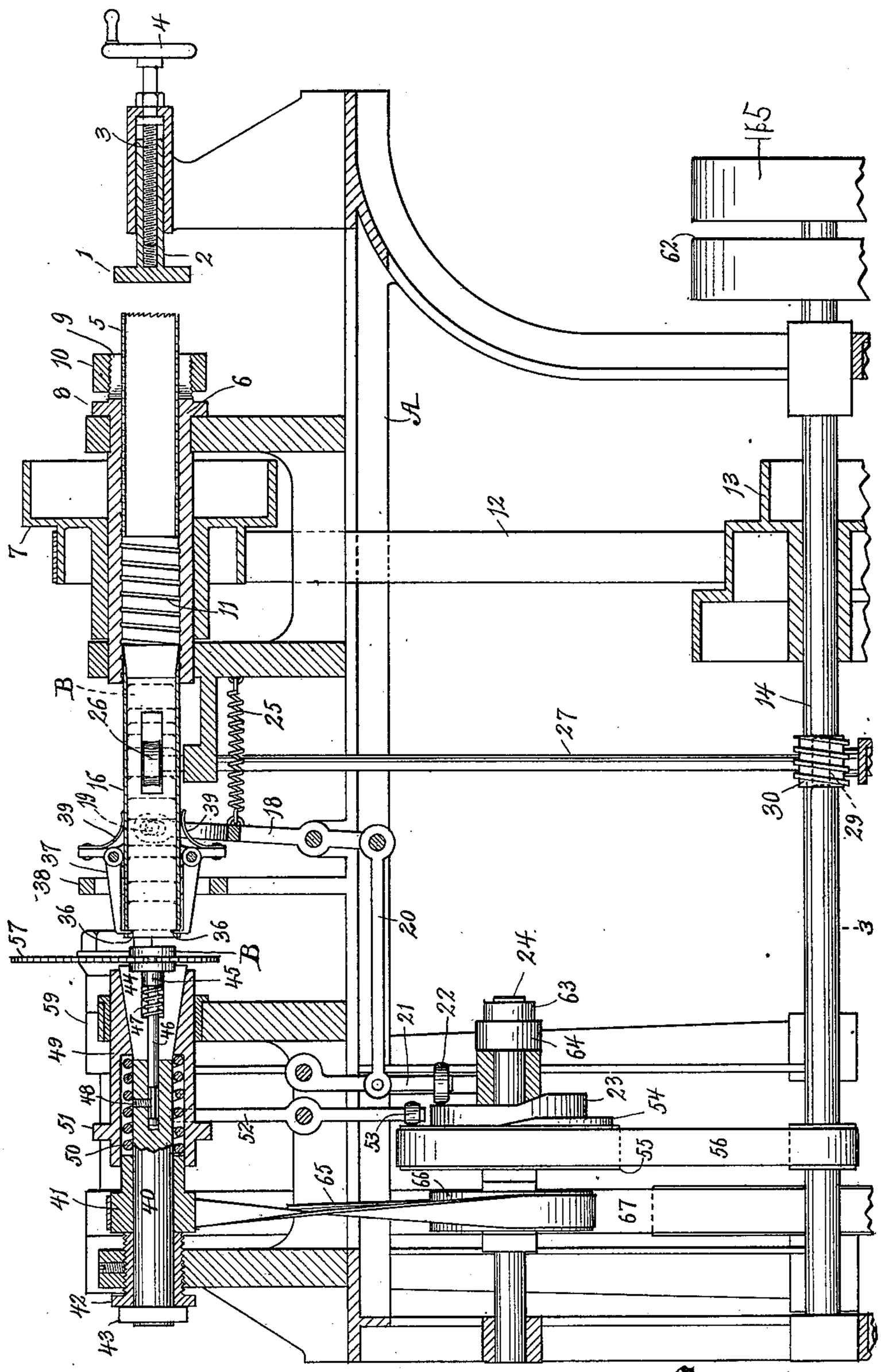
(No Model.) 4 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

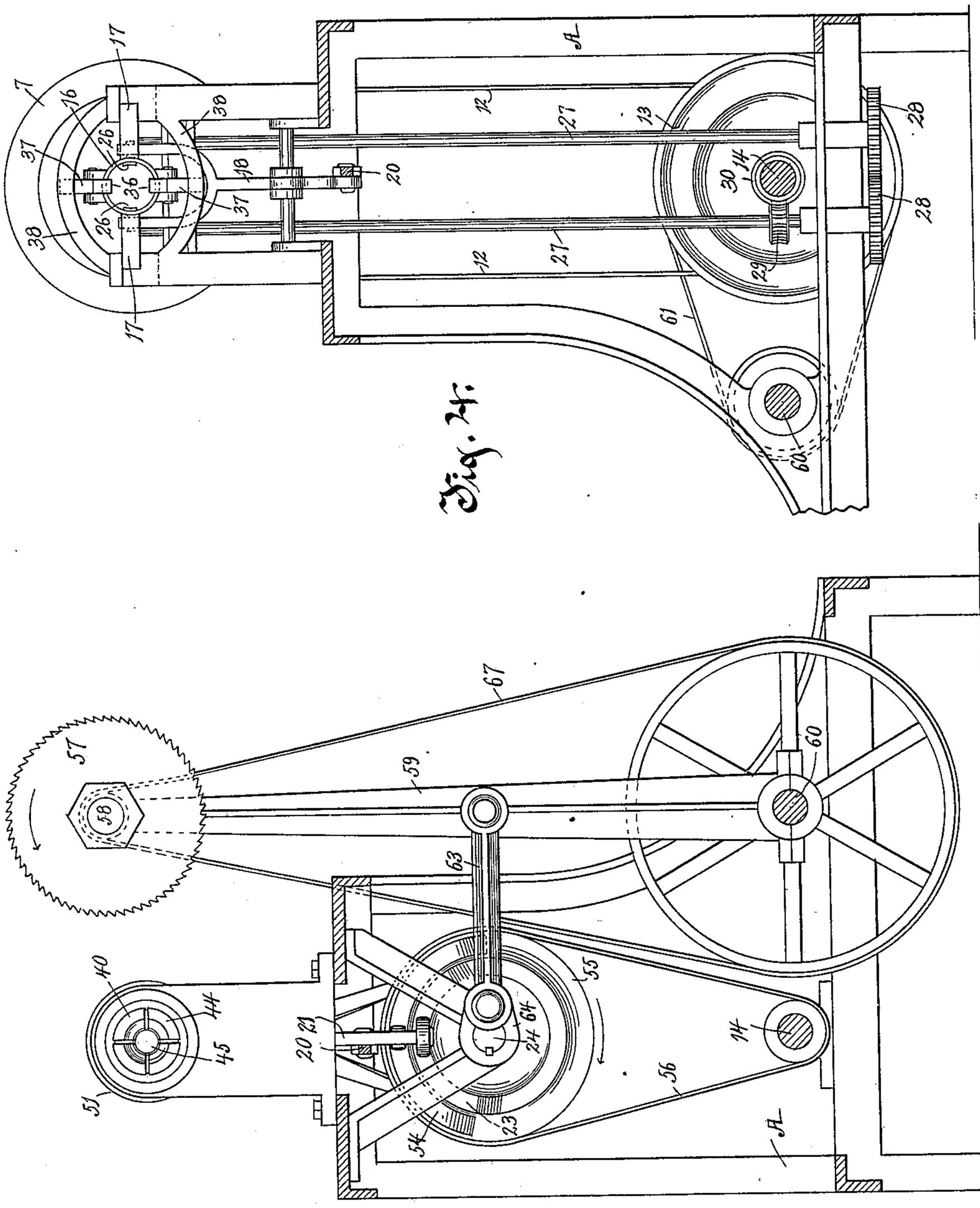

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 6.

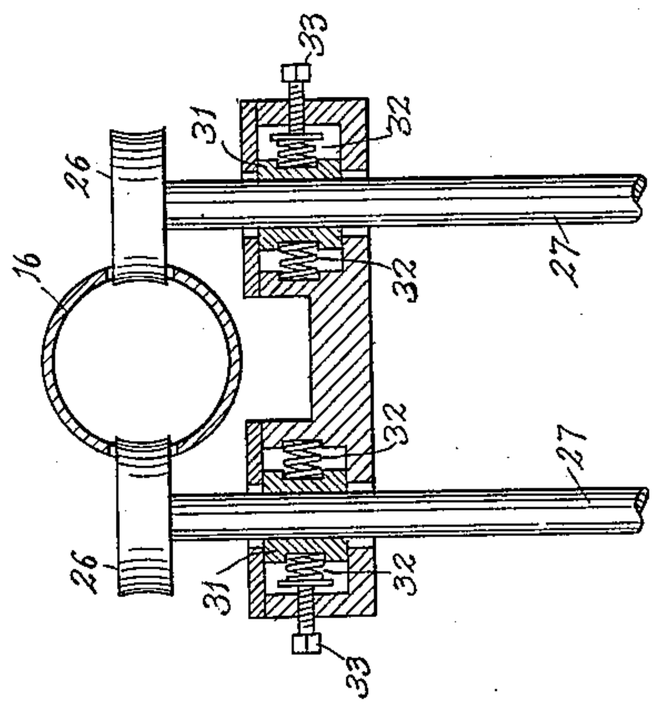
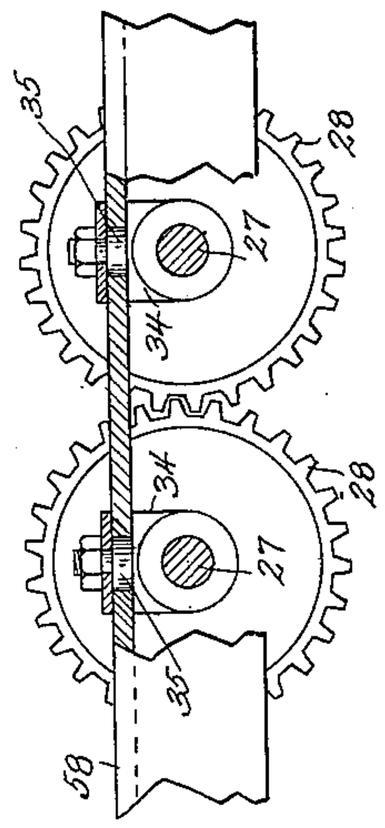


Fig. 7.



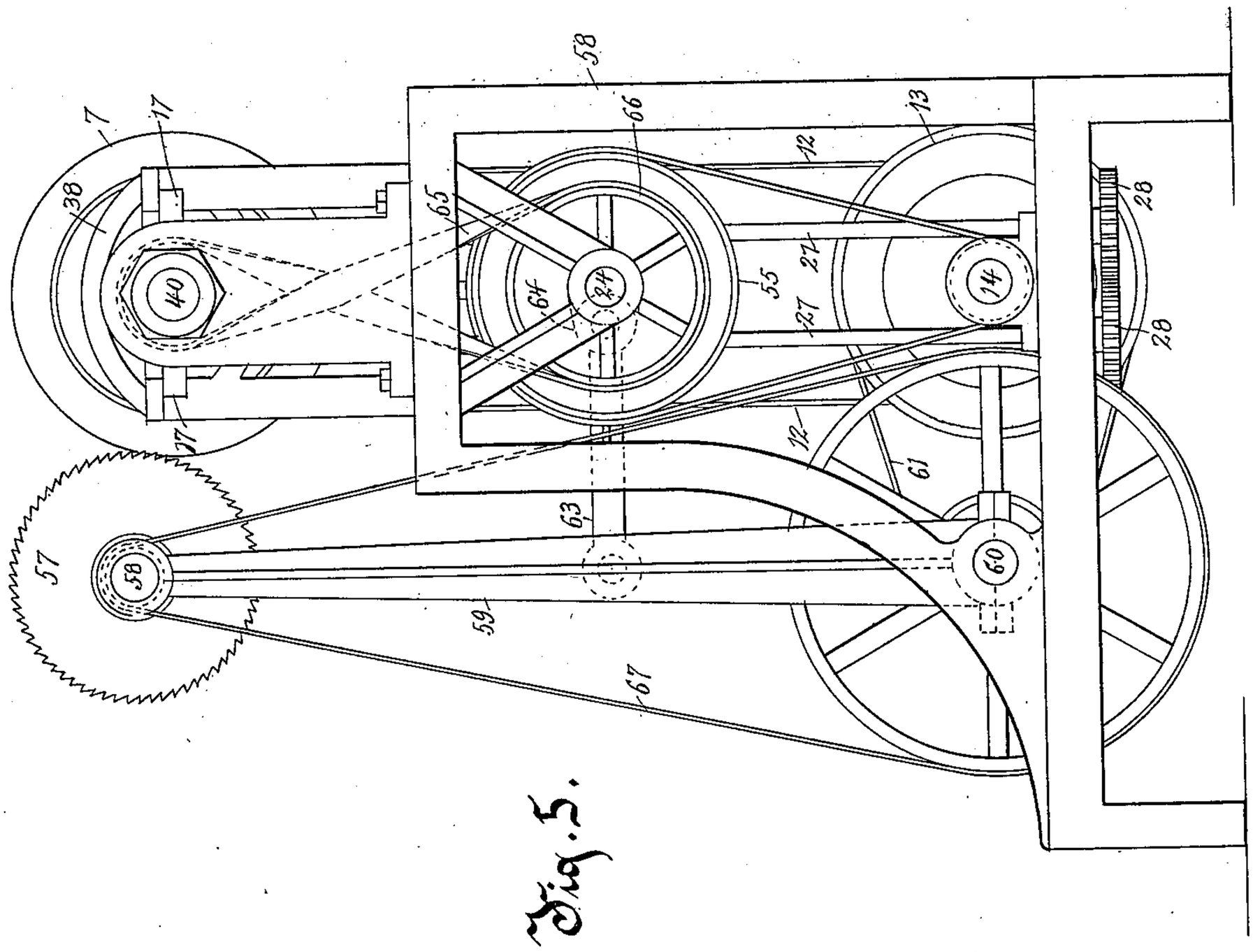


Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWARD I. KIDD, OF PRAIRIE DU CHIEN, WISCONSIN.

SHELL-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 675,354, dated May 28, 1901.

Application filed May 28, 1900. Serial No. 18,194. (No model.)

To all whom it may concern:

Be it known that I, EDWARD I. KIDD, of Prairie du Chien, in the county of Crawford and State of Wisconsin, have invented a new and useful Improvement in Shell-Cutting Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The invention relates to an improved machine for cutting shells into circular planchets or blanks of suitable size and desirable thickness for buttons or analogous articles; and the invention consists of the improved machine, its parts and combinations of parts, as herein described and claimed, or the equivalents thereof.

In the drawings, Figure 1 is a top plan view of the improved machine. Fig. 2 is a central vertical section of the principal operative parts of the machine. Fig. 3 is a section on line 3 3 of Fig. 2 looking toward the left. Fig. 4 is a section of the machine on the line of the section of Fig. 3 looking toward the right. Fig. 5 is a view of that end of the machine at the left in Fig. 2. Fig. 6 is a detail, partially in section, of feed mechanism. Fig. 7 is a cross-section, looking downwardly, of parts of the machine at the lower end of the feed mechanism shown in Fig. 6.

In the drawings, A is the frame of the machine, of such suitable form and size as adapts it for the support of the operative mechanism. The machine is adapted, first, to cut blanks or planchets in a circular form from shells, and, second, for dividing or trimming these blanks transversely of their cylindrical axis to desirable thicknesses for buttons or analogous articles. A tail-stock is provided consisting of a flat-faced head 1, having a tubular rearwardly-extending stem 2, that is slidable endwise in a standard on and forming a part of the frame. A screw 3, revoluble in the frame, turns by its thread into the stem 2 and adjusts the head 1 forward and back. The screw 3 is revoluble but non-movable endwise in the frame and is provided with a hand-wheel 4 for rotating it. Opposite the head 1 of the tail-stock a tubular saw 5 is mounted loose in a tubular pulley-hub 6, that is rotatable in bearings therefor in the frame. A speed-pulley 7, tight on the hub 6, and a collar 8, tight on the hub, bear against the frame and prevent movement of the hub endwise. The aperture of the hub is slightly larger than the saw-tube 5 and permits of the saw-tube being readily inserted in the hub, and an end portion 9 of the hub is split, forming elastic jaws, and a nut 10, turning by its thread on the exterior beveled threaded surface of the cleft end of the hub, forms a clamp adapted to secure the saw-tube in place in the hub. The bore of the hub at and beyond the rear end of the saw-tube 5 is preferably, though not necessarily, grooved spirally, as shown at 11, thereby adapting the surface of the bore to aid in advancing the blanks or planchets as they pass through the hub and to support and steady them in their passage through the hub. A belt 12, running on the speed-pulley 7 and on a speed-pulley 13 on the driving-shaft 14, rotates the hub 6 and the tubular saw 5. The tubular saw is required to be run with considerable rapidity to secure the best results. The band-pulley 15 on the driving-shaft is the means for connecting a belt thereto from a source of power for rotating it.

At the rear of the tubular hub 6 and in continuation thereof feeding mechanism is provided to take the cylindrical blanks as discharged from the tubular saw and hub 6 and deliver them to a thereto-succeeding chuck, in which they are held and rotated while being divided transversely. In this feeding mechanism a feed-tube 16 is mounted movable endwise on the frame, the initial end of the tube being fitted loosely in the rear end of the bore of the hub 6. Arms 17 17, rigid on the feed-tube 16 and projecting in pairs laterally therefrom, ride in ways therefor on the frame and support the tube movable endwise on the frame. A lever 18, pivoted medially on the frame, is provided at its upper extremity with furcate arms that are pivoted on stud pins or trunnions 19 19 on the feed-tube. At its lower end this lever 18 is connected by a link 20 to a swinging arm 21, pivoted at one extremity on the frame and at the other end provided with a bearing-roller 22, that rides on a crown-ring provided with a cam 23, fixed on the counter-shaft 24. A spring 26, attached to the frame and to the lever 18, holds the feed-tube yieldingly to its initial position. (Shown in Fig. 2.)

For feeding the planchets along in the feed-tube 16, feed-rollers 26 26, one at each side of the tube 16, are fixed, respectively, on feed-shafts 27 27, Fig. 4, the lower ends of which shafts have bearings on the frame and are geared to each other by wheels 28.28. One of the shafts 27 is provided with a worm-wheel 29, meshing with a worm 30 on the driving-shaft 14. This secures a slow rotary movement in the rollers 26. These rollers 26 project through the side walls of the feed-tube 16 in elongated slots therefor. The rollers 26 26 must bear very slightly against the blanks in the feed-tube 16, and it is desirable that the bearings of these rollers should be yielding, and therefore I preferably mount the feed-shafts 27 near their upper extremities in boxes 31 31, that are movable in the frame and are held yieldingly to position therein by springs 32 32 at the respective sides thereof, the tension of the springs being adjustable by means of set-screws 33 33, turning in the frame against the springs at one side of the boxes. To provide for this slight yielding movement of the shafts 27, these shafts are mounted at their lower ends in boxes 34 34, provided with pivot-pins 35 35, that pass through the frame and are secured rotatably therein, conveniently by nuts turning thereon.

For preventing the discharge of the blanks from the feed-tube 16 except at the proper moment, blank-stops 36 36 are provided, which stops are the overturned ends of the long arms of bell-cranks 37 37, pivoted to lugs therefor on the exterior surface of the feed-tube 16. The stops 36 in normal position project inwardly beyond the wall of the tube at its discharging end and so as to engage the shell blanks as they come thereto in the tube. The short arms of the bell-cranks 37 extend outwardly and are so disposed as to contact with the frame at 38 38 when the tube 16 is moved endwise away from its initial position in the hub 6 and up to the chuck, hereinafter to be described, whereby the bell-cranks are tilted and the stops 36 are withdrawn temporarily from in front of the discharging-aperture of the tube, permitting a blank to be discharged therefrom. The bell-cranks 37 are held to the positions shown in Fig. 2 by springs 39 39, fixed on the tube 16 and bearing against the bell-cranks. Planchets or blanks B of varying thicknesses are indicated in the tube 16, and a blank is also shown nearly divided by the circular saw, hereinafter to be described, in the chuck.

In the chuck for holding a cylindrical blank for being divided by a saw or other cutting implement a cylindrical stock 40 is provided medially with a pulley 41, having an elongated hub, and at the rear of the pulley the stock is mounted rotatably in a sleeve-box 42, adjustable by exterior screw-thread in the frame. The pulley 41 on the stock at one end of the box 42 and a collar 43 on the stock at the other end of the sleeve-box prevent the movement of the stock endwise. At its front end the stock is flaring outwardly in frustum-cone form, which frustum-cone is cleft, advisably, quadrifid, forming jaws 44, the end of the stock being provided with a socket adapted to receive a cylindrical planchet therein to be clamped by the jaws and held while being divided by a saw or other implement. A device for discharging the portion of the blank that is in the chuck after the blank has been divided consists of the pusher 45 in a recess therefor in the stock at the rear of the material-holding socket, which pusher is provided with a stem 46, extending rearwardly in an aperture therefor in the stock, and with a spring 47, adapted to force the pusher yielding against the blank. A pin 48, through the stock alongside a reduced portion of the stem 46, limits the movement of the pusher and prevents its escape from the stock. A sleeve 49 about the stock 40 is provided with a flaring front terminal portion which fits on the beveled or frustum-cone portion of the stock 40 and is adapted to compress the jaws of the frustum-cone slightly, whereby they are made to grip a blank in the socket in the front end thereof. The rear end of the sleeve fits loosely on the hub of the pulley 41. A spring 50 around the stock 40 within the sleeve 49 bears against the hub of the pulley 41 and against a shoulder on the sleeve and forces the sleeve yieldingly onto the frustum-cone of the stock, compressing the jaws of the frustum-cone. The sleeve 49 is mounted revolubly in the frame. An annular collar 51, fixed on the sleeve 49, provides a bearing for a lever 52, pivoted medially on the frame, the other extremity of which lever is provided with a bearing-roller 53, that rides on the face of a ring provided with a cam 54 on the shaft 24. The rings of which the cams 23 and 54 form a part are conveniently fixed on the pulley 55 on the shaft 24, on which pulley a belt 56 runs, that also runs on a pulley on the driving-shaft 49. A belt 65 runs on a pulley 66, loose on the counter-shaft 24, and also on the pulley 41 on the stock 40. This belt is crossed.

For dividing the cylindrical blanks transversely a circular saw 57 is provided, which saw is fixed on an arbor 58, mounted in the free extremity of a frame 59, pivoted at its lower edge on the shaft 60, having its bearings in the main frame. The shaft 60 is driven by the belt 61, running on a pulley on the shaft 60 and on a pulley 62 on the driving-shaft 14. A pitman 63, pivoted medially to the frame 59, is also pivoted to the pin of a crank 64 on the counter-shaft 24. This construction automatically swings the saw 57 to and from cutting engagement with a cylindrical blank in the chuck-stock 40. The saw 57 is rotated by a belt 67, running on the arbor of the saw and on shaft 60. The construction and disposition of the parts are such that as the saw-frame 59 is tilted toward the stock 40 the belt 67 is medially pressed against the belt 65, running on the loose pulley

66, and by the frictional contact thereof the belt 65 is put in motion, thereby rotating the chuck and the planchet therein. When the belt 67 is released from contact with the belt 65, the rotation of the stock 40 ceases at once by reason of friction of the parts in contact therewith, and especially by reason of the bearing of the lever 52 against the collar 51 on the sleeve 49.

The construction and disposition of the parts of the machine are such that when the machine is employed its operation is substantially as follows: The driving-shaft 14 being started, an attendant places a shell on the face of the head 1 of the tail-stock and by rotating the crank 4 brings the shell against the rotating tubular saw 5, which cuts a cylindrical blank from the shell. The head 1 is then withdrawn and another blank is cut by repetition of the operation. As these blanks are thus cut they are forced along through the saw-tube 5 and through and into the feed-tube 16 and are engaged by the feed-rollers 26, which feed them along in the tube 16 to the end thereof. At this point they are held by the stops 36. By the action of the levers 18 the feed-tube 16 is at the proper moment carried forward toward the chuck 40, and the stops 36 being concurrently withdrawn a blank is forced forward by the rollers 26 into the socket therefor in the chuck, the jaws of the chuck being opened by their resiliency at this moment, the sleeve 49 being withdrawn therefor at the same time by the action of the cam 54 on the lever 52. This cam 54 releases the lever 52, and the sleeve 49 by the action of the spring 50 compresses the jaws of the stock and grips the blank in the chuck, and directly thereafter the lever 21 is released from the cam 23 and the spring 25 withdraws the feed-tube 16 from the chuck, leaving the cylindrical blank in the chuck. Thereupon by the action of the crank 64 through the pitman 63 on the frame 59 the saw 57 is brought forward to the blank and the stock 40, with the blank therein, is rotated by the contact of the belt 67 with the belt 65 opposite the pulley 66, and the saw cuts into the blank from its periphery entirely around the blank to the center thereof, thus dividing the blank by an annular cut inwardly from the periphery. The rotation of the blank and the rotation of the saw are in the same direction, so that their adjacent edges move in reverse directions.

What I claim as my invention is—

1. In combination in a shell-cutting machine, a tail-stock, a rotating tubular saw, a tubular-blank-feeding device, a rotatable chuck adapted to take and hold a cylindrical blank, and a saw arranged to divide a blank held in the chuck.

2. In combination, a frame, a blank-feed tube mounted reciprocably endwise on the frame, a lever 18 pivoted medially on the frame and pivoted to the feed-tube, a spring adapted to hold the tube yieldingly in initial position, and means for tilting the lever and moving the tube against the action of the spring.

3. In combination, a frame, a blank-feed tube mounted reciprocably endwise on the frame, a lever 18 pivoted medially on the frame and pivoted to the feed-table, a spring adapted to hold the tube yieldingly in initial position, a swinging arm 21 connected to said lever, and a cam on a rotatable shaft against which cam the swinging arm bears and by which it is actuated to tilt the lever and shift the feed-tube.

4. In combination, an endwise-reciprocable feed-tube, means adapted to shift the tube endwise, stops 36 on bell-cranks pivoted on the tube, springs holding the bell-cranks and stops in initial positions yieldingly, and means for engaging the bell-cranks as the tube is shifted endwise and withdrawing the stops.

5. In combination, a frame, a blank-feed tube reciprocable endwise on the frame, feed-rollers projecting through elongated slots in the wall of the tube and slightly into the tube, and means for rotating the rollers.

6. In combination, a frame, a blank-feed tube reciprocable endwise on the frame, feed-rollers projecting through elongated slots in the wall of the tube, shafts on which the rollers are fixed, yielding boxes in which the shafts are mounted near the rollers, boxes oscillating on the frame in which the other ends of the shafts are mounted, gears on the shafts meshing with each other, and means for rotating one of the shafts.

7. In combination, a blank-feed tube, feed-rollers at the respective sides thereof projecting through slots in the wall of the tube, shafts on which the rollers are fixed, shaft-boxes slidable on the frame, springs holding the boxes yieldingly to place, oscillating boxes pivoted on the frame in which the shafts have other bearings, gears on the shafts intermeshing loosely with each other, a worm-wheel on one of the shafts, a driving-shaft, and a worm on the driving-shaft meshing with said worm-wheel.

8. In combination, a rotatable bored hub 6, a saw-tube 5 insertible in one end of the hub, and a spiral groove in the interior surface of the hub about the bore rearwardly of the saw-tube.

9. In combination, a rotatable chuck-stock having an exteriorly-beveled cleft portion, a rotatable sleeve around the stock and fitted on the beveled cleft portion, a spring forcing the sleeve onto the beveled cleft portion, an annular rib on the sleeve, a lever 52 pivoted on a fixed support and bearing at one end against said rib, and a revoluble ring having a cam-surface against which ring and cam-surface the other end of said lever bears and by which the lever is actuated to withdraw the sleeve on the chuck-stock.

10. In combination, a shiftable feed-tube 16, a lever 18 pivoted to the tube, a swinging arm 21 connected to the lever, a crown-ring

provided with a cam 23, a shiftable chuck-sleeve 49, a lever 52 bearing against an annular rib on the sleeve, and a crown-ring provided with a cam 54 concentric with the other cam-provided ring whereby the feed-table is shifted and a chuck is permitted to open at predetermined and relative intervals.

11. In combination, a chuck-stock 40, a loose pulley 66, a belt running on the pulley and on the stock, a swinging saw-frame, a saw-arbor mounted in the free edge of the swinging frame, a pulley on a shaft 60 at the axis of the saw-frame, a belt 67 running on the pulley at the axis of the saw-frame and on the saw-arbor, the disposition of the parts being such that as the saw is swung toward the chuck the belt running on the saw-arbor is put into frictional contact with the belt running on the chuck-stock and the chuck is rotated.

12. In combination, a shiftable feed-tube 16, a shaft 24, a cam 23 on the shaft, means bearing on said cam and connected to said tube whereby the effort of the cam is made to shift the tube, a rotatable chuck-stock provided with clamping-jaws, a sleeve slidable on the stock adapted to close the jaws releasably, a second cam 54 on said shaft, a lever bearing against said second cam and against a rib on the sleeve whereby the effort of the cam is made to withdraw the sleeve from and permit the opening of the chuck-jaws, a circular saw, a swinging saw-frame in which the saw is mounted, and a pitman connecting the saw-frame to a crank on said shaft whereby oscillation of the saw-frame is secured relative to the shifting of the feed-tube and the opening and closing of the jaws of the chuck.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD I. KIDD.

Witnesses:
C. T. BENEDICT,
ANNA V. FAUST.