No. 619,787. Patented Feb. 21, 1899.

W. B. PLACE.

MACHINE FOR MAKING CARTRIDGE SHELLS.

(Application filed Dec. 7, 1891.)

(No Model.) 5 Sheets—Sheet 1.

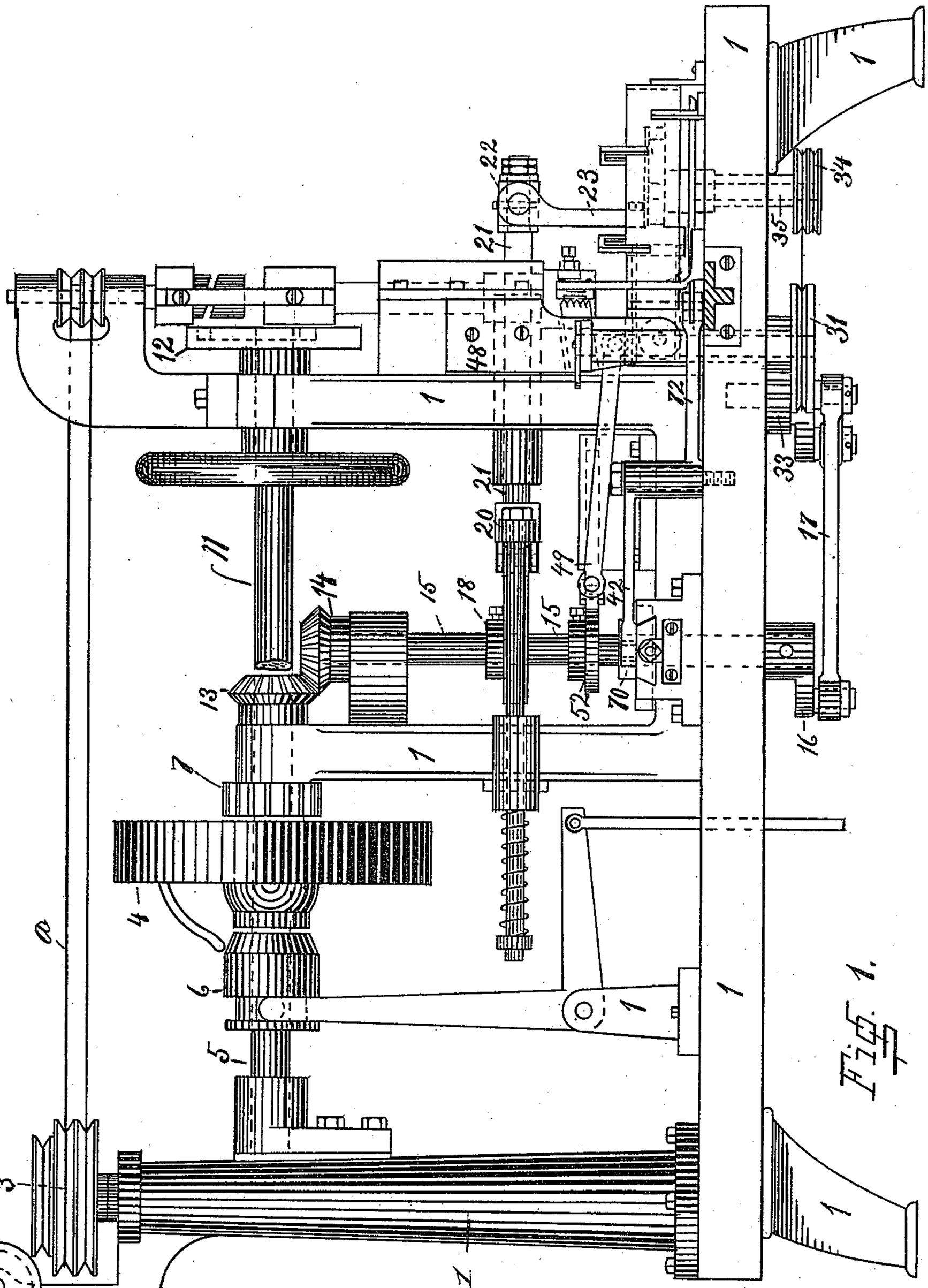

Fig. 1.

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(No Model.) 5 Sheets—Sheet 2.

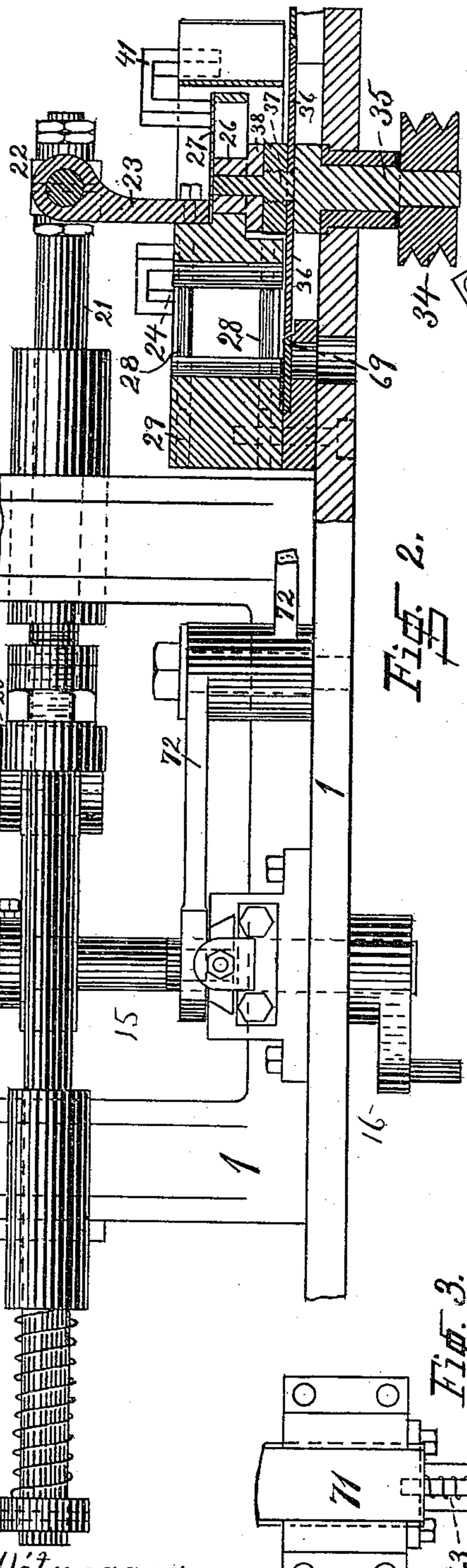

Fig. 2.

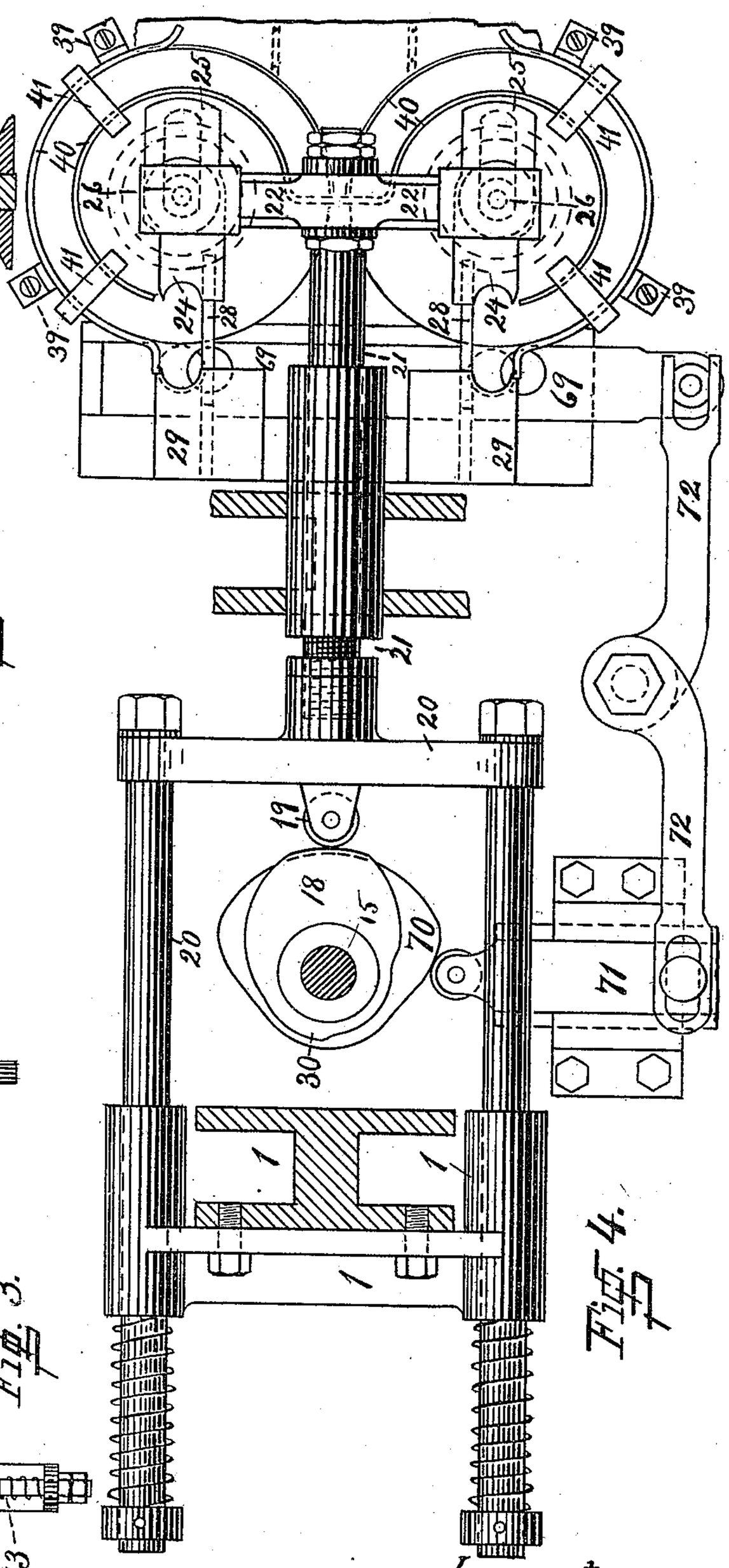

Fig. 4.

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No. 619,787. Patented Feb. 21, 1899.

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MACHINE FOR MAKING CARTRIDGE SHELLS.

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(No Model.) 5 Sheets—Sheet 3.

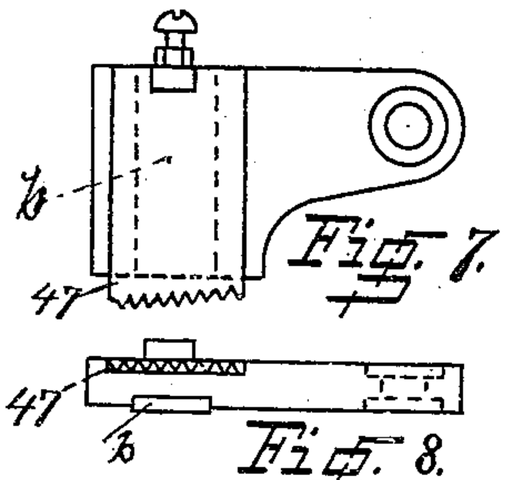

Fig. 7.

Fig. 8.

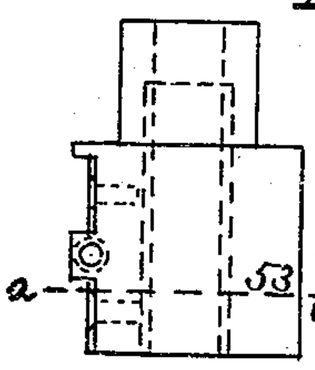

Fig. 9.

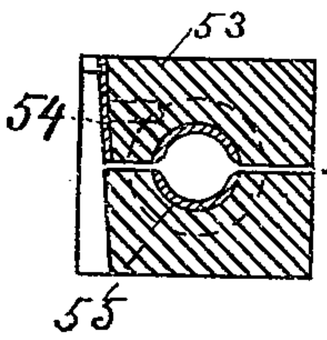

Fig. 10.

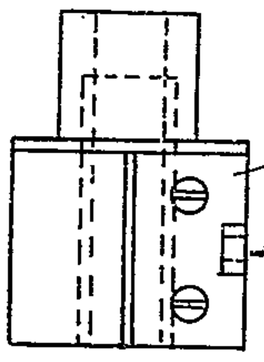

Fig. 11.

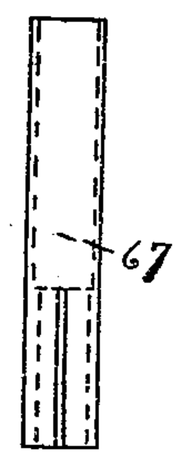

Fig. 12.

Fig. 13.

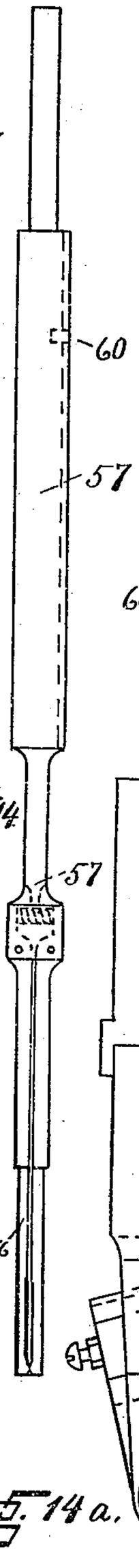

Fig. 14.

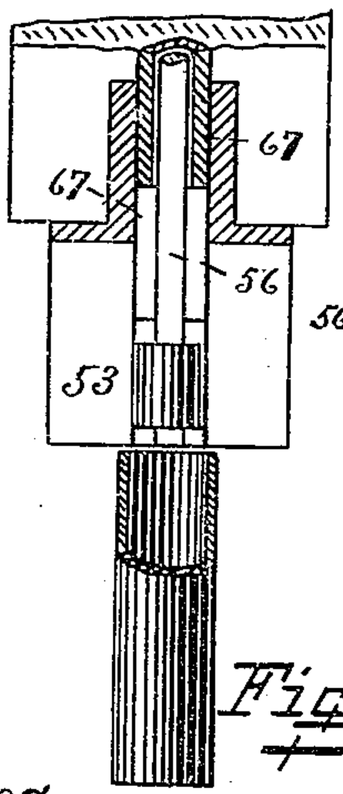

Fig. 14a.

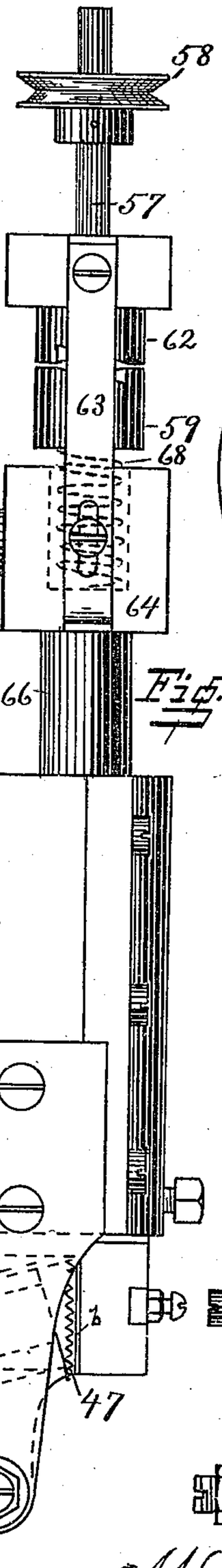

Fig. 5.

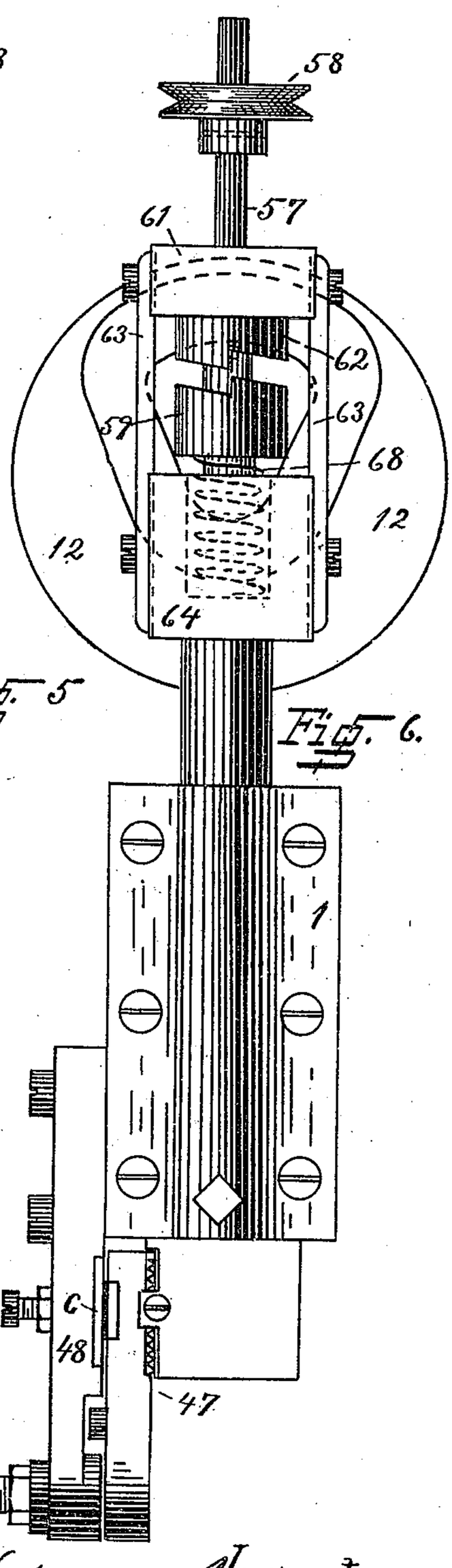

Fig. 6.

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MACHINE FOR MAKING CARTRIDGE SHELLS.

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(No Model.) 5 Sheets—Sheet 4.

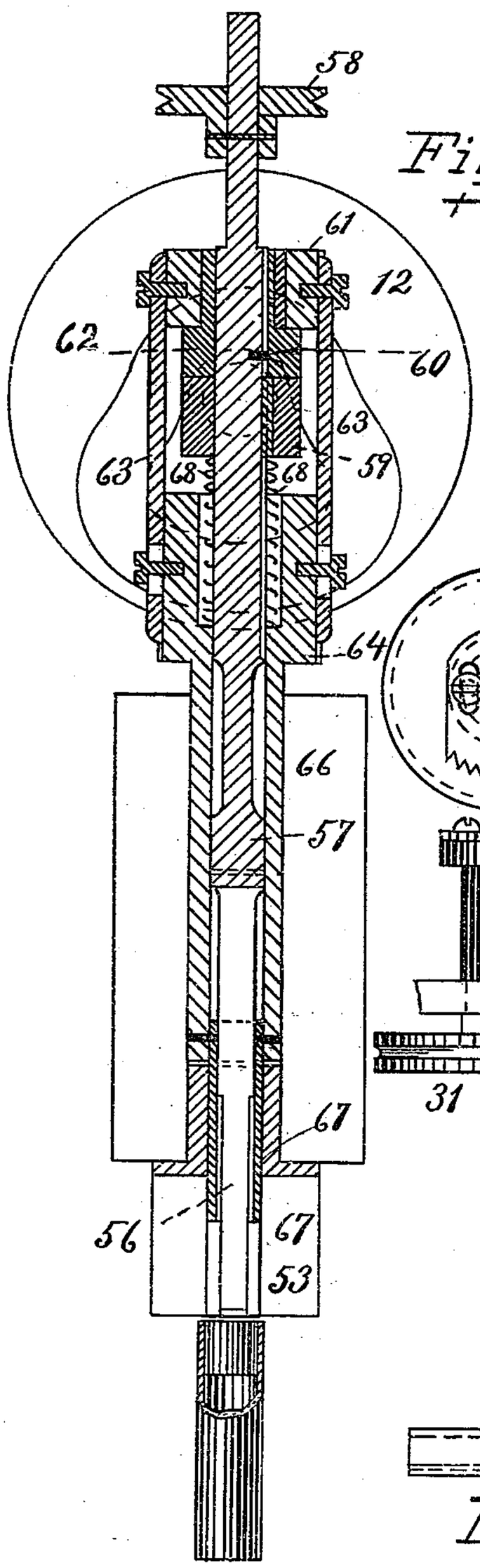

Fig. 15.

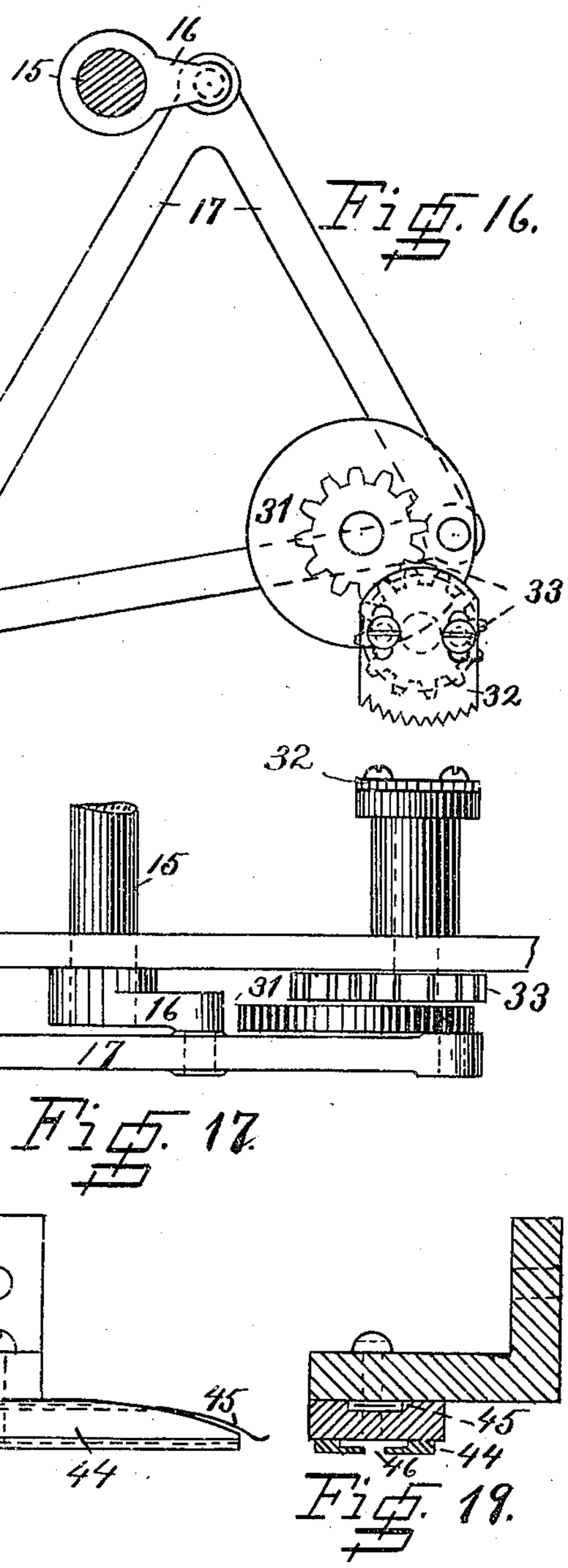

Fig. 16.

Fig. 17.

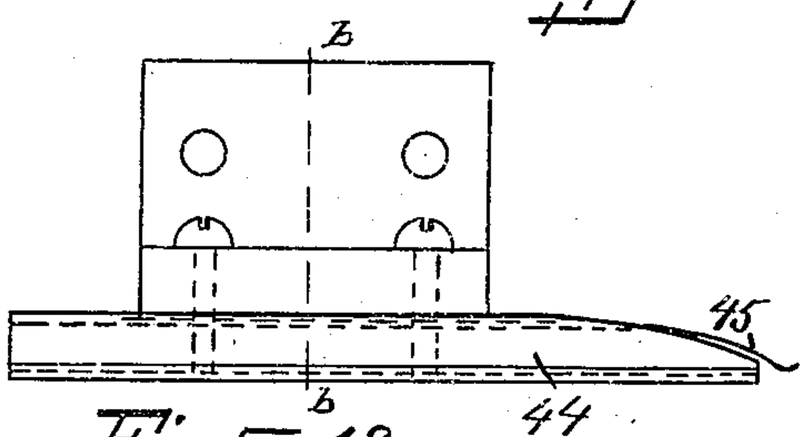

Fig. 18.

Fig. 19.

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MACHINE FOR MAKING CARTRIDGE SHELLS.

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(No Model.) 5 Sheets—Sheet 5

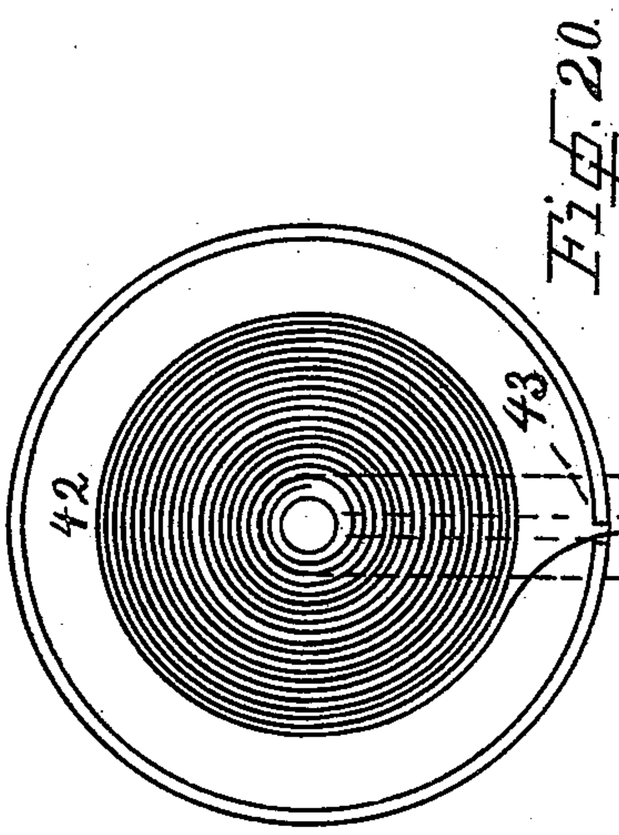
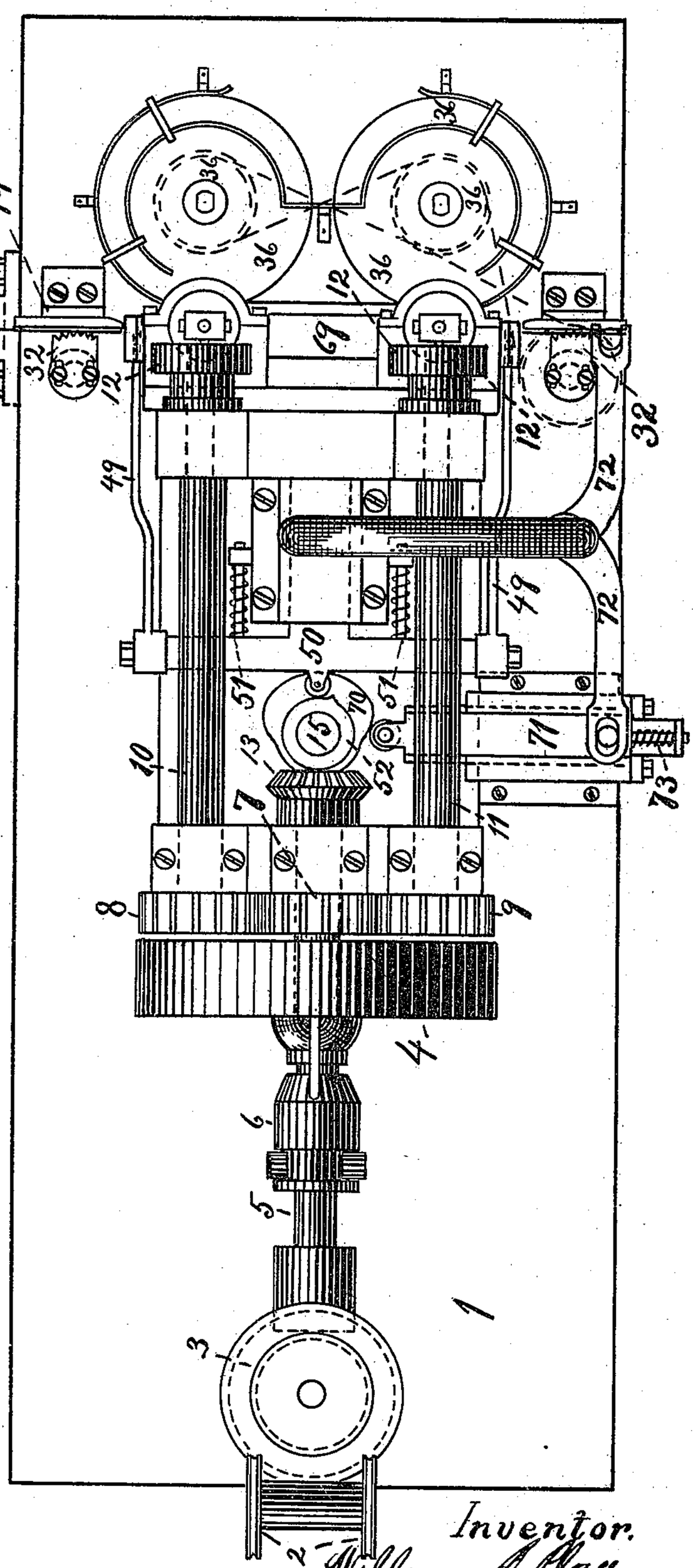


Fig. 20.

Fig. 21.



Witnesses.
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E. C. Merrill

Inventor.
William B. Place
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UNITED STATES PATENT OFFICE.

WILLIAM B. PLACE, OF KINGS MILLS, OHIO, ASSIGNOR TO THE PETERS CARTRIDGE COMPANY, OF CINCINNATI, OHIO.

MACHINE FOR MAKING CARTRIDGE-SHELLS.

SPECIFICATION forming part of Letters Patent No. 619,787, dated February 21, 1899.

Application filed December 7, 1891. Serial No. 414,300. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. PLACE, a citizen of the United States, residing at Kings Mills, in the county of Warren and State of Ohio, have invented a new and useful Improvement in Machines for Making Cartridge-Shells, of which the following is a specification.

This invention relates to machines employed in the making of shells for cartridges, and more particularly to the mechanism for winding and placing wads in previously-formed paper tubes or shell-cases.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in side elevation of the entire machine. Fig. 2 is a view in side elevation of that part of the mechanism for operating the shell-case-placing mechanism and adjacent coöperating parts, including the shell-case-feeding disk, the latter being shown in vertical section. Fig. 3 is a detached broken detailed view in plan of a cam-actuated spring-pressed slide for operating the apertured cut-off slide, the portion shown being that part thereof which is broken off in the plan view in Fig. 4. Fig. 4 is a top plan view of the mechanism shown in Fig. 2, parts being in horizontal section. Fig. 5 is a view in side elevation of the wad-winding and strip-puncturing mechanisms. Fig. 6 is a view in front elevation of the construction shown in Fig. 5. Fig. 7 is a detached detail view, in side elevation, of the puncturing device. Fig. 8 is an end view of the same. Fig. 9 is a detached detail view, in side elevation, of the block or die within which the wad is formed. Fig. 10 is a horizontal sectional view of the same. Fig. 11 is a front elevation of the same. Fig. 12 is a detached detail view, in side elevation, of the wad-stripper. Fig. 13 is a bottom end view of the same. Fig. 14 is a detached detail view, in side elevation, of the wad-winding spindle. Fig. 14ª is a broken sectional detail view of the lower end of the winding-spindle with a wad wound thereon, an open-ended shell-case being shown in position underneath ready to receive such wad when the stripper is forced downwardly. Fig. 15 is a detached detail view, in vertical central section, of the mechanism shown in side elevation in Fig. 5, a shell being shown underneath the winding-spindle and a wad placed in the shell by the stripper. Fig. 16 is a detached detail view in plan of the serrated feeding-segments and their actuating-gearing and a triangular arm for operating the same. Fig. 17 is a side elevation of the same. Fig. 18 is a detached detail side view of the guide-bar for the wad-strip and the spring for supporting the strip. Fig. 19 is a cross-sectional view of the same on the line *b b*, Fig. 18. Fig. 20 is a plan view of the entire machine with the exception of the spindle for winding the wads and its operating mechanism. Fig. 21 is a detached detail view, in side elevation, of a hopper for supporting the wad-strip.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

In the drawings, reference-sign 1 designates the frame of the machine, which may be of any suitable size, shape, or material adapting it to receive and support the operating parts of the apparatus and including the various brackets, posts, and supports, all of which are designed to be comprehended under the general expression "frame." Upon this frame or a bracket secured thereto are the pulleys or sheaves 2, mounted, preferably, upon a horizontal shaft near the rear of the machine. Pulleys or sheaves 3 are mounted upon a vertical shaft adjacent to the first-mentioned pulleys. The pulleys 2 serve merely as guiding-sheaves for a drive-belt, (not shown,) which is driven from a suitable or convenient source of power and which in turn drives one of the set of pulleys 3. Another of said set of pulleys serves as a driver, through belt connection *a*, for the winding-spindle 57. The pulleys 3 are frictionally coupled to their supporting-shaft, the whole arrangement being substantially the same as that shown and

described in my Patent No. 393,028, dated November 28, 1888. By this construction I am enabled to rotate the winding-spindle from a rotating part of the machine instead of rotating the same from an independent source from the main driving-pulley 4, hereinafter to be more specifically mentioned.

The main driving-pulley 4 is mounted loosely upon a horizontally-arranged shaft 5 and may be connected thereto by an operating-clutch 6, keyed to such shaft, but free to slide thereon and arranged to engage the hub of the driving-pulley when desired.

Fixed to the shaft 5 is a pinion 7, which meshes with pinions 8 and 9 upon each side of the same. The pinions 8 and 9 are respectively secured to the outer ends of shafts 10 and 11, which shafts at their inner ends carry wheels or disks 12, having cam-grooves in their faces. These wheels or disks, through the cam-grooves in the faces thereof, serve to reciprocate a part of the wad-winding mechanism, and the action and operation thereof will be more fully and particularly specified hereinafter.

Secured to the same shaft with the pinion 7 is a miter or bevel gear 13, arranged to mesh with a corresponding gear 14, the latter being mounted upon the upper end of the vertical shaft 15. This vertical shaft 15 serves a very important purpose in this machine, for by means of a series of cams mounted thereon it operates the plungers, the shell-case placers, the perforators, and the cut-off slide, as will be more particularly hereinafter pointed out, and by means of the crank 16, secured to the lower end of said shaft 15, motion is imparted to the triangular arm 17, which latter operates the serrated feeding-segments, presently to be described more in detail.

Reverting to the mechanism operated by the cams on the vertical shaft 15, it will be seen that the uppermost cam 18 operates against the friction-roller 19, mounted on the cross-arm of the yoke 20. The side arms of this yoke are guided in horizontal bearings in the frame and are moved by said cam 18 against the tension of a spring placed between the frame and collars secured to the outer ends of such side arms. The front portion of this yoke, which may comprise a cross-arm, may be provided with a socket, into one end of which a screw-threaded connecting-rod 21 fits, while the other end of such rod is secured to the cross-head 22. The cross-head 22 has dependent therefrom two arms 23, which are placed at proper distances apart, and each operates a shell-case-placing plunger 24, which plunger 24 consists of a suitable block curved or concave on its inner side and having a central projecting flange 25, through which is cut an elongated rectangular slot, as shown, which fits over a washer 26, mounted upon the upper end of the vertical shaft which rotates the feeding-disk. This rectangular slot is best shown in Fig. 4; but in Fig. 2 its top is shown as covered by a plate 27, so as to prevent the operator's finger or any other extraneous object from gaining access to such slot. As before suggested, the shell-case-placing plunger and connected parts are placed in pairs on the machine. Each shell-case-placing plunger has preferably near its inner side two extended or projecting lugs 28, which project the one over the other into and reciprocate through grooves or ways formed in the block 29, which latter is secured to the frame. This block may have its front side concaved like the corresponding side of the shell-case-placing plunger. It is evident that when vertical shaft 15 is rotated the cam 18 thereon will strike the friction-roller 19 and cause the yoke 20, which carries the connecting-rod of the shell-case-placing plungers, to move, thereby moving the shell-case-placing plungers in the same direction. It is preferable that this cam should move the shell-case-placing plungers outwardly and away from the winding-spindles and that the springs move such yoke and placing-plungers forward to place the shell-cases in the proper position to receive the wads from the winding mechanisms, for by such an arrangement if a shell-case or any other object is caught between the sides of the placing-plungers and the frame it will simply have against it the pressure of the springs, whereas if this arrangement were reversed such shell-case or other object would have against it the power of the machine, thereby injuring if not destroying the shell-case or other object. It is found desirable, also, that the cam 18 should be so formed as to move the placing-plungers only a short distance at first and allow them to rest at this point for a short time before complete movement is given thereto. This is rendered desirable by reason of the fact that the shell-case is sometimes pulled backward by the placing-plunger, and if the placing-plunger moved its entire distance it might carry the shell-case beyond the discharge-opening in the cut-off slide; but by moving the placing-plunger only a short distance at first the discharge-opening in the cut-off slide is carried under the shell-case before the movement of the shell-case is completed. This result is effected by the supplemental knob 30 on the cam 18. The crank 16 is pivoted to one angle of the triangular arm 17 and thereby gives such arm oscillatory motion. To each of the other angles of this arm is connected the crank 31, which either mediately or immediately imparts motion to the serrated feeding-segments 32. One of these feeding-segments may be connected directly with the crank, but the other, in order to feed in the proper direction, must be connected to its crank through a pair of reversing-gears 33, so as to cause the wad-strip to be fed in the proper direction to the winding-spindle on that side of the machine and in a direction opposite to that in which the wad-strip on the opposite side of the machine is fed. These

cranks 31 are preferably wheels with crank-pins and are also so formed as to constitute pulleys, the object being to connect and impart the motion of the same to pulleys 34, mounted upon vertical shafts 35, journaled at a suitable distance apart in the table of the machine, and mounted on or secured to each shaft 35, at its upper end, is a feeding-disk 36, designed to carry the shell-cases to the shell-case plungers when thus caused to rotate, and from which the shell-cases are carried by such shell-case plungers into position to receive the wads from the wad-winding spindle. These shell-case-feeding disks 36 are preferably secured upon the enlarged upper ends of shafts 35 and are fastened thereto by means of upwardly-projecting screw-threaded pins 37, which pass through said disks and carry nuts 38, which bear upon the upper sides of the disks and thereby clamp the same firmly. Above the nuts 38 the pins may be made smooth—that is, the screw-threads may be omitted therefrom—and upon these smooth portions are loosely mounted the washers 26, before referred to, which serve as guides by fitting within the slots in the extended portions 25 of the plungers. When the shell-cases are placed upon the rotating disks 36, they may be guided in single file to a point in front of the reciprocating shell-case-placing plungers, and to this end above each disk there is secured to the frame by brackets 34 a pair of suitably-curved sheet-metal strips 40, one strip of each pair being within the other and at a distance therefrom about the diameter of a shell-case and the two strips of the pair being held in their proper relative positions by means of brackets 41, which latter may be in the form of yokes, having their ends soldered to the strips and their bows extending above the same a sufficient distance to allow the shell-cases to pass thereunder. These guiding-strips serve as a raceway, through which the shell-cases are fed in single file by each rotating disk and from which the shell-cases are delivered at a point in front of the shell-case-placing plunger. When the placing-plunger moves forward and carries one of the shell-cases into position under the wad-winder, as will be hereinafter more fully described, the side of such plunger serves as a cut-off to prevent the other shell-cases from being fed forward by the disk, and although the disk continues to revolve the supporting-surface thereof will merely slide or slip past the under ends of the shell-cases resting thereon until the shell-case-placing plunger is moved back into position to receive another shell-case.

All of the mechanism thus far specifically described is designed to manipulate the wad-strip and the shell-case, which latter is, as above indicated, simply a tube open at both ends; but the main purpose of this machine is to close one of the ends of such tube by inserting therein a wad composed of a number of convolutions or windings of the wad-strip. The manner of forming this wad from such strip and inserting it within the open-ended shell case or tube will now be described.

Referring to Figs. 20 and 21, reference-sign 42 designates a shallow hopper supported adjacent to the machine by brackets projecting therefrom or in any other suitable or convenient manner, which hopper is intended to contain a comparatively long strip of the wad-making material, the said strip being arranged within the hopper in the form of a coil, said coil resting upon its edge on the top surface of the hopper. One end of the strip is passed through an opening in the edge of the hopper, as indicated at 43, and into the guiding-chute 44, the inner end of which chute may be beveled or cut away, and the spring 45 is arranged to extend over and beyond such beveled end, as shown in Fig. 18 of the drawings. It will be understood that the winding-spindle is rapidly rotated during the formation of the wad, and hence the wad-strip is rapidly and violently drawn or reeled from the coil resting upon its supporting-hopper as the winding-spindle revolves. The purpose of spring 45, therefore, is to accurately and steadily guide the wad-strip as it is thus drawn through its feeding-chute by the rotation of the winding-spindle and also to prevent the same from being ruptured or broken during the violent pull exerted thereon by the edges of the opening 43 in the peripherally-flanged hopper. The guiding-chute has also a longitudinal slot or opening, as shown at 46, Fig. 19, for the purpose of permitting the passage therethrough of the serrated feeding-segment 32. The relation of this feeding-segment with relation to the guiding-chute is best shown in Fig. 20 of the drawings, and the mechanism for operating the same is best shown in Figs. 16 and 17 of the drawings. The end of the wad-strip is fed by the feeding mechanism above described to the wad-winding spindle, which thus begins to revolve and winds up the wad thereon. When nearly a sufficient length of the wad-strip to form a complete wad is wound upon the winding-spindle, the segment 47, serrated upon the edge thereof, is advanced transverse to the line of feed of the strip and punctures the strip, thereby weakening it to a point such that the further rotation of the winding-spindle to complete the wad ruptures or causes the strip to part or to be broken off at the point where it has been weakened by the perforations or punctures. This serrated perforator is shown in detail in Figs. 7 and 8 and in relation to the other parts in Figs. 1, 5, and 6 of the drawings. The perforator 47 consists, essentially, in an arm pivoted at its lower end to a bracket 48, said arm being provided with a transverse groove in the end thereof, in which is adjustably secured a plate or bar having a projecting edge formed with serrations, and this edge is inclined relative to a line drawn from the pivot of the arm to the upper corner of said projecting edge of the

plate. This inclination is rendered necessary by reason of the fact that the perforator moves in the arc of a circle, its supporting-arm being pivoted at its lower end, and it is necessary that the serrated edge of the plate strike the wad-strip squarely throughout the width thereof. It is evident that the inclination of the edge of the perforator may be varied according to the variation in the length of its supporting-arm. At some suitable point intermediate the ends of the supporting-arm of the perforator said arm is connected with a rod 49, which latter at its other end is secured to a cross-bar 50, suitably mounted in guides in the frame and arranged to bear against the spiral spring 51, mounted on rods projecting from said bar and arranged between said bar and the frame. A movement in one direction is imparted to cross-bar 50 by the cam 52, and this movement causes the perforator to act upon the wad-strip, and such perforator and cross-bar are carried in the opposite direction by the spring 51. It will be understood that a perforator is employed at each side of the machine and for coöperation with each set of the wad-strip-feeding mechanisms, and therefore a connecting-rod 49 is provided for the supporting-arm of each perforator. The cam 52 is arranged upon the vertical shaft 15 and is the intermediate of the three cams above mentioned as being arranged upon this shaft. This cam is preferably in the form of a circular disk, except that at one point in the periphery thereof is formed a sharp knob or protuberance, which enables the cam to give a quick sharp stroke. The back of the supporting-arm of the perforator may be provided with a hardened-steel plate *d*, as shown in Figs. 4 and 8 and in dotted lines in Fig. 7. Similarly the inside of the bracket to which said arm is pivoted may be provided with a similar plate *c*, Fig. 6, and in this manner the wear of the parts is lessened. The strip of wad material is fed to the wad-winding spindle between the side or face of the block 53 and the serrated edge of the perforator, when the supporting-arm of said perforator is held in its retracted position, and the serrated edge of the perforator when projected forwardly to perform its function strikes or impinges against the side or face of the said block 53. At the point where this serrated edge of the perforator strikes the block 53 there may be provided a hardened-steel plate, as shown at 54, Fig. 10 of the drawings, in order to receive the impact of the perforator. The block 53 is secured to the frame at a point adjacent to the perforator and immediately surrounding the lower end of the wad-winding spindle, and the wad-strip is fed through the chute into and through the vertical slit in said block. This vertical slit or opening is lined with a steel bushing 55. (Most plainly shown in Fig. 10 of the drawings.) When the wad-strip is passed through the chute and through the vertical slit or opening in the side of block 53 and into the opening between the jaws of the spindle, as clearly shown in Fig. 14, this forward end of the wad-strip is grasped by said jaws and the rotations imparted to the spindle cause the strip to be wound thereon in convolute layers and within the steel bushing or lining in block 53, this bushing thereby forming a die, within which the wad is formed by the wad-strip being coiled on the winding-spindle.

Attention is now directed to the construction of the winding-spindle and its adjacent and coöperative parts and connections. (Best shown in Figs. 5, 6, 14, and 15 of the drawings. The spindle-jaws 56 are pivoted at their upper ends to the spindle-shank 57 and are normally held together or closed by means of a spring interposed between the ends of the said jaws projecting above their pivots. Of course a space of sufficient extent to permit the end of the wad-strip to pass into the same is left between these jaws at their lower ends. The spindle-stem is provided at its upper end with a pulley 58 or other gear, which in the present instance is connected by a suitable belt with pulley 3, which latter in turn is driven by a belt extending from the same point over a guiding-pulley 2 and to a pulley on a suitably-arranged main driving-shaft. It will thus be seen that unless in some manner prevented from so doing the wad-winding spindle will be constantly rotated; but after a sufficient length of the wad material is wound upon such spindle to form a wad of the required or proper size it is desirable to stop the rotation of the spindle and to strip the wad from the same and place it in the shell-case. The construction and arrangement for accomplishing this object will now be described.

The stem of the winding-spindle is provided with a vertical groove extending for a considerable distance therein, as shown in dotted lines in Figs. 14 and 15. The block 59 surrounds the spindle and is feathered in the groove just mentioned, so as to be capable of sliding vertically on the spindle, but always rotated therewith. This block has its upper surface formed into a half-clutch, and its upward movement is limited by a pin or shoulder 60, arranged near the upper end of the vertical groove. A non-rotatable collar 61 is provided, which collar has an opening through it somewhat larger than the diameter of the stem of the spindle and through which the stem of the spindle passes. Within the opening in collar 61 is secured the upwardly-projecting flange of the half-clutch 62, which clutch has teeth formed on the under surface thereof and arranged to engage with the engaging teeth of the other half-clutch 59. An arm 63 is secured upon each side of the collar 61 and extends downwardly and is adjustably fastened at the other end thereof to a recessed head-block 64, which latter is provided on its rear side with a projecting pin 65, as is clearly shown in Fig. 5 of the drawings. This pin

65 on head-block 64 is arranged to project into the cam-groove in the face of the wheel or disk 12, whereby the head-block and connected parts are given a vertical reciprocating motion when said disk or wheel is rotated. The head-block 64 is provided with a downwardly-extending sleeve 66, which is arranged to surround the stem of the spindle, and to the lower end of the sleeve is secured a stripper 67, which is best shown in Figs. 12, 13, and 15 of the drawings. This stripper 67 is provided with vertical slits in the lower portion thereof to permit the wad-strip to pass to the spindle. Within the head-block 64 is a recess which contains a spiral spring 68, said spring normally projecting above the recess and against the inner side of the half-clutch portion 59, the latter being thereby normally forced upward against lug 60. From the foregoing description it will be readily seen that the half-clutch portion 62 is held against rotary motion by collar 61, and therefore when said half-clutch is in engagement with the half-clutch portion 59 the latter is positively held against rotation, thereby positively preventing and locking the winding-spindle from rotation, it being understood that the tension of the driving-belt around pulley 58 is constantly applied to rotate the stem of the winding-spindle, and therefore when said spindle is positively locked against rotation said driving-belt merely slips around upon the pulley 58. In other words, the winding-spindle is normally energetic, and when released from engagement with the non-rotatable clutch portion 62 immediately begins rotation under the tension of the driving-belt. Ordinarily, however, the half-clutches 62 and 59 are a slight distance apart and the spindle is free to revolve. During the revolution of the wheel or disk 12, having the cam-groove in the face thereof, said groove at a certain point in the rotation of said wheel or disk engages the pin 65 on the head-block and forces the same downwardly, carrying with it the head-block, and consequently drawing down the collar 61 and half-clutch 62, thereby causing said half-clutch 62 to engage the half-clutch 59, splined or feathered to the winding-spindle, thereby positively locking said spindle against rotation. At the same time the sleeve depending from the head-block will be carried downwardly, thereby causing the stripper to strike the upper edge of the wad, which at this point in the operation has been completely wound upon the spindle, and will force said wad off the spindle and into one end of the section of tube constituting the shell-case, which latter by a proper timing of the apparatus is at this moment placed underneath the stripper and in position to receive the wad. In this manner the wad which has been formed by the rotating spindle is removed from such spindle and is placed in the upper end of the shell-case, thus completing the main function of the machine. The machine is so arranged and timed that immediately after the above-described function has been completed the cam-slot in the face of the disk or wheel 12 will, through its engagement with pin 65, lift the head-block, collar 61, half-clutch 62, and the stripper to their first positions, and the spring 68 will lift the half-clutch 59 on the spindle-stem to its first position, thus replacing the parts in their relative positions for receiving, winding, and stripping another wad. The lug 60 may be positioned as described or in any desired manner on the stem of the spindle, and its position will regulate the size of the wad wound on the spindle, because it regulates the distance between the half-clutch 59 and the half-clutch 62, and the normal distance between these half-clutches determines the distance the half-clutch portion 62 has to travel before it effects a locking of the winding-spindle. As stated, it is manifest that this pin or lug 60 may be made adjustable in any suitable or convenient manner. It is to be understood that these wad winders and strippers and connecting mechanism are arranged in pairs in the machine, and the construction of one of them having been described it is not necessary to specify particularly the duplicate construction.

Only one portion of the machine remains to be described, and that is the mechanism which supports the shell-cases while the wads are being placed in their open ends and the means for delivering the shell-cases from the machine after the wads have been so placed. This mechanism will now be described, and attention is particularly directed to Figs. 2, 3, and 4 of the drawings. When the open-ended shell-cases have been fed through the raceway of the shell-case-placing plungers and have been carried by the latter underneath the wad-winding mechanism and rest upon the sliding plate 69, which is provided with circular apertures corresponding in number to the shell-cases in which wads are intended to be placed at the same time (in the present case two) and so positioned as to register with the corresponding openings in the table of the machine, the plate is forced inwardly by its operating-cam, hereinafter to be specifically mentioned. By this arrangement the shell-cases are, as above stated, supported while the wads are being inserted therein. After the wads have been inserted in the shell-cases said cases are permitted to drop through the apertures in the slide and the corresponding apertures in the table into a convenient receptacle by suitably projecting said slide endwise for the apertures therein to register with the cases. The mechanism for imparting movement to this slide 69 will now be described. The third or lowermost cam 70 on the vertical shaft 15 is arranged to operate upon the sliding guiding-plate 71, to the outer end of which is pivoted one end of a bell-crank lever 72, the other end of said lever being loosely connected to the cut-off slide 69. The slide 71

moves in ways in the frame and is moved therein by a cam against the tension of the spring 73, said spring normally acting to hold the slide 71 into contact with the cam 70, and hence to return the cut-off slide 69 and the projecting slide 71 to their normal positions.

The above description and the accompanying drawings set forth the best manner of applying my invention; but it is manifest that many variations may be made in the details of construction and arrangement and the relative location of parts by persons skilled in the art without departing from the principles and scope of my invention, and therefore I do not wish to be understood as limiting myself to the exact construction, location, and arrangement shown and described; but

What I claim, and desire to secure by Letters Patent, is—

1. In a machine for winding wads and placing them in cartridge-shell cases, a shell-case-feeding mechanism, shell-case placing and clamping mechanism, strip-feeding mechanism, strip-puncturing mechanism, wad stripping and placing mechanism, a main shaft and appliances for operating said several mechanisms from said shaft, in combination with wad-winding devices, as and for the purpose set forth.

2. In a machine of the class described, the combination with a pair of strip-feeding segments, of a shaft, a triangular arm connected at one angle to the shaft and at another angle with devices for operating said feeding-segments, substantially as and for the purpose set forth.

3. In a machine of the class described, the combination with a pair of rotatable shell-case-feeding disks, having pulleys for operating the same, a pair of wad-strip-feeding segments, a pulley having a crank mounted on the shaft of one of said segments, a similar pulley having a crank and geared to the shaft of the other of said segments, a drive-shaft having a crank, an oscillating lever connected respectively to the crank on said drive-shaft and to the cranks upon said pulleys, and belt connections between said several pulleys, as and for the purpose set forth.

4. In a machine of the class described, the combination with a rotatable shaft having a crank, of a triangular arm connected at one angle to said crank, two cranks connected respectively to the other two angles of the arm, and a strip-feeding mechanism operated by the last-mentioned cranks, substantially as and for the purpose set forth.

5. In a machine of the class described, the combination with wad-winding and strip-feeding mechanisms, of a guide for the strip, a strip-puncturing mechanism and a spring for supporting the strip beyond the end of the guide, substantially as and for the purpose set forth.

6. In a machine of the class described, the combination with wad-winding mechanism and mechanism for feeding the wad-strip to said winding mechanism, of a pivotally-mounted perforator and means for rocking the same transversely to the line of feed of the wad-strip, whereby, when said plate is rocked, the wad-strip is weakened sufficiently for the wad-winding mechanism to effect a rupture of a sufficient length therefrom to form a wad, as and for the purpose set forth.

7. In a machine of the class described, the combination with wad-winding mechanism, and mechanism for feeding the wad-strip to the said winding mechanism, of an arm pivotally mounted at one end, a perforator, having an inclined serrated edge, mounted in the free end of said arm, said edge presented transversely to the line of feed of the said wad-strip, a block between which and the edge of said perforator the wad-strip is arranged to pass, whereby when said perforator is rocked, the wad-strip is weakened sufficiently for the wad-winding mechanism to effect a rupture of a sufficient length therefrom to form a wad, as and for the purpose set forth.

8. In a machine of the class described, the combination with a wad-winding spindle adapted to receive the end of the wad-strip, and means for rotating the same, of a pivotally-supported arm, a perforator carried thereby, said plate having a serrated edge, a block against the face of which said edge operates, means for feeding the wad-strip to said spindle between the edge of said perforator and the face of said block, and means for rocking said arm transverse to the line of feed of said strip, as and for the purpose set forth.

9. In a machine of the class described, wad winding and stripping mechanism, one or more rotatable shell-case-feeding disks, guiding-flanges extending above the surface of such disk in combination with a reciprocating shell-placing plunger and a stationary clamping-jaw coöperating therewith, whereby the said shell-cases are fed and clamped in position to receive the wad from said winding and stripping mechanism, as and for the purpose set forth.

10. In a machine of the class described, the combination of wad winding and stripping mechanism and shell-case-feeding devices, a reciprocating shell-case placing and clamping plunger and stationary clamping-block cooperating with said plunger, and mechanism for operating such parts, as and for the purpose set forth.

11. In a machine of the class described, the combination with wad winding and stripping mechanism, a rotatable shell-case-feeding disk, a shell-case guide consisting of grooved flanges held at determinable distances apart, and a reciprocating shell-case placing and clamping plunger adapted to carry the shell-case forward in position to receive the wad, and serving as a cut-off for the remaining shell-cases in the guide, and a stationary

clamping-block coöperating with said plunger, as and for the purpose set forth.

12. In a machine of the class described, the combination with a rotatable shell-case-feeding disk, a reciprocating shell-case-placing plunger, a stationary block coöperating therewith, and wad-winding mechanism, of means for inserting the wads in the shell-cases and an apertured cut-off slide and means for actuating all of such parts, as and for the purpose set forth.

13. In a machine of the class described, a rotatable disk for feeding the shell-cases, guiding-collars above such disk in combination with a reciprocating shell-case-placing plunger having slotted flanges or extensions adapted to fit and be guided by such collars, and a stationary block coöperating with said plunger, substantially as and for the purpose set forth.

14. In a machine of the class described, in combination with wad winding and stripping mechanisms, a shell-case-placing plunger and cross-head, connections between such cross-head and plunger, a shaft, a cam thereon arranged to move said cross-head and plunger to receive the shell-cases, and a spring arranged to resist the action of said cam and adapted to move said cross-head and plunger yieldingly to place said shell-case in position to receive the wad, as and for the purpose set forth.

15. In a machine of the class described, the combination of wad-winding and wad-stripping mechanisms, means for feeding the end of the wad-strip to said winding mechanism, a shell-case feeding and clamping mechanism, an apertured cut-off slide arranged to have the aperture thereof projected into alinement with the shell-case, whereby said case, after receiving the wad, may drop from the machine, a shaft, a cam mounted thereon, means for rotating said shaft, and connections between the cam and the cut-off slide for periodically projecting the latter, substantially as and for the purpose set forth.

16. In a machine of the class described, the combination with guides for the strips of wad material, of a pair of serrated strip-feeding segments, one of said segments arranged to coöperate with each of said guides, a perforator for each wad-strip, a rod connected to each perforator, a yoke secured to said rod, a driving-shaft, a cam for operating such yoke in one direction and springs for returning such yoke, as and for the purpose set forth.

17. In a machine of the class described, a wad-winding device comprising a rotatable spindle adapted to receive the end of the wad-strip, means for imparting a constant rotative tension thereto, a sliding half-clutch splined to rotate therewith but capable of longitudinal movement thereon, and a limiting-stop for said clutch in combination with a non-rotatable sleeve carrying a coöperating half-clutch adapted to engage the half-clutch of the spindle and means for moving said non-rotatable sleeve to engage and disengage said half-clutches, as and for the purpose set forth.

18. In a machine of the class described, a wad-winding device comprising a rotatable spindle adapted to receive the end of the wad-strip, means for imparting a constant rotative tension to said spindle whereby said spindle is normally energetic and means for periodically and positively locking said spindle against rotation and against the normally energetic action of said rotative tension, as and for the purpose set forth.

19. In a machine of the class described, a wad-winding device comprising a rotatable spindle adapted to receive the end of the wad-strip, means for imparting a constant rotative tension to said spindle, a sliding half-clutch splined to rotate with, but movable longitudinally upon, said spindle, an adjustable limiting-stop for said half-clutch, in combination with a non-rotatable coöperating half-clutch and means for moving said non-rotatable half-clutch into and out of coöperative engagement with the rotatable half-clutch, whereby the constant rotative tension applied to said spindle may be periodically overcome and the size of the wad to be wound regulated, as and for the purpose set forth.

20. In a machine of the class described, a wad-winding device comprising a rotatable spindle adapted to receive the end of the wad-strip, means for constantly applying a rotative tension thereto, a sliding half-clutch splined to rotate with, but capable of longitudinal movement upon, said spindle, a limiting-stop for said half-clutch, a non-rotatable coöperative half-clutch, a tubular wad-stripper connected therewith and means for reciprocating said last-mentioned half-clutch, as and for the purpose set forth.

21. In a machine of the class described, a wad-winding device comprising a rotatable spindle provided with a groove and adapted to receive the end of a wad-strip, a limiting-stop arranged in said groove, a half-clutch mounted to slide upon said spindle, but adapted to rotate therewith, a non-rotatable sleeve carrying a coöperating half-clutch, and a wad-stripper and a cam for reciprocating said sleeve, thereby overcoming the rotative tension applied to said spindle and positively locking said spindle and simultaneously operating the stripper, as and for the purpose set forth.

22. In a machine of the class described, the combination of a rotatable wad-winding stem, a spindle consisting of two jaws pivoted to such stem, a half-clutch feathered to the stem and a limiting-stop for the clutch, a collar loosely surrounding the stem and having a half-clutch secured thereto and arms dependent therefrom, a head-block secured to the lower end of such arms and carrying a pin, a wheel or disk having a cam-groove adapted to receive said pin, a spring arranged

in the recess in the head-block and operating against the lower surface of the half-clutch on the spindle, a sleeve depending from the head-block and a tubular slitted stripper connected to such sleeve, a die provided with a hardened-steel bushing in the same by which the wound strip is confined, as and for the purpose set forth.

23. In a wad-winding machine, a driving-shaft, a wad-strip-feeding mechanism comprising an adjustable plate serrated upon an edge thereof, a shaft upon which said plate is mounted, a swinging lever having crank connection with said plate and supporting-shaft, and also with said driving-shaft, whereby said lever is actuated and said supporting-shaft for the feeding-plate is rotated; as and for the purpose set forth.

24. In a wad-strip-feeding mechanism, comprising a triangular-shaped lever, a driving-crank connected at one corner thereof, and crank connections at the other corners thereof, shafts to which said corners are connected, and wad-strip-feeding devices operated by said shafts, and means for oscillating said lever; as and for the purpose set forth.

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