No. 693,572. Patented Feb. 18, 1902.

L. S. SHEAR.

MACHINE FOR MAKING DISHES OR TRAYS.

(Application filed Oct. 30, 1901.)

(No Model.) 10 Sheets—Sheet 1.

Fig. 1.

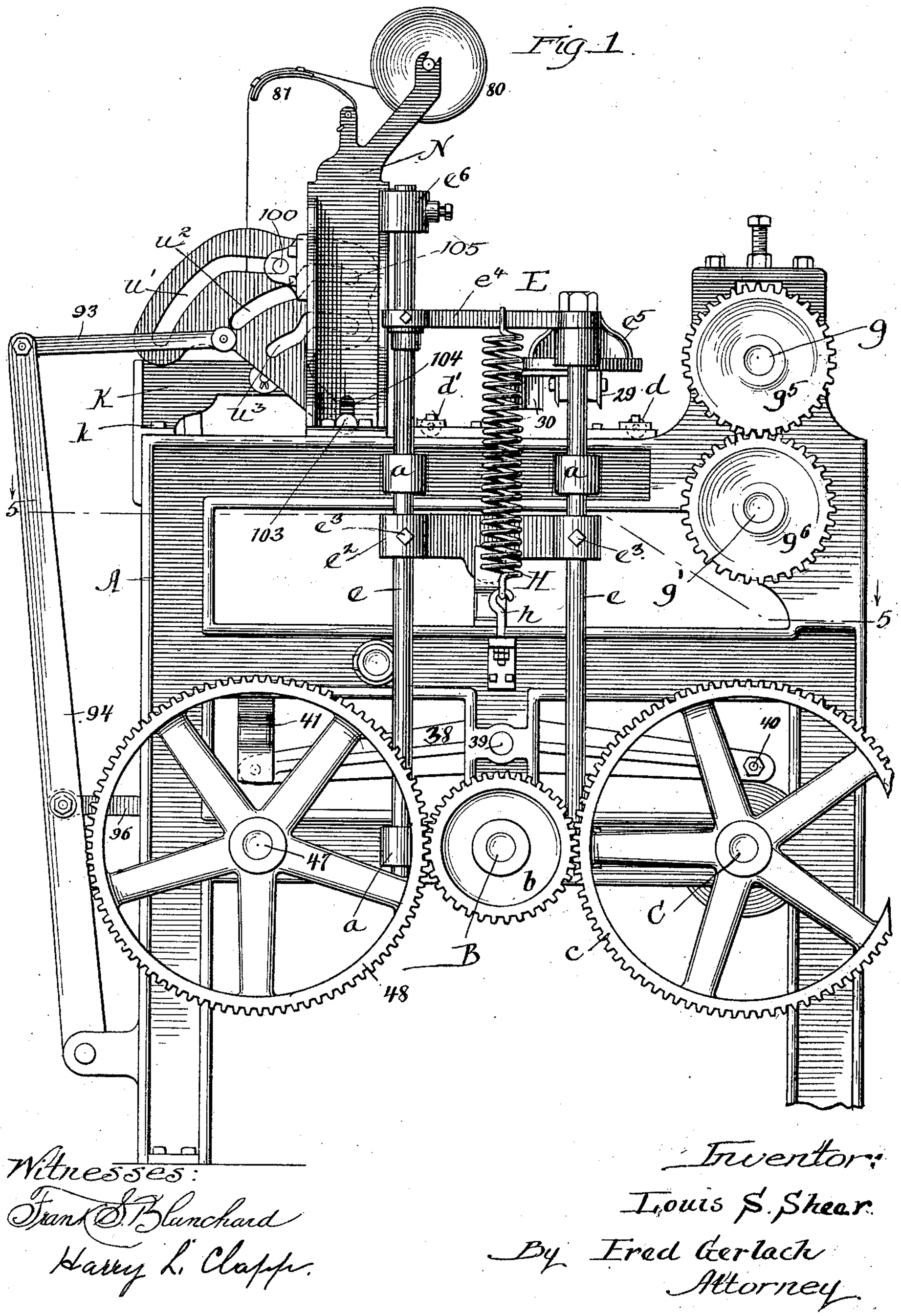

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Fig. 2.

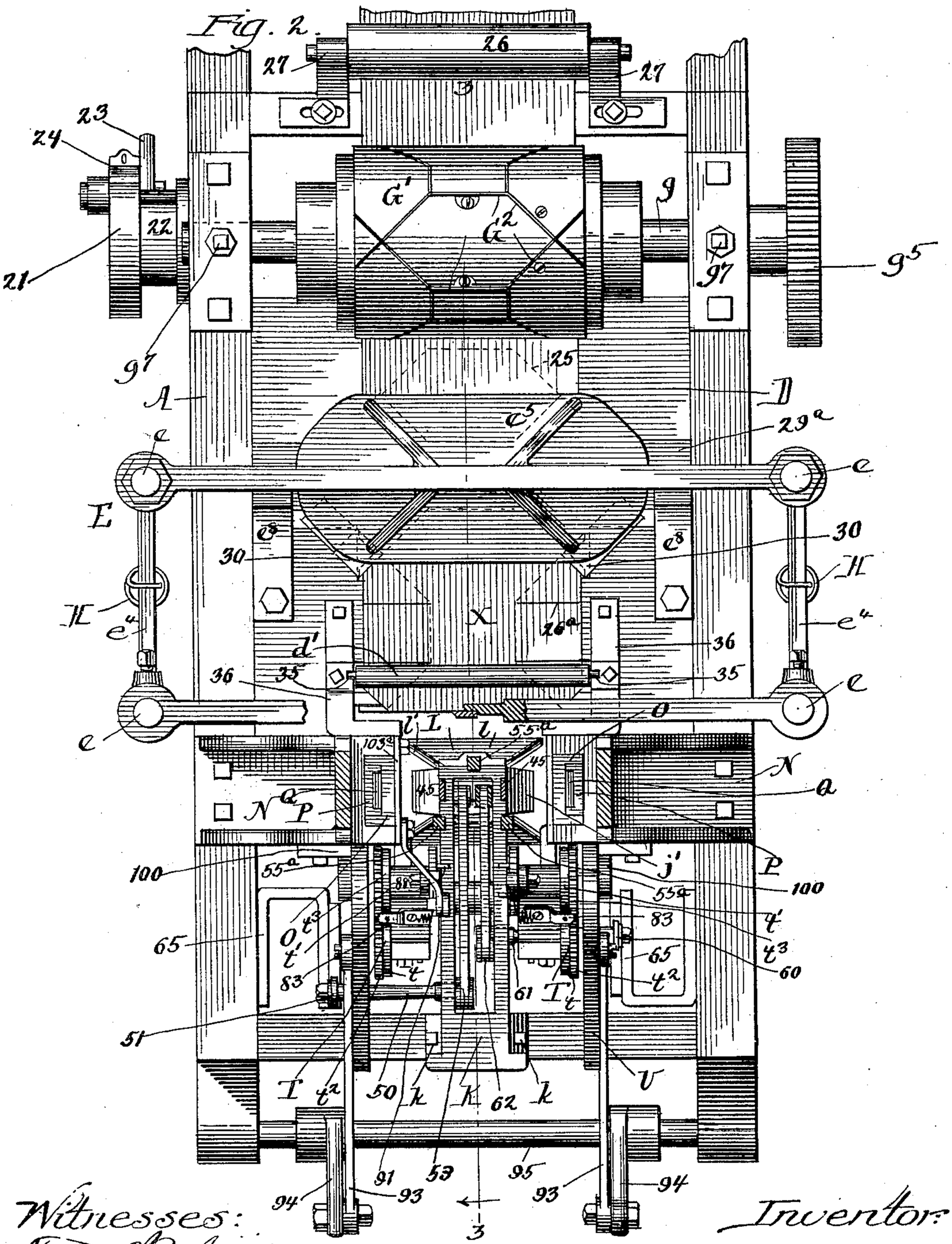

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Fig. 2a

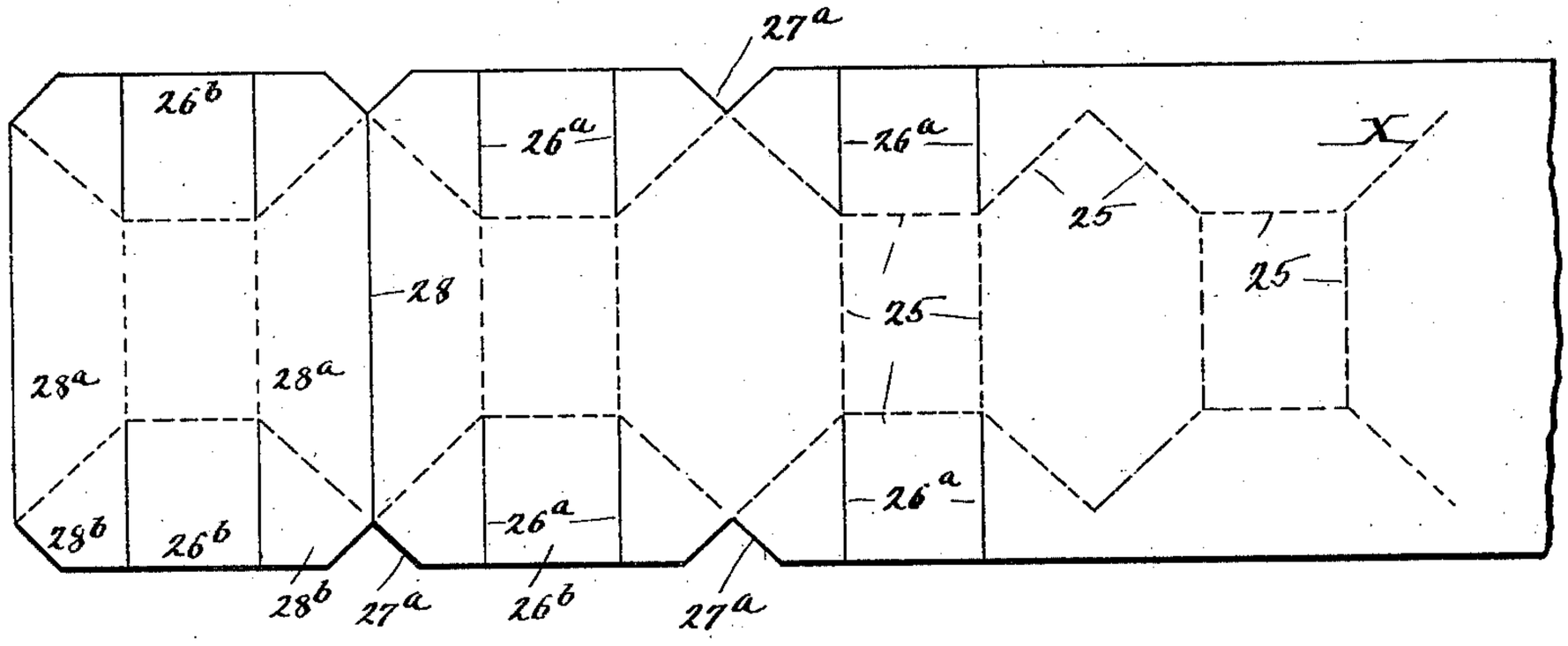


Fig. 2b

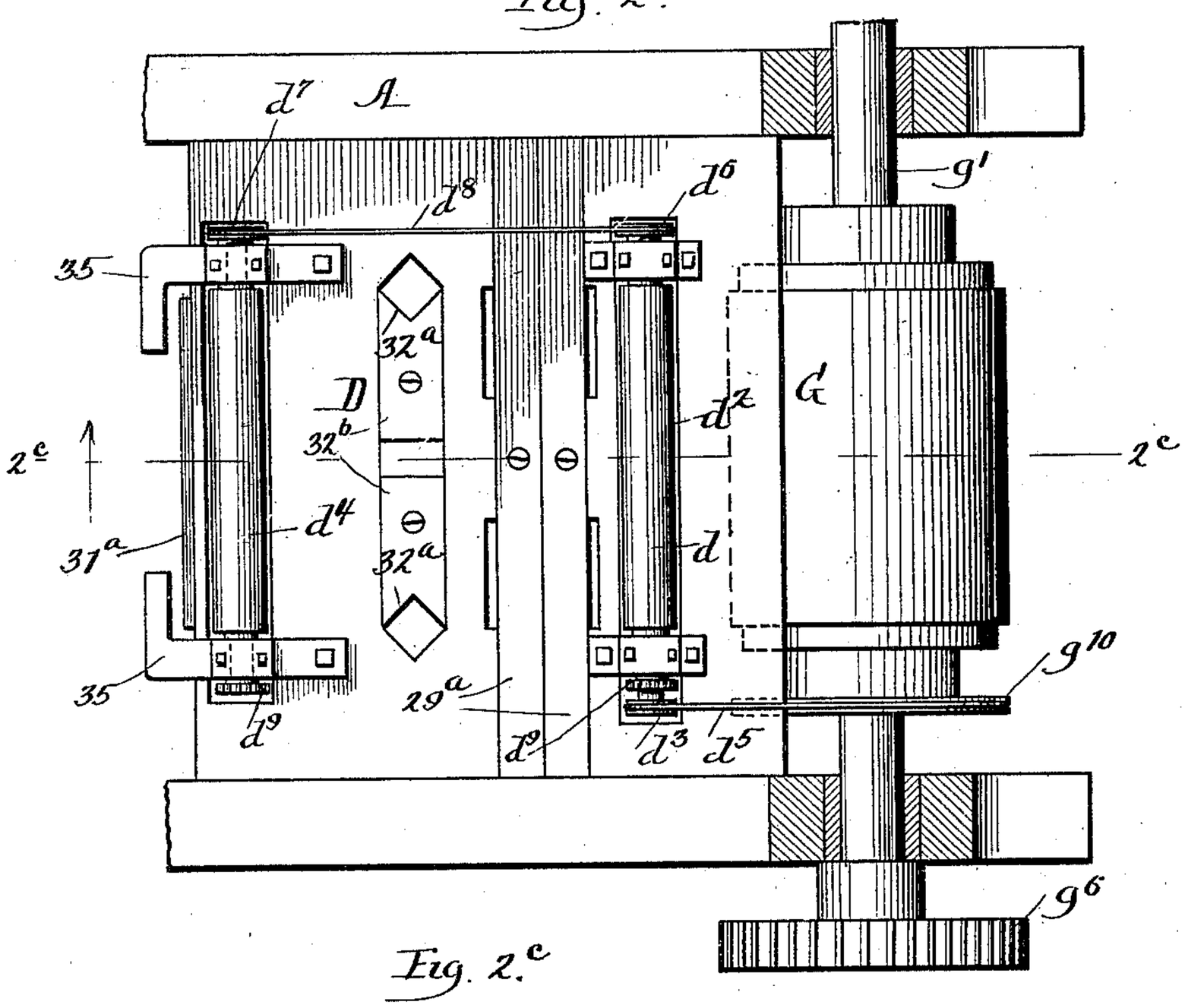
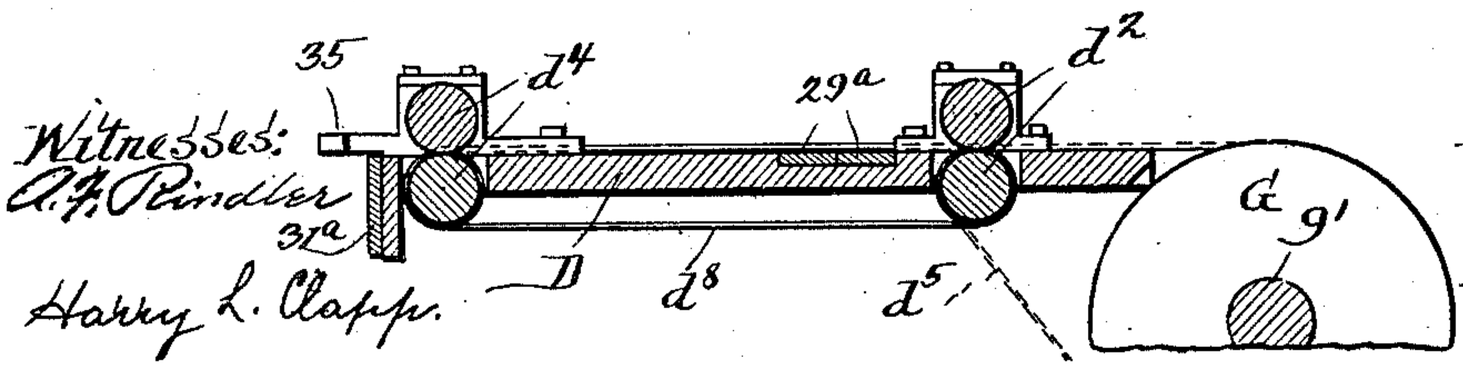


Fig. 2c



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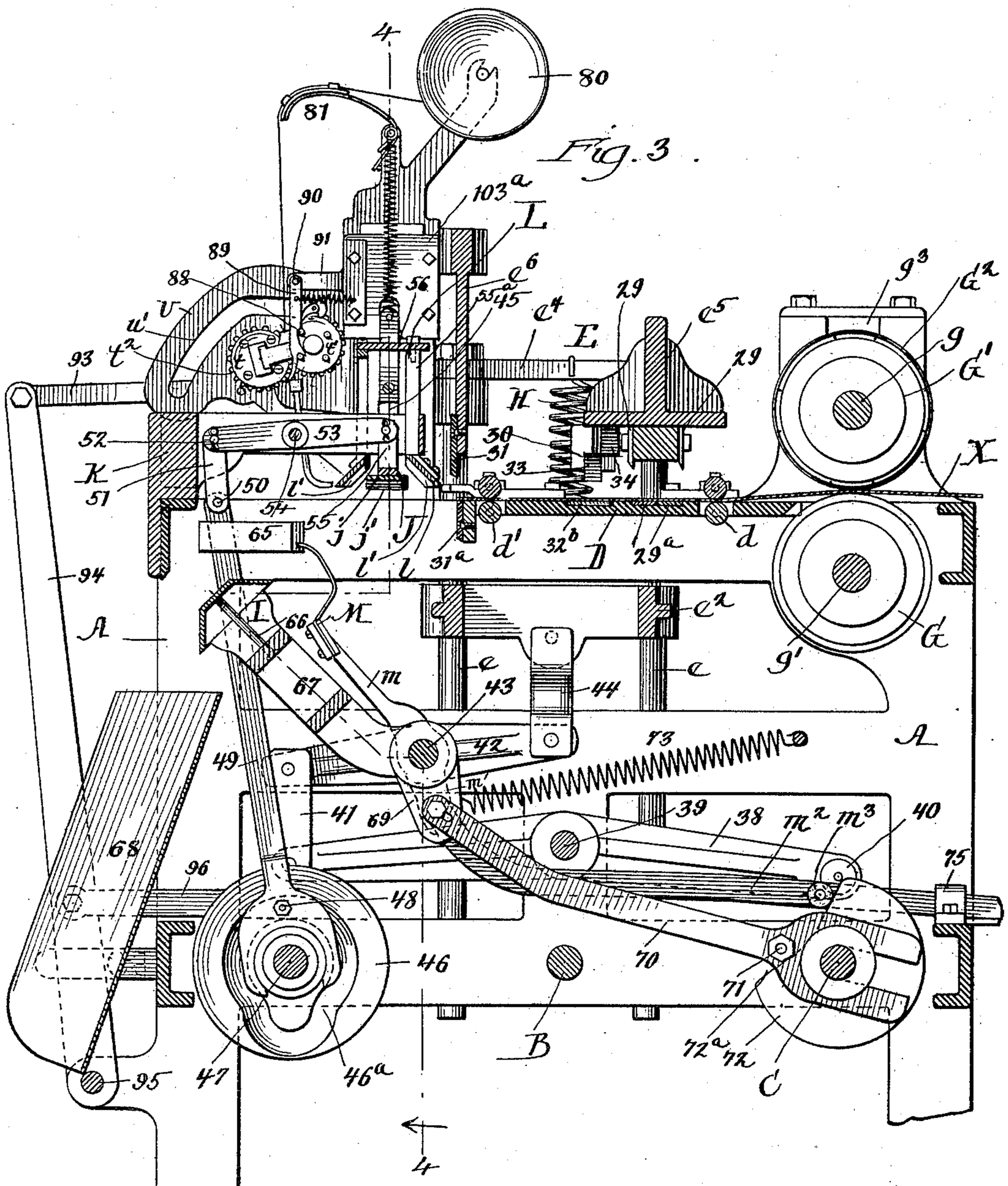
(No Model.) 10 Sheets—Sheet 4.

Fig. 3.



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(No Model.) 10 Sheets—Sheet 5.

Fig. 4.

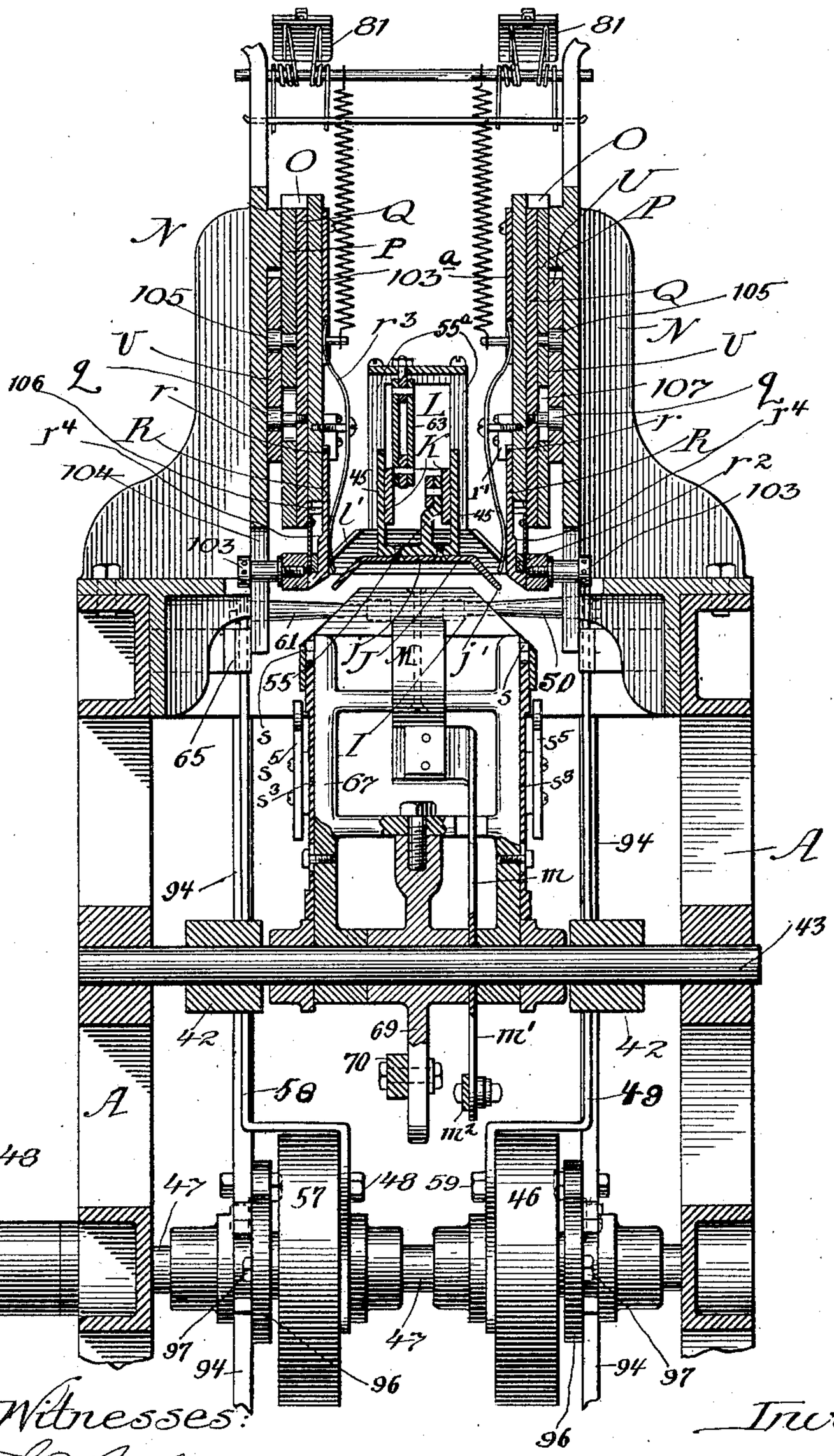

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Fig. 5.

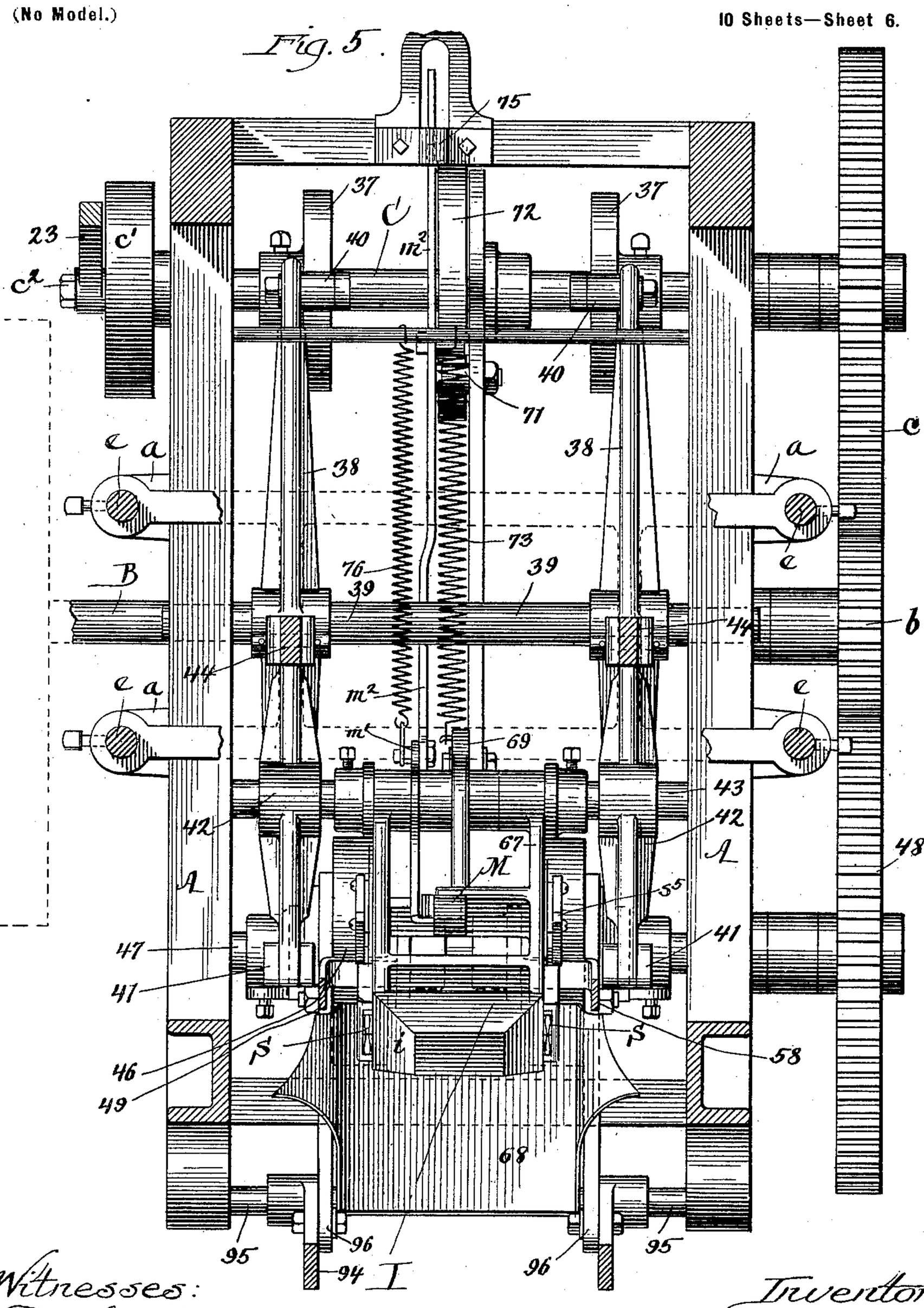

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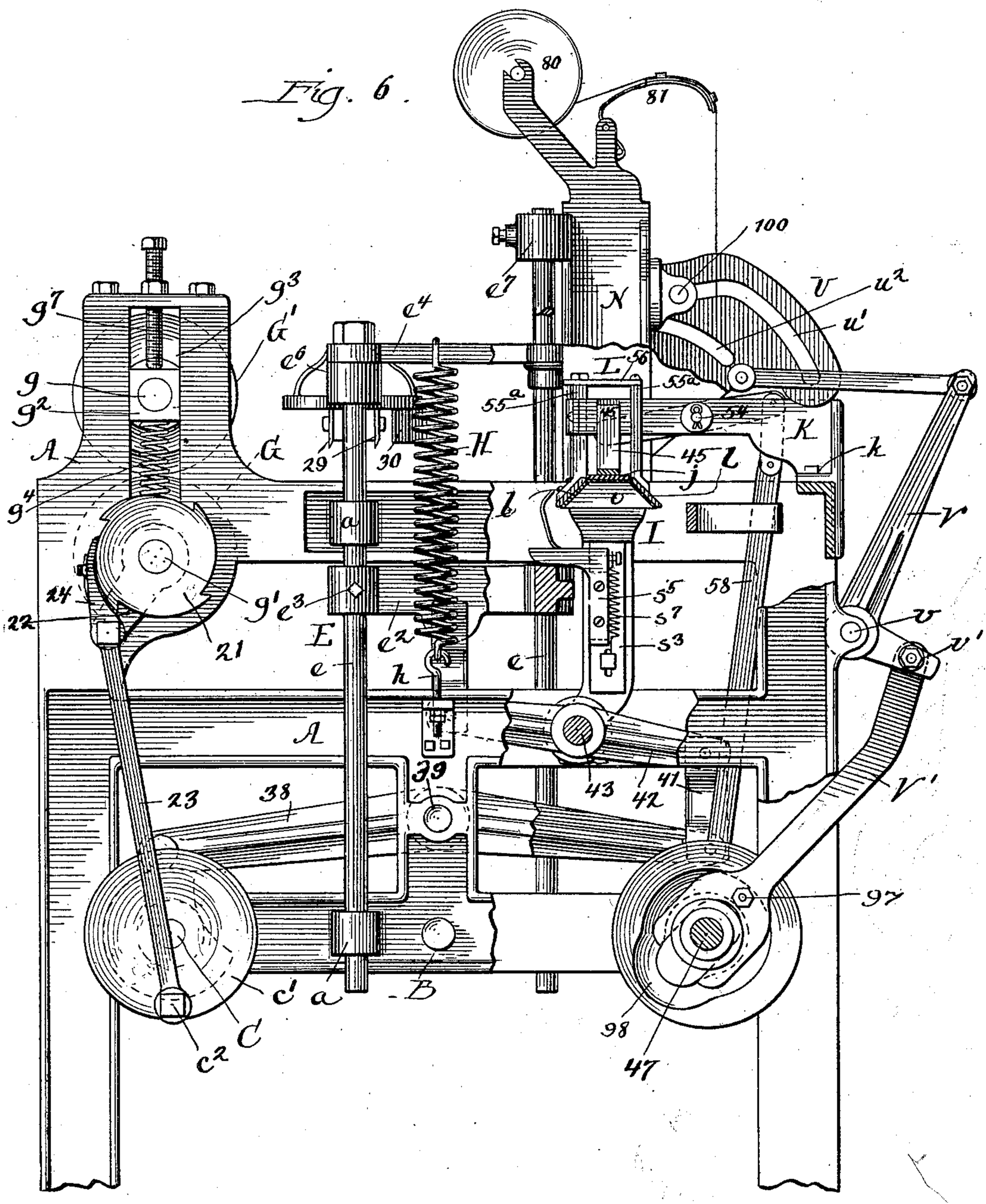
Fig. 6.



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(No Model.) 10 Sheets—Sheet 8.

Fig. 7

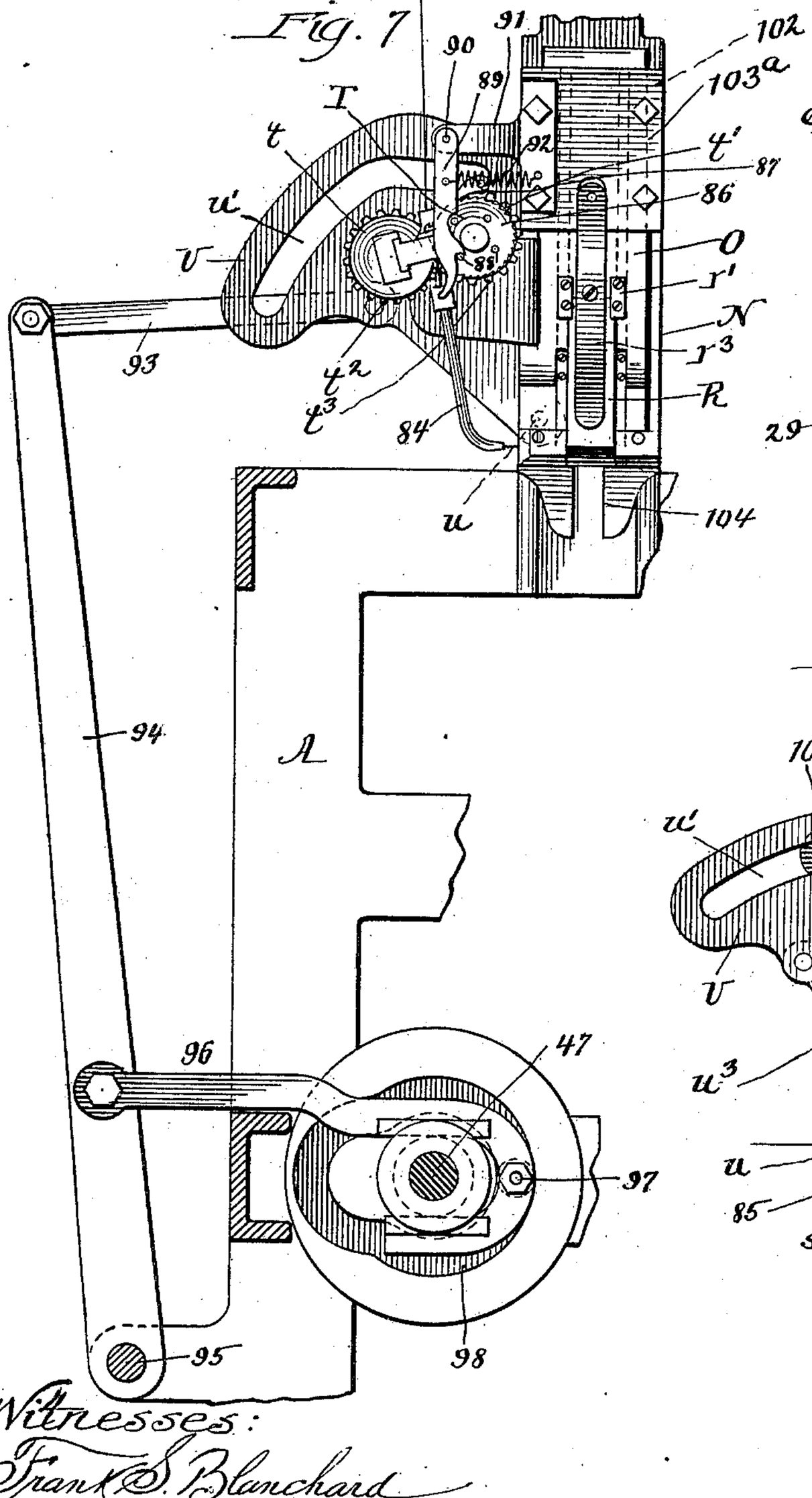


Fig. 7a

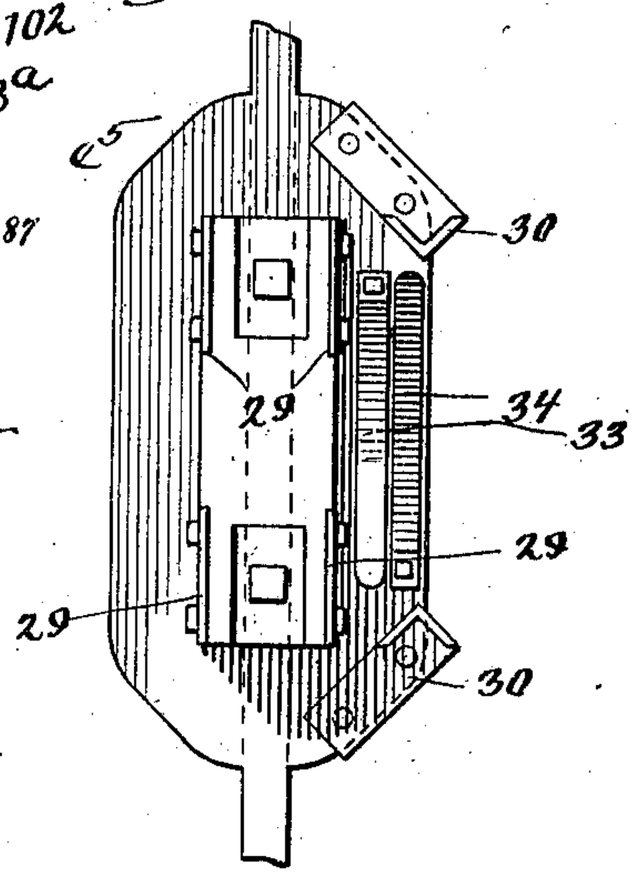
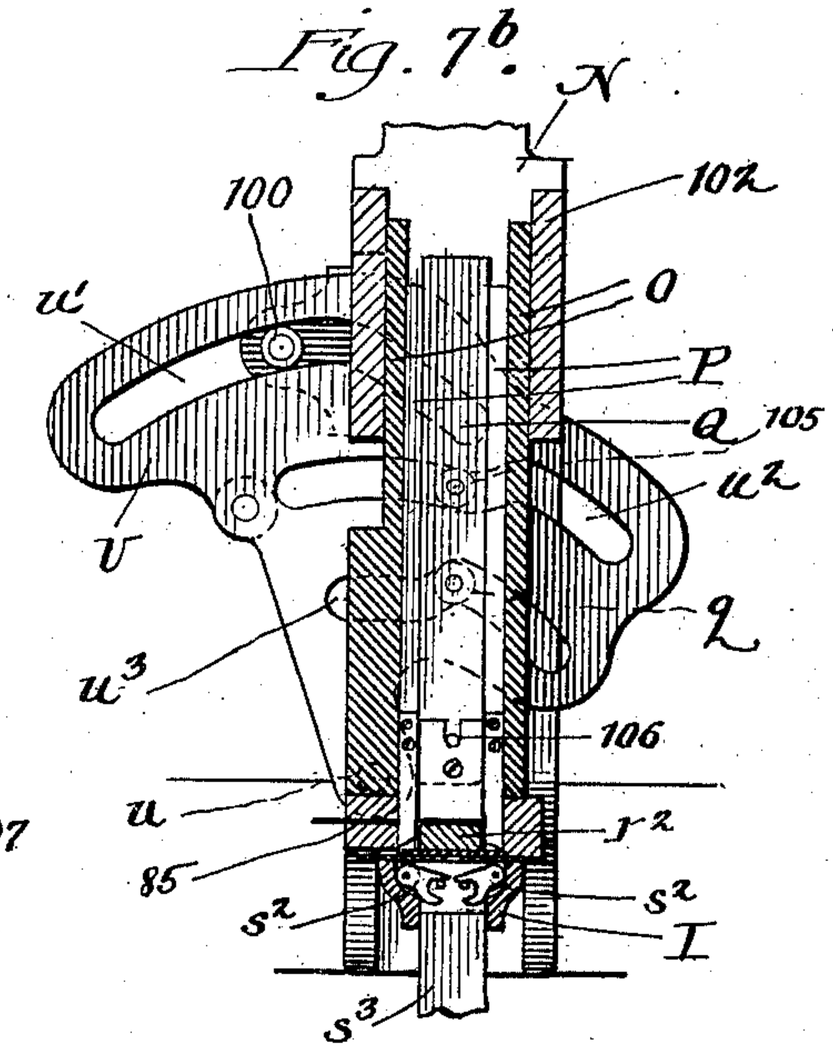


Fig. 7b.



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(No Model.) 10 Sheets—Sheet 9.

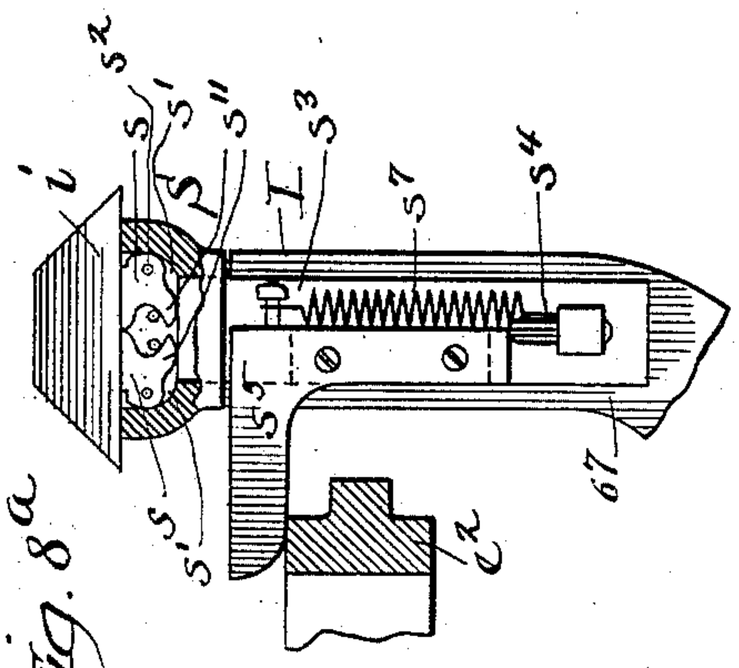

Fig. 8a

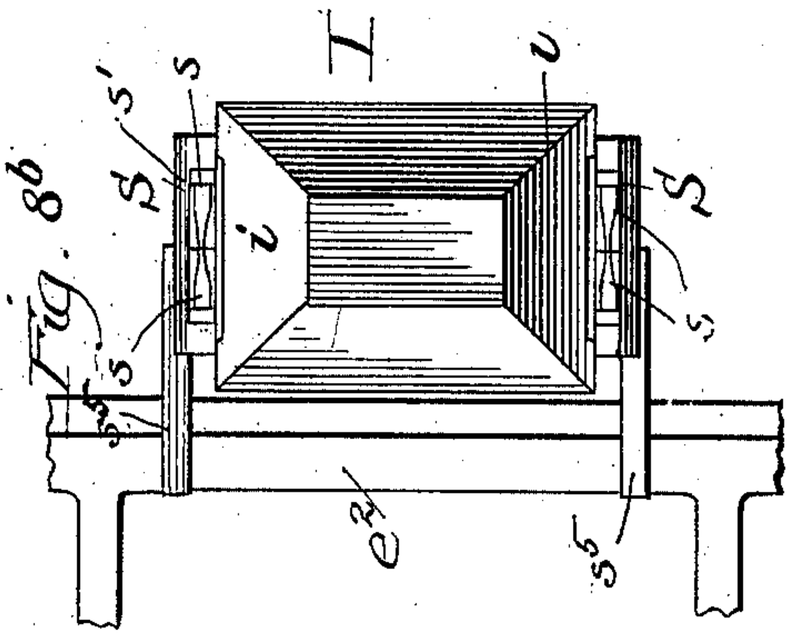

Fig. 8b

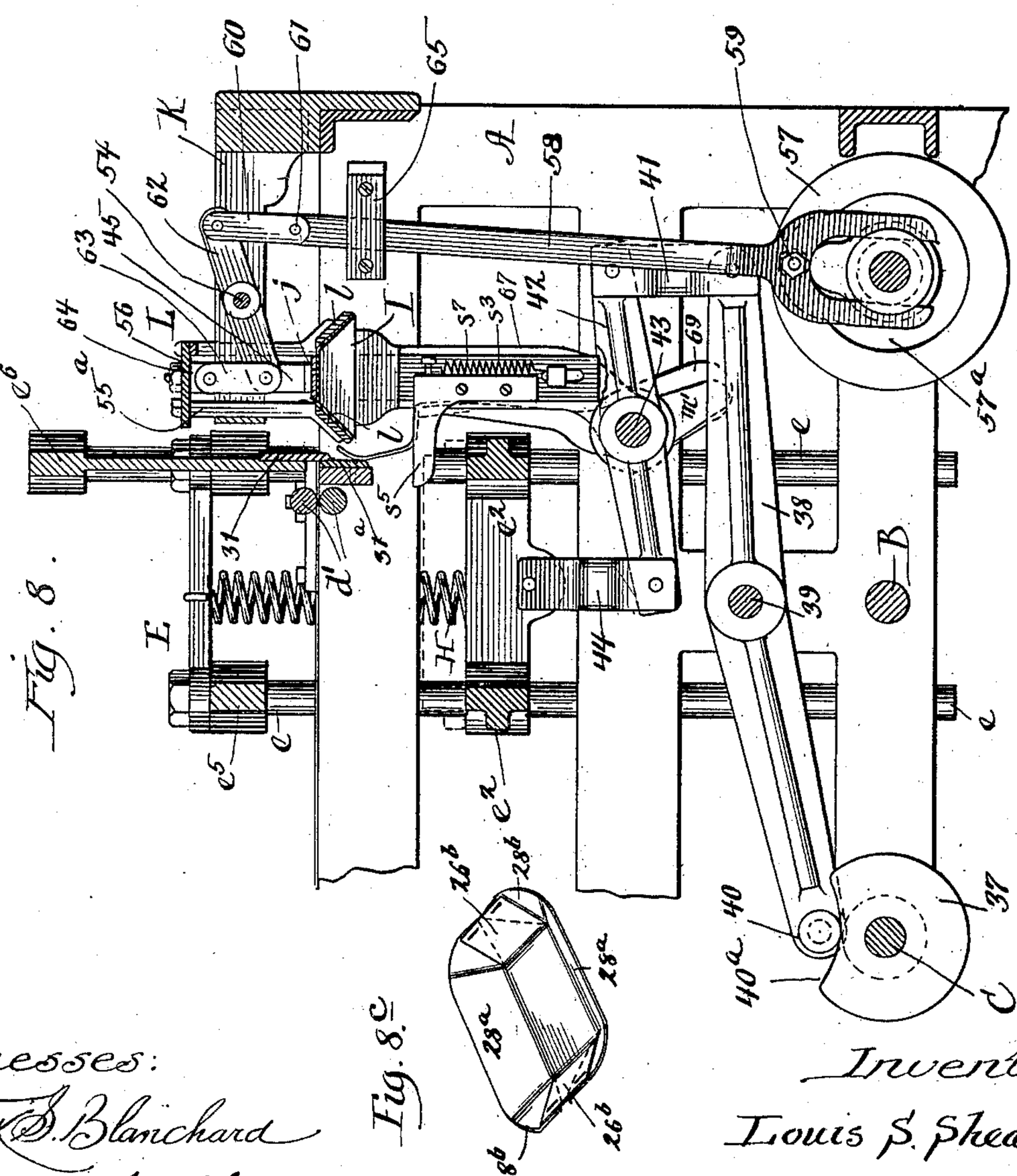

Fig. 8.

Fig. 8c

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Fig. 9.

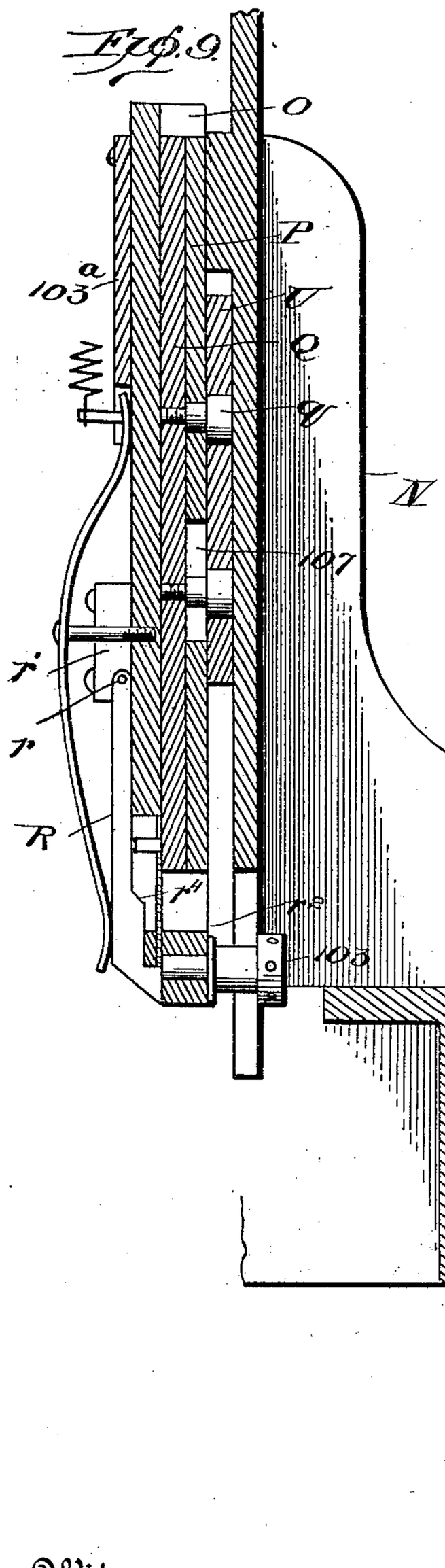


Fig. 9a.

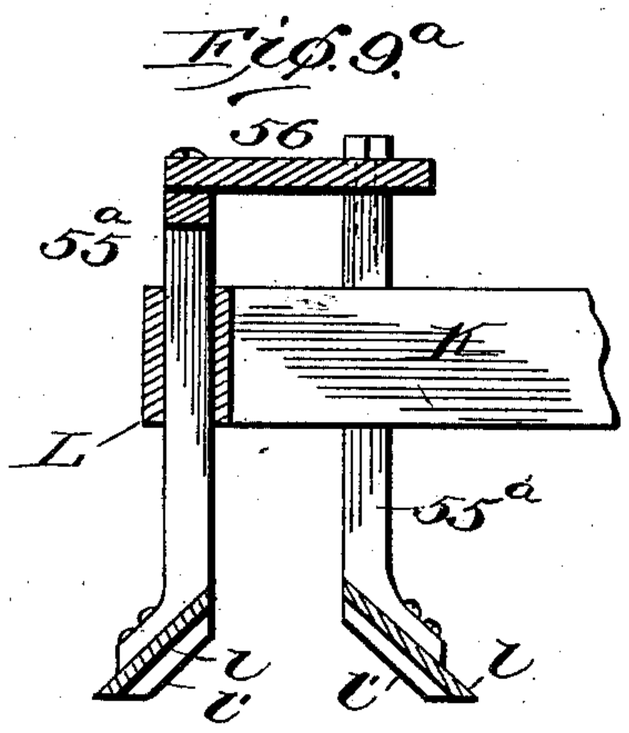
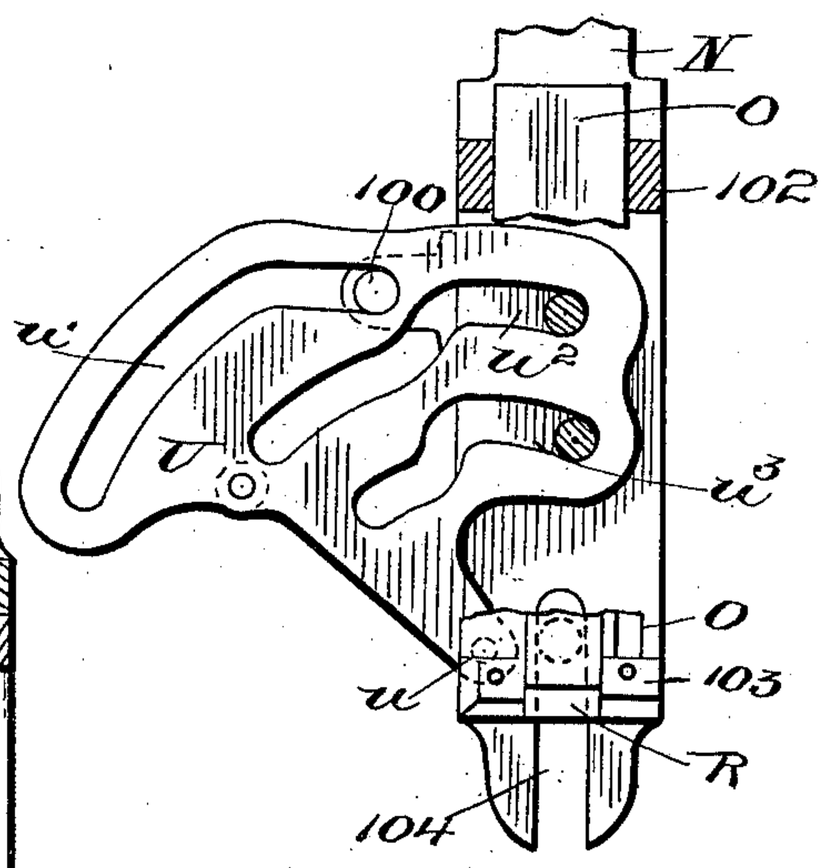


Fig. 9b.



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UNITED STATES PATENT OFFICE.

LOUIS S. SHEAR, OF CHICAGO, ILLINOIS.

MACHINE FOR MAKING DISHES OR TRAYS.

SPECIFICATION forming part of Letters Patent No. 693,572, dated February 18, 1902.

Application filed October 30, 1901. Serial No. 80,501. (No model.)

To all whom it may concern:

Be it known that I, LOUIS S. SHEAR, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Making Dishes or Trays, of which the following is a full, clear, and exact description.

The present invention relates to machines for making trays or dishes of veneer, paper, or other flexible material, and designs to provide an improved machine which is simple in construction and efficient in operation.

The invention consists in the several novel features of construction hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings, Figure 1 is a view in side elevation of a machine embodying the preferred form of the invention. Fig. 2 is a plan view. Fig. 2^a is a diagram showing the web of material from which the dish or tray is to be formed, the manner of creasing, slitting, and cutting the blank being indicated thereon. Fig. 2^b is a detail plan view of the table and showing a modified form of mechanism for feeding the web. Fig. 2^c is a view in vertical section taken on line 2^c 2^c of Fig. 2^b. Fig. 3 is a view in central vertical longitudinal section taken on line 3 3 of Fig. 2. Fig. 4 is a view in vertical transverse section taken on line 4 4 of Fig. 3, the former being shown in position assumed during the operation of the folding plungers and the binder mechanism. Fig. 5 is a view in horizontal section taken on line 5 5 of Fig. 1. Fig. 6 is a view partly in side elevation and partly in section and showing a modified form of mechanism for imparting movement to the binder mechanism. Fig. 7 is a view in side elevation of one of the binder mechanisms and the mechanism for shifting the same. Fig. 7^a is an inverted plan view of the cutter-head, whereby the slitters and trimmer-knives are carried and the parts secured thereto. Fig. 7^b is a detail view showing one of the binder mechanisms, the sliding frame wherein the staple-driver and wire-bender are held being shown in section, the parts being shown in position assumed when the staple has been formed. Fig. 8 is a view in central vertical longitudinal section taken on line 3 3 of Fig. 2, looking to the right, parts being shown in elevation. Fig. 8^a is a detail view of the arm whereby the former is sustained, the mechanism for clenching the staple ends, and a portion of the knife-carrier which shifts said mechanism, the parts being shown in position assumed when the knife-carrier has been lifted to shift the clenchers. Fig. 8^b is a plan of the parts shown in Fig. 8^a. Fig. 8^c is a perspective view of the completed dish made by the machine. Fig. 9 is a view in vertical transverse section of one of the stapling mechanisms upon an enlarged scale. Fig. 9^a is a detail view in longitudinal section, upon an enlarged scale, of the plunger which folds the sides of the blank against the former and showing the lips secured to said plunger, which fold the corner portions of the blank. Fig. 9^b is a detail view showing the cam-plate for operating the mechanism for forming the staple and driving the staple through the overlapping blank portions and the standard whereby the cam-plate is sustained, a portion of the sliding frame being also shown.

A denotes a suitable main frame, wherein the several mechanisms of the machine are sustained. In the central lower portion of the main frame is journaled a main drive-shaft B, whereto continuous revolution is imparted in any well-known and usual manner and which imparts movement to the several operating parts of the machine. At one side of the main frame a pinion *b* is secured to drive-shaft B and intermeshes with a gear-wheel *c*, secured to a shaft C, which is continuously driven thereby. Shaft C serves to impart movement to the feed-rolls, the former, and the cutter-frame.

G and G′ are feed-rolls located at the rear of the main frame and intermittently advance the web of veneer or paper X wherefrom the dishes are to be formed. Shaft g' of roll G is journaled in the main frame, and shaft g of roll G′ is held at each side of the main frame in a bearing g^2, held in a vertical guideway g^3. Adjustable stops g^7 limit the upward movement of bearing g^2, and springs g^4 serve as a cushion for the bearings.

The mechanism for intermittently advancing the feed-rolls comprises a disk c', provided with a wrist-pin c^2, a ratchet-wheel 21, fixedly secured to shaft g' of feed-roll G, an arm 22,

loosely held on shaft g', a pitman 23, pivotally connecting arm 22 and wrist-pin c^2, and a spring-pressed pawl 24, carried by arm 22 and engaging the teeth of ratchet-wheel 21. Revolution of disk c' reciprocates pitman 23, which will impart an oscillatory movement to arm 22 and pawl 24, which engages ratchet-wheel 21, and will intermittently advance the lower feed-roll G'. Gear-wheels g^5 and g^6, secured, respectively, to shafts g and g', cause the rolls to revolve at a uniform surface speed. The web of material X passes between the feed-rolls and is intermittently advanced during each shift of the feed-rolls a distance corresponding to the width of a dish-blank. If desired, guide-rolls 26, sustained in brackets 27, may be employed to direct the paper between the feed-rolls. Roll G' is provided on its periphery with a series (four being shown) of scoring or creaser blades G^2, which score or crease the web of paper at the points at which the material is to be folded. The impression made by each creaser is indicated by lines marked 25 in Figs. 2 and 2^a of the drawings.

The operation of the mechanism thus far defined will be as follows: Assuming a web of material to have been passed between the feed-rolls G G' during each revolution of shaft C, the pitman 23 will be lifted by wrist-pin c^2 and will oscillate arm 22 and pawl 24. During each upward shift the pawl will engage ratchet-wheel 21 and cause the feed-rolls to be revolved a part of a revolution and sufficiently to advance the web for a dish-blank. During the reverse movement of pitman 23 pawl 24 will slip over the ratchet-teeth and the rolls will remain stationary. As the web is passed between the feed-rolls one of the blades G^2 will score or crease the blank upon the lines 25 of Fig. 2^a. Thus the feed-rolls will be intermittently revolved to advance the web for a dish-blank during each operation and will simultaneously crease the blank. The web of material passes from the feed-rolls onto a horizontal table D, whereupon the material is slitted to form the ends of the dish, as shown by lines 26^a in Fig. 2^a. The corners of each blank are cut away, as at 27^a, and the blank is severed from the web, as shown at 28. The mechanisms for slitting, cutting, and severing the blank are secured in proper relative position by a vertically-reciprocating frame or carrier E, which comprises rods or guides *e e* at each side of the main frame, which is provided with lugs *a* wherein said rods are held in manner free to slide, a rectangular frame e^2 beneath the table D and adjustably secured by screws e^3 to all of the rods *e*, side bars e^4, a cutter-head e^5, and a cutter-bar e^6, whereby the knife for severing the blanks is sustained. Beneath the cutter-head e^5 slitters 29 are secured and arranged (see Figs. 3 and 8^a) in position to slit the web of paper upon the lines 26^a. (Shown in Fig. 2^a.) Fixed knives 29^a (see Fig. 3) are secured in recesses formed in the table and coöperate with the slitters 29. It will be understood that the table is recessed or cut away beneath the slitters and adjacent the knives 29^a to permit the necessary downward movement of the slitters. V-shaped cutters 30 coöperate with stationary correspondingly-shaped knives 32^b (see Fig. 2^b) and are also secured to the bottom of cutter-head e^5 and cut away or trim the corners of the blank, as shown at 27^a of Fig. 2^a. A knife 31 is secured to cutter-bar e^6 of the reciprocating cutter-frame E and is arranged to sever the blank (as shown at 28 in Fig. 2^a) which has passed forwardly of the table and is being held in the folding mechanism while the cutters 30 and slitters 29 are operating on an attached portion of the web. A stationary knife 31^a is secured to the front edge of table D and coöperates with knife 31 in severing the blank. The table D is cut away, as at 32^a, (see Fig. 2^b,) to permit the severed portions of the web to fall therethrough. Flexible strips 33 and 34 (see Fig. 7^a) serve as presser-bars for impinging against the web on the table D and prevent the web from being lifted by the cutters and slitters, these flexible strips having their opposite ends secured to the cutter-head e^5 and their free ends bent downwardly to engage the web in advance of the cutters. Two pair of rolls *d* and *d'* are sustained in table D, and between these rolls the web of paper will pass as it is fed over the table. Said rolls are extended across the table, engage the web across its entire width, and serve to smooth or flatten the web while passing beneath the cutter mechanism. This construction is of importance when the machine is used for veneer dishes, as the veneer is usually uneven and sometimes possesses a tendency to curl or bend. Rolls *d'* are arranged immediately at the rear of the cutter 31 and flatten the web just before it passes beneath the knife. Rolls *d* serve a similar purpose at a point adjacent the rear of the slitter-knives. The lower rolls of each pair of rolls *d* and *d'* are held in the table in any suitable manner, and the upper rolls are adapted to rest on the web of material and hold the web snugly against the table and are held in recesses or grooves 35 in brackets 36, (see Fig. 2,) so they can be conveniently withdrawn when access to the table is desired. Guides e^8, engaging cutter-head e^5 and brackets 35, further secure the carrier against lateral movement during the cutting operation.

The mechanism for imparting movement to reciprocating carrier E and the cutters and slitters sustained thereby comprises cams 37 37, secured to shaft C, and long levers 38 38, pivotally sustained by a cross-rod 39. Each lever 38 is provided at its rear end with a stud or roller 40, adapted to bear against one of said cams, and is connected at its front end with a link 41. Each link 41 has its upper terminal connected to the front end of a short lever 42, pivotally sustained by a cross shaft or rod 43, and the rear end of each lever 42

is connected by a link 44 with carrier E, wherewith the upper end of link 44 is connected. Springs H, (one at each side of the main frame,) having their lower ends adjustably secured to the frame by a hook *h* and their upper ends attached to side bars e^4 of the reciprocating carrier E, hold said frame E and the parts sustained thereby normally in downward position and serve also to impart the downward movement to said frame and said parts.

The operation of the mechanism for slitting, trimming, and severing the dish-blanks is as follows: Continuous revolution is imparted to cams 37 by shaft C. During each revolution of cams 37 each of the studs 40 will enter a depression 40^a (see Fig. 8) in said cams and springs H will draw carrier E and the parts sustained thereby downwardly to slit the blank, cut the corners therefrom, and sever the forward blank. Thus it will be seen that the cutters and slitters are operated by springs, and such mechanism lessens the breakage of the parts and permits the machine to be operated very rapidly without danger of breakage of the parts and without employing unnecessary power. Moreover, it frequently occurs that the web contains a knot or other obstruction, and by reason of the yielding force to cut the web the knives and cutters will not be injured, but the blank will be advanced without being cut. After the cutting and slitting of the blank have been effected cams 37 will shift levers 38, links 41, levers 42, and links 44 and will restore carrier E to its upper position against the force of springs H. The slitters 29, cutters 30, and knife 31 will then be restored to the upper position, (shown in Fig. 3,) and the carrier will remain in such position until studs 40 again pass into depressions 40^a for the next succeeding operation. The particular construction of mechanism for operating the cutters and slitters is advantageous, because simple cams can be employed which serve to control the movement of long levers, which in turn are connected with the reciprocating frame by intermediate levers, and because such mechanism can be compactly arranged beneath the table.

The folding mechanism comprises an oscillating former I, whereon the blank is held during the operation of the folding and binder mechanisms. During the operation of folding the blank the former assumes the vertical position. (Shown in Fig. 6.) The dish-blank having been slitted and trimmed is advanced into position over the former after it has passed over the table D. A central vertically-sliding plunger J is arranged above the former and is adapted to be lowered into position to hold the blank on the former-block. Plunger J is provided with a head *j* and inclined ends *j'*, adapted to bend the end portions 26^b (see Fig. 2^a) of the blank downwardly against the correspondingly-inclined ends *i* of the former-block. Central plunger J is provided with vertical guides 45, held in manner free to slide in grooves formed in a plunger support or frame K, which is secured, as at *k*, to the main frame A. The vertical movement of central plunger J is effected by a cam 46, secured to a cross-shaft 47, which has revolution imparted thereto by a gear-wheel 48, meshing with pinion *b* on the main drive-shaft B. Cam 46 is provided with a groove 46^a, (see Fig. 3,) wherein is a stud 48, carried by a lever 49, which is connected at its upper end by a laterally-projecting stud 50 to a link 51, which is connected, as at 52, to the front end of a horizontally-arranged lever 53, which is pivotally sustained by a pin 54, supported in plunger-frame K. The inner end of horizontal lever 53 is connected with a lug 55, formed on the plunger J. The bifurcated lower terminal of lever 49 straddles the hub of cam 46 and guides said lever. When a dish-blank has been fed onto the former, plunger J is lowered to impinge against and hold the blank and to fold the ends 26^b thereof downwardly. Such downward shift occurs before the blank has been severed from the web.

The operation of the mechanism for shifting the central plunger J is as follows: During each revolution of cross-shaft 47 cam-groove 46^a in cam 46 will lift lever 49 and link 51, and said lever and link will shift horizontal lever 53 about its pivot 54 and depress the plunger J. Cam-groove 46^a is formed to move the plunger positively in both directions. When the dish has been formed, the plunger will be shifted in reverse direction.

L denotes a vertically-sliding plunger for folding the sides 28^a and corner portions 28^b of the dish-blank and holding such sides and portions against the former. Plunger L comprises inclined heads *l l*, arranged respectively forwardly and rearwardly of the central plunger J, and is provided with lips *l'* (see Fig. 9^a) for folding the corner portions 28^b over the ends 26^b of the blank, standards 55^a, guided in suitable ways formed in plunger-support K, and a top plate 56, whereto said standards are secured. The mechanism for shifting plunger L (see Fig. 8) comprises a cam 57, provided with a cam-groove 57^a, a lever 58, provided with a stud 59, projected into cam-groove 57^a, a link 60, connected with a laterally-projecting stud 61 at the upper terminal of lever 58 and with a horizontal lever 62, pivotally sustained in the plunger-frame by pin 54. The inner end of horizontal lever 62 is connected by a link 63 with a lug 64, secured in top plate 56 of plunger L. The lower end of lever 58 is bifurcated and straddles the hub of cam 57 and is guided thereby, and the upper end of said lever is held in a guide 65.

The operation of plunger L will be as follows: Cam 57, being secured to cross-shaft 47, will revolve continuously, and during each revolution lever 58 will be lifted to rock horizontal lever 62 and cause the inner end of lever 62 to depress plunger L into position

shown in Fig. 6. Such movement of plunger L will cause the heads *l l* to fold the sides of the dish-blank and lips *l' l'* to fold the corner portions 28^b of the dish-blank over the ends 26^b of the blank and so as to overlap said ends. While the blank is thus held upon the former-block, the binder mechanism hereinafter described is operated to drive a staple through the overlapping end portions of the dish-blank to form the dish. Immediately following the operation of the binder mechanism plungers J and L are lifted away from the former-die and restored to normal position, as seen in Fig. 3.

A binder mechanism is provided for forming and driving a staple through the overlapping end portions of the dish-blank at each end thereof. As these binder mechanisms for each end of the dish are similar in construction and operation it has not been deemed necessary to describe each in detail. Each binder mechanism comprises a fixed standard N, conveniently secured to the main frame, a channeled vertically-sliding frame O, a wire-bender P, a staple-driver Q, an anvil R, a clencher mechanism S, carried by former-arm 67, and a wire-feeding mechanism T. A spool of wire 80 (see Fig. 3) is conveniently sustained in standards N. The wire is directed through a tension device 81 and thence through an eye 83 (see Fig. 2) to feed-rollers *t* and *t'* and thence through a guide 84 to an opening 85 (see Fig. 7^b) in the lower portion of sliding frame O. Feed-rolls *t* and *t'* are provided, respectively, with intermeshing gears t^2 and t^3 and are sustained in a lug projecting forwardly from sliding frame O. A ratchet-wheel 86 and pawl 87 (see Figs. 2 and 7) prevent retraction of the feed-rolls *t* and *t'*. Feed-roll *t'* is provided with a series of studs or teeth 88, wherewith a feed-dog 89 successively engages. Dog 89 is pivotally sustained, as at 90, in a forwardly-projecting lug 91, which is fixed to standard N. A spring 92 holds the dog normally in engagement with studs 88 of ratchet-wheel 86. The dog 89, being held against vertical movement, will, during each downward movement of the sliding frame O (which is effected by mechanism hereinafter described) pass into position to engage the next succeeding stud 88 during the upward movement of the frame O. During each upward movement the dog 89 will advance the feed-rolls *t* and *t'*, and thus advance the wire.

The mechanism for operating the sliding frame O, (see Fig. 7,) the wire-bender, the staple-driver, and the anvil comprises an oscillating cam-plate U, connected by a pivot *u* with the sliding frame O and connected with a horizontally-arranged operating-bar 93, which is connected with an operating-lever 94. The lower end of operating-lever 94 is sustained by a cross-shaft 95, mounted in the main frame. A pitman 96 is provided with a stud 97, engaging a cam-groove 98, formed in the outer face of each of the plunger-controlling cams 46 and 57, which are secured to shaft 47. Each pitman 96 has its inner terminal bifurcated to straddle the hub of one of the cams 46 and 57. Said pitman imparts a vibratory movement to lever 94, which shifts the cam-plate U to effect the operation of the binder mechanism. The vertical movement of the sliding frame O is effected by cam-plate U, which is pivotally connected therewith by a pin *u*. A fixed pin 100 is projected into cam-slot *u'* and causes the cam-plate to be shifted vertically during the oscillatory movement imparted thereto by bar 93. The sliding frame O being held in the standard against lateral movement will secure the pivot *u* of the cam-plate against lateral movement. During the oscillation of the cam-plate by bar 93 the cam-plate will be depressed and lifted by fixed pin 100, and thus cause pin *u* to impart a corresponding vertical shift to the sliding frame O. The upper portion of the frame O is held between ribs 102, formed on the standard N, and a cap-plate 103^a and the lower portion thereof is guided by a stud 103, held in a vertical slot 104, formed in the standard. Wire cutter and bender P is held in a vertical channel formed in the sliding frame O, and its vertical movement is effected and controlled by a pin or stud 105 and a cam-slot u^2, formed in cam-plate U.

Anvil R is pivotally sustained, as at *r*, (see Fig. 4,) in pivot-lugs *r'*, secured to sliding frame O, and is provided with a plate r^2, whereon the staple is formed. A spring r^3 holds the anvil normally in position to coöperate with the driver in forming the staple. A stud 106 on the driver engages an inclined abutment r^4 of the anvil and moves the anvil out of the path of the driver after the staple has been formed. The staple-driver Q is held in a vertical channel formed in the wire-bender P and between the bender and sliding frame O. The vertical shift of the staple-driver is effected and the position thereof is controlled by a stud *q*, extended through a vertical slot 107 in the wire-bender and into a cam-slot u^3 in cam-plate U.

The mechanism for clenching the staple ends (see Figs. 8^a and 8^b) after these have been driven through the blank is preferably carried by the oscillating former I and comprises two clenchers *s s*, held in a recess *s'*, formed in former-carrying arm 67. Each clencher *s* is pivotally sustained, as at s^2, and has a restricted movement about its pivot. A shifter-bar s^3 is held in manner free to slide along arm 67 by a slot and bolt s^4, and the upper terminal is arranged to abut against arms s^{11} of the clenchers. An abutment s^5 is secured to shifter-bar s^3 and is positioned to be engaged by frame e^2 of the knife-carrier E when the former-carrying arm is in its vertical position. When abutment s^5 is lifted by frame c^2 of the cutter mechanism, shifter-bar s^3 will be lifted against the force of spring s^7 and engage arms s'' of the clenchers, thus

swinging the clenchers upwardly and bending the staple ends inwardly. When the former-arm is swung forwardly to discharge the dish, abutment s^5 will be withdrawn from the path of travel of cutter-frame c^2. When said abutment has been withdrawn, spring s^7 will draw shifter-bar s^3 downwardly and permit the clenchers to fall into their lower position.

The operation of each binder mechanism will be as follows: Movement in rearward direction will be imparted to cam-plate U by cam-groove 98, stud 97, pitman 96, lever 94, and operating-bar 93. Cam-plate U will be swung about its pivot u and fixed pin 100, and slot u' will lower the frame O into position immediately above the blank. During the initial rearward movement of cam-plate U frame O, wire-bender and cutter P, and driver Q will travel downwardly in unison. Cam-slot u^2 and pin 105 will next force the wire-bender downwardly, so the wire will be cut and the staple will be formed, as shown in full lines in Fig. 7^b. The anvil R will next be withdrawn from its position beneath the driver by pin 106 and abutment r^4. Cam-slot u^3 and stud q will next shift the staple-driver downwardly until the staple has been driven through the overlapping blank ends. The clenchers s s will be in their lower position while the staple is being driven. The knife-carrier E is lowered before the binder mechanism is operated, and cams 37 are so constructed that the knife-carrier will not be lifted until the staple has been forced through the blank, and thus frame e^2 of the knife-carrier will lift abutment s^5 of the clencher mechanism and force the clenchers into position seen in Fig. 8^a. Such shift of the clenchers will bend the staple ends snugly against the blank and secure the blank ends together. Cam-plate U will then be shifted in reverse direction, and the frame O, wire-bender and cutter P, staple-driver Q, and anvil R will be restored to normal position.

It will be observed that the parts of the binder mechanism are positioned to slide vertically in lieu of perpendicularly to the inclined end of the former. An important resultant advantage of the construction of the binder mechanism and the operating mechanism therefore is that in constructing the machine the entire binder mechanism may be accurately set according to the size and shape of the former employed by positioning the pin 100.

A modified form of the mechanism for imparting movement to cam-plate U is illustrated in Fig. 6. Each of the operating-bars 93 of the binder mechanism is connected with the upper end of a bell-crank lever V, which is pivotally sustained at v. The short arm v' of lever V is pivotally connected with a pitman V', wherein stud 97 is secured.

The former-block is removably secured by a bolt 66 to an arm 67, which is pivotally sustained by cross-rod 43. Arm 67 is arranged to remain in vertical position during the operation of the folding and binding mechanisms and to swing forwardly and downwardly after said operation and so as to throw the dish from the former and into a suitable chute 68. (See Fig. 3.) The mechanism for shifting the former comprises an operating-crank 69, a lever 70, pivotally connected with said crank and having its other end bifurcated to straddle shaft C and be guided thereby, and a stud 71, adapted to engage a cam 72, which is secured to shaft C and controls the movement of the former. A spring 73 effects the downward and forward movement of the former, and the edge of cam 72 is formed to positively shift the former into vertical position. The operation of the oscillating former will be as follows:

It will be observed that the several parts of the binder mechanism are positioned to slide vertically in their support in lieu of perpendicularly to the inclined end of the former, as arranged in the machines now in common use. An advantage of such arrangement is that simple mechanism can be employed for imparting movement to the binder mechanism from the transverse shaft which imparts movement to the folding mechanism.

An oscillating finger M holds the dish on the former during the initial part of the forward movement of the former and prevents the discharge of the dish until the former is in position to discharge the dish into the chute. Finger M is carried by an arm m, which is pivotally sustained by cross-rod 43, whereby the plunger is sustained, and said arm is provided with an extension m', whereto a shifter-bar m^2 is secured. Shifter-bar m^2 is provided with a stud m^3, arranged to be engaged by former-controlling cam 72 and is freely held in a guide-bracket 75. A spring 76, attached to arm m, retains stud m^3 of the shifter-bar m^2 in engagement with cam 72 and effects the retraction of finger M. When the former is in its vertical position, finger M is positioned slightly to the rear of the former-die and out of the path of plunger L. (See Fig. 8.) As soon as the plungers are lifted cam 72 will permit spring 73 to shift the finger into engagement with the dish on the former and hold the dish during a part of the forward shift of the former. Before the former reaches its foremost position the finger will be withdrawn from the dish and will release the dish, so the dish will be thrown from the former when the forward and downward movement of the former is checked by cam 72. Thus it will be seen that an oscillatory movement is imparted to the former, and the range of travel of the former is such that during each forward and downward movement thereof a dish thereon will be discharged into the chute. The finger M coöperating with the chute causes the dish to be firmly held on the former during a part of the shift of the former and prevents the dish from being caught in the operating mechanism. It

will be observed that the former-controlling cam 72 is employed to control the operation of finger M, and thereby the proper relative movements of these parts is attained and effected in a simple manner.

In Figs. 2^b and 2^c there is shown a modified form of mechanism for advancing the web. When a web of wood veneer is used, it is desirable to provide mechanism which will feed the end of the web—*i. e.*, the last blank—to the folding mechanism and which avoids the necessity of advancing the web end manually and the waste thereof. To accomplish this result, the rolls which are arranged intermediate the feed-rolls and the knife which severs the blank from the web are positively driven and whereby the web will be advanced after the web has passed through combined scoring and feed rolls G and G'. A pair of supplemental feed-rolls d^2 is mounted in the table D, and said rolls are intermittently advanced and synchronously with the main feed-rolls by a pulley g^{10}, secured to feed-roll G, a pulley d^3, secured to lower roll d^2, and a belt d^5, which passes around said pulleys. Similar movement is also imparted to a pair of supplemental feed-rolls d^4, which are arranged intermediate the slitters and the knife which severs the blank from the web, by a pulley d^6, secured to lower roll d^2, a pulley d^7, secured to lower roll d^4, and a belt d^8, passing around said pulleys. Movement is imparted to the upper roll of each pair of supplemental feed-rolls by gear-wheels d^9, secured to each upper roll and intermeshing with a corresponding gear-wheel secured to each lower roll. In operation, therefore, the main feed-rolls G G' and each pair of feed-rolls d^2 and d^4 will be intermittently and synchronously advanced to advance the web and blank.

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

1. In a machine for making dishes or trays, the combination with mechanism for folding the blank, of a pivotally-sustained former whereon the blank is folded, said former having a restricted movement from a position beneath said plunger, to a point where the dish will be thrown from the former, mechanism for imparting oscillatory movement to said former, said former being provided with inclined sides, whereon the sides of the dish will be formed, means for engaging one of the sides of the dish, and holding the dish during a part of the travel of the former, and mechanism for shifting said means, to release the dish and permit the dish to be thrown from the former.

2. In a machine for making dishes or trays, the combination with a plunger for folding the blank, of a pivotally-sustained former, whereon the blank is folded, said former having a restricted movement from a position beneath said plunger to a point where the dish will be discharged from the former, mechanism for imparting oscillatory movement to said former, said mechanism comprising an arm whereby said former is sustained, a cam and a lever connected with said former and shifted by said cam, said former being provided with inclined sides, whereon the sides of the dish will be formed, means for engaging one of the sides of the dish, and holding the dish during a part of the travel of the former, and mechanism for shifting said means, to release the dish and permit the dish to be thrown from the former.

3. In a machine for making dishes or trays, the combination with a plunger for folding the blank, of a pivotally-sustained former, whereon the blank is folded, said former having a restricted movement from a position beneath said plunger to a point where the dish will be discharged from the former, mechanism for imparting oscillatory movement to said former, said mechanism comprising an arm whereby said former is sustained, a cam, a shaft whereon said cam is secured, and a lever provided with a bifurcated terminal which straddles said shaft and connected with said former and shifted by said cam, said former being provided with inclined sides, whereon the sides of the dish will be formed, means for engaging one of the sides of the dish, and holding the dish during a part of the travel of the former, and mechanism for shifting said means, to release the dish and permit the dish to be thrown from the former.

4. In a machine for making dishes or trays, the combination with a plunger for folding the blank, of a pivotally-sustained former, whereon the blank is folded, said former having a restricted movement from a position beneath said plunger to a point where the dish will be discharged from the former, mechanism for imparting oscillatory movement to said former, said mechanism comprising an arm whereby said former is sustained, a cam, a shaft whereon said cam is secured, a lever, provided with a bifurcated terminal which straddles said shaft, and connected with said former and shifted by said cam, and a spring for shifting said former in one direction, said former being provided with inclined sides, whereon the sides of the dish will be formed, means for engaging one of the sides of the dish, and holding the dish during a part of the travel of the former, and mechanism for shifting said means, to release the dish and permit the dish to be thrown from the former.

5. In a machine for making dishes or trays, the combination with a plunger for folding the blank, of a pivotally-sustained former whereon the blank is folded, said former having a restricted movement from a position beneath said plunger to a point where the dish will be discharged from the former, mechanism for imparting oscillatory movement to said former, a finger for holding the dish on the former and mechanism for shifting said finger.

6. In a machine for making dishes or trays, the combination with a plunger for folding

the blank, of a pivotally-sustained former whereon the blank is folded, said former having a restricted movement from a position beneath said plunger to a point where the dish will be discharged from the former, mechanism for imparting oscillatory movement to said former, a finger for holding the dish on the former, and means for holding said finger away from the former during the operation of said plunger, and for shifting said finger against the dish during a part of the travel of said former.

7. In a machine for making dishes or trays, the combination with a plunger for folding the blank, of a pivotally-sustained former whereon the blank is folded, said former having a restricted movement from a position beneath said plunger to a point where the dish will be discharged from the former, mechanism for imparting oscillatory movement to said former, a finger for holding the dish on the former, mechanism for shifting said finger, said mechanism comprising a cam, a shifter-bar actuated by said cam and connected with said finger, and a spring connected with said mechanism, and for shifting said finger in one direction.

8. In a machine for making dishes or trays, the combination with a plunger for folding the blank, of a pivotally-sustained former whereon the blank is folded, said former having a restricted movement from a position beneath said plunger to a point where the dish will be discharged from the former, mechanism for imparting oscillatory movement to said former, said mechanism comprising a cam and suitable connections between said cam and said former, a finger for holding the dish on the former, and mechanism for shifting said finger, said mechanism comprising a shifting-bar, actuated by said cam and a spring for shifting said finger in one direction.

9. In a machine for making dishes or trays, the combination with mechanism for intermittently advancing a web of flexible material, of a cutter support or carrier, one or more knives carried by said support, mechanism for shifting said support in one direction, said shifting mechanism comprising a cam, a horizontally-arranged long lever, actuated by said cam, a horizontally-arranged short lever, a vertical link extending between and connecting said levers, and a connection between said short lever and said cutter-support, and mechanism for forming the dish.

10. In a machine for making dishes or trays, the combination with mechanism for intermittently advancing a web of flexible material, of a cutter support or carrier, one or more knives carried by said support, mechanism for shifting said support in one direction, said shifting mechanism comprising a cam, a horizontally-arranged long lever, actuated by said cam, a horizontally-arranged short lever, a vertical link extending between and connecting said levers, and a connection between said short lever and said cutter-support, a spring for shifting said support in the other direction and mechanism for forming the dish.

11. In a machine for making dishes or trays, the combination with mechanism for intermittently advancing a web of flexible material, of a cutter support or carrier, one or more knives carried by said support, mechanism for shifting said support in one direction, said shifting mechanism comprising a cam, a horizontally-arranged long lever actuated by said cam, a horizontally-arranged short lever, a link extending between and connecting said levers, a connection between said short lever and said cutter-support, a spring arranged to force the cutter-support in that direction in which the cutting of the web is effected, and mechanism for forming the dish.

12. In a machine for making dishes or trays, the combination with mechanism for intermittently advancing a web of flexible material, of slitters, trimmer-knives, a pair of rolls extending transversely across the web, to guide and flatten the web, a knife, for severing the blank from the web, and arranged adjacent said rolls, mechanism for operating said knives and slitters and mechanism for forming the dish.

13. In a machine for making dishes or trays, the combination with mechanism for intermittently advancing a web of flexible material, of slitters, trimmer-knives, a pair of rolls extending transversely across the web, a knife for severing the blank from the web, and arranged adjacent said rolls, another pair of rolls extending transversely across the web and arranged adjacent the slitters, mechanism for operating said knives and cutters, and mechanism for folding the blank.

14. In a machine for making dishes or trays, the combination with mechanism for intermittently advancing a web of flexible material, of slitters, trimmer-knives, a pair of rolls extending across the web to guide and flatten the web, a knife for severing the blank from the web, and arranged adjacent said rolls, mechanism for driving said pair of rolls, mechanism for operating said knives and slitters and mechanism for forming the dish.

15. In a machine for making dishes or trays, the combination with mechanism for intermittently advancing a web of flexible material, of slitters, trimmer-knives, a pair of rolls extending transversely across the web, a knife for severing the blank from the web, and arranged adjacent said rolls, another pair of rolls extending across the web and arranged adjacent the slitters, mechanism for driving both pairs of rolls, mechanism for operating said knives and cutters, and mechanism for folding the blank.

16. In a machine for making dishes or trays, the combination with mechanism for forming the dish, of mechanism for forming and driving a staple through the overlapping blank portions, said stapling mechanism comprising

a sliding frame, a wire-bender, a staple-driver and an anvil, mechanism for operating said parts of the stapling mechanism, said operating mechanism comprising a cam-plate pivotally secured to said sliding frame and means engaging the cam-plate to effect the shift of the pivot of said cam-plate and the longitudinal shift of said sliding frame, and mechanism for oscillating said cam-plate.

17. In a machine for making dishes or trays, the combination with mechanism for forming the dish, of mechanism for forming and driving a staple through the overlapping blank portions, said stapling mechanism comprising a sliding frame, a wire-bender, a staple-driver and an anvil, mechanism for operating said parts of the stapling mechanism, said operating mechanism comprising a cam-plate pivotally secured to said sliding frame and having cam-slots therein for operating the wire-bender and said driver, and means engaging the cam-plate to effect the shift of the pivot of said cam-plate and the longitudinal shift of said sliding frame, and mechanism for oscillating said cam-plate.

18. In a machine for making dishes or trays, the combination with mechanism for forming and driving a staple through the overlapping blank portions, said stapling mechanism comprising a sliding frame, a wire-bender, a staple-driver and an anvil, mechanism for operating said parts of the stapling mechanism, said operating mechanism comprising a cam-plate pivotally secured to said sliding frame, and a fixed stud engaging the cam-plate to effect the shift of the pivot of said cam-plate, and the longitudinal shift of said sliding frame, and mechanism for oscillating said cam-plate.

19. In a machine for making dishes or trays, the combination with mechanism for forming and driving a staple through the overlapping blank portions, said stapling mechanism comprising a wire-bender, a staple-driver, an anvil, and a sliding frame, mechanism for operating said parts of the stapling mechanism, said operating parts comprising a cam-plate pivotally secured to said sliding frame, and having cam-slots therein for operating the wire-bender and said driver, a fixed stud, another cam-slot in said cam-plate into which said stud is extended to engage the cam-plate to effect the shift of the pivot of said cam-plate and the longitudinal shift of said frame, and mechanism for oscillating said cam-plate.

20. In a machine for making dishes or trays, the combination with mechanism for forming the dish, of mechanism for forming and driving a staple through the overlapping blank portions, said stapling mechanism comprising a sliding frame, a wire-bender, a staple-driver and an anvil, mechanism for operating said parts of the stapling mechanism, mechanism for feeding wire to the stapling mechanism, said feed mechanism comprising a pair of rolls sustained by said sliding frame, a dog held against longitudinal movement, and means wherewith said dog will engage and whereby the rolls will be advanced by the shift of the rolls during the operation of the stapling mechanism, and mechanism for shifting said frame and operating the stapling mechanism.

21. In a machine for making dishes or trays, the combination with mechanism for cutting the blank and mechanism for forming the dish, of mechanism for forming and driving a staple through the overlapping portions of the blank, and clencher mechanism having a part in the path of movement of a part of the cutter mechanism.

22. In a machine for making dishes or trays, the combination with a pivotally-sustained former, mechanism for folding the blank, and mechanism for forming and driving a staple, of a clencher mechanism carried by said former, mechanism for imparting an oscillatory movement to said former, and means for operating the clencher mechanism, said means comprising a movable part sustained independently of the former and a part carried by the former and engaged by said movable part.

23. In a machine for making dishes or trays, the combination with mechanism for cutting the blank, mechanism for folding the blank, a pivotally-sustained former and mechanism for forming and driving the staple through the overlapping portions of the blank, of a clencher mechanism carried by the former, and comprising a part in the path of movement of a part of the cutter mechanism, and mechanism for oscillating said former.

24. In a machine for making dishes or trays, the combination with an oscillating arm, a former carried by said arm, and mechanism for shifting said former, of a vertically-reciprocating frame, a cutter mechanism, mechanism for operating said cutter mechanism and shifting said frame, mechanism for forming and driving a staple, and a clencher mechanism, carried by said arm, and movable therewith, and carrying an abutment extending into the path of said reciprocating frame and shifted thereby.

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