

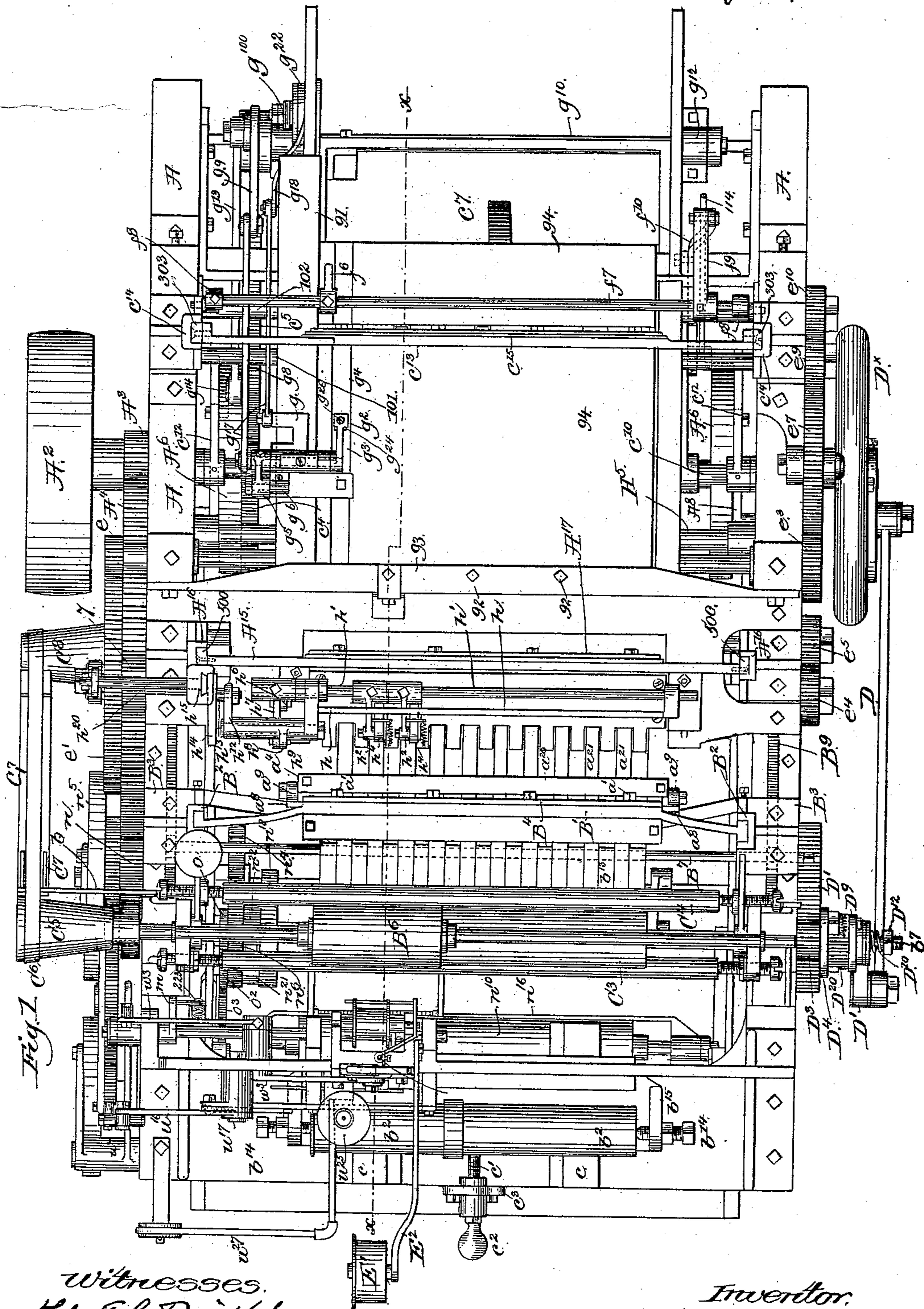
(No Model.)

16 Sheets—Sheet 1.

E. WOODWARD.
MAILING MACHINE.

No. 408,202.

Patented July 30, 1889.



Witnesses.
John F. C. Prentiss
Frederick L. Emery

Inventor.
Erastus Woodward.
by Crosby & Morgan
Attys.

(No Model.)

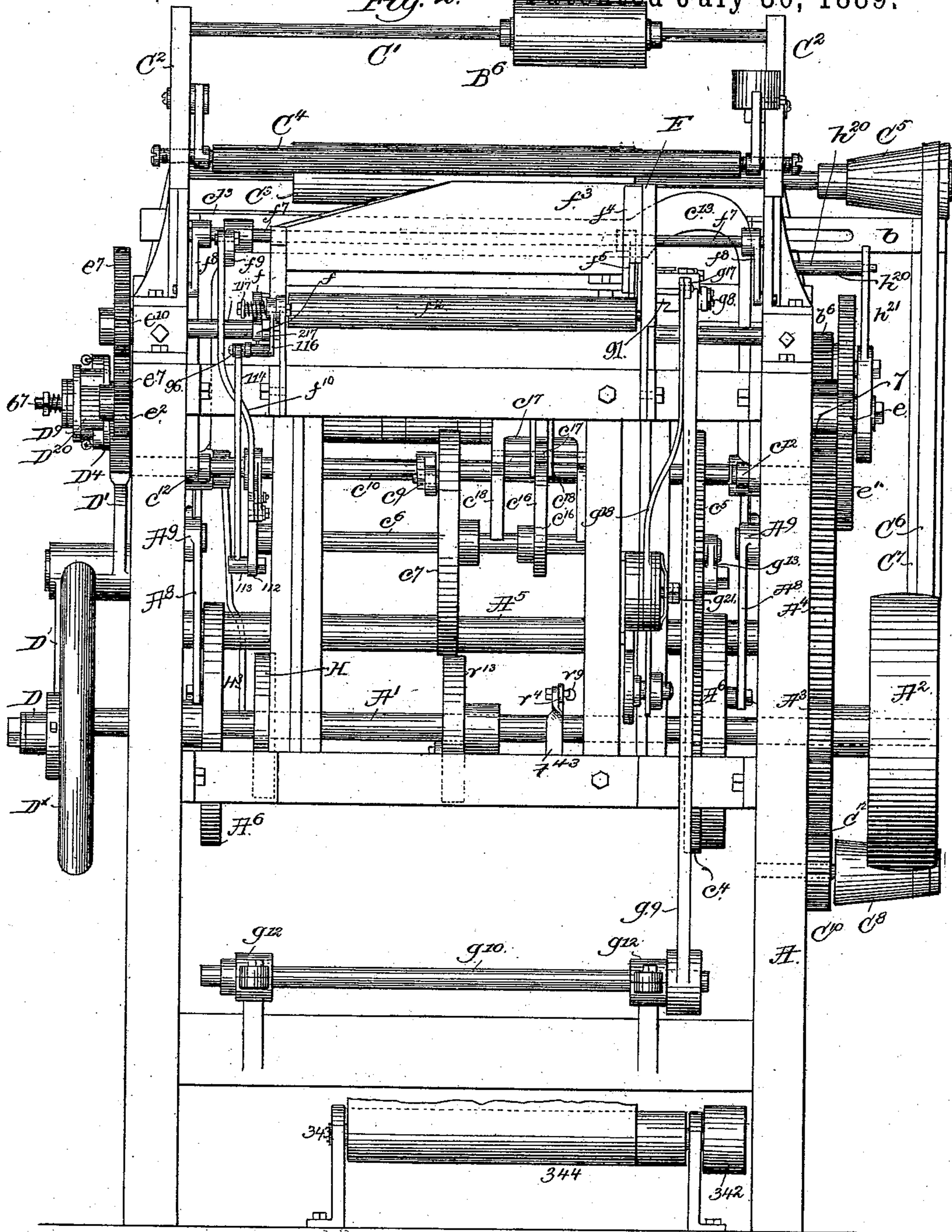
16 Sheets—Sheet 2.

E. WOODWARD.
MAILING MACHINE.

No. 408,202.

Fig. 2.

Patented July 30, 1889.



Witnesses,
John F. C. Prinkert
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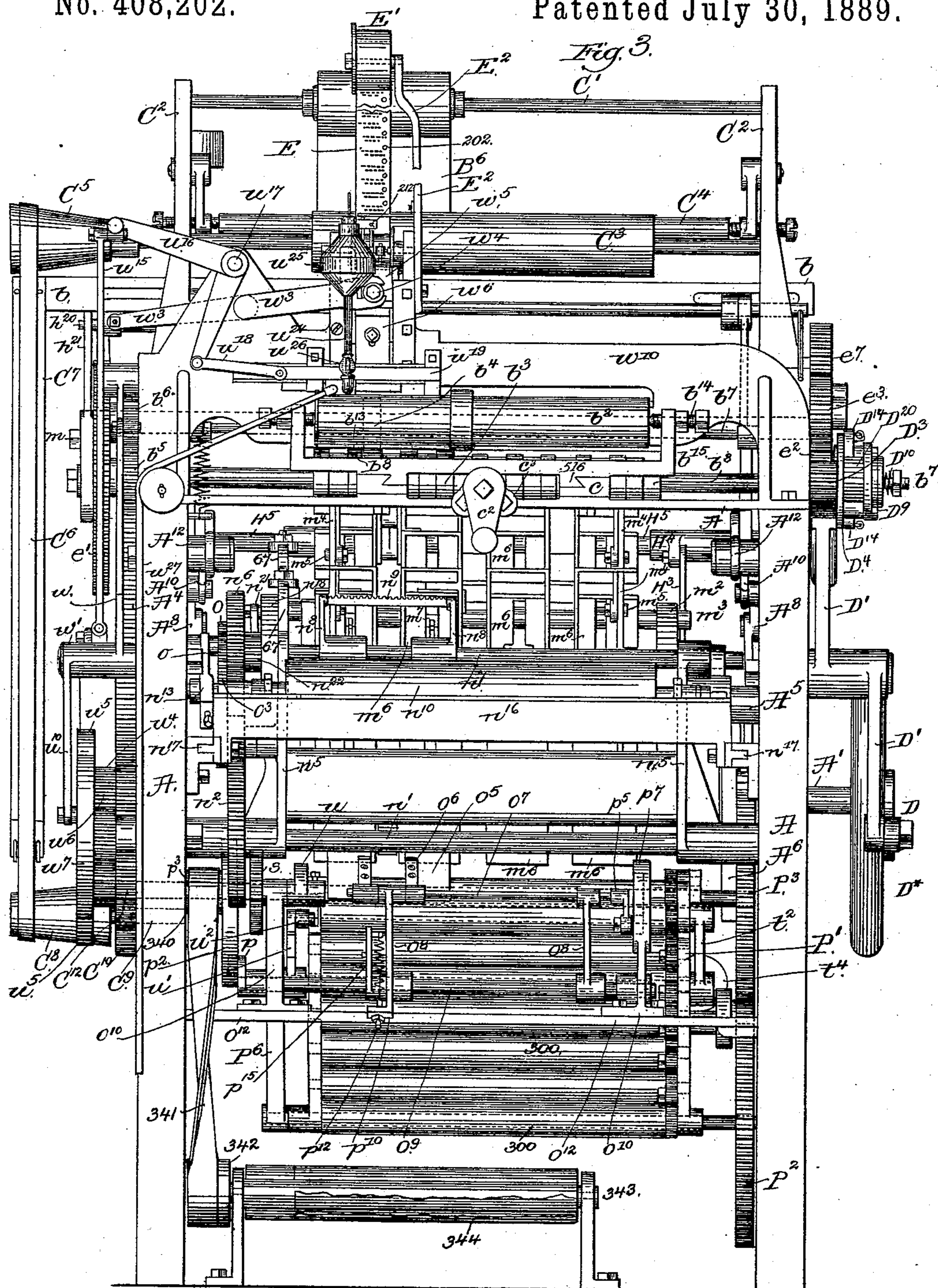
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MAILING MACHINE.

No. 408,202.

Patented July 30, 1889.



Witnesses.
John F. C. Prinkert
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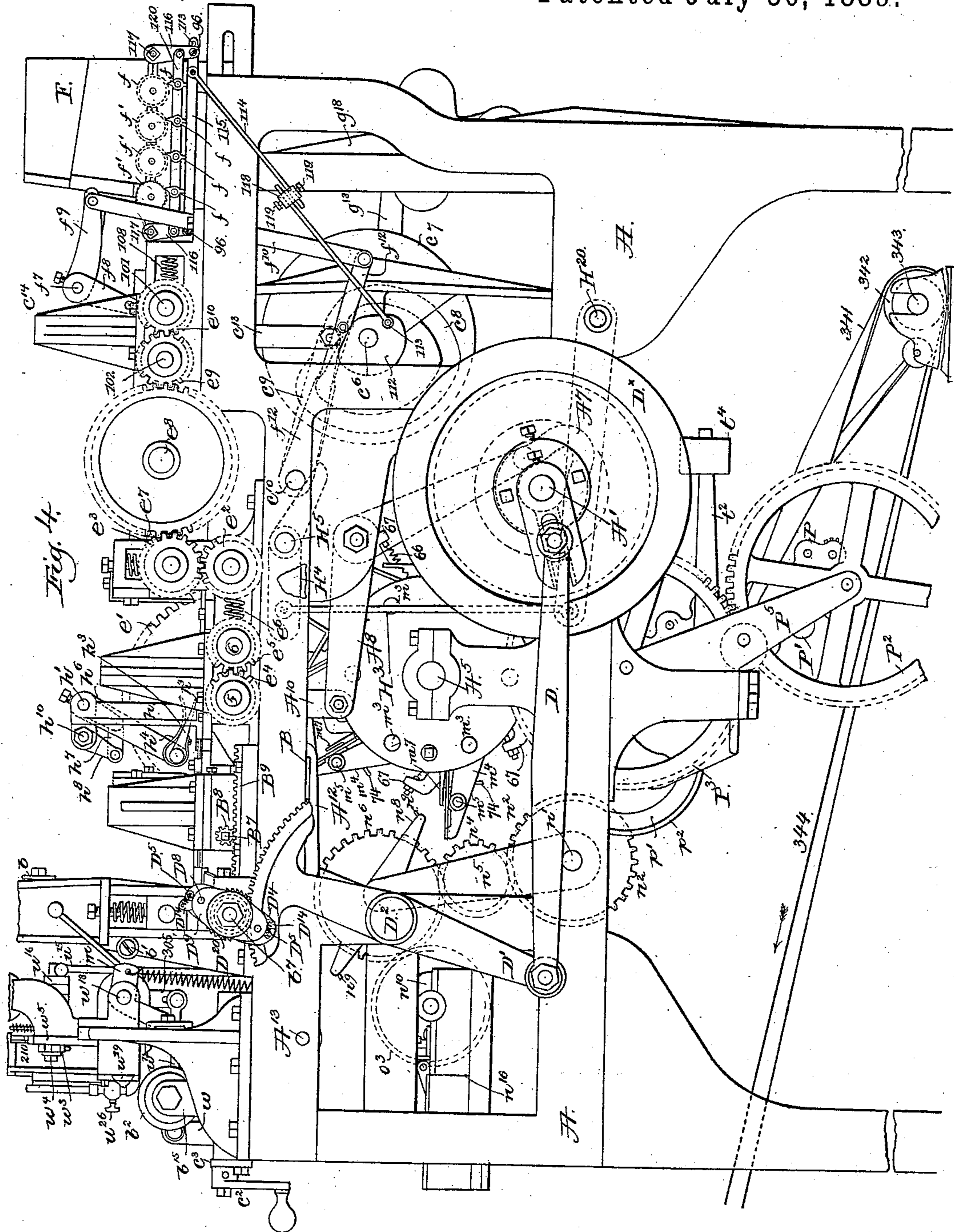
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16 Sheets—Sheet 4.

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MAILING MACHINE.

No. 408,202.

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Witnesses.
John P. C. Perin
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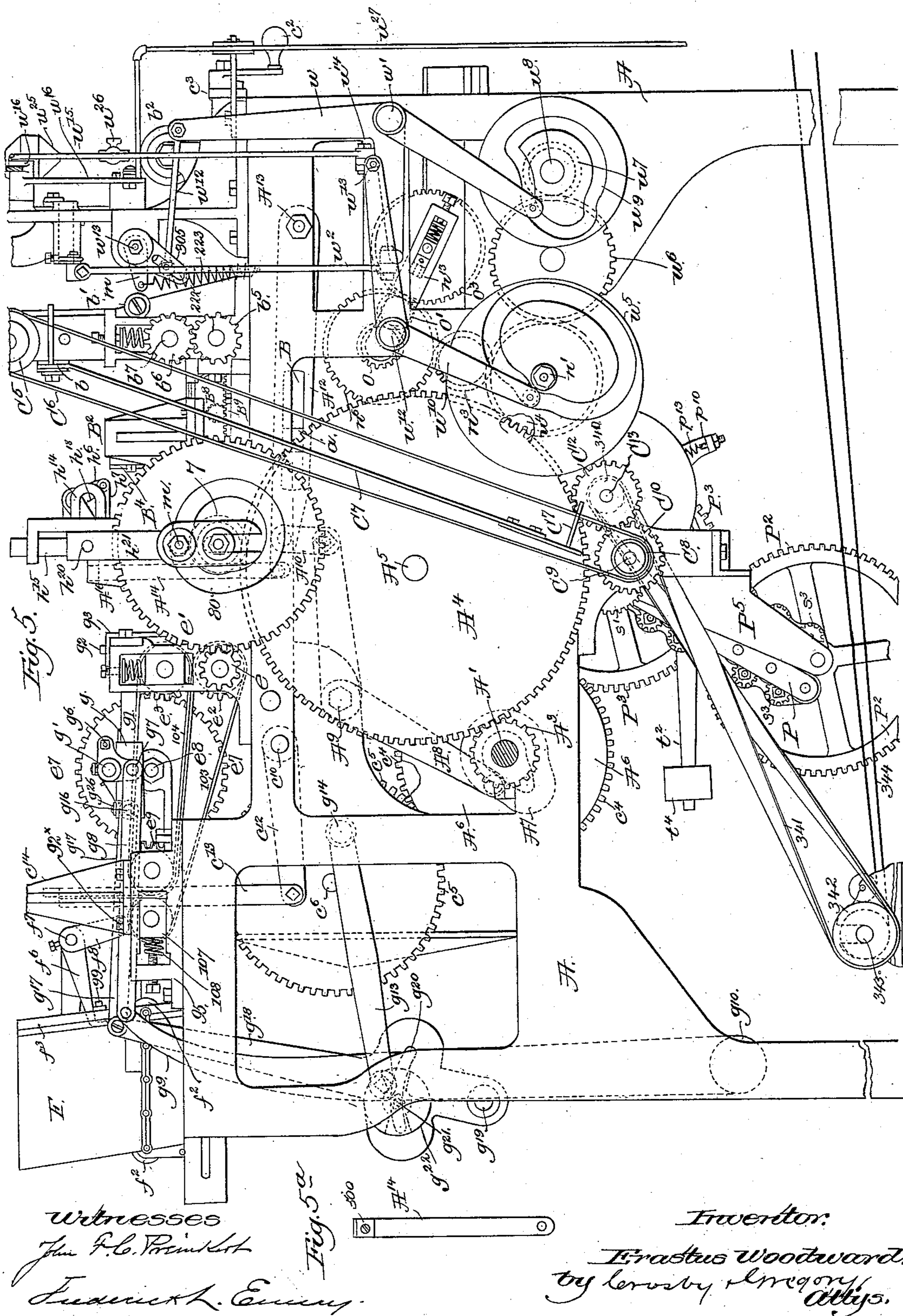
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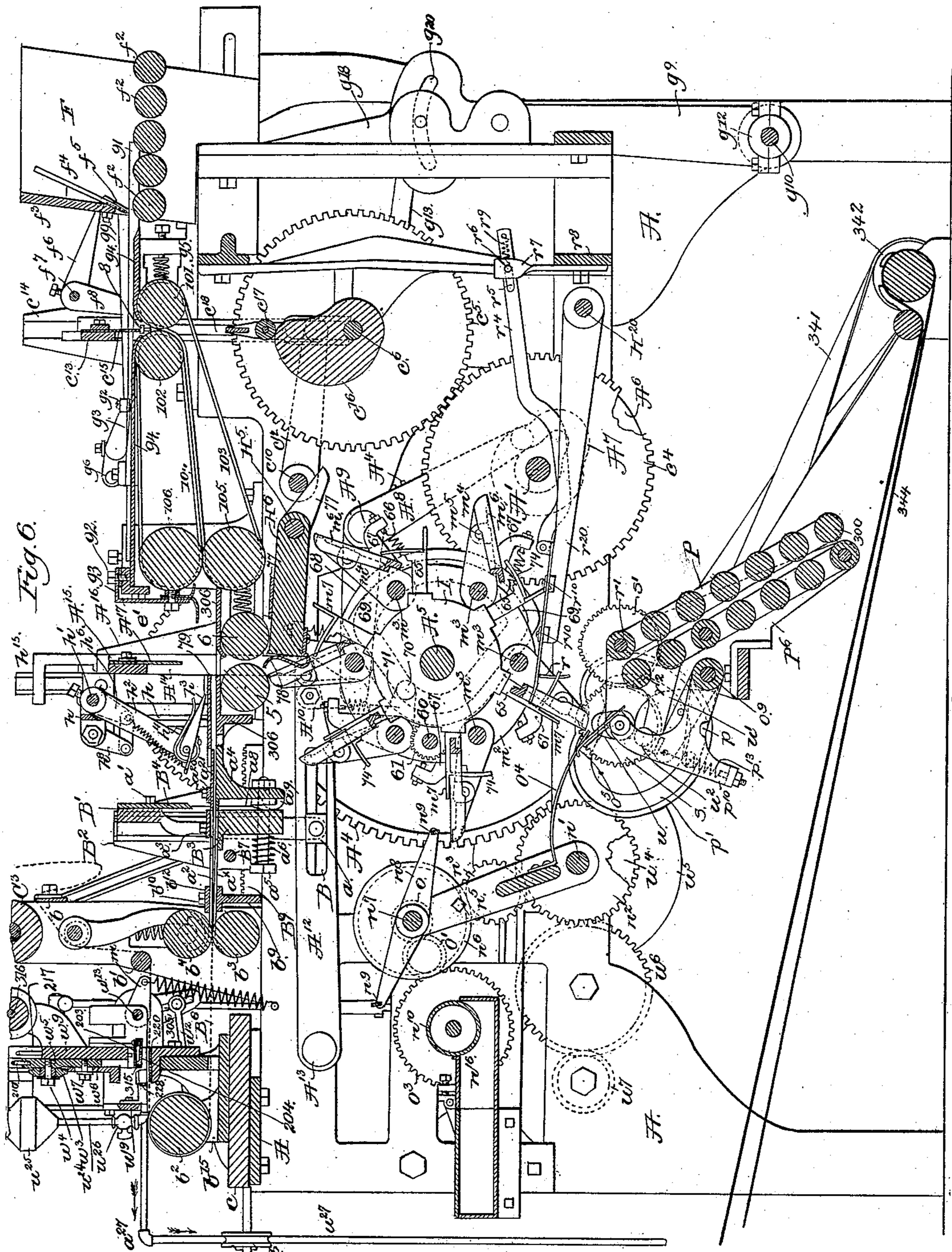
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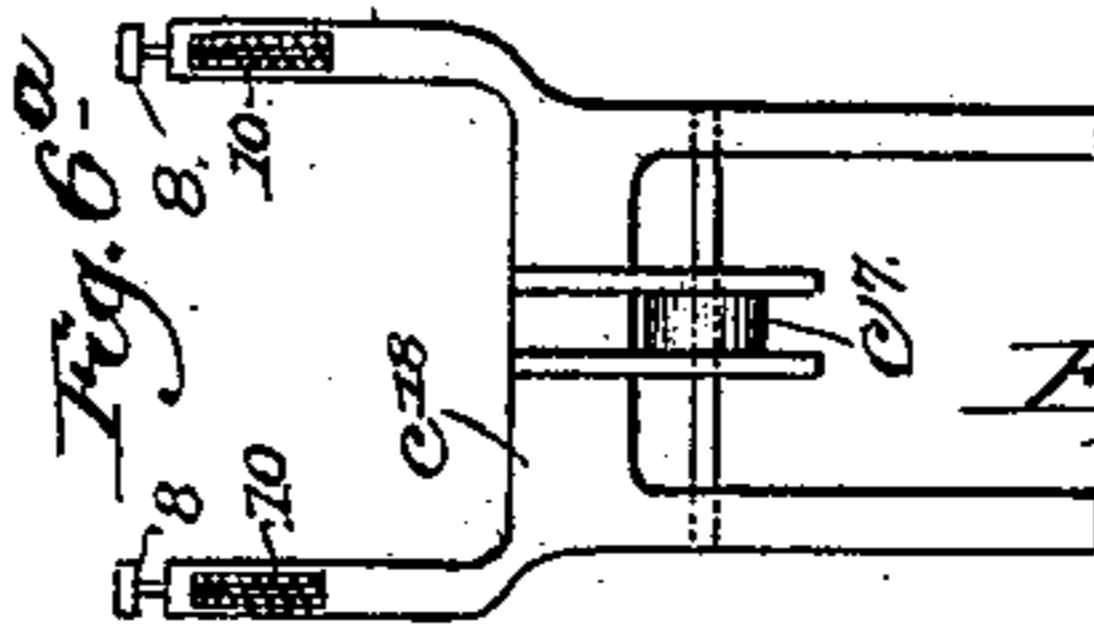
E. WOODWARD.
MAILING MACHINE.

No. 408,202.

Patented July 30, 1889.



Witnesses,
John H. Prinkert,
Lucius L. Emery.



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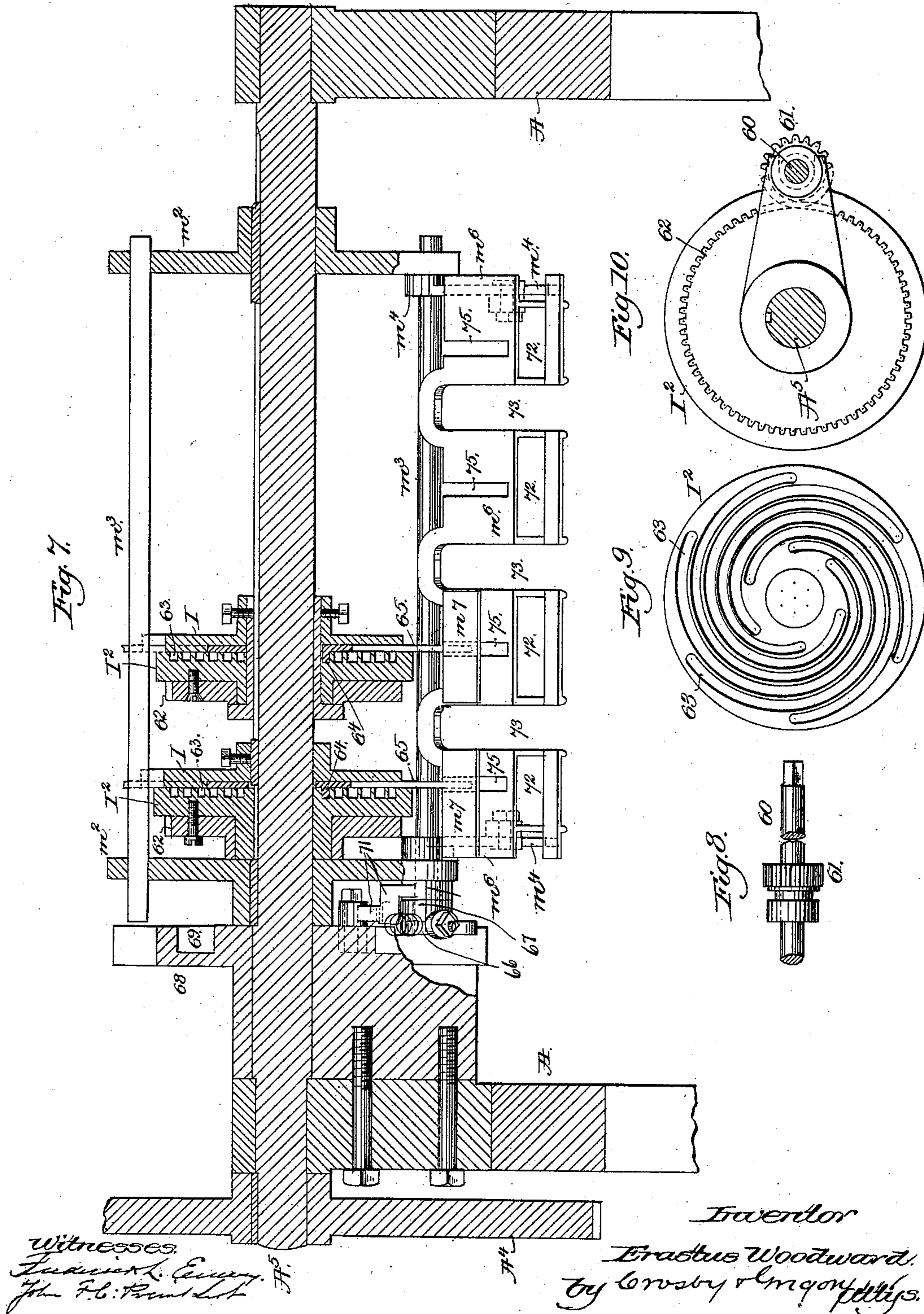
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(No Model.)

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Fig. 16.

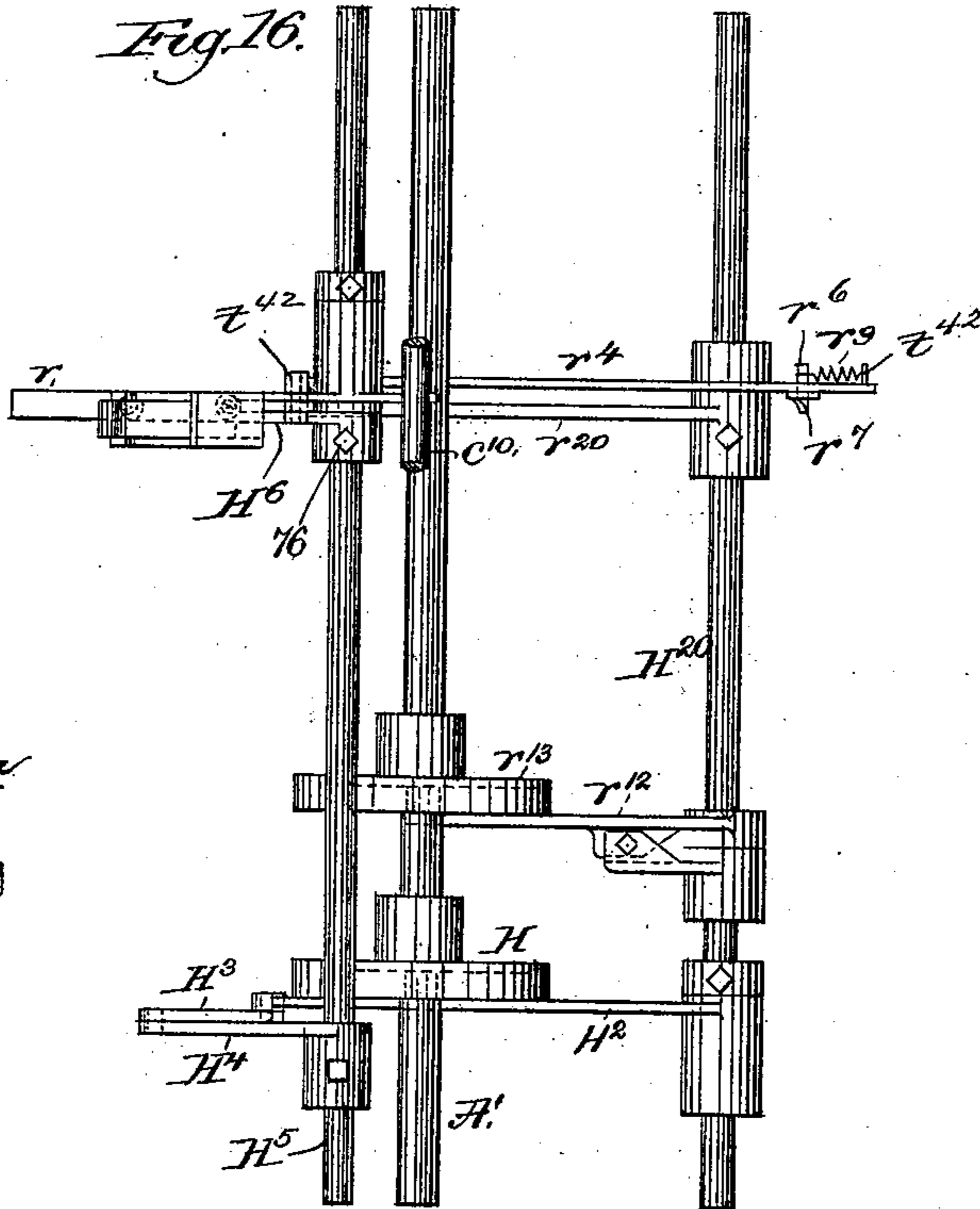


Fig. 18.

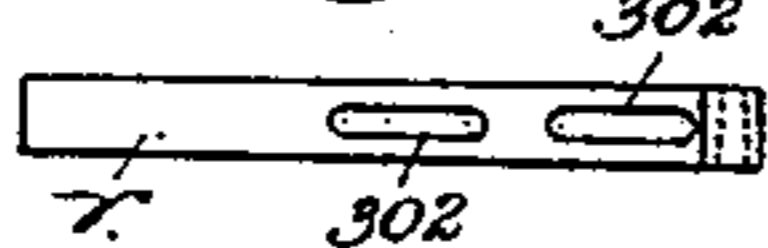


Fig. 17.

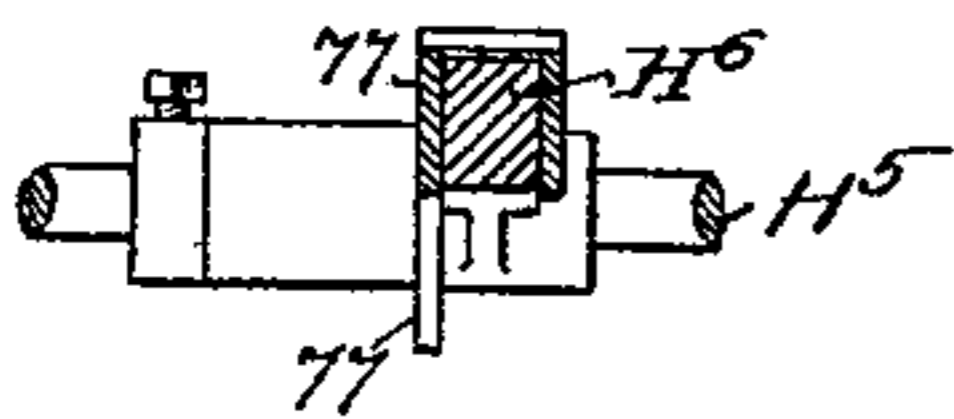


Fig. 18.

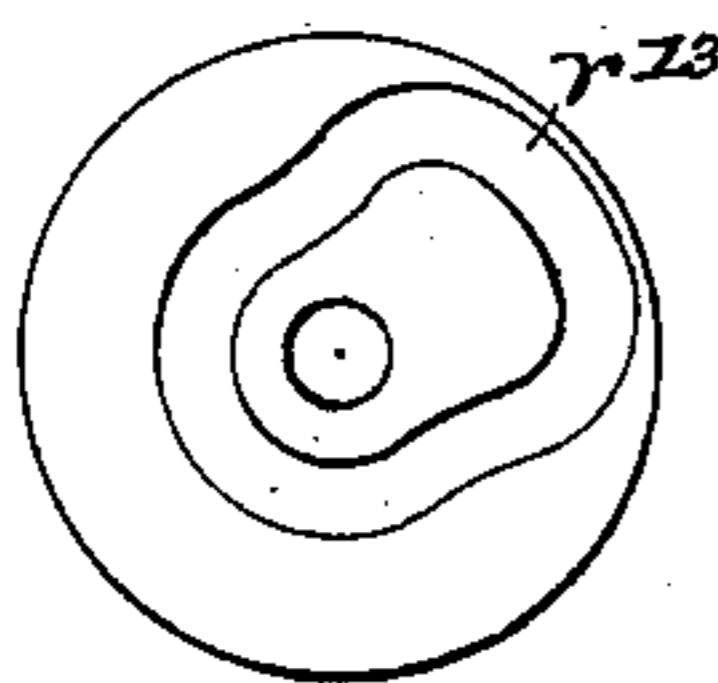
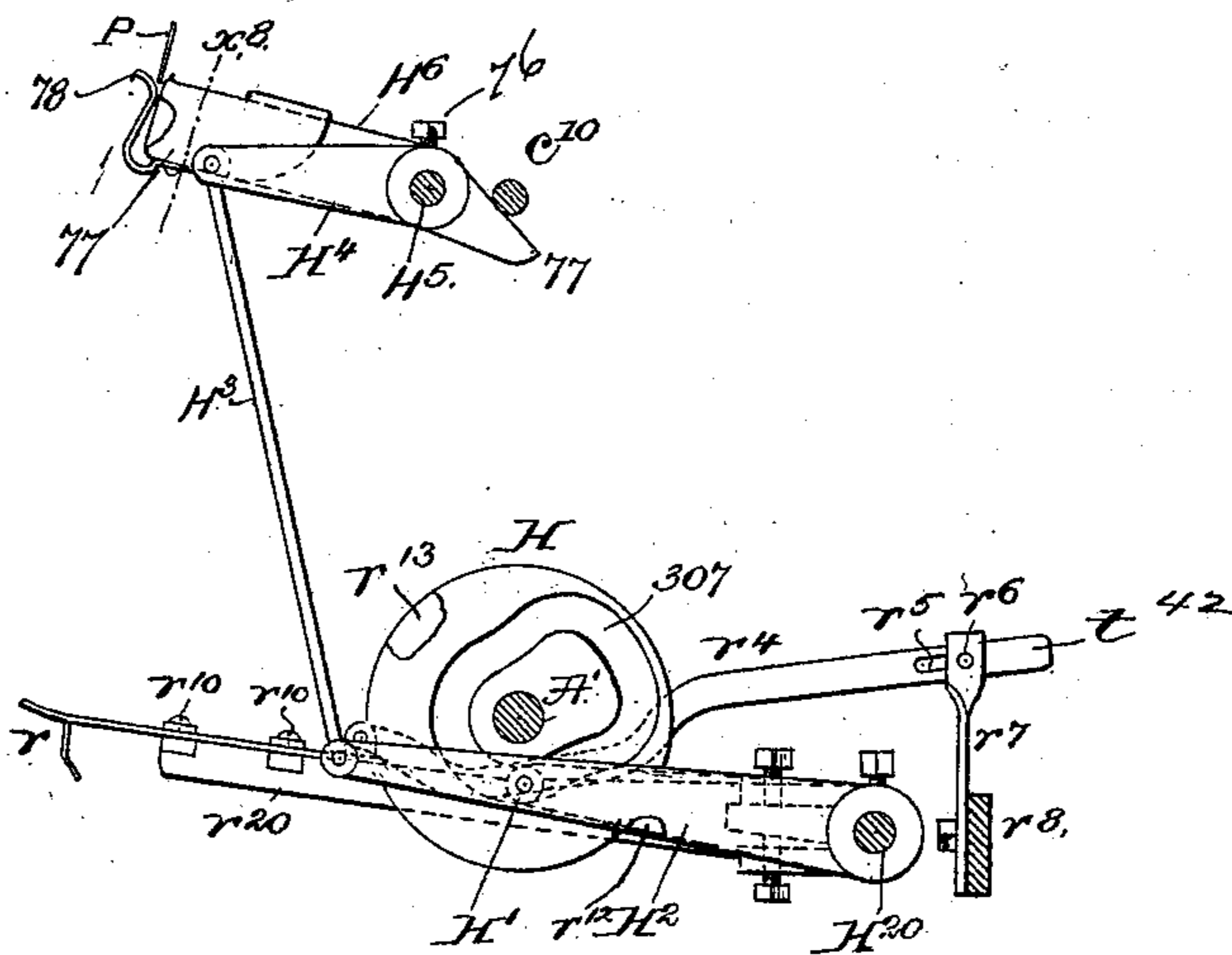


Fig. 17.



Witnesses.

Frederick L. Emery.
John F. C. Brinkert

Inventor.

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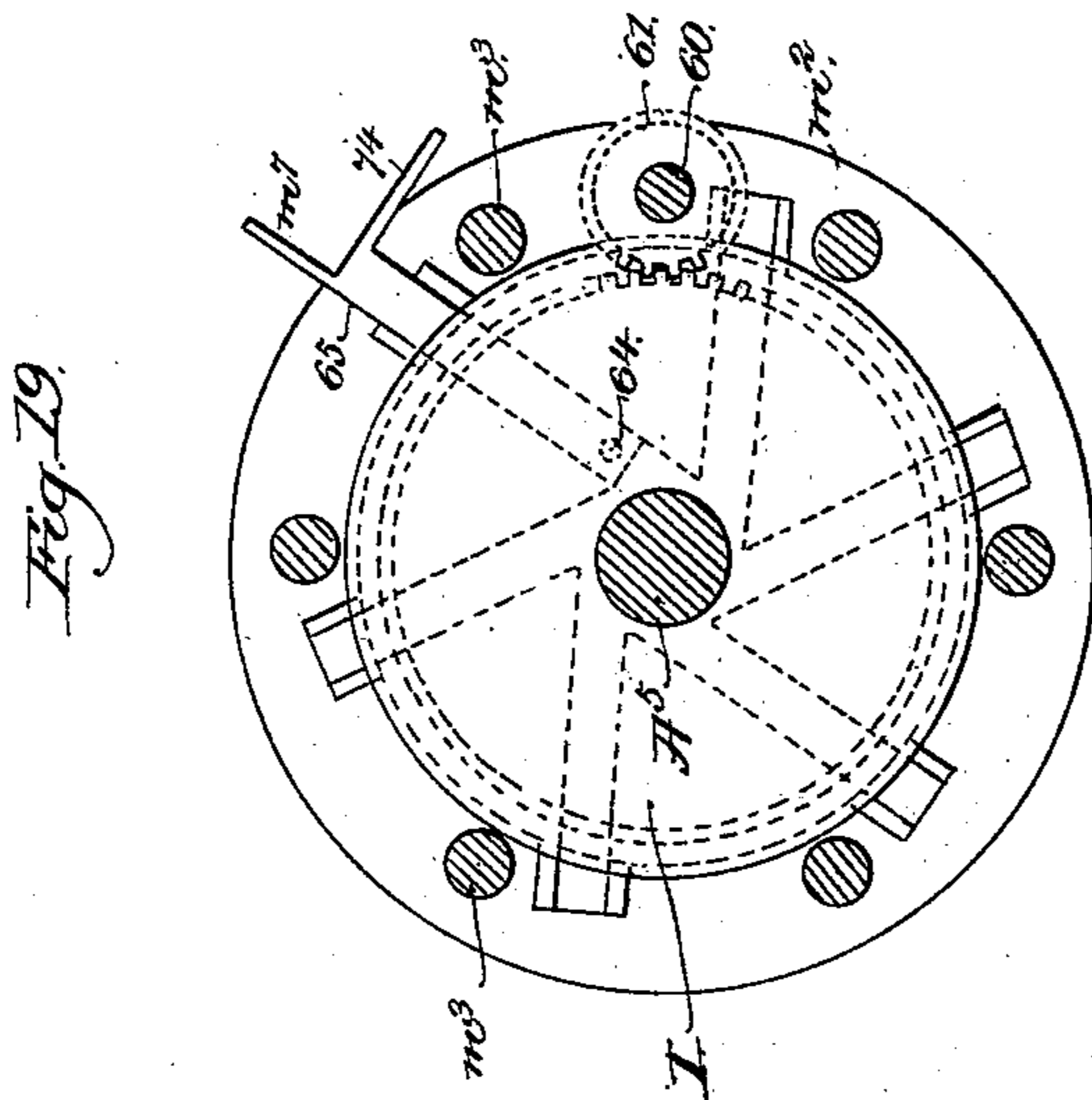
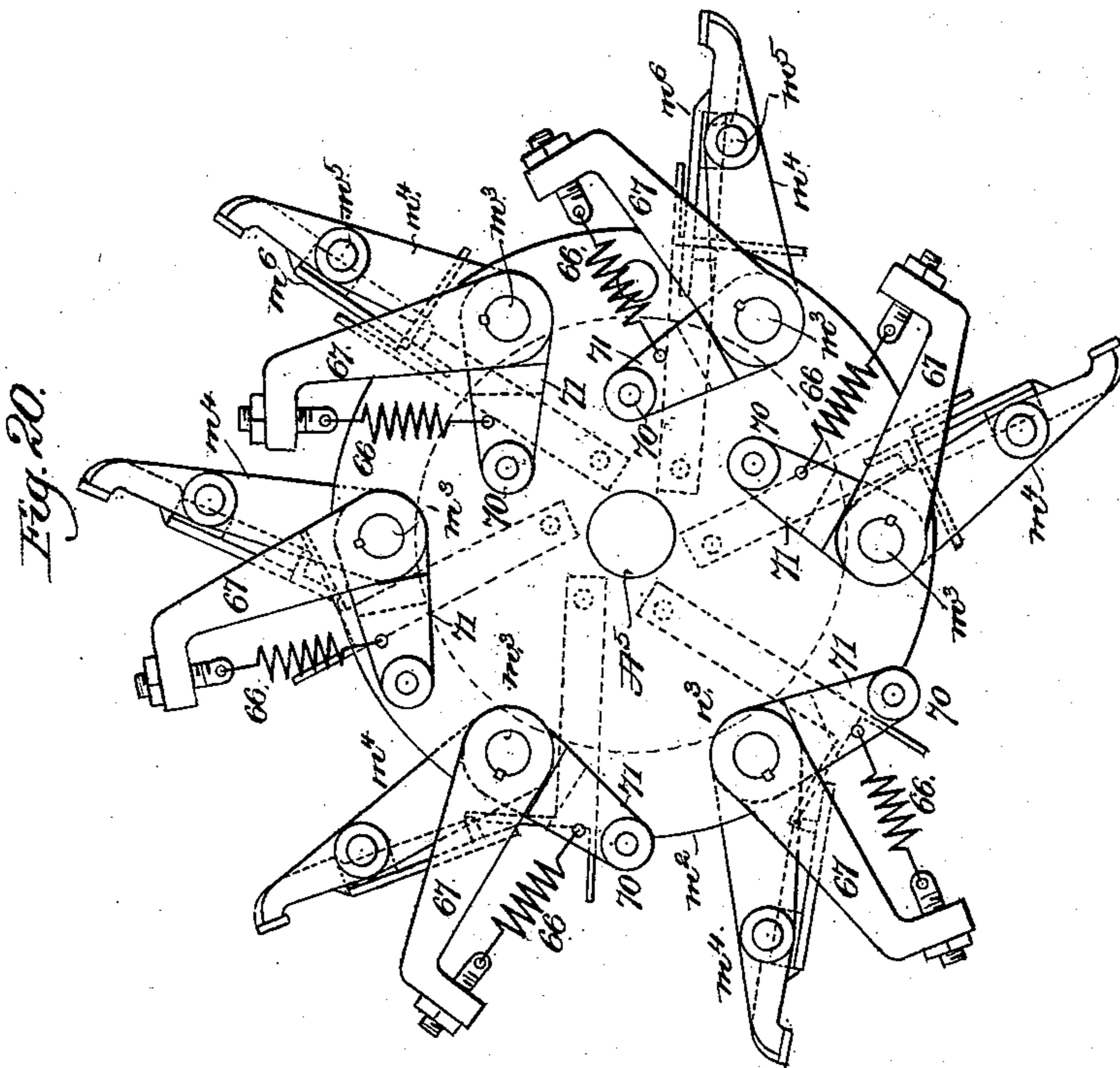
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Witnesses.
John P. Printz
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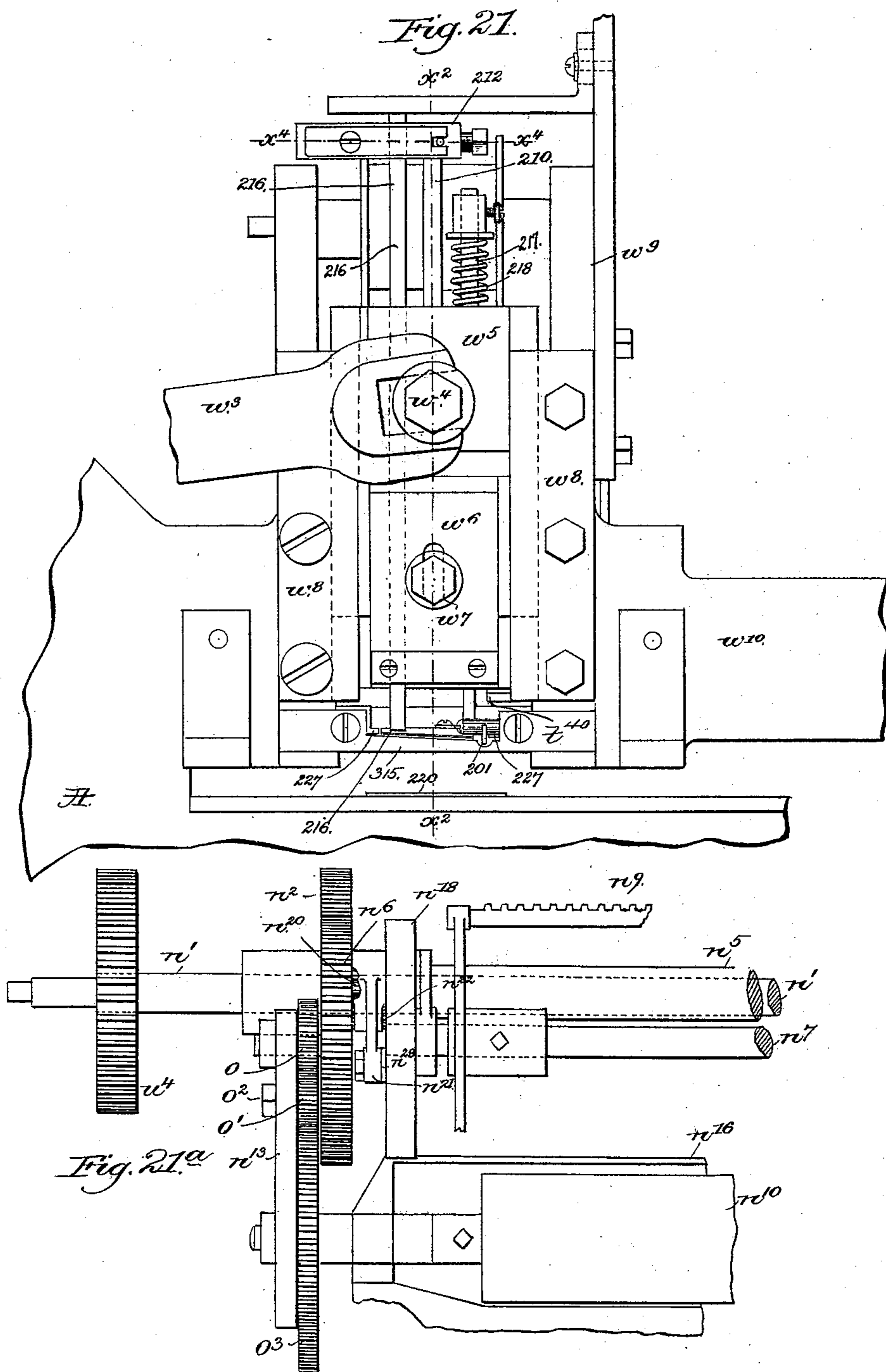
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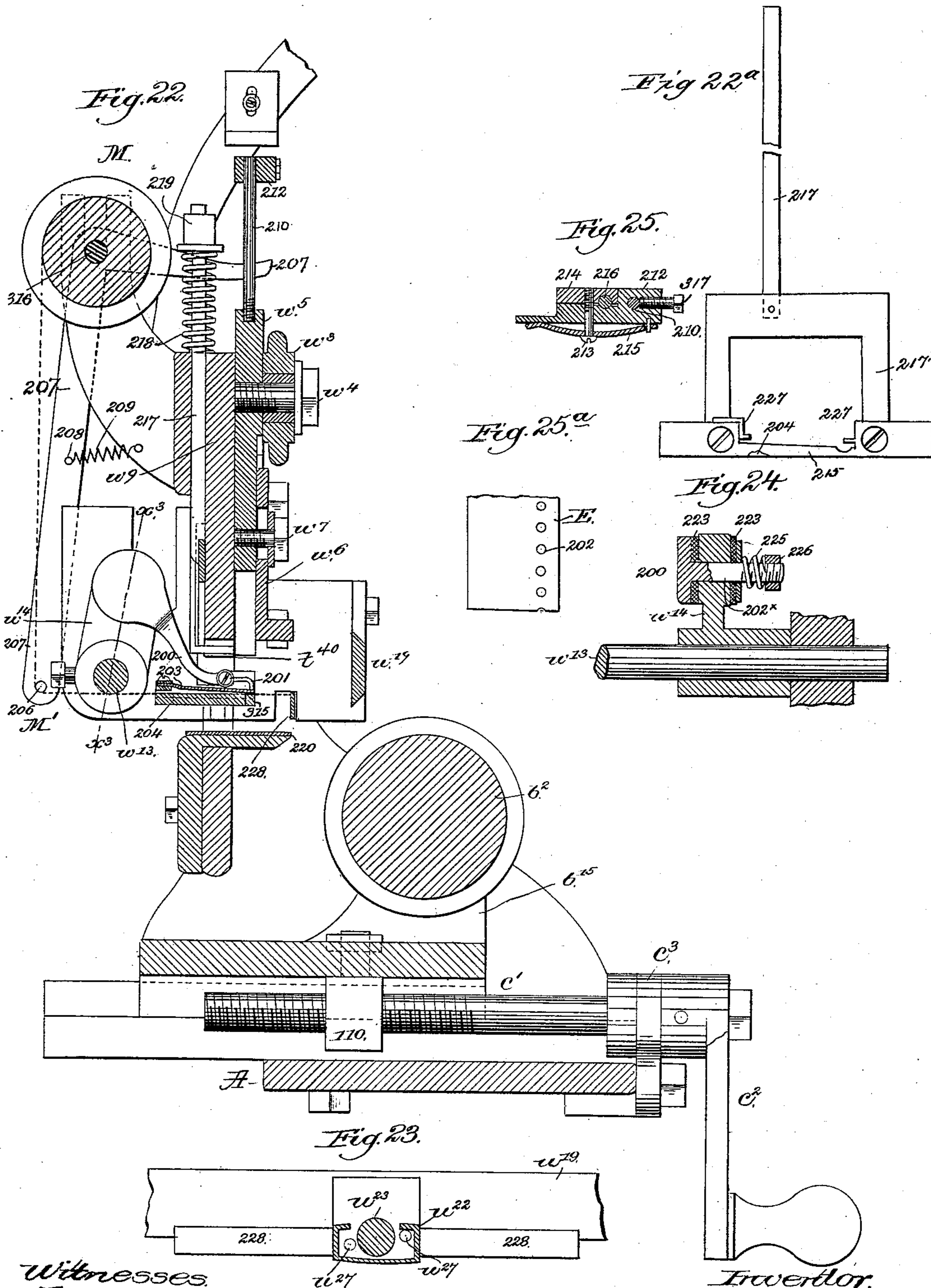
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Witnesses
Frederick L. Emery
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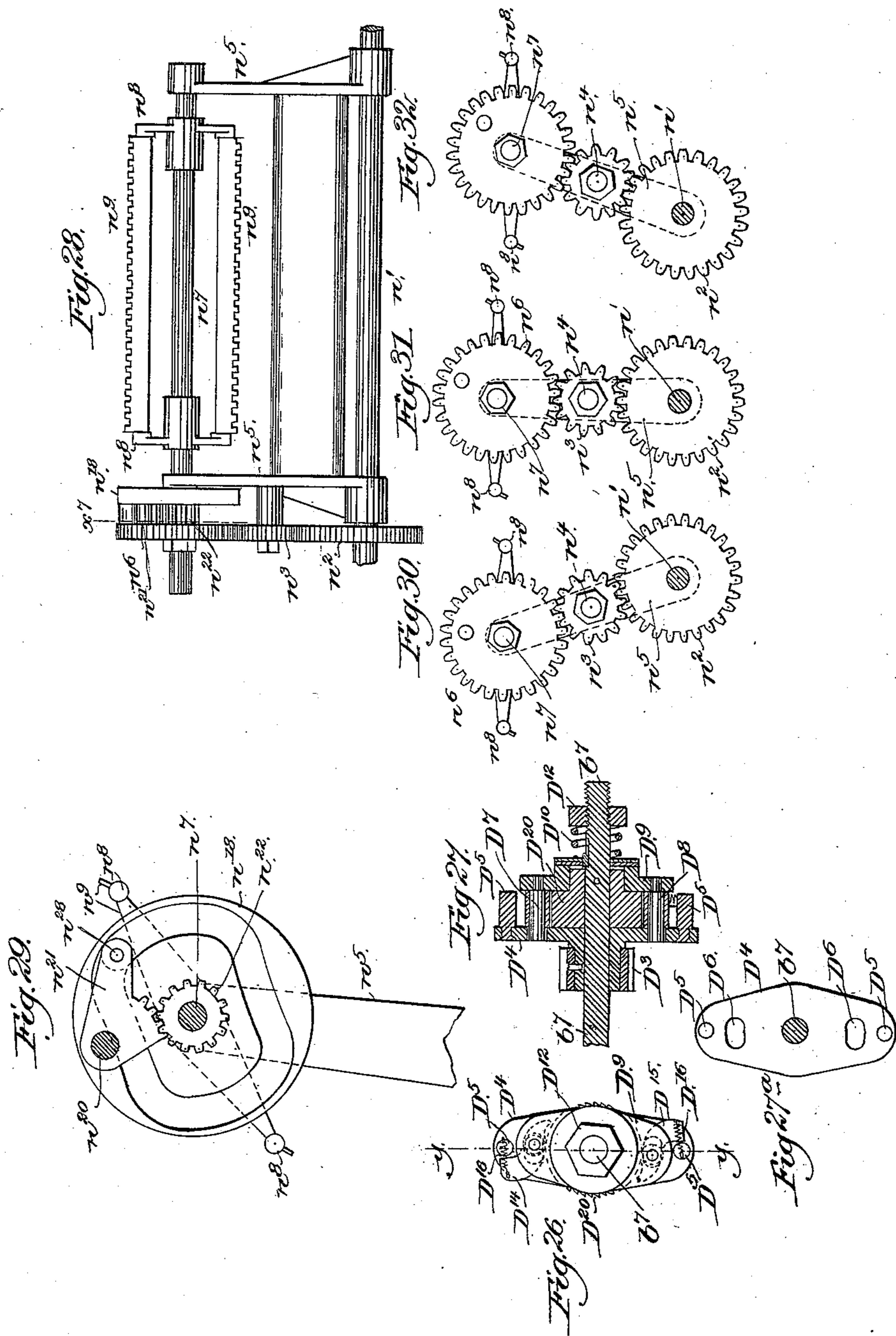
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16 Sheets—Sheet 13.

E. WOODWARD.
MAILING MACHINE.

No. 408,202.

Patented July 30, 1889.



Witnesses,
Frederick L. Emery,
John R. C. Prinkert.

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(No Model.)

16 Sheets—Sheet 14.

E. WOODWARD.
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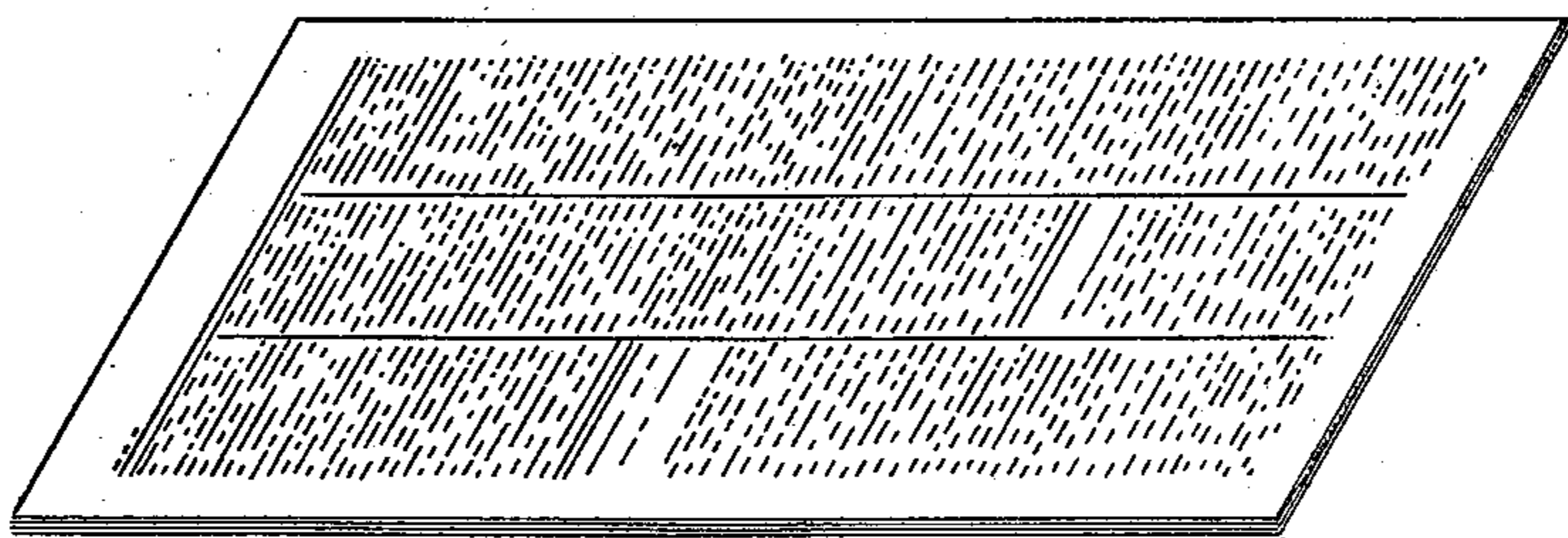


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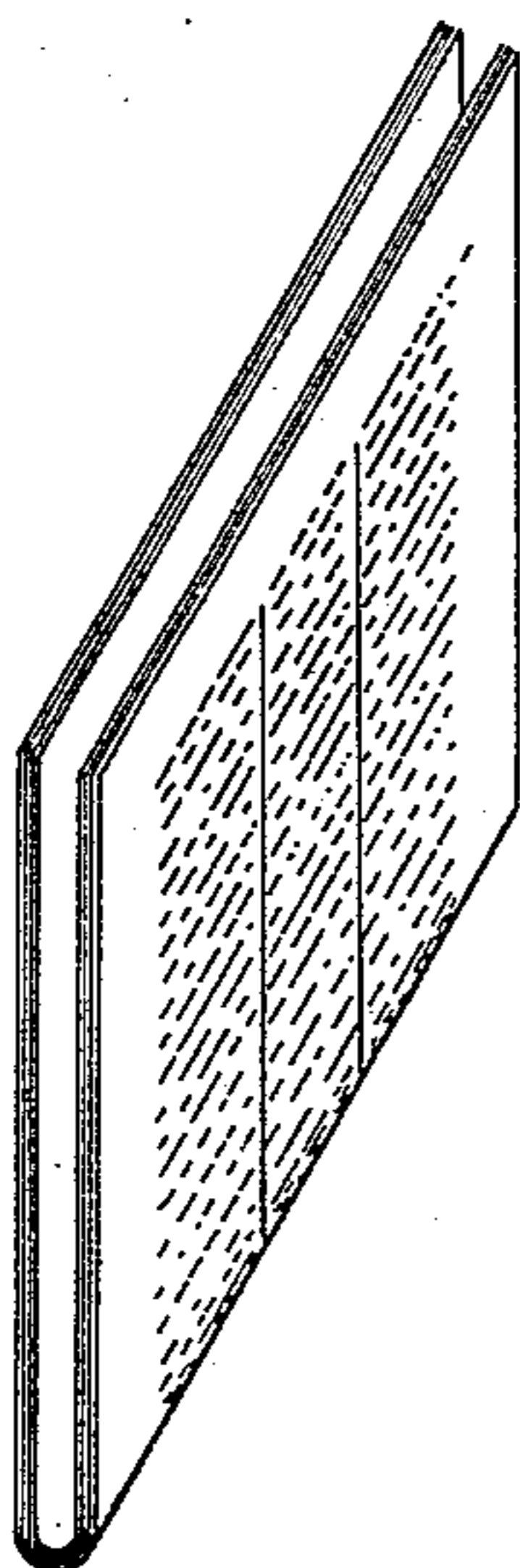


Fig. 34.

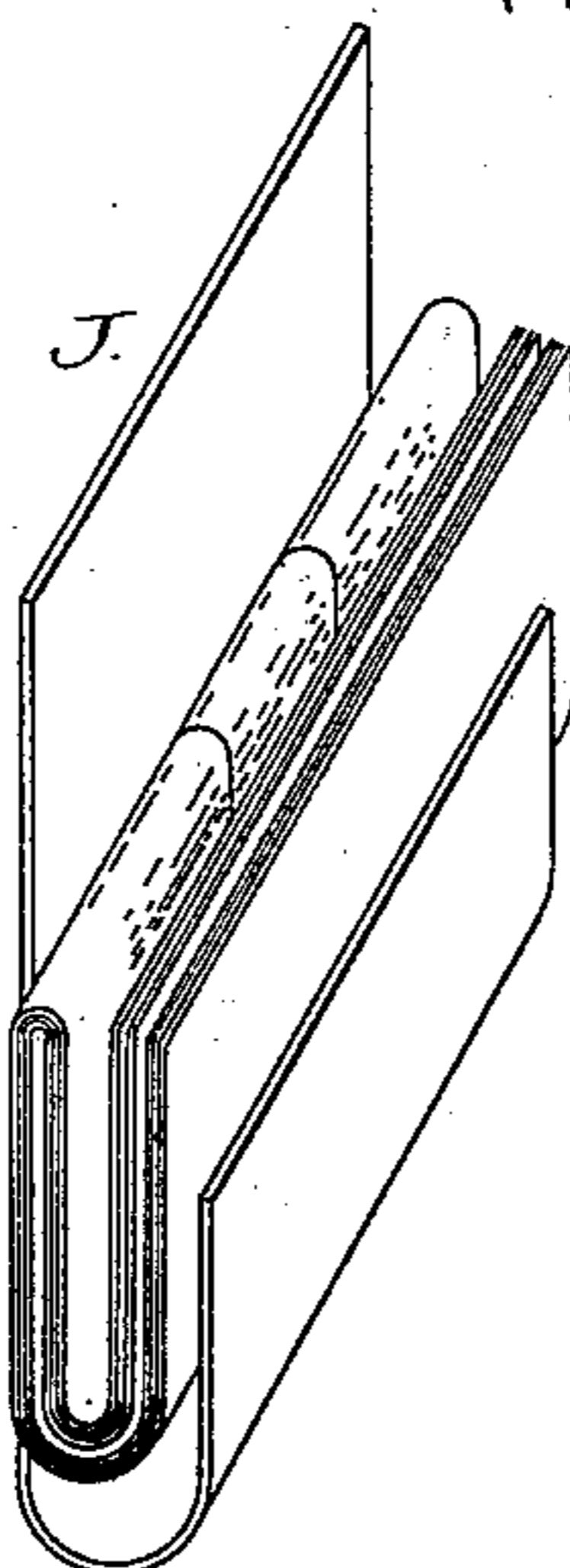


Fig. 35.

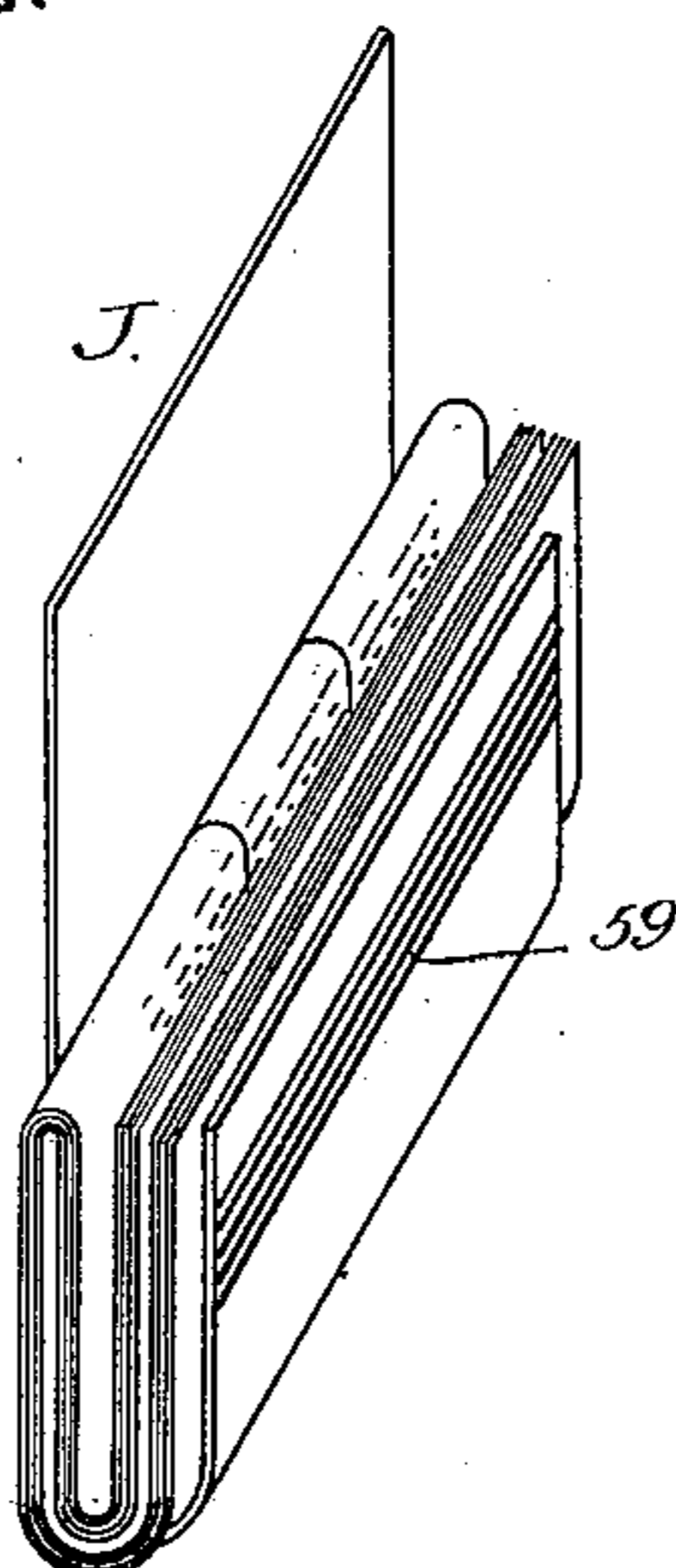


Fig. 36.

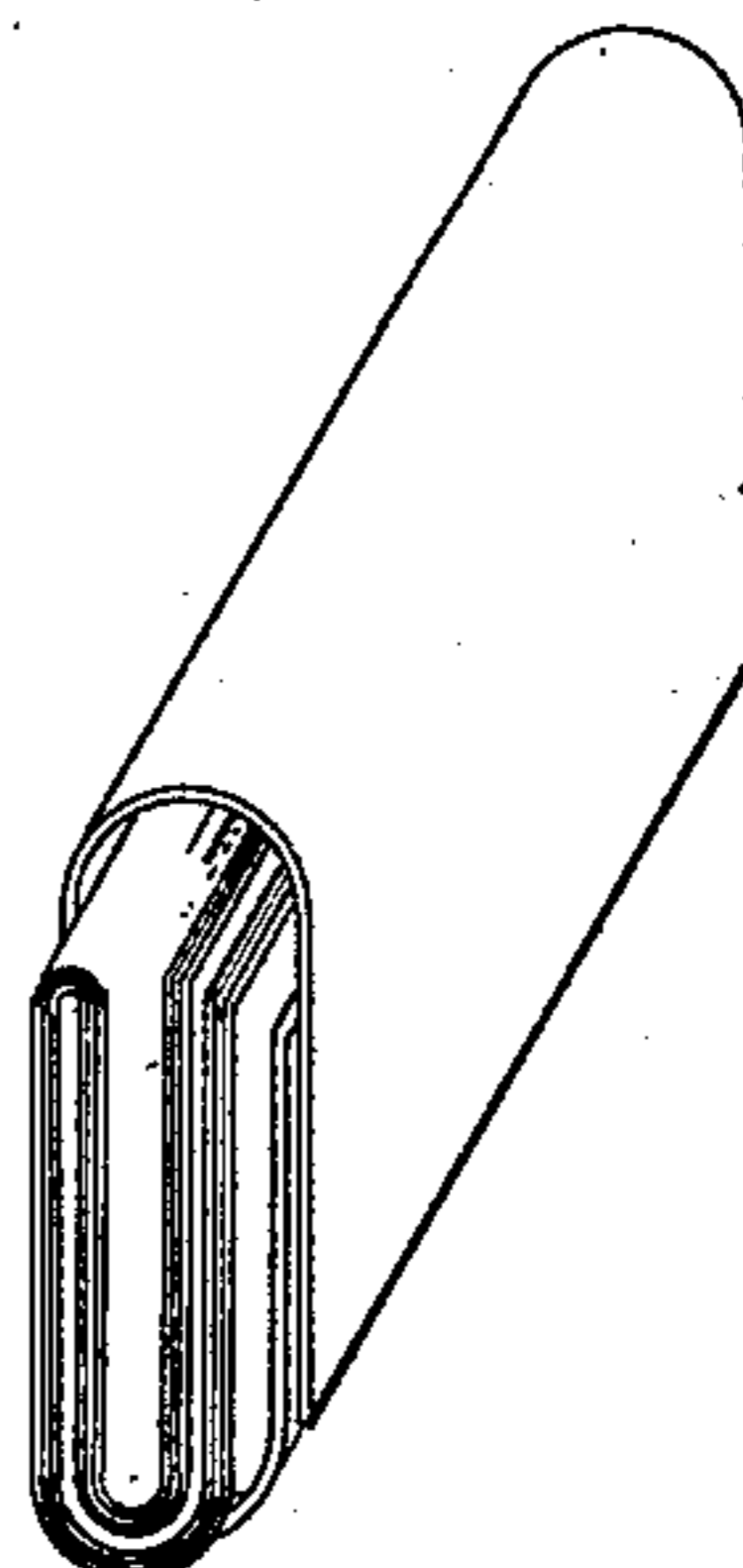


Fig. 37.

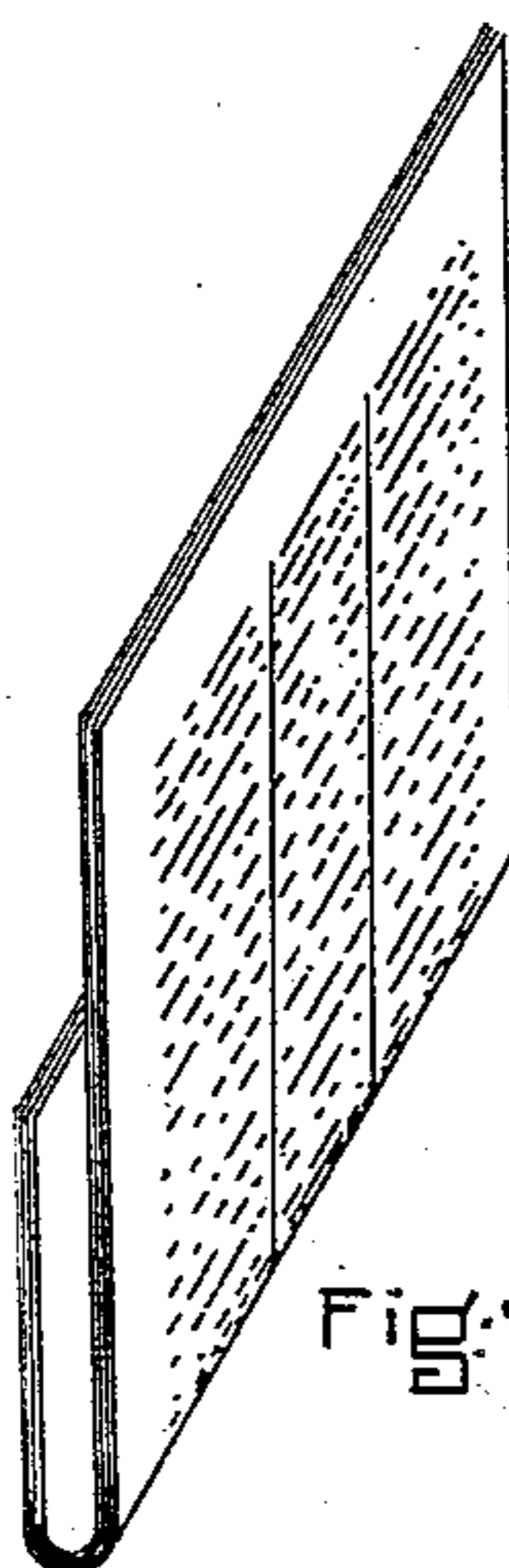


Fig. 38.

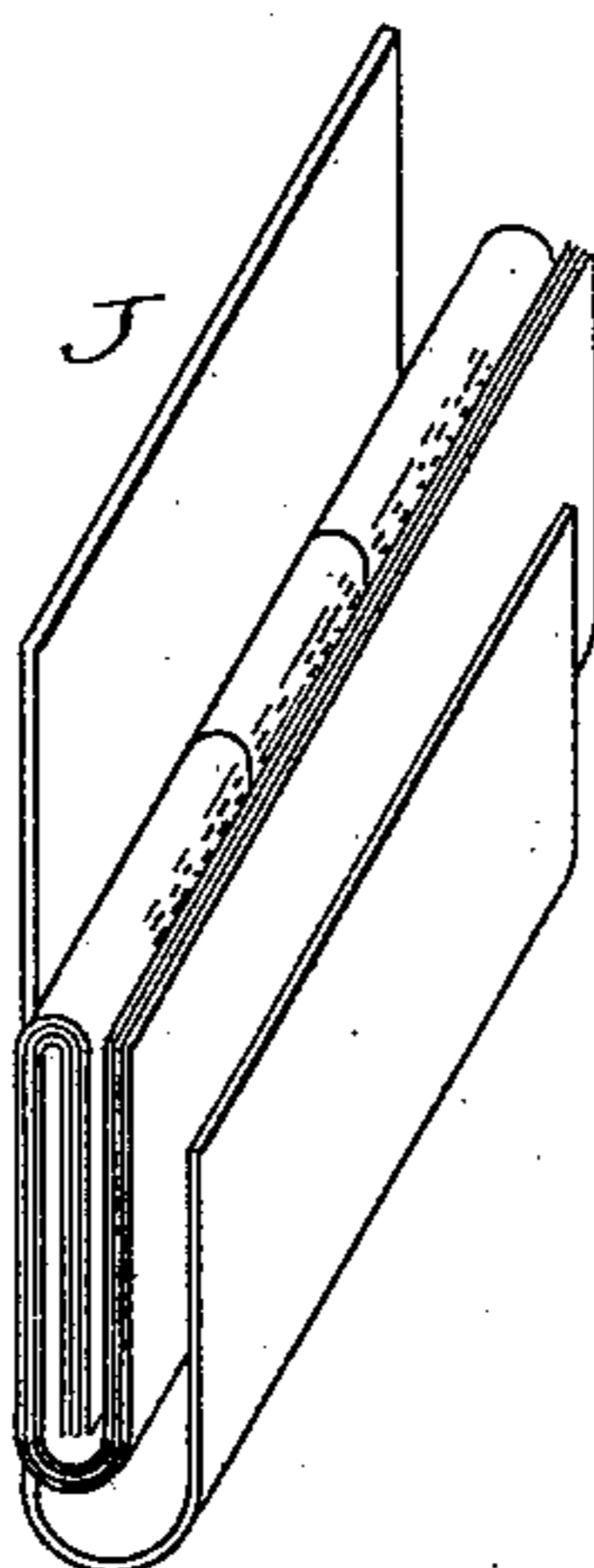


Fig. 39.

WITNESSES.
Frederick L. Emery.
John H. Prunkert

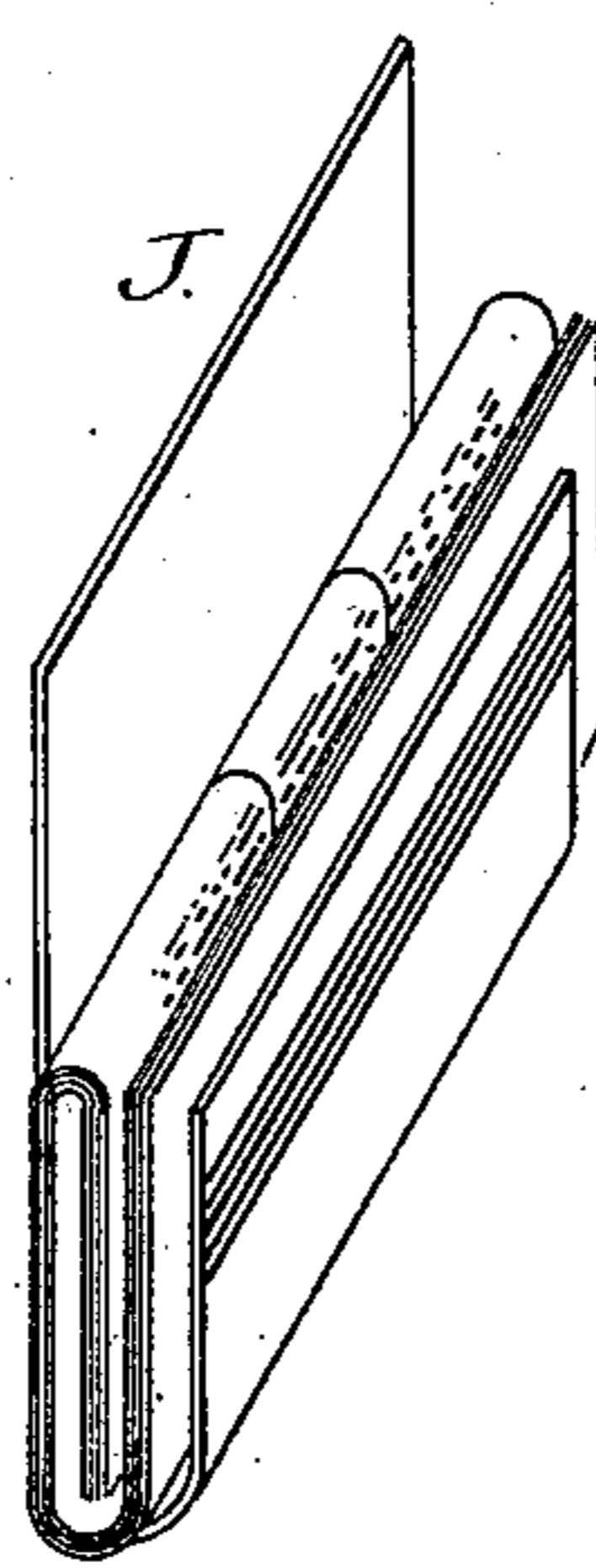


Fig. 40.

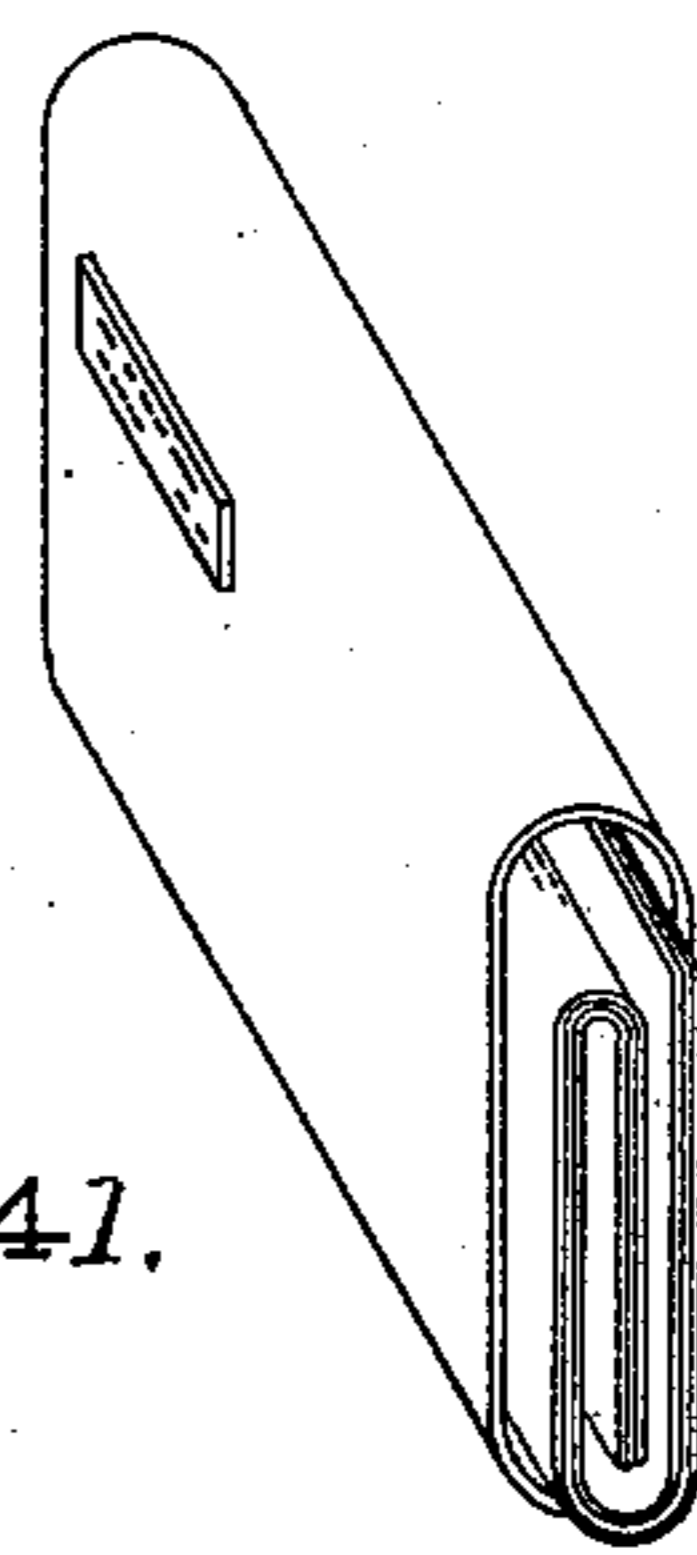


Fig. 41.

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Erastus Woodward
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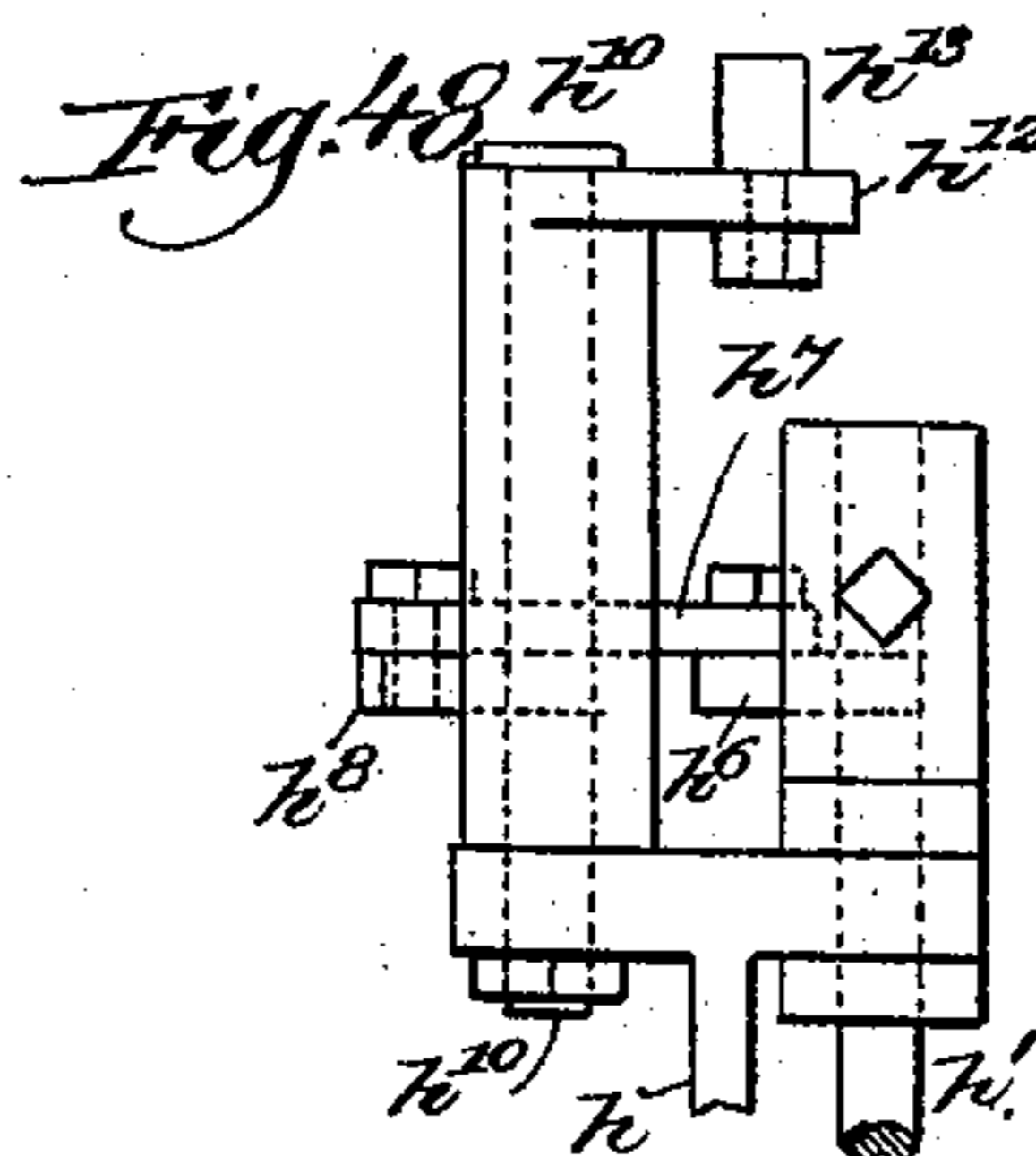
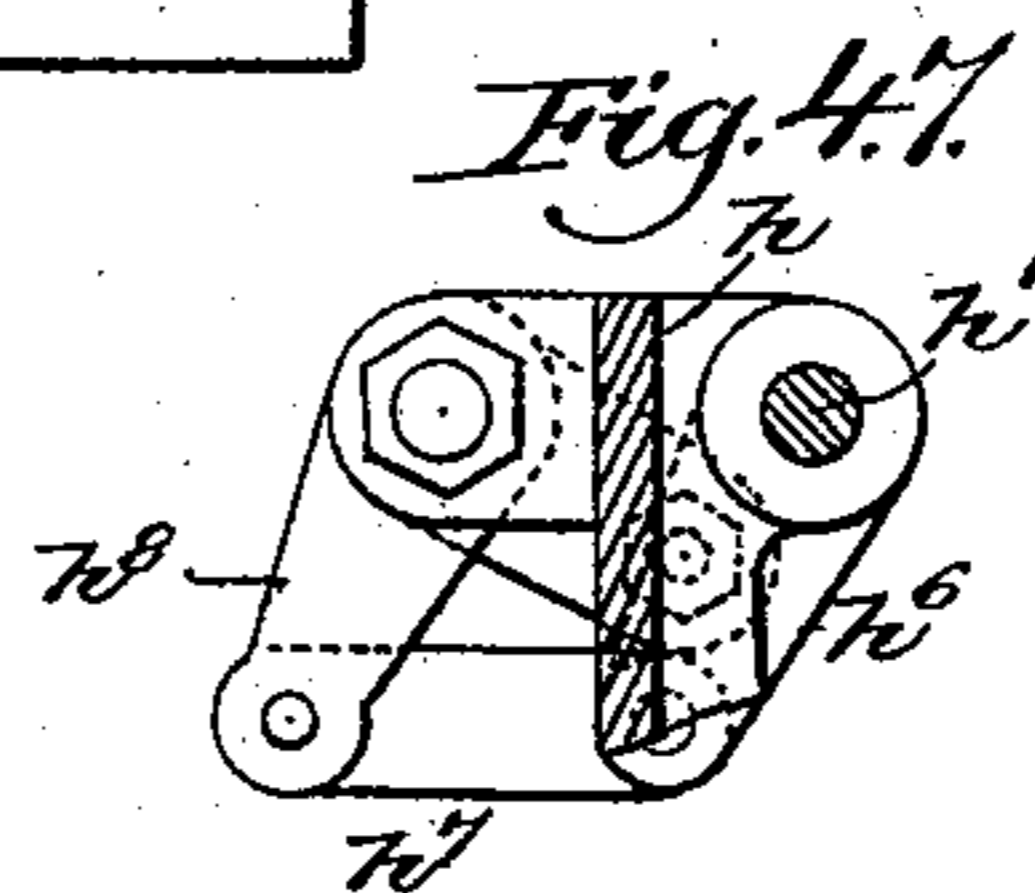
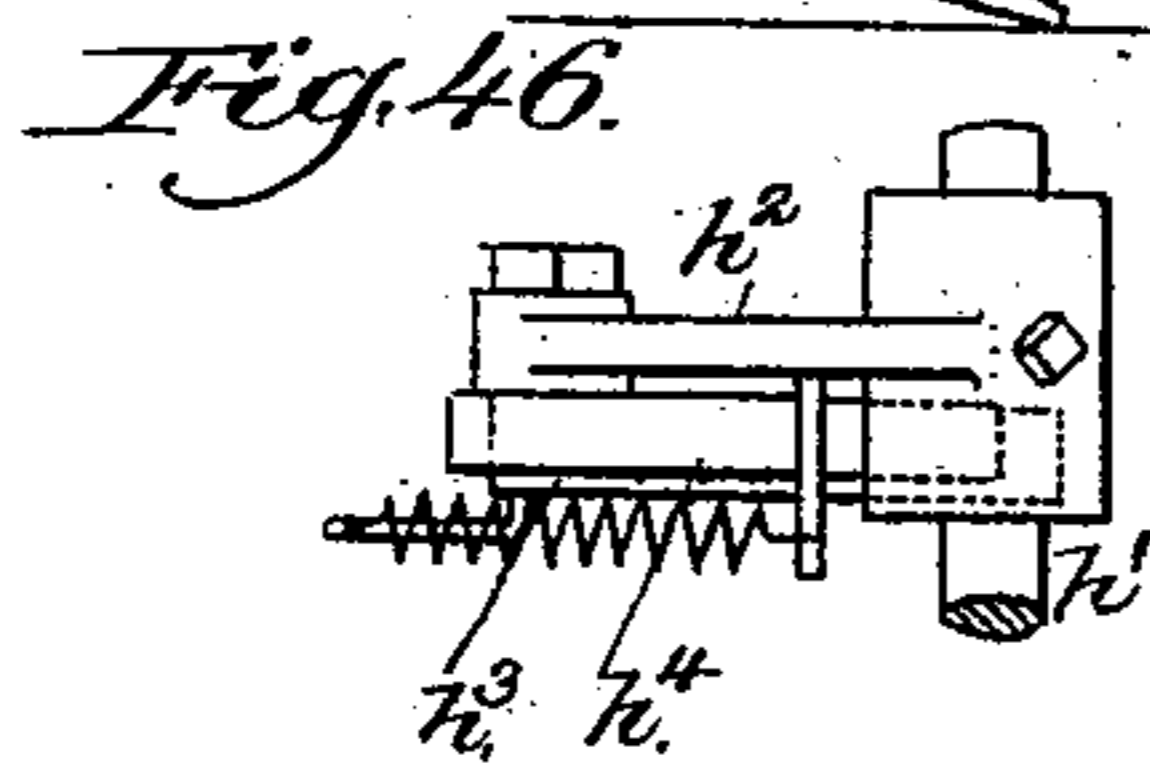
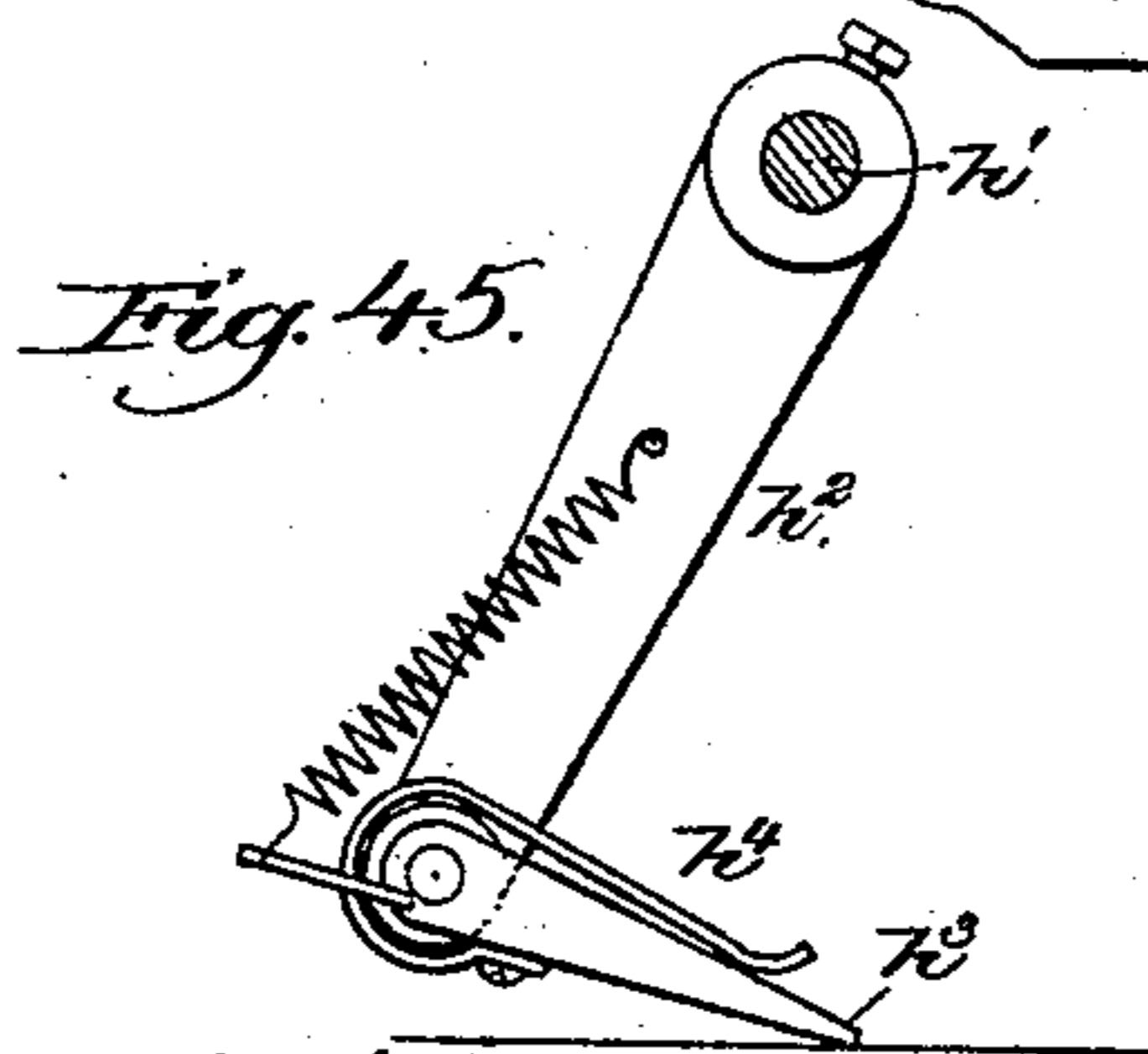
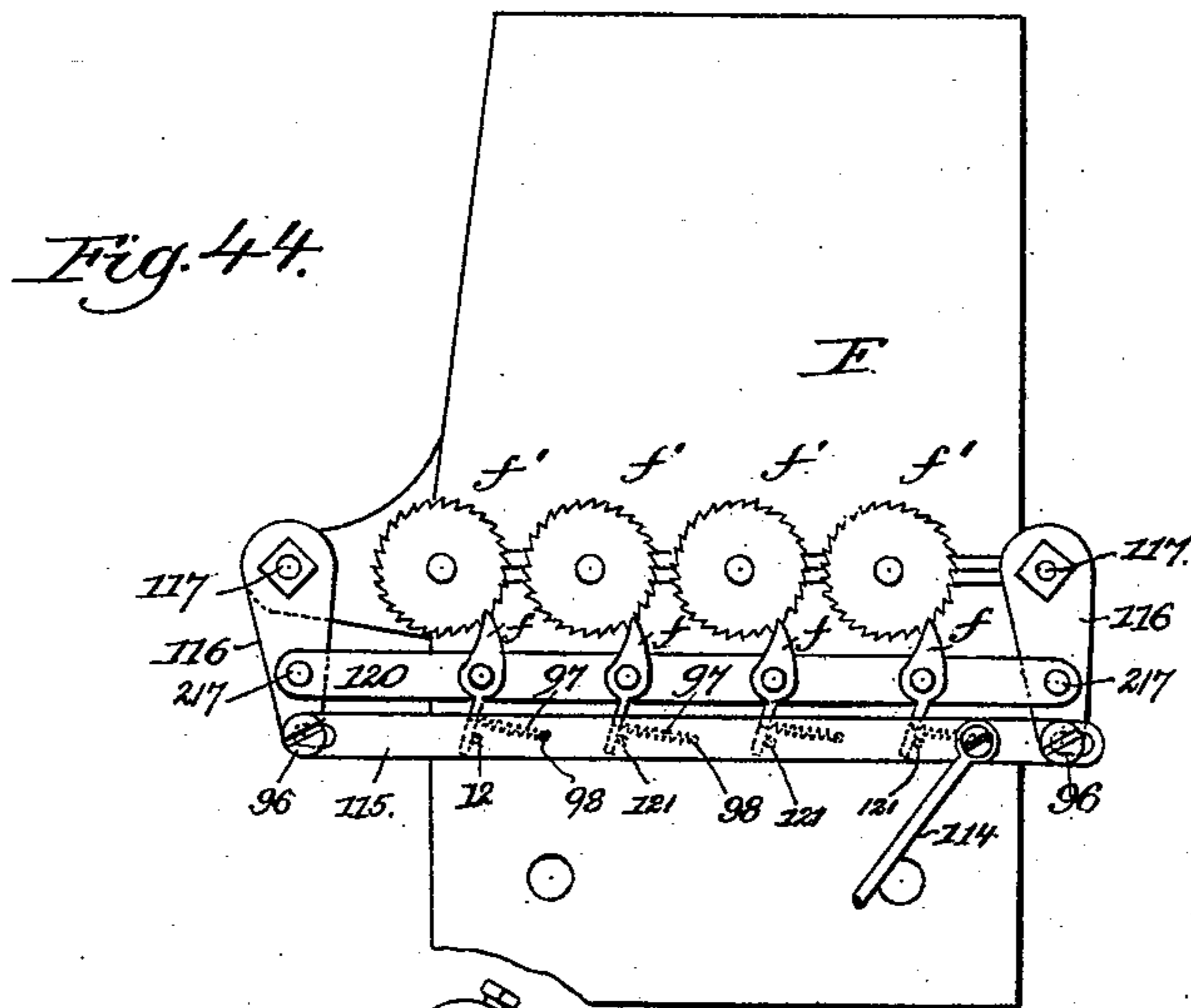
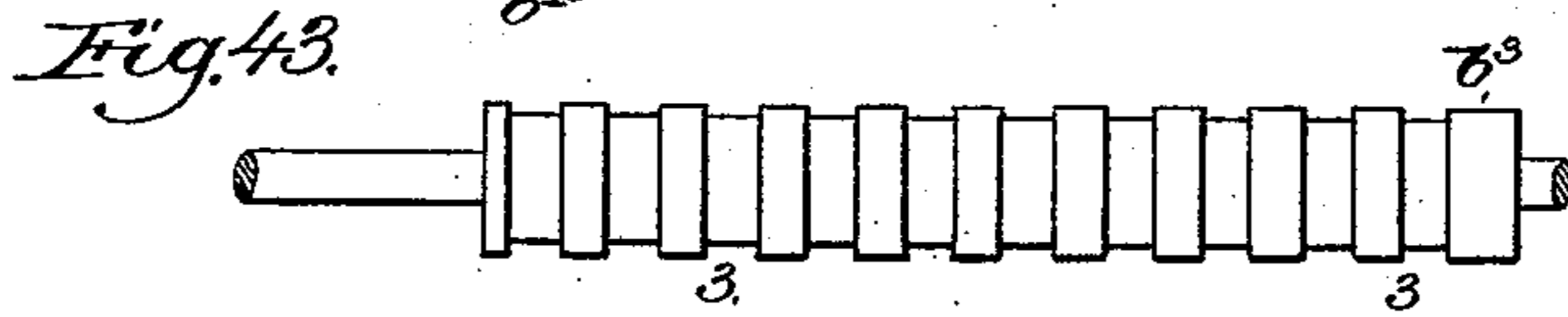
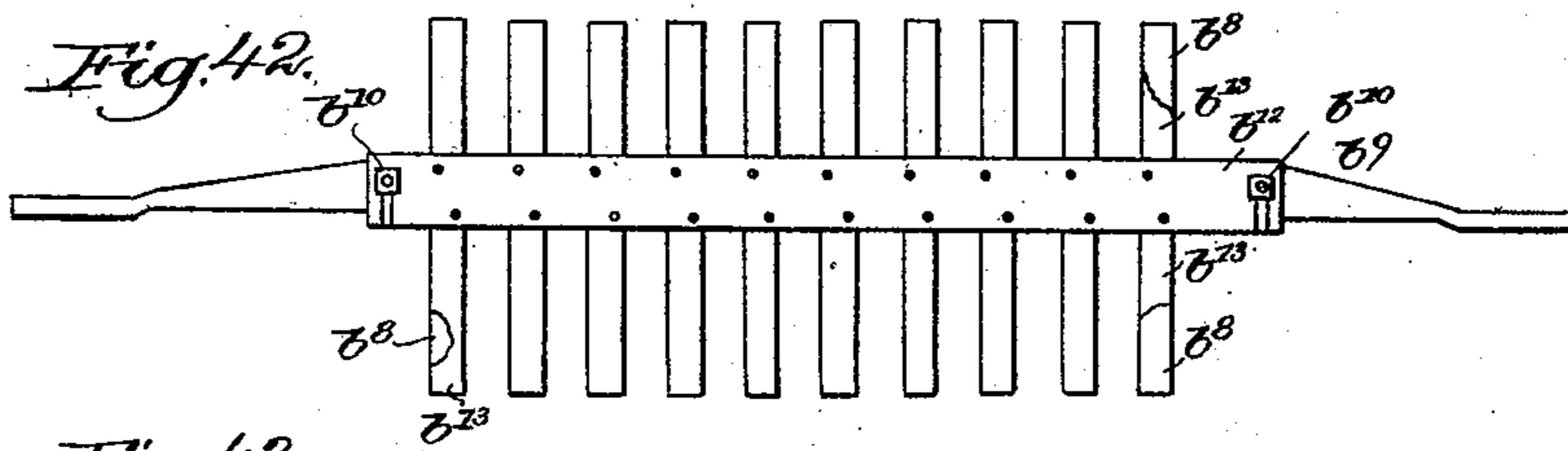
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16 Sheets—Sheet 15.

E. WOODWARD.
MAILING MACHINE.

No. 408,202.

Patented July 30, 1889.



Witnesses.
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MAILING MACHINE.

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Patented July 30, 1889.

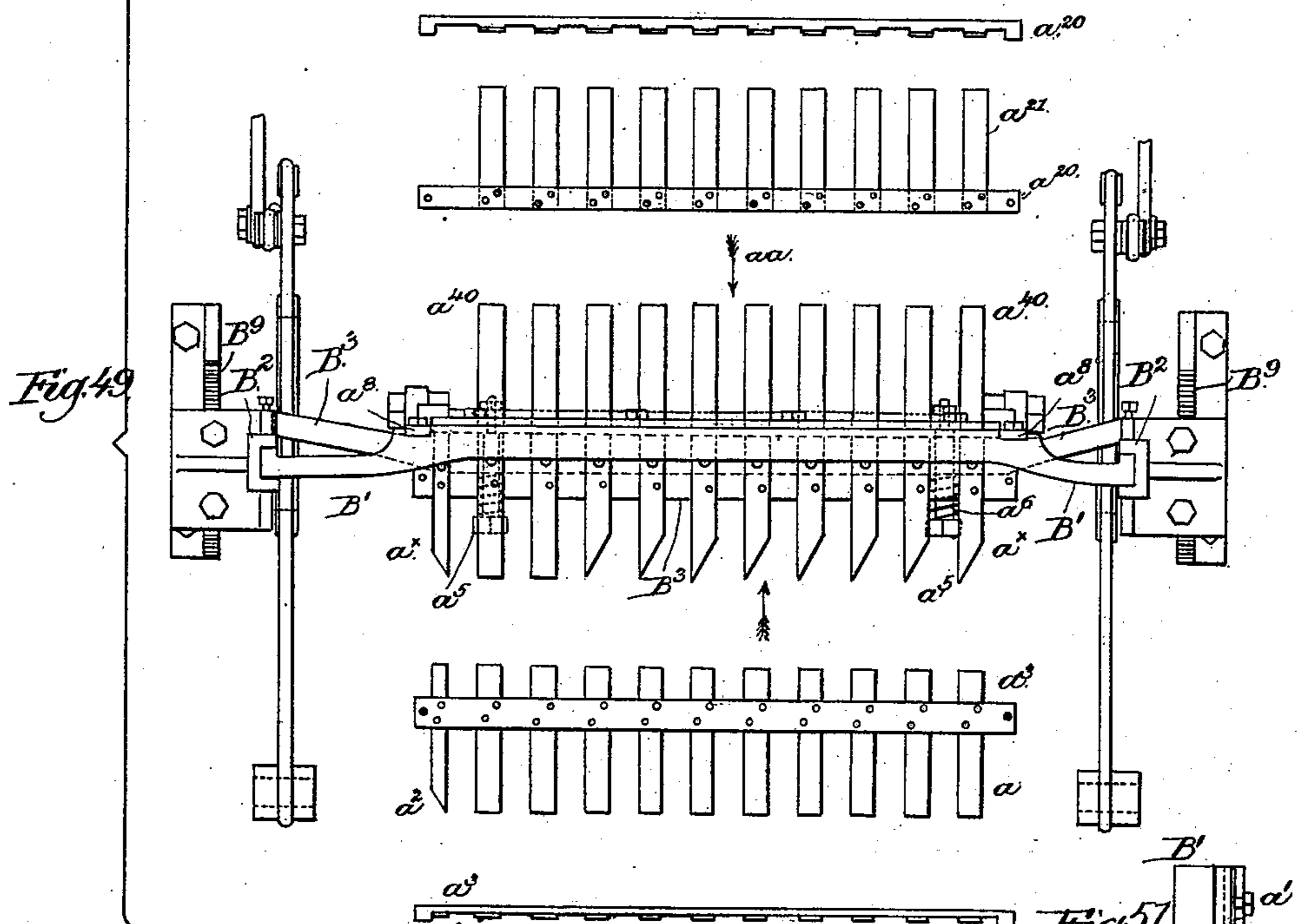
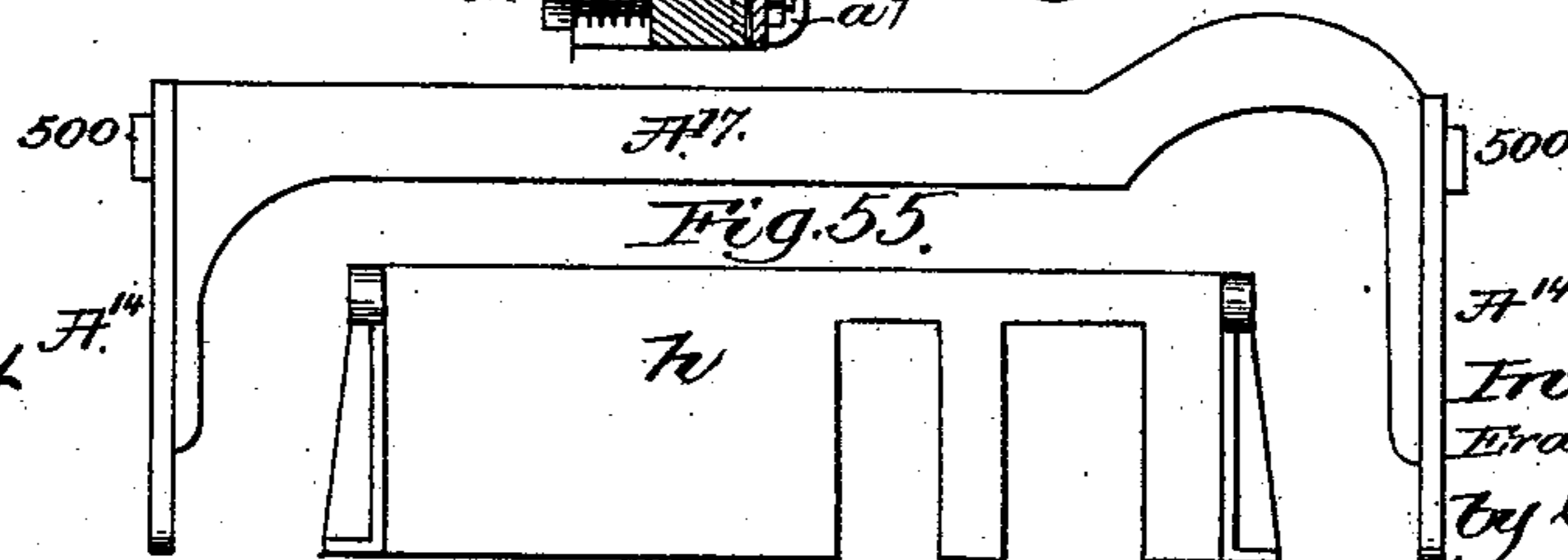
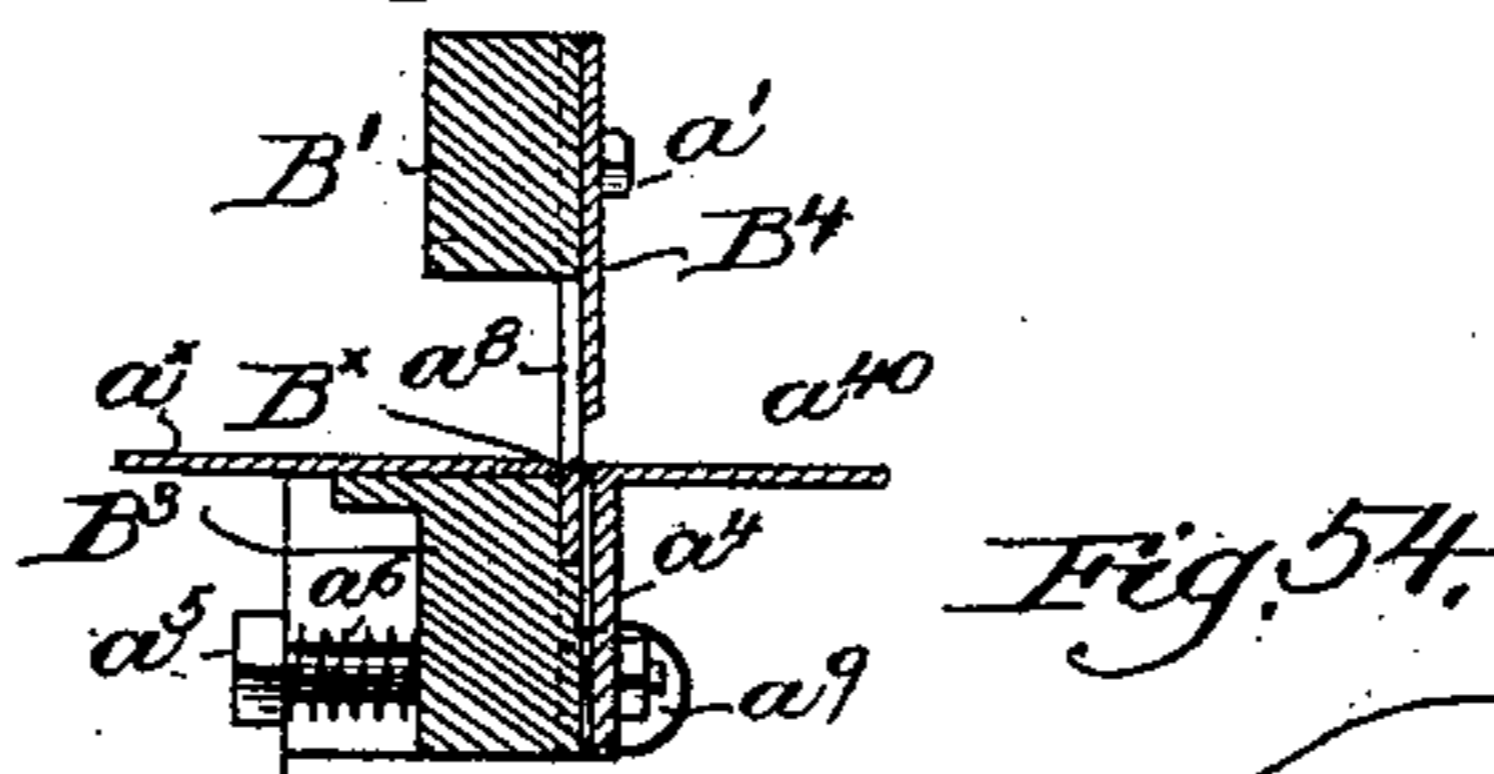
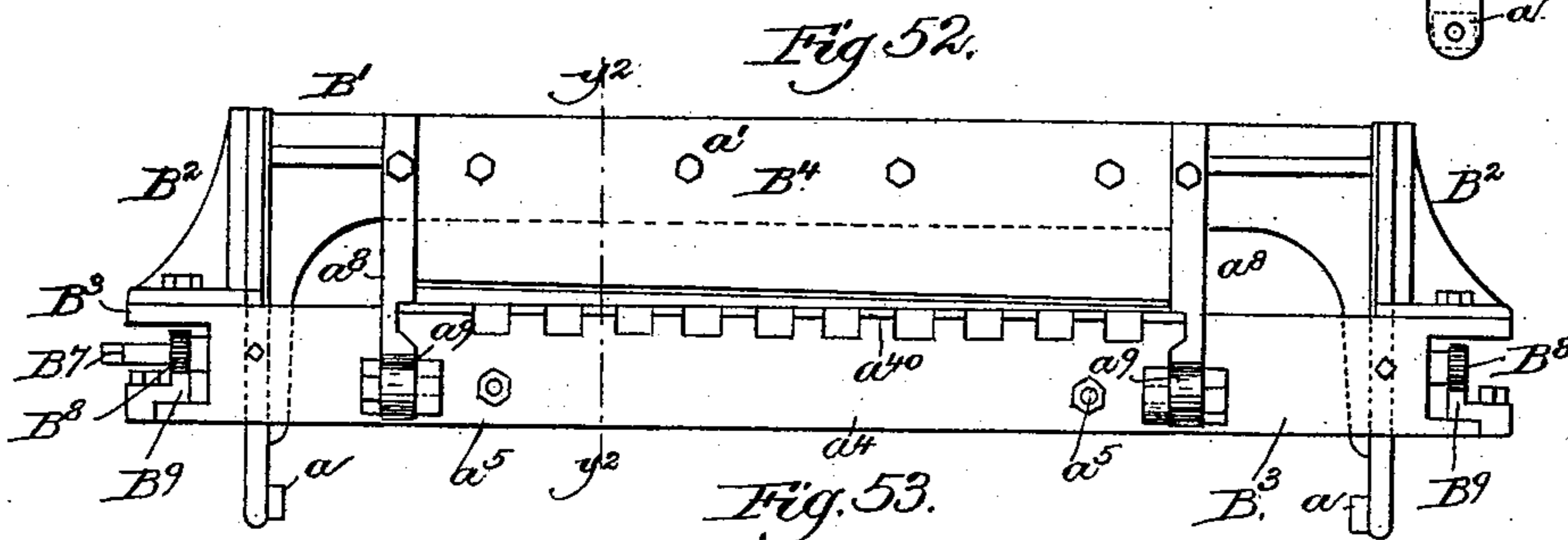
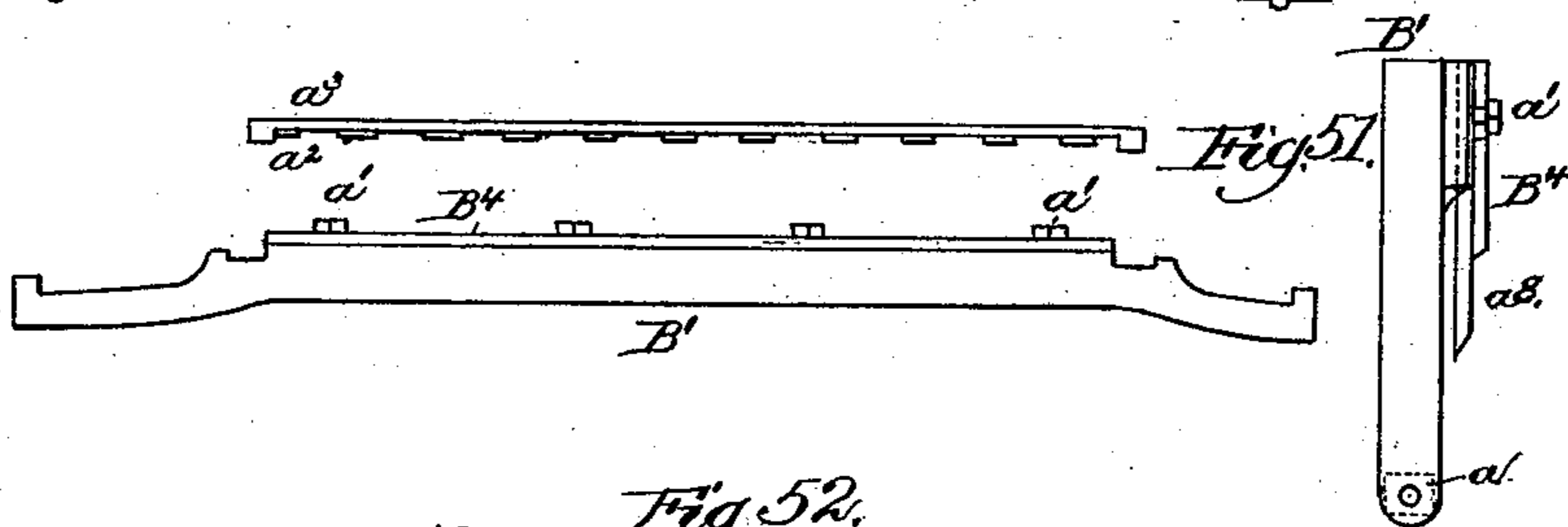


Fig. 50.



Witnesses.
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Fig. 55.

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by Leroy G. Gray
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UNITED STATES PATENT OFFICE.

ERASTUS WOODWARD, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO THE
WATERS WRAPPING AND MAILING MACHINE COMPANY, OF PORTLAND,
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MAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,202, dated July 30, 1889.

Application filed April 21, 1888. Serial No. 271,447. (No model.)

To all whom it may concern:

Be it known that I, ERASTUS WOODWARD, of Somerville, county of Middlesex, and State of Massachusetts, have invented an Improvement in Mailing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention is an improvement on that class of machine represented in United States Letters Patent No. 264,385, dated September 12, 1882, to simplify the same and increase the speed of mailing papers and other articles.

15 In the machine described in the patent referred to but one size of paper could be folded and wrapped, and the machine had to be stopped periodically to feed it with papers, and so, also, the wrapper-web and also the addressing-web were fed from their rolls intermittently, and the result was such unevenness of feed as to soon necessitate stopping the machine to alter or adjust tensions.

25 In this present invention papers are placed in a raceway-box having a bottom composed of a series of rolls, which act to project forward or out of the box at the proper time the lowermost paper of the pile, and the papers can consequently be added from time to time while the machine is in motion. To prevent the paper taken from the box to be folded from twisting aside or out of direct path, I have combined with the first folding-blade a presser which co-operates with the edge of the said blade just as it is about to pass the paper between the first pair of folding-rolls, the presser releasing its hold upon the paper after the fold in the paper has been properly started. I have also combined with the paper-feeding mechanism located between the first and second folding blades and rolls suitable jaws to take the papers from the said feeding mechanism and draw them squarely to a defined position under the second folding-blade. I have also combined with the second folding blade and rolls feeding-jaws and devices to carry them, the said jaws and devices being adjustable with re-

lation to the second folding devices to thus insure the folding of the once-folded paper midway its ends no matter what the size of the paper. Herein the wrapper-web is unwound continuously from the roll carrying it to thus form slack in advance of the regular feeding-rolls, which act to feed the wrapper-web forward to the paper or article to be wrapped and to the cutter to cut off the wrapper-web and form the wrapper. Providing the wrapper-web with slack in advance of the feeding-rolls relieves the feeding-rolls from the duty of rotating the reel of paper and enables the machine to be run at high speed without subjecting the wrapper-web to excessive strain, the strain on the wrapper-web being only that due to the friction of the web on its support. I have also provided the machine with a novel mechanism for actuating the feed-rolls for feeding the wrapper-web, the devices being so constructed as to obviate noise and reduce to the minimum the wear between the ratchet and pawl. I have mounted the cutting-off mechanism for the wrapper-web upon a bed made adjustable with relation to the length of the machine and toward and from the second folding blade and rolls to thus insure the proper amount of "lip" or overlapping portion for the wrapper. I have combined with the knife for severing the wrapper-web and the horizontally-movable carriage to which the knife is attached a reciprocating skeleton bed which is located between the second folding mechanism and the web-cutting mechanism to uniformly support the wrapper-web. I have provided between the cutting mechanism for the wrapper-web and the feeding-rolls which move it forward skeleton beds and top plates which permit elongation of the bed according to the adjustments of the various parts. I have also combined with the second folding mechanism and the jaws which receive and clamp the associated paper and wrapper a transferring device which grasps both the wrapper and paper as they leave the folding mechanism and transfers them into jaws of a rotating cylinder. Co-operating with the said jaws I have provided suitable adjustable stops to deter-

mine the position of the folded and wrapped paper in the jaws. I have also materially changed the jaws which receive the folded paper with the wrapper thereon, so that the said jaws are readily self-adapting to papers of varying thickness, and yet the jaw members always remain parallel, or substantially so. All the stops co-operating with the jaws are made adjustable together or simultaneously. I have devised an improved pasting mechanism consisting, essentially, of a comb-shaped bar, and I have so constructed the mechanism for imparting motion to the pasting-bars that the same may be driven positively by the same gearing, notwithstanding adjustments of the paste-applying devices. I have also combined with paste-applying bars devices whereby the said bars have given to them a variable motion, so as to come quickly against and apply paste to the lip of the wrapper, retain their contact with the paper, travel a short distance with the jaws, then rest while the jaws go away, after which the paste-applying bars are thrown quickly away out of operative position, the bars traveling in a circle, but at a variable speed. I have combined with the jaws what I denominate "lip lappers or sealers," said devices consisting, essentially, of flat plates which bear against the wrapper on the paper, and by a rocking motion lay the lip part of the wrapper over upon the pasted body of the wrapper, the said lip-lappers and folding-jaws continuing to exert pressure and hold the paper and wrapper together until the wrapped paper is fed between the first pair of a series of compressing-rolls. I have also combined with the jaws a bunter, which assists in removing the wrapped paper from between the jaws when the latter are slightly open, but moving in their rotary path, the snugness of the fit of the wrapper on the paper being effected by pressure between the so-called "pad" and the lip-lapper, the said devices receiving between them the overlapping or lip part of the wrapper and exerting sufficient friction thereon as the bunter pushes the paper and wrapper out of the jaw to strain the wrapper closely about the paper. The jaws herein to be described are so made as to take papers, catalogues, circulars, magazines, &c., of any usual lengths, and the wrapper-web may be applied to the papers or other articles at any desired distance from their ends, or the wrapper may be broader than the paper or be narrower than the paper. The addressing-strip is also drawn off from its reel in such manner as to form slack in advance of its engagement by the feeding mechanism, which mechanism moves the said strip intermittently a distance equal to one address, and the said feeding mechanism has been so constructed as to positively engage the addressing-strip when it was to be moved rather than to engage the said strip frictionally, as by rollers, the feeding mechanism being so devised that it engages and feeds the strip forward of the cutting mech-

anism therefor for a distance equal to one address, thus projecting beyond the cutting-blade the address which is next to be wet, cut off, and applied to the wrapper-web, the severance of the strip being substantially in the same transverse line in which the feed engages the strip to move it. The upper member of the cutting mechanism for the addressing-strip has been provided with a rigid foot or flange to overlap the wetted end of the strip for the width of one address, the said foot in its descent with the cutter applying the wet addressing-slip directly to the wrapper-web under it. I have combined with the addressing-strip and its feeding mechanism a wetting mechanism to wet the gummed side of the said addressing-strip at each single stroke. The mechanism employed to manipulate the addressing-strip has a clamp which clamps the same at bottom and top and holds it in elevated position while the wetting device wets the strip, and then the clamping mechanism descends nearly to the wrapper-web, when the address next to be applied is cut off, as stated, the clamp acting to prevent any twisting or curling of the addressing-strip after it is wet and between that time and the time of cutting off each slip. I have combined with the mechanism for feeding the addressing-strip a roll over which the wrapper-web is extended, and this roll has been made adjustable in order to thereby enable the addressing-slip to be applied to any part of the wrapper-web, so as to always leave the address upon the face of the wrapper.

Prior to my invention I am aware that a wetting device having a tube provided at its end with a sponge or absorbent has been moved across and in contact with a gummed addressing-strip and then back again into its normal position prior to cutting off each address; but herein the gummed surface of the addressing-strip has water applied to it by a non-fibrous roll, which carries only a thin film of water, just enough to moisten and not saturate the addressing-strip, and I have also devised the mechanism for actuating the wetting device that it operates at each stroke of the wetting device in each direction, thus greatly economizing time of the machine.

Specific features constituting my invention and combination of elements going into an organized machine for the wrapping and addressing papers are hereinafter more particularly described, and pointed out in the claims at the end of the specification.

Figure 1 is a top or plan view of a machine embodying the invention to be herein described, with the exceptions of the box for the reception of the papers and the feed mechanism co-operating therewith, the parts so omitted being shown in Figs. 2, 4, 5, and 6. Fig. 2 is a front elevation of the machine shown in Fig. 1, but with the box and feed mechanism for the papers added, the delivery mechanism for taking the folded and wrapped papers

from the carrier and the carrier being omitted, said parts being, however, fully shown in other figures. Fig. 3 is a rear end view of the machine shown in Fig. 1. Fig. 4 is a left-hand side elevation of the machine shown in Fig. 1, some of the parts at the top of the machine being omitted, the said parts being, however, shown in Figs. 1 to 3 and other detailed figures to be referred to; Fig. 5, a right-hand side elevation thereof, the driving-pulley being omitted; Fig. 5^a, a detail, to be referred to, of the yoke A¹⁷ and its arms A¹⁴. Fig. 6 is a longitudinal section of most of the machine in the dotted line *x*, Fig. 1. Figs. 6^a and 6^b are details showing the clamp or pressers co-operating with the first folding-blade. Fig. 7 is a sectional detail referring to the rotating carrying-jaws, the said figure showing the devices employed for adjusting the stops co-operating with the said jaws. Fig. 8 is a detail of one end of the shaft employed for adjusting the said stops. Fig. 9 is an inner side view of one of the scroll-cams employed to adjust a series of stops in unison. Fig. 10 is a detail to be referred to, showing the opposite side view of the scroll-cam, together with means for rotating it. Fig. 11 is a detail showing parts of the delivery mechanism or devices employed to take the wrapped papers or articles away from the jaws and hold them pressed together while the wrapper dries. Fig. 12 is a detail of one of the rollers employed in the train or series of rolls forming part of the delivery mechanism. Figs. 13, 14, and 15 show in elevation and in sectional detail part of the mechanism for taking the papers from the box to the first folding mechanism. Figs. 16, 17, and 18 are details showing the devices which feed the folded paper from the second folding mechanism into the jaws and the bunter which aids in discharging the folded and wrapped paper from the jaws; Fig. 17^a, a section of Fig. 17 in the line *x*³. Fig. 18^a is a plan view of the front portion of the bunter detached. Fig. 19 is a detail showing the disk or head in which the stops co-operating with the jaws slide. Fig. 20 is a sectional detail to show the construction of the jaws which carry the folded papers or articles and some of their actuating parts. Fig. 21 is an enlarged detail showing part of the mechanism for feeding and cutting off the addressing-strip and carrying it down to the addressing-web, the said view showing the cutting members for severing the addressing-strip. Fig. 21^a is an enlarged detail of the pasting mechanism and means for operating it. Fig. 22 is a section of Fig. 21 in the line *x*². Fig. 22^a is a detail chiefly to show the block 204 and the rod 217, to which it is attached. Fig. 23 is a detail showing part of the wetting mechanism to wet the gummed side of the addressing-strip. Fig. 24 is a sectional detail in the line *x*³, Fig. 22. Fig. 25 is a sectional detail in the line *x*⁴, Fig. 21, showing the friction device which co-operates with one member of the cutting

mechanism for the addressing-strip. Fig. 25^a is an enlarged detail of the addressing-strip. Fig. 26 represents a detail of the toothed clutch mechanism employed to rotate the feed-roller to feed the wrapper-web, the sector-lever for actuating the said clutch mechanism being shown in Fig. 4. Fig. 27 is a section of Fig. 26 in the line *y y*; Fig. 27^a, a detail showing the plate D⁴. Fig. 28 is a detail to be referred to, it showing part of the pasting devices to paste the wrapper. Fig. 29 is a section in the line *x*⁷, Fig. 28, looking to the right. Figs. 30, 31, and 32 are details showing the different positions occupied by the gearing employed to actuate the pasting device, the said gearing permitting the position of the paste-applying device to be changed to apply the paste more or less over upon the wrapper and yet be operated correctly in all its positions. Figs. 33, 34, 35, 36, and 37 are details showing a paper or article in its flat state, then in its once-folded state, and so on into a sealed wrapper. Figs. 38, 39, 40, and 41 show modified forms of folding which may be practiced on the machine herein described by merely adjusting the parts. Fig. 42 is a detail showing the skeleton bed or support for the wrapper-web; Fig. 43, the lower feed-roller co-operating with it. Fig. 44, on an enlarged scale, shows parts of the devices for rotating the rolls in the paper-receiving box; Figs. 45 and 46, details showing the spring-jaws for taking the once-folded paper and putting it in position to receive the second fold; Figs. 47 and 48, details of the mechanism for actuating the said spring-jaws. Fig. 49 is a detail showing distended or separated the top and bottom plates co-operating to support and direct the wrapper-web, and also the knife which severs it, together with the movable jaw and its attached fingers which co-operate to support and also hold down in place the wrapper after the same has been severed from the wrapper-web, the said jaw being made movable horizontally toward and from the fixed part of the bed, which forms the stationary cutting member, to co-operate with the blade which severs the wrapper-web. Fig. 50 is a plan showing the yoke-shaped slide B⁷; Fig. 51, a left-hand end elevation of the said yoke and its attached knife. Fig. 52 is a view of part of Fig. 49, looking at it in the direction of the arrow *a a*. Fig. 53 is a section in the line *y*² *y*², Fig. 52; Fig. 54, a detail of the bar A¹⁷, and Fig. 55 a detail of the bar *h*.

The frame-work A, of suitable shape to receive the working parts, has suitable bearings for the reception of the main shaft A', provided with a suitable pulley A² to receive a belt by which to rotate the said shaft; but the shaft may be rotated in any usual manner. The main shaft A' has attached to it just outside the frame-work a pinion A³, (see Figs. 1 and 2,) which engages a large toothed gear A⁴, fast on a shaft A⁵, which carries the jaws or clamps to be described, their co-oper-

ating mechanism, and devices for actuating them. The main shaft A', just inside the frame-work, (see Fig. 2,) has fast to it two like cam disks or plates A⁶, each provided at its outside with a cam-groove, as A⁷, (see dotted lines, Figs. 5 and 6,) the said cam-grooves receiving roller or other studs attached to the ends of elbow-levers A⁸, having their fulcrum at A⁹, the said levers at their inner ends being connected or jointed by suitable links, as A¹⁰, with like levers A¹², pivoted at A¹³, the inner ends of the said levers being jointed to downwardly-extended arms A¹⁴ (shown by dotted lines in Fig. 5 and in full lines, Figs. 5^a, 6, and 54) of a yoke A¹⁵, which, as shown in Figs. 5^a, 1, and 54, has at each end a stud, on which is mounted loosely a block, as 500, which blocks slide in grooves of guideways A¹⁶, the said yoke having bolted to it securely the folding-blade A¹⁷, it serving to form the second fold in the paper and associate the paper with the wrapper, as in Figs. 35 and 36.

The levers A¹², one at each side of the machine, one lever being shown in Figs. 5 and 6, are slotted, as at B, to receive loose blocks a, mounted on studs projecting inwardly from a yoke-shaped slide B', adapted to slide vertically in guideways B², forming part of an adjustable bed B³, (shown separately in Figs. 49 and 52,) extended entirely across the frame, the said yoke having bolted to it by bolts a' the knife B⁴, which forms the movable blade of the cutting-off mechanism for severing the wrapper-web B⁶, (see Fig. 3,) a second blade B⁵, bolted to the said bed, serving as the stationary cutting member for the wrapper-web.

The bed B³ has extended across it an adjusting-rod B⁷, (see Figs. 6 and 52,) provided at each end with a small pinion B⁸, (see Fig. 4,) which engages a rack B⁹, secured to the top of the frame-work at each side, rotation of the said shaft enabling the said bed B³ and its attached knives to be adjusted horizontally with relation to the second folding mechanism, and to the jaws and stops (to be described) co-operating therewith, whereby the length of the wrapper may be regulated to enable one end thereof to more or less overlap the other end of the wrapper when the same is applied to the paper or other article to be folded.

The bed B³ referred to has attached to it a series of narrow fingers a*, (see Figs. 6, 49, and 53,) which project toward the rear of the machine, the said fingers supporting the under side of the free end of the wrapper-web B⁶, and immediately above the said fingers is arranged a corresponding set of overlapping fingers, as a², (see Figs. 6 and 49,) which are attached to the under side of a cross-bar a³, bolted to the movable bed B³, the overlapping fingers a² being elevated sufficiently above the fingers a* to afford a space for the passage of the wrapper-web between them.

In front of the bed B³ (see Figs. 6, 52, and 53) I have placed an auxiliary bed, as a⁴, having a series of fingers a⁴⁰, the bed having se-

cured rigidly to it at or near each end guiding-studs a⁵, (see Fig. 6,) which are extended loosely through holes in the main body of the bed B³. The said studs have applied to them springs a⁶, which normally act to keep the bed a⁴ pulled toward the bed B³. The inner ends a⁷ of the fingers a⁴⁰ of the bed a⁴ (see Fig. 52) are extended toward the bed B³. The bed a⁴ also has attached to it at a slight distance above the fingers a⁴⁰ a cross-bar a²⁰, (see Figs. 6 and 49,) having bolted to its under side a series of fingers a²¹ parallel to and located slightly above the fingers a⁴⁰ to leave a space for the passage of the wrapper-web to be severed.

The ends of the fingers a²¹ will in practice be upturned slightly, and will enter for a short distance the spaces between adjacent pairs of fingers a^x a², so as to obviate the formation of a longitudinal space across the machine, up into which the free or leading end of the wrapper-web may enter or be caught on its way to the blade B⁴, and thus prevent its free forward movement. When the knife B⁴ is to descend to sever the wrapper from the wrapper-web, the fingers a⁴⁰ a²¹ must be moved away from the fingers a^x a² to afford a space for the movement of the knife. To do this the yoke B' near each end has been provided with a wedge a⁸, (see Figs. 6, 49, 51, and 53,) which projects downwardly, the said wedge, as the blade B⁴ begins to descend, striking against rollers a⁹, (see Figs. 1, 52, and 53,) attached to each end of the frame a⁴, thus moving the said frame bodily away from the bed B³ and toward the front of the machine, compressing the springs a⁶ referred to.

The slot B referred to, as will be understood, enables the block a to move therein when the bed B³ is to be adjusted horizontally, as before described. The roll of paper constituting the wrapper-web B⁶ (see Fig. 3) is secured upon a shaft C', having suitable bearings in uprights C², secured to the frame-work. The wrapper-web B⁶ is passed down under a pull-off roll C³, (shown in Figs. 1 and 3,) and thence up over a smaller pull-off roll, as C⁴, co-operating with it, the latter roll acting merely as a presser-roll to nip the wrapper-web against the roll C³. The pull-off roll C³, at its outer end, is provided with a cone-pulley C⁵, over which is extended a belt C⁶, under the control of a suitable belt-shipper C⁷ on a bar b, the said belt being extended down and about a reverse-shaped conical driving-roll C⁸ (see Figs. 1 and 3) loose on a stud C⁹, (see Fig. 5,) secured to the main frame-work, the rear end of the said roll C⁸ being provided with an attached pinion C¹⁰, (see Fig. 3,) which is engaged and rotated by an intermediate pinion C¹², fast on the shaft C¹³, it actuating the lapping or sealing devices, to be described, the gear C¹² referred to deriving its rotation from the toothed gear A⁴, before referred to. The wrapper-web drawn positively from the roll on the shaft C' by the rolls C³ C⁴ passes over the shipper-

bar b , and thence under a guide-roll b' , (see Fig. 6,) where the said web is shown dotted, and thence through below the addressing mechanism, to be described, thence over, 5 about, and under a guide-roll b^2 , from which the wrapper-web is led between the feeding mechanism proper for the wrapper-web, it consisting of a roll b^3 , extended across the frame-work, and a single narrow roll b^4 , it 10 being shown in Fig. 3 as dotted behind the roll b^3 .

The journal of the roll b^3 has connected to it (see Fig. 5) a pinion b^5 , which engages a pinion b^6 of corresponding size, attached to 15 the journal of the shaft b^7 , carrying the said narrow roll b^4 , the shaft b^7 referred to being driven from its opposite end by mechanism which will be presently described.

The lowermost feeding-roll b^3 is provided 20 with a series of annular grooves, as 3, (shown in Fig. 43,) into which are extended fingers b^8 , securely attached to a cross-bar b^9 , bolted to the standards supporting the feed-rolls b^3 b^4 , the rear ends of the said fingers entering the 25 said annular grooves being somewhat curved downwardly to prevent the wrapper-web from coming under them, the upper sides of the annular projections forming the acting periphery of the said roll, and the upper sides 30 of the said fingers entering the said annular grooves being substantially at the same level. These fingers b^8 are extended forward beyond the cross-bar b^9 to enter spaces between the fingers a^* referred to, which project back- 35 wardly from the adjustable bed B^3 , the said fingers b^8 being dovetailed, as it were, one with relation to the other, so as to form a continuous level bed notwithstanding horizontal adjustment of the bed B^3 .

To keep the wrapper-web properly down 40 upon the stationary bed composed of the cross-bar b^9 and the fingers b^8 , the said bed has detachably connected with it, by screws b^{10} , an auxiliary cross-bar b^{12} , to which are at- 45 tached fingers b^{13} , (see Fig. 42,) the said fingers lying directly above but not in contact with the fingers b^8 , the fingers b^{13} also extending forward into the spaces between the fingers a^2 . (See Fig. 49.)

The pull-off rolls C^3 and C^4 , running con- 50 tinuously, pull off from the roll of wrapper-web, in advance of the requirements of the feeding, an amount of wrapper-web sufficient for the next wrapper needed, and make slack 55 in the wrapper-web, (see Fig. 6,) which is taken up by the feeding-rolls b^3 b^4 as needed, the said feeding-rolls being thus relieved from the duty of turning the roll of wrapper-web, the feeding-rolls not having, as will be seen, to 60 overcome the varying friction or tension due to decreasing size and weight of the roll of wrapper-web, and being also freed from the tension of starting the roll of wrapper-web intermittingly, as it would have to do were not 65 the wrapper-web fed out or pulled off and made slack before the intermittingly-operat-

ing feed-rolls b^3 b^4 started to feed the wrapper-web forward to the paper to be wrapped.

The main shaft A' , at the left-hand end of the machine, (see Fig. 4,) is provided with a 70 pulley D^* , having adjustably connected to it a link, as D , which is pivoted to one end of a sector-lever D' , mounted upon a stud D^2 , the toothed end of the said sector-lever engaging a pinion D^3 . The pinion D^3 is secured to the 75 hub of a plate D^4 , (see Figs. 26 and 27,) loose on the shaft b^7 , the said plate being provided with two pins D^5 , and having two slots, somewhat elongated, to receive the reduced ends of two pawl-carrying studs D^7 D^8 , erected 80 upon a plate D^9 , surrounding loosely the end of the ratchet-gear D^{20} , fast on the shaft b^7 , the hub of the said plate D^9 being acted upon by a spring D^{10} , made adjustable as to its length 85 by a nut D^{12} , screwed upon a threaded part of the end of the said shaft, the said spring acting to force the inner sides of the said plate D^9 frictionally against the outer side of the said ratchet-wheel D^{20} .

The studs D^7 D^8 have mounted loosely upon 90 them two pawls D^{14} D^{15} , the engaging ends of which are pointed in the same direction, the said engaging ends being held normally in engagement with the teeth of the ratchet-wheel D^{20} by means of like springs, as D^{16} . (Shown 95 in Fig. 26.)

In operation, when the toothed end of the sector-lever D' is moved toward the rear end of the machine, the pawls D^{14} D^{15} , held in en- 100 gagement with the teeth of the pinion D^3 , rotate the feeding-rolls b^3 and b^4 . When the sector-lever D' is reversed, the plate D^4 , connected with the pinion D^3 , is also reversed, and by reason of the slots D^6 in the said plate permit the latter to move backward for a 105 short distance before the said plate actually engages the studs D^7 D^8 , carrying the pawls D^{14} D^{15} , thus permitting the said pins or projections to strike the outer ends or tails of the said pawls and throw their inner 110 ends out of engagement with the ratchet-teeth of the wheel D^{20} , the inner ends of the said pawls being retained out of engagement with and so as not to touch the said ratchet-teeth during the entire backward movement 115 of the sector D' ; but as soon as the said sector again commences to move toward the rear of the machine the plate D^4 , having the slots referred to, starts forward a little before the friction-plate D^9 and removes the pins or pro- 120 jections D^5 from the outer ends or tails of the said pawls, permitting the springs to throw the inner ends of the said pawls into engagement with the teeth of the ratchet-wheel D^{20} , the small amount of lost motion due to the 125 slots D^6 , which are a little longer than the diameter of the studs upon which the pawls are mounted, enabling the said pins or projections to be thrown against and then removed from the outer ends of the pawls, in 130 one instance before the friction-plate D^9 is started by the plate D^4 and in the other in-

stance before it is stopped, the difference between the size of the slot and the diameter of the pawl-carrying studs being proportioned to the distance it is desired to remove the inner ends of the pawls from the teeth of the ratchet-wheel D²⁰.

The guide-roll b² is, as herein shown, mounted upon pointed screws b¹⁴, extended through ears of an adjustable plate b¹⁵, having, preferably, a dovetailed foot, as 516, fitted into a dovetailed guideway c, fixed with relation to the frame of the machine, the said plate b¹⁵ having at its lower side a threaded lug 110, (see Fig. 22,) which receives a screw c', provided with a handle c² and connected with an ear c³, fixed to the frame-work, rotation of the said screw enabling the operator to adjust the guide-roll b² toward and from the feeding-rolls or toward and from the second folding devices and longitudinally with relation to the addressing mechanism to be described, so that the addressed slip cut from the addressing-strip E, taken from a reel or spool E' on a bracket E², may be applied upon the wrapper-web at any desired position, so as to enable the said strip to appear upon any desired part of the wrapper when the latter is applied to the paper.

The main shaft A' has attached to it, within the frame-work near its right-hand side and immediately at the left of the cam A⁶, (see Fig. 2,) a toothed gear c⁴, which engages a toothed gear c⁵ on a shaft c⁶, (see Fig. 6,) which actuates the mechanism (to be described) for feeding the papers or articles out of the receiving-box F.

The shaft c⁶ referred to also has secured to it farther to the left a cam c⁷, provided at one side with a groove c⁸, (see Fig. 4,) the said groove receiving a roller or other stud in one end of an arm c⁹, attached to a rock-shaft c¹⁰, having at each end a like arm c¹², (both shown in Fig. 2,) the arms c¹² being connected loosely by a suitable bolt or stud to the depending arms of a yoke c¹³, provided at each end with a pivoted block 303, adapted to slide in guideways c¹⁴, erected upon the frame work, the said yoke having attached to it by bolts (see Figs. 1 and 6) the first folding-blade c¹⁵, it having co-operating with it two rolls 101 102, each of which is grooved annularly for the reception of the feeding-bands 103 104, the said feeding-bands being extended over other annular rolls 105 106.

The journals of the roll 101 nearest the paper-receiving box F are mounted in suitable usual bearings 107, (see Fig. 5,) which are acted upon by suitable springs 108, the latter enabling the roll 101 to be moved away from the rolls 102 by the action of the paper and the folding-blade c¹⁵ as the latter passes the paper between the said rolls in making the first cross-fold therein.

The journal of the lowermost roll 105 of the pair of rolls 105 106 has fast to it at the right-hand end of the machine (see Fig. 5) a pinion e, which is engaged by a toothed gear e',

fast on the journal of the roll 5, constituting the rearmost roll of the pair of rolls 5 6, which co-operate with the second folding-blade A¹⁷, already described, the said shaft also having fixed to it at the rear of the toothed gear e' a pinion 7, (see Fig. 2,) which is engaged by the toothed gear A⁴, already referred to.

The journal of the roll 105 at the left-hand side of the machine (see Fig. 4) is provided with a pinion e², which engages a pinion e³ of corresponding size attached to the journal of the roll 106, over which is extended the upper set of bands 104, the journals of the said roll at the opposite sides of the machine being mounted in suitable plumber-boxes, which are free to rise and fall to a limited extent to accommodate the said bands and rolls to any variations in the thickness of papers being passed between them and being fed by the said bands and rolls from the first folding mechanism to jaws (to be described) which present the paper to the second folding mechanism.

The journal of the roll 5, constituting the rearmost roll of the pair of rollers 5 6, co-operating with the second folding mechanism, has fast upon it a toothed pinion e⁴, (see Fig. 4,) which engages a pinion e⁵ of corresponding size attached to the journal of the roll 6, said roll having its journals in suitable plumber-boxes controlled by springs e⁶.

The pinion e³ upon the journal of the roller 106 at the left of the machine (see Fig. 4) engages an intermediate gear e⁷, mounted upon a stud e⁸, the said gear engaging a pinion e⁹, secured to the left-hand end journal of the roll 102, the said pinion e⁹ engaging a pinion e¹⁰ of corresponding size fast upon the journal of the roll 101.

The shaft c⁶ has attached to it a frog-cam c¹⁶, (see Figs. 2 and 6,) which in its rotation acts upon a roll c¹⁷, (see Fig. 6^a,) forming part of a yoke c¹⁸, provided at its lower end with forked arms, slotted as shown by dotted lines, Fig. 6, to embrace the said shaft c⁶, the upper end of the said yoke, extended up between the two rolls 101 and 102 in annular grooves or spaces therein being provided with pressers 8, (see Fig. 6^a and detail, Fig. 6^b,) which are normally held up by springs 10 in the ends of the yoke c¹⁸, the frog-cam c¹⁶ acting to lift the said yoke and pressers, causing them to pass up between the said rolls, act upon the under side of the paper to be folded, and impinge the said paper against the lower side of the first folding-blade c¹⁵ before the latter reaches the rolls 101 and 102 and commences to force the paper or article through between the said rolls, the said pressers 8 preventing the said paper or article from twisting or turning aside out of direct course by or through friction of the first folding-blade c¹⁵ upon the rollers 101 and 102.

The shape of the frog-cam c¹⁶ is such that as soon as the first folding-blade gets the paper well started in between the rolls 101 and 102 the gravity of the yoke c¹⁸ is sufficient to

cause it to drop quickly and remove the pressers 8 from between the said rolls.

Fig. 6 shows the yoke lifted and one of the pressers above the rolls and against the lower edge of the blade c^{15} , the paper being omitted.

The shaft c^6 at its left-hand end (see Fig. 4) is herein shown as provided with a cam 112 and crank-pin 113, which, by a connecting-rod 114, is jointed to a pawl-operating slide-bar 115, supported at each end frictionally by like links 116, pivoted by bolts 117, supported at one side of the paper-receiving box F. The connecting-rod 114 has intermediate between its ends an adjusting-block 118, (see Fig. 4,) provided with suitable set-screws 119, so that the link of the said connecting-rod may be adjusted as desired, according to the position to be occupied by the feed-box with relation to the first folding-blade.

The links 116 have attached to them by bolts 217 the opposite ends of a pawl-carrying bar 120, having a series of studs upon which are mounted loosely a series of pawls f , having extensions below their pivots, (see Fig. 44,) the said extensions being acted upon by studs 121, secured to the said slide-bar 115, there being as many studs as there are pawls, the said studs acting, however, upon the said extensions only when the pawls are to be disengaged from the ratchet-wheels f' , secured to the ends of each of the series of rollers f^2 , (see Fig. 6,) constituting the bottom of the paper-receiving box F, the pile of papers to be folded, wrapped, and addressed being laid in this box, the undermost paper of the pile resting upon the said rolls.

The rolls f^2 will, in practice, be coated preferably with sand or other suitable material, to enable them to engage the lowermost paper of the pile and in their rotation project the same forward out from the paper-receiving box, the front end of the said box having a front plate f^3 , preferably adjustable or so held as to be raised and lowered, so as to leave under the said front plate a space to afford proper access to the undermost paper of the pile.

The slide-bar 115 has a second series of studs 98, (shown by dotted lines, Fig. 44,) to which are joined one end of a series of spiral springs 97, the opposite ends of the said springs being attached to the extensions of the pawls f , the said springs normally acting to throw the engaging ends of the pawls into engagement with the ratchet-wheels f' , secured to the rollers f^2 referred to.

The slide-bar 115 is slotted at its ends to leave a space of greater area than the area of the screws 96, passed through the said slots to connect the said slide-bar to the links 116 referred to, the said slots affording a small amount of lost motion or enabling the said slide-bar to be started from either of its two positions and be moved for a short distance before the ends of the slots bring up against the ends of the screws 96, such lost motion of the bar prior to starting the links 116 and the

bar 120, upon which is pivoted the pawls f , resulting in turning the pawls on their pivotal studs, so as to throw their engaging ends into and out of engagement with the ratchet-teeth upon the feeding-rollers f^2 , thus enabling the pawls to be moved backward over the said ratchet-wheels f' without touching them, engaging the pawls, however, quickly with the ratchet-wheels when the slide-bar is being moved in the opposite direction, as when the feed-rolls are to be rotated.

Between the paper-feeding wheels f^2 and the pillow-blocks 95, containing the boxes for the rollers 101 and 102, and extended above the said rolls and also over rollers 106, is placed a bed-plate 94, (see Fig. 6,) the inner end of the said bed-plate being attached to a cross-bar 93 by screws 92. (See Fig. 1.) This bed-plate 94 is slotted immediately above the rolls 101 and 102, and at each side of the slot the bed-plate is turned down somewhat to conform to the surfaces of the said rolls, the first folding-blade c^{15} acting to force the paper down through this slot and between the said rolls 101 and 102.

The front plate f^3 has connected to it an adjustable finger f^4 , which leaves between its lower end and the last roll f^2 in the paper-receiving box just enough space for the passage of a single paper or other article to be folded and wrapped.

To insure the proper starting and feeding of the undermost paper from the paper-receiving box F, a presser-finger f^5 has been arranged to descend upon the papers, the leading ends of which are most exposed at the lower ends of the pile, the said presser-finger forcing the undermost paper snugly against the said roll. This finger f^5 is attached to an arm f^6 , secured to a shaft f^7 , having its ends secured in arms f^8 , pivoted at 92* (see Fig. 5) upon a fixed part of the frame of the machine. This shaft f^7 has attached to it an arm f^9 , (see Fig. 4,) jointed by link f^{10} to a lever or arm f^{12} , mounted loosely upon the shaft c^{10} , before referred to, the said arm f^{12} having a roller or other stud, (see Fig. 4,) which is acted upon by the cam 112, secured to the shaft c^6 , the said arm being normally kept down in contact with the said cam-plate by a suitable weight or spring, which also determines the extent of pressure of the finger f^5 upon the paper next to be fed out from the receiving-box F.

The bed-plate 94, near the right-hand side of the machine, (see Figs. 1 and 13,) is shaped to constitute a track 91, upon which slides the nipper-carriage g , (shown separately in Figs. 13 and 14,) the said carriage containing a shaft g' , to the inner end of which is attached the movable member g^2 of the nippers $g^2 g^3$, which grasp the lower end of the lowermost paper projected from the pile of papers by the feeding-rolls. The lower member g^3 of the nippers is a stiff or rigid finger or plate, which slides in a groove g^4 in the upper side of the said bed-plate. The outer end of the

shaft g' , carrying the movable member g^2 of the nippers, has attached to it, as herein shown, an elbow-lever g^5 , provided with two pins $g^6 g^7$. The pin g^6 is extended inwardly over the nipper-carriage, and when the nipper-carriage is being moved forward bears upon the said carriage until the then open nippers are passed over the leading end of the paper next to be folded. The pin g^7 receives loosely upon it a link g^8 , connected by pin with a lever g^9 , (see Fig. 5,) secured at its lower end to a rock-shaft g^{10} , held in bearings g^{12} at the front of the machine, (see Fig. 2,) the said lever in turn being connected by a pitman g^{18} to a crank-pin g^{14} upon the toothed wheel c^5 , fast upon the shaft c^6 , the said toothed wheel and shaft deriving their motion of rotation from a toothed wheel fast upon the main shaft.

The nipper-carriage has a stud g^{16} , (shown in Figs. 5 and 14,) which receives upon it one end of a link g^{17} , the opposite end of which is jointed to a radius-bar g^{18} , pivoted at g^{19} , and having a long curved slot g^{20} , through which is extended a bolt g^{21} , stationary with relation to the frame-work, and having co-operating with it suitable friction-plates g^{22} under the control of a suitable spring and adjusting-nuts, the rotation of which will cause the friction-plates to exert more or less friction upon the said radius-bar and constitute a friction device.

By employing a friction device such as described connected to and moved by the carriage g it is possible to insure with the greatest accuracy that the rock-shaft g' , carrying the nippers, be opened as soon as the lever is moved forward to draw the nipper-carriage and nippers toward the pile of papers and that the nippers be closed upon the paper next to be folded at the instant that the lever g^9 starts backward toward the rear end of the machine, the nippers being closed before the carriage starts forward. The pin or stud g^6 extended over the nipper-carriage acts as a stop to prevent the nipper being opened too far. The nipper-carriage g in its forward movement travels under the yoke to which is attached the first folding-blade c^{15} and across the slot through which the said blade works.

The nipper referred to has a stop or gage pin g^{24} , which defines the distance that the paper may pass into the nippers, the said stop or gage pin being inserted in order to determine with accuracy the position of the first fold from the leading end of the paper.

The movable member g^2 of the nipper at its under side is provided with a block having a serrated face attached thereto by a screw g^{26} , the nippers grasping the papers and drawing them one by one unerringly from the bottom of the pile, the feed-rolls f^2 at such time (the pawls f having been lifted from the ratchets f') running loose upon their shafts at a speed determined solely by the speed of the nipper-carrier.

The cross-bar h , extended across the frame

from side to side (see Figs. 1 and 55) between the yoke A^{17} , carrying the second folding-blade, and the yoke B' , to which is attached the knife B^4 , receives in it a rock-shaft h' , to which is attached an arm h^2 , provided at its lower end with a pivoted finger h^3 and with a spring h^4 bearing upon it, the outer end of the said spring being upturned and being preferably shorter than the finger, the finger and spring referred to constituting a jaw for receiving the leading end of the once-folded paper as the same emerges from between the feeding-rolls 105 and 106 and their belts. These jaws, two being used, (see Fig. 1,) are shown best in Fig. 6 and in the detail, Fig. 45, where they are represented as in their rearmost position; but when they receive the paper between them their free ends are thrown forward or to the right, viewing Fig. 6, substantially up to the rolls.

The outer end of shaft h' at the right-hand side of the machine has attached to it a short arm h^5 , (shown by dotted lines, Fig. 4, and fully in Figs. 47 and 48,) connected by links h^7 to a short arm h^8 of a hub h^9 , mounted loosely upon a stud h^{10} , secured in an ear of the cross-bar h referred to, the outer end of the said hub having a second arm h^{12} , provided with a roller or other stud h^{13} , (see detail, Fig. 48,) which enters a slot h^{18} (see Fig. 5) in a sliding plate h^{14} , fast upon a vertical slide h^{15} , free to be moved in suitable guides forming part of the standard in which slides the yoke A^{15} of the second folding-blade.

The slide-bar h^{15} has projected from it a long stud h^{20} , (see Figs. 1 and 2,) which enters a slide h^{21} , (see Fig. 5,) slotted at its lower end to embrace or straddle the outer end of the shaft of the second folding-roll 5, to which is secured the toothed gear e' , the said toothed wheel having at its outer side a cam-groove, as 80, in which enters a roller or other stud m , connected to the said slide-bar h^{21} , the said cam-groove acting upon the said stud to lift the slide-bar h^{15} , and with it the sliding plate h^{14} , thereby rocking the hub h^9 and rock-shaft h' .

The jaws referred to take the once-folded paper and draw it evenly and squarely against the front side of the cross-bar h , which is adjusted to occupy a position distant from the space in the second bed-plate 79, through which descends the second folding-blade, equal to one-half the length of the once-folded paper.

The cross-bar h is extended down nearly to the supporting-plate 79, which is attached at its ends to the second bed-plate 306, (see Fig. 6,) it being shown in section as turned down about the slot through which descends the second folding-blade, the said supporting-plate being elevated above the second bed-plate far enough to permit the passage between them of the wrapper, the forward end of the wrapper being in practice fed across the slot in the said second bed-plate 306 and

under the said supporting-plate 79, the once-folded paper passing over the upper side of the said supporting-plate. The slotted part of the cross-bar h referred to (see Fig. 55) permits the arm h^2 , carrying the jaws $h^3 h^4$, to pass through said slots, the unslotted parts of the said bar, as the jaws pull the paper under the second folding-blade, acting as a stop to arrest the folded leading end of the paper grasped between the said jaws, so that the jaws cannot carry the paper beyond the said stops.

The bar h , constituting the stop, may be adjusted toward and from the second folding-blade, as is necessary, to adapt the machine to fold papers of different sizes, and during such adjustment the roller-stud h^{13} referred to in the arm at the outer end of the arm h^{12} travels in the elongated slot h^{18} of the plate h^{14} , attached to the slide-bar h^{15} , the said slot permitting this adjustment.

The cam-shaft A' (see Figs. 2, 16, and 17) has attached to it a cam H , provided at one side with a cam-groove 307, to receive a roller or other stud H' on a lever H^2 , loose on a shaft H^{20} , a link H^3 being connected, preferably, in an adjustable manner to an arm H^4 on a rock-shaft H^5 extended across the machine, the said rock-shaft (see Figs. 17 and 6) having secured to it by screw 76 the hub of a gripper-lever H^6 , provided at its outer end with an up-turned spring 78, the free end of which is outwardly turned, so as to afford an open V-shaped space between the said spring and the end of the said gripper-lever. This gripper-lever is moved up and down in the space between a shield 77, made U-shaped in cross-section, (see Fig. 17 and the section, Fig. 17^a), the said shield being uncovered or cut away at its upper side near its outer end, so as to fit closely up against the under side of the roll 6. (See Fig. 6.) The shield 77 is loose on the shaft H^5 , its inner end bearing against the rod c^{10} .

The front end of the shield referred to (see Fig. 17) is beveled to receive upon it the lower edge of the folded paper P as it is fed down between the second pair of folding-rolls 5 6, the pressure of the rolls against the paper somewhat diverting the leading folded end of the paper into place between the jaws of the then elevated gripper lever or device.

The gripper lever or device referred to takes the second folded paper and carries the same down into and between the members of that pair of the series of jaws (to be described) which at that time are brought into position immediately below the rollers 5 6 of the second folding mechanism.

The machine herein shown (see Figs. 6, 7, 19, and 20) has six pairs of jaws, each of which receive between them in succession a folded paper, the said jaws in their further movement holding and clamping the folded paper and the wrapper upon it, while the said wrapper, as will be hereinafter described, is pasted and its lip is turned over upon the paper and

pasted portion of the wrapper, the jaw finally delivering the paper into the drying or setting mechanism, from which it is delivered, preferably, to an endless traveling belt.

The shaft A^5 , upon which is attached the toothed gear A^4 referred to, has attached securely to it (see Fig. 7) suitable heads or disks m^2 , which form bearings for a series of rock-shafts m^3 , to which are attached, inside the said heads, arms m^4 , the said arms receiving in them bolts extended through ears of slotted plates m^6 , constituting the tipping or self-adjusting members of the jaws.

Each plate m^6 referred to has, as best shown in Fig. 7, slots 75, into which slide stops 74, (see Figs. 6, and 19,) attached to and projecting forward from the pads m^7 , (shown in Fig. 6 and enlarged in Fig. 19,) there being one such pad m^7 co-operating with each of the four broad portions of the plate m^6 to constitute the other members of the pairs of jaws.

The plate m^6 is provided with suitable slots at 73 for the passage of the gripper-lever H^6 , before described, as it brings the twice-folded paper down into the jaws or between the plate m^6 and the pads m^7 and against the stops 74 referred to. Each plate m^6 also has a longitudinal slot 72, so located with relation to its center of motion that in case, by any accident, a paper should not be drawn down into the jaws the pasting device, (to be described,) when it comes into operation, would not strike against the face of the jaw and leave paste upon it, which would be destructive to the next paper and wrapper fed properly therein.

Each rock-shaft m^8 referred to, at or near the right-hand end of the machine, outside one of the said heads or disks m^2 , has attached to it loosely an arm 71, provided at its outer end with a roller-stud 70, which enters a cam-groove 69 in a stationary cam 68, surrounding the shaft A^5 . (See Fig. 7.) This arm 71, near its inner end, is provided with a shoulder which overlaps the hub or other portion of a second arm which is fast upon the said rock-shaft m^8 , the two arms 71 and 67 being connected together by a spiral spring 66, one end of which is attached to an adjustable stud, in order that the strength of the said spring may be increased or diminished. By employing two arms 67 and 71, as described, the power applied to turn the rock-shaft m^3 is readily applied through a spring, so that the jaws embracing the paper are permitted to adapt themselves to varying thicknesses of paper, which would not be the case if the said two arms were fixed to the rock-shaft m^8 and were moved positively by the cam 68. The shaft A^5 has keyed or otherwise secured to it disks or heads I , (see Figs. 7 and 19,) provided with radial grooves, (shown by dotted lines, Fig. 19,) into which are fitted the shanks 65 of the jaw members m^7 , having the stops 74. Each of these shanks has projecting from it a proper stud, as 64, (shown best in Fig. 7,) which enters one of the spiral grooves 63 cut

in the inner face of a cam-plate I^2 , (see Figs. 7 and 9,) mounted loosely upon the shaft A^5 .

The hubs of the cam-plates I^2 are surrounded by toothed gears 62, fixed to the said cam-plates by suitable screws, the said toothed gears being engaged each by a suitable pinion, as 61, (see Figs. 8 and 10,) secured to a shaft 60, provided preferably with a squared head and extended through the said disks or heads. By applying a suitable wrench or key to this shaft 60 it may be rotated to (through the pinion 61 and toothed gear 62,) turn the cam-plate I^2 and move the shanks 65 in unison radially outward from the center of the shaft A^5 to place the stops 74 at exactly the proper distance to arrest the folded papers and the wrapper upon them, so that the papers, no matter what may be their width, may be presented in exactly the proper position to co-operate with the pasting device, (to be described,) so that the paste may be applied more or less back from that portion of the wrapper which is laid directly upon the paper. As soon as the gripper referred to draws a paper and wrapper folded together, as represented in Fig. 35, down against the stop 74, the rock-shaft m^3 of the set of jaws then in place is caused to move the jaws m^6 in such direction as to immediately grasp the paper and wrapper between the plate m^6 and the pads m^7 , and thereafter through about one hundred and eighty degrees of the rotation of shaft A^5 the said jaws, due to the shape of the groove in the cam 68, firmly clamp the paper and wrapper. When, however, the shaft A^5 has rotated about ninety degrees from the point at which the jaws are provided with the paper and wrapper, that portion of the wrapper which is laid upon the folded upper side of the folded paper is acted upon by a pasting device, which applies to the wrapper a line of paste, as at 59. (See Fig. 36.)

Referring now to the pasting mechanism, (see Figs. 6, 21^a, and 28 to 32,) the toothed gear A^4 , before described, engages a toothed gear u^4 , (see dotted lines, Fig. 5,) fast to a shaft n^7 , the said gear being just outside the frame. This shaft n^7 , just inside the right-hand end of the machine, is provided with a second toothed gear n^2 , (see Figs. 3, 6, 28, and 29,) fast thereon, which engages an intermediate gear n^3 on a stud n^4 , projecting from a paste-carrying yoke n^5 , the hubs of which latter are mounted loosely upon the said shaft n^7 , the said intermediate gear engaging and rotating a toothed gear n^6 , loose on the rotating shaft n^7 , having its bearings in the upper end of the pasting-yoke n^5 , the said shaft carrying the pasting device.

The pasting device, as herein shown, is composed of two parallel arms n^8 , connected by two bars n^9 , which, in the rotation of the shaft n^7 , come in contact with the paste-roll n^{10} and then with the wrapper to apply paste upon it in the line 59. When the folded and wrapped papers vary in width, this pasting

device has to be adjusted in order that the paste may be applied in exactly the proper position upon the wrapper, and to enable this to be done the shaft n^7 of the pasting device has been mounted in the pivoted yokes n^5 and it has been driven by the gearing described, so that the shaft of the pasting device will be rotated in the same manner and at the same speed notwithstanding the adjustments of the yoke.

The yoke n^5 and the paste-box n^{16} , in which rotates the pasting-cylinder n^{10} , are connected together by means of a slotted link or arm n^{13} , (see Fig. 21^a,) which surrounds loosely the prolonged end of the shaft n^7 , carrying the pasting device, and also the journal of the pasting-roller n^{10} , extended outside of the paste-box, the paste-box having flanged feet n^{17} (see Fig. 3) to enter guide grooves or ways connected to the frame-work, a suitable set-screw holding the paste-trough and its connected yoke in proper position, so that the pasting-bar will meet the wrapper at the desired point.

For the correct operation of the pasting device it becomes necessary to enable the pasting-bars to meet quickly and retire from the wrapper when the jaws carrying the paper and wrapper get into substantially horizontal position, and to do this it has been found necessary to give to the pasting-shaft n^7 a variable movement of rotation. To accomplish this the pinion n^6 referred to has been mounted loosely upon the shaft n^7 , and a hub of the yoke n^5 has been provided with a face-cam n^{18} , (see Figs. 28 and 29, the latter enlarged,) and the said pinion n^6 at its inner side has been provided with a stud n^{20} , upon which is mounted an elbow-like sector n^{21} , the teeth of which engage a pinion n^{22} , fast upon the shaft n^7 (see Fig. 29) of the pasting device, the said elbow-like sector having a roller or other stud n^{23} , which enters the cam-groove (see Fig. 29) cut in the outer side of the said stationary cam n^{18} , loose with relation to the shaft n^7 , the said cam, as herein shown, being fast to the yoke n^5 referred to. The cam-groove referred to is of such shape (see Fig. 29) that during the rotation of the toothed gear n^6 and its attached sector n^{21} , which rotates the shaft n^7 , the said sector has imparted to it a faster speed just as the pasting-bar is to come in contact with the wrapper, as described.

The shaft n^7 , outside its gear n^6 , has fast upon it a toothed pinion o , (see Figs. 3, 6, 28, and 21^a,) which engages an intermediate gear o' on a stud o^2 of the link n^{13} , before referred to, the said intermediate gear engaging a toothed gear o^3 , fast on and rotating the paste-roller. The paste having been applied to the paper wrapper, as stated, the shaft A^5 in its further rotation brings the jaws holding the paper with the pasted wrapper upon it into such position that the projecting lip J of the wrapper (see Figs. 35 and 36) meets a stationary finger o^4 , attached to a cross-bar of the yoke

n^5 referred to, the said finger being opposite a space in the plate m^6 of the jaws. This finger arrests the flap J, so that in the further rotation of the jaws the said flap is partially overturned about the folded paper held by the jaws. Then in the further rotation of the jaws the wrapper arrives against the lip-lappers o^5 , (see Figs. 6 and 11,) composed, essentially, of flat steel plates beveled at their outer end and suitably attached to arms o^6 , (see Fig. 3,) secured to a rock-shaft o^7 , having its bearings in hubs at the upper ends of arms o^8 , attached to and surrounding loosely the rock-shaft o^9 , having its bearings in stands o^{10} , (see Figs. 3 and 11,) suitably secured to a cross-bar o^{12} , extended across the frame-work, the said rock-shaft having at one end, outside the said bearings, an arm p , provided with a roller or other stud, which enters a cam-groove p' (see Fig. 11) in the cam p^2 , fast upon a short shaft p^3 , to which is secured the gear p^4 , located outside the frame-work, (see Fig. 3,) the latter gear being rotated by the gear A^4 .

The shaft o^7 , carrying the lip-lappers o^5 , has at one end, outside its bearings, an arm p^5 , (see Fig. 3,) provided with a roller or other stud, which enters a cam-groove p^6 (see Fig. 11, dotted lines) in a stationary cam-plate p^7 , so that it will be seen that the said rock-shaft has a motion about its own center, and is also carried bodily by the cam p^2 toward and from the shaft A^5 , which actuates the jaws.

The cam-grooves p' and p^6 referred to are of such irregular shape that the lip-lappers o^5 first come squarely up against the wrapper and paper and act upon the wrapper in a direction to somewhat strain the flap of the wrapper over and upon the paper, and thereafter in the movement of the shaft A^5 and the jaws the shaft carrying the lip-lappers is swung bodily in toward the shaft A^5 , thus enabling the lip-lappers o^5 , acting upon the flap J and holding it pressed against the pasted portion of the wrapper on the paper, to follow the jaws and keep up its pressure.

One of the arms o^8 of the rock-shaft o^9 referred to has a projecting branch p^{10} , which receives an adjusting-screw p^{12} , to which is attached one end of a spiral spring p^{13} , the other end of the said spring being attached to a stud p^{14} , extended from an arm p^{15} , secured to the said rock-shaft o^9 . The rock-shaft o^9 derives its rocking motion referred to from or through the spring p^{13} , so that the lip-lappers o^5 are pressed in a yielding manner against the paper and wrapper held between the jaws. As soon as the lip-lapper o^5 comes to a bearing upon the wrapper surrounding the paper to thus lay the lip J against the pasted portion of the wrapper, further or continued rotation of the jaw-carrier with the roll 70 of each arm 71 in the groove of the stationary cam 68 causes the arm 71 to be moved in such direction that its shoulder part (see Fig. 7) strikes the lever 67 and turns the rock-shaft positively in the direction to release the grip of the jaws upon the paper,

and at this time, and before the lip-lappers complete their forward movement, the bunter r drops and arrests the paper inclosed by the wrapper; and as the lip-lappers continue to move forward, following the plate m^6 in its movement due to the rotation of the shaft A^5 , the paper is forced against the backwardly and downwardly inclined finger of the bunter, and is forced out radially from between the jaws into and between the first pair of rollers $r' r^2$, forming part of the setting and drying mechanism, the said setting and drying mechanism being composed of a series of pairs of like rolls, (see Figs. 6 and 11,) preferably six or more, suitably geared together, so as to be rotated at the same speed and in the same direction, the last pair of the said rolls discharging the folded paper preferably upon an endless traveling belt 344, which carries the folded and wrapped papers away from the machine.

While the bunter acts against the rear side of the wrapper surrounding the paper, the wrapper and paper are moved or forced downwardly, and at the same time the lip-lappers o^5 are pressed in a yielding manner against the outer side of the lip J of the wrapper, then laid over upon the pasted part of the said wrapper, and the strain is such as to draw the wrapper snugly about the paper.

The bunter r described—preferably made as a slotted steel plate—is jointed at t^{42} to the end of an arm or bar r^4 , and rests on a lever r^{20} , to be described.

The bar r^4 is herein shown as slotted at r^5 (see Fig. 17) to receive a pin r^6 , erected upon a stand r^7 , secured to a cross-bar r^8 , supposed to be extended from one to the other side of the machine.

The pin r^6 referred to, (see Fig. 16,) at its opposite end outside the said bar r^5 , receives upon it a spiral spring r^9 , (see Fig. 16,) the opposite end of the said spring being connected to a pin t^{42} , secured to the bar r^4 , the normal tendency of the said spring being to push the bar r^4 and its attached bunter forward on the lever r^{20} , as in Fig. 17.

The slots 302 of the bunter r receive through them two guiding studs or screws r^{10} , which enter the lever r^{20} , connected to the rock-shaft H^{20} , the said rock-shaft serving to support the said lever and bunter to guide the bunter as it is pushed back against the spring r^6 by the pressure of the paper and wrapper upon the front end of the bunter during the time that the wrapped paper is being discharged from between the jaws.

The rock-shaft H^{20} referred to has attached to it a second arm r^{12} , (see Fig. 16,) provided with a roller or other stud, which enters a cam-groove cut in the face of the cam-plate r^{13} (see Fig. 18) and moves the bunter r to discharge the paper from between the open jaws.

The short shaft p^3 , carrying the cam p' , (see Figs. 3 and 11,) has fast upon it not only a small toothed gear s , but also a cam-hub u . The toothed gear s engages a toothed gear s'

(see Fig. 11) of corresponding size fast on the shaft of the roll r' , forming the uppermost pair of rolls $r' r^2$.

All the rolls in the series of rolls through which the folded and wrapped paper is passed are alike and are as shown in Fig. 12, they being cut at one end to form a series of gear-teeth 304 to co-operate with suitable intermediate pinions s^3 , to thus enable the rolls to be driven in the same direction at the same speed. The teeth cut into the roll r' engage a pinion s^4 (see dotted lines, Fig. 11) on a stud s^5 , held in a short link s^6 , pivoted at t to a link t' , the latter link being connected to the journal of the roll r^2 , supported in bearings at the upper end of an elbow-lever t^2 , fast to a shaft b^3 , said lever being acted upon by a suitable weight, as t^4 , or a spring. The opposite end of the roller r^2 takes its bearing in a short arm u' , (see Fig. 3,) fast to the shaft t^3 . This short arm u' , as shown in dotted lines, Fig. 11, has projected from it an arm provided with a roller or other stud w^2 , which is so placed as to be acted upon by the cam w^3 (see Fig. 3) referred to, attached to the shaft p^3 , just as each wrapped paper is being pushed from between the jaws referred to, the movement of the arm referred to causing the roll r^2 of the uppermost pair of rolls $r' r^2$ to be moved bodily away from the other roll r' of the said pair, so as to permit the paper being discharged from the jaws to readily enter between the first pair of rolls, the links s^6 and t' permitting such separation of the rolls without disconnecting the gearing which effects their rotation. The shaft n' , containing the toothed gear n^2 , which effects the rotation of the shaft of the pasting device, has secured to it outside the gear n^2 a like toothed gear u^4 of same size, (see Fig. 6,) and also a cam-wheel w^5 .

The toothed gear n^2 , through an intermediate gear u^6 , engages a pinion u^7 , loose on a stud u^8 , secured in the said frame of the machine, the said pinion having fast to it a cam u^9 .

The cam w^5 referred to (see Fig. 5) receives in it a roller or other stud attached to an elbow-lever u^{10} , having its fulcrum upon a stud u^{12} , secured to the side of the machine, the said elbow-lever at its opposite end having a stud u^{13} , upon which is placed loosely a collar having a hole at right angles to the said stud, the said collar receiving a stud or bolt u^{14} , which is also passed through a hole in the lower end of the link u^{15} , connected by a sort of universal joint to the outer end of an elbow-lever u^{16} , (see Fig. 3,) pivoted upon a stud u^{17} , extended from the frame-work, the opposite end of the said lever being attached by a link u^{18} to a slide-bar u^{19} , forming part of the wetting apparatus.

The slide-bar u^{19} , fitted to slide in suitable guideways, has attached to it at its rear side (see Fig. 23) a small box u^{22} , containing water, in which is free to turn a small wetting-roller u^{23} , the said box being in communication,

through a suitable pipe u^{24} , with a reservoir u^{25} to contain water, the delivery of the water from the reservoir to the tank being controlled by a suitable valve, as at u^{26} , the said box u^{22} having connected to it a waste or overflow pipe u^{27} , so that the water may be maintained in the said box just high enough to immerse the lower side of the wetting-roller u^{23} , so that the latter as it is reciprocated across in contact with the under or gummed side of the gummed addressing-strip E will moisten the said gum, so that the addressing-slip cut from the addressing-strip, as will be described, will readily adhere to the wrapper-web.

The cam w^9 referred to receives in its groove a roller or other stud at one end of a three-armed lever w , supported upon a stud w' , extended from the frame-work. One arm of the said three-armed lever is jointed universally, or substantially so, to a rod w^2 , in turn jointed at its upper end in like manner to a rocking lever w^3 , (see Fig. 3,) slotted at its end to embrace a suitable stud w^4 , projected from the front side of a vertically-sliding carriage w^5 , to which is attached the cutting-off blade or knife w^6 , (see Figs. 21 and 22,) which operates upon the upper side of the addressing-strip E when it is to be cut off, the said knife being preferably adjustably attached to the said carriage by a bolt w^7 . The carriage is preferably of dovetail shape in cross-section to slide up and down behind gibs w^8 , attached by suitable bolts to a vertical plate w^9 , forming part of the rigid cross-bar w^{10} at the rear end of the machine.

The uppermost arm of the three-armed lever w has attached to it a connecting-rod w^{12} , which embraces a stud adjustably attached to an arm fast upon a rock-shaft w^{13} , provided at its other end with an arm w^{14} , (see Fig. 22,) upon which is pivoted frictionally the feeding-finger 200, having a point 201, which enters holes or depressions 202, formed at equal distances apart in or along one edge of the addressing-strip E, an enlarged detail of the said strip being shown in Fig. 25^a, the said addressing-strip being taken from the adjustable roll E', (see Figs. 1 and 3,) mounted upon a stud at the upper end of bracket E², the said addressing-strip being passed down over a guide-roll M, mounted in bearings back of the carriage w^5 , the addressing-strip, suitably gummed, being passed from the said guide-roll over a pull-off, (to be described,) and thence under and between a preferably steel friction-plate 203 and the addressing-strip-supporting block 204, at the forward end of which is a bar 315, which serves as one member of the cutting mechanism to sever the addressing-strip, and at the same time the said block supports the addressing-strip, so that the feeding device may properly engage and move the same over the said block and under the movable knife w^6 when the latter is raised, the feeding finger or device 201, in engagement with one of the holes 202, being at such time moved forward to project be-

yond the knife that portion of the addressing-strip which contains only the address which is next to be cut off and applied to the wrapper-web.

5 The holes 202 referred to are made between the addresses previously printed upon the said addressing-strip, and the point 201, entering one of the said holes, always moves the strip so that it leaves projecting beyond the cutting mechanism for the strip just one address, and no more and no less, so that the cutting mechanism always correctly severs the addressing-strip between two addresses and never cuts through or obliterates a printed address.

15 The pull-off referred to is herein shown as a pin 206, extended from an arm or lever 207, having its fulcrum on the pin or shaft 316, about which turns the guide-roll M. This arm or lever has a second pin 208, to which is secured a spring 209, which normally keeps the pull-off pressed toward the cutting mechanism. The carriage w^5 has erected upon it a rod 210, which, by a screw 317, has secured to it a block 212, the opposite end of which extends over and across the short arm of the lever 207.

20 The block 212 referred to has extended through it a screw 213, which enters a friction-plate 214, (see Fig. 25,) the said screw being also extended through a suitable spring, as 215, which regulates the pressure of the block against the pressure-rod 216, the pressure being such that the said rod cannot move except when acted upon positively at each end.

30 The block 204 referred to (shown best in Figs. 22 and 22^a) is secured to a yoke-shaped plate 217^x, fastened to a rod 217, which is extended loosely up through a hole in the upright guide w^9 and receives upon it above the said guide w^9 a spiral or other spring 218, and thereafter a nut 219 is applied to the said rod, so that rotation of the said nut governs the strength of the said spring. The spring 218 normally acts to keep the said block 204 elevated, as shown in Fig. 22, the said block occupying the position therein shown when the feeding-finger 200 moves forward in engagement with and to feed the addressing-strip, and at such time the presser-plate does not press upon and retard the movement of the addressing-strip.

45 The presser-rod 216 referred to is extended loosely through a vertical hole in the carriage w^5 , and as the carriage commences to descend after the addressing-strip has been fed forward sufficiently to leave one address beyond the edge of the block 204 the carriage in its descent first causes the lower end of the presser-rod 216 (see Fig. 21) to act upon the upper side of the presser-plate 203 and clamp the addressing-strip E between it and the top of the block 204, and thereafter in the further descent of the carriage the clamping-block 212 commences to slide upon the said presser-rod. As the block 212 slides down upon the presser-rod 216, the motion of which

has been arrested, as described, the outer end of the said block meets the inner short arm of the lever 207 and operates the pull-off 206, 70 throwing the latter backward in contact with the addressing-strip E and pulling off from the roll E' enough of the said strip, which is thus left slack, so that when the feeding device again operates, the point 201, retiring until its point enters another hole or depression in the edge of the strip, shall not have to pull off from the roll E' the paper, but only to overcome the friction of the weight of the paper on top of the block, which is practically nothing. The lower end of the knife or cutter w^6 , attached to the carriage w^5 , is thrown out to form a stamp of substantially the width and size of the addressing-slip to be cut off. The said stamp supports the upper or printed side of the addressing-strip, while the roller w^{23} of the wetting device (before described) is passed under it to wet or moisten the gummed under side of the addressing-strip where it is next to be cut off. 80 As the cutting-edge of the upper movable member arrives in contact with the upper side of the addressing-strip resting upon the upper side of the block 204, the said block begins to descend in unison with the cutting-blade, stamp, and carriage, because the power required to cut off the addressing-strip and pass the edge of the knife beyond the front edge of the block is a little in excess of the power exerted by the spiral spring 218, and consequently the spiral spring yields, letting the block come down with the carriage until the under side of the block meets the noise-deadening pad 220, (see Fig. 22,) when the block is arrested, and in the further descent 95 of the carriage the knife w^6 passes the upper rear corner of the block 204, thus severing the addressing-strip between two addresses, the widened lower or stamp portion overlying the said addressing-strip as it is cut off and acting upon its upper side close to the wrapper-web, upon which it stamps or impacts the moistened addressing-slip before the latter has any opportunity to curl, twist, or fly out of position. 100

105 The rock-shaft w^{13} , which operates the feeding-finger, is provided with an arm m , to which is secured a spiral spring 222, (see Fig. 5,) which normally acts to move the feeding-finger backward. 110

115 As the feeding-finger, having the point 201 described, is connected with a rock-shaft, and it is to move the addressing-strip for some distance in a true horizontal line upon the upper surface of the block 204, it becomes necessary, it will be understood, to pivot the feeding-finger 200, and hence the said finger is provided with a rearwardly-extended bolt or stud 202^x, as shown at Fig. 24, which is passed loosely through the arm or block w^{14} , before referred to, the said bolt at each side the said arm receiving upon it, preferably, a friction washer or pad 223, the outer end of the bolt receiving a spiral or other spring 225 120 125 130

and an adjustable nut 226. This frictional connection is essential to the operation of the feeding-finger, as by it it is possible to lift the point 201 of the finger out of the hole in the addressing-strip, to thereby enable the finger to be moved backwardly. As the rock-shaft w^{13} and arm w^{14} are moved in the direction to enable the point 201 to enter a hole in the addressing-strip, the forward end of the feeding-finger, as soon as the point enters the hole referred to, comes to a bearing on the ledge 227, and thereafter, as the feeding-finger cannot further descend, it results that the further rotation of the rock-shaft w^{13} causes the feeding-finger to move forward in a straight line, the said feeding-finger and arm w^{14} co-operating together after the manner of a toggle-joint. As the feeding-finger is lifted by a reverse movement of the rock-shaft w^{13} , the finger, as soon as the point 201 leaves the paper, strikes against the under side of a stop t^{40} , (shown in Fig. 22,) the said stop having a shank which is held in the bracket or stand w^9 .

The block 204, immediately above its top surface, at each side of the part thereof upon which rests the addressing-strip, is provided with two overlying lips 227, (see detail, Fig. 21,) one of which lips acts as a rest and guide for the hub at the end of the feeding-finger 200, so that the point 201 thereof cannot descend too far, and, as shown by dotted lines in Fig. 22 and full lines, Fig. 21, the upper side of the block 204 referred to is provided with a groove in line with the projection or point, as 201, of the finger, so that the said point or finger employed with that class of addressing-strip provided with a series of feeding-holes will not itself come in contact with the block, but only descend through the hole and get a firm engagement with the strip.

The carriage w^{10} of the wetting device is provided with a gage or stop 228, (see Figs. 22 and 23,) one and then the other of which, as the said carriage comes to rest after having wet the addressing-strip E, stops immediately in front of the end of the addressing-strip next to be cut off, the said stop preventing the addressing-strip from flying horizontally away from the cutting mechanism.

In the machine herein shown the cylinder carrying the jaws and their co-operative parts to receive between them the folded and wrapped papers is long enough to take a paper, say, twenty inches long; but in practice for shorter papers of about nine to twelve inches only one end of the cylinder will be employed. The roll r' drives through intermediates s^3 a series of like rolls, all having their journals in side plates P, having as their fulcrum the center of the uppermost roll r' , all the like rolls r' being rotated in the same direction and at the same speed.

All the rolls 300*, just like the roll r^3 and in line with it, have their opposite ends journaled in a frame, as P', having as its center

of motion or fulcrum the shaft of the lowermost roll of the series of rolls 300*, the lowermost roll of the said series of rolls having attached to its shaft a large gear, as P². (See Fig. 5.) The shaft of the roll r' also has fast to it (see Fig. 5) a large toothed gear, as P³, the said gear P³ engaging and rotating the gear P² at the same speed. All the rolls of the series of rolls 300* are toothed at their ends, as described of the roll r' , and are all driven from the lowermost roll of the series 300* through like series of intermediate gears s^3 . The journals of the lowermost roll of the series of rolls 300* are supported upon depending arms P⁵ P⁶. (See, respectively, Figs. 5 and 6.)

The short shaft p^3 (see Fig. 3) is provided with a belt-pulley 340, over which is extended a cross-belt 341, in turn extended over a pulley 342 on a shaft 343, which in practice will drive an endless apron 344, on which are dropped the sealed papers to carry the same away to a suitable receptacle or mail-bag.

The plates P P', referred to as carrying the rolls, are pivoted or joined together at their upper ends, as described, to thereby enable the rolls to act properly upon the paper being passed between them, and so adapt themselves to the thickness of the papers which have been inclosed by the wrappers, such papers, pamphlets, &c., varying very considerably in thickness. As the said plates are separated, the acting face of each series of rolls is always kept parallel to the face of the other series of rolls whatever may be the thickness of the paper between them.

As will be understood from the foregoing description, the wetting-roll passes across the machine, wets the gummed end of the addressing-strip, and stops while the said strip is severed to separate from it an addressing-strip, and then, the wrapper-web having been fed and also the addressing-strip, the wetting-roll is moved backward to its starting position, it wetting during its return movement the under side of the gummed strip, the wetting-roll thus doing work at each stroke in each direction, which enables me to run the other parts of the machine faster than it would be practicable if the wetting apparatus had a complete forward and backward stroke at each wetting operation.

I do not desire to limit my invention to the exact form of pull-off shown for pulling off or making slack in the addressing-strip, and instead of the particular device shown I may feed the said addressing-strip off from its roll in excess of the quantity wanted, as described with relation to the wrapper-web.

The roll b^2 , over which is passed the wrapper-web, is mounted upon bearing-screws b^{14} , extended through the upturned arms of a carriage b^{15} , having a dovetailed foot 516, which enters a corresponding-shaped groove in the block c. The carriage b^{15} has at its under side a screw-threaded nut 110, (see Fig. 22,) through which is extended a screw c' , having an annular groove which receives in it a yoke

or stand c^3 , the rotation of the said screw causing the carriage b^{15} to be adjusted longitudinally of the machine, in order to keep the wrapper-web at the proper tension and under the proper conditions with relation to the other parts.

I do not herein broadly claim the feed-box and the box-rolls therein contained and the means for actuating them, as the same forms the subject-matter of the claim in an application, Serial No. 221,206, filed by me December 10, 1886.

I claim—

1. The paper-receiving box, the independent freely-rotating rolls forming the bottom thereof and on which rests the pile of papers, and means to rotate the said rolls in a direction to feed the papers from the said box, combined with the nippers to engage the undermost paper of the pile and draw it from the said box, the paper being pulled out by the nippers causing the rotation of the feed-rolls in the same direction and at a speed determined by the movement of the nippers; and with the first folding-blade and its co-operating roll, substantially as described.

2. A paper-receiving feed-box having in its bottom two or more independently-movable loose rolls to support the lowermost paper of the pile of papers, a pair of rolls located outside of the said feed-box, and the first folding-blade, combined with the nippers adapted to pass between the said folding-blade and the rolls under it to engage the paper and pull it from the said feed-box, substantially as described.

3. The paper-receiving box having a series of independent feeding-rolls, upon which rests the undermost paper of the pile of papers to be folded, a ratchet-wheel for each roll, a pawl for each ratchet, and means to actuate the said pawls to rotate the said feeding-rolls positively and independently in but one direction, combined with the first folding-blade and its co-operating rolls, to operate substantially as described.

4. The paper-receiving box having a series of independent feeding-rolls, upon which rests the undermost paper of the pile of papers to be folded, a ratchet-wheel for each roll, a pawl for each ratchet means to actuate the said pawls to rotate the said feeding-rolls positively and independently in but one direction, and a presser to impinge the lowermost paper of the pile against that feeding-roll of the paper-receiving box nearest the first folding-blade, combined with the first folding-blade and the nippers to carry the paper from the said receiving-box to the said blade, substantially as described.

5. The bed-plate, the track, the nipper-carriage mounted on the said track at the rear of the first feed-rolls in the direction of the feed of the paper, the link g^{17} , the arm g^{18} , to which it is connected to move the said slide on the said track, the box to receive the paper to be folded, the first feeding-rolls, the first

folding-blade, the rock-shaft g' , mounted in the said carriage, the movable nipper member g^2 , attached to an arm at one end of the said rock-shaft, and the elbow-lever g^5 , attached to the opposite end of the said rock-shaft, and having projection g^6 extended over the said carriage, combined with an independent link jointed to the said elbow-lever, and with means, substantially as described, to actuate the said link to positively move the jaw g^2 toward and from the jaw g^3 , as and for the purpose set forth.

6. The paper-receiving box, independent loose rolls in the bottom of the box to support the papers, the pressure-finger f^5 , the first folding-blade, its co-operating rolls, the nippers having stationary and movable members, a carriage supporting the said nippers, and a track upon which the said carriage is adapted to slide, combined with means to move the carriage on the track and means to rock the movable member of the nippers on the carriage, substantially as described.

7. In a mailing-machine, the rolls 101 and 102 and folding-blades and the bed-plate 94, provided at one edge with a track, a nipper-carriage thereon, the rocking or movable member g^2 thereof, and the connecting-link and lever to reciprocate the said carriage, combined with a link and lever and friction device and means to move the said lever to rock the movable member of the nippers upon the carriage, substantially as described.

8. The rolls 105 and 106, for feeding the paper forward, and the jaws to grasp the folded leading end of the paper as it leaves the said rolls, combined with the second folding-blade and rolls, the jaws carrying the paper forward to be folded squarely across the same, substantially as described.

9. The folding-blade A^{17} and its co-operating rolls, combined with the spring-jaws to grasp the folded end of the paper and carry it positively and squarely under the said folding-blade, and with stops to arrest the folded end of the paper held by the said jaws, substantially as described.

10. The feeding-rolls $b^3 b^4$ and the cross-bar b^9 , having fingers b^8 , combined with the bed B^3 , having the fingers a^x , the knife-carrying yoke in the said bed, and with means to adjust the said bed toward and from the said feeding-rolls, substantially as described.

11. The feeding-rolls $b^3 b^4$, the cross-bar b^9 , having the fingers b^8 , and the adjustable bed B^3 , having rearwardly-extended fingers a^x , combined with the cross-plates b^{12} and a^3 , and with their attached fingers located above the fingers b^8 and a^x , to operate substantially as described.

12. The second folding-blade, its co-operating rolls, and the jaws to grasp the folded paper and draw it underneath the said folding-blade, combined with the elevated supporting-plate 79, located near the said rolls, and with feeding-rolls to feed the wrapper-web underneath the said supporting-plate and

across the path of movement of the said folding-blade, substantially as described.

13. The bed B^3 , the knife-carrying yoke therein, its attached knife for severing the wrapper-web, and the cutter member B^* , combined with the adjusting-rod, its pinions, and the rack-bars to adjust the said bed horizontally upon the frame of the machine, and with the slotted levers A^{12} and the blocks a , and with means to move the said levers to reciprocate the knife-carrying yoke, substantially as described.

14. The second folding-blade and its co-operating rolls, combined with the transferring mechanism located below the said rolls and adapted to receive the folded paper within them, and with the jaws to which the said transferring mechanism delivers the folded paper, substantially as described.

15. In a paper-folding mechanism, the folding-blade and rolls, combined with the transferring device, including the shaft II^5 , the arm H^6 , its attached spring-jaw 78, arm II^4 , means to move the said arm, and the shield 77, loose on the said shaft, substantially as described.

16. The cylinder composed of a shaft, the heads m^2 , and bars m^3 , combined with the jaws composed, essentially, of the pivoted arms m^4 , the rocker-plates m^6 , pivoted thereon, and the pads m^7 , substantially as described.

17. The shaft A^5 , its heads, the shafts m^3 , arms m^4 , plates m^6 , pivoted thereon, and arms 67 and 71, connected by a spring, and a cam to move the arms 71, combined with the pads m^7 , substantially as described.

18. The shaft A^5 , its heads, the rods m^3 , and plates m^6 , slotted at 75, combined with the stops 74, made movable in the said slots, substantially as described.

19. The shaft A^5 , its heads, the rods m^3 , and plates m^6 , slotted at 75, combined with the stops 74, made movable in the said slots, and with the pads m^7 , substantially as described.

20. The shaft A^5 , its heads, the rods m^3 , and plates m^6 , slotted at 75, combined with the stops 74, made movable in the said slots, and the pads m^7 , and with cams I^2 , to simultaneously adjust the bars 65, carrying the said stops, substantially as described.

21. The shaft A^5 , heads m^2 , rods m^3 , plates m^6 , having slots 73, and pad m^7 , combined with the bunter r , substantially as described.

22. The shaft A^5 , heads m^2 , rods m^3 , plates m^6 , having slots 73, and pads m^7 , combined with the bunter r and with the lip-lappers, to operate substantially as described.

23. The roll carrying the wrapper-web and means to rotate it to deliver the wrapper-web at a speed faster than it is required by the feed-rolls, thus accumulating slack in the web, combined with the feed-rolls, the web-cutting mechanism, means, substantially as described, to adjust the same toward and from the said feed-rolls, and folding blade and rolls, between which the wrapper-web is

fed before being cut off, substantially as described.

24. The roll carrying the wrapper-web, means to rotate it to form slack in the said web, and the feed-rolls b^3 and b^4 , combined with the intermediate guide-roll b^2 , means to feed the addressing-strip, sever therefrom a single address, and stick it to the wrapper-web, and with means to adjust the said roll b^2 to insure the application of the address to the face of the wrapper, substantially as described.

25. The support 204 for the addressing-strip and the shaft w^{13} , provided with the arm w^{14} , combined with the feeding-finger frictionally connected thereto, and having a feed-point to engage a hole or depression in the addressing-strip, substantially as described.

26. The support 204, its rod 217, the upright w^9 , in which it is free to slide, and the spring 218, combined with the clamping-plate 213, the rod 216, the carriage w^5 , its rod 210, and friction device attached to the said rod 210 and engaging the rod 216, to operate substantially as described.

27. The vertically-movable supporting-plate 204 and the carriage w^5 and its attached knife, combined with means, substantially as described, to reciprocate the said carriage and knife, substantially as described.

28. The spring-supported supporting-plate 204, its attached blade, the carriage w^5 , and attached knife or cutter w^6 , combined with means to raise and lower the said carriage and supporting-plate, and with wetting mechanism to travel under and wet the gummed end of the addressing-strip when the same is elevated, substantially as described.

29. The supporting-plate 204, located above the wrapper-web and supporting the under side of the addressing-strip provided with addresses and with a series of holes or recesses, one for each address, a feeding-finger to enter each hole or depression in succession, the arm w^{14} , to which it is jointed frictionally, the rock-shaft w^{13} , and means to actuate the said rock-shaft to cause the feeding-finger to positively feed the said addressing-strip the distance of one address and leave one address projecting beyond the knife at the delivery end of the said supporting-plate, and a stop to limit the upward movement of the feeding-finger, combined with a knife n^6 and means to actuate it to cut off the said addressing-strip substantially in line with the hole or depression engaged by the feeding-finger, thus insuring correct placing and cutting of the addressing-strip, substantially as set forth.

30. The adjustable roll b^2 , over which is extended the wrapper-web, the rest 220 for the wrapper-web, the supporting-plate 204, to support the addressing-strip, its connected knife, the slide or carriage w^5 , and its attached knife or cutter, combined with means for reciprocating the slide or carriage w^5 , and with it

the said supporting-plate, and with a feeding-finger to engage holes or recesses in the addressing-strip and feed it positively just the distance for one address at each stroke, substantially as described.

31. The roll for supporting the addressing-strip and the feeding-finger for engaging holes or recesses in the said strip to feed it intermittently, combined with drawing-off mechanism, substantially as described, to make slack in the addressing-web in advance of the requirements of the feeding-finger, substantially as described.

32. The supporting-plate 204, to support the gummed addressing-strip, the bar n^{10} , means to reciprocate it, the box attached to the said bar, and the roll in the said box, combined with a water-supply and with an overflow-pipe, to operate substantially as described.

33. The addressing-strip-supporting plate having a ledge at one side, under which passes the edge of the addressing-strip, combined with the feeding-finger having a point, a stop to limit the upward movement of the feeding-finger, and with means to operate the said finger, the said ledge supporting the said finger to insure the movement of the point of the finger in a horizontal line, substantially as described.

34. The jaws to hold the wrapper and paper, the swing-frame n^5 , its rotating shaft n^7 , having pasting-bars, and the paste-roll, combined with the shaft n^7 and gears n^2 n^3 n^6 , the cam n^{18} , gear n^{22} , and sector n^{21} , to operate substantially as described.

35. The shaft n^7 and the attached pasting bars, combined with the yoke n^5 , the gears n^6 n^4 n^2 , and shaft n^7 , the said yoke resting on the said shaft loosely, and with means to rotate the gear n^2 , substantially as described.

36. The jaws to carry the wrapper and paper, the paste-box mounted in guides on the framework, the paste-roll shaft in the said box, the yoke n^5 , the shaft n^7 , to support the yoke, the shaft n^7 , its attached pasting-bars, and the link n^{13} , to connect the paste-roll shaft with the shaft n^7 , combined with the gears, substantially as described, to rotate the said shaft n^7 at a variable speed, the said gearing being operative to rotate the shaft n^7 in all positions of the said paste-box, substantially as described.

37. The feed-roll shaft b^7 , the ratchet D^{20} fast thereon, the stud D^7 , pawl thereon, the loose slotted plate or hub D^4 , having a pinion D^3 , and a stud to act upon one end of the said pawl and disengage it from the teeth of the said ratchet-wheel, combined with a rack to reciprocate the said gear and plate or hub D^4 to effect the intermittent rotation of the feed-roll in one direction and remove the point of the pawl from the teeth of the said ratchet in the backward stroke of the said pawl, substantially as described.

38. The plate 204 and the spring-clamp 203, combined with a wetting device having a roll

and a box in which the roll is partially held, and with means, substantially as described, to operate the said wetting device and cause it to travel but once across the wetting-strip before the same is severed, substantially as described.

39. The combination, with the clamping-jaws to hold the folded and wrapped papers and the bunter, of a series of rolls and supports therefor to conduct the said folded and wrapped papers away from the jaws, substantially as described.

40. The paper-receiving box, a series of rolls therein provided with ratchet-toothed wheels, a bar 102, provided with a series of spring-held pawls, arms 116, upon which the said bar is pivoted, and a reciprocating slide-bar 115, combined with the nippers and with the first folding-blade, loosely connected to the said arms 116, to provide for lost motion and enable the pawls to be disengaged from the ratchets during one stroke of the bar 115, combined with the nippers and with the first folding-blade, to operate substantially as described.

41. In a folding-machine, the rolls r^1 r^2 and their supports, combined with means, substantially as described, to open or separate the said rolls intermittently for the reception between them of the folded and wrapped papers, and with a series of rolls to carry the wrapped papers from the rolls r^1 r^2 first to receive between them the papers, substantially as and for the purpose set forth.

42. In a folding-machine, the rotating cylinder having jaws, and means, substantially as described, to open and close the said jaws, combined with a bunter to enter slots in the jaws and dislodge the folded and wrapped papers therefrom in succession, the same bunter co-operating with all the sets of jaws, substantially as described.

43. In a folding-machine, the roll to support the addressing-web, means to feed the said web, the blade to support the wrapper-web, and means, substantially as described, to feed the wrapper-web, combined with the frame carrying the said roll b^2 , and with adjusting devices for the said frame to enable the addressing-slip to be applied to any part of the wrapper-web, substantially as described.

44. In a folding-machine, a rotating cylinder containing jaws composed of pads, as m^7 , and of plates, as m^6 , arms m^4 , on which the said plates are pivoted, shafts carrying the said arms, and springs to normally press the plates toward the said pads, substantially as described.

45. In a folding-machine, the rods m^3 , arms m^4 , a paste-roll, and plates m^6 , pivoted thereon, to support the end of the wrapper-web to be pasted, combined with a vibrating frame and its attached paster to transfer paste from the paste-roll to the wrapper, substantially as described.

46. In a folding-machine, jaws to hold the

assembled paper and wrapper, and pasting mechanism, substantially as described, to paste the wrapper, combined with the lip-lapper to meet and lay the lip of the wrapper over upon the pasted part thereof, substantially as described.

47. In a folding-machine, jaws to hold the assembled paper and wrapper, and pasting mechanism, substantially as described, to paste the wrapper, combined with the lip-lapper to meet and lay the lip of the wrapper over upon the pasted part thereof, and with means, substantially as described, to move the lip-lapper bodily and cause it to follow the jaws for a slight distance and meet the rolls r' r'' , substantially as described.

48. The rotating cylinder and its attached jaws, and the lip-lapper, the bunter, and means, substantially as described, to operate the said lapper and the bunter, combined with the rolls between which the folded and wrapped paper is delivered, substantially as described.

49. The feed-box and its series of independent rolls, on which rests the pile of papers, and means, substantially as described, to rotate the said rolls to project the end of the paper next to be fed out of the box, combined with nippers to engage the paper so projected forward and draw it from the said feed-box, the said rolls during such operation being turned only by the moving paper, and only so long as the said paper is in contact with the roll, and then coming to rest, and with the first folding-blade and parts co-operating therewith to fold the paper, to operate substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERASTUS WOODWARD.

Witnesses:

G. W. GREGORY,
C. M. CONE.