

No. 777,588.

PATENTED DEC. 13, 1904.

B. F. BERRY.  
ENVELOP MACHINE.

APPLICATION FILED NOV. 27, 1903.

NO MODEL.

6 SHEETS—SHEET 1.

FIG. I.

FIG. II.

attest:    
 W. P. Smith  
 E. J. Krivick

Inventor:—  
 Berry. F. Berry.  
 By Thompson & 17th attys.

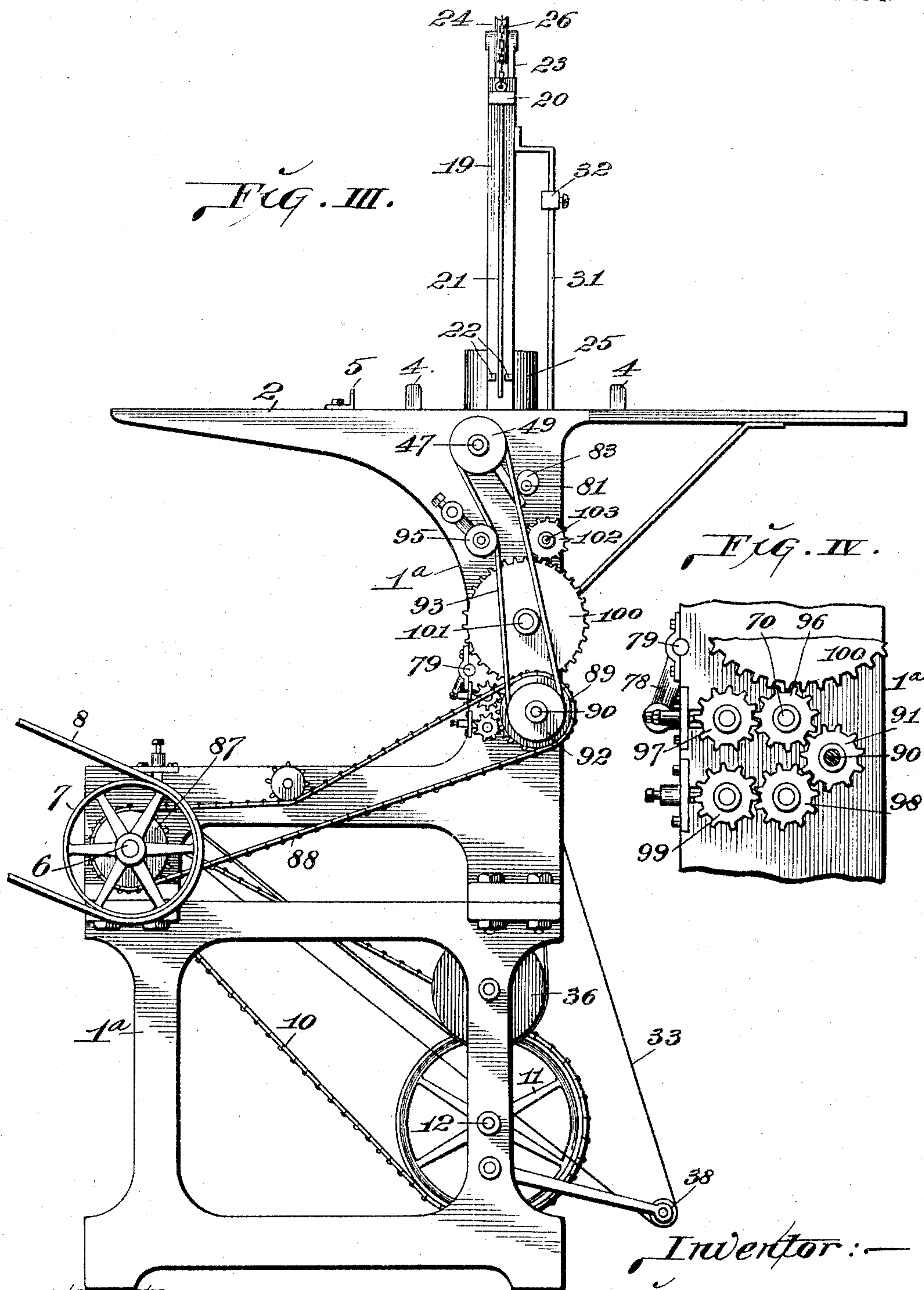
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6 SHEETS—SHEET 2.



attest:—  
M. Smith.  
E. J. Knight

Inventor:—  
Benj. F. Berry.  
By Thos. B. Berry atty's.



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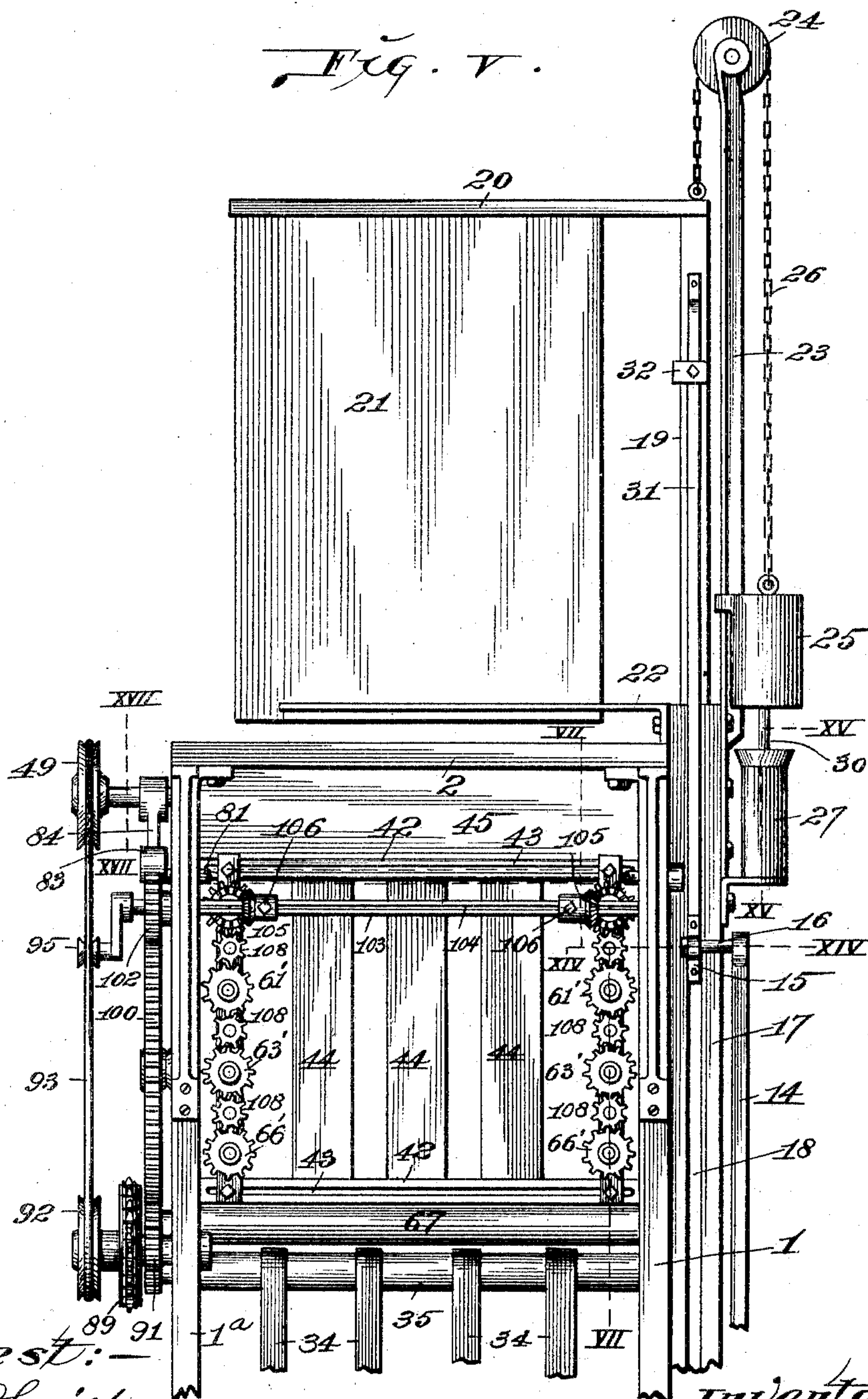
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6 SHEETS—SHEET 3.

*Fig. V.*



*attest:*  
*W. Smith*  
*E. K. Knipf*

*Inventor:*  
*Benj. F. Berry.*  
*By Wright Bros.*  
*Attys.*

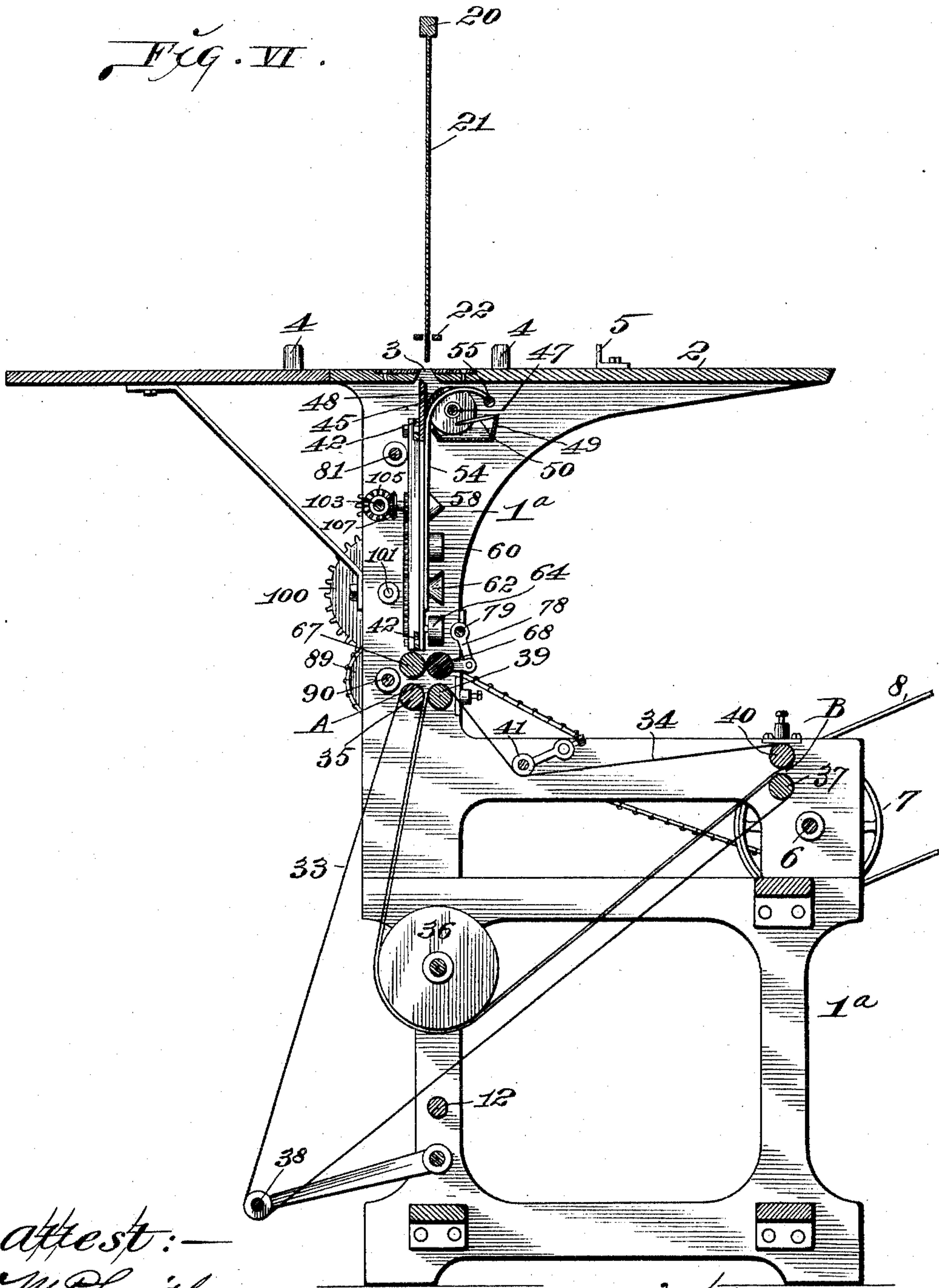
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6 SHEETS—SHEET 4.



*attest:—*  
*W. Smith*  
*E. Knight*

*Inventor:—*  
*Benj. F. Berry.*  
*By Thos. B. Berry atty's.*

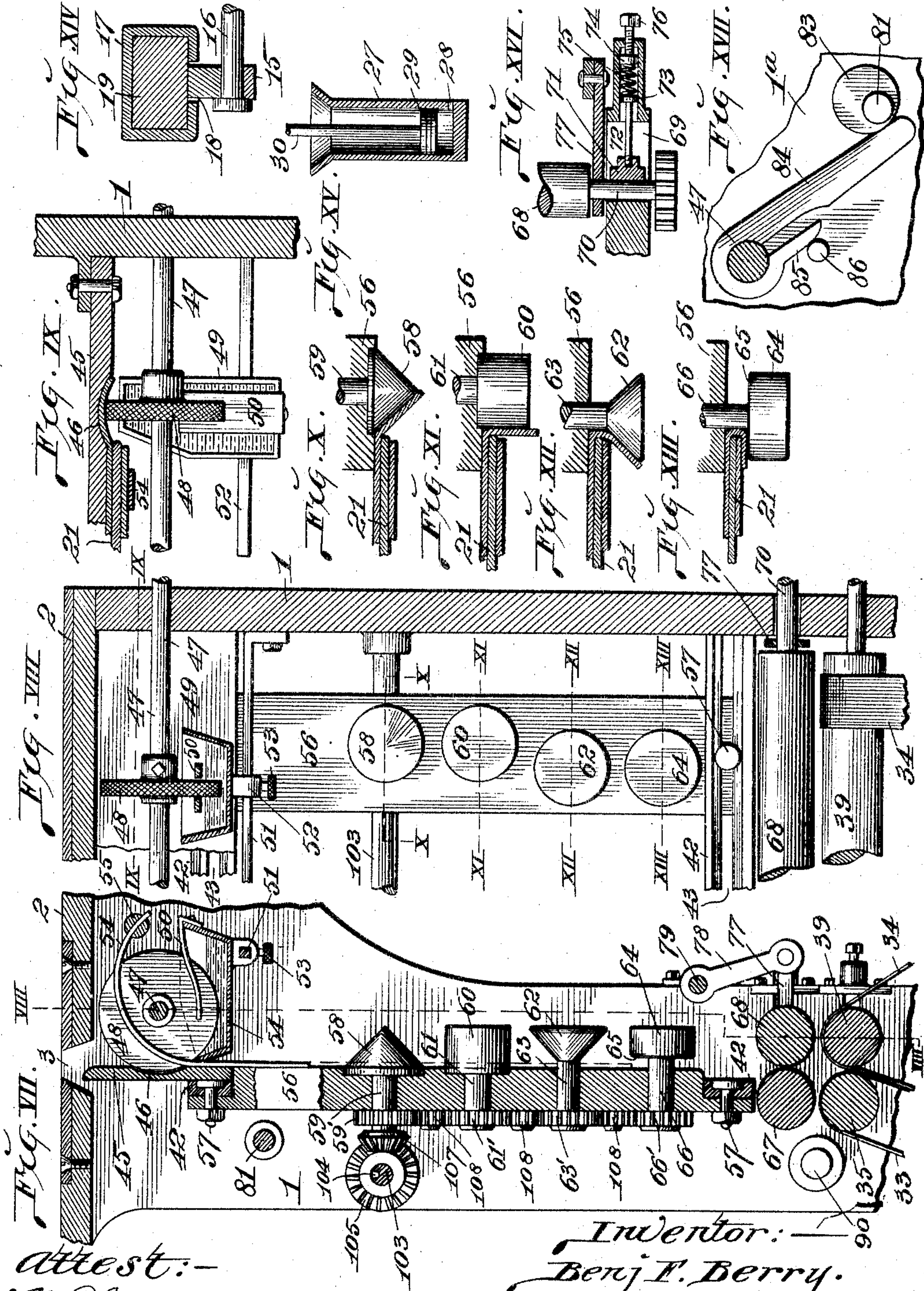


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NO MODEL.

6 SHEETS—SHEET 5.



attest:-  
W. Smith  
J. S. Knight

Inventor:  
Benj. F. Berry.  
By Thos. H. Berry  
attys.



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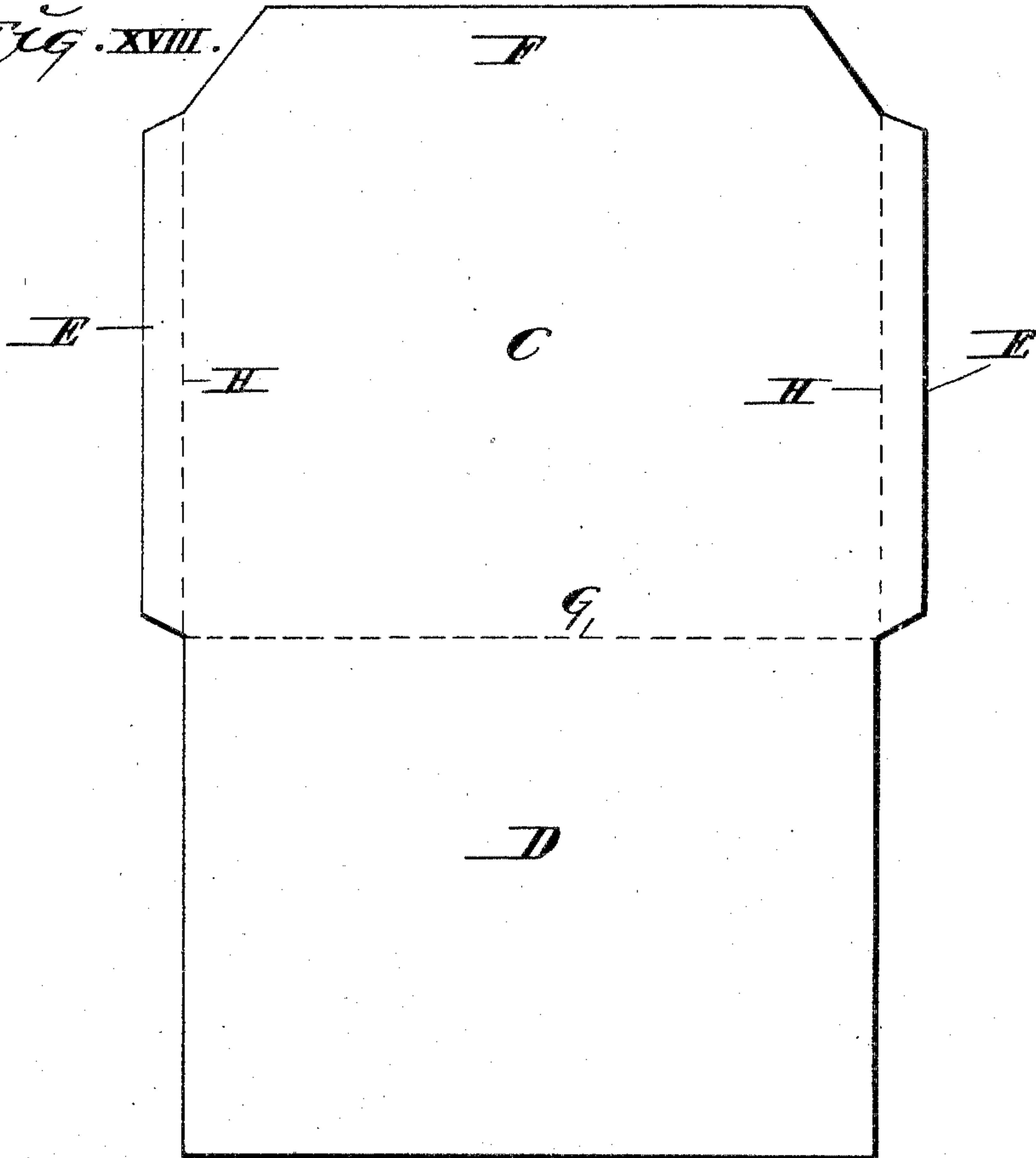
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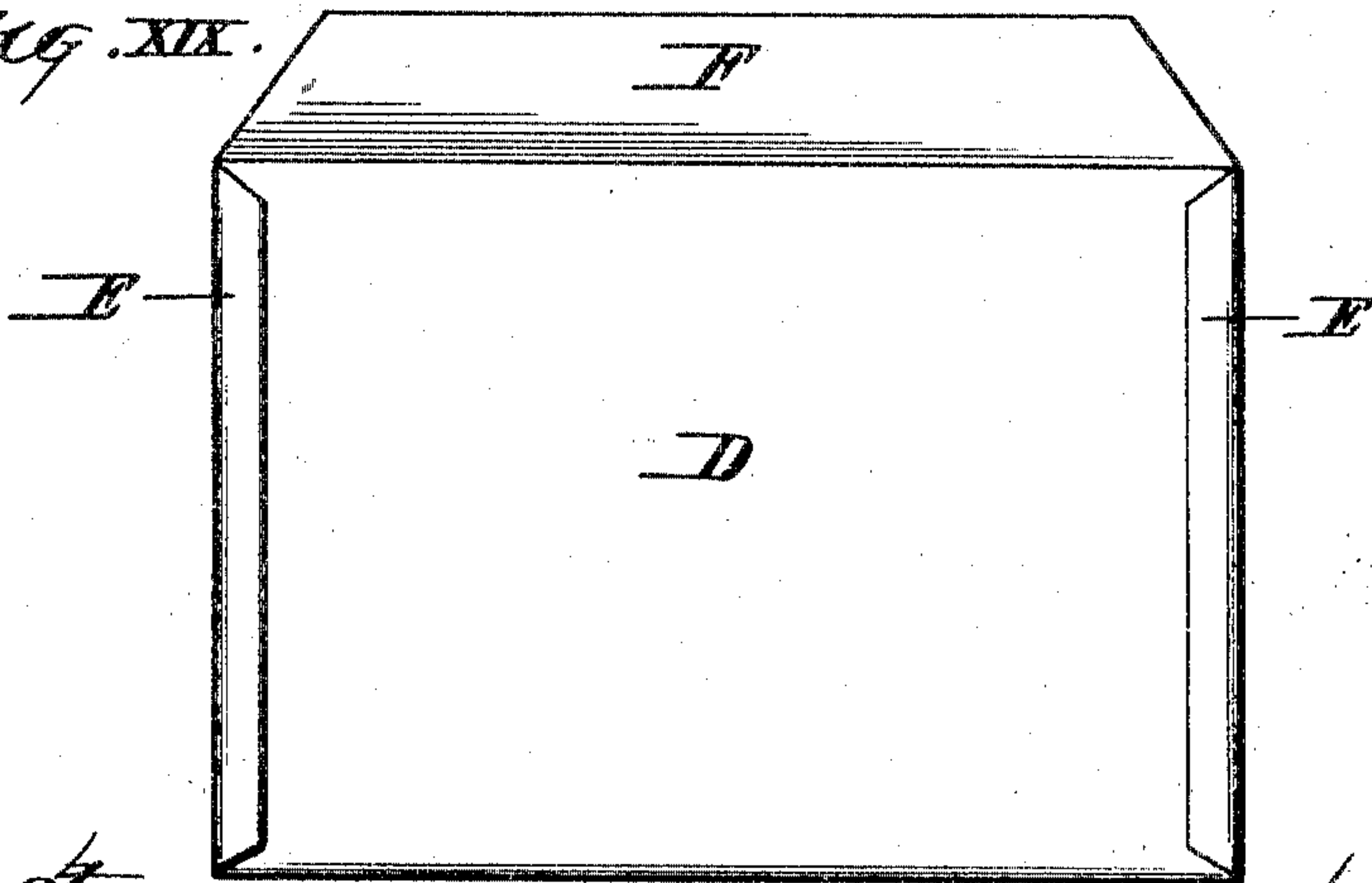
NO MODEL.

6 SHEETS—SHEET 6.

*Fig. XVIII.*



*Fig. XIX.*



Attest:

*M. Smith*  
*E. S. Knight*

Inventor:

*Benj. F. Berry.*

By *Wright Bros* atty's.

# UNITED STATES PATENT OFFICE.

BENJAMIN F. BERRY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO ANY SIZE ENVELOPE & MANUFACTURING COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION.

## ENVELOP-MACHINE.

SPECIFICATION forming part of Letters Patent No. 777,588, dated December 13, 1904.

Application filed November 27, 1903. Serial No. 182,720. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN F. BERRY, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Envelop-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a machine for gumming, folding, and pasting blanks into the form of envelopes, the object of the invention being to produce a machine of this character of the simplest form, while at the same time obtaining satisfactory results.

The construction of the machine is of such nature as to provide for the production of envelopes of various sizes.

The invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a side elevation of my machine. Fig. II is a rear elevation of the lower portion of the machine at the side shown in Fig. I. Fig. III is an elevation of the side of the machine opposite that shown in Fig. I. Fig. IV is an enlarged view of the envelop-feed-roller and tape-driving-roller gears. Fig. V is an enlarged rear elevation of the upper part of my machine. Fig. VI is a vertical transverse section taken centrally through the machine. Fig. VII is an enlarged vertical section taken on line VII VII, Fig. V. Fig. VIII is a vertical section taken on line VIII VIII, Fig. VII. Fig. IX is a horizontal section taken approximately on line IX IX, Fig. VIII. Fig. X is a horizontal section taken on line X X, Fig. VIII. Fig. XI is a horizontal section taken on line XI XI, Fig. VIII. Fig. XII is a horizontal section taken on line XII XII, Fig. VIII. Fig. XIII is a horizontal section taken on line XIII XIII, Fig. VIII. Fig. XIV is a horizontal section taken on line XIV XIV, Fig. V. Fig. XV is a vertical section taken on line XV XV, Fig. V, through the dash-pot of the machine. Fig. XVI is a horizontal section taken through the yielding bearing of the envelop-pressure feed-roller of the machine. Fig. XVII is a view of the

mechanism for stopping the operation of the gumming-rollers with the shaft that carries said rollers shown in section, taken on line XVII XVII, Fig. V. Fig. XVIII is a view illustrating the blank from which the envelopes are produced in my machine. Fig. XIX is a view of the finished envelop.

1 designates one of and 1<sup>a</sup> the other of the side frames of my machine. These side frames are surmounted by a table 2. In the table 2 is a longitudinal slot 3. (See Figs. VI and VII.)

4 designates side gage-stops and 5 a rear gage-stop on the table 2, to which the envelop-blank (shown in Fig. XVIII) is presented to lie across the slot 3 in the table, through which it is folded and pressed in a manner to be hereinafter set forth.

6 designates the main driving-shaft of the machine, to which is fixed the drive-pulley 7, that receives a belt 8. (See Figs. I, III, and IV.) The drive-shaft 6 extends transversely of the machine through both of its side frames. Fixed to the drive-shaft, preferably at the far end from that to which the drive-pulley 7 is secured, as shown, is a gear-wheel 9. (See Fig. I.) This gear-wheel receives a drive chain or belt 10, that leads to a gear-wheel 11 to convey power to a shaft 12, journaled in the machine side frames.

13 designates a crank fixed to the shaft 12 to rotate therewith. To the outer end of this crank is journaled the lower end of a pitman 14, the upper end of which is journaled in a boxing 15 through the medium of a pivot-pin 16. (See Figs. I, V, and XIV.) The boxing 15 is carried by a member to be presently referred to.

17 designates a guide secured to the side frame 1. This guide extends vertically and is of box-like form, as seen in Fig. XIV, and has in one of its walls a vertical longitudinal slot 18. The guide is located in a position approximating that of the slot 3 in the machine-table.

19 is a vertical slide-bar operating in the guide 17 and by which the boxing 15, that receives the connection of the pitman 14, is carried, thereby providing for the vertical re-



reciprocation of said slide-bar in its guide upon the rotation of the crank 13, by which the pitman is driven.

20 is an arm extending horizontally from the slide-bar 19. This arm carries a blade 21, that depends therefrom directly in vertical line corresponding to the longitudinal extent of the table-slot 3. This blade is designed to reciprocate vertically through said slot during the reciprocation of the slide-bar 19 to fold the envelop-blank downwardly through the slot, and it is directed in its movement by a guide 22. (See Figs. III, V, and VI.)

23 designates a standard projecting upwardly from the guide 17 in the line of travel of the slide-bar 19, and in the upper end of which is journaled a pulley 24. 25 is a traveling weight that rides in engagement with the standard 23, as seen in Fig. V, and which is flexibly connected to the slide-bar 19 or its arm 20 by a chain 26. This weight by its connection with the blade-carrying members operates to assist in the raising of said members each time that the blade 21 is elevated and serves as a counterbalance member for the blade and the members by which it is carried. For the purpose of furnishing a cushioning action for the traveling weight 25 I utilize a dash-pot 27, that is mounted beneath the weight and is provided with an air-exit 28. (See Fig. XV.) This dash-pot receives a piston 29, carried by a rod 30, fixed to the weight 25 and adapted to enter the dash-pot as the weight approaches the lower limit of its travel. As the piston so enters and travels downwardly the air in the dash-pot is gradually forced therefrom through the exit 28, thereby affording a gradually-yielding air-cushion beneath the piston that obviates the occurrence of a sudden jar as the blade-carrying members of the machine are operated upwardly to their limit, and the traveling weight is consequently lowered to the terminus of its travel.

31 designates a rack having its upper end fixed to the slide-bar 19 and its lower end fixed to the boxing 15, projecting from said slide-bar.

32 is a trip-collar adjustably secured to the rack 31, so that it may be moved vertically thereon to any desired position. The utility of these parts will be hereinafter set forth.

33 and 34 designate two series of envelop-conveying tapes, which are arranged to travel in similar directions and between which the envelops are received at a point A (see Fig. VI) after being produced and conveyed to a point B for discharge. The tapes 33 pass around a driving-roller 35, located at the point A, thence downwardly and beneath rollers 36 and upwardly to a roller 37, located at the point B, from which the tapes return downwardly and rearwardly to the tightener-roller 38, and then again upwardly to the driving-roller 35. The tapes 34 travel on a driving-

roller 39 and descend therefrom to the rollers 36, from which they pass upwardly to a roller 40 and return to the driving-roller beneath a tightener-roller 41. (See Fig. VI.)

42 designates upper and lower horizontal bars provided with slots 43 and extending transversely of the machine between the upper portions of the side frames 1 and 1<sup>a</sup>. Attached to these slotted bars are envelop-directing uprights 44, (see Fig. V,) in front of which the envelops travel while being folded in a manner to be described.

45 is a vertical plate extending upwardly from the upper slotted bar 42 immediately beneath the slot 3 in the table 2, this plate being provided with a longitudinal horizontal recess 46. (See Figs. VII and IX.)

47 designates a rotatable shaft journaled in the side frames 1 and 1<sup>a</sup> of the machine forward of the vertical plate 45, and 48 designates gumming-wheels adjustably mounted on said shaft to be shifted into varying positions thereon, as desired.

49 designates paste-pans in which the gumming-wheels 48 rotate to receive a continuous supply of gum or paste, the surplus of the adhesive substance gathered thereby being removed by scrapers 50, secured to the pans 49 and straddling the gumming-wheels. (See Figs. VII, VIII, and IX.) The paste-pans are upheld beneath the gumming-wheels by supporting-bars 51, to which the pans are adjustably held by slip-collars 52, containing set-screws 53. Provision is thus made for adjustment of the paste-pans to correspond to any adjustment of the gumming-wheels.

54 designates yielding pressure-arms, which are secured to a shaft 55 (see Figs. VI and VII) and the free ends of which extend to the vertical plate 45 to bear against the envelop-blanks as they pass downwardly between the vertical plate and the gumming-wheels adjacent thereto.

56 designates a pair of upright folding-member carriers that are shiftably and adjustably secured to the horizontal slotted bars 42 by bolts 57, (see Figs. V, VI, VII, and VIII,) said carriers being designed to be moved toward or away from each other in line with the table-slot 3 to provide for the folding members supported thereby, being more or less widely separated, according to the size of the envelop being produced in the machine and the flaps of which are operated upon by the folding mechanism to be described. This folding mechanism consists of the following parts: The uppermost folding member of each carrier is a forwardly-inclined conical roller 58, carried by a shaft 59. The second folding member is a straight-faced horizontal roller 60, carried by a shaft 61. The next folding member is a rearwardly-inclined conical roller 62, carried by a shaft 63, and the lowermost member is a straight-faced roller 64, having a rear working face 65 advanced from each



carrier 56, as seen in Figs. VII and XIII, and carried by a shaft 66. The folding members or rollers just described receive and fold the flaps of the envelops in a manner to be hereinafter more particularly referred to after said flaps have been gummed by the wheels 48. When the envelops have traversed the folding members, they are immediately received between a feed-roller 67 and pressure feed-roller 68, located beneath the folding members. The feed-roller 67 is mounted in fixed journals to rotate in a stationary position, while the pressure feed-roller 68 is yieldingly held toward the roller 67 in slotted boxes 69. (See Fig. XVI.) The shaft 70 of said roller 68 is therefore moved horizontally in said box, and it is pressed rearwardly by bearing-shoes 71, which are each equipped with a rod 72, having a head 73 located in a spring-box 74, containing an expansion-spring 75. The springs 75 are put under tension to the desired extent through the medium of set-screws 76. The shaft 70 of the roller 68 receives the connection at each of its ends of links 77, (see Figs. VI, VII, VIII, and XVI,) which are pivoted to rocker-arms 78, fixed to a rock-shaft 79, journaled to the machine side frames. This rock-shaft bears a lever-arm 80, which extends into the path of travel of the boxing 15, carried by the slide-bar 19, so that said boxing will strike the lever on each downward movement of said slide-bar.

81 designates a rock-shaft journaled in the machine side frames in proximity to the gumming-wheel shaft 47. On the end of this shaft in the path of travel of the trip-collar 32, carried by the rack 31 that moves with the slide-bar 19, is a rocker-finger 82, that is struck by said trip-collar when it descends thereto. Upon the other end of the rock-shaft 81 is a cam 83.

84 is a spring-clamp that is fitted to the gumming-wheel shaft 47 and is provided with a yielding arm 85, that rests against a stud 86, projecting from the adjacent machine side frame, as seen in Fig. XVII. The free end of the clamp 84 extends to the cam 83, and therefore when the shaft 81 is rocked, through the medium of engagement of the trip-collar 32 with the rocker-finger 82, pressure is exerted against the free end of said clamp to cause it to grip the gumming-wheel shaft and stop its rotation.

I will next describe the mechanism through means of which the folding members, feed-rollers, tape-rollers, and gumming-wheel shaft are operated.

87 is a gear-wheel fixed to the main drive-shaft 6 to receive a drive chain or belt 88, that leads to a gear-wheel 89, carried by a stub-shaft 90. (See Figs. III, IV, VI.) On this shaft 90 is a spur-wheel 91 and a grooved pulley 92. The grooved pulley receives a belt 93, which leads upwardly to a second grooved pulley 94, fixed to the gumming-wheel shaft

47 and through the medium of which rotation is imparted to said shaft. The belt 93 is rendered taut by a tightener 95. The spur-wheel meshes with a pinion 96, carried by the shaft 70 of the pressure feed-roller 68, and the pinion 96 in turn meshes with a pinion 97, fixed to the shaft of a feed-roller 67. The spur-wheel 91 also meshes with a pinion 98, that in turn meshes with a pinion 99, these last-named pinions being fixed to the shafts of the tape-driving rollers 35 and 39.

100 is a transmitting gear-wheel carried by a stub-shaft 101 and meshing with the pinion 96, carried by the pressure-feed-roller shaft 70. This transmitting gear-wheel conveys power to a pinion 102, that is fixed to a shaft 103, that extends transversely of the machine, as seen most clearly in Fig. V. The shaft 103 is provided with a longitudinal groove 104, and it bears a pair of bevel-gears 105, which are shiftable thereon and held by set-screws 106, that enter said longitudinal groove. The bevel-pinions 105 receive bevel-pinions 107, carried by the shafts 59 of the uppermost folding-rollers 58. It will therefore be seen that when power is transmitted to the shaft 103 it is imparted to the upper folding-roller. From the shaft of this roller the power is conducted to the folding-rollers 60, 62, and 64 through the medium of a pinion 59', fixed to the shaft 59, and pinions 61', 63', and 66' on the shafts of the last-named folding-rollers, that are connected in train through the medium of intermediate pinions 108.

C designates the front of my envelop; D, the envelop-back; E, the pasting-flaps, and F the sealing-flap. The said flaps are carried by the front of the envelop, as seen in the blank illustrated in Fig. XVIII, and assume the positions illustrated in the completed envelop. (Seen in Fig. XIX.) In forming the envelop it is first folded on the transverse line, (indicated at G on the blank,) and the flaps are then folded over onto the back D by bending on the lines H.

Having now furnished a description of my machine, I will set forth the operation of the parts during the production of envelops.

Power having been applied to the drive-shaft 6 through the medium of its pulley and power-belt, the various gear mechanisms are set in motion through the connections described. During the rotation of the drive-shaft 12 the crank-arm 13 travels in a circular path and imparts reciprocating motion to the pitman 14, thereby reciprocating the slide-bar 19, to which the pitman is connected. Each time that the slide-bar 19 descends it carries with it the folding-blade 21, which descends onto the envelop-blanks that are fed onto the table of the machine against the gage-stops 4 and 5. When the envelop-blanks are fed into such position, the juncture of the front and back of the blank at the location of the line G occupies a position immediately above



the table-slot 3. Therefore as the folding-blade 21 descends onto the blank it folds it downwardly through said slot past the vertical plate 45, and the pasting-flaps E of the blank travel between said vertical plate 45 and the gumming-rollers 48, which last-named members are so positioned on their shaft as to be spaced a distance apart corresponding to the space between the pasting-flaps. The flaps are thereby gummed ready to be pasted onto the back of the envelop when folded thereto. The folding action then takes place under the influence of the folding-rollers, during which period the folding-blade 21 remains within the folded blank, as seen in Figs. X to XIII, inclusive. The forwardly-inclined conical rollers 58 are first encountered by the pasting-flaps, and the flaps are bent to an outwardly-projecting obtuse angle with respect to the folded blank, as seen in Fig. X. As the flaps proceed in their movement they reach the longitudinal straight-faced folding-rollers 60, and their bending is continued to position them at right angles to the body of the folded blank, as seen in Fig. XI. The flaps are next engaged by the rearwardly-inclined conical folding-rollers 62 and bent rearwardly, so that they stand at backwardly-presented obtuse angles with respect to the folded blank, as seen in Fig. XII. The blanks and their flaps then pass back of the roller 64, so that they are pressed between the rear working faces of said rollers and the folding-roller carriers, as seen in Fig. XIII, where the flaps are pressed tightly to the back of the blank, thereby completing the envelop. The course of the envelop is continued after the flaps have been folded by reason of the continued descent of the folding-blade 21, and said blade passes between the feed-rollers 67 and 68, its passage therebetween being permitted owing to the pressure feed-roller 68 being yieldingly mounted in the manner explained, so that said roller will move laterally as the folding-blade reaches said rollers. Just at the moment the folding-blade reaches the rollers the lever-arm 80 is struck by the blade-carrying slide-bar boxing 15, and the rock-shaft 79 is rotated through the medium of said lever-arm to actuate the rocker-arms 78 and links 77, through the medium of which the pressure feed-roller is drawn away from the feed-roller 67. The folding-blade is therefore permitted to carry the envelop thereon between the feed-rollers, and the rollers thereupon immediately act to withdraw the envelop from the blade and transmit it to the conveying-tapes 33 and 34, which conduct it out of the machine. The folding-blade having reached the lower limit of its stroke when the envelop is delivered to the feed-rollers immediately ascends under the action of the pitman that drives it and passes above the table of the machine ready to convey the next blank downwardly into the machine.

During the period that the envelop-flaps are being folded it is desirable to avoid rotation of the gumming-wheels 48 after they have applied gum to the flaps, as otherwise they would rotate against the face of the vertical plate 45 and impart paste thereto that would be received by the fronts of the envelop-blanks thereafter passing in the machine. I therefore provide for the stoppage of the gumming-wheel shaft immediately after the gumming-wheels have performed their function. This stoppage is obtained through the medium of the clamp 84, which is caused to grip the gumming-wheel shaft in the manner explained each time that the trip-collar 32 passes into engagement with the rocker-finger 82, arranged in its path.

I claim as my invention—

1. In an envelop-machine, the combination of a folding mechanism comprising a series of folding members consisting of rollers of varying configuration to operate consecutively upon the flap of an envelop-blank, and means for presenting the blank to said folding members comprising a folding-blade traveling entirely through said folding mechanism, substantially as set forth.

2. In an envelop-machine, the combination of a folding mechanism comprising two series of folding members consisting of conical and straight-faced rollers to operate consecutively upon the flaps of an envelop-blank, and means for presenting the blank to said folding members comprising a folding-blade traveling entirely through said folding mechanism, substantially as set forth.

3. In an envelop-machine, the combination of a folding mechanism comprising two series of folding members, each consisting of an outwardly-inclined conical roller, a straight-faced roller, a rearwardly-inclined conical roller, and a roller having a rear working face, and means for presenting the envelop-blank to said folding members to permit their operation upon the flaps of the blank comprising a folding-blade traveling entirely through said folding mechanism, substantially as set forth.

4. In an envelop-machine, the combination of a pair of adjustable carriers, a folding mechanism operatively mounted in said carriers and consisting of rollers having varied configuration to operate upon the flaps of the envelop-blank, and means for presenting the envelop-blank to said roller comprising a folding-blade traveling entirely through said folding mechanism, substantially as set forth.

5. In an envelop-machine, the combination of a flap-folding mechanism, means for presenting an envelop-blank to said folding mechanism comprising a blade traveling entirely through the mechanism, and a controlling weight connected to said blade, substantially as set forth.

6. In an envelop-machine, the combination of flap-folding mechanism, means for present-



ing an envelop-blank to said folding mechanism, comprising a blade traveling entirely through said mechanism, a controlling-weight connected to said blade, and a dash-pot for cushioning the descent of said weight, substantially as set forth.

7. In an envelop-machine, the combination of a folding mechanism comprising a series of folding members consisting of rollers of varying configuration to operate consecutively upon the flap of an envelop-blank, a pair of feed-rollers for receiving the envelops from said folding mechanism, and means for presenting the blank to said folding members and conveying the blank to said feed-rollers, said means comprising a blade traveling entirely through said folding mechanism, substantially as set forth.

8. In an envelop-machine, the combination of folding mechanism, means for conveying an envelop-blank to said folding mechanism, and a pair of feed-rollers for receiving the envelops from said folding mechanism, one of said rollers being shiftable with respect to the other, and means for automatically moving said shiftable roller laterally, substantially as set forth.

9. In an envelop-machine, the combination of flap-folding mechanism, a reciprocating blade for conveying the envelop-blank to said folding mechanism, a stationary feed-roller and a shiftable feed-roller located adjacent to said folding mechanism, and means for automatically moving said shiftable roller when said blade approaches said feed-rollers, substantially as set forth.

10. In an envelop-machine, the combination of flap-folding mechanism, a reciprocating blade for conveying the envelop-blank to said folding mechanism, a stationary feed-roller and a shiftable feed-roller located adjacent to said folding mechanism, and means for auto-

matically moving said shiftable roller when said blade approaches said feed-rollers; said last-named means comprising a rock-shaft connected to said shiftable roller and a lever-arm actuated through the medium of a part by which said reciprocating blade is carried, substantially as set forth.

11. In an envelop-machine, the combination of envelop-folding mechanism, a gumming-wheel shaft, gumming-wheels carried by said shaft, a clamp mounted on said gumming-wheel shaft, and means for automatically tightening said clamp to said shaft at a specified period during the operation of the machine, substantially as set forth.

12. In an envelop-machine, the combination of folding mechanism, means for presenting an envelop-blank to said folding mechanism, a gumming-wheel shaft, gumming-wheels carried by said shaft, a clamp fitted to said gumming-wheel shaft, and means operated by said blank-presenting means for tightening said clamp to said gumming-wheel shaft at a specified period during the operation of the machine, substantially as set forth.

13. In an envelop-machine, the combination of folding mechanism, a blade for presenting the envelop-blank to said folding mechanism, a reciprocating member by which said blade is carried, a rack carried by said blade-carrying member, an adjustable collar secured to said rack, a gumming-wheel shaft, gumming-wheels carried by said shaft, a clamp mounted on said gumming-wheel shaft, and means actuated by said rack-collar for tightening said clamp to the gumming-wheel shaft, substantially as set forth.

BENJAMIN F. BERRY.

In presence of—

E. S. KNIGHT,

NELLIE V. ALEXANDER.