

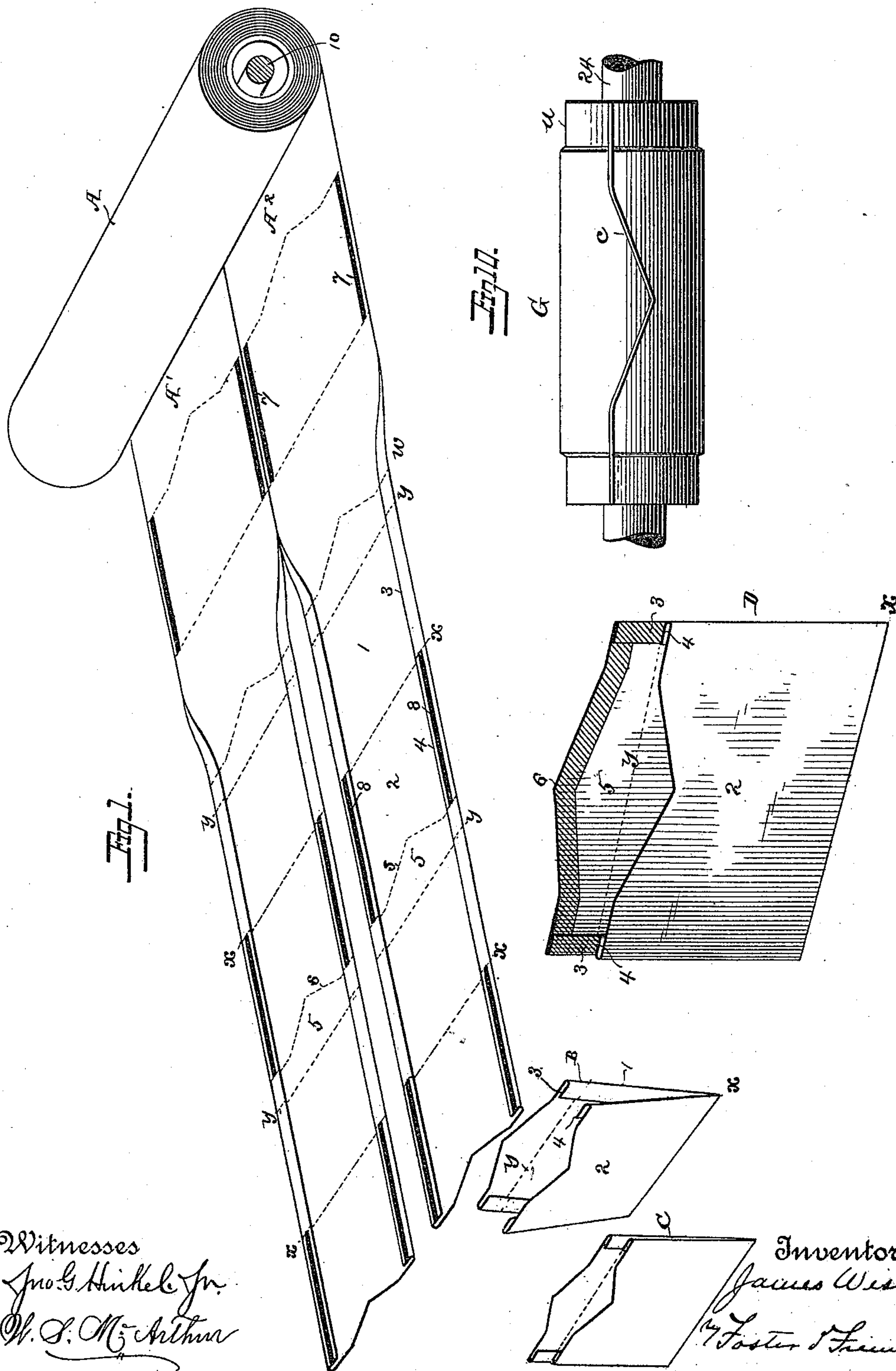
(No Model.)

7 Sheets—Sheet 1.

J. WEST.
ENVELOPE MACHINE.

No. 442,839.

Patented Dec. 16. 1890.



Witnesses
Jno. G. Hinkel Jr.
W. S. McArthur

Inventor
James West
Foster Freeman
Attorney

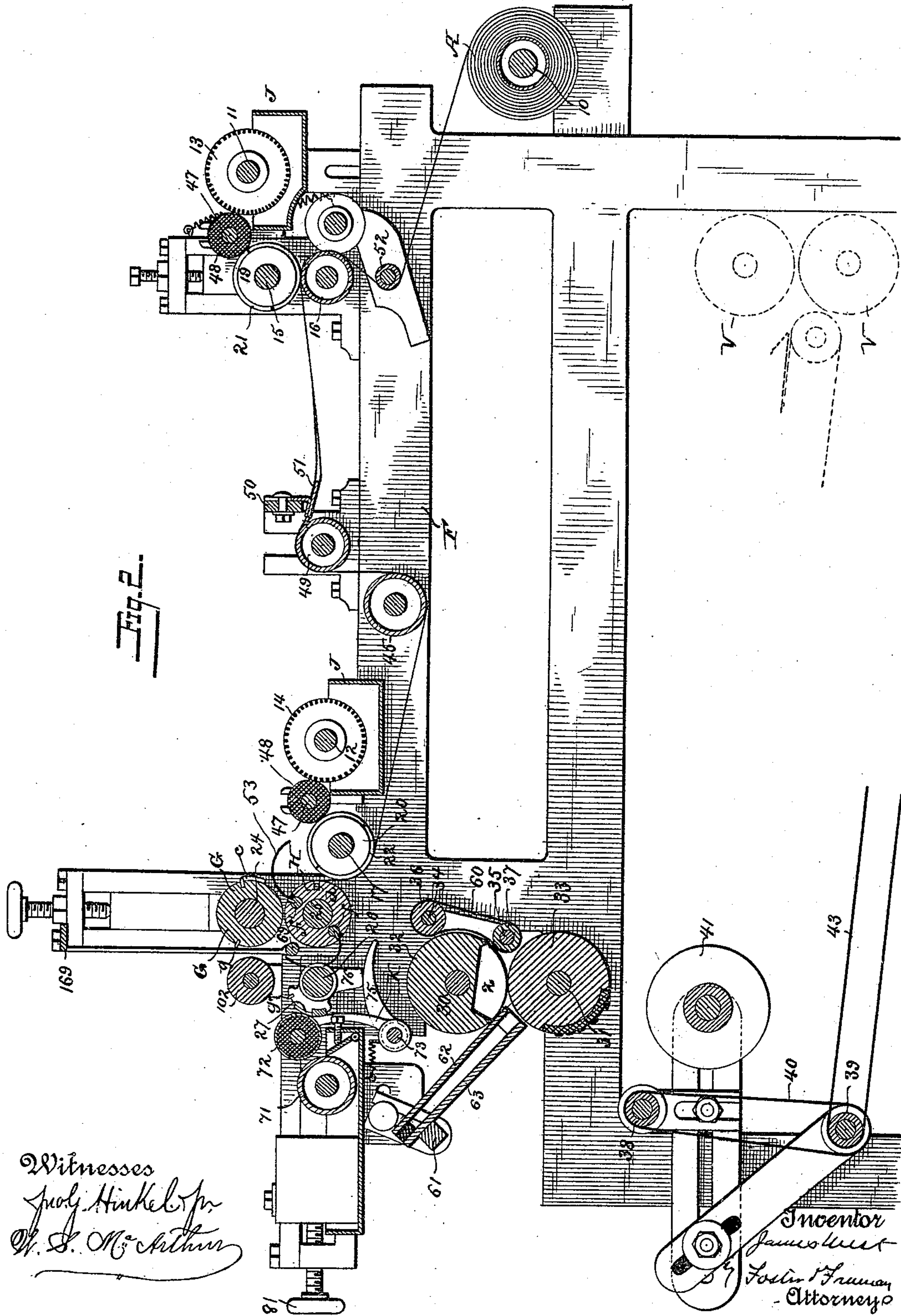
(No Model.)

7 Sheets—Sheet 2.

J. WEST.
ENVELOPE MACHINE.

No. 442,839.

Patented Dec. 16. 1890.



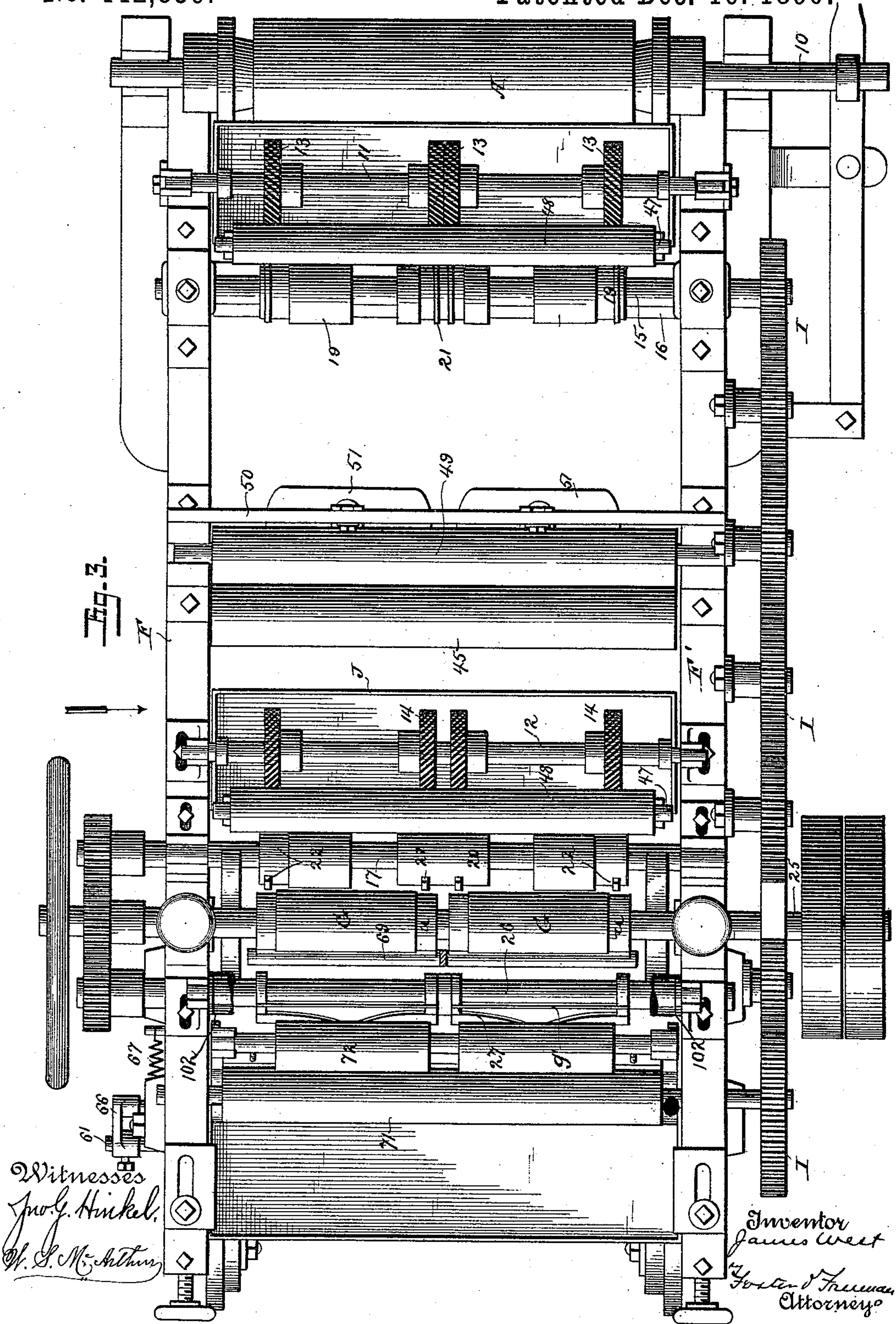
(No Model.)

7 Sheets—Sheet 3.

J. WEST.
ENVELOPE MACHINE.

No. 442,839.

Patented Dec. 16. 1890.



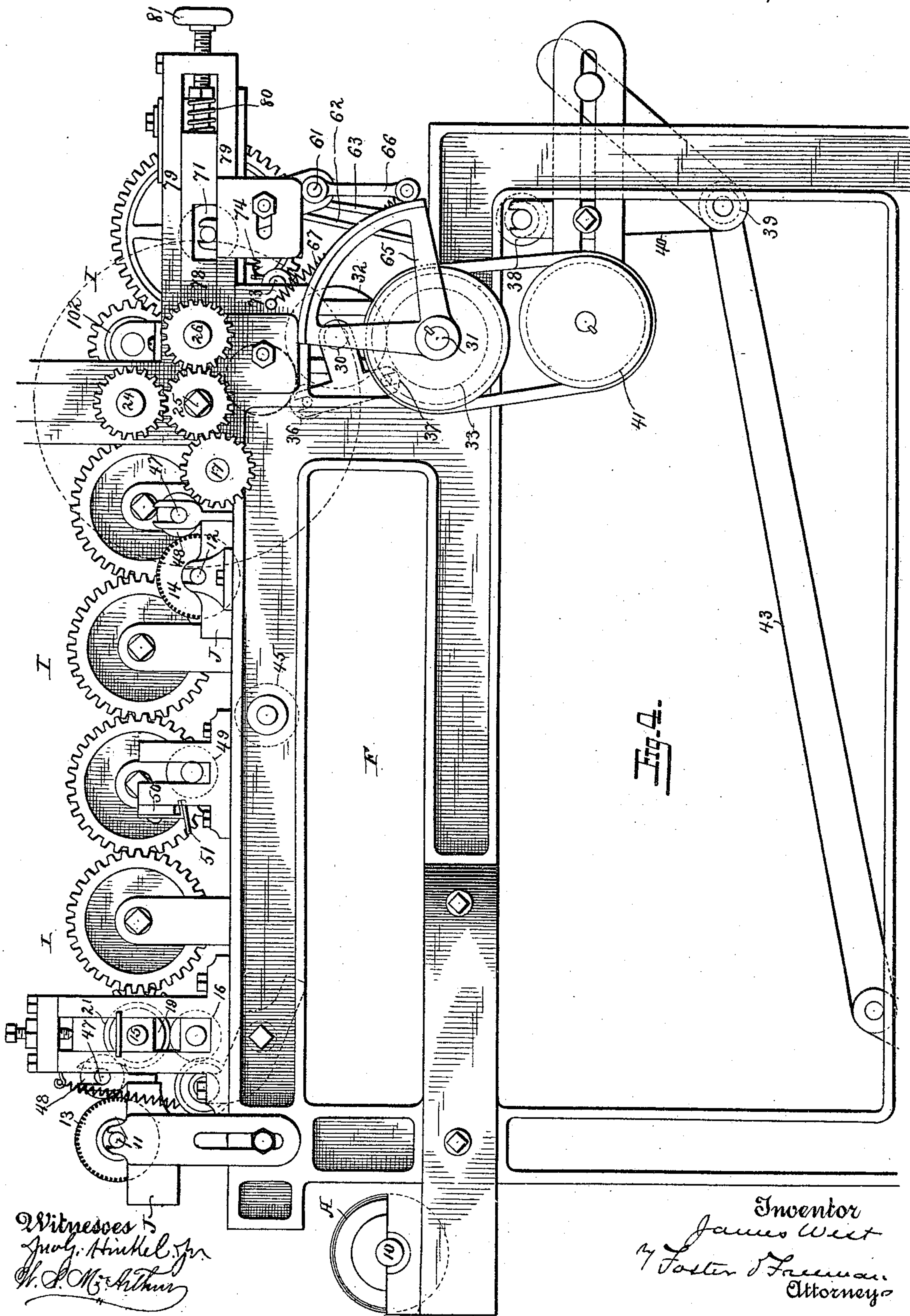
(No Model.)

7 Sheets—Sheet 4.

J. WEST.
ENVELOPE MACHINE.

No. 442,839.

Patented Dec. 16, 1890.



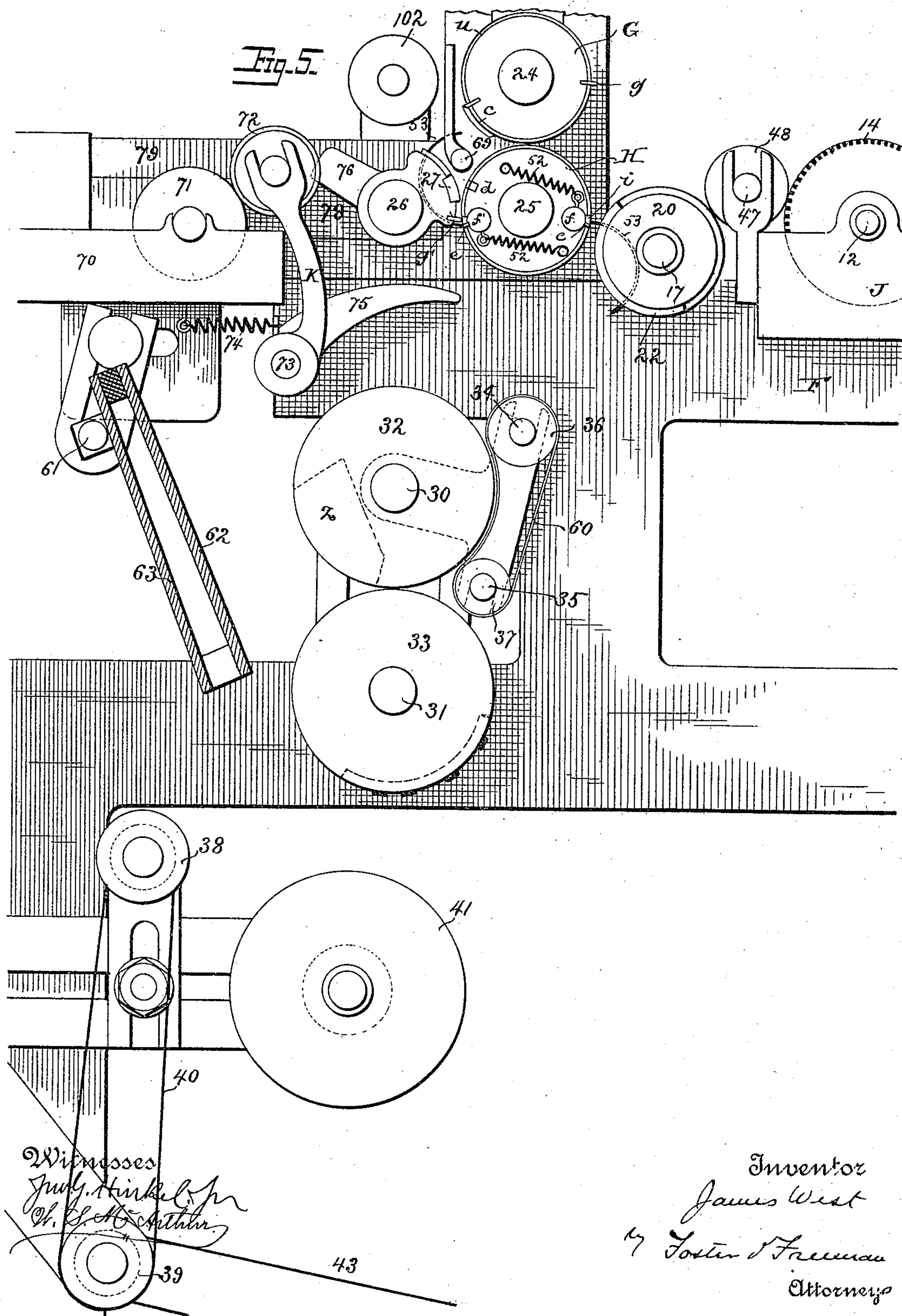
Witnesses
J. H. Hinkel, Jr.
H. A. McArthur

Inventor
James West
Foster & Freeman
Attorneys

7 Sheets—Sheet 5.

No. 442,839.

Patented Dec. 16, 1890.



(No Model.)

7 Sheets—Sheet 6.

J. WEST.
ENVELOPE MACHINE.

No. 442,839.

Patented Dec. 16, 1890.

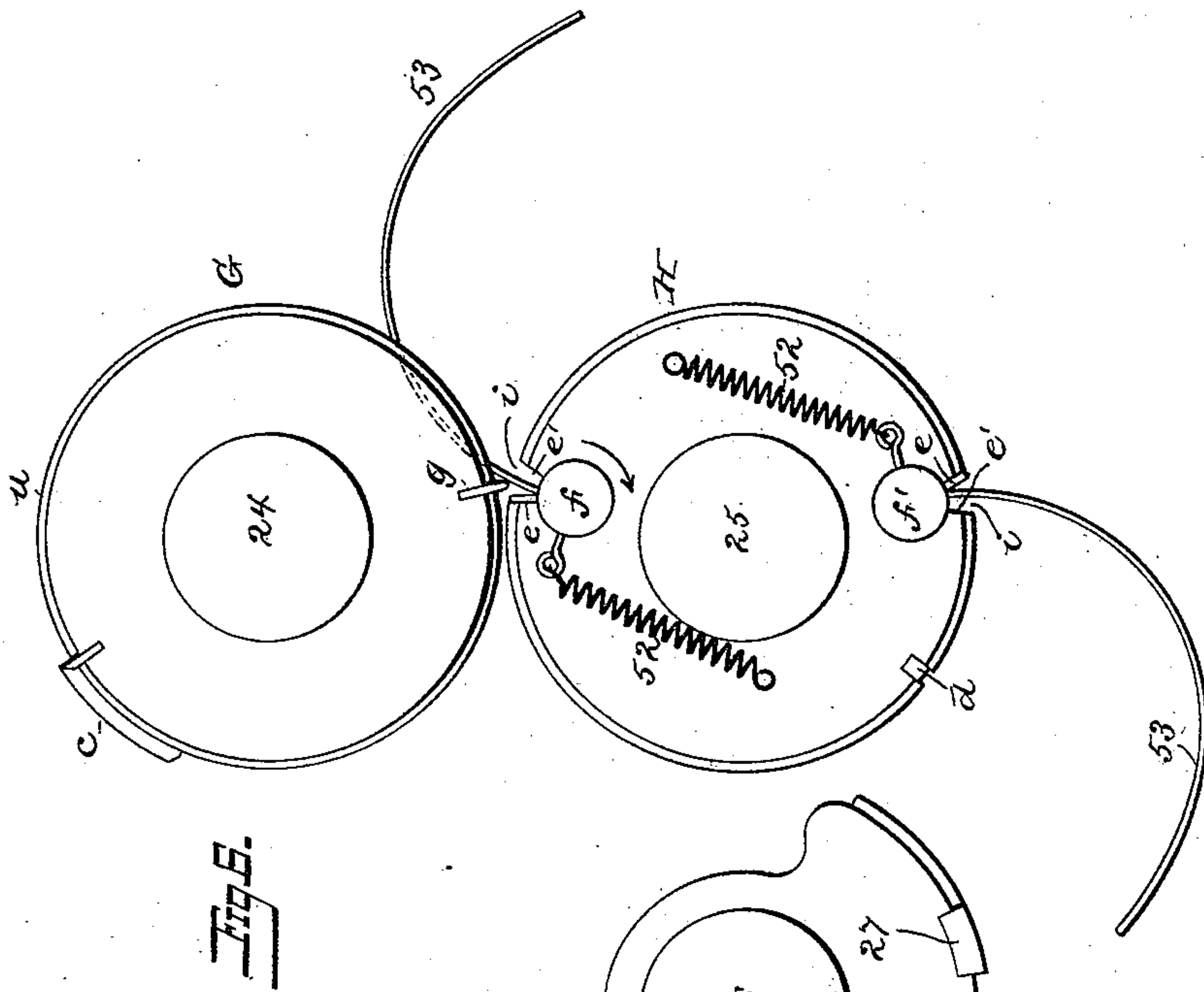
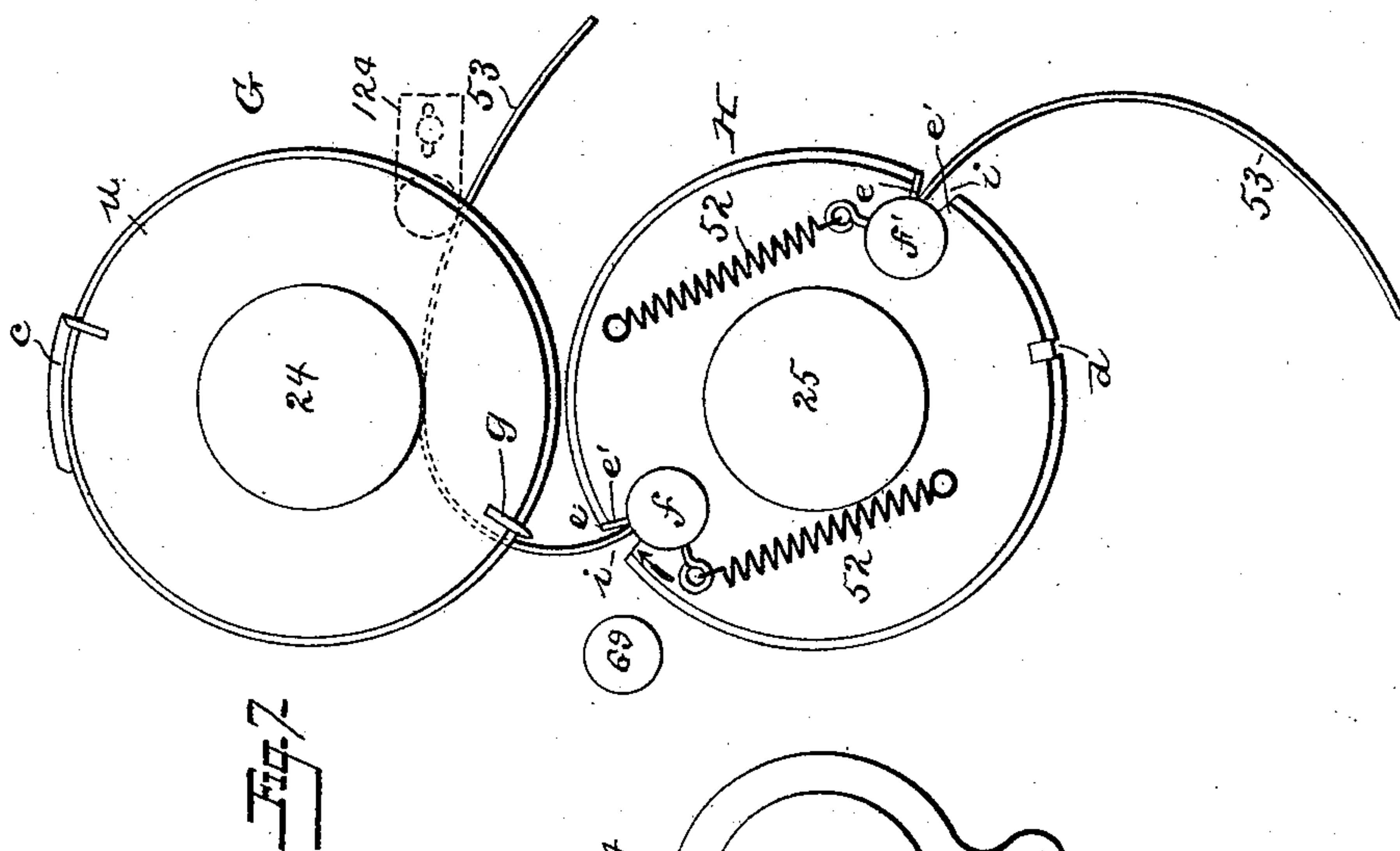


Fig.



7-11

Witnesses
Jno. G. Hinkel, Jr.
W. S. McArthur

Inventor
James West
By Foster & Freeman
Attorneys

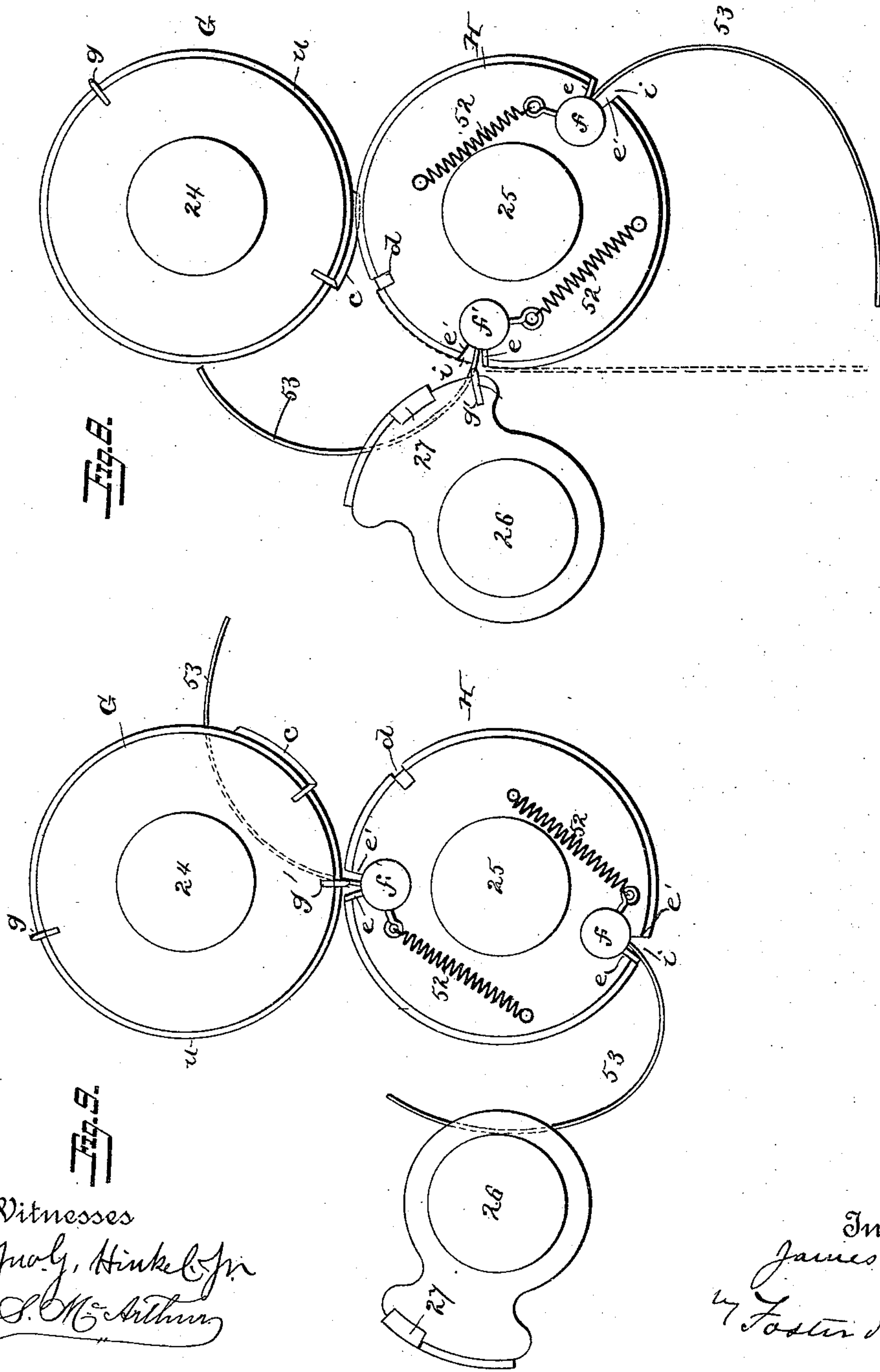
(No Model.)

7 Sheets—Sheet 7.

J. WEST.
ENVELOPE MACHINE.

No. 442,839.

Patented Dec. 16, 1890.



Witnesses
Jno. G. Hinkley Jr.
W. S. McArthur

Inventor
James West
by Foster & Freeman
Attorneys

UNITED STATES PATENT OFFICE.

JAMES WEST, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO SAMUEL CUPPLES, OF SAME PLACE.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 442,839, dated December 16, 1890.

Application filed January 26, 1888. Serial No. 261,983. (No model.)

To all whom it may concern:

Be it known that I, JAMES WEST, a citizen of the United States, and a resident of St. Louis, Missouri, have invented certain new and useful Improvements in Envelope-Machines, of which the following is a specification.

My invention is a machine for the manufacture of envelopes and bags, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a perspective diagrammatic view illustrating the manufacture of envelopes from a continuously-traveling paper strip. Fig. 2 is a longitudinal sectional elevation of a machine embodying my invention. Fig. 3 is a plan view of a machine; Fig. 4, a side view, looking in the direction of the arrow, Fig. 3; Fig. 5, an enlarged sectional elevation of the parts of the machine adjacent to the folding, cutting, and creasing appliances. Figs. 6, 7, and 8 are detached views illustrating the construction and operation of the folding, cutting, and creasing and gumming appliances. Fig. 9 is a detached view of said appliances, illustrating a modification. Fig. 10 is a view showing the cutter and supporting-roll.

Before describing the construction of the machine and the parts thereof I will refer to the mode of operating upon the paper in order to form therefrom the desired article, and will then specifically describe the appliances by means of which the operations are effected.

Referring to Fig. 1, A represents a roll of paper on a suitable support 10 and adapted to make one or more series of articles. As shown, it is sufficient in width to make two series of envelopes at the same time, and as the sheet is drawn from the roll it is cut centrally, so as to form two contiguous strips A' A², each of which is operated upon in the same manner.

The form of the envelope to be made is indicated at B C D, Fig. 1, said envelope consisting of a single sheet or piece of paper folded along the line x to form the front and back portions 1 2, folded along each edge to form inturned flanges 3 4, the former on the front

and the latter on the back portion, the flange 3 being pasted against the front portion and the flange 4 being pasted against the opposite face of the flange 3, and the front portion being creased transversely at y to form a line of separation between the flap 5 and the front portion and facilitate the turning down of the flap, which is gummed along the edge at 6.

The first step in the operations upon the strip as it passes from the roll is to deposit by suitable pasters at intervals adjacent to the opposite edges thin films or layers of gum or paste, forming lines 7 7, such lines being equal in length to the length of the combined front and flap portions of the sheet. After the lines 7 7 have been placed upon the strip the opposite edges of the latter are turned in at about the points w by edge-folders, Fig. 1, and the turned-in portions or flanges are pressed down upon the body portion of the strip and will be cemented thereto at the points opposite to and contacting with the gummed portions, while the intermediate parts of the flanges will lie loosely upon the body portion of the strip. Other layers of paste or gum are now applied by suitable pasters at intervals to the outer faces of the inturned flanges, forming lines 8 8, each line 8 being equal in length to the length of that part of the sheet that constitutes the back 2. The next operation is to fold in succession, by means of suitable creasers, each portion of the strip upon a line x , transverse to the strip and near the ends of the lines 8 8, the end portion of the strip which is folded over upon the other portion constituting the back 2 of the envelope, and the lines 8 are so applied with respect to the lines 7 that when the sheet is so folded those portions of the inturned flanges upon the back 2 holding the lines 8 will constitute the flanges 4, that are loose from the back, while the remaining portions of the flanges will constitute the flanges 3, that are pasted on the lines 7 close to the front portion 1 of the envelope, while the lines 8 of paste will cement the contiguous faces of the flanges 3 4 together when the back portion 2 is folded down upon the front portion, as shown at C D, Fig. 1. The sheet is then creased trans-

versely along the line y , so as to divide the flap portion 5 from the front portion 1, and then cut transversely on the line s to form the edge of the flap, and a layer of gum 6 is applied to the edge of the flap portion 5 and is dried thereon, so as to afford a means of sealing the envelope, as usual.

It will be evident that the above-described series of operations may be performed by suitable appliances upon a continuously-traveling strip, so that the latter is transformed with great rapidity into envelopes of the desired character, and in order to avoid the loss of time as well as other objections incident to the use of reciprocating cutters, dies, &c., I effect all of the operations, except the inturning of the edges of the sheet, by means of devices carried by rotating shafts.

While different appliances may be used for performing the different operations set forth, I will now proceed to describe those which in actual practice have proved to be very effective.

In the machine shown the devices are arranged to operate upon a roll A, which is severed centrally so as to form two strips, and as the devices for operating upon each strip are duplicates of the others, I will in my description refer only to a single set of devices, although two sets are shown.

F and F' are the side frames of the machine, of any suitable construction, and provided with suitable bearings for the supporting-shaft 10 of the roll A; for the shafts 11 12 of the pasters, shown in the form of pasting-disks 13 and 14; for the shafts 15 and 17 of the pasting-rollers 19 and 20, each provided with peripheral pasting-type 21 and 22; for the shafts of the cutting and creasing rolls G and H; for the shaft 26, carrying the flap-gumming type 27 and creasing-bar g' ; for the shafts 30 and 31 of the impression-roll 32 and type-roll 33 and for the shafts 34 and 35 of the guide-rolls 36 and 37, and for the shafts of the vertical band-rolls 38 and 39, carrying the endless bands 40, the shafts of the counter-roll 41, and of the lower band-roll, (shown in dotted lines, Fig. 2,) which with the roll 39 carries the receiving-bands 43.

The various shafts are geared together by means of gears I I, so as to turn in unison, and are driven from the driving-shaft 25, constituting the shaft of the lower folding-roll H. There are also bearings in the side frames for the shaft of a guide-roll 45, which may be used to deflect the strip away from contact with an adjacent paste-box J, and for shafts of rolls 45 49 102 and rock-shaft 61. There is a paste-box J to each set of pasting-disks 13 14, and said paste-box is hung to swing upon the shaft of the said disks, and has slotted bearings receiving loosely the shaft 47 of a transfer paste-roll 48, which rests upon the faces of the adjacent pasting-disks and of the type carried by the adjacent pasting-rolls to transfer the paste or gum deposited on it by the disks to the faces of the types, which ex-

tend partly around the pasting-rolls, so as to deposit the lines of paste 7 and 8 on two horizontal lines in the relative positions before described. Between the pasting-roll 19 and the guide-roll 49 is suspended from a cross-bar 50 an edge-folder in the form of a folder-blade 51, curved at the ends slightly below the level of the upper surface of the roll 49 and inclined downward toward the back of the machine, so that the strip of paper is first deflected downward from the pasting-rolls and then rises toward the guide-roll 49, and as the blade is shorter than the width of the paper the latter will naturally fold up opposite the ends of the blades and will fold over, forming the intumed flanges before described, which flatten down upon the portion of the paper as it passes around the roller 49. The strip of paper after passing around the guide-roll 45 passes upward between the pasting-roll 20 and a cutting and creasing roll H, and then over the latter between it and the corresponding roll G, and the faces of the intumed side flanges have the lines 8 of paste or gum deposited upon them by the type upon the pasting-roll 20, the opposite portions of the roll G being cut away or reduced in diameter at u , so as not to contact with the freshly-deposited layers of paste; but the intermediate portions of said roll bear upon the strip and hold it firmly in contact with the roll H, so that the two rolls may constitute feeding-rolls. It is not necessary, however, that the roll G shall act as one of the feeding-rolls, as the adjacent pasting-roll 20 may cooperate with the roll H as a feeding-roll, in which case it would be set up in contact therewith. One of the rollers G or H, carries a knife of proper form to cut the sheet transversely to form the edge s of the flap 5, (see Fig. 10,) while the other roll carries a cutting-bed, which is penetrated by the knife. Thus the upper roll is provided with a knife c and the lower roll with a bed d of corresponding shape consisting of wood or hide packed in a recess in the roller.

To draw the paper taut upon the counter-roll and insure an even cut, avoiding ragged edges, while permitting the paper to be moved at a high rate of speed, I provide the said counter-roll with one or more clamps, which bite upon the paper strip after it has passed from between the rolls and hold it close and tight upon the counter-roll until the shearing has been effected. The said clamping devices further serve to make neat, absolutely straight, and uniform folds at the portions of the strip where the same is bent at $x y$, Fig. 1. The clamps for this purpose may be constructed in different ways. That which I prefer I will now describe on reference to Figs. 6, 7, 8, and 9. The roller H is provided with two longitudinal bores adapted to receive two cylindrical bars $f f'$, each of which has a radial blade e extending outward into a narrow slot i along the face of the roller, of such width, however, as to permit a slight rocking

movement of the rod *f*, which carries the blade *e* to and from the adjacent face *e'* of the slot *i*. Each rod *f* is provided with an arm connected with a spring 52, secured at the other end to the roller, which tends to rock the rod *f* so as to carry the blade *e* away from the face *e'*, and each rod also carries at one or both ends a curved elastic or spring arm 53, which as the rod is carried by the rotation of the roll *H* from beneath the roll *G* contacts with any metallic contact piece or pieces, as the shafts 24 and 26, and thereby swings the rod *f* in the direction of the arrow, Fig. 7, so as to bring the blade *e* with an elastic pressure against its co-operating face *e'*. The roller *G* is provided with a folding-blade *g*, so arranged as to press upon the strip as it passes between the rolls and fold it into the slot or recess *i* while the blade *e* is away from the face *e'*, and as the folding-blade *g* then passes from the strip and the arms 53 of the rod *f* strike the shaft 24 the fold is grasped between the blade *e* and the face *e'* and tightly gripped, so that the strip of paper is held closely upon the surface of the roller until the latter has turned to carry the rod *f* to the position shown in Fig. 8, and until the cutter *c* has completed the severing of the strip to form the edge of the flap. As the cutter *c* severs the strip the bar *f'* is brought opposite the folding-blade *g'*, carried by the gumming-shaft 26, which blade *g'* folds the strip while it still lies flat upon the face of the roller into the slot *i* opposite the rod *f'*, the cutter *c* completing the severing of the strip as the folding-blade *g'* effects its operation, so as to leave the flap portion of the strip loose to supply sufficient material to make the fold, after which the rod *f'* is turned by the contact of its arms 53 with the shaft 26, and the paper is gripped, folded, and creased by the creaser, as described, to form the crease *y*. As this is effected the arms 53 of the rod *f* leave the shaft 26, and the rod is rocked to loosen the lower end of the sheet, which assumes a vertical position. (Shown in dotted lines, Fig. 8.) Immediately after the sheet has been gripped by the rocking of the rod *f'* the gummer-type 27 is brought against the same to deposit the line 6 of gum upon the edge thereof, and the clamp maintains firm hold of the sheet as the roller *H* rotates until the sheet is carried entirely away from the gummer-type, after which the arms 53 of the rod *f'* leave the shaft 26, and the rod *f'* is rocked back and the completed envelope is released. By thus maintaining the grip upon the sheet I prevent any adhesion of the same to the gummer-type and insure an absolute delivery of each envelope.

It is important to prevent the flap of the envelope from being turned down against the back while the gum is moist. It is also desirable to prevent the freshly-gummed surface from making contact with any of the rolls or bands, and yet the flap should be turned to such an extent as to enter freely be-

tween the rolls *V V*, dotted lines, Fig. 2, by which it is closed down upon the body after the gum has become dried. For this reason I use the arrangement of parts shown in the drawings beneath the gripping and gumming roller, and especially illustrated in Fig. 5.

When the envelopes are to be printed, the type-cylinder 33 and impression-roll 32 are used in connection with the driving-rolls 36 and 37, around which pass the tapes 60, and the envelope passes vertically downward from the roll *G* between the rolls 32 and 36, and its bottom or folded edge is turned outward by the action of the roll 37 and the tapes, so as to pass between the type-cylinder 33 and roll 32, and the latter is cut away, leaving a chamber *z* in such position, Fig. 2, as to receive the flap 5 of the envelope, (bent to a slight angle to the face by the creasing along the line *y*,) so that the fresh gum upon the flap does not contact with any portion of the roll. To the rock-shaft 61, in front of the roll 32, is secured a reverser consisting, as shown, of a conductor having two parallel plates 62 63, with an intermediate channel, which when swung inward present the space between them so as to receive therein the envelope as it is fed outward by the action of the roll and cylinder, and after the body of the envelope has passed into the reverser it is swung down to the position shown in Fig. 5, so that the envelope will drop therefrom between the tape-roll 38 and cylinder 41, the flap striking the cylinder and being bent inward to an acute angle as the envelope passes downward, but without being pressed against the body of the envelope. The envelope is then carried backward by the feeding-tapes to any desired extent until the gum upon the flap is dry, and is then fed to the folding-rollers *V V*, which may be at considerable distance from the body of the machine, and as the flap has been bent down to an acute angle the edge can be readily seized between said rollers and bent flat down against the body as the envelope is fed forward and discharged.

It will be obvious that any desired system of feeding rollers, bands, or conveyers may be used for conducting the envelope from the impression-rollers to the folding-rollers *V*.

The rocking of the reversing device at proper intervals may be effected in any suitable manner—as, for instance, by means of a cam 65, Fig. 4, upon the type-cylinder shaft 31, which contacts with an arm 66 upon the shaft 61 to throw the reversing device outward, while a spring 67, connected to the arm 66 and to the frame of the machine, draws the reversing device inward after the cam passes from contact with the arm.

It is not essential that the folding or creasing blade *g'*, which forms the flap-piece *y*, shall be carried by the same shaft 26 that carries the gummer-type. For instance, it may be carried by the upper roll *G*, as shown in the modification, Fig. 9, so as to form the

crease y just before the flap-cutter c operates to sever the strip.

In order that the end of the strip after the flap of the preceding envelope has been cut therefrom may be turned upward as the strip is fed forward from between the rollers G H, I place a blade or bar 69 opposite said rollers, over which the traveling strip passes, until the strip is gripped to form the fold y , after which the folded sheet will be carried down upon the roller H between the said roller and the bar 69. The bar 69 is suspended from a cross-piece 169, that is adjustably secured to the side frames, so that the bar may be set to the position required. The roll 102, mounted forward of the roller G and under which the forward end of the paper passes, serves to keep the paper straight and prevents it from bending back against said roller G. The turned-up portion of the envelope is pressed against the front portion, so as to seal it along the pasted flanged edges by the pressure of the tapes 60 and of the roller 36 against the body of the impression-roll.

By supporting the transfer-rolls upon the paste-boxes vibrating upon the shaft of the paste-disks I always maintain the said rolls in the same relation to the disks and yet permit them, by vibrating upon said shaft, to yield to any of the irregularities in the movements of the pasting-type.

By arranging the pasting type or devices and the folding-blades 51 above the course of the paper strips, as described, the edges of the strips are turned up and folded down onto the upper surfaces thereof, so that the folding and the pasting operations are visible and the devices are accessible from above, and if there is anything defective in the operations the fact is at once apparent and can be easily remedied.

The rocking of the clamp-rods of the clamp cylinder or roller can be effected by means of any suitable devices, as will be evident to any mechanic; but I prefer to use the curved spring-arms before described, because of their yielding character, which enables me to secure a firm but yielding grip upon the paper and at the same time operate the machine with great rapidity without the jars, friction, wear, and noise which would result from the contact of rigid cams with the arms of the bars or the use of other rigid devices, while the spring-arms also insure a spring clamping-pressure that will operate without any nice adjustment, regardless of the thickness of the paper employed in making the articles.

Instead of arranging the spring-arms to strike the shafts of the rollers, they may strike against any other contact-piece—as, for instance, adjustable studs 124, supported by the frame. (See dotted lines in Fig. 6.)

Gum is supplied to the gumming-type 27 upon the roller 26 from a paste-box 70, through the medium of a paste-roll 71 and a transfer-roll 72, and the latter is carried by the arms of the frame K, supported by a shaft 73, and

thrown outward by the action of a spring 74, which holds the transfer-roll 72 against the paste-roll 71. The shaft 26 carries an arm 76, which at the proper time contacts with an arm 75, projecting from the shaft 73, and rocks the frame K inward for an instant to contact with the gumming-type 27 to coat the latter with a layer of gum prior to its contact with the flap of the envelope.

In order to regulate the thickness of the coating of gum applied to the flap, the boxes 78, supporting the gum-type shaft 26, slide between guides 79 of the frame and are moved inward by the pressure of springs 80, which may be set to any desired position by set-screws 81, as shown in Fig. 4. If the coating of gum is to be a thin one, the pressure upon the roller-bearing is increased; but if it is to be thicker the pressure is reduced.

When no printing is required to be done, impression and type cylinders may be dispensed with. In some cases, also, the cutter and folder will be carried by the shaft upon arms, instead of upon the solid roll; but the latter is preferred when it is desired to clamp the sheet, the rolls G H in this case acting as presser and feeding rolls. In some instances a single clamp may be used upon a roll, where, for instance, my improved clamping device is used for other purposes than the manufacture of envelopes.

The different parts of the machine are adapted to be readily altered to conform to the varying sizes and shapes of envelopes or other articles to be made—as, for instance, as is required in the manufacture of envelopes with open ends instead of open sides—and it will be evident that some of the features of my machine may be used without the others in envelope or other machines.

I do not here claim the form of envelope described and illustrated, nor do I claim the mode of making the envelopes herein set forth, as these features constitute the subjects of separate applications for Letters Patent, Serial Nos. 262,153 and 262,154.

Without limiting myself to the precise construction and arrangement of parts described, I claim—

1. In a machine for making envelopes, the combination of a support for a roll of paper, pasters arranged to apply paste at corresponding intervals on the opposite edges of the strip of paper as it travels through the machine, an edge-folder blade whereby the opposite edges are turned in and down upon the body of the strip, pasters whereby the faces of the inturned flanges are coated with paste, a transverse folder whereby the sheet is doubled upon a transverse line at the termination of each of the inner lines of paste, a creasing device arranged to crease the paper transversely near the edge of the part folded over, and a cutter arranged to sever the sheet transversely beyond the said edge and paper-folding rolls, substantially as described.

2. The combination, with the pasters, one of which has curved type for a part of a circle, edge and transverse folders, and cutter, of a creaser arranged to crease the sheet adjacent to the edge of the back portion of the envelope, substantially as described.

3. The combination, in an envelope-machine, of an edge-folder and rolls carrying pasters, a transverse folder, a creaser, and a cutter, the first paster arranged to deposit lines of paste at intervals upon the opposite edges of a continuously-moving sheet of paper, the edge-folder arranged to turn in the said edges, forming flanges, the second paster arranged to apply paste to said flanges, the transverse folder turning the end of the strip over onto the body to form the back of the envelope, the creaser creasing the strip adjacent to the edge of the said back and the cutter severing the strip transversely beyond said crease, substantially as described.

4. The combination, in an envelope-machine, of rolls carrying two sets of pasters, an edge-folder arranged between the rolls, a transverse folder, creaser, and cutter, and mechanism for operating the pasting, folding, and creasing devices, substantially as described.

5. The combination, with the pasting-roller and with the pasting-disk carried by a shaft, of a paste-box suspended to said shaft, and a transfer-roller supported loosely in bearings carried by said box, substantially as set forth.

6. The combination, with the pasting and edge-folding devices arranged to operate upon a continuous sheet, of a roll carrying clamps for seizing and holding the transverse folds of said sheet, and a shaft carrying a cutter for severing said sheet beyond the clamped portion, substantially as set forth.

7. The combination, with a roll provided with independent sheet-clamps, of a shaft carrying a folding-blade and cutter, and a separate shaft carrying an independent folding-blade, substantially as set forth.

8. The combination, with the roll provided with independent clamps, of a roll carrying a folding-blade arranged to fold an intervening strip of paper into one of the clamps, a second folding-blade, whereby the paper is folded into the other clamp, and a cutter arranged to sever the sheet beyond the point where it is seized by the second clamp, substantially as set forth.

9. The combination, with a shaft carrying a clamping device, of a spring-arm connected with said clamping device, and a contact-piece arranged to be struck by said arm as the shaft revolves, substantially as set forth.

10. The combination, with the roll carrying a rocking rod provided with a clamping-blade, of a bent flexible arm extending from said rod, a contact-piece, and a spring connected with said rod to rock it in one direction, substantially as set forth.

11. The combination, with the shafts carrying rolls G and H, of a clamp carried by one of the rolls and provided with a curved yielding arm arranged to contact with the shaft of the opposite roll, substantially as set forth.

12. The combination, with the roll G, carrying a cutter and folder-blade, of a presser-roll carrying two rock-rods, each provided with blades coacting with clamping-faces of the roll, springs turning said rods in one direction, and yielding arms extending from the rod to contact with stationary bearings to turn the rods in the opposite direction, substantially as set forth.

13. The combination, with the shafts 24, 25, and 26, of the clamps carried by one shaft, a cutter and folder-blade carried by the other, and a folder-blade and gummer carried by the remaining shaft, substantially as set forth.

14. The combination, with the envelope-folding devices and with the gummer for applying the gum to the flap, of a reverser for receiving the envelope after the flap is gummed and for carrying it to another position, and rolls arranged to partially bend down the flap and to receive the envelope from the reverser, substantially as set forth.

15. The combination, with the rolls feeding forward the gummed envelope, of a vibrating conductor and a pair of rolls for partially turning the flap of the envelope, and devices for reciprocating said conductor to carry it from the feeding to the turning rolls, substantially as set forth.

16. The combination, with the folding, flap-creasing, and pasting and gumming devices, and a reverser 61 62 63, of rolls arranged to receive the envelope between them, but separated to prevent the flap from being pressed against the body of the envelope, substantially as set forth.

17. The combination, with the envelope forming and pasting and gumming devices, of a type-cylinder, an impression-roll having a recess to receive the upturned flap of the envelope, and separated rolls 38 41 for bending inward the flap, substantially as set forth.

18. The combination, with the impression-roll and type-cylinder and with the envelope forming and gumming devices, of the guide-rolls 36 37, carrying bands 60, arranged to press the edges of the envelopes against the impression-roll and to guide the envelopes between said roll and the type-cylinder, substantially as and for the purpose set forth.

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

JAMES WEST.

Witnesses:

J. M. KERR,
C. A. KAHN.