

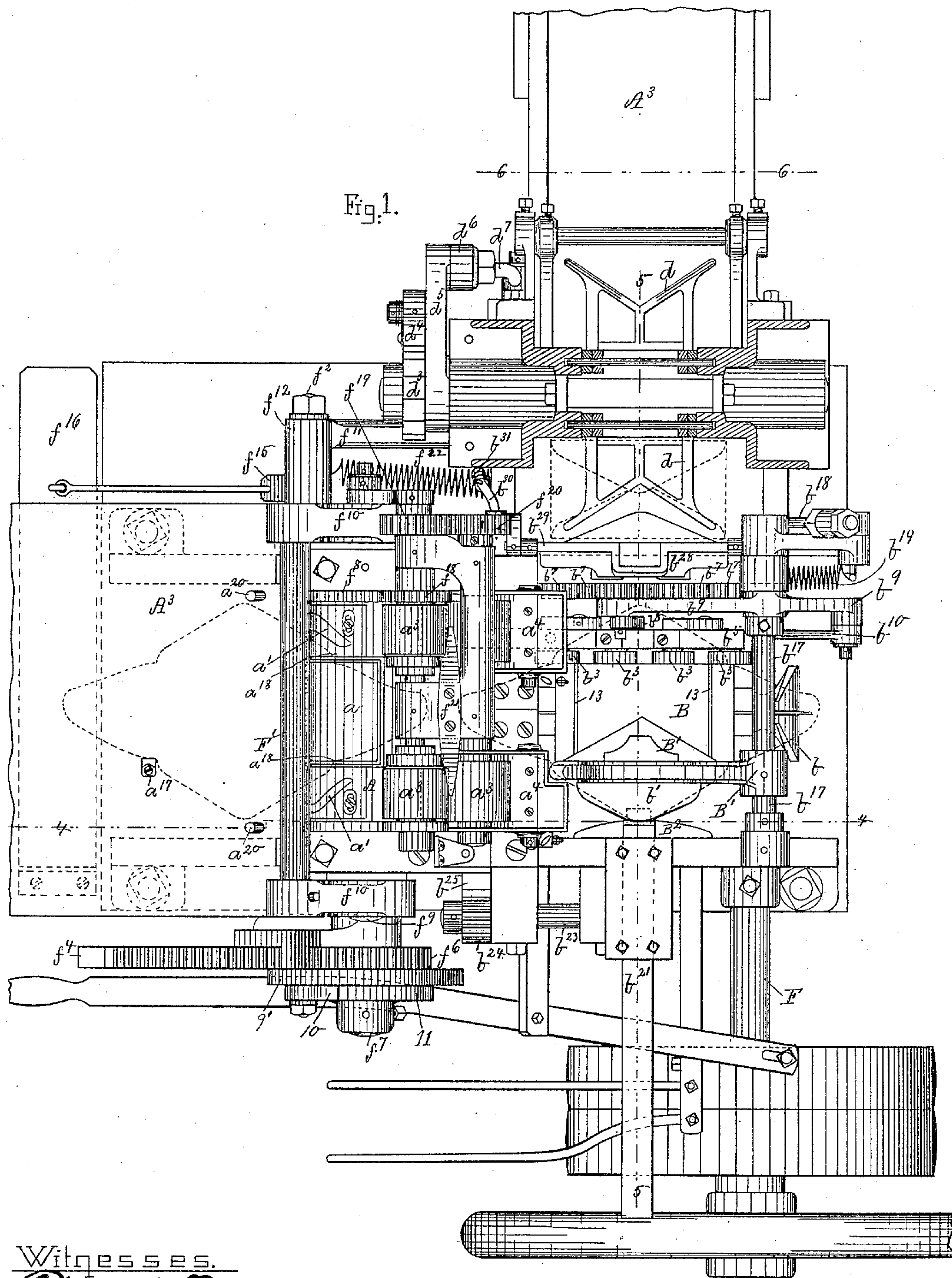
(No Model.)

8 Sheets—Sheet 1.

S. A. GRANT.
ENVELOPE MACHINE.

No. 432,749.

Patented July 22, 1890.



Witnesses.

Edward A. Beach.
John R. Brown.

Inventor

Sidney A. Grant
by J. P. Maynard
att'y.

(No Model.)

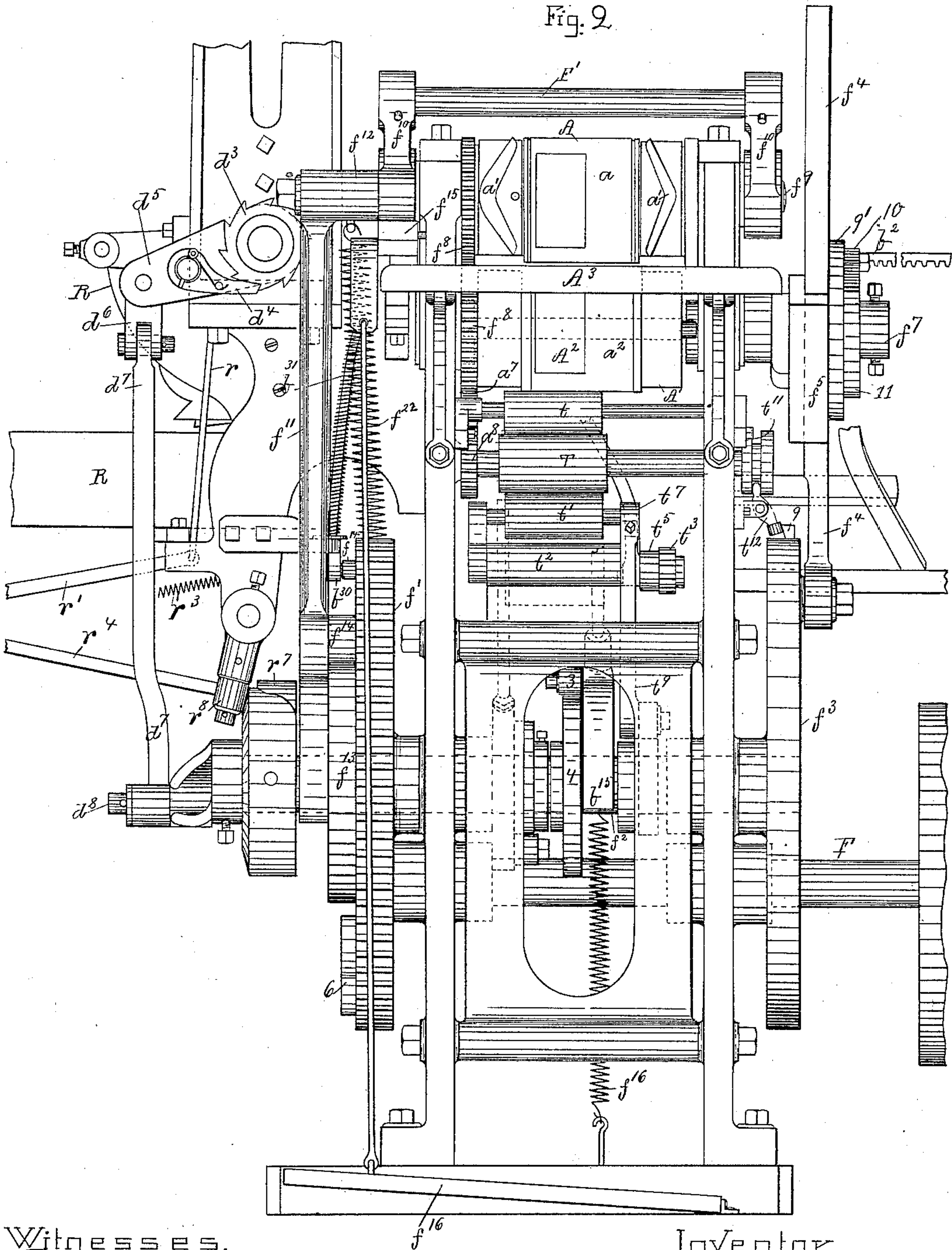
8 Sheets—Sheet 2.

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Fig. 2.



Witnesses.

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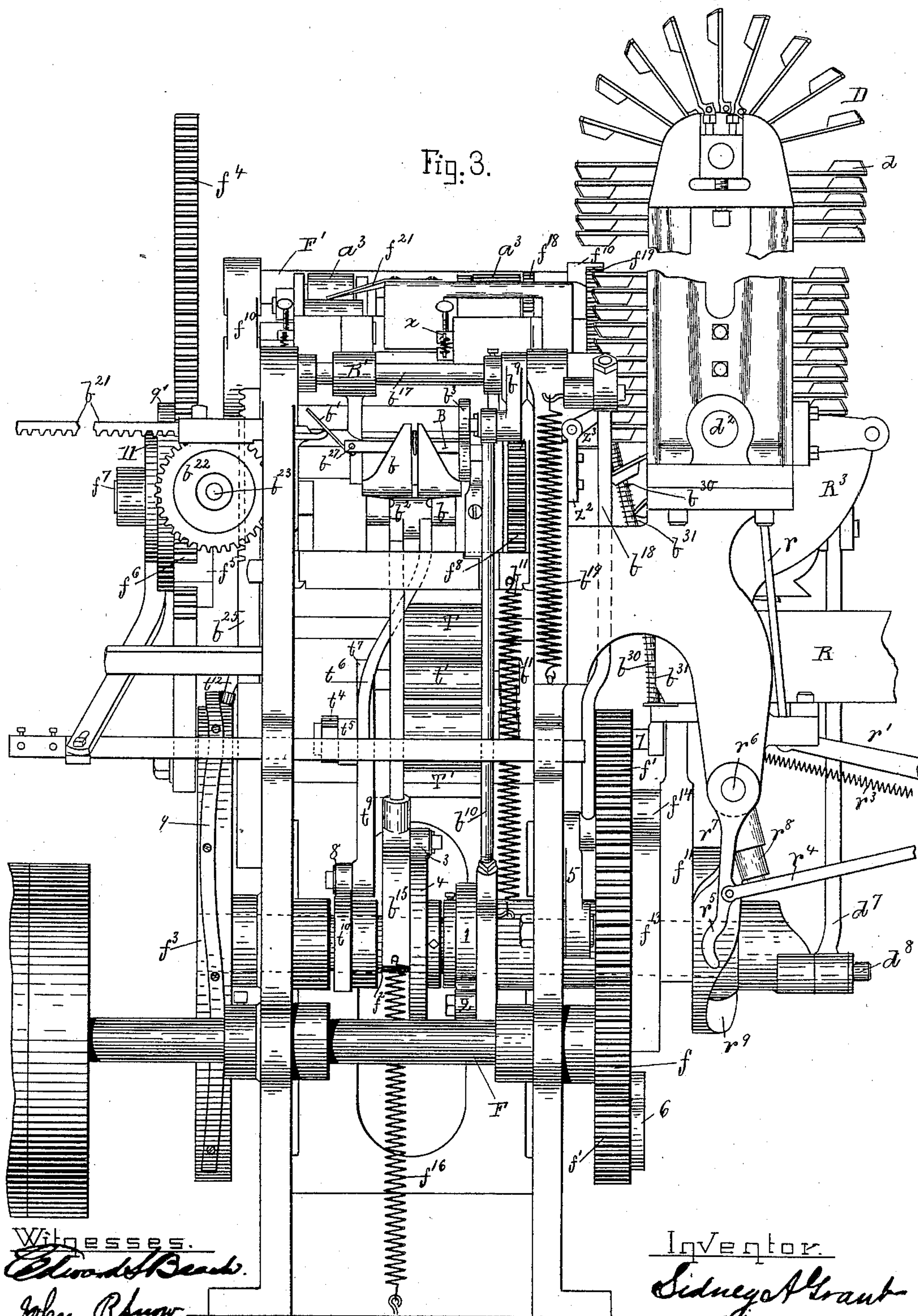
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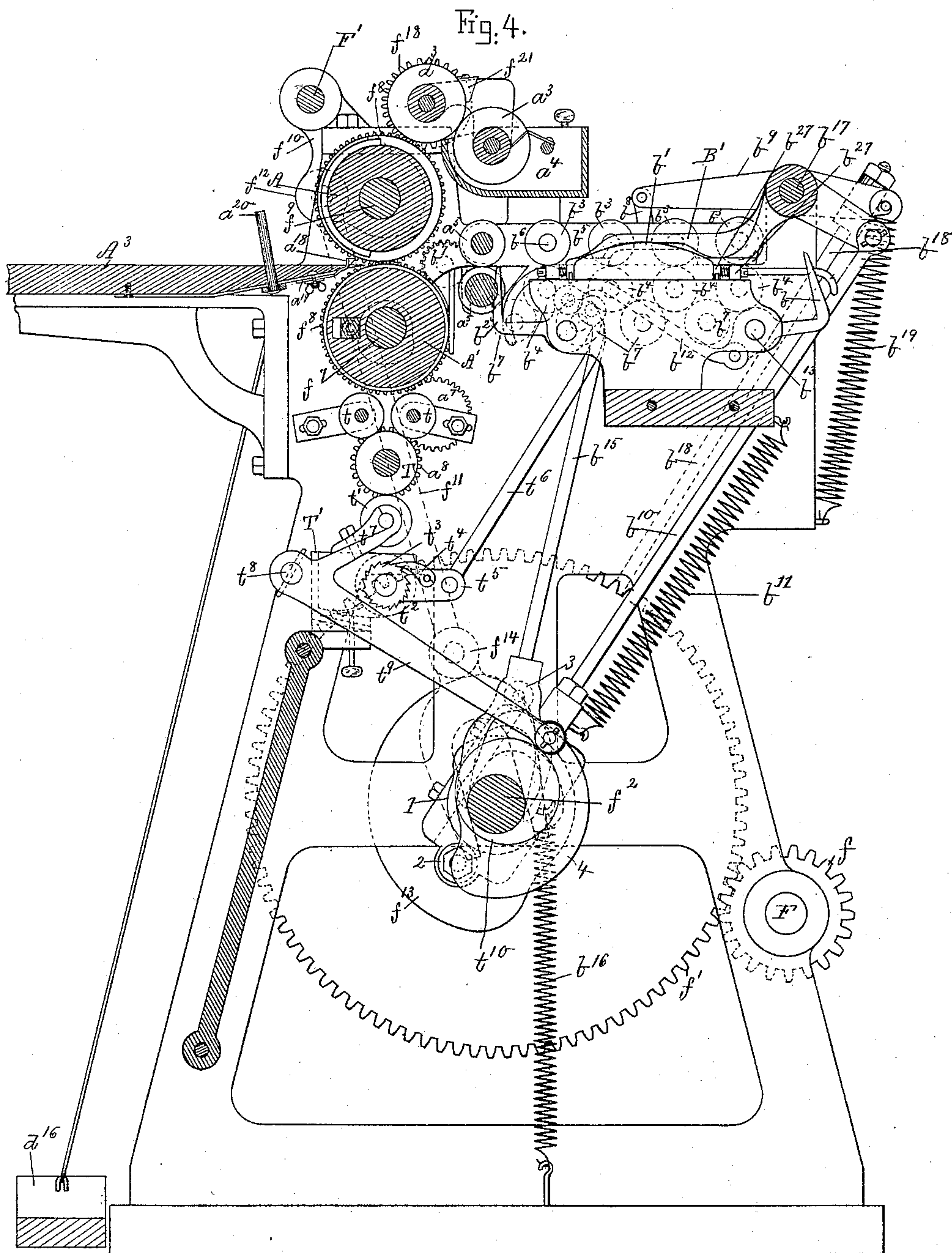
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Witnesses.

Edward S. Beach
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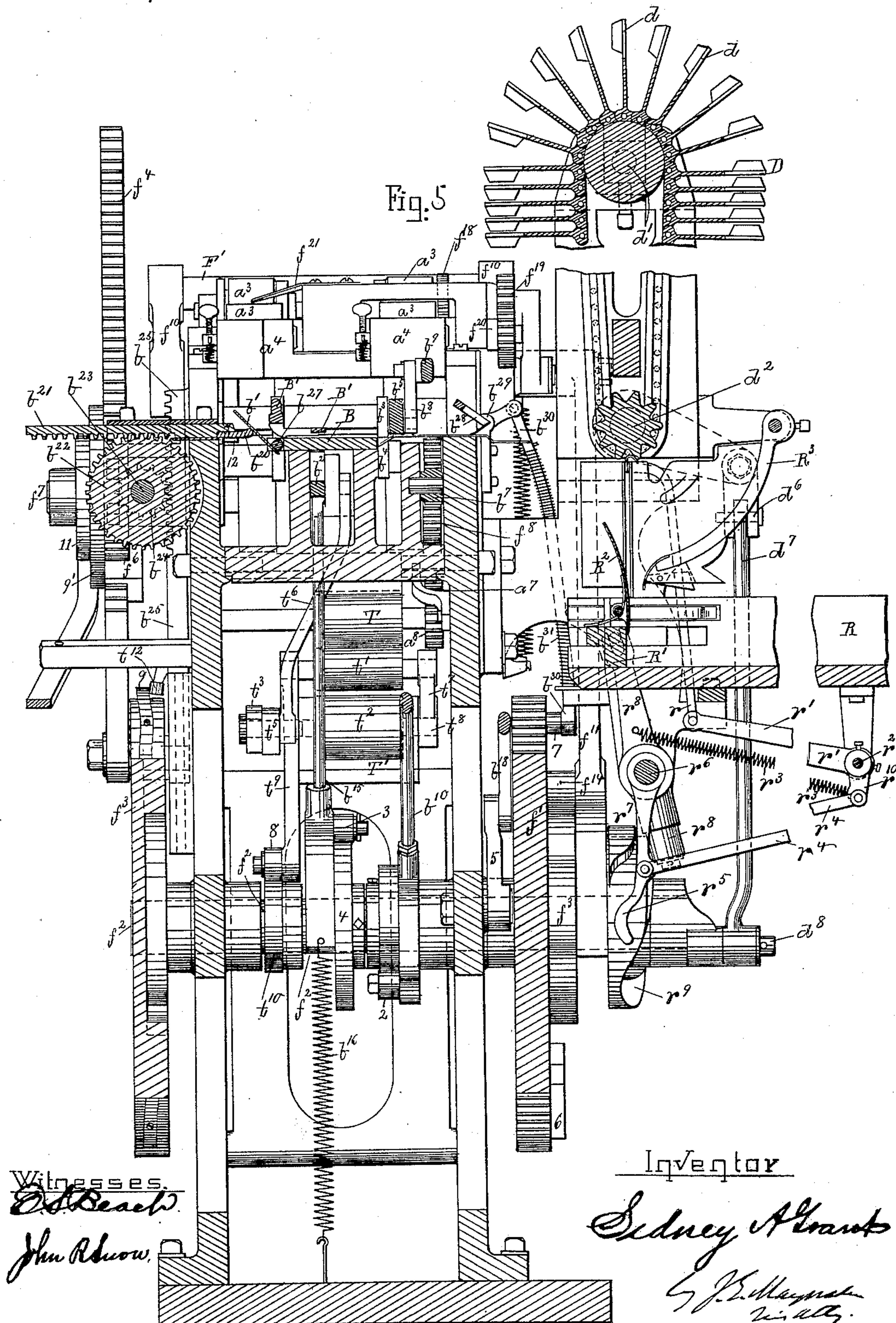
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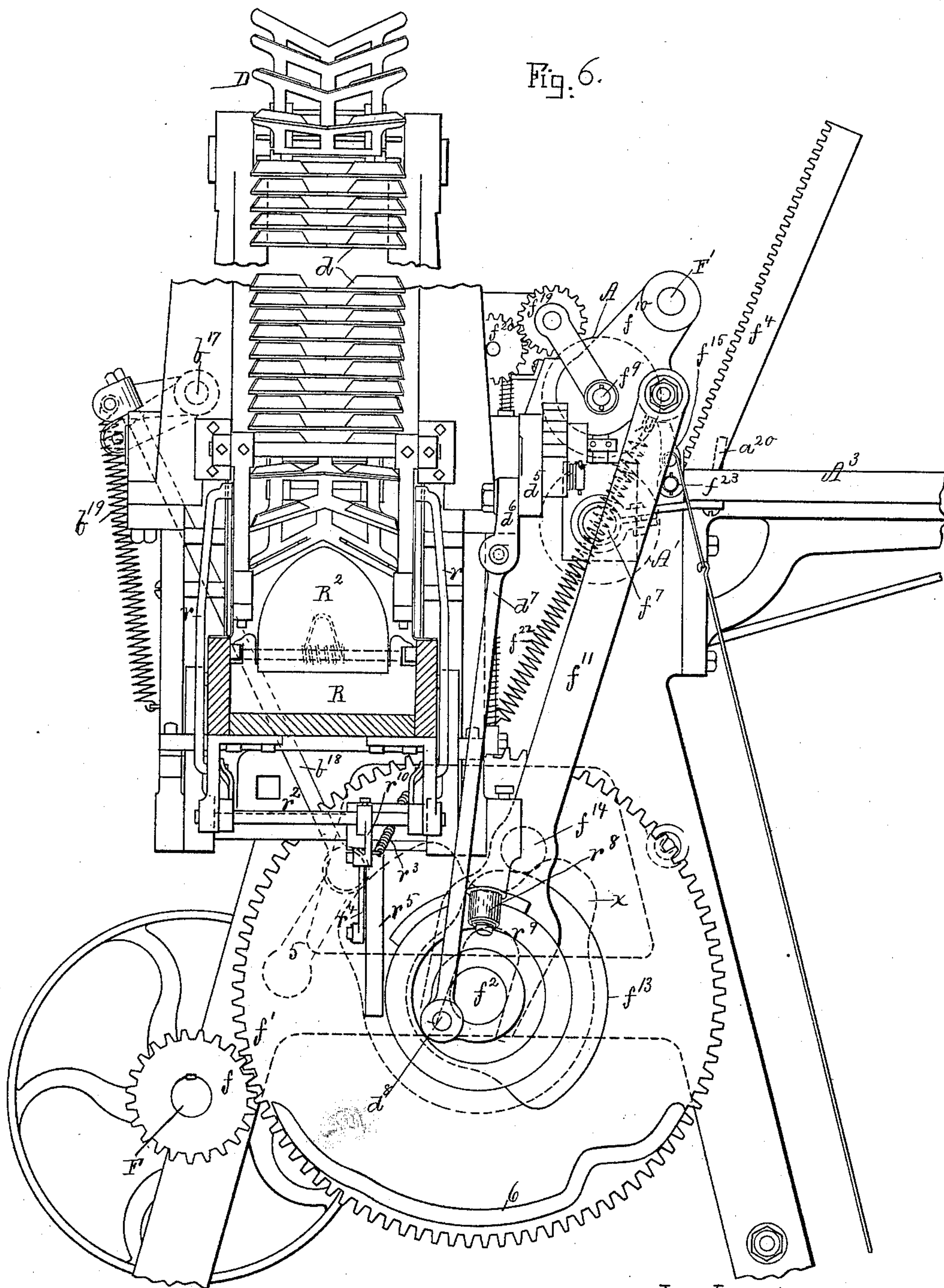
(No Model.)

8 Sheets—Sheet 6.

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ENVELOPE MACHINE.

No. 432,749.

Patented July 22, 1890.



Witnesses.

Edward L. Beach,
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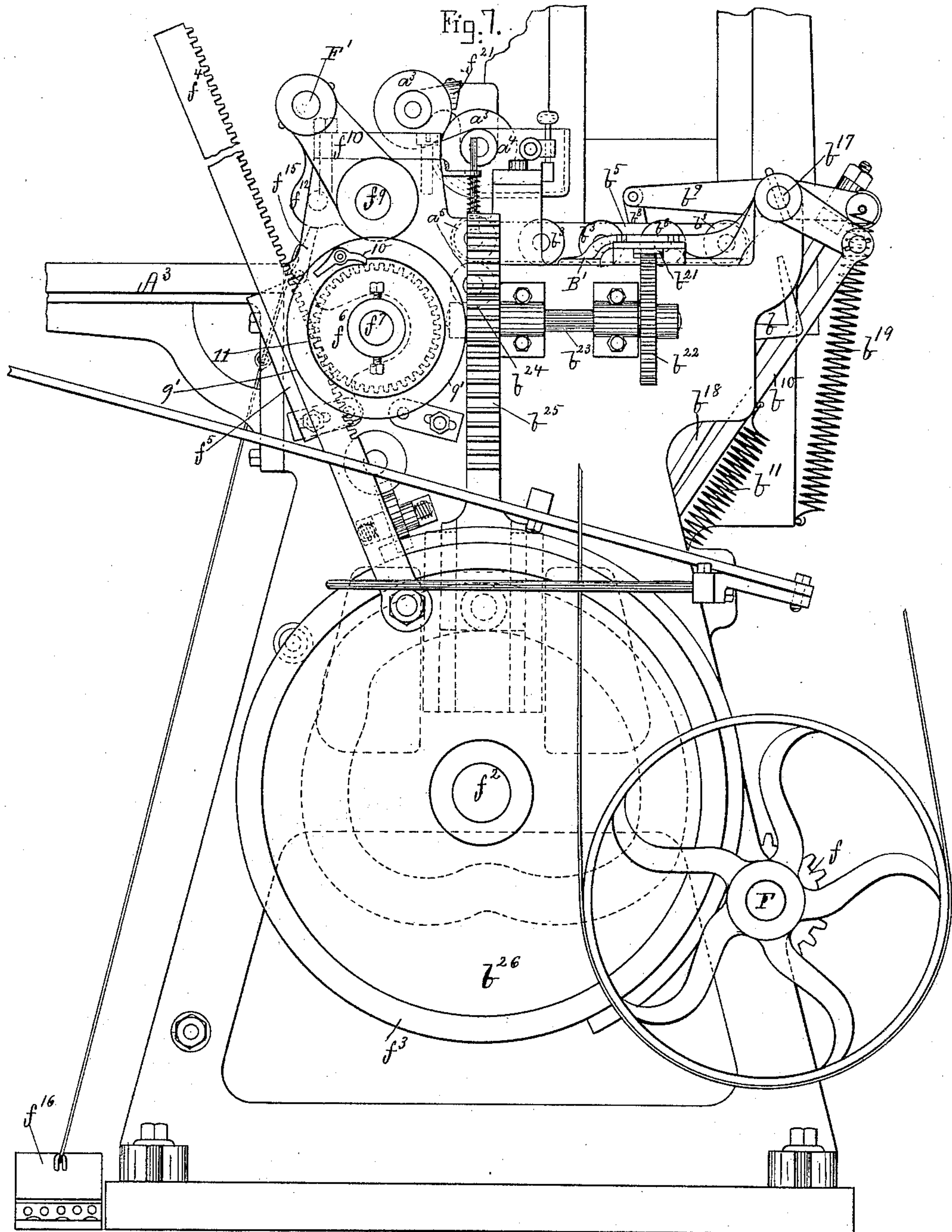
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8 Sheets—Sheet 7.

S. A. GRANT.
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Patented July 22, 1890.



Witnesses
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(No Model.)

8 Sheets—Sheet 8.

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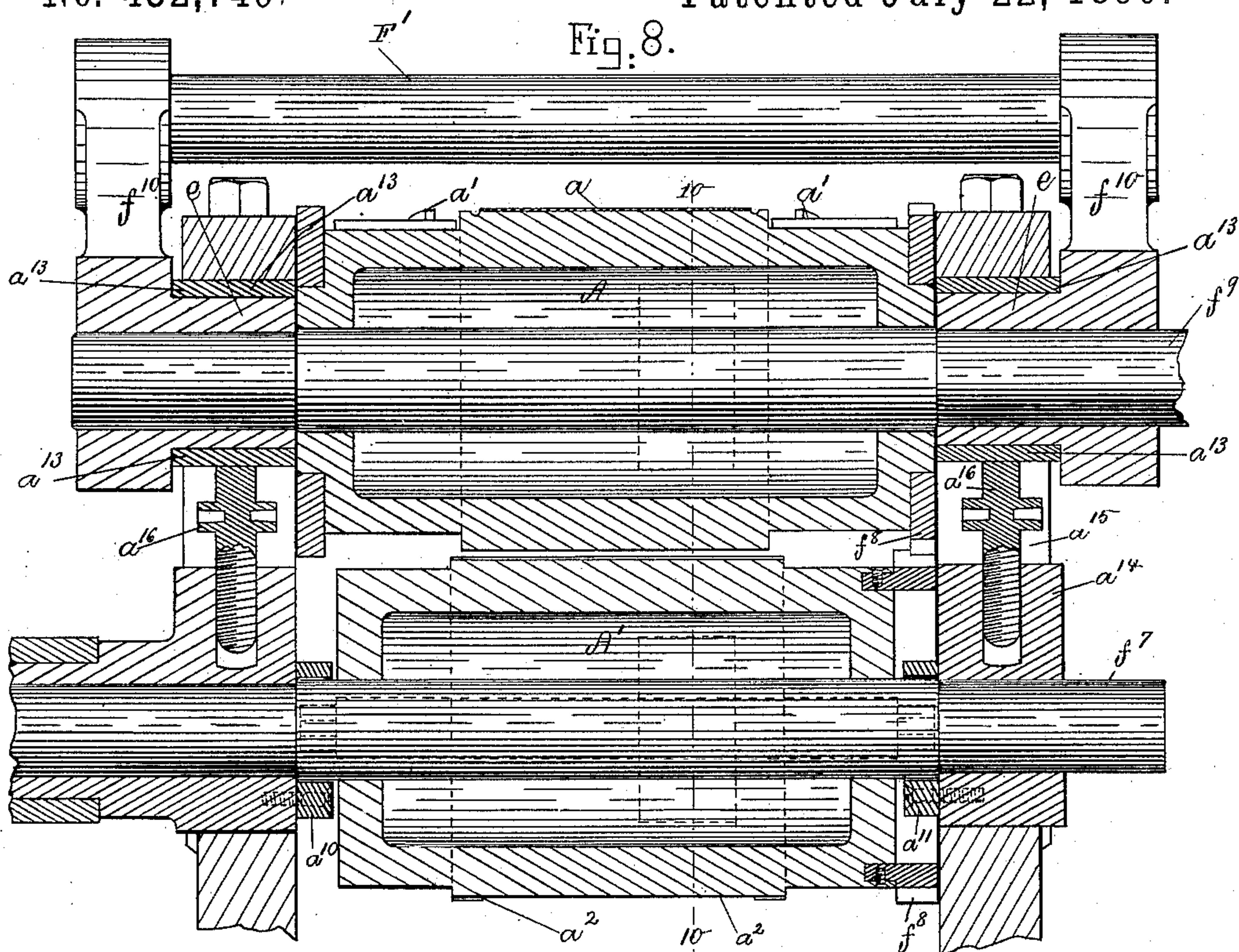
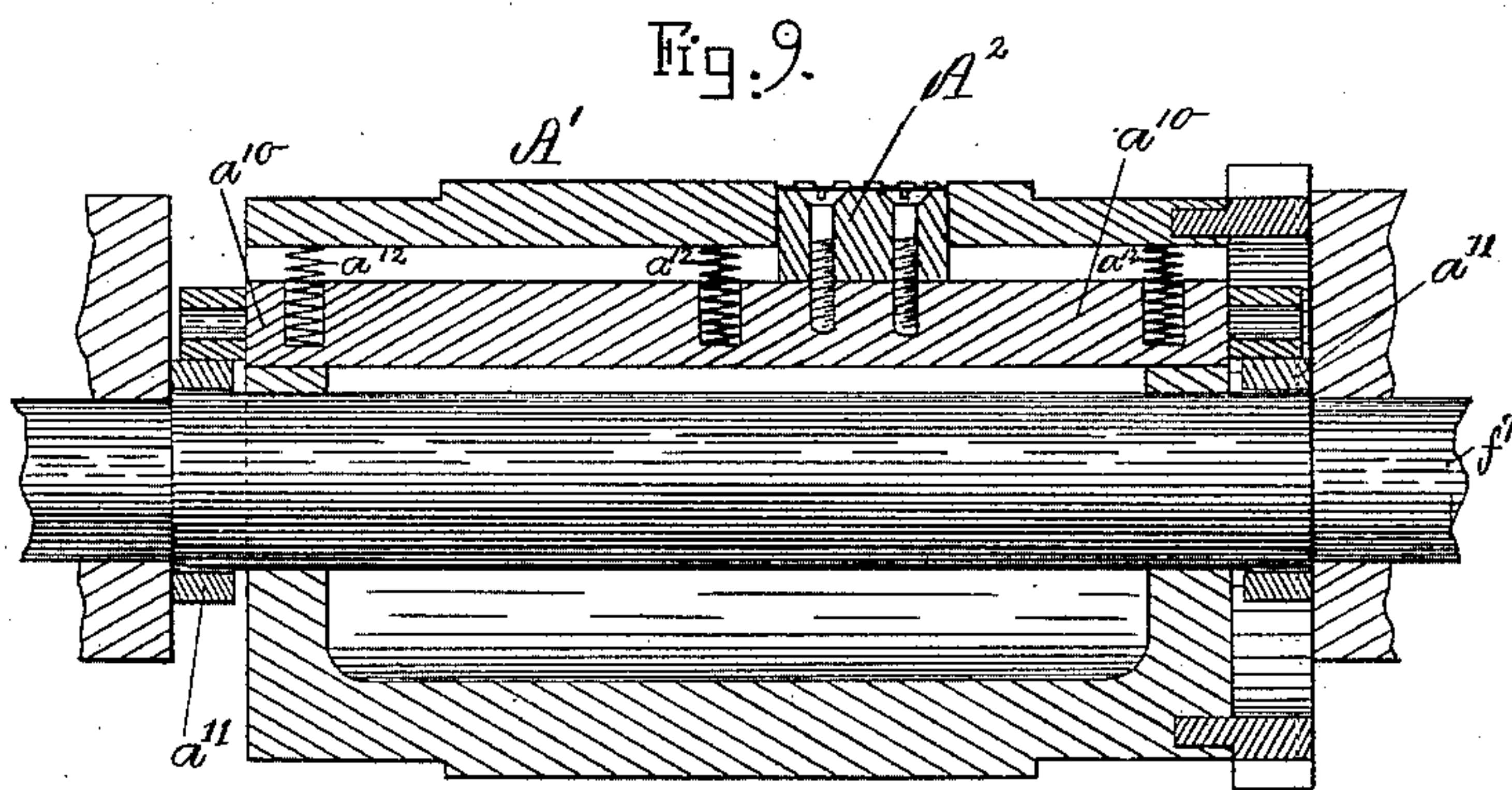
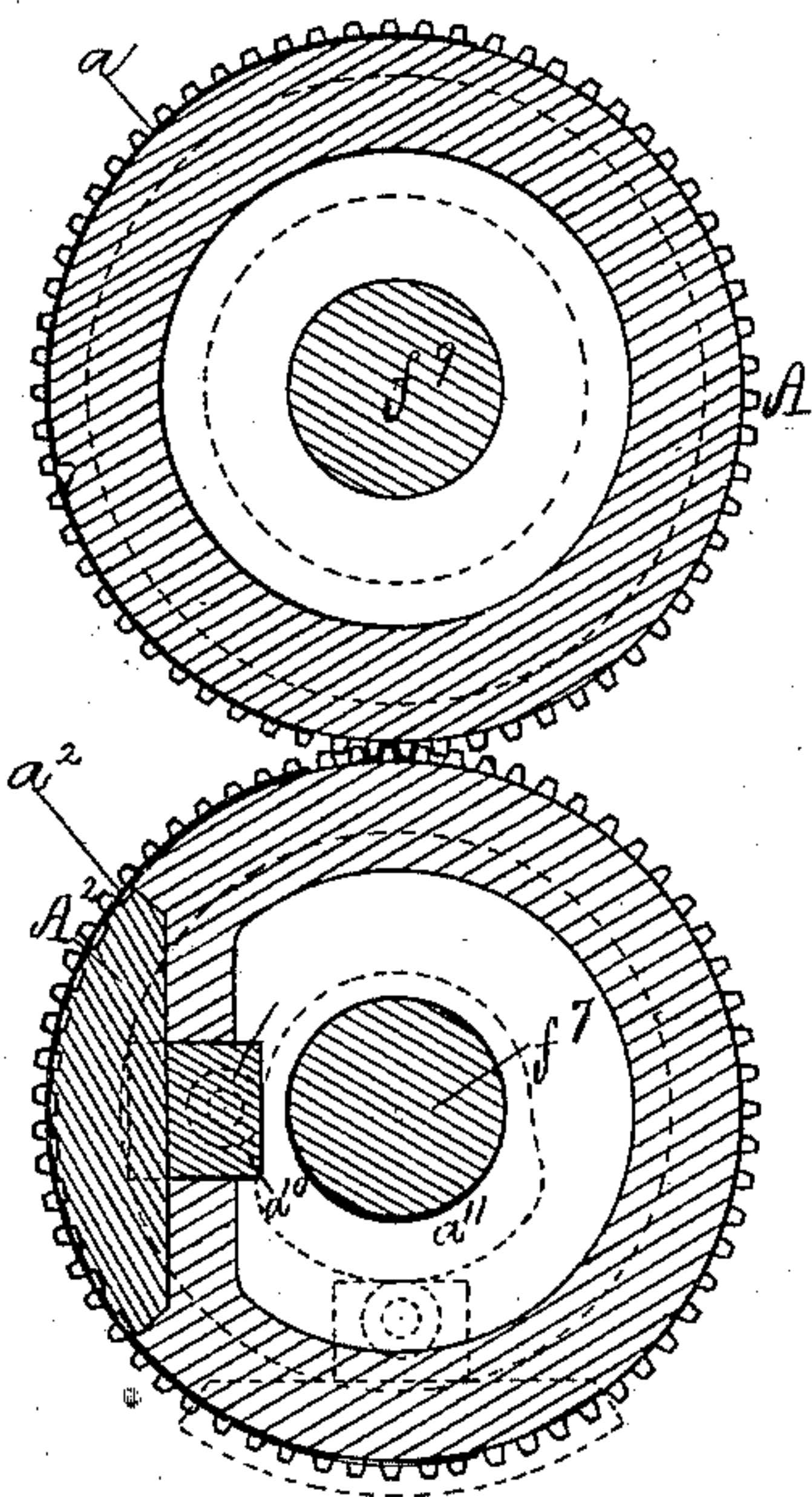


Fig. 10.



Witnesses

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John Rhoads

Inventor

Sidney A. Grant
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UNITED STATES PATENT OFFICE.

SIDNEY A. GRANT, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO THE
UNITED STATES ENVELOPE MACHINE COMPANY, OF SAME PLACE.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,749, dated July 22, 1890.

Application filed October 20, 1888. Serial No. 288,638. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY A. GRANT, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Machine for Making Envelopes and the Like, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a plan of one form of machine embodying my invention, the greater part of the endless drying-chain with which my machine is preferably provided being removed for greater clearness. Fig. 2 is a front elevation with parts broken off. Fig. 3 is a rear elevation with parts broken off. Fig. 4 is a vertical section on line 4 4 of Fig. 1. Fig. 5 is a vertical section on line 5 5 of Fig. 1. Fig. 6 is a side elevation, partly in section. Fig. 7 is an elevation of the side opposite the side shown in Fig. 6. Fig. 8 is a sectional view of the creasing and gumming cylinders, and shows also a portion of the frame in which these cylinders are mounted. Fig. 9 is a section of one of the cylinders, showing it arranged to carry a type-plate. Fig. 10 is a section on line 10 10 of Fig. 8.

My invention is an envelope-machine which simultaneously creases and gums (and, if desired, prints) the envelope-blanks, one object of my invention being to produce machines of this sort which may be attended to in practice by unskilled or youthful attendants.

The features of my invention will be pointed out and claimed hereinafter.

While I prefer to use a slight projection on one cylinder and a slight depression on the other, it will be clear that a slight ridge forming a rectangular figure upon one cylinder and a slight groove forming a corresponding figure on the other cylinder will answer. I have tried both forms, but prefer the former, the only advantage of the latter being that the slight ridge forming the rectangular figure will make its own groove on a roll whose surface is sufficiently yielding.

In the drawings, which show one form of machine embodying my invention, (being the best form now known to me,) the device by which the blank is creased is made up of cylinders A A', one of the cylinders being provided with a land α and the other cylinder be-

ing formed with a depression α^2 , adapted to receive the land, so that when the blank is pressed between the land and its corresponding depression creases are formed by the corners of the end and side walls of the land on the blank. Cylinder A is also shown as provided with gummers α' , which are formed to correspond to the margin which is to receive the gum, and are conveniently supplied with gum by the gum-distributor α^3 , taking gum from fountains α^4 .

Folding-bed B receives the blank after it passes from between the cylinders A A', the blank being fed positively to the folding device, which may be of any suitable construction, but is preferably made up of the table B, folders $b b^2$ for the end flaps, and folder b' for the back flap. The folders $b b' b^2$ are actuated to fold the creased blank, and in the preferred form of my machine the positive feed of the blank from the gumming and creasing device to the folding device is accomplished not only by the creasing-cylinders, but also by the auxiliary disks α^5 .

One important feature of my construction is the combination, with a device for folding the end and back flaps, of a presser-foot, which, in the preferred form of my machine, not only holds the blank on the folding-bed while the end flaps are being turned, but also presses the back flap after it has been folded firmly on the underlying end flaps. This presser-foot is marked B'.

The envelope is moved positively out of the folding device by means of the reciprocating pusher B², which engages an edge of the envelope and shoves it off the folding-bed.

I prefer to feed the completed envelope from the folding device to a drying-chain D, the operation of which is hereinafter explained, and from the drying-chain the envelope is fed positively into a receiver R.

In the form of machine now shown, motion is communicated to cylinder A' from main shaft F through gears $f f'$, shaft f^2 , disk f^3 , rack f^4 , pinned thereto, guarded in box f^5 , and meshing with pinion f^6 on shaft f^7 . The cylinders A A' are each provided with a pinion f^8 , and these pinions mesh together, so that the rotation of cylinder A' rotates cylinder A, which is mounted on shaft f^9 , mounted in a

bracket F' , arms f^{10} of which are provided
 with eccentrics e , (see Fig. 8,) so that when
 the bracket is rocked in one direction cylinder
 A is moved away from A' , and when
 5 rocked in the other direction is moved toward
 cylinder A' . The bracket is rocked by means
 of forked rod f^{11} , pivoted to an ear f^{12} of
 bracket F' and projecting toward shaft f^2 , on
 which a cam f^{13} (see Fig. 4) is mounted.
 10 Forked rod f^{11} , provided with roll f^{14} , co-oper-
 ates with cam f^{13} to move cylinder A away
 from cylinder A' . The bracket F' is moved
 in the other direction by a spring f^{22} . Cylin-
 ders A A' are closed to engage the blank to
 15 crease and gum it, and when the blank is fed
 out of them are separated, so that the gum-
 mers do not come in contact with the com-
 panion roll, and they are held apart until it
 is time to feed another blank—that is, until
 20 the folding operation is sufficiently advanced
 to make it practicable to feed another blank,
 and for this purpose I employ the dog f^{15} ,
 which is controlled by a treadle f^{16} . Dog f^{15}
 is pivoted to the frame of the machine and is
 25 moved out of the way of the bracket F' by
 pressing down on the treadle f^{16} , and is re-
 turned into position under the bracket F by
 a spring f^{23} , (a portion of which is shown in
 Fig. 6,) the foot being then removed from the
 30 treadle f^{16} . The rotation of cylinder A ro-
 tates the gum-rollers through gears f^8 , f^{18} , f^{19} ,
 and f^{20} . f^{21} is a doctor for the gum-roller.
 The cylinders A A' , arranged as shown in the
 drawings, have a function as feed-rolls, but the
 35 feed from the cylinders to the folding device
 is accomplished mainly by the disks a^5 , above
 referred to, and from these disks the blank is
 guided to the folding device largely by the
 disks b^3 co-operating with corresponding disks
 40 b^4 , the disks b^3 being mounted on arm b^5 , loose
 on cross-rod b^6 . Disks b^4 are mounted in the
 frame of the folding-bed B and are driven by
 gears b^7 , one of which meshes with a gear
 on one of the feed-rolls a^5 , which is driven by
 45 gears meshing with a gear on cylinder A' .
 (See Fig. 4.) Rocker-arm b^5 is moved by link
 b^8 , connecting the rocker-arm with rocker-le-
 ver b^9 , loose on shaft b^{17} and actuated by con-
 necting-rod b^{10} and the cam l on shaft f^2 , the
 50 rod b^{10} having a roll 2 to engage the cam l
 against the force of a spring b^{11} , secured at
 one end to the frame of the machine and at
 the other end to connecting-rod b^{10} .

When the blank is fed into place on table
 55 B, the folder b is moved to engage an end flap
 and turn the end flap on the main portion of
 the blank. Motion is communicated to the
 folder b through link b^{12} , connecting the folder
 b , which rocks on shaft b^{13} , to an ear on the
 60 folder b^2 , as indicated in dotted lines in Fig.
 4, and this ear on b^2 (see dotted lines in Fig.
 4) is connected by rod b^{15} to a cam on shaft
 f^2 , the connecting-rod being provided with a
 roll 3, engaging cam 4, and being moved in
 65 one direction against the force of spring b^{16}
 and being moved in the other direction by the
 spring b^{16} , as will be readily understood with-

out further description by reference to Fig.
 4. The movement of folder b thus combined
 with folder b^2 folds the end flaps of the blank, 70
 the blank being held on the bed between the
 friction-rolls b^3 and rolls b^4 and also by the
 presser-foot B' , which descends to clamp the
 blank upon the table B by the rocking of shaft
 b^{17} , which is rocked by means of cam-rod b^{18} , 75
 fast to rocker-arm 5, and a cam x (shown in
 the dotted lines in Fig. 6) on the face of
 gear f' , the rock-shaft being rocked against
 the force of spring b^{19} , by which it is returned
 to place at the proper time. Rocker-arm 5 is 80
 provided with a roller, (see dotted lines in
 Fig. 6,) which works with the cam x . (See
 Figs. 6 and 5.) The back-flap turner b' , by
 means of which the back flap is folded, is
 moved to fold the back flap by the pusher b^{20} , 85
 mounted in rack b^{21} , meshing with pinion b^{22} ,
 mounted on shaft b^{23} , which is provided with
 a pinion b^{24} , meshing with rack b^{25} , which is
 reciprocated by means of a cam on the face
 of rotary disk f^3 , mounted on shaft f^2 . As 90
 pusher b^{20} moves inwardly, it moves the
 back-flap turner b' on its rock-shaft b^{27} against
 the force of springs with which that shaft is
 provided, the shaft being journaled in a
 recess in the folding-table B. The presser- 95
 foot B' , which was lifted to allow the proper
 motion to flap-turner b' , now descends, as
 above explained, and is afterward lifted by
 the rocking of shaft b^{17} in the other direc-
 tion. Rocker-arm b^5 and the friction-disks 100
 b^3 , carried by it, are also lifted to allow pusher
 b^{20} to move over the folding-bed and push the
 envelope into the drying-chain. As the en-
 velope is pushed along, the edge of its seal-
 ing-flap comes against the sealing-flap turner 105
 b^{28} , (mounted on rock-shaft b^{29} , which is rocked
 in one direction by cam-rod b^{30} , and cam 6 on
 the face of gear f' , the cam 6 engaging roll 7
 on rod b^{30} , and is rocked in the other direc-
 tion by spring b^{31} , with which cam-rod b^{30} is 110
 provided,) rides up the turner b^{28} , which is
 rocked to bend the sealing-flap along the line
 of its crease over toward the body of the en-
 velope as the envelope is pushed along under
 the turner b^{28} and off of the folding-table by the 115
 continued forward movement of the pusher
 b^{20} . When the drying-chain D is used, the
 envelope is pushed off the folding-table into
 the chain, the members d of which open to
 receive the envelope and then close to carry 120
 it to the receiver R, the chain D being mount-
 ed on a roll d' and a sprocket d^2 , as will be
 readily understood by all skilled in the art,
 the shaft of the sprocket being provided with
 ratchet d^3 , with which a spring-controlled 125
 pawl d^4 , mounted on arm d^5 , co-operates. Arm
 d^5 is rocked by connections d^6 d^7 and crank-
 pin d^8 , rotating with shaft f^2 . When the en-
 velope has been carried into position for re-
 moval from the chain, it is seized by fingers r , 130
 working in the chain, the members d of which
 loosen their grip on the envelope, as will be
 readily understood by those skilled in the art.
 When the envelope has reached the said po-

sition, the fingers are actuated by the rocker-arm r' , fast to rocker shaft r^2 , to pull the fingers downwardly against the force of spring r^3 , and thereby to pull the envelope from the chain into the receiver R. Rocker-shaft r^2 is rocked to accomplish this, and is provided with an arm r^{10} , connected by rod r^4 to an arm r^5 , mounted on shaft r^6 , the arm r^5 being adapted to engage the cam r^7 on shaft f^2 . Receiver R is provided with a follower R' , which is moved in the receiver R by means of a rocker-arm r^8 , mounted on shaft r^6 and actuated by cam r^9 . The receiver R is also provided with a spring-controlled guard R^2 and with stationary guard R^3 .

Gear f^8 of cylinder A' meshes with gear a^7 , which meshes with a gear a^8 on ink-roller T, on which the ink-distributing rolls t rest. Ink is supplied to ink-roll T by a roll t' , which comes in contact at proper times with ink-roll t^2 , rotating in fountain T', the shaft of ink-roll t^2 being provided with a ratchet t^3 , which is engaged by a pawl t^4 , mounted on arm t^5 , which is connected by a link t^6 to an ear of the flap-turner b^2 , the movement of which flap-turner causes the arm t^5 to move, and thereby to rotate the roller t^2 in the ink-fountain. The roller t' , which is intermediate the ink-roller T, and the roller t^2 , which rotates in the fountain, are reciprocated between the two rollers, and are accordingly mounted in a bracket t^7 , which is rocked on shaft t^8 by an arm t^9 , controlled by a cam t^{10} , arm t^9 being provided with a roll. In order to secure a thorough distribution of the ink on the ink-rolls, it is desirable to reciprocate one or more of them endwise, and in the machine shown the shaft of roller T is provided with a grooved hub t^{11} , in the groove of which is placed a finger t^{12} , which engages cam 9 on disk f^3 .

When it is desired to print the envelope, the cylinder A' is provided with type—say an electro-type A^2 —which is preferably mounted on a reciprocating carrier a^{10} , so that the type-plate is in position to print when the block is in its lowest position. The reciprocating carrier a^{10} is mounted in the cylinder A' , and is moved to move the type-plate into position to be inked by cams a^{11} on the shaft of the cylinder. The carrier a^{10} is moved against the force of springs a^{12} , and when the cams a^{11} are in their inoperative position the carrier is returned into the position shown in Fig. 9 by the springs a^{12} . The shaft of cylinder A is journaled in the arms f^{10} of bracket F', the eccentrics e of these arms fitting in bearings a^{13} , mounted in the frame of the machine. The bearings a^{13} and the bearings a^{14} of the shaft of cylinder A' are mounted in an opening a^{15} , and adjusting-screws a^{16} are provided for regulating the space between the two cylinders, as will be readily understood from reference to Fig. 8, this regulation being to fix the cylinders at any desired distance apart, and being wholly independent of the movement of the cylinders in relation to each other

to vary the distance between them during the operation of the machine.

The machine is provided with table A^3 , having a number of guides a^{17} , by means of which the blank is properly guided to the cylinders $A A'$ by the operator. Table A^3 is provided with stop-guides a^{18} , which prevent the insertion of a blank between cylinders $A A'$, except at the proper time, the guides a^{18} being mounted on a leaf-spring a^{19} and projecting above the upper surface of the table in front of the rolls, except when depressed by the cross-bar of bracket F' striking pins a^{20} .

The operation of that form of my machine shown in the drawings is as follows: Starting with the rack f^4 , bracket F', and stops a^{18} in their highest positions (see Figs. 2, 4, and 6) motion is imparted to shaft f^2 from main shaft F and to disk f^3 , rotating with shaft f^2 and carrying rack f^4 . As the rack descends, meshing with pinion f^6 , it carries the disk 9', which is fast to the pinion, and the pawl 10, mounted on the disk, into the position shown in Fig. 7, and when the rack begins its upstroke the pawl 10 engages the toothed disk 11, fast to shaft f^7 , thereby rotating cylinder A' and compelling the rotation of cylinder A and parts connected therewith. The blank is presented by the attendant and properly gaged by the stops a^{18} , one of its flaps projecting between the cylinders $A A'$; but these cylinders are kept apart by the dog f^{15} until that dog is drawn away by the operator by means of treadle f^{16} , when the bracket F' is pulled down by its spring f^{20} , thereby bringing the cylinders $A A'$ together and nipping the front flap of the blank between them and also depressing the stops a^{18} , the rolls $A A'$ being at this time stationary. The blank is carried through the cylinders and fed by them positively to the auxiliary feed-disks a^5 , (which, together with the gum-distributors, are driven simultaneously with the cylinders $A A'$, as will readily be understood from what has been said above,) and the auxiliary disks a^5 feed the blank to the disks $b^3 b^4$, which guide and help feed the blank to the folding-table B. The feed begins when the rack f^4 is in its lowest position and continues during the upstroke of the rack f^4 , so that the cylinders are intermittently rotated, thereby giving time to the attendant to put the blank in place to be seized by the cylinders $A A'$. As the rack f^4 begins its upstroke, the pusher b^{20} is drawn back into the position shown in Fig. 5, and the end-flap turners $b b^2$ are moved back out of the way of the blank which is being fed to the folding-table B. When the pusher has completed its back-stroke, the back-flap turner b' is open—that is, thrown into the position shown in Fig. 5 by its springs. As the blank thus gummed and creased by the cylinders, and also printed, if desired, is fed forward on the folding-table, the arm b^5 , which carries the friction-disks b^3 , descends to bring the disks in place to co-operate with the un-

der disks b^4 , and thereby guide the blank into place on the table B. When the blank has reached its proper position on the table, the feed ceases, because the rack f^4 then begins its downstroke and the presser-foot B' descends. As the presser-foot moves down, the end-flap turners $b b^2$ move simultaneously to fold the end flaps of the blank, the end flaps being supported previous to folding by fingers projecting from the table. The presser-foot B' holds the blank in place while the end flaps are being turned. When the end flaps are folded and while the end-flap turners are yet on the blank, the presser-foot B rises sufficiently to allow the pusher b^{20} to turn up the back-flap turner b' and fold the back flap over in place on the end flaps. The pusher b^{20} rides over the back-flap turner, lingering thereon, while the presser-foot B' descends on the flap-turner b' , and thereby presses the gummed flap firmly in place on the end flaps folded underneath. The arm b^5 , carrying the friction-disks b^3 , now begins to rise, and the end-flap and back-flap turners and the presser-foot move away from the folding-table nearly simultaneously, and the pusher, with its fingers 12 in grooves 13 in table B, begins to push the envelope toward the drying-chain. The seal-flap turner b^{23} now rises, the seal-flap being carried over the seal-flap turner by the forward motion of the envelope until the turner finally brings the seal-flap into position. The seal-flap turner is formed with a passage (see Fig. 5) for the pusher to allow the pusher to move through it and push the envelope into the drying-chain.

As the pusher forces the folded envelope into the drying-chain and before it is moved back, the rack f^4 reaches its lowest position, thereby bringing the cylinder into position to feed another blank.

What I claim as my invention is—

1. In an envelope-machine, the cylinders $A A'$, in combination with folding mechanism, one cylinder having a land a and the other a depression a^2 to make the four creases between the flaps and the body of the envelope, substantially as and for the purpose set forth.
2. In combination with the cylinders $A A'$, one having a land a and the other a depression a^2 , and actuating mechanism to intermittently rotate the cylinders, stop-guides a^{18} , and means, substantially such as described, (for example, bracket F' , pins a^{20} , and springs a^{19}), for varying the position of the stops, the stops when in one position preventing the insertion of the blank between the cylinders and when in the other allowing the insertion of

the blank between the cylinders, all substantially as and for the purpose set forth.

3. In combination, creasing-cylinders $A A'$, one having a land a and the other a depression a^2 , gummers a' , and gum-distributer a^3 , the gummers being mounted on creasing-cylinder A , substantially as and for the purpose set forth.

4. The improved means for creasing, gumming, and printing envelope-blanks, composed of cylinders $A A'$, one having a land a and the other a depression a^2 , combined with gummers a' on one of the cylinders and a form A^2 on the other cylinder to simultaneously crease, print, and gum an envelope-blank, substantially as and for the purpose set forth.

5. In combination, feed-table A^3 , reciprocating stops a^{18} , and creasing-cylinders $A A'$, one of the cylinders having an intermittent motion toward and from the other cylinder, and mechanism for depressing the stops a^{18} , and folding mechanism, all arranged and operating substantially as and for the purpose set forth.

6. In combination, a folding-table and folding mechanism, with feed-rolls and blank creasing and gumming cylinders, one of the cylinders having an intermittent motion toward and away from the other cylinder, all arranged to feed the creased and gummed blank positively to the folding-table, substantially as described.

7. In combination, folding-table B , flap-folder b' , flap-folder b' being mounted at one edge of table B , pusher b^{20} , and means (for example, rack b^{12} and pinion b^{22}) for reciprocating the pusher to turn the flap-folder b' and to move said pusher over the folding-table, substantially as and for the purpose set forth.

8. In combination, feed-table A^3 , reciprocating stops a^{18} , gumming and creasing rolls $A A'$, stationary folding-table B , flap-folders $b b^2 b'$, presser-foot B' , reciprocating pusher b^{20} , and mechanism, substantially such as described, for actuating the same, the stops a^{18} being depressed to allow the operator to feed the blank to the creasing and gumming cylinders, the creasing and gumming cylinders simultaneously creasing and gumming the blank, the blank being fed positively from these cylinders to the folding-bed and removed positively from the folding-bed by the reciprocating pusher, all arranged and operating substantially as and for the purpose set forth.

SIDNEY A. GRANT.

Witnesses:

EDWARD S. BEACH,
JOHN R. SNOW.