

(No Model.)

7 Sheets—Sheet 1.

C. BICKFORD.

MACHINE FOR MARKING OR PRINTING MAIL MATTER.

No. 464,704.

Patented Dec. 8, 1891.

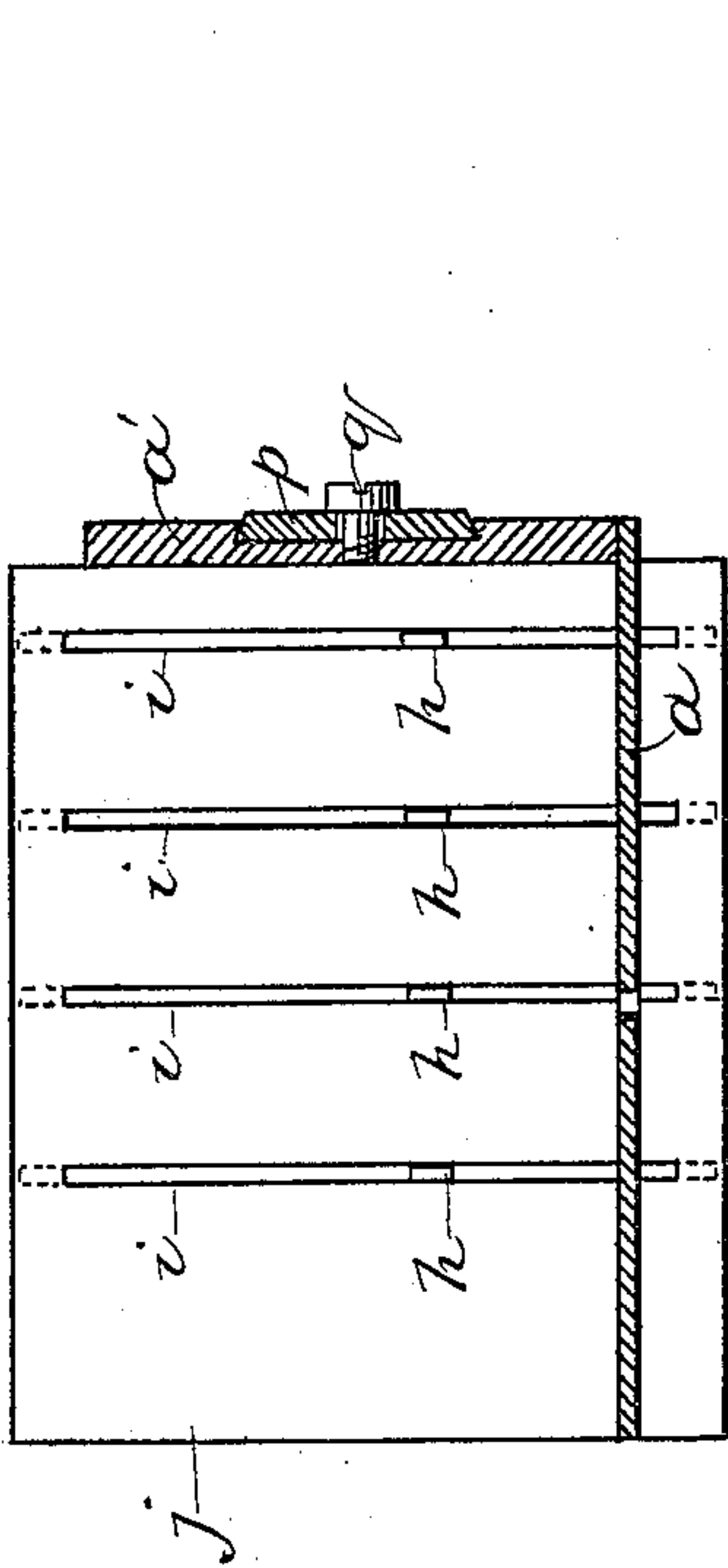


Fig. 2.

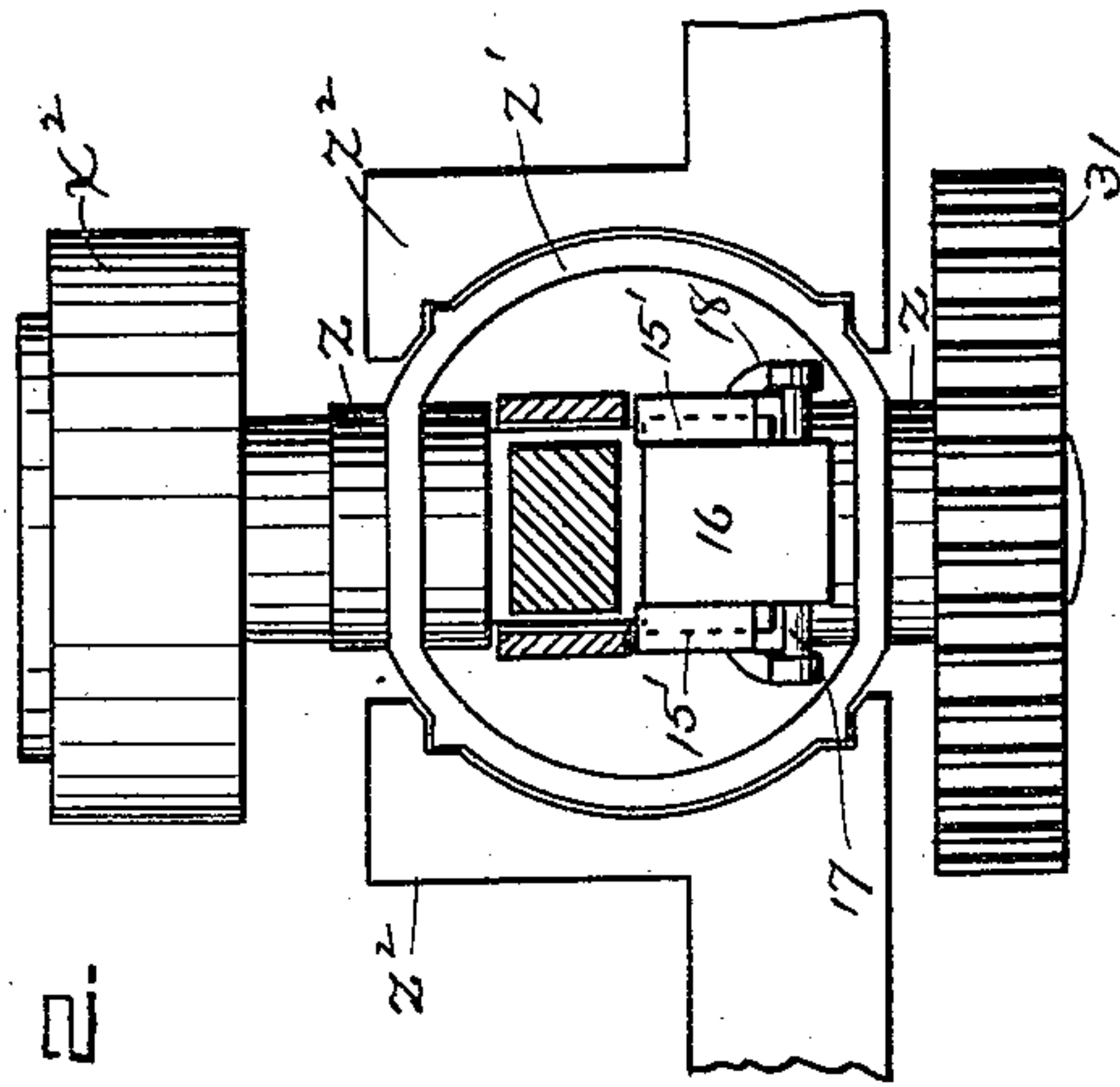


Fig. 3.

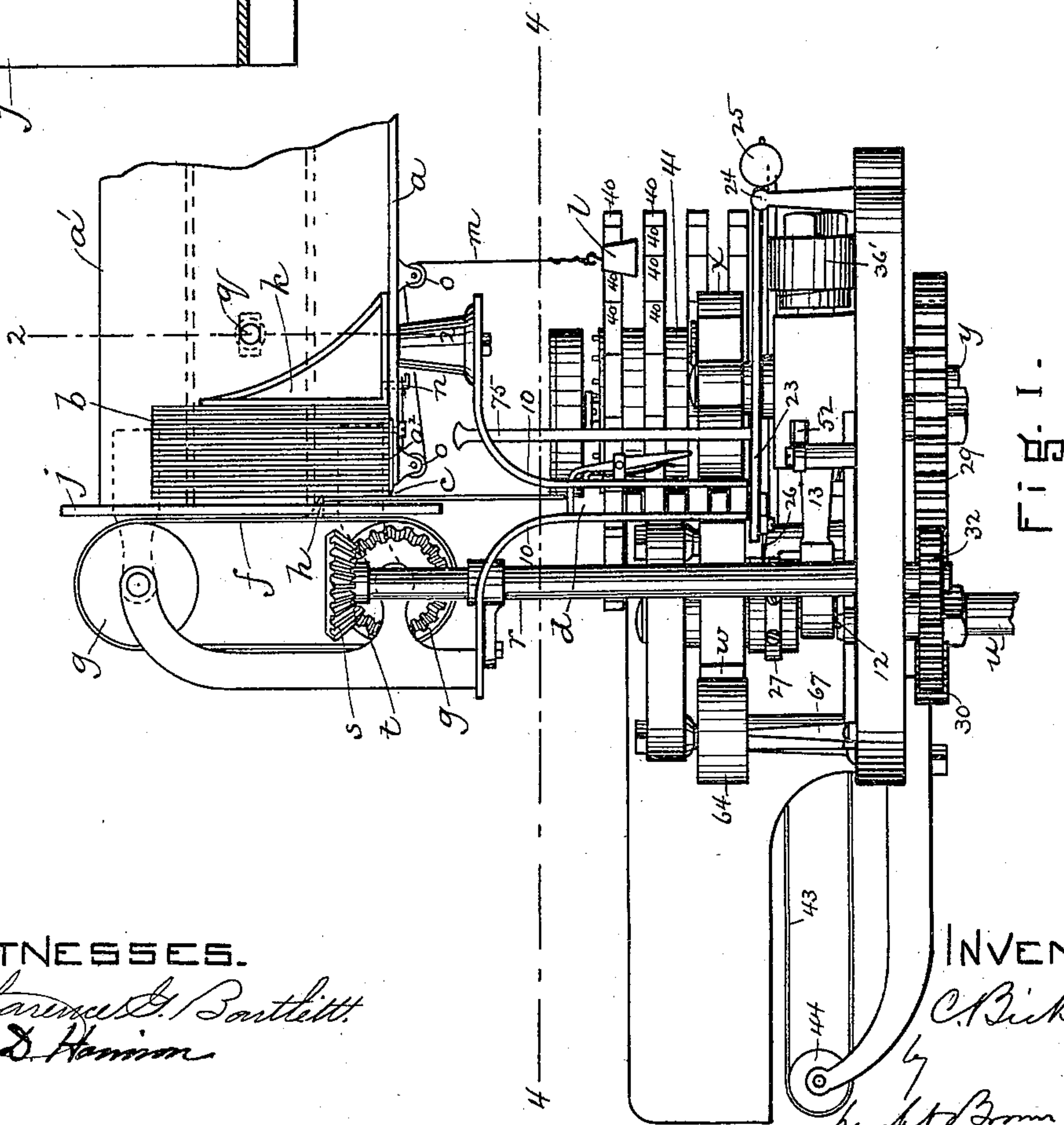


Fig. 1.

WITNESSES.

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(No Model.)

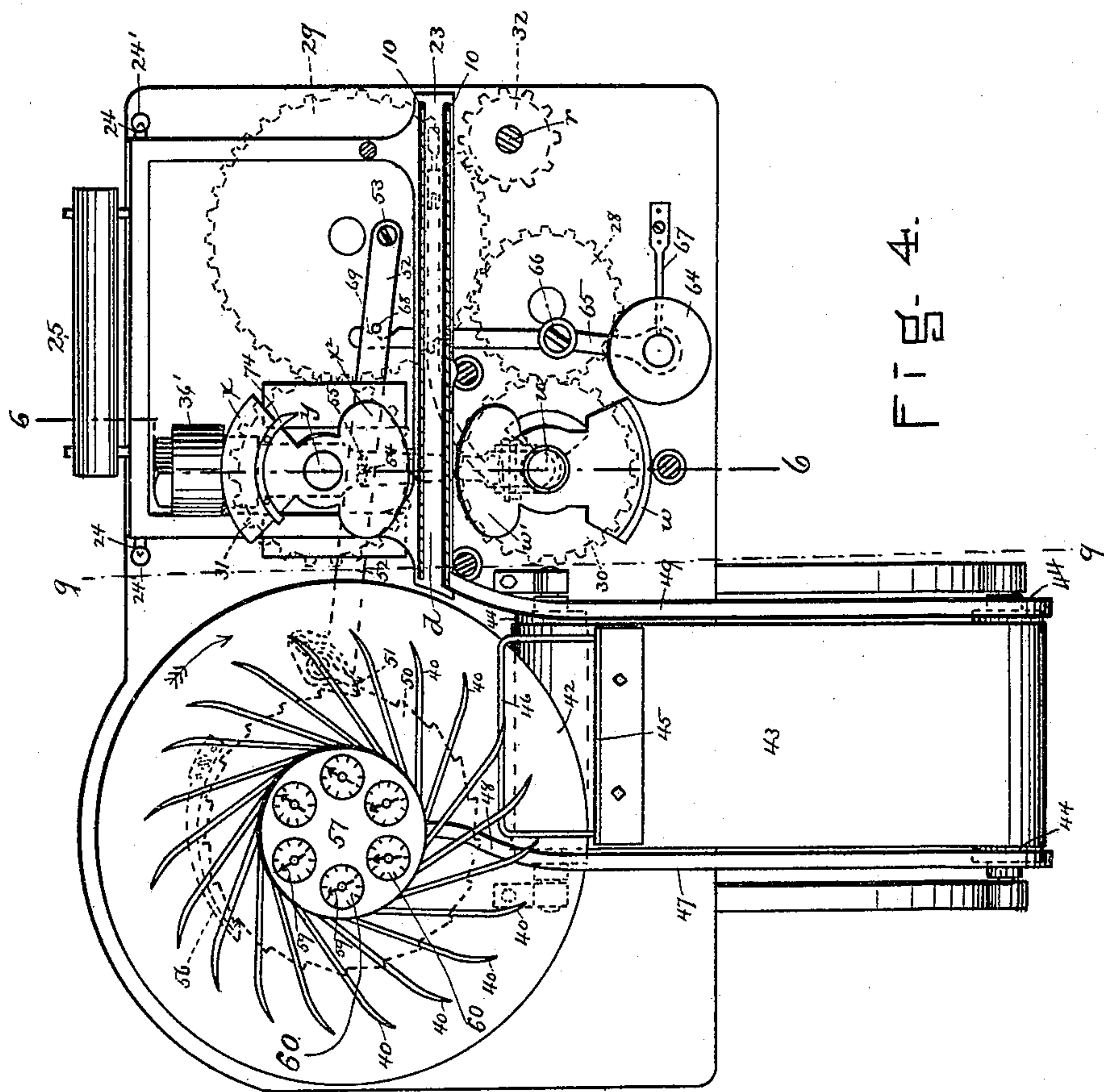
7 Sheets—Sheet 2.

C. BICKFORD.

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No. 464,704.

Patented Dec. 8, 1891.



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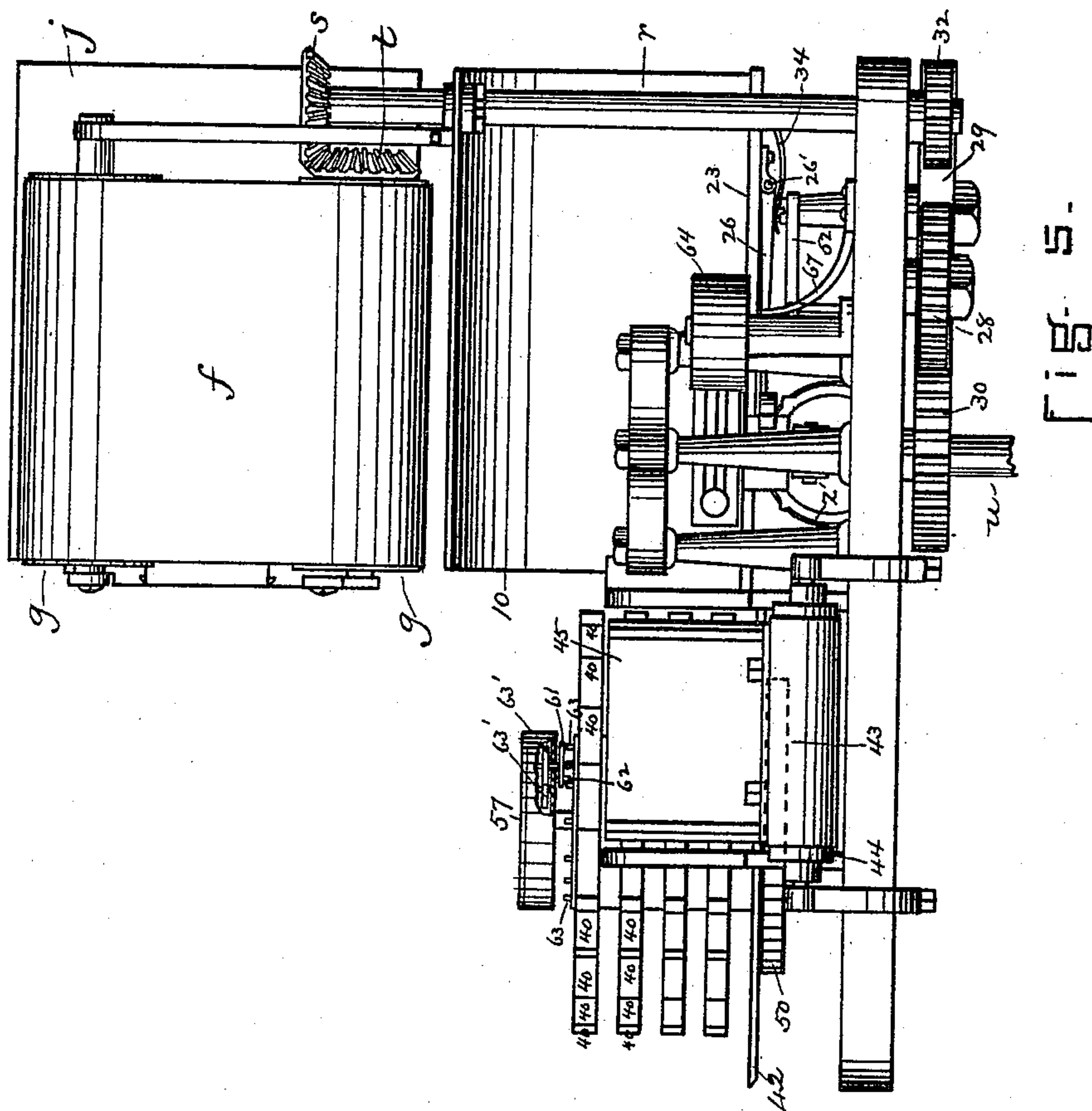
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C. BICKFORD.

MACHINE FOR MARKING OR PRINTING MAIL MATTER.

No. 464,704.

Patented Dec. 8, 1891.



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7 Sheets—Sheet 4.

C. BICKFORD.

MACHINE FOR MARKING OR PRINTING MAIL MATTER.

No. 464,704.

Patented Dec. 8, 1891.

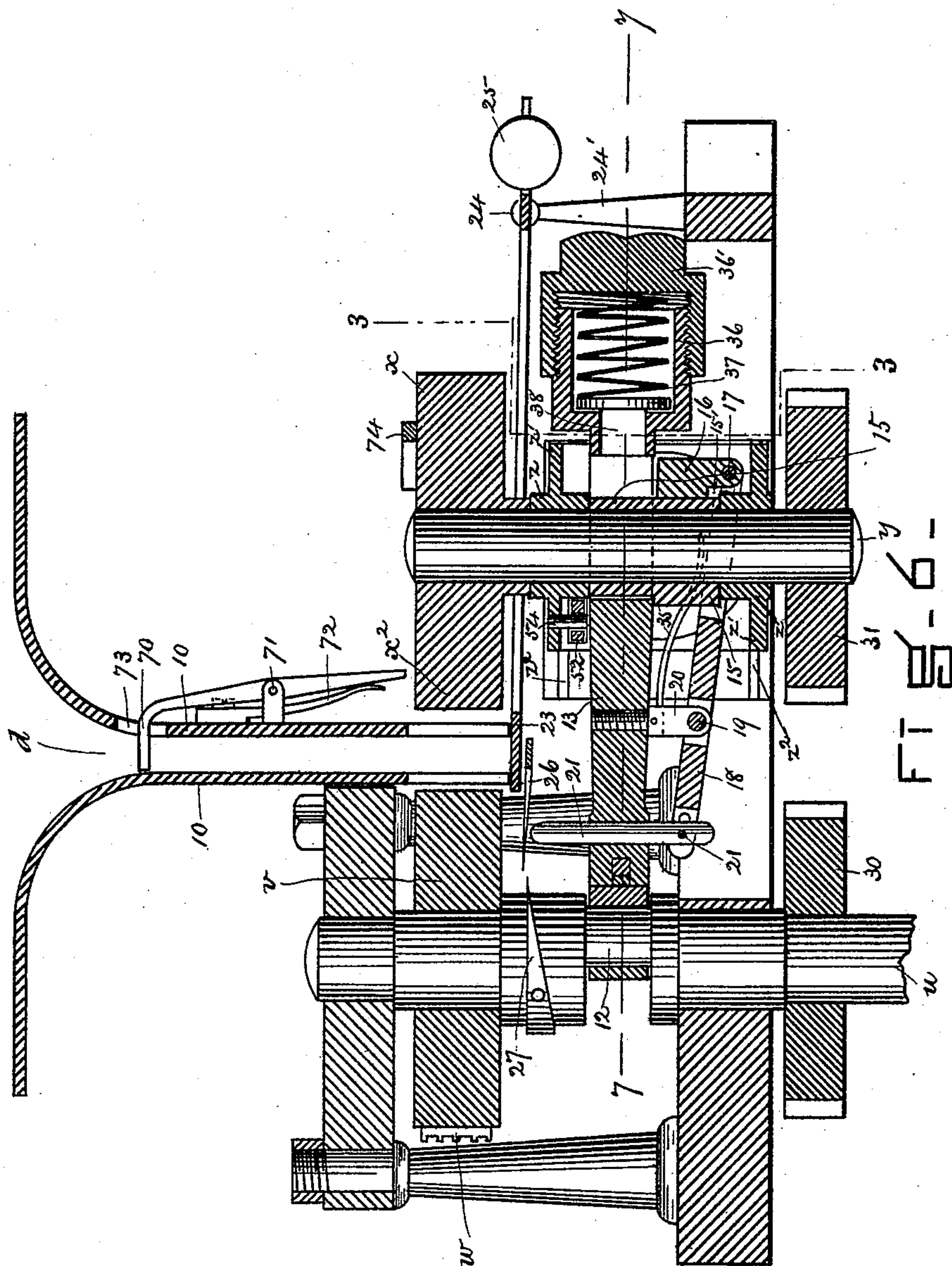


FIG. 6-

WITNESSES—

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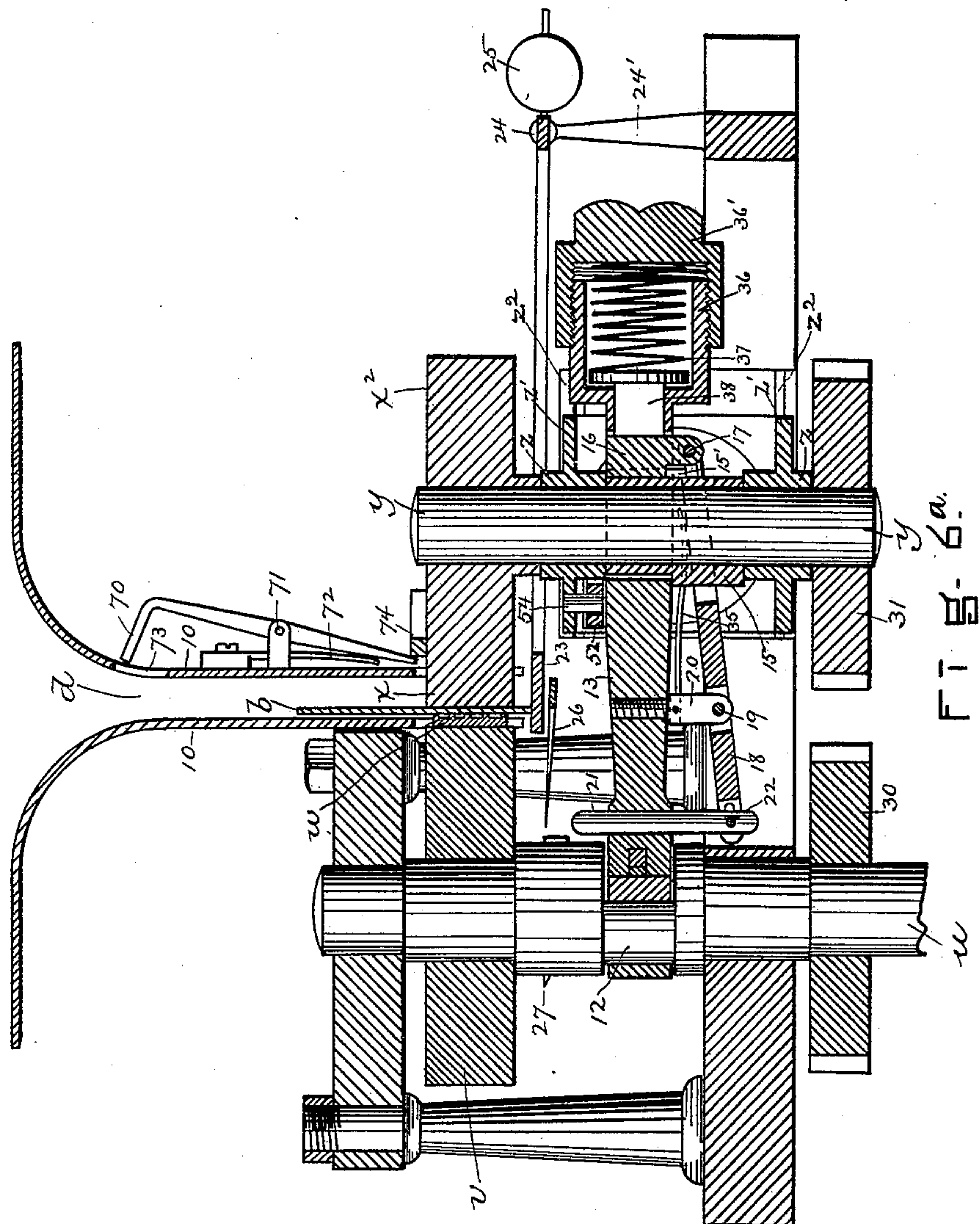
7 Sheets—Sheet 5.

C. BICKFORD.

MACHINE FOR MARKING OR PRINTING MAIL MATTER.

No. 464,704.

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WITNESSES.

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(No Model.)

7 Sheets—Sheet 6.

C. BICKFORD.

MACHINE FOR MARKING OR PRINTING MAIL MATTER.

No. 464,704.

Patented Dec. 8, 1891.

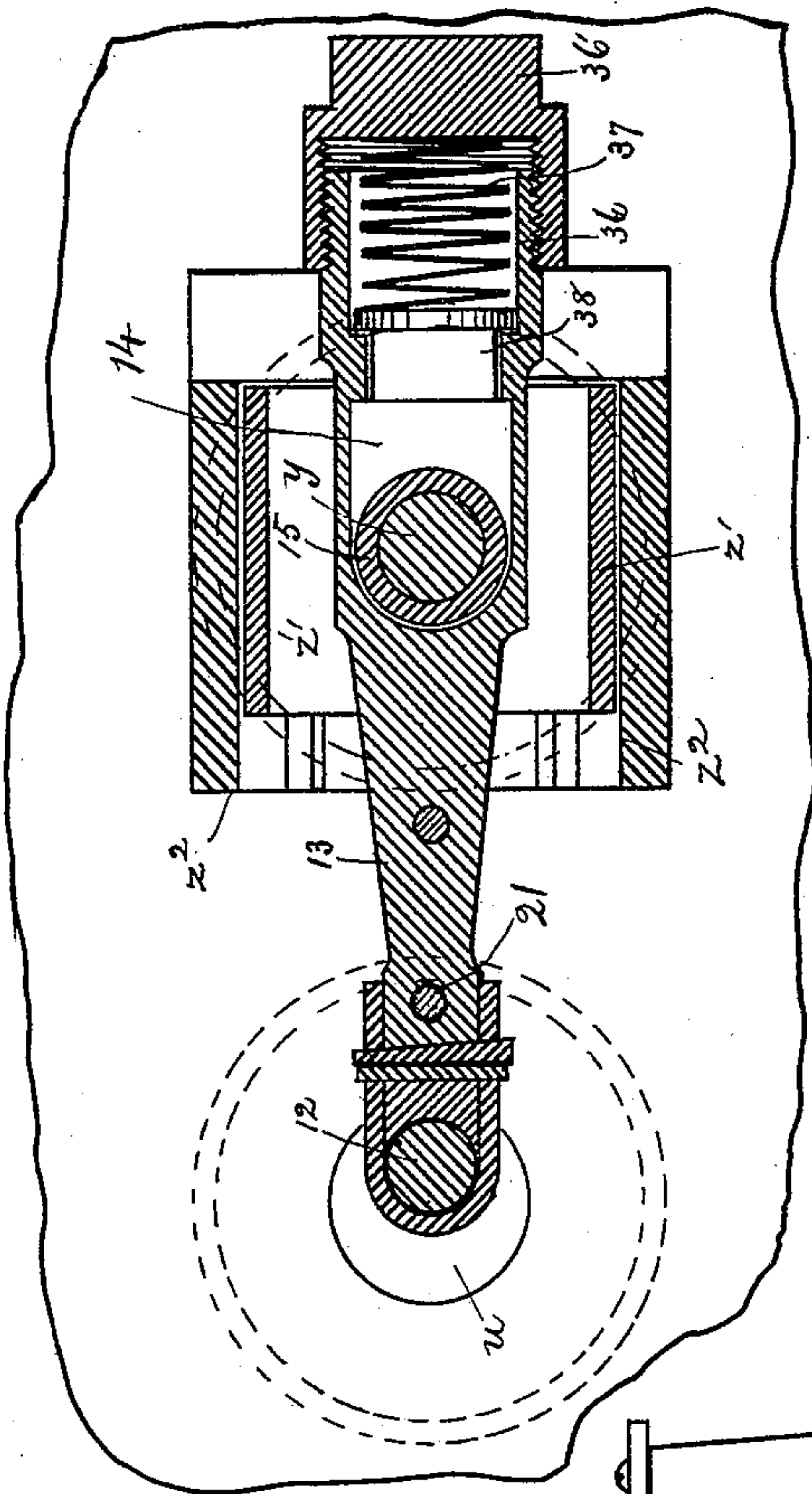


Fig-7-

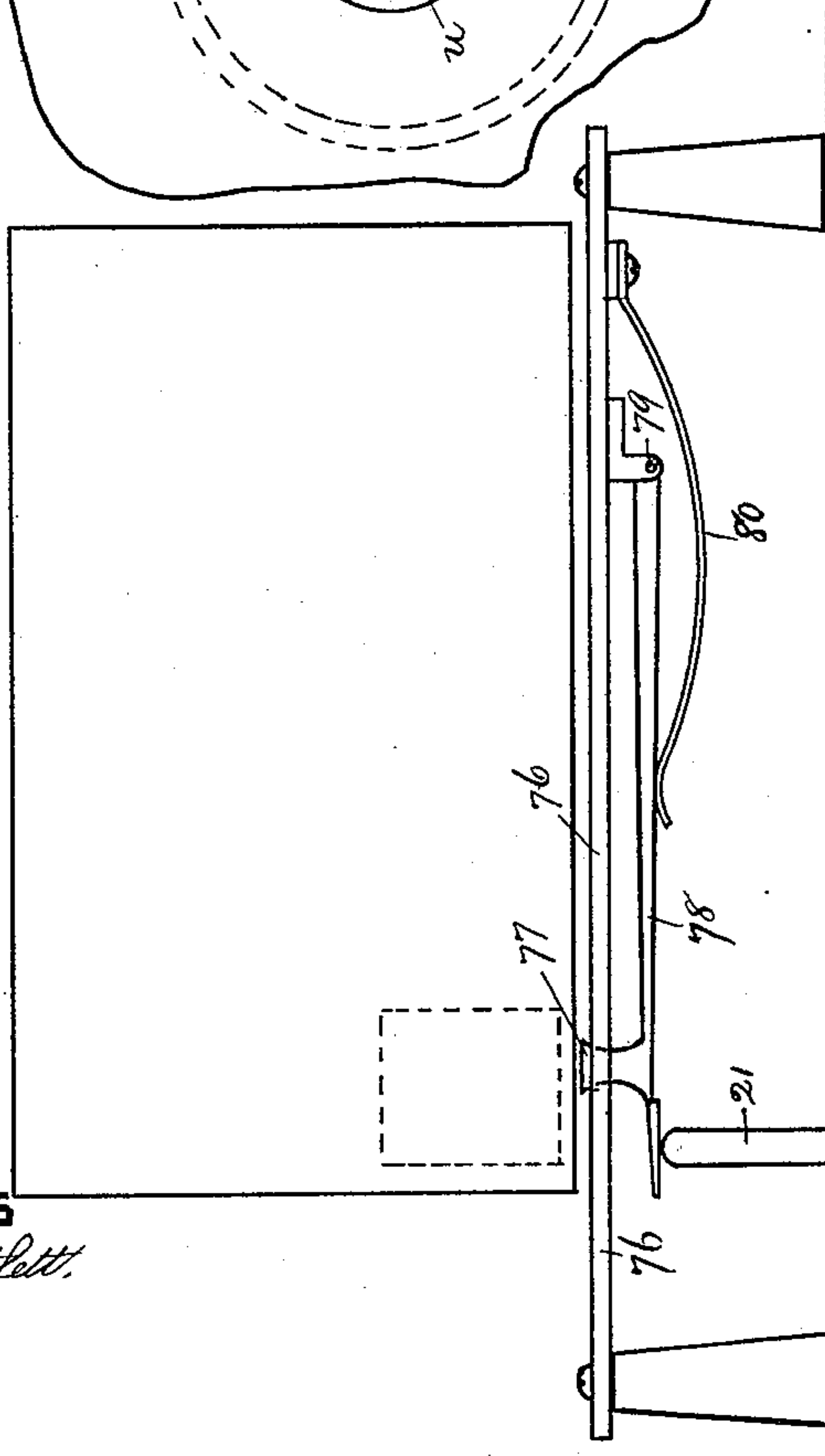


Fig-8-

WITNESSES

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(No Model.)

7 Sheets—Sheet 7.

C. BICKFORD.

MACHINE FOR MARKING OR PRINTING MAIL MATTER.

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Patented Dec. 8, 1891.

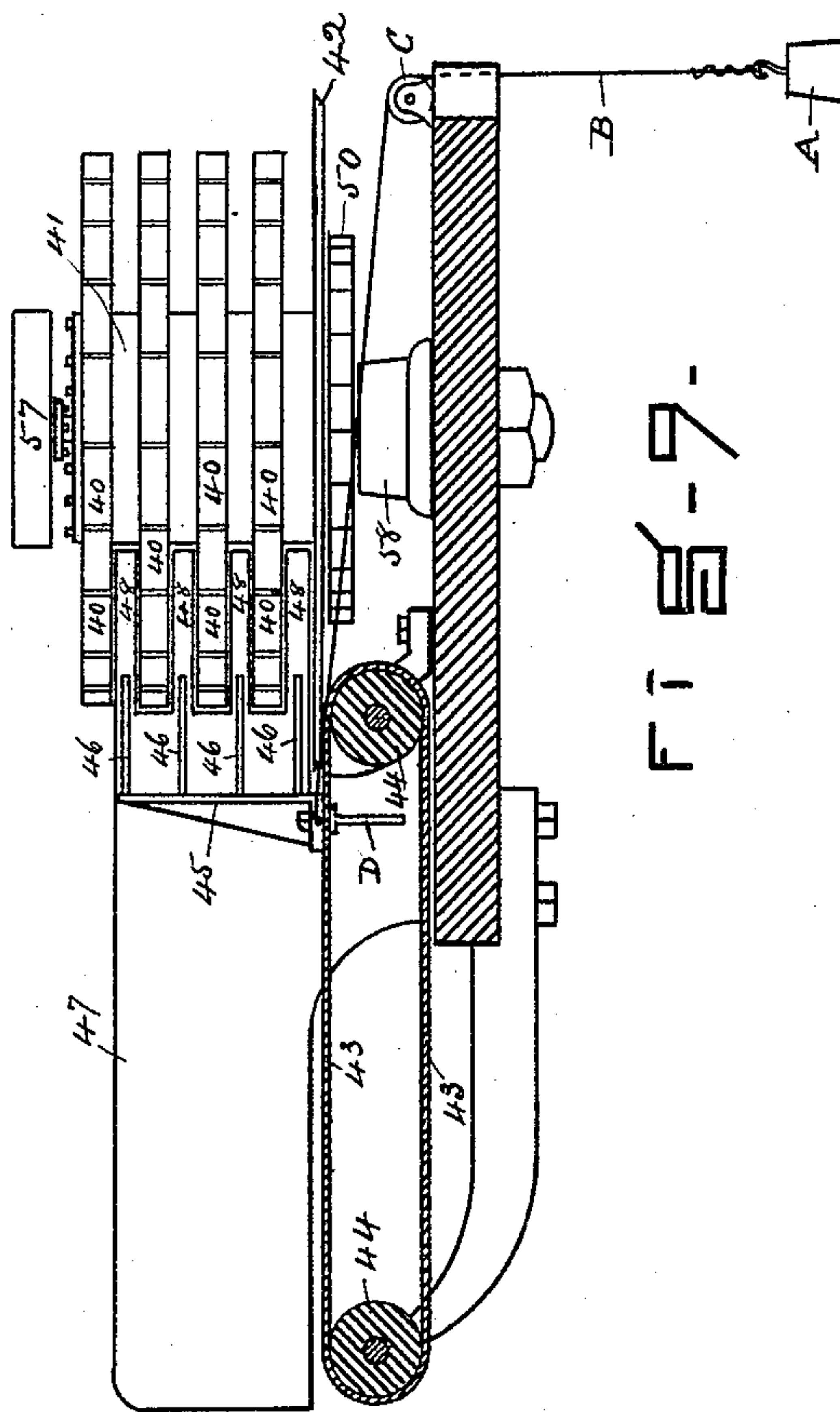


Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES BICKFORD, OF BOSTON, MASSACHUSETTS.

MACHINE FOR MARKING OR PRINTING MAIL-MATTER.

SPECIFICATION forming part of Letters Patent No. 464,704, dated December 8, 1891.

Application filed October 17, 1890. Serial No. 368,375. (No model.)

To all whom it may concern:

Be it known that I, CHARLES BICKFORD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Marking or Printing Mail-Matter, of which the following is a specification.

This invention has for its object to enable letters, postal-cards, and other like pieces of mail-matter to be marked or printed in such manner as to give the piece the usual post-mark and stamp-canceling marks, in which the printing or marking mechanism shall be made operative by the movement of each piece of mail-matter into position to be marked, said mechanism remaining inoperative at all other times, so that there can be no operation of the machine excepting when a piece of mail-matter is in position to be acted on.

The invention consists in the several improvements hereinafter described relating to an organized postmarking and canceling machine, or to a machine for printing any desired marks on detached pieces—such as cards, envelopes, &c.—for other purposes than postmarking and canceling—such, for example, as printing names and addresses on envelopes, printing business-cards, &c.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a postmarking and canceling machine embodying my invention. Fig. 2 represents a section on line 2 2, Fig. 1. Fig. 3 represents a section on line 3 3, Fig. 6, looking toward the left in the last-named figure. Fig. 4 represents a section on line 4 4, Fig. 1, and a plan view of the mechanism below said line. Fig. 5 represents a rear elevation of the machine; and Fig. 6 represents a section on line 6 6, Fig. 4, on a larger scale than the last-named figure. Fig. 6^a represents a section like Fig. 6, but showing the impression-bed moved forward. Fig. 7 represents a section on line 7 7, Fig. 6. Fig. 8 represents a modification. Fig. 9 represents a section on line 9 9, Fig. 4.

The same letters and numerals of reference indicate the same parts in all the figures.

In the drawings, *a* represents a horizontal bed or table which supports a pack of pieces *b* of mail-matter, and is provided at one end

with a delivering-slot *c*, Fig. 1, arranged to permit the letter at one end of the pack to drop into a guide which is located below the table and is adapted to guide each piece as it falls from the table *a* until said piece strikes a tilting-table 23 below the guide and by its weight moves said table and sets in operation the mechanism which prints the postmarking and canceling characters on the piece and feeds the piece endwise to the packing mechanism, all as hereinafter described. The guide *d* is here shown as composed of two vertical plates 10 10, the upper portions of which are curved outwardly, as shown in Figs. 1 and 6, and attached by any suitable means to the supporting-frame of the machine, said curved portions forming an enlarged mouth or entrance to the vertical space between said plates. The pieces *b* are forced downwardly into the guide through the slot *c*, one at a time, by means of a feeding or separating device, which, for convenience, I will call a "separator." Said separator is composed of a belt *f*, running upon pulleys *g g* and provided with a series of teeth *h*, Fig. 1, which, in passing along the descending side of the course of the belt, project through slots *i i*, Fig. 2, in a vertical plate *j*, which is arranged at one end of the table *a*, said teeth projecting through the plate *j* just far enough to engage the upper edge of the piece *b* at the inner end of the pack on the table *a* and force said piece downwardly into the guide *d*. The pack of pieces is pressed toward the plate *j* by means of a sliding follower *k*, impelled by any suitable means—as, for example, by a weight *l*, attached to a cord *m*, one end of which is secured to a lug *n* on the follower *k*, said cord passing over pulleys *o o* below the table *a*, as indicated in Fig. 1. The plate *j* is provided with an ear or lug *p*, which is secured by a screw *q* to a vertical wall *a'* at one edge of the table *a*, Fig. 2, said ear having a slot which receives the screw *q*, so that the plate *j* may be adjusted to vary the projection of the teeth *h* through the slots in the plate *j*, and thus adapt said teeth to letters and pieces of different thickness. The belt *f* is impelled in the direction indicated by the arrow in Fig. 1 by power applied to the lower pulley *g*, which supports it, through

a shaft *r*, having a bevel-gear *s*, meshing with a bevel-gear *t* on said pulley, the shaft *r* being driven by connections with the main driving-shaft of the machine, as presently described. The pulleys *g g* are journaled in bearings suitably affixed to the supporting-frame of the machine.

u represents a vertical shaft which is journaled in fixed bearings in the supporting-frame of the machine and is provided with a head or carrier *v*, on the periphery of which are mounted the forms or printing characters which apply to the pieces *b* the desired post and canceling marks. One of the said forms or printing characters *w* is shown in section in Fig. 6. The head or carrier *v* is located so that the printing-form *w* thereon is caused by the rotation of the shaft *u* to project through an opening in one side of the guide *d*, as shown in Fig. 6, once during each rotation of the shaft *u*, and thus effect an impression upon a piece *b* within the guide, said piece being supported by a rotating bed *x*, formed on a head *x'*, which is affixed to a shaft *y*, located at the opposite side of the guide *d* from the shaft *u*. The shaft *y* is journaled in bearings *z z* in a slide or carriage *z'*, which is adapted to move horizontally in fixed guides *z² z²*, Figs. 2, 6, and 7, on the supporting-frame, said carriage and the shaft *y* being movable toward and from the shaft *u* to bring the segmental impression-bed *x*, affixed to the shaft *y*, into contact with a piece of mail-matter that has been deposited between the two shafts and press said piece against the printing-form *w* on the shaft *u*. The shaft *u* is provided with an eccentric 12, which is engaged with one end of a connecting-rod 13, the other end of which is provided with an elongated slot or opening 14, through which the shaft *y* passes, as shown in Fig. 7, the shaft being inclosed within said slot by a loose sleeve 15, which bears on the sides of the slot and turns with the oscillating movements of the connecting-rod. The slot 14 is considerably longer than the width of the sleeve 15, and is of such length that the reciprocating movements of the connecting-rod 13, caused by the rotation of the shafts *u*, have no effect upon the shaft *y* and carriage *z'* until a plug or key 16 is forced into one end of the slot 14 by mechanism set in operation by the descent of each piece *b* of mail-matter, as hereinafter described, the slot 14 being shortened, as it were, by the thickness of the plug 16, so that the reciprocating movements of the connecting-rod are imparted to the shaft *y* during the time that the plug 16 remains in the slot 14. The plug 16 is adapted to slide vertically between guides 15' on the sleeve 15, Figs. 3, 6, and 7, and is pivoted at 17 to one end of a lever 18, which is pivoted at 19 to an ear 20 on the connecting-rod.

21 represents a plunger adapted to slide vertically in a socket in the connecting-rod 13 and connected to the lever 18 at its lower end by a pin 22.

23 represents a tilting table, which is hung or pivoted at 24 to supports 24' on the frame of the machine and is nearly counterbalanced by a weight 25, said weight being slightly heavier than the table, so that the swinging end of the table is normally slightly elevated, but is adapted to be depressed by the weight of the lightest piece of mail-matter. The swinging end of the table is under the guide *d* and below the printing-form and impression-bed, its location being such that when a piece of mail-matter has entered the guide and reached a position between the printing-form and the impression-bed it will strike the swinging end of the table 23 and slightly depress the latter.

26 represents a light finger, which is pivoted at 26', Fig. 5, to an ear on the table 23, and is normally held against the under side of said table by a spring 34, said finger moving with the table and being adapted also to move downward independently of the table. The finger 26 is arranged so that the depression of the table 23 will bring the swinging end of said finger into the path of rotation of an inclined or cam-shaped rib 27 on the shaft *u*, so that the inclined or cam-shaped under side of said rib will engage the finger 26 and press the latter downwardly upon the plunger 21. Said plunger is thus depressed and caused to impart, through the lever 18, an upward movement to the plug 16 and insert said plug in the slot 14 in the connecting-rod 13.

The arrangement and timing of the described mechanism is such that the plug is inserted in the slot 14 when the connecting-rod is at the end of its throw. (Shown in Fig. 6.) The insertion of the plug into the slot 14 causes the connecting-rod in moving from the position shown in Fig. 6 to move the shaft *y* and the impression-bed *x* thereon to the position shown in Fig. 6^a, so that the impression-bed is caused to press the piece of mail-matter against the printing-form *w* and at the same time co-operate with said form in moving the piece endwise to a packing device, both the printing-form and the impression-bed being continuously rotated, as presently described. The return movement of the connecting-rod back to the position shown in Fig. 6 causes it to move the shaft *y* away from the shaft *u*, the plug 16 being at the same time released from the grip, which during the opposite movement of the connecting-rod held it between the sleeve 15 and the end of the slot 14, so that during said return movement the plug drops from the slot 14, its downward movement being accelerated by a spring 35, Figs. 6 and 6^a. The descent of the plug makes the connecting-rod once more loose, so that it reciprocates idly without moving the shaft *y* until the next piece of mail-matter strikes the table 23, when the above-described operation is repeated. It will therefore be seen that there is no operation of the printing mechanism until a piece of mail-matter is in position to be printed and that after one printing op-

eration the printing mechanism cannot operate until another piece reaches said position.

To enable the impression-bed to adapt itself to the thickness of the different pieces of mail-matter, I make the connecting-rod slightly elastic or capable of yielding, so that a piece of maximum thickness will not receive too great pressure between the form and bed. To this end I provide one end of the connecting-rod with a box 36, containing a spring 37, which presses a block or plunger 38 against the plug 16 when the latter is inserted in the connecting-rod. Said block 38 is in effect one end of the slot 14, and is enabled by the spring 37 to yield and thus permit the arrest of the lateral movement of the shaft *y* by the contact of the impression-bed with a piece of mail-matter when the connecting-rod is carrying the impression-bed toward the printing-form before the completion of the throw or movement of the connecting-rod. As before stated, the shafts *u* *y* are continuously rotated, so that whenever the impression-bed *x* on the shaft *y* is brought forward and presses a piece of mail-matter against the printing-form said bed and form serve also as feeding devices to move the letter or piece endwise away from the position it occupied when first dropped onto the tilting table 23. The rotation of said shafts may be effected in any suitable way. I prefer to impart power to the shaft *u* and impart the same to the shaft *y* through the intermediate gears 28 and 29, the former meshing with a gear 30 on the shaft *u* and the latter with a gear 31 on the shaft *y*. The shaft *r*, which imparts motion to the lower pulley *g* of the belt or separator *f*, is provided with a gear 32, meshing with the intermediate gear 29.

The pieces of mail-matter are moved by the described feeding action of the impression-bed and printing-form to a packing device, which consists of a series of vertical rows of tangentially-arranged arms 40, projecting horizontally from a vertical hub or shaft 41, which is rotated step by step by devices presently described. The spaces between the rows of arms 40 constitute pockets to receive the pieces of mail-matter as they are moved endwise by the impression-bed and printing-form, the arrangement being such that one of the pockets stands substantially in line with the guide *d* and in position to receive a piece of mail-matter emerging therefrom at each operation of the impression-bed and type-form. The shaft or hub 41 is provided with a horizontal disk 42 below the said pockets, said disk constituting a bottom for the pockets and supporting the pieces of mail-matter therein. The step-by-step rotation of the shaft or hub 41 causes the arms 40 to move the pieces laterally in a curved path onto a table, which is preferably an endless apron 43, supported by loose rolls 44 44, the upper portion of said apron being just below the disk 42 and extending outwardly therefrom substantially at right angles to the

guide *d*. To said apron is affixed a vertical bracket 45, having a series of horizontal arms 46, which project between the packer-arms 40, said arms 46 collectively furnishing a vertical support against which the pieces of mail-matter are pressed by the movement of the arms 40, said movement being in the direction indicated by the arrow in Fig. 4. A vertical wall or guide 47, extending along one edge of the apron 43, projects through the arms 40, as shown in Figs. 4 and 9, its inner end being slotted to form fingers 48, Fig. 9, alternating with the members of the rows of arms 40, said fingers arresting the movement of the letters in the direction of the circular movement of the arms 40 and causing them to move outwardly toward the arms 46 of the bracket 45, so that the letters or pieces are accumulated on the apron 43, said apron moving to permit the bracket 45 to yield to the accumulation of letters. A pack of letters is thus formed on the apron 43, and said letters may be removed from time to time, as occasion may require. The letters are kept in place on the apron by the bracket 45 at one side of the pack, the wall 47 at one end of the pack, and another wall 49, extending along the edge of the apron opposite the wall 47. The bracket 45 is yieldingly impelled or drawn toward the packing device by means of a weight A, connected by a cord B to the bracket, said cord running over a pulley C, as shown in Fig. 9. A spring may be arranged to perform this function instead of a weight, it being desirable to give the bracket at all times a yielding pressure on the mail-matter moved against it by the packing device.

To prevent the band or apron from moving far enough to allow the bracket to pass over the outer drum 44, and thus permit the escape of letters at the outer end of the pack, I provide the apron with a downwardly-projecting arm D, Fig. 9, which is arranged under the bracket and strikes the outer drum 44 when the bracket reaches a position over said drum, thus arresting the outward movement of the bracket.

The preferred means for rotating the hub or shaft 41 and its packing-arms are as follows: A ratchet 50 is affixed to said hub or shaft below the packer and is engaged by a pawl 51, which is mounted on the swinging end of a lever 52. Said lever is pivoted at 53 to a fixed support, and has a slot 55, Fig. 4, which receives a pin 54, Figs. 4, 6, and 6^a, affixed to the slide or carriage *z'*, in which the impression-bed-supporting shaft is journaled. The movements of said carriage, caused as above described, oscillate the lever 52 and cause it, through the pawl 51 and ratchet 50, to give a step-by-step rotation to the shaft 41, the movement of the carriage that carries the impression-bed toward the printing-form giving the lever 52 the movement that partly rotates the packing device. Hence every letter or piece moved out by the action of the printing-form and bed finds a pocket in the

packing device ready to receive it. The backward movement of the packing device during the backward movement of the pawl 51 is prevented by a retaining-pawl 56, Fig. 4.

5 57 represents a fixed casing located above the packing device and supported by a fixed standard or bearing 58, Fig. 5, passing through the hub 41. Said casing contains a train of gears 63', Fig. 5, the arbors of which project
10 through the top of the casing and are provided with pointers or indicators 59, which rotate over dials 60 on the top of the casing. One of the said arbors projects downwardly below the casing and is provided with arms
15 61, which have downwardly-projecting pallets 62, which are arranged to be struck by upwardly-projecting pins 63 on the packing device. Each pin 63 in passing a given point strikes one of the pins 62 and gives a partial
20 rotation to the arbor with which the pins 62 are connected. The gears 63' are formed so that the total number of movements of the packer will be indicated by the pointers 59 and the accompanying dials, the number of
25 pieces passing through the machine being thus automatically counted.

The printing-form *w* is inked by means of an inking-roll 64, journaled on one end of a lever 65, which is pivoted at 66 to a fixed support and is normally held by a spring 67 in
30 position to ink the printing-form. It is not desirable, however, to ink the form when the latter is revolving idly without printing. Hence I provide means for automatically
35 holding the roll out of its operative position, so that it will not bear on the revolving form, excepting when the latter is about to effect an impression on a piece of mail-matter. To this end I provide the lever 65 with an in-
40 cline 69, which is acted on by a pin 68 on the lever 52. The contact of the pin with said incline when the impression-bed is in its retracted position holds the lever 65 in such position that the inking-roll cannot bear on
45 the form; but when the impression-bed is moved toward the form the corresponding movement of the lever 52 causes the pin 68 to permit the lever 65 to be moved by the spring 67 into the position required to bring
50 the inking-roll into contact with the form.

The printing-form is preferably made slightly eccentric, its ends projecting farther from the center of the shaft *u* than its central portion. This peculiarity of form
55 compensates for the changes in the position of the impression-bed caused by the movements thereof toward and from the printing-form, the bed moving slightly toward the form at the commencement of the printing
60 operation and slightly away from the form during the closing part of the same. The eccentric shape of the printing-form enables it to make a uniform impression on the paper supported by the alternately advancing and
65 retreating bed. The impression-bed may be made eccentric for the same purpose, and, if desired, both the bed and printing-form may

be made eccentric, it being my belief that the latter arrangement will produce the best results. 70

The operation of the machine above described is substantially automatic, the only attention required from the operator being to place the pieces *b* in position on the table
75 *a* and to remove them from the apron 43. It is obvious, however, that the automatic separator shown in Figs. 1, 2, and 5 may be dispensed with and the letters separated from the pack and dropped into the guide *d* by hand. When this is done, I prefer to provide
80 an automatic stop 70, Figs. 6 and 6^a, which is pivoted at 71 to an ear on one of the side pieces of guide *d*, and is normally forced by a spring 72 through a slot 73 in said side piece, as shown in Fig. 6, so that it holds each
85 piece of mail in the proper position for the action of the printing devices. On the upper side of the head or piece on which the impression-bed is formed is a rib or cam 74, which is arranged to strike the stop 70 and
90 withdraw the same from the guide, as shown in Fig. 6^a, in time to permit a piece *b*, which has previously been arrested by the stop 70, to be moved forward by the printing devices.

75 represents a pin or stud attached to and
95 projecting upwardly from the tilting table 23, the upper end of said stud being above the guide *d* and in such position that the operator can by pressing downwardly upon it depress the said table in case a piece of mail-matter
100 dropped thereon is too light to depress the table.

*x*² represents a projection or counter-balance for the impression-bed, said projection being on the opposite side of the shaft *y* from
105 said bed.

It is obvious that various modifications may be made in the construction and arrangement of the devices and parts of the machine above described without departing from the spirit
110 of the invention. For example, instead of employing the tilting table 23, I may use a fixed table 76, having a slot through which extends a projection 77 on a finger 78, said finger being pivoted at 79 and pressed upwardly by a
115 spring 80, so that the projection 77 normally stands above the table 76. The weight of the falling letter strikes the projection 77 and depresses the latter and the finger 78, the latter being brought within the path of the cam 27
120 and caused thereby to depress the plunger 21.

The machine may be used for printing business-cards, addresses on envelopes, &c., instead of postmarking mail-matter.

It will be obvious that the positions of the
125 printing-form and the impression-bed may be reversed, the form being applied to the shaft *y* and the bed to the shaft *u*, without affecting the essential principle of the invention, although in such case a different inking mechanism from that shown in the drawings would
130 necessarily be employed.

For the sake of convenience I have herein-after referred to the printing-form and its

carrier and the impression-bed and its carrier as "printing members."

The pressure of the spring 37, which permits the yielding of the impression-bed when the latter is in contact with the piece to be marked, may be regulated by means of a screw-cap 36', which is screwed upon the box 36 and supports the outer end of the spring, said cap being adjustable to compress or relax the spring, as the case may be.

It will be observed that the slotted vertical plate *j*, which supports the forward end of the pack of letters on the table *a* and receives in its slots the teeth *h* of the separator, being adjustably secured to the wall *a'* of the table *a*, as above described, enables the teeth or projections *h* of the separator to project to a greater or less extent from the supporting-face of the plate *j*, and thus adapts said teeth to letters or pieces of different thickness, so that when running a pack of pieces of a given thickness the plate *j* may be adjusted to give the teeth a projection suitable for the thickness of said pieces, and when running thicker or thinner pieces the plate may be adjusted to give the teeth a greater or less projection.

The slot *c* is made adjustable to the thickness of the pieces of mail-matter, so that there will be no liability of two or more thin pieces being carried down at once. To this end I provide the table *a* with an adjustable slide *a²*, adapted to be moved to increase or decrease the width of the slot *c*.

I claim—

1. The combination of two co-operating printing members, one of which is a printing-form and the other an impression-bed, one of said members being movable toward and from the other, a vertically-movable table or arm adapted to be depressed by the gravity of a piece of mail-matter between said members, a guide or opening to permit the descent of a letter upon said table or arm, and mechanism which is made operative by the depression of said table or arm to move the said movable member toward the other to effect an impression of the form on the said piece, as set forth.

2. The combination of two co-operating printing members, one of which is a rotary printing-form and the other a rotary impression-bed, one of said members being laterally movable toward and from the other, mechanism for rotating said members simultaneously, a vertically-movable table or arm adapted to be depressed by the gravity of a piece of mail or other matter between said form and bed, a guide or opening to permit the descent of a letter upon said table or arm, and mechanism made operative by the depression of said table or arm to move the said movable rotating member toward the other member to cause the printing and removal of the said piece, as set forth.

3. The combination of two co-operating rotary printing members, shafts supporting the same, gearing connecting said shafts, where-

by the members are simultaneously rotated, a slide or carriage supporting one of said shafts and movable toward and from the other shaft, normally-inoperative connections between the last-mentioned shaft and the carriage, a guide or opening to permit the vertical descent of a letter to a position between said printing members, and devices operated by the gravity of a letter deposited between said members, whereby the said connections are made operative to move the said carriage and the printing member thereon first toward and then from the other member, as set forth.

4. The combination of the two co-operating printing members, one of which is a rotary printing-form and the other a rotary impression-bed, a power-driven shaft supporting one of said members and provided with an eccentric and with a cam-shaped rib or flange, a slide or carriage movable toward and from said shaft and carrying the shaft that supports the other member, a connecting-rod engaged at one end with said eccentric and formed to play loosely at its other end on the shaft in said carriage, a movable table or arm adapted to be depressed by a piece of mail or other matter between said members and thereby be engaged and further moved by the said cam-shaped rib or flange, and devices operated by the movement of the table or arm whereby the connecting-rod is operatively engaged with the carriage and caused to move the latter and the printing member thereon toward and from the other printing member, as set forth.

5. The movable slide or carriage, the shaft journaled therein, the power-driven shaft journaled in fixed bearings and provided with an eccentric, the printing members on said shafts, and the connecting-rod engaged at one end with said eccentric and provided at the other end with an elongated slot, which normally plays loosely on the shaft in the carriage, combined with the movable plug adapted to enter said slot to operatively engage the connecting-rod with the carriage, and devices operated by the entrance of a letter between the printing members, whereby said plug is inserted in the slot, as set forth.

6. The movable slide or carriage, the shaft journaled therein, the power-driven shaft journaled in fixed bearings and provided with an eccentric, the printing members on said shafts, and the connecting-rod engaged at one end with said eccentric and provided at the other end with an elongated slot which normally plays loosely on the shaft in the carriage, combined with the movable plug adapted to enter said slot to operatively engage the connecting-rod with the carriage, a lever supported by the connecting-rod and connected at one end with the said plug, a plunger connected with the other end of said lever, a table or arm adapted to be depressed by the entrance of a letter between the printing members, and a cam-shaped rib or flange on the power-driven shaft adapted to act on

said arm when the latter has been depressed and through the arm, plunger, and lever raise the plug to its operative position, as set forth.

7. The combination of the slide or carriage, the shaft journaled therein and provided with a printing member, the loose sleeve on said shaft within the carriage, the power-driven shaft journaled in fixed bearings, an eccentric on the last-named shaft, the connecting-rod engaged with said eccentric and provided with an elongated slot adapted to play loosely on the sleeve in the carriage, a plug adapted to move on guides on said sleeve into and out of the slot in the connecting-rod, and means, substantially as described, whereby the plug is moved into said slot upon the entrance of a letter between said printing members, as set forth.

8. The rotary printing members, their supporting-shafts, the movable carriage supporting one of said shafts, the other shaft being in fixed bearings, an eccentric on the last-named shaft, the connecting-rod engaged at one end with said eccentric and adapted to play loosely on the movable shaft, and the plug adapted to operatively engage said rod with the movable shaft, so that its movements will move said shaft laterally, combined with a spring in the connecting-rod, whereby the movable shaft and its printing member are adapted to yield and conform to different thicknesses interposed between the printing members, as set forth.

9. The rotary printing members, their supporting-shafts, the movable carriage supporting one of said shafts, the other shaft being in fixed bearings, the connecting-rod engaged at one end with an eccentric on the shaft in fixed bearings and adapted to play loosely on the movable shaft, and the plug adapted to operatively engage said rod with the movable shaft, so that its movements will move said shaft laterally, combined with a spring in the connecting-rod, whereby the movable shaft and its printing member are adapted to yield and conform to different thicknesses interposed between the printing members, a movable block or plunger interposed between said spring and the point in said slot occupied by the plug, and means, substantially as described, for adjusting the pressure of said spring, as set forth.

10. The combination of the rotary printing members and their supporting-shafts, one of said shafts being laterally movable and the other journaled in fixed bearings and provided with an eccentric and with a cam-shaped rib, the connecting-rod engaged with said eccentric and provided with a slot adapted to play loosely on the movable shaft, the plug adapted to enter said slot and engage the connecting-rod with the movable shaft, the pivoted table arranged to be depressed by the entrance of a letter between the printing members, the finger pivoted to said table and adapted to be depressed with and independently of the latter, said finger being brought by

the depression of the table into engagement with the said cam-shaped rib and independently moved by said rib, the plunger in the connecting-rod arranged to be depressed by the independent movement of said finger, and the pivoted lever connecting said plunger with the plug, as set forth.

11. The combination of the pack-supporting table having a delivering-slot, a separating device composed of a belt arranged to run downwardly across one end of the said table and provided with letter-engaging teeth or projections adapted to separate the foremost letter or piece from the pack and force it through the delivering-slot, a vertical plate interposed between the separator and the pack and provided with slots to receive the letter-engaging teeth or projections, and means for adjusting said plate to accommodate the said teeth or projections to the thickness of the letters or pieces, as set forth.

12. The combination, with the pack-supporting table having a delivering-slot, of the adjustable slotted plate, the separator having teeth projecting through said plate, and means for adjusting the width of the said slot, as set forth.

13. The improved packing device composed of a vertical hub or shaft and a series of vertical rows of tangential arms on said hub separated by letter-receiving pockets, and a series of fixed fingers projecting into the spaces between the arms to force the letters from said pockets, as set forth.

14. The combination of a guide, printing-members arranged to act on a letter in the guide, a packing device at one end of said guide, composed of a vertical rotary shaft or hub, tangential arms extending horizontally from said hub, the spaces between said arms constituting pockets, and a series of fixed fingers projecting into the spaces between the arms, and means for rotating said packing device step by step, as set forth.

15. The combination, with printing and delivering mechanism and a guide, of a rotary packing device composed of a hub or shaft and tangential arms arranged in a series of vertical rows, fixed letter-ejecting fingers projecting between said arms, means for rotating said packing device step by step, and a table or support onto which the printed pieces are packed by said packing device, as set forth.

16. The combination, with printing and delivering mechanism and a guide, of a rotary packing device composed of a hub or shaft and tangential arms arranged in a series of vertical rows, means for rotating said packing device step by step, a table or support arranged to receive the letters from the packing device, and a guiding-wall beside said table terminating in a series of fingers which project across one side of the packing device and operate to force the letters out of the pockets of the packing device onto the table or support, as set forth.

17. The combination, with printing and de-

livering mechanism and a guide, of a rotary packing device composed of a hub or shaft and tangential arms arranged in a series of vertical rows, means for rotating said packing device step by step, a table or support arranged to receive the letters from the packing device, a guiding-wall beside said table terminating in a series of fingers which project across one side of the packing device, and a movable bracket on said support provided with a series of arms arranged to project into the spaces between the arms of the packing device, as set forth.

18. The combination, with the packing device composed of a rotary shaft or hub and a series of rows of tangential arms thereon separated by letter-receiving pockets, of the band or apron supported by loose rolls in position to receive the letters from the packing device, the letter-supporting bracket on said band, and the guiding-walls at opposite edges of said band, as set forth.

19. The combination of the rotary printing members, a movable slide or carriage supporting the shaft of one of said members, mechanism which operates to reciprocate said slide upon the entrance of a letter between the printing members, whereby said members are caused to co-operate in printing and ejecting a letter, a rotary packing device composed of a hub or shaft and arms projecting therefrom, the spaces between said arms constituting pockets adapted to receive the letters or pieces ejected by the printing members, and connections between said packing device and the slide or carriage whereby each movement of said carriage in one direction is caused to partly rotate the packing device, as set forth.

20. The combination of the rotary printing members, a movable slide or carriage supporting the shaft of one of said members, mechanism which operates to reciprocate said slide upon the entrance of a letter between the printing members, whereby said members are caused to co-operate in printing and ejecting a letter, a rotary packing device composed of a hub or shaft and arms projecting therefrom, a ratchet affixed to said hub or shaft, a lever pivoted to a fixed support and having at its swinging end a pawl engaging said ratchet, and a connection between said lever and the slide or carriage whereby the lever and its pawl are oscillated by the movements of the carriage, the pawl being thereby caused to rotate the ratchet step by step, as set forth.

21. The combination, with a rotary printing member mounted in movable bearings whereby said member is moved laterally, of

another rotary member mounted in fixed bearings, one or both of said members being eccentric in form to compensate for said lateral movement, as set forth.

22. The combination, with the rotary printing-form, the rotary impression-bed, a carrier therefor, and means for moving the said carrier and bed toward and from the printing-form, of an inking-roll normally in position to ink said form, and connections between the inking-roll and the carrier of the impression-bed whereby said roll is displaced and prevented from inking the form when the impression-bed is retracted from the printing-form, as set forth.

23. The combination of the two parallel shafts having the printing members, a movable slide or carriage supporting one of said shafts, the other shaft being power-driven and journaled in fixed bearings, a system of gearing including gears affixed to said shafts and suitable intermediate gears whereby rotary movement may be continuously imparted from the power-driven shaft to the movable shaft, a connecting-rod engaged at one end with an eccentric on the power-driven shaft and having a slot adapted to play loosely on the movable shaft, a plug adapted to be inserted in said slot to operatively engage the connecting-rod with the movable shaft, and mechanism operated by the entrance of a letter between the printing members to insert the plug in the slot in the connecting-rod, as set forth.

24. The combination, with the rotary packing device, of the pack-receiving belt or apron having a pack-supporting bracket, the rolls or drums supporting said apron, and means for pressing said bracket yieldingly toward the packing device, as set forth.

25. The combination, with the rotary packing device, of the pack-receiving belt or apron having a pack-supporting bracket, the rolls or drums supporting said apron, and a weight and cord arranged to pull the bracket toward the packing device, as set forth.

26. The combination, with the rotary packing device, of the pack-receiving belt or apron having an upwardly-projecting bracket, the rolls or drums supporting said apron, and an arm projecting downwardly from the belt between said rolls, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 2d day of October, A. D. 1890.

CHARLES BICKFORD.

Witnesses:

C. F. BROWN,

A. D. HARRISON.