7 Sheets--Sheet 1.

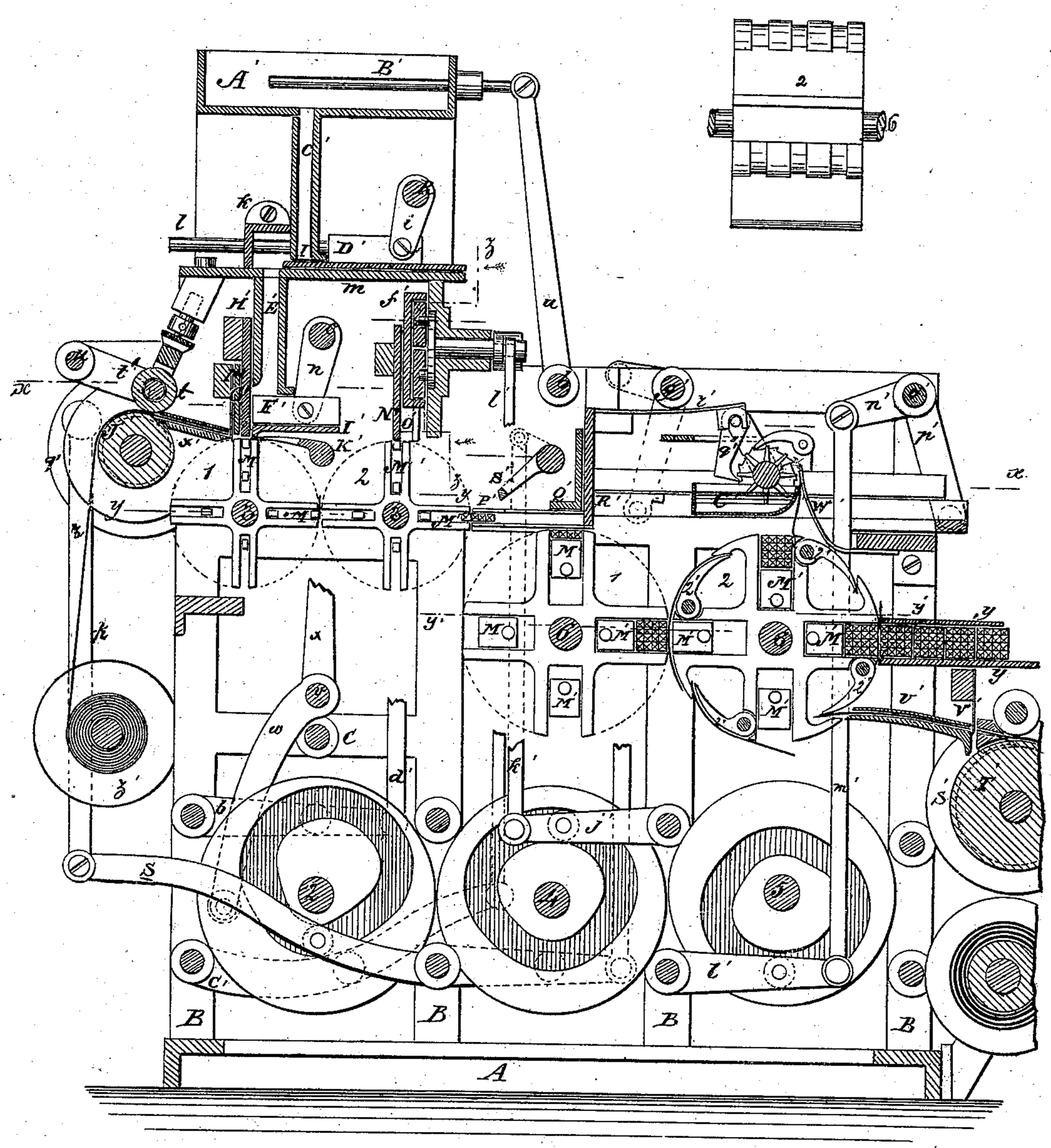
A. EWING.

Machines for Manufacturing and Bundling Cigarettes.

No. 150,549. Patented May 5, 1874.

Fig. 1.

Fig. 1ª



WITNESSES.

Chas. Nida
Belgnick

INVENTOR.

A. Ewing

BY Munn & Co

ATTORNEYS.

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A. EWING.

Machines for Manufacturing and Bundling Cigarettes.

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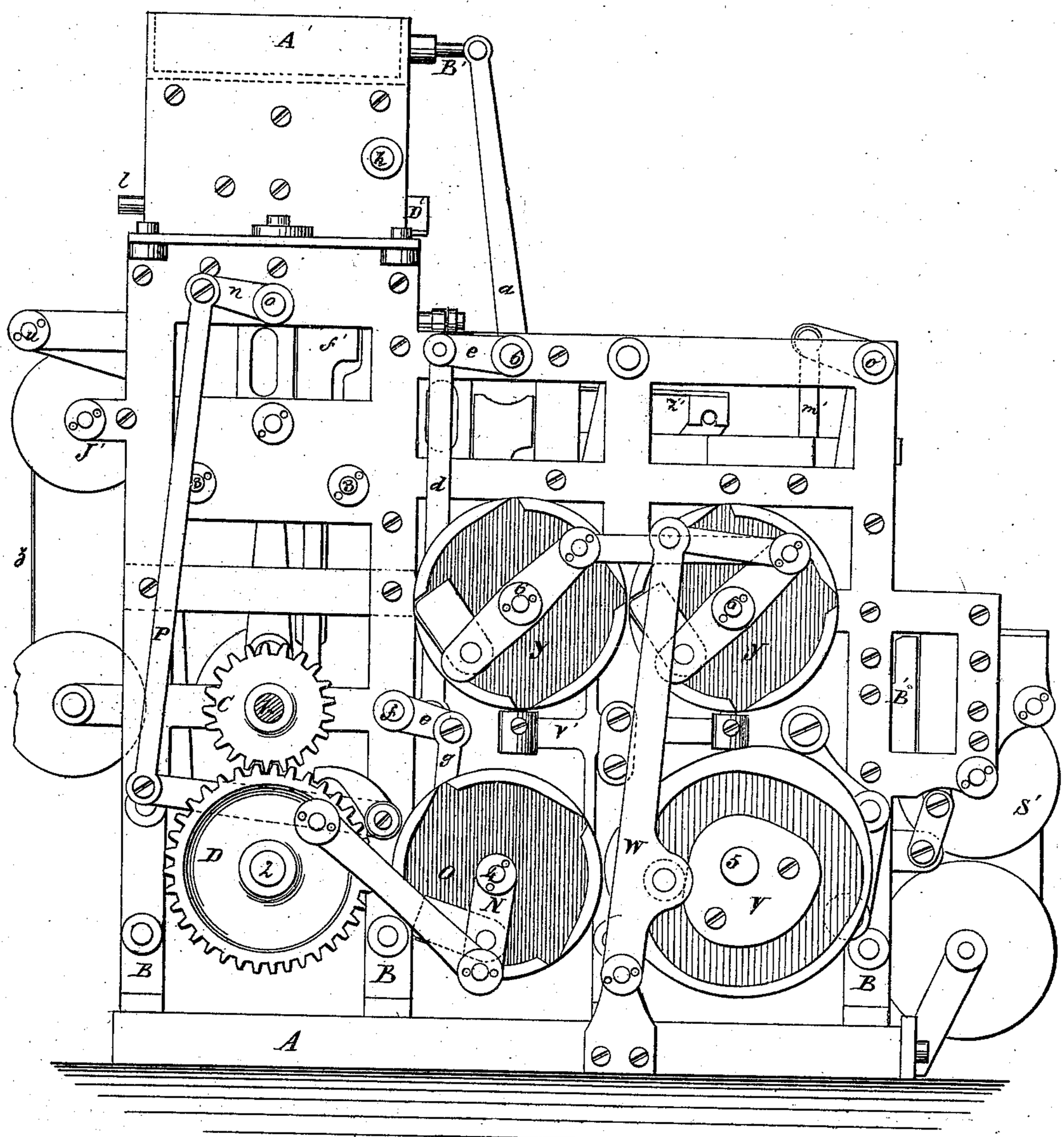
Fig. 2.



WITNESSES.

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ATTORNEYS.

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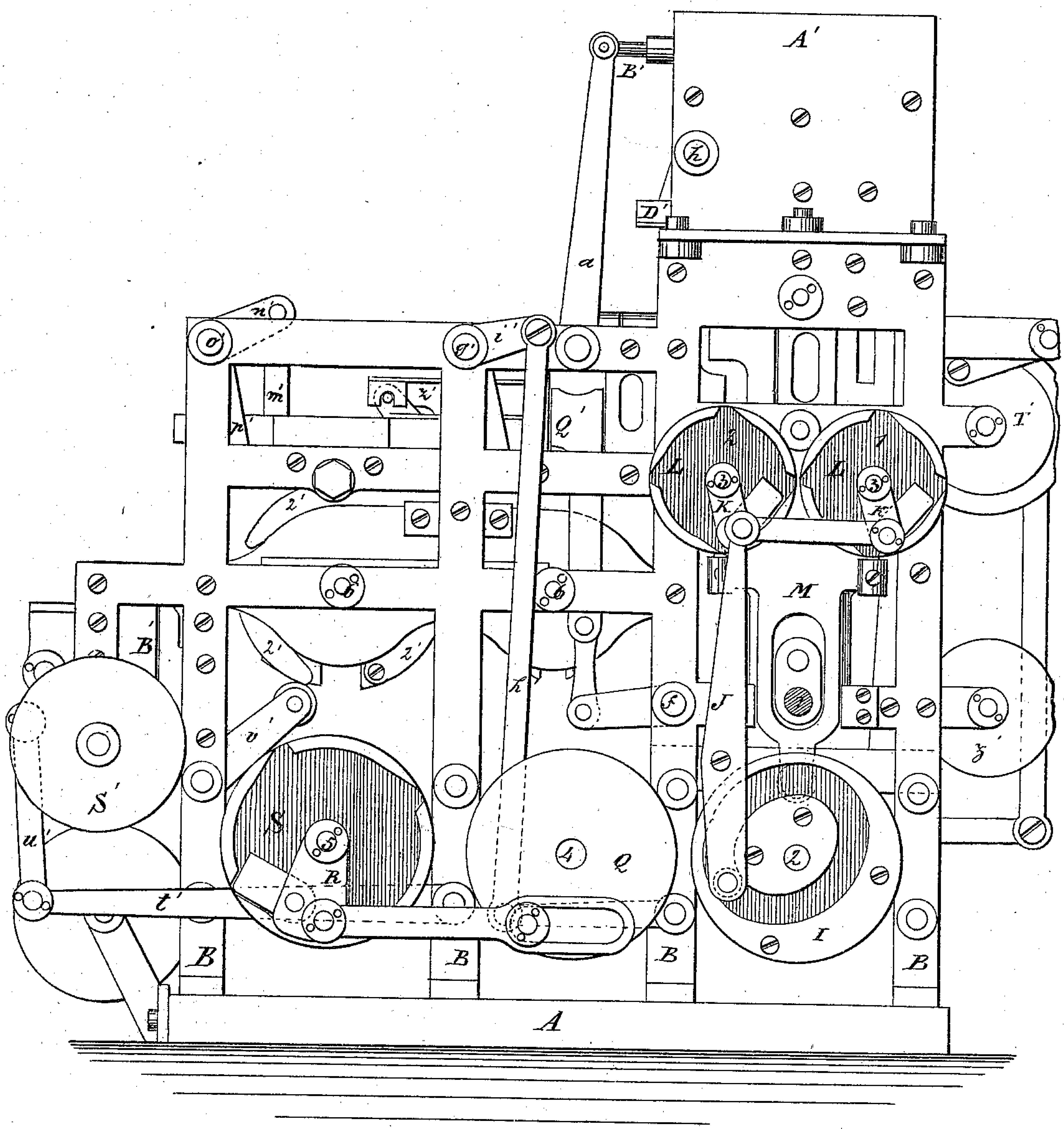
Machines for Manufacturing and Bundling Cigarettes.

No. 150,549. Patented May 5, 1874.

Fig: 3.



WITNESSES.

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A. EWING.

Machines for Manufacturing and Bundling Cigarettes.

No. 150,549. Patented May 5, 1874.

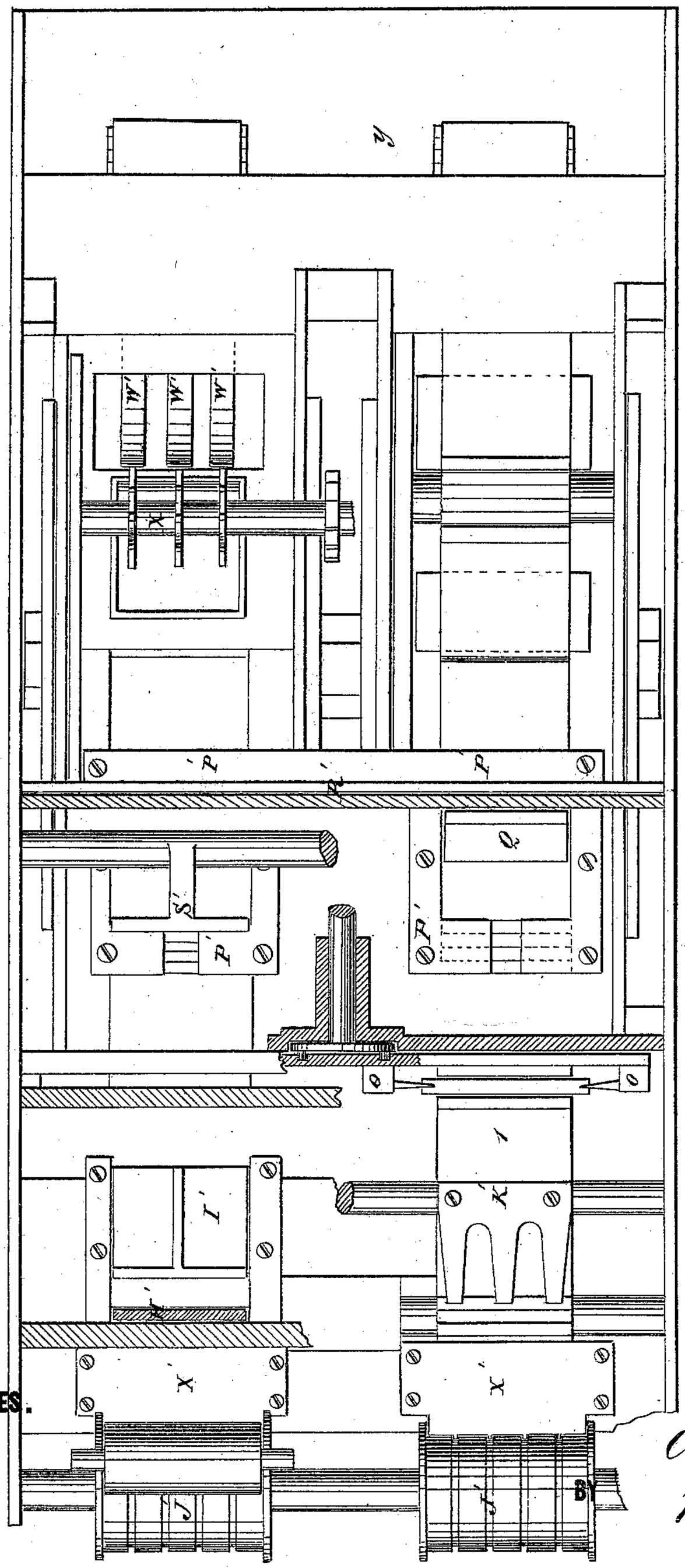

Fig. 4.

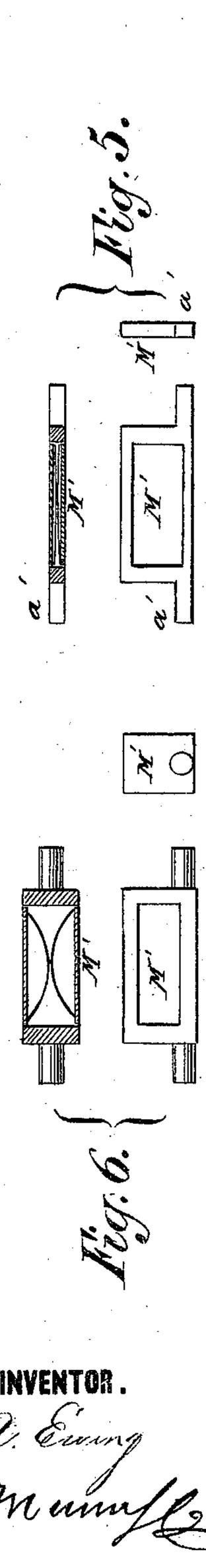

Fig. 5.

Fig. 6.

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ATTORNEYS.

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A. EWING.

Machines for Manufacturing and Bundling Cigarettes.

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Fig: 7.

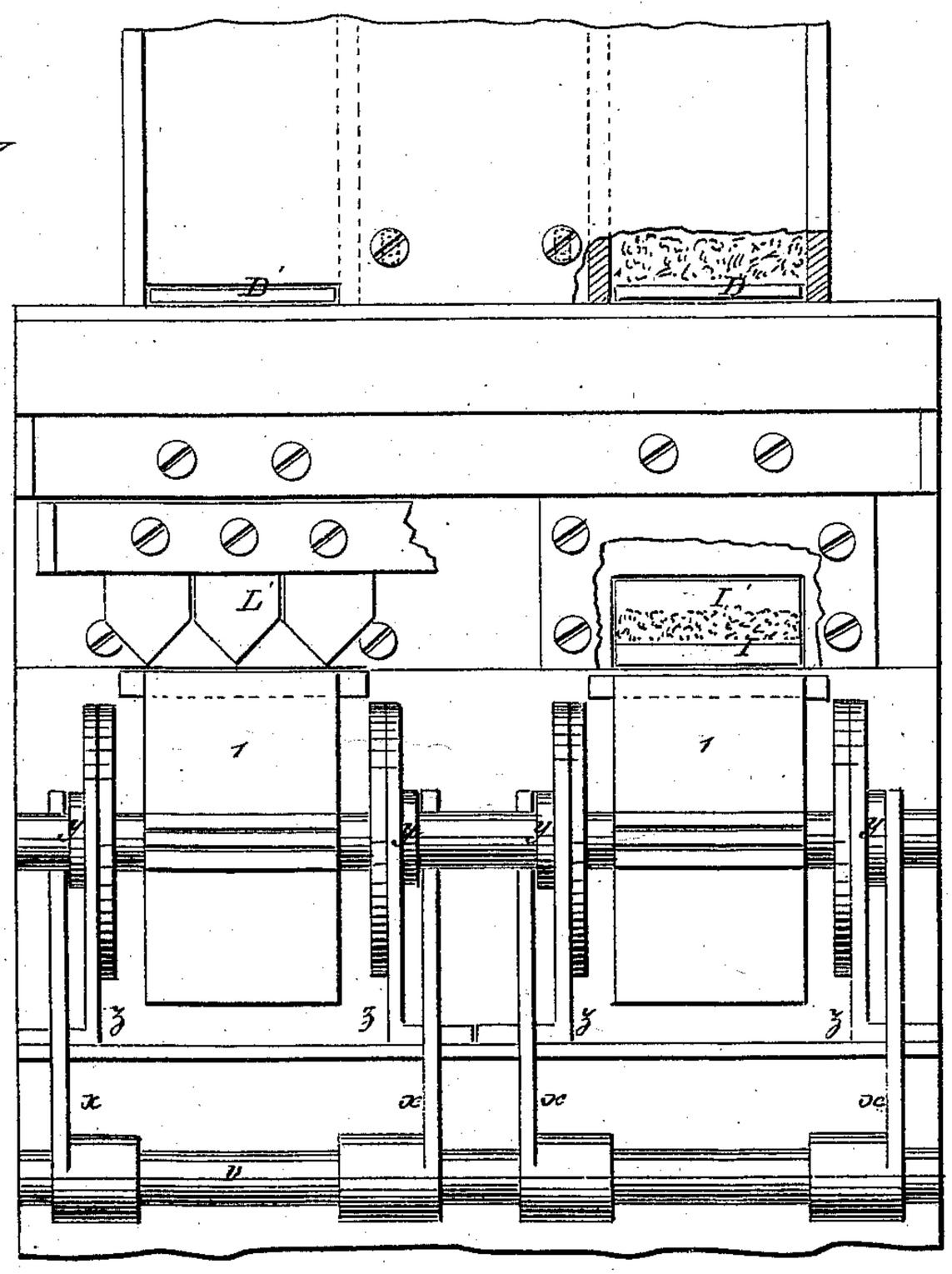

Fig: 8.

Fig: 9.

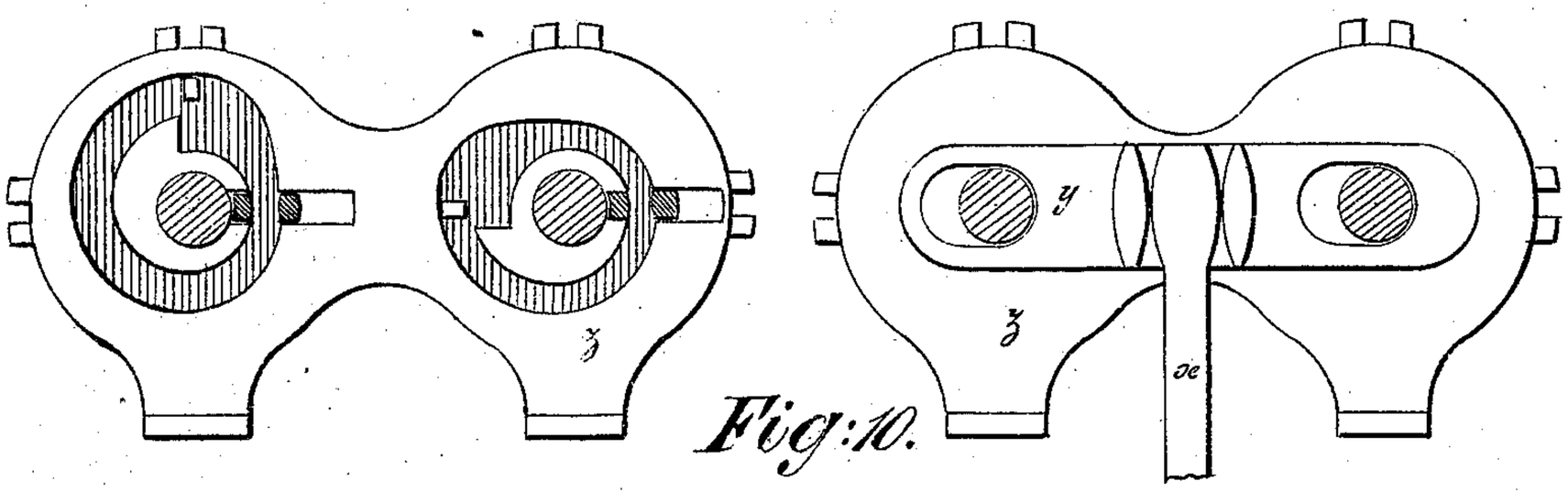

Fig: 10.

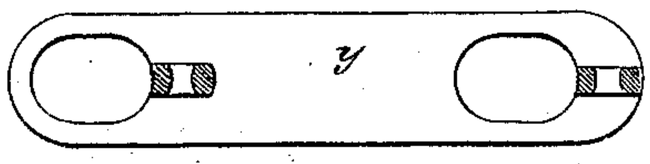

Fig: 11.

WITNESSES:

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A. EWING.

Machines for Manufacturing and Bundling Cigarettes.

No. 150,549. Patented May 5, 1874.

Fig: 12.

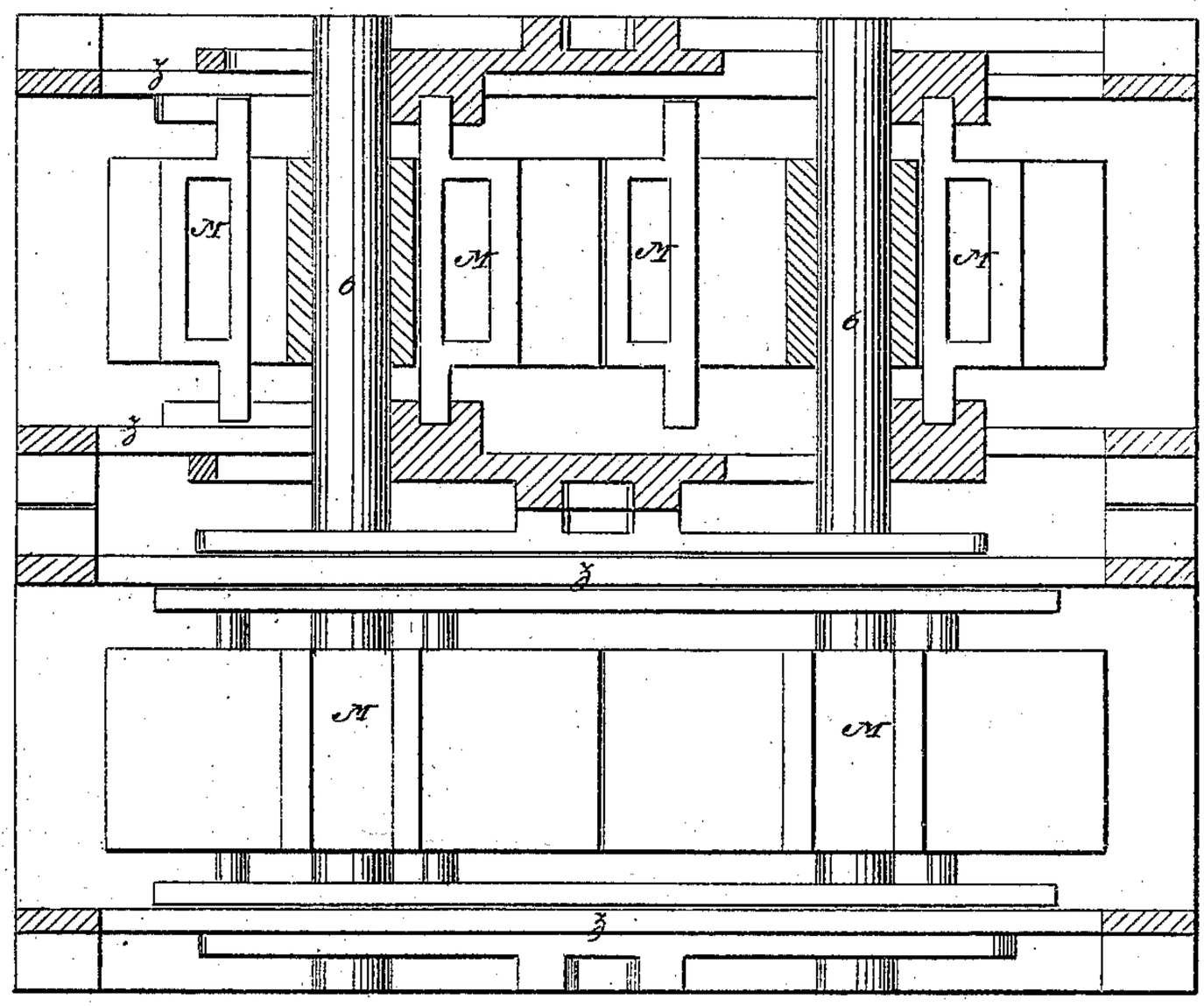


Fig: 13.

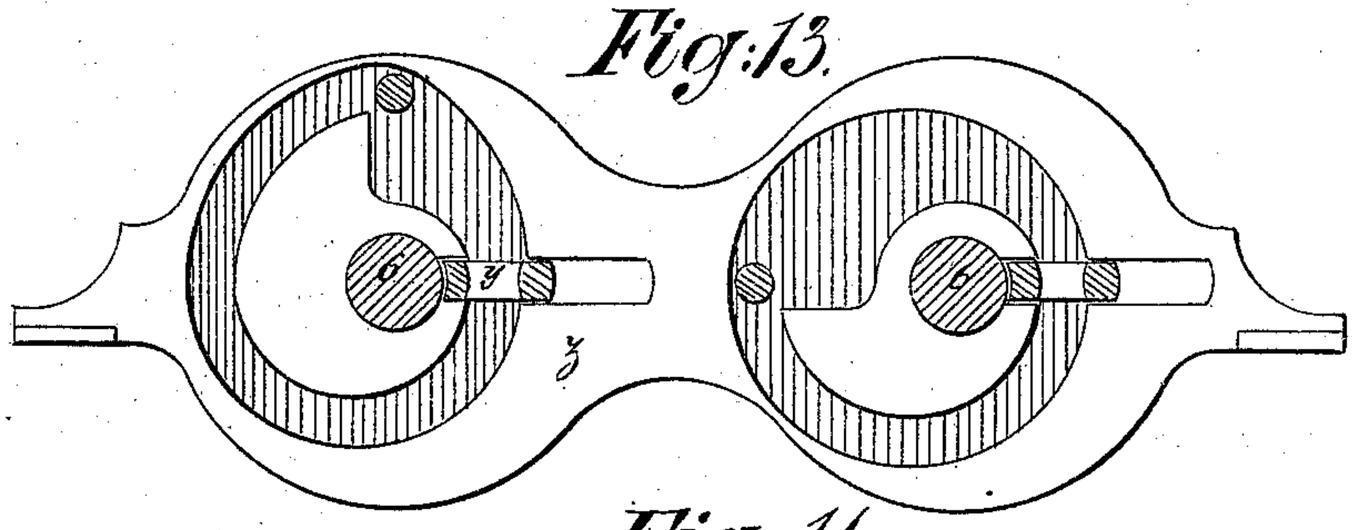


Fig: 14.

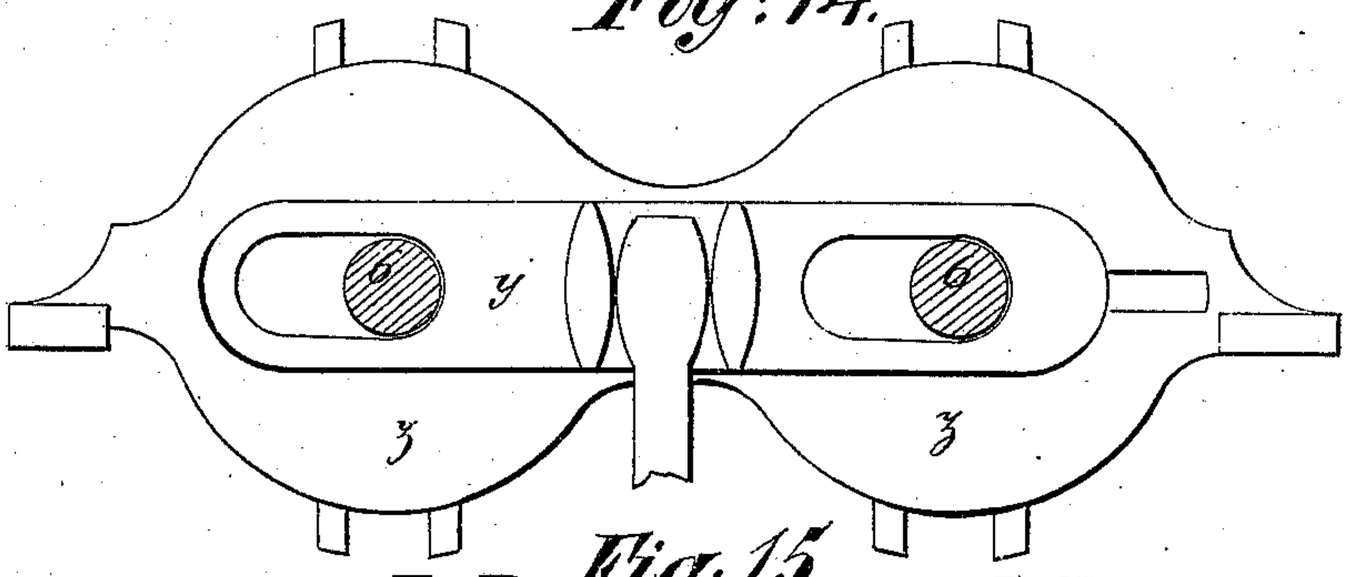


Fig: 15.

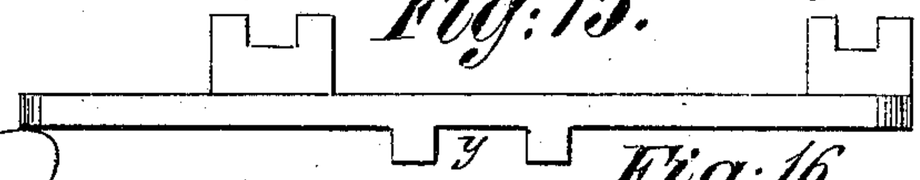
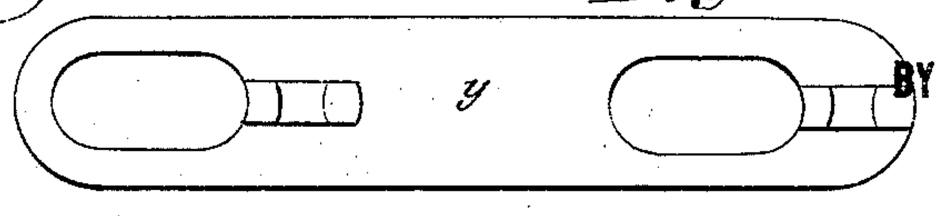


Fig: 16.



WITNESSES:

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Munn & Co

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7 Sheets--Sheet 7.

A. EWING.

Machines for Manufacturing and Bundling Cigarettes.

No. 150,549. Patented May 5, 1874.

Fig: 17.

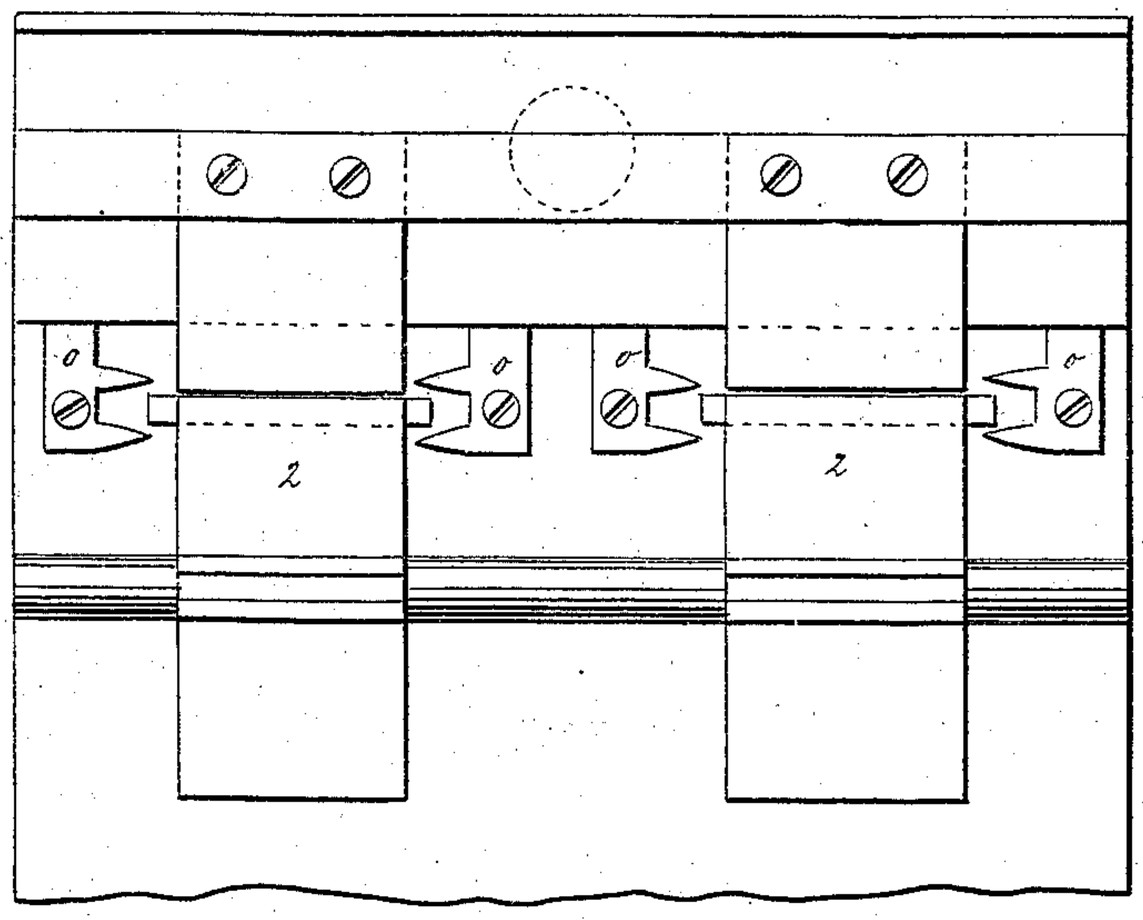


Fig: 18.

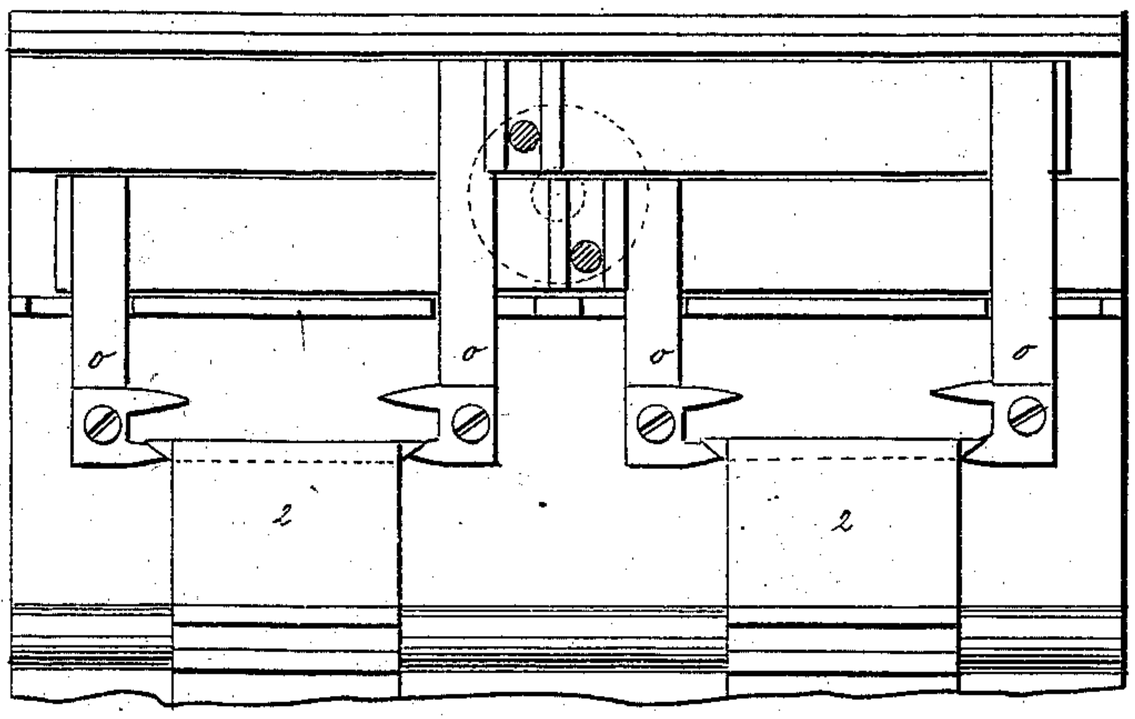
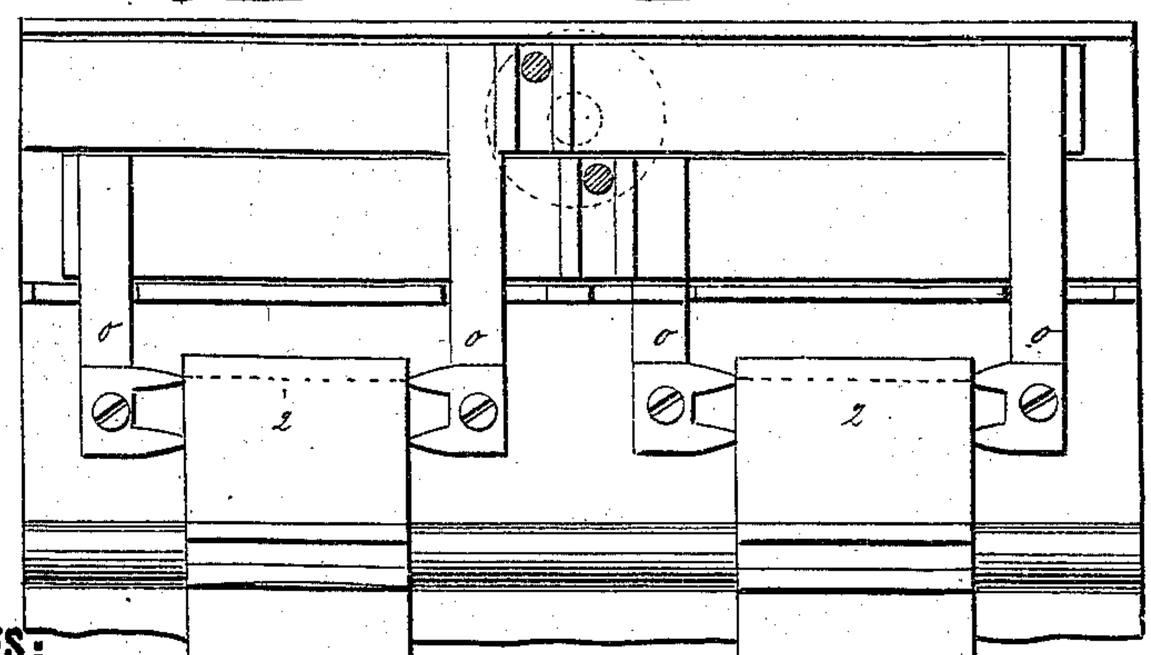


Fig: 19.



WITNESSES:

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Edgueto

INVENTOR:

A Ewing

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALEXANDER EWING, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND JAMES EWING, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MANUFACTURING AND BUNDLING CIGARETTES.

Specification forming part of Letters Patent No. **150,549**, dated May 5, 1874; application filed January 31, 1874.

To all whom it may concern:

Be it known that I, ALEXANDER EWING, of the city, county, and State of New York, have invented a new and useful Improvement in Machines for Manufacturing Cigarettes, of which the following is a specification:

My invention relates to an improved machine for forming cigarettes, and collecting and binding the same into packages of suitable size for transportation, handling, &c. The features of novelty are indicated in the claims.

Figure 1 is a vertical section of the machine, in which the cigarette is traced through all the different stages from the time the tobacco enters the machine until they are completed, gathered into bunches, and delivered. Fig. 1ª is a detail plan view of the second bundling-wheel, showing the peripheral grooves, which accommodate the paste-strips on the paper wrapper. Fig. 2 is an elevation of one side of the machine. Fig. 3 is an elevation of the opposite side of the machine. Fig. 4 is a horizontal irregular section on the line *x x* of Fig. 1. Figs. 5 and 6 are details of the dischargers of the machine. Fig. 7 is a view of the lances for cutting the paper, showing parts of Fig. 1, the hopper discharger-arms. Figs. 8 and 9 are detail views, showing the vertical and horizontal motions of the cams. Figs. 10 and 11 are details of the same. Fig. 12 is a horizontal section on the line *y y* and *y' y'* of Fig. 11, the former showing the forming-wheels, and the latter the bundling-wheels. Figs. 13 and 14 are details of Fig. 12, and Figs. 15 and 16 represent different views of the parts of Figs. 13 and 14. Figs. 17, 18, and 19 represent the mechanism for closing the ends of the cigarette, showing three positions.

Similar letters of reference indicate corresponding parts.

The entire operation of forming and completing cigarettes is seen in Fig. 1. It is traced from the time that the tobacco leaves the hopper, receives the wrapper as it is transferred to the second forming-wheel, and then to the carrier, where the single cigarette is completed, four of them being carried to the first bundling-wheel, and from the first bundling-wheel, where they have been gathered in bundles, to the second bundling-wheel, where wrapper is applied to the bundle, the edge of the paper pasted, and the bundle completed and delivered, ready for sale, at the opposite side of the machine from where the operation commenced. This cursory view will give something of an idea of how the operation is performed. The particular mechanism by which the various motions are produced will now be more particularly described, it being understood that this is a double machine, the operating parts being duplicated.

This machine is supported on the bed A, to which the two skeleton side frames B B are firmly attached. C is the driving-pinion on the shaft 1, to which the power is applied. This pinion C gives motion to the cog-wheel D, which is fast on the end of the main shaft 2. On this shaft 2 are five double cam-wheels, E, F, G, H, and I, (all but the latter unseen,) the latter being on the opposite end of the shaft, 2, to that of the cog-wheel D. From the outside of the cam-wheel I the lever J obtains its motion, the top end of which, by suitable connecting-links, takes hold of pins fixed in the ends of the vibrating pawl-arms K K, which work loosely on the ends of the shafts 3 3. These pawl-arms, as they are advanced, engage with the two pawl-wheels L L, which are fixed on the ends of the shafts 3 3, causing them to make a quarter of a revolution for a whole revolution of the main shaft 2. From the back side of the double cam-wheel I the vertical anchor M is made to act. This anchor M has two arms, at the ends of each of which there is a taper point, (not shown,) corresponding to four notches that are in the rear circumference or periphery of each of the pawl-wheels L L, which they enter the moment that the pawl-wheels, as they rotate, are brought into position. The cog-wheel D has a wrist-pin fixed eccentrically on its outside face, from which a suitable connecting-bar takes hold of a pin fixed in the end of a vibrating pawl-arm, N, (see Fig. 2,) which works loose on the end of shaft 4. As the pawl upon the pawl-arm is operated, it engages with the pawl-wheel O, which is fast on the shaft 4, causing it to advance a quarter of a revolution to one entire revolution of the cog-wheel D. The shaft 4

has also fixed on it two double cam-wheels, P and Q, (P not seen,) the latter being fast on the opposite end to that of the cam-wheel O. On the outside face of Q a pin is fixed, around which a slotted connecting-rod works, giving motion to the vibrating pawl-arm R, which, in turn, gives motion to the pawl-wheel S, which wheel is fixed on the end of shaft 5, causing it to make a quarter of a turn to one revolution of the shaft 4. (See Fig. 3.) On the shaft 5 there are also fixed three double cam-wheels, T, U, and V, the two former not being seen, the latter being fast on the end opposite that of the pawl-wheel S. From a cam on the outside of wheel V the lever W obtains motion, and, by suitable links, communicates motion to two vibrating pawl-arms, which, in turn, engage and carry with them the two pawl-wheels *y y*, which are fast on the ends of the shafts 6 6, causing them to make a quarter-turn to one revolution of shaft 5. (See Fig. 2.) From the back side of cam-wheel V the vertical anchor V′ receives motion, having at the end of each arm a tapering point, corresponding to four notches in the rear periphery of each of the two pawl-wheels *y y*, thus securing them intermittently in four different positions. This completes the description of the proportional velocities of the principal shafts, and from which it will be seen that for every sixteen revolutions of the cog-wheel D, with its shaft 2, the pawl-wheels *y y*, with the shafts 6 6, will have made one-quarter of a revolution.

I will now proceed to describe the operation more in detail.

The tobacco, being properly prepared, (or cut fine,) is placed in the hopper A′, (see Fig. 1,) where the agitator B insures a constant and uniform flow into the channel C′ without sifting or separation of the fine particles from the coarser, since the ends of the rods composing the agitator have no tendency to disturb the tobacco, except at their points immediately over the mouth of the channel. At the bottom of said channel a sufficient quantity for a cigarette is taken by the horizontally-operating separator D′, causing it to enter the second channel E′, at the bottom of which it rests upon the plate I′, where it meets with the collector F′, which takes it over and into an oblong opening in the plate I′, and at the same time against the vertical plate G′ immediately under the filler or plunger H′. Previous to the last-mentioned operation, the forming-wheel 1, which works directly under and close up to the horizontal plate I′, has advanced forward one-quarter of a revolution at the same time the feed-roller J′ has, by a revolution, caused a sufficient quantity of wrapping-paper to advance through the mouth-piece X′, with and over the forming-wheel 1, and immediately under the plate I′. The forming-wheel is then anchored in position, as seen in Fig. 1, having one of its four openings exactly coinciding with that of the oblong opening in plate I′. The pincher K′ now descends upon the front edge of the wrapping-paper, holding it down upon the periphery of the forming-wheel 1. At the same instant the lance-knife I″ descends, cutting off a sufficient quantity of paper for the wrapper of the cigarette. The pincher K′ is now about to be raised, when the filler H′ (previously mentioned) descends, bringing tobacco before it through the opening in the plate I′, and, here meeting with the wrapping-paper, both it and the tobacco are compelled to enter the opening in the forming-wheel 1, where it is now lodged securely, the tobacco being enveloped on three sides by the wrapping-paper, part of which still remains unfolded above the top of the forming-wheel. The wheel is now liberated and advances another quarter of a revolution, taking with it the unfinished cigarette, (to a horizontal position,) when the wheel is again anchored, as before described, with one of its four openings directly opposite to one of the openings of the second forming-wheel 2. By this operation the wrapping-paper has been folded over the fourth side of the cigarette. The discharger M′ now advances, transferring the partly-finished cigarette to the opening of the second forming-wheel 2. By this operation one edge of the wrapper has been obliged to take another fold. The discharger M′ now withdraws the second forming-wheel 2, taking with it the still unfinished cigarette to the top or vertical position and immediately under the holder N′, by which means the last folding of the paper has been accomplished. The moment that the forming-wheel 2 has been brought to position, the holder N′ descends upon the cigarette in the opening of the wheel, and there holds it secure while the two ends are being closed. The closing of the ends is accomplished by the double fingers *o′ o′*, which stand in mid-position and directly in line with the center of the cigarette during the time that the forming-wheel 2 is changing its position. These double fingers *o′ o′* are plainly represented in Figs. 17, 18, and 19. The instant that the holder N′ descends upon the cigarette the lower finger *o′* (one on each end of cigarette) rises, coming in contact with the lower side of the wrapping-paper near to its end, and takes it upward and inward, thus shutting one-half of each end. The lower fingers *o* now withdraw and descend, and the upper fingers come down upon the top side of the paper near to its ends. The cigarette is now finished, and the fingers assume their mid-position, ready to allow the unclosed ends of the next cigarette to pass between them. The forming-wheel 2 now advances another quarter of a revolution, taking with it the finished cigarette, to a horizontal position, where it is about to be discharged, by means of the discharger M′, from the second forming-wheel 2 to the horizontal carrier P′, (distinctly seen in Fig. 4,) between two plates of the carrier, the space between which is so arranged as to admit of the cigarette passing easily between them. The openings in the carrier P′ co-

incide exactly with the openings in the forming-wheel 2, and the carrier remains stationary and close up to the wheel until it has received its fourth cigarette, when it immediately withdraws, taking the four cigarettes in a row between the plates directly over one of the openings of the first bundling-wheel 1, and under the vertical packer Q′, and at the same time against the stationary plate R′, the face of which coincides with the opening of the first bundling-wheel. As the carrier withdraws from the forming-wheel 2 with its four cigarettes, the cross-bar S′ is so arranged that it descends, and at the same time follows up close behind the carrier, the position of the cross-bar coinciding with the opening between the plates, which the carrier through the bar freely passes, so that the instant that the carrier P′ arrives over the opening of the first bundling-wheel 1, the cross-bar S′ behind the cigarette is made to slightly press them against the stationary plate R′. The carrier is now relieved, and returns to the forming-wheel 2 in time to receive the next finished cigarette, leaving the four cigarettes suspended by means of the cross-bar S′ against the stationary plate R and under the packer Q′, which at this time descends, taking with it the first row of four cigarettes into the opening of the first bundling-wheel 1. The cross-bar, being now at liberty, immediately returns, taking its former position over the carrier P′, and there awaits its withdrawal, and thus the operation is continued until the carrier has made its fourth passage, the cross-bar its fourth advance, and the packer its fourth ascent, at which time there will be found four rows of four cigarettes each (in all sixteen) packed into the opening of the first bundling-wheel, but without a bundle-wrapper. The wheel now advances a quarter-turn, taking with it, to a horizontal position, the unfinished bundle of cigarettes, and is anchored in position.

Before going further with the operation, it must be understood that the second bundling-wheel 2 has on its periphery four pinchers, marked 2′, which secure the end of the wrapping-paper from the feed-roll T′ and through the mouth-piece U′. The lance-knife V′ now descends, cutting off sufficient paper for the wrapper of a bundle.

This operation takes place on the opposite side of the second bundling-wheel 2 to that where it receives the bundle from the first wheel; consequently, as the wheel revolves it will be seen that each of the pinchers takes with it the quantity of wrapping-paper, which is brought in due time between the two bundling-wheels.

Returning again to the operation, as above mentioned, the discharger M′ now advances, transferring the unfinished bundle from the first bundling-wheel 1, taking before it the wrapping-paper into the opening of the second bundling-wheel, where it is now about to be lodged, having three of its sides enveloped by the wrapping-paper, part of which paper remains unfolded. The wheels are here again relieved and advanced another quarter-turn, the second wheel taking with it the unfinished bundle to a vertical position, bringing the unfolded edge of the paper wrapper against the stationary fingers W′, the object of which is to support the paper that is now about to receive the paste from the pasting-roll X. This roller is advanced, having a series of pasting-fingers, supplied with paste from the trough *i′* to paste the paper. The paste-roll then withdraws to its former position; the wheel again advances a quarter of a revolution, taking with it the still unfinished bundle to a horizontal position, where it is again anchored, with its bundle exactly coinciding with the opening between the two horizontal plates *y y*.

It will be seen now that the paper wrapper has been laid over the fourth side of the bundle, at which time the discharger M′ advances and transfers the bundle from the second wheel into the opening between the horizontal plates *y y*, and thus causing at the same time the pasted and last fold of the wrapping-paper to be laid down. The bundle, now being finished, remains here until the next finished bundle from the bundling-wheel compels it to advance farther on between the plates. These plates are of such a length that the paste has time to dry and adhere by the time the bundle is finally liberated and discharged.

In the former part of this specification I gave a general description of the construction of the machine. In the latter part I traced the operation from the commencement to the close, and in describing the movements of the several parts (to avoid a confusion of ideas) I did not trace those movements (as the parts were mentioned) to their origin. This I now propose to do. The agitator B′ receives its horizontal motion in the hopper from the arm *a*, which is on the rock-shaft *b*, to which is attached the arm *e*, which is connected to the arm *e d* on the rock-shaft *f*, which is actuated by means of the connection *g* by the cam-wheel O. (See Fig. 2.) The separator D′ receives its motion by a connection with one of the five cam-wheels, (not shown,) which actuates the rock-shaft R and arm *i*. *k*, Fig. 1, is a pivoted triangular shutter for excluding dust, which shutter is raised occasionally by the handle *l* to expose the separator D′, which slides on the stationary plate *m*. *n* is an arm on the rock-shaft O, which actuates the collector F′, the arm *n* being connected with a cam on the back of the cog-wheel D by the connecting-rod *p*. (See Fig. 2.) The feed-roller J′ is worked by means of a pawl-wheel, the edge of which is seen at *q*, Fig. 1, the pawl being carried by the rod *r* from the lever *s*, which is vibrated by means of a cam on one of the unseen five cam-wheels before mentioned. *t* is a pressure-roller on

the end of the arm t', which is held by the stationary shaft u. The forming-wheels 1 and 2 are on the two shafts 3 3, to which the pawl-wheels L L are attached. (Seen in Fig. 3.) The pincher K′ is moved by means of a rod, which connects it with one of the five cam-wheels, (unseen.) The dischargers M′ are actuated by means of the rock-shaft v, (see Fig. 7,) which receives motion from one of the five cam-wheels (unseen) by means of the connections w, which has a roller on its end, which works in a cam-groove in the wheel. The shaft v has four arms, x, connected with the sliding plates y, which work on the stationary cam-plates z, between which the discharger M′ works. On the inner sides of the plates z are cams, which guide the lugs a' on the discharger. These lugs a' are seen in Fig. 5. The fingers o, by means of which the ends of the cigarette are closed, are actuated from one of the unseen cam-wheels by means of the levers b' and c', (seen partly in dotted lines,) and connecting-rods d' and e'. The former gives vertical motion to the sliding plate f'. The latter, e', is connected with a crank on a rock-shaft, which actuates the finger o, as before described. (See Fig. 1.) The carrier P′ is worked from the rock-shaft g', connected by means of a rod, h', with arm i', and with a cam on the back of the wheel 2. (See Fig. 3.) The shaft g' has two arms, which extend down and, by suitable connection, take hold of the carrier P′, and give it the horizontal motion described. (See Fig. 1.) The packer Q′ is actuated from shaft f. (Seen in Fig. 3.) The cross-bar S′ (see Figs. 1 and 4) receives its motion from the lever j', connecting-rod k', and the cam-wheel fast on shaft 4.

The operation of the discharger M is the same in all respects for the forming-wheels and the bundling-wheels, performing the same functions in each case.

The pasting-trough C′ carries the pasting-roller X, and the paste is applied by means of arms on the roller. It receives a horizontal motion from cam-wheel of shaft 5, Fig. 1, by means of lever l' and connecting-rod m', attached to arm n' on the rock-shaft O′, the arm p' of this shaft being connected by means of a link directly with the pasting-trough. The horizontal motion of the pasting-trough causes the paste-roller to periodically revolve by means of the pawl q' on a pin in a block on the end of the spring r', the pawl-wheel being fast on the pasting-roller shaft. The fingers W′ spring slightly when the arms of the roller touch the paper.

In Fig. 1ª I have shown that the second bundling-wheel has shallow circumferential grooves, corresponding in position to the arms or notched wheels of the paste-roll, so that, as the paste is applied in strips, or at isolated points, to the edge of the paper wrapper, said paste-strips will coincide with the grooves, and thus not adhere to the wheel.

S′ is a pawl-wheel, from which the feed-roller T′, which carries the bundling-paper, is actuated by a cam on the back of pawl-wheel S by means of lever t' and the connection u'.

In Fig. 3 is seen an arm, v', which acts upon and opens the pinchers 2′, the arm receiving its motion from cam on shaft 5.

The reels Z′, which carry the wrapping-paper and the bundling-paper, may be placed separate from the machine, if desired.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a cigarette-machine, the combination, with the hopper, of the agitators or bars B′, with means for reciprocating the same across the mouth of the discharge-passage, as shown and described, for the purpose specified.

2. The combination, with the stationary vertical discharge tube or channel C′ of the hopper and the second stationary vertical channel, of the horizontally-reciprocated separator, arranged to operate between them to carry the tobacco in definite quantities or charges from the upper to the lower channel, as shown and described.

3. The combination, with the second vertical channel E′, through which the tobacco descends by gravity in definite quantities, of the horizontal gatherer F′, the horizontal apertured plate I′, the vertical plate or abutment G′, the filler H′, and a grooved receptacle, all as shown and described.

4. The combination of first and second forming-wheels, pinchers K′, feed-rolls, guide-tube, cutter I′, and discharge-bars M, as shown and described, whereby the paper is severed, receives its first and second folds, and the cigarette is transferred from one wheel to the other, as set forth.

5. The dischargers M′, having movable sides and springs for pressing said sides outward, and thus holding the dischargers by friction in the groove, except when acted on by the mechanism for imparting a positive movement, as set forth.

6. The combination, with a forming-wheel, dischargers M′, and holder N′, of end folders attached to bars or cross-heads, arranged for simultaneous vertical and horizontal movement, as specified.

7. The combination, with the carrier P′, arranged between the forming and bundling wheels 2 and 1, of a vibrating bar, S′, for transferring the cigarettes and the plate R′, in the manner specified.

8. The combination, with a paste-trough, C′, of notched wheels or cylinders rotating therein, and spring-plates W′ for applying paste to the paper strip at separate points, as specified.

9. The combination, with the bundling-wheel 2, provided with receptacles for the cigarette packages, of the reciprocating trough C′ and paste-applying cylinder, as shown and described.

10. The bundling-wheel 2, provided between its grooved radial arms with the pivoted pinchers 2′, in combination with suitable means for operating said pinchers, as shown and described.

11. The bundling-wheel 2, provided between its grooved arms with pivoted pinchers 2′, the cutter V′, the feed-rolls, and suitable mechanism for operating the pinchers, as shown and described.

12. The receiving-wheel 2, paste-applying device, and passage *y y*, constructed and arranged as specified, whereby the pasting and folding processes are completed and the package delivered from the machine, as shown and described.

13. The combination of the forming and bundling wheels, the wheels of each pair rotating in direct communication with each other, and suitable transferring mechanism arranged intermediately between the pairs of wheels, as shown and described.

14. The second bundling-wheel, provided with grooves corresponding with the points to which paste is applied on the wrapper inclosing the cigarette package, as specified.

ALEX. EWING.

Witnesses:
C. SEDGWICK,
T. B. MOSHER.