

(Model.)

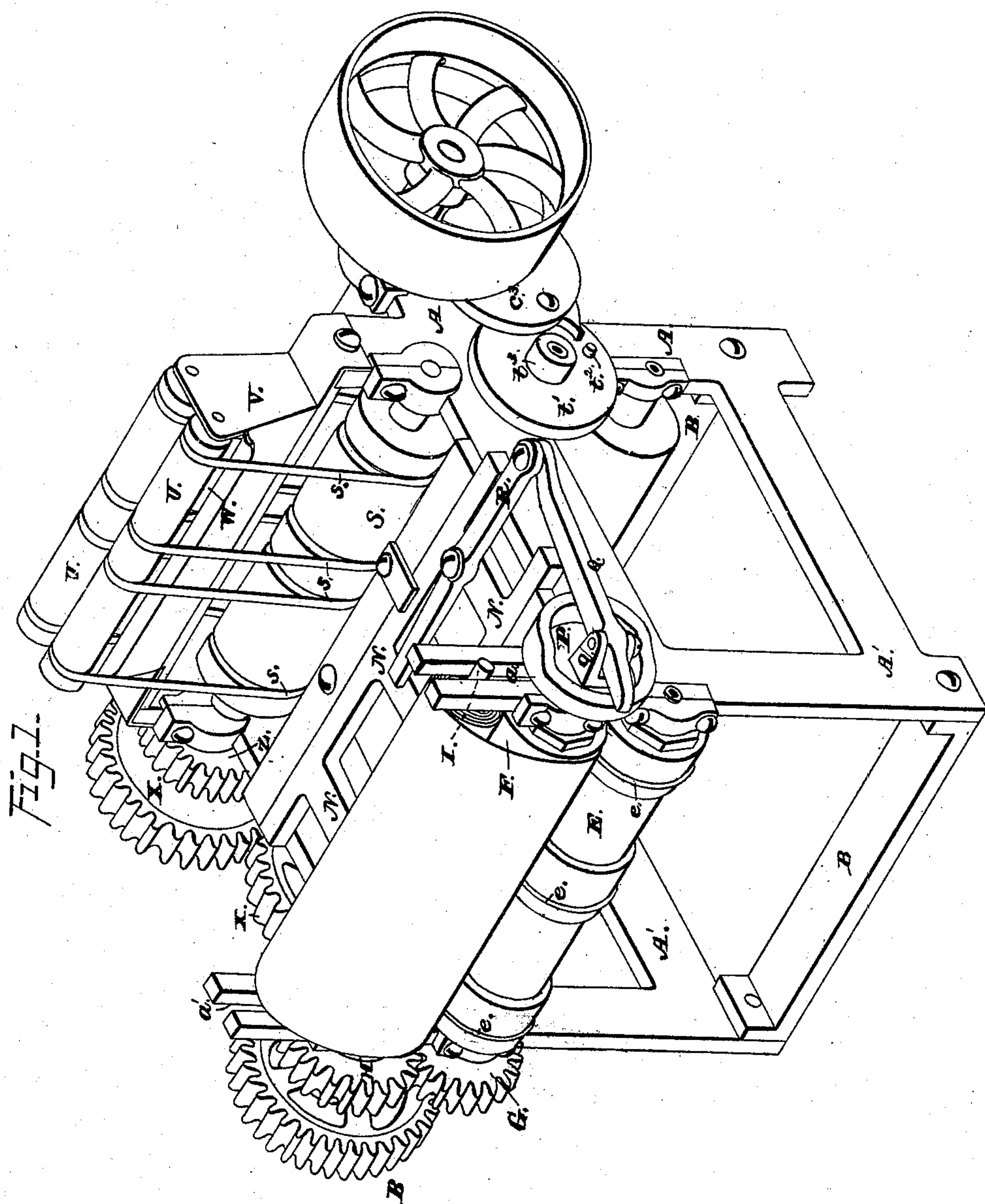
6 Sheets—Sheet 1.

B. F. SAWYER.

BAG MACHINE.

No. 271,922.

Patented Feb. 6, 1883.



WITNESSES=
Jas. E. Hutchinson.
Henry C. Hazard.

INVENTOR-
B. F. Sawyer, by
Geo. S. Prindle, his Atty

(Model.)

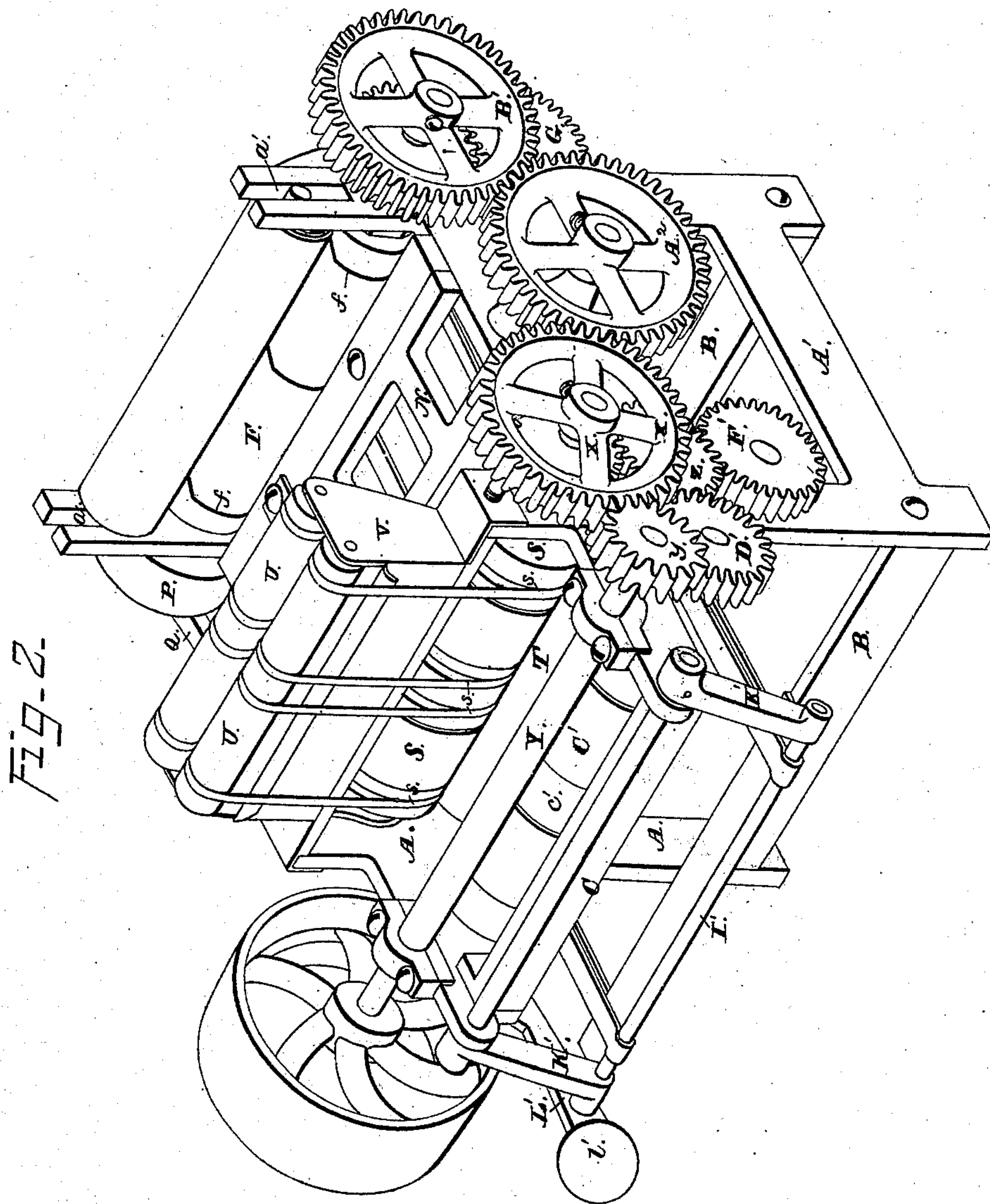
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BAG MACHINE.

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(Model.)

6 Sheets—Sheet 3.

B. F. SAWYER.

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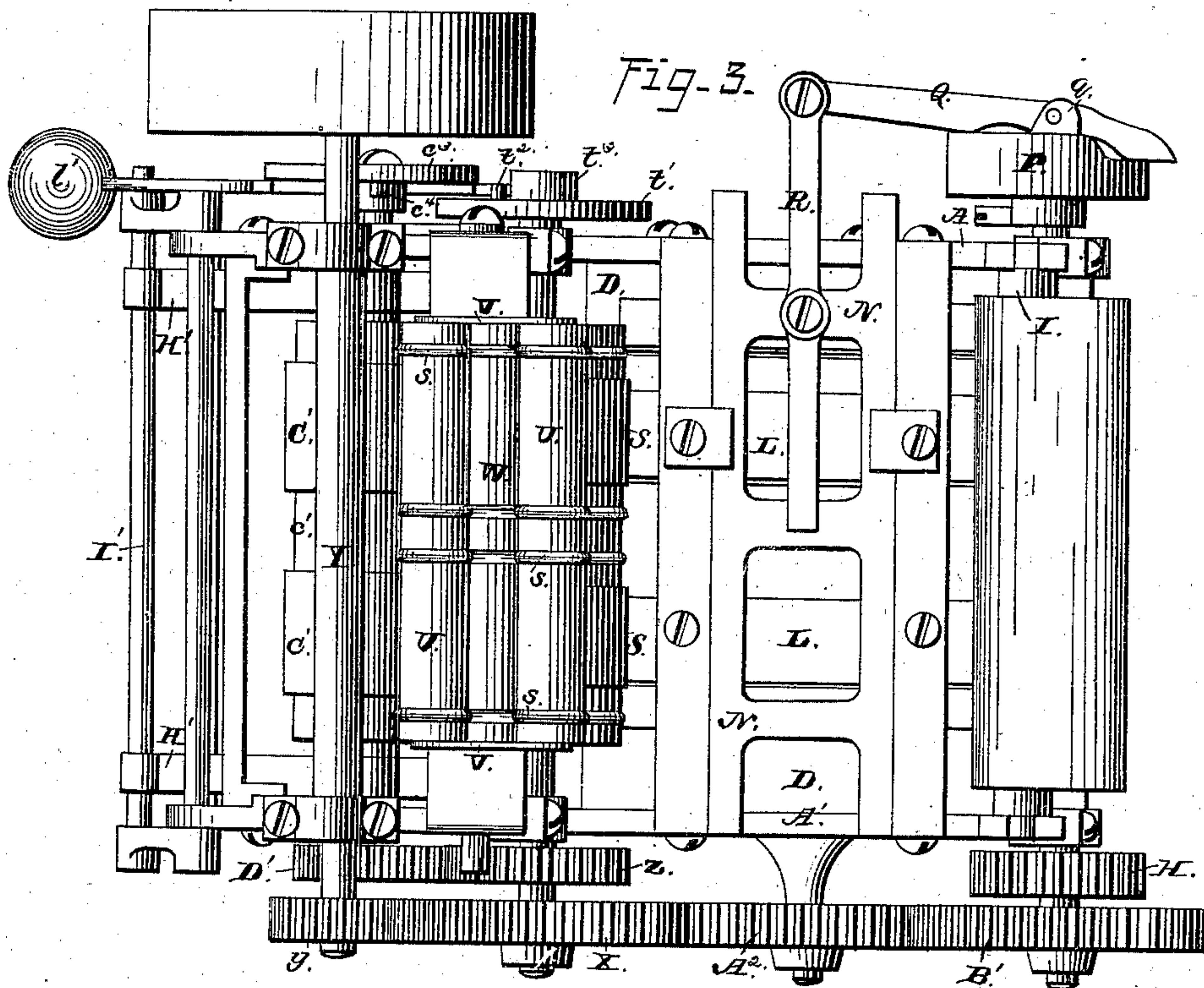
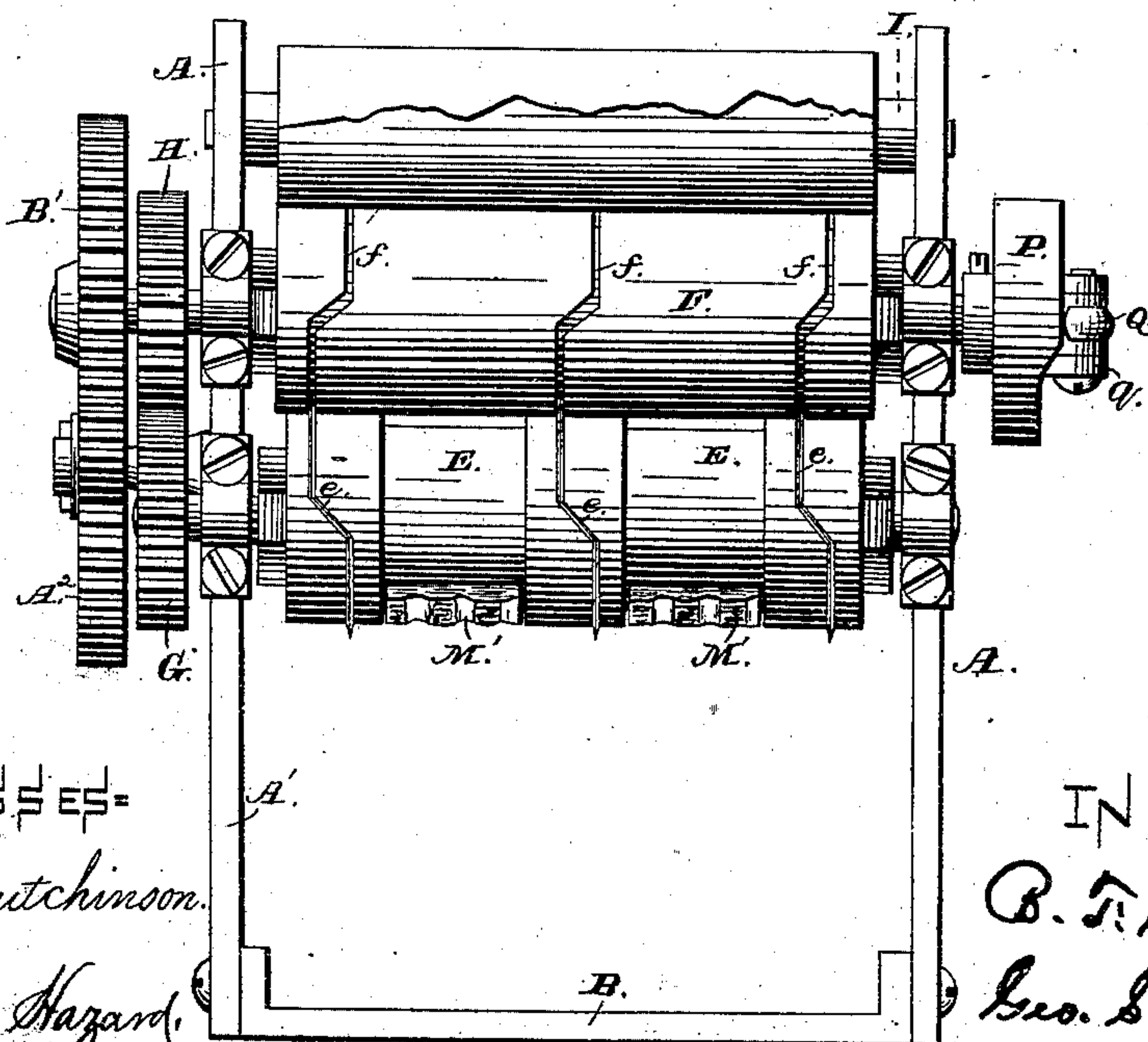


Fig. 4.



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(Model.)

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Fig. 5.

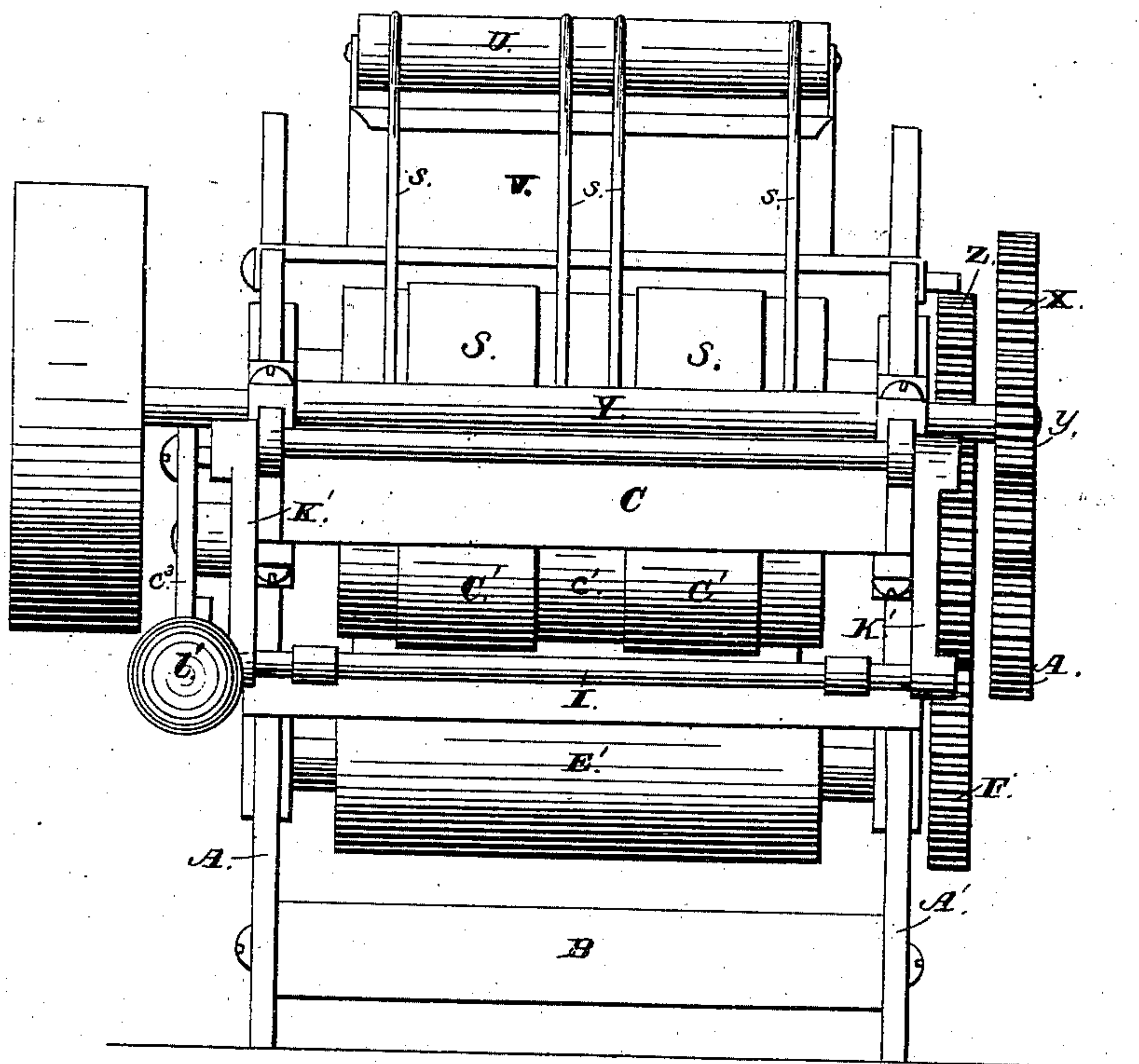
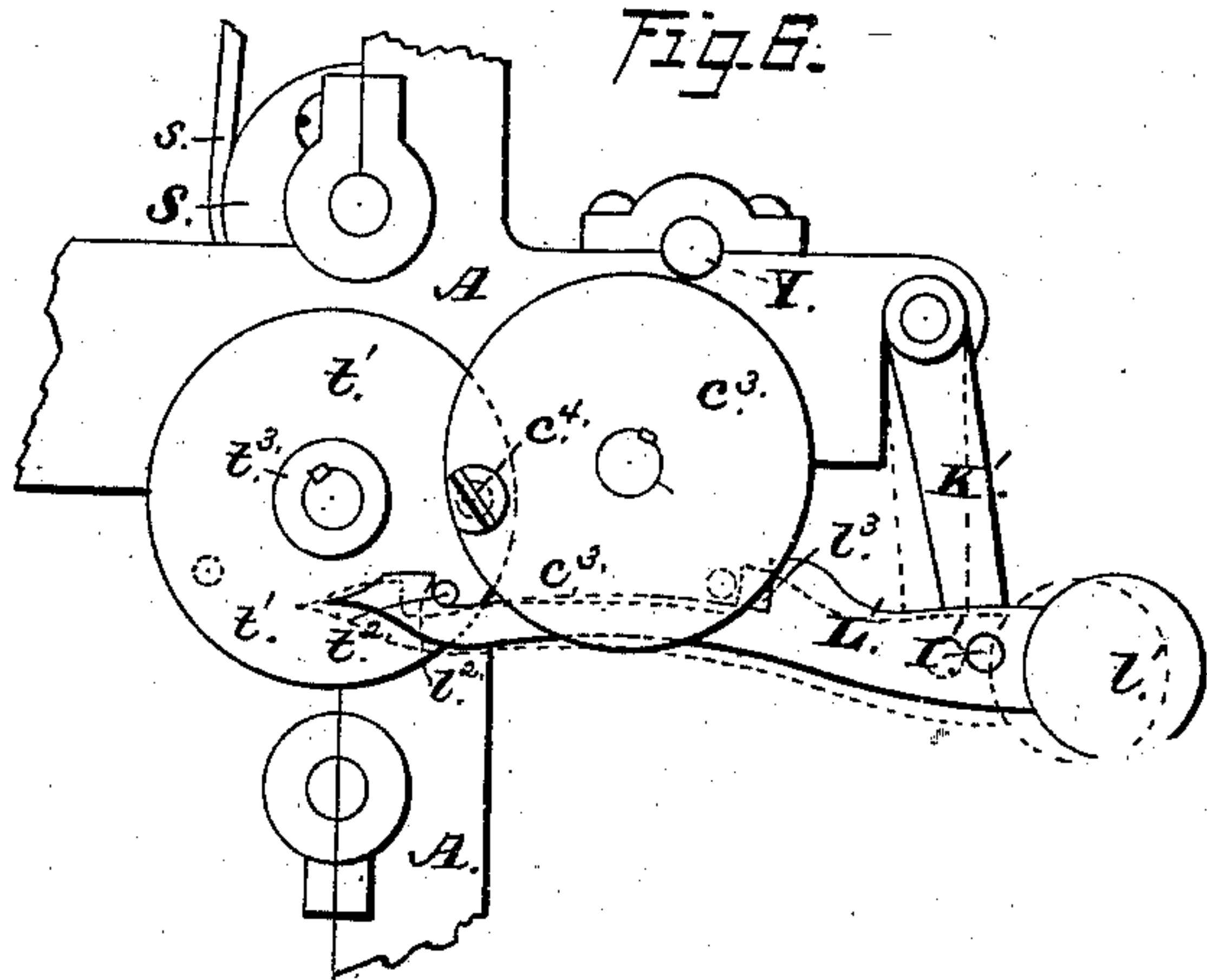


Fig. 6.



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(Model.)

B. F. SAWYER.

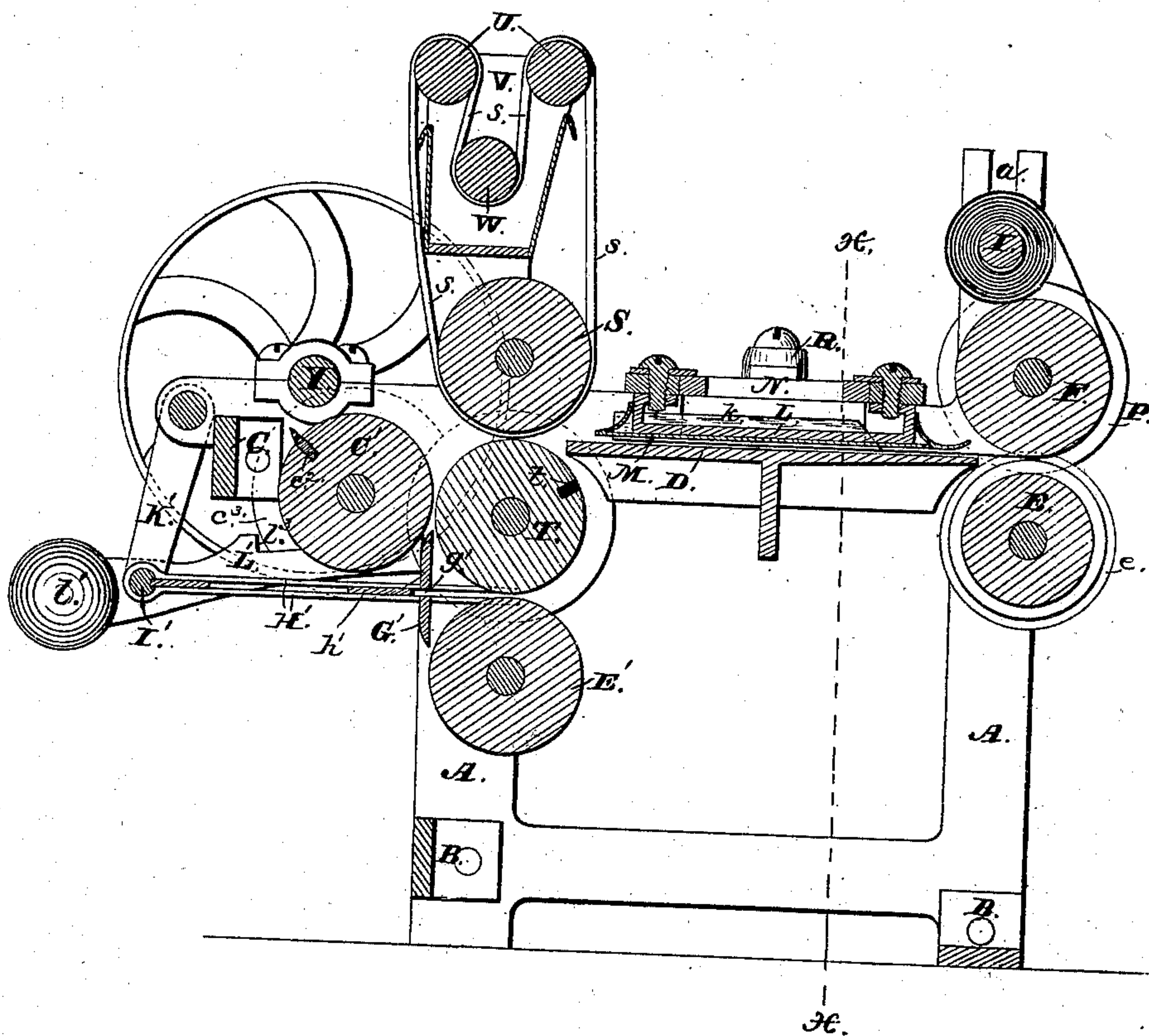
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BAG MACHINE.

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Fig-7-



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(Model.)

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B. F. SAWYER.

BAG MACHINE.

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Fig. 8.

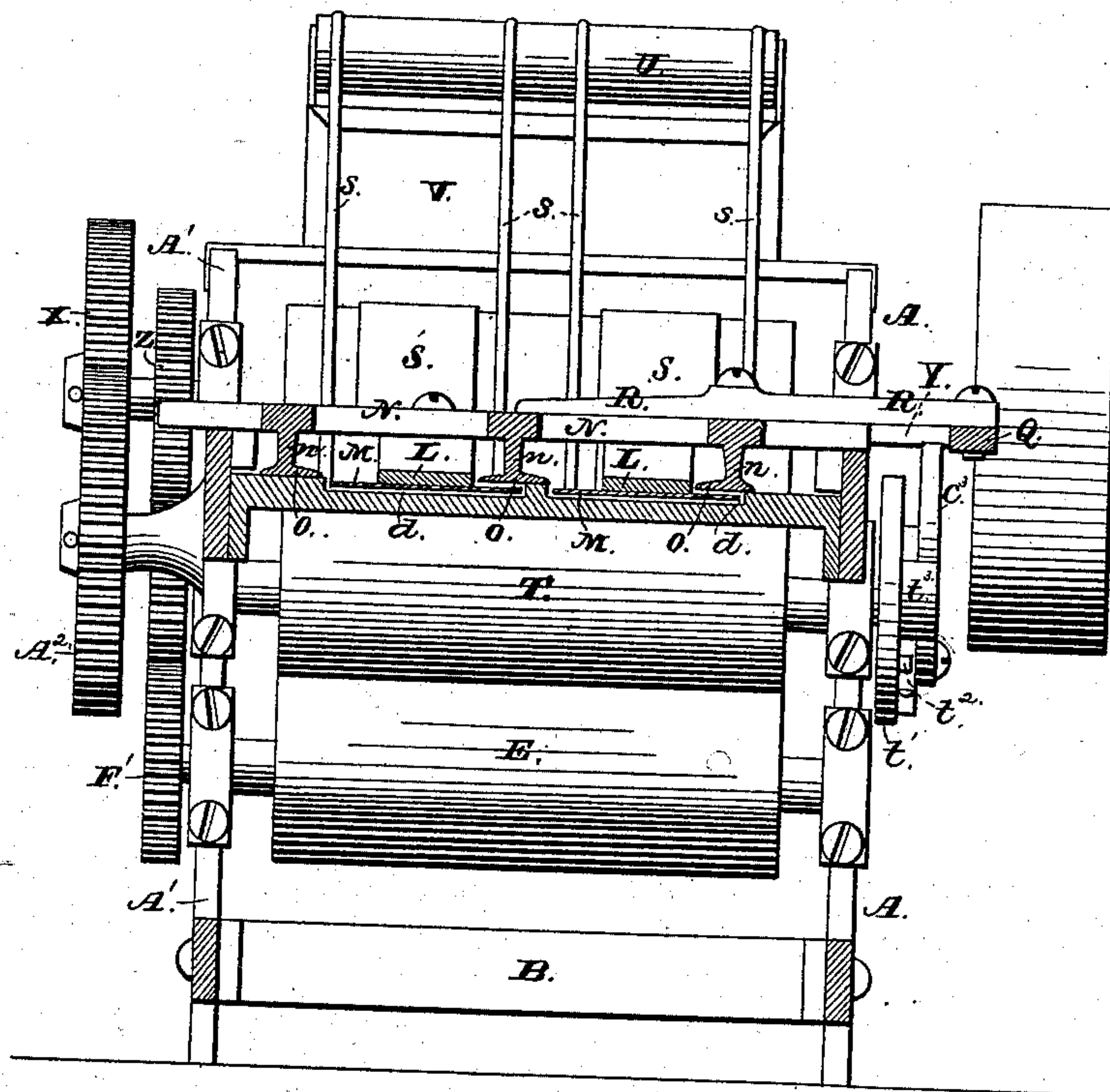


Fig. 9.

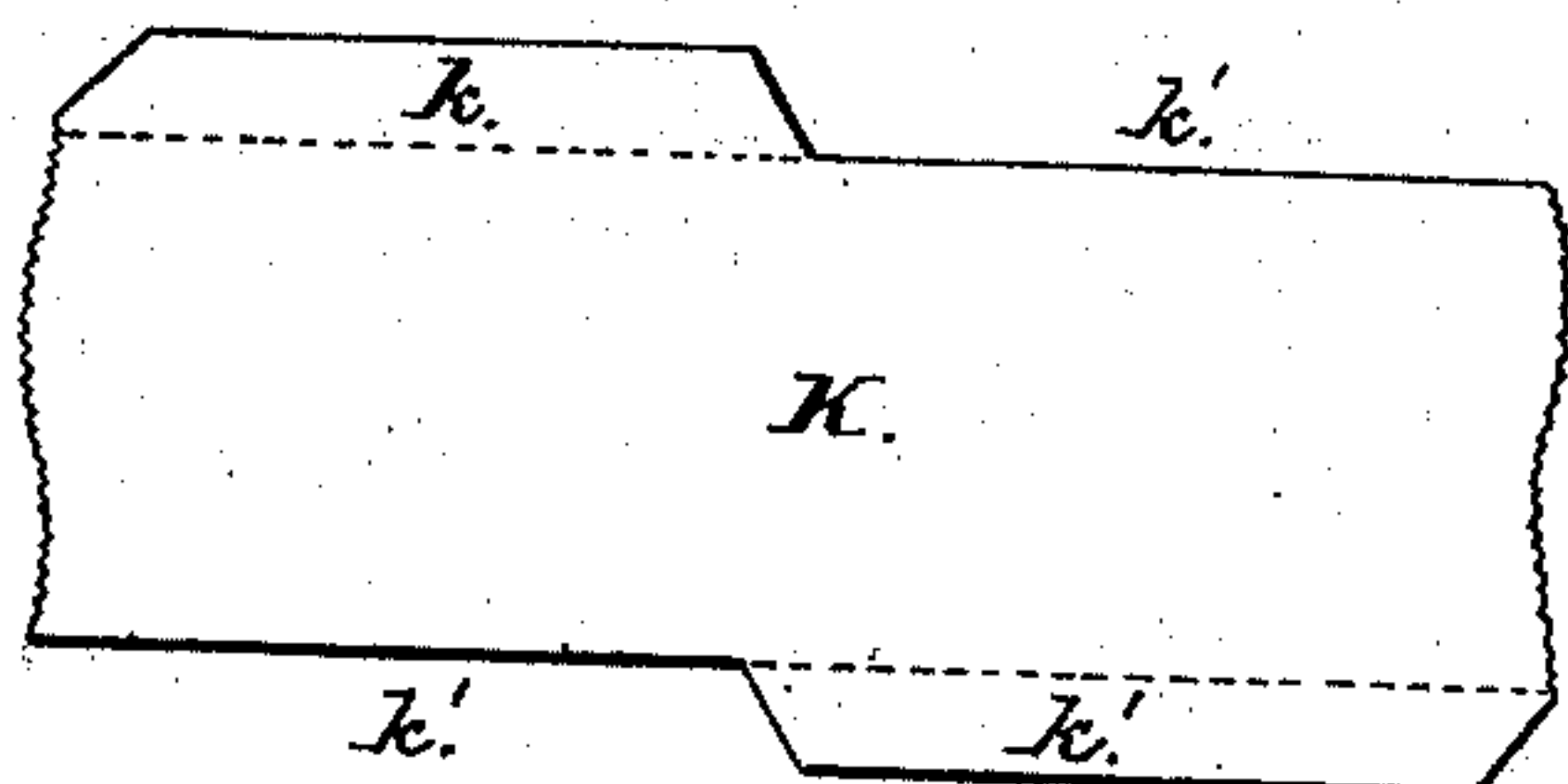


Fig. 10.

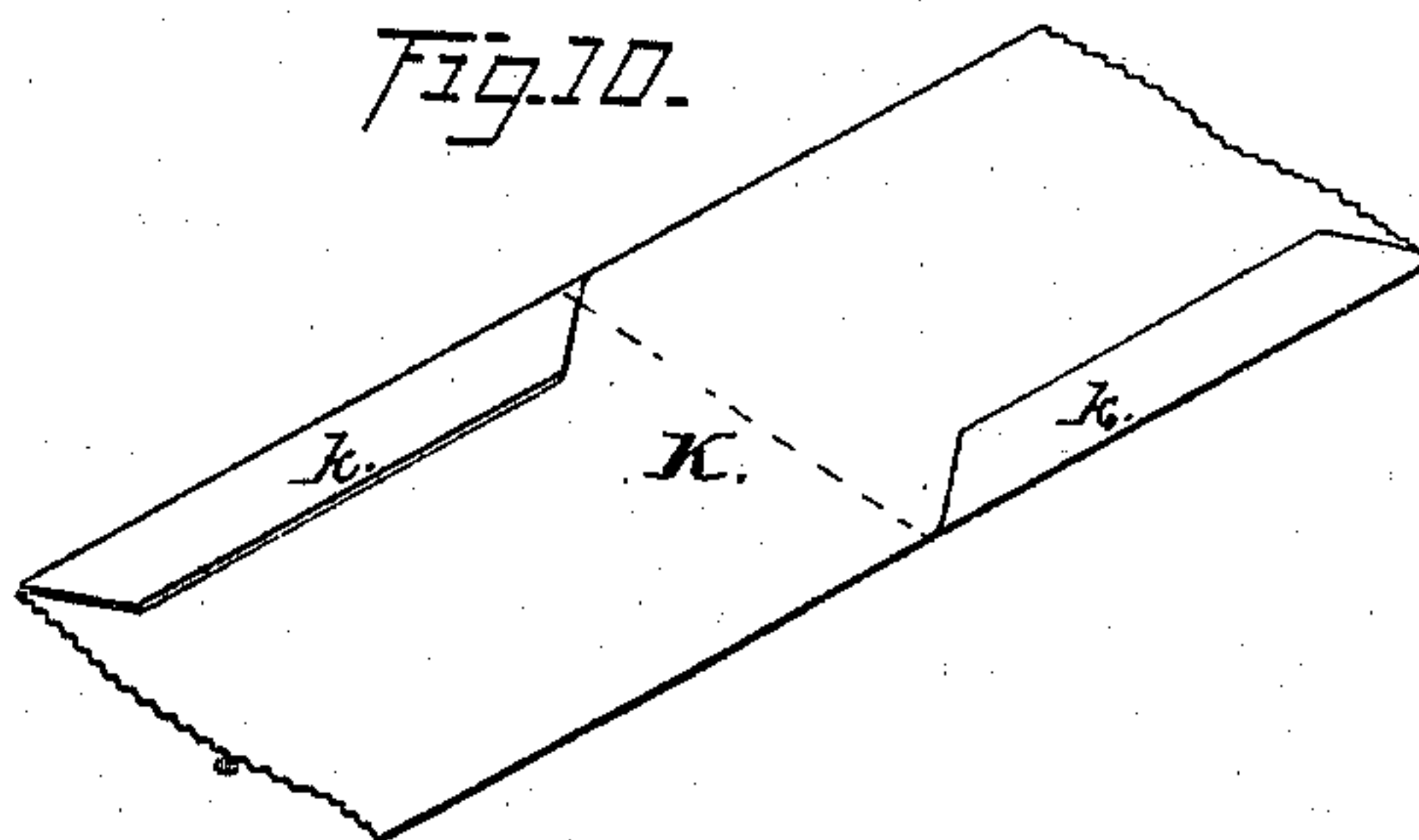
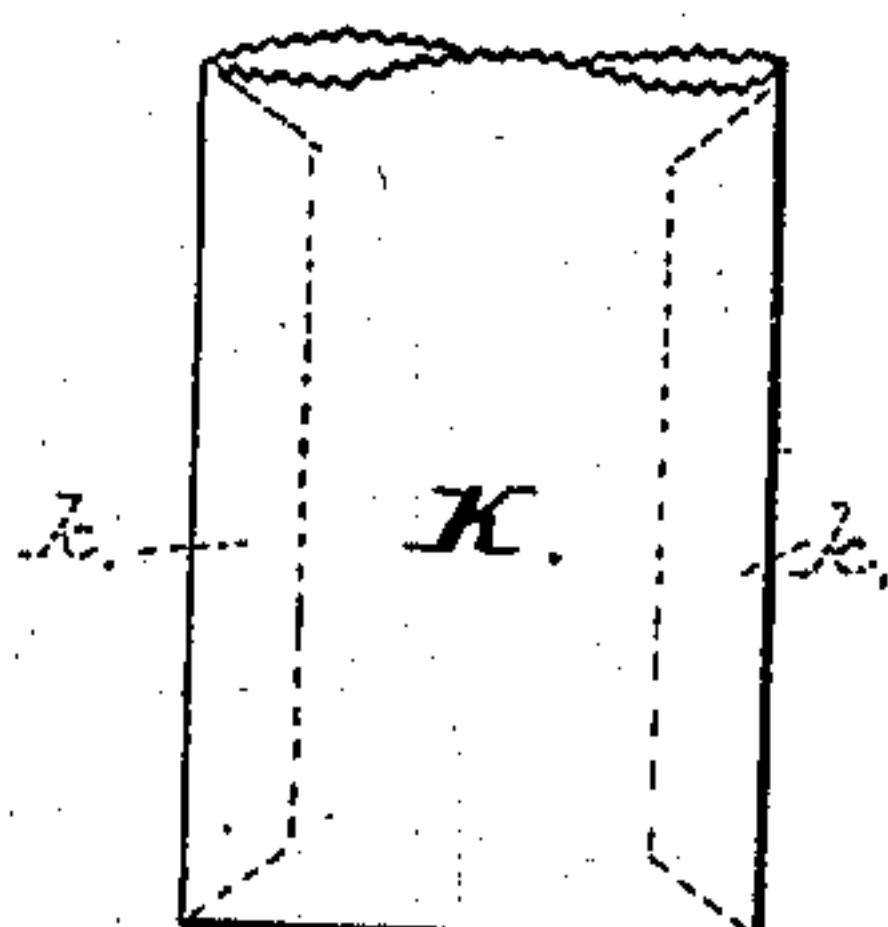


Fig. 11.



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 Geo. S. Grindle, his Att'y

UNITED STATES PATENT OFFICE.

BENJAMIN F. SAWYER, OF ROME, ASSIGNOR TO THE AMERICAN BAG COMPANY, OF ATLANTA, GEORGIA.

BAG-MACHINE.

SPECIFICATION forming part of Letters Patent No. 271,922, dated February 6, 1883.

Application filed June 24, 1880. (Model.)

To all whom it may concern:

Be it known that I, BENJ. F. SAWYER, of Rome, in the county of Floyd, and in the State of Georgia, have invented certain new and useful Improvements in Bag-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my machine from the front. Fig. 2 is a like view of the same from the rear. Fig. 3 is a plan view of the upper side of said machine. Figs. 4 and 5 are elevations of the front and rear ends, respectively, of the same. Fig. 6 is a side elevation of the right-hand side of said machine, the driving-pulley being removed so as to show the mechanism employed for operating the folder. Fig. 7 is a vertical central section upon a line passing lengthwise of the machine. Fig. 8 is a vertical cross-section of the same upon line *xx* of Fig. 7. Fig. 9 is a plan view of one of the blank-strips as it leaves the cutting-cylinders. Fig. 10 is a perspective view of the same after its edge-laps have been turned inward, and Fig. 11 is a like view of the completed bag.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable bags to be easily and cheaply made from paper, cloth, &c.; and to this end it consists principally in the method of making bags, substantially as and for the purpose hereinafter specified.

It consists, further, in the method of simultaneously forming two or more bags, substantially as and for the purpose hereinafter shown.

It consists, further, in the means employed for cutting bag-blanks from a continuously-moving roll of paper and folding the side flaps of the same, substantially as and for the purpose hereinafter set forth.

It consists, further, in the means employed for simultaneously cutting and printing the bag-blanks, substantially as and for the purpose hereinafter shown and described.

It consists, further, in the means employed for folding inward the side flaps of the bag-blanks, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for applying an adhesive preparation to the edges and side flaps of the bag-blanks, substantially as and for the purpose hereinafter shown.

It consists, further, in the combination of the devices employed for cutting the bag-blanks and folding inward their side flaps, substantially as and for the purpose hereinafter shown and described.

It consists, further, in the combination of the devices employed for folding inward the side flaps of the bag-blanks and coating said flaps and the side edges with adhesive preparation, substantially as and for the purpose hereinafter specified.

It consists, finally, in the combination of the various parts of the machine, substantially as and for the purpose hereinafter shown.

In the annexed drawings, A and A represent the sides of the frame of my machine, which parts are connected together at their lower ends by cross-bars B and B, at their rear ends by means of a cross-bar, C, and at and in front of their longitudinal center, near their upper edges, by means of a table, D, the whole forming a frame which has a general rectangular form.

Journaled horizontally within suitable bearings at the front end of the frame are two cylinders, E and F, which have the same diameters, and are arranged with their peripheries in contact, and such point of contact upon a line vertically with the upper face of the table D. The lower cylinder, E, is provided with three or more radial knives or cutters, *e*, which extend in parallel lines around nearly one-half the circumference of said roller, thence obliquely for a short distance, thence circumferentially a distance equal to the first-named portions, and thence obliquely, in an opposite direction, to their starting-point, as shown in Fig. 4. The upper cylinder, F, has a plain periphery, and within the same are provided grooves *f*, which correspond in width and depth to the thickness and radial projection of the cutters *e*, and have such longitudinal shape as to enable them to receive said cutters, when said cylinders are simultaneously rotated in opposite directions, for which purpose meshing gear-wheels G and H, respectively, hav-

ing the same dimensions, are secured upon the projecting journals of said cutters E and F.

Above the cylinder F, within suitable vertical slots, *a* and *a'*, is journaled a roller, I, which receives a roll of paper, and is free to rise or fall as the quantity of paper is greater or less, the periphery of said roll of paper being thus kept in contact with the periphery of said cylinder. If, now, paper from the roll be caused to pass between the cylinders E and F from the rear side, said paper will be cut longitudinally into strips K, which have the form shown in Fig. 9, the edges having alternate projections *k* and recesses *k'*, which are relatively arranged, so that the projection upon one edge comes directly opposite to the recess upon the other edge of each strip.

Within the upper face of the table D is provided a groove, *d*, for each set of cutters *e*, which groove has a depth of about one thirty-second of an inch, and a width equal to the width of a strip, K, inside of the lines of its projections *k*, and is arranged to receive said strip as the latter passes from between the cutting-cylinders.

Extending between the sides A and A', above the table D, are two parallel bars, L, which are connected together, and from which are suspended metal plates M, which correspond in number to the number of the grooves *d*, and in horizontal size and shape to the like features of the same. Each plate M is formed of thin sheet metal, is suspended centrally at its ends, so as to leave its side edges and central portion free, and is placed with its lower face so near the bottom of its groove *d* as to leave but little more space between the same than is necessary for the free movement between of one of the strips of paper K. The front end of the table D is inclined slightly downward and forward between the grooves *d*, while the corresponding ends of the plates M are turned slightly upward, so that when the end of a strip, K, passes rearward from between the cutting-cylinders its body will pass beneath one of said plates within a groove, *d*, while its projections *k* will pass upward upon the face of said table upon each side of said groove, the operation causing said projections to have an upward and outward inclination. The projections *k* form the side laps of the bag, and in order that they may be in position for use it is necessary that each lap should be folded inward, an operation which is accomplished by the following-described mechanism.

Above the bars L is loosely fitted a frame, N, upon the lower side of which is provided a number of transverse lugs, *n*, that extend downward nearly to the plates M, and are each provided with a thin rectangular plate, O, that has a length substantially the same as the length of each lap *k*. Each of said plates O bears lightly upon the table D between the grooves *d*, and is capable of sliding over the contiguous edges of two of said plates M, so that if said frame is caused to move longi-

tudinally, and its movements are properly timed with reference to the cutting-cylinders E and F, each plate will pass beneath one of the said laps *k* and fold the same over upon the upper side of the plate M, beneath which is passing the strip K, to which it is attached, at each movement of said frame. The movements of the folding-frame N are produced by means of a cam, P, which is secured upon and revolves with the shaft of the upper cutting-cylinder, F, the outer face of said cam acting upon a lever, Q, which is pivoted at one end to or upon a bar, R, that is in turn pivoted upon said frame N, while said lever Q is pivoted near its front end within a bearing, *q*, that is swiveled at the center of said cam, the arrangement being such as to cause said folding-frame to remain at rest until a lap, *k*, upon each strip K is in position for folding, and then move rapidly in the necessary direction to turn over said lap, after which said frame has another period of rest, followed by a rapid return movement, during which the laps upon the other edge of each sheet are folded. The strips K now pass rearward between two rollers, S and T, around the upper of which pass elastic bands *s*, that are saturated with adhesive mixture, which is transferred to each edge of each strip as said bands pass around said roller S, above said strips H, such transfer being caused in part by simple contact between said bands and strips, but principally by the pressure caused by said rollers. Were said bands held in contact with the blanks by a slight pressure, as in case the latter was supported by or upon a flexible endless apron, as has heretofore been done, it would be necessary that the adhesive preparation should be very thin, in order that it might be transferred to said blanks, and even then there would be difficulty in coating the paper evenly; but where said blanks and said adhesive-coated strips are confined between unyielding rollers and are subjected to pressure, the adhesive preparation is forced to combine with and adhere to the paper, and can be applied when very thick—an advantage that is material, as less time is required for it to set and dry than when used in a thin, diluted condition. The bands *s* are continuous, and from the roller S pass upward over two smaller rollers, U, that are journaled above the edge of a vat, V, for containing adhesive mixture, and thence downward around a roller, W, that is journaled within said vat, by which arrangement said bands are caused, by the rotation of said roller S, to pass through said vat and become loaded with its adhesive contents, which latter is then transferred to the edges of the paper strips K, as before described. Motion is imparted to the rollers S and T by means of a gear-wheel, X, which is secured upon one of its journals and meshes with a pinion, *y*, that is secured upon a driving-shaft, Y, which latter is suitably journaled upon the upper side of the frame in rear of said roller. Upon the projecting shaft of each of said rollers is a gear-wheel, Z, which wheels

have the same dimensions, and, meshing together, cause said rollers to move with equal velocity in opposite directions. From the gear-wheel X motion is transmitted to the cutting-cylinders E and F by means of a gear-wheel, B', that is secured upon the projecting shaft of said cylinder F, and a third gear-wheel, A², which is placed between and meshes with each of said gears X and B'.

10 Journalled in rear of the lower roller, T, is a cylinder, O', which bears against said roller, and is provided with peripheral grooves c', that coincide with the edges of the strips K, which have just been coated with an adhesive
15 mixture, the arrangement being such as to cause the central portion of each strip to be confined between said cylinder and roller without interference with its edges. The cylinder O' is caused to have the same peripheral velocity as the roller T by means of a gear-wheel,
20 D', which is secured upon the projecting end of its shaft and meshes with the gear-wheel Z of said roller, and within the periphery of said cylinder is secured a cutter, c², that has a serrated edge and extends longitudinally along the same. A corresponding groove, t, is provided within the surface of said roller T for the reception of said cutter as said cylinder and roller come into contact at such points.

30 The operation of the cylinder O' and roller T is to cut the strips K into lengths suitable for bags, each blank thus severed having upon each edge one of the projections or laps k, and the points of severance being at
35 the ends of such laps. The cutter c² follows an irregular line, preferably a wave-line, and the ends of the bag-blank have a corresponding shape. The object of such shape is to prevent said ends from coinciding and to render
40 easy the opening of the mouth of the bag, the result being accomplished by causing the projecting portions of one edge to come opposite to the hollow portions of the opposite edge, as seen in Fig. 11. Each blank passes downward
45 between the roller T and cutting-cylinder O' and is folded together, and its adhesive coated edges pressed together by the following-described means.

Directly beneath the roller T is a similar
50 roller, E', which has peripheral contact therewith, and is rotated in an opposite direction thereto by means of a gear-wheel, F', that is secured upon the projecting end of one of its journals and meshes with the gear-wheel Z, the arrangement being such as to cause the
55 peripheries of said rollers to move rearward at their points of contact.

Directly in front of the rollers T and E' is a vertical plate, G', which, at a point opposite to
60 the line of peripheral contact between said rollers, is provided with a narrow horizontal slot, g', that has a length somewhat greater than the length of each roller, which slot at each end is somewhat enlarged vertically.

65 Within the enlarged ends of the slot g' are loosely fitted the ends of two bars, H', the opposite ends of which are secured upon a shaft,

I', that is journaled at its ends within the lower ends of two hangers, K', which hangers are pivoted upon the front ends of the side plates, A, the arrangement being such as to enable
70 said shaft I' to be swung toward and from the rear end of the machine, with said bars H' sliding longitudinally and horizontally within said slot.

75 Secured to and extending between the bars H', near their front ends, is a thin plate, h', which has considerable less thickness than the width of the slot g', so as to pass freely through the same, and, when the shaft I' is at the outer
80 limit of its motion, is arranged sufficiently in front of the plate G' to permit a blank passing downward from between the roller T and cutting-cylinder O' to pass between the front face of said plate G' and the rear edge of the
85 plate h'.

Upon the projecting journal of the roller T is secured a circular plate, t', which is provided upon its outer face with an outward projecting stud, t², while upon the journal of the
90 cutting-cylinder O' is secured a second similar plate, c³, that has upon its inner face an inwardly-projecting stud, c⁴. Said plate c³ is placed sufficiently outside said plate t' to permit their studs to pass freely between their
95 overlapping faces.

Journalled upon the projecting end of the shaft I' is a bar, L', which extends between the plates t' and c³ forward to or slightly beyond the center of said plate t', and is provided
100 upon its rear end with a weight, l', that is heavier than the portion of said bar in rear of its pivotal bearing, and causes such portion to be held upward against the hub t³ of said plate t'.

105 Within the upper edge of the bar L' is a longitudinal notch, which terminates in two vertical shoulders, l² and l³, that are separated by a space slightly greater than the distance between the axes of the roller T and cutting-cylinder O', the front one of which shoulders, l², engages with
110 the stud t² during the rotation of said cylinder, while the rear shoulder, l³, engages with the stud c⁴ as said roller revolves. When a bag-blank, passing downward from between the roller T and cutting-cylinder O', reaches a point
115 where its longitudinal center is opposite to the slot g' of the plate G, the stud t² engages with the shoulder l² and moves the bar L' forward, causing the plate h' to pass through said slot and to impinge upon and double the central
120 part of said blank. The forward motion of the folding-plate h' continues until the folded center of the bag-blank is caught between the rollers T and E', at which instant the stud c⁴, moving downward and rearward, bears against the
125 upper edge of the bar L' and presses the front end of said bar downward out of engagement with the stud t², arresting the further forward movement of said folding-plate. At the instant when the front end of the bar L' is released from engagement with the stud t² the
130 stud c⁴ engages with the shoulder l³ and moves said bar and the folding-plate rearward, said stud l³ being released from such engagement

by the engagement of the front end of said bar with the hub t^3 of the plate t' , which prevents said bar from following said stud farther in its upward and rearward movement.

5 From the foregoing description it will be seen that from the roller the paper passes between cutting-cylinders which separate it into strips which have alternately upon opposite sides laps for forming the side edges
10 of the bag. Said strips next pass beneath devices which fold said laps inward, then beneath elastic bands which coat the edges and laps with adhesive mixture, from thence between cutting devices that cut each strip into
15 blanks having suitable length, which blanks are then folded and passed between rollers which press together the edges coated with adhesive mixture, and complete the bag, the operations described being constantly repeated,
20 ed, so as to cause the paper from the roll to be drawn into the machine at a uniform rate of speed.

This machine is especially adapted for use in immediate connection with a paper-mill, as
25 it is capable of being run at any rate of speed necessary to enable it to work up the paper as it passes from the mill, by which means such paper would not require handling or storage until ready for the market as completed bags.

30 In order that the bags made by the machine may be ready for immediate use, it is only necessary that each should have printed upon one side such matter as may be desired, which result is effected by means of stereotype-plates
35 M' , fitted upon or within the periphery of the cutting-cylinder E in such positions as to impinge upon each portion of each strip K intended for a bag-blank, and when properly inked to print upon such blanks the letters
40 composing the printing-surfaces of said plates. When such printing-plates are used within the said cylinder, it is necessary that the upper cylinder, F, should have such portions of its surface as come opposite to said plates com-
45 posed of material sufficiently elastic to prevent injury to the printing-characters.

While it is intended that the machine described shall construct bags from paper, it is
50 equally adapted to the manufacture of bags from cloth.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The herein-described method of making
55 a paper bag, which consists in longitudinally cutting a continuously-moving web, so as to leave side flaps upon opposite sides and at opposite ends of the bag-length, then folding in the said flaps as said web advances, then ap-
60 plying an adhesive mixture to said flaps, then folding said bag-lengths transversely, and finally cutting the completed bag from the web, substantially as and for the purpose specified.

2. The combination of devices, substantially
65 as hereinbefore described, whereby there are simultaneously formed from a continuously-moving web two or more bag-lengths, each having

side flaps upon opposite sides and at opposite ends of their contiguous edges, which side flaps alternate and are cut without waste, and are
70 then at one time and by one motion of mechanism, substantially as described, folded in at one end of each bag-length, and by a reverse motion of such mechanism said side flaps at the
75 opposite ends of the same are folded in, and those upon each end coated with an adhesive mixture, and said bag-lengths folded transversely and the completed bags then cut from the web, substantially as and for the purpose
80 shown.

3. In a machine which makes bags from a continuously-moving web of paper, rotating cutting devices, which cut the blank so as to leave side flaps upon opposite sides and at opposite ends of the blank, in combination with
85 reciprocating blades, which operate to alternately fold said side flaps inward, substantially as and for the purpose set forth.

4. The cylinder E, provided with radial cutters e , and having its periphery cut away be-
90 tween said cutters to receive printing devices, in combination with the cylinder F, having the peripheral grooves f , said cylinders having peripheral contact, and being arranged to have the impinging portions of their peripheries
95 travel in the same direction and with uniform velocity, substantially as and for the purpose shown and described.

5. The cutter-cylinder E, provided with radial knives e , and having its periphery cut
100 away between said knives to receive printing-surfaces of varying sizes, in combination with the platen-cylinder F, substantially as and for the purpose specified.

6. The combination of the table D, provided
105 with the grooves d , the plates M, fitted within said grooves, and the plates O, suspended above, and adapted to reciprocate over said plates M and table D, said plates O being rigidly connected together, and all moving in the
110 same direction and at the same time, substantially as and for the purpose shown.

7. As a means for applying an adhesive preparation to the edges of bag-blanks, elastic
115 bands coated or saturated with such preparation, and arranged to pass, with the bag-blanks, between two rollers, whereby said bands are pressed upon the edges of said blanks, substantially as and for the purpose set forth.

8. In combination with the table D, pro-
120 vided with the grooves d , the plates M, fitted within said grooves, and the plates O, rigidly connected together, suspended above, and adapted to reciprocate over said plates M and table D, and the cutting-cylinders E and F,
125 provided respectively with radial knives e and grooves f , substantially as and for the purpose specified.

9. In combination with the table D, pro-
130 vided with the grooves d , the plates M, fitted within said grooves, and the plates O, rigidly connected together, suspended above, and adapted to reciprocate over said plates M and table D, the rollers S and T, and the elastic

bands *s*, coated with adhesive preparation, and arranged to pass with the bag-blanks *H* between said rollers, substantially as and for the purpose shown.

5 10. The hereinbefore-described machine, in which are combined the cutting-cylinders *E* and *F*, the grooved table *D*, the stationary plates *M*, the laterally-reciprocating plates *O*, the rollers *T* and *E'*, the elastic adhesive-liquid-distributing bands *f*, the cutting-cylinder

C', and the folding-plate *h'*, said parts being arranged to operate in the manner and for the purpose substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 4th day of 15 May, 1880.

B. F. SAWYER.

Witnesses:

JAS. E. HUTCHINSON,
HENRY C. HAZARD.