(No Model.)

13 Sheets—Sheet 1.

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PAPER BAG MACHINE.

No. 429,007. Patented May 27, 1890.

FIG. 1.

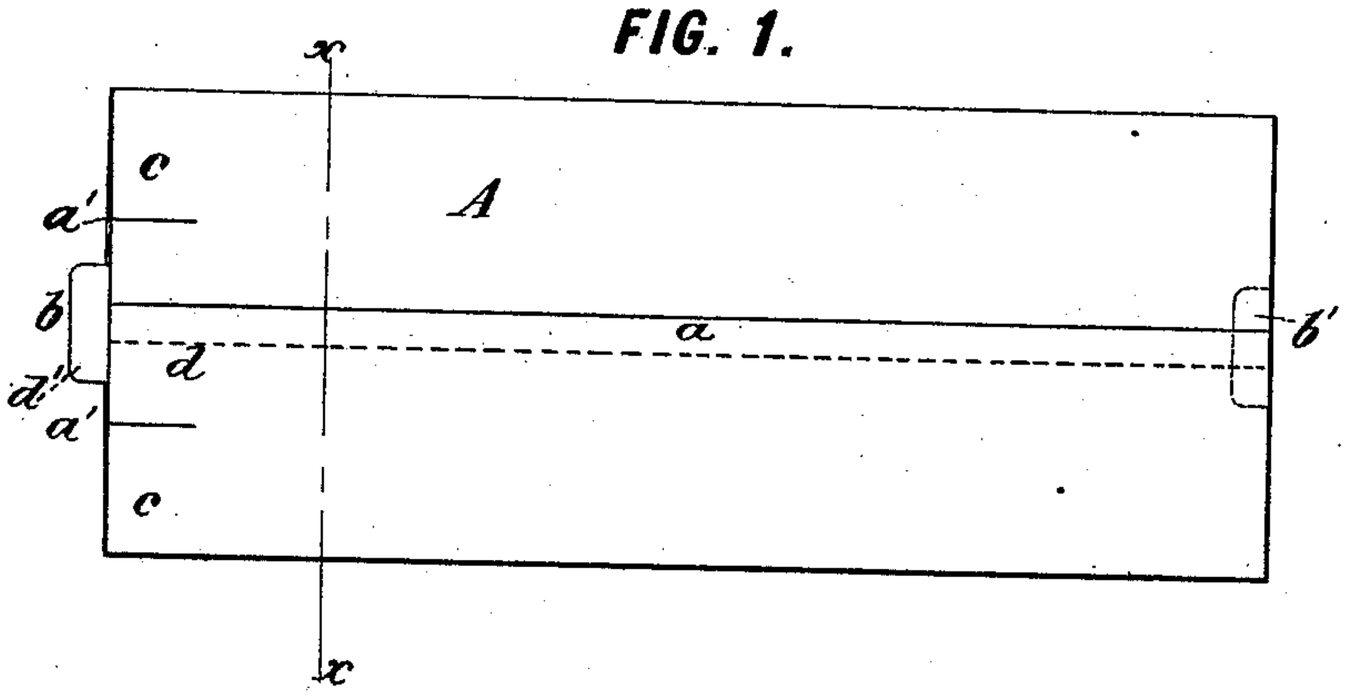


FIG. 2.

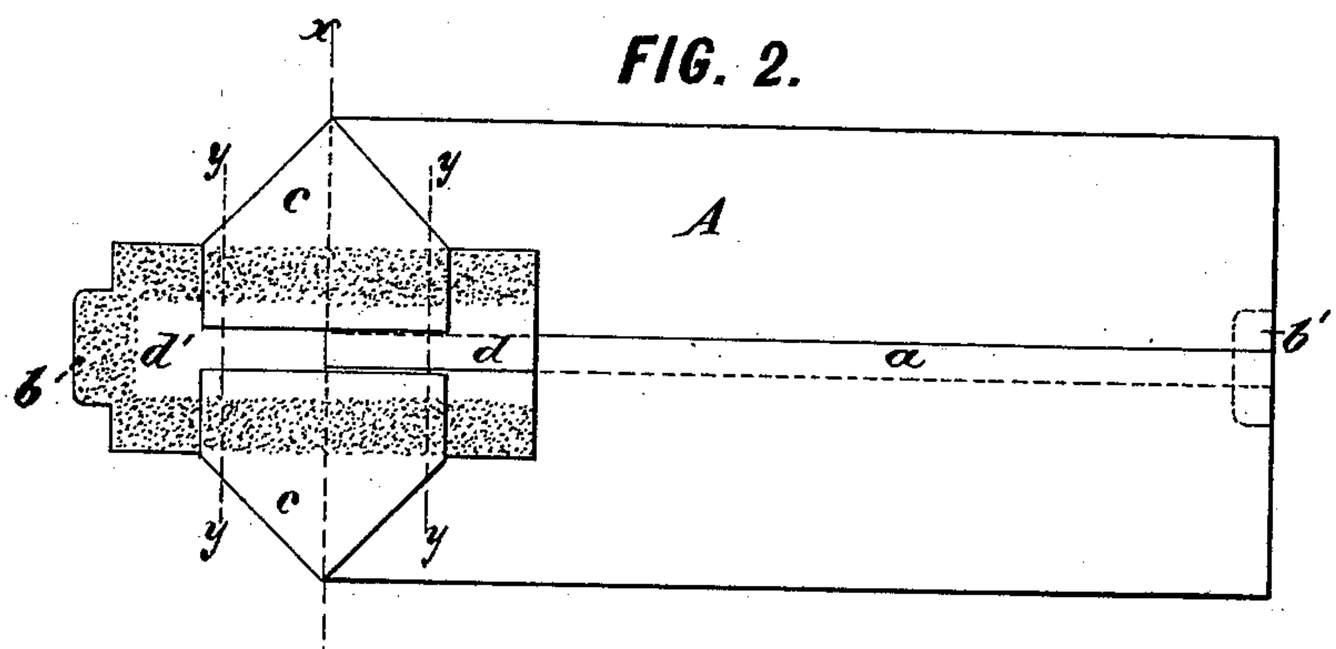


FIG. 3.

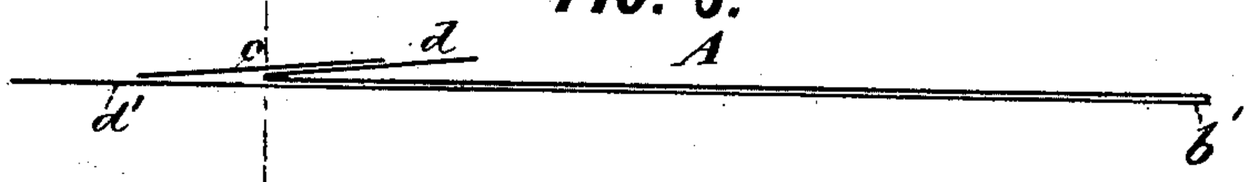


FIG. 4.

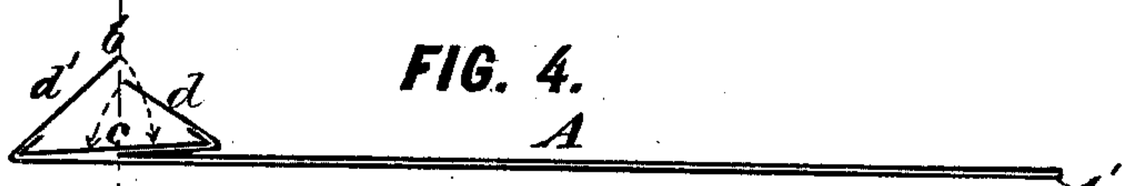
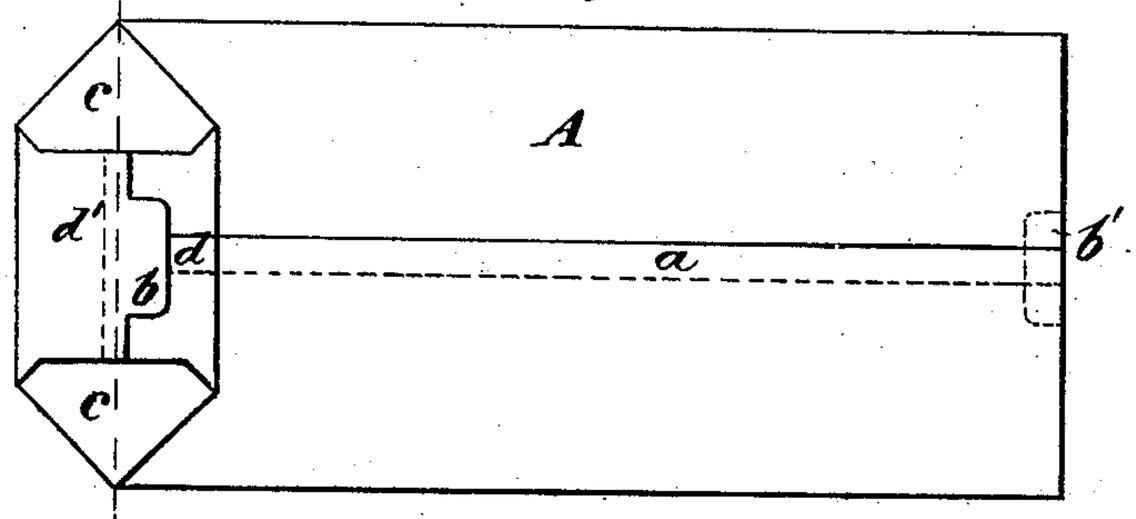


FIG. 5.



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(No Model.) 13 Sheets—Sheet 2.

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FIG. 7.

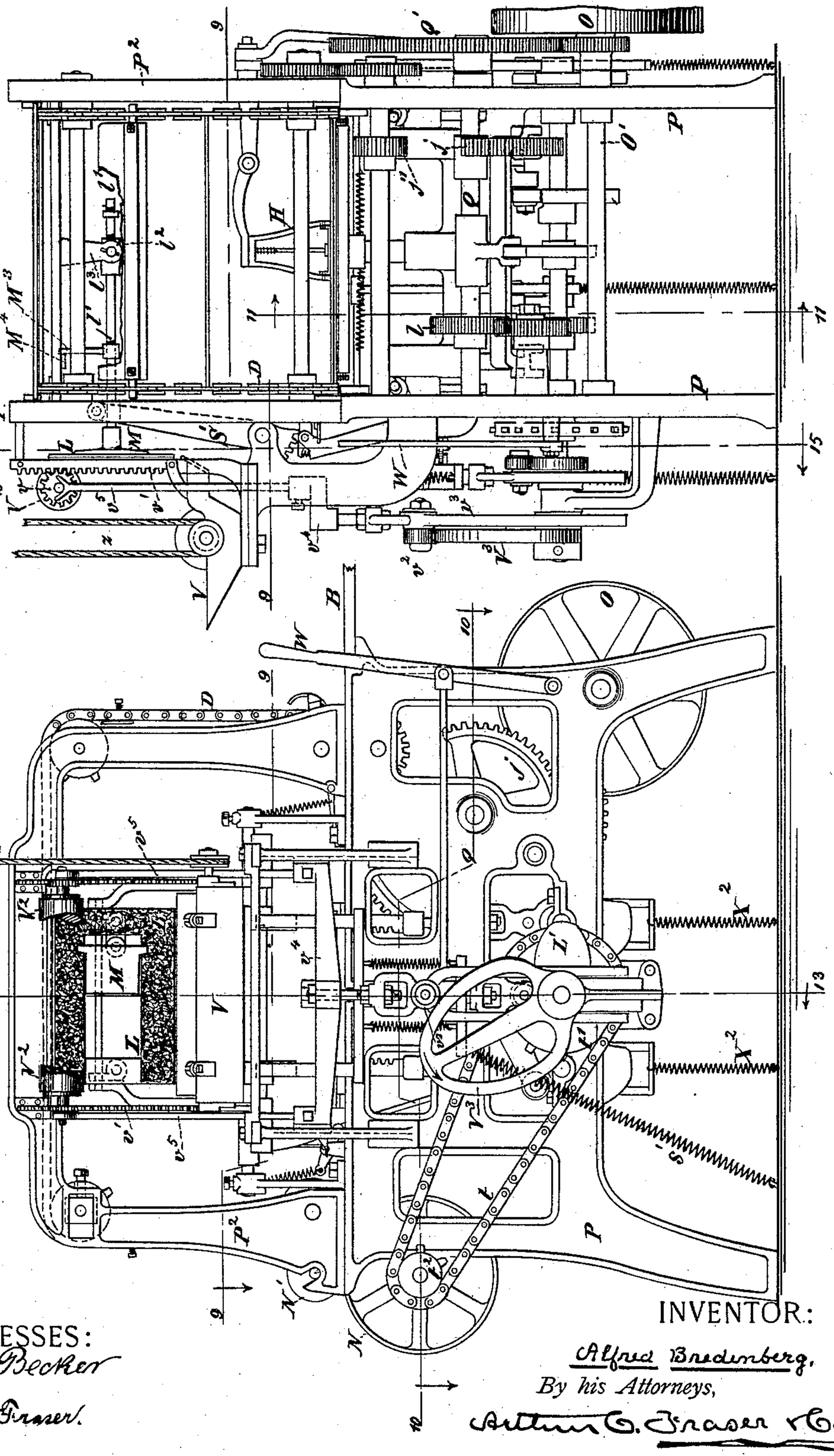

FIG. 6.

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(No Model.) 13 Sheets—Sheet 3.

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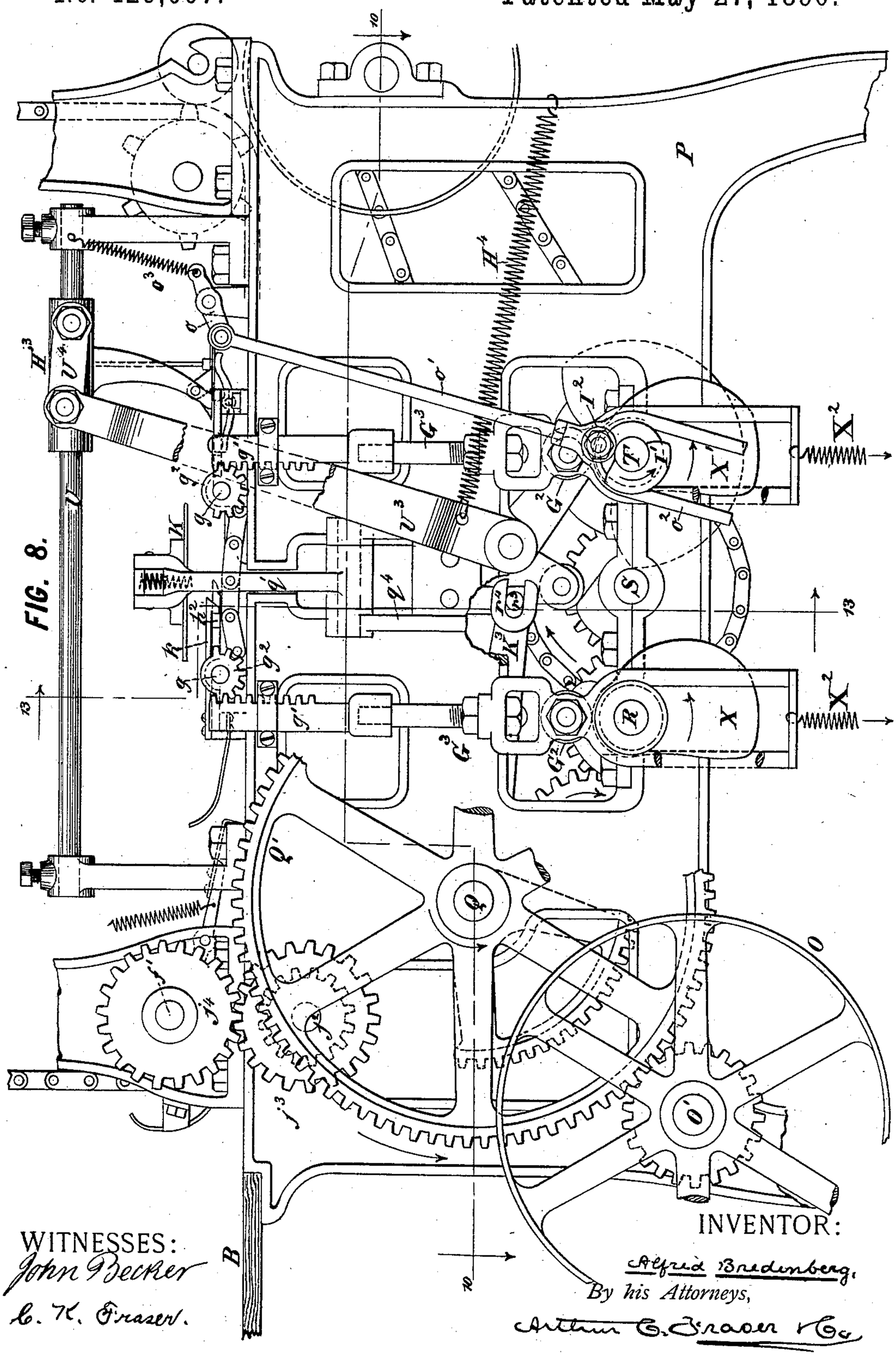

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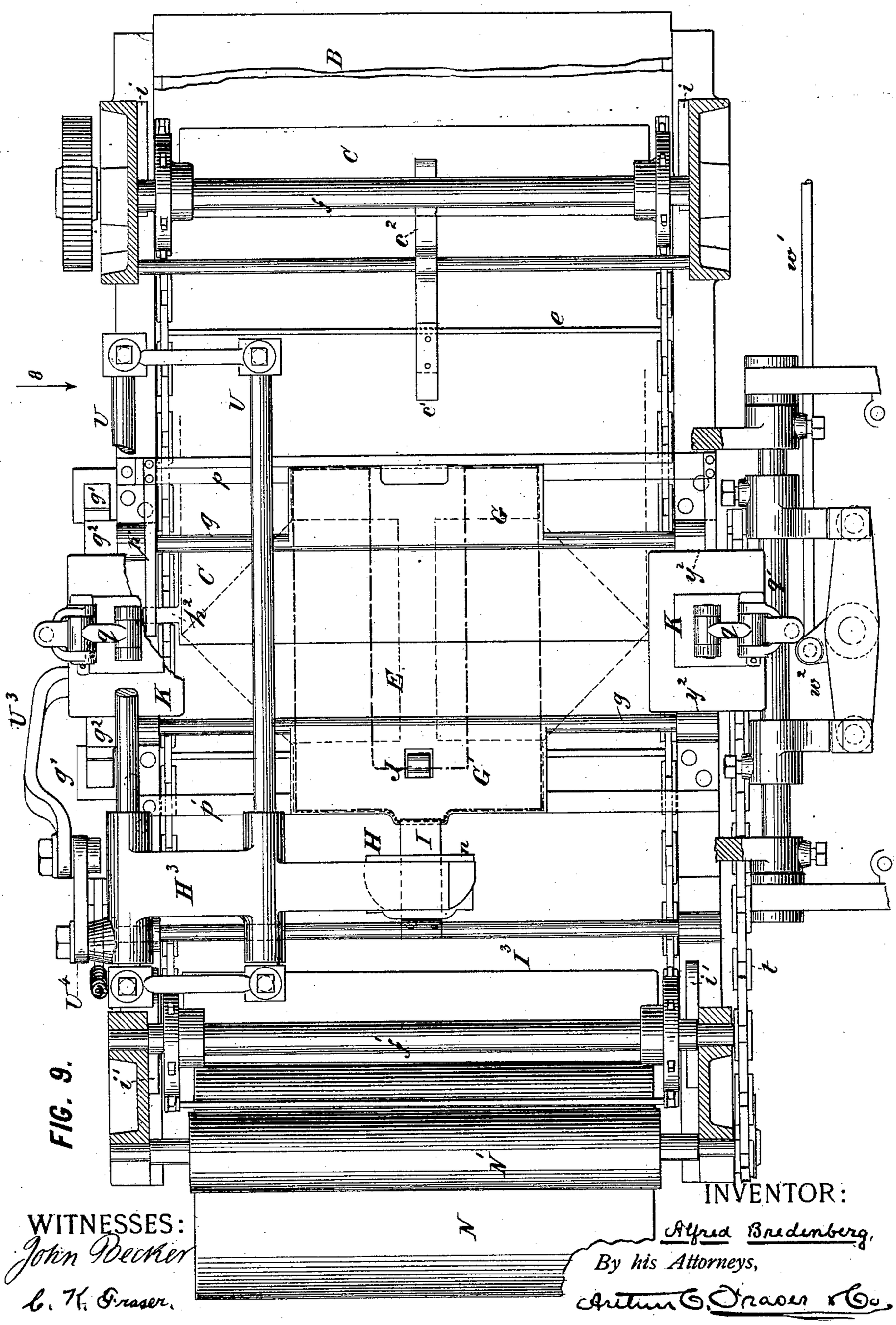

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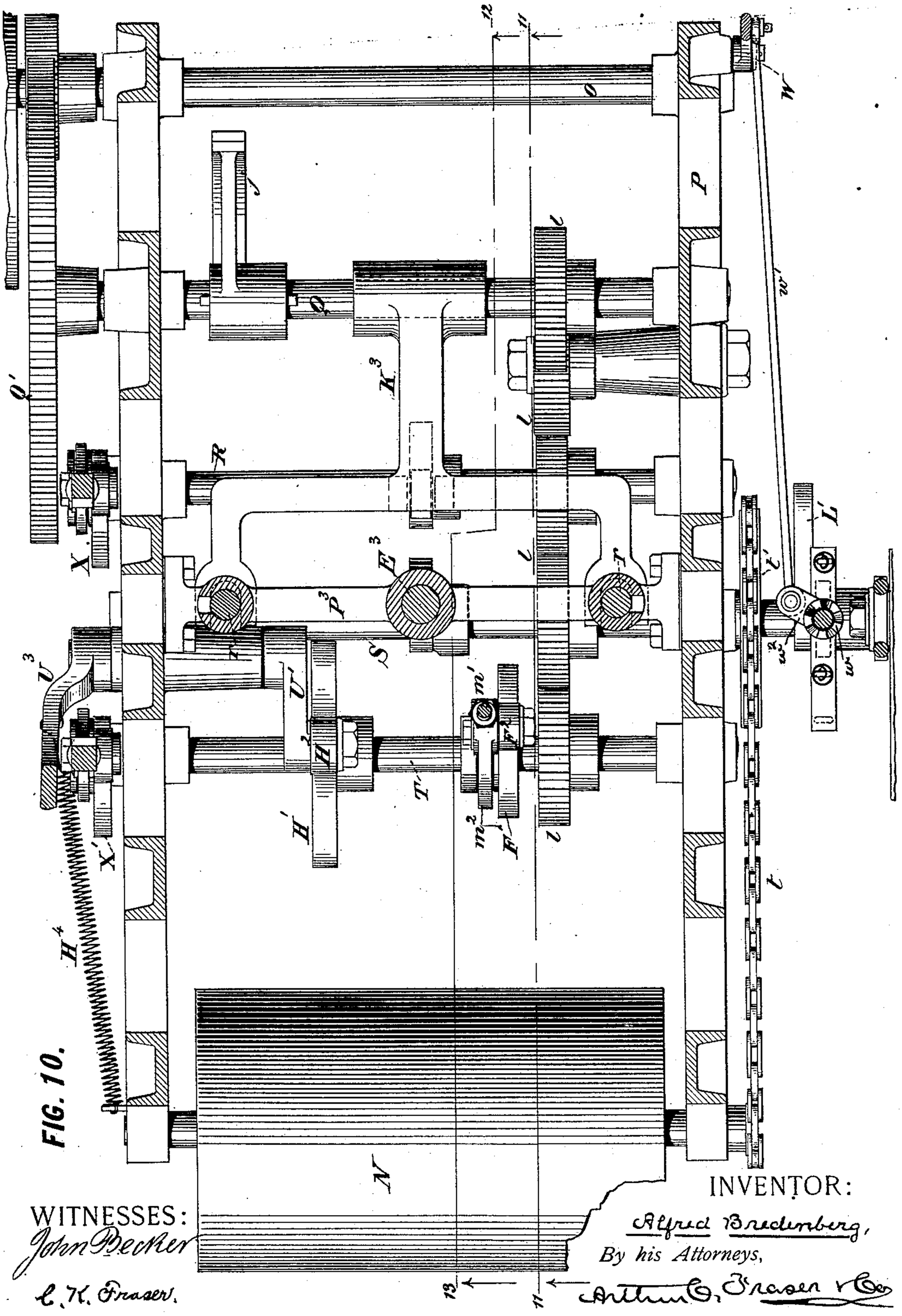

FIG. 10.

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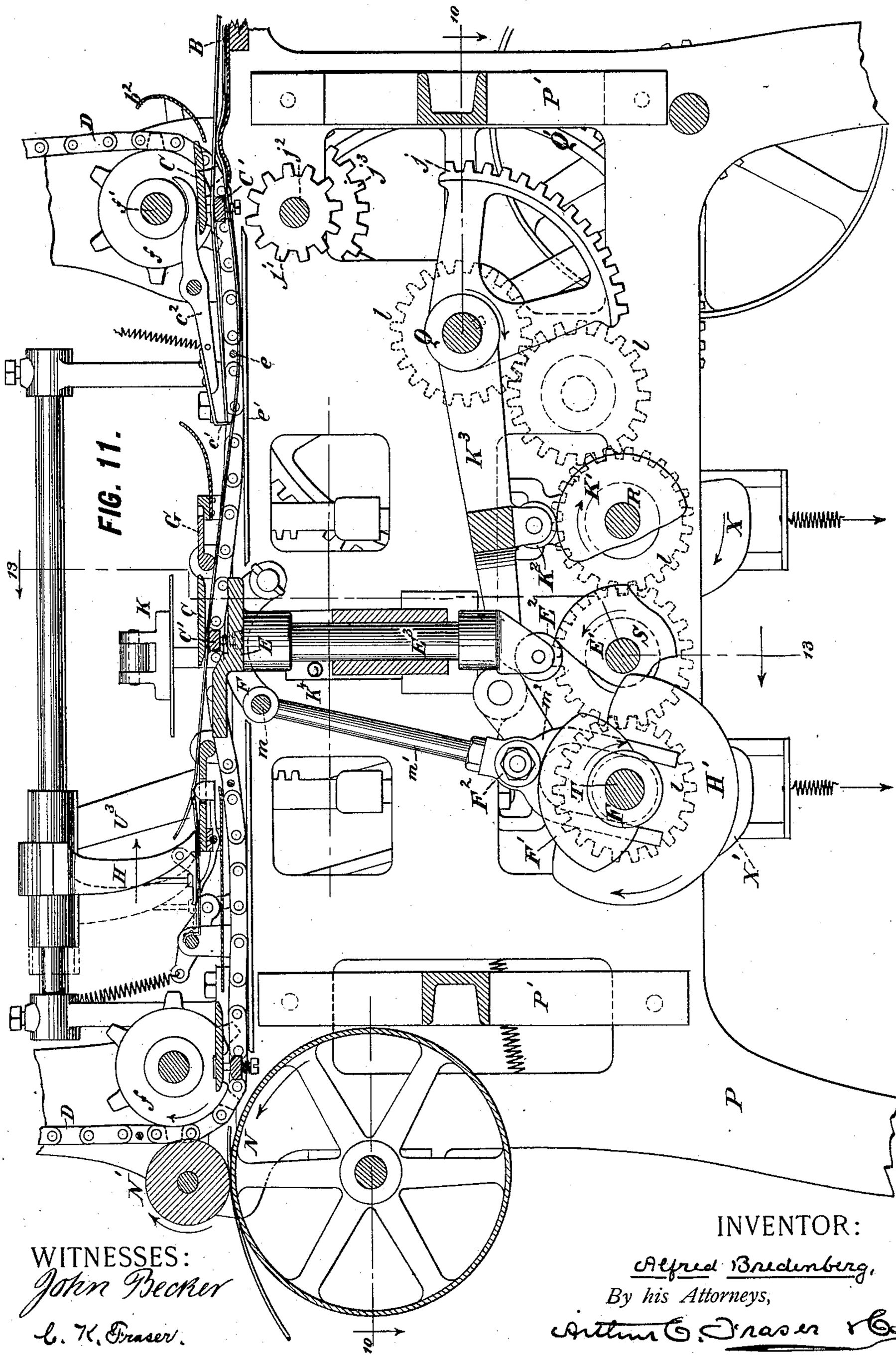

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(No Model.)

13 Sheets—Sheet 7.

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PAPER BAG MACHINE.

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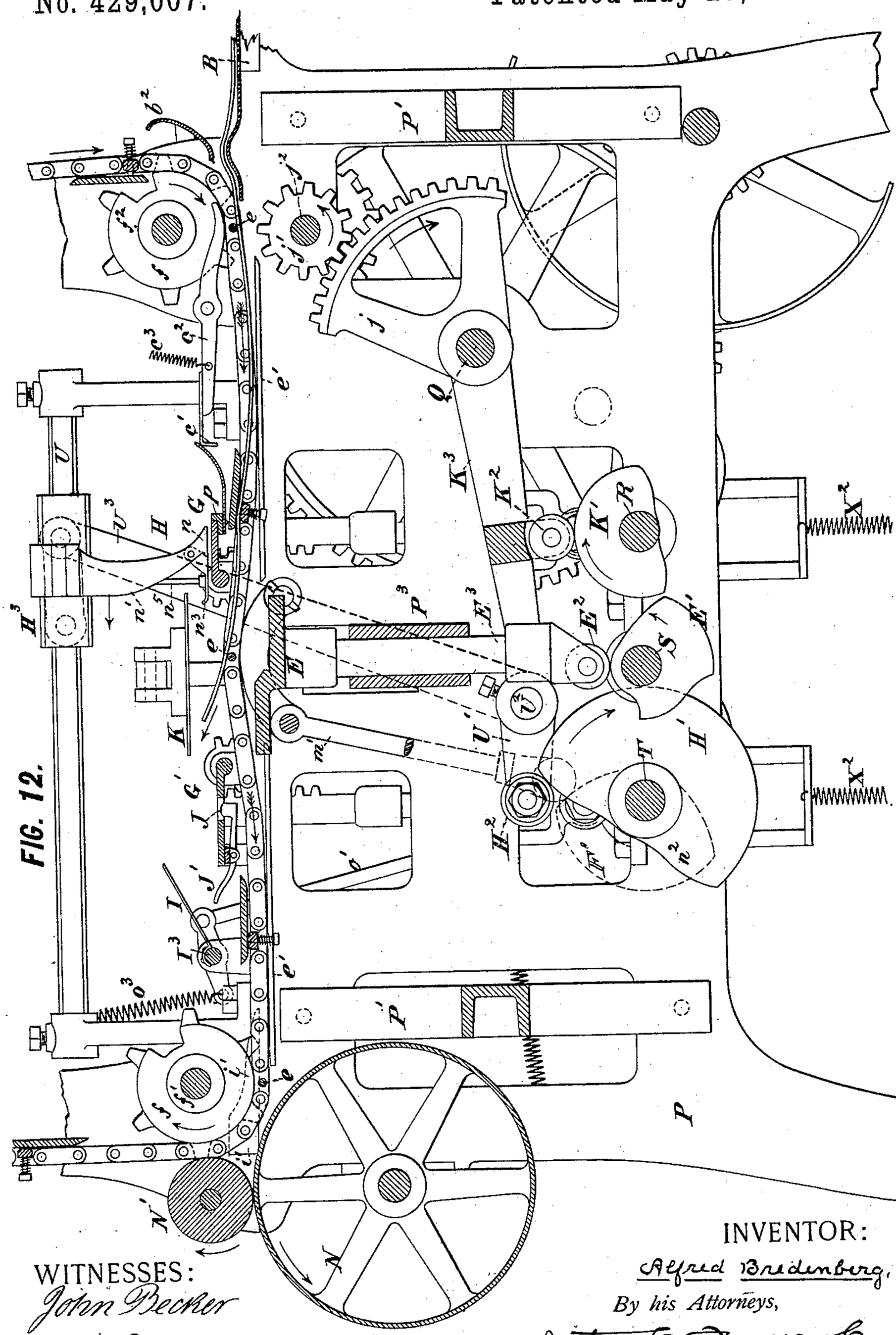

FIG. 12.

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(No Model.) 13 Sheets—Sheet 8.

A. BREDENBERG.

PAPER BAG MACHINE.

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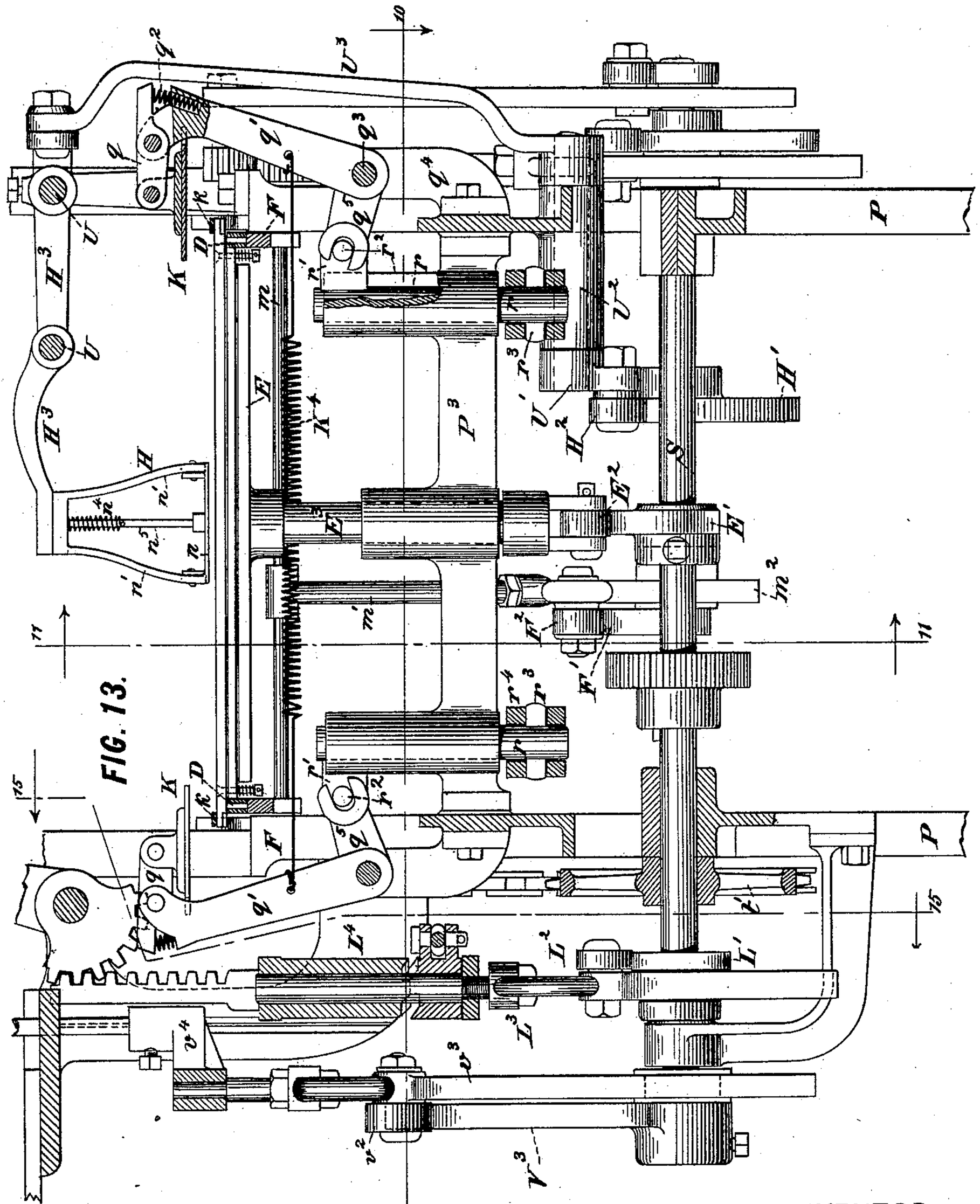

FIG. 13.

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(No Model.) 13 Sheets—Sheet 9.

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PAPER BAG MACHINE.

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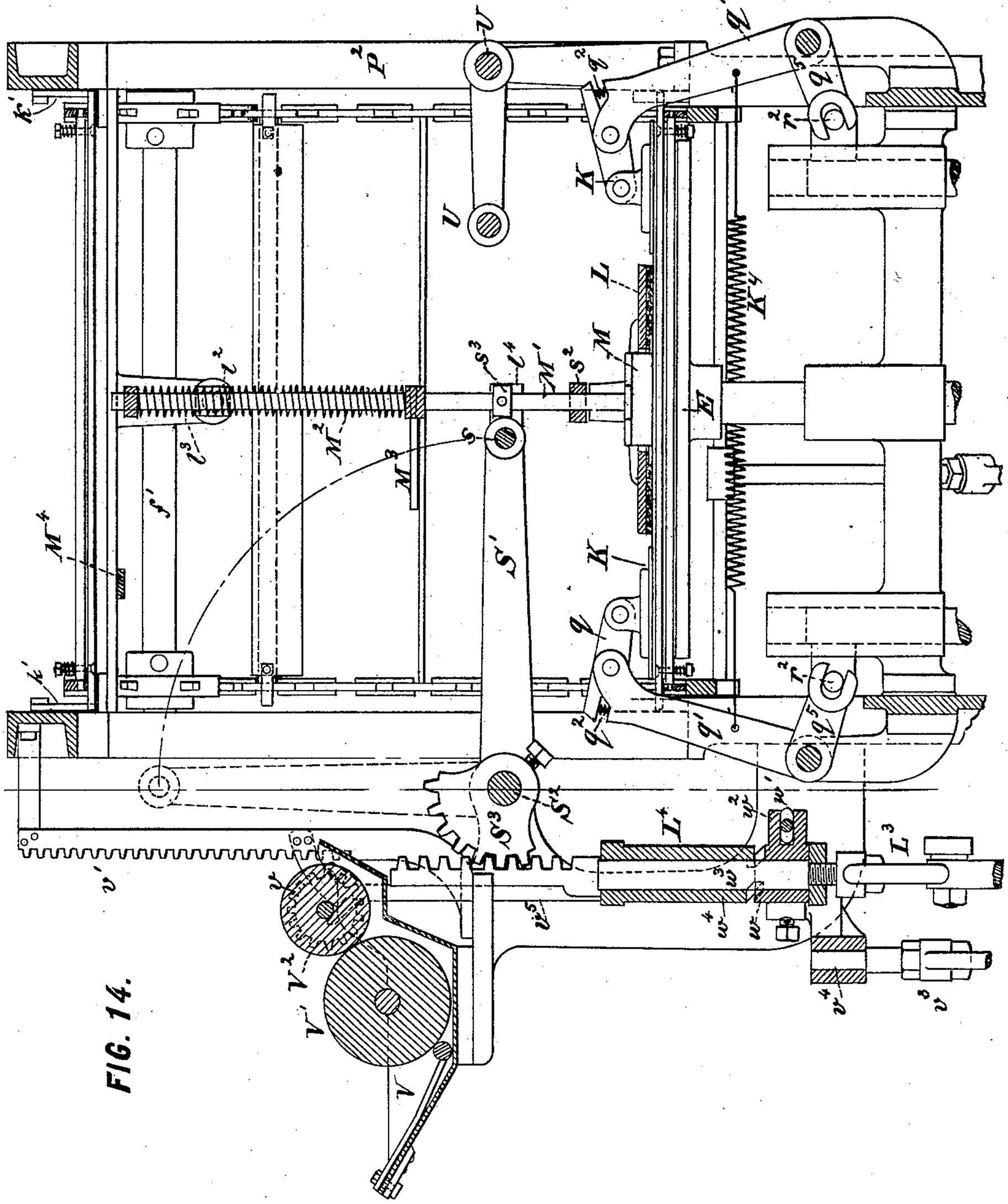

FIG. 14.

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No. 429,007. Patented May 27, 1890.

FIG. 15.

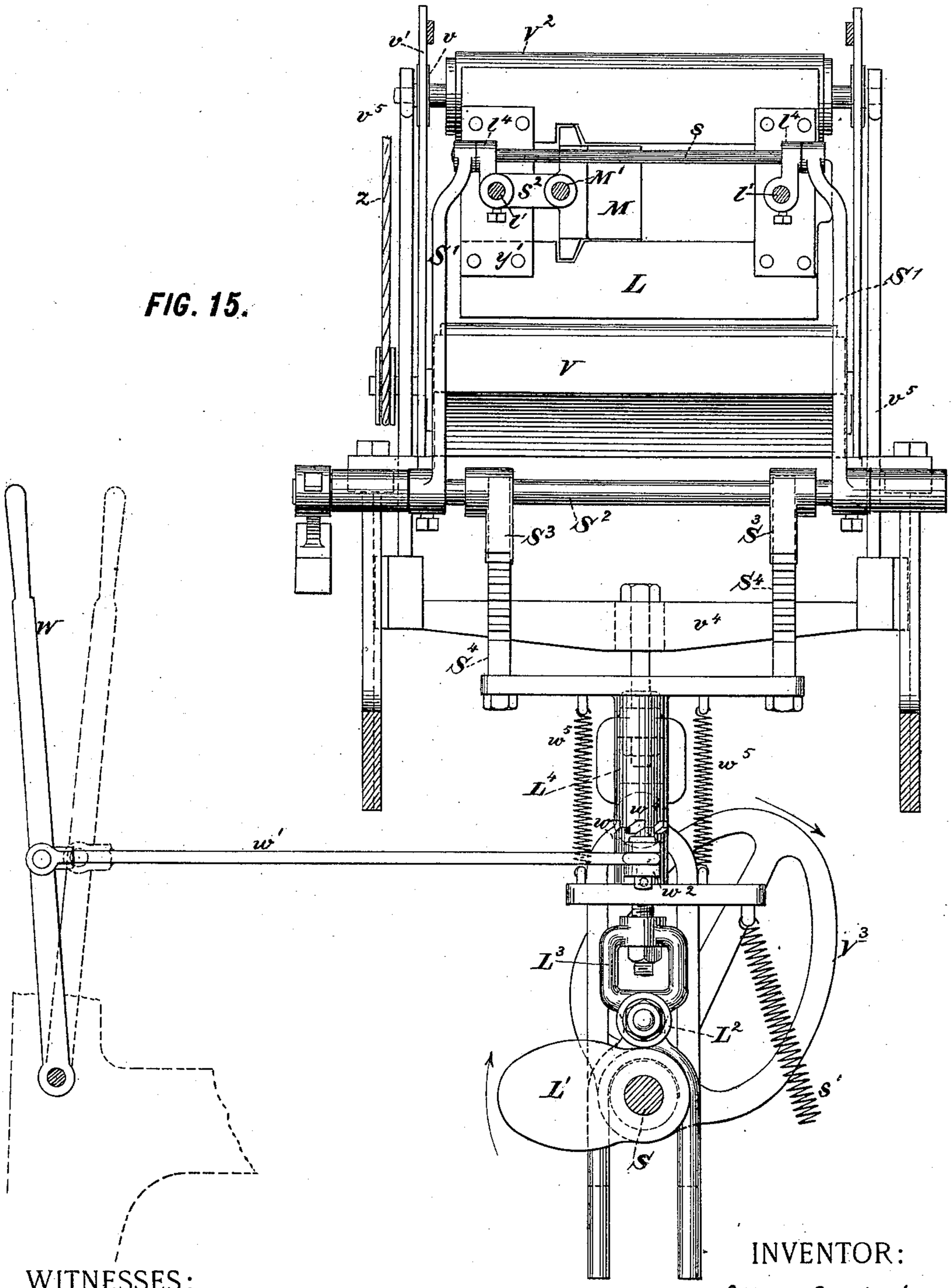

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FIG. 16.

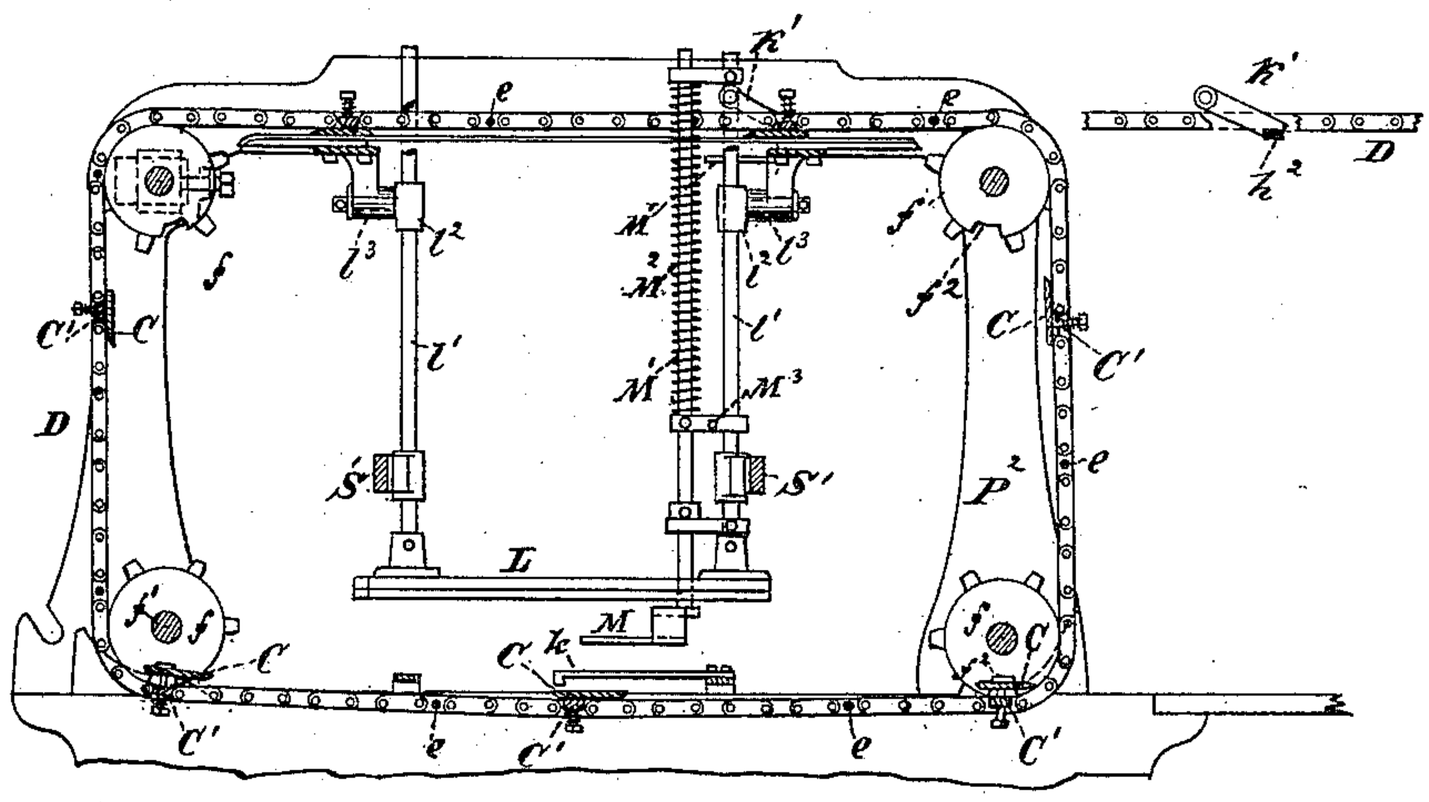


FIG. 17.

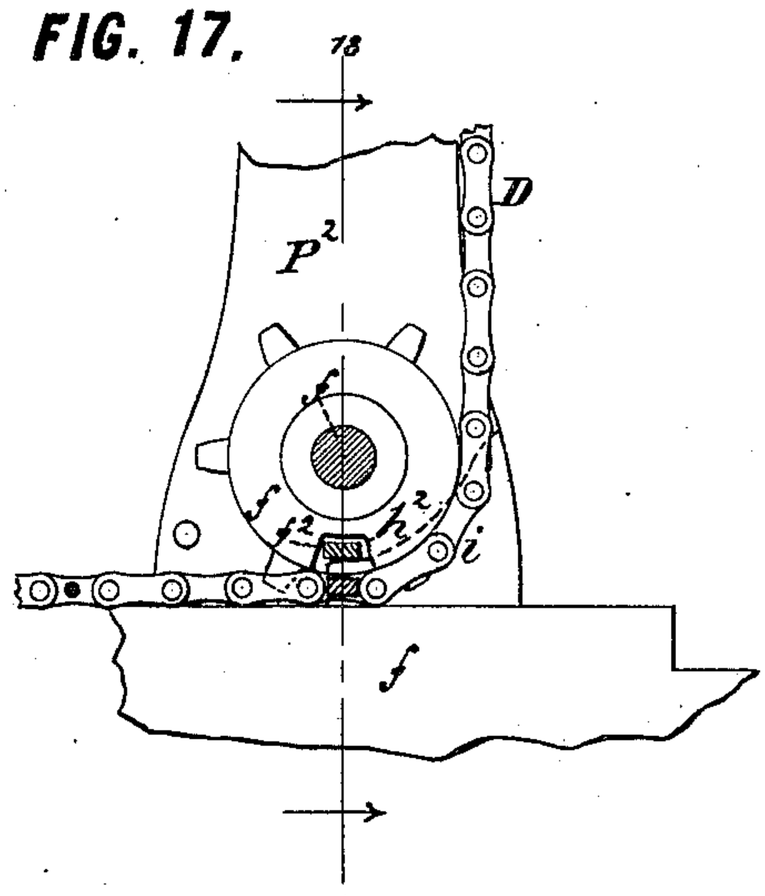


FIG. 18.

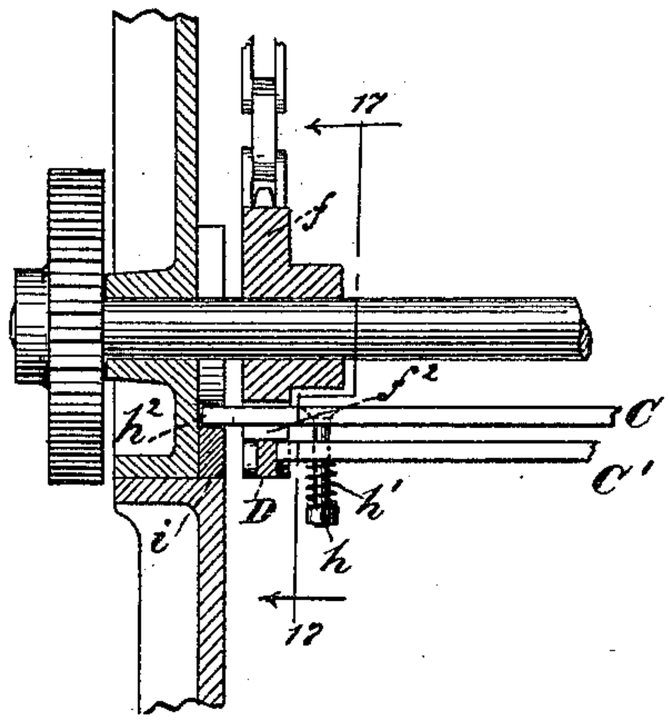
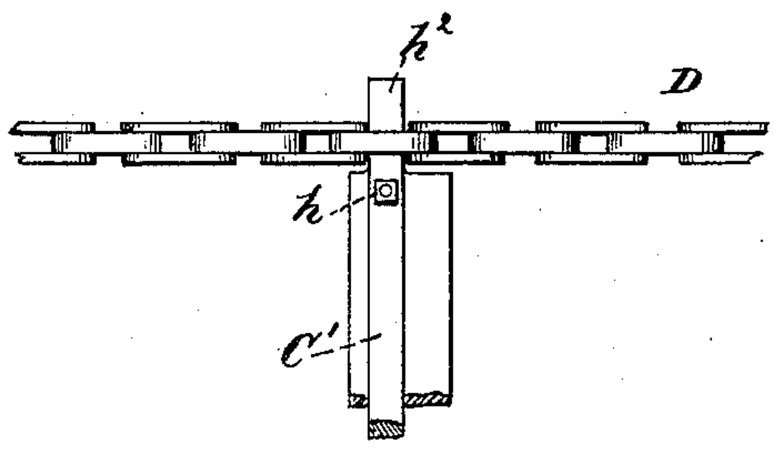
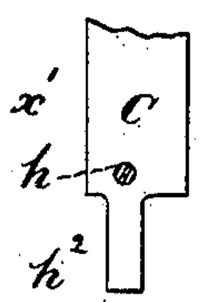


FIG. 19.





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PAPER BAG MACHINE.

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FIG. 20.

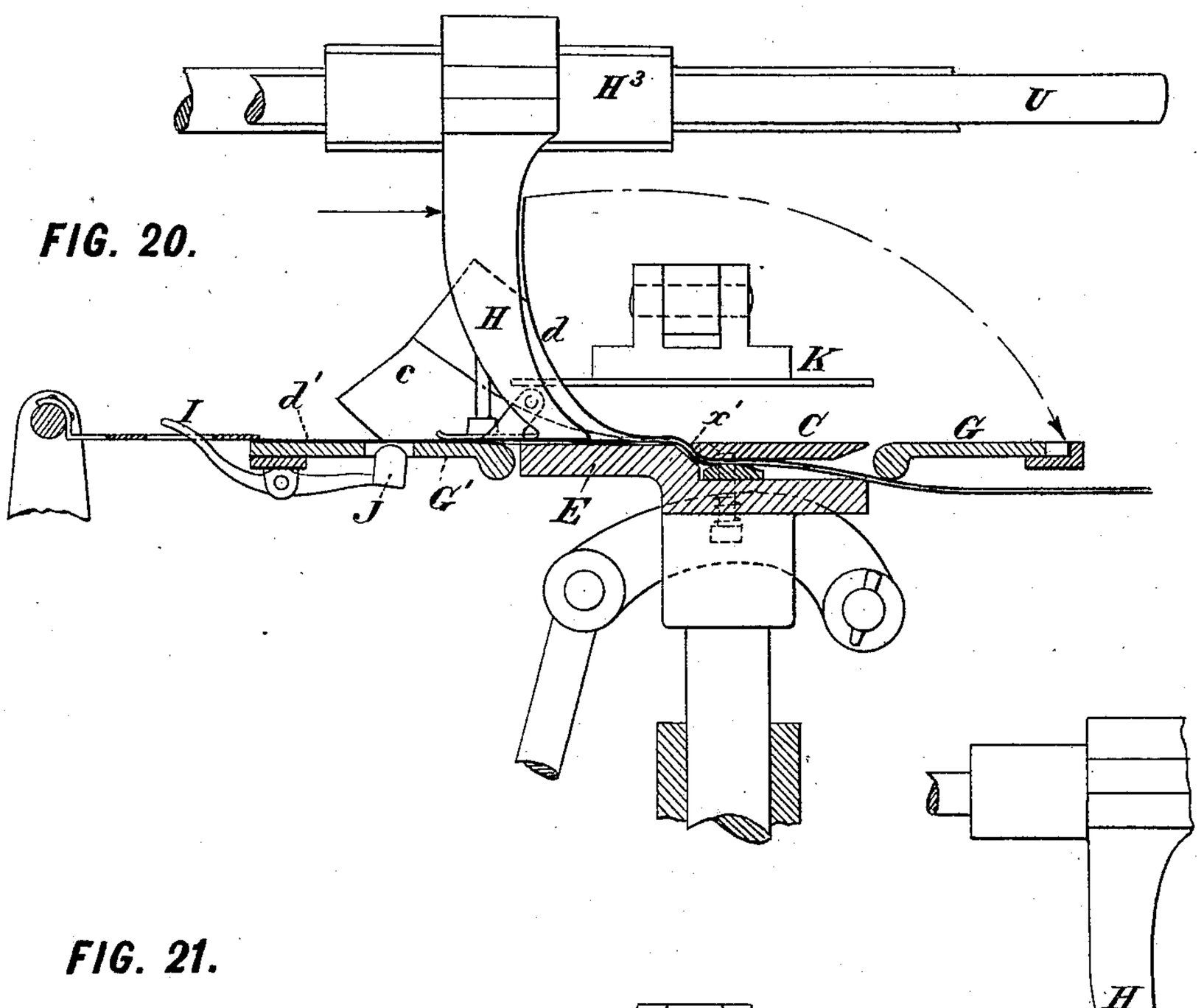
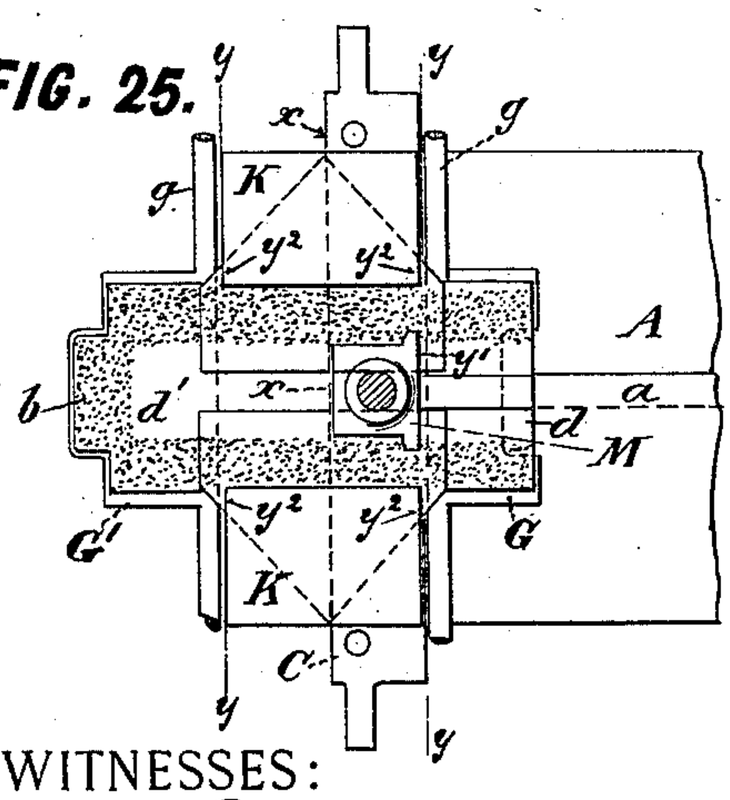


FIG. 21.

FIG. 25.



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PAPER BAG MACHINE.

No. 429,007. Patented May 27, 1890.

FIG. 22.

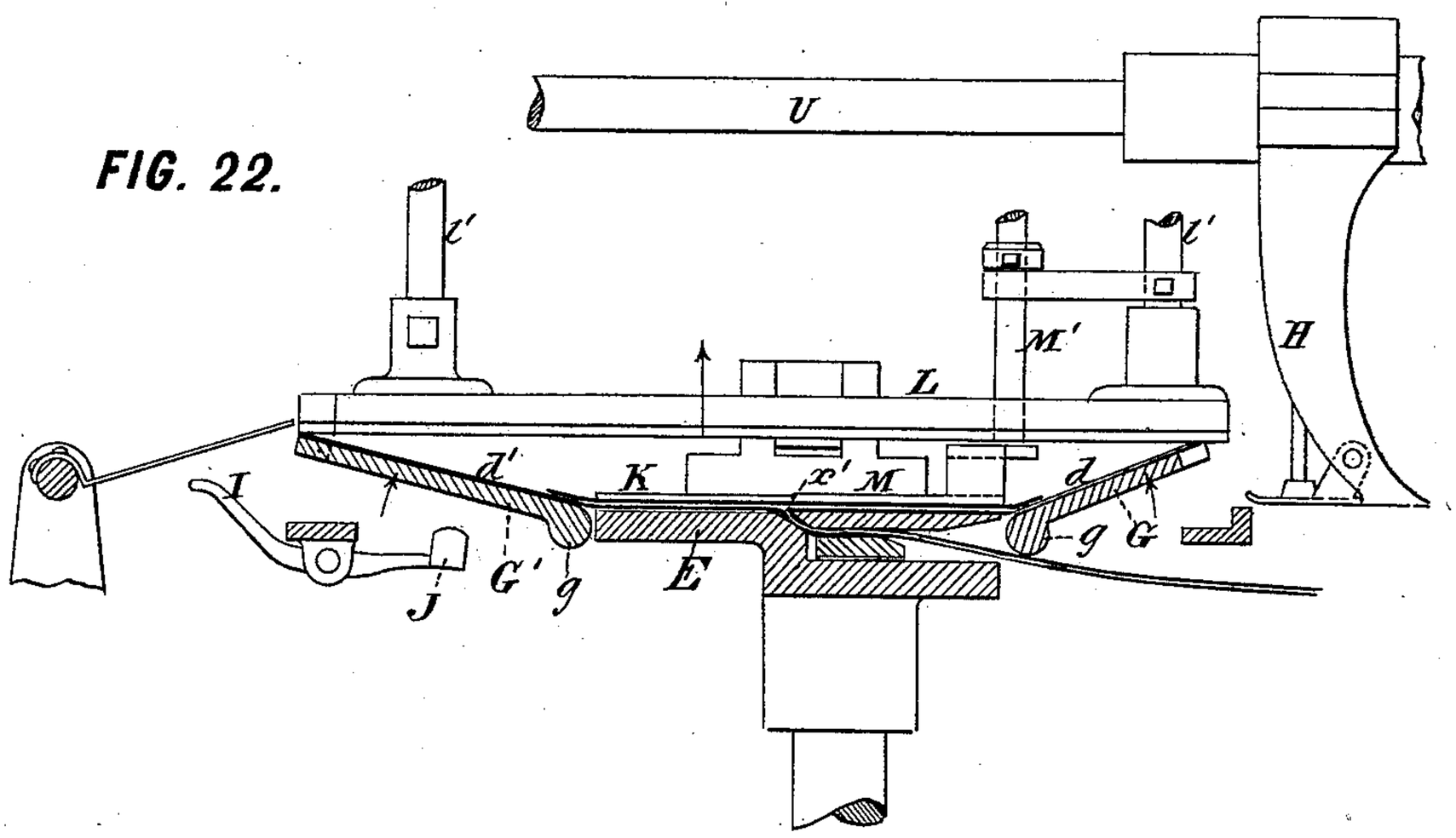


FIG. 23.

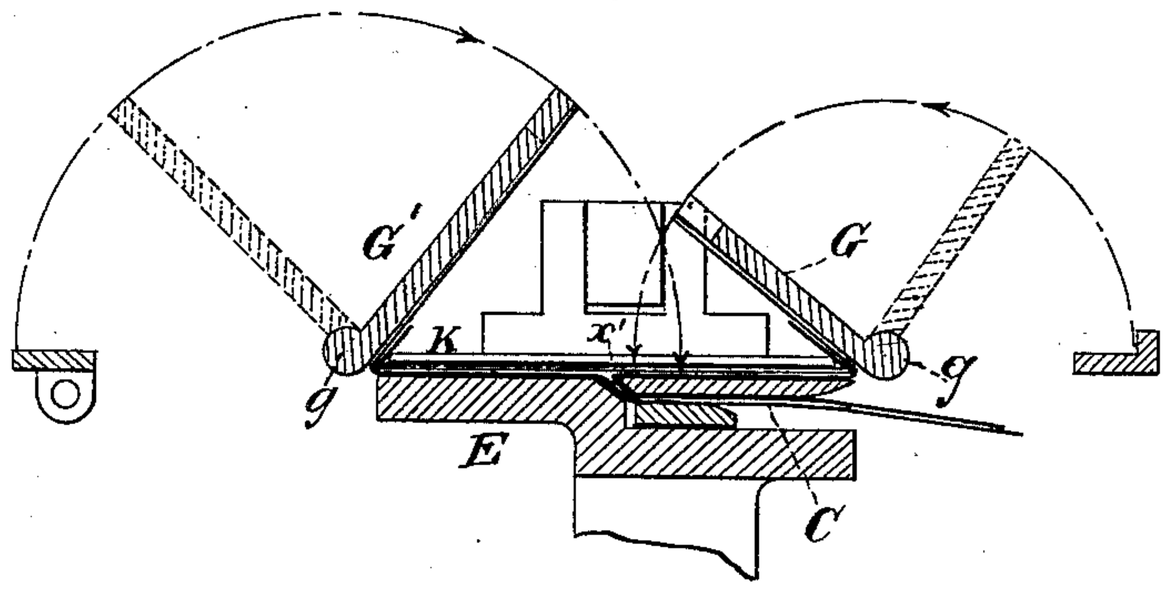
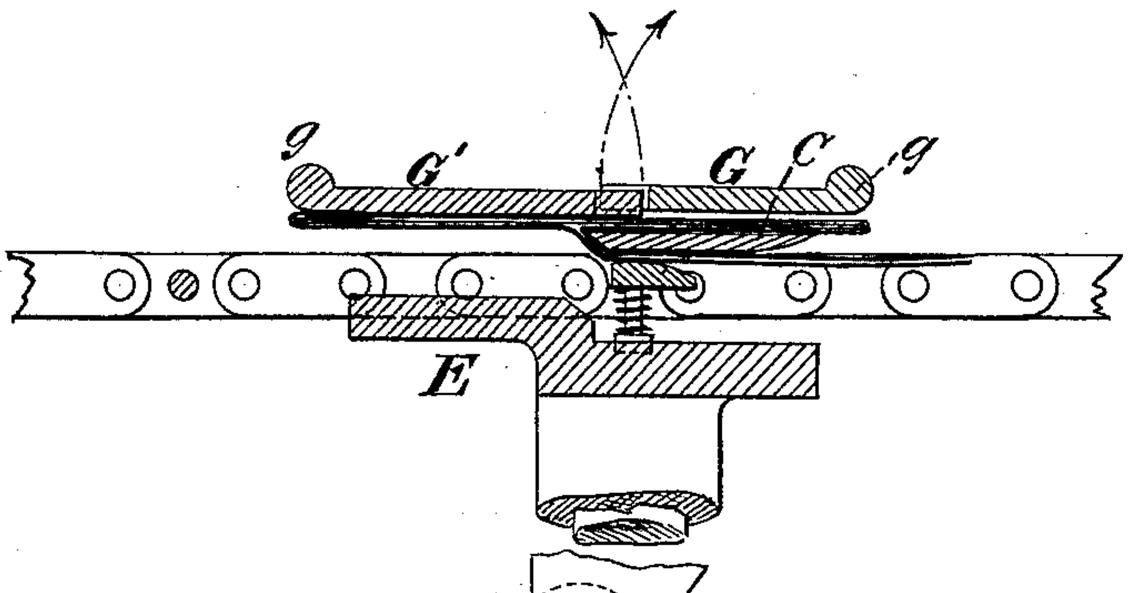
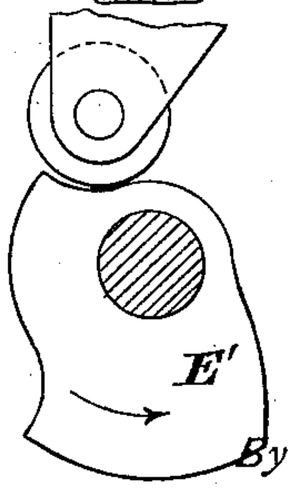


FIG. 24.





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By his Attorneys,
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALFRED BREDENBERG, OF BROOKLYN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WELLS A. BINGHAM, OF NEW YORK, N. Y.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 429,007, dated May 27, 1890.

Application filed February 18, 1889. Serial No. 300,371. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BREDENBERG, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a specification.

In the manufacture of paper bags it is usual to first form the paper into a tube by overlapping the edges of the paper and pasting them together. Subsequently the end portion of the tube thus formed is folded and pasted to form the satchel-bottom. This bottoming operation is sometimes performed in the same machine which makes the tube and sometimes in a different machine. In the latter case the tube-forming machine delivers the flat tubes or blanks cut to the proper length, after which they are fed into the bottoming-machine, which forms the satchel-bottom.

My invention, although applicable to a machine which both forms the tubes and bottoms them, has been by preference embodied in a machine for bottoming the blanks already prepared for it by the tube-forming machine.

My invention relates to bag-machines or bag-bottoming machines of that general class in which the blank being operated upon travels longitudinally, its forward or advancing end being the one that is folded and pasted to form the bottom. It belongs also to the general class of machines in which the bottoming operations are performed while the blank is held stationary. The blank thus fed into the machine is grasped and carried to the bottoming mechanisms, is held stationary during their action upon it, and when the bottom is completed is again carried forward and is delivered out of the machine in time to make room for the next following blank.

In the accompanying drawings, Figures 1 to 5 show the blank in the successive stages of the bottoming operation, Fig. 1 being a plan of the blank as it is fed to the machine, Fig. 2 a plan thereof after the diamond fold has been made and the paste applied, Fig. 3 a longitudinal section of Fig. 2, Fig. 4 a similar view showing the turning up of the bottom folds, and Fig. 5 a plan of the finished bag. The remaining views illustrate my improved bag-bottoming machine in its preferred construction. Fig. 6 is an elevation of the left-hand side of the machine. Fig. 7 is an elevation of the rear or feeding end of the machine. Fig. 8 is an elevation of the right-hand side of the machine on a larger scale, some of the parts being broken away to show those behind them. Fig. 9 is a plan of the machine on the same scale as Fig. 8, the upper portion of the machine being in horizontal section on the lines 9 9 in Figs. 6 and 7. Fig. 10 is a horizontal section cut in the plane of the lines 10 10 in Figs. 6, 8, and 11. Fig. 11 is a vertical longitudinal section in the plane of the lines 11 11 in Figs. 7 and 10. All the preceding views show the machine in one position—namely, at the commencement of the bag-bottoming operation. Fig. 12 is a vertical longitudinal section similar to Fig. 11, but in a slightly-different plane, as denoted by the line 12 12 in Fig. 10, and showing the machine in a different position—namely, during the feeding movement and before the blank reaches the bottoming position. Fig. 13 is a vertical transverse section of the lower portion of the machine cut in the plane of the line 13 13 in Fig. 11. Fig. 14 is a vertical transverse section of the upper portion of the machine cut in the same plane as Fig. 13, but showing the machine in a different position—namely, at the instant when the paste is being applied. Fig. 15 is a fragmentary elevation showing the pasting mechanism alone, viewed from the right, as in Fig. 8, the plan of the section being denoted by the lines 15 15 in Figs. 7 and 14, the parts being in the position shown in Figs. 6 to 11. Fig. 16 is a vertical longitudinal section of the upper part of the machine on the same scale as Fig. 6 and looking in the same direction, all the parts except the carrying-chains and their appurtenances being omitted. Figs. 17 and 18 are fragmentary detail views of one of the grippers and the means for operating it, the former view being a section longitudinally of the machine, and the latter view a vertical section in transverse direction. Fig. 19 is a fragmentary plan of the chain-grippers. Figs. 20 to 24, inclusive, are fragmentary longitudinal sections in the same plane as Fig. 11 and on a somewhat

larger scale, showing the successive operations performed in bottoming the bag. Fig. 25 is a plan on the same scale as Fig. 2, showing one of the bottoming operations.

Before describing my improved machine I will briefly explain the operations performed in the making of a satchel-bottom bag of the character designed to be made by my machine, referring for this purpose to Figs. 1 to 5.

The blank shown in Fig. 1 consists of a flat tube formed by bending a sheet or strip of paper and pasting its edges together to form a seam *a* on one side. On the opposite side of the flat tube is formed a projecting lip *b* at its front end, or end on which the bottom is to be formed, with a corresponding notch *b'* at the other end, as shown in dotted lines. The front end is slitted at *a' a'*, whereby it is divided into four flaps, being two side flaps *c c* and between them two bottom flaps *d d'*, on the latter of which the ear *b* is formed. The blank in this condition is delivered from the blank-forming machine and is fed to the bottoming-machine.

The process of forming the bottom consists, first, in making what is called a "middle crease" on the line *x x* in Fig. 1 by laying the edge of a blade or plate along this line. Then the bottom of the bag is opened by lifting the flap *d* away from the flap *d'* and carrying it toward the right in Fig. 1, thereby bending the paper along the fold *x x*, and by the same movement drawing in the side flaps *c c* and forming the diamond fold, as shown in Fig. 2.

Fig. 3 is a longitudinal section showing the flap *d'* still lying extended, the flap *d* thus opened back and the edge or end of one of the side flaps *c* laid down upon these flaps. Paste is then applied in the manner shown by the stippled surface in Fig. 2.

The next operation consists in creasing the paper along the lines *y y* in Fig. 2 and turning up the flaps *d d'* on these creases in the manner indicated in the sectional view, Fig. 4. The flap *d* is folded down on the flaps *c c*, and the flap *d'* is folded down upon the side flaps and over the flap *d*, whereby the bottom laps are formed, as shown in Fig. 5, which represents the completed bag. The flap *d* is folded down slightly in advance of the flap *d'* in order to fold under it. As these bottom flaps are folded down, they are pressed or squeezed for an instant to cause the opposite surfaces to adhere. The completed bag is then passed out of the machine.

Referring now to Figs. 6 to 24, inclusive, I will proceed to describe the portions of my machine which act directly upon the bag, ignoring for the present the mechanisms by which these parts are given their relative movements.

The bag-blanks lie on a feeding-table B with their slitted ends turned toward the bottoming-machine or toward the left in Figs. 6 and 11. The apparatus being in the position shown in Figs. 6 to 11, inclusive, the attendant feeds one of the blanks into the machine by thrusting its end under a guide-plate b^2 and in between two gripper bars or plates C and C', which are standing at rest in the position shown at the right in Fig. 11 and somewhat separated from one another, so that the blank can be easily slipped in between them. The blank is pushed through between them until its advancing end encounters a stop *c'*, which gages the extent of its feed. The parts pause in this position for a moment. Presently and before the attendant feeds in the next blank the gripper-plates C C' commence to move toward the left in Fig. 11, and instantly thereafter the upper plate C closes down upon the lower one C', thereby gripping the blank tightly between them and carrying it along with them. Simultaneously therewith the stop-finger *c'* lifts and permits the end of the blank to be moved forward. The grippers continue to move to the left, being carried by chains D D until they reach the second position in Fig. 11, where they stand directly over the table E. In making this movement the advancing end of the blank is supported by a cross bar or rod *e*, extending across from one of the chains D to the other. The chains travel or slide along on ledges *e'* until the advancing edge of the blank passes over the table E, whereupon the chains are lifted adjacent to the ends of this table by chain-lifters F F. This lifting of the chains raises the rod *e*, and thereby lifts the advancing edge of the blank up in the manner shown in Fig. 12, in which figure the machine is shown during the period of travel of the grippers. The blank having been carried under the first bottom-lap folder G is thus by the lifting of its advancing edge carried over the second bottom-lap folder G', as clearly shown in Fig. 12. After the advancing end of the blank has arrived over the folder G', and while it is still advancing, an opener H moves from the position shown in Fig. 12 forwardly in the same direction as the blank, but at a more rapid speed, so that it rides over the advancing portion of the blank and presses it down flat upon the surface of the folder G', the opener finally stopping in the position shown in dotted lines in Fig. 11. Before the opener reaches this position, however, and at the instant of the stoppage of the feeding movement of the blank, a holding-clip or gripper-finger I moves down from the position shown in Fig. 12 to that shown in Fig. 11, so that its end presses upon the ear *b* of the blank, thereby gripping the latter against the surface of the folder G'. The parts then come to rest with the grippers C C' in the position shown in Fig. 11, and the opener H in the position shown in that figure in dotted lines. During the feeding or blank-forwarding operation just described the table E has been depressed in the position shown in Fig. 12. The table now begins to rise in order that its higher or left-hand surface shall be brought

up flush with the upper surfaces of the folders G G′; but before it reaches this position the opener H begins to execute its return movement, moving in the direction of the arrow upon it in Fig. 11. The advancing end of the opener is brought to an edge to enable it to enter under the flap *d* of the blank. It is shown in Fig. 11 at the instant of so entering. In order to insure that it shall pass beneath the flap *d* instead of over it, I provide means for lifting this flap, consisting of a finger J, (shown best in Figs. 20 and 21,) which strikes an upward blow through an opening formed in the folder G′ an instant before the opener commences its return movement. This upward blow bulges up the lower flap *d′* and lifts the upper flap *d* above it in the manner shown in Fig. 11, so that when the opener H, which immediately thereafter commences its movement, reaches the end of the blank it is forced to enter under the flap *d*. During this movement of the opener the table E continues to rise, and by the time the opener reaches the table the latter has fully risen, so that its upper surface is flush with that of the folder G′, as shown in Fig. 20. The right-hand portion of the table E is recessed or made of a lower level in order to enable the gripper-plates C C′ to drop into it, as shown in Fig, 20, in order to bring the upper surface of the plate C on a level with the surfaces of the folders G G′. Thus these folders, the table E, and the plate C form together a level and practically continuous surface, over which the opener H slides. This movement of the opener H toward the right from the position shown in dotted lines in Fig. 11 folds the flap *d* back over the advancing edge *x′* of the plate C in the manner shown in Fig. 21. Thus the plate C serves not only as a gripper for feeding along the blank, but also in part as a table on which to fold the bottom of the bag and as a blade for determining the position of the middle fold *x x* in Figs. 1 and 2. The action of the opener not only lays back the flap *d*, but also draws in the side flaps *c c* in the manner well understood, thereby forming the so-called "diamond fold." Two side-folders or side-flap holders K K are provided on opposite sides, as best shown in Figs. 9 and 13. These side-folders are normally elevated in the position shown in Fig. 13; but during or immediately after the backward movement of the opener H they move downwardly and inwardly to the position shown in Fig. 14, where they bear upon the side flaps *c c* and press the latter flat upon the table. The side-folders are shown thus moving down in Fig 21.

The next operation is that of applying paste to the blank, and which is performed by a paster L, which is shown in Figs. 6, 7, and 15 turned up out of action and in Fig. 14 as being down in the act of applying paste to the blank. This paster consists of a platen having the shape indicated by the stippling in Fig. 2, to which paste is applied, and which then moves down and presses its pasted face against the blank while the latter is opened out on the table formed by the combination of the folders G G′, table E, and plate C. The outlines of the bag thus opened out are shown by light dotted lines in Fig. 9, while the outlines of the paster are shown therein in heavy dotted lines. After the paste has been thus applied the next operation is the folding down of the bottom laps *d d′*. An important preliminary to this is the operation of forming the creases or folds on the lines *y y* in Fig. 2. This creasing is performed in part simultaneously with the pasting and in part subsequently thereto.

I have stated that during the pasting the opened blank is supported on the table formed by the flush surfaces of the folders G G′, table E, and plate C. Just previous to the paster coming in contact with the blank a plunger M, carried by the paster and moving in advance of it, comes down upon the portion of the blank which is resting on the plate C, as shown in Fig. 25. The right-hand edge *y′* of this plunger coincides with the position of the crease or fold on the line *y y*. This plunger M acts first to flatten the paper and hold it flat during the pasting operation, thereby preventing any buckling of the paper on or near the seam *a*, where some buckling or bellying is apt to occur. The paster rises in advance of the plunger M, which remains pressed down upon the table, and immediately after or simultaneously with the rising of the paster the bottom-lap folders G G′ commence to turn up until the position shown in Fig. 22 is reached, whereupon the plunger M begins to reascend with the paster. Until this instant the plunger remains down upon the table and continues to press down the blank, and its edge *y′* serves, by reason of the rising angular movement of the folder G, to determine the line of the fold *y* of the bottom lap *d*, this fold being started against the edge *y′* of the plunger. The positions of the bottom folds *y y* are determined also by the side edges y^2 y^2, Fig. 25, of the side-folders K K. The table E remains stationary until the plunger M begins to lift, and immediately thereafter the table commences to descend, the side-folders K K descending with it, and thereby pressing down the portions of the blank on which they rest, and holding these portions against the table so that they are pressed down into the gap or space between the two bottom-folders G G′, whereby the paper is creased between the pivoted edges of these folders and the side edges y^2 y^2 of the side-folders. The table E continues to move down until its upper surface reaches the position shown in Fig. 23, where it pauses. The side-folders K K continue to move down with the plunger until it reaches this position, when they also pause. The functions of the side-folders are, first, to flatten down the diamond fold formed by the turning in of the side flaps *c c;* second, by reason of

their edges y^2 y^2, to break the creases on the lines y y in the corners adjacent to the diamond fold, where the paper is more refractory than at any other place, except on the seam a, and, third, to hold the paper down firmly upon the table both while the latter is resting in its upper position, while it is descending, and during its pause, in order to prevent the lifting of the side flaps during the operation of folding over the bottom laps. As soon as the paster commences to rise the bottom-lap folders G G′ commence to turn up on their pivotal axes g g, which are adjacent to the creases on the lines y y. They are shown in Fig. 22 at the beginning of this movement. These folders swing through an arc of one hundred and eighty degrees, carrying the flaps d and d' with them, the folder G moving sufficiently in advance of the folder G′ to bring the flap d down first, so that the flap d' shall be folded over it. Just before the folder G′ commences to move, the clip I lifts in order to release the paper, and moves up somewhat farther than the folder G′ in order to get out of its way. The side-folders K K remain down against the table until the folders G G′ have swung up beyond the perpendicular and carried the bottom flaps sufficiently inward so that their folds form acute angles, so that there is no longer any possibility of these folds escaping upwardly from between the folders G G′, whereupon the side-folders K K quickly move outwardly and upwardly to their original position. When the bottom-folders G G′ have reached the end of their swinging movement, their active faces lie both in the same plane or flush with each other and parallel with the upper surfaces of the table L′ and plate C, against which they press with a sufficient pressure to squeeze the bottom laps of the bag tightly to their places, this position being maintained for a moment during a resting or dwelling of the parts in order to cause the paste to set and hold the laps down. At the end of this momentary dwell the table E descends lower to the position shown in Fig. 24, whereupon the chains D D are again set in motion, carrying the gripper-plates C C′, and with them the bag, from the intermediate or bottoming position shown in Fig. 11 to the third position shown at the left-hand end of the machine in Fig. 11. Upon arriving in this position the chains again stop and the gripper-plates are opened or separated, leaving a gap between them, through which the bag can be freely drawn. Upon the instant of reaching this position the advancing edge of the bag-bottom is gripped between two delivery-rollers N and N′, which are revolving at a rapid speed, and which draw the bag between them and pass it out of the machine. The upper roller N′ may be made heavy in order to give the bag-bottom a further squeeze during its delivery. The rollers N N′ move rapidly enough to draw the finished bag beyond the table E before the latter begins to move up into the position for forming the bag-bottom on the next successive blank.

The various operations performed upon the blank and the several active elements or tools which perform these operations being now understood, I will now proceed to describe the particular mechanisms for imparting the proper relative motions to these parts. It is to be well understood, however, that my invention is not limited to the particular mechanisms for driving the essential parts or tools which I have adopted in this my preferred construction, since such driving mechanisms are susceptible of considerable variation without departing from the principles introduced by my invention.

The frame of the machine consists, generally, of two side frames P P, formed with legs and spaced apart by cross-frames P′ P′, (shown in Figs. 11 and 12, but omitted in the other figures for the sake of clearness,) and of upper frames P^2 P^2, of inverted-U shape, which are erected upon the frames P P.

The machine is driven by a pulley O, Figs. 6, 7, and 8, on a shaft O′, on which is fixed a pinion, which meshes with a gear Q′ on the main driving-shaft Q. This shaft drives all the operative parts of the machine and executes one revolution to the bottoming of each bag.

I will now describe the mechanism for supporting and moving the carrying-chains D D and operating the grippers. Referring to Figs. 6 and 16, each of these chains is carried over four sprocket-wheels f f, which are fixed on transverse shafts f', which shafts have bearings in the upper frames P^2. The chains are preferably Vaucauson chains. The grippers C C are applied to the chains at uniform intervals, as shown in Fig. 16. The lower plate C′ of each gripper has its opposite ends fastened to links of the chain, as are also the ends of the cross-bars e e. The upper plate or blade C of each gripper is fastened to the plate C′ through the medium of studs h, fixed, preferably, to the plate C, near opposite ends thereof, and working through coinciding holes in the plate C′, the two plates being drawn together through the medium of springs h' applied on these studs, all as best shown in Fig. 18. Each plate C is formed with a projecting end or finger h^2, which extends over and projects beyond the chain D. Each of the sprocket-wheels f is formed with a deep notch f^2 on one side, into which the fingers h^2 of the gripper-plates may enter. The sprocket-wheels are made of such diameter that during the revolution these projecting fingers coincide with and enter the notches. The chief function of these fingers h^2 is to cause the grippers to open when they reach the feeding and delivery positions. This may best be understood by reference to Figs. 17 and 18, which show in detail the construction of the sprocket-wheel and its accessories at the feeding position.

A cam-plate i is applied to or formed into-

grally with the upper frame P^2, its cam-face being so shaped eccentrically to the axis of the sprocket-wheel f that as the plate C passes around this wheel its finger h^2 rides on this cam-face and is pressed thereby inwardly and upwardly, thereby lifting the plate C away from the plate C′, as shown in Fig. 18. When the position shown in Figs. 17 and 18 is reached the chain stops, and while it is thus stopped the blank is fed in between the gripper-plates. When the chain starts again, the finger h^2 slips off the end of the cam i, whereupon the two gripper-springs h' draw the plate C down tightly against the plate C′. At the delivery end of the machine the plate C is again forced away from the plate C′ by a similar cam i', which is shown in dotted lines in Fig. 12 and in full lines in the plan view, Fig. 9. It will be understood that the cams $i\,i'$ are duplicated on the opposite side of the machine in order to lift simultaneously both ends of the plate C.

The intermittent movement of the carrier-chains is imparted to them in the following manner: On the main shaft Q is fixed a toothed sector j, which at each revolution of this shaft comes into mesh, as shown in Fig. 12, with a pinion j', having as many teeth as the sector, and to which the sector imparts one complete revolution. The pinion j' is fixed on a shaft j^2, on which is also fixed a gear j^3, which meshes, as shown in Fig. 8, with a gear j^4, fixed on one of the sprocket-wheel shafts f'. Thus at each revolution of the driving-shaft the sprocket-wheels are turned one revolution, carrying the chain forward the distance from one pair of grippers to the next, and then leaving the chain at rest during the remainder of the revolution of the main shaft.

To prevent the momentum of the parts carrying the chain too far, I provide on each side of the machine a spring-stop k, (shown best in Fig. 16,) the turned-down end of which lies in the path of the projecting finger h^2 on the gripper-plate C and stops the latter, and consequently the chains, in the correct position. The finger h^2 is caused to strike this stop (which is arranged above the line of the direct travel of the chain, as shown in Fig. 16) by reason of the lifting of the chain by the chain-lifter F at this point, as shown in Fig. 8. By this lifting movement, also, the stop k is sprung upwardly, and being a stiff spring-bar it exerts a downward pressure on the finger h^2, which serves the useful purpose of steadying the plate C and holding it firmly during the operations of forming the bottom of the bag. Before the chain is started on again the lifter F descends, thereby lowering the finger h^2 beneath the stop k, so that when it starts forward it clears the stop.

To prevent any rebound of the chain when it stops, a pawl k', Figs. 16 and 14, is provided, which drops in behind the finger h^2 as soon as the latter has passed under it.

The feed stop or gage c' is mounted on a lever c^2 and drawn upwardly by a spring c^3, (or by counterweighting the tail of the lever, if preferred.) The stop is thrown down during the time that the gripper is in the feeding position by the lifting movement of the gripper-plate C, which, as it comes to place, enters under the tail of the lever and lifts it, thereby throwing down the end bearing the stop. When the gripper starts on again and its plate C is dropped by running off the cam i, the stop-lever c^2 tilts back and lifts the stop out of the way.

In the lower part of the machine are mounted three transverse shafts R, S, and T, which are driven from the shaft Q through a train of equal-sized gears $l\,l$, (shown in dotted lines in Fig. 11 and in full lines in plan in Fig. 10,) and from these shafts, which rotate synchronously with the shaft Q, all the remaining parts of the machine are driven.

The chain-lifters F F consist of levers arranged close against and pivoted to the side frames, with their free ends tied together by a cross-bar m, extending transversely from one to the other (see Fig. 13) and connecting by a rod m' to a guiding-fork m^2, which straddles and is guided by the shaft T, and which carries a roller F^2, which rides on the periphery of a cam F′, Fig. 11, fixed on the shaft T, whereby this cam serves to raise and lower the lifters F F in proper time.

The opener H is constructed of the shape shown in side view in Fig. 12 and front view in Fig. 13 and in plan in Fig. 9. It has a bottom plate n, supported by two side arms n', which are fixed to a carrier-frame H^3, which frame slides on longitudinal rods or ways U U, mounted fixedly on the frame-work of the machine.

The opener is operated by the cam H′, fixed on the shaft T, as best shown in Fig. 12. The periphery of this cam acts on a roller H^2, carried on an arm U′, which is fixed on a rock-shaft U^2, extending through to the right-hand side of the machine, as shown in Fig. 13, and to which is fixed a long arm U^3, Figs. 12 and 13, the upper end of which is connected by a link U^4, Figs. 8, 12, and 13, to the sliding frame H^3.

To the arm U^3 is connected a spring H^4, Fig. 8, which imparts motion to the opener during its retractile stroke, while its rearward or active stroke toward the right in Fig. 11 is imparted to it by the rising face n^2, Fig. 12, of the cam H′. This cam has the greater portion of its cam-face concentric for the purpose of holding the opener H stationary in its extreme position toward the right.

By preference the opener H is made with its bottom plate in two parts, the portion n being fixed rigidly to the arms n', as described, while the portion n^3, Fig. 12, is hinged thereto and is pressed down by a spring n^4, Fig. 13, acting through a rod n^5. Thus the tail of the opener is given a yielding motion, causing it to press down the paper upon the table without liability of tearing or injuring it.

The clip or gripper I is mounted on a cross-shaft I^3, Figs. 12 and 9, on one end of which is an arm o, Fig. 8, which connects by a rod o' to a fork o^2, which embraces the shaft T, and carries a roller I^2, which is acted upon by the clip operating cam I', all as best shown in Fig. 8. A spring o^3 acts to press down the clip I, while the cam I' acts to lift it up.

The finger J is mounted on a lever J', Fig. 12, which is fulcrumed beneath a cross-bar p', extending across the machine and supporting the free edge of the hinged folder G'. The folder G is similarly supported by a cross-bar p. The tail of the lever J' enters freely a hole or opening cut in the clip I, as shown in Fig. 20, and when the opener H is making its retractile stroke toward the left in Fig. 12 its plate n^3 encounters this tail and presses it down with a quick motion, thereby throwing the finger J up and causing it to strike a blow upon the blank, which by this time is held by the gripper I, so that its lower flap cannot escape, but is bulged up by the opener, thereby lifting up the free edge of its upper flap, as shown in Fig. 11. The opener H makes the return movement instantly and before the flap has had time to settle back to place, so that it enters with certainty under it.

The movement of the table E up and down is imparted to it by a cam E', carried by the shaft S and acting upon a roller E^2, mounted at the lower end of a vertical post or pillar E^3, which slides freely through a vertical opening in a cross-frame P^3, and on the upper end of which pillar the table E is mounted, all as clearly shown in Figs. 11, 12, and 13. The cam E' is formed with concentric surfaces at three different radial distances in order to cause the table to pause at three different elevations. The portion of greatest radius lifts the table to its upper position on a level with the folders G G' and holds it there during the opening and pasting operations. The portion of next smaller radius causes the table to pause during its downward motion in the position shown in Fig. 23, where the folded-down laps are being pressed. The concentric portion of the smallest radius causes the table to pause in its lowest position, Fig. 24, during the time that the finished bag is being fed out and the next blank fed in over the table, as shown in Fig. 12.

The side-folders K K consist of flat plates, the width of which between their edges y^2 y^2 is equal to the width of the bottom of the finished bag or the width of the laps between the folds y y in Fig. 2. Each folder is pivoted on a longitudinal horizontal axis to a lever or dog q, which lever is pivoted to the end of an elbow-lever q', a spring q^2 intervening and serving to throw down the side-folder with a yielding pressure. The elbow-lever q' is pivoted at q^3 on a bracket q^4, fixed to the side frame of the machine, as shown in Figs. 8 and 13, and its short arm q^5 projects toward the middle of the machine and is forked or slotted both vertically and transversely. Into the vertical fork projects a block or arm r' on the upper end of a post or pillar r, which slides vertically in a hole formed in the cross-frame P^3. This block r' carries a pin r^2, which projects to both sides and enters the transverse forks in the arm q^5. The lower end of the post r carries a cross-pin r^3, which is grasped by a similar doubly-bifurcated end r^4 of a lever K^3, which is fulcrumed loosely on the shaft Q, as shown in Figs. 10 and 11. This lever K^3 carries a roller K^2, which rides on the cam K', fixed on the shaft R, by which cam the grippers K K are operated. Motion is thus communicated to the grippers from this cam through the roller to the lever K^3, which, as shown in Fig. 10, has two arms extending to the opposite sides of the machine, thence to the vertically-sliding posts r r, thence to the two elbow-levers q' q', and from them through the dogs q q to the side-folders K K. The levers q' q' are retracted against the action of the cam by a spring K^4, Fig. 13, which extends across from one lever to the other. The side-folders K K are thus moved down obliquely, turning around the centers q^3 until they strike the table, when they are pressed down flat upon it, and by the continued motion of the levers q' they are pushed flatwise over the surface of the table toward each other, the springs q^2 being compressed during this movement. When the table descends to make the side creases y y, Fig. 2, the side-folders K K follow it vertically downward by reason of the tension of these springs q^2 until, when the folders G G' have turned up far enough to confine the folds y y, the cam K', by lifting the lever K^3, causes the folders K K to move outwardly and upwardly to their original positions.

I will now describe the pasting mechanism. The paster L consists of a rectangular plate with an open space cut into it from one end nearly to the other, as shown in Figs. 6 and 15. This plate is mounted rigidly on two rods l' l', which extend back from it, as shown in Fig. 7, and pass through holes in guide-heads l^2 l^2, which are mounted to oscillate in bearings l^3, Fig. 16, which are fixedly attached to the top frames P^2 P^2. The rods l' are free to slide through the holes in the heads l^2. Blocks l^4 are fixed to the rods l', and through these blocks passes a rod s, the ends of which are fixed in the ends of lever-arms S' S', which are fixed to a rock-shaft S^2. As this shaft oscillates the arm S' moves from the position shown in dotted lines in Fig. 14 down to that shown in full lines and back again, the axis of the rod s traversing the dotted arc. During this movement the paster L is moved from its position in a vertical plane (shown in Fig. 7) down to its position in a horizontal plane with its pasted face against the blank, as shown in Fig. 14, its rods l' meanwhile sliding freely in the heads l^2. This oscillatory motion is imparted to the shaft in order to work the paster by means of a cam L', fixed on the shaft S and working against a roller L^2,

mounted on an upright frame L^3 L^4, Fig. 15, the upper part L^4 thereof being formed of T shape and having fixed to each of its arms a rack S^4, which rack meshes with toothed segments S^3 S^3, fixed on the shaft S^2. The cam L′ imparts an up-and-down reciprocating movement to the frame, and hence a corresponding oscillatory movement to the shaft S^2, whereby the paster is brought from its upper position down upon the blank and immediately returned, after which the parts remain at rest for something more than half a revolution of the shaft S, during which time the paster, which stands as shown in Fig. 7, receives a fresh coating of paste. The downward movement of the frame L^3 L^4 is preferably assisted by a spring s'.

The paste is placed in a vessel V, Fig. 14, in which turns a roller V′, driven by a belt z', Figs. 6 and 7. During about one-third of each revolution of the power-shaft a roller V^2 rests in contact with the roller V′ and receives paste therefrom. Subsequently this roller V^2 is lifted bodily and again lowered, gears v v on its opposite ends coming in mesh with racks v', fixed to the frame, imparting to it a rotary motion as it ascends and descends. This roller thus rolls up and down across the face of the paster L and in contact therewith, thereby spreading the paste in a uniform coating upon the face of the paster. The up-and-down movements of the roller V^2 are imparted by a cam V^3, Figs. 6, 13, and 15, acting against a roller v^2, carried on a vertically-sliding frame v^3, which carries a T-head v^4, to the opposite arms of which are fixed two vertical rods v^5 v^5, the forked upper ends of which engage the journals of the roller V^2. The pasting mechanism as thus far described is not new with me.

It is sometimes desirable in the operation of the machine to be able to throw the pasting mechanism out of action—as, for example, in case the operator should miss the feed—so that during one cycle of operations the machine would have no blank to operate upon, in which case if the paster were to come down as usual it would smear the table E, plate C, and folders G G′ with paste. To avoid this I have devised means for arresting the operation of the paster, which I will now describe.

On the left-hand side of the machine, adjacent to the feed-table B and in position where the operator can conveniently reach it, is placed a throw-off lever W, Figs. 6, 7, and 15. This lever is connected by a rod w' to a crank w^2, formed on an oscillatory sleeve w, which is interposed between the sections L^3 and L^4 of the vertically-sliding frame, through which the motion is communicated between the cam L′ and the oscillating shaft S^2. This sleeve w turns freely on a vertical stud or pin w^3, Fig. 14, on which the tubular portion w^4 of the section L^4 of this frame slides freely. The lower end of this tubular portion w^4 and the upper end of the sleeve w are formed with reciprocally-inclined notches or cam-faces, as shown best in Fig. 15, which when the sleeve w is oscillated in one direction close into one another, thereby shortening the frame L^3 L^4, and when the sleeve is oscillated in the opposite direction to the proper extent the inclines lift up the section L^4, thereby lengthening the frame. These oscillatory motions are communicated to the sleeve from the lever W through the rod w'. When the lever is in the position shown in full lines in Fig. 15, the frame L^3 L^4 is of its normal length and the paster L comes fully down and pastes the blank. When, however, the lever W is thrown over to the position shown in dotted lines in Fig. 15, the frame L^3 L^4 is shortened, so that the paster comes down a proportionately less distance, so that in its lowest position it stands sufficiently above the surfaces of the parts G′, E, C, and G, forming the table on which the pasting is done, so that no paste can be applied to these parts even if the blank be not fed in. The two sections of the frame L^3 L^4 are drawn together by springs w^5.

The plunger M is mounted on a rod M′, extending parallel with and between the paster-rods l' and sliding in guides s^2, carried by one of these rods. The plunger thus moves with the paster and has a movement independently thereof parallel with the axes of the rods l'. This latter movement is imparted to it by a spring M^2, which tends to press the plunger beyond the face of the paster until it is arrested by the abutting of a collar s^3 on its rod M′ against the stop or guide s^2. To prevent the plunger projecting thus beyond the paster when the latter is in its upper position, where it receives paste, and in order to draw the plunger back, so that it shall not project as far as the paster, to prevent paste being applied to it, the plunger is provided with an arm M^3, projecting from its rod M′, which arm, as the paster moves upwardly and outwardly, encounters a stop-bar M^4, Fig. 14, on the frame, and is arrested thereby, as shown in Fig. 7, while the paster continues to move outwardly to its paste-receiving position. Upon the paster being carried down the paster M upon the release of its arm M^3 moves with the paster and projects beyond its pasted face, and as the paster comes down toward the blank the plunger, being in advance of it, encounters the blank first in the position shown in Fig. 25 and presses down the portion of the blank in which the seam a is formed, thereby holding the blank flat during the pasting, and when the paster lifts again the plunger remains down and continues to hold down the blank, thereby preventing its being pulled up by adherence to the paster. The plunger continues down after the lifting of the paster and during the ascent of the folder G long enough to cause its edge y' to determine the folding of the paper on the line y y, after which by the continued ascent of the paster and upon the abutting of the stops s^2 s^3 the plunger is caused to move upward again with the paster.

I will now describe the means for operating the bottom-folders G G′. It is to be observed that these two folders are substantially counterparts of each other and their operating mechanisms are substantially alike, the only difference being that their operating-cams are so formed and set that the folder G is caused to move slightly in advance of and somewhat quicker than the folder G′. These folders are driven, respectively, by the cams X and X′, fixed, respectively, on the shafts R and T, as best shown in Fig. 8. These cams act against rollers G^2 G^2, carried by vertically-sliding frames G^3 G^3, the upper portions of which frames are provided with racks g' g', the teeth of which mesh with sector-pinions g^2 g^2, fixed on the ends of the respective shafts g g of the respective folders G G′. The cams impart, first, a slow upward movement to each of the frames G^3, then a short dwell, then a quick downward movement, and then a long dwell. These motions result, first, in the folding movements of the folders G G′, wherein they swing toward each other; second, in the dwell of the folders when they have reached the position shown in Fig. 24; third, in the quick return movement of the folders, and, fourth, in their prolonged dwell in the position shown in Fig. 12 during the feeding on of the blank and the opening, side-folding, and pasting thereof. The cams X X′ impart the folding movement to the folders, their retractile motions being derived from springs X^2 X^2.

The delivery-roller N is driven from the shaft S through the medium of a chain *t*, Fig. 6, carried over a sprocket-wheel *t′* on the shaft S and a sprocket-wheel t^2 on the shaft of the roller N.

My improved machine which I have thus fully described has been found by practical operation to possess the important advantage over prior bag-bottoming machines that it is capable of successfully making bags of very heavy paper, such as large flour-bags. This advantage I attribute in part to the construction of the grippers C C′, by which the blank is firmly and securely held during not only the feeding but also during the bottoming operations, and partly to the improved combination of bottoming mechanisms provided by my invention, whereby the folds on the lines *y y* in Fig. 2 are deeply creased by a downward movement of the table E with the side-folders K K relatively to the bottom-folders G G′.

Certain of the accessory features of my machine—such as the plunger M, the clip I, the striking-finger J, the smoothing action of the opener H during its retractile stroke, the chain-stops *k′ k′*, and the chain-lifters F F—also contribute in an important degree to the practical advantage realized in the operation of my machine.

The constructions introduced by my invention are such that all of the working parts may be made of ample strength, and the several motions are of such character that a relatively high speed can be attained considering the heavy character of the paper upon which my machine is designed to operate.

For making bags of comparatively thin paper my machine is also advantageous, although it does not possess the same degree of advantage over prior machines, especially those of the type wherein the blank is moved forward continuously during the successive manipulations, wherein a somewhat higher speed can be attained when operating on thin paper.

It will be understood that my invention may be variously modified without departing from its essential features. I have not deemed it necessary to illustrate any such modifications, believing them to be easily within the province of a skilled mechanician.

It is also to be noted that certain parts or novel features of my invention might be adopted in other machines without necessarily employing in connection with them the other elements or features which in my complete machine are constructed to co-operate with them. Thus, for example, the feeding-grippers might be employed with different bottoming mechanisms, and these grippers might be propelled by other means than by chains, and my rising and falling table might be used with other folding mechanisms, and my opener H might be employed with different mechanisms for creasing the folds and laying down the flaps; or the plunger M might be employed by itself and without reference to the particular construction of the pasting mechanism shown, or the novel features of my side-folders K K might be applied to other machines wherein such side-folders are used without necessarily employing any other features of my invention.

The particular construction of bottom-lap folders G G′ employed in my machine—namely, that of hinged leaves swinging toward each other, the one slightly in advance of the other—is not in itself new and may be substituted by any other known form of bottom-lap folders.

I claim as my invention the following-defined novel features and combinations applied to bag-machines, or bag-bottoming machines, or other analogous mechanisms, the same being substantially as hereinbefore specified, namely:

1. The combination, with bottoming mechanisms, of grippers movable to three positions—a feeding position, a bottoming position, and a delivering position—a driving mechanism for driving said grippers intermittently, stopping them at said positions, and gripper-openers for opening said grippers in their receiving and delivery positions, whereby in their movement from the former to the latter and during their stop at the bottoming position they continue to grip the blank.

2. In a machine for bottoming bags, the combination of grippers for grasping the blank, constructed to engage it at the ad-

vancing end on which the bottom is to be formed, a feeding mechanism for advancing the successive grippers intermittently, gripper-openers arranged to open the grippers in the feeding and delivering positions, and bottoming mechanisms arranged to act on the blank while it is held stationary in a position of the grippers intermediate of said feeding and delivering positions.

3. The combination, with endless chains and sprocket-wheels carrying them, of a gripper consisting of two plates extending between said chains, one plate fastened to the chains and the other connected to it and formed with end fingers extending beyond it, springs for pressing said plates together, and opening-cams arranged in positions to be encountered by said fingers as the latter move to the feeding and delivery positions of the gripper and constructed to displace the latter out of their normal line of movement, and thereby to press the plate having said fingers away from the other plate against the tension of said springs.

4. The combination of grippers for feeding the blank, each consisting of two plates arranged to extend transversely across the blank, adapted to engage the blank between them, and one of said plates formed with a straight edge and engaging the blank with that edge coincident with the position for the middle bottom fold, driving mechanism for advancing the grippers intermittently from a feeding position to a bottoming position, and bottoming mechanism for forming the bottom while the blank is held stationary in the bottoming position, comprising a blank-opener for folding open the bottom flap over said edge, a paster for pasting the diamond fold, and folders for turning down the flaps.

5. The combination, with bottoming mechanisms, of grippers for feeding the blank, each consisting of two plates arranged to extend transversely across the blank and adapted to engage the blank between them, and one of said plates formed with a straight edge, a gaging-stop against which to feed the blank, arranged beyond said edge in the feeding position of the grippers a distance equal to that from the end of the blank to the middle fold, whereby the grippers engage the blank with said edge coincident with the position of such fold, and a blank-opener for folding open the bottom flap over said edge.

6. The gripper consisting of two parallel plates arranged to extend across the blank and to be brought together against the same on opposite sides after the blank has been fed between them, and a gaging-stop for limiting the feeding of the blank, mounted on a lever, the tail of which overlies the feeding position of the upper gripper-plate, whereby when the latter closes down upon the blank the lever is tilted and the gage lifted out of the way of the blank.

7. The combination, with endless chains and sprocket-wheels carrying them, of grippers consisting of plates extending between said chains, a driving-gear for intermittently propelling said chains at each movement the distance from one gripper to the next, and stops arranged to arrest the chains at the end of each such movement, whereby the displacement of the grippers by momentum is prevented.

8. The combination, with endless chains and sprocket-wheels carrying them, of grippers consisting of plates extending between said chains, a driving-gear for intermittently propelling said chains at each movement the distance from one gripper to the next, stops for arresting the chains at the end of each movement, and pawls arranged behind some projecting part of the chains as the latter reach the end of each movement, whereby the recoil of the chains is prevented.

9. The combination, with feeding-grippers and carrying-chains therefor, of bottoming mechanisms and chain-lifters adapted to lift said chains at intervals, arranged adjacent to said bottoming mechanisms.

10. The combination, with endless chains and sprocket-wheels carrying them, of grippers consisting each of two plates extending between the chains and adapted to grip the blank between them, and rods for supporting the portion of the blank in advance of said grippers, and chain-lifters arranged beneath the respective chains and adapted to move upwardly and lift said chains during the passage over them of said supporting-rod.

11. In a bottoming-machine wherein the blank is fed longitudinally, the combination of endless carrier-chains, plates extending transversely between them, having straight edges, and arranged to overlie the successive blanks, with said edges extending transversely thereof and coincident with the position of the middle fold of the bag-bottom, driving-gear for advancing said chains intermittently at each movement a distance from one plate to the next, and a table immovable in longitudinal direction arranged at one of the stopping positions of said plates, and folders for folding down the bottom laps upon said table.

12. In a bottoming-machine wherein the blanks are fed intermittently, the combination of a stationary table over which the blank is fed, a clip for holding the end of the lower flap, and a plate having a straight edge arranged to overlie the blank, with such edge coincident with the position of the middle fold of the bag-bottom, and an opener moving on guides parallel with the table and reciprocating in direction longitudinally of the blank and adapted to enter under the upper flap and fold it open over said plate in order to form the diamond fold.

13. In a bottoming-machine wherein the blanks are moved intermittently and the bottoming operations are performed while the blank is stationary, the combination of a table on which the bottom laps are folded, station-

ary in longitudinal direction and movable up and down, with driving mechanism for moving said table up after the blank is fed to place and moving it down before the beginning of the next feeding movement.

14. In a bottoming-machine wherein the blanks are moved intermittently and the bottoming operations are performed while the blank is stationary, the combination of two bottom-lap folders, a table movable up and down in the space between them, and feeding mechanism for introducing the blank longitudinally beneath the first bottom-folder and over the table and over the second bottom-folder, with driving mechanism for raising the table to position between said folders after the blank has been fed to the bottoming position.

15. The combination of two bottom-lap folders consisting of hinged leaves with their pivotal sides toward each other, a table movable up and down in the space between said leaves, a plate having a straight edge arranged to extend transversely across the blank, with said edge coincident with the position of the middle fold, driving mechanism for lifting the table after the blank is fed to place, whereby the upper surfaces of the table and side-folders and plate are brought substantially flush with one another to form a continuous flat table or support on which to open and paste the diamond fold, an opener constructed to reciprocate over said supporting-surface, and a paster constructed to subsequently come down thereon and apply paste to the blank.

16. The combination of bottom-lap folders, a table movable into and out of the space between them, a plate having a straight edge over which the middle fold is formed, a reciprocating opener movable over said folders, table, and plate, and side-fold holders constructed to press the folds down upon the table after they have been formed by said opener.

17. The combination of bottom-lap folders, a table movable into and out of the space between them, an opener for opening the diamond fold, and side-folders constructed to descend upon said table and press down the side folds, and driving mechanism for moving said side folders relatively to the bottom-folders into or partly through the space between the bottom-folders, whereby the folds for the bottom laps are creased between the side-folders and bottom-folders.

18. The combination of bottom-lap folders, a table movable into and out of the space between them, an opener for opening the diamond fold, and side-folders movable against the table to press the side folds, and driving mechanism adapted to move said side-folders relatively to the bottom-folders into or partly through the space between the bottom-folders in order to crease the folds for the bottom laps; secondly, to turn over the bottom-folders, and, finally, when the latter have carried the bottom-laps beyond the perpendicular, to withdraw the side-folders.

19. The combination of bottom-folders, a table movable into and out of the space between them, side-folders for pressing the side folds down upon said table, and mechanism for subsequently moving the side-folders and table relatively to the bottom-folders into and partly through the space between the bottom-folders in order to crease the bottom folds, withdrawing the side-folders and leaving the table in position for laying down the bottom folds upon it, and turning over the bottom-folders upon said table in order to press the bottom laps between the bottom-folders and the table.

20. The combination of bottom-folders consisting of hinged leaves adapted to turn toward each other, a table movable into and out of the space between them, side-folders adapted to crease the bottom folds by moving into the space between the bottom-folders, and driving mechanism adapted to move the table, first, into the space between said bottom-folders and to a level therewith; secondly, down into position for folding the bottom laps and turning over the bottom-folders upon it while in that position in order to squeeze the bottom laps between said folders and table, and, thirdly, to move the table farther down in order to leave space for the feeding out of the finished bag between the table and folders.

21. In a bag-bottoming mechanism, the combination, with a table for supporting the blank, bottom-lap folders for turning the laps down upon said table, and an opener for opening the diamond fold, of a plunger constructed to move downwardly into position between said folders, with its edge adjacent to one of the latter in order to determine the position of the middle portion of the fold for the bottom lap.

22. In a bag-bottoming mechanism, the combination, with bottom-lap folders for turning down the laps, a table movable relatively to said lap-folders into and below the space between them, and an opener for opening the diamond fold, of a plunger constructed to be pressed down upon said table, with its edge close to the inner side of one of said folders, and driving mechanism constructed to commence to move up said folder while said plunger remains against the table, whereby the position for the middle portion of the fold for the bottom lap is determined, and to subsequently lift said plunger out of the way of the bottom-folder.

23. The combination, with the bottom-lap folders, of a table movable into and out of the space between them, side-folders movable down upon said table and into the space between the bottom-folders, and a plunger movable down into position between the bottom-folders and arranged with its edge adjacent to one of said folders in line with the edges

of the side-folders, whereby the side-folders and said plunger co-operate to determine and crease the fold for the bottom lap.

24. The combination, with a paster movable down upon the blank and upwardly therefrom to a paste-receiving position and with a paste-applying roller for applying the paste to the face of said paster when in the latter position, of a plunger carried by said paster and projecting normally beyond the face thereof, a spring against which said plunger is seated, and abutting stops for retracting said plunger beneath the face of the paster when the latter moves to the paste-receiving position in order that paste shall not be applied to the plunger.

25. The combination, with bag-bottoming mechanisms and a feeding mechanism for feeding the blank to the bottoming position, of a flat reciprocating opener constructed to move in its retractile stroke in contact with the moving blank and at a faster speed, and thereby to smooth the blank and lay it down in place and on its active stroke to enter between the bottom flaps and open the diamond fold.

26. The combination, with bag bottoming and feeding mechanisms, of an opener mounted to reciprocate over the blank and constructed with a yielding shoe on its rear side, whereby said shoe moves in advance during the retractile stroke of the opener and presses down the blank smoothly to place preparatory to the active or opening stroke of the opener.

27. The combination, with a feeding mechanism for carrying the blank to the bottoming position, of a clip for gripping the undermost bottom flap, a finger constructed to strike upwardly from beneath and thereby separate and lift the uppermost bottom flap, and an opener constructed to subsequently enter between said bottom flaps and open out the diamond fold.

28. The combination, with a feeding mechanism for carrying the blank to the bottoming position, of a clip for gripping the undermost bottom flap, a reciprocating opener, and a lever carrying a striking-finger on one arm and having its other arm projecting up into the path of said opener, whereby it is struck by the opener during the retractile movement thereof, thereby tilting the lever and throwing up said finger against the bottom flap, whereby the uppermost flap is separated and lifted above the lowermost one in order that upon the return-stroke of the opener it shall enter between said flaps.

29. The combination of two endless chains, sprocket-wheels carrying them, gripper-plates extending transversely between said chains, two bottom-lap folders arranged above the normal path of travel of said chains, and a table movable beneath the path of travel of said chains, with driving mechanism for advancing said chains intermittently and stopping them each time with one of said grippers over said table, and for subsequently lifting said table and gripper into the space between said bottom-folders, and for finally dropping said table again before the next movement of the chains.

30. In a bag-bottoming machine, a reciprocating paster movable against the blank and away therefrom, a reciprocating frame, constructed to be extended or collapsed, connected to said paster and communicating motion thereto, a driving mechanism for reciprocating said frame, a throw-off lever, and mechanism in connection with said lever for changing the length of said reciprocating frame upon the displacement of the lever, whereby the stroke of the paster as it approaches the paste-applying position is shortened and the application of paste is prevented.

31. In a bag-bottoming machine, a paster L, vibrating arms S′, for imparting motion thereto, sectors S^3 in connection with said arms, a cam L′, and a frame L^3 L^4, reciprocated by said cam and carrying racks meshing with said sectors, in combination with a throw-off lever W and mechanism in connection therewith for changing the length of said frame L^3 L^4 upon the displacement of said lever, whereby the stroke of the paster as it approaches the paste-applying position is shortened and the application of paste is prevented.

32. In a bag-bottoming machine, the combination, with bottom-folders G G′, of a table E, movable into and out of the space between them, a vertically-sliding frame carrying said table, a rotary shaft S, and a cam E′, fixed on said shaft and acting against said frame to move it up and down.

33. The combination, with chains D D and their supporting sprocket-wheels, of chain-lifters F F, rotary cam F′, a roller F^2, and a movable frame carrying said roller and connecting with said lifters.

34. The combination of opener H, sliding frame H^3, to which it is fixed, longitudinal slideways for said frame, whereby the frame and opener are reciprocated in a straight path, rotary cam H′, and connecting mechanism acted upon by said cam and intervening between it and the sliding frame for reciprocating the latter.

35. The combination of opener H, sliding frame H^3, longitudinal ways therefor, rotary cam H′, roller H^2, lever-arm U′, carrying said roller, lever-arm U^3, connected thereto, and a connection between the free end of the latter arm and said slide.

36. The combination of the clip I, its oscillating shaft I^3, having lever-arm *o*, rotary cam I′, roller I^2, and frame *o′*, for communicating the movement of said roller to said rock-shaft.

37. The combination, with a table E and mechanism for forming a diamond fold, of the side-folders K K, for pressing the side

creases of the diamond fold, consisting each of a flat plate and the carrying-levers q' for said folders, to which the folders are pivoted, whereby the side-folders are caused to come flatwise against said table, notwithstanding the angular movement of their carrying-levers.

38. The combination of side-folders K K, their carrying-levers q', sliding frames r, connected to said levers for imparting motion thereto, a forked arm K^3, its forks engaging said frames, a roller K^2, carried by said forked arm, and a rotary cam K', acting against said roller for vibrating said forked arm, and thereby communicating motion to said side-folders.

39. The combination of side-folders K K, their carrying-levers q', a rotary cam K', a roller K^2, acted on by said cam and connected to said levers for imparting motion thereto to carry the side-folders upwardly, and a spring K^4, for drawing said levers together to press the side-folders inwardly and downwardly.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALFRED BREDENBERG.

Witnesses:
ARTHUR C. FRASER,
JNO. E. GAVIN.