(No Model.) 12 Sheets—Sheet 1.

H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

FIG. 1.

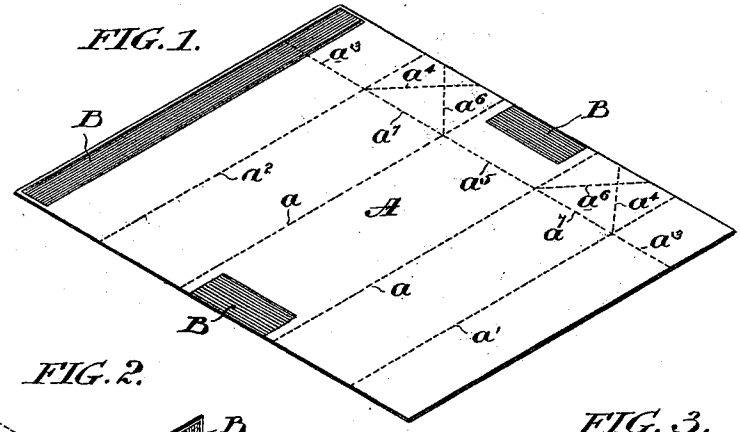

FIG. 2.

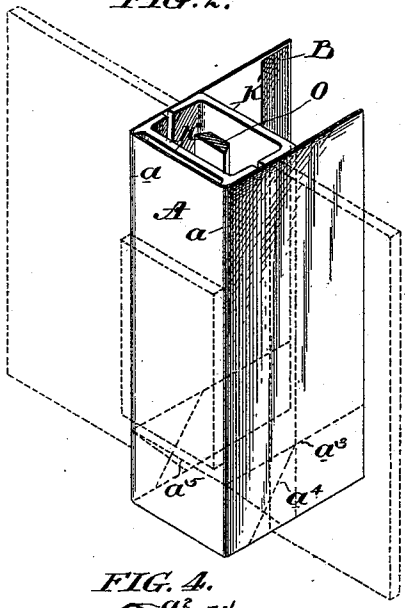

FIG. 3.

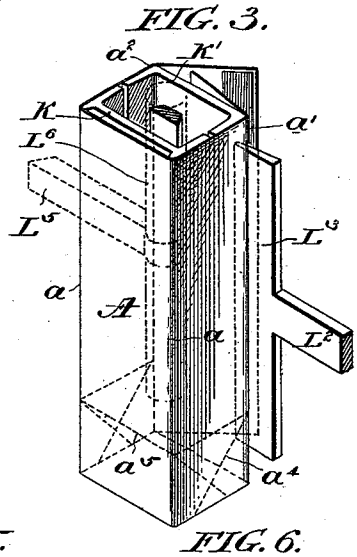

FIG. 4.

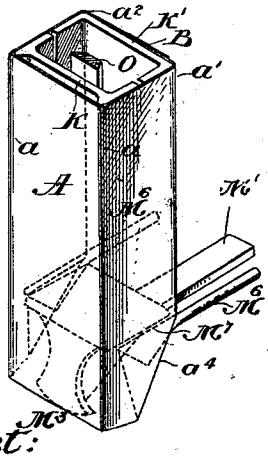

FIG. 5.

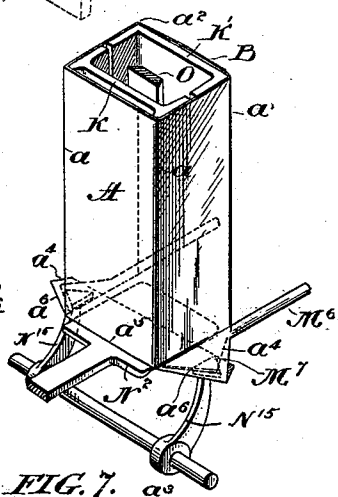

FIG. 6.

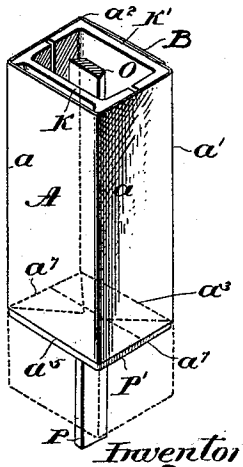

FIG. 7.

Attest:
David D. Williams.
Joshua Mallack, Jr.

Inventor:
Henry E. Smyser
by his atty.
Francis T. Chambers

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H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

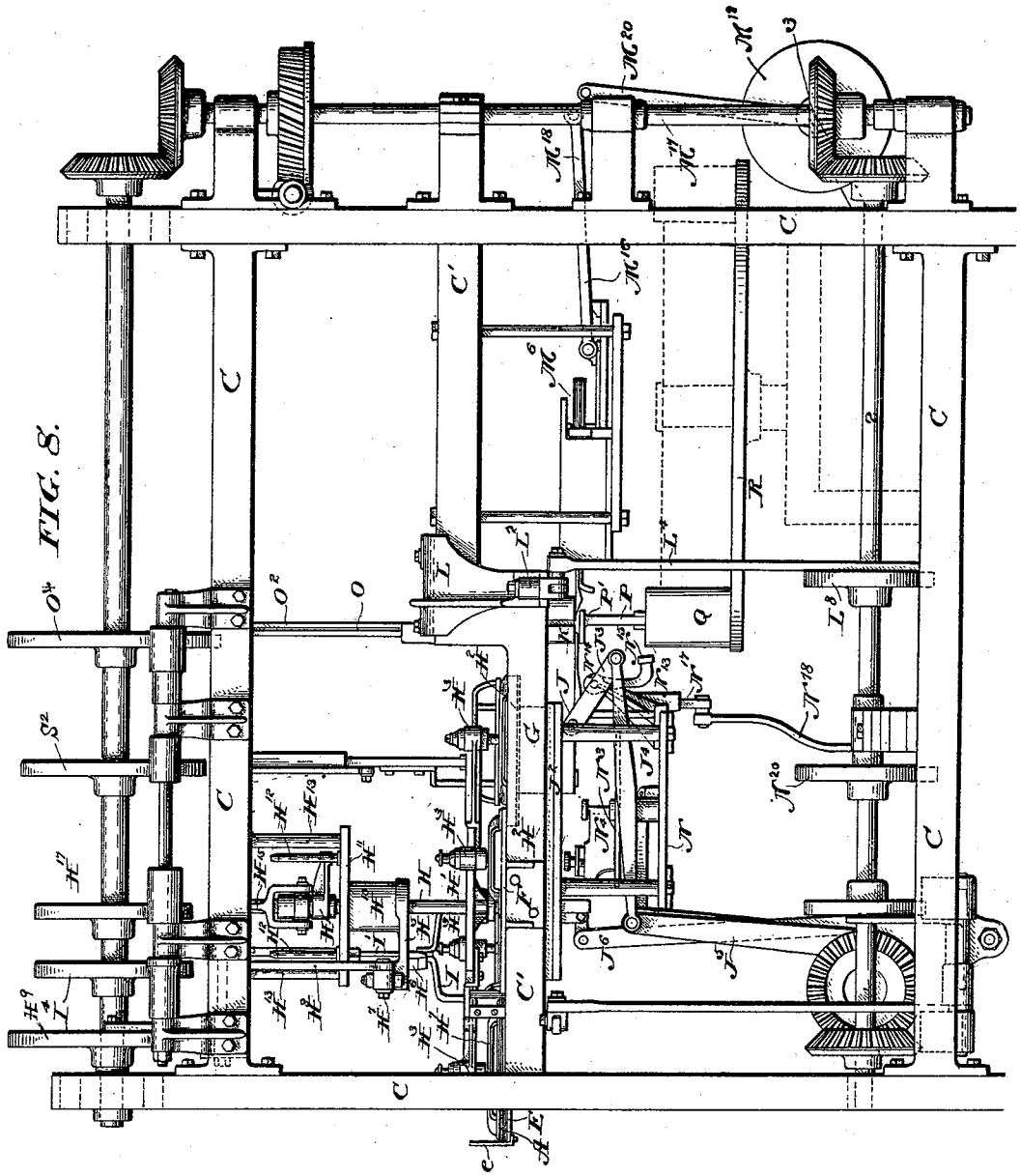

FIG. 8.

Attest:
David S. Williams.
Joshua Mallack, Jr.

Inventor:
Henry E. Smyser
by his atty
Francis T. Chambers

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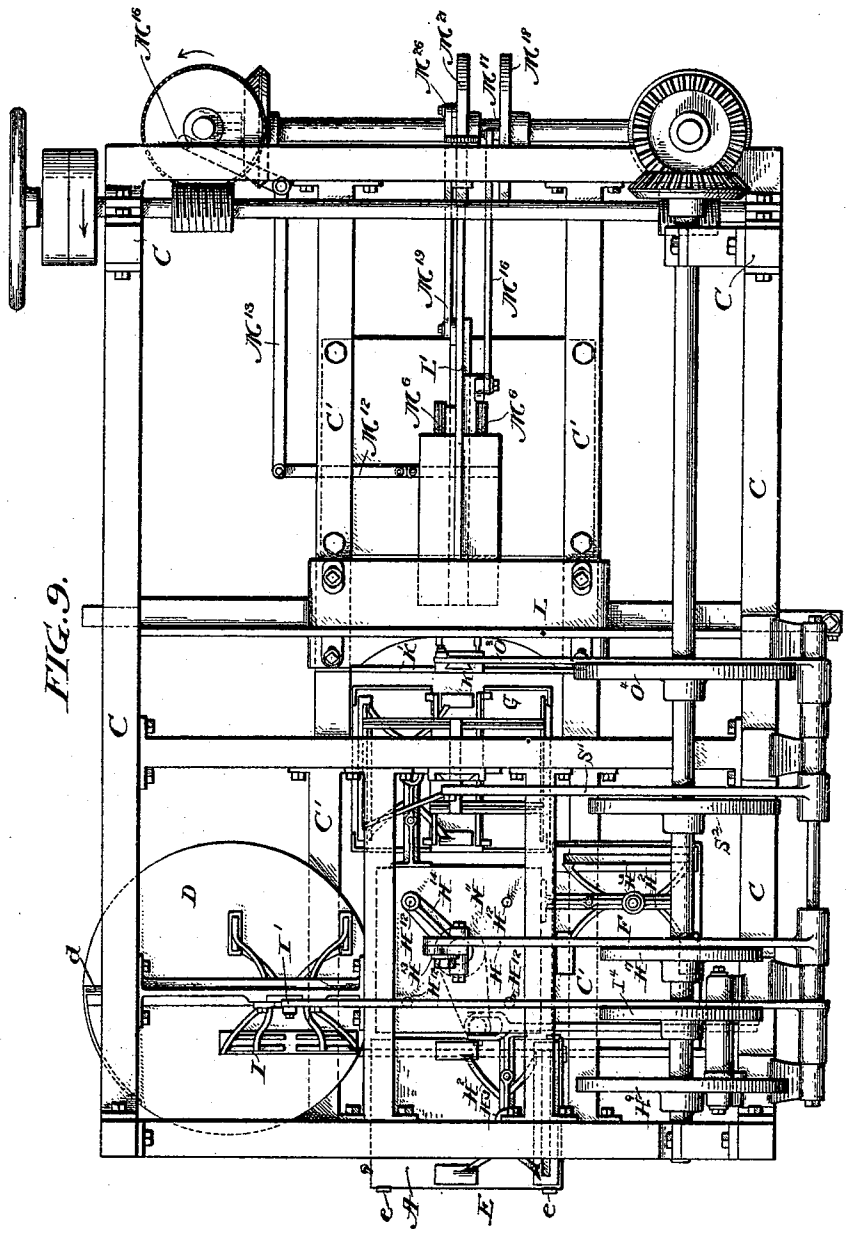
H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

FIG. 9.



Attest:
David D. Williams Co.
Joshua Matlack, Jr.

Inventor:
Henry E. Smyser
by his atty
Francis T. Chambers

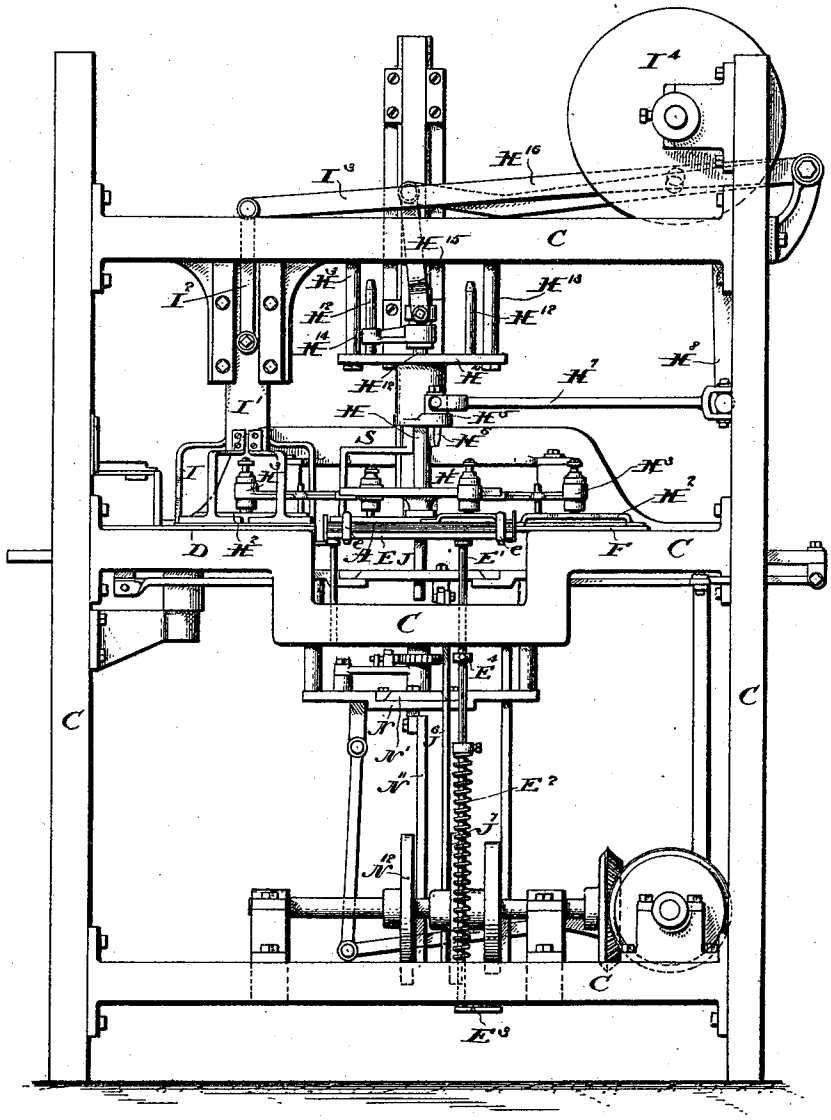
(No Model.) 12 Sheets—Sheet 4.

H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

FIG. 10.



Attest:
David D. Williams
Joshua Mallack Jr.

Inventor:
Henry E. Smyser
by his atty
Francis T. Chambers

(No Model.)

12 Sheets—Sheet 5.

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PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

FIG. II.

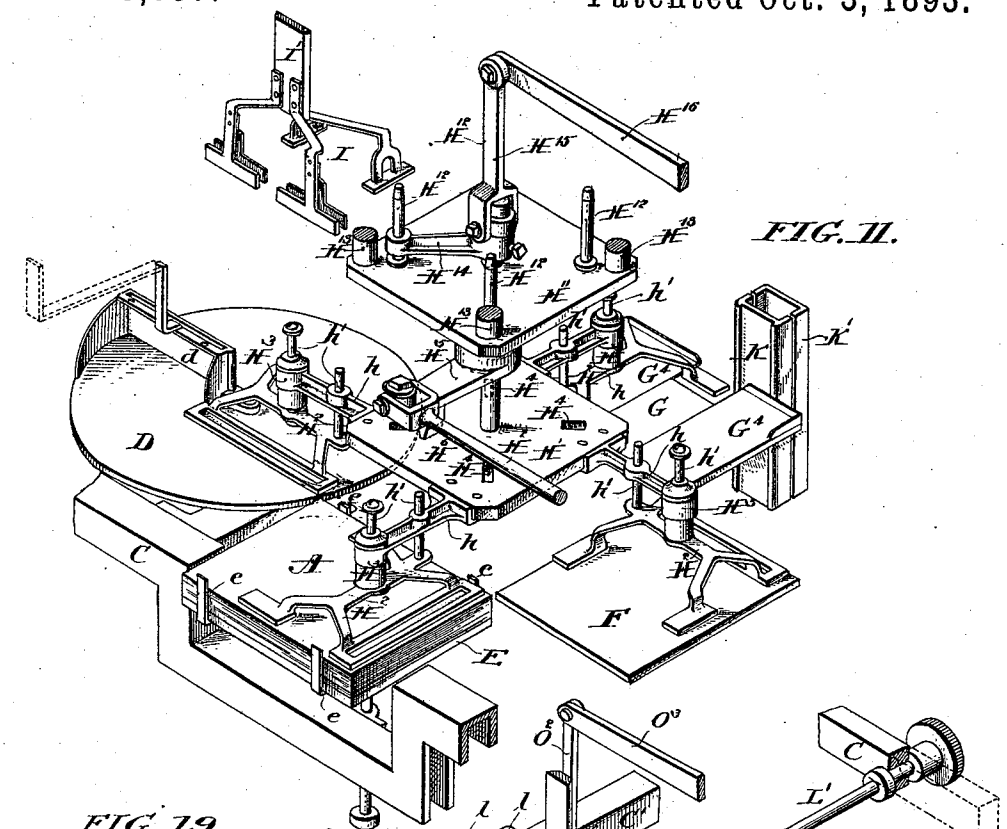


FIG. 19.

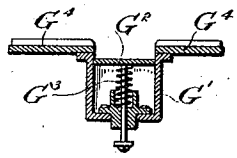


FIG. 23.

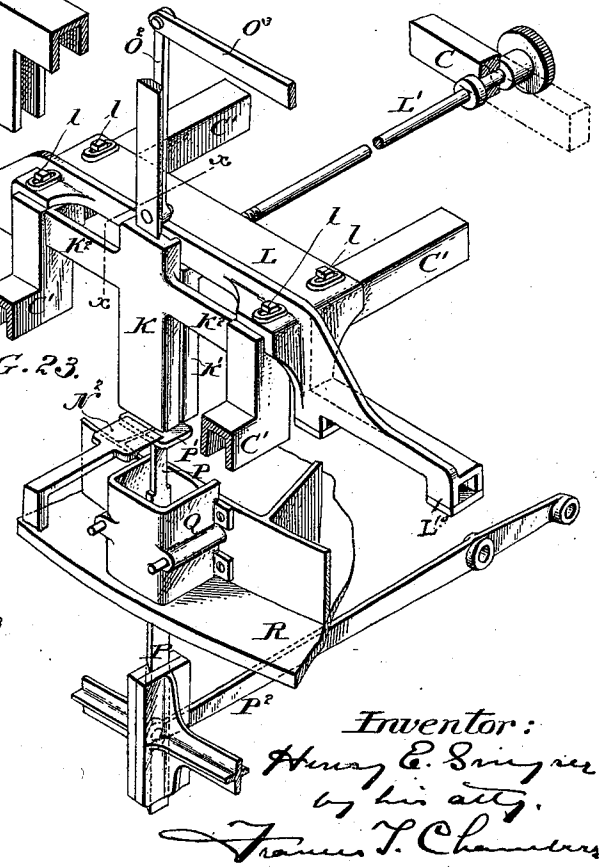
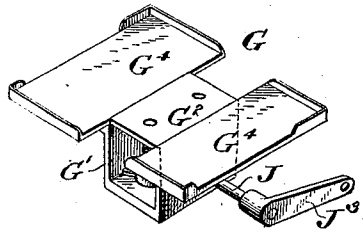


FIG. 20.



Attest:

David S. Williams.

Joshua Mallack, Jr.

Inventor:

Henry E. Smyser

by his atty.

Francis T. Chambers

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H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

FIG. 12.

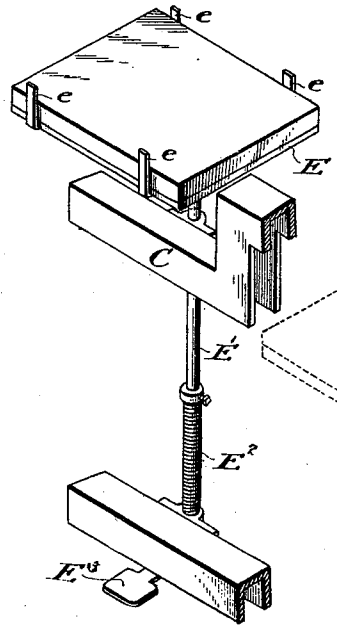


FIG. 14.

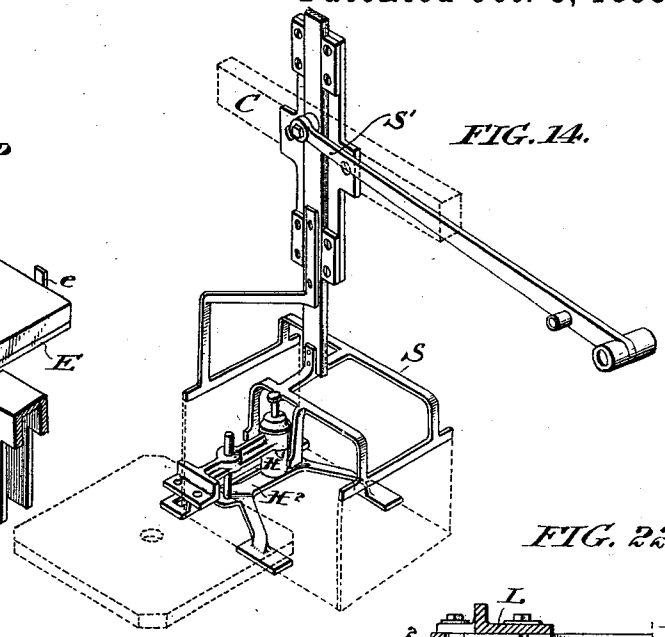


FIG. 22.

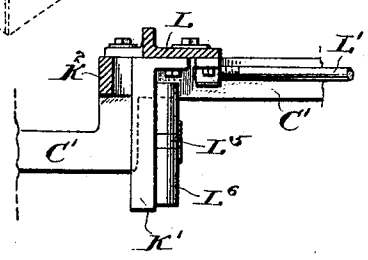


FIG. 21.

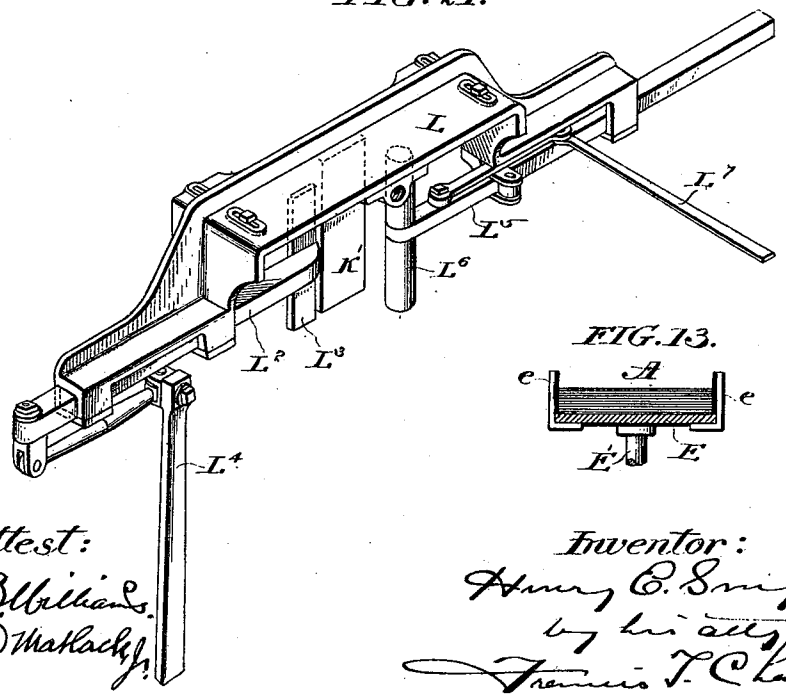


FIG. 13.

Attest:
David D. Williams.
Joshua Mackey Jr.

Inventor:
Henry E. Smyser
by his atty
Francis T. Chambers

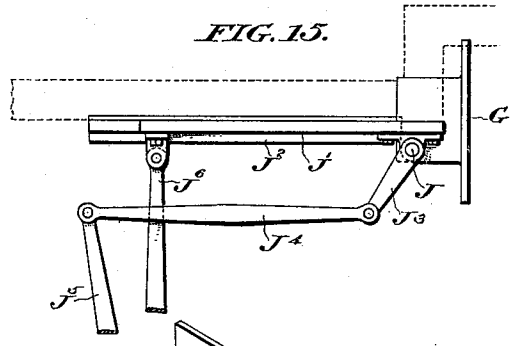
(No Model.) 12 Sheets—Sheet 7.

H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857 Patented Oct. 3, 1893.

FIG. 15.



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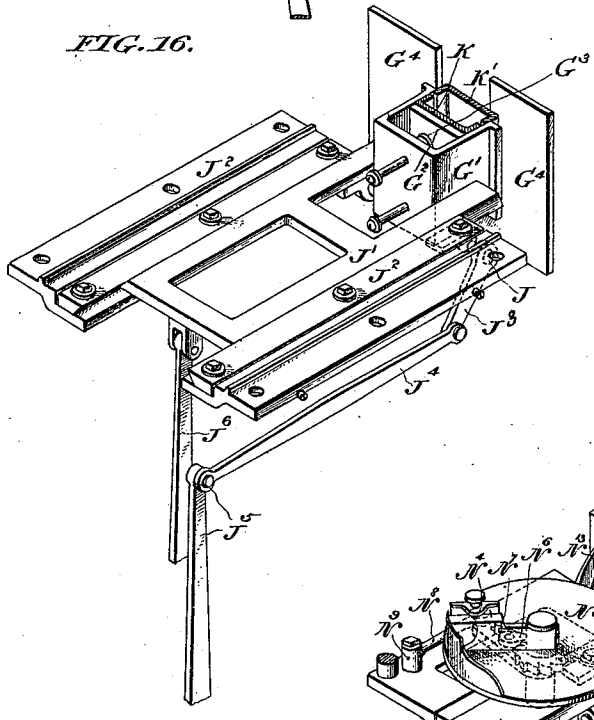
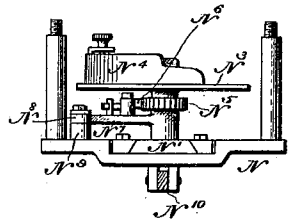


FIG. 17.



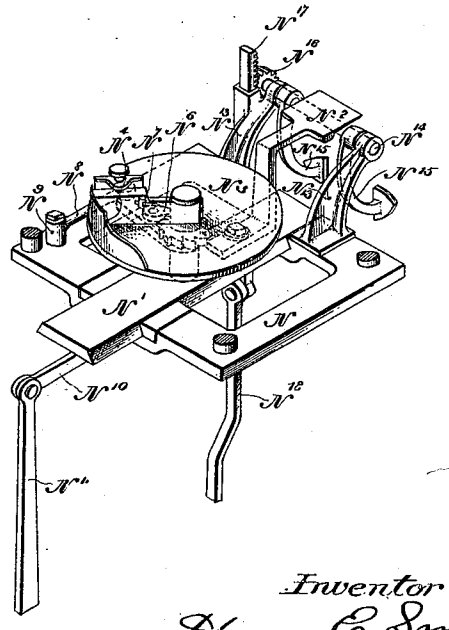


FIG. 18.

Attest:

David D. Williams.
Joshua Wallack, Jr.

Inventor:

Henry E. Smyser
by his atty.
Francis T. Chamberlain

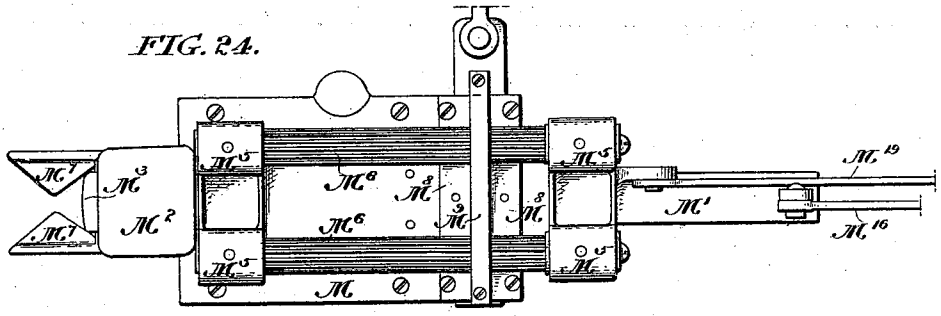
(No Model.) 12 Sheets—Sheet 8.

H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

FIG. 24.



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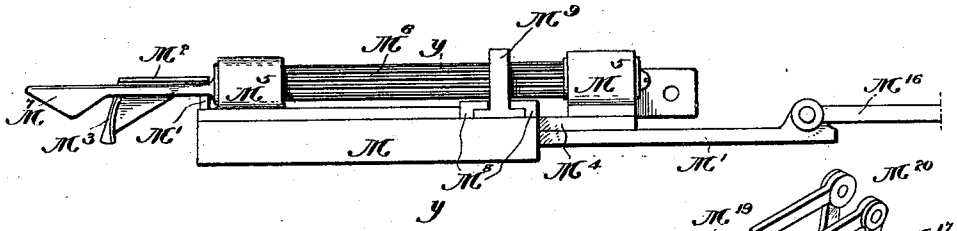


FIG. 26.

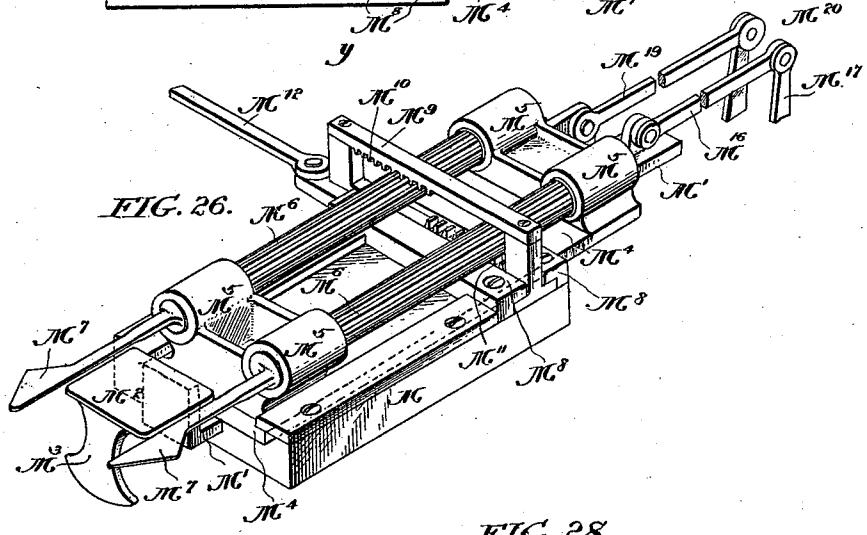


FIG. 27.

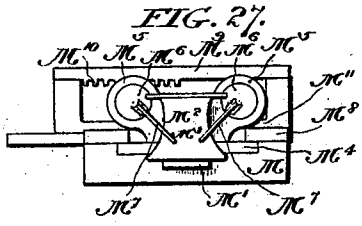
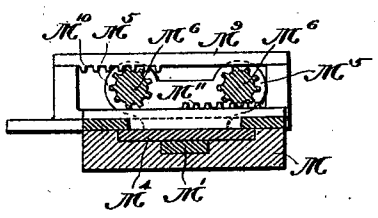


FIG. 28.



Attest:
David S. Williams.
Joshua Matlack, Jr.

Inventor:
Henry E. Smyser
by his atty
Francis T. Chambers

(No Model.) 12 Sheets—Sheet 9.

H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

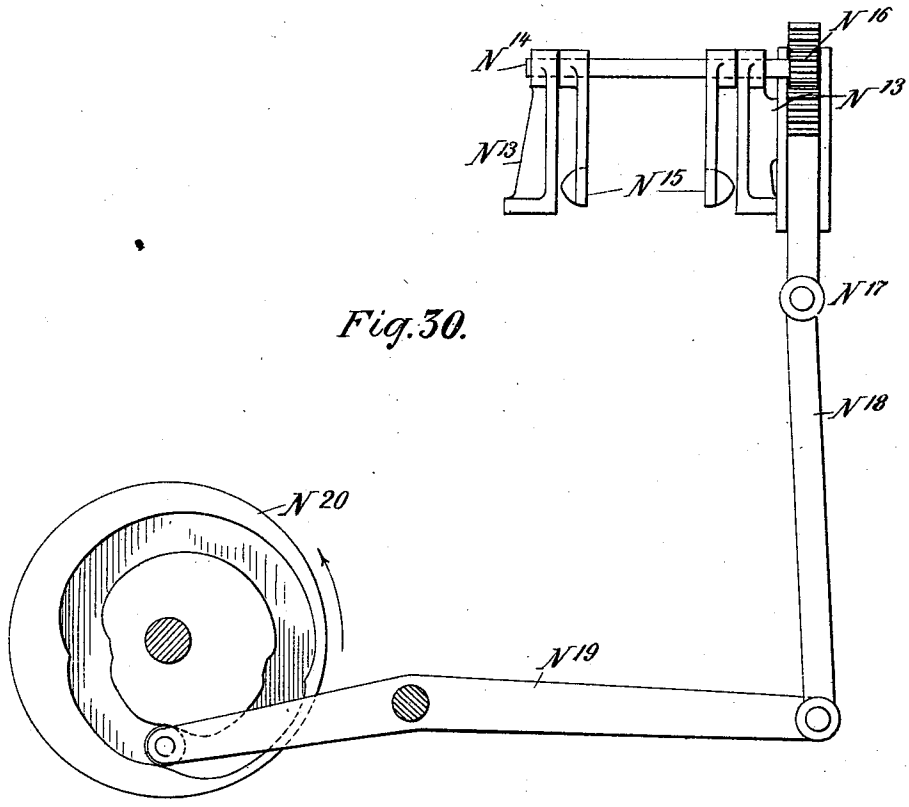


Fig. 30.

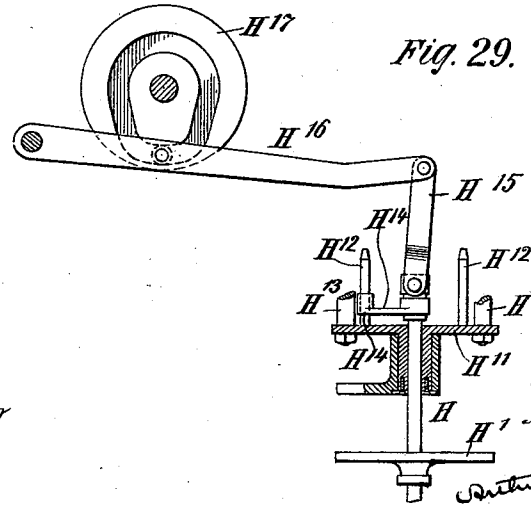


Fig. 29.

WITNESSES:
John Becker
Fred White

INVENTOR:
Henry E. Smyser,
By his Attorneys:
Arthur O. Fraser & Co.

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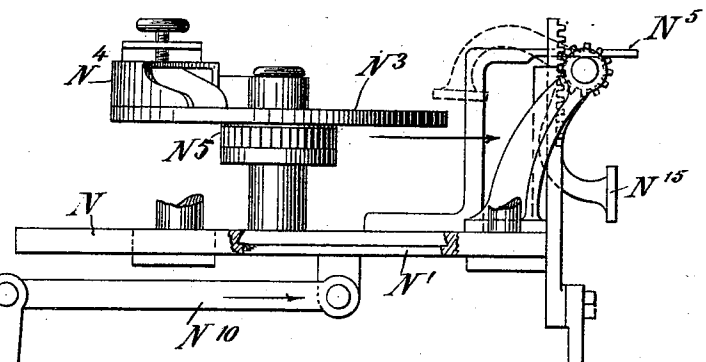
H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

Fig. 31.



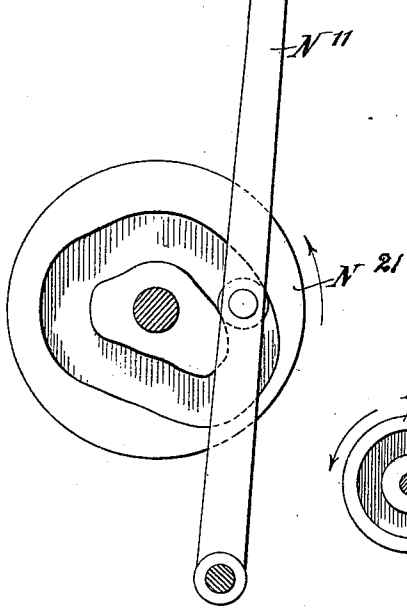


Fig. 32.

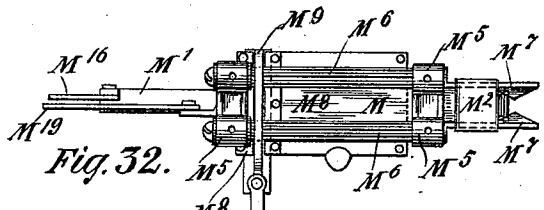


Fig. 33.

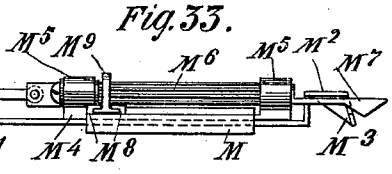
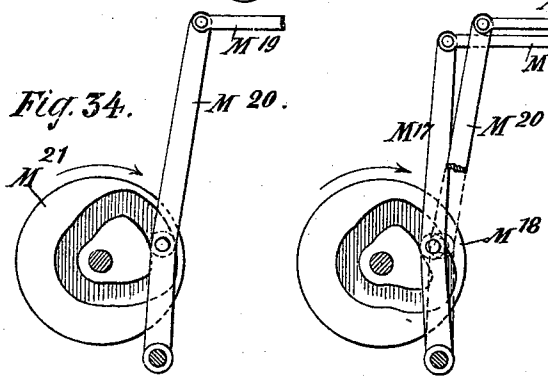


Fig. 34.



WITNESSES
John Becker
Fred Whitey

INVENTOR:
Henry E. Smyser,
By his Attorneys
Arthur G. Draper & Co.

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H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

Fig. 35.

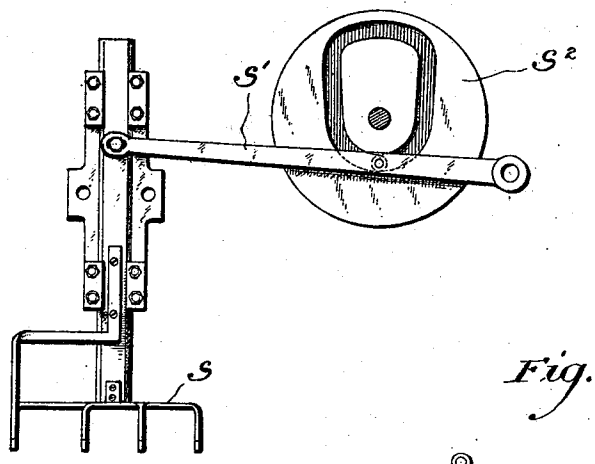
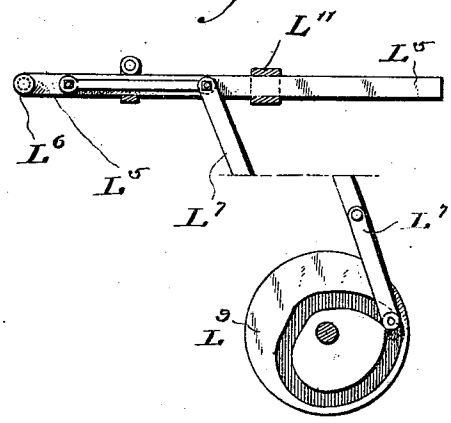


Fig. 36.



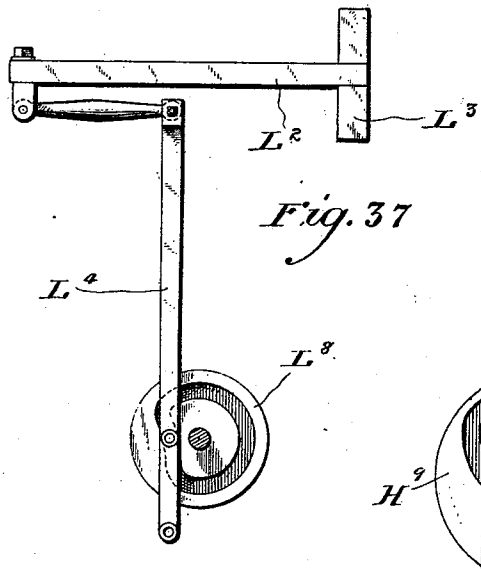
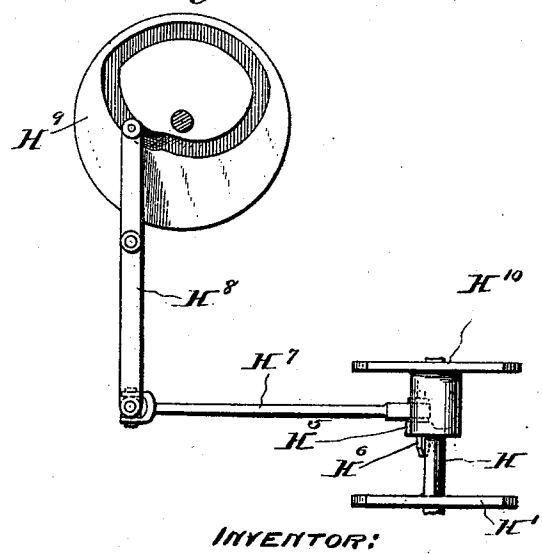


Fig. 37

Fig. 38.



WITNESSES:

Fred White,

C. K. Fraser.

INVENTOR:

Henry E. Smyser,

By his Attorneys:

Arthur C. Fraser & Co

(No Model.) 12 Sheets—Sheet 12.

H. E. SMYSER.

PACKAGE MAKING MACHINERY.

No. 505,857. Patented Oct. 3, 1893.

Fig. 39.

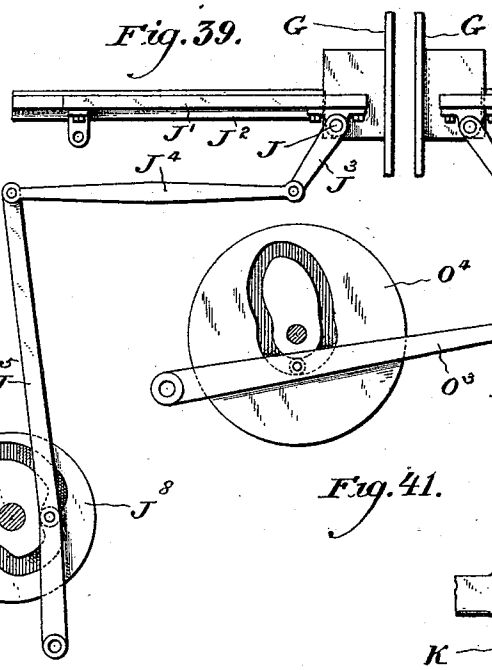


Fig. 40.

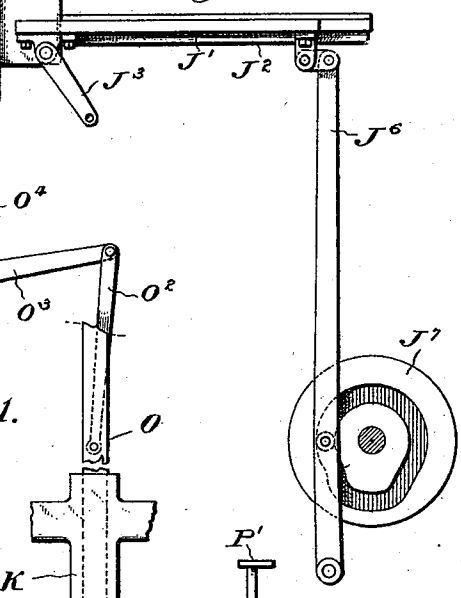


Fig. 41.

Fig. 42.

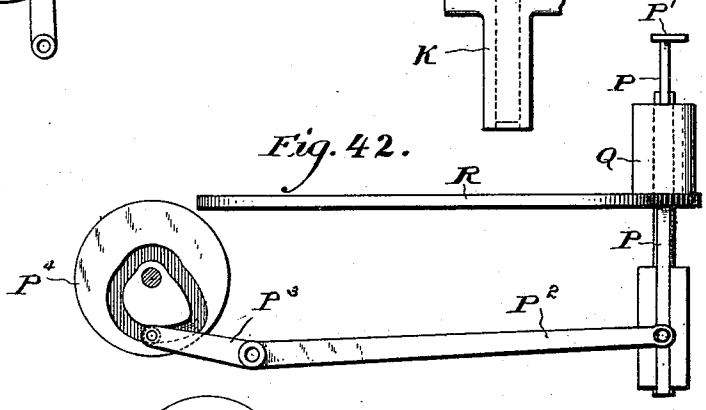


Fig. 43.

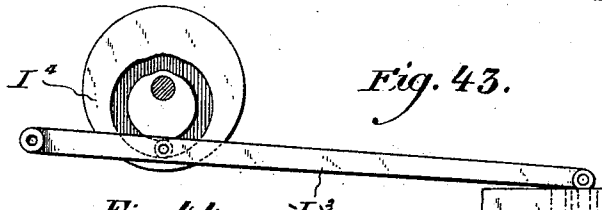
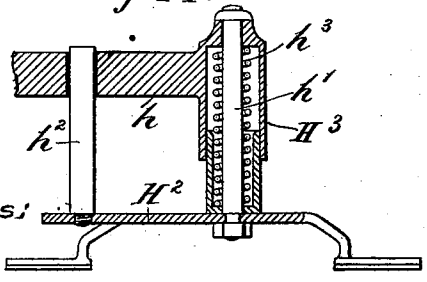
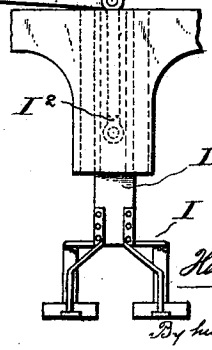


Fig. 44.





WITNESSES:
Fred White
C. K. Fraser.

INVENTOR:
Henry E. Smyser,
By his Attorneys:
Arthur O. Fraser & Co.

UNITED STATES PATENT OFFICE.

HENRY E. SMYSER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO ARBUCKLE BROTHERS, OF NEW YORK, N. Y.

PACKAGE-MAKING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 505,857, dated October 3, 1893.

Application filed February 6, 1891. Serial No. 380,470. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. SMYSER, of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Package-Making Machinery, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the construction of machinery for forming and filling packages and my present invention relates to certain improvements upon the machine described and shown in my Letters Patent, granted March 31, 1891, No. 449,275.

The nature of my improvements will be best understood as described in connection with the drawings in which they are illustrated and in which—

Figures 1 to 7 inclusive are perspective views showing the different operations performed upon a sheet of paper in converting it into a rectangular bag in my improved machine. Fig. 8 is a side elevation of the bag-forming mechanism; Fig. 9 a plan view thereof; Fig. 10 an end elevation thereof. Fig. 11 is a perspective view illustrating the mechanism for pasting and transferring the sheets of paper to the bag-forming devices. Fig. 12 is a perspective view of the table which holds the package of paper; Fig. 13 a cross-section through the paper-holding table. Fig. 14 is a perspective view of the mechanism by which the paper is freed from the paper-carrying arm. Fig. 15 is a side elevation of the forming matrix and its actuating mechanism; Fig. 16 a perspective view showing the same parts in combination with a former K with which the matrix co-operates, the latter being shown in section. Fig. 17 is an end elevation of the paste table used in connection with the device for applying paste to the bottom of the bag. Fig. 18 is a perspective view of the said table and other parts of the machine co-acting with it. Fig. 19 is a cross-sectional view through the forming matrix; Fig. 20 a perspective view of the same device. Fig. 21 is a perspective view of the adjustable saddle and its attached parts; Fig. 22 a section on the line 22—22 of Fig. 23. Fig. 23 is a perspective view showing the adjustable saddle and other parts of the machine immediately connected therewith; said view being taken from the front of the saddle. Fig. 24 is a plan view of the wing folders and their actuating devices; Fig. 25 a side view thereof; Fig. 26 a perspective view of the same mechanism; Fig. 27 a front elevation; and Fig. 28 a cross section on the line 28—28 of Fig. 25. The remaining figures are detail views chiefly of the several cam movements by which the moving parts are driven. Fig. 29 is an elevation of the cam movement for raising and lowering the shaft H. Fig. 30 shows on a larger scale the cam movement for oscillating the pasting arms N^{15}. Fig. 31 shows also on a larger scale the cam movement for reciprocating the slide N. Fig. 32 is a plan showing the cam movement which oscillates the wing folders M^7. Figs. 33 and 34 are side elevations of the cam movements which work the slides M′ and M^4 respectively. Fig. 35 is an elevation of the cam motion which operates the stripper S. Fig. 36 is a sectional plan showing the cam motion which operates the folding roller L^6. Fig. 37 is an elevation of the cam motion operating the folding plate L^3. Fig. 38 shows the cam motion for operating the swinging arm H^5. Figs. 39 and 40 are elevations from opposite sides of the cam motions for respectively oscillating the tilting former matrix G and sliding back and forth its carrying slide J′. Fig. 41 is an elevation of the cam motion for working the plunger which moves through the former K. Fig. 42 is a side elevation of the cam motion for working the plunger P′ which works the pocket Q. Fig. 43 is an elevation of the cam motion for working the presser I. Fig. 44 is an enlarged fragmentary sectional view of the spring mounting of the paper carriers.

The machine illustrated in the above drawings is, in its general features, similar to the machine described and shown in my patent above noted; it will therefore not be necessary to describe the same minutely except as to the various improvements embodied in my present application.

Referring to Figs. 1 to 7 inclusive, A is a sheet of paper which, by the operation of my mechanism, is converted into a rectangular

paper bag; the first operation being the folding of the sheet A around the former or hollow block K K′ forming the corners a a (see Fig. 2); the next operation is the folding down of one projecting edge of the blank on the line a', and the next operation the folding down of the opposite edge on the line a^2, these operations being shown in Fig. 3; the bottom of the tube thus formed projects below the former, and the next operation performed upon it is the folding in of one side of the bottom on the line a^3 forming a crease at that line and also the oblique creases a^4 a^4 (see Fig. 4); a subsequent fold is made on the line a^5 a crease being formed on that line and on the line a^6 a^6 (see Fig. 5); and the bag is then completed by folding in the triangular projecting flaps shown in Fig. 5 on the line a^7 a^7 so as to complete the rectangular bag as shown in Figs. 6 and 7.

B B in the above figures of the drawings indicate the lines of paste which in my machine are applied to the blank previous to folding it into a bag.

Referring next to the drawings illustrating the machine itself, C indicates the frame of the machine.

D (see Figs. 9 and 10) is a paste disk which is given an intermittent rotating movement and provided with a scraper d (Fig. 11) which keeps the paste spread out in a thin uniform layer over its surface.

E, (Figs. 8, 9 and 10) is the table which holds a pile of paper blanks A, the blanks being held between fingers e e (Fig. 12) some of which should be provided on their inner surfaces with pads of rubber or leather which will prevent more than one sheet from coming up at a time; the table is supported on a spindle E′ (Figs. 10 and 12) which is thrust up by means of a spring E^2, and at the end of the spindle a treadle E^3 is conveniently applied so that the operator can depress the table by placing his foot upon the treadle in order to be able to place a new pile of blanks A upon the table; an adjustable collar E^4, Fig. 10, prevents the table from rising above a certain determined height.

F, (Figs. 9, 10 and 11) is a table placed opposite to the paste disk D and about on a level with it; and G (Figs. 9, 11, 15 and 16) is a forming matrix (shown separately in Fig. 20) which should have wings or flanges G^4 upon which the paper is deposited.

The disk D, the tables E and F, and the matrix G are arranged about a central shaft H, to which shaft is attached a series of paper-carriers H^2 (in the present case four in number); these paper carriers are arranged so that they will come over the disk, tables and matrix and are conveniently attached to the shaft as shown in Fig. 11; that is, connected to arms h h secured to a square plate H′ which is in turn firmly attached to the shaft. In my former patent the paper-carriers were rigidly attached to the shaft, but I have found that a material improvement in the operation of the machine is secured by so attaching the carriers to the shaft that they shall be capable of a vertical movement relatively to it, while at the same time they will always tend to assume a uniform position by means of spring pressure. I therefore secure the carriers to the shaft by a spring connection, as shown in Figs. 11 and 44. On the end of each arm h is formed a tubular sleeve or casing H^3, through which passes a vertical rod h' to which the carrier H^2 is affixed. This rod is freely movable upward through the casing, but is pressed downwardly by an inclosed spring h^3. To prevent the rotative displacement of the carrier, a guide-pin h^2 is provided which works through a hole in the arm h.

As in my former machine, the shaft H has two motions which take place alternately, namely, a vertical or up and down motion, and an intermittent rotary motion. The first of these motions is communicated to the shaft by means of a connecting-rod H^{15} which is connected to the top of the shaft and moved up and down by a lever H^{16} which is actuated in turn by a cam H^{17} (Fig. 29). The upper part of the shaft passes through a stationary platform H^{11} secured to the frame by standards H^{13} and from the four corners of which rise guide-pins H^{12}; and near the top of the shaft is secured an arm H^{14} which, when the shaft is in its uppermost position, stands above the level of the pins H^{12} and which has a perforation in its end which, as the shaft descends, passes over one of the four guide pins, thus holding the shaft against any rotary movement until it has been again raised to its uppermost position. In the end of a downwardly projecting hub H^{10} (Fig. 10) is pivotally mounted a lever-arm H^5 having a downwardly-projecting tooth H^6 at its end and a connecting-rod H^7 (Figs. 11 and 38) also attached to the end of the lever-arm. By means of a lever H^8 actuated by a cam H^9 the lever-arm H^5 is given an intermittent oscillatory movement or stroke of ninety degrees, the movement being so timed as only to occur when the shaft H is in its uppermost position. Below the lever H^5 is secured on the shaft the plate H′ already referred to, and at the four corners of this plate are formed perforations or holes H^4 adapted to receive the projecting tooth H^6 of lever H^5.

The operation of the device is easily followed. The shaft H moving upward carries the plate H′ with it until one of the perforations H^4 engages with the tooth H^6. This engagement begins just before the lever-arm H^{14} passes above the guide-pin H^{12} with which it has been engaged and a slight additional upward movement disengages the arm H^{14} and completes the engagement with the tooth H^6. The lever H^5 then makes its stroke of ninety degrees carrying the shaft and paper carriers attached thereto through the like angle. The shaft H then moves down, the arm H^{14} engaging the guide-pin H^{12} just before the lever H^5 is disengaged from the shaft.

Then the lever H^5 moves back to its original position ready to engage the next perforation H^4 in the plate H' when the shaft H makes its next upward motion.

The result of the operation above described is that each of the paper carriers H^2 is brought down first upon the paste table D, then lifted, carried around for ninety degrees and brought down upon the pile of blanks A on table E; again lifted, the paste on the carrier causing the top blank to cling to it, moved around for ninety degrees and brought down upon the table F; at this point taking a firmer grasp upon the blank, although the principal function of the table is to balance the strains on the carriers; again lifted the carrier moves to a position over the top of the matrix G and moving down it deposits the blank upon the wings G^4 of said matrix. A stripper S (Fig. 14) actuated by a lever S' and cam S^2 (Fig. 35) is arranged to hold the paper on the matrix when the carrier moves up therefrom preparatory to its next rotation to a position over the paste disk; this stripper being fully described in my said patent it is unnecessary to further describe it here. To insure the carrier taking up a proper amount of paste from the disk, a presser I (see Figs. 10 and 11) is arranged to come down upon the carrier and press it firmly against the disk, said presser being attached to a slide I' which is operated by a cam I^4 (Figs. 10 and 43) through lever I^3 and connecting-rod I^2. The presser after pressing the carrier against the paste disk rises ahead of it and comes down when the next carrier descends upon the paste disk.

The forming matrix G is substantially like the matrix described in my said patent; instead however, as in my former construction, of providing the matrix with a bottom or back side which is made adjustable by means of screws, I provide it with a movable back G^2 (Figs. 19 and 20) which is supported upon springs G^3, the result of this construction being that the said back G^2 remains in contact with the paper while it is being folded around the former hereinafter to be described, adjusting itself to any adjustment or dimension of the former and holding the paper more securely than in my previous construction.

The device for moving the forming matrix is also new and an improvement upon my former construction. The matrix is provided with a shaft J (see Fig. 20) to which it is firmly attached and which shaft is secured in bearings on a slide J' (Figs. 15 and 16) the guides J^2 of which are fixedly attached to the frame of the machine and which is actuated by means of a lever J^6 the motions of which are governed by a cam J^7 (Fig. 40); to one end of the shaft J is attached a lever-arm J^3 (Fig. 16) which is actuated from time to time by means of link J^4 and lever J^5 which is actuated by cam J^8 (Fig. 39). The forming matrix G when the slide J' is drawn back rests upon the top of said slide with its tables or wings G^4 in a horizontal position, as shown in Figs. 8, 9 and 11; a blank having been deposited upon the said wings the shaft J is oscillated so as to bring the matrix into the vertical position shown in Fig. 16, and the slide J' is at the same time thrust forward so that the matrix passes around the former K K' folding the paper around it as shown in Fig. 2 and holding it upon said former until the devices hereinafter described form the paper into a tube, after which the matrix moves back to its initial position to receive another blank.

The former K K' around which the tube is formed is as in my previous patent constructed in two parts or sections adjustable toward and from each other in order to vary the size or capacity of the bag being made. Instead of adjusting the two parts of the former toward and from each other by a series of adjusting screws or bolts at opposite sides thereof as in my said previous patent, my present invention provides some important improvements for facilitating the adjustment of the effective size of the former, and for simultaneously and automatically adjusting and bringing to proper position the folders which form the blank into a tube around the former. The former is made in two parts or sections, one of which, K, can be rigidly attached to the frame of the machine by arms K^2 (see Fig. 23) and which consequently is stationary, while the other or movable part K' of the former is so mounted as to be movable bodily, being preferably fastened to an adjustable frame or saddle L which is supported and guided by the portions C' C' of the frame of the machine; the saddle L carrying the former section K' is adjusted to and from the former-section K by means of the screw shaft L', so that by turning a single screw the adjustment of the capacity of the bag can be readily effected, set screws *l l* being provided to hold the saddle in any determined adjustment. Guides L^{10} L^{11} are formed on or attached to the saddle L, in which slide reciprocating bars L^2 and L^5 (Fig. 21) the bar L^2 carrying a folding plate L^3 (Figs. 3, 21 and 37), and the bar L^5 carrying a folding roller L^6 (Figs. 3, 21 and 36); these bars and folding devices are given a proper intermittent reciprocating action by means of levers L^4 and L^7 connecting with and actuated by cams L^8 and L^9 respectively of proper form, as shown in Figs. 37 and 36, so that after the matrix has folded the paper around the former first the plate L^3 and then the roller L^6 will fold the paper on the lines a' and a^2 as shown in Fig. 3. The flap of paper folded down by the roller L^6 is the one having a pasted edge B whereby it is gummed to the opposite flap. To securely unite this gummed joint, the roller L^6 is caused to roll back and forth across the pasted flap. It is of course obvious that as the folding devices and the section K' of the former are both connected with the saddle L they will always preserve the same relative position, so that no matter how far the section K'

is moved away from the section K the folding devices will have their positions relatively changed to the same degree and will always act to the best advantage in folding the paper around the former. Thus my invention provides that by a single adjustment of the screw L′ or other equivalent means for effecting the adjustment, not only is the former expanded or contracted to the desired extent, but a corresponding readjustment of the positions of the folders which act against this former is effected, so that the adjustment can be most expeditiously accomplished without deranging the operation of the machine, and it may even be performed while the machine is running. The bags being made may thus be expanded or contracted at will to render their capacity exactly that which is required to fit them to the mass of material with which they are to be filled.

The folders which form the bottom of the bag consist of a folding plate M^2 (Fig. 26) which forms the first bottom fold, as shown in Fig. 4, a folding plate N^2 (Fig. 18) which forms the opposite bottom fold, as shown in Fig. 5, and two wing folders M^7 M^7 (Fig. 26) consisting of triangular blades adapted to swing or oscillate through nearly a half circle, and serve to fold the triangular flaps or wings at the ends of the bag-bottom.

In the operation of closing the bag-bottom, the first folder M^2 advances, and folds the paper under in the manner shown in Fig. 4. The wing-folders M^7 advance, following behind the first folder to give it time to do its work, and turned inward to enter freely within the fold made by the first folder. The first folder M^2 on completing its movement dwells until the wing folders have moved fully forward; it then draws back, while at the same time the wing-folders swing outwardly, engaging the folded side flaps and turning then outward, and drawing in the opposite side of the bag bottom, which is folded up against the first fold by the folder N^5 which advances as the folder M^2 retreats and while the wing-folders are turning outward, completing its movement after they have come to rest. The wing-folders dwell in their out-turned horizontal positions (Fig. 5) while the pasters N^{15} N^{15} swing up and apply paste to the two wings or flaps of paper. As these pasters swing back out of the way, the wing folders turn inward to fold the wings in, and as they pass the vertical, so as to be able to hold the second fold, the folder plate N^5 is retracted, sliding out in time to avoid being touched by the pasted wings, and as the latter are folded up by the wing folders the lower plunger P′ (Fig. 42) rises under them and when it reaches them, so that it will hold them from springing down again, the wing-folders M^7 M^7 slide back, out of the wings or flaps, and the latter are then pressed up against the first and second folds by the completion of the ascent of the plunger. To facilitate the commencement of the folding and render the paper more easy of manipulation where it is stiffened by the overlapping of two thicknesses forming the side seam, I provide the first folding plate M^2 with a downwardly turned plate M^3 projecting at a suitable angle from its end so that this plate shall first encounter and start the inward flexure of the paper before the more abrupt fold thereof is made by the plate M^2. The plate M^2 is mounted on a slide M′ movable in a slideway formed in a frame or block M which is fixedly attached to the frame of the machine. Another slide M^4 is mounted in a slideway in this same plate M, and is movable independently of the slide M′. This slide M^4 carries the oscillating spindles M^6 M^6 of the wing folders M^7, being formed at or near its opposite ends with four bearings M^5 M^5, in which the opposite ends of the spindles M^6 are journaled. The slides M′ and M^4 are reciprocated longitudinally to impart the requisite advancing and retracting movements to the folders M^2 M^7 by means of suitable cams and intervening mechanical connections, as best shown in Figs. 33 and 34. The slide M′ is driven by a cam M^{18} through a lever M^{17} and link M^{16} (Fig. 33), while the slide M^4 is driven by cam M^{21} (Fig. 34) through the medium of lever M^{20} and link M^{19}. The wing folder spindles M^6 are constructed within the guides M^5 as elongated pinions, their teeth meshing with racks M^{10} M^{11} of rack-frame M^9, which frame slides freely in transverse guides M^8 on the plate M, being reciprocated through the link M^{12} and elbow-lever M^{13} by a cam M^{22} (Fig. 32). The function of the device as in my former machine is to intermittently cause the folders M^7 to move from the position shown in Fig. 26 to that shown in Fig. 24; this oscillation of the folders bringing the triangular flaps shown in Fig. 5 to the position shown in Figs. 6 and 7 and completing the bag. The second folder plate N^2 is mounted fixedly on a reciprocating slide N′ movable in a slide formed in a fixed frame N, which frame or plate N is fastened to the frame of the machine. This slide N′ is reciprocated from a cam N^{21} (Fig. 31) through a lever N^{11} and link N^{10}.

The triangular flaps or wings at the bottom of the bag are pasted by wing pasters N^{15} N^{15}, shown best in Figs. 5 and 18. These consist of triangular heads or paste dabbers mounted on vibrating arms fixed to an oscillating shaft N^{14} which is hung in bearings in brackets N^{13} conveniently fixed to the frame or plate N. These pasters receive paste from the paste-disk N^3, which occupies a horizontal plane and is pivotally mounted on a vertical axis on the slide N′, so that it reciprocates with this slide. It is given an intermittent rotary motion by means of a ratchet N^5 attached to it (Figs. 17 and 18) and engaged by a pawl N^6 which is pivoted to a lever N^7, which lever is pivoted on the axial shaft of the disk, and has its outer end connected by a link N^8 to a fixed

pin N^9 on the plate N, so that as the slide and disk move back and forth the pawl by its engagement with the ratchet imparts an intermittent rotary motion to the disk. Paste is fed to the disk in the usual way, and is spread evenly over its surface by means of an adjustable scraper N^4. The wing pasters N^{15} after rising to apply paste to the outturned wings of a bag (Fig. 5) swing downwardly, backwardly and upwardly for approximately a half-revolution, until their ends or dabbers stand above the plane of the paste disk N^3, this disk being retracted during this movement to enable them to pass. The slide N' is next advanced sufficiently to bring the paste-disk under the pasters. The pasters N^{15} then descend into contact with the surface of the paste-disk so that they receive paste therefrom, whereupon they are again lifted clear of the disk, and the disk is then retracted or moved backwardly far enough to be out of their way, whereupon the pasters move downwardly and swing forwardly and upwardly and apply the paste to the outturned flaps or wings of the bag. While they are thus swinging forward the slide N' is moved forward farther than before, so that the folder N^5 moves under the bag-bottom to do its work, and about the time it completes this movement the pasters come against the flaps. The described movements of the pasters are imparted to them by means of a cam N^{20} (Fig. 30) acting through a lever N^{19} and link N^{18} to reciprocate the rack N^{17} which meshes with a pinion N^{16} fixed on the paste-shaft N^{14}. Immediately after the paste is applied to the outturned wings, and while the pasters are being swung back, the folders M^7 fold them in against the bag bottom, thereby completing the bag.

As in my previous machine I remove the completed bag from the former K K' by means of two plungers, one situated at the bottom of the former attached to the end of slide O and actuated by a cam O^4 through lever O^3 and link O^2 (Fig. 41), and the other plunger P' (Figs. 23 and 42) which is attached to a rod P and actuated by a cam P^4 and lever P^3 P^2 (Fig. 42) so as to pass up through an opening in a table R through each in turn of a rotating series of pockets Q moving intermittently over said table, the two plungers being arranged so that they will clamp the completed bag bottom between them and then move down together drawing the bag off of the former and depositing it in the pocket Q; after which, the plunger P' being below the edge of the pocket the upper plunger moves back to its original position at the bottom of the former and the series of pockets revolve bringing a new pocket beneath the end of the former ready to receive the next bag when completed.

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

1. The combination of a paste-disk, a series of carriers movable down upon said disk, then descending upon a pile of paper, then lifting and transferring the top sheet of the pile, driving mechanism for imparting the successive movements to the carriers, and a presser movable up and down, and arranged to descend as each carrier reaches the paste-disk and press it into firm contact therewith.

2. In a paper-feeding mechanism, the combination with a shaft having alternate rotative and down-and-up movements, a series of paper carriers mounted thereon, and a paste-disk in position to receive the successive carriers in their descending movements, of a presser I movable up and down over the paste-disk, and driving mechanism for said shaft and presser, adapted to cause the presser to descend at each descending movement of the shaft, and press a carrier against the paste disk.

3. In a mechanism for folding paper into a rectangular tube, the combination of a stationary former K, a forming matrix G movable toward and from the former, having wings G^4 G^4 for holding the sheet of paper and a recess between them of just sufficient size to embrace the former, a movable back-plate G^2 mounted in said recess, standing normally flush with said wings to support the paper, and adapted to slide back into said recess, springs G^3 for normally pressing said back-plate forward, mechanism for moving the matrix forward to embrace the former and back, whereby when the matrix, carrying a sheet of paper, is moved against the former the plate G^2 first clamps the paper against the former and remaining stationary against it holds the paper while by the continued advance of the matrix its wings move forward on opposite sides of the former and fold the paper flat against both sides thereof, and independently-operating folders acting upon the completion of the forward movement of the matrix, for folding down both projecting flaps of the sheet of paper against the opposite side of the former, whereupon the drawing back of the matrix leaves a complete tube enveloping the former.

4. The combination of the forming matrix G fixed on a shaft J, a reciprocating slide J' upon which said shaft is journaled, driving mechanism for reciprocating the slide and driving mechanism engaging said shaft for oscillating the shaft and matrix, all substantially as and for the purpose specified.

5. In a bag forming mechanism, the combination as means for forming the bag bottom, of opposite folders for folding in the bottom, wing folders for folding in the resulting triangular flaps or wings, and pasters for applying paste to these wings, of a paste-disk for supplying paste to the pasters, and driving mechanism constructed to move the pasters and paste-disk relatively to each other to press the pasters down against the paste-disk between their upward movements for applying paste to the wings.

6. In a bag forming mechanism, the combination with folders for closing the bag bottom of pasters N^{15} for applying paste to the wings, a paste-disk N^2, and driving mechanism for imparting relative movements to the pasters and disk, constructed to move the pasters up above the disk, then to move the disk relatively to the pasters to bring the latter over the disk, then to move them into contact with the disk to cause the pasters to take paste from the disk, and then move them out of contact therewith, then to move the disk from under the pasters, and finally to move the pasters down, invert them and bring them up to apply paste to the bag.

7. The combination of the paste-disk N^2 mounted to reciprocate, pivoted paster-arms N^{15} mounted to oscillate around a center, and driving mechanism for moving the disk and arms constructed to swing the arms backward and upward, then to move the disk to a position beneath the arms, and bring the arms down against the disk to take paste therefrom, then to elevate the arms and retract the disk, and then to swing the arms downwardly and forwardly to apply the paste to the bottom of the bag.

8. The combination of the paste-disk N^2, slide N′ on which it is mounted, paster arms N^{15} shaft N^{14} on which they are fixed, and a driving mechanism consisting of cam N^{21} and intervening connections for reciprocating said slide, and rack and pinion N^{16} N^{17} cam N^{20} and intervening connections for oscillating said shaft.

9. The combination of the reciprocating slide N′ and bottom-folder N^2 carried thereby, paster-arms N^{15}, driving mechanism for oscillating them, driving mechanism for reciprocating said slide, and paste-disk N^3 cooperating with said arms, mounted on said slide.

10. In a bag forming mechanism, the combination with means for folding the bag bottom, of a folding plate M^2 for making the first fold, and a folding plate N^2 for making the second fold, with an oblique downwardly-turned plate M^3 carried by and in advance of the first folding plate, and adapted to gently turn in the paper preparatory to forming the first fold.

11. In a bag forming mechanism comprising a former and means for folding a sheet of paper around it to form a paper tube, the former constructed in two sections, one of them fixed and the other movable toward and from it, guides for supporting and guiding the movable section, maintaining it parallel with the first section, and an adjusting screw for propelling the movable section toward or from the fixed section.

12. In a bag forming mechanism comprising a former and means for folding a sheet of paper around it to form a paper tube, the former constructed in two sections, one of them fixed and the other movable toward and from it, the folders for folding the paper against the former arranged to act against the side of the movable section, and a screw for adjusting the former connected to the movable section thereof and to said folders, so that in displacing the movable section the folders acting against it are equally displaced, and their relative engagement is unimpaired.

13. In a bag forming mechanism comprising a former and means for folding a sheet of paper around it to form a paper tube, the former constructed in two sections, one of them fixed and the other movable toward and from it, a movable frame supporting the movable section, the folders for folding the paper against the former having bearings in said frame, and means for moving said frame to adjust the thickness of the former.

14. In combination with a relatively-fixed former-section K, a longitudinally-movable saddle L having the former-section K′ attached thereto, and folders as L^3 L^6 having bearings in the saddle so as to preserve the same position with reference to former-section K′ irrespective of the adjustment of the saddle.

15. In combination with a relatively-fixed former-section K, a longitudinally-movable saddle L having the former-section K′ attached thereto, a folder-plate L^3, and a folding roller L^6 also attached to and moving with the saddle, substantially as and for the purpose specified.

H. E. SMYSER.

Witnesses:
LEWIS R. DICK,
JOSHUA MATLACK, Jr.