

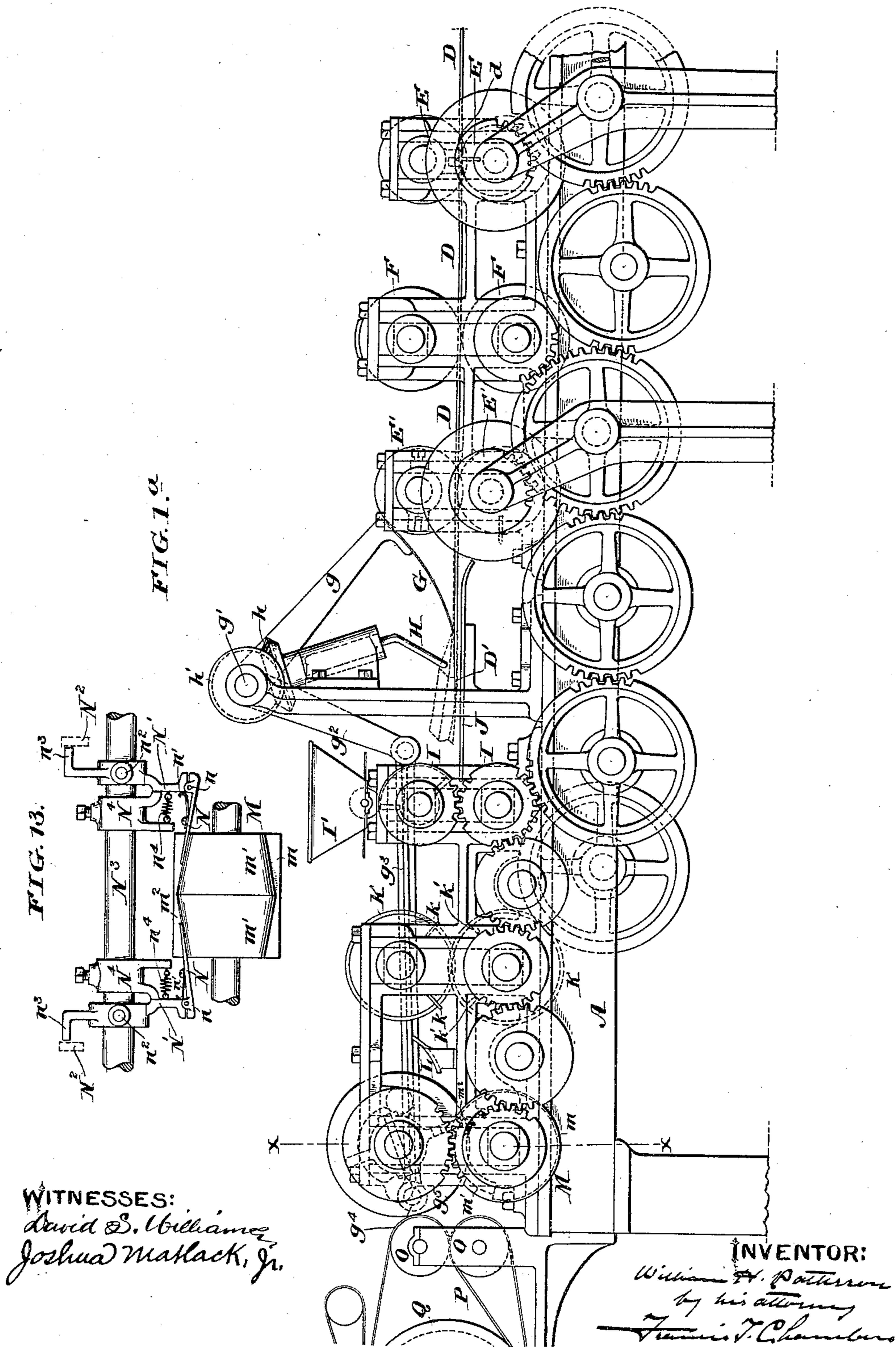
(No Model.)

5 Sheets—Sheet 1.

W. H. PATTERSON.
PAPER BAG MACHINE.

No. 446,839.

Patented Feb. 17, 1891.



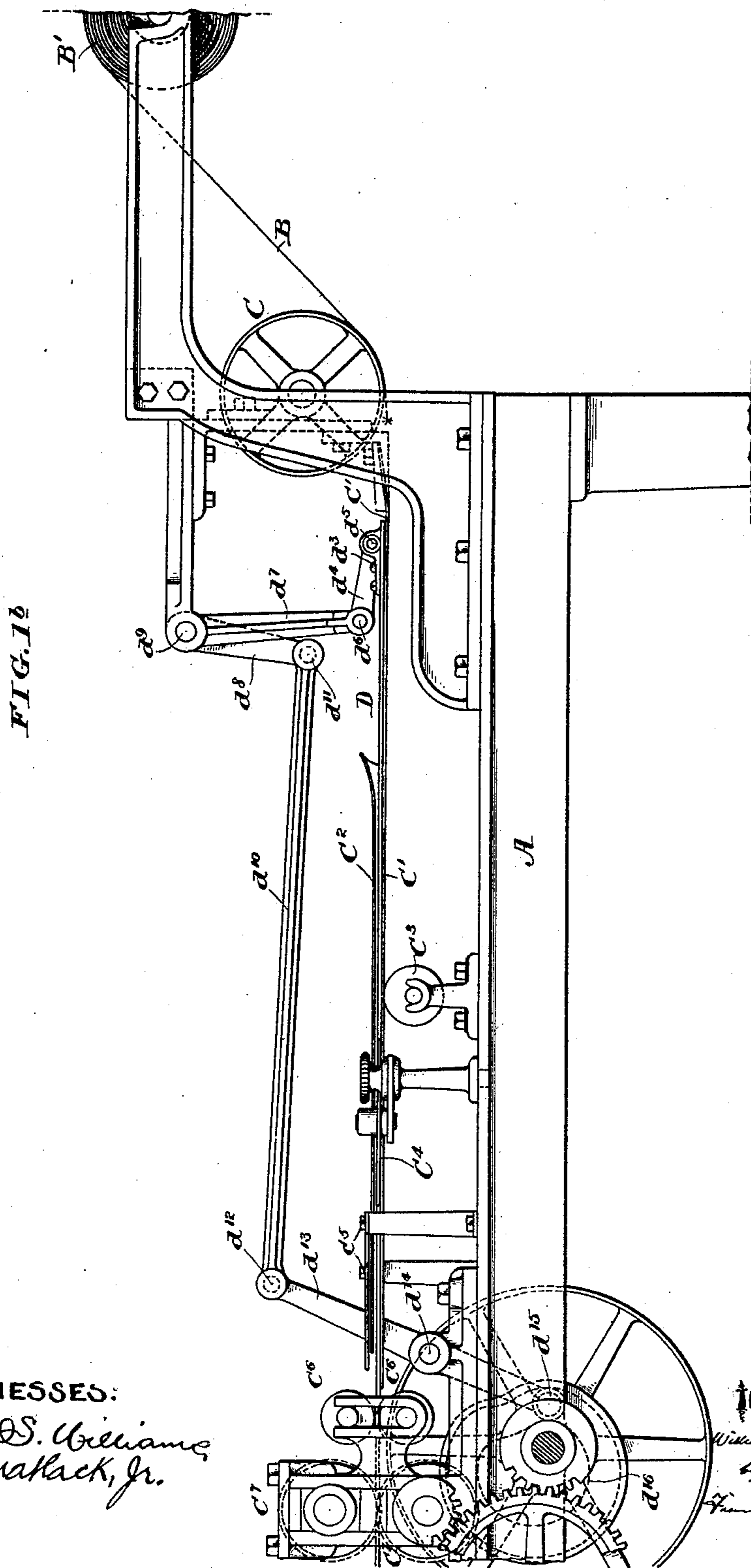
(No Model.)

5 Sheets—Sheet 2.

W. H. PATTERSON.
PAPER BAG MACHINE.

No. 446,839.

Patented Feb. 17, 1891.



WITNESSES:

David S. Williams
Joshua M. Black, Jr.

INVENTOR:

William H. Patterson
by his attorney
Fanning J. Chambers

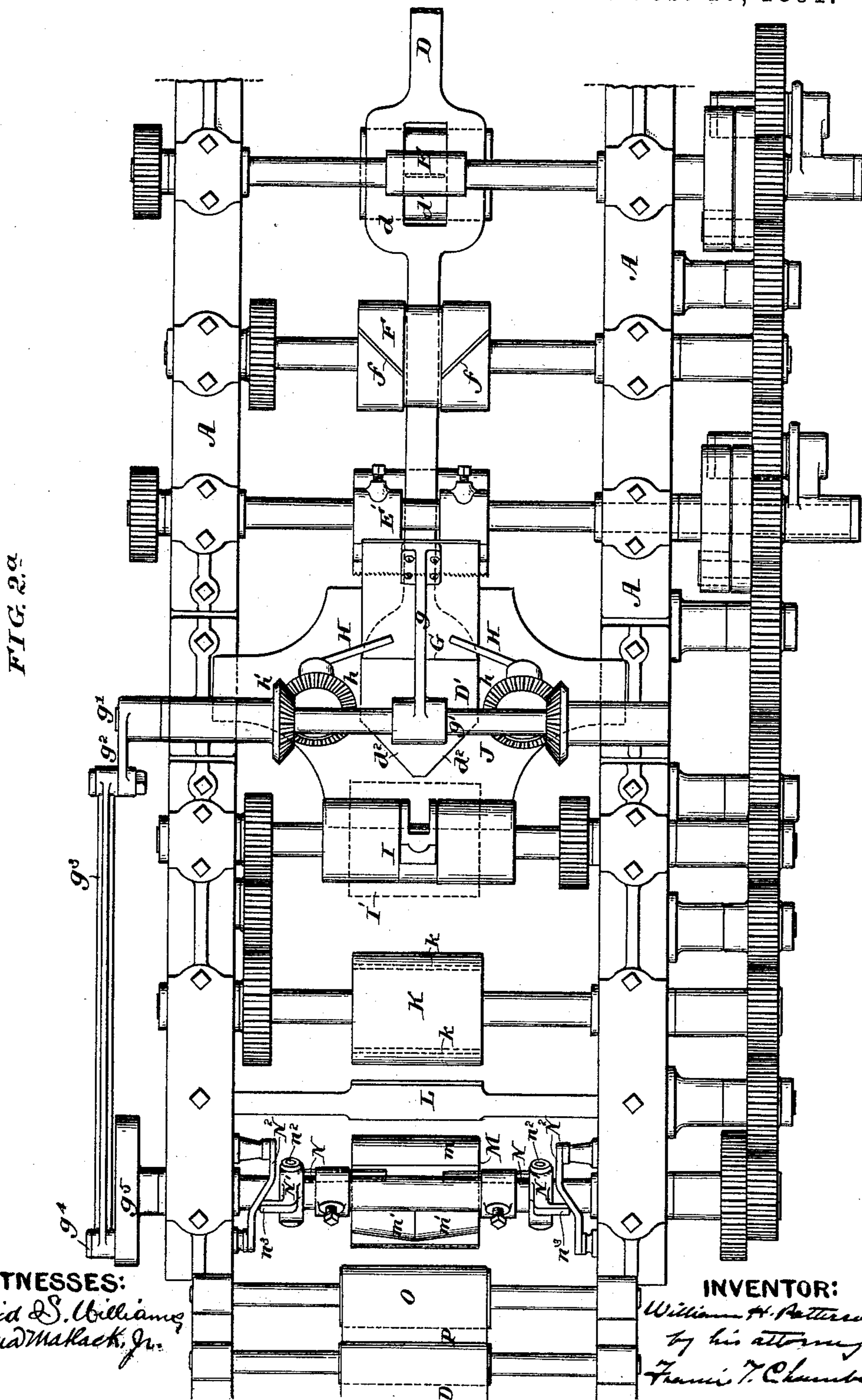
(No Model.)

5 Sheets—Sheet 3.

W. H. PATTERSON.
PAPER BAG MACHINE.

No. 446,839.

Patented Feb. 17, 1891.



WITNESSES:
David S. Williams
Joshua M. Mack, Jr.

INVENTOR:
William H. Patterson
by his attorney
Francis T. Chambers

(No Model.)

5 Sheets—Sheet 4.

W. H. PATTERSON.
PAPER BAG MACHINE.

No. 446,839.

Patented Feb. 17, 1891.

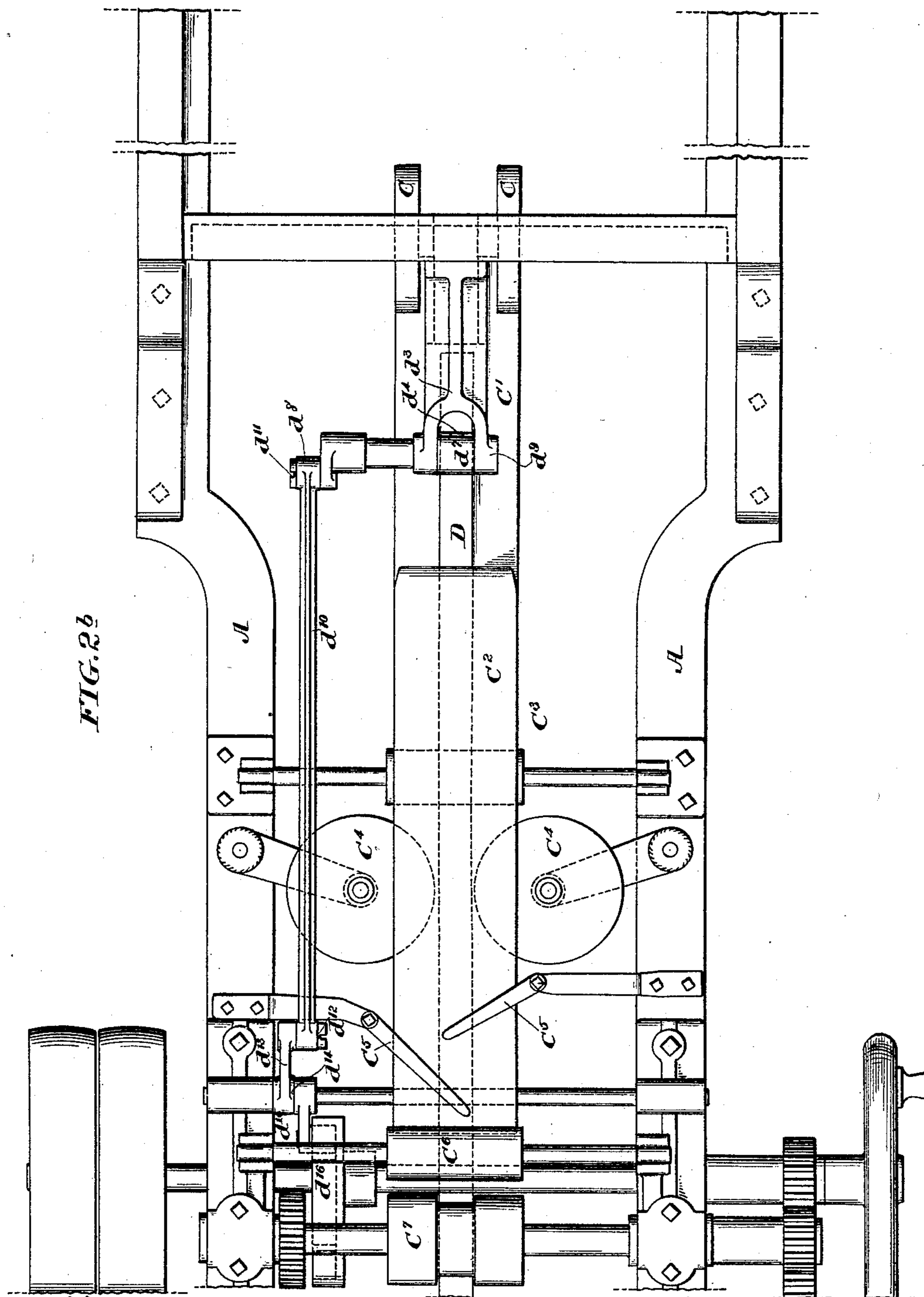


FIG. 2b

WITNESSES:

David S. Williams
Joshua Mahack, Jr.

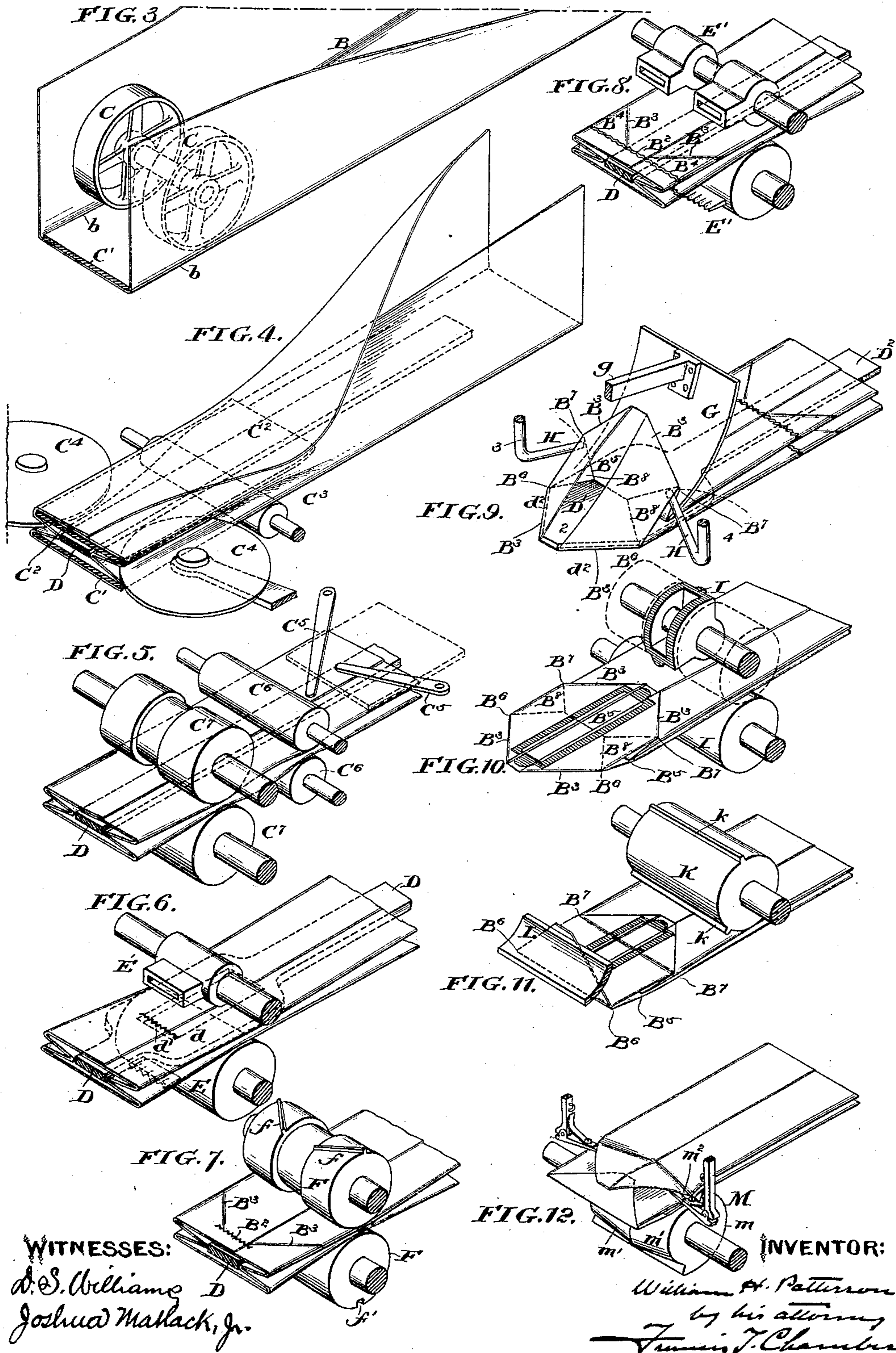
INVENTOR:

William H. Patterson
by his attorney
Francis T. Chambers

W. H. PATTERSON.
PAPER BAG MACHINE.

No. 446,839.

Patented Feb. 17, 1891.



UNITED STATES PATENT OFFICE.

WILLIAM H. PATTERSON, OF CLEVELAND, OHIO, ASSIGNOR TO THE UNION
PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 446,839, dated February 17, 1891.

Application filed January 11, 1890. Serial No. 336,623. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PATTERSON, of Cleveland, county of Cuyahoga, State of Ohio, have invented a new and useful Paper-Bag Machine, 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 making bellows-folded satchel-bottom bags such as are shown and described in Reissue Letters Patent No. 10,083, granted to the Union Paper Bag Machine Company, April 11, 1882, my object being to provide simple and efficient mechanism for manufacturing such bags.

The nature of my improvements and their mode of operation will be best understood after a description of the drawings in which they are illustrated and in connection with which the novel features will be described, as well as being clearly pointed out in the claims.

Reference being now had to the drawings, which illustrate my improvement, Figures 1^a and 1^b show in side elevation a machine embodying my invention, Fig. 1^a showing the left-hand end of the machine and Fig. 1^b showing the right-hand end of the machine. Figs. 2^a and 2^b show the plan of the machine divided in the same way, Fig. 2^a being the left-hand end, and Fig. 2^b being the right-hand end, of the machine. Fig. 3 shows in perspective the mechanism by which the first fold of the paper web is formed in folding up a bellows-folded tube. Fig. 4 shows in perspective the mechanism for completing the bellows-folded tube. Fig. 5 is a perspective view of the pressure and feed rolls for compacting the tube prior to cutting it into bag-blanks. Fig. 6 is a perspective view showing how the blank is severed in its center. Fig. 7 is a perspective view showing the creaser-rolls and their operation upon the paper. Fig. 8 is a perspective view showing the cutter-rolls, which complete the severing of the blank from the tube. Fig. 9 is a perspective view showing the mechanism which opens out the diamond fold on the end of the bellows-folded blank. Fig. 10 is a perspective view showing the pasting-roll which ap-

plies paste to the edges of the diamond. Fig. 11 is a perspective view showing the roll which creases the diamond and a device for turning down the front flap thereof. Fig. 12 is a perspective view of my device for folding down the back flap of the diamond to complete the bag, and Fig. 13 a front elevation of the said device shown in a little greater detail than in Fig. 12.

A is the frame of the machine; B, Fig. 1^b, the web of paper passing from the roll B' to the mechanism, which converts it first into a bellows-folded tube and then into a bellows-folded satchel-bottom bag.

C C are wheels under which the web B passes, and around the edges of which it is folded up, as shown in Fig. 3.

C' is a former-plate, beneath which the paper passes on leaving the wheels C C.

C² is a former-plate lying above the plate C'; C³, a guide-roll to hold the web up against the lower former-plate C'.

C⁴ C⁴ are narrow wheels, which operate to push a definite amount of the paper in the blank between the plates C' and C² to form the inwardly-folded or bellows sides of the tube.

C⁵ C⁵ are fingers, which operate to turn over and downward the upper edges of the paper to complete the bellows-folded tube.

C⁶ C⁶ are pressure-rolls, which operate to press the pasted seam of the paper down, in order to make permanent the tube.

In all the features above described the mechanism shown is of an old and familiar type; and need not therefore be further described.

D is a plate or rod situated between the former-plates C' and C², extending back of the said plates to a point near the wheels C, which define the first folds made in the web B and attached at that end to mechanism arranged to give it a reciprocating backward and forward motion. As shown, a lug d³ is fastened to the end of rod D, and to a pivot d⁵ in said lug a link d⁴ is fastened, said link being pivoted at d⁶ to a lever-arm d⁷, attached to a shaft d⁹, which shaft is given a reciprocating-oscillation through a lever d⁸, to which is pivoted on d¹¹ a rod d¹⁰, said rod being pivoted

at d^{12} to a lever d^{13} , pivoted to the frame of the machine at d^{14} and resting at its other end d^{15} against the cam d^{16} , which said cam is formed to give the reciprocating rod D the movement hereinafter described. The rod D extends forward through the machine and terminates in a former-plate D' and having the angular form shown in Figs. 2^a and 9—that is, its front edges d^2 and d^3 are beveled off to have the same lines as the front flap of the diamond fold which is formed on the blank in the process of making a satchel-bottom upon it.

Before describing the operation of the angular former-plate D' in the operation of making the bag I will refer to those parts of my machine which act upon the tube and blank before the said former-plate comes into operation.

After passing the feed-rolls $C^7 C^7$ the tube passes between the cutter-rolls $E E$, a knife being secured in one roll and working in a slot in the other roll in the manner which is entirely familiar to all those who are acquainted with the art of making paper bags. At this point (see Fig. 2^a) the reciprocating rod D is broadened out, as shown at d , and a hollow place d' formed in the center of the enlargement to permit the knife-blade to pass through the center of the tube. The cutting here performed does not sever the blank from the tube, but only cuts through the center of the tube in the line in which the blank is ultimately to be severed. The blank next passes between the creaser-rolls $F F$, upon one of which oblique flanges $f f$ are formed, arranged to register with and press down into the corresponding slots f'' in the other roll. The projections and slots operate upon what will be the front edge of the blank when it is severed from the tube, and they are formed so as to crease the said blank on the lines in which the blank will afterward be folded in the formation of the front and back laps of the diamond. After passing between those rolls and being creased as described the tube passes between the rolls $E' E'$, provided with knife-blades and slots arranged to operate upon the two sides of the tube and complete the operation of severing the blank therefrom. After passing through the last cutting-rolls the blank is delivered to the angular former D' in such a way that the oblique edges $d^2 d^3$ of the said plate shall lie on the under ply of the blank in line with the creases B^3 , formed thereon by the rolls $F F$. The cam d^{16} then operates on the system of levers, rods, &c., which connect it with the reciprocating rod D in such a way as to first push said rod and the plate D' upon its end forward, and simultaneously with this forward motion of the rod and plate the tucker G and fingers $II II$ come into operation. The said tucker G is fastened to the end of an arm g , which is pivoted on a shaft g' , said shaft being given an oscillating reciprocating movement by means of a lever-arm g^2 , actuated by a rod g^3 , attached to a

crank-pin g^4 on a rotating disk g^5 . It is formed and actuated so as to come down upon the blank along the line B^5 , Figs. 9, 10, and 11, upon which the diamond is spread out and to move forward with the blank and the plate D' maintaining its position upon it approximately upon said line B^5 until the diamond is substantially defined.

$II II$ are fingers, which are arranged to engage the upper ply of the blank beneath its inwardly-folded edge at or near the points B^1 , at which the front flap of the diamond of the opened blank terminates and at which the inwardly-folded triangular flap which distinguishes this kind of bag begins. The corresponding corners on the lower side of the paper are marked $B^6 B^6$ and are defined by the corners of the angular plate D' . The fingers $II II$ sweep backward, turning the upper ply of the paper back over the edge of the tucker G and upon the line B^5 . In doing this they form the inward triangular folds $B^8 B^8$, the corners B^6 and B^7 of which are defined by the corner of the former-plate D' and by the folds $D^3 D^3$ previously made in the blank. The upper flap of the diamond folds on the lines $B^3 B^3$, which are already creased, and by the coaction of the former-plate D' , the tucker G , and the fingers $II II$, the diamond is spread out, and it is thus defined, as shown in the drawings.

The mechanism shown for actuating the fingers $II II$ is best seen in Figs. 1^a and 2^a. Said fingers are attached to miter-wheels h , which are rotated by connecting miter-wheels $h' h'$, secured on a shaft running transversely to the machine. By this plan the fingers $II II$ have a continuously rotating action, making, of course, one rotation for each blank passing through the machine and acting upon the blank in their backward sweep over the plate D' and tucker G . As their action in the mechanism shown is simultaneously with the forward movement of the blank and the former-plate D' , their engagement with the paper is but for a short time. Obviously, however, they could be used with a stationary former-plate and a tucker, which is stationary while they are in operation; but I prefer to have all three of the instrumentalities move in the manner as heretofore described.

The mechanism which actuates the plate D' and its rod D retracts the said plate and rod after the diamond is formed, and the diamond-folded blank then passes between rolls $I I$, the upper one of which is a paster-roll, which applies paste to the edges of the diamond, as shown in Fig. 10. I' indicates the paste-vat which feeds this upper paster-roll. The blank then passes between creaser-rolls $K K$, the upper one of which is provided with projecting ribs $k k$, registering and fitting into crease $k' k'$ in the lower roll and so placed as to crease the blank on the lines $B^7 B^7$ and $B^6 B^6$, thus defining the final folds upon which the front and back laps of the diamond are folded down in order to complete the bag-bottom.

From the rolls K K the blank, with the laps of the diamond projecting upward, passes beneath an angularly-set plate L, which engages the front lap of the diamond and folds it back upon the creased line B⁶ B⁶ and down upon the center of the diamond fold, after which the blank passes over the roll M, which, together with coacting mechanism, is arranged to fold down the back flap of the diamond and complete the back. This roll M is made up of two parts, one *m* being the segment of a cylinder and the other *m'* *m'* made up of conical segments set with their bases together in the center of the roll. Above the roll M is a shaft N³, to which are secured brackets N⁴, and upon these brackets are pivoted at *n*² arms N', with projections extending above and below their pivots. Upon one end of these pivoted arms are secured fingers N N, pivoted to the arms at *n* *n* and provided with springs *n'* *n'*, which tend to push the fingers N downward. Springs *n*⁴ *n*⁴ tend to draw the arms N' inward, as shown, and projections *n*³ *n*³ on the other ends of arms of N' are arranged to come in contact with cams N² N², said cams, together with the springs *n*⁴ *n*⁴, governing the position of the arms N'. To explain now the operation of this device I will state that the blank is fed onto the roll M so that the line B⁷ B⁷ and the crease formed along this line will extend over the edge *m*² of the cylindrical part of the roll. As the roll M rotates and the shaft N³ also rotates, the cams N² are formed so as to push the upper ends of the pivoted arms N' inward, and consequently to push the fingers N N downward, and the said fingers come down upon the blank just inside of the line B⁷ B⁷. The backward flap of the diamond is already bent upward slightly, a crease formed along the line on which it is to be folded. The pressure of the fingers, together with the shoulder formed upon the roll M between the cylindrical and conical parts thereof, has the effect of throwing the back flap of the diamond upward, and as the downward pressure of the finger ends continues the bottom of the blank is bent on the conical face *m'* *m'* of roll M, and the back flap in consequence of this bending folds down upon the center of the diamond and upon the front flap already folded down thereon, the finger ends being withdrawn as soon as this fold is completed by the action of the cams N² N². After leaving the roll M the blank passes between presser-rolls O O, which press down the seams of the bottom, and it then travels on the blade P around the drying-cylinder Q and is delivered as a completely folded and pasted bag.

I have shown in the drawings gearing connected with the frame of the machine and the various operative parts thereof; but as such gearing may be modified in any convenient way I have not thought it necessary to describe the same, and I would also state that any convenient feeding and guiding devices can be used for carrying the blanks into and

through the various parts of the machine which operate upon them in forming the bag. Such devices are familiar to all bag-manufacturers.

Many of the operative features of my improved machine are obviously capable of separate as well as conjoint use.

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

1. In a paper-bag machine, the combination of an angular former-plate D', arranged to lie on the inside of the under ply of a bellows-folded bag-blank, with a tucker G, operating to define the line on which the diamond is opened, and fingers H, arranged to engage the upper ply of the blank beneath its inwardly-folded edge, and operated by mechanism which gives them a backward sweep, all substantially as described.

2. In a paper-bag machine, the combination of an angular former-plate D', arranged to lie on the inside of the under ply of a bellows-folded bag-blank, with creasing-rolls F F, arranged to crease the end of the blank on the lines on which it folds to form the points of the diamond when opened up, a tucker G, operating to define the line on which the diamond is opened, and fingers H, arranged to engage the upper ply of the blank beneath its inwardly-folded edge, and operated by mechanism which gives them a backward sweep, all substantially as described, and so as to spread out the diamond.

3. In a paper-bag machine, the combination of a reciprocating angular former-plate D', arranged to lie on the inside of the under ply of a bellows-folded bag-blank, with a tucker G, operating to define the line on which the diamond is opened, and fingers H, arranged to engage the upper ply of the blank beneath its inwardly-folded edge, and operated by mechanism which gives them a backward sweep, all substantially as described, and so as to spread out the diamond.

4. In a paper-bag machine, the combination of mechanism for forming a bellows-folded tube, a tongue extending from said mechanism, rolls F F, arranged to crease the bellows-folded blank on the lines on which the paper folds to form the points of the diamond when opened out and at the corners where said folds terminate, said rolls being arranged to operate on the blank on each side of the tongue aforesaid, and mechanism situated at the end of said tongue, arranged to fold back the end of the tube, so that a diamond fold will be formed thereon with parallel side folds between the creased corners.

5. In a paper-bag machine, the device for turning down the back flap of the diamond fold, consisting of a roll M, having a segment *m'* *m'* in the form of conical segments set base to base in the center of the roll, and a segment *m*, of cylindrical form, in combination with fingers N, secured on pivoted arms,

and a shaft N^3 and cams N^2 , arranged to actuate said arms and fingers, all substantially as and for the purpose specified.

6. In a paper-bag machine, the device for
5 folding down the flaps of a diamond-folded bag-blank, consisting of creasing-rolls K K , arranged to crease the diamond on the lines on which the said flaps are folded down, an
angular plate L , acting to turn down the front
10 flap, and the device for turning down the back flap of the diamond fold, consisting of a roll M , having a segment m' m' in the form

of conical segments set base to base in the center of the roll, and a segment m , of cylindrical form, in combination with fingers N ; 15 secured on pivoted arms, and a shaft N^3 and cams N^2 , arranged to actuate said arms and fingers, all substantially as and for the purpose specified.

WILLIAM H. PATTERSON.

Witnesses:

LEWIS R. DICK,

H. W. HARE POWEL.