

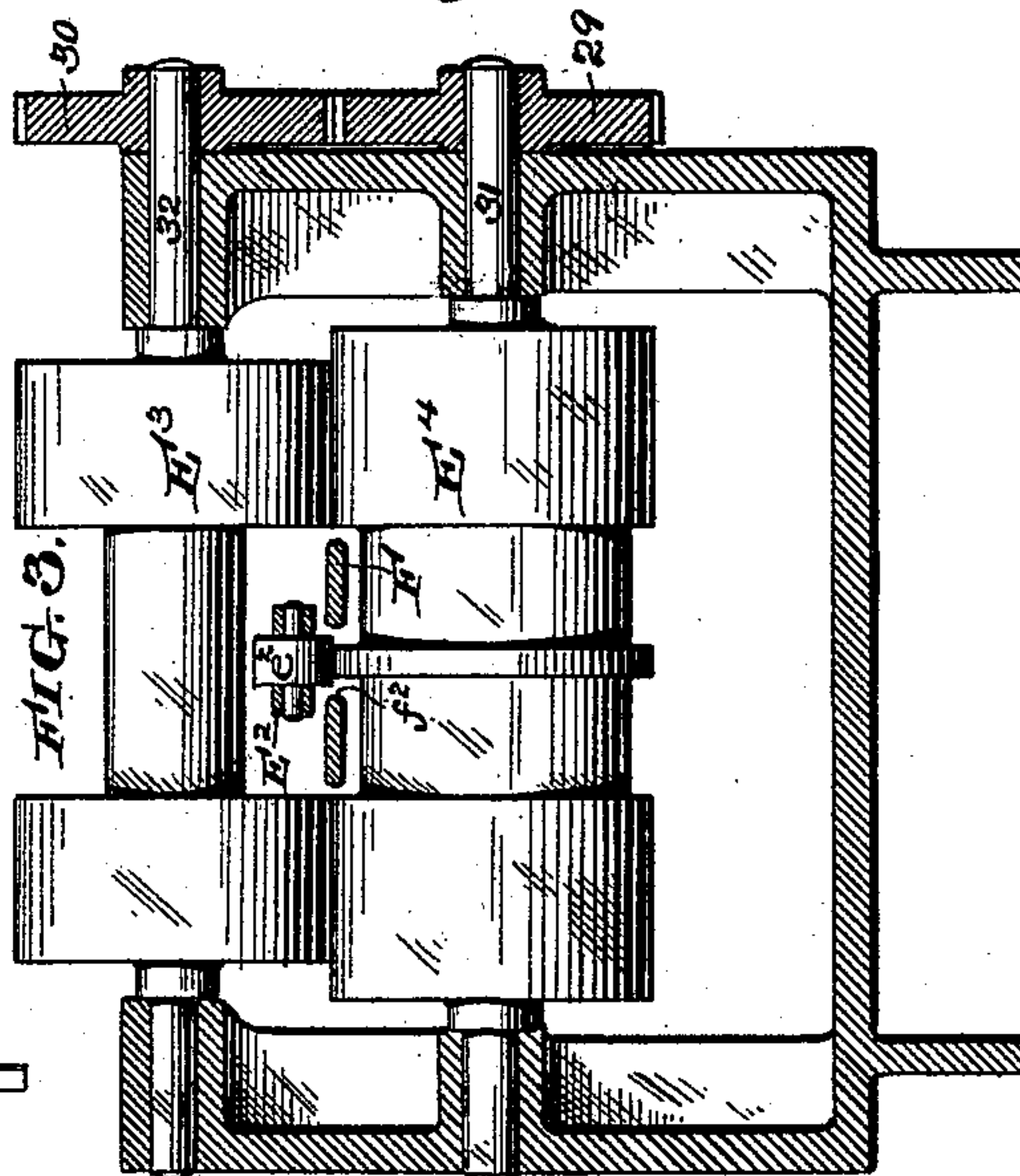
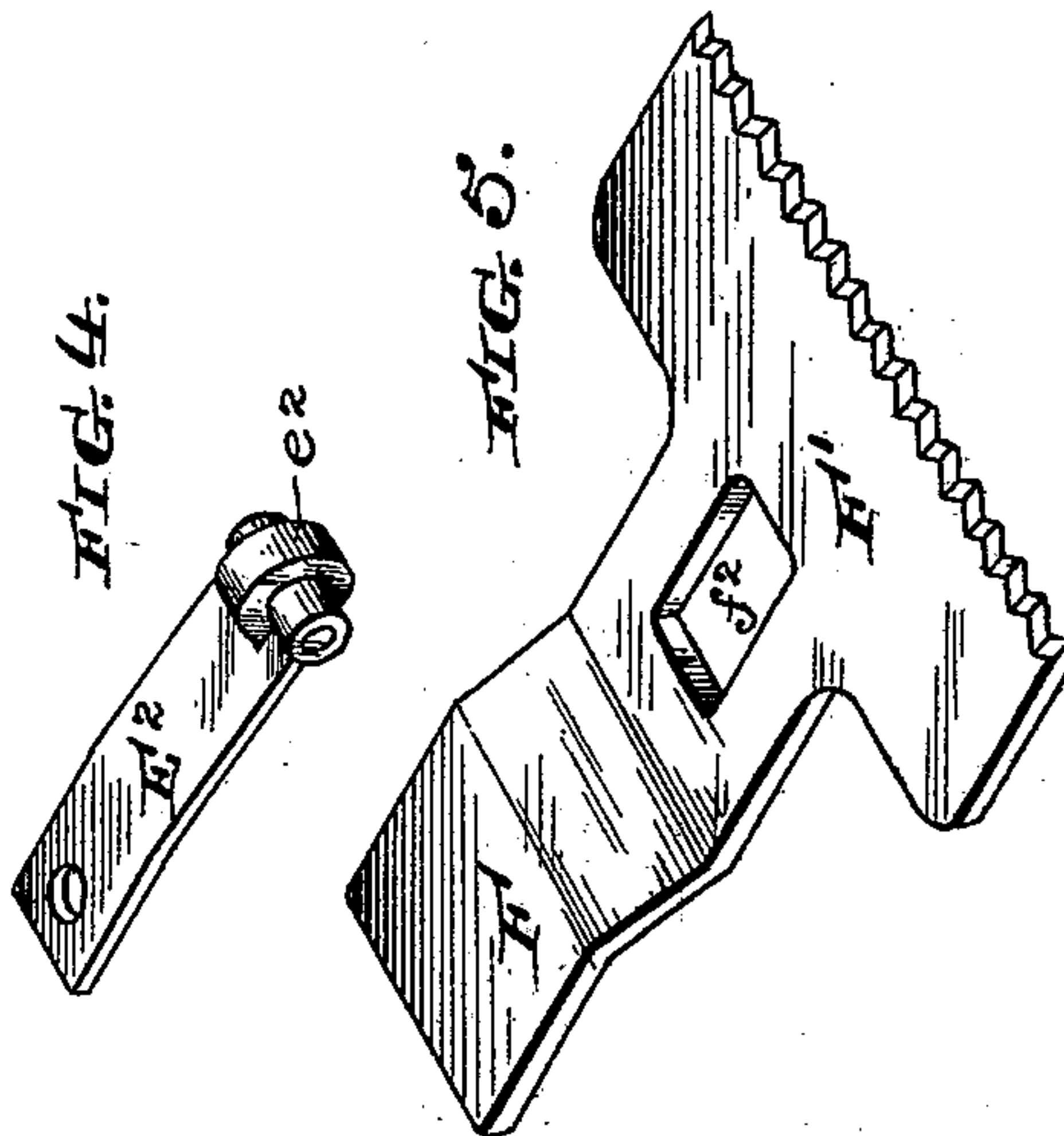
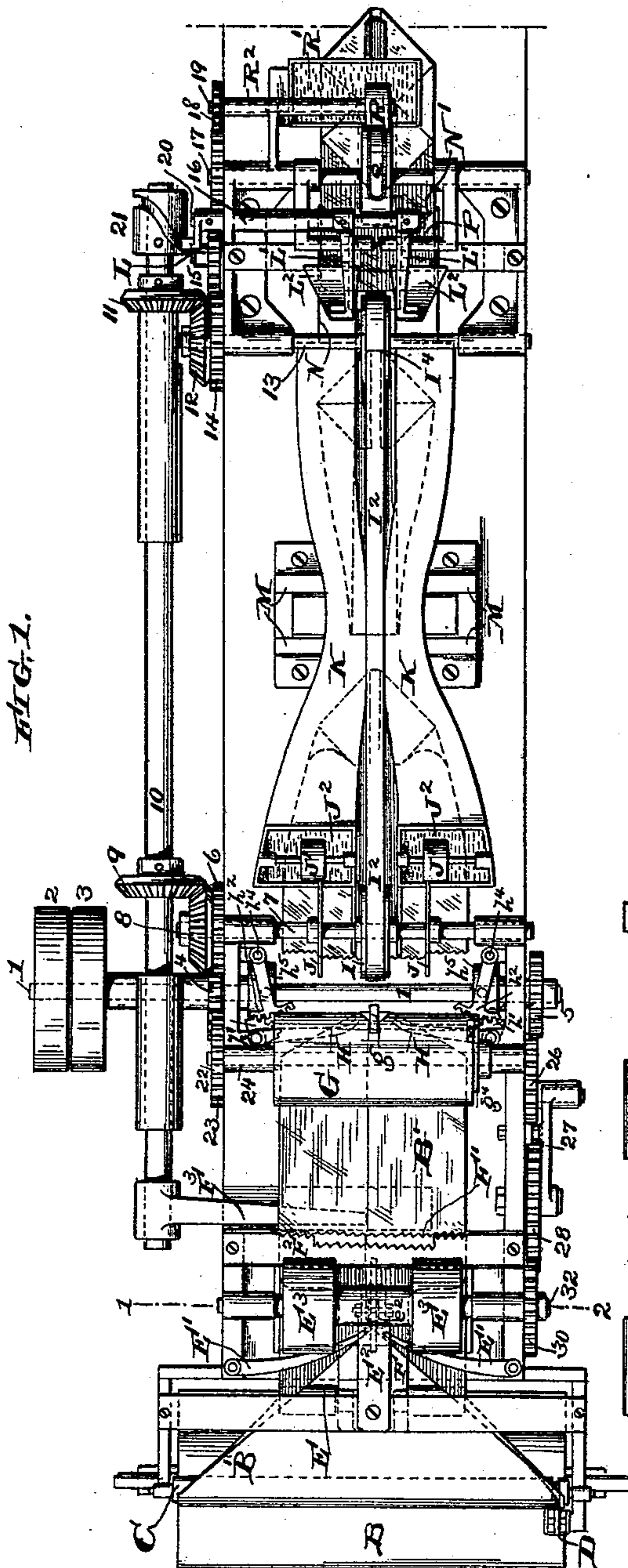
(No Model.)

5 Sheets—Sheet 1.

E. E. CLAUSSEN.  
APPARATUS FOR MAKING PAPER BAGS.

No. 496,860.

Patented May 9, 1893.



Witnesses:  
Henry D. King  
Joshua M. Mack, Jr.

Inventor:  
Edward E. Claussen  
by his atty.  
James T. Chambers

(No Model.)

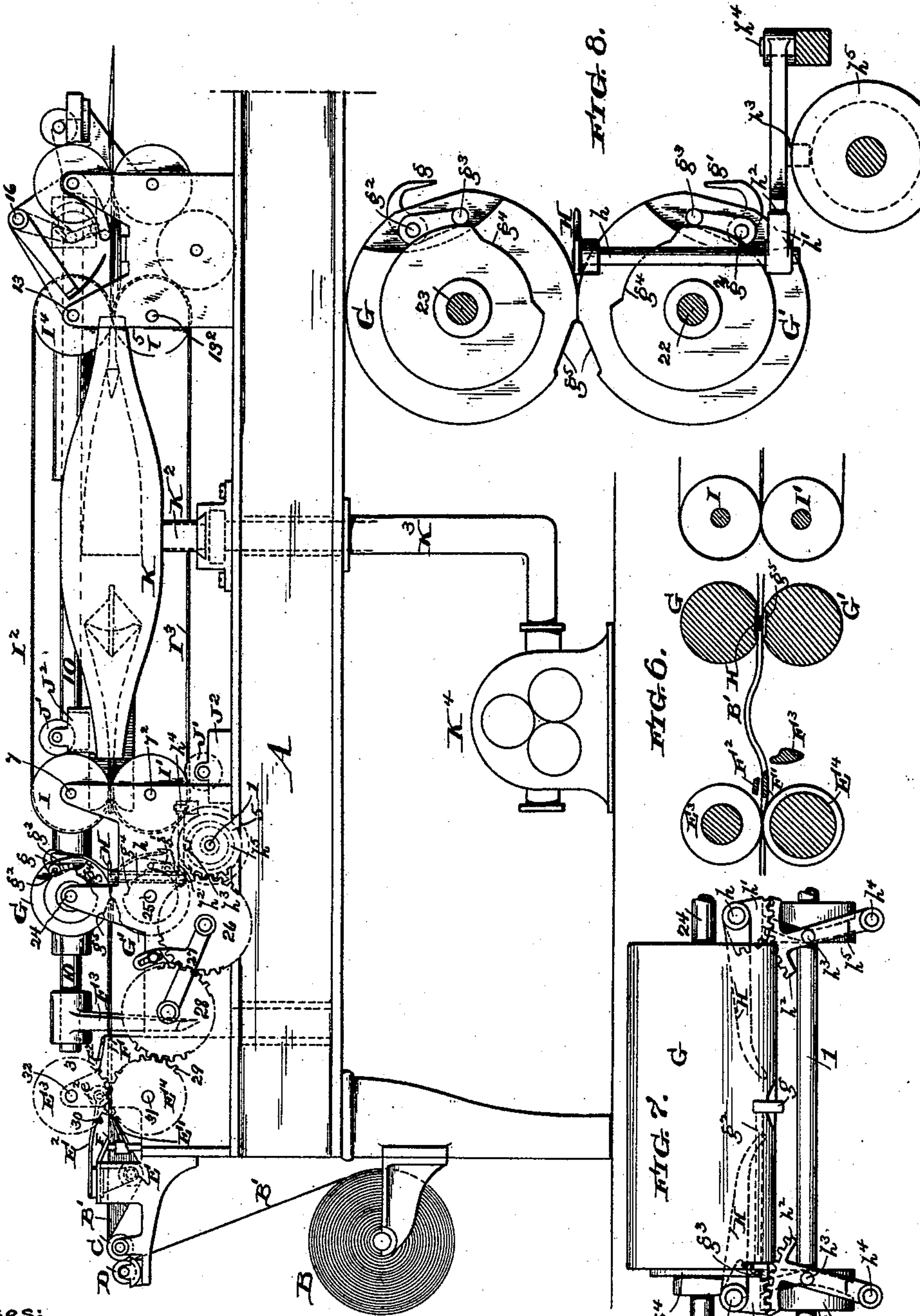
5 Sheets—Sheet 2.

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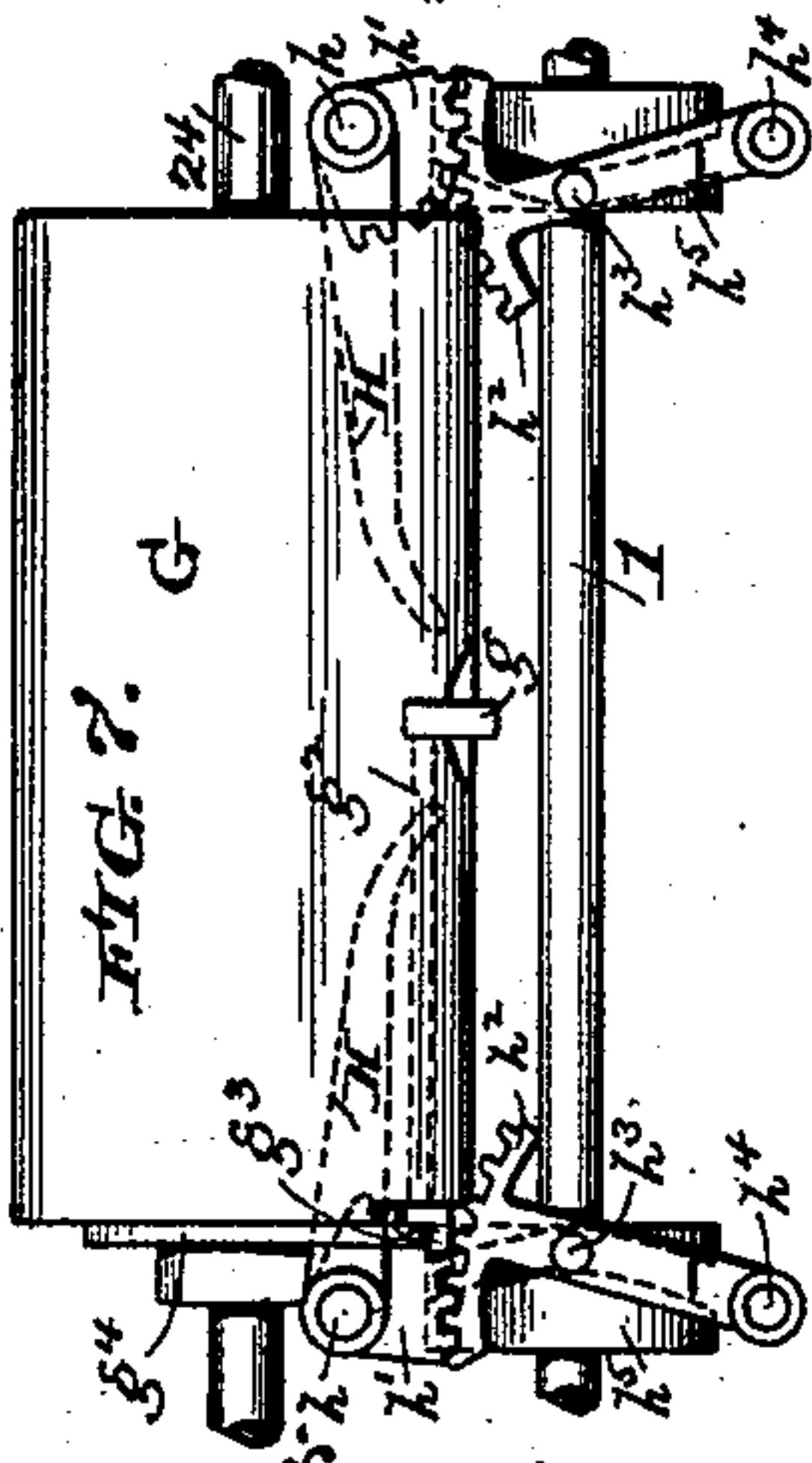
FIG. 2.



Witnesses:

Henry Denny  
Joshua M. Ketch, Jr.

FIG. 6.



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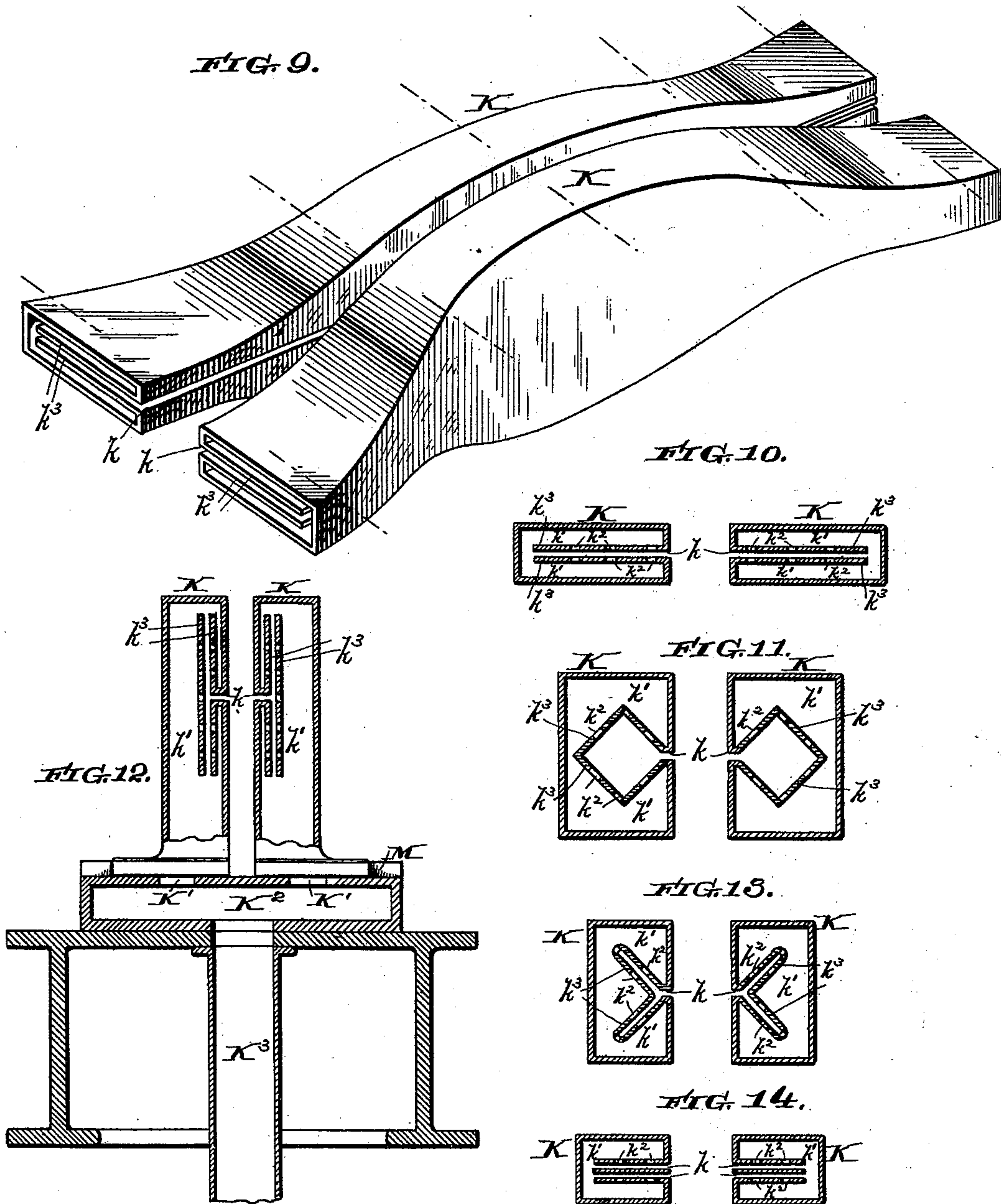
(No Model.)

5 Sheets—Sheet 3.

E. E. CLAUSSEN.  
APPARATUS FOR MAKING PAPER BAGS.

No. 496,860.

Patented May 9, 1893.



Witnesses:  
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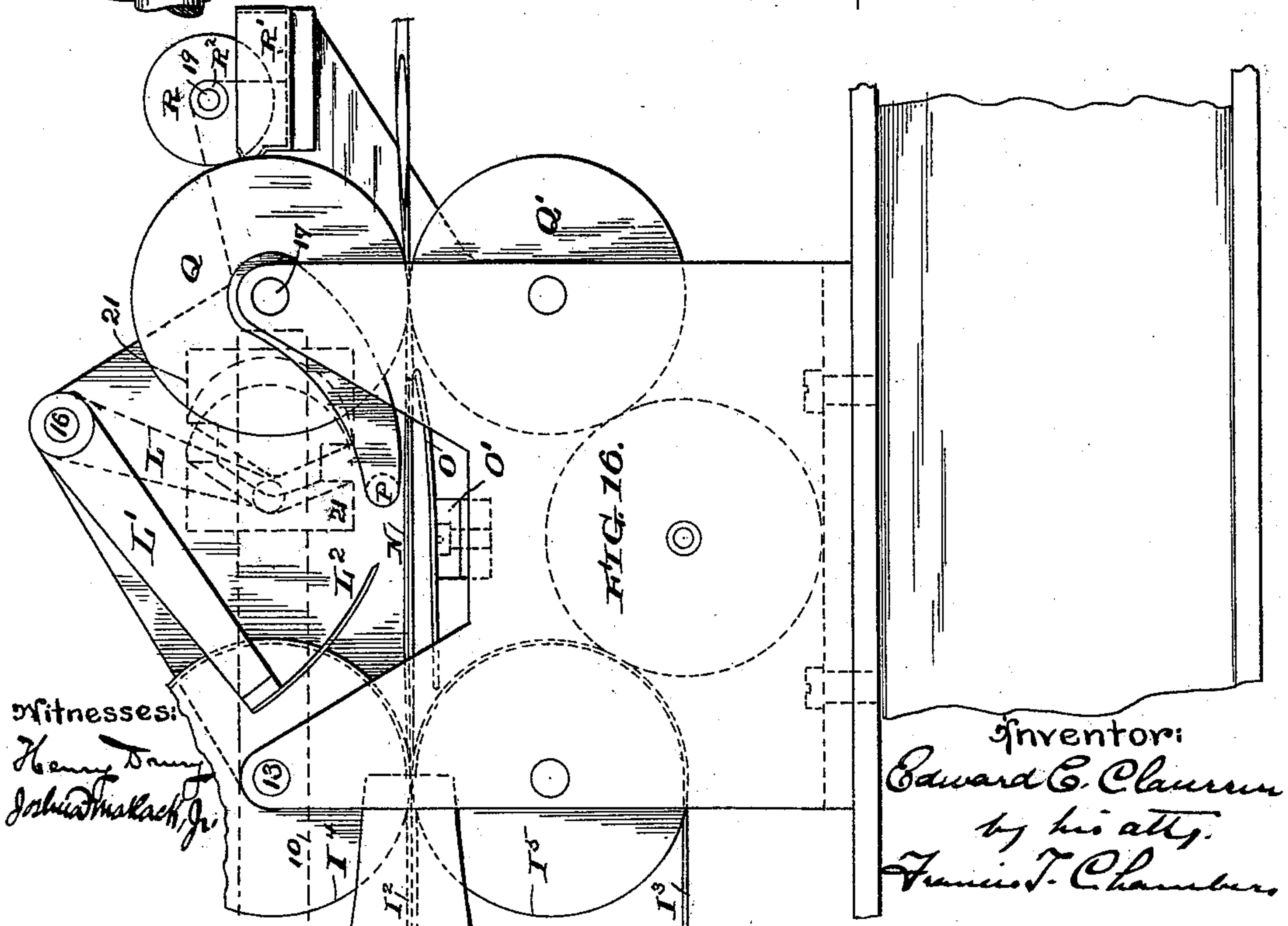
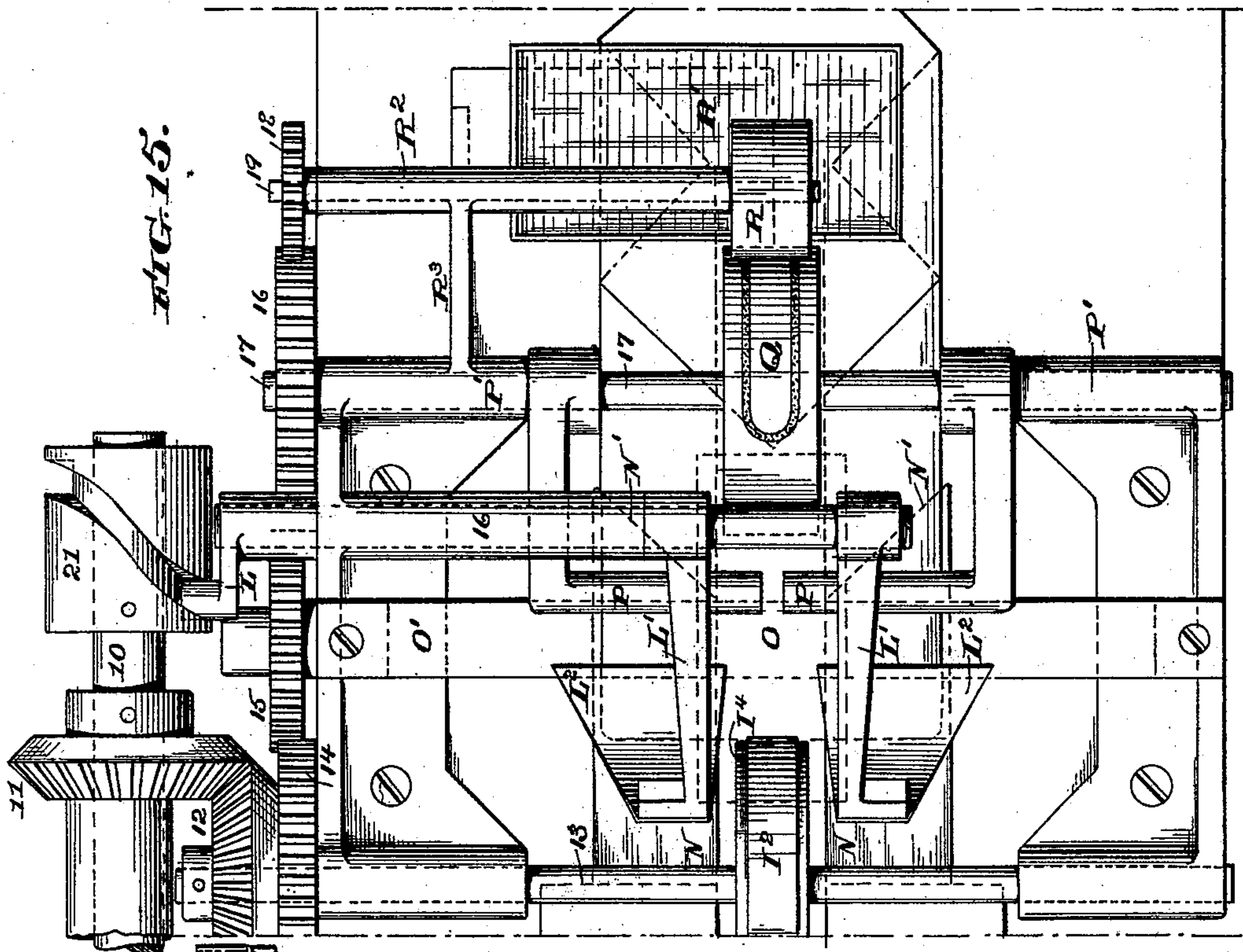
(No Model.)

5 Sheets—Sheet 4.

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Patented May 9, 1893.



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Henry D. ...  
John M. ...

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(No Model.)

5 Sheets—Sheet 5.

E. E. CLAUSSEN.  
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FIG. 17.

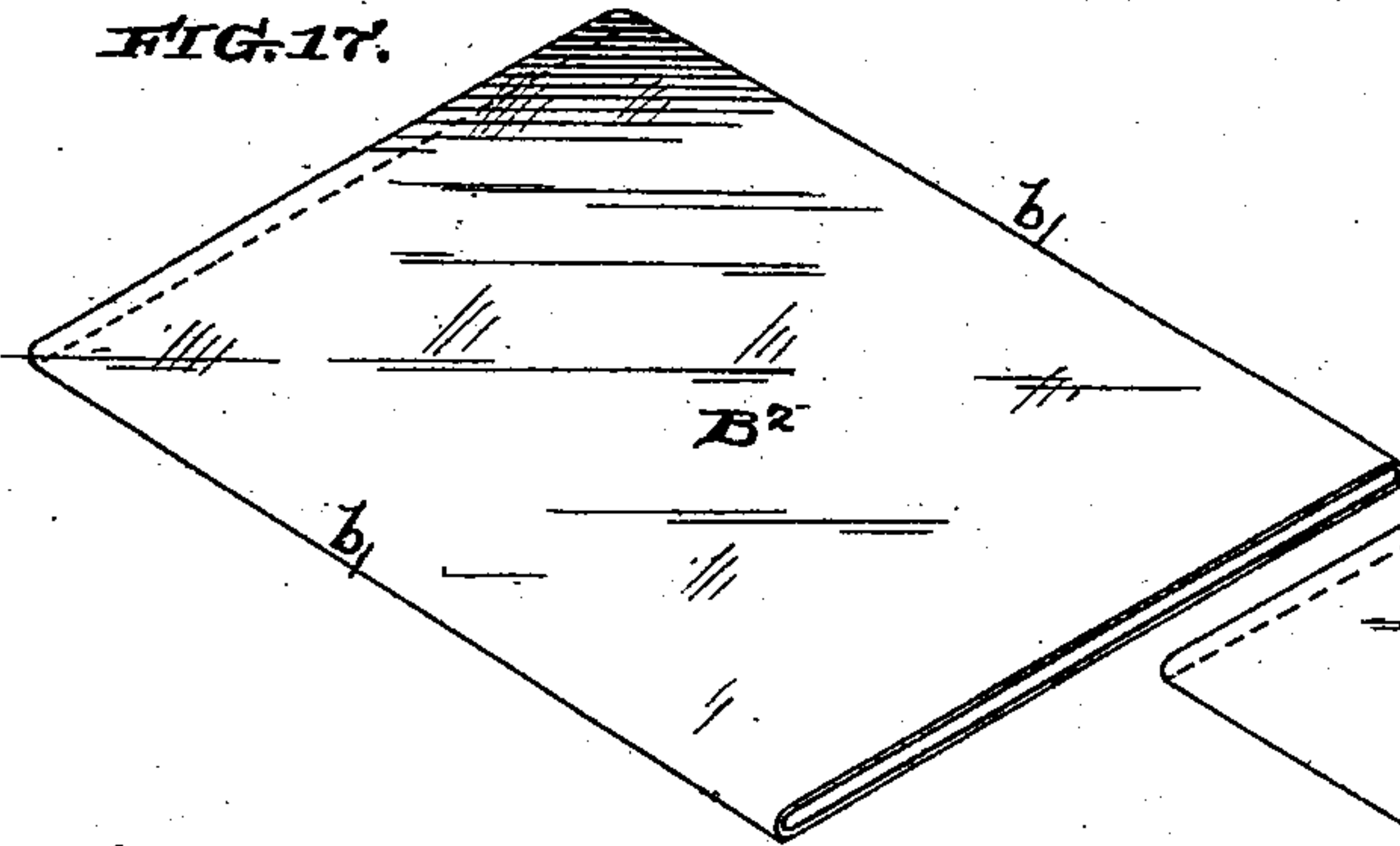


FIG. 18.

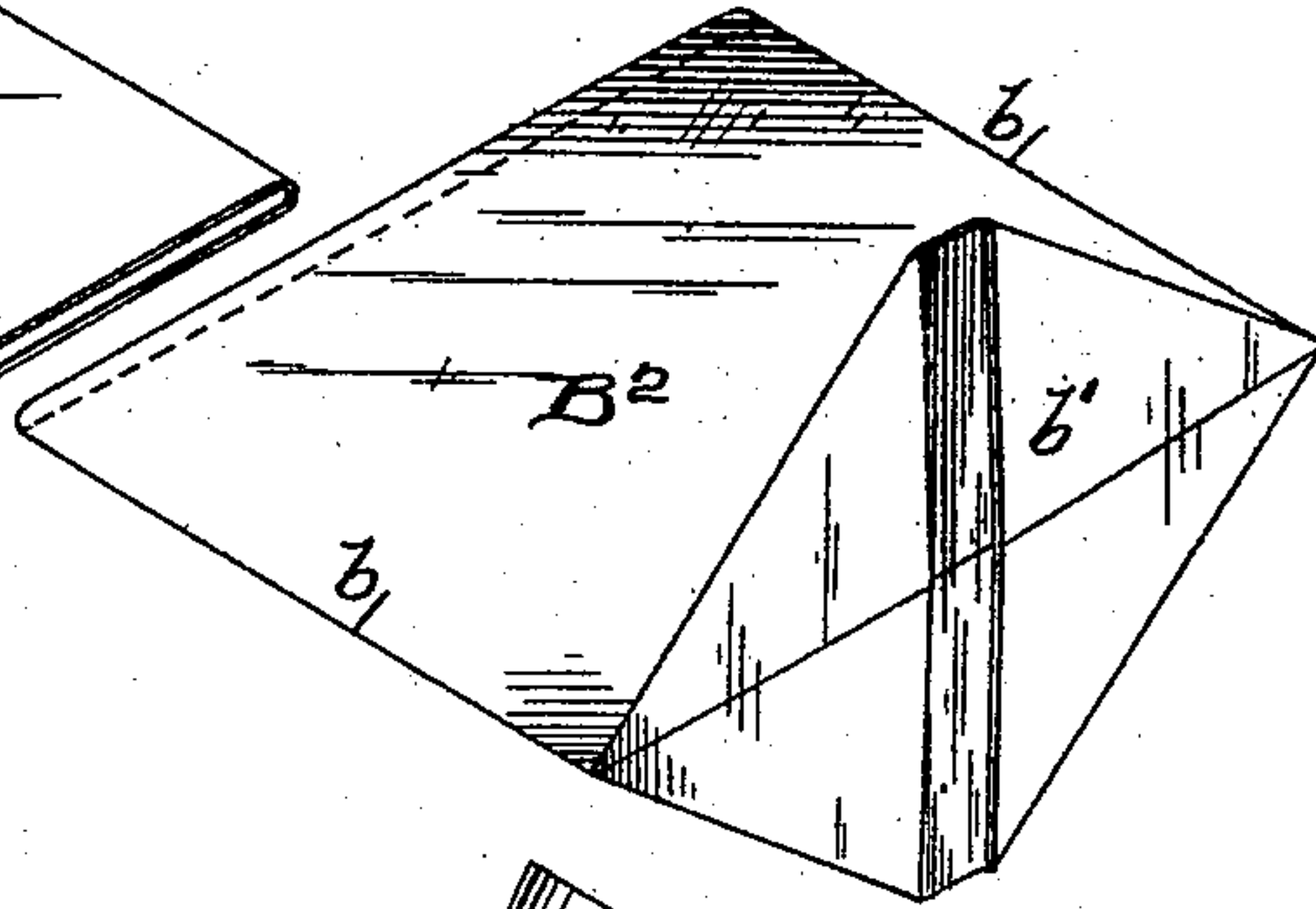


FIG. 19.

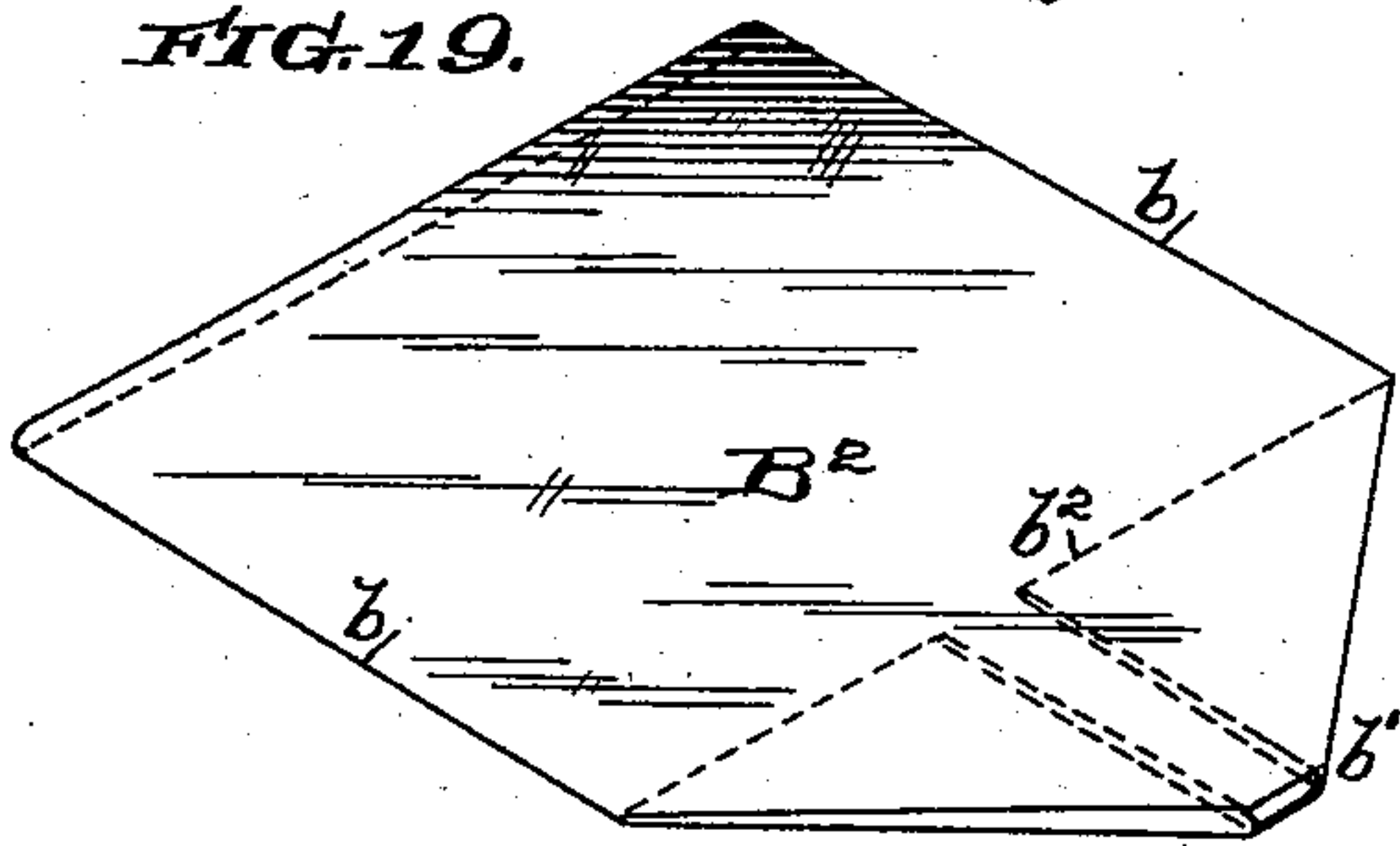


FIG. 20.

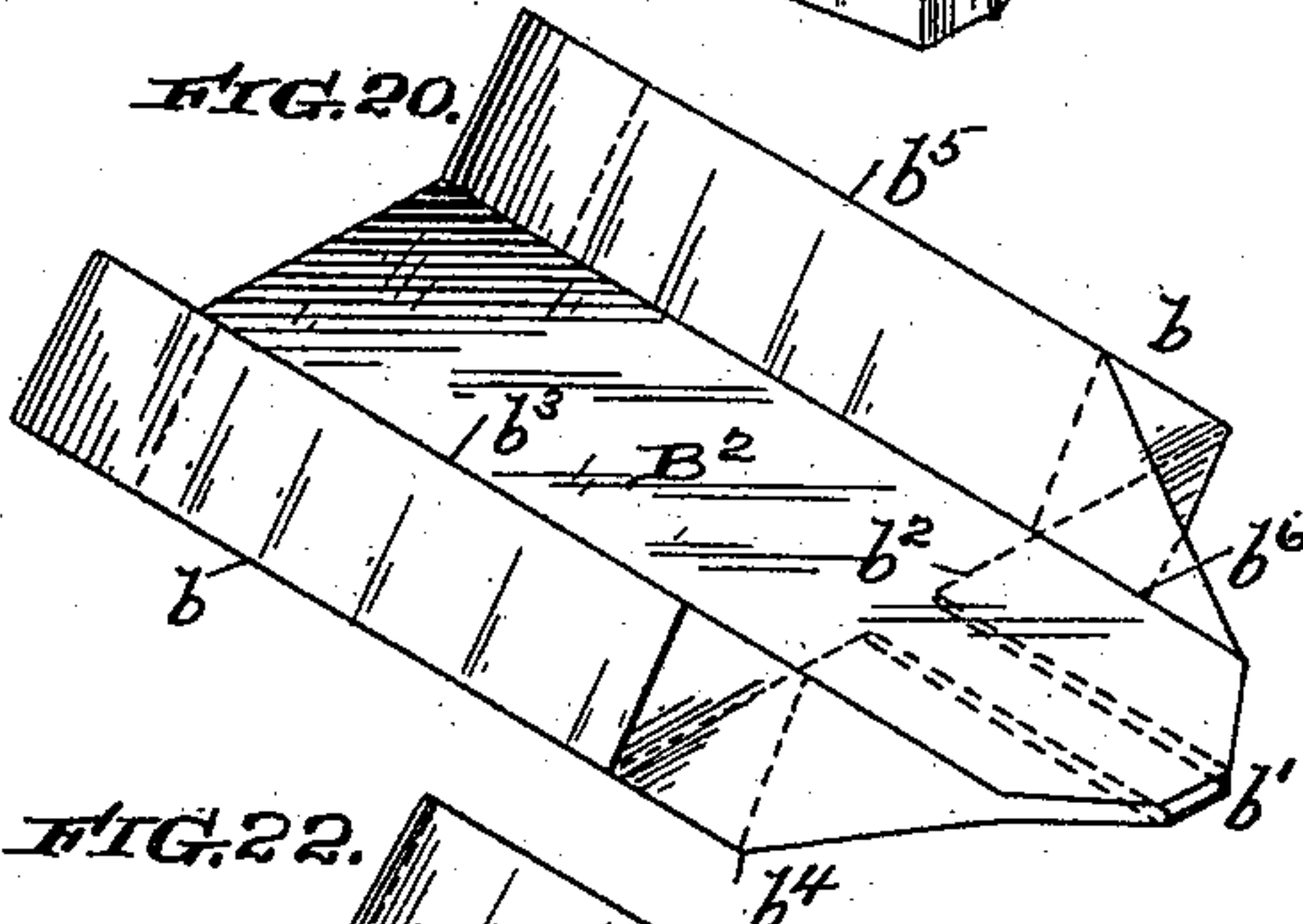


FIG. 21.

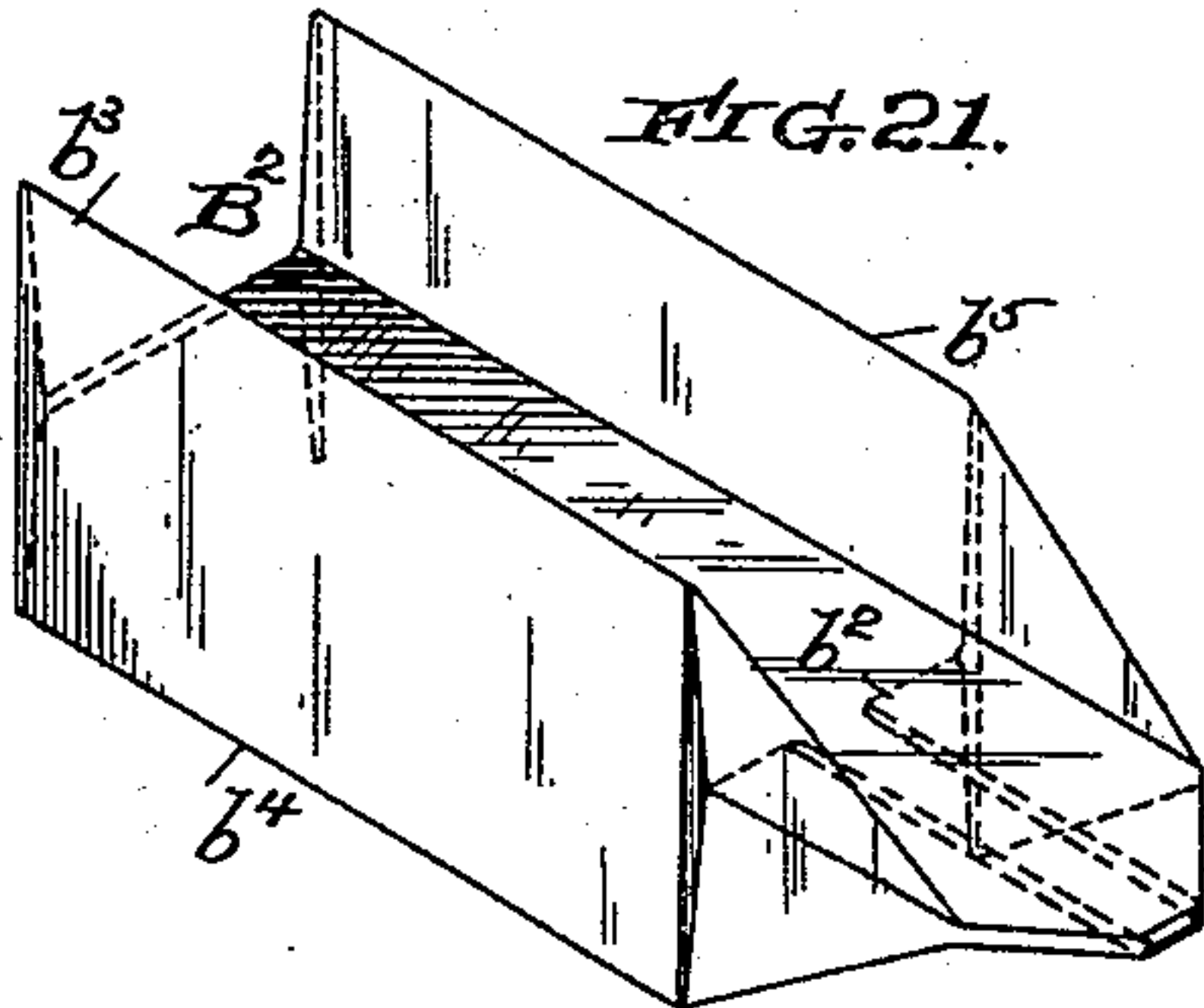


FIG. 22.

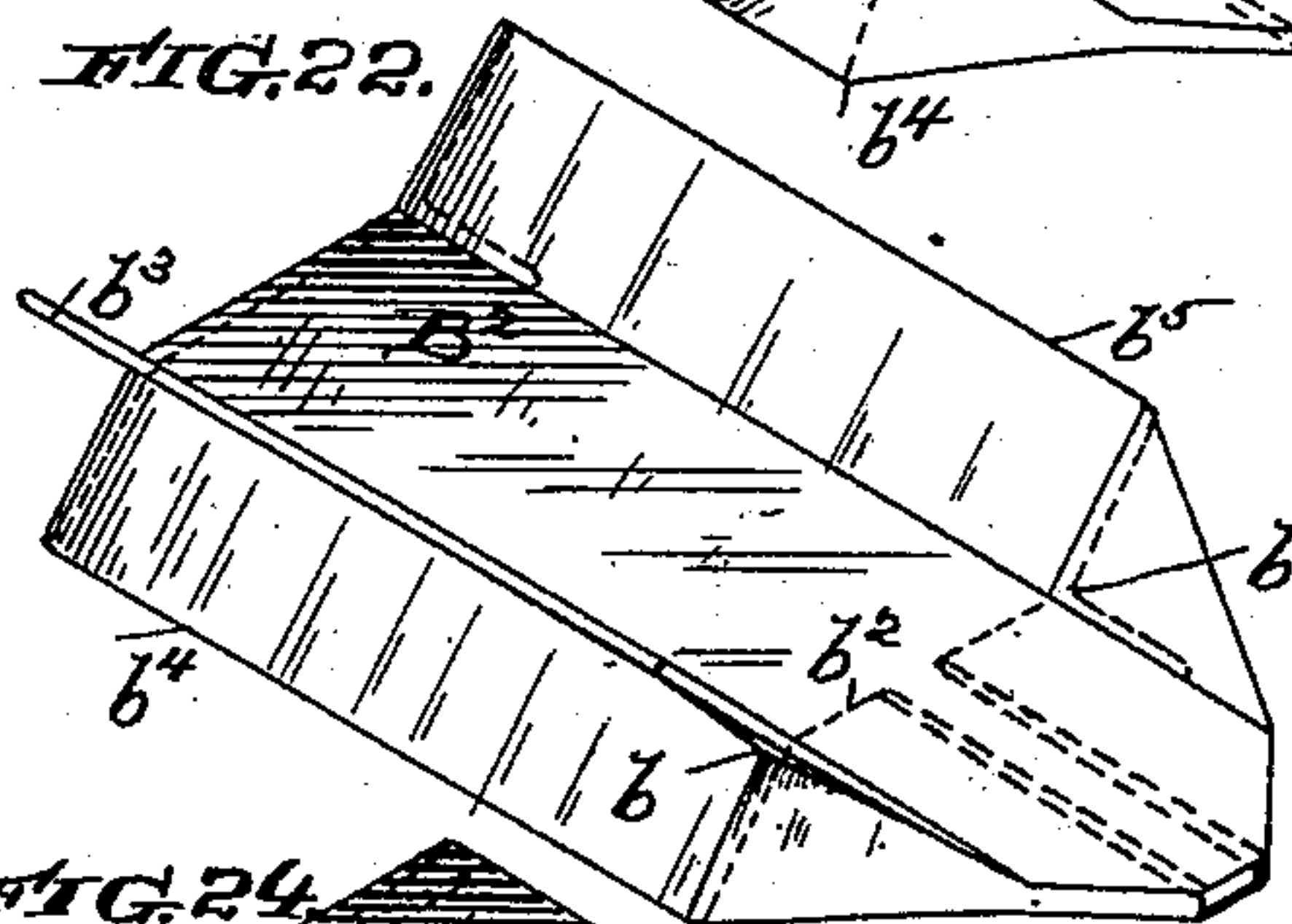


FIG. 23.

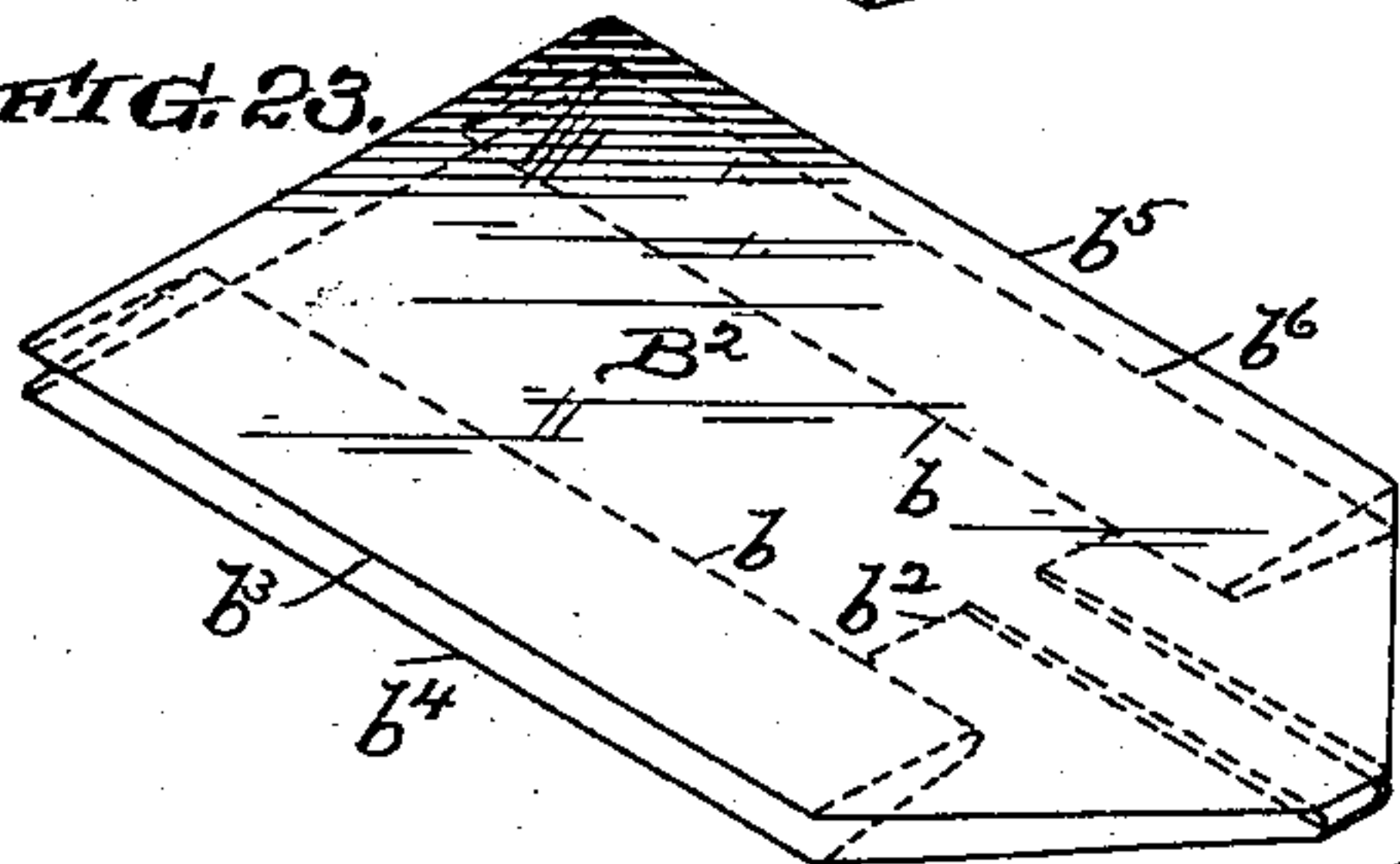
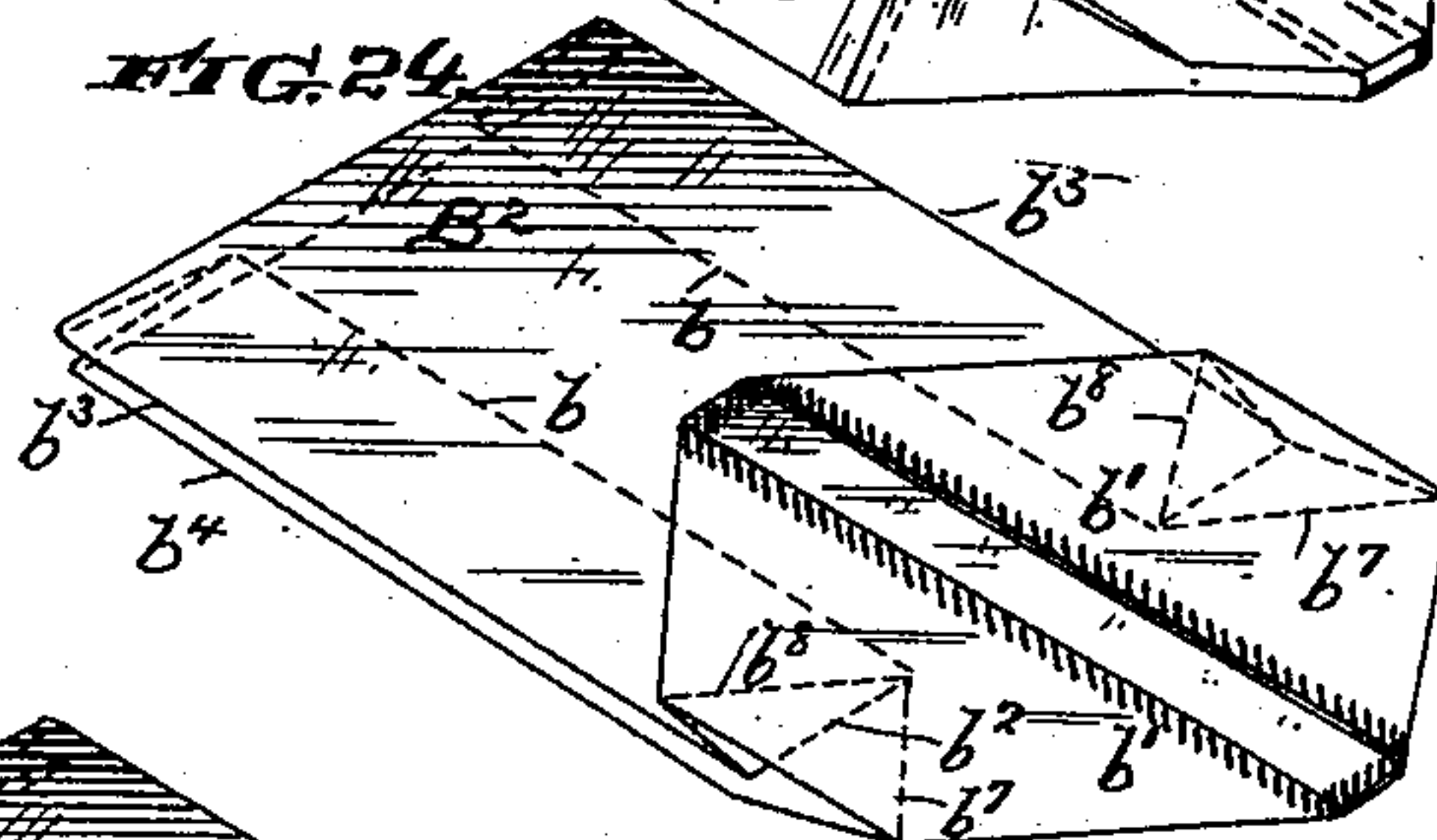


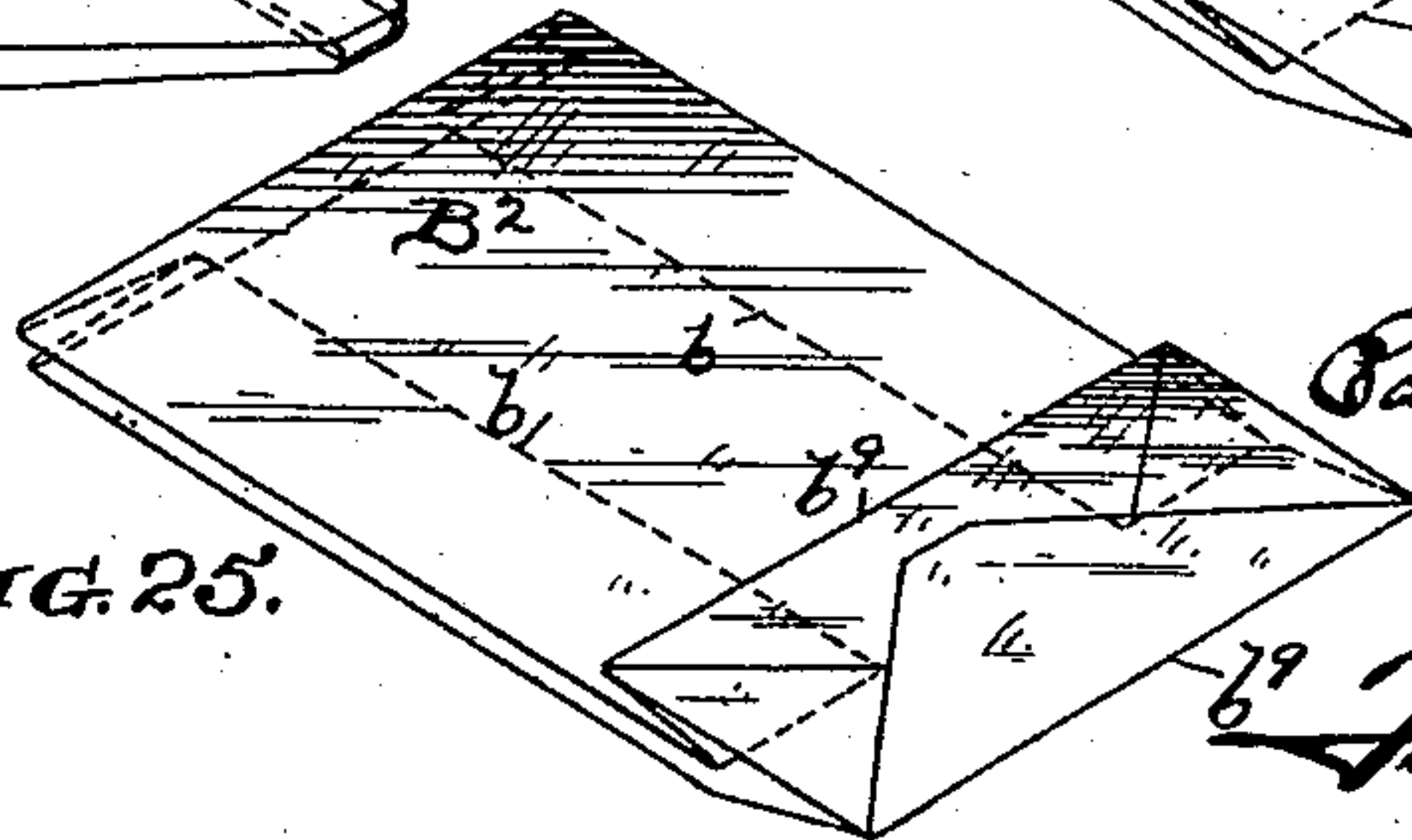
FIG. 24.



Witnesses:

Henry D. ...  
Joshua M. ...

FIG. 25.



Inventor:

Edward E. Clausen  
by his atty.  
James T. Chamber...



# UNITED STATES PATENT OFFICE.

EDWARD E. CLAUSSEN, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

## APPARATUS FOR MAKING PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 496,860, dated May 9, 1893.

Application filed October 14, 1890. Serial No. 368,153. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD E. CLAUSSEN, of the city and county of Hartford, State of Connecticut, have invented a certain new and useful Apparatus for Making Paper Bags, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The invention will be best understood as described in connection with the drawings in which it is illustrated and in which—

Figure 1 is a plan view of my improved machinery; Fig. 2 a side elevation thereof; Fig. 3 a cross-sectional view on an enlarged scale taken through the line 1—2 of Fig. 1. Figs. 4 and 5 are perspective views of parts of the machine shown on an enlarged scale; Fig. 6 a central sectional view extending from the rolls marked  $E^3$   $E^4$  to those marked I and I'. Fig. 7 is a plan view on an enlarged scale showing the roll G and the mechanism immediately co-acting therewith. Fig. 8 is a side elevation of the rolls G and G' and the mechanism connected therewith. Fig. 9 is a perspective view of the vacuum boxes which form an important part of my apparatus. Figs. 10 to 14, inclusive, are, respectively, cross-sectional views taken approximately on the lines C, A, E, B and D of Fig. 9. Fig. 15 is an enlarged plan view of the rear part of the machine; and Figs. 16 an enlarged sectional elevation thereof. Figs. 17 to 25, inclusive, illustrate the different operations performed upon the blank in converting it into a paper bag.

My improved method of forming a paper bag consists in first forming a plain tubular blank such as is indicated at Fig. 17; then opening the diamond fold at the end thereof as shown in Fig. 18; then folding the said diamond fold down upon itself as shown in Fig. 19; then folding in the sides of the blank to form bellows-folds as indicated in Fig. 23; the folding operation being shown in Figs. 20 to 23 inclusive; then spreading open the diamond fold parallel with the body of the blank and at the same time forming the inward triangular folds characteristic of this form of bag as shown in Fig. 24; and finally complet-

ing the bag by folding down the corners of the diamond in the usual way.

The machine illustrated in the drawings is especially designed for carrying out the above described process though various parts of it are also susceptible of use in other methods.

In the drawings,—A indicates the bed of the machine; B a roll or web of paper to be converted into bag blanks; B' indicating the paper on its way through the machine.

C is a roller over which the paper passes; and D a paste roll arranged as shown so as to apply a line of paste to one end of the web. After passing over roll C the paper passes beneath a roll E of a breadth equal or substantially equal to the tube into which the web is to be formed and the overlapping edges of the paper are folded down upon each other and over a former plate F by means of fingers  $E'$   $E''$ ; and the tube thus formed passes between feed rollers  $E^3$   $E^4$  and while passing between said rolls the seam is pressed down by means of a roller  $e^2$  held on the end of a spring rod  $E^2$  so as to press down against the periphery of the roll  $E^4$  through an opening  $f^2$  formed in the former plate F (see Figs. 3, 4, and 5). At the end of the plate F is formed or secured a serrated cutting plate  $F'$  of substantially the full breadth of the tube, and above it a second cutting plate  $F^2$  is placed, the tube being severed into blanks in the usual way by means of a revolving striker  $F^3$  acting in front of the said serrated cutting plates. Before being cut, however, the forward end of the tube is fed into the grip of rolls G G': each provided with a central gripping finger  $g$   $g'$  actuated in the usual way by means of a stationary cam  $g^4$  which actuates the rod  $g^2$  of the gripping finger by means of the lever  $g^3$ , the end of which rests upon the cam surface. The function of these fingers is to seize respectively the top and bottom plies of the tube and draw them apart so as to spread open the mouth of the tube and draw it approximately to the diamond fold form well-understood in connection with satchel bottom bags. Situated between and in front of the rolls G G' are the reciprocating fingers H H, the stems,  $h$ , of which have secured upon them segmental



gears  $h'$ , which gears are in engagement with segmental gears  $h^2$  pivoted at  $h^4$  and having a pin  $h^3$  which passes into the slot of an actuating cam  $h^5$ . The motion of these fingers is so regulated that they shall move on as the mouth of the tube is distended pushing the sides of the tube inward as its top and bottom are pulled apart. Recesses  $g^5$   $g^5$  are formed in the surface of the rolls  $G$  and  $G'$  so as to come opposite each other at or just after the time when the grippers release the top and bottom plies of the paper; and into the space formed by these registering recesses the fingers  $H$   $H$  move after the grippers have released the paper. The effect produced by the co-action of the grippers and fingers is the spreading out of the blank somewhat as indicated in Fig. 18 and the effect produced by the co-action of the fingers and recesses in the rolls is the folding down of the diamond upon itself as shown in Fig. 19. It will be seen that when the recesses  $g^5$   $g^5$  come opposite each other they permit the paper to move freely irrespective of the motion of the rolls  $G$  and  $G'$  the tube being temporarily released from the bight of the said rolls, and the action of the fingers in connection with the said recesses not only folds down the diamond as described, but pushes the paper back forming a slack between the rolls  $E^3$  and  $E^4$  and the rolls  $G$  and  $G'$  as represented in Fig. 6. It is while this slack exists in the tube that the striker  $F^3$  comes into operation severing the tube in the way already described and the interference of the blanks with each other is prevented by giving the rolls  $G$  and  $G'$  a greater surface velocity than the rolls  $E^3$  and  $E^4$  so as to take up the slack before the mouth of another blank is presented to the gripping fingers.

The combination of parts as above described for forming and folding down the diamond as well as the combination of this mechanism with the feed rolls  $E^3$  and  $E^4$  and the tube-severing appliances is, I believe, new with me and constitutes a part of the novel mechanism which I desire to protect by Letters Patent.

The next part of the machine is that by which the plain tubular blanks, preferably having the folded down diamond formed at their ends, are converted into bellows-folded blanks. As shown in the drawings, after leaving the rolls  $G$   $G'$  the blank is engaged by the carrying belts  $I^2$   $I^3$  moving over rolls or pulleys  $I^4$  and  $I^5$ . These feed belts draw the paper along through the apparatus for folding in the sides of the blank and of course any other convenient feeding device may be used in place of them although I believe they are best adapted for use with the mechanism illustrated. On each side of the feeding mechanism are placed what I will call vacuum boxes  $K$   $K$  within which are situated perforated plates  $k^3$   $k^3$ , &c., the space between which opens at the side of the vacuum box as indicated at  $k$   $k$ , and the internal

form of which can readily be followed at the sections illustrated in Figs. 10 to 14.

$k^2$   $k^2$ , &c., indicate the perforations or holes through the plates  $k^3$ , said perforations communicating with the space  $k'$  within the vacuum box. The two boxes are situated on a slide  $M$  so that they can be made to accommodate bags of different sizes by adjusting them to and from each other; and they communicate through openings  $K'$  with an air box  $K^2$ , which box is in communication through a pipe  $K^3$  with an exhaust pan  $K^4$  so that air is always being drawn from the inside of the boxes. It will readily be seen that as the tubular blanks are fed through the vacuum boxes their sides will conform to the space between the plates  $k^3$ , the result of passing through the vacuum boxes being shown in Fig. 23, while the different stages of the process of forming the bellows-folds on that blank are represented in Figs. 20, 21, and 22.

This device, which constitutes another of the features which I desire to protect by Letters Patent, can obviously be used to form bellows-folded blanks without the diamond but it is especially well adapted for use in the process in which the diamond fold is formed and folded down upon itself before the plain blank is converted into a bellows-folded blank.

In order to insure the regular and easy folding of the blank on the lines of the bellows side I prefer, before subjecting the blank to the action of the vacuum box folders, to lay a line of water along the lines on which the blank is to be folded and this is accomplished in the mechanism illustrated by means of narrow wheels  $J$   $J$ , &c., secured to the same shafts that hold the rolls  $I$  and  $I'$  and which narrow wheels run in contact with wheels  $J'$  which again are situated in water boxes  $J^2$ . By this arrangement lines of water are applied to the plain blank immediately before it enters the vacuum boxes.

The next division of the machine is that which converts the bellows-folded blank into one having the diamond spread out at its end and the inward triangular folds which are characteristic of this form of bag formed in its sides. The bellows-folded blanks are delivered to plates  $N$   $N$  which, in the machine shown, are secured at the end of the vacuum boxes and which fit into the bellows folds and have ends which are beveled at an angle of substantially forty-five degrees as shown at  $N'$ . In connection with these plates means must be employed for pushing back the upper ply of the paper and thus spreading out the diamond. A number of devices for thus spreading back the upper ply of the paper and opening the diamond are known in the art and while the mechanism which I have planned and illustrated in the drawings is especially valuable for use in connection with the plates  $N$  all experts will recognize the applicability of the other known devices for a similar purpose. The function of the beveled



ends of the plates N is to define the lines  $b^7$   $b^7$  (see Fig. 24) of the inward triangular folds, and it is obvious that this line being defined as the upper ply of the blank is folded back the other lines of the bag will fall approximately into their proper places.

As shown in the drawings I provide a plate O supported on cross-bar O' which holds the bottom ply of the blank in correct position, and arms or fingers P are extended across the path of the blank so as to engage the upper point of the folded down diamond and push it back as the blank passes beneath the said fingers. These fingers in the design illustrated are secured on the ends of sleeves P and P' which are attached to the frame of the machine and through which passes the shaft 17 upon which the pasting roll Q is secured. In order to correctly define the line  $b^2$  upon which the upper ply of the paper is folded back as well as to hold the front end of the blank in proper position and feed it forward, I employ a tucker  $L^2$  secured on a lever-arm L' which arm is fastened to a rock-shaft 16 and actuated by means of a cam 21 acting on another lever-arm L secured to the rock shaft. After having the diamond formed as shown in Fig. 24 the blank passes between the rolls Q and Q', the upper one of which (Q) runs in contact with a paste-wheel R situated in a paste box R' and applies paste to the diamond which is then folded as shown in Fig. 25 by any convenient mechanism.

I have not thought it necessary to illustrate any mechanism for making final folds in the blank and completing the bag as such mechanism forms no part of my present invention and may be of any of the many known constructions.

In the illustrations of the blank in Figs. 17 to 25, B<sup>2</sup> indicates the blank;  $b b$  the lines on which the paper is folded to form the plain tubular blank and which afterward form the central inward folds of the bellows-folded sides;  $b'$  indicates the diamond fold;  $b^2$  the line on which the blank is spread open in forming the diamond;  $b^3 b^4 b^5$  and  $b^6$  the lines of the outer folds of the bellows-folded sides;  $b^7$  and  $b^8$  indicate the lines on which the inward triangular folds are formed; and  $b^9 b^9$  the lines on which the corners of the diamond are folded down to complete the bag.

The gearing of the machine may of course be constructed in any convenient way for giving the desired motions to the various operative parts. As shown 1 is the main driving shaft having upon it fast and loose pulleys 2 and 3. Upon the shaft 1 are secured the cams  $h^5$  which actuate the fingers H in the way already described and the same shaft carries pinions 4 and 5. The pinion 4 engages a pinion 22 secured to the shaft 25 of roller G' and which pinion engages a pinion 23 on the shaft 24 of roller G. The pinion 4 also engages a pinion 6 secured to shaft 7 and which pinion engages and drives a similar pinion situated on the shaft 7<sup>2</sup>; a miter-wheel 8 is also secured

to the shaft 7 and is in engagement with a miter-wheel 9 secured to a shaft. Upon the shaft 10 is secured the cam 21 which actuates the tuckers  $L^2$  and to the same shaft is secured a miter-wheel 11 which engages a similar wheel 12 secured to shaft 13. To this same shaft 13 is secured a pinion 14 which drives a pinion 15 mounted loosely on a bearing and which communicates motion to the pinion 16 secured on the end of the shaft 17; and, as shown, the pinion 16 also engages with a pinion 18 fastened to shaft 19 and actuating the paste wheel R. Returning again to the shaft 1 the gear-wheel 5 secured to said shaft communicates motion to the idler gears 26 and 28; the gear 26 being secured on a fixed bearing and the gear 28 on an adjustable bearing as indicated at 27 so that gears of different diameters may be interposed between the gears 26 and 29 which last mentioned gear is driven by the wheel 28 and is secured to the shaft 31. The gear 29 engages a similar gear 30 which is secured to the shaft 32.

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 with mechanism for feeding the tube of rolls G G' having gripping fingers  $g g'$  adapted to hold the upper and lower plies of the blank and spread open the bottom thereof, and recesses  $g^5$  with reciprocating fingers H H arranged to push in the sides of the bag as the grippers open it and to come between the recesses  $g^5$  after the grippers have released the blank, all substantially as described and so as to form a diamond fold on the blank and fold the same down upon itself.

2. In a paper bag machine, the combination of the feed rolls E<sup>3</sup> E<sup>4</sup>; serrated cutting plates F' F<sup>2</sup>; and striker F<sup>3</sup> situated in front of said rolls, the rolls G G' moving with greater speed than rolls E<sup>3</sup> E<sup>4</sup> and having grippers  $g g'$  and recesses  $g^5 g^5$  as described; and the reciprocating fingers H H arranged to push in the sides of the blank between rolls G G' and to move into recesses  $g^5$  after the grippers have released the blank, all substantially as and for the purpose specified.

3. In a paper bag machine, the device for forming bellows-folds in a plain blank consisting of the vacuum boxes K K having perforated forming plates arranged therein as described to spread out and turn in the edges of the blank in combination with feed mechanism as I<sup>2</sup> I<sup>3</sup> arranged between the boxes to draw the blanks through them.

4. In a paper bag machine the device for forming bellows-folds in a plain blank consisting of the laterally adjustable vacuum boxes K K having perforated forming plates arranged therein as described to spread out and turn in the edges of the blank in combination with feed mechanism as I<sup>2</sup> I<sup>3</sup> arranged between the boxes to draw the blanks through them.

5. In a paper bag machine the combination



of rolls G G' having grippers  $g g'$  arranged as described to open the mouth of a blank passing between said rolls and having also recesses  $g^5 g^5$  formed in their peripheries with reciprocating fingers H H arranged to fold in the sides of the blank end as the grippers open it and to pass between the recesses  $g^5 g^5$  after the grippers have released the blank; vacuum boxes K K arranged to receive the blank as it passes from rolls G G', said vacuum boxes having perforated plates arranged therein as described to spread out and turn in the sides of the blank; and feed mechanism as belts I<sup>2</sup> I<sup>3</sup> adapted to carry the blanks through the vacuum boxes, all substantially as and for the purpose specified.

6. In a paper bag machine the device for forming bellows folds on plain bag blanks consisting of the vacuum boxes K K having perforated plates arranged within them as described to spread out and fold in the sides of the blank; means, as belts I<sup>2</sup> I<sup>3</sup>, for drawing the blanks through the boxes; and means, as wheels J J, for applying lines of water to the blank before it enters the vacuum boxes and along the lines of fold to be made therein, all substantially as and for the purpose specified.

7. In a paper bag machine, the combination of rolls G G' having grippers  $g g'$  arranged as described to open the mouth of a blank passing between said rolls and having also recesses  $g^5 g^5$  formed in their peripheries with reciprocating fingers H H arranged to fold in the sides of the blank end as the grippers open it and to pass between the recesses  $g^5 g^5$  after the grippers have released the blank; vacuum boxes K K arranged to receive the blank as it passes from rolls G G', said vacuum boxes having perforated plates arranged therein as described to spread out and turn in the sides of the blank; means as wheels J J, situated between rolls G G' and the vacuum boxes for applying lines of water to the blank on the lines of fold to be formed in the vacuum boxes;

and feed mechanism as belts I<sup>2</sup> I<sup>3</sup>, adapted to carry the blanks through the vacuum boxes, all substantially as and for the purpose specified.

8. In a paper bag machine, the device for spreading open the diamond on the end of a bellows-folded blank consisting of the stationary plates N N adapted to fit in the bellows-folded sides of the blank, and having their ends, N', beveled at an angle of substantially forty-five degrees in combination with means as described for feeding the blank over the same plates and for pushing the upper ply of the blank back upon itself to spread out the diamond.

9. In a paper bag machine, the device for spreading open the diamond on the end of a bellows-folded blank formed as described, consisting of the stationary plates N N adapted to fit in the bellows-folded sides of the blank and having their ends, N', beveled at an angle of substantially forty-five degrees; a stationary rod or rods P P arranged to push back the upper end of the blank and spread out the diamond, and means for feeding the blank over the plates N and against the rod or rods P, all substantially as and for the purpose specified.

10. In a paper bag machine, the device for spreading open the diamond on the end of a bellows-folded blank formed as described, consisting of the plates N N adapted to fit in the bellows-folded sides of the blank and having their ends, N', beveled at an angle of substantially forty-five degrees; a rod or rods P arranged to push back the upper end of the blank and spread out the diamond; and a tucker as L<sup>2</sup> arranged to engage the blank on the line at which the diamond is folded back and define the same, all substantially as and for the purpose specified.

EDWARD E. CLAUSSEN.

Witnesses:

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