

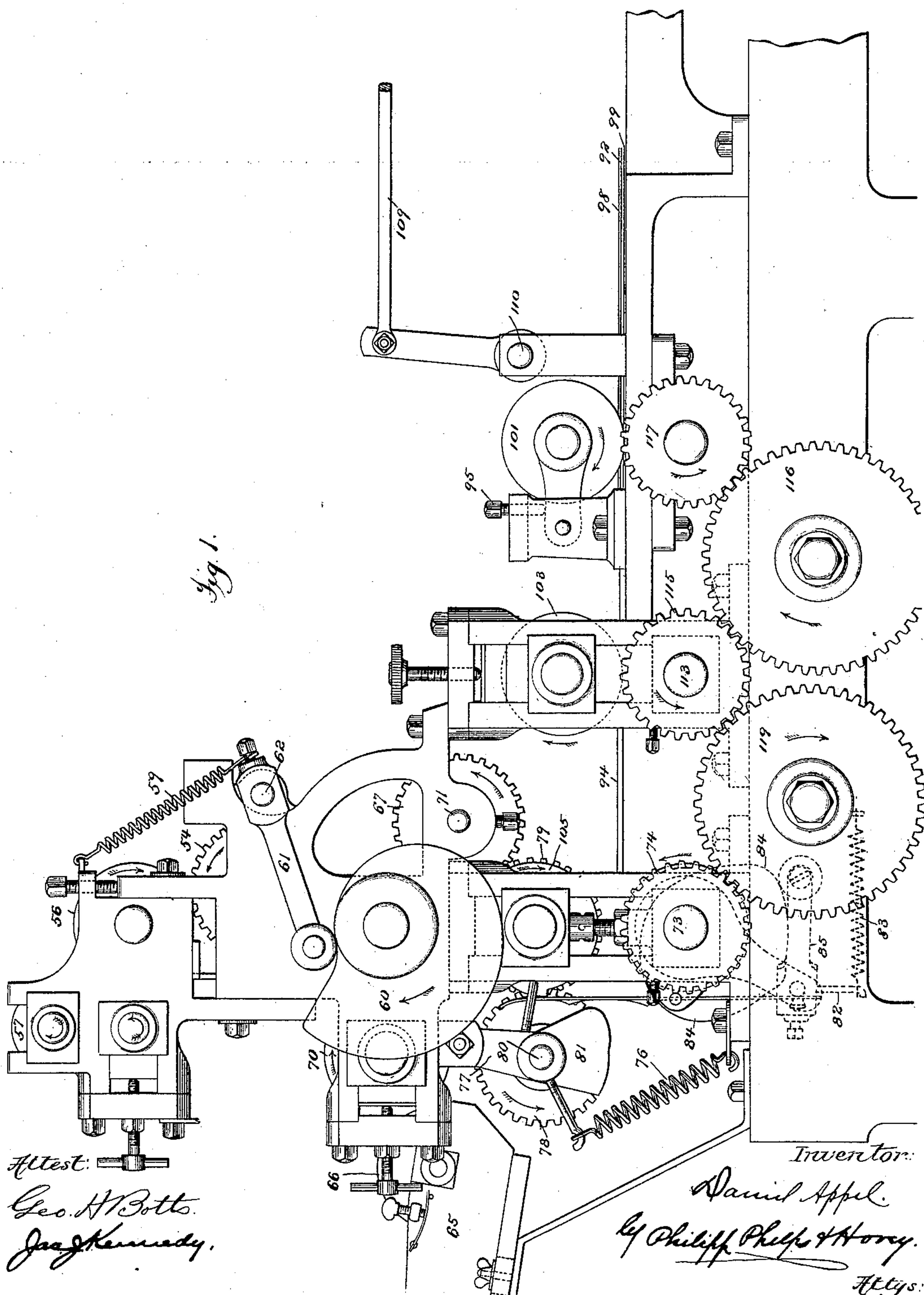
(No Model.)

7 Sheets—Sheet 1.

D. APPEL.
BAG MACHINE.

No. 387,573.

Patented Aug. 7, 1888.



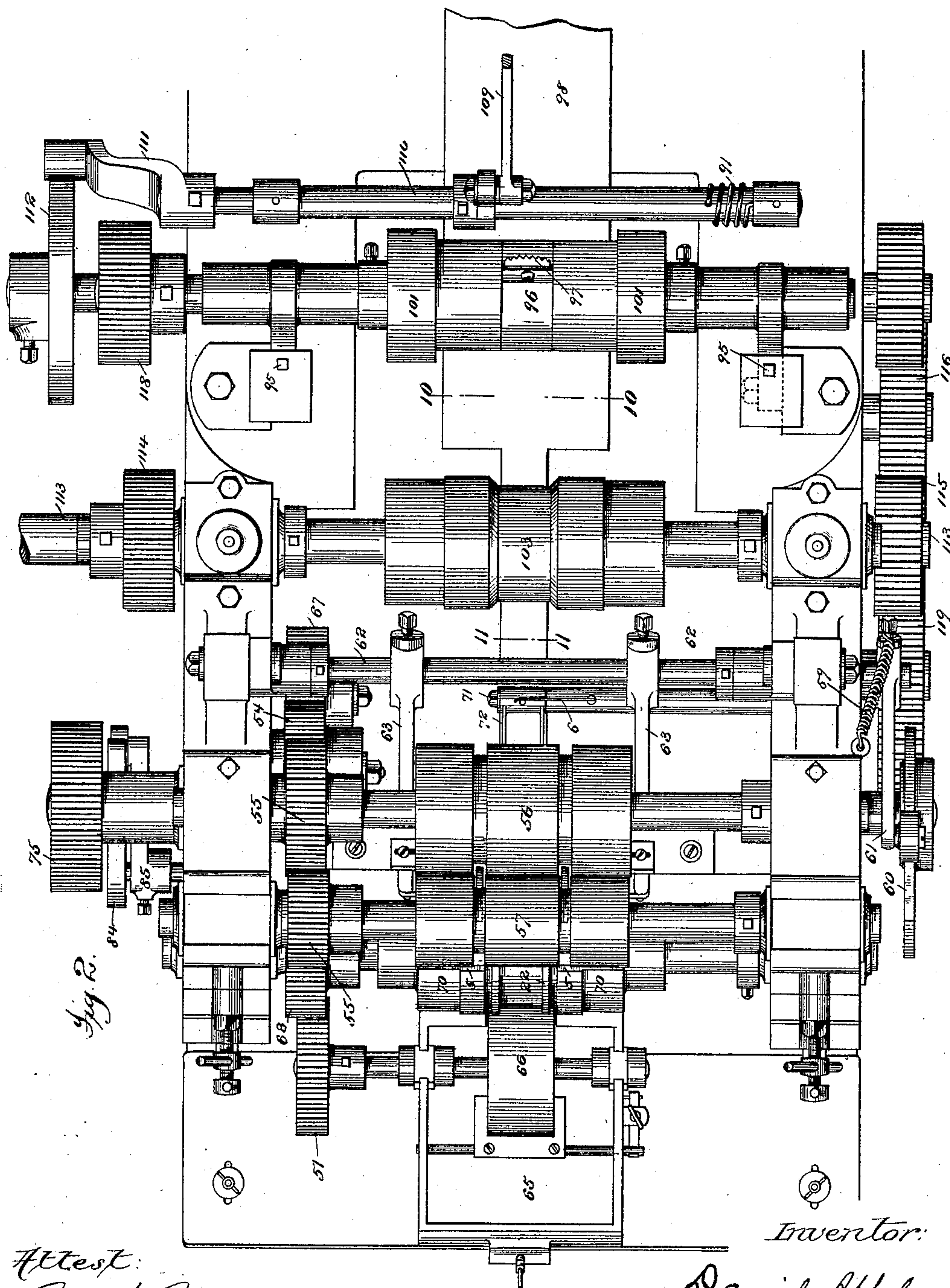
(No Model.)

7 Sheets—Sheet 2.

D. APPEL.
BAG MACHINE.

No. 387,573.

Patented Aug. 7, 1888.



Attest:
Geo. H. Dotts
Jas. J. Kennedy,

Inventor:
Daniel Appel.
by Philip Phelps & Henry
Attys:

(No Model.)

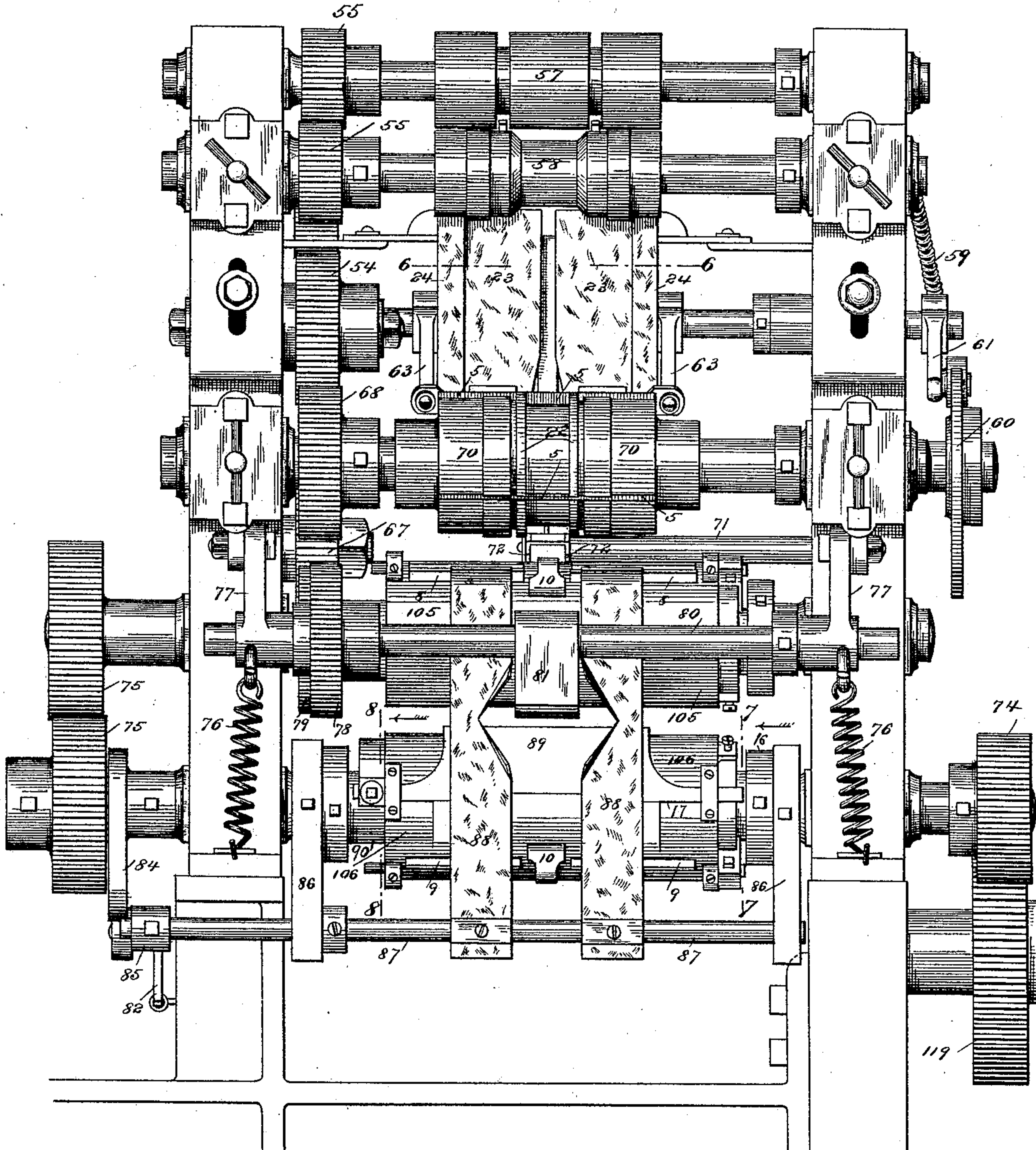
7 Sheets—Sheet 3.

D. APPEL.
BAG MACHINE.

No. 387,573.

Patented Aug. 7, 1888.

Fig. 3.



Attest:
Geo. H. Botts,
Jas. J. Kennedy,

Inventor:
Daniel Appel.
by Philip Phelps Hony.

Attest:

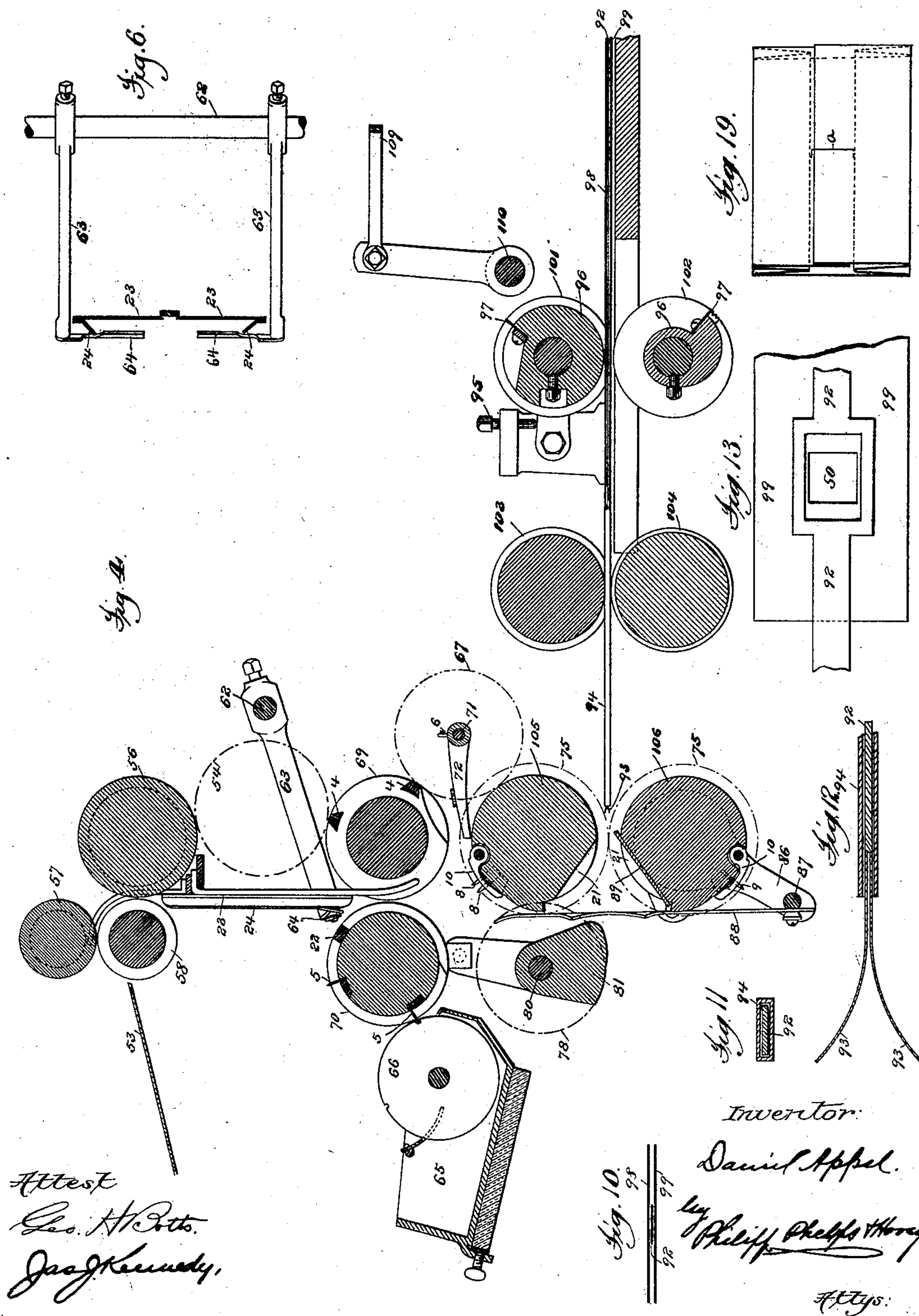
(No Model.)

7 Sheets—Sheet 4.

D. APPEL.
BAG MACHINE.

No. 387,573.

Patented Aug. 7, 1888.



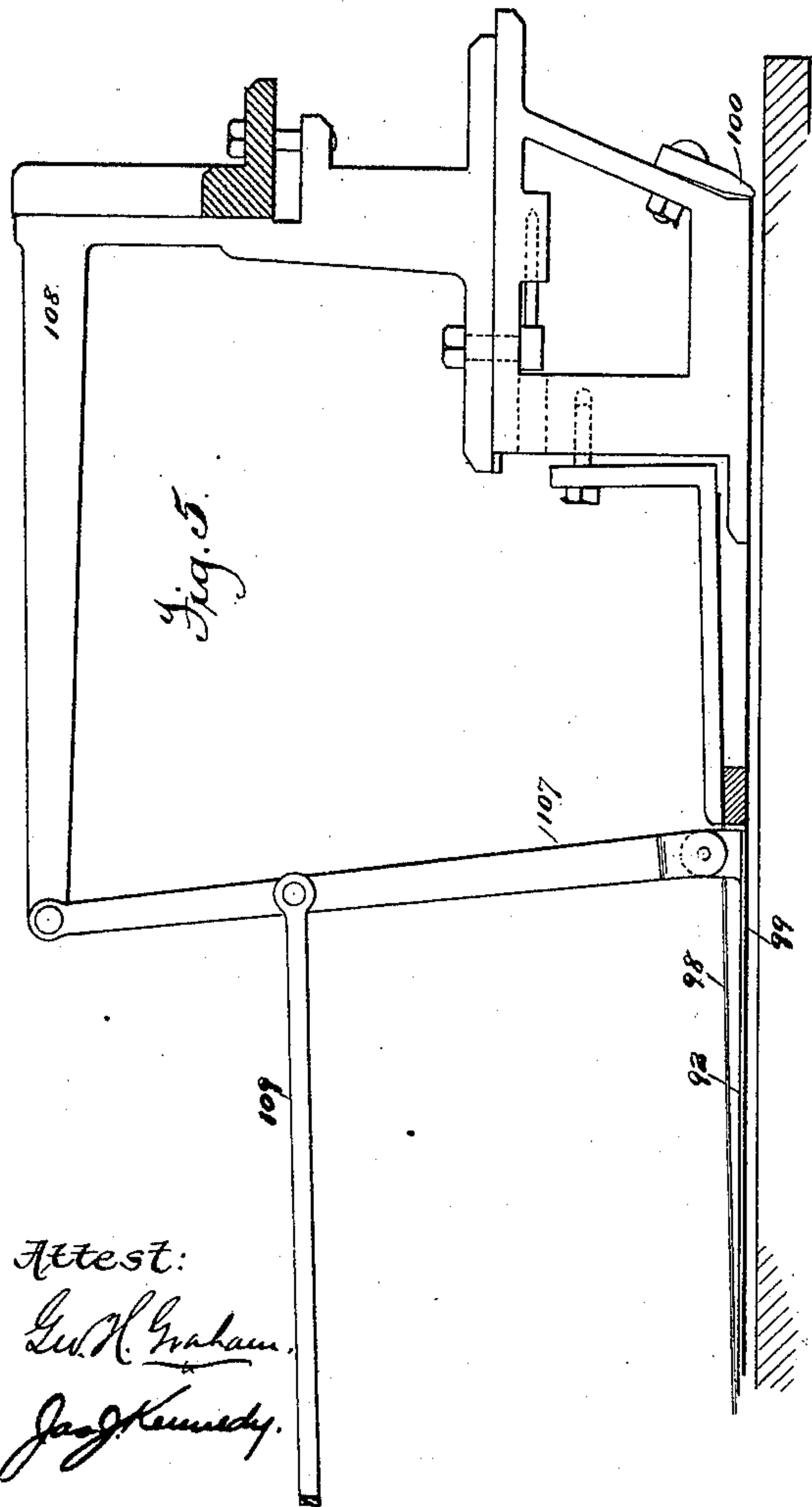
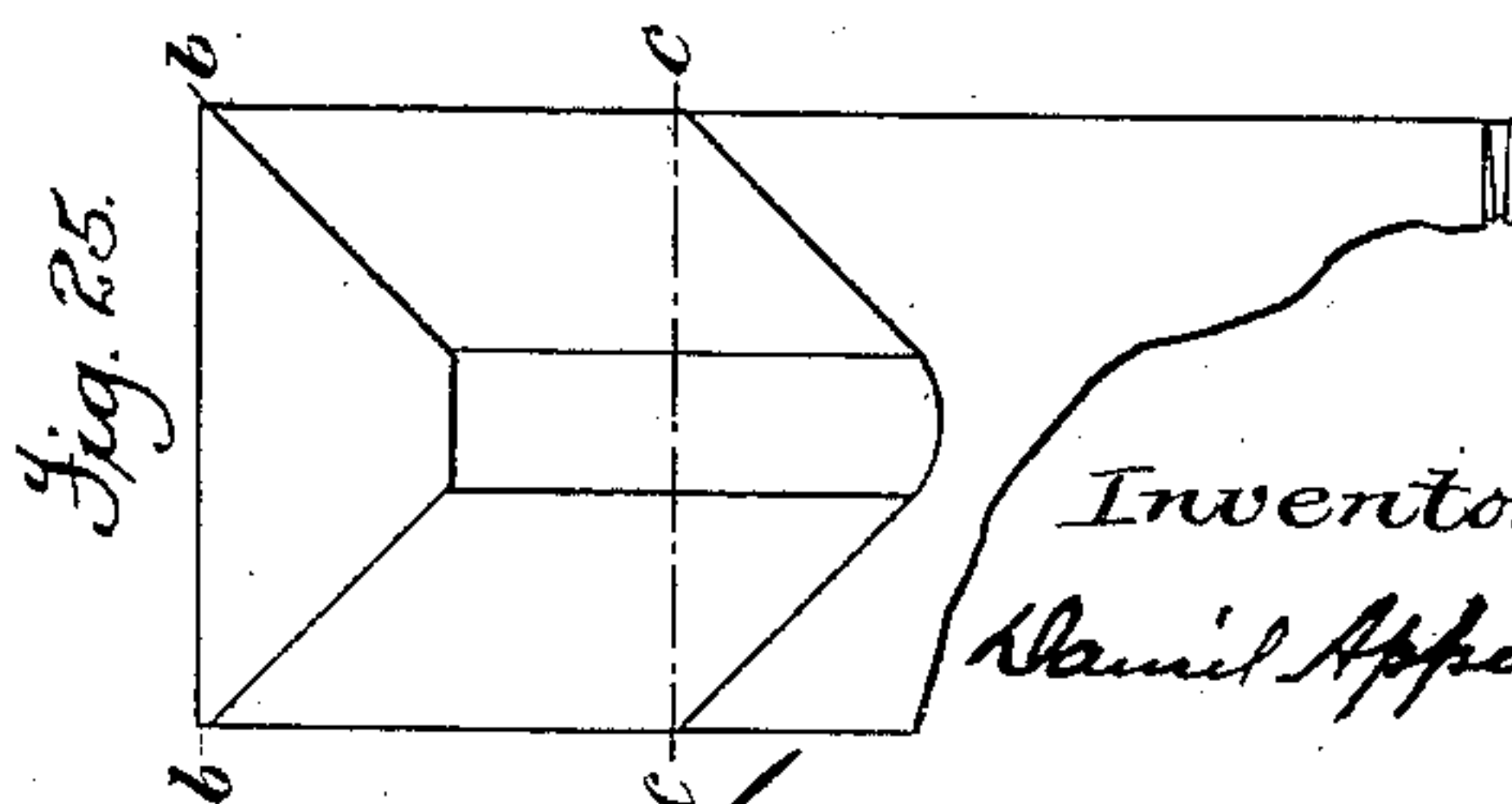
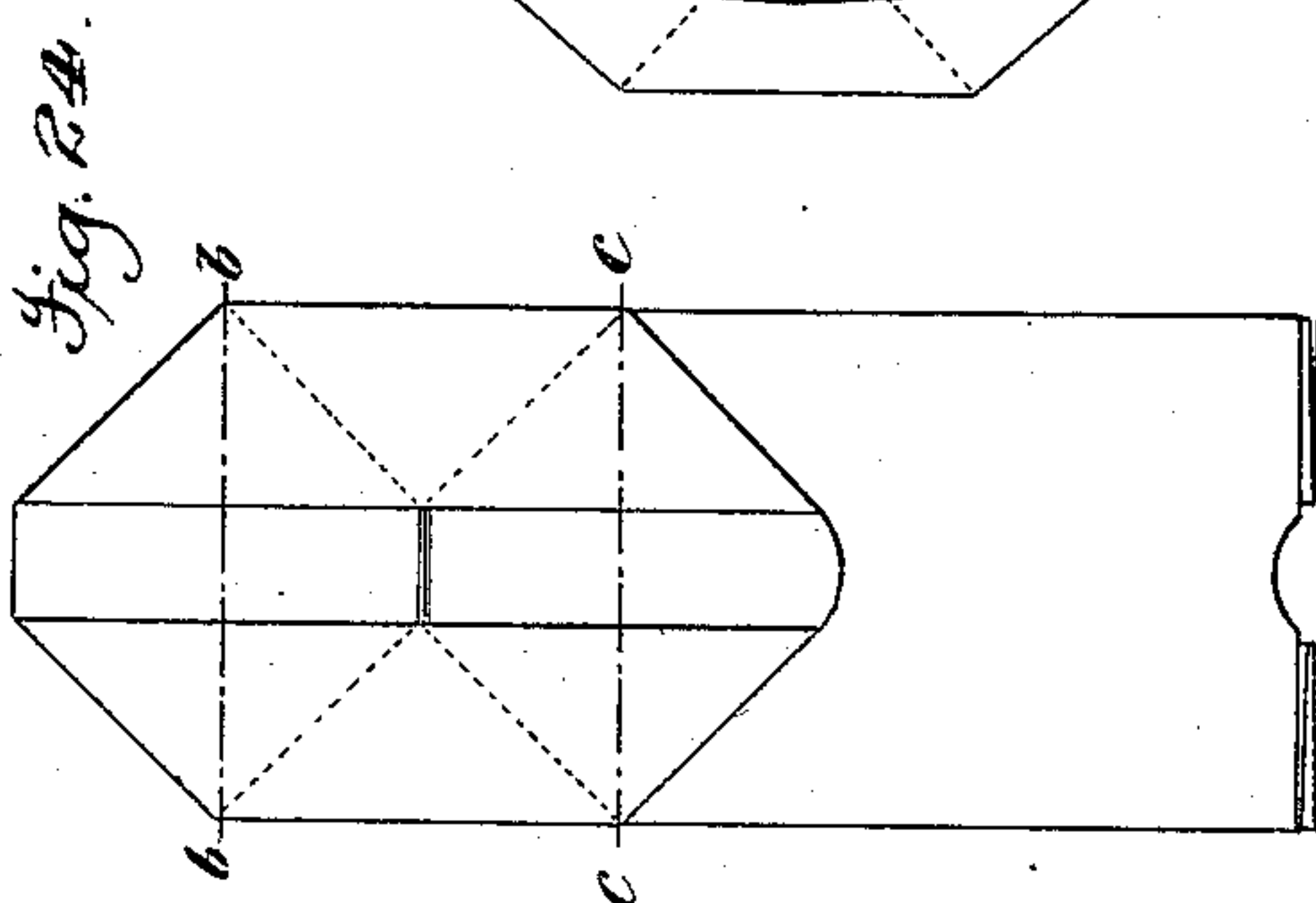
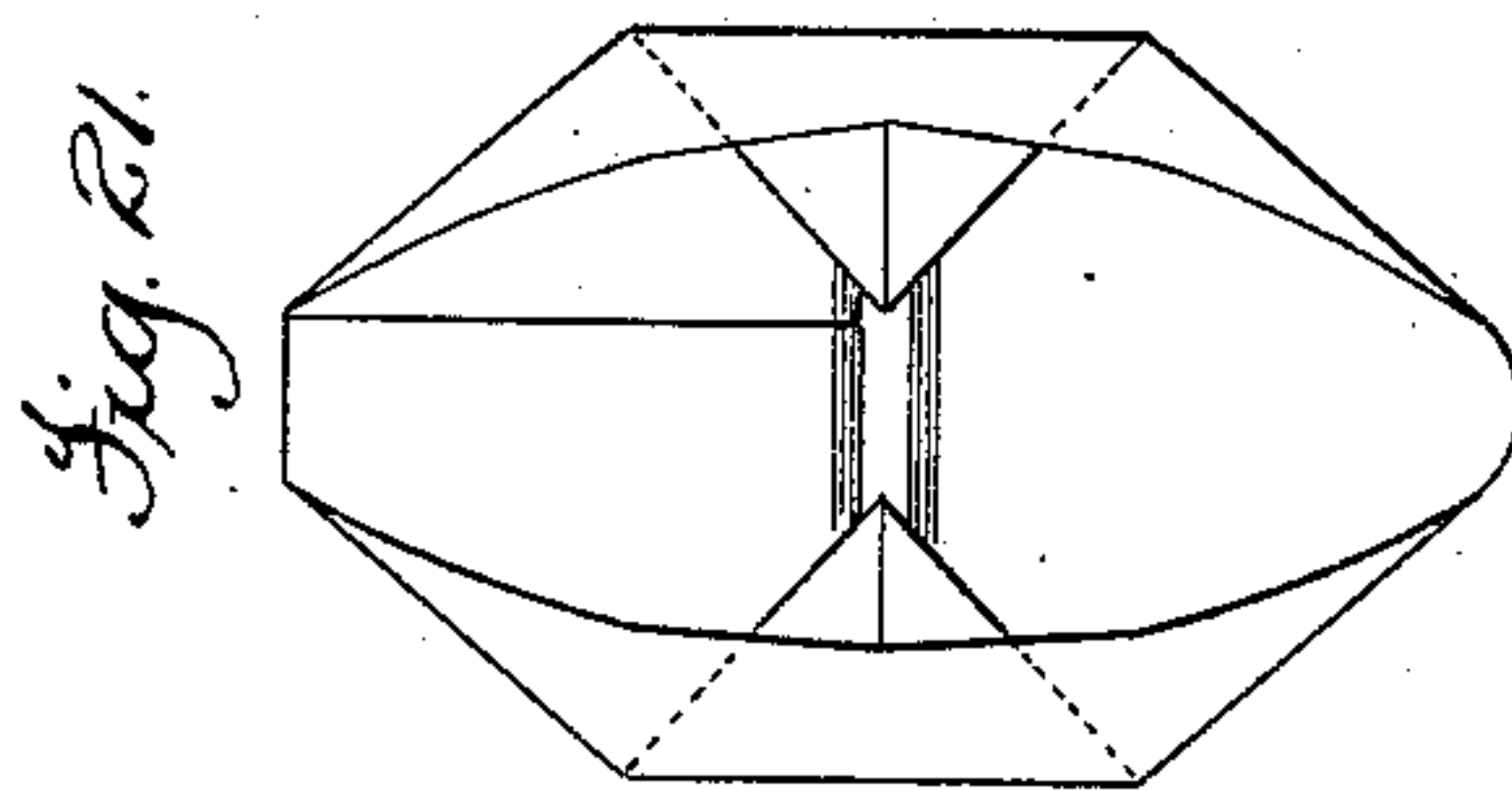
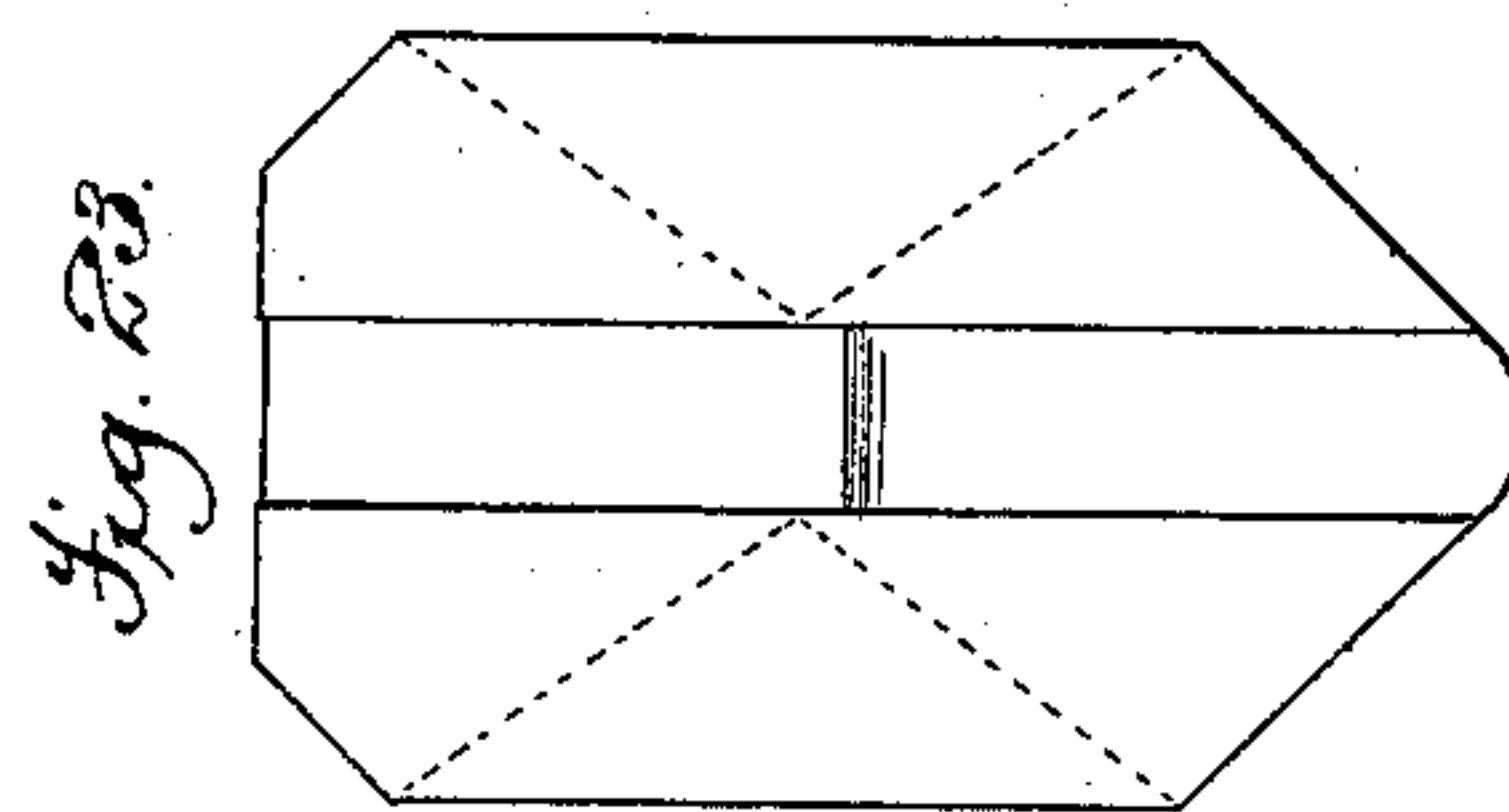
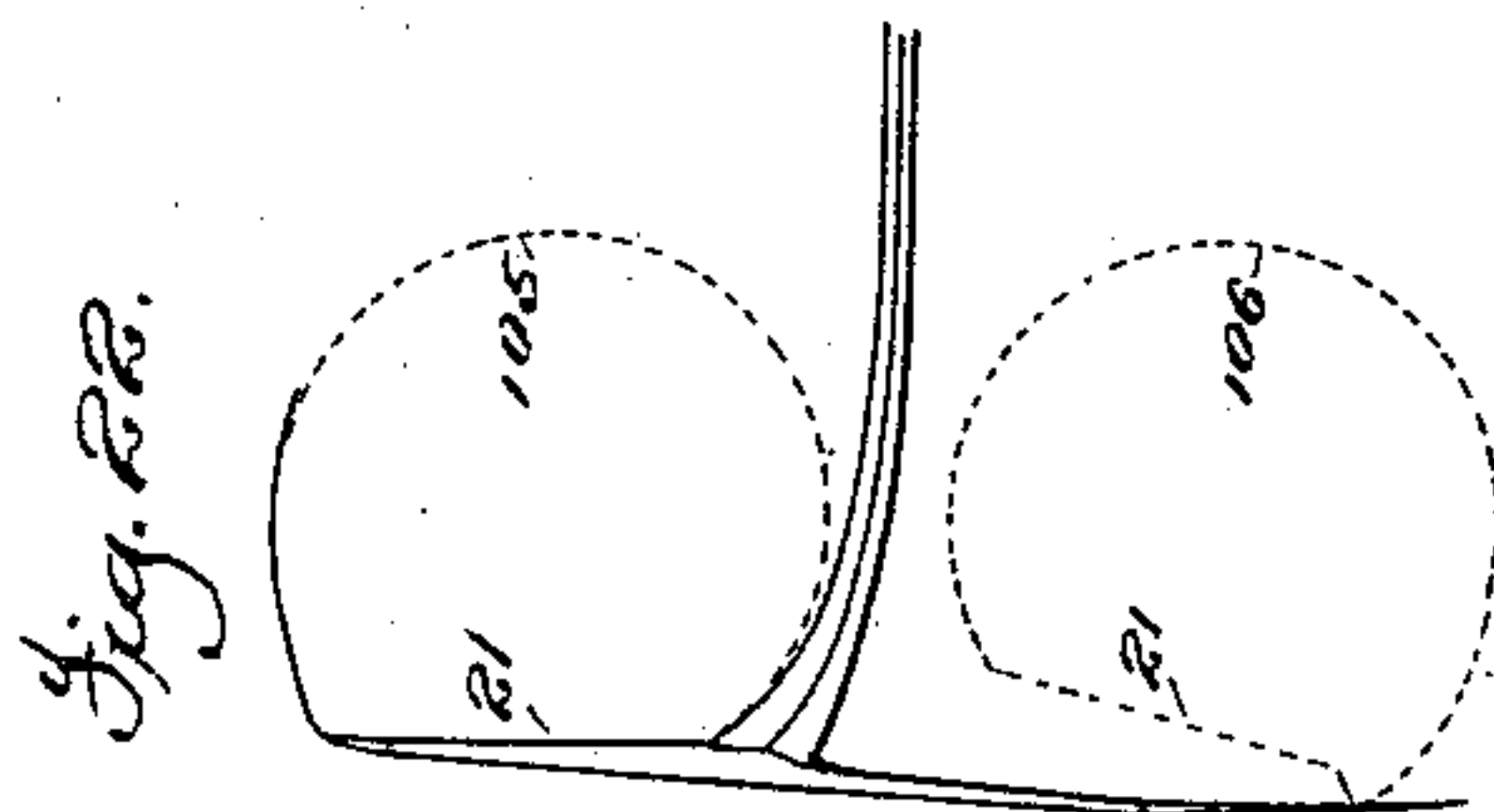
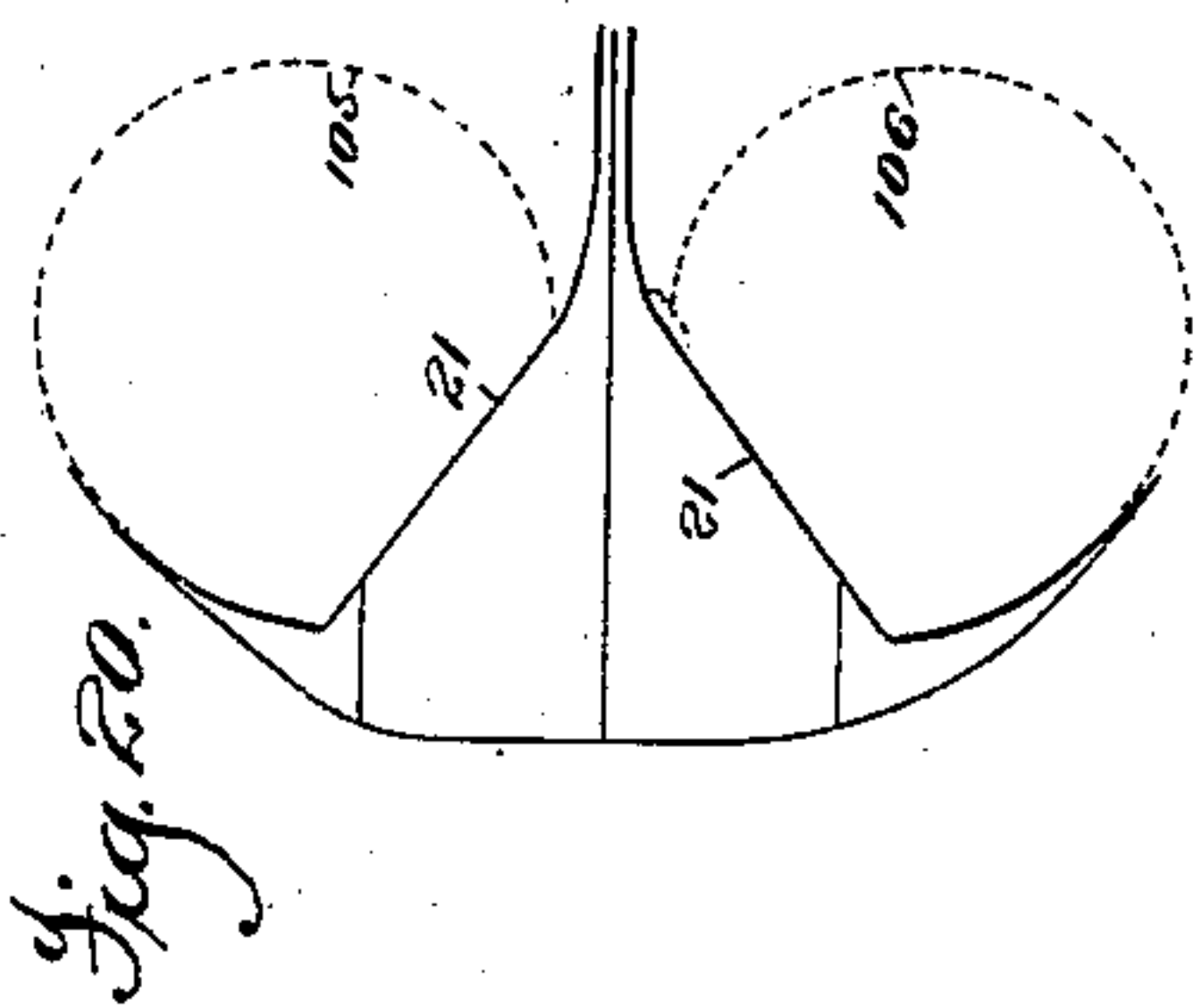
(No Model.)

7 Sheets—Sheet 5.

D. APPEL.
BAG MACHINE.

No. 387,573.

Patented Aug. 7, 1888.



Attest:

Geo. H. Graham.
Jas. Kennedy.

Inventor:

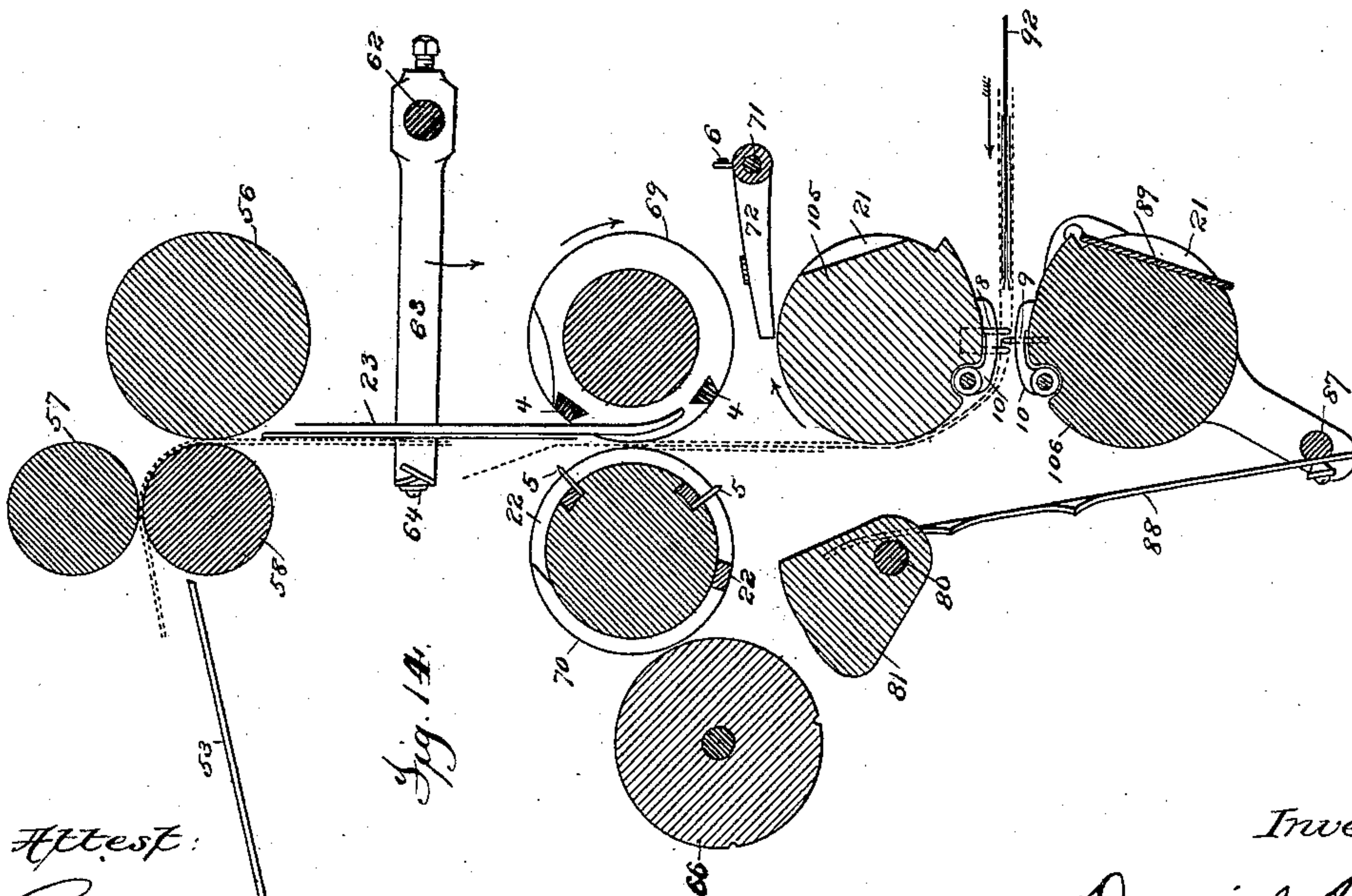
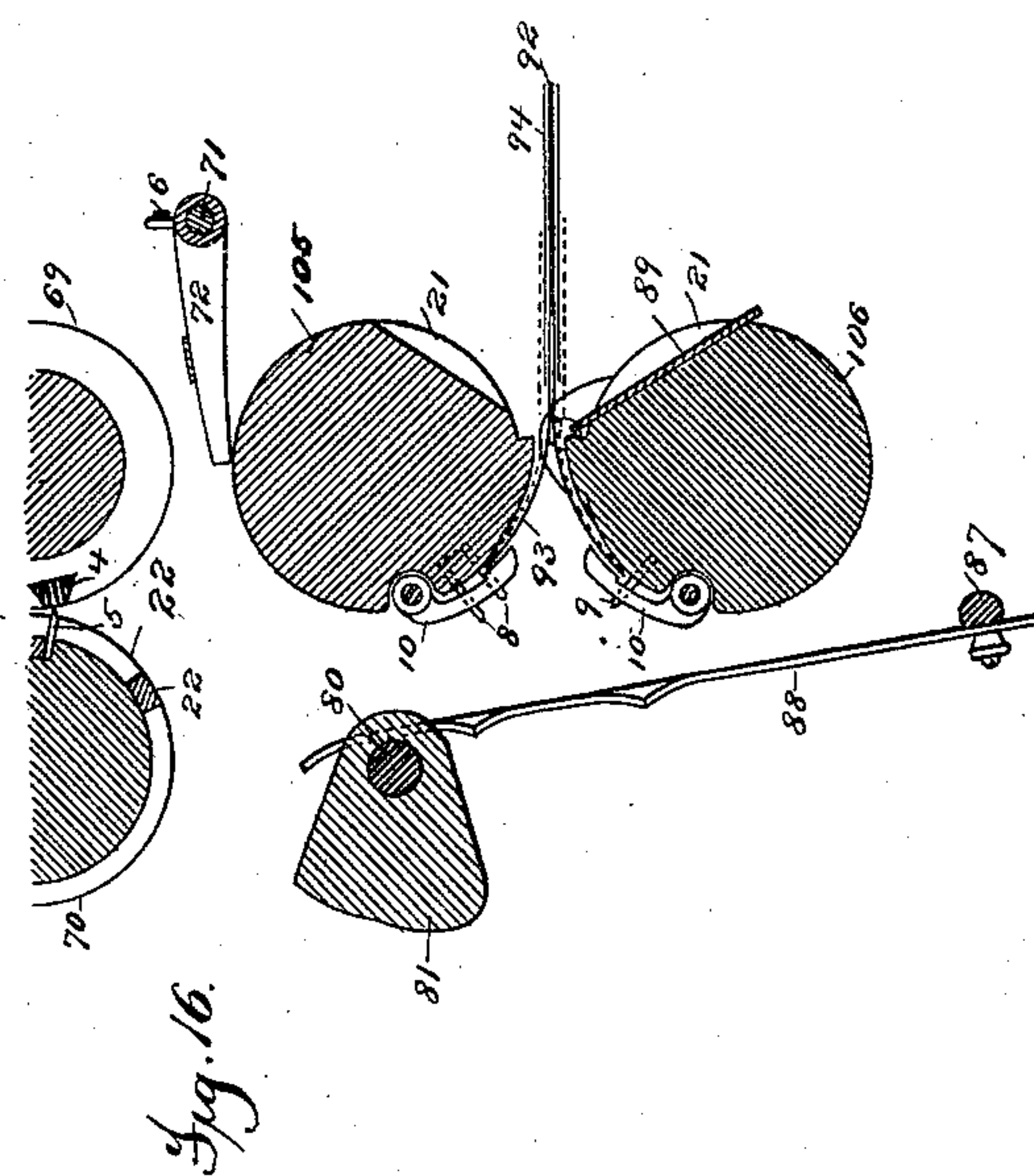
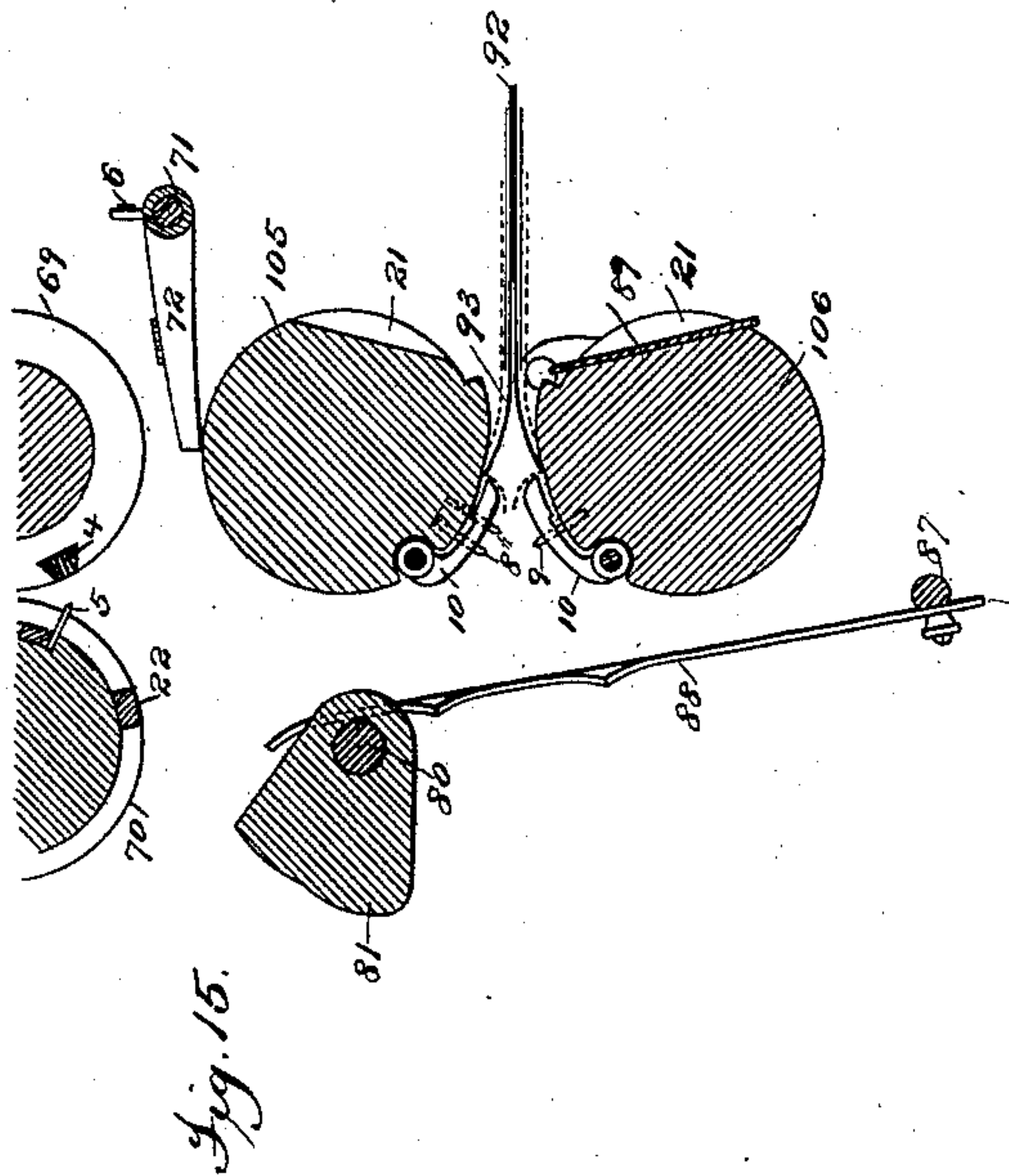
Daniel Appel.

By Philip Phelps Horn
Atty.

D. APPEL.
BAG MACHINE.

No. 387,573.

Patented Aug. 7, 1888.



Attest:
Geo. H. Botts.
Jacob Kennedy.

Inventor:
Daniel Appel.
by Philip Phelps & Hony
Atty's.

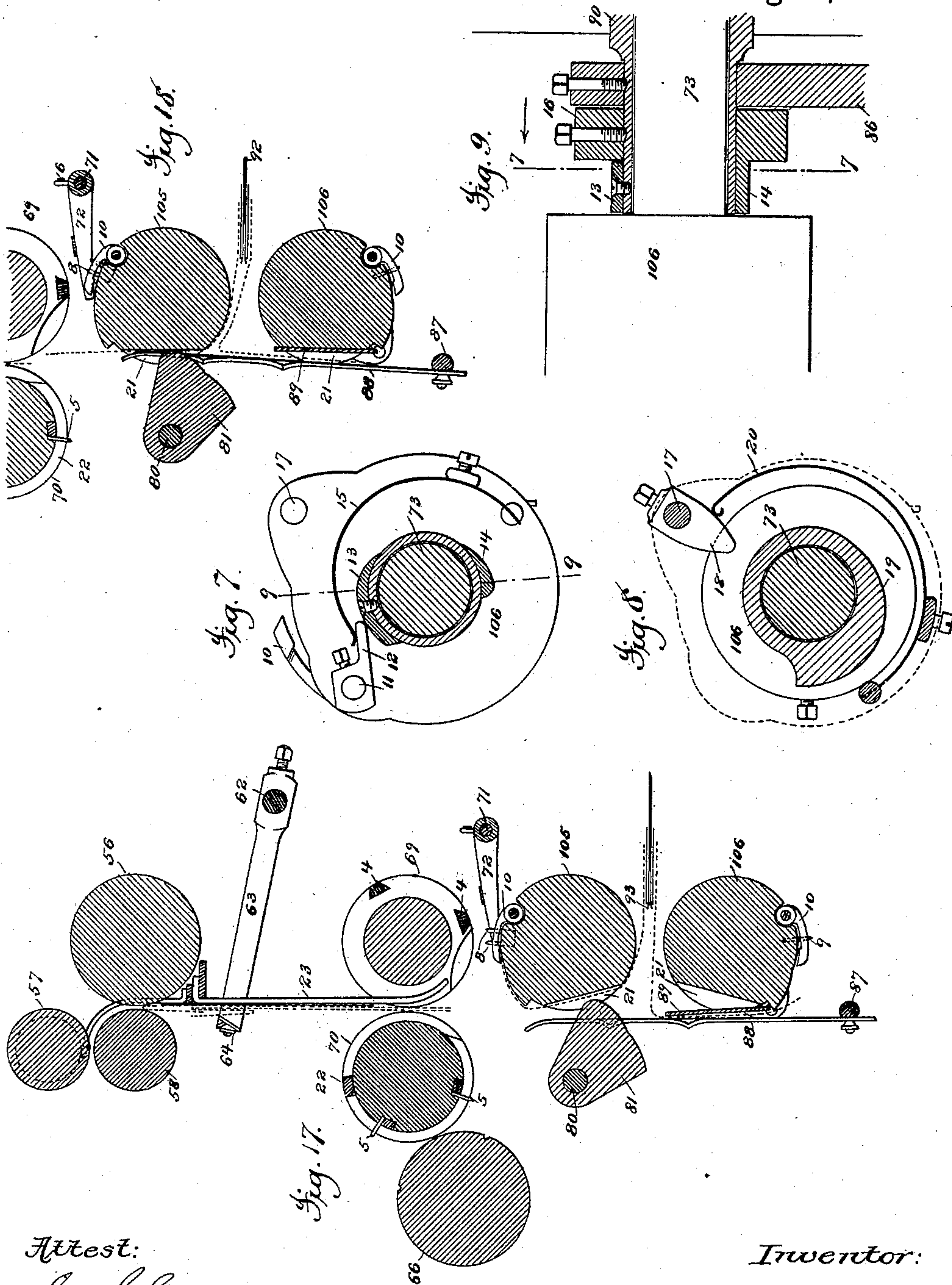
(No Model.)

7 Sheets—Sheet 7.

D. APPEL.
BAG MACHINE.

No. 387,573.

Patented Aug. 7, 1888.



Attest:

Geo. H. Graham.

James Kennedy.

Inventor:

Daniel Appel.

by Philip Phelps & Henry
Attys.

UNITED STATES PATENT OFFICE.

DANIEL APPEL, OF CLEVELAND, OHIO, ASSIGNOR TO THE UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

BAG-MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,573, dated August 7, 1888.

Application filed October 15, 1887. Serial No. 252,421. (No model.)

To all whom it may concern:

Be it known that I, DANIEL APPEL, a citizen of the United States, residing at Cleveland, county of Cuyahoga, and State of Ohio, have
5 invented certain new and useful Improvements in Bag-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to a mechanism for the manufacture of paper bags of that class known as "bellows-sided satchel-bottom bags," and particularly to a mechanism for the manufacture of a bag such as that shown and described in United States Reissued Letters Patent No. 10,083, it being the object of the invention to provide a mechanism which, operating upon a continuous web or sheet, will perform all the operations necessary to produce and deliver completed bags of the character stated.

As a full understanding of the various improvements constituting the invention can only be given by an illustration and a detailed
25 description of an organized mechanism embodying said improvements, all preliminary description of the invention will be omitted and a detailed description given, reference being had to the accompanying drawings, in
30 which—

Figure 1 is a side elevation of the principal parts of an organized bag-machine embodying the present invention. In this view the mechanism for converting the web of paper into a
35 bellows-sided tube is omitted, as the mechanism for this purpose is of substantially the common and well-known form. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is an end elevation of the machine, looking
40 from the left of Figs. 1 and 2, the apparatus for applying the necessary lines of paste to close the bottom of the bag being omitted. Fig. 4 is a longitudinal sectional elevation of the principal parts of the mechanism shown in
45 Figs. 1, 2, and 3. Fig. 5 is a similar view of the tubing mechanism. Fig. 6 is a horizontal section taken on the line 6 of Fig. 3. Fig. 7 is a section taken on the line 7 of Figs. 3 and 9, looking toward the left or inward from the
50 frame of the machine. Fig. 8 is a similar view

taken on the line 8 of Fig. 3, also looking toward the left. Fig. 9 is a section taken on the line 9 of Fig. 7. Fig. 10 is a cross-section of the former, taken on the line 10 of Fig. 2. Fig. 11 is a cross section taken on the line 11 of the same figure. Fig. 12 is an enlarged
55 sectional view of the spreader and its guide. Fig. 13 shows a detail which will be hereinafter referred to. Fig. 14 is a view similar to Fig. 4, illustrating the first step in the formation of the bag-bottom. Figs. 15 and 16 are
60 similar views illustrating the next succeeding steps in the formation of the bag-bottom. Figs. 17 and 18 are similar views illustrating subsequent steps. Fig. 19 is a view of a portion of the tube. Figs. 20 to 25 are views
65 showing particularly the positions which the material takes during the different stages of the formation of the bag-bottom.

Referring to said drawings, it is to be understood that the mechanism for forming the
70 web of paper into a bellows-sided tube is or may be of substantially the ordinary form, and therefore will require but a very brief mention herein. This mechanism is partly illustrated in Fig. 5, and as therein shown consists of a breaking or guiding edge, 100, arranged to extend transversely across the central portion of the web, and around which the
75 web, being led from a roll mounted in a higher plane, is deflected, so that its side portions, which are to be folded over to form the tube, will stand up sufficiently and be sufficiently
80 slack to permit them to be acted upon by the turning-fingers (not shown) and be turned over above the central portion of the web in the
85 usual manner. The former is of substantially the usual construction, consisting of two plates, 98 99, supported a short distance apart, and between which the sides of the web are forced
90 by suitable side guides or fingers, (also not shown,) so as to be folded inward and produce the ordinary and well-known bellows-sided tube. The pasting mechanism for uniting the
95 edges of the web to form the longitudinal seam of the tube is not herein shown, as it may be of any of the well-known forms. After being thus formed, the tube passes between a pair of cutting-rolls, 101 102, and thence between a pair of feeding-rolls, 103 104. The plates 100

98 99, composing the former, extend forward and pass between the cutting-rolls 101 102, the rolls being cut away to permit the passage of the former. The rolls 101 102 are provided with blades 97, which are secured to sections 96 of the rolls, which sections are adjustable upon the shafts of the rolls to permit of the easy and accurate adjustment of the blade. These rolls are made of a circumference equal to the length of the bag to be produced, so that at each revolution the blades 97, coming together through openings 50, (see Fig. 13,) provided at that point in the plates 98 99, operate to form short transverse cuts *a* (see Fig. 19) through both plies of the tube at its center. The cutting-roll 101 is mounted in vertically-movable bearings, which are operated upon by adjusting-screws 95, so as to regulate the nipping-contact of the two rolls. The plates 98 99, constituting the former, terminate a short distance in advance of the cutting-rolls 101 102, but are provided with a tubular extension, 94, which passes forward between the feeding-rolls 103 104, the rolls being cut away at their centers to permit the passage of the tube 94, and terminates a short distance in the rear of a pair of opening-rolls 105 106, which will be presently referred to.

Located in and guided by the tube 94 is a reciprocating forked spreader, 93, the arms of which are made of light spring metal, and are arranged to open apart when protruded from the end of the guide 94 and to be closed together as they are retracted within the guide. The spreader 93 is provided with a rearward extension, 92, which extends rearward between the plates 98 99, it being provided with an opening (see Fig. 13) for the passage of the blades 97, and is pivotally connected to a lever, 107, (see Fig. 5,) which is fulcrumed upon a bracket, 108, and is connected by a rod, 109, with an arm extending from a rock-shaft, 110, having an arm, 111, which is acted on by a cam, 112, mounted upon the shaft of the cutting-roll 102. These parts are so arranged that at each revolution of the cutting-rolls the cam 112 will operate, through the connections which have been described, to move the spreader 93 forward and permit its spring-fingers to protrude from the end of the guide 94 and pass between the opening-rolls 105 106, and these parts are so timed and adjusted that as the spreader is thus advanced its spring-fingers will come into contact with the sides of the tube just in the rear of the slits *a*, made by the blades 97. The return movement of the spreader is effected by means of a spring, 91, with which the shaft 110 is provided. The feeding-rolls 103 104 are connected by gears 114, and are positively driven by power applied to the shaft 113 of the roll 104. The cutting-rolls 101 102 are also geared together by gears 118, and are positively driven from the shaft 113 by means of gears 115 116 117.

The opening-rolls 105 106 are mounted and

equipped as follows: The rolls are arranged a short distance apart, as will be observed, and are journaled in boxes 90, (see Fig. 9,) which are provided with inward tubular extensions which surround the shafts of the rolls. Each of the rolls is provided with a gripper, 10, which is located at the middle of the roll and in such position that as the rolls revolve the grippers of the two rolls will come together at each revolution. These grippers are mounted upon shafts 11, which are journaled in bearings formed on the ends of the rolls. The shafts 11 extend slightly beyond the rolls, and are provided with arms 12, (see Fig. 7,) which are acted upon by stationary cams 13 14, (see Fig. 7,) so as to open the grippers slightly twice at each revolution of the rolls. The closing movement of the grippers is effected by means of springs 15, which act upon the arms 12. The cams 13 are secured directly to the inward tubular extensions of the boxes 90, while the cams 14 project from adjustable collars 16, mounted upon said tubular extensions. By this means the cams are adjustable with relation to each other, so as to secure the opening of the grippers at the proper times. The cams for operating only one of the grippers are illustrated in detail in the drawings; but as the cams for the two grippers are exactly the same this single illustration applies to both.

The roll 106 is provided with two cutting-blades, 9, which extend from the sides of the grippers 10 to the end of the roll, and the roll 105 is provided with parallel blades 8, which are arranged in a similar position with relation to the gripper 10 of that roll and coact with the blades 9 to complete the severance of the tube.

A short distance in the rear of the grippers 10 these rolls are flattened, as indicated at 21, for a considerable distance, the purpose of which will hereinafter appear. Resting upon this flattened portion of the roll 106 is a creasing-blade, 89, the shaft 17 of which is journaled in the ends of the roll, and is provided at one end with an arm, 18, (see Fig. 8,) which is engaged by a cam, 19, mounted upon or made integral with the tubular extension of the box 90 in such manner as to periodically rock the creasing-blade 89 outward away from the roll. The return movement of the blade is effected by means of a spring, 20, which acts upon the arm 18.

Coacting with the opening-rolls 105 106 are a pair of presser-plates, 88, which extend upward in front of the rolls, and are mounted upon a shaft, 87, which is supported in arms 86, extending from the tubular extensions of the boxes 90. The shaft 87 is provided with an arm, 85, which is acted upon by a cam, 84, mounted upon the shaft of the roll 106 in such manner as to periodically rock the plates 88 inward against the rolls. The movement of the plates in the opposite direction is effected by means of a spring, 83, which acts upon an

arm, 82, of the shaft 87. Coacting also with the opening-rolls 105 106 is a rotating pressing-head, 81, which is mounted upon a shaft, 80, and is driven through gears 78 79 from the shaft of the roll 105, these gears being so proportioned that the head makes turn for turn with the opening-rolls. The shaft 80, which carries the head 81, is mounted in swinging arms 77, which are acted upon by springs 76, so as to hold the gears 78 79 in engagement and yet allow the head to yield slightly as it comes in contact with the roll 105. The opening-rolls are connected by gears 75, and are positively driven from the gear 115, through an intermediate, 119, which engages with a gear, 74, upon the shaft 73 of the roll 106.

The function of the part of the mechanism which has just been described is to open out the end of the tube to what is commonly known as the "diamond form," preparatory to folding over the points of the diamond to form the satchel-bottom.

The operation of the various devices in performing this function is as follows: The bel- lows-sided tube, having been formed and provided with the short central transverse cuts, *a*, as before explained, passes between the feeding-rolls 103 104, and is advanced beyond the end of the guide 94 and passes between the opening-rolls 105 106. As the portion of the tube containing the transverse cuts *a* arrives between the opening-rolls, the blades 89, coming together, (see Fig. 14,) complete the severance of the tube, and immediately after this the arms 12 engage with the cams 13 and open the grippers 10, as shown in Fig. 15. As soon as this takes place the spreader 93 is advanced, as hereinbefore described, and as it is protruded from the end of the guide 94 its spring-fingers separate and engage with the sides of the tube just in the rear of its severed end, and as the spreader continues to advance it spreads the sides of the tube and enters them beneath the grippers 10, as shown in Fig. 16. As soon as this is accomplished the spreader is quickly retracted, and the arms 12 passing off the cams 13, the grippers are closed, so as to grasp and retain the sides of the tube. As the opening-rolls continue their revolution, the sides of the tube are drawn apart, so as to open out the end of the tube and strain its sides across the flattened portions 21, as shown in Figs. 4, 20, and 21. As this takes place, the cam 84 commences to swing the presser-plates 88 inward toward the opening-rolls, and at the same time the cam 19, acting on the arm 18, swings the creasing-blade 89 outward against the advancing presser-plates, so as to grasp the under side of the tube between the two and crease the line of the central transverse fold of the diamond, and directly after this takes place the pressing-head 81 passes between the presser-plates 88 and presses and holds the upper side of the tube against the flattened portion 21 of the upper roll, 105, as shown in Figs. 17, 22, and 23. Directly after this takes place the

arms 12 come into engagement with the cams 14, so as to again open the grippers 10 and release the sides of the tube from the grippers, and at or about the same time the cam 19 passes out of engagement with the arm 18, so as to allow the creasing-blade 89 to be restored to its normal position, and the presser-plate 88, continuing to advance, presses the opened end of the tube against the flat bearings 21 of the opening-rolls, and thus complete the formation of the diamond, as shown in Figs. 18 and 24. To insure the release of the upper side of the tube, or what is the forward point of the diamond, from the gripper 10 of the roll 105, there are provided a pair of fingers, 72, which extend from a shaft, 71, and rest upon the roll at the sides of the gripper, and which operate to strip the forward point of the diamond from beneath the gripper as soon as the latter is opened. As soon as the point of the diamond is thus stripped from beneath the gripper the elasticity of the folded paper will cause the point to immediately assume an erect position and come into line with the body of the diamond, as indicated in Fig. 18. The fingers 72 are loosely mounted upon the shaft 71, and are pressed against the roll 105 by means of a light spring, 6. After the point of the diamond is thus released from the gripper 10 the end of the tube upon which the diamond has been formed is advanced by the roll 105 and the presser-head 81 until the forward point of the diamond is entered between a pair of creasing and pasting rolls, 69 70, which operate to apply the necessary lines of paste to the diamond and to crease the points preparatory to folding them over to close the bag-bottom. These rolls are connected by gears 68, and are driven through an intermediate, 67, from the gear 79 upon the shaft of the roll 105. The roll 70 is provided with ribs or raised portions 22, which receive paste from a roll, 66, running in an ordinary paste-vat, 65, and are arranged to apply the paste at the proper points upon the diamond fold as the latter passes between the rolls 69 70. The paste-roll 66 is driven from the roll 70 by a gear, 51. The roll 70 is also provided with two creasing-blades, 5, which coact with yielding portions 4 upon the roll 69 to crease the diamond upon the lines *b c*, to enable its points to be readily folded to close the bottom. The diamond, after passing between the rolls 69 70 and receiving the proper lines of paste and being creased at the proper points, as stated, passes upward between guides 23 24. Arranged in front of these guides and in position to act upon the points of the diamond is a vibrating folding-blade, 64, which is carried by arms 63, extending from a shaft, 62, having an arm, 61, which is acted on by the cam 60, mounted upon the shaft of the roll 69 and arranged to give a quick upward movement to the blade 64 at the proper period. The return movement of the blade 64 is effected by means of a spring,

59, which acts upon the shaft 62. Located at the upper ends of the guides 23 24 are a group of three folding and delivery rolls, 56 57 58, which are connected by gears 55 and are driven through an intermediate, 54, from the gear 68 of the roll 69. The creasing upon the lines *b* *c* will, as will be readily understood, cause the points of the diamond to take positions out of line with the body of the bag-bottom, as indicated in Fig. 14, so that as the forward point of the diamond arrives at the bite of the rolls 56 58 that point will be caught by the roll 58, which is cut away at its center, so as not to come in contact with the paste-lines upon the diamond, and be turned downward on the line *b*, so as to be folded over onto the body of the diamond, as shown in Fig. 25. Just as this takes place the cam 60 will give a quick upward movement to the blade 64, which blade will catch under the outstanding rear point of the diamond and fold it upward on the line *c* and against the body of the bag-bottom, as shown in Fig. 17, thus completing the operation and closing the bottom of the bag. The two points of the diamond thus folded over will pass successively between the rolls 56 58 and 57 58, so as to be pressed and set in position, and the completed bag will be discharged onto the platform 53, or into the control of a drier or other suitable mechanism.

What I claim is—

1. The combination, with the blade 9, for completing the severance of the tube, of the former having the openings 50, and the cutting-rolls 101 102, having adjustable portions 96, carrying co-operating blades 97, for making a preliminary central cut in the tube, both of said portions 96 being adjustable to secure the proper register between the preliminary and final cuts, substantially as described.

2. The combination, with the opening-rolls 105 106, having the flattened portions 21, of the presser-plates 88, substantially as described.

3. The combination, with the opening rolls 105 106, having the flattened portions 21, of the presser plates 88 and the creasing-blade 89, substantially as described.

4. The combination, with the opening-rolls having the flattened portions 21, of the presser-plates 88 and the rotating pressing-head 81, substantially as described.

5. The combination, with the opening-rolls having the flattened portions 21, of the presser-plates 88, the creasing-blade 89, and the rotating pressing-head 81, substantially as described.

6. The combination, with a cutting mechanism for making the short cuts *a* at the center of the tube, of the opening-rolls 105 106, provided with blades for completing the severance of the tube and with grippers for taking the sides of the tube, and the reciprocating spreader 93, for entering the sides of the tube beneath the grippers, substantially as described.

7. The combination, with the opening-rolls 105 106, set a distance apart, of the blade 9, carried by one of said rolls, and the parallel blades 8, carried by the other of said rolls, substantially as described.

8. The combination, with the opening-rolls having the flattened portions 21, of the presser-plates 88, the rotating pressing-head 81, and the creasing-rolls 69 70, substantially as described.

9. The combination, with the opening rolls 105 106, having the flattened portions 21, of the presser-plates 88, the rotating pressing head 81, the creasing-rolls 69 70, provided with the ribs 22, for applying paste, and the folding and pressing rolls 56 58, substantially as described.

10. The combination, with the opening-rolls 105 106, having the flattened portions 21, of the presser-plates 88, the pressing-head 81, the creasing and pasting rolls 69 70, the folding-blade 64, and the folding and pressing rolls 56 58, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

DANIEL APPEL.

Witnesses:

E. H. BOHM,

EDWARD DAVID.