

(No Model.)

5 Sheets—Sheet 1.

W. A. LORENZ.
PAPER BAG MACHINE.

No. 410,843.

Patented Sept. 10, 1889.

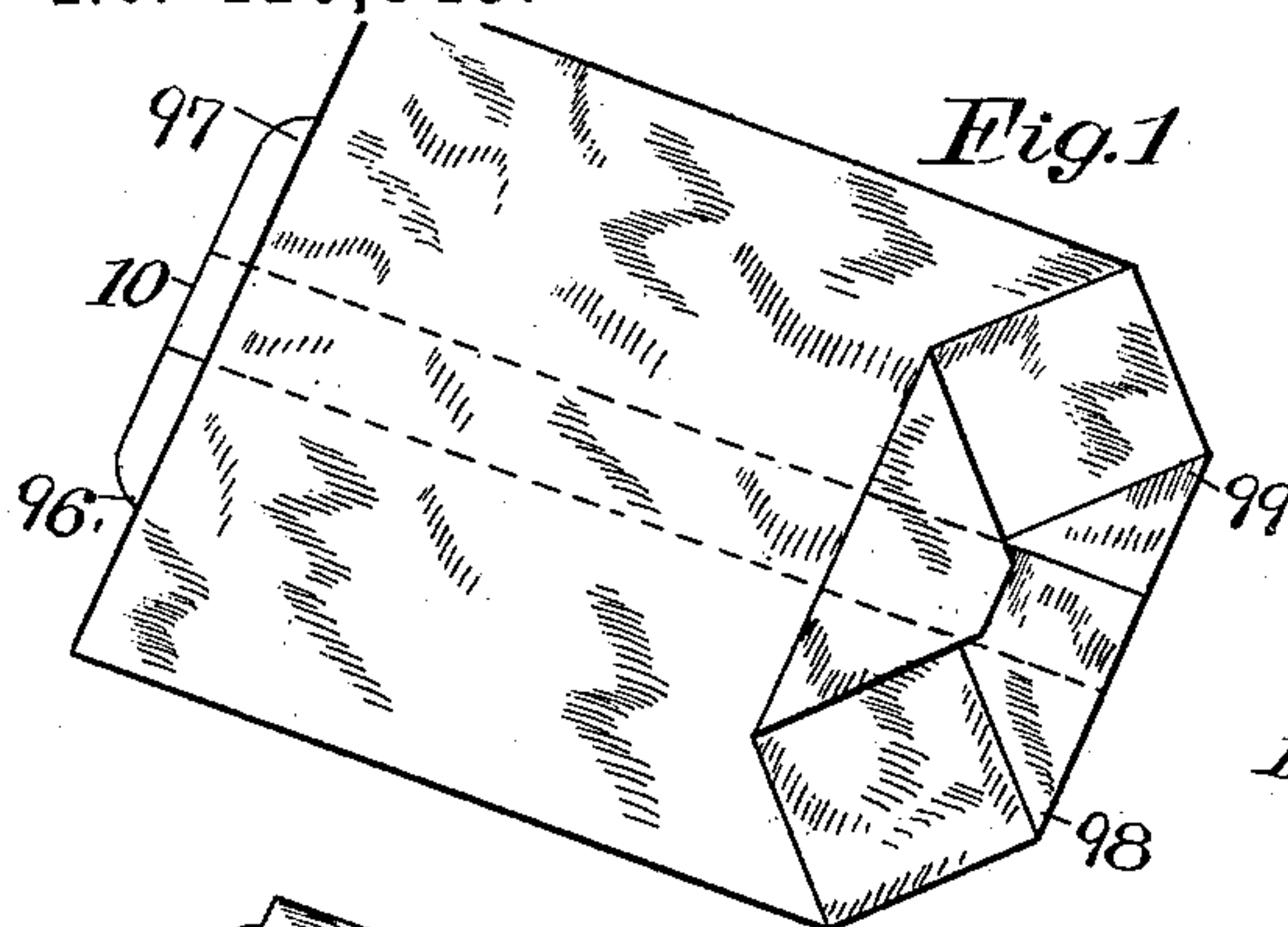


Fig. 2

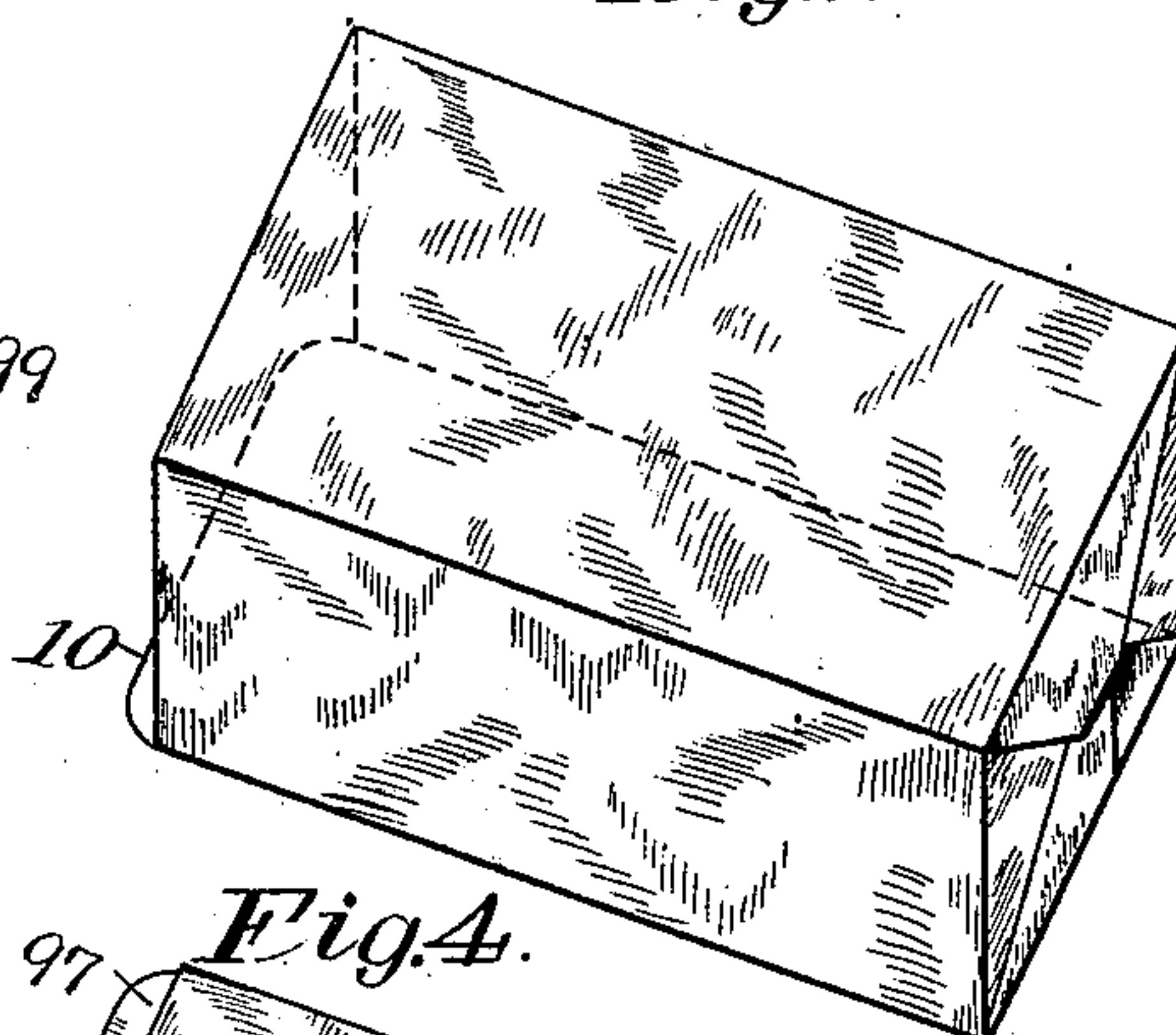


Fig. 3

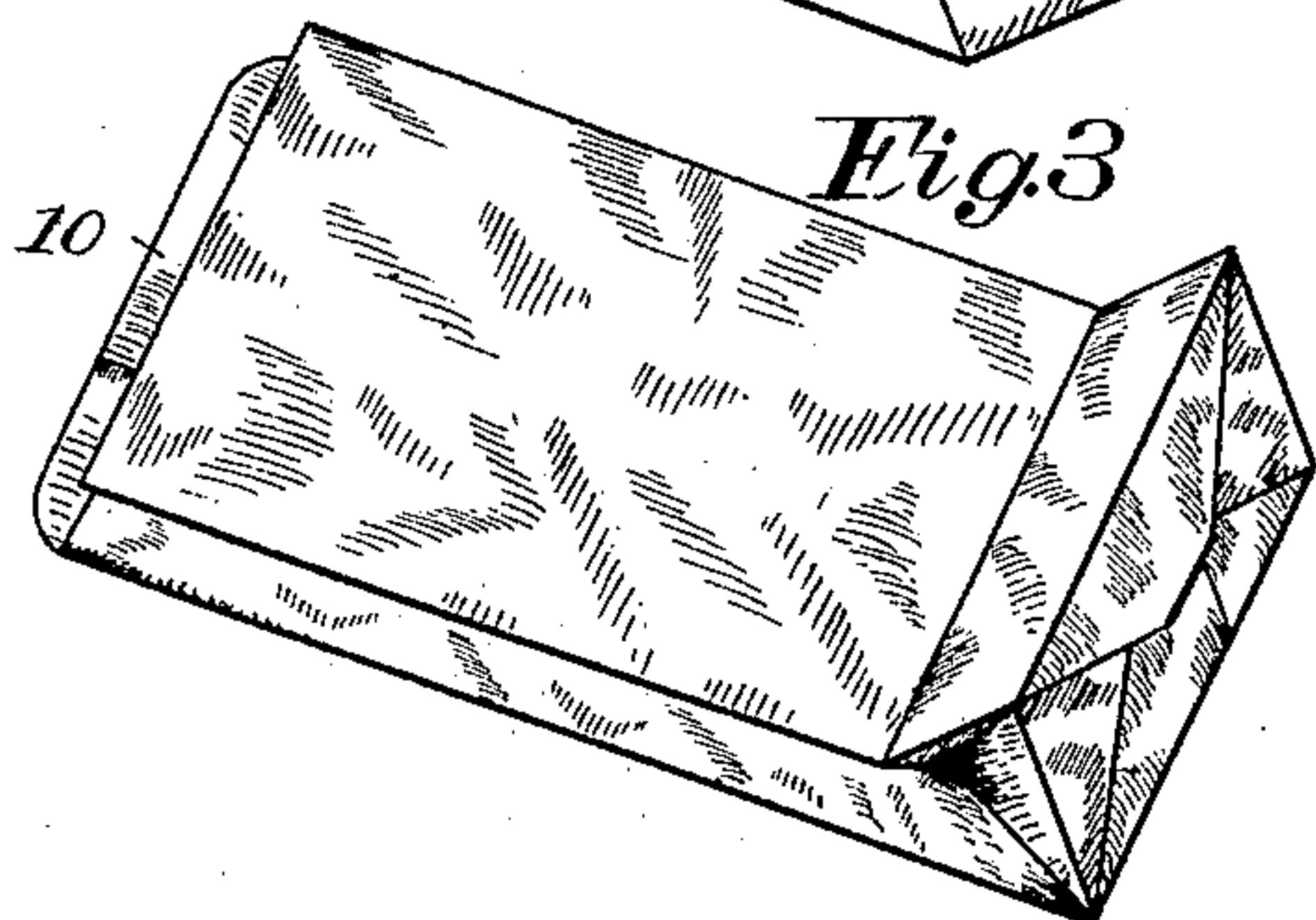


Fig. 4.

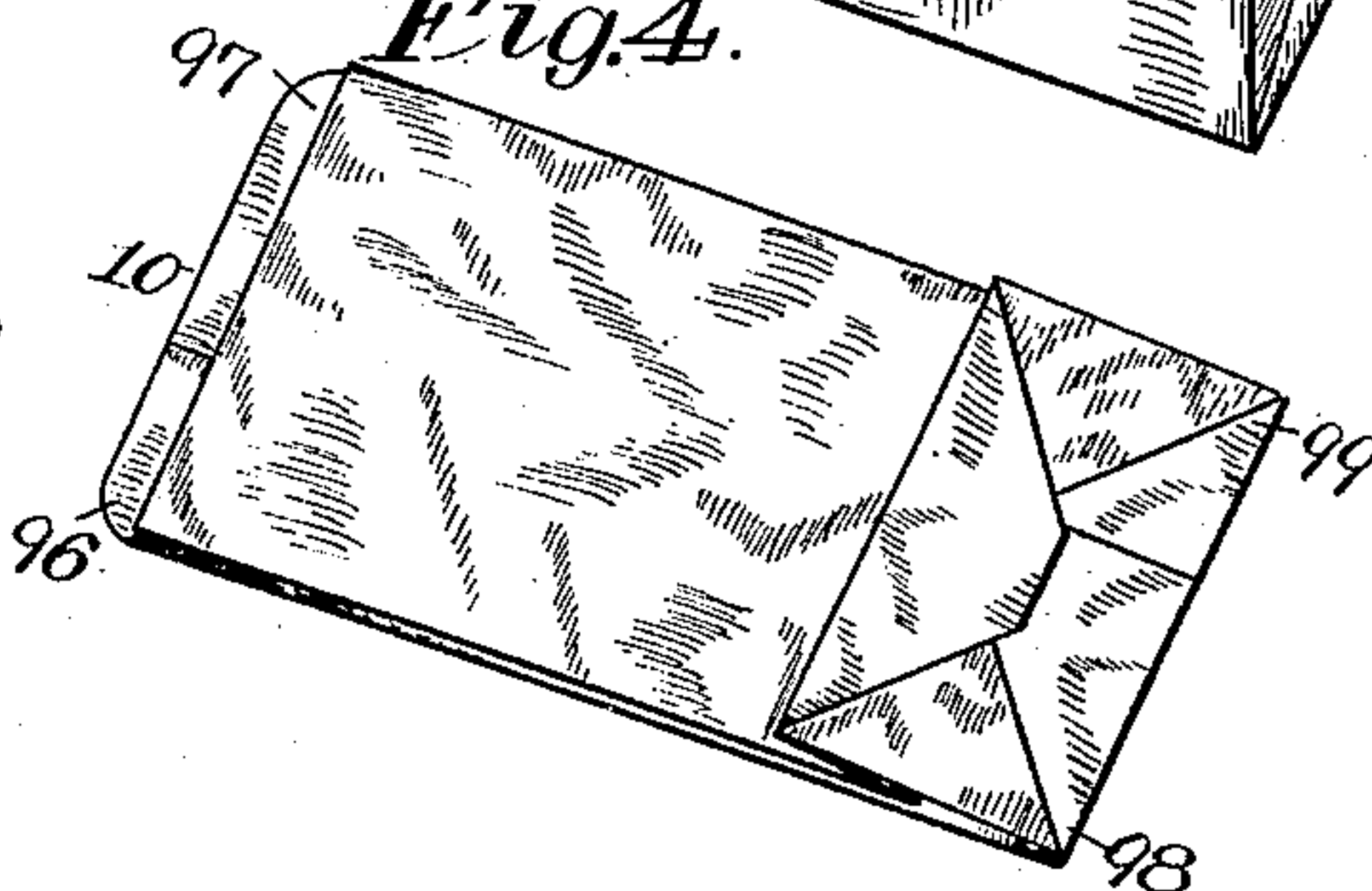


Fig. 13

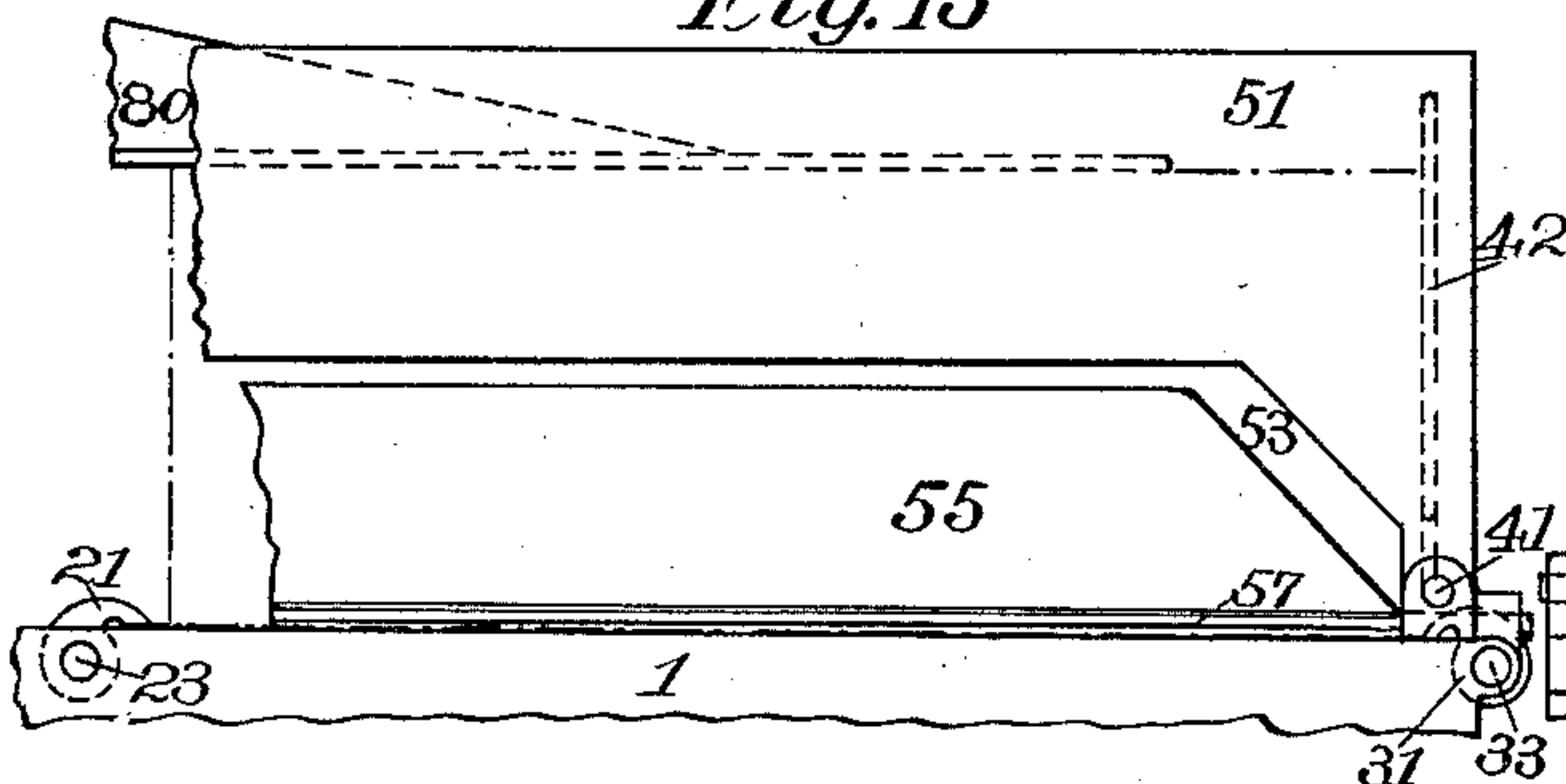


Fig. 14

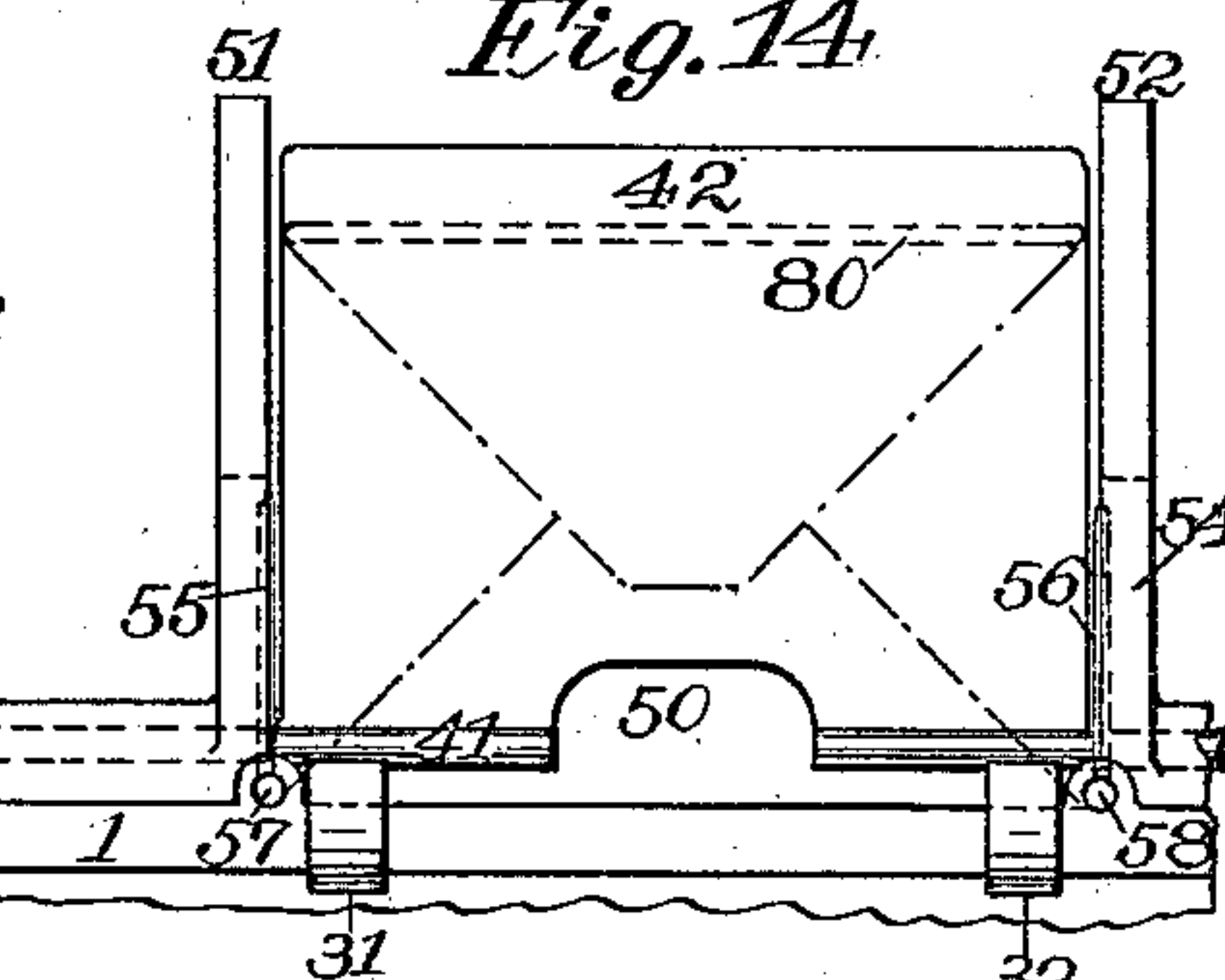


Fig. 15

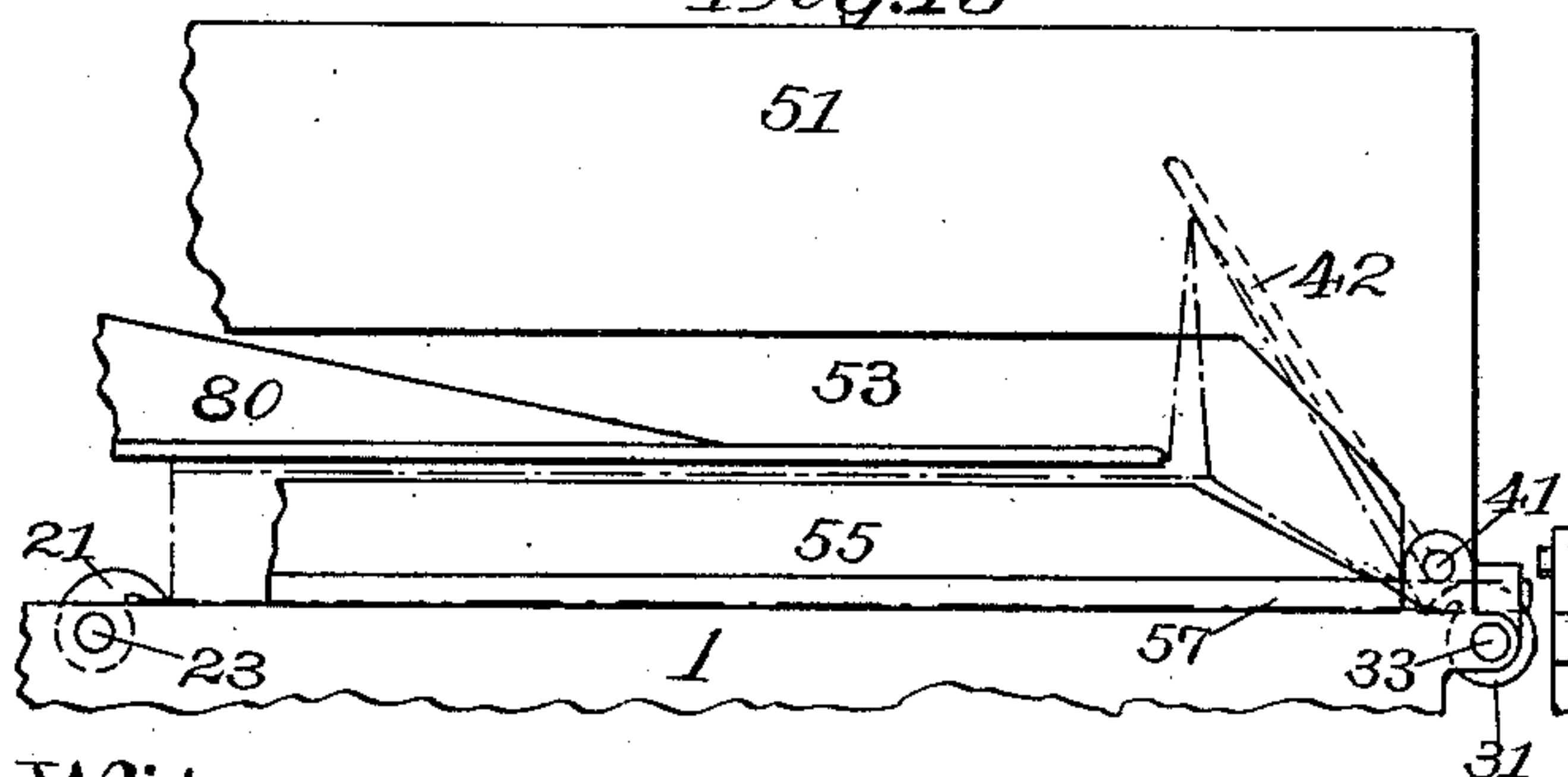
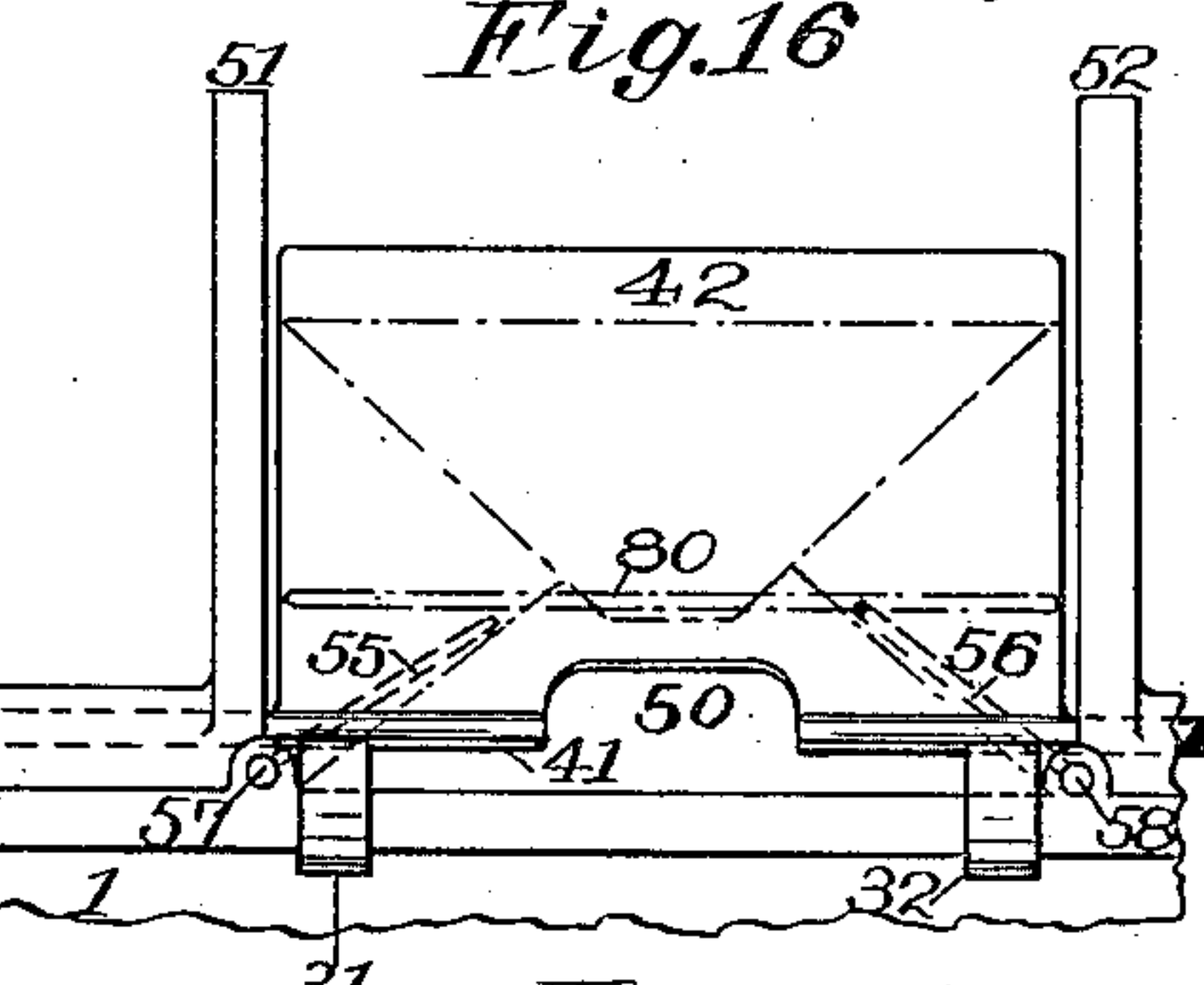


Fig. 16



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Inventor:
William A. Lorenz

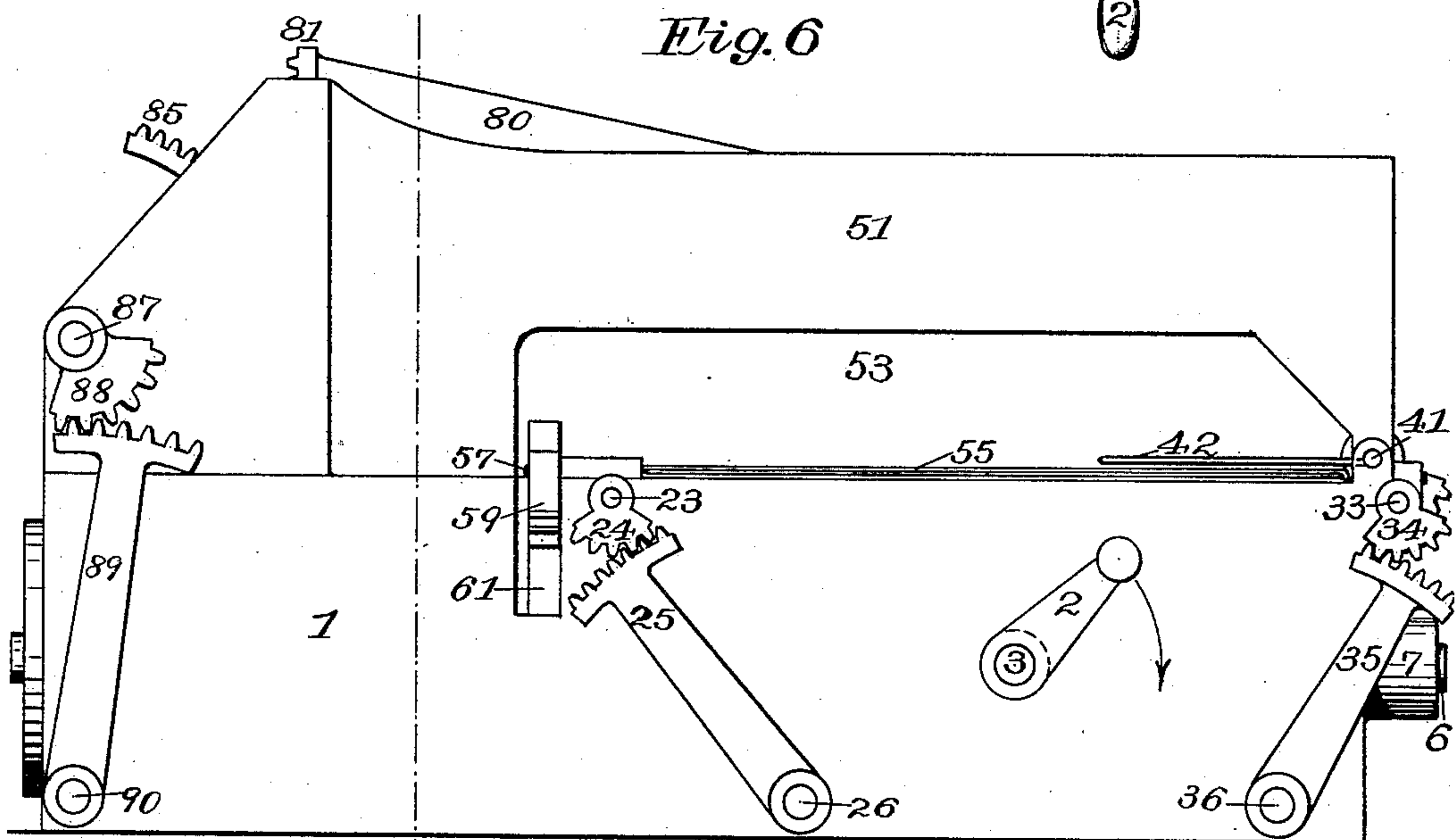
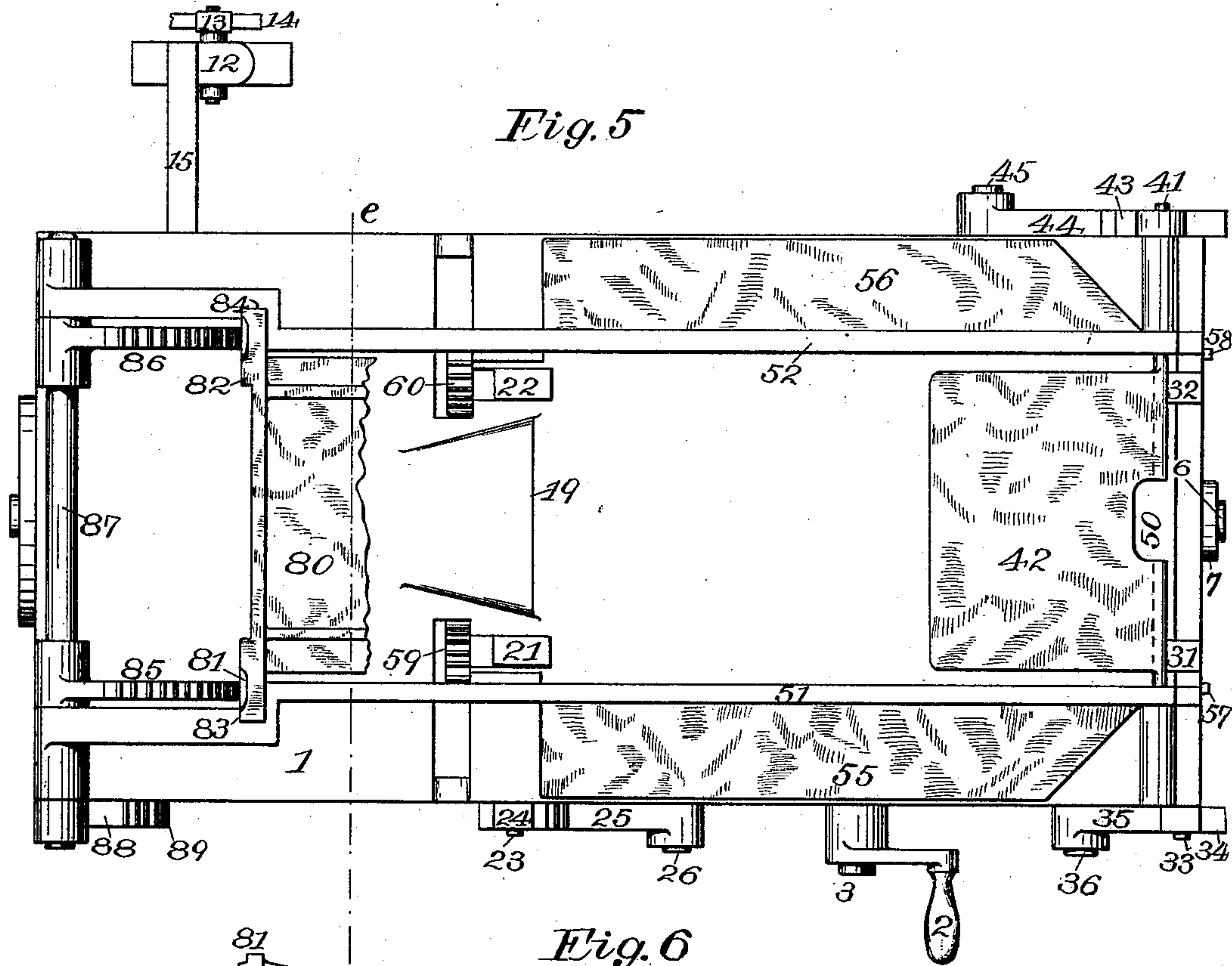
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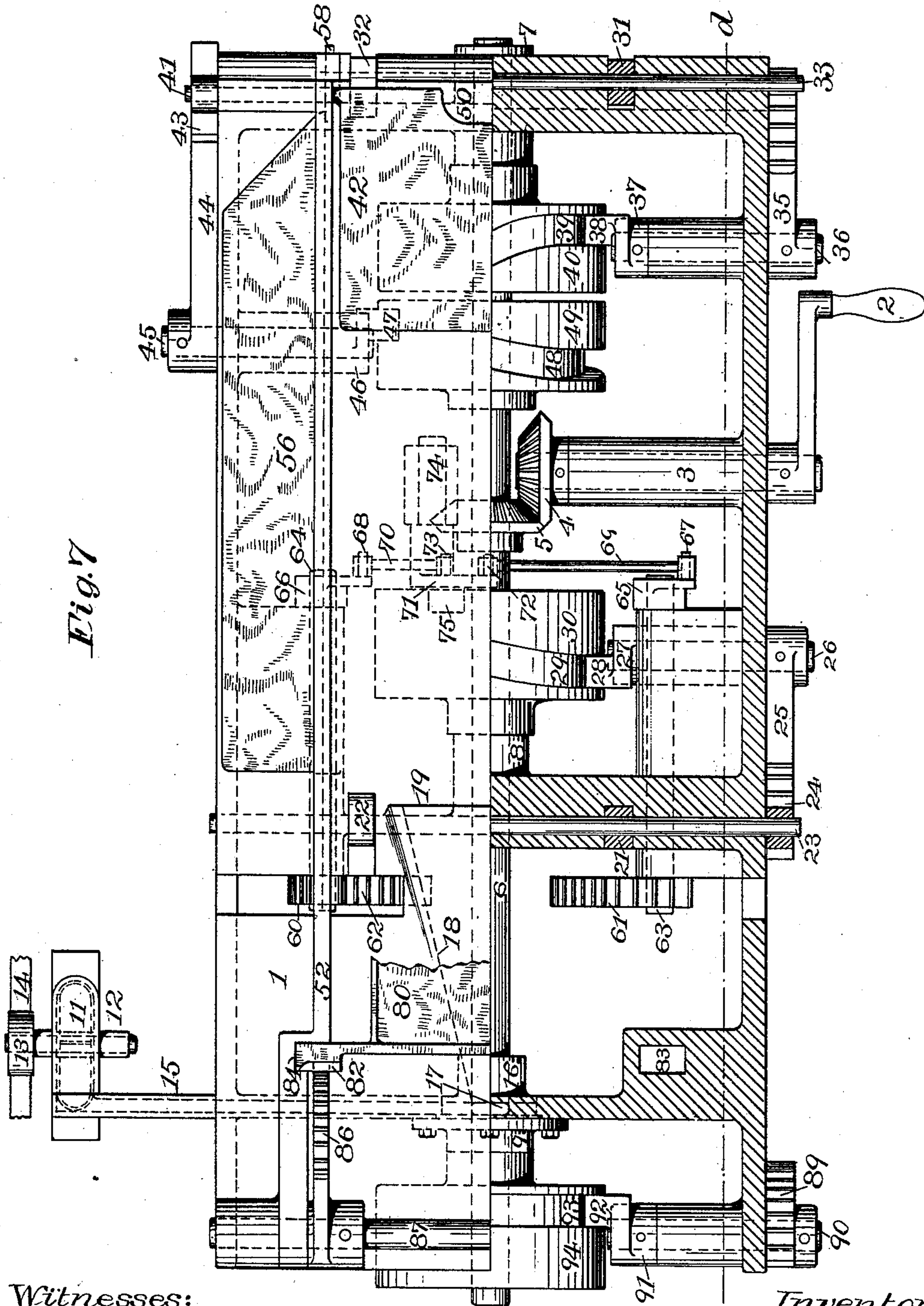
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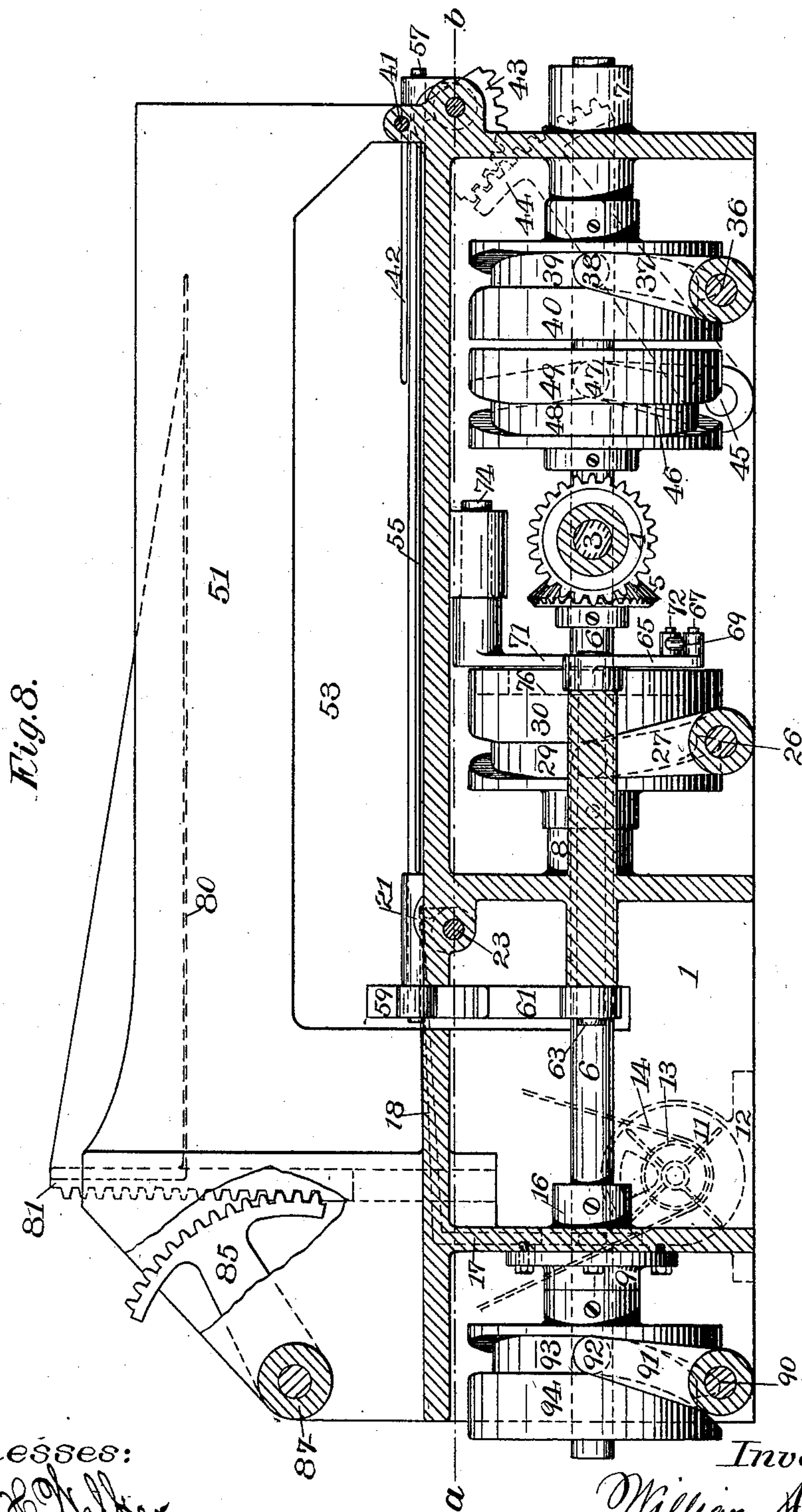
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Patented Sept. 10, 1889.



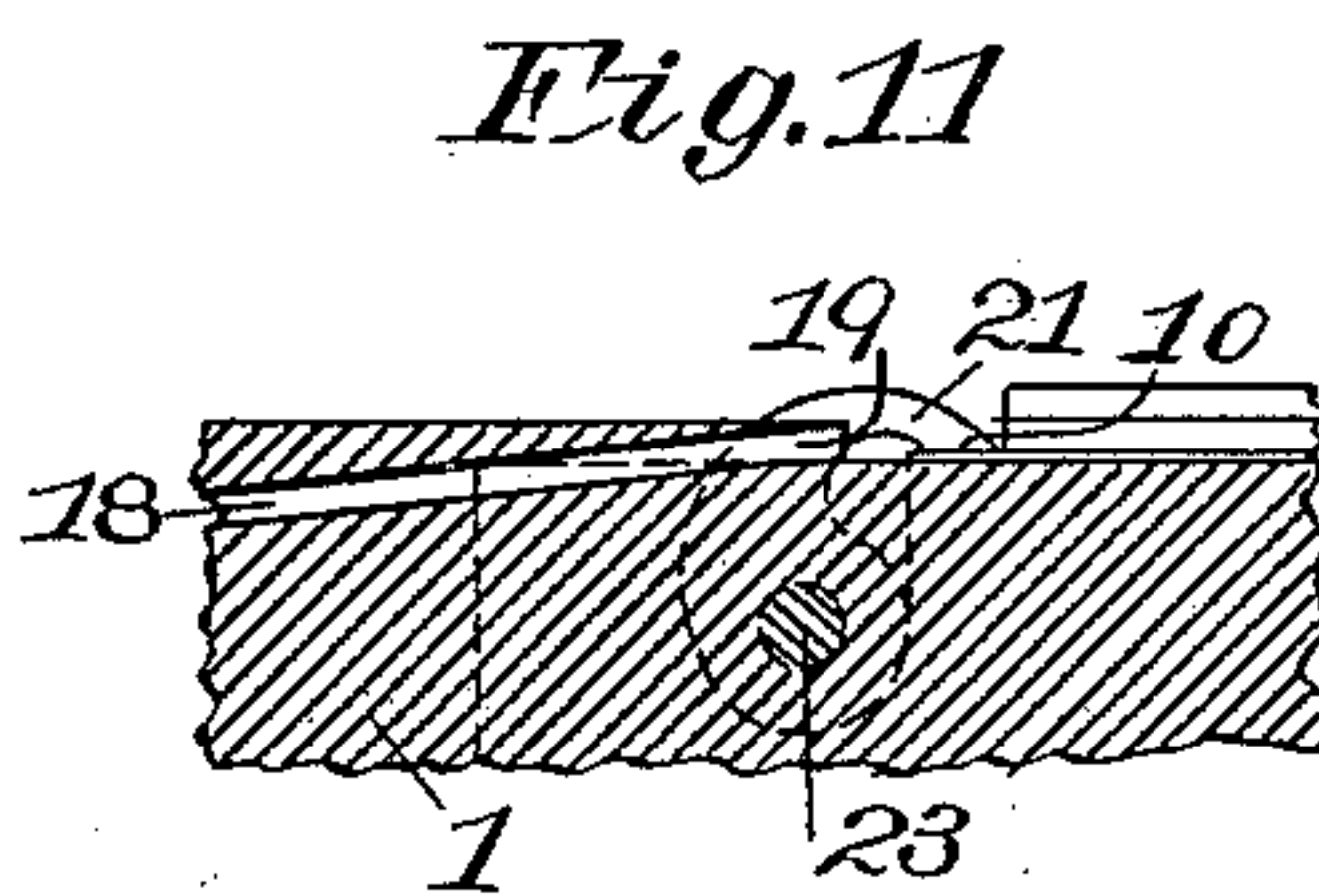
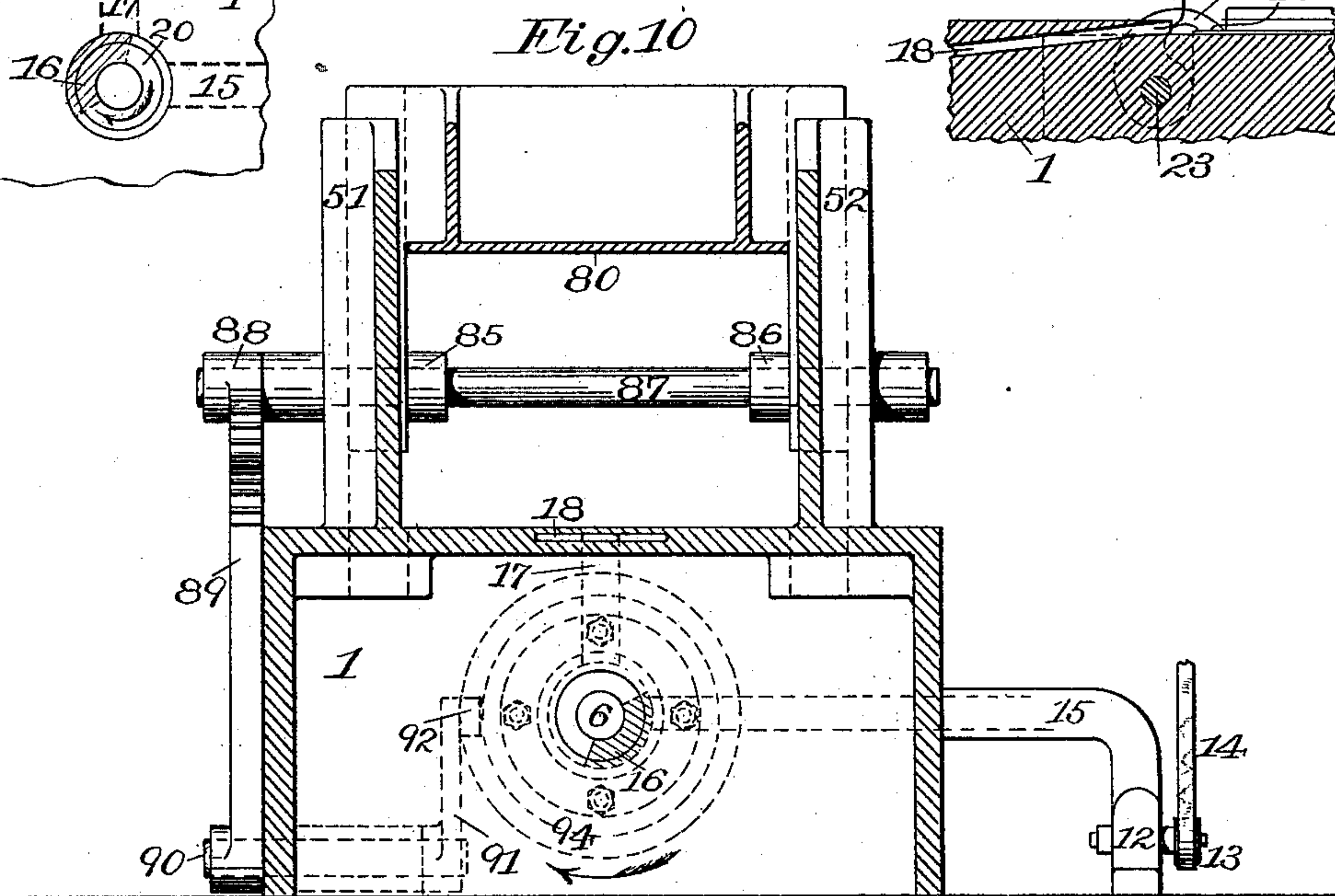
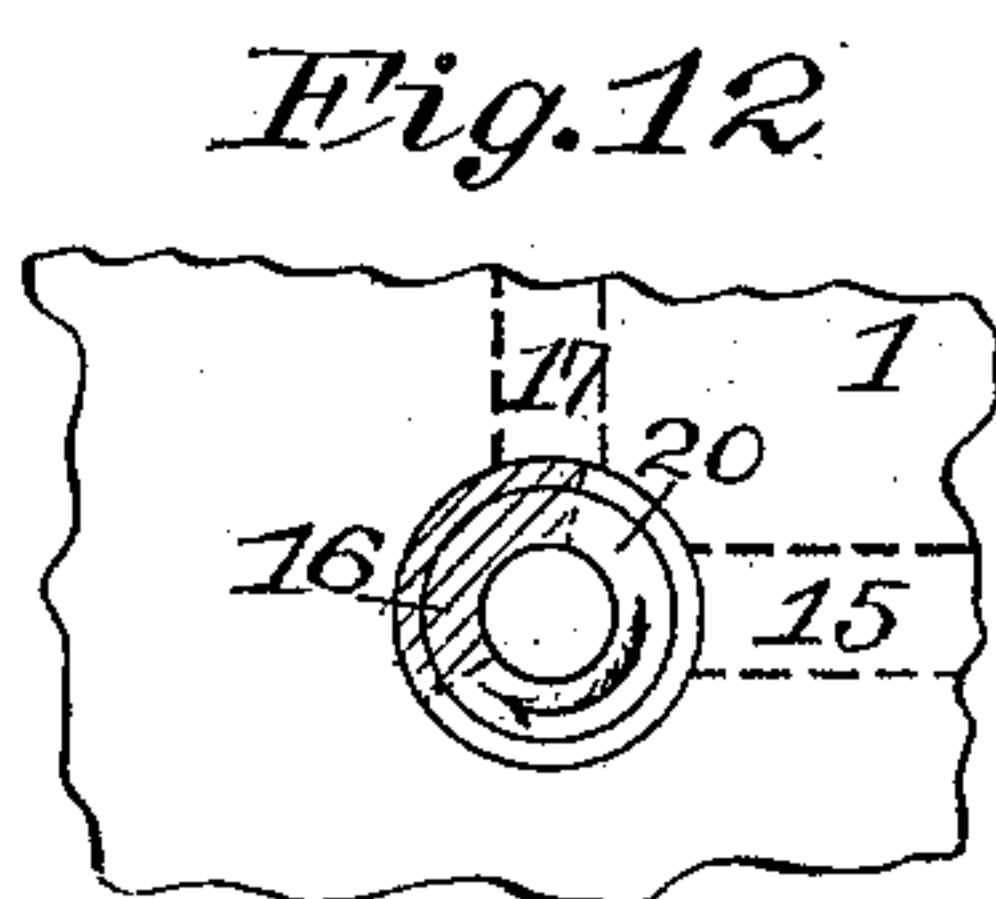
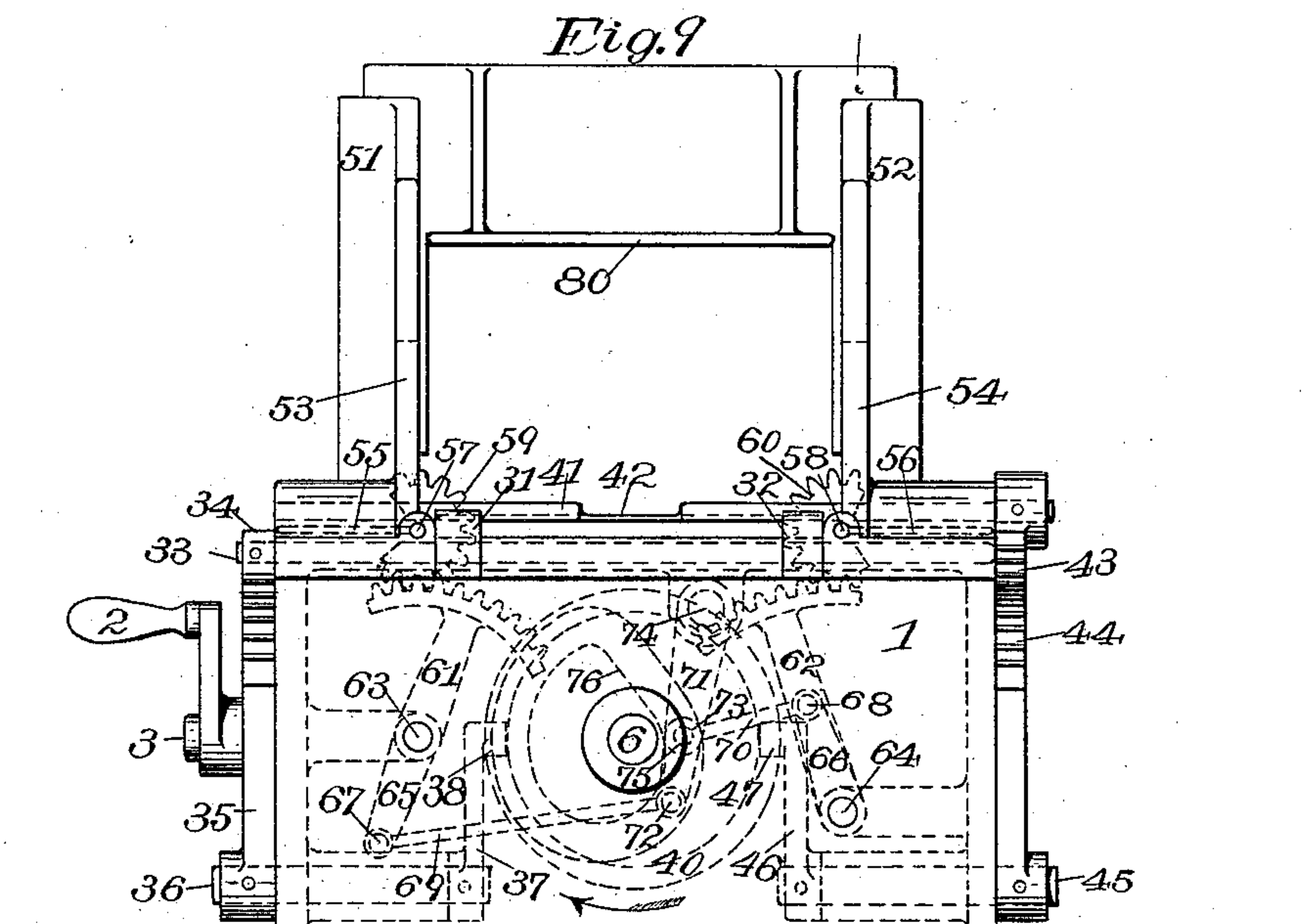
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UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ, OF HARTFORD, CONNECTICUT, ASSIGNOR TO FELIX W. LEINBACH AND CLARENCE A. WOLLE, OF BETHLEHEM, PENNSYLVANIA.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 410,843, dated September 10, 1889.

Application filed January 18, 1889. Serial No. 296,749. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. LORENZ, of Hartford, Connecticut, have invented a certain new and useful Paper-Bag Machine, of which the following description and claims constitute the specification, and which is illustrated in the accompanying five sheets of drawings.

This machine converts an ordinary flat satchel-bottom paper bag into a bellows-sided square-bottom paper bag. This is done by inserting a satchel-bottom bag into the machine and turning a crank one revolution.

Figure 1 represents a flat satchel-bottom paper bag. Fig. 2 represents the same bag opened out into a rectangular form. Fig. 3 shows the same bag partly collapsed into the form of a bellows-sided square-bottom paper bag. Fig. 4 shows that result fully accomplished. Fig. 5 is a plan view of the exterior of the machine. Fig. 6 is a side view thereof. Fig. 7 is an enlarged plan view of the machine, partly in horizontal section, on the line *a b* of Fig. 8. Fig. 8 is an enlarged side view thereof, partly in vertical section, on the line *c d*, Fig. 7. Fig. 9 is a view of the right-hand end of the machine. Fig. 10 is a vertical section of the machine on the line *e f* of Figs. 5 and 6. Fig. 11 is an enlarged vertical central longitudinal section of a part of the machine, showing a gripper and part of a bag. Fig. 12 is a vertical section of the valve. Figs. 13 and 14 are side and plan views, respectively, of parts of the machine in another position than Figs. 5 and 6. Figs. 15 and 16 show the same parts in still another position.

The frame or bed 1 supports the various moving parts of the machine, which compose a set of gripping devices to hold the bag, an air-blast apparatus to expand the bag, a pair of side plates to fold in the bellows sides of the bag, a presser-plate to define the cross-fold for the bottom, and a bottom plate to hold and fold down the bottom of the bag. All these devices are worked by connections from the crank 2 at one side of the machine and fastened to a shaft 3. At the other end of shaft 3 a bevel-gear 4 is attached, and meshes into the bevel-gear 5 upon the main

central longitudinal shaft 6, which is supported in bearings 7, 8, and 9 in the frame 1.

At the side of the machine is shown a fan 11, working in a suitable casing 12, and driven by a pulley 13 and belt 14. A pipe 15 connects the fan with a valve 16, which revolves with the main shaft 6. Above this valve another pipe 17 is placed, which widens out into a throat 18 on top of the bed 1 and forms an opening or mouth, as seen at 19. On opposite sides of the mouth 19 two grippers 21 and 22 are fixed upon a cross-shaft 23 in the bed 1, their ends projecting above the bed. The shaft 23 receives an oscillating motion to lift and drop the grippers by means of a sector 24, secured to it, and this sector meshes with another sector 25 upon the shaft 26, which has the arm 27, provided with the projection 28, which runs in the cam-groove 29 of the cam 30 upon the main shaft 6. At the right-hand end of the machine two other grippers 31 and 32 are placed upon the cross-shaft 33, which receives oscillating motion by means of the sector 34, meshing with the sector 35, secured to the shaft 36, which has the arm 37, provided with the projection 38, which runs in the cam-groove 39 of the cam 40 on the shaft 6. Above the grippers 31 and 32 a shaft 41 is placed, carrying a bottom-folding plate 42, and receiving oscillating motion through an arc of about ninety degrees by means of a sector 43, meshing with a sector 44, attached to a shaft 45, which has the arm 46, provided with the projection 47, which runs in the cam-groove 48 of the cam 49 on the main shaft 6.

Projecting above the bed 1 are two parallel uprights 51 and 52, placed wide enough apart to admit the bag when opened up, as in Fig. 2. These are cut away at the lower parts, as at 53 and 54, to admit of the oscillating of a pair of side plates 55 and 56, which move in an arc of about one hundred and eighty degrees. These plates are fastened to shafts 57 and 58, and are moved by means of sectors 59 and 60, meshing with sectors 61 and 62, the latter pair being fastened, respectively, to shafts 63 and 64, at whose other ends arms 65 and 66 are secured. Connected to the arms 65 and 66 by pins 67 and 68 are two rods 69

and 70, which are pivoted to the lever 71 by pins 72 and 73. The lever 71 is pivoted to a stud 74, and has a projection 75, which runs in the cam-groove 76, cut in the face of cam 30.

Arranged between the uprights 51 and 52 is a presser-plate 80, which moves up and down, and is fastened to two racks 81 and 82, which slide in grooves 83 and 84 in the uprights 51 and 52. These racks engage with sectors 85 and 86, secured to shaft 87, which has a sector 88 at its outer end meshing with a sector 89 upon the shaft 90. At the other end of shaft 90 an arm 91, carrying a projection 92, is secured, and the projection enters a cam-groove 93 of the cam 94 on the main shaft 6.

The valve 16 is shown closed in Fig. 10, so that air from the fan 11 cannot pass it. In Fig. 12 it is shown open, so that air passes through its port 20 from the fan 11, through the pipe 15 to pipe 17, and thence out of the throat 18 and mouth 19.

The mode of operation is as follows: A bag like that of Fig. 1 is inserted into the machine under the plate 42 and between and over the side plates 55 and 56 in such a position that the grippers 21 and 22 clasp the lip 10 of the bag at 96 and 97, and the grippers 31 and 32 clasp the corners of the bottom at 98 and 99. The parts of the machine then occupy the position shown in Figs. 5 to 11, no bag, however, being shown in any of these figures, excepting a part of bag in Fig. 11. The crank 2 is then turned in the direction of the arrow shown in Fig. 6, when the following operations take place, the various cams being timed to give the various motions at the proper times: The valve 16 is opened and an air-blast issues from the mouth 19, enters the mouth of the bag, and inflates the bag. The plate 42 meanwhile rises to a vertical position, and thus allows the bag to open up fully to the shape of Fig. 2. The side plates also meanwhile rise to the vertical positions shown in Figs. 13 and 14, when the bag will fill the space between the uprights 51 and 52 up to the presser-plate 80. If preferred, the presser-plate may be partly down at the commencement of inflation and rise with the opening bag. The bag being thus fully opened, the side plates 55 and 56 swing inward and make inward bellows folds in the sides of the bag, the bottom plate 42 swings downward and the presser-plate 80 moves downward, and the air-blast is preferably also continued for the purpose of holding the walls of the bag smoothly against the sides of the four plates. When part way down, the parts assume the

position shown in Fig. 15, and the bag is then collapsed about as in Fig. 3. When the downward motions of the four plates have reached their limits, the bag is collapsed, as in Fig. 4, and is thus completed. Continuing the motion of the crank a little farther will open the four grippers 21 and 22 and 31 and 32, and release the bag, which may then be withdrawn from the machine by seizing its bottom at the opening 50 and drawing it out from that end of the machine. Continuing the motion of the crank a little farther will turn back the two side plates to the position of Fig. 5, while the four grippers remain stationary, and thus another bag may be inserted in the machine and the foregoing operation repeated upon it.

The combination of the four grippers and the two side plates is also applicable to making bellows folds in the sides of a rectangular paper tube or blank, whether that blank has one end partly or wholly folded into the form of the bottom of a bag or before or during such a folding.

I claim as my invention—

1. The combination of the grippers 21 and 22, 31 and 32, constructed and operating substantially as described, to clasp and hold a paper bag, with pneumatic apparatus, constructed and operating substantially as described, to inflate the bag thus held, all substantially as described.

2. The combination of the grippers 21 and 22, 31 and 32, constructed and operating substantially as described, to clasp and hold a paper bag or blank, with the side plates 55 and 56, constructed and operating to make bellows folds in the sides of the bag or blank thus held, all substantially as described.

3. The combination of the side plates 55 and 56, the bottom plate 42, and the presser-plate 80, all constructed and arranged to work together to collapse a rectangular paper bag into a bellows-sided square-bottom paper bag, all substantially as described.

4. The combination of the side plates 55 and 56, the bottom plate 42, the presser-plate 80, and pneumatic apparatus, substantially as described, all constructed and arranged to work together to collapse a rectangular paper bag into a bellows-sided square-bottom paper bag, all substantially as described.

Signed at Hartford, Connecticut, January 15, 1889.

WILLIAM A. LORENZ.

Witnesses:

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