

(No Model.)

8 Sheets—Sheet 1.

F. W. LEINBACH, C. A. WOLLE & E. H. BRUNNER.
PAPER BAG MACHINE.

No. 327,280.

Patented Sept. 29, 1885.

FIG. 1.

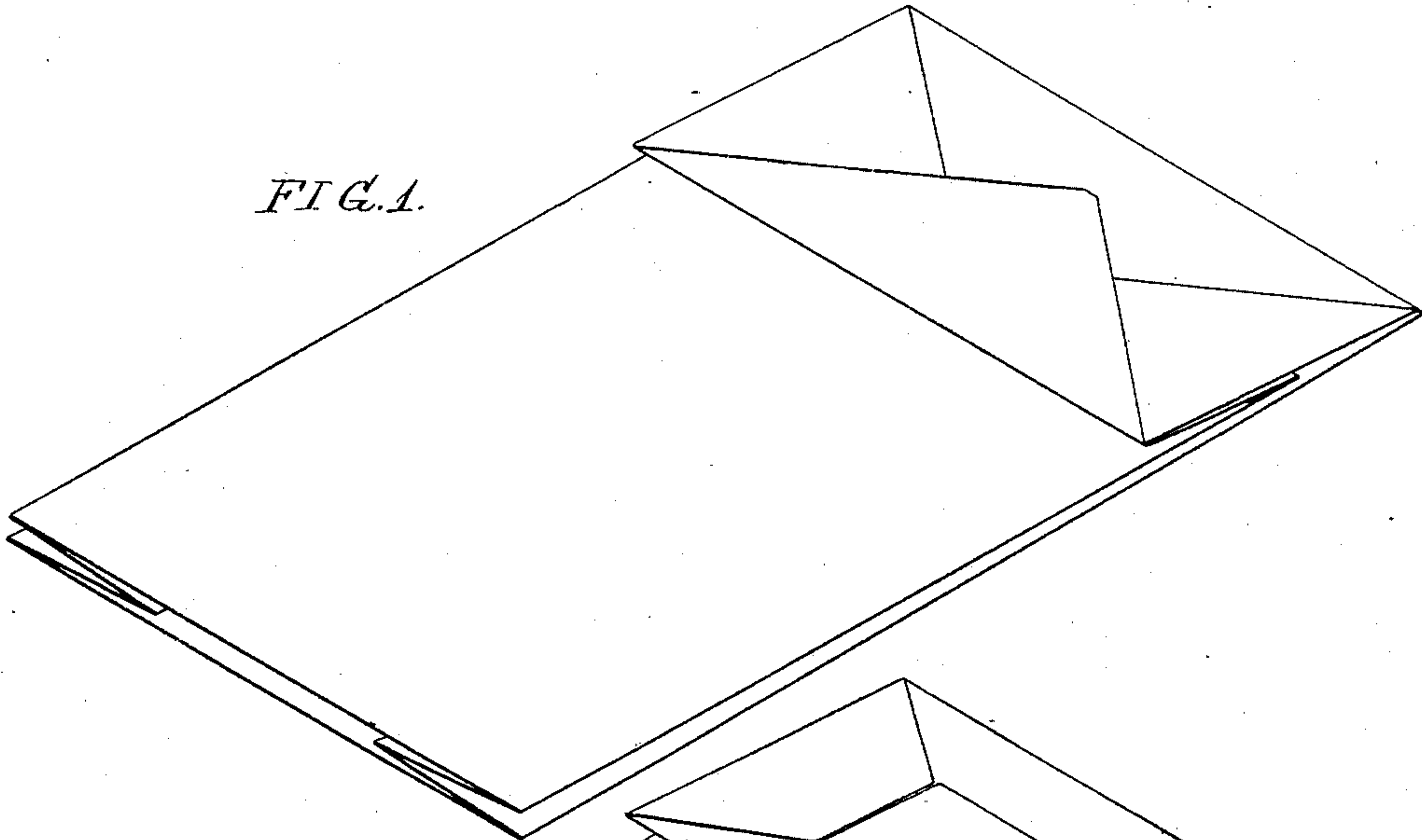


FIG. 2.

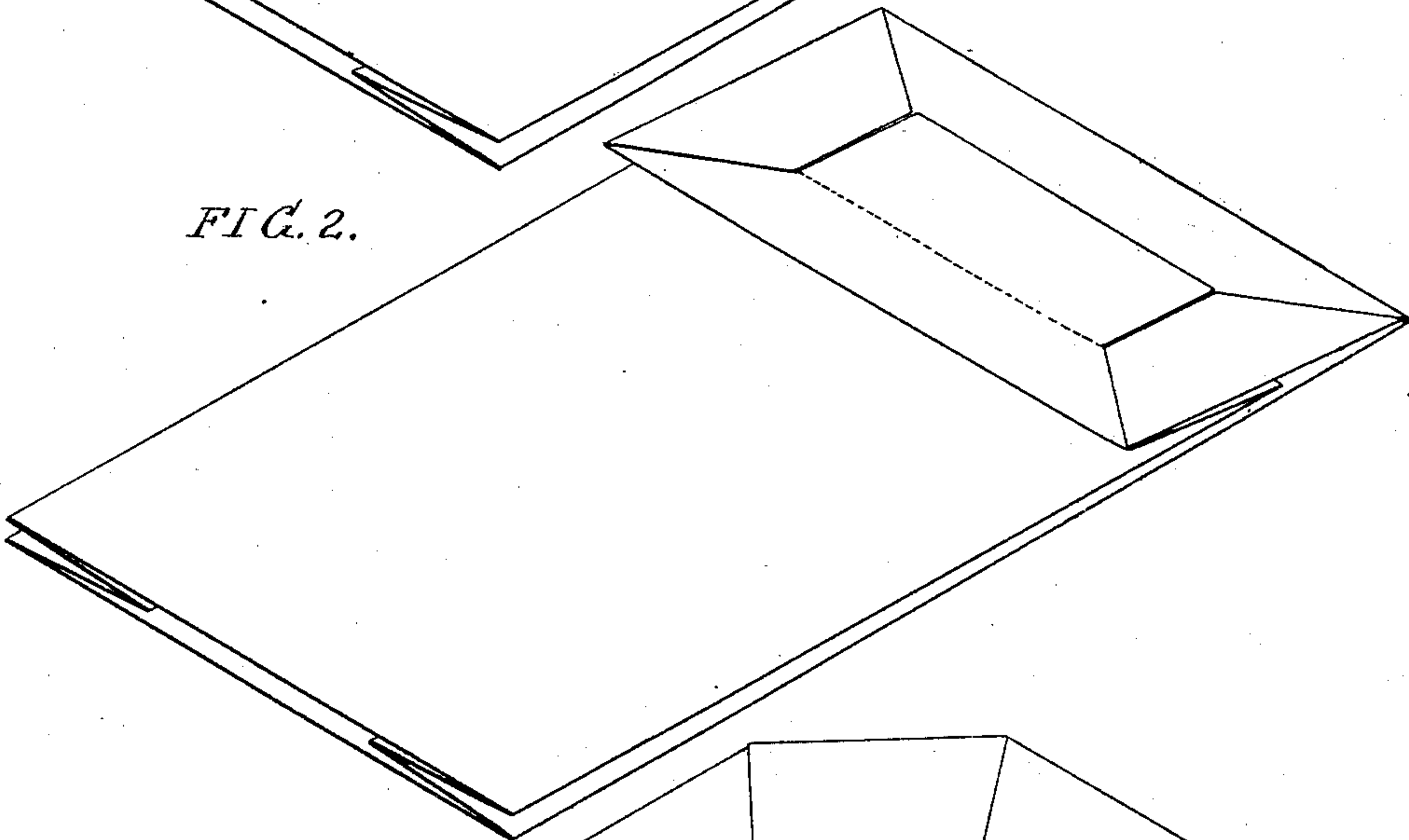
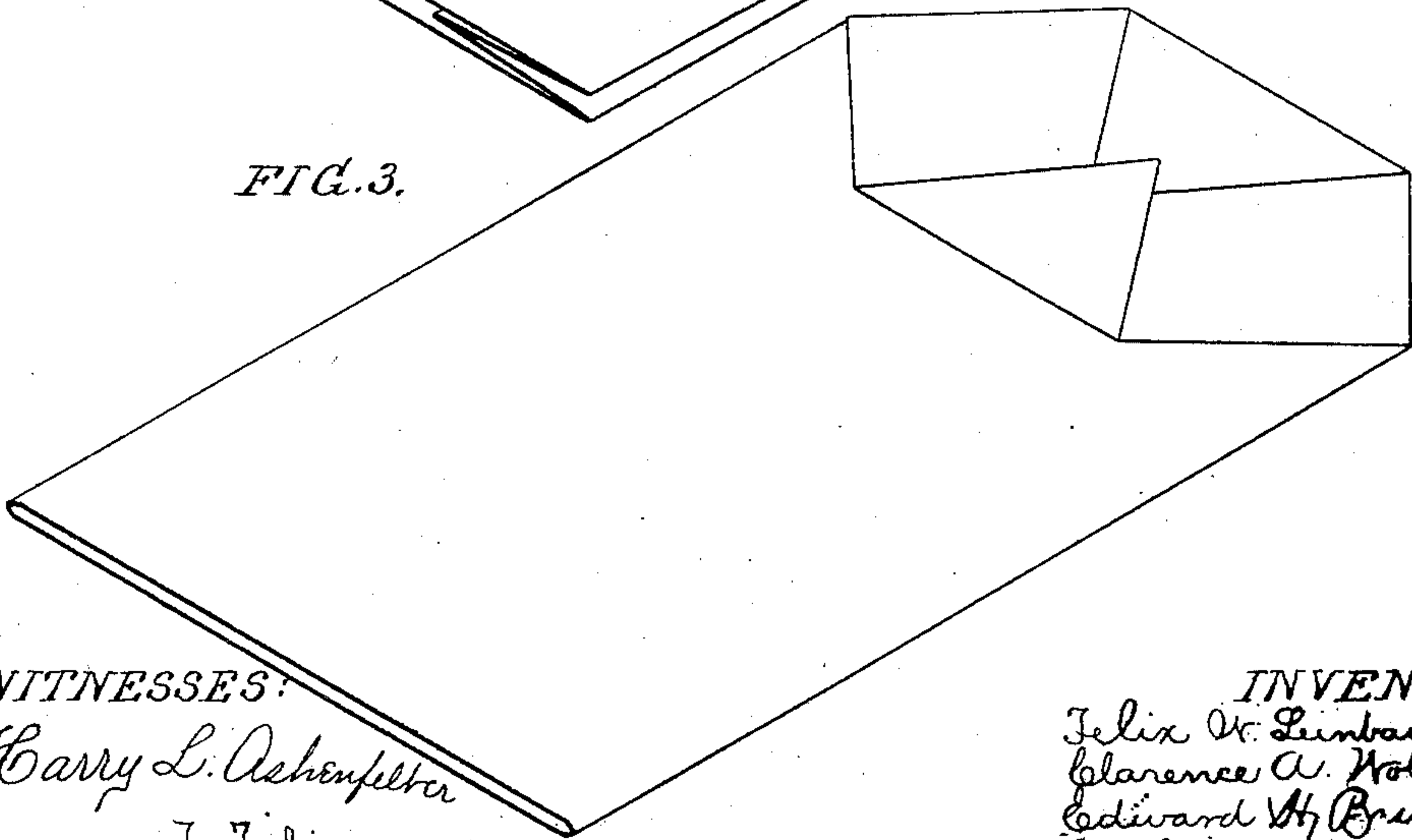


FIG. 3.



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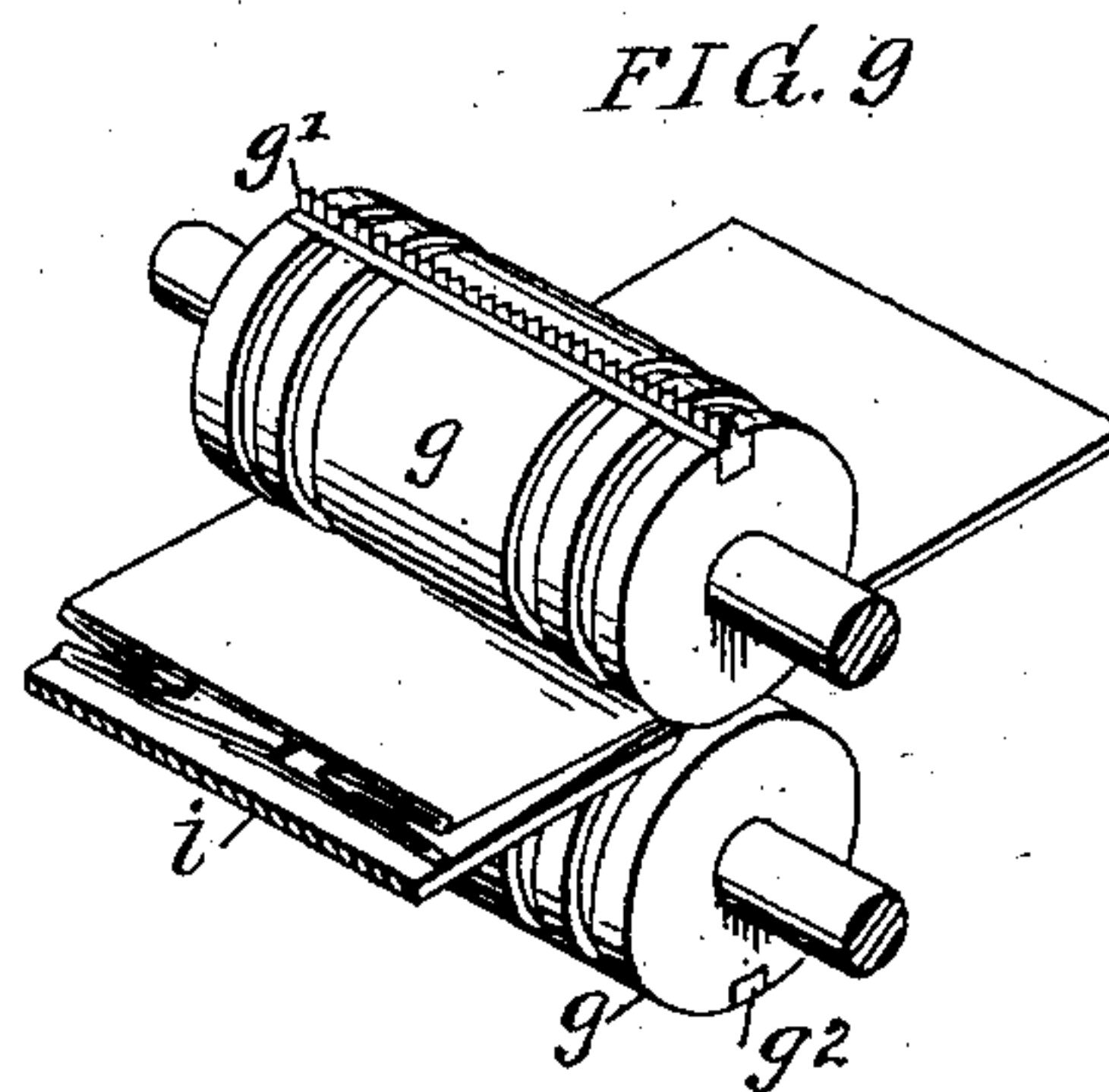
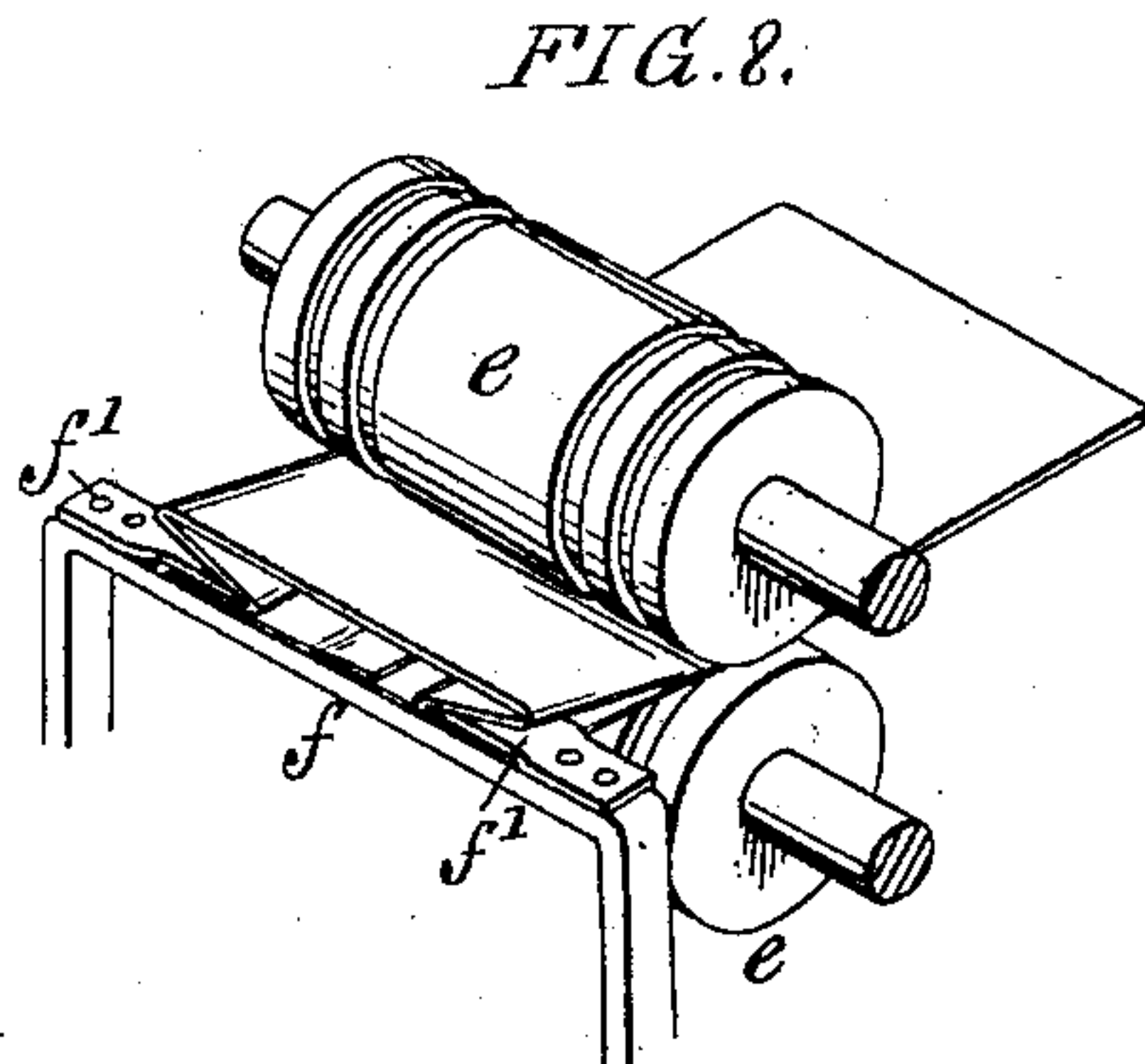
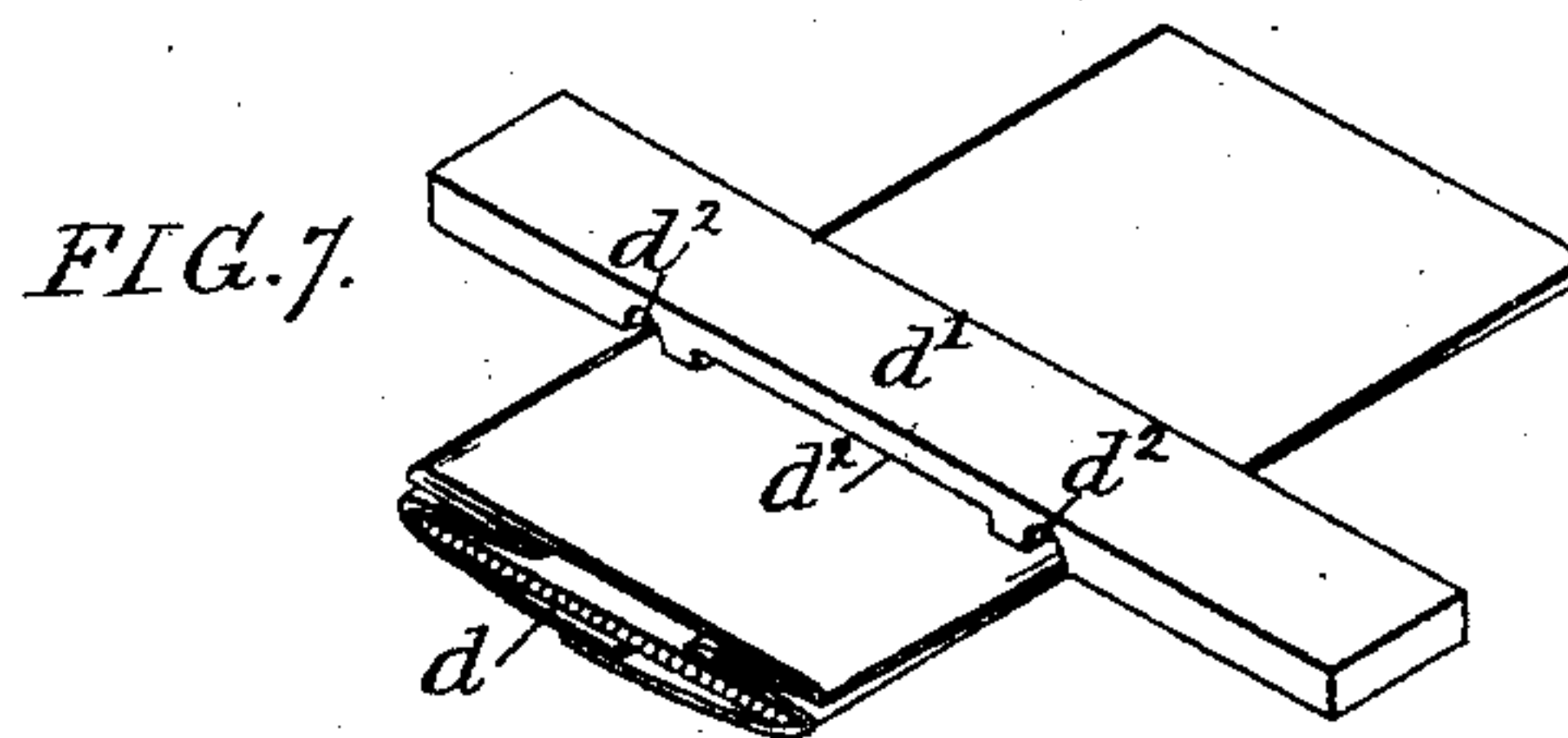
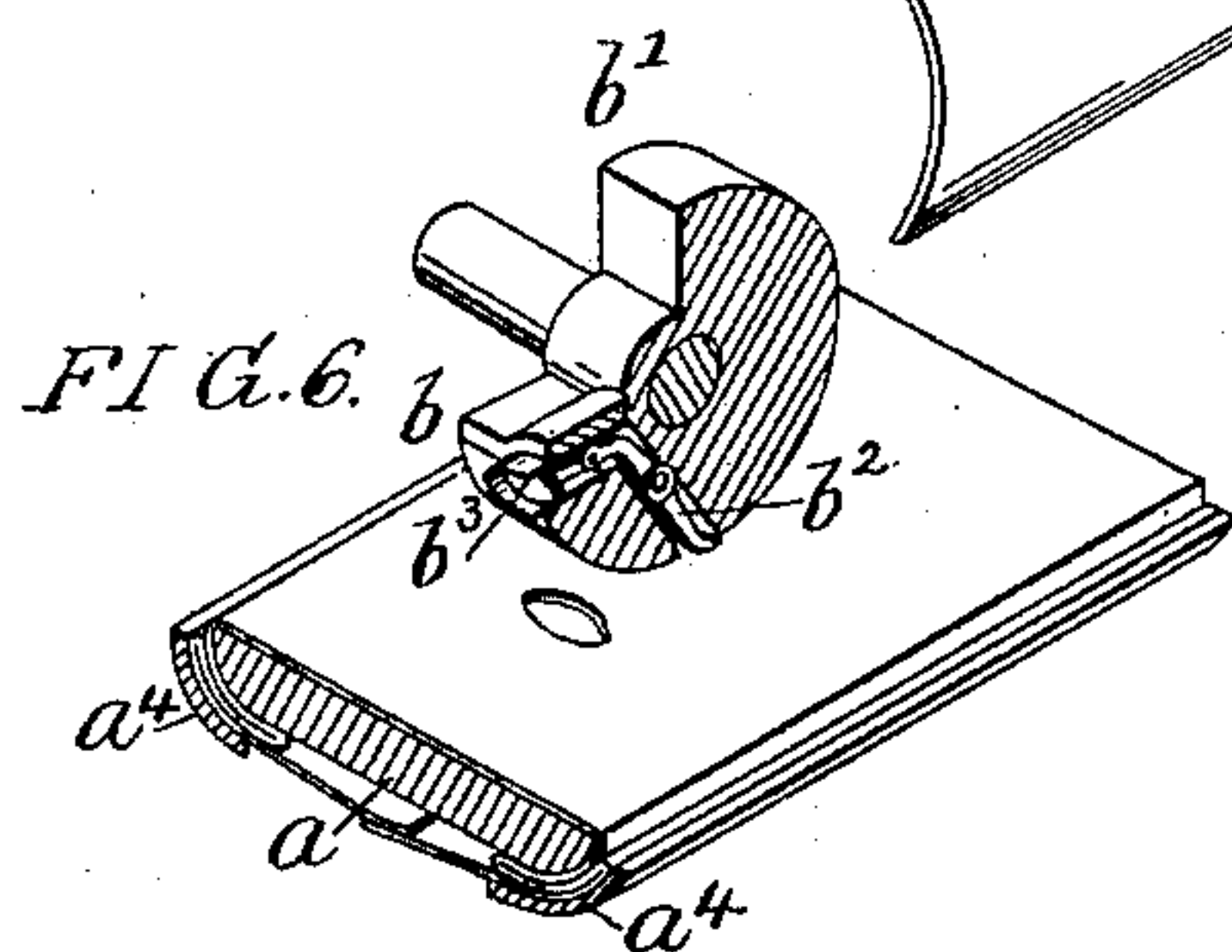
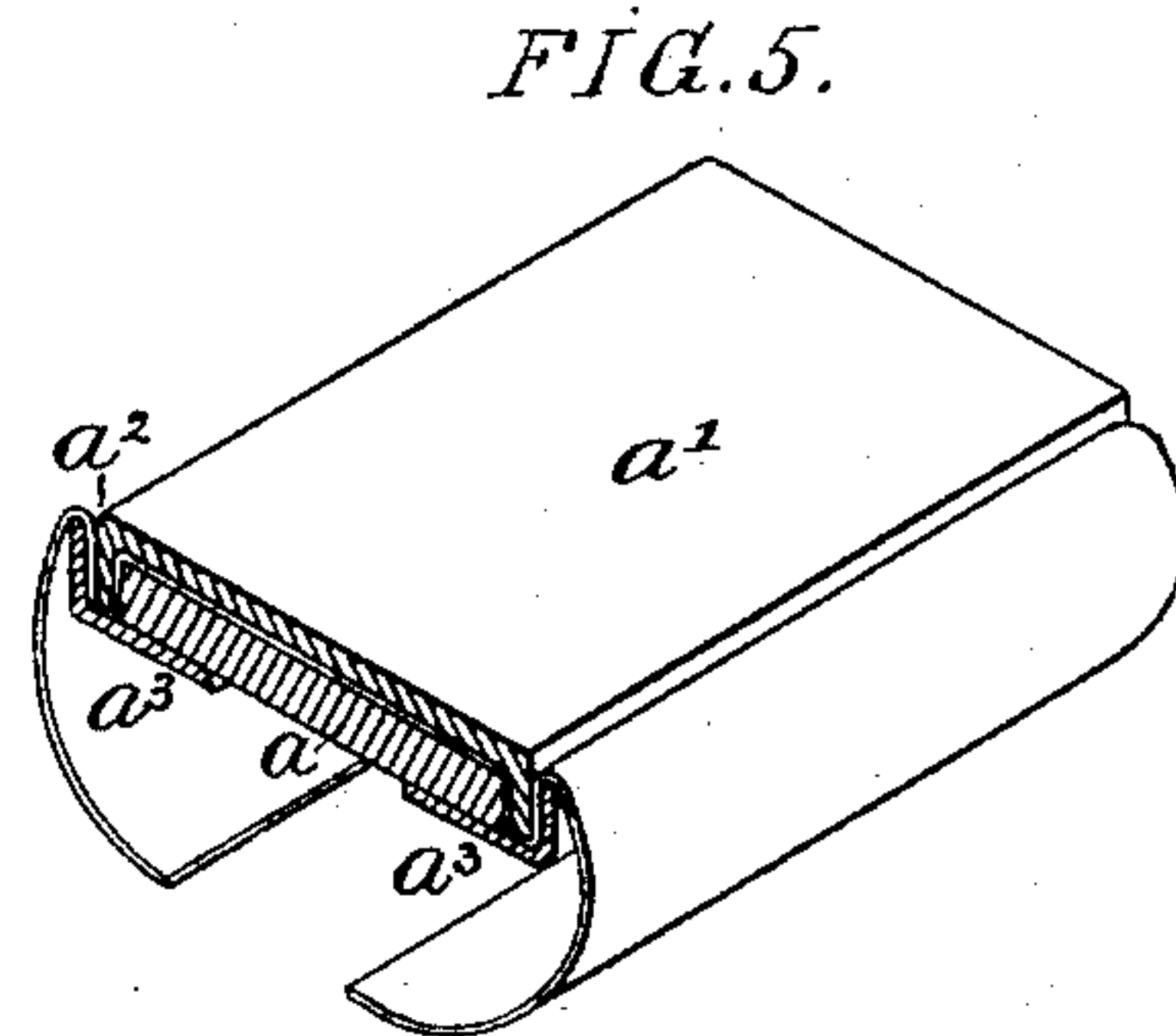
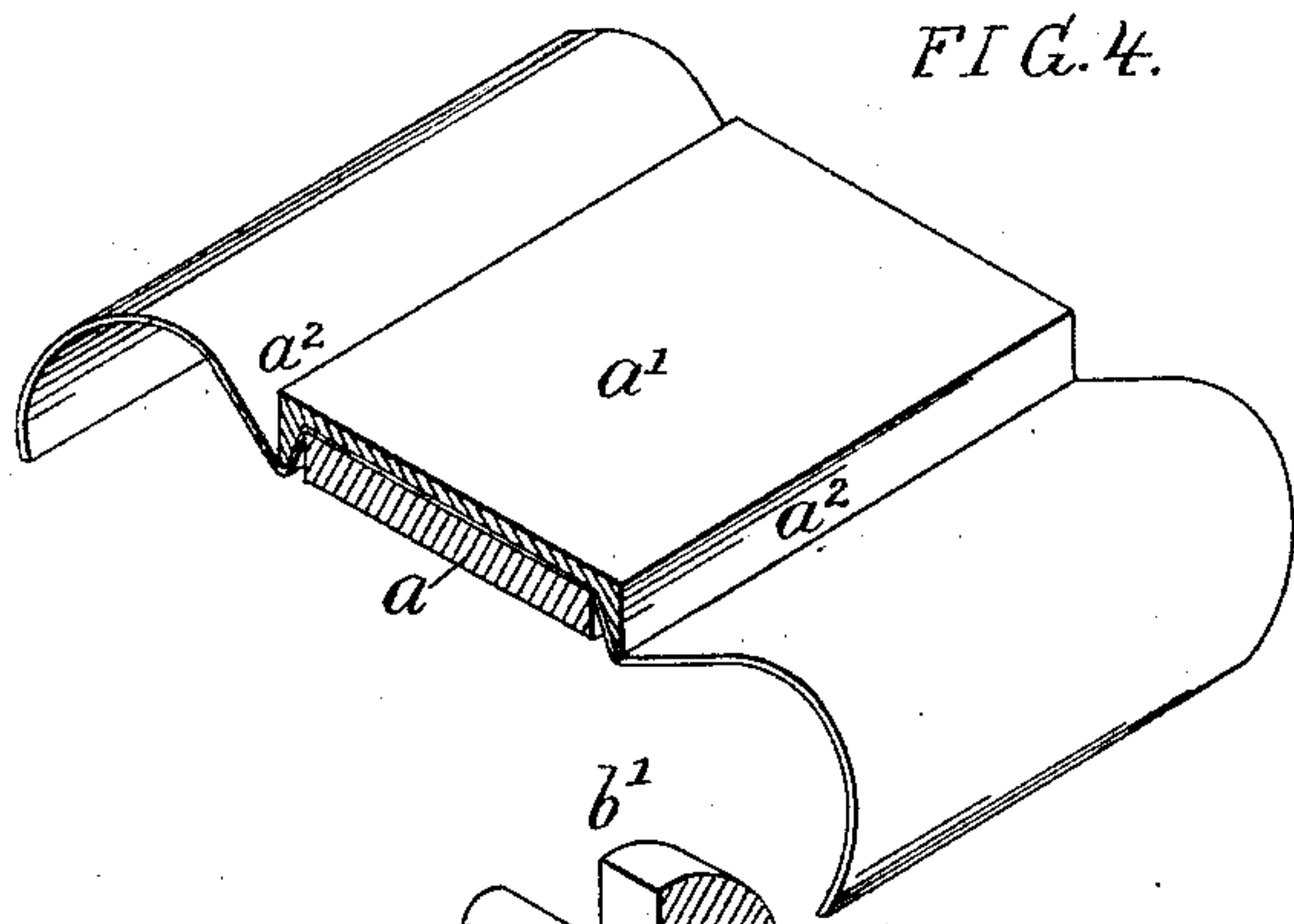
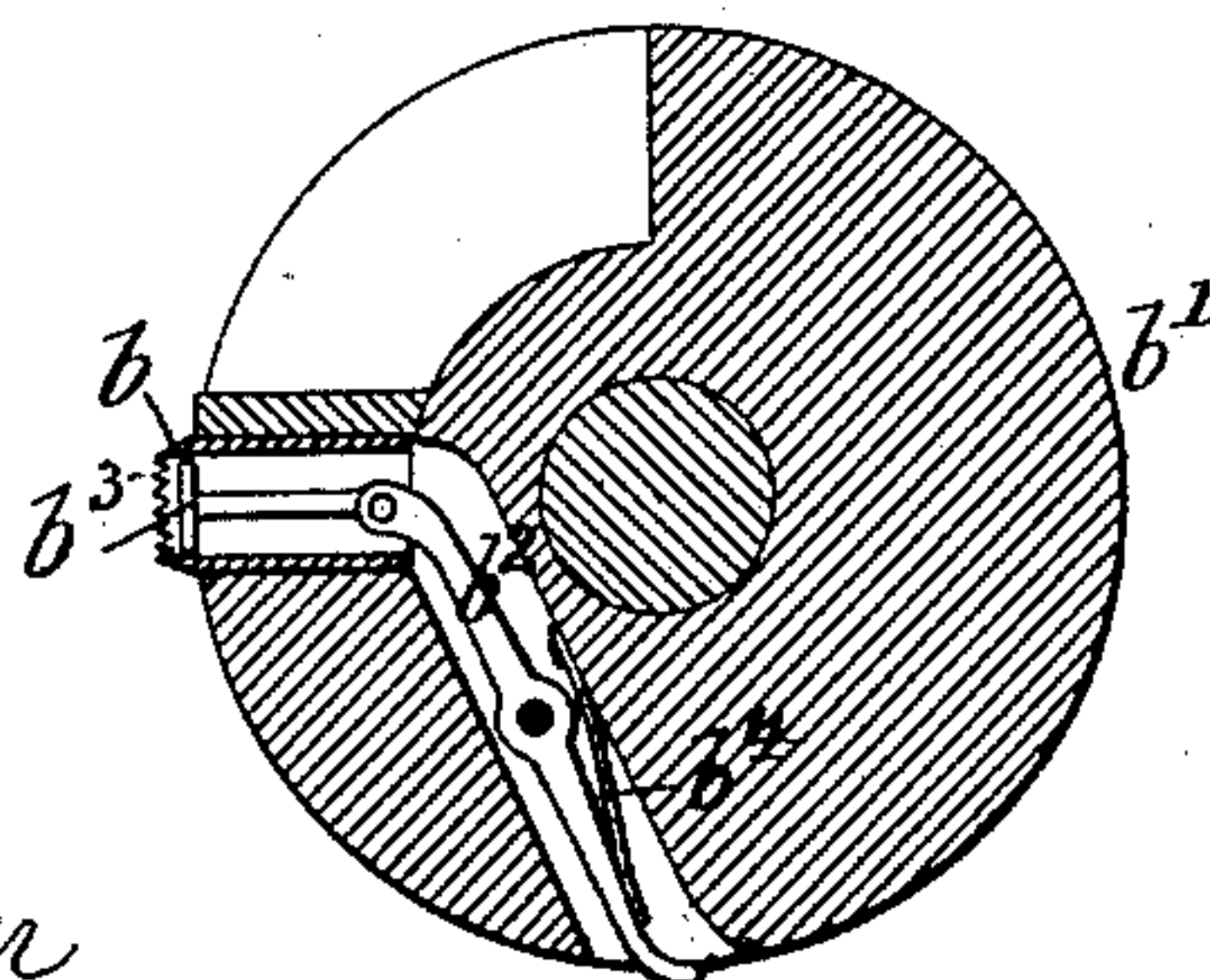


FIG. 32



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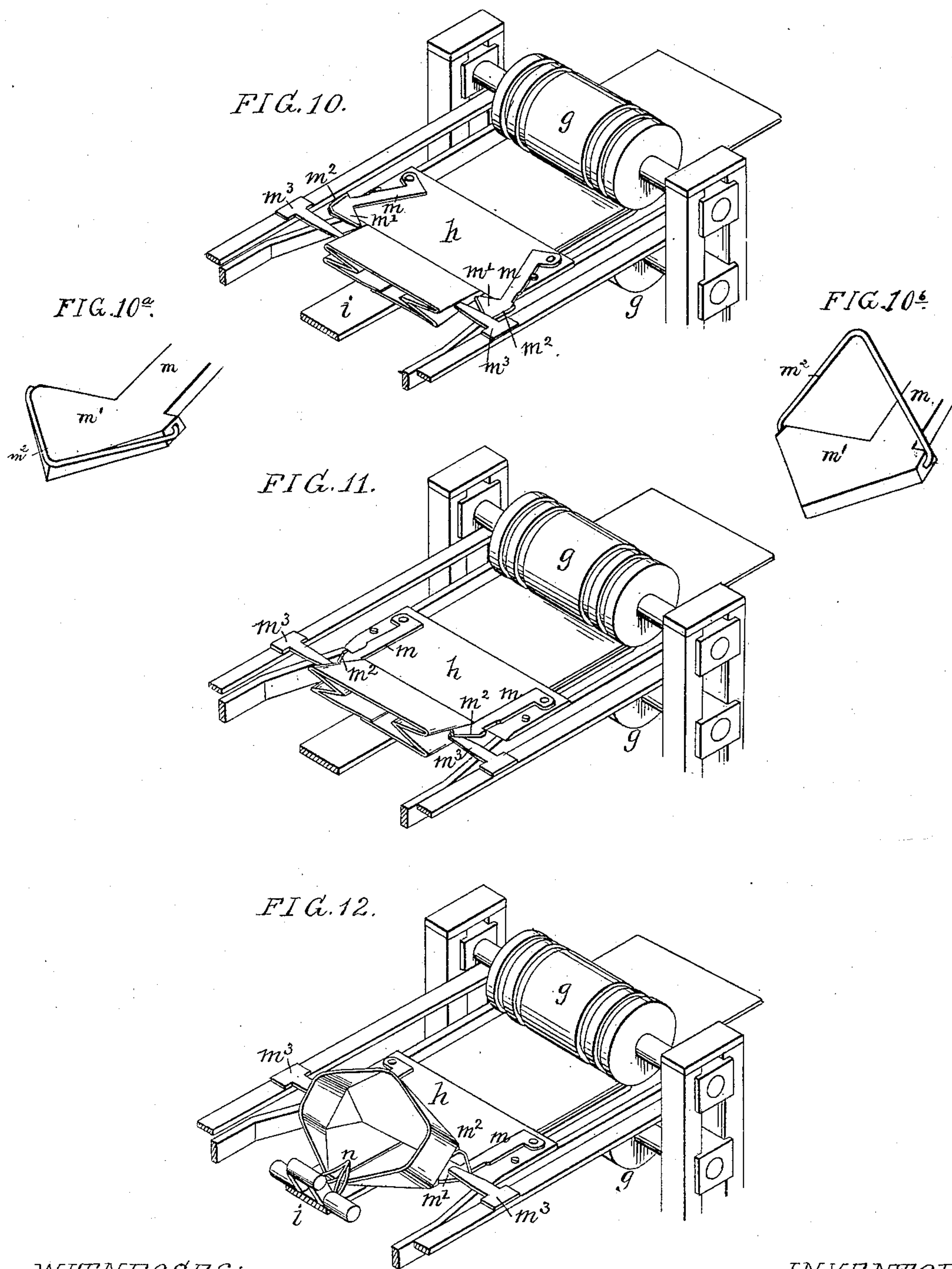
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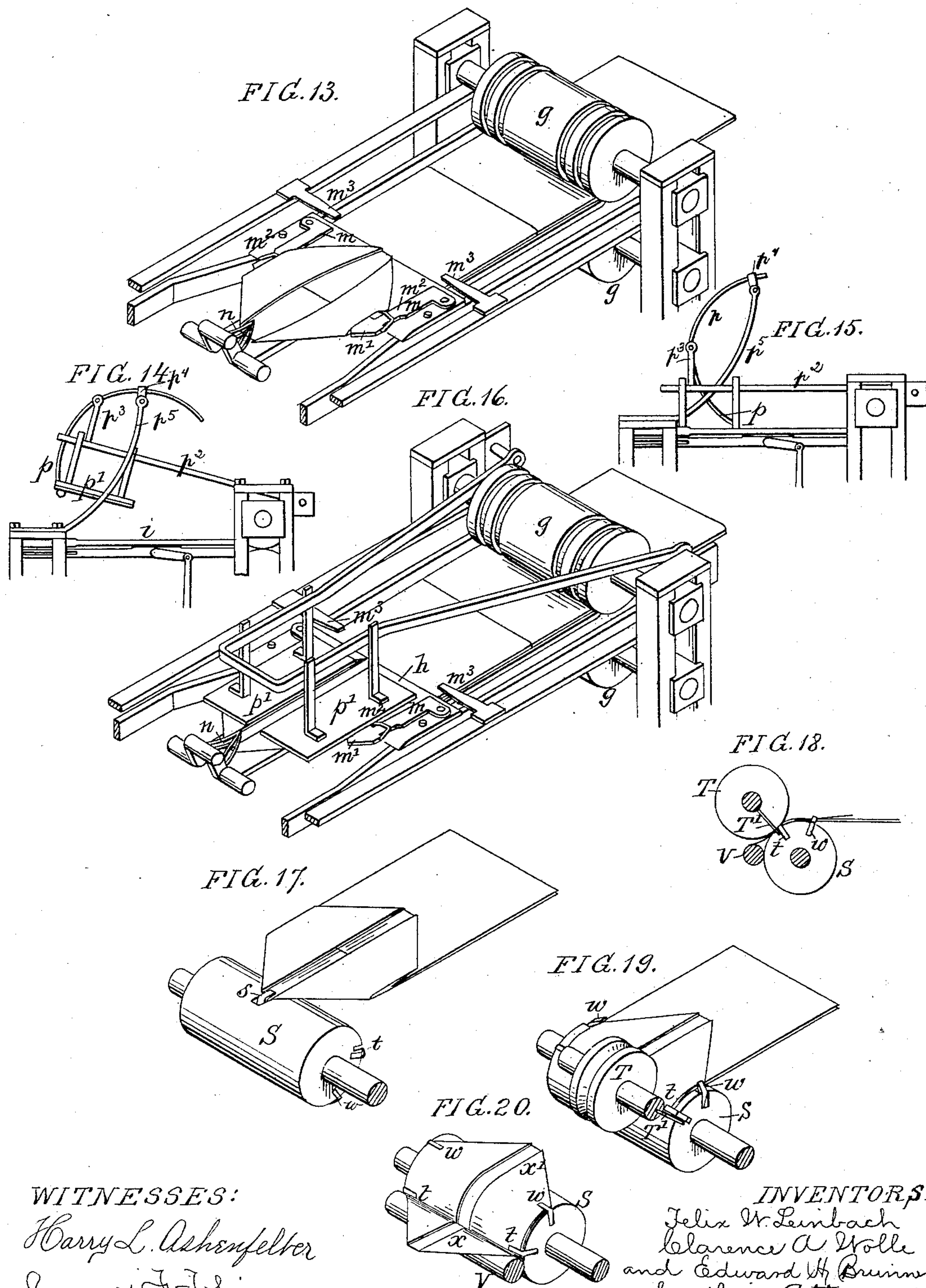
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FIG. 21.

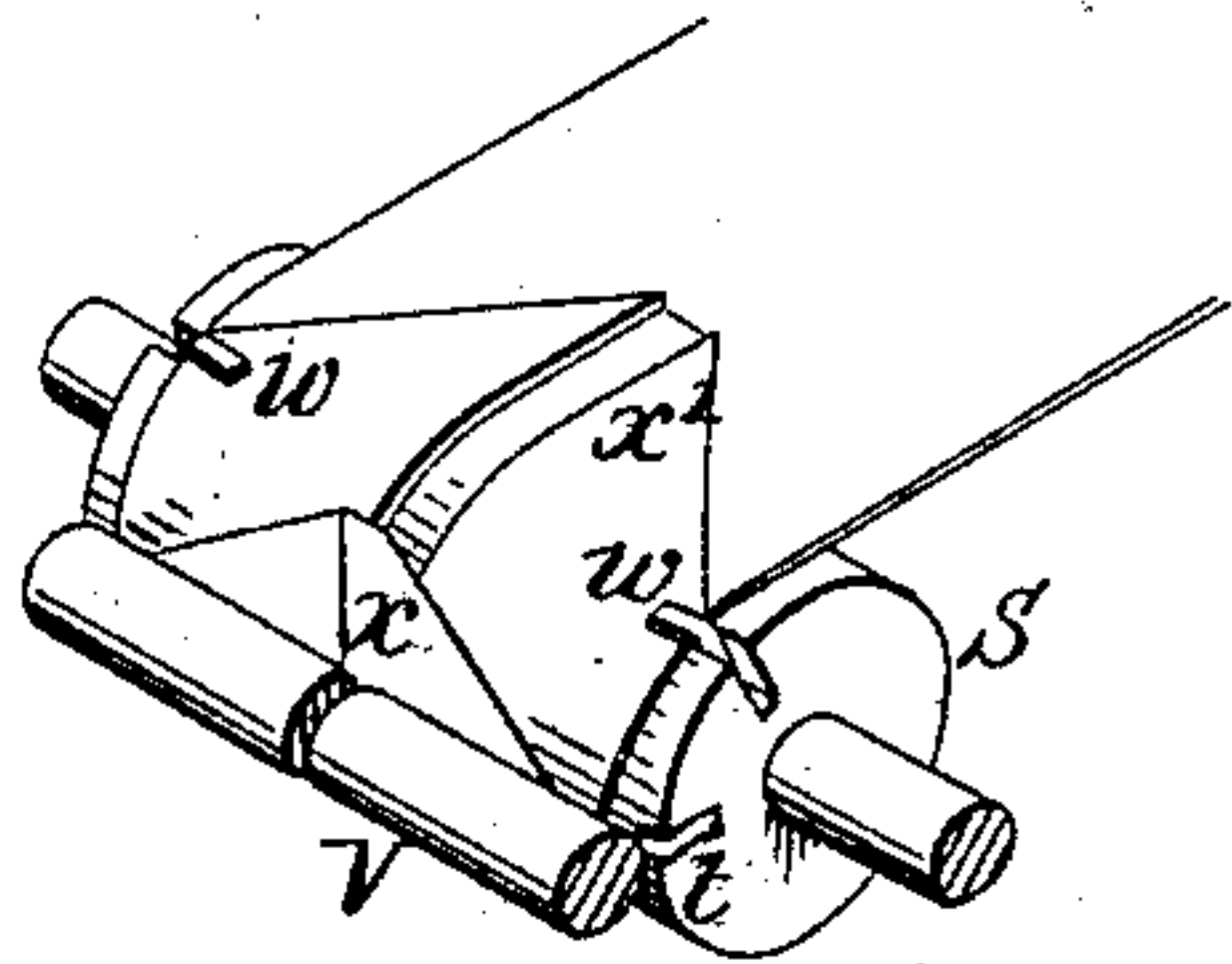


FIG. 22.

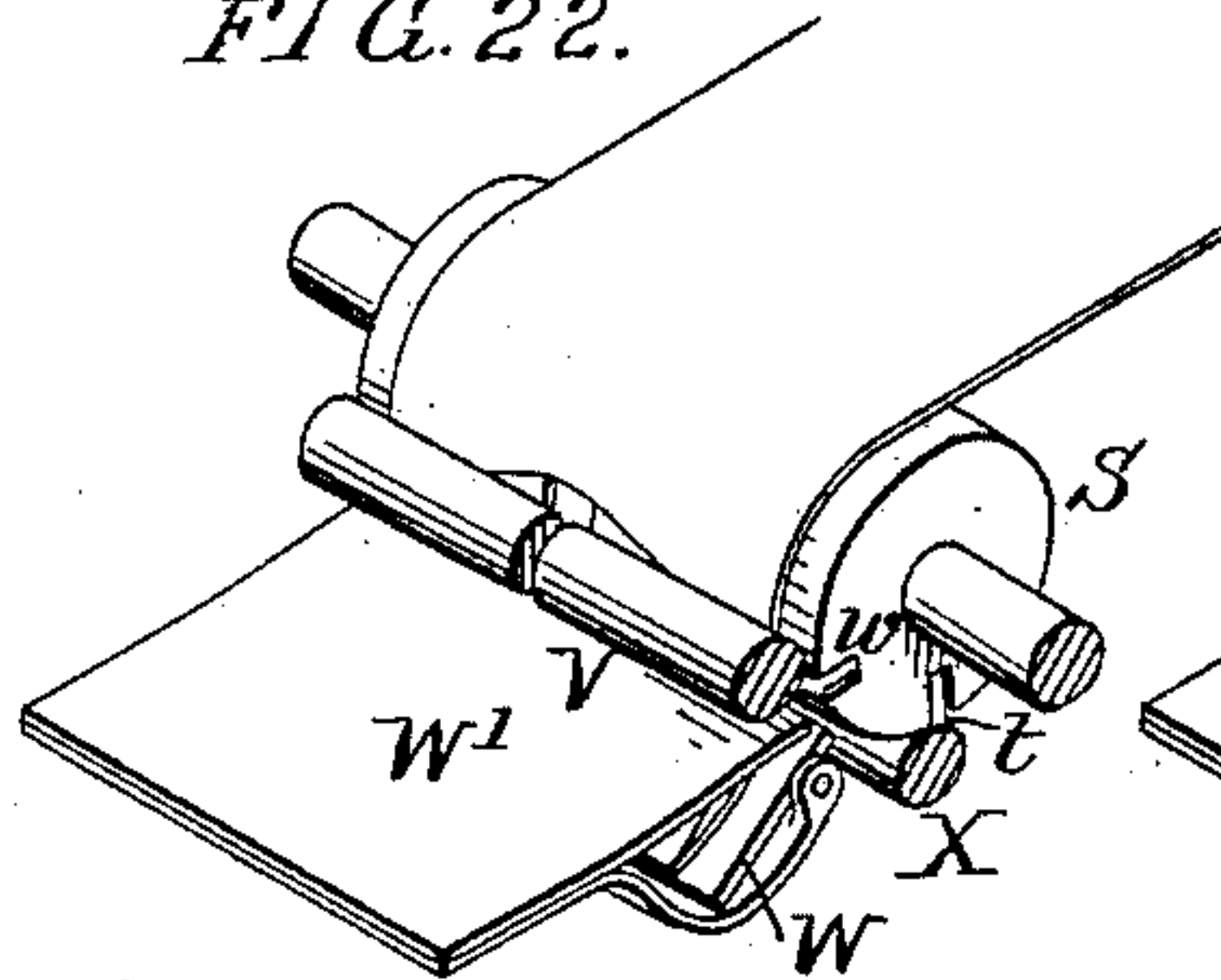


FIG. 26.

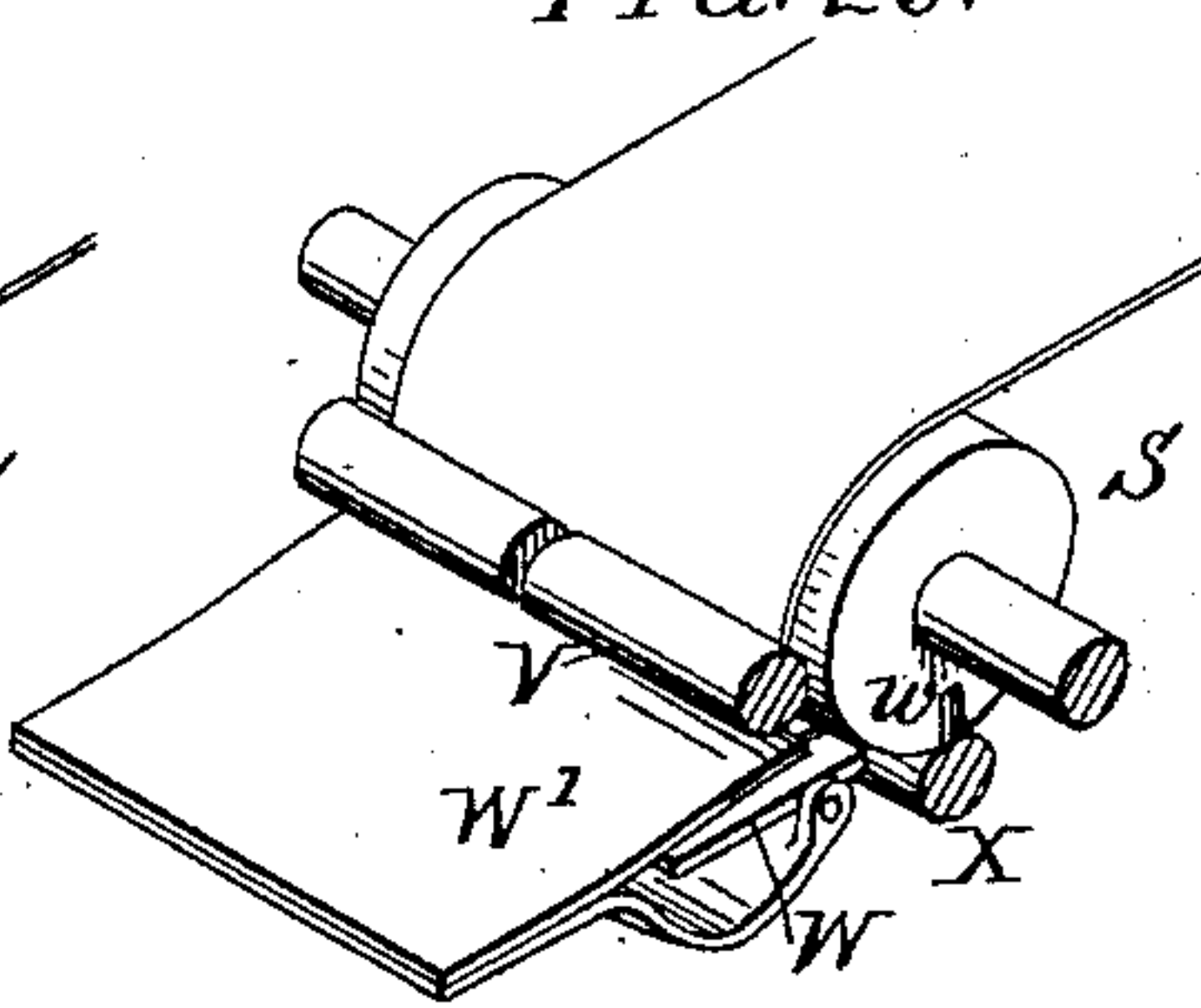


FIG. 24.

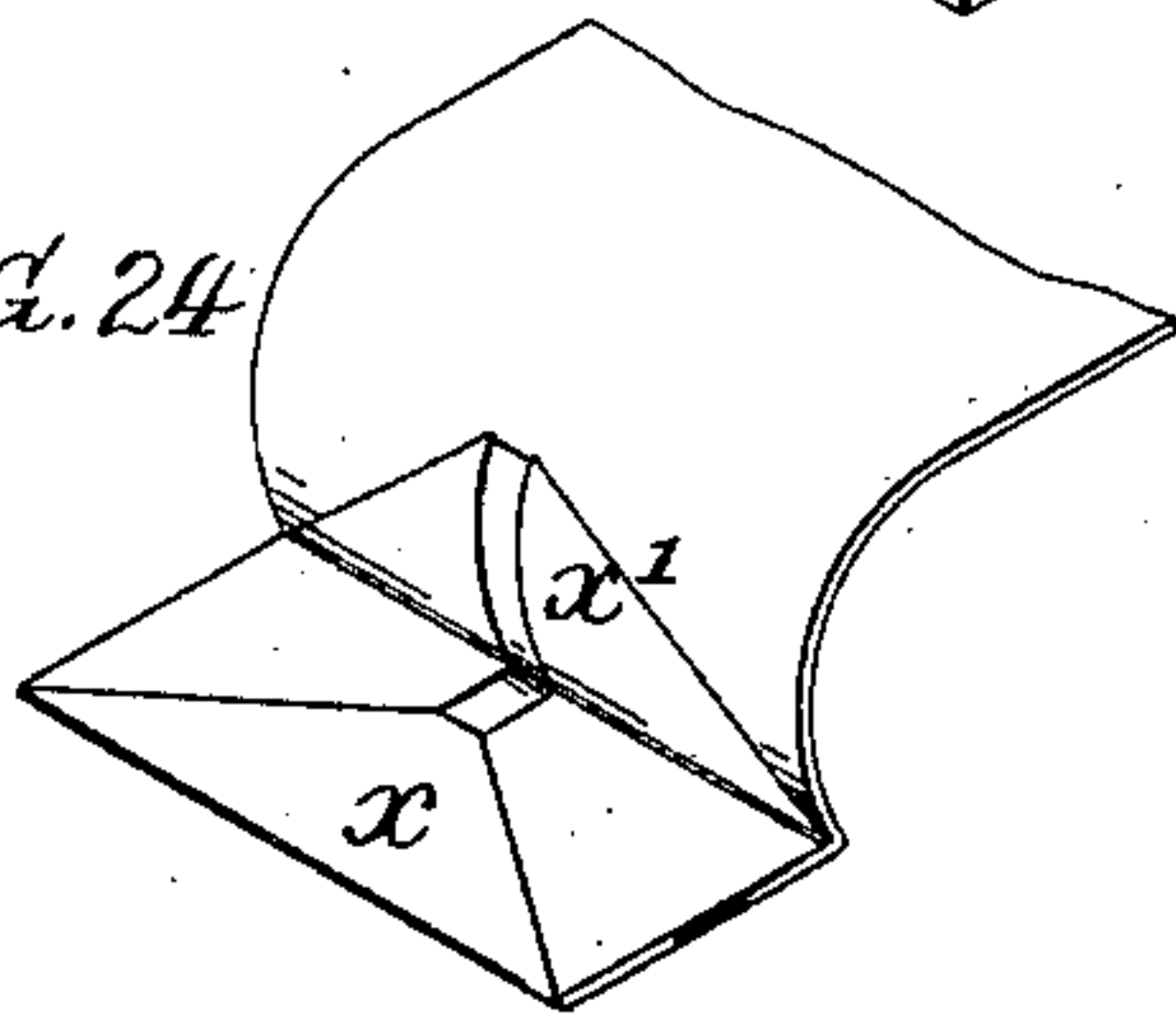


FIG. 25.

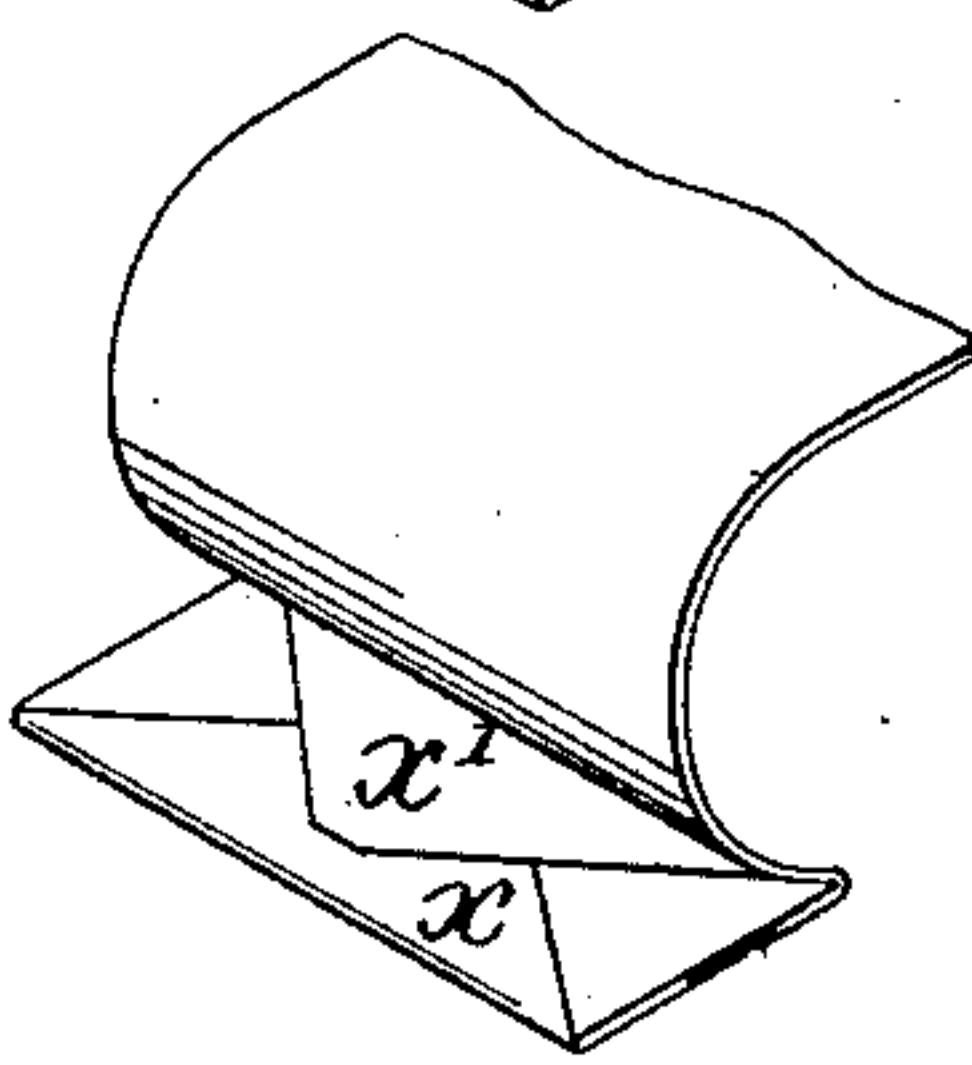


FIG. 23.

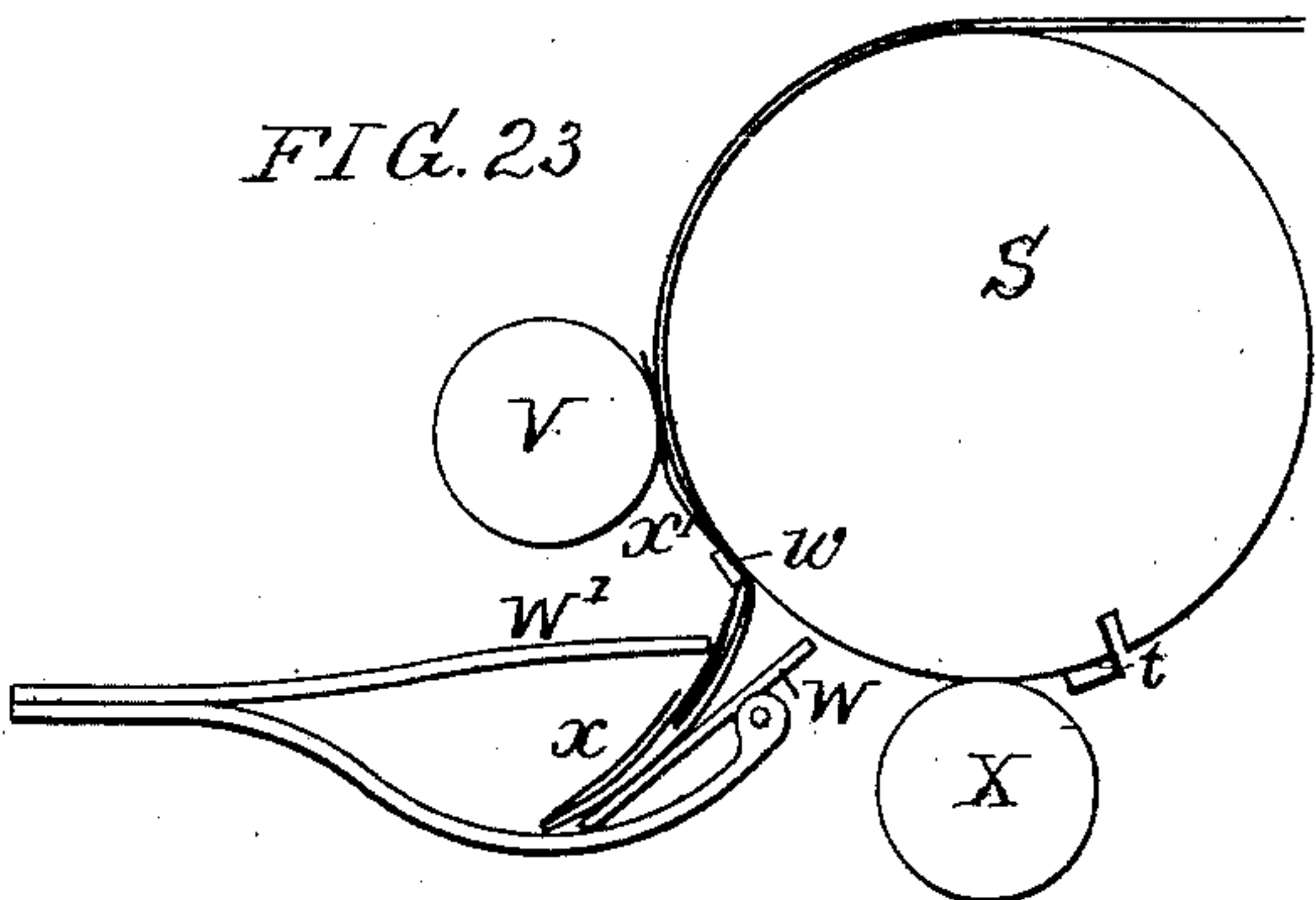


FIG. 27.

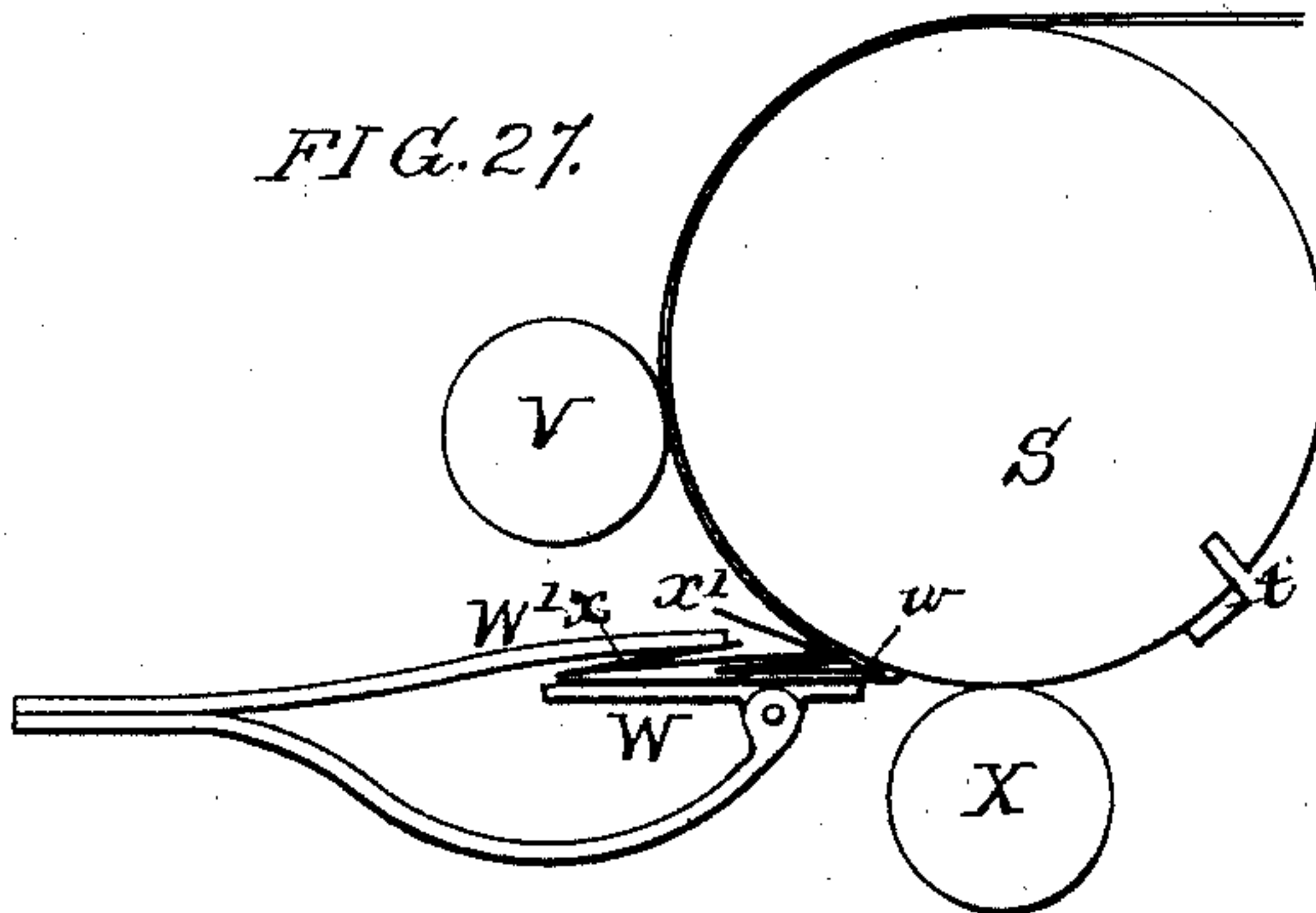
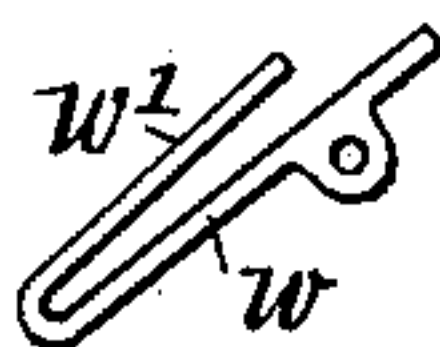


FIG. 27 a



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FIG. 30

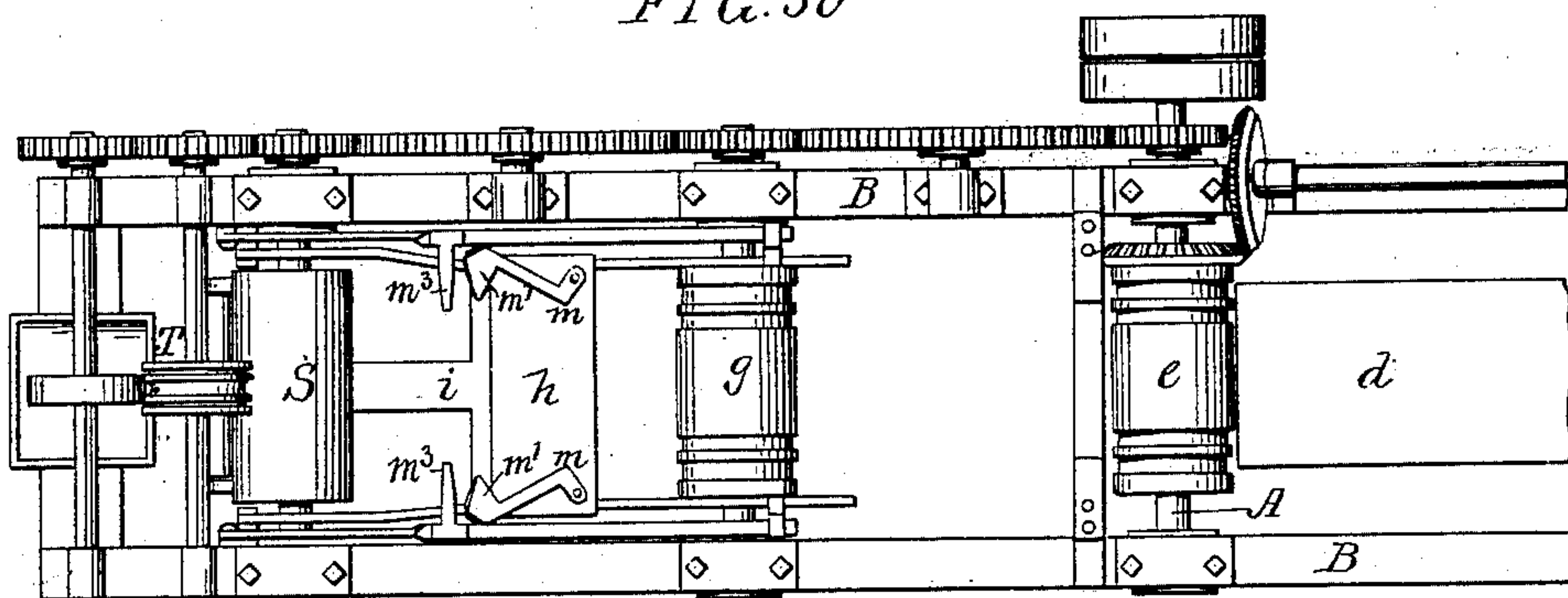
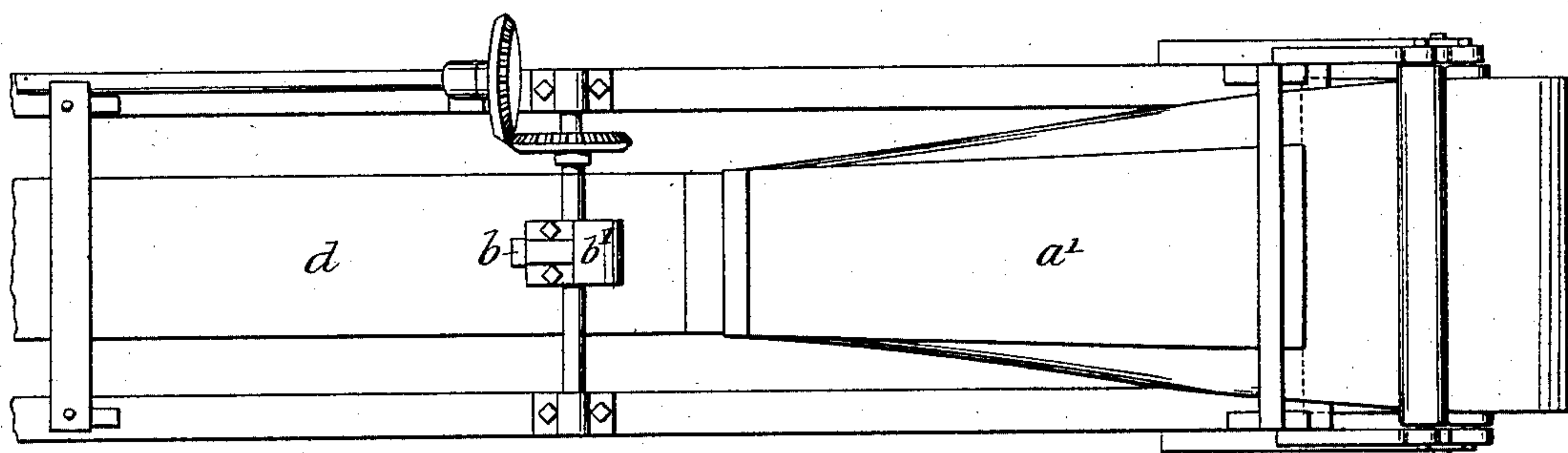


FIG. 31.



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FIG. 33.

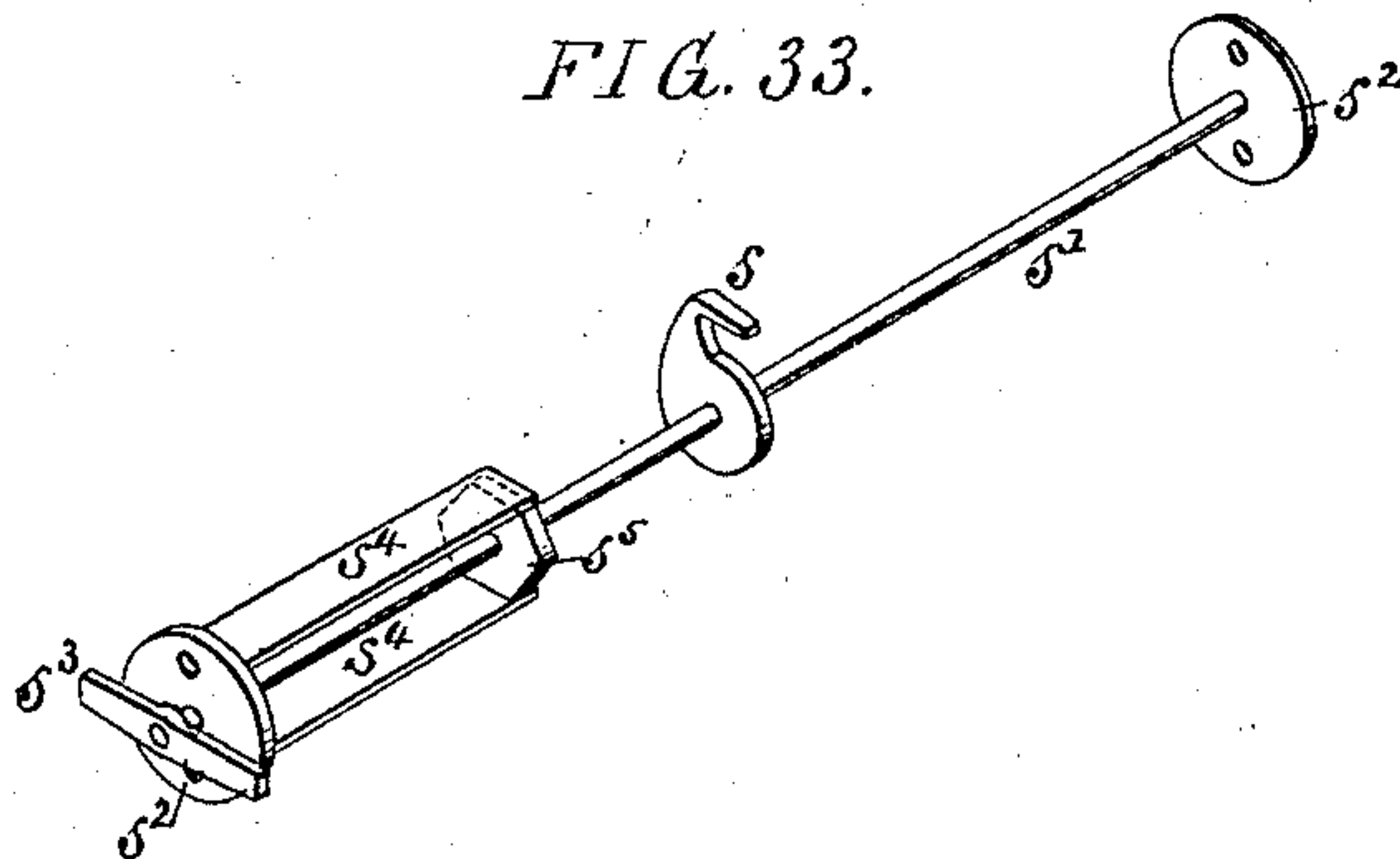
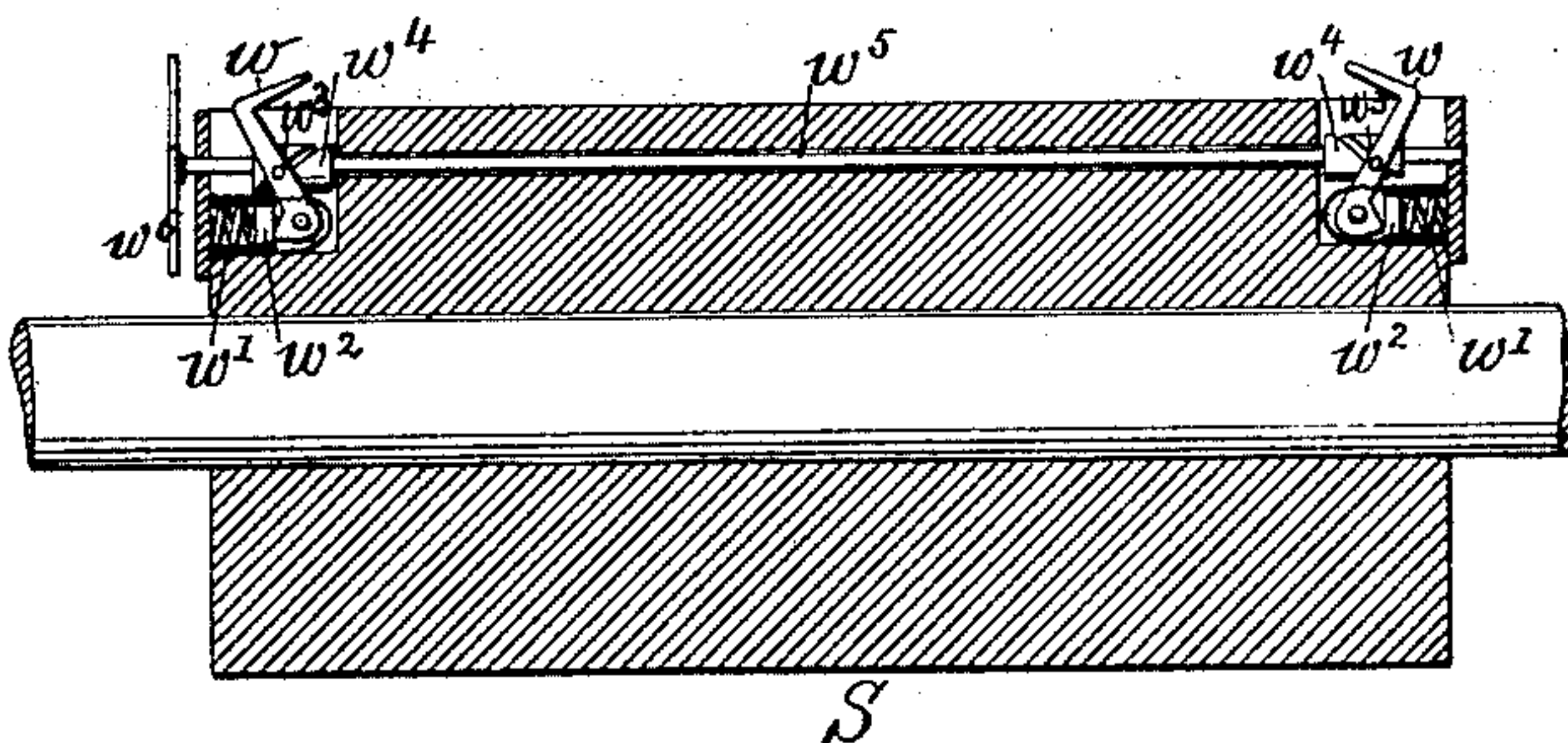


FIG. 34.



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UNITED STATES PATENT OFFICE.

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BETHLEHEM, PA., ASSIGNORS TO SAID LEINBACH AND WOLLE.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 327,280, dated September 29, 1885.

Application filed July 2, 1883. (No model.)

To all whom it may concern:

Be it known that we, FELIX W. LEINBACH, CLARENCE A. WOLLE, and EDWARD H. BRUNNER, citizens of the United States, and residents of Bethlehem, Northampton county, Pennsylvania, have invented certain Improvements in Paper-Bag Machines, of which the following is a specification.

Our invention relates to certain improvements in machines for making satchel-bottomed paper bags, part of our improvements being based upon the Letters Patent No. 242,661, dated the 7th day of June, 1881.

In the accompanying drawings, Figs. 1, 2, and 3, Sheet 1, are views of different paper bags which can be produced by our machine. Figs. 4 to 27, Sheets 2, 3, 4, and 5, are diagrams illustrating the operations resorted to in forming the bag, only such parts of the machine being shown as are necessary for such illustration. Figs. 28 and 29, Sheet 6, show a longitudinal section of the machine; Figs. 30 and 31, Sheet 7, a plan view of the same with some of the parts removed; and Figs. 32, Sheet 2, and 33 and 34, Sheet 8, detached views of various parts of the machine, illustrating features of our invention.

The machine which we have shown in the drawings, and which we will describe in this specification, is adapted for the production of paper bags, such as shown in Figs. 1 and 2, these bags being made of tubes having an inward fold or tuck in each side. The machine can, however, with very slight change, be used for the production of ordinary satchel-bottomed bags made from plain tubes, as shown in Fig. 3. The devices for forming the tube with tucked-in sides from a sheet of paper differ somewhat in construction from those described in our former patent, but are similar in principle thereto, a being the plate over which the tube is formed, and a' the upper plate, having flanges a'' , which serve to form the V-shaped tuck in the paper, as shown in Fig. 4, this tuck being guided by a bent plate, a^3 , and finally flattened and bent beneath the plate a by the action of a plate, a^4 , Fig. 6, said plate also causing the lapping of the edges of the under layer of paper to complete the tube, one of said edges having been previously pasted, so that when pressure is ap-

plied to the overlapping fold the edges will be secured together.

A thumb-notch is cut in the upper ply of the tube by means of a cutter, b , of the proper shape, carried in the present instance by a rotating segment, b' . To prevent the clogging of this cutter, which is likely to take place, we use an ejector, which consists of a lever, b^2 , adapted to a slot in the segment b' and pivoted to said segment. One arm of the lever is connected to a plunger, b^3 , adapted to fit snugly, but slide freely, within the cutter b , this plunger being pressed inward by the action of a spring, b^4 , on the lever b^2 , Fig. 32, so as to cause the opposite end of the lever b^2 to project from the slot in the segment, whereby as the latter revolves the projecting end of the lever by contact with the tube is pressed inward, thus causing an outward movement of the plate b^3 and the ejection of the paper from the cutter. (See Fig. 6.) As the tube is drawn forward it leaves the former a and passes over a plate, d , the latter occupying a position between the lower folds of the tucks and the bottom ply of the tube, as shown in Fig. 7. This enables us to impart pressure to the tucks before the tube reaches the feed-rolls, such pressure being imparted by means of a bar, d' , extending transversely across the tube and having recesses d'' , as shown in Fig. 7, so that while each tuck is subjected to pressure the upper fold and the inner or central fold of said tuck are not flattened, the object of this being to permit the proper action, at a subsequent stage of the operation, of a presser-plate for distending the mouth of the tube. For the same reason the feed-rolls e , Fig. 8, are grooved at points in line with the upper and inner folds of the tucks. It is advisable, however, to press the lower fold of the tuck so that the bottom lap of the tube will lie flat on the table or bed, and not interfere with the action of the side tuck-folders hereinafter described; hence we arrange adjacent to the feed-rolls e a bar, f , which carries spring-presser blades f' , which press upon and flatten the lower fold of the tuck as the tube is drawn forward. (See Fig. 8.) From the feed-rolls the tube passes to the severing-rolls g , Fig. 9, the upper of said rolls carrying a severing-knife, g' , and the lower roll having a yielding block, g^2 , serving as a

cutting-bed for the knife, so that as the tube passes between the rollers it is cut into blanks of the proper length for the bags to be produced. The severing-rolls also serve to feed the tube, and are grooved for the same reason as the feed-rolls *e*.

From the severing-rolls the blank passes between the table *i* and presser-plate *h*, the latter being elevated until sufficient of the blank has passed beneath the same to form the bottom of the bag, when the plate is depressed, as shown in Fig. 10, so as to cause the gaping of the mouth of the blank, as described in our former patent.

Pivoted to the presser-plate *h* are arms *m*, the outer ends of which carry side tuck-folders substantially similar to those described in our former patent, and comprising a fixed plate, *m'*, and pivoted plate *m''*, the latter in the present instance being simply a skeleton plate of wire, instead of the solid plate formerly used. The construction of the side tuck-folders will be understood on reference to the enlarged perspective views, Figs. 10^a and 10^b.

When the plate *h* descends onto the blank, the arms *m* are in a retracted position, as shown in Fig. 10; but when the tucks have been opened by the gaping of the mouth of the blank the arms *m* are caused to move inward, so as to carry the folding-plates into the tucks, as shown in Fig. 11. The plate *h* after descending upon the blank moves forward with the same, and the plates *m''* are thus brought under the influence of fingers *m'''* on the frame of the machine, and said plates are caused to turn backward, so that in conjunction with the plates *m'* they will form the internal triangular folds necessary to the production of a satchel-bottom on a bag with tucked sides. (See Fig. 12.)

The primary or diamond fold of the bag-bottom is also formed by the combined action of the presser-plate *h* and side tuck-folders, as said plate and folders continue to advance, as shown in Fig. 13. In our former machine we used, in addition to these elements, a longitudinally-reciprocating distending-rod, which we have now dispensed with, and rely upon the side folders to effect the necessary distention and formation of the diamond fold. In this case, however, we use a presser, *n*, Fig. 12, for holding down the lower ply of the blank and directing the same to a nipper hereinafter referred to, said presser acting upon the forward end of the diamond fold, as shown in Figs. 12 and 13.

It is also advisable to flatten down the rear end of the diamond fold after the latter has been formed by the action of the side folders, and for this purpose we use a rod, *p*, the point of which is carried rearward over the center of the fold, so as to press down that portion of the fold which is brought under its action. (See Figs. 14 and 15.) While this rod performs one of the duties of the distending-rod described in our former patent, we do not

consider it the equivalent of said rod, as its action is simply a supplemental one, and is not essential to the formation of the diamond fold.

After the fold has been formed, it is further flattened by the action of the presser-plates *p'*, similar to those described in our Patent No. 242,661, and shown in Fig. 16. In this figure the presser-rod *p* and the means for operating the same have been omitted in order not to confuse the representation of the flattening-plates *p'*.

During these operations, it should be understood, the blank has been moving continually forward, and before the side folders had commenced to act the front end of the blank had been caught and held by a nipper, *s*, on a drum, *S*, Fig. 17, and as the latter rotates the blank is carried round by it, and the edges of the blank are acted upon in succession by nippers *t* and *w*, also carried by and moving with the drum, Fig. 18. These nippers *t* and *w* are so far apart, and the distance between them is such in relation to the dimensions of the diamond fold on the bag-blank, that the nippers *t* will define the limits of the first of the finishing flaps *x* of the bag-bottom, while the nippers *w* will define the limits of the last flap, *x'*, of the same.

As the blank is carried around the drum *S*, paste is deposited along the center of the diamond fold by means of a paste-roll, *T*, Fig. 18. As soon as the point of the diamond fold has passed beneath the paste-roll, it is released from the control of the nipper *s*, and is thrown out from the roll *S* by the action of a creasing-blade, *T'*, carried by the shaft of the paste-roll and acting in conjunction with a recess in the roll *S*, this recess being immediately in advance of the nippers *t*, as shown in Fig. 19. The point of the diamond fold is thus thrown out over a roller, *V*, Fig. 20, and as the drum *S* continues to rotate the flap *x* is folded by the joint action of said roller and the drum *S* and its nippers *t*, as shown in Fig. 21. As soon as the nippers *t* have passed the roller *V*, they are retracted, so as to free from the control of the drum *S* all that portion of the partially-folded bottom in advance of the nippers *w*. As the drum *S* rotates this free projecting portion of the blank strikes a pivoted deflecting-plate, *W*, Figs. 22 and 23, and is thus thrown outward, as shown in Fig. 24, so that as the nippers *w* advance they will form the finishing fold *x'*, Fig. 25, the plate *W* yielding to permit this folding of the blank, as shown in Figs. 26 and 27. As the plate *W* swings upward that portion of the partially-formed bottom of the bag resting on said plate is brought into contact with a guard-plate, *W'*, and the flap *x* is thereby pressed down and the secure fastening of the same insured. This guard-plate *W'* may, if desired, form part of the plate *W*, as shown in Fig. 27^a. The previously-folded portion of the bottom, with the final flap, are then drawn by the nippers *w* between the drum *S* and a roller, *X*, whereby

the final pressure is imparted and the formation of the bottom completed, the nippers being then retracted, so as to release the finished bag, which falls into a suitable receptacle or
5 onto an endless belt, which conveys it to the drying-room.

On reference to Figs. 28, 29, 30, and 31 it will be observed that the various rollers and drums of the machine are driven from the
10 main shaft A by means of spur and bevel gearing, the spindles of the various rollers and drums being adapted to suitable bearings on the frame B of the machine.

The presser-plate *h* and the arms *n*, carrying the side folders, are operated by means similar to those set forth in our former Patent No. 242,661; hence we have not considered it necessary to again illustrate or describe them in this application.

The pressers *p'* are carried by a pivoted frame, *p*², to a stud, *p*³, on which is hung the rod *p*, the latter being curved, and the outer end of the same being free to slide in an eye, *p*⁴, on a fixed bracket, *p*⁵. When the frame *p*²
25 is elevated, as shown in Fig. 14, the rod *p* is retracted, as shown; but as the said frame *p*² descends the relation of the stud *p*³ to the eye *p*⁴ is changed, and as the upper end of the rod *p* is controlled by said eye the rod is caused to
30 turn on its pivot, so as to project the lower end of the rod, as shown in Fig. 15, and thus flatten out the rear point of the diamond fold.

The nipper *s* is constructed as shown in Fig. 33, being secured to a shaft, *s'*, which turns in bearings in plates *s*² on the ends of the drum S, the end of the shaft having an arm, *s*³, which is acted upon by suitable cams on the frame of the machine, these cams serving to com-
40 mence the opening or closing of the nipper, and the completion of the movement being effected by the action of springs *s*⁴ on an angular plate, *s*⁵, carried by the shaft.

The operation of the nippers *w* and *t* is effected by the means shown in Fig. 34. Each nipper is hung to the slotted end of a tube, *w'*, let into an opening in the end of the drum, the nippers working in slots in the drum. Each nipper has a V-shaped projection, which
50 is acted upon by a spring-bolt, *w*², in the tube *w'*, and on each nipper is a pin, *w*³, adapted to a cam-slot in a collar, *w*⁴, secured to a shaft or spindle, *w*⁵, which is adapted to bearings in end plates on the drum, and has a projecting end with an arm, *w*⁶, for the action of cams on the frame, these cams, as in the case of the nipper *s*, serving to start the movement of the nippers in either direction, and the movement being completed by the action of the spring-
60 bolts *w*² on the V-shaped projections of the nippers.

While these devices for operating the nippers are preferred, they are not essential to our invention, as various devices for causing the opening and closing of the nippers may be
65 devised.

Other modifications of the finishing end of

the machine may also be made within the scope of our invention. For instance, it is not essential that the deflecting-plate W should
70 be used in every case, or that rollers V and X should be used for pressing down the folds *x* and *x'* of the bag-bottom, as rods or bars may be used in place of the rollers in some cases, and, instead of employing a drum, S, for car-
75 rying the nippers, the latter may be combined with an endless belt.

The machine shown and described is intended for the manufacture of a square-bottomed bag from a tube with tucked sides, such
80 as shown in Figs. 1 and 2. The bag shown in Fig. 1 has the primary fold for the bottom of the usual diamond shape, but in making the bag Fig. 2, the tube has longitudinal incisions formed in it on each side of the center, so as
85 to form quadrangular tongues, as shown at each point of the diamond fold.

In making an ordinary satchel-bottomed bag from a plain tube, the tube-forming devices shown will be replaced by a plain former, and
90 the side tuck-folders will be removed or thrown out of action, the other parts remaining the same.

We claim as our invention—

1. The combination of a rotating drum or
95 segment having a cutter, *b*, and slotted as described, with the pivoted ejector-lever *b*², as set forth.

2. The combination of the plate *d* with the presser-bar *d'*, having recesses *d*², whereby
100 pressure of the upper and inner folds of the tuck of the tube is prevented, as set forth.

3. The combination of mechanism, substantially as described, for forming a tube with tucked sides, with feed-rolls, recessed as de-
105 scribed, whereby the upper and inner folds of the tucks are relieved from pressure, as set forth.

4. The combination of feed-rolls, recessed as described, so as to feed the tucked tube
110 without pressing the edges of the folds, with presser-plates *f'*, whereby the lower folds of the said tucks are flattened at the edges without affecting the upper folds, as set forth.

5. As a means of forming the primary or
115 diamond fold on a tube with tucked sides, the combination of the transverse presser-plate with side tuck-folders, operating, as described, to fold back the upper ply of the tube, as set forth.
120

6. The combination of the presser-plate and side tuck-folders with the guide *n*, for the forward end of the diamond fold, as specified.

7. The combination of the presser *p'* with the rod *p*, actuated by and in advance of the
125 said presser *p'*, as set forth.

8. The combination of a bag-blank carrier with laterally-operating edge-nippers *t* for determining the line of fold of the flap *x*, and with a creasing-blade, as set forth.
130

9. The combination, in a paper-bag machine, of mechanism for forming the primary or diamond fold of the bag-bottom, with fold-completing mechanism comprising the following

- elements: a drum, S, edge-nippers *t* and *w* thereon, mechanism for operating said nippers, a deflector, V, located as described, so as to press the advance point of the diamond over the nippers *t* and onto the body, and a deflector, W, located as described, whereby it folds the portion of the bottom in advance of the nippers *w* back over the latter and onto the rear point of the diamond, as set forth.
- 10 10. The combination of the bag-blank carrier, edge-nippers for determining the line of fold of the final flap *x'*, a deflector, W, and a presser, X, as set forth.
- 15 11. The combination of the bag-blank carrier and its nippers with the deflector W and guard-plate W', as set forth.
12. The combination of the drum, edge-

nippers *w*, and presser X, with the pivoted deflecting-plate W, as set forth.

13. The combination of the drum S with the nippers *t* and *w*, pivoted in slots in said drum, the cam-collars *w¹*, adapted to act upon pins on said nippers, and spring-plates *w²* acting on the nippers to complete the closing of the same.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witness.

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