

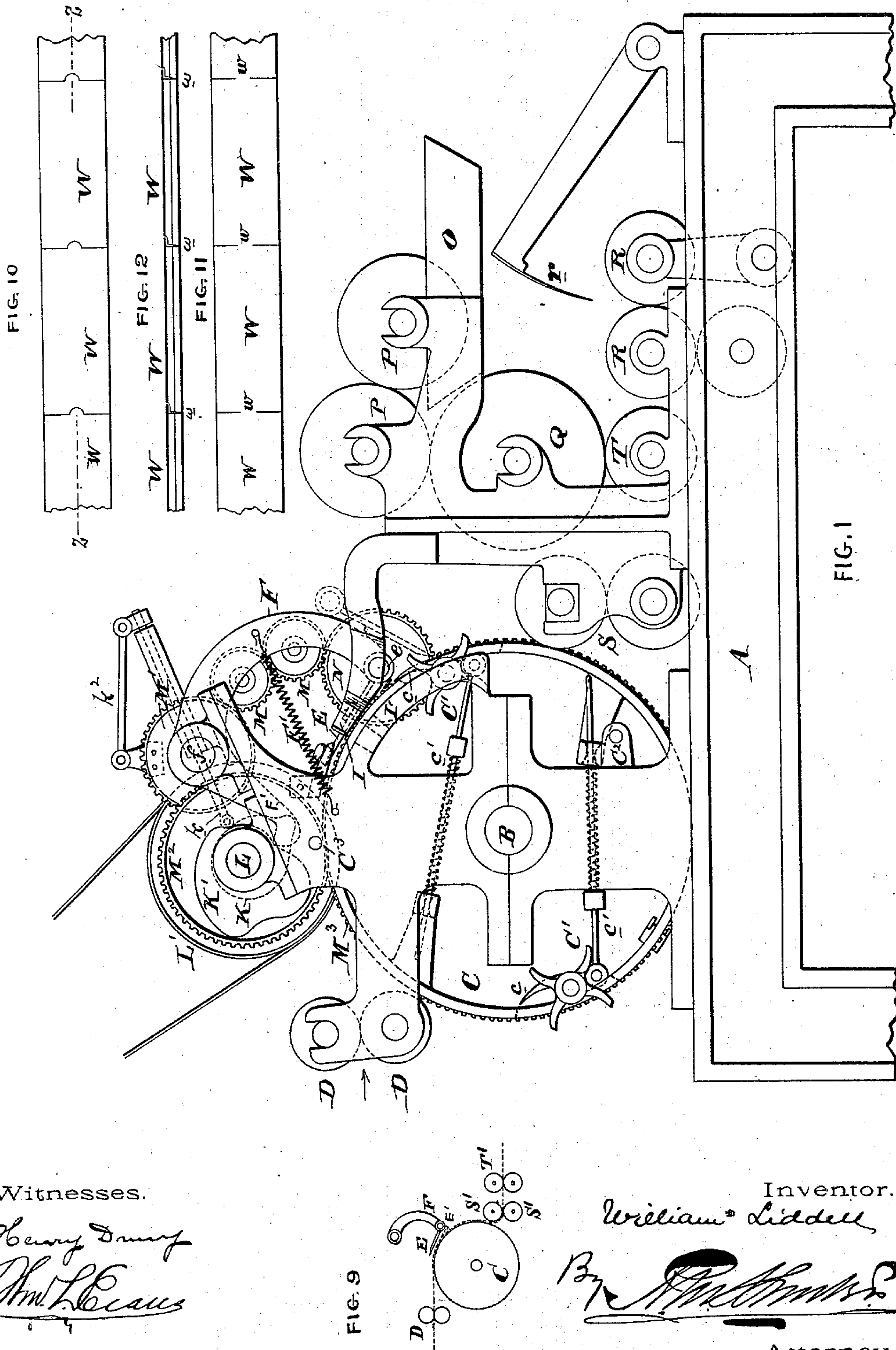
(No Model.)

3 Sheets—Sheet 1.

W. LIDDELL.
PAPER BAG MACHINE.

No. 558,969.

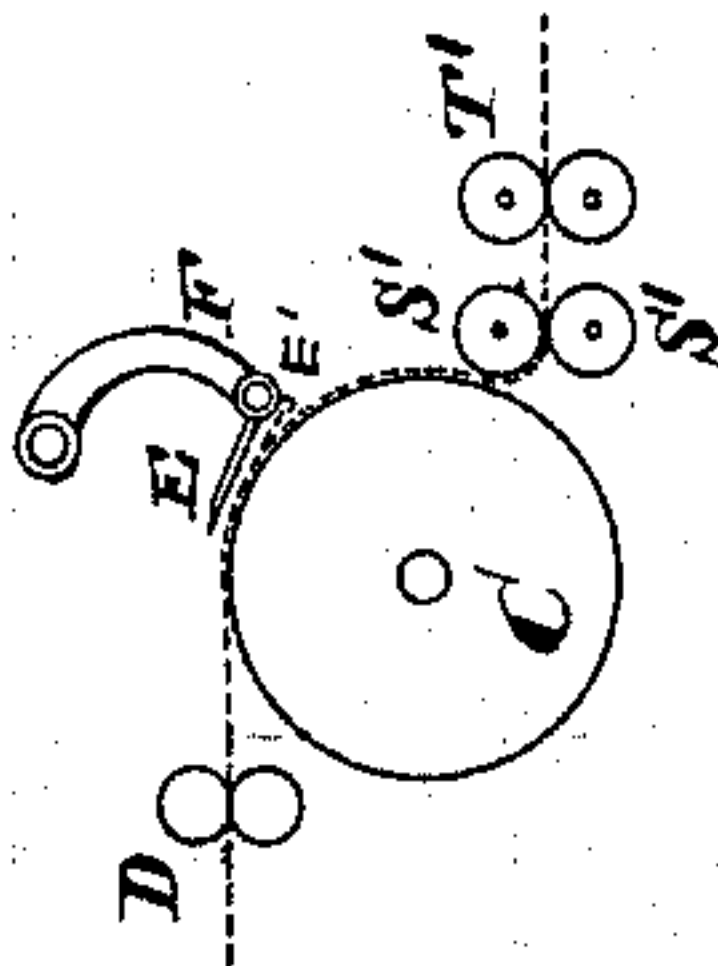
Patented Apr. 28, 1896.



Witnesses.

Henry Denny
Am. Leicaus

FIG. 9



Inventor.
William Liddell
By *[Signature]*
Attorney.

(No Model.)

3 Sheets—Sheet 2.

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FIG. 2

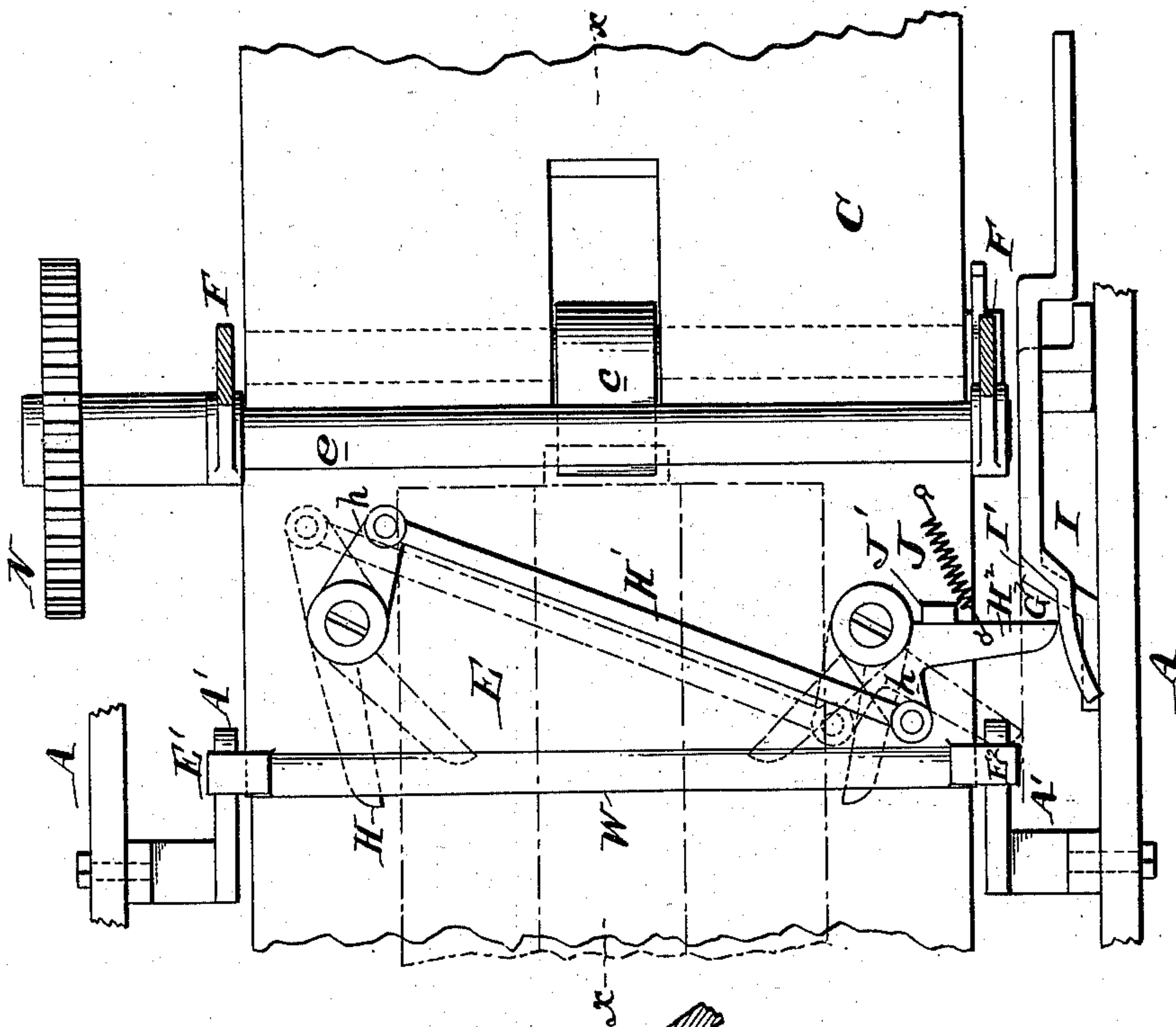


FIG. 3

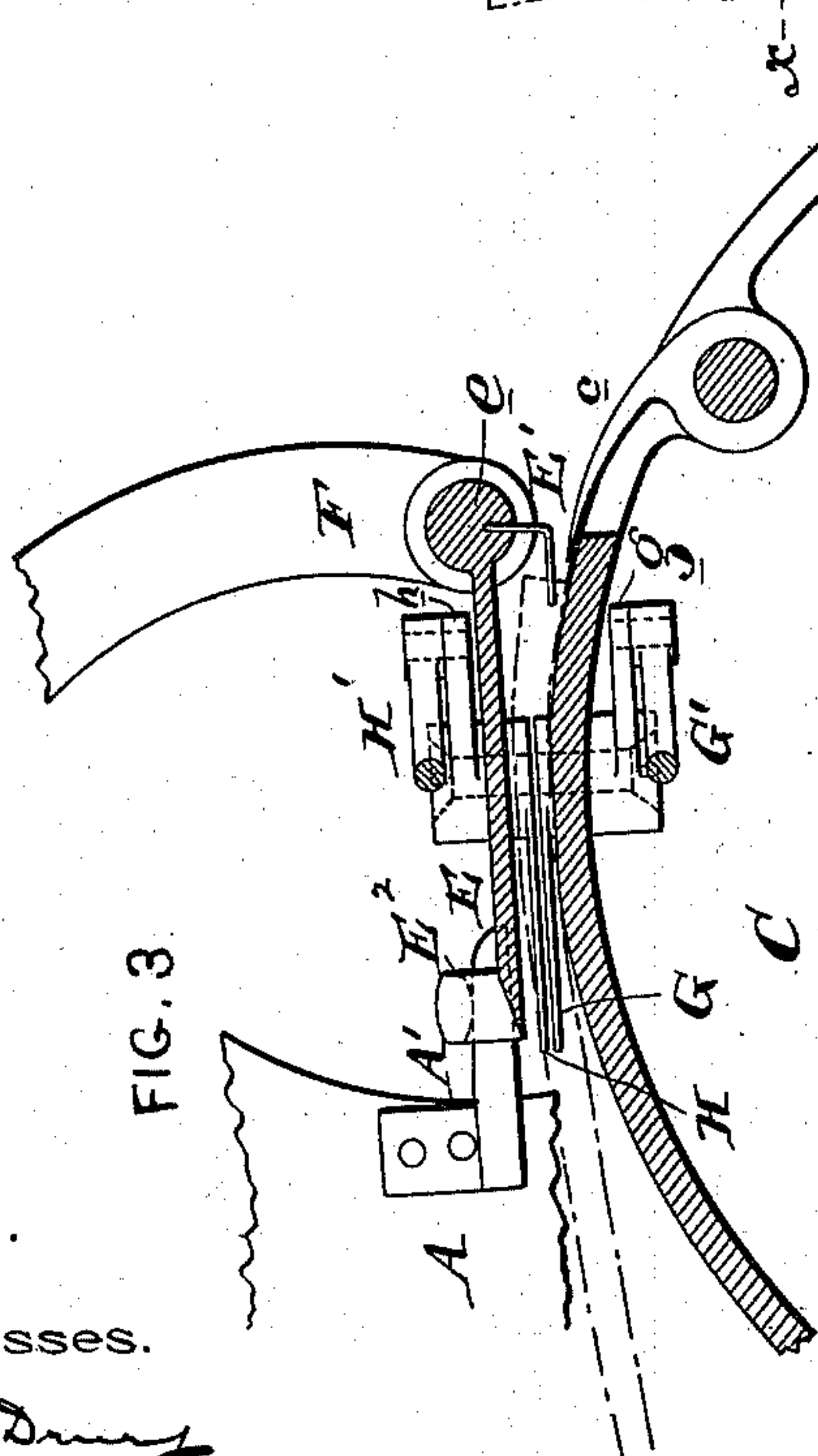
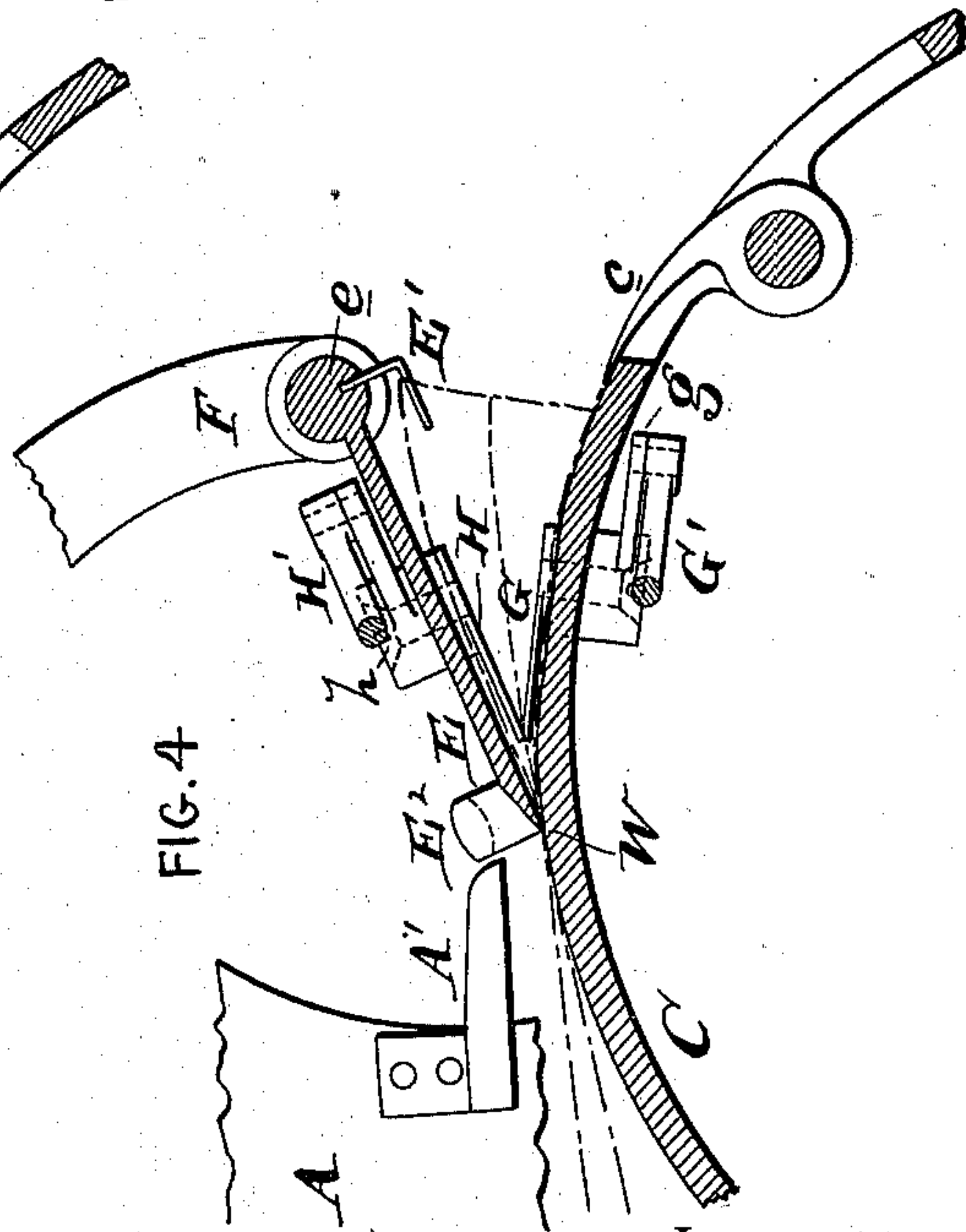


FIG. 4



Witnesses.

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Wm. L. Cress

Inventor.

William Liddell

By [Signature]

Attorney.

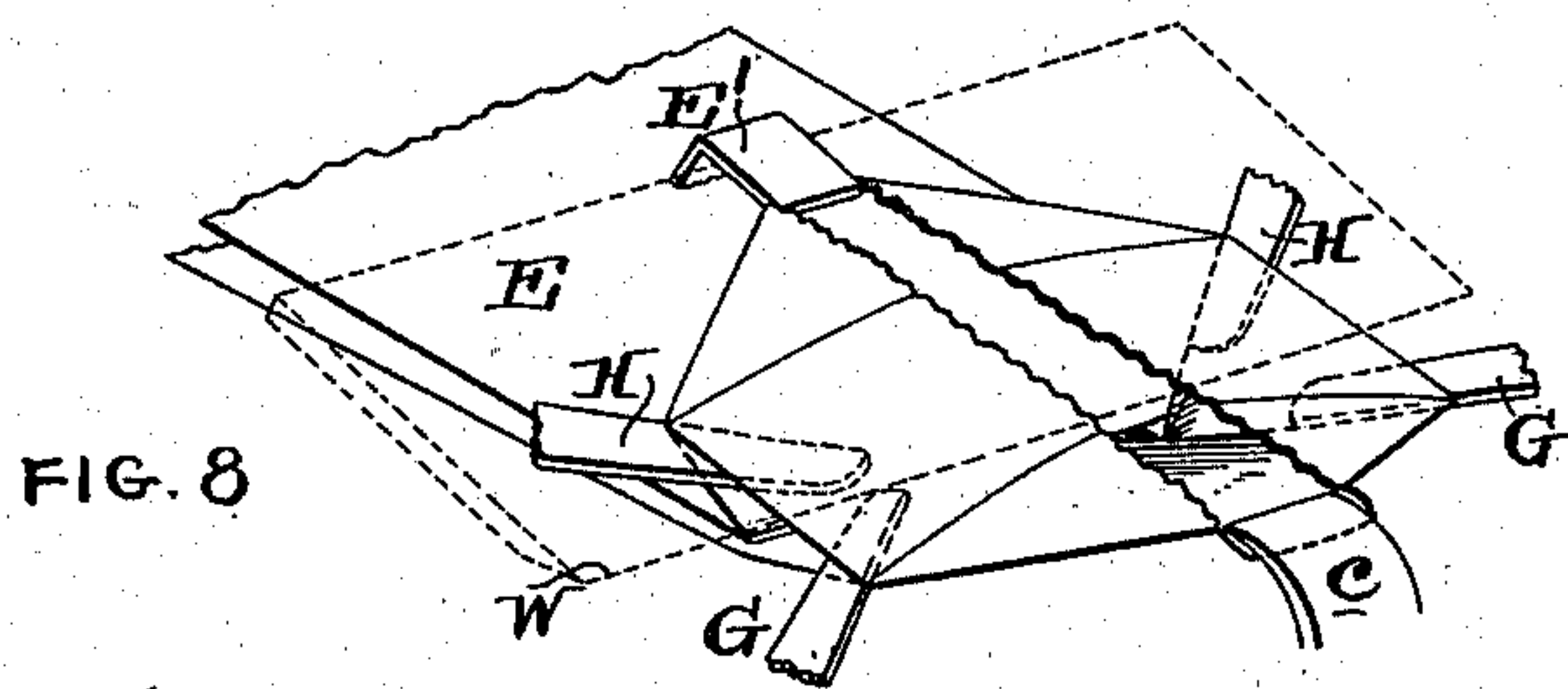
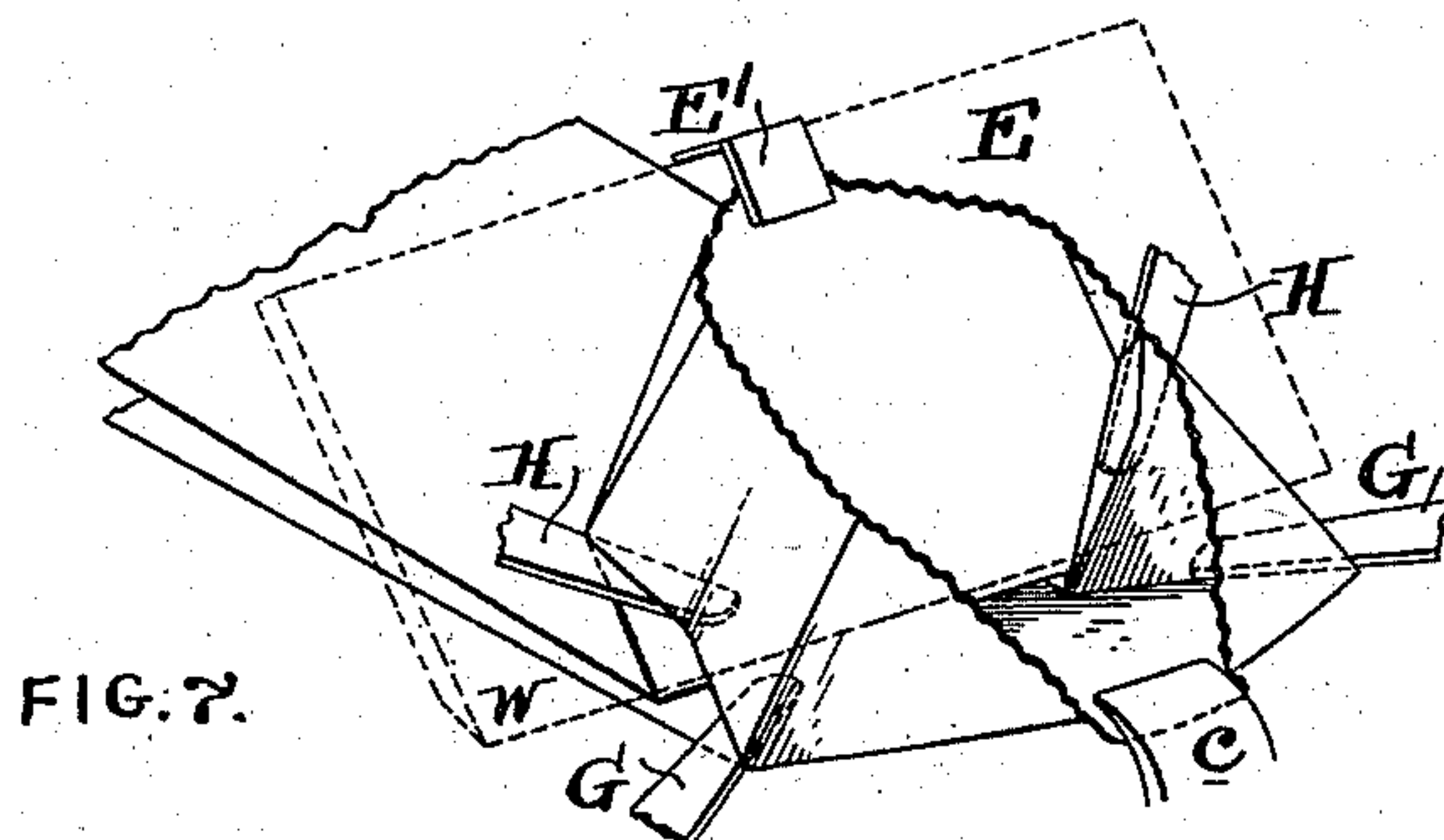
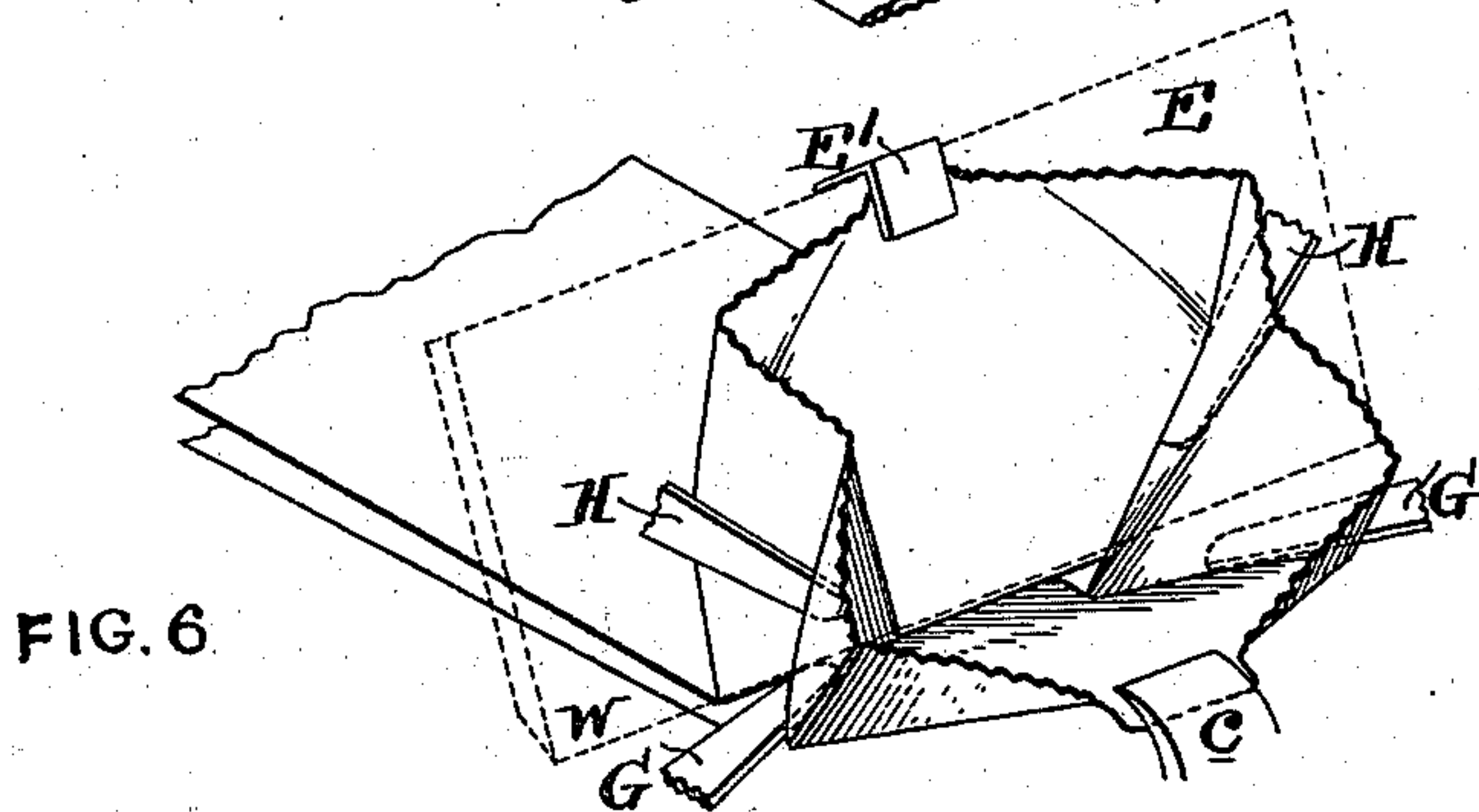
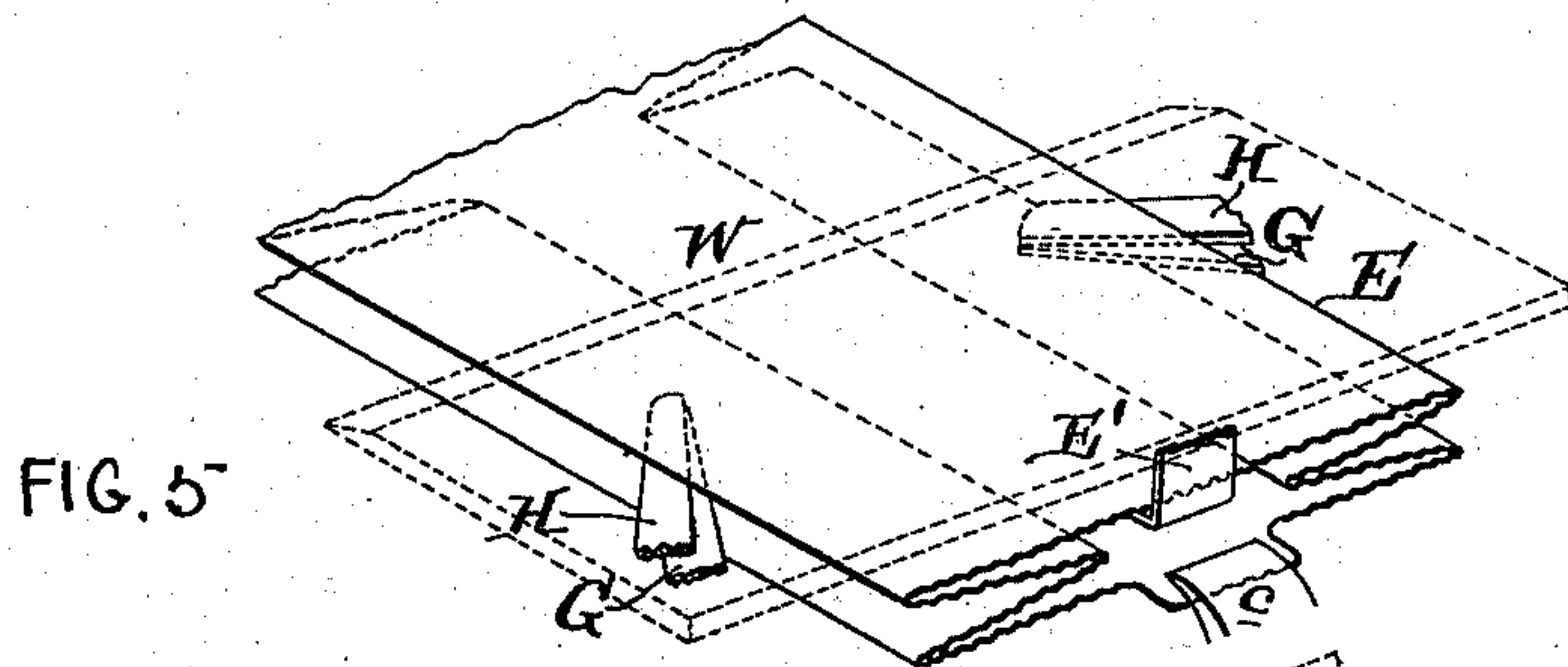
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3 Sheets—Sheet 3.

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Witnesses.

Henry Denny
Wm. L. Lewis

Inventor.

William Liddell

Wm. L. Lewis
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM LIDDELL, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE EASTERN PAPER BAG COMPANY, OF CONNECTICUT.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 558,969, dated April 28, 1896.

Application filed February 6, 1896. Serial No. 578,291. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LIDDELL, of the city of Brooklyn, county of Kings, State of New York, have invented an Improvement in Paper-Bag Machines, of which the following is a specification.

My invention has reference to paper-bag machines; and it consists of certain improvements which are fully described in the following specification and are shown in the accompanying drawings, which form a part thereof.

This application comprehends certain mechanism for forming a satchel bottom upon the tube in the manufacture of paper bags, and has for its object the production of a perfectly-formed satchel-bottom bag in a speedy and accurate manner. My improvements, briefly stated, may be described as follows: The tube is received upon a revolving cylinder and carried forward by a nipper, which clamps the lower sheet of the tube, or by other means hereinafter described. The upper sheet of the tube passes above a finger upon a movable forming-plate securely held at a short distance from the revolving cylinder and between which and the cylinder the tube is guided. The forming-plate is then caused to rotate about its rear edge simultaneously with its movement or travel with the revolving cylinder, thereby opening the end of the tube, spreading the side folds, and marking a creased line transversely. Simultaneously with this forming-fingers are projected into the side folds, one pair being adapted to the cylinder and the other pair to the forming-plate. A continued movement of the parts causes the upper layer or sheet of the tube to be completely turned backward upon itself, and at the same time the forming-fingers together with the other parts insure the proper formation of the diamond fold. The tube in this shape leaves the revolving cylinder, passes to the pasting devices, and thence to the folder.

The invention will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a paper-bag machine embodying my improvements. Fig. 2 is a plan view of a portion of the same. Figs. 3 and 4 are sectional elevations on the

line *xx* of Fig. 2, showing the operations of the parts in the formation of the bottom. Figs. 5, 6, 7, and 8 are perspective views illustrating the several manipulations which take place upon the bag-tube in its formation under the action of the nipper and the forming-fingers. Fig. 9 is a diagram illustrating the employment of a continuous or connected series of tubes to insure their being fed with the cylinder and obviating the necessity of nippers. Fig. 10 is a plan view of the paper tube employed in connection with Fig. 9. Fig. 11 is an inverted plan view of same, and Fig. 12 is a longitudinal section of the tube on line *zz*.

A is the main frame of the machine.

B is a shaft carried upon the main frame and upon which is supported the forming-cylinder C, which may be provided with one or more nippers *c*, adapted to be closed and held closed by the action of the spring *c'*, and opened by the action of a pin *C²*, acting upon the star-wheel *C'*. The nipper is also controlled as to its being closed by the action of the pin *C³*, also acting upon the star-wheel. These devices operate to enable the nipper to close upon the forward edge of the under layer of the bag-tube, and after the formation or creasing of the bottom into the diamond folds to release the bag-tube.

D D are two feed or guide rollers adapted to properly deliver the bag to the cylinder C.

E is a forming-plate and is hinged at *e* to the arm F, journaled to the main frame at *f*. This arm F is drawn toward the cylinder C by a spring *F'*, and is moved away from the cylinder about the axis *f* by cam *K'* and arm *F'*.

L is a rotating power-shaft carrying cam and is driven by a belt-pulley *L'* and operates the cylinder C by gears *M² M³*. Spur-gears *M' M N* operate the axis *e* of the forming-plate E when the arm F is moved. Of these gears *M'* is substantially fixed, and hence when the arm F is moved its gears *M* work upon gear *M'* as if it were a rack. This causes motion to the plate E about *e* as an axis.

As the motion of the arm F is irregular and not always in the same direction for one continuous movement of the former-plate E, I cause the gear *M'* to be moved somewhat to compensate for this. On the shaft L, I arrange

a cam K, which acts upon a rod k to reciprocate it, and this by link k^2 rocks the gear or rack M' . The cams K and K' insure a proper return movement of the arm F and former-plate E, and in time with the rotations of the cylinder C. In place of these devices for controlling the movement of the plate E relatively to the cylinder C the said plate may be moved or operated by any other suitable means. The return movement of the plate E is unimportant, so long as it is secured in time to receive a new bag-tube or section thereof.

The cylinder C has pivoted upon its periphery fingers G G, which are normally out of the line of the bag-tube, but which may be projected inwardly by the action of a cam I' , secured to the main frame A. The fingers G G are connected together by arms g and a link G' , arranged in the under side of the cylinder-surface, and one of them is further provided with an arm G^2 , adapted to come in contact with the cam I' during the rotation of the cylinder and thus cause said fingers to be projected inward, as indicated in dotted lines in Fig. 2, so as to enter the bellows side folds of the tube. The former-plate E has its rear edge made sharp, as at W, so that when it presses downward upon the bag-tube it forms a transverse crease about which the paper bends, as clearly shown in Figs. 4 and 6. This former-plate E is also provided with fingers H H, corresponding to the fingers G G, which are connected by arms h and link H' precisely as are connected the fingers G G, and are operated by means of a spring J in one direction to hold them out of action, and a stationary cam I, acting upon an arm or projection H^2 , to move them inward or in the other direction, so that they enter the bellows side folds precisely as at the fingers G G. Stops J' limit their movement in one direction.

The rear or free end of the former-plate E is provided with eyes E^2 , which are received upon projections A' , as clearly shown in Fig. 3, so as to be maintained out of the line of the bag-tube in entering between the said plate and the cylinder C after it has been caught by the nipper c and moved forward. When the bag-tube is moved to the position shown in Fig. 3, the upper layer of the paper is moved over a finger E' , arranged adjacent to the axis e and below the former-plate E. As the plate E is moved forward with the bag-tube the eye E^2 leaves the projection A' , as shown in Fig. 4, and the edge W presses down upon the paper, forming a line or crease. It will also be observed that as this takes place the fingers G H upon each side at their free ends are brought more or less together, and at the same time the finger E' moves away from the nipper c , opening the bellows side folds, as indicated in Fig. 4. This permits the ready entrance of the fingers G H under the action of the cams $I' I$, and these fingers continue to maintain their position during the successive formative actions of

the machine. As the cylinder C moves forward the plate E rotates upon its own axis e and also about edge W as an axis, as indicated in Figs. 6, 7, and 8, which action is so timed that the several fingers G H, nippers g , and finger E' operate to form the several actions upon the tube substantially in the manner as indicated in Figs. 2 to 8. As this folding action is completed the fingers G H quickly fly out of the folds of the tubes when their arms $G^2 H^2$ lift the cams $I' I$, and the bag in its folded condition is still held by the nipper c and carried forward with the cylinder C. It is then delivered to the rolls S, having pins s , thence to the paste-rolls Q T, of which Q applies the paste after having received it from the rolls P P and vat O. The bottom is then folded by the knife r , which folds the paper upon itself between pressure-rolls R R. It is quite evident that the delivery, paste, and subsequent folding devices may be made in any of the well-known manners, and their particular construction is immaterial to my invention. I do not, therefore, deem it necessary to describe the minute details of these devices, but illustrate them so as to show their relative position in a machine of the class described.

When the cylinder C advances sufficiently to deliver the bag to the feed-rolls S, the star-wheel reaches the pin C^2 and opens the nipper c to release the paper bag, and the said nipper remains open until it reaches the pin C^3 , which closes the nipper upon another bag-tube. I have shown two such nippers and their operating mechanism, and it is evident that so far as my improvements are concerned one or more of these devices may be employed by simply reducing or enlarging the diameter of the cylinder C, maintaining its surface speed the same.

As soon as the tube has been withdrawn from the plate E the said plate is caused to return to its original position by the operation of the arm F, cams, and gears, so that it shall be in the proper position to receive the next paper tube. As before explained, the gear M' is in effect substantially a rack, but moved by cam K, and as the arm F is oscillated about f as a center by cam K' the intermediate gear M and gear N causes a proper rotation or oscillation of the plate E about e as a center. The movement of the arm F is governed by the cam K' and arm F' , and is so timed that while permitting the rotation or oscillation of the plate E about its axis e it insures the edge W moving exactly at the same speed of the surface speed of the cylinder C, so as not to displace in any manner the tube.

While I have shown the nippers upon the cylinder C, they are not necessary, as the paper tube may be severed into bag-tube sections W, Fig. 10, but left connected by short connections w , Fig. 11, so that it is in effect pulled by itself about cylinder C under the action of the rolls S' . The rollers S' may be

cutting-rolls, which while drawing the tube-section through sever the bag-tube sections before they go to the pasting devices. This method of operating is indicated in Fig. 9.

5 It will be observed that as the tube is bent over the cylinder C the upper layer will rise and pass above the finger E' of the former-plate E. In this case the bag-tube will have the diamond folds made upon the tube while
10 still connected together. It will thus be seen that it is not necessary to employ the nippers upon the cylinder C, though it may be more desirable to use them.

15 It is evident that the mere mechanism for securing the several movements to the different parts may be modified or changed in various ways without departing from the spirit of the invention, and I do not, therefore, confine myself to the details of construction here
20 shown.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a paper-bag machine, the combination of a rotating cylinder provided with one or
25 more pairs of side-folding fingers adapted to be moved toward or from each other, a forming-plate also provided with side-forming fingers adapted to be moved toward or from each other, means for operating said fingers at definite times during the formative action upon
30 the bag-tube, operating means for the forming-plate adapted to cause the said plate to oscillate about its rear edge upon the surface of the cylinder during the rotary movement of said cylinder, the whole operating for the
35 purpose of opening and forming the bottom of the bag-tube, and means to move the bag-tube with the cylinder.

2. In a paper-bag machine, the combination
40 of the rotating cylinder provided with one or more pairs of side-folding fingers adapted to be moved toward or from each other, a forming-plate also provided with side-forming fingers adapted to be moved toward or from
45 each other, means for operating said fingers at definite times during the formative action upon the bag-tube, operating means for the forming-plate adapted to cause the said plate to oscillate about its rear edge upon the sur-
50 face of the cylinder during the rotary movement of said cylinder for the purpose of opening and forming the bottom of the bag-tube, a finger moving with the forming-plate for receiving the upper sheet of the tube and lift-
55 ing it during the formative action, power devices for returning the forming-plate to its original position to receive a new bag-tube, and means to move the bag-tube with the cylinder.

60 3. In a paper-bag machine, the combination of the rotating cylinder provided with one or more pairs of side-folding fingers adapted to be moved toward or from each other, a forming-plate also provided with side-forming
65 fingers adapted to be moved toward or from each other, means for operating said fingers at definite times during the formative action

upon the bag-tube, operating means for the forming-plate adapted to cause the said plate to oscillate about its rear edge upon the sur- 70
face of the cylinder during the rotary movement of said cylinder for the purpose of opening and forming the bottom of the bag-tube, a finger moving with the forming-plate for re-
75 ceiving the upper sheet of the tube and lifting it during the formative action, power devices for returning the forming-plate to its original position to receive a new bag-tube, means to sustain the rear of the forming-plate
80 clear of the surface of the revolving cylinder so as to permit the proper entrance of the paper bag between the former-plate and the surface of the cylinder, and means to move the bag-tube with the cylinder.

4. In a paper-bag machine, the combination 85
of the rotating cylinder provided with one or more pairs of side-folding fingers adapted to be moved toward or from each other, a forming-plate also provided with forming side
90 fingers adapted to be moved toward or from each other, means for operating said fingers at definite times during the formative action upon the bag-tube, operating means for the forming-plate adapted to cause the said plate
95 to oscillate about its rear edge upon the surface of the cylinder during the rotary movement of said cylinder for the purpose of opening and forming the bottom of the bag-tube, means to sustain the rear of the forming-plate
100 clear of the surface of the revolving cylinder so as to permit the proper entrance of the paper bag between the former-plate and the surface of the cylinder, and means to move the bag-tube with the cylinder.

5. In a paper-bag machine, the combination 105
of a rotating cylinder provided with one or more nippers, power devices for opening and closing the nippers at predetermined intervals of time, pivoted side-forming fingers G G carried upon the surface of the cylinder and upon
110 each side thereof so as to receive the bag-tube between them, power devices for operating the fingers G, G at definite times during their movement forward with the cylinder, a forming-plate E also provided with side-forming
115 fingers H H adapted to be brought into alignment above the fingers G G in the preliminary operation of forming the bag, a movable frame to which said forming-plate is hinged, power
120 devices for moving said movable frame, power devices for oscillating the said forming-plate upon the movable frame so that its rear edge travels in conjunction with and at the same
125 rate of speed as the cylinder, and means for operating the forming-fingers of the former-plate.

6. In a paper-bag machine, the combination of a rotating cylinder provided with one or
more nippers, power devices for opening and closing the nippers at predetermined intervals 130
of time, pivoted forming-fingers G G carried upon the surface of the cylinder and upon each side thereof so as to receive the bag-tube between them, power devices for operating

the fingers G G at definite times during their movement forward with the cylinder, a forming-plate E also provided with the forming-fingers H H adapted to be brought into alignment above the fingers G G in the preliminary operation of forming the bag and also provided with a finger rearwardly extending at its forward end for separating the upper layer of the bag-tube when opening the same during the oscillation of the plate, a movable frame to which said forming-plate is hinged, power devices for moving said movable frame, power devices for oscillating the said forming-plate upon the movable frame so that its rear edge travels in conjunction with and at the same rate of speed as the cylinder, and means for operating the forming-fingers of the forming-plate.

7. In a paper-bag machine, the combination of the rotating cylinder for the bag-tube provided with one or more pairs of folding-fingers adapted to be moved toward or from each other, a forming-plate also provided with forming-fingers adapted to be moved toward or from each other, means for operating said fingers at definite times during the formative action upon the bag-tube, operating means for the forming-plate adapted to cause the said plate to oscillate about its rear edge upon the surface of the cylinder during the rotary movement of said cylinder for the purpose of opening and forming the bottom of the bag-tube, and connecting mechanism for timing

the movements of the rotating cylinder and the forming-plate.

8. In a paper-bag machine, the combination of a rotating cylinder provided with one or more nippers, power devices for opening and closing the nippers at predetermined intervals of time, pivoted forming-fingers G G carried upon the surface of the cylinder and upon each side thereof so as to receive the bag-tube between them, power devices for operating the fingers G, G at definite times during their movement forward with the cylinder, a forming-plate E also provided with forming-fingers H H adapted to be brought into alignment above the fingers G G in the preliminary operation of forming the bag, a movable frame to which said forming-plate is hinged, power devices for moving said movable frame, power devices for oscillating the said forming-plate upon the movable frame so that its rear edge travels in conjunction with and at the same rate of speed as the cylinder, means for operating the forming-fingers of the forming-plate, and connecting devices for timing the movements of the movable frame the former-plate and the rotating cylinder.

In testimony of which invention I have hereunto set my hand.

WM. LIDDELL.

Witnesses:

R. M. HUNTER,
ERNEST HOWARD HUNTER.