

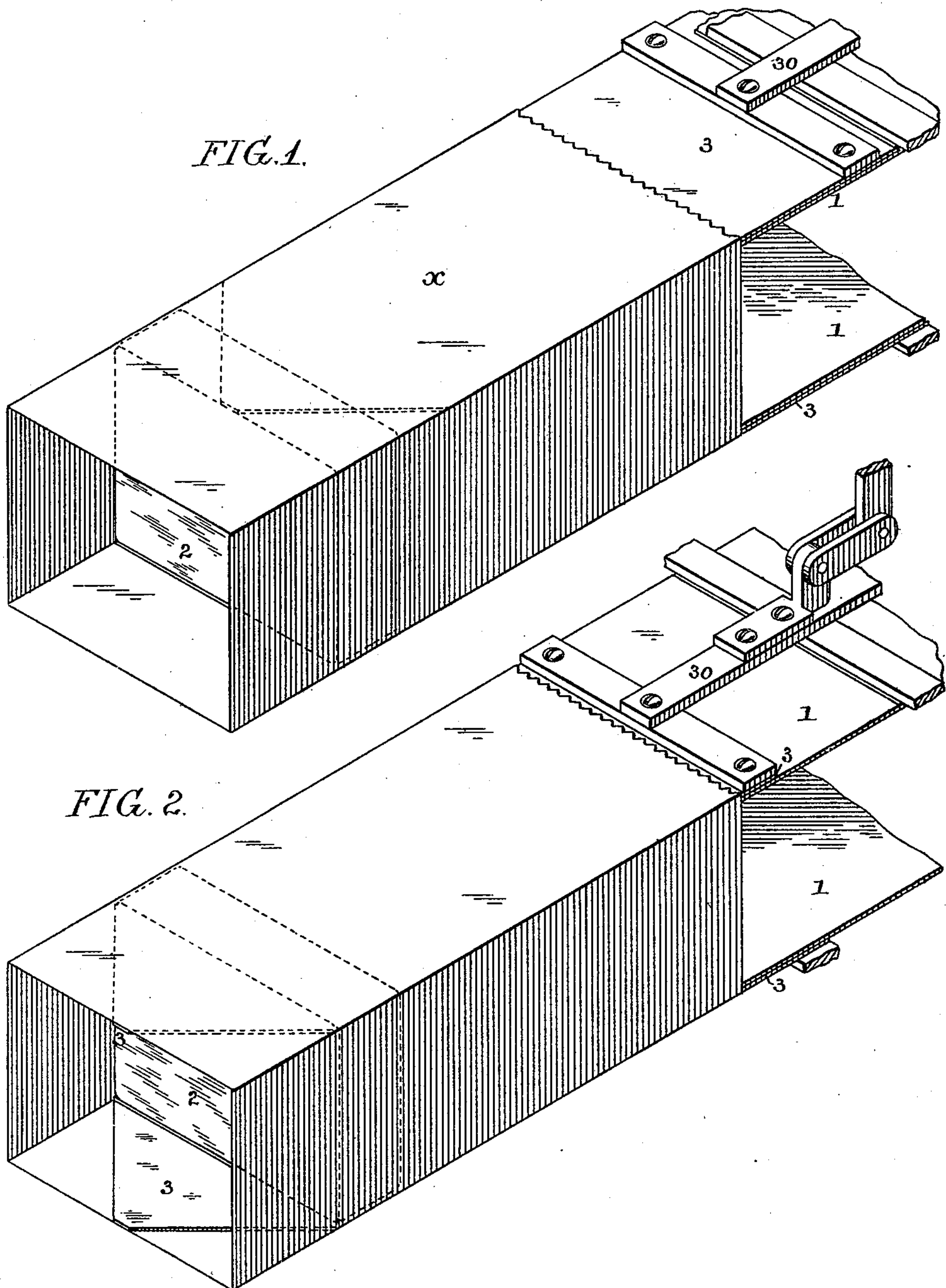
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17 Sheets—Sheet 1.

W. WERTS.
PAPER BAG MACHINE.

No. 583,523.

Patented June 1, 1897.



Witnesses:
Fred H. Goodwin
R. Schleicher.

Inventor:
William Werts
by his Attorneys
Houson & Houson

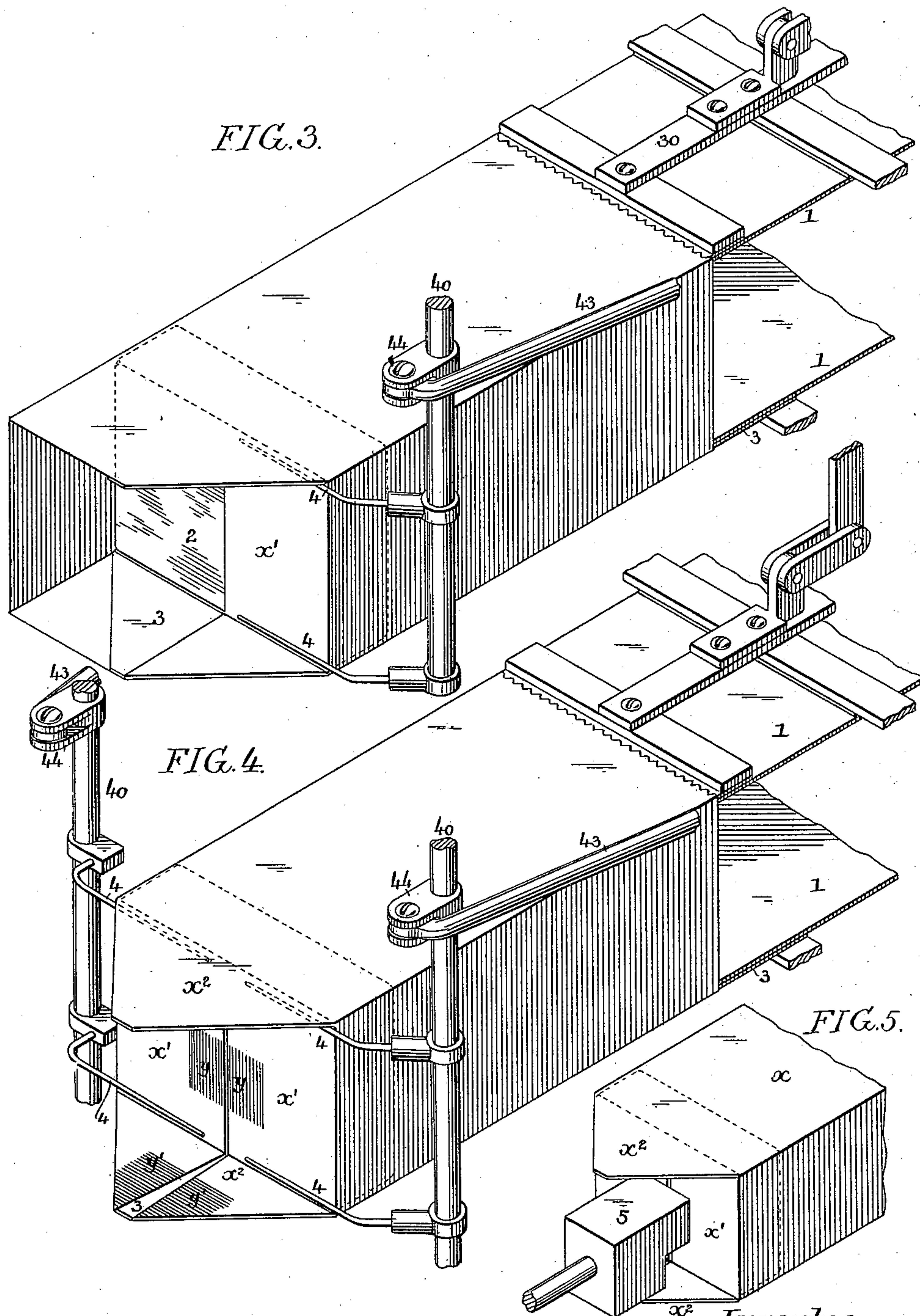
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Patented June 1, 1897.



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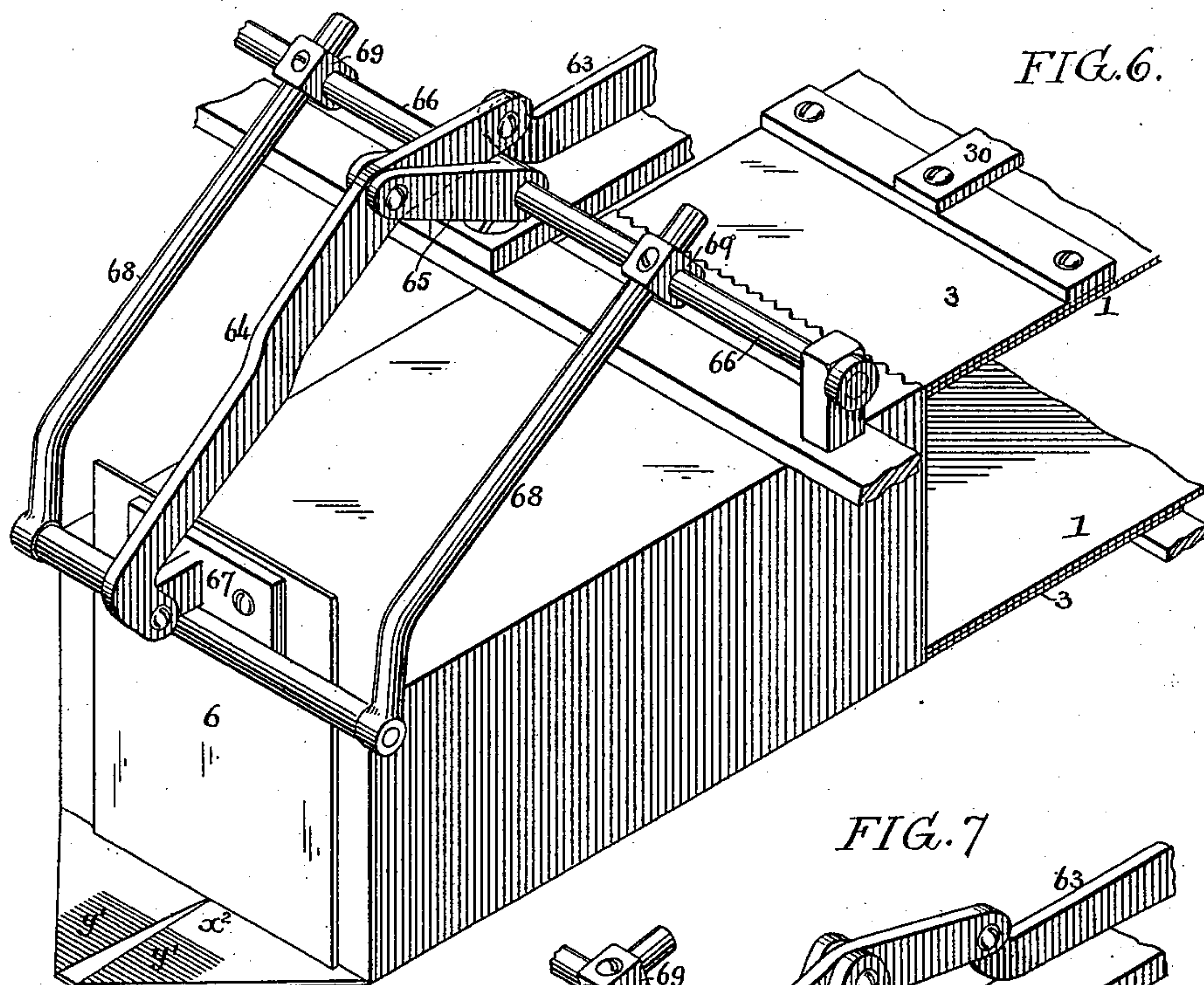


FIG. 6.

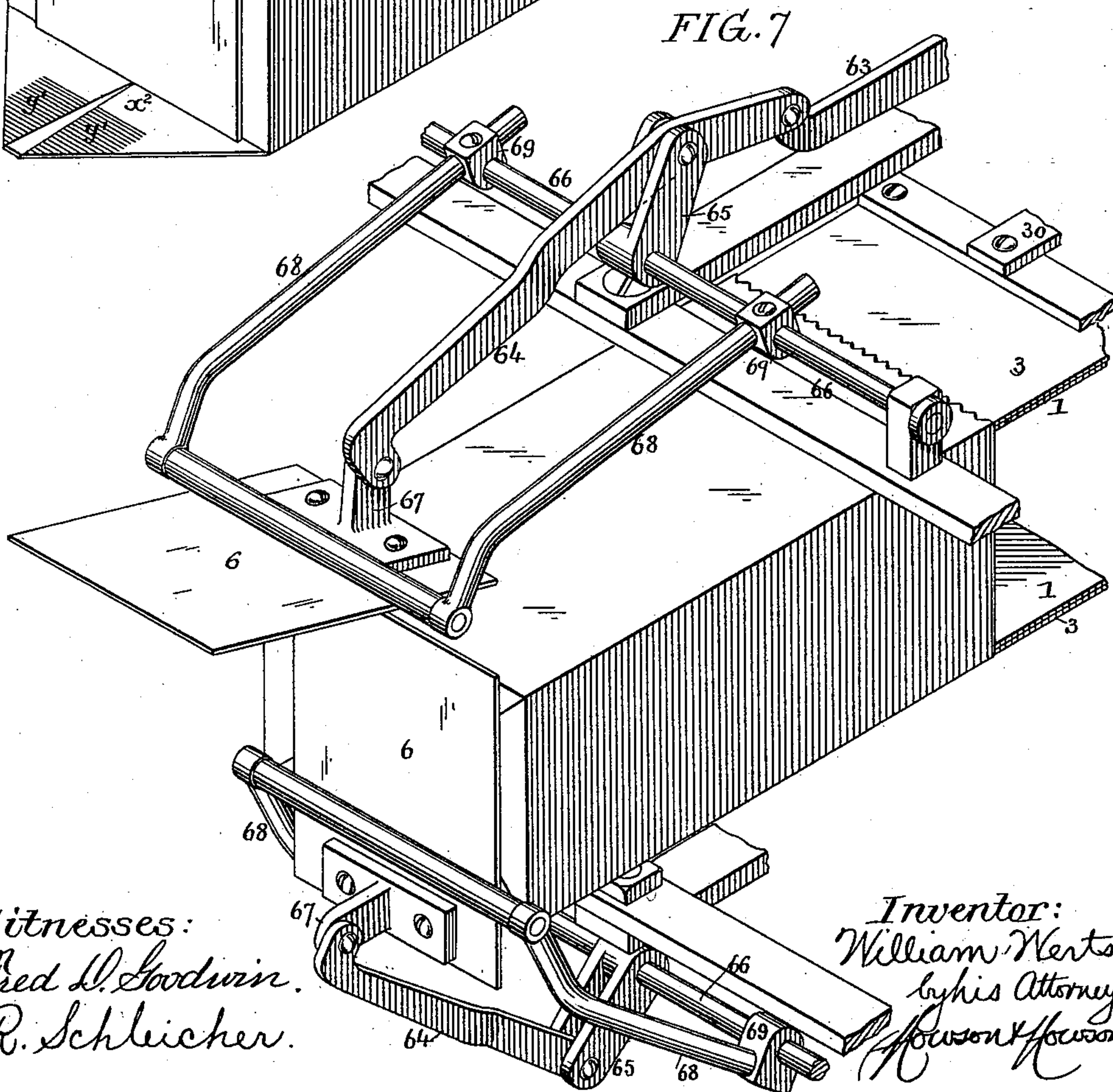


FIG. 7.

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FIG. 8.

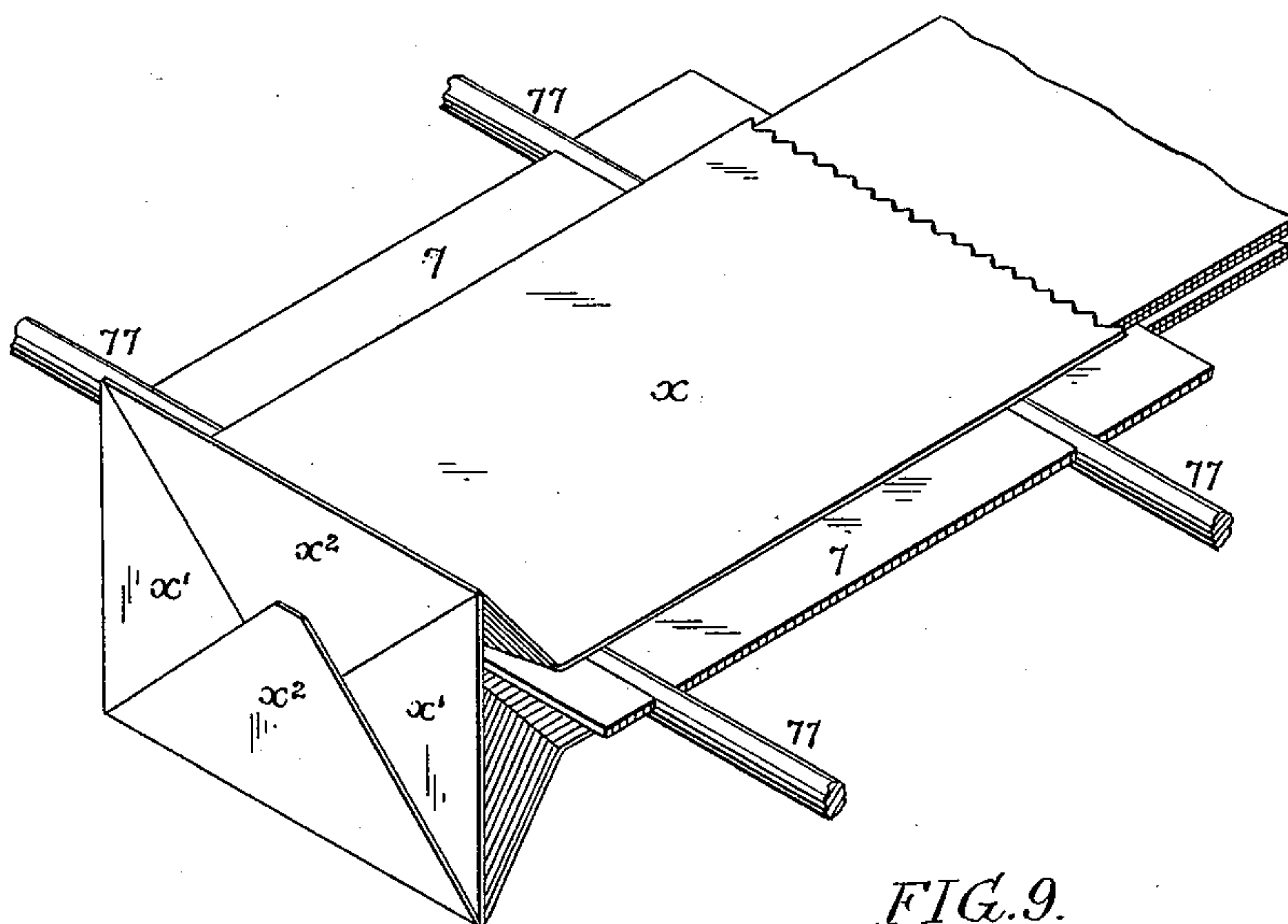
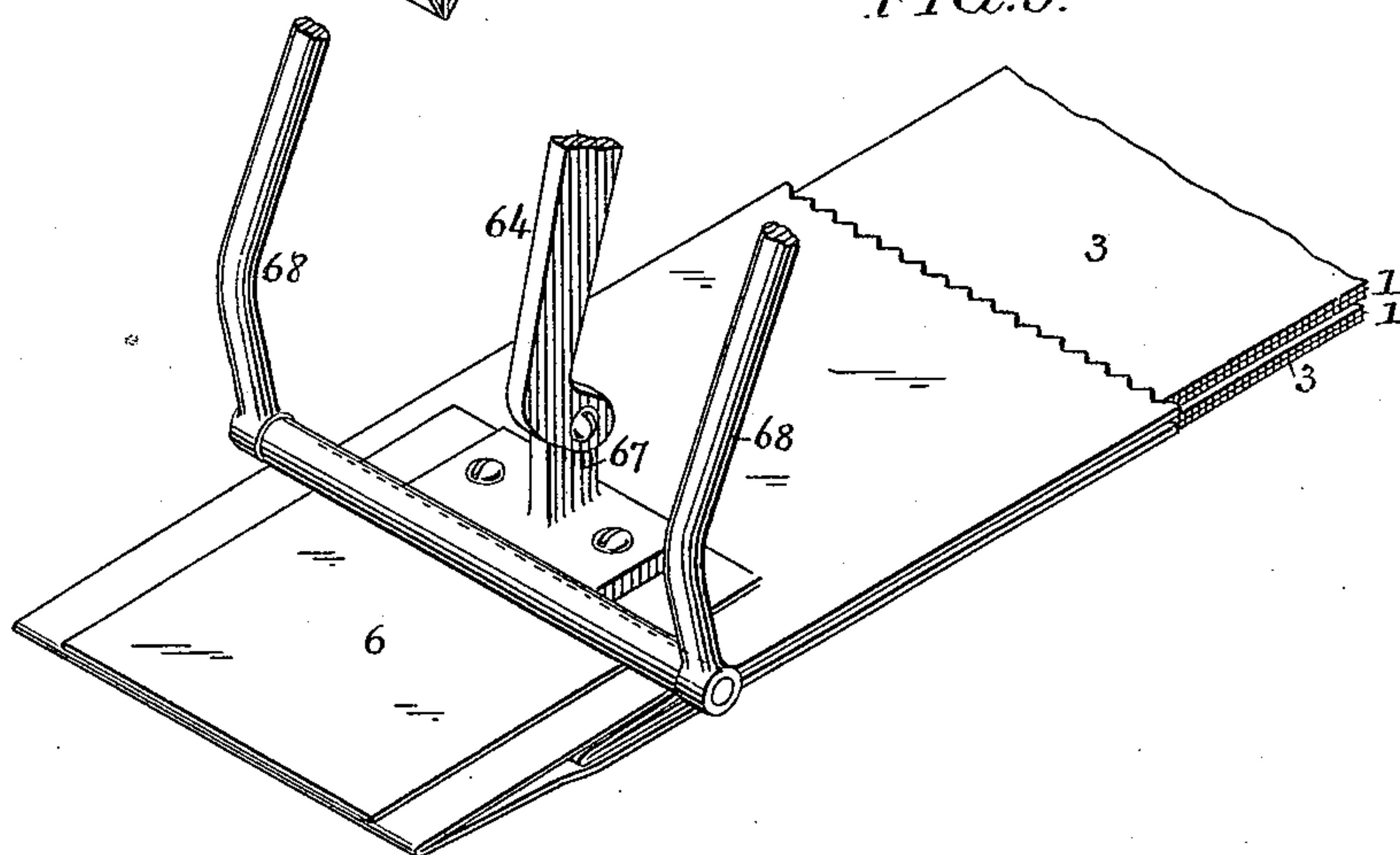


FIG. 9.



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(No Model.)

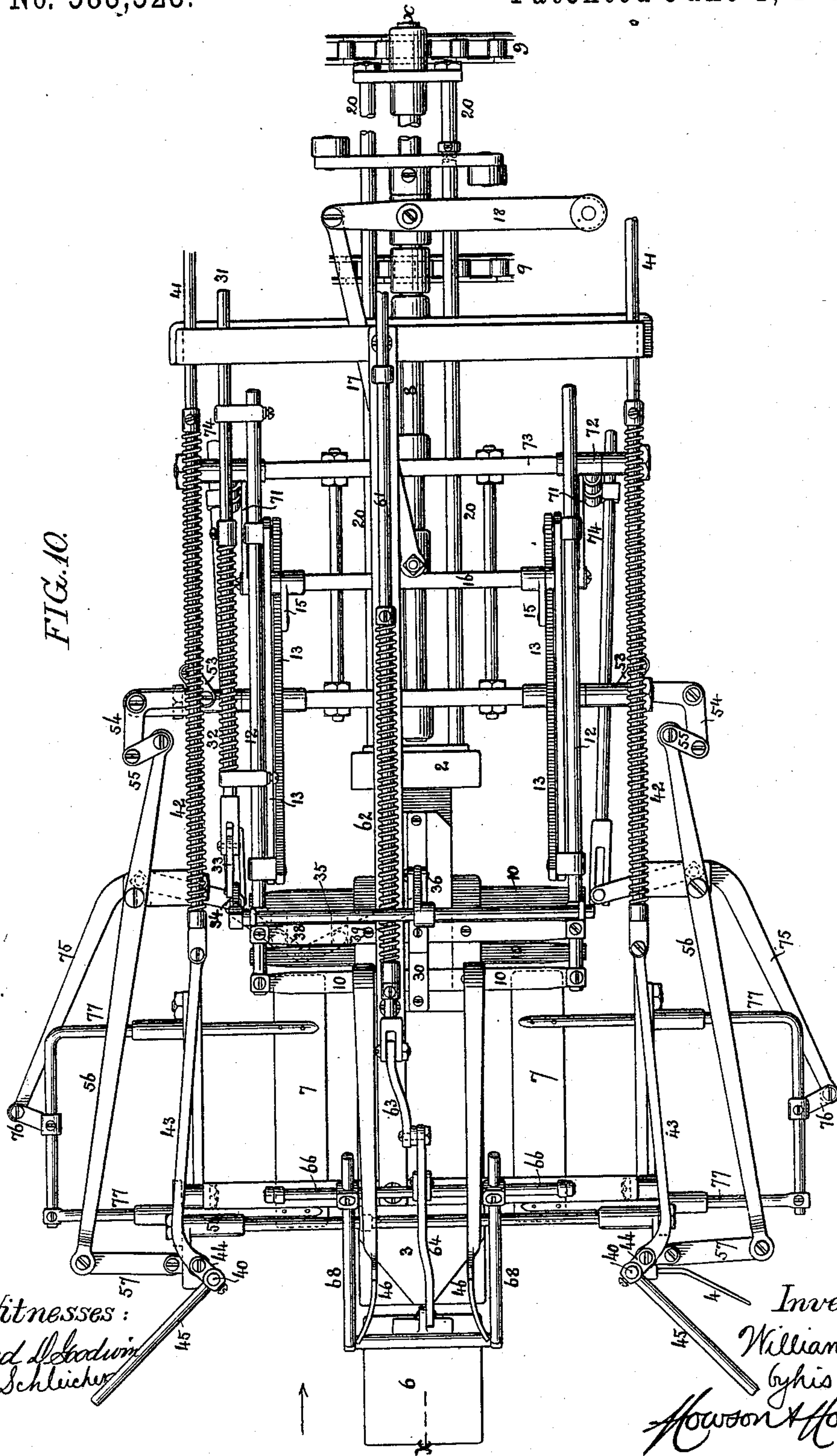
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FIG. 10.



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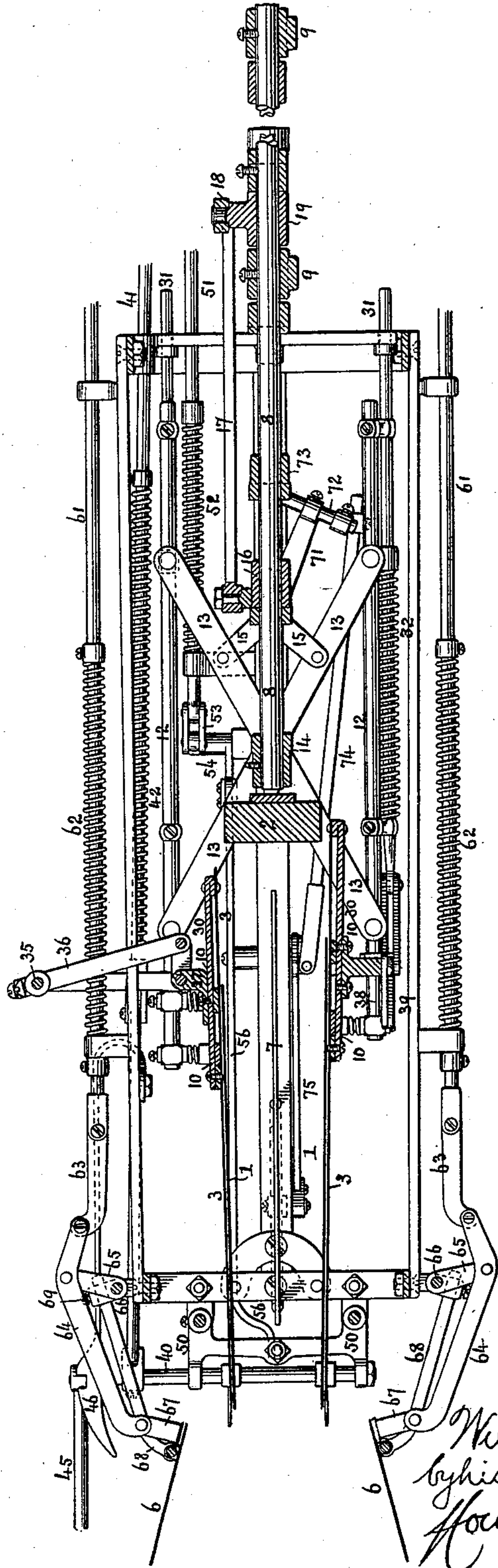
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FIG. 11.



Witnesses:

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(No Model.)

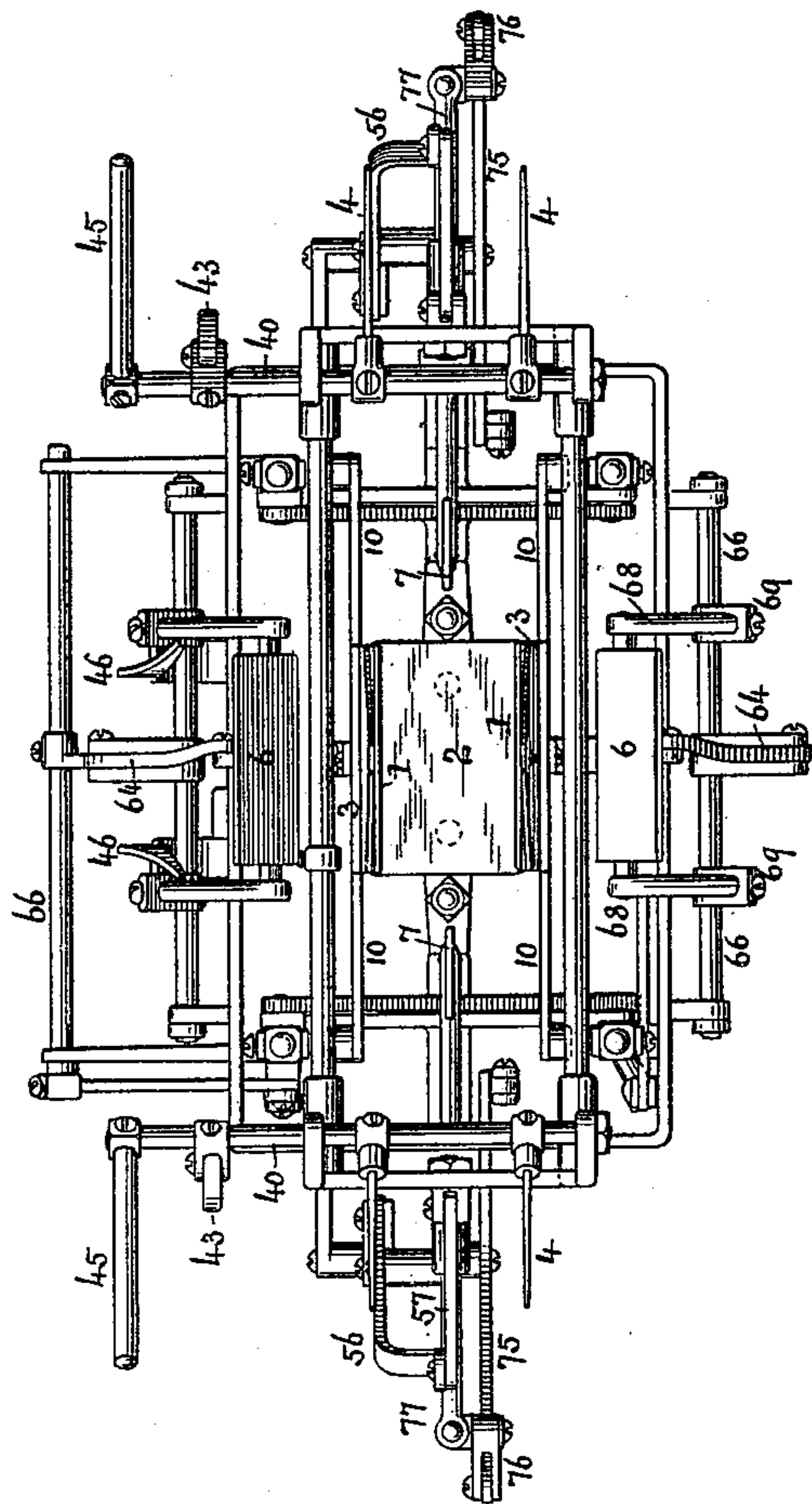
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FIG. 12.



Witnesses:

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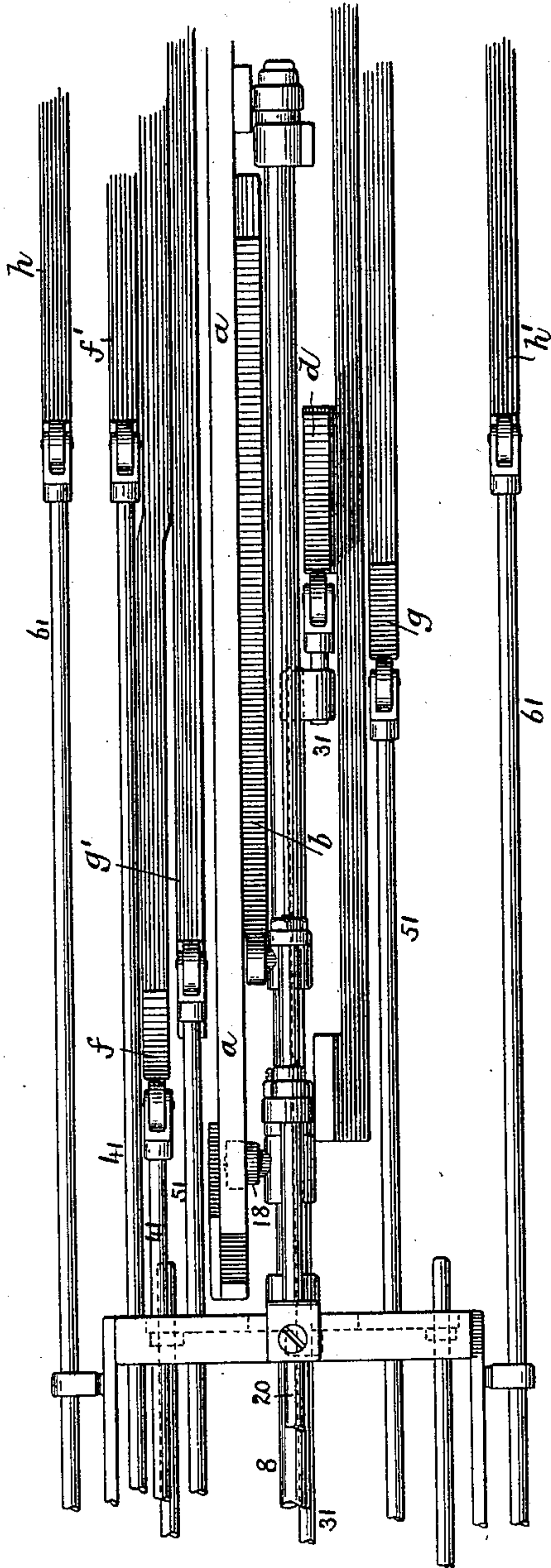
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FIG. 13.



Witnesses:

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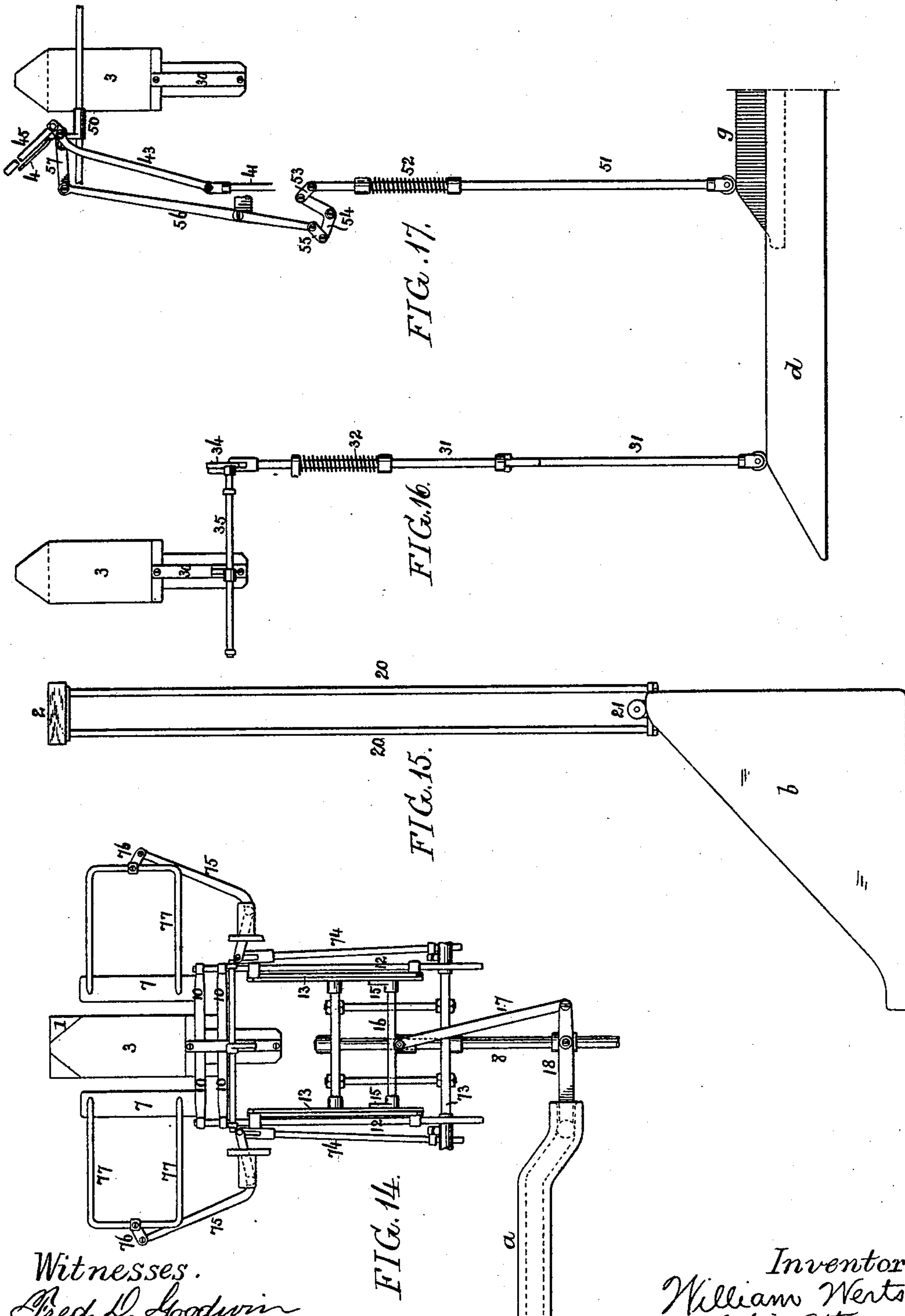
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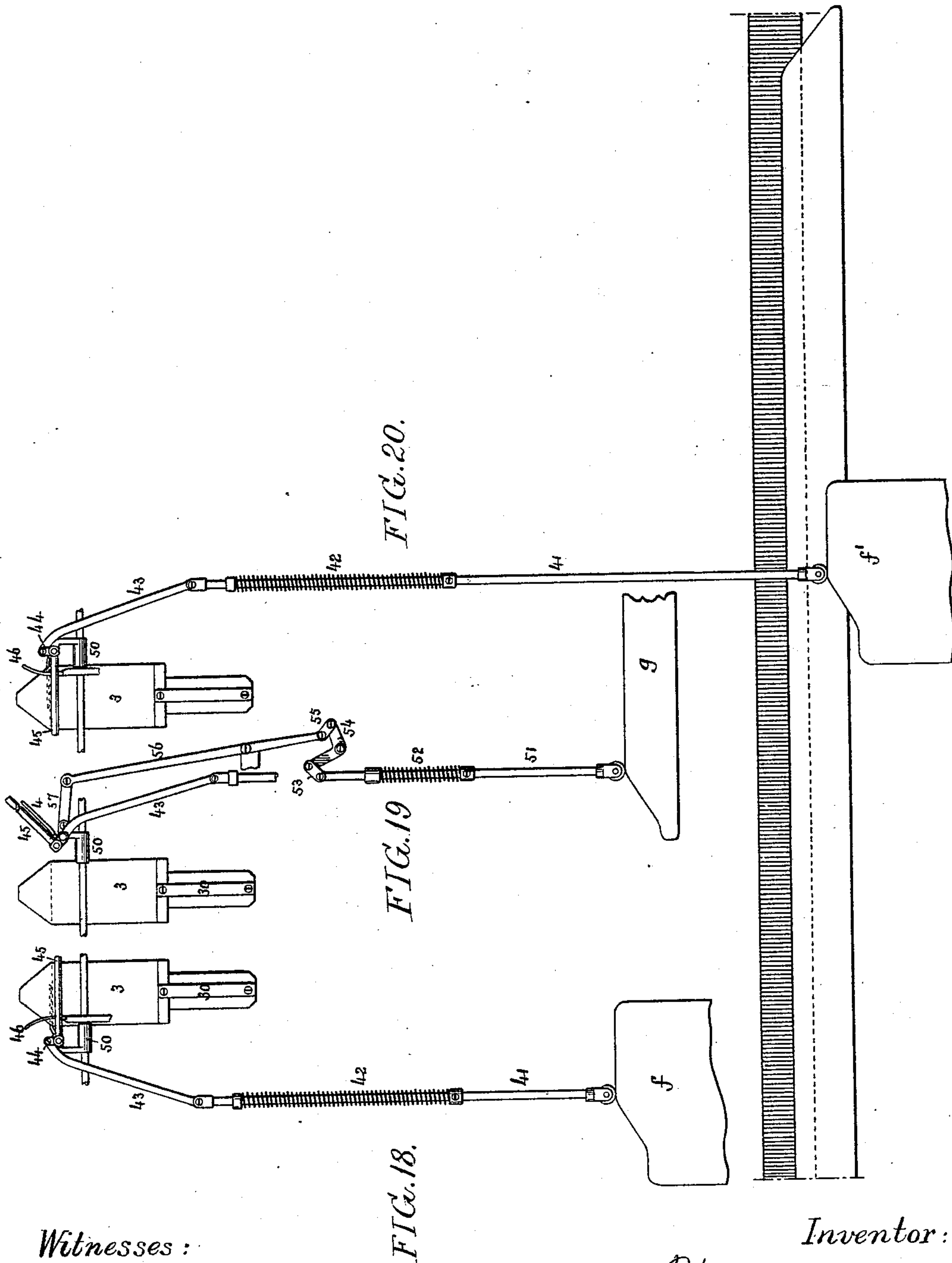
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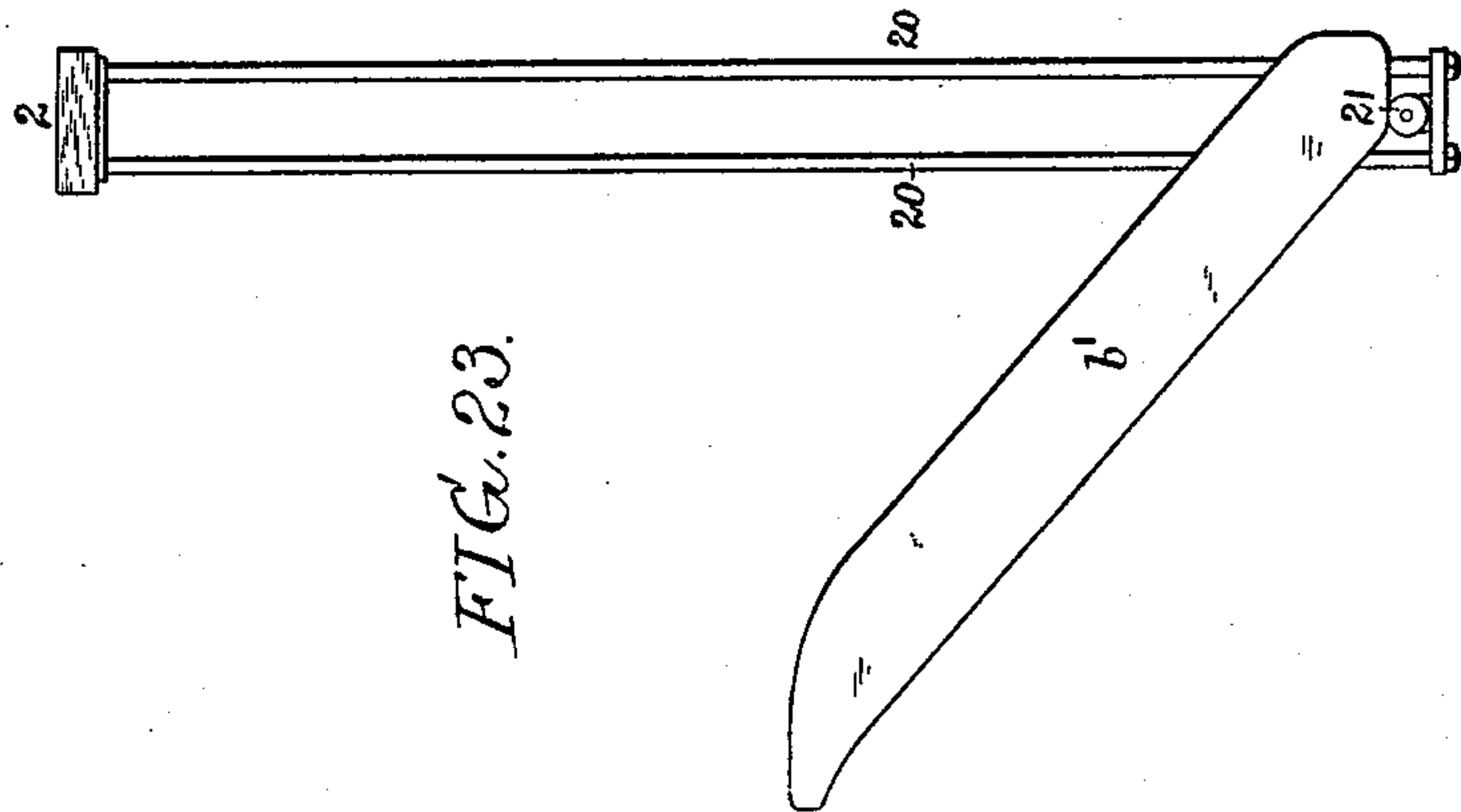


FIG. 23.

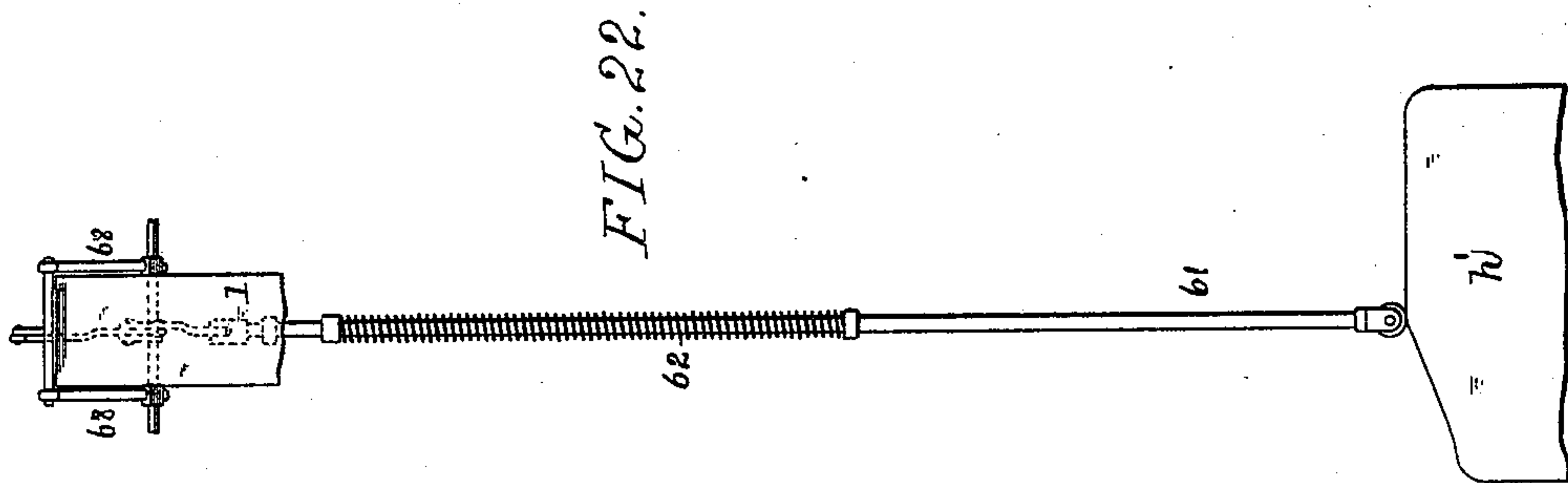


FIG. 22.

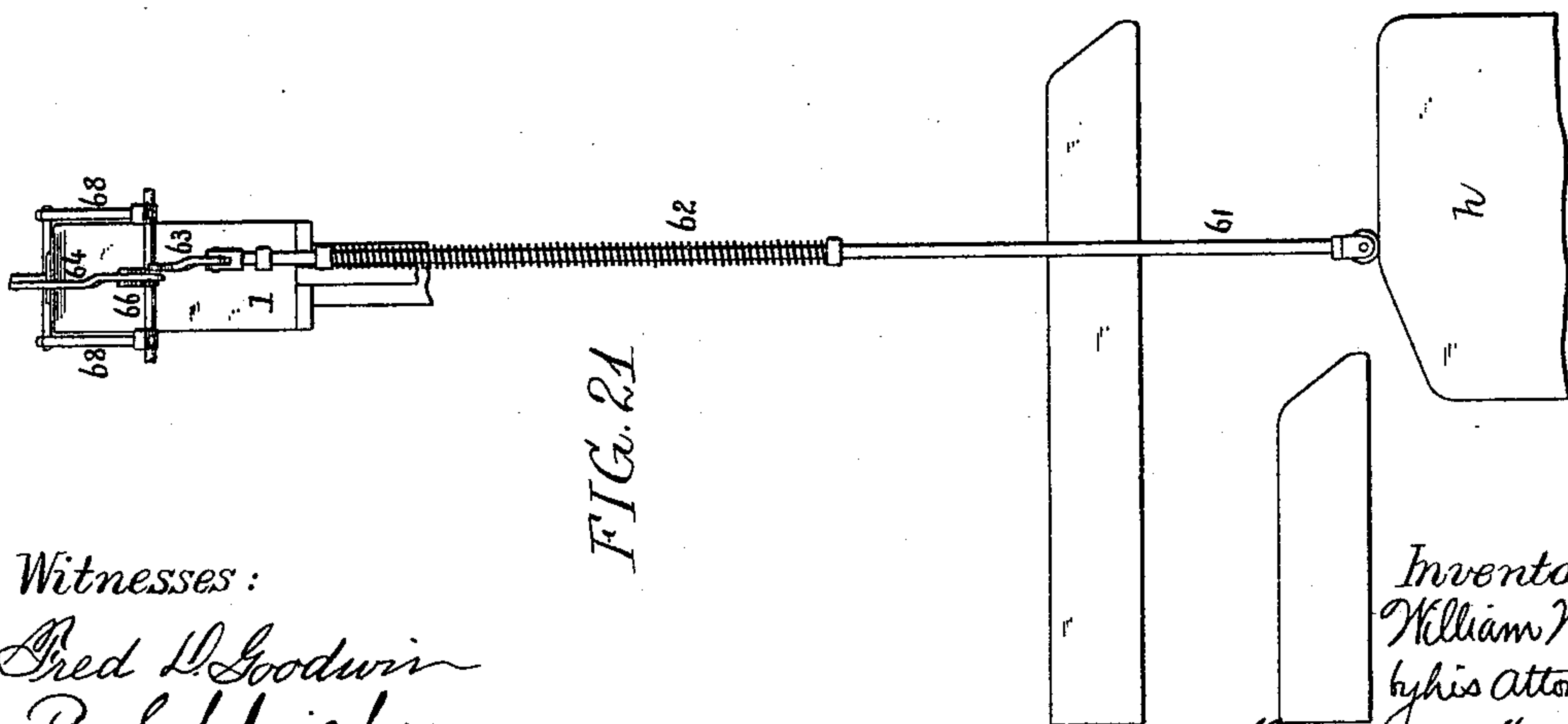


FIG. 21.

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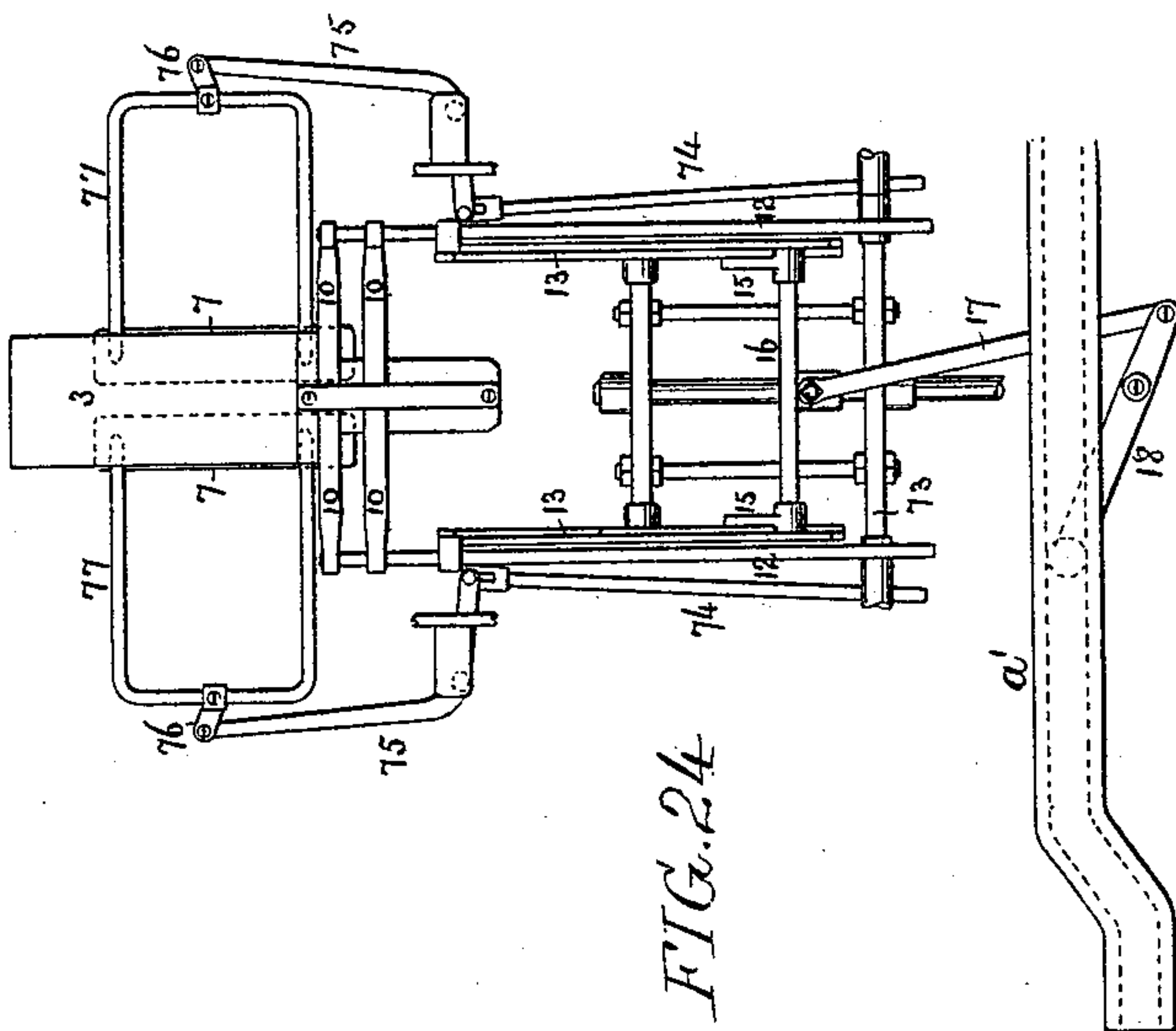
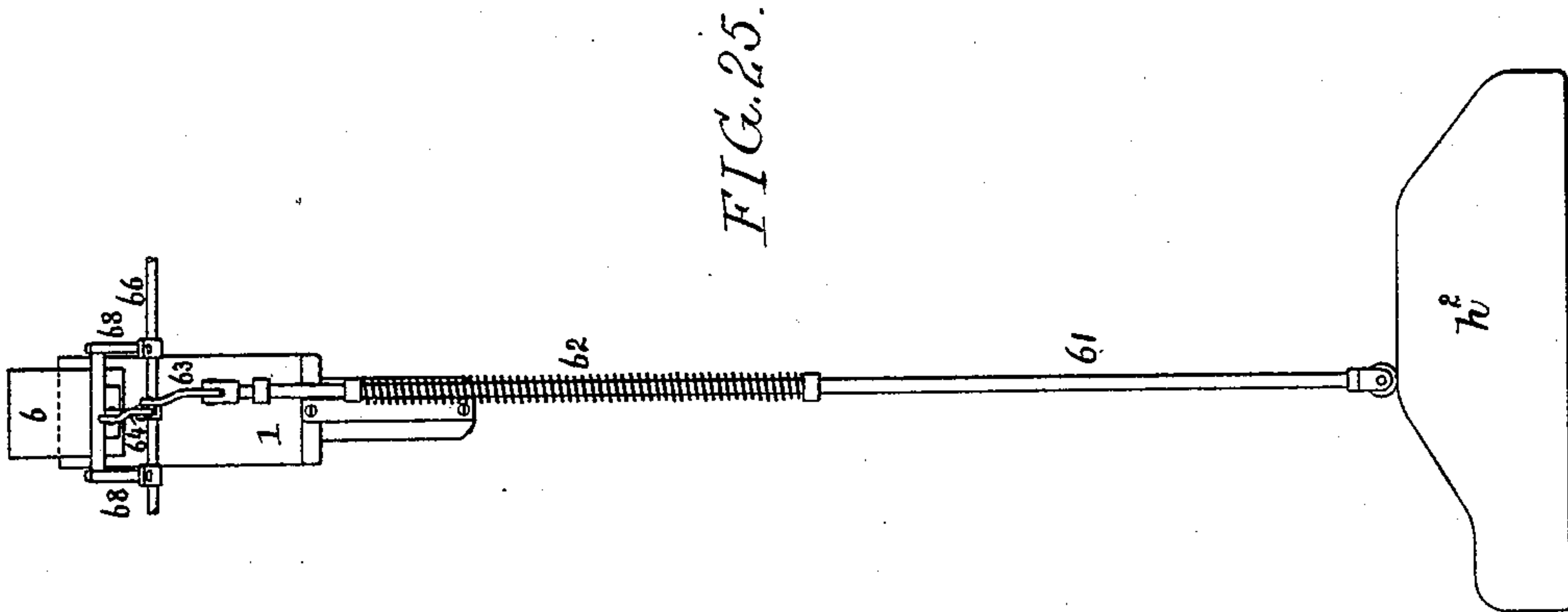
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17 Sheets—Sheet 12.

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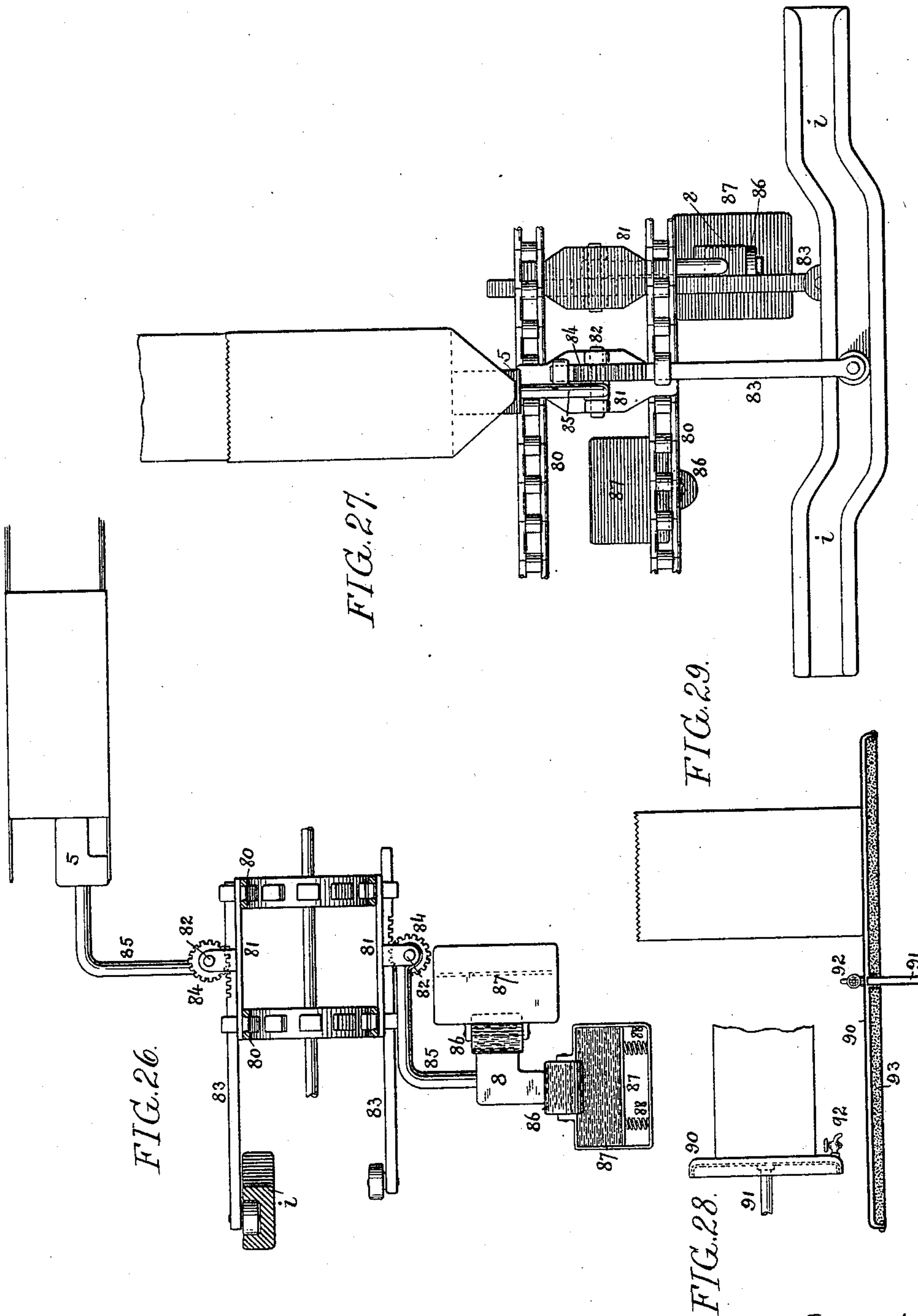
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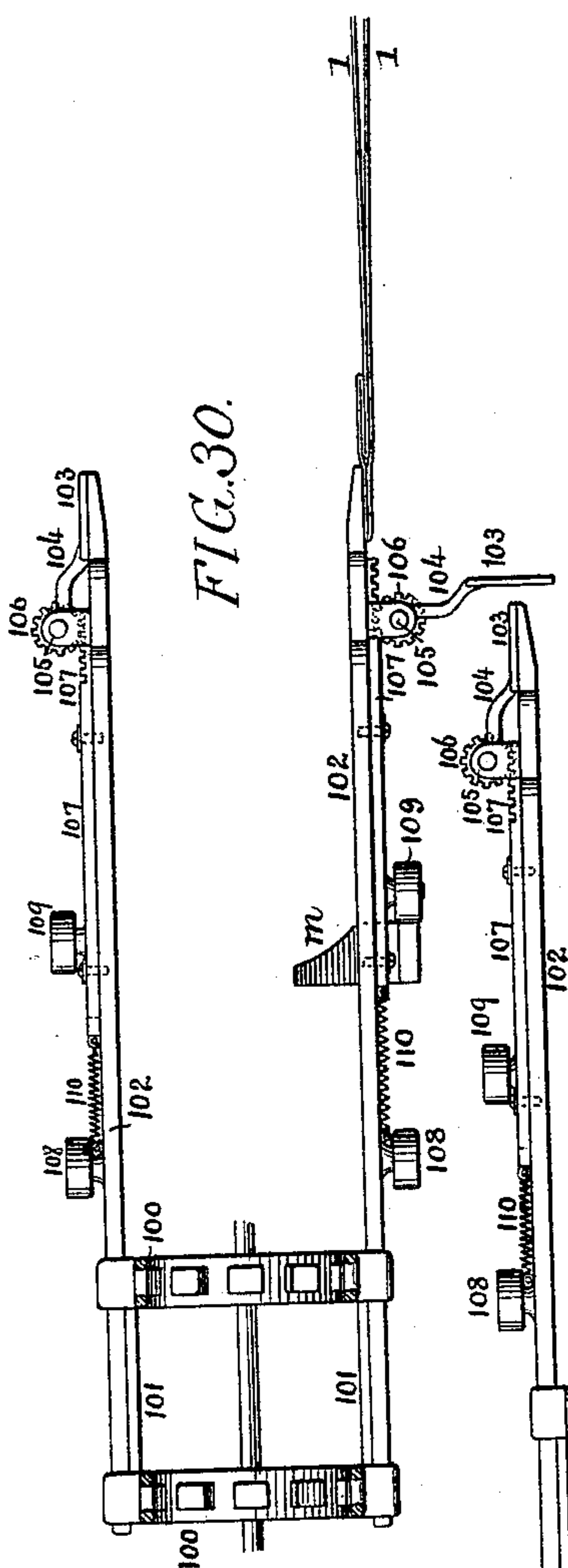


FIG. 30.

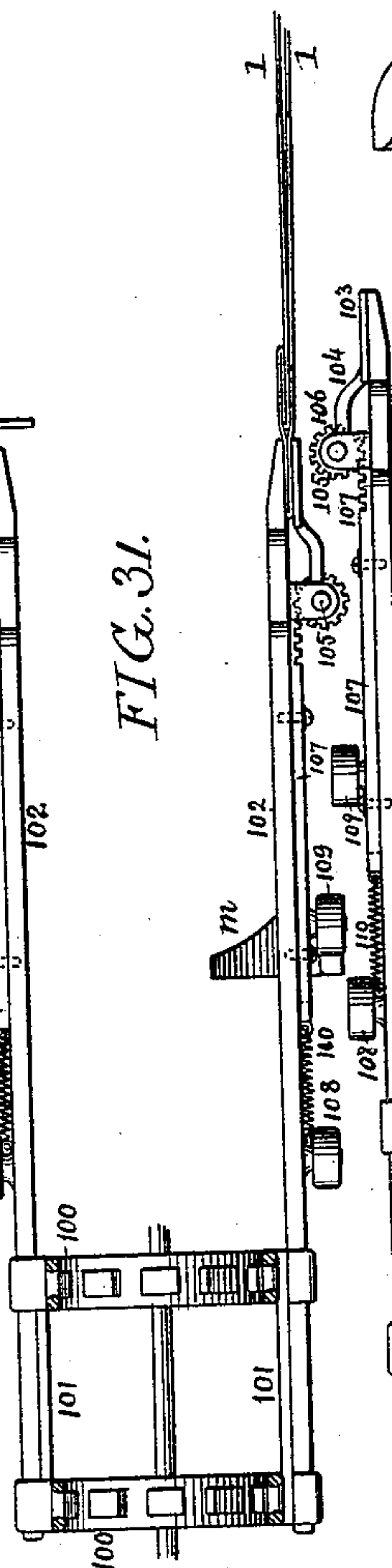


FIG. 31.

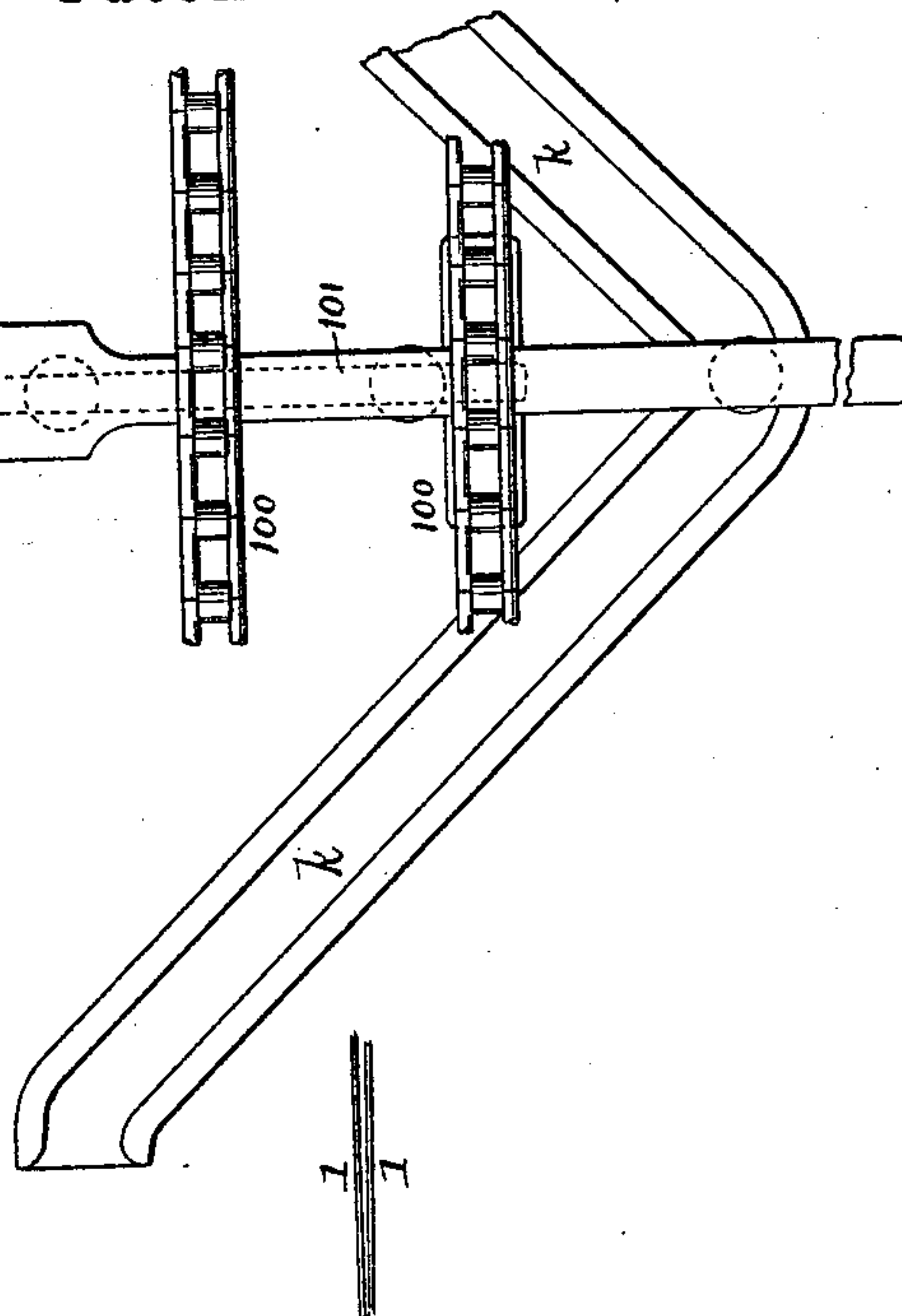


FIG. 33.

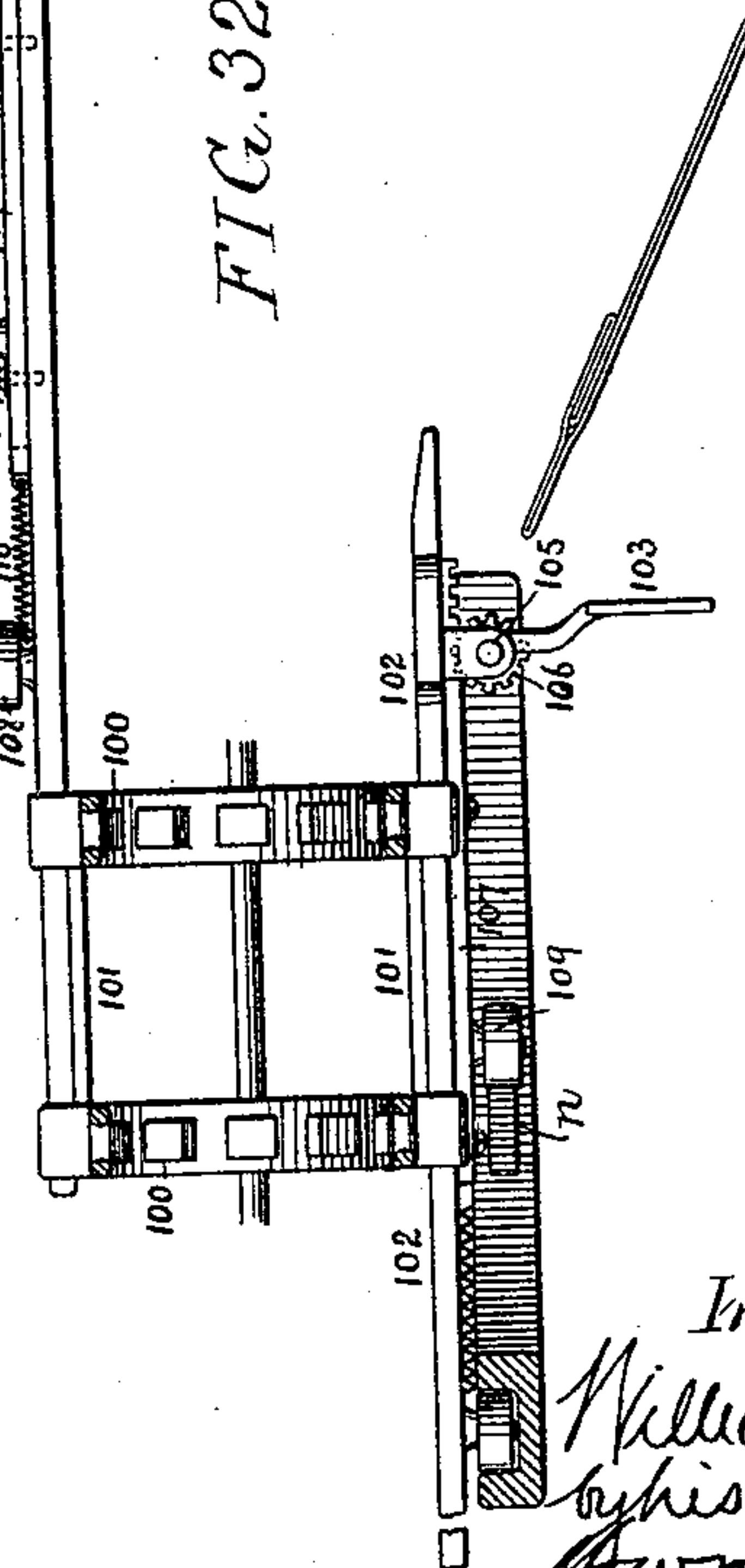


FIG. 32.

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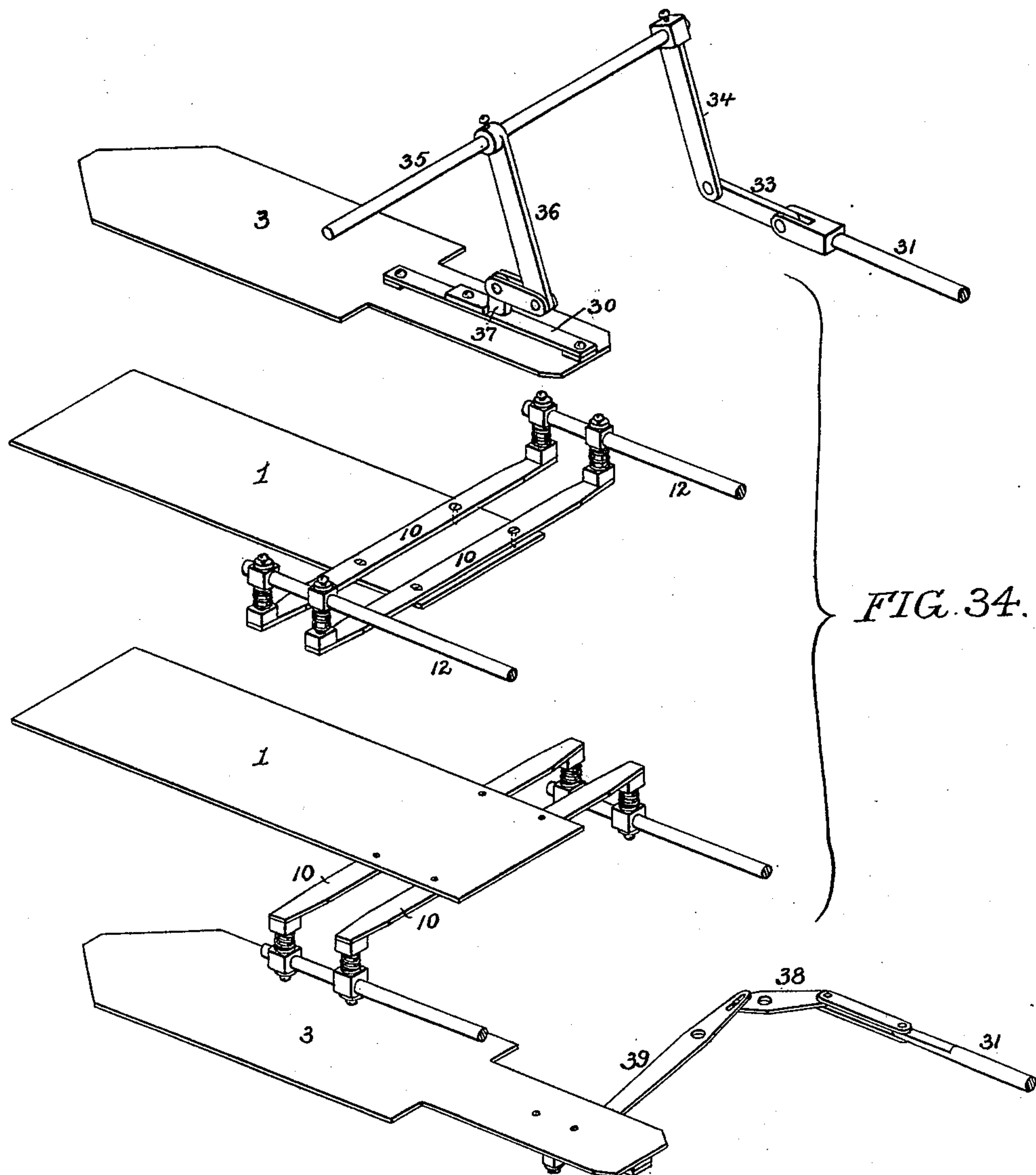
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W. WERTS.
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(No Model.)

17 Sheets—Sheet 16.

W. WERTS.
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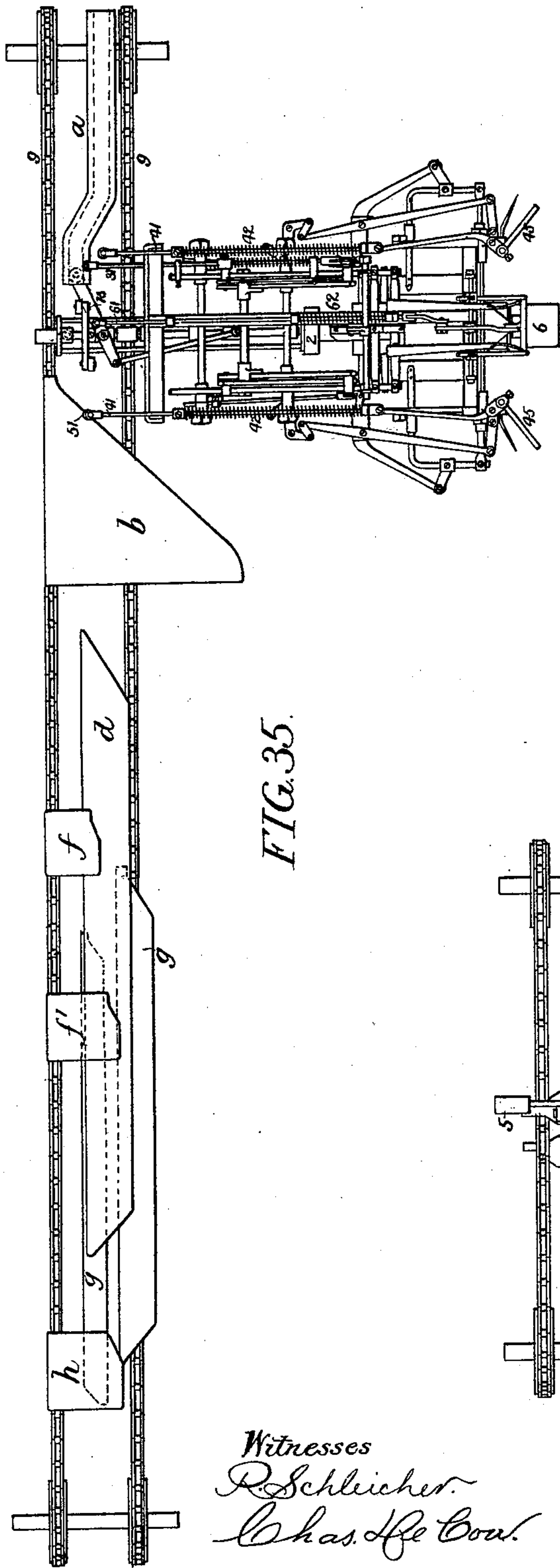
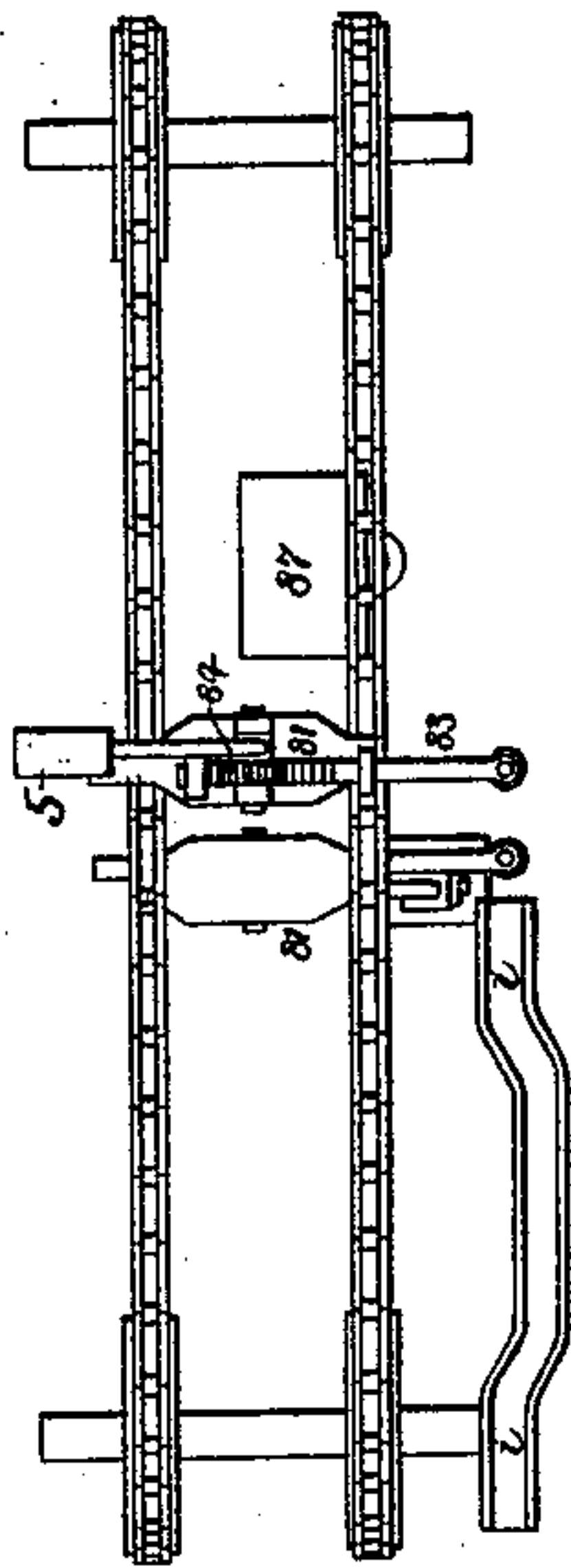


FIG. 35.



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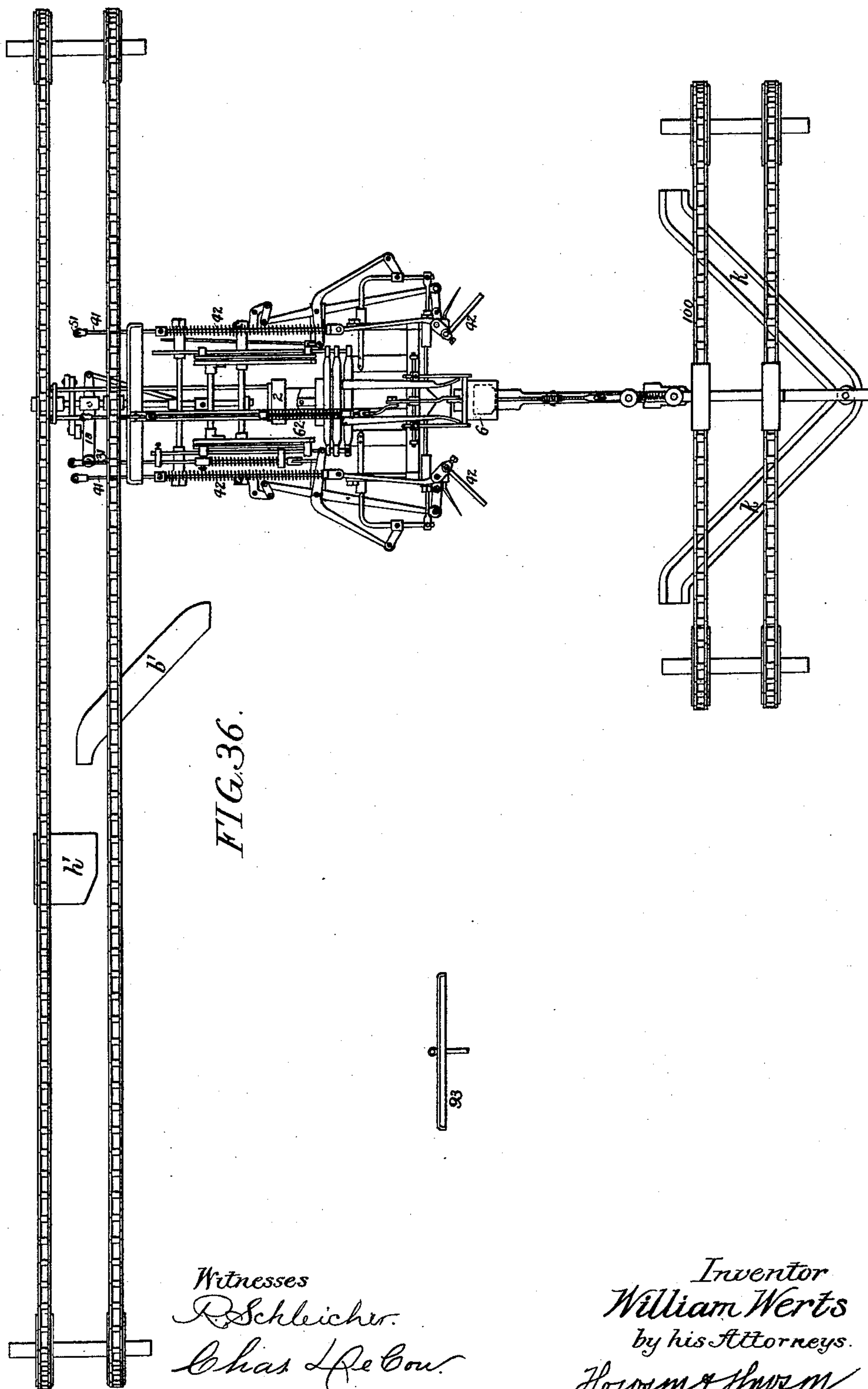
(No Model.)

17 Sheets—Sheet 17.

W WERTS.
PAPER BAG MACHINE.

No. 583,523.

Patented June 1, 1897.



UNITED STATES PATENT OFFICE.

WILLIAM WERTS, OF CAMDEN, NEW JERSEY.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 583,523, dated June 1, 1897.

Application filed July 8, 1891. Renewed October 15, 1896. Serial No. 609,031. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WERTS, a citizen of the United States, and a resident of Camden, Camden county, New Jersey, have invented certain Improvements in Paper-Bag Machines, of which the following is a specification.

The object of my invention is to construct a machine for making with extreme rapidity from suitable tubular blanks square paper bags—that is to say, bags having tucked or bellows-folded sides, and by preference also what are known as “satchel-bottoms.”

The main feature of the invention consists in mounting upon an endless belt or carrier a number of bag-forming mechanisms which operate in conjunction with certain cams and supplementary forming mechanisms, so that a number of different operations, in fact, all of the successive steps in the making of the bag, may be carried on simultaneously, one step in the operation upon one bag, another step in the operation upon another bag, and so on, so that in one machine a large number of bags may be under construction at one time.

The invention also comprises the detailed construction of the various parts of the machine, as fully set forth and claimed hereinafter.

In the accompanying drawings, Figures 1 to 9, inclusive, are perspective diagrams illustrating the successive steps in the formation of the bag upon my improved machine, only so much of the mechanism of the machine being shown as is necessary to a proper understanding of the operation of making the bag. Fig. 10 is a plan view of one of the main bag-forming mechanisms of the machine. Fig. 11 is a longitudinal section of the same on the line *xx*, Fig. 10. Fig. 12 is a front view looking in the direction of the arrow, Fig. 10. Fig. 13 is a side elevation of the various operating-cams and the rods connected to the bag-forming mechanisms shown in Figs. 10, 11, and 12. Figs. 14 to 25 are plan views of the various operating-cams and in connection with each of the same those parts of the bag-forming mechanism upon which it acts. Figs. 26 and 27 are respectively a side elevation partly in section and a plan view of the pasting mechanism of the machine. Figs. 28

and 29 are respectively an end elevation and a sectional plan of the means for drying the bottom of the bag after it is pasted. Figs. 30 to 33, inclusive, are views illustrating the construction and operation of the mechanism for taking off the finished bag from the mechanism on which it was formed and delivering said finished bag from the machine, and Fig. 34 is a perspective view illustrating the mechanism for carrying and operating certain plates constituting the bag-former or bag-blank holder. Fig. 35 is a plan view showing the endless belt or carrier with one set of bag-forming devices mounted thereon and showing the relation of the same to certain operating-cams and to a second endless belt which carries devices for pasting the bottom of the bag; and Fig. 36 is a plan view showing said endless belt or carrier with its set of bag-forming devices, illustrating the relation of the latter to certain other operating-cams, to a certain drying-chest, and to a third endless belt which carries devices for removing the finished bag from the bag-former.

The machine which I have shown and will describe is one for making a square satchel-bottomed bag—that is to say, one having tucked or bellows-folded sides and a bottom with opposite inwardly-projecting triangular flaps or pockets, so that when the bag is opened it will naturally assume a square or box-like form—but my machine can by the omission of a number of parts be adapted for the manufacture of ordinary square bags—that is to say, bags having tucked sides but having at the bottom a single transverse flap folded over and pasted on against one side of the bag.

In order to facilitate an understanding of the construction and operation of the mechanism of the machine, it will be best, in the first instance, to describe the successive steps in the making of the bag with reference only to those parts of the machine which act upon the bag during its manufacture, and for this purpose reference may be had to Figs. 1 to 9 of the drawings.

The bag-blanks, in the form of tubes of the proper length, are made in a separate machine and are fed into the bag-forming machine by mechanism which will form the sub-

ject of a separate application for patent, and need not therefore be here further alluded to.

The bag-blank x is delivered by the feeding mechanism onto a pair of plates 1 1, located one above the other and of a width equal to the width of the desired bag, the blank being fed over these plates while the same are only separated from each other a short distance, and being allowed to project beyond the outer end of the plates to an extent sufficient for the formation of the necessary folds for the bottom of the bag. As soon as the blank has been applied to the plates 1 1 the latter are separated, so as to distend the tubular blank, as shown in Fig. 1, and a block 2 is thrust forward between the plates until it is flush with the outer ends of the same, as also shown in said figure.

Above the top plate 1 is another plate 3 with beveled or V-shaped front end, and beneath the lower plate 1 is a similar plate 3, these plates during the preceding operations having been retracted so that their beveled or V-shaped front ends are in the rear of the front edges of the plate 1. The plates 3 are now projected, however, so that their beveled front ends extend beyond the plates 1, as shown in Fig. 2, and form a bearing for the projecting end of the tube during the action of the lateral folding-fingers 4 4. There are two pairs of these fingers, one pair for each side of the bag, each pair comprising a finger close to the upper plate 1 and a like finger close to the lower plate 1, and the fingers have a swinging movement imparted to them, so that the two pairs act in succession and form first the fold x' at one side of the bag-blank, as shown in Fig. 3, and then a like fold x' at the other side of the bag-blank, as shown in Fig. 4, the effect of these side folds, owing to the projecting V-shaped ends of the plates 3, being to form at the top and bottom of the blank V-shaped flaps x^2 , as shown in Fig. 4. Paste is now applied by means of an L-shaped block or pasting-head 5, Fig. 5, to the outer faces of the folds x' at the points y and to the upper face of the lower flap x^2 at the point y' , the pasting-head being then withdrawn simultaneously with or immediately before the withdrawal of the plates 3. The upper projecting flap x^2 is then folded downward by means of a folding-plate 6, as shown in Fig. 6, so as to overlap the pasted portion y of the side folds x' , and the upper folding-plate 6 is then withdrawn and the lower flap x^2 is turned upward against the bottom of the bag by a lower folding-plate 6, as shown in Fig. 7, so that the pasted portion y' of said flap is brought into contact with the end of the upper flap and with the portions of the side folds x' , adjacent thereto. The pasted folds are then subjected for a time to heat and pressure by means of devices to be hereinafter described, so as to insure the firm uniting of the pasted parts. During all these operations the block 2 occupied a position at the front ends of the plates

1 and provided a bearing against which the successive folds of the bottom were laid, but this block is now withdrawn and the plates 1 1, carrying with them the plates 3, are caused to approach each other, and at the same time lateral folding or tucking plates 7 are caused to move inward between the plates 1 at each side of the bag, so as to form the opposite tucked or bellows folds therein, as shown in Fig. 8. The side folding or tucking plates 7 are then withdrawn and the bottom of the bag is acted upon by the upper folding-plate 6, so as to fold it over into line with the body of the bag, as shown in Fig. 9, it being understood that the folding-plate 6 is so pivoted that it can assume either a vertical or a horizontal position, or any position intermediate of the two.

The mechanism above described for forming the various folds in the bag is mounted upon a substantial framework carried by a rod 8, which is supported upon and is carried by an endless belt or conveyer, preferably in the form of a chain belt, having any desired number of chains. Thus, as shown in Figs. 10 and 11, the rod 8 is secured to a conveyer having two chains 9 9, certain of the links of these chains being constructed for the reception of the rod 8, which is firmly secured thereto.

As stated in the specification, it is proposed to have a series of folding mechanisms upon the chain belt or conveyer, which folding mechanisms are brought successively under the control of the operating-cams, referred to hereinafter, as said folding mechanisms are carried along by the belt, the cams being stationary, and the endless belt or conveyer may be passed around opposite drums or pulleys, so as to have simply an upper and lower run, or it may be guided in serpentine form, where the size of the room or apartment in which the machine is situated is not such as to warrant the use of the simple straight belt.

The plates 1 are carried by cross-bars 10, which, as shown in Fig. 34, are carried by the front ends of the rods 12, suitably guided in bearings in the frame of the machine, so that they are capable of longitudinal movement and also of movement from and toward each other. The upper rod 12 is carried by the upper arms and the lower rod 12 by the lower arms of a pair of levers 13, which are hung to a cross-bar 14 on the rod 8, the upper rear arm of one lever and the lower rear arm of the other lever being connected by links 15 to a slide 16, on the rod 8, and said slide being connected by a rod 17 to a lever 18, hung to a block 19 on the rod 8, an antifriction-roller on this lever being under control of a grooved cam a , Fig. 14, whereby at the proper time forward and backward movements on the rod 8 are imparted to the slide 16, and the levers 13 are thereby expanded and contracted, so as to raise and lower the rods 12 and thus separate or bring together the plates 1.

The block 2 is carried by a pair of rods 20, which are suitably guided in the frame, and said block 2 is projected by the action of a cam *b* upon an antifriction-roller 21, carried by a cross-head at the rear of the rods 20, as shown in Fig. 15, the retracting movement of the block being effected by the action of a cam *b'* upon said roller 21, as shown in Fig. 23.

The upper and lower plates 3 are carried by bars 30, as shown in Fig. 11, and the movement of said bars is derived from cams *d*, Fig. 16, these cams acting upon upper and lower rods 31, Figs. 10 and 11, the cams imparting forward movement to the rods, the backward movement of which is due to the action of springs 32. The upper rod 31 is connected by a link 33 to an arm 34 on a rock-shaft 35, which has another arm 36, connected by a link to a bracket 37 on the frame 30, carrying the upper plate 3, while a stud on the frame 30, carrying the lower plate 3, is connected to one arm of a lever 39, the other arm of which is connected to a lever 38, which is connected by links to the front end of the lower rod 31. This construction is shown by dotted lines in Fig. 10, and is also illustrated in Fig. 34.

The folding-fingers 4 at one side of the bag are operated by mechanism precisely similar to that which operates the folding-fingers at the other side of the bag. Hence it will not be necessary to describe more than one set of these devices.

The fingers 4 are carried by a rock-shaft 40, adapted to bearings in a frame 50, described hereinafter, rocking movement being imparted to the shaft 40 at one side of the machine from a cam *f*, Fig. 18, and to the rock-shaft at the opposite side of the machine from a cam *f'*, Fig. 20, these cams each acting through the medium of a rod 41, which is projected by the cam and retracted by a spring 42, the front end of each rod being connected by a rod 43 to an arm 44 on the rock-shaft, which also has another arm 45, adapted to engage with a spring-catch 46 at the top of the machine, so as to retain the fingers in their inward position after the rod 41 has passed beyond the control of its cam. Before any swinging movement of the fingers 4, however, there is an inward movement of the frame 50, carrying the same, such movement being effected as to the frame at one side of the machine by a cam *g*, Fig. 17, and as to the frame at the other side of the machine by a cam *g'*, Fig. 19. Each of these cams acts through the medium of a rod 51, which is projected by the cam and retracted by a spring 52, the forward end of each rod being connected by a link 53 to one arm of a bell-crank lever 54, the other arm of which is connected by a link 55 to one arm of a lever 56, the other arm of the latter being connected by a link 57 to the frame 50. When, therefore, the frame is moved inward and the shaft 40 is rocked so as to fold inward the fingers 4 and cause the arm 45 to engage

with the spring-catch 46 said arm will be held by the catch until the frame 50 is moved outward by the action of the springs 52 upon the rod 51 when the rod passes from under control of its cam.

The mechanism for actuating the upper folding-plate 6 is under control of a cam *h*, Fig. 21, and the mechanism for operating the lower folding-plate 6 is under control of a cam *h'*, Fig. 22, each of these cams acting upon a rod 61 to project the same, and each rod being acted upon by a spring 62 to retract it. The forward end of each rod is connected by a link 63 to one arm of a lever 64, which is hung to an arm 65 on a rod 66, the other arm of said lever being connected to a bracket at the rear end of the plate 6. Each plate 6 is hung, however, at a point in advance of the bracket 67 to the front end of a bar 68, which is carried by a block 69 on the rod 66. Owing to this construction the movement of each plate 6 is a compound one—that is to say, it comprises a movement toward and from the plates 1 and a swinging movement on its pivot. When the plates 1 are separated, the plates 6 in their movement toward said plates 1 strike the front edges of the same at a point in the rear of the pivot. Hence the continued forward movement of the rod 61 is devoted to turning the plates on their axes, so as to fold in the flaps x^2 of the bag-bottom, as before described, but when the plates 1 are close together the upper plate 6 in swinging toward said plates 1 strikes the same at a point in advance of the pivot, and hence is caused to move inward and rearward, so as to fold over the bottom as the bag in line with the body of the same, as before set forth. The final movement of the upper folding-plate 6, in order to form this last fold in the bottom, is effected by the action of a cam *h*², Fig. 25. Before this action, however, it was necessary to close together the plates 1 and form the side tucks, and this operation was effected by means of a cam *a'*, Fig. 24, acting upon the lever 18, and thence upon the mechanism carrying the said plates 1.

The side tucking or folding plates 7 are moved inward simultaneously with the closing of the plates 1, and move outward simultaneously with the opening of said plates, so that they can be operated by connection with the same mechanism which effects the movement of the plates. The slide 16 is therefore connected at each side by an arm 71 to a swinging arm 72, hung to a cross-bar 73 on the rod 8, this swinging arm 72 being connected by a rod 74 to one arm of a lever 75, hung to the fixed frame, and this lever being connected by a link 76 to a yoke 77, which carries at its inner end the folding or tucking plates 7, as shown in Fig. 24.

The mechanism for applying the paste, as shown in Fig. 5, is illustrated in Figs. 26 and 27, this mechanism being carried by an endless belt or conveyer running adjacent to the

front ends of the folding mechanisms carried by the endless belt or conveyer 10 in such relation thereto that when the pasting-head 5 is projected, as described hereinafter, it will properly apply the paste to the bottom of the bag, as before set forth. There are any desired number of these pasting devices carried by said endless belt or conveyer, which, in the present instance, has two chains 80, provided with as many cross-bars 81 as there are pasting devices, each of these cross-bars having bearings for a rock-shaft 82 and for a sliding rack 83, which meshes with a pinion 84 on said rock-shaft, the latter also carrying the arm 85, on which is mounted the pasting-head 5. The rack 83 has at the outer end an antifriction-roller adapted to a grooved cam *i*, which is adjacent to the upper run of the chain and serves to actuate the racks 83 in succession, so as to throw the pasting-heads forward against the bags carried by the forming devices and then retract the said devices, suitable friction-brakes or equivalent means being employed to hold the devices in this retracted position when they are freed from the control of the cam.

As before stated, the endless conveyer carrying the pasting devices is arranged adjacent to the bag-forming devices, so that in their movements along the upper run of the chain each of the pasting devices will be in line with one of the bag-forming devices.

The relation of the conveyer 80, which carries the pasting devices to the conveyer 9, which carries the bag-forming devices, is shown in Fig. 34, in which the conveyers are represented conventionally as belts. When first reaching the upper run of the chain, each pasting device is retracted, but as it comes under the influence of the cam *i* it is first thrown forward, as shown at the top of Fig. 26, so as to apply the paste to the bag as it travels along with the same, and is then retracted prior to passing down onto the lower run of chain. During its passage along the lower run of the chain the two faces of each pasting-head 5 are brought into contact with paste-applying rolls 86, which are carried by paste-boxes 87, and project forward beyond the faces of said boxes, the inner portion of each roll running in the paste in the box, as shown in Fig. 26, and the paste being, if desired, constantly pressed forward by means of a follower 87, acted on by springs 88.

After the bottoms of the bags have been pasted and folded they are dried by passing in contact with a steam-box 90, Figs. 28 and 29, this box consisting of a long shallow box having a smooth face for contact with the bag-bottom and containing a steam-chamber to which steam is admitted through a pipe 91, the water of condensation being withdrawn through a suitable cock 92, and the back of the box being packed with suitable non-conducting material 93, so as to prevent undue condensation. This heating-box acts upon the

pasted bottoms of the bags as soon as possible after they are pasted and before they are acted upon by the upper press-plate 6 in the manner shown in Fig. 9, the preferable location for the heating-box being at that end of the lower run of the carrier 9 which is farthest from the delivery end, as shown in Fig. 34. As soon as the bag-bottoms have passed beyond the heating and pressing box 90 they are acted upon by the upper press-plate 6, in the manner before described, so as to turn the bag-bottom in line with the body of the bag, thereby finishing the folding of said bottom and bringing the bag into condition for the action of the delivery devices. These devices are shown in Figs. 30 to 33, inclusive, and consist of a double chain-carrier 100, the lower run of which is in line with the finished bags carried by the forming devices on the lower run of the main chain-carrier 9, as shown in Fig. 34. As in the case of the pasting devices, there are a number of these delivery devices, and the chain-carrier 100 travels at the same speed as the bag-forming devices, so that as each delivery device comes around onto the lower run of the chain it is in position to engage with the projecting bottom of a bag on one of the forming devices and travels along with the same, and during this movement first nips the bottom of the bag, then pulls it outward from the plates 1, and then releases and drops it, these successive operations being shown, respectively, in Figs. 30, 31, and 32. The chain-carrier 100 has as many cross-bars 101 as there are delivery devices, and each of the latter consists of a bar guided longitudinally in bearings on said cross-bar 101, the outer end of the said bar 102 forming one of the nipping-jaws of the delivery device, the other jaw 103 of which is carried by an arm 104 on a rock-shaft 105, adapted to bearings on the bar 102, and having a spur-pinion 106, which meshes with a rack 107, guided on the bar 102. The bar 102 has an antifriction-roller 108, which is under control of a grooved cam *k*, running part way along the lower run of the chain-carrier 100, and the rack-bar 107 has an antifriction-roller 109 under control of a cam *m*, which runs part way along the lower run of the chain-carrier and part way around one turn of the same, where the delivery devices are carried down from the upper to the lower run of the chain, as shown in Figs. 30 and 31. The tendency of this cam is to move the rack-bar 107 forward, and thus open the lower jaw of the delivery device, the jaw being closed by the action of a spring 110 on the rack-bar as soon as the roller 109 has passed from under the control of the cam.

The action of the cam *k* is to first retract the bar 102 and then project the same again, so that the successive operations of the delivery device are those shown in Figs. 30, 31, and 32, and are as follows: As the delivery devices travel along the upper run of the chain the nipping-jaws are closed, but as they descend toward the lower run the jaw 103 of each de-

vice is opened by the action of the cam *m*, so as to clear the projecting bottoms of the bags, as shown in Fig. 30, the end of the bar 102 overlapping a bag-bottom, as shown in said figure, and traveling along with the same. As soon as the roller 109 has passed beyond the cam *m* the jaw 103 is closed on the bag-bottom by the action of the spring 110, and the bar 102 then comes under the action of the cam *k* and is retracted so as to pull the bag from the plates 1, as shown in Fig. 32. As soon as the bar has been fully retracted, as shown in Figs. 32 and 33, or some short time before it reaches this point, the roller 109 comes under the influence of the short cam *n*, Fig. 32, which projects the rack-bar 107 sufficiently to open the jaw 103 and permit the bag to drop, as shown in Fig. 32, the jaw being then again permitted to close under the action of the spring 110 as the bar 102 is projected on leaving the cam *k* preparatory to rising again to the upper run of the chain.

In assembling the parts of the machine the cams *a*, *b*, *c*, *d*, *f*, *g*, *h*, *a'*, *f'*, *g'*, and *h'* will be adjacent to the upper run of the main carrying-chain 9, as these cams act upon the folding devices of the machine while they are traversing said upper run, and in like manner the chain-carrier for the pasting devices and the cams operating in conjunction therewith will be in line with the folding devices as they are traversing the upper run of the main chain-carrier 9, as shown in Fig. 34. This provides for the disposal of the heating and pressing box 90, the cams *h*² and *b*³ for imparting the final movement to the press-plate 6, and the endless chain-carrier for the delivery devices and the cams operating therewith along the lower run of the chain, so that a large number of bags may be simultaneously in process of formation in the machine, the speed of which can be as high as it is possible to move the reciprocating and vibrating parts of the machine. Hence the capacity of the machine is only limited by the mechanical limitations imposed upon all machinery having reciprocating or vibrating parts under control of cams.

One of the main differences, so far as I am aware, between my machine and preceding paper-bag machines is that, whereas in the present machines the folding devices act successively upon one bag and practically complete the same before acting upon another, in my machine there are practically as many different sets of folding mechanisms as there are successive steps in the operation, so that each element of the following mechanism is working continuously at its highest speed—that is to say, there is no dwell or pause in its action to await the action of some other part of the machine.

Such of the springs employed and hereinbefore referred to as having the function of retracting a rod or bar after the same has

been projected by the action of the cam are so disposed as to act between a flange or collar on said rod or bar and a fixed lug or projection on the machine, the springs being compressed by the forward movement of the rod or bar under the action of the cam and effecting the retraction of said rod or bar by recoil when the cam permits such retraction.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. A paper-bag machine having a series of bag-forming devices carried by an endless conveyer, and bag-removing devices likewise carried by an endless conveyer independent of that carrying the bag-forming devices, substantially as specified.

2. A paper-bag machine having a series of bag-forming devices carried by an endless conveyer, in combination with pasting devices for the bottom of the bag and with mechanism for removing the finished bag from the forming devices, said pasting and removing devices being each carried by an independent endless conveyer, substantially as specified.

3. The combination in a paper-bag machine, of a pair of plates for the reception of the bag-blank, carriers for said plates, and means for moving said carriers from and toward each other, whereby the plates are caused to approach and recede from each other; the movement being coextensive throughout the length of the plates, substantially as specified.

4. The combination in a paper-bag machine, of a pair of plates adapted to enter the bag-blank, carriers for said plates, means for moving said carriers from and toward each other so as to cause the plates to approach and recede from each other, the movement being coextensive throughout the length of the plates, a block adapted to be projected between the plates when the latter are separated, and means for advancing and retracting said block, substantially as specified.

5. The combination, in a bag-forming device, of plates adapted to enter the bag-blank, means for moving said plates toward and from each other, sliding plates having tapered ends for forming the triangular folds of the bag-bottom, and means for advancing and retracting said plates, substantially as specified.

6. The combination, in a bag-forming device, of bag-blank-holding plates movable from and toward each other, the sliding plates having tapered ends, means for operating said plates, and laterally-swinging folding-fingers for bending the projecting end of a tube around the projecting tapered ends of the sliding plates, substantially as set forth.

7. The combination of the bag-blank-holding plates movable from and toward each other, the sliding plates, having tapered ends, the spreader-block, and means for operating said parts, with laterally-swinging folding-fingers at each side of the blank, substantially as specified.

8. The combination of the bag-blank-holding plates, the sliding plates having tapered ends, mechanism for operating said plates, and folding-fingers at opposite sides of the blank, each set of folding-fingers having a compound movement imparted to it, namely, a lateral movement from and toward the blank and a swinging movement for folding the end of the blank, substantially as specified.

9. The combination of a bag-blank holder and mechanism for folding the end of the blank, with a pasting-head swinging in a plane parallel with the bag and in line with the center of the same, and having two faces, one for applying paste to the bottom folds of the bag and the other for applying paste to one of the projecting flaps of the bag, substantially as specified.

10. The combination of the bag-blank holder and the laterally-moving side-folding fingers, with the flap-folding plates, swinging in a plane at right angles to that of the side-folding fingers, and having two movements, namely, a swinging movement from and toward the bag and a pivotal movement on said swinging carrier, substantially as specified.

11. The combination of the bag-blank-holding plates adapted to enter the blank, and movable from and toward each other, devices for folding the bottom of the bag, and side-tucking plates for forming the bellows folds in the sides of the bag after the formation of the bottom and during the collapsing movement of the holding-plates, substantially as specified.

12. The combination of the bag-blank-holding plates movable from and toward each other, devices, including flap-folding plates, for forming the bottom of the bag, side-pressers for tucking the sides of the bag on the collapse of the holding-plates, and means for moving one of said flap-holding plates subsequently to the operation of the side-folding plates and the collapse of the holding-plates, whereby the folded bottom of the bag is turned into line with the body of the bag, substantially as specified.

13. The combination of the bag-blank-holding plates, rods carrying the same, levers upon which said rods are mounted, a reciprocating slide and means for imparting the movement of said slide to said levers, so as to move the plate-holding rods from and toward each other, substantially as specified.

14. The combination of the bag-blank-holding plates, the rods carrying same, levers on which said rods are mounted, the laterally-moving side-tucking plates, a reciprocating slide, and means for transmitting the movement of said slide both to the levers and to said side-tucking plates, substantially as specified.

15. The combination of the bag-blank-holding plates, the flap-forming plates mounted thereon, means for moving said bag-holding plates from and toward each other, and mechanism comprising levers and links for im-

parting a reciprocating movement to said flap-forming plates and permitting them to rise and fall with the bag-blank-holding plates, substantially as specified.

16. The combination of the side-folding fingers, rock-shafts carrying the same, laterally-guided frames on which said rock-shafts are mounted, and means for imparting sliding movement to said frames and for rocking the shafts which carry the folding-fingers, substantially as specified.

17. The combination of the side-folding fingers, rock-shafts carrying the same, laterally-sliding frames on which said shafts are mounted, mechanism for laterally moving said frames and for swinging the rock-shafts, arms on said rock-shafts, and spring-catches for engaging with said arms when the folding-fingers and slides are moved inward, thereby retaining said folding-fingers until the slides are moved outward, substantially as specified.

18. The combination of the flap-folding plates, vibrating arms to which said plates are pivoted, arms connected to the plates in the rear of and above the pivots, and means for operating said arms, substantially as specified.

19. The combination of the bag-forming devices, an endless conveyer carrying the same, a series of pasting-heads, an endless conveyer on which said heads are free to swing, and paste-boxes having paste-applying rollers against which the heads are carried during part of their travel, substantially as specified.

20. The combination of the bag-forming devices and the endless conveyer carrying the same, with a series of pasting-heads, an endless conveyer having rock-shafts with arms upon which said pasting-heads are mounted, rack-and-pinion mechanism for rocking said shafts, and a cam for reciprocating the rack, substantially as specified.

21. The combination of bag-forming devices, an endless conveyer carrying the same, a series of pasting-heads, an endless conveyer having rock-shafts with arms upon which said pasting-heads are mounted, rack-and-pinion mechanism for rocking the shaft, a cam for reciprocating the rack, and paste-boxes having paste-applying rolls in contact with which said pasting-heads are carried when rocked away from the bag-holders, substantially as specified.

22. The combination of the bag-forming devices mounted upon an endless conveyer, with bag-delivery devices likewise mounted upon an endless conveyer and each comprising a longitudinally-moving jaw and a jaw movable therewith, but having also an opening and closing movement, substantially as specified.

23. The combination of the bag-folding devices carried by an endless conveyer, with the bag-delivery devices, likewise carried by an endless conveyer and comprising a bar movable longitudinally on the conveyer, a

cam for reciprocating said bar, a pivoted jaw
hung to the bar, rack-and-pinion mechanism
for operating said jaw, a cam for moving the
rack to open the jaw, and a spring for moving
5 the rack to close the jaw, substantially as
specified.

In testimony whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

WILLIAM WERTS.

Witnesses:

EUGENE ELTERICH,
HARRY SMITH.