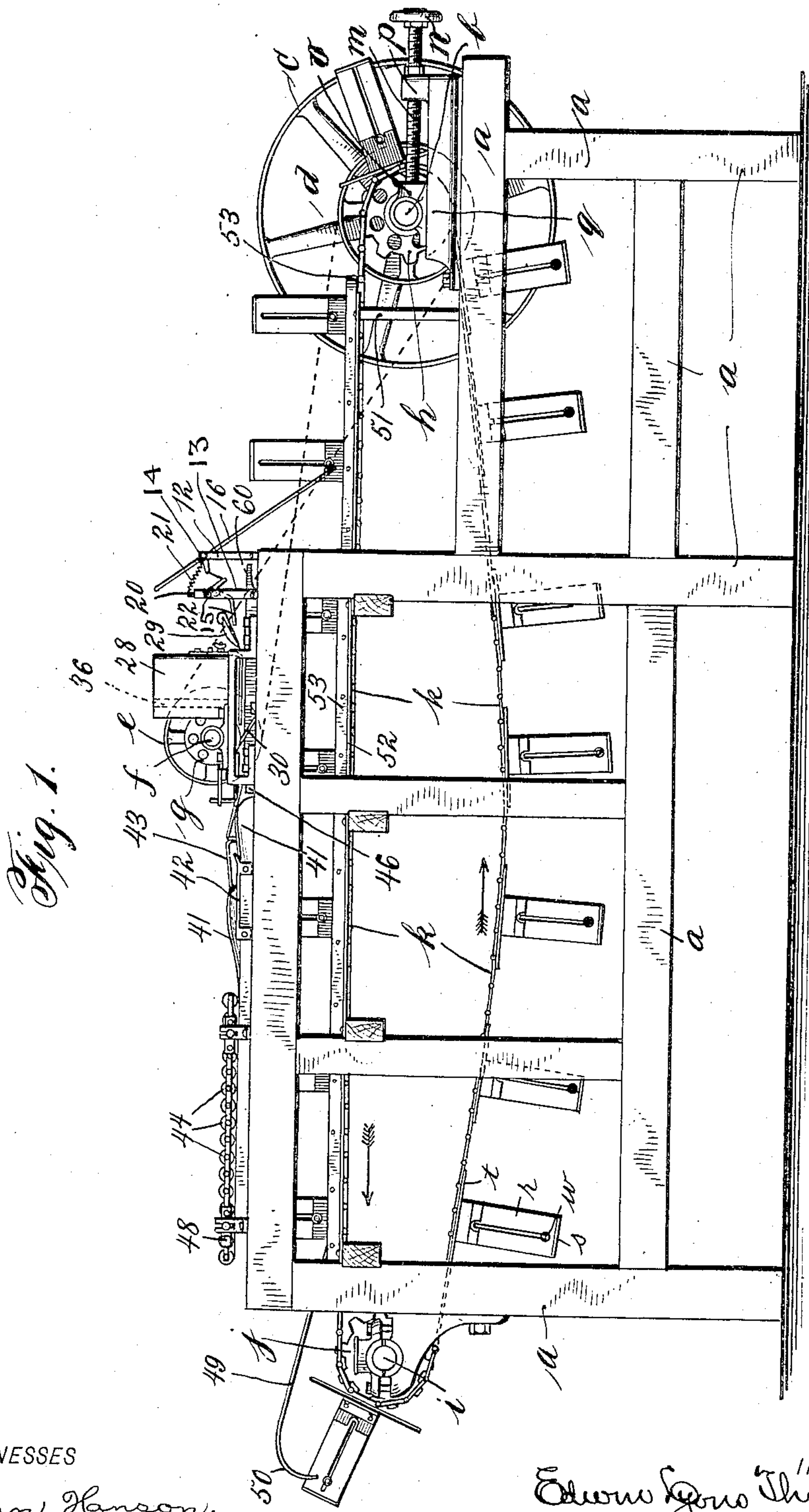


No. 876,506.

E. L. THURBER.
BOX MAKING MACHINE.
APPLICATION FILED JAN. 8, 1907.

PATENTED JAN. 14, 1908.

4 SHEETS—SHEET 1.



WITNESSES

Lillian Hanson.

M. Hamilton.

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ATTORNEY..

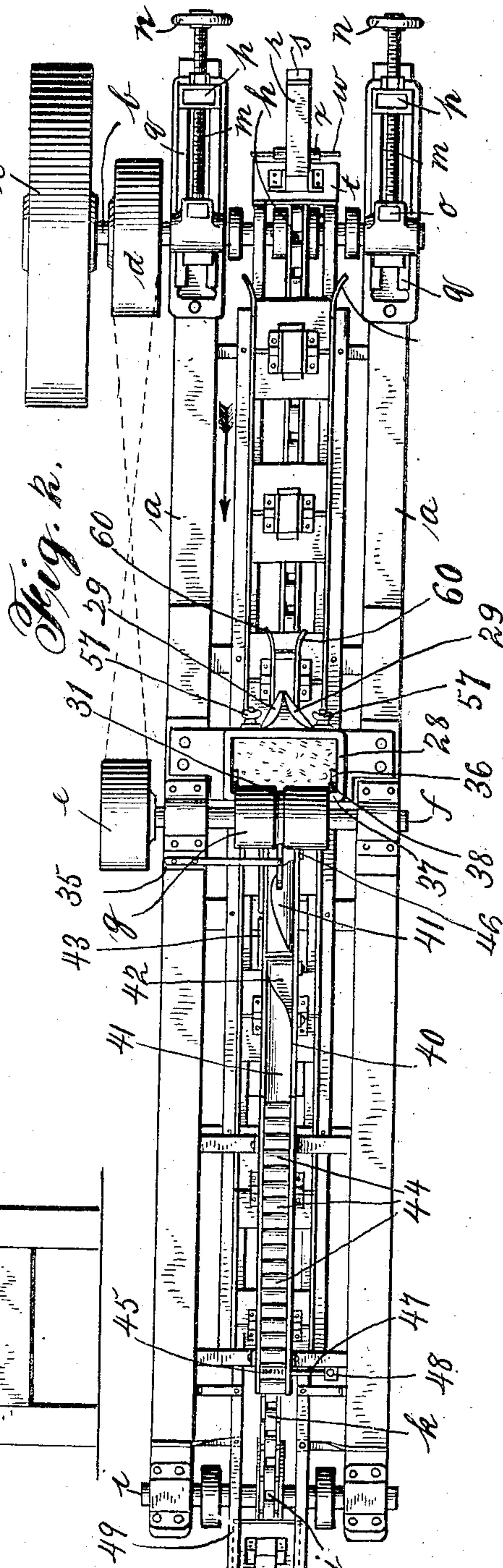
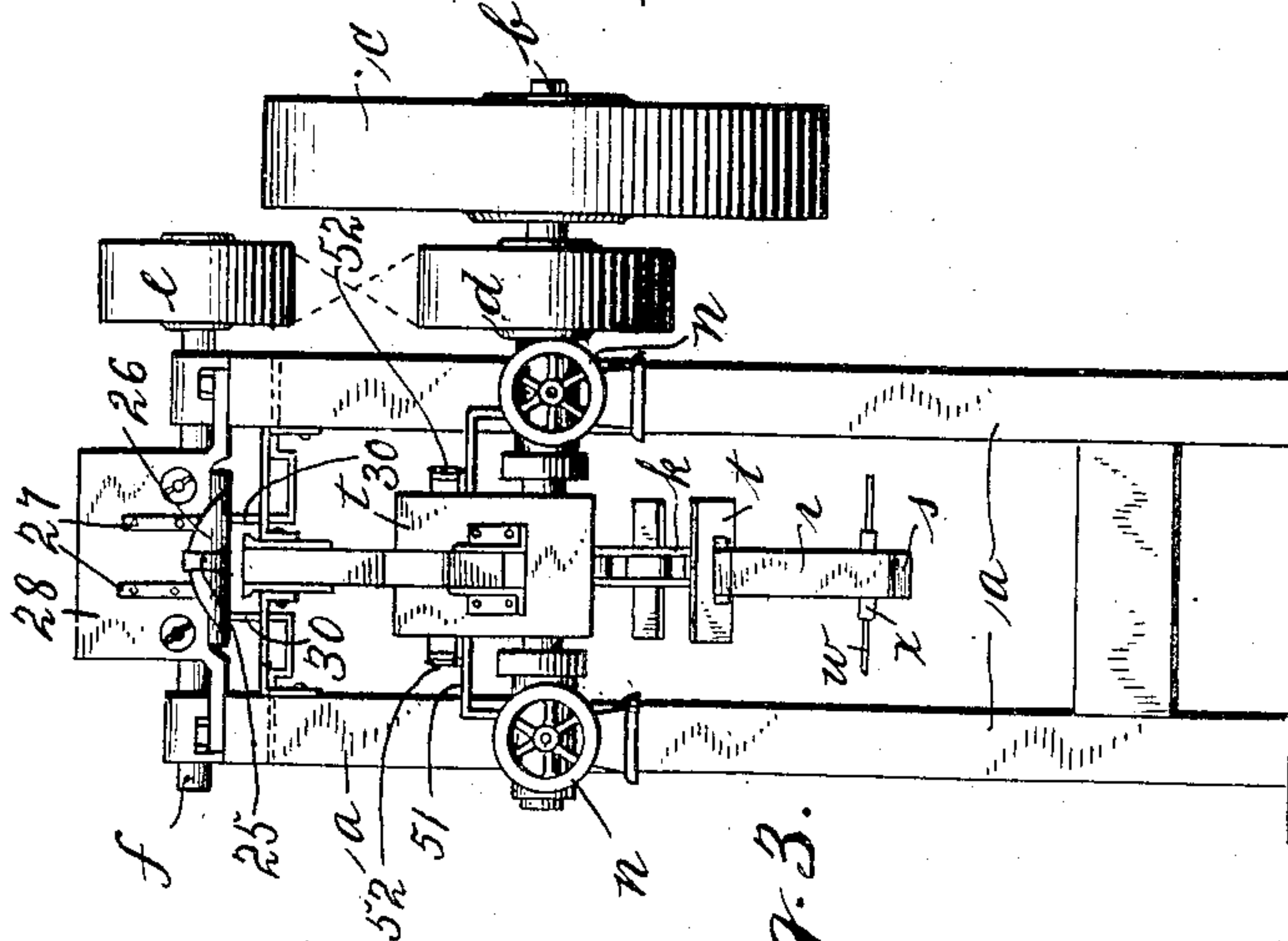
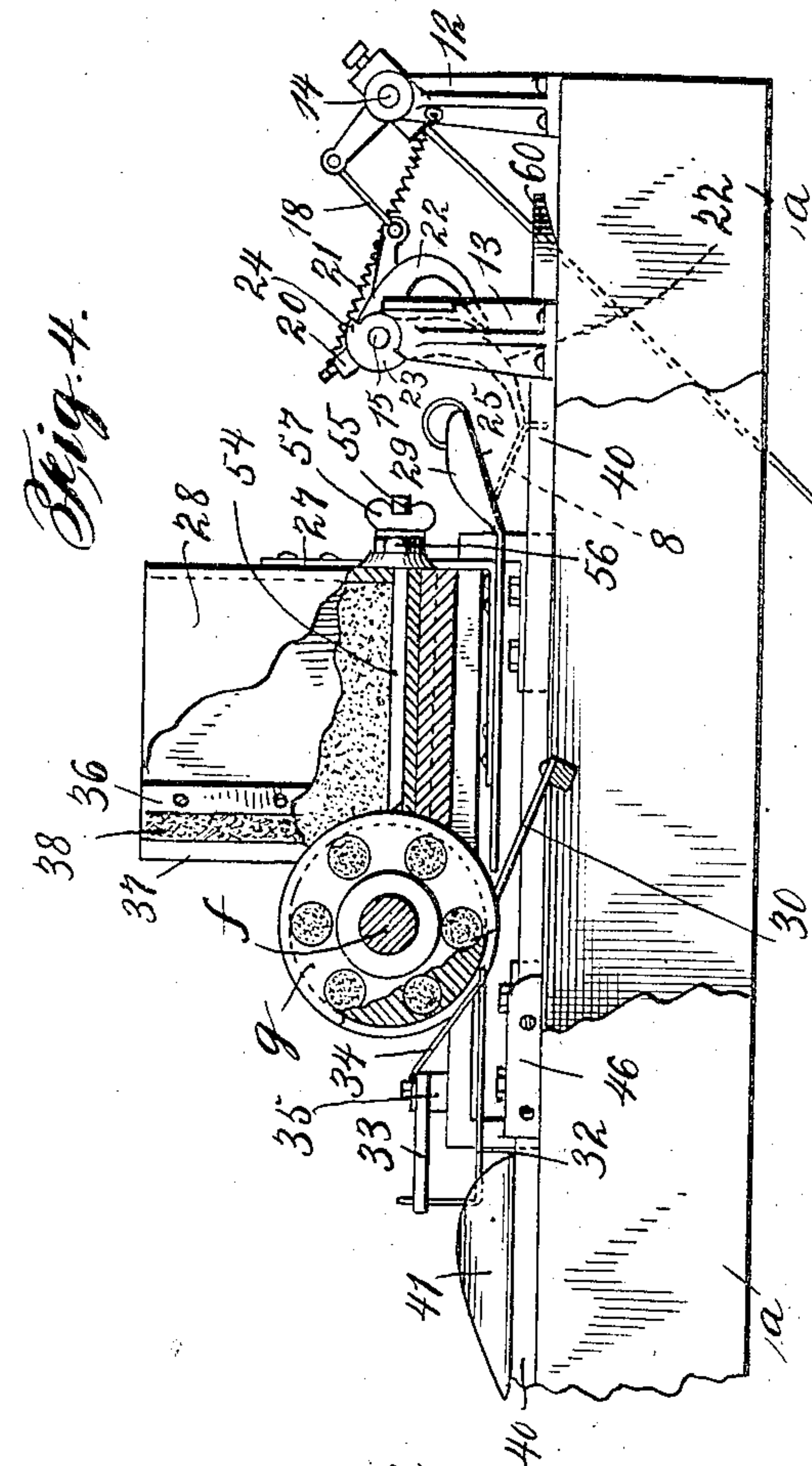
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4 SHEETS—SHEET 2.



WITNESSES

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Fig. 3.

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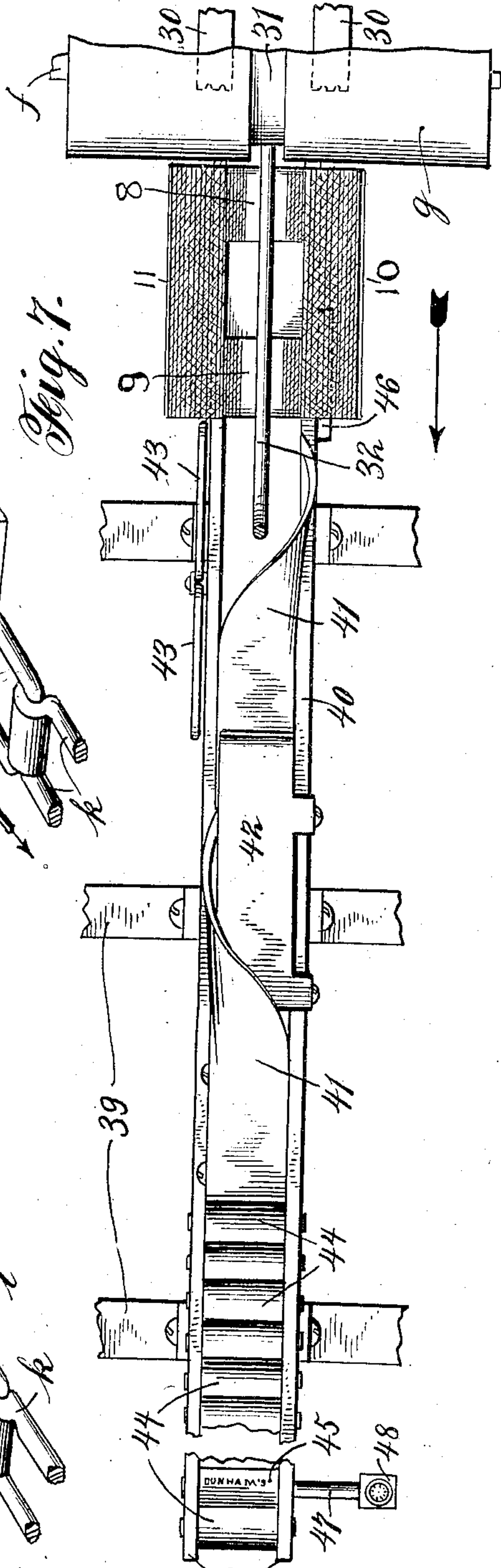
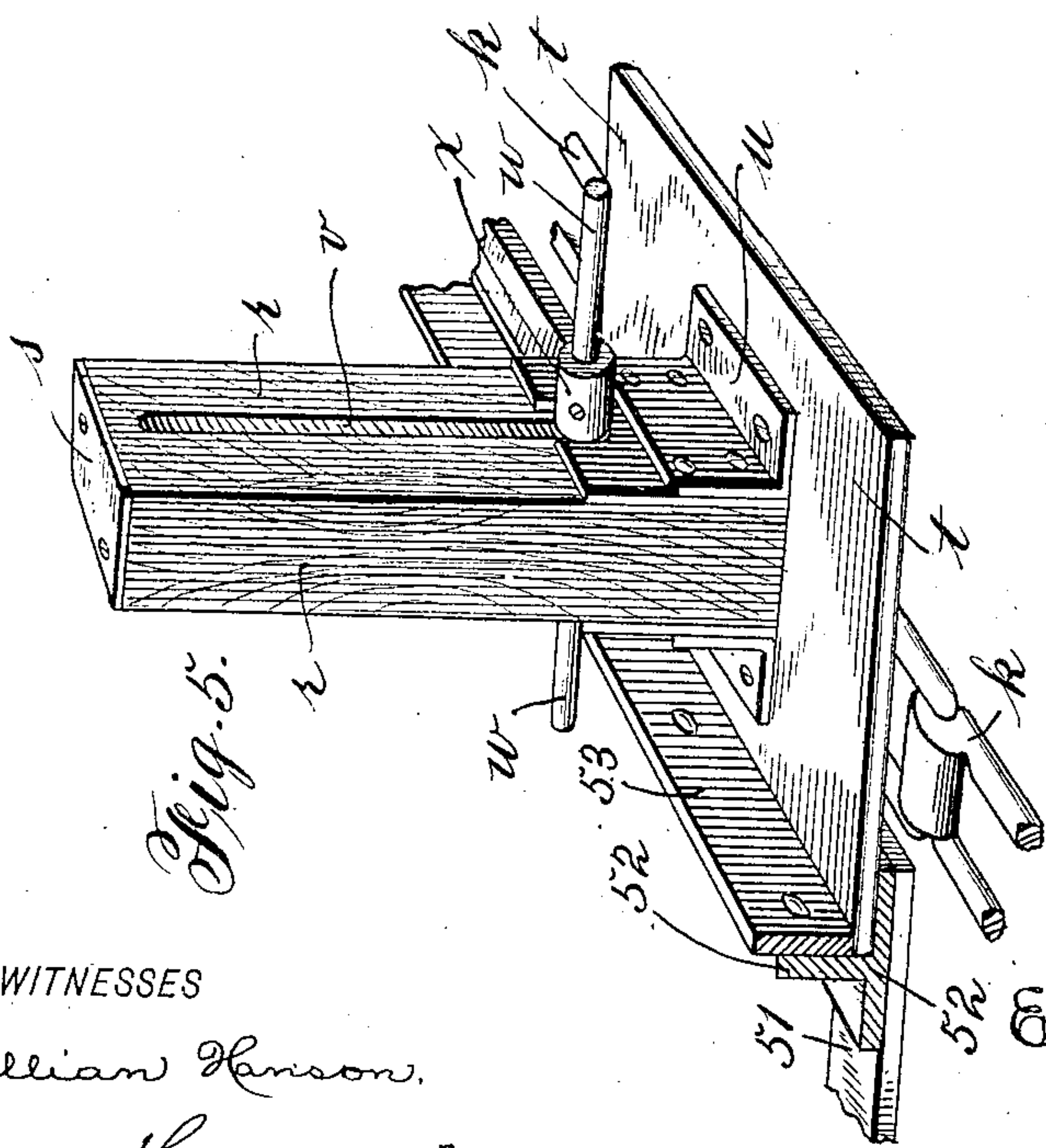
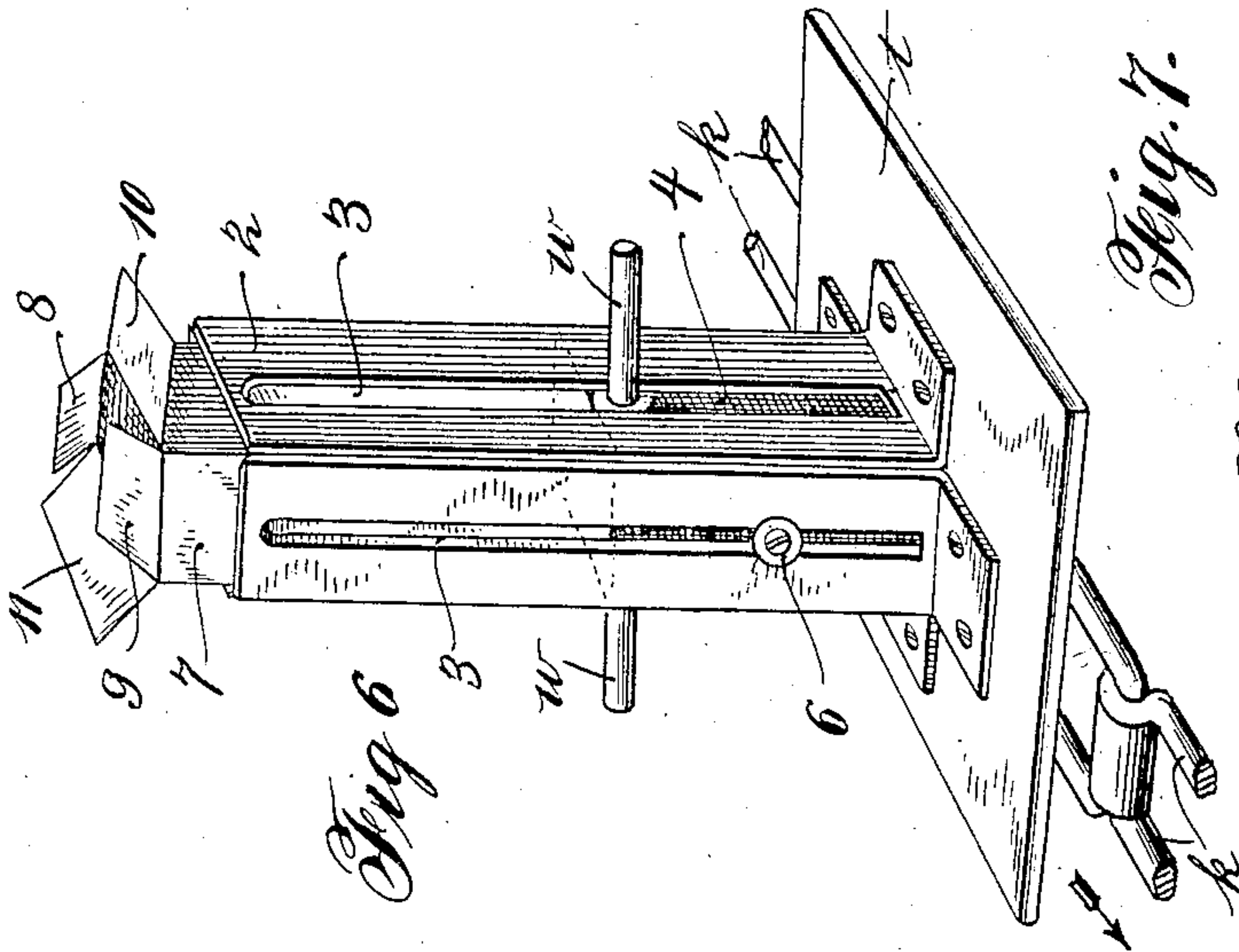
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4 SHEETS—SHEET 3.



WITNESSES

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4 SHEETS—SHEET 4.

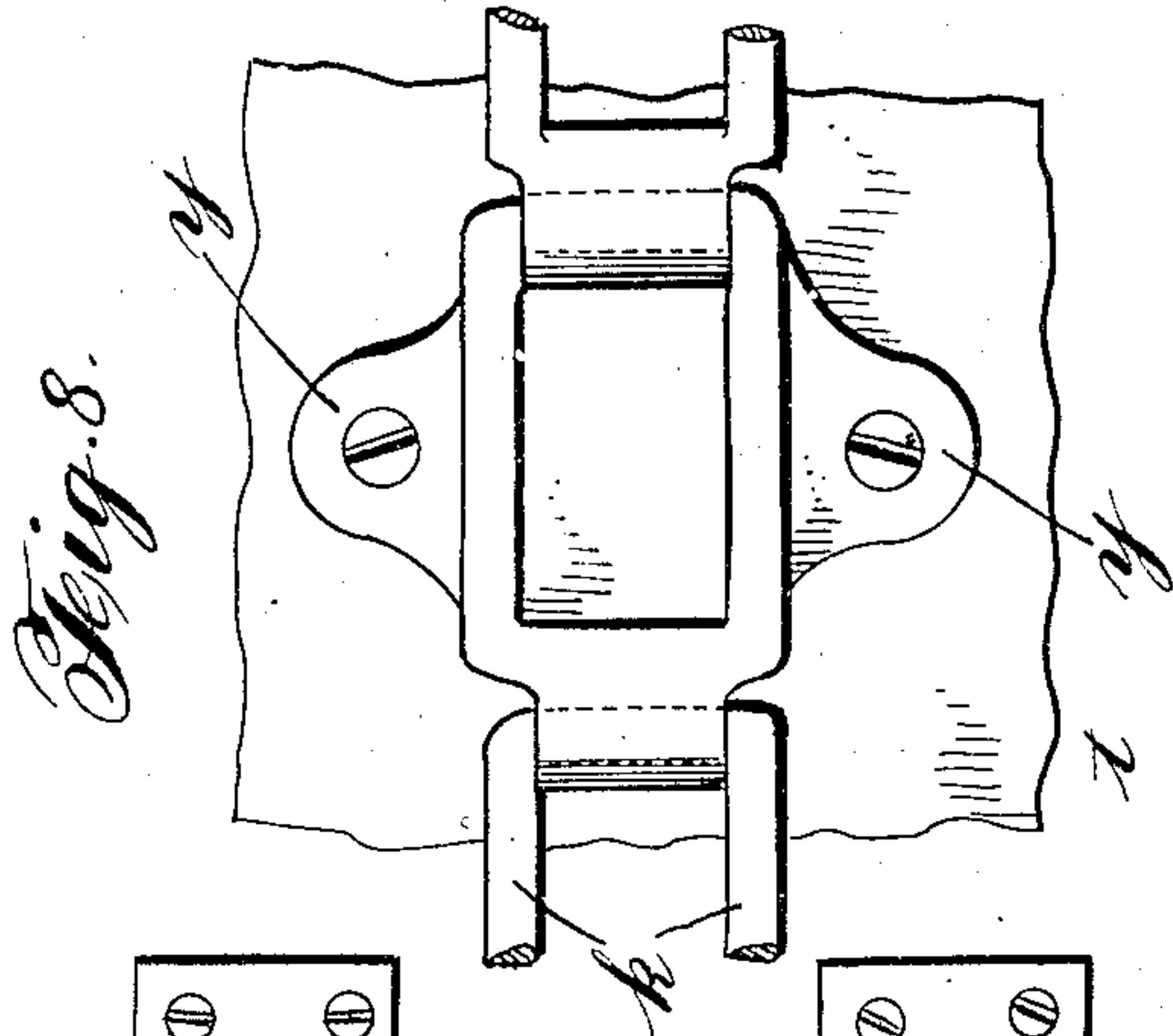


Fig. 9.

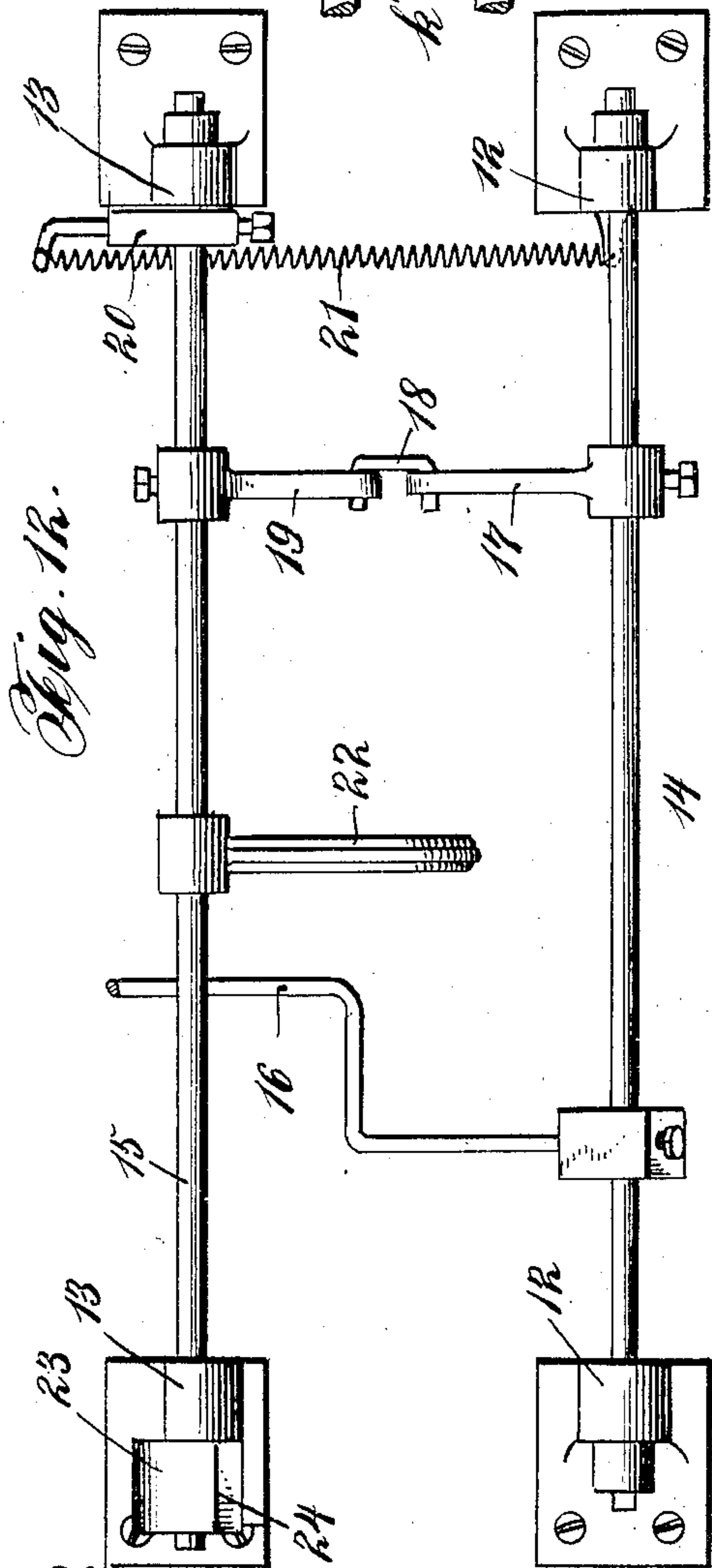
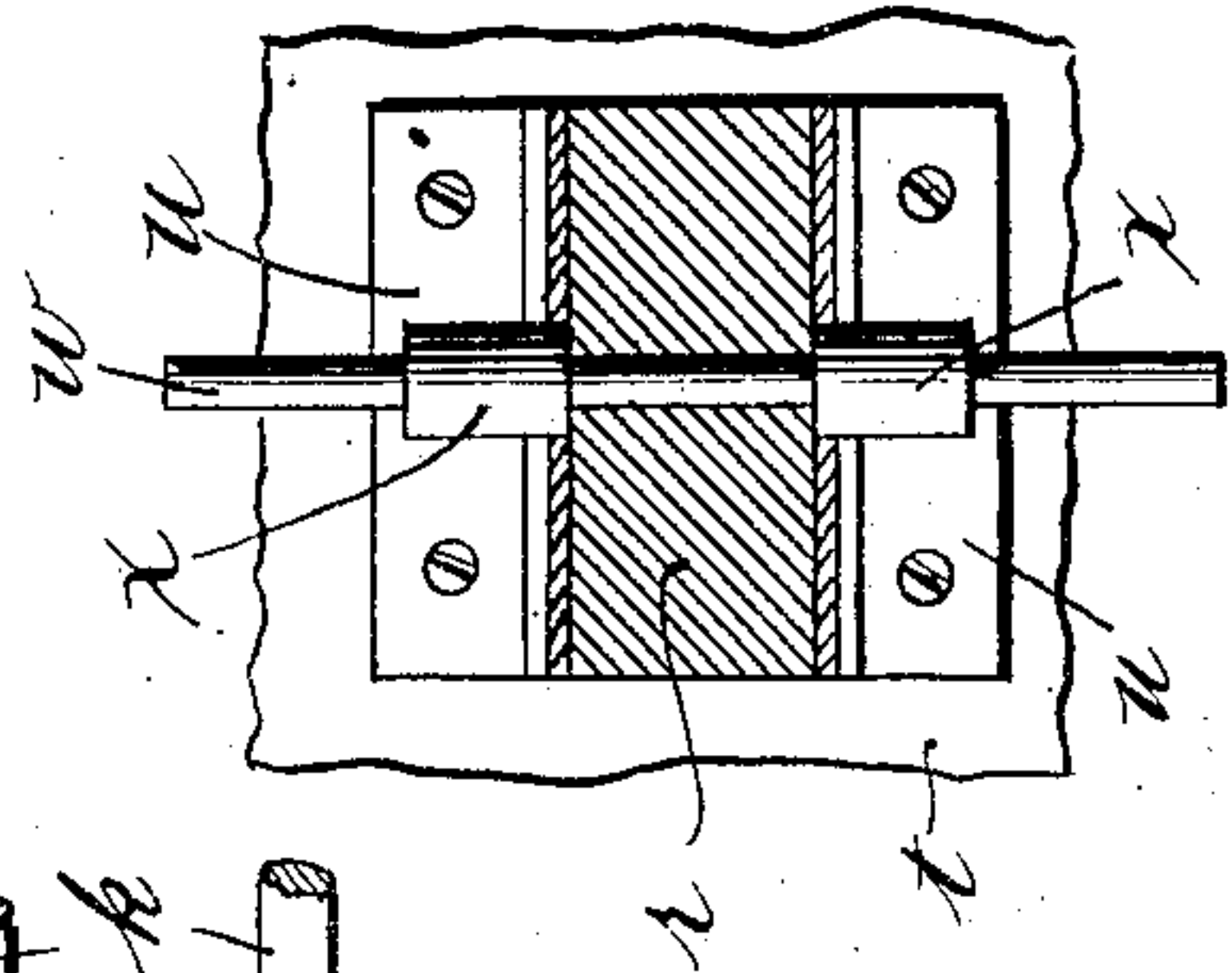


Fig. 10.

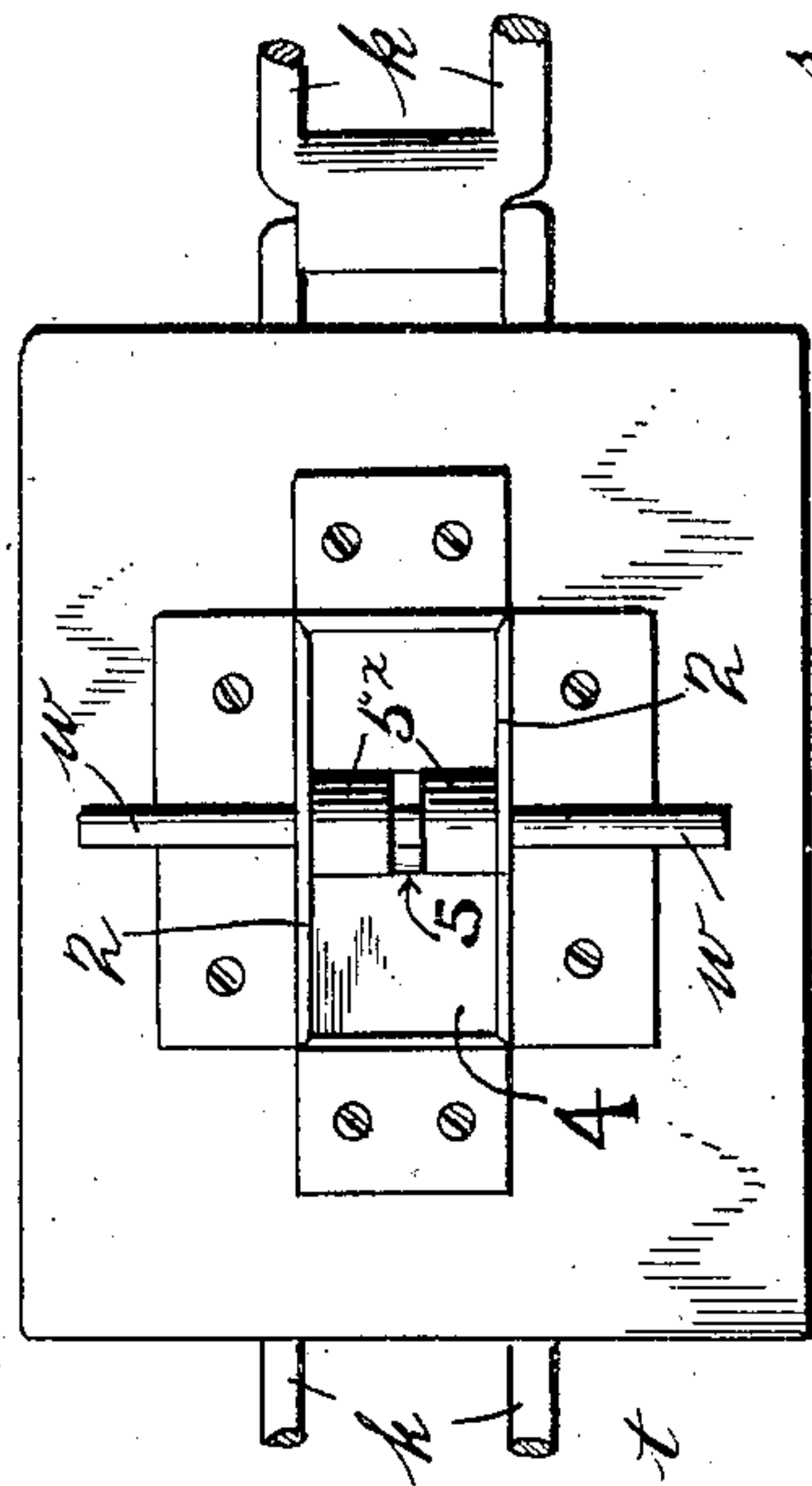


Fig. 11.

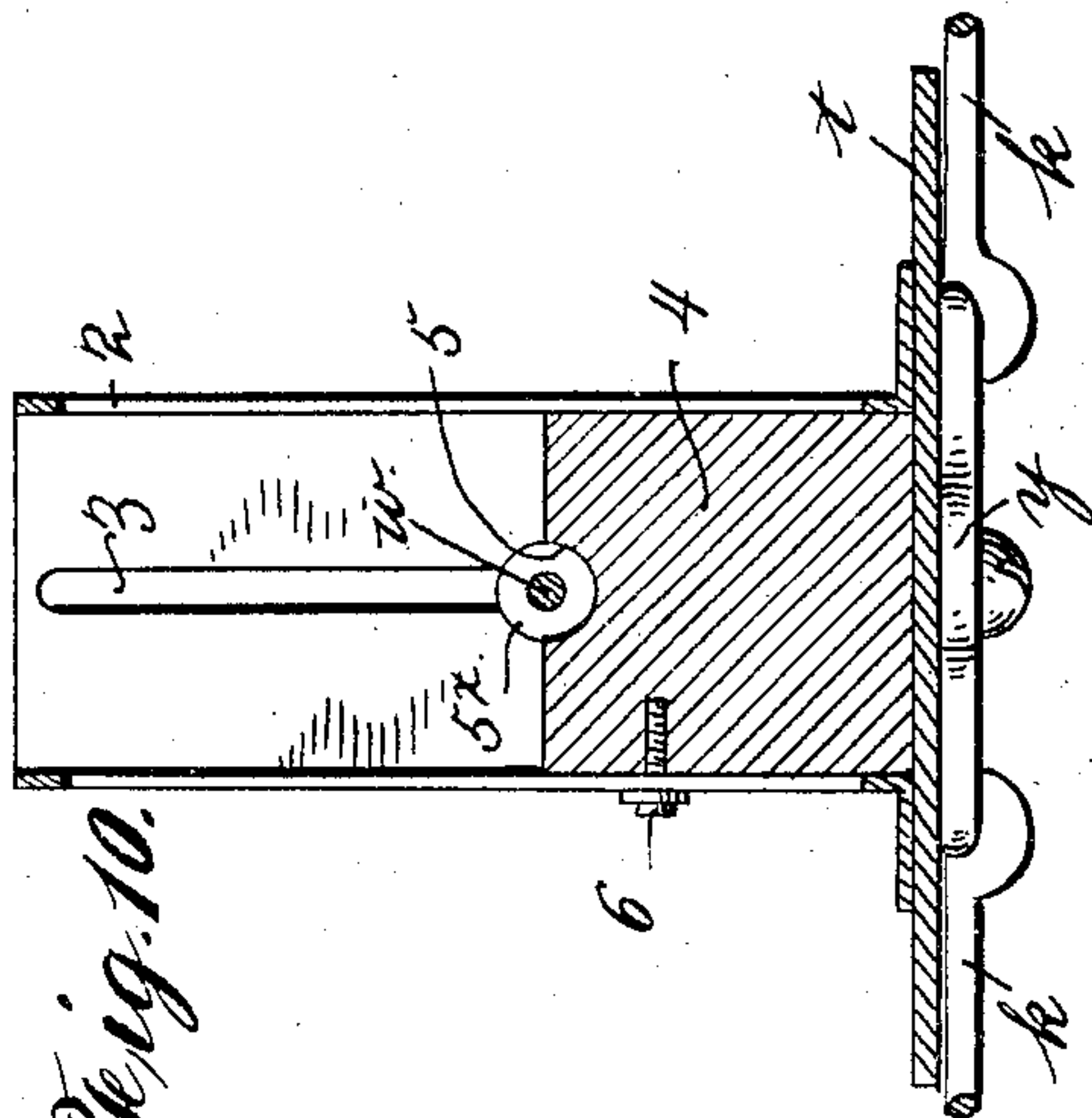


Fig. 12.

Witnesses
Lillian Hanson.
M. Hamilton.

Edwin Louis Thurber Inventor
By his Attorney
James Hamilton

UNITED STATES PATENT OFFICE.

EDWIN L. THURBER, OF NEW YORK, N. Y., ASSIGNOR TO DUNHAM MANUFACTURING COMPANY, A CORPORATION OF NEW YORK.

BOX-MAKING MACHINE.

No. 876,506.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed January 8, 1907. Serial No. 351,324.

To all whom it may concern:

Be it known that I, EDWIN LYONS THURBER, a citizen of the United States, residing in the city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Box-Making Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in machines for closing the ends of cartons; and one object of my invention is to provide a machine of this class which will be simple in construction and efficient in operation.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, Figure 1 is a side elevation of my new machine; Fig. 2 is a plan view thereof; Fig. 3 is an end view thereof, the flap-tucking mechanism being removed; Fig. 4 illustrates the gluing mechanism, partly in sectional elevation, and the flap-folding mechanism at the front end of the machine; Fig. 5 shows a carton-holder for an empty carton; Fig. 6 represents a carton-holder for a filled carton; Fig. 7 is a plan view of the press rolls and of the stationary flap-turning mechanism for the side flaps of the carton; Fig. 8 shows the mode of attachment of the carton-holder to the endless sprocket-chain; Fig. 9 is a detail of the ejecting-rod of the carton-holder for an empty carton; Fig. 10 is a vertical central longitudinal section of the carton-holder for a filled carton; Fig. 11 is a plan of the carton-holder for a filled carton; and Fig. 12 is a detail in plan of the flap-tucking mechanism at the front end of the machine.

Referring to Figs. 1, 2 and 3, the mechanism is suitably supported on the side-frames *a* at the front end of which is journaled the driving shaft *b* the outer end of which carries a driving pulley *c* and a transmission pulley *d*, the latter being belt-connected with the small pulley *e* fast upon the shaft *f* which carries the glue-roll *g*. Upon the shaft *b* is mounted fast the sprocket *h* between the side frames *a* and at the other or rear end of the machine is mounted the idle shaft *i* upon which is mounted fast the sprocket wheel *j*. Over the sprockets *h* and *j* passes an endless carrier-chain *k* the degree of slackness of which is controlled by the adjusting screws

m one end of which is provided with the hand-wheel *n* and the other end of which engages a journal box *o* in which the shaft *b* takes a bearing. Each screw *m* passes through a threaded aperture in a post *p* and by turning the hand-wheel *n* the journal box *o* is moved back and forth on the guides *q* (Fig. 2).

At intervals along the endless carrier-chain *k*, there are secured thereto carton-holders, two forms of which are shown in Figs. 5 and 6. The form shown in Fig. 5 is for the empty carton and comprises a wooden block *r* provided with a metal top-plate *s* and secured to the base-plate *t* by means of angle-plates *u*. The block *r* is formed with a central slot *v* through which extends an ejecting rod *w* provided near its middle with the holding collars *x* on each side of the block *r*. The base-plate *t* is secured to two ears *y* which, in turn, are secured to a link of the carrier-chain *k* (Figs. 8 and 9).

The carton-holder shown in Fig. 6 is adapted and designed for the reception of a filled carton and comprises a box-like casing 2 open at its top and having its walls provided with vertical central slots 3 through two of which extends the ejecting rod *w* provided with holding collars 5^x inside the casing. The side walls are suitably secured to the base-plate *t* which, in turn, is secured to the carrier-chain *k*, as in the case of the form shown in Fig. 5. Within the casing 2 is secured a wooden block 4 formed with a central groove 5 in its top upon the bottom of which groove rest the collars 5^x (Figs. 10 and 11). The block 4 is secured in the casing by screw 6 and it may be of various heights in order to support suitably cartons of different capacities.

The carton 7 is provided at its top and at its bottom with two narrow flaps 8, 9 and two wide flaps 10, 11 (Figs. 6 and 7). In closing the end of the carton, the narrow flaps are first turned in and then the wide flaps. To fold the flap 8 the following mechanism is provided (see Figs. 4 and 12): Mounted near the front end of the machine are two pairs of posts 12, 13 which carry at their upper end the shafts 14, 15 respectively. Upon the shaft 14 is adjustably secured the arm 16, and a crank-arm 17 connected by a link 18 with the crank-arm 19 adjustably secured to the shaft 15. The latter is pro-

vided also with the crank-arm 20 to which is secured one end of the coil spring 21, the other end of which is secured to one of the posts 12. Near the middle of the shaft 15 is adjustably mounted the flap-tucker 22 and at one end of the same shaft is secured the block 23 formed with shoulders 24 which co-operate with one of the posts 13 to limit the rotary movement of the shaft 15. The lower end of the arm 16 is in the path of one end of the rod *w* (Fig. 1), as the latter travels from front to rear of the machine. Thus, the arm 16 is swung from front to rear at its lower end and thereby causes the shaft 14 to rock. Rocking of the shaft 14 causes rocking of the shaft 15 through the crank-arms 17 and 19 connected by the link 18; and rocking of the shaft 15 extends the coil spring 21 and draws to the front the lower end of the flap-tucker 22, as is indicated by the solid lines in Fig. 4. At a certain point of its travel the rod *w* will pass under and release the arm 16, whereupon the coil spring 21 will rock the shaft 15 in the opposite direction and throw the flap-tucker to the rear. The lower or free end of the latter will strike the flap 8 and tuck it under the rod 25 (see dotted lines in Fig. 4). The latter folds inwardly and downwardly the other narrow flap 9 and is secured to a plate 26 the rear end of which is riveted to the brackets 27 suitably secured to the front side of the glue box or vat 28. The free front end of the plate 26 is formed with curled edges 29 which serve to press outwardly and downwardly the wide flaps 10, 11, until they take the position which they are shown as having in Fig. 7.

The glue box or vat 28 is open at its rear side and within this opening rotates the glue roll *g* mounted upon the shaft *f*, as hereinbefore described. Beneath the glue box 28 are secured two leaf springs 30 the free end of each of which rubs against one of the flaps 10, 11 and presses it against the glue-roll *g*. The latter is formed with a central circumferential groove 31 which prevents the roll from contacting with the rod 32 by which the flaps 8, 9 are held down in rear of the glue roll one end of which rod is secured to the arm 33 and the other end of which is held against springing up by the brace 34. The latter and the arm 33 are secured to the post 35. To make the glue box 28 tight its side walls are provided with the vertical metal strips 36 between which and the flanges 37 is inserted packing 38. This construction is found to prevent the glue from leaking out past the ends of the glue roll *g*.

Supported by the cross-pieces 39 and extending from just in front of the plate 26 to near the rear end of the machine along the central line thereof are two parallel metal bars 40 the front end 60 of each of which flares outwardly to allow the end of the carton to pass

smoothly between them. To each of these bars is secured a stationary flap-folder 41 the surface of which is warped or helical at its front end and concave towards the carton-holder, and terminates at its rear end in a plane flat surface, as is best shown in Fig. 7. Between the flap-folders 41 is mounted a plate 42 (Fig. 7); and to each bar 40 just in front of the opening or front end of each flap-folder is secured a guide 43 (or 46) which serves to raise the flap 11 (or 10) and guide it into the folder 41 and thereby to prevent the breaking off of the flap by a too abrupt meeting with the wall of the folder 41. The flap 10 will be first folded down, as shown in Figs. 6 and 7 and will be held down by the plate 42 until the flap 11 is turned in over it. The flaps are pressed down by the press-rolls 44, one of which (45) is provided or formed with raised letters by which any desired information may be printed upon the end of the carton. Secured to the press roll 45 is a shaft 47 which drives a counting mechanism shown conventionally at 48, by which the number of cartons closed by the machine may be ascertained (Fig. 7).

At the rear end of the machine are mounted a pair of inclined arms 49 the free ends of which are curved; and up each arm 49 rides one end of the ejecting rod *w*, thereby forcing the empty carton from the block *r* or the filled carton from the casing 2 (Figs. 1 and 2).

Mounted upon the supports 51 and extending from front to rear of the machine parallel to each other are a pair of angle-bars 52 to the side of each of which is suitably secured a metal bar or rail 53 between which and the bottom of the angle-bar travels one edge of the base-plate *t*, which by this construction is securely held and guided in its travel from front to rear of the machine (Fig. 5).

To regulate the amount of glue which the roll *g* takes up, there is adjustably mounted in the bottom of the box 28 a plate 54 provided with threaded tangs 55 each engaged by an adjusting nut 56 and a lock-nut 57 (Fig. 4).

I claim:

1. In a machine of the class described, the combination of a holder for the carton; mechanism for moving said holder; a stationary flap-folding device having a curved surface; and a guide for directing the flap into said folder, said guide being in advance of the folder and serving to raise the flap preparatory to its entry into the folder.

2. In a machine of the class described, the combination of a carton-holder formed with a slot; a rod which extends through and is freely movable in said slot and the ends of which project beyond the opposed slotted walls of said carton-holder; and devices

which are adapted to rub simultaneously against both ends of said rod to force the carton from said holder.

3. In a machine of the character described, 5 the combination of a supporting frame; a holder for the carton, said holder being formed with a slot; mechanism for moving said holder relatively to said frame; an ejecting rod which extends through and is freely 10 movable in said slot and the ends of which project beyond the opposed slotted walls of said holder; and a pair of inclined arms mounted on said frame, each of said arms being positioned to rub against one of the projecting ends of said ejecting rod to force the 15 carton from its holder.

4. In a machine of the class described, the combination of a holder for the carton; mechanism for moving said carton-holder; a pair of 20 interconnected shafts, one of which is spring-controlled and the other of which is controlled by said holder; mechanism mounted on said other shaft and adapted to be engaged by said holder in its travel; and a flap-folding device 25 mounted on one of said shafts.

5. In a machine of the class described, a flap-folding mechanism comprising a pair of cooperating parallel shafts, one of which is 30 provided with an arm for turning the same;

a flap-folder upon one of said shafts; and means for swinging said arm to turn said shafts.

6. In a machine of the class described, the combination of a holder for the carton; a 35 carton-ejecting device movably mounted in said holder; mechanism for moving said holder; means for moving said device to eject the carton from the holder; and a flap-folding mechanism controlled by said device. 40

7. In a machine of the class described, a flap-folding mechanism consisting of the combination of a supporting frame; a holder for the carton; mechanism for moving said 45 holder relatively to said frame; a pair of interconnected shafts mounted upon said frame, one of said shafts being provided with an arm which normally lies in the path of travel of said holder; a flap-folder mounted upon one of said shafts; and automatic de- 50 vices for restoring said arm to its original position, after it has been displaced therefrom by said holder.

In testimony whereof I have hereunto set my hand this seventh day of January, A. D. 55 1907, in the presence of two witnesses.

EDWIN L. THURBER.

Witnesses:

JAMES HAMILTON,
ELLEN M. LEWIS.