

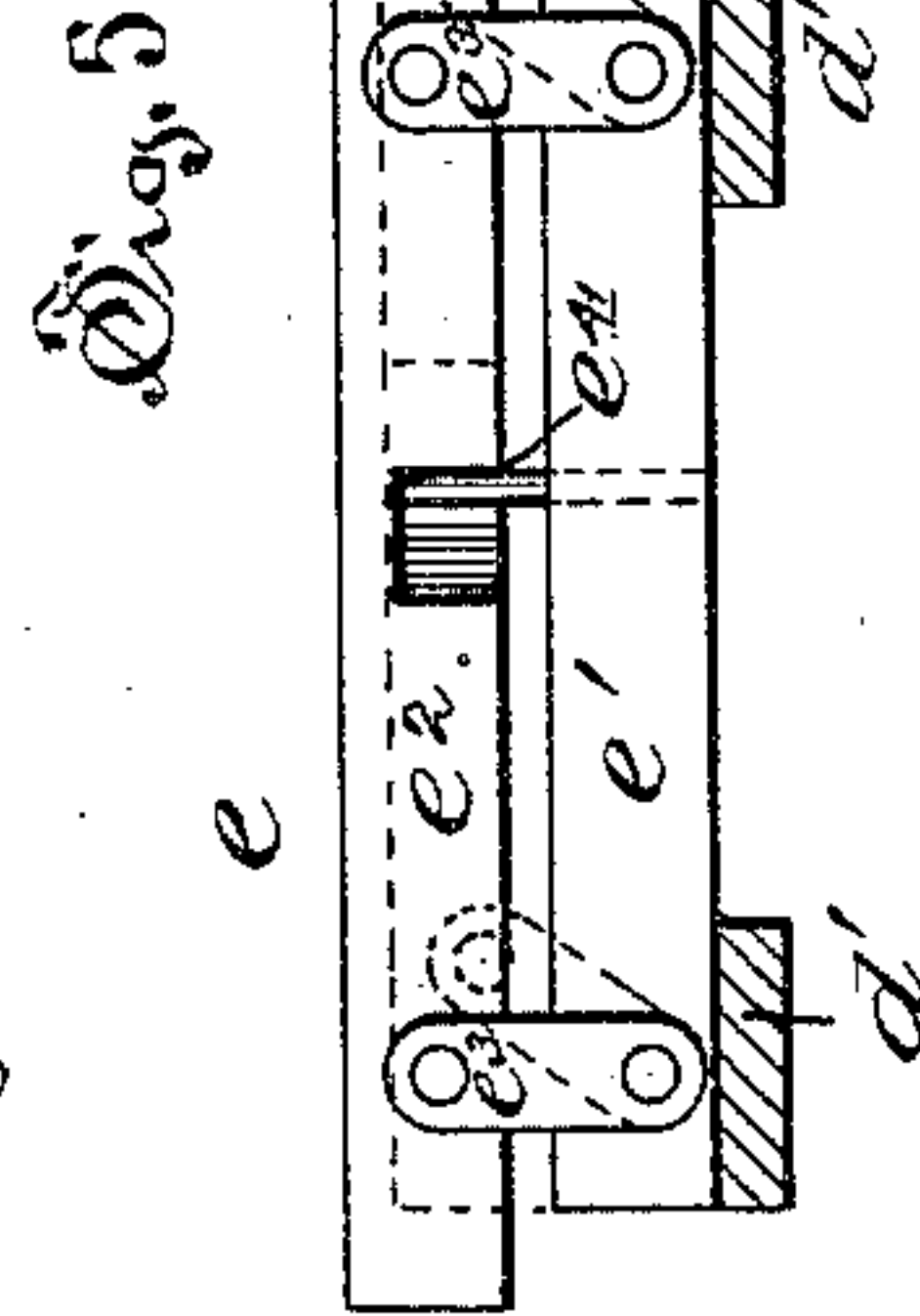
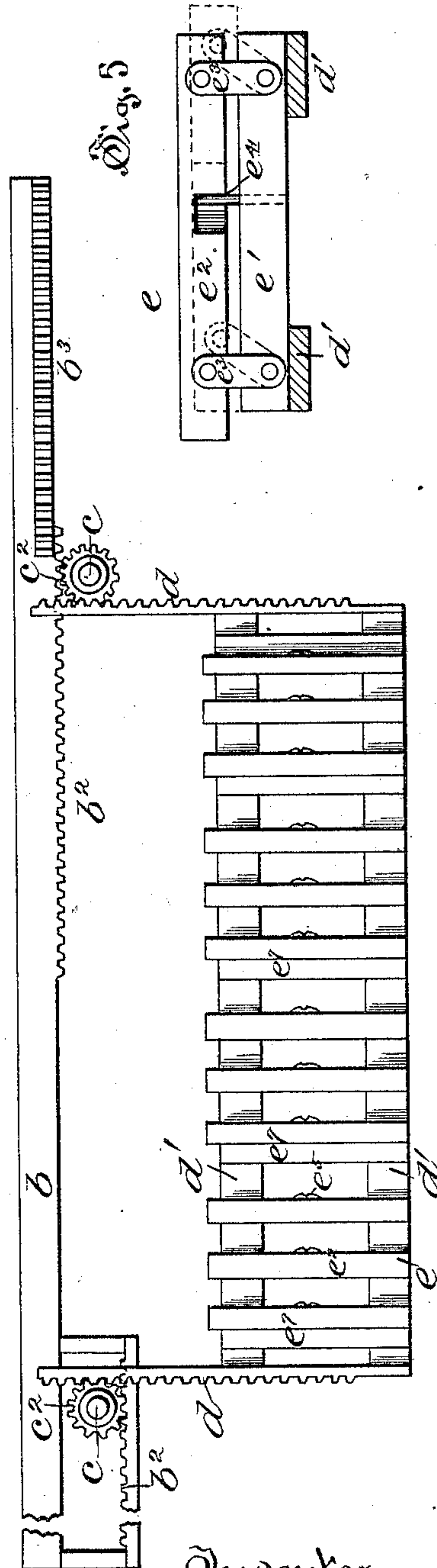
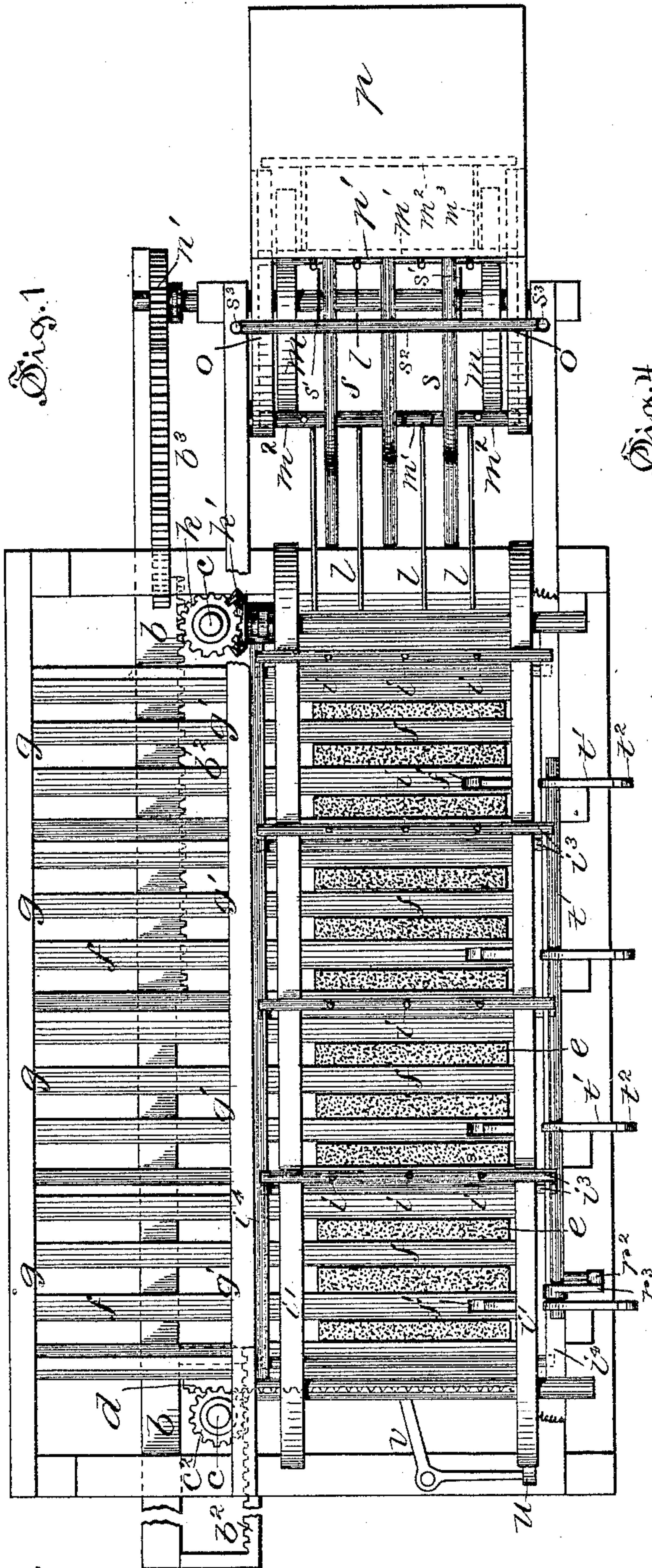
(No Model.)

3 Sheets—Sheet 1.

A. I. JACOBS.
MACHINE FOR GATHERING SIGNATURES.

No. 433,569.

Patented Aug. 5, 1890.



Witnesses:
Albert H. Walker
Arthur P. Jenkins,

Inventor,
Arthur I. Jacobs, by
Harry R. Williams
Atty.

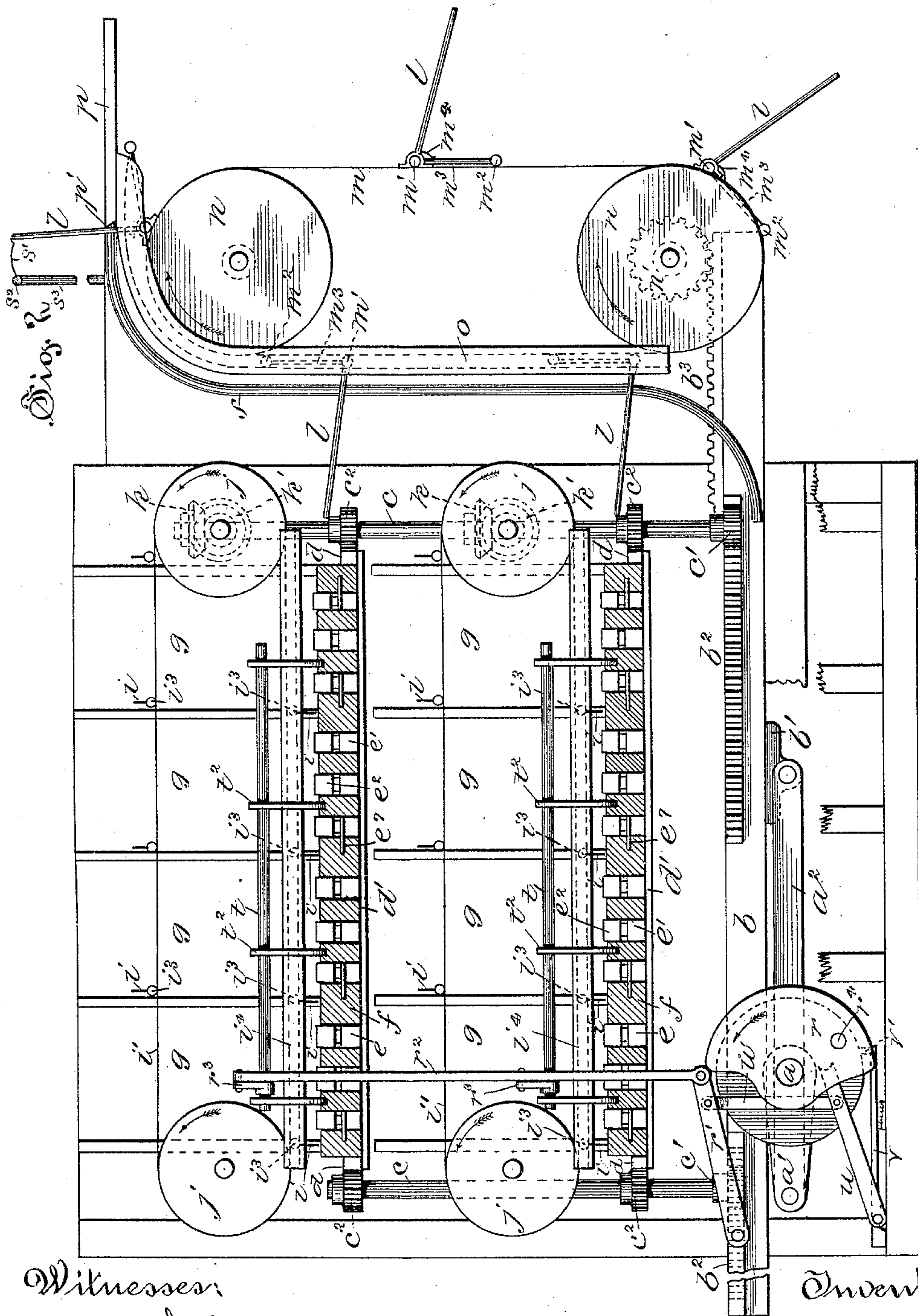
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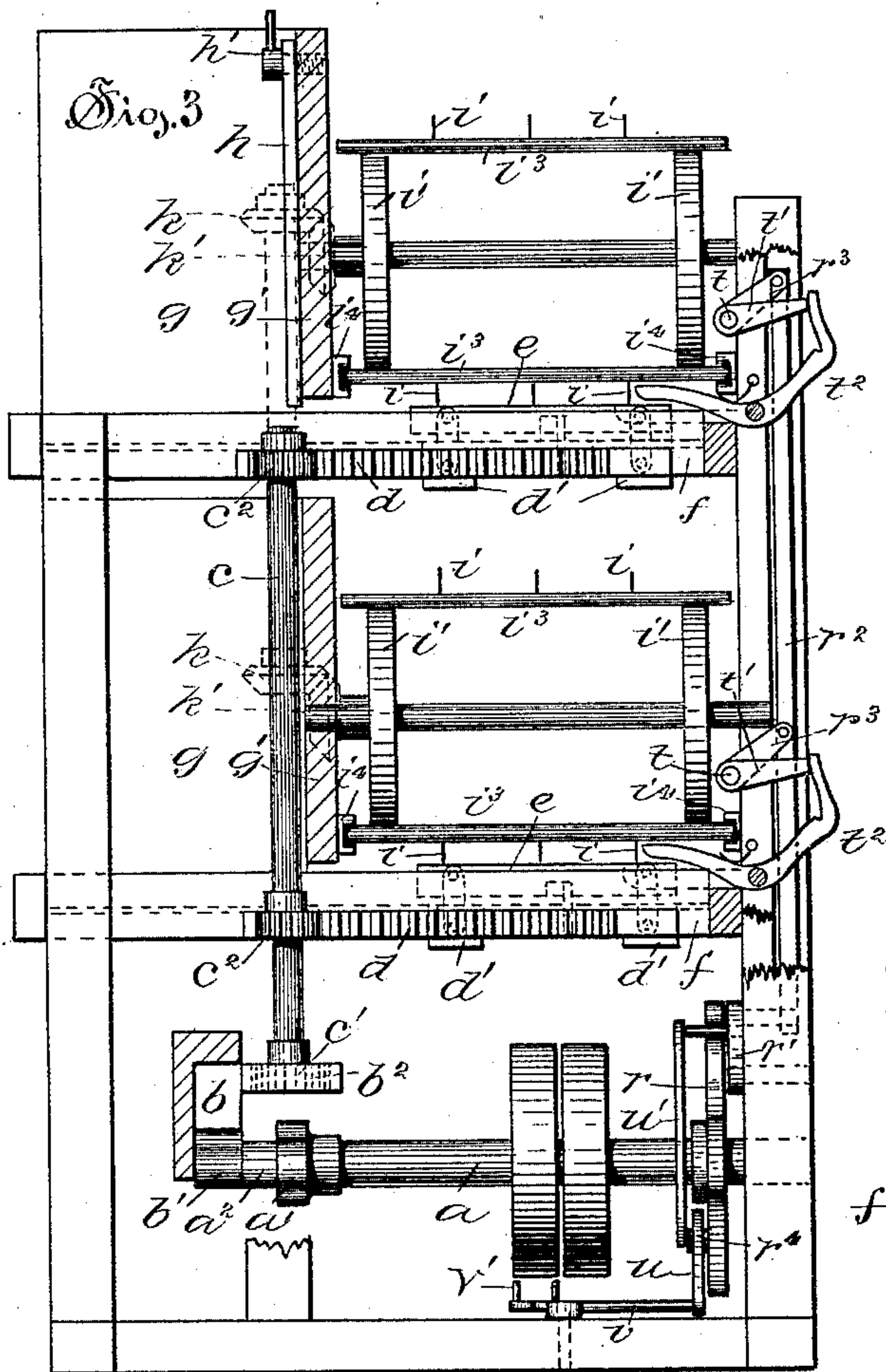


Fig. 6

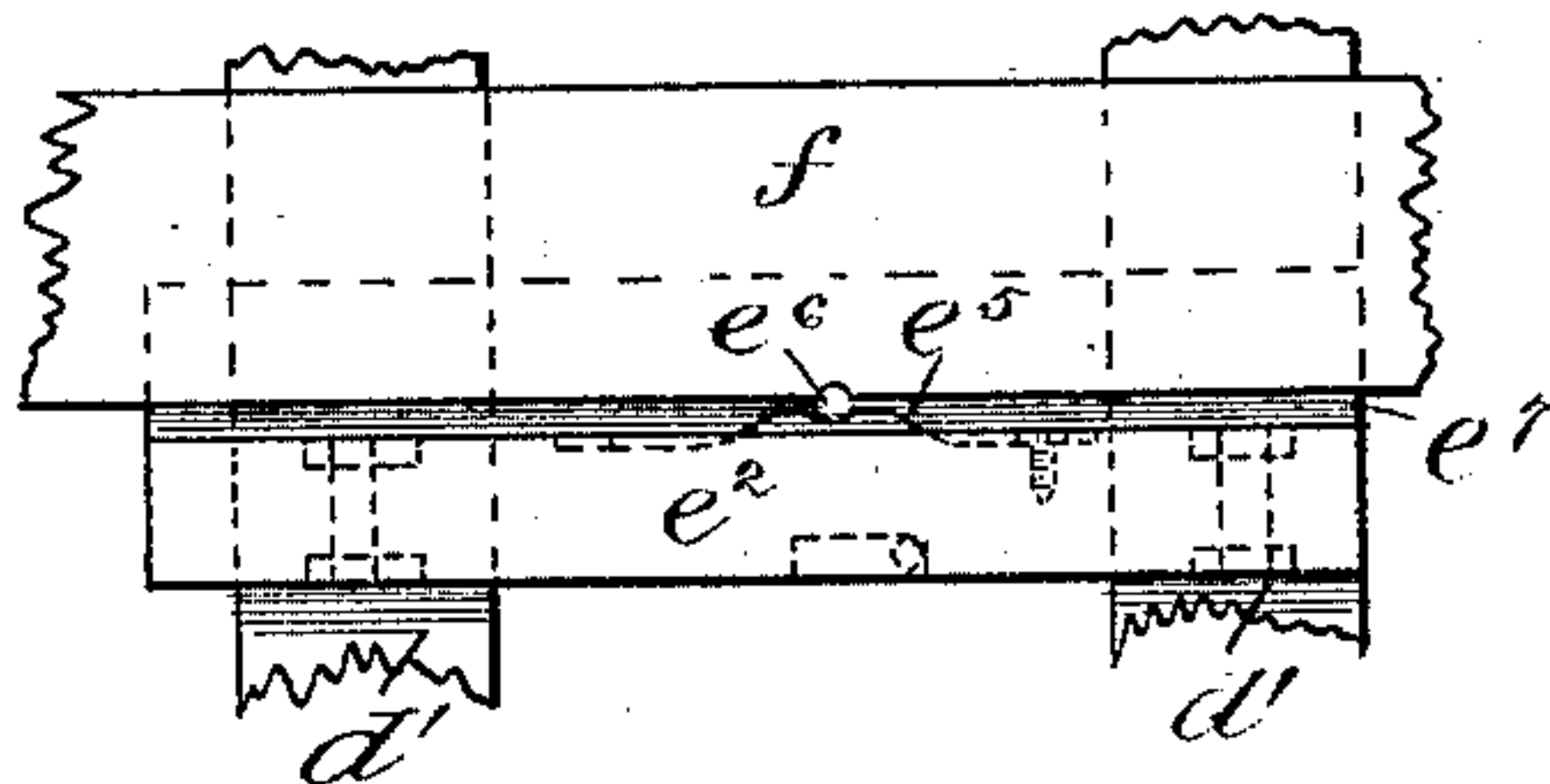


Fig. 7

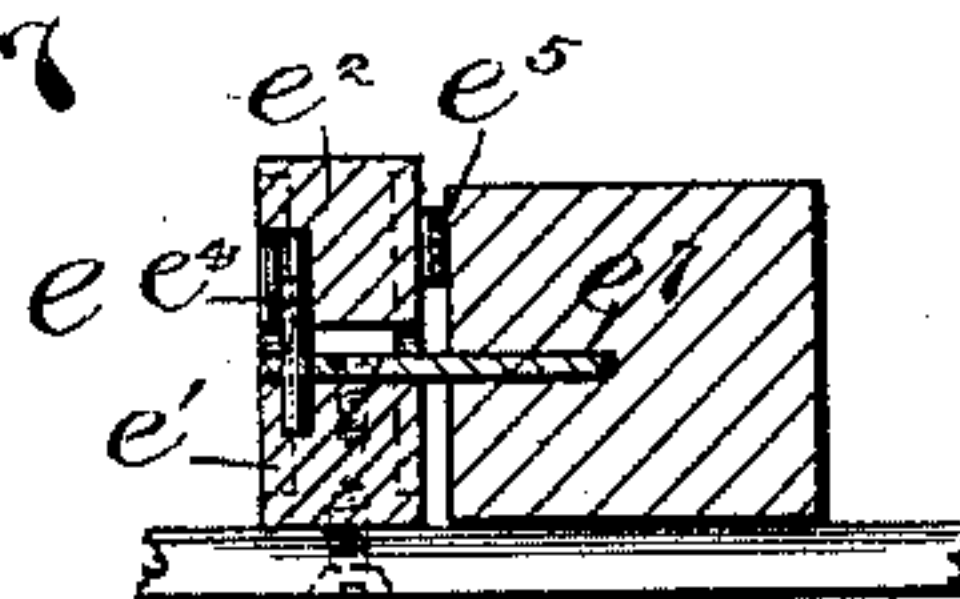


Fig. 8

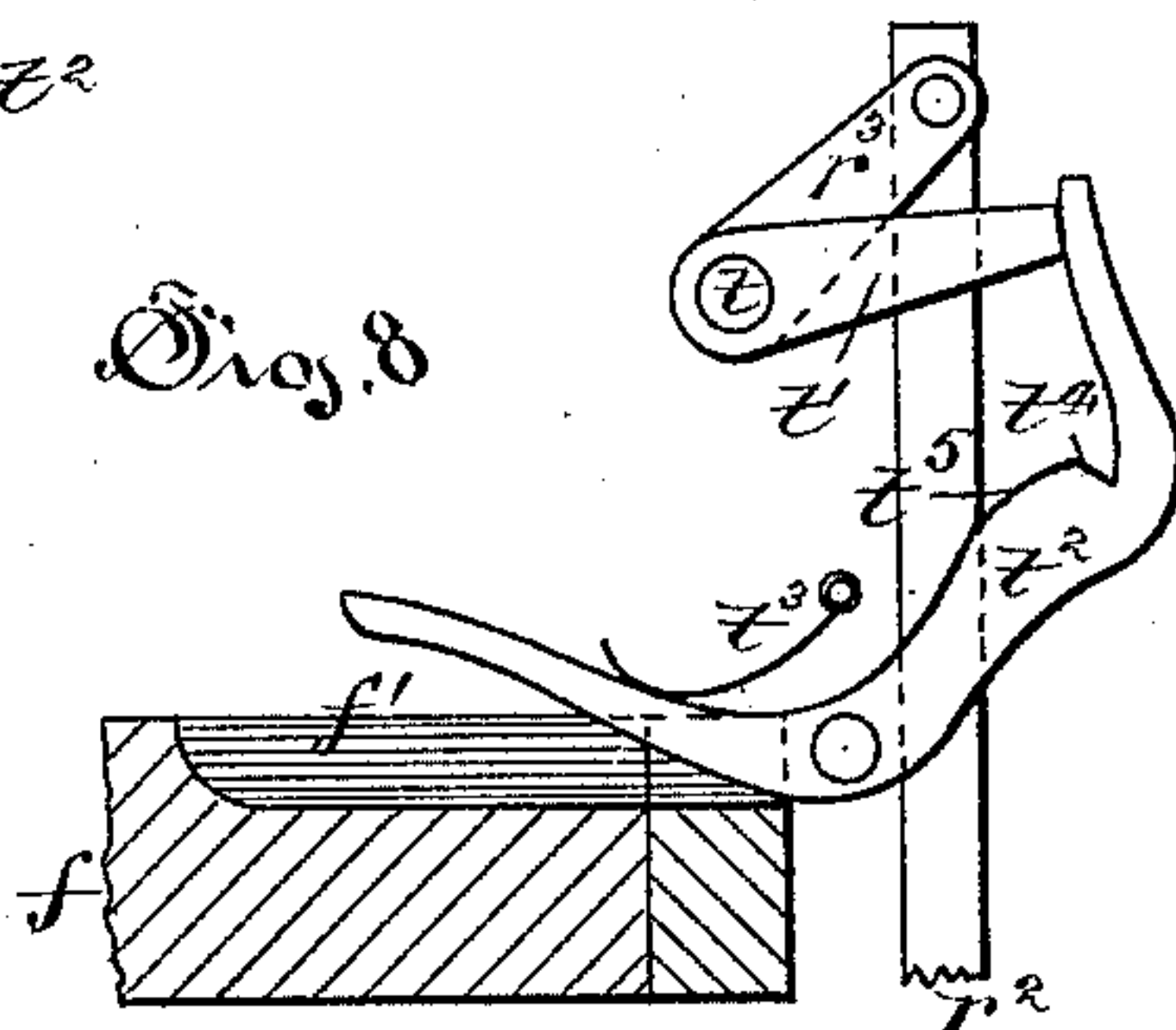


Fig. 9

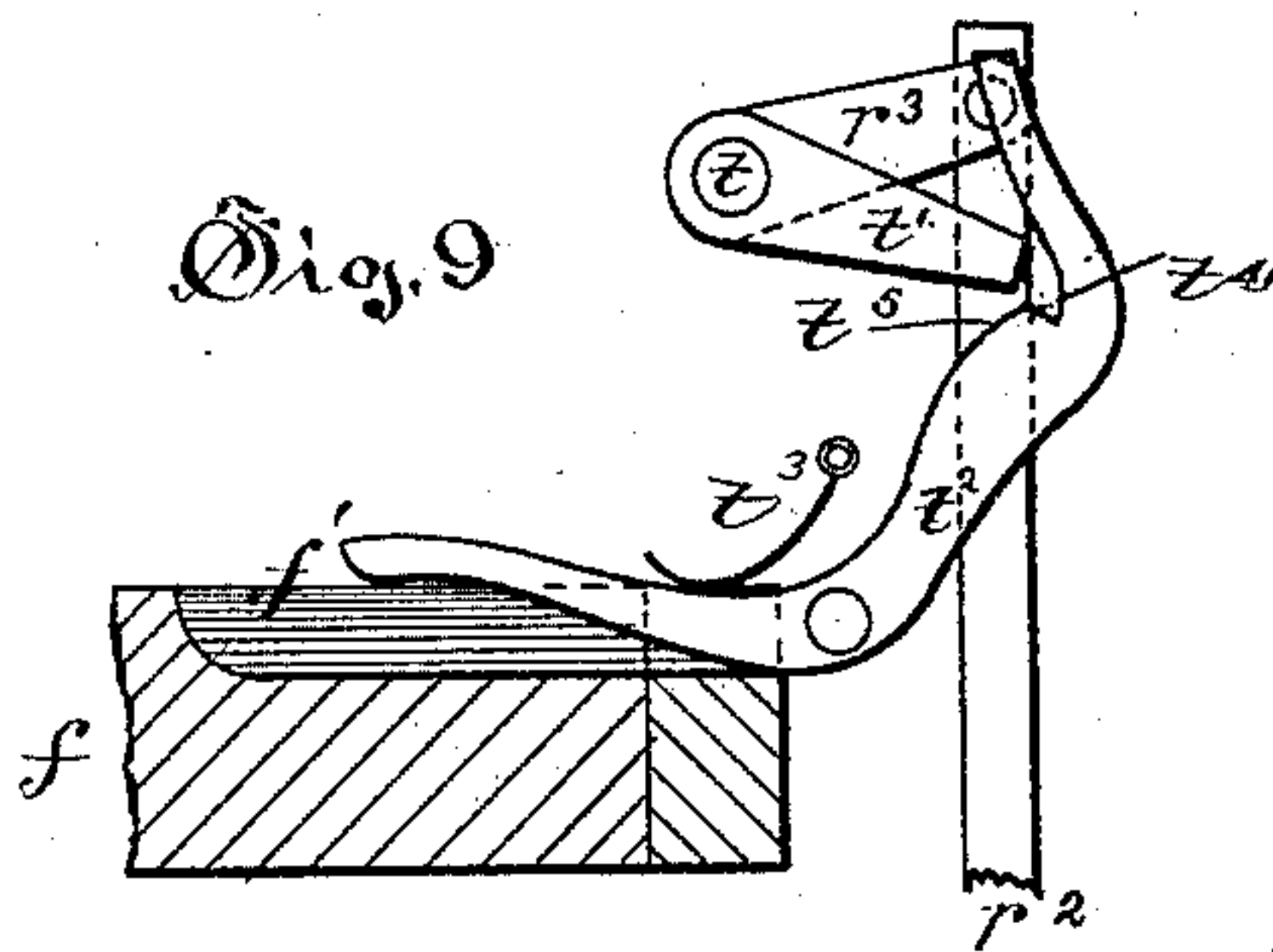
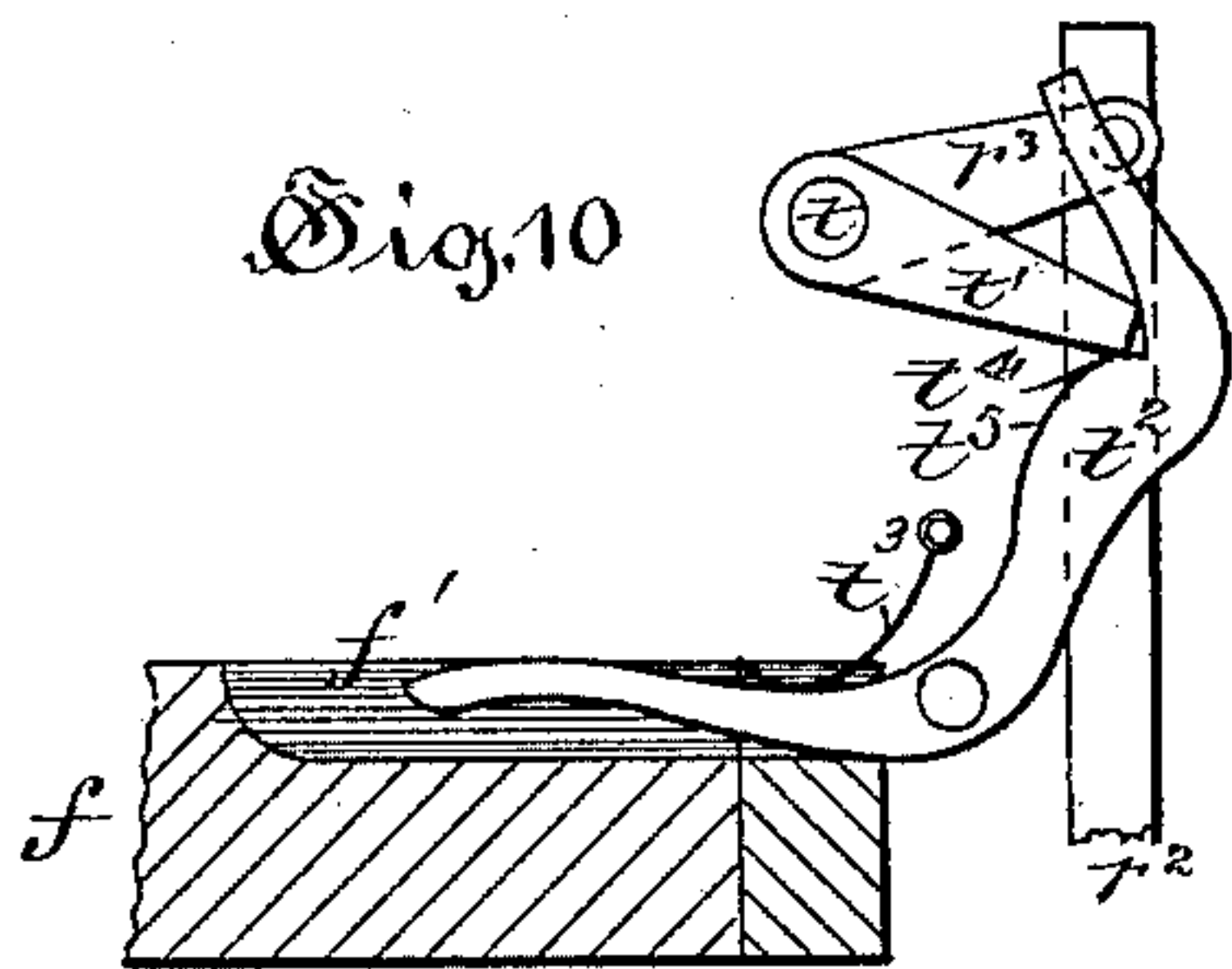


Fig. 10



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UNITED STATES PATENT OFFICE.

ARTHUR I. JACOBS, OF HARTFORD, CONNECTICUT.

MACHINE FOR GATHERING SIGNATURES.

SPECIFICATION forming part of Letters Patent No. 433,569, dated August 5, 1890.

Application filed September 21, 1889. Serial No. 324,639. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR I. JACOBS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Gathering Signatures, of which the following is a full, clear, and exact specification.

The invention relates to the class of machines which automatically collect from separate piles and place together for binding the folded signatures which are to form a book; and it is the object of the invention to provide an efficient machine of this class wherein the operations are performed by simple mechanism and the signatures surely and neatly gathered without danger of omitting a single signature.

The invention consists in mechanism for withdrawing a signature from several piles, mechanism for transferring the signatures withdrawn to a collector which stands the signatures on a table ready for binding, and mechanism which stops the machine if the withdrawing mechanism fails to pull out the proper number of signatures, as more particularly hereinafter described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a top view of the machine, part of the frame being removed to show the construction. Fig. 2 is a front elevation with part of the frame removed. Fig. 3 is an end elevation. Fig. 4 is a plan view of the signature-withdrawing slides and operating mechanism. Fig. 5 is a side view, on an enlarged scale, of one of the slides. Fig. 6 is a plan view of a slide and a part of the adjacent floor. Fig. 7 is a cross-sectional view of the same. Figs. 8, 9, and 10 are diagram views of part of the stop mechanism.

The driving-shaft *a*, which is supported by the frame transversely of the machine, is provided with the customary fast and loose pulleys, upon which the driving-belt runs. A crank *a'* on the inner end of the shaft is connected by a pitman *a''* to a bracket *b'*, attached to a slide *b*, which extends the length of the machine, and is so supported by the frame that it may be reciprocated longitudinally by the pitman.

Supported by the frame near each end are two vertical shafts *c*, which bear on their lower end pinions *c'*, that mesh with racks *b''*, secured to the slide *b* on opposite sides of the pinions, so that the shafts will rotate in opposite directions when the slide reciprocates. These shafts also bear pinions *c''*, that mesh with racks *d*, secured to plates *d'*, that support the slides *e*, which are adapted to be reciprocated between the floor-pieces *f*, that at intervals extend transversely of the frame. Each of these slides preferably consists of a part *e'*, that is attached to the plates *d'*, that bear the racks *d*, and a part *e''* so connected to the part *e'* that the reciprocation of the latter gives the part *e''* a vertical movement as well as a horizontal reciprocation. In the manner illustrated this is accomplished by connecting the upper part to the lower by pivoted links *e³*, of such length that when the slide starts forward and friction against the sides of the floor-pieces *f* retards the forward motion of the upper part the upper part will rise a slight distance above the level of the floor; but when the slide starts backward the upper surface of the part *e''* will drop below the level of the floor.

A pin *e⁴*, projecting from one part into a mortise in the other part, limits the amount of movement of the upper part on the links. The upper surface of the part *e''* is provided with rubber, sand-paper, or any similar substance which will have a frictional grasp upon paper. If the friction between the sides of the floor-pieces *f* and the upper part of the slide is not sufficient to cause the latter to rise quickly when the slide starts forward, a spring *e⁵* may be attached to the slide, which, by contact with a pin or projection *e⁶* on the floor-piece, will retard the upper part until the links have sufficiently raised that part. Gibs *e⁷*, which project into mortises in the floor-pieces *f*, may be attached to the lower part *e'* of the slides to aid in their support, if necessary.

The folded signatures are placed in piles in compartments *g*, the front walls *g'* of which are open at the bottom to permit the passage of a single signature, this opening being preferably regulated by means of an adjustable gage *h*, that may be properly set when its

clamp-screw h' is loosened. When the slides move forward, the upper parts rise upon the links above the floor, and by frictional contact with the lower surface of the bottom signature of the pile in each bin draw those signatures from the compartments, and when the slides return the upper parts immediately drop below the floor and leave the signatures in line with fingers i , which in proper time push the signatures onto the arms of the collector. These fingers i are borne by a belt, preferably formed of bands of thin steel i' , which pass around pulleys j , that are borne on horizontal shafts supported near each end of the frame. Cross-rods i^3 tie these bands together, and to these the fingers i are so attached that when the belt stops the fingers project downward, ready to push along the signatures, which are drawn out by the slides and left in front of the fingers. Bevel-gears k , attached to one of the shafts c , mesh with bevel-gears k' , attached to the shaft of the pulley j at one end by ratchet-and-pawl clutches, and drive the belts forward when the slide b moves in one direction, but allow the belts to rest when the slide moves in the opposite direction, giving to the belts an intermittent movement. Guides i^4 , which receive the ends of the rods i^3 , are secured to the frame in line with the bottom edge of the pulleys j to hold the rods with the fingers downward, so that they will not drag over or skip a signature. An endless belt m , preferably formed of bands of thin steel, passes around the pulleys n , which are borne on horizontal shafts supported at one end of the frame, one of the shafts being provided with a gear-wheel n' , preferably attached to the shaft by a ratchet-and-pawl clutch which meshes with a rack b^3 , fast to the end of the slide b , so that when the slide moves backward this belt is driven in the direction of the arrows in Fig. 2; but when the slide moves forward the belt is stationary, and the arms l receive a set of signatures.

The rods m' , which are pivoted to the bands of the belt and bear the collector-arms l , project beyond the edges of the belt into the grooves of the guides o , and the ends of the rods m'' , of equal length with the rods m' , to which they are joined by wires m^3 , also project into the grooves of the guides o and hold the arms l in position to receive and carry the signatures deposited upon them up to the table p . The guides o are of such length and shape and are so attached to the frame that the ends of the rods m' m'' travel in the grooves with the arms projecting outward until the signatures are stood up on the table in position to be removed to a stitching-machine, when the rods m'' reach the end of the guides and the arms l striking the edge p' of the table, draw away from the signatures deposited on the table. After the arms have freed themselves from the table a small spring m^4 on the rod m' returns the rod m'' close to the belt, so that its ends will enter the guide-

way when it is reached. Rods s are so attached to the frame and table that the signatures are lifted onto the table when they are carried up. Light springs s' , attached to a rod s'' , that passes above the table between uprights s^3 , attached to the frame, project forward in such position as to hold the signatures on the table from falling back when the arms l withdraw from behind them.

The Stop Mechanism.—A cam r , rotating with the driving-shaft, oscillates a lever r' , that is pivoted to the frame and connected to a rod r'' , which is adapted to be reciprocated vertically by the oscillation of the lever. This rod is connected by rocker-arms r^3 to the horizontal shafts t , that bear a number of arms t' equal to the number of compartments. Pivoted to the frame opposite each of the arms t' are levers t'' , of such shape that when the arms t' project upward the inner ends of the levers t'' are held above the floor f , upon which the signatures are deposited by the slides. When the signatures are laid upon the floor and the arms t' are oscillated downward by the dropping of the rod r'' , the inner ends of the levers t'' are pressed downward by springs t^3 until they strike the surface of the signatures. With the levers in this position the arms t' do not strike the shoulder t^4 on the lever, but pass by it, and by contact with the cam-surface t^5 on the lever raise the inner end of the lever away from the signatures, so that they may be pushed forward by the transferring-fingers. If the signatures become exhausted in either of the compartments and the slides fail to deliver all the signatures into the path of the transferring-fingers, the end of the feeler-lever t'' opposite the empty compartment from which a signature has failed to come will not be stopped by the signature, but will drop into the mortise f' in the floor, which will throw in the other end of the lever so far that the arm t' will catch on the shoulder t^4 as it oscillates and will prevent the rod r'' from dropping down with the lever r' and cam r . When the parts are in this position, the end of the lever u , which is connected by a link u' with the lever r' , is left in the path of the pin r^4 , that projects from the inside of the cam-wheel. The opposite end of this lever u is pivoted to the bell-crank lever v , which bears belt-shifting arms v' .

When the pin r^4 strikes the end of the lever u , the belt is shifted from the fast to the loose pulley and the machine stopped. If the signatures are all removed and properly placed under the transferring-fingers i , the rod r'' drops down so far that the end of the lever u is below the path of the pin, so that the belt will not be thrown to stop the machine.

The mechanisms are so timed that the signatures are first drawn from the piles in the compartments by the slides and laid in the path of the transferring-fingers, which, as the slides drop down and move backward, transfer the signatures to the arms of the collector.

As the slides come forward, the collecting-arms, with the signatures, move upward and stand the signatures on the table and wait until another set of signatures are placed on the following collector-arms.

In the drawings the machine is illustrated as constructed for two tiers of four compartments each; but of course the machine may be built in the same manner with as many tiers of as many compartments as desirable by lengthening the frame, shafts, and belts, so as to gather signatures for volumes of large size. It will be noticed that the slides make contact with quite a portion of the under surface of the signatures when they are being withdrawn from the piles, and the signatures are not wrinkled or strained, as when they are pushed or pulled out from the piles, which is a difficult operation to perform, owing to the flexibility of the paper and the unevenness of the edges of the signatures.

I claim as my invention—

1. In combination, in a machine for gathering signatures, compartments for holding piles of signatures, slides adapted to make frictional contact with the surface of the bottom signatures of each pile during a part of the movement of the slides, said slides being attached to a plate bearing racks in mesh with pinions on shafts which are alternately rotated forward and backward by the reciprocation of a slide connected to a crank on the driving-shaft, mechanism for transferring to the collector the signatures removed by the slides, and the collector which gathers the signatures together, substantially as shown and described.

2. In combination, in a machine for gathering signatures, compartments for holding piles of signatures, slides with an adhesive upper movable surface adapted to make frictional contact with the under surface of the bottom signature of each pile during the forward movement of the slide, said frictional upper surface of the slides being joined to the slides by links, whereby the frictional surface has a limited vertical movement, but is always parallel with the slides, fingers adapted to transfer to the collector-arms the signatures removed by the slides, and a collector which gathers the signatures together, substantially as shown and described.

3. In a machine for gathering signatures, in combination with compartments, a portion of the bottom of each compartment being stationary, and a portion adapted to rise up and move forward, the movable portion consisting of a lower part having a reciprocation parallel with the stationary bottom and an upper part connected by links near each end with the lower part, fingers adapted to intermittently move forward over the floor in front of

the compartments, and collectors which gather the signatures together, substantially as shown and described.

4. In a machine for gathering signatures, in combination with compartments for receiving piles of signatures, reciprocating slides adapted to make contact with the surface of the end signature of each pile during a part of the movement of the slides, each of said slides consisting of a lower part secured to a plate bearing racks in mesh with pinions on shafts which are alternately rotated forward and backward by the reciprocation of a slide connected to a crank on the driving-shaft, and an upper part connected to the lower part by links near each end, whereby a parallel vertical as well as a longitudinal movement is given to the upper part by the reciprocation of the lower part, substantially as shown and described.

5. In combination, in a machine for gathering signatures, compartments for holding piles of signatures, slides with an adhesive surface adapted to make frictional contact with the surface of the end signature of each pile during the forward movement of the slide, transferring mechanism, collecting mechanism, and mechanism adapted to stop the machine if the slides fail to deliver the desired number of signatures, substantially as shown and described.

6. In a machine for gathering signatures, in combination with the compartments for holding signatures, slides for removing signatures from the compartments, and the transfer mechanism, and a collector consisting of an endless belt bearing arms adapted to receive the signatures from the transfer mechanism and deposit them on a table for binding, said belt being intermittently moved forward by the reciprocation of a rack connected with a crank upon the driving-shaft, substantially as shown and described.

7. In a machine for gathering signatures, in combination with the compartments, signature-withdrawing mechanism, transferring mechanism, and collecting mechanism, a stop mechanism consisting of levers pivoted to the frame and adapted to rock a certain distance if the proper number of signatures are withdrawn from the compartments, and to rock farther if the proper number of signatures are not withdrawn, and a shaft adapted to oscillate according to the rocking of the levers, said shaft being connected by rods, levers, and links to a belt-shifting device, substantially as shown and described.

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