

No. 633,265.

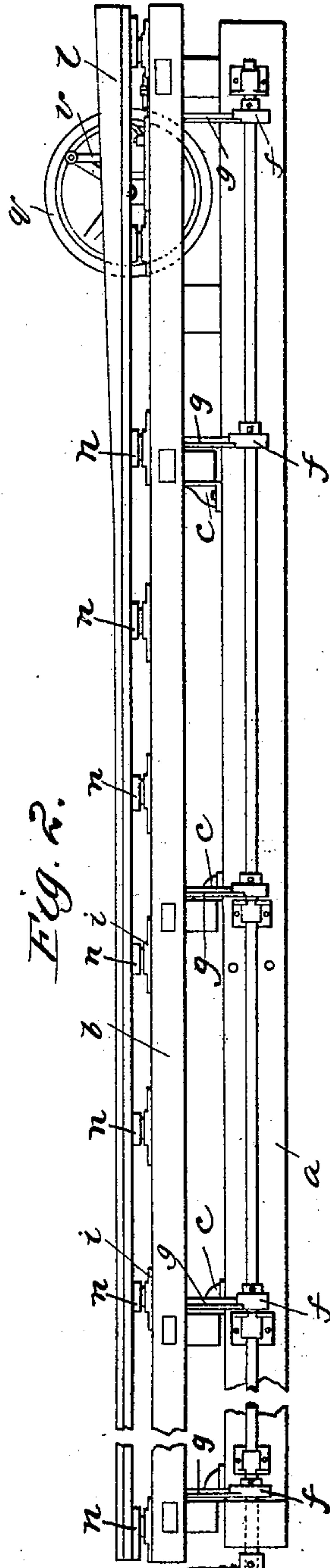
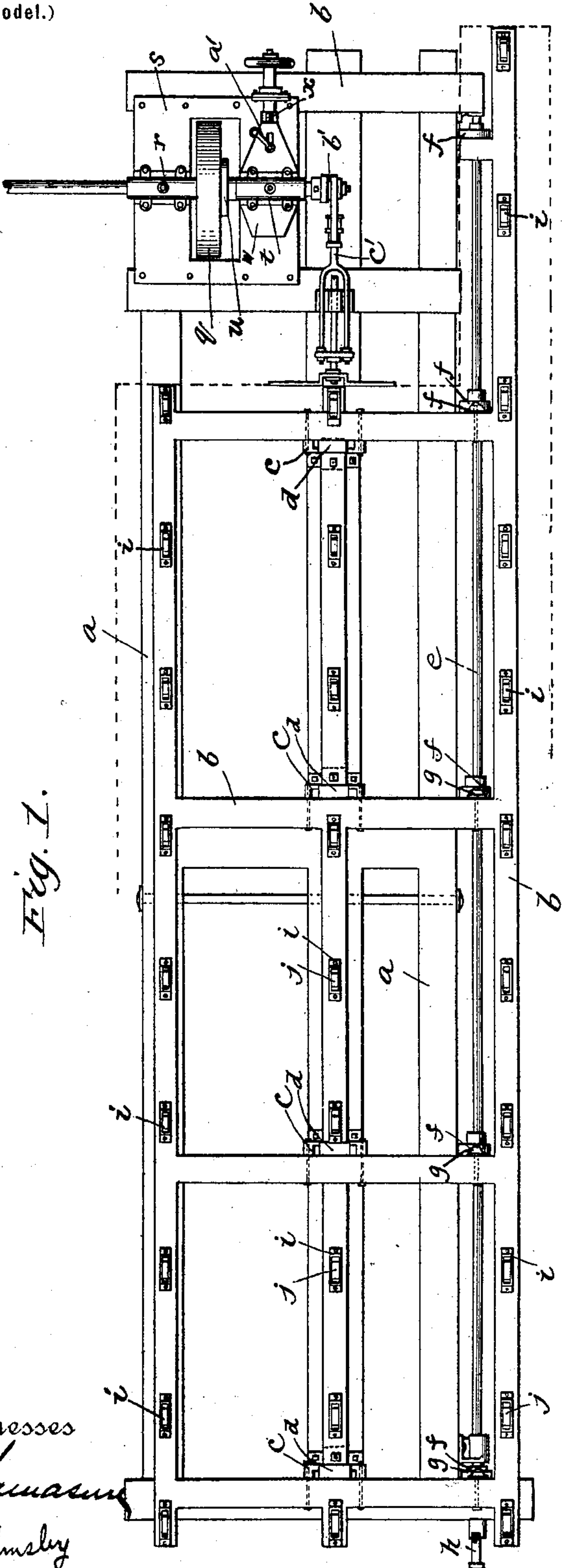
Patented Sept. 19, 1899.

U. S. JAMES.
CONCENTRATING TABLE.

(Application filed Jan. 11, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses

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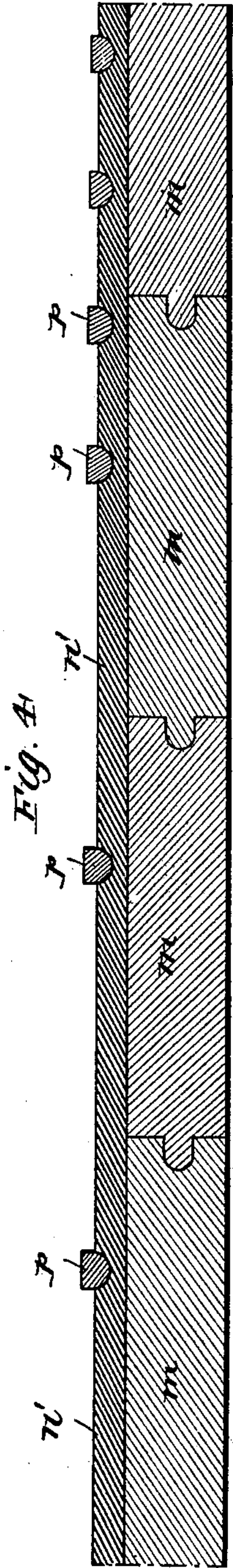


Fig. 5.

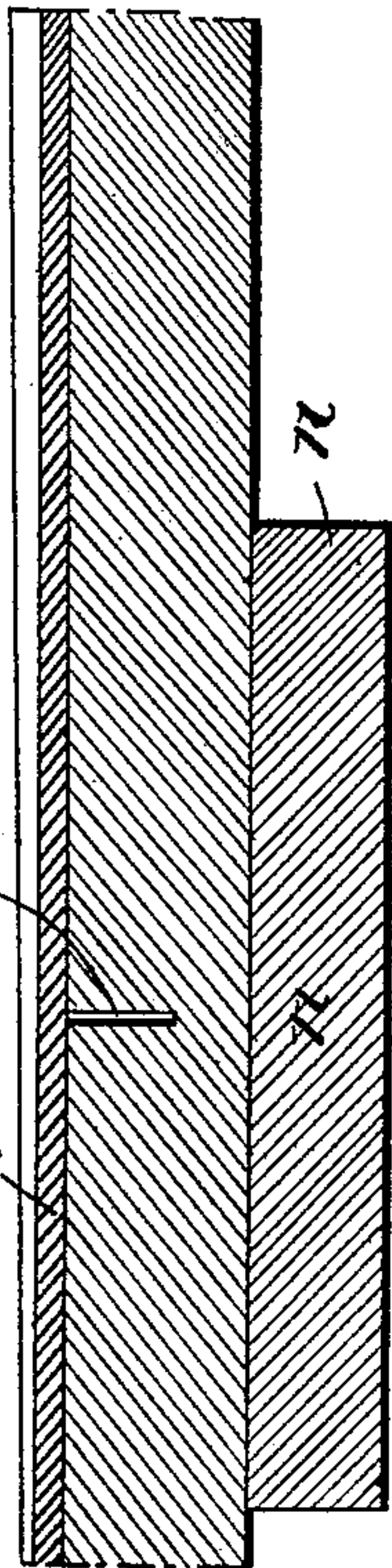
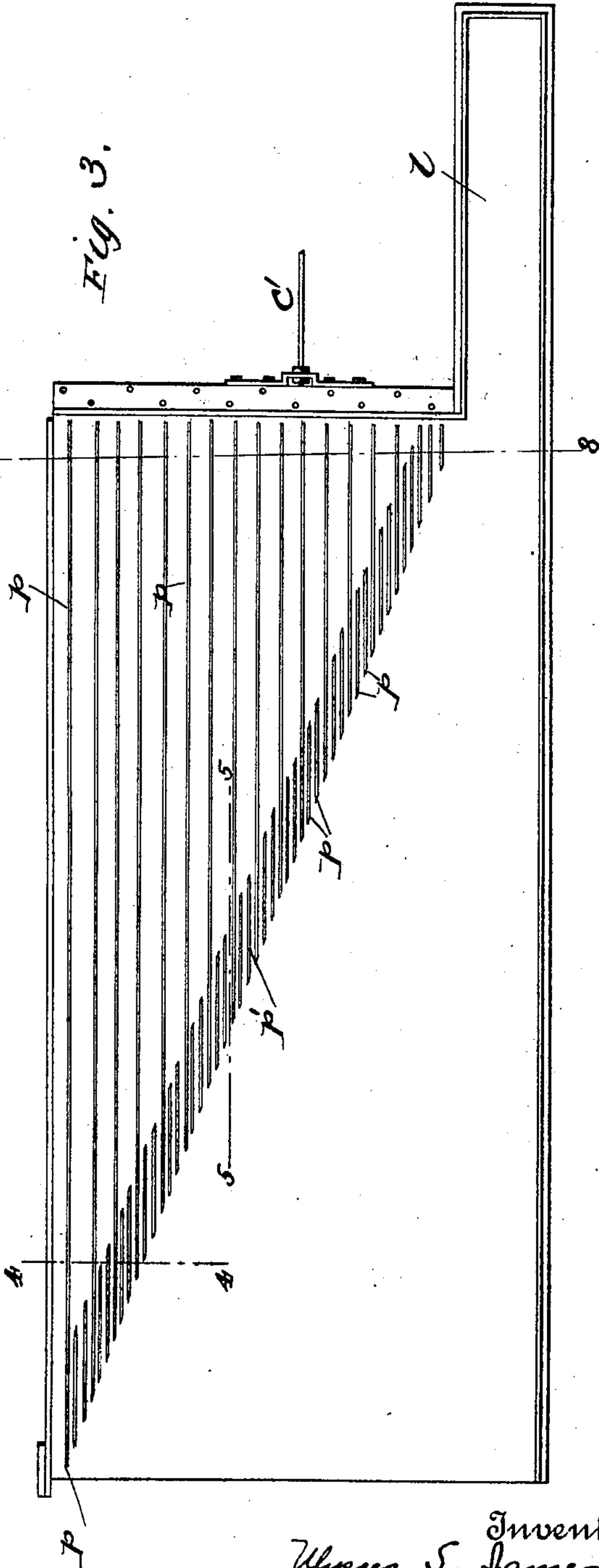


Fig. 3.



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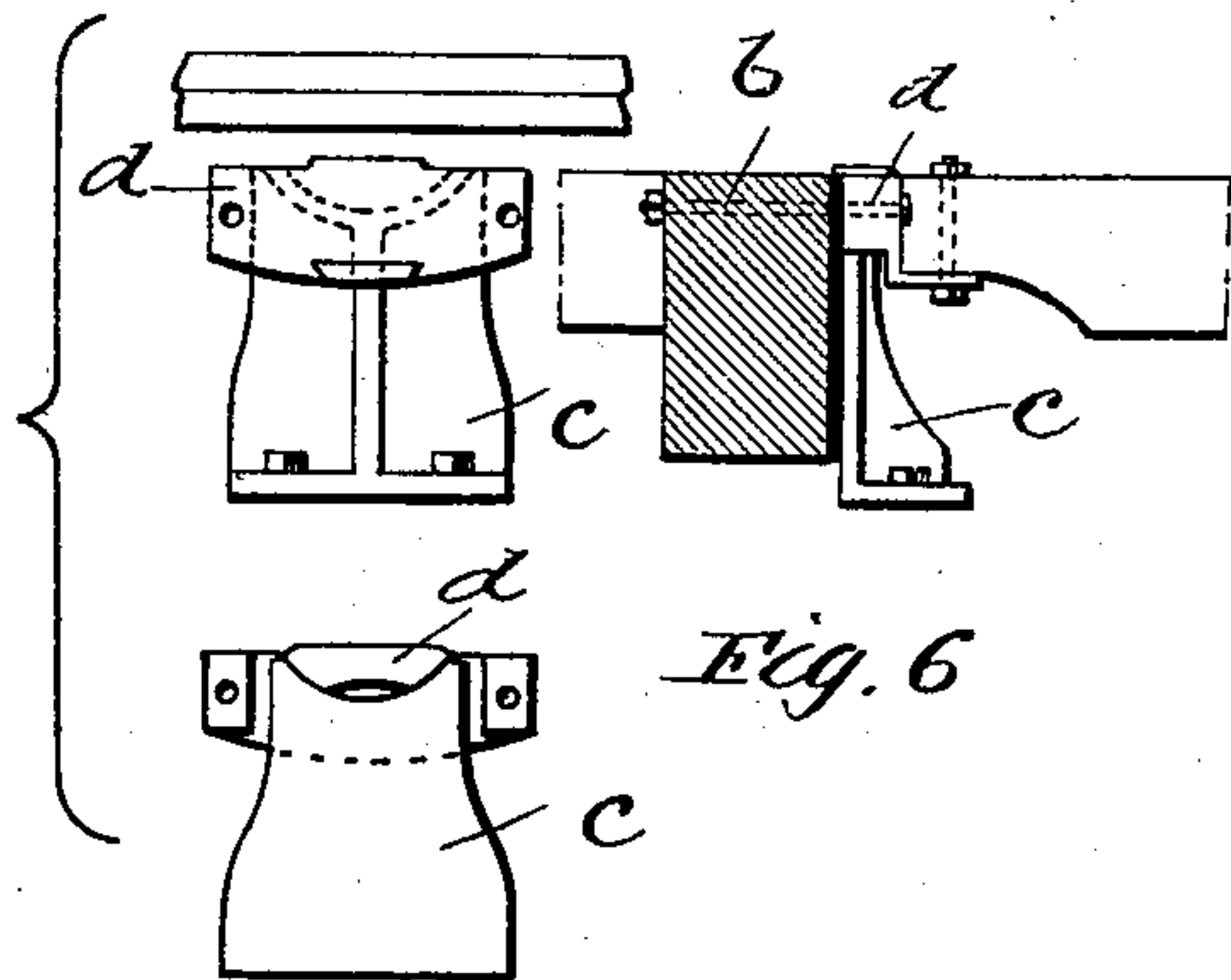


Fig. 6

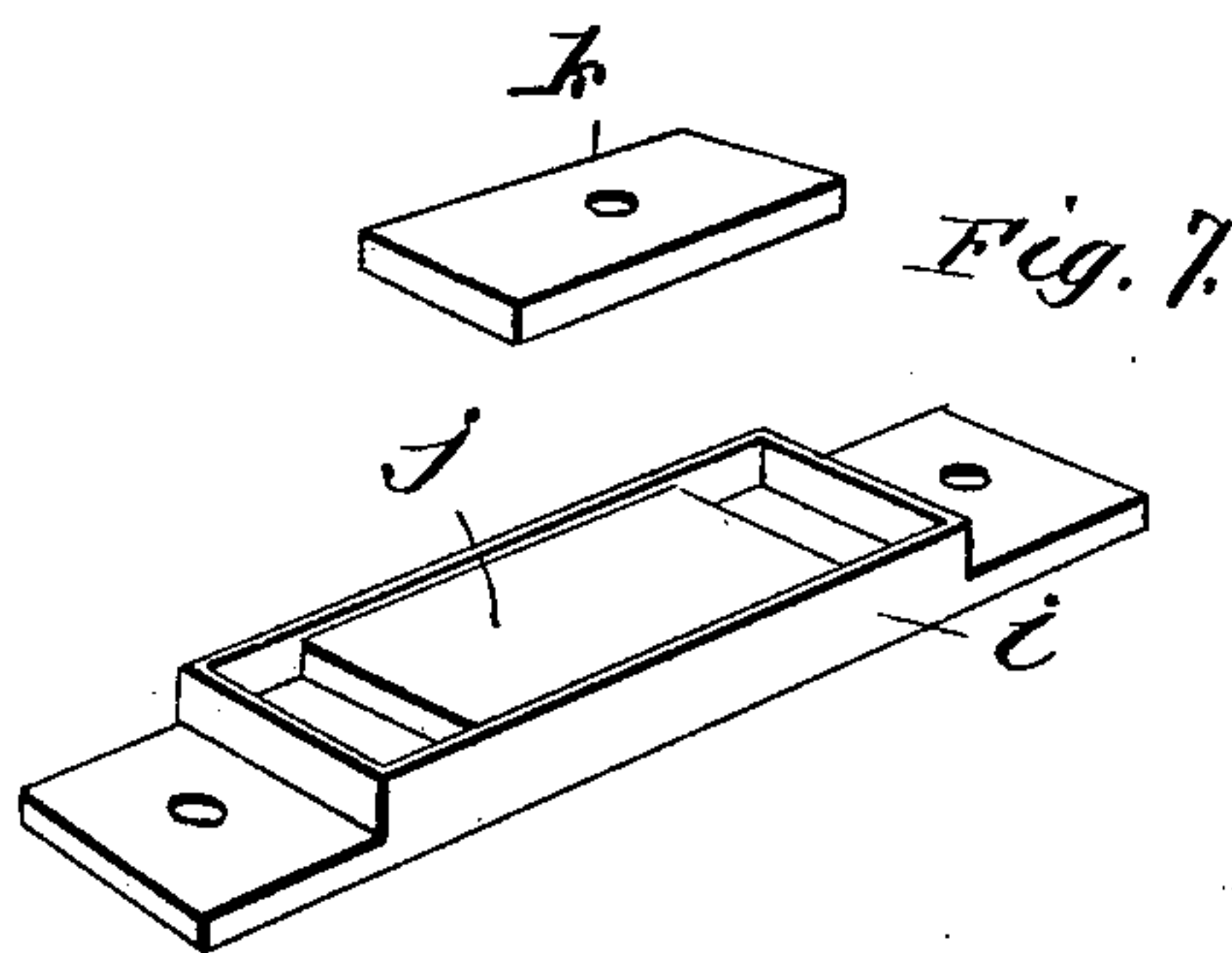


Fig. 7

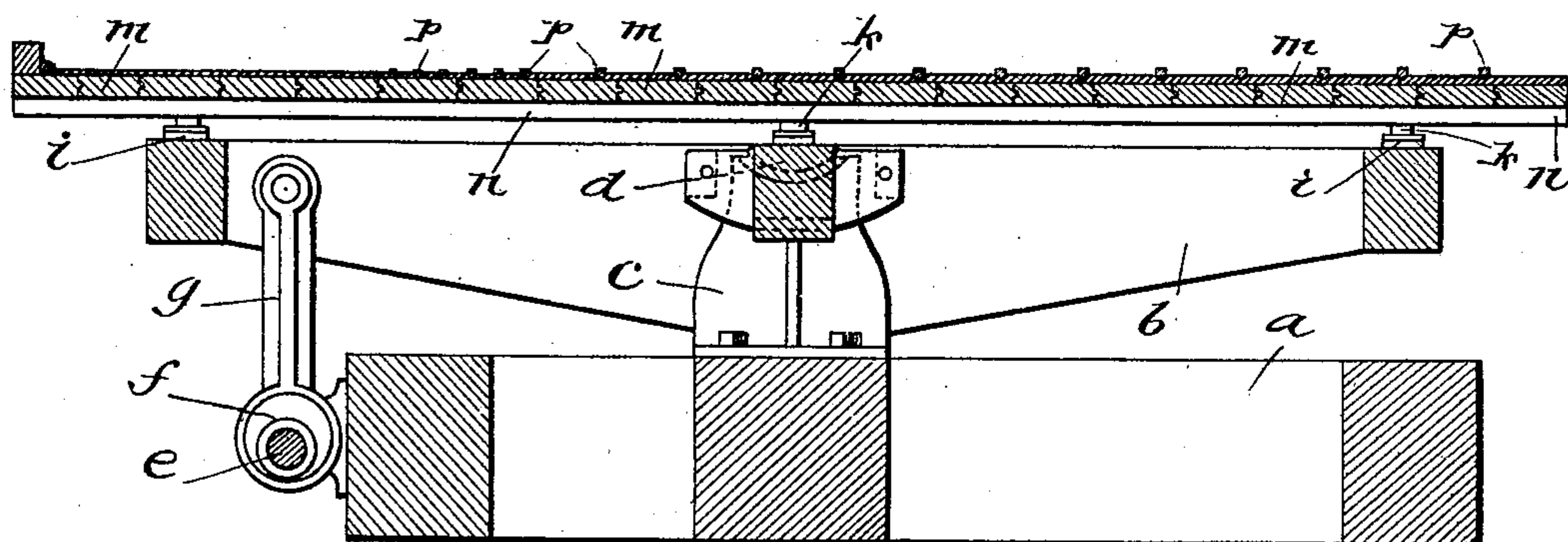


Fig. 8.

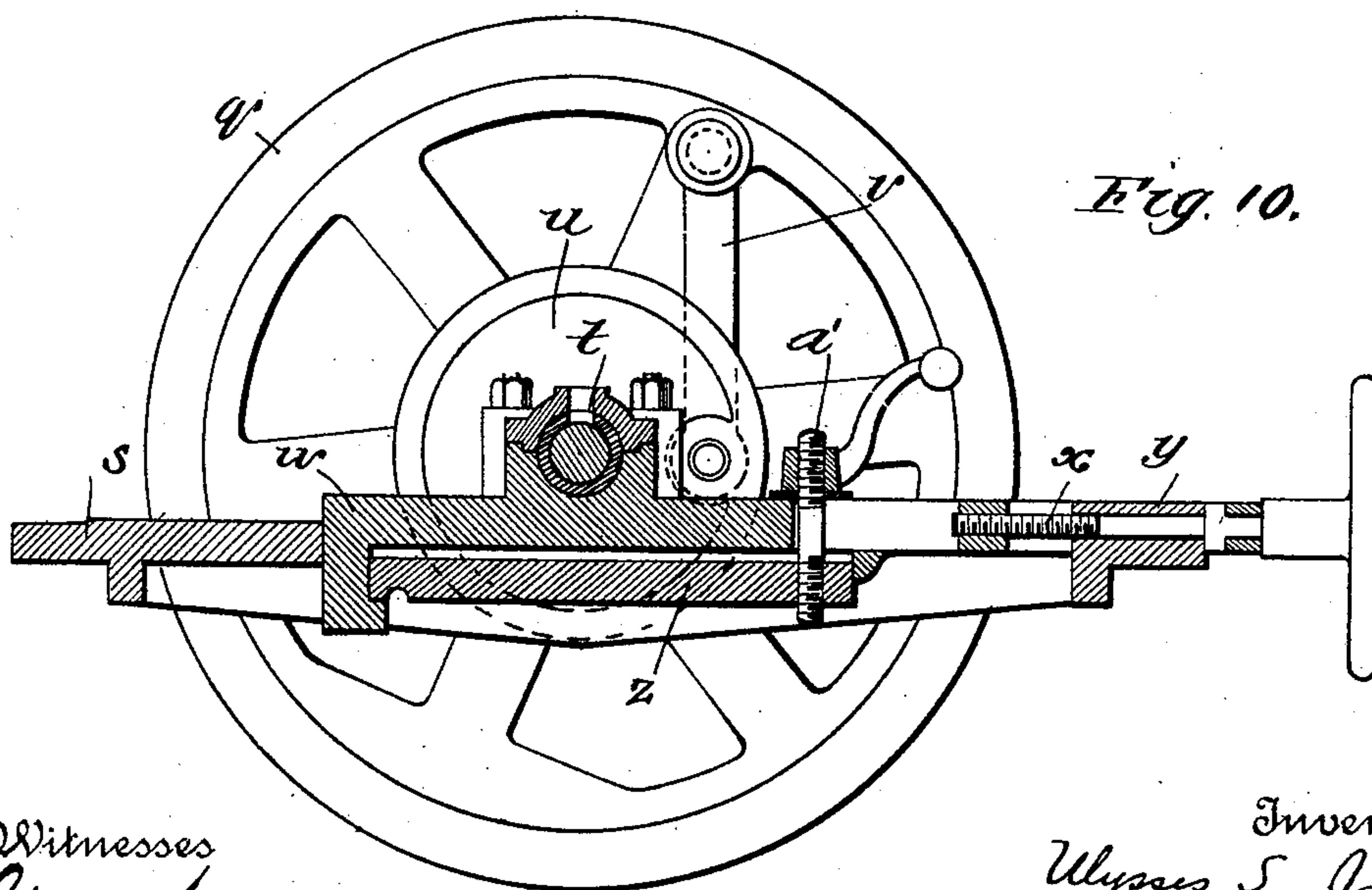


Fig. 10.

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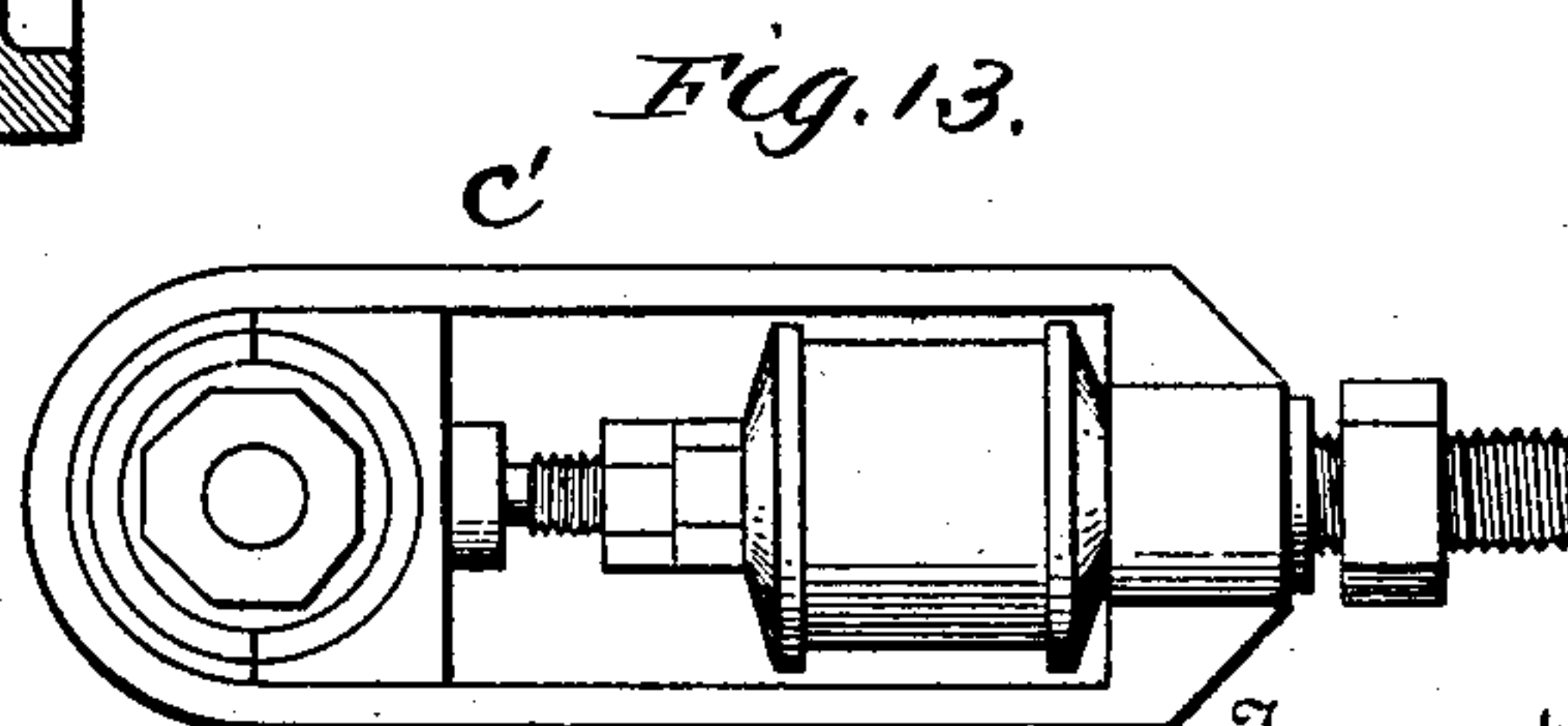
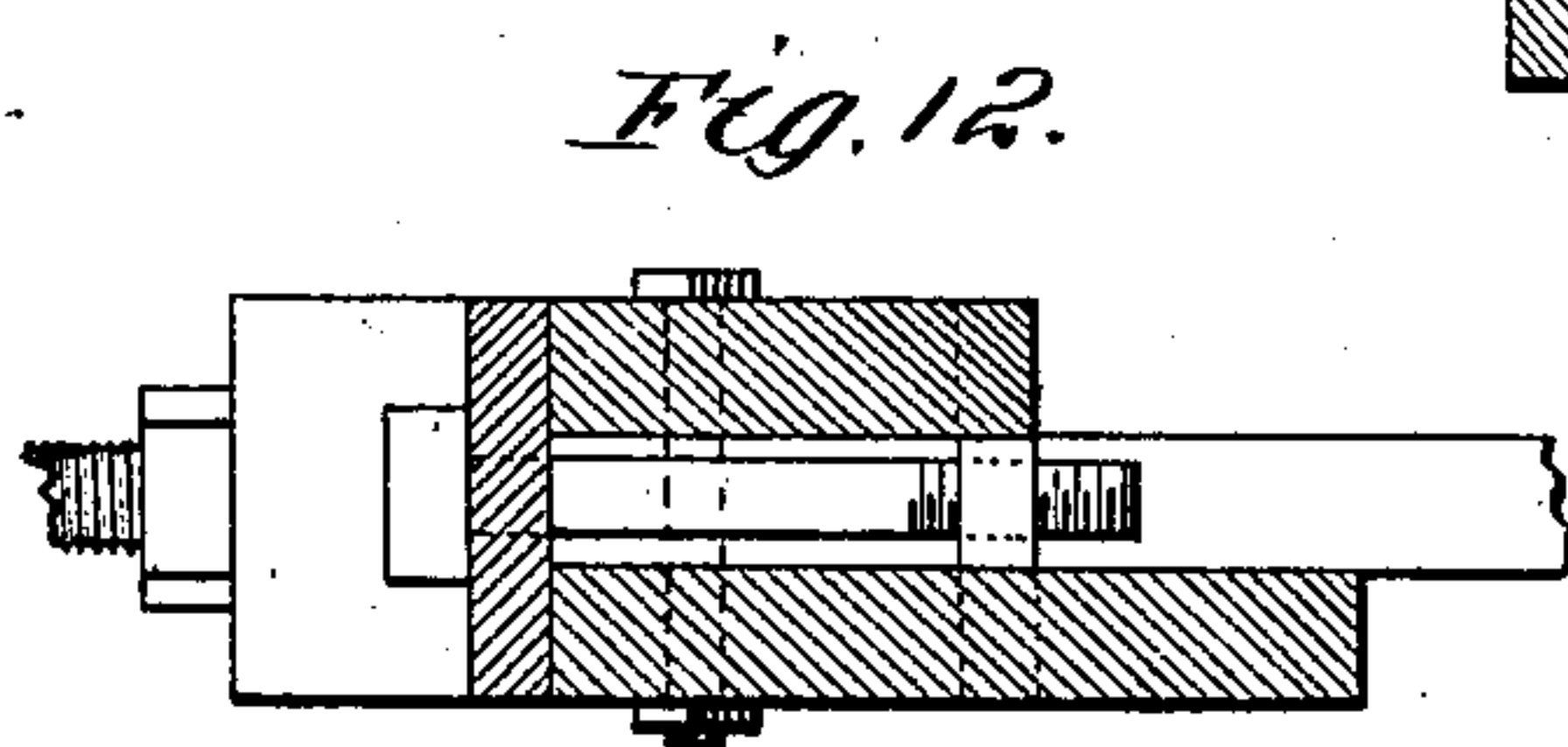
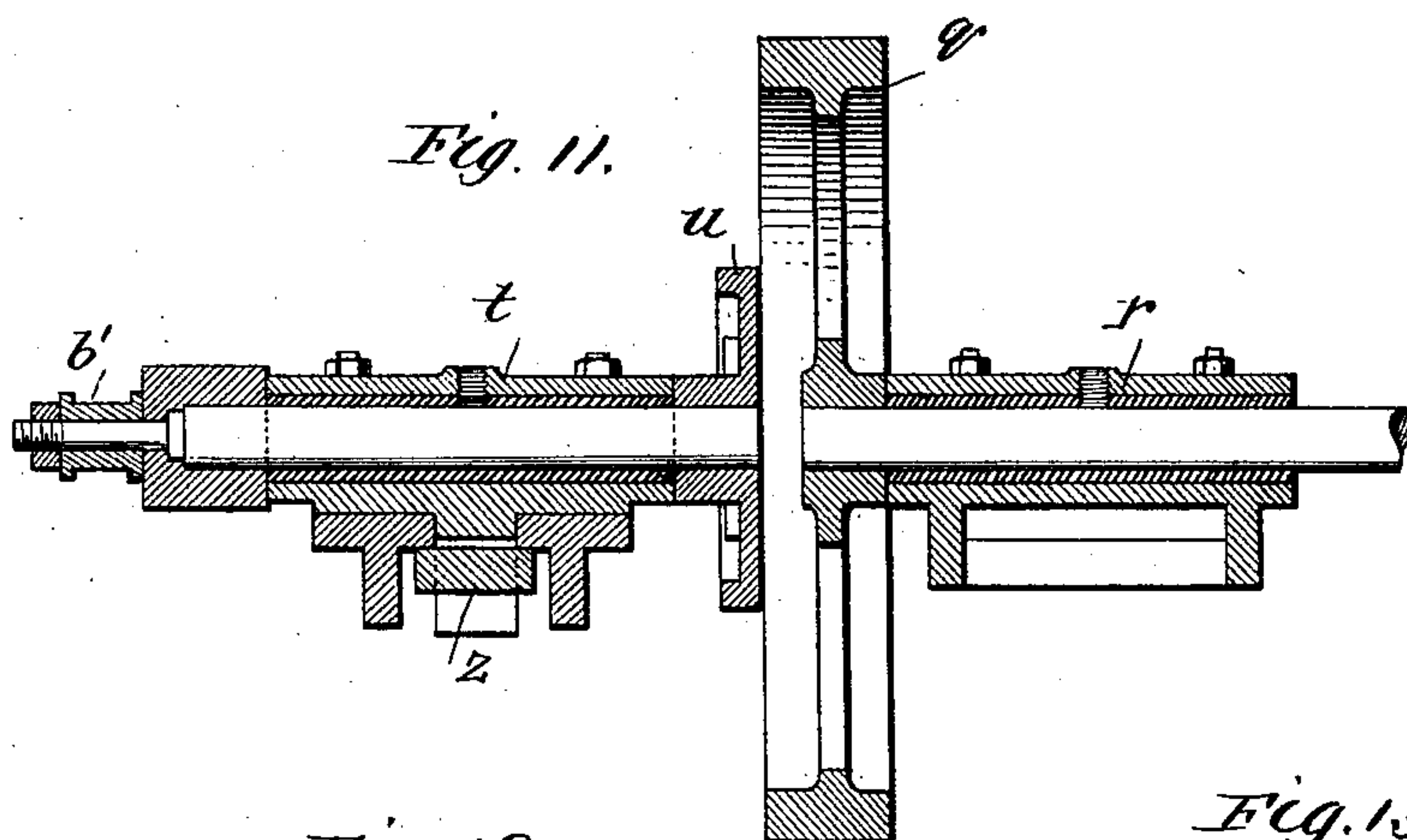
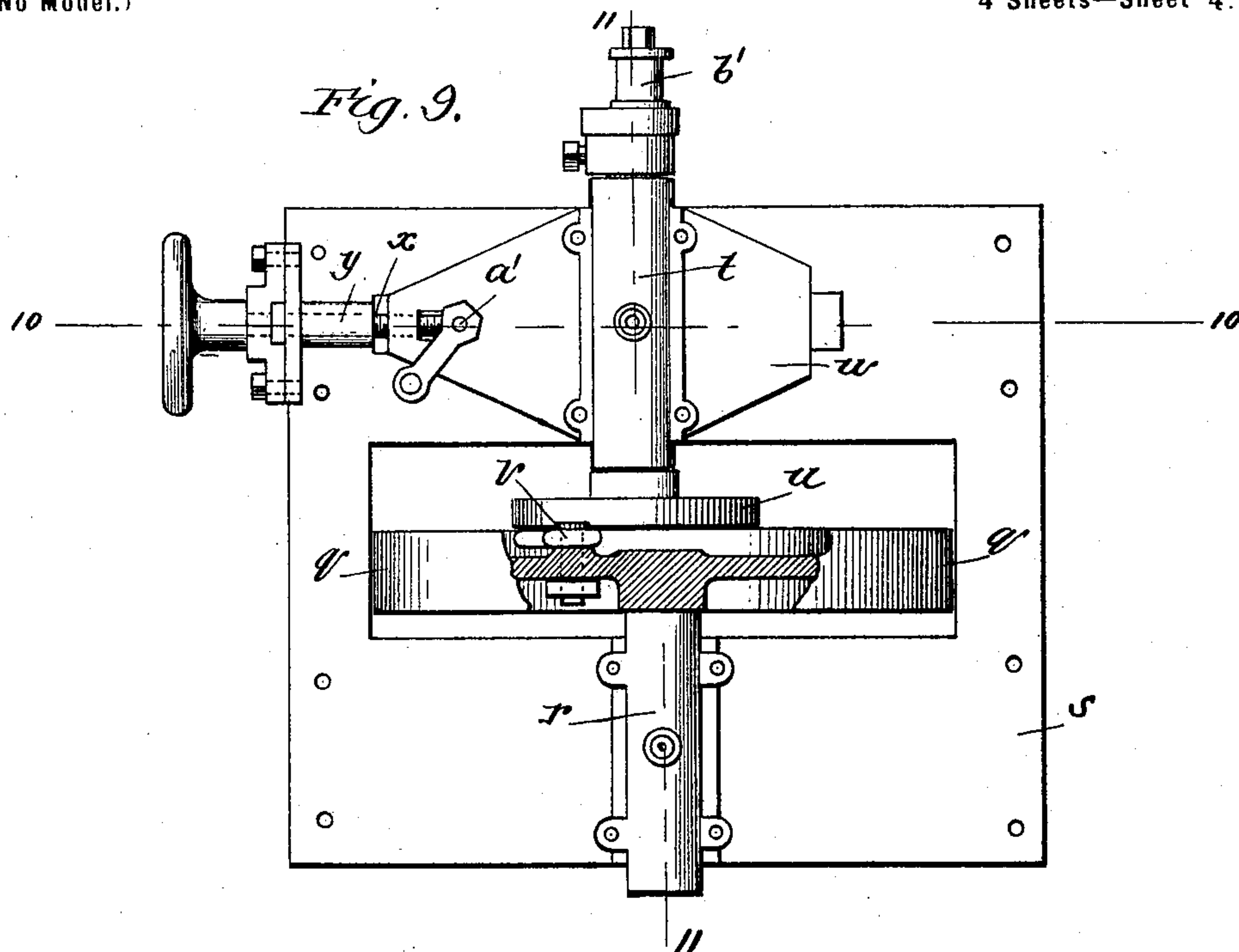
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

ULYSSES S. JAMES, OF HELENA, MONTANA, ASSIGNOR OF ONE-HALF TO
ROBERT A. BELL, OF SAME PLACE.

CONCENTRATING-TABLE.

SPECIFICATION forming part of Letters Patent No. 633,265, dated September 19, 1899.

Application filed January 11, 1899. Serial No. 701,811. (No model.)

To all whom it may concern:

Be it known that I, ULYSSES S. JAMES, a citizen of the United States, residing at Helena, in the county of Lewis and Clarke and State of Montana, have invented certain new and useful Improvements in Concentrating-Tables, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to an improved concentrating-table for the separation of heavy minerals from the gangue or quartz matter in ores that have been crushed or reduced to pulp; and it has for its objects, briefly, to lessen the expense of separating the minerals
15 and to save a higher percentum of mineral than is possible with similar appliances now in general use, as more fully hereinafter set forth.

20 In the drawings, Figure 1 is a plan view of the table-supporting frames. Fig. 2 is a side elevation complete. Fig. 3 is a detail plan of the table; Fig. 4, a detail section on the line 4 4 of Fig. 3; Fig. 5, a detail section on the
25 line 5 5 of Fig. 3; Fig. 6, a group of views in detail of one of the rocker-bearings for supporting the rocker-frame; Fig. 7, a perspective of the parts of one of the slide-bearings for supporting the table-top; Fig. 8, a cross-
30 section on the line 8 8 of Fig. 3 with the rocker-frame and base in position; Figs. 9, 10, and 11, views in detail of the mechanism for shaking the table-top, and Figs. 12 and 13 details of the pitman.

35 Referring to the drawings by letters, *a* designates a suitable base-frame, upon which is supported a rocker-frame *b*, both of which frames are constructed of a suitable number of longitudinal and transverse beams, their
40 length being several times their width. The frame *b* is supported upon the base by a series of bearings *c*, arranged along the longitudinal center of the frame and bolted to the base, these bearings each having a concaved
45 seat in its upper end for the reception of a pivot or journal *d*, bolted to an adjacent part of the rocker-frame. Thus supporting the rocker-frame it is free to be tilted in either direction transversely. Any suitable devices
50 may be employed to tilt this frame; but I prefer the employment of a rock-shaft *e*, sup-

ported in suitable journals at one side of the base *a* and running the full length thereof and carrying at intervals eccentrics *f*, whose straps are connected to arms *g*, pivotally de- 55
pending from the rocker-frame, said shaft being provided at one end with an operating-lever *h*. This simple arrangement enables the table-frame *b* to be readily tilted to the desired angle to suit the kind of ore being 60
treated, and when tilted it will remain in the adjusted position until readjusted.

By supporting the rocker-frame along its longitudinal center it will be observed that it may be readily tilted with the utmost ease 65
and accuracy, which will be especially advantageous in connection with exceptionally long tables used for certain kinds of ores. It will be observed that the bearings *c* extend up between the transverse beams, so as to 70
bring the pivotal point at or near the upper face of the rocker-frame, whereby the rocker-frame is nicely suspended or balanced on the pivots, enabling the frame to be adjusted with a minimum of exertion. It will also be 75
noted that the center line of the pivots—that is, a line running through the centers of the several circles of which the bearing-pivots *d* form arcs—is approximately in line with the operating-pitman *c'*, connected to 80
the forward end of the table midway between the side edges thereof, whereby the table may be freely tilted without subjecting the pitman to any torsional strain or lateral oscillation, which obviously contributes to the utility of 85
the apparatus.

Fastened at intervals along the longitudinal beams of the table-frame are slide-boxes *i*, each containing a sliding block *j*, upon which rests a slide-block *k*, secured to the 90
under side of the table, the table being provided with one of these blocks for each of the slide-boxes, whereby the table will be slidingly supported throughout its length and breadth. The slide-blocks *k* rest upon the 95
slide-blocks *j* and are confined within the side flanges of the boxes, whereby the reciprocating movements of the table will be guided and the table will be prevented from sliding down sidewise in the direction of its 100
inclination.

The table at its forward end at one side is

provided with a forward extension l , flanged around its edge to form a trough, into which the pulp is fed and along which it must pass to reach the main portion of the table and the riffles. The flange around this trough is continued across the forward edge of the table and along its upper longitudinal edge. It will be evident that the shaking motion of the table-top settles the fine mineral to the bottom and brings the coarse gangue on top before the material reaches the riffles, so that the gangue will not pack at the points of the riffles and dam the fine mineral; but the fine mineral having settled at the bottom will gradually move along above the points of the riffles, while the coarser gangue will move down across the riffles and separate from the fine mineral. It will therefore be noted that this trough-like extension of the feed end of the table-top is a very essential feature and that in order to be effective the extension must be sufficiently long to insure the settling of the fine mineral before the material reaches the riffles on the main surface. As a general thing the length of the extension should be a little greater than one-third the length of the table.

The table-top is constructed of longitudinal strips m of selected wood, preferably matched tongue-and-groove stuff, and bound together by cross-battens n , fastened at intervals to the under side of the table-top. At a point coincident with each of these battens the table-top is sawed entirely across, as at o , the kerfs extending down a sufficient depth to give the desired flexibility to the table, preferably about half-way through the strips m . Secured on the surface of the strips is a covering of heavy linoleum n' or other thick flexible material, this covering extending over and covering the transverse slits o . A table thus constructed is self-adjusting by reason of its transverse flexibility to all the slide-bearings, thereby practically abolishing vertical vibration, a great desideratum in this class of appliances.

The riffles p run longitudinally of the table parallel with each other and with the lower edge of the table, and their upper edges incline downward from their forward ends toward their rear ends, and they extend over that portion of the table-surface below a diagonal line running from near the upper forward corner of the table to its lower rear corner, making the field covered by the riffles a triangular one, although this location and arrangement of the riffles may be varied, if found desirable. The riffles are fastened in grooves formed in the upper surface of the linoleum cover and extend only partially therethrough, and they are of course sufficiently flexible transversely to yield to the sinuous movements of the table caused by irregularities in the supporting-surface thereof. This manner of fastening the riffles to the table has peculiar advantages. It enables the riffles to be planed down to any desired de-

gree—in fact, actually to the table-surface—without destroying their strength, and, furthermore, it prevents the riffles breaking loose and springing up from the table-surface, whereby the life of the riffles will be greatly increased and their function rendered more perfect. The fastening means must obviously be something other than nails or screws or other devices passing down through the riffles. I prefer cement or glue that will not dissolve in water. Where the riffles are highest, (at the forward end of the table,) they are more widely spaced, and as their height is reduced their number is increased by the insertion of the short supplemental riffles p' . The reason of this is that where the riffles are low there is less tendency for the pulp to pack, and their number is increased in order to make a more continuous dam to resist or prevent waste of mineral. It will also be observed that if the riffles were laid the full length of the table extravagant agitation would be necessary to avoid packing the pulp, which would result in the fine mineral being held in suspense in the water and lost by being passed off across the riffles with the tailings.

The shaking or panning movement by which the pulp is made to travel downward and rearward on the table may be imparted to the table by any suitable devices; but I prefer the devices shown, because by means of them the pulp can be made to travel along the table at the desired speed without varying the velocity of the fly-wheel or the length of the stroke of the pitman. These devices consist of a balance-wheel q , secured to the end of a drive-shaft mounted in the bearing r , bolted to a bed-plate s , this bed-plate being in turn bolted to the table-frame b and having an opening in its center in which works said wheel q . Also fastened to the bed-plate is another long bearing t , in which is journaled a supplemental shaft carrying a disk or wheel u at its inner end, this disk u being close to the balance-wheel and being connected therewith by a pivotal link v . The shafts of the wheels q and u are supported in the same horizontal plane, and by reason of the lateral adjustability of the bearing t said shafts may be adjusted into axial alinement or out of axial alinement for a purpose hereinafter stated. The bearing t is rendered adjustable upon the bed-plate by being secured to a slide w , which is adapted to be adjusted back and forth by a screw-shaft x , journaled in a bearing y at the rear edge of the base-plate s . This slide is adapted to be clamped in its adjusted position by means of a clamp-plate z and screw a' . On the other end of the shaft carrying wheel u is formed or secured an eccentric b' , to which is connected the pitman c' , which at its rear end is connected to the table. This pitman is provided with suitable adjusting and cushioning devices, as is usual, so that the pitman may be extended to suit the adjustments of the supplemental shaft carrying the eccentric. It will be observed

that when balance-wheel *q* is rotated wheel *u* and its shaft will be rotated and the table reciprocated. When the shafts are in axial alinement, as shown in Figs. 1, 10, and 11, the wheel *u* will have a regular rotary motion imparted to it, this motion being in unison with the balance-wheel. When, however, the slide-bearing is adjusted away from the table forward to bring the shaft of wheel *u* out of alinement with the driving-shaft, the rotary motion imparted to the eccentric-carrying shaft will be irregular—that is, accelerated at a certain point in each revolution, and this acceleration will be imparted to the table. By properly arranging the eccentric upon the shaft the acceleration can be made to act on the table at the proper point in its forward or backward stroke or portions of both to accelerate the movement of the pulp along the table. It will thus be observed that by this differential-operating mechanism the flow of the pulp along the table can be regulated to a nicety without varying the speed of the drive-shaft or the length of the pitman stroke. Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A concentrating-table provided on its surface with a series of substantially parallel, longitudinal riffles extending from the forward end rearward and terminating short of the rear end of the table, on a substantially diagonal line running downward and rearward, and a series of supplemental riffles interposed between the rear extremities of the aforesaid riffles.

2. A concentrating-table having its feed-point at its forward upper corner and provided on its face with a series of parallel riffles tapering rearward and extending from the forward end of the table to a line running diagonally across the table from near the feed-

point rearward and downward, and a series of supplemental riffles interposed between the rear extremities of the aforesaid riffles, as and for the purpose set forth.

3. A concentrating-table provided with longitudinal riffles tapering rearward and being more numerous and more closely spaced toward their rear ends, the riffles extending across the line of travel of the lighter material, substantially as set forth.

4. A concentrating-table provided with transverse kerfs to render it flexible transversely and provided with a series of longitudinal riffles extending across said kerfs and being transversely flexible.

5. A concentrating-table rendered transversely flexible by a series of kerfs extending across its upper surface, a flexible covering for said upper surface and kerfs, and a series of longitudinal riffles fastened to this covering and rendered transversely flexible.

6. A concentrating-table constructed of longitudinal wooden strips, cross-pieces binding the strips together, grooves or cuts being formed across the table coincidently with said cross-pieces, a flexible cover fastened to the table and covering said grooves or cuts, and riffles carried by said cover and made flexible transversely.

7. A concentrating-table rendered transversely flexible and provided on its upper surface with a flexible covering, and transversely-flexible riffles fastened in grooves in the face of said flexible covering, said grooves extending only partially through the covering.

In witness whereof I have hereunto affixed my signature, in the presence of two witnesses, this 3d day of January, 1899.

ULYSSES S. JAMES.

Witnesses:

L. P. BENEDICT,
JNO. K. SCOTT.