

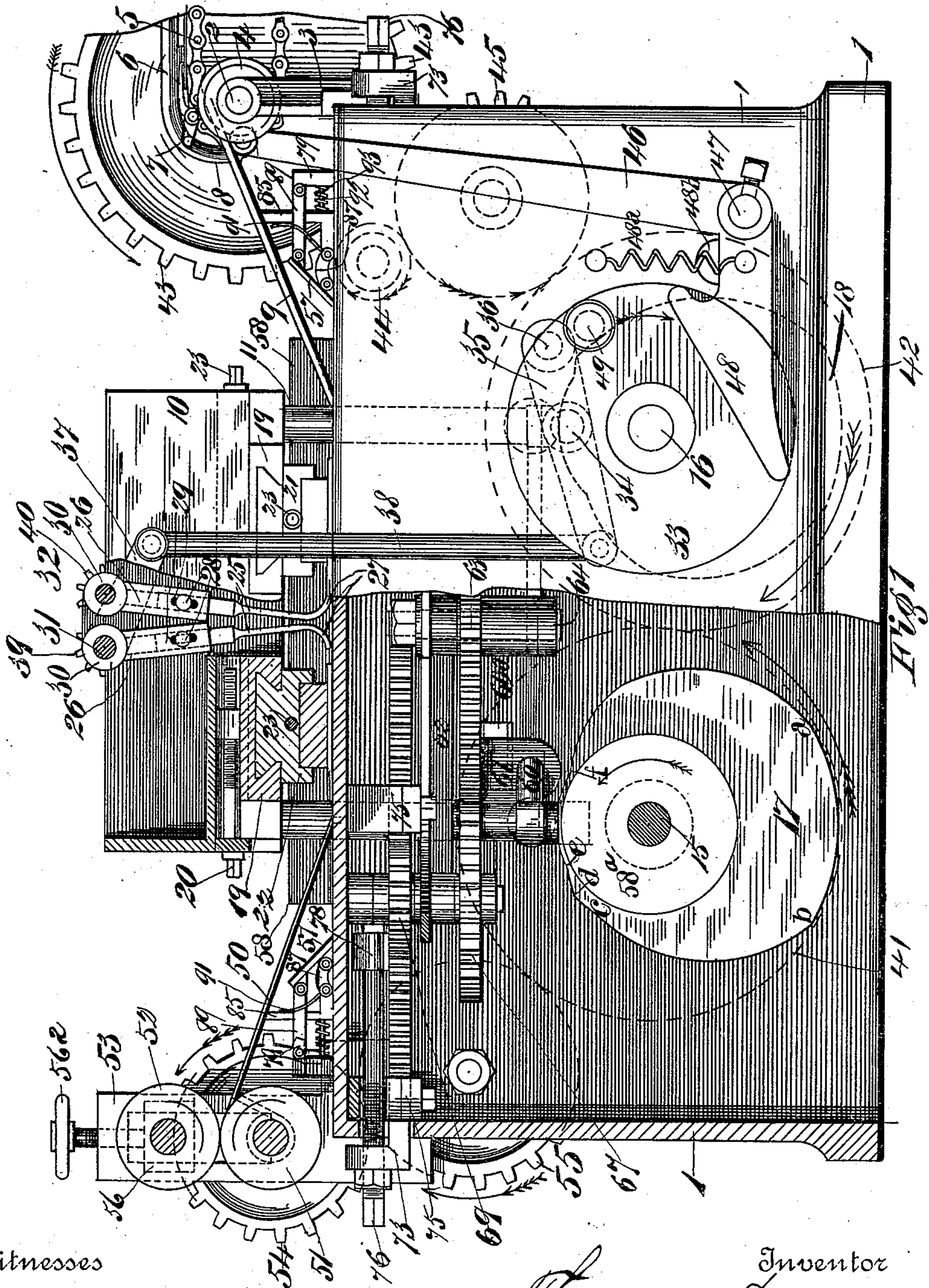
(No Model.)

6 Sheets—Sheet 1.

T. DEAN.
BOOK COVER FOLDING MACHINE.

No. 549,499.

Patented Nov. 12, 1895.



Witnesses

Jno. Geo. Smith
W. W. DeFree

Inventor

Thomas Dean

By his Attorney

Thompson & Bell

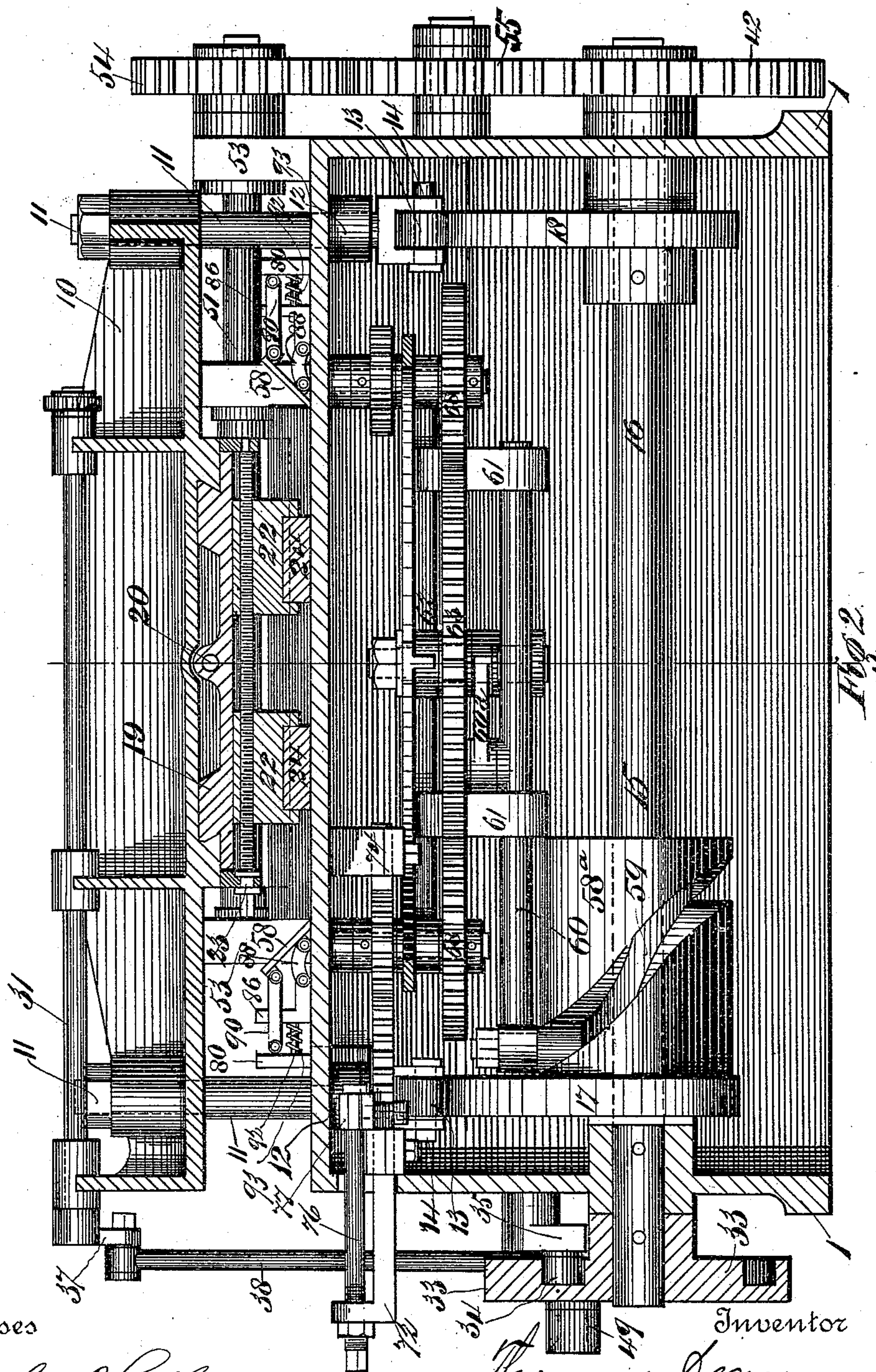
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Witnesses

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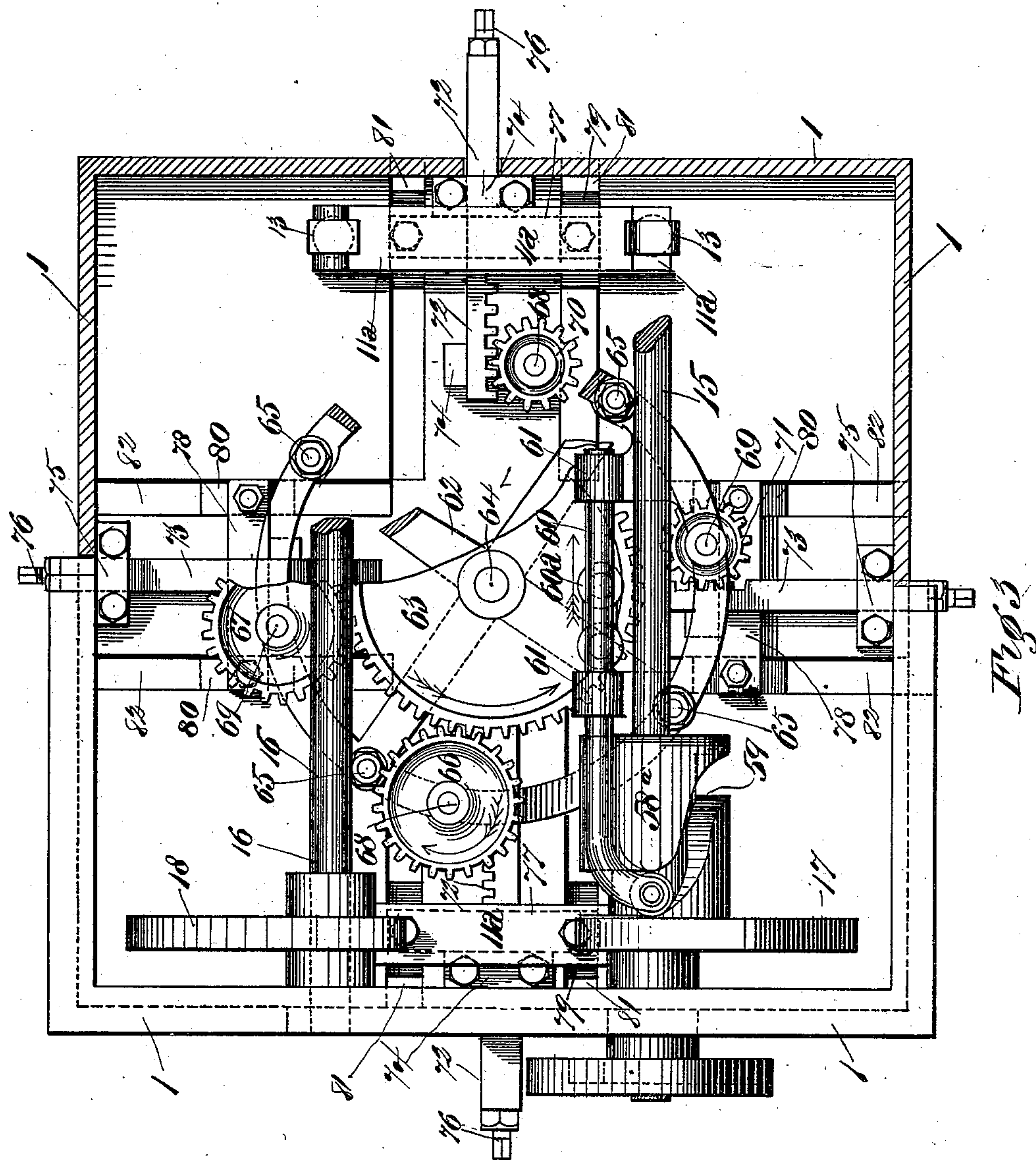
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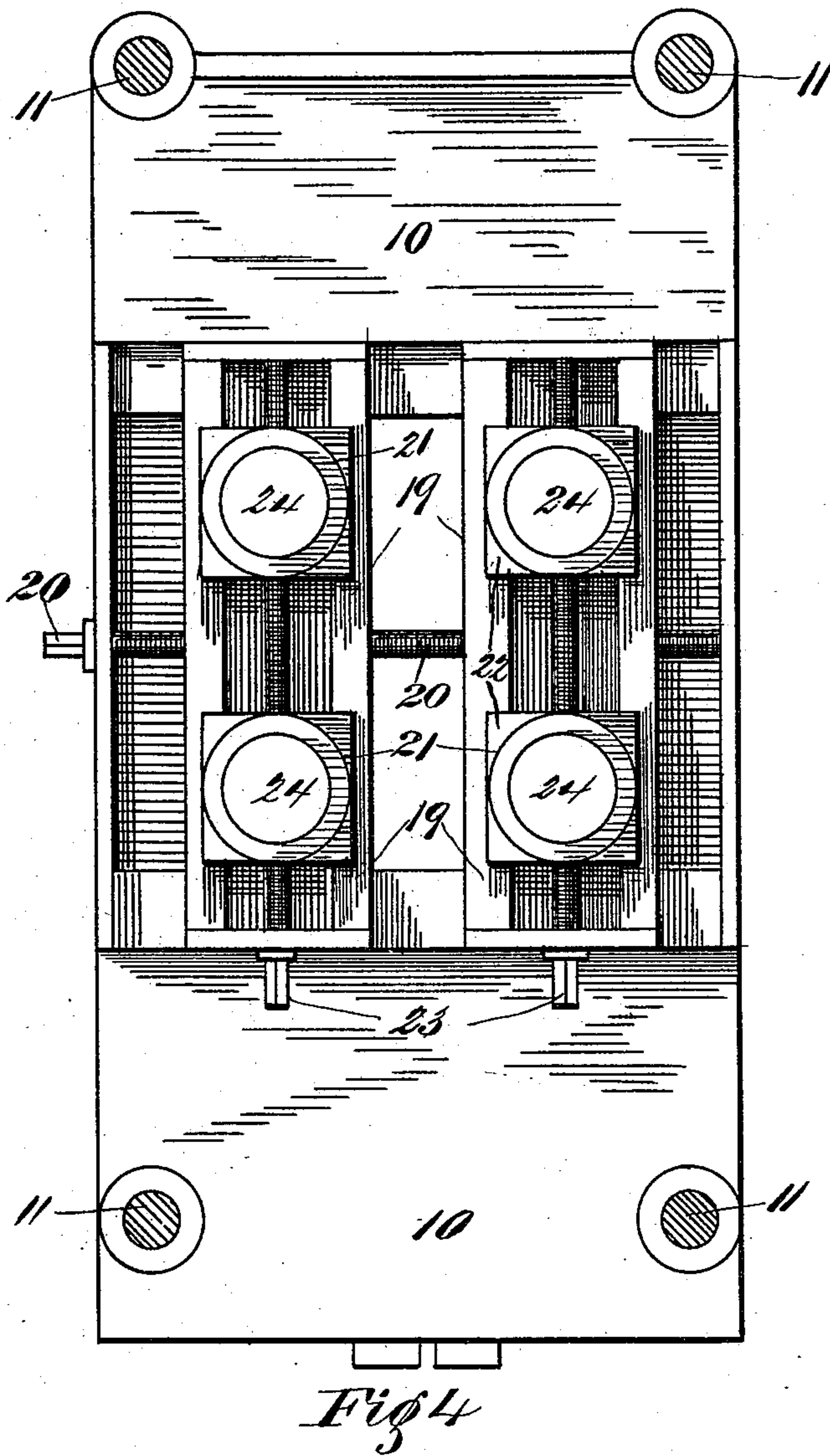


Fig 4

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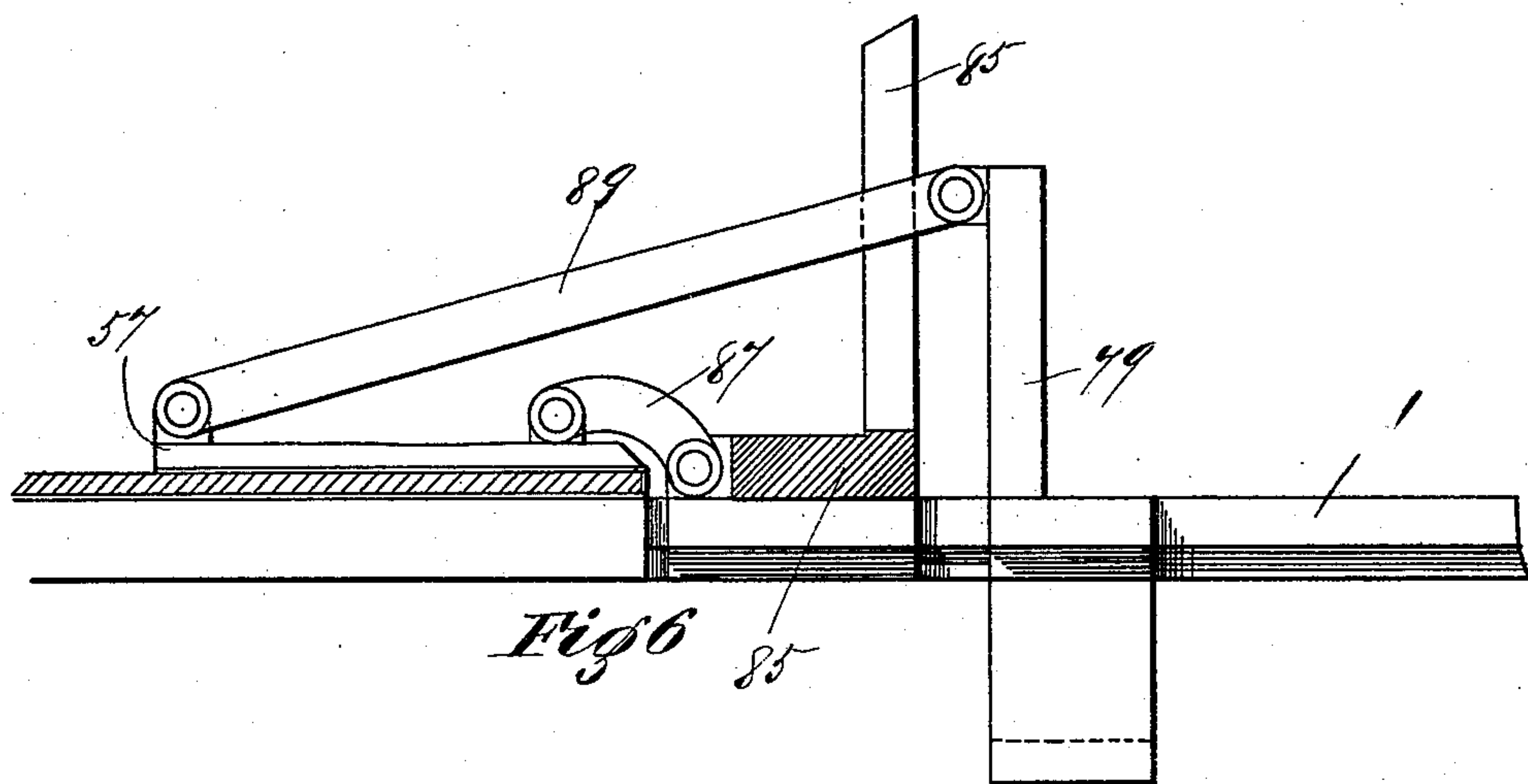
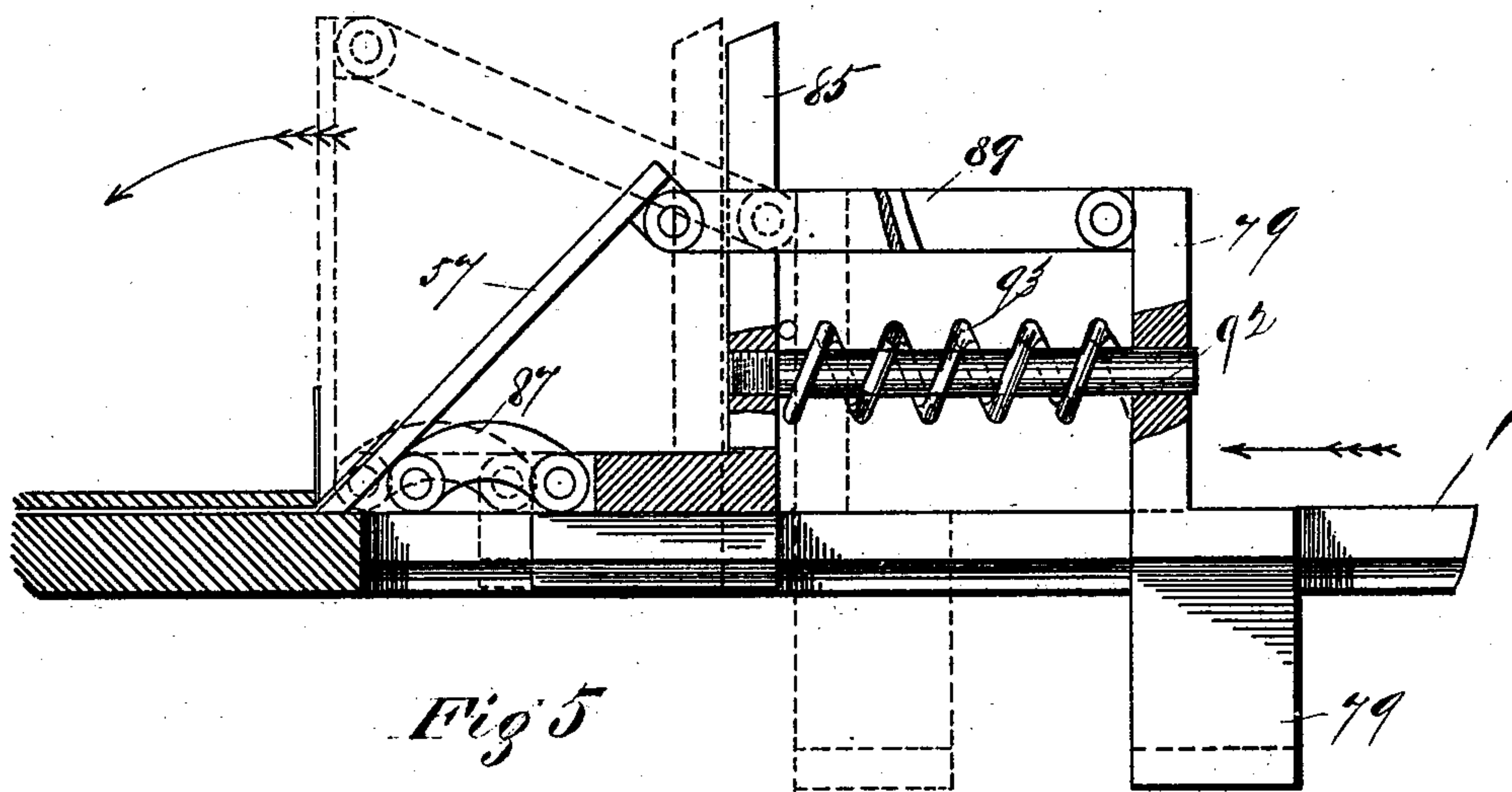
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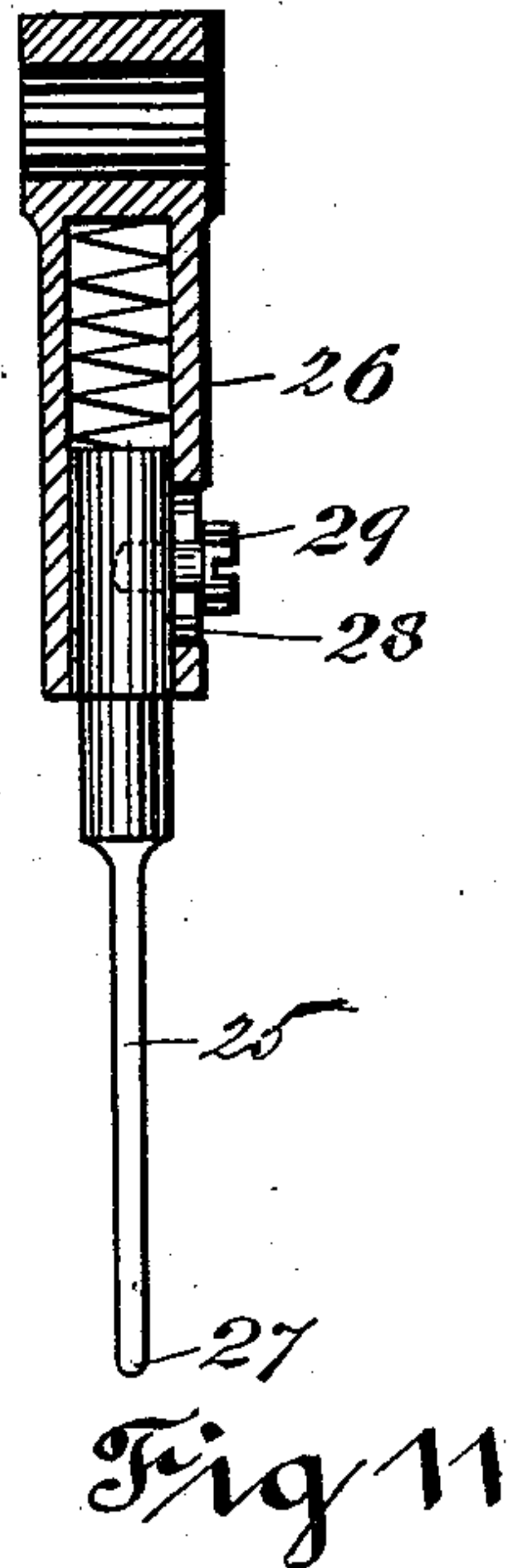
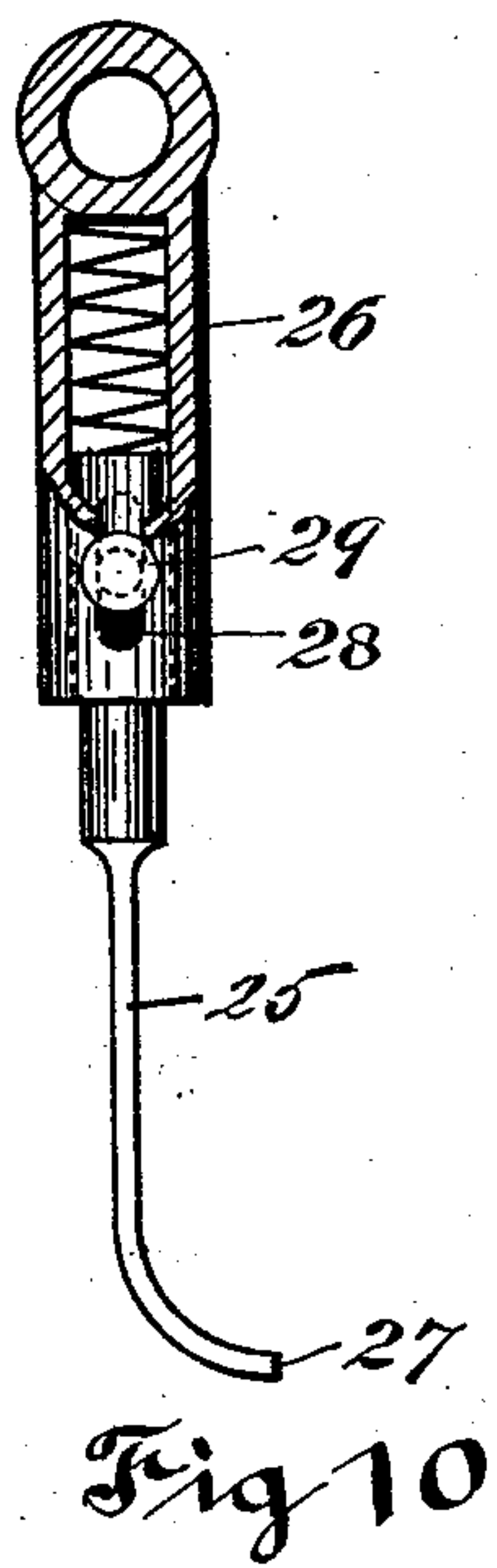
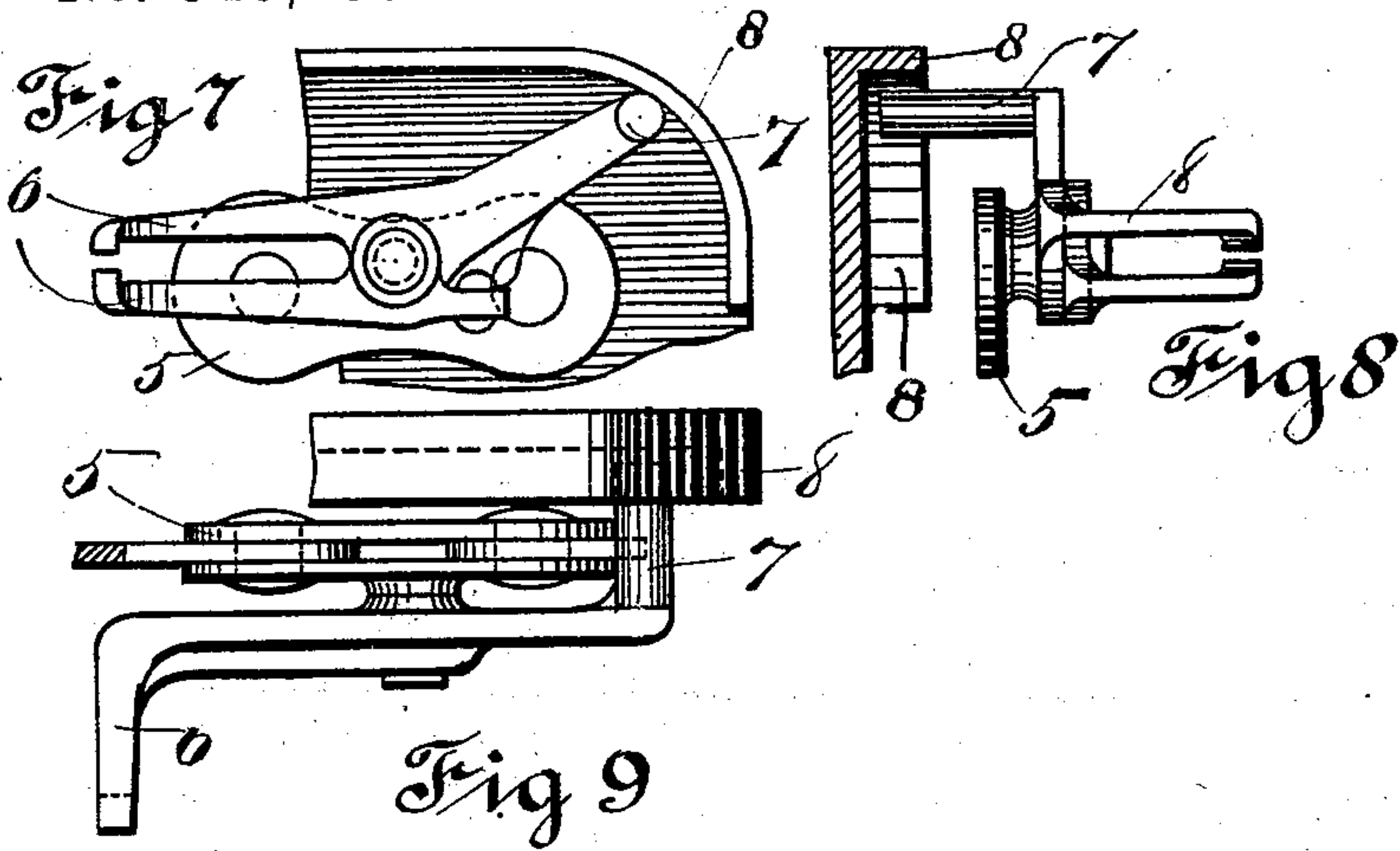
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UNITED STATES PATENT OFFICE.

THOMAS DEAN, OF INDIANAPOLIS, INDIANA.

BOOK-COVER-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,499, dated November 12, 1895.

Application filed November 30, 1892. Serial No. 453,631. (No model.)

To all whom it may concern:

Be it known that I, THOMAS DEAN, a citizen of the United States, residing at Indianapolis, county of Marion, and State of Indiana, have invented new and useful Improvements in Book-Cover-Folding Machines, of which the following is a specification.

My invention relates to new and useful improvements in machinery for folding the cloth or other covering over the millboards of book-covers; and it consists in novel mechanism hereinafter described.

The object of my invention is to provide means whereby the cases or unfinished book-covers will be automatically fed into the machine to be operated upon and then automatically discharge said cover from the machine; to provide means whereby the edges of the covering material will be folded or lapped over the edges of the millboards of the cover and firmly pressed to adhere thereto, and to provide suitable mechanism for operating the several devices used in connection with the operation of folding or lapping the edges of the cloth covering of the millboards. I attain these objects by means of the mechanism illustrated in the accompanying drawings, illustrating my invention, and in which similar numbers of reference designate like parts throughout the several views, in which—

Figure 1 is a side elevation of my machine partly in section. Fig. 2 is a transverse sectional elevation. Fig. 3 is an inverted plan of my machine, showing the reciprocating mechanism of the folding mechanism. Fig. 4 is an inverted plan of the pressure-table. Fig. 5 is an enlarged detail view of the folding device. Fig. 6 is a similar detail view showing the folding-plate just at the point of completing the folding or lapping operation. Fig. 7 is an enlarged detail view of the grippers and a broken view of the fixed cam. Fig. 8 is an end elevation of the same, showing the said cam in section. Fig. 9 is a plan of the same. Fig. 10 is a part side sectional detail view of the centering-finger, and Fig. 11 is a similar end elevation of the same.

The main frame 1 of the machine is preferably of a box-section and incloses the major portion of the automatic mechanism of the machine. The shaft 2 is journaled at its ends in the standards 3 and is provided with

the sprocket or chain wheels 4, around which pass the conveyer-chains 5. The conveyer-chains 5 have a number of grippers 6 secured to them at regular intervals apart and operate to close by a suitable spring device to engage the projecting covering at the edge of the unfinished case or book-cover, and are opened to disengage said case by means of their interlocking-arms 7, which alternately contact the camways 8, formed on the standards 3. The casings, owing to the inertia stored in them, due to the velocity imparted to them by the movement of the conveyer-chain 5, will slide on the inclined pusher-arms 9 into position on the top surface of the frame 1 and directly beneath the pressure-table 10, which I will now describe.

The pressure-table 10 is firmly secured on the upper ends of the guide-rods 11, which slide upwardly and downwardly in their ways 12, formed in the main frame 1 and having their lower ends forked to receive their cam-rollers 13, journaled on their fork-pins 14. In order to prevent any vibration of the guide-rods 11, I provide the tie-bars 11^a, secured to their bottom ends above the forks, which, being in compression, due to the direction of rotation of the cams, hold said bottom ends of the guide-rods perfectly rigid. On the shafts 15 and 16 are firmly secured the cams 17 and 18, which contact with their rollers 13 to raise and lower the guide-rods 11, the pressure-table 10, and its attachments. On the bottom surface of the pressure-table are formed suitable V-ways, wherein the traversing heads 19 are adapted to slide in a longitudinal direction, and are operated and adjusted independently by means of the traversing screws 20. On the under surfaces of the heads 19 are also formed V-ways, but in a direction transverse with the ways of the heads 19, and wherein the opposite pairs of the heads 21 and 22 slide, each pair of the latter being actuated simultaneously, moving either farther apart or nearer together by their traversing screws 23, one-half of which is a right-hand and the other a left-hand screw-thread.

In the under surfaces of the heads 21 and 22 are formed circular recesses, in which bumpers 24, of rubber or other suitable elastic or pliable material, are firmly secured, and are provided for the purpose of presenting a

soft yielding surface of contact to the unfinished cases and preventing any indentation or marks on their surfaces.

The centering-fingers 25 of the pressure-table have their upper enlarged ends adapted to loosely fit and to slide in their sockets 26, the toes or bottom bent ends 27 being turned outwardly to engage the inner edges of the millboards of the cases, said fingers held in position by the set-screws 28, working in suitable slots 29, which limit their motion and retain them in their sockets. Inclosed in the sockets 29 are suitable coil-springs, which force the fingers 25 outwardly and readily yield or compress to permit the fingers 25 to telescope or yield when the fingers contact with the unyielding surface of the top bed or table of the main frame 1. The top ends of the sockets 26 are provided with the hubs 30, which neatly fit on their shafts 31 and 32, whereon they are secured. The shafts 31 and 32 are journaled in suitable journal-bearings formed in the pressure-table 10 and receive their partial opposite rotations by means of the face cam 33, engaging the roller 34, the pivotal rocking lever 35, pivoted on the stud 36, secured on the side of the main frame 1, the rocking lever 37, secured on the shaft 31, the connecting-rod 38, and the gear-pinion 39, secured on the end of the shaft 31 and meshing with the pinion 40, secured on the shaft 32. Thus as the cam 33 is rotated, owing to its special form, it only operates the centering-fingers 25 when the table is about to complete its downward stroke to compress the case to be operated upon. It will be observed that the cams 17 and 18 are positively connected by the gear-wheels 41, meshing with the gear-wheel 42, secured firmly on the cam-shafts 15 and 16 and driven by the gears 43, connected by the intermediate or idler gears 44 and 45. The shaft 2, whereon the gear 43 is secured, receives its motion from the chain 5, but power may be applied directly to the idler 44 to drive the machine by means of a belt-pulley secured thereon.

Simultaneous with the upward movement of the pressure-table 10 moves also the inclined pusher-arms 9 in a forward direction by means of the bell-crank lever 46, pivoted on the stud 47 and having its cam 48 actuated by means of a cam-lever 49, pivotally secured on the outer face of the face cam 33, to cause the free ends of the pusher-arms 9, resting on the table of the machine, to push the case up the inclined finger 50, pivoted on the necks of the roller 51 and between said rollers 51 and 52, which are journaled in the standards 53, to smooth said cases by compression and to discharge them into a suitable receptacle. The return movement of the cam 48 and its lever 46 is accomplished by means of the spring 48^a, which holds said lever firmly against its stop 48^b when at rest.

The rollers 51 and 52 are rotated by means of the gear-wheel 54 and its intermediate or idler 55, meshing with the gear-wheel 41, se-

cured on the cam-shaft 15. The roller 53 is preferably journaled in sliding boxes 56, adjustably secured in their standards and adjusted by means of their adjusting-screws 56^a, screwed in said standards.

The folding-plates 57 and 58 are operated to alternately move in opposite directions by means of a suitable mechanism inclosed in the interior of the main frame, and consists in a cylindrical cam 58^a, secured firmly on the cam-shaft 15, and having the cam-groove 59 so formed on its surface as to produce regular reciprocations and a period of rest at the end of each double stroke of the sliding bar 60. The sliding bar 60 is adapted to slide longitudinally in its guideways 61, formed integral or removably secured on the supporting or carrying piece 62 of the traversing mechanism of the folders, and by means of the connecting-rod 60^a communicates a partial rotation or oscillation to the center driving gear-wheel 63, journaled on the center stud 64, secured firmly on the supporting-piece 62, which is securely bolted to the inner under side of the main frame 1 by the securing-bolts 65.

The center wheel 63 meshes with the opposite pairs of pinions 66 and 67, (two of these pinions are removed for the purpose of showing the upper traversing pinions, which they cover in the inverted plan view,) firmly secured on the vertical shafts 68 and 69, journaled on suitable bearings formed on the under side of the main frame 1 and the center piece 62. On each of the shafts 68 and 69 are firmly secured the pinions 70 and 71, (two of which are only shown, the others being covered by the pinions 66 and 67,) which mesh with the racks 72 and 73 to reciprocate them in their bearings 74 and 75. It will be observed that each of the opposite pairs of reciprocating racks are geared or mesh with their pinions on opposite sides for the purpose of reciprocating the said racks and the folders attached thereto in directly opposite directions alternately. Thus as the racks 72 are moved inwardly the racks 73 are moved outwardly and vice versa. On the outer projecting ends of the racks 72 and 73 are formed the vertically-projecting lugs, into which are screwed the adjusting-screws 76, which have their inner ends journaled in the cross-heads 77 and 78, secured on the sliding heads 79 and 80, and are provided for the purpose of adjusting the position of said heads 79 and 80 and also the position of the folders to which they are attached. The heads 79 and 80 project through the top surface of the main frame 1 and are adapted to slide in their guideways 81 and 82 simultaneously with their racks, with which they are positively connected. The folding mechanism consists of the angle or folding plates 57 and 58, which are hinged on their reciprocating heads 85 and 86 at their bottom edges by the links 87 and 88 and have their top or throw-over rods 89 and 90 hinged at or near their top edges and to the positively-moving heads 79 and 80. The springs 91 are

provided for the purpose of swinging the hinge-links 87 and 88 to press the lower edge of the folding-plates 57 and 58 firmly against the surface of the table and are of just sufficient flexibility to permit the links 87 and 88 to yield to the resistance produced by the folding-plates 57 and 58, contacting with the edge of the millboards of the book-cover under process of treatment.

The heads 85 and 86 are adapted to slide loosely in their ways 81 and 82 and are connected to their heads 79 and 80 by the loosely-fitting connecting-pins 92, by which they are withdrawn or moved backwardly. Said heads 79 and 80 when impelled forward communicate their motion through the resistance-springs 93, surrounding said connecting-pins 92, to the heads 85 and 86, which movement will be hereinafter more fully set forth.

The operation of the machine is as follows: The unfinished case or cover is conveyed by the conveyer-chain 5 to the inclined pusher-arms 9, at which instant the cams 17 and 18 have moved till their points *a* on their peripheries contact with the cam-rollers 13 to raise the table 10 to its highest position. Simultaneous with this movement the grips 6 are opened to release the case, which is free to now slide down the guide or pusher arms 9 into position under the pressure-table. During this operation the cams 17 and 18 have rotated to the position *c*, at which point the face-cam 33 operates the fingers 25 to move the toes 27 outwardly against the inner edges of the millboards of the cover (see Fig. 1) to center the latter under the pressure-rubbers 24 of the table 10. During this centering operation the pressure-table is supported and is held stationary by the cams 17 and 18 during their rotation from the points *c* to *d* with the pressure-rubbers 24, just touching the casing to permit the casing to be readily moved in position by the fingers 25. The table 10 is now lowered during the movement of the cams 17 and 18 from the points *d* to *e* to apply pressure to the case, at which time, also the end folders 58 move toward the edge of the case to center it and finally lap the edges at the ends of the case or millboards. The folders 58 are now moved backward or outwardly from the case and simultaneous with this movement move also the folders 57 to fold or lap the edges of the case. The operation of folding the cloth or other covering over the edges of the case being completed and the cams 17 and 18 having now moved to their positions *f*, the table 10 is gradually raised to free the cover or case, at which time also the roller 49 contacts with the cam 48 to move the pusher-arms 9, by means of the lever 46, against the edge of the case to push it up the inclined finger-guides 50 and between the delivery or smoothing rollers 51 and 52, by which said cases are delivered into any suitable receptacle. Referring to Figs. 5 and 6, the heads 79 of the fold-

ers are rigidly secured to the cross-heads 77, (shown in dotted lines in Fig. 3,) by which they are reciprocated. This head when moved inwardly (see the direction of the arrow in Fig. 5) pushes the heads 85 also inwardly through the medium of the intercepting-springs 93, and when the plates 57 contact with an obstruction the heads 85 are retarded and stopped in their movement of translation in a straight line, while the head 79 continues to move, and by which action or movement the rods 89 move the plates 57 forward, as shown in dotted lines, Fig. 5, and when the heads 79 have completed their strokes toward the case the plates 57 have moved to the horizontal position and rest on the upper flat surface of the case, as shown in Fig. 6.

Having thus fully described the construction and operation of my invention, what I claim as new and useful, and desire to cover by Letters Patent of the United States therefor, is—

1. In a folding machine for book covers, the combination, with a supporting table, a pressure table and means for raising and lowering said table, of a suitable conveyer chain having suitable engaging and disengaging grippers secured thereon, suitable pusher arms inclined toward and extending from the discharging end of said chain toward said pressure table, and suitable means whereby said pusher arms are traversed to discharge said case, substantially as set forth.

2. In a folding machine for book-covers, the combination, with a suitable supporting table, a pressure table and means for raising and lowering said table, of a suitable endless conveyer chain having suitable engaging and disengaging grippers secured at regular intervals along said chain, a fixed cam adapted to engage said grippers to disengage them at the delivery point of said chain, and suitable pusher arms inclined and extending from the delivery point of said chain toward said pressure table, a pivotal cam lever and its operating roller whereby said pusher arms are traversed to discharge the case, substantially as set forth.

3. In a folding machine for book-covers, the combination with a supporting table, a pressure table and means for raising and lowering said table, of a suitable endless conveyer chain having suitable engaging and disengaging grippers secured at intervals along said chain, a fixed cam adapted to engage said grippers to disengage at the delivering point of said conveyer chain, suitable pusher arms inclined toward and extending from the delivery point of said chain toward said pressure table, and pressure or smoothing rollers and suitable pusher arms extending from the receiving side of said rollers toward said pressure table and a suitable pivotal cam-lever and its cam operating roller whereby said lever is reciprocated and said inclined pusher arms are

traversed to discharge said case into said smoothing rollers, substantially as and for the purpose set forth.

4. In a folding machine for book covers, the combination with a supporting table, its pressure table and means for raising and lowering said table, of suitable parallel oscillating shafts journaled in said raising and lowering table, downwardly projecting centering fingers having their bent ends turned outwardly, and suitable means whereby said fingers are moved outwardly to engage and to center the cases under said pressure table, substantially as and for the purpose set forth.

5. In a folding machine for book covers, the combination with a supporting table its pressure table and means for raising and lowering said table, of suitable parallel and oscillating shafts journaled in said raising and lowering pressure table, downwardly projecting fingers secured on said shafts and having their ends turned outwardly, said fingers comprising an upper socket end and a lower yielding end adapted to telescope in said socket end, a rocking lever secured on the end of one of said parallel shafts, a pivotal lever, a cam roller pivoted on said lever, a cam engaging said cam roller, and a connecting rod connecting said upper shaft lever and said pivotal lever, and suitable means for rotating said cam to operate said centering fingers, substantially as set forth.

6. In a folding machine for book-covers, the combination with a supporting table its pressure table and suitable means for raising and lowering said table, of suitable parallel shafts journaled in said raising and lowering pressure table and adapted to oscillate simultaneously therein, downwardly projecting fingers secured on said shafts and having their ends turned outwardly, said fingers comprising a socket end and a lower yielding end adapted to telescope in said socket end, a rocking lever secured on one of said parallel shafts, a cam lever pivoted on a fixed point of the machine, a cam roller pivoted on said roller and a connecting rod connecting said upper shaft lever and said pivotal lever, and suitable

means for rotating said cam to operate said shafts and their centering fingers.

7. In a folding machine for book-covers, a pressure table comprising an upper or main piece having transverse guide-ways formed in its under surface, suitable traversing heads adapted to slide in said ways, said heads having longitudinal ways formed in their under surfaces and transverse with said main ways, lower traversing heads adapted to slide in the latter guide ways, and having their under surfaces recessed to receive a resilient material, suitable means for traversing said heads independently and in opposite directions, and means for raising and lowering said pressure table, substantially as set forth.

8. In a folding machine for book-covers, the combination with the table the pressure table thereof and means for raising and lowering said table, of opposite folding plates adapted to operate alternately, their reciprocating racks, drive pinions engaging said racks, lower driving pinions adapted to rotate with said rack pinions, a center oscillating wheel engaging said lower pinions, a cam, a sliding bar and its roller engaging said cam and suitable means for connecting said bar to said oscillating wheel to oscillate or partially rotate the latter in opposite directions, substantially as set forth.

9. A folding machine for book-covers, consisting of the following elements, an inclined folding plate, a yielding reciprocating head, a link hinging said plate to said yielding head, a positively connected traversing head to the rear of said yielding head, a link connecting the said positive head and the top edge of said folding plate, and a suitable intercepting spring between said yielding head and positive head, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS DEAN.

Witnesses:

THOMPSON R. BELL,
M. M. DEFREES.