

No. 673,607.

Patented May 7, 1901.

A. L. LE GRAND.
ORE JIGGER.

(Application filed May 10, 1900)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

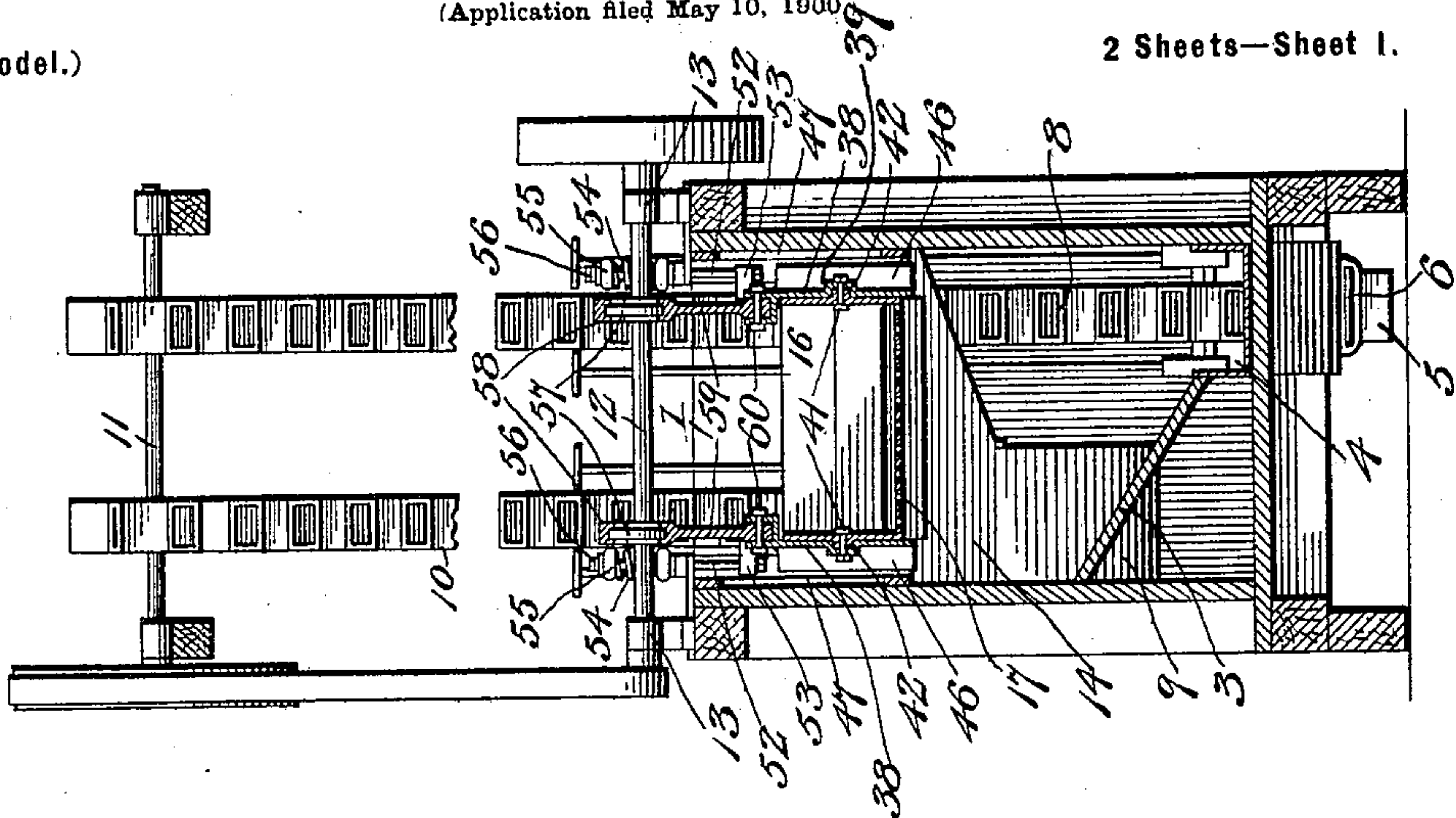
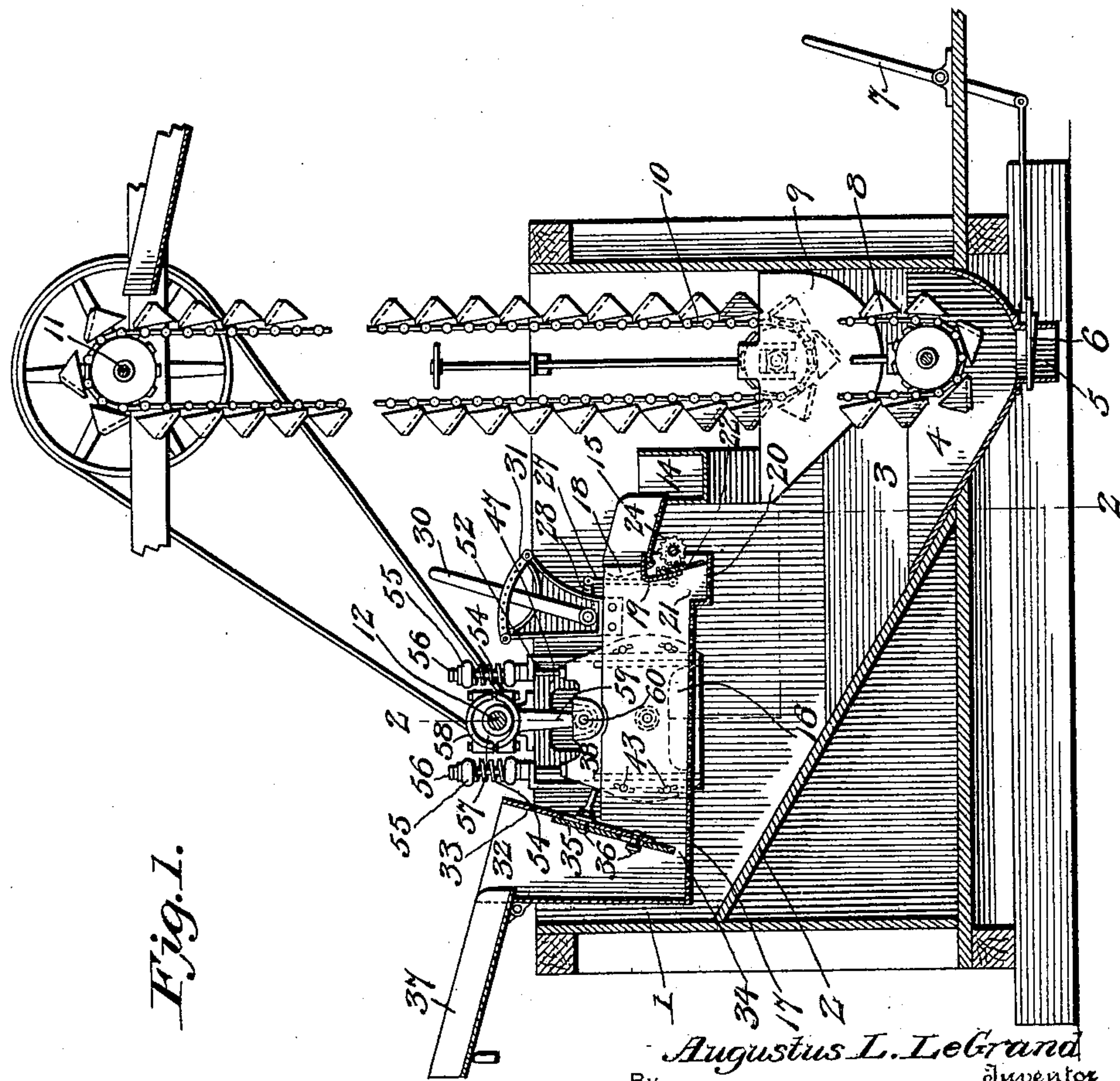


Fig. 1.



By *Augustus L. LeGrand* Inventor

E. G. Sigges Attorney

Witnesses
Edwin G. McKee
J. P. Hollander

No. 673,607.

Patented May 7, 1901.

A. L. LE GRAND.

ORE JIGGER.

(Application filed May 10, 1900.)

2 Sheets—Sheet 2.

(No Model.)

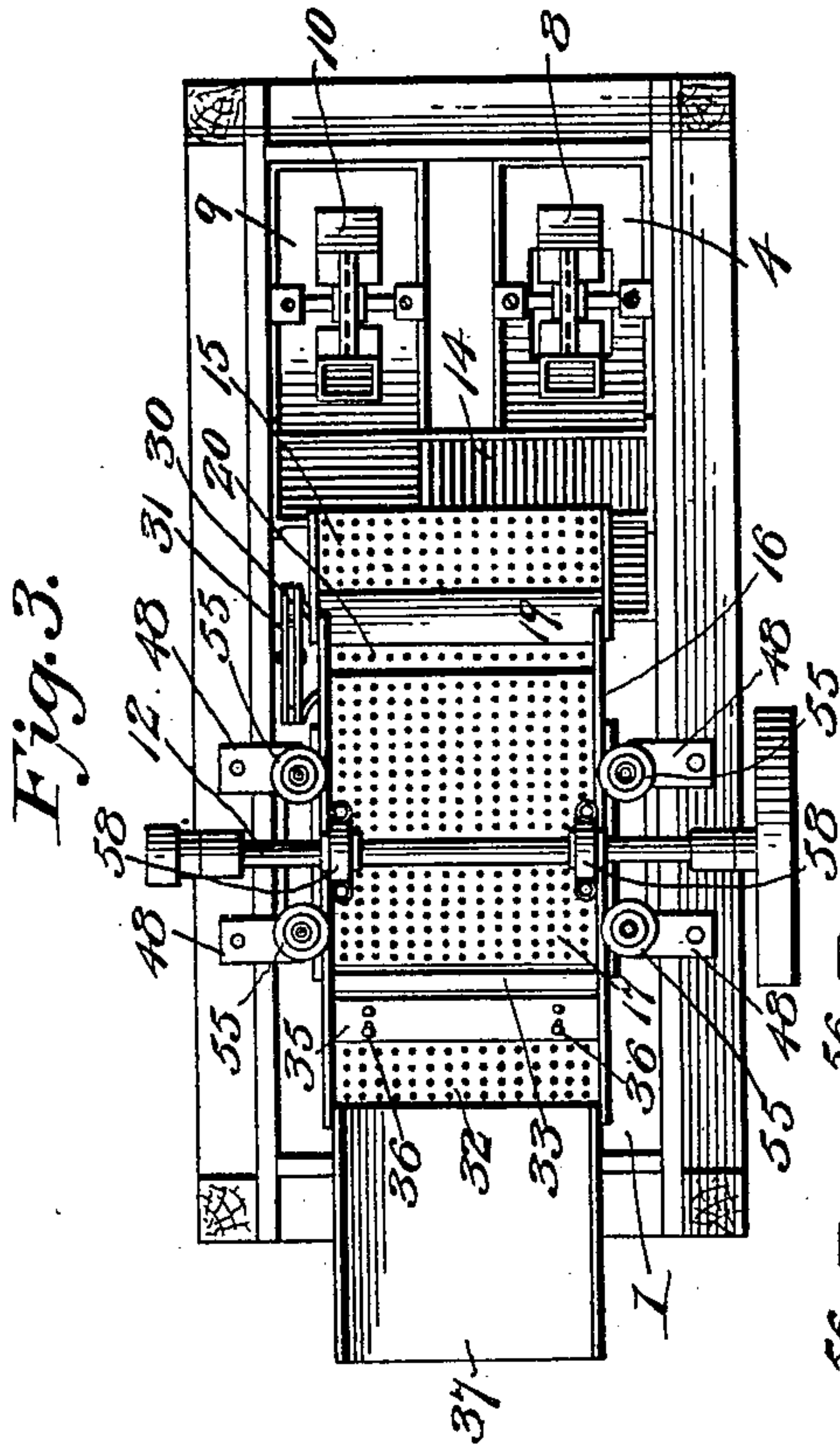
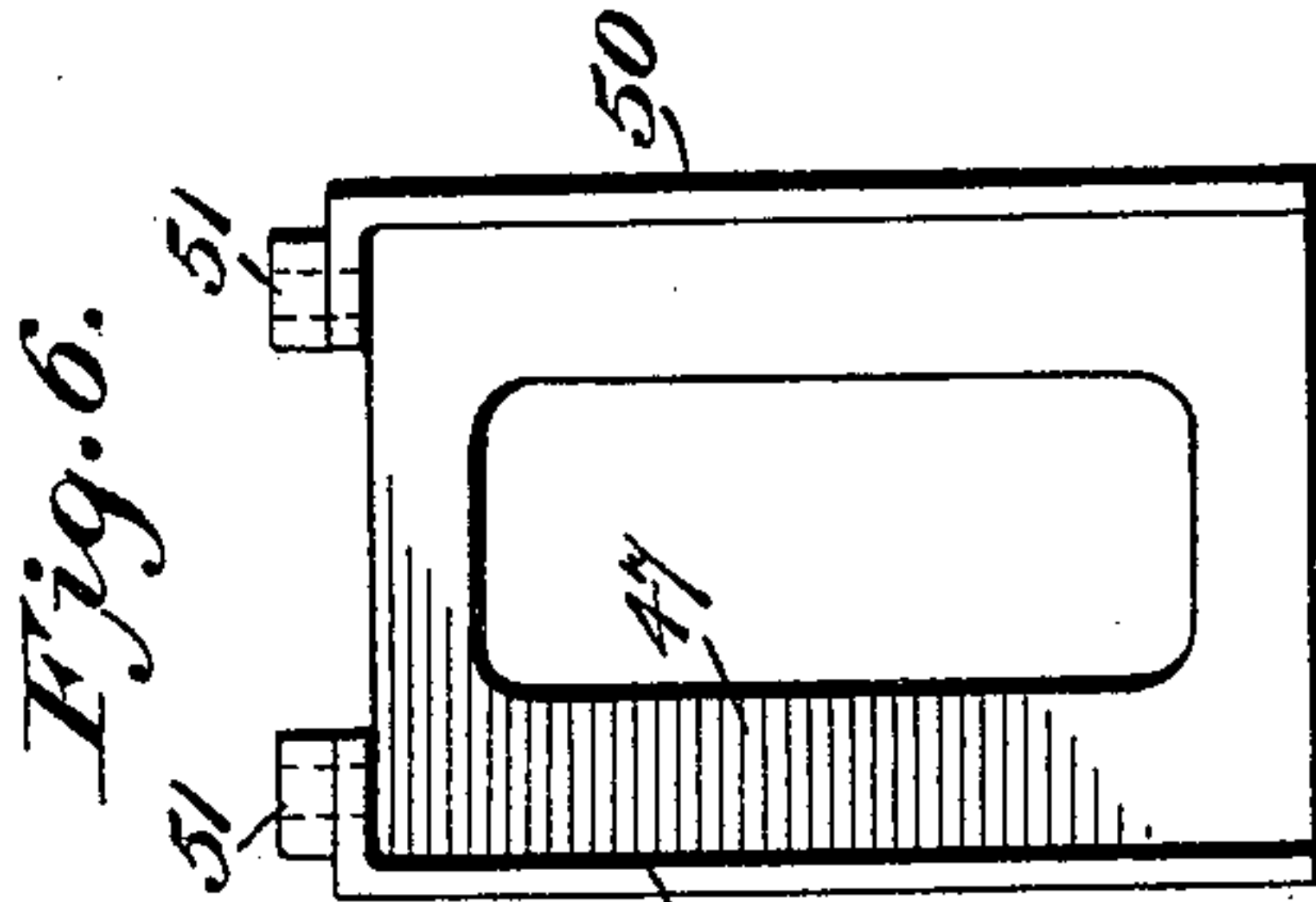
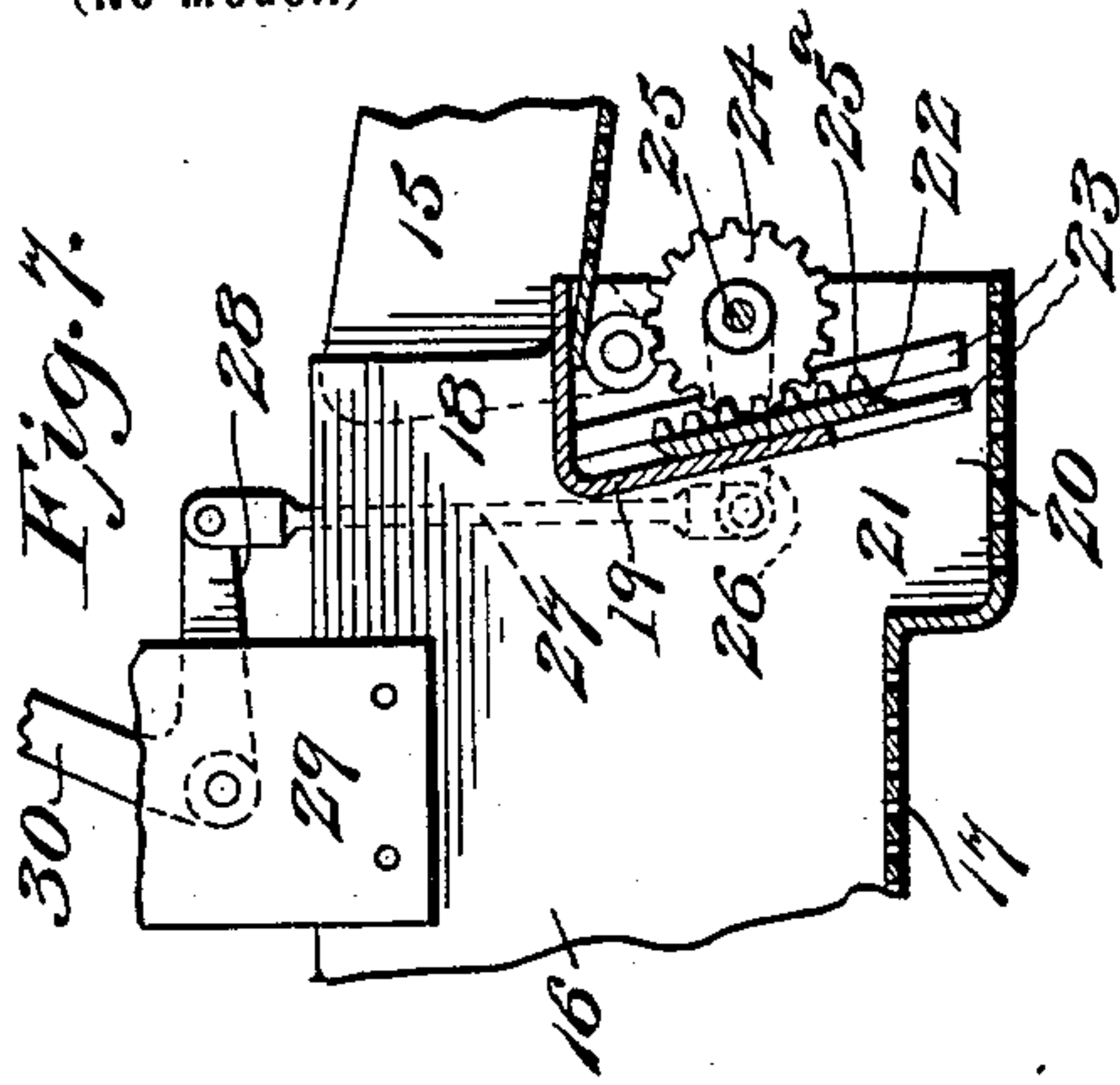
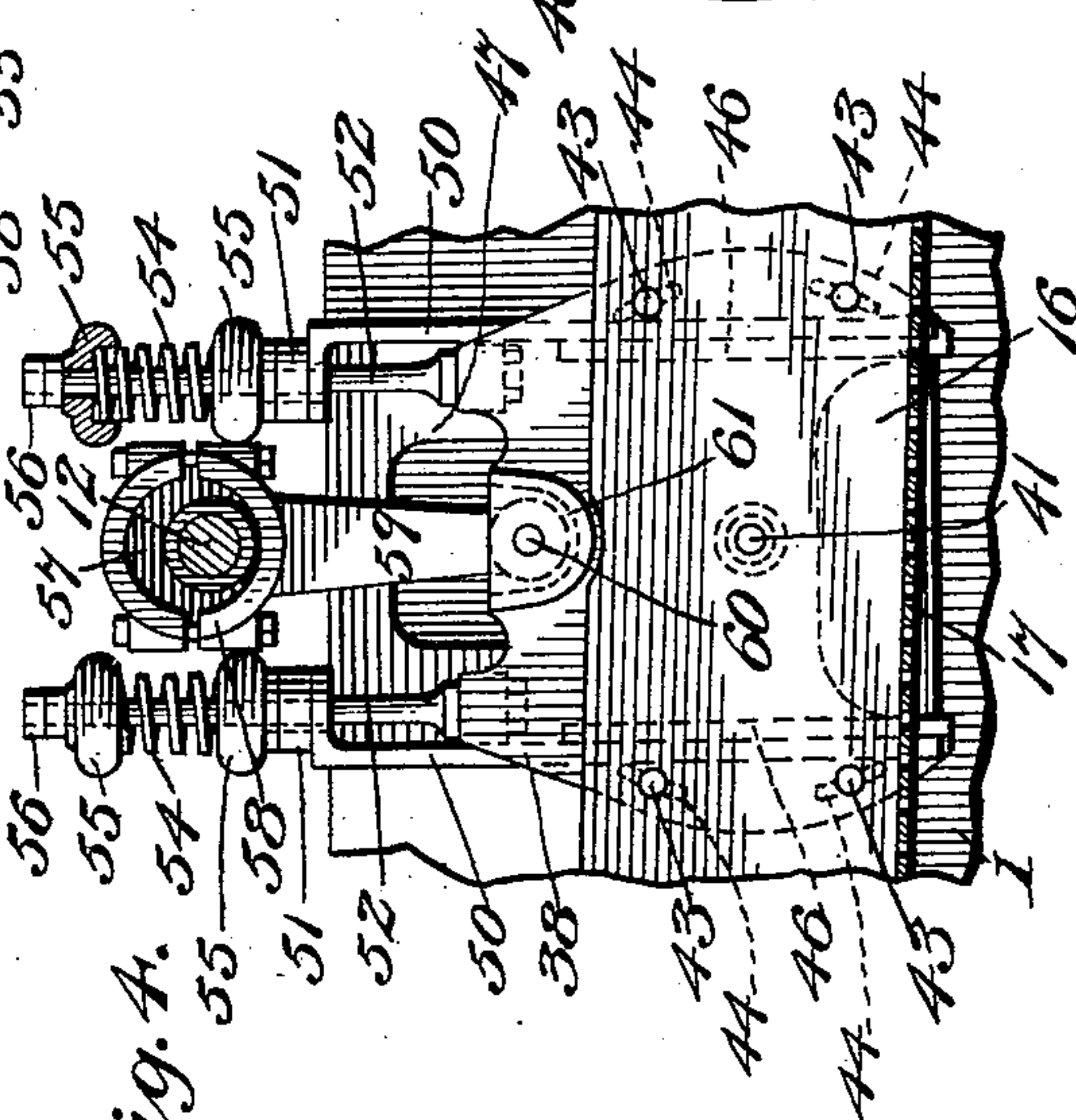
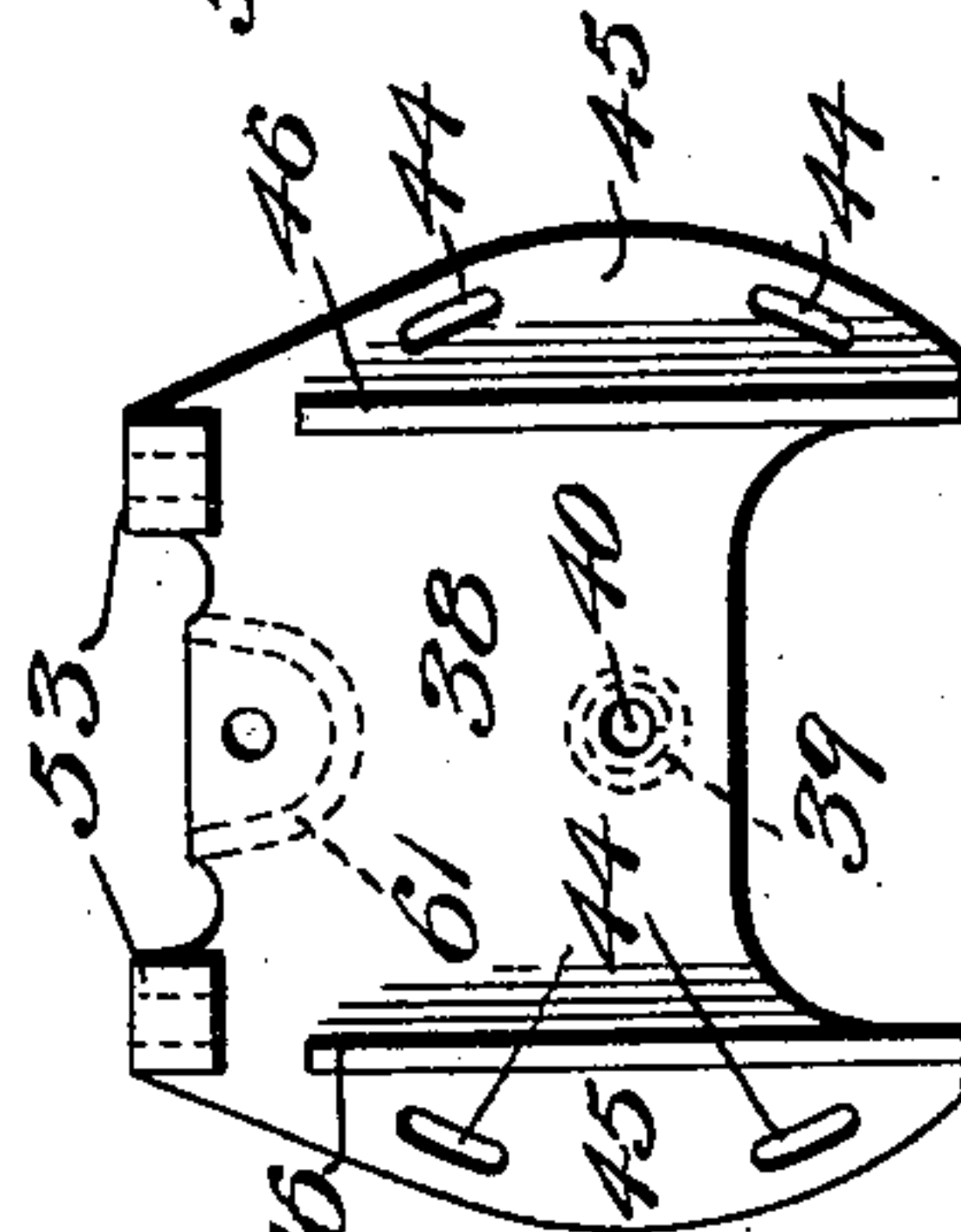


Fig. 5.



Witnesses

Edmund McKee
J. H. Hauptster

By Augustus L. LeGrand
Inventor

E. L. Siggers

Attorney

UNITED STATES PATENT OFFICE.

AUGUSTUS L. LE GRAND, OF WEST PITSTON, PENNSYLVANIA, ASSIGNOR
OF ONE-HALF TO JOHN N. THOMAS, OF SAME PLACE.

ORE-JIGGER.

SPECIFICATION forming part of Letters Patent No. 673,607, dated May 7, 1901.

Application filed May 10, 1900. Serial No. 16,204. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS L. LE GRAND, a citizen of the United States, residing at West Pittston, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Ore-Jigger, of which the following is a specification.

This invention relates to separating-machines of the class commonly known as "ore-jiggers," which are employed in the treatment of mine products to secure a separation of the valuable from the worthless portions of the material operated upon.

To this end the invention primarily contemplates certain improvements that are intended to render the jigger more efficient and durable in its operation, while at the same time providing positive and reliable means for thoroughly separating the slate and other inferior substances of like gravity from the coal. In the accomplishment of this object the invention has in view an important improvement which will greatly strengthen the working parts of the machine and at the same time provide a uniform and steady stroke for the separating or jig pan that has heretofore been practically impossible. In the ordinary type of ore-jiggers or separating-machines, in which vibrating or reciprocating pans are employed to effect the separation of the different substances, the jiggling motion is usually imparted to the pan directly from eccentrics carried by a fixedly-positioned driving-shaft, and in such constructions, on account of the weight of the separating or jig pan and the jar or shock at the end of the stroke thereof, owing to its momentum, an excessive strain is placed upon the driving mechanism, including the eccentrics, which not only causes the violent jarring of the entire machine and the loud noise which is such a nuisance in the operation of these machines, but also loosens and quickly wears away all of the working parts of the machine, thereby necessitating frequent and expensive repairs.

It is therefore one of the objects of the present invention to associate with the separating or jig pan suitably-arranged stroke-cushioning devices which will positively absorb the jar incident to the vibrations of the

pan and which cushioning devices will in effect constitute the direct supporting or hanging means for the pan, thus entirely relieving the driving mechanism from the weight of the pan, besides preventing the thrust of the pan at the end of its stroke from being transmitted with full force to the driving mechanism.

A further object of the invention is to provide novel and efficient means for mounting the pan in such a way as to secure a fixed reciprocation thereof in a vertical plane and also to provide means whereby the inclination of the pan may be readily adjusted to suit the condition of the substances being operated upon, according to the speed at which it is desired to have the substances work through the pan, from the feeding to the discharging end thereof.

With these and many other objects in view, the invention consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

The essential features of the invention, involving the cushioning devices associated with the pan and the means for guiding and adjustably mounting the pan, are necessarily susceptible to a variety of modifications without departing from the spirit or scope of the invention; but the preferred embodiment thereof is shown in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of an ore-jigger constructed in accordance with the present invention. Fig. 2 is a cross-sectional view on the line 2 2 of Fig. 1. Fig. 3 is a top plan view of the machine. Fig. 4 is an enlarged sectional elevation showing more clearly the mounting of the pan and the parts associated therewith. Fig. 5 is an enlarged detail elevation of one of the carrying-slides for the pan. Fig. 6 is a similar view of one of the channel guide-plates fitted to the sides of the water-tank. Fig. 7 is an enlarged detail sectional view of the discharging end portion of the pan, showing more clearly the mounting and means for adjusting the regulating tail-gate for controlling the discharge of slate and other refuse material from the pan.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

In carrying out the present invention the improvements are used in connection with the usual water-tank 1, which is open at the top and is designed to be filled with water to a sufficient depth to provide for partially or entirely submerging the separating or jig pan within which the substances to be separated are agitated in order to carry out the usual operation of effecting the separation by the shaking movement of the pan combined with the presence of water therein in which the substances to be separated have a partial flotation, thus insuring a proper separation of the substances largely by the different specific gravity thereof, the heavier substances settling to the bottom of the pan and the lighter substances, such as the coal, being worked out in a higher plane. This is the usual action and is well understood by those familiar with the art; but with reference to the water-tank 1 the same is provided with the longitudinally and transversely inclined bottom portions 2 and 3, respectively, which converge to a refuse-hopper 4, fitted within one bottom corner of the tank and provided with a discharge-spout 5, in which is fitted a cut-off valve 6, controlled through the medium of a valve-operating lever 7 and providing means whereby the discharge-spout 5 may be opened up to permit of the hopper being emptied of accumulations of material therein. When the said discharge-spout 5 is closed through the medium of the cut-off valve 6, the slate and other refuse material, which are deflected by the inclined bottom portions 2 and 3 into the hopper 4, are caught up by the buckets of the lifting-conveyer 8 for the refuse material. This lifting-elevator may be of any approved construction, preferably of the bucket-conveyer type, and is arranged in an upright position, so as to extend out of and above the water-tank to a position where the refuse material may be delivered to any desired point of deposit or discharge.

In addition to the refuse-hopper 4, fitted within the bottom corner of the water-tank 1, the latter has suitably mounted therein in a different plane from said hopper 4 a hopper 9 for the valuable substance, such as coal, which has been separated from the slate and other refuse material. The said hopper may be properly termed the "main" hopper and is adapted to have work therein the lower end portion of a lifting-conveyer 10 of any approved construction, preferably of the bucket-conveyer type, which, like the conveyer 8, is arranged in an upright position, so as to extend out of and above the water-tank to deliver the good material to any desired point of deposit. Both of the lifting-conveyers 8 and 10 are preferably driven from a common shaft 11, supported in bearings arranged above the water-tank, and said shaft 11 for the elevating-conveyers may be utilized to

transfer motion to the main driving-shaft 12, which imparts the jiggling motion to the separating or jig pan in the manner to be presently explained. The said shaft 12 extends transversely across the top of the water-tank 1 and is journaled in suitable bearings 13 at opposite top edges of the tank.

The main receiving-hopper 9 for the coal or other substance separated from the refuse material has associated therewith a transversely-arranged inclined discharging-chute 14, which opens into the top of the hopper 9 and is overhung by one end of the upper delivery-spout 15, projecting from the discharge end of the vertically-reciprocating separating-pan 16, which is sometimes termed the "jig-pan." The said vertically-reciprocating jig-pan 16 is of the usual generally rectangular configuration and open at the top, besides being of a sufficient capacity, according to the quantity of material to be handled thereby. The said jig-pan 16 is provided with the usual perforated bottom or grate 17, extending the full length thereof, to permit of the water-currents freely passing into and out of the pan during the agitation thereof, and in carrying out the present invention the said pan is also necessarily provided at the discharge end thereof with separate discharges in different horizontal planes, respectively, for the good material, such as coal, and for the refuse material, such as slate, bone, and other substances of greater gravity than coal. The said upper delivery-spout 15 is fitted to the discharge end of the pan and declines from the upper discharge-opening 18, provided at or contiguous to the top of the pan. Immediately beneath the plane of the upper discharge-opening 18 the pan 16 has fitted therein an end wall 19, which is disposed above the downwardly-deflected pocket 20, formed at the discharging end of the perforated bottom or grate 17. The said wall 19 at the discharging end of the pan terminates short of the adjacent portion of the bottom or grate to leave a lower discharge-opening 21 for the slate and other refuse material, and to provide for regulating the size of said opening, according to the speed at which it is found desirable to permit the slate and refuse material to escape from the pan, there is employed an adjustable regulating tail-gate 22. The said tail-gate 22 is mounted to work in suitable guides 23, fitted to the sides of the pan at one side of the end wall 19, and the said gate is arranged to cover and uncover the lower discharge-opening 21, being controlled in its movements through the medium of adjusting-pinions 24, meshing with racks 25 upon one side of the gate. The adjusting-pinions 24 are mounted on a horizontal rock-shaft 25, journaled in suitable bearings arranged at the sides of the pan-body and having fitted to one of the extremities thereof a rock-arm 26, having connected thereto one end of a rod or link 27. The other end of this rod or link 27 is connected to one arm of

a bell-crank adjusting-lever 28, mounted upon a bracket 29, fitted to one top edge of the pan and having a handle portion 30 cooperating with the locking-segment 31, sustained or supported by the said bracket 29. By manipulating the handle 30 of the lever 28 movement is transmitted to the rock-shaft 25, thereby causing a rotation of the pinions 24 in the desired direction, with a consequent adjustment of the gate 22 to provide for regulating the size of the discharge-opening 21.

At the end opposite its discharge-openings 18 and 21 the vertically-reciprocating separating or jig pan 16 is provided with the up-standing receiving-hopper 32, having an inner inclined side wall 33, which terminates short of the perforated bottom or grate 17 of the pan to leave a feeding-opening 34, providing communication between the receiving-hopper 32 and the main portion of the pan. The size of this feeding-opening may be regulated by means of the adjustable feed-gate 35, adjustably mounted upon the inner wall 33 of the receiving-hopper through the medium of the bolts 36 and adapted to be projected more or less across the opening 34 as the requirements of the machine may demand. The said receiving-hopper 32 at the receiving end of the separating-pan has fitted thereto one end of an inclined feed-chute 37, from which the substances to be separated pass into the receiving-hopper 32.

To provide for the support of the separating-pan 16, as well as for the guiding and cushioning thereof, there is employed a pair of oppositely-arranged carrying-slides 38, between which slides the said pan is hung. In other words, the carrying-slides 38 for the pan are arranged, respectively, at diametrically opposite sides of the pan, upon the exterior thereof, and each of said slides consists of a single casting or plate provided in its inner side with a pivot-socket 39, pierced by the bolt-opening 40, which receives a pivot-bolt 41, passing through the adjacent side of the pan-body and serving to pivotally connect the same with the adjacent carrying-slide. At the points where the pivot-bolts 41 connect the sides of the pan with the oppositely-arranged carrying-slides 38 the said pan is provided with offset pivot-bosses 42, registering in the said sockets 39 of the carrying-slides and providing a positive pivotal connection between the pan and the said slides, thereby greatly strengthening the pivotal connection and permitting the bolts 21 to be used partly as clamping or tightening means should this be found necessary.

The pivotal connection described between the sides of the pan-body and its carrying-slides permits of the pan being tilted or adjusted on the said pivotal connections as an axis, so as to change the inclination or pitch of the pan to any degree desired, as may be required by the particular nature of the substances being treated. In order to positively fasten or hold the pan at its adjusted inclina-

tion, a plurality of clamping-bolts 43 are employed. These clamping-bolts 43 are arranged, respectively, at opposite sides of each pivot for the pan, as plainly shown in Fig. 4 of the drawings, and passing through openings in the pan sides are adapted to adjustably engage with the segmental or arcuate bolt-slots 44, formed in the ears 45, projecting from the side edges of the carrying-slides 38. By loosening the clamping-bolts 43 the pan may be readily rocked on its pivots to the desired inclination, whereupon the bolts 43 are tightened to provide for securely clamping or locking it in the adjusted position and holding the same rigid with the carrying-slides 38 therefor.

The oppositely-arranged carrying-slides 38 for the separating or jig pan have projected from their outer sides a pair of parallel guiding-ribs 46, adapted to slidably work within the channel guide-plates 47, preferably consisting of single castings securely fastened to the inside of the water-tank and having off-standing retaining-arms 48 at their upper ends, said retaining-arms overhanging the top edges of the water-tank to provide for firmly holding the guide-plates in position. The said guide-plates are provided, at the side edges thereof, with the longitudinal side flanges 50, which provide the channel at the inner side of the plates to receive the guiding-ribs 46 of the carrying-slides; but it is to be observed that the said guiding-ribs 46 slidably engage directly with the inner faces of the side flanges 50, thereby providing means for positively holding the carrying-slides to a fixed reciprocation to prevent lateral or side-wise play thereof.

In addition to the longitudinal side flanges 50 the channel-plates 47 are further provided at their upper ends with the perforated guiding-ears 51 for the sliding supporting-stems 52, which are bolted or otherwise rigidly fastened at their lower ends to the opposite attaching-lugs 53, projecting integrally and laterally from the top edges of the carrying-slides 38. Above the guiding-ears 51 of the guide-plates the sliding supporting-stems 52 have mounted thereon the compressed cushioning-springs 54, which are interposed between the oppositely-arranged socketed holding-caps 55, also mounted upon the supporting-stems, and arranged above the uppermost socketed holding-caps 55 for the cushioning-springs are the adjustable nuts 56, which are fitted on the upper threaded extremities of the stems 52 to provide means for adjusting the tension or compression of the springs 54 to insure the effective cushioning of the stroke of the separating or jig pan.

The jiggling movement is imparted to the separating or jig pan from the eccentrics 57, mounted on the driving-shaft 12 and having fitted thereto the eccentric-straps 58, connected with the pitmen 59, hanging within the water-tank and pivotally fitted at their lower ends, as at 60, within the pitmen-sock-

ets 61, formed in the top edges of the carrying-slides 38.

From the foregoing it will be observed that the stems and the cushioning-springs 54, associated therewith, provide practically the sole support for the separating or jig pan, thus entirely relieving the driving mechanism, consisting of the shaft 12, the eccentrics 57, and the pitmen 59, from the weight and thrust of the moving parts. The springs under compression serve to balance the pan and its parts and also act in conjunction with the operating devices to assist in the upward stroke of the pan after it has been depressed by the operating devices, thus rendering the stroke or movement easy and uniform and to a considerable extent relieving the operating devices from the jarring thrust.

Further reference to the separating action seems unnecessary, as this is well understood by those skilled in the art; but it may be stated that the good material or coal which is worked out of and above the slate and other heavy refuse material passes out of the upper discharging-opening 18 into the delivery-spout 15, and thence through the chute 14 into the main hopper 9, while the slate and other heavy refuse material is worked out through the lower discharge-opening 21 and falls therefrom into the bottom of the tank, which deflects it into the refuse-hopper 4.

It is thought that the construction, operation, and many advantages of the herein-described improvements will be readily apparent to those familiar with the art without further description, and it will be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In an ore-jigger, the combination with the water-tank, stationary guide-plates fitted to opposite sides of the tank, carrying-slides movable vertically between and in engagement with said guide-plates, a superposed driving-shaft, supporting-stems rigidly connected at their lower ends with the carrying-slides and extending upward at opposite sides of the driving-shaft, fixed guides through which said stems slide, the supporting-pan suspended between the slides, normally-compressed cushioning-springs encircling the upper portions of the stems above the fixed guides at opposite sides of the driving-shaft, means for varying the compression of the springs, and driving mechanism having operative connection with the slides.

2. In an ore-jigger, the combination of the water-tank, stationary guide-plates fitted to opposite sides of the tank, carrying-slides

slidably engaging with said guide-plates, a superposed driving-shaft, reciprocatory supporting-stems connected at their lower ends with the carrying-slides and extending upwardly therefrom on opposite sides of the driving-shaft, the supporting-pan suspended between the slides, normally-compressed cushioning-springs arranged in an elevated position and encircling the upper end portions of the stems at opposite sides of the driving-shaft, means for varying the compression of the springs, and driving mechanism having operative connections with the slides.

3. In an ore-jigger, the water-tank, stationary guide-plates fitted to opposite sides of the tank and provided at their upper ends with guiding-ears, carrying-slides slidably engaging said guide-plates, supporting-stems fitted to the carrying-slides and working through the guiding-ears of the guide-plates, holding-caps arranged upon the supporting-stems above said guiding-ears, cushioning-springs normally held compressed between said holding-caps, and eccentric driving mechanism having pitmen connections with the carrying-slides.

4. In an ore-jigger, the water-tank, oppositely-arranged reciprocatory supports, a separating or jig pan carried by said supports and having an end discharge, said pan being tiltable upon a horizontal axis located between the top and bottom of the pan, and means engaging with the supports and pan sides for holding the pan set at an adjusted inclination between the supports.

5. In an ore-jigger, the combination with the fixed guides, and the reciprocatory supports engaging therewith, of a separating-pan pivotally connected to said supports upon a horizontal axis or pivot, and having an end discharge, and fastening means for holding the pan set at an adjusted inclination.

6. In an ore-jigger, the combination of a pair of reciprocatory supports having pivot-sockets, a separating-pan having upon its opposite sides pivot-bosses registering in said sockets to constitute a horizontal pivot-axis for the pan, to permit of its being adjusted to variable inclined positions, pivot-bolts connecting the pan with the supports at the pivotal joints, and separate fastening devices independent of the pivot-bolts, said fastening devices engaging with the pan sides and also with said supports, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

AUGUSTUS L. LE GRAND.

Witnesses:

SAMUEL C. WEBB,
HENRY GAUPP.