G. L. LEISNER.

BUNDLE SHOCKER.

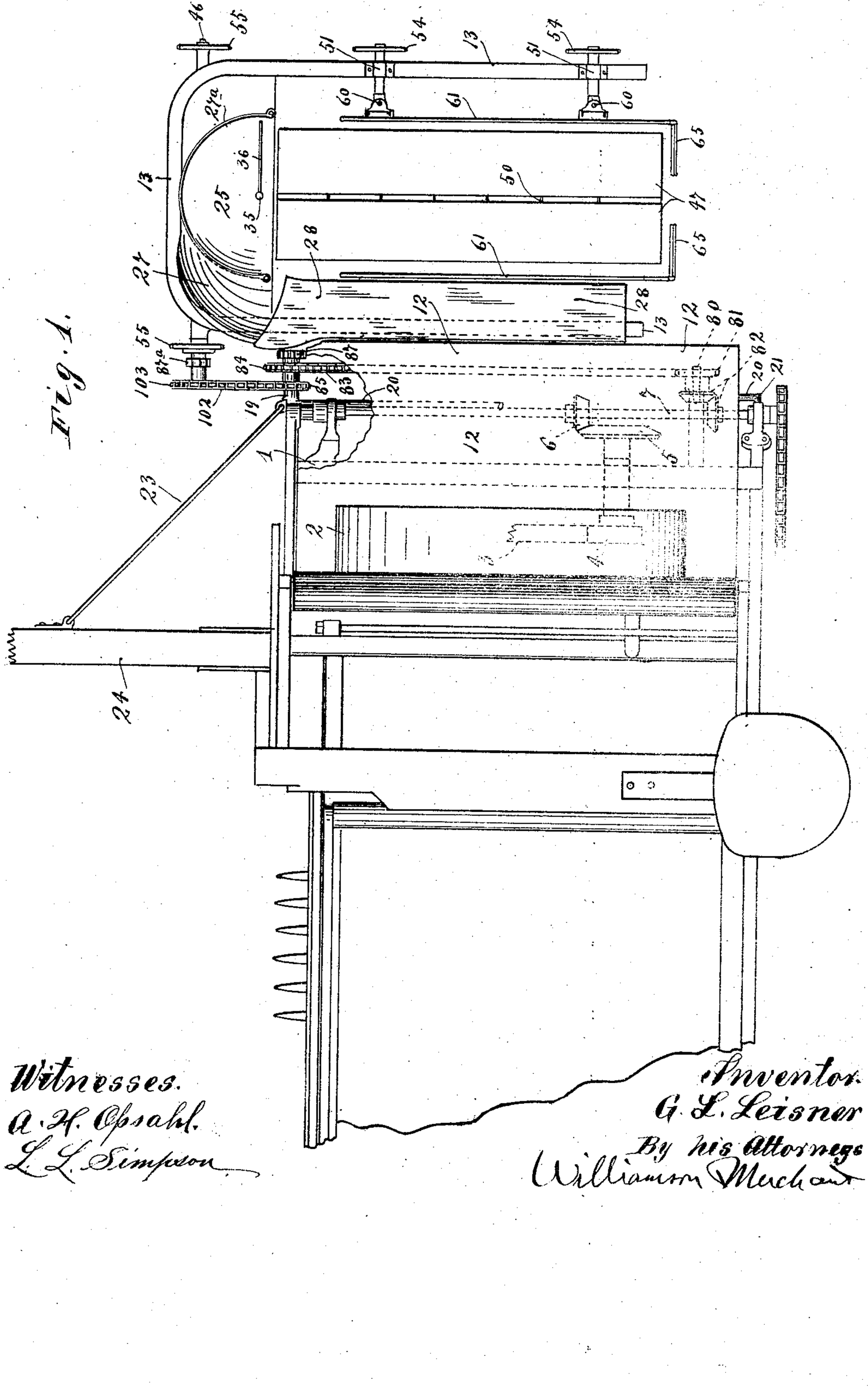
APPLICATION FILED NOV. 25, 1907.

903,207.

Patented Nov. 10, 1908.

6 SHEETS—SHEET 1.

Fig. 1.



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6 SHEETS—SHEET 2.

Fig. 3.

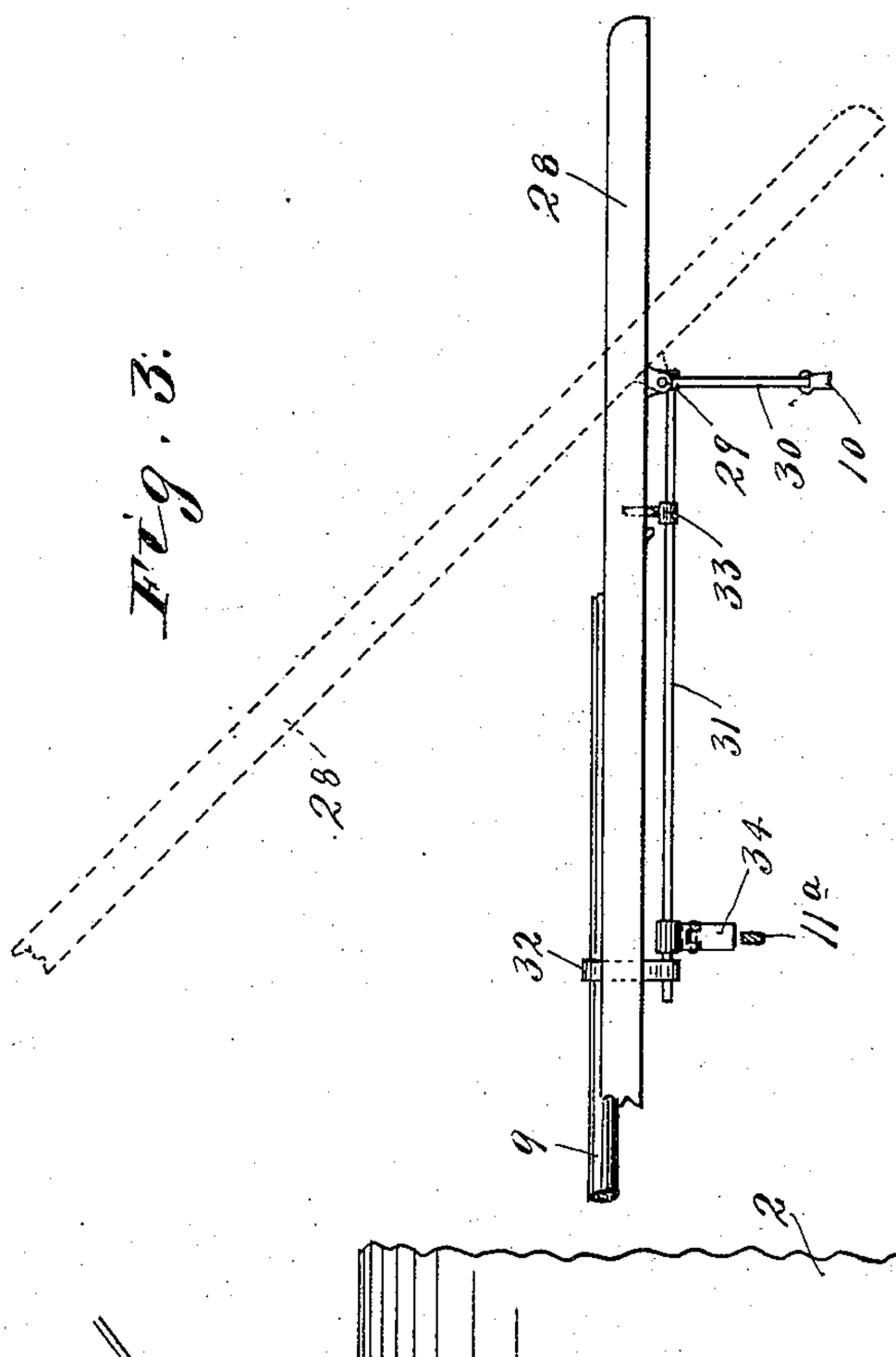
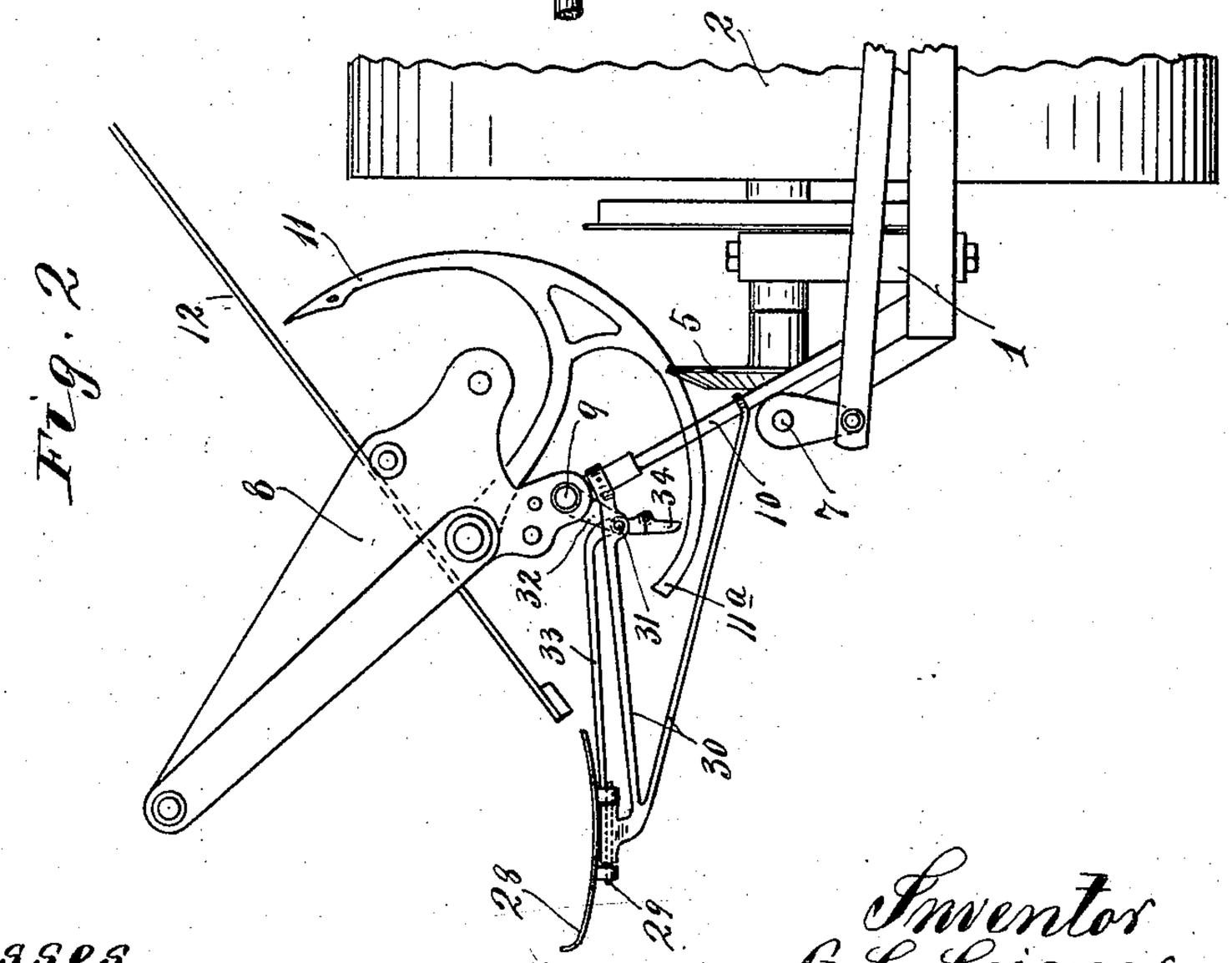


Fig. 2



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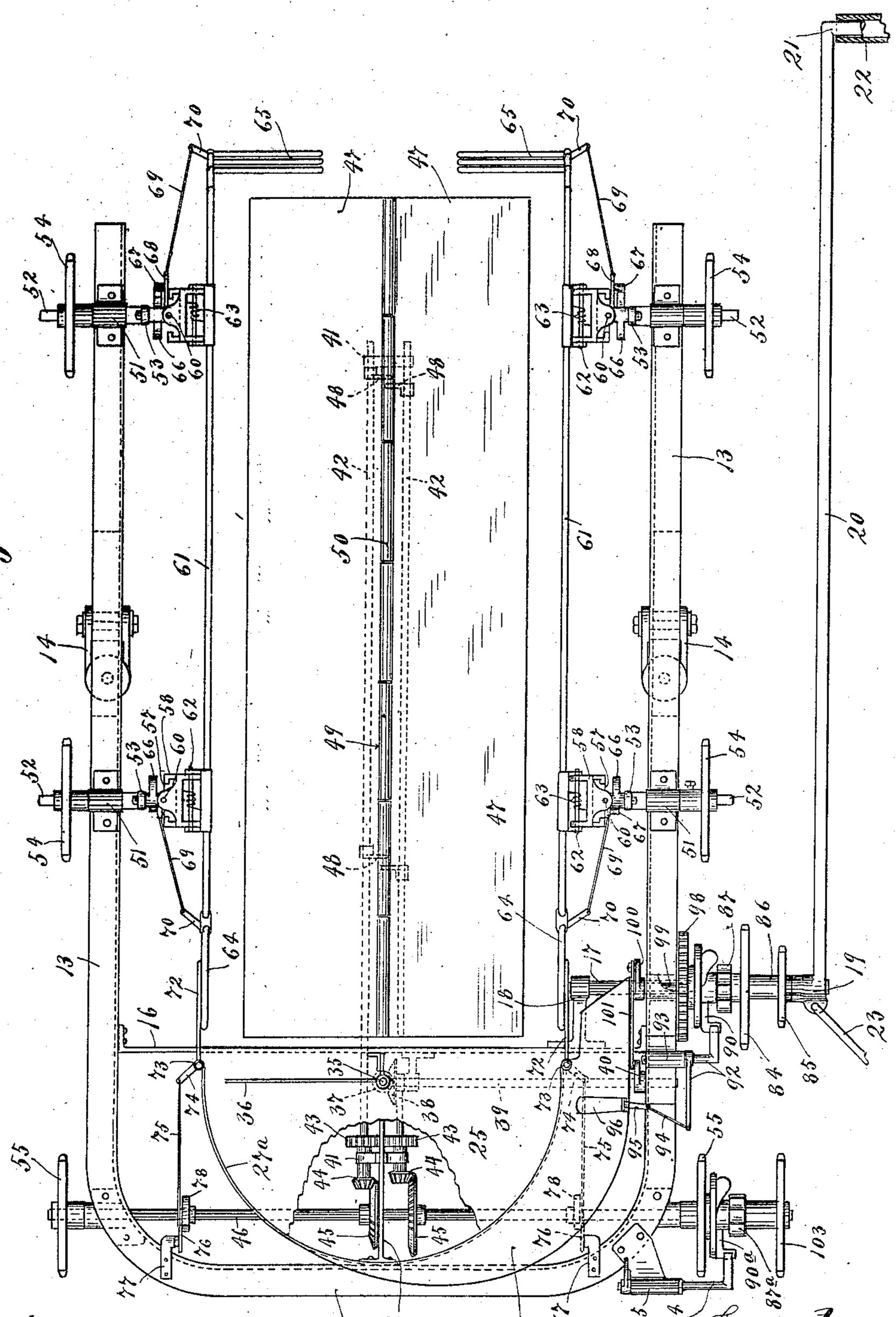
6 SHEETS—SHEET 3.

Fig. 4.



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6 SHEETS—SHEET 4.

Fig. 5.

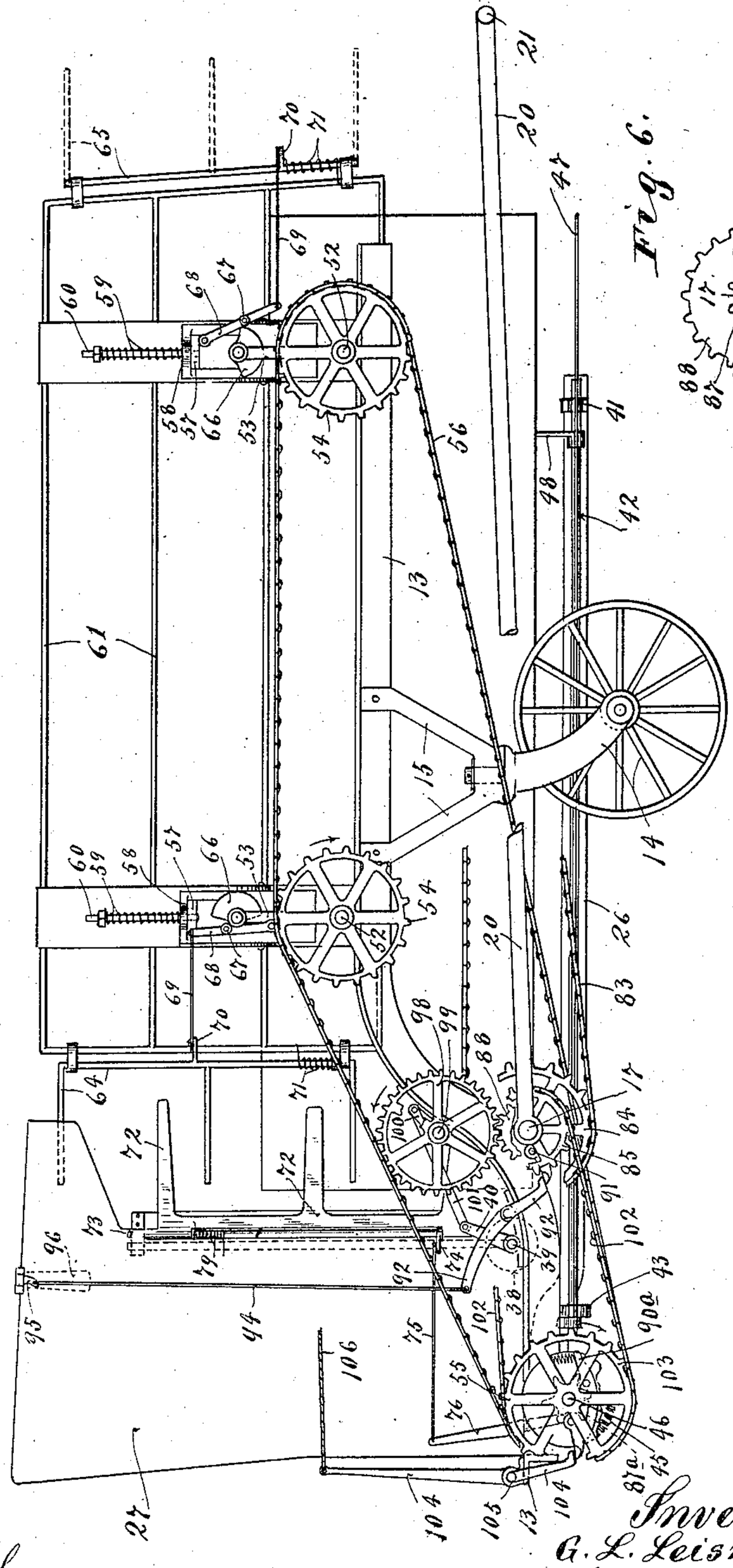
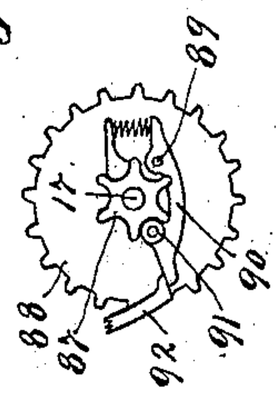


Fig. 6.



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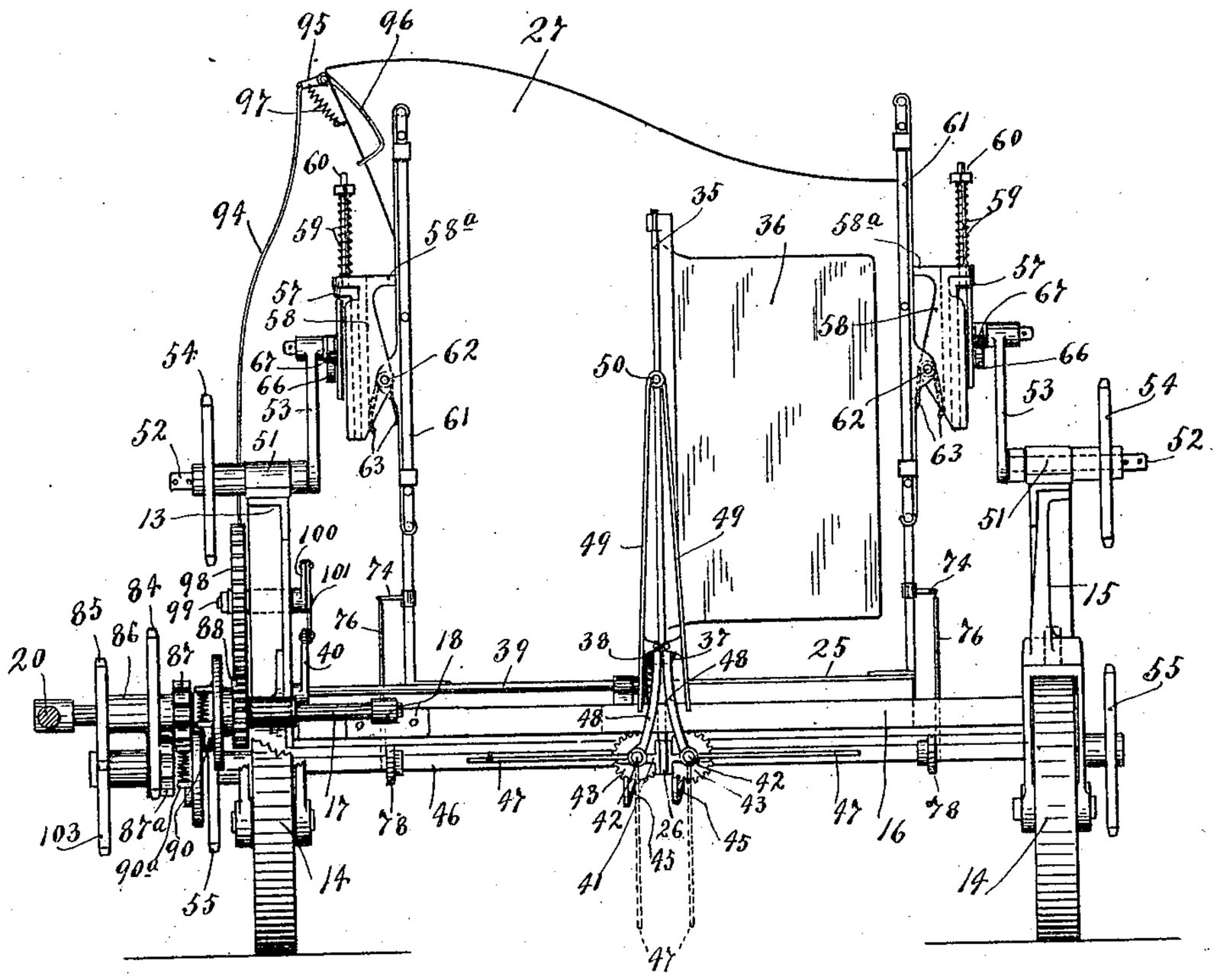
6 SHEETS—SHEET 5.

Fig. 7.



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6 SHEETS—SHEET 6.

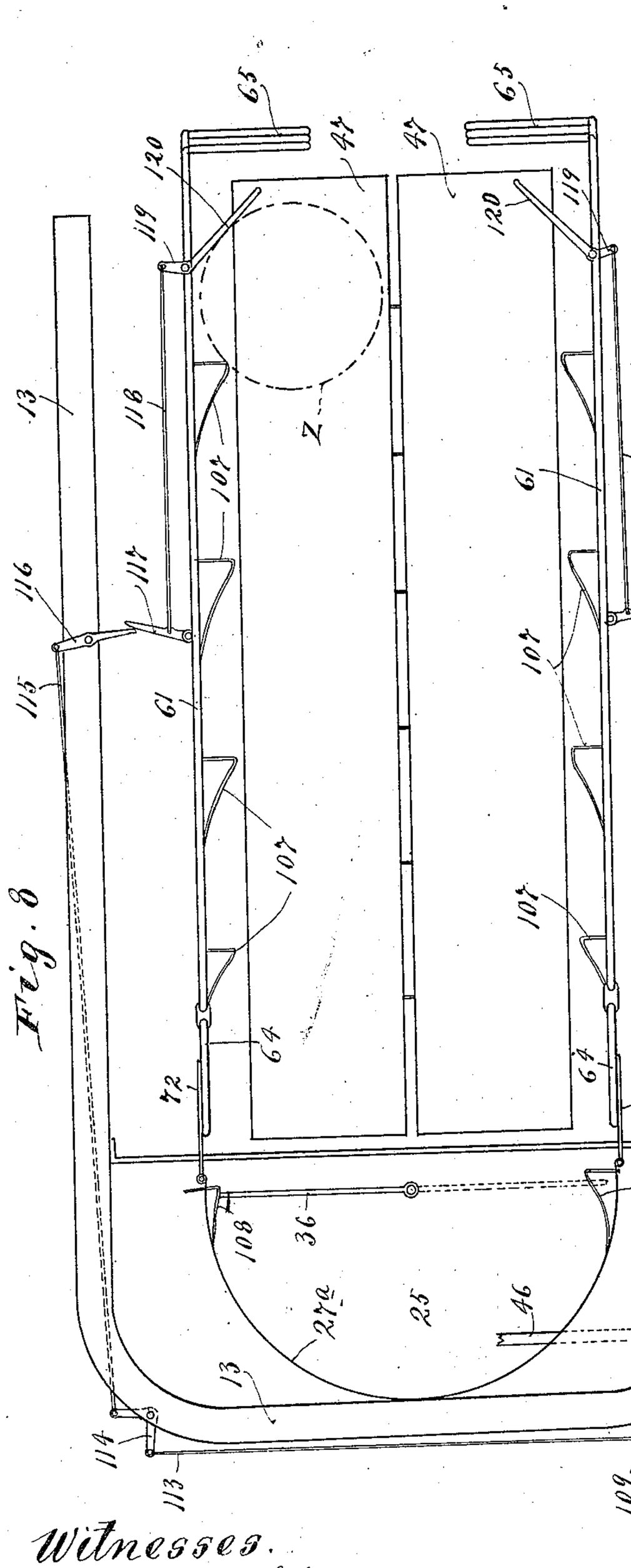

Fig. 8

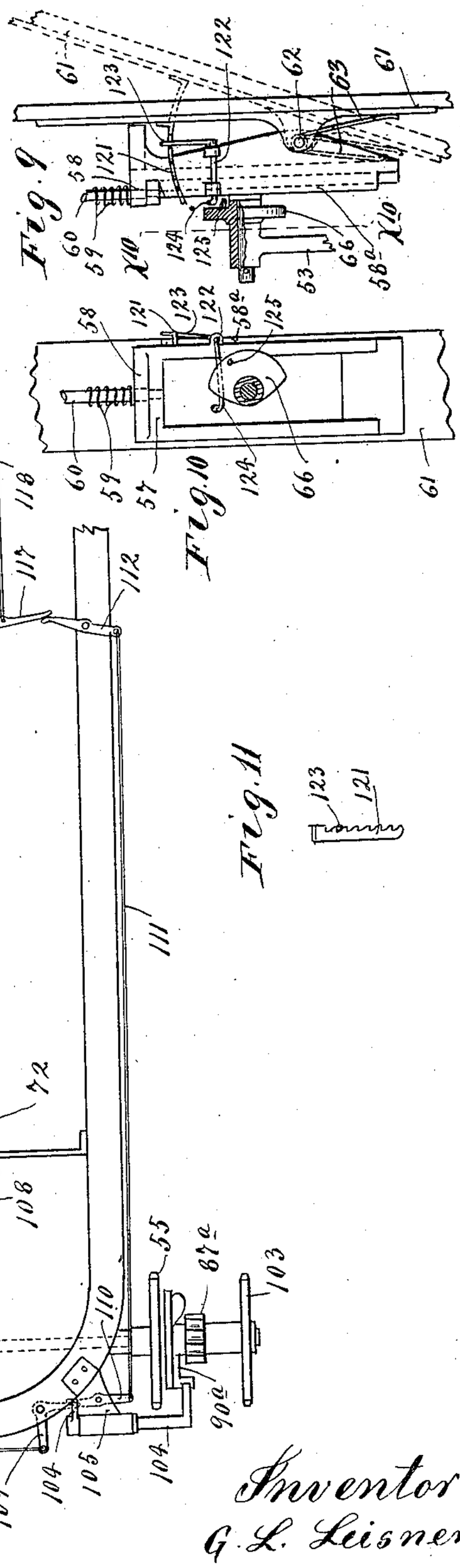

Fig. 9

Fig. 10

Fig. 11

123
121

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UNITED STATES PATENT OFFICE.

GUSTAF L. LEISNER, OF STEPHEN, MINNESOTA.

BUNDLE-SHOCKER.

No. 903,207. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed November 25, 1907. Serial No. 403,675.

To all whom it may concern:

Be it known that I, GUSTAF L. LEISNER, a citizen of the United States, residing at Stephen, in the county of Marshall and State of Minnesota, have invented certain new and useful Improvements in Bundle-Shockers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an efficient bundle shocker or bundle shocking attachment for harvesters, and to this end it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a plan view, with some parts in diagram, some parts removed and some parts broken away, showing my improved bundle shocker connected to a harvester of standard construction. Fig. 2 is a view in front elevation, with some parts broken away, showing diagrammatically part of the harvester, including a binder, and showing part of the shocking attachment applied thereto. Fig. 3 is a detail view in left side elevation, showing the so-called bundle arighting table which constitutes part of the shocking attachment, some parts thereof being broken away. Fig. 4 is a plan view of the shocking attachment, some parts thereof being broken away. Fig. 5 is an elevation of the shocking attachment, looking at the inner or left side thereof. Fig. 6 is a detail of the clutch device, constituting part of the shocking attachment; and Fig. 7 is a rear elevation of the shocking attachment. Fig. 8 is a diagrammatic plan view with parts removed, showing additional features which are capable of use in connection with the machine. Fig. 9 is a detail in rear elevation, with some parts sectioned and with some parts broken away, showing the latch device for temporarily holding the side frame in an oblique position in respect to the cooperating secondary crank head. Fig. 10 is a vertical section taken on the line x^{10} x^{10} of Fig. 9; and Fig. 11 is a detail in plan, showing the latch segment of the latch device illustrated in Figs. 9 and 10.

Of the parts of the harvester, as shown in the drawings, it is only desirable for the purposes of this application to particularly note as follows: The harvester frame 1 at the binder end of the machine is carried by the usual traction wheel 2, the axle of which is connected in the usual way to said frame. The traction wheel 2 carries a gear 3 that meshes with a pinion 4 on a common shaft with a bevel gear 5, which shaft is journaled in suitable bearings on the main frame 1. The bevel gear 5 meshes with a bevel pinion 6 of the sickle driving crank shaft 7.

The binder frame 8 is mounted on a supporting rod 9, which, in turn, is supported from the main frame 1 by oblique rods 10 and other devices (not shown). The numeral 11 indicates the binder needle and the numeral 12 the binder deck. The parts so far described are of standard or any suitable construction.

The improved bundle shocker is mounted on an independent truck, the frame of which is made up of a heavy U-shaped horizontally disposed structural iron frame 13, the side prongs or legs of which project rearward. Caster wheels 14 are connected to the intermediate portions of the legs of said frame 13, by means of brackets 15. The weight of the load on this truck will be nearly balanced on the caster wheels 14. The transverse tie bar 16 rigidly connects the legs of the frame 13 at points somewhat at the rear of the forward portion of said frame. A coupling shaft or heavy rod 17 is rigidly secured to the left hand side of the truck frame and projects toward the binder end of the harvester to which the attachment is connected. This shaft, as shown, is rigidly connected at its outer end to a bracket 18 which, in turn, is rigidly secured to the transverse bar 16 of the truck frame. The other end of said shaft 17 is rigidly secured to the head 19 of a long link or arm 20, the rear end of which is connected at 21 to a tubular portion 22 of the harvester frame 1 (see Figs. 1 and 4). The head 19 of the link 20 is connected by a brace rod 23 to the pole 24 of the harvester.

A horizontal bundle receiving deck or table 25 is secured to the cross bar 16 and other portions of the truck frame, including a longitudinally extended tie bar 26. An obliquely set segmental deflecting plate 27 is secured to that side of the table 25 that is next to the binder, and to an approximately semi cylindrical upright sheath 27^a on said table 25.

The bundles, after being bound and dis-

ged from the lower end of the binder able 12, are delivered directly onto a so-called bundle arighting table 28 (see particularly Figs. 1, 2 and 3). This arighting table, near its forward end, is pivotally connected at 29 to a supporting bracket 30 that is rigidly secured to the binder supporting post or leg 10, and to other rigid parts of the harvester, if desired. A rock shaft 31 is journaled in the bracket 30 and in a bearing 32 on the binder supporting rod 9, as best shown in Figs. 2 and 3. Rigidly secured to the intermediate portion of the rock shaft 31 is a long arm 32, the outer end of which underlies the intermediate portion of the arighting table 28. Also rigidly secured to the rock shaft 31, is a jointed tappet arm 34, the free end of which is adapted to be engaged by the crooked end 11[a] of the binder needle 11.

The relation of the parts just described is such that when the needle 11 moves upward, its end 11[a] engages the jointed tappet arm 34 and buckles the same without any other action thereon, but when the needle, under downward movement, closely approaches its normal position, its end 11[a] engages the tappet arm 34 and thereby oscillates the rock shaft 31, causing the arm 33 to tilt the arighting table 28, as shown by dotted lines in Fig. 3. When the arighting table is tilted, as shown by dotted lines in Fig. 3, it will discharge the bundles, butt end downward, against the deflecting plate 27 and thence onto the receiving platform 25. Just before the needle 11 reaches normal position, its end 11[a] passes beyond the end of the tappet 34, thereby releasing the same and permitting the arighting table 28 to drop back into its normal position.

Mounted in suitable bearings on the truck frame and on the receiving deck 25 and projecting above the latter, is an upright rock shaft 35 to which is secured a radially projecting vertically extended packer blade 36. To the lower end of the rock shaft 35 is secured a bevel gear 37 that meshes with a bevel gear 38 carried by a horizontally extended rock shaft 39 that is mounted in suitable bearings on the truck frame, and is provided near the left hand side of said truck frame with an upwardly projecting arm 40.

The frame bar 26 before noted is a long rigid bar which extends rearward approximately as far as the legs of the main U-shaped truck frame bar 13, and at its forward portion is rigidly secured to the transverse forward portion of said bar 13 and to the receiving deck 25 and transverse bar 16 (see Figs. 4, 5 and 7). To suitable bearings 41 secured on opposite sides of the centrally located supporting bar 26, is mounted a pair of long rock shafts 42, which, near their forward ends, are connected for simultaneous rotary movements in reverse directions by a pair of spur gears 43. Also at their forward ends, said shafts 42 are provided with bevel pinions 44 that coöperate with reversely faced segmental bevel gears 45 that are carried by a transverse shaft 46 mounted in suitable bearings on the forward portion of the U-shaped frame bar 13.

To the long rock shafts 42 are rigidly secured oppositely projecting bundle supporting plates or drop platforms 47 that normally stand in horizontal position, as shown in Figs. 4 and 7. Also rigidly secured to said rock shafts 42 are parallel upwardly projecting arms 48 (see Figs. 4 and 7). The upper ends of these arms 48 are pivotally connected to the lower portions of division plates 49, the extreme upper edges of which are pivotally connected at 50 for hinge-like movements, the one from the other. Normally, these division plates 49 are held close together in elevated positions immediately over the rock shafts 42 and supporting bar 26, as shown in Fig. 7.

Mounted in suitable bearings 51 on the legs of the U-shaped frame bar 13, are crank shafts 52 arranged in pairs and having arms 53 at their inner ends. At their outer ends, the shafts 52 are provided with sprockets 54 that aline with sprockets 55 rigidly secured to the transverse shaft 46. Sprocket chains 56 run over the alined sprockets 54 and 55 and thus connect the two pairs of cranks 52—53 for parallel rotary movement.

Revoluble, but non-rotary crank heads 57 are journaled to the free ends of the crank arms 53, and to these crank heads 57 supplemental crank heads 58 are connected with freedom for vertical movements, but are yieldingly pressed downward by springs 59, which springs react on collars on studs 60 secured at their lower ends to the primary heads 57 (see particularly Figs. 5 and 7).

Upright slatted or skeleton side frames 61 are hinged at 62 to the intermediate portions of the supplemental crank heads 58. The lower portions of these two side frames 61 are capable of being sprung or moved away from each other, but are yieldingly held in upright positions against stops 58[a] on said supplemental heads, by suitable spring devices, such, for instance, as the torsional springs 63 shown in Figs. 4 and 7. Skeleton front end gates 64 are pivoted to the forward ends of the side frames 61, and similar rear end gates 65 are pivoted to the rear ends of said side frames. Normally, said gates stand as shown in Fig. 4.

To the free ends of the crank arms 53 are secured segmental cams 66 that operate on rollers or stud projections 67 of arms 68. The lower ends of the forward arms 68 are pivoted to the coöperating primary crank heads 57, while the upper ends of the rear levers 68 are pivoted to the coöperating rear primary crank heads 57, as shown in Fig. 5.

The free ends of the levers 68 are connected by rods 69 to arms 70 that project outward from the coöperating front and rear gates 64 and 65. Torsional springs 71 (see Fig. 5) react against the side frames 61 and gates 64 and 65 in proper direction to yieldingly force the said gates open and maintain engagement between the coöperating cam 66 and rollers 67. It will be noted that the front and rear cams 66 are so set that when the front gates are open, the rear gates will be closed, and conversely.

To the opposite side edges of the deflecting plate or bundle-container 27, cut-off gates 72 are hinged at 73. These cut-off gates 72 are provided with radially projecting arms that are arranged to clear the arms of the front gates 64, and they are also provided with outwardly and forwardly projecting crank arms 74. These crank arms 74 (see Figs. 4 and 5) are connected by rods 75 to the upper end of the levers 76, which levers are intermediately pivoted to brackets 77 and frame bar 13, and at their lower ends are subject to cams 78 carried by the shaft 46. Torsional springs 79 (see Fig. 5) react against the cut-off gates 72 and adjacent edges of the plate 27 with a force tending to hold the lower ends of the levers 76 engaged with the coöperating cam 78.

Motion is imparted from the traction wheel driven shaft 7 of the harvester to certain running parts of the attachment through the following connections, to-wit: A counter-shaft 80 (see Fig. 1) which carries a sprocket 81 is connected to said shaft 7 by a pair of miter gears 82. A sprocket chain 83 runs over the sprocket 81 and over a sprocket 84 that is connected to another sprocket 85 by a hub 86 loosely mounted on the coupling rod or shaft 17, all as best shown in Figs. 1, 4 and 5. The hub 86 also carries a toothed clutch wheel 87. Loosely mounted on said fixed shaft 17, close to the clutch wheel 87, is a spur gear 88 to which is pivoted, at 89, (see particularly Fig. 6), a spring pressed clutch dog 90 having a roller or stud 91 that is adapted to be spring pressed into engagement with said clutch wheel, so as to couple the gear 88 for rotation with the sprockets 84 and 85.

Normally, the clutch dog 90 is held with its roller 91 disengaged from the clutch wheel 87, by means of a trip lever 92 which, as shown, is intermediately pivoted to a bearing 93 on the frame bar 13. The upper end of this trip lever 92 is connected by a rod 94 to the outwardly projecting end or arm 95 of a tripping plate 96. This tripping plate 96 (see particularly Figs. 4, 5 and 7) is pivoted to the upper edge of the left hand side of the plate 27, and is yieldingly pressed so that it normally stands in the position shown in Fig. 7, preferably by means of a light coiled spring 97.

The gear 88 (see particularly Fig. 5) meshes with a larger overlying gear 98 that is connected by a short shaft 99 to a crank arm 100 (see Figs. 4 and 5). The shaft 99 is mounted in a suitable bearing on the frame bar 13, and the crank arm 100 is connected by a link 101 to the arm 40 of the rock shaft 39, before described. The said crank arm 40, it will be noted by reference to Fig. 5, is considerably longer than the crank arm 100, so that the former will be given an oscillatory movement under rotary movement of the latter.

A sprocket chain 102 runs over the constantly driven sprocket 85 and over a sprocket 103 that is loosely mounted on the left hand or inner end of the counter-shaft 46, as best shown in Figs. 1, 4 and 5. The hub of the sprocket 103 carries a toothed clutch wheel 87^a that corresponds to the clutch wheel 87, and the sprocket 55 which, as before stated, is rigidly secured to the counter-shaft 46, carries a spring pressed clutch dog 90^a that corresponds in construction and action to the clutch dog 90 and coöperates with the clutch wheel 87^a. Otherwise and briefly stated, the constantly driven sprocket 103 is adapted to be intermittently coupled to the sprocket 55 by a one-revolution clutch, the construction and action of which is the same as the one-revolution clutch used to intermittently connect the constantly driven sprocket 84 to the gear 88. Normally, the free end of the clutch dog 90^a is engaged and the said dog is held in an inoperative position so that the sprocket 55 and shaft 46 stands still, by means of the clutch tripping lever 104, the intermediate spindle portion of which, as shown, is journaled in a bearing 105 secured to the frame bar 13, as best shown in Figs. 4 and 5. A tripping connection 106, which is attached to the upper end of the tripping lever 104, extends to some distant point, preferably within reach from the driver's seat on the harvester.

The operation, briefly summarized, is as follows: The bundles, as already stated, are delivered onto the so-called arighting table 28 and when the binder needle 11 approaches the limit of its return movement the said table is tilted endwise into the position indicated by dotted lines in Fig. 3. This causes the bundle to slide, butt end downward, onto the inclined inner end of the deflecting plate 27, by which it is delivered in upright position onto the receiving table 25. When the bundle slides over the inclined portion of said deflecting plate 27, it engages and depresses the tripping plate 96, thereby causing the trip lever 92 to release the clutch dog 90 and permit the latter to be coupled to the clutch wheel 87. This clutch then couples the small gear 88 to the constantly running sprocket 84 and imparts one rotation thereto, at the limit of which rotation the clutch dog

90 is again thrown into an inoperative position by reëngagement with the trip lever 92. This one rotation of the small gear 88 imparts a half rotation to the large gear 98 and crank 100, and this crank movement, through the link 101, crank 40, rock shaft 39 and bevel gears 37—38, moves the packer blade 36 first in one direction and then in the other through approximately 180 degrees, so that the successive bundles delivered onto the platform 25 will be forced alternately onto the two drop platforms 47.

When the two rows of bundles have been accumulated on the two drop platforms 47 and the rear members thereof have been forced back to the rear gates 65, the trip lever 104 should be moved so as to release the clutch dog 90ª of the one-way clutch which serves to intermittently connect the constantly driven sprocket 103 to the sprocket 55 which is secured to the shaft 46, so that the said shaft 46 will be given one complete rotation. Under this complete rotation of the shaft 46, several actions take place, to-wit, the segmental gears 45 are thrown into action in succession on the coöperating pinions 44, so that the two drop platforms 47 are first turned downward, as indicated by dotted lines in Fig. 7, and are then returned to normal positions shown by full lines in Fig. 7. When the platforms 47 are turned downward, the arms 48 which are carried by the shafts 42 draw the division plates 49 downward and at the same time separate the lower edges thereof so as to assist in discharging the bundles in a shock upon the ground, and, of course, these division plates are returned to normal positions when the drop platforms 47 are returned to normal positions.

Approximately simultaneous with the downward movements of the platforms 47 and division plates 49, the cranks 53 are simultaneously moved downward, carrying with them the side plates or frames 61, and, at the beginning of this movement, the cams 66, acting upon the levers 68 and connections therefrom, simultaneously move the front gates 64 into closed positions and the rear gates 65 into open positions. Also at approximately the same time, the cams 78, acting on the levers 76 and connections therefrom, move the cut-off gate 72 into closed positions, so as to hold upon the platform 25 any bundles that may be discharged thereon from the binder before the drop platforms 47 have been moved downward into normal positions. The said frames 61, as already described, are yieldingly connected to the primary crank heads 57 so that they are capable of vertical and lateral yielding movements. This is done to prevent breaking of said frames when they are forced downward by the cranks 53 and into contact with the discharged bundles. The bundles, as is evident, are left in a shock upon the ground as the bundle shocking attachment is moved forward thereof.

The purpose of mounting the hinged division plates for outward swinging movement at their lower edges, when lowered, and for mounting the vertically movable laterally spaced side plates for outward separating movements at their lower edges, when lowered, is to permit the two rows of bundles to be tilted or canted toward each other at their upper ends, so that they will form a self sustaining shock of bundles.

Attention is now directed to Figs. 8, 9, 10 and 11. The numeral 107 indicates spring bundle retaining teeth attached at their forwardly extended ends to the side frame 61 and engageable with the bundles to hold the same upright and to prevent forward movement thereof after they are forced rearward on the drop platforms 47. Similar spring retaining teeth 108 are connected at their forward ends to the semi-cylindrical sheath 27ª and are located in position to hold against return movements bundles moved off from the bundle receiving platform 25 by the packer blade 36. To arrange for the automatic tripping of the one revolution clutch on the driving shaft 46, the bell crank lever 109 is pivoted to the frame yoke 13 and a small lever 110 is pivoted to the bearing 105. The overlapped ends of this bell crank and lever 110 engage the depending clutch tripping lever 104 and, when either is moved, the said clutch tripping lever 104 will be moved into an inoperative position and the said one revolution clutch will be thrown into action so that the said shaft 46 will be given one revolution from the constantly driven sprocket 55. The lever 110 is connected, by a rod or wire 111, to a small lever 112 intermediately pivoted on the inner leg of the frame yoke 13. The forwardly projecting arm of the bell crank 109 is connected, by a rod or wire 113, to one arm of the bell crank 114 which bell crank is pivoted to the frame yoke 13 and is connected, by another rod or wire 115, to a lever 116 that is intermediately pivoted to the outer leg of the frame yoke 13. The inner ends of the levers 112 and 116 engage arms 117 that are pivotally mounted, at their inner ends, one on each of the side frames 61. The arms 117 are connected by rods 118 to an outward projection 119 of tripping arms 120, which tripping arms are pivoted one to each of the side frames 61 and project inward in position to be engaged by a bundle that has been forced rearward on the drop platform nearly to the alined rear gate 65. With this construction it is evident that when a bundle is pressed against either one of these tripping arms 120, the one revolution clutch on the shaft 46 will be dropped into action.

In Figs. 9, 10 and 11, the numeral 121 indicates a ratchet-toothed latch segment

which is secured to the side frame 61 above the pivotal connection 62 between the same and the supplemental crank head 58ª. Mounted in suitable bearings on the supplemental crank head 58ª is a small rock shaft 122 which has an upwardly projecting finger 123 that is engageable with the teeth of the latch bar 121. This rock shaft 122 also has a forwardly projecting arm 124 that is adapted to be engaged by a pin 125 carried by the coöperating cam 66. The pin or stud 125 is so located that it will engage the arm 124 and force the finger 123 out of engagement with the latch segment 121 under upward movement of the crank arms 53 which carry the same, and, when this takes place, the springs 63 will move the side frame 61 back into its normal position shown by full lines in Fig. 9.

What I claim is:

1. A harvester and binder, in combination with a shocker comprising a receiving table, a drop platform, a packer for delivering the bundles from said receiving table onto said drop platform, and a bundle-arighting table receiving the bundles from said binder and delivering the same, butt-end downward, onto said receiving table, substantially as described.

2. A harvester and binder, in combination with a shocker comprising a receiving table, a pair of drop platforms, an oscillatory packer arranged to deliver the bundles, alternately, from said receiving table onto said drop platforms, and a pivoted binder-actuated arighting table receiving the bundles from said binder and delivering the same, butt-end downward, onto said receiving table, substantially as described.

3. A harvester and binder, in combination with a bundle shocking attachement comprising a pair of drop platforms, a bundle receiving table, a vibratory packer arranged to deliver the bundles, alternately, from said receiving table onto said drop platforms, means for automatically moving said packer once for each bundle discharged onto said receiving table, a pivoted bundle-arighting table receiving from said binder and delivering the bundles, butt-end downward, onto said receiving table, and connections acted upon by the binder needle under return movement thereof for tilting said arighting table, substantially as described.

4. A harvester and binder, in combination with a shocking attachment comprising a pair of drop platforms, hinged division plates connected to said drop platforms and movable downward therewith, upright side frames, cranks supporting said side frames, a bundle-receiving table, a vibratory packer arranged to deliver the bundles, alternately, from said table onto said drop platforms, and means operative under the advance movement of the machine for imparting vibratory movements to said packer and downward and return movements to said drop platforms, division plates and crank-supported side frames, substantially as described

5. A harvester and binder, in combination with a bundle shocking attachment comprising drop platforms, hinged division plates connected to said drop platforms, laterally spaced side frames, gates applied to the front and rear ends of said side frames, a bundle receiving platform, a vibratory packer for delivering the bundles, alternately, from said table onto said drop platforms, automatic means for moving said packer once for each bundle delivered from said binder onto said receiving table, said means comprising a one-revolution clutch and a bundle-engaging tripping plate, and means for moving said front and rear gates in alternate order and for tripping and returning said drop platforms and division plates, substantially as described.

6. In a shocking device for harvesters, the combination with a suitable frame-work, of a pair of drop platforms, a bundle receiving table, a vibratory packer for delivering the said bundles, alternately, from said table to said drop platforms, a pair of laterally spaced side frames, parallel cranks to which said side frames are pivotally and yieldingly connected, and means for intermittently imparting roatry movements to said cranks, involving a one-revolution clutch and a clutch-tripping connection, substantially as described.

7. In a bundle-shocking device, the combination with an approximately U-shaped frame and wheels applied to the intermediate portions of the legs thereof, of a bundle-receiving platform supported by the front portion of said frame, a pair of drop platforms supported between the legs of said frame, means for intermittently imparting upward and downward movements to said platforms, including a one-revolution clutch, a vibratory packer for alternately delivering the bundles from said receiving table onto said drop platforms, and means for intermittently vibrating the same, including a one-revolution clutch and a clutch-tripping connection, substantially as described.

8. In a bundle-shocking device, the combination with drop platforms, a bundle receiving table, a vibratory packer for delivering the bundles, alternately, from said table onto said platforms, means for intermittently moving said packer, including a one-revolution clutch and a clutch-tripping connection, laterally spaced side frames having front and rear gates, parallel cranks supporting said side frames and having cams for actuating said gates, and means for intermittently imparting downward and return movements to said drop platforms and side frames, comprising shaft and gear connections to said platforms, sprocket chain connections to said cranks, a one-revolution clutch and a

clutch tripping connection, substantially as described.

9. In a bundle shocking device, the combination with pivoted drop platforms, hinged division plates, crank arms movable away from and toward each other and connecting the said division plates to said drop platforms for moving the lower edges of said division plates away from each other when said drop platforms are turned downward, of laterally spaced side plates, and means for moving the said side plates downward when the said drop platforms and division plates are moved downward, substantially as described.

10. In a bundle shocking device, the combination with drop platforms pivotally supported at their inner edges and connected for simultaneous movements downward and upward, of division plates, cranks connecting said division plates to said drop platforms and themselves connected to move toward and from each other when said drop platforms are moved downward, laterally spaced side frames, means for moving said side frames downward and upward, and means for moving said drop platforms and division plates approximately simultaneously with corresponding movements of said side frames, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GUSTAF L. LEISNER.

Witnesses:
IDA ANDERSON,
C. M. MCCLERNAN.