

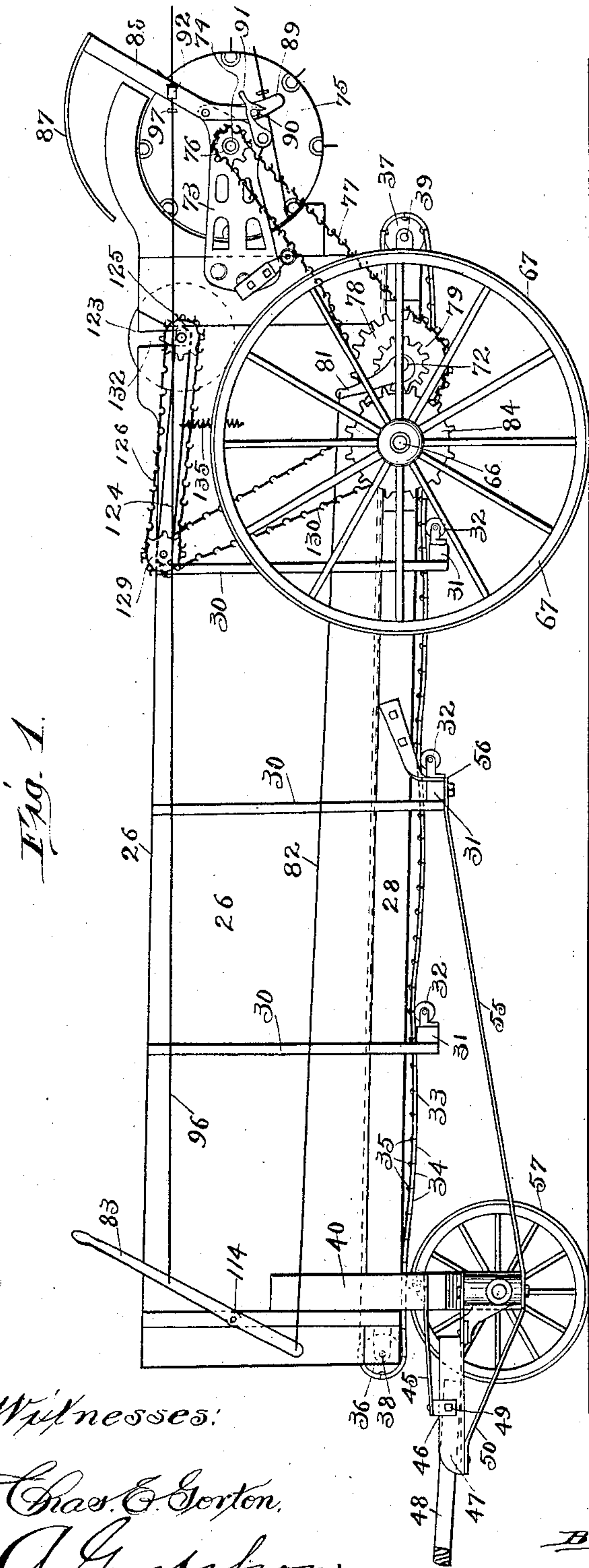
No. 789,859.

PATENTED MAY 16, 1905.

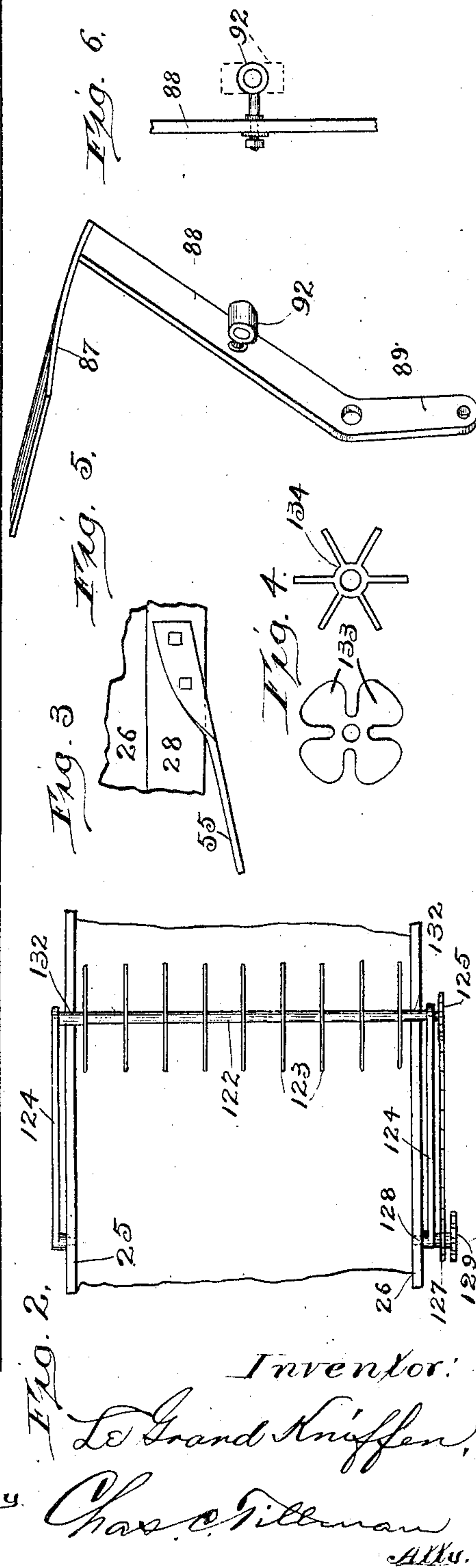
LE GRAND KNIFFEN.
MANURE SPREADER.

APPLICATION FILED OCT. 1, 1904.

4 SHEETS—SHEET 1.



Witnesses:
Chas. E. Gorton.
A. Gustafson



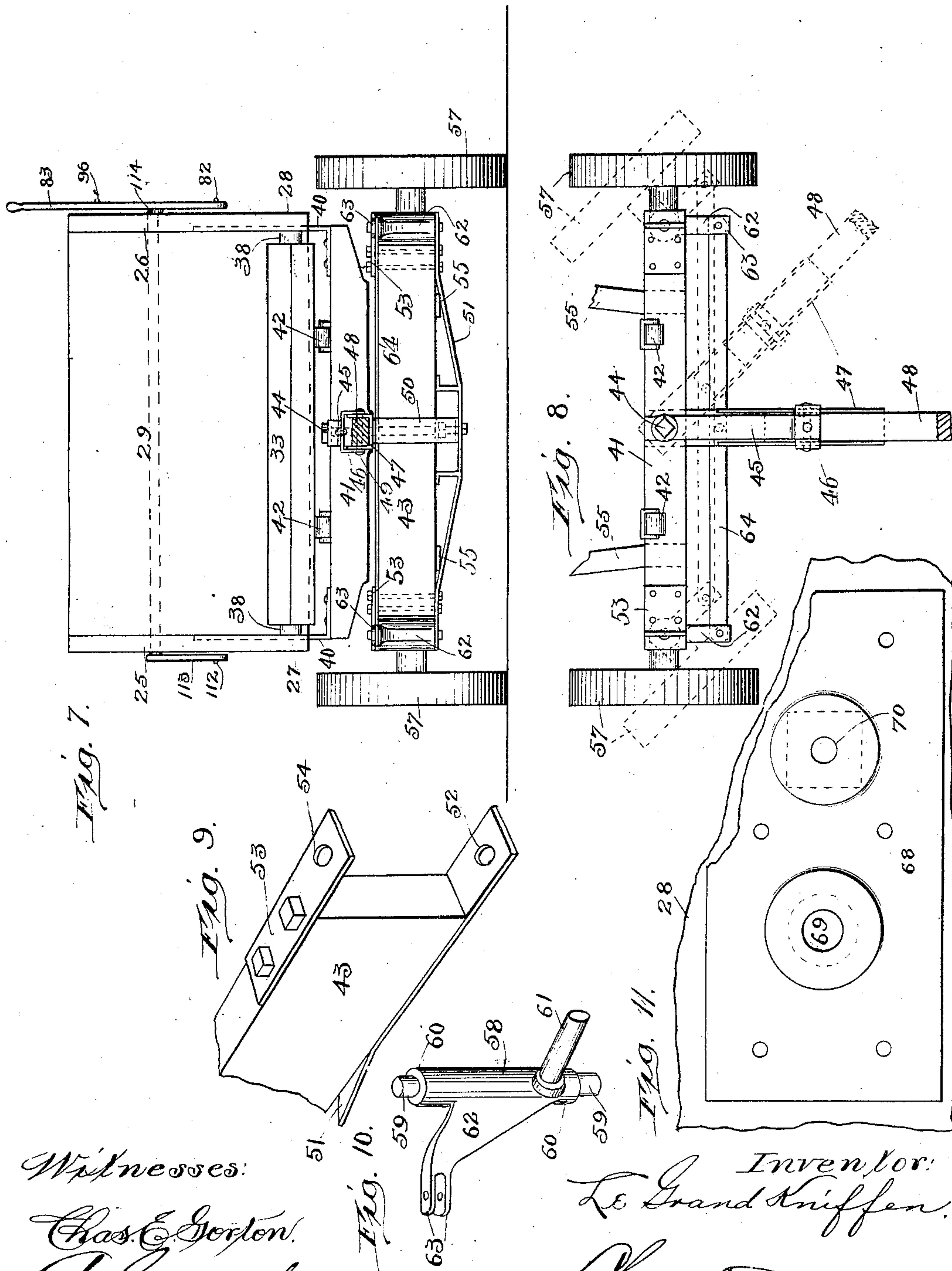
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4 SHEETS—SHEET 2.



Witnesses:

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Att'y

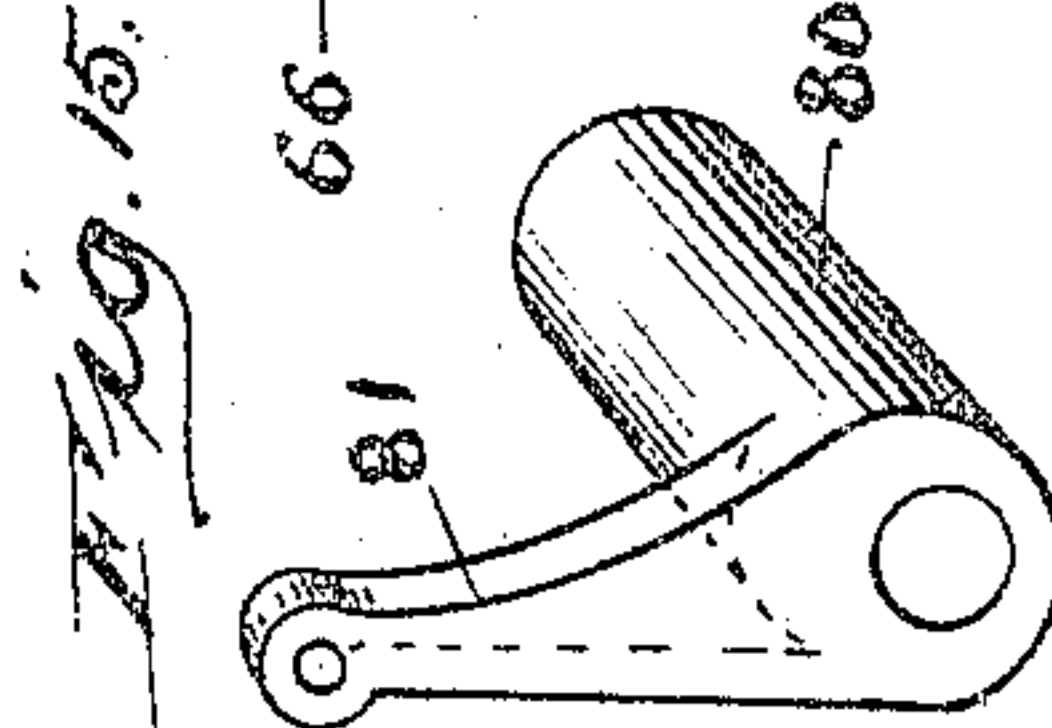
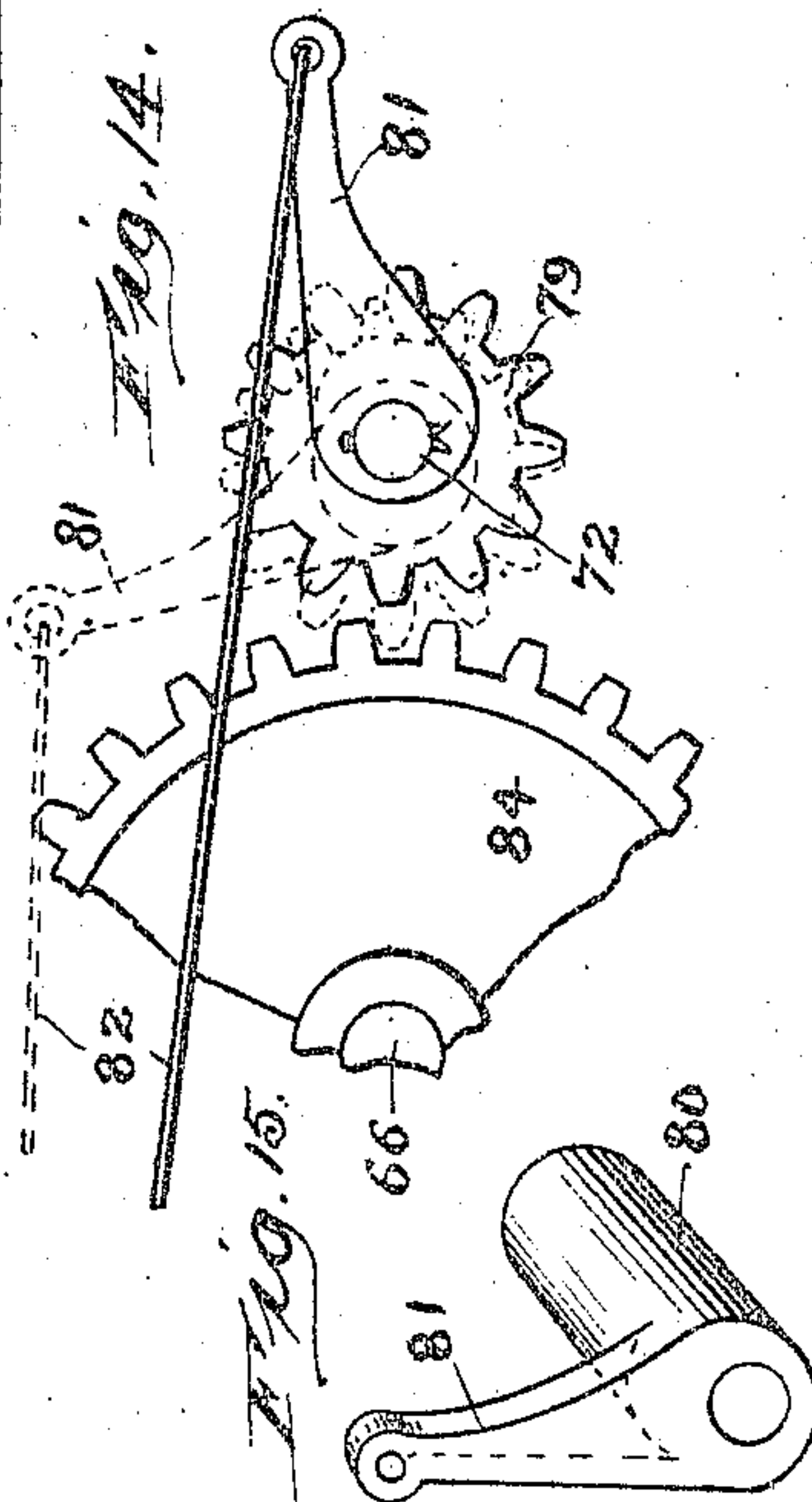
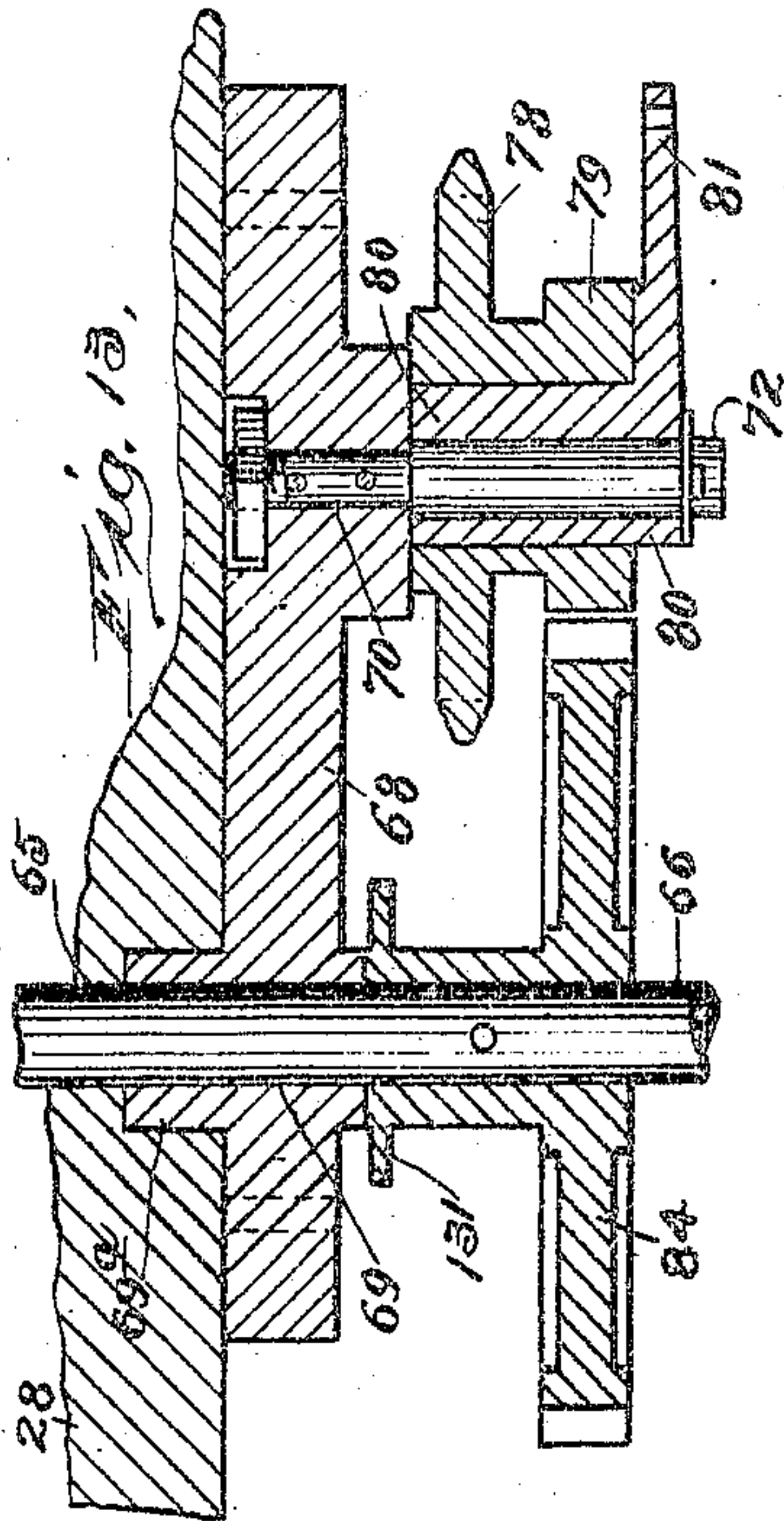
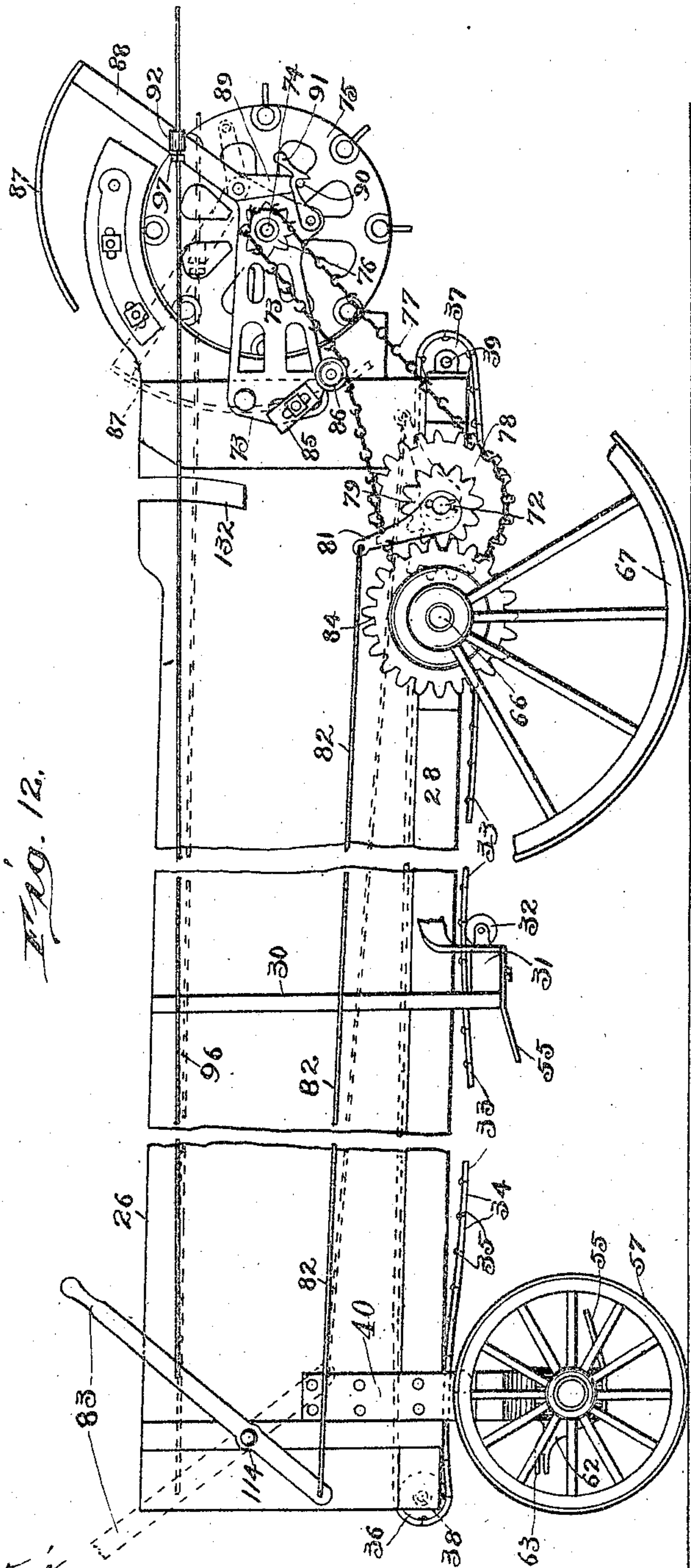
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4 SHEETS--SHEET 3.



W/nesses:

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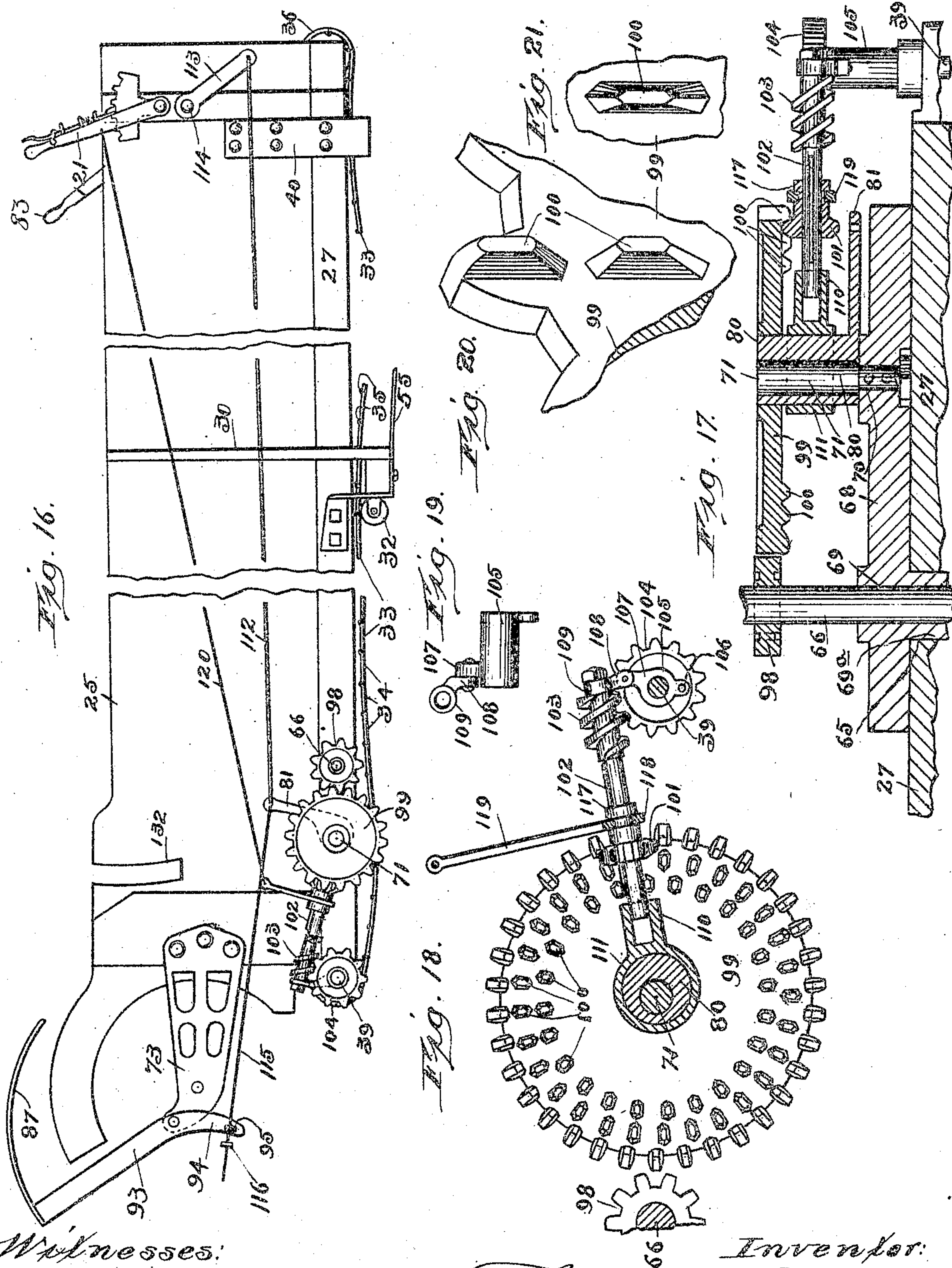
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4 SHEETS--SHEET 4.



Witnesses:

Chas. E. Gorton.
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Inventor:

To Grand Jurors.
By, Chas. C. Hillman
Atty.

UNITED STATES PATENT OFFICE.

LE GRAND KNIFFEN, OF CHICAGO, ILLINOIS.

MANURE-SPREADER.

SPECIFICATION forming part of Letters Patent No. 789,859, dated May 16, 1905.

Application filed October 1, 1904. Serial No. 226,807.

To all whom it may concern:

Be it known that I, LE GRAND KNIFFEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Manure-Spreaders, of which the following is a specification.

This invention relates to that class of manure-spreaders which comprise a box-like body mounted on a wheeled frame or the running-gear of a wagon, said body having at its bottom means to gradually move the load rearwardly or to the rear end of the body, thus feeding it to a toothed beater or distributor located at said end of the body and by means of which it is thrown from the machine and spread upon the ground. As is well known, in this class of manure-spreaders the machine can distribute its load in a swath or trail about as wide only as its body and that it is important to spread the manure over as much ground as possible in a single course of the machine. To widen the body necessitates placing the wheels a corresponding width apart, and therefore the use of longer axles. With a long front axle pivoted at its middle, as usual, the jar or vibration of the tongue when one of the front wheels strikes an obstruction or passes over rough ground is considerable and objectionable.

To provide a manure-spreader which will spread a wider trail or swath of manure than usual by widening the body and lengthening the axles without increasing but rather diminishing the vibration of the tongue is one of the objects of my present invention, and to accomplish this, as well as to permit the body to be placed lower or nearer the ground, which is also desirable, so that it can be more readily loaded, I secure the front axle rigid with respect to the body and pivotally mount the front wheels at the ends thereof, which arrangement enables the machine to make a very short turn, as the wheels do not turn under the body, but on their pivots at the ends of the axle. When this arrangement for the front portion of the body of the machine is employed, provision for lowering the rear portion of the body to a corresponding height without reducing the height of the rear wheels

is required, which is accomplished by providing the rear portion of the sills of the body just below a portion of the means for feeding the manure to the beater with openings for the main or rear axle. As is evident, this will drop the body much lower than if it rested on the top of the rear axle; but the said openings in the frame will tend to weaken the same, which is overcome by plates secured longitudinally on the frame on each side of said openings.

When a manure-spreader of the above-named type is loaded with manure in which straw or hay is embedded, forming hard and compact lumps, which are thrown into the body without being broken up on account of the tenacity with which they are held by the straw or hay fail to be disintegrated by the beater and are often carried over thereby practically intact, which operation of the machine is commonly known as "bunching." Various devices, have heretofore been employed to overcome this difficulty, but without entire success—among them, a spring-pressed retarding-rake with the view of holding back the lumps until the revolving beater picks them to pieces before being discharged thereby. This arrangement puts excessive labor on the beater, and when too great the machine becomes stalled and ceases to operate. To provide means for surmounting this serious objection of the machine throwing over the manure in lumps and to sufficiently pulverize or disintegrate the manure before it comes in contact with the beater, thereby relieving it of undue work, so that it can spread the previously broken up or disintegrated manure evenly, is another and very important object of this invention, which I accomplish by means of a suitable pulverizer or disintegrator rotatably mounted in front of the beater, so as to act on the manure in its passage to the latter, and which may be driven by means of suitable mechanism connected to the rear axle.

In my present invention I employ a worm geared to the rear axle and a worm-gear operatively connected to the means for feeding the manure to the beater for driving said means and am aware that such use of a worm and gear is old; but heretofore it has been the custom

to throw the feeding mechanism out of gear by moving the worm out of engagement with the worm-gear, and vice versa, when it is desired to operate the feeding mechanism, yet
 5 allowing the worm-shaft to remain in gear with and be rotated by the driving-shaft or rear axle, thus creating undue friction and wear.

To provide means whereby the worm may be kept in engagement with the worm-gear, so as
 10 always to be in proper mesh therewith, and to permit of the feeding apparatus being thrown out of gear, so that all motion of the various parts thereof shall instantly cease, is a further object of the invention.

15 A still further object is to equip the machine with a pivoted or rotatable rear end-gate or shield to protect the beater while the machine is being loaded and with means for raising it as well as for throwing the feeding mechanism
 20 and the driving-gear for the beater into gear, all of which can be done simultaneously and by the movement and use of a single lever, which shall be so connected to the end-gate or shield and to the driving mechanism for the beater
 25 and feeding device that after the shield or end-gate has once been raised by the movement of the lever at the time of starting to discharge the load it (the lever) shall be free to operate at any time without affecting the shield.

30 Other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In order to enable others skilled in the art to which my invention pertains to make and
 35 use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a view in side elevation of a manure-spreader embodying my invention.
 40 Fig. 2 is a fragmental plan view of the body, showing the pulverizer or disintegrator located therein. Fig. 3 is a fragmental view of the lower portion of one side of the body and one of the sills thereof, showing a modification in one of the braces for rigidly securing the front axle-beam thereto. Fig. 4 is a
 45 detached detail view of modified forms of the pulverizer. Fig. 5 is a perspective view of a portion of the rear end-gate or shield, showing it detached. Fig. 6 is an edge view of a
 50 portion of one of the arms of the shield or end-gate, showing one of the swiveled eyebolts thereon. Fig. 7 is a front end view in elevation of the machine, showing the tongue in section. Fig. 8 is a plan view of the front
 55 part of the machine with the body removed, showing by dotted lines the positions to which the tongue and wheels may be turned. Fig. 9 is a perspective view of a portion of the front axle-beam. Fig. 10 is a similar view of
 60 one of the pivoted shafts on which the front wheels are mounted. Fig. 11 is an enlarged view in elevation of a portion of one of the sills of the body, showing one of the strengthening-plates attached thereto and provided

with bearings for the rear axle and a stub-shaft. Fig. 12 is a view in side elevation of the same side of the machine as that shown in Fig. 1, but illustrating the body as being shortened for the convenience of illustration, 70 and also showing the tongue as being omitted and the driving-gear for the beater in gear. Fig. 13 is a plan sectional view of a portion of the body, showing the rear axle, main driving-gear, stub-shaft, sprocket-wheel, and eccentric for throwing the driving mechanism 75 for the beater in and out of gear. Fig. 14 is a face view of a portion of the driving mechanism for the beater, showing it by continuous lines as out of gear and by dotted lines as 80 in gear. Fig. 15 is a detached perspective view of one of the eccentric-sleeves employed for throwing the driving mechanism for the beater, as well as the mechanism for operating the conveyer or feeding device, in and out 85 of gear. Fig. 16 is a view in side elevation of the opposite side of the body of the machine from that shown in Figs. 1 and 12 and illustrating the mechanism for operating the conveyer or feeding apparatus. Fig. 17 is a 90 plan sectional view of a portion of the body and the mechanism for operating the conveyer. Fig. 18 is an inner face view of said mechanism. Fig. 19 is a detail view of a sleeve used for holding the worm in mesh 95 with the worm-gear. Fig. 20 is an enlarged perspective view of a portion of the inner surface of the main driving-gear used for operating the feeding device; and Fig. 21 is a fragmental face view of a portion of said gear, showing the formation of one of the teeth thereof.

Like numerals of reference refer to corresponding parts throughout the different views of the drawings.

The body of the machine comprises side pieces 25 and 26 and sills 27 and 28, located longitudinally at the bottom thereof. The front of the body is provided with a fixed end-gate 29, of the ordinary construction. Secured on the outer surfaces of the sides of the body and extending a slight distance below the sills 27 and 28 thereof are vertical standards 30, to the lower portions of which are secured cross-pieces 31, each of which is provided with a series of antifriction-rollers 32, on which the lower or return portion of the conveyer 33 rests. In the present instance I have shown the conveyer as being of the endless type and as comprising a series of transverse slats 34, secured together at their meeting edges by means of hinges 35, located near each of the ends of the slats, so as to pass around and engage the sprocket-wheels 36 and 37, which are mounted near each of the ends of the shafts 38 and 39, journaled on the front and rear lower portions of the body, respectively.

Horizontally located below the front portion of the body and supported thereon by

means of brackets 40, secured to the sides and sills of the body, is a bolster 41, which has horizontally journaled thereon a series of rollers 42, upon which the lower portion of the conveyer may rest, as is clearly shown in Fig. 7 of the drawings, in which figure it will be noted that the bolster is located a sufficient distance below the sills of the body to permit of the operation of the conveyer between the two. Passing vertically through the middle of the bolster 41 and through the middle of the axle-beam 43 is a bolt 44, which also passes through the rear end of a strap 45, the front end of which is connected by means of a yoke 46 to a channel-shaped box or socket 47, which receives the rear end of the tongue 48. The yoke 46 strides the box 47 and tongue 48 and has a bolt 49 passing transversely through the same to permit of a slight vertical movement of the tongue. The front portion of the box 47 is braced by means of a bar 50, the lower end of which is secured to the middle portion of a strengthening-bar 51, located on the lower surface of the axle-beam 43, as is clearly shown in Figs. 7 and 9 of the drawings. The strengthening-bar 51 projects some distance beyond each end of the beam 43 and has in each of its projecting ends an opening 52 to afford a bearing for one end of the front-wheel pivots. The upper surface of the axle-beam 43 has secured thereto at each of its ends a bar 53, which project beyond the ends of said beam, and each of which is provided with an opening 54 to furnish bearings for the upper ends of the wheel-pivots. Secured at their front ends to the beam 43 are brace-bars 55, which extend rearwardly and upwardly and have their other ends secured to the sills 27 and 28, preferably at the rear of the cross-piece 31, which is located at about the middle of the body. Each of said bars may be provided near its rear end with a bend 56 to fit around said cross-piece, to which it may also be secured. Each of the pivot-pieces for the front wheels 57 comprises a vertical shaft 58, which has its ends reduced, as at 59, to fit in the openings 52 and 54 of the bars 51 and 53, which, as before stated, are secured to the axle-beam 43, and which openings are located in the projecting ends of said bars. By reducing the ends of the pivot-shafts 58 it is apparent that shoulders 60 will be provided thereon, so as to rest against the adjacent surfaces of the bearing-bars. Each of the pivot-shafts or bars 58 is provided near its lower end with a stub-shaft or axle 61, extending at right angles, upon which the front wheels are mounted. Extending upwardly and forwardly from each of the shafts or bars 58 is an arm 62, which preferably has its free end formed with apertured prongs 63, between which are pivotally secured the ends of a connecting-bar 64, which is also connected at its middle

to the rear end of the socket or box 47 for the tongue.

By reference to Figs. 1, 7 to 10, inclusive, of the drawings it will be seen and understood that the axle-beam 43 is held rigid with respect to the body by means of braces 55 and that the front wheels 57 are pivotally as well as rotatably mounted on the ends of said beam in such a manner that they can be turned to various angles thereto, and as their axles 61 are quite short the vibration or jar of the tongue incident to the front wheels striking an obstruction or passing over rough ground will be reduced to a minimum. As the free ends of the arms 62 are connected by means of the bar 64 and said bar is also connected to the box or socket for the tongue, it is evident that the wheels will be turned in unison.

The rear portion of each of the sills of the body is provided with an opening 65, in which is journaled the rear axle 66, on the ends of which are mounted the rear wheels 67 in usual manner, which arrangement will drop or lower the rear portion of the body considerably and on a level with the front portion thereof. As the openings 65 in the sills 27 and 28 will have a tendency to weaken the same, I secure to the outer surfaces thereof strengthening-plates 68, which are provided with openings or bearings 69 and 70 for the rear axle and stub-shafts 71 and 72, respectively. Secured to the rear ends of the sides of the body and extending rearwardly therefrom are brackets 73, on and near the rear ends of which is horizontally journaled a shaft 74, on which is mounted a cylindrical and toothed beater 75, which distributes the manure. On one end of the shaft 74 is mounted a sprocket-wheel 76, over which a sprocket-chain 77 passes, which chain also engages a main sprocket-wheel 78, mounted on the stub-shaft 72, which, as shown, is located on that side of the body on which the sprocket-wheel 76 is mounted.

As shown in Fig. 13 of the drawings, the main sprocket-wheel 78 has integral therewith a pinion 79, which pinion and wheel are mounted on an eccentric-sleeve 80, which is journaled on the stub-shaft 72 and is provided with an arm 81, to which one end of a rod 82 is connected, the other end of which rod is connected to the lower portion of a lever 83, fulcrumed on the front portion of the body. (See Figs. 1, 12 to 15, inclusive, of the drawings.) Instead of making the pinion 79 integral with the sprocket-wheel 78 it is apparent that it may be separate therefrom and rigidly secured thereto. The pinion 79 is adapted to mesh with the main gear 84 for operating the beater-driving mechanism, which gear is mounted on the rear axle 66 between one of the rear wheels and one side of the body, and said pinion may be thrown in and out of mesh or engagement with the main gear 84 by moving the lever 83 in the proper direction. Ad-

justably mounted on the rear portion of the side 26 is a hanger 85, which has journaled on its lower portion a grooved roller 86, which hanger and roller afford a tightener for the chain 77, which, as before stated, engages the main sprocket-wheel 78 and the sprocket-wheel 76 on the beater-shaft. To protect the beater from the manure while the machine is being loaded, I employ a shield 87, which is preferably slightly curved and has at one of its ends, near its rear or upper edge, an arm or extension 88, which is pivotally secured to the rear portion of one of the brackets 73 and is provided with an extension 89 below its pivot-point, which extension is furnished with a pin 90 to engage a dog 91, pivoted on the bracket 73, and employed to hold the shield in its raised position. The arm 88 has secured thereon, between its pivoted point and the shield, a swiveled eyebolt 92, for the purpose to be presently explained. The opposite end of the shield 89 is provided with an arm 93, which is pivotally secured to the rear portion of the bracket 73 on the opposite side of the body and has an extension 94 projecting below its pivot, which extension is also provided with a swiveled eyebolt 95 for the reception of an operating-rod. Secured at one of its ends to the lever 83 is a rod 96, which loosely passes through the eye of the bolt 92 and has on its rear portion a stop or enlargement 97, which will engage the bolt 92 when the shield is in its lowered position, so that by moving the lever 83 to the position shown by continuous lines in Figs. 1 and 12 of the drawings the shield will be raised, in which position it may be retained by means of the dog 91, which is adapted to engage the pin 90 on the extension 89 of one of the shield-supports. When thus raised, it is apparent that the lever 83 may be operated back and forth without affecting the position of the shield.

On the opposite of the body from that on which the driving mechanism for the beater is mounted is located the driving mechanism for the means for feeding the manure to the beater, which comprises a driving-gear 98, mounted on the rear axle, and which gear is adapted to mesh with the peripheral teeth of the gear-disk 99, which is mounted on an eccentric-sleeve 80, which is journaled on the stub-shaft 71 and is similar in construction to the eccentric-sleeve which is mounted on the stub-shaft 72 and employed for throwing the mechanism for driving the beater into and out of gear. The gear-disk 99 is provided on its inner face with a series of teeth 100, arranged in concentric circles and adapted to mesh with the teeth of a gear 101, movably mounted on the longitudinal worm-shaft 102, which has near one of its ends a worm-gear 103 to cooperate with the teeth of a worm-gear 104, mounted on the rear shaft 39 of the conveyer near one of its ends. The worm 103

is held in permanent engagement with the worm-gear 104 by means of a sleeve 105, which is loosely mounted on the shaft 39 and has at one of its ends an apertured lug 106, by means of which it may be secured against rotary movement. This sleeve has near its other end a lug 107, to which is pivotally secured a link 108, which has a collar 109 to fit loosely around the worm-shaft, so as to allow the same to rotate. The opposite end of the worm-shaft 102 is movably fitted in a socket 110 on a collar 111, which surrounds the eccentric-sleeve 80 on the shaft 71, which sleeve is provided with an arm 81, to which one end of a rod 112 is connected, the other end of which rod is secured to a crank 113, which is rigidly fixed to one end of a shaft 114, which is transversely journaled in the front portion of the body and has rigidly fixed on its other end the lever 83, which, as before stated, has connections for throwing the driving mechanism for the beater in and out of gear as well as raising the shield. Extending from the arm 81 rearwardly and loosely through the eyebolt 95 on the extension 94 of one of the supports for the shield is a rod 115, which has on its rear portion a stop or enlargement 116 to engage the eyebolt 95 when the shield is lowered. The gear 101, which is adapted to mesh with the teeth 100 of the gear-disk 99, is provided with a hub 117, around which is secured a collar 118, which has an upwardly-extending arm 119, to which is secured at one of its ends a rod 120, the other end of which is secured to a lever 121, fulcrumed on the front part of the body. By moving the lever 121 in the proper direction it is apparent that the gear 101 through its connections with said lever will be moved back and forth on the worm-shaft 102, so as to engage or mesh with one of the concentric rows of teeth 100, thus increasing or diminishing the movement of the worm-shaft, and thereby the rate of feed to the beater.

By reference to Figs. 20 and 21 of the drawings it will be seen that the ends of the teeth 100 are inclined and beveled or rounded, which construction permits of the positive engagement therewith of the teeth of the movable gear 101 at all times, the teeth of which are also beveled at their ends.

To thoroughly pulverize or disintegrate the lumps of manure as it is being fed to the beater, I employ a pulverizer or disintegrator which is rotatably mounted in front of the beater and in parallelism therewith, and in order to allow the pulverizer to rise and fall with the manure I journal it on a pivoted frame. In Fig. 2 of the drawings is illustrated a plan view of a portion of the body and one form of a pulverizer which I may employ, which consists of a shaft 122, having a series of disks 123 mounted thereon, and which shaft is journaled at each of its ends

on one end of a bar 124, the other end of each of which is pivotally secured to the sides of the body. On one end of the shaft 122 is mounted a sprocket-wheel 125, over which passes a chain 126, which also passes over a sprocket-wheel 127 on the stub-shaft 128, which secures one of the bars 124 to the body. Mounted on the stub-shaft 128 is another sprocket-wheel 129, over which passes a chain 130, which also passes over a sprocket-wheel 131 on the hub of the main gear 84 on the rear axle, which main gear is used for driving the beater mechanism. As it is desirable that the pulverizer shall have a vertical movement, so as to properly act on the manure when the body is fully or partially loaded, the sides of the body are provided with slots or recesses 132 for the reception and operation of the shaft 122, which carries the disks or pulverizing instruments. Instead of employing circular knife-edged disks, as shown in Figs. 1 and 2 of the drawings, I may mount on the shaft 122 serrated disks, as shown at 133, or toothed collars, as shown at 134, in Fig. 4 of the drawings, which will operate to break up or disintegrate the lumps of manure as it is being fed to the beater.

While I have shown a conveyer of the endless or belt type to be used for conveying the manure rearwardly, yet I do not desire to be limited to such means for conveying the manure to the beater, as I may employ other means therefor without departing from the spirit of my invention.

The operation of the machine is as follows: When the machine is being loaded, the shield or rear end-gate 87 is lowered to the position shown by dotted lines in Fig. 12, in which position it will protect the beater from the manure as it is thrown into the body. The shield may be turned to its lowered position by hand, and when lowered the lever 83 will assume the position indicated by dotted lines in Fig. 12, thus throwing the mechanism for driving the beater, as well as the mechanism for operating the conveyer, out of gear. After the machine has been driven to the field or point for distribution of the manure and it is desired to start operating the same the lever 83 should be thrown to the position indicated by continuous lines in Figs. 1 and 12 of the drawings, which operation will, through the medium of the rods 96 82, shaft 114, crank 113, and rod 112, throw the driving mechanism for the beater, as well as the operating mechanism for the conveyer, into gear and at the same time raise the shield 87 to its elevated position, where it will form a wind-break to prevent the manure being scattered by the wind. When in its raised position, the shield may be so retained by means of the dog 91, which engages the pin 90 on one of the supporting-arms of the shield. It is obvious that as the lever 83 and the crank 113 are rigidly secured on the shaft 114 the movement of said

lever will throw the driving mechanism for the beater and the operating mechanism for the conveyer into and out of gear simultaneously and after the shield has been raised without affecting its position. As the load is being scattered the pulverizer or disintegrator will be caused to rotate both by the rearward trend of the load as well as by the driving mechanism therefor, which operation will cut up or disintegrate the lumps of manure as the load is fed to the beater. As the weight of the pulverizer may not be sufficient to hold it in operative contact with the manure, a spring 135, secured at one of its ends to each of the bars 124 and at its other end to the sides of the body, may be employed to actuate the pulverizer downwardly.

By locating the rear axle 66 in the openings 65 therefor in the sills comprising a portion of the body it is apparent the body will be lowered considerably, and to overcome the weakening of the sills by reason of said openings the plates 68 are secured thereto to strengthen the same, and, besides, each of these plates is provided around its opening or bearing 69 with a boss or extension 69^a, which will form a part of the bearing for the rear axle and will also strengthen the plate, as is clearly shown and will be readily understood by reference to Figs. 13 and 17 of the drawings.

While I have shown the gear-disk 99 as being provided with two rows only of teeth 100, arranged in concentric circles, yet it is evident that I may employ any desired number of rows.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a manure-spreader, the combination with the body, having downwardly-extending slots in the upper portion of its sides, of means to convey the manure rearwardly, a bar pivoted at one of its ends to each side of the body, a shaft journaled in the other ends of said bars and adapted to operate in the slots of the body, and pulverizing devices mounted on said shaft, substantially as described.

2. In a manure-spreader, the combination with the body, having downwardly-extending slots in the upper portion of its sides, of means to convey the manure rearwardly, a bar pivoted at one of its ends to each side of the body, a shaft journaled in the other ends of said bars and adapted to operate in the slots of the body, disks mounted on said shaft, and means to rotate said shaft, substantially as described.

3. In a manure-spreader, the combination with the body having downwardly-extending slots in the upper portion of its sides, of means to convey the manure rearwardly, a bar pivoted at one of its ends to each side of the body, a shaft journaled in the other ends of said bars and adapted to operate in the slots, pulverizing devices mounted on said shaft,

and gearing operatively connecting the pulverizer-shaft and rear axle, substantially as described.

4. In a manure-spreader, the combination
5 with the body, of means to convey the manure rearwardly, a rear axle, a longitudinal shaft geared to the conveying means, a pinion slidable on said shaft, a transverse shaft located in rear of said axle, an eccentric-sleeve mounted
10 on said transverse shaft, a toothed-face gear-disk which receives motion from the rear axle and is mounted on said sleeve and which is adapted to mesh with said pinion, a collar mounted on the eccentric-sleeve and having
15 a socket to receive one end of the longitudinal shaft, means to shift the pinion lengthwise on the said longitudinal shaft to throw said pinion in and out of gear with the teeth on the face of the gear-disk, and means connected to the sleeve to throw the gear-disk in
20 and out of operative relation with the rear axle, substantially as described.

5. In a manure-spreader, the combination with the body, of means to convey the manure
25 rearwardly, a beater journaled at the rear end of the body, a shield having supporting-arms pivotally secured at the rear end of the body, a rear axle on the lower portion of the body, a transverse shaft on the body near said axle,
30 an eccentric-sleeve rotatably mounted on said transverse shaft and provided with an arm, a main sprocket-wheel on the sleeve and geared to the beater-shaft, a pinion on said sleeve so as to turn thereon in unison with the sprocket-wheel, a main gear on the rear axle to engage
35 said pinion, a hand-lever fulcrumed on the front portion of the body, a rod connected at one of its ends to the hand-lever below its fulcrum-point and at its other end to the arm of the eccentric-sleeve, another rod connected at
40 one of its ends to said lever above its fulcrum-point and loosely connected at its other end to one of the arms of the shield whereby the driving mechanism for the beater will be thrown into gear and the shield raised by one
45 movement of said lever, substantially as described.

6. In a manure-spreader, the combination with the body, of means to convey the manure
50 rearwardly, a beater journaled at the rear end of the body, a shield having supporting-arms pivotally secured at the rear end of the body, an eyebolt swiveled on one of its arms above its pivot-point, a rear axle on the lower portion of the body, a transverse shaft on the
55 body near said axle, an eccentric-sleeve rotatably mounted on said transverse shaft and provided with an arm, a main sprocket-wheel on the sleeve and geared to the beater-shaft, a pinion on said sleeve, a main gear on the rear axle to engage said pinion, a hand-lever fulcrumed on the front portion of the body, a rod connected at one of its ends to the hand-lever below its fulcrum-point and at its other
60 end to the arm of the eccentric-sleeve, an-

other rod connected at one of its ends to said lever above its fulcrum-point and having its rear portion loosely located in the eye of the bolt on the arm of the shield, an enlargement or stop located on the rear portion of the last-named rod in front of the said bolt, whereby the driving mechanism for the beater will be thrown into gear and the shield raised by the movement of said lever in one direction, substantially as described. 70

7. In a manure-spreader, the combination with the body, of a shield having a supporting-arm at each of its ends pivoted to the rear portion of the body, a lever fulcrumed on the front portion of the body, a rod having on its rear portion an enlargement or stop, said rear portion loosely connected to one arm of the shield and the front portion of said rod to the said lever, whereby the movement of the lever in one direction will cause the enlargement or stop on the rod to engage the connection with the arm of the shield and thereby raise the latter, after which the lever may be operated without actuating the shield until it is again lowered, substantially as described. 75 80 85 90

8. In a manure-spreader, the combination with the body, of a shield having a supporting-arm at each of its ends pivoted to the rear portion of the body, an eyebolt swiveled on one of said arms above its fulcrum-point, a lever fulcrumed on the front portion of the body, a rod connected at its front end to said lever and having its rear portion loosely located in the eye of the bolt on the arm of the shield, an enlargement located on the rear portion of said rod in front of said bolt, whereby the movement of the lever in one direction will cause the enlargement or stop on the rod to engage said bolt and thereby raise the shield after which the lever may be operated without actuating the shield until it is again lowered, substantially as described. 95 100 105

9. In a manure-spreader, the combination with the body, of a beater journaled at its rear end, gearing to rotate the beater, means at the bottom of the body to convey the manure rearwardly, a mechanism to operate the conveying means, a shield pivotally secured near the beater, a shaft transversely journaled on the front portion of the body, a hand-lever rigidly mounted on one end of said shaft, a crank rigidly secured on the other end of said shaft, a rod secured at one of its ends to said lever below its fulcrum and at its other end to a portion of the gearing for the beater, another rod secured at one of its ends to said lever above its fulcrum and having its rear portion loosely connected to the shield, an enlargement or stop located on the rear portion of the last-named rod in front of the connection therefor with the shield, and a rod connected at one of its ends to the aforesaid crank and at its other end to a portion of the mechanism for operating the conveying means, substantially as described. 110 115 120 125 130

10. In a manure-spreader, the combination with the body, of a beater journaled at its rear end, gearing to rotate the beater, means at the bottom of the body to convey the manure rearwardly, a mechanism to operate the conveying means, a shield pivotally secured near the beater, a shaft transversely journaled on the front portion of the body, a hand-lever rigidly mounted on one end of said shaft, a crank rigidly secured on the other end of said shaft, a rod secured at one of its ends to said lever below its fulcrum and at its other end to a portion of the gearing for the beater, another rod secured at one of its ends to said lever above its fulcrum and having its rear portion loosely connected to the shield, an enlargement or stop located on the rear portion of the last-named rod in front of the connection therefor with the shield, a rod connected at one of its ends to the aforesaid crank and at its other end to a portion of the mechanism for operating the conveying means, another rod connected at one of its ends to a portion of the mechanism for operating the conveying means and having its rear portion loosely connected to the shield, and an enlargement on the rear portion of the last-named rod to en-

gage its connection therefor with the shield, substantially as described.

11. In a manure-spreader, the combination with a shield having pivoted supporting-arms, of an eyebolt swiveled on one of said arms, a rod loosely located near one of its ends in the eye of said bolt, an enlargement located on the said rod near said bolt and adapted to engage the same, and means near the other end of said rod to move it longitudinally, substantially as described.

12. In a manure-spreader, the combination with a shield having pivoted supporting-arms, of a rod loosely connected near one of its ends to one of the arms of the shield, an enlargement or stop located on the said rod near said connection and adapted to engage the same, and means to move the rod longitudinally whereby the shield will be raised in the initial movement of the rod and thereafter said rod may be moved for the purpose of performing other functions without actuating the shield, substantially as described.

LE GRAND KNIFFEN.

Witnesses:

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