

No. 807,622.

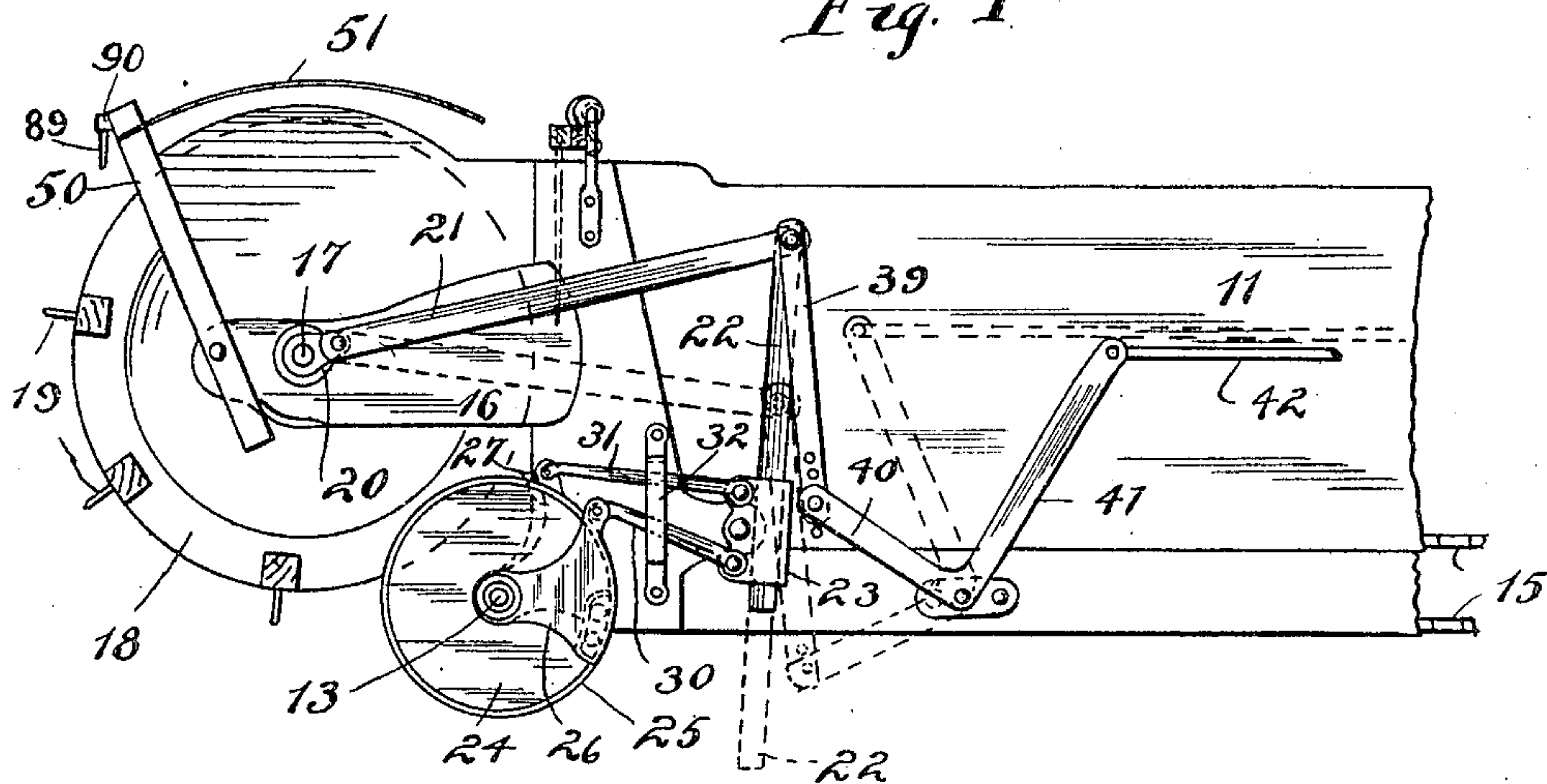
PATENTED DEC. 19, 1905.

LE GRAND KNIFFEN.  
MANURE SPREADER.

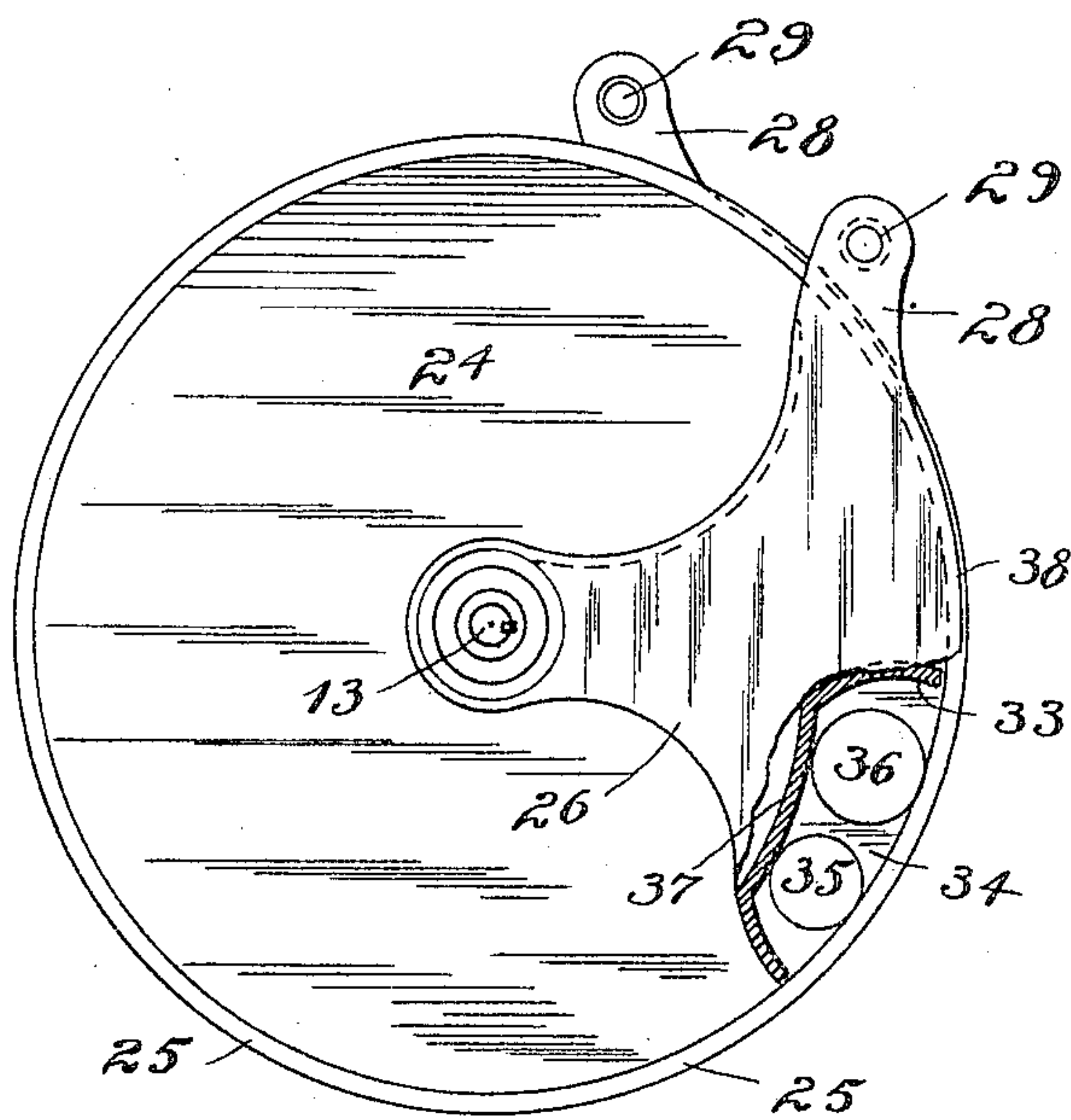
APPLICATION FILED MAR. 30, 1904.

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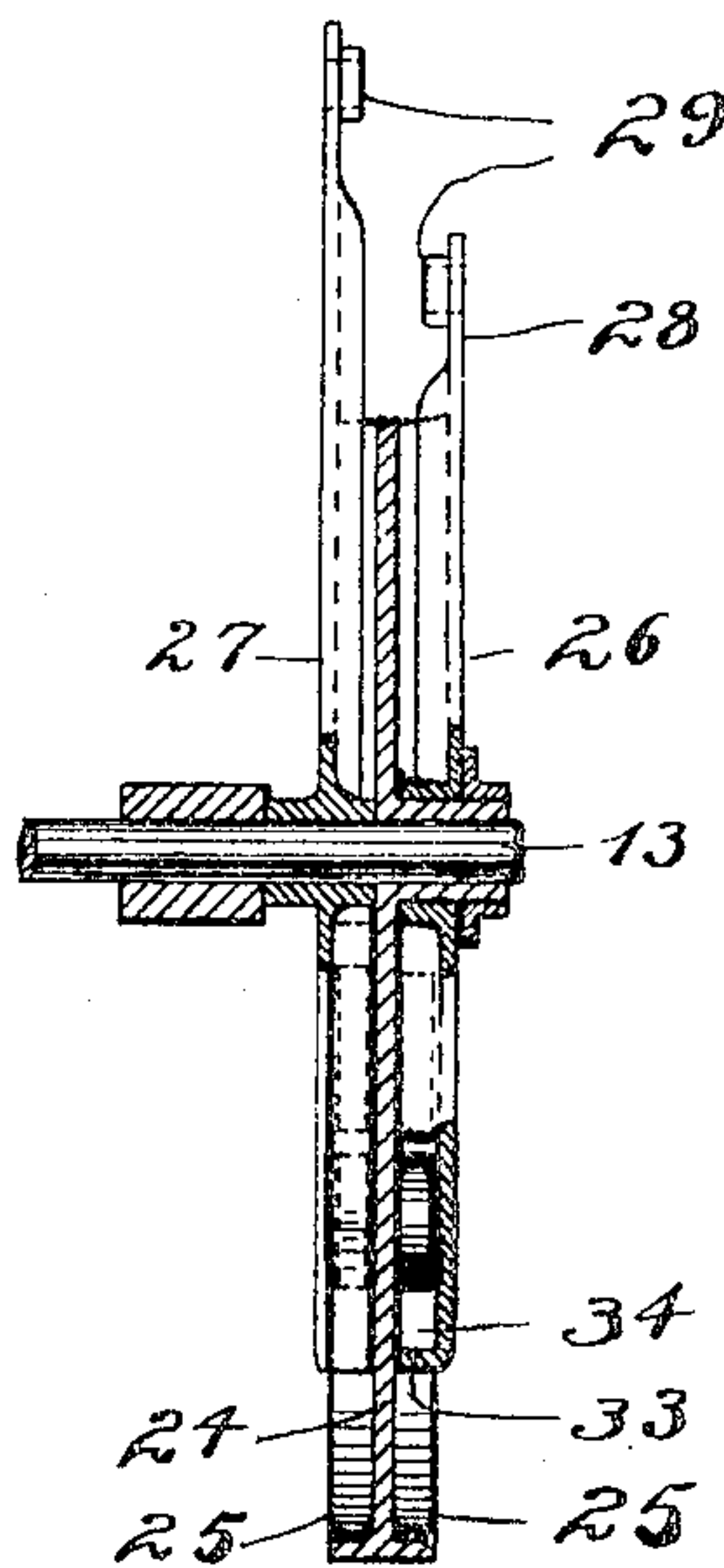
Fig. 1.



*Fig. 2*



*Fig. 3*



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2 SHEETS—SHEET 2.

Fig. 4

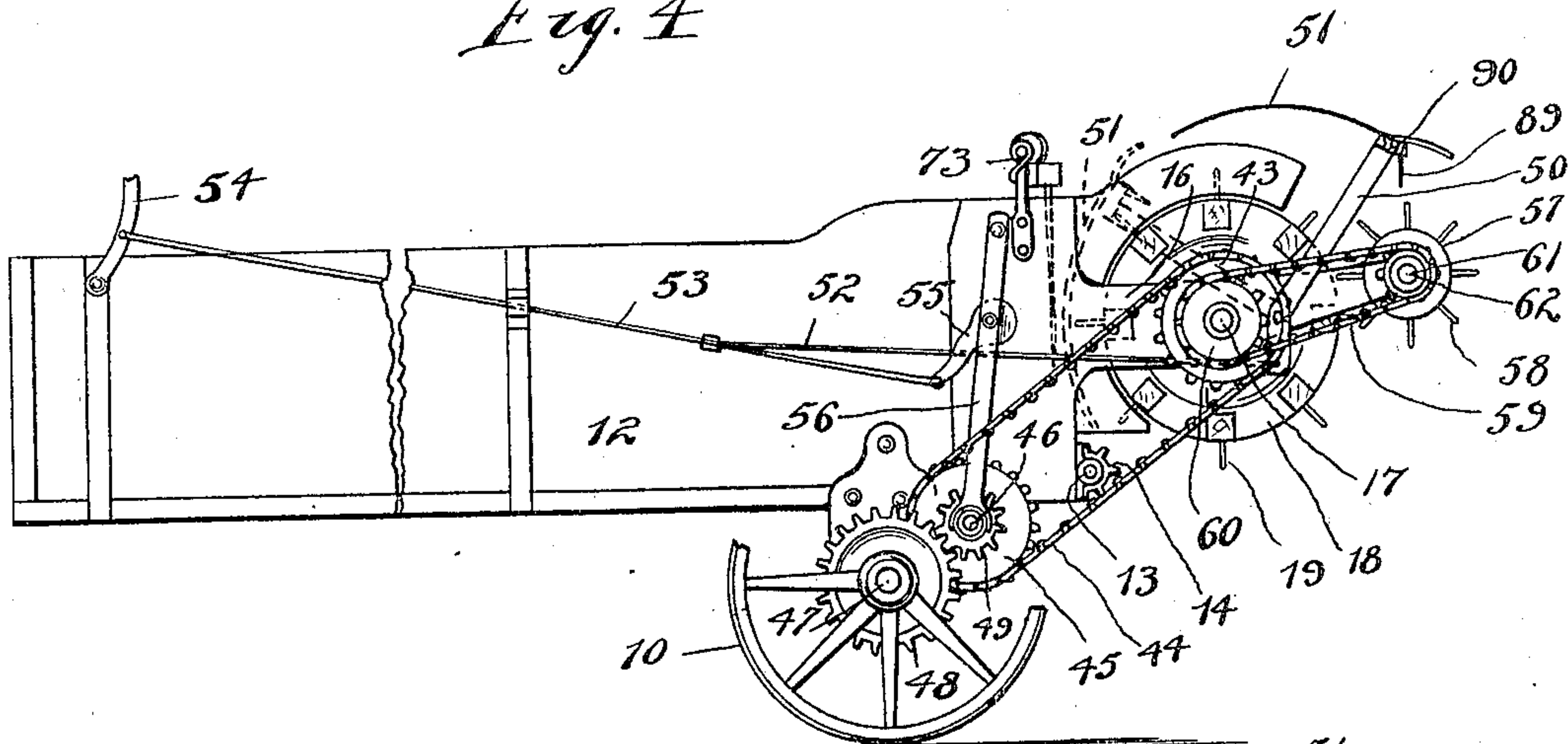


Fig. 5

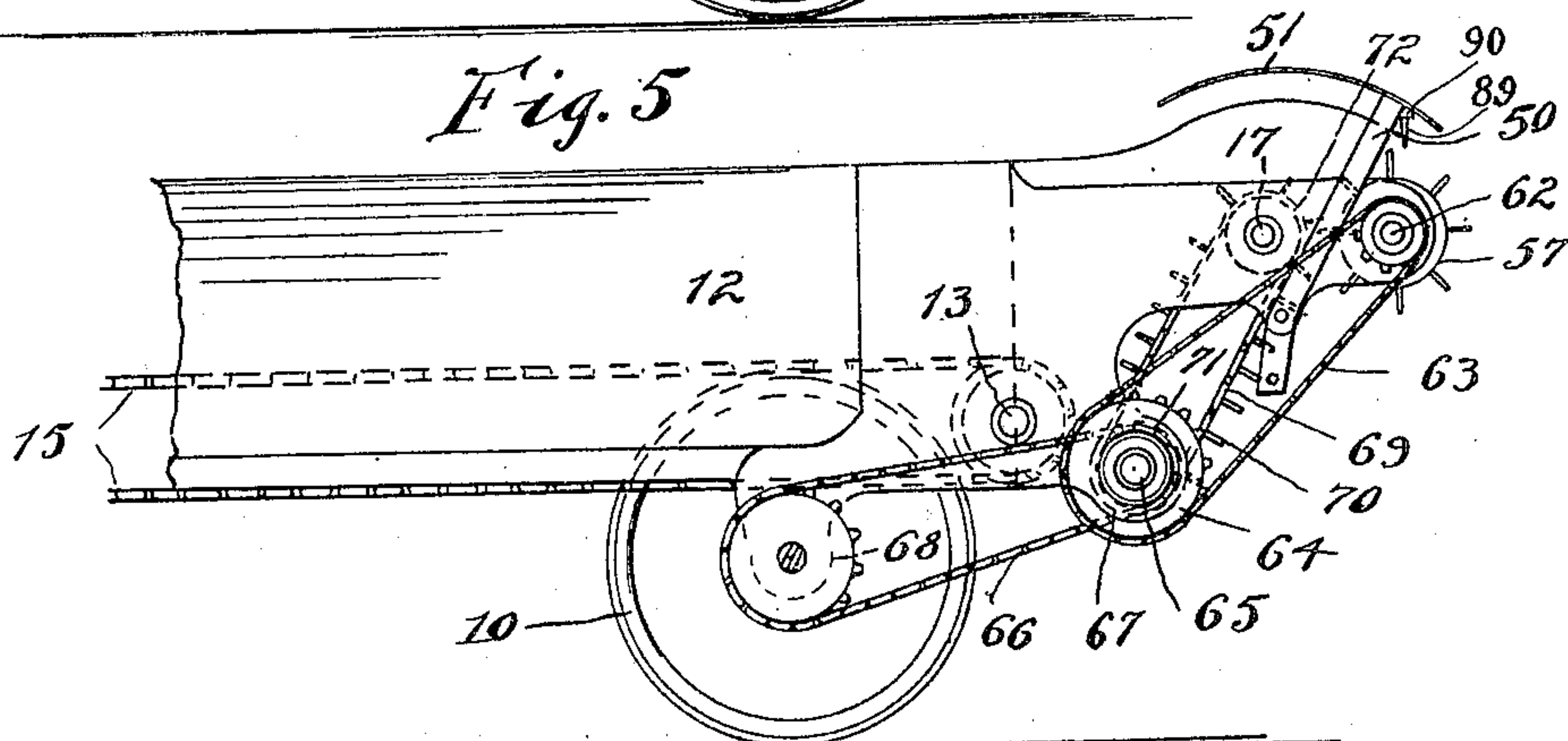


Fig. 7

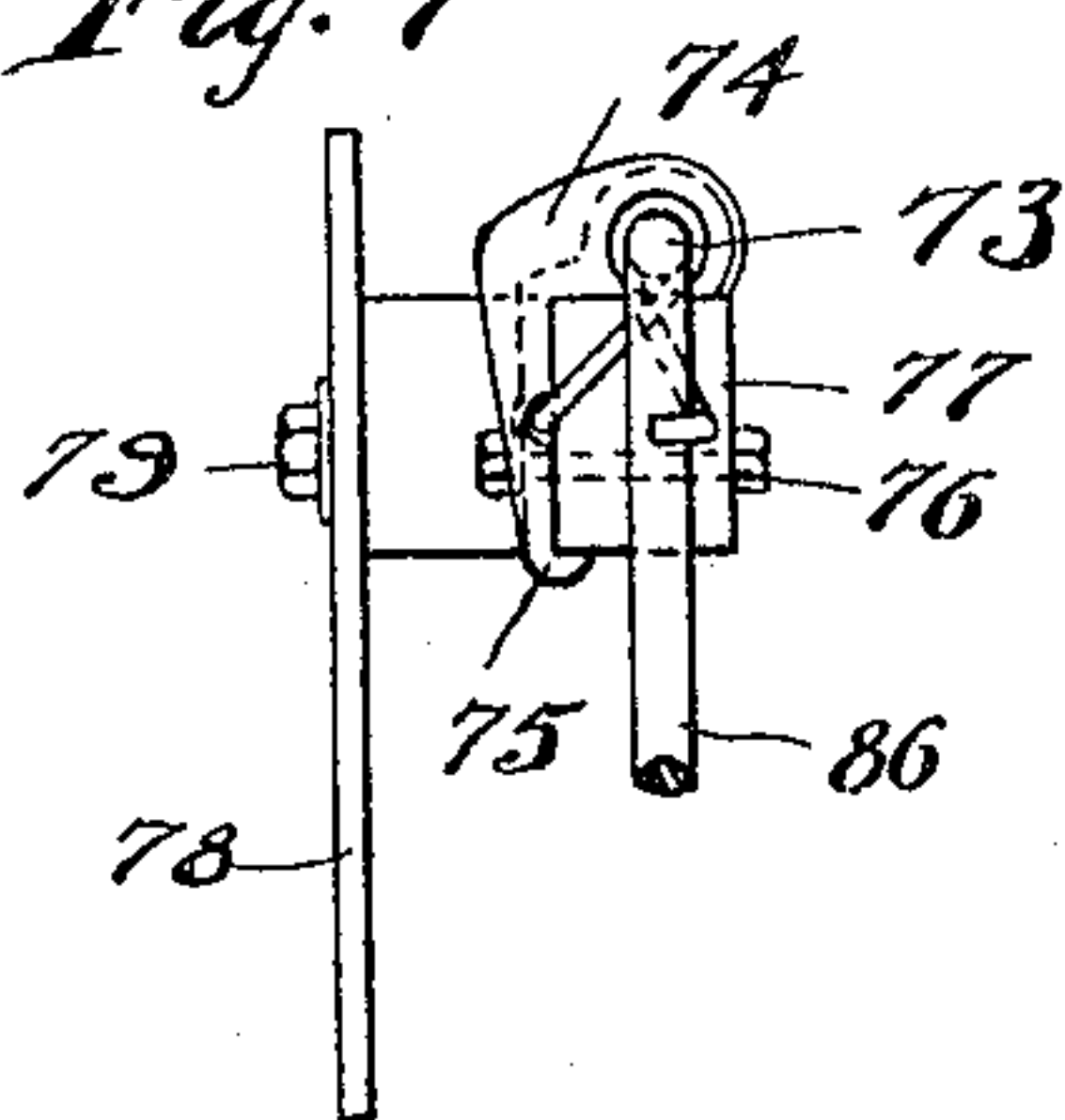


Fig. 6

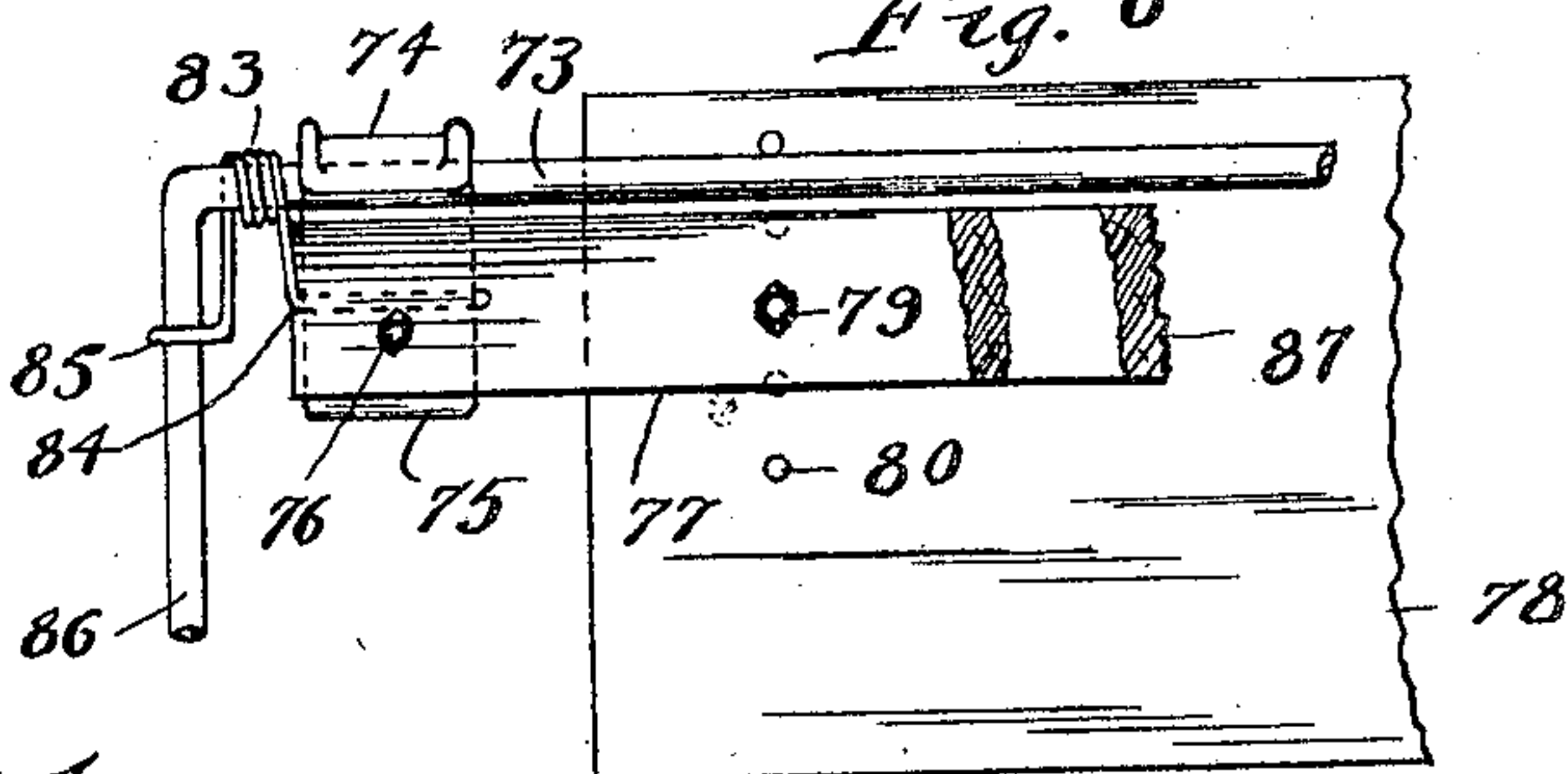
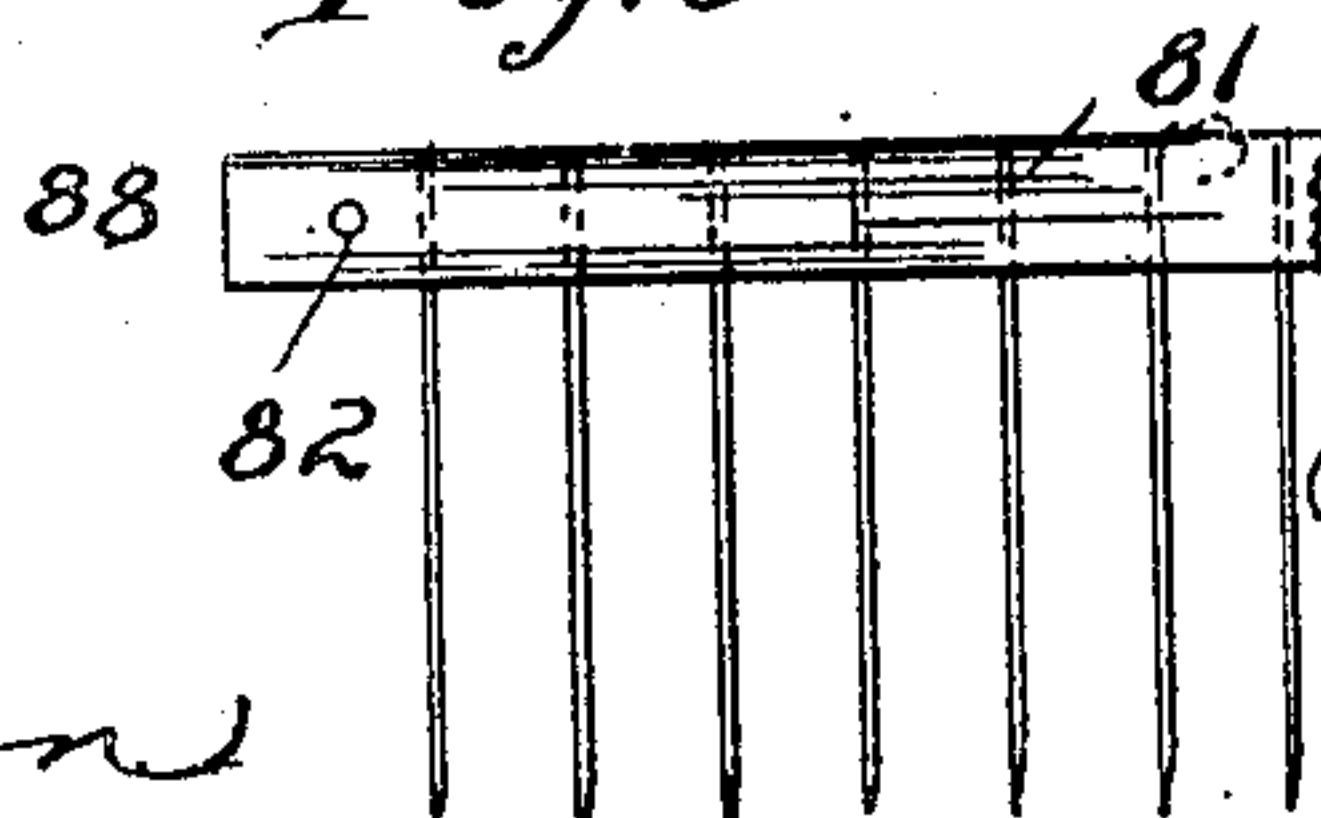


Fig. 8



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# UNITED STATES PATENT OFFICE.

LE GRAND KNIFFEN, OF CHICAGO, ILLINOIS.

## MANURE-SPREADER.

No. 807,622.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Application filed March 30, 1904. Serial No. 200,701.

*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 has relation to improvements in an apparatus for spreading manure and compost or distributing the various kinds of fertilizers used for enriching land, and especially to that class of such machines in which a rearwardly-traveling conveyer located at or in the lower portion of a wagon body or box is employed for carrying the material to the rear end of the body for distribution by means of suitable mechanism operated through connections with the traction-wheels of the vehicle on which the body or box is mounted.

The conveyers for the manure or material employed in the above-named type of machines are either of the endless kind, which are caused to travel in one direction only—*i. e.*, rearwardly—or are of the reciprocating sort, which carry either an end-gate at their front ends to push or transverse scrapers or bars to engage the load, so as to present it to the distributing mechanism at the rear end of the body.

My present invention consists in part in a manure-spreader having improved means for driving and regulating the rate of speed of the conveyer be it of the endless or reciprocating type, whereby the operation will be noiseless and more positive than heretofore accomplished.

The invention also consists in a manure-spreader having devices at the rear end of the body to receive or engage the material and uplift it as it is carried to the rear by the conveyer, to the end that it may be disintegrated and more satisfactorily distributed.

The invention also contemplates the employment in a manure-spreader of a retarding device located at the rear portion of the body to prevent the material being fed too freely to the distributing mechanism.

The invention further contemplates certain novel features of the construction, combination, and arrangement of the several parts of the machine, whereby certain important advantages are attained and the machine is made more convenient for use than various other forms of such machines heretofore designed, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings, which serve to illustrate my invention, Figure 1 is a view in side elevation of the rear portion of the body of a manure-spreader, showing my improved frictional mechanism for operating the conveyer. Fig. 2 is an enlarged view in elevation of the friction-wheel employed in said operating mechanism, showing one of the segmental plates broken away to disclose the friction-rollers and receptacle therefor. Fig. 3 is an edge view, partly in section and partly in elevation, thereof. Fig. 4 is a view in elevation of the opposite side of the body of the manure-spreader from that shown in Fig. 1 and illustrating one form of the uplifting, disintegrating, and distributing mechanism. Fig. 5 is a similar view of like parts, showing a modification of the construction in said mechanism. Fig. 6 is a fragmental view of one form of a retarder, showing it detached. Fig. 7 is an end view thereof, and Fig. 8 is a detached fragmental view of a modified form of a portion of the retarder.

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

The running-gear of the wagon or machine may be of the ordinary or any preferred construction and is represented by the reference-numeral 10 and has mounted thereon a box or body having sides 11 and 12, on the rear portion of which is respectively mounted the mechanism for operating the conveyer and the driving-gear for the machine as well as for the disintegrating and distributing mechanism. Transversely journaled on the rear lower portion of the sides 11 and 12 of the body is a conveyer-shaft 13, on which are mounted near each of its ends sprocket-wheels 14 to engage suitable means, such as sprocket-chains on the conveyer 15, to cause the same to travel rearwardly, so as to carry the manure or material to the rear end of the body. In the present instance I have shown the conveyer 15 as being of the endless type, which may pass over a shaft or roller (not shown) transversely journaled on the front portion of the body in the well-known manner; but I do not desire to be limited to the use of the endless type of conveyer, as I may employ a conveyer adapted to travel rearwardly and then to be reciprocated or returned to its initial position, and such conveyer may carry



an end-gate, which is normally located near the front end of the body, or it may carry scrapers or transverse bars, which move over the floor of the body and push or carry the material to the rear end thereof, without departing from the spirit of my invention.

Transversely journaled on suitable rearwardly-extending brackets or extensions 16 on the rear ends of the sides of the body is a shaft 17, on which is mounted a drum or cylinder 18, provided with a series of radial teeth or spikes 19 to engage the manure or material as it is fed rearwardly by the conveyer. One end of the shaft 17, which I will term the "auxiliary distributing-shaft," is provided with a crank 20, to which one end of a pitman 21 is pivotally secured. The other end of this pitman is secured to the upper portion of a sliding and vibrating bar 22, which passes through a rocker-box 23, pivotally secured to one side of the body at a proper point in advance of the shaft 13 or rear conveyer-shaft, on the end of which is rigidly mounted a friction-wheel 24, which has a peripheral flange 25 on each of its surfaces. Loosely mounted on the outer surface of the friction-wheel 24 is a plate 26, which is preferably segmental, and similarly mounted on said shaft near the inner surface of said wheel 24 is another plate 27, which is also preferably segmental in shape. Each of these plates has an extension or arm 28, which projects upwardly beyond the periphery of the friction-wheel 24 and is provided with a pin or stub-shaft 29, as is clearly shown in Figs. 2 and 3 of the drawings. Pivotally secured at one of its ends to the extension or arm 28 on the outer plate 26 is a pitman 30, which is pivotally secured at its other end to the lower rear portion of the rocker-box 23, and pivotally secured at one of its ends to the arm 28 of the plate 27 is a pitman 31, the other end of which is pivotally secured to the upper portion of said rocker-box. These pitmen are protected and held in operative position one above the other by means of a strap 32, secured at its ends on one side of the body of the machine. The plates 26 and 27, as before stated, are preferably segmental in shape and are of the same construction—that is, the inner surface of each plate is provided with and carries a casing 33, which together with the annular flanges 25 of the friction-wheel 24 comprise receptacles 34 for one or more friction-rollers 35 and 36, which are loosely located in said receptacles. By reference to Figs. 1 and 2 it will be seen that the plates 26 and 27 are mounted around the shaft 13, so that their arms or extensions 28 will be out of alinement, and it will also be observed by reference to the last-named figure that the casings 33 are contracted toward their lower portions and have their inner walls or those adjacent to the shaft 13 slightly curved, as at 37, thus holding the rollers 35 and 36 when more than one

is used at a slight distance apart. This contracted form of each of the casings 33 will permit of the free downward movement of the plates 26 and 27, yet will cause the friction roller or rollers held therein to immediately and positively impinge the peripheral or annular flanges of the friction-wheel on the slightest upward movements of said plates. While I have shown in Figs. 1 and 2 of the drawings two friction-rollers located in the receptacle 33 and one of them larger than the other and prefer to use a plurality of such rollers, so that if one should be prevented by reason of dust or other substances collecting in the receptacle performing its function of impinging the flange 25 of the friction-wheel properly the other one will do so, yet I do not desire to be limited to the use of two rollers in each of said receptacles, as I may employ one or more in each or both of said receptacles, or may employ one roller only in one of the receptacles and a plurality in the other. The casing 33 on each of the plates 26 and 27 is interposed between the inner surface of each of said plates and the respective faces of the friction-wheel 24 in such a manner that the peripheral edges 38 of the plates will overlap the edges of the flanges 25, thus excluding dust and other substances from the receptacles, as is apparent. Pivotally secured at its upper end to the upper portion of the vibrating bar 22 is a bar 39, the lower portion of which is adjustably and pivotally connected to the shorter arm 40 of a bell-crank lever, which is fulcrumed on the lower portion of the body at a suitable point in advance of the rocker-box. The longer arm 41 of the bell-crank lever is united by means of a rod 42 to an operating-lever (not shown) fulcrumed on the front portion of the body, which lever is employed for regulating the speed of the conveyer, and thereby the rate of feed to the distributing mechanism. When the parts are in the positions shown by continuous lines in Fig. 1, it is apparent that the rocker-box will have a short oscillating or rocking movement, which, through the medium of the pitmen 30 and 31 and the plates 26 and 27 and their friction-rollers, will rotate the wheel 24 and shaft 13 very slowly, thus giving a slow movement to the conveyer, and thereby furnishing a slow rate of feed. By throwing the parts rearwardly, so as to cause them to assume the positions indicated by dotted lines, the rocker-box will have a longer stroke, thus causing the friction-wheel and conveyer to be moved more rapidly and the rate of feed increased. By the use of this mechanism it is evident that a continuous, positive, and noiseless movement of the conveyer is afforded and that said movement may be regulated so as to feed the manure or material to the distributing mechanism as desired.

Mounted on that end of the auxiliary dis-



tributing-shaft 17 adjacent to the side 12 of the body is a sprocket-wheel 43, over which passes a belt or sprocket-chain 44, which also passes over a main sprocket-wheel 45, mounted on a shaft 46 near the rear axle 47, which is provided with a gear-wheel 48, which meshes with a pinion 49, journaled on the shaft 46, which pinion has on its inner surface a clutch-face to engage a clutch-face on the outer surface of the main sprocket-wheel 45. The construction of the gears 45, 48, and 49 and the means for throwing them into and out of gear is similar to that shown and described in Patent No. 729,189, issued to me on the 26th day of May, 1903, for improvements in manure-spreaders, and as I will not herein make any claim specific to said parts and as other means may be employed for driving the auxiliary beater-shaft and for throwing the machine in and out of gear it is deemed unnecessary to describe said means in detail.

Pivotaly secured at their lower ends to the extensions 16 on the rear ends of the sides of the body are arms 50, which support at their upper ends a curved shield 51, which is shown by continuous lines in its raised position and by dotted lines in its lowered position, in which latter position it will act as a shield or protector for the distributing mechanism while the body is being loaded and in the former position as a wind-brake to prevent the lighter particles of the manure being scattered or blown away by the wind. One of the arms 50 of this shield is connected, by means of a rod 52, to a rod 53, which is connected at its front end to a hand-lever 54, fulcrumed on the front portion of the body and employed for raising and lowering the pivotal shield, as well as for throwing the driving mechanism in and out of gear. The rear end of the rod 53 is connected to a cam-lever 55, which operates on the bar 56 so as to move the pinion 49 back and forth on the shaft 46, so that its clutch-face will engage or be disengaged from the clutch-face on the main sprocket-wheel 45, as before stated.

Transversely journaled at the rear of the auxiliary cylinder 18 is a distributing-cylinder 57, which is provided with teeth 58 and is geared to the shaft 17 by means of a sprocket-chain 59, which passes over a sprocket-wheel 60 on the shaft 17 and a smaller sprocket-wheel 61 on the shaft 62 of the distributing-cylinder, thus causing the said cylinder to run at a higher rate of speed than that of the auxiliary cylinder. In some instances, however, I may not use the distributing-cylinder 57; but in order to properly disintegrate or break up the manure or material before it is distributed I prefer to use both cylinders which I have shown in Fig. 4 of the drawings, in which construction it will be understood that the manure or fertilizer will be carried rearwardly by means of the con-

veyer until it approaches the auxiliary cylinder 18, by means of which it will be raised and carried over until it reaches the distributing-cylinder 57, which, as before stated, is driven at a higher rate of speed than the auxiliary cylinder and which by reason of its teeth intermeshing or interlocking with those of the auxiliary cylinder will disintegrate or break up the manure or material and at the same time will properly distribute it.

In Fig. 5 I have shown a modification in the construction of the disintegrating and distributing mechanism which consists in employing the distributing-cylinder 57, which is geared, by means of a belt or chain 63, to a sprocket-wheel 64, mounted on a shaft 65, which is also geared by means of a belt or chain 66, passing over a sprocket-wheel 67 on said shaft, as well as over a sprocket-wheel 68, mounted on the rear axle of the machine. In this modified construction an auxiliary conveyer 69 of the endless type and having teeth 70 passes over rollers 71 and 72, mounted on the shafts 65 and 17, the latter shaft being located above the shaft 65 and in front of the shaft 62, on which the distributing-cylinder is mounted. In using this modified construction it is apparent that the manure or material will pass from the conveyer 15 to the auxiliary conveyer 69 and be uplifted and carried over to the distributing-cylinder 57, by means of which it will be disintegrated and distributed.

In order to prevent the manure or material being fed too freely to the disintegrating and distributing mechanism, I employ an interchangeable spring-actuated retarder which consists of a transverse rod 73, which has its ends downturned and secured to the upper rear portion of the side of the body at a suitable distance in front of the disintegrating and distributing mechanism. Loosely mounted on the rod 73, near each of its ends, is a casting 74, which has secured to its downward extension 75, by means of bolts 76, a cross-bar 77, to which a board 78 may be adjustably secured by means of bolts 79, passing through openings 80 in said board, or, when desired, a rake 81 may be substituted for said board and secured to the cross-bar 77 by means of bolts passing through openings 82 in the rake-head. Coiled around the rod 73, near each of its ends, is a spring 83, which has one of its ends 84 secured between the bar 77 and the downward projection 75 of the casting and its other end 85 outturned to engage the downwardly-bent portions 86 of the said rod, thus yieldingly supporting the retarder board or rake. The said board is intended to be used when lime or other finely-pulverized material is carried in the body and it is obvious that said board may be adjusted on the bar 77 so as to occupy the proper position from the floor or the conveyer of the body. While I



have shown the board 78 provided with a supplementary bar 87, through which the securing-bolts 79 are passed, and which bar will rest on the rear surface of the bar 77, yet I  
5 may sometimes dispense with the bar 87 and secure the board 78 directly to the bar 77, as is apparent. The rake 81 is shown as having a head-piece 88 separate from the bar 77; but  
10 it is evident that said bar may be provided with teeth and the head-piece dispensed with. The rake is intended to be used when the machine is loaded with manure, and it is apparent that when either form of the retarder is employed it will serve to prevent the load  
15 being delivered to the disintegrating and distributing mechanism in too large quantities, yet will yield sufficiently to permit of the proper discharge of the material.

In order to hold the manure after it has  
20 been carried upwardly by means of the auxiliary cylinder 18 or auxiliary conveyer 69, so that the distributing-cylinder 57 may more thoroughly disintegrate or break up the manure, I provide the shield 51 with a series of  
25 downwardly-projecting teeth 89, secured in a bar 90, which extends from the upper end of

one of the supporting-arms 50 for the shield to the other.

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, of disintegrating and distributing mechanism located at the rear end thereof, a rearwardly-movable conveyer located at the bottom of the body, a spring-actuated retarder transversely mounted on the rear portion of the body, and a curved shield pivotally mounted on the rear portion of the body and having on its rear part downwardly-projecting teeth, substantially as described.

2. In a manure-spreader, the combination with the body, of distributing means located at its rear end, a curved shield provided with supporting-arms pivoted on the rear portion of the body and having on its rear part downwardly-projecting teeth, substantially as described.

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Witnesses:

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