

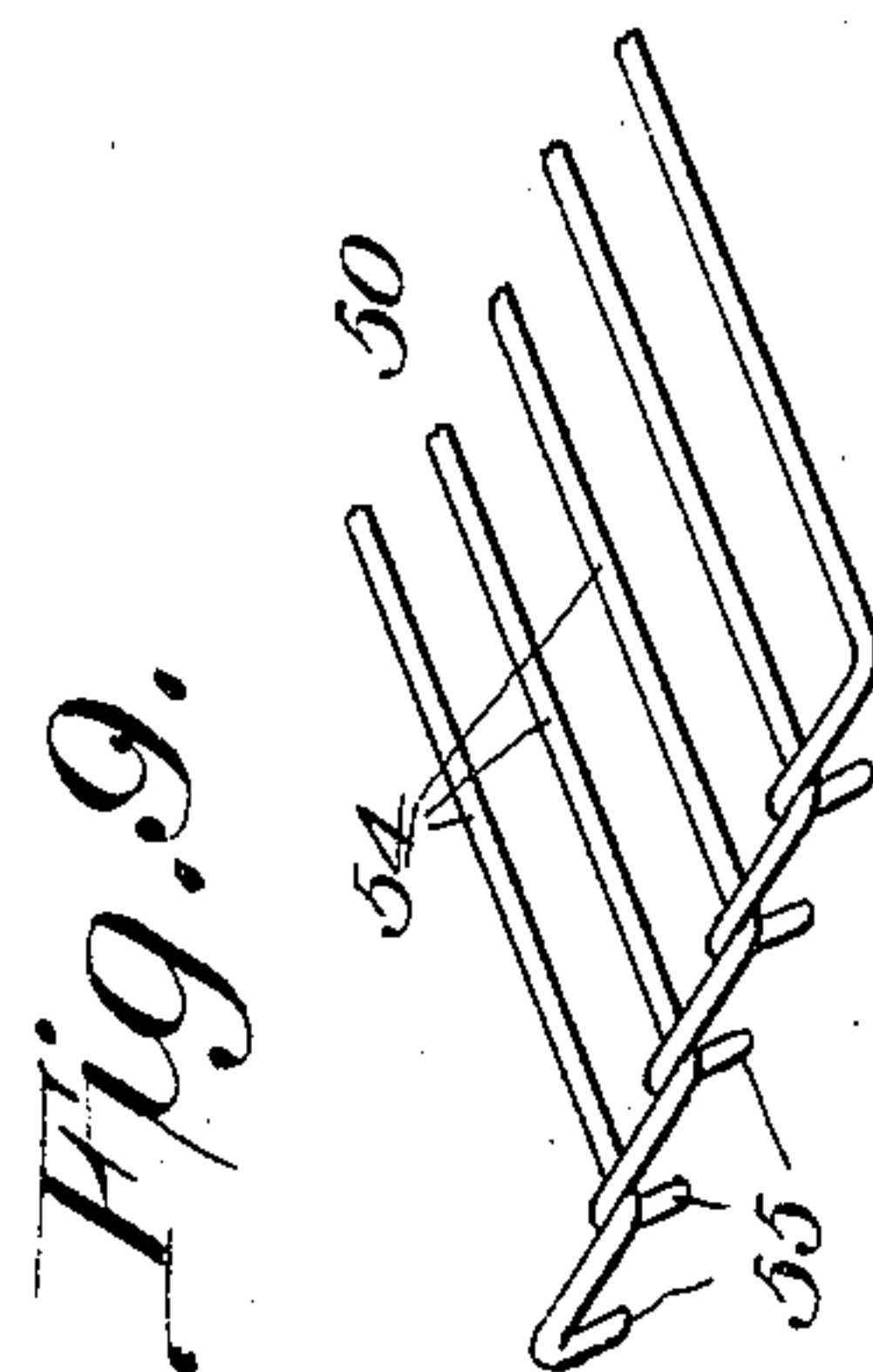
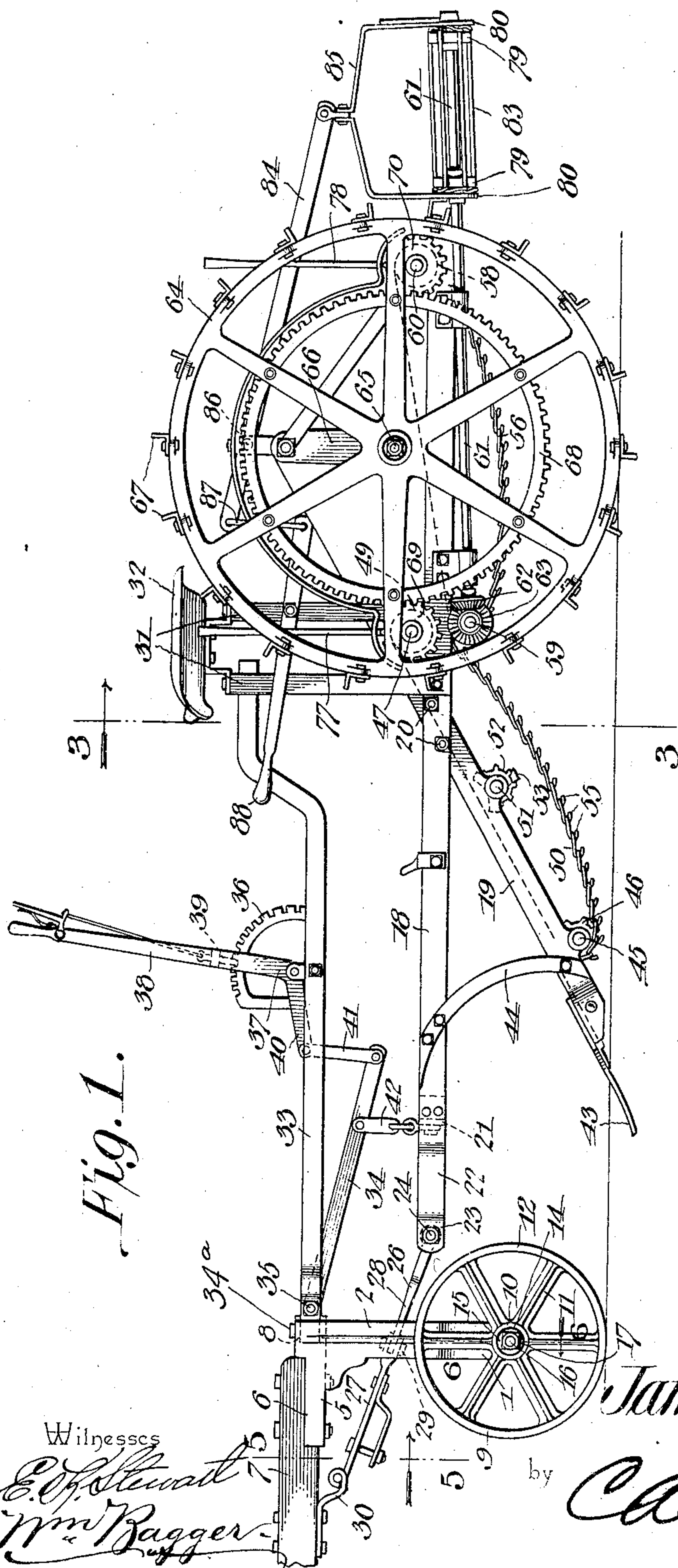
No. 789,839.

PATENTED MAY 16, 1905.

J. COLGROVE.  
POTATO DIGGER.

APPLICATION FILED MAR. 4, 1904.

4 SHEETS—SHEET 1.



Witnesses  
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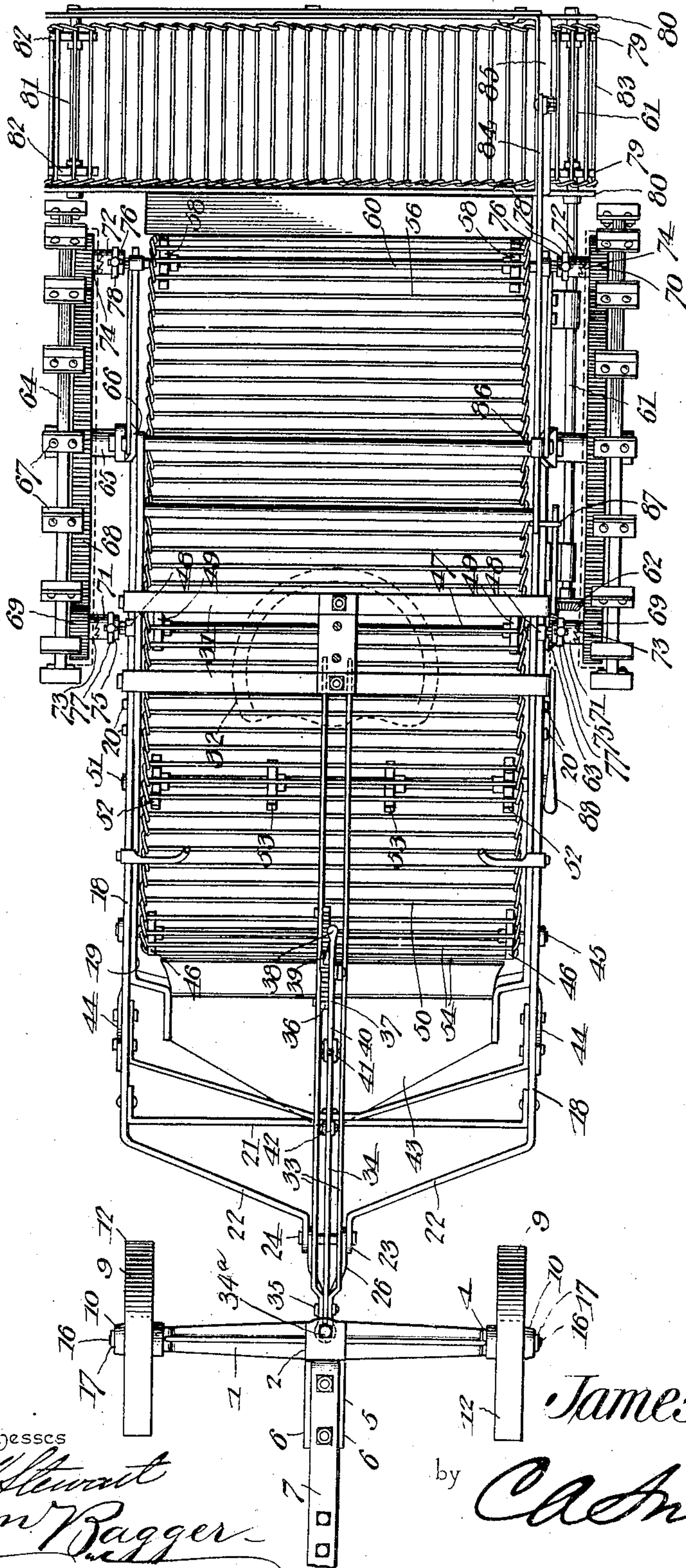


Fig. 2.

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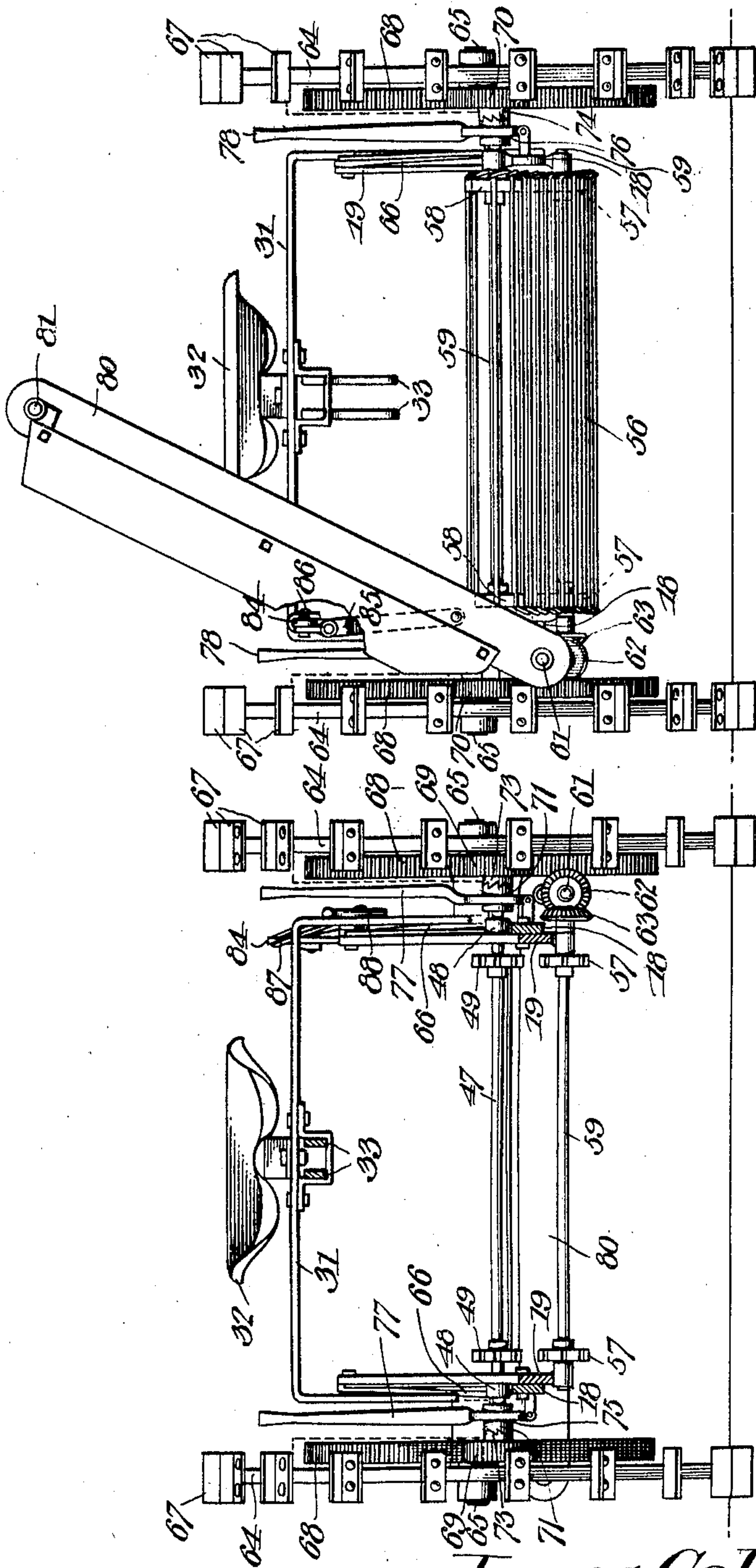


Fig. 4.

Fig. 3.

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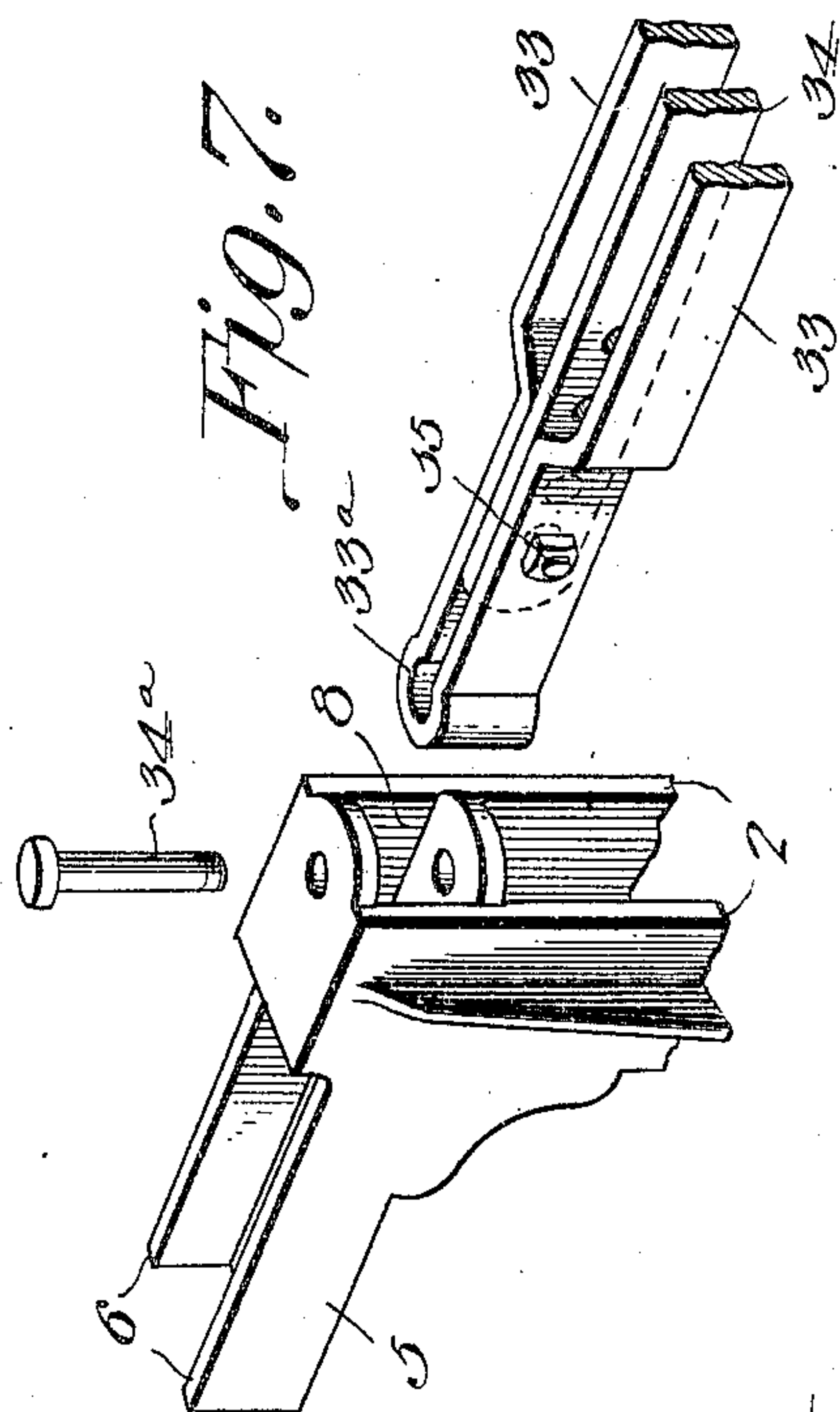


Fig. 7.

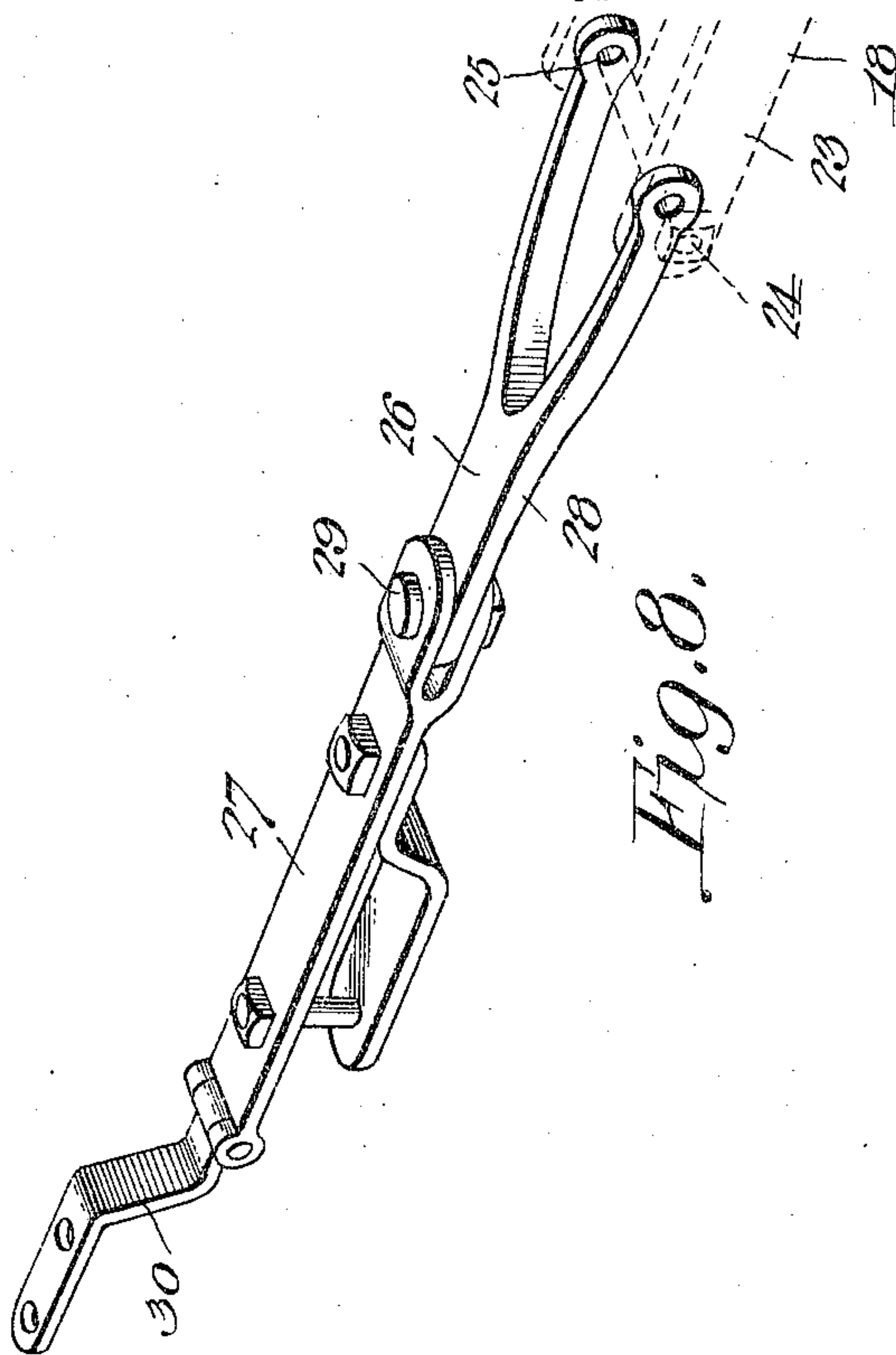


Fig. 8.

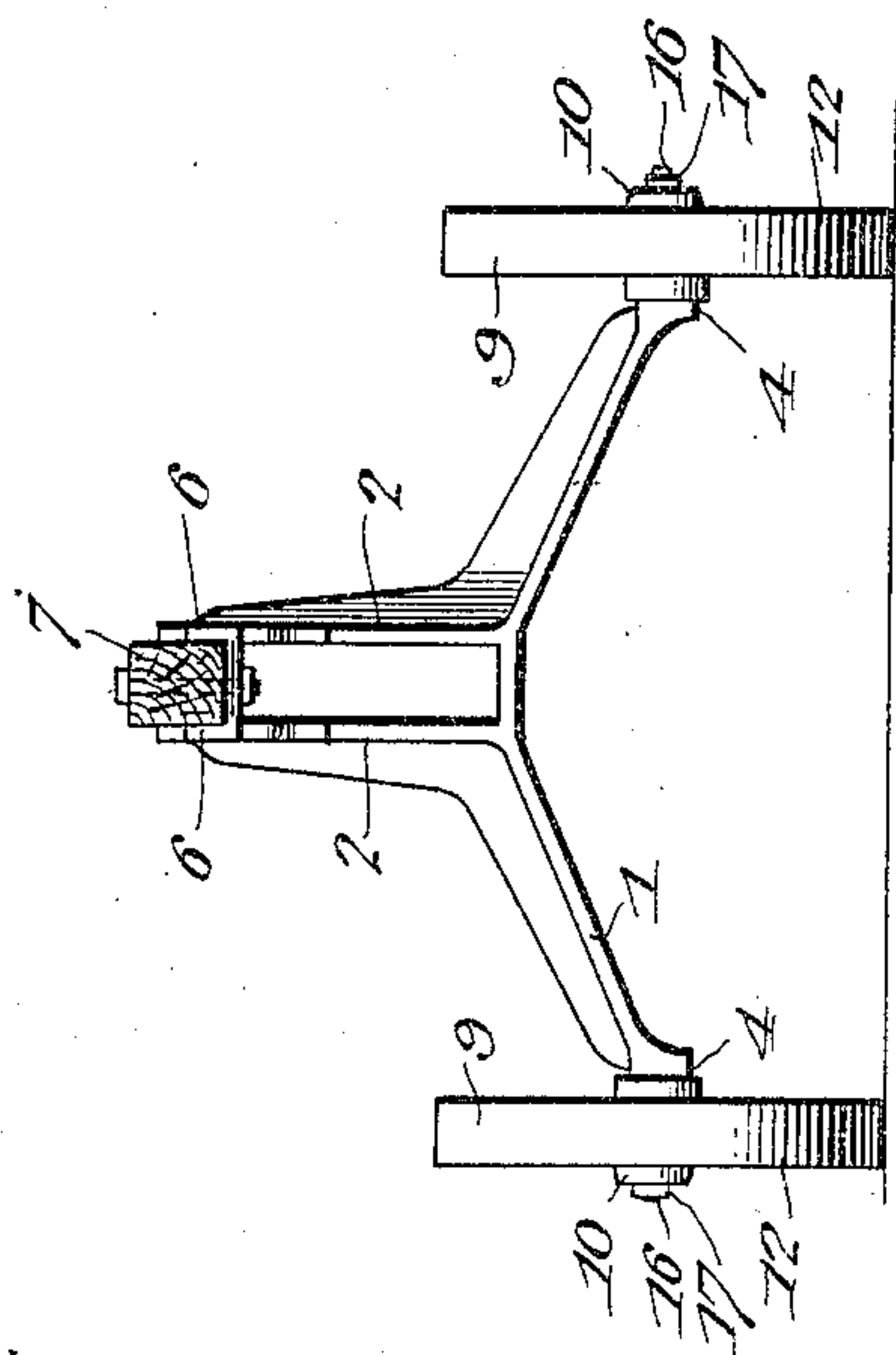


Fig. 5.

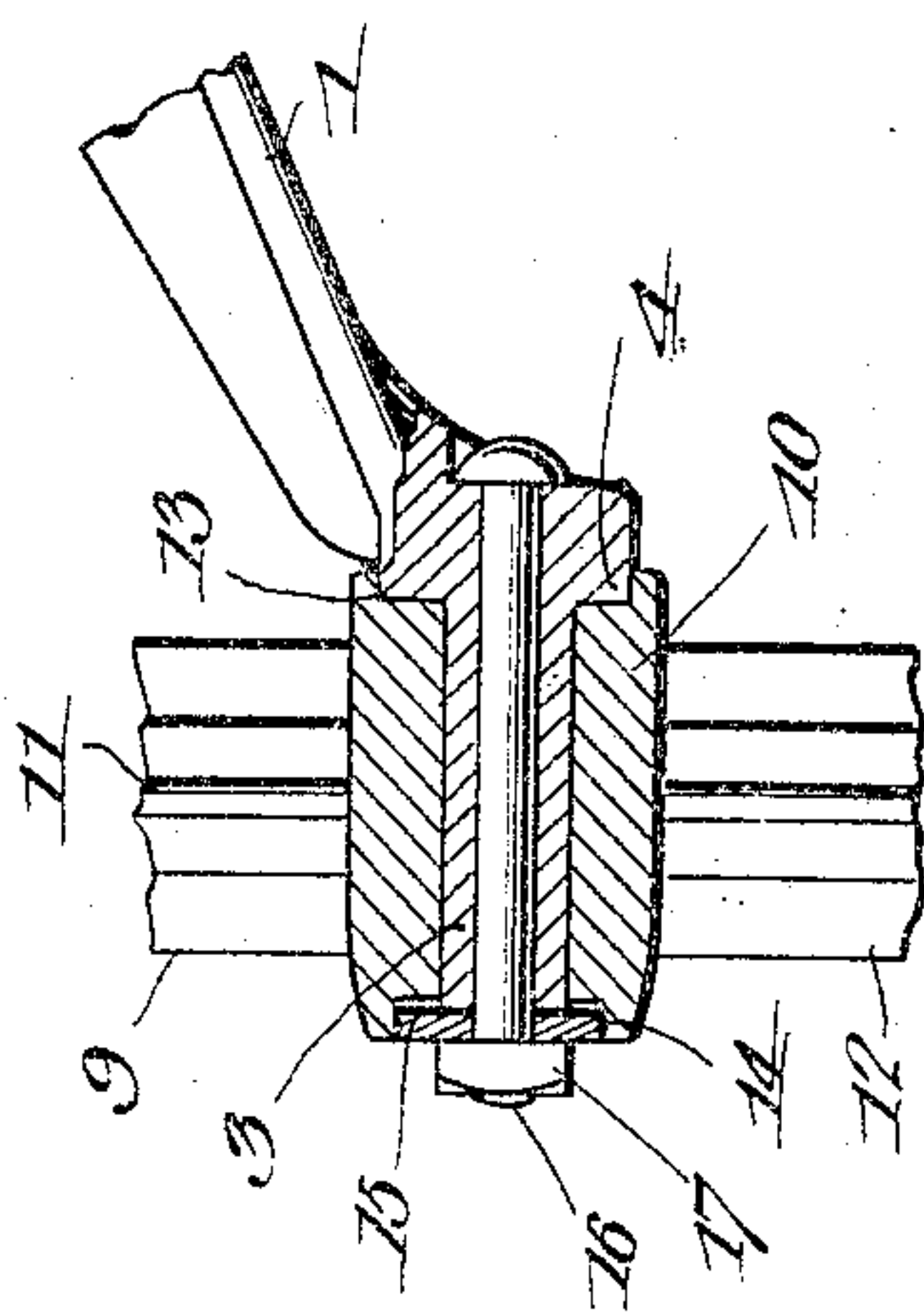


Fig. 6.

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# UNITED STATES PATENT OFFICE.

JAMES COLGROVE, OF ST. CLOUD, MINNESOTA.

## POTATO-DIGGER.

SPECIFICATION forming part of Letters Patent No. 789,839, dated May 16, 1905.

Application filed March 4, 1904. Serial No. 196,611.

*To all whom it may concern:*

Be it known that I, JAMES COLGROVE, a citizen of the United States, residing at St. Cloud, in the county of Stearns and State of Minnesota, have invented a new and useful Potato-Digger, of which the following is a specification.

This invention relates to machines for digging and gathering potatoes; and it has for its object to provide a machine of this class which shall possess superior advantages in point of simplicity, durability, and general efficiency, in which the potatoes dug by the machine shall be carried by endless conveyers to a transversely-disposed endless conveyor at the rear part of the machine, whereby the potatoes shall be deposited at one side of the row, in which the various parts of the machine shall be capable of convenient and proper adjustment, and in which the transversely-disposed conveyor at the rear end of the machine may, when desired, be elevated to and supported in a position where it is temporarily inoperative or be entirely dispensed with.

With these and other ends in view the invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of embodiment of my invention, it being, however, understood that I do not necessarily limit myself to the precise structural details therein exhibited, but reserve the right to such changes, alterations, and modifications as come fairly within the scope of the invention and which may be resorted to without departing from the spirit or sacrificing the efficiency of the same.

In said drawings, Figure 1 is a side elevation of a machine constructed in accordance with the principles of the invention. Fig. 2 is a top plan view of the same. Fig. 3 is a transverse sectional view taken on the line 3 3 in Fig. 1. Fig. 4 is a rear elevation of the machine, showing the transverse carrier elevated. Fig. 5 is a transverse sectional detail

view taken on the line 5 5 in Fig. 1. Fig. 6 is a sectional detail view taken on the line 6 6 in Fig. 1. Fig. 7 is a perspective detail view illustrating the coupling or connection between the front truck and the supporting-bars carrying the adjusting-lever. Fig. 8 is a perspective detail view illustrating the coupling or connection between the main frame and the draw-bar. Fig. 9 is a perspective detail view showing a portion of one of the carriers.

Corresponding parts in the several figures are indicated by similar numerals of reference.

The front supporting-truck of my improved potato-digger consists of a casting comprising an arched axle 1, a pair of spaced parallel uprights 2 merging at their upper ends, tubular spindles 3 at the ends of the axle, said tubular spindles being provided near their inner ends with collars 4, a tongue-support 5 extending forwardly from the upper ends of the uprights 2, said tongue-support being provided, at the sides thereof, with flanges 6, between which the tongue 7 is mounted and securely bolted, provided at its upper end with a recess or lever-support 8, the object of which will be presently understood.

The front supporting-wheels 9 9 are preferably composed of castings comprising the hubs 10, spokes 11, and rims 12. The hubs, which are bored to engage the tubular spindles 3, are provided at their inner ends with recesses 13, engaging the axle-collars 4, and at their outer ends with recesses 14 for the reception of washers 15, mounted upon the bolts 16, which extend from the inner ends through the tubular spindles and which are provided at their outer ends with nuts 17, serving to tighten the washers 15 against the outer ends of the spindles, thereby securing the hubs of the wheels between the latter. By this construction, a sand-proof and dirt-proof joint is provided in an extremely simple and inexpensive manner, as will be readily understood, and the construction, moreover, is one of considerable strength, which will be fully able to resist any strain to which the device in practice may be subjected.

The main frame of the machine is composed



of outer side members 18 and inner side members 19, which cross each other obliquely and which are securely connected together at the points of intersection by means of bolts 20.

5 The side pieces 18 are connected by means of a cross-bar 21, in front of which the said side pieces are bent to converge in the direction of each other, as shown at 22, the front extremities of the said side members being disposed parallel to each other, as will be seen at 23. The said parallel front portions of the side pieces 18 are connected by means of a transverse bolt 24, which extends through an eye 25 at the rear end of the draw-bar 26,

15 which latter is composed of two separate members 27 and 28, the adjacent ends of which are connected by means of a vertical pivot 29, which latter is located between the uprights 2, rising from the axle. The front end of the draw-bar is connected pivotally with a bracket 30, extending downwardly from the tongue 7 near the rear end of the latter. It will thus be noticed that the draw-bar forms a universal-joint connection between the tongue and the frame of the machine whereby the latter may be adjusted vertically at the front end thereof, while the front truck is capable of turning with relation to the frame of the machine to the extent of almost one-quarter turn, and thus enabling sharp turns to be made. The frame of the machine is provided with a seat-supporting bracket or stirrup 31, supporting the seat 32. Suitably connected with this stirrup are the rear ends of a pair of parallel bars 33, which are curved upwardly to enable them to be connected with said stirrup, while the front ends of said bars are made to converge and to embrace between them a lever 34, the said bars being joined together at their front ends, as clearly shown in Fig. 7, and connected with each other by means of a bolt 35, which forms the fulcrum for the lever 34. The front ends of the bars 33 are

45 connected to form an eye 33<sup>a</sup>, engaging the recess 8 and mounted pivotally in said recess by means of a bolt 34<sup>a</sup>. One of the bars 33 supports a toothed quadrant 36, concentrically with which is pivoted a bell-crank lever 37, the long arm of which constitutes a handle 38, carrying a spring-actuated dog or pawl 39, adapted to engage the toothed quadrant. The short arm 40 of the bell-crank lever is connected by a link 41 with the rear end of the lever 34, which latter is connected by a link 42 with the cross-bar 21. It is to be specially noted that the connection of the bars 33 and lever 34 with the supporting-recess 8 by means of the bolt 34<sup>a</sup> is to be sufficiently loose to permit the front truck to be

60 turned with relation to the frame of the machine to the extent of about one-quarter

turn, as hereinbefore described, this being easily accomplished by the construction described.

The side bars 19, which extend obliquely across the side bars 18 of the frame of the machine, are made to converge at the lower front ends to support the shovel or digger 43, which in its preferred form consists of a triangular-pointed inclined plane and the function of which is to dig into the soil under the potatoes, the latter and the dirt being caused to slide upwardly upon the inclined plane of the shovel as the machine progresses. Curved braces 44 connect the side bars 18 with the lower front ends of the side bars 19 in order to brace the shovel and to form a structure of sufficient strength to resist the strain to which it may be subjected.

Suitably journaled between the lower ends of the frame-bars 19 is a shaft 45, carrying sprocket-wheels 46. Another shaft, 47, journaled in bearings 48, carries sprocket-wheels 49.

50 designates an endless conveyer which is guided over the sprocket-wheels 46 and 49 between the upwardly and rearwardly inclined side frame-pieces 19. The latter are also provided with bearings for a shaft 51, carrying idlers 52 and triangular beaters 53, which latter when the machine is in operation contact with the under side of the upper lead of the conveyer 50, agitating the latter and causing the adhering dirt to be separated from the potatoes. These triangular beaters or agitators are used only when the soil is damp and clayey. When the soil is sandy, they may be dispensed with. The endless conveyer 50 is preferably made up of a plurality of rods 54, having hooked ends 55, whereby they are connected to form an endless chain which constitutes the conveyer. While this is the preferred construction, it may be varied, if desired, without departing from my invention.

An endless conveyer 56 of a construction similar to that of the conveyer 50 is mounted upon sprocket-wheels 57 and 58, secured upon shafts 59 and 60, which are journaled in suitable bearings in the side members of the frame of the machine, the shaft 60 being disposed near the rear end of the frame, while the shaft 59 is disposed well forward under the shaft 47, which supports the elevated rear end of the conveyer 50, so that material elevated by the latter shall be dumped or deposited upon the conveyer 56, as will be readily understood. The frame of the machine is also provided with suitable bearings for a longitudinally-disposed shaft 61, the front end of which has a bevel-pinion 62 meshing with a bevel-pinion 63 upon one end of the shaft 59. The rear end of the shaft 61



extends for some distance in rear of the frame of the machine and serves to support one end of a transverse conveyer, which will be presently more fully described.

5 The transporting-wheels of the machine 64 are mounted upon stub-axles 65, which are cast upon or suitably connected with braces 66, which connect the frame members 18 and 19 at each side of the machine. These transporting-wheels are made with a comparatively narrow tread, and to their peripheries are bolted or otherwise suitably secured angle-plates 67, which are of a considerably greater width than the tread of the wheels. The radiating members of these angle-plates serve to cut into and to engage the soil with no possibility of slipping, thus enabling motion to be transmitted from the transporting-wheels to the conveyers of the machine, as will be presently described. The concentric parts of said angle-plates—that is to say, the parts which are bolted or secured to the rims of the wheels and which are therefore concentric with the axle of the latter—are sufficiently wide to engage the surface of the soil and to prevent the rims of the wheels from cutting deeply into the latter. Thus by using wheels with comparatively narrow rims heavy draft is to a large extent avoided, such as would be caused by the clogging of the wheels in wet and loamy soil.

Suitably connected with the transporting-wheels or integral therewith, if desired, are spur-wheels 68, the latter being of course disposed concentrically with the transporting-wheels, as shown. The shafts 47 and 60 are each provided with pinions designated, respectively, 69 and 70, said pinions being mounted loosely upon the respective shafts and in operative engagement with the spur-wheel 68. Upon the shafts 47 and 60, adjacent to the inner sides of the pinions 69 and 70, are feathered clutch members 71 72, adapted to operatively engage correspondingly-shaped clutch-faces 73 and 74 upon the inner sides of the pinions. The clutch members 71 and 72 are provided with annular grooves 75 and 76, which are engaged by forked levers 77 and 78, whereby they may be thrown into and out of engagement with the pinions. It is obvious that when the clutch members are in engagement with the pinions the latter will become locked upon their respective shafts, which being thus rotated by the engagement of the pinions with the spur-wheels will be rotated and transmit motion to the endless conveyers 50 and 56, the movement of the upper lead of each of said conveyers being in a rearward direction.

The longitudinally-disposed shaft 61 is provided upon its rearwardly-extending end with a pair of sprocket-wheels 79, and said

shaft also carries the side boards 80, which are suitably connected with each other to constitute a rectangular frame and which are pivotally connected with the shaft 61. The free ends of the side frame-pieces 80 support a shaft 81, carrying sprocket-wheels 82, which, together with the sprocket-wheels 79, serve to support an endless carrier 83, which is constructed in practice in the same manner as the conveyers 50 and 56, but which, as will be readily seen, is disposed transversely to and below the latter, so as to receive the discharge therefrom.

84 designates a supporting-lever having a yoke 85, the arms of which are suitably connected with the frame-pieces 80, so as to support the conveyer mounted in the casing, composed mainly of said side pieces, in position for operation. The lever 84 is fulcrumed at 86, and it is connected by means of a link 87 with a suitably-arranged hand-lever 88, the end of which is disposed within convenient reach of the operator, who by manipulating said lever may elevate the casing containing the conveyer 83 to the position shown in Fig. 4 of the drawings, where it will be seen it is out of the path of the discharge from the conveyer 56. When the transverse conveyer is thus elevated, it follows that the material passing over the conveyer 56 will be deposited directly upon the ground in rear of the machine.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains. An important feature of the invention is the facility with which the front part of the machine may be raised or lowered, so as to cause the shovel to engage the soil at any desired depth, it being retained in operative position by means of the dog 39, engaging the toothed quadrant 36. The shovel will thus dig under the row of potatoes, which will be elevated, and pass from the said shovel onto the endless conveyer 50, which latter, it will be especially noted, is wider than the shovel, thus causing the matter discharged thereon to be scattered and spread over a considerable surface, whereby the sifting and separation of the dirt from the potatoes is greatly facilitated. From the conveyer 50, which latter in operation may be subjected to the action of the agitators 53, the potatoes, with such dirt and clods as still remain, will be dropped into the conveyer 56, the drop being sufficient to cause clods to be readily broken, so that the dirt may sift through the link-rods constituting the conveyer, while the potatoes are carried rearwardly and discharged over the rear end of the conveyer 56. It will be understood that



the transversely-disposed conveyer 83 may be made of sufficient length and may be disposed at a proper inclination to elevate the potatoes into a wagon, which may be driven alongside the digger. Usually, however, the said conveyer will be only of sufficient length to deposit the potatoes upon the ground at one side of the machine. Now in using the machine it is intended first to operate upon a row which is intermediate two other rows of plants. In other words, the second row of potatoes will be dug before the first one, and the transversely-disposed conveyer while said second row of potatoes is being dug will be elevated to the position shown in Fig. 5, so that the potatoes will be deposited upon the ground in rear of the machine. At the end of the row the machine is turned and caused to operate upon one of the adjacent rows, which will be either the first or the third, counting from the end of the field, according to the side at which the transversely-disposed conveyer is arranged to discharge, the transversely-disposed rear conveyer being now lowered, so as to receive the discharge from the conveyer 56 and deposit the potatoes upon the ground along with the row of potatoes first dug. At the end of the second row operated upon the machine is again turned and the third row is operated upon, with the result that the potatoes dug therefrom are carried to and deposited upon the ground along with the potatoes already excavated, and the machine now proceeds as before, beginning with an intermediate row. It will thus be seen that much labor may be saved in picking or gathering the potatoes, inasmuch as it is necessary to traverse only a single row in order to gather the potatoes dug from three rows, and the potatoes may thus be gathered much more rapidly and easily than if the three rows had to be traversed.

It is obvious that in order to turn at the ends of the rows it is necessary for the machine to make a very sharp turn, and this, by the construction of the front truck and the connection of the same with the frame of the machine, the machine is enabled readily to do. The draft is direct from the tongue upon the main frame of the machine, and the parts are so flexibly connected by the jointed draft-rod that there will be no severe or unnatural strain upon any of the parts. It will be observed that all driven parts of the machine are actuated directly from the spur-wheels connected with the transporting-wheels, thereby securing positive motion and long life to the machine. The general construction is simple, inexpensive, and as light as may be consistent with durability and ability to resist strain and wear.

It is to be specially noted that whenever

desired the transverse carrier at the rear end of the machine may be entirely dispensed with. When this is the case, the potatoes will be deposited directly upon the ground in the track of the machine. A machine without the transverse carrier may obviously be handled with less power than is required to operate the machine when equipped with said transverse carrier, and it may therefore be preferred by small growers.

Having thus described my invention, I claim—

1. A frame consisting of inner and outer side pieces obliquely crossing each other and connected at the point of intersection, rotary supporting means for the rear part of the frame, a front truck, a tongue, supporting means connecting the frame with the truck, and a universally-jointed draw-bar connecting the tongue with the ends of the outer side bars of the frame.

2. A frame consisting of inner and outer side pieces crossing each other obliquely and connected at the point of intersection, a seat-supporting stirrup upon the said frame, a front truck, a tongue, supporting-bars connecting the truck with the seat-supporting stirrup, a lever mounted pivotally between said bars, a cross-bar in the frame, a link connecting said lever with said cross-bar, and means for retaining said lever at various adjustments.

3. A frame consisting of inner and outer side bars crossing each other obliquely and connected at the points of intersection, braces connecting the said inner and outer frame-bars in rear of the points of intersection, said braces having laterally-extending stub-axles, and transporting-wheels mounted upon the latter.

4. A frame consisting of inner and outer side pieces crossing each other obliquely and connected at the points of intersection, a seat-supporting stirrup on said frame, a front truck, supporting-bars connecting the front truck with the seat-supporting stirrup upon the frame, said bars being connected loosely with said truck to permit the latter to turn freely, a lever fulcrumed loosely between the supporting-bars, a link connecting said lever with the frame of the machine, adjusting and supporting means for said lever, and a universally-jointed draft-bar connecting the ends of the outer side pieces of the frame with the tongue.

5. In a potato-digger, a frame having inner and outer side pieces crossing each other obliquely and connected at the points of intersection, a digging implement supported upon the front ends of the inner frame-pieces, shafts journaled in said inner frame-pieces, an endless conveyer supported upon said shafts, shafts journaled in the outer



frame-pieces below and in rear of the upper  
ends of the inner frame-pieces, an endless  
conveyer supported upon said shafts, braces  
connecting the inner and outer side members  
5 of the frame in rear of their points of inter-  
section, stub-axles upon said braces, support-  
ing-wheels upon said stub-axles, spur-wheels  
connected with said transporting-wheels, and  
pinions upon the rear supporting-shafts of

the respective carriers, said pinions meshing 10  
with the said spur-wheels.

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

JAMES COLGROVE.

Witnesses:

ANTON RIELAND,  
N. MUELLER.