

No. 872,159.

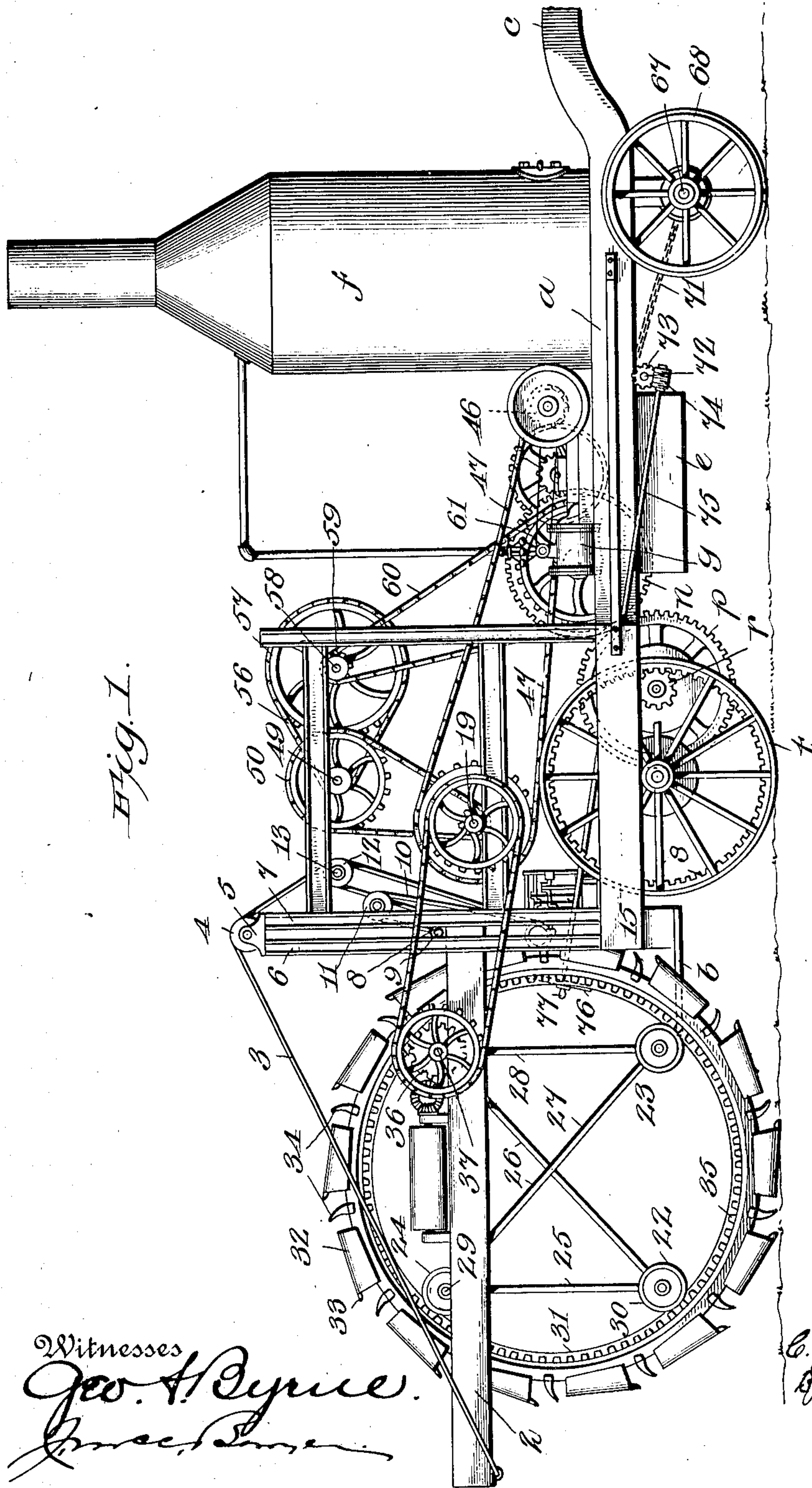
PATENTED NOV. 26, 1907.

C. J. VAN BUREN.

COMBINED SCALPER, EXCAVATOR, ROAD ROLLER, AND LOCOMOTIVE.

APPLICATION FILED SEPT. 12, 1906. RENEWED JUNE 20, 1906.

6 SHEETS—SHEET 1.



Witnesses

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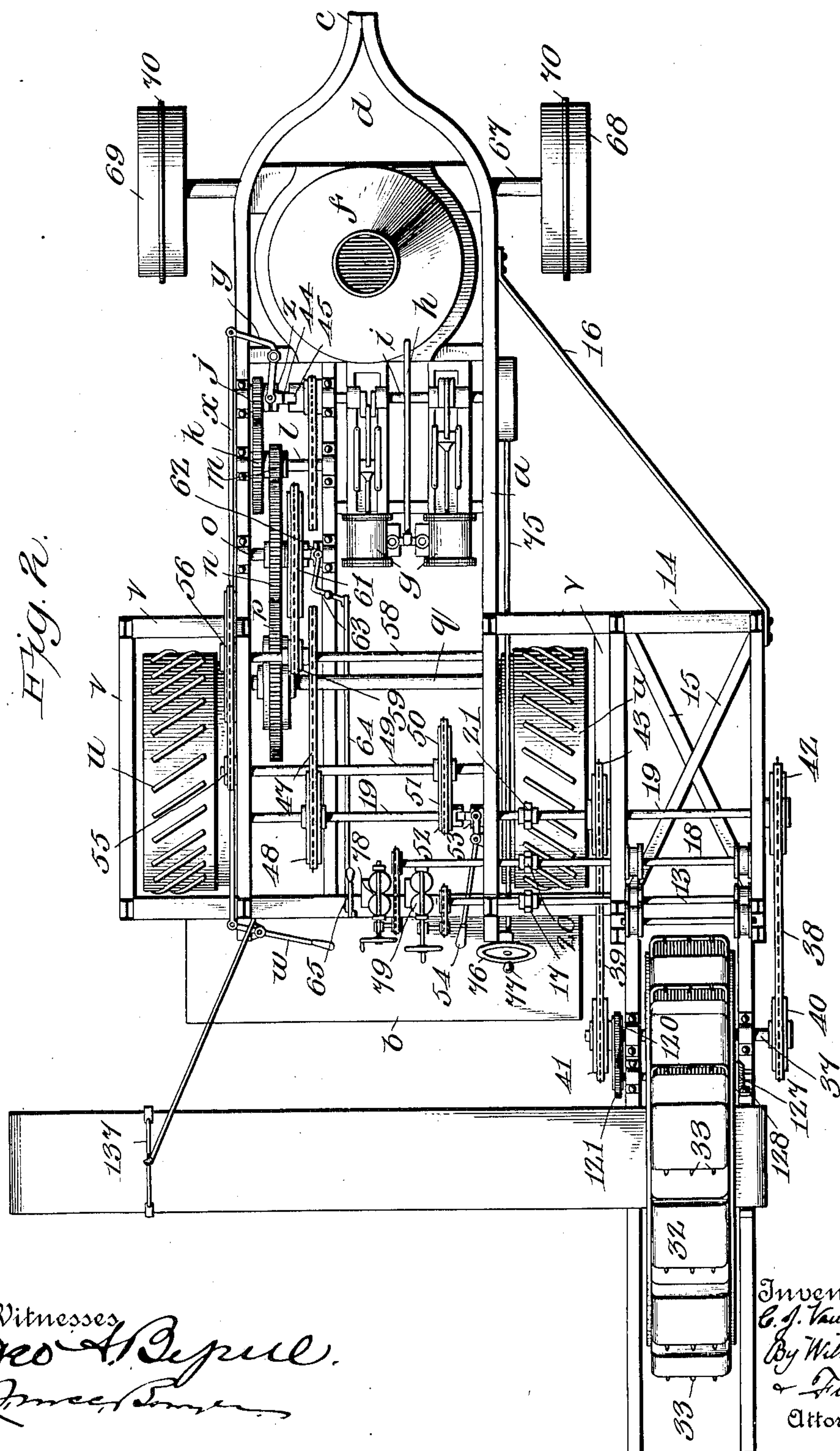
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5 SHEETS—SHEET 2.



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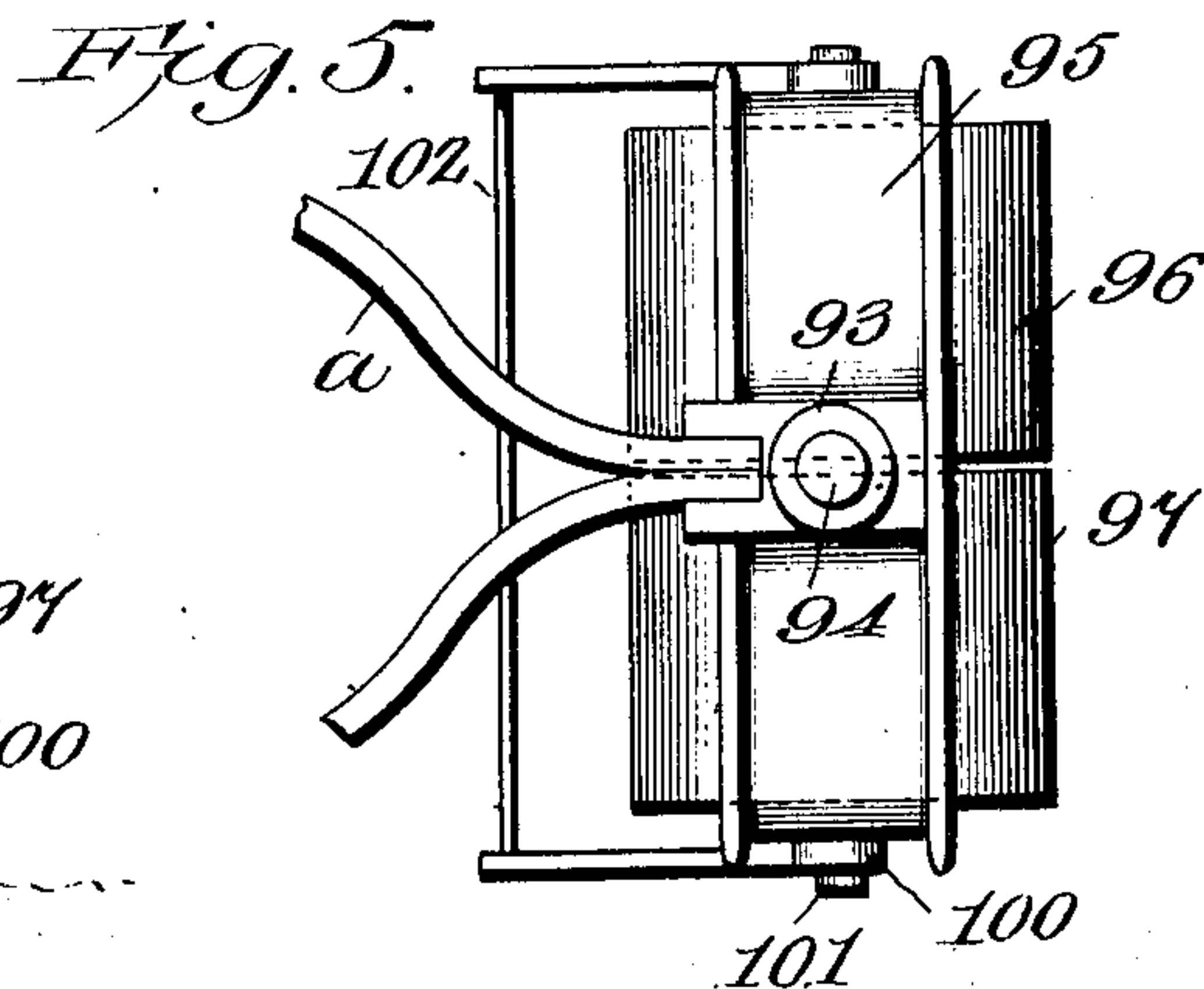
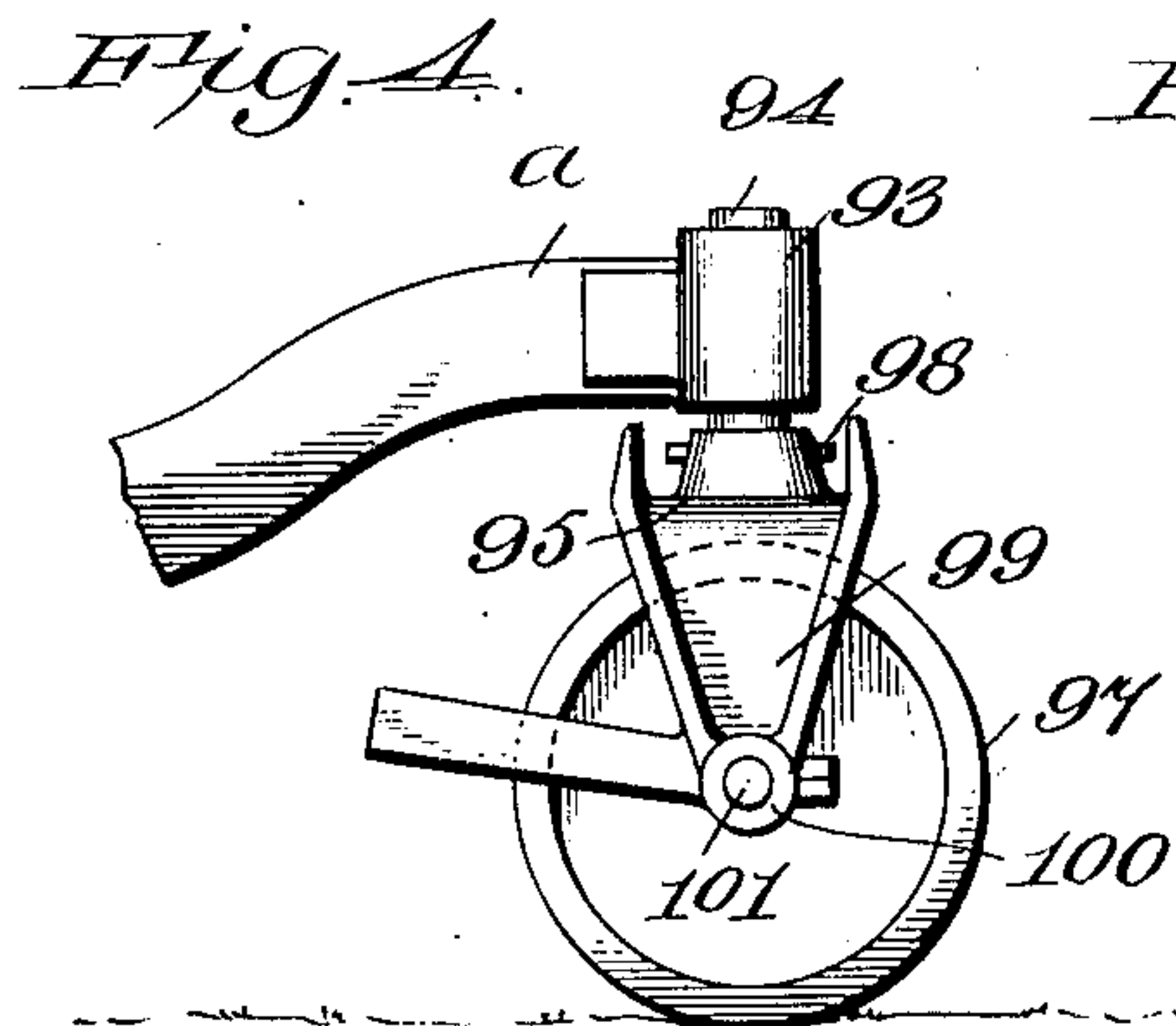
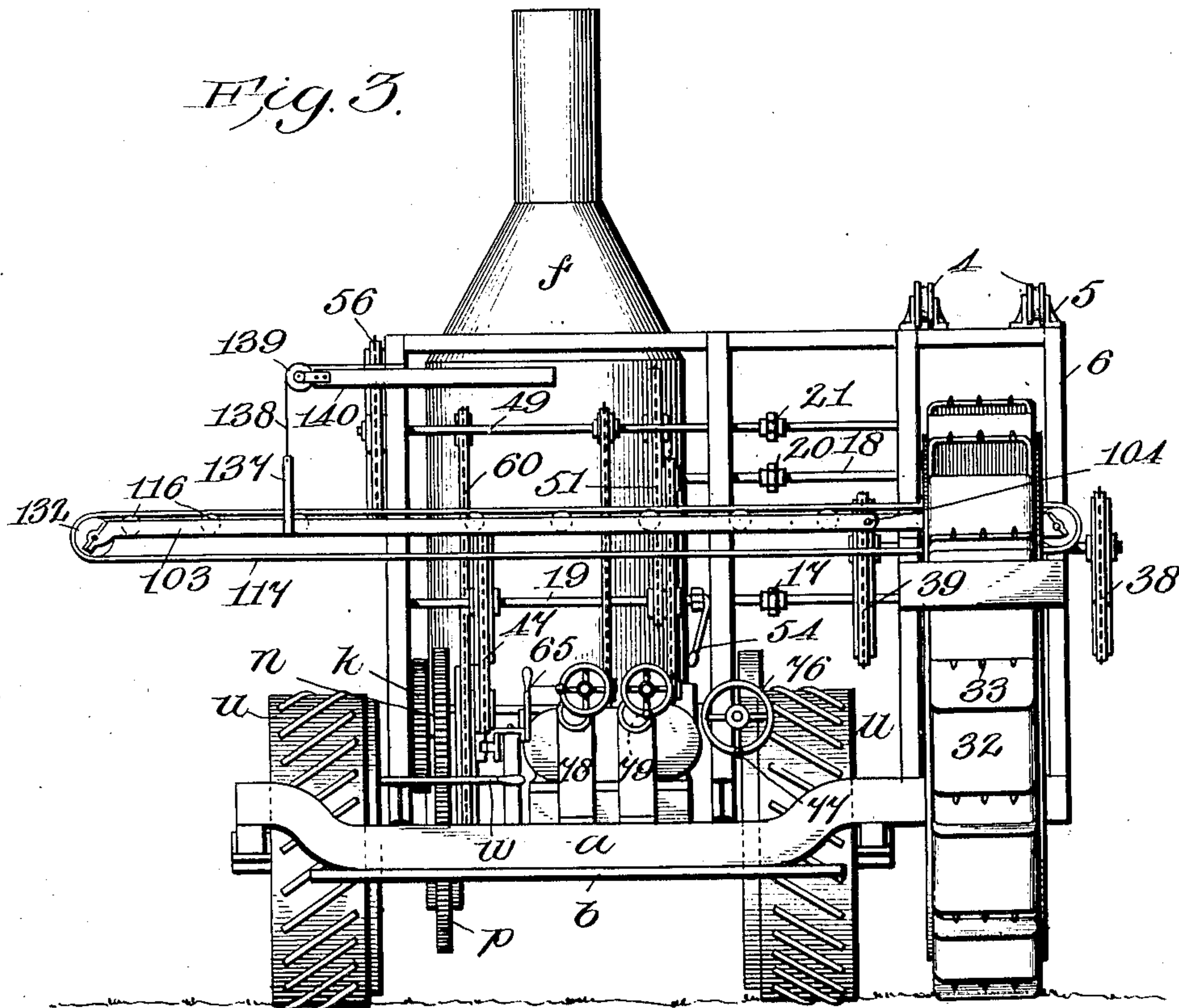
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5 SHEETS—SHEET 3.



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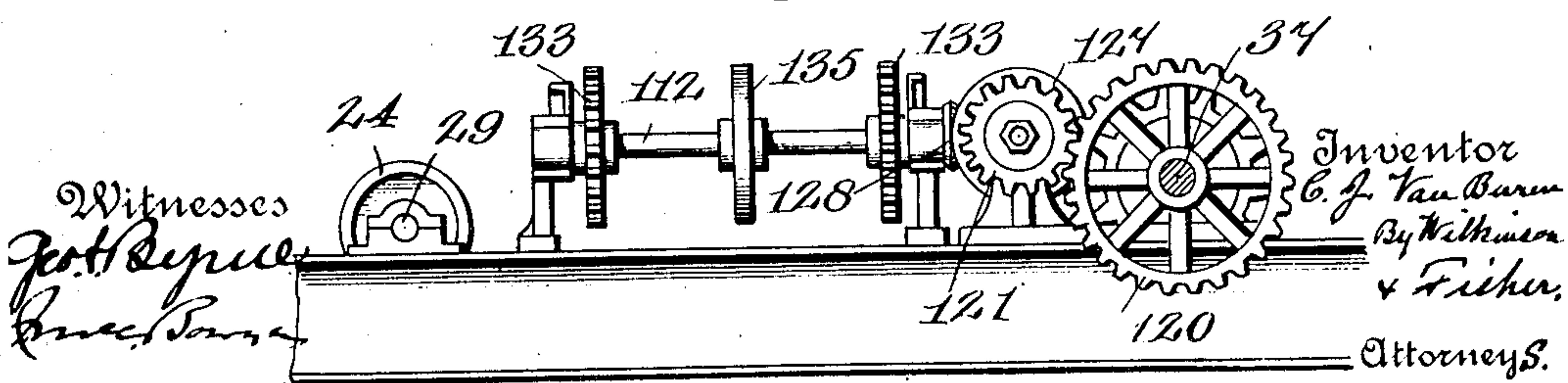
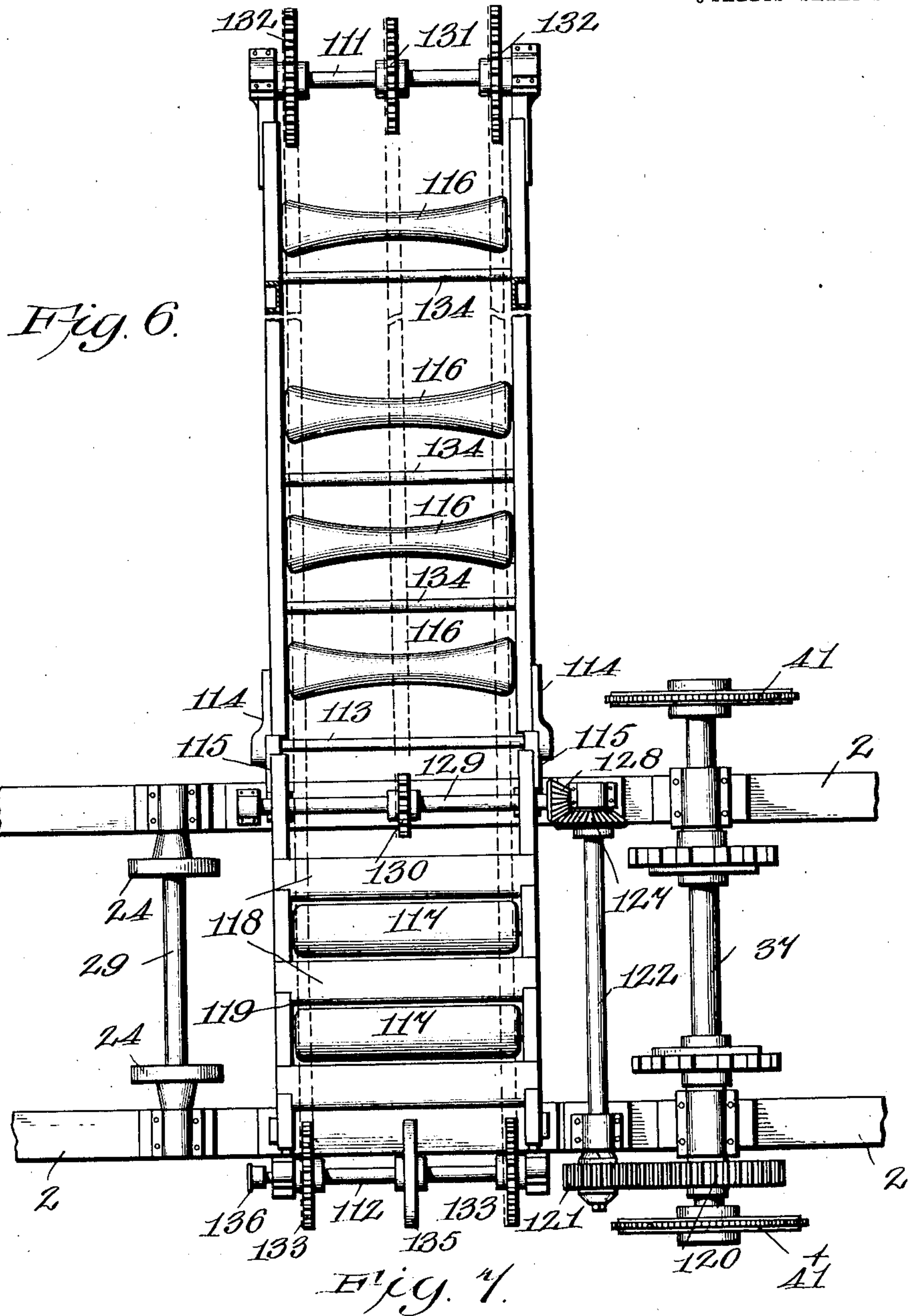
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5 SHEETS—SHEET 4.



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5 SHEETS—SHEET 5.

Fig. 8.

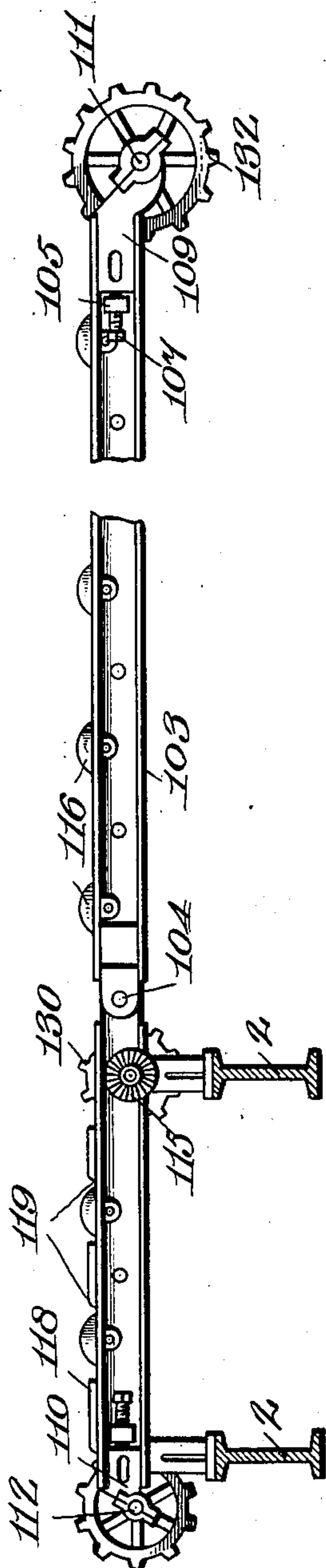


Fig. 10.

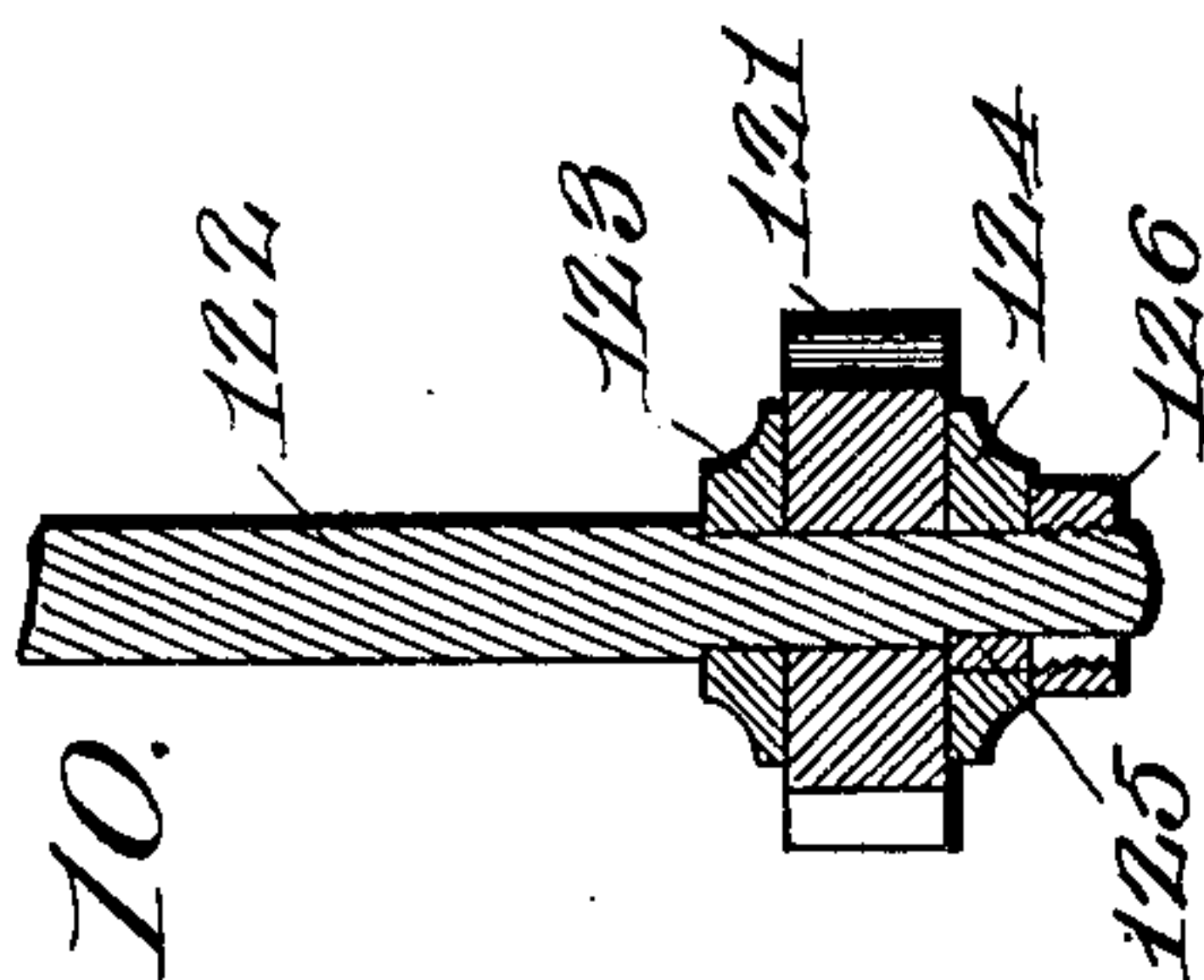
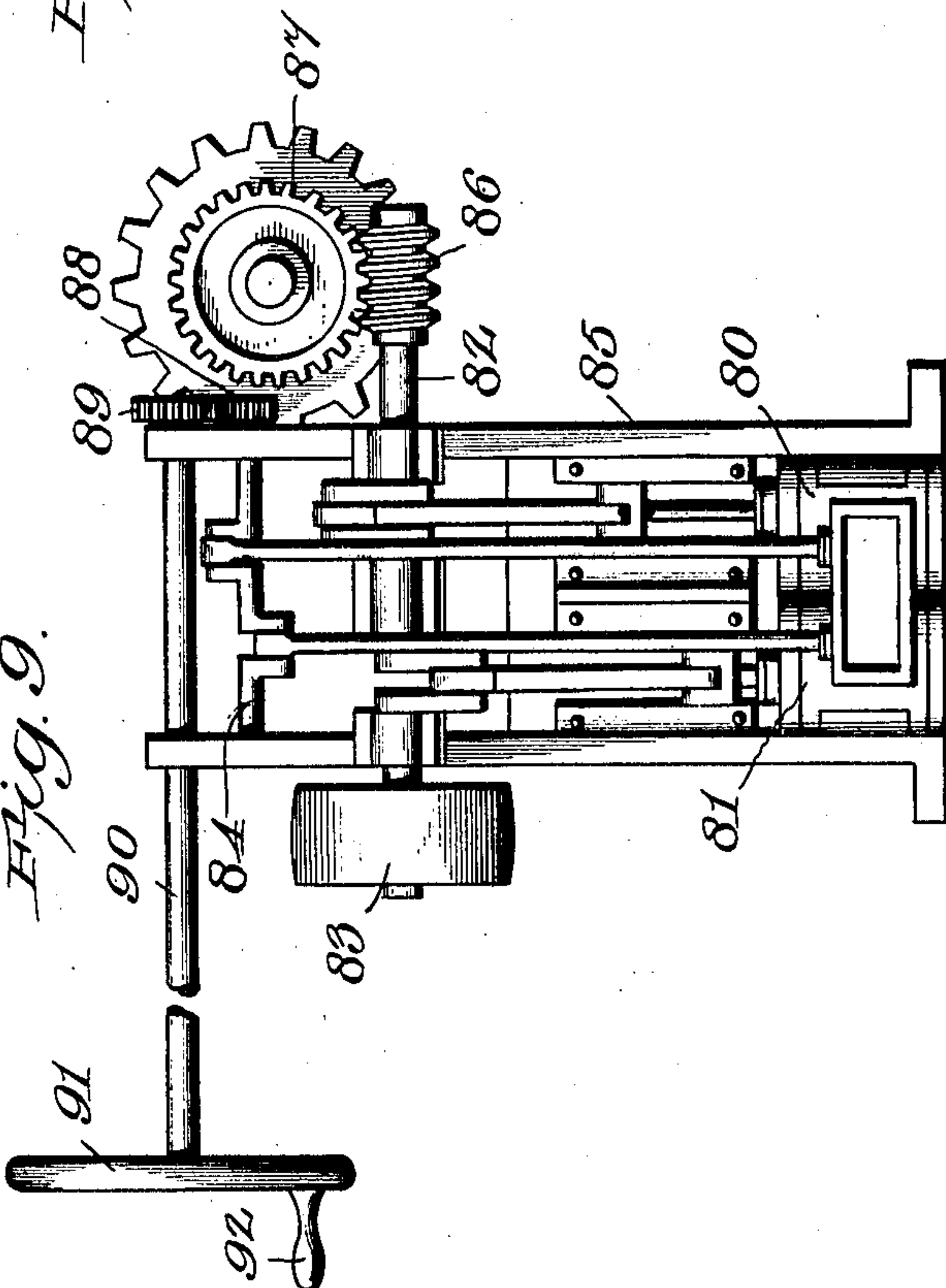


Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES J. VAN BUREN, OF FINDLAY, OHIO.

COMBINED SCALPER, EXCAVATOR, ROAD-ROLLER, AND LOCOMOTIVE.

No. 872,159.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed September 12, 1905, Serial No. 278,123. Renewed June 20, 1906. Serial No. 322,610.

To all whom it may concern:

Be it known that I, CHARLES J. VAN BUREN, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented certain new and useful Improvements in Combined Scalpers, Excavators, Road-Rollers, and Locomotives; 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 relates to improvements in combined scalpers, excavators, road rollers, and locomotives, and the object of my invention is to provide a machine which may be readily used for all these four purposes.

My invention includes a machine consisting of a platform on which an engine is mounted, which engine may be used to drive the ditching wheel, to propel the machine, or to do both at the same time. This machine is provided with a removable roller, and with a removable ditching wheel. The driving and steering wheels are also removable, so that by a simple removal or substitution of parts the machine may be used for all the purposes specified. It is, however, not absolutely necessary to remove, for instance, the ditching wheel or the roller when the machine is to be used as a road locomotive, nor is it absolutely necessary to remove the ditching wheel when the machine is used as a road roller, but for the sake of appearances, as well as from considerations of power and weight, I prefer usually to remove the ditching wheel from the machine when the latter is to be used as a road locomotive, or as a road roller, to remove the roller from the machine when the latter is to be used as an excavator or scalper, and to remove both the ditching wheel and the roller when the latter is to be used merely as a road locomotive.

With these objects in view, my invention consists in the construction and combinations of parts as hereinafter described and claimed.

In the accompanying drawings; Figure 1 represents my machine in side elevation, the front part thereof being broken off. Fig. 2 is a plan view of the machine shown in Fig. 1. Fig. 3 is a rear view of the same. Figs. 4 and 5 are side and top views respectively of the roller, which is adapted to be attached to the front of the machine. Fig. 6 is a top view on an enlarged scale of a portion of the

machine showing the elevator for delivering the excavated material away from the machine, the elevator apron, however, being removed. Fig. 7 is a side view of the parts shown in Fig. 6. Fig. 8 is a side view partly in section showing the elevator frame. Fig. 9 is a side view of the duplex engine for raising or lowering the ditching wheel, and Fig. 10 is a cross section of the shaft which drives the elevator apron.

The machine is mounted on a strong frame *a*, which is provided at its rear with a platform *b* on which the operator stands and from which he directs the operation of the machine. In front the frame comes to a point, as shown at *c*, the sides of the frame forming a fuel box in the space *d*.

e represents a water tank carried by the frame, and *f* represents a boiler mounted on said frame. On the frame is mounted the driving engine *g*, preferably a duplex engine, and supplied with steam from the boiler by the pipe *h*.

i represents the main driving shaft which is driven from the engine *g* by cranks and connections of the usual type. On the shaft *i* is slidably mounted the driving pinion *j*, it being connected to said shaft by a spline or feather (not shown) or in any other desired way, which will cause it to revolve with the shaft *i*, and yet be slidably mounted thereon. The pinion *j* meshes with the gear wheel *k* fastened to the shaft *l*, to which shaft is also fastened the pinion *m*, which meshes with the gear wheel *n* fastened to the shaft *o*. The gear wheel *n* meshes with a differential gear wheel of any usual type *p*, which is mounted upon the shaft *q*, which extends across the frame *a* from side to side. This shaft *q* is provided at each end with a small gear wheel *r*, Fig. 1, which meshes with an internal gear wheel *s* on the traction wheels *t* provided with mud cleats *u* of the usual type. The frame *a* is preferably provided with extensions *v*, one on each side of the wheel which encircle the driving wheels. It is obvious by means of the gearing, just described, and when the parts are in the position shown in Fig. 2, that the rotation of the driving shaft *i* will cause the driving wheels *t* to revolve, propelling the whole machine forward.

The position of the pinion *j* upon the shaft *i* is determined by the operator, who can move the lever *w*. By means of the connecting rod *x*, crank *y*, and fork *z*, the move-

ment of the lever *w* will shift the pinion *j* from the position shown in Fig. 2 to a position in which the pinion *j* will be disengaged from the gear wheel *k*.

- 5 The gearing hereinbefore described is that which is used to move the machine from place to place, the ditching wheel being out of operation, or when the machine is used as a road locomotive or a road roller.
- 10 The ditching wheel 1 is supported in a strong frame, preferably made of I-beams 2, 2, which are connected together near their ends by cross beams (not shown). The outer end of this frame is supported by means of ropes or chains 3, one running to the rear end of each of the I-beams 2, and each passing over a pulley 4 supported on a bracket 5 located on the top of an upright standard. This standard is preferably com-
- 15 posed of two parallel I-beams 6, 7, mounted on the frame *a*, leaving a long narrow space or slot between them. A pair of these vertical I-beams is located on the outside of each of the I-beams 2. Each of the I-beams is provided at one end with a pin 8 which passes into the space between the I-beams 6 and 7, and on this pin is mounted, preferably loosely, a roller 9, so that the front end of the frame carrying the ditching wheel may be
- 20 raised or lowered easily, and without friction. A pair of flexible ropes 10 are attached one to each end of the wheel frame passing over pulleys 11.

The ropes 3 are wound up on drums 12 on the shaft 13, this shaft, as well as several other of the shafts, being mounted in a rectangular frame 14 provided with braces 15, which frame is attached to the frame *v*.

- 35 The frame 15 is removably connected to the frame *v* fitting into it by means of lugs and sockets and fastened by bolts (not shown) or in any other suitable way. A brace 16 extends from the outer part of the frame 14 to the main frame *a*. This shaft 13 is provided with a coupling 17, so that the two parts of which it is composed may be readily separated from each other. The other shafts 18 and 19, which pass through the frame 14 are similarly provided with couplings 20 and 21,
- 40 so that these shafts also may be easily separated into their component parts.

When it is desired to remove the ditching wheel from the machine, the couplings 17, 20 and 21 are separated, the brace 16 unscrewed from the main frame *a*, and the whole frame together with the brace 16, the wheel carrying frame, the ditching wheel and the elevator are lifted bodily from the machine.

- 50 The ditching wheel is hollow, and is supported on four or more pulleys such as 22, 23, and 24. These pulleys are carried at the end of a frame made by uniting together the braces 25, 26, 27 and 28, in the corners of which frame bearings for the pulleys are lo-

cated. The two upper pulleys of this frame are supported on shafts, one of which is shown at 29, which in turn are supported in bearings on the wheel frame. Thus the wheel is suspended in the wheel frame, and can be easily moved therein. The guide pulleys 22, 23 and 24 are flanged, as shown at 30, and these flanges engage with a flange 31 on the ditching wheel, thus preventing any appreciable sidewise movement. The pul-

55 ley frame, shown in Fig. 1, is, of course, made double, one set of four pulleys each bearing on each of the I-beams 2. The outer face of the wheel is provided with buckets or scoops 32, which are preferably provided with teeth 33. These buckets extend from side to side on the edge of the wheel, and knives or cutters 34 are provided located between the buckets. The wheel is provided with two internal sets of gear teeth 35, with which the

60 pinions 36 engage, which pinions are mounted on the shaft 37, which in turn is mounted on the wheel frame.

The shaft 37 is driven by means of two sprocket chains 38 and 39 running over sprocket wheels 40 and 41 carried by the shaft 37, and also over sprocket wheels 42 and 43 carried by the shaft 19. When it is desired to operate the ditching wheel from the engine, the lever *w* is moved by the operator throwing the parts from the position shown in Fig. 2 into a position where the pinion *j* will be disengaged from the pinion *k*, and the clutch portion 44 on the hub of said pinion be moved over to engage the clutch

65 portion 45 on the hub of the sprocket wheel 46. A sprocket chain 47 passes over the sprocket wheel 46 and over a sprocket wheel 48 on the shaft 19.

By means of the parts, just described, the operation of the main engine will operate the ditching wheel, but it is desirable, under ordinary circumstances, that when the ditching wheel is operated the whole machine should be moved slowly forward, and the means for doing this will now be described.

Behind the vertical frame 14 is located an upright frame substantially of the same shape as the frame 14 shown in Fig. 1. This frame, of course, is in duplicate, one side of it being located just inside the inner edge of the traction wheels *t*. In this frame is mounted a shaft 49 carrying a large sprocket wheel 50. A sprocket chain 51 passes over this sprocket wheel 50, and a sprocket pinion 52, loosely mounted on the shaft 19. A clutch 53 splined to the shaft 19 is provided, which is operated by the attendant by means of a lever 54. When this clutch is thrown into engagement it is obvious that the rotation of the shaft 19 will rotate the sprocket wheels 52 and 50, and will therefore rotate the shaft 49. This shaft 49 has on it a sprocket pinion 55, which is connected by a sprocket chain 56 to a sprocket wheel 57

70 75 80 85 90 95 100 105 110 115 120 125 130

mounted on the shaft 58. On this shaft 58 is a sprocket pinion 59, and a sprocket chain 60 passes over this sprocket pinion, and a sprocket wheel 61 on the shaft *o*. The sprocket wheel 61 is loosely mounted on the shaft *o*. A clutch 62 is provided which can be operated by means of the crank 63, connecting rod 64, and hand lever 65, which is under the control of the operator.

It is obvious that when the clutches 53 and 62 are thrown into their closed position the operation of the shaft 19 will operate in succession the shafts 49, 58 and *o*, which latter shaft, as already described, operates the driving wheels *t*. In ditching operations the lever *w* is first operated throwing the clutch portions 44 and 45 into engagement with each other, and then the operation of the engine will operate the shaft 19, which will start the ditching wheel in operation. The clutch 53 is then closed, which starts the shafts 49, and 58 into operation. The clutch 62 is then closed, which starts the shaft *o* into operation, and thereby the driving wheels *t*, so that the whole machine moves slowly forward, cutting a ditch or trench as it goes. Of course, it is necessary that this forward movement of the machine, while the ditch is actually being cut, should be comparatively slow, and the parts are so proportioned that during the ditch cutting operation the advance of the machine is comparatively slow. When, however, the ditching operation has been finished, and it is desired to transport the machine, the direct operating means through the gears *j*, *k*, etc., are used, the movement in that case being much faster.

Ordinary means for admitting steam to the engine *g* and cutting it off therefrom are, of course, used, and these means are extended backward so that the attendant on the platform *b* can admit steam to, or cut it off from, the engine without leaving the platform, but these means being of the ordinary type have not been shown on the drawing, in order to avoid complication.

The front part of the frame *a* is pivotally mounted on an axle 67 on which are mounted two guiding wheels 68 and 69, each provided with a central rib 70. The machine is guided by shifting the axle one way or the other, as desired, and this is accomplished in the usual way by chains 71, which pass over the axle 67, and over another axle or drum 72 mounted on the main frame. The axle or drum 72 is moved by means of a worm wheel 73 with which a worm 74 engages. This worm is actuated by a rod 75 carried in suitable bearings on the frame *a* and extending backwards to the platform *b* where it is provided with a wheel 76 having a handle 77.

The means for raising and lowering the ends of the wheel frame will now be de-

scribed. Each pair of ropes, such as 3 and 10, is operated by a small reversible duplex engine, such as 78 and 79, one of which is shown on an enlarged scale in Fig. 9, and consists of two cylinders 80 and 81 connected by a crank to a shaft 82 on which is mounted a fly wheel 83. The valve gear of this engine is operated in the usual way, but to start the engine peculiar means are provided. The valve gear is provided with crank connections running to the shaft 84 mounted in a frame 85, in which the whole engine is mounted. The shaft 82 is provided with a worm 86 meshing with a worm wheel 87. The shaft 84 is provided with a gear wheel 88 meshing with a gear wheel 89 on the shaft 90, which is mounted in the frame 85. The shaft 90 is provided with a wheel 91 and a crank handle 92. Steam connections between the boiler and each of the small engines are, of course, provided, but have not been shown on the drawing in order to avoid complication. To start the engine the valve in this connecting steam pipe is opened, and then the shaft 90 is revolved by hand, thus starting the engine, which then continues its operation as long as the shaft 90 is revolved. These small shifting engines are, of course, reversible, and one of them is provided for each end of the wheel frame, so that each end of the wheel frame may be raised or lowered, as desired, either separately or at the same time that the other end of the wheel frame is moved.

The levers *w*, 65, and 54, as well as the means for starting the shifting engines, for guiding the machine and for cutting off, and for supplying steam to the large engine and to the shifting engines, are all located so as to be within easy reach of the attendant standing on the platform *b*.

In Figs. 4 and 5 is shown the road roller attachment, which may be removed or be left on the machine, being mounted in a slightly higher frame than the front steering frame. The front end of the main frame *a* terminates in a bearing 93 adapted to embrace a swivel pin 94 centrally mounted on the top of the frame 95, which carries the rollers 96 and 97, which may, however, be made integral, if desired. The pin 94 is fastened in the center of the frame 95 in any desired way, as by the pin 98. At the ends the frame 95 is bent downwardly, as shown at 99, and each lower end is formed into a bearing 100 for the axle 101 of the rollers. A protecting frame 102 of ordinary construction extends rearwardly from the axle 101.

When the machine is to be used as a road locomotive or an excavator, the pin 94, frame 95, and the rollers mounted therein are preferably removed from the machine. When it is desired to use the machine as a road roller the pin 94 is mounted in the bear-

ing 93, and the ordinary front steering wheels of the machine removed, allowing the entire weight of the front of the machine to rest on the rollers 96 and 97.

5 The elevator, by means of which the dirt is carried from the ditching wheel and deposited on the side of the ditch will next be described, special reference being had to Figs. 6, 7, 8 and 10.

10 103 represents the elevator frame, which is composed of two parts hinged together, as shown at 104. The sides of the elevator frame are preferably composed of U-shaped iron beams set on edge. At each end each
15 beam is provided with a screw threaded projection 105, 106, through which pass adjusting screws 107 and 108, which carry the end brackets 109 and 110, in which are mounted the shafts 111 and 112 which carry the driv-
20 ing sprockets. At the point 104 there is a cross bar 113 which serves as a hinge, and perforated brackets 114 and 115 are attached to the swinging and stationary parts of the frame 103 respectively, and through these
25 brackets the bar 113 passes. Several rollers are mounted near the top of the frame 103. The rollers 116 in the swinging portion of the elevator frame are concaved towards the center, as shown, so that the elevator apron 117
30 with its load of dirt, gravel, etc., will sag inwardly towards the center, thus preventing the gravel from being spilled. The stationary part of the elevator frame is provided with cylindrical rollers 117, and between
35 these cylindrical rollers, and fastened to the frame, are located the steel plates 118 curved downwardly, as shown at 119. These plates are provided so that if large stones should be delivered from the buckets of the ditching
40 wheel upon the apron, the shock to the apron, should they happen to fall between the rollers 117, will not seriously injure the apron.

The elevator apron is driven in the follow-
45 ing way. The shaft 37 which drives the ditching wheel is provided with a gear wheel 120 which meshes with the pinion 121 on the shaft 122. On the shaft 122 is a collar 123, which is shrunk thereon, and is therefore
50 firmly fixed to said shaft. Another collar 124 is secured to this shaft by means of the spline 125 and this collar is held in position by the nut 126. The pinion 121 is held between the two collars 123 and 124, and when
55 the nut 126 is screwed home the pinion 121 is in frictional contact with the shaft 122, and will drive said shaft frictionally. At the other end the shaft 122 is provided with a beveled gear wheel 127 which meshes with a
60 similarly shaped wheel 128 on the shaft 129, which passes through the stationary part of the elevator frame. On this shaft 129 is mounted a sprocket wheel 130, which is located between the upper and under folds of

the apron, said sprocket wheel being, of 65 course, fastened to said shaft. The sprocket wheel 130 is connected by a sprocket chain indicated by dotted lines in Fig. 6, with a sprocket wheel 131 mounted on the shaft 111. It will be evident that by the means 70 thus described the revolution of the shaft 37 will cause the revolution of the shaft 111.

On the shafts 111 and 112 are mounted sprocket wheels 132 and 133. These sprocket wheels are connected by sprocket chains in- 75 dicated in dotted lines in Fig. 6 to which sprocket chains the elevator apron is fastened. The sprocket wheel 131 is, of course, smaller than the sprocket wheels 132 in order not to interfere with the apron. Addi- 80 tional bracing rods 134 are preferably provided in the movable part of the elevator frame to make the structure stiff. The shaft 112 is also provided with a pulley 135 of about the same size as the sprocket wheels 85 133, which serves to support the central part of the elevator apron at one end.

The shaft 112 is hollow, and the sprocket wheels 133 are loosely mounted thereon. 136 represents a compression grease cup by 90 means of which a lubricant is forced into the hollow shaft 112, and up through holes therein which are located underneath the hubs of the sprocket wheels 133, thereby lubricating the same. A similar construction 95 may be employed in connection with the shaft 111, if desired, and, of course, any desired means for lubricating any of the parts of the machine may be used.

The outer end of the elevator frame is sup- 100 ported by a bail 137, Figs. 2 and 3, which is connected by means of a rope 138, which passes over a pulley 139 mounted in a brace 140 secured to the main frame of the machine, to a winding drum (not shown). By turning 105 this drum the outer end of the elevator frame may be raised or lowered, as desired.

While I have thus described my invention I wish it to be distinctly understood that I do not limit myself to the exact features shown 110 and described, as these might be varied greatly without departing from the spirit of my invention.

The features which I consider of especial importance are that the machine may be 115 used with equal facility either as an excavator, or as a scalper, or as a road roller, or as a road locomotive. By having the ditching wheel on the side of the machine it may either be placed at the rear of the machine or along 120 side the machine. The removal of the front steering wheels and axle, and the substitution of the divided drum on the extreme front end makes the machine well adapted as a road roller. Then by disconnecting the 125 ditching wheel and its frame the machine can be used either as a road roller, or as a road locomotive. In any case the arrangement of

the parts so that they can all be governed by an attendant standing on the rear platform is of great advantage.

The specific form of the elevator I also regard as new and very useful.

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

1. A road locomotive, road roller and excavator combined in a single unitary structure, substantially as described.

2. The combination of a traction engine and a road roller and ditching wheel removably secured thereto, substantially as described.

3. The combination of a road locomotive provided with driving and steering wheels, a frame provided with an excavating wheel and with an elevator detachably secured to said road locomotive, and rollers also detachably secured to said road locomotive, substantially as described.

4. The combination of a frame provided with driving and steering wheels, a boiler and engine and controlling means, the whole forming a road locomotive, with a ditching wheel detachably connected to said road locomotive, at the side or at the rear, but always to one side of the traction wheels, substantially as described.

5. The combination of a frame provided with steering and traction wheels, a boiler, engine, and gearing, the whole forming a road locomotive, and a second frame detachably secured to the frame of said road locomotive, said second frame being provided with a ditching wheel, an elevator, and with means for driving the same, substantially as described.

6. The combination of a frame provided with traction and steering wheels, a boiler, engine and gearing supported by the frame, the whole forming a road locomotive, a second frame carrying a ditching wheel and an elevator, detachably secured to the frame of said road locomotive, and driving means for said ditching wheel and elevator, said driving means being detachably connected to the driving means of said road locomotive, substantially as described.

7. The combination of a road locomotive provided with traction and steering wheels, a boiler and engine, and gearing for operating said traction wheels by the movement of said engine, with a detachable frame adapted to be connected to the frame of said road locomotive, a ditching wheel mounted in said detachable frame, means for driving said ditching wheel, detachable connections between said driving means and the driving means of the road locomotive, and clutch mechanisms so arranged that the whole machine may be moved forward without operating the wheel or that the ditching wheel may be operated without moving the whole machine forward,

or that the whole machine may be moved forward and the ditching wheel operated at one and the same time, substantially as described.

8. In an excavating machine, the combination of a main frame, a supplemental frame detachably connected to said main frame, a movable frame arranged to slide up and down in said supplemental frame, a ditching wheel carried by said movable frame, and means for moving each end of said movable frame either upwards or downwards, simultaneously or separately, substantially as described.

9. The combination of a main frame provided with driving and steering wheels and operating means thereon, the whole forming a road locomotive, of a supplemental frame detachably connected to said main frame, a swinging frame, one end of which is mounted in said supplemental frame, a ditching wheel carried in said swinging frame, flexible connections attached to each end of said swinging frame respectively, and an engine connected to the connections of each end of said swinging frame, substantially as described.

10. The combination of a main frame provided with driving and steering wheels and operating means on said frame, the whole forming a road locomotive, a supplemental frame removably mounted on said main frame, a swinging frame, one end of which is mounted in said supplemental frame, flexible connections attached to each end of said swinging frame, a duplex engine attached to the connections at each end of said frame, and hand operated means for starting each of said engines, substantially as described.

11. The combination of a frame, a swinging frame, one end of which is mounted in said first named frame, a ditching wheel mounted in said swinging frame, flexible connections attached to each end of said swinging frame, a duplex engine connected with the connections at each end of said swinging frame, and hand operating means for starting said engine, and for moving said swinging frame, substantially as described.

12. The combination of an adjustable frame, a ditching wheel mounted therein, an elevator for carrying away the material delivered by said ditching wheel, said elevator comprising a jointed frame, an apron running over said frame, means for adjusting the outer end of said elevator and means for adjusting the inner end of said elevator and thereby keeping all the chains as well as the apron in proper tension, and frictional means for operating said elevator, substantially as described.

13. The combination of a frame, a ditching wheel supported therein, an elevator, one end of which is supported by said frame, said elevator including a jointed frame, an apron, guide rollers, and means for adjusting

the tension of said apron, and means for raising or lowering the delivery end of said elevator, substantially as described.

14. The combination of a frame, a ditching wheel carried thereby, means for operating said wheel, and an elevator for carrying off the material delivered thereon by said ditching wheel, said elevator comprising a jointed frame, adjustable sprocket wheels at each end of said frame, rollers mounted in said frame, some of said rollers being concaved towards the center, means for operating said elevator, and means for adjusting the outer end of said elevator, substantially as described.

15. The combination of a main frame, driving wheels attached thereto, steering wheels movably carried by said frame, a boiler, engine and operating gear carried by said drum, the whole constituting a road locomotive, said frame being provided with a bearing near its front end, a roller carrying

frame provided with a spindle adapted to engage said bearing, and rollers mounted in said roller carrying frame, substantially as described.

16. The combination of a frame, a ditching wheel supported therein, an elevator, one end of which is supported by said frame, said elevator including a jointed frame, an apron, guide rollers, means between some of said guide rollers for preventing the apron from being torn if heavy bodies are delivered thereon by said ditching wheel, means for adjusting the tension of said apron, and means for raising or lowering the delivery end of said elevator, substantially as described.

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

CHARLES J. VAN BUREN.

Witnesses:

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LOUIS M. MONHEIMER.