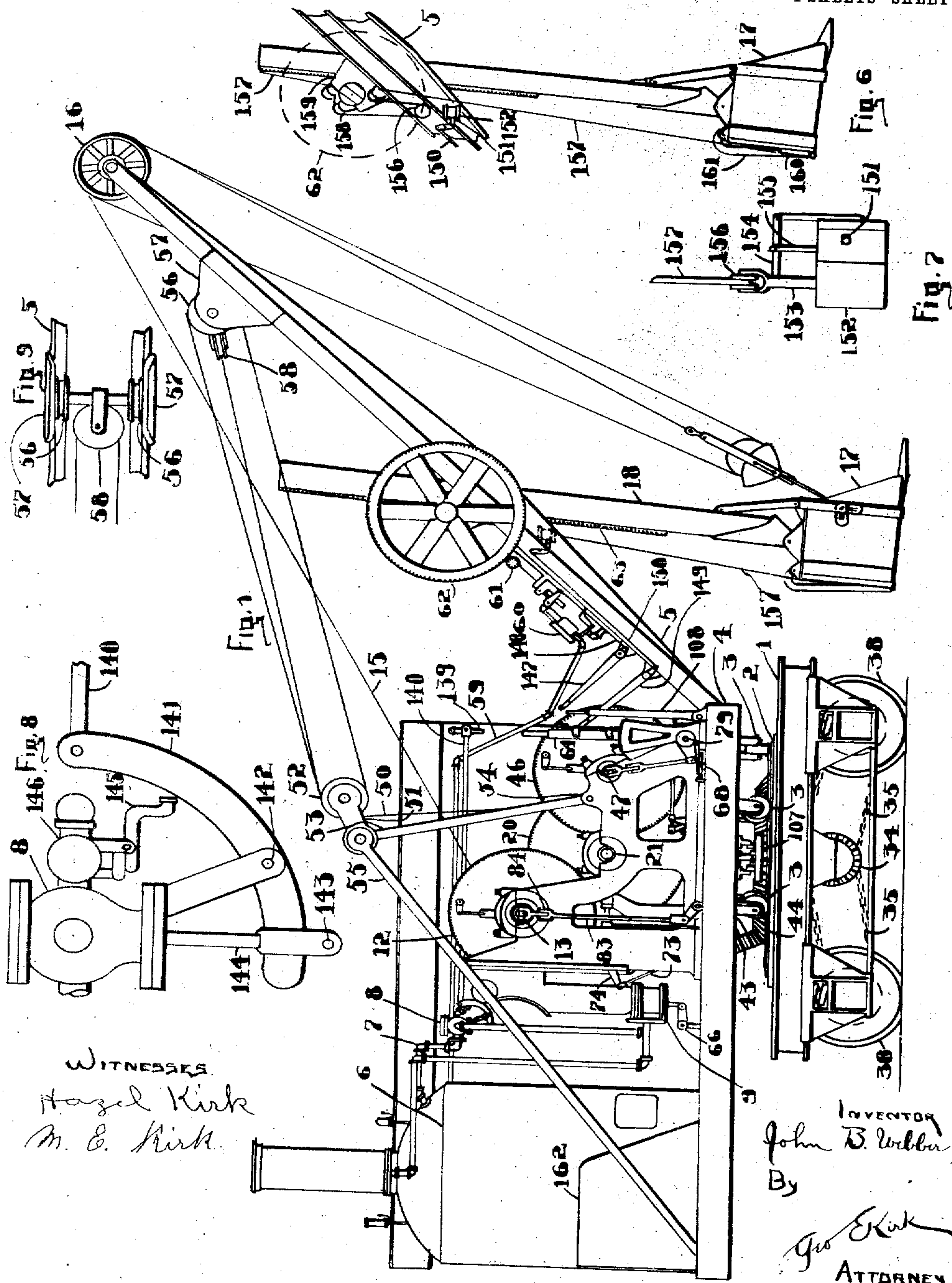


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APPLICATION FILED JAN. 15, 1908.

Patented Dec. 22, 1908.  
4 SHEETS—SHEET 1.



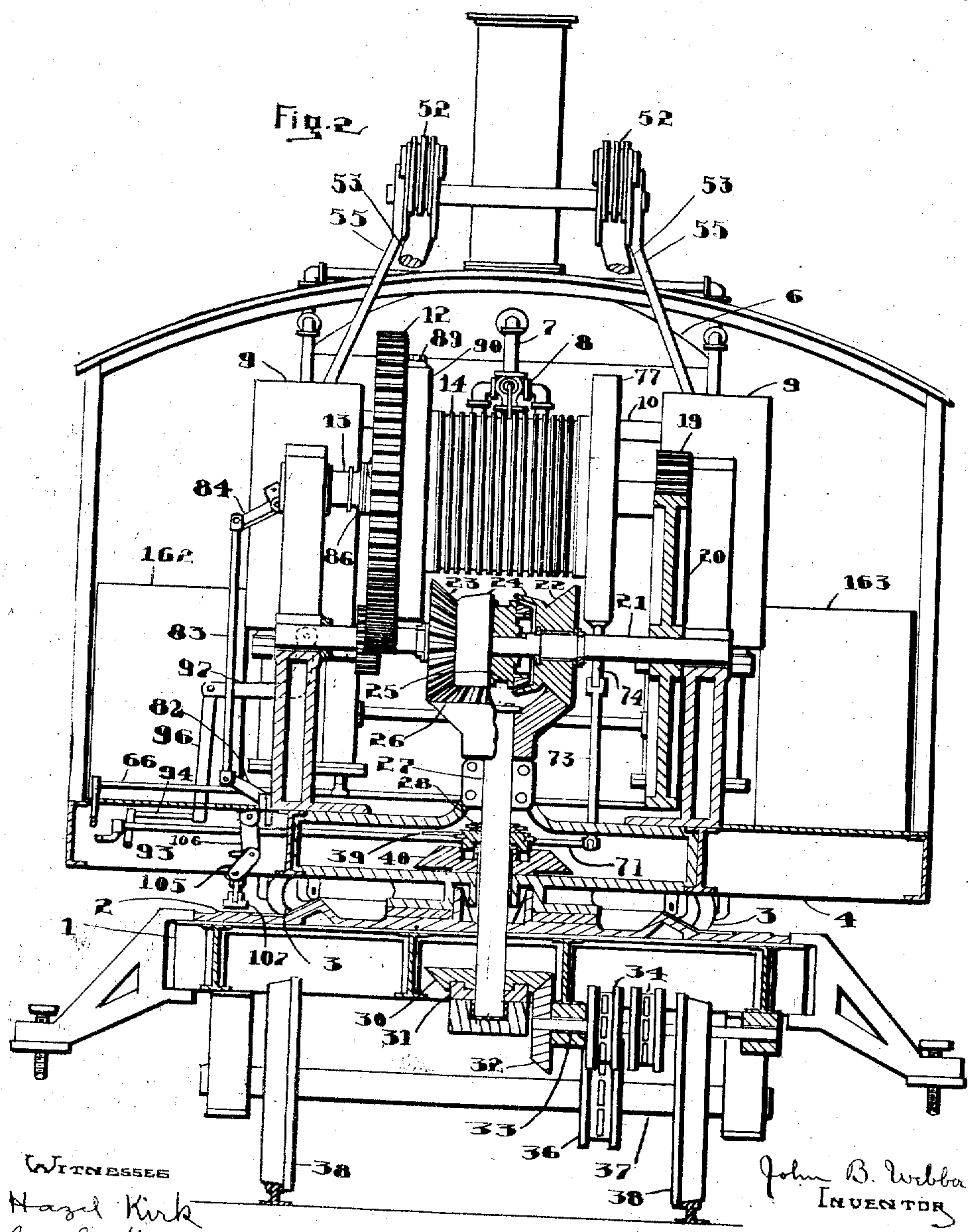
WITNESSES  
Hazel Kirk  
M. E. Kirk

INVENTOR  
John B. Webber Jr.  
By  
Geo. E. Kirk  
ATTORNEYS

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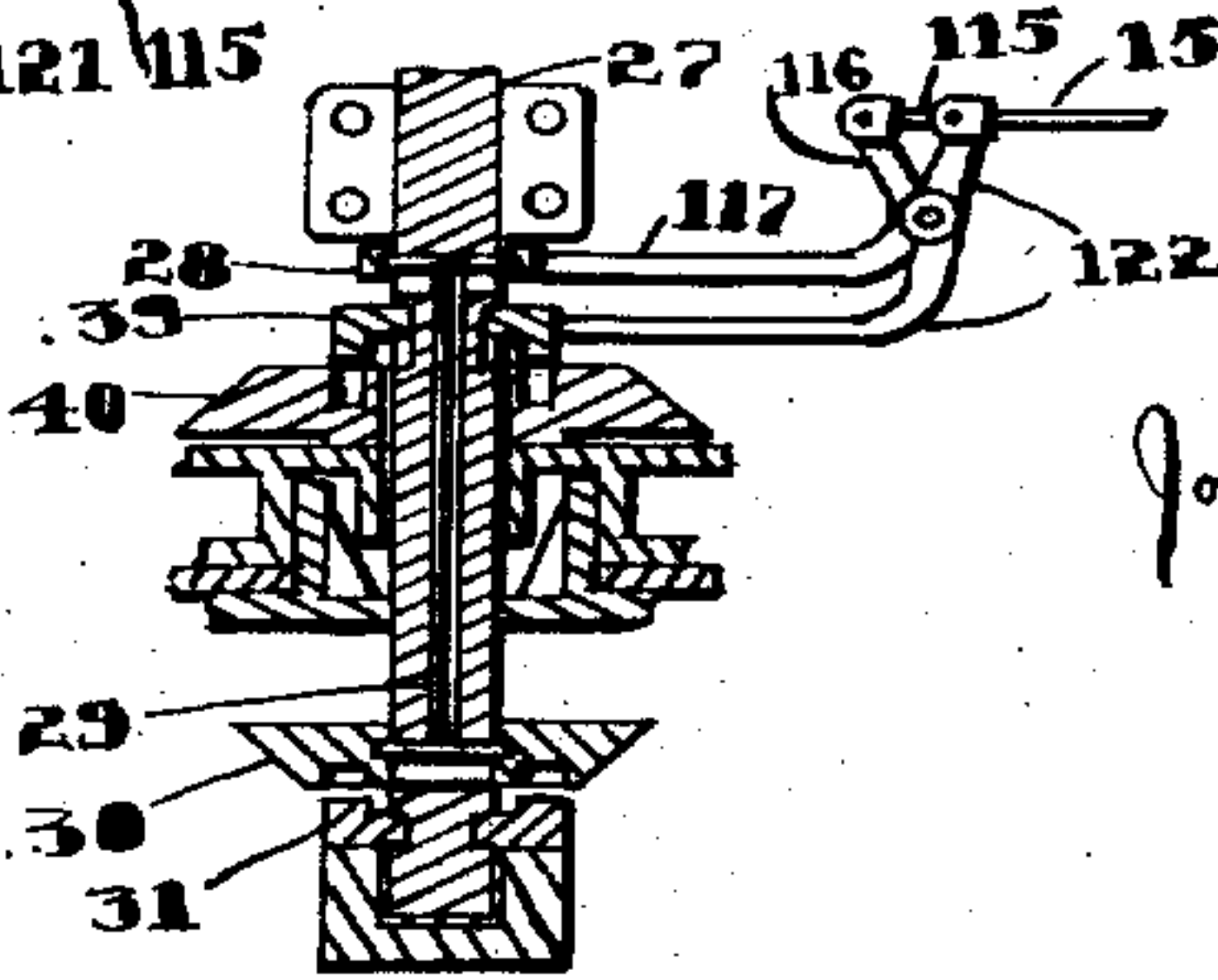
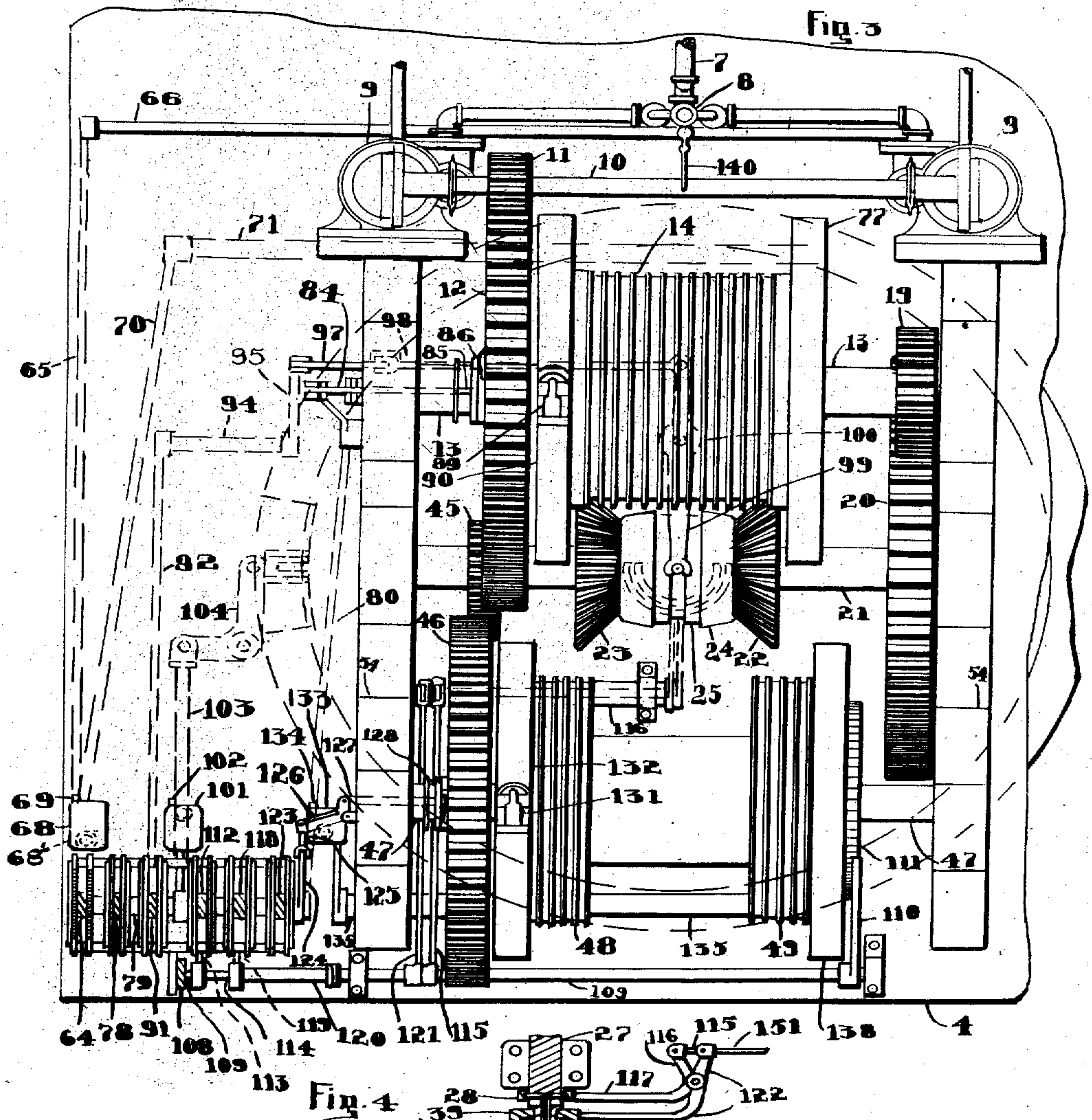
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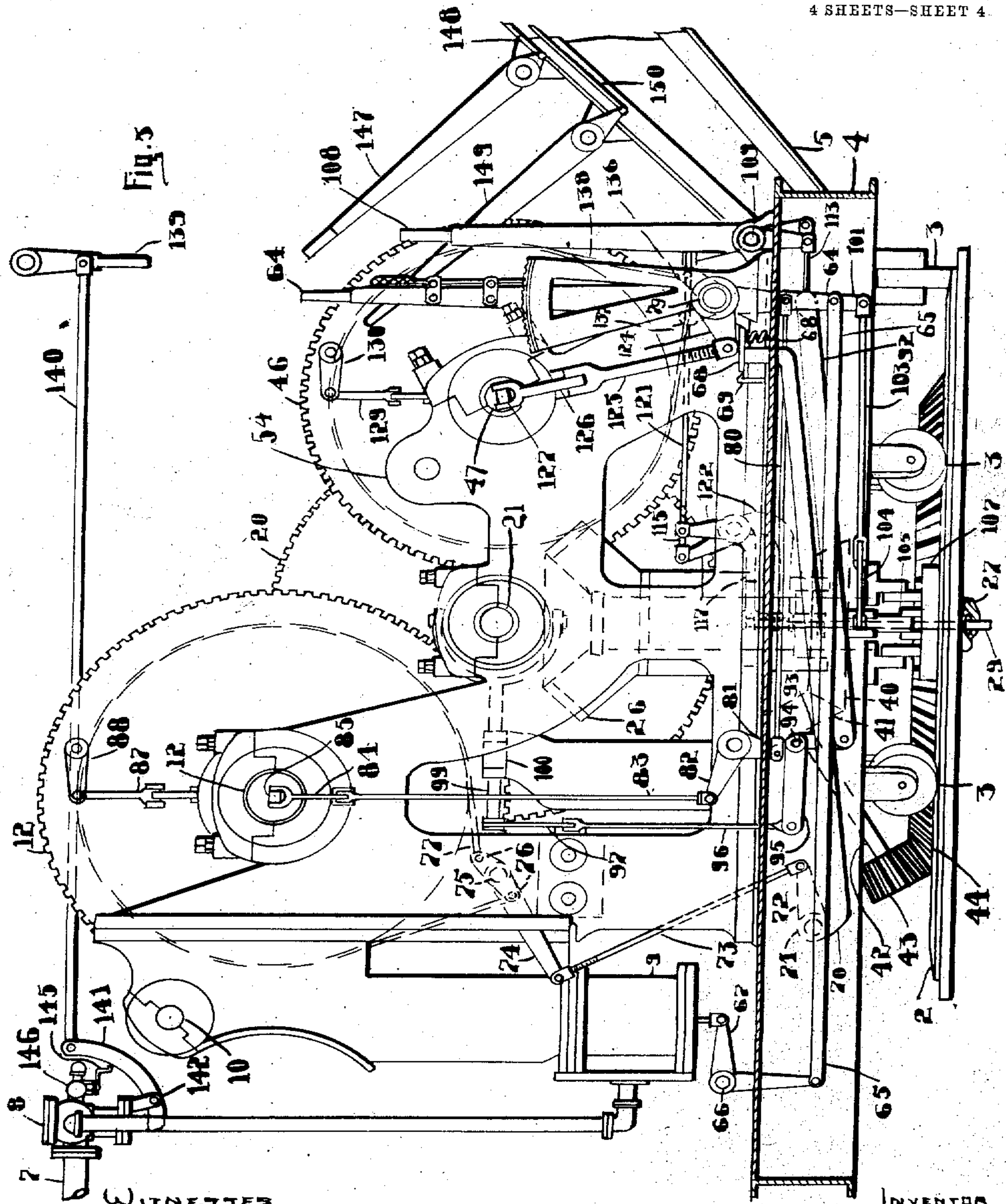
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# UNITED STATES PATENT OFFICE.

JOHN B. WEBBER, JR., OF TOLEDO, OHIO, ASSIGNOR TO THE VULCAN IRON WORKS COMPANY,  
OF TOLEDO, OHIO, A CORPORATION OF OHIO.

## EXCAVATOR.

No. 907,431.

Specification of Letters Patent.

Patented Dec. 22, 1908.

Application filed January 15, 1908. Serial No. 410,892.

*To all whom it may concern:*

Be it known that I, JOHN B. WEBBER, JR., a citizen of the United States, residing at Toledo, Lucas county, Ohio, have invented a new and useful Excavator, of which the following is a specification.

This invention relates to a machine having in combination a plurality of features, and more especially to the control of the complex machine and its features.

This invention has utility when embodied in a power excavator in which the several features may be simply and effectively handled with ease and speed in such succession and together as the necessities of operation require.

Referring to the drawings: Figure 1 shows an embodiment of the invention in a steam shovel; Fig. 2 is a medial transverse section on an enlarged scale of the excavator shown in Fig. 1 in side elevation with housing partially removed; Fig. 3 is a plan view, with housing removed, of prime mover, some of the features driven thereby and some of the control connections; Fig. 4 is a fragmentary view showing in vertical section the pivot shaft and clutch connections; Fig. 5 is a side elevation with parts broken away to more clearly show the assemblage of the controlling devices; Fig. 6 is a detail view showing dipper or shovel door unlatching device; Fig. 7 is an enlarged showing of the power mechanism for operating the unlatching device; Fig. 8 is a detail in elevation of the throttle showing the connections to actuate the exhausting valve; and Fig. 9 is a fragmentary plan of the elevating device connections to actuate the boom.

The wheel truck 1 (Fig. 1) has on its platform a circular track 2, on which travel a plurality of bearing rollers 3 antifrictionally sustaining the swingable platform 4, upon which is mounted the boom 5. Remotely from the boom 5 on platform 4 is the boiler 6, supplying through main 7 and throttle valve 8 steam for the prime movers 9. The prime movers 9 (Fig. 3) drive shaft 10 mounted in frame carried by the platform 4. On shaft 10 is pinion 11 in mesh with gear wheel 12 on shaft 13. Also mounted on shaft 13 is hoisting drum 14, which by flexible means 15 (Fig. 1) passing over pulley 16 on the boom 5, comprises the hoist for the digging member or shovel 17 provided with the directing member 18 movably mounted in the boom 5.

On shaft 13 (Fig. 3) is pinion 19 in mesh with gear wheel 20 on shaft 21, which has centrally of platform 4 oppositely disposed bevel gears 22, 23, each having clutch portions 24 (Fig. 2). These gears 22, 23, are loosely mounted on shaft 21, while disposed between them and splined on shaft 21 is slidable double faced clutch member 25 movable to frictionally engage gear 22 or 23, which gears are in mesh with bevel gear 26 on central shaft 27, herein shown as the pivot pin for swingable platform 4.

Collar 28 on shaft 27 (Fig. 4) has connection by stem 29 centrally of shaft 27 with bevel gear 30 loosely mounted on shaft 27. The gear 30 is provided with a clutch face coacting with clutch member 31 fixed on shaft 27, whereby gear 30 may be driven to actuate bevel gear 32 meshing therewith (Fig. 2). Bevel gear 32 is mounted on shaft 33 beneath the truck platform 1, and has thereon wheels 34 connected by chains 35 (Fig. 1) to wheels 36 on axles 37 which carry the wheels 38 of the truck 1. Also mounted on shaft 27 is collar 39 provided with a clutch face. This collar 39 is splined on shaft 27, and is reciprocable to engage clutch face of bevel gear 40 loosely mounted on shaft 27. Meshing with bevel gear 40 (Fig. 5) is bevel pinion 41 on shaft 42 having gear 43 coacting with toothed way 44 on the platform of truck 1, the driving of which connections effect the swinging of the platform 4.

On shaft 21 (Fig. 3) is pinion 45 meshing with gear wheel 46 on shaft 47. The shafts 13, 21, 47, are mounted in a common frame on the platform 4. On shaft 47 is double drum 48, 49, from each portion of which extend reaches 50 (Fig. 1) of the flexible means passing over pulleys 52 (Fig. 2) held by links 51 (Fig. 1) extending from the A-frame stepped in lugs 54 of the drum shaft frame. Rearwardly extending bars 55 brace the A-frame 53. By thus strutting the A-frame between the downwardly tending forces near its top against the upwardly acting forces upon the drum carrying frame, a most rigid and compact construction is produced which will not be distorted in operation to work itself loose.

Taking flexible means attached to drum 48 (Fig. 3), it extends over right hand pulley 52 (the left Fig. 2) to corresponding pulley 56 in block 57 on boom 5 (Figs. 1 and 9), thence back over the same pulley 52, about pulley



58, from whence it extends similarly over the other pulleys 52, 56 and 52 back to drum 49 (Fig. 3), thus continuous to insure uniform action in operating the device in elevating the boom. The laterally spaced reaches of the flexible connection of the boom elevating device, besides permitting the boom to locate in a stable central position, allow for uninterrupted passage of connection 15 of the hoist as well as upward extension of directing member 18 through the boom 5.

Connected to the boiler 6 (Fig. 1) is steam line 59 extending to the boom 5. On the boom 5 is prime mover 60 driving pinion 61 to rotate gear wheel 62 having connection with rack 63 on the directing member 18, whereby the shovel 17 may be thrust away or drawn toward the boom.

Forwardly and near the right hand corner of platform 4 (Fig. 3) is the operator's station, without moving from which station an operator may control the many operations of this power driven machine.

Hand lever 64, (Fig. 5) through link 65 may rock shaft 66 having arm 67 effective to control and reverse prime movers 9. Foot lever or treadle 68 held thrown by spring catch 69 against resistance of spring 68' has arm 70 (Figs. 3 and 5) connected to rock shaft 71. Arm 72 on shaft 71 is connected by link 73 with lever 74 having pivot 75. The lever 74 has two arms 76 connected to band friction 77 on drum 14 to serve as a brake in stopping the shovel hoist, and which may be partially set in lowering the shovel. Hand lever 78 rocks the pivot shaft 79 on which it is mounted (Figs. 3 and 5) which at its inner end has an arm connected to reciprocate link 80 connected to bell crank lever 81, 82, having link 83 connected to bell crank 84 (Fig. 2) to reciprocate stem 85 in shaft 13. The stem 85 is connected to collar 86, the reciprocating of which through linkage 87 effects rocking of cranked shaft 88 carried by gear wheel 12. On the opposite side of gear wheel 12 from linkage 87, cranked shaft 88 has arm 89 connected to friction band 90 about drum 14, so that by tightening the band there is a friction clutch to drive the hoist from wheel 12.

Hand lever 91 (Figs. 3 and 5) by link 92 rocks shaft 94 having arm 95 connected by link 96 to bell crank lever 97 (Fig. 2) which reciprocates link 98 connected to lever 99 having pivot 100. Lever 99 remote from link 98, is forked to engage clutch member 25, whereby rocking of hand lever 91 in one direction will clutch one of the gears 22, 23, (splined on shaft 21) to drive shaft 27 in one direction, while opposite movement of the hand lever will drive shaft 27 in a reverse direction. Foot lever 101 spring upheld and pivoted on shaft 79 has catch 102. One arm of the lever 101 extends below platform 4 to link 103 connected to bell crank 104 (Figs. 3

and 5), which is connected to the toggle having links 105 and 106 (Fig. 2) the latter connected to platform 4, and the former carrying brake shoe 107, which by movement of the treadle 101 may be moved against track 2 on platform 1 to brake the swing travel of table 4. Hand lever 108 mounted on rock shaft 109 extending across the forward portion of platform 4 (Fig. 3) serves to control pawl 110 movable into engagement with ratchet wheel 111 on shaft 47, of the boom elevating device, thereby serving to effectively lock the boom in adjusted position. Hand lever 112 is connected by link 113 to rock sleeve 114 on shaft 109 (Fig. 3), which sleeve may reciprocate link 115 connected to arm of rock sleeve 116, which has arm 117 engaging collar 28 (Fig. 4) on shaft 27. Hand lever 118 is connected by link 119 to rock sleeve 120 surrounding sleeve 114 on shaft 109. Sleeve 120 through link 121 engages an arm 122 of rock shaft in sleeve 116, the other arm of which rock shaft 122 engages collar 39 on shaft 27 (Fig. 4). Accordingly hand lever 112 serves to connect and disconnect the truck propelling mechanism, while hand lever 118 connects and disconnects the platform swinging mechanism. Hand lever 123 (Fig. 3) has arm 124 (Fig. 5) which through link 125 rocks bell crank 126 to reciprocate stem 127 in shaft 47. The stem 127 is connected to collar 128 on shaft 47, which collar through linkage 129 effects rocking of cranked shaft 130 carried by wheel 46. On the side of wheel 46 opposite linkage 129, cranked shaft 130 has arm 131 engaging friction band 132 about drum 48, 49, forming a friction clutch for driving the elevating device from wheel 46. Foot lever 133, spring raised, (Fig. 3) is held down by catch 134. This lever or treadle 133 is connected to rock shaft 135 extending across the forward portion of platform 4, which rock shaft has arms 136, 137 (Fig. 5) connected to friction band 138, so that in controlling the elevating device there is a brake which may be additionally used in lowering the boom by partially setting friction and throwing out pawl 110 until adjusted position desired is reached.

At the operator's station and above the bank of levers just described is lever 139 connected by link 140 to lever 141 (Figs. 5 and 8) having pivot 142. This lever 141 loosely fits above pin 143 in forked valve stem 144 of the throttle 8. The throttle is of the balanced type and is readily controlled, so in starting the stem 144 downward it will go to its seat leaving pin 143 spaced from lever 141. With the prime movers 9 thus shut off and say with the shovel swung over a wagon but a little high for dumping, a further or continued movement of lever 139 will cause lever 141 to contact lever 145 and open the small valve 146, which may be of the whistle



type, thereby slowly exhausting the steam power from the prime movers and allowing the shovel to settle slowly and with far greater nicety than can be accomplished by a friction brake, as brake 77. The certainty of this feature is a safeguard against damage to wagons in dumping therein. Extending to the operator's station is hand lever 147 on the boom 5 (Figs. 1 and 5) which by link 148 controls and reverses prime mover 60 on the boom 5. Another lever 149, on the boom 5 extends to the operator's station. This hand lever is connected by link 150 (Figs. 1, 6 and 7) to stem 151 and serves to control admission of steam and direction of action of piston in cylinder 152. Connected to the piston in cylinder 152 is piston rod 153 co-acting with lever 154 which through stem 155 shuts off the power when stem 153 has traveled a distance proportionate with throw of hand lever 149. Piston rod 153 carries pulley 156 about which extends flexible means 157 passing over pulleys 158 grouped on block 159 for shaft of wheel 62. One end of the cable 157 is connected to the directing member remote from the shovel 17, while the other end of the cable extends to the pin 160 of the latch on shovel door 161. Movement of pulley 156 away from the group 158 will pull the latch pin 160 to release the door 161, so that dumping may take place. This action is brought about by movement of hand lever 149 in one direction to admit steam in the upper end of cylinder 152, and as the piston rod 153 travels down, the steam is automatically cut off. A further movement of hand lever 149 in the same direction, would cause still more travel of rod 153, while a reverse movement of hand lever 40 would slacken cable 157 to permit pin 160 to latch door 161 closed when the shovel is swung back. This reverse movement of the hand lever to admit steam to lower side of cylinder 152 automatically cuts off steam by lever 154 and stem 155 in a manner similar to that cut off in other movement of the hand lever. At one side of the boiler 6 is the fuel box 162, while at the opposite side is the water tank 163 (Fig. 2<sup>nd</sup>).

What is claimed and it is desired to secure by Letters Patent is

1. A power excavator comprising a body, wheels for sustaining the body, a platform mounted on the body, a pivot pin for the platform, and means for driving the pivot pin for swinging the platform on the body.
2. A power driven working member comprising a wheeled truck, a swingable platform mounted on the truck, a pivot shaft for the platform, a toothed way on the truck, and a gear meshing with the way and driven from the pivot shaft to actuate the platform.
3. A truck, a swingable platform mounted thereon, a working element, a prime mover for actuating the working element, for swing-

ing the platform and for propelling the truck, the connections to actuate the platform comprising a central shaft, a gear and a clutch for connecting the gear to the shaft.

4. A power driven machine comprising a wheeled platform truck, a swingable platform, bearing rollers intermediate the truck platform and the swingable platform, and a brake shoe mounted on the swingable platform and movable to engage the truck platform.

5. A power driven machine comprising a wheeled truck, a swingable platform mounted on the truck, a reversible driving shaft pivotally disposed relatively to the platform, driving connections between the shaft and truck, and actuating means for the shaft including a clutch member shiftable from intermediate idle position to engage to propel the truck forwardly and rearwardly.

6. A power driven machine comprising a wheeled truck, a swingable platform, a prime mover on the platform, a shaft driven by the prime mover, a pivot pin for the platform, clutching means connecting the pin for either direction driving from the shaft, and connections from the pin to the platform whereby the platform may be swung in either direction.

7. A power excavator comprising a wheeled truck, a swingable platform, propelling means for the truck, a shaft centrally of the platform, a clutch to connect the shaft to the propelling means, a prime mover, and a two-way clutch to connect the shaft for opposite direction driving whereby the truck may be caused to travel forwardly and rearwardly.

8. A power driven machine comprising a truck, a swingable platform, propelling means for swinging the platform, a central shaft in the platform, a clutch to connect the shaft to the propelling means, a prime mover, and a two-way clutch to connect the shaft for opposite direction driving whereby the platform may be caused to swing in two directions.

9. A power driven excavator comprising a swingable platform, an adjustable boom carried by the platform, a digging member movably mounted in the boom, means for thrusting the member relatively to the boom, a prime mover, digging member hoisting means driven by the prime mover, and a boom elevating device also connected to the prime mover.

10. A power driven machine comprising a swingable platform, an adjustable boom carried by the platform, a digging member mounted in the boom, a digging member hoist, a boom, means for thrusting the member relatively to the boom elevating device, a platform swinging mechanism, and a prime mover controllably connected to operate the hoist, device and mechanism.

11. A power excavator comprising a truck



platform having an operator's station, a swingable boom mounted on the platform, a digging member carried by the boom, a prime mover on the boom to thrust the digging member, and controlling connections for the digging member extending to the operator's station on the boom sustaining platform.

12. A power excavator comprising a boom, a shovel, a directing member for the shovel mounted in the boom, said shovel having a door, a latch for the door, flexible connections from the latch to the boom and member, and intermediate means for varying the effective length of the connections to operate the latch.

13. A platform, a boom mounted on the platform, an A-frame, a device to adjust the boom comprising a drum, flexible means having two reaches extending from the drum, and pulleys mounted on the A-frame and boom about which the flexible means continuously extends to automatically distribute tension and insure uniform action in adjusting the boom.

14. A platform, a boom mounted on the platform, a working member operated from

the boom, a power actuated mechanism having connections coacting with the boom, said mechanism including a frame resting upon the platform, and an A-frame for the boom stepped on said frame.

15. A platform, a boom mounted on the platform, a working member operated from the boom, driving mechanism for the member, a prime mover for the mechanism, a controller for shutting off the power to the prime mover, and an exhausting device actuable through continued movement of the controller to permit escape of power from the prime mover to enable accurate handling of the working member.

16. A power shovel, and a coacting device for the shovel comprising the combination with a prime mover and throttle of an exhausting valve for the prime mover and connections to the throttle movable to actuate the exhausting valve.

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

J. B. WEBBER, JR.

Witnesses:

M. W. PLATT,  
GEO. E. KIRK.

Correction in Letters Patent No. 907,431.

It is hereby certified that in Letters Patent No. 907,431, granted December 22, 1908, upon the application of John B. Webber, Jr., of Toledo, Ohio, for an improvement in "Excavators," an error appears in the printed specification requiring correction, as follows: In lines 125-6, page 3, the words "means for thrusting the member relatively to the boom" should be stricken out and inserted after the word "boom" in line 124, same page; and that the proper correction has been made in the files and records of the Patent Office, and is hereby made in said Letters Patent.

Signed and sealed this 2nd day of March, A. D., 1909.

[SEAL.]

C. C. BILLINGS,  
Acting Commissioner of Patents.



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