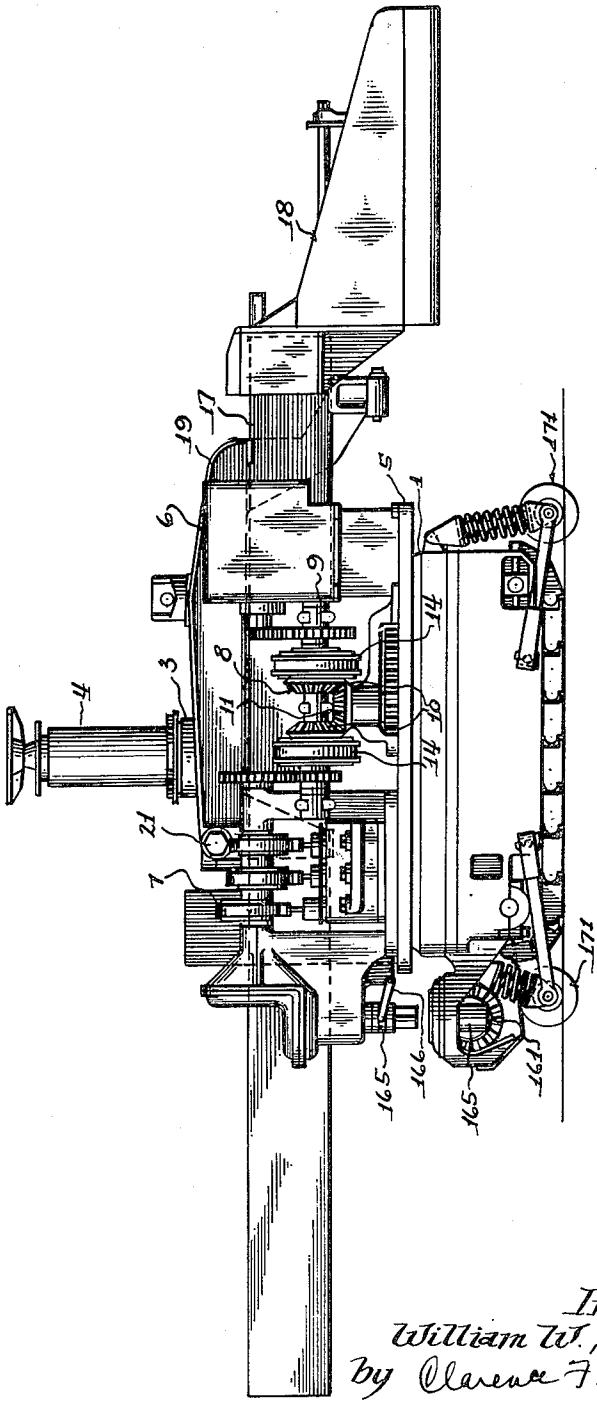
May 28, 1929. W. W. SLOANE 1,715,149

PROPULSION MEANS FOR POWER SHOVELS AND THE LIKE

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Fig. 1



Inventor
William W. Sloane
by Clarence F. Poole
Attorney

May 28, 1929. W. W. SLOANE 1,715,149

PROPULSION MEANS FOR POWER SHOVELS AND THE LIKE

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Fig. 3

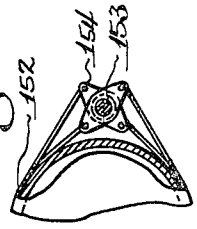
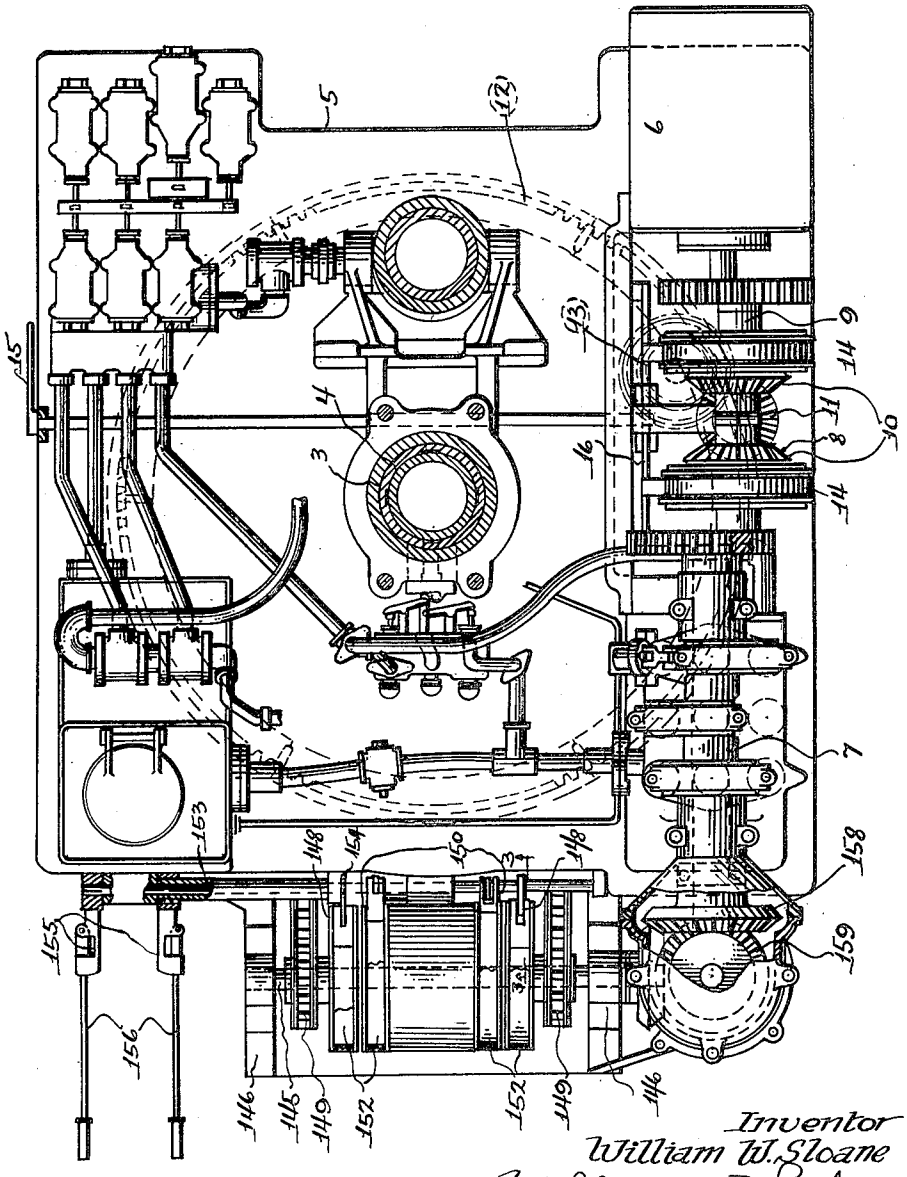


Fig. 2



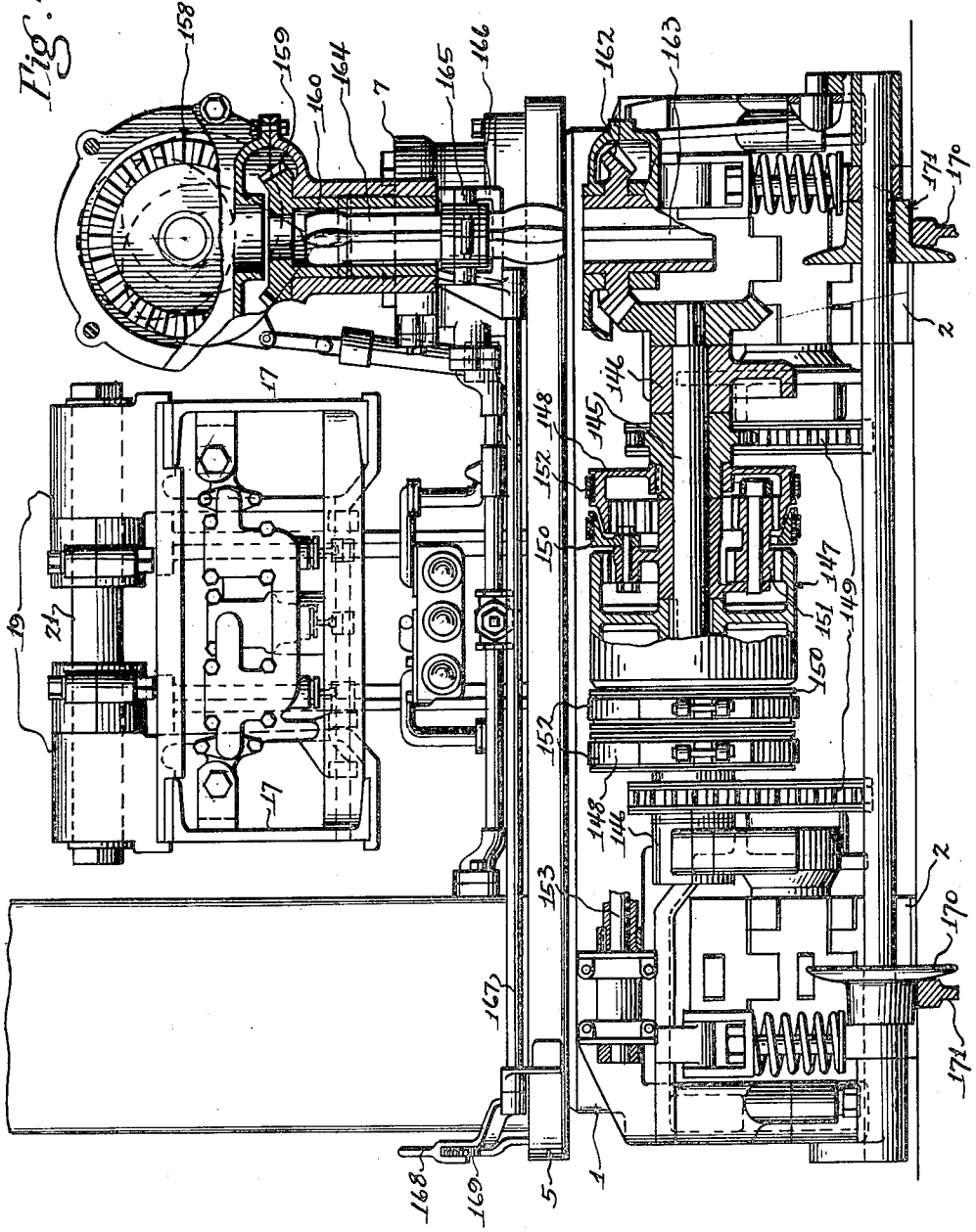
Inventor
William W. Sloane
By Clarence J. Poole
Attorney

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PROPULSION MEANS FOR POWER SHOVELS AND THE LIKE

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Fig. 4



Inventor
William W. Sloane
by Clarence J. Poole
Attorney

Patented May 28, 1929. 1,715,149

UNITED STATES PATENT OFFICE.

WILLIAM W. SLOANE, OF CHICAGO, ILLINOIS, ASSIGNOR TO GOODMAN MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PROPULSION MEANS FOR POWER SHOVELS, AND THE LIKE.

Original application filed October 29, 1925, Serial No. 65,549. Divided and this application filed April 30, 1926. Serial No. 105,630.

This invention relates to continuous tread propulsion means and particularly to such means as applied to power shovels although not limited to this use alone, and the general objects thereof reside in the provision of such means which is well adapted for its purpose and which is particularly adapted for application on power shovels for use in confined spaces, such as in mines.

Referring now to the drawings:

Figure 1 is a side elevation of a power shovel embodying one form of my invention;

Figure 2 is a horizontal sectional view through the central part of the machine;

Figure 3 is an enlarged partial section on the line 3—3 of Figure 2; and

Figure 4 is a rear elevation of the machine with parts broken away and in section and with parts omitted.

Like numerals refer to like parts throughout the several figures.

Referring to the drawings 1 designates a base frame which is carried on laterally spaced continuous tread mechanisms 2 of usual construction which are adapted for the propulsion of the shovel.

Mounted centrally upon the base frame 1 is a vertically disposed cylinder 3 containing a piston 4, arranged so that the piston may be raised by fluid pressure to engage a fixed part, such as a roof, thus forming a holding jack for the machine while it is in operation.

A turntable or rotatable frame 5 is carried by the base 1 for movement axially about the vertically disposed cylinder 3, as best shown in Figure 4, and this turntable carries the major portion of the operating mechanism.

An electric motor 6 and a fluid pressure pump 7 are mounted on the turntable and are disposed in horizontal longitudinal arrangement along one side thereof. A reduction gear transmission mechanism 8, including a counter shaft 9, operably connects the adjacent ends of the shafts of the motor and pump. See Figures 1 and 2. Carried for independent rotation on the counter shaft 9 is a pair of opposing bevel gears 10, and these gears oppositely mesh with a revoluble bevel gear 11 carried with the turntable 5, and this bevel gear is operably connected with a large internal gear 12, secured on the base 1 and disposed coaxially with the turntable, by means of a gear train 13, carried with the turntable for angularly moving the turntable on the base. See Figures 1 and 2.

Releasable frictional driving devices 14, of usual construction, are carried on the counter shaft 9 for operable connecting respective bevel gears 10 with the counter shaft 9 to drive the turntable in either direction from the motor 6, said devices being manually controlled for normal release and for alternate engagement by means of a hand lever 15 on the opposite or control side of the turntable and operably connected with said devices by means of suitable mechanism 16.

Carried with the turntable is a beam 17 which carries a scoop 18 secured at the front end thereof. The beam comprises two longitudinal members disposed on opposite sides of the centrally disposed holding jack, and is mounted for longitudinal movement upon an elevating arm 19. This elevating arm is journaled at its rear end on a shaft 21, carried by the turntable at an elevated point to the rear of the holding jack, for providing vertical movement of the scoop.

Operation of the holding jack and of the scoop is effected hydraulically, under manual control, in a manner unnecessary to be described, the pump 7, driven by the motor 6, supplying the fluid pressure for this purpose.

Means is provided whereby the continuous tread mechanisms are driven in a controlled manner and will now be described. A horizontal transversely disposed transmission shaft 145 is journaled in spaced bearings 146 at respective sides of the frame 1 at the rear thereof. See Figures 2 and 4. A primary internal gear member 147 is secured on this shaft intermediate said bearings. Two final drive internal gear members 148 are journaled on the shaft 145 between said primary gear member 147 and respective of said bearings 146, and chain and sprocket drive devices 149 serve to drive said continuous tread mechanisms 2 from respective adjacent final drive gear members 148. Two intermediate members 150 are journaled on the shaft 145 between said primary gear member 147 and respective final drive members 148, and planetary gears 151 are carried by respective of said intermediate members and mesh with said primary gear members 147 and respective adjacent final drive members 148 for driving the same from said primary gear member. The final drive mem-

bers 148 and the intermediate members 150 are provided with external friction brake surfaces and surrounding respective of these surfaces are brake bands 152 contractable on these surfaces for frictionally engaging the same.

Journaled on the rear end of the base frame 1 is a pair of horizontal transversely disposed telescoped shafts 153, and secured on each of these shafts is a pair of arms 154. See Figures 2 and 3. Each pair of these arms 154 is pivotally connected at diametrically opposite points to the ends of respective of a pair of said brake bands 152 respectively engageable with an intermediate member 150 and the associated final drive member 148. These arms are adapted for releasably contracting the brake bands 152 about respective of said brake surfaces, by angular movement of respective of said shafts 153, and the arms of each of these pairs are angularly spaced for alternately engaging the respective brake bands with respective brake surfaces with opposite pivotal movements of the respective shaft 153. See Figure 3. Frictional engagement of the respective bands 152 with said intermediate members 150 effects a drive from the shaft 145 to respective continuous tread mechanisms in an obvious manner, and frictional engagement of the respective band 152 with said final drive members 148 effects retarding of respective continuous tread mechanisms in a likewise obvious manner.

It will be observed that each shaft 153 controls the brake bands 152 of a respective continuous tread mechanism for alternately driving or retarding the same, so that either or both continuous tread mechanisms may be driven from the shaft 145 or either mechanism driven and the other retarded for steering the shovel while it is propelled.

For purposes of manually controlling the shafts 153 a pair of radial arms 155 are secured on respective shafts 153, and a pair of hand levers 156 are detachably engaged with respective of said arms and project rearwardly from the frame 1 for actuation by an operator standing on the ground whereby the operator controls the propulsion and steering of the shovel while walking along with the shovel by manipulation of the levers 156. When the shovel is not being moved the levers 156 may be detached from the arms 155 so that they cause no interference.

The manner in which the shaft 145 is driven from the motor 6 will now be described. As hereinbefore described the motor 6 and pump 7 are disposed in horizontal longitudinal arrangement along one side of the turntable, and the turntable is operated angularly from the reduction gear transmission operably connecting the adjacent ends of the motor and pump shafts. Secured on the rear end of the shaft of the pump 7 is a bevel gear 158, and a bevel gear 159 is journaled on a vertical axis on an extension 160 at the rear end of the base of the pump 7 and meshes with the gear 158. Secured on the end of the shaft 145 corresponding with the side of the turntable on which the pump 7 is disposed is a bevel gear 161, and a bevel gear 162 is journaled on a vertical axis on an extension 163 of the base 1 and meshes with the gear 161. The gears 159 and 162 are disposed to align in the position of the turntable shown in the drawings. The gears 159 and 162 are provided with splined axial bores, and a splined positive clutch shaft 164 is engaged in the bore of the gear 159 for driving and for axial movement with respect thereto to engage the splined bore of the gear 162 for driving and to disengage therefrom, as shown in the drawings, to permit angular movement of the turntable on the base. A shifter collar 165 is mounted on the intermediate portion of the clutch shaft 164, and this shifter collar is engaged by a lever 166 secured on a transversely disposed pivoted shaft 167 carried on the turntable. A hand lever 168 is also secured on the shaft 167 for axially moving the clutch shaft into and out of engaging position, and a usual latch device 169 is associated with this hand lever for releasably securing the clutch shaft 164 in the axial positions thereof. See Figure 4.

In order that the shovel may be conveniently moved along railway tracks with the continuous tread mechanisms 2 engaged on respective rails 170 of the track for propelling movement therealong, removable guide means, generally indicated at 171, is provided which is unnecessary to be described for the present purposes. This guide means is fully described and claimed in my co-pending application for Letters Patent of the United States for improvement in track guided vehicles, Serial No. 105,629, filed April 30, 1926, which is a division of my co-pending application for Letters Patent of the United States for improvements in power shovels. Serial Number 65,549, filed October 29, 1925, of which latter application this application is also a division.

While I have shown herein and described one form of my invention, I do not wish to be limited to the precise details of construction or arrangements herein shown and described except as specifically limited in the appended claims.

I claim as my invention:

1. In a device of the character described, the combination with a frame and two cooperating laterally spaced continuous tread mechanisms carrying the same, of a horizontal transversely disposed transmission shaft journaled in spaced bearings at respective sides of the frame, a primary gear member secured on the shaft intermediate said bearings, two final drive gear members journaled on the shaft between said primary gear mem-

ber and respective of said bearings for driving respective adjacent continuous tread mechanisms and provided with external brake surfaces, two intermediate members journaled on the shaft between said primary gear member and respective final drive members and provided with external friction brake surfaces, planetary gears carried by said intermediate members and meshing with said primary gear member and respective adjacent final drive gear members, friction brake devices engageable with respective brake surfaces, and a pair of manually actuated devices each adapted for alternately engaging the brake devices of a respective intermediate member and the associated final drive member.

2. In a device of the character described, the combination with a base and a turntable carried by the base for movement thereon, of two cooperating laterally spaced continuous tread mechanisms carrying the base, an electric motor on the turntable, transmission mechanism on the base comprising a pair of manually controlled releasable frictional driving devices for independently driving respective continuous tread mechanisms, a pair of manually controlled releasable friction brake devices for retarding respective continuous tread mechanisms, and means for driving said transmission mechanism from the motor including cooperating positive clutch members carried respectively with the base and turntable and disengageable to permit movement of the turntable on the base.

3. In a device of the character described, the combination with a base and a turntable carried on the base for movement thereon, of continuous tread means carrying the base, an electric motor on the turntable, and means for operably connecting the motor with said continuous tread means and including cooperating positive clutch members carried respectively with the base and turntable and disengageable to permit movement of the turntable on the base.

4. In a device of the character described, the combination with a base and a turntable carried by the base for movement in a horizontal plane, of propulsion means carrying the base, a prime mover on the turntable, and means for operably connecting the prime mover with said propulsion means and including cooperating positive clutch members carried respectively with the base and turntable on vertical axes aligned in one position of the turntable, one of said clutch members being axially movable for engagement and disengagement with the other.

5. In a device of the character described, the combination with a base and a turntable carried by the base for movement thereon in a horizontal plane, of continuous tread means carrying the base, an electric motor on the turntable and disposed on a horizontal axis, a pair of meshed bevel gears on the turntable one of which is disposed on a horizontal axis for driving from the motor and the other of which is disposed on a vertical axis, a revoluble transmission member on the base for driving said continuous tread mechanism and disposed on a vertical axis aligning with said second mentioned bevel gear in one position of the turntable, and a positive clutch member for operably connecting said second mentioned gear and transmission member and engaged and carried with one thereof for driving and for axial movement with respect thereto to engage and disengage the other.

6. In a device of the character described, the combination with a base and a turntable carried by the base for movement thereon in a horizontal plane, of propulsion mechanism carrying the base, a transmission member carried by the base for driving said propulsion mechanism and disposed on a horizontal axis, a pair of meshed bevel gears on the base one of which is disposed on a horizontal axis for driving said transmission member and the other of which is disposed on a vertical axis, a prime mover on the turntable and disposed on a horizontal axis, a second pair of meshed bevel gears on the turntable one of which is disposed on a horizontal axis for driving from the prime mover and the other of which is disposed on a vertical axis aligning with said second mentioned gear in one position of the turntable, and a positive clutch member carried and engaged with one of said gears disposed on vertical axes for driving and for axial movement to engage and disengage the other of these gears.

7. In a device of the character described, the combination with a base and a turntable carried by the base for movement thereon, of continuous tread means carrying the base, an electric motor and a fluid pressure pump on the turntable and disposed in horizontal longitudinal arrangement, means operably connecting the adjacent ends of the shafts of the motor and pump, releasable means operably connected with said last mentioned means for driving the turntable on the base from the motor, and means operably connected with the other end of the pump shaft for driving said continuous tread mechanism from the motor and adapted for permitting movement of the turntable on the base.

8. In a device of the character described, the combination with a base and a turntable carried by the base for movement thereon in a horizontal plane, of continuous tread means carrying the base, an electric motor and a fluid pressure pump on the turntable and disposed in horizontal longitudinal arrangement along one side thereof, reduction gear transmission means operably connecting adjacent ends of the shafts of the prime mover and pump and including a counter shaft, releasable means operably connected with

said counter shaft for driving the turntable on the base from the prime mover, a pair of meshed bevel gears carried with the turntable one of which is secured on the other end of the pump shaft and the other of which is disposed on a vertical axis, a transmission member on the base for driving said continuous tread means and disposed on a vertical axis aligning with said second mentioned gear in one position of the turntable, and a positive clutch member for operably connecting said second mentioned gear and said transmission member and engaged and carried with one thereof for driving and for axial movement with respect thereto to engage and disengage the other.

Signed at Chicago, in the county of Cook and State of Illinois, this 28th day of April, A. D. 1926.

WILLIAM W. SLOANE.