March 24, 1931. W. WHALEY 1,797,459

SHOVELING MACHINE

Filed Sept. 15, 1927 4 Sheets-Sheet 1

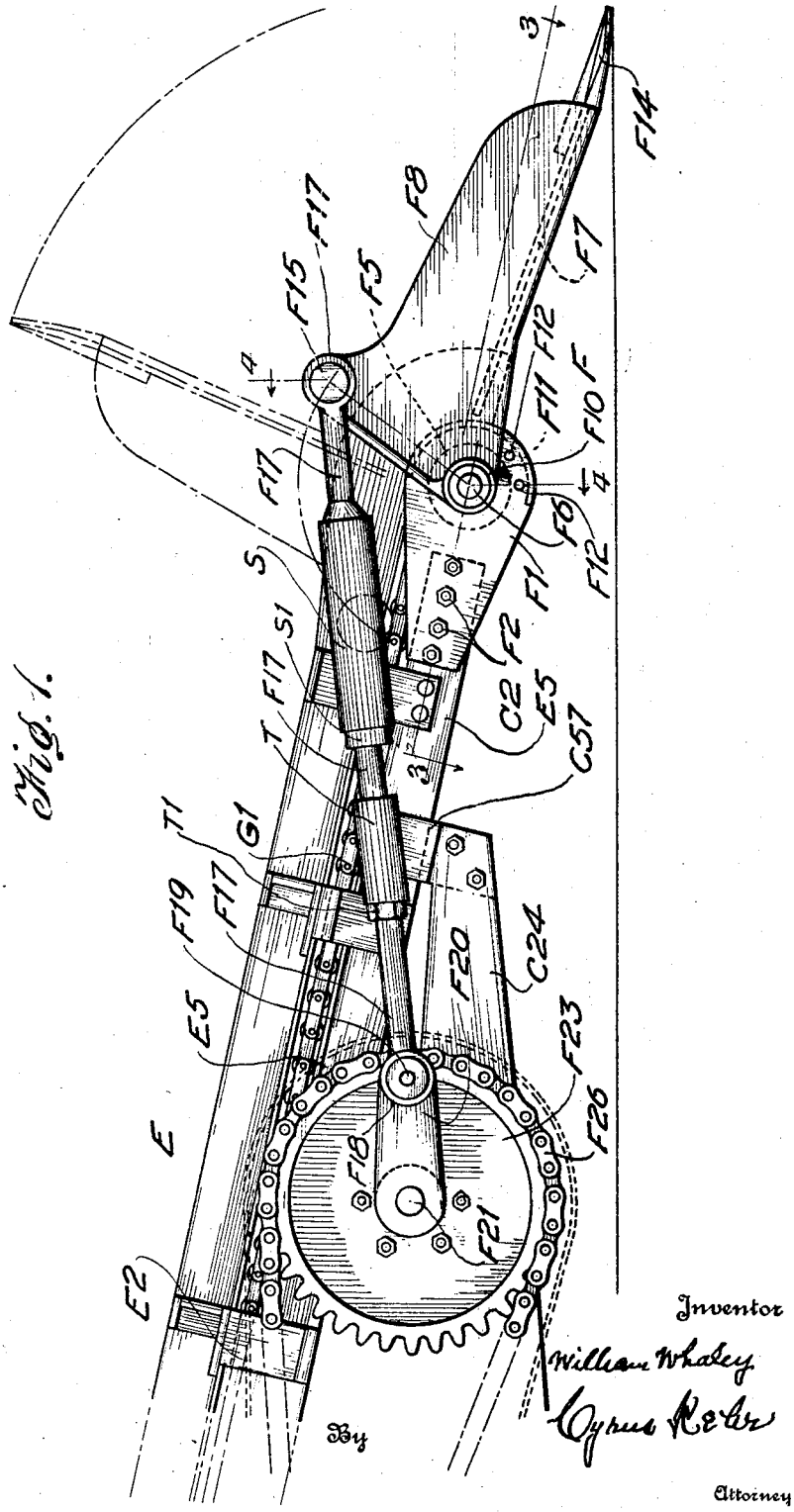


Fig. 1.

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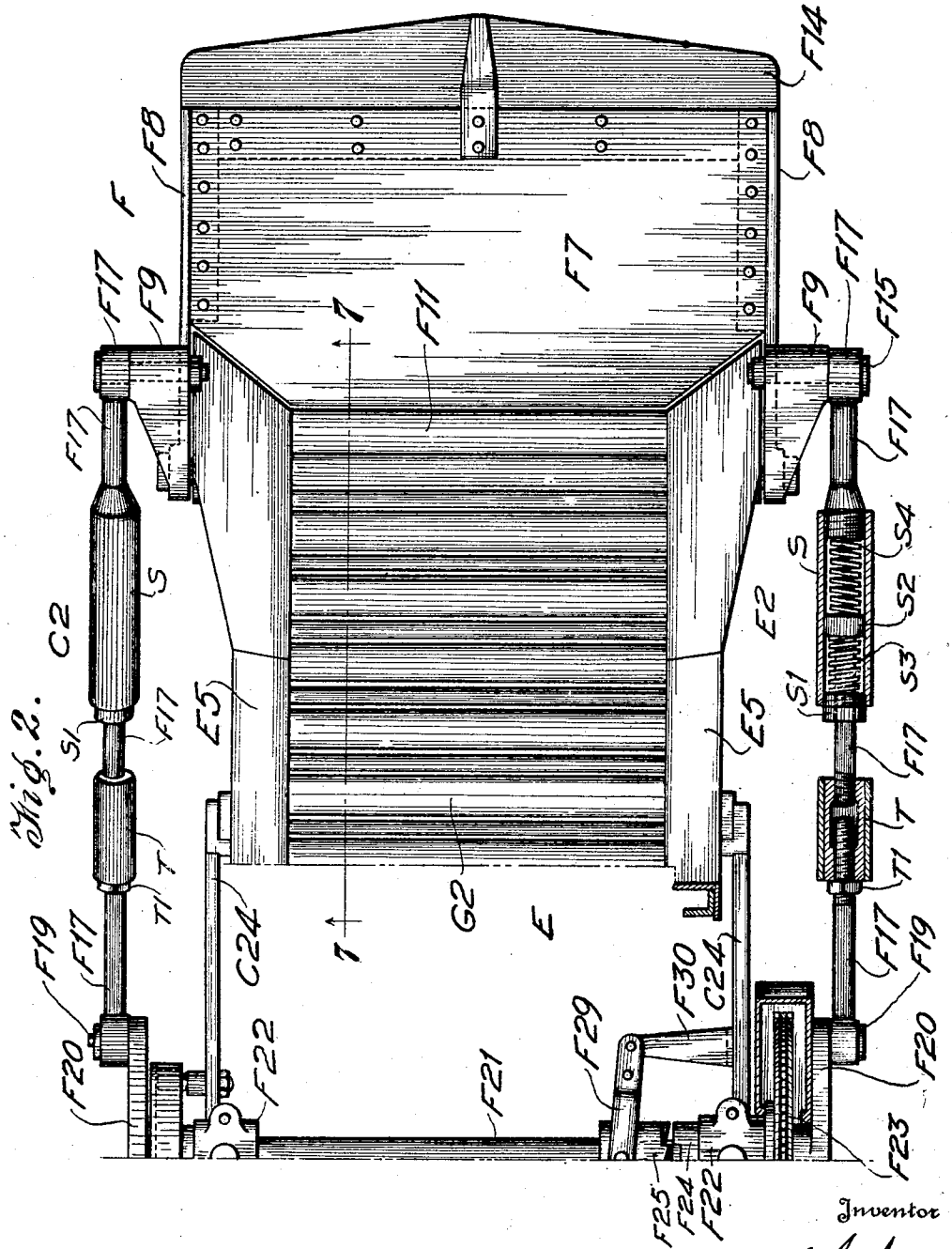


Fig. 2.

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Fig. 7.

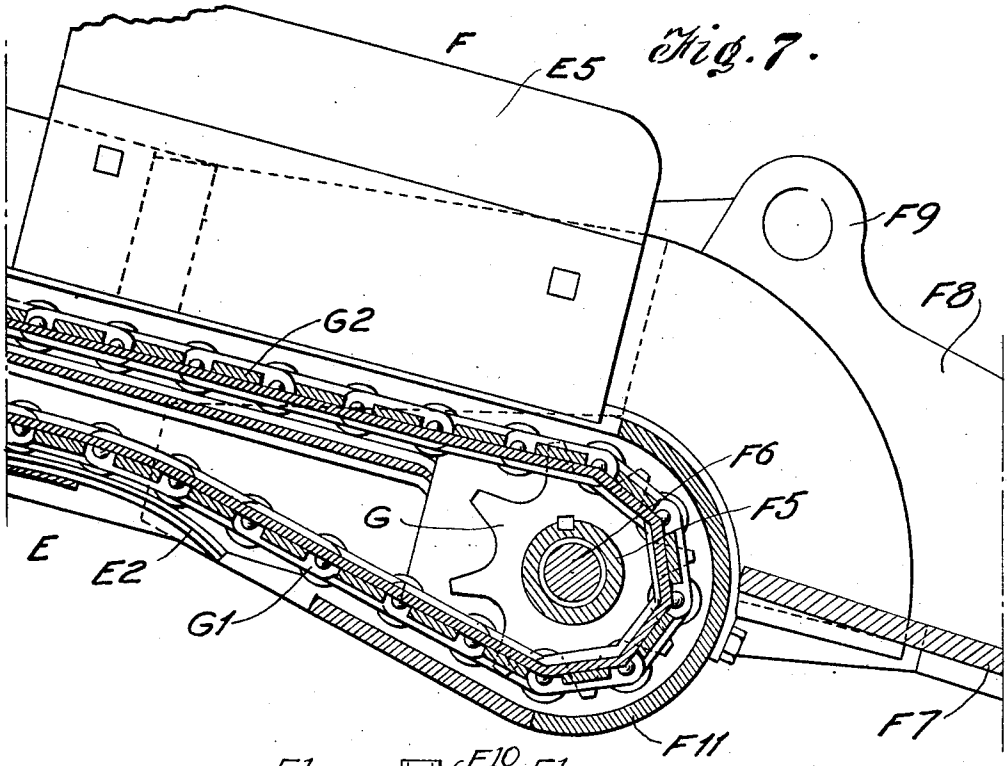
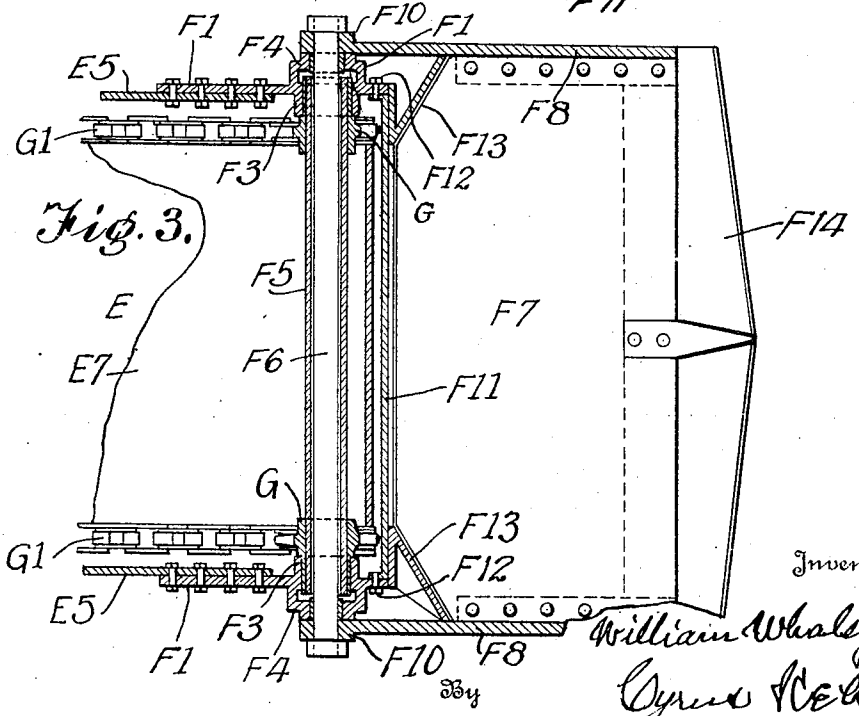


Fig. 3.



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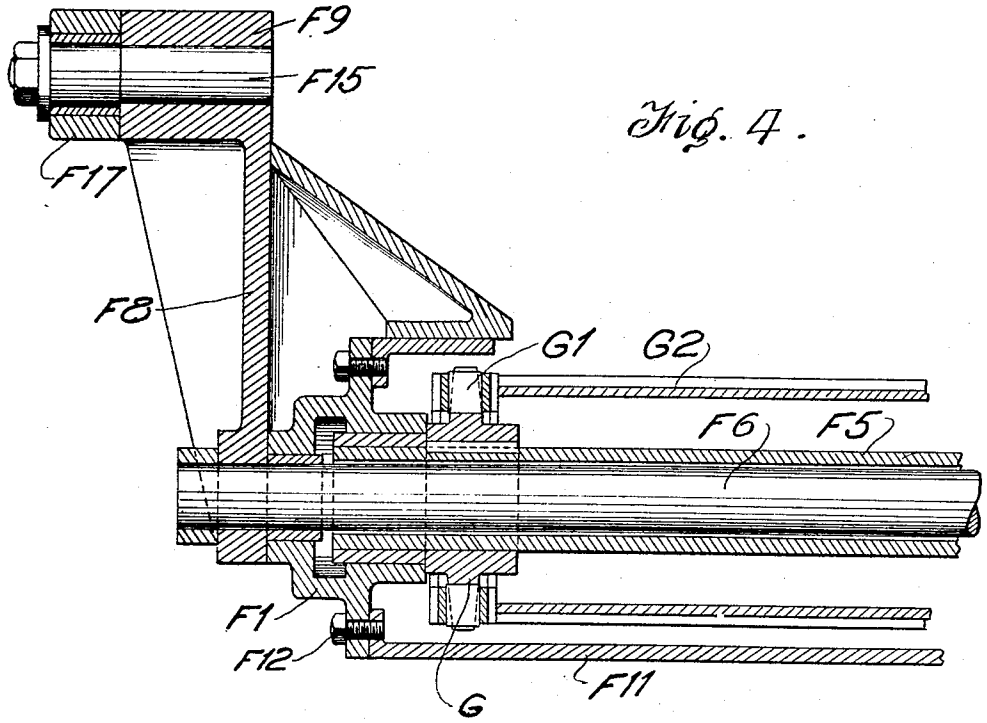


Fig. 4.

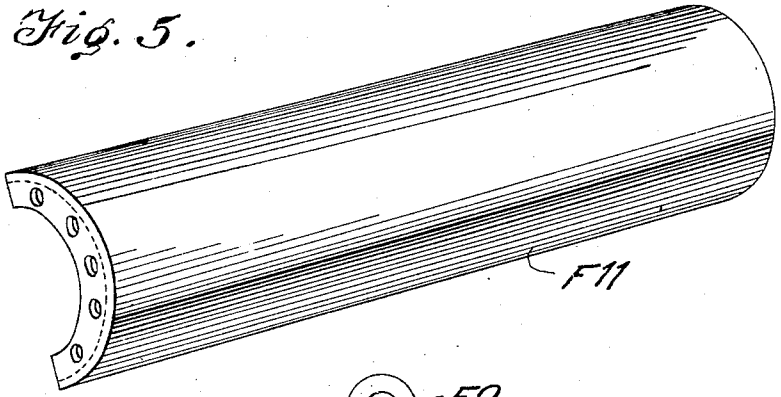


Fig. 5.

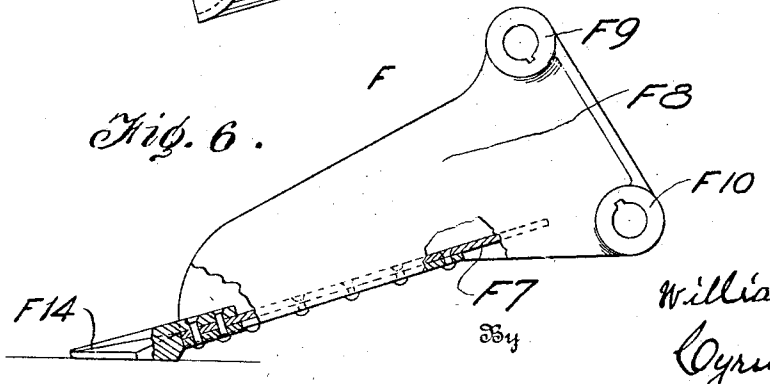


Fig. 6.

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Patented Mar. 24, 1931 1,797,459

UNITED STATES PATENT OFFICE

WILLIAM WHALEY, OF KNOXVILLE, TENNESSEE

SHOVELING MACHINE

Application filed September 15, 1927. Serial No. 219,713.

This invention relates particularly to machines for shoveling coal, loose rock, and similar material. For machines of this type, reference is made to my Letters Patent of the United States, No. 940,999, dated November 23, 1909, and No. 1,379,428, dated May 24, 1921.

The object of this invention is to produce a new form of shovel and shovel-actuating mechanism for machines of the types disclosed by the above-mentioned patents.

In the accompanying drawings,

Fig. 1 shows an elevation of the right hand side of the forward part of a machine embodying my improvement;

Fig. 2 is a plan of the part of the machine shown in elevation by Fig. 1;

Fig. 3 is a section on the line, 3—3, of Fig. 1, looking downward;

Fig. 4 is a transverse section on the line, 4—4, of Fig. 1, looking toward the left;

Fig. 5 is a perspective of a boot for the forward end of the jib;

Fig. 6 is a detached detail view of the shovel, parts being broken away;

Fig. 7 is an upright section on the line, 7—7, of Fig. 2.

In machines of the types disclosed by the above-mentioned patents, there is a main frame or body supported on four ordinary wheels adapted to rest on track rails or on the ground. On the frame or body is a forward-directed jib on which is an endless apron in front of which is a shovel associated with means for actuating the shovel for taking material from the ground or floor and delivering the material to the endless apron to be carried backward for discharge from the rear end of the machine.

My improved shovel, F, and means for actuating the shovel are applied to the forward end of such a jib. The rear end of the shovel is supported on an axis which is horizontal and at right angles to the length of the jib.

Shovel

At the forward end of each side rail of the frame section, E2, a steel casting bearing piece, F1, is attached to the outer face of said rail by means of four bolts, F2. (Figs. 1, 3 and 4.) Each of these pieces has an inner horizontal bearing, F3, and an outer horizontal bearing, F4, on the axial line of the bearing, F3. A hollow shaft, F5, rests rotatably in the bearings, F3. A shaft or axle, F6, extends loosely through the hollow shaft, F5, and rests rotatably in the outer bearings, F4.

The shovel, F, has a bottom, F7, and upright sides, F8, on the rear upper part of which is a horizontal bearing, F9, these bearings being on the same horizontal axial line. Below each bearing, F9, and below the level of the bottom, F7, is a similar bearing, F10, which extends over the outer face of the adjacent outer bearing, F4. Each end of the shaft, F6, extends through the bearing, F4, into the adjacent bearing, F10, and is immovably secured in said bearing, whereby the shovel and said shaft are compelled to rock in unison.

The forward part of each bearing piece, F1, is rounded concentric with the shaft, F6. Thus a semi-circular edge is formed. A cast steel boot, F11, is curved to be concentric with the shaft, F6, and has its ends bearing against the inner face of the semi-circular part of each bearing piece, F1. (Fig. 5.) Cap screws, F12, extend horizontally through the bearing pieces into the ends of the boot. This connection between the boot and the bearing pieces extends from the lower part of the bearing piece to its upper part above the shaft, F6. (Figs. 3 and 7.) The function of this boot is to shield the forward lower part of the conveyor belt or apron, G2.

At each bearing plate there is a side plate, F13, which reaches over a part of the adjacent forward face of the boot, F11, and thence obliquely forward and outward. The rear edge of the shovel bottom, F7, is cut to meet the front face of the boot and the oblique faces of the plates, F13. The upright sides, F8, of the shovel are extended rearward far enough beyond the bottom, F7, to support the bearings, F9 and F10. Attached to the forward edge of the shovel bottom, F7, is a steel lip, F14.

At the inner end of each bearing, F3, a

sprocket wheel, G, surrounds and is keyed to the hollow shaft, F5. A sprocket chain, G1, is applied to each sprocket wheel, G, and extends rearward along the jib to other sprocket wheels. With these members are associated means (not shown) for driving said chains. Said chains constitute parts of the endless conveyor belt or apron, G2.

Shovel operation

In operation, the shovel is to be in approximately the horizontal position—usually with its lip on the floor—while the entire machine is moved forward to drive the shovel under the material which is to be loaded. When the shovel is thus under the material, it is to be turned on the shaft, F6, to which the lower bearings, F10, of the shovel are secured, as already described.

This turning of the shovel raises its forward part until the bottom, F7, of the shovel is about even with the upper edge of the boot, F11, and is sufficiently inclined toward the conveyor belt to cause the material on the shovel bottom to slide downward and rearward onto the conveyor belt. When the material has been thus discharged, the shovel is to be turned in the reverse direction to again be in position to receive material by being moved forward by the bodily forward movement of the machine. These movements of the shovel are to be carried on indefinitely.

The mechanism by which these movements are effected will now be described.

At each side of the shovel, a wrist, F15, extends outward from the upper bearing, F9, and into the bearing, F16, on the forward end of the adjacent pitman rod, F17. The rear end of said pitman rod has a bearing, F18, which receives the wrist, F19, on the crank, F20, which is fixed on the crank shaft, F21, which rests in bearings, F22, seated on the side members, C24, of the jib yoke.

On each pitman rod, F17, is a turn buckle, T, threaded in the usual manner on two sections of said rod. (Figs. 1 and 2.) At one end of the turn buckle a jam nut, T1, surrounds the rod. Its function is to set or bind the turn buckle after the buckle has been adjusted for varying the length of the rod. This turn buckle is to be regarded as screw mechanism for manually adjusting the length of the rod. On each pitman rod is also placed cushioning means for yieldingly resisting longitudinal strains on said rod. On the forward section of the rod is fixed the forward end of a barrel, S. In the rear end of said barrel is a bearing, S1, in which rests slidably the middle section of the rod, F17. On the forward end of said section is fixed a head, S2, which is slidable in the barrel, S. Between said head and the bearing, S1, an expanding coiled spring, S3, surrounds said middle section and yieldingly resists forward movement of the bearing, S1, and the barrel S, and the forward section of the rod and the shovel bearing, F9, whereby limited downward movement of the front of the shovel is yieldingly resisted. Within the barrel and in front of the head, S2, is an expanding coiled spring, S4, which yieldingly resists rearward movement of said barrel and the forward section of the rod and the shovel bearing, F9, and upward movement of the forward part of the shovel. Permitting such upward movement of the shovel is desirable when the lip of the shovel, during its forward movement, meets a rising surface, and such downward movement is desirable when the lip of the shovel meets a descending surface. Said springs also permit yielding as may be required when the forward part of the forward jib section rises or descends relative to the forward part of the rear section of the jib, as will be described further on. Such movement is then needed, because the crank shaft and the hinge of the forward jib section are not in the same axial line.

For driving the crank shaft, F21, a sprocket wheel, F23, surrounds the crank shaft, F21, between the right hand crank, F20, and the adjacent bearing, F22, and has a hub, F24, seated in and extending through the bearing, F22. The part of the hub which extends beyond the bearing is flanged outward to overlap the outer end of said bearing for holding said hub against outward movement through said bearing. (Figs. 1 and 2.) Said end of the hub is also notched to make one member of a toothed clutch which is adapted to be engaged by the sliding keyed clutch member, F25, surrounding the shaft, F21. The sprocket wheel, F23, is driven by a sprocket chain F26, applied to the wheel, F23, and driven from a source of power not shown.

The clutch member, F25, is controlled by a horizontal shift lever, F29, having its forward end coupled to the horizontal bracket, F30, secured to the inner face of the right hand yoke member, C24, and having its rear end coupled to means for shifting (not shown). When the forward end of the lever, F29, is driven toward the right, the clutch member, F25, is driven into engagement with the hub, F24, of the wheel, F23. Then the crank shaft, F21, receives rotation from the sprocket wheel, F23. Then the cranks F20, are turned and each pitman is reciprocated for the reciprocation of the bearings, F9, of the shovel, whereby the shovel is put through its movements.

I claim as my invention,

In a shoveling machine, the combination with a jib of a shovel having bearings, a pair of duplex bearings at the forward end of the jib, said bearings being on a common axial line which is horizontal and transverse to the length of the jib, the inner bearing of each pair being of larger diameter than the

adjacent outer bearing, a rotary tubular shaft having one end resting in one inner bearing and having its other end resting in the other inner bearing, conveyor wheels surrounding and fixed to said tubular shaft adjacent each inner bearing, and a shaft of smaller diameter extending loosely through the inner bearings and resting in and extending through the outer bearings and into the shovel bearings.

In testimony whereof I have signed my name, this 7th day of September, in the year one thousand nine hundred and twenty-seven.

WILLIAM WHALEY.