July 6, 1926. 1,591,764

O. J. MARTINSON

TRACTION MECHANISM

Filed March 23, 1926 4 Sheets-Sheet 1

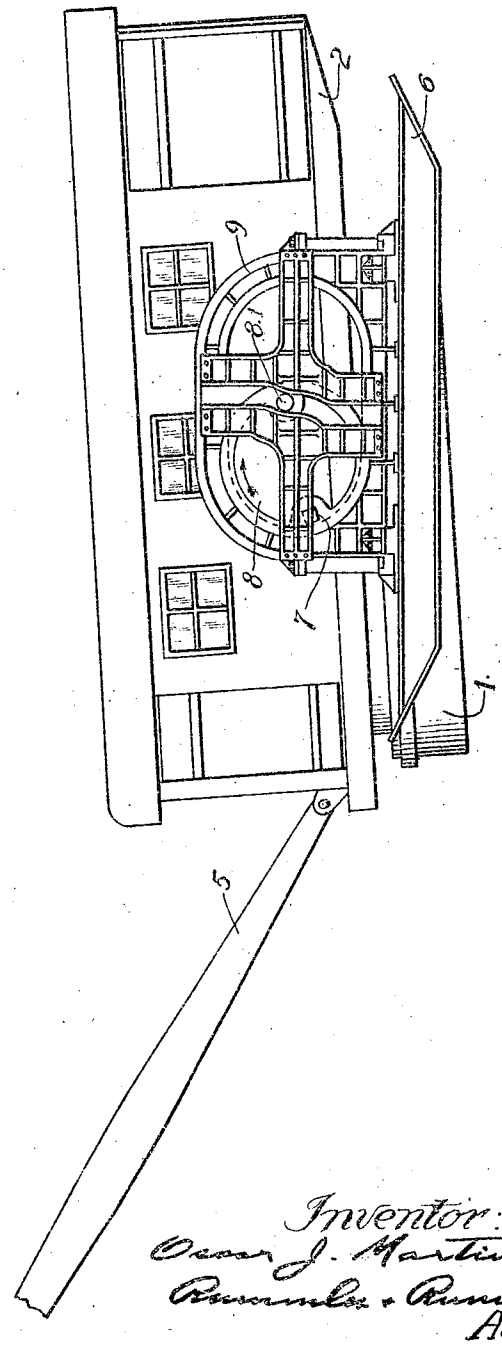


FIG. 1

Inventor:
Oscar J. Martinson
Rummler & Rummler
Atty's

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O. J. MARTINSON

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FIG. 3

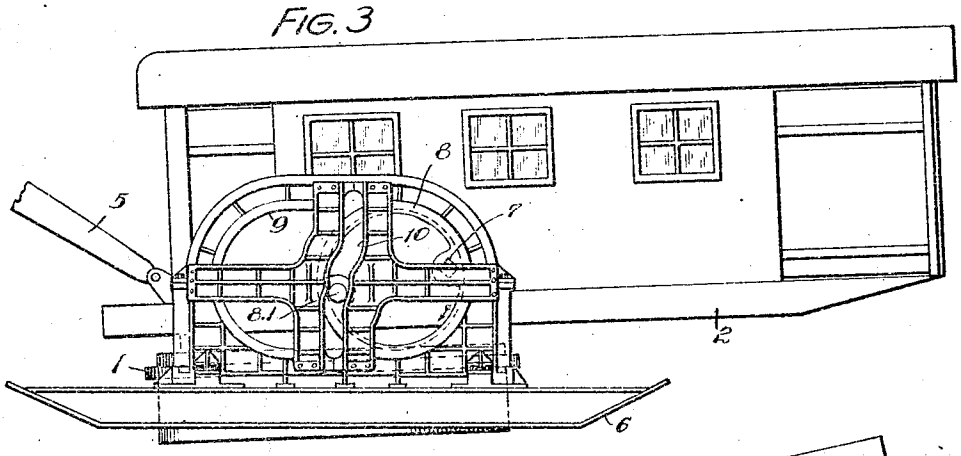


FIG. 2

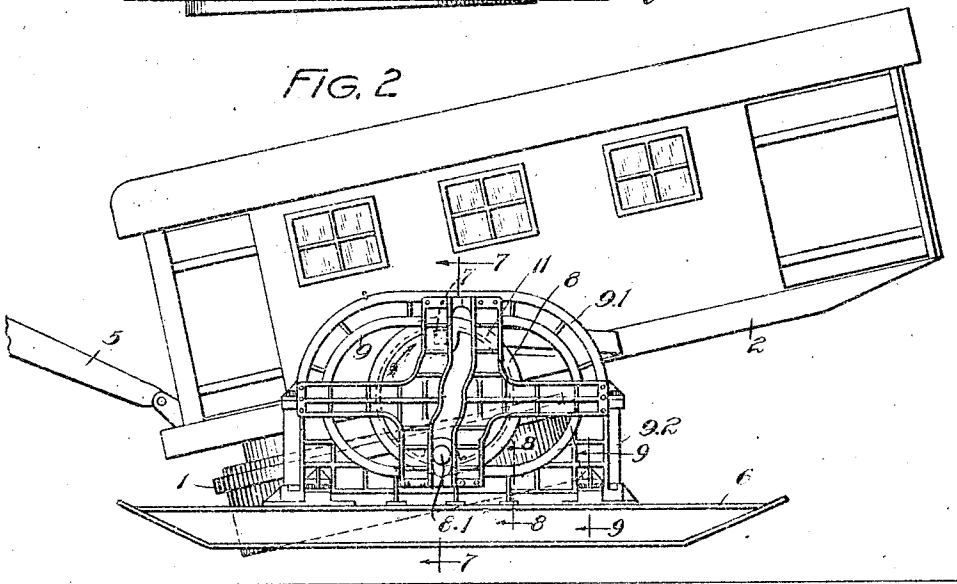
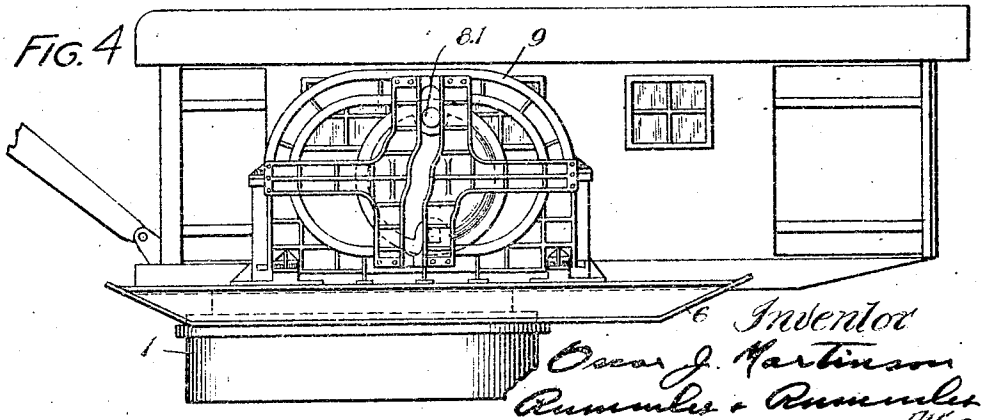


FIG. 4



Inventor
Oscar J. Martinson
Rummler & Rummler
Attys

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O. J. MARTINSON

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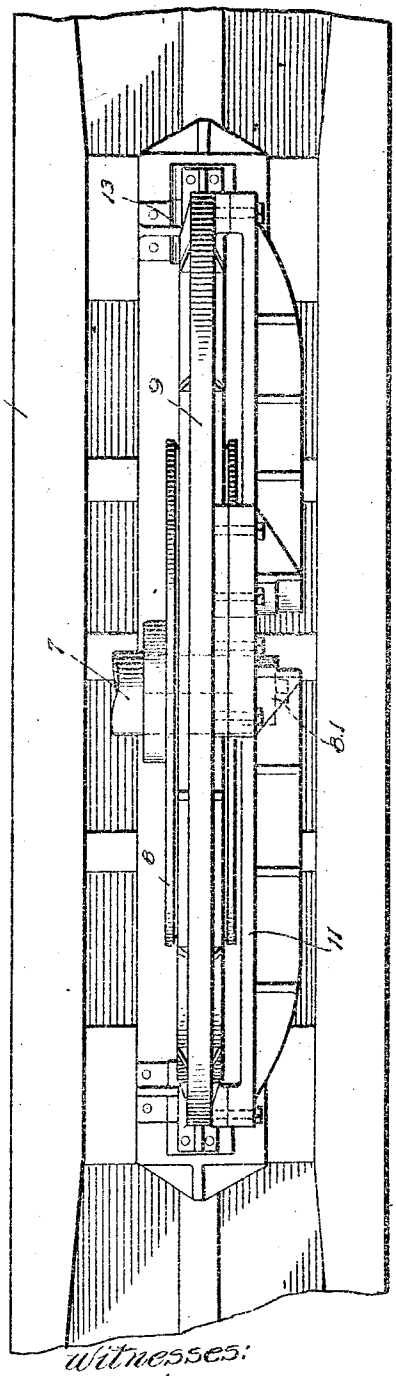


FIG. 5

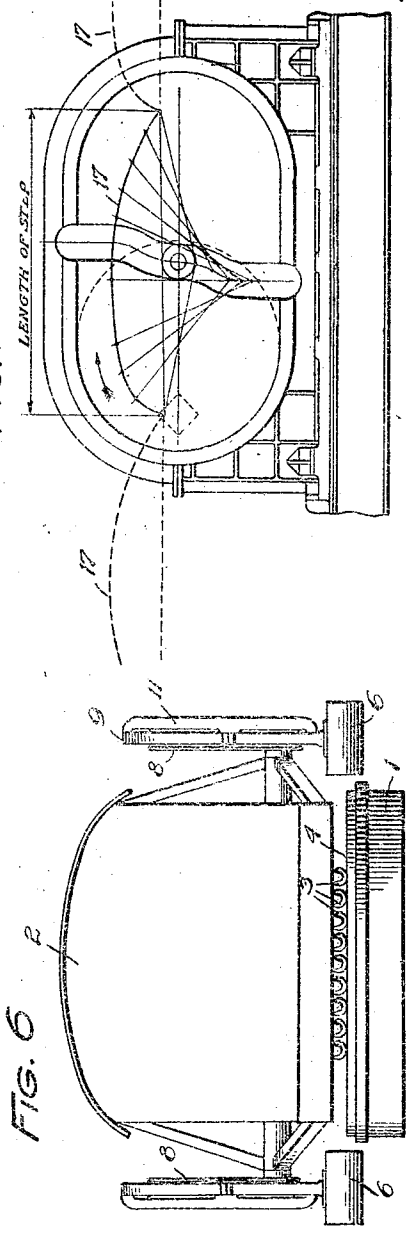


FIG. 10

FIG. 6

Witnesses:
W. A. Snow

Inventor
Oscar J. Martinson
Rummler & Rummler
Attys

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O. J. MARTINSON

TRACTION MECHANISM

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FIG. 6A

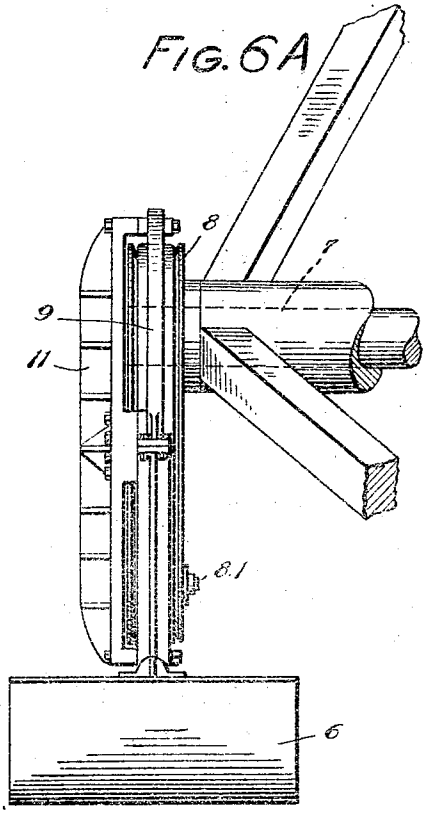


FIG. 7

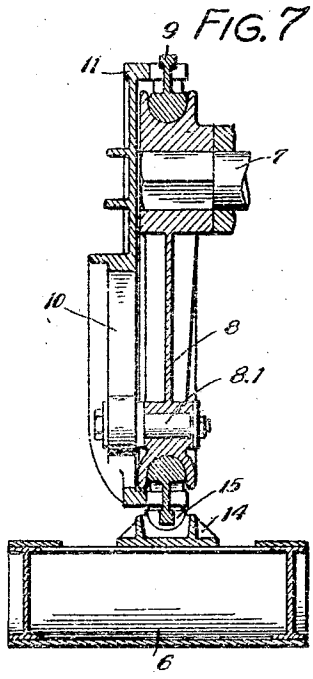


FIG. 8

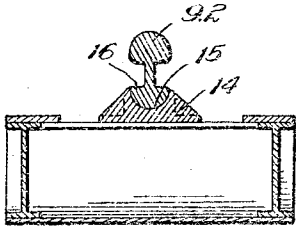
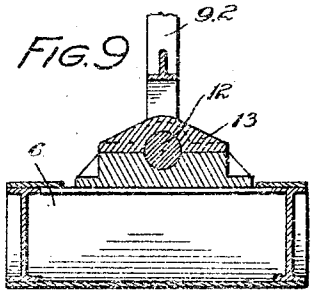


FIG. 9



Inventor
Oscar J. Martinson
Assumbo & Assumbo
Attys

Patented July 6, 1926. 1,591,764

UNITED STATES PATENT OFFICE.

OSCAR J. MARTINSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO MONIGHAN MACHINE CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TRACTION MECHANISM.

Application filed March 23, 1926. Serial No. 96,822.

This invention relates to walking tractors of the type shown in my co-pending application for patent, filed April 24, 1925, Serial No. 25,567, and more particularly to an improved construction of the movable side treads and driving mechanism therefor.

The main objects of the invention are to provide an improved mechanism for alternately raising, advancing and lowering the driven machine and its traction means or side treads. Other objects are to provide an improved form eccentric and wrist pin mechanism, whereby the eccentric is allowed to slip at one end of the horizontal movement for raising the machine abruptly to clear the edge of a depression or other obstruction before advancing it; to provide a construction of this kind in which the enclosing track structure is effectually and properly guided in the plane of the cam and is properly reinforced and strengthened; and to provide an improved traction mechanism which is substantial and adapted to withstand the severe strains to which such mechanisms are subjected in the service of large excavating machines and the like.

This invention is chiefly characterized by providing a wrist pin and cam slot arrangement of improved design for governing the horizontal movements of the tread with respect to the excavator body, together with an eccentric and elongated enclosing track for governing the vertical movements, the slot being provided in a frame structure which also serves as a guide for preserving proper alinement of the track and eccentric.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Figure 1 is a side elevation of the body portion of a drag line excavator, showing the improved walking mechanism in operation with the turntable commencing to be tilted to clear obstructions, before advancing.

Fig. 2 shows the same at a time when the tilting is at its maximum and the turntable is being dragged along the ground.

Fig. 3 shows a position of the parts when the body has reached the end of a step and is settling down to a level position.

Fig. 4 is similar to Fig. 1 and shows the side treads in raised position and advanced half-way in their horizontal movement.

Fig. 5 is a fragmental plan view of one of the side treads.

Fig. 6 is an end elevation of the excavator with the treads in the position shown in Fig. 4.

Fig. 6[a] is an enlarged end elevation and shows the tread lowered.

Fig. 7 is a section on the line 7—7 of Fig. 2.

Fig. 8 is taken on the line 8—8 of Fig. 2.

Fig. 9 is taken on the line 9—9 of Fig. 2.

Fig. 10 is a diagram showing the curve representing the path traversed in space by the center of the shaft 7 as the machine moves along.

In the form shown in the drawings, the turntable base 1 normally supports the body 2. The weight of the body 2 is borne by an annular series of wheels 3, roughly indicated in Fig. 6, which run on the circular track 4 of the base 1, and the turntable base 1 is rotatably secured to a central post (not shown) in the body, so that the base is lifted as a unit with the body.

The boom 5, of which a fragment is shown, is attached to one end of the body 1, and is ordinarily equipped with a drag line bucket or other excavating device commonly used. This is usually referred to as the front of the machine, but since the walking movements are in a direction away from the boom, the words "forward" and "rearward," as herein used, should be construed as applying to the direction of travel.

The walking treads 6 are located on each side of the body, and pivotally attached thereto at a point forward of the center of gravity of the body, which is weighted, as shown, at one end by the long boom 5. As a result, when the treads, which work in unison, are thrust downwardly, the advancing edge of the base or turntable 1 is lifted to clear the ground, and the rearward portion of the base drags when the excavator is propelled along on the treads.

For mounting the treads 6, a transverse horizontal shaft 7 is journaled in the body 2 and extends transversely therethrough. The shaft 7 is driven by an engine which is carried in the body portion 1, but not shown in the drawings.

On the outer ends of the shaft 7 are eccentrically secured a pair of flanged wheels or eccentrics 8, which are similarly positioned on the shaft to rotate in unison. Each wheel is provided with an outwardly projecting crank or wrist pin 8.1 which is pref-

erably positioned at a point diametrically opposite to the boss in which the squared end of the shaft 7 is secured.

The flanged wheels 8 are embraced by the elongated track frame 9 mounted on the treads 6, and the pins 8.1 fit loosely in vertically disposed guide or cam slots 10 provided in the side guide frames 11 which are rigidly secured across the track frame 9. The track frames 9 are made in two parts, the upper half 9.1 and the lower half 9.2, which are bolted together at the ends. The treads 6 are pivotally mounted on the lower edges of the track frames, so as to be capable of swinging sidewise to suit the slope of the ground. Cylindrical parts 12 of the track frames rest on bearing blocks on top of the treads 6, and the latter are held in place by bearing caps 13, as shown in Figure 9. The side frames 11 may be built up, as shown, of two T-shaped sections bolted across the halves of the track frame 9, the slot 10 being formed between the two sections. In the frame structure just described, the metal is well distributed for obtaining the maximum longitudinal and transverse strength and stiffness without excess weight. The horizontal members of these side frames 11 prevent the frame 9 from getting out of true fore and aft alinement with the eccentrics 8.

When the weight of the excavator is being borne by the treads and the eccentrics 8 are rolling on the lower straight portion of the track 9, the load is communicated to the treads through the sub-base members 14. Each member 14 is secured on the top of its tread 6 and has in its upper edge a groove 15 which is concave and concentric with the axis of the cylindrical parts 12. The track frame is provided with a convex circular edge 16 which fits in the groove 15. By this construction the treads may tilt sidewise. The bearing caps 13 are used for lifting the treads.

The track 9 has upper and lower straight portions which both engage the grooved or flanged eccentric wheel 8, as shown in Fig. 7, and has semi-circular end portions. The wheel has both rolling and sliding relation to the track as determined by the action of the wrist pin and slot. The track is then lifted and runs rearwardly with the upper straight surface bearing on the top of the wheel; and the wheel then slips in the track as the machine is lifted, the front end of the track at this time being in contact with the wheel. The slot is suitably curved to allow for the desired slippage during the lifting of the machine when the cam is at the front end of the track frame.

In Figure 2, the advancing end of the turntable is raised and the excavator is being dragged forwardly or to the right of the drawing, the drive shaft being rotated clockwise.

In Figure 4, the treads are fully lifted and are being advanced with the upper straight portions of the tracks 9 riding on the tops of the wheels 8, which are shown in the highest position with respect to the drive shaft 7.

In Figure 3, the shaft has rotated about 80 degrees from the position shown in Figure 1. The wheel has rolled forwardly in the track and the turntable has about come to rest on the ground. The cam slot being now substantially tangent to the motion of the wrist pin, further rotation of the eccentrics will lift the floats or treads rapidly before advancing them.

In Figure 1 the treads are shown fully advanced and the body is commencing to be lifted. The cam slots are so shaped that the lifting of the body or treads is rapid at first with little advancing movement, then the advance is rapid and is accompanied by a gradual lowering of the body or treads, as the case may be. The path of the shaft 7 is shown by the curve 17 of Figure 10.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention, as defined by the following claims.

I claim:

1. In a walking tractor, a body having an eccentric rotatably mounted thereon, said eccentric having a crank pin, and a tread member having a horizontally elongated opening engaging the eccentric and having a cam slot coacting with the crank pin.

2. In a walking tractor, a body, movable treads located on opposite sides of the body, a horizontal shaft rotatably mounted in the body and extending therethrough, flanged wheels eccentrically mounted on the ends of the shaft, upstanding yoke frames attached to each tread and each having an elongated opening in which the respective wheel is engaged, a guide frame secured across each yoke and having a vertically disposed slot, and a crank pin in each eccentric engaging in the responsive vertical slot.

3. In a walking tractor, a body portion, a horizontal shaft rotatably mounted in the body portion, means for rotating the shaft, a wheel eccentrically mounted on the end of the shaft, a crank pin mounted on the wheel, and a tread having an upstanding frame having a horizontally elongated opening for engaging the wheel and having a substantially vertical slot for receiving the crank pin.

4. In a walking tractor, a body portion, a horizontal shaft rotatably mounted in the body portion, means for rotating the shaft, a wheel eccentrically mounted on the end of the shaft, a crank pin mounted on the wheel,

an endless track frame having a horizontal elongated opening for engaging the periphery of the wheel, a reinforcing frame secured across the track frame at one side thereof, said reinforcing frame having a substantially vertical slot for receiving the crank pin, and a tread pivotally suspended from the track frame.

5. In combination in a walking tractor a body portion, a driven shaft rotatably mounted in the body portion, a flanged wheel eccentrically mounted on said shaft, a yoke having an elongated opening in which said wheel is engaged, said wheel having a crank pin in offset relation with the shaft, a frame attached across one side of the yoke and having a slot for the crank pin, and a tread pivotally suspended from the yoke, said tread being pivoted on an axis parallel to the elongation of said opening.

6. In a walking tractor, a body, tread floats at opposite sides thereof, and operating mechanism for lifting and advancing the body and floats alternately, said mechanism comprising eccentrics on the body coacting with elliptical tracks on the treads, crank pins on said eccentrics, and stationary guide means extending vertically across said tracks and coacting with said crank pins to control the travel of the eccentrics on said tracks.

Signed at Chicago this 9th day of March, 1926.

OSCAR J. MARTINSON.