May 27, 1969 W. C. LATHERS 3,446,123

EARTH COMPACTING DEVICE

Filed Feb. 21, 1967

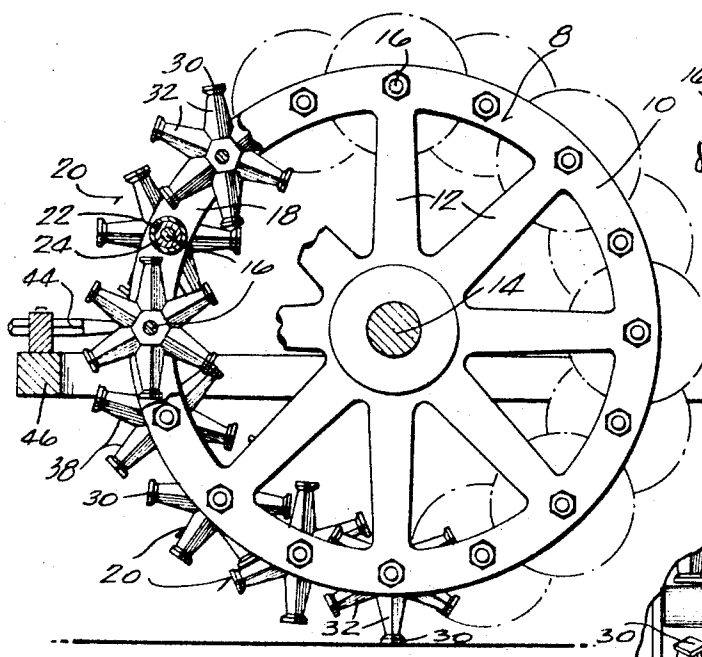

Fig. 1

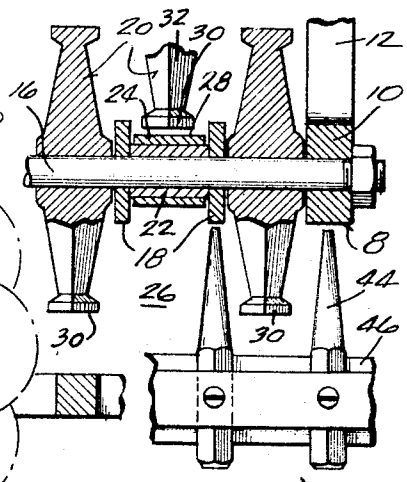

Fig. 3

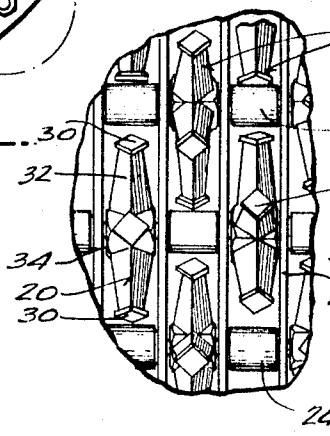

Fig. 2

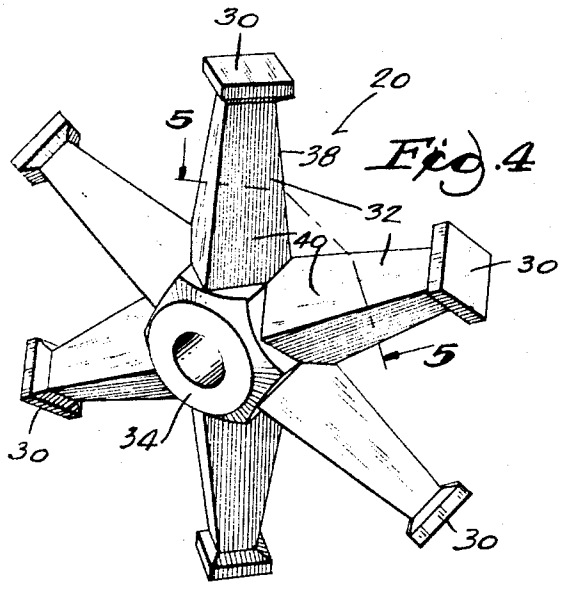

Fig. 4

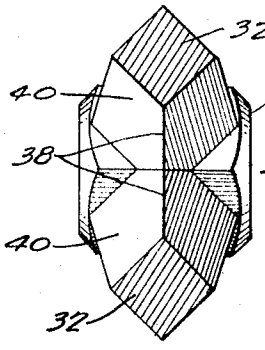

Fig. 5

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EARTH COMPACTING DEVICE

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U.S. Cl. 94—50 7 Claims

ABSTRACT OF THE DISCLOSURE

Sheep's-foot rotors are rotatably mounted in annular series on a skeletonized cylinder which is supported for rotation on its own axis. Each sheep's-foot rotor comprises a hub from which sheep's-foot legs radiate, the legs having faces converging to edges facing each other to squeeze out axially dirt which might otherwise be trapped between the legs. A stationary comb has teeth projecting at both sides of each annular series of rotors to engage and discharge such dirt. Rotatable sleeves coaxial with the rotors of one series are immediately proximate the paths of movement of the sheep's-foot ends of the legs of the staggered rotors of the next series, whereby to dislodge radially projecting earth.

BACKGROUND OF THE INVENTION

The features stressed above are improvements upon the device shown in my prior Patent 3,269,285, granted Aug. 30, 1966. In that patent I used rotors having but four legs. I recognized that a greater number of legs would be desirable but it was felt that they might not clear themselves of sticky earth. In the instant device, I use five or six legs with sheep's-foot terminals and I assure clearance by the features specifically recited in the abstract of disclosure. They are all effective in clearing the device of earth when the soil which the rollers traverse is sticky and might otherwise impair the freedom of rotation of the individual rotors.

SUMMARY OF INVENTION

It is particularly desirable to have each rotor provided with at least five, and preferably six, radial legs to perform the sheep's-foot function of compressing the soil traversed by the device. However, it has not heretofore been considered feasible to provide so many legs because of the tendency of some soils to pack between the legs when the angle between them is small. That tendency is obviated in the instant device by so designing the legs that they present sharp edges to each other, such edges being formed by surfaces which, in the instant device, are at an angle of 45° or less to a plane normal to the axis upon which the rotor turns. With the surfaces of consecutive legs at 90° or more with refernce to each other, the earth into which the legs penetrate tends to extrude itself from between the legs, being forced axially of the respective rotor to positions where the earth will either be dislodged or will project from the rotor to be scraped off by the comb teeth hereinafter mentioned. The result is that the rotors do not fill up with earth.

Clearing of the earth from between the legs of the sheeps-foot rotors is facilitated by the provision of stationary comb teeth which project from the frame of the device to extend beside each rotor so that the rotor moves between two proximate teeth as the drum turns. Any protruding masses of earth are engaged by the comb teeth and caused to move outwardly from between the legs of the rotor. Some of the balls of earth will be dislodged completely by the comb teeth. In other cases, the earth may be caused to move radially from between the legs of the rotor. In the latter case, the masses of earth will

encounter freely rotatable rolls which tend to eject them from the drum.

DESCRIPTION OF THE INVENTION

In the drawings:

FIG. 1 is a view in side elevation of an earth compacting device embodying the invention, portions of the supporting frame being broken away.

FIG. 2 is a fragmentary plan view looking downwardly and forwardly on the drum mounted rotors of a device embodying the invention.

FIG. 3 is a fragmentary detail view taken in axial section through a portion of the drum and rotors of two annular series, parts being broken away.

FIG. 4 is an enlarged detail view in perspective of a six leg sheeps-foot rotor.

FIG. 5 is a view taken in cross section through two consecutive legs on the line 5—5 of FIG. 4.

Aside from the features mentioned above in the summary of invention, the device is essentially as shown in my former Patent 3,269,285. As in the device of the patent, there is a skeletonized drum **8** comprising side rings **10** supported by spokes **12** from a shaft **14** upon which the drum is bodily rotatable. The tie bolts **16** connect together the side members **10** and the intermediate rings **18**. The rotors generally designated by reference character **20** (and separately illustrated in FIG. 4) are freely rotatable on tie bolts **16** between the rings **10**, **18**. The rotors are in staggered annular series. Where the rotors of any given series are absent between rings **18**, the latter are spaced by sleeves **22**.

In accordance with the invention, rollers **24** are mounted to turn freely on the spacers **22**. So that they will not bind, the rollers **24** are slightly shorter than the spacing sleeves **22** and are big enough in their central openings **26** to turn freely about the sleeves. The external peripheries **28** of the rollers **24** are sufficiently large so that as the sheep's-foot rotors **20** turn upon the respective tie bolts **16**, the sheep's-foot treads **30** at the ends of their legs **32** pass in close proximity to the rollers **24**.

Each of the rotors **20** includes a hub **34** having generally radial legs **32**, which are not only integral with the hub but preferably merge with each other as shown in FIG. 4. The faces **40** of the several legs **32** converge toward the edges **38** and are desirable at no less than 90° to each other as clearly appears in FIG. 5.

But for the wide angles between the faces **40** and convergence of such faces to form the edges **38**, soil having and tendency to pack would lodge between sheep's-foot legs which are as close together as shown. However, by reason of the wide divergence of faces **40**, the earth pushed toward the hub between the legs **32** tends to be extruded axially of the hub from between such legs.

If the earth still clings between the legs, the emergent portions thereof will be caught by the comb teeth **44**. These are so mounted on the frame **46** as to lie quite closely beside the paths of movement of respective rotors. As the drum rotates on its shaft **14** and the respective rotors turn individually upon the spacing sleeves **24**, the comb teeth will tend to dislodge the entrapped earth or to force it radially of the rotors. Any earth which projects radially beyond the tread of one of the rotors will encounter one of the freely rotatable rollers **24** which will complete the dislodgement of the clinging earth and cause it to fall to the ground.

What is claimed is:

1. In a device for tamping compactible material, said device including the combination of a rotatable drum, and sheep's-foot rotors mounted thereon for separate rotation and each comprising a hub having generally radial legs; the improvement which consists in providing the said legs in said combination with forwardly and rear-

wardly directed edges angularly spaced from corresponding edges of adjacent legs and with side surfaces which are convergent toward said legs; said surfaces tending to extrude axially from between said legs material forced between said legs during use of the tampering device, the drum comprising spaced rings and tie rods extending axially of the drum and spanning the spaces between respective rings, the said rotors being in respective annular series in which the rotors of one series are circumferentially staggered with respect to the rotors of the next series, the rotors of each series being mounted on alternate tie rods and the intervening tie rods having spacers between rings, and rollers mounted to turn about the spacers and disposed in positions proximate to the paths of the ends of respective tamping legs on said rotors.

2. A sheep's-foot rotor for tamping compactible material and comprising a rotatably mounted hub, tamping legs extending generally radially from the hub and in close circumferential proximity, said legs having forwardly and rearwardly directed edges close together adjacent the hub and angularly divergent radially from corresponding edges of adjacent legs, said legs further having faces converging obliquely toward said edges and adapted to extrude axially from between said legs material forced between said legs during use of the rotor.

3. A device for tamping compactible material, said device including in combination a series of rotors each of which comprises a rotatably mounted hub and generally radial sheep's-foot tamping legs, said legs having forwardly and rearwardly directed edges angularly spaced from like edges of adjacent legs and further having side surfaces convergent toward the respective edges and cooperating to extrude axially from between said legs material forced between the legs during use of the tamping device, and means upon which the respective rotor hubs are operatively mounted for independent rotation, said means comprising an axle shaft and a frame constituting means for positioning the shaft and having an element extending across the drum and provided with comb teeth between which the respective rotors move in proximity to the teeth during drum rotation on said shaft.

4. In a device for tamping compactible material said device including a plurality of sheep's-foot rotors mounted in annular series, and means supporting said rotors for orbital movement and for rotary movement upon their respective axes, each rotor comprising a hub having generally radial legs which are closely proximate to each other adjacent the respective hub; the improvement which

consists in providing the said legs with forwardly and rearwardly directed edges which are immediately adjacent in the vicinity of the hub to the edges of successive legs of the same series and which diverge angularly from such last mentioned edges in a radially outward direction from the hub, said legs having side surfaces convergent toward respective edges, the surfaces of successive legs tending to extrude axially the material which is forced between said legs during use of the tamping device.

5. A device for tamping compactible material according to claim 4 in which the said edges of respective legs merge with the edges of successive legs in the vicinity of the hub.

6. In a device for tamping compactible material, a shaft, hub means on the shaft from which spokes project radially, tie bolts in annular series about the shaft and connected with the spokes, sheep's-foot rotors mounted in annular series upon the tie bolts for orbital movement therewith about the axis of the shaft, each such rotor including a rotor hub also rotatable upon its respective tie bolt, each such rotor including a number of legs having portions radiating in immediate proximity to each other from the respective rotor hub, successive legs having opposed radially divergent edges forwardly and rearwardly directed and with side surfaces which are convergent toward said edges; the said surfaces of successive legs tending to extrude axially from between said legs material forced between said legs during use of the tamping device.

7. A tamping device according to claim 6 in which said tie bolt supports a plurality of circumferentially disposed series of sheet's-foot rotors, with the rotors of respective series being staggered with respect to the rotors of adjacent series, the forward and rearward edges of the respective legs being disposed substantially in a plane normal to the axis of said shaft.

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