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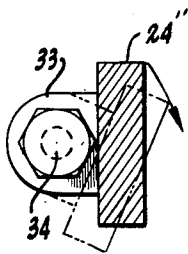
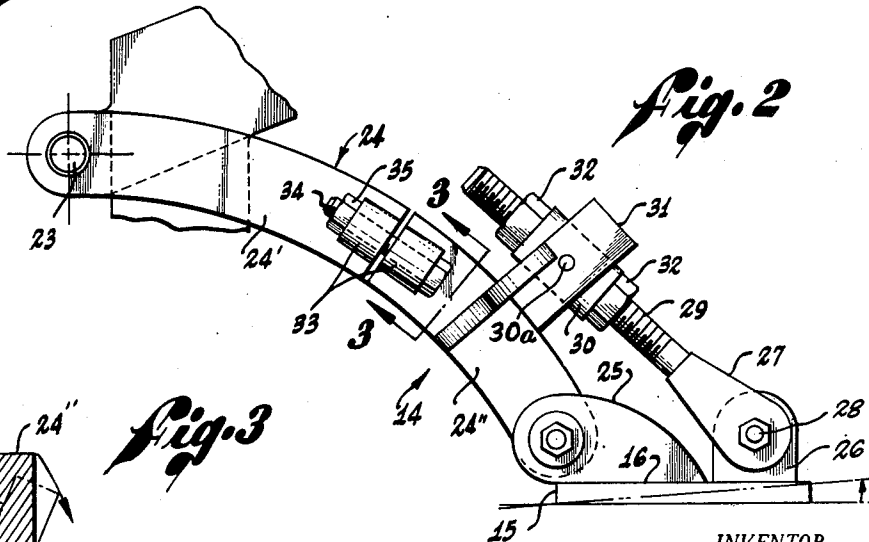
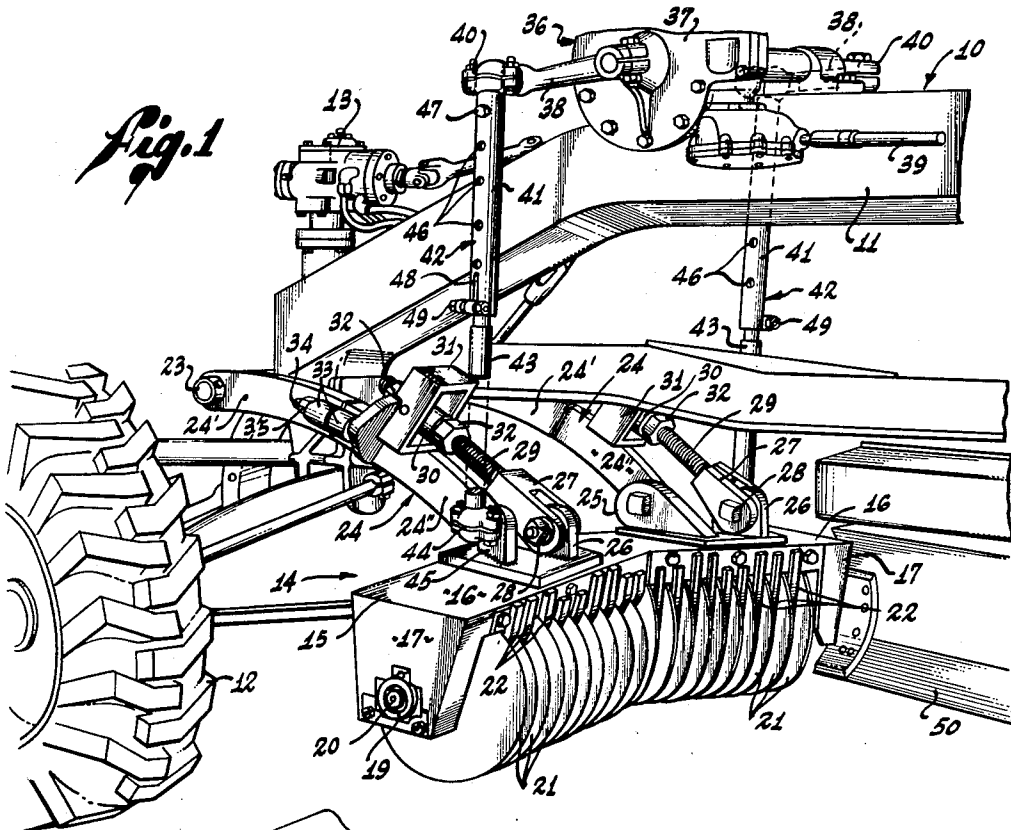
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2,804,294

ROAD SHAVING EQUIPMENT HAVING AN ADJUSTABLE DISC HOUSING

Filed July 5, 1955

2 Sheets-Sheet 1



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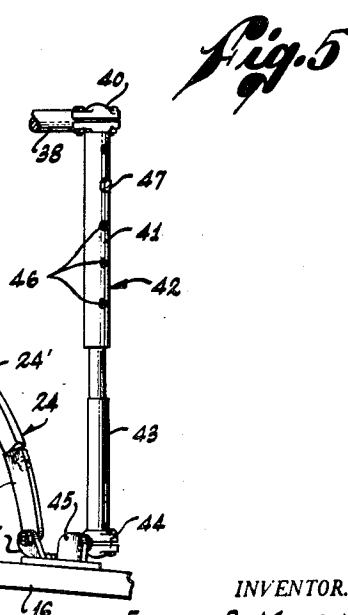
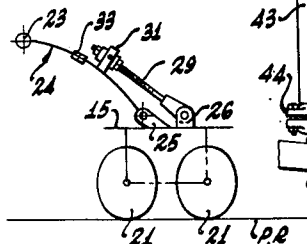
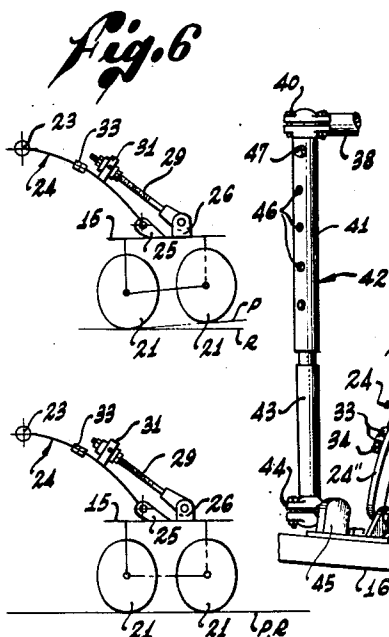
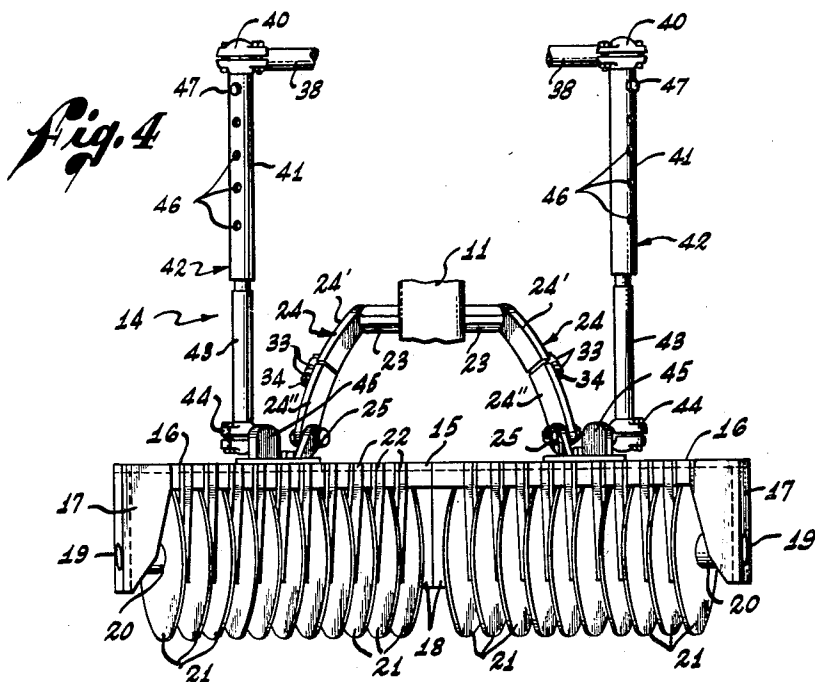
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ROAD SHAVING EQUIPMENT HAVING AN ADJUSTABLE DISC HOUSING

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2 Sheets-Sheet 2



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ROAD SHAVING EQUIPMENT HAVING AN ADJUSTABLE DISC HOUSING

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6 Claims. (Cl. 262—20)

This invention relates generally to road construction and repair equipment and more particularly to improvements in road shaving equipment.

Road equipment of the present type comprises generally a motor patrol to the forward end of the frame of which are pivoted a pair of rearwardly extending, vertically swingable arms. Mounted on the rearward extremities of these arms is a generally V-shaped shaving disk housing with its apex directed forwardly. A plurality of spaced, coaxial shaving disks are rotatably carried on each arm of the housing, the disks being tangent to a common plane at their bottoms. Suitable lift mechanism connected between the motor patrol frame and shaving disk housing are provided for raising and lowering the latter about the pivotal axis of the arms.

In operation of the equipment, the shaving disk housing is lowered to a position of cutting engagement of the shaving disks with the surface of a road, the disks acting to shave off the surface of the road when the motor patrol is moved thereover. The disks, when viewed longitudinally of the patrol, overlap each other, such overlapping causing the shaved off material to be pulverized.

It will be apparent that to effect the most efficient operation of the shaving disks, the aforementioned plane, to which the disks are tangent, must be in substantial parallelism with the surface of the road so that all of the shaving disks will cut equally.

Heretofore, the shaving disk housing has been rigidly fixed on the rearward extremities of the aforementioned pivotal arms so that the angle between the arms and said common plane of tangency of the disks was fixed.

Because of this fixed angular relationship, it was sometimes impossible to bring all of the disks into equal cutting engagement with the road owing to unequal wear or improper inflation of the tires of the motor patrol. Thus, for example, a difference in the wear or inflation of the front and rear tires of the motor patrol would result in said common plane of tangency of the disks being inclined to the surface of the road when the shaving disk housing was in shaving position so that the disks adjacent the apex of the housing and the disks adjacent the ends of the housing would cut or shave to different extents.

Accordingly, one object of this invention is the provision of road shaving equipment of the class described having means for angularly adjusting the shaving disk housing, relative to the pivotal arms which support the housing on the motor patrol, about an axis extending transversely of the motor patrol so that all of the shaving disks may be brought into equal cutting engagement with the road.

A further deficiency of existing road shaving equipment has been the inability to angularly adjust the shaving disk housing, relative to its supporting arms, about an axis extending longitudinally of the motor patrol.

Thus, when shaving the surface of a road which rises to a crown at its center, it is necessary, to accurate con-

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touring of the road, that the aforementioned plane of tangency of the shaving disks be angulated, relative to the plane of the bottoms of the wheels of the motor patrol, about an axis extending longitudinally of the patrol. Such angular adjustment of the shaving disk housing was impossible in prior road shaving equipment due to the rigid attachment of the housing to its pivotal supporting arms.

Another object of this invention is, therefore, the provision of road shaving equipment of the class described having means for angularly adjusting the shaving disk housing, on the arms which support it on the patrol, about an axis extending longitudinally of the motor patrol.

A still further object of the invention is the provision of road shaving equipment of the class described wherein the shaving disk housing may be tilted, relative to its pivotal supporting arms about an axis extending transversely of the motor patrol as well as an axis extending longitudinally of the motor patrol so that the equipment may be accommodated to the resurfacing of both flat and crowned roads under substantially all conditions of wear and inflation of the motor patrol tires.

These and other objects of the invention will become readily apparent to those skilled in the art from the following detailed description and accompanying drawings of a present preferred embodiment thereof in which drawings:

Fig. 1 is a perspective view of the forward portion of road shaving equipment embodying the features of the invention;

Fig. 2 is an enlarged detail view illustrating the shaving disk housing adjustment means of this invention;

Fig. 3 is a section taken along line 3—3 of Fig. 2;

Fig. 4 is a view in elevation of the shaving disk housing of this invention, the housing being shown in position for shaving a flat road;

Fig. 5 is a view similar to Fig. 4 but with the shaving disk housing being shown in position for shaving a crowned road;

Figs. 6 and 7 diagrammatically illustrate certain shaving disk housing adjustments embodied in the invention.

Reference is now made to these drawings and more particularly to Fig. 1 wherein there is illustrated the forward portion of a piece of road shaving equipment incorporating the features of this invention. This equipment comprises a motor patrol 10 of conventional design including a main frame 11 the forward end of which is suspended between a pair of steerable front wheels 12. Only one of these front wheels is shown for the sake of clarity. Conventional steering mechanism 13, controlled from an operator's cab, not shown, at the rear of the motor patrol, is provided for steering the front wheels.

Indicated generally at 14 is the shaving disk assembly of the invention. This assembly comprises a shaving disk housing 15 including a pair of coplanar top plates 16 which are joined to form a V with the apex of the V directed forwardly.

Bearing plates 17 depend from the outer ends of plates 16 and other bearing plates 18 (Fig. 4), depend from the adjacent, inner edges of the plates. Extending between adjacent pairs of these bearing plates and journaled at opposite ends in bearings 19 (only two shown) carried by the bearing plates are shafts 20 each of which fixedly carries a plurality of spaced shaving disks 21. These shaving disks are provided with peripheral cutting edges which are tangent, at their bottoms, to a plane parallel to the plane of the top plates 16. Stripper fingers 22, carried by the top plates, project between the shaving disks and serve to dislodge any pieces

of pavement which may become caught between the disks as they move over a road.

The forward end of frame 11 of the motor patrol mounts a transversely extending nose pin 23. Pivoted at one end on opposite ends of the nose pin 23 are a pair of arcuate, rearwardly extending arms 24 which have their other ends pivoted to upstanding lugs 25 on top plates 16.

Fixed to top plates 16, somewhat rearwardly of upstanding lugs 25, are a second set of upstanding lugs 26. Straddling these latter lugs 26 are a pair of clevis members 27 which are pivotally connected to the lugs 26 by bolts 28 extending through the members and lugs, as shown.

Clevis members 27 have threaded extensions 29 the free end portions of which are journaled in sleeve bearings 30 pivotally mounted, as by means of horizontal trunnions 30a, in box frames 31 on arms 24. As shown more clearly in Fig. 2, a pair of nuts 32 are threaded on each extension 29 at opposite ends of the bearing sleeves 30 so as to retain the extensions in adjusted axial positions in the sleeves. As will be presently seen, the inclination of the shaving disk housing 15 to the arms 24 may be adjusted by adjustment of the positions of nuts 32 on extensions 29 so as to enable all of the shaving disks 21 to be brought into equal cutting engagement with the surface of a road. Parts 26 through 32 have been omitted from Figs. 4 and 5 in the interest of clarity.

Each of the arms 24 comprises a pair of separate segments 24' and 24'', segments 24'' carrying the box frames 31.

Fixed to the outer surfaces of the segments 24' and 24'' of each arm adjacent the opposing ends thereof are lugs 33 which are bored to receive bolts 34 for hingedly connecting the segments together. Hinge bolts 34 are retained in position in the lugs by nuts 35 threaded thereon. These pivotal connections between the segments of the arms 24 enable the shaving disk housing 15 to be angularly adjusted about an axis extending longitudinally of the motor patrol, as will presently be seen.

Generally indicated at 36 is mechanism for raising and lowering the shaving disk housing 15 out of and into its shaving position, shown in Fig. 1. This mechanism comprises a reduction gear assembly 37 for simultaneously turning a pair of crank arms 38 through vertical arcs. Reduction gearing 37 is adapted to be selectively driven in opposite directions, for turning crank arms 38 in one direction or the other, from a shaft 39 extending rearwardly to the operator's cab, not shown. This shaft may be manually or power operated.

The free ends of crank arms 38 are attached by ball and socket connections 40 to the upper ends of sleeves 41 of a pair of vertical, telescoping links 42. Sleeves 41 slidably receive the upper extremities of rods 43 which are attached at their lower ends, through ball and socket connections 44, to a third set of upstanding lugs 45 fixed to top plates 16 of the shaving disk housing.

The upper ends of rods 43 are formed with openings, not shown, and sleeves 41 are formed with a plurality of longitudinally spaced openings 46. A bolt 47, associated with each link 42, is adapted to be passed through a selected one of the sleeve openings 46 and said opening, not shown, in the respective rod 43 for retaining the latter in axially adjusted position in its associated sleeve 41. The lower ends of the sleeves are slotted at 48 (Fig. 1) and provided with clamp screws 49 to aid in providing a rigid connection between sleeves 41 and rods 43.

The motor patrol may conveniently mount a scraper blade 50.

From the foregoing description it will be apparent that shaving disk housing 15 may be selectively raised and lowered, about the axis of nose pin 23, by rotation of shaft 39 to turn crank arms 38 in the desired direction.

In operation of the present road shaving equipment, motor patrol 10 is driven along a road to be resurfaced with the shaving disk housing 15 lowered to its shaving position shown in Fig. 1. As the motor patrol is moved

over the road, disks 21 act to shave off the surface of the road and simultaneously pulverize the shaved off material, the latter being spread evenly over the surface by the scraper blade 50.

In order to effectively and evenly shave the surface of the road, it is necessary that all of the cutting disks 21 cut equally into the road. Owing to V-shape of the housing 15 and the corresponding V arrangement of the shaving disks 21, it will be apparent that unless the aforementioned plane of tangency of the bottoms of the disks is parallel to the surface of the road, such equal cutting action of all of the disks will not be obtained.

Thus, as indicated in Fig. 6, if said plane of tangency, designated by the letter P, is rearwardly, upwardly inclined relative to the surface of the road R, those disks adjacent the apex of the housing will cut deeper into the road than those disks adjacent the ends of the housing. Conversely, if said plane of tangency is rearwardly, downwardly inclined, those disks adjacent the ends of the housing will cut deeper into the road than those disks adjacent the apex of the housing. Such inclination of said plane of tangency may result, for example, from unequal inflation or wear of the front and rear tires of the motor patrol.

The angular adjustment of the shaving disk housing relative to the arms 24, offered by the adjustable linkage comprising the threaded extensions 29 and nuts 32 enables said plane of tangency to be brought into parallelism with the plane of the road, the condition of Fig. 7. Thus, by altering the positions of the nuts 32 on the extensions 29, the shaving disk housing may be angularly adjusted about the axis of its pivotal connection to arms 24 so as to effect equal cutting engagement of all of the shaving disks with the road.

As previously mentioned, it is necessary, when shaving a road which rises to a crown at its center, that the shaving disk housing be tilted about an axis extending longitudinally of the motor patrol so as to position one end of the housing lower than the other end. The pivotal connections 33, 34 between arm segments 24' and 24'', and the telescoping links 42 accommodate this tilting of the shaving disk housing. Thus, to angulate the housing about said longitudinal axis, the links 42 are adjusted in length by passing bolts 47 through different ones of the sleeve openings 46, as shown in Fig. 5, so that one end of the housing will be disposed above the other end. This tilting of the housing results in swiveling of arm segments 24'' relative to arm segments 24', as illustrated in Figs. 3 and 5. The maximum angle of tilt of the housing necessary in such road shaving operations is relatively small, being in the order of 3°-5°. It is obvious, therefore, that the machining tolerances involved in the manufacture of massive equipment of this character provide sufficient play at the connections of the arms 24 to the frame of the motor patrol and to the housing 15 to accommodate the extremely slight drawing together of the ends of the arms attached to the housing occurring during such tilting of the latter.

After the housing has thus been tilted, the linkage comprising extensions 29 and bolts 32 may be adjusted in the aforescribed manner to bring all of the shaving disks 21 into equal cutting engagement with the road.

Obviously numerous modifications in design and arrangement of parts of the invention are possible in the light of the above teachings. It is to be understood, therefore, that within the scope of the following claims the invention may be practiced otherwise than as specifically described and illustrated herein.

I claim:

1. Road repair and construction equipment comprising in combination: a motor patrol adapted to move along a road and including a frame, a pair of spaced arms extending longitudinally of the motor patrol and pivoted at one end to the frame of the latter for vertical swinging movement, each of said arms comprising a pair

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of separate segments, means connecting the segments of each arm for relative pivotal movement about an axis extending longitudinally of the respective arm, a housing extending laterally of the motor patrol, means mounting said housing on the free ends of said arms, two sets of spaced, coaxial shaving disks carried by and extending below the housing, the two sets of disks being arranged in a V and the bottoms of the disks being tangent to a common plane, and means for raising and lowering said arms to elevate and lower said housing and disks and to tilt said housing and disks about a longitudinal axis of the motor patrol.

2. A road shaving assembly for mounting on a motor patrol including vertically movable lift means, comprising: a pair of spaced, parallel arms having means at one end for pivotal connection to the motor patrol, each of said arms comprising a pair of separate segments, means connecting the segments of each arm for relative pivotal movement thereof about an axis extending longitudinally of the respective arm, a housing extending laterally of the arms and pivotally connected to the free ends of the latter, means on the housing for connection to the lift means on the motor patrol, two sets of spaced, coaxial shaving disks arranged to form a V carried by and projecting from the housing, the projecting portions of said disks being tangent to a common plane parallel to the axis of the pivotal connection of said housing to the arms.

3. Road repair and construction equipment comprising in combination: a motor patrol adapted to move along a road and including a frame, a pair of spaced arms extending longitudinally of the motor patrol and pivoted at one end to the frame of the latter for vertical swinging movement, a housing extending laterally of the motor patrol, two sets of spaced, coaxial shaving disks carried by and extending below the housing, the two sets of disks being arranged in a V and the bottoms of the disks being tangent to a common plane, means mounting said housing on the free ends of the arms for pivoting of the housing about an axis extending substantially parallel to said common plane and located in a plane substantially normal to said common plane and intersecting the arms of said V, a pair of links pivoted at one end to the housing about an axis spaced from and substantially parallel to the first mentioned axis, adjustable means pivotally securing the other ends of said links to the arms respectively for angular adjustment of the housing on the arms by adjustment of said adjustable means whereby to vary the inclination of said common bottom plane of said disks to the horizontal, and means on the motor patrol to raise and lower said arms.

4. The subject matter of claim 3 wherein each of said

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arms comprises a pair of separate segments, one end of one of the segments of each arm being said free end of the respective arm, means connecting the segments of each arm for relative pivotal movement about an axis extending longitudinally of the respective arm, and said adjustable means securing said other ends of said links to said one segment of the respective arms.

5. The subject matter of claim 1 wherein one end of one segment of each arm forms said free end of the respective arm and said housing is pivotally mounted on the free ends of said arms, means for retaining the housing in angularly adjusted position on the arms comprising a pair of links pivoted at one end to the housing, and adjustable means pivotally securing the other ends of said links to said one segment of the respective arms for angular adjustment of the housing on the arms by adjustment of said adjustable means.

6. Road repair and construction equipment comprising in combination: a motor patrol adapted to move along a road and including a frame, a pair of spaced arms extending longitudinally of the motor patrol and pivoted at one end to the frame of the latter for vertical swinging movement, a housing extending laterally of the motor patrol, two sets of spaced, coaxial shaving disks carried by and extending below the housing, the two sets of disks being arranged in a V and the bottoms of the disks being tangent to a common plane, means mounting said housing on the free ends of the arms for pivoting of the housing about an axis extending substantially parallel to said common plane and located in a plane substantially normal to said common plane and intersecting the arms of said V, a pair of links pivoted at one end to the housing about an axis spaced from and substantially parallel to the first-mentioned axis, and pivoted at the other end to the arms respectively, means for adjusting the lengths of said links for angular adjustment of the housing on the arms whereby to vary the inclination of said common bottom plane of said disks to the horizontal, and means on the motor patrol to raise and lower said arms.

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