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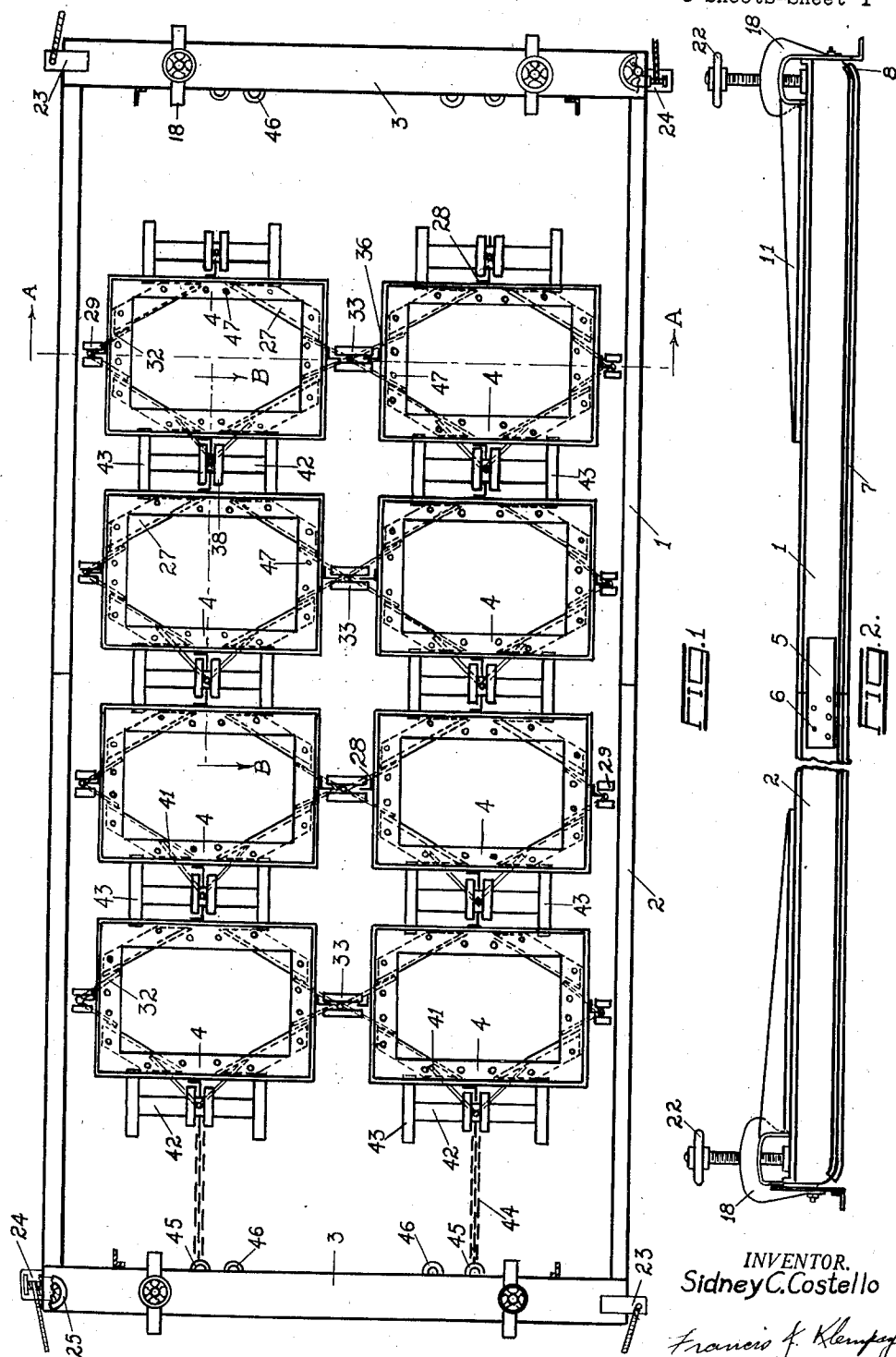
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2,227,296

SURFACE TREATING DRAG

Filed June 19, 1936

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

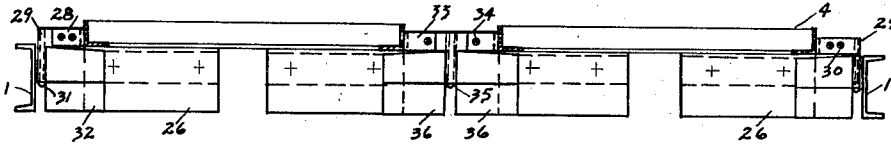


FIG. 3

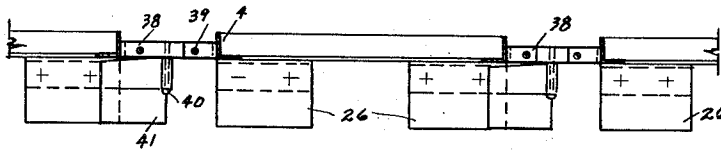


FIG. 4

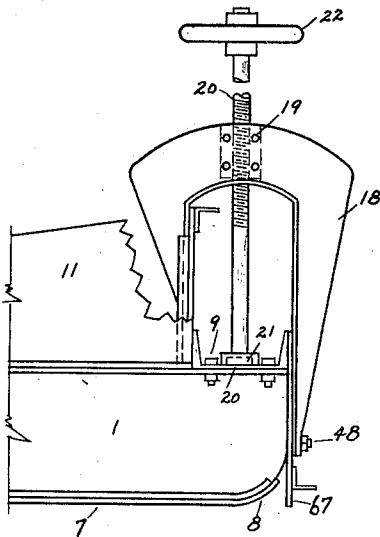


FIG. 5

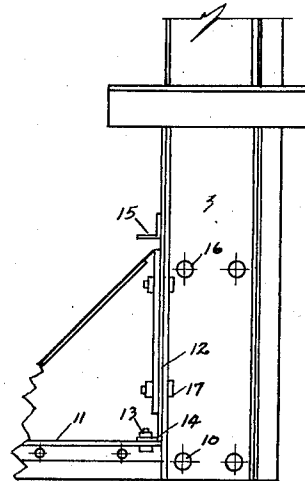


FIG. 6

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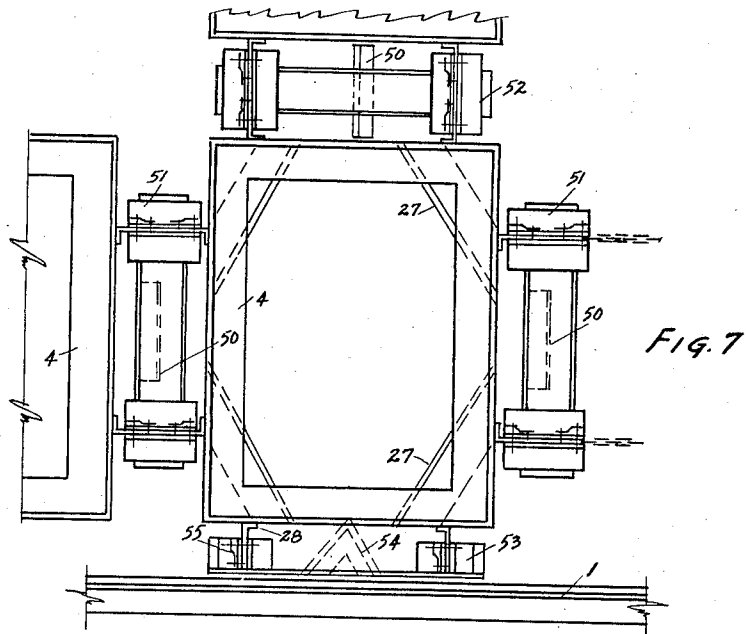
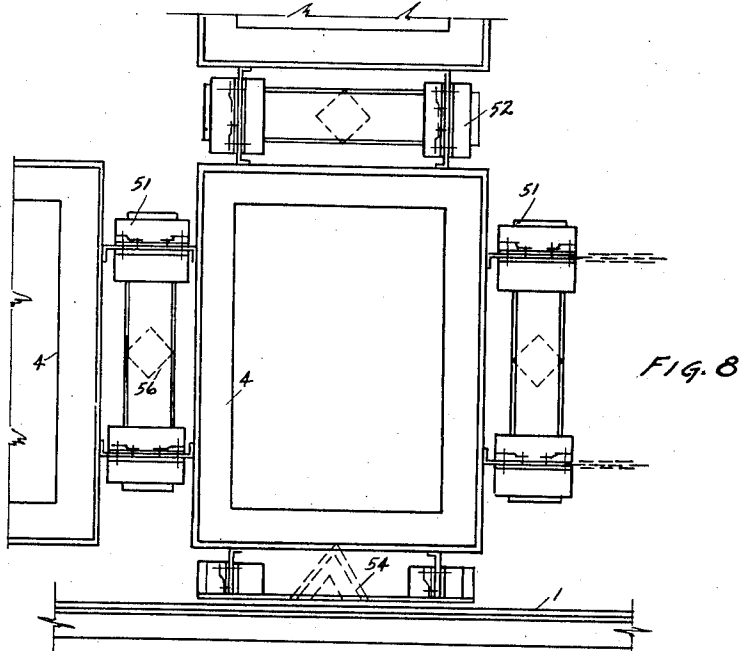
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3 Sheets-Sheet 3



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2,227,296

SURFACE TREATING DRAG

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12 Claims. (Cl. 94-44)

This invention relates to road making machinery and more particularly to a surface treating drag for mixing and distributing aggregate and bituminous materials on the road bed in road construction and maintenance operations.

In surfacing roads it is usual practice to evenly distribute on the road bed a layer of aggregate of desired thickness upon which is distributed a quantity of bituminous material; asphalt or tar.

A drag or retread mixer is employed to mix and distribute these materials and to provide a smooth surface which is then rolled as is well known in the art. A drag is used to mix up to approximately 70 lbs. of aggregate per square yard whereas a retread mixer is designed to handle heavier layers of material.

The machine forming the subject matter of this invention is designed for and is particularly useful for mixing 20 to 70 lbs. of aggregate per square yard. Prior devices for performing similar functions have not been satisfactory in use in that thorough mixing was not accomplished, irregularities of the existing road bed caused a wavy surface on the mixture, a plurality of passes through the material was required and consequently quick breaking bituminous material could not be used, no provisions were made for facilitating surfacing of varying widths of roads, the machines were operable in one direction only and no means were employed to control the distribution of materials for the construction of wedge courses and the like.

Accordingly it is an object of this invention to provide a surface treating drag which will thoroughly mix the aggregate and bituminous material with one pass thereby enabling quick breaking bituminous materials to be used to enable roads to be surfaced with facility.

Another object of this invention is to provide a surface treating drag in which the mixing units are flexibly interconnected to follow the contour of the road to thoroughly mix all the material deposited.

Another object of this invention is to provide a drag in which irregularities of the road surface will not affect the path of travel of the strike-off blade thereby producing a smooth finished surface on the mixture.

A further object of the invention is to provide a drag which may easily be disassembled, loaded and carried on a light motor truck of usual design.

A further object of this invention is to provide a drag which may readily be varied in width to surface varying widths of roads.

Still another object of this invention is to pro-

vide a drag with means to control the lateral distribution of the aggregate thereby enabling courses of laterally varying depths to be laid.

A still further object of this invention is to provide a mixing drag which is operable in either direction.

A further object of this invention is to provide means on a drag to maintain the drag parallel with the direction of the road.

Other objects and advantages of the invention will become apparent from a consideration of the drawings and the following detailed description. It is understood, of course, that changes may be made in the specific forms of my invention, as herein disclosed, within the scope of what is claimed, without departing from the spirit of my invention.

In the drawings:

Figure 1 represents a plan view of my device.

Figure 2 represents a side elevation.

Figure 3 is a sectional view taken along the line A-A of Figure 1.

Figure 4 is a sectional view taken along the line B-B of Figure 1.

Figure 5 is a detailed view of the means for raising and lowering the strike-off blade.

Figure 6 is a detailed view of the corner construction of the frame.

Figure 7 is a partial plan view of a modification.

Figure 8 is a partial plan view of a further modification.

The surface treating drag of my invention consists generally of a rigid frame having side rails 1-2, end members 3 and a plurality of mixing units 4 positioned within the frame.

Each side rail consists of two channel sections 1 and 2 detachably secured in end to end relation by a splicing plate 5 permanently fastened to one section preferably by welding and detachably secured to the other section by bolts 6. On the lower surface of the bottom flange of the side channels 1 and 2 there is secured the runners 7 of hard steel to enhance the wearing qualities of the device. As indicated in Figures 2 and 5 the lower flanges of the side rails are curved upwardly at 8 to insure smooth passage over the surface of the road. The ends of the side rails 1-2 are detachably secured to end members 3 by bolts 9 which pass through openings 10 of the channel 3. A bracing plate 11 flanged and secured in any manner to the top flange of the side rail is detachably connected by bolts 13 to flange 14 of plate 12 which is secured to a flange of channel 3 by the bolts 17. It is apparent that the side rails may be easily detached from the

end members by simply unscrewing a few readily accessible bolts. If it is desired to decrease the width of the frame, the side channels 1 are fastened to the end channels 3 by bolts passing through holes 16. In this position the brace plates 11 are bolted to the angle 15. In practice I preferably construct the drag of such dimensions that when the side rails are fastened to the ends of the channels 3 the width between the side rails will be ten feet and when the side rails are fastened to channels 3 at 16, the width between the side rails will be eight feet. With this arrangement I am able to resurface variable widths of roads with a minimum number of courses. For example: 16, 18 and 20 foot roads may be resurfaced with two courses, the first using two eight foot courses, the last two ten foot courses and the other one eight and one ten foot course. 24, 28 and 30 foot roads may be resurfaced in three courses and 40 foot roads in four courses.

As stated above, the side rails may readily be detached from the end members and by unscrewing bolts 6 the side rails are quickly reduced to short lengths. The mixing units 4 are easily detached from each other by withdrawing the pins which hold them together. Consequently the entire machine may be quickly disassembled into pieces having a maximum length of approximately twelve feet which can be loaded on any motor truck of standard design.

At each end of the drag there is provided a strike-off blade 67 carried by the U-shaped members 13 and positioned in sliding contact with the ends of the side rails and the outer flanges of the end channels 3. The other leg of the U-shaped member slidably engages the plate 12 and is maintained in vertical alignment by vertically extending members (not shown) on plate 12. Members 13 are provided with threaded portions 19 through which extend the partially threaded shafts 20. The lower ends of shafts 20 have an integral enlarged circular end 21 positioned within an inverted cupped housing 20 secured to channel 3. The other end of shafts 20 is provided with operating wheels 22. Rotation of the wheels 22 results in the raising or the lowering of the strike-off blades.

In surfacing roads having varying cross-sectional contours by the method described above I have found it difficult to maintain the mixing drag in parallelism with the direction of the road. To obviate this difficulty I have found it necessary to provide means to vary the relative lengths of the two cables pulling the drag while the drag is in operation. The end of one cable is fastened to a member 23 attached to an end of channel 3. The end of the other cable is fastened to the drum of a small hand operated winch 24, the drum being rotated by the hand wheel 25 through suitable non-reversing reduction worm gears of usual design. An operator may manipulate the winch while the drag is in operation and definitely control the path of travel of the rear end of the drag and the strike-off blade.

Positioned within the above described frame is a plurality of mixing units 4 which consist of rectangular frames built of angle sections as shown in Figures 3 and 4. Extending diagonally across each corner of each unit there is a depending mixing blade 26 riveted or otherwise secured to angles 27 which are in turn welded to the frames 4. As shown in Figures 1, 7 and 8, the diagonally extending blades 26 are arranged

to provide a passage into the unit at the center of each side thereof. Each unit is provided with identical angle-shaped connecting elements 28 at the center of each member of the frame. The outwardly extending portion of the element 28 is provided with two spaced holes for a purpose to be later described.

Referring more particularly to Fig. 3, a pair of short angle sections 29 are rigidly secured to element 28 between the side of each mixing unit 4 and the side rail 1. Suitably supported by the members 29 is a downwardly extending hinge pin 31 to which is swingably supported a mixing baffle 32. As shown in Figure 1 the free end of baffle 32 is positioned within the opening between the ends of the diagonally positioned baffles 27. To flexibly inter-connect the laterally aligned mixing units, I provide a pair of angle sections 33 whose ends are pivotally attached to elements 28 by a single pin 34 passing through each end of the angle sections 33 and the elements 28. Suitably secured to the center of the angle sections 33 is the downwardly extending hinge pin 35 on which is swingably mounted a pair of baffles 36 having their ends positioned within openings of adjacent mixing units between the ends of the diagonally extending baffles 27. To provide means to flexibly interconnect longitudinally aligned mixing units and to maintain them in proper spaced relation I provide a pair of angle sections 38 whose ends are pivotally attached to elements 28 by pins 39. Suitably secured at the center of section 38 is a downwardly extending hinge pin 40 on which is swingably supported a pair of baffles 41 having their ends lying against the outer face of the diagonally extending baffles of the mixing units. Suitably secured to the angle sections 38 is the plate 42 on the ends of which are secured the spacers 43 abutting the vertical flanges of the angle sections constituting frames 4 and maintaining them in proper spaced relation. This construction flexibly interconnects the mixing units and allows the individual units to rise and fall with relation to the other units. Consequently the mixing units follow the contour of the road bed and thoroughly mix all the material deposited on the road bed. Also irregularities on the surface, while causing vertical displacement of the mixing units, will not affect the path of travel of the frame or strike-off blade, since the mixing units are not connected to the frame except by the chains 44. The strike-off blade therefore leaves a smooth even surface.

The mixing units are pulled over the surface of the road and through the aggregate and bituminous mix by the chains 44 which are fastened to the end members 3 by hooks or eyes 45. An additional set of hooks or eyes 46 are provided for use when the narrowed frame is used.

As shown, the mixing units are rectangular in shape, and are preferably three feet wide and four feet long. When the ten foot width frame is used, the units are arranged as shown in Figure 1. When the frame is narrowed to eight feet, the units are arranged with their long sides extending longitudinally but by the use of identical connecting elements 28 ready interchangeability is effected and the connecting members 29, 33 and 38 remain in their same relative positions. The frame of the drag is made sufficiently long to accommodate the increased length of the rearranged group of mixing units.

In operation the drag is pulled through the mixture of aggregate and bituminous material

which is caused to flow along the obliquely positioned hinged and fixed baffles into and out of the mixing units. The material on one half of the course is divided by the foremost baffles 41 and one half thereof is mixed with material from the other half of the course and divided by foremost baffles 36 to pass into the two foremost mixing units 4. The material then emerges from the center of the mixing units and is again divided and mixed by subsequent baffles, the process continuing until the thoroughly mixed material leaves the last set of mixing units. It is readily apparent that an intensive amount of mixing takes place before the material leaves the last set of mixing units. I have found that one passage through the material provides sufficient mixing. This enables me to use a quick breaking bituminous binder which has heretofore been considered impractical in constructing roads by the method outlined above. The strike-off blade then passes over the mixture to evenly and smoothly distribute it over the area of the course.

Due to the hinged construction of baffles 32, 36 and 41 and the arrangement of the fixed baffles 27 it is obvious that the machine is operable in either direction and in order to render the machine operable in the other direction it is only necessary to attach the chains 44 to the other end of the machine and to the other end of the group of mixing units 4.

It is highly desirable in road making machinery of the type herein disclosed to provide means whereby a course varying in depth transversely may be laid. Such a course is commonly referred to as a "wedge" course. By the use of the swingable baffles of my machine I can very readily do this. For this purpose I place holes 47 in the frames 4 of the individual mixing units into which headed pins (not shown) may be passed to secure the individual hinged baffles 32, 36 and 41 in selected position. As shown the openings are so placed that the hinged baffles when locked in selected position will be substantially in engagement with the fixed baffles of the mixing units. With this arrangement I am able to cause all the aggregate to flow to either side of the course or to affect a variable distribution with a heavy layer of aggregate on side of the course which is progressively thinner towards the other side of the course. Various combinations may be used and the ability of the machine to lay courses varying in cross-sectional shape greatly enhances its usefulness. The use of two spaced raising and lowering devices 18-22, each of which are pivotally connected to the strike-off blade 67 by means of a single large bolt 48 enables the lower edge of the strike-off blade to assume an angular relationship with the general horizontal plane of the frame. This feature is particularly useful in the laying of wedge courses.

Figure 7 illustrates a modification of my device in which the pivotally mounted baffles are replaced with laterally extending baffles 50 rigidly attached to the members 51 and 52 which connect the mixing units to each other and the leading units to the pulling chains. The carrier member 53 is rigidly attached to the frame 4 by a plurality of pins 55 extending through openings in the L-shaped brackets 28 fastened to the frame. The V-shaped baffle 54 extends downwardly and is carried by member 53 and serves to divert material flowing along the side rail 1 and the adjacent baffle 27 into the adjacent unit 4. This modification performs satisfactorily in use but is not so desirable since it provides no means to

control the lateral distribution of the material.

The modification illustrated by Figure 8 is similar in all respects to the device of Figure 7 except that diamond or square shaped baffles 56 are used in place of the transverse baffles 50 of Figure 7.

Having thus described my invention what I claim is:

1. A surface treating drag comprising a rigid rectangular frame with vertically adjustable strike-off blades on each end thereof, a plurality of mixing units within the frame, each mixing unit comprising a rectangular frame having a plurality of obliquely positioned downwardly extending blades secured thereto, means to connect the mixing units to each other comprising linkage means pivotally connected to the frames of the mixing units, mixing blades pivotally connected to the linkage means to swing about vertical axes, apertures in the horizontal portions of the frames of the mixing units, headed pins adapted to be placed in the apertures to maintain the last mentioned blades in predetermined selected position, members rigidly attached to the mixing units and positioned between the mixing units and the first mentioned frame, mixing blades pivotally connected to the members to swing about a vertical axis, means to secure the last mentioned blades in selected position and means to flexibly connect the mixing units to one end of the first mentioned frame.

2. A surface treating drag comprising a rigid rectangular frame having a vertically adjustable strike-off blade at each end thereof, a plurality of mixing units within the frame, a plurality of obliquely positioned downwardly extending blades on each mixing unit, means to flexibly connect the mixing units to each other, downwardly extending blades pivotally connected to said means, downwardly extending pivotally mounted blades between the mixing units and the frame and means to flexibly connect the mixing units with one end of the frame.

3. A surface treating drag comprising a rigid rectangular frame, a plurality of mixing units within the frame, a plurality of obliquely positioned downwardly extending blades on each mixing unit, means to flexibly connect the mixing units to each other, downwardly extending blades pivotally connected to said means, downwardly extending pivotally mounted blades between the mixing units and the frame and means to flexibly connect the mixing units with one end of the frame.

4. In a surface treating drag, a frame, a plurality of mixing units within the frame, each mixing unit comprising a rectangular frame having a downwardly extending blade positioned diagonally across each corner of the rectangular frame but having their adjacent ends spaced to provide a passageway into and out of the mixing units, means to flexibly connect the mixing units to each other, two downwardly extending blades pivoted to each of said means to swing about vertical axes and having their ends overlying the adjacent ends of adjacent diagonally positioned blades and swingable about their axes to overlie other adjacent diagonally positioned blades.

5. In a surface treating drag, a frame having side members constituting runners adapted to engage the surface of the road bed, a plurality of mixing units each comprising a base having a plurality of rigidly attached downwardly extending mixing blades within the frame, a strike-off blade carried by said frame, means interconnect-

ing said frame and said strike-off blade and operable to alter the relative vertical position and the angular relation of said blade with respect to the horizontal plane of said frame.

- 5 6. A surface treating drag comprising a rigid rectangular frame with vertically adjustable strike-off blades on each end thereof, a plurality of spaced obliquely disposed vertically extending mixing blades positioned within said frame, said
10 blades being flexibly interconnected whereby they may follow the contour of the road bed independently of the vertical movement of the frame, a plurality of pivotally mounted vertically extending
15 mixing blades interposed between the first mentioned blades and adapted to pivot about vertical axes, the arrangement of the fixed and pivotally mounted blades being such that the drag is operable in either direction.

7. A surface treating drag according to claim 6
20 including means to lock said pivotally mounted blades in predetermined selected position whereby the lateral distribution of material coming into the frame may be controlled.

8. A surface treating drag comprising a rigid
25 rectangular frame with vertically adjustable strike-off blades on each end thereof, a plurality of spaced vertically extending mixing blades swingably mounted on vertical pivots positioned within the frame, means to limit the swinging
30 movement of said blades, said limiting means being operable to position said blades in such manner that said blades are operable to cause material coming into said frame to be subjected
35 to a series of divisions and mixings during movements of the frame in either direction.

9. A surface treating drag comprising a rigid rectangular frame, a plurality of spaced obliquely disposed vertically extending mixing blades positioned within the frame, said blades being flexibly
40 interconnected whereby they may follow the contour of the road bed independently of the vertical movement of the frame, a plurality of pivotally mounted vertically extending mixing blades interposed between the first mentioned blades and
45 adapted to pivot about vertical axes, said pivotally mounted blades being carried by the interconnecting means.

10. A surface treating drag comprising a pair of spaced parallel runners adapted to engage and

move along the surface of a roadway, means to maintain said runners in predetermined spaced relation, a plurality of mixing elements positioned between said runners in laterally and longitudinally spaced relation and adapted to intermix
5 materials coming between said runners as said runners are moved along the roadway, means interconnecting said runners and elements to maintain the elements in predetermined lateral and longitudinal relation with said runners, said
10 elements being free to move vertically with respect to said runners whereby the elements will follow the contour of the roadway independently of the path of travel of the runners and will act on all the material previously deposited on the roadway
15 forwardly of the drag and a strike-off blade carried by said runners rearwardly of said mixing elements.

11. A surface treating drag comprising a pair of spaced parallel runners adapted to engage and
20 move along the surface of a roadway, means to maintain said runners in predetermined spaced relation, means positioned between said runners to engage materials previously deposited on the roadway forwardly of the drag and coming be-
25 tween said runners as said runners are moved forwardly, a strike-off blade carried by said runners rearwardly of said second mentioned means, means adjacent one of said runners to secure an end of a cable length, means adjacent the other
30 of said runners to secure an end of another cable length, said last mentioned means including means to vary the last mentioned length when the cable lengths are under tension in drawing the
35 drag.

12. In a surface treating drag, a sectional frame comprising side rails adapted to engage and move along the surface of a roadway and end members, means to detachably connect the ends
40 of the side rails with the end members at selected points spaced along said end members whereby the interval between said side rails may be varied, a vertically adjustable strike-off blade carried by one of said end members and a plurality of flex-
45 ibly interconnected downwardly extending material mixing blades positioned within said frame and horizontally movable therewith.

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