June 21, 1949. O. G. MANDT ET AL 2,473,961

MACHINE OR APPARATUS FOR SURFACING ROADS

Filed Nov. 27, 1944 2 Sheets-Sheet 1

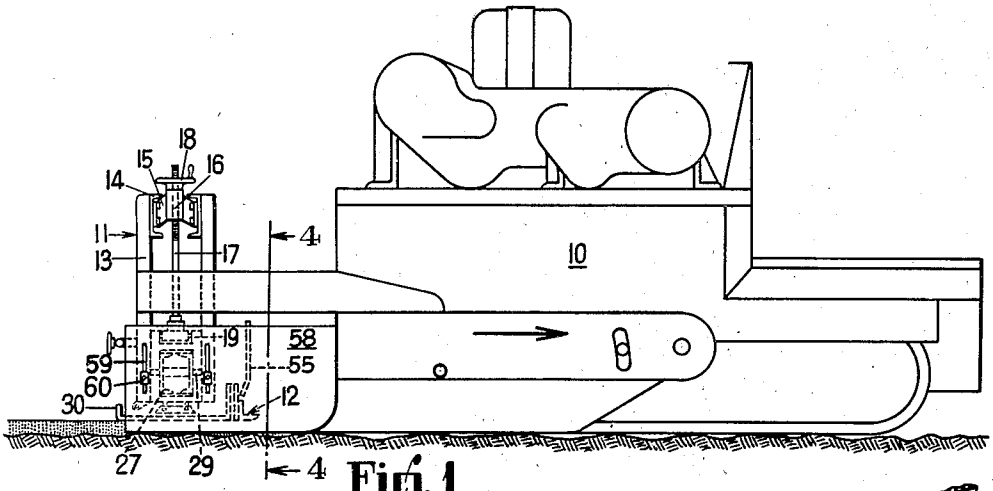

Fig. 1

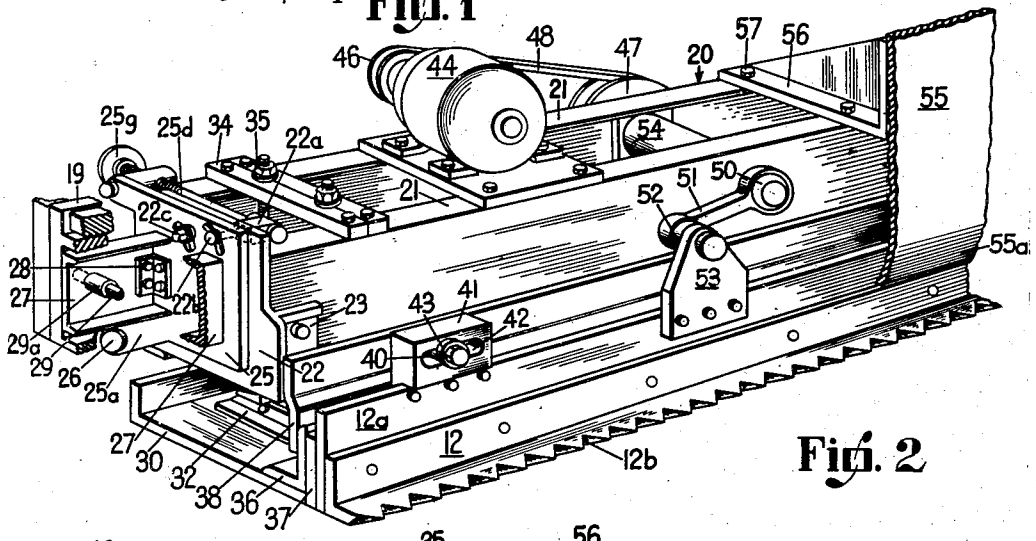

Fig. 2

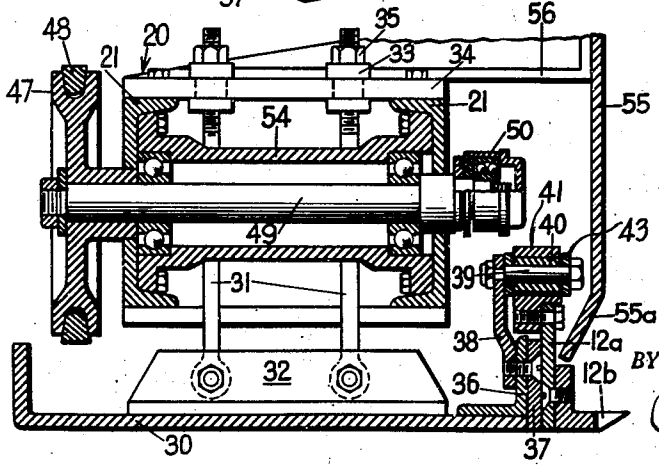

Fig. 3

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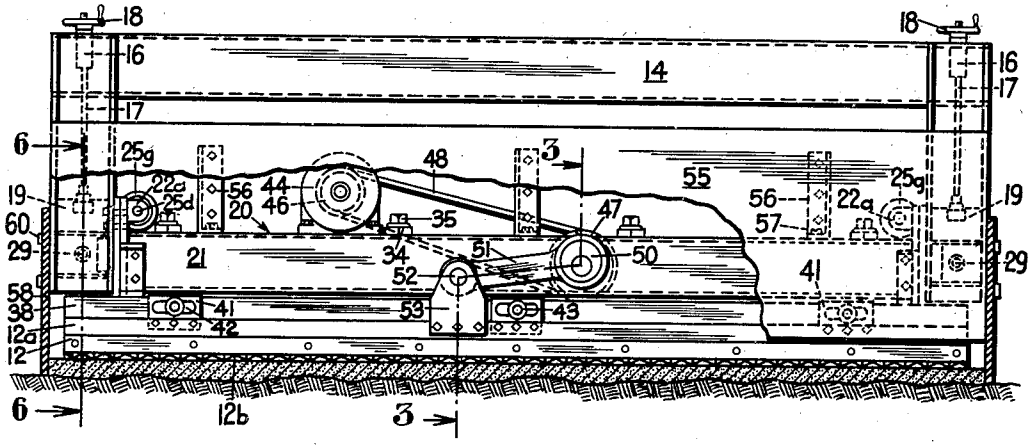

Fig. 4

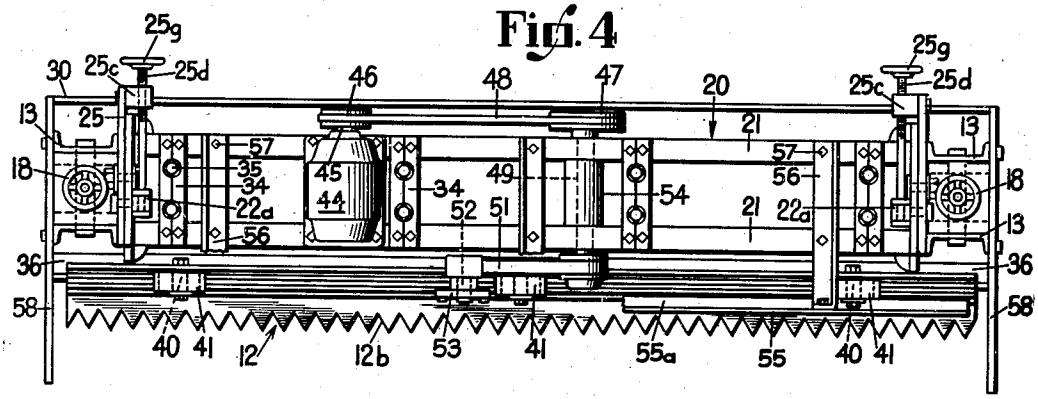

Fig. 5

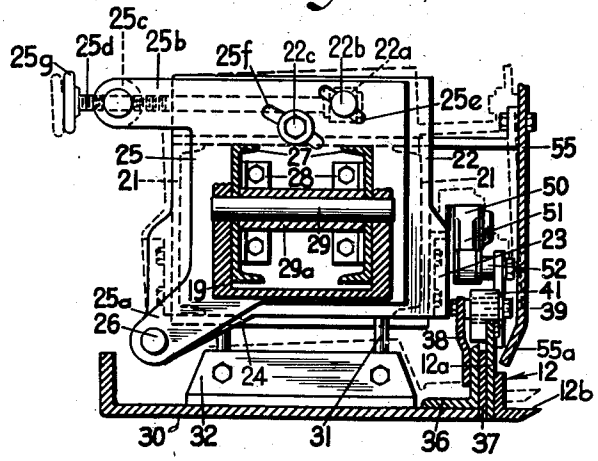

Fig. 6

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MACHINE OR APPARATUS FOR SURFACING ROADS

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10 Claims. (Cl. 94—45)

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Our invention relates to a machine or apparatus for surfacing roads. It has to do particularly with a machine or apparatus for producing a smooth and level surface on a layer of material which is being applied to an old road surface or to a rough graded surface. More particularly, it has to do with an oscillating cut-off and compactor bar associated with a non-oscillating screed unit for application to such a machine or apparatus, and to means for supporting and operating said cut-off bar.

The improved apparatus or machine of our invention is particularly useful in connection with the laying and/or repairing of road and other surfaces formed from various materials, such as bituminous mixes, concrete, et cetera.

One of the objects of our invention is to provide a machine or apparatus of the foregoing character which includes an oscillatable cut-off and compactor bar operable at high speed to thereby give better compaction or density of the material being laid than has been possible with previously known apparatus of this general nature.

Another object of our invention is to provide a combined high speed cut-off bar and compactor of the oscillating type adapted to be associated with an ordinary non-oscillating or so-called "dead" screed unit, in which the compactor and cut-off bar is movable back and forth in substantially a horizontal plane lengthwise of the screed unit.

A further object of our invention is to provide a combined oscillating cut-off bar and compactor which is so formed and constructed as to compact the newly laid material evenly and thoroughly throughout the full width thereof and then cut off the material cleanly at the level of the finishing screed to which it is attached.

Another object of our invention is to provide a cut-off bar of the foregoing character which relieves the screed of the necessity of compacting and cutting the newly laid material and which eliminates the use of previously employed relatively narrow tampers which produced fine hair checks on the finished surface.

A further object of our invention is to provide an improved screed unit which is capable of easy and quick adjustments vertically and angularly with respect to the newly laid material.

Another object of the invention is to provide an improved screed unit in which the screed is of a length corresponding to the width of the newly laid surface and in which the oscillating

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cut-off bar is of somewhat shorter length and oscillatable within the limits of surface width.

Generally speaking the machine or apparatus of our invention consists, preferably, of a power driven tractor unit, a screed unit having a non-oscillatable or "dead" screed, and a rapidly oscillating combined compactor and cut-off bar operatively associated with the forward or leading edge of the screed and movable back and forth lengthwise of the screed and crosswise of the machine. The screed is adjustable vertically with relation to the surface and is mounted for tilting movement relative to the surface, as well as for crowning adjustment. Since the cut-off bar is carried by the screed, it is likewise correspondingly adjustable vertically and angularly, that is tiltable, with relation to the surface. Power operated means, such as an electric motor, is provided for oscillating the cut-off bar at a high rate of speed such, for example, as approximately 1000 to 1500 R. P. M.

The foregoing and other objects and advantages of our invention will be apparent from the following description and appended claims when considered in conjunction with the accompanying drawings forming a part of this specification, wherein like reference characters designate corresponding parts in the several views.

In said drawings:

Fig. 1 is a side elevational view showing a machine or apparatus embodying the present invention.

Fig. 2 is an enlarged fragmentary perspective view of the screed unit of the machine, showing the oscillating cut-off bar of the present invention applied thereto.

Fig. 3 is a vertical transverse sectional view taken substantially along the line 3—3 of Fig. 4, looking in the direction of the arrows.

Fig. 4 is an enlarged vertical elevational view, partly in section and partly broken away, taken substantially along the line 4—4 of Fig. 1, looking in the direction of the arrows.

Fig. 5 is a top plan view of the apparatus of Fig. 4; and

Fig. 6 is an enlarged vertical sectional view taken substantially along the line 6—6 of Fig. 4, looking in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways.

It is to be understood also that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention herein claimed beyond the requirements of the prior art.

Referring now to the drawings, we have shown therein one embodiment of our present invention. In Fig. 1, the machine or apparatus comprises a power driven tractor unit, shown as a whole at 10, a trailing screed unit, shown as a whole at 11, and an oscillating combined compactor and cut-off bar, shown as a whole at 12.

The screed unit 11 is connected in any suitable manner to the rear end of the tractor unit 10 so as to be drawn along over the surface by said tractor unit. The screed unit comprises pairs of upright supporting members or channels 13 located at opposite sides of the machine and interconnected at their upper ends by cross frame members or channels 14. The upper ends of each pair of channels 13 are provided with brackets 15 having bearing portions 16 through which extend vertically adjustable supporting rods or shafts 17 having threaded upper end portions onto which hand wheels 18 are threaded. The lower ends of the rods 17 carry hanger blocks 19 on which the lower portion of the screed unit, shown as a whole at 20, Fig. 2, is mounted.

The lower portion of the screed unit 20 comprises a pair of spaced channels 21 secured at their opposite ends to adjustable supporting plates 22 by means of off-set portions 23, Fig. 2. Each of the plates 22 is provided with a projecting ear 24, Fig. 6.

Plates 25, similar to plates 22, cooperate with plates 22 and have projecting ears 25*a* which cooperate with ears 24 and are connected together by means of pivot pins or bolts 26. Each of the outer plates 25 carries a pair of opposed outwardly extending arms or channels 27 secured to the plates by angle clips 28, or by welding. The channels 27 carrying shafts 29 whose ends extend beyond the channels and into the hanger blocks 19, Figs. 2 and 6. The shafts are surrounded by sleeves 29*a* which serve to maintain the channels in spaced relation. The members 27, shafts 29, blocks 19 and the rods 17 together serve to support the lower portion 20 of the screed unit for vertical adjustment which is effected by operating the hand wheels 18.

Forming a part of the screed unit is the screed member 30 which is supported from the lower portion 20 of the screed unit by means of adjusting rods 31 secured at their lower ends to angles 32 carried by the screed 30. The upper ends of the rods 31 are threaded and extend through bearing sleeves 33 which in turn are supported by pairs of cross bars 34 secured to the upper flanges of the channels 21 and mounted thereon. Nuts 35 are threaded onto the rods and engage the bearing sleeves 33, as best seen in Figs. 2 and 3. The rods 31 and nuts 35 provide means for adjusting the screed member 30 to the desired crown.

The forward or lead end of the screed 30 carries an angle 36 welded thereto which extends the full length of the screed. A wear plate 37 is secured to the front face of the upright flange of the angle 36. Secured to the rear face of this flange is a plate 38 which extends the full length of the screed 30. The upper portion of this plate is provided with several forwardly extending roller supporting pins 39 carrying idler rollers 40, three such being shown, see Figs. 4 and 5.

Associated with the forward portion of the screed 30 and carried thereby for oscillation relative thereto lengthwise of the screed and transversely of the machine, is the combined compactor and cut-off bar 12, previously mentioned. The cut-off bar 12 is carried by a combined supporting and wear plate 12*a* cooperating with the wear plate 37 of the screed. The plate 12*a* carries at its upper portion spaced hanger blocks 41 having longitudinal slots 42 formed therein. These slots receive the idler rollers 40 of the screed, the parts being held together in operative relationship by washers 43, see Figs. 2 and 3. Thus, it will be seen that the cut-off bar is supported by the non-oscillatable or "dead" screed 30 for oscillating movement relative to said screed. The cut-off bar 12 is provided with a series of forwardly projecting teeth 12*b* which, as shown, are wedge-shaped and bevelled on their under surfaces. With its wedge-shape bevelled teeth oscillating at high speed as they advance, the cut-off bar contacts and crowds every bit of the material under equal pressure, works and presses stones and material into all low spots, firmly compacts the entire mass, then cuts it off clean at level of the finishing screed 30.

The non-oscillating screed portion 20, in addition to being capable of vertical adjustment as mentioned above, is also capable of being tilted with relation to the newly laid surface. As best seen in Figs. 2 and 6, the tilting of the screed may be accomplished by adjusting or moving the portion 20 including the plates 22 relative to the plates 25. Suitable means is provided for this purpose. As shown, the plates 25, suspended from rods 17, are provided with projecting portions 25*b* at their upper rear corners which provide means for supporting rotatable blocks 25*c*. These blocks are provided with transverse bores having internal threads through which threaded adjustment rods 25*d* extend. The forward ends of the rods are rotatably mounted in supporting blocks 22*a* carried by the vertically swingable plates 22 in line with the blocks 25*c*. The blocks 22*a* are provided with projecting headed pins 22*b* which extend through arcuate slots 25*e* formed in the relatively fixed plates 25. The plates 22 carry bolts 22*c* whose outer end portions extend through arcuate slots 25*f* and are provided with tightening nuts. The threaded rods 25*d* carry at their free ends hand wheels 25*g* for operating the rods to tilt the unit 20 relative to the plates 25, as shown in broken lines, Fig. 6.

The front edge of the screed member 30 is normally maintained at a higher level than the rear edge thereof.

Suitable power means is provided for oscillating the cut-off bar 12 at a high rate of speed. As shown, such means comprises an electric motor 44 mounted upon the channels 21, see Figs. 2, 4 and 5. The motor shaft 45 carries a pulley 46 which is drivingly connected to a pulley 47 by means of a belt 48. The pulley 47 is mounted upon a shaft 49 carrying at its forward end an eccentric 50. A crank arm 51 is connected at one of its ends to the eccentric 50 and at its other end by a pin 52 to a bracket 53 mounted upon the supporting plate 12*a* of the oscillating cut-off bar 12. The shaft 49 extends through the channels 21 and is enclosed by a bearing housing 54, see Fig. 3.

A stationary guard plate or shield 55 is mounted upon the forward end of the screed unit lower

portion 20 by means of brackets 56 secured to the channels 21 by bolts or the like 57. The lower end portion of the guard plate extends inwardly or rearwardly at 55a and terminates in the region of the oscillating cut-off bar 12. This plate 55 serves as means for pushing the loose material ahead and protects the mechanism for operating the oscillating cut-off bar 12.

Floating side plates or forms 58 are mounted upon the uprights 13 at opposite ends of the screed unit. These plates are provided with vertical slots 59 with which suitable bolts 60 cooperate to permit them to have free up and down movement over the uneven road surfaces at opposite sides of the machine beyond the ends of the screed unit. The plates 58 provide means movable with the machine for determining the side edges of the newly laid material. The screed 30 extends throughout the entire width or space between the forms or plates 58. With all known prior art machines wherein the screeds themselves were oscillated, the screeds could not be long enough to bridge the space between the side plates, there being spaces left between their ends and the side plates or forms. For this reason, finishing operations were required to be performed on the edges of the new surface to correct the irregular or uneven edges of said surface.

The high speed of oscillation of the cut-off bar 12, at approximately 1000 to 1500 R. P. M. provides for better compaction of the newly laid material due to several factors, viz: the oscillation of the bar, the tilt in the screed 30 and also the induced vibration from the high speed oscillation.

Having thus described our invention, what we claim is:

1. In a road-surfacing machine, a screed unit, said screed unit including a dead screed member extending transversely of the machine, side form plates carried by said screed unit and disposed at the ends of said dead screed member, a compacting and cut-off bar supported on said screed unit at the forward side of said dead screed member within said side form plates for engaging and compacting material into which said screed unit is crowed before the material reaches said dead screed member, said compacting and cut-off bar being supported on the screed unit for reciprocating movement thereof lengthwise of the dead screed member and transversely of the machine whereby to contact material into which the bar is crowded and compact and cut it off at a desired level, said bar being of less length than the space between said side plates so as to permit the reciprocation thereof but traversing substantially the full length of such space in its reciprocations, and means carried by the machine and operatively connected to said bar for reciprocating said bar relative to said dead screed member between said side form plates.

2. A structure according to claim 1 wherein said side form plates are supported for vertical floating movement directly adjacent the ends of said dead screed member.

3. A structure according to claim 1 wherein the cut-off bar has its horizontal lower surface

substantially level with the horizontal lower surface of the dead screed member and is provided at its forward edge with a series of forwardly projecting teeth having beveled under surfaces.

4. A structure according to claim 3 including a guard plate supported by the screed unit and extending from side form plate to side form plate, said teeth on said bar projecting beneath and forwardly beyond the lower edge of said guard plate.

5. A structure according to claim 1 wherein said side form plates are supported directly adjacent the ends of said dead screed member, said dead screed member and said bar having lower horizontal surfaces which are substantially at the same level, a guard plate supported by the screed unit and extending from side form plate to side form plate, said bar having a material-engaging edge projecting beneath and forwardly beyond the lower edge of said guard plate.

6. Apparatus according to claim 1 wherein means is provided for supporting the compacting and cut-off bar directly from the dead screed member, said means including rollers carried by one of said members and horizontally disposed guide members carried by the other of said members.

7. Apparatus according to claim 6 wherein an eccentric drive is provided between said dead screed member and said bar to produce reciprocation thereof, said drive being connected to a power unit carried by the screed unit.

8. Apparatus according to claim 1 including means carried by the screed unit for adjusting the dead screed member vertically, and means carried by said unit for adjustably tilting said dead screed member forwardly or rearwardly.

9. Apparatus according to claim 8 wherein the vertical adjusting means comprises adjustable means for suspending both ends of the dead screed member, and wherein the tilting means comprises vertically disposed relatively fixed plates connected with the suspending means and adjacent vertically disposed relatively tiltable plates which carry the dead screed member, and means connected with said adjacent fixed and tiltable plates for moving them relatively to tilt said dead screed member.

10. Apparatus according to claim 9 including means for securing said plates in relatively adjusted positions.

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