

March 19, 1935.

F. A. PEASE

1,995,267

ROAD MAKING AND MAINTENANCE APPLIANCE

Filed April 14, 1931

2 Sheets-Sheet 1

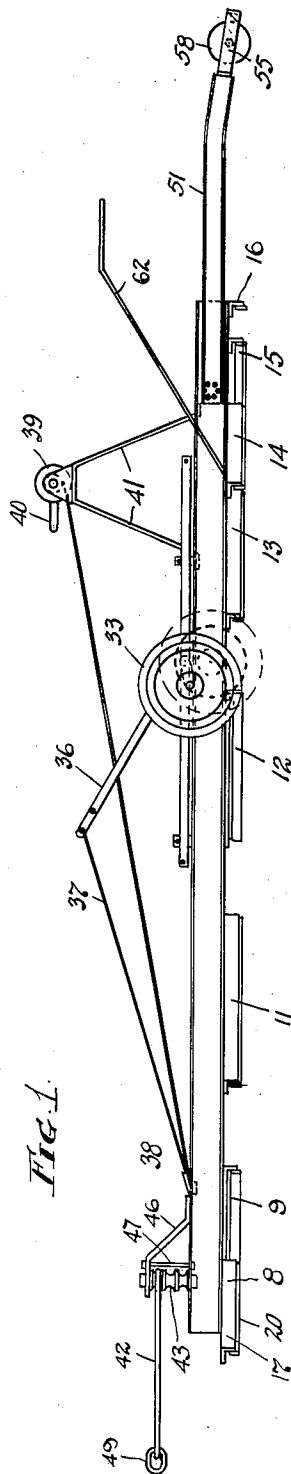


Fig. 1.

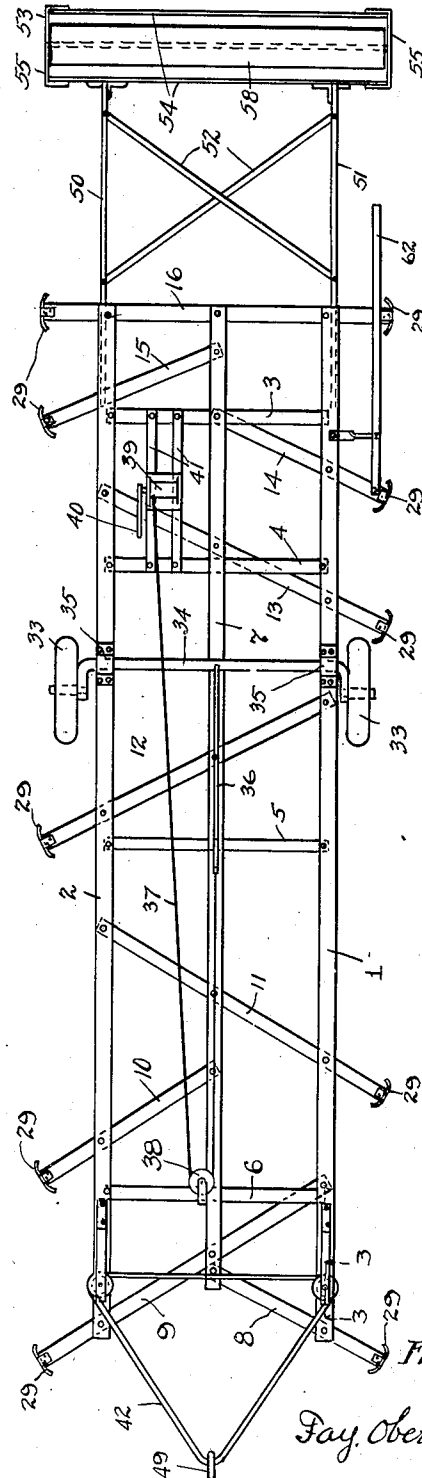


Fig. 2.

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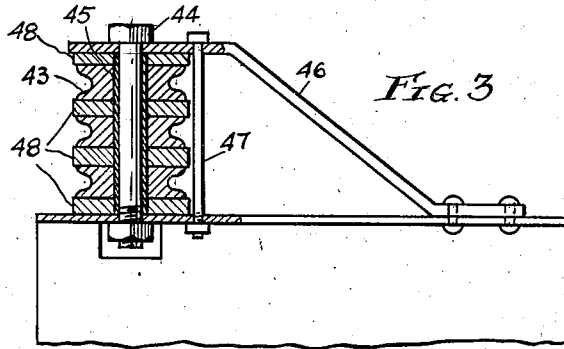


Fig. 3

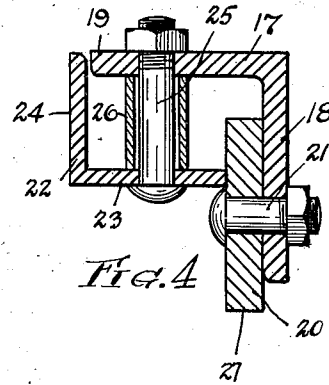


Fig. 4

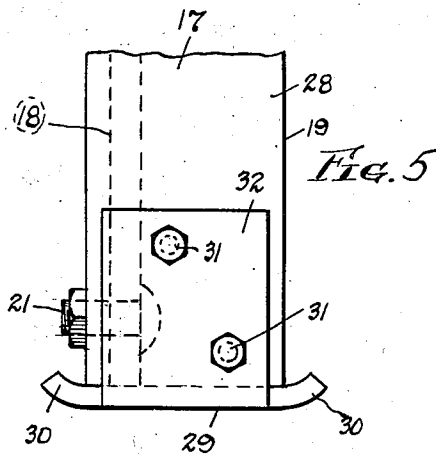


Fig. 5

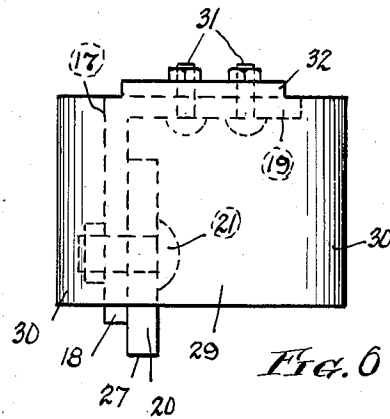


Fig. 6

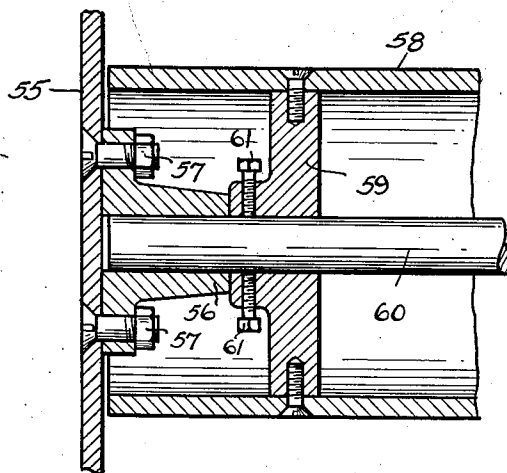


Fig. 7

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1,995,267

ROAD MAKING AND MAINTENANCE
APPLIANCEFred A. Pease, Cleveland Heights, Ohio, assignor
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Application April 14, 1931, Serial No. 530,028

7 Claims. (Cl. 94—44)

This invention relating as indicated to road working appliances has particular reference to a form of construction which is primarily designed to carry forth a method of re-surfacing roads and the like such as is disclosed and claimed in my co-pending application, Serial No. 510,937, filed January 24, 1931.

As will be evident from the description in the aforesaid pending application, in order to properly re-surface or finish roads which have imperfections on their surfaces, it is essential to employ an apparatus which, in its passage over the road bed, will not be influenced by the imperfections occurring in the road which is to be surfaced so that the resultant road bed contour produced by such apparatus will be practically smooth. It is, therefore, essential that the particular apparatus have sufficient longitudinal and/or lateral extent so as to travel upon that portion of the road which has already been surfaced so as to, in effect, stabilize that portion of the apparatus which encounters the uneven portions of the worn road which is to be worked.

When re-finishing a road by applying at least a superficial layer of bitumen bound aggregate, it is necessary that the implement employed to accomplish such finishing operation be capable of manipulation at the end of the section being improved or intermediately of the ends without disturbing such freshly applied surface.

When the particular implement is drawn over the surface to be finished, means should be provided for establishing driving or drawing connection to such implement so that as relatively hard local areas are encountered by the drag or like implement passing over the road, such hard areas will not affect materially the evenness of the pull of the implement and further, no chattering or excessive side swaying of the implement should be permitted.

When an implement in the form of a drag is employed for the purpose of distributing a layer of material over a worn road bed and to plane off at least superficially some of the high spots of the bed so as to employ such scraped off material to supplement the new material added to fill in the depressions in the road to the desired level and contour, it is essential that the operating blades or scrapers of such drag or implement be arranged so as to effect a balanced distribution of material over the area covered by the drag and further, to insure that the depressions will be properly filled and that no material will be discharged laterally from the drag so as to pro-

duce an objectionable ridge in the finished surface.

Considerable difficulty has been experienced in the past in every effort to apply a relatively thin layer of material to a road bed, which material is of the type commonly referred to as oil bound aggregates. This difficulty has been due largely to the fact that plain scraper elements have been employed for the purpose of distributing the material without providing any means for at least superficially packing such new material into the depressions. Without first or simultaneously with the dragging operation at least superficially packing such newly added material in the depressions which are to be corrected, the effect of the scraper blades has been to carry along with them a portion of the material which should have been retained in the depressions. A further necessity for a preliminary packing of the oil bound aggregates when applied to a road bed has been that high priced solvents are usually added to the material which, unless the material is packed so as to entrap such solvents at least for the time being, will evaporate and their effectiveness be lost before the finishing operation is completed.

It is among the objects of my invention to produce a road working apparatus which shall have all of the above named desirable characteristics. Other objects of my invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a side elevational view of the apparatus comprising my invention; Fig. 2 is a plan view of such apparatus; Fig. 3 is a fragmentary part sectional, part elevational view of a portion of the apparatus illustrated in Fig. 2 taken on a plane substantially indicated by the line 3—3; Fig. 4 is a transverse sectional view of one of the transversely extending road contacting members of the apparatus illustrated in the previous figures; Fig. 5 is a fragmentary plan view of one end of such transverse members; Fig. 6 is an end view of the apparatus illustrated in Fig. 5; and Fig. 7 is a fragmentary sectional view of one end of the roll-

er and its associated supporting means illustrated in Figs. 1 and 2.

Referring now more specifically to the drawings and more especially to Figs. 1 and 2, it will be noted that the apparatus comprising my invention consists of longitudinally extending substantially parallel side frame members 1 and 2 which may be I beams as illustrated in the drawings or such frames might be channels depending specifically upon the type of construction desired. The side frame members 1 and 2 are suitably cross-braced by members such as 3, 4, 5, and 6. The construction is further strengthened by the employment of a longitudinally extending intermediate member 7 which is secured to the transverse members such as by riveting or the like.

The above described substantially rectangular frame supports and carries a plurality of angularly disposed scraper members such as 8, 9, 10, 11, 12, 13, 14, and 15, and a further member 16 preferably similar in its construction to the members just described but extending preferably at right angles across the rear end of the main frame of the implement for the purpose hereinafter more fully described.

The angularly arranged transverse members 8 to 15, both inclusive, and the member 16 are preferably formed in the manner which is clearly illustrated in Fig. 4. As indicated in this figure, the body of the element consists of an angle member 17 which has one of the legs 18 arranged substantially normal to the horizontal plane of the grader and the other leg 19 extending substantially parallel to such plane and preferably forwardly in the direction which the grader is to move during the operation. A hardened removable wear shoe 20 may be secured to the leg 18 by means of bolts such as 21. For the purposes hereinafter more fully explained, the angle member 17, more specifically the leg 19 thereof, will have secured thereto in the manner illustrated in Fig. 4 an angle member 22, which has one leg 23 extending substantially parallel to the leg 19 of the angle 17 and into contact either with the member 20 or the leg 18. The other leg 24 of the angle member 22 extends substantially normal to the leg 19 or parallel to the leg 18 so that the material being spread over the road surface by the grader will be forced under the leg 23 of the angle 22. The angle 22 is removably secured to the angle 19 by means of bolts such as 25, which have associated therewith thimbles or sleeves 26, the axial extent of which determine the relative position between the two named angles. It will be noted that by varying the axial extent of the sleeve 26 the distance between the lower edge 27 of the scraper or grader element and the lower surface of the leg 23 of the angle 22 may be accurately controlled.

The ends 28 of the angularly related and transversely extending members 8 and 16, both inclusive, may have curb shoes 29 associated therewith, the construction of which is most clearly illustrated in Figs. 5 and 6. As illustrated in these figures, the curb shoes 29 comprise rebent portions 30 diverging from the central portion so that as the grader comes in contact with a curb, no damage will be done thereby. The shoes 29 are preferably removably secured to the members 17 by means of bolts such as 31 which pass through apertures provided therefor in a laterally extending projection 32 of such curb shoe and the leg 19 of the angle 17.

In order to facilitate the manipulation of the road grader, especially to assist in turning the same in relatively small spaces, I provide adjust-

able wheels 33 which are rotatably supported on opposite sides of the frame by the arms of a crank shaft 34, which is itself oscillatably supported in bearing blocks 35 carried in axial alignment on the opposite side frame members 1 and 2. The crank shaft 34 has rigidly secured thereto an arm 36 by means of which such crank shaft may be rotated to move the wheels 33 into any desired position. The position illustrated in full lines in Fig. 1 is that which the wheels will occupy during the actual operation of the grader and the dotted line position in such figure is that which the wheels will occupy when supporting the grader during the time it is turned in the road or otherwise manipulated.

In order to facilitate the actuation of the lever 36 and the resultant control over the wheels 33, I may provide a cable 37 which, at one end, is secured to the arm 36, passes around a sheave 38 and at its other end is wound on a drum 39, the rotation of which may be effected by a rotation of its associated handle 40. The drum 39 may be supported on suitable braces such as 41 carried by the transverse members 3 and 4.

The particular form of construction illustrated in the drawings is designed to be moved over the road bed operated upon by being hitched to a tractor or other suitable source of motive power. In order to enable the grader to follow the source of power most evenly, without chattering which would produce inequalities in the finished road surface, I provide novel means for hitching the grader to the motive power such as the tractor. This means comprises a preferably continuous cable 42 which is trained about a selected pair of sheaves 43 which are mounted on the forward ends of the side frame members 1 and 2 by means of a bolt 44, a sleeve 45, bracket members 46 and bolts 47. The sheaves 43 are spaced by discs such as 48. The cable 42 may have a ring 49 associated therewith to which the tractor or like motive power may be connected.

At the rear end of the grader and rigidly attached to the side frame members 1 and 2 are rearwardly extending arms 50 and 51 which are suitably cross-braced by members such as 52. The arms 50 and 51 at their rearmost ends are secured to a substantially rectangular frame 53 which consists of longitudinal members 54 and transverse members 55. The members 55 as most clearly illustrated in Fig. 7, have removably secured thereto bearing blocks 56 by means of bolts 57. Positioned within the rectangular frame 53 is a roller 58 which is constructed and supported as most clearly illustrated in Fig. 7. The roller 58 consists of a tubular shell which has heads 59 secured therein adjacent the ends, which heads support a shaft 60, which is secured against axial movement by set screws such as 61. The shaft 60 projects into the bearing member 56 so that the roller is rotatably supported by means of the side members 55.

The particular operation of the hereinbefore described apparatus is briefly as follows: The apparatus will be hitched to a suitable source of power such as a tractor and pulled over the surface of the road to be finished. A quantity of new material such as oil bound aggregate or the like having been previously placed either on the road to be repaired or in front of the grader, will be first met with by the angularly disposed grader members 8 and 9 at the forward end of the implement. It will be noted that the angular relation between the members 8 and 9 is considerably sharper than between each succeeding pair of

members. In fact, such angular relation between the several members decreases progressively throughout the length of the grader until the last member 16 occupies a position at right angles to the longitudinal axis of the apparatus. One reason for the relatively sharp angle between the first pair of members 8 and 9 is that for certain classes of work, these members are relied upon to scrape together, at least superficially, the material on the road and by working the same as the grader progresses, such material will be mixed and prepared ready to be deposited evenly in the depressions in the road by the subsequent pairs of like members. It will be noted that by arranging the blades at the indicated angles as the grader moves over the road there will be an even rate of diminution of material in the successive blades until the rear end of the grader is approached where the baffles 14 and 15 are encountered, the primary object of which is to divert all of the material not already deposited to the central portion of the transverse member 16.

The object of diverting the excess undeposited material to the center of this last transverse member is to insure the formation of a road bed having the desired even convex slope inasmuch as the grader is designed to move in a plurality of lateral contiguous paths longitudinally of the road, and due to the fact that the working edge of the last blade is substantially a straight line, chords instead of arcs would be formed by such last named blades. However, by localizing the excess material at the center of the last blade, the center will be slightly crowned so as to produce the proper curved contour to the finished road surface.

The arrangement of the several elements illustrated in Fig. 4 which constitute the cutting or scraping blades of the grader has advantages which may briefly be summarized as follows:

The material passing under the leg 23 of the angle 22 will be firmly compacted due to the weight of the grader itself before such material is met by the scraping or cutting member 20. The material will, therefore, be sufficiently packed on the road surface so as to entrap the solvents in the material which would readily evaporate otherwise. The packing of the material in front of the blades likewise enables the low areas to be filled with a solid body and then leveled off by means of the cutter blade 20 without gouging out of such low places the material which has been added thereto. This particular formation of the cutter or scraper elements is believed to be highly important to the successful operation of apparatus of the character described. The type of material which is operated upon should, of course, govern the vertical distance between the lower edge 27 of the cutter 20 and the lower surface of the leg 23 of the angle 22.

The curb guards of curved section securely attached to the ends of the blade frames, as hereinbefore described, fully prevent damage by the grader to the curbs which occur alongside of the road. When such curb guards are employed, the grader may be operated within close limits of the border of the highway or street so as to obviate the necessity of hand raking, scraping or otherwise working over the gutter section and to fill in the space which would not be treated with a grader not worked close to the curb.

The draft device at the front of the machine enables the same to be operated most evenly under varying circumstances. It is recognized that if the connection to the tractor or the like is not made at the proper vertical point on the

grader, it will cause the front blades to dig into the surface of the road or to be lifted to such an extent that the efficient operation of the grader is interfered with. The particular form of construction of the draft device lends itself to easy manipulation of the grader and further, to adjustments which may be made quickly and easily.

A tiller bar or arm such as 62 may be secured as indicated most clearly in Figs. 1 and 2 to one or more sides of the grader so that a work man following along the grader may accurately control its position on the road.

The roller 58, rotatably supported in the frame-work extending rearwardly of the grader and rigid therewith, produces a dual result. First, such roller will serve as a means for packing or rolling the surface which has been finished by the grader and second, such roller by virtue of the fact that it is carried in a rigid extension of the grader frame, serves as a means for dampening or entirely removing oscillations in the grader frame which would occur as the grader passes over undulations or irregular areas in the road, in effect, the roller produces a straight edge effect with the grader frame so that the surface produced by the grader will be free from imperfections.

Numerous other advantages result from the operation of the above described apparatus which, it is believed, will be so apparent to those familiar with the art of road building and maintenance that a further enumeration thereof at this point is unnecessary.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a road working apparatus, the combination of a rigid frame, a plurality of angularly disposed scraper members supported by said frame, drawing means for said frame comprising a plurality of paired rotatable sheaves supported in spaced relation on the forward end of said frame, and an endless cable around a selected pair of said sheaves.

2. In a road working apparatus, the combination of a rigid frame, a plurality of angularly disposed scraper members supported by said frame, and curb guards having rebent terminal portions secured to the laterally projecting terminals of said members.

3. In combination with a road working apparatus, a working tool comprising a blade extending substantially normal to the surface to be worked, and an independent material packing member extending forwardly from said blade, said member comprising an angle bar having one face parallel to the surface to be worked, said bar being suspended by bolts having sleeves, the length of said sleeves determining the height at which said member operates.

4. In combination with a road working apparatus, a working tool comprising a blade extending substantially normal to the surface to be worked, a material packing member extending forwardly from said blade and adjustably supported by sleeved bolts with one face substantially parallel to the surface to be worked.

5. In a road working apparatus, the combination of a frame, scraper members carried by said

- frame, drawing means on said frame comprising laterally spaced rotatable sheaves and an endless cable around said sheaves, curb guards on said scraper members having rebent terminal portions, and material packing means supported directly in front of said scraper members, said last named means including angle bars having a face parallel to the surface to be worked, and being adjustly supported by means of sleeved bolts.
6. In a road working apparatus, the combination of a frame, scraper members carried by said frame, drawing means on said frame comprising laterally spaced rotatable sheaves and an endless cable around said sheaves, curb guards on said scraper members having rebent terminal portions, and material packing means supported directly in front of said scraper members, said last named means including angle bars having a face parallel to the surface to be worked, and being adjustably supported by means of sleeved bolts, said frame having a crank shaft thereon with wheels mounted on said shaft, said wheels being rotatable in the direction of travel of said apparatus and said crank shaft having

power means operatively associated therewith for raising and lowering said frame.

7. In a road working apparatus, the combination of a rigid frame with a plurality of angularly disposed scraper members, said frame having longitudinal edges, said scraper members respectively spaced longitudinally of said frame and supported thereby, the angular relation between said scraper members and the longitudinal axis of said frame increasing progressively from the front to the rear of said frame, a scraper member adjacent the rear end of said frame extending transversely thereof at right angles to the longitudinal axis of said frame, and the rear end of the scraper immediately in front of said last named scraper member terminating adjacent the longitudinal axis of said frame, certain of said scraper members extending completely across said frame with the discharge end of one member adjacent the inlet end of another member, whereby road surfacing material is caused to travel from one longitudinal edge of said frame to the other.

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