

June 9, 1942.

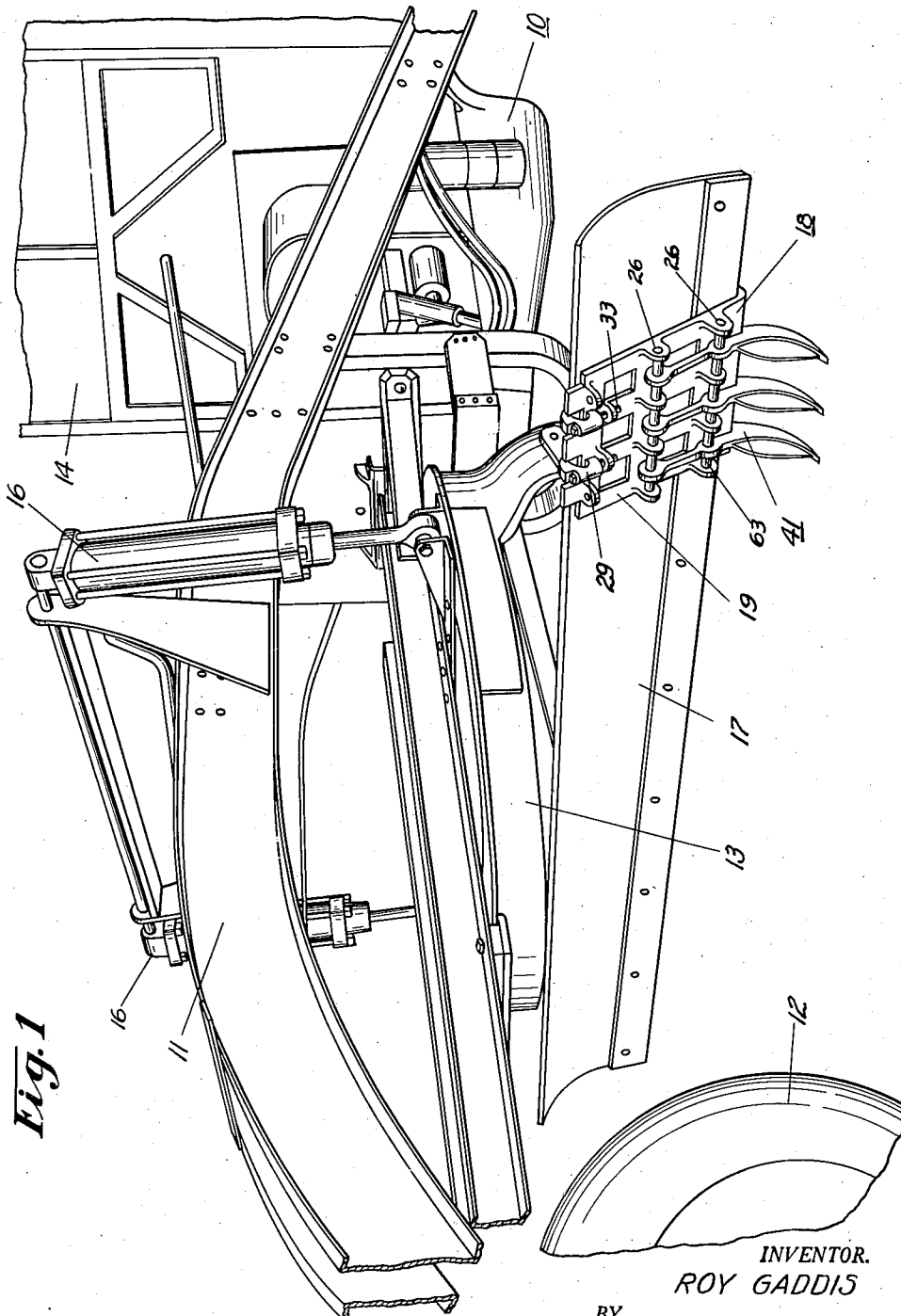
R. GADDIS

2,285,706

ROAD SCARIFYING DEVICE

Filed Feb. 24, 1940

2 Sheets-Sheet 1



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June 9, 1942.

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2 Sheets-Sheet 2

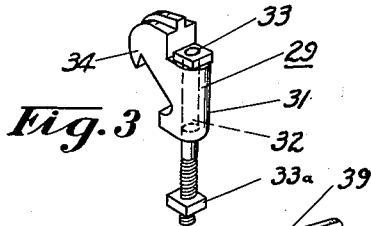


Fig. 3

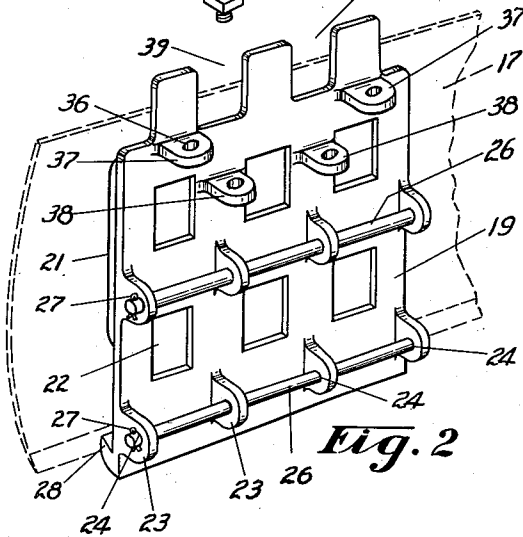


Fig. 2

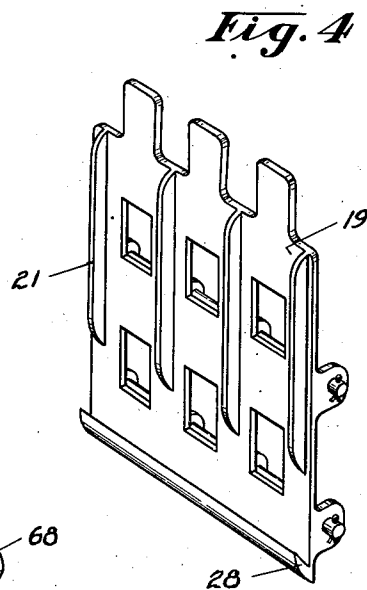


Fig. 4

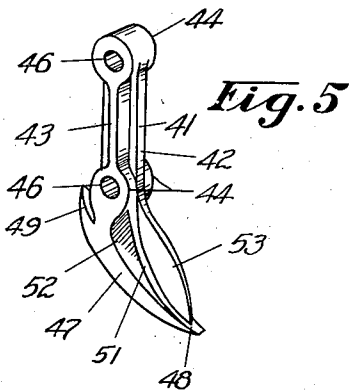


Fig. 5

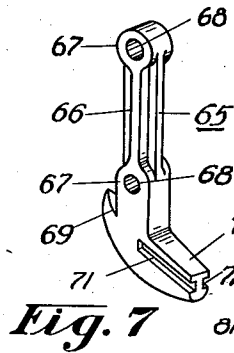


Fig. 7

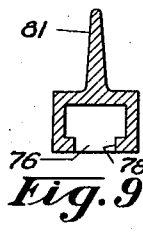


Fig. 9

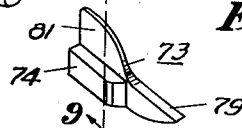


Fig. 8

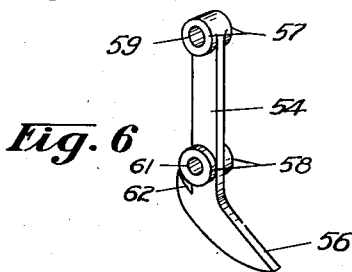


Fig. 6

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ROAD SCARIFYING DEVICE

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10 Claims. (Cl. 262—8)

This invention relates to improvements in dirt moving devices such as scrapers and the like, and has particular relation to scarifying devices adapted for use in resurfacing roads and for use in the removal of packed snow and ice.

It has become common practice in recent years, in the maintenance of gravel, black-top, and oiled roads, to resurface them, when their condition becomes poor, by digging up or scarifying the old surface to permit a new surface to be formed that is free from ripples or the corduroy effect with which most motorists are acquainted.

It has also become common practice to use scraping and scarifying devices in the removal of packed snow and ice from highways during the winter months.

A large number of devices, more or less suitable for the purpose, have been advanced in recent years. It has been my experience, however, that the majority of these devices are large, cumbersome, and generally quite expensive to manufacture and maintain.

I have noticed that few of these devices offer any amount of flexibility in operation. Many of these devices have been designed for use with a given make of road machine, as for instance with a road grading device of a single manufacturer. There are of course a large number of manufacturers of equipment for use in road building and maintenance, and it will be very apparent that the necessity for the owner of a number of makes of machines to purchase and use an equal number of scraping or scarifying devices, results not only in considerable inconvenience, but in the necessity for a considerable outlay of money.

It is, therefore, a primary object of my invention to provide a simplified, relatively inexpensive scarifying device which is readily adaptable for use in resurfacing old roads and for use in removing ice and packed snow from highways.

Another object of my invention is the provision of a scarifying device suitable for quick installation in relatively small units on the mold board or scraper blade of practically any standard type of road scraping or grading machine.

Another object of my invention is the provision of a device which may be easily and quickly removed from one machine and mounted upon another.

A still further object of my invention is to provide a strong and easily replaceable tooth structure of an improved shape such as will require a minimum amount of power during use and one which will aid in breaking up the scarified surface into relatively small pieces.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specification, wherein are disclosed exemplary embodiments of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawings:

Figure 1 is a fragmentary view in perspective of a representative type of road grading machine to which has been applied a single unit of a scarifying device constructed in accordance with my invention.

Figure 2 is a front view in perspective of the mounting plate of a scarifying device, such as the one illustrated in Figure 1, and as constructed in accordance with my invention.

Figure 3 is a view in perspective of one of the clamping means used in mounting the plate shown in Figure 2 on the mold board of a grading device.

Figure 4 is a rear view in perspective of the mounting plate illustrated in Figure 2.

Figure 5 is a view in perspective of a scarifier tooth constructed according to one embodiment of my invention.

Figure 6 is a view in perspective of a modified form of the tooth shown in Figure 5.

Figures 7 and 8 illustrate a further modification of the scarifier tooth structure in which the hardened wearing portion may be renewed by removing the old point and driving on a new one, and

Figure 9 is a view in section taken along the line 9—9 of Figure 8 to further illustrate the shape of the drive-on point.

Referring now to the drawings, and to Figure 1 in particular, the device here shown may be considered as representative of the majority of the devices used to perform the operations of planing or grading in the building or maintenance of highways.

The device shown comprises, in general, a tractor type prime mover 10, a main arched framework 11 extending forwardly from the prime mover and mounted at its forward end on wheels, as indicated at 12. The bull ring 13 is mounted for rotation near the under side of the arched frame 11. Means are provided for operation from within the cab 14 for rotating the bull ring as desired. Other means, such as the hydraulic jacks 16, are used in raising or lower-

ing the bull ring as desired, and are also arranged to be controlled from within the cab.

The mold board or scraper blade 17 is supported below the bull ring and may be adjusted angularly and vertically in accordance with the usual practice by rotating and by raising or lowering the bull ring as required. I have directed my attention, in particular, to a unitary scarifying device suitable for mounting upon a mold board such as shown at 17, and I have shown such a unitary scarifying device at 18 in Figure 1.

This structure comprises, in general, a back plate 19, clamping member 29, clamping bolts 33, a plurality of scarifier teeth 41, mounting rods 26, and spacers 63.

Figures 2 and 4 illustrate the construction of the mounting plate in detail. This mounting plate 19 is preferably rectangular in shape, having reinforcing ribs 21 extending vertically on the back side thereof. Portions of the plate may be removed where not necessary for strength, as shown at 22, in order to reduce the weight. A plurality of spaced ears or attachment lugs 23 extend forwardly from the front surface of the plate. It is preferable that these ears be spaced at a sufficient distance apart to permit two or three scarifier teeth to be received between adjacent ones for a purpose which will be given in detail hereinafter.

The ears or lugs are also preferably arranged in two vertically spaced groups, as shown, each group being provided with aligned openings 24 through which a pair of mounting rods 26—26 may be installed. These rods may be held in position by means such as cotter keys 27.

The lower edge of the mounting plate is provided with a rearwardly extending hooked portion 28 adapted to be engaged under the cutting edge of the mold board. One or more clamping members, such as the one illustrated at 29 in Figures 1 and 3, are utilized in attaching the upper edge of the mounting plate to the mold board. Such a clamping member may include a main body portion 31 having an opening 32 extending vertically therethrough for the reception of a clamping bolt 33. The body of the clamping member is extended upwardly and rearwardly to terminate in a hooked portion 34.

Two of such clamping members are generally sufficient to rigidly support a mounting plate on a scraper blade. In use, the hooked portion 34 of a clamp is engaged over the top edge of the mold board and a bolt 33, of sufficient length, is installed so as to extend downwardly through a matching opening 36 in an ear or lug member 37 which extends outwardly from the forward surface of the mounting plate. The nut 33a is drawn up tightly against the under surface of the lug 37 to clamp the entire assembly rigidly in place on the mold board.

In order to provide for mounting a device of this construction on a mold board which has become worn through use, I have provided the additional lugs or ears 38, and these are positioned somewhat lower on the mounting plate than the mounting lugs 37. When a device, constructed according to my invention, must be mounted upon a narrow mold board or one that has become worn from use, the clamping members 29, are attached to the lower lugs 38 in place of the upper lugs 37. When so mounted, the hooked portion 34 of each clamping member extends rearwardly through spaces 39, provided

for that purpose, in the upper edge of the mounting plate.

It will be apparent that this method of mounting a scarifying unit on a scraper blade is very simple, as it requires the insertion and tightening of only two bolts for each unit.

Tooth members for use in connection with a mounting plate, as described, may be made in any suitable form but preferably similar to those shown in Figures 5 to 9 inclusive.

The device illustrated at 41 in Figure 5 comprises, in general, a strap or bar-like main body portion 42, preferably having reinforcing ribs as at 43, and a pair of laterally extending bosses 44—44 through which openings 46 are provided in such a position as to permit their being mounted on the mounting rods 26—26 of the mounting plate. The lower end of the body portion of the tooth is extended downwardly and forwardly and terminates in a pointed or wedge-shaped tooth 48. The heel or lower end of the main body portion is also extended rearwardly and upwardly to form a hook member, as shown at 49.

The forward edge of the tooth is chamfered, as at 52, to cause less resistance to the breaking up of road surfaces. The narrow leading edge 51 remaining after the forward edge of the tooth has been chamfered, is extended forwardly to provide a fin-like splitting edge 53, which portion of the tooth structure is of great value in breaking up the surface of the road. It offers a cutting edge rather than a blunt surface to the tough and hard material being removed from the surface of the road, and particularly materials such as sticky black-top and the surfaces of oiled roads.

It will also be apparent that there will be considerably less power required in forcing such a splitting tooth through a road surface than would be required by a simple pointed tooth.

The form of tooth illustrated at Figure 6 is particularly adapted for use in removing packed snow or ice from the surface of a highway. It comprises a simple bar or strap-like body member 54 having a forwardly and downwardly extending tooth portion 56. This tooth portion is preferably chisel-pointed to permit easy penetration and splitting of ice layers. Bosses 57 and 58 are also provided on the main body portion of this tooth, and are provided with openings 59 and 61 respectively for mounting upon the mounting bars 26 and 26. The heel of the tooth member is extended rearwardly, as shown at 62, to provide a hooked portion for a purpose which will be hereinafter described in more detail.

It is preferable that the width of the boss members, in which the mounting holes are provided, be such that three teeth may be mounted side by side between each pair of mounting ears or lugs on the mounting plate. When mounted in this manner each unit will include nine tooth members. These of course will be spaced relatively close together and I have found this combination to be particularly well adapted for use in removing ice.

It will, of course, be apparent that such closely spaced teeth require considerably more power to operate than when the teeth are widely spaced. Also, it is unnecessary, in digging up old road surfaces, to use such closely spaced teeth. When the device is to be used for such purposes, a single tooth member may be mounted between each pair of mounting ears, and may be held in

its proper position on the rods 26 by means of spacing members or washers of the proper thickness and as shown at 63 in Figure 1.

The hooked portion or heel of each tooth member is adapted to be engaged under the lower edge of the mounting plate before the supporting rods 26 are inserted through the mounting holes, and serves the purpose, not only of making the unit more rigid, but also serves to remove part of the strain from the mounting bars 26 and particularly when the road machine, on which it is mounted, is moved rearwardly as is frequently necessary in plowing through an extra tough surface.

Another form of tooth structure, as illustrated in Figures 7 to 9 inclusive, embodies the advantages of the forms shown in Figures 5 and 6 and has the additional advantage of a replaceable point.

The main body portion, shown generally at 65, is substantially the same as that shown in Figure 5, and includes a reinforced or ribbed body portion 66 having bosses 67 in which openings 68 are provided and positioned so as to permit mounting upon the mounting rods 26. The body portion extends rearwardly and upwardly to form a hooked portion or heel 69 which may be engaged under the bottom edge of the mounting plate in the same manner as heretofore described. The main portion of the body also extends forwardly and downwardly. This portion, however, of the tooth structure is not provided with a point. It is, instead, provided with a pair of wedge shaped slots, as shown at 71 and 72, onto which a replaceable, hardened tooth member may be driven. Such a tooth member is illustrated at 73 in Figure 8 and includes a substantially box-like portion 74 slotted along its lower edge as shown at 76 in Figure 9 to permit it to be received over the T-shaped upper portion 77 of the body member 65. The lower walls 78 of the box-like portion 74 are made of suitable thickness to be tightly wedged into place when driven home in the slots 71 and 72.

The box-like portion of the tooth is extended forwardly to form a solid chisel-like tooth portion 79 and also upwardly to form a fin-like splitter edge 81.

It will of course be apparent that the replaceable point 73 may be provided with a cutting edge or point as desired or as required for any particular work. For example, in chipping or cutting ice from paving a wider chisel-like point may be employed than would ordinarily be used in breaking up black-top surfaces.

I have found it advisable to make the tooth supporting body member 65 of cast steel and the replaceable tooth of an oil hardened steel or abrasive resistant alloy. In making the types of teeth shown in either Figures 5 or 6, I preferably form the cutting edge of such an abrasive resisting material by welding a tip of such material in place on a body of cast steel or the like.

Although I have shown only one of my unitary scarifying structures as applied to the mold board of a grader in Figure 1, it will be apparent that as many units may be used as are desired or as the grader is capable of handling. Under ordinary conditions, I have found three or four units as the most satisfactory.

It will be apparent that a device constructed in accordance with my invention may be easily applied and removed from the mold board of practically any road grading device. It will be obvious, however, that modifications may be

made in the structure to permit it to be readily mounted or attached to other devices not using a mold board. A scarifying device, such as I have described, is extremely simple and rugged in structure. Broken or worn tooth members may be easily replaced. Furthermore, various combinations of the tooth members may be quickly and easily made to adapt the scarifier for use on any particular job. I have also devised a tooth member from which a worn point may be easily removed and on which a new point may be easily installed. Furthermore, I have provided a scarifier tooth particularly well adapted to break up a road surface into relatively small pieces and with a minimum of effort.

Although I have shown and described specific embodiments of my invention, it is apparent that modifications thereof may be made by those skilled in the art. Such modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. For use in connection with a grading device having a mold board, a scarifying device including a mounting plate, means for clamping same to the horizontal edges of the mold board, a plurality of lugs extending outwardly from the face of the mounting plate, said lugs having aligned holes therethrough, a mounting bar extending through the said holes, and a plurality of tooth members also having holes extending laterally therethrough, adapted to be received on the mounting rod.

2. In a scarifier device of the character described, a mounting plate, means for engaging same to the horizontal edges of the mold board of a grading device, a plurality of lugs extending from the surface of the mounting plate and having aligned openings therethrough, at least one mounting bar extending through said aligned openings, a plurality of tooth members having at least one opening through each adapted to be received on the mounting bar, and other means for securing said tooth members to said mounting plate.

3. A scarifier tooth comprising a substantially vertically positioned body portion having at least one laterally extending opening therethrough for mounting purposes, a downwardly and forwardly extending tooth portion, and a hooked, rearwardly extending heel portion for mounting purposes.

4. A scarifier tooth comprising a substantially vertically positioned body portion having at least one laterally extending opening therethrough for mounting purposes, a downwardly and forwardly extending tooth portion, a rearwardly extending heel-like portion for mounting purposes, and a splitter portion extending forwardly and upwardly from a point close to the tip of the tooth.

5. In a scarifier device, a mounting plate, means for mounting the mounting plate on the mold board of a grading device, rod means attached in substantially horizontal position across the face of said mounting plate, a plurality of cutter teeth having openings therethrough adapted to be received on the rod means, and other means for holding the cutter teeth in substantially fixed position on the mounting plate.

6. A scarifier tooth including a body member having means for mounting same, a forwardly and downwardly extending foot portion, a replaceable hardened shoe member, and means for securing said shoe member to the foot por-

tion with a wedge action, said shoe member having a forwardly extending digging point and a splitter member thereabove, the body member having a rearwardly extending heel portion for mounting purposes.

7. For use in connection with the mold board of a grading machine, a scarifier device comprising a mounting plate, hook means for engaging the lower edge thereof to the lower edge of the mold board, separable and adjustable clamping means for engaging the mounting plate to the upper edge of the mold board, a pair of spaced horizontally positioned rods, means for attaching same to the mounting plate near the face thereof, a plurality of tooth members having laterally extending openings therethrough adapted to be received on the rods, and means for retaining said tooth members in spaced relation on the rods.

8. In a scarifier, a tooth member comprising a substantially vertically positioned body portion including a rearwardly extending heel portion and other mounting means, the body portion having a downwardly and forwardly curved tooth portion, the said tooth portion being chisel pointed and of gradually increasing width toward the heel thereof, the leading curved surface of the tooth being chamfered along the edges thereof, and a relatively thin splitter member extending forwardly from the tooth between the chamfered portions thereof and upwardly

from the tooth from a point close to the chisel point whereby a portion of road surface lifted by the chisel point will be split almost immediately and rolled forwardly and sidewardly upon itself.

9. A scarifier tooth having a relatively pointed entering tip, a widened body portion extending rearwardly and upwardly from the tip and terminating at its rear end in a heel for mounting purposes, the said widened body portion adapted to lift a portion of a road surface entered into by the tip, and a relatively thin splitter member extending vertically from the forwardmost part of the widened portion of the body whereby a portion of road surface entered into by the tip is split by the splitter before the surface is lifted by the widened portion of the body to thereby greatly decrease the resistance of the tooth to passage through a road surface.

10. In a scarifying device for mounting upon the mold board of a grading device, a mounting plate, means thereon for detachably engaging the lower and upper edges of the mold board, a plurality of lugs having openings therethrough, extending forwardly from the mounting plate, mounting rods extending through the openings in the lugs, and a plurality of scarifier tooth members having openings therethrough adapted to be received on the mounting rods for supporting the tooth members.

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