June 23, 1959 F. H. LINNEMAN 2,891,335

ROAD REPAIR EQUIPMENT ROLLER ATTACHMENT FOR GRADERS

Filed June 2, 1955 2 Sheets-Sheet 1

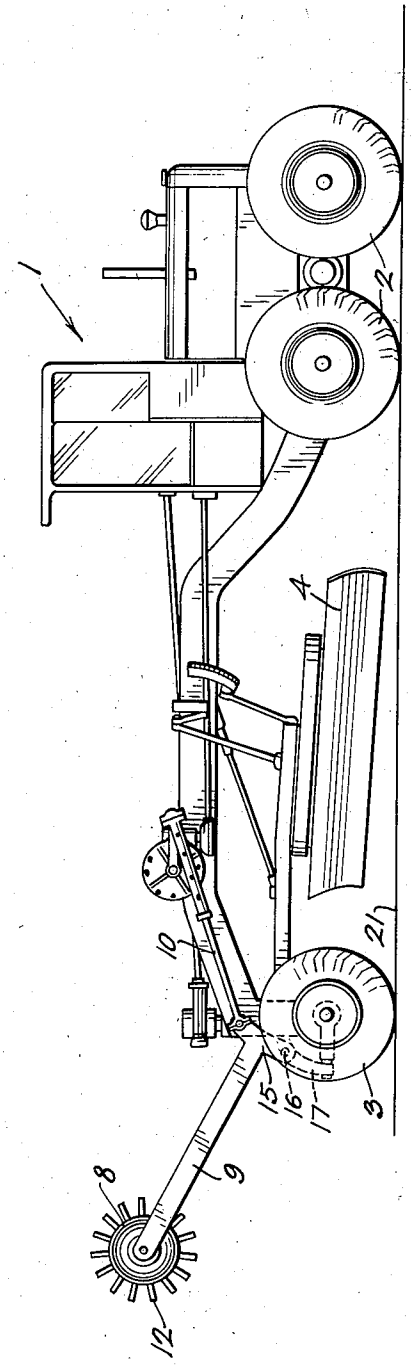


Fig. 1.

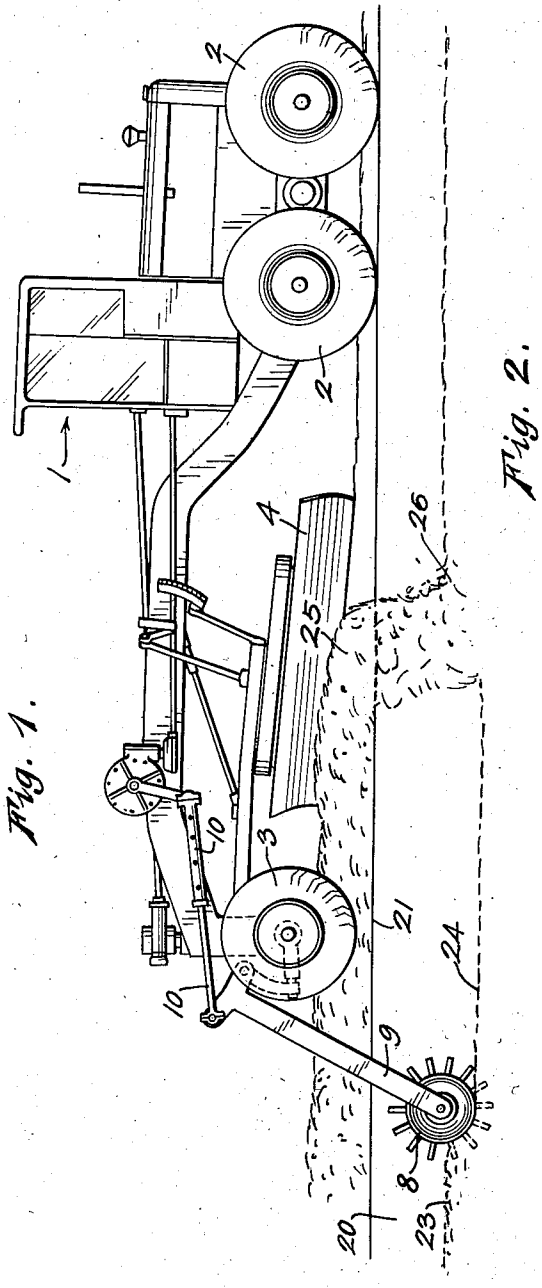


Fig. 2.

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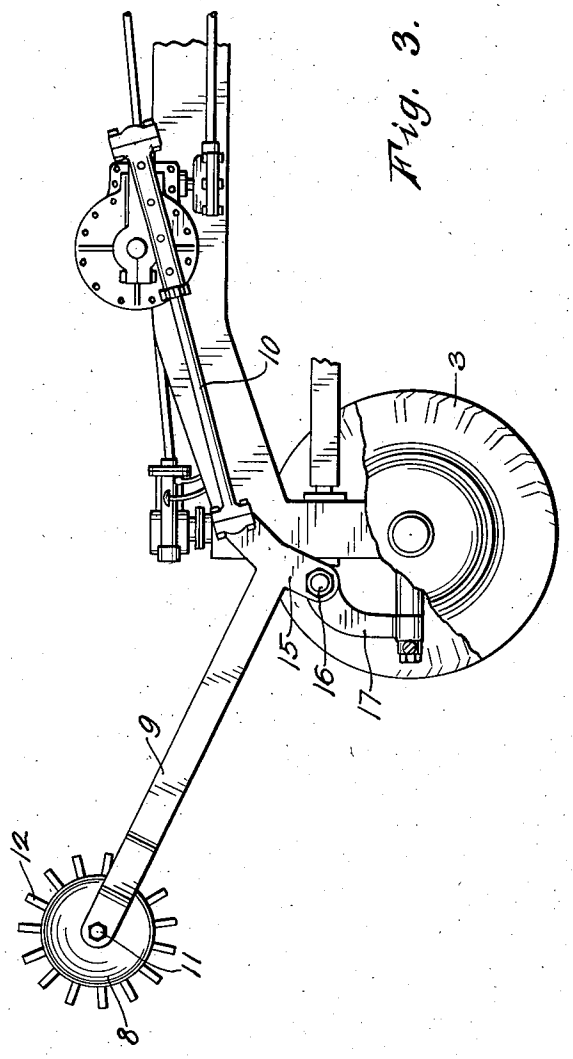


Fig. 3.

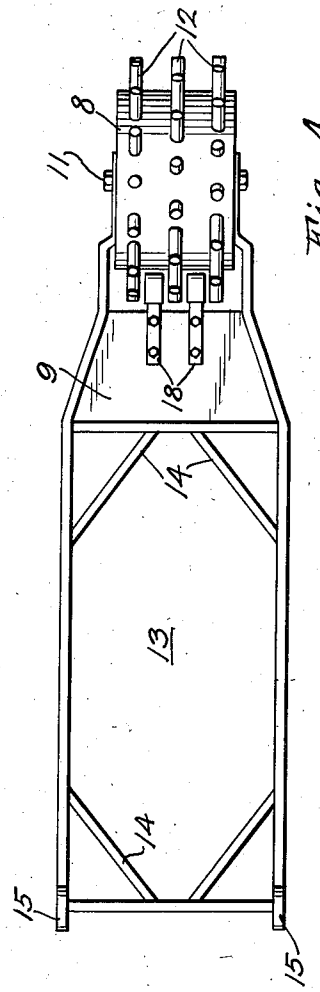


Fig. 4.

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ROAD REPAIR EQUIPMENT ROLLER ATTACHMENT FOR GRADERS

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Application June 2, 1955, Serial No. 512,642

6 Claims. (Cl. 37—146)

This invention relates to road repair equipment, and more particularly to earth packing attachments for motor graders for use in packing the back fill dirt of narrow service lines and/or pipe ditches.

The device of the present invention includes a narrow sheep's foot roller arranged to be mounted so as to extend forwardly of the front guide wheels of a motor grader. The roller is pivotally mounted so as to be raised and lowered into a service ditch with sufficient force to raise the front wheels of the motor grader from the ground whereby the grader rides on the packing roller and its rear wheels; the weight of the grader on the roller packs the back fill dirt in the ditch as the grader runs therealong.

The grader blade may be used simultaneously with the packing roller to back fill the ditch behind the packing roller. The roller when in dirt packing position, guides the grader along the ditch without the use of the grader front wheels, even where the ditch curves along the roadway. The roller may be simply and easily attached to standard motor graders, and the mechanisms which normally operate a scarifying blade may be advantageously used for the operation of the roller.

The roller of the invention may be made of various widths to correspond to the width of the particular type ditch in which it is to be used. Modern ditching methods call for excavating a ditch only slightly larger than pipe which is placed therein. There will, therefore, be miles of narrow ditches for service lines, pipes, etc. in and around urban communities, and invariably the ditch runs in the middle of or along a surfaced road. To correctly complete the ditching job, the back fill dirt must be tamped or packed tightly enough to prevent sinking of the resurfaced ditch below the surface of the adjoining roadway. Commonly used ditch tamping machines, which include a reciprocating tamper, may perform an adequate job of packing the dirt, but they are too slow and require an additional piece of equipment for back filling, slowing down the entire crew of the ditching operation. The tamper is, also, so slow there is a definite tendency for the operator to skip portions of the ditch or to tamp periodically, which is not conducive for permanent ditching.

Included among the objects and advantages of the present invention is to provide an inexpensive earth tamping or packing attachment for a motor grader which may be used simultaneously with the grader blade for packing back fill dirt simultaneously with the blade which is further back filling the tamped ditch. The roller attachment effectively and efficiently tamps the back fill dirt in narrow service ditches without the use of additional equipment or an additional operator. The device is easily and quickly mounted on standard motor graders having a front scarifying blade mount, and the roller operates on the scarifying blade lever system. The roller is arranged to be lowered into a service ditch with sufficient power to raise the front wheels of the grader off the ground and to guide the grader along the ditch during the rolling operation.

These and other objects and advantages may be readily ascertained by referring to the following description and illustrations in which:

Fig. 1 is a side elevational view illustrating the position of a sheep's foot earth roller mounted on a motor grader and in raised position;

Fig. 2 is a side elevation of the roller according to the invention in operative position tamping the back fill dirt of a ditch;

Fig. 3 is a side elevation in partial section showing in enlarged detail the mounting of the roller on the front of a motor grader; and

Fig. 4 is a bottom elevation of a roller and its mounting framework according to the invention.

In the device illustrated, a motor grader is indicated in general by numeral **1**. Motor graders are more or less standard pieces of roadworking equipment, and they, generally, include two pairs of drive wheels **2** mounted toward the rear of the vehicle and a front drive wheel assembly **3** mounted at the forward end of the arched frame of the device. A scraper blade **4** is provided for the grader mounted beneath the curved frame, and the blade is adapted to be turned at various angles, lifted and lowered to perform various scraping operations along roadways. The roller attachment of the invention includes a sheep's foot roller **8** mounted on a carrying framework **9** which is secured to the front of the motor grader and is controlled by a system of levers **10** on the grader. The roller **8** is a cylindrical member journaled for rotation on an axle **11** which is secured to the front of the frame **9**. A plurality of projections or sheep's feet **12** extend from the periphery of the cylinder for packing dirt in a ditch. The supporting frame **9** includes a top plate **13** and a system of reinforcing members **14** to provide sufficient strength for the frame **9**. A lateral link or T bar member **15** is mounted on the frame **9** on the end opposite the roller **8**, and one end of the lateral link is secured to the motor grader frame by means of an axle **16** journaled to a support lever **17** which normally holds a scarifying blade. The opposite end of the T-shaped link **15** is secured to the operating link **10**, which normally is utilized to raise and lower the scarifying blade. The link **15** rotates about axle **16** as the lever arm **10** is moved, raising and lowering the frame **9**. A pair of cleaning teeth **18** are secured to the frame **9** and are positioned to ride between the rows of teeth **12** in proximity to the drum periphery to prevent accumulation of dirt on the drum. The number of cleaning teeth is, of course, controlled by the number of rows of sheep's feet projections on the cylinder **8** and by the stickiness of the dirt in which the machine is operating.

For operation of the machine, a narrow service ditch is dug by a ditching machine, not shown, and the service pipes or whatever is to be buried in the ditch is connected up, placed in the ditch and the ditch is made ready for back filling, that is filling in the dirt which was taken from the ditch. The motor grader **1** is then run along the ditch using only the blade **4** to partially back fill the ditch, that is, putting in a small amount of the pile of dirt along the ditch. For back filling, scraping or for normally transporting the grader from place to place the roller is maintained in position as indicated in Fig. 1. On the return of the motor grader back along the partially filled ditch, the roller **8** is lowered into the ditch into contact with the dirt and with sufficient power to raise the front wheels **3** completely off of the ground indicated at **21** in Fig. 2. The motor grader riding on the roller as a front wheel is then started back along the ditch. The roller packs the loose dirt **23** which the grader has back filled into the ditch on the first pass, leaving a packed or tamped partial back fill **24**. Simultaneously with running the motor grader back along the ditch in the tamping

operation, the blade 4 is utilized to back fill additional dirt 25 which makes a pile 26 on top of the tamped dirt 24. Thus the motor grader tamps and back fills at the same time. By putting the cylinder down with sufficient force to raise the wheels 3 off the ground the motor grader runs on the two drive wheels 2 and the tamping cylinder 8. Since the cylinder is in the ditch the grader will be guided along the ditch by the cylinder even when the ditch curves along a roadway, and the operator may divert his entire attention to the proper back fill without having to worry about guiding the grader along the course of the ditch. The operation of tamping and back filling is continued until all the dirt has been scraped back into the ditch and has been tamped into the ditch by means of the roller. The final tamping may be made by the roller or by the wheels of the grader.

By having the roller extended outwardly in front of the drive wheels of the motor grader the roller is given a downward component due to the forward motion of the motor grader, so that the tamping effect of the cylinder is substantially greater than a roller with merely a heavy weight on it. Also, by having the cylinder extended in front of the drive wheels of the motor grader there is no tendency for the cylinder to climb out of ditch in the event the cylinder comes in contact with the side wall of the ditch in which it is operating. The roller may be used in substantially all ditching operations, and a very effective combination may be realized by having a roller corresponding to the width of trenching or ditching machine. By wetting the backfill, it is possible to pack the dirt more tightly than before trenching so that additional dirt must be used to completely fill the ditch.

While the invention has been illustrated by reference to a specific embodiment, there is no intent to limit the scope thereof to the precise details so set forth except insofar as defined in the appended claims.

What I claim is:

1. A ditch rolling attachment for a motor grader, comprising a frame having a wide portion at its inner end and a compacting roller journaled for rotation at the outer end of said frame, said wide portion having means laterally of the lengthwise axis of said frame for its pivotal connection with the forward end of a motor grader, and having other means spaced from said pivotal connection for its connection with an actuating member on the grader arranged to impart a pivotal movement to said frame whereby the roller is moved from an elevated point to the ditch bottom substantially below the surface on which the grader wheels are supported such as to suspend the front end of the grader and utilize its weight in the compacting movement of the roller.

2. A ditch rolling attachment for a motor grader, comprising an elongated frame having a wide portion at its inner end and a sheep's foot roller journaled for rotation at the outer end of said frame, said wide portion having means laterally of the lengthwise axis of said frame for its pivotal connection with the forward end of a motor grader, and having other means spaced from said pivotal connection for its connection with an actuating member on the grader arranged to impart a swinging movement to said frame whereby the roller is moved from an elevated point to the ditch bottom substantially below the surface on which the grader wheels are supported such as to suspend the front end of the grader and utilize its weight in the compacting movement of the roller, said roller including plural rows of projections for tamping earth contacted by said roller, and a plurality of teeth mounted on said frame and depending into the spaces between the rows of projections on said roller for removal of dirt adhering to said roller in its earth-compacting movement.

3. A ditch rolling attachment for a motor grader, comprising an elongated frame having means at its inner end for pivotal connection with a motor grader about a horizontal axis and having a compacting roller journaled for rotation about a parallel axis at the outer end of said frame, and means at said inner end spaced from said first means for connection with an actuating member on the grader arranged to impart a swinging movement to said frame whereby the roller is moved from an elevated point to the ditch bottom substantially below the surface on which the grader wheels are supported such as to suspend the front end of the grader and utilize its weight in the compacting movement of the roller.

4. The combination with a wheel-supported motor grader having a power system at its forward end, of a ditch rolling attachment including an elongated frame having at one end a pivotal connection with the forward end of the grader about a horizontal axis and means extending laterally from said elongated frame and connected to said power system for moving said frame about said axis, a compacting roller mounted for rotation about a parallel horizontal axis at the forward end of said frame and carried by said frame in swinging movements imparted by said power system between an elevated position above the surface on which the grader is supported and a lower position at the ditch bottom below said surface, in which latter position the forward end of the grader is elevated above said surface such that its weight is utilized in the compacting rotational movement of the roller.

5. The combination with a wheel-supported motor grader having a power system at its forward end, of a ditch rolling attachment including an elongated frame having one inner portion in pivotal connection about a horizontal axis at the forward end of the grader and another inner portion in driven connection with said power system for moving said frame about said axis, a compacting roller mounted for rotation about a horizontal axis at the outer end of said frame, and said pivotal mounting providing a range of swinging movements imparted by the power system between an elevated position above the surface on which the grader is supported and a lower position at the ditch bottom below said surface, in which latter position the forward end of the grader is elevated above said surface such that its weight is utilized in the compacting rotational movement of the roller along the ditch.

6. Apparatus for back filling and tamping a service ditch, comprising a motor grader having rear driving wheels and front guiding wheels, inclusive of a power system, a ditch rolling attachment including a rolling member pivoted at the forward end of said grader in driven connection with said power system and movable thereby between an elevated inactive position and a lower active position in engagement with the bottom of a ditch straddled by said grader in its operative movement, and the movement of said rolling member into the ditch being arranged to elevate the front end of said grader to lift said guiding wheels from the surface over which the grader is moved so as to utilize the weight of the grader in the earth-compacting movement of the rolling member along said ditch and whereby the steering of the grader is effected by movement of the rolling member along the ditch, and scraper means carried on the grader rearwardly of said rolling member for directing additional earth into the ditch concurrently with the earth-compacting operation.

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