Sept. 27, 1955 G. P. GREEN 2,718,830

MATERIAL MIXING APPARATUS FOR ROAD MACHINES

Filed March 24, 1952 2 Sheets-Sheet 1

Fig. 1

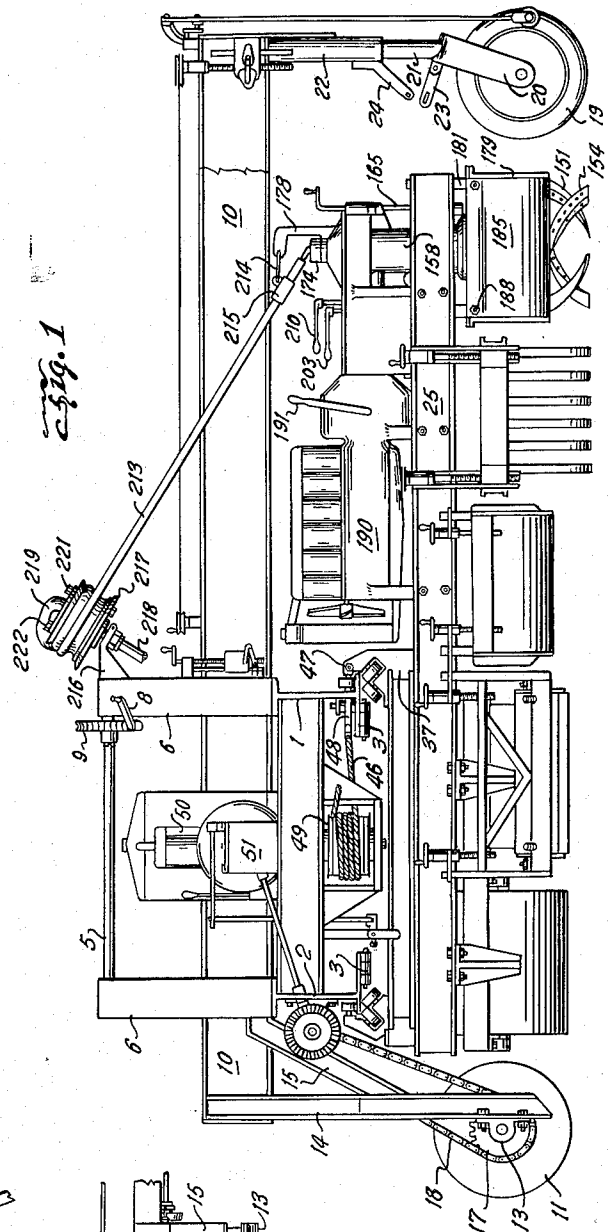
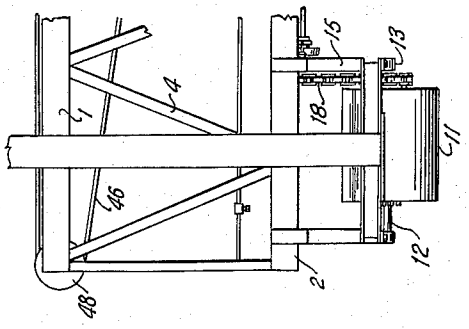


Fig. 2



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Filed March 24, 1952 2 Sheets-Sheet 2

Fig. 3

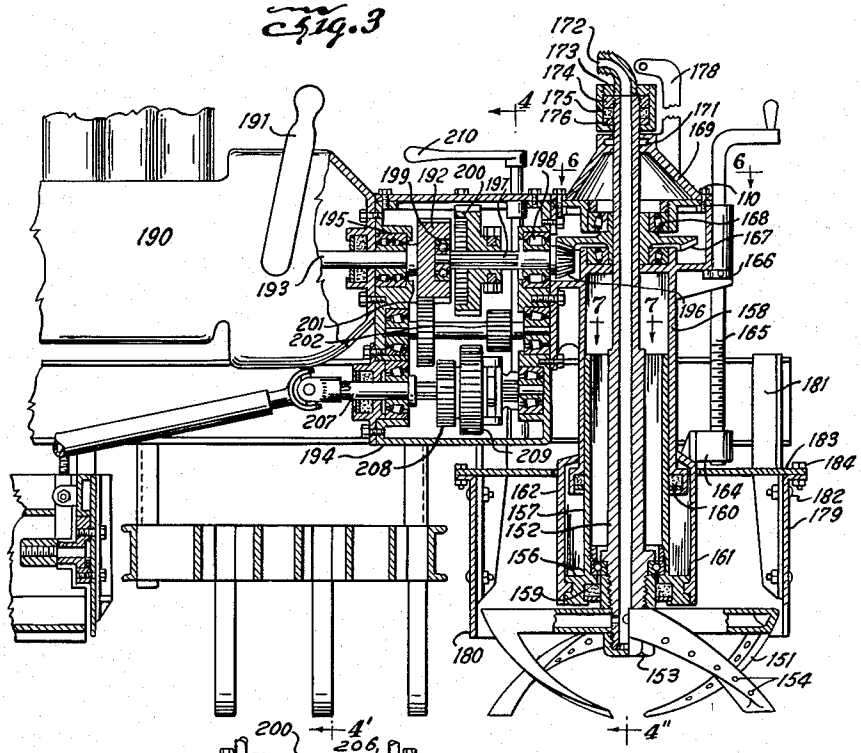


Fig. 4

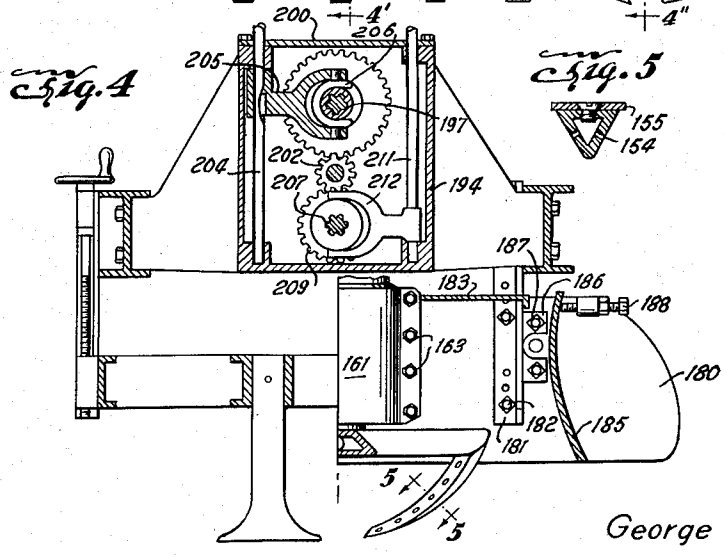


Fig. 5

Fig. 6



Fig. 7



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MATERIAL MIXING APPARATUS FOR ROAD MACHINES

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Application March 24, 1952, Serial No. 278,249

3 Claims. (Cl. 94—40)

This invention relates to an improvement in road machines, and the principal object is to provide a machine of this class which may be advantageously applied in construction operations relative to road subgrades, base courses, surface courses and other work of similar nature such as terracing, leveling, compacting and miscellaneous construction of this nature. These and other objects are hereinafter more fully described, illustrated in the drawings, and specifically pointed out in the appended claims; it being understood that construction deviations may be made so long as they fall within the scope of the claims.

This application is a continuation-in-part of Serial No. 580,882, filed March 3, 1945, now Patent No. 2,601,277.

Figure 1 is an elevation of the right side of the machine.

Figure 2 is an enlarged and fragmentary top plan view of the machine shown in Figure 1.

Figure 3 is a sectional elevation of a front portion of the carriage assembly.

Figure 4 is a transverse section along lines 4—4' and 4—4'' of Figure 3.

Figure 5 is a sectional view of a mixer claw along line 5—5, Figure 4.

Figure 6 is a sectional view of a mixer shaft along line 6—6, Figure 3, and

Figure 7 is a section through the mixer shaft along line 7—7, Figure 3.

Similar numerals refer to similar parts throughout the several views.

In general, the machine comprises a horizontal frame provided with supporting wheels at each end, to travel along a strip of work, with the woodworking structure spanned transversely thereto; and a carriage frame roller mounted on the structure and supporting certain members such as a mixer, blades and rollers adapted to perform a sequence of road construction operations as the carriage is propelled back and forth across the work. The travel rate of the entire machine along the strip of work is coordinated with the carriage travel, so that the operations lap to produce a uniformly worked section. It is to the material mixing apparatus that this application pertains.

The structure which spans the work comprises two I beams, 1 and 2, which are hinged at the middle on hinges 3. The I beams are spaced and secured horizontally by the braces 4, Fig. 4. The I beams are pivoted about hinges 3 by means of shaft 5, Figs. 1 and 5, with eccentric portions connecting integral truss portions 6 of the beams through suitable links. A crank 8 with a worm gear cooperates with a gear 9 which is adapted to rotate shaft 5 and thus enable adjustment of the angle at which beams 1 and 2 meet at hinges 3. This is for the purpose of predetermining the crown of the road section under construction or repair.

The span structure is detachably fixed to girders 10, and braces 15, Figs. 1 and 3, by bolts (not shown) passing through holes in the contacting flanges of the members, the bolt holes being arranged along the I beams to permit fixing the girders 10 at optional positions to

thus adapt the wheel tread to various widths, as well as to facilitate knock-down for transportation. Girders 10 are supported by a wheel arrangement on each end adapted to support the entire machine.

The rear wheels 11, Figs. 1 and 2, are relatively wide for bearing and traction purposes. Axle 12 for wheel 11 is rotatably mounted in bearings 13 on frame member 14, which are fixed to girders 10. Braces 15 connect frame members 14 to beam 2 and are fixed to girders 10. A sprocket 17, Fig. 1, is fixed to each wheel 11 and cooperates with chain 18 to which power is transmitted to propel the machine.

Pneumatic front wheels 19, Figs. 1 and 21, are rotatably fixed to respective forks 20 from which a piston 21 extends into a cooperating hydraulic cylinder 22. A link 23, fixed to front wheel fork 20, is adapted to be fixed at option to a bracket 24 which is rigidly fixed to cylinder 22 so that piston 21 is free for longitudinal motion and restrained from rotation in the cylinder 22.

The carriage which supports the various road operation performing members comprises a frame consisting of main members 25, Fig. 1.

The carriage frame, members 25 etc., with the attached operation members and the intermediate frame are propelled back and forth along beams 1 and 2 of the span structure, by means of cable 46 which is attached to each support member 37 by means of eye bolts 47. Cable 46 passes over a sheave 48 (Figs. 1 and 2) at each end of the span structure and over drum 49 which actuates the cable. Preferably the cable is fixed to the drum to prevent slippage and sufficient raps are made over the drum each side of the fixed point to permit sufficient drum rotation either way for the back and forth travel of the cable. Drum 49 is actuated by a power plant 50 through a transmission 51 adapted to automaticaly reverse the direction of rotation of drum 49 at a predetermined instant.

The combination leveling and mixer member is shown in Figs. 3 and 4. The mixing rotor 151, Fig. 3, is secured to shaft 152 by nut 153 for horizontal rotation. The mixer is adapted to discharge a fluid to material through openings 154. Mixer shaft 152 is rotatably supported by bearing 156 in housing 157 which is disposed in a housing 158 to permit vertical motion of 157 to adjust the depth of operation. Packings 159 and 160 are provided to seal the lubricant. A cover comprised of parts 161 and 162 are secured by bolts 163 (Fig. 4) to protect the parts from abrasive materials. A bracket 164 is attached to cover 161 and threaded to crank operated screw 165 with antithrust collar 166 to control depth setting. A gear 167 supported by bearings 168 is slidably fitted to mixer shaft 152 to rotate the mixer. A cover 169 is secured to casing 158 by bolts 110 and is adapted with packing 171 to seal mixer shaft 152. Fitting 172 for connection of fluid supply line comprises non-rotating packing members 173 and 174, and retaining flanges 175 and 176 with packing 171 which rotates with shaft 152. A fluid line support 178 is provided.

A material retaining hood over the mixer comprises side members 179 and 180 fixed to supports 181 from the carriage frame by bolts 182, and top 183 being secured by bolts 184, Figs. 3 and 4. Leveling members 185 (Fig. 4) are pivotally supported by brackets 186 secured to the hood by bolts 187 positioned by stop screws 188, fixed to the hood. The mixer is actuated by power plant 190 through clutch 191, through gear 192 and shaft 193 supported by case 194 and bearing 195, cooperating with gear 196 and shaft 197 supported by bearings 198 and 199. Gears 200, 201, 202 and control lever 203, control shaft 204, arm 205, yoke bearing 206 (Figs. 3 and 4) are arranged to permit two different transmission drive speed ratios for the mixer.

A two speed power take off for actuating a vibrating roller is shown in Figs. 3 and 4, comprising shaft **207**, gears **208** and **209**, control lever **210**, with shaft **211** and arm **212**.

Fluid cement, asphalt or other agent is conveyed to the mixer through flexible conduit **213** (Fig. 1) connected to fitting **172** and supported by link **214** and clamp **215**. To support the other end of the fluid conduit a reel is provided in which drum **217** is rotatably supported by hollow shaft **218** journaled upon the span structure by bracket **216**. Fitting **219** is secured to drum **217** by bolts **221** and **222** and serves to convey fluid from shaft **218** to flexible conduit **213**. A fluid supply source may be mounted on the machine and connected by fitting **226** to hollow shaft **218**.

The operation of the machine is as follows:

The construction of a flexible base, sub grade, or courses stabilized with cement, bitumen, salt, or the like, and other courses which require mixing, addition of water or stabilizing material, levelling and compacting to a defined section, are all handled in the same general manner.

The material to be worked is uniformly windrowed in the middle, or evenly distributed over the work strip. The wheels which support the machine are set to travel on the outer parts of the work strip, and the machine is adjusted to operate to the desired width. Leveling members **185** are adjusted in elevation to level the material and above any surplus to the edges; and mixer rotor **151** is set to operate at a predetermined depth; and the required quantity of moisture or stabilizing material in fluid condition is introduced through the rotor **151** as set forth.

The above description and drawings are merely an illustration of my invention in one of many possible forms of application, and the scope of protection contemplated is to be taken from the appended claims interpreted as broadly as is consistent with the prior art.

What is claimed is:

1. In a machine of the class described, a wheel supported frame structure; a trackway supported by said frame structure transversely of the longitudinal axis thereof; a carriage supported on said trackway for back and forth movement thereacross; power means mounted on said frame structure to propel the machine; means operated by said power means to actuate the carriage back and forth on said trackway at a predetermined travel rate relative to the rate of the movement of the machine; a mixing and leveling device supported by said carriage and comprising a rotor having a hollow shaft mounted for rotation about a vertical axis, said rotor having a plurality of outwardly extending tubular, perforate arms; power means on said carriage for rotating said rotor; a material retaining hood supported on said carriage, said rotor being disposed in said hood with said arms extending below the lower ends of said hood, and means connected to said hollow shaft for supplying liquid for mixing with material moved by said arms, said liquid flowing downwardly through said hollow shaft to said tubular arms.

2. In a machine of the class described, a wheel supported frame structure; a trackway supported by said frame structure transversely of the longitudinal axis thereof; a carriage supported on said trackway for back and forth movement thereacross; power means mounted on said frame structure to propel the machine; means operated by said power means to actuate the carriage back and forth on said trackway at a predetermined travel rate relative to the rate of the movement of the machine; a mixing and leveling device supported by said carriage and comprising a rotor having a hollow shaft and mounted for rotation about a vertical axis, said rotor having a plurality of outwardly extending tubular, perforate arms mounted on said shaft; power means on said carriage for rotating said rotor; and means connected to said hollow shaft for supplying liquids for mixing with material moved by said arms, said liquids flowing through said shaft to said tubular arms.

3. In a machine of the class described, a wheel supported frame structure; a trackway supported by said frame structure transversely of the longitudinal axis thereof; a carriage supported on said trackway for back and forth movement thereacross; power means mounted on said frame structure to propel the machine; means operated by said power means to actuate the carriage back and forth on said trackway at a predetermined travel rate relative to the rate of the movement of the machine; a mixing and leveling device supported by said carriage and comprising a rotor having a hollow shaft mounted for rotation about a vertical axis, said rotor having a plurality of outwardly extending tubular, perforate arms; power means on said carriage for rotating said rotor; a material retaining hood supported on said carriage, said rotor being disposed in said hood with said arms extending below the lower ends of said hood; and means connected to the upper end of said hollow shaft for introducing liquids within the hood for mixing with material moved by said arms, said liquids flowing through said hollow shaft and into said tubular perforate arms.

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