Jan. 19, 1926. 1,570,171

T. S. O'BRIEN

ROAD WORKING APPARATUS

Filed Oct. 10, 1923 7 Sheets-Sheet 1

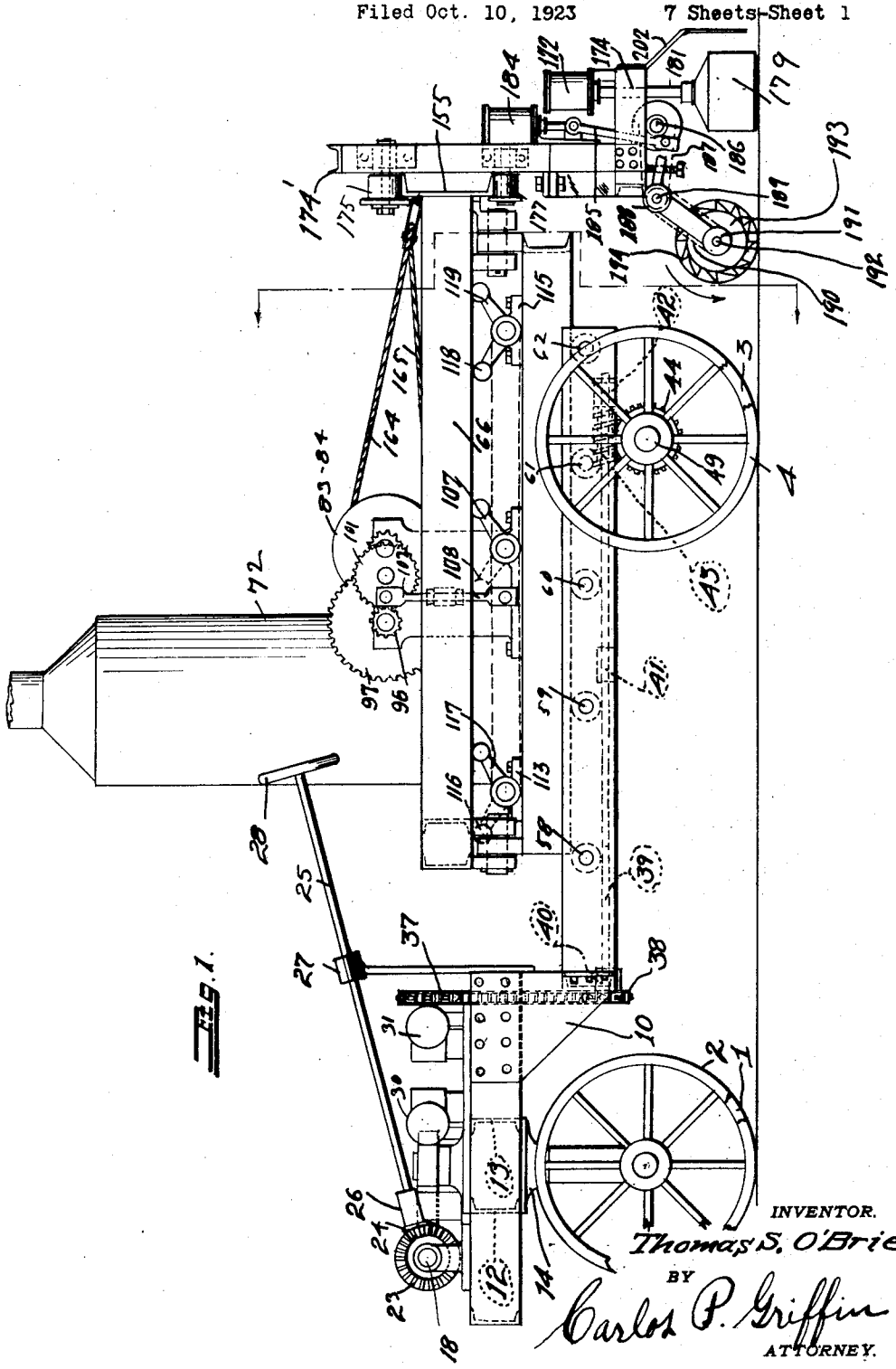


Fig. 1.

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Filed Oct. 10, 1923 7 Sheets-Sheet 2

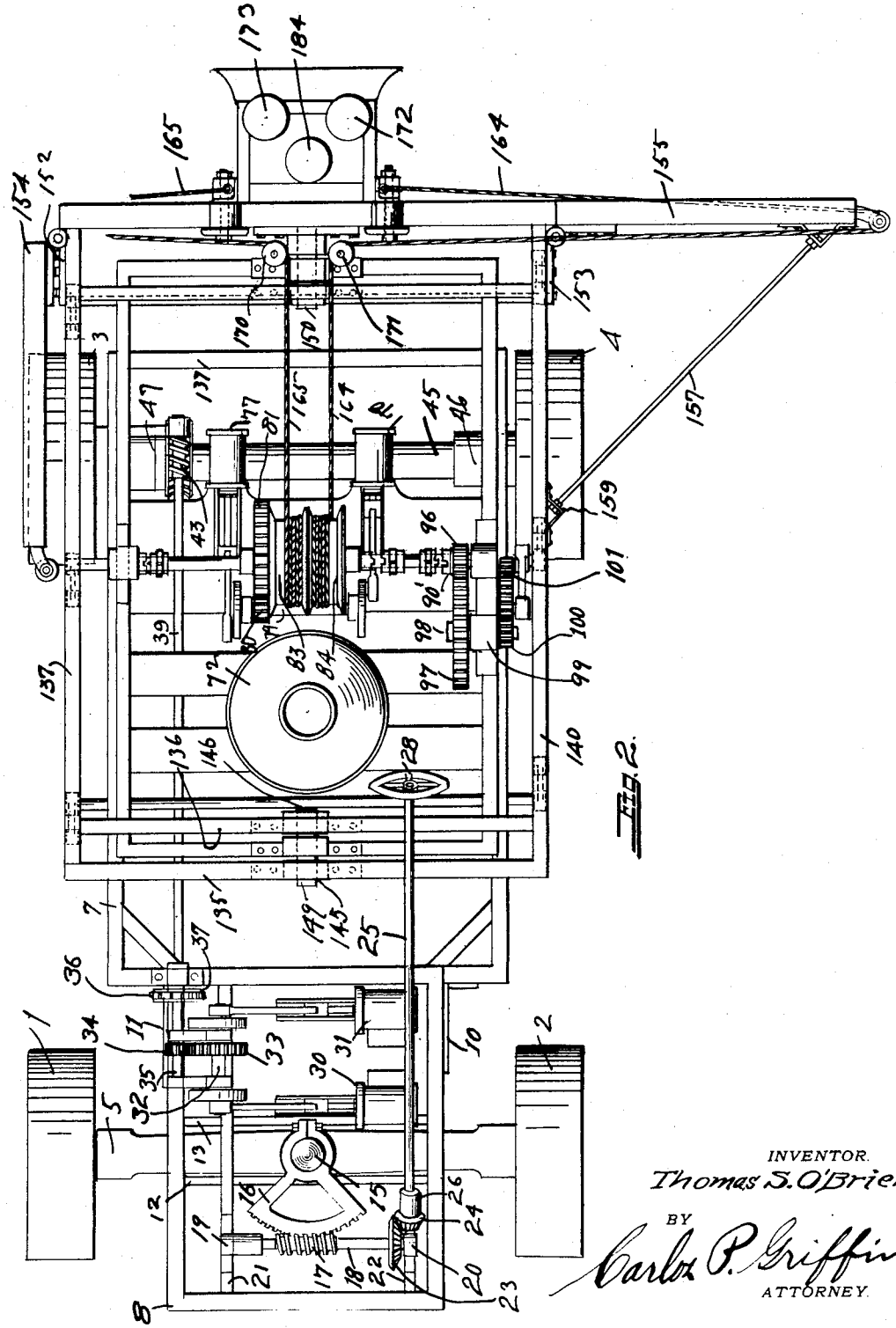


Fig. 2.

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Filed Oct. 10, 1923 7 Sheets-Sheet 3

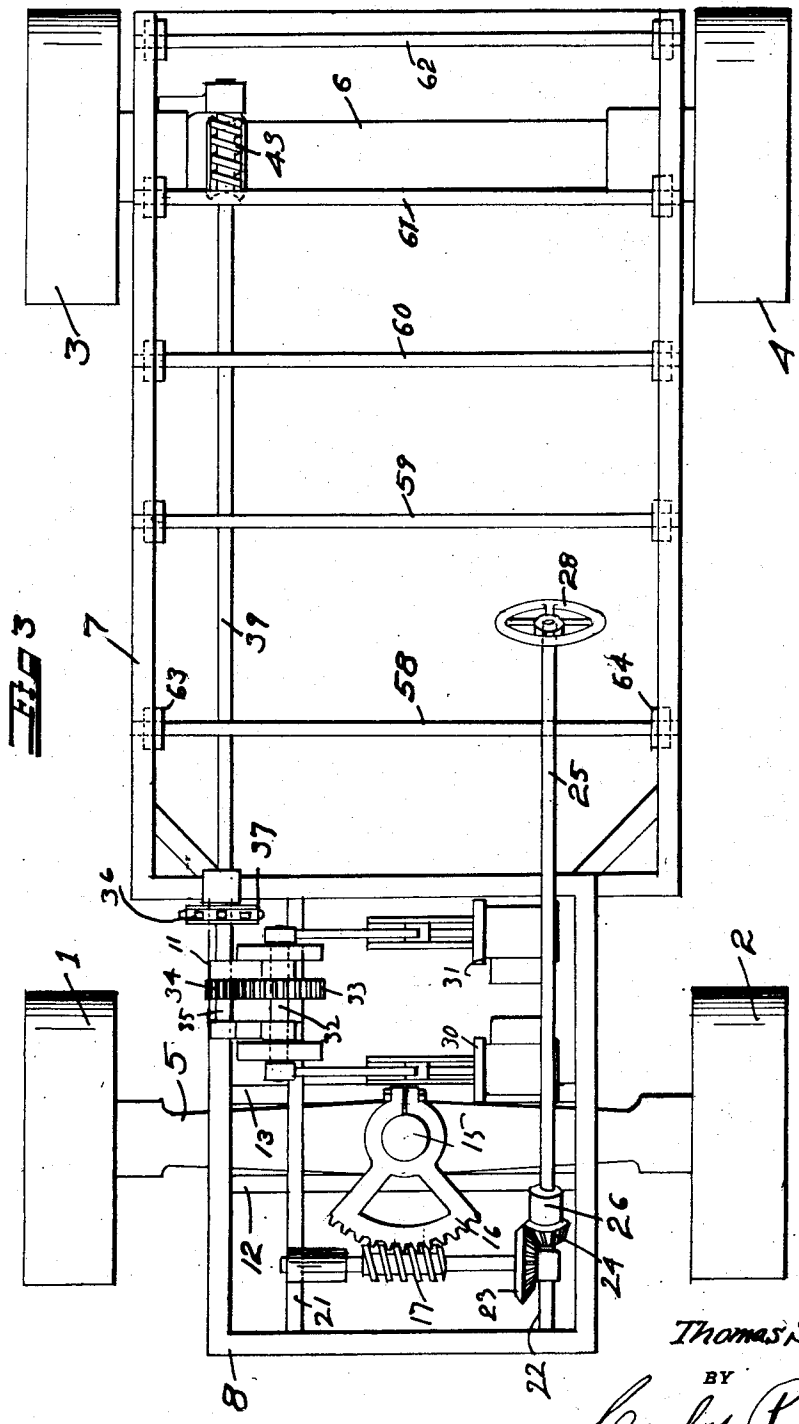


FIG 3

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ROAD WORKING APPARATUS

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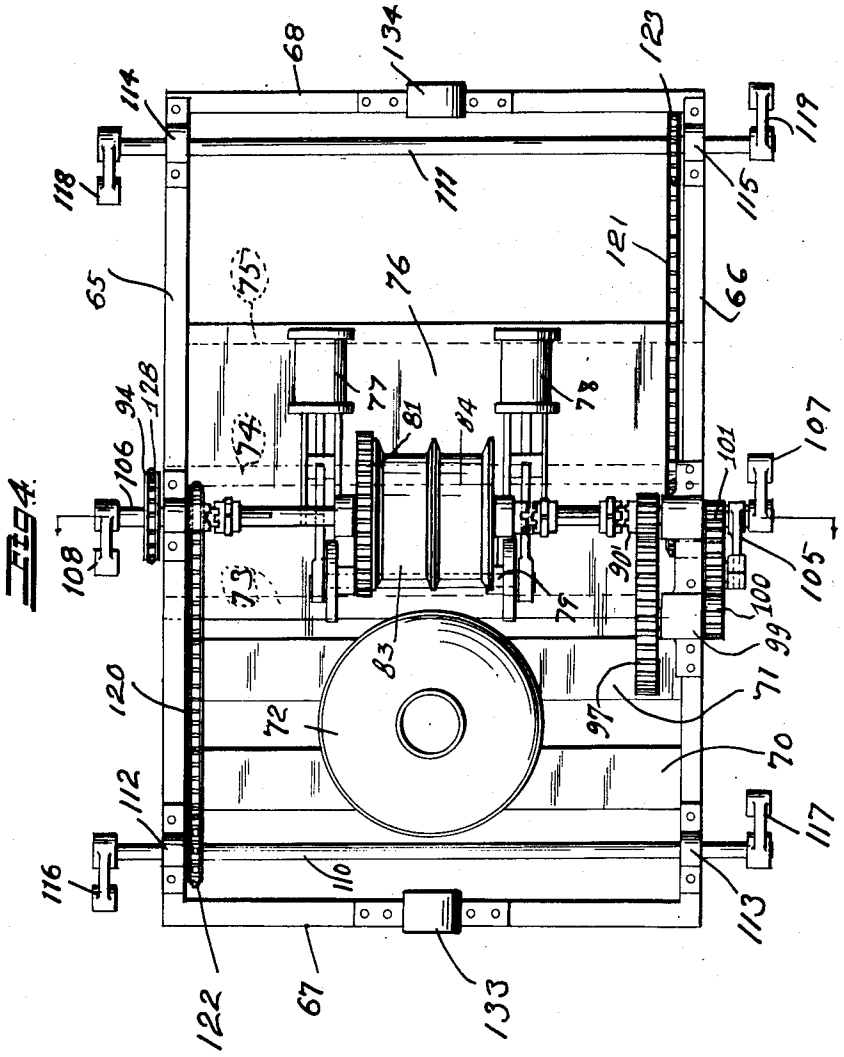


Fig 4.

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ROAD WORKING APPARATUS

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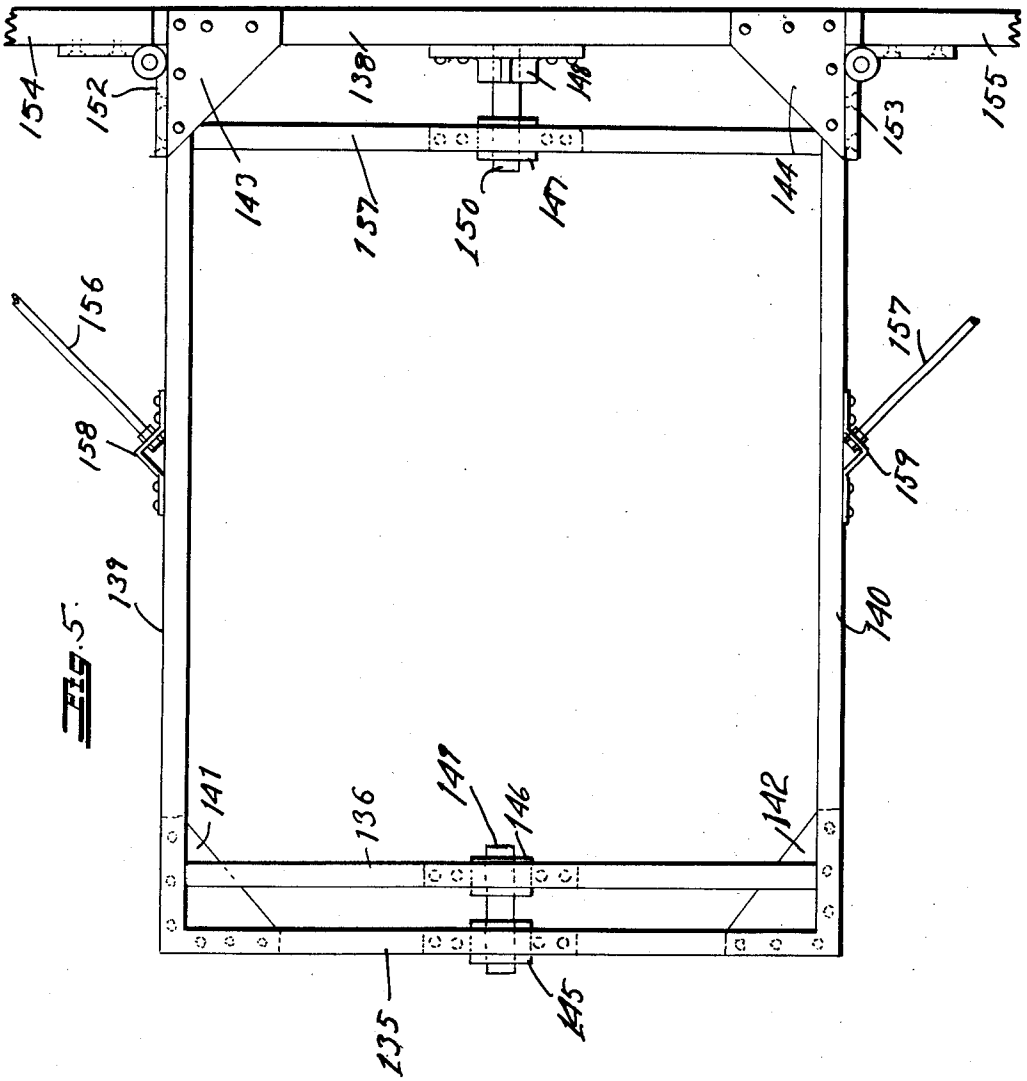


Fig. 5.

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ROAD WORKING APPARATUS

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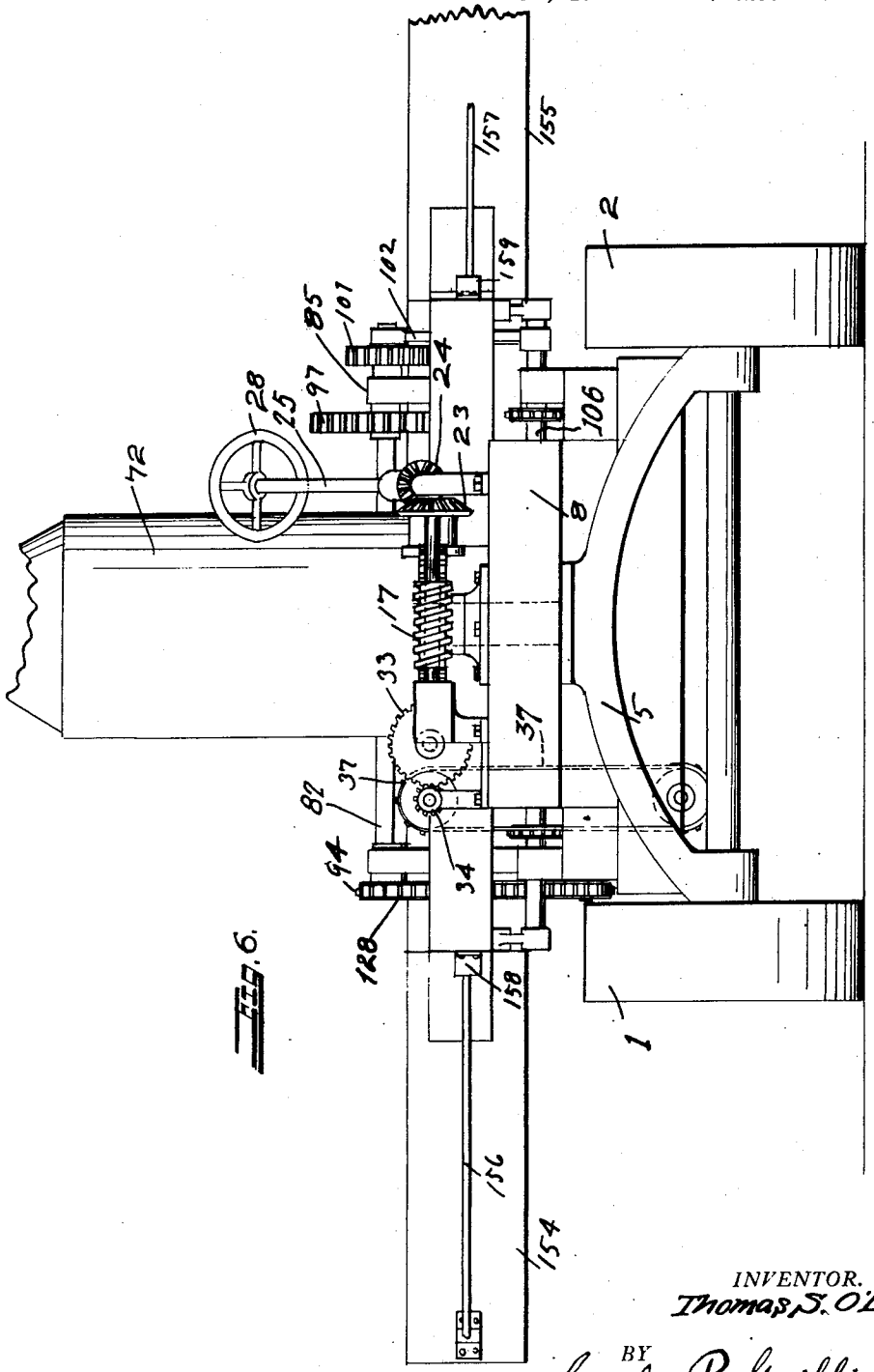


Fig. 6.

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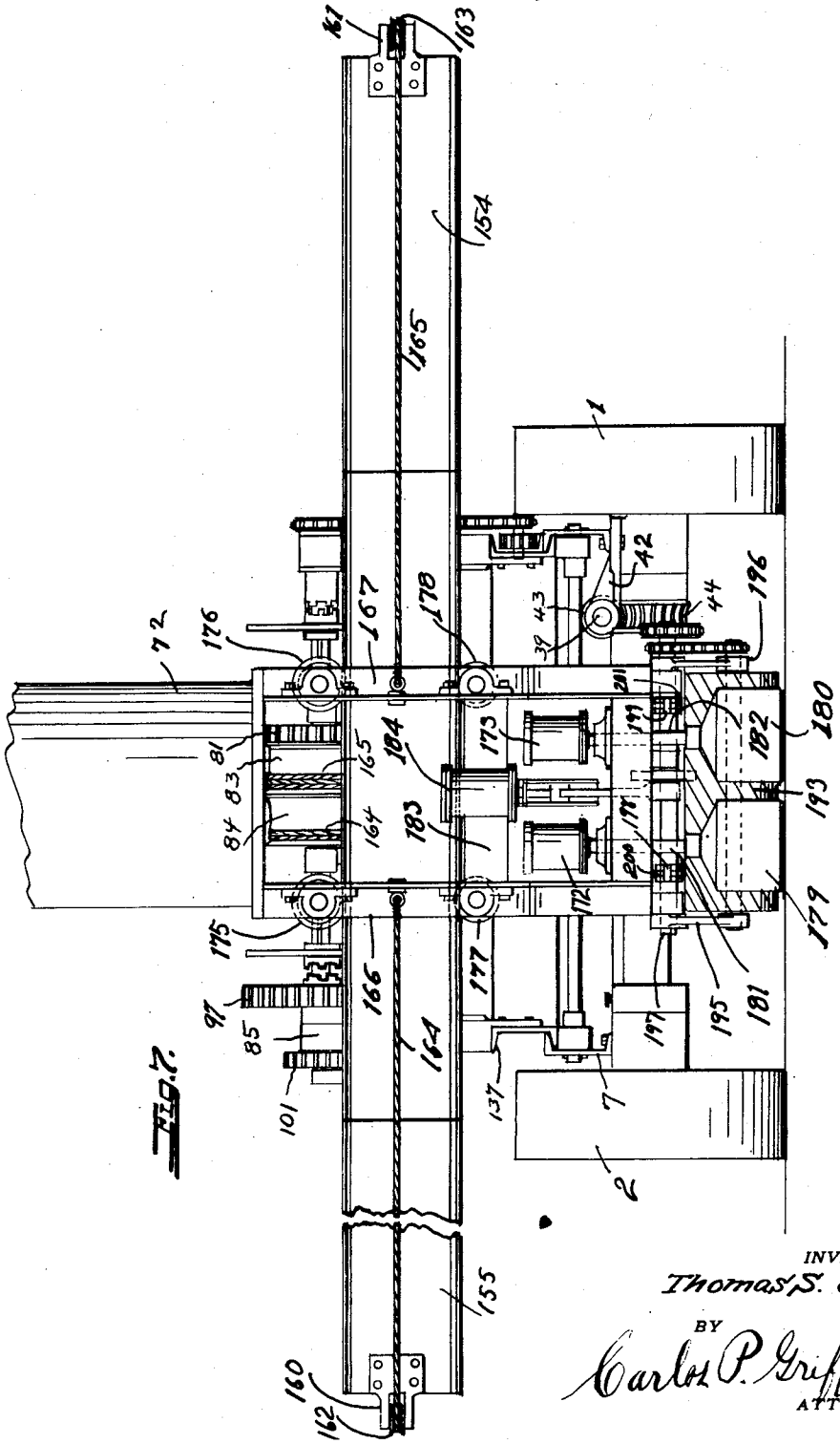
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ROAD WORKING APPARATUS

Filed Oct. 10, 1923 7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE.

THOMAS S. O'BRIEN, OF OAKLAND, CALIFORNIA, ASSIGNOR TO LESSER-CARSON COMPANY, A COPARTNERSHIP CONSISTING OF HARRY LESSER, FRANCIS L. CARSON, AND THOMAS S. O'BRIEN, OF SAN FRANCISCO, CALIFORNIA.

ROAD-WORKING APPARATUS.

Application filed October 10, 1923. Serial No. 667,666.

To all whom it may concern:

Be it known that I, THOMAS S. O'BRIEN, a citizen of the United States, residing at Oakland, in the county of Alameda, State of California, have invented a new and useful Road-Working Apparatus, of which the following is a specification in such full and clear terms as will enable those skilled in the art to construct and use the same.

This invention relates to a machine for preparing road sub-grades for the placement of the surface paving, and its object is to smooth and grade the roughly plowed surface to the desired grade, without the interposition of the large amount of scraping and hand-shovelling ordinarily required in the preparation of such grades by rolling.

Another object of the invention is to provide a machine which is capable also of spreading asphalt or concrete paving and compacting the same upon the sub-grade, should it be necessary in an emergency to use this machine for that purpose.

Another object of the invention is to provide means whereby the cutting roller and compacting apparatus may be moved from side to side of the road, and for a short distance longitudinally thereof without moving the truck supporting the entire apparatus, a special shiftable bed being used upon the truck to effect this result.

A further object of the invention is to provide means whereby the compacted road may be crowned, should the specifications call for that character of road. This latter object is effected by tilting the frame supporting the leveling and compacting apparatus upon an axis parallel to the length of the road, and the apparatus itself is intended to be sufficiently wide to complete ordinary roads of 18 to 24 feet in width in a single operation.

Another object of the invention is to provide means whereby the apparatus may be reduced in size to permit it to be moved from place to place without interfering with the placing of ordinary gates, bridges, etc., which determine the total width such apparatus may extend to when being moved from place to place.

Other objects of the invention will appear as the description proceeds.

An embodiment of the invention is shown in the accompanying drawings in which the same reference numeral is applied to the same portion throughout, but I am aware that there may be modifications thereof.

Fig. 1 is a side elevation of the complete apparatus.

Fig. 2 is a plan view of the complete apparatus.

Fig. 3 is a plan view of the sub-frame of the truck.

Fig. 4 is a plan view of the longitudinally movable frame which is mounted upon the truck frames shown in Figure 3.

Fig. 5 is a plan view of a portion of the tilting frame which is mounted upon the frame shown in Figure 4.

Fig. 6 is a front elevation of the machine.

Fig. 7 is a rear elevation of the machine.

The apparatus consists of a main truck having wheels 1 to 4 inclusive for supporting the axles 5 and 6, and which axles in turn support the large rectangular horizontally extending frame 7 and smaller horizontally extending frame 8 at the front of the frame 7.

The frame 8 is rectangular in shape and is suitably connected to the rectangular frame 7 by means of heavy riveted gussets 10 and 11, and is at a slightly higher elevation than the frame 7.

Channel irons 12 and 13 extend transversely of the frame 8 and serve to carry the bearing 14 for the king bolt 15. The king bolt has a segment gear 16 thereon which is in mesh with a worm 17 on a shaft 18. This shaft is supported by bearings 19 and 20 on bars 21, 22 carried by the frame 7. This shaft 18 also has a gear 23 in mesh with a gear 24 on the steering column 25. The steering column is journaled in two bearings 26, 27, and has the wheel 28 for rotating it to enable the apparatus to be steered in the proper direction.

Mounted on the frame 7 are two engine cylinders 30, 31 which are connected to the shaft 32, on which shaft there is a gear 33. This gear is in mesh with another gear 34 on the shaft 35. The shaft 35 also carries a sprocket wheel 36 around which passes the sprocket chain 37, said chain also passing around a sprocket gear 38 at the front end

of the main frame 7. This sprocket gear 38 is on the shaft 39 journaled in suitable bearings 40, 41, and 42, and it has a worm thereon as indicated at 43 in mesh with the worm wheel 44 to drive the truck forward or back as may be desired.

The worm wheel 44 is mounted on a heavy tubular shaft 45 journaled in bearings 46, 47 connected to the under side of the frame 7 at its rear.

The wheels 3 and 4 are respectively connected to stub axles 48, 49, said axles being slidable in the tubular member 45. These axles are held in a fixed position in either adjustment with respect to the tubular shaft in which they are slidable, by means of the keys 51, 52; set screws 53, 54 enabling said keys to be raised sufficiently to clear the shafts 48, 49 when it is desired to shift them from one position to another.

The bracket 50 has a bearing 55 for the shafts 48 or 49, there being two of said brackets, and each is provided with an upwardly extending flange as indicated at 56 and with a bracing flange as indicated at 57.

The engine cylinders 30, 31 are provided with power from any source desired unnecessary to indicate herein.

The frame 7 is provided with a plurality of horizontally extending shafts 58 to 62 inclusive, and each of said shafts has two wheels thereon as indicated at 63, 64. The wheels 63, 64 of which there are ten, form the support upon which the rectangular frame shown in Figure 4 is movable. This frame consists of two side channel bars 65, 66 connected at their ends to two transversely extending channel bars 67, 68. The side channel bars are placed with their flanges outwardly to fit under the inwardly extending flanges of the truck frame 7, and they at the same time ride upon the wheels 63, 64.

The result of the foregoing construction is that while the entire load of the movable parts of the apparatus is carried by the wheels 63 and 64, that the frame having the side bars 65, 66 cannot be dislodged from the frame 7 either laterally or by tilting.

Extending transversely across from the channel bars 65, 66 are two shallow channels 70, 71 which support a boiler 72. In addition there are other channels 73, 74 and 75 which support a floor 76 for the two engine cylinders 77, 78. These engines are suitably connected to the crank shaft 79, which shaft carries a grear 80 in mesh with a larger gear 81 on the shaft 82 supporting the winding drums 83, 84.

The shaft 82 is mounted in four bearings 85, 86, 88 and 89, and it is arranged to rotate freely therein, unless one of the clutch collars 90, 91 or 92 is engaged with the apparatus it is to drive.

The winding drums 83, 84 are connected together and are connected to a tube which extends through the journal 86 and carries the complementary member 91′ of the clutch collar 91.

Similarly the sprocket wheel 94 is rigidly connected to a sleeve 95 which extends through the bearing 89 and has a portion 92′ complementary to the clutch collar 92.

At the other end of the shaft 82 there is a small gear 96 having a hub 90′ complementary to the clutch collar 90.

The gear 96 is loosely mounted on the shaft 82 and is in engagement with a gear 97 on a shaft 98 journaled in the bearing 99.

The shaft 98 and bearing 99 is also provided with a smaller gear 100 in mesh with a larger gear 101 to which is connected the rod 102. The rod 102 is connected by means of a turn-buckle 103 with another rod 104 in turn connected to an arm 105 on a shaft 106. The shaft 106 extends transversely of the two frame members 65, 66 and has oppositely placed arms 107, 108 thereon.

At the front and back of the frame members 65, 66 there are two other shafts 110, 111 journaled in bearings 112, 113, 114 and 115. These shafts have oppositely placed arms 116, 117, 118, 119 thereon to correspond with the two arms 107, 108, the arrangement being such that all of the arms on one side of the frame extend parallel to each other, while all of the arms on the opposite side of the frame extend parallel to each other but in a reverse position to the first three arms.

Sprocket chains 120, 121 extend around sprocket wheels on the shaft 106 and around sprocket wheels 122, 123 on the shafts 110, 111 respectively.

The clutch collars 90, 91, 92 may be shifted by means of the levers 125, 126, 127 at the will of the operator to drive the drums 83, 84, the sprocket wheel 94 or the gears 96, 97 at will. If the gears 96, 97 are operated the shafts 106, 110 and 111 will be rotated to reversely raise or lower the arms at the ends of said shafts.

The sprocket wheel 94 has a sprocket chain 128 passing over the same and under a sprocket wheel 129 mounted on the side of the frame member 65. The shaft carrying this sprocket wheel is indicated at 130 and has a gear 131 thereon in mesh with a rack 132 on the top of the sub-frame 7 shown at the right hand side Figure 8.

The result of this construction just outlined is that when the sprocket wheel 94 is operated the frame formed of the members 65 to 68 inclusive will be either backed up or pulled forward in accordance with the direction of movement of the shaft 82.

At the middle of the cross bars 67, 68 there are two bearings 133, 134 which support the tilting frame composed of the transverse members 135, 136, 137, 138 and the longitudinal members 139, 140.

This frame is open in the center but has

suitable heavy gussets 141 to 144 inclusive at its corners to stiffen it. Its cross members are also provided with four bearings 145 to 148 inclusive for the pivot pins 149, 150 which support said frame, said pins being in turn journaled in the bearings 133, 134 on the longitudinally movable frame.

The outer ends of the tilting frame rest upon the ends of the arms 108, 107 and 116 to 119 inclusive.

If the road is level, the frame just described will be held level by the arms which support it at its edges, but if the road is to have a crown, this frame will be tilted as may be necessary to produce the crown as will be later explained.

The member 138 is a very heavy channel bar and has two heavy hinges 152, 153 at its ends. These hinges are connected to two small channel bars 154, 155, said channel bars being held in the extended position as shown in Figures 5, 6 and 7 by means of rods 156, 157 in turn connected to brackets 158, 159 on the side frame members 139, 140.

The frame members 154, 155 have brackets 160, 161 at their ends which carry rollers 162, 163 around which cables 164, 165 pass. These cables are connected to the vertical angle bars 166, 167 of the frame for supporting the leveling and tamping apparatus, and they also pass around pulleys 170, 171 in front of the winding drums 83, 84, and said cables are reversely wound upon said drums so when the drums are operated as a unit, the leveling and tamping apparatus will be pulled to one side or the other of the road as may be desired.

The tamping apparatus consists of two engine cylinders 172, 173 supported by a rectangular frame 174 suitably bolted to the lower ends of the two vertical members 166, 167. These members are in turn connected at their upper ends by means of a heavy channel bar 174'. Four wheels 175 to 178 inclusive are journaled in suitable bearings on the vertical members 166, 167 to form the supports and guides for the frame carrying the tamping apparatus.

The two engine cylinders 172, 173 carry heavy tamping heads 179, 180 at the lower ends of their piston rods 181, 182. A transverse bar 183 supports another engine cylinder 184 and its connecting link 185 is connected to the crank pin of a shaft 186.

This shaft carries a sprocket gear around which passes a sprocket chain 187, which chain also passes around a sprocket gear 188 on a shaft 189. Another sprocket chain 190 passes around this sprocket wheel and around a sprocket wheel 191 on the shaft 192 which carries the leveling cylinder 193 with its heavy steel cutters 194.

The cylinder 193 is supported by two arms 195, 196 from the shaft 197 on which the sprocket wheels for carrying the cylinder are carried. These arms also have backwardly extending projections 198, 199 through which set screws 200, 201 pass to determine the depth at which the cutters will act, or to hold the cylinder off the ground if that is desired.

At the front of the frame there is a sheet metal guard 202 to prevent the dirt thrown forward by the cutters from passing out of the range of the tamping mechanism.

In operation the machine is placed upon the road with its rear wheels adjusted to the widest possible position so as to pass over piles of dirt or other materials to be spread, and the supporting channels 154, 155 are swung outwardly. Thereupon the winding engine is operated to bring the tamping apparatus and cutting cylinder to the desired portion of the road; whereupon the engines 172, 173 and 184 are operated to smooth the road. At the same time the winding engine is operated to cause the tamping apparatus and smoothing apparatus to be moved transversely of the road to any extent desired.

When a given portion of the road has been smoothed the clutches are engaged to shift the position of the intermediate frame longitudinally of the main truck, and this is continued throughout the possible shifting of that truck, ordinarily six or seven feet.

When this amount of road has been smoothed, the main truck may be operated to shift its position on the road sufficiently to give a new possibility of movement of the intermediate supporting frame and the tamping apparatus, and the operation is continued.

If the roadway is to be provided with a crown, the upper frame is tilted first one way, and then the other to correspond with the crown desired, so that when the tamping apparatus is near one end of its supporting beam, it will finish the road lower than it does when at the center of its supporting beam.

It will be observed that this apparatus may either by used for finishing roads from the rough grade, or for spreading and tamping the road building materials upon the finished sub-grade.

What I claim is as follows, but various modifications may be made in the construction shown in the drawings and above particularly described form, within the purview of my invention.

1. A road working apparatus comprising a truck, a longitudinally movable frame thereon, means to move said frame in either direction, a transversely extending beam carried thereby, a means to prepare a road surface, a frame supporting said road surface preparing means, and means to move said frame back and forth along said beam.

2. A road working apparatus comprising

a mobile wheeled truck, a longitudinally movable frame supported thereon, means to move the frame in either direction on the truck, a transversely extending beam carried by the frame, a vertically placed frame supported by the beam, means to prepare a road surface supported by the frame, and means to move the frame back and forth along the beam.

3. A road working apparatus comprising a mobile wheeled truck, a plurality of rollers carried thereby, a frame supported on said rollers and movable longitudinally of the truck, means to move said frame in either direction, a transversely extending beam, a frame supported thereby, road working apparatus carried by said frame, and means to move the frame from one end to the other of the beam supporting it.

4. A road working apparatus comprising a mobile truck, a plurality of rollers carried thereby, a longitudinally movable frame supported on the rollers, a longitudinally pivoted frame carried by the first frame, means to move the latter frame on its pivots, a transversely extending beam carried by the latter frame, a movable frame supported by the beam, road leveling apparatus carried by the latter frame, and means to move the frame and road leveling apparatus from one end to the other of the beam supporting said apparatus.

5. A road working apparatus comprising a mobile truck, a longitudinally movable frame supported thereon, means to move said frame in one direction or the other, a frame pivotally mounted on the first frame to move on an axis longitudinal of the truck, means to tilt said frame to one side or the other at will, a beam carried by the latter frame and extending transversely of the truck, a frame supported on the beam, road leveling apparatus carried by the frame, and means to move the frame longitudinally of the beam supporting it.

6. A road working apparatus comprising a mobile truck, means whereby the tread of the rear wheels of the truck may be extended or retracted, a longitudinally movable frame carried by the truck, a frame pivotally mounted on the first frame to move on a longitudinal axis, a transversely extending beam carried by the pivoted frame, a vertically extending frame carried by the beam, road working and leveling apparatus supported by said frame, and means to move the road working and leveling apparatus and its supporting frame laterally across the road at will.

7. A road working apparatus comprising a mobile truck, a longitudinally movable frame supported thereon, a pivoted frame mounted to move on an axis longitudinally of the truck, a plurality of shafts carrying oppositely placed arms bearing upon the tilting frame for tilting it as required, a transversely extending beam, road working apparatus supported by said beam, and means to move the road working apparatus transversely across the road.

8. A road working apparatus comprising a mobile truck, a longitudinally movable frame thereon, a pivotally mounted frame on the first frame, means carried by the first frame to tilt the pivotally mounted frame at will, a transversely extending beam carried by the pivotally mounted frame, road working apparatus supported by said beam, and motors mounted on the longitudinally movable frame for moving the road working apparatus back and forth across the road.

9. A road working apparatus comprising a mobile truck, a longitudinally movable frame supported thereon, a second frame pivotally mounted on the first frame, shafts carrying oppositely placed arms bearing upon the pivotally mounted frame to tilt it at will, a transversely extending beam carried by the pivotally mounted frame, a frame supported on rollers bearing upon said beam, road working apparatus carried by said frame, and means to move the latter frame back and forth across the road.

10. A road working apparatus comprising a mobile truck, a longitudinally movable frame supported thereon, a longitudinally pivoted frame supported on the first frame, means to tilt the latter frame to one side or the other at will, a transversely extending sectional beam carried by the tilting frame, road leveling apparatus supported from said beam, motors carried by the longitudinally movable frame, and means whereby the motors may be operated to move the road leveling apparatus transversely of the road at will.

11. A road working apparatus comprising a mobile truck, a longitudinally movable frame carried thereby, a pivotally mounted frame supported on the longitudinally movable frame, a jointed beam carried by the pivotally mounted frame, means to hold all of the portions of said beam in alignment with each other, a frame supported by said beam and movable longitudinally thereof, road working apparatus supported by the frame, motors on the frame for the operation of said apparatus, and means to move the frame transversely of the road at will to work it.

12. A road working apparatus comprising a mobile truck, a longitudinally movable frame carried thereby, a pivotally mounted frame supported on the first frame, a transversely extending beam carried by the pivoted frame, a vertically extending frame supported from and movable along the transversely extending beam, road surface preparing means carried by the frame, motors on the frame for the operation of the cut-

ting and tamping apparatus, and means to move the cutting and tamping apparatus back and forth across the road.

13. A road working apparatus comprising a mobile truck, a longitudinally movable frame carried thereby, a pivotally mounted frame on the first frame, shafts carrying oppositely placed arms for tilting the pivoted frame from one side to the other at will, a transversely extending beam supported by the pivoted frame, road surface preparing means supported by the frame, motors carried by the frame for the operation of the cutting and tamping apparatus, and means to move the cutting and tamping apparatus back and forth across the road.

In testimony whereof I have hereunto set my hand this 3rd day of Oct. A. D. 1923.

THOMAS S. O'BRIEN.