Dec. 13, 1938. F. CLUSTER 2,140,105

ROAD BUILDING AND RECLAMATION MACHINE

Filed May 19, 1936 4 Sheets-Sheet 1

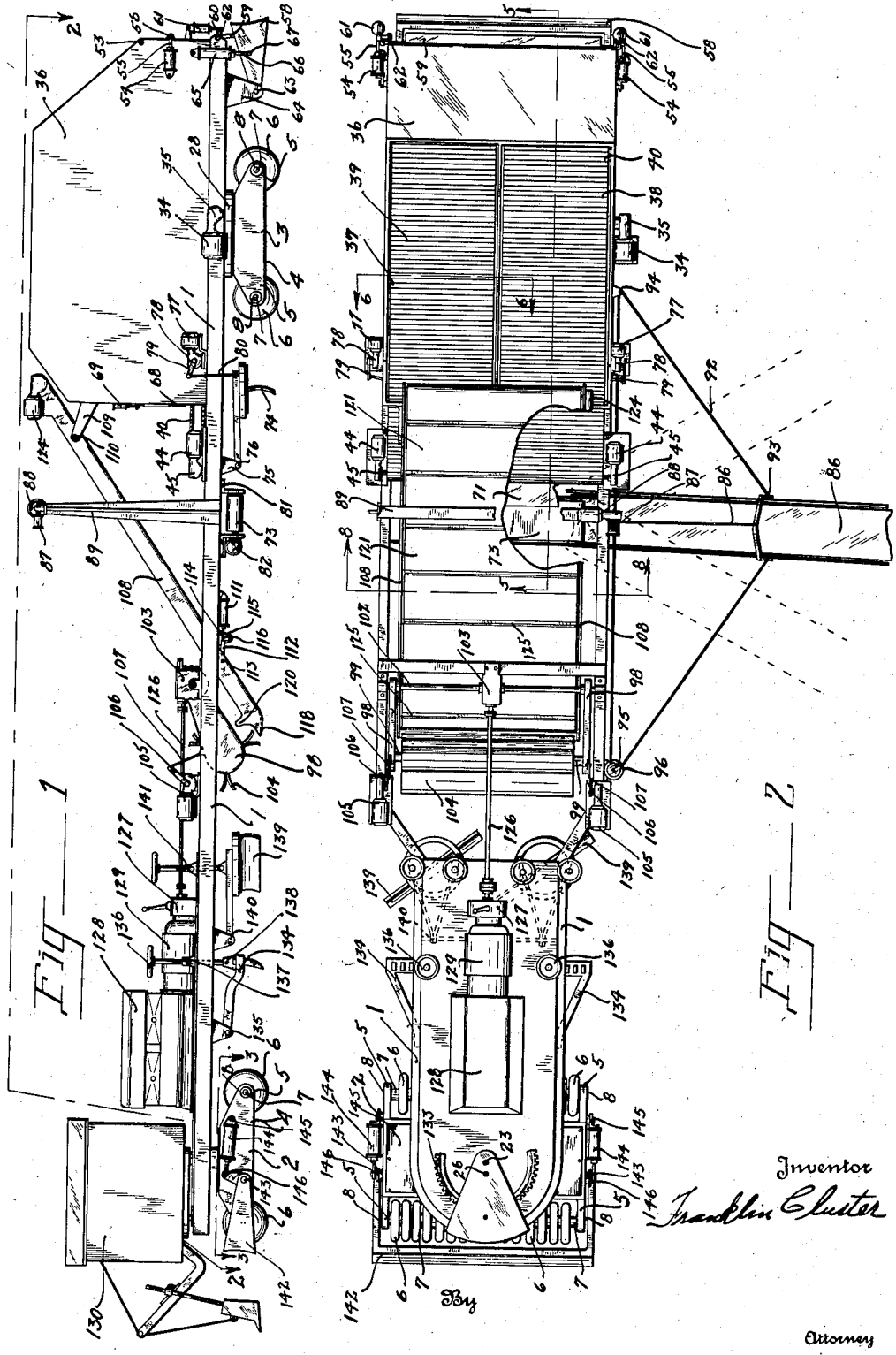


Fig. 1

Fig. 2

Inventor
Franklin Cluster

By

Attorney

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ROAD BUILDING AND RECLAMATION MACHINE

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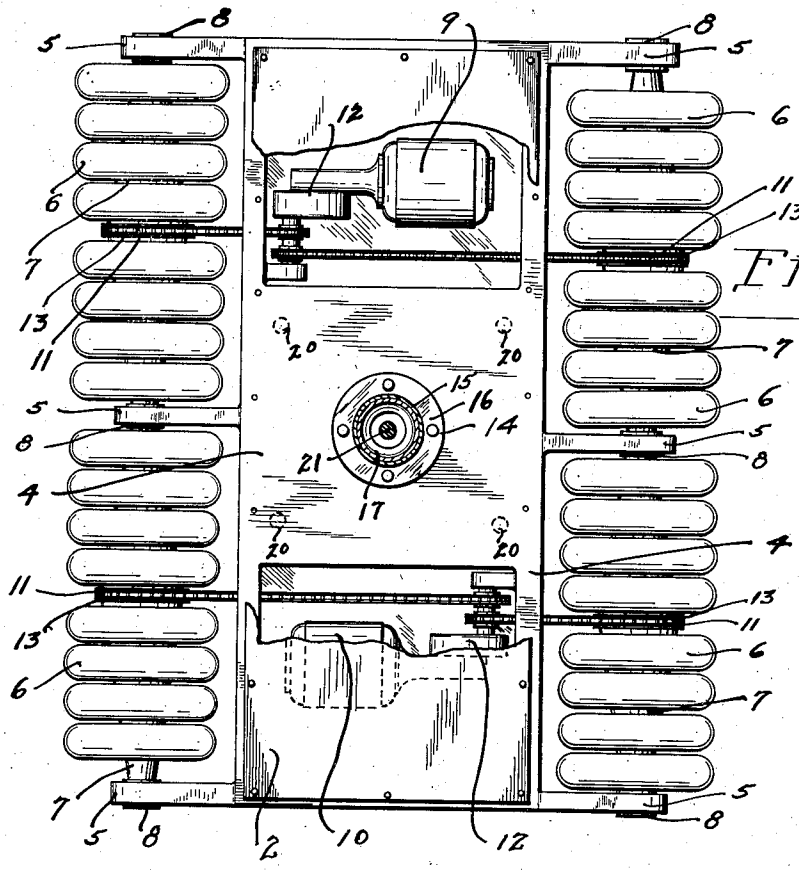


Fig — 3

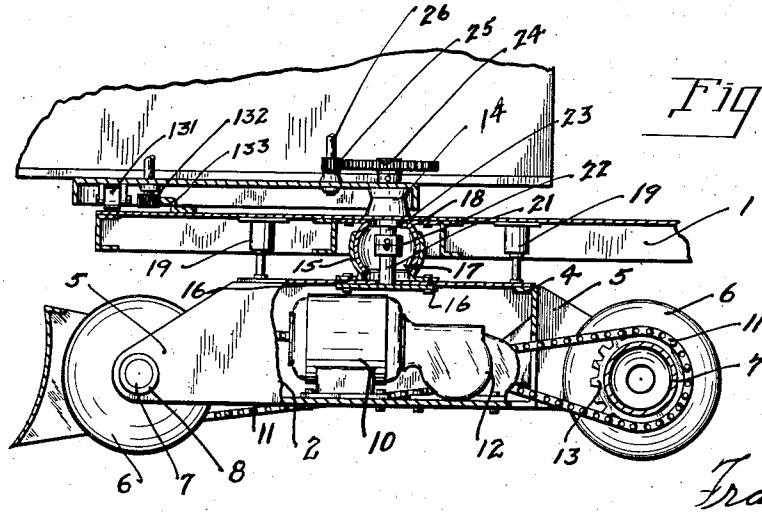


Fig — 4

Inventor

Franklin Cluster

By

Attorney

Dec. 13, 1938. F. CLUSTER 2,140,105

ROAD BUILDING AND RECLAMATION MACHINE

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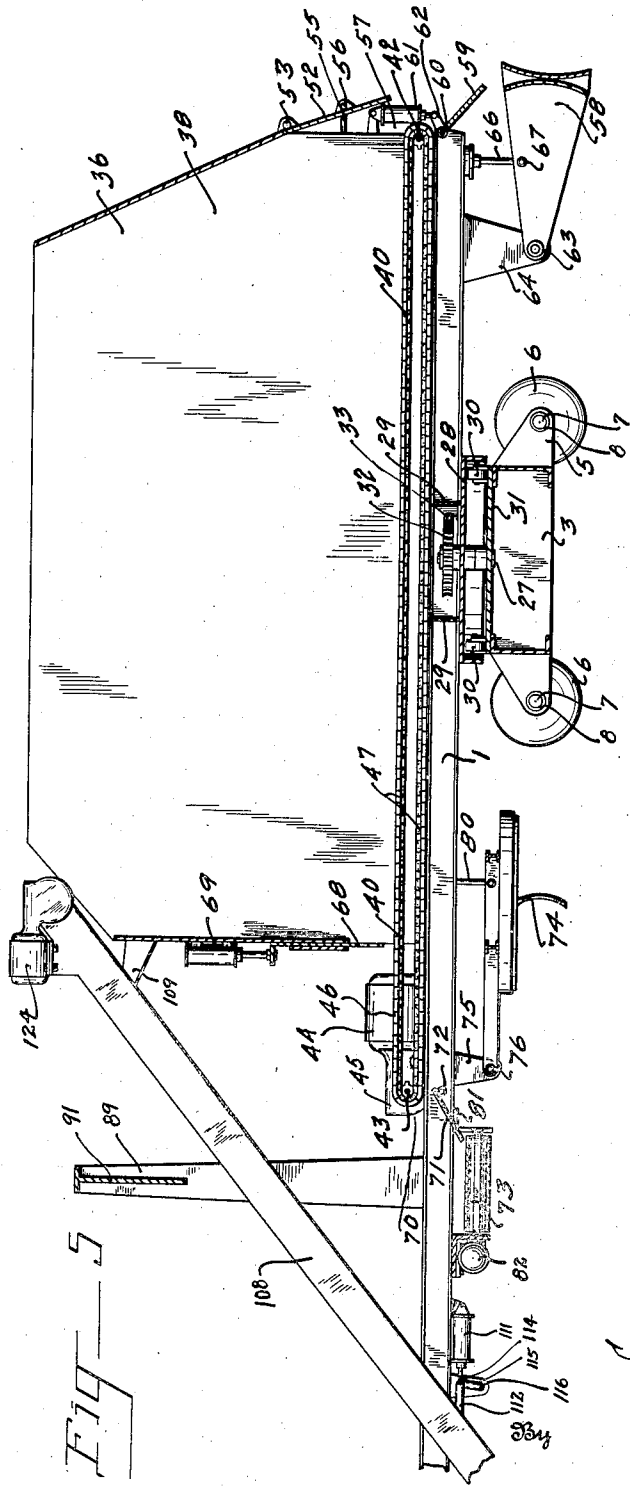


Fig. 5

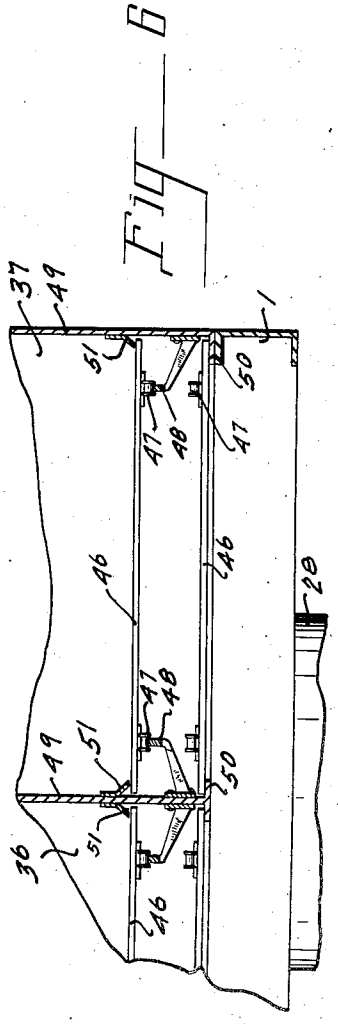


Fig. 6

Inventor
Franklin Cluster

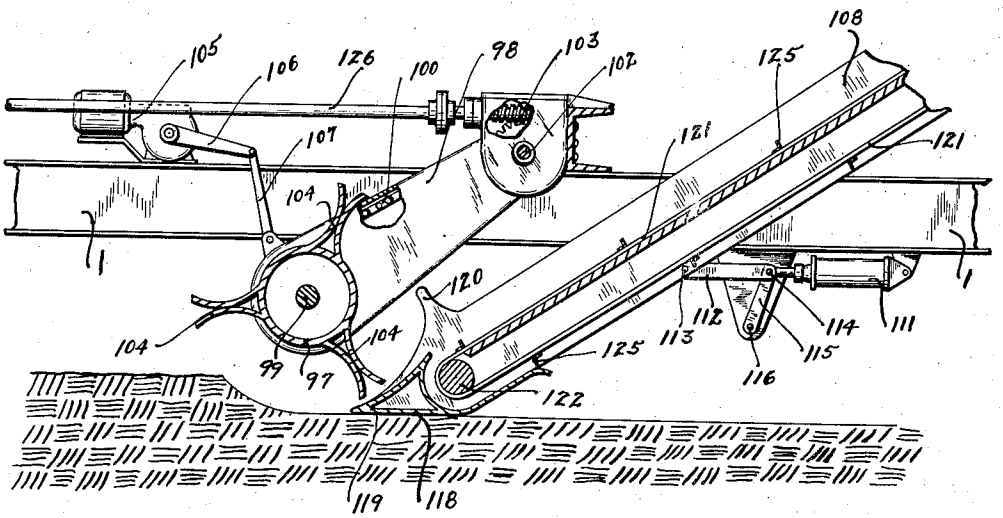
Attorney

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ROAD BUILDING AND RECLAMATION MACHINE

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Fig. 7



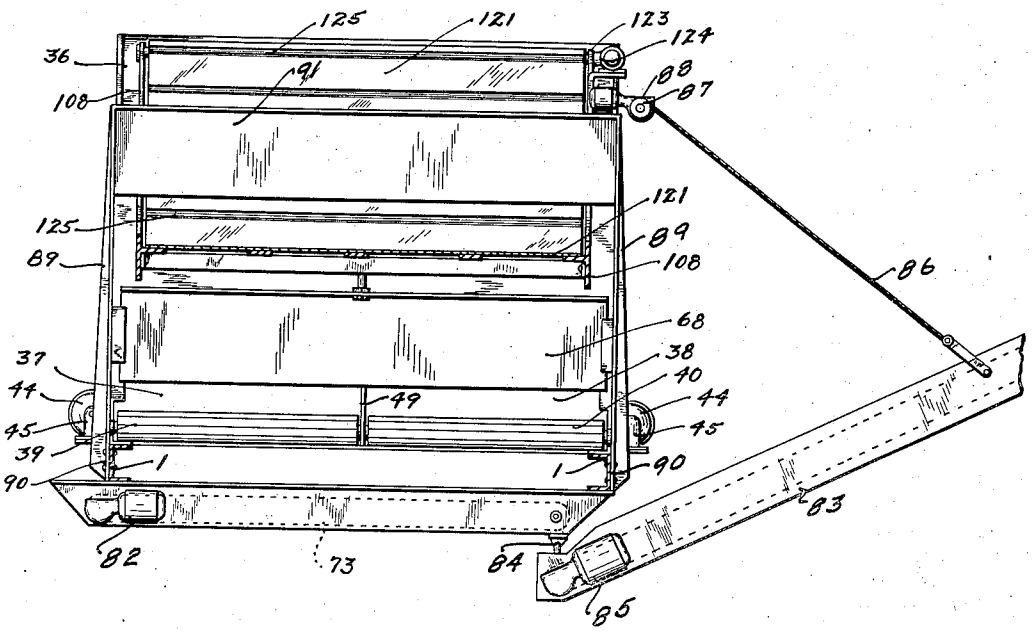


Fig. 8

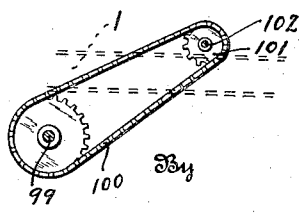


Fig. 9

Inventor
Franklin Cluster

By

Attorney

Patented Dec. 13, 1938 2,140,105

UNITED STATES PATENT OFFICE

2,140,105

ROAD BUILDING AND RECLAMATION MACHINE

Franklin Cluster, Springfield, Oreg.

Application May 19, 1936, Serial No. 80,603

6 Claims. (Cl. 37—108)

This invention relates to road building and reclamation machines and is particularly adapted to use where dirt is to be moved from one place to another, dug from banks and the like, high places taken down and fills brought up to grade. In fact in any place where the building of roads is taking place or ground is being leveled.

The primary object of this invention is to provide a framework sufficiently large to mount any one or all of the different road building machines thereto.

Another object of this invention is to mount the machine upon pneumatic tires, the number of tires being of sufficient number and width of tread to make the machine stable under any and all operating conditions.

A further object of this invention is to provide means for controlling the direction of travel of the trucks, so that the machine may travel in a straight line direction or that the trucks may be turned to travel in such a direction that the main frame of the machine will travel at a diagonal to the road being built or in some cases at right angles to the direction of the road.

A still further object of the invention is to provide a road building machine incorporating a bin or hopper for transporting material from one place to another for distribution.

Another object of the invention is to provide sufficient scrapers, bulldozers, scarifiers, digging rotors, even including shovels, bucket or drag line equipment, elevators and conveyors, to accomplish the particular purpose intended.

A further object of the invention is to provide power means for all of the units from a central power plant located on the machine. This power may be transmitted to the different units either by electricity, hydraulic or direct drive.

Another object of the invention is to arrange the wheels of the trucks in such relation to one another that they will completely roll the surface of the grade.

A further object of the invention is to provide a road building machine that can travel on the highways without injuring the pavements.

Figure 1 is an assembled side elevation of my invention incorporating several different forms of road building machines within a single unit In this way I have eliminated some of the parts as the side elevator shown in Figure 2.

Figure 2 is a plan view of Figure 1 taken on line 2—2 of Figure 1, showing a side elevator connected thereto.

Figure 3 is a plan view, partially broken away, taken on line 3—3 of Figure 1 of the front truck mechanisms, the bulldozer having been removed.

Figure 4 is a fragmentary sectional view, parts broken away for convenience of illustration, of the forward end of the main frame and forward truck. The hydraulic jacks shown in locked position.

Figure 5 is a fragmentary sectional view taken on line 5—5 of Figure 2, looking in the direction indicated.

Figure 6 is a fragmentary sectional end view taken on line 6—6 of Figure 2, looking in the direction indicated.

Figure 7 is a cross section side elevation of the digging rotor, driving mechanism and lower end of the elevator conveyor.

Figure 8 is a sectional view taken on line 8—8 of Figure 2, looking in the direction indicated.

Figure 9 is a sectional view of one of the supporting and driving arms of the digging roller.

Referring to the drawings: Frame 1 is mounted upon the trucks 2 and 3. The trucks 2 and 3 are practically identical in construction having a main frame 4. The frame 4 has outwardly extending arms 5, having the pneumatic wheels 6 mounted therebetween. The wheels 6 are all fixedly mounted to the core or axle 7 by any suitable means. The axle 7 is journaled within suitable bearings 8, mounted within the arms 5. Motors 9 and 10 drive the chains 11 through the reduction gear boxes 12. The opposite ends of the chain 11 coacts sprockets 13, which are fixedly mounted to the shaft 7. Each motor drives two sets of pneumatic tires. Each set of tires being located on either side of the pivot point 14 of the truck. This enables the operator to stear the trucks by running the motor 9 and 10 in opposite directions so that the pneumatic tires will walk around the center point 14.

Referring to Figure 4, the truck 2 has a socket bearing 15 fixedly mounted thereon by suitable fastening means 16. A coacting socket or ball-joint 17 is fixedly mounted to the main frame of the machine at 18. The ball-socket 17 works freely within the socket 15. This allows the truck 2 to oscillate in all directions underneath the main frame 1. The truck 2 may be held in any fixed position relative to the main frame 1 by hydraulic jacks 19 which are fixedly mounted on the main frame 1 and extended to the truck frame 2 at the points 20. This locks the main frame and the truck frame solidly together while certain operations are being performed by the mechanism mounted thereon. The motors 9 and 10 assist in the turning of the

trucks, but a direct stearing shaft 21, having a universal joint 22 and stub-shaft 23 and a suitable gear 24 fixedly mounted to its upper end and coacting with the pinion 25 mounted upon a suitable stearing shaft 26 leading to a stearing mechanism, not here shown, also controls the turning of the truck 2 and locking of the same in any fixed position relative to the frame 1.

Referring now to Figure 5, the rear truck 3 is mounted to the frame 1 by the spindle or kingbolt 27. A track 28 is fixedly mounted to the frame 1 by cross frames 29. Trunnion wheels 30, fixedly mounted to the frame 31 of the truck 3, holds the truck rigidly to the frame 1 but permitting the same to pivot about the pin 27. The pin 27 is controlled and revolved by the worm wheel 32, which is in turn rotated by the worm 33. The worm 33 is driven by the driving motor 34 and reduction gear 35. This motor is reversible and controlled by the operator of the machine by remote control. A bin or hopper 36 is superposed upon the frame 1. The bin 36 is divided into two sections 37 and 38. The bottom of the bin consists of conveyors 39 and 40 journaled about bearings or sprocket wheels 42 on its one end and about sprocket wheels 43 at its opposite end and driven by the motors 44 and reduction gears 45. This motor is reversible causing the conveyor to run in either direction. The conveyor consists of cross-bars 46 fixedly mounted to the roller chains 47, the said roller chains traversing the tracks 48 which are fixedly mounted to the side walls 49 of the bin 36. The conveyor returns upon the surfaces or angles 50. Means is provided by the guards 51 for holding the material from falling through past the ends of the bars 46. The rear of the bin 36 has a swinging gate 52 pivoted at 53 and controlled by the hydraulic cylinder 54 through the piston rod 55 being journaled to the point 56. The gate 52 permits the discharging of the material from the bin 36 by the moving conveyor 39 through the opening 57, either in front of the bulldozer 58 or behind the same, depending upon the position of the movable baffle plate 59. The baffle plate 59 is pivotally mounted at 60 and is controlled by the hydraulic cylinder 61 whose piston rods are connected to the crank 62. The discharging of the material of either side of the bulldozer provides for the leveling of the material while traveling in either direction.

The bulldozer 58 is pivotally mounted at 63 to the bracket arm 64 and is raised and lowered by the hydraulic cylinder 65 having its piston rod 66 journaled to the pin 67 fixedly mounted to the bulldozer 58. An adjustable discharge gate 68 is provided at the opposite end of the bin and controlled by the cylinder 69. The discharge from the point 70 of the conveyor may be controlled by the movable baffle plate 71 which is pivotally mounted at 72, either into the cross conveyor 73 or down in front of the blade 74. The blade 74 is pivotally mounted to the bracket 75 by the pin 76 and raised and lowered on either side by the motor 77, reduction gear 78, crank arm 79 and connecting link 80. The operation of this blade is controlled by the operator by remote control. The cross conveyor 73 is mounted to the underneath side of the frame at 81 and driven by the motor and reduction gear 82 in either direction. A side elevating conveyor 83 may be pivotally mounted at 84 and driven by the motor and reduction gear 85 for transferring the material from the cross conveyor 73 to any desired point or angle at the side of the grading of the machine. The outer end of the side conveyor 83 may be held in an upright position by the cable 86 trained about the reel 87 which is driven by the motor and reduction gear 88. For this purpose an upright frame 89 fixedly mounted to the main frame 1, at 90 having its upper ends tied together by the cross-web 91, provides a mounting for the motor 88 and reel 87. The side conveyor 83 may be mounted to either side of the machine. Cable 92 fixed to the side of the conveyor 83 at 93, trained about the pulley 94 and the reel 95 of the motor and reduction gear 96 controls the angle of the conveyor relative to the frame of the machine.

One of the main features of the machine is in the construction of the digging apparatus and the conveying of the material to the bin 36. A cylinder or core 97 extends transverse of the frame and is journaled and mounted to the side arms 98 by the stub-shaft 99 journaled within the side arms 98 and having a sprocket wheel secured thereto. Illustrated in Figure 9.

The chain 100 drives the cylinder 97 in either direction by the sprocket wheel 101 fixedly mounted to the shaft 102 which in turn is driven by the reduction gear assembly shown at 103. The cylinder 97 has oppositely disposed curved cutting blades 104 for digging in either direction. Either side of the cutting assembly may be raised by the motor and reduction gear 105, crank arm 106, connecting links 107. A conveyor 108 is pivotally mounted to the bracket 109 at 110. The lower end of the conveyor is controlled by a hydraulic cylinder 111, actuating the link 112 which is pivotally mounted to the conveyor at 113 at its one end and to the piston rod 114 at its opposite end, having a link 115 pivotally mounted at 116, controlling the piston rod 114 and link 112 in approximately straight line position. This mechanism raises and lowers the lower end of the conveyor 118. A digging shear 119 is fixedly mounted to the lower end of the conveyor 108. This digging shear works in combination with the digging or cutting blades 104, sufficient clearance being maintained between them by the stop 120 contacting the arms 98. A conveyor belt 121 is trained about the lower roller 122 at the lower end of the conveyor and about the upper roller 123, which is driven by the motor and reduction gear 124, cross-slats 125 are provided for carrying the material upwards on the conveyor belt 121. Due to the separate controls on either side of the cutting drum and of separate hydraulic cylinders on either side of the conveyor, any slope of grade can be cut. The drum 97 is driven by the reduction gear 103, drive shaft 126, transmission 127 and motor 128.

The motor 128 provides the primary motive power for the entire machine. An electric generator 129 directly connected to the motor provides the electric energy for remote control motors. A hydraulic pump, not here shown, will provide hydraulic means for the hydraulic cylinder. I do not wish to be limited to any particular form of controls or operating motors or mechanism, as all of the mechanism controlling the bulldozer, blades, gates, raising and lowering of the elevators could be done by direct mechanical gear driven controls, but I have selected the control shown due to the simplicity of illustration.

A complete shovel and hoisting mechanism is shown at 130. This mechanism may be of well known standard construction pivoted upon the

pivot point 14 of the front trucks 2. The same being mounted upon trunnion wheels 131 and controlled by the pinion 132 coacting with the segment gear 133. The pinion and gear 133 brings the shovel mechanism 130 to any desired position of operation relative to the front of the main machine, in other words working in a half-circle either directly in front of the machine or to one side. The pivot point 14, about which the mechanism 130 is revolved, is best shown in Figure 4. The same being locked together by the stub-shaft 23 and the gear wheel 24.

A scarifier 134 is pivotally mounted at 135 and controlled by the hand wheels 136, worm mechanism 137 pivotally mounted to the rear end of the scarifier at 138. A pair of blades 139 are pivotally mounted at 140, and raised and lowered by the mechanism 141, their angles being controlled by present well known gear mechanism not here shown.

Referring to Figures 1 and 2, a bulldozer is shown mounted upon the front truck 2. The bulldozer 142 is pivotally journaled at 143 and raised and lowered by the action of the cylinder 144. The cylinder is pivotally mounted at 145 having its piston rod fixed to the arm 146 of the side arm of the bulldozer.

From the foregoing description it will be readily understood that one or more of the single units may be in operation at the same time, and due to the size of the machine, a more even control may be had of the various separate machines contained in the frame of the main machine.

There are so many uses to which this machine is adapted that it would be impossible to elaborate on all of them, as for instance, sloping devices for shaping the edge of grades can be attached at different points on the machine for further combinations.

While a specific form of construction has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having described my invention, I claim—

1. A road building machine including a frame, ground supporting wheels therefor, a ground cutting implement mounted transversely of and below the frame, means for independently controlling the cutting depths of the cutting implement, a conveyor cooperating with the cutting implement, a bin mounted on the frame to receive the material from the conveyor, a traveling apron forming the bottom of the bin, means for selectively driving the apron in either direction, a gate at the rear of the bin for delivering material therefrom in the travel of the apron, a bulldozer supported below the machine in line with the rear of the bin, and means for operating the gate for delivering material from the bins in advance of or in rear of the bulldozer at will.

2. A road building machine including a ground traveling frame, a cutting implement mounted transversely of and below the frame, means for controlling the cutting depths of the implement, a divided bin supported on the frame rearwardly of the implement, a conveyor for delivering material from the cutting implement to one of the divisions of the bin, traveling aprons forming the bottom of the divided bin, a conveyor belt movable laterally of the frame, said conveyor belt receiving material from the forward ends of the aprons, and means operative to direct the material from the aprons onto the conveyor belt.

3. A construction as defined in claim 2, including a scraper arranged in rear of the conveyor belt, the means for delivering the material from the aprons to the conveyor belt being operative to deliver said material free of the conveyor belt and in advance of the scraper.

4. A construction as defined in claim 2, including an extension belt in line with the conveyor belt, said extension belt being mounted for swiveling movement laterally and vertically to deliver material from the conveyor belt laterally of the machine and at selected points, and means for controlling the position of the extension belt.

5. A construction as defined in claim 2, including a scraper arranged in rear of the conveyor belt, and means for adjusting the scraper for appropriate scraping of the material.

6. A road building machine including a frame, ground wheels supporting the frame, a cutting implement mounted transversely of and below the frame, a support for the cutting implement swingingly mounted above the frame and extending below the frame and carrying the cutting implement, the cutting implement including a plurality of cutters mounted for revolution about a fixed axis in the lower end of the support, said cutters being arranged in pairs with the respective cutters of each pair acting in opposite directions for cutting function to thereby permit effective operation of the cutting implement on rotation in either direction, driving means for the cutting implement operating in the support, and means for changing the angle of the support with respect to the frame to vary the cutting depths of the cutters.

FRANKLIN CLUSTER.