July 30, 1929. C. E. WHITTENBERG 1,722,547

ROAD PREPARING MACHINE

Filed April 16, 1927 4 Sheets-Sheet 1

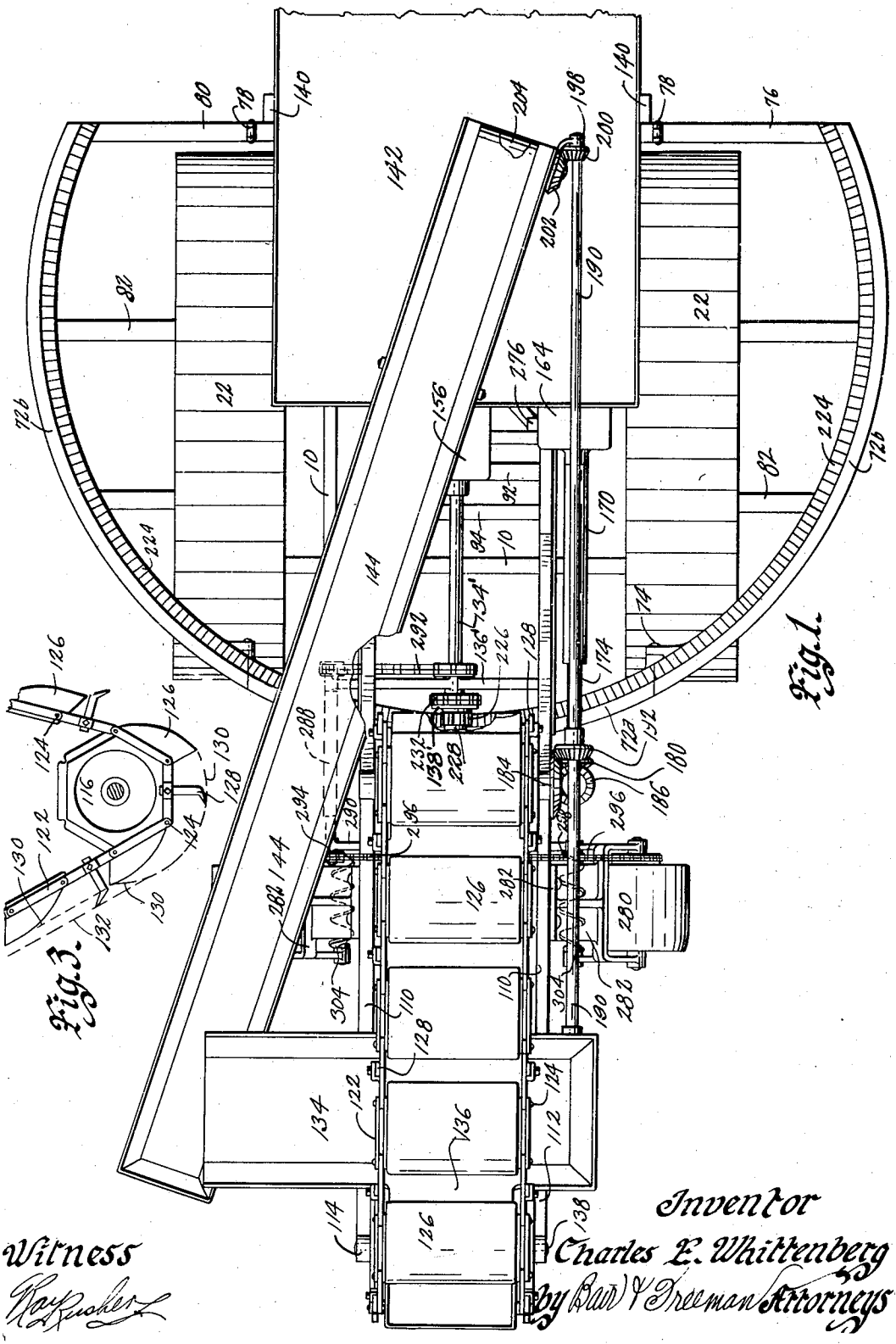


Fig. 1.

Fig. 3.

Witness
Ray Rusher

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ROAD PREPARING MACHINE

Filed April 16, 1927 4 Sheets-Sheet 2

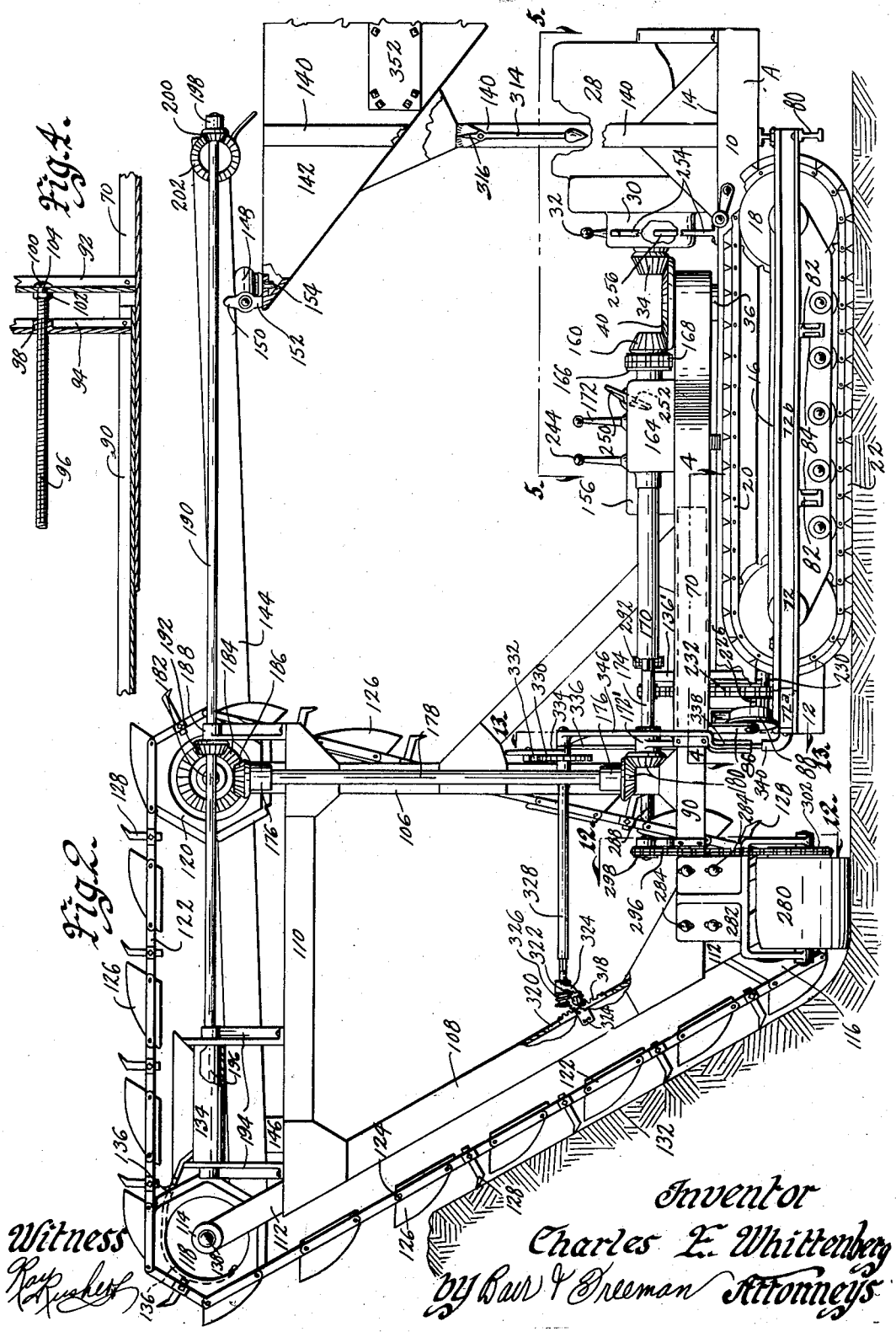


Fig. 1.

Fig. 2.

Witness
Ray Rockett

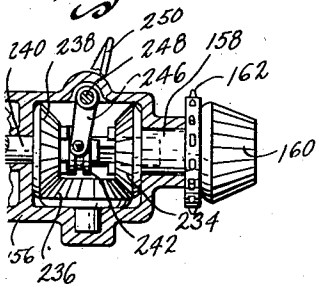
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July 30, 1929. C. E. WHITTENBERG 1,722,547

ROAD PREPARING MACHINE

Filed April 16, 1927 4 Sheets-Sheet 3

Fig. 7.



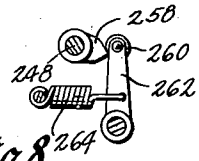


Fig. 8.

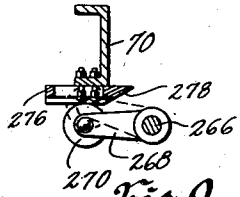
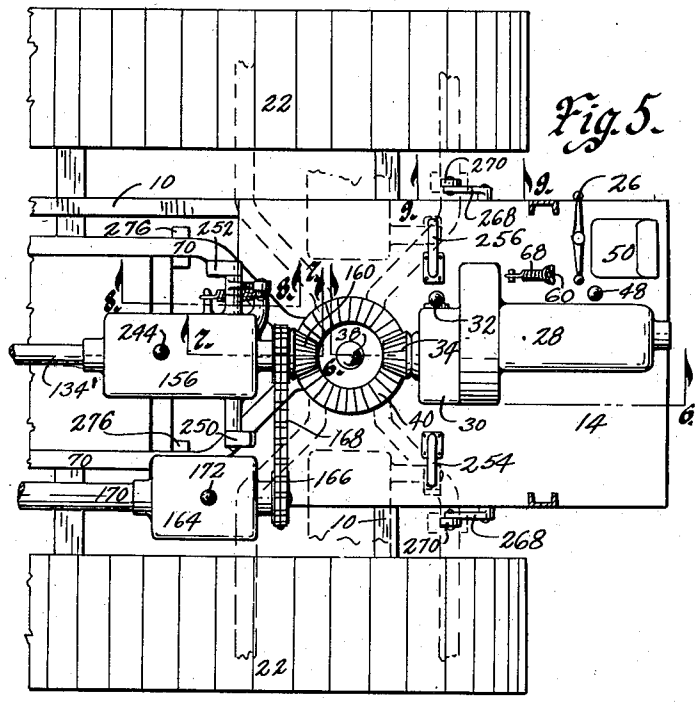


Fig. 9.

Fig. 5.



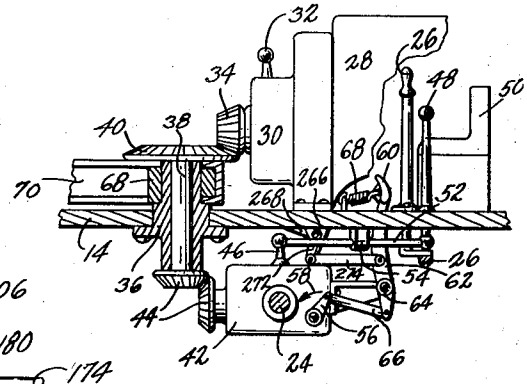
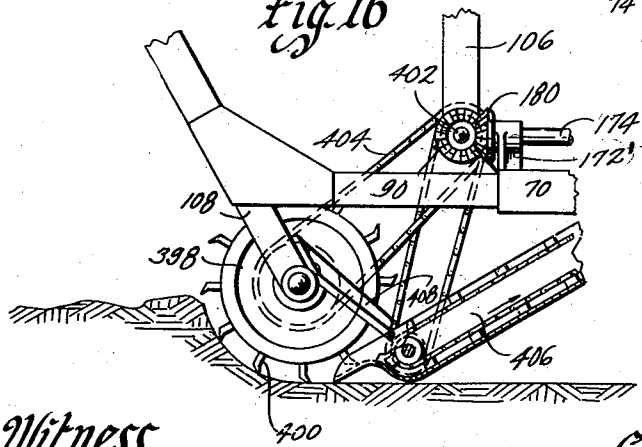


Fig. 6.

Fig. 16



Witness
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July 30, 1929. C. E. WHITTENBERG 1,722,547

ROAD PREPARING MACHINE

Filed April 16, 1927 4 Sheets-Sheet 4

Fig. 10.

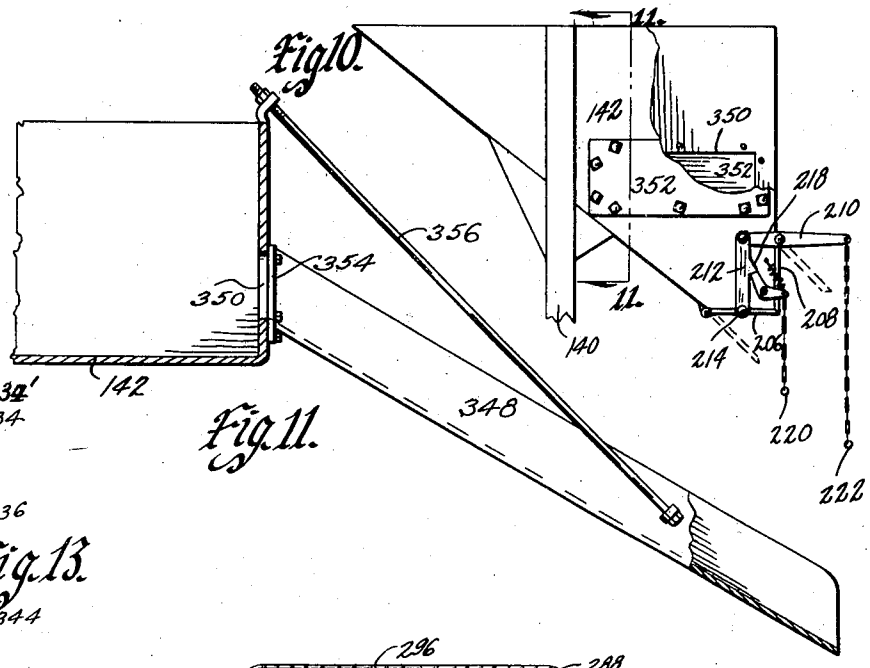


Fig. 11.

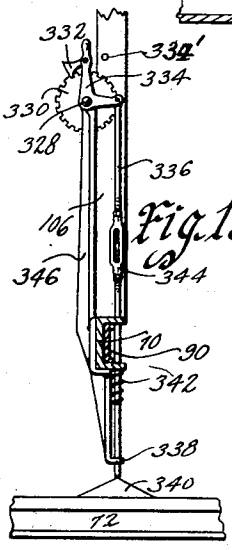


Fig. 13.

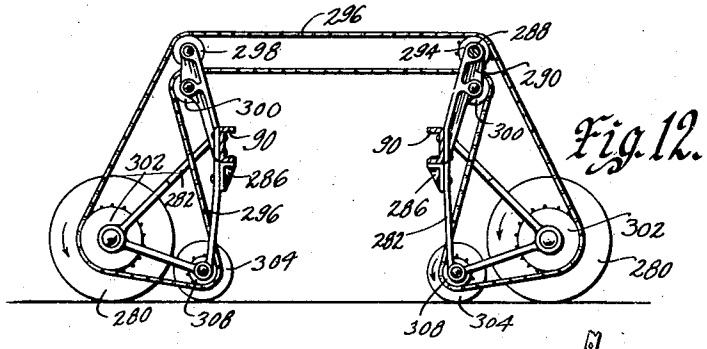


Fig. 12.

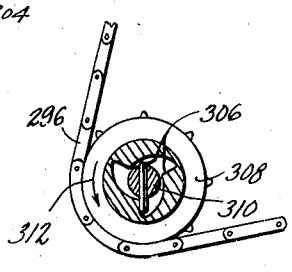
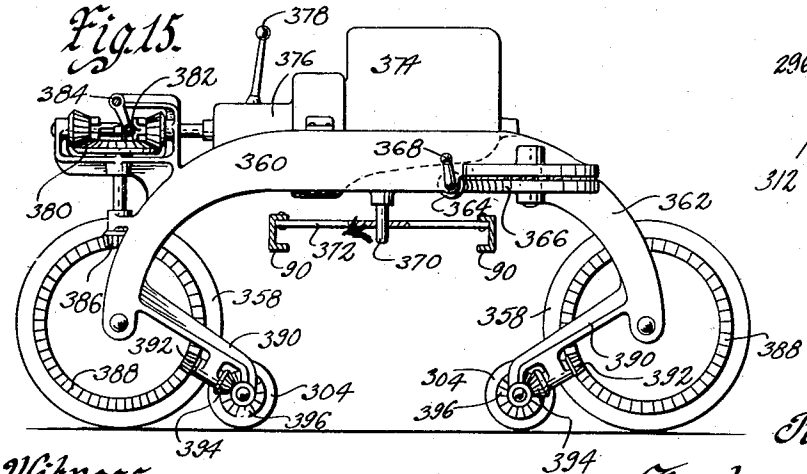


Fig. 14.

Fig. 15.



Witness

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Patented July 30, 1929. 1,722,547

UNITED STATES PATENT OFFICE.

CHARLES E. WHITTENBERG, OF KNOXVILLE, IOWA.

ROAD-PREPARING MACHINE.

Application filed April 16, 1927. Serial No. 184,260.

The object of my invention is to provide a road preparing machine adapted to completely surface a road from one side thereof to the other, the parts of the machine being of simple, durable, and comparatively inexpensive construction.

Another object of my invention is to provide a road preparing machine adapted to be moved along a road and having mechanism thereon adapted to surface the road and thereby prepare it for paving or merely to put it in condition for traffic.

More particularly it is my object to provide a main frame adapted to be advanced along the road and to provide an auxiliary frame having one end pivoted on the main frame and cutting mechanism on the outer end thereof whereby the auxiliary frame may be swung through an arc of substantially ninety degrees for the purpose of resurfacing the road from one side thereof to the other.

A further object is to provide mechanism for advancing the main frame so that the entire device can be moved along the road for resurfacing it.

Still a further object is to provide means actuated by the auxiliary frame as it swings to position extending laterally on either side of the machine for causing intermittent advancement of the machine along the road surface.

Still a further object is to provide a semicircular track secured to the main frame and rollers on the auxiliary frame adapted to travel on the track as the auxiliary frame swings from one side to the other of the machine.

Still another object is to provide reversible mechanism for causing the auxiliary frame to swing and the rollers thereon to travel along said track, the reversible means being actuated for reversal when the auxiliary frame is in a predetermined position with relation to the main frame.

Another object of my invention is to provide a conveying means in the form of buckets adjacent the cutting mechanism for the purpose of picking up the material cut and elevating it to be dumped at a predetermined point.

Still a further object is to provide a hopper mounted on the main frame and a conveying means for collecting the material from the conveyor buckets and conducting it to the hopper from where it can be dumped through a chute as desired.

Still another object is to provide heavy rollers positioned along the side of the auxiliary frame adjacent the cutting mechanism whereby they are used to pack the ground which has previously been surfaced by the cutting mechanism.

Still another object is to provide means for rotating the rollers so that they assist in swinging the auxiliary frame about its pivot point, this means being reversible so that the rollers can be utilized to swing the auxiliary frame in either direction.

Still a further object is to provide auger devices between the rollers and the cutting mechanism for the purpose of moving any material which might be dropped from the cutting mechanism out of the path of travel of the rollers.

Still a further object is to provide a mechanism operated by the auxiliary frame as it swings to raise or lower the cutting mechanism with relation to the main frame for the purpose of changing the grade of the road with relation to the part of the road which has just been surfaced.

Still another object is to provide the auxiliary frame of extensible construction whereby the radius of the cutting mechanism can be varied for the purpose of surfacing a wide or narrow road as desired.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my road preparing machine, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of my road preparing machine.

Figure 2 is a side elevation of the same.

Figure 3 is a side elevation of the lower portion of the cutting mechanism showing the manner in which the buckets attached thereto scrape the ground for picking up the material which has been dropped from the cutting teeth.

Figure 4 is a sectional view taken on the line 4—4 of Figure 2 and illustrates the

extensible construction of the auxiliary frame whereby its length may be varied as desired.

Figure 5 is a sectional view taken on the line 5—5 of Figure 2 and illustrates a plan view of the engine which is used to operate the various parts of my machine and also shows its operative connection to such parts.

Figures 6, 7, 8, and 9 are detail sectional views taken on the lines 6—6, 7—7, 8—8, and 9—9 respectively of Figure 5.

Figure 10 is a side elevation of the hopper mounted on the rear end of the machine and illustrates the doors thereon which can be opened to discharge the material in the hopper.

Figure 11 is a sectional view taken on the line 11—11 of Figure 10 and illustrates a chute which can be secured, one on either side of the hopper, for the purpose of conducting the material therein to the sides of the road when so desired.

Figures 12 and 13 are sectional views taken on the lines 12—12 and 13—13 respectively of Figure 2.

Figure 14 is a sectional view through the hub of one of the sprockets mounted on one of the augers for the purpose of rotating the auger in only one direction.

Figure 15 is a modified form of roller construction in which an independent engine is used for rotating the rollers and thereby swinging the auxiliary frame; and

Figure 16 is a modified form of cutting mechanism and elevating means which can be substituted for the cutting mechanism and conveyor buckets illustrated in Figure 2.

On the accompanying drawings I have used the reference character A to indicate generally a main frame upon which the various parts of my machine are mounted. The frame A comprises a plurality of frame members 10 and 12 and a platform 14.

Secured to the main frame A, one on either side thereof, are caterpillar frame members 16 in which are journaled caterpillar sprockets 18. A caterpillar chain 20 extends around the sprockets 18 on either side of the frame A and is provided with caterpillar tread members 22. The rear sprockets 18 are secured to a drive shaft 24 extending from one side of the machine to the other.

The caterpillar devices just described are of any conventional type found suitable. The machine can be steered by any suitable braking or clutching mechanism (not shown) in the manner that caterpillar mounted devices are usually steered. Such steering can be operated by the usual type of double handle steering control 26.

On the platform 14 I mount a motor 28 of a horse power sufficient to operate the various parts of my improved machine. The motor 28 may be provided with a transmission mechanism 30, controllable by a clutch lever 32. A bevel pinion 34 is secured to a shaft extending from the transmission 30 and is used to transmit the power of the motor 28 to the various parts of my machine.

Secured to the platform 14 is a sleeve 36 in which is journaled a shaft 38. Secured to the upper end of the shaft 38 is a bevel gear 40 in mesh with the bevel pinion 34 whereby rotation of the pinion will be transmitted to the shaft 38.

A transmission mechanism 42 is mounted in the main frame A and is operatively connected to the shaft 38 through mitre gears 44. The transmission mechanism 32 contains suitable speed control gears, reversing gears, and clutch mechanism whereby the shaft 24 may be controlled with relation to the shaft 38 for the purpose of advancing the machine through the medium of the caterpillar device. The gear shifting operation within the transmission 42 is controlled by a lever 46 which in turn is controlled by a gear shift lever 48 adjacent the operator's seat 50. This can be accomplished by any remote control mechanism such as a link 52 universally pivoted to the levers 46 and 48 and slidably mounted through a bracket 54 secured to the bottom of the platform 14.

For controlling the stopping and starting of the shaft 24, a clutch within the transmission casing 42 is provided and is controlled by a lever 56 on the outside of the casing. The lever 56 is constrained to move in the direction of the arrow 58 whereby the clutch is maintained in engagement. For operating the clutch lever 56 from the operator's seat 50, a clutch pedal 60 is provided. The pedal 60 is formed on a lever 62 extending down through the platform 14 and pivoted on a bracket 64. A link 66 connects the lower end of the lever 62 to the clutch lever 56. A spring 68 secured to the back of the pedal 60 is normally unhooked from the pedal so that the spring in the clutch can operate to move the clutch pedal rearwardly and maintain the clutch in engagement.

From the construction of the parts just described, it will be obvious that the machine can be controlled as to advancement along a road when moving from one place to another by manipulation of the gear shift lever 48 and the clutch pedal 60 in the same manner that a tractor is controlled.

Pivotally mounted on the sleeve 36 is a bearing 68. An auxiliary frame member 70 substantially U-shaped, is secured to the bearing 68 and extends, as illustrated in Figures 1 and 2 of the drawings, forwardly over the top of the main frame A. It will be obvious that by securing the frame 70 to the bearing 68, it is capable of being swung with relation to the sleeve 36.

For supporting the forward end of the auxiliary frame 70 I provide a track 72. The track 72 is substantially semi-circular as

clearly illustrated in Figure 1 of the drawings. The front portion of the track 72 is secured to and rests on the frame members 12 of the main frame A.

The track 72 is made in three sections. The front section 72^a is secured to the frame members 12 and the two side sections 72^b each have one end hinged as at 74 to the ends of the portion 72^a of the track. The other end of each section 72^b is secured to a supporting bar 76 which is hinged as at 78 to a cross frame member 80 of the main frame A.

It will be obvious from the construction of the track as just described that the portions 72^b can be raised for the purpose of reducing the width of the machine when traveling from one location to another. For supporting the sections 72^b of the track when lowered, a pair of supporting bars 82 are provided on each side of the machine. The bars 82 are adapted to be inserted in sockets 84 formed in the caterpillar frame members 16.

Secured to each side of the auxiliary frame member 70 adjacent the forward end thereof is a U-shaped bracket 86 adapted to receive a flanged roller 88. The rollers 88 are positioned on the frame member 70 so that they register with the track 72 (which is curved on a radius having its center at the axis line of the shaft 38) and are thereby adapted to travel on the track for the purpose of supporting the outer end of the frame member 70.

The frame member 70 may be of any desirable cross sectional shape and in the drawings I have illustrated it as a channel. Another frame member consisting of two channel shaped bars 90 is positioned within the outline of the auxiliary frame 70 as clearly illustrated in Figures 2 and 4 of the drawings. In this manner the second frame is slidably mounted within the auxiliary frame 70 so that the members 70 and 90 together form an extensible frame which is swingably mounted on the sleeve 36.

For extending the frame 90 with relation to the frame 70 and for maintaining it in any desired extended position, I provide a cross member 92 secured to the frame 70 and a cross member 94 secured to the members 90. A threaded rod 96 is in screw threaded engagement with a boss 98 formed on the cross member 94. The rod 96 is provided with a head 100 and an angular portion 102 between which is a reduced portion 104 rotatably mounted in the cross member 92. From the construction of the parts just described, it will be obvious that rotation of the rod 96 by a wrench in engagement with the angular portion 102 will cause the frame members 90 to be extended with respect to the auxiliary frame 70 when the rod is rotated in one direction. Contraction of the frame may be accomplished by rotating the rod in the opposite direction.

Secured to the frame members 90 is an upright frame comprising members 106, 108, and 110. The upright frame just referred to is provided for supporting a cutting mechanism and conveying means hereinafter to be more fully described. The members 108 may be channel shaped in cross section for the purpose of slidably supporting the sprocket supporting bars 112. The bars 112 are provided with bearings 114 in which are mounted lower sprockets 116 and upper sprockets 118. Sprockets 120 are supported on the members 106.

Extending around the sprockets 116, 118, and 120, are chains 122. Supported on the pivot bolts 124 of the chains 122 are conveyor and elevating buckets 126.

Secured to alternate links of the chain 122 are digger teeth 128. The teeth 128 are positioned substantially midway between the pivot bolts 124. The purpose of the construction just referred to is clearly illustrated in Figure 4 of the drawings. As the chain 122 passes around the sprocket 116, the teeth 128 will just scrape the arcuate surface 130 of the ground as illustrated. The edges of the buckets 126 will also just scrape the surface 130 whereby all material lying on the surface 130 will be picked up by the buckets. However, when the chain 122 begins to travel from the sprocket 116 to the sprocket 118, the digger teeth 128 cut the ground down to the surface 132 but the buckets 126 are clear of this surface and do not scrape it. In this manner, it is only the teeth that do the cutting and not the edges of the buckets.

Mounted on the frame members 110 is a cross conveyor 134. The conveyor 134 is provided with an apron 136 extending over the shaft 138 mounted in the bearings 114 and back of the buckets 126 as they pass up over the sprockets 118. It will therefore be obvious that the material in the buckets 126 will be dumped onto the conveyor 134.

Secured to a pair of hopper supporting members 140 attached to the main frame A adjacent the rear portion thereof, is a hopper 142. For conveying the material from the conveyor 134 to the hopper 142 I provide a conveyor 144. The conveyor 144 has its forward end secured to a bracket 146 extending from the frame member 110. The rear end of the conveyor 144 is adapted to rest on a roller 148 and between guide portions 150 formed on a roller supporting bracket 152. The bracket 152 is pivoted as at 154 on the hopper 142.

I will now describe the manner in which the conveyor and cutter chain 122 and the conveyors 134 and 144 are driven from the motor 28.

Secured to the auxiliary frame 70 is a

transmission mechanism 156. Secured to a sleeve 158 extending from the housing of the transmission mechanism 156 is a bevel pinion 160 in mesh with the bevel gear 40. A sprocket 162 is also secured to the sleeve 158.

Another transmission mechanism 164 is mounted on the frame 70 and has secured to a shaft extending therefrom a sprocket 166. The sprockets 162 and 166 are operatively connected by a chain 168. From the construction of the parts just described, it will be obvious that rotation of the pinion 34 will be transmitted to the sprocket 166.

A tubular shaft 170 extends from the forward end of the housing for the transmission mechanism 164 and is controllable by a gear shift lever 172 for shifting the gears within the housing and thereby causing the shaft 170 to rotate at a desired ratio with relation to the sprocket 166. One position of the lever 172 of course is neutral whereby the shaft 170 is not operatively connected to the sprocket 166.

Mounted in a bearing 172′ secured to the left hand frame member 90 is a shaft 174. The shaft 174 is provided with a squared portion adapted to be slidably mounted in the tubular shaft 170 which is provided with a squared opening. The purpose of this construction is so that the frame 90 can be adjusted with relation to the frame 70 and the shaft 174 will still remain in operative connection with the shaft 170.

Mounted in bearings 176 secured to the left hand frame member 106 is a vertical shaft 178. The shaft 178 is operatively connected to the shaft 174 through the medium of mitre gears 180. Secured to the shaft 182 to which the sprockets 120 are attached is a bevel gear 184. A bevel pinion 186 on the upper end of the shaft 178 serves to operatively connect the shaft 182 to the shaft 178.

From the construction of the parts just described it will be obvious that rotation of the shaft 170 will be imparted to the shaft 182 for moving the chains 122, the buckets 126 and the cutter teeth 128. For operating the conveyors 134 and 144 from the bevel gear 184 I provide the following described mechanism.

Mounted in a bearing 188 is a shaft 190 and a bevel pinion 192 secured thereto. The pinion 192 is in mesh with the bevel gear 184 whereby the shaft 190 rotates simultaneously with the shaft 182.

The forward end of the shaft 190 extends through the bearing portions of the cross conveyor supporting brackets 194 and has the conveyor roller 196 secured to it whereby the cross conveyor 134 is operated upon rotation of the shaft 190. The rear end of the shaft 190 is journaled in a bearing 198 secured to the side of the conveyor 144. A bevel pinion 200 on the shaft 190 serves to operatively connect the shaft to a bevel gear 202 to the shaft of which is secured the conveyor roller 204 whereby the conveyor 144 is operated when the shaft 190 is rotated.

From the foregoing description it will be obvious that the material cut by the digger teeth 128 will be picked up by the buckets 126 and dumped on the conveyor 134 from which it will be discharged into the conveyor 144. The material is then discharged from the conveyor 144 into the hopper 142 from which it may be discharged in any suitable manner. In Figure 10 of the drawings I have illustrated a pair of doors 206 and 208 on the hopper 142. The pintle rod of the door 208 has secured thereto a lever 210 connected by a link 212 to a pivot pin 214 on the door 206. In this manner the doors 206 and 208 are connected together whereby they open and close simultaneously.

For holding the doors in closed position I provide a spring actuated catch 216 adapted to engage a projection 218 on the link 212. The catch 216 may be actuated by a chain 220 against the action of its spring for releasing the doors 208 and 206 whereby the weight of the material within the hopper 142 will open the doors as indicated in dotted lines in Figure 10. When it is again desired to close the doors the operator may pull downwardly on the chain 222.

It will be noted that the doors 206 and 208 are located at the rear end of the machine whereby wagons or trucks may be driven adjacent the rear end of the platform 14 for the purpose of receiving a load from the hopper 142.

The purpose of swinging the frames 70 and 90 is so that the cutter teeth may operate on a relatively wide road for the purpose of cutting it down to a desired level. By swinging the cutting mechanism from a position extending laterally from one side of the caterpillar mounted frame A to a position substantially opposite or extending in a laterally opposite direction the cutting mechanism will cut a road equal in width to the diameter of the circle described by the cutting mechanism. By arranging the frame 90 adjustable relative to the frame 70 this diameter can be increased or decreased for cutting a wider or narrower road. For causing swinging movement of the auxiliary frame and the cutting mechanism and for automatically controlling such swinging movement, I provide the following described mechanism.

The track 72 is formed with a rack portion 224 illustrated on the inside of the track. The rack portion 224 may, however, be a separate bevel gear structure secured in any desired manner to the main frame A. Coacting with the rack portion 224 is a pinion 226 secured to a shaft mounted in a bracket 228

attached to the frame 70. A sprocket 230 is secured to the same shaft whereby rotation can be transmitted through the medium of a chain 232 to the pinion 226.

Extending from the transmission mechanism 156 is a shaft 134'. The outer end of the shaft 134' is journaled in a bearing 136' and is provided with a sprocket 138' over which the chain 232 extends. In the manner just described, rotation of the shaft 134' is transmitted to the pinion 226 for the purpose of advancing the pinion along the rack 224 in either direction depending on the direction of rotation of the shaft 134'. When so advanced the frames 70 and 90 and the cutting mechanism together with the buckets and conveyors will be swung about the sleeve 36 as a pivot.

I provide a reversing mechanism in the housing of the transmission mechanism 156 as clearly illustrated in Figure 7 of the drawings. Secured to the sleeve 158 inside the casing is a mitre gear 234. An idler gear 236 which is also a mitre gear is in mesh with the gear 234. A third mitre gear 238 is loosely mounted on a transmission shaft 240. A jaw clutch member 242 is slidably but non-rotatably mounted on the transmission shaft 240 and is adapted to move between the mitre gears 234 and 238. The mitre gears 234 and 238 are provided with clutch jaws adapted to coact with the clutch member 242. The shaft 240 is operatively connected to the shaft 134' through suitable gear mechanism controllable by a gear shift lever 244.

For moving the jaw clutch member 242 to engage the clutch members on either the gear 234 or the gear 238 I provide a yoke 246 secured to a rock shaft 248. The rock shaft 248 is journaled in the casing 156 and has secured to its ends an upwardly projecting arm 250 and a downwardly project ing arm 252. The arms 250 and 252 are adapted to operatively engage projections 254 and 256 extending up from the platform 14. Engagement between the arms and the projections as just described occurs only when the auxiliary frame is swung to its laterally extending positions with relation to the main frame A as illustrated in the dotted line positions of Figure 5.

From the construction of the parts just described, it will be obvious that when the frame supporting the cutting mechanism is swung to either of the laterally extending positions the projections 254 or 256 as the case may be will engage its corresponding arm on the shaft 248 and thereby cause reversal of the transmission mechanism 156, the shaft 134' and consequently the pinion 226 for automatically reversing the swinging movement of the frame supporting the cutting mechanism. The frame therefore in operation will swing from one side of the machine to the other, cutting the ground or bank as it swings.

For positively maintaining the clutch member 242 in engagement with the clutch jaws of the mitre gears 234 or 238 I provide a point-like projection 258 secured to the shaft 248. A roller 260 mounted on a pivoted arm 262 is maintained in resilient engagement with the projection 258 by a spring 264. This construction causes the roller 260 to constrain the arm or projection 258 in either an upward or downward direction depending on which side of the point of the projection the roller 260 is positioned. As soon as the clutch member 242 is moved to an intermediate position the spring 264 causes the shaft 248 to continue to rotate and throw the clutch member 242 into a position just reversed from the position which it has previously been in. This occurs whenever one of the arms 250 or 252 strikes its corresponding projection 254 or 256.

In a machine of this character, it is desirable to continuously intermittently advance the entire machine along the road surface being worked on and in the embodiment of my invention as illustrated I have provided for intermittent advancement of the machine. It is desirable that such advancement occur when the cutting mechanism is extending laterally from either side of the machine so that the cutting mechanism is not advanced directly into the material being cut. In other words the cutting mechanism can be advanced while in laterally extending position in which position it is moved sideways instead of forward as would be the case if the machine was advanced when the cutting mechanism is in position extending directly forward. For accomplishing advancement of the machine intermittently and automatically I provide the following described mechanism.

When my machine is used in digging, the spring 68 is hooked onto the foot pedal 60 whereby it maintains the clutch within the casing 42 out of engagement. To accomplish this purpose, of course, the spring 68 must be stronger than the clutch spring in the clutch which controls the shaft 24.

It will now be obvious that for advancing the machine intermittently, it is merely necessary to move the clutch pedal 60 toward the rear end of the machine the same as when in transferring the machine from one location to another the operator releases the pedal 60 by removing his foot therefrom.

Mounted in bearings on the under surface of the platform 14 is a rock shaft 266 having on each end thereof a lever 268. The levers 268 are positioned on each side of the platform 14 and are provided with rollers 270 rotatably mounted on their free ends. The rock shaft 266 has secured thereto intermediate its length a lever 272. The lever

272 is operatively connected to the lever 62 by a link 274. From the description just made it will be obvious that depression of the rollers 270 will cause the lever 62 to be moved against the action of the spring 68 for causing operation of the clutch controlling the rotation of the shaft 24 and consequently the advancement of the machine.

For depressing the rollers 270 I provide a pair of shoes 276 one mounted on each side of the frame 70. The shoes 276 are provided with tapered leading portions 278 and are slidably mounted by means of bolt and slot connections with the frame 70. One of the leading edges 278 is adapted to depress one of the rollers 270 when the swinging frame is in position extending laterally as illustrated in Figure 5 of the drawings. For regulating the amount of time that the rollers 270 are depressed the shoes 276 can be longitudinally adjusted whereby they will engage the rollers 270 a certain length of time before the mechanism illustrated in Figure 7 is actuated for reversal. This arrangement causes the clutch lever 56 to be moved to operative position a longer or shorter length of time depending on how far it is desired to advance the entire machine at the end of each swinging movement of the cutting mechanism.

In a machine of the character described, it is desirable to provide a roller device for the purpose of packing the ground which has been cut so that it is in smooth condition either for traffic or for laying a pavement on the road which has been cut. In the construction of my machine I provide a pair of such rollers 280. The rollers 280 are journaled in brackets 282 secured to the side members 90 of the swinging frame. The brackets 282 are secured thereto by means of slot and bolt connections 284 whereby the brackets are free for slight up and down movement with relation to the swinging frame. The bolt connections 284 are made to brackets 286 secured to the lower edge of the members 90 as clearly illustrated in Figure 12.

It will be obvious that the swinging of the frame itself will cause the rollers 280 to rotate over the ground which has been cut and thereby pack it but I prefer to operatively connect the rollers 280 with the motor 28 whereby the rollers can assist in swinging the frame or even be relied on entirely without the use of the pinion 226. In so connecting the rollers to the motor it is desirable to have them reversibly connected and I therefore transmit motion to them from the shaft 134 which is already reversibly arranged. This mode of connection is provided for by a shaft 288 journaled in a bracket 290 on the right hand frame member 90 and connected by means of a chain 292 to the shaft 134'. The shaft 288, of course, must be extensibly arranged so that the frame 90 may be adjusted with relation to the frame 70 without affecting the operation of the rollers 280.

On the shaft 288 I provide a sprocket 294 for driving a chain 296. The chain 296 extends over an idler 298, over the idlers 300 and around the sprockets 302 secured to the rollers. In this manner it will be obvious that the rollers 280 are rotated in the proper direction whenever the pinion 226 is rotated for swinging the frame which carries the cutting and conveying mechanisms.

In operation bits of material will be dropped from the cutting teeth 128 and from the buckets 126 and these will be pressed into the ground by the rollers 280. However, this is undesirable and I provide between the rollers 280 and the buckets 126 a pair of augers 304. The augers 304 are designed to rotate for the purpose of picking up such material and conveying it forwardly and out of the path of travel of the rollers. The augers 304 are journaled in extensions formed on the brackets 282.

It will be obvious that if the augers 304 were caused to rotate in reversed direction as the rollers 280 do, they would pull the material dropped backward which is also undesirable. I provide against such a contingency by providing ratchet mechanisms 306 in the hubs of the sprockets 308 which are driven by the chain 296. The sprockets 308 are loosely mounted on the auger shafts 310. In Figure 14 I have illustrated the hub of the right hand sprocket 308 showing the sprocket travelling in the direction of the arrow 312 whereby the right hand auger 304 is operated. The left hand auger 304 would in this event be inoperative due to the ratchet connection 306 between the hub of the left hand sprocket 308 and the shaft 310 of the left hand auger 304. The left hand roller 280 in this case is retravelling over the ground which it has just covered and does not therefore require an auger to clear the ground in front of it.

In using my road repairing machine, it is sometimes desirable to cut the road upon the level and sometimes on a grade. Such grade can be indicated by a plumb lever 314 illustrated in Figure 2 of the drawings. A scale 316 is used in conjunction with the lever 314 for indicating the grade on which the machine is travelling at any time.

For changing from the level to some incline to be cut or for changing from one incline to another, it is merely necessary to lower the frame members 112 whereby the sprockets 116 are lowered and the teeth 128 will cut deeper. This operation is for changing from the level to a down hill grade and by raising the sprockets 116, a change to an up hill grade can be made.

For accomplishing the result just outlined,

I provide racks 318 secured to the members 112 and projecting through slots 320 in the frame members 108. A shaft 322 is journaled in bearings secured to the frame member 108 and has secured thereto pinions 324 adapted to coact with the racks 318 and move them upon rotation of the shaft. For rotating the shaft 322 I provide a worm gear 326 mounted on a shaft 328. For rotating the shaft 328 I provide a ratchet wheel 330 which is adapted to be actuated in either direction by the reversible pawl 332. The pawl 332 is pivoted on an oscillatably mounted bell crank lever 334. The lever 334 can be oscillated by a rod 336 slidably mounted in a bracket 338 and adapted to engage a cam block 340 secured to the track 72. In this manner the lever 334 will be oscillated each time the swinging frame is swung in either direction. A spring 342 is used to return the rod 336 after it has been actuated by the cam block 340. A stop pin 334' projects from the frame member 106 and limits the oscillation of the lever 334 in the direction it is constrained to move, due to the action of the spring 342. The rod 336 is extensible by means of a turn buckle 344 or the like whereby the lower end of the rod engages more or less of the peak of the cam block 340 and the lever 334 upon oscillation may thus be made to rotate the ratchet wheel 330 any desired number of teeth.

The rear end of the shaft 328 is journaled in a bearing 346 secured to the frame 70 and the shaft 328 is extensible whereby the operation thereof is not effected by adjustment of the extensible swinging frame.

In Figure 15 I have shown a modification consisting of rollers 358 adapted to replace the rollers 280. The rollers 358 are journaled in bearings on a framework consisting of a supporting member 360 and a swivel mounted member 362 whereby the axis of one of the rollers can be changed with relation to the axis of the other roller for the purpose of causing the rollers to travel in any desired radius. The adjustment of the axes just referred to is accomplished by a worm 364 journaled in the member 360 and adapted to coact with a worm gear sector 366 formed on the member 362. A crank 368 is utilized for rotating the worm 364.

The member 360 is provided with a downwardly projecting pintle 370 adapted to be slidably received through an opening in a bar 372. The bar 372 is secured to the members 90 of the swinging frame whereby rotation of the rollers 358 will cause the frame to swing.

The rollers 358 are adapted to be driven by a source of power independent of the motor 28. This source of power is a motor 374 mounted on the member 360 and provided with suitable transmission mechanism indicated by the reference numeral 376. The speed of this mechanism and consequently the swinging of the frame can be controlled by a gear shift lever 378. A suitable reversing mechanism indicated generally by the reference numeral 380 is provided for reversibly transmitting motion to the rollers 358. The mechanism just referred to is controlled by a clutch 382 which is actuated by a shaft 384. The shaft 384 can be connected through suitable link and bell crank connections to the rock shaft 248.

The reversing mechanism 380 actuates a bevel pinion 386 which is in mesh with a bevel gear 388 formed on one of the rollers 358. In this manner the entire assembly illustrated in Figure 15 is driven in either direction, which direction can be controlled automatically the same as the swinging of the frame carrying the cutting mechanism hereinbefore described. The augers 304 are also used in conjunction with the rollers 358 and are journaled in extensions 390 formed on the members 360 and 362. The augers 304 are operatively connected to the rollers 358 by bevel gears 392, 394, and 396. It may here be mentioned that the right hand roller 358 is also provided with a bevel gear 388 for the purpose of actuating the right hand bevel gear 392. The hubs of the bevel gears 396 are provided with the ratchet devices illustrated in Figure 14 whereby the augers will rotate as desired and as hereinbefore described.

In Figure 16 I have illustrated a modified form of cutting and conveying mechanism consisting in a rotating drum 398 provided with cutting teeth 400. The drum 398 can be driven from a shaft 402 through the medium of a chain 404. For collecting the material cut by the cutters 400 I provide a conveyor 406 having its front end supported on brackets 408 extending from the frame members 108.

The cutting and conveying mechanism just described is used when only a shallow cut is to be made and where it is not desirable to carry the complete cutting chain 122 and its buckets and cutter teeth. The conveyor 406 when used in this manner conveys the material from the cutter wheel 398 into the hopper 142 or discharges it elsewhere if desired. The buckets 126 are used when a deep cut is to be made and when the cutting mechanism is swung to position extending laterally from the machine it will cut the sides of the road on a slant as illustrated in Figure 2 of the drawings.

Referring to Figure 11, I have illustrated a chute 348 secured to one side of the hopper 142. The hopper 142 is provided with openings 350 in each of its sides which are normally covered by plates 352. The plates 352 can be removed so that a chute 348 can be secured to each side of the hopper. Each

chute is provided with a flange 354 adapted to be bolted against the hopper around one of the openings 350. Suitable brace rods 356 are provided for supporting the outer ends of the chutes 348.

The purpose of using the chutes 348 is to discharge the contents of the hopper 142 at the side of the road instead of through the doors 208 and 206. This is desirable when the machine is used for merely cutting off a small portion of the surface of the road and discharging it to the sides of the road.

Practical operation.

In the practical operation of my improved road preparing machine the device can be moved from one location to another by means of the power of the motor 28. When so moving the frame members 82 are withdrawn from the sockets 84 and the track portions 72^b are swung on their hinges 74 and 78 and secured in any convenient manner in an upright position so as to reduce the width of the machine to the extreme width of the caterpillar tread device 22. When so adjusted, the machine can be driven onto a freight car if desired and will not extend over the sides thereof.

For imparting motion to the caterpillar sprockets 18 the spring 68 is unhooked whereby the spring actuated clutch 56 is normally operative. The gear shift lever 48 should be in neutral position so that the motor 28 can be started. The motor 28 can then be operatively connected to the shaft 38 by the clutch lever 32 whereby it operates the transmission mechanism 42. The clutch pedal 60 can be pressed forwardly for disengaging the clutch within the transmission mechanism whereby the lever 48 can be moved to position for any desired speed of the caterpillar sprockets 18. The machine can then be advanced by releasing the foot pedal 60 the same as in operating a tractor. Steering is accomplished by manipulation of the steering bar 26.

When it is desired to operate the cutting mechanism, the gear shift lever 172 can be moved from neutral to position for any desired speed of the chain 122. For causing swinging movement of the cutting mechanism, the gear shift lever 244 can be moved from neutral to position for any desired speed of the shaft 134. The swinging frame carrying the cutting mechanism will immediately start operating and will be automatically reversed by the levers 250 and 252 alternately striking the projections 254 and 256 whereby the reversing mechanism in the transmission mechanism 156 can be automatically operated.

For intermittently causing the entire machine to be advanced when the cutting mechanism is swung to either of the lateral positions illustrated in dotted lines in Figure 5, the spring 68 is hooked to the pedal 60 thereby depressing it to cause the clutch within the casing 42 to be inoperative. The gear shift lever 48 is then moved to position for any desired speed ratio within the transmission casing 42. As the cutting mechanism swings, the shoes 276 will alternately engage the rollers 270 for rocking the shaft 266 and causing the clutch 256 to be moved for a short time to operative position. The length of this time can be regulated by longitudinal adjustment of the shoes 276 with relation to the frame members 70.

Some changes may be made in the construction and arrangement of the various parts of my invention, without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. A road preparing machine comprising a main frame, a movable frame having one end pivoted to the main frame, cutting means on the free end of said movable frame, means for swinging said movable frame with respect to the main frame from a position extending laterally from one side of the main frame to a position extending laterally from the opposite side of the main frame, said means comprising reversible gearing carried by the movable frame, said movable frame being extensible whereby the width of swath cut by said cutting means as it swings from side to side of the main frame can be varied and means for advancing the main frame while the movable frame is in said laterally extending positions, said last means comprising a clutch operated momentarily by the movable frame while in said laterally extending positions.

2. A road preparing machine comprising a main frame, means for intermittently advancing said main frame, a movable frame having one end pivoted to the wheeled frame, cutting means, packing rollers and augurs mounted on the free end of said movable frame, said augurs serving to remove particles of dirt from in front of the packing rollers as they advance, and means for swinging said movable frame through substantially a half circle.

3. A road preparing machine comprising a main frame, means for advancing said main frame, a movable frame having one end pivoted to the main frame, cutting means on the free end of said movable frame, means for swinging said movable frame through substantially a half circle whereby said cutting means will cut a swath equal to the diameter of the circle through which it swings, and means, operable by the

movable frame as it swings, for operating said advancing means intermittently.

4. A road preparing machine comprising a main frame, means for advancing said main frame, a movable frame having one end pivoted to the main frame, cutting means on the free end of said movable frame, means for swinging said movable frame through substantially a half circle whereby said cutting means will cut a swath equal to the diameter of the circle through which it swings, means, operable by the movable frame as it swings, for operating said advancing means intermittently, a hopper mounted on said main frame and a conveyor associated with said cutting means for conveying the material cut thereby to said hopper.

5. A road preparing machine comprising a main frame, a movable frame having one end pivoted to the main frame, cutting means on the free end of said movable frame, means for swinging said movable frame with respect to the main frame whereby to cut a swath wider than the width of the cutting means, packing rollers secured to the outer end of said movable frame and adapted to move therewith, and augur devices positioned between the packing rollers and the cutting means whereby material dropped from the cutting means will be moved out of the path of said packing rollers.

6. A machine of the character described comprising a main frame, a hopper supported thereon, a movable frame pivoted thereto and capable of swinging through an arc of substantially half a circle, cutting mechanism on the free end of said movable frame, packing rollers secured to the outer end of said movable frame and adapted to move therewith, augur devices positioned between the packing rollers and the cutting means whereby material dropped from the cutting means will be moved out of the path of said packing rollers, conveying means associated with said cutting mechanism for elevating the material cut thereby and conveying it to said hopper, means for discharging said material from said hopper, a prime mover on said main frame, means for operatively connecting said cutting mechanism and said conveying means to said prime mover, reversible means for operatively connecting said movable frame to said prime mover whereby to swing said movable frame with respect to said main frame, and means for operatively connecting the main frame to said prime mover whereby the main frame may be advanced.

7. A machine of the character described comprising a main frame, a hopper supported thereon, a movable frame pivoted thereto and capable of swinging through an arc of substantially half a circle, cutting mechanism on the free end of said movable frame, conveying means associated therewith for elevating the material cut by said cutting mechanism and conveying it to said hopper, a packer roller connected to said movable frame adjacent said cutting mechanism, means for discharging said material from said hopper, a prime mover on said wheeled frame, means for operatively connecting said cutting mechanism and said conveying means to said prime mover, reversible means for operatively connecting said movable frame and said packer roller to said prime mover whereby to swing said movable frame with respect to said main frame and means for operatively connecting the wheeled frame to said prime mover whereby the main frame may be advanced.

8. A machine of the character described comprising a main frame, a hopper supported thereon, a movable frame pivoted thereto, and capable of swinging through an arc of substantially half a circle, cutting mechanism on the free end of said movable frame, conveying means associated therewith for elevating the material cut by said cutting mechanism and conveying it to said hopper, means for discharging said material from said hopper, a prime mover on said main frame, means for operatively connecting said cutting mechanism and said conveying means to said prime mover, reversible means for operatively connecting said movable frame to said prime mover whereby to swing said movable frame with respect to said main frame, means for operatively connecting the main frame to said prime mover whereby the main frame may be advanced intermittently, mechanism associated with said main frame and the prime mover and adapted to be actuated by the movable frame as it swings to a predetermined position for causing such advancement of the wheeled frame.

9. A machine of the character described comprising a main frame, a hopper supported thereon, a movable frame pivoted thereto and capable of swinging through an arc of substantially half a circle, cutting mechanism on the free end of said movable frame, conveying means associated therewith for elevating the material cut by said cutting mechanism and conveying it to said hopper, a packer roller connected to said movable frame adjacent said cutting mechanism, means for discharging said material from said hopper, a prime mover on said main frame, means for operatively connecting said cutting mechanism and said conveying means to said prime mover, reversible means for operatively connecting said movable frame and said packer roller to said prime mover whereby to swing said movable frame with respect to said main frame, means for operatively connecting the main

frame to said prime mover whereby the wheeled frame may be advanced intermittently, mechanism associated with said main frame and the prime mover and adapted to be actuated by the movable frame as it swings to a predetermined position for causing such advancement of the main frame.

10. A machine of the character described comprising a main frame, a hopper supported thereon, a movable frame pivoted thereto and capable of swinging through an arc of substantially half a circle, cutting mechanism on the free end of said movable frame, conveying means associated therewith for elevating the material cut by said cutting mechanism and conveying it to said hopper, a roller connected to said movable frame adjacent said cutting mechanism, means for discharging said material from said hopper, a prime mover on said main frame, means for operatively connecting said cutting mechanism and said conveying means to said prime mover, reversible means for operatively connecting said movable frame and said roller to said prime mover whereby to swing said movable frame with respect to said main frame, means operated by the swinging of said movable frame for causing reversal of said reversible means, and means for operatively connecting the main frame to said prime mover whereby the main frame may be advanced.

11. A machine of the character described comprising a main frame, a hopper supported thereon, a movable frame pivoted thereto and capable of swinging through an arc of substantially half a circle, cutting mechanism on the free end of said movable frame, conveying means associated therewith for elevating the material cut by said cutting mechanism and conveying it to said hopper, rollers connected to said movable frame adjacent said cutting mechanism, reversible means associated therewith for rotating said rollers in either direction, means for discharging said material from said hopper, a prime mover on said main frame, means for operatively connecting said cutting mechanism and said conveying means to said prime mover, reversible means for operatively connecting said movable frame and said rollers to said prime mover whereby to swing said movable frame with respect to said main frame, means operated by the swinging of said movable frame for causing reversal of said reversible means for the movable frame and the reversible means associated with the rollers and means for operatively connecting the main frame to said prime mover whereby the main frame may be advanced.

12. In a road preparing machine, a frame, sprockets mounted thereon, chains on said sprockets, cutter teeth and conveyor buckets attached to said chain packer rollers connected to said frame and positioned on either side thereof, means for rotating said sprockets and said rollers, said means being reversibly connected to the rollers, augur devices mounted between said rollers and said buckets for moving material dropped from said buckets out of the path of travel of said rollers, means for rotating said augur devices, whereby one of them is rotated when the rollers rotate in one direction and the other one rotates when the rollers rotate in the other direction.

13. In a machine of the character described, a main frame, an arc shaped track thereon, a movable frame pivoted to said main frame, rollers on said movable frame adapted to travel on said track and thereby support the movable frame, portions of said track being hinged whereby said portions may be raised for reducing the overall width of the machine for transportation purposes.

14. A road preparing machine comprising a main frame, a movable frame having one end pivoted to the main frame, a supporting frame mounted for substantially vertical adjustment on said movable frame, cutting means on said supporting frame, means for periodically swinging said movable and supporting frames with respect to the main frame, and means associated with said movable and supporting frames for intermittently causing adjustment of said supporting frame whereby the cutting means will be advanced vertically, said last means being actuated by engagement with said main frame as the movable frame moves periodically.

15. A machine of the character disclosed comprising a main frame, a movable frame mounted thereon, cutting means, packing rollers and augurs on the free end of said movable frame, said augurs serving to remove particles of dirt from in front of the packing rollers.

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