To all whom it may concern:

Be it known that I, MELVIN MITCHELL, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Road Shaping and Finishing Machines, of which the following is a specification.

This invention has reference to a road shaping and finishing machine, and has for its object the production of a machine which is adapted to simultaneously scrape the surface of the road on the opposite sides of the crown, and between the crown of the road and the ditches alongside thereof, removing the humps and delivering the dirt obtained therefrom into the hollows and toward the crown of the road, and then compressing or making the crown compact, by passing over the crown a roller traveling in the wake of the scraping device.

The invention has for a further object to construct a machine of the character referred to, which may be used to scrape both sides of the road alike, throwing the dirt toward the center, and roll the crown to make it compact; or should one or both ditches need deepening or cleaning out, said scraping devices may be arranged to dig into or clean out such ditches, bringing the dirt toward the center or crown of the road, and the crown of the road packed solidly by the roller traveling in the wake of the scraping devices.

The invention has for a further object to provide a road shaping and finishing machine, not only capable of working across the full width of the road at one operation, whereby both sides of the road are simultaneously scraped, and the crown of the road compressed by the action of the roller, but also to provide a machine which is adjustable to the various widths of roads, and wherein the operative and supporting parts are foldable, so that the machine will pass over or through the very narrowest road bridges now in use.

The invention has a further object to provide a road scraping and finishing machine, having a pair of scraping devices, making it possible to scrape both sides of the road at once, throwing the dirt toward the center or crown of the road, thereby shaping and smoothing the road; and simultaneously with such action, compressing and packing the crown by means of a roller, said roller being preferably concave so as to leave the crown of the road convex and sloping to the ditches on either side thereof.

A still further object of the invention, is generally to improve upon the class of machines for shaping and finishing roads, so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

Figure 1 is a plan view on a greatly reduced scale, of my road shaping and finishing machine, the parts being in folded relation, for transportation; the dotted lines showing the scraping devices moved out wardly in operative position;

Fig. 2 is a side view of the machine, the parts being in the same position shown in Fig. 1; the scraping devices, however, being shown provided with a mold-board attachment and shares, for use in digging out the ditches alongside a road, and the dotted lines showing how the scraping devices may be adjusted so as to dig the nose of the scraping devices down into the ditches;

Fig. 3 is a rear end view of the machine;

Fig. 4 is a cross-section, as the same would appear taken on the line 4—4 of Fig. 2, looking toward the rear of the machine;

Fig. 5 is a sectional detail, as the same would appear, if taken on the line 5—5 of Fig. 2;

Fig. 6 is a sectional detail, as the same would appear, if taken on the line 6—6 of Fig. 2, and

Fig. 7 is a detail of certain ratchet locking features on the machine.

Like characters of reference denote corresponding parts throughout the figures.

I wish it understood that my machine is in no sense a “grading” machine, but on the other hand is designed for use after the road has been gone over with a “grading” machine, or when the road needs leveling, or shaping up, and at times when it gets rutty or the ditches are filling up. The
usual "grading" machine is moved, first, up and down one side of the road, cutting a ditch and throwing the dirt up toward the center of the road, and then, up and down the opposite side of the road. With the use of my machine, the road may be shaped and finished, after "grading," the sides being leveled and the crown packed solid with a proper arch. If the ditch needs opening up or cleaning, it may be done with my machine, and one or both sides of the road may be worked at a time, as may be desired, the machine being capable of considerable adjustment and of performing work not heretofore possible with machines of this character.

The machine, as I prefer to construct the same, includes a main frame composed of the outside side-rails or channel-beams 8, 8, connected at the rear ends by the pair of spaced transverse angle-iron bars or beams 9, 9, and at their front ends by the pair of spaced curved angle-iron bars or beams 10, 10. An inner supplemental frame is disposed in this main frame, this inner supplemental frame including the spaced longitudinal and parallel channel bars or beams 11. These bars or beams lie in the same plane and are parallel with the bars or beams 8, but are much longer than said bars or beams 8, being secured together at or near their rear ends by the cross-pieces 11a, and extending from the bars or beams 9, forwardly to a suitable point in advance of the bars or beams 10, where they are joined or braced by the pair of spaced angle-iron bars or beams 12, 12. It is to be noted that the members 11, 11a and 12 are a supplemental inner frame which is mounted between the spaced end members 9 and 10 of the main frame, the two frames being movable relative to each other, such movement being provided for by means of mechanism hereinafter to be described.

The roller is supported by what I term the main frame, and the movement of the main frame relative to the supplemental frame, moves the roller correspondingly so as to provide means for guiding and steering the machine.

18 designates a reach, which is of considerable length, the same being preferably a channel-bar which passes between the bars or beams 9 and 10, lying approximately centrally between the bars or beams 8, and when the machine is in its normal or closed position, as shown in Fig. 1, said reach 18 extends from the bars or beams 9, forwardly to a point considerably in advance of the bars or beams 10, where provision is made to attach the same, in a suitable manner, to a traction engine or other suitable means, for moving the machine over the road to be shaped and finished, or for moving the same from place to place. Any available means may be used for preventing said reach bar from moving sidewise relative to the inner supplemental frame; that is, between the transverse bars or members 11a and 12.

The reach 18 on its upper face, at its forward end is provided with a rack bar 14. This rack bar begins at a point removed just beyond the forward or extreme end of the reach and extends back onto the reach for a suitable distance. In mesh with the rack bar 14, is gear wheel 15 and said gear wheel is connected on a short shaft 16 journaled in a bearing on a movable or slidable member or sleeve 17, on the reach 18. Connected to and forming a part of the gear-wheel 15, is a bevel gear wheel 18, and in mesh with said bevel gear wheel 18 is a similar bevel gear wheel 19 carried on the forward end of a shaft 20. This shaft 20 extends back and across the bars or beams 10, above the same, passing through a bearing member 21, and on the inner end of the shaft 20, is a hand wheel 22 positioned close to an operator's seat 23 supported upon or from the reach 18, so that the operator may manipulate the hand-wheel 22, for purposes to be explained. The forward end of the shaft 20 is so journaled on the slidable member or sleeve 17, that it will adapt itself to the movement of said member or sleeve on the reach 18.

The scraping members or scraping devices of the machine include the two channel-bars or beams 24, 24, each of which are of considerable length and are pivotally connected to machine parts at or near the rear end of the machine so that their front ends may be swung outwardly or inwardly, as may be desired. To the rear ends of the scraper bars or beams 24 are connected brackets 25, and said brackets have the bearing sleeves 26 provided with the vertically disposed openings 27, which taper from an oblong opening, at the top of the sleeves 26, see Fig. 6, to a round smaller opening at the bottom of the sleeves. These sleeves 26 encircle sustaining rods 28, which pass through said sleeves, being secured at their lower ends in braces 29, hung or depending from the bars or beams 11, and passing up through bearings 30, secured to the inner faces of said bars or beams 11, extend up to a suitable point above the machine frame.

The bearing member 21 through which the rear end of the shaft 20 passes, is secured to the rods 28.

The sleeves 26 are each provided with the slotted piece 31 and to said slotted pieces 31 are connected link rods 32, having a pivotal connection with an arm 33, of levers 34, positioned close to the seat 23, within easy reach of the operator and pivoted to the supplemental frame. Each lever 34 is associ-
ated with a toothed member 35, or other part, with the use of which the levers 34 may be locked in adjusted positions.

Connected with the scraper bars or beams 24, at a suitable point, are reach arms 36 and said arms at their upper or outer ends are pivotally connected at 37 with the sliding sleeve 17, and are used, as will be explained, for moving the outer ends of the scraping bars out and in, as may be desired. At the point where the reach arms 36 are connected to the scraper bars 24, is provided a pulley or sheave wheel 38, and around said pulleys or sheave wheels pass ropes or cables 39, one end of each of said cables being fast to a crane 40, and the other end passing over a sheave wheel 41 positioned at the outer end of each crane, and thence under a sheave wheel 42 carried at or near the inner end of each crane, and across the face of a sheave wheel 43 carried by the rode 28 and around a drum 44 on the lower ends of vertically disposed shafts 45. It is to be noted that the cranes 40 are positioned so to extend above and partially parallel to the scraping blades 24, in all adjusted positions thereof, it being understood that the cranes swing with the scraping blades so that they may be raised readily and with facility in any position of angular adjustment.

Further, it is seen that the scraping members 24 and the cranes 40 are both pivotally supported at their rear ends and at points in substantially the same vertical plane. These shafts 45 are suitably supported by and extend up from the bars or beams 11, close to the operator's seat 29 to enable him to operate either of the cranes 40 by means of the hand wheels 46 on the upper ends of said shafts 45. Winding the ropes or cables 39 on the drums 44 will raise the outer ends of the scraping bars 24 and by unwinding said ropes or cables from the drums the scraping bars will be allowed to lower. The shafts 45 are locked, so as to maintain the scraping bars in adjusted positions, by means of the toothed wheels 47, see Fig. 1, and ratchet members 48, which the operator may regulate with his feet.

The cranes 30 each comprise a pair of angle-iron bars or beams 49, see Fig. 1, which at their lower ends are connected to the bearings 30, and at their outer ends are joined at the point where the sheave wheels 41 are journaled therebetween. To support the cranes in the position shown, a guy-wire or stay 50 is attached to the outer end of each crane. They extend back and are connected to the upper ends of rods 28 and tied to the outside rear corners of the supplemental inner frame, or to the angle iron bar 11.

51 designates a roller, of suitable length, and diameter, and made in any suitable manner to give it the necessary weight to pack the dirt over which it travels. This roller I prefer to be concave, that is to say, of less diameter at the middle than at its opposite ends, and sloping toward said ends. With the use of such a roller, the crown of the road is not only packed solidly but is shaped so that it tapers at a proper degree, to the ditches at the side of the road. This roller is carried on a shaft 52 and said shaft is journaled at its opposite ends in bearings 53 supported by frames 54 secured to and depending from the bars or beams 8.

The roller 51 is removed a short distance to the rear ends of the scraper bars 24 and travels in the wake of said bars, and positioned between the rear ends of said scraper bars and said roller 51 are short scraping blades 55. These blades are very close together, or meet, at their inner edges, centrally of the machine, and diverge rearwardly and outwardly. The rear ends of the scraping bars 24, when said bars are in scraping position, are close together and the bodies of each, diverge from each other, in manner seen in dotted lines in Fig. 1. The blades 55 are supported from the braces 29.

The scraping bars 24 when out, force the loose dirt on each side of the road to the center of the road or onto the crown, possibly leaving a loose ridge, and it is the function of the blades 55 to spread this dirt, so that a smooth crown may be made with the finishing work of the roller 51, passing over the same.

To each scraping bar or beam may be attached a mold board 56 and a share 57. The mold board and share may be of any desired construction or formation, and are intended for use, when desired to dig or clean out the ditches alongside of the road. In dotted lines in Fig. 2, the scraping bars are shown elevated at their rear ends, dipping their forward ends, with the nose of the bars in position to dig or clean out the ditches; and the mold boards so shaped as to carry or direct the loose dirt or material up on the side slope of the road. These mold boards and shares are detachable and may be used on both scraping devices, at the same time or not, as the occasion requires.

On the face of the upper curved bar or beam 10 of the main frame is suitably arranged a rack-bar 58, and meshing with said rack bar is a gear-wheel 59, said gear-wheel 59 being carried on the lower end of an upwardly disposed shaft 60, which is provided, at its upper end, with a hand-wheel 61, for operating said shaft. This shaft may be suitably supported or journaled on the supplemental frame of the machine and the same being locked with the use of devices, such as shown, in Fig. 7.

The main frame, comprising the parts 8, 9 and 10, and the supplemental frame comprising the parts 11, 11a and 12, are pivot-
ally arranged relative to each other, in a manner, which I will now explain, so that when turning a corner, the operator may swing the roller 51 to assist in turning the machine, which, as will be understood, is rather long. On one side of the reach bar or beam 13, and at its rear end, is arranged a rack-bar 62 of a desirable length, and meshing with said rack-bar 62, is a gear wheel 63, said gear wheel being carried on the lower end of an upward standing shaft 64, having an operator’s wheel 65, for operating said shaft. This shaft may be supported in bearings in any suitable manner, and has associated therewith locking parts such as shown in Fig. 7, or other equivalent devices. The gear wheel 63 is mounted in the member 64 which is pivoted to the main frame at 64a, the reach bar being slidable therein.

As is understood, the reach bar 13 is slidable between the bars or beams 11 and 12 and is held against lateral movement relative to the supplemental frame. It is also pivotally connected to the main frame by means of the pivot 64b so that if it is desired to oscillate the main frame relative to the supplemental frame, the operator by actuating the hand wheel 61 after first releasing the locking parts, and on account of the engagement of the gear wheel 59 with the rack 58, will cause the main frame to swing about said pivotal connections 64a, so as to steer the machine.

To move the scraping bars outwardly, the operator will revolve the hand-wheel 22 so as to cause the gear wheel 18 to travel rearwardly on the rack-bar 14, which will cause the reach bars 26 to force the scraping bars outwardly, into positions similar to that shown in dotted lines, in Fig. 1. To obviate the necessity of making the reach 13 too long, to obtain the necessary swing of the reaches 36 when the scraping bars have been moved outwardly as far as may be possible with the use of gear wheel 18 and rack-bar 14, the shaft 64 is operated to move the frame along the reach 13. This will cause the rods 28, connected with the rear ends of the scraping bars 24, to force the rear ends of said bars forwardly and change or regulate the angularity of said scraping bars 24. When the parts are in folded position, they appear, as in Fig. 1.

To tilt the scraping bars, into the position shown in dotted lines, in Fig. 2, the operator will move the levers 34, and thereby position the forward ends of said bars to dig into the ditch at whatever depth desirable.

Shaping the openings in the sleeves 27, as has been explained, will allow for such swinging movement of the scraping bars as may be necessary, whether it is to move the scraping bars 24, or to raise or lower the front ends thereof. The oblong opening in 65 the sleeves 27, such as shown in Fig. 6, while allowing the scraping bars 24 to be raised and lowered at their rear ends to position their forward ends for ditch work, will prevent vertical motion or canting of the 70 scraping bars 24.

The shaft 20 is an extensible shaft, having a telescopic relation with a sleeve 67. The connection between the parts of the shaft 20 and sleeve 67, may be in the manner shown in Fig. 5, by squaring the opening in the sleeve, or by making a spline and groove connection between the parts, common in structures of this character.

Special attention is directed to the frame structure of my invention, particularly in that the roller 51 is the supporting means for the frame part carrying the supporting means for the scraping bars, and other associated parts. The frame is made skeleton in form 85 and when attached at its forward end to the traction engine, or other means, needs no support at that end, but when unattached, to maintain the reach in its elevated position, I employ the caster wheel 68, journaled on the support 69, connected with the forward end of the reach 13. Not only does the roller 51 support the frame of the machine, as mentioned, but will prevent any tipping or tilting of the frame, sideways.

It is to be noted that all the various operating parts are connected to the supplemental frame, the reach bar being slidable longitudinally thereof and the main frame having the roller secured thereto, being angularly adjustable relative to said supplemental frame and reach bar, said reach bar being slidable in the casting 64 which is pivoted to the main frame, as indicated.

What I claim is:

1. In a road shaping and finishing machine, in combination, a supporting frame, a scraping member, a vertically arranged rod connected to said frame, means for pivotally connecting the rear end of said scraping member on said rod whereby said member may be swung on said rod and its rear end raised and lowered on said rod for changing the inclination of said scraping member, its rear end being loosely slidable on said rod, so that it is free to float vertically over inequalities in the ground, means for moving said scraping member out and in relative to said frame, means for raising and lowering said scraping member on said rod and means for supporting and raising and lowering the forward portion of said scraping member.

2. In a road shaping and finishing machine, in combination, a supporting frame, a pair of scraping members, said members pivotally supported at their rear ends at points adjacent each other, and capable of being swung outwardly, diverging from
their pivotal points, a pair of scraping blades supported at the rear of said members, said blades diverging from each other rearwardly and outwardly adapted to smooth the crown of the road after the action of said scraping members, and a roller traveling in the rear of said blades for compressing the crown of the road, said roller supporting the rear end of the frame.

3. In combination, a frame, a roller supporting said frame, a reach bar associated with said frame, vertically arranged supports, scraping members having a pivotal connection at or near one end with said supports, a rack bar of suitable length connected with the forward end of said reach bar, a member slidable on said reach bar, connections between said slidable member and said scraping members, a gear wheel journaled on said slidding member and in mesh with said rack bar, and means for operating said wheel for the purpose of moving said slidding member on the reach bar, and thereby swing said scraping members out or in, as desired.

4. In combination, a frame, a reach bar associated with said frame, said reach bar being movable longitudinally with respect to said frame, a roller for supporting said frame, a pair of scraping members, means for pivotally supporting said scraping members, a member slidable arranged on the forward end of said reach bar, connections between said slidding member and said scraping members, means for moving said slidding member on the reach bar for the purpose of swinging said scraping members out or in, and means for moving said frame and said roller on said reach bar.

5. In combination, a frame, a reach bar associated therewith, said reach bar being movable longitudinally relative to said frame, a roller supporting said frame, means for holding said frame relative to said reach bar, a pair of scraping members extending forwardly in advance of said roller, means for pivotally supporting said scraping members at their rear ends, a member slidable on said reach bar, connections between said slidable member and said scraping members, and means for moving said slidable member on said reach bar so as to swing said scraping members out or in, as desired.

6. In combination, a frame, a reach bar associated therewith, a roller for supporting said frame, said reach bar being movable longitudinally relative to said frame, a pair of scraping members pivotally supported on said frame, the pivotal connection being so arranged as to adapt them to be swung out or in, and to adapt the rear ends of said members to be raised for the purpose of dipping the forward ends of said members, means for swinging said scraping members out or in, and means for raising and lowering the rear ends of said scraping members.

7. In combination, a frame, a reach bar associated therewith, said reach bar adapted to be moved longitudinally relative to said frame, a roller for supporting said frame, a pair of scraping members pivotally supported at their rear ends, the pivots of said members being so arranged as to permit said members to be swung out or in, and raised and lowered for the purpose of dipping the forward ends of said members, a lever arrangement for raising and lowering said scraping members, a member slidable arranged on the forward portion of said reach bar, connections between said slidable member and said scraping members, and means for moving said slidable member on the reach bar for the purpose of swinging said scraping members out or in.

8. In combination, a frame, a roller supporting said frame, a reach bar associated therewith, a pair of scraping members pivotally supported at their rear ends, a rack bar connected with the forward end of said reach bar, a member slidable arranged on said reach bar, connections between said slidding member and said scraping members, a gear wheel journaled on said sliding member and in mesh with said rack bar, a hand wheel, and connections from said hand wheel to said gear wheel for rotating the same and thereby moving said slidable member on said reach bar for the purpose of swinging said scraping members out or in, as may be desired.

9. In combination, a frame, a roller supporting said frame, a reach bar disposed centrally of said frame, and extending forwardly therefrom a suitable distance, said frame being adapted to be swung relative to said reach bar, means for swinging said frame and with it said roller, a pair of scraping members pivotally supported at their rear ends, and means for swinging said members out or in.

10. In a mechanism of the character described, and in combination, a main frame, a roller supporting said main frame, a supplemental frame including a reach bar, pivotally connected to said main frame, said main frame having a rack in the form of an arc of a circle, a pinion on said supplemental frame meshing with said main frame for operating said pinion to change the relative position of said main and supplemental frames and thereby steer the machine, cutting and scraping members connected to said supplemental frame and reach bar, and means for adjusting said cutting and scraping members relative to said supplemental frame and reach bar.
11. In a mechanism of the character described, and in combination, a main frame, a roller connected to and supporting said main frame, a supplemental frame including a reach bar, pivotally connected to said main frame, said reach bar being slidably mounted in said supplemental frame, means for moving said reach bar relative to said supplemental frame and means for moving said main and supplemental frames relative to each other, cutting and scraping members connected to said supplemental frame and said reach bar, and means for adjusting the positions of said cutting and scraping members.

12. In a mechanism of the character described, and in combination, a main frame including spaced end members, and side members secured between said end members, a roller connected to and supporting said main frame, a supplemental frame, including side members, and transverse members connected thereto, said supplemental frame being positioned between said spaced end members of the main frame and pivoted thereto, a reach bar slidable in said supplemental frame, means for moving said reach bar relative to said supplemental frame, means for moving said main and supplemental frames relative to each other, cutting and scraping members connected to said supplemental frame and reach bar, and means for adjusting said cutting and scraping members.

13. In combination in a road shaping and finishing machine, a frame, a vertically extending supporting member secured thereto, a scraping member pivotally and movably mounted on said supporting member, means for raising and lowering said scraping member on said supporting member, a crane pivotally mounted on said frame and extending substantially parallel to said scraping member, said crane having connections with the forward portion of said scraping member for raising and lowering the same, whereby the scraping member may be adjusted to its proper depth at any inclination.

14. In combination in a road shaping and finishing machine, a frame, a scraping member having a pivotal connection at its rear end with said frame, means for raising and lowering the scraping member at its rear end so as to vary its inclination, a crane extending substantially parallel to said scraping member and having connections with the forward portion of said scraping member for raising and lowering said scraping member so that the scraping member may be adjusted at any depth regardless of its inclination, and means for varying the angular position of said scraping member relative to said frame.

15. In combination in a road shaping and finishing machine, a frame, a pair of scraping members pivotally connected to said frame at their rear ends and extending on opposite sides thereof, means for raising and lowering the rear ends of said scraping members so as to vary their inclination, means for adjusting the angular position of said scraping members relative to said frame, and a crane for each scraping member pivotally mounted on said frame and extending parallel to said scraping members, and each having connections with the forward portion of its scraping member for raising and lowering the same for adjustment regardless of its inclination.

In testimony whereof I affix my signature, in presence of two witnesses.

MELVIN MITCHELL.

 Witnesses:

CHAS. N. LA POINTE,
MILDRED F. BOMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D.C."