(No Model.) 5 Sheets—Sheet 1.

J. F. KIMBALL.

ROAD SCRAPER.

No. 491,565. Patented Feb. 14, 1893.

Fig. 1.

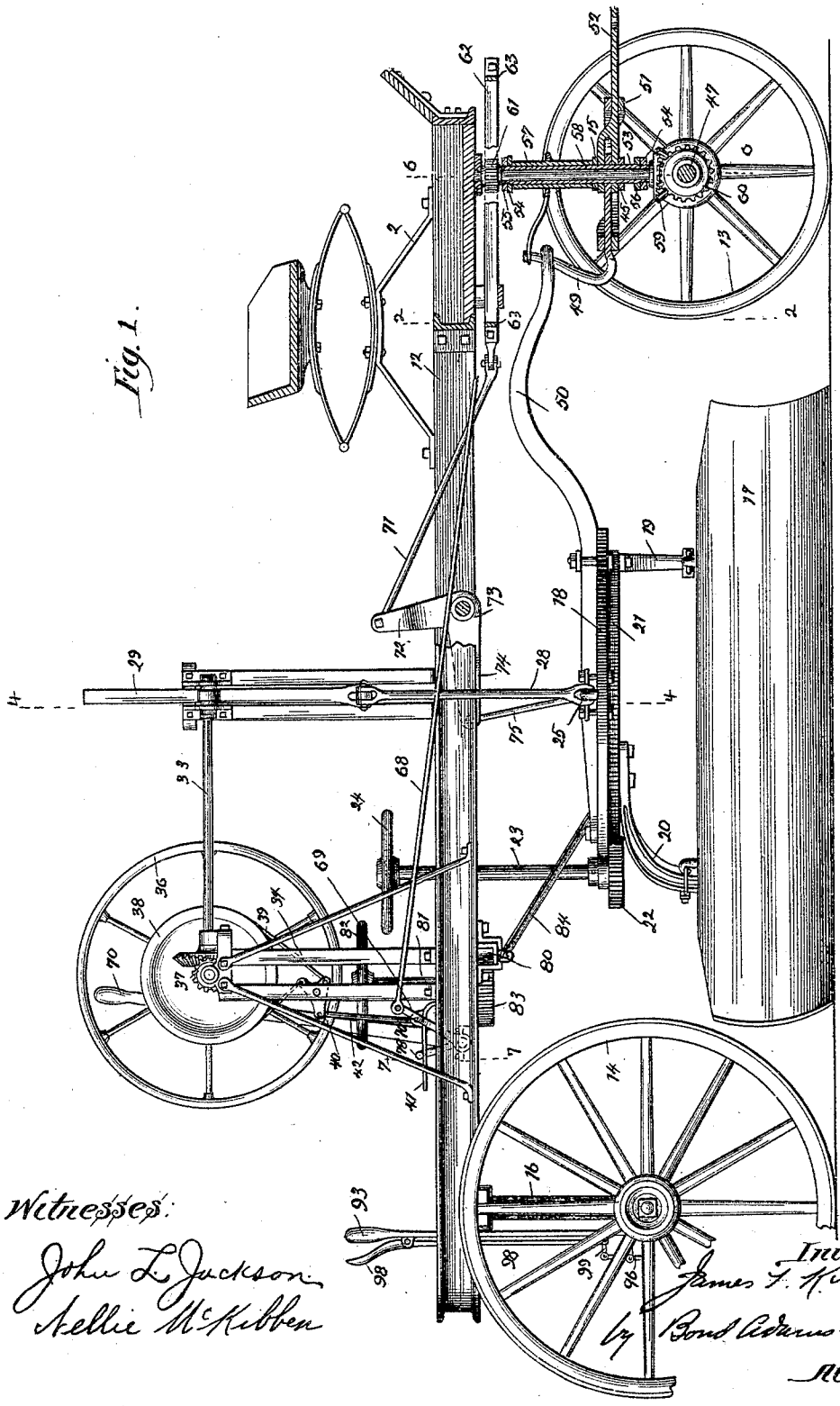

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Fig. 2.

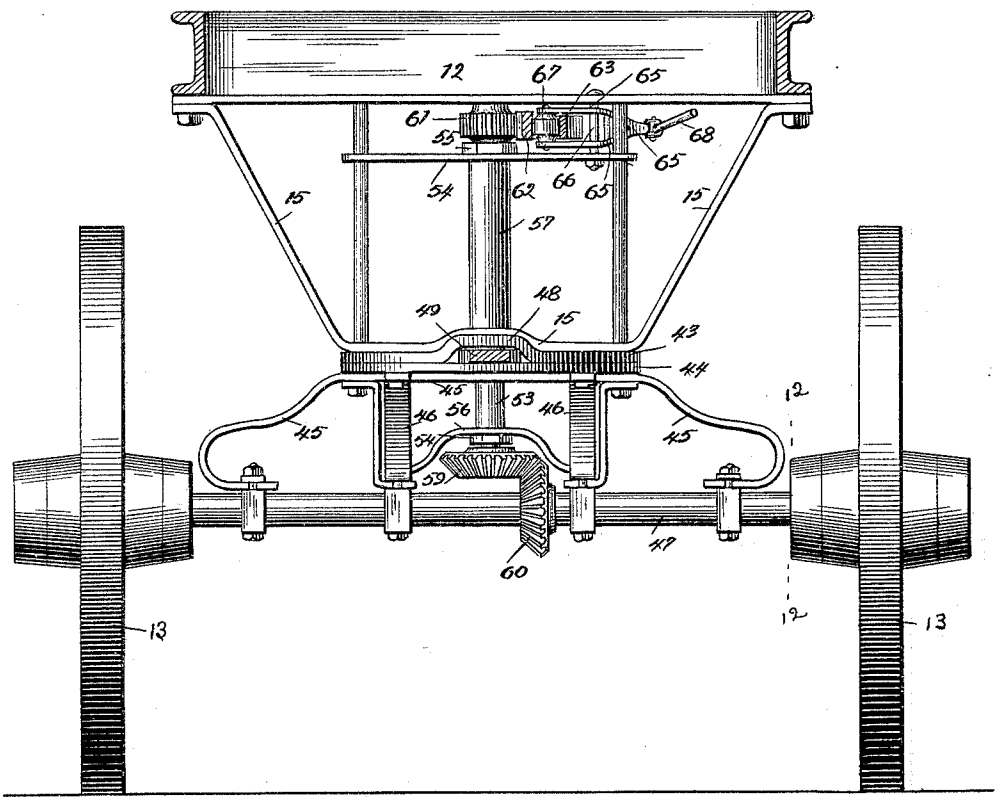
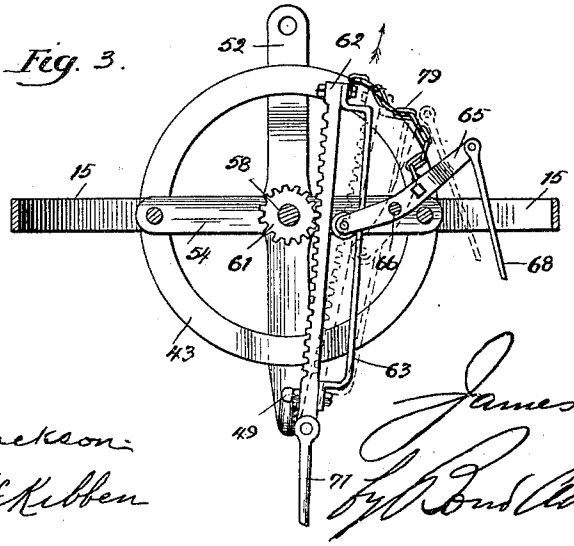


Fig. 3.



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ROAD SCRAPER.

No. 491,565. Patented Feb. 14, 1893.

Fig. 4.

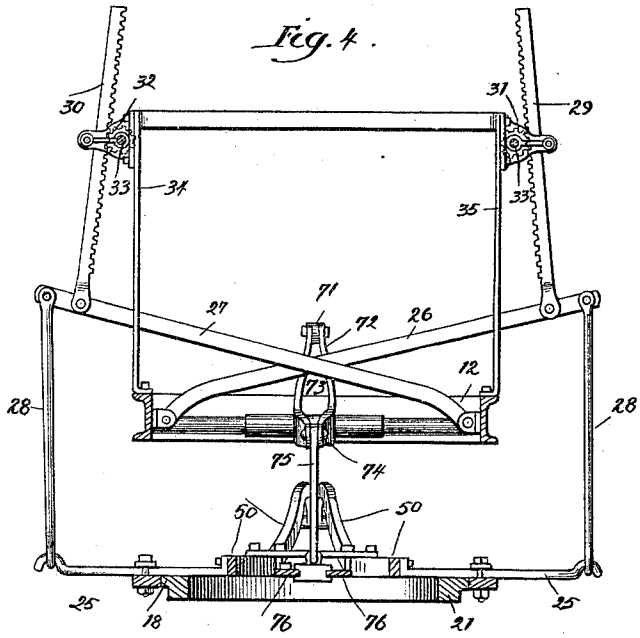
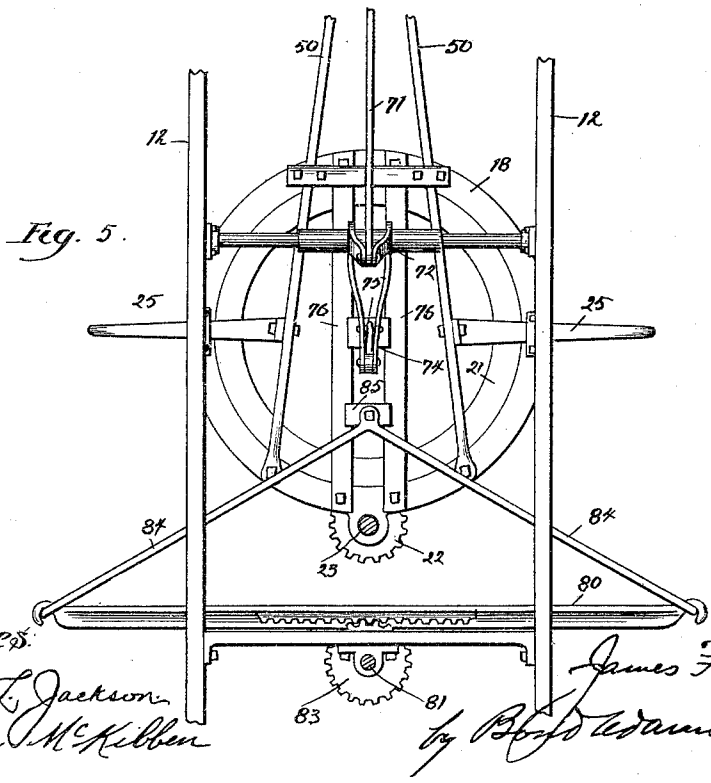


Fig. 5.



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(No Model.) 5 Sheets—Sheet 4.

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ROAD SCRAPER.

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Fig. 6.

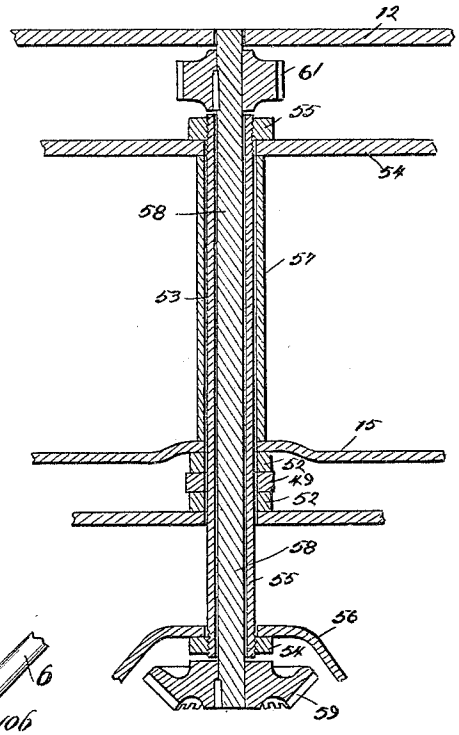


Fig. 12.

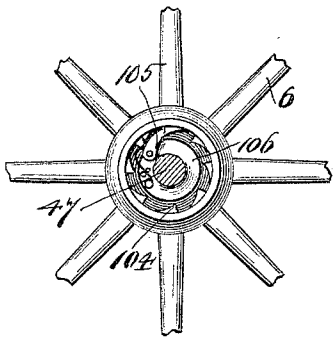


Fig. 7.

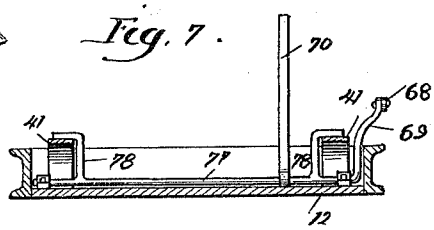
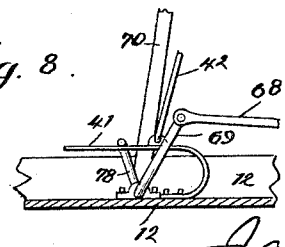


Fig. 8.



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J. F. KIMBALL.

ROAD SCRAPER.

No. 491,565. Patented Feb. 14, 1893.

Fig. 9.

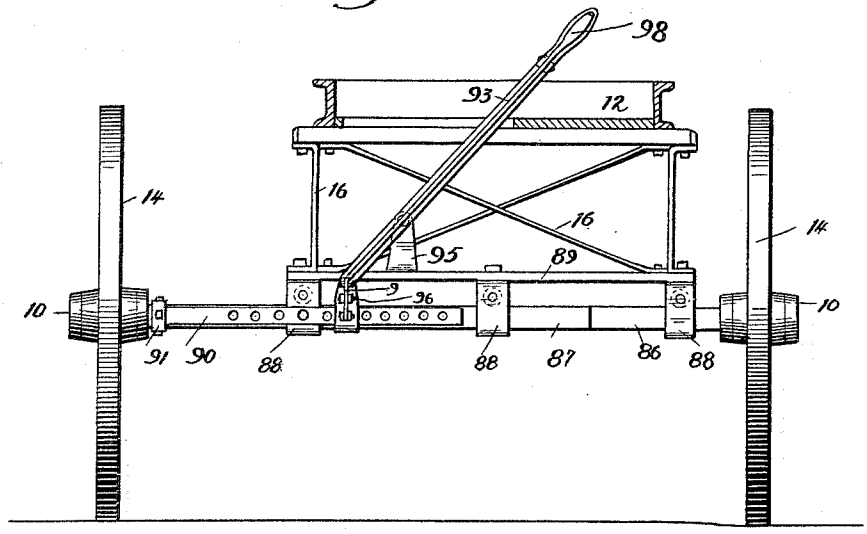


Fig. 10.

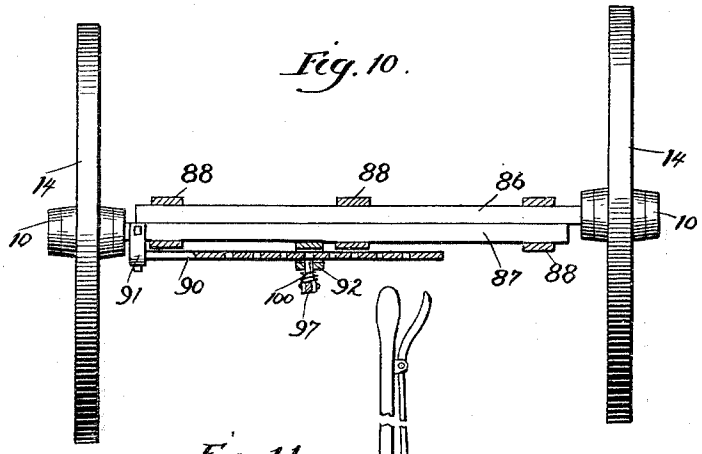
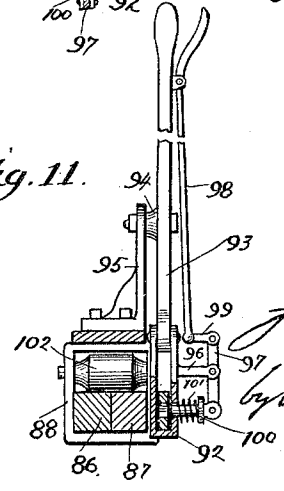


Fig. 11.



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UNITED STATES PATENT OFFICE.

JAMES F. KIMBALL, OF TILDEN, MAINE, ASSIGNOR TO THE WESTERN WHEELED SCRAPER COMPANY, OF AURORA, ILLINOIS.

ROAD-SCRAPER.

SPECIFICATION forming part of Letters Patent No. 491,565, dated February 14, 1893.

Application filed October 28, 1891. Serial No. 410,133. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. KIMBALL, a citizen of the United States, residing at Tilden, in the county of Hancock and State of Maine, have invented certain new and useful Improvements in Road-Scrapers, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation; Fig. 2 is a vertical cross section on line 2—2 of Fig. 1; Fig. 3 is a detail, being a top or plan view of a portion of the mechanism for lifting the scraper blade; Fig. 4 is a detail, being a vertical cross section on line 4—4 of Fig. 1, looking toward the front of the machine; Fig. 5 is a detail, being a top or plan view of the mechanism for adjusting the scraper blade laterally; Fig. 6 is an enlarged detail, being a vertical cross section on line 6—6 of Fig. 1; Fig. 7 is a detail, being a partial vertical cross section on line 7—7 of Fig. 1; Fig. 8 is a detail, being a side elevation of the parts shown in Fig. 7; Fig. 9 is an end elevation of the machine, part being in section; Fig. 10 is a horizontal section on line 10—10 of Fig. 9; Fig. 11 is a section showing the operation of the shifting lever; and Fig. 12 is a section on line 12—12 of Fig. 2.

My invention relates to road scrapers which are carried by a horizontal frame mounted upon wheels.

The objects of my invention are to provide new and improved means for lifting the scraper blade; to provide improved means for laterally adjusting the scraper blade; to provide a new and improved extension axle; and to improve the construction and operation of road scrapers of this class in various other particulars, which will be hereinafter set forth.

In the drawings,—12, indicates the main frame of the machine, which is of the usual construction, and is supported upon wheels 13 and 14. Instead of the usual bolsters for supporting the frame above the wheels, I prefer to provide iron or steel bars 15 and 16, as best shown in Figs. 2 and 9, as such construction is lighter and better adapted for use on my improved machine.

17, indicates the usual scraper blade, which is carried under the main frame. It is supported from a flat metal ring 18 by supporting bars 19 and 20, substantially as shown in patent to S. F. Welch, No. 379,550, dated March 13, 1888. The ring 18 is provided preferably on its under surface with an annular rack plate 21, which is rigidly attached thereto, and is in mesh with a pinion 22, carried on a rod 23, mounted in the frame of the machine. A hand-wheel 24 is provided for rotating the rod 23.

25, 25, indicate bars, which are rigidly secured to the ring 18 and project radially therefrom in opposite directions, as best shown in Fig. 5.

26, 27, indicate levers, which at their lower ends are secured at opposite sides of the main frame, and extend in opposite directions across the frame of the machine, terminating at a point over the ends of the bars 25, to which they are connected by connecting rods 28, as best shown in Fig. 4.

29, 30, indicate rack bars, which at their lower ends are connected to the levers 26 and 27 respectively, their upper ends being in mesh with pinions 31 and 32 respectively, which pinions are mounted upon the ends of shafts 33, one of which is journaled in suitable supporting frames 34 and 35 at opposite sides of the main frame, and a short distance above it, as best shown in Fig. 1. The shafts 33 are each adapted to be rotated by hand wheels located at the opposite sides of the main frame, one of which is shown in Fig. 1 and marked 36. The shafts 33 are preferably rotated from the hand wheels 36 by means of suitable bevel gear 37.

38, indicates a brake wheel, mounted upon the shaft which carries the hand wheel 36.

39, indicates a band adapted to encircle the brake wheel 38, the ends of which band are secured to a lever 40, suitably supported by the frame 34.

41, indicates a spring foot lever, which is mounted upon the main frame 12, and is connected to the arm of the lever 40 by a connecting rod 42, as best shown in Fig. 1. The tension of the spring 41 is such that it will normally bear upward, and thereby tighten the band 39 upon the brake wheel 38, to set

the brake. By pressing the foot lever 41, the band will be loosened and the brake thrown off.

The construction of the brake mechanism is similar to that described in patent to S. F. Welch, No. 392,246, dated November 6, 1888.

By operating the hand wheel 36 on one side of the machine, the corresponding rack bar 29 or 30 will be raised or depressed, and its lever 26 or 27 will also be raised or lowered, thereby raising or depressing one or the other end of the scraper blade 17. By operating the hand wheels together, the scraper blade may be raised or lowered without changing its angle of inclination.

The brace bars 15 which support the front portion of the main frame 12, are supported upon a fifth wheel 43, which rests upon another fifth wheel 44, which is supported by brace rods 45 and 46, mounted in suitable bearings upon the front axle 47, as best shown in Fig. 2. The fifth wheel 43 is provided at the rear with an off-set 48, best shown in Fig. 2, to permit of the passage of a hook 49, which serves to hold the forward end of the main draft bar 50, and at its lower end encircles the king bolt. The fifth wheel 44 is also provided with an off-set 51, for the passage of a draft iron 52, which also encircles the king bolt, as best shown in Fig. 1. The main draft bar 50 is preferably bifurcated, as shown in Figs. 4 and 5, and is secured at its rear end upon the ring 18.

53, indicates the king bolt, which is tubular, as best shown in Fig. 6, and is provided on its lower end with nuts 54 and 55 screwed upon it below and above cross bars 56 and 57 respectively, to hold the main frame upon the axle. The lower portion of the supporting bar 15 extends horizontally above and across the fifth wheel 43, as best shown in Fig. 2; and around the king bolt, between the horizontal portion of the supporting bar 15 and the cross bar 54, is placed a sleeve 57, which acts as a further support and brace.

58, indicates a vertical shaft, which is carried within the tubular king bolt 53 and is adapted to rotate therein. The upper end of the shaft is preferably journaled in a bed of the main frame 12, as shown. The shaft 58 is provided at its lower end with a bevel gear 59, which is adapted to mesh with a similar gear 60 mounted upon and keyed to the front axle 47, as best shown in Fig. 2.

61, indicates a cogged wheel, which is mounted upon and keyed to the upper end of the shaft 58. By this construction, when the front axle rotates, the wheel 61 will be caused to rotate. In order to provide for the rotation of the front axle, it is provided near each spindle with a collar 106, carrying a pawl 105, and each wheel hub is provided with a ratchet 104, the teeth of which are adapted to be engaged by a pawl 105, and the axle consequently rotated when the wheel turns in a forward direction. This construction permits the wheels to turn backward independently of the axle and of each other, as may be necessary in operating the machine.

62, indicates a rack, which is horizontally arranged, and is adapted to be moved into and out of mesh with the cogged wheel 61. 63 indicates a bar, which is of about the shape shown in Fig. 3, and is secured to the rear edge of the rack bar 62 in such position as to form a slot 64.

65, indicates a lever, which is pivotally mounted in the plane of the rack bar 62, preferably upon a bolt 66 which is secured in a vertical position between the cross bar 54 and the bed of the main frame 12, as best shown in Fig. 2. The lever 65 is preferably bifurcated at its inner end, as shown in Fig. 2, and is provided with a roller 67, which is adapted to move in the slot 64.

68, indicates a connecting rod, which is connected at one end to the outer end of the lever 65, and at the other end is connected to an arm 69, carried by an operating lever 70, as best shown in Fig. 1. The lever 70 is mounted in the main frame 12 at a point near the spring lever 41.

I do not wish to limit myself to the exact construction of the rack bar 62, slot 64 and lever 65, as these may be varied in construction without materially affecting their operation.

The rear end of the rack bar 62 is connected by a connecting rod 71 to one arm, 72, of a bell crank lever 73, pivoted in the main frame of the machine, as best shown in Fig. 1. The other arm, 74, of the lever 73 is connected by a connecting rod 75 to parallel cross bars 76, rigidly secured to the ring 18 from which is swung the scraper blade, substantially as shown in Figs. 1 and 5. By this construction, when the lever 70 is thrown backward, the outer end of the lever 65 will also be thrown backward, causing the roller 67 to bear against the rack bar 62, thereby throwing it into mesh with the cogged wheel 61. If the front axle 47 is rotating, the rotation of the wheel 61 through the bevel gears 59 and 60 and shaft 58, will cause the rack bar 62 to move in the direction indicated by the arrow in Fig. 3, throwing the arm 74 of the bell crank lever upward, and the scraper blade will be lifted.

For throwing off the brake when the lever 70 is so operated, a horizontal shaft 77 is provided, which is rigidly connected with the lower end of the lever 70, and is provided with arms 78, adapted to bear upon the upper portions of the spring levers 41 which control the brake band 39. By this construction, when the lever 70 is thrown backward, the spring levers 41 will be depressed, loosening the brake band 39, and thereby throwing off the brake. When the scraper blade has been lifted to the desired height, by throwing the lever 70 forward the rack bar 62 will be thrown out of engagement with the wheel 61, and the brake will at the same time be set, whereby the scraper blade will

be automatically locked at the position in which it then happens to be. As the length of the rack bar 62 is somewhat limited, a chain or flexible connection 79 is provided, which is connected to the outer end of the rack bar 62 and to the lever 65 between the pivot 66 and the connecting rod 68. The length of the chain 79 is such that before the rack bar 62 has moved outward nearly as far as its length will permit, the chain will operate to throw the outer end of the lever 65 forward, and thereby throw the rack 62 out of engagement with the wheel 61. This will at the same time throw the lever 70 forward and set the brake, as before.

If desired, instead of lifting the scraper blade by the rotation of the axle 47, it may be lifted independently of said mechanism by means of the hand wheels 36.

80, indicates a rack bar, which extends transversely of the frame 12 a short distance back of the ring 18, and is adapted to slide transversely of the frame.

81, indicates a vertical shaft, suitably journaled in the frame, which shaft is provided at its upper end with a hand wheel 82 and at its lower end with a gear wheel 83, adapted to mesh with the cogs in the rack 80.

84, indicates connecting rods, which extend downward and forward from the rack bar 80, and connect its outer ends with a block 85, which is adapted to slide between the parallel bars 76, which are arranged in such manner as to adapt them to act as guides for the block 85. By this construction, when it is desired to shift the scraper blade with relation to the main frame 12, *i. e.*, to move it to one side or the other of the frame, by rotating the cogged wheel 83 by means of the hand wheel 82, the bar 80 will be moved transversely of the frame, and the ring 18 and scraper blade moved in the corresponding direction. The block 85 will move toward the outer ends of the parallel bars 76, permitting such shifting and also raising and lowering of the ring 18. By this construction, the operation of the ring and scraper blade is much steadier, and it is also strengthened.

The rear axle is composed of two sections 86 and 87, upon the ends of which are mounted the two rear wheels. The sections 86 and 87 are held together by means of clips 88, in such manner that they will be adapted to slide upon each other to extend or contract the axle. The clips 88 are secured to a cross bar 89, secured to the supporting rods 16 of the main frame.

90, indicates a perforated metal bar, which at one end is pivoted in a clip 91, secured to the section 87 of the axle, in such manner that it may extend in a horizontal direction back of said section, and parallel with it. By pivoting the bar 90 as described, its outer end may be moved up or down as may be necessary. The outer end of the bar 90 is supported by a clip 92, which is hinged to the lower end of a lever 93, pivoted at 94 to a bracket 95, mounted at a suitable point upon the bar 89, as shown in Figs. 9 and 10. The clip 92 is provided with suitable holes to permit of access to the perforations in the bar 90.

96, indicates a standard, which projects from the clip 92, and forms the pivotal point of a short lever 97, as shown in Fig. 11.

98, indicates a rod or lever, fulcrumed at its upper end upon the lever 93, and at its lower end connected by means of a ball and socket joint with a connecting rod 99, which connects it to the lever 97.

100, indicates a dog, which is pivoted to the lower end of the lever 97, and is adapted to pass through the opening in the clip 92 into the perforations in the bar 90. A spring 101 is provided, which encircles the dog, and is adapted to throw it outward. By operating the lever 98, the dog may be thrown into or out of the perforations in the bar 90.

102, indicates rollers, which are mounted in the clips 88 between the bar 89 and the sections 86 and 87 of the axle, for the purpose of permitting the frame to be moved more easily upon the axle. Instead of single rollers 102 they may be divided so that one section may rest upon each section of the axle.

By the construction shown, when it is desired to extend the axle, the rear wheels are lifted from the ground by forcing the scraper blade downward by means of the hand wheel 36, the weight of the frame and rear wheels then resting upon the front wheels and the scraper blade. The dog 100 is then thrown into one of the perforations in the bar 90 by means of the lever 98, and the lever 93 is then moved to the position shown in Fig. 9, causing the section 87 of the rear axle to move upon the section 86, and extending the axle. The rear wheels are then lowered to rest upon the ground, and the lever 93 is moved in an opposite direction, whereby the main frame will be caused to move upon the rollers 102 until it rests over the center of the extended axle. When it is desired to contract the axle, the operation is the reverse of that above described. If desired, a lever and perforated bar may be provided for each section of the rear axle, so that either or both sections may be extended.

That which I claim as new and desire to secure by Letters Patent, is,—

1. In a road machine, the combination of a carriage having a front steering axle, a suspended scraper blade, a shaft geared to and driven by the front steering axle, and lifting mechanism geared with the shaft and connected with the scraper blade for lifting the latter by the rotation of the front steering axle, substantially as described.

2. In a road machine, the combination of a carriage having a front steering axle, a suspended scraper blade, lifting mechanism geared to and operated by the front steering axle to lift the scraper blade, and devices for throwing the lifting mechanism out of gear with the said axle, substantially as described.

3. In a road machine, the combination with a carriage, and a scraper blade, of a bell-crank lifting lever for lifting the scraper blade, and mechanism operated by the rotation of the axle of the carriage to shift the bell crank lifting lever and elevate the scraper blade, substantially as described.

4. In a road machine, the combination with a carriage and a scraper blade, of a lever adapted to be operated to lift the scraper blade, a rack bar connected to said lever, a cogged wheel adapted to mesh with said rack bar, mechanism for rotating said cogged wheel, and a lever adapted to be operated to throw said rack bar and cogged wheel into and out of engagement with each other, substantially as described.

5. In a road machine, the combination with a carriage and a scraper blade, of a lever adapted to be operated to lift the scraper blade, a rack bar connected to said lever, a rotatable shaft, gear wheels for rotating said shaft by the rotation of the carriage wheels, a cogged wheel upon said shaft, adapted to mesh with said rack bar, and a lever adapted to be operated to throw said rack bar and cogged wheel out of engagement with each other, substantially as described.

6. The combination with a carriage frame and wheels, of a hollow king bolt, a vertical shaft passing through said king bolt, bevel gear for rotating said shaft by the rotation of the carriage wheels, a scraper blade, a bell crank lever, a rack bar connected thereto, a cogged wheel on said shaft adapted to mesh with said rack bar, and a lever for throwing said rack bar and cogged wheel into and out of engagement with each other, substantially as described.

7. The combination with a carriage, a scraper blade, and a lever 73 adapted to be operated to lift said blade, of a shaft adapted to be rotated by the rotation of the carriage wheels, a cogged wheel mounted upon said shaft, a rack bar adapted to mesh with said cogged wheel, said bar having a longitudinal slot, a lever 65, a hand lever 70, a connecting rod 71, a connecting rod connecting said levers 65 and 70, and a roller upon one end of said lever 65, said roller being adapted to move in the slot in the rack bar, substantially as described.

8. The combination with a carriage and a scraper blade, of a rotatable shaft, a cogged wheel mounted upon said shaft, a rack adapted to mesh with said cogged wheel, devices for moving said rack into and out of engagement with said cogged wheel, a lever for lifting the scraper blade, a connecting bar connecting said rack with said lifting lever, and devices for automatically throwing the rack out of engagement with the cogged wheel when the scraper blade has been lifted, substantially as described.

9. In a road machine, the combination with a carriage, a scraper blade, and lever for lifting said blade, of a shaft 58 cogged wheel 61 carried thereby, rack 62, levers 65 and 70, connecting rod 68, and chain 79, substantially as described.

10. In a road machine, the combination with a frame, wheels carrying said frame, a beam adapted to be moved laterally at its rear end, and a scraper blade carried thereby, of guide plates, sliding block 85, rack bar 80, hand wheel 82, and rods 84, connecting the sliding block and the rack bar, substantially as described.

11. In a road machine, the combination with a frame, the levers 26 and 27 pivoted to opposite sides of the frame and extending transversely thereof in reverse directions, the racks 29 and 30 arranged at opposite sides of the frame, the cog wheels 31 and 32 respectively engaging the racks, means for independently rotating either one of the cog wheels, the bars 25, the rods 28 connecting the bars respectively with the reversely arranged levers, and a scraper blade swung from the said bars, substantially as described.

12. In a road grading machine, a hollow king bolt adapted to pivotally connect the body frame with the front axle, in combination with a shaft rotating therein and driven by said axle, substantially as described.

13. In a road grading machine, the hollow king bolt, the shaft 58 having central gearing on the rotating front axle, which permits the swaying of said axle in turning without interfering with its rotation, substantially as described.

14. The combination of the extensible axle 86–87, perforated plate 90, lever 98, and pin 100, substantially as described.

15. The combination of the extensible axle 86–87, perforated plate 90, lever 93, pin 100, the main frame 12 and the rollers 102, substantially as described.

16. In a road machine, the combination with a carriage and a scraper blade, of mechanism operated by the rotation of the front steering axle to lift the scraper blade, and wheels on said front steering axle adapted to effect its rotation only when they are rotated in a forward direction, substantially as described.

17. In a road machine, the combination with a carriage, a scraper blade, and mechanism adapted to be operated by the rotation of one of the axles to lift the scraper blade, of pawls mounted upon said axle, wheels carried by said axle, said wheels having ratchets adapted to be engaged by said pawls, substantially as described.

18. In a road grader, the combination with an extensible axle composed of sections, of a plate pivoted to one of said sections, and devices for clutching said plate, substantially as described.

19. In a road grader, the combination with an extensible axle composed of sections, of a perforated plate pivoted to one of said sections, a pin adapted to enter said perforations, and a lever for operating said pin, substantially as described.

20. In a road grader, the combination with an extensible axle composed of sections, of a perforated plate pivoted to one of said sections, a pin 100, and levers 93, 97 and 98, substantially as described.

21. In a road grader, the combination with the frame 12 wheels, extensible axle 86–87 and devices for extending the axle, of clips 88, rollers 102, and a lever, whereby the frame may be shifted upon the axle, substantially as described.

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