H. K. CLEMONS.

ROAD GRADER.

APPLICATION FILED FEB. 7, 1912.

1,067,308.

Patented July 15, 1913.

3 SHEETS—SHEET 1.

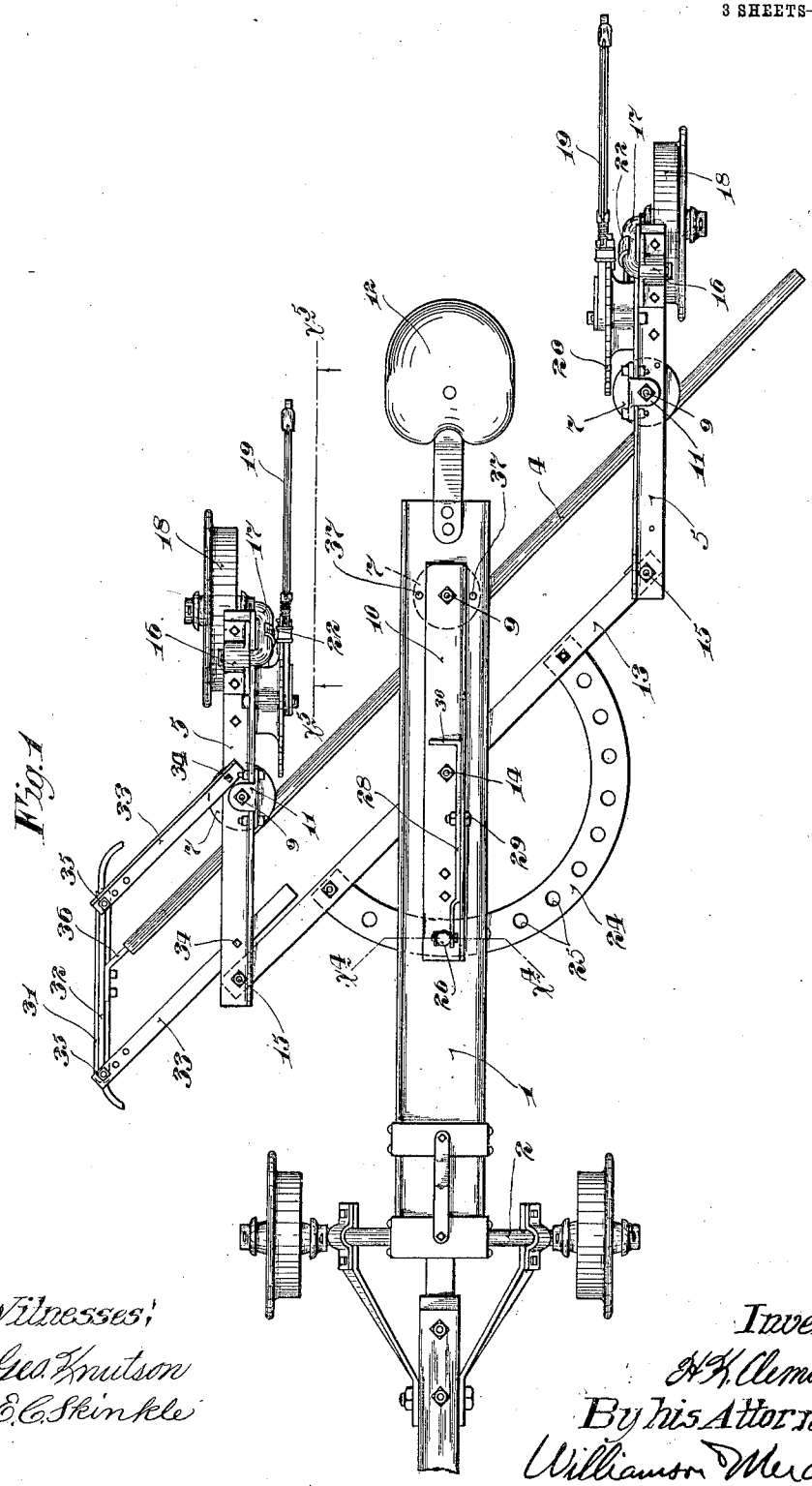


Fig. 1.

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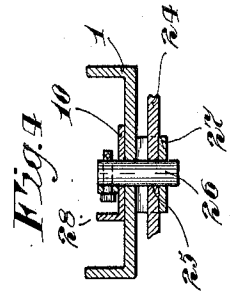


Fig. 4

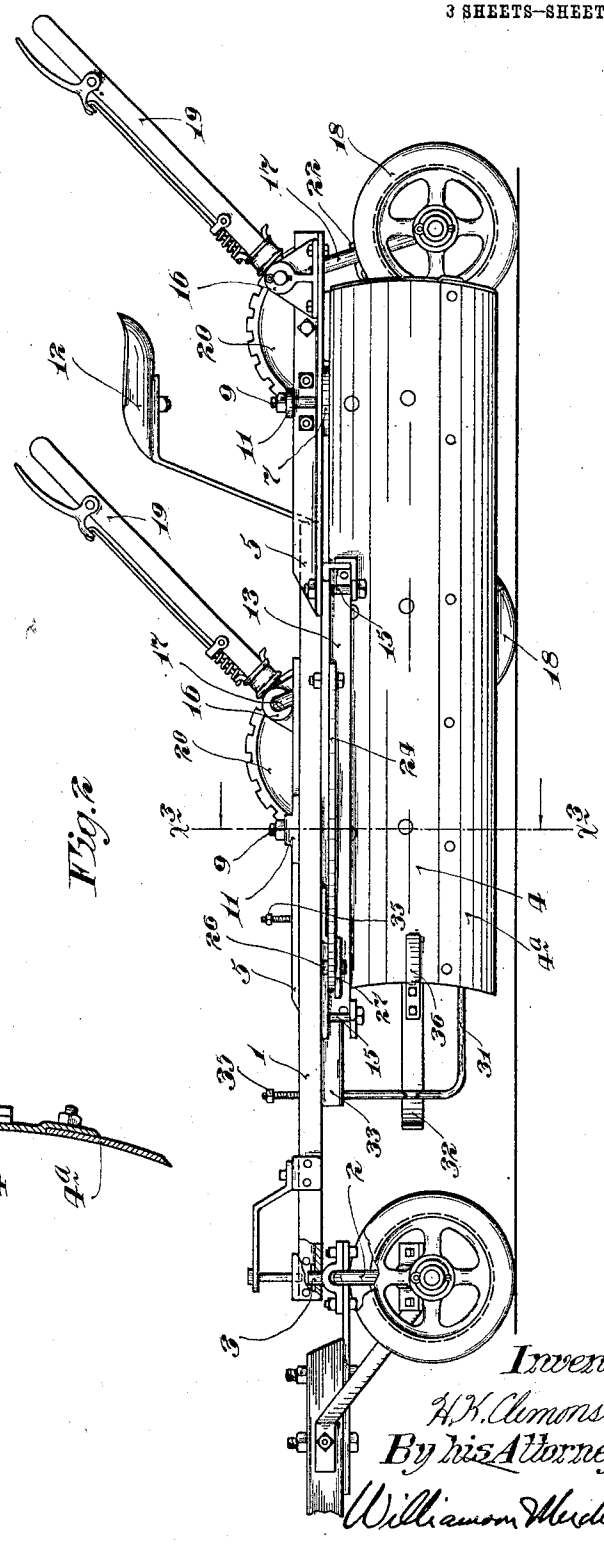


Fig. 2

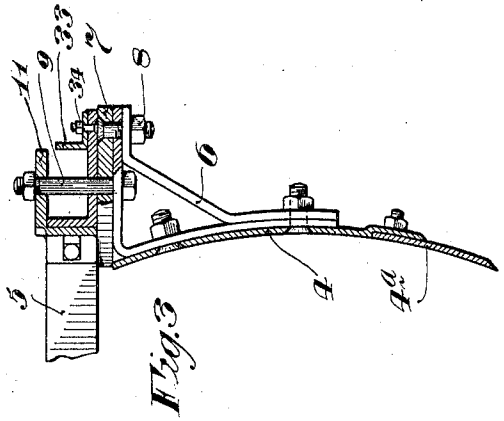


Fig. 3

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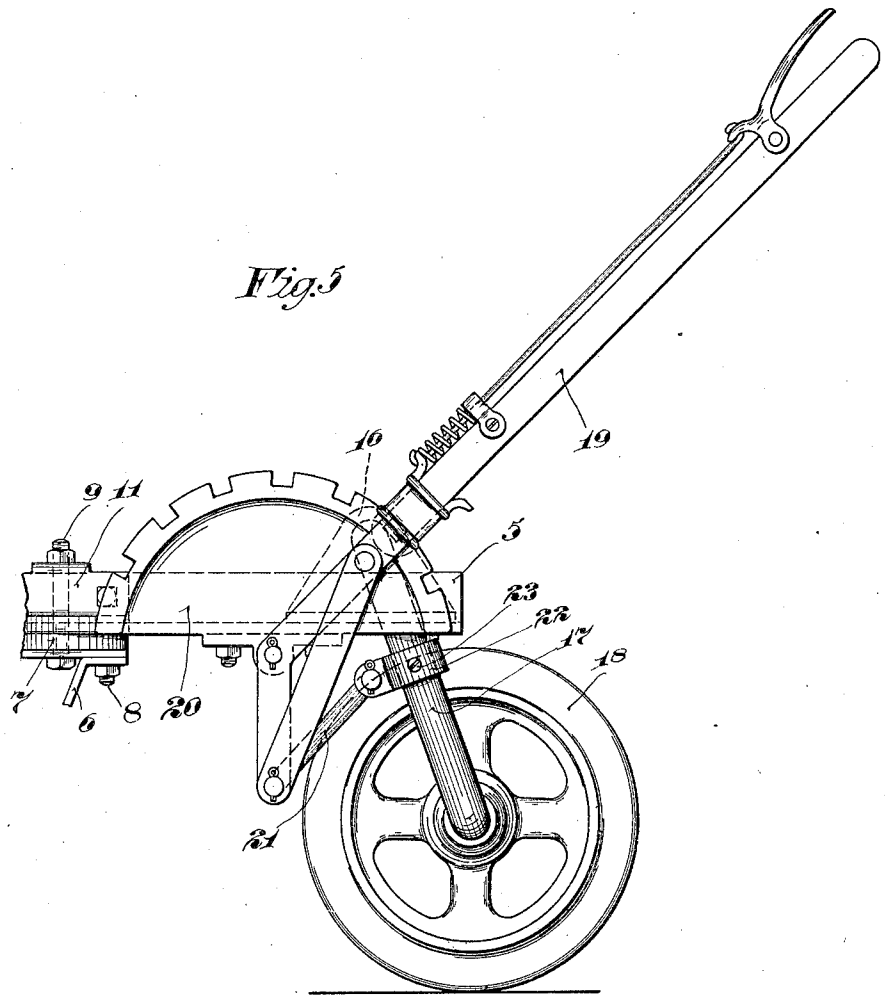
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3 SHEETS—SHEET 3.

Fig. 5



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UNITED STATES PATENT OFFICE.

HARRY K. CLEMONS, OF ST. PAUL, MINNESOTA.

ROAD-GRADER.

1,067,308. Specification of Letters Patent. Patented July 15, 1913.

Application filed February 7, 1912. Serial No. 675,933.

To all whom it may concern:

Be it known that I, HARRY K. CLEMONS, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Road-Graders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved road grader adapted for use in building and repairing highways, in digging trenches and ditches and for analogous uses; and generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The invention is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a plan view showing the complete grader; Fig. 2 is a side elevation of the grader; Fig. 3 is a vertical section taken approximately on the line x^3 x^3 on Fig. 2; Fig. 4 is a detail in vertical section taken on the line x^4 x^4 on Fig. 1; and Fig. 5 is a side elevation showing parts of the grader located in the vicinity of the line marked x^5 x^5 on Fig. 1.

In this improved grader I employ a main center beam, a front truck pivotally connected to the said main beam, laterally spaced auxiliary beams, a scraper blade pivotally connected to said main and auxiliary beams, an equalizing tie bar pivotally connected to said main and auxiliary beams, and wheel-equipped cranks for supporting the rear ends of said auxiliary beams for vertical adjustments. The said main beam 1 is preferably in the form of a rolled steel channel, the front end of which is connected to the front truck 2 by a suitable pivotal connection 3 which permits horizontal pivotal and transverse rocking movements of the said truck in respect to the said beam.

The scraper blade 4, at the points where it is pivotally connected to the rear end of the main beam 1 and to the intermediate portions of the auxiliary beams 5, is provided with trussed brackets 6 secured to its rear upper face, and horizontal bearing plates 7 are rigidly secured to the upper portions of said brackets, by nut-equipped bolts 8 or other suitable means. Nut-equipped pivot bolts 9 are extended upward through the upper portions of the bracket 6 and through the bearing plates 7 and serve to pivotally connect the said scraper blade to the said beams 1 and 5. The central bolts 9 which pivotally connect the central portion of the blade 4 to the rear end of the main beam 1 are extended upward through the web of the said beam 1 and, as shown, also through the horizontal flange of an angle iron 10 secured on top of said beam 1. The bolts 9, which pivotally connect the end portions of the scraper blade 4 to the intermediate portions of the auxiliary beams 5, are extended upward through the horizontal flanges of said auxiliary beams, and through projecting flanges of brackets 11 that are bolted or otherwise rigidly secured to the said beams 5. The auxiliary beams 5 are preferably formed from angle iron. The numeral 12 indicates a driver's seat attached to the rear end of the main beam 1.

The auxiliary beams 5, in all their adjustments, are kept parallel to each other and parallel to the main beam 1, by means of a so-called equalizing tie bar 13, which latter is intermediately pivoted to the main beam 1, at 14, and to the front ends of the auxiliary beam 5, at 15. This equalizing tie bar 13 maintains a parallel relation to the scraper blade, so that the said parts 4, 5—5, and 13 constitute an adjustable parallelogram, in which the said members 4 and 13 vary their angle in respect to the main beam 1, while the said members 5 maintain a parallel relation to the said beam 1.

On the rear end of its auxiliary beam 5 is a bearing 16 in which the upper end of a wheel crank 17 is pivoted for oscillatory movements in planes parallel to the vertical planes of the beams 1 and 5. Wheels 18 are journaled on trunnions projecting from the lower ends of the cranks 17. The said wheels 18 and the wheels of the front truck 2 are preferably flanged so as to prevent the grader from being skidded or moved by the lateral pressure upon the scraper blade, when the blade is working at an angle in respect to the line of travel. The opposite

ends of the scraper blade are adapted to be independently adjusted vertically so as to set the said scraper blade for rounding off or transversely inclining the road bed. For adjustment of its wheel crank 17, there is a hand operated latch lever 19 that is pivoted to and coöperates with a lock segment 20 rigidly secured on the rear end of the co-operating auxiliary bar 5. The depending ends of the latch levers 19 are connected by links 21 to collars 22 shown as secured on the crank 17 by set screws 23 which permit vertical adjustments of the said collars.

Rigidly secured to the equalizing bar 13 is a lock segment 24 having, as shown, a multiplicity of circumferentially spaced perforations 25. Working vertically through a suitable seat in the main beam 1 and in the angle bar 10 which is secured thereon, is a lock bolt 26, the depending end of which is adapted to be passed through any one of the perforations 25 of the lock segment 24. The numeral 27 indicates a guide stirrup suitably secured to the under side of the main beam 1 and which supports the lock segment 24. As shown, in Fig. 4, the lower end of the lock bolt 26 also works through a perforation in the said stirrup 27.

The lock bolt 26 is, as shown, adapted to be raised and lowered by means of a foot actuated lever 28 shown as intermediately pivoted at 29 to the vertical flange of the angle bar 10. The rear end 30 of this lever 28 is laterally bent to afford a foot piece within reach of the operator while seated on the driver's seat 12. Preferably, the scraper blade 4 is formed with a detachable supplemental section 4^a at its lower edge (see Figs. 2 and 3). This supplemental blade section 4^a is adapted to be made from tempered steel and when worn is adapted to be replaced by a new section.

When driving along the road near a curb or adjacent to a bank, or along an irregular ridge left at the side of the road, the forward end of the scraper blade is liable to catch and deeply embed itself, thus very greatly interfering with the steady advance of the machine and subjecting the said scraper blade to strains frequently sufficient to bend or break the same. To prevent this and to form a straight even ridge as a formed curb, I provide a gage attachment preferably constructed, as shown, in the drawings, and including a ground engaging shoe 31 and a laterally projecting side shoe 32, which latter is shown as rigidly secured to upturned legs of the former. The upper ends of the legs of the ground shoe 31 extend upward through perforations in the outer ends of a pair of parallel arms 33, the inner ends of which are adapted to be detachably pivoted by small bolts 34, to the outwardly extended flange of either of the auxiliary bars 5. At their upper ends, the upturned legs of the shoe 31 are provided with nuts or stop devices 35 that limit the downward movement of the gage shoes but permit the same to move vertically to adapt themselves to irregularities in the ground.

By reference to Fig. 1, it will be noted that the arms 33 are parallel to the blade 4 and tie bar 13, and that the shoes 31 and 32 are parallel to the beams 1 and 5. This parallel relation of the said parts is maintained throughout the different angular adjustments of the scraper blade. Obviously, the gage device may be applied for coöperation with either end of the scraper blade, according to which end thereof is turned forward. The said gage device will, of course, coöperate with the scraper blade when it is turned into position at right angle to the direction of travel.

For most classes of work, the scraper blade will be set to work obliquely to the line of travel and the angles thereof, in respect to the line of travel may, of course, be varied at will. Sometimes, however, the scraper blade will be used for leveling purposes such as for filling up holes or depressions in the road bed, and it is preferably then set to work at a right angle to the line of travel. By different adjustments of the crank-equipped wheel arms, effected by manipulation of the levers 19, the scraper blade may, as already indicated, be set with its lower edge either horizontal or inclined in respect to a horizontal in either direction, and regardless of which end of the scraper blade is set in advance or projected forward.

It should be noted that the shoe 32 of the gage device is provided with a rigidly secured inwardly projecting stop arm 36 that engages the front end portion of the scraper blade 4 to hold the said gage device against rearward swinging movement in respect to the said scraper blade. This stop arm 36 is shown as detachably secured to the shoe 32 by machine screws or bolts so that it may be reversely projected when the gage device is applied to the opposite side of the machine. Also, by referring to Fig. 1, it will be noted that the web of the main beam 1 is provided with laterally spaced perforations 37, through any one of which, the bolt 9 which pivotally connects the blade 4 and beams 1, may be passed so as to set the wheels 18 exactly parallel to the said beams 1, or at a slight angle thereto, at will. By giving the wheels a slight angularity in respect to the beams 1, and hence, in respect to the line of travel or line of travel of the machine, the said wheels may be caused to crowd laterally and thereby offset any tendency which the lateral pressure on the scraper blade may produce, tending to crowd the machine laterally.

The machine or grader is of simple construction, of comparatively small cost, has

no parts that are likely to get out of order, is strong, and in practice, has been found highly efficient for the purposes had in view.

What I claim is:

1. In a grader, the combination with a central main beam and laterally spaced auxiliary beams in parallel relation thereto, of a truck supporting the front end of said main beam, wheels supporting the rear ends of said auxiliary beams, a scraper blade pivotally connected to the rear end of said main beam and to the intermediate portions of said auxiliary beams, a tie bar intermediately pivoted to said main beam in front of said scraper blade and having its ends pivotally connected to the front ends of said auxiliary beams, and means for securing said scraper blade and tie bar in different angular adjustments in respect to said main beam while maintaining their parallelism.

2. In a grader, the combination with a central main beam and laterally spaced auxiliary beams in parallel relation thereto, of a truck supporting the front end of said main beam, wheel-equipped arms connected to and supporting the rear ends of said auxiliary beams and having independent adjusting devices, a scraper blade intermediately pivoted to the rear end of said main beam and pivotally connected to the intermediate portions of said auxiliary beams, a single tie bar located in front of said scraper blade in parallel relation thereto and intermediately pivoted to said main beam and having its ends pivotally connected to the front ends of said auxiliary beams, a lock segment secured to said tie bar, and a lock applied to said main beam and cooperating with said lock segment to secure said scraper blade in different angular adjustments in respect to said main beam.

3. In a grader, the combination with a main beam and laterally spaced auxiliary beams, of a scraper blade and a compensating tie bar intermediately pivoted to said main beam and pivoted at its ends to said auxiliary beams, wheels with connections supporting said auxiliary beams, a gage device coöperating with one end of said scraper blade and comprising a shoe extended approximately parallel to the adjacent auxiliary beams, and a pair of parallel links connecting said shoe to the said adjacent auxiliary bar, said shoe being adjustable with said scraper blade.

4. In a grader, the combination with a main beam and laterally spaced auxiliary beams, of a scraper blade and a compensating tie bar intermediately pivoted to said main beam and pivoted at its ends to said auxiliary beams, wheels with connections supporting said auxiliary beams, a gage device comprising a ground shoe and a side shoe, a pair of parallel links connecting said shoes to the adjacent auxiliary bar, and a connection between said shoes and the adjacent end of said scraper blade whereby said gage device is made adjustable with said scraper blade.

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

HARRY K. CLEMONS.

Witnesses:

F. D. MERCHANT,

HARRY D. KILGORE.

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