(No Model.)

3 Sheets—Sheet 1.

S. PENNOCK.

ROAD GRADER.

No. 305,533. Patented Sept. 23, 1884.

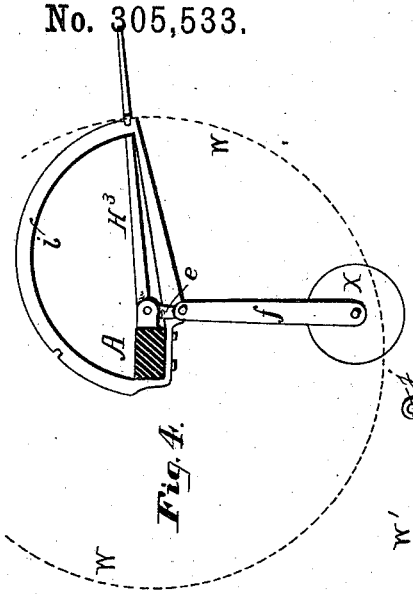

Fig. 4.

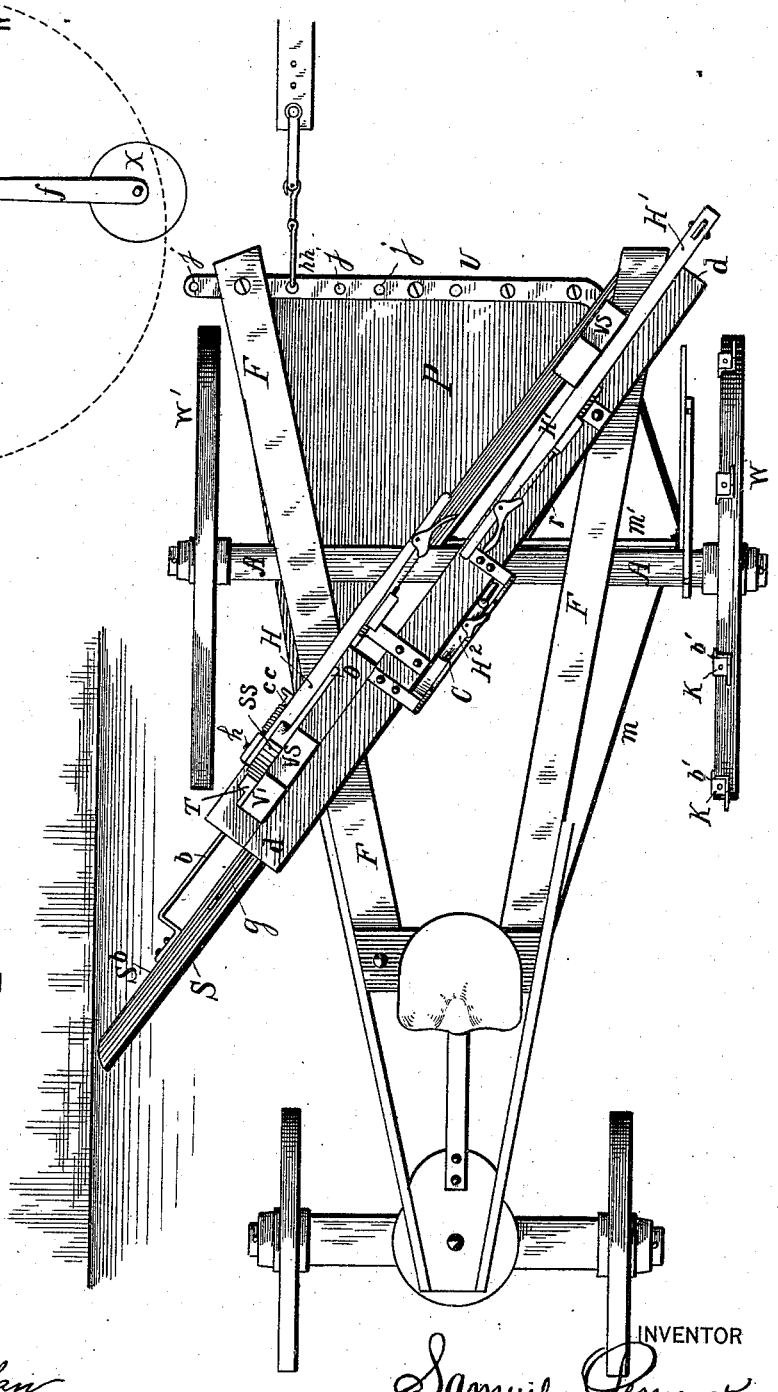

Fig. 1.

WITNESSES:

John Nolan

N. Heulser

INVENTOR

Samuel Pennock

By Joshua Pusey Atty.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 5.

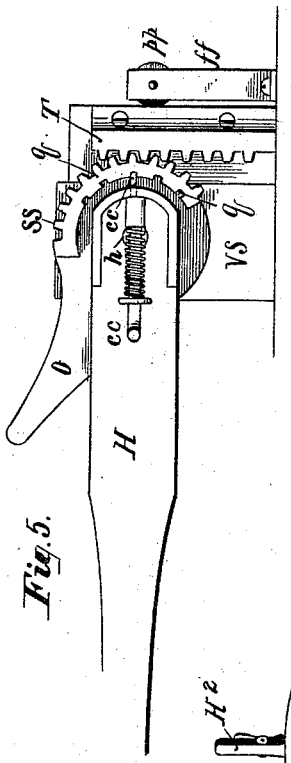
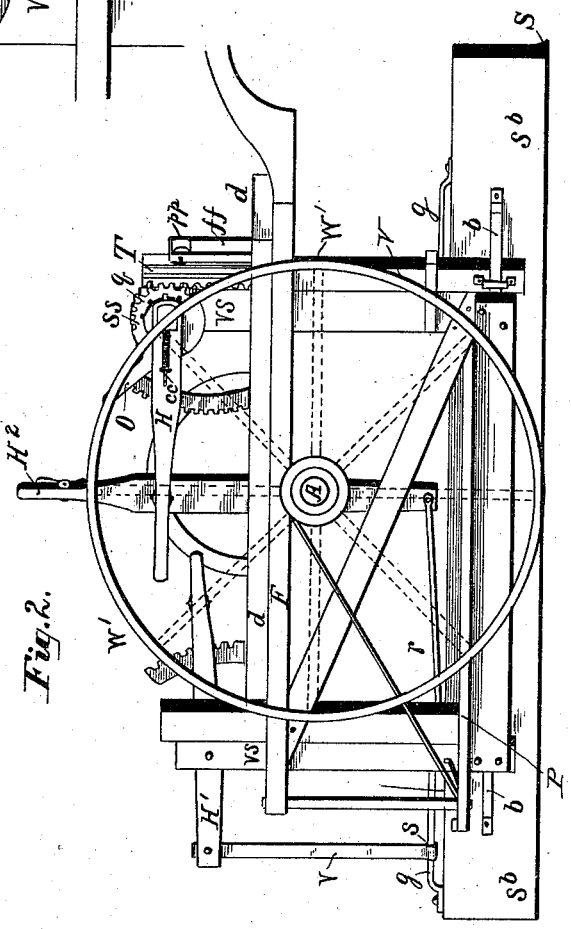


Fig. 2.



WITNESSES:

John Nolan

N Heubner

INVENTOR

Samuel Pennock,

By Joshua Pusey atty.

(No Model.)

3 Sheets—Sheet 3.

S. PENNOCK.

ROAD GRADER.

No. 305,533. Patented Sept. 23, 1884.

Fig. 6.

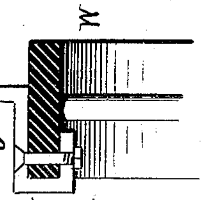
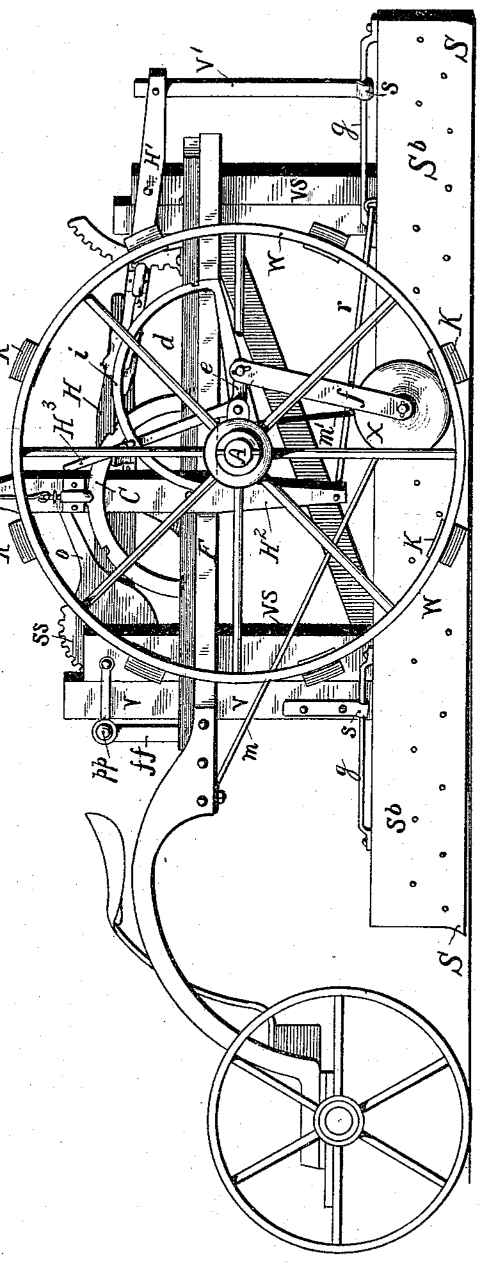


Fig. 3.



WITNESSES:

John Nolan

N H Lenbor

INVENTOR

Samuel Pennock,

By Joshua Pusey, att'y.

UNITED STATES PATENT OFFICE.

SAMUEL PENNOCK, OF KENNETT SQUARE, PENNSYLVANIA, ASSIGNOR TO THE S. PENNOCK & SONS COMPANY, OF SAME PLACE.

ROAD-GRADER.

SPECIFICATION forming part of Letters Patent No. 305,533, dated September 23, 1884.

Application filed February 1, 1884. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL PENNOCK, a citizen of the United States, residing at the borough of Kennett Square, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in Road-Graders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1, Sheet 1, is a plan view of a road-grader in which my improvements are embodied, the scraper being at its extreme outward projection. Fig. 2, Sheet 2, is an off side elevation of the machine. Fig. 3, Sheet 3, is a near side elevation thereof. Fig. 4, Sheet 1, is a detail of the side-thrust resistance-wheel. Fig. 5, Sheet 2, is a side view, enlarged, of the adjustable lever, rack, and toothed-segment device for imparting vertical movement to the scraper; and Fig. 6, Sheet 3, is a detail showing one of the detachable flange-pieces secured to the rim of the near hind wheel of the machine.

This invention relates to that general class of road grading or mending machines in which the scraper-bar is connected to frame-work mounted upon wheels. Such machines are shown and described in my Letters Patent of the United States No. 10,023, of Reissued Patent, dated January 31, 1882, and No. 270,693, of January 16, 1883.

The object of the present invention is more especially to improve the construction of the said patented machines in several particulars without affecting their essential features or principles of operation.

These improvements relate, first, to means for imparting, at the will of the operator, an independent longitudinal or diagonal movement to the scraper, whereby the latter, or rather the bar to which it is secured, may be readily shifted or regulated while the machine is in motion, or otherwise, so that the forward end of the scraper may be projected a greater or less distance beyond the path of the adjacent or off wheel of the running-gear; secondly, to better means for securing, when necessary or desirable, resistance to the tendency of the draft to deflect the machine laterally; thirdly, to adjustable mechanism for facilitating the act of raising or lowering the end of the scraper; fourthly, to certain minor details of construction of the machine, which will be set forth in the course of this specification, and pointed out in some of the claims.

Referring now to the annexed drawings, in which the same letters of reference, where they occur in the several figures, uniformly indicate the same or corresponding parts, F is the forked supporting-frame, whose forward extension is connected to the front axle of the machine in the usual way, and whose rearward extension rests upon and is bolted to the axle A of the hind wheels, W W'. This frame, together with its diagonal cross-bar *d* and the vertical standards *v s*, sustains the platform P, upon which the operator rides, and also the scraper-bar S^b, with the mechanism for manipulating the same in order to give to it the requisite independent vertical and longitudinal movements.

The general construction and mode of operation of the devices for raising and lowering the ends of the scraper-bar are substantially similar to those heretofore employed by me, consisting of the hand-levers H H', connected to the scraper-bar by vertical bars V V', and pivoted, respectively, upon the standards *v s*. There was, however, in said previous arrangement no provision made for imparting a lateral or diagonal movement to the scraper S, which movement I found by experience to be desirable under certain circumstances, so that the forward or leading end of the scraper might be projected beyond the line of the wheel W', behind it, in order more especially to work up close to the usual ditch or depression at the edge of the roadway, thus permitting the adjacent wheel to be kept a safe distance from the edge of the ditch, so that it will not be apt to slide into the same. A means which I have contrived for securing such movement of the scraper is as follows: The scraper-bar is provided with guide-rods *g* near the ends thereof, upon which rods slide the sleeves *s* of vertical supporting-bars V V', whose upper ends respectively connect with the short arms of the hand-levers H H', that are pivoted to the standards *v s*, respectively, the vibration of which levers raises or lowers the scraper. A rod or pitman, *r*, connects the scraper-bar with the

lower extremity of a vertical hand-lever, H^2, which is pivoted on the side of the diagonal cross-bar *d*, and is provided with a spring-catch interlocking with indentations in a segment, C, whereby the lever may be locked in the several positions in which it may be thrown. By reciprocating this lever the scraper is thrown back or forth, as the case may be, in the direction of its length. When the lever is in the position shown in Fig. 1, the leading end of the scraper extends beyond the wheel W′ its full extent. These movements of the scraper may be effected while the machine is in motion, and also without interfering with the operation of the devices for imparting vertical movements to the former.

It is obvious that the extension and retraction of the scraper may be nicely regulated at the will of operator standing upon the platform P, to suit the contour or direction of the roadside or to avoid an obstruction.

Guide-braces *b*, fastened to the rear side of the scraper-bar and spanning the standards *v s*, serve to aid in retaining the scraper-bar in place against the stress upon the latter when the machine is doing work.

In order to counteract the side shifting of the machine, owing to the diagonal position of the scraper, especially when working close to the edge of the roadway, when otherwise there would be danger of the off wheel being forced into the ditch or gutter, I provide a device which may be thrown in and out of play at will. This consists of a wheel, X, with an edge somewhat acute, in order that it shall readily bite into the ground. Said wheel is journaled in a frame, *f*, which is pivoted at the upper end to the bent short arm *e* of a hand-lever, H^3, that is in turn pivoted to the side of the axle A, whereby when said lever is in one position, as in Figs. 1 and 4, the wheel is depressed, so that its edge extends some distance below the periphery of the large wheel W, and when the lever is in the other position—*i. e.*, thrown forward, as in Fig. 3—the wheel X is elevated above the ground. I prefer to bend the short arm of the lever outwardly about at right angles to the long arm, and to pivot said lever on the rear side of the axle, so that when it is drawn back and wheel X thrown down the short arm will stop against the axle just after the pivoted frame *f* has passed under the center or pivot of the lever. In this way the wheel is kept well in place in the ground, yet may easily be shifted to its elevated position. A segment, *i*, with indentations on its side into which the long arm of lever H^3 locks, serves to retain the latter in position. The frame *f* is braced and stayed by means of a lateral rod, *m*, and a transverse bar, *m′*, attached or pivoted, respectively, to the frame F and the axle A. When the wheel X is thus depressed, it is obviously forced or cuts its way a certain distance into the earth, thereby offering an extraordinary resistance to the side-thrust of the machine. This wheel being in front of the scraper, the track or furrow made by it is effaced by the latter. Under usual conditions, however, I rely upon the penetrating flange-pieces K, secured to the rim of the near wheel, W, to furnish sufficient resistance for this purpose. Said pieces are made of the form shown more clearly in Fig. 6, Sheet 3—that is, so as to fit upon and embrace the rim of the wheel on the inner side thereof, and are secured to the latter, at suitable intervals apart, by through-bolts *b′*. I make use of these readily attachable and detachable flange-pieces in lieu of the flanged ring shown in my said Patent No. 270,693.

The feature of my present invention now to be described relates to the devices for giving vertical movement, more especially, to the forward end of the scraper, which requires a greater range of movement than does the rear end. Consequently the throw of the long arm or handle of the operating-lever is such as is sometimes inconvenient to the operator. The object, then, is to avoid the necessity of such long sweep of the lever in order to sufficiently raise or lower the scraper. This I attain, in the present instance, by combining with said lever an independent adjustable toothed or pinion segment, S S, in conjunction with a toothed rack, T, on the side of the vertical bar whose lower end is connected to the forward part of the scraper-bar, as hereinbefore described. The lever and segment both turn on the same pivot or stud, *h*, on the side of the fixed upright *v s*, that is a part of the main frame-work of the machine. This segment has an arm or handle, O, projecting therefrom, and also a series of slots, *q*, in the inner side or periphery thereof, into any one of which the end of a spring-controlled finger-catch, *c c*, on the side of lever H, is adapted to lock, whereby the segment and lever are caused to work as a whole; but when the catch is retracted the two may be adjusted with relation to each other as circumstances may require. I have added a small wheel or pulley, *p p*, journaled in a vertical frame, *f f*, and bearing against the front side of the rack-bar T, in order to aid in taking the strain, and to keep the rack up to its work, yet allowing its free vertical play. Finally, in lieu of the curved plow attachment to be used in connection with my graders, as shown in my said Patent No. 270,693, I now provide a metallic bar or strip, V, secured to the main frame of the machine, and running along the rear edge of the platform P, as seen in Fig. 1. This strip serves to brace the latter, and is provided with a series of holes, *j*, designed for the reception of the hook *h h* of a plow-clevis in case it may be desired to employ a plow in connection with the grader.

Having thus described my invention, I claim as new and wish to secure by Letters Patent—

1. In a road-grader of the described class, the combination, with the scraper, of means, substantially as shown, for imparting independent longitudinal movement thereto, as and for the purpose set forth.

2. In combination with the suspended scrap-

er, the pivoted hand-lever connected thereto and arranged to operate the scraper longitudinally, substantially in the manner and for the purpose stated.

3. The scraper suspended to the vertically-movable bars, so as to be capable of being reciprocated in the direction of its length, with means for imparting such movement thereto, together with means, substantially as described, for raising and lowering said bars, and consequently the scraper, all combined, constructed, and adapted to operate substantially as and for the purposes set forth.

4. In a road-grader of the class recited, the scraper provided with mechanisms constructed and operating substantially as described, whereby said scraper may be moved independently, either in a longitudinal or a vertical direction, or in both directions at the same time, if desired, while the machine is in motion or otherwise, as and for the purpose set forth.

5. In a road-grader, the combination, with the diagonal scraper suspended from the frame-work of the machine, of the resistance-wheel X, when placed in front of the scraper, with means for depressing and elevating the same, substantially as and for the purpose described.

6. In combination with the diagonal scraper secured to the frame-work upon wheels, the resistance or penetrating wheel X, journaled in a frame that is attached to the short arm of a hand-lever, which lever is pivoted on the side of the axle or equivalent support, said short arm being formed and placed with relation to the axle as shown, whereby it stops against the latter just after it has passed a vertical line through the pivot on which the said lever turns, all constructed and adapted to operate substantially as and for the purpose specified.

7. In combination with the diagonally-suspended scraper and the wheels W W′, the attachable and detachable flange-pieces K, secured to the rim of wheel W, as and for the purpose specified.

8. The scraper, the vertical bar connected thereto, the toothed rack, the independent toothed segment, with an arm or handle extending therefrom, the lever H, pivoted concentrically with said segment, together with the slots or stops *q*, and catch *c c*, all combined, constructed, and adapted to operate substantially as and for the purpose stated.

9. In combination with the platform P, the brace-strips U, provided with the perforations *j*, as and for the purpose specified.

In testimony whereof I have hereunto affixed my signature this 21st day of January, A. D. 1884.

SAMUEL PENNOCK.

Witnesses:

W. A. PIERCE,

WILLIAM W. POLK.