(No Model.) 3 Sheets—Sheet 1.

F. M. PENNOCK.

ROAD SCRAPING AND DITCHING MACHINE.

No. 422,621. Patented Mar. 4, 1890.

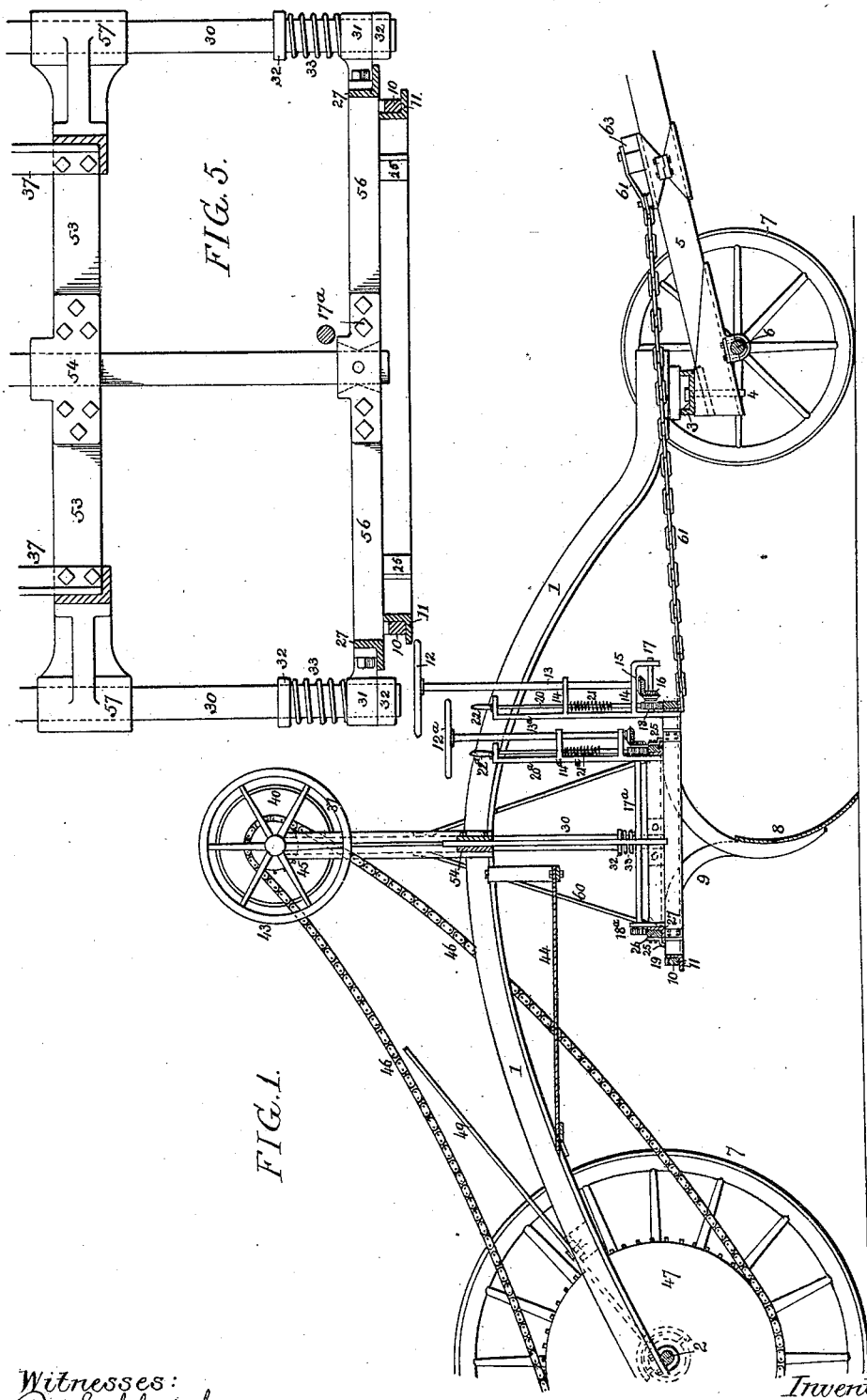

FIG. 5.

FIG. 1.

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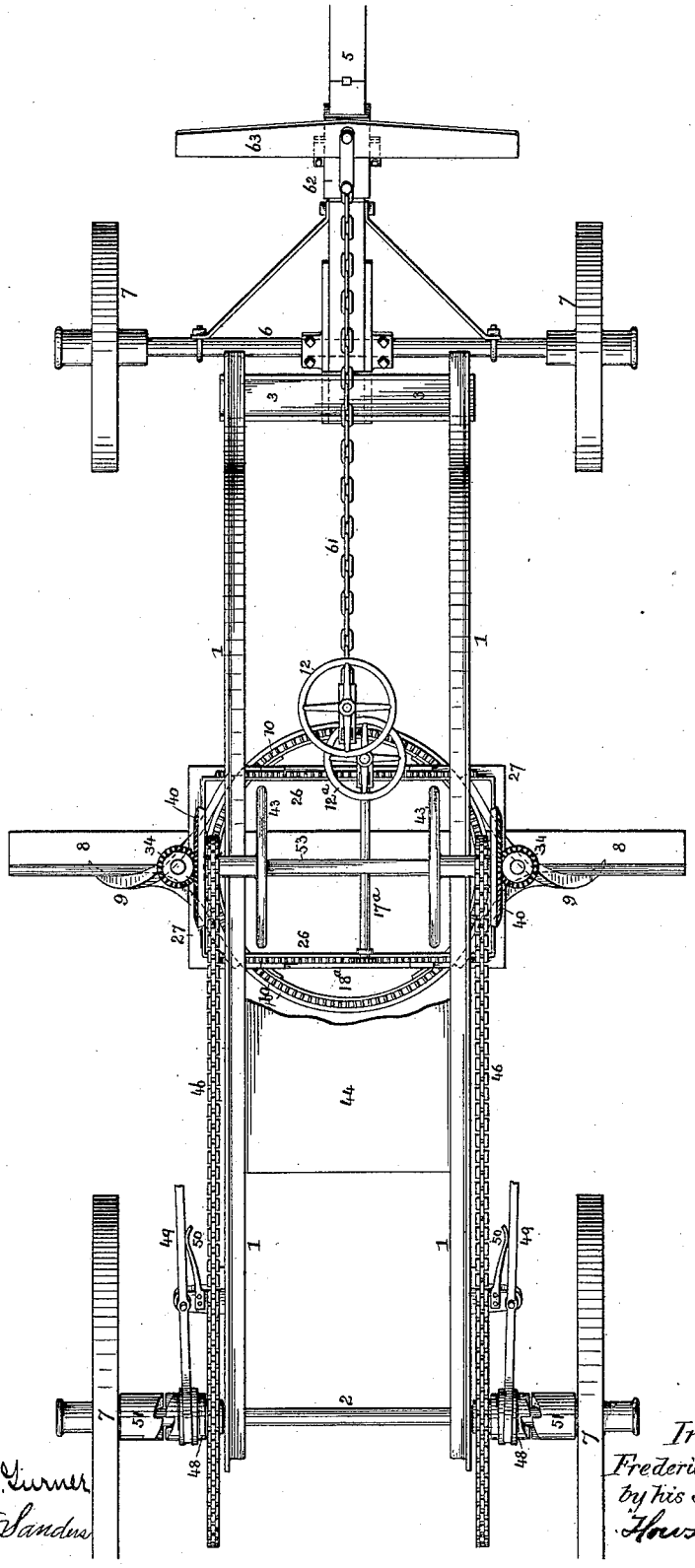
FIG. 2.



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(No Model.) 3 Sheets—Sheet 3.

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FIG. 4.

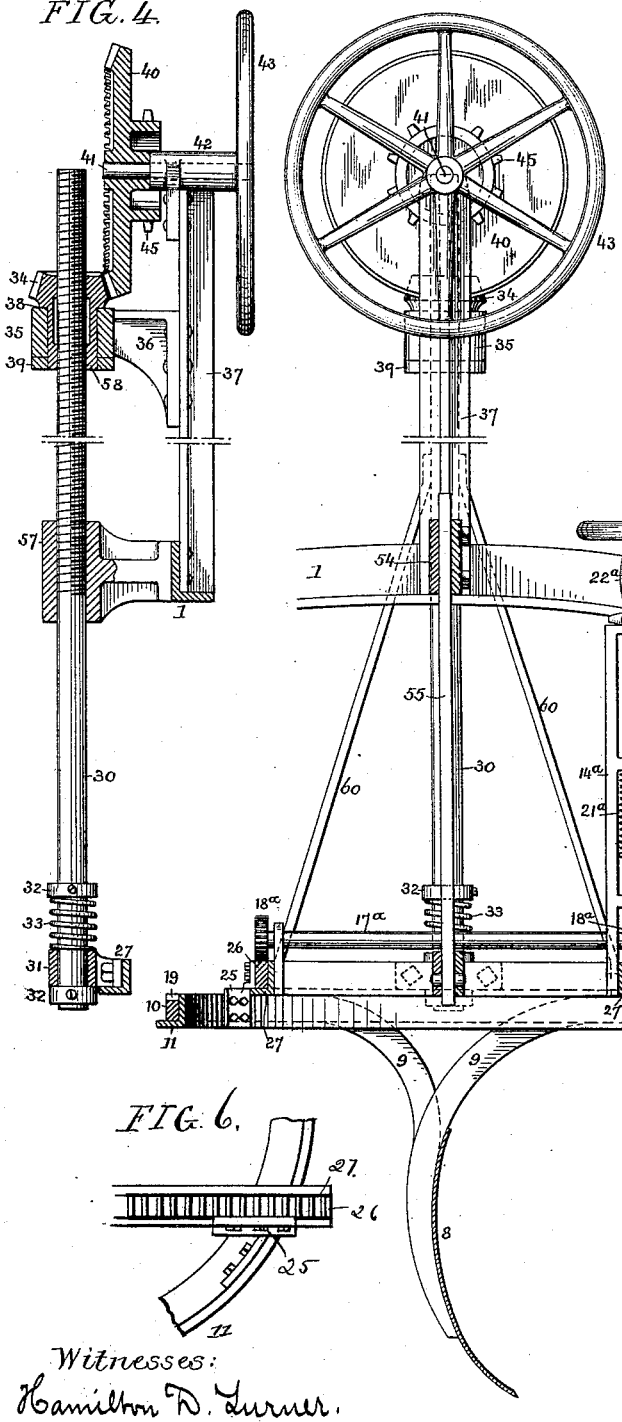
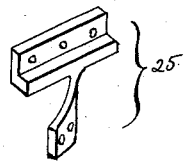


FIG. 3.

FIG. 6.

FIG. 7.



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UNITED STATES PATENT OFFICE.

FREDERICK M. PENNOCK, OF KENNETT SQUARE, PENNSYLVANIA.

ROAD SCRAPING AND DITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 422,621, dated March 4, 1890.

Application filed May 18, 1889. Serial No. 311,251. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK M. PENNOCK, a citizen of the United States, and a resident of Kennett Square, Chester county, Pennsylvania, have invented certain Improvements in Road Scraping or Ditching Machines, of which the following is a specification.

One object of my invention is to construct a road scraping or ditching machine having as few parts as is consistent with the various adjustments of the blade required, a further object being to provide simple and efficient means whereby the lifting or vertical end adjustment of the scraping-blade can be effected by power instead of by hand when necessary, and a still further object being to provide simple draft mechanism which will not be affected by the side shifting of the plowing or scraping blade. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a road scraping or ditching machine constructed in accordance with my invention. Fig. 2 is a plan view of the machine with part of the operator's platform and part of the operating-levers for the power-gears broken away. Fig. 3 is an enlarged longitudinal section of part of the machine, showing the scraping-blade and its adjusting and carrying devices. Fig. 4 is an enlarged transverse section of part of the operating devices for the blade, and Fig. 5 is a transverse section showing the central brace for the blade-carrying frame. Figs. 6 and 7 are views illustrating a detail of the machine.

The fixed frame of the machine comprises opposite side bars 1 1, mounted upon a rear axle 2 and upon a transverse front bar 3, the latter having a king-bolt 4, to which is hung the inner end of a shaft or pole 5, carrying the front axle 6, both front and rear axles being provided with suitable carrying-wheels 7, and the frames being arched in the center, so as to permit the front wheels to run under the same in steering, and so as to provide for the necessary lift of the scraping-blade and of the devices carrying the same.

The scraping-blade 8 is mounted by means of oppositely-curved arms 9 upon the ring 10, which is mounted so as to be free to turn upon an annular frame or track 11, the circumferential movement of the ring on said frame or track being effected by the manipulation of a hand-wheel 12 on a vertical shaft 13, which is adapted to bearings in the frame or standard 14, carried by the frame 11, the lower end of this shaft 13 having a bevel-wheel 15, meshing into a bevel-pinion 16 on a short counter-shaft 17, likewise adapted to bearings in said frame 14, and having a spur-wheel 18, adapted to a rack 19, formed around the upper edge of the ring 10, so that by turning the hand-wheel 12 in one direction or the other like turning movement will be imparted to the ring 10, and the horizontal angular adjustment of the scraping-blade will be effected.

Sliding vertically in suitable openings in the frame 14 is a locking-bolt 20, acted upon by a spring 21 and having at the upper end a cam-lever 22, bearing upon the upper portion of the frame 14. The spring 21 tends to depress the locking-bolt, so that its lower end will engage with the teeth of the rack on the ring 10 and will lock the same in position, the bolt being raised so as to release the ring by depressing the cam-lever 22 before manipulating the hand-wheel 12 to effect a movement of the ring 10 in one direction or the other.

The annular frame or track 11 is suspended by hangers 25, Figs. 6 and 7, from the front and rear transverse slide-bars 26, which are mounted upon the transverse bars of a rectangular carrying-frame 27, transverse movements of said slide-bars on the frame being effected by devices almost exactly similar to those employed for effecting the circumferential movement of the scraper-blade-carrying ring 10; hence in the drawings I have used to indicate the parts of the slide-bar-operating mechanism the same numerals as are applied to corresponding parts of the ring-operating mechanism, distinguishing them by the addition of the letter *a*. The only point of difference between the two sets of mechanism is, that the counter-shaft 17^a extends across the frame 27 and has two spur-wheels 18^a, one for each of the slide-bars 26. Manipulation of the hand-wheel of the slide-bar mechanism thus provides for lateral or side shift of the scraping-blade independent of the horizontal angular adjustment of the

same, the devices for effecting said horizontal angular adjustment being mounted on the annular frame 11, and hence traveling with the latter as it is shifted transversely by means of the slide-bars.

The raising and lowering of the blade, or the independent raising and lowering of the opposite ends of the same, known as the "vertical end adjustment," are effected by means of opposite lifter-rods 30, the lower ends of which pass through openings in brackets 31, secured to the opposite end bars of the rectangular lifting-frame 27, as shown in Fig. 4, each rod having collars 32 above and below the bracket, the lower collar bearing against the bracket, but the upper collar being some distance above said bracket, so that a spring 33 can be interposed between the two. While the blade is always raised and lowered with the rods, therefore said blade can have a slight rising movement independent of said rods when it strikes a stone or meets with some other obstruction offering a resistance greater than the pressure exerted by the springs 33. Each lifting-rod passes through a guide or steady bearing 57 on a bracket secured to the bar 1 of the main frame, and the upper portion of the rod is threaded and adapted to a nut 58, forming the hub of a bevel-pinion 34, said hub being free to turn in a bearing 35 in a bracket 36, secured to and projecting laterally from a vertical standard 37 on the frame 1, the bevel-pinion and its hub being vertically confined to said bearing 35 by means of a shoulder 38 on the pinion and a collar 39 at the lower end of the hub, as shown in Fig. 4. The hub 58 of the bevel-pinion is preferably recessed or chambered between its opposite ends, as shown in Fig. 4, so as to lessen the friction which would be caused if the screw-rod had a bearing in the hub throughout the entire length of the same, and this central recess or chamber may, if desired, be utilized as an oil-reservoir for the purpose of effecting the proper and continual lubrication of the screw-rod 30. The pinion 34 meshes with a bevel-wheel 40 on a short shaft 41, free to turn in a bearing 42 at the upper end of the vertical standard 37, the opposite end of the shaft 41 having a hand-wheel 43, whereby said shaft may be conveniently operated by the attendant standing upon the platform of the machine.

It is also advisable to provide for the lifting of the scraping-blade by power in some cases; hence I form upon the hub of each of the bevel-wheels 40 sprocket-teeth 45 for the reception of an endless chain belt 46, driven by a sprocket-wheel 47, secured to or forming part of a clutch-sleeve 48, free to slide laterally on the axle 2 under control of a suitable lever 49, a spring 50 acting on said lever and tending to move the same, so as to throw the clutch-sleeve 48 out of engagement with the clutch-sleeve 51, which, if the wheels 7 are secured to and turn the axle 2, may be secured to said axle, or if the wheels turn loosely on the axle may be secured to or form part of the hub of one of the wheels. When the machine is being driven forward, therefore, manipulation of either of the levers 49, so as to throw its clutch-sleeve 48 into engagement with the corresponding clutch 51, will effect the operation of the corresponding lifting-rod 30 by the power-transmitting gearing, as described, either end of the blade being thus lifted by power independently of the other end, or both ends of the blade being lifted by power simultaneously when desired.

When the scraping-blade 8 is set at an acute angle in respect to the line of draft, there may, as the machine is drawn forward, be considerable lateral thrust upon the blade, which thrust is transmitted to the transverse carrying-frame 27, and thence to the lower ends of the lifting-rods 30, to which said frame is hung. In order to aid these rods in resisting this strain, I secure to the opposite bars 1 of the fixed frame, or to the standards 37 thereon, a transverse bar 53, which has at or about the center a bearing 54, through which passes a brace-bar 55, extending upward from a transverse bar 56 on the frame 27.

As the bar 53 forms practically a fixed part of the frame of the machine, it provides a comparatively rigid stay for preventing transverse movement of the frame 27, and thus in great measure relieves the lower ends of the lifting-rods from side strain due to lateral thrust upon the scraping-blade.

The lower end of the bar 55 is pivoted to the bar 56, so as to permit vertical end adjustment of the blade without corresponding change in the angle of the bar 55, the bearing 54 being long enough to prevent twisting or distortion of the bar when the frame 27 is subjected to direct lateral thrust.

Diagonal braces 60, extending from the front and rear bars of the frame 27 to the lifting-rods 30, serve to stiffen said frame and prevent twisting or distortion of the same due to rearward thrust upon the blade.

Slotted connections of the braces 60 with the frame 27 or lifting-rods 30 permit the slight lifting movement of said frame independently of the rods hereinbefore referred to, the braces in all cases, however, serving as a means whereby the positive lift of the frame by the rods 30 is assisted.

Draft is imparted directly to the annular frame 11, carrying the blade-supporting ring 10, by means of a chain 61, the front end of which is connected to a block 62, mounted upon and free to slide longitudinally on the pole or shaft 5, this block carrying the double-tree 63, to which the team is attached, so that there is direct draft from the sliding block through the chain to the annular frame 11, lateral or side shift of the latter, as well as its vertical adjustment, in no way affecting this direct and positive draft, but merely causing the block 62 to slide in or out upon the shaft or pole 5 to a slight extent, the block being drawn out to its fullest extent when the frame

11 is in the central position, and the chain 61 is straight and being drawn inward slightly on the pole or shaft as the chain is drawn off at an angle to right or left or up or down by reason of the side shift of the blade or its elevation and depression. A rod may, if desired, be substituted for the chain, although the latter is preferred.

It will be observed that, considering the variety of adjustments of the blade which are permitted, my improved machine has but few parts, which parts are of the simplest and cheapest character; hence my invention provides an extremely effective machine at comparatively low cost.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the scraping or plowing blade, the supporting-ring therefor, and an annular frame or track for said ring, suspended and free to move in a constant vertical plane to effect the lift or vertical end adjustment of the blade, substantially as specified.

2. The combination of the scraping or plowing blade, the supporting-ring therefor, the annular frame or track for said ring, transverse slide-bars carrying said annular frame or track, a transverse supporting-frame for said slide-bars, raising and lowering mechanism for said frame, and operating and locking devices for the slide-bars carried by said transverse frame, substantially as specified.

3. The combination of the scraping or plowing blade, the transverse frame, and opposite lifting-rods for said frame with adjusting-gearing carried by said frame for effecting the side shift and horizontal adjustment of the blade, substantially as specified.

4. The combination of the transverse frame, the opposite lifting-rods for supporting the ends thereof, the side-shifting bars mounted on said frame, an annular frame or track carried by said bars, a ring mounted on said frame and carrying a scraping-blade, gearing carried by the transverse frame for operating the slide-bars, and gearing carried by the annular frame for operating the blade-carrying ring, substantially as specified.

5. The combination of the scraping-blade, the transverse frame, mechanism carried by said frame for effecting the side shift and horizontal angular adjustment of the blade, lifting-rods supporting the ends of the transverse frame, and gearing whereby said rods may be operated by power derived from the wheels or axle of the machine, substantially as specified.

6. The combination of the opposite screw-rods, nuts adapted thereto, bearings for said nuts, bevel-gearing for operating the nuts, endless chains and sprocket-wheels whereby said gearing is actuated from the rear wheels or axle, and clutches and clutch-levers at each side of the machine for throwing said gearing into and out of operation, substantially as specified.

7. The combination of the plowing or scraping blade, the transverse frame carrying said blade, opposite lifting-rods for said frame, a brace-bar connected to the fixed frame of the machine, and a brace-bar carried by said transverse frame and adapted to a bearing on the brace-bar of the fixed frame, so as to resist side-thrust upon the transverse frame, substantially as specified.

8. The combination of the fixed frame, its transverse brace-bar, the transverse lifting-frame carrying the blade, and a brace-bar pivoted to a bar on said transverse frame and adapted to a bearing on the brace-bar of the fixed frame, as set forth.

9. The combination of the main frame of the machine, the scraping-blade, a transverse frame, a blade-carrier mounted thereon and movable laterally in a direction at right angles to the main frame, mechanism for effecting this lateral or side shift, and raising and lowering devices for the transverse frame, substantially as specified.

10. The combination of the frame carrying the scraping-blade with the lifting-rods adapted to brackets on said frame and having collars above and below said brackets, and springs interposed between the upper collars and the brackets, substantially as specified.

11. The combination of the plowing or scraping blade, a carrier therefor adjustable laterally to effect side shift of the blade with a single central draft-chain connected at its front end to a longitudinally-sliding whiffletree-carrier, substantially as specified.

12. The combination of the plowing or scraping blade, a pole or shaft of the machine, a draft-chain for the plowing or scraping blade, and a slide connected thereto and provided with team-attaching devices, said slide embracing the pole or shaft and having an extended bearing on the top and bottom of the same, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK M. PENNOCK.

Witnesses:
WILLIAM D. CONNER,
HARRY SMITH.