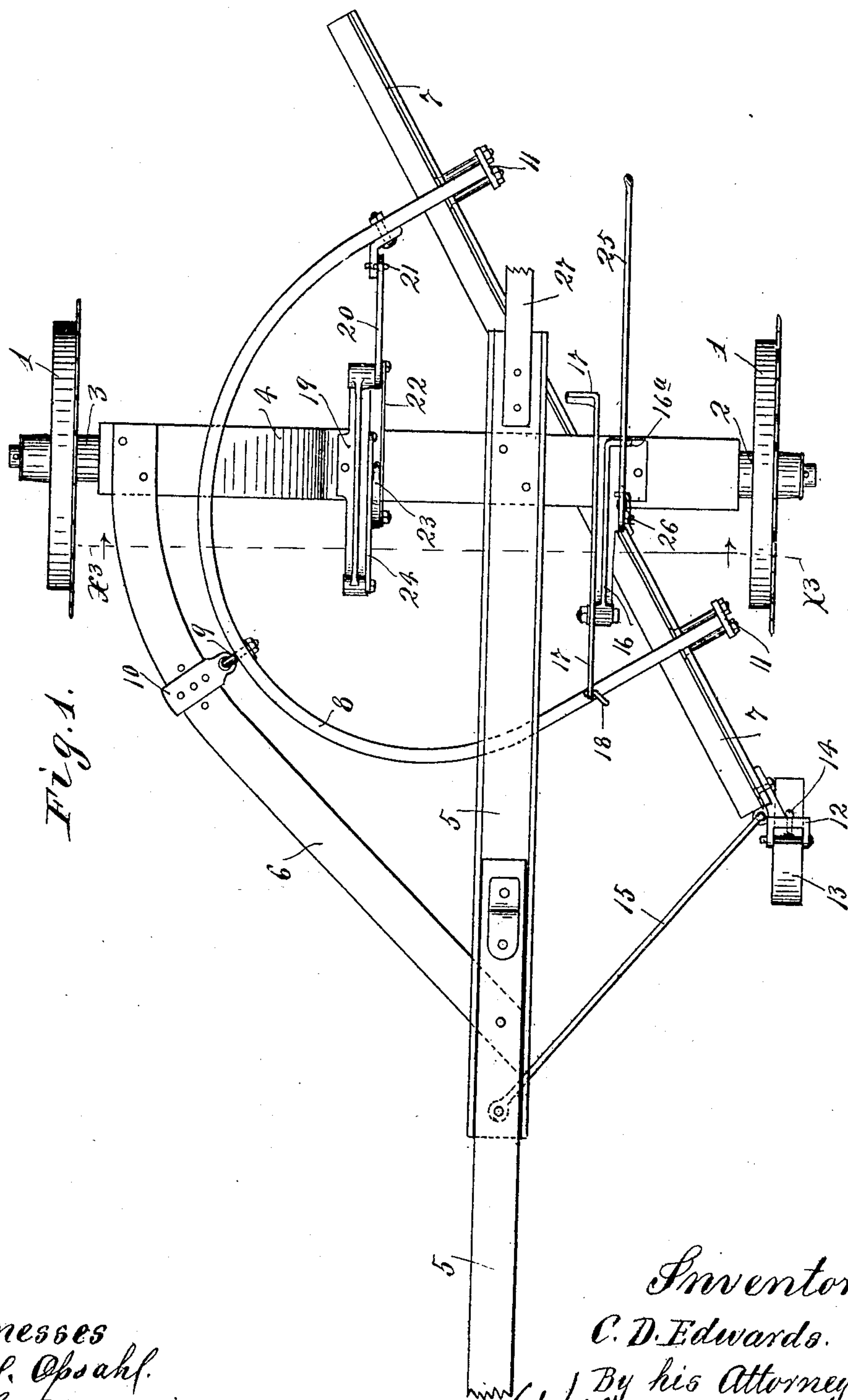


No. 869,354.

PATENTED OCT. 29, 1907.

C. D. EDWARDS.
GRADING MACHINE.
APPLICATION FILED JULY 24, 1907.

3 SHEETS—SHEET 1.



Witnesses
A. H. Opsahl.
L. L. Simpson.

Inventor.
C. D. Edwards.
By his Attorneys
Williamson & Merchant

No. 869,354.

PATENTED OCT. 29, 1907.

C. D. EDWARDS.
GRADING MACHINE.

APPLICATION FILED JULY 24, 1907.

3 SHEETS—SHEET 2.

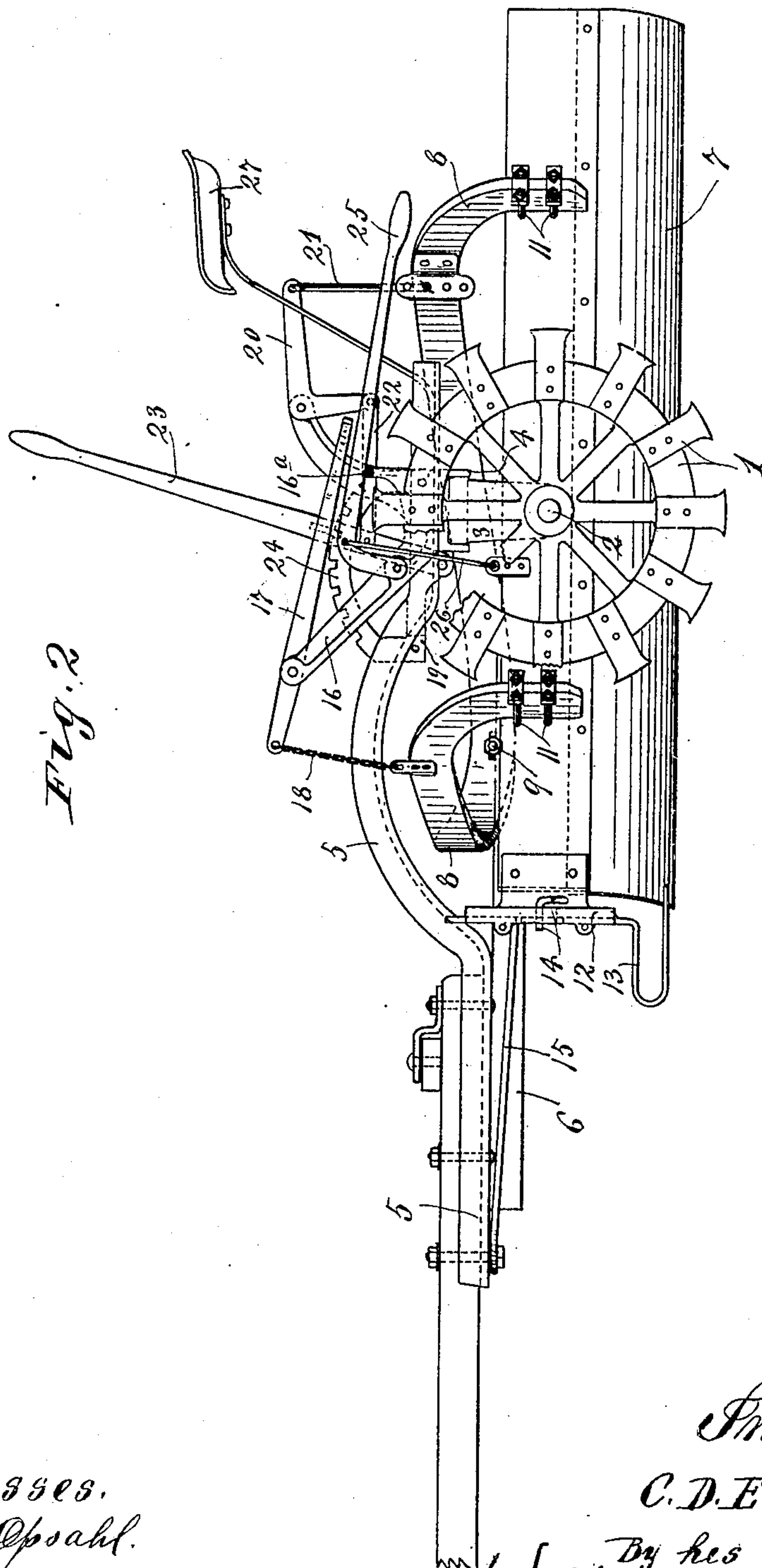


Fig. 2

Witnesses.
A. H. Opsahl.
L. L. Simpson.

Inventor.
C. D. Edwards.
By his Attorneys
Williamson & Merchant

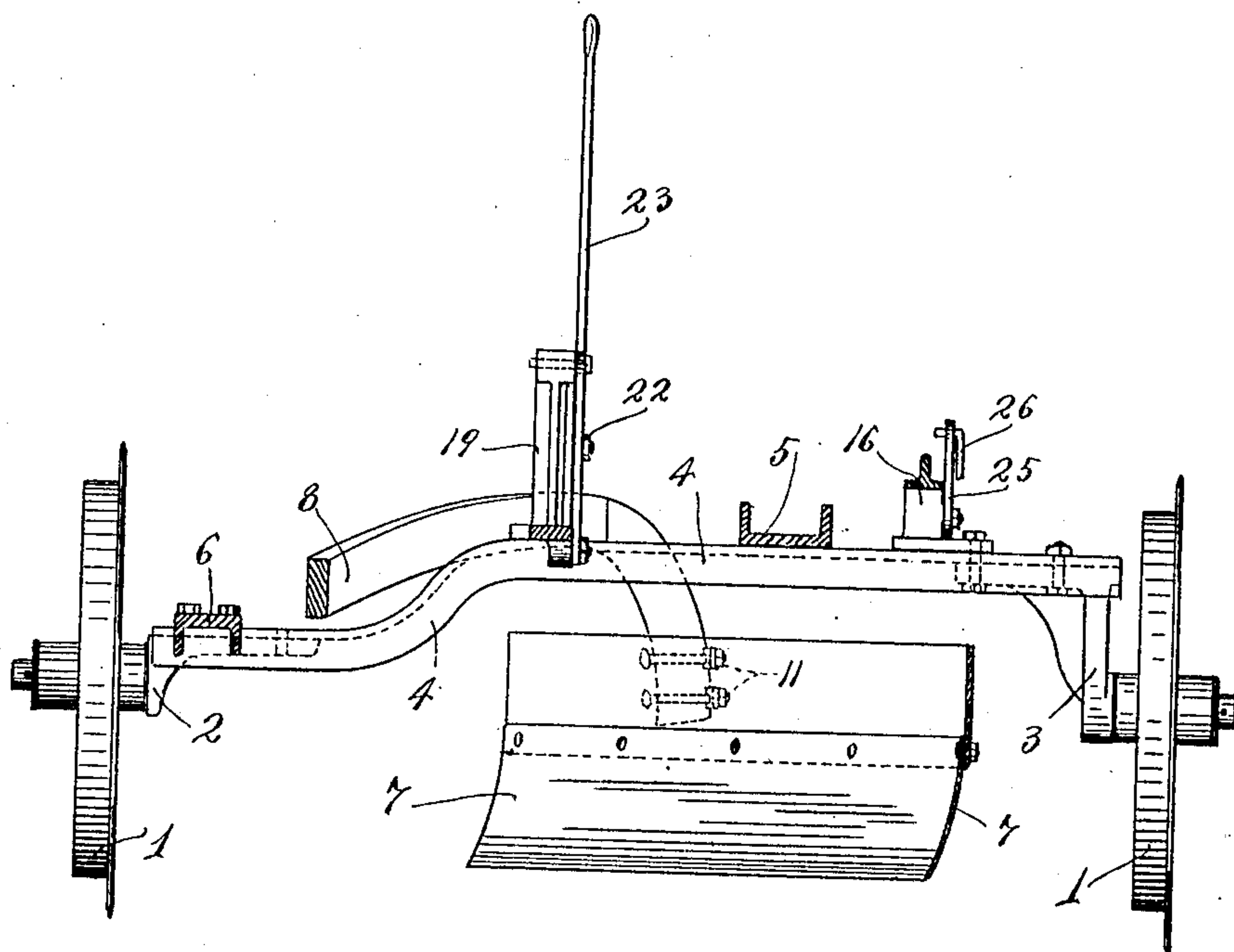
No. 869,354.

PATENTED OCT. 29, 1907.

C. D. EDWARDS.
GRADING MACHINE.
APPLICATION FILED JULY 24, 1907.

3 SHEETS—SHEET 3.

Fig. 3.



Witnesses
A. H. Opsahl.
L. L. Simpson.

Inventor.
C. D. Edwards.
By his Attorneys.
Williamson & Merchant

UNITED STATES PATENT OFFICE.

CHARLES D. EDWARDS, OF ALBERT LEA, MINNESOTA.

GRADING-MACHINE.

No. 869,354.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed July 24, 1907. Serial No. 385,286.

To all whom it may concern:

Be it known that I, CHARLES D. EDWARDS, a citizen of the United States, residing at Albert Lea, in the county of Freeborn and State of Minnesota, have invented certain new and useful Improvements in Grading-Machines; 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 a simple and efficient grading machine, and to this end, my invention consists of the novel devices and combinations of devices hereinafter described and pointed out in the claims.

Some features of the machine herein disclosed are disclosed and claimed in my two prior patents, of date January 23rd, 1906, and numbered, respectively, 810,477 and 810,478.

The preferred form of my improved machine is illustrated in the accompanying drawings, wherein like notations refer to like parts throughout the several views.

In said drawings; Figure 1 is a plan view of the machine, with some portions broken away. Fig. 2 is a left side elevation with respect to Fig. 1, with some portions broken away; and Fig. 3 is a cross section on the line $x^3 x^3$ of Fig. 1.

The numerals 1 represent a pair of frame supporting wheels of the kind disclosed and claimed, as a wheel, in my said prior patent 810,478, and disclosed and claimed in combination with other parts of a grading machine in my prior patent 810,477. Said wheels 1 are mounted on stub axles, marked respectively 2 and 3, which are respectively secured to the opposite end portions of an axle bar 4 which is bent upon itself, as best shown in Fig. 3, to afford sections thereof at different levels. The stub axle brackets 2 and 3 are of unequal height in the vertical sections thereof, with the shorter member 2 fixed to the lower section of the axle bar and the longer axle bracket 3 fixed to the higher section of the axle bar. The numeral 5 represents the draft pole iron, and the numeral 6 a reach bar connecting the pole iron to the lower section of the axle bar 4. The rear end of the pole iron 5 is fixed to the higher section of the axle bar 4, at a point on the scraper side of the center of said bar. These parts marked with the numerals 2 to 6 inclusive constitute a rigid frame supported from the wheels 1.

The numeral 7 represents the scraper, which is of the customary or any suitable form, and is suspended from the wheel-supported frame at an angle to the line of draft. The means for suspending the scraper 7 from the said wheel-supported frame constitutes the most important feature of my present invention. For this purpose, I provide a hanger 8 which crosses a part of

stantially at right angles to the scraper. As shown, the hanger 8 is of bow shape, and is connected at the crown of the bow by an eye-bolt and clip 10, which connection affords pivotal motion in all directions, said parts 9 and 10 together constituting a universal joint device. The clip 10 is adjustable with the reach bar 6. The forward arm of the bow shaped hanger 8 underlies the draft pole 5, and the rear arm of said hanger overlies the lower section of the axle bar 4, as best shown in Fig. 1; and both ends of the bow are curved downward, at right angles to the general plane of the bow, and are rigidly secured to the scraper 7, on opposite sides of the scraper's longitudinal center, so as to support the scraper under the higher section of the axle bar 4. As shown, the downwardly curved ends of the hanger bow are secured to the scraper 7 by clamping devices 11, the bolt members of which have their heads countersunk in the mold-board. The draft pole iron is arched in the portion thereof which overlies the forward arm of the hanger 8. In virtue of the relation of the arms of the hanger 8 to the draft pole iron 5 and the axle bar 4, it is, of course, obvious that the axle bar will limit the downward movement of the scraper, and the arched portion of the pole iron 5 will limit the upward movement of the scraper. Otherwise stated, the pivotal motion of the hanger 8 in the vertical plane is limited, in both directions, by sections of the wheel-supported frame.

To the scraper-head, at its forward end, is fixed a shoe guide 12 in which is adjustably mounted a shoe 13 which may be set at any desired height in respect to the guide 12, and there held by a removable pin 14 engaging registering holes of the guide and the shoe, all as disclosed in my prior patent 810,477. The shoe 13 is set at any height desired in respect to its guide 12, to determine the depth of the cut, at the forward end of the scraper. The shoe guide 12, and thereby the forward end of the scraper, are connected pivotally to the forward end of the draft iron 5 by a combined drag and stay bar 15.

An angular bracket 16 is shown as fixed to the axle bar 4 with a portion thereof extending forward toward the front arm of the hanger 8. To the forward and uppermost end of this bracket 16 is pivoted a foot lever 17 having its short arm connected by a chain 18 to the forward arm of the hanger 8. This foot lever 17 affords a means for raising or lowering the forward end of the scraper. To the axle bar 4 is also secured another angular bracket 19 of bell crank shape, to the upper and rear portion of which is pivoted a bell crank 20 having its rear end connected by a link 21 to the rear arm of the scraper hanger 8. The other arm of the bell crank 20 is connected by a link 22 to a hand lever 23 pivoted to the forward arm of the bracket 19, and provided with means for engagement with a notched lock segment 24 to hold the lever in any desired position. The lever 23 and its

connections afford a means for raising and lowering the rear end of the scraper 7.

To the angular bracket 16 is pivoted a curved lever 25 connected by a link 26 to the scraper-head, for raising
5 or lowering the whole scraper, the lever and link being so applied that the lever will throw past the center in either direction, and, when in its raised position will overlie a stop lug or projection 16* of the bracket 16 and thereby hold the scraper in its elevated position. A
10 driver seat 27 is secured to the wheel-supported frame, in proper position for the driver to reach the several levers for manipulating the scraper 7.

The general operation of the machine is probably obvious from the foregoing specification of the parts, and
15 their relation to each other. By the proper manipulation of the respective levers 17 and 23, the scraper may be so set as to make either of its outer ends the higher, and thereby afford the proper slant for crowning the road to the center in either direction of the machine's
20 travel. Otherwise stated, the scraper is reversible in respect to its vertical slant so as to work on opposite sides of the road in opposite directions of the machine's travel. By the lever 25, the whole scraper may be raised or lowered, for the better handling thereof when
25 turning the machine around, or when moving the machine with the scraper out of use. It is, of course, obvious that the machine is extremely simple in structure, and that the scraper hanger, constructed and applied as described, affords a strong and reliable means for sus-
30 pending the scraper with freedom for the requisite motions of the scraper relative to the frame, and for applying the draft or power from the team to the best advantage for dragging the scraper under load. The flanged wheels 1 resist the side thrusts, as set forth in my prior
35 patent, 810,477.

Although the machine is described with special reference to its use in grading roads, it will, of course, be understood that the same is capable of general use wherever the corresponding functions are desired.

40 What I claim is:—

1. In a grading machine, the combination with a wheel-supported frame and a scraper, of a scraper-suspending hanger overlying a part of said frame and pivoted to the frame, substantially at right angles to the scraper.

45 2. In a grading machine, the combination with a wheel-supported frame and a scraper, of a scraper-suspending hanger overlying the axle bar of said frame and pivoted to the frame substantially at right angles to the scraper.

3. In a grading machine, the combination with a wheel-supported frame and a scraper, of a scraper-suspending hanger overlying the axle bar of said frame, and connected thereto by a universal joint at a point substantially at right angles to the scraper. 50

4. In a grading machine, the combination with a wheel-supported frame having an axle bar with sections thereof at different levels, of a scraper and a scraper-suspending hanger, which hanger overlies the lower section of said axle bar and is provided with downward extensions suspending the scraper below the highest section of said axle bar at an angle to the line of draft, and which hanger is pivoted to said frame substantially at right angles to the scraper. 55 60

5. In a grading machine, the combination with a wheel-supported frame and a scraper, of a hanger, for suspending said scraper at an angle to the line of draft, which hanger is of bow shape and is mounted with one arm of the bow overlying the axle bar, and the other arm of the bow underlying the pole iron of the frame, and is pivoted at the crown of the bow to the frame substantially at right angles to the line of draft. 65

6. In a grading machine, the combination with a wheel-supported frame, having an axle bar with opposite end sections at different levels, of a scraper and a bow shaped scraper hanger mounted with one arm overlying the lowest section of said axle bar, its other arm underlying the pole iron, the crown of its arch connected to said frame by a universal joint substantially at right angles to the scraper, and the ends of its arms curved downward and fixed to the scraper-head for suspending the same beneath the highest section of the axle bar at an angle to the line of draft, substantially as described. 70 75 80

7. In a grading machine, the combination with a wheel-supported frame and a scraper, of a scraper-suspending hanger overlying the axle bar of said frame and provided to the frame substantially at right angles to the scraper, and levers mounted on the frame and operative to afford independent vertical adjustments of the opposite ends of said scraper, substantially as described. 85

8. In a grading machine, the combination with a wheel-supported frame and a scraper, of a scraper-suspending hanger overlying the axle bar of said frame and pivoted to the frame substantially at right angles to the scraper, a vertically adjustable shoe attached to the forward end of the scraper, levers on the frame operative to afford independent vertical adjustments of the opposite ends of said scraper, and a lever on said frame operative to raise or lower the entire scraper, at will, and to hold the same in its elevated position by throwing the lever past a dead center, all for coöperation, substantially as described. 90 95

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

CHARLES D. EDWARDS.

Witnesses:

ALFRED CHRISTOPHERSON,
BEN. H. CLEMENT.