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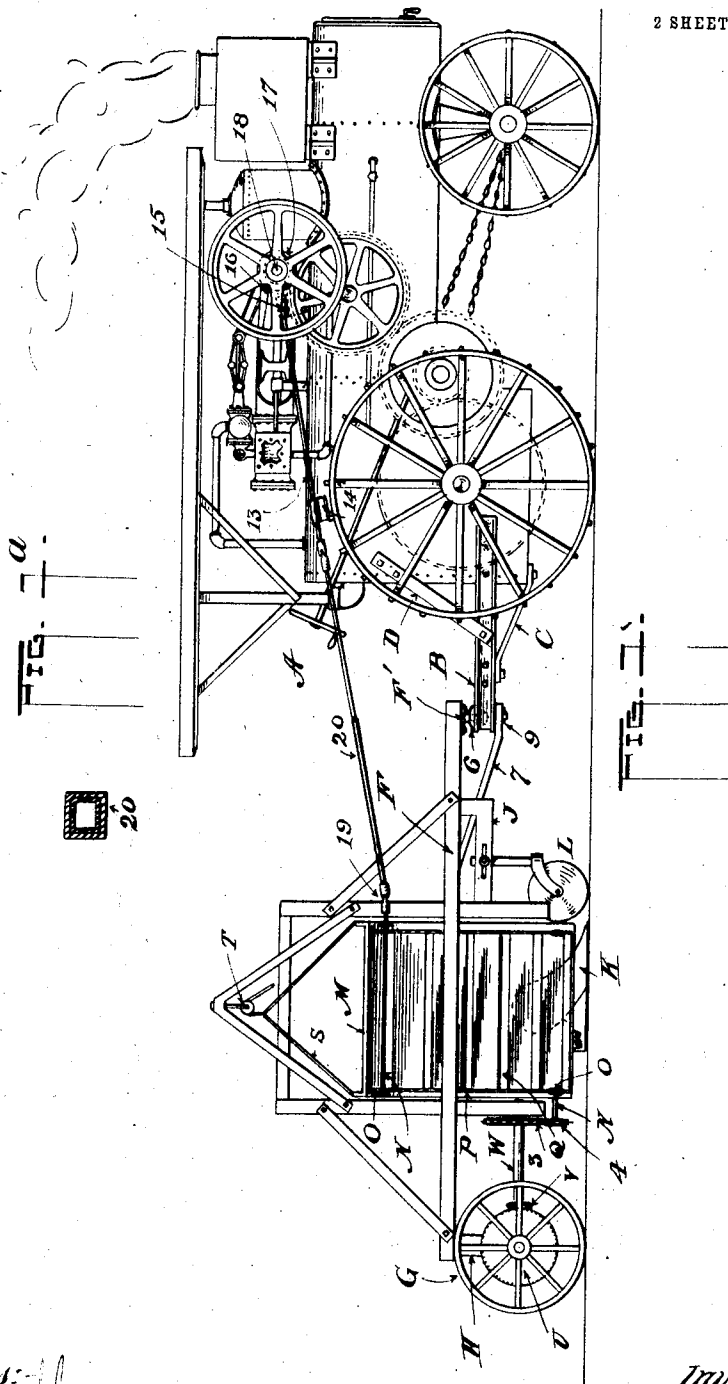
PATENTED OCT. 30, 1906.

H. A. CLAPP.

COMBINED TRACTION ENGINE AND ELEVATING GRADER.

APPLICATION FILED AUG. 26, 1905.

2 SHEETS—SHEET 1.



Witnesses:
J. M. Howell
H. K. Cohen

Inventor:
Hiram A. Clapp,
By L. M. Thurston
att'y

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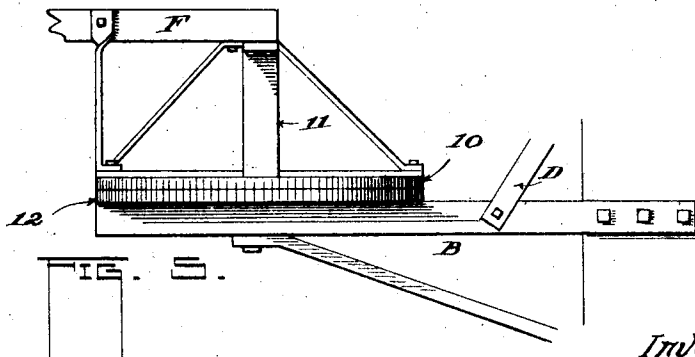
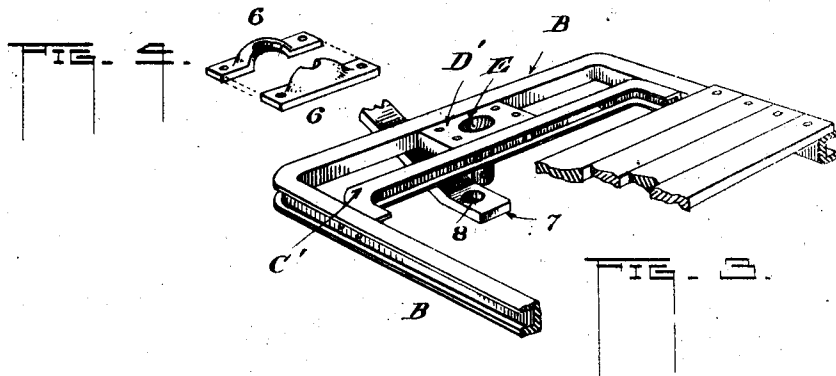
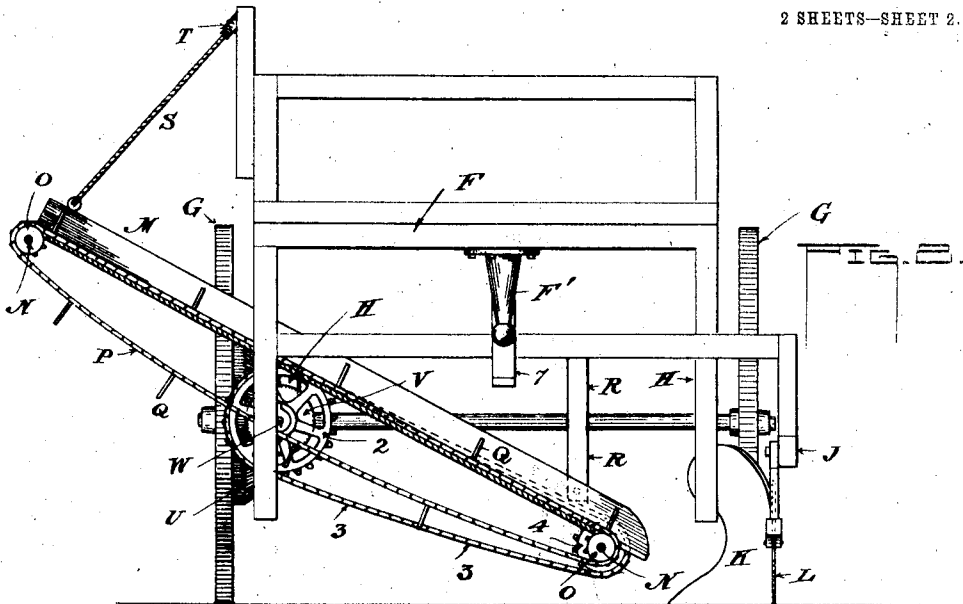
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Witnesses:
H. H. Gales

Inventor:
Hiram A. Clapp,
 By *I. M. Thurston,*
att'y.

UNITED STATES PATENT OFFICE.

HIRAM ALLAN CLAPP, OF CHICAGO, ILLINOIS.

COMBINED TRACTION-ENGINE AND ELEVATING-GRADER.

No. 834,455.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed August 26, 1905. Serial No. 275,936.

To all whom it may concern:

Be it known that I, HIRAM ALLAN CLAPP, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Combined Traction-Engine and Elevating-Grader; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to a combined traction engine and grader.

It has for one of its objects to combine a traction-engine and a machine for grading purposes.

A further object is to combine an engine and grader in a manner whereby the distance between the engine and the plow member of the grader will be greatly reduced from that obtained when combining an engine and an ordinary grader.

Still another object is to provide a positively-driven elevating member for carrying away the dirt from the plow member.

Another object is to positively drive the elevating member from the engine by means of a positive driving connection between the two.

A further object is to simplify construction reduce the cost of production, and, furthermore, to reduce the draft, all of which will be pointed out.

In the drawings, Figure 1 is a side elevation of a traction-engine having coupled therewith a grading-machine. Fig. 2 is a front elevation of the grader. Fig. 3 is a perspective view of a platform of the traction-engine, showing a socket for the reception of a member of the grading-machine. Fig. 4 is a perspective view of a pair of "caps" for covering the socket shown in Fig. 3. Fig. 5 is a modified form of connection between the engine and grader.

The engine is represented by the letter A, being of that form known as a "grader-engine," though as a matter of fact other kinds can be as readily used.

At B is an extension, rigidly secured to the rear of the engine and properly braced, as by the members C and D, below and above, respectively, whereby said platform or extension is properly sustained in rigid position and capable of supporting much weight.

Preferably, though not necessarily, this extension B is formed of channel-iron to give it rigidity and strength, and inside it is bolted a member C', parallel with the rear limb, and between these is bolted a block D' at substantially the middle of the width of the extension, as shown in Fig. 3. In this block is a socket E; the purpose of which will presently appear.

In the rear of the engine (see Fig. 1) is represented a grading-machine, comprising the main frame F, whose rear end is supported and carried on the ground-wheels G by means of the uprights H or other means. Suspended from a portion J of the frame F is the plow member K, forward of which is the usual rolling cutter L, also carried on the frame portion J. Suspended within the main frame F is an elevating mechanism, comprising the elevator-body M, carrying at each end a shaft N and sprocket-wheels O, which project through the bottom of said body and carry sprocket-chains P, provided with drag members Q, designed to travel upward upon the bottom of the said body M for receiving the dirt turned by the plow and elevating and discharging it from the top of the elevator at the side of the ditch being excavated. The elevator-body is suitably supported at its lower end—as, for instance, by a hanger R, Fig. 2, upon which it can pivot—the upper end being adjustable by means of a rope or cable S, carried over a pulley T, suspended from the top of the machine-frame, although it is to be understood that any other means may be used for accomplishing the same purpose. Also any desired mechanism may be employed for imparting the proper movement to the drag members. I have shown in the drawings one form for driving the drag-chains, which may be understood from the following.

Secured to the ground-wheel at one side of the machine is a beveled gear-wheel U, with which meshes a pinion-gear V, carried on a shaft W, lying at right angles to the axle carrying the ground-wheels. The opposite end of said shaft W carries a sprocket-wheel 2, and a chain 3 thereon serves to impart movement to a sprocket-wheel 4 on the lowermost shaft N of the elevator. Now it will be seen that a forward movement of the grading-machine will drive the sprocket-wheel 2 toward the left as viewed in Fig. 2, and a like direction of movement will be im-

parted to the wheel 4, with the result that the upper stretch of elevating-chain will move toward the upper end of the elevator or in a direction to properly discharge the dirt being moved.

Thus far the grader described does not differ materially from those commonly used; but my improvements and invention will now be understood, since it is neither the grader nor the engine that I desire to secure by Letters Patent, but the peculiar combination of the two and the connections by which they are coupled together and which will be described at this time. It will be observed that the grader is destitute of forward supporting-wheels and all mechanism necessary to their use, and it will be further observed that the forward end of the grader-frame is carried up to and upon the extension B of the engine. (See Fig. 4.) Secured to the under side of the frame is a bolster F', consisting of a casting having a ball at its lower end adapted to fit in the socket E of the block D', hereinbefore described. It is thus seen that a ball-and-socket joint results, which will allow the desired pivotal motion between the two machines. In Fig. 4 are depicted two members 6 designed to be secured upon the block D' to cover and hold the ball in the socket E. These members are arched, so as to permit the ball to have free movement, all of which may be understood. In order to provide more strength for the connection between the engine and grader, I employ a bar 7, one end of which is suitably secured to some part of the frame F, (connection not shown,) the other end having a hole 8, designed to receive a pin or stud depending from the block D' and there held by a cotter-pin or other similar device 9, Fig. 1.

As a modification of the pivotal connection between the engine and grader I have shown in Fig. 5 the usual "fifth-wheel" connection used on many classes of implements, such as wagons and the like. The frame F is supported on the upper rim 10 of the fifth-wheel by the upright 11, the lower rim 12 lying upon the extension B of the engine. This also provides a very desirable connection, as is evident.

The removal of the front wheels and the elimination of the parts necessary to their use on a grader admits of the latter being brought about eight feet closer to the engine than would otherwise be possible. The result is that a shorter turn can be made, and a ditch designed to have sharp turns in it can be readily and easily excavated. A further advantage of thus shortening the wheel-base of the combined implements is that a much lighter draft results. It is also evident that an outfit of this form is much more cheaply constructed and is much stronger and more rigid throughout. By the means described also a grader of any make can be changed to

couple with an engine in a very short time when desired to convert it from a horse-drawn to an engine-drawn machine.

I have illustrated and described herein means for driving the elevating portion of the grader from the ground-wheel; but I have also shown a positive driving connection between the said elevating portion and the engine by which the latter will impart unlimited power to the elevator. As a matter of fact it is often impossible to elevate the dirt turned by the plow when the ground is soft or wet, for the reason that the ground-wheels slip, so that the work must be in many cases abandoned until more favorable conditions exist. In view of this I have provided the means shown in Fig. 1, consisting of a shaft 13, mounted in bearings 14 and 15 on the boiler and carrying at one end a beveled gear 16, adapted to mesh with a similar wheel 17 on the engine-shaft 18. The upper shaft N of the grader-elevator is provided at its end with a knuckle-joint 19, as also is the free end of the said shaft 13, and between both said shafts is a tumbling-rod 20, by which the power imparted to the shaft 13 can be imparted to the shaft N. The tumbling-rod is made square or rectangular in cross-section, there being two parts, one of which is adapted to telescope the other. This is in order to permit the said rod to lengthen or shorten at will as the elevator is raised and lowered or as the relation of the grader and engine varies in turning curves. The power at the engine is practically unlimited, and the elevator is therefore rendered capable of raising great weight and working under all conditions. It is quite evident that other mechanical connection could be used to replace the mechanism described, and some means can be used to disengage the gears U and V at the ground-wheel. The elevator is then adapted to be driven from either the ground-wheels or from the engine behind which it is drawn.

I have intimated that I do not wish to confine myself to any particular structure as to the grader or connections between it and the engine, but I desire to secure the combination of an engine and elevating-grader having the positive driving advantages described, also shortening the connection between the implements and lightening the draft by removing the power from the ground-wheels and the like.

I claim—

1. A grading and ditching apparatus comprising a traction-engine having a rearward extension thereon, and a grading-machine having carrying-wheels at its rear end, the forward end of such machine having support on the rearward extension of the engine, there being pivotal means between such engine and grader for the purposes described.

2. In an apparatus of the character described, the combination of a traction-engine,

a grading-machine in the rear thereof, an elevating means on the latter for discharging dirt removed from the vicinity of the plow, an extension on the engine and an extension on the forward portion of the grader for pivotal connection with the engine extension all for the purposes herein described.

3. A power grading apparatus comprising a traction-engine having a rearward extension, a dirt moving and elevating machine in the rear of the engine, rear carrying-wheels for the machine and pivotal connection between the front end of the machine and the engine extension for the purposes described.

4. In a power-drawn grading and elevating apparatus, a traction-engine having an extension at its rear end, a frame in the rear of the engine and having pivotal attachment at its forward end with the engine extension, carrying-wheels at the rear end only of the frame, the forward end of the latter being supported and carried at its front end upon the said extension, a dirt-turning member carried on the frame and an elevator likewise carried thereon.

5. In a power-operated grading apparatus, the combination of a traction-engine having a rearward extension, a frame behind the engine having rear carrying-wheels and carried and supported at its forward end on such rearward extension, a dirt-turning member and a dirt-elevating member carried by the said frame, and driving connection between the said rear wheels and the elevator for driving the latter.

6. In a power-operated grading apparatus, a traction-engine having a rearward extension, a frame behind the engine having pivotal connection with the extension, rear carrying-wheels for said frame, a dirt-turning member and an elevator carried on the frame, driving means between the said rear wheels and the elevator, and positive driving connection between the said elevator and the engine, the said elevator adapted to be operated either by the said rear wheels or by the engine.

7. In a power-operated grading apparatus, a traction-engine a grading-machine rearward thereof and drawn thereby, the forward end of the machine being supported on the engine, an elevator on the machine for carrying dirt and a rigid rod member connecting the engine and the elevator for positively

driving the latter, said member accommodating itself to the varying positions of the engine and grader relatively.

8. In a power-operated grading apparatus, a traction-engine, a grading-machine rearward thereof and supported at its forward end on said engine, rear carrying-wheels for the machine, a dirt-elevating member for the grader and an adjustable rod connection between the engine and the grader adapted to shorten and lengthen and accommodate itself to the varying positions of the engine and the grader relatively.

9. In a power-operated grading apparatus, a traction-engine, a grading-machine rearward thereof, a dirt-elevating member for the grader and a tumbling-rod connecting the said elevator and engine and adapted to drive the former in any position of the grader with reference to that of the engine.

10. In a power-operated grading apparatus, a traction-engine, a grading-machine rearward of the engine and having its forward end pivotally supported on the said engine there being carrying-wheels at its rear end, a dirt-elevator on the grader and a tumbling-rod connecting the elevator and engine, for positively driving such elevator, the rod adapted to shorten and lengthen and alter its position to accommodate itself to the varying positions of the engine and grader relatively.

11. The combination of a traction-engine, a grading-machine rearward of, drawn by and supported at its forward end on said engine, said machine having carrying-wheels only at its rear end, its only other support being at its forward end as described, an elevator for the grader for removing the dirt turned by the plow member, and a tumbling-rod connection between the engine and elevator for transmitting driving power from the former to the latter, said rod having provision for changing its length to accommodate itself to the varying distances between the machines which it connects, said rod likewise conforming to the varying positions of the machines relatively as in turning curves.

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

HIRAM ALLAN CLAPP.

Witnesses:

W. H. COLEMAN,
J. W. McDOWELL.