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PATENTED AUG. 29, 1905.

C. H. WOLFE.
EXCAVATING ATTACHMENT FOR TRACTION ENGINES.

APPLICATION FILED AUG. 20, 1904.

2 SHEETS—SHEET 1.

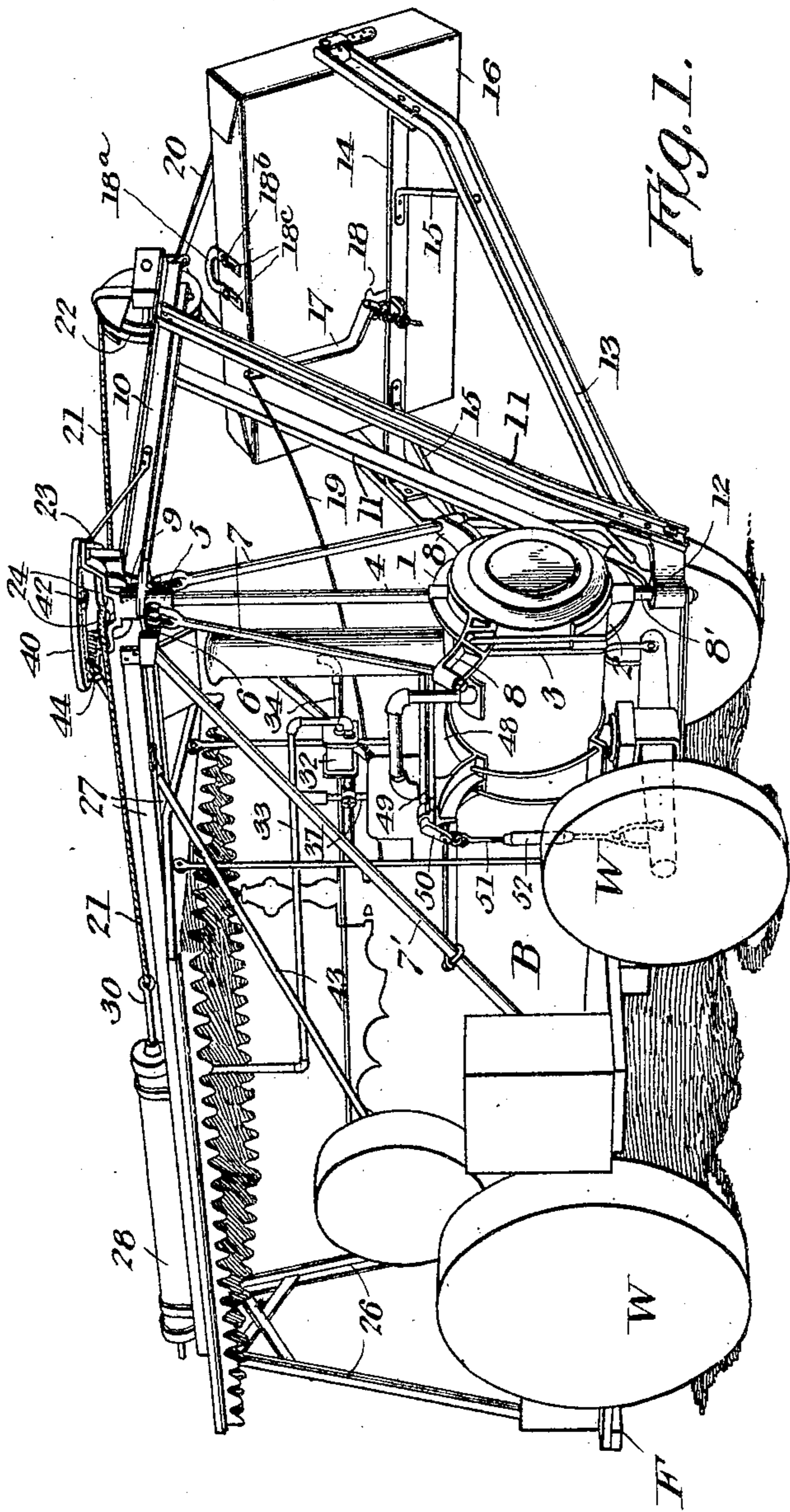


Fig. 1.

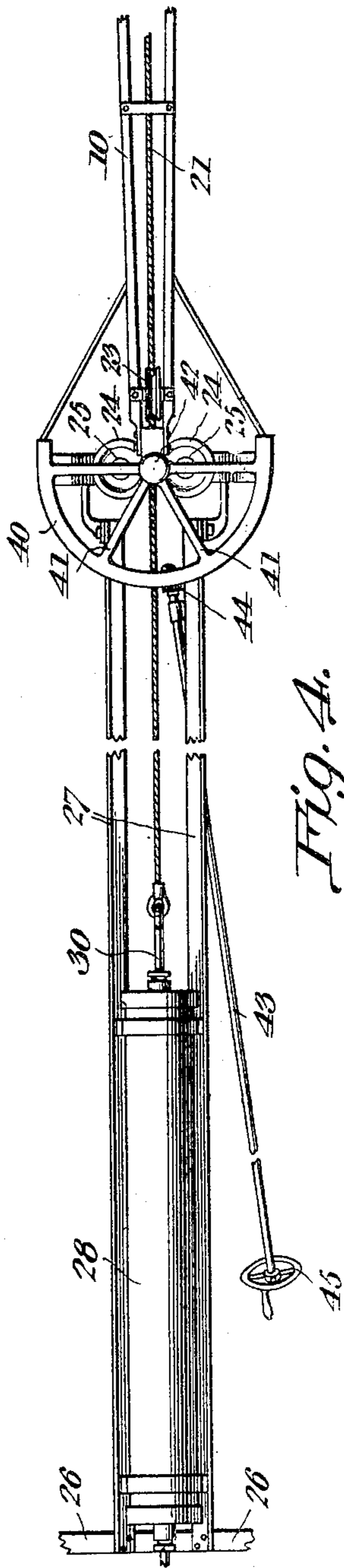


Fig. 4.

Witnesses

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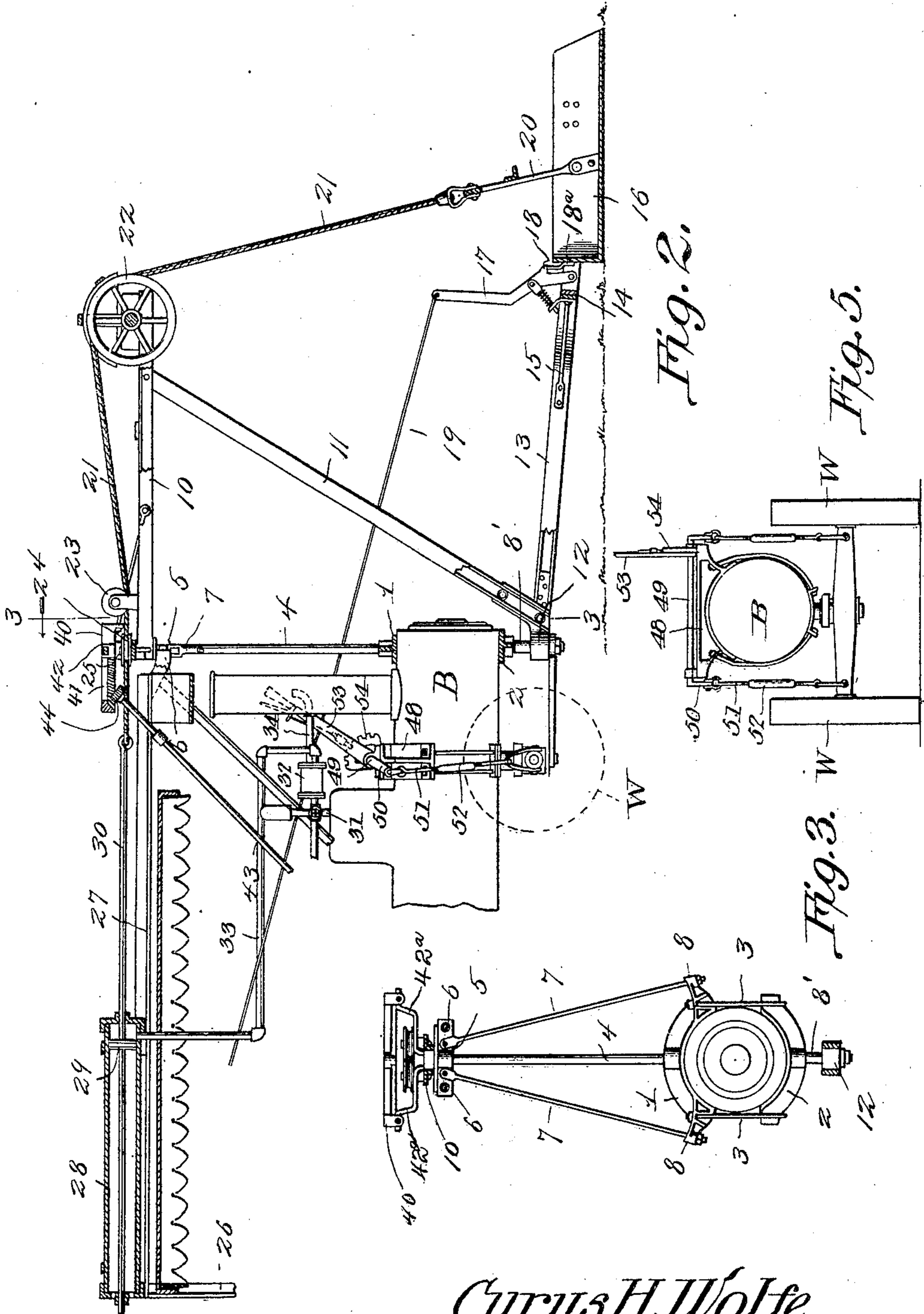
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UNITED STATES PATENT OFFICE.

CYRUS HARLAN WOLFE, OF CHARLOTTE, NORTH CAROLINA.

EXCAVATING ATTACHMENT FOR TRACTION-ENGINES.

No. 798,246.

Specification of Letters Patent.

Patented Aug. 29, 1905.

Application filed August 20, 1904. Serial No. 221,590.

To all whom it may concern:

Be it known that I, CYRUS HARLAN WOLFE, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented a new and useful Excavating Attachment for Traction-Engines, of which the following is a specification.

This device relates to devices for moving earth, and especially to that class of devices which are known as "steam-shovels" and which belong under the general class known as "excavators."

The invention relates particularly to an improved shoveling device adapted to be attached to or detachably mounted upon any ordinary type of traction-engine from which power is derived to operate the said shoveling attachment, the object of the invention being to afford a simple, inexpensive, and easily-operated means for moving dirt by taking the same from the surface of the ground, elevating the same, and conveying it to a place of deposit, which may be in the nature of a vehicle or other receptacle by means of which the dirt excavated by the machine may be removed to a distant point.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts to be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of embodiment of the invention, it being understood, however, that no limitation is necessarily made to the precise structural details therein exhibited, but that the right is reserved to any changes, alterations, and modifications to which recourse may be had within the scope of the invention and without departing from the spirit or sacrificing the advantages of the same.

In said drawings, Figure 1 is a perspective view showing a conventional form of traction-engine to which the invention has been applied. Fig. 2 is a longitudinal sectional view showing as much as is necessary to enable the invention to be understood. Fig. 3 is a vertical transverse section taken on the line 3 3 in Fig. 2. Fig. 4 is a detail plan view. Fig. 5 is a transverse sectional detail view.

Corresponding parts in the several figures

are indicated by similar characters of reference.

In carrying this invention into effect a traction-engine, of which B designates the boiler, W the wheels, and F the frame, is employed, said traction-engine being of any ordinary well-known type and pattern. As is usually the case, the body of the boiler B projects over the front truck.

The improved attachment comprises a saddle 1, adapted to fit upon or to straddle the front end of the boiler, said saddle consisting of a heavy casting which is connected with a girth-block 2, fitting against the under side of the boiler by means of heavy bolts or coupling members 3 3, whereby the saddle and the girth-piece are secured firmly and rigidly upon the boiler. Extending upwardly from the saddle is an upright 4, which may consist of a massive iron shaft which supports at its upper end a head-block 5. The latter is provided with ears or lugs 6, connected by stay-rods 7 with wings 8, extending from the ends of the saddle. The head-block 5 is also connected, by means of stay-rods 7', with the frame of the traction-engine or with the boiler or with any other suitable relatively fixed point which shall render the presence of the stay-rods effective.

The girth-block 2 is provided with a perforation for the passage of the lower end of the mast 4, which latter extends through the boiler extension or the smoke-box and the lower end of which constitutes a pintle 8'. The mast is extended somewhat above the head-block 5 for the reception of a boxing 9 at the inner end of the horizontal beam 10 of a crane or derrick, said beam being bifurcated, as shown, each of the members thereof being connected by an oblique beam 11 with a boxing 12, which engages the pintle 8', formed by the lower end of the mast, thereby enabling the crane to swing in a horizontal plane.

Mounted pivotally between the lower ends of the diagonals 11 is the shovel-carrying frame, the side members of which, 13, diverge forwardly and are connected by means of a cross-bar 14 and braces 15. The shovel 16 is an ordinary metallic scoop which is mounted pivotally between the side members 13 of the frame in such a manner that its front or receiving end shall overbalance its rear end when loaded in order to enable the tilting of the shovel for the purpose of dumping the

contents of the same to be effected automatically by gravity.

The cross-brace 14 supports a spring-actuated trip-lever 17, having a catch 18 adapted to engage a clip or bail 18^a upon the rear edge of the shovel for the purpose of retaining the latter automatically in operative position for the purpose of gathering earth. The clip or bail 18^a is secured adjustably to the back of the shovel by means of set-screws 18^b, engaging slots 18^c in said bail. By properly adjusting the latter it will be seen that the front edge of the shovel may be raised or lowered so as to engage the ground at various depths. A string or rope 19 extends from the trip-lever to a point within convenient reach of the operator, who is thus enabled to trip the shovel at the proper time.

Pivotaly connected with the shovel is a yoke or bail 20, from which a hoisting-cable 21 passes over a guiding-pulley 22, which is mounted in a suitable housing at the point of the crane. The beam 10 of the latter supports a guide-pulley 23, and a pair of horizontally-disposed guide-pulleys 24 are journaled upon studs 25 at the inner ends of the members of the bifurcated beam 10 adjacent to the upper extremity of the mast.

At the rear end of the frame of the traction-engine are mounted a pair of uprights 26, converging upwardly in the direction of each other and suitably braced and reinforced, the upper ends of said uprights being connected with the head 5 by means of longitudinal beams 27, which serve to support a cylinder 28, containing a piston 29, the rod 30 of which extends through one end of the cylinder and is connected at its front end with the hoisting-cable 21, which latter is guided by the pulleys 22, 23, and 24. The cylinder 28 is preferably disposed above the rear portion of the traction-engine, and said cylinder and the piston-rod are of considerable length, so that the elevation of the shovel may be accomplished by a single stroke of the piston-rod.

The motive power is supplied from the steam-space in the boiler of a traction-engine which is shown as being connected by a pipe 31 with a valve-casing 32, which is connected by a pipe 33 with the front end of the cylinder 28. The valve is an ordinary three-port valve, one port of which connects the pipe 31 with the exhaust, which is conducted through a pipe 34 to the smoke-stack, into which it is discharged for the purpose of accelerating the draft. The valve, which has not been shown in detail, may be of any suitable construction.

For the purpose of enabling the crane or derrick to be conveniently swung to either side prior to dumping or discharging a load a segmental gear or rack 40 is provided, said gear being provided with spokes 41 and a hub 42, the spokes being suitably connected, as by means of brackets 42^a, with the boxing 9 at

the inner end of the horizontal beam 10 of the crane or derrick with which the segmental gear or rack is thus firmly connected in a position concentric with the axis of the mast. 43 designates a suitably-supported inclined shaft provided at its upper end with a bevel-gear 44, meshing with the segmental gear 40. The lower end of the shaft 43 extends within convenient reach of the operator and is provided with a hand-wheel 45, whereby it may be conveniently turned. It will be seen that by this simple mechanism the operator without leaving his post is enabled to swing the crane or derrick upon its axis to either side of the machine, thereby enabling him to dump the load at any desired point.

Suitably supported upon the boiler in rear of the smoke-stack and directly above the front axle is a saddle 48, having bearings for a short shaft 49, provided at the ends thereof with cranks 50. Said cranks are connected with the ends of the front axle by means of suitable flexible connecting means 51, including turnbuckles 52, whereby the said connecting means may be tightened to any desired extent. The shaft 49 is provided with a radially-extending arm or lever 53, whereby it may be rotated in its bearings, so as to cause the cranks 50 to take up the slack in the flexible connections 51, and thus draw the front axle into a rigid relation with the boiler. Ratchet means 54 are provided to retain the arm or lever 53 at the desired adjustment. It will be seen that by this simple mechanism the front axle and the boiler may be drawn rigidly together, and thus held while material is being dumped to either side of the machine. This is important in order to prevent the boiler from tilting or from being displaced by the heavy weight which will be imposed thereon when the machine is in the act of dumping at either side.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of this invention will be readily understood by those skilled in the art to which it appertains.

It will be understood that the improved attachment includes simply the derrick and the operating-cylinder and the means whereby these members are connected with a traction-engine or other suitable self-propelling engine, which latter may be of any desired construction. When the shovel is in a lowered position, the traction-engine is utilized to propel it in a forward direction, thus causing the surface soil to be gathered into the shovel. When the soil operated upon is hard, it may be necessary to plow the same in front of the shovel; but when the soil is loose and sandy this will not be found necessary. When a sufficient load has been gathered, the engine may be brought to a stop, while the position of the valve 36 is reversed to admit steam into the front end of the cylinder 28, causing

the piston-rod to recede into the latter and the shovel to be elevated. With the shovel thus elevated the traction-engine may be started and caused to carry the load to any
 5 desired point of delivery, or the crane or derrick may be swung to either side prior to dumping the load upon the ground, or a wagon or other receptacle may be driven underneath the shovel either while the latter is in front
 10 or at either side of the engine. At the proper moment the trip-lever is operated, thus causing the shovel to tilt and to deposit its load, after which it may be immediately lowered for a repetition of the operation, the shovel
 15 when it contacts with the ground automatically assuming its normal operative position with relation to the trip mechanism, as will be readily understood.

This device, as will be seen, is simple and
 20 inexpensive in construction, and it may be easily and quickly applied to almost any ordinary form of a traction-engine in connection with which it may be effectively and serviceably employed for shoveling, grading,
 25 and excavating purposes.

Having thus described the invention, what is claimed is—

1. The combination with a traction-engine, of a crane, means for mounting said crane detachably upon the engine, a shovel-carrying
 30 frame connected pivotally with the lower end of the crane, a tilting shovel, and means for raising and lowering the latter.

2. A shovel attachment for traction-engines
 35 comprising a pivoted shovel-carrying frame, means for connecting the latter with a traction-engine for propulsion by said engine, and means for raising and for lowering said shovel.

3. In a device of the class described, the
 40 combination with a traction-engine, of a saddle straddling the boiler of said engine, means for securing said saddle in position, a mast extending upwardly from said saddle, stay-rods for bracing said mast, a head on the top of
 45 the latter, a crane, a shovel-carrying frame pivotally connected with said crane, a tilting shovel in said frame, a yoke connected with said shovel, and a suitably-guided operating-cable connected with said yoke.

4. In a device of the class described, the
 50 combination of a traction-engine, a saddle straddling the boiler of said engine and having outwardly-extending wings, a girth-block beneath said boiler, clamping means connecting
 55 said girth-block and saddle, a mast rising from the latter and extending through the girth-block to form a pintle, and a crane mounted for horizontal movement upon said mast and pintle.

5. In a device of the class described, a boiler-engaging clamping device including a saddle
 60 and a girth-block, a mast extending through

said saddle and girth-block, a crane mounted for horizontal movement upon said mast, a shovel-carrying frame connected pivotally
 65 with said crane, a tilting shovel, a yoke connected pivotally with the latter, and a suitably-guided operating-cable connected with said yoke.

6. In a device of the class described, the
 70 combination with a traction-engine boiler, of clamping means including a saddle having outwardly-extending wings and a girth-block, a mast extending through said saddle and girth-block and through the smoke-chamber of the
 75 boiler, connecting means for said saddle and girth-block, a head at the upper end of the mast, stay-rods connecting said head with the wings of the saddle and with the traction-engine, a crane pivotally engaging the mast, a
 80 shovel-carrying frame pivotally connected with the crane, a tilting shovel, trip means for the latter, a yoke connected pivotally with said shovel, and a suitably-guided operating-cable connected with said yoke.
 85

7. In a device of the class described, the
 combination with a traction-engine, of a crane, a shovel-carrying frame connected pivotally
 90 with said crane, means for operating the shovel-carrying frame, a rack-segment supported upon the crane, a suitably-supported shaft, a pinion upon one end of said shaft meshing with the rack-segment, and a hand-wheel upon the other end of the shaft within
 95 reach of the operator.

8. In a device of the class described, the
 combination with a traction-engine, of a crane, a shovel-carrying frame connected pivotally
 100 with said crane, means for operating the shovel-carrying frame and the crane to swing the latter to either side of the engine, and means for drawing the boiler of the engine into rigid connection with the front axle to prevent displacement of the boiler from the
 105 axle when the crane is swung laterally.

9. In a device of the class described, the
 combination with a traction-engine, of a crane, a shovel-carrying frame connected pivotally
 110 with said crane, means for operating the shovel-carrying frame and the crane, a saddle supported upon the boiler of the engine above the front axle, a shaft journaled in said saddle, cranks at the ends of said shaft, flexible connections between said cranks and the
 115 ends of the front axle, and means for rotating the shaft to tighten said flexible connections.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CYRUS HARLAN WOLFE.

Witnesses:

JNO. C. McDONOLDE,
 W. M. MOORE.