

C. H. WOLFE.

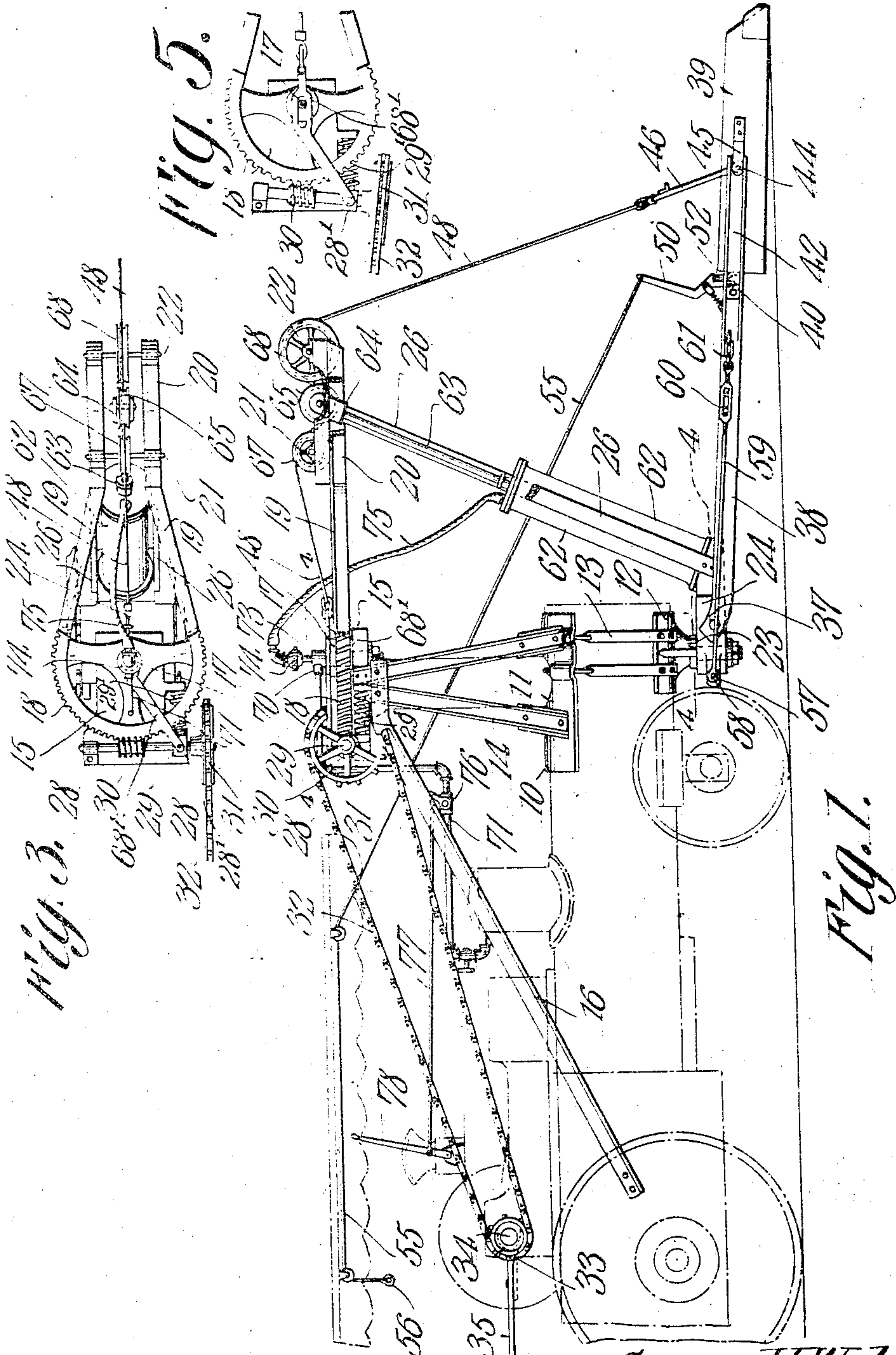
STEAM SHOVEL.

APPLICATION FILED FEB. 18, 1908.

898,618.

Patented Sept. 15, 1908.

2 SHEETS—SHEET 1.



Inventor

Cyrus H. Wolfe.

C. H. Wolfe

Attorneys

Witnesses

E. J. Stewart
J. H. Parker

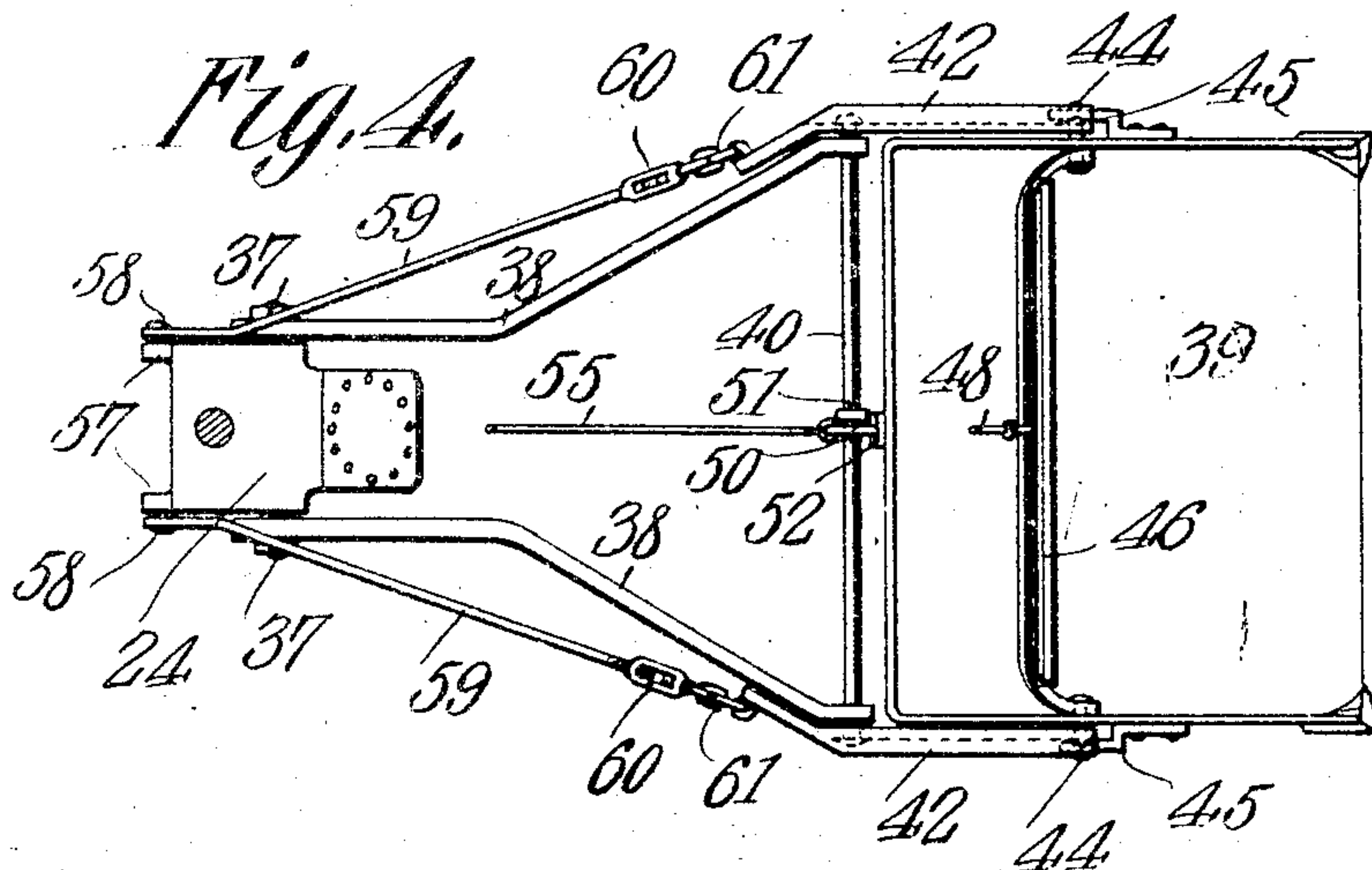
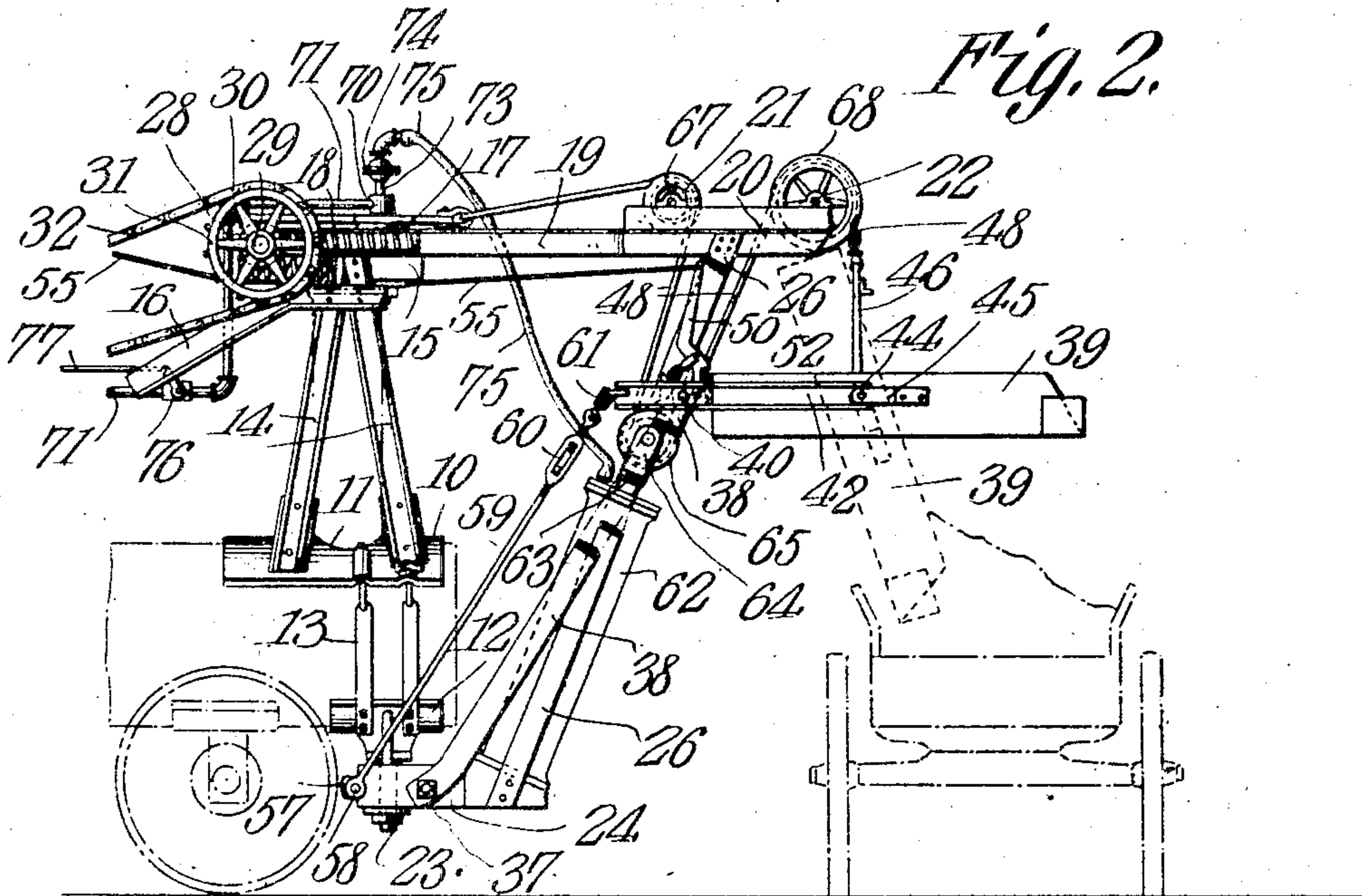
C. H. WOLFE.
STEAM SHOVEL.

APPLICATION FILED FEB. 18, 1908.

898,618.

Patented Sept. 15, 1908.

2 SHEETS-SHEET 2



Witnesses

E. J. [Signature]
John E. [Signature]

Inventor
Cyrus H. Wolfe.

By *Chas. H. [Signature]*
Attorneys

UNITED STATES PATENT OFFICE.

CYRUS HARLAN WOLFE, OF CHARLOTTE, NORTH CAROLINA.

STEAM-SHOVEL.

No. 898,618.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed February 18, 1908. Serial No. 416,513.

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 Steam-Shovel, of which the following is a specification.

This invention relates to excavating machines, and has for its principal object to provide a novel form of steam shovel that is especially adapted for surfacing or stripping, and which may be readily employed as an attachment for an ordinary traction engine.

One of the principal objects of the invention is to provide an improved means for elevating the shovel after filling, so that the contents may be dumped into a wagon or conveyer, or deposited at one side of the machine, especially where the latter is employed in the digging of trenches or ditches.

A further object of the invention is to provide improved means for maintaining the shovel in a perfectly horizontal position as the latter is elevated.

A still further object of the invention is to provide an improved means for turning the shovel carrying frame, so that the load may be deposited at the side of the machine.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a side elevation of an excavating machine constructed in accordance with the invention, showing the same as applied to an ordinary form of traction engine. Fig. 2 is a similar view showing the shovel in elevated position. Fig. 3 is a plan view of the upper portion of the machine. Fig. 4 is a sectional plan view on the line 4—4 of Fig. 1. Fig. 5 is a detail plan view showing the crane turning worm gear out of mesh.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The apparatus forming the subject of the present invention is designed as an attach-

ment for any ordinary type of traction engine and may be readily placed in position or removed, so that the engine may be employed for other purposes.

On the upper portion of the front end of the boiler is arranged an arcuate shoe 10 that is provided with a central opening 11, and fitted around the smoke stack of the engine, and at the under side of the front portion of the boiler, is a lower shoe 12, these shoes being firmly clamped in place by straps 13 of ordinary construction.

To each side of the upper shoe 10 are bolted inclined channel bars 14, forming frames which are united at the top by a head plate 15, and these frames are braced by inclined bars 16, that extend downward and rearward and are bolted or otherwise secured to the smoke box or other fixed part of the engine.

The upper head plate 15 carries a vertically disposed stud 17 on which is mounted a worm segment 18 from the forward ends of which project channel or angle bars 19, that gradually converge toward their forward ends, the extreme portion of the forward ends being disposed in parallel relation and forming a pair of arms that carry bearings for the reception of two transversely disposed shafts 21 and 22.

From the lower shoe 12 depends a post 23, to which is pivoted a block 24 that is held from vertical play by suitable flanges or collars carried by the post, and the axes of the post and the stud 17 are disposed in the same vertical plane. The block 24 is extended to a position forward of the boiler, and the opposite sides of said block are connected to the arms 20 by inclined bars 26, this structure forming a crane which may be freely swung in a horizontal plane with the stud 17 and post 23 as an axis of movement.

The rear portion of the head plate 15 is provided with two bearings 28 and 28' for the reception of a shaft 29 carrying a worm 30 that intermeshes with the worm segment 18. The bearing 28 is pivoted and the bearing 28' is normally forced back by a spring 29' so as to keep the worm out of mesh with the worm wheel. When the two are in mesh the worm may be turned to revolve the crane in either direction. At one end of the shaft 29 is a sprocket wheel 31 that is connected by a link belt 32 to a sprocket wheel 33 that is disposed on the shaft 34 of the operating engine, the sprocket wheel 33 being preferably so

connected to the engine as to permit ready connection and disconnection therefrom, and for this purpose any suitable form of clutch may be employed, the clutch operating lever 5 being indicated at 35.

The block 24 carries a horizontally disposed bolt or pin 37, that is located forward of the axis of the post 23, and to the opposite ends of this pin are pivoted a pair of arms 38 10 which extend forward in parallel relation for a short distance, and thence are arranged on divergent lines to a point adjacent the rear end of the shovel 39 and extending through openings in the extreme forward ends of the 15 arms is a pivot bar 40 that is free to turn in said openings. To the outer ends of the pivot bolt are rigidly secured a pair of levers 42, preferably formed of channel iron, the forward ends of said levers being in parallel 20 relation and their rear arms being bent on lines parallel with the diverging portions of the arms 38. The pivot bolt 40, being rigidly secured to the lever, will turn with the latter as the shovel is raised and lowered during 25 the operation of the machine.

The shovel 39 may be of any ordinary construction, and is provided with flanged side and rear walls. Through the side flanges extend pivot pins 44 carried by the forward 30 ends of the levers 42, and these pins are disposed in a vertical plane rearward of the vertical plane of the center of gravity of the shovel, so that if the latter is left free, its forward end will tilt downward to discharge the 35 load, as indicated by dotted lines in Fig. 2. The pivot pins are reinforced by straps 45 which are riveted or bolted to the side flanges, and have openings for the passage of said pins. To the inner ends of the pins are 40 pivoted the opposite ends of a carrying bail 46 by which the shovel is suspended from a hoisting cable 48.

The shovel is maintained in a horizontal position during the filling and hoisting operations 45 by a latch lever 50 that is pivotally mounted on a block 51 carried by the pivot bar 40, the nose of the latch lever engaging a lip or lug 52 that is carried by the rear end of the shovel. From the upper end of the 50 latch lever extends a wire or cord 55 that runs back over suitable guiding pulleys and is provided with a ring or handle 56 within convenient reach of an operator stationed at the rear end of the traction engine.

55 The lower block 24 is provided with rearwardly extending arms 57 carrying pins 58 which are located at the same distance from the axis of the post 23 as the pin or bolt 37, and to these pins 58 are connected the lower 60 ends of a pair of tension rods 59 that are connected by a turn buckle 60 and a section of chain 61 to the rear arms of the levers 42, and the distance between the pivot bolt 40 and the point of connection of the chains 65 with the levers is the same as the distance

between the pivot pin 37 and the pins 58. This construction is in the nature of a parallel link that will insure retention of the lever 42 and the shovel in a horizontal position during the entire upward movement. 70

On the forwardly projecting end of the block 24 is mounted a steam cylinder 62, the upper portion of which may be secured to the inclined bars 26. This cylinder receives any 75 ordinary form of piston, and from the piston extends a rod 63 carrying at its upper end a bracket 64, in which is journaled a sheave 65 under which the hoisting cable 48 passes. The hoisting cable is, also, guided over sheaves 67 and 68 that are carried by the 80 shafts 21 and 22, respectively, and the rear end of the cable is secured to the front end of a bar 68' having a slot for the passage of the stud 17. The rear end of this bar is connected to the bearing block 28' and when 85 the cable is placed under stress the bearing is pulled forward against the resistance of spring 29' and brings the worm into engagement with the worm segment. When steam or other actuating fluid is allowed to flow 90 into the upper end of the cylinder, the piston will be forced downward and will pull down the sheave 65 for the purpose of elevating the shovel from the position shown in Fig. 1 to the position shown in Fig. 2, and as 95 the sheave operates on a loop or bight of the cable, the stroke of the piston will be approximately one half the vertical lift of the shovel.

In order to supply steam to the cylinder in 10 any position of the crane, the upper end of the stud 17 is made hollow or supports a pipe coupling 70, to which leads a steam supply pipe 71 that is coupled to the steam dome of the engine. From the coupling 70 extends 10 a pipe 73 carrying a swing joint 74, from which leads a flexible steam pipe 75 to the upper end of the cylinder.

In the steam pipe 71 is arranged any ordinary form of three-way valve 76, that is connected 11 by a rod 77 to an operating lever 78. By manipulating this lever the valve may be opened to allow steam to pass from the dome to the cylinder, or may be turned for the purpose of allowing the steam to exhaust from 11 the cylinder through the valve to the outer air. As this valve is of any ordinary type, its detail construction has not been illustrated.

In operation, the shovel remains in the position shown in Fig. 1 during the loading operation, and the traction engine is moved forward until a load has been gathered. During this operation, the spring 29' holds the worm out of engagement with the worm segment, so that the shovel and crane are free to move in any direction for the purpose of gathering the load, the spring being of sufficient strength to maintain the worm separated until strain is exerted on the hoisting 13

cable. Steam is then admitted to the cylinder and the shovel is raised to the position shown in Fig. 2. As soon as the shovel is raised, the strain of the cable will pull the bar 68' forward and the spring 29' will be compressed, allowing the worm to move into engagement with the worm segment and the worm gearing may then be operated for the purpose of turning the crane and shovel to one or other side of the machine as may be desired, the mechanism for turning the sprocket wheel 33 in one direction or the other being of any ordinary type. By pulling the latch cord or wire 55, the latch lever is moved to release position and the shovel then turns by gravity to the dumping position shown by dotted lines in Fig. 2.

It will be seen that the apparatus may be readily attached to any ordinary form of traction engine and employed for ditching, stripping, or other purposes and when the engine is to be otherwise employed, the shovel or excavating attachment may be removed.

I claim:

1. A shovel attachment for traction engines comprising a shovel, a pivoted shovel carrying frame, means for raising and lowering the shovel and frame, and means for maintaining the shovel in horizontal position during the vertical movement.

2. A shovel attachment for traction engines comprising a shovel, a pivoted frame connecting the shovel to the engine, means for raising and lowering the shovel, means for maintaining the shovel in horizontal position during the raising movement, and a latch for holding the shovel from tilting movement.

3. A shovel attachment for traction engines comprising a pivotally mounted frame, a pair of levers pivoted to the upper end of the frame, a shovel pivotally swung between said levers, and tension members connecting the rear ends of the levers to a relatively fixed point and extending approximately parallel with the pivoted frame to thereby hold the shovel and levers in horizontal position.

4. In a shovel attachment for traction engines, a block or support, a frame having its lower end pivoted thereto, a pair of levers pivoted to the outer end of the frame, a shovel pivoted between the forward ends of said levers, tension rods connecting the rear ends of the levers to the block or support at a point to the rear of the pivotal connection of the frame, and means for raising and lowering the shovel and frame.

5. In a machine of the class described, a shovel arranged to be pushed forward to effect loading, a pivoted frame carrying the shovel, means for elevating the frame, and means for maintaining the shovel in a horizontal position during its vertical movement.

6. In a shovel attachment for traction en-

gines, a crane arranged to swing horizontally, a cylinder supported by the crane, a piston rod, a sheave supported by the piston rod, a shovel, a hoisting cable extending from the shovel to a fixed point, a pair of guiding sheaves for directing the cable around the piston carried sheaves, and a pivoted frame forming a connection between the shovel and the lower portion of the crane.

7. In a machine of the class described, a crane, a cylinder supported thereby, a piston in the cylinder, a rod extending from the piston, a sheave carried by the rod, a pivotally mounted shovel, a frame forming a connection between the shovel and the lower portion of the crane, a cable extending from the shovel to a fixed point, a pair of sheaves for guiding the cable around the piston carried sheave, and means for controlling the admission and exhaust of an operating fluid to and from said cylinder.

8. In a machine of the class described, a pivoted crane having a vertical axis of movement, a shovel, a shovel raising cylinder on the crane, and an actuating fluid supply pipe leading to the cylinder and having a swing joint in the plane of said axis.

9. In a machine of the class described, a crane having a vertical axis of movement, a worm segment carried by the crane, a worm engaging the segment, a shaft carried by the worm, means for actuating the shaft for turning the crane in either direction, a cylinder supported by the crane, a shovel, a cable extending from the shovel to a fixed point adjacent the axis of movement of the crane, a cable sheave actuated by the cylinder, and a pair of cable guiding sheaves for directing said cables around the cylinder sheave.

10. In a device of the class described, the combination with a traction engine, of a pair of shoes detachably connected to the front portion of the boiler, truss frames extending from the upper shoe, braces connecting said truss frames to a fixed part of the engine, a head plate carried by the frames, a stud mounted on said head plate, a worm segment on the stud, a worm intermeshing with the segment, means for actuating the worm, a pair of arms extending from the segment, shafts journaled on said arms and provided with guiding sheaves, a post depending from the lower shoe, a pair of spaced pivoted pins carried by the post, a frame connected to the forward pivot pins, a pair of levers pivoted to the outer end of the frame, a shovel hung between the outer arms of the levers, adjustable tension rods connecting the rear ends of the levers to the rearmost pivots of the block, a bail pivoted to the shovel, and a hoisting cable extending from the bail to a connection adjacent the axis of movement of the crane, said cable being guided over the several sheaves.

11. In a machine of the class described, a

crane, gearing connections for carrying the crane, a spring normally holding the gears out of mesh, a shovel, or scoop, and a hoisting member extending therefrom to the gearing connections and arranged to force the latter into mesh when the shovel or scoop is raised.

12. In mechanism of the class described, a crane arranged to swing in a horizontal plane, a worm segment connected thereto, a worm arranged to mesh with the segment, a worm shaft, movable bearings carrying said shaft, a spring acting on said bearings and tending normally to hold the worm out of

mesh with the segment, a shovel or scoop, a hoisting cable extending therefrom to the movable bearing, and means for exerting stress on the cable to thereby move the worm into mesh with the segment when the shovel or scoop is raised. 15

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses. 20

CYRUS HARLAN WOLFE.

Witnesses:

C. V. FURR,
W. M. LONG.