

C. F. HINKLEY.
STEAM SHOVEL.
APPLICATION FILED MAR. 20, 1908.

901,101.

Patented Oct. 13, 1908.

3 SHEETS—SHEET 1.

Fig. 1.

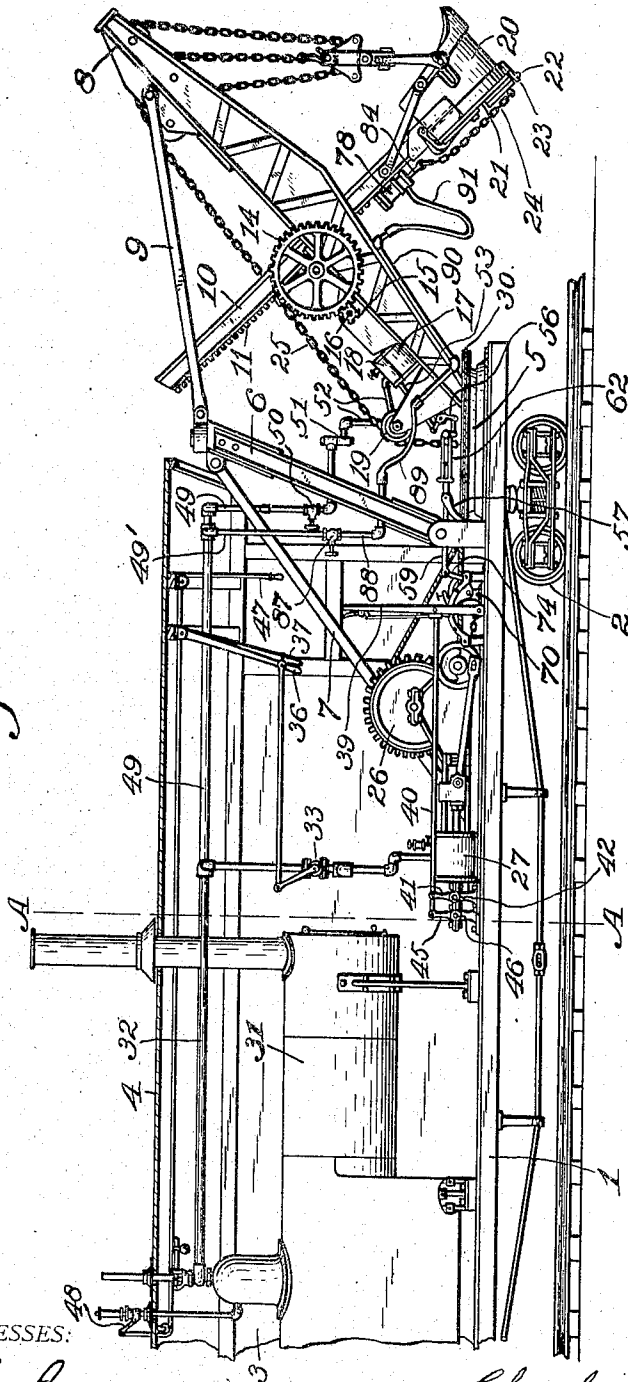


Fig. 3.

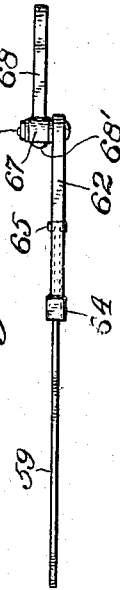
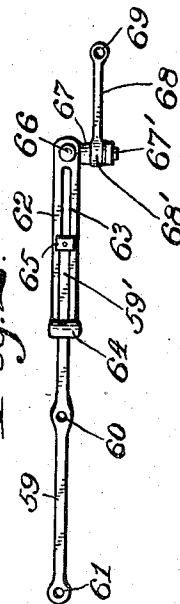


Fig. 2.



WITNESSES:

J. H. Gardner.
M. D. Praty

INVENTOR:

Charles F. Hinkley,
BY
E. T. Silvius,
ATTORNEY.

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3 SHEETS—SHEET 2.

Fig. 5.

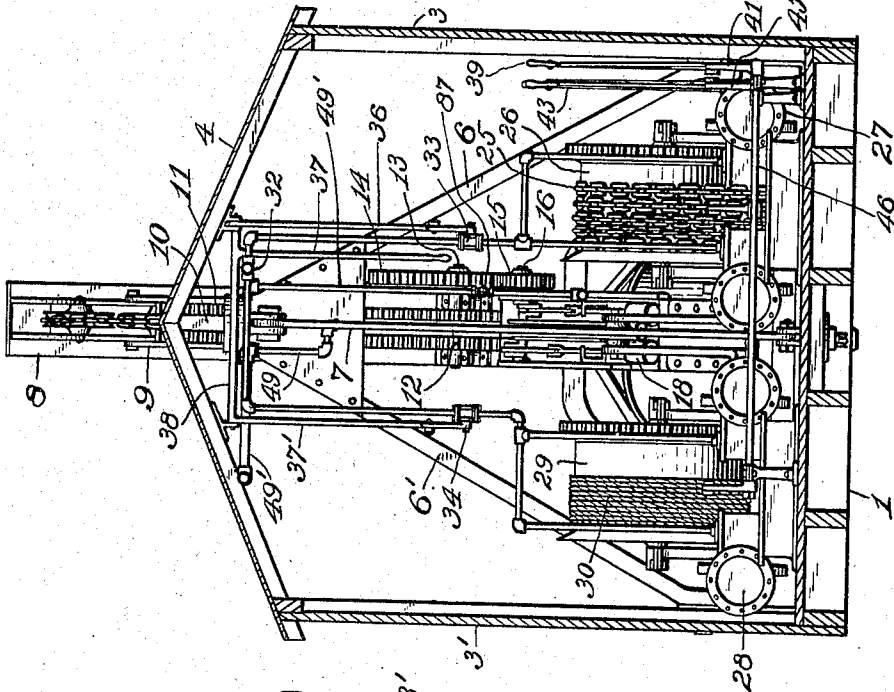
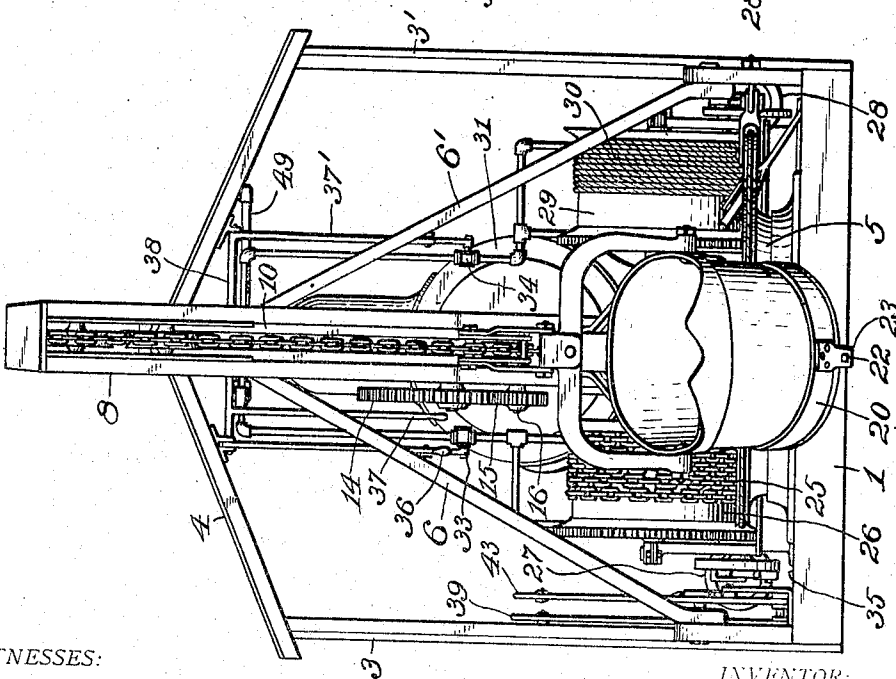


Fig. 4.



WITNESSES:

J. H. Gardner.
M. D. Beatty.

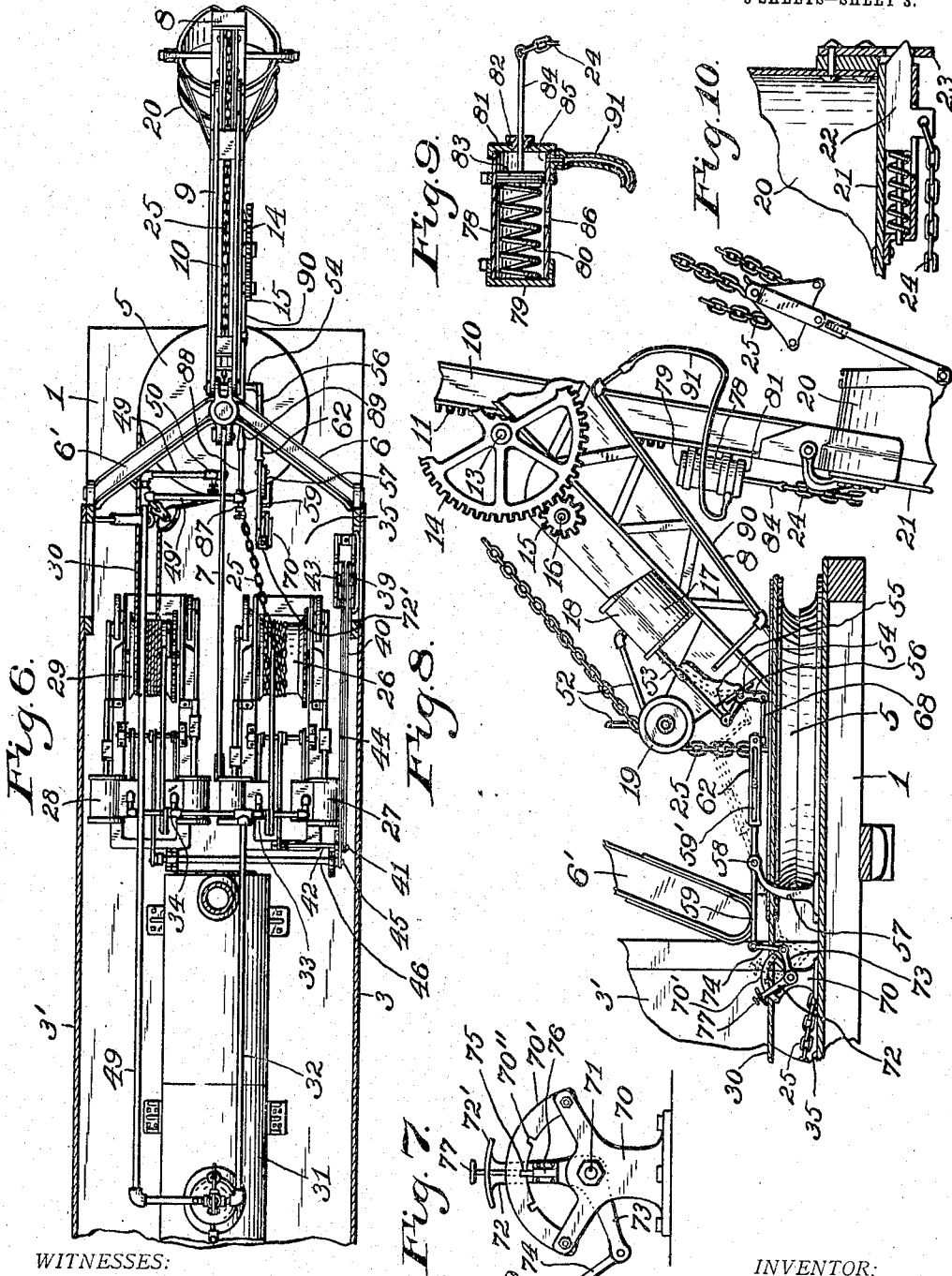
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3 SHEETS—SHEET 3.



WITNESSES:

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 M. D. Beatty.

INVENTOR:

Charles F. Hinkley.
 BY
 E. J. Silvius,
 ATTORNEY.

UNITED STATES PATENT OFFICE.

CHARLES F. HINKLEY, OF SEELYVILLE, INDIANA

STEAM-SHOVEL.

No. 901,101.

Specification of Letters Patent.

Patented Oct. 13, 1908.

Application filed March 20, 1908. Serial No. 422,203.

To all whom it may concern:

Be it known that I, CHARLES F. HINKLEY, a citizen of the United States, residing at Seelyville, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Steam-Shovels; and I do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to the type of machines that have swinging cranes or booms on which auxiliary engines are mounted for operating machinery connected with shovels or scoops for assisting in the operation of the shovels or scoops, the invention having reference particularly to mechanism that is adapted to enable the engineer who may control the main engines to also operate the auxiliary engines of the crane, the invention having reference also to means whereby the engineer may cause the bottom of the shovel to be released for dumping the load.

Heretofore it has been customary to employ and station a man on the swinging crane for operating the auxiliary engine or engines thereon and for dumping the loads out of the shovel; and the object of the present invention is to provide means whereby the auxiliary engine may be operated and controlled by the engineer who controls the engines for hoisting the load and swinging the crane, thus obviating the necessity of employing an additional attendant on the crane, further objects being to provide mechanism that will enable the engineer to have complete control of all movements of the shovel or similar apparatus, so that the greatest efficiency and economy in the operation of the machine may be attained.

The invention comprises mechanism that extends from the position of the engineer to the auxiliary engine that moves on the swinging crane for starting or stopping the auxiliary engine, the mechanism being self adjusting during swinging motions of the crane. And the invention comprises also a fluid actuated device for releasing the bottom of the shovel for dumping the load, and means at the engineer's position for controlling the operation of the device. And the invention consists further in the parts

and combinations and arrangements of parts 55 as hereinafter particularly described and defined in the appended claims.

Referring to the drawings Figure 1 is a fragmentary side elevation of a steam shovel with the engine-house in section and having 60 the improvements applied thereto; Fig. 2, a side elevation of the self adjusting reverse-lever forming a part of the mechanism for controlling the auxiliary engine; Fig. 3, a top plan of the reverse-lever; Fig. 4, a front 65 elevation of the steam shovel; Fig. 5, a transverse sectional view on the line A A in Fig. 1; Fig. 6, a top plan of the machine with the engine-house in section below the roof thereof; Fig. 7, a side elevation of the operating lever for controlling the reverse-lever; 70 Fig. 8, a fragmentary sectional elevation showing the reverse-lever and connections as applied to the auxiliary engine; Fig. 9, a central sectional view of the power cylinder and associated devices for releasing the latch of the shovel bottom; and, Fig. 10, a fragmentary sectional view of the shovel showing the latch of the bottom thereof.

Similar reference characters throughout 80 the various figures of the drawings designate corresponding elements or features of construction.

In the drawings, the principal features of construction of the steam shovel are shown 85 in order to illustrate the purpose and functions of the improvements that are applied thereto, and it will be understood that in the interest of clearness some of the mechanism is shown as being distorted or exaggerated; 90 and details of well known parts of the machinery are omitted.

The principal features of a steam shovel as usually constructed comprise a platform 1 usually mounted on a suitable number of 95 pairs of wheels 2; an engine house on the platform comprising sides 3 and 3' and a roof 4, the platform projecting beyond one end of the house and supporting a turn-table 5, there being an A-frame comprising 100 two members 6 and 6' mounted on the sides of the platform and joined at their tops centrally above the turn-table and serving as a mast for the crane, being supported in upright position by a rod 7, the A-frame usually 105 leaning forward slightly; a jib 8 attached to the top of the turn-table forward of its center and having supporting rods 9

connected pivotally to the top of the A-frame; an arm 10 provided with a toothed rack-bar 11 and mounted on the jib and operated by pinions 12 that are attached to a shaft 13 that is mounted on the jib, the shaft having a gear wheel 14 secured thereto that is driven by a pinion 15 which is secured to the main shaft 16 of the auxiliary engine 17 which is mounted on the jib, the engine having a steam chest 18 in which is a suitable valve for starting, stopping or reversing the engine, as is well known. A guide-pulley 19 is mounted on the jib so as to lead a draw chain down through a central opening in the turn-table to the hoisting engine for lifting the shovel 20 that is attached to the arm 10 and provided with a hinged bottom 21 provided with a spring-pressed latch 22 adapted to engage a latch plate 23 when the bottom swings to closed position, the latch being provided with a chain 24 for releasing it from the latch plate, 25 designating the draw chain that runs over suitable sheaves and over the pulley 19 for lifting the shovel or drawing it forward to fill the shovel. The machine includes also a hoisting-drum 26 operated by a suitable hoisting engine 27 mounted on the platform 1 for operating the chain 25, there being a crane engine 28 having a drum 29 mounted also on the platform, and a cable 30 is mounted on the drum and connected with the turn-table 5 for turning or swinging the crane about its axis. A boiler 31 is mounted on the platform and has a steam pipe 32 connected therewith, the pipe having branches extending to the hoisting engine and crane engine, the pipe leading to the hoisting engine having a throttle valve 33, and the pipe for the crane engine having a throttle valve 34 connected therewith.

The engineer's position is at 35 where he can observe the movements of the crane and shovel, and an operating handle 36, is arranged at the engineer's position and is connected with the valve 33, another handle 37 being similarly connected by means of a rock shaft 38 and arm 37' with the valve 34. A reverse-lever 39 is arranged also at the engineer's position and has a reach rod 40 connected thereto that is connected also to a rock arm 41 mounted on a shaft 42 which is suitably connected with the reversing gear of the hoisting engine 27; a reverse-lever 43 being mounted also at the engineer's position and having a reach rod 44 connected thereto, and connected also to a rock shaft 45 that is attached to the rock shaft 46 which is connected by suitable mechanism to the reversing gear of the engine 28. A whistle cord 47 terminates at the engineer's position and is connected to the whistle 48 that is connected to the boiler. A steam pipe 49 extends from the boiler to the forward portion

of the engine house and downward a suitable distance, and has a stop valve 50 connected thereto within reach of the engineer at his position, a swivel joint 51 being connected to the pipe and arranged at the axis of the crane, a pipe 52 extending from the swivel joint to the steam chest 18 of the auxiliary engine. A valve stem 53 extends through one end of the steam chest 18 towards the turn-table for controlling the auxiliary engine, it being required that the valve stem be moved longitudinally for reversing the engine and held in mid-position for stopping the engine.

The improvements comprise a rock shaft 54 which is suitably mounted on the jib, and has an arm 55 secured thereto connected to the valve stem 53, another arm 56 being secured also to the shaft 54, these devices being arranged forward of the axis of the turn-table, and if desired may obviously be mounted directly on the turn-table to which the jib is attached. A pivot stand 57 is suitably supported fixedly on the platform 1 and has a pivot 58 on which an adjustable reverse-lever is mounted, the reverse-lever comprising a member 59 that has a pivot hole 60 between its ends whereby it is connected to the pivot 58, one end of the member having a pivot hole 61, and the other end of the member having a guide-bar 59', the reverse-lever comprising also a movable member 62 having a guideway 63 therein into which the guide bar 59' extends and is guided by a suitable guide 64 on one end of the member 62, and guide plates 65 attached to the guide bar 59' and engaging the member 62, the other end of the member 62 being provided with a rigid pivot pin 66 on which a coupling block 67 is pivoted, so that it may swing partially about a horizontal axis, the block having a vertical pivot 67' on which a link 68 is mounted by a pivot-head 68' on one end thereof, the link having a pivot hole 69 in its opposite end whereby it is connected to the arm 56, so that when the reverse-lever moves on its pivot up or down, the arm 56 will swing so as to move the valve stem 53. A suitable stand 70 is supported on the platform 1 at the engineer's position and is provided with a quadrant 70' having notches 70'' in the under side thereof, and also has a pivot 71 on which a foot lever 72 is pivoted and provided with an integral arm 73 to which is connected a link 74 that is connected also to the member 59 of the reversing-lever, the foot lever having a foot plate 72' on its upper end and provided with a latch 75 mounted movably in a housing 76 on the foot lever, so that the latch will normally enter either one of three notches in the quadrant, the latch being provided with a plunger 77 for pushing the latch out of the notches. The movement of the lever 72, as

will be understood, will operate the reversing lever as may be desired to move the valve stem 53.

It will be remembered that the chain 25 is at the axis of the turn-table, and as will be seen the reversing lever is placed at one side of the chain with the coupling block 67 as near as convenient to the axis of the turn-table, so that while the reversing lever can not swing laterally, the link 68 may swing with respect to the reversing lever when the crane swings, and the member 62 may slide longitudinally with respect to the member 59 of the reversing lever when the crane swings without affecting results in moving and controlling the valve stem 53.

Other features of the improvement comprise a cylinder 78 that is secured to the under side of the arm 10 at the end of the rack bar 11 and near the shovel 20, the cylinder having a closed head 79 against which a spring 80 is seated that is arranged in the cylinder, the latter having also a head 81 provided with a packing box 82. A piston 83 is movable in the cylinder and is engaged by the spring 80 that normally forces the piston towards the head 81 through which extends a piston rod 84 that is attached to the piston and connected to the chain 24 of the latch 22. The cylinder has an inlet port 85 arranged near the head 81 and an exhaust port 86 arranged between the two cylinder heads so as to permit the escape of steam when the piston is pushed past the port towards the head 79. A branch pipe 49' is connected to the steam pipe 49 and has a valve 87 connected thereto that is arranged at the engineer's station, a pipe 88 extending from the valve to a point near the axis of the turn-table and is connected by a flexible pipe or hose 89 that is connected by a pipe 90 which is mounted on the jib, and has a hose 91 connected thereto that is connected also to the inlet port 85 of the steam cylinder, the flexible hose 91 permitting the arm 10 to swing or to move vertically in the operation of the shovel without fracturing the steam connections.

In practical use, the engineer or man in control of the machine will stand at the station 35 from which position he may reach and move all of the devices above-mentioned for controlling the operations of the engines for lifting the shovel, moving the crane pivotally or for moving the arm of the shovel up or down, or for releasing the latch of the

bottom of the shovel, thus enabling the machine to be operated rapidly with precision and economically.

Having thus described the invention, what is claimed as new is—

1. In a steam shovel, the combination of a platform, a crane pivoted on the platform, an engine mounted on the crane, a starting and stopping device on the engine, and an automatically-adjustable reverse-lever mounted pivotally on the platform and connected with the starting and stopping device, the reverse-lever extending past and near to the axis of the crane-pivot and having an extensible or contractible part.

2. In a steam shovel, the combination of a platform, a crane pivoted on the platform, an engine mounted on the crane, reversing gear for the engine mounted thereon, and an automatically-adjustable reverse-lever mounted pivotally on the platform and connected with the reversing gear, the reverse-lever extending past and near to the axis of the crane-pivot and having an extensible or contractible part.

3. In a steam shovel, the combination of a platform, a crane pivoted on the platform, an engine mounted on the crane and comprising controlling apparatus, and an automatically-adjustable reverse-lever mounted pivotally on the platform and extending past and near to the axis of the crane-pivot and having an extensible or contractible part, a coupling-block pivoted to the extensible or contractible part, and a link pivoted to the coupling-block and connected with the controlling apparatus or the engine.

4. In a steam shovel, the combination of a platform, a crane pivoted on the platform, a movable shovel-arm on the crane, a shovel on the shovel-arm, a bottom hinged to the shovel, a latch for the bottom, a cylinder attached to the shovel-arm, a piston movable in the cylinder and having a rod attached thereto and operatively connected with the bottom-latch, a supply-pipe on the crane, a flexible pipe connected to the supply-pipe and also to the cylinder, and a spring normally holding the piston at one end portion of the cylinder.

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

CHARLES F. HINKLEY.

Witnesses:

JNO. C. HAAS,
L. S. BYERS.