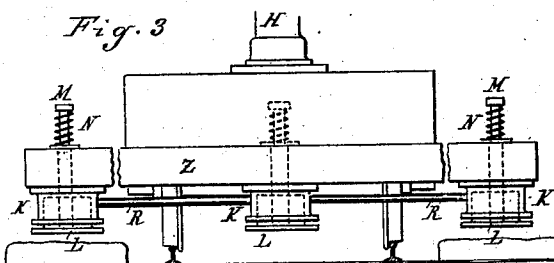
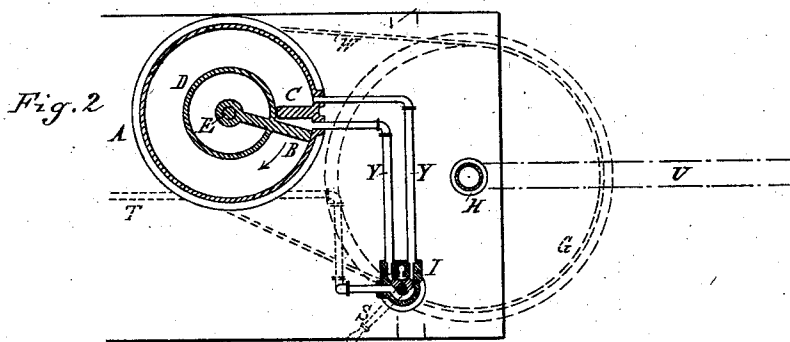
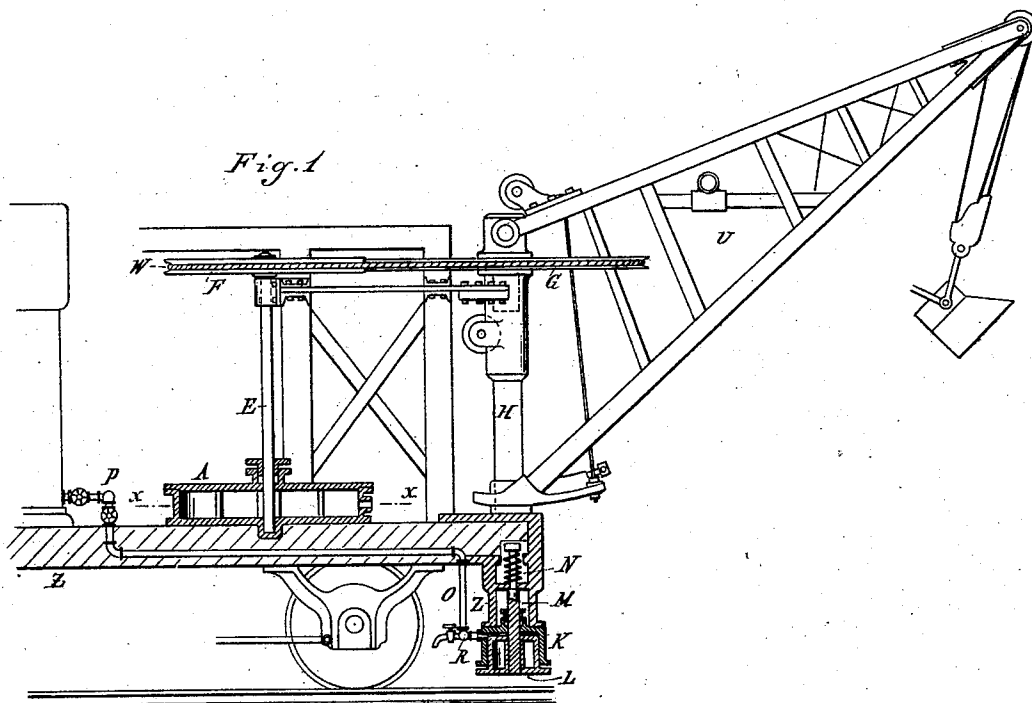


(No Model.)

T. DILL.
EXCAVATING MACHINE.

No. 244,718.

Patented July 19, 1881.



Witnesses:

George H. Carlisle

J. Keena

Inventor:

Thomas Dill
by Geo. H. Lothrop
his atty.

UNITED STATES PATENT OFFICE.

THOMAS DILL, OF BAY CITY, ASSIGNOR TO JAMES CLEMENTS, OF ANN ARBOR, MICHIGAN.

EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 244,718, dated July 19, 1881.

Application filed January 13, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS DILL, of Bay City, in the county of Bay and State of Michigan, have invented a new and useful Improvement in Excavating-Machines, of which the following is a specification.

In the drawings, Figure 1 is a side view with the lower portion in section. Fig. 2 is a top sectional view on line *xx* in Fig. 1. Fig. 3 is an end view of the front of the car, showing the hydraulic jacks.

Z is the frame of a railway flat car.

My invention relates to excavators and hoisting-machines which are constructed with a swinging crane; and it consists, first, in the connection of the mast of the swinging crane, by suitable means, with a shaft which is rigidly connected to an oscillating piston, so that the crane may be swung from side to side and held in any desired position by the direct pressure of steam applied to the piston; second, in using for swinging the crane a circular steam-cylinder in which oscillates a piston carrying a shaft, with suitable connections between the shaft and mast of the crane; third, in the use of inverted hydraulic jacks for steadying the forward end of a car which carries an excavating-machine operated by an injector or pump driven by the boiler which works the excavator.

A is a circular steam-cylinder.

B is a piston pivoted in a circular frame, D, concentric with cylinder A, and which oscillates in cylinder A.

C is a stationary partition or cylinder-head in cylinder A, making a steam-tight joint with circular frame D.

E is a shaft rigidly attached to the center of frame D.

Y Y are steam-pipes for supplying steam to cylinder A.

I is a valve worked by lever S, by which steam can be admitted to or exhausted from either of the steam-pipes Y Y at pleasure.

T is a steam-pipe leading from a boiler to valve I.

F is a wheel or pulley on the upper end of shaft E.

H is the mast of the crane U of an excavat-

ing or hoisting machine, set so as to be capable of turning on its axis.

G is a pulley attached to the upper end of mast H.

W is an endless rope or chain passing around pulleys F and G, which rope is to be attached at suitable points to the respective pulleys, so as to avoid slipping when the pulleys are in use. The pulleys are to be so proportioned that turning pulley F less than one turn in either direction will swing the mast H to the full extent of its desired motion. When steam is admitted to the left-hand pipe Y in Fig. 2 it will enter the cylinder A and force the piston B in the direction indicated by the arrow, thus turning shaft E and pulley F. When the crane is swung as far as required steam can be admitted through the right-hand pipe Y to cushion the piston, and to force it in the contrary direction, when desired. Valve I is so adjusted that when it admits steam to either pipe Y it exhausts the other pipe Y.

K K K are inverted hydraulic jacks attached to a frame extending across the front end of the car. At the upper end of the piston of each jack is a spiral spring, N, strong enough to hold the piston clear of the ground when the jack is not in use.

P is a pump or injector, by which water can be forced through pipes O and R into all of the jacks simultaneously. When the excavator or hoisting-machine is ready for work water is forced into the jacks until the weight of the forward end of the car is borne upon the jacks in order to steady the machine.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an excavating apparatus, the combination of a vertical mast pivoted in bearings to permit its rotation, and connected with a swinging crane, with a vertical shaft rigidly connected at its lower end with the oscillating piston of a steam-cylinder, and at its upper end connected with the mast of the swinging crane, substantially as described, whereby when the said piston is oscillated the mast of the crane is rotated in its bearings and swings the crane, as set forth.

2. In an excavating apparatus, the combi-

nation, with a vertical mast arranged to rotate in bearings and connected with a swinging crane, and provided at or near its upper end with an attached pulley, of a vertical shaft 5 connected at its lower end with the oscillating piston of a steam-cylinder and provided, at or near its upper end, with an attached pulley, and a rope or chain connecting the pulley of the mast and the said shaft, substantially as described, whereby when the piston is oscillated 10 the mast will be rotated and swing the crane, as set forth.

3. The combination of the cylinder A, piston B, center D, shaft E, pulleys F G, connected

by suitable ropes or chains, and mast H with 15 the swinging crane U, substantially as shown and described.

4. In an excavating or hoisting machine, the inverted hydraulic jacks K K K, attached to the front end of the car carrying the machine, 20 and operated by a pump or injector driven by the boiler which operates the hoisting or excavating machine.

THOMAS DILL

Witnesses:

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E. A. COOLEY.