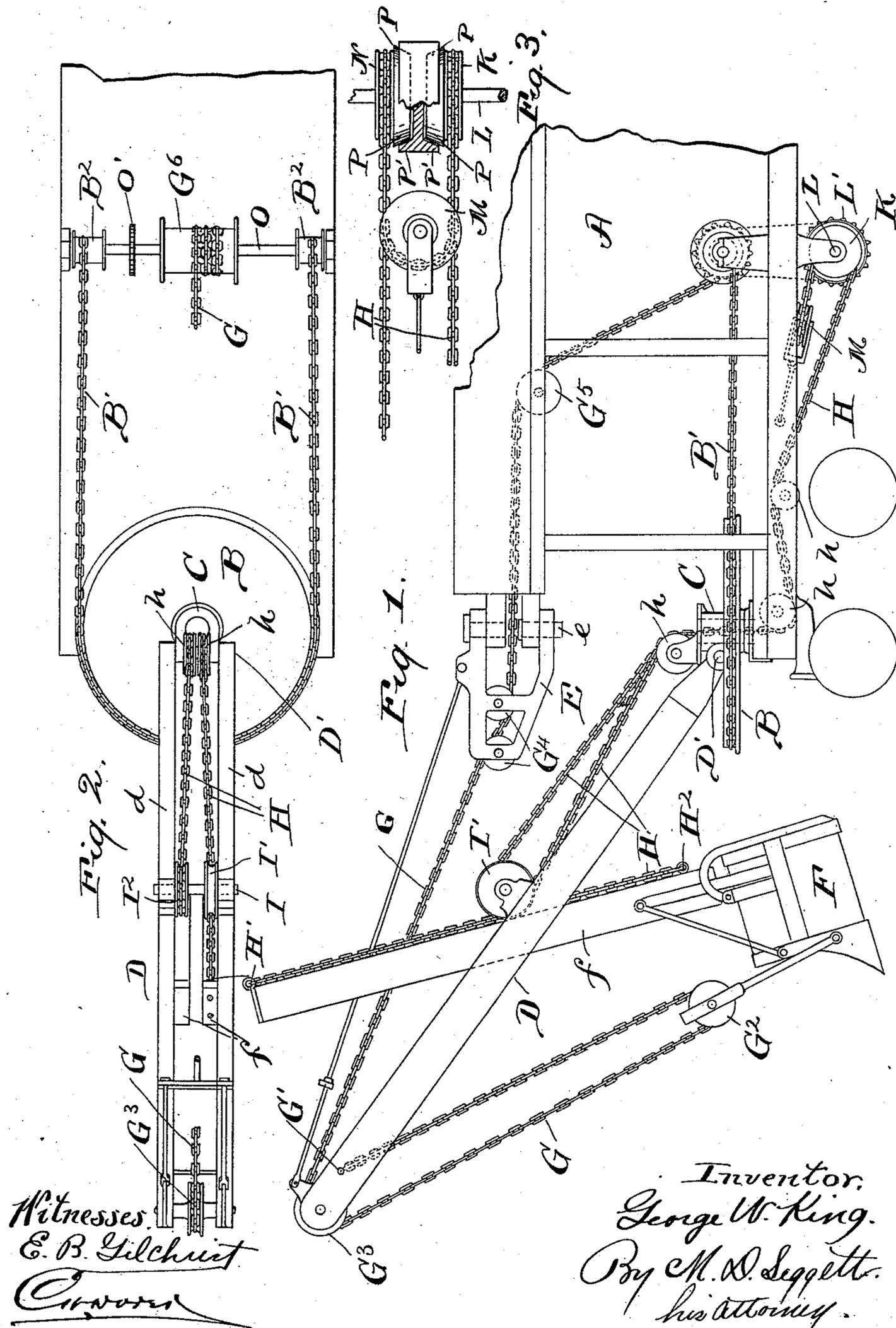


(No Model.)

G. W. KING.  
EXCAVATING MACHINE.

No. 534,510.

Patented Feb. 19, 1895.



# UNITED STATES PATENT OFFICE.

GEORGE W. KING, OF MARION, OHIO.

## EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 534,510, dated February 19, 1895.

Application filed July 18, 1894. Serial No. 517,870. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. KING, of Marion, in the county of Marion and State of Ohio, have invented certain new and useful

5 Improvements in Excavating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

10 My invention relates to improvements in excavating-machines; and it consists in certain features of construction and in combinations of parts hereinafter described and pointed out in the claims.

15 The subject-matter of this application pertains more especially to the means employed for actuating the shovel or dipper-arm longitudinally in order to thrust the dipper or shovel-proper in and out, as required in the

20 operation of the machine, and to the arrangement of the parts that compose said means. In the accompanying drawings, Figure 1 is a side elevation of a steam-shovel embodying my invention, a portion being broken away

25 to reduce the size of the figure. Fig. 2 is a top plan of a portion of the machine. Fig. 3 is a plan, partly in section, of a portion of the reversing-gear employed.

Referring to the drawings, A represents the

30 car or body-portion of the machine, the same, at one end, being provided with a turn-table, B, that is mounted on an upright hollow shaft C. A boom or crane, D, is suitably secured to the turn-table, as at D', in any approved

35 manner. The boom or crane consists, in the main, of two upwardly and outwardly inclined beams or timbers *d d* located a suitable interval apart (see Fig. 2), and suitably tied together. The boom or crane is also shown

40 connected with the top portion of the adjacent end of the car or body-portion of the machine, preferably to a bracket E that is pivotally supported, as at *e*, from the body-portion of the machine in such a manner, as to

45 accommodate the swinging of the crane or boom in a horizontal plane, by actuating the turn-table with which the crane or boom, as already indicated, is suitably connected. The

50 turn-table is actuated by means of a continuous chain, B', that engages said table, and that is attached, at opposite ends, to winding-

drums B<sup>2</sup> B<sup>2</sup>, respectively, the turn-table-actuating-chain being paid out by the one drum while it is wound upon the other drum, and the turn-table being actuated in the one direction 55 or the other according as the operating-chain is wound upon the one winding-drum or the other.

The shovel-proper or dipper F is swung in a vertical plane in any approved manner, the 60 apparatus employed for the purpose, consisting, preferably, of a continuous chain, G, that, at one end, is secured to the crane or boom, as at G', and thence leads downwardly to and under a sheave or pulley G<sup>2</sup> pivotally con- 65 nected with the shovel-proper or dipper, and thence returns and leads to and over a sheave or pulley G<sup>3</sup> supported by the crane or boom in suitable proximity to point G'. From sheave or pulley G<sup>3</sup> the chain leads to sheaves or 70 pulleys G<sup>4</sup> carried by bracket E; thence, leads in a horizontal or approximately horizontal plane to and over a sheave or pulley G<sup>5</sup> carried by the top portion of the car or body-portion of the machine, and thence leads 75 downwardly to and is suitably attached to a winding-drum G<sup>6</sup> supported in any approved manner on the body-portion of the machine.

By the apparatus just described, it is obvious that the shovel-proper or dipper is 80 hoisted or elevated by actuating the winding-drum in the direction to take up the chain or cable, and that the dipper is permitted to descend by gravity upon actuating the winding-drum in the direction to pay out the hoisting- 85 chain.

The means employed for actuating the shovel or dipper-arm, *f*, longitudinally, as required to thrust the shovel-proper or dipper in and out in the operation of the machine, 90 and that, as already indicated, constitutes the subject-matter of this application, is shown to be as follows:—A continuous chain or cable H, at opposite ends, is attached to opposite ends 95 respectively, of the shovel or dipper-arm, the chain leading from its upper point of attachment H' downwardly to and under a guide-sheave or pulley I' mounted upon a shaft or pin I borne by the boom or crane, thence leading 100 to and over a pocket-pulley K that is loosely mounted upon a horizontally-arranged shaft L supported below the floor of the car or body-portion of the machine. From pulley K the chain leads to and over an idler M, and thence

leads to and over another pocket-pulley N, also loosely mounted upon said shaft; thence leads to a guide-sheave or pulley I<sup>2</sup> supported in suitable proximity to pulley or sheave I' and thence leads downwardly to its lower point of attachment to the shovel or dipper-arm, as at H<sup>2</sup>, any suitable number of guide-sheaves or pulleys *h* being employed between pulleys I' I<sup>2</sup> and pulleys K N. Shaft L is adapted to be rotated continuously in one direction, and the arrangement of parts is such that chain or cable H is actuated in the one direction or the other according as operative connection is established between said shaft and the one or the other of pocket-pulleys K and N, the result being that the shovel or dipper-arm is actuated longitudinally in the one direction or the other, to thrust the dipper in or out, according as said chain is actuated in the one or the other direction. Shaft L is rotated continuously in one direction in any approved manner, the same being provided with a driving-wheel L' to which the power is applied.

Beams or timbers *d d* of the boom or crane are, of course, located a suitable interval apart to accommodate, between them, the location and operation of the shovel or dipper-arm and sheaves or pulleys I' I<sup>2</sup>.

I would here remark that the driving-wheel L' of shaft L is preferably a sprocket-wheel or chain-pulley and is operatively connected by means of an endless-chain with a sprocket-wheel O' operatively mounted on shaft O that is supported from the car or body-portion of the machine and driven in any approved manner, and upon which shaft O are loosely mounted the winding-drums for operating the turn-table-actuating-chain and hoisting-chain, and which drums, by means of suitable clutch-mechanism (not shown), are capable of operative connection with their supporting-shaft.

A suitable clutch is provided for each of the loose pulleys K and N for establishing operative connection between the respective pulley and its supporting-shaft. Friction-clutches are preferably employed for the purpose. The one member P of said clutches is carried

by the respective pulley, and the other members P' of the clutches are rigid with the shaft. The two pulleys K N are located a suitable interval apart to accommodate the clutches between them, and any approved mechanism (not shown) is employed for establishing and interrupting operative connection between the companion clutch-members. Hence, by the construction just described, it will be observed that the shovel-proper or dipper is thrust in or out according as pulley K or pulley N is operatively connected with shaft L.

What I claim is—

In an excavating-machine, the combination with the shovel or dipper-arm, and the boom or crane that carries the shovel-proper or dipper, of a continuous chain attached at opposite ends to opposite ends, respectively, of the shovel or dipper-arm, guide-sheaves or pulleys suitably supported from the crane or boom, in suitable proximity to the shovel or dipper-arm and a shaft adapted to rotate continuously in one direction, two pulleys loosely mounted upon said shaft, a clutch for each of said loosely mounted pulleys for establishing operative connection between the respective pulley and the supporting-shaft, an idler supported in suitable proximity to said clutch-member-bearing-pulleys, and the aforesaid chain leading from its upper point of attachment to and under one of the aforesaid guide-sheaves or pulleys, thence into operative engagement with one of the clutch-member-bearing-pulleys, thence to and over the idler, thence into operative engagement with the other clutch-member-bearing pulley, thence to and over the other of the aforesaid guide-sheaves or pulleys and thence to its lower point of attachment to the shovel or dipper-arm, all arranged and operating substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 20th day of January, 1894.

GEORGE W. KING.

Witnesses:

JOHN A. WOLFORD,  
FRED. W. PETERS.