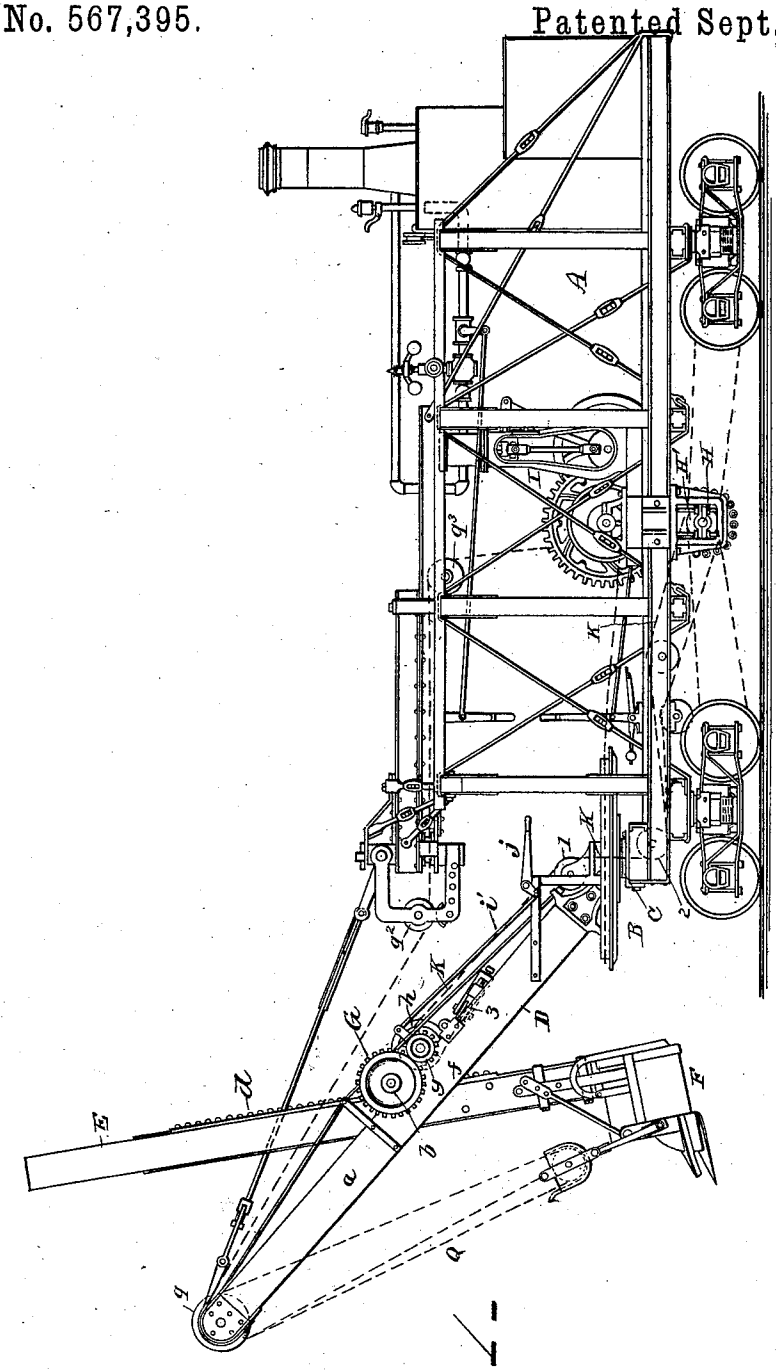
(No Model.) 3 Sheets—Sheet 1.

# G. W. KING.

## STEAM SHOVEL.

No. 567,395. Patented Sept. 8, 1896.



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(No Model.) 3 Sheets—Sheet 2.

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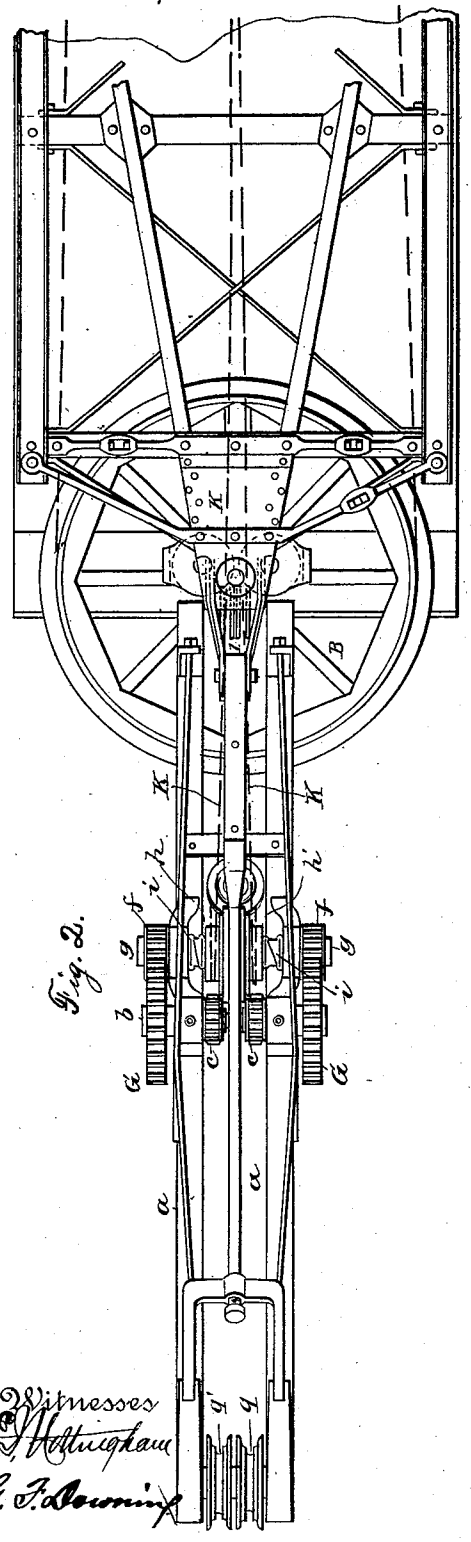


Fig. 2.

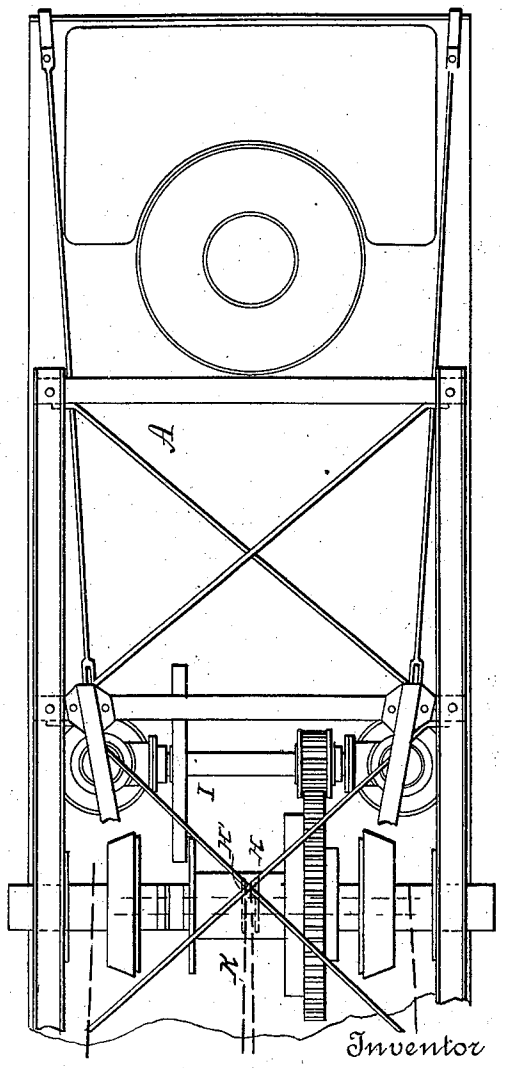


Fig. 3.

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## STEAM SHOVEL.

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Fig. 4.

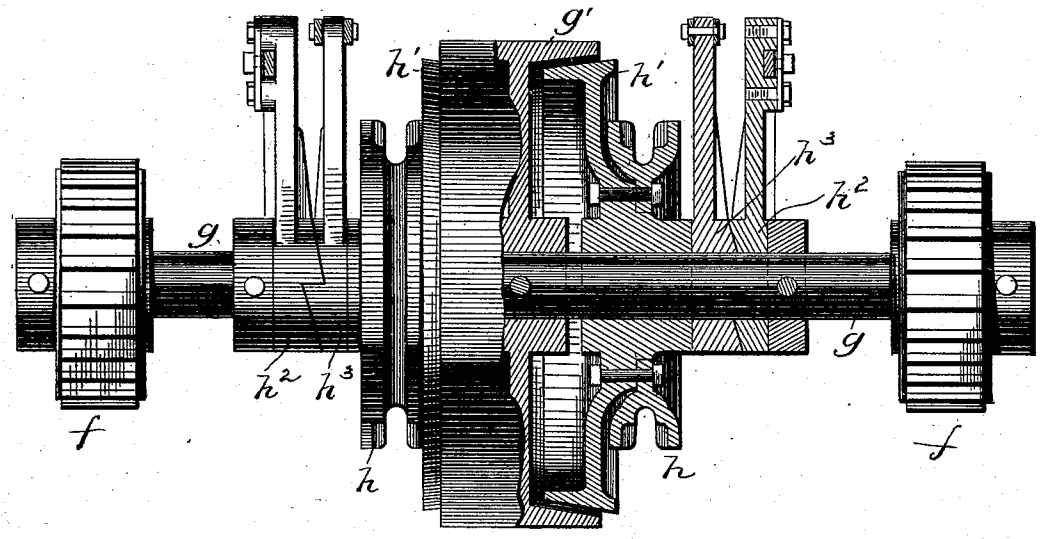
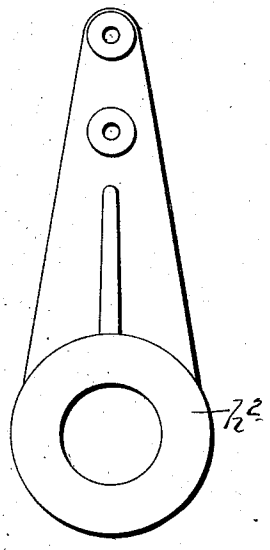



Fig. 5.

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# UNITED STATES PATENT OFFICE.

GEORGE W. KING, OF MARION, OHIO.

## STEAM-SHOVEL.

SPECIFICATION forming part of Letters Patent No. 567,395, dated September 8, 1896.

Application filed March 26, 1891. Serial No. 386,563. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. KING, a citizen of Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Steam-Shovels; 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 appertains to make and use the same.

My invention relates to an improvement in excavators or steam-shovels, and more particularly to improved devices for handling and thrusting the dipper or shovel. Heretofore in the manufacture of steam-shovels or excavators it has been customary to take the power for handling and thrusting the shovel from the hoisting-chain, which does not move except when the bucket is going up or down. It has also been proposed to place a pair of engines on the crane, and in some cases steam-cylinders have been employed in order that the craneman could thrust the dipper-handle in or out independently of the movement of the hoisting-chain.

It is the object of my invention to overcome the objectionable features of such prior constructions and to lessen the cost of producing mechanism for the accomplishment of the purpose stated.

A further object is to provide simple and efficient means whereby the dipper of a steam-shovel may be under the control of the operator, and whereby the power to handle or thrust said shovel or dipper shall be derived from the main source of power independently of the raising-chain; and the invention consists in certain novel features of construction and combinations and arrangements of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a steam-shovel embodying my improvements. Figs. 2 and 3 are enlarged plan views representing the entire machine broken in the middle for convenience in illustration, and Figs. 4 and 5 are details.

A represents a car, on the forward end of which a turn-table B is mounted on a hollow shaft C. A boom or crane D is pivotally mounted on the turn-table, in any approved manner, and may be composed of two longitudinal timbers *a a*, between which a beam or shovel-handle E is adapted to pass and provided at its lower end with a shovel or dipper F. Mounted on the boom or crane D, preferably about midway between its ends and in close proximity to the beam or handle E, is a shaft *b*, on which pinions *c* are mounted and adapted to mesh with a rack-bar *d* on the handle E. Gear-wheels G are secured to the ends of the shaft *b* and are adapted to mesh with pinions *f* on the ends of a shaft *g*.

Keyed or otherwise secured on shaft *g* is the female section *g'* of a cone-clutch. This section has a conical recess or cavity formed on each side, and a pair of cones or male sections *h'*, loosely mounted on shaft *g* on each side of section *g'*, are adapted to alternately engage and disengage the female section, accordingly as it is desired to turn the shaft forward or reverse it. Sheaves *h h* are secured to the cones, and over these sheaves the endless chain K K passes, so that they always rotate in opposite directions. The cones are shifted on their shaft by means of cam sections $h^2$ $h^3$. The cams $h^2$ are fixed to some stationary part of the machine, while the cams $h^3$ are adapted to be rocked back and forth, in order to throw one cone into engagement with the section *g'* and the other out of engagement, as the case may be, to raise or lower the shovel or dipper. This shifting of the cams is done by means of a hand-lever *j*, which is connected to arms on the movable cams $h^3$ by rods *i' i'*. A sheave 1 is mounted over the turn-table, and a sheave 2 mounted beneath said turn-table. A counter-shaft H is mounted in suitable brackets beneath the car and geared with the main driving mechanism I, this shaft H being also provided with a sprocket-sheave H'. The counter-shaft H is geared with the sprocket-sheaves *h* by means of a chain K, said chain being run as follows: Said chain runs over the sprocket-sheave H' on the counter-shaft H underneath the car, then over sheave 2, through the hollow shaft C, over sheave 1, over sheave *h*, turning or driving the friction-clutch, which is loose on the shaft. The chain then passes back over an idle-wheel or tightener 3, and then up around the other sprocket-sheave *h*, and thence back by the

same way it came to the counter-shaft under the car. From this arrangement it will be seen that the frictional devices on the shaft $g$ are made to rotate in reverse directions, and that by throwing either of them in contact with the part keyed to the shaft said shaft can be made to rotate in either direction, thus causing the dipper or shovel to be thrust in or out. When both of the frictional devices are disengaged, the motion of the dipper-handle can be controlled by the ordinary brake-band, which holds the dipper-handle at any point desired, and can be operated in the usual way. The mechanism thus far described is for feeding the shovel or dipper in and out; but in addition to it means is provided entirely independent thereof for hoisting and lowering the shovel or dipper. This consists of a chain or cable Q, which is secured to the shovel or dipper, passed over pulley $q$ on the outer end of the boom, thence back to the shovel or dipper, up again over pulley $q'$, under pulley $q^2$, over pulley $q^3$, and finally to a drum on the shaft $H^3$, which imparts motion to the shaft H.

It is evident that slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope, hence I do not wish to limit myself to the precise details of construction herein set forth; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a turn-table, boom, shovel, and operating-shaft, of a shaft having sheaves and clutches thereon, a counter-shaft, a cable-tightening device having a sheave, and a cable running from the counter-shaft over the several sheaves, substantially as set forth.

2. The combination with a car, a turn-table, and a boom, of a shovel or dipper handle passing through said boom, gearing connected with said handle, a shaft carrying pinions to mesh with said gearing, sheaves loose on said shaft, clutches also on said shaft, means for manipulating said clutches, a counter-shaft connected with the main source of power, and a chain passing over said sheaves and the counter-shaft, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEO. W. KING.

Witnesses:
JOHN A. WALFORD,
JOHN G. GOMPF.