

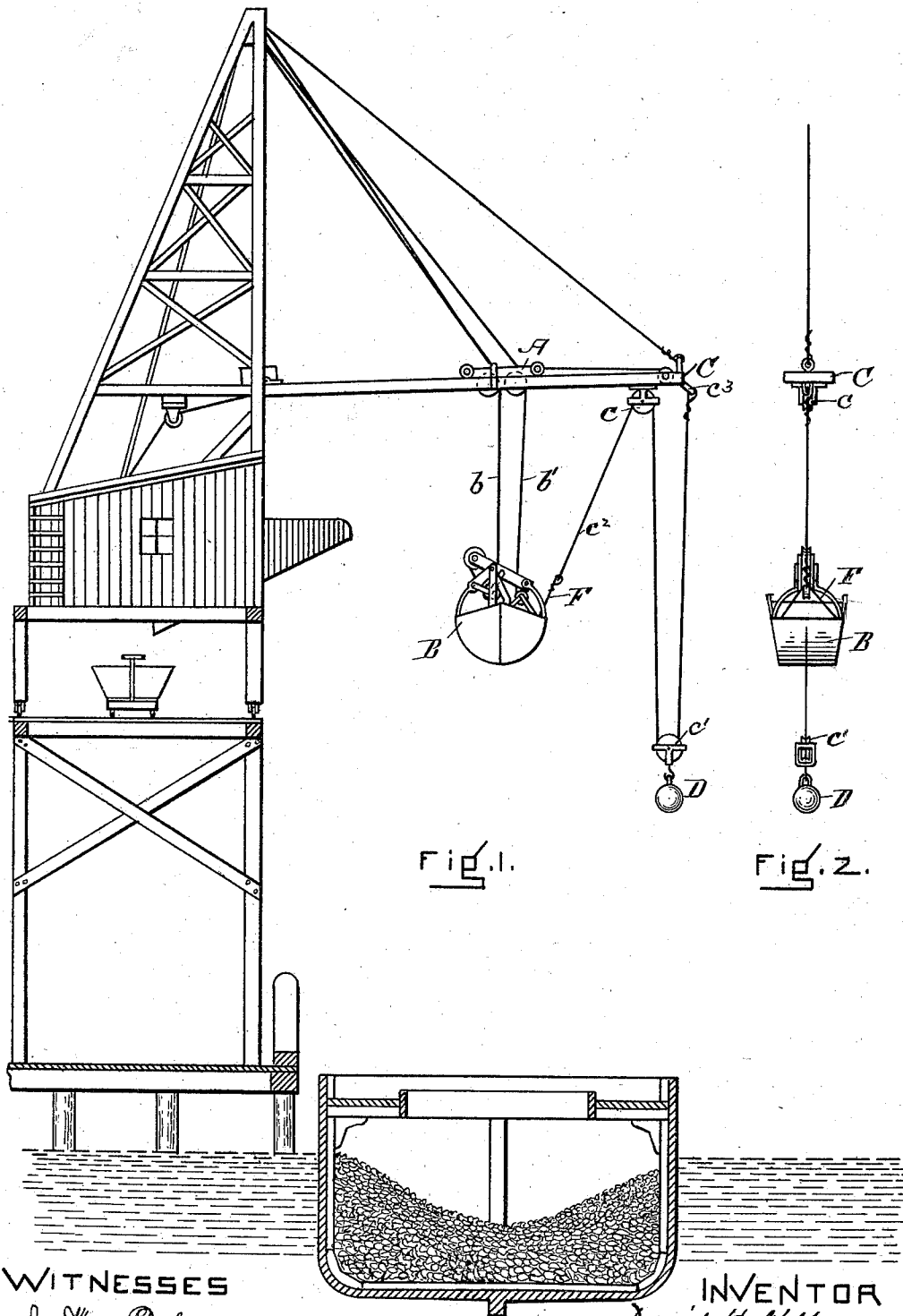
(No Model.)

4 Sheets—Sheet 1.

D. H. KELLEY.
STEAM SHOVEL.

No. 558,908.

Patented Apr. 21, 1896.



WITNESSES

J. W. Dolan
Ernest L Ford

INVENTOR

by his attys
Clarke & Raymond

(No Model.)

4 Sheets—Sheet 2.

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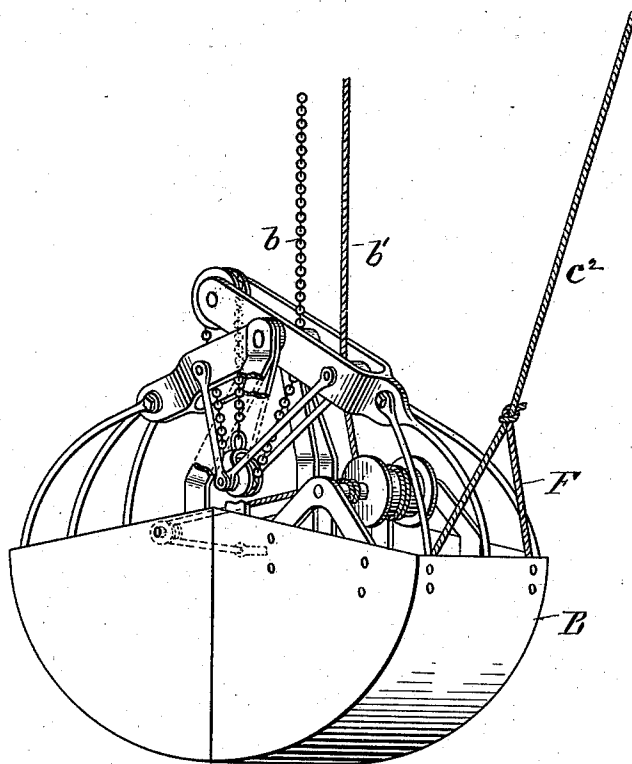


Fig. 3.

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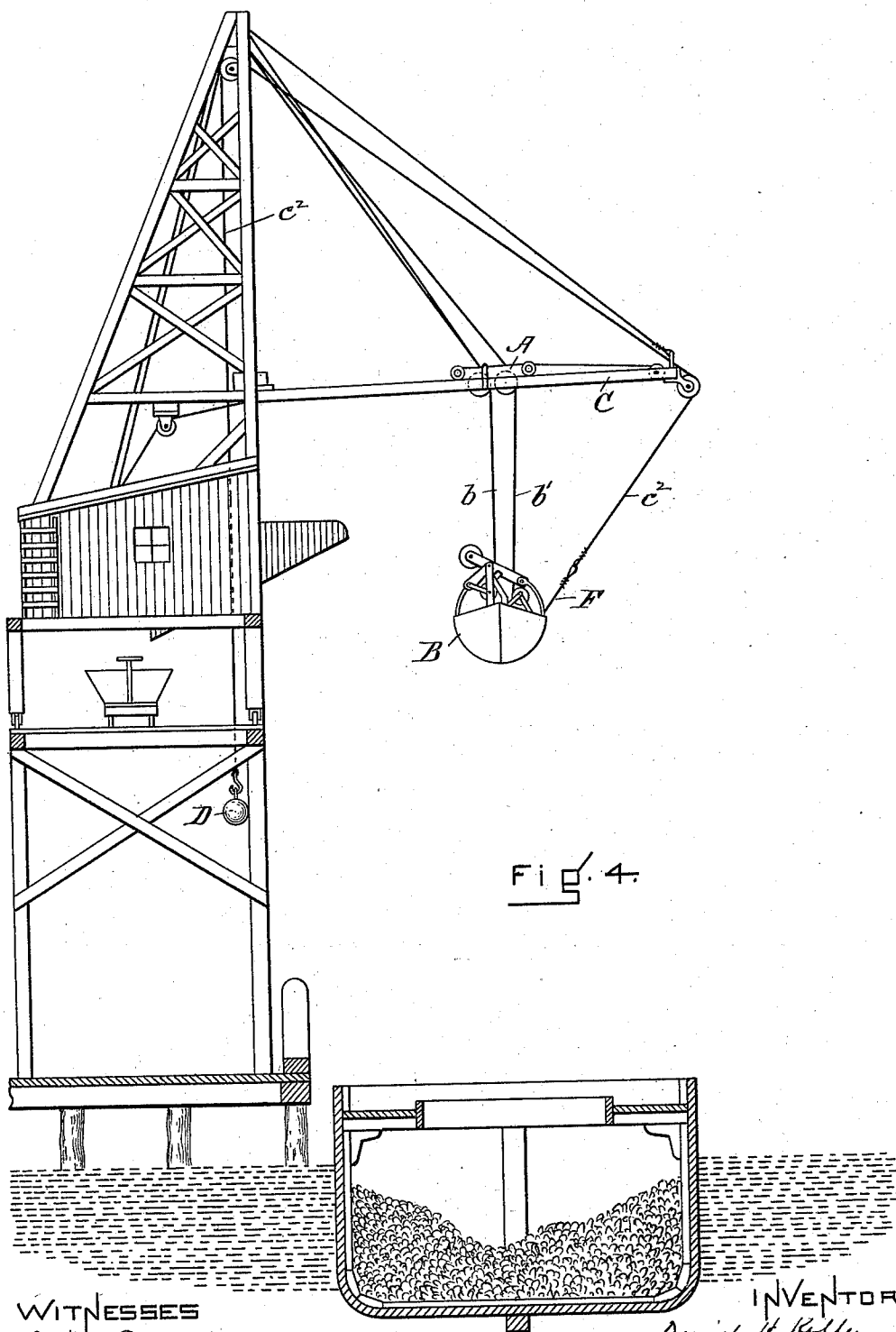
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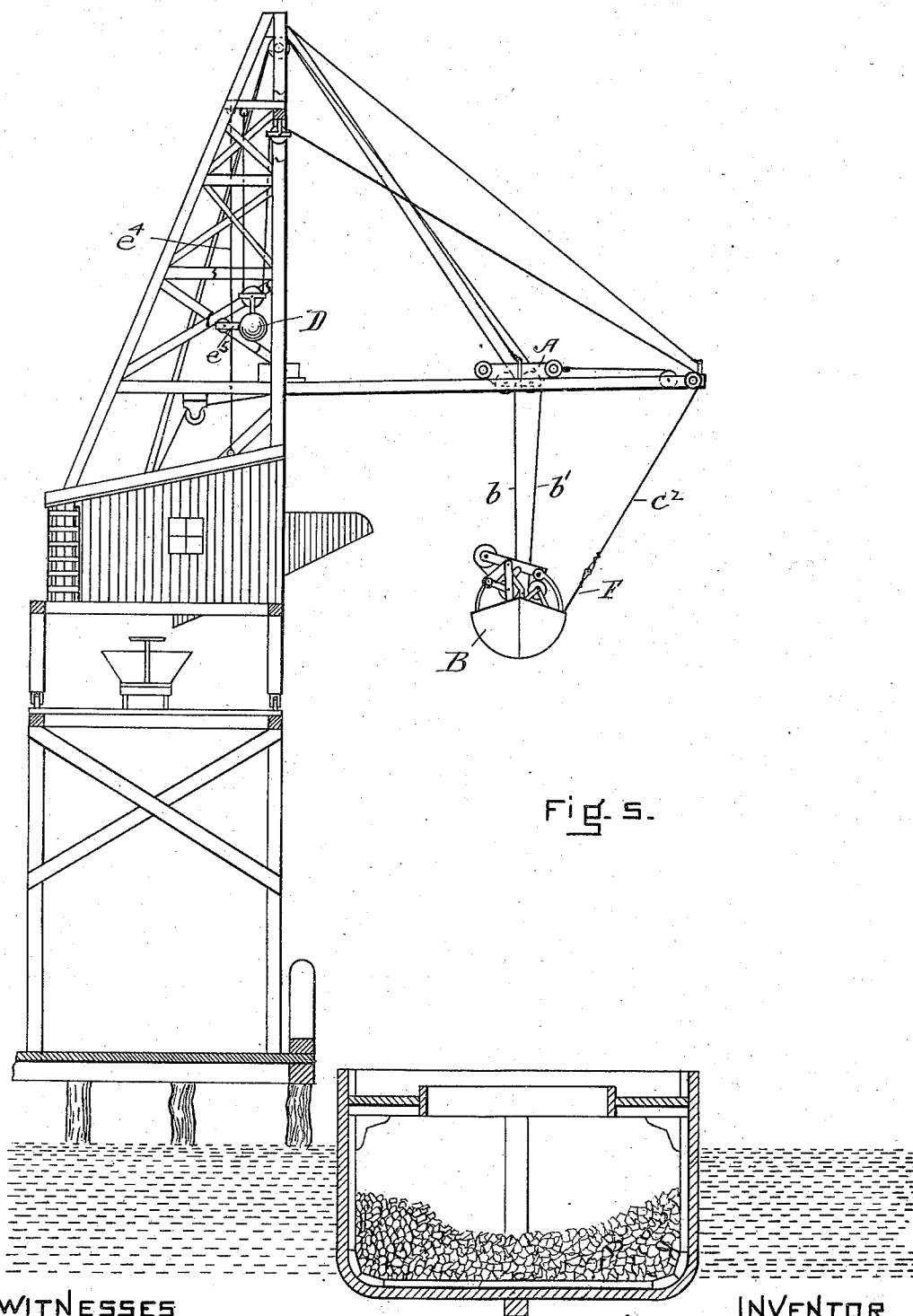


Fig. 5.

WITNESSES

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INVENTOR

Daniel H. Kelley
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UNITED STATES PATENT OFFICE.

DANIEL H. KELLEY, OF CHELSEA, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO JEREMIAH CAMPBELL, OF SAME PLACE.

STEAM-SHOVEL.

SPECIFICATION forming part of Letters Patent No. 558,908, dated April 21, 1896.

Application filed October 19, 1895. Serial No. 566,207. (No model.)

To all whom it may concern:

Be it known that I, DANIEL H. KELLEY, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Steam-Shovels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to means for preventing the twisting or turning of a steam-shovel while it is being lifted and lowered.

In the operation of steam shovels, buckets, and scoops which are suspended, lifted, and lowered by one or more ropes or chains, and which have no other means for operating them, the bucket shows a tendency to turn or twist while it is in a suspended condition and to thereby turn or twist the hoisting rope or ropes. It has been customary to control this tendency or to attempt to control it by means of a rope attached to the shovel and held by a man generally below the shovel, who by straining upon the rope and following the movement of the shovel prevents to some extent, although not always successfully, this tendency. This at the best is only a makeshift, as the shovel is usually very rapidly operated, and the man can only follow the movements for a short part of the upward movement of the shovel, and it is, therefore, not at all satisfactory. Not only this, but the shovel is so heavy that one man's strength is not sufficient to quickly control it. There is danger also of the man being caught in the coil of the rope and being lifted by it or otherwise injured.

My invention overcomes the objection above named and saves the services of one man, being entirely automatic in its action. It also permits the shovel to be run at a higher speed and controls it more completely.

In the drawings, Figure 1 is a view in elevation of the steam-shovel and its operating devices. Fig. 2 is a view in end elevation of the boom looked at from a point beyond its end. Fig. 3 is a view of the shovel, enlarged, to represent the form of connection which I prefer to employ between it and the automatically-controlled guy-rope. Figs. 4 and 5 show different positions of the shovel devices.

A is the trolley. It is movable upon the boom C in the usual way.

B is the steam-shovel, and $b b'$ are its hoisting and actuating ropes, which extend about rolls carried by the trolley to a stationary actuating-engine.

Attached preferably, but not necessarily, to the outer end of the boom C is the pulley c , and the steadying-rope c^2 , which is attached to the side of the shovel, preferably by a bridle F, extending to the side corners thereof, (see Fig. 3,) extends outwardly upon a diagonal or diverging line from the side of the shovel to the pulley c , over which it runs, and about the suspended pulley c' to the end of the boom, where it is attached to it by a bolt c^3 or any other suitable device.

D is a weight, which may be attached to the end of the rope c^2 or to the movable sheave or pulley c' , about which the rope runs.

Where the drop of the shovel is small, the pulley c' may be dispensed with, but where the drop of the shovel is great there is danger that the rapid rising and falling of the shovel may cause the weight to swing back and forth, and in such cases it is desirable that the travel of the weight be reduced.

While I have described the pulley c as attached to the end of the boom C, I would not be understood as limiting the invention to this specific construction, as it may be attached to some other part of the boom or other suitable support.

I do not limit the invention to the employment of a weight, but wish it understood that any means for exerting automatically a constant tension upon the said rope c^2 may be employed.

I prefer to attach the rope c^2 to the shovel by a bridle F, as above stated, extending from the lower end of the rope to each corner of the shovel upon the side toward the rope, and it is desirable that the sections of this bridle should be of the same length. This permits the steadying-rope to exert a leverage upon the shovel greater than it would have if it were attached to the side at its center only, and increases the efficiency of the invention.

It will be understood that unlike the man-controlled rope the steadying device c^2 exerts a constraining effect upon the shovel through-

out its entire movement while being lifted, while at rest, and while it is being lowered, while the man-operated rope is only effective within a relatively short distance from the man holding it—say fifteen or twenty feet. It is desirable that the steadying-rope have as great an inclination or angle to a vertical line as is consistent with the other features of construction and operation, and it will be seen that this angle increases as the shovel is lifted and moved by the trolley toward the point of discharge.

I would be understood as meaning in the term "rope or ropes" chains or cords, or similar flexible operating devices, and I would not be understood as limiting the invention to a shovel suspended by two ropes, as it is equally effective with a shovel suspended by one, and I would also say that it may be used with equal effect in preventing a rope-suspended scoop or bucket from turning.

In Fig. 4 I have shown the shovel controlling or steadying rope c^2 as extending about a sheave e at the outer end of the boom, and thence upwardly and inwardly to a sheave e' , carried or supported at the upper end of the frame, which carries the sheaves over which the shovel lifting and operating ropes extend, the steadying or controlling rope extending downward from this sheave inside the frame, and having at its lower end the weight D .

In Fig. 5 the steadying or controlling rope c^2 passes around a sheave at the end of the boom and a sheave at the top of the framework, and is attached to the framework near the top thereof. It carries, by means of a sheave or pulley, the weight D inside the framework between the upper sheave and the said point of attachment. The weight is thus given a relatively short travel, and it is more favorably located than when arranged to hang from the outer end of the boom, as represented in Fig. 1. The weight is steadied and the rope prevented from twisting by means of a guiding wire or rod e^4 and an arm e^5 , extending from the housing of the weight-sheave and connected with the rod or wire e^4 to slide thereon.

When the weight is disposed as represented in Figs. 4 and 5, the shovel may be used for inboard or outboard loading without changing the position of the steadying-rope, and the weight is also out of the way and protected, and I therefore prefer this construction, and especially that of Fig. 5, to the construction of Fig. 1, where the weight is somewhat in the way, especially for outboard loading, and it is generally necessary to reverse the position of the steadying-rope in relation to the shovel to the inner end of the boom when the construction of Fig. 1 is employed for outboard work.

It will be understood that this invention relates to the class of shovels, scoops, or buckets which are entirely rope-suspended, and which are very different in construction and operation from the class of dredges and shovels which use guiding-poles.

I do not herein claim the specific applications of the invention described in the application of Jeremiah Campbell for steam-shovels, filed August 30, 1895, Serial No. 560,989, and in the joint application of the said Campbell and myself, filed January 19, 1895, Serial No. 535,496.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. As a means for automatically preventing the turning of a rope-suspended steam-shovel, scoop or bucket and the twisting of its actuating rope or ropes, the combination of a horizontally-movable trolley A , a shovel D , a shovel-actuating rope or ropes extending from or connecting the trolley with the shovel and movable with the trolley and also in relation to it, and an automatic shovel-steadying device comprising a rope connected to the side of the shovel and extending to a stationary pulley or block in a line diverging from that of the shovel-actuating rope or ropes, the said pulley or block, and means for exerting a constant tension upon said rope, as and for the purposes described.

2. The combination of a power-shovel suspended and operated by one or more ropes substantially as specified with an automatically-acting steadying device comprising a rope or chain having an automatic take-up and connected with the shovel at an angle to the said suspending and operating rope or ropes, whereby a draft or pull is exerted upon the shovel sufficient to prevent the turning or twisting thereof while suspended, as and for the purposes described.

3. The combination in a device of the character specified of the trolley A , the shovel B , its actuating rope or ropes, the rope c^2 attached to the side of the shovel, a stationary pulley about which said rope extends on a line diverging from that of the actuating rope or ropes, a movable pulley and a weight carried thereby, the said rope extending over the stationary pulley and around the movable pulley to a point of attachment, as and for the purposes described.

4. The combination in a machine of the character specified of a steam-shovel having a great rise and fall and also adapted to be moved laterally, its hoisting and controlling rope or ropes, a bridle attached to the corners of the steam-shovel, a steadying-rope leading from the center of said bridle in a diverging line to a stationary pulley or block and means beyond said stationary pulley or block for exerting a constant tension upon said rope and bridle, as and for the purposes described.

5. The combination in a machine of the character specified, of a rope-suspended steam-shovel having a great rise and fall and also adapted to be moved laterally, its hoisting and controlling rope or ropes, a steadying-rope attached to the side of the steam-shovel and extending in a diverging line over

a fixed or stationary pulley or block and means beyond the pulley or block for exerting a constant tension upon said rope, as and for the purposes described.

5 6. The combination in an apparatus of the character specified of a steam-shovel having automatic movements, a stationary engine, a trolley, means connecting it with an engine for moving it horizontally, actuating and
10 hoisting devices connecting the shovel with the trolley and stationary engine, and a rope or line extending from one side of the shovel at a point removed from the lower end of the shovel-hoisting device and arranged to di-
15 verge from said point of attachment, and means connected with the rope for exerting a constant automatic tension thereon, as and for the purposes specified.

20 7. The combination in a hoisting apparatus of the character specified of a stationary engine, a trolley, means connecting the trolley with the engine for moving the trolley, actu-

ating means extending from the shovel to the trolley for automatically closing and opening the steam-shovel, a stationary engine and a
25 rope or line extending diagonally from the side of the shovel outwardly to a fixed point, the said trolley and shovel having a movement away from said fixed point while the shovel is being lifted, as and for the purposes
30 described.

8. In an apparatus of the character specified, the combination of the movable trolley, the steam-shovel, its actuating-ropes, the position of which is controlled by the trolley,
35 the steadying-rope, its weight D, and a guide with which the weight is connected and upon which it is adapted to be moved vertically, as and for the purposes set forth.

DANIEL H. KELLEY.

Witnesses:

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J. M. DOLAN.