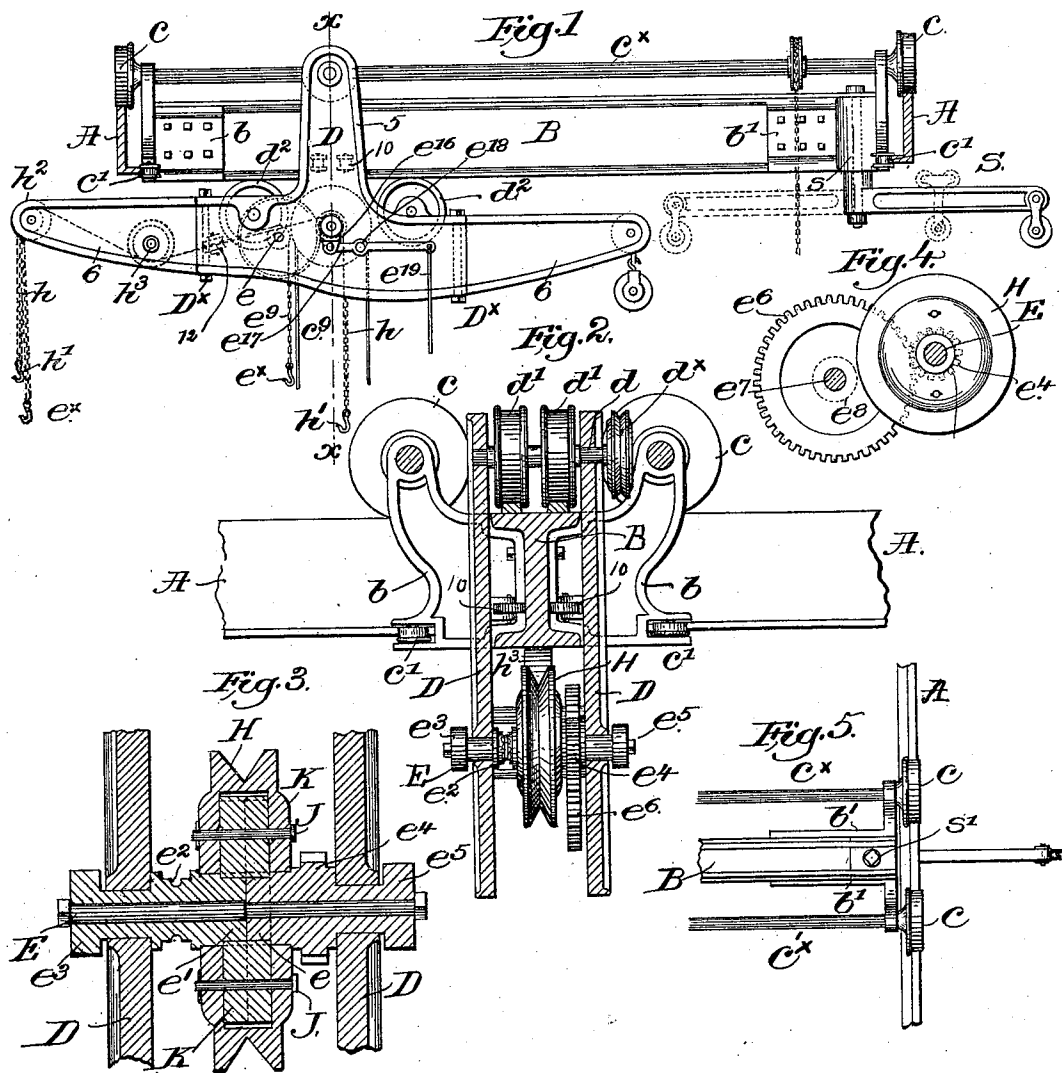


(No Model.)

R. LAVERY.
TRAVELING CRANE.

No. 581,467.

Patented Apr. 27, 1897.



Witnesses.
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UNITED STATES PATENT OFFICE.

RICHARD LAVERY, OF BOSTON, MASSACHUSETTS.

TRAVELING CRANE.

SPECIFICATION forming part of Letters Patent No. 581,467, dated April 27, 1897.

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To all whom it may concern:

Be it known that I, RICHARD LAVERY, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Traveling Cranes, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to traveling cranes.

10 Cranes of this class as heretofore generally constructed consist of a bridge piece or pieces of considerable length supported upon trolleys or wheels at opposite ends which are adapted to run upon fore-and-aft tracks extending from one to the other end of a shop or building. The bridge piece or pieces of the crane is or are provided with a movable trolley or lifting device adapted to be rolled from one to the other end of the bridge transversely 20 of the shop or building to pick up a load from any position within the range of the fore-and-aft tracks that it may be conveyed in either direction to any part of the shop or building. These cranes are generally located in the center or middle line of a shop over a clear space, the machinery or tools with which the shop is equipped being arranged along but outside of the fore-and-aft tracks, the various articles to be transported after leaving the machines 30 or tools being rolled into the middle of the shop beneath the line of travel of the crane and within the range of the trolley, where they may be picked up and conveyed to any other point in the shop within range of the crane.

35 This invention has for its object to provide a crane of the class above referred to with a suitable device or devices whereby the load may be picked up from any point within a certain radius at either side and outside of the fore-and-aft tracks or outside the range of the usual trolley, the load when picked up being conveyed to proper position beneath the bridge of the crane, when it may be conveyed fore and aft to any position in the shop.

45 In carrying out this invention I may employ what I term a "cantaliver-trolley" adapted to run lengthwise of the bridge of the crane or crosswise of the shop and having one or more arms which, when the trolley has reached 50 the limit of its movement on the bridge of the crane, will reach beyond the fore-and-aft tracks into that position of the shop where the

tools or machines are located to enable any load to be picked up from that portion of the shop and conveyed into position beneath the bridge in order to be transferred to any desired point. One or both these arms may be hinged to swing to one side or the other, if desired. I may also provide the bridge of the crane with a fixed pivoted or swinging arm, 60 which may be swung into that portion of the shop where the machines are placed to pick up the load and then revolved about its axis to bring it into the open portion of the shop beneath the crane, so that it may be transferred by movement of the bridge to any desired point. The pivoted or swinging arm and the cantaliver-trolley will be provided each with suitable lifting device or devices to facilitate the lifting and moving of the loads, 70 but which do not necessarily constitute an essential part of this invention.

Other features of the invention will be hereinafter described, and pointed out in the claims. 75

Referring to the drawings, Figure 1 represents in side elevation a traveling crane embodying this invention; Fig. 2, a section of the same, taken on the dotted line *xx*, on an enlarged scale; Figs. 3 and 4, detail views of 80 one form of lifting mechanism to be described; Fig. 5, a partial top or plan view of one end of the crane, showing the means of supporting the swinging arm.

Referring to the drawings, *A A* represent 85 the fore-and-aft tracks, which may be of metal or wood, the same extending from one to the other end of a building or shop and on which the traveling crane is to run.

The bridge *B* of the crane, which consists 90 in the present instance of a single I-section girder, but which may consist as well of two or more cast or other girders or pieces, is provided at or near its opposite ends with suitable brackets *b b'*, in which are suitable journal-bearings for the axles *c^x*, carrying at their opposite ends outside the said bearings flanged wheels or rolls *c c*, which roll upon the fore-and-aft tracks *A* and sustain the bridge, together with any weight carried there- 100 by, one of the axles being provided, as herein shown, with a sheave or gear provided with an operating-chain by which the rotation of the axle and the wheels carried thereby may

be effected to cause movement of the bridge on the fore-and-aft tracks. The brackets b b' are also shaped to carry one or more friction-rolls c' to take up the lateral or end thrust or movement of the crane and also to prevent the bridge from twisting in its fore-and-aft movement, the said wheels or rolls c' being preferably provided with flanges to prevent the bridge from lifting when a load is swung outside the fore-and-aft tracks A.

The crane and its construction so far as thus described need not as regards this invention necessarily be of any particular construction, although a construction such as I have described is preferable, the gist of this invention lying in the devices including the trolley and supporting-arm which I will now proceed to describe, and referring to Figs. 1 and 2, D D represent the side frames of a trolley embodying this invention, the upwardly-extended portions 5 at opposite sides of the bridge being suitably connected above the latter, preferably by means of a shaft d , on which between the side frames one or more supporting rolls or wheels d' are made fast, the said shaft being fitted with any suitable device for causing rotation of the same and wheels in order to move the side frames from one position to another on and with relation to the bridge, the said shaft in the present instance being provided with a differential gear device d^x , the construction of which is substantially the same as that shown and described in Patent No. 402,601, granted to me May 7, 1889. The side frames D D below the bridge B also carry the rolls or wheels d^2 , adapted to run upon the under side of the bridge to maintain the side frames in proper position and to prevent them from tilting under the weight of a load.

The side frames D D, as herein represented, have hinged to them at D^x oppositely-extended arms 6, secured thereto at their outer ends in suitable manner and fitted to sustain suitable devices by which to lift and sustain a load.

In the present instance I have shown a lifting device of substantially the construction shown and described in my Patent No. 402,601, above referred to, and referring to Figs. 4 and 5 the shaft E, extended between and supported by the side frames D, has journaled upon it the two pinions $e e'$, one of which is provided with a sleeve having inside the side frame a chain-wheel e^2 , said sleeve being extended through the side frame and provided upon the outside thereof with a friction-wheel e^3 , while the other pinion e is provided within the side frames D with a pinion e^4 and is extended through the side frame to the outside thereof, where it is provided with a friction-wheel e^5 , said friction-wheels having cooperating with them suitable brake-shoes e^{16} , mounted on the levers e^{17} , pivoted at e^{18} on the side frames and fitted with suitable actuating rods or chains e^{19} .

An operating-wheel H is journaled about the sleeves of the pinions $e e'$, referred to, said wheel carrying, as herein represented, four shafts J, on each of which is journaled a pinion K, having two sets of teeth, the teeth of one set exceeding in number the teeth of the other set, one set of teeth meshing with the pinion e and the other set meshing with the pinion e' , so that when either pinion $e e'$ is restrained from rotation by the brake-shoes pressed against their respective friction-wheels and the operating-wheel H revolved on its bearings the four shafts J, carrying the pinions K, will be revolved about the axis of the shaft E, causing the pinions K to roll about the pinions $e e'$, and one half of each pinion K having more teeth than the other half and one of the pinions $e e'$ being restrained from rotation it will be evident that the other pinion, which is free to revolve, will, owing to the different number of teeth on the two halves of the pinions K, be slowly revolved in one or the other direction, this operation being substantially as in the patent referred to.

A lifting-chain h , provided in the present instance with a hook h' , is passed over a suitable sheave or roll h^2 in one of the arms 6 of the side frames D, constituting the cantaliver - trolley, said chain being thereafter passed under a loose sheave h^3 and over the chain-wheel e^2 , forming part of the pinion e' , journaled on the shaft E, the other end of the chain h being also fitted with a hook h^x , so that when the pinion e' is restrained from rotation and the operating-wheel h revolved about its axis a slow rotative movement will be given the chain-wheel e^2 to thereby move the ends of the chain h to lift any load sustained thereby.

The pinion e^4 , fast to the pinion e on the shaft E, is in mesh with a larger gear-wheel e^6 , fast on a shaft e^7 , carrying a winding-drum or chain-wheel e^8 , as represented in dotted lines, Fig. 1, a lifting-chain e^9 being passed over said wheel and also over the sheave h^3 in the arm 6, the two ends of the chain being fitted with lifting-hooks e^x , as shown.

If the pinion e' is restrained from rotation and the operating-wheel H be rotated about its axis a slow rotative movement will be given the pinion e^4 , which movement will be transmitted through the larger gear-wheel e^6 to the chain-wheel e^8 and the chain e^9 moved to lift a load. It will therefore be understood that if the pinion e is restrained from rotation and the operating-wheel H revolved a load may be lifted by the chain h , but should the pinion e' be restrained from rotation and the operating-wheel revolved a load may be lifted by the slower and more powerful movement of the chain e^9 , thus providing the trolley with a fast and slow movement adapted to lift light or heavy loads. The outer end of the opposite or inner arm 6 of the pivoted swinging arm of the trolley is

provided with a hook, to which may be attached any desired lifting device, herein shown as a simple pulley or chain-block.

The side frames D D and the arms 6, hinged thereto, constitute what I term a "cantaliver-trolley," and while I have seen fit to show the arms 6 as hinged to the frames D D for convenience in reaching a point direct access to which is obstructed by a post or other obstruction, still I desire it to be understood that I may form either or both the arms 6 as a part of or rigid with relation to the frames D D, the construction in either case forming what I have designated as a "cantaliver-trolley."

The operation of the crane is as follows, viz: Assuming the fore-and-aft tracks A to be strung or supported through the middle of the shop or building and the working tools or machines arranged at opposite sides of the tracks and out of the range of movement of the bridge or an ordinary trolley thereon, it being desired to lift a large article from one of the machines at one side of the line of movement of the crane, the cantaliver-trolley D will be run to that end of the bridge B nearest which the article to be lifted is located, in which case one of the arms 6 of the trolley will extend to such a distance beyond the end of the bridge as to overlie the article to be lifted, permitting the latter to be picked up by one or another of the lifting devices carried by the arm of the trolley, when the latter may be run back to a central position on the bridge, which may then be run to any part of the shop. In like manner an article located at the opposite side of the shop may be picked up by the other arm of the cantaliver-trolley and transported in like manner. In the present instance I have shown one end of the bridge B as fitted with a swinging crane or arm S, which, referring to Fig. 1, is pivoted on a vertical shaft s, journaled in a suitable support s', (see Fig. 5,) bolted or otherwise secured between the brackets b', which sustain that end of the bridge B, although the said arm may be supported in other suitable manner, if desired. This arm S is fitted at its outer or free end with any suitable lifting device, herein shown as a simple pulley or differential block, so that the arm may be swung out beyond the end of the bridge B to pick up a load and thereafter be swung in, as represented in dotted lines, beneath the bridge, one of the arms 6 of the cantaliver-trolley D being made somewhat lower to avoid interference and the bridge moved to one or another point in the shop, when the arm may be again swung out to drop the load at another machine, if it is so desired.

While I have herein shown the arm S as provided with an ordinary differential block, still the said arm may be provided with a movable trolley carrying the lifting device, as represented in dotted lines.

By the use of a crane embodying my inven-

tion as herein set forth all necessity of rolling heavy articles from the sides of the shop to the middle thereof in order to be taken up by the crane is avoided, for either the swinging arm S or the cantaliver-trolley D may be utilized to reach out beyond the bridge of the crane to any part of the shop to pick up a load and transfer it into proper position beneath the bridge to be conveyed by the latter to any part of the shop.

This invention is not limited to the particular construction of devices shown, as it is evident the same may be varied without departing from the scope of this invention, the gist of which lies in a crane provided with an arm which may be moved beyond the bridge of the crane to pick up a load lying at one side of or out of reach of any lifting device carried on the bridge proper.

In practice the side frames D of the cantaliver-trolley will be provided with antifriction-rolls 10, moving upon the sides of the bridge to take up the lateral thrust of the frames when a load sustained by one of the swinging arms is swung to one side. The said frames will also be provided with lateral guide-pulleys 12 (see dotted lines, Fig. 1) for the lifting-chains h and e⁹ to act against as the arm 6 of the cantaliver is swung to one side.

I claim—

1. In a traveling crane, a bridge supported at or near its opposite ends and adapted to travel in a direction substantially at right angles to its length, combined with a cantaliver-trolley consisting of inverted-T-shaped side frames, a shaft carried at the upper ends of the vertical central arms of said side frames, and wheels on said shaft adapted to run upon the upper side of the bridge, shafts carried by the oppositely-extended horizontal arms of the side frames at opposite sides of their central vertical arms, and wheels on said shafts adapted to run upon the under side of the said bridge, and oppositely-extended arms 6 attached to and forming a continuation of the oppositely-extended horizontal arms of the side frames, D, substantially as described.

2. In a traveling crane, a bridge supported at or near its opposite ends and adapted to travel in a direction at right angles to its length, combined with a cantaliver-trolley consisting of inverted-T-shaped side frames arranged at opposite sides of the said bridge, a shaft carried by the vertical central arms of said side frames, and wheels on the shaft adapted to run upon the upper side of said bridge to take the weight of the trolley and load sustained thereby, shafts carried by the oppositely-extended horizontal arms of the side frames at opposite sides of their central vertical arms, and wheels on said shafts adapted to run upon the under side of said bridge, and oppositely-extended arms 6 hinged to the ends of the oppositely-extended horizontal arms of the side frames, forming a

continuation of the same and adapted to swing horizontally on their hinges, substantially as described.

3. The combination with a bridge of a traveling crane, and brackets *b'* secured thereto, and containing bearings for the rolls *c*, of a support *s'* secured between the said brackets, and a swinging arm pivoted in said support and carrying lifting devices, substantially as described.

4. A traveling crane, comprising a traveling bridge, a cantaliver-trolley movable thereon and provided with oppositely-extended arms, and a swinging lifting-arm pivoted at one end to the traveling bridge, all to operate, substantially as described.

5. The combination with the shaft *E*, the pinions *e*, *e'* thereon, and devices whereby either of the said pinions may be restrained from rotation at will, of the operating-wheel *H*, pinions *K*, chain-wheel *e*², pinion *e*⁴, gear-wheel *e*⁶, and drum rotated thereby, substantially as described.

6. In a traveling crane, the combination with a bridge, of a trolley carried thereby, a shaft *E* mounted in said trolley, pinions *e*, *e'* thereon, and devices for rotating one of the said pinions with relation to the other, lifting devices controlled by one of said pinions, and independent lifting devices controlled by the

other of said pinions but geared to have greater power than the same, substantially as described.

7. In a traveling crane, the combination with a bridge, of a trolley therefor carrying a shaft *E*, pinions *e*, *e'* on said shaft, mechanism to cause rotation of one of the said pinions with relation to the other, a chain-wheel fast to and movable with one of the said pinions, and an independent chain-wheel geared to the other of the said pinions, substantially as described.

8. In a traveling crane, the combination with a bridge, of a trolley therefor, a shaft *E* carried by said trolley, pinions *e*, *e'* on said shaft, a chain-wheel fast to and movable with one of the said pinions, a separate chain-wheel geared to and moved by the other of the said pinions, and devices to restrain either of the said pinions, from rotation at will, whereby either of the chain-wheels may be utilized, substantially as described.

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

RICHARD LAVERY.

Witnesses:

FREDERICK L. EMERY,
EMMA J. BENNETT.