March 11, 1930. D. W. COE ET AL 1,749,935

UNLOADING DEVICE

Filed Oct. 10, 1927 2 Sheets-Sheet 1

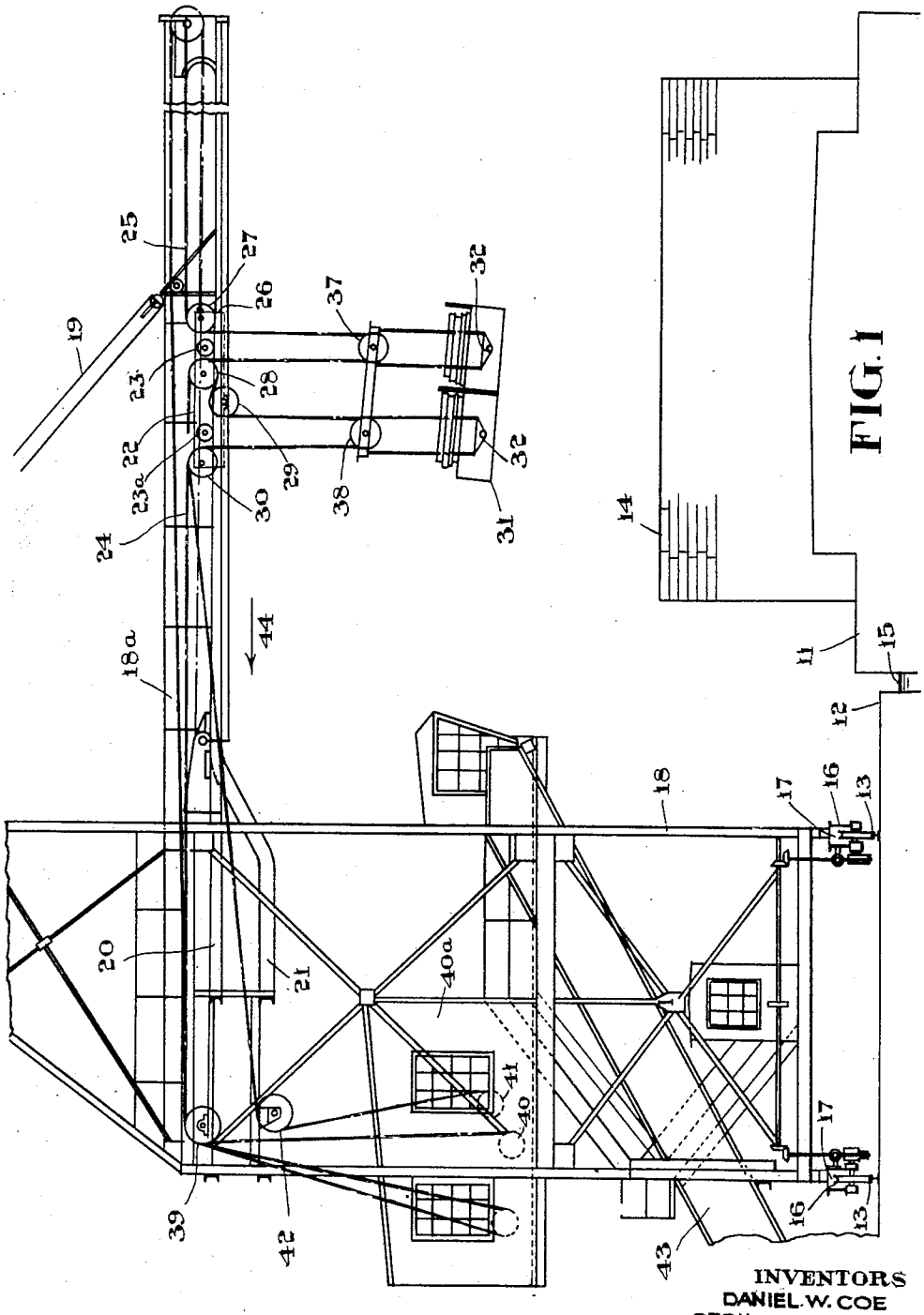

FIG. 1

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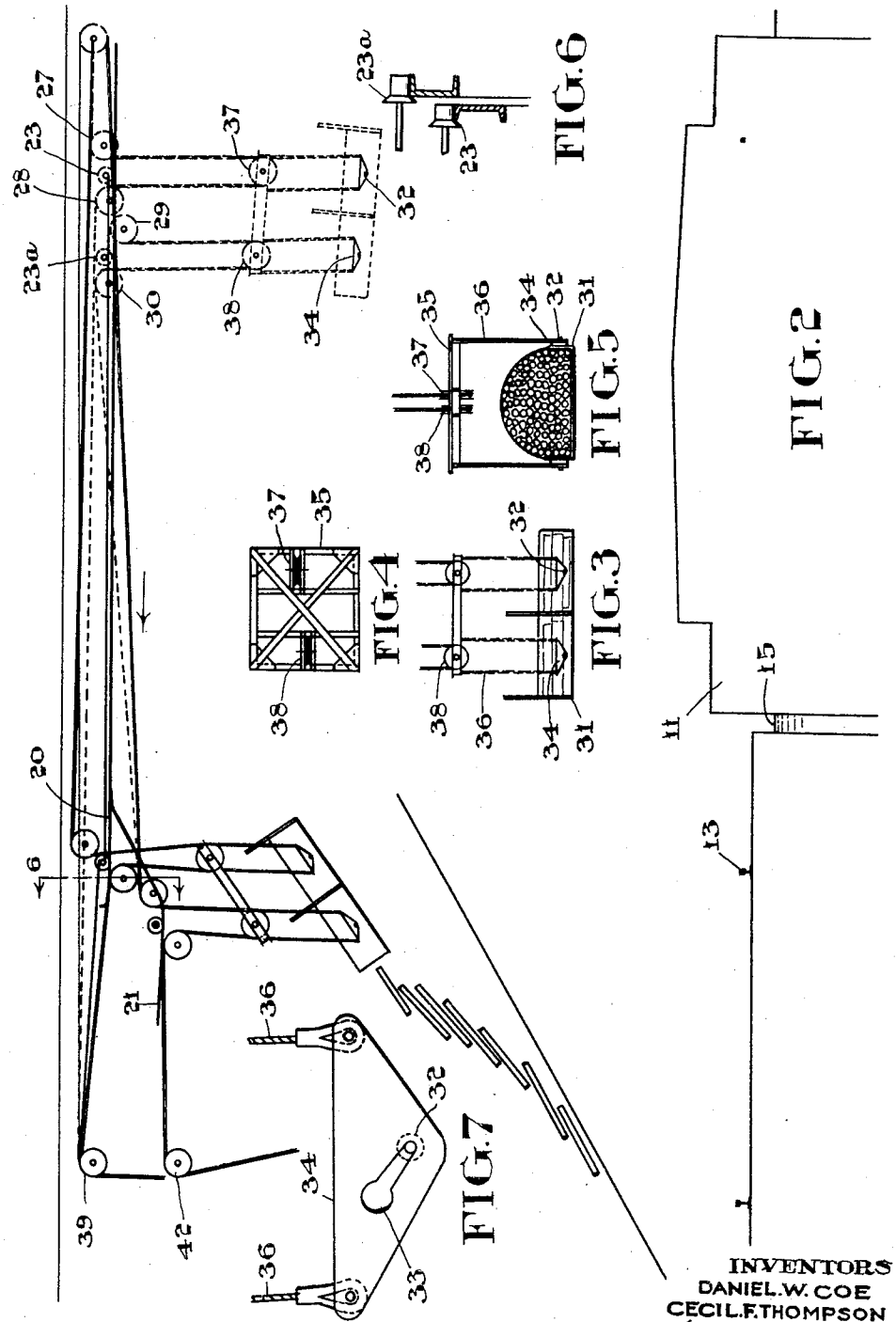

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Patented Mar. 11, 1930 1,749,935

UNITED STATES PATENT OFFICE

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UNLOADING DEVICE

Application filed October 10, 1927, Serial No. 225,284, and in Canada December 15, 1926.

This invention relates to new and useful improvements in cargo unloading devices and particularly to the hoisting and dumping mechanism therefor, and the object of the invention is to provide a hoisting mechanism which will prevent lateral and oscillating movement of the skip during the hoisting and traversing movements of same. Another object of the invention is to provide a simple and easily operated mechanism which will dump a loaded skip without the use of clutches, trip gear or such like mechanism usually employed on machines of this type.

A further object is to provide an unloading device which will be very easily constructed and which when set in position will require no further adjustments.

A further object is to provide a dumping mechanism which may be operated by means of the usual hoisting winches or units.

In our invention we provide a skip suspended by any suitable means from a frame within which is rotatably mounted return pulleys, each of which is positioned directly below guide pulleys rotatably mounted on a travelling trolley. The trolley is adapted to travel along a track, so formed that it will automatically bring the skip into the loading or dumping position during the travel of the trolley. The frame is suspended on hoisting ropes, one end of each of which is anchored to one end of the track, while the other ends are secured to a hoisting unit. The hoisting ropes pass over pulleys in the trolley, in the frame, and pulleys at the end of the track supporting structure.

In the drawings which illustrate one form of our invention:—

Figure 1 is a side elevation of a cantilever crane with our improved type of skip dumping or tipping means attached thereto.

Figure 2 is a skeleton diagram showing the skip in full lines in its dumping position and in dotted lines in its loading or normal position.

Figure 3 is a side elevation of the skip and its supporting frame.

Figure 4 is a plan view of the frame.

Figure 5 is an end view of the skip and the frame.

Figure 6 is a part sectional end elevation of the trolley and track, with the trolley in its dumping position, said elevation being taken on the line 6—6 Figure 2.

Figure 7 is an enlarged side elevation of one of the equalizing beams.

Referring more particularly to the drawings, 11 designates in cross section, a boat which may be secured by any suitable means to a wharf 12, which may be provided with rails 13. The boat may be loaded with pulp wood 14, which must be unloaded and dumped into the chute which may direct the wood into the water 15 on the side of the wharf remote from the side to which the boat is anchored, or into a conveyor, storage bin, or the like. Mounted on travelling wheels 16 rotatably mounted in carriages 17, is the tower structure 18, which is adapted to support the cantilever arm 18a through the medium of the guy ropes 19 and the means for securing the end of said arm to the structure. The arm is provided with spaced parallel tracks 20 and 21. The trolley designated as a whole by the numeral 22 is mounted on the trolley travelling wheels 23 and 23a and is adapted to travel towards or away from the tower, by means of suitable mechanism not herein shown, and the trolley travelling ropes 24 and 25. The trolley consists of a frame 26 within which are rotatably mounted on suitable pins the hoisting rope pulleys 27, 28, 29 and 30. The last-mentioned pulleys are spaced apart in the longitudinal direction of the track. Pulleys 27 and 28 are placed in longitudinal alignment with one another, but out of alignment with the pulleys 29 and 30, so that the traversing rope hereinafter mentioned, may be operated without fouling or coming in contact with the hoisting ropes. The pulp wood or cargo of the boat is loaded into skips 31 which are of the cradle type with an open top and one open end, which is positioned at the end of the skip nearest the tower. The skip shown is designed to carry pulp wood and to assist the labourer in loading the skip evenly, a guide bar is provided midway between the ends of the skip. Secured to the sides of the skip near the top thereof, are the trunnions

32 which are adapted to pass through the slots 33 formed in the supporting equalizing beams 34, the ends of which are secured to the frame 35 by means of the slings 36. Rotatably mounted in the frames are the hoisting rope pulleys 37 and 38. The pulley 37 is so positioned that it aligns with pulleys 27 and 28 and pulley 38 aligns with the pulleys 29 and 30. There are two hoisting ropes, one of which is anchored at the free end of the arm and passes over the pulley 27, over the pulley 28 and also the pulley 39 to the hoisting drum 40 positioned within the machinery house 40a. The pulley 39 is rotatably mounted on a pin secured to the tower structure and in substantially horizontal alignment with the arm. The other hoisting rope is secured to the free end of the arm and passes over the pulley 29, under the pulley 38, over the pulley 30 and also the pulley 42, to the hoisting drum 41. The pulley 42 is also rotatably mounted on suitable means secured to the tower but below the level of the pulley 39, for the purpose hereinafter described. It will be seen that the frame is suspended on two separate hoisting ropes passing over pulleys spaced apart in the longitudinal direction of the frame to prevent the ropes from twisting. This also prevents the load from swinging as it is suspended from two points and not from a single pin, which is the usual type of skip suspended means at present in use. The trolley is mounted on the travelling wheels 23 and 23a, the gauges of which are made of different widths. The gauge of the wheels 23a which are nearest the tower, are made narrower than the gauge of the wheels 23, which are remote from the tower. The wheels 23 are adapted to contact with the track 20 which is horizontally disposed, while the wheels 23a are adapted to rest on the track 21, part of which is in substantially horizontal alignment with the track 20, until it approaches the tower, where it gradually dips downwardly and assumes a level below that of the remaining part of the track 20. The pulley 42 is preferably placed in horizontal alignment with the end of track 21. Mounted on the tower and extending from one side of the wharf or quay, is the sloping chute 43, so that material fed thereon will be guided towards the side of the wharf remote from the side over which the arm extends. In the drawing double tracks are shown, one on each side of the arm, but it will be readily understood that this construction may be modified without departing from the spirit of the invention. The cantilever crane is shown for illustrative purposes only, but the same type of track and skip may be used with equal effect on cranes of different construction from that disclosed.

Modifications may be made in the travelling wheels and the trolley and frame construction, without departing from the spirit of the invention.

In operation, the trolley is lowered onto the vessel loaded with pulp wood, and raised into the position shown in dotted lines in Figure 2. This is accomplished by revolving the hoisting drum through suitable mechanism. It will be seen that the skip is slightly tilted in this position towards the closed end of the skip, so that any vibration due to the starting and stopping of the trolley in its travel along the cantilever arm, will cause the wood to move towards the closed end of the skip. When the skip has been hoisted the desired amount to clear the end of the chute in the tower, the trolley is moved in the direction indicated by the arrow 44, by means of the trolley travelling ropes which are wound around the drum 45 located in the machinery house. The trolley ropes are so arranged that when said drum is rotated by suitable machinery, not shown, the ropes will be unwrapped from one side of the drum and wound on the other side of the drum. The trolley moves towards the tower and as it approaches same, the trolley wheels nearest the tower travel down the declining trackway while the wheels remote from the tower remain at practically the same level during the travelling operation. It will be seen that when the trolley assumes this position, the skip is in the dumping position shown in full lines in Figure 2, so that the wood or material mounted on the skip slides towards the open end of the skip into the chute and from thence into the water, as shown. The hoisting ropes are so arranged that the frame from which the skip is suspended is held in such a manner that the load does not swing during the hoisting or travelling movement towards or away from the chute. The above operation has been described in relation to an unloading device for pulp wood, but it will be seen that the device may be used for a great many purposes, such as dumping ore, coal, and the like.

The device is very simple in operation and provides a means for rapidly unloading a vessel and in which the skip is automatically dumped and brought back into its normal or loading position without the use of special friction clutches, trip mechanism, or special tipping units, usually employed for this purpose. The device is simple to construct and when once installed needs no adjustment as there are practically no intricate parts which may go out of order or need repairs. The load is suspended in such a manner that there is practically no swinging or tilting during the unloading operation.

Having thus described our invention, what we claim is:—

1. In an unloading mechanism, a travelling trolley, a skip, flexible means suspending the skip from said trolley and affording a

vertically adjustable support for the skip, a track for said trolley, said track being at one part formed into a double track at different elevations to cause the trolley and the skip suspended therefrom to be angularly disposed to the horizontal at said part.

2. In an unloading mechanism, a travelling skip supporting unit, a skip, flexible connections suspending the skip from said supporting unit and adjustable to vary the elevation of the skip, a normally horizontal track for said supporting unit, part of said track being split into two tracks at different elevations so that the supporting unit when moved over said track will assume a position other than the horizontal.

3. In an unloading mechanism, a travelling trolley having wheels with gauges of different widths, a skip, flexible connections suspending the skip from said trolley and adjustable to vary the elevation of the skip, tracks for said wheels, said tracks being substantially horizontally disposed and having sloping therefrom a portion of the track adapted to engage with the wheels of narrower gauge, while the wheels of larger gauge engage with the horizontal portion, so that the trolley when passing over this part will assume a position angularly disposed to the horizontal.

4. In an unloading mechanism, a trolley, a frame adjustably suspended therefrom, a skip suspended from the frame, travelling wheels for said trolley, the travelling wheels at one end of the trolley having a wider gauge than the wheels at the other end of the trolley, a track for said travelling wheels, part of said track being formed to support the trolley in a substantially horizontal position, while the other part of the track is adapted to engage with the wheels having the narrower gauge, so that the trolley in travelling over said part, will be angularly disposed to the horizontal, thereby causing the frame and the skip to be parallel to the trolley with the skip in a dumping position.

5. In an unloading mechanism, a trolley mounted on travelling wheels, the gauges of two of the wheels being made narrower than the gauge of the other two wheels at the end of the trolley, a frame adjustably suspended from the trolley, a skip suspended from the frame, a track for said travelling wheels, part of said track being horizontally disposed and adapted to engage with the trolley travelling wheels to hold the trolley in a substantially horizontal position, while the remaining portion is split into two portions, one in alignment with the horizontal part and adapted to engage with the broad gauge wheels, while the other portion is positioned below said horizontal part and adapted to communicate therewith through an inclined bend in the track, so that the trolley travelling wheels with the narrower gauge will contact therewith and tilt the trolley, the frame and the skip, so that the material thereon will be discharged from the skip.

6. In an unloading mechanism, a trolley, a track for same, said track being so formed that it will hold the trolley in a substantially horizontal position while travelling over a portion of same, and while travelling over the remaining portion will be tilted from the horizontal, a frame adjustably secured in the vertical direction to the trolley, a skip suspended on a plurality of slings secured to the frame, said skip being provided with an open end and a closed end and means to assist in centralizing the loading of the skip.

7. In an unloading mechanism, a trolley, a track for same to hold the trolley in a substantially horizontal position, at one part of the track, and to hold the trolley tilted from the horizontal at another part of the track, a frame adjustably secured to the trolley, a skip suspended from the frame, said skip being provided with an open end to allow material placed in the skip to be dumped from said end.

8. In an unloading device, a frame, a skip, equalizing beams detachably secured to the skip, a plurality of slings between the equalizing beams and the frame, a pair of return pulleys each suspended in independent hoisting ropes spaced from one another, means for travelling the skip and the frame, and means for attaching the return pulleys in the frame in spaced relationship, said spacing being in the direction of travel of the frame.

In witness whereof, we have hereunto set our hands.

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CECIL E. THOMPSON.