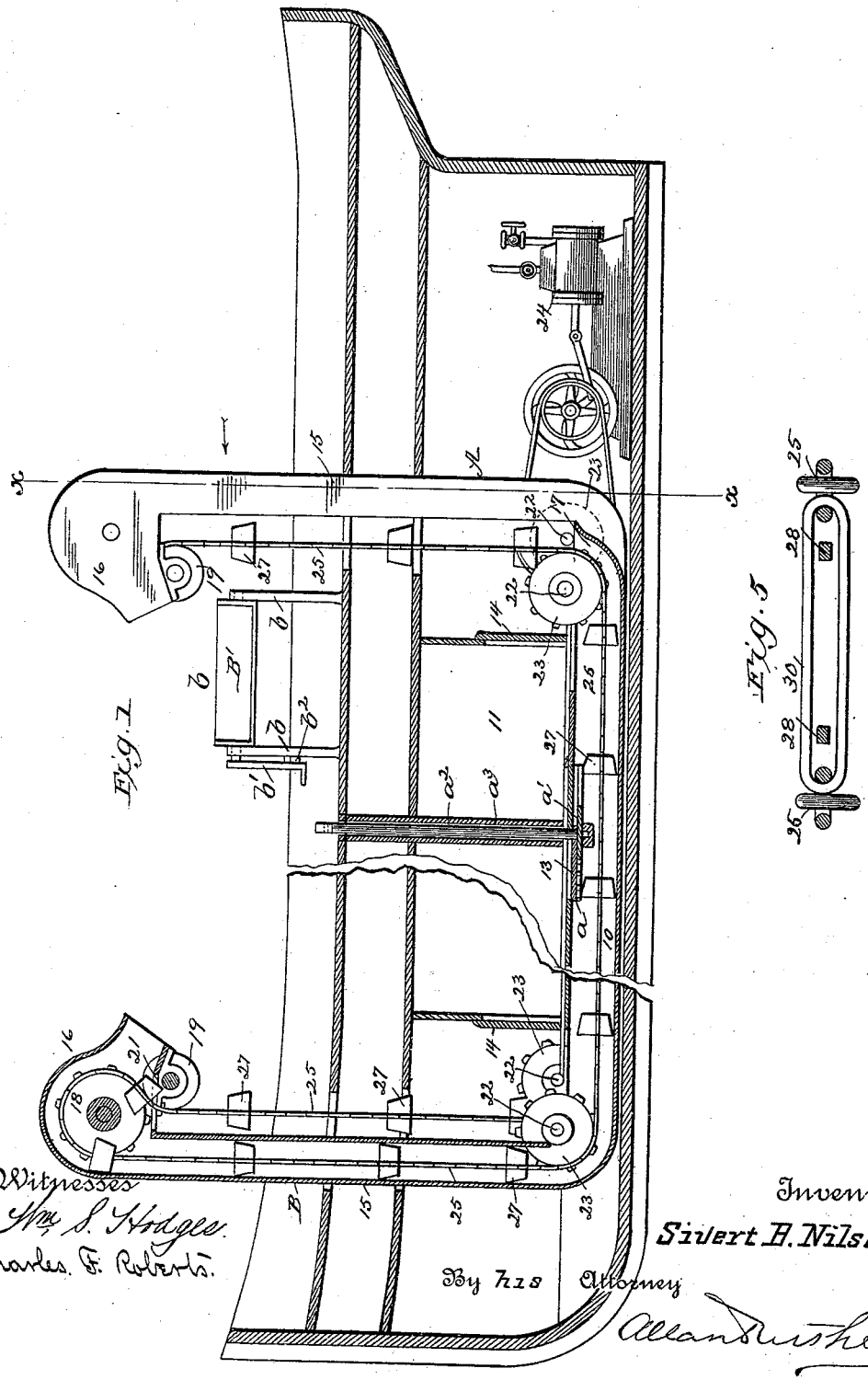
(No Model.) 3 Sheets—Sheet 1.

S. B. NILSEN.

DEVICE FOR UNLOADING VESSELS.

No. 492,827. Patented Mar. 7, 1893.



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(No Model.) 3 Sheets—Sheet 2.

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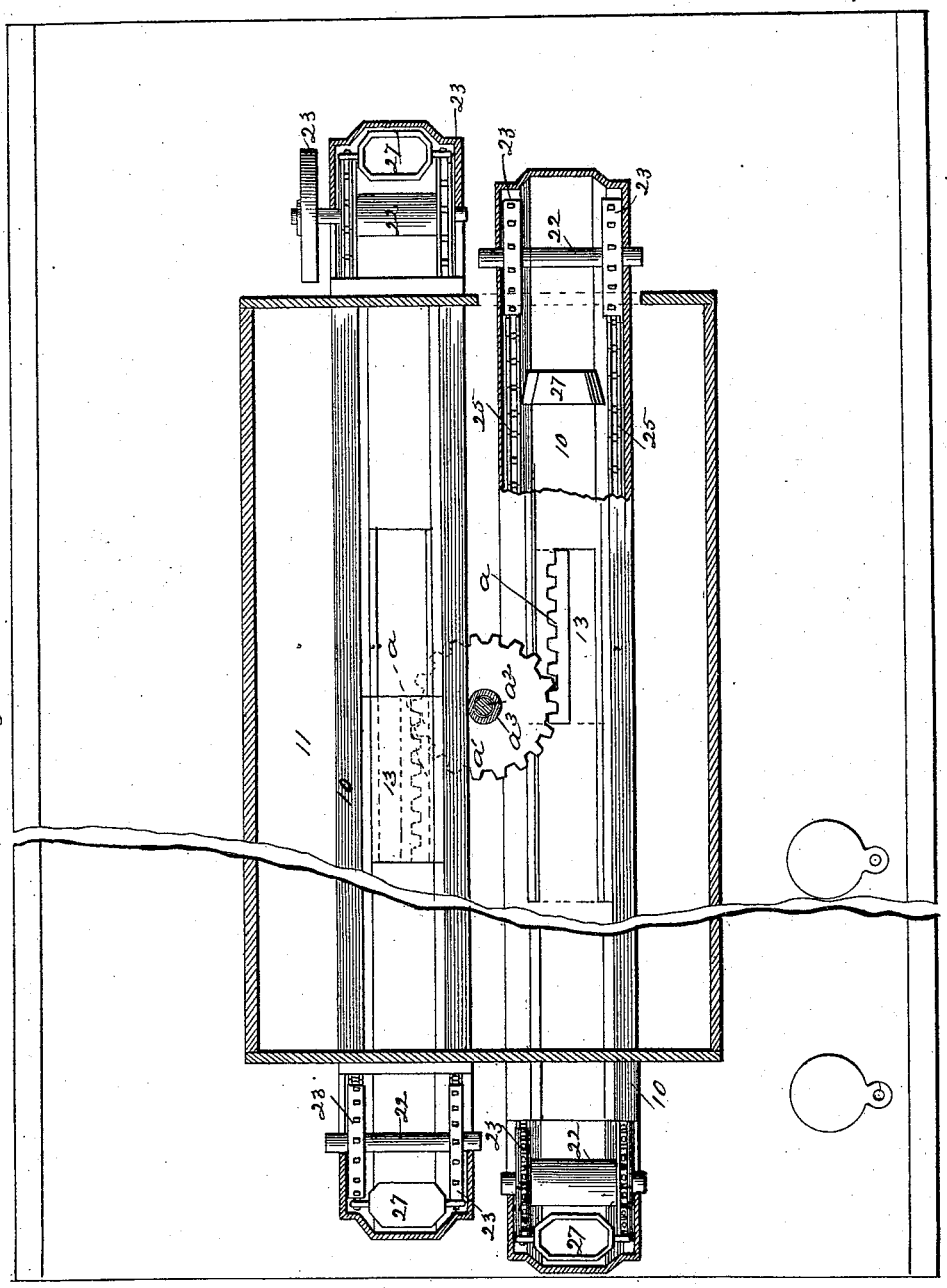

Fig. 2.

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Fig. 3.

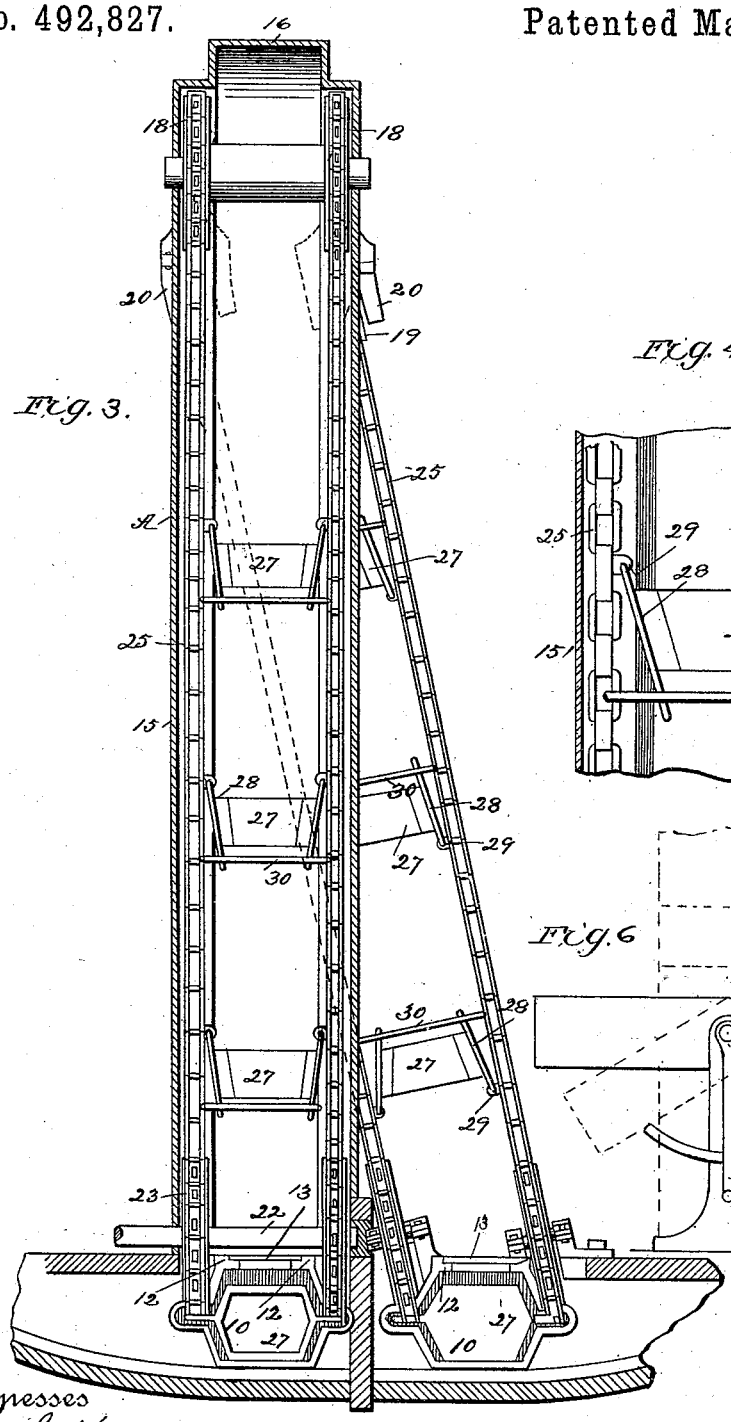


Fig. 4.

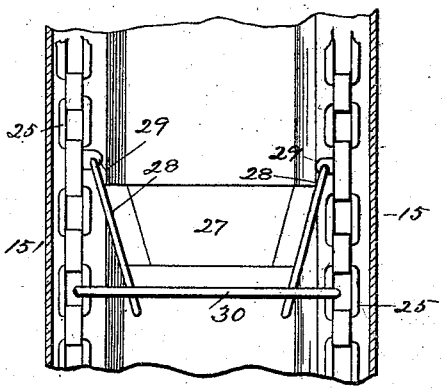
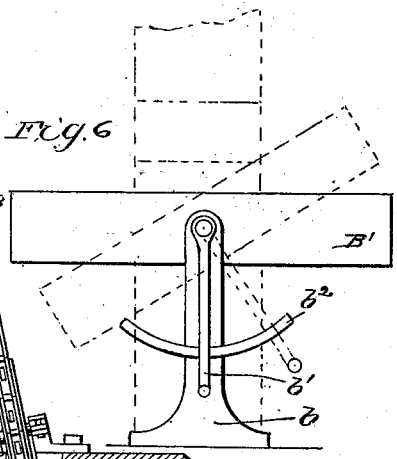


Fig. 6



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UNITED STATES PATENT OFFICE.

SIVERT B. NILSEN, OF DULUTH, MINNESOTA.

DEVICE FOR UNLOADING VESSELS.

SPECIFICATION forming part of Letters Patent No. 492,827, dated March 7, 1893.

Application filed January 30, 1890. Renewed April 14, 1892. Serial No. 429,141. (No model.)

To all whom it may concern:

Be it known that I, SIVERT B. NILSEN, a citizen of the United States of America, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Devices for Unloading Vessels, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention pertains to certain new and useful improvements in devices for unloading vessels, and has for its object to provide a device of simple and durable construction adapted to be applied in the hold of a vessel whereby such material as cereals, coal and the like may be expeditiously and continuously elevated at or near each end of such hold or vessel by suitable buckets or carriers passed through two parallel troughs and up over the supporting frames at the ends thereof.

The invention also comprises the mechanism whereby the endless chains of buckets may be carried downward in an inclined position, and right themselves when carried vertically downward from such inclined position; and it further comprises the detail construction, combination and arrangement of parts, substantially as hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings:—Figure 1 is a partial longitudinal vertical section through a vessel, illustrating the application of the device, a portion of which is in side elevation and the remaining portion in vertical section. Fig. 2 is a partial horizontal section through the hold of a vessel, and a similar section through a portion of the device. Fig. 3 is a section on the line x—x of Fig. 1, looking in the direction of the bow; and Figs. 4 and 5 are detail sectional views, illustrating the method of connecting the buckets to the endless carrying chains. Fig. 6 is a front view of the pivoted receiving trough.

In carrying out the invention, a trough or run 10, is built at each side of the keel of the vessel beneath the floor of the hold 11, and the said floor of the hold over each trough or run 10, is provided with a fore-and-aft opening and guide ways 12, formed at each side of the opening below the level of the floor, as illustrated in Fig. 3, the said guide ways being adapted to form supports or ways for two opposite sliding doors 13, fitting beneath openings in said floor. These doors are provided on their undersides with rack bars a, with which engages a gear wheel a' fast upon the lower end of a vertical shaft a^2 projecting above the deck so as to be operated by a lever, its lower end being supported by the keelson. This shaft is incased in a pipe or tube a^3 so as to be protected from the coal or cereals. By operating shaft a^2, sliding doors 13 will move in opposite directions. At each end of the hold, an opening is formed covered by a perpendicular door 14, which end doors 14, may be hinged or made to slide, as in practice may be found most advantageous. Thus the boat can supply coal or cereals from three different points so as to prevent any strain or breaking of the vessel by leaving the bulk of the load at one point.

Each run or trough, at opposite ends, is provided with an upwardly extending perpendicular section 15, which sections are carried above the deck and also above the sides of the vessel, and are provided at their upper ends with an inclosed delivery chute 16, open at its outer end, and the end of each trough or run opposite to that having attached thereto the upright section 15, is carried slightly upward, preferably a little beyond the level of the floor of the hold, beyond the end of the same, and it is flared outward, as illustrated at 17, in Fig. 1.

Within each chute 16, two spaced sprocket or chain wheels 18, are pivoted, the shafts of which wheels pass through the center of the chute, and to the under face of each chute 16, a guide pulley 19, is journaled at each side at an angle to the longitudinal axis of the upper trough section 15, as is best illustrated in Fig. 3, the direction of the angle of the guide pulleys being toward the open lower end of the chute opposed to that carrying the upright section. These guide pulleys are mounted in suitable hangers 20, illustrated also in the said Fig. 3, and in the bottom of the chute 16, an opening 21, is formed to permit the downward passage of the buckets hereinafter described.

In the lower curved or upwardly extending portion of each of the chutes or runs, shafts 22 are journaled, each shaft having attached

thereto two spaced sprocket or chain wheels 23. The shafts 22 of each of the runs or troughs are parallel, but the shaft located in that section of the trough which is carried upward beyond the deck, does not horizontally align with the shaft located in the open or lower curved section of the opposed chute, as is illustrated in Fig. 1; that is to say, the shaft journaled in the lower open section of each chute is nearer the end of the hold than the shaft journaled in that section of the chute which is provided with a vertical extension. Each shaft 22 is independent, and one of the shafts is driven by an engine 24, or other suitable motor.

Endless chain belts 25, are carried over the several sprocket wheels 23 and 18, the direction of the belts being as follows:—The belts pass up over the sprocket wheels contained in the elevated section A, over the sprocket wheels 18, in the chute of said section and down in contact with the inclined guide pulleys 19, of said section; from these the belts are carried downward with an inclination, as shown in Fig. 3, into the lower open mouth of the chute at the opposite side of the keel over the sprocket, wheels journaled in said open end, through the horizontal body of this chute, up over the sprocket wheels 23, journaled in the opposite end of the chute and thence upward through the elevated section B, over the sprocket wheels journaled in the head of the same, and from thence the belts pass diagonally down in a similar manner to that described in connection with the elevated section A, to a contact with the sprocket wheels journaled in the lower open mouth of the chute carrying the elevated section A, and to a connection with the end described as starting from the sprocket wheel journaled beneath the said elevated section A.

A series of buckets 27, is attached to the endless chain belts, the mode of attaching said buckets being illustrated in Fig. 4. The buckets are preferably made with tapering sides having attached thereto bars or handles 28, which extend above and below the body of the bucket, the upper ends of which bars are pivoted to lugs 29, integral with one link of the chain belt, and the lower ends of said bars are made to project through a link 30, attached to the opposed links of the chain belt and extending transversely across the chutes or runs.

In operation the chain belts being set in motion, the fore-and-aft outer doors are slid from the openings which they cover leading into the chutes, and the grain or coal passes down from the hold through the said openings into the said chutes. The material passing down into the chute is taken up by the buckets passing through the chutes at one side of the keel, carried up the upright section A, and dumped into the chute of the same, from thence the buckets pass down empty, as shown in Fig. 3, in the open lower mouth of the next chute and receive the material contained in the said chute carrying the same upward through the upright section B, of this latter chute, and the load is dumped into the chute of this section; from thence the empty buckets pass down into the chute from which they first started to receive another load, and thus the operation is continued until all the material in the hold, desired, has been delivered upon the deck or over the side of the vessel. When a sufficient quantity of material has run from the hold through the openings uncovered by the end slides, the sliding doors 13, of the hold may be opened by operating shaft a^2, or these latter doors may be opened in the first instance, and the end doors opened subsequently.

In Figs. 1 and 6 I have shown a pivoted trough B′, having open ends and designed to receive the coal or grain as discharged from chute 16. Each trough is pivotally mounted between posts b, b, and is provided with a crank-handle b' which has frictional contact with a curved bar b^2, secured to one of said posts. As these troughs are filled they are turned on their pivots and made to deposit their contents onto the device that may be employed for conveying the latter to the deck.

I do not herein claim the subject matter of my pending application for patent filed June 21, 1889, Serial No. 315,037, which relates to vessels having passage ways in their bottoms, vertically arranged elevator frames, and endless chains of buckets arranged in such passage-ways and upon said frame so as to discharge their contents at the upper ends of said frames.

I claim as my invention—

1. In an elevating device for vessels, the combination with elevating chains, of buckets pivotally connected at their upper ends to said chains, and their lower ends having a limited free movement, and cross links for guiding the lower ends of said buckets, substantially as set forth.

2. In an elevating device for vessels, the combination with elevating chains, of buckets, inclined bars secured to the ends of said buckets and pivotally connected at their upper ends to said chains, and their lower ends having a limited free movement, transverse to the chains substantially as set forth.

3. In an elevating device for vessels, the combination with elevating chains, of buckets provided with a bar attached to the outer face of each at each side, extending above and below the body of the bucket, a lug projected from the chain belts, in which lugs the upper ends of the said bars are pivoted, and a link connecting the opposed links of the chain belts beneath the bucket, said link being adapted to receive the lower ends of the bucket bars, substantially as shown and described, whereby the buckets may be carried downward in an inclined position, and right themselves when the belt is carried vertically down-

ward from such inclined position, as and for the purpose specified.

4. The combination with a vessel having a discharge chute, of a receiving trough having open ends and located in proximity to said chute, posts *b* between which said trough is pivotally mounted, a crank-handle centrally secured to said trough, and a curved bar attached to one of said posts and with which said crank handle has frictional contact, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SIVERT B. NILSEN.

Witnesses:
CHAS. F. HOPKINS,
A. J. TALLAS.