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DRAWINGS ATTACHED

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(54) A SHIP'S LOADING RAMP

(71) We, ASSOCIATED CARGO GEAR AB, a Swedish Body Corporate of Gustav Dalensgaten 8, Göteborg, Sweden, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

Many ships are nowadays loaded and unloaded by means of trucks, which are driven directly into the ship. In order to make such traffic possible a folding bridge, usually called a ramp, is often used between the ship and the quay.

This ramp may be arranged in connection with an opening in the ship's side, but the best availability of the cargo spaces is obtained if the ramp is arranged in the stern of the ship. This will, however, presuppose suitable berthing arrangements on the quay so that the trucks may be driven straight into the ship. One difficulty encountered during all loading and unloading by means of trucks is that the ship rises and falls with the tide as the work proceeds, and in many places the tide water will have a deciding influence upon the position of the ship in relation to the quay.

A ramp is usually hingedly connected to the ship in such a manner that the inner end of the ramp is level with a deck, and at sea the ramp is swung on board to a vertical position. It will often be necessary to use a fairly long ramp, and in raised position this may reach above the superstructure of the ship, which is undesirable with respect to the stability of the ship, and furthermore means that the ramp structure will have a large windage.

The present invention consists in a ship's loading ramp including an inner track part hingedly connected to the ship, an outer track part hingedly connected to the inner track part so that when the ramp is swung inboard the outer track part is foldable down against the inner track part, and a frame joined to the inner track part which frame

projects beyond the outer end of the inner track part, said outer track part being longer than the difference between the lengths of the inner track part and the frame. 50

The ramp may be arranged obliquely in relation to the fore and aft line of the ship and is then designed in such a manner that it will be possible to drive into the ship from a quay side being parallel to the ship, along a cranked or curved travelling track having a large radius. 55

One embodiment of the present invention is schematically shown in the accompanying drawings, in which 60

Figure 1 shows a portion of a ship along a quay and provided with a loading ramp arranged obliquely in relation to the fore and aft line of the ship. 65

Figure 2 shows the ramp during a lowering operation, and

Figures 3 and 4 show the ramp in a working position and with the ship at different levels in relation to the quay. 70

Figure 1 shows the after part 10 only of a ship moored along a quay. The ship is provided with a ramp of a sufficient size to permit trucks or other wheeled carriages of conventional size to be driven into the ship. 75

The ramp is mounted at an angle to the fore and aft line of the ship and is at its inner end pivotably connected to the ship's structure by means of hinges 12, in such a manner that the ramp when at sea may be swung inboard to a substantially vertical position. The ramp has such a length and shape, that it will reach across to the quay from the stern of the ship and make possible a passage for trucks from the quay directly into the ship. 85

The ramp consists of a frame made from two unitary side beams 13 and 14, respectively, as well as a travelling track interconnecting said beams. The track contains an inner part 15, which is fixedly connected to the beams and extends outwards from the ship to about three quarters of the length of the beams. 90

To the outward end of the inner track

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part an outer track part is connected by means of hinges 17 in such a manner that this outer part may be swung downwards along and against the inner part when the ramp is raised to vertical position. The outer end portion of the outer track part consists of a flap 18, which is hingedly connected to an outer track part element 16. The hinges 19 between the flap and the outer track part are arranged adjacent to the transverse axis through the centre of gravity of the flap whereby the flap, within practical limits, will automatically tend to maintain a horizontal position independent of the inclination of the outer track part element 16 in relation to the quay. To facilitate the driving up on the ramp the flap is broader than the distance between the beams at the free ends thereof.

The length of the beams is thus less than the combined length of the two track parts 15, 16 and the beams will rest on the outer track part 16 at about the mid portion of said part. In this manner the high load from the beams will be transferred to the flap 18 by way of the element part 16, whereby the pressure at the ends of the beams will be distributed over a comparatively large area. This is important since the quay may not be designed to carry the concentrated loads of a magnitude likely to appear at the ends of the beams. The outer track part is to this end provided with laterally exceeding brackets 20, which may be designed in such a manner that they can be retracted into the track structure, when the ramp is being raised.

To make possible an adjustment of the ends of the beams in relation to the outer part of the ramp each beam is provided with a pivotal member 21 the position of which in relation to the beam is adjustable by means of a pressure fluid operated ram 22. The pivotal members will rest against the above mentioned brackets 20 extending from the outer track part.

The position in the vertical direction of the ship in relation to the quay will vary depending on the different height of the quays in different harbours, the changed draft of the ship during loading and unloading, and the height of the tide.

Figures 3 and 4 show two different positions where the attachment of the ramp to the ship is located higher than, and lower than the quay. On both occasions the travelling track will operate in a satisfactory manner. The beams are designed with due respect to the loads to be encountered, and the shape of the beams illustrated in Figures 3 and 4 has been found suitable for an actual structure. As shown in Figure 1 the beam 14 adjacent to the ship is bent outwards. In this manner it will be easier for trucks to turn towards the fore and aft line of the ship. Furthermore the broader flap 18 may, when the ramp is swung to vertical position,

be brought in between the beams, which lessens the space required for stowage. In the stowed position only the ends of the beam will extend above the hinge joint 17 between the track parts so that the windage will be reduced.

The ramp is operated by means of two winches 23 and 24 of which the former is mounted in the ship's superstructure, and the other, 24, is mounted on one of the beams. In the present embodiment there are two winches 23 working in parallel, as well as two winches 24 similarly arranged.

Figure 2 shows with unbroken lines the ramp during a lowering operation. Broken lines show the ramp in the stowed position, in which it may be locked by means of suitable devices not shown.

The ramp is lowered by means of the wire 25 attached to winch 23 to the position shown in Figure 2. During this operation the outer track part element 16 and flap 18 will hang initially downwards substantially in a vertical position. From the position in Figure 2 the outer part of the track is swung upwards by means of the winch 24, in such a manner that it will form an extension of the fixed inner part 15 of the track. The wire 26 from the winch 24 is led over a first pulley 27 at the end of the beam, and from that to a second pulley 28 back to the beam where it is attached. When the ramp rests on the quay the position of flap 18 will automatically adjust itself to the plane thereof. An adjustment of the ends of the beams in relation to the brackets 20 by means of the sliding members 21 is made during the upward swinging of the outer track part.

The winch 23 is preferably of the same type as mooring winches of known design, and may be adjusted to maintain a constant strain in the wire 25, whereby this is paid out or wound home if the load is changed from a certain value. In the present embodiment this load corresponds to the weight of the ramp.

It can be appreciated that in a raised position the outer ends of the beams only will extend above the superstructure and offer a small surface to catch the wind, whereas in lowered position the load will be distributed over a large area.

It is evident that the ramp may be dimensioned in such a manner that it will permit road trucks and other vehicles to drive into a ferry, and the position of the ramp in relation to the fore and aft line of the ship may of course be other than the one shown in the drawing.

The term "Quay" is used throughout the specification to indicate any working surface onto which and alongside which a ship is required to embark or disembark cargo or loading or unloading vehicles as described.

WHAT WE CLAIM IS:—

1. A ship's loading ramp including an inner track part hingedly connected to the ship, an outer track part hingedly connected to the inner track part so that when the ramp is swung inboard the outer track part is foldable down against the inner track part, and a frame is joined to the inner track part which frame projects beyond the outer end of the inner track part, said outer track part being longer than the difference between the lengths of the inner track part and the frame.
2. A ramp as claimed in claim 1 wherein when the ramp is lowered into a working position the weight of the outward end of the frame is arranged to bear on the outer track part.
3. A ramp as claimed in claim 1 or 2 wherein the outer track part is divided into an outer track part element at the inner end and a flap hingedly connected to the element at the outer end of said element, the flap being free to take up the plane of the working surface of the quay onto which the ramp is lowerable.
4. A ramp as claimed in any one of claims 1 to 3 wherein the frame includes two beams arranged at the sides of the inner track part.
5. A ramp as claimed in any one of claims 1 to 4, wherein the outboard ends of the frame is provided with at least one adjustable pivoted member designed for cooperation with the outer track part.
6. A ramp as claimed in claims 4 or 5 wherein the axis of hinged connection to the ship is angled to the altwartships line of the ship and wherein the portion of the outer track part extending outside the beams is boarder than the distance between the outboard ends of the beams and wherein at least one of the beams, adjacent to the ship, is cranked sideways sufficiently to permit the portion of the outer track part extending outboard of the beam ends is to be brought in between the beams when the ramp is stowed.
7. A ramp as claimed in any one of claims 1 to 6 wherein there are provided at least two winches for operating the ramp, a first winch of which being arranged to raise and to lower the frame, and a second winch of which arranged for controlling the outer track part, the first winch being adapted to maintain a constant strain in its winch wire sufficient to carry the weight of the ramp.
8. A ship's loading ramp substantially as described with reference to the accompanying drawings.
9. A ship having a ship's loading ramp as claimed in any one of claims 1 to 8.
10. A ship as claimed in claim 9 wherein the loading ramp is fitted in the stern.

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