A. VANDEVELDE.

MEANS FOR LOADING AND UNLOADING MERCHANDISE.

APPLICATION FILED JULY 15, 1913.

1,190,822.

Patented July 11, 1916.

5 SHEETS—SHEET 1.

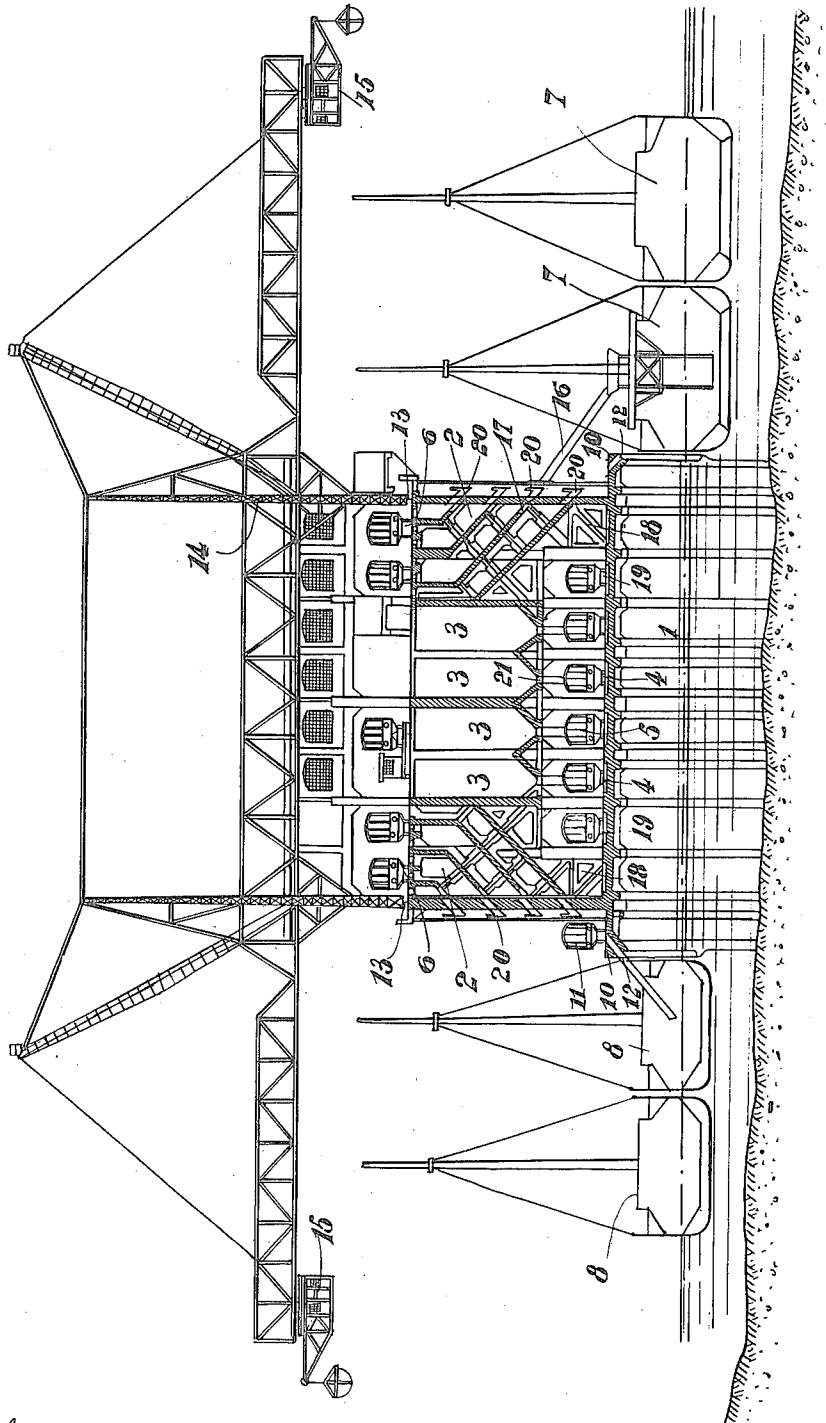


Fig. 1.

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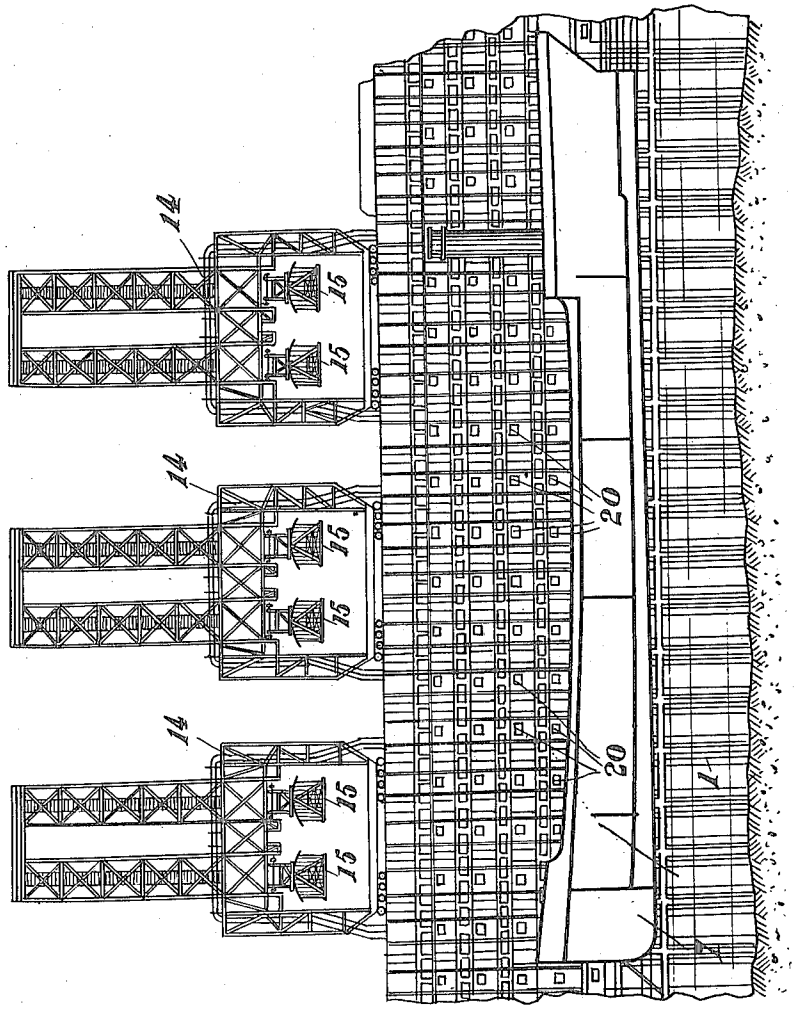
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5 SHEETS—SHEET 2.

Fig. 2.



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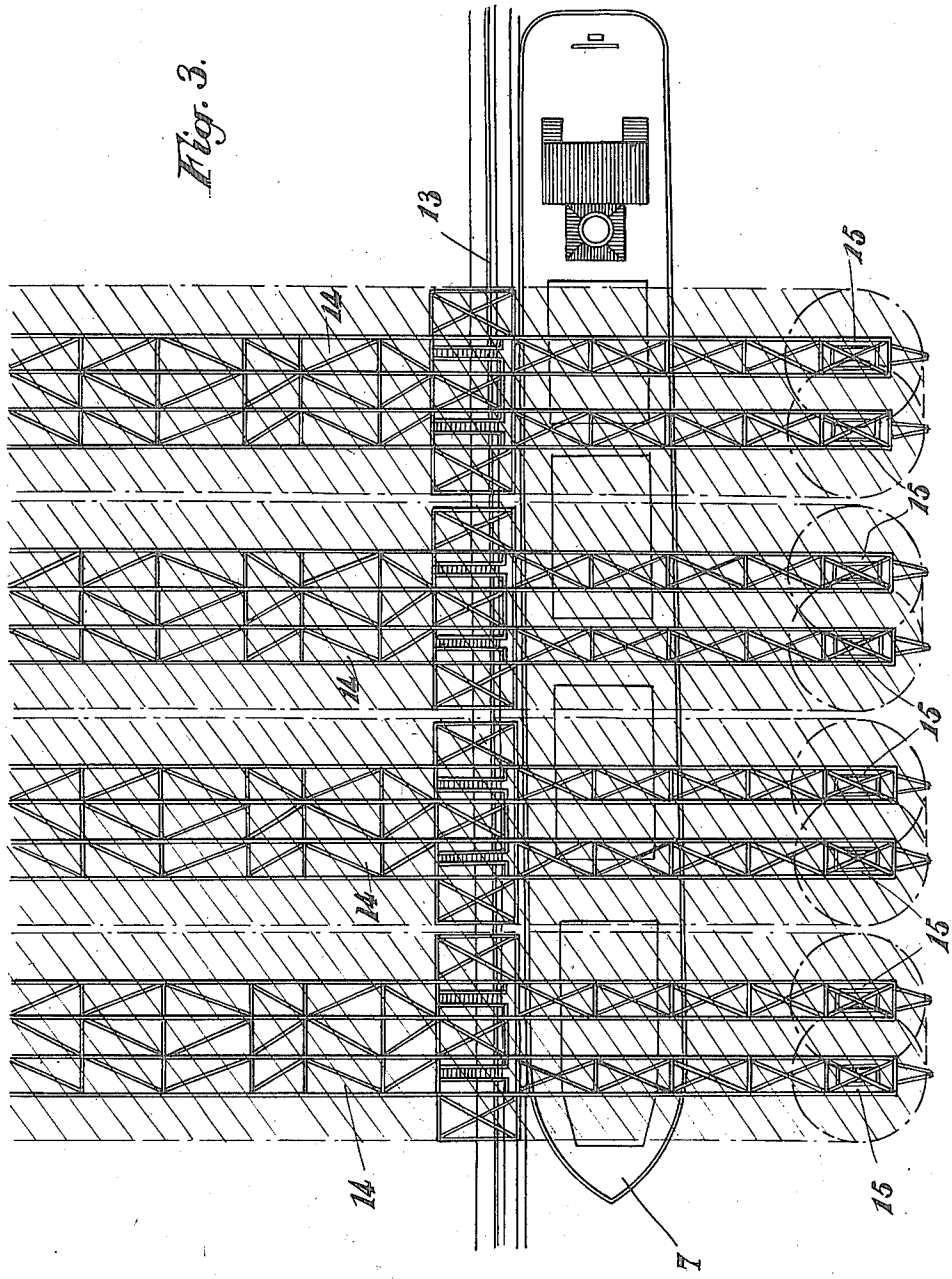
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5 SHEETS—SHEET 3.

Fig. 3.



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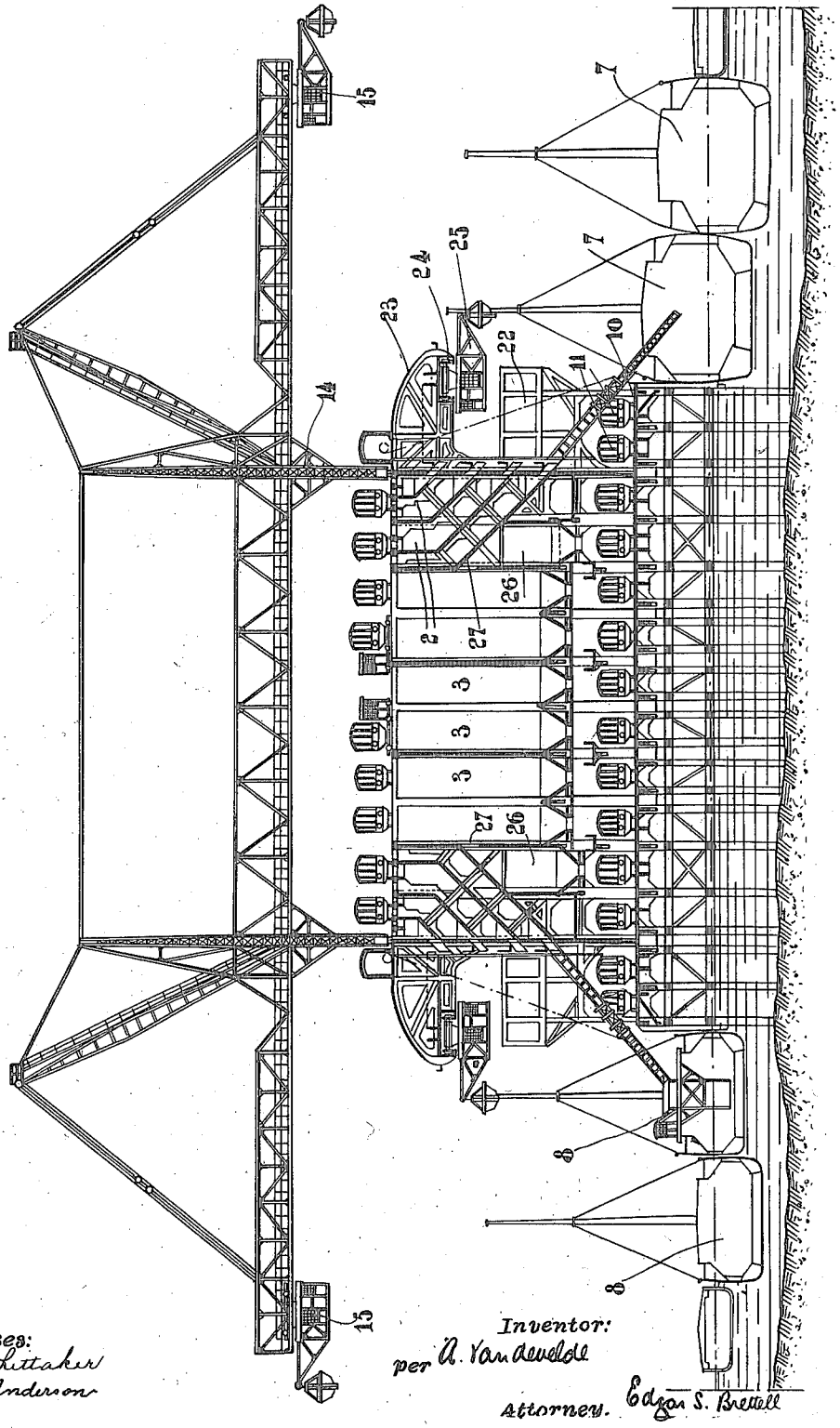


Fig. 4.

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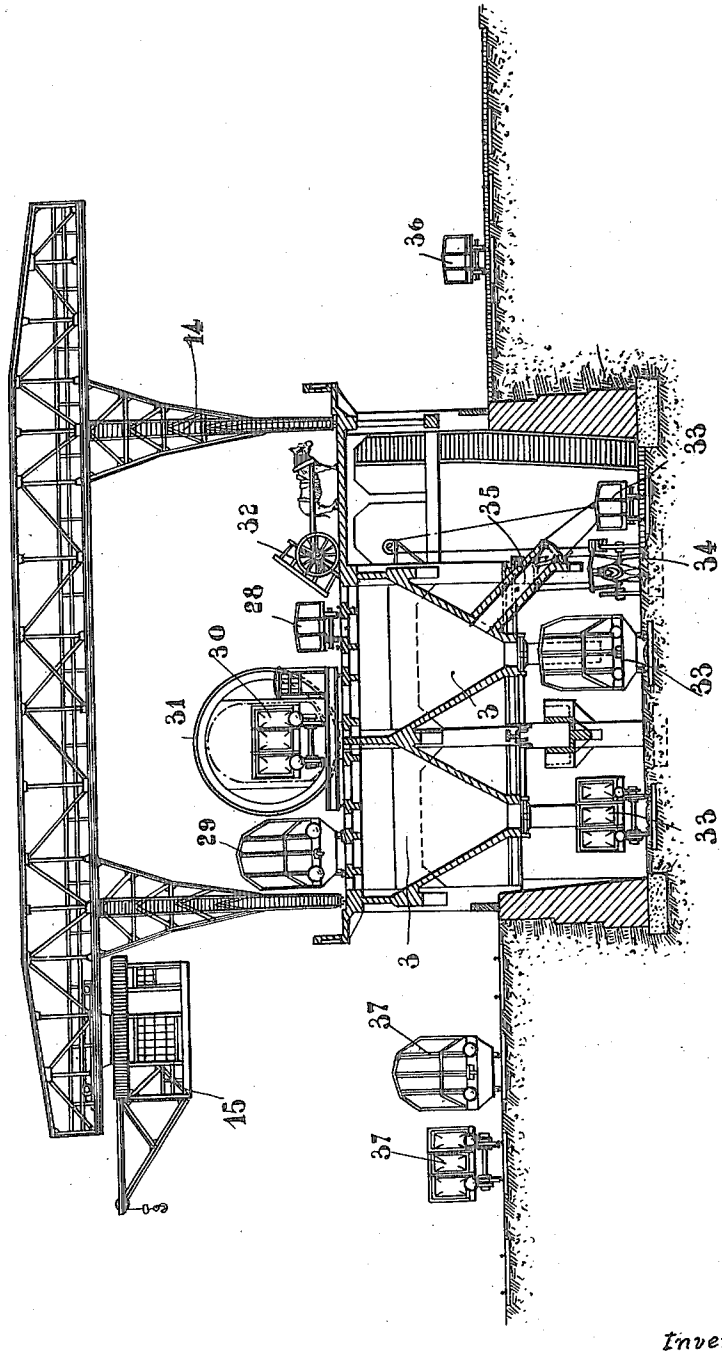
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5 SHEETS—SHEET 5.

Fig. 5.



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UNITED STATES PATENT OFFICE.

ALEXANDRE VANDEVELDE, OF BRUSSELS, BELGIUM.

MEANS FOR LOADING AND UNLOADING MERCHANDISE.

1,190,822. Specification of Letters Patent. Patented July 11, 1916.

Application filed July 15, 1913. Serial No. 779,160.

To all whom it may concern:

Be it known that I, ALEXANDRE VANDEVELDE, subject of the King of the Belgians, residing at Brussels, Belgium, have invented certain new and useful Improvements in Means for Loading and Unloading Merchandise, of which the following is a specification.

This invention has for its object improved means for facilitating and accelerating the loading and unloading of merchandise at seaports, railway stations, and the like and also the transportation of such merchandise. These improved means, the main objects of which are to render independent of each other the means of conveyance by which the goods are brought and those intended to carry the same away, and to permit of intensive working of the cranes, are substantially the same for a railway station and a seaport. When the said improved means are established in a port, for example, they consist in a structure erected along a quay or jetty and containing hoppers for the storage and loading of goods in bulk, tracks for railway trains to travel above these hoppers, a track for roller bridges and cranes or the like on the top of the structure and tracks for railway trains below the hoppers, the whole being arranged in such a manner that the goods intended for embarkation can be discharged by the trains upon the upper tracks into inclined hoppers which can be connected by means of hose or ducts with the hold of the ships; on the other hand the goods brought by the vessels can be discharged by cranes into hoppers opening over the trucks running upon the lower tracks or directly upon the trucks running upon upper tracks or else into other boats or lighters. The goods to be loaded in bulk onto ships can be stored in the inclined hoppers as they are delivered by the trains and remain there until the ship is ready for loading, so that it is unnecessary to detain the trains and the contents of one or more hoppers can be discharged very rapidly into a ship, the loading of which is thus considerably accelerated. The emptying of the hoppers can be accelerated by causing them to communicate with each other by means of apertures so that the contents of a number of hoppers can be discharged through one of them. On the other hand the goods brought by the ship can be discharged immediately into the hoppers intended for loading the trains or into inclined chutes serving for loading other ships or lighters and if desired the goods can remain therein until the arrival of the trains, lighters or the like so that the ship can be unloaded without waiting for them.

The arrangement of the tracks for the roller bridges or cranes above the hoppers has the great advantage that their height above the tracks is greatly reduced so that their gage can be largely diminished and they can be placed much closer together, whereby a larger number of cranes can be utilized together for unloading a ship in completely covering the latter and so that the work can be carried out by all the cranes simultaneously without their impeding each other and without the necessity for moving the bridges until the unloading is completed.

Small quays can be provided along the base of the two faces of the structure, for the circulation of trains and tracks for the circulation of auxiliary cranes can be supported above these quays upon brackets fixed at intervals to the pillars of the outer walls of the structure, for the loading and unloading of the trains which can thus be effected very readily even when the latter are distant from the ship. Between these auxiliary cranes and the space required for the trains on the quays auxiliary hoppers can be provided at intervals, for the reception of goods discharged from ships by the auxiliary cranes, in case it should not be possible for any reason, to load these goods directly onto trucks.

It will be understood that the arrangements hereinbefore described are equally applicable to a railway depot in which trains carry out the same offices as ships in a port.

Installations embodying the invention are illustrated diagrammatically by way of example in the accompanying drawings, in which:

Figures 1, 2, 3 and 4 show the structure built upon a jetty enabling ships to be loaded and unloaded on both sides of the structure. Fig. 5 represents an installation for a railway depot. Fig. 1 is a side elevation of the structure showing the hoppers in vertical section. Fig. 2 is a front elevation of a part of the structure. Fig. 3 is a plan

view of the same in which the field of action of the cranes is indicated by wide cross-hatching, and Fig. 4 is a view similar to Fig. 1 showing a portion of the structure modified.

In the drawings, 1 is the jetty upon which the structure is built, this structure containing along both its faces superposed rows of inclined hoppers 2, and between them rows of vertical hoppers 3. Tracks 4 are arranged beneath the hoppers 3 for trucks 5 for the conveyance of the goods contained therein and other tracks 6 are arranged above the hoppers 2 for the trucks bringing the goods intended to be loaded onto ships 7 and 8. Small quays 10 can be provided upon the jetty along the structure for laying tracks for trucks 11 intended either for the reception of goods from the hoppers 2 or for discharging goods directly into the ships through an inclined passage way 12 carried through the walls of the jetty and to which a discharge hose can be fitted. Above the hoppers tracks 13 are also provided for the circulation of roller bridges 14 with cranes 15 intended either for removing goods from boats for conveying them to the hoppers 3 or to the hoppers 2 on the other side of the structure, or for loading crates, casks or the like, brought in the trucks 6.

As shown in Figs. 2 and 3, the gage of the roller bridges 14 can be very small owing to the high level of the tracks 13, thereby permitting of grouping a large number of cranes in a relatively small space so as to use them for unloading or loading one and the same ship. The lower orifices 20, 21 of the hoppers are provided with any suitable doors or registers and the hoppers are emptied into the ships or trucks by means of hose or ducts 16 fitted to these apertures and adapted to be shifted from one to another.

Apertures 17 provided with doors or registers place each of the inclined hoppers 2 in communication, in proximity with its discharge aperture, with the hopper located below, in such a manner that two or more hoppers can be discharged through one and the same hose 16 without the necessity for shifting the latter.

Warehouses 18 and tracks 19 can also be provided beneath the inclined hoppers 2.

In the modified construction illustrated in Fig. 4 above the quay 10 hoppers 22 are provided and above the latter brackets 23 support a track 24 upon which auxiliary cranes 25 travel. The brackets 23 are arranged at intervals along the structure for supporting the track 24 and the cranes 25 running upon this track can conveniently be grouped like the principal cranes 15 for rapidly removing from ships goods intended to be loaded onto the trucks 11. In the absence of trucks 11, these cranes can deposit the goods in the hoppers 22 arranged at intervals where they can be stored until they can be loaded into trucks. Beneath the inclined hoppers vertical hoppers 26 are arranged which communicate with the hoppers 3 through apertures 27 provided with doors and intended for the reception of a portion of the goods loaded in these hoppers 3.

Fig. 5 shows a simplified construction more particularly intended for a railway station or depot. This comprises vertical hoppers 3 into which goods in bulk to be loaded, are dumped by automatically discharging trucks 28, 29 or from ordinary wagons 30 introduced into a tipping frame or off-putter 31, or any other similar apparatus, or from carts 32. These goods are then loaded into wagons 33 or carts 34, either from the bottom of the hoppers or from lateral passages 35 provided with appropriate doors or registers.

The cranes 15, carried by the roller bridge 14, serve for transferring goods other than goods in bulk, for example from the trucks 28, 29, 30 or the trucks 36 located on one side of the structure onto trucks 37 located upon the other side, or vice-versa or onto a yard or floor either inside or outside the structure.

The internal and external arrangements can of course be modified according to circumstances and the ships and trucks can also be replaced by other conveyance means.

What I claim and desire to secure by Letters Patent is as follows:

1. A hopper comprising a plurality of similarly-formed compartments, each of such compartments comprising an inclined portion and an upright portion, the inclined portions having a superposed disposition and gradually increasing in length from top to bottom, and the upright portions having a lateral arrangement and gradually increasing in depth.

2. A hopper comprising a plurality of similarly-formed compartments, each consisting of an inclined portion and an upright portion, the inclined portions having a superposed arrangement and gradually increasing in length and capacity from the topmost to the lowermost inclined portion, and the upright portions having a lateral disposition and gradually increasing in depth from the shortest to the longest inclined portion of the compartments.

3. A hopper comprising an inclosed structure, the top of the structure having transversely arranged inlet openings, and the front of the structure being provided with a corresponding number of outlet openings at different elevations, and partitions dividing the structure into compartments which communicate at their upper ends with the respective inlet openings and at their lower

ends with the respective outlet openings, each of the partitions consisting of a vertical portion and an inclined portion, the vertical portions of the partitions having a lateral arrangement and the inclined portions of the partitions being disposed vertically one above the other.

4. In combination, adjacent rows of storage hoppers, having discharging apertures arranged in vertical rows, partitions between the successive hoppers of each row, comprising each a vertical upper section and an inclined lower section, means for filling the said hoppers from above and means for unloading same through the bottom into conveying means.

5. In combination, adjacent rows of storage hoppers, having discharging apertures arranged in vertical rows, partitions between the successive hoppers of each row, comprising each a vertical upper section and an inclined lower section, means for discharging the contents of one hopper through the discharging aperture of another hopper, opening below the former, means for loading the hoppers from above and means for unloading the same through the bottom directly into conveying means.

6. In combination, adjacent rows of storage hoppers, discharging apertures arranged in vertical rows, partitions between the successive hoppers of each row, comprising each a vertical upper section and an inclined lower section, railway tracks above the said hoppers and means for discharging the latter through the bottom directly into conveying means.

7. In combination, adjacent rows of storage hoppers, discharging apertures arranged in vertical rows, partitions between the successive hoppers of each row, comprising each a vertical upper section and an inclined lower section, railway tracks above the said hoppers and movable inclined spouts for connecting the discharge apertures of the hoppers with conveying means.

8. A structure, comprising in combination adjacent rows of storage hoppers, having their lower portions inclined and discharging apertures arranged in superposed rows, vertical storage hoppers, railway tracks above the said hoppers, railway tracks below the vertical hoppers and means for discharging the inclined hoppers through the bottom directly into conveying means.

9. A structure comprising in combination adjacent rows of storage hoppers having inclined lower portions and discharging apertures arranged in superposed rows, opening through an external wall of the structure, tracks for roller bridges and cranes on top of the structure and means for discharging the inclined hoppers through the bottom directly into conveying means.

10. A structure comprising in combination adjacent rows of storage hoppers having inclined lower portions and discharging apertures arranged in superposed rows, opening out through an external wall of the structure, vertical storage hoppers, conveyance means above the hoppers, conveyance means below the vertical hoppers, tracks for roller bridges and cranes on top of the structure and movable inclined spouts for connecting the discharging apertures of the inclined hoppers with conveying means.

11. A structure comprising in combination groups of adjacent rows of storage hoppers having inclined lower portions and discharging apertures arranged in superposed rows, opening out through external walls of the structure, vertical storage hoppers between the said groups of hoppers, means for loading all of the said hoppers from above and means for discharging the same through the bottom into conveying means.

12. A structure comprising in combination groups of adjacent rows of storage hoppers having inclined lower portions and discharging apertures arranged in superposed rows, opening out through external walls of the structure, vertical storage hoppers between these groups of rows of hoppers, conveying means above and beneath all of the said hoppers, tracks on top of the structure and cranes on the said tracks.

13. A structure comprising in combination adjacent rows of storage hoppers some of said hoppers having inclined lower portions and discharging apertures arranged in superposed rows opening out through an external wall of the structure, conveying means above and beneath these hoppers, tracks on top of the structure, cranes on said tracks, a quay arranged externally and lengthwise of said structure, conveying means upon said quay, brackets secured at intervals in the external wall of the structure, a track supported on said brackets and cranes upon said track.

14. A structure comprising in combination adjacent rows of storage hoppers having inclined lower portions and discharging apertures arranged in superposed rows opening out through an external wall of the structure conveying means above and below said hoppers, tracks on top of the structure, cranes on said tracks, a quay arranged externally and lengthwise of said structure, conveying means upon said quay, brackets secured at intervals to the external wall of the structure, a track supported on said brackets, cranes on said track and storage hoppers secured to the external wall of the structure between the quay and said last-mentioned track.

15. A structure comprising in combination groups of adjacent rows of storage hoppers having inclined lower portions and discharging apertures arranged in superposed

rows opening out through the external walls of the structure, vertical storage hoppers between said groups of hoppers, railway tracks above the hoppers and railway tracks below the vertical hoppers, adjacent and parallel tracks on the top of the structure and cranes upon said last-mentioned tracks.

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

ALEXANDRE VANDEVELDE.

Witnesses:

ADOLPHE VOGEL,

LÉON PIÉRARD.