

F. L. STUART.
 APPARATUS FOR LOADING AND UNLOADING.
 APPLICATION FILED MAY 29, 1916.

1,313,928.

Patented Aug. 26, 1919.

6 SHEETS-SHEET 1.

FIG 1

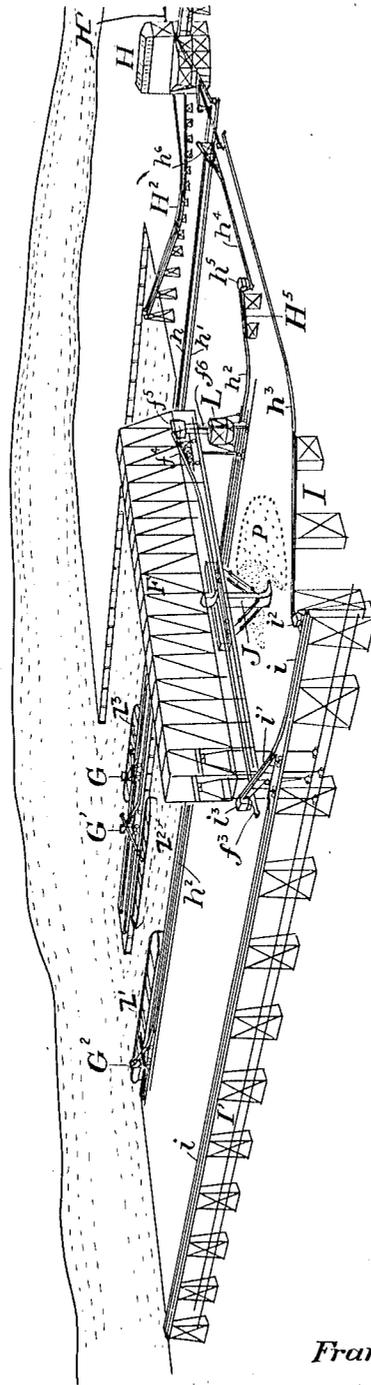


FIG. 6

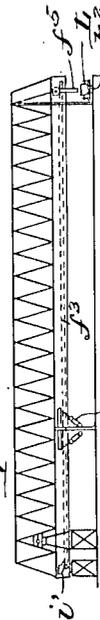


FIG. 7



FIG. 8



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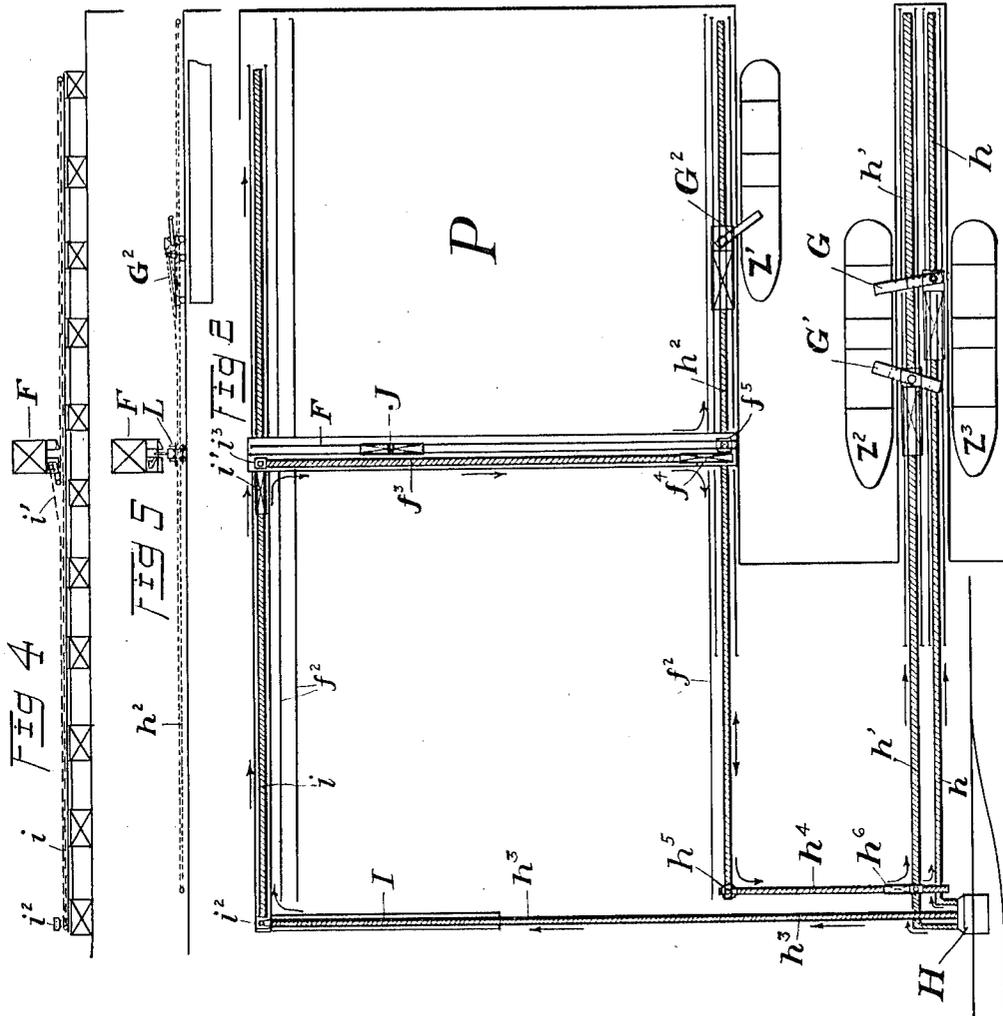
has Attorneys

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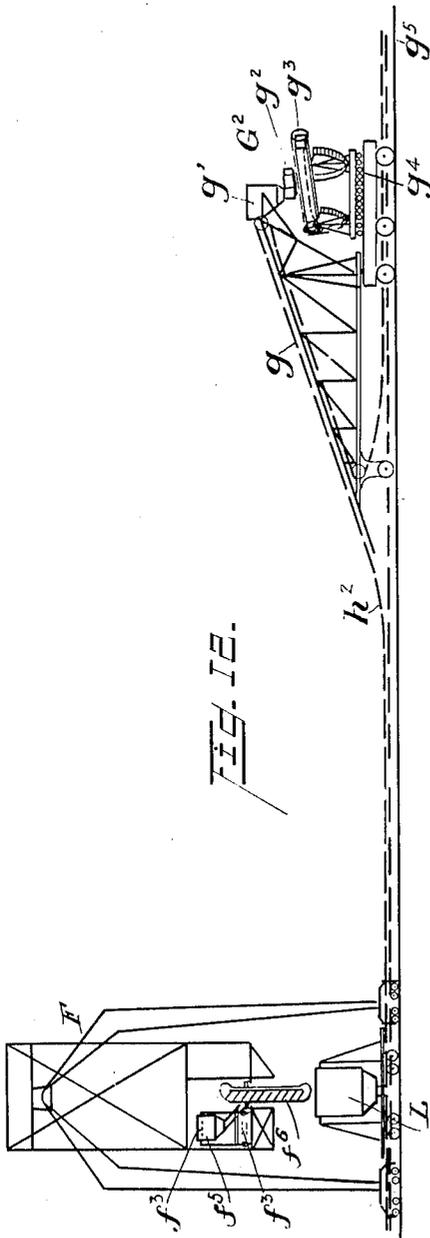


FIG. 1A.

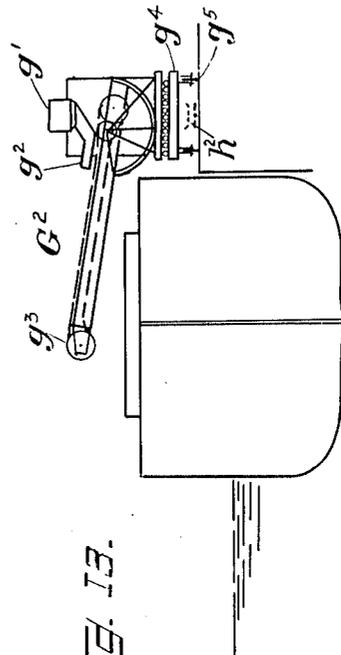


FIG. 1B.

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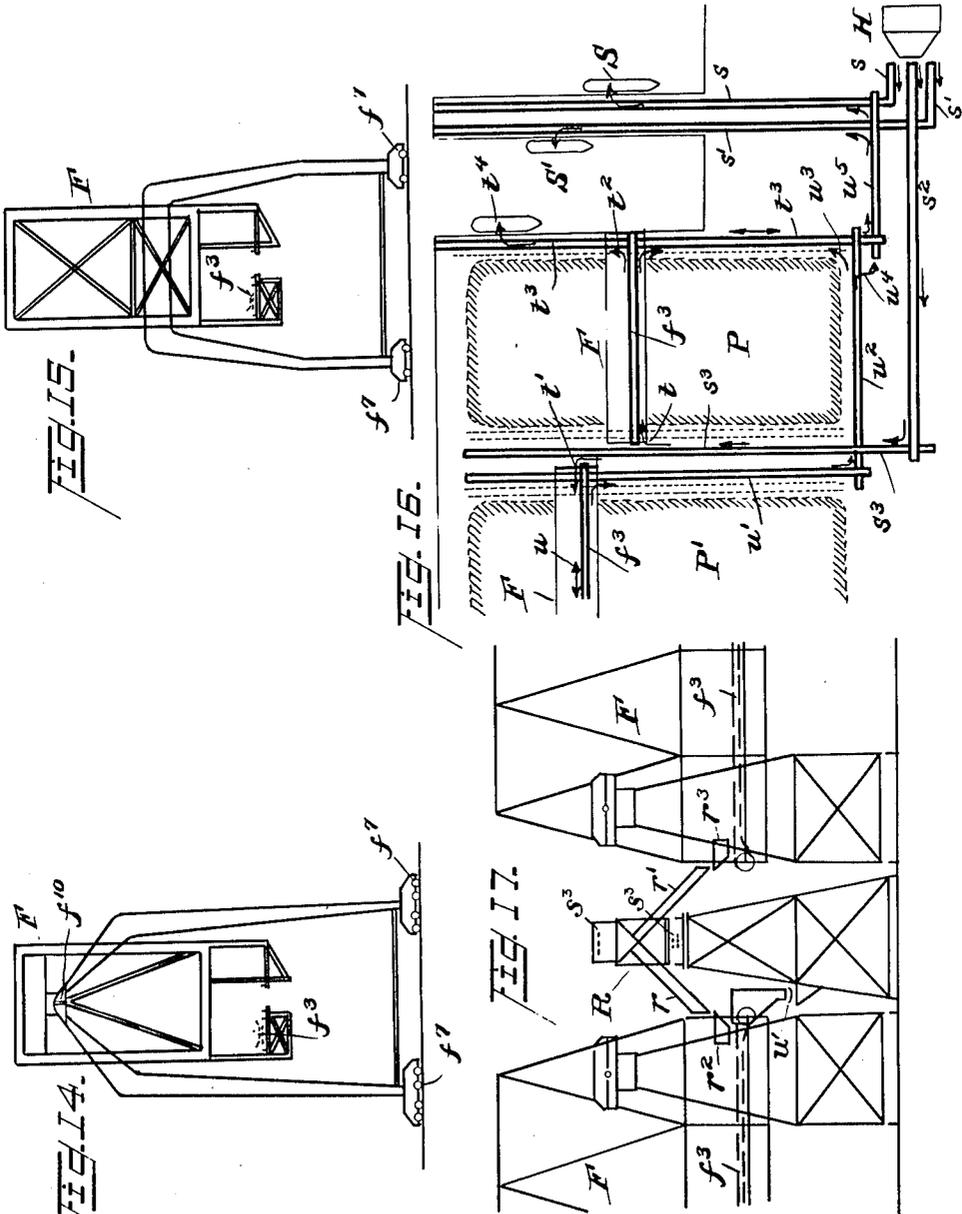
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6 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

FRANCIS LEE STUART, OF BALTIMORE, MARYLAND.

APPARATUS FOR LOADING AND UNLOADING.

1,313,928.

Specification of Letters Patent. Patented Aug. 26, 1919.

Application filed May 29, 1916. Serial No. 100,632.

To all whom it may concern:

Be it known that I, FRANCIS LEE STUART, a citizen of the United States, residing in Baltimore, Maryland, have invented certain new and useful Improvements in Apparatus for Loading and Unloading, of which the following is a specification.

This invention relates to apparatus for unloading coal, ore and other material from cars, barges, ships or other vessels or carriers, for delivering such material to other receptacles, for conveying the material to distant points, and for delivering it and storing it in bins, cars, floating vessels or other carriers or places of storage. It also relates to apparatus for reclaiming material from storage and delivering it to suitable carriers.

The accompanying drawings are for the most part diagrammatic as my invention can be fully illustrated in this way. The details of construction of the individual units may be considerably varied, but in other copending applications I have shown more fully the specific construction of some novel parts of the apparatus.

Figure 1 is a perspective view of the general system or organization of the apparatus.

Fig. 2 is a plan view showing diagrammatically an arrangement of conveyers extending from a dumping apparatus or other source of supply to trimmers and to a movable bridge conveyer and from the bridge conveyer to the trimmers.

Fig. 3 is an end view of the mechanism shown in Fig. 2, and shows how one conveyer belt delivers to another leading to the bridge conveyer.

Fig. 4 shows a side elevation looking at the receiving end of the bridge.

Fig. 5 is a similar view of the opposite or delivery end of the bridge.

Fig. 6 shows a front elevation of the bridge, and some of the mechanism associated therewith.

Fig. 7 shows diagrammatically how a conveyer belt may deliver to a transfer belt, in turn delivering to other conveyer belts.

Fig. 8 is a front elevation of the bridge and certain mechanism associated therewith being on a larger scale than Fig. 6.

Fig. 9 shows in side elevation how a conveyer belt delivers to the bridge conveyer through a tripper attached to the bridge.

Fig. 10 is an end view, illustrating mechanism

for lowering material from the bridge conveyer.

Fig. 11 shows in elevation a reclaiming elevator associated with the bridge conveyer.

Fig. 12 illustrates some of the mechanism shown in Figs. 5 and 8 and particularly the mechanism for transferring material from the bridge conveyer to a belt conveyer delivering to a trimmer.

Fig. 13 is another view of this mechanism showing how the trimmer delivers to a barge.

Figs. 14 and 15 are sectional views of the bridge showing its supports.

Fig. 16 is a plan view, showing how material may be conveyed from a car dumper by belt conveyers to boats or to bridge conveyers delivering to bins, store houses or piles and how material may be taken from the piles or places of storage and conveyed to boats, cars, etc.

Fig. 17 shows in elevation some of the mechanism shown in Fig. 16, and illustrates particularly how material may be conveyed by a belt between two bridge conveyers and may deliver to either or both of them.

Fig. 18 shows diagrammatically apparatus for transferring material from boats to conveyers which deliver the material to a bridge conveyer or to other conveyers which carry it to places of storage or to other carriers.

Fig. 19 shows the same mechanism in elevation.

Fig. 20 shows in elevation some of the mechanism shown in Fig. 18.

In Fig. 1 of the drawings I have shown in perspective a general view of the system or organization embodying my improvements.

The mechanism is so constructed and organized that material, such as coal, ore and the like, may be carried from the car-dumper or other source of supply to trimmers which deposit the material in boats or other carriers, or may be carried to a movable bridge conveyer which may deposit the material in bins, storage-houses or piles, or may transfer the material to other conveyers which carry it to boats or other carriers. It also shows an organization of apparatus by means of which stored material may be elevated and transferred to a bridge conveyer which in turn delivers it to other conveyers which carry it to the desired destination.

The specific construction of the elements or units of the system are shown in other figures of the drawings and where such mechanism is shown in Fig. 1 the reference characters are similar.

In the general system illustrated, material is taken from cars coming in on tracks H' , H^2 to a dumping tower H and the material is received from the dumping apparatus by belt conveyers h , h' leading to trimmers or loaders G , G' which deposit the material in boats Z^2 , Z^3 . Said dumping apparatus may also deliver to a belt h^3 which extends over an inclined trussed frame I and delivers to a hopper i^2 in turn delivering to a belt conveyer i mounted on a trussed frame and equipped with a tripper i' connected to move with the bridge F and delivering to a hopper i^3 in turn depositing the material on the bridge conveyer f^3 which is provided with a movable tripper f^4 delivering to a hopper f^5 discharging into a chute or lowerator f^6 in turn delivering either to a storage pile beneath the bridge as will be subsequently described, or to a hopper L movable with the bridge F and depositing the material upon a belt conveyer h^2 which may be moved in either direction. When moved in one direction it carries the material to a movable trimmer G^2 delivering to a boat Z' and when moved in the opposite direction it delivers to a hopper h^5 which deposits the material upon a belt h^4 provided with a tripper h^6 in turn delivering to the belts h , h' so that the material may be carried to the boat Z' or from the bridge to the boats Z^2 , Z^3 . The bridge is provided with reclaiming means such as grab buckets but preferably a reclaiming elevator J which is adapted to be moved endwise of the bridge to any desired extent and may be operated to elevate the material from storage piles, store houses or bins and deliver it upon the bridge conveyer f^3 by means of which it may be carried to the tripper f^4 and delivered to the hopper L .

Fig. 2 of the drawings shows diagrammatically the arrangement of conveyers, etc., illustrated in Fig. 1 and as this mechanism has been fully described the construction and operation of the conveyers shown in Fig. 2 will be readily understood. The arrows illustrate the direction in which the belts move or may be moved.

Figs. 3, 4, 5 and 6 merely show parts of the mechanism shown in Fig. 2.

Fig. 7 is a detached diagrammatic view illustrating how the conveyer belt h^2 delivers to a transfer belt h^4 which may in turn deliver to either belt h or h' .

The bridge conveyer F is shown on an enlarged scale in Fig. 8. The bridge is supported on standards F' with which it is pivotally connected at f^{10} . The standards move

from place to place on tracks f^2 . The tripper i' is movable on rails i^4 and is connected to move with the bridge. The tripper delivers to a hopper i^3 which discharges onto the conveyer belt f^3 which may deliver to a pile below the bridge by means of the hopper f^5 and the chute or lowerator f^6 previously described, or the hopper and lowerator may be moved with the tripper along the bridge and discharged into the hopper L mounted on tracks l' and connected to the bridge to move from place to place therewith. The lowerator, as before described, may be moved to any desired position between the ends of the bridge and by means of the tripper f^4 the conveyer belt f^3 may be made to discharge the material from the bridge conveyer at any desired position between the ends of the bridge.

The reclaiming elevator J is suspended from the bridge and may be moved in either direction to the desired extent between the opposite ends thereof. It is constructed to elevate the material from a pile and deliver it to the bridge conveyer f^3 which discharges into the lowerator f^6 in turn delivering to the hopper L as before described. When not in use the reclaiming elevator may be moved to one side of the bridge or otherwise disposed of.

It will thus be seen that the apparatus is so organized that material may be transferred from place to place and delivered as required by the particular conditions present at the time the transfers are being made.

The specific construction of the reclaiming elevator is more fully shown, described and claimed in my copending application, Ser. No. 98,889, filed May 20, 1916, (Case No. 10).

In Fig. 12 I have illustrated some of the mechanism already described but have shown more in detail the trimmer G^2 which receives material from the belt h^2 . The tripping mechanism g delivers to a hopper g' in turn delivering to a hopper g^2 which deposits the material upon a delivery conveyer g^3 mounted on a truck g^4 which may be moved from place to place on a track g^5 . The delivery conveyer may be turned about a vertical axis oscillated on a horizontal axis and may deliver to a boat or other carrier in the manner indicated in Fig. 13.

Fig. 16 shows a system of conveyers, bridges, etc., whereby material may be conveyed from a feeding apparatus, such as a car-dumper, and delivered to boats or to bridges which in turn deliver to bins or other places of storage or to conveyers which deliver to boats or other carriers. It also shows an arrangement whereby material may be taken from bins, piles, etc., and delivered to boats or other carriers. H indicates the source of supply, such as a car-dumper, and s , s' indicate belt conveyers for carrying material to suitable trimmers or

loading apparatus indicated at S, S'. The belt s^2 conveys and delivers to the belt s^3 which in turn delivers to the bridge conveyers at the points t, t' . The bridge conveyer f^3 on the right hand side of Fig. 19 may deliver at t^2 to a conveyer belt t^3 discharging at t^4 , or the bridge conveyer may discharge onto a pile P. The bridge conveyer on the left hand side of Fig. 19 may discharge onto a pile P' or otherwise.

Each bridge may be provided with an elevator of the kind shown in Fig. 8 and material may be raised from the piles and conveyed to other places of storage or to suitable carriers. For instance, the bridge conveyer f^3 on the left hand side of Fig. 16 may carry material to the right as indicated at u and deliver to a belt u' discharging upon a belt u^2 in turn delivering to the belt t^3 as indicated at u^3 which conveys the material to loading apparatus at t^4 , or the belt u^2 may deliver as indicated at u^4 to a belt u^5 delivering to the belts s, s' . In this way ships, cars and other carriers may be loaded either from the dumping apparatus H or from the storage piles P, P'.

It will be understood that the bridge conveyers may be moved from place to place on suitable tracks and the loading apparatus may in like manner be moved to any desired place of delivery.

Fig. 17 shows in elevation some of the mechanism shown in Fig. 16 and indicates how the conveyer belt s^3 may deliver to a hopper R discharging the material through chutes r, r' to the hoppers r^2, r^3 which deposit the material upon the belts f^3 .

Figs. 18 and 19 of the drawings show some of the mechanism hereinbefore described associated with a modified form of apparatus. In this case material may be taken from vessels by cranes M, M' and delivered to movable hoppers m in turn delivering to conveyer belts m' discharging into a hopper N from which a conveyer passes over an incline N' and delivers to the belt conveyer i at n' and said belt conveyer i in turn delivers to the bridge conveyer f^3 by means of the tripper i' . The cranes M may be moved back and forth on tracks m^2 and the hoppers m may also be moved back and forth on tracks parallel with the belts m' . The hopper N, as before stated, delivers to a belt leading to the bridge conveyer or it may deliver to a belt N² leading to a hopper N³ delivering onto a belt o and thence to trimmers such as G³ depositing the material in cars or other carriers O. In other respects the apparatus is similar to that before described.

Fig. 20 shows in elevation other mechanism which may be employed for raising the material from boats and delivering it to belt conveyers. In this case there is a bridge M' provided with a cage m^3 supporting an

extensible arm m^4 equipped with hoisting devices, such as a grab-bucket, m^5 , which may be operated to carry the material from the boats on each side to the hoppers m . The standards of the bridge may be provided with rollers traversing suitable tracks m^2 . The bridge conveyer M' shown in Fig. 20 is also shown in plan in Fig. 18.

As a whole the system hereinbefore described is such that the material may be conveyed from cars, boats or other places of supply or storage to other places of storage or to carriers either on land or afloat and wherever located within reasonable distances.

The material is so handled that there is a minimum amount of breakage. In no instance does the material fall to any great extent but it passes gently from one part of the system to the other with the least possible friction or shock.

I claim as my invention:

1. In a system for loading and unloading, a plurality of docks, loading apparatus at each of said docks, a main source of supply, means for conveying material from the main source of supply to the loading apparatus at one of said docks, a second source of supply, means for conveying material from the main source of supply to the second source, and means for conveying material from the second source of supply to the loading apparatus at each of the docks.

2. In a system for loading and unloading, a plurality of docks, loading apparatus at each of said docks, a main source of supply, belt conveyer mechanism for carrying material from the main source of supply to the loading apparatus at one of said docks, a second source of supply, belt conveyer mechanism for carrying material from the main source of supply to the second source and belt conveyer mechanism for carrying material from the second source of supply to the loading apparatus at each of the docks.

3. In a system for loading and unloading, a plurality of docks, loading apparatus at each of said docks, a main source of supply, belt conveyer mechanism for carrying material from the main source of supply to the loading apparatus at one of said docks, a secondary source of supply, independently operated belt conveyer mechanism for carrying material from the main source of supply to the second source of supply, and belt conveyer mechanism for carrying material from the second source of supply to the loading apparatus at each of the docks.

4. In a system for loading and unloading, a plurality of docks, loading apparatus at each of said docks, a main source of supply, belt conveyer mechanism for carrying material from the main source of supply to the loading apparatus at one of said docks, a storing space, a movable bridge traversing

said storage space and provided with a belt conveyer, belt conveyer mechanism for conveying material from the main source of supply to the bridge conveyer, means for delivering material from the bridge to the storage space, means for reclaiming such material and for depositing it on the bridge conveyer, belt conveyer mechanism movable in opposite directions receiving reclaimed material from the bridge conveyer and which belt conveyer mechanism delivers to

loading apparatus at one of the docks and other belt conveyer mechanism which receives material from said last mentioned conveyer and delivers to loading apparatus at another dock. 15

In testimony whereof, I have hereunto subscribed my name.

FRANCIS LEE STUART.

Witnesses:

E. R. SPARKS,
A. H. SCHAEFFER.