

Jan. 8, 1929.

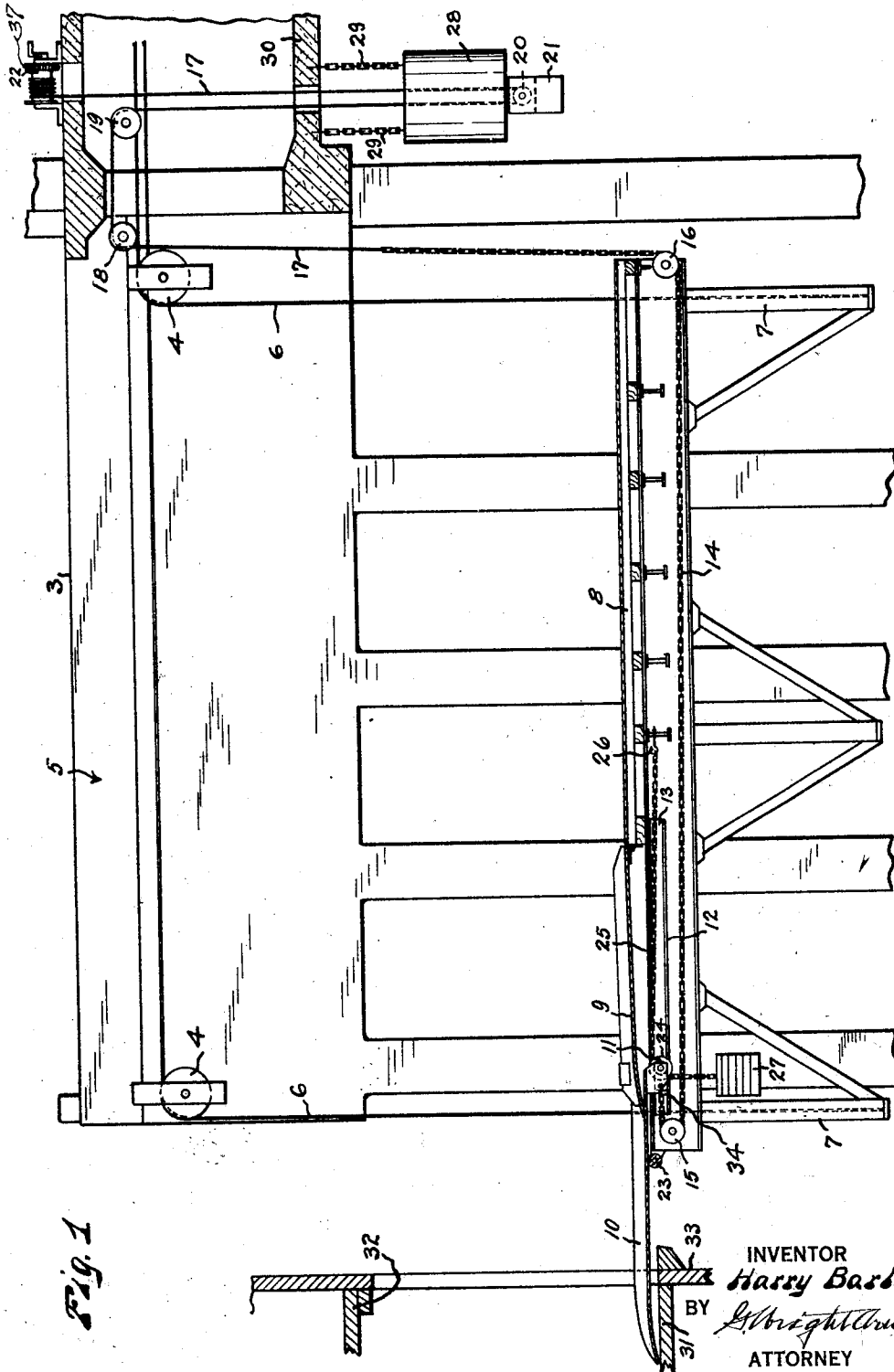
1,698,209

H. BARLOW

MARINE ELEVATOR

Filed Jan. 24, 1927

2 Sheets-Sheet 1



INVENTOR
Harry Barlow
BY *Edw. Wright*
ATTORNEY

Jan. 8, 1929.

1,698,209

H. BARLOW

MARINE ELEVATOR

Filed Jan. 24, 1927

2 Sheets-Sheet 2

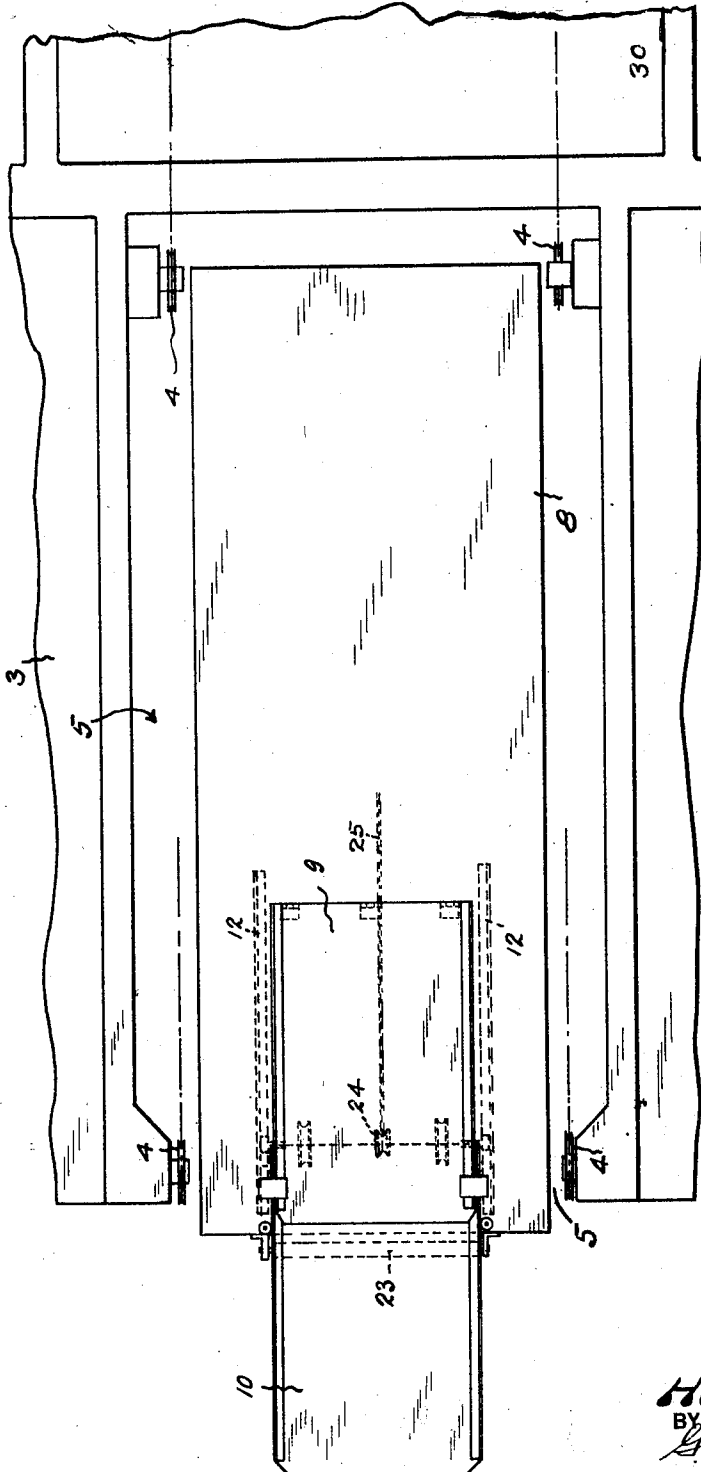
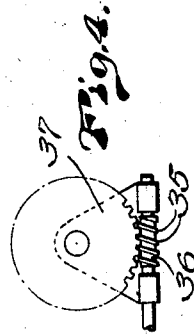


Fig. 2

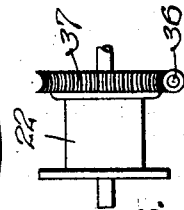


Fig. 3

INVENTOR
Harry. Barlow
BY *Wrightthold*
ATTORNEY

UNITED STATES PATENT OFFICE.

HARRY BARLOW, OF PORT MADISON, WASHINGTON, ASSIGNOR TO BARLOW MARINE ELEVATOR CO. INC., OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

MARINE ELEVATOR.

Application filed January 24, 1927. Serial No. 163,291.

My invention relates to a marine elevator. More particularly my invention relates to an extension apron for a marine elevator platform which apron may be caused to move beyond the edge of said platform to bridge a gap between said platform and a deck, said apron being extendable and retractable automatically in synchronism with the travel of said platform.

be done automatically in synchronism with the travel of the elevator platform to satisfy the requirement as to speed and practical operation of the platform. It will be understood that in moving freight to or from a vessel, it is always done with the utmost speed in order not to delay the vessel in port any longer than absolutely necessary as all time when said vessel is not under way is considered loss.

A special difficulty obtains in providing elevator mechanism for docks in that the mechanism must be such as to afford a certain dock elasticity, that is, to permit the dock being swayed or sprung out of its normal position by contacting the vessel without interfering with the operation of the elevator. The moving parts must be such as to not become bound or thrown out of alignment to an extent that will interfere with their operation.

In providing an extension apron for an elevator platform operating under the said described marine conditions, it is important that there should be actuating means for said apron which will cause the same to move to and fro and over the edge of the platform and that the maximum throwout movement of the apron may be provided at any desired level of the platform intermediate its travel.

A primary purpose of my invention is to provide actuating means which will provide for the maximum extension of said apron at any desired level intermediate the travel of said platform.

Furthermore, in providing such an extension apron for the elevator platform it is important that the mounting of the extension apron and the actuating means for causing said apron to move to and fro automatically in synchronism with the travel of the elevator platform shall be of a character which will permit the platform to be unintentionally lowered below the level at which the maximum apron extension is provided without injury to the apron or associated mechanism.

In general, a fundamental object of my invention is to provide an extension means for an elevator platform which will satisfy all of the practical operating conditions obtaining in practice and as set forth above.

The above general objects of my invention,

For purposes of clearness and definiteness of illustration I will describe a marine application of my invention under conditions obtaining on a dock to which a vessel may be moored for purposes of loading or unloading. However, it will be distinctly understood that my invention is not to be restricted to any such specific application but is co-extensive with all situations where like conditions and problems obtain. My invention is directed particularly to solving the problem of loading and unloading vessels where tidal variation obtains. The term "tidal variation" herein includes both the difference in level of fresh water in rivers or lakes where spring freshets and the summer droughts cause great variation in the levels of the water, as well as where variation is due to true tidal action occurring daily in the oceans.

There are the following situations:

(1) Where the deck of the vessel from or to which the freight is to be moved is above the level of the dock and there is a considerable gap between said deck and the edge of the elevator platform which is to be spanned, a simple and common expedient is to fix in place on the deck of a vessel a transfer board which extends over said gap, the elevator working up to the under edge of said transfer board.

(2) When the deck of the vessel from or to which the freight is to be moved is below the level of the dock then the elevator may be of such construction that the platform may be capable of being moved outwardly, or

(3) The platform itself may be provided with means herein called an "apron", which may be extended to bridge the gap when the platform is on a level with the deck of the vessel, and which means may be retracted to clear the upper deck of the vessel as the elevator platform travels to the level of the dock. Furthermore, this extending and retracting of the extension or apron means must

together with other inherent in the same, are obtained by the device illustrated in the following drawings, the same being preferred exemplary forms of embodiment of my invention throughout which drawings like reference numerals indicate like parts.

Figure 1 represents a view in side elevation of an elevator platform and mounting means embodying my invention, and

Fig. 2 represents a plan view of the same.

Fig. 3 is an enlarged view in side elevation of the drum, attached worm wheel, and worm; and

Fig. 4 is a view in end elevation of the worm wheel and cooperating worm.

Beneath the deck 3, the dock hoisting sheaves 4 may be provided at each corner of the elevator well 5. Over these sheaves extend hoisting cables 6 secured to the legs 7 of an elevator platform 8. Thus the platform is provided with suspending means at its four corners. Having the legs 7, provides for elevating the platform 8 above the level of the deck 3 of the dock.

Upon the elevator platform 8, is an upper hinged apron 9 which makes sliding contact with a second or under apron 10. This under apron 10 is hingedly mounted on a roller 11 which is provided with a trackway 12 which in fact is the flange of an H beam 13. The apron means provides for bridging the gap between the edge of the deck 31 of the vessel which may be moored against the dock and the edge of the platform 8. It will be understood that the fender logs or rafts which customarily lie along the face of the deck or wharf, prevent the hull of the vessel from directly contacting the face of the dock or wharf so that the space between the vessel and the dock must be bridged when cargo is being handled.

A chain 14 is provided with one end secured to the rear end of apron 10 and reeved over sheave 15 and thence through sheave 16 and then the chain is preferably made fast to a cable 17 which extends over sheaves 18 and 19 and thence through fall block sheave 20 which is mounted in a counterweight 21 and the cable then goes to drum 22 which may be of any convenient form and may be locked in any convenient means, a common means being the self-locking worm type of shaft. The threads 35 of the worm 36 are of very small angle and directly mesh with the teeth of worm wheel 37. This counterweight 21 provides for maintaining the associated chain and cable taut. Apron 10 is provided with roller 23 to facilitate its being forced outwardly. A sheave 24, which appears as a dotted line in Fig. 1, is mounted intermediate the width of the apron 10. Over this sheave, a chain 25 passes having one end anchored at 26, and one end secured to a counterweight 27. A relatively very heavy

counterweight 28 is suspended by chains 29 from the dock structure 30.

The mode of operation of an elevator embodying my invention is as follows:

It will be assumed that the deck 31 of the vessel from or to which the freight is to be removed is on a level with the position of the elevator platform 8, as shown in Fig. 1. The freight is to be either removed from or to the vessel from this level to the level of the deck 3 of the dock. By way of setting the elevator for operation, the operator would then lower the elevator 8 to a position of a few feet above that shown in Fig. 1. He would then wind up on drum 22 the cable 17 until he causes the counterweight 21 to contact the under side of counterweight 28. Thereupon drum 22 is made fast as this fixes the throwout of the apron 10 automatically while the elevator is thereafter being operated at the given level, and thereupon would lower away the platform 8 which would cause the weight of the counterweight 28 to be borne by cable 17 and chain 14. Since counterweight 28 is relatively much heavier than counterweight 27, it is obvious that the apron 10 would be forced outwardly over roller 23 against the tendency of counterweight 27 to cause the same to move backwardly, i. e., when the platform 8 is lowered to the position shown in Fig. 1, the apron would be fully extended forwardly and be caused to bridge completely the gap between the deck of the vessel 31 and the face of the dock. When the elevator is lifted, obviously a condition of slackness will occur in line 17 and chain 14 which permits counterweight 27 and its chain 25 to drag backwardly the apron 10 in order to clear the upper deck 32 of the vessel 33. Thereafter, as the elevator moves up and down, the apron 10 will be caused to be retracted and extended automatically. When the tide falls to a lower level then the operator would pay out cable 17 from drum 22 so that a new setting of the block 21 against the block 28 would result in the commencement of the throwout movement of the apron at a lower level.

In this mounting counterweight 28 on cables 29 a safety factor is introduced, because, if perchance the operator should lower the elevator platform 8 below the level of the deck 31 of the vessel, immediately the apron 10 would swing upwardly on its pivotal mounting on roller 11 and the block 21 would be required to lift block 28, through the axis of which block the cable 17 passes, several feet before any rigid structure would be contacted. The raising of the apron 10 would be a prompt signal to the operator that he had gone below the desired level, and would then promptly raise the elevator platform until apron 10 assumed more nearly the horizontal position. It is thus manifest that the mount-

ing of apron 10 is such as to permit efficient operation of the platform 8 even when it is approximately in horizontal position.

It will be understood that the roller 11 of the apron 10 strikes against a stop 34 provided in the trackway 12. Therefore, in a continued descent of the elevator it simply lifts the weight 28 upwardly with the apron fully extended, and as stated above, the same would tend to turn upwardly on its pivotal mounting on roller 11 and no damage would result.

Obviously changes may be made in the forms, dimensions and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only a preferred form of embodiment.

I claim:

1. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; and actuating means for said apron.

2. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; and actuating means for said apron which imparts automatically a to and fro movement to said apron in synchronism with the travel of said platform.

3. An elevator platform embodying an apron hingedly mounted; a second apron slidably and hingedly mounted thereunder; and actuating means for said second apron.

4. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; actuating means for said apron, said means including a flexible connector secured to said apron; sheave means over which said connector extends; and a counterweight operatively mounted on said connector intermediate the ends thereof.

5. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; actuating means for said apron which imparts automatically a to and fro movement to said apron in synchronism with the travel of said platform, said means including a flexible connector secured to said apron; sheave means over which said connector extends; and a counterweight operatively mounted on said connector intermediate the ends thereof.

6. An elevator platform embodying an apron hingedly mounted; a second apron slidably and hingedly mounted thereunder; actuating means for said second apron, said means including a flexible connector secured to said second apron; sheave means over which said connector extends; and a counterweight operatively mounted on said connector intermediate the ends thereof.

7. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; actuating means for said apron, said means including a sheave mounted on said apron; a counterweight

and a flexible connector having one end fixedly secured to said platform and the other end secured to said counterweight.

8. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; actuating means for said apron which imparts automatically a to and fro movement to said apron in synchronism with the travel of said platform, said means including a sheave mounted on said apron; and a counterweight and a flexible connector having one end fixedly secured to said platform and the other end secured to said counterweight.

9. An elevator platform embodying an apron hingedly mounted; a second apron slidably and hingedly mounted thereunder; actuating means for said second apron, said means including a sheave mounted on said second apron; and a counterweight and a flexible connector having one end fixedly secured to said platform and the other end secured to said counterweight.

10. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; actuating means for said apron, said means including a flexible connector secured to said apron; sheave means over which said connector extends; a counterweight operatively mounted on said connector intermediate the ends thereof; a sheave mounted on said apron; a second counterweight; and a flexible connector having one end fixedly secured to said platform and the other end secured to said second counterweight whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of said platform.

11. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; actuating means for said apron which imparts automatically a to and fro movement to said apron in synchronism with the travel of said platform; said means including a flexible connector secured to said apron; sheave means over which said connector extends; a counterweight operatively mounted on said connector intermediate the ends thereof; a sheave mounted on said apron; a second counterweight; and a flexible connector having one end fixedly secured to said platform and the other end secured to said second counterweight whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of said platform.

12. An elevator platform embodying an apron hingedly mounted; a second apron slidably and hingedly mounted thereunder; actuating means for said second apron, said means including a flexible connector secured to said second apron; sheave means over which said connector extends; a counterweight operatively mounted on said connector intermediate the ends thereof; a sheave

mounted on said apron; a second counterweight; and a flexible connector having one end fixedly secured to said platform and the other end secured to said second counterweight whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of said platform.

13. In an elevator platform the combination of an apron slidably mounted on said platform; and actuating means for said apron having parts which operate in opposition to each other whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of said platform.

14. In an elevator platform the combination of an apron slidably and hingedly mounted on said platform; and actuating means for said apron having parts which operate in opposition to each other whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of said platform; and an adjusting means for said actuating means which may be set to provide for the maximum throwout movement of said apron at any desired level of the platform, and when so set without further adjusting automatically provides for said maximum throwout at said selected level while said elevator is caused to travel between said selected level and any other desired level.

15. In an elevator platform the combination of an apron slidably and hingedly mounted on said platform; actuating means for said apron having parts which operate in opposition to each other whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of

said platform; and an adjusting means for said actuating means, said adjusting means consisting of a drum to which the end of said first named connector means is secured.

16. In an elevator platform the combination of an apron slidably and hingedly mounted on said platform; actuating means for said apron having parts which operate in opposition to each other whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of said platform; an adjusting means for said actuating means, said adjusting means consisting of a drum to which the end of said first named connector means is secured, said drum means having a worm gear fixedly secured thereto said worm meshing with a worm whereby said drum is self-locking.

17. In an elevator platform the construction of an apron slidably and hingedly mounted on said platform; actuating means for said apron, said means including a flexible connector secured to said apron; sheave means over which said connector extends; a counterweight operatively mounted on said connector intermediate the ends thereof; a sheave mounted on said apron; a second counterweight of lighter weight than said first named counterweight; and a flexible connector having one end fixedly secured to said platform and the other end secured to said second counterweight whereby a to and fro movement is automatically imparted to said apron in synchronism with the travel of said platform.

In witness whereof I hereunto subscribe my name this 5th day of January, A. D. 1927.

HARRY BARLOW.