

April 25, 1933.

D. H. MORGAN

1,905,947

GANGWAY

Filed May 21, 1931

6 Sheets-Sheet 3

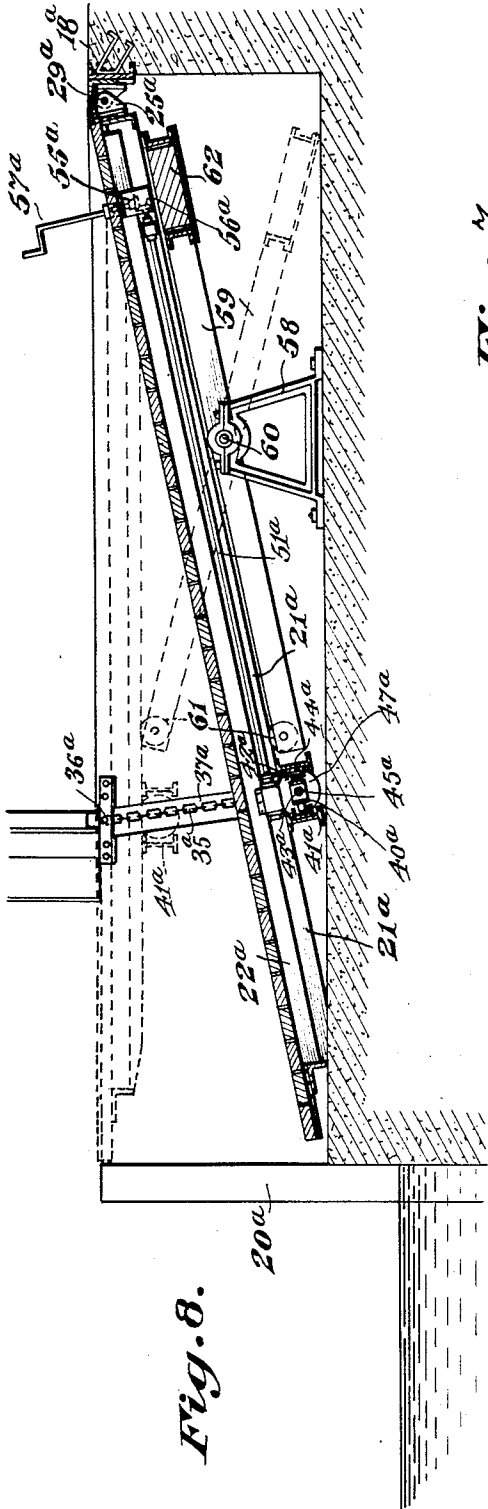


Fig. 8.

Fig. 7.

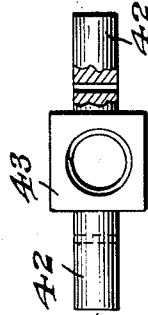


Fig. 6.

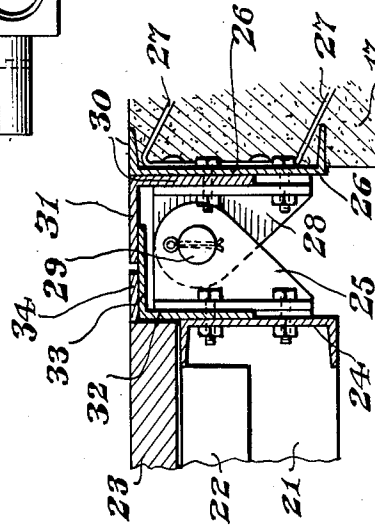
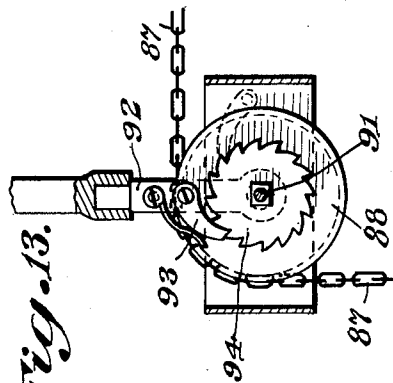


Fig. 13.



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Fig. 3.

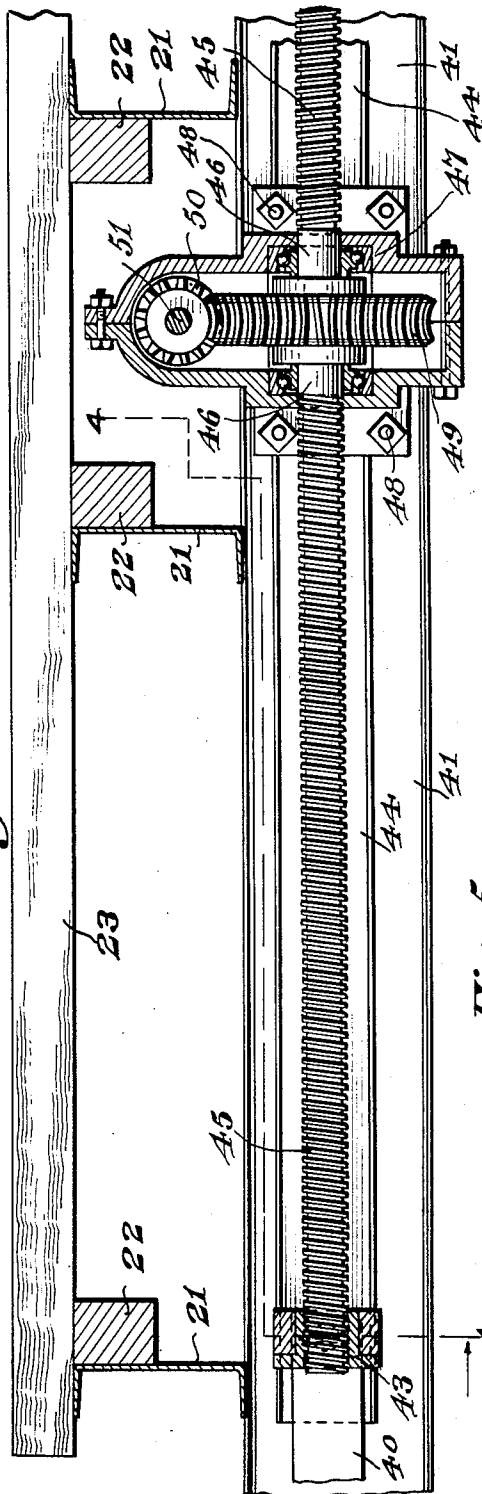


Fig. 4.

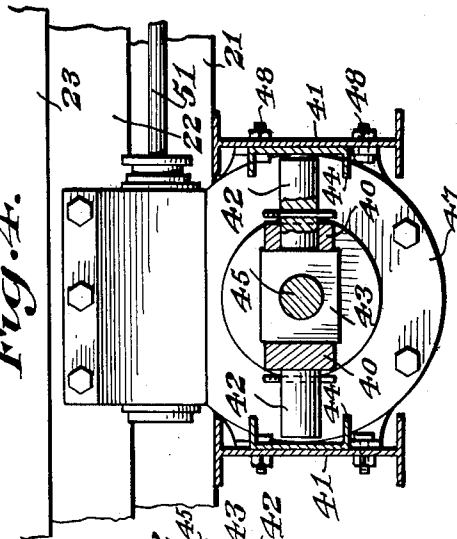
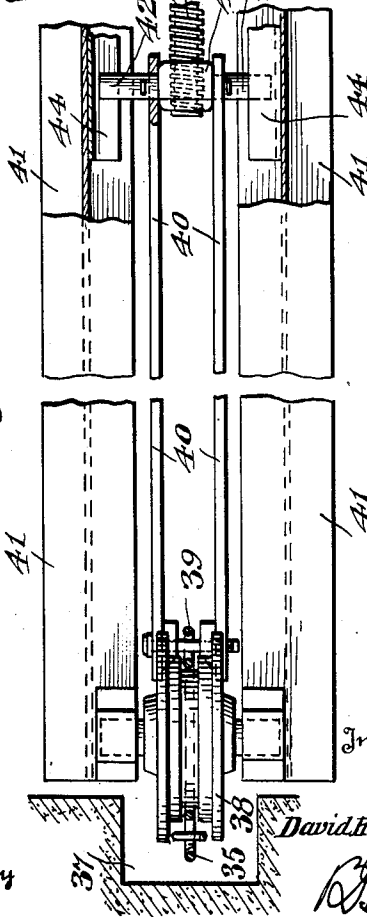


Fig. 5.



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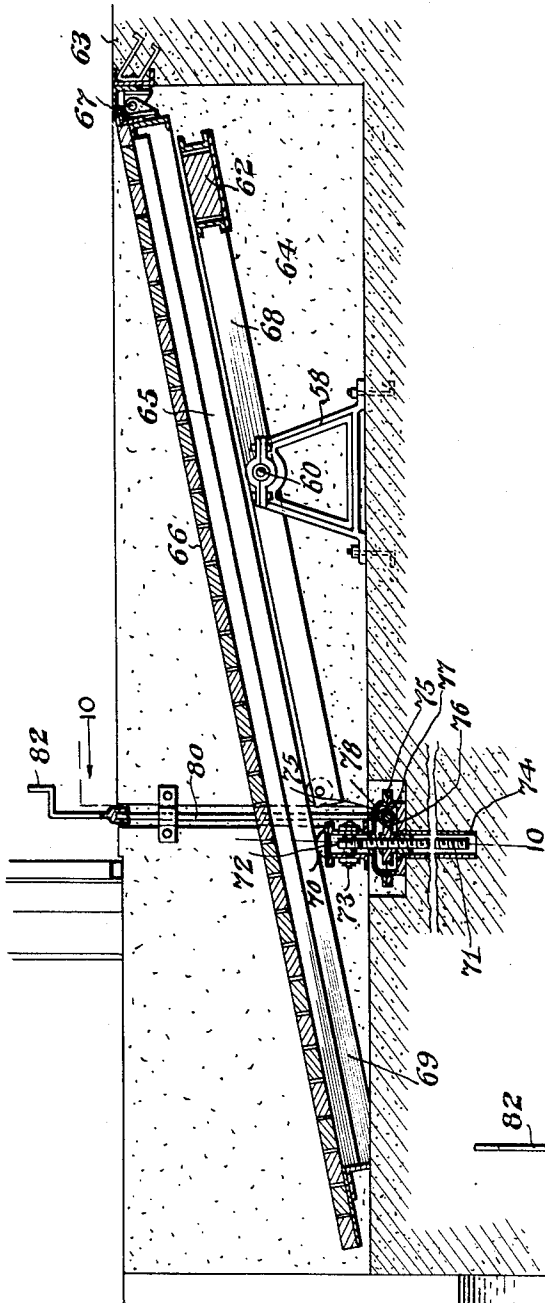


Fig. 9.

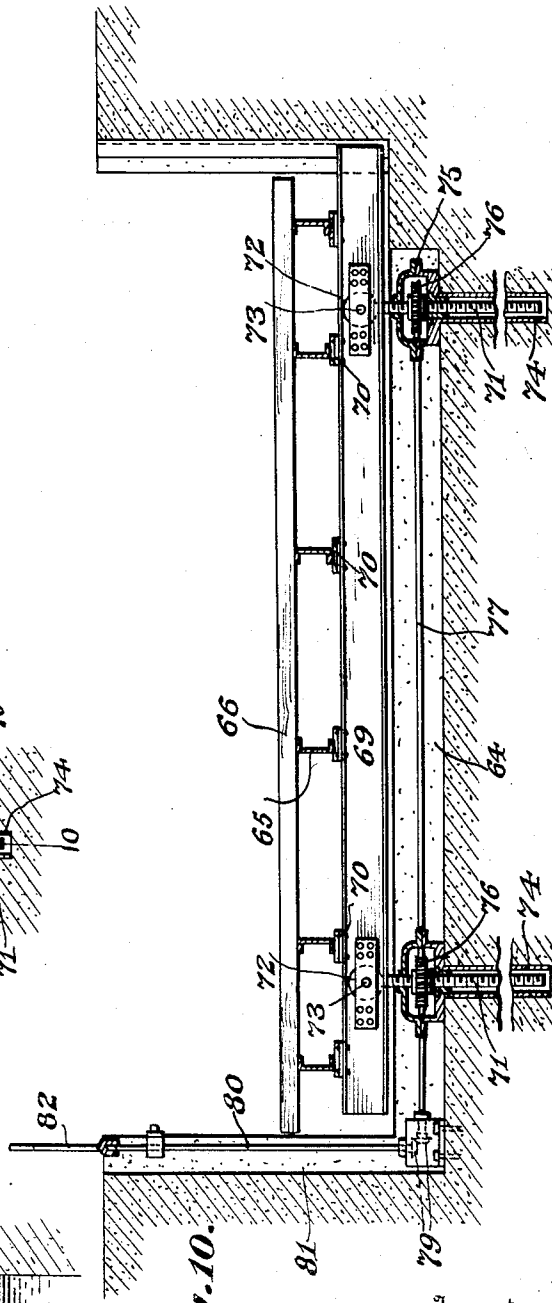


Fig. 10.

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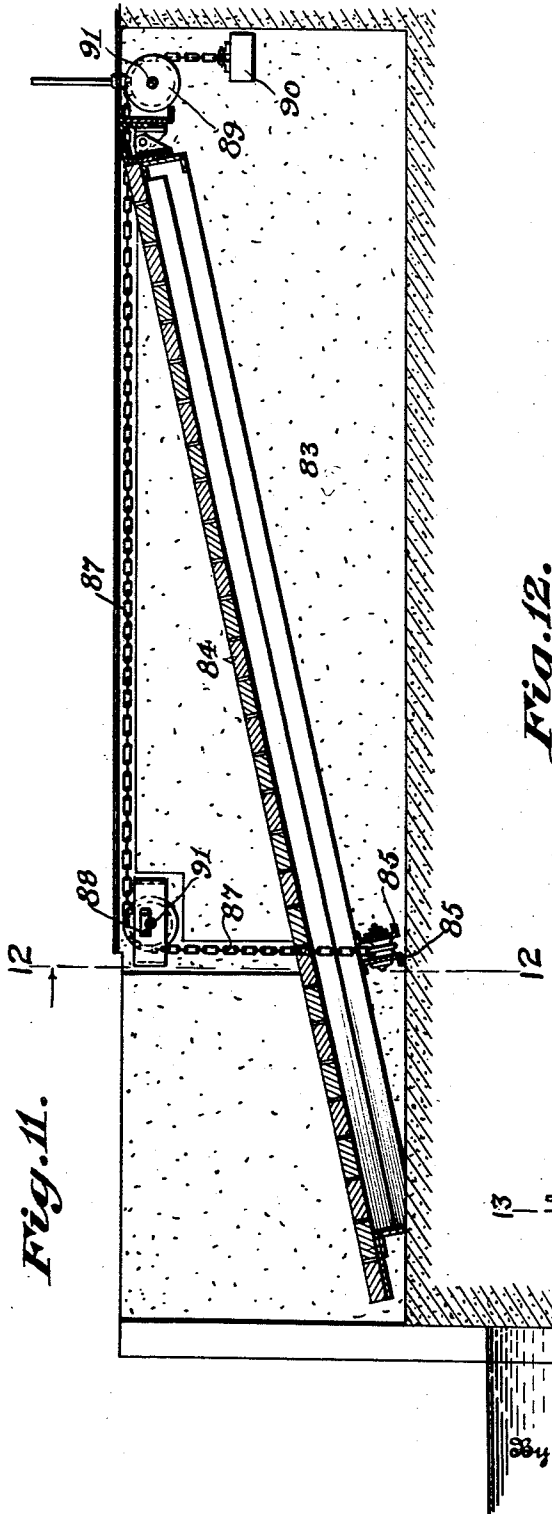
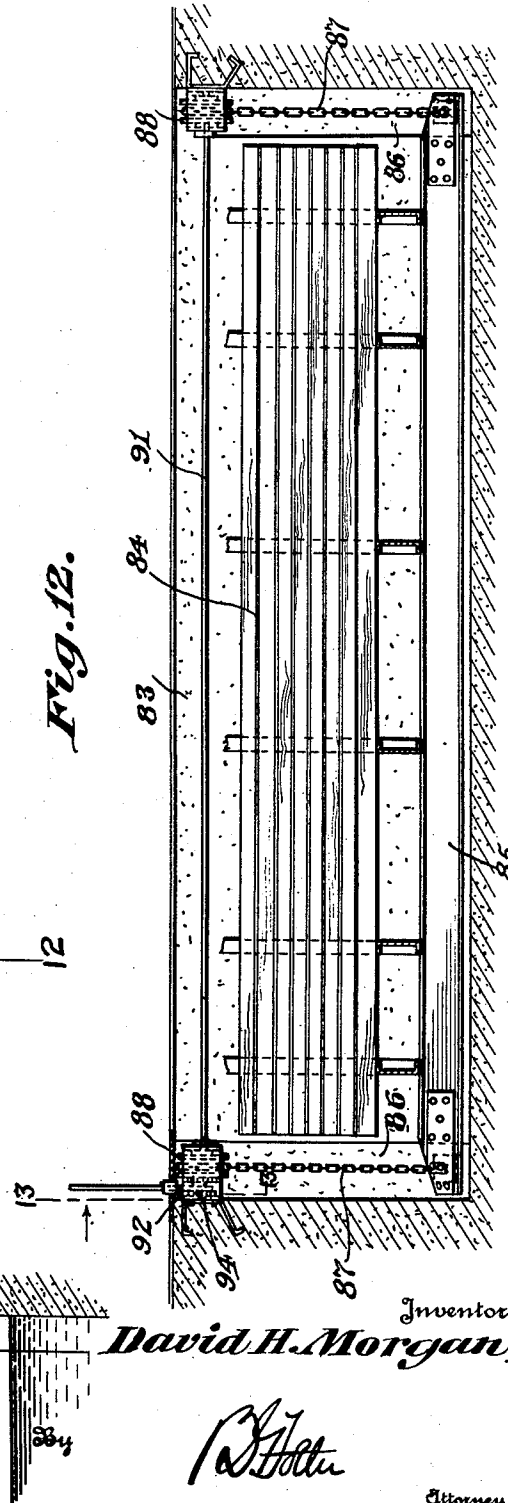
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1,905,947

GANGWAY

Filed May 21, 1931

6 Sheets-Sheet 6

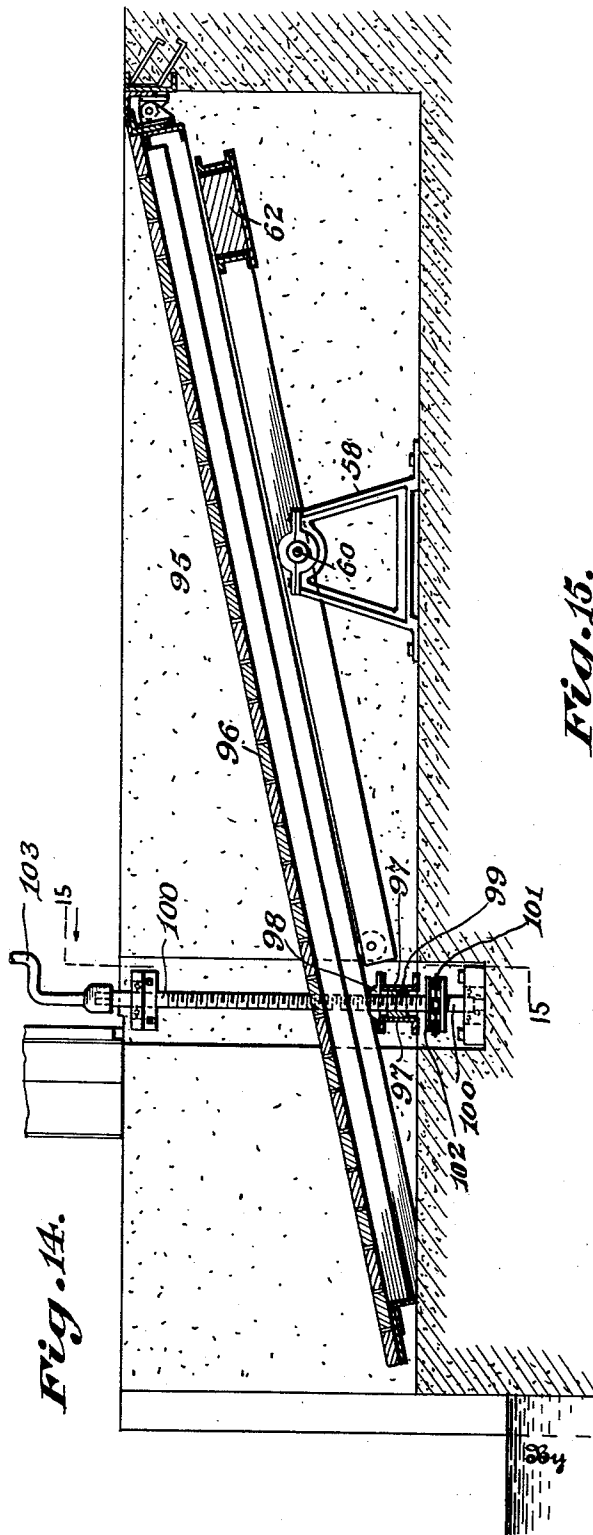
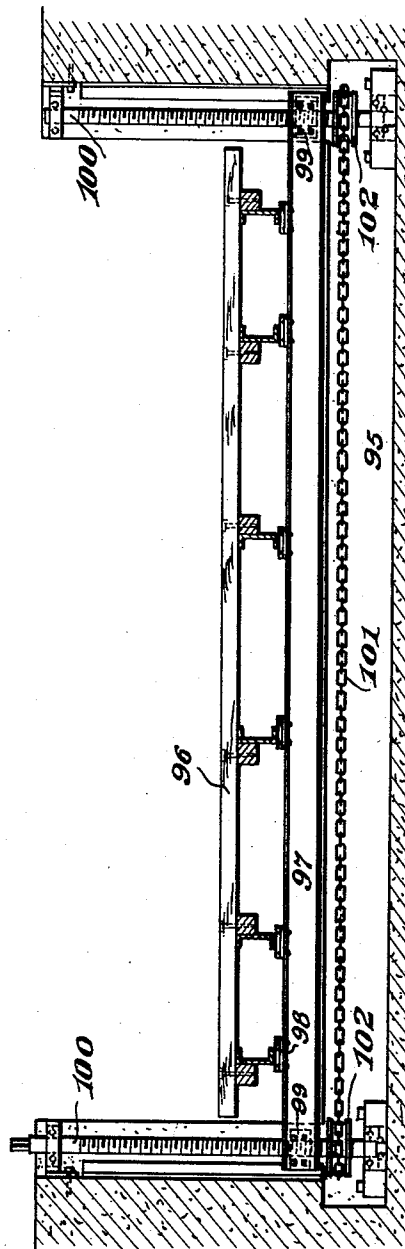


Fig. 15.



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UNITED STATES PATENT OFFICE

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GANGWAY

Application filed May 21, 1931. Serial No. 539,069.

This invention relates to that type of gangway that is usually employed on wharfs and piers for providing a passageway between the vessels and the floor of the pier, the same being adjustable so that a proper cooperative relation can be established with the vessel, irrespective of the variation of the height of the vessel due to tide, the amount of cargo that may be carried, or other conditions well understood. Such structures are popularly known as "wharf drops".

In the development of shipping and wharfs, there has been of course a corresponding development in the mechanism for adjusting these gangways or wharf drops, and as the latter have increased in size and weight, the mechanism for raising and lowering them, its location, and the necessary supporting structure thus required to be installed so as not to interfere with other important features of the wharfs and piers, as for example the door structures and their operating mechanisms, has become a serious problem.

One of the primary objects of the present invention is to provide in connection with an adjustable gangway or wharf drop, operating means therefor that will occupy practically no overhead space, thus leaving such space free for the utilization of other structural features, such as above indicated.

A further object is to provide means that is simple and effective and is open to a wide range of modification that may be necessary by reason of the different conditions encountered.

In the accompanying drawings:

Figure 1 is a longitudinal sectional view through a simple form of gangway, in which the invention is embodied.

Figure 2 is a cross sectional view on the line 2—2 of Figure 1.

Figure 3 is a horizontal sectional view on an enlarged scale, also on the line 2—2 of Figure 1 but showing only the draft means for the elevating cables.

Figure 4 is a detail cross sectional view on the line 4—4 of Figure 3.

Figure 5 is a detail sectional view on the line 5—5 of Figure 2.

Figure 6 is a detail vertical sectional view showing one of the hinges and the overlying slide joint.

Figure 7 is a detail view in elevation of one of the draft nuts.

Figure 8 is a longitudinal sectional view through another embodiment of the invention.

Figure 9 is a longitudinal sectional view through a different form of construction.

Figure 10 is a cross sectional view of the same on the line 10—10 of Figure 9.

Figure 11 is a longitudinal sectional view of still another embodiment of the invention.

Figure 12 is a sectional view on the line 12—12 of Figure 11.

Figure 13 is a detail sectional view on the line 13—13 of Figure 12.

Figure 14 is a longitudinal sectional view of another form of construction.

Figure 15 is a sectional view on the line 15—15 of Figure 14.

In the embodiment disclosed in Figures 1-7 inclusive, the foundation structure of the pier is shown generally at 17 and has the usual top surface 18 which may be considered the floor surface of the wharf or pier. In this foundation 17 is provided a pit or chamber 19 having an open outer end 20. In this pit or chamber is located the gangway.

In the structure disclosed the gangway comprises a series of longitudinal supporting beams 21 that may be of channel form and having nailing strips 22. Secured transversely on this sub-frame is a floor or deck shown as composed of planks 23 which are fastened to the nailing strips 22. The rear end of this platform includes a cross beam 24 to which are secured hinge ears 25. The upper margin of the rear end wall of the pit has embedded therein a metal beam 26 secured by anchors 27 and carrying hinge ears 28 that are connected to the hinge ears 25 by pintles 29. The platform is thus mounted to pivot at its rear end while its outer end moves vertically in the outer end of the pit or chamber. In order to provide a closed joint over the hinges the anchored beam 26 has secured to its outer face an angle bar 30

(see Figs. 1 and 6), this angle bar having an outstanding flange 31 that overlies the hinge 25—28—29. A similar angle bar 32, secured to the cross beam 24 of the platform, has a rearwardly extending flange 33 that rides under the flange 31. A filling piece 34 may be provided on the portion of the flange 33 which does not slide beneath the flange 31. A closed joint is thus provided at the hinged end of the platform between said platform and the floor of the pier which however permits the swinging movement of the platform, it being understood that the flanges 31 and 33 will give sufficiently to allow the swinging movement.

In this embodiment of the invention now under consideration, the means for raising and lowering the platform, with the exception of the actuating or control device is located below the floor level 27* and is in the form of draft cables 35 fixed at their upper ends, as shown at 36, at substantially the floor level and having vertical portions located in channels 37 formed in the side walls of the pit. These draft cables pass around pulleys 38 journaled on the sides of the platform below the deck 23 and have their ends secured, as shown at 39, to links 40 arranged horizontally between a pair of cross I-beams 41. The I-beams 41 are located beneath the longitudinal frame bars 21 and are suitably secured thereto by electric welding or other means. The links 40 in turn are connected to the outstanding gudgeons 42 of nuts 43 arranged between the beams 41, and said gudgeons have their ends slidably guided in channel bars 44 secured to the inner sides of the I-beams 41.

The nuts 43 have threaded engagements with screw rods 45 located longitudinally between the I-beams 41, and forming in effect the ends of a shaft 46 that is journaled in a gear case 47 located between and bolted to the I-beams 41, as shown at 48 in Figures 3 and 4. In said gear case and fixed to the shaft 46 is a worm wheel 49, meshing with which is a worm 50 carried by an actuating shaft 51 that extends longitudinally beneath the platform. This shaft may be rotatably driven by any suitable means. Thus in Figure 1 there is shown an electric motor 52 suspended from the under side of the platform and having a gear drive 53 with the shaft 51. An electric cable 54 supplies current to the motor from any suitable source and under any suitable control placed at any suitable situation desired (which has not been illustrated, but which is obvious to one skilled in the art.) The shaft 51 may also be manually operated, and as illustrated in Figure 1, a vertical stub shaft 55 is geared, as indicated at 56, to the shaft 51. On this stub shaft may be mounted a handle crank 57, which being manually turned, will rotate the shaft 51.

Obviously when the shaft 51 is rotated in

one direction the shaft 46 will be rotated, and the screws 45 turned so as to move the nuts 43 either toward the gear case 47 or away from the same. When the nuts are moved towards each other, draft will be placed upon the cables 35, causing the platform to be elevated. When the direction of rotation of the shaft 51 is reversed and the nuts move away from each other, obviously the outer end of the platform is allowed to lower. Thus it will be seen that the platform or gangway can be elevated from a position where it rests upon the bottom of the pit to a position where the deck is level with the floor surface, and it can be held at any point intermediate these two extremes. Moreover the lifting mechanism is below the floor level, leaving the space above the same entirely unobstructed for the building and installation of any other features of a pier or wharf as may be desired.

The structure shown in Figure 8 is substantially the same as that already described, except that it is illustrated as being only a manually operated device. It will of course be understood that the elevating means may be power-driven. The same parts are therefore given the same reference numerals with the added exponent *a*. It is believed unnecessary to re-describe the structure. There is, however, an additional feature disclosed in this figure, making it particularly adaptable for manual operation, to-wit, a counterweight. As shown in Figure 8, there is provided beneath the platform a supporting frame 58, and one or more lever bars 59 are fulcrumed between their ends, as shown at 60 on said frame. One arm of each of these levers has at its free end a roller 61 that rides against one of the longitudinal beams 21^a. The other arm of each lever carries a suitable counterweight 62. The weight or weights 62 obviously tend to elevate the deck or gangway, but of course are lighter than said gangway so that when the nuts are separated and strain thus removed from the draft cables, the platform will move downwardly by gravity.

In Figures 9 and 10 a different form of operating mechanism is disclosed. The pier structure is designated generally by the reference numeral 63 and has a pit or chamber 64. The supporting frame of the platform is shown at 65, and the platform deck is designated 66. A hinge connection 67 between the rear end of the platform and the rear end wall of the pit 64 is the same as that already described. A counterweight mechanism 68 similar to that shown in Figure 8 and already described is employed if desired. In this embodiment of the invention there is located beneath the supporting frame of the deck a pair of transversely disposed channel bars 69 having bearing knuckles 70 that are rounded, and on which the longitudinal frame bars of the platform rest. Vertically

arranged threaded standards 71 have heads 72 at their upper ends that are located between the channel bars 69 and are secured thereto by cross bolts 73. These standards 5 operate in sockets 74 formed in the floor of the pit 64. The standards 71 pass through gear casings 75 placed on the floor of the pit 64, and in these casings are worm wheels 76 having threaded engagements with the stand- 10 ards 71. A cross shaft 77 is provided with worms 78 in mesh with the worm wheels 76 and the cross shaft may be operated by any suitable means, as for example, through bevel 15 gears 79 with a vertical actuating shaft 80 located in the channel 81 in one of the side walls of the pit. On the upper end of this shaft 80 may be detachably mounted a handle crank 82 by which said shaft 80 can be rotated. When rotated in one direction, ob- 20 viously the worm wheels 76 will be rotated and the standards 71 raised thereby, elevating the platform, and when turned in the other direction the standards 71 will be lowered with a corresponding movement on the 25 part of the platform.

Still another form that the invention may take is illustrated in Figures 11 and 12. Therein the pit is designated 83 and the vertically swinging platform is shown at 84. 30 Near the free end of the said platform 84 are cross beams 85 that project beyond the sides of said platform into channels 86 formed in the side walls of the pit. Secured to the projecting ends are cables 87 that pass over guide 35 sheaves 88 and extend horizontally to the rear end of the platform. Here they pass over actuating sheaves 89 and their free ends may carry weights 90. The sheaves 89 are fixed 40 to a driving shaft 91 which may be actuated by any suitable means, as for example, a lever 92 having a pawl 93 that operates on a ratchet wheel 94 (see Figure 13) fixed to the shaft 91. By oscillating the lever 92 the shaft 91 45 may be given a rotation, thereby either elevating the platform or allowing it to lower.

Another type of elevating and lowering mechanism is shown in Figures 14 and 15. Here the pit is designated 95 and the plat- 50 form 96. Beneath the free end portion of the platform are located a pair of cross bars 97 having bearing knuckles 98 on which the frame bars of the platform 96 rest. Between the cross bars 97 and fixed thereto are nuts 99. 55 These nuts are threaded on vertical shafts 100 that are located in the side walls of the pit and are operatively connected by an endless cable or chain 101 that passes around pulleys 102 fixed to said shafts. On one of these 60 shafts may be detachably mounted a handle crank 103 by which the screws can be turned in either of opposite directions, thereby causing the nuts and consequently the platform to be raised or lowered.

From the foregoing, it is thought that the 65 construction, operation and many advantages

of the herein described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit of sacrificing any of the advantages of the invention.

What I claim, is:

1. In a gangway structure, the combination 75 with a floor having a pit and a platform pivotally mounted to have a free end that swings in a substantially vertical direction between a depressed and an elevated position, and mechanism in the pit and beneath the plat- 80 form and below the floor level for elevating it and effecting its depression and for holding it at different elevations.

2. In a gangway structure, the combination 85 with a floor having a pit, of a vertically swinging platform hinged adjacent one end and having its other end movable to different elevations, and means substantially confined to the pit for elevating and depressing the 90 platform and holding it at different elevations.

3. In a gangway structure, the combination with a floor having a pit, of a vertically 95 swinging platform hinged adjacent one end and having its other end movable to different elevations, and means mounted in the pit below the free end portion of the platform for raising and lowering it and holding it at different elevations.

4. In a gangway structure, the combina- 100 tion with a floor having a pit, of a vertically swinging platform hinged adjacent one end and having its other end movable to different elevations, and means located in the pit below the free end portion of the platform for 105 raising and lowering it, said means including a screw having connection with the platform and means for operating the screw.

5. In a gangway structure, the combina- 110 tion with a floor having a pit having a closed end and an open end, of a platform that vertically swings in the pit and has one end pivotally mounted at the closed end of the pit, and means in the pit operating on the free end 115 portion of the platform to raise and lower it.

6. In a gangway structure, the combina- 120 tion with a floor having a pit having a closed end and an open end, of a platform that vertically swings in the pit and has one end pivotally mounted at the closed end of the pit, and means including screw mechanism 125 located in the pit and connected to the free portion of the platform for raising and lowering said platform.

7. In a gangway structure, the combina- 130 tion with a platform hinged at one end and movable to and from different elevations, of a screw rotatably journaled on the underside of the platform, means for rotating the screw, travelling nuts engaged and operated

by the screw, and elevating cables connected to the nuts and acting to raise and lower the platform.

5 8. In a gangway structure, the combination with a platform hinged at one end and movable to and from different elevations, of vertically disposed screw shaft elements at the sides of the platform, nut elements engaged with the screw shaft elements, certain
10 of said elements being connected to the platform, and means for effecting relative rotation between the nut elements and screw shaft elements to cause the elevation and depression of the platform.

15 9. In a gangway structure, the combination with a pit, of a platform, hinge mountings in one wall of the pit and the platform, means for elevating and lowering the platform, and overlapping joint plates at the
20 hinged end of the platform and covering the joint between the pit end wall and platform above the hinge mountings.

10. In a gangway structure, the combination with a floor, of a platform hinged at one
25 end and having its other end movable to different elevations, and mechanism supported below the floor level and engaged with the platform for moving the platform to different elevations and holding it at said elevations.
30

11. In a gangway structure, the combination with a floor having a pit, of a platform operating in the pit, said platform being hinged at one end and having its other end
35 movable to different elevations, and mechanism supported in the pit and engaged with the platform for moving the platform to different elevations and holding it at said elevations.

40 In testimony whereof, I affix my signature.
DAVID H. MORGAN.

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