No. 749,595. PATENTED JAN. 12, 1904.

H. D. VAN DOORN.

WHARF DROP.

APPLICATION FILED JULY 1, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 4.

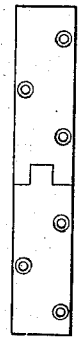


FIG. 5a

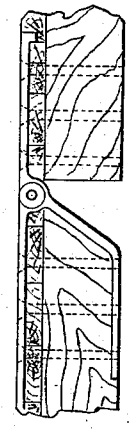


FIG. 2.

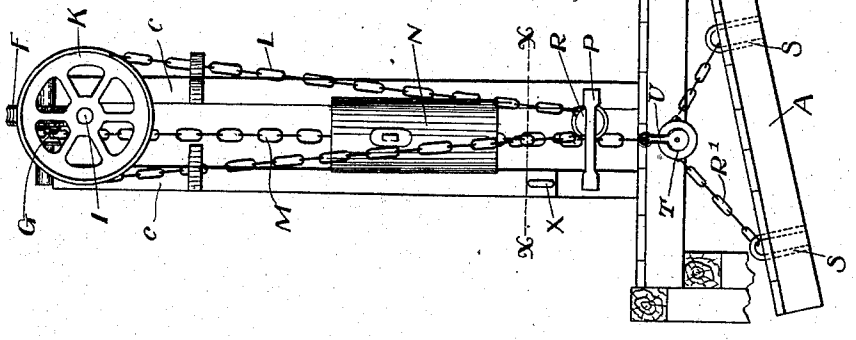
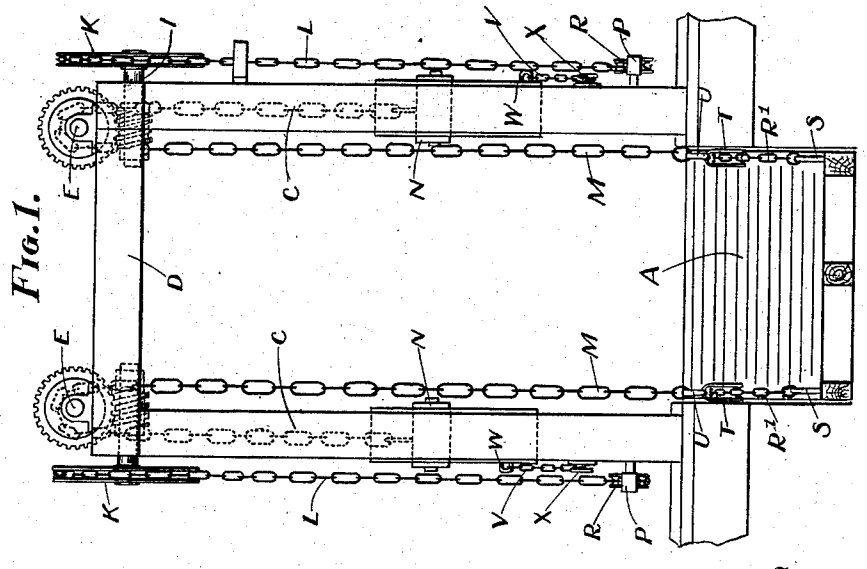


FIG. 1.



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NO MODEL. 2 SHEETS—SHEET 2.

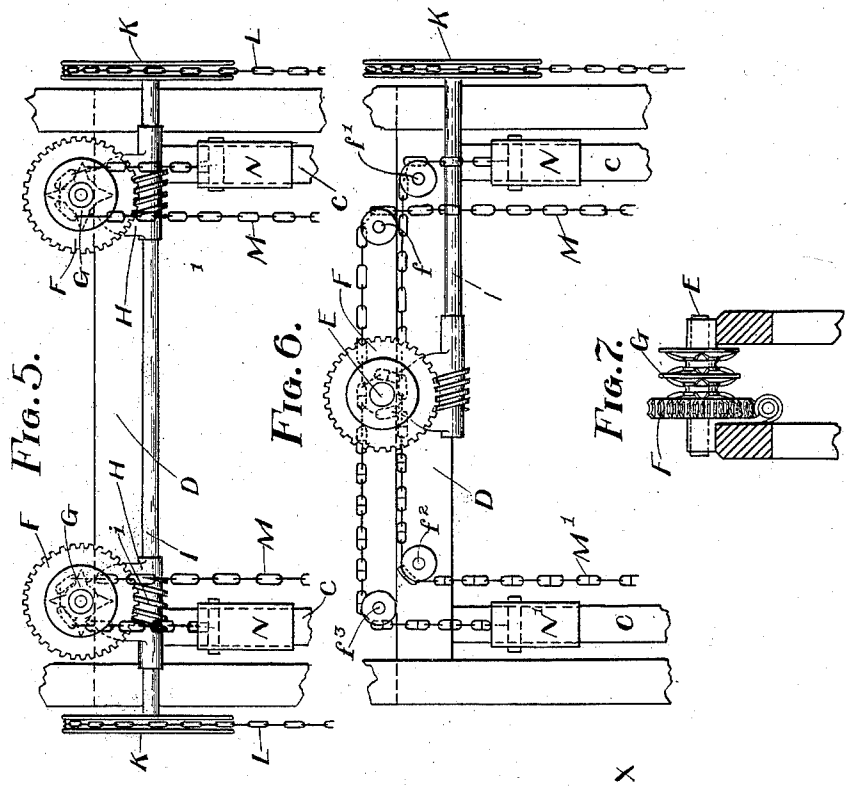


Fig. 5.

Fig. 6.

Fig. 7.

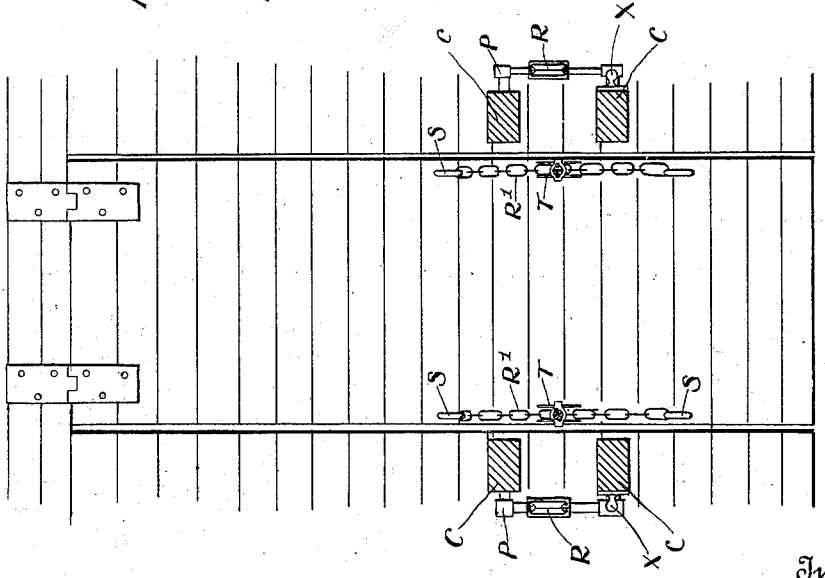


Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY DANFORTH VAN DOORN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE AMERICAN SHIP WINDLASS CO., OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

WHARF-DROP.

SPECIFICATION forming part of Letters Patent No. 749,595, dated January 12, 1904.

Application filed July 1, 1903. Serial No. 163,939. (No model.)

To all whom it may concern:

Be it known that I, HENRY DANFORTH VAN DOORN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Wharf-Drops; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in what are termed "wharf-drops" or "bridge-ways."

The object of said invention is to meet the varying requirements of the rising and falling of tides and of light and loaded vessels and whereby the wharf-drop may be readily and quickly operated and be effectively or securely held in any required position.

Said invention consists of the combination of parts, including their arrangement, substantially as hereinafter more fully disclosed, and pointed out by the claims.

In the accompanying drawings, illustrating the preferred embodiment of my invention, Figure 1 is a front view thereof. Fig. 2 is a sectional elevation of the same. Fig. 3 is a horizontal section taken through Fig. 2 on the lines $x\,x$, parts being broken away. Figs. 4 and 5^a are detailed plan and side views more particularly of a preferred form of hinge employed in connection with the wharf-drop. Figs. 5, 6, and 7 are modifications of the wharf-drop-actuating mechanism.

In carrying out my invention I provide a wharf-drop A of the usual construction, with its rear end hinged to the wharf proper, B, by means, preferably, of hinges A′ or otherwise. The forward end of said wharf-drop may be supported by a float, so as to rise and fall with the tide, or not, as may be preferred. Upon each side of said wharf-drop are erected stanchions or uprights C C of suitable height, and secured or supported upon these stanchions are cross-beams D D. In suitable bearings secured to these cross-beams D D, near each end thereof, are mounted the shafts E E. Upon each of these shafts is secured a worm-wheel F and a chain-wheel G, as clearly shown in Fig. 2. A worm-wheel and chain-wheel may be produced in a single casting or entirety, as shown in Fig. 7, although, if desired, they may be cast separately. Each chain-wheel G is provided with lugs or other suitable devices to prevent the chain from slipping thereon.

Suitably attached or bolted to one of the cross-beams D are brackets H H, in arms of each of which is a mounted shaft I, having secured thereto a worm *i*, meshing with the worm-wheel F. Upon each worm-shaft at one end is provided a chain wheel or pulley K, adapted to receive an endless chain L, or it may be adapted for the engagement therewith of a cable or rope. The stanchions C C have secured thereto contiguously to the pulleys K keepers or guides adapted to receive and guide the hand-actuated chains or cables as against lateral displacement from the pulleys or becoming involved therewith. Also arranged in position on two of said stanchions or uprights, one at each side of the drop, are sheaves R, preferably hung or supported in brackets P, suitably secured to said uprights down near the wharf proper and under which sheaves pass or are guided the chains L to prevent the latter swinging or the back and forth movement thereof.

To the forward end of the wharf-drop A, at opposite sides thereof, are secured chains M M at their lower ends. Each of these chains is passed over a chain-wheel G, as shown in Figs. 1 and 2, and to the end of each chain is attached a counterbalance or weight N, preferably arranged so as to be guided between the uprights or stanchions C C, as shown in Fig. 2. When not convenient to place the stanchions supporting the chains at a point not in alinement with the end of the wharf-drop A—as, for instance, as seen in Fig. 2—connection is effected between said wharf-drop and said chains by means of what may be termed "bridle-chains" R′, fastened at their ends to said drop, preferably by staples S S, said chains passing over rolls or sheaves T, suspended

from the ends of chains M, preferably by means of clevis U. This arrangement provides for the retention of the chains M at all times vertically, thus, as is apparent, equally distributing the load.

To raise or lower the wharf-drop, the pulleys K K are revolved in the required direction by accordingly actuating the endless chains L L, said pulleys in turn revolving the worm-shafts I I, actuating the worm-wheels F F and the chain-wheels G G. The action of the chain-wheels G G effects the movement of the chains M M, said movement in one direction raising the wharf-drop A and lowering the weights N N and in the opposite direction causing the raising of said weights and the lowering of said wharf-drop.

In the modification as disclosed by Fig. 5 a single worm-shaft only is employed, extending from side to side of the wharf-drop and provided with a right and a left hand worm engaging the worm-wheels F F, respectively. By this arrangement power need be applied to but one of said pulleys in actuating the worm-shaft to raise or lower the drop, although, if preferred, two pulleys may be employed for convenience in operating said shaft from either side of the wharf-drop.

In the modification as shown by Figs. 6 and 7 but one worm-wheel F is employed, said wheel being secured to a shaft E, mounted in bearings secured to the cross-beams D D about midway of their lengths. Arranged upon the shaft E and preferably cast solid with the worm-wheel F is a double chain-wheel G, adapted to be engaged by two chains, as shown in Fig. 7, and upon studs secured to the cross-beam D are mounted pulleys or rolls f f' f^2 f^3. The chain M, connected to the wharf-drop, engages the pulley f and one section of the double chain-wheel and passes from the upper surface thereof to and over the pulley f', it then being connected to a weight N. The chain M', likewise connected to the wharf-drop, engages the pulley f^2 and the other section of said double chain-wheel and passes from the lower surface thereof to and over the pulley f^3, it being finally connected to a weight N'. By revolving the pulley K and the worm-shaft I in one direction or the other the worm-wheel F will be rotated to the right or to the left and the chains M M, and the wharf-drop, to which they are attached, may be lowered or raised accordingly. This arrangement of parts for operating the wharf-drop is simple and compact, while the operative parts are located overhead and occupy no space upon the wharf, and only the minimum power is required to operate the drop. By the employment of the worm-shaft and worm-wheel the wharf-drop is practically self-locking and when once brought to rest will thus remain secure and firm without the aid of pawls or other locking mechanism, by reason of the fact, as well understood, that although the worm-shaft is adapted to operate the worm-wheel the worm-wheel cannot in any way operate the worm-shaft. As an extra safeguard, however, in case the wharf-drop should be started downwardly when a load is thereon a safety-chain V is used, the same being connected at one end to the weight N, preferably by means of a staple W, its opposite end being secured around a cleat X, fastened to one of the stanchions C.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A wharf-drop, comprising a hinged or adjustable platform or bridge and mechanism for actuating the same, embracing an endless belt or cable, and guides adapted to receive and retain said belt or cable in operative position.

2. In apparatus of the character described, a hinged or adjustable platform, means for actuating the same, embracing an endless belt or cable, and a guide roll or sheave engaged by said belt for the retention of the latter in vertical alinement with the pulley suspending said belt.

3. In apparatus of the character described, a hinged or adjustable platform, means for actuating said platform comprising an endless belt or cable, a bracket secured in position and carrying a guide roll or sheave engaged by said belt for the retention of said belt in vertical alinement with the pulley suspending said belt.

4. In apparatus of the character described, a hinged or adjustable platform, means for actuating said platform embracing an endless cable or belt, guides adapted to retain said belt as against displacement from its suspending-pulley, and a guide-roll for the retention of said belt, in vertical alinement with said pulley.

5. In apparatus of the character described, a pivoted platform or bridge, means for actuating said platform, means for suspending said platform having adjustable means effecting connection with said platform and providing for the vertical retention of said suspending means.

6. In apparatus of the character described, a pivoted or adjustable platform, means for actuating said platform, means for suspending said platform comprising a chain or cable and a bridle chain or line connected to said platform and passing over a pulley or roll connected up with the first referred to chain, or cable.

7. In apparatus of the character described, a pivoted platform or bridge, means for suspending said platform, means for actuating said suspending means, whereby the platform is raised or lowered, and means connected up with said suspending means, and a fixture forming a safeguard against the accidental descent of said platform.

8. In apparatus of the character described,

a pivoted platform, means for actuating said platform, means for suspending said platform, connected up with said actuating means and embracing chains or cables having suspended therefrom counterbalancing-weights, and supplemental chains or lines connected to said weights and to cleats secured to supporting-framework.

9. The combination substantially as set forth of a hinged wharf-drop or bridgeway, suitable chains, chain-wheels and counterbalance-weights as described, a worm-shaft and worm-wheels for raising and lowering the wharf-drop and holding it at any desired elevation, and a hand-chain and pulley, for rotating the worm-gearing, guides for said hand-chain, also a suitable safety-chain, cleat, and bridle-chain, sheave and clevis for supporting-chains, and hinges for the drop.

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

HENRY DANFORTH VAN DOORN.

Witnesses:
HARRY O. SWAN,
A. A. RUTH.