Sept. 21, 1943. C. M. ZOLL 2,329,972

SHIP SALVAGING APPARATUS

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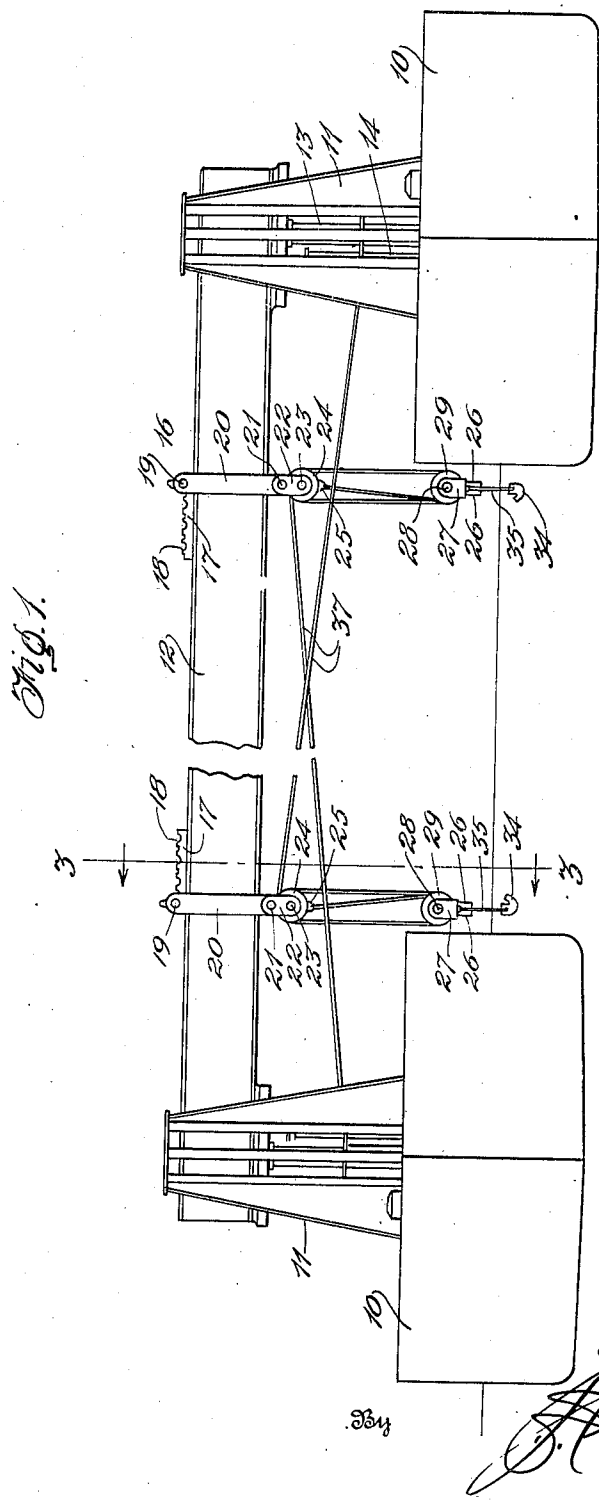


Fig. 1.

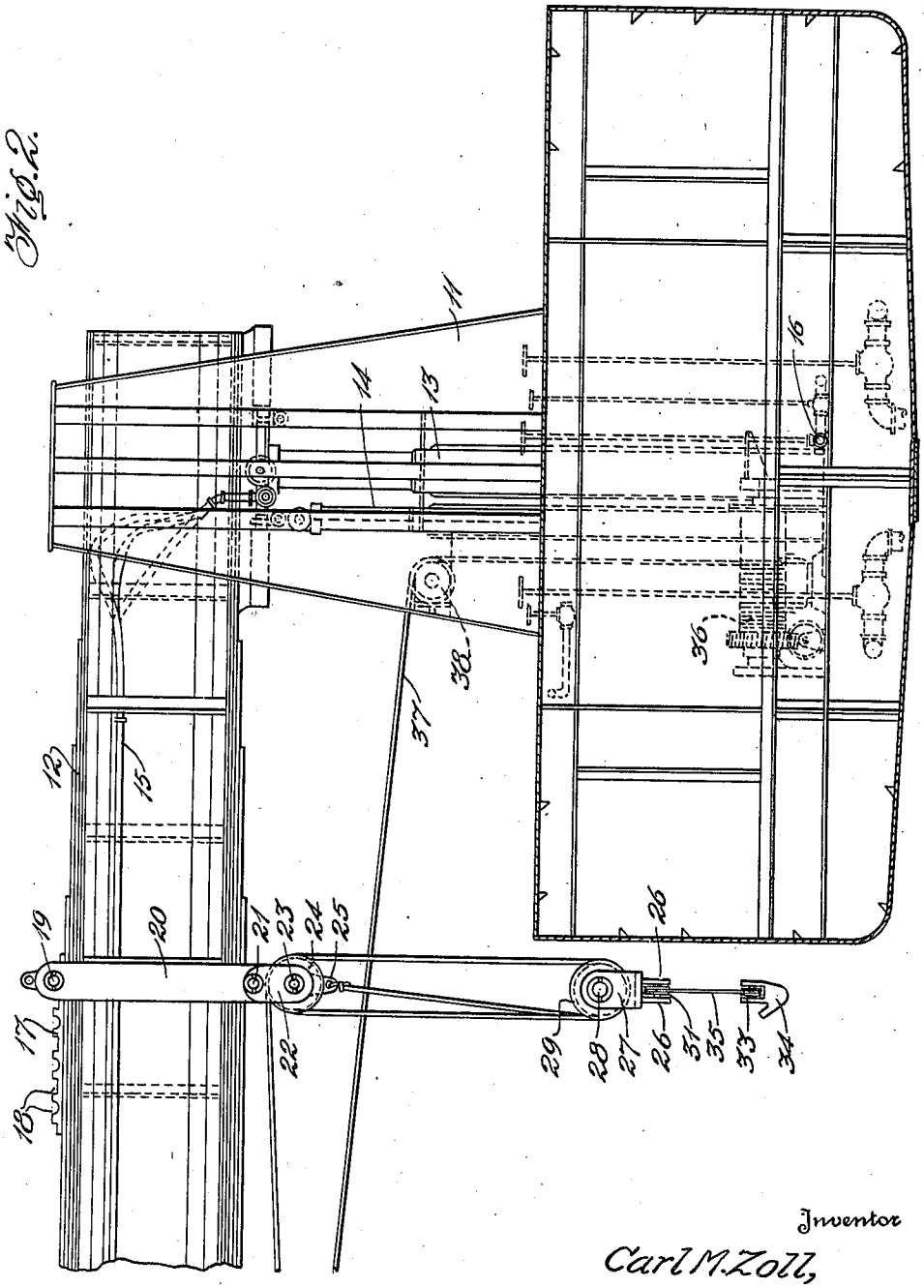
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Fig. 2.



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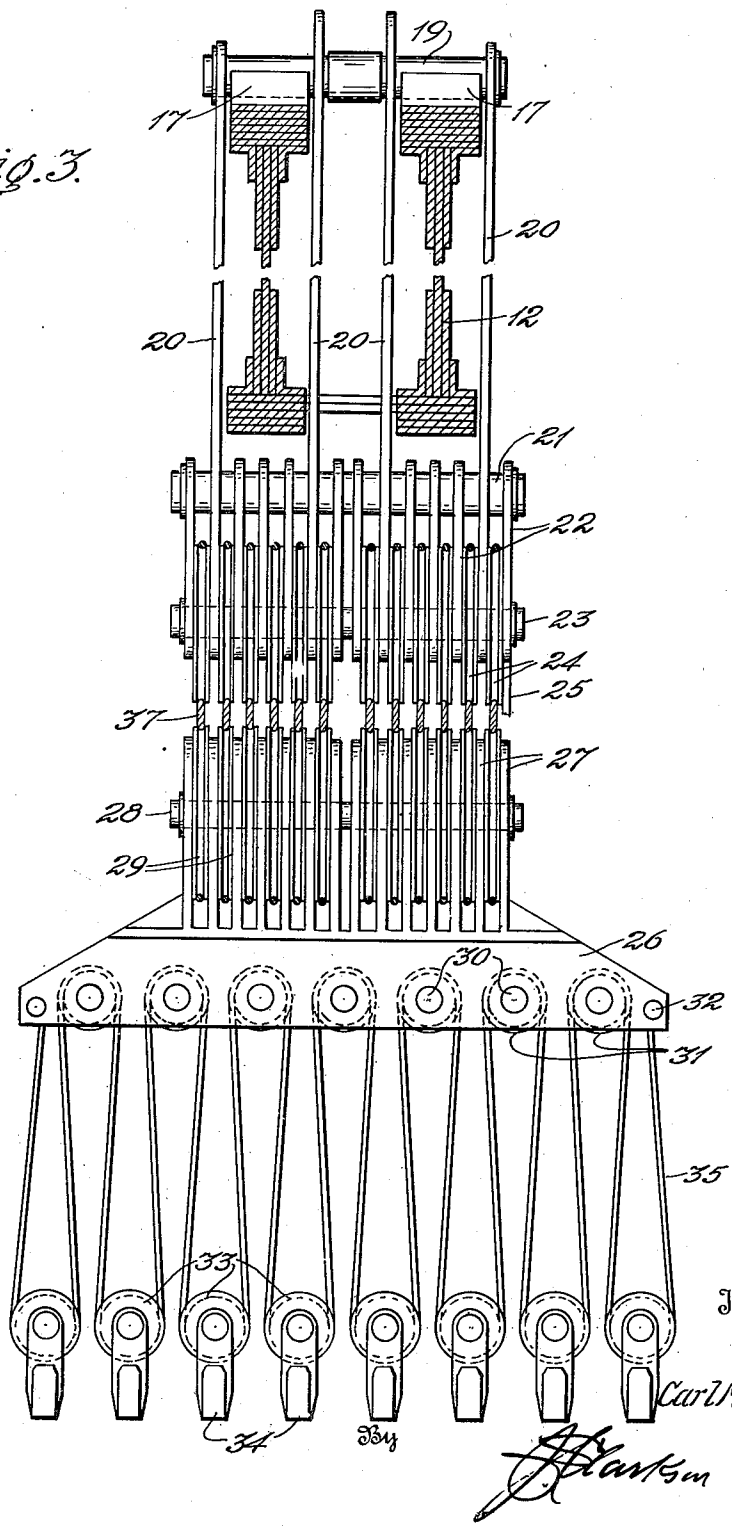
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SHIP SALVAGING APPARATUS

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Fig. 3.



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2,329,972

SHIP SALVAGING APPARATUS

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Application March 14, 1942, Serial No. 434,764

4 Claims. (Cl. 114—51)

This invention relates to ship salvaging apparatus and more particularly to stress equalizing means for ship salvaging hoists.

The invention especially relates to equalizing means for equalizing the stresses on the hoisting tackle or falls shown and described in my prior patent for Ship salvaging apparatus, No. 2,272,785, issued February 10, 1942.

As shown in said patent a pair of spaced barges or other floatation means is provided each of which carries a series of spaced towers. Corresponding towers on the two barges are connected by girders from each of which depends a pair of hoisting tackle or falls. Each fall is located adjacent a respective barge which carries a hoisting drum actuating the fall, the cable or rope of the fall leading from the drum to the upper block of the fall. As fully set forth in said patent, each barge rises and falls under influence of sea motion while the girder remains in a substantially fixed position of elevation in space. Consequently, the hoisting drum varies in distance from the upper block and, unless preventive means are provided the fall may be slackened or drawn upon according to the vertical movements of the barge relative to the girder. In the prior patent an oscillatable lever carries an idler sheave engaging the fall cable or rope between the drum and upper fall block and is actuated by connection with the girder to compensate for movements of the respective barge.

The principal object of the present invention is to improve and simplify the arrangement of the above described parts in such manner that the lever and idler sheave will be eliminated while the novel arrangement now disclosed effectively compensates tendency to changes in the vertical position in space of the lower block of each fall due to vertical movements of the barge supporting the respective hoisting drum.

As set forth in my said prior patent rocking movements of the barges tend to vary the distance between the tops of each girder supporting pair of towers and such movements are restrained by certain dash-pots.

A second important object of the present invention is to so arrange the hoisting means carried by each girder that the hoisting means itself will act to restrain such movements of the tower tops toward and from each other.

A third important object of the invention is to provide, in connection with the arrangement for preventing effects of vertical displacement of the barges on the lower fall blocks, a multiple sheave fall so that any possible shortening or lengthening of the distance between the drum and its upper block will have an inappreciable effect on the vertical position in space of the respective lower block.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims.

In the accompanying drawings like characters of reference indicate like parts in the several views, and:

Figure 1 is an end view of a salvaging apparatus constructed in accordance with the present invention.

Figure 2 is an enlarged athwartships section through one of the barges better disclosing the barge supported apparatus.

Figure 3 is a greatly enlarged view on the line 3—3 of Figure 1, parts of the apparatus being broken away.

As here shown there is provided a pair of spaced barges or floatation means 10. Each of these barges supports a series of towers as shown in my prior patent and one tower on each barge is here shown at 11. A girder 12 spans the space between the upper parts of these towers and the end portions of these girders are supported in the upper parts of these towers by hydraulic leveling means indicated in general at 13. Also pneumo-hydraulic girder supporting means 14 is associated with each tower. The upper ends of each of the cylinders forming part of the means 13 are connected in pairs by cross pipes 15 and all of said cylinders on each barge are connected by a pipe 16. This arrangement is, in substance that shown in my prior patent aforesaid.

The parts now to be described deal specifically with the present invention. On top of the girder 12, here shown as a double girder, are mounted saddles 17 provided each with spaced and upwardly open notches 18. In the present arrangement there is a pair of these saddles arranged at each side over the space between the barges and each pair of saddles has a shaft 19 resting in aligned notches of the pair. Hanger straps 20 depend from each shaft 19 and through the lower ends of these hangers passes a shaft 21. Links 22 depend from the shaft 21 and through the lower ends of these links passes an upper block shaft 23 on which are mounted upper sheaves 24, the links forming spacers between the sheaves. This construction forms the upper

fall block and the end link of the series has an eye 25 formed on its lower end.

The lower block includes a pair of spaced longitudinal members or bars 26 from which rises a series of spaced arms 27 through the upper ends of which passes a lower block shaft 28. On the shaft 28 between the arms 27 are mounted the lower sheaves 29. Between the bars 26 extend short shafts 30 on each of which is mounted an upper equalizer sheave 31. Also pins 32 connect the bars 26 at their ends. At 33 are shown lower equalizer sheaves each of which has a ship engaging hook 34 connected thereto. One end of a rope or cable 35 is led alternately under a sheave 33 and over a sheave 31 until it has been reeved around all of these sheaves. The remaining end of the rope 35 is then secured to the other pin 32.

On each barge 10 there is provided for each girder a hoist having a drum 36 around which is wound one end of a rope or cable 37 which leads upwardly to a guide sheave 38 mounted at a fixed point on the tower from whence it passes to the upper block of the fall at the opposite side of the space between the barges where it is reeved through the upper and lower blocks of this fall, its end being secured to the eye 25.

It will now be observed from Figures 1 and 2 that the rope 37 between the guide sheave 38 and its upper fall block is inclined but slightly from the horizontal. It is to be remembered that the girder, and consequently the upper fall blocks remain constantly in the same position in space. If the barge 10 at the right of Figure 1 is raised by a wave the sheave 38 at the right will also be raised. There will then be some slight decrease of the distance between the axes of the sheave and its related upper fall block but, due to small normal inclination of the rope 37 between these parts this slight change in distance will slack off on the rope but slightly. Moreover, since the fall has a multiplicity of sheaves the effect on the lower block of the fall rope will be so little as to be of no practical operative effect. For instance, there is here shown a fall of such construction that the lower block is supported by twenty-four runs of the rope. Consequently, the effect on the lower block will be but one twenty-fourth of that produced by the rising of the sheave 38. Thus, if the rope 37 is effectively lengthened as much as one foot the lower fall block will drop only one-half inch, a distance too small to have any appreciable effect in salvage operations. Practically, therefore, the present construction compensates for any variation in the hoisting tackle due to vertical movements of a barge.

It is also to be noted that the tensions on the ropes 37 tend to draw the towers toward each other and thus resists rolling movements of the barges.

What is claimed is:

1. In apparatus of the kind described, spaced floatation means, a girder spanning the space between said floatation means, supporting means carried by the floatation means and supporting the ends of the girder, said supporting means being constructed and arranged to support the girder in a fixed position in space independently of the movements of the floatation means under the influence of wave motion, a pair of spaced falls carried by said girder adjacent its ends and each including an upper and a lower block and a fall rope, and a hoisting engine on each floatation means having the rope of the remote fall connected thereto whereby said fall ropes span the space between the floatation means.

2. In apparatus of the kind described, spaced floatation means, a girder spanning the space between said floatation means, supporting means carried by the floatation means and supporting the ends of the girder, said supporting means being constructed and arranged to support the girder in a fixed position in space independently of the movements of the floatation means under the influence of wave motion, a pair of spaced falls carried by said girder adjacent its ends and each including an upper and a lower block and a fall rope, a hoisting engine on each floatation means having the rope of the remote fall connected thereto whereby said fall ropes span the space between the floatation means, and an elevated idler sheave carried by each floatation means and having the respective fall rope run thereover between the upper block and the hoisting engine, said sheave being positioned to cause the fall rope between the upper block and idler sheave to run in nearly horizontal position.

3. In apparatus of the kind described, spaced floatation means, a girder spanning the space between said floatation means, supporting means carried by the floatation means and supporting the ends of the girder, said supporting means being constructed and arranged to support the girder in a fixed position in space independently of the movements of the floatation means under the influence of wave motion, a pair of spaced falls carried by said girder adjacent its ends and each including an upper and a lower block and a fall rope, a hoisting engine on each floatation means having the rope of the remote fall connected thereto whereby said fall ropes span the space between the floatation means, and an elevated idler sheave carried by each floatation means and having the respective fall rope run thereover between the upper block and the hoisting engine, said sheave being positioned to cause the fall rope between the upper block and idler sheave to run in nearly horizontal position, said idlers being in fixed position relative to the respective floatation means.

4. In apparatus of the kind described, spaced floatation means, a girder spanning the space between said floatation means, supporting means carried by the floatation means and supporting the ends of the girder, said supporting means being constructed and arranged to support the girder in a fixed position in space independently of the movements of the floatation means under the influence of wave motion, a pair of spaced falls carried by said girder adjacent its ends and each including an upper and a lower block and a fall rope, a hoisting engine on each floatation means having the rope of the remote fall connected thereto whereby said fall ropes span the space between the floatation means, and an elevated idler sheave carried by each floatation means and having the respective fall rope run thereover between the upper block and the hoisting engine, said sheave being positioned to cause the fall rope between the upper block and idler sheave to run in nearly horizontal position, said girder supporting means including opposed towers fixed on the floatation means and the idlers being mounted at fixed points on said towers.

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