Sept. 27, 1966 M. E. GEARON ETAL 3,274,629

PORTABLE JACK PIER

Filed March 13, 1964 3 Sheets-Sheet 1

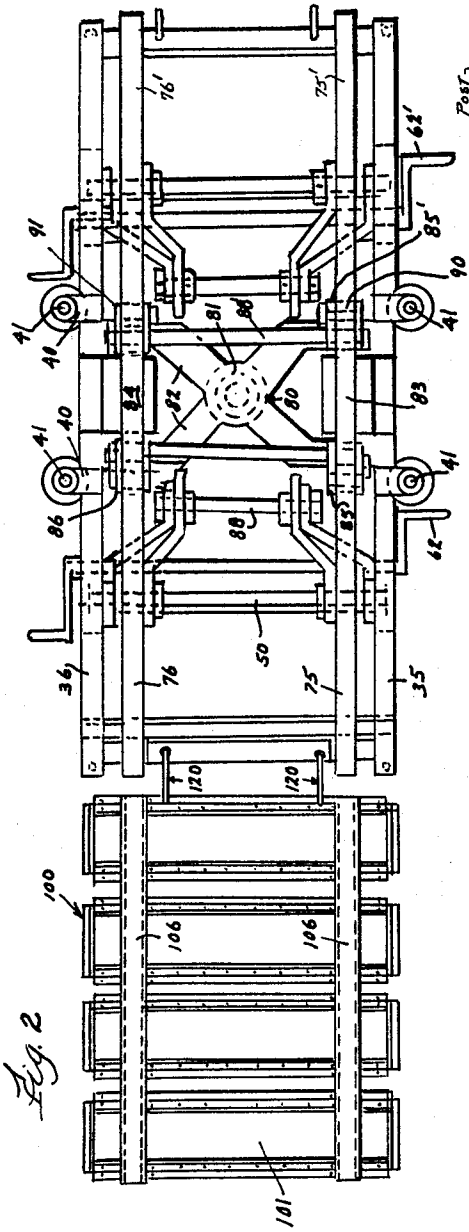


Fig 2

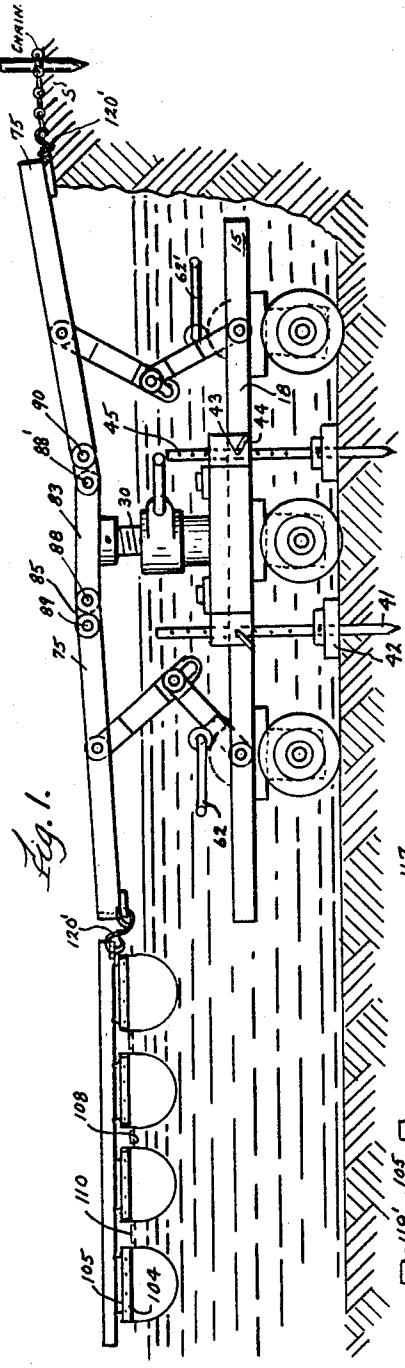


Fig. 1.

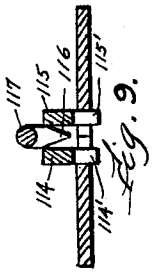


Fig. 9.

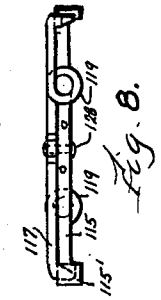


Fig. 8.

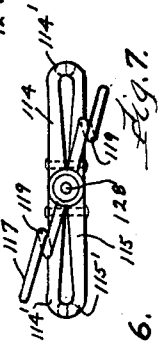


Fig. 7.

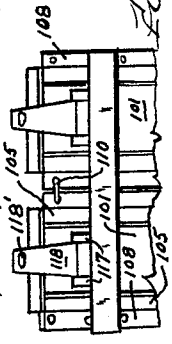


Fig. 6.

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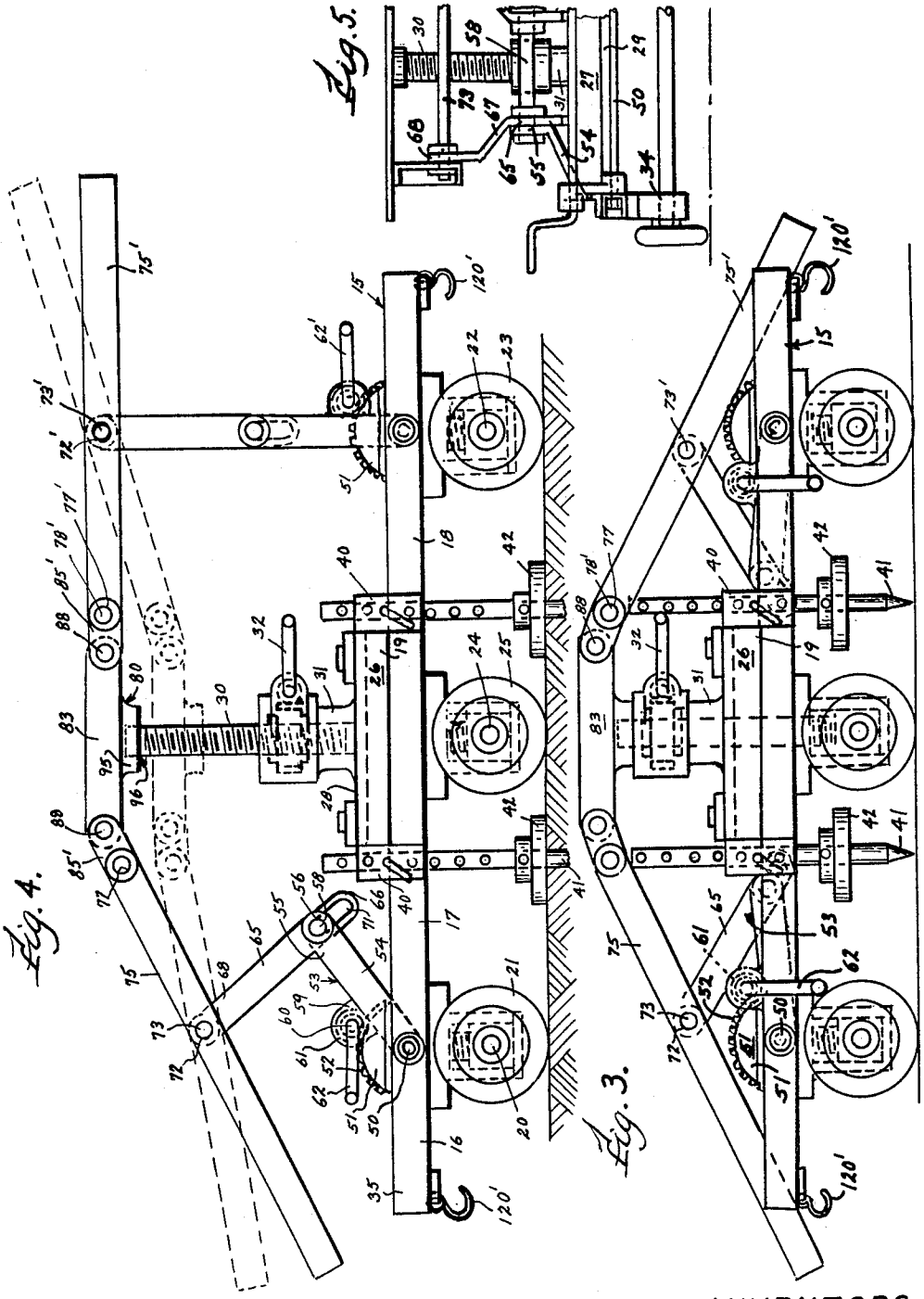


Fig. 5.

Fig. 4.

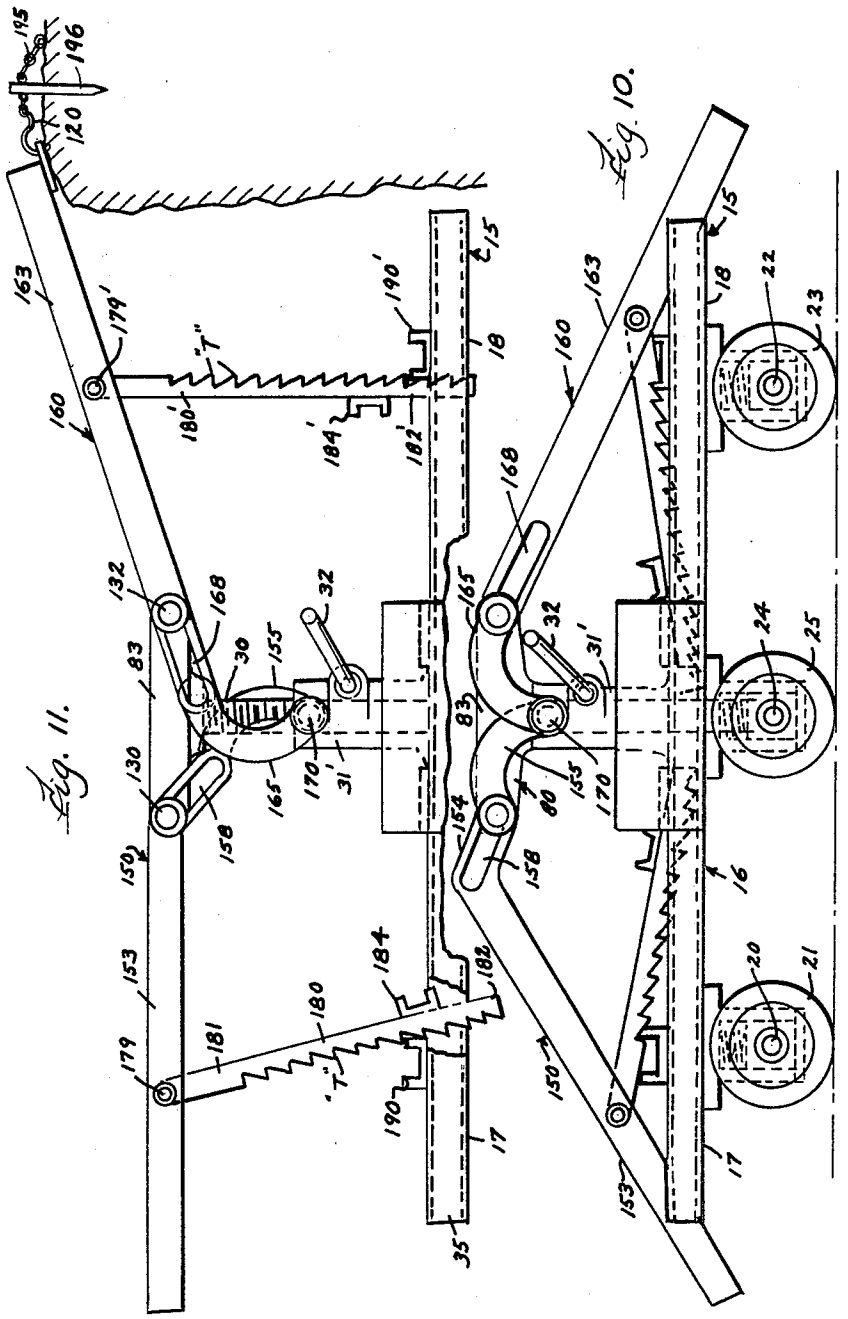
Fig. 3.

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United States Patent Office 3,274,629 Patented Sept. 27, 1966

3,274,629

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Filed Mar. 13, 1964, Ser. No. 351,728
9 Claims. (Cl. 14—71)

This invention relates to improvements in piers, and has for its object the production of a portable device of the character which can be easily moved to a required location, which can be blocked and by means of jacks or equivalents can be elevated or lowered as desired, to provide an approach which is connected to one end of the shore and connected at the other end to a military pontoon bridge or floating dock.

Heretofore pontoon bridges have been constructed of rigid material, fixed against movement relative to the shore at a fair distance away therefrom, and then required a pier to be built between the bridge and the shore from a supply of lumber and the like, requiring extra labor and considerable time before it could be used.

A need has long existed for a portable pier which could be moved, or drawn by a motor vehicle, to the shore location, pushed into the water between the pontoon bridge and the shore, blocked in location, one end thereof lowered or raised, and connected to the floating pontoon bridge and the opposite end lowered or raised and secured to the dry shore landing strip. The present invention satisfied that need.

The invention is inclusive of a portable pier of a vehicle arrangement whereby the same may be readily adapted either for travel on highways, or on snow and ice or the like, and can be easily moved into the water and used as desired.

An object of the invention resides in the provision of a portable pier, embodying an elongated frame structure which is inclusive of channel shaped side members and transverse supporting members, and three pair of wheels journalled on three axles secured to the frame; and a second frame structure pivotally mounted upon the first frame structure adapted to be raised and lowered relative thereto.

Still another object of the invention is to provide adjustable tubular posts arranged on opposite sides of the frame structure of the pier, the lower ends being adapted to pierce the ground, and having stop blocks assembled thereon which limit or determine the extent to which the posts may enter the ground, the blocks to rest upon the ground, that is, the bottom of the lake or stream.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which:

FIGURE 1 is a side elevational view of a portable jack pier constructed in accordance with this invention in use, showing the jack pier attached to an inflatable, collapsible, military pontoon bridge and in contact with the shore;

FIGURE 2 is a top plan view of the portable jack pier and pontoon bridge connected together as shown in FIG. 1;

FIGURE 3 is a side elevational view of a portable jack pier with platform and members in lowered position adapted for ground or highway travel;

FIGURE 4 is a side elevational view of the pier shown by FIG. 3 with parts in raised position and with tubular

posts penetrating the ground for preventing movement of the pier from its location;

FIGURE 5 is a fragmentary rear end view of a pier, similar to the pier shown in FIG. 4, posts and parts omitted for sake of clearness, and having a heavy plank laid across the top of the side members;

FIGURE 6 is a top plan of the ends of two pontoons in juxtaposition or close assembly for use as a raft, such as shown in FIGS. 1 and 2 and prior art Patent No. 2,423,832;

FIGURE 7 is a top plan of the novel hook assembly used as an accessory for assembling the pontoon bridge structure;

FIGURE 8 is a side elevation of the hook shown in FIG. 7;

FIGURE 9 is a sectional view in a transverse plane to illustrate the manner of using the hook disclosed in FIGURES 7 and 8;

FIGURE 10 is a side elevational view of a modified form of this invention, similar to FIG. 3, the under side of the supporting arms being provided with teeth inclined toward pivotal ends thereof; and

FIGURE 11 is a fragmentary elevational view of the invention shown by FIG. 10 with operating parts in raised position.

Referring to the drawings, which are somewhat diagrammatic in the various conventional supporting parts for the different operating features of the construction are omitted, it will be noted that the portable pier **15** is comprised of a rectangular frame **16**, having a front section **17**, a rear section **18** and a centrally raised section **19**; and each section having an axle, the front axle **20** having a pair of wheels **21** journalled thereon, the rear axle **22** having a pair of wheels **23** journalled thereon, and the centrally arranged axle **24** having a pair of wheels **25** journalled thereon. Said axles supported in axle housing **34**.

It is contemplated that the frame of the portable pier **15** thus far described, and which is not shown in detail because the small details are immaterial to the invention, the central raised section **19** being a substantially closed, rectangular shaped box-like section having side channels **26** secured on top of the frame **16** and cross channels **27** secured to said channels **26** forming an enclosure which is covered by a metal top member **28** and bottom member **29**; said top and bottom members **28** and **29** each having a central aperture therethrough to allow the passage of a vertical thrust bar or shaft **30** of considerable length. Said shaft **30** is actuated by a structure secured to and supported upon the top wall **28** and comprises a housing **31** having portions defining a chamber, the side walls defining cylindrical guide means to guide the upper part of the thrust bar **30**. A gear is assembled upon the threaded bar **30** and secured against relative movement, the gear meshes with a pinion carried by a pinion shaft journalled in a bearing integral with and defined by a portion of the housing **31**, the pinion shaft extending outwardly from the housing and provided with a crank **32** whereby the pinion shaft may be rotated to raise or lower the threaded bar **30**; purpose to be described later. The above mentioned means to raise and lower the bar **30** need not be fully described as it is well known in the industry and by the inventions, for example see Patent No. 1,994,984. The elevated box-like central section **19** indicates as an entirety a sub-frame type box member correlated with the main frame **16** to illustrate how it may be adapted for use with a vertical thrust bar used in a jack pier; used in and out of water as needed.

The frame **16** comprises a pair of rolled channel bars **35** and **36** which are spaced by transverse sill members **37**

and 38 for a rectangular frame, rigid and sturdy in construction and suitable as part of a pier.

The three pair of wheels mounted on the three axles suitably journalled in axle housings 34 secured to the lower portions of the frame 16 illustrate how the jack pier is mobile, or portable to any desired location.

The central raised section 19 is provided at all four corners with vertical housings 40, attached to the front and rear walls thereof adjacent the side walls thereof. Block housing 40 forming a supporting structure for a post 41 which may pass therethrough, the four posts 41 are alike so only one housing 40 and one post 41 will be described here at this time. The lower end portion of said posts 41, in the installation or erecton of the pier, being adapted to pierce or be driven into the ground, as clearly seen in FIG. 4. Spaced above the lower ends of said posts are stop blocks 42, which limit or determine the extent to which said posts may enter the ground, the blocks 42, when the posts 41 are in operative position, being adapted to rest upon the ground, that is, the bottom of the lake. Each housing 40 has a threaded bore 43 extending horizontally and transversely through its side wall adapted to receive a male bolt 44 like member, threaded at one end and formed as a crank at its opposite end. The bolts 44 cooperate with each supporting housing 40 for locking the same in positions of vertical adjustment upon the posts 41, the end of the threaded portion of the bolts 44 being screwed inwardly and adapted to extend into transverse holes 45 longitudinally spaced in the posts 41, said holes 45 being larger than the diameter of the bolt and without threads, since it is not deemed necessary in this instance.

It is clearly seen that the central section 19 connected with said housings 40 may be adjusted to any vertical position desired and locked in such position through adjustment of said male bolts 44 relative to holes 45 in posts 41. With this construction of the posts it will be seen that a pier is provided which permits of ready and expeditious erection of its center section 19 and frame structure 16, the end sections 17 and 18 later to be described.

In removing the pier, the reverse steps are followed. The male bolts 44 are partially removed to allow posts 41 to be drawn upwardly free of the ground, allowing the wheels to again provide the support for the portable pier. If the wheels become lodged in the mud, or bottom of the lake or the like, by applying downward pressure to the posts by suitable means placed between the frame 16 and blocks 42, the frame and wheels will be lifted free of the mud. Thereafter, the portable pier is ready to be pulled out of the lake.

Referring to front section 17, seen at the left in FIG. 4, a shaft 50 extends transversely through the side channel 35 and 36 and entirely across the main frame 16. To the side channels 35 and 36 are rigidly secured the sectors 51, each semi-circular disc arranged vertically with gear teeth 52 arranged upon its curved periphery, or top curved surface.

A pair of supporting arms 53 are pivotally mounted at their lower ends upon shaft 50, one arm close to each of the side frame members 35 and 36, each arm being provided with an inwardly and upwardly extending central section 54 with a top end portion 55 which extends upwardly normal to shaft 50; each top end 55 having a horizontal transverse aperture 56 therein. A shaft 58 approximately one-half the length of shaft 50 extends between each of the top ends 55 and through the apertures 56, said shaft 50 having locking means at each end to retain it in position relative to arms 53. Said arms 53 are provided with side edge flanges 59 supporting a bearing means transversely therethrough. A single shaft 60 is horizontally arranged across the frame and into said bearing means in said flanges 59, said shaft 60 having a crank arm 62 on each end thereof; said flanges permitting rotation but restraining horizontal movement therein. A

gear 61 is rigidly mounted upon the horizontal portion at each end of the straight portion of said shaft 60 adjacent said bearing means and having teeth in mating engagement with said gear teeth 52 on the upper curved edge portion of sectors 51. The crank arms 62 arranged for the purpose of imparting rotation to said shaft 60 and gears 61 rigidly secured thereto. As a crank arm 62 is turned counter-clockwise, as shown in FIG. 3, the gear 61 will travel to the left raising said arm 53 and turning it in a counter-clockwise manner. A pair of links 65 are associated with the pair of arms 53. Each link 65 has a lower end 66, an outwardly curved central portion 67 and a top end 68, said lower end 66 provided with a longitudinal slot 71 therein, said shaft 58 being transversely arranged through the apertures 56 and slots 71, the upper end 68 of each link 65 having an aperture 72 therein. A shaft 73 extends horizontally and transversely across the frame through the apertures 72 of each link 65 and through a pair of metal front stringers 75 and 76, said stringers being longitudinally assembled over the front section 17, and each stringer 75 and 76 having a transverse bore 77 in its one end adjacent threaded lifting bar 30.

Referring to the rear section 18, seen at the right in FIG. 4, a pair of arms 53' are pivotally mounted at their lower ends upon a shaft 50' and have portions like those of arms 53. Shaft 58' extends through upper ends 55' of shaft 53' and said arms 53' having flanges 59' thereon. A single shaft 60' extends horizontally, and through said flanges, and having crank arms 62' at opposite ends thereof. A pair of links 65' are associated with arms 53', the upper ends of each link having apertures 72' therein. A shaft 73' extends horizontally through the apertures 72' and through metal rear stringers 75'; said rear stringers 75' and 76' each having a transverse bore 77' in its end adjacent the threaded lifting bar 30. The associated parts being similar, all to be noted by similar numerals with prime marking; therefore they do not need to be described in detail.

An operating platform 80 is assembled on the upper end of threaded bar 30. Said platform 80 consists of a central housing 81 with four angularly extending arms integrally secured thereto and noted by numeral 82. Said arms 82 extend outwardly at 45 degrees relative to the longitudinal axis of the frame 15 and have a pair of central stringers 83 and 84 rigidly secured to the two end portions at each side of the frame 15, stringer 83 having transverse bores through both its opposite ends and stringer 84 having transverse bores through both its opposite ends. The central stringer 83 is connected to stringer 75 by a pair of links 85 having apertures in opposite ends thereof and arranged on opposite sides of the ends of stringers 83 and 75 adjacent thereto. The stringer 84 is connected to stringer 76 by a pair of links 86 having apertures in opposite ends thereof. A shaft 88 extends across between the stringers 83 and 84 and through links 85 and 86. A bolt 89 extends through stringer 75 and adjacent ends of links 85. It is obvious that a link type joint is provided between stringers 75 and 83. The central stringer 83' is connected to stringer 75' by a pair of links 85' having apertures in opposite ends thereof and arranged on opposite sides of the ends of the stringers 83 and 75'. A shaft 88' extends across between the stringers 83 and 84 and through links 85' and 86'. A bolt 90 extends through stringer 75' and adjacent ends of links 85'. Therefore, there is a link type joint provided between stringers 83 and 75'. Two similar link joints are on opposite side connecting stringer 84 with stringers 76 and 76'.

The operation is similar and details need not be described. It is obvious that three stringers are connected on each side of the pier by two link joints, the pier having six (6) stringers, 4 link joints connected together adapted to be elevated by a single jack screw.

The operating platform 80 have the four outstanding arms 82, and a hub portion 95 formed on the lower side

of the housing 81, said hub portion 95 having a central bore 96 extending upwardly therein having a closed inside top wall adapted to rest upon the uppermost end of shaft 30 and act as a thrust bearing. Suitable thrust bearings may be added if so desired. Elevation of shaft 30 will raise the inner ends of stringers 75, 76, 75', 76', 83 and 84. The turning of crank 32 will elevate or lower said platform 80. The turning of crank 62 will effect the raising and lowering of outer end portions of stringers 75 and 76. The turning of crank 62' will effect the raising and lowering of outer end portions of stringers 75' and 76'.

From the above it is clearly seen how the portable pier can be moved into the water with the wheels contacting the bottom of the river, lake or body of water. See FIG. 1. Once the pier is moved close to the shore, the crank 62' can be turned so the ends of stringers 75' and 76' will rest upon the shore S, the posts will be lowered into the soil or ground G, the blocks 42 will be adjusted to keep the pier from settling or forcing the wheels 21 into the soft ground. The opposite end of the pier, with stringers 75 and 76 will now be raised by turning of crank 62 so that the outer ends thereof can be connected to a pontoon bridge as shown by Patent No. 2,423,832, and as shown by FIG. 2.

The bridge designated 100 has reinforced angle-metal frame work and a plurality of inflatable buoyant floats joined together and provided with laterally flanged side members which are used for connecting adjacent floats to each other in spaced relation. Hook members are employed for connecting the floats consisting of an air tube covered by a casing 101, the casing having horizontal angle-metal strips 104, the top wall having longitudinal metal strips 105. The end strips 104 and side strips 105 constitute a rectangular framework, a definite and efficient reinforcement for the upper portion of the pontoon. The upright flanges of the angle strips 105 are adapted to support the stringers 106. The roadway or platform, which usually consists of heavy planking, is laid across these stringers 106, as well as stringers 75, 76, 75', 76', 83 and 84. This planking, however, is not shown in the drawing except in FIG. 5, since this is done in the customary manner. This planking is used to make the roadway for troops to march across the bridge, onto the pier, and onto the shore S. Angle strips 108 are riveted to the side walls of casing in a horizontal plane below the flanges of strips 104. The S-shaped hooks are engaged in holes made in angle strips 108 and in an intermediate tie-brace 110. In FIG. 6 there is shown a pair of pontoons disposed closely together and locked together by means of novel spring hooks shown in FIGURES 7, 8 and 9. In this structure the stringers 106 are provided with spaced bearing lugs 117 for journalling the trunnions of suitable clamping members 118 which are mounted thereon for hinging movement so they will extend over and be attached to the members at the end of aligned pontoons. The free ends of the hinged members 118 are provided with holes 118'. Spring hooks such as shown in detail in FIGURES 7, 8 and 9 are adapted for cooperation with the holes 118' for securing adjacent floats to each other, whereby a series of floats may be joined, all affixed together to use a single pier.

These spring hooks 120, as detailed in FIGURES 7, 8 and 9, comprises elongated confronting body members 114 and 115 of yieldable metal and having at their ends downwardly extending lugs 114' and 115' that are normally disposed alongside each other to be entered in apertures 118', and the proximate faces of the body members are tapered outwardly as contemplated in FIG. 7 to increase yieldability since their mid-portions are secured together by rivets. The separation of the lugs is performed by means of tapered wedges 116 depending from the outer free ends of the spring arms 117 which are mounted for swinging movement upon a pivot pin 128, that projects from the mid-portion of the body members 114 and 115. Spring coils 119 are formed in the arms 117 intermediate the pivot pin 128 and the outer ends of said arms; and the internal diameters of said coils are sufficient to permit insertion therethrough of the prongs of a double-claw bar whereby the arms may be flexed upwardly and swung laterally to dispose the wedges 116 at the outer meeting portions of the spring body members 114 and 115 so that said wedges may be forced in between them to thereby separate or spread the adjacent pair of lugs 114' and 115' to force the latter in the outer portions of the holes 118'. This locking position of the parts just described is illustrated in detail in FIG. 9. These spring hooks 120, as detained in FIGS. 7, 8 and 9 are shown diagrammatically in FIG. 2 for connecting the pontoon bridge to the pier. In FIG. 1, the pontoon bridge is shown connected to the pier by an S-shaped hook, here referred to as 120'. Either can be used according to the demand. The floating bridge may rise and fall slightly according to the roughness of the water and, since the pier is rigid, the spring hooks 120 and the longitudinal slots 71 in the links 65 and slots 71' in links 65' provide sufficient means to allow the bridge to rise and fall. The pier can be secured to the shore by use of S-shaped hooks 120', as shown by FIGS. 1, 3 and 4.

The manually operable, portable pier shown by FIGS. 10 and 11, consists of the same frame work 15 with main frame 16, having a front section 17, a rear section 18 and a centrally raised section 19, having axles 20, 22 and 24 with wheels 21, 23 and 25 mounted thereon, a central raised section 19, a housing 31' and a shaft 30, and other common parts as shown, thereby providing a novel modified form of a portable pier. The shaft 30 raises and lowers the platform 80, as described above, effecting movement of stringers.

The modified form of this invention employs a pair of stringers 150 over the front section 17 and a pair of stringers 160 over the rear section 18. The stringers 150 each have a major portion 153 which is straight, a short angular portion 154 at the rear of said straight portion 153, and a curved end portion 155 at the rear of said angular portion 154. Said portion 154 is provided with a longitudinal slot 158 throughout its entire length. Said portion 155 is provided with a horizontal bore 156 extending therethrough.

The invention employs a pair of stringers 160 over the rear section 18. Said stringers 160 each have a major rear end portion 163 which is straight and has an integral front end portion 165 which is curved forwardly and downwardly. Said stringers 160 have a longitudinal slot 168' in their straight portions 163 near the junction with the curved portions 165. The housing 31' is slightly higher than the housing 30 described above and as bolt 170 extending horizontally from the front side thereof and a similar bolt extending horizontally from the rear side thereof, both bolts arranged near the top of housing 31'. The inner ends of said stringers 150 and 160 have holes therein and are pivotally mounted on said bolts 170', stringer 163 mounted on the front bolt 170 and stringer 153 mounted on rear bolt 170. Said platform has stringers 83 and 84 with horizontal bores therein at the opposite ends thereof. A shaft 130 extends through the bores in the front ends of stringers 83 and 84 and through the longitudinal slots 158 in the stringers 153. A shaft 132 extends through the bores in the rear ends of stringers 83 and 84 and through the longitudinal slots 168 in the stringers 163. The shape of the stringers 153 and 163 allow up and down movement as well as sliding movement on shafts 130 and 132 since they each embody the longitudinal slots therein. Intermediate the ends of the straight portion of the stringers 153 there is arranged a bolt 179. A pair of stringers supporting steel bars 180 have their upper ends 181 pivotally mounted on said bolts 179, thereby allowing the lower opposite ends 182 to swing downwardly.

The steel bars 180 are spaced apart at the top by

the stringers **150** and at a location above the bottom ends **182** thereof by a steel cross channel **184**, and the longitudinal forward edges, as seen in FIG. 11, are provided with a series of teeth T, said teeth being inclined upwardly. A steel channel **190** of U shape in cross section is arranged across the frame between channels **35** and **36**, the top transverse rear edge of said channel **190** effecting engagement with the teeth T. By turning the crank **32**, the platform **80** is raised, raising the innermost ends of the stringers **150** and **160**. The outer ends of said stringers are raised manually and adjusted in position by engagement of the teeth T with the channel **190**. The free ends of stringers **150** will be attached to the pontoon bridge which the free ends of the stringers **160** will be arranged on the shore, the S-shaped hook assembled with the stringers **160** will be inserted in a chain **195** which is secured to a stake **196** driven into the ground. The stringers **160** are supported by bars **180'** pivotally mounted upon bolts **179'**, allowing the lower ends **182'** to swing downwardly. The teeth on bars **180'** are inclined upwardly and arranged on the rear edge thereof, the teeth engaging the steel channel **190'**. The bars **180'** being spaced apart by steel cross channel **184'**. When the stringers **150** and **169** are in their lowermost position for travel, as shown by FIG. 10, the cross channels **184** and **184'** rest in contact with the raised section **19** at the forward and rear sides thereof, thereby supporting the free ends of the stringers **150** and **160** and preventing same from assuming a dangerous low position during travel.

A bar **200** is secured to the free ends of stringers **75** and **76**, it extending transversely above the main frame, said bar **200** having holes therein to receive spring hooks **120** or S-shaped hooks **120'**. A similar bar **202** is secured to the free ends of the stringers **75'** and **76'**, same extending transversely above the main frame, said bar **220** having holes therein to receive S-shaped hooks **120'** for attaching to the chain usually used for attachment to a post driven into the bank of the shore.

It is obvious that several pontoon bridges may be arranged side by side and attached to a plurality of portable piers. Where the shore line is very irregular, a plurality of bridges may be satisfied by one portable pier. In the past it has been very difficult to land the troops from the bridges as suitable piers could not be arranged. It was also difficult to dismantale the bridges and get the parts onto the shore. By using a portable pier, the bridges may be dismantled while adjacent the piers. With the bridge parts dismantled, the inflation valves are opened to exhaust the air from the pontoons. The bidge parts in dismantled condition may be held together by the improved spring fastening hooks shown by FIG. 7, whereby the bundled parts may be placed upon the pier frame, the pier pulled from the water onto the shore. After the pier and parts are prepared for travel, the piers may be pulled by trucks on the ground and highways, the tires **21**, **23** and **25** absorbing the shock of uneven pavements.

Many deviations in the details of the construction herein described are possible without departing from the spirit and scope of our invention, and we do not therefore desire to be limited to the exact form herein described, and shown in the accompanying drawings.

We claim:

1. An adjustable portable jack pier for use with pontoon bridges consisting of a plurality of floats each embodying an inflated envelope having a normally flat rectangular surface region and a region normally arcuate in cross-section and a platform supporting frame secured to the upper portion of said envelope, and stringers mounted upon the supporting frames of a plurality of floats; the pier comprising a main frame having a front section, a rear section and a central section located midway between the ends thereof, said central section embodying a frame structure with a top supporting surface arranged in a plane above but parallel to the plane of said main frame, a jack housing mounted upon and secured to said top supporting surface, a threaded thrust bar extending through said housing, means within said housing for actuating said thrust bar including a manually rotated shaft, crank means outside said housing for rotating said shaft, an operating platform mounted upon the upper end of said thrust bar, central stringers secured to the sides of said platform, a pair of front stringers pivotally mounted with the front end of said operating platform and extending above said front section, a pair of rear stringers pivotally mounted with the rear end of said central stringers on said operating platform and extending above said rear section, supporting members pivotally connected with said front and rear stringers intermediate the ends thereof and adjustably supported upon said main frame adapted to elevate the free ends of said stringers relative to the elevation of said central stringers on said operating platform, a plurality of axle housings secured to and extending below said main frame, an axle mounted in each pair of said housings, arranged transversely of the frame, each axle supporting a pair of wheels journalled for rotation thereon adapted to make said main frame mobile, vertical adjustable means for supporting said frame, and means for connecting the rear end of said rear section with an anchoring element on the shore.

2. An adjustable portable jack pier for use with pontoon bridges consisting of a plurality of floats each embodying an inflatable envelope having a normally flat rectangular surface region and a region normally arcuate in cross-section and a platform supporting frame secured to the upper portion of said envelope, and stringers mounted upon the supporting frames of a plurality of floats; the pier comprising a main frame having a front section, a rear section, and a central section located midway between the ends thereof, said central section embodying a frame structure with a top supporting surface arranged in a plane above but parallel to the plane of said main frame, a jack housing mounted upon and secured to said top supporting surface, a threaded thrust bar extending through said housing, means within said housing for actuating said thrust bar including a manually rotated shaft, means outside said housing for rotating said shaft, an operating platform mounted upon the upper end of said thrust bar, a pair of central stringers mounted on the sides of said platform, a pair of front stringers pivotally mounted with the front end of said operating platform and extending above said front section, a pair of rear stringers pivotally mounted with the rear end of said stringers on said operating platform and extending above said rear section, supporting members pivotally connected with said front and rear stringers intermediate the ends thereof and adjustably supported upon said main frame adapted to elevate the free ends of said front and rear stringers relative to the elevation of said central stringers on said operating platform, a plurality of axle housings secured to and below said main frame, an axle mounted in each of said housings arranged transversely of the frame, each axle supporting a pair of wheels journalled for rotation thereon adapted to make said main frame mobile in water, a support for said main frame comprising posts adapted to engage the ground, stop blocks mounted upon said posts adapted to rest upon the surface of the ground, and means to secure said block upon said posts in any desired position.

3. A pier comprising a main frame supporting and forming a plurality of sections integrally secured end to end, a central section thereof arranged in a plane above but parallel to the plane of remaining sections, vertical adjustable means for supporting said frame, said adjustable means comprising a plurality of pipe housings rigidly secured to the main frame adjacent said central section and each housing having a vertical bore extending therethrough, a post slidably and adjustably mounted within each of said post housings and adapted to engage and penetrate into the ground, stop blocks secured to each post a fair distance above the lower end of each post adapted to rest upon the ground surfaces, a jack housing mounted

upon and secured to the top surface of said central section, a threaded thrust bar extending through said housing, means within said housing for actuating said thrust bar including a manually rotated shaft, crank means outside said housing for rotating said shaft, and operating platform mounted upon the upper end of said thrust bar, a pair of side central stringers rigidly secured to said platform, a pair of front stringers pivotally mounted with the front ends of said central stringers, a pair of rear stringers pivotally mounted with the rear ends of each of said central stringers, supporting members pivotally connected at their top ends with each front and rear stringer intermediate the ends thereof, the lower ends of said supporting members adjustably supported upon said main frame adapted to raise and lower the free ends of said front and rear stringers relative to the elevation of said rigid central stringers, a plurality of axles journalled with said main frame, each axle supporting a pair of wheels journalled for rotation thereon adapted to make said main frame mobile.

4 A jack pier for use on ground and in the water comprising a main frame embodying a plurality of sections rigidly secured end to end, a centrally located center section thereof arranged in a plane above the plane of said frame, a jack housing mounted upon and secured with said center section, a threaded thrust bar extending through said housing, crank means for actuating said thrust bar, an operating platform mounted upon the upper end of said thrust bar, said platform comprising arm means having a center stringer rigidly secured longitudinally at opposite sides thereof, a pair of front stringers pivotally mounted with the front ends of said rigid center stringers, a pair of rear stringers pivotally mounted with the rear ends of said rigid center stringers, a link pivotally connected at one end with each front and rear stringer intermediate the ends hereof, an arm pivotally connected at one end with the opposite end of each of said links, the opposite ends of each said arms being pivotally connected with said main frame, each arm having gear means rotatably mounted intermediate the ends thereof having gear teeth engageable with teeth on a sector mounted upon said main frame and adjacent thereto, crank means for imparting rotation to each of said gears and effecting movement of the arm and link and stringer pivotally connected together, a plurality of axles mounted to the underside of said main frame, each axle supporting a pair of wheels journalled for rotation thereon adapted to make said pier mobile.

5. A pier according to claim 4 wherein said link has a longitudinal slot in its end pivotally connected with an arm, the pivot means adapted to move in said slot to provide free motion there-between to relieve any force caused by wave motion of water surrounding said pier.

6. A pier according to claim 4 wherein each link has a longitudinal slot in its end pivotally connected to an arm by a transverse shaft, said shaft adapted to move longitudinally in said slot when said link is moved upwardly a short distance but preventing downward movement thereof except that governed by said arm, said shaft extending through the said pair of arms and links on opposite sides of the frame.

7. A pier according to claim 5 wherein said pivot means consists of a shaft extending transversely of the main frame.

8. A pier comprising a rectangular shaped rigid main frame, a front section, a rear section and a center section formed with said main frame, an axle housing mounted below each of said sections at opposite sides of the main frame, an axle mounted in each pair of axle housings extending transversely of said frame, each axle supporting a pair of wheels journalled for rotation thereon adapted to make the pier mobile, said center section having an upper surface elevated above the horizontal plane of said main frame, a jack housing mounted upon and secured to said upper surface of said center section, a threaded thrust bar extending vertically through said housing, crank means for actuating said thrust bar, an arm type supporting platform mounted upon the upper end of said thrust bar, said platform having center stringers rigidly secured longitudinally at opposite sides thereof, a pair of front stringers pivotally mounted with the front ends of said rigid center stringers, a pair of rear stringers pivotally mounted with the rear ends of said rigid center stringers, an elongated link pivotally connected at one end thereof to each front and rear stringer intermediate the ends thereof, an arm pivotally connected at one end with the opposite end of each of said links, the opposite end of each of said arms being pivotally connected with said frame, a gear rotatably mounted on each arm engageable with a sector gear mounted on the frame adjacent each arm, means to rotate said gear relative to said sector gear adapted to elevate and lower said front and rear stringers by the action of said arms and links and vertically adjustable means adapted to hold said pier in one location while in use in the water.

9. The combination of a pontoon bridge and a jack pier, said bridge consisting of a plurality of floats each embodying a frame and an inflatable envelope having a normally flat rectangular surface region, stringers mounted upon the frame of a plurality of floats, said pier consisting of a mobile frame unit, said frame unit embodying three sections, a front section, a central section and a rear section, a jack housing mounted upon said central section, a thrust-bar passing vertically through said jack housing, a supporting platform mounted upon the upper end of said thrust-bar, a pair of stringers rigidly secured longitudinally to the sides of said platform, a pair of front stringers pivotally mounted with the front ends of said pair of central stringers, a pair of rear stringers pivotally mounted with the rear ends of said pair of central stringers, a plurality of pivoted arms and links operable to raise and lower the free ends of said front and rear stringers relative to the raising and lowering of said central stringers by said thrust-bar, spring hooks connecting a bar extending transversely between the front ends of said front stringers with the frame of the adjacent float of said bridge, and hook means connecting a bar extending transversely between the rear ends of said rear stringers with anchoring means on the shore.

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