Aug. 18, 1970 L. F. MIKLOS 3,524,324

FLEXIBLE PIER

Filed July 1, 1968

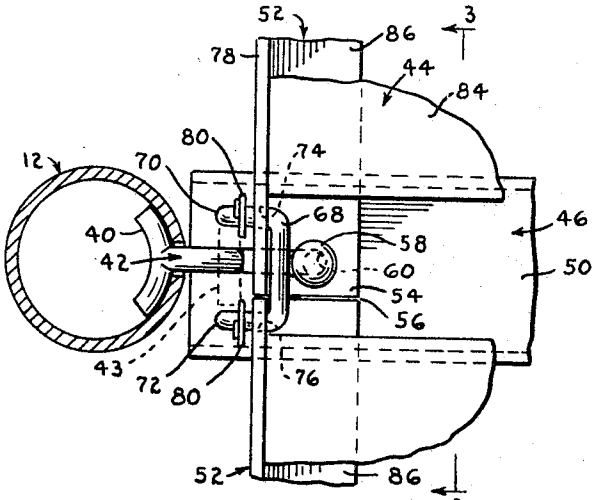


Fig.-2

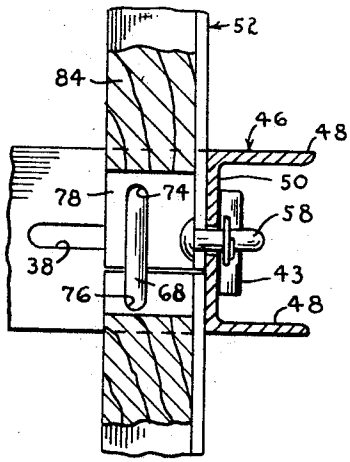
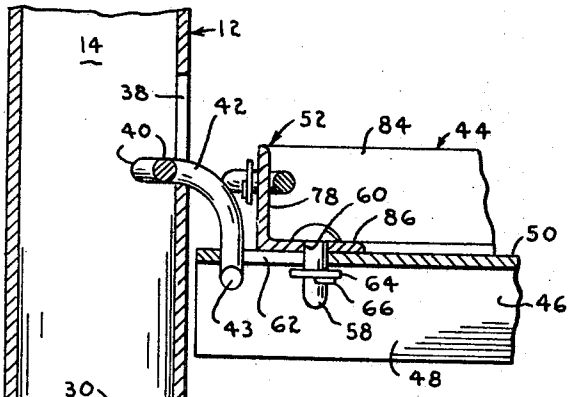


Fig.-3



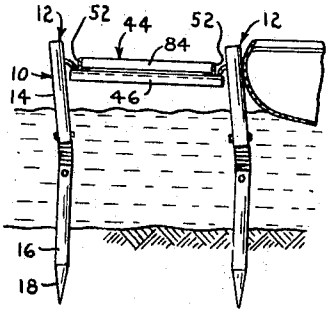


Fig.-4

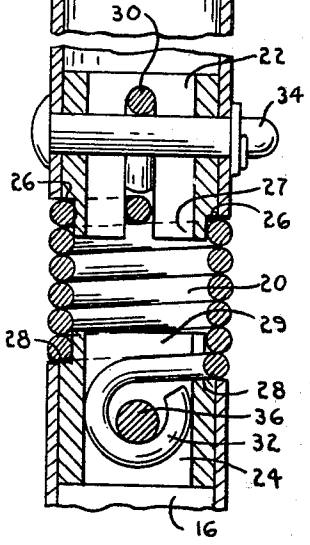


Fig.-1

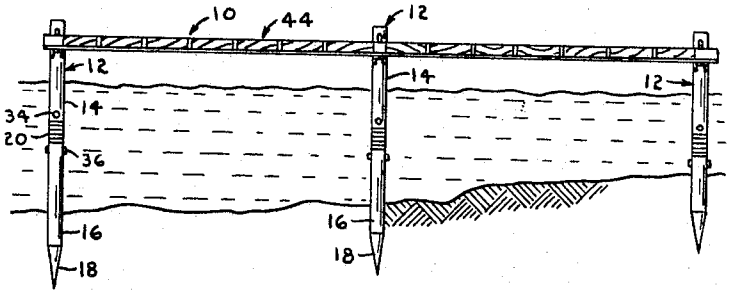


Fig.-5

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FLEXIBLE PIER

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ABSTRACT OF THE DISCLOSURE

A flexible pier comprising posts laterally aligned in transverse rows each of which are formed to include a closed coil spring in the body thereof so that the top section may laterally flex relative to the bottom section. A hanger member pivotally connecting the top section of each post and pendantally supporting a cross beam between a pair of laterally aligned posts through a slotted opening in the ends of the cross beam. Longitudinal frame members on each end of the cross beams being connected together end to end and to the cross beam through the slotted aperture therein. Cross boards laid side by side on the transversely spaced longitudinal runners forming the platform.

This invention relates to piers and more particularly to a novel pier construction to render the pier flexible.

Piers of the prior art are generally rigid and are supported on wooden piles which are arranged in transverse rows. Longitudinal members are supported on the portion of the piers extending above the water line which support the deck. My invention is directed toward piers of relatively small dimension which are commonly used to dock small boats and extend into rivers and lakes. The prior art piers are inflexible and are easily damaged when a boat is forcefully bumped against the pier. The wooden posts are also dislodged from their upright position due to movement of the ice thereagainst during the winter months. In consequences of these forces, the rigid piers of the prior art become damaged, misaligned and out of level.

Accordingly, my objectives are to overcome the above disadvantages which I accomplish by providing a pier of novel construction which includes upright posts which flex when impinged upon by a lateral force, and a deck construction and stringers therefor connecting the flexible portions of the post in a manner to allow movement thereof without rupture or dislocation of any part, and the maintenance of the deck's level bearing.

Another objective of my invention is to provide a flexible pier which includes a minimum of parts for economy of manufacture and ease of construction.

Another object of my invention is to provide a flexible pier having component parts which may be preformed for easy assembly in situ and removal therefrom when desired.

Other objects and advantages of my invention will become apparent after a more careful study of the following specification taken together with the drawings wherein is illustrated the preferred embodiment of my invention.

FIG. 1 is a side elevation of portions of the flexible post of my invention longitudinally sectioned and showing a portion of the deck and beam members suspended from the post;

FIG. 2 is a plan elevation of the post, platform and beam members showing the post in cross section and the platform members in fragment;

FIG. 3 is a sectional end view taken along line 3—3 of FIG. 2;

FIG. 4 is a pictorial view of the pier of my invention

shown in a flexed posture due to the striking force of the boat shown in fragment;

FIG. 5 is a side elevation of the pier in longitudinal section.

With reference now to the drawings, numeral **10** designates generally the pier of my invention. It comprises rows of transversely spaced piles or posts which I designate generally by numeral **12**. The posts **12** are identical in structure with the possible exception of their lengths which may vary to accommodate the uneven floor line. Accordingly, the description of one post is applicable to all the other posts and the numerals designating the component parts thereof should be read to apply to the same component parts of all posts. Each post **12** comprises a top section **14** and a bottom section **16**. The bottom section **16** is pointed as at **18** to facilitate being driven into the ground.

Top and bottom post sections **14** and **16** respectively are connected end to end having interposed therebetween closed coil spring **20**. The ends of sections **14** and **16** abutting against the opposite ends of coil spring **20** are formed to accommodate the end coils of spring **20**. The sections **14** and **16** are hollow since they are most conveniently formed from pipe stock. I further provide collars **22** and **24** to fit in the hollow of the post sections ends. Collars **22** and **24** are provided with shoulders **26** and **28** respectively which serve to seat the ends of spring **20**. Collars **22** and **24** longitudinally extend beyond shoulders **26** and **28** with a reduced diameter **27** and **29** respectively to fit inside the opposite end of coil spring **20**. Hook ends **30** and **32** are formed to fit inside collars **22** and **24** respectively and therein secured by means of pins **34** and **36** respectively which diametrally pass through the end of post section **14**, collar insert **22** and hook **30**; and the end of post section **16**, collar insert **24** and hook **32** respectively. Thus assembled, post sections **14** and **16** are co-axially and rigidly connected together to render the combined length thereof a solid structure for a force applied longitudinally thereof such as a pile driving force, and simultaneously be transversely flexible at coil spring **20** to give under an impact force applied transversely thereto.

Top section **14** of post **12** extending above the water line is provided with a vertical slot **38** which is best shown in FIG. 1, to receive therethrough cross bar **40** of hanger member **42** when the hanger member **42** is turned sidewise from its pendent, platform supporting position. Pier platform **44** comprises a cross beam **46** between each pair of transversely aligned posts **12**, which may conveniently be formed from channel beams positioned so that the flanges **48** depend downward and the web section **50** provides the support base for longitudinal frame runners **52** at each end of cross beams **46**.

I find it convenient to utilize angle bars for longitudinal frame runners **52**. The abutting ends **54** and **56** of adjacent longitudinal frame runners **52** are cut to rest off center on cross beam member **46** which are connected together by means of a pin **58** through hole **60** in one of the abutting ends **54** of frame runners **52** which overlap the center line of cross beam member **46**, and through slot **62** provided in the ends thereof. Washer **64** and cotter pin **66** are connected to the end of pin **58** to prevent accidental removal of pin **58**. Sufficient clearance is allowed between washer **64** and web section **50** to allow sliding movement of pin **58** in slot **62**. The abutting ends **54** and **56** of longitudinal frame runner **52** are connected together to hold end **56** of longitudinal frame runner **52** on cross beam member **46** by means of U pin **68**. Legs **70** and **72** of U pin **68** are inserted through holes **74** and **76** respectively, provided in the upright flange **78** of frame runners **52**. Washers and cotter key means **80**

are connected to each of legs 70 and 72 to retain U pin 68 connected to the adjacent ends 54 and 56 of frame runners 52. Cross beam members 46 are supported at each end by means of hanger members 42 which are connected to each post 12. Hanger members 42 preferably comprises a curvilinially formed bar having top cross bar 40 and bottom cross car 43 at the ends thereof. I prefer to form cross bar 40 concentrically arcuate with the circumferential curvature of post 12, and cross bar 43 rectilineal to seat against web section 50 of cross beam member 46.

The pier platform 44 is formed with boards 84 which are placed side by side and the ends thereof resting on the horizontal flanges 86 between the upright flanges 78 of the angle bars forming frame runners 52 to span the space therebetween. Each of boards 84 may be fastened in any convenient manner to the horizontal flanges 86 of frame runners 52 such as by bolt and nut fastening means (not shown). Thus constructed and assembled the pier of my invention is sturdy and stable under normal usage and cable of being flexibly movable in any direction. The posts 12 are resiliently bent at spring member 20 under the impact of a force which would otherwise damage a conventional pier. The lower end 14 of posts 12 remains undisturbed, fixedly moored and the pier platform 44 is supported from posts 12 to allow substantial relative movement therebetween to prevent loosening, collapse, or rupture of any part thereof.

It is obvious that modifications may be made without departing from the true spirit of my invention. Accordingly, what has been shown and described in detail is a preferred embodiment of my invention and is not to be taken as a definition of the scope of invention, reference being had for this purpose to the appended claims.

What I claim is:

1. A flexible pier comprising:
a plurality of posts transversely aligned in spaced rows,
each of said posts being separable intermediate the ends thereof for providing a top section and a bottom section,
a spring interposed between said top and bottom sections, said spring connecting said top and bottom sections in coaxial alignment,
a hanger member means pivotally pendant from said top post sections,
a cross beam member pivotally supported by said hanger member means between transversely aligned posts;

longitudinal frame runners transversely spaced and supported on said cross beam members adjacent the ends of said cross beam members; and
a plurality of board members supported at the ends thereof by said transversely spaced longitudinal frame runners.

2. The flexible pier of claim 1 wherein said spring is further characterized as a close coil spring.

3. A flexible pier structure comprising:
a plurality of posts transversely aligned in spaced rows,
each of said posts being separable intermediate the ends thereof for providing a top section and a bottom section,
a closed coil spring interposed between said top and bottom sections, said spring connecting said top and bottom sections in coaxial alignment,
a hanger member means pivotally pendant from said top post sections,
a cross beam member between each pair of transversely aligned posts;
said cross beam member having a slotted aperture in each end thereof for receiving therethrough the pendant end of said hanger member means.
a plurality of longitudinal frame runners transversely spaced and supported on said cross beam members adjacent said ends of said cross beam members;
connecting means at one end of said frame runners extending through said slotted aperture in the ends of said cross beam member; and
a second connecting means linking said one end of said frame runner and the other end of a longitudinally adjacent frame runner.

References Cited

UNITED STATES PATENTS

1,402,465	1/1922	Wood	52—113
2,949,324	8/1960	Birge et al.	287—86
3,208,227	9/1965	Armbrust	61—48
3,437,059	4/1969	Stonier et al.	287—86 X

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U.S. Cl. X.R.

52—113; 287—86; 114—230