United States Patent [19]

Roland et al.

[11] **3,812,978**

[45] **May 28, 1974**

[54] **CRANE SAFETY BARRIER**

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[73] Assignee: **J. A. Jones Construction Company,** Charlotte, N.C.

[22] Filed: **Nov. 21, 1972**

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[52] **U.S. Cl.** **212/1,** 256/1

[51] **Int. Cl.** ..... **B66c ,** E04h 17/00

[58] **Field of Search** ..... 212/1, 28; 280/150 R; 256/10, 1; 52/73; 74/608, 609, 111; 272/39, 42

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Attorney, Agent, or Firm—Clarence A. O'Brien; Harvey B. Jacobson

[57] **ABSTRACT**

A barrier supported from the base of a crane for movement therewith and shiftable between retracted and horizontally outwardly extended position relative to the base of the crane for enclosing an area about the crane base within which the oscillatable superstructure of the crane is swingable, so as to thereby exclude accidental movement of persons into the area about the base of the crane through which portions of the crane superstructure are swingable.

10 Claims, 14 Drawing Figures

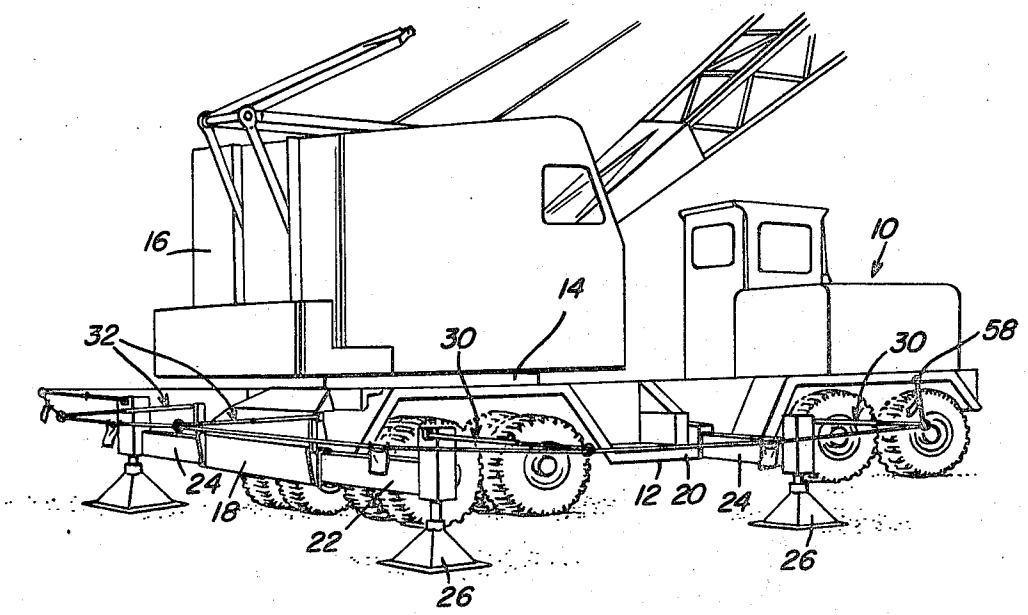


Fig. 1

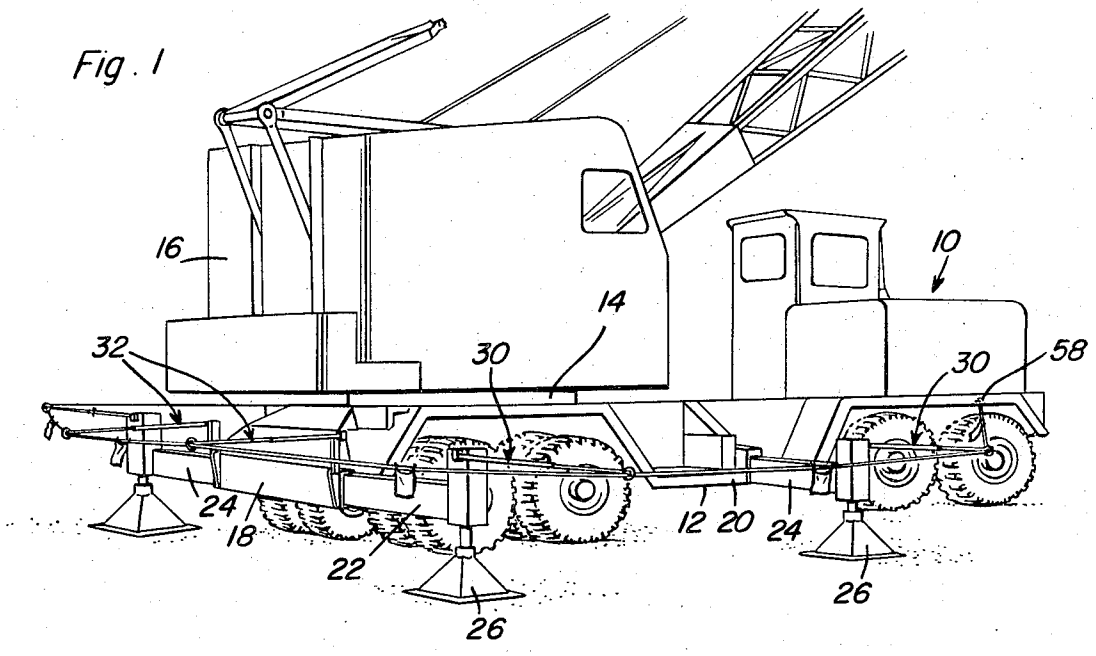

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12
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Fig. 2

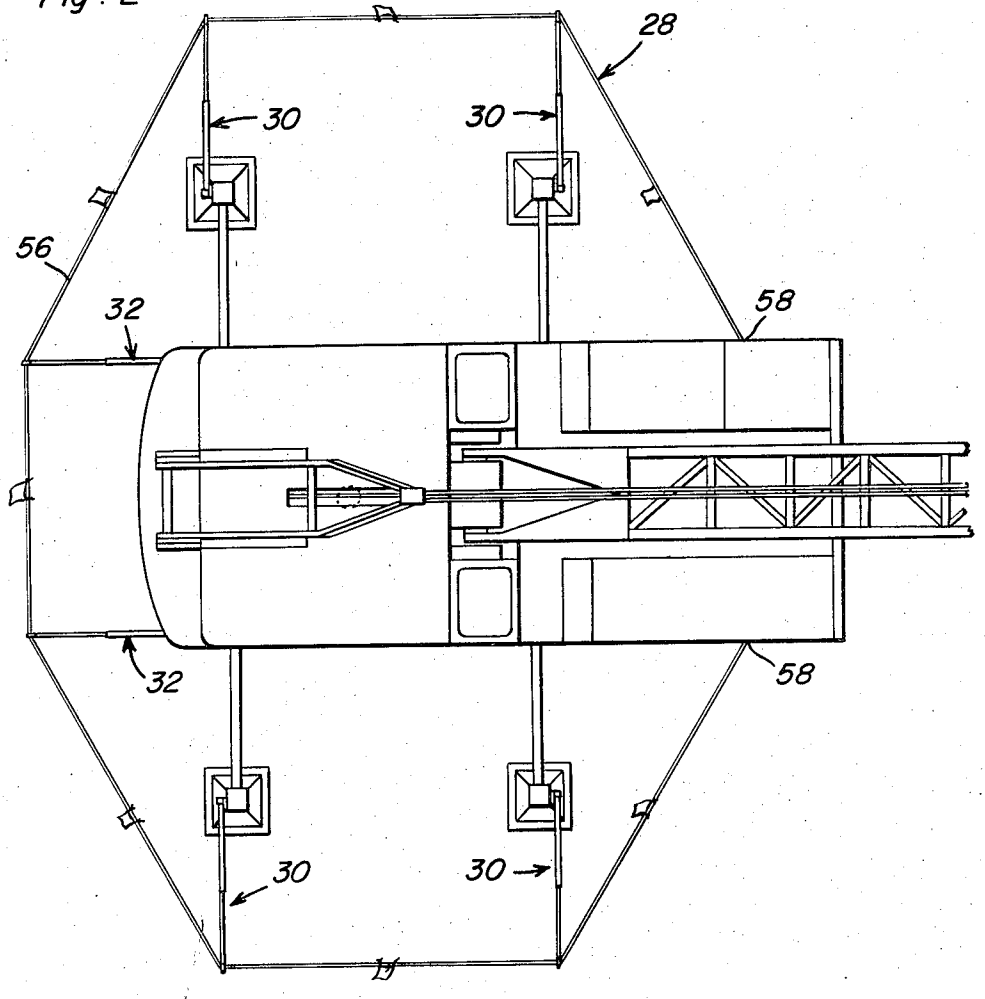

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Fig. 3

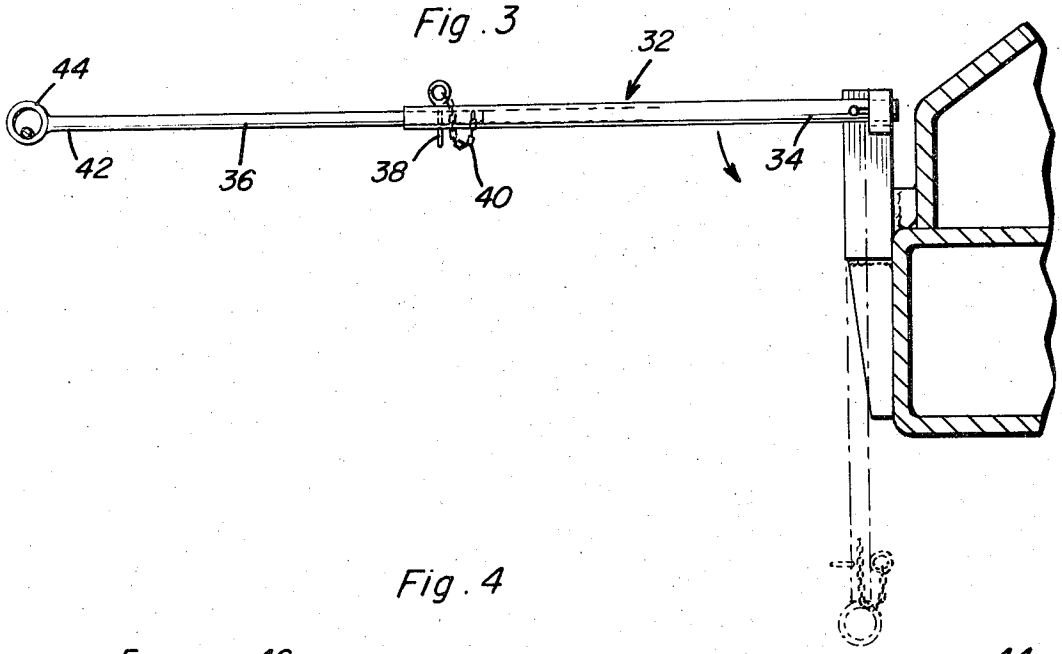


Fig. 4

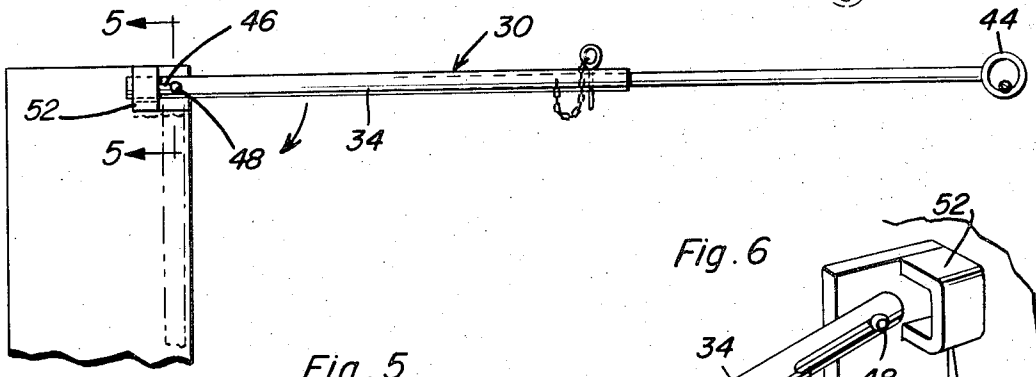


Fig. 5

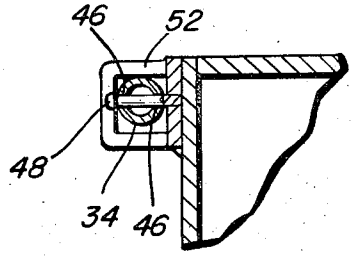


Fig. 6

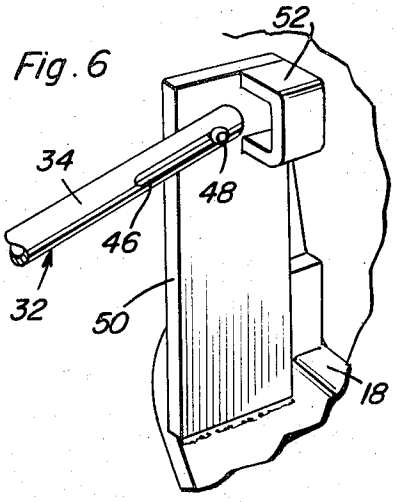


Fig. 11

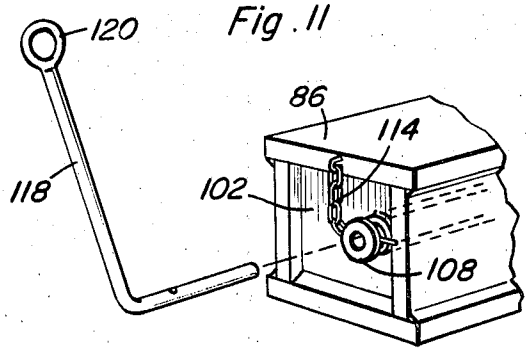


Fig. 12

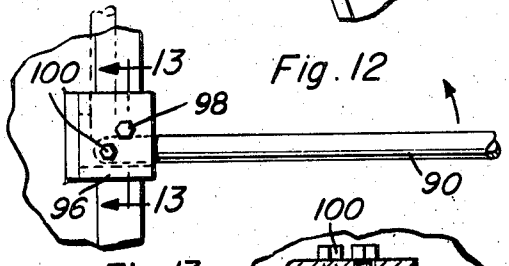


Fig. 13

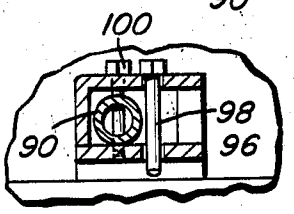


Fig. 7

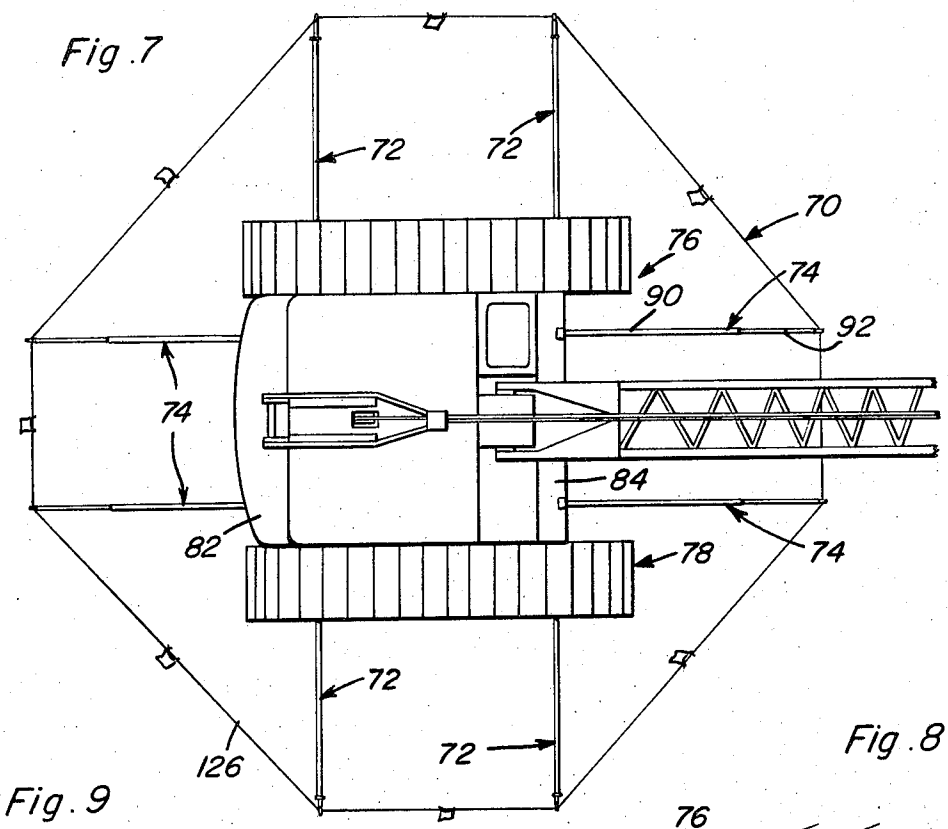


Fig. 8

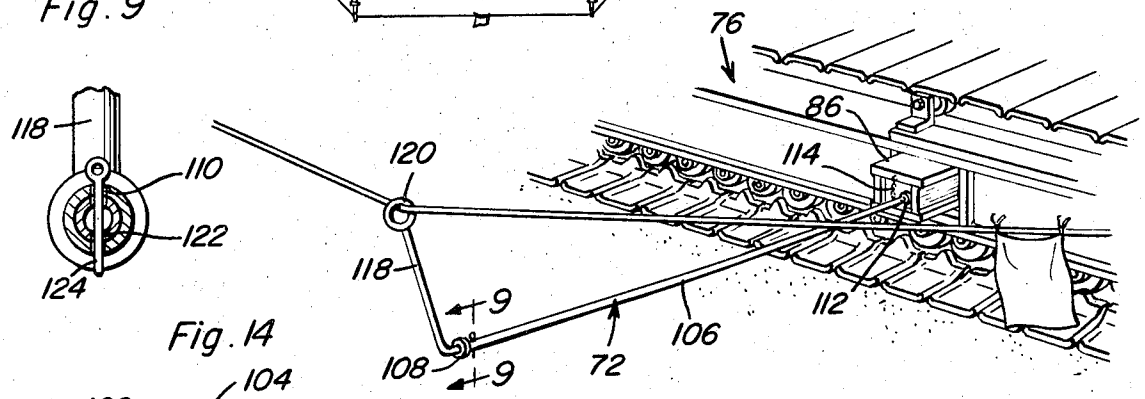


Fig. 9

Fig. 14

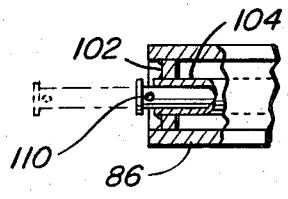


Fig. 10

CRANE SAFETY BARRIER

This invention relates to a means of reducing the frequency of bodily injury sustained by persons inattentively placing themselves within the area of oscillation of the superstructures of powered, self-propelled motor cranes, wagon cranes and certain other types of cranes.

The invention facilitates compliance with Safety And Health Regulations For Construction, Code of Federal Regulations, Title 29, Chapter XVIII, Part 1926 (former designation Chapter XIII, Part 1518), Subpart N, Section 1926.550 Cranes and Derricks, Subsection (a), paragraph (9), reading:

"Accessible areas within the swing radius of the rear of
rotating superstructure of the crane, either permanently
or temporarily mounted, shall be barricaded in such a
manner as to prevent an employee from being struck or
crushed by the crane."

The invention is designed to cause persons to become aware of the dangerous condition existing in proximity to the crane and is not intended to provide an impenetrable barricade to "prevent" approaching the crane. In fact, it is virtually impossible to provide a portable barricade in order to "prevent" a person approaching the crane if he is determined to do so.

Permanently mounted cranes present no problem insofar as the erection of barriers to impede the movement of persons into the ground areas through which the superstructure of the crane is swingable. However, portable cranes have bases of various types and some of these portable cranes are of the self-propelled type whereby they may be moved slightly under their own power to a slightly different on-the-site position. The instant invention not only establishes a barrier about a stationary portable crane but also a barrier for enclosing the danger area about a portable crane as that portable crane is being moved to a slightly different on-site position.

In many construction jobs a portable crane will remain in the same position throughout the working day and in these instances temporary and stationary ground supported barriers may be used. However, in a majority of the instances where cranes are used on construction jobs the cranes must be moved several or more times during the working day and in these instances it becomes time-consuming and expensive to maintain a barricade about the base of a crane.

It is accordingly the main object of this invention to provide a barrier construction which may be carried from the base of a crane, readily erected with a minimum of effort by the operator of the crane and moved with the crane base in substantially all instances when it becomes necessary to shift the location of the crane on the job site.

Another object of this invention is to provide a crane safety barrier in accordance with the immediately preceding object and with a first form of the invention adapted specifically for use on wheeled crane bases and a second form of the invention specifically adapted for use on tracked crane bases.

A final object of this invention to be specifically enumerated herein is to provide a crane safety barrier in

accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

FIG. 1 is a fragmentary perspective view of a wheeled mobile crane with a first form of the safety barrier of the instant invention operatively associated therewith in extended operative position;

FIG. 2 is a fragmentary top plan view of the assemblage illustrated in FIG. 1;

FIG. 3 is an enlarged fragmentary vertical sectional view illustrating one of the end support members of the barrier illustrated in FIGS. 1 and 2 and disclosing the manner in which the support member may be horizontally retracted and swung to an inoperative position;

FIG. 4 is a fragmentary side elevational view of one of the side support members of the barrier illustrating the manner in which the side support member is supported for movement to a retracted position on the side of the crane base;

FIG. 5 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 5—5 of FIG. 4; FIG. 6 is a fragmentary perspective view of the assemblage illustrated in FIG. 4 and with the outer end portion of the side support member of the safety barrier broken away;

FIG. 7 is a top plan view of a tracked crane having a second form of crane safety barrier of the instant invention operatively associated therewith in the extended operative position;

FIG. 8 is a fragmentary perspective view illustrating the support of one of the side support members of the second form of safety barrier supported from the base of the tracked crane;

FIG. 9 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 9—9 of FIG. 8;

FIG. 10 is an enlarged fragmentary end elevational view of the base portion of the tracked crane illustrated in FIGS. 7 and 8 and with the end support members illustrated in retracted inoperative position and the side support members also illustrated in the retracted position;

FIG. 11 is a fragmentary perspective view of one side portion of the base of the tracked crane illustrating the manner in which the associated side support member for the second form of crane safety barrier may be supported therefrom;

FIG. 12 is a fragmentary top plan view illustrating the manner in which the end support members of the second form of crane barrier are supported from the base of the tracked crane; and

FIG. 13 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 13—13 of FIG. 12.

FIG. 14 is a fragmentary sectional view illustrating one of the support members in retracted position.

Referring now more specifically to the drawings, the numeral 10 generally designates a form of mobile crane including a wheeled frame 12 having a turntable 14 ro-

tatably mounted thereon and upon which crane superstructure **16** is mounted.

The frame **12** includes transverse guides **18** and **20** from which retractable outrigger beams **22** and **24**, respectively, are supported and the outer ends of the outrigger beams **22** and **24** include vertically adjustable float pads **26.**

The foregoing comprises a description of a conventional form of wheeled mobile crane.

The first form of crane safety barrier of the instant invention is generally referred to by the reference numeral **28** and operatively associated with the crane **10.** The safety barrier **28** includes two pairs of opposite side horizontally outwardly projecting support members referred to in general by the reference numeral **30** and a pair of rear horizontally outwardly projecting support members referred to in general by the reference numerals **32.** Each of the support members **30** is supported from the outermost end of a corresponding outrigger beam and the support members **32** are supported from the rear guide **18.**

With attention now invited more specifically to FIG. **3** of the drawings, it may be seen that each elongated support member **32** comprises a tubular base section **34** and an extendible section **36** which is telescopingly engaged in one end of the base section **34** for extension and retraction relative thereto. The end of the base section **34** into which the adjacent end of the extendible section **36** is telescoped is provided with diametrically opposite radial bores through which an anchor pin **38** tethered to the base section **34** by means of a chain **40** is insertable. In addition, the first inserted end of the extendible section **36** is provided with a diametric bore through which the pin **38** is receivable in order to maintain the extendible section **36** in its extended position. In addition, the outer end **42** of each extendible section **36** includes an integral anchor ring **44** and a diametric bore registered with the diametrically opposite radial bores formed in the base section **34** and through which the pin **38** is receivable when the extendible section **36** is in the retracted position.

From FIG. **6** of the drawings it may be seen that the end of the base section **34** remote from the chain **40** is provided with diametrically opposite registered longitudinal slots **46** through which an anchor pin **48** is secured in order to fasten the base section **34** to the bracket **40** provided therefor on the transverse guide **18** by means of a pin and slot connection. In addition, a U-shaped bracket **52** is secured to the bracket **50** in horizontal alignment with the anchor pin **48** and spaced horizontally from the latter whereby when the base section **34** is in its maximum extended position it may be swung about the anchor pin **48** to the retracted phantom line position illustrated in FIG. **3** of the drawings. Of course, after the base section **34** has been swung to a horizontal outwardly projecting position, it may be slid inwardly relative to the anchor pin **48** so that the base end of the section **34** is received within the bracket **52** to maintain the base section **34** in a horizontal position.

With attention now directed more specifically to FIGS. **4** and **5** of the drawings, it may be seen that each of the support members **30** is constructed identically to the support members **32** and that the base ends of the base sections **34** of the support members **30** are also longitudinally slotted as at **46** and secured to the outer end of the corresponding outrigger beam by means of a pivot anchor pin **48** and an attendant bracket **52.** Thus, each of the support members **30** and **32** may be readily swung to the horizontal position and subsequently horizontally extended. Thereafter, an elongated flexible tension member **56** is passed through the various anchor rings **44** carried by the outer ends of the support members **30** and **32** and the free ends of the tension member **56** are anchored to opposite side forward portions of the frame **12** as at **58.** Thus, it may be seen that the tension member **56** is adequately supported in position defining a perimeter of a zone through which the crane superstructure **16** may swing in an unobstructed manner.

If it becomes necessary to move the crane **10** from one location to another at the job site, the float pads **26** may be raised and the crane may be moved to its new location with the safety barrier **28** fully erected. Of course, when the crane **10** is transported over the road the support members **30** and **32** are moved to their fully retracted positions and the endless flexible tension member **56** is removed.

With attention now directed more specifically to FIGS. **7** through **13** of the drawings, there will be seen a second form of crane safety barrier referred to in general by the reference numeral **70** and including opposite side support members **72** as well as opposite end support members **74.** The crane safety barrier **70** is supported from a tracked crane referred to in general by the reference numeral **76** and including a tracked base **78** from which a turntable **80** is supported, the turntable **80** having crane superstructure **82** rotatably mounted thereon.

The tracked base **78** includes longitudinally spaced front and rear transverse beams **84** and **86** from which the track assemblies are supported and the support members **74** are supported from corresponding end portions of the transverse beams **84** and **86.**

The support members **74** each comprises a base section **90** of tubular configuration in whose outer end an extendible section **92** is telescoped. The sections **92** may be maintained in fully extended positions by means of pins such as the pins **38** and the outer ends of the extendible sections **92** include anchor rings **94** corresponding to the anchor rings **44.** However, the base ends of the base sections **90** are supported from the corresponding transverse beams by means of brackets **96** including removable stop pins **98** whereby the base sections **90** may be secured in positions angularly displaced 90° relative to each other including a retracted position generally paralleling and extending along the corresponding transverse beam and an extended position projecting horizontally outwardly from the corresponding transverse beam of the base of the crane. The sections **90** are pivotally secured to the brackets **96** by means of pivot fasteners **100** and the support members **74** are wholly receivable between the track assemblies of the base when the support members **74** are in the fully retracted positions.

The transverse beams **84** and **86** are hollow and include opposite end plates **102** through which horizontal sleeves **104** are secured. The support members **72** each comprise a tubular base section **106** having a flanged outer end **108.** In addition, the outer end of each base section **106** is provided with diametrically opposite and aligned bores **110.** The base sections **106** are telescopingly received within the sleeves **104** and each end of each transverse beam has an anchor pin **112** tethered

thereto by means of a chain 114. The pins 112 may be passed through the bores 110 in order to secure the base sections 106 in substantially fully retracted positions within the beams. On the other hand, the inner ends of the base sections 106 are also provided with diametrically opposite aligned radial bores 116 and thus each of the pins 112 may also be utilized to retain the corresponding base section in its extended position such as that illustrated in FIG. 8 of the drawings.

The support members 72 each also comprise outer end risers 118. The risers 118 include upper end anchor rings 120 corresponding to the anchor rings 94 and the lower ends of the risers 118 include horizontally directed terminal ends which are telescopingly receivable in the outer ends of the base sections 106 and are provided with diametrically opposite radial bores 122 which are registrable with the bores 110 in order to receive anchor pins 124 therethrough. Thus, the anchor pins 124 are operable to retain the risers 118 on the outer ends of the base sections 106 and the pins 112 are operable to retain the base sections 106 in the extended positions such as that illustrated in FIG. 8 of the drawings as well as retracted positions received substantially wholly within the transverse beams of the base of the crane.

The crane barrier 70 also includes an elongated flexible member 126 passed through the anchor rings 94 and 120 and accordingly, the tension member 126 encloses an area about the crane through which the superstructure 82 may be swung. Of course, the crane 76 may also be moved from one location to another at the job site without diassembling the safety barrier 70. However, the support members 72 may be shifted to their recessed positions within the transverse beams 84 and 86 whenever desired and the risers 118 may be removed. Also, the support members may be telescoped to their shortened conditions and thereafter swung to their stored conditions illustrated in FIG. 10 whenever it becomes necessary to transport the crane 76 to another job site.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be restored to, falling within the scope of the invention.

What is claimed as new is as follows:

1. In combination, a heavy equipment structure of the type including a mobile base including front and rear marginal portions and a pair of opposite side marginal portions, said base having a turntable rotatably supported therefrom upon which superstructure is mounted, said super-structure including low portions thereof spaced further radially from the axis of rotation of said turntable relative to said base than various peripherally spaced marginal portions of said base, one of said end marginal portions and each of said side marginal portions including a pair of horizontally outwardly projecting support members spaced therealong, the outer ends of said support members including tension member support means, and elongated flexible tension member means extending between and slidably supported from said support means for longitudinal shifting relative thereto, said tension member means comprising the outer boundary of a plan area disposed about said axis within which the lower portions of said superstructure are contained during rotation of said superstructure relative to said base.

2. The combination of claim 1 wherein the other end marginal portion of said base also includes a pair of horizontally outwardly projecting support members and corresponding tension member support means on their outer ends, said tension member means also extending between and supported from the last mentioned pair of support members.

3. The combination of claim 1 wherein said support members are longitudinally extendible.

4. The combination of claim 1 wherein the inner ends of said support members are supported from said marginal portion for swinging toward depending upstanding positions about horizontal axes extending along the corresponding marginal portions.

5. The combination of claim 4 wherein said support members are longitudinally extendible.

6. The combination of claim 1 wherein the outer end portions of the side marginal support members include upturned terminal ends upon whose upper ends said tension member support means are mounted, said tension member means being under at least mild tension.

7. The combination of claim 1 wherein said end marginal portion support members are supported from said base for swinging to retracted positions generally paralleling said end marginal portions about upstanding axes.

8. The combination of claim 1 wherein said base includes hollow transversely extending elongated members extending between said opposite side marginal portions, said support members of said side marginal portions being supported from the corresponding ends of said transversely extending elongated members in telescopic engagement therewith for inward telescoping relative thereto toward retracted positions with only the outer ends of said support members projecting outwardly of the ends of said transversely extending elongated members.

9. The combination of claim 1 wherein said base includes laterally outwardly extendible outrigger members, said side marginal outwardly projecting members being supported from said outrigger members.

10. The combination of claim 8, wherein the outer end portions of the side marginal support members include upturned terminal ends upon whose upper ends said tension member support means are mounted, said tension member means being under at least mild tension.

* * * * *