Nov. 5, 1968 W. A. JENNINGS 3,409,266

SHORING STRUCTURE FOR CONCRETE FORMS

Filed Aug. 30, 1965 4 Sheets-Sheet 1

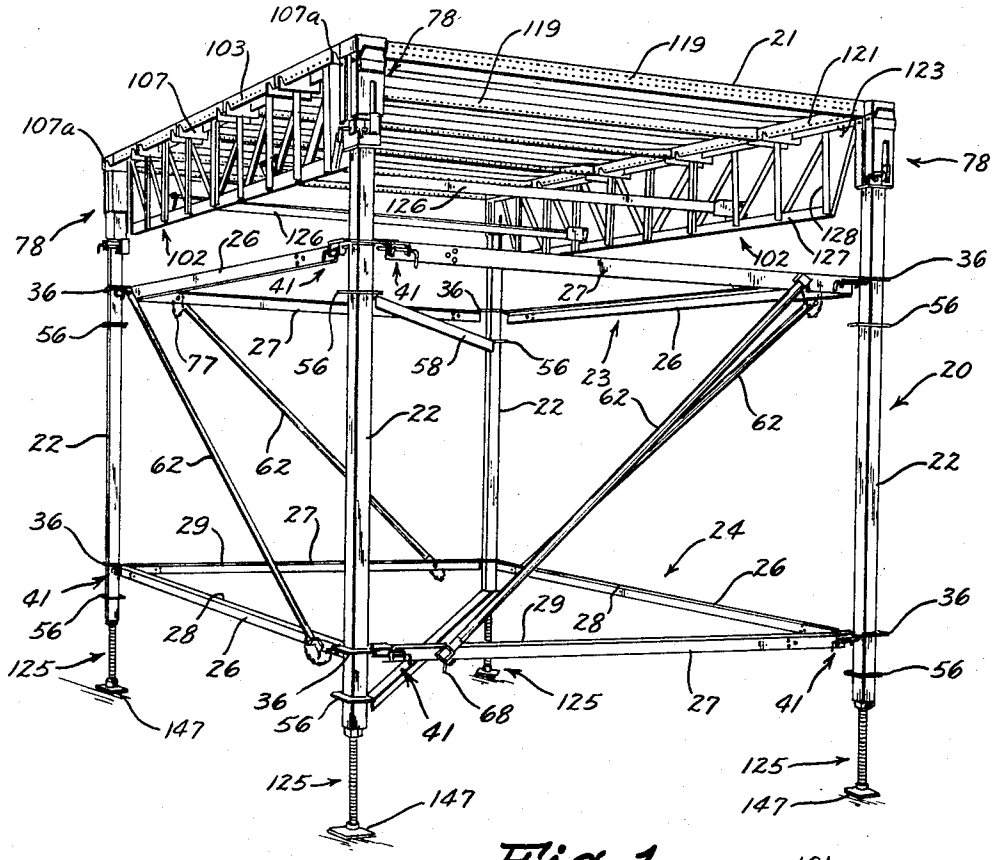


Fig. 1

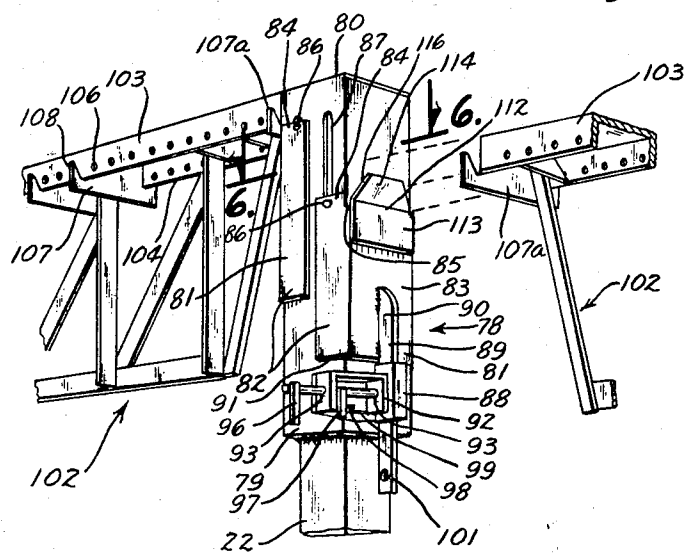


Fig. 5

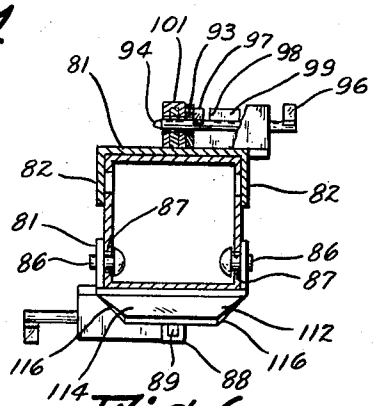


Fig. 6

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SHORING STRUCTURE FOR CONCRETE FORMS

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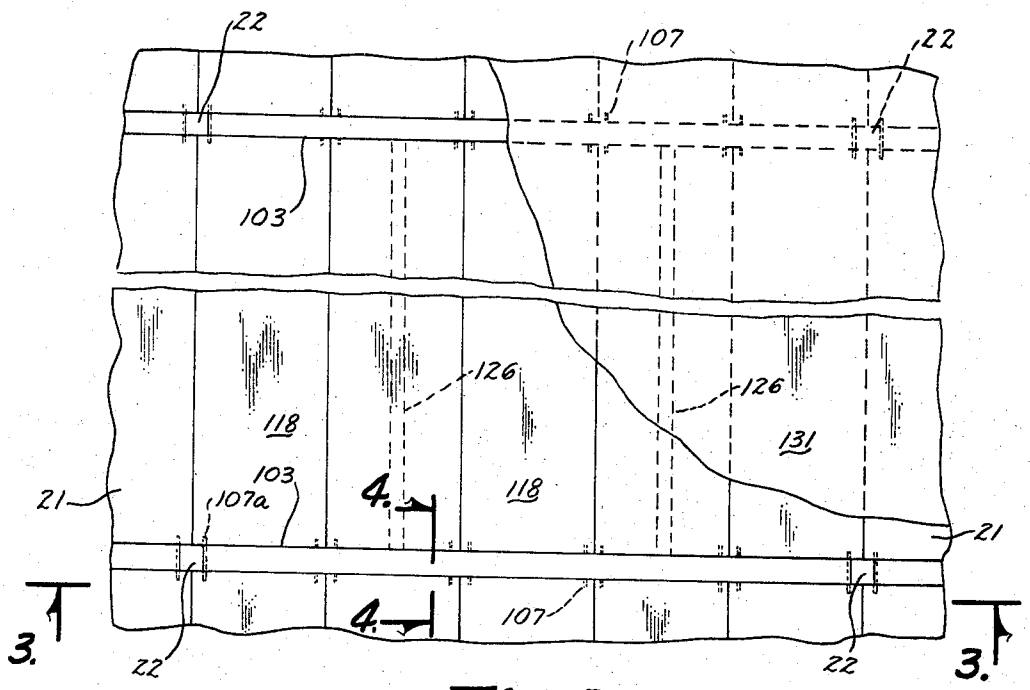


Fig. 2

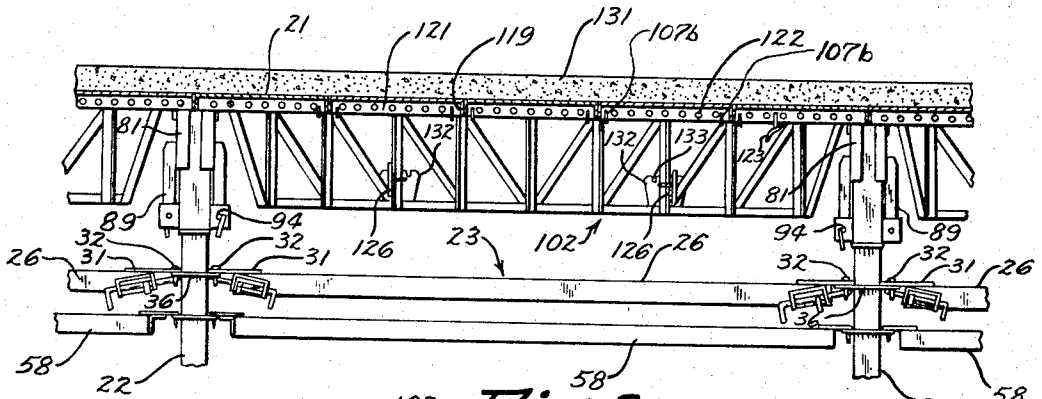


Fig. 3

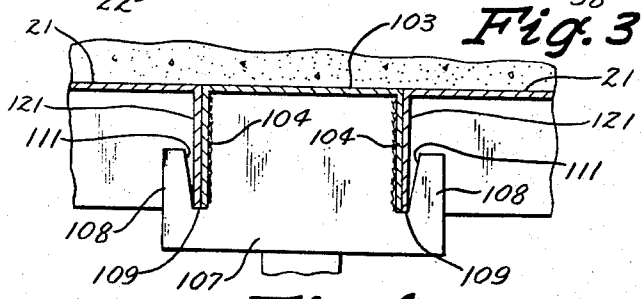


Fig. 4

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SHORING STRUCTURE FOR CONCRETE FORMS

Filed Aug. 30, 1965 4 Sheets-Sheet 3

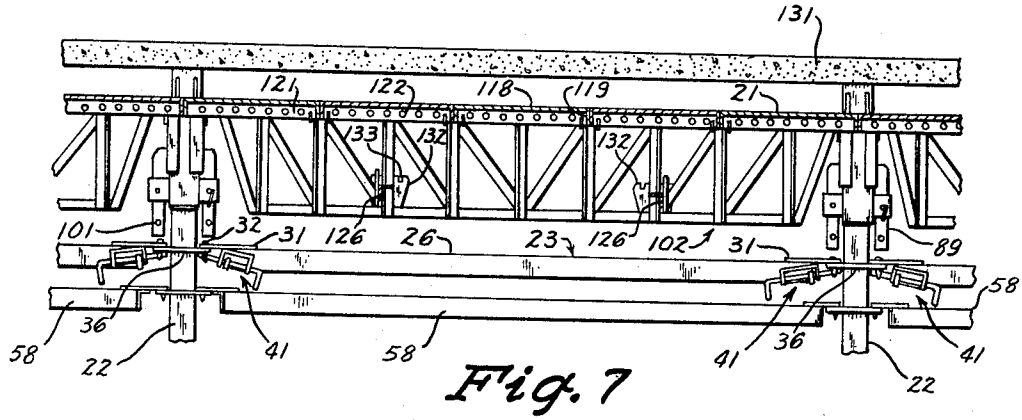


Fig. 7

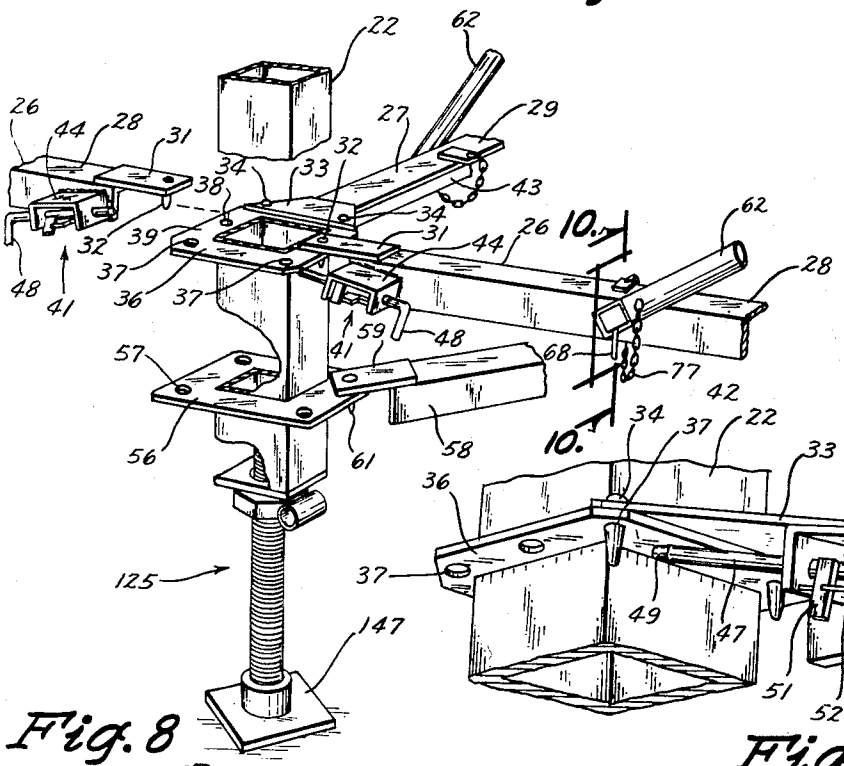


Fig. 8

Fig. 9

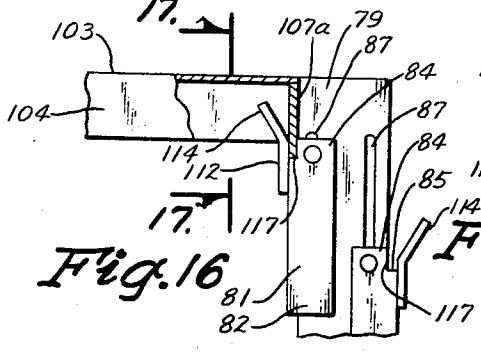


Fig. 16

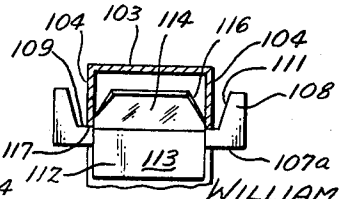


Fig. 17

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SHORING STRUCTURE FOR CONCRETE FORMS

Filed Aug. 30, 1965 4 Sheets-Sheet 4

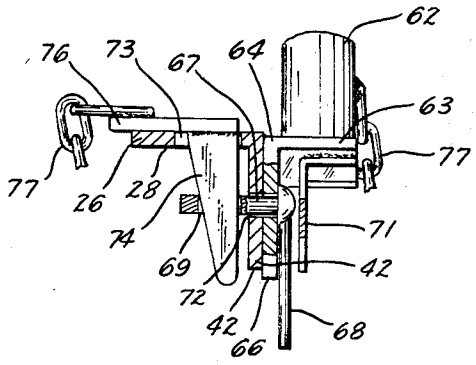


Fig. 11

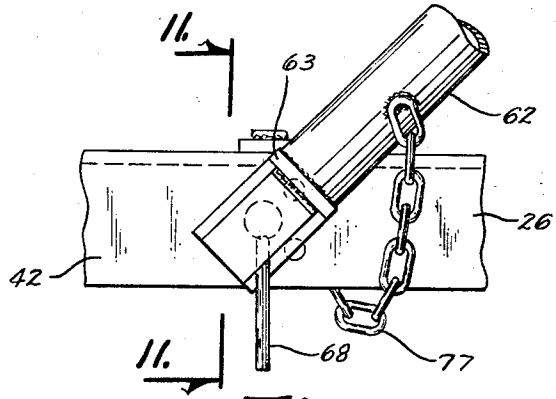


Fig. 10

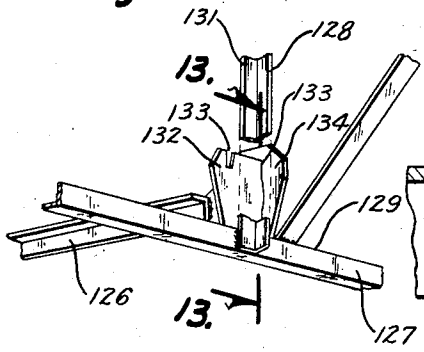


Fig. 12

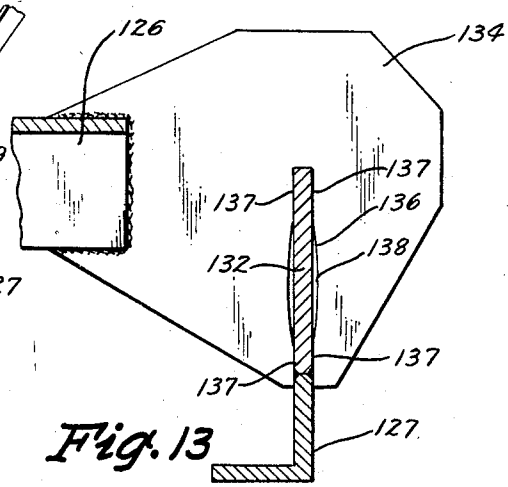


Fig. 13

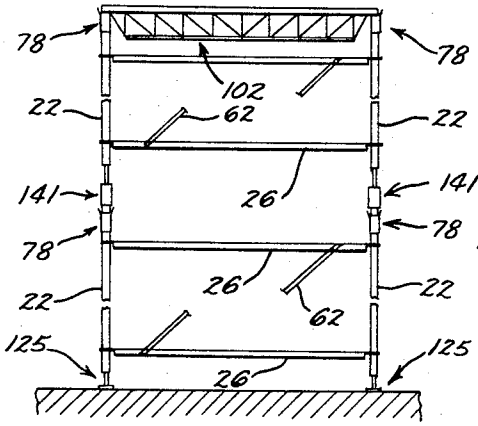


Fig. 14

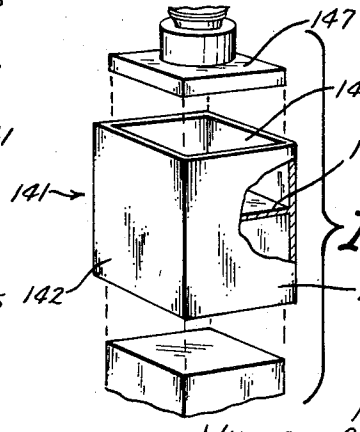


Fig. 15

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United States Patent Office

3,409,266

Patented Nov. 5, 1968

3,409,266

SHORING STRUCTURE FOR CONCRETE FORMS

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Filed Aug. 30, 1965, Ser. No. 483,587

7 Claims. (Cl. 249—18)

ABSTRACT OF THE DISCLOSURE

The shoring structure is for supporting metal forms in the construction of an elevated concrete floor or top wall and is of a knockdown construction capable of assembly on the job without the use of special tools. The structure comprises four shoring units or corner posts, connected together to form a rigid supporting frame structure. Each post has a flat top surface and slidably carries adjacent its upper end a vertically movable mounting unit for adjustable movement relative to the top surfaces of the posts. Extended between each pair of longitudinally spaced corner posts and releasably connected to a corresponding pair of mounting units is a truss assembly that has a flat top surface. Metal forms are extended between and releasably connected to the truss assemblies with flat top surfaces thereof in the plane of the top surfaces of the truss assemblies. When the mounting units are moved to first elevated positions, the top surfaces of the posts are in the plane of the top surfaces of the metal forms and truss assemblies so as to form therewith a continuous concrete supporting area. After the concrete has been poured and is in a slab form, the truss assemblies and forms are dropped, on movement of the mounting units to second lowered positions thereof, to positions wherein their top surfaces are below the slab which continues to be supported on the top surfaces of the corner posts. The metal forms are then removable from the truss assemblies which in turn are removable from the lowered mounting units to provide for a reuse of the metal forms and truss assemblies at another location.

This invention relates generally to a metal concrete form assembly and more particularly to a shoring structure for supporting metal forms in the construction of an elevated concrete floor or top wall.

An object of this invention is to provide an improved shoring structure for metal concrete forms.

Another object of this invention is to provide a shoring structure of a knockdown construction, capable of being quickly assembled on the job without the use of special tools.

Still another object of this invention is to provide a shoring structure for metal concrete forms wherein the forms are detachably carried on vertically adjustable supports that are movable to a first working or load supporting position and to a second rest or non-load supporting position wherein the forms may be removed from or connected to the adjustable supports.

A further object of this invention is to provide a shoring structure of a knockdown construction wherein the frame assembly has the parts thereof detachably connected together and releasably locked against separation

by positive acting latch units secured to the frame members.

A still further object of this invention is to provide a shoring structure that is readily connectable in series with like shoring structures to form a shoring assembly having a desired concrete supporting area.

A still further object of this invention is to provide a shoring structure of a knockdown construction that is inexpensive to manufacture, easy to set up into a rigid assembly, and formed of parts that can be handled by one man.

Further objects, features and advantages of this invention will become apparent from the following description when taken in connection with the accompanying drawing in which:

FIG. 1 is a perspective view of the shoring structure of this invention shown in assembly relation with metal concrete forms;

FIG. 2 is a plan view showing a plurality of the shoring structures of FIG. 1 connected together to form a continuous supporting area, with a part of the poured concrete being broken away for the purpose of clarity;

FIG. 3 is a sectional view taken along the line **3—3** in FIG. 2;

FIG. 4 is an enlarged sectional detail view taken along line **4—4** in FIG. 2;

FIG. 5 is an enlarged fragmentary perspective view of the upper portion of a corner post embodied in the shoring structure of this invention;

FIG. 6 is an enlarged sectional view taken along the line **6—6** in FIG. 5;

FIG. 7 is a view illustrated similarly to FIG. 3 but showing the parts thereof in changed positions;

FIG. 8 is an enlarged fragmentary perspective view of the lower portion of a corner post showing its adaptation for a series assembly of the shoring structuring of this invention;

FIG. 9 is an enlarged fragmentary perspective view of a corner post showing a latch unit which forms part of the shoring structure of this invention;

FIG. 10 is a fragmentary elevational view taken along the line **10—10** in FIG. 8;

FIG. 11 is a sectional view as seen on the line **11—11** in FIG. 10;

FIG. 12 is an enlarged detail perspective view of a brace assembly shown generally in FIG. 1, with parts broken away for clarity;

FIG. 13 is an enlarged sectional view taken along the line **13–13** in FIG. 12;

FIG. 14 is a diagrammatic showing of a pair of the shoring structures of this invention assembled in a vertically stacked or superposed relation;

FIG. 15 is an enlarged fragmentary perspective view of a coupler unit used to connect the vertically stacked shoring structures shown in FIG. 14;

FIG. 16 is a fragmentary side elevational view of the corner post portion shown in FIG. 5; and

FIG. 17 is a sectional view taken along the line **17–17** in FIG. 16.

With reference to FIG. 1 the shoring structure of this invention, indicated generally at **20**, is shown in assembly relation with concrete metal forms **21**. The shoring structure comprises a knockdown frame unit including four corner posts **22** releasably connected together by means

including upper and lower connecting frames **23** and **24**, respectively, of a like construction and releasably connected in like manner with the corner posts **22**. Only the lower frame **24**, therefore, will be described in detail with like parts being indicated by like numerals.

The lower frame **24** has pairs of oppositely arranged side members **26** and **27** with each pair being of a like construction. All of the side members **26** and **27** are illustrated as being formed of an angle iron material faced inwardly with the legs **28** and **29**, respectively, thereof (FIGS. 1 and 8) arranged horizontally and uppermost.

A leg **28** of a side member **26** (FIG. 8) is provided at each end thereof with a flat longitudinal extension **31**. Adjacent the free end of the extension **31** and projected downwardly therefrom is a tapered connecting pin **32**. A leg **29** of a side member **27** is provided at each of its ends with a flat extension **33** of a generally trapezoidal shape so that the terminal end portion of the extension **33** has a width greater than the width of the leg **29**. Oppositely arranged transversely of the terminal or free end portion of an extension **33** is a pair of downwardly projected connecting pins **34**.

The side members **26** and **27** are connected to the corner posts **22** through laterally extended peripheral upper flanges **36** mounted on and about a corner post **22**. As shown in FIG. 8 a corner post is of a tubular construction of a square shape in transverse section with a mounting flange **36** being of a corresponding square shape in plan view. A hole **37** is formed in each corner of a flange **36** with an intermediate hole **38** being additionally formed in the oppositely arranged flange side section **39**.

For the purpose of convenience the side members **26** will hereinafter be referred to as longitudinal frame members and the side members **27** as transverse frame members.

The longitudinal frame members **26** are extended between each pair of longitudinally spaced posts **22** with a tapered pin **32** at each end thereof inserted within a corresponding adjacent intermediate hole **38** (FIG. 8). In like manner the transverse frame members **27** are extended between and connected to transversely spaced pairs of posts **22** by insertion of a pair of the tapered pins **34** at the ends thereof within adjacent corresponding holes **37** of the flanges **36**.

The tapered pins **32** and **34** are locked against accidental removal from their associated flanges **36** by the provision of latching or locking units, indicated generally at **41**, adapted for coacting locking engagement with the mounting flanges **36**. A locking unit **41** is carried at each end of the vertical legs **42** and **43** of the side members **26** and **27**, respectively. Since each locking unit **41** is similar in construction and operation only one thereof will be described in detail with like numbers being used to indicate like parts.

As shown for the transverse member **27** in FIG. 9 the lock or latching unit **41** includes a U-shape bracket **44** faced downwardly and welded at one end to the outer surface of the vertical leg **43** adjacent to and below the extension **33**. Slidably mounted in the bracket **44** for movement in a direction longitudinally of the transverse member **27** is a bolt **46** of a rod construction having a laterally bent handle **48**. The bolt **46** is inclined in an upward and outward direction toward the extension **33** so that when it is in a fully projected position from the bracket **44** its free end **49** is adjacent to and spaced from the under side of the extension **33** a distance equal substantially to the thickness of the upper mounting flange **36**.

The bolt **46** is held in projected and retracted positions relative to the mounting bracket **44** by a keeper member **51** secured to and extended laterally from the bolt **46** in the same direction as the handle **48**. The keeper **51** is selectively engageable with the opposite sides of a stop member **52** projected laterally from a bottom plate **53** secured to the bracket **44**. As illustrated in FIG. 9 the

stop member **52** is formed by cutting out sections of the plate **53** to each side thereof.

In the connecting of a transverse member **27** with a flange **36** the bolt **46** is in its retracted position wherein the keeper member **51** is against the side **54** of the stop member **52**. After the tapered pins **34** have been inserted within their corresponding openings **37** the bolt **46** is rotated by manipulation of the handle **48** to move the keeper member **51** out of an engaging position with the stop member **52** to permit extension of the bolt **46** from the bracket **44**. On being extended the terminal end **49** of the bolt **46** is engageable with the under side of that section of the mounting flange **36** to which the extension **33** is connected. By virtue of the upward and outward inclination of the bolt **46** relative to the longitudinal axis of the transverse member **27** the bolt end **49** functions as a follower relative to the under side of the flange **36** whereby to positively pull the tapered pins **34** into fully inserted positions within their corresponding holes **37** along with clamping the extension **33** against the mounting flange **36**.

The bolt **46** is then again manipulated through the handle **48** to move the keeper member **51** into its engaged position with the stop member **52** as shown in FIG. 9. The inclination of the bolt **46** and the relative arrangement of the keeper member **51** and handle **48** with the stop **52** functions to maintain the bolt **46** in locked position. The transverse member **27** is thus positively and rigidly held in a connected position with the flange **36**.

It is to be noted that this rigidity is complemented by the flush bearing engagement of the under side of the extension **33** with the top side of the mounting flange **36**. It is to be understood also that the above operation and function of the locking unit **41**, as described in connection with FIG. 9, is identical for all of the frame members **26** and **27**.

Lower mounting flanges **56** (FIGS. 1 and 8) corresponding to the upper mounting flanges **36** are extended about and secured to the posts **22** at positions vertically spaced below a corresponding mounting flange **36**. Each lower flange **56** is of a square shape in plan view with a hole **57** in each of its corners.

A pair of horizontal diagonal brace members **58** are connected to diagonally opposite posts **22** at the lower flanges **56**. Each brace member **58** is of the same construction as a longitudinal frame member **26** except for being longer. An extension **59** at each end of a brace member **58** carries a downwardly projected tapered pin **61** for reception within adjacent corresponding corner holes **57**.

Vertically opposite ones of the frame members **26** and **27** are connected together by upright diagonal brace members **62** (FIG. 1). The brace members **62** are similar in construction and operation so only one thereof will be described in detail with like numbers being applied to like parts. An upright brace member **62** is of a pipe construction (FIGS. 10 and 11) having welded to each end thereof one leg **63** of an angle connector **64**, the other leg **66** of which is positionable in a side-by-side relation with the vertical legs **42** and **43** of the frame members **26** and **27**, respectively. A straight connecting pin **67** is rotatably supported in the connector leg **66** and extends laterally therefrom in the opposite direction from the connector leg **63**.

The pin **67** has a head portion to which is secured a radially extended handle **68**. The shank of the pin **67** is formed with an elongated opening **69** extended diametrically of the pin in the same direction as the handle **68**. It is seen, therefore, that the handle not only provides for manipulation of the pin **67**, but also functions as a counterweight to maintain the opening **69** in an upright position concurrently with acting as a visual indicator of such upright position. The pin **67** is maintained against removal from the connector leg **66** by a stop plate **71** secured as by welding to the connector leg **63** in a spaced parallel relation with the connector leg **66**.

In connecting an upright brace **62** to the longitudinal frame member **26** (FIGS. 10 and 11) the pin **67** is inserted through an opening **72** formed in the vertical leg **42** of the member **26** so that the pin opening **69** is located below its horizontal leg **28**. Formed in the horizontal leg **28**, directly above and in vertical alignment with the pin **69**, is a slot **73** for receiving a flat tapered wedge **74**. The wedge **74** is secured to a stop plate **76** which in turn is connected by a chain **77** to the brace member **62**. Insertion of the wedge **74** through the opening **69** and slot **73** is limited by the engagement of the stop plate **76** with the horizontal leg **28** of the longitudinal frame member **26**.

The frame unit thus far described is seen to be of a knockdown construction having all of its parts of a size and weight adapted for easy handling by one man. It will be further noted that no tools are required in the connecting together of the various frame members and that such members are relatively constructed and assembled to provide rigidity at all of the connecting areas or zones.

The forms **21** are supported on the corner posts **22** for adjustable up and down movement by the provision of means including pairs of identical mounting units **78** (FIGS. 1 and 5) secured to the upper ends of the posts.

A mounting unit **78** includes a tubular housing or sleeve **79** of a square shape in transverse section and of a size to be received in a telescoped relation about the upper end of a post **22** so as to constitute an upper extension for a post (FIG. 5). The upper end of the sleeve **79** is closed by a cover plate **80** and its lower portion is secured to a post **22** by welding or like means.

Slidably supported on a sleeve **79** is a pair of oppositely arranged upright slide members **81** (FIGS. 5 and 6) of a channel shape in transverse section. The slide members **81** face each other with their leg sections **82** in a straddling relation with the longitudinal sides of the sleeve, and with their base sections **83** in contact engagement with the transverse sides of the sleeve **79**. The upper portions of the leg sections **82** project upwardly from the upper edge **85** of the base section **83** to form ears **84** for carrying transversely aligned guide pins **86**. As best appears in FIG. 6 each pair of aligned pins **86** is received in corresponding upright elongated slots **87** formed in the longitudinal sides of a sleeve **79**. It is seen therefore that the pins are guidably retained in the slots to provide for an up and down slidable movement of the slide members **81** relative to the sleeve **79**.

Slidable movement of the slide members **81** to load and non-load supporting positions for the forms **21** is accomplished by means including a tubular upright guide member **88** (FIGS. 5 and 6) secured to a transverse side of a sleeve **79** adjacent the lower end thereof. Receivable in a guided relation within the guide member **87** is an upright guide bar **89** having its upper end **90** secured as by welding to the outside surface of the base section **83** of a slidable member **81** so that the unsecured portion of the guide bar **89** is movable within the guide member **88**. A non-load supporting position of the forms **21** is defined by the engagement of the lower edge **91** of a slide member **81** with the top edge of a corresponding guide member **88**.

Secured to one side of the guide member **88** and to its corresponding sleeve **79** so as to extend laterally from the guide member is a U-shaped bracket **92** the legs of which extend downwardly. The legs of the bracket and opposite sides of the guide member **88** are formed with transversely aligned openings **93** to slidably receive a bolt **94** of a rod construction having a laterally extended handle **96** at the end thereof remote from the guide member **88**. A keeper member **97** is secured to and laterally extended from the bolt **94** in the same direction as the handle **96** but at a position between the legs of the bracket **92**. Extended between and connected to the lower ends of the bracket legs is a plate member **98** formed with a stop member **99** having the opposite sides thereof selectively engageable with the keeper member **97**.

The upright guide bar **89** is provided adjacent its lower end with a hole **101** for receiving the bolt **94**, when the hole **101** is in axial alignment with the holes **93**. When the bolt **94** is in its position shown in FIG. 5 the guide bar **89** is freely movable within the guide member **88**. In other words the bolt **94** is out of the path of movement of the guide bar **89**. This retracted position of the bolt is maintained by engagement of the keeper member **97** with the stop member **98**, with the depending positions of the keeper member **97** and handle **96** providing for these members acting as counterweights to hold the bolt against rotation from its guide bar releasing position.

On upward movement of the slide member **81** and in turn of the guide bar **89** to a position providing for the axial alignment of the holes **93** and **101**, the bolt **94** is manipulated for insertion through the hole **101** whereby to hold the guide bar and in turn the slide member **81** in an elevated position and against downward movement. This elevated or load supporting position of the mounting unit **78** is maintained by engagement of the keeper member **97** with the stop **98** as shown in FIG. 6.

To carry the metal forms **21** in a supported position on the slide members **81** there is provided a pair of longitudinal truss assemblies **102** each of which is extended between and connected to a corresponding pair of longitudinally spaced mounting units **78**. The truss assemblies **102** are similar in construction, operation and in their assembly with the mounting units **78**.

A truss assembly **102** includes a body member constituting a metal form **103** of an inverted U-shape in transverse section and of a width substantially equal to the transverse dimension of a tubular sleeve **79**. The legs **104** (FIGS. 4 and 5) of the truss form **103** are each formed with a series of longitudinally spaced openings **106** for a purpose to appear later. Secured to and extended transversely of a truss form **103** are a series of upright plate members **107** having form receiving hooks **108** projected laterally from opposite sides of the truss form **103**.

As best appears in FIG. 4 each form receiving hook **108** has a flat base portion **109** which lies in a plane common to the plane of the lower ends of the truss form legs **104** and a side surface **111** inclined upwardly and outwardly from the base portion **109**. The plate members indicated as **107*a*** (FIGS. 1 and 5) are arranged at each end of a truss form **103**. The remaining plate members **107** are in pairs longitudinally of a truss form.

To connect a truss form **103** with a mounting unit **78** each slide member **81** has secured to the outer surface of its base section **83**, and at the upper end of the base section, a combination guide and connector plate **112**. Each plate (FIGS. 5 and 6) has a flat lower section **113** and an outwardly and upwardly inclined top section **114** having sides **116** which converge in an upward direction. Referring to FIG. 16 it is seen that the junction of the upper section **114** and lower section **113** is located above the upper edge **85** of the slide member base section **83**. A transversely extended groove or pocket **117** is thus formed by the upper edge **85**, the upper end of the lower flat section **116**, and adjacent portions of the ears **84** and sleeve member **79**. Also as shown in FIG. 17 the width of the flat section **113** is substantially equal to the transverse spacing between the legs **104** of a truss form **103**.

In the connecting of a truss assembly **102** with a mounting unit **78** a slide member **81** is in its lowered position as shown in FIG. 7 or for the right-hand slide member **81** in FIG. 5. A truss assembly **102** is then manually raised to a position extended between a pair of longitudinally spaced posts **22** with a plate member **107*a*** hung over the upper or inclined section **114** of a corresponding connector plate **112**. On lowering of the truss assembly **102** the inner surfaces of the legs **104** of a truss form **103** (FIG. 17) are guidably engaged by the tapered sides **116** of the inclined section **114** to guide the lower edge of a plate

member **107***a* into a pocket **117** with the outer surfaces of the legs in alignment with the longitudinal side surfaces of a sleeve **79**. A truss assembly **102** is thus supported directly on the upper edge **85** of a slide member **81** against transverse and longitudinal movements relative to the sleeve **79**.

As also clearly appears in FIG. 16 the end surface of a truss form **103** and side surface of a plate member **107***a* are in flush contact engagement with an adjacent transverse surface of the sleeve **79**. Thus on raising of a truss assembly **102** to a load supporting position, as shown in FIG. 3, the top surface of a truss form **103** is continuous with and in the plane of the cover plate **80** of a sleeve member **79**.

With the truss assemblies **102** thus supported between longitudinally spaced posts **22** and, while in their lower or non-load supporting positions, the forms **21** are assembled therewith. Each form **21** (FIGS. 1 and 2) includes a base or plate member **118** of a rectangular shape having side and end flanges **119** and **121**, respectively, extended laterally from one side. The flanges **119** and **121** are formed with openings **122** in a spaced arrangement corresponding to the holes **106** in the truss form **103** so that when the holes **106** in the truss form **103** are in axial alignment with the openings **122** the forms **21** and **103** are connectable with their upper or supporting surfaces in a common plane. Connection is made by the use of form clamps **123** extendible through aligned holes in adjacent forms and adapted to be clamped thereto. For a more detailed description of the forms **21** and clamps **123** reference is made to Patent No. 2,870,516.

In the assembly of a form **21** with a truss form **103**, the ends of a form **21** are positioned over the hooks **108** of corresponding pairs of plate members indicated as **107***b* in FIG. 3. In other words the plate members **107***b* are located adjacent opposite transverse corners of a form **21**, so that all four corners of a form **21** have associated hooks **108**. As shown in FIG. 4 a form **21** is guided by a hook side portion **111** into a supported position on a base portion **109** wherein the holes **106** of the truss form **103** and the holes **122** in a form **21** are at the same vertical height. A form **21** then need only be transversely adjusted to axially align the holes **106** and **122** for connecting the forms by means of the clamps **123**.

The transverse and longitudinal dimensions of a form **21** correspond to the transverse and longitudinal spacing between the posts **22**. In other words the transverse dimension of a form **21** is an equal multiple of the longitudinal distance between the longitudinal center lines A of the posts **22** (FIG. 2) and the longitudinal dimension of a form **21** is of a length equal to the transverse spacing between the truss forms **103**. The forms **21** are thus connectable directly to a truss form **103** and to each other by the clamps **123** so as to form a continuous concrete supporting surface area comprised of the upper surfaces of the forms **21**, truss forms **103** and cover plate **80** for the sleve member **79**. Also by the interconnecting of the forms **21** and truss forms **103** it is apparent that such surface area is movable as a unit between load and non-loading supporting positions, shown in FIG. 3 and 7, respectively, in response to the vertical adjustment of the slide members **81**.

On assembly of the forms **21** with the truss assemblies **102** this composite assembly is moved to the load supporting position of FIG. 3 which is determined by the insertion of the bolts **94** through the guide bars **89** on the slide members **81**. The height of the load supporting position may be varied by manipulation of jacks or lifting units **125** operatively associated with the lower ends of the corner posts **22**. Concrete, indicated at **131** (FIGS. 2 and 3), is then poured over the forms **21** and **103** and permitted to set.

The truss assemblies **102** are then lowered to their positions shown in FIG. 7 providing for the removal of the forms **21** for use at another location with another shoring structure **20** of this invention. With the forms **21** removed the shoring structure **20** may be dismantled, reused at another location or continued in situs with the truss assemblies **102** alone moved to load supporting positions to support the newly set concrete floor while it serves as a base for the forming of another concrete floor thereabove.

To prevent any accidental lateral tilting movement of the truss assemblies **103**, transverse brace members **126** (FIG. 1) are connected between lower longitudinal truss members **127** which form part of a truss assembly **102**. A truss member **127** is connected to a corresponding truss form **103** by means including upright brace members **128**.

As best appears in FIG. 12 the truss member **127** and upright brace members **128** are of an angle iron construction having leg sections **129** and **131**, respectively, welded together in a side-by-side relation. A flat upright longitudinally extended connector plate **132** is attached as by welding to the legs **129** and **131** so as to lie within the plane of the leg **129** with opposite side portions extended outwardly from opposite sides of the leg **131**. The upper end of the connector plate **132** is formed with a pair of spaced guide notches **133** located at opposite sides of the upright brace member **128**. It is to be understood that the connector plates **132** on the truss members **127** are arranged opposite each other with the notches **133** therein in alignment transversely of the shoring structure **20**.

A transverse brace member **127** is provided at each of its ends with a flat upright connecting member **134** (FIG. 13) arranged in a plane normal to the plane of the connector plate **132**. In this respect it is to be understood that the connecting members **134** on the brace member **127** are in a common plane. An upright slot **136** open to the lower end of the connecting member **134** has side wall portions **137** at the opposite ends thereof spaced a distance apart equal substantially to the thickness of the connector plate **132**. The intermediate portion of the slot **136**, as indicated at **138**, is of a width greater than the thickness of the connector plate **132**.

In use a transverse member **126** is extended between the longitudinal trust members **127** with the slots **136** open to corresponding transversely opposite notches **133** in the connector plate **132**. On downward movement of a connecting member **134** relative to a connector plate **132** such parts are interlocked in a rigid right angle relation with the connecting member **134** extended downwardly so as to receive a portion of the leg **129** within the slot **136**. It is to be noted that the slot sidewall portions **137** constitute spaced bearing surfaces engageable with the connector plate **132** to prevent rocking movement of the transverse member **126** relative to the connector plate **132**.

For additional rigidity between the truss assemblies **102** transverse brace members **126** can be assembled in pairs by merely utilizing the second set of transversely aligned notches **133** in the connector plates **132**.

In some construction work it may be necessary to lay a floor or ceiling at a height greater than can be accommodated by the use of a single shoring structure **20** of this invention. Where this occurs a pair of the structures **20** may be used in a vertically stacked relation as illustrated diagrammatically in FIG. 14.

For this purpose there is provided a post coupling means **141** (FIG. 15) comprising a tubular housing **142** having a transverse base plate **143** secured within and intermediate the ends thereof. The base plate **143** and housing **142** thus form upper and lower square shape cup units **144** and **146**, respectively, open to opposite ends of the housing **142**. The upper end of a sleeve **79** on the lower shoring structure **20** is received within the lower cup unit **146** to a position defined by the support of the base plate **143** on the sleeve. A ground plate **147** of a lifting unit **125** is then positioned within the upper cup unit **144**, it being noted that the plate **147** is of a square shape so as to fit in a nested relation within the confines of the housing **142**.

A shoring structure **20** is readily adapted to provide a variable load supporting surface by assembly with one or more like shoring structures **20**. Thus as shown in FIG. 2, a shoring structure is illustrated as being extended in directions transversely and longitudinally thereof. Referring to FIG. 3 it is seen that longitudinal extension is accomplished simply by connecting additional transverse members **26** at one of their ends to the mounting flanges **36**, it being understood that the opposite ends thereof would be similarly connected to additional posts **22**. In like manner, a shoring structure **20** is transversely extended by the use of additional transverse members **27** connected to and extended between the flanges **36** on a post **22** and on a corresponding additionally provided transversely spaced post **22**.

Although the invention has been described with respect to a preferred embodiment thereof it is to be understood that it is not to be so limited since changes can be made therein within the scope of this invention as defined by the appended claims.

I claim:

1. A shoring structure for metal concrete forms, comprising:

(a) A frame means including four upright corner posts, each of which has a flat top surface,

(b) truss assembly mounting units corresponding to said corner posts,

(c) means adjustably supporting each mounting unit adjacent the upper end of a post for vertical movement thereon relative to the top surfaces of the post,

(d) a longitudinally extended truss assembly including a truss form releasably connected to and extended between each pair of longitudinally spaced mounting units for vertical movement therewith,

(e) said truss forms having flat top surfaces in a common horizontal plane.

(f) a plurality of form members extended between and releasably connected to said truss forms for vertical movement therewith, said form members having flat top surfaces lying in said common plane, and

(g) said mounting units being vertically movable to a first adjusted position wherein said common plane is in the plane of the top surfaces of said posts, and to a second adjusted position wherein said common plane is lower than the plane of the top surfaces of said posts.

2. A shoring structure for concrete forms comprising:

(a) a frame means including a plurality of corner posts having flat upper end surfaces,

(b) mounting units corresponding to said corner posts,

(c) means reciprocally supporting each mounting unit on a corresponding corner post for selective vertical movement to raised and lowered positions thereon relative to said flat upper end surfaces,

(d) a plurality of releasably interconnected forms having flat top surfaces in a common horizontal plane.

(e) means for supporting said interconnected forms on said mounting units for vertical movement therewith,

(f) said upper end surfaces of the corner posts being in said common plane when the mounting units are in said raised positions therefor, and

(g) said common plane being lower than the upper end surfaces of said posts when the mounting units are in said lowered positions therefor.

3. A shoring structure for metal concrete forms comprising:

(a) a frame means including a plurality of corner posts having horizontal top surfaces,

(b) truss assembly mounting units corresponding to said corner posts,

(c) means adjustably supporting each mounting unit on a corresponding post for vertical movement thereon to raised and lowered positions relative to said horizontal top surfaces,

(d) a pair of truss assemblies having horizontal top surfaces,

(e) means releasably connecting each truss assembly to and extended between a pair of oppositely arranged mounting units so that the pair of truss assemblies are in a parallel relation,

(f) a plurality of form members having horizontal top surfaces extended between said truss assemblies,

(g) means releasably connecting said form members to said truss assemblies with the top surfaces thereof in a plane common to the top surfaces of said truss assemblies,

(h) said top surfaces of the corner posts being in said common plane when the mounting units are in said raised positions therefor, and

(i) said common plane being lower than the top surfaces of the corner posts when the mounting units are in said lowered position therefor.

4. A shoring structure for metal concrete forms including:

(a) frame means having four corner posts with horizontal top surfaces,

(b) truss assembly mounting units corresponding to said corner posts,

(c) means adjustably supporting each mounting unit on a corresponding post for vertical movement thereon to adjusted positions relative to said top surfaces,

(d) a pair of oppositely arranged parallel truss assemblies, each truss assembly extended between and connected to a pair of mounting units, each truss assembly including a horizontal top surface,

(e) metal forms extended between and releasably connected to said truss assemblies, each of said forms having a top horizontal surface in the plane of the top surfaces of said truss assemblies, and

(f) said metal forms, truss assemblies and mounting units being movable as a single unit to a first adjusted position of said mounting units wherein the top surfaces of said metal forms and truss assemblies form a continuous horizontal surface with the top surfaces of said corner posts, and to a second adjusted position of said mounting units wherein the top surfaces of said metal forms and truss assemblies are below the top surfaces of said corner posts.

5. A shoring structure according to claim **4** including:

(a) coacting means on said posts and mounting units for releasably locking said mounting units in said first adjusted position.

6. A shoring structure according to claim **4** including:

(a) coacting means on said truss assemblies and metal forms for holding said truss assemblies and metal forms against relative downward movement when the top surfaces of the metal forms are in the plane of the top surfaces of said truss assemblies.

7. A shoring structure for metal concrete forms, comprising:

(a) frame means including four upright corner posts having horizontal top surfaces,

(b) truss assembly mounting units corresponding to said corner posts,

(c) means adjustably supporting each mounting unit on a corresponding post for selective vertical movement thereon to raised and lowered positions relative to said top surfaces,

(d) a pair of oppositely arranged parallel truss assemblies, having horizontal top surfaces, each truss assembly extended between and releasably connected to a pair of mounting units,

(e) a plurality of contiguous metal forms extended between and releasably connected to said truss assemblies, each of said forms having a horizontal upper surface in a plane common to the top surfaces of said truss assemblies,

(f) said metal forms and truss assemblies on movement of the mounting units to raised positions therefor being movable as a single unit relative to the corner posts to provide for the top surfaces of said corner posts being coextensive with said common plane, and

(g) said metal forms, and truss assemblies on movement of the mounting units to lowered positions therefor, having said common plane below the top surfaces of said corner posts to provide for the removal of said metal forms from said truss assemblies and the removal of said truss assemblies from said mounting units.

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