

April 9, 1963

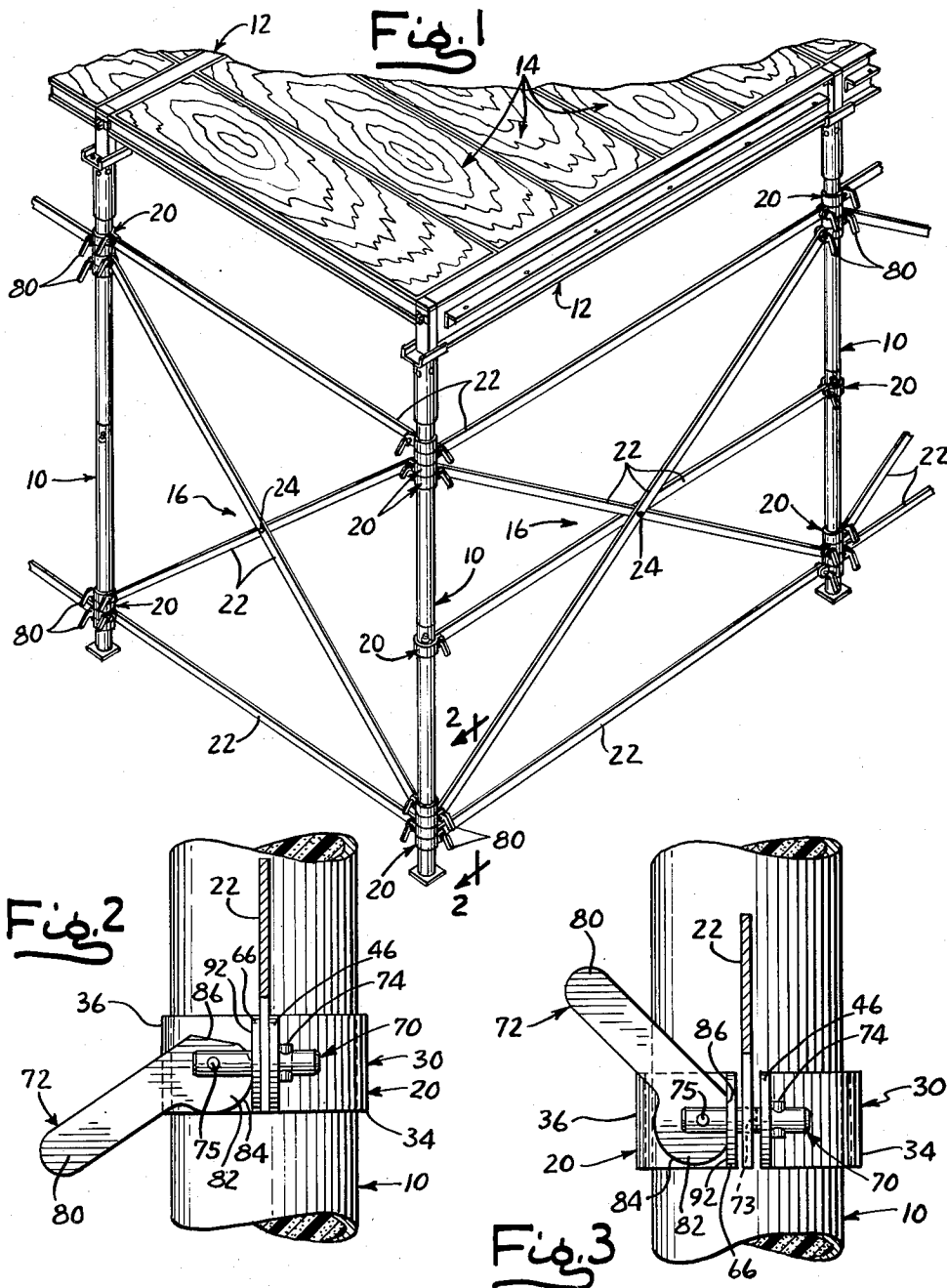
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3,084,964

COLUMN BRACE AND CLAMP ASSEMBLY

Filed Jan. 24, 1961

2 Sheets-Sheet 1



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Fig. 4

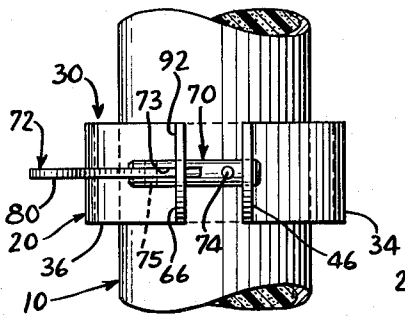


Fig. 5

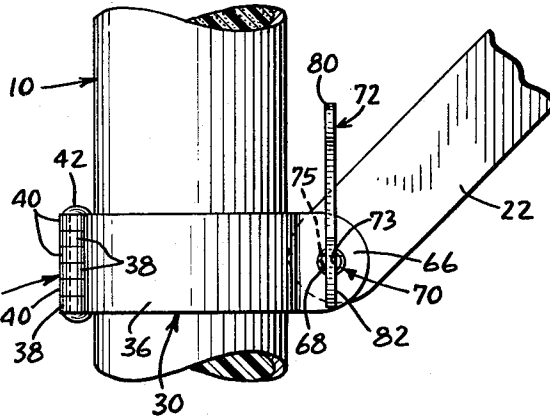


Fig. 6

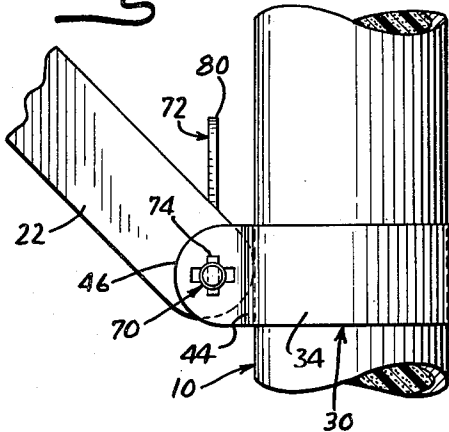


Fig. 7

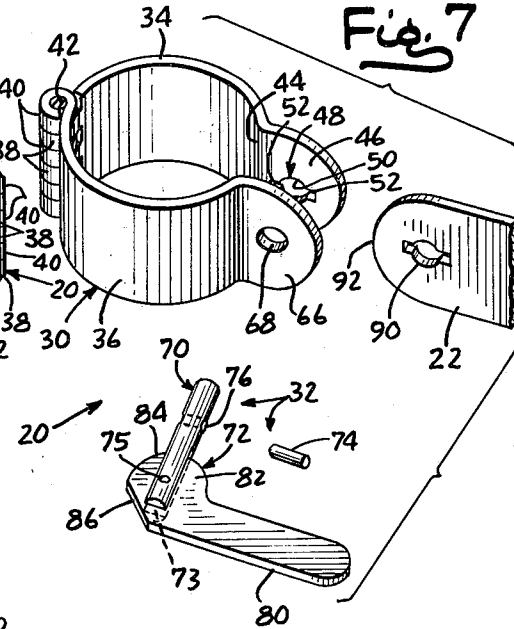
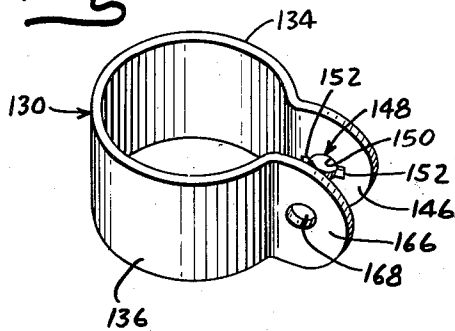


Fig. 8



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3,084,964

COLUMN BRACE AND CLAMP ASSEMBLY

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1 Claim. (Cl. 287—53.5)

The improved brace and clamp assembly comprising the present invention is designed for use primarily in connection with the reinforcement of the shoring which is employed for supporting concrete slabs, as for example, the floor and ceiling slabs that are associated with the concrete form installation of a building construction. The invention, however, is capable of other uses and brace and clamp assemblies constructed in accordance with the principles of the present invention may, if desired and with or without modification, be employed in connection with the reinforcing of scaffolding of the type which is used in connection with large scale painting operations, sand blasting of buildings, or building maintenance and repair. In short, the present invention will be found useful in many situations where an effective and easily applied column clamp and brace assembly is required. Irrespective, however, of the particular use to which the present invention may be applied, the essential features thereof are at all times preserved.

In the erection of buildings involving relatively massive and expansive concrete floor and ceiling slabs, the form panels over which the wet concrete is poured and which serve temporarily to support the hardened concrete slabs, are supported at their ends upon longitudinally extending stringers, and these, in turn, are supported upon suitable shoring. In many instances, the shoring which is employed is in the form of a plurality of vertical steel columns or shores which, during their initial installation at least, must be maintained in reasonably accurate vertical position to facilitate application thereto of the stringers and panels. The present invention contemplates the provision of a novel brace and clamp assembly in the form of a column clamp which may be quickly and easily applied to a pre-positioned vertical column or shore at any desired elevation therealong, together with a cooperating brace bar one end of which is designed for cooperation with the clamp in such a manner that, when the parts are assembled upon each other and upon the column and then are locked in their respective operative positions, there is little likelihood of the parts becoming loosened or separated or of slippage of the clamp upon the column.

The provision of a column brace and clamp assembly of the character briefly outlined above being among the principal objects of the invention, it is a further object to provide such a brace and clamp assembly which is applicable to the associated shore or other column in such a manner that after the clamp of the assembly has been applied to the column and the adjacent end of the brace bar has been applied to the clamp, the two parts (clamp and brace bar) may be preliminarily locked together against separation with the clamp being loosely slidable vertically upon the column so that it may be slid to the desired elevational position on the column, after which pressure may be applied to the clamp by the simple expedient of manipulating an associated clamping lever to draw the clamp fast around the column and, at the same time, bind the brace bar in a fixed position with respect to the clamp so that such powerful frictional forces will be exerted upon the column as to prevent further sliding movement of the clamp on the column.

Briefly, in carrying out the abovementioned objects, the invention contemplates the provision of a strap-type C-clamp assembly having cooperating jaws adapted to straddle the column upon which the clamp is to be mounted, together with radially disposed ears which are

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at the distal or free ends of the jaws and which, when drawn together, serve to constrict the clamp about the cylindrical column. Novel means are provided for drawing the radially disposed ears together to constrict the clamp about the column and this means is devoid of threaded parts which frequently are employed for this purpose in connection with conventional C-clamps so that the inconvenience offered by the necessity of nut and bolt orientation, and the difficulty of finding initial threaded engagement between the parts, is completely avoided. Accordingly, it is a further and specific object of the invention to provide a brace and clamp assembly which utilizes a through-pin which passes completely through both of the radially disposed ears, as well as through the adjacent end of the brace bar to retain the parts in their assembled relationship, and in which the pin and one of the ears are provided with a particular connection for retaining the pin in its operative position during application of the constricting means, the connection being releasable when it is desired to relieve the constricting pressure by the simple expedient of moving the connection to its inoperative position, whereupon the inherent resiliency of the jaws will cause the ears to move apart.

Another object of the invention is to provide a brace and clamp assembly which is applicable to and removable from the shore or other column to which it is to be applied without the use of a wrench or other tool.

The provision of a brace and clamp assembly which is extremely simple in its construction; one which consists of a minimum number of parts and, therefore, is unlikely to get out of order; one which is rugged and durable and, therefore, will withstand rough usage; one in which the principal parts thereof are in the form of metal stampings and, therefore, may be manufactured at a low cost; one which requires no special machining operations in the manufacture thereof, thereby further contributing toward economy of manufacture; one which is compact and consumes but little space on the shore or other column with which it is associated; and one which otherwise is well adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

With these and other objects in view the invention consists in the novel construction, combination, and arrangement of parts shown in the accompanying two sheets of drawings forming a part of this specification.

In these drawings:

FIG. 1 is a fragmentary perspective view of a concrete form installation for a building slab, such view showing a series of shores to which brace and clamp assemblies embodying the present invention have been operatively applied;

FIG. 2 is an enlarged section view taken substantially along the line 2—2 of FIG. 1 and illustrating one of the improved brace and clamp assemblies;

FIG. 3 is a view similar to FIG. 2 but showing the clamping pressure on the clamp portion of the assembly relieved or released;

FIG. 4 is a view similar to FIG. 3 but showing the clamp portion of the assembly completely released;

FIG. 5 is a side elevational view of the assembly shown in FIG. 3;

FIG. 6 is an opposite side elevational view of the assembly shown in FIG. 5;

FIG. 7 is an exploded perspective view of the brace and clamp assembly of FIGS. 2 to 6, inclusive; and

FIG. 8 is a perspective view of a modified form of clamp capable of being employed in connection with the present invention.

Referring now to the drawings in detail and in par-

ticular to FIG. 1, there has been disclosed in this view a typical concrete form installation for supporting one of the horizontal concrete floor or ceiling slabs (not shown) for a building to be erected. The installation includes a plurality of spaced apart vertically disposed shores or columns 10, the upper ends of which serve to support thereon a series of elongated stringers 12 which in turn serve to support the opposite ends of a plurality of form panel units 14, the latter being arranged in contiguity so that the upper panel facings thereof define a substantially continuous unbroken slab-supporting surface upon which the wet concrete for the slab is adapted to be poured. The details of the shores 10, the stringers 12, the panel units 14 have not been disclosed herein since they form no part of the present invention and the disclosure of FIG. 1 is somewhat schematic in its representation. The present invention is concerned primarily with the cross-bracing of the form installation and this has been designated in its entirety by the reference numeral 16, and will now be more fully described in detail and subsequently claimed.

The cross-bracing 16 involves in its general organization a series of clamp assemblies 20 and a series of co-operating brace bars 22. Each clamp assembly 20 constitutes an operative connection whereby the adjacent end of the associated brace bar 22 may be attached to one of the shores 10 at any selected elevation therealong. The disposition of the cross-bracing 16 with respect to the shores 10 may vary widely but, in the particular environment selected herein for illustrative purposes, certain of the brace bars 22 extend horizontally between adjacent shores 10, while other brace bars are inclined. In one instance, two of the inclined brace bars cross each other medially of their ends while a third horizontally disposed brace bar passes through the point of intersection of the inclined bars and the three brace bars are secured together by a nut and bolt assembly 24. Irrespective, however, of the specific arrangement of the cross-bracings 16, the essential features of the present invention are at all times preserved.

Referring now to FIGS. 2 to 7 inclusive, and in particular to FIG. 7, the clamp assembly 20 consists of two principal parts, namely, a two part sectional C-clamp proper 30 and a clamp-constricting pin assembly 32. The C-clamp proper is comprised of two sections 34 and 36, respectively, having interlocking, integrally formed, staggered pintle-confining tubular fingers 38 and 40. The latter are maintained in their aligned and staggered relationship by means of a pintle pin 42. The two sections 34 and 36 are thus capable of relative swinging movement toward and away from each other about the longitudinal axis of the pintle pin. The clamp section 34 is, in the main, semi-cylindrical in horizontal cross section and the distal end region thereof is turned radially outwardly as at 44 to provide a clamping ear 46. The clamping ear 46 has formed centrally therein an elongated slot 48 in the form of a small hole 50 from which there extends laterally a pair of side notches 52. The other section 36 of the C-clamp proper 30 is similar in configuration to the section 34 and the radially disposed ear 66 thereof is provided with a central hole 68 therethrough in substantial axial alignment with the central enlargement or hole 50 of the slot 48.

The clamping pin assembly 32 is comprised of three parts, namely, a clamping pin 70, a cam lever 72 and a cross pin 74. The pin 70 is in the form of a length of rod stock and is slotted as at 73 at one end thereof to receive therebetween the operating cam portion of the cam lever 72, a pivot pin 75 being provided for maintaining the cam lever in the slot and also in pivotally connected relation with the pin 70. A transverse bore 76 extends through the pin 70 adjacent to the other end thereof and is adapted to receive therein the cross pin 74. The cam lever 72 is in the form of a flat metal stamping of heavy gauge stock and has an elongated handle portion 80 and

an enlarged cam body portion 82. The latter presents a curved cam edge 84 and a straight relief edge 86.

The brace bar 22 which is associated with the clamp assembly 20 of FIGS. 2 to 7, inclusive, is in the form of an elongated strip of flat metal stock, the opposite end regions of which are provided with elongated slots 90 which are substantially identical in size and shape to the slot 48 in the ear 46 and, therefore, require no further description. The ends of the brace bar are rounded as at 92 for clearance purposes as will be described presently.

In order to apply the brace and clamp assembly of the present invention to a shore or column 10, such as has been illustrated in FIG. 1, the two sections 34 and 36 of the C-clamp proper 30 are swung about the axis of the pintle pin 42 until the jaws defined thereby are open to a sufficient extent that the clamp proper may be caused to straddle the particular shore or other column 10 to which the assembly is to be applied. The jaws are then closed upon the column until the column is engaged thereby and the ears 46 and 66 extend in substantial parallelism. Thereafter the clamping pin 70 is passed endwise through the hole 68 in the ear 66 to such an extent that its extreme end projects into the space existing between the two ears 46 and 66, but not to such an extent that the clamping pin enters the central hole 50 of the elongated slot 48. One end of the brace bar 22 is then brought into position so that its slot 90 is aligned with the end of the clamping pin 70, after which the clamping pin is moved further in an axial direction so that it passes through the slot 90 and through the hole 50. It should be stated here that the cross pin 74 and the cam lever 72 are previously assembled upon the pin 70 so that it is necessary to orient the brace bar 22, the clamping pin 70 and the clamp assembly 30 so that the cross pin 74 and the two slots 48 and 90 are in axial alignment and register, while preserving the same directional relationships portrayed in FIG. 7 to the end the clamping pin may ultimately be pushed through the enlarged central portions of the slots 90 and 48 until the cross pin 74 lies outside of the two ears 46 and 66.

With the parts in the position just described, the handle portion 80 of the cam lever 72 may be swung in either direction to a vertical position about the axis of the clamping pin 70. Preferably it is swung upwardly to the position shown in FIG. 3, thus rotating the clamping pin 70 through an angle of 90° to move the cross pin 74 out of register with the ends or radial notches 52 of the elongated slot 48. The parts are then locked against separation.

In order to close the two ears 46 and 66 upon the intervening end of the brace bar 22, it is merely necessary to swing the handle portion 80 of the cam lever 72 downwardly, whereupon the cam edge 84 will frictionally engage the outside face (FIGS. 2 and 3) of the ear 66 and force the same toward the ear 46 until such time as the brace bar 22 is engaged by both ears and is firmly clamped thereby as shown in FIG. 2. Such movement of the ear 66 toward the ear 46 will cause the curved clamping jaws afforded by the sections 34 and 36 firmly to grip the shore or column 10 therebetween.

Release of the assembly 20 is effected by substantial reversal of the steps described above and, therefore, a detailed description of this operation is believed to be unnecessary. It is to be pointed out, however, that when the two ears 46 and 66 are in their clamping engagement with the brace bar 22, they are under an appreciable degree of stress so that, during the releasing operations, as soon as the pressure of the cam edge 84 is released, the ear 46 will move away from the ear 66 and engage the cross pin 74 as shown in FIG. 3. The misalignment of the cross pin 74 at this time with the ends or side notches 52 of the elongated slot 48 will prevent detachment of the parts.

This loose position of the parts just described also represents an initial position incident to installation of the assembly upon the shore or column so that prior to effecting the final clamping operation, the clamp assembly 20

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may be slid either upwardly or downwardly along the shore or column to any desired elevation before effecting tightening of the clamping means. Thus, an improperly installed clamp assembly, or one which requires revision as to its initial setting for any reason whatsoever, may be relocated by the simple expedient of moving the lever handle 80 to the elevated position shown in FIG. 3 to loosen the parts, after which the adjustment may be made and the lever again restored to the position shown in FIG. 2 to effect tightening of the parts in the manner previously described.

To effect final release of the adjacent end of the brace bar 22, the handle portion 80 of the cam lever 72 is swung outwardly away from the shore 10 to the horizontal position shown in FIG. 4 to align the cross pin 74 with the notches 52 of the elongated slot 48. At this time the ear 46 will be released so that it may "snap" to its fully released position, so to speak, after which the clamp sections 34 and 36 may be opened wide and withdrawn from the shore or column 10.

In FIG. 8 there has been disclosed a slightly modified form of clamp 130, which may be employed in association with the clamping pin assembly 32 and the brace bar 22, instead of the previously described clamp proper 30. In this form of the invention, the clamp proper 130 remains substantially the same as the clamp proper 30 with the single exception that the hinge connection 38, 42 and the two sides of the unit 134 and 136, respectively, are formed as an integral resilient bond. Otherwise the clamp proper 130 remains substantially identical with the clamp proper 30 so needless repetition of description may be avoided by the application of similar reference characters, but of a higher order, to the corresponding parts as between FIGS. 7 and 8.

The application of the clamp proper 130 to and its removal from the column 10, involves the same procedural operations as those previously described in connection with the clamp proper 30, it being understood, of course, that the resilient and yielding nature of the clamp proper 130 is such that the latter may be opened up to the degree necessary to permit its initial installation around the column 10.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the

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details of construction may be resorted to without departing from the spirit of the invention. Therefore, only insofar as the invention has been pointed out particularly in the accompanying claim is the same to be limited.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

In a column brace and clamp assembly, in combination, a split, generally cylindrical, collar-like band adapted to be constricted and compressed around a column, said band having free end regions which are turned radially outwardly to provide first and second substantially parallel spaced ears adapted when drawn toward each other to compress the band about the column, said first ear being formed with a hole therein, said second ear having formed therein an elongated slot with an enlarged central portion in substantial alignment with said hole, an elongated clamping pin projecting through said hole and the enlarged central portion of the aforesaid slot and bridging the distance between said ears, a cross pin carried by the clamping pin exteriorly of the two ears and adjacent to the second ear, an elongated brace bar having one end thereof interposed between said ears and provided with an elongated slot which is substantially the same in shape and size as the slot in the second ear and embodies an elongated central portion through which the clamping pin extends, a cam lever pivoted to said clamping pin exteriorly of the two ears and adjacent to said first ear, said lever having a cam surface operable upon swinging movement of the lever in one direction, when said cross pin is out of register with the ends of the slot in said second ear, to engage the outside face of the first ear and, in combination with said cross pin, draw said ears together first to compress the band about the column and thereafter to clamp said ears hard against the opposite sides of the interposed end of the brace bar.

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