Aug. 6, 1940. W. D. SCHENK 2,210,264

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Filed May 31, 1938 2 Sheets-Sheet 1

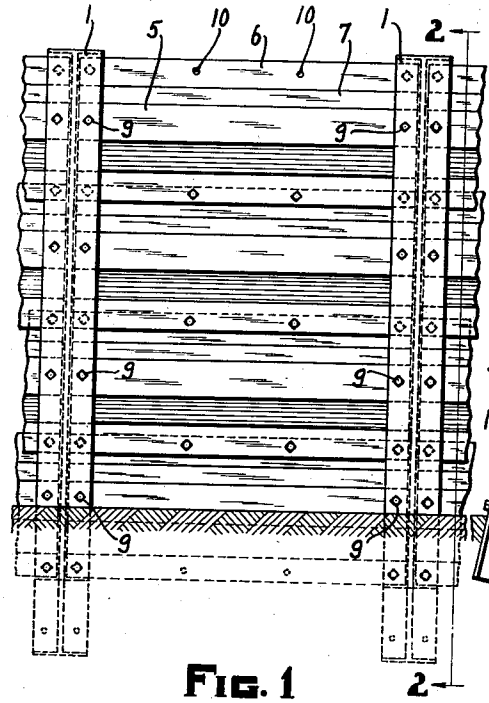


FIG. 1

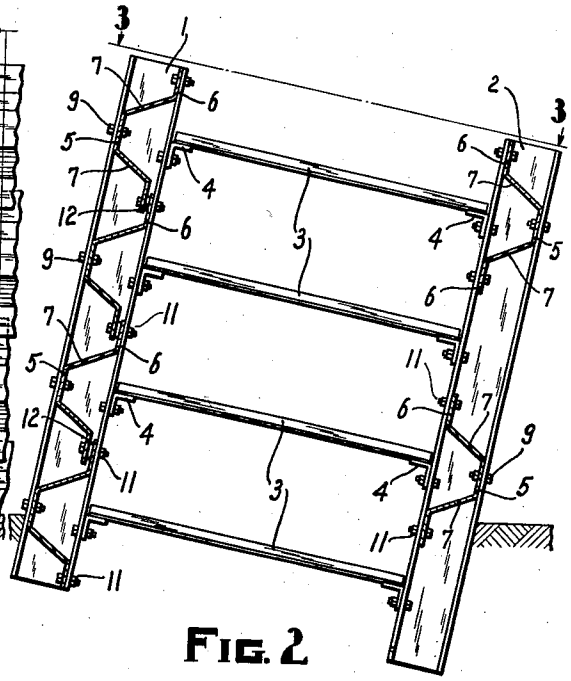


FIG. 2

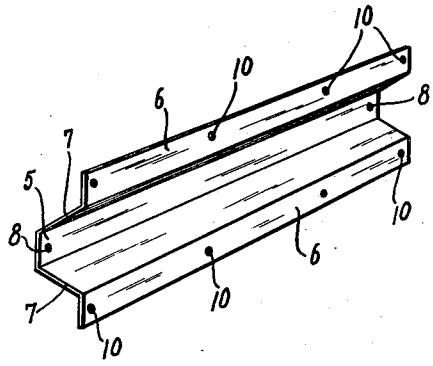


FIG. 4

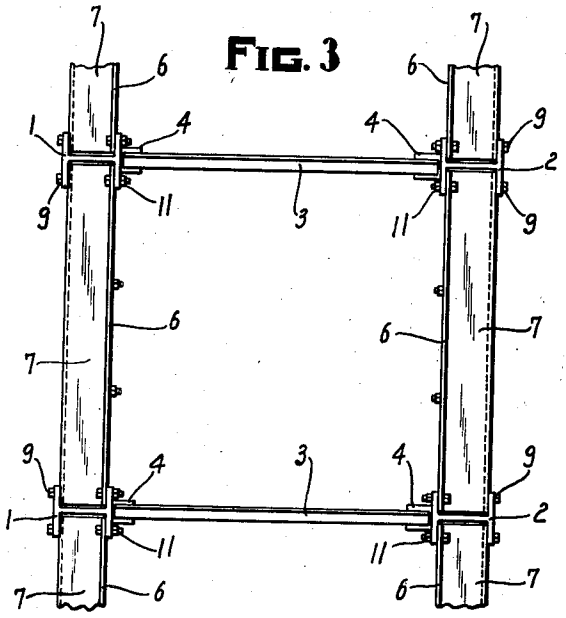


FIG. 3

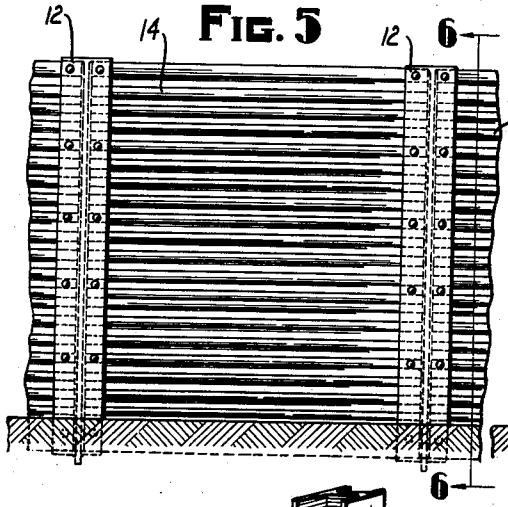
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FIG. 5



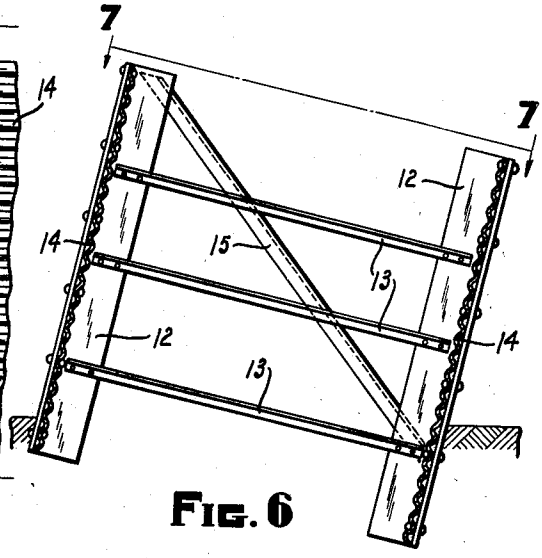
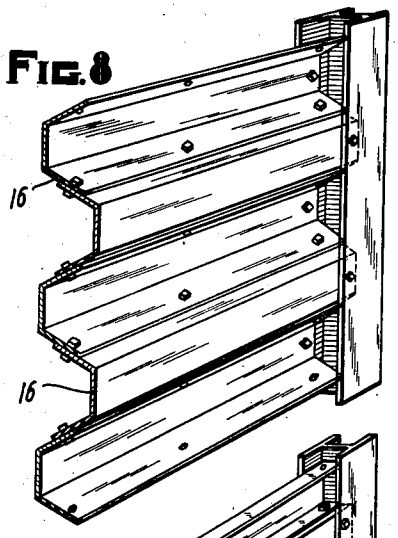


FIG. 6

FIG. 8



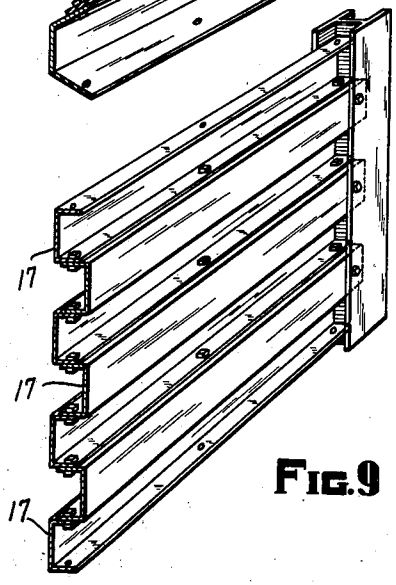


FIG. 9

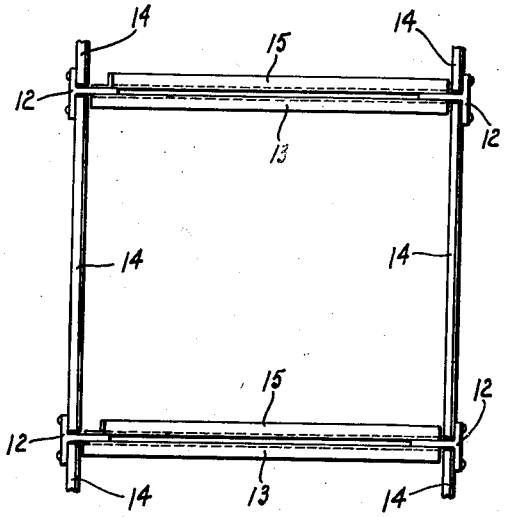


FIG. 7

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UNITED STATES PATENT OFFICE

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Walter D. Schenk, Cleveland, Ohio

Application May 31, 1938, Serial No. 210,933

6 Claims. (Cl. 61—47)

This invention relates to the art of cribbing structures and is related to the subject matter of my co-pending application Serial No. 90,287, filed July 13, 1936, now Patent No. 2,152,926, granted April 4, 1939.

As in my companion application supra, so here also the invention relates to metal cribbing and in both cases the structure is to be recognized as embodying columns at the junction between the stretcher and header members. Whereas in the companion application, supra, there is disclosed a form of column which might be regarded as being fabricated during and as a result of the actual construction of the cribbing, the present construction involves columns which are pre-formed, as will appear from the following.

Thus, in the present case, I have devised an improved column type of cribbing structure in which there are disclosed various forms of elements; and all of the several embodiments herein are embraced within and constitute the object of my present invention.

One particular feature of my present invention consists in the provision of a pre-formed bent or frame which may be fabricated at the shop or at the site of the installation and then raised as a unit to upright position, the stretcher or panel members being then applied to the front and rear of the series of bents or frames; and this is one of the objects of my present invention.

A further object is to devise such a cribbing structure with improved drainage means.

Other objects will appear from the following description and claims when considered together with the accompanying drawings.

Fig. 1 is a partial front elevation of a cribbing structure embodying one form of combination of elements that may be employed therein;

Fig. 2 is a view taken on line 2—2 of Fig. 1;

Fig. 3 is a view taken on line 3—3 of Fig. 2;

Fig. 4 is a perspective view of one of the stretcher members employed in the combination illustrated in Figs. 1, 2 and 3;

Fig. 5 is a partial front elevation of a cribbing structure embodying another combination of elements that may be employed herein;

Fig. 6 is a view taken on line 6—6 of Fig. 5;

Fig. 7 is a view taken on line 7—7 of Fig. 6;

Fig. 8 is a perspective view illustrating another modified combination of elements; and

Fig. 9 is a perspective view illustrating still another modified combination of elements that may be employed in the type of construction herein set forth.

It is to be understood that the present forms of construction herein disclosed are merely for purposes of illustration and that there may be devised various other forms and combinations of elements without departing from the spirit of the invention as herein set forth and claimed.

At the outset, it might be explained that the several forms of stretcher members herein disclosed are all of panel form and are to be referred to as corrugated or ribbed, these terms being used in a generic sense.

Referring first to the form of structure disclosed in Figs. 1 to 4 inclusive, the front and rear columns are made of duplicate metal I-beams 1 and 2, between which there extend and to which there are fastened the header or tie-beam members 3 here shown as of L-bar form, although their form may vary. Any suitable means may be employed for fastening the headers 3 to the columns 1 and 2; for instance, their ends may be welded, bolted or riveted to the metal brackets 4 which are fastened in any of the same manners to the flanges of the I-beams 1 and 2. The header and column members may be assembled, in the manner just explained, at the shop and then shipped as a unit to the point of use and there erected into upright position for application of the front and rear stretcher members; or the column and header members may be shipped as separate elements to the point of use and there assembled as a frame or bent in flat form upon the ground and then raised into upright position for application of the front and rear stretcher members to the series of such units.

In the form of structure illustrated in Figs. 1 to 4, the stretcher members are in the form of corrugated metal plates or sheets in strip form, each of which has parallel middle and edge portions, and intermediate portions inclined towards the middle portion. The middle portion is indicated by reference numeral 5, the edge portions by reference numeral 6, and the intermediate portions by reference numeral 7.

The ends of the stretcher members have bolt holes 8 in the intermediate portions 5 for the bolts 9 by which they are fastened to the outer flanges of the I-beam column members. The edge portions 6 have the bolt holes 10 for fastening to the inner flanges of the I-beam columns by means of bolts 11, the adjacent edge portions of adjacent stretcher members overlapping each other, as indicated in Fig. 2. At the front of the cribbing, the overlapping edge portions 6 are spaced by means of the intermediate washer 12, this being for the purpose of drainage, to be more fully explained, it being understood that the overlapping edge portions 6 will thus be spaced throughout their entire extent, these edge portions being bolted together through holes 10.

As will be observed, the ends of the stretcher members are inserted between the flanges of the I-beam columns upon each side thereof and are fastened in such position, the edge portions 6 being fastened to the rear of the I-beam columns, and the intermediate portions being fastened to the front thereof.

Still referring to Figs. 1 to 4, the rear stretcher members are duplicates of the front stretcher members and are fastened in the same manner, their ends extending between the inner and outer flanges of the I-beam columns. At the rear of the cribbing, there may be omitted every other stretcher member, as indicated in Fig. 2, the purpose of the space thus allowed between the rear stretchers being to facilitate drainage through the cribbing.

When the cribbing is completely assembled, the space therein will be filled with earth and rock, as usual. In the present case, however, as in the other instances herein disclosed, there will be practically no void, this result being made possible by the form of header and the other elements in the combination so that the earth will be filled practically completely within the cribbing without any air gap being left in the fill.

Any moisture, either down through the cribbing or in through the rear thereof, may find its way out through the front thereof. Such moisture, when it comes to the front wall of the cribbing, will run downwardly and rearwardly over the lower inclined intermediate portion of each intermediate portion of each stretcher member, thence down through the space provided between the adjacent stretchers and thence downwardly and forwardly over the outer surface of the upper intermediate portion of each stretcher member, to the outside of the cribbing.

By omitting every other stretcher member at the rear of the cribbing, the moisture from the rear thereof is permitted to pass therethrough. However, instead of omitting any of the rear stretcher members, they may form a completely closed rear wall and holes may be provided in the upper intermediate portions to permit passage of moisture therethrough to the inside of the cribbing. The moisture will then find its way through the fill within the cribbing and thence out through the front wall, as above explained. The passage of moisture from the rear will be facilitated also by drainage surfaces afforded by the inner surfaces of the lower intermediate portions of the stretcher members at the rear, at least some of the moisture being so directed forwardly through the rear wall.

The cribbing structure, above described, may be provided with a base or bearing plate as a means of supporting the same upon the ground, if the prevailing conditions so require. In some instances, the individual column members may be driven into the ground, and the header and stretcher members then fastened thereto.

In the form of construction illustrated in Figs. 5, 6 and 7, I employ front and rear columns in the form of metal T-beams 12, to the inwardly extending legs of which are bolted, riveted or welded the front and rear ends of the L-shaped metal header members 13. In this form of cribbing, I provide stretcher members out of the familiar corrugated metal strips 14 which have their ends bolted, riveted or welded to the inner sides of the cross-heads of the T-bars. Or, if so desired, the stretcher members may be fastened to the outer sides of the T-bars. The stretcher members 14 may overlap each other, or their adjacent horizontal edges may abut each other or be slightly spaced from each other so as to allow drainage therethrough. If so desired, apertures may be provided in either or both of these front and rear stretcher members for the purpose of drainage; and every other stretcher member may be omitted at the rear for the same purpose, if so desired.

As a means of further bracing the cribbing structure just described, I may provide the obliquely disposed metal bar 15 which has its ends fastened in any suitable manner to the inwardly extending legs of the column members, as indicated in Fig. 6. The tie bars or stays 15 may consist of steel rods or bars of any suitable form, properly fabricated according to any given requirements. Other such stays may extend also in the other direction.

In the form of construction just described, the same general manner or method of procedure may be followed in the erection of the same as in the form of construction illustrated in Figs. 1 to 4. And here also, a base or bearing plate may be supplied.

In Fig. 8 I have illustrated a form of construction which more nearly resembles that shown in Figs. 1 to 4. In this form, as in the other form above described, I employ metal I-beams, between the inner and outer flanges of which are arranged and fastened the ends of the stretcher members 16. But these two constructions differ from each other with respect to the stretcher members, the form and arrangement of the header members being the same in the two cases.

In Fig. 8, the stretcher members 16 each have intermediate and inclined side portions, the middle portions thereof being bolted, riveted or welded to the inner sides of the inner and outer flanges, alternately, of the column members, and the superposed side portions thereof being bolted, riveted or welded together. As will be seen, these stretcher members are of duplicate form and are reversely arranged with respect to each other, and the front and rear walls of the cribbing are constructed in the same manner. For purposes of drainage, holes may be provided in the middle portions of the front stretcher members, and every other one of the rear stretcher members may be omitted, if so desired.

In the form of construction illustrated in Fig. 8, as in the preceding forms herein described, the same manner of procedure may be followed in erecting the same, and there may be employed a base or bearing plate, if so desired.

In Fig. 9 I have illustrated another form of stretcher member which may be employed in the same manner as in Figs. 1 to 4 and Fig. 8, so far as the construction and arrangement of the rest of the device is concerned, the form of stretcher shown in Fig. 9 to be regarded as a substitute for the other forms of stretchers shown in the other figures just referred to. In Fig. 9, the stretchers 17 have middle and side portions at right angles to each other, the middle portions being bolted, riveted or welded to the inside of the inner and outer flanges, alternately, of the I-beam columns, while their side portions are bolted, riveted or welded to each other. As indicated, these stretcher members are arranged reversely with respect to each other. The front and rear walls of the cribbing are constructed in the same manner except that every other stretcher may be omitted at the rear for drainage, if so desired. As in other forms above described, drainage holes may be provided in the stretcher members, if so desired, and there may be employed also a base or bearing plate, although it is to be understood that there may be followed the practice of driving the columns into the ground if and when possible and desirable. Also, the angularly disposed brace bars may be

employed in any of the several forms of cribbing, with some suitable means of connection to be provided for the ends thereof to the I-beam form of column.

As above indicated, all of these cribbing structures include columns at front and rear, to which the stretcher and header members are connected, and the stretcher members may all be recognized as being corrugated or as having alternating projected and recessed portions. All of the several forms of stretcher members may be formed of metal plate which is corrugated or ribbed and formed into panels or sheets of the desired form and size for any given set of conditions.

The header members may be made from angle bars, I-beams, trusses, T-bars or any other suitable form of metal.

As a result, I obtain several forms of construction which possess very great resistance to load strain throughout the walls thereof and also at the columns to which the strain is transmitted. Furthermore, my several forms of construction are comparatively simple and can be assembled in a convenient manner, with comparatively little labor required.

In all of the several forms of cribbing, there has been devised a new method of construction which consists in first connecting the front and rear ends of the header or tie beam members to the front and rear columns, respectively, so as to form what might be regarded as a bent or frame which can be assembled in horizontal position either at the shop and shipped as a unit, or the parts thereof may be shipped to the point of erection and there assembled on the ground where the cribbing is to be located. These bents or frames are then raised from horizontal position to substantially upright position at proper distance apart, and the stretchers then connected thereto. When diagonal braces are used, they will be applied before the frames are raised to upright position. When the cribbing has been completely constructed, earth, stones, etc. are filled into the same; and, because of the fact that the element of air gaps within the body of the earthen fill is reduced practically to nil, the result obtained is virtually a solid body of earth, etc., reinforced by the metal members of the cribbing structure embedded therein.

The corrugated stretcher members at the front and rear produce another advantage, in that they provide a greater angle of friction between the earth and metal and thus the danger of the cribbing structure over-turning is greatly reduced. That is, any force which would otherwise have over-turning tendency will be received and resisted by the transverse corrugated portions of the stretcher members. In other words, the corrugated stretcher members provide what might be regarded as pockets of earth which will transmit downwardly any force which would otherwise have a tendency to over-turn the wall structure.

Also, when bolts are employed in connecting the parts of my structure together, speed wrenches may be used since the bolts are easily accessible and as a result there is realized a great saving in labor and time and hence in cost of erection.

What I claim is:

1. In a cribbing structure, the combination of a plurality of spaced unitary preformed frames identifiable as such and each comprising front and rear upright flanged columns and spaced duplicate header members located above the lower ends of said columns and having their ends connected to said front and rear columns, stretcher members arranged at the front and rear of said unitary frames, and means for connecting said stretcher members to the flanges of said columns in such manner that each stretcher member may occupy its designated elevation independently of the others.

2. In a cribbing structure, the combination of a plurality of spaced unitary preformed frames identifiable as such and each comprising front and rear upright I-beam columns and spaced header members having their ends secured to the inner flanges thereof, stretcher members having their ends arranged between the flanges of said I-beam columns, and means for connecting the ends of said stretcher members to said flanges.

3. In a cribbing structure, the combination of a plurality of spaced unitary preformed frames identifiable as such and each comprising front and rear upright T-beam columns and spaced duplicate header members located above the lower ends of said columns and having their ends secured to the legs of said T-beam columns, and stretcher members arranged at the front and rear of said frames, and means for connecting said stretcher members to the head flanges of said T-beam columns in such manner that each stretcher member may occupy its designated elevation independently of the others.

4. In a cribbing structure, the combination of a plurality of spaced unitary preformed frames identifiable as such and each comprising front and rear upright flanged columns and spaced header members having their ends connected to said front and rear columns, corrugated stretcher members arranged at the front and rear of said unitary frames, and means for connecting said stretcher members to said flanges, said corrugated stretcher members having reversely inclined portions and being provided with means of communication for facilitating drainage therethrough.

5. In a cribbing structure, the combination of a plurality of spaced unitary pre-formed frames identifiable as such and each comprising front and rear upright flanged columns and spaced header members located above the lower ends of said columns and having their ends connected to said front and rear columns, stretcher members at the front and rear of said unitary frames, said stretcher members including channel-shaped members with over-lying substantially right-angle flanges, means for connecting together said over-lying flanges, and means for connecting said stretcher members to the flanges of said columns in such manner that each stretcher member may occupy its designated elevation independently of the others.

6. In a cribbing structure, the combination of a plurality of spaced unitary pre-formed frames identifiable as such and each comprising front and rear upright T-beam columns and spaced header members located above the lower ends of said columns and having their ends secured to the legs of said T-beam columns, stretcher members arranged at the front and rear of said frames, said stretcher members including channel-shaped members at the front, and means for connecting said stretcher members to the head flanges of said T-beam columns in such manner that each stretcher member may occupy its designated elevation independently of the others.

WALTER D. SCHENK.