

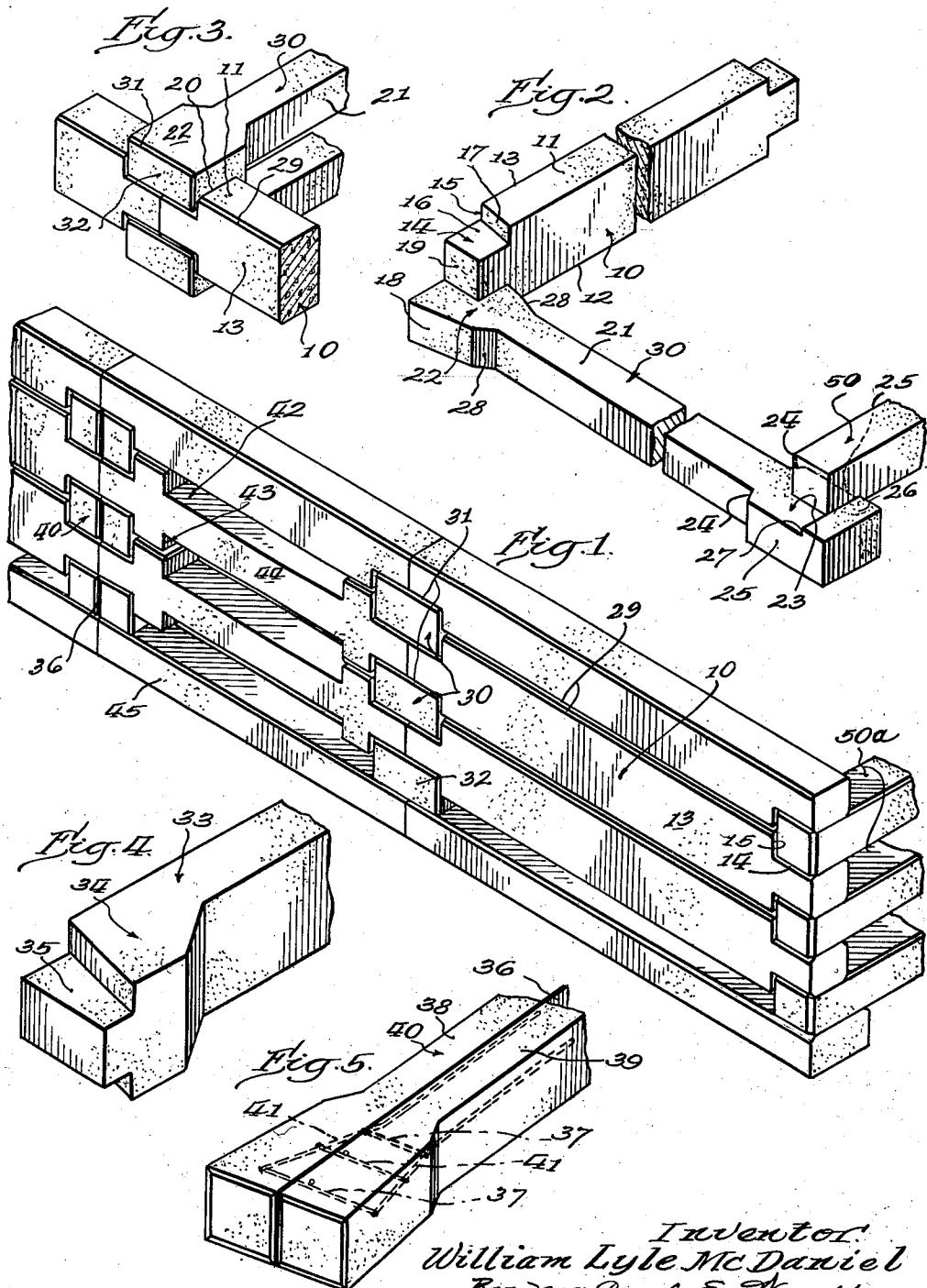
March 30, 1943.

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2,315,441

## CRIBBING

Filed Aug. 23, 1940



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## UNITED STATES PATENT OFFICE

2,315,441

## CRIBBING

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Application August 23, 1940, Serial No. 353,817

9 Claims. (Cl. 61—47)

The present invention relates to cribbing, and is particularly concerned with cribbing adapted to be built up of precast header and stretcher members of concrete or the like.

One of the objects of the invention is the provision of an improved flush face type cribbing which is adapted to be constructed either with a closed face or an open face, and which has a maximum degree of flexibility so that the possibility of the spalling of the bearing surfaces of the cribbing members is reduced to a minimum and the cribbing is adapted to be used successfully under various conditions of service.

Another object of the invention is the provision of an improved cribbing built up of cribbing units of an improved structure, which is adapted to accomplish the functions of resistance to direct compression and resistance to lateral movement by features of construction so arranged that the failure of one of these functions will not induce the failure of the other.

Another object of the invention is the provision of an improved cribbing having its cribbing members so constructed as to provide resistance to the lateral movement of the members by a wedging action instead of a direct shear.

Another object of the invention is the provision of improved cribbing members which provide bearing surfaces that are adapted to be flat and free from any device intended to prevent lateral movement, thus enabling the bearing surfaces to function more efficiently in resisting the direct compression between the members of the cribbing.

Another object of the invention is the provision of an improved cribbing assembly in which all of the members cooperate to resist lateral movement of the respective members, and in which a maximum area of bearing surface may be provided at a minimum expense.

Another object of the invention is the provision of improved cribbing members which are provided with plane sides and faces so far as possible, for the purpose of maintaining the simplicity of the cribbing, the simplicity of the forms, and a maximum of strength at a minimum expense.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawing, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the single sheet of drawings accompanying the specification,

Fig. 1 is a fragmentary view in perspective of a cribbing wall constructed according to the invention, the rearwardly extending header members behind the wall being covered with the fill, and the wall embodying both a closed face and an open face type of cribbing;

Fig. 2 is a fragmentary view in perspective of several cribbing members constructed according to the invention, showing the mode of assembly and the cooperation between the parts of the cribbing;

Fig. 3 is another fragmentary view in perspective of an assembly of the headers and stretchers as viewed from the front of the wall, showing the mode of assembly of the cribbing members;

Fig. 4 is a fragmentary view in perspective of one end of a modified form of stretcher member, having an increased bearing surface;

Fig. 5 is another fragmentary view in perspective of a modified form of header, which I prefer to call the split type, in which parts of the header are adapted to give, to permit the unequal settling of one side of a cribbing structure with respect to another side, without damage to the face of the cribbing.

Referring to the drawing, the wall exemplified in Fig. 1 is preferably built up of cribbing members of the general type shown in Figs. 2 and 3 or 4 and 5.

The cribbing members comprise stretchers of the type indicated at 10 in Fig. 2, and headers of the type indicated at 30 for the front of the wall.

Each of the stretchers 10 preferably has the substantially plane rectangular top 11 and the bottom 12 of the same characteristics and shape. The front side 13 is also plane and rectangular, except for the fact that there is a stretcher portion 14 at each end of reduced vertical depth, formed by blocking out an angular recess 15 in the mold at the top and bottom and at each end.

This end portion of reduced vertical depth has upper and lower bearing surfaces 16 for engaging the headers 30, and these bearing surfaces are trapezoidal in shape, as the end wall 17 extends diagonally outward to correspond to the taper occurring at the thrust surfaces 18 on the headers.

It is the diagonally extending end surfaces 17 in combination with the diagonal surfaces 18 on the headers 30 that resist lateral thrust on the stretcher members. Aside from these blocked out portions 15, the stretchers are provided with substantially rectangular surfaces on all sides,

and both ends of the stretchers are similar in shape and construction.

The longitudinal dimension of the bearing surface 16 and blocked out portion 15 corresponds to one-half of the lateral width of the header 30 at the end, which is engaged by the stretcher so that the extreme end surface 19 of the stretchers is located on a plane extending midway between the sides of the header 30.

The vertical dimension of the diagonally extending wall 17 is preferably slightly less than half of the vertical depth of a header 30, so that a small opening is provided for drainage.

The cribbing may be so constructed that the main bearing surfaces are between the surfaces 16 and those parts of the headers which these surfaces engage, or the portion 14 of reduced vertical depth of these stretchers may be made slightly smaller so that the stretchers rest upon each other throughout their full length, and the headers merely rest upon the end portions 14 of the stretchers.

The headers 30 are provided with a central elongated body portion 21, which may be substantially square in cross section, and which is provided with four sides that are plane surfaces. At each end the square body portion 21 is provided with an enlargement, as at 22, on the front end and on the rear end.

The rear enlargement 23 is merely for the purpose of increasing the bearing surface area. For this purpose the headers 30 are provided with diagonally outwardly extending surfaces 24 and with the side surfaces 25, which are more widely spaced to increase the area of the top and bottom of the enlargement 23.

The enlargement 23 is preferably also formed with an upwardly extending lug 26 of rectangular cross section, having a vertically extending shoulder at 27 on its inner side for engaging the rear stretcher members 50.

These rear stretcher members may consist merely of concrete members, having rectangular plane sides, and substantially square ends, the stretchers being substantially square in cross section.

The vertically extending shoulder 27 prevents the outward thrust of the stretcher members 50 by engaging outside of the stretcher members below each stretcher member, and the weight of the assembled stretcher members above keeps the stretchers in engagement with the shoulders 27.

The front enlargement 21 of the header 30 is also made wider for the purpose of increasing the bearing surface area, since this part of the header has the engaging ends of two stretchers above and two stretchers below. Thus this enlargement 21 has two diagonally outwardly extending surfaces 28 leading from the flat sides of the square body portion 22.

This enlargement is also provided with two elongated diagonally outwardly extending thrust surfaces 18, which have the same slope or angularity as the shoulders 17 on the ends of the stretchers 11.

The complementary diagonal surfaces 17 and 18 engage each other, and by wedging action the header prevents the stretchers from being forced outward. Any tendency of the stretcher to move outward would involve its longitudinal movement in the assembly against the friction interposed by its engagement with other members, and of course longitudinal movement of any stretcher is resisted by the complementary diagonal thrust

surfaces at the other end of the stretcher engaging another header.

Thus the outward thrust of the fill on the stretchers is resisted by the wedging action of the complementary diagonal surfaces on the headers and stretchers, and it is unnecessary to provide any shoulders or lugs which would be in direct shear.

The members 59a at the right end of Fig. 1 are headers, which comprise one-half of the structure of the headers shown in Figs. 3 or 5; that is, these headers have beveled surfaces 18 on the inner side, but the outer face is in the same plane as the body of the header 59a for the purpose of providing a flush surface for a corner of a cribbing wall.

The faces 13 of the stretcher members are preferably provided with a bevel 29 around all of the front corners of the stretchers, and the same type and size of bevel 31 is preferably provided around the front corners at the end surfaces 32 of the headers 30.

This provides a finished joint between the respective headers and stretchers, or between the surfaces of the stretchers, which gives a more desirable appearance and tends to prevent damage to the cribbing members at the front corners thereof, which are at the face of the wall, because the relatively weak and sharp portions of these corners are removed.

Referring to Fig. 4, this is a stretcher member 33, which is similar in construction to the stretchers 16, except that it has been made thicker in its front-to-back dimension at each end, to provide an enlargement 34 at each end for increased bearing surface.

The bearing surface 35, which is equivalent to the bearing surface 14 in function, has thus been made deeper in a horizontal direction by providing the enlarged portion at each end of the cribbing, indicated at 34. This bearing surface 35 is, however, preferably the same width at the front face of the cribbing as the bearing surface in the stretchers of Fig. 2.

Referring to Fig. 5, this is a modified form of header member, which is provided with a partition 36 of fibrous material, such as indurated fiber, fiber board, tar or asphalt impregnated felt, or the like.

This partition 36 is placed in the mold during the casting of the header. It comprises a compressible membrane, preferably extending the full depth and length of the header. Its thickness may vary, but in one embodiment of the invention was made one-eighth of an inch.

This partition or membrane is penetrated by a plurality of transversely extending metal reinforcing rods 37, and each half portion 38, 39 of the split type of header, which is indicated in its entirety by the numeral 40, has its own longitudinally extending reinforcing members 41 preferably located near the top and near the bottom.

Of course, the upper and lower reinforcing frames may also be tied together by short vertically extending reinforcing members and tie wires at the intersections.

The split type headers are exemplified at the left in Fig. 1 and the ends of these headers are preferably finished to have the appearance of two blocks, as shown at the end of Fig. 5 and in Fig. 1.

The cribbing wall may be made open face by blocking out an intermediate portion of the mold of each stretcher above and below, as indicated in Fig. 1 at 42, 43.

This provides drainage slots between the middle body portions of the stretchers. These middle body portions 44 may be made substantially rectangular in cross section and of the same size as the end portions 14. Thus the open face type of cribbing is exemplified at the left part of Fig. 1, and the closed faced type of cribbing exemplified at the right of Fig. 1.

It is of the utmost importance to users of cribbing that the face of the cribbing be preserved intact without cracking or spalling, and the split type headers are capable of preventing these bad effects when they are due to unequal settling.

The cribbing wall is preferably built up along the lines of Figs. 2 and 3, with the headers and stretchers laid alternately upon each other, the stretchers being end to end, with the headers interposed between the end surfaces of the stretchers.

Such a wall is preferably first laid upon a foundation or a plurality of plain rectangular stretchers 45, laid end to end in the form of a foundation. At an end or corner of a wall the headers 30 may be replaced by headers 50a which comprise half of the headers 30.

The rearwardly extending headers are then covered with a fill of dirt or gravel, which tends to retain the assembly in place and provide an embankment that is faced with the concrete cribbing members.

It will thus be observed that I have provided an improved cribbing wall utilizing a new method of restraining lateral movement between the header and stretcher at the front of the wall. The cribbing members are so shaped that when they are fitted together the diagonally extending side portions of the header contact complementary angular parts at the ends of the stretcher, which are above and below the bearing surfaces of the stretcher. The flat bearing surfaces make perfect contact and are free to perform their function of resisting direct compression.

The stresses caused by direct compression and those caused by resistance to lateral movement are imparted to different surfaces of the cribbing members. This enables the cribbing members to function efficiently in resisting each of these stresses, and the action in each case is free from interference of the action in performing the other function.

The resistance to the lateral movement between the stretchers and headers is that of wedging action rather than one of direct shear, and this results in a greater flexibility in the wall. Flexibility is to be desired rather than absolute rigidity as tending to preserve the characteristics of the wall without breakage.

The flexibility of the wall is also increased by the use of what I call the split header, having the compressible membrane extending vertically and longitudinally along the center of the header. This enables the header to conform to the position of the stretcher, in the event of unequal settlement, thus preventing spalling along the edges of the bearing surfaces.

It should be understood that all of the cribbing members are provided with suitable steel reinforcing members extending longitudinally thereof and located preferably near the corners and faces.

The longitudinally extending reinforcing members are tied together by horizontal and vertical steel reinforcing rods, which are connected to the longitudinally extending reinforcing members by tie wires or other convenient means.

The reinforcing rods may be suitably formed to provide a maximum bond between the rods and the concrete.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a concrete cribbing, a header member

15 having a body portion of substantially rectangular cross section and having plane upper and lower surfaces, said header having an enlargement at one end, said end being enlarged laterally, and provided at one side with a diagonally

20 extending thrust surface adapted to engage a complementary thrust surface on a stretcher, and a similar header member secured side by side to the first-mentioned header member by metallic reinforcing members embedded in both of said headers, said header members having plane surfaces engaging each other at the juncture between said header members.

25 2. In a concrete cribbing, the combination of a plurality of stretchers and a plurality of headers, said headers and stretchers having their end portions

30 provided with bearing surfaces, and said headers and stretchers being laid alternately one upon the other to form a cribbing wall, the stretchers having their end portions extending

35 half way over said headers, and said headers being formed of two separated header portions joined midway of said headers at the joint of said stretchers by metallic reinforcing members extending from one portion to the other, said headers having adjacent plane surfaces at the

40 midway juncture of said headers whereby settling is permitted of one of the portions of said wall, including the portions of said header on one side of said joint, and without damage to the surface of the stretchers and headers.

45 3. In a concrete cribbing, the combination of a plurality of stretchers and a plurality of headers, said headers and stretchers having their end portions provided with bearing surfaces, and

50 said headers and stretchers being laid alternately one upon the other to form a cribbing wall, the stretchers having their end portions extending

55 half way over said headers, and said headers being formed of two separated header portions joined midway of said headers at the joint of said stretchers by metallic reinforcing members extending from one portion to the other, whereby

60 settling is permitted of one of the portions of said wall, including the portions of said header on one side of said joint, and without damage to the surface of the stretchers and headers, said header portions being separated by a fibrous partition which is traversed by said reinforcing members.

65 4. A concrete header member adapted to facilitate unequal settling of parts of a cribbing wall, comprising a header having two separate concrete portions cast on the opposite sides of a fibrous partition, said fibrous partition being

70 traversed by reinforcing members embedded in said portions whereby said portions may be permitted a limited degree of separate movement under predetermined forces without breakage.

75 5. In a concrete cribbing the combination of a plurality of concrete header members and con-

crete stretcher members, said stretcher members being arranged with their ends abutting and overlapping the ends of said header members, the cribbing header and stretcher members being piled alternately upon one another to form a cribbing, one of said members having its end located under the abutting ends of two others of said members and having a plane of cleavage arranged in line with the juncture between the two abutting ends of said members, and reenforcing members extending across said plane of cleavage and embedded in the parts of said member whereby the cribbing may settle on one side or the other of said plane of cleavage without damage to the surface of the cribbing.

6. In a concrete cribbing the combination of a plurality of headers and a plurality of stretchers, said stretchers extending longitudinally of the cribbing and the stretchers comprising concrete members having plane rectangular sides, said concrete members being substantially rectangular in cross-section and having a reduced portion of rectangular cross-section at each end, there being a vertically and diagonally extending thrust shoulder located between said reduced portion and the main body of each stretcher for engaging a complementary surface on a header, said headers comprising concrete members having plane sides and being substantially rectangular in cross-section, each header having at its outer end an enlargement provided with the vertically and diagonally extending complementary thrust surfaces above mentioned for engaging the diagonal surfaces on the stretcher, said stretchers and headers being piled alternately upon each other to form a cribbing, said headers being formed in two distinct parts separated by a plane of cleavage and a partition member midway between the sides of the header and coincident with the juncture between the abutting ends of stretchers whereby parts of the cribbing wall may settle separately from other parts.

7. In a concrete cribbing the combination of a plurality of headers and a plurality of stretchers, said stretchers extending longitudinally of the cribbing and the stretchers comprising concrete members having plane rectangular sides, said concrete members being substantially rectangular in cross-section and having a reduced portion of rectangular cross-section at each end, there being a vertically and diagonally extending thrust shoulder located between said reduced portion and the main body of each stretcher for engaging a complementary surface on a header, said headers comprising concrete members having plane sides and being substantially rectangular in cross-section, each header having at its outer end an

enlargement provided with the vertically and diagonally extending complementary thrust surfaces above mentioned for engaging the diagonal surfaces on the stretcher, said stretchers and headers being piled alternately upon each other to form a cribbing, said headers being formed in two distinct parts separated by a plane of cleavage midway between the sides of the header and coincident with the juncture between the abutting ends of stretchers whereby parts of the cribbing wall may settle separately from other parts, the separate parts of said headers being separated by a sheet of fibrous material.

8. In a concrete cribbing the combination of a plurality of headers and a plurality of stretchers, said stretchers extending longitudinally of the cribbing and the stretchers comprising concrete members having plane rectangular sides, said concrete members being substantially rectangular in cross-section and having a reduced portion of rectangular cross-section at each end, there being a vertically and diagonally extending thrust shoulder located between said reduced portion and the main body of each stretcher for engaging a complementary surface on a header, said headers comprising concrete members having plane sides and being substantially rectangular in cross-section, each header having at its outer end an enlargement provided with the vertically and diagonally extending complementary thrust surfaces above mentioned for engaging the diagonal surfaces on the stretcher, said stretchers and headers being piled alternately upon each other to form a cribbing, said headers being formed in two distinct parts separated by a plane of cleavage midway between the sides of the header and coincident with the juncture between the abutting ends of stretchers whereby parts of the cribbing wall may settle separately from other parts, the separate parts of said headers being separated by a sheet of fibrous material.

9. A concrete header member adapted to facilitate unequal settling of parts of a cribbing wall, comprising a header having two separate concrete portions cast on opposite sides of a plane separating member, said concrete portions being formed with plane surfaces opposite each other to facilitate relative movement, said separating member being traversed by reinforcing members embedded in said portions whereby said portions may be permitted a limited degree of settling movement under predetermined forces without breakage.

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