June 19, 1934. S. M. GOODER 1,963,362

BRACE AND METHOD OF FORMING CONCRETE STRUCTURES

Filed May 1, 1931

Fig. 1.

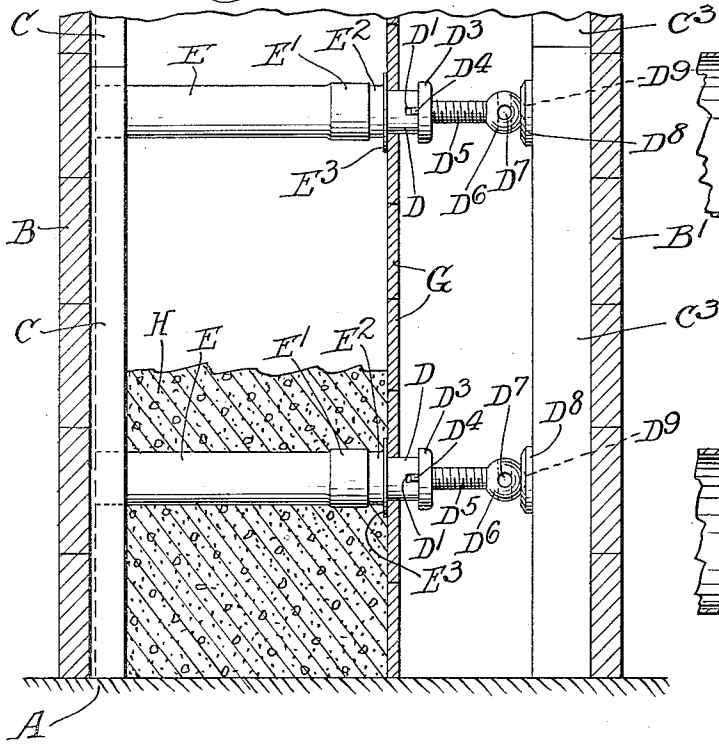


Fig. 5.

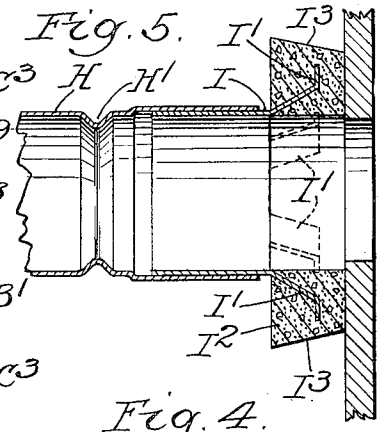


Fig. 4.

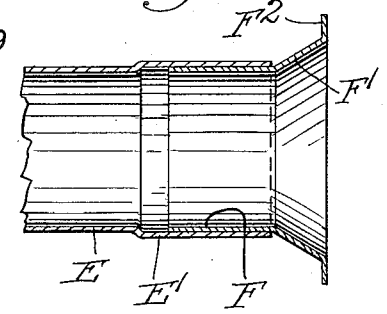


Fig. 2.

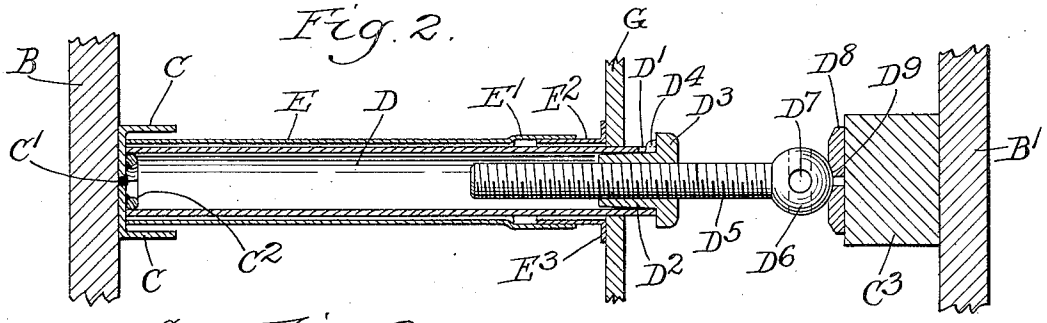
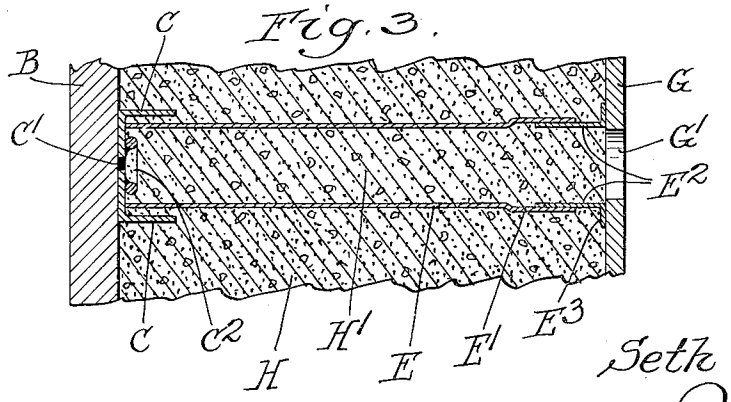


Fig. 3.



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UNITED STATES PATENT OFFICE

1,963,362

BRACE AND METHOD OF FORMING CONCRETE STRUCTURES

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Application May 1, 1931, Serial No. 534,336

9 Claims. (Cl. 61—39)

This invention relates to an apparatus and a method for forming concrete walls and particularly for forming concrete walls and constructions generally in trenches, holes, excavations, or other constricted spaces although it is not limited in its use to that particular association.

One object of the invention is to provide means for spacing and holding walls, retaining members or forms. If the invention be applied to a construction in which a wall is to be built in a trench, one object of the invention is to provide means for keeping the trench open by holding apart the members which retain its sides. The device of this invention may also be used to retain a portion of the members which serve as the form for a concrete wall.

Another object of the invention is to provide in connection with a method and apparatus of the sort suggested, means whereby the load carrying member of the prop or shore may be removed after the wall is completed so that it may be used again.

Other objects will appear from time to time in the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawing, wherein:—

Figure 1 is a vertical cross section, showing the props of my invention in place in a wall during the process of formation;

Figure 2 is a longitudinal cross sectional detail on an enlarged scale through one of the props;

Figure 3 is a sectional view through the wall, after the concrete is in place and after the load carrying member of the prop has been removed;

Figure 4 is a detailed cross sectional view on an enlarged scale, showing a modified form of a portion of my invention;

Figure 5 is a further modification;

Like parts are designated by like characters throughout the specification and drawing.

A indicates a foundation upon which a wall is to be built. It may be any suitable supporting surface, involving a prepared foundation or merely involving soil or other material upon which a wall can be erected.

B, B^1 indicate wall members preferably formed of separable parts such as planks. These may be retaining walls and may be positioned against earth, as within a trench, and may then serve to keep the trench open and prevent collapse and cave-in. Also the retaining wall B may serve as one form for a concrete wall or structure. The plank members, of which the members B, B^1 are formed, may be positioned horizontally and the vertical channel members which may be in relatively short sections, as indicated in Figure 1, will then be positioned vertically. Whether or not either of these members are vertical or horizontal is a matter of convenience and they might be arranged either way.

Since, however, they serve together as a retaining structure, it is preferable that they are angularly disposed with respect to each other so that one tends to reinforce the other. Each of the channel members, while it may be of any suitable construction, is preferably built up of a pair of angles C, C, which are welded together as at C^1. This weld is ordinarily not continuous throughout the length of the channel. As a centering and spacing member, rings C^2 are preferably welded or otherwise fastened within the channel as shown in Figures 2 and 3. This centering member may be of any suitable construction but is here shown as formed of a rod bent into a circular shape and then welded to the inside of the channel. The wall members B^1 are preferably associated with frame members C^3 which will ordinarily be generally parallel to the channel members C and, therefore, will run at right angles to the members which make up the walls B, B^1.

The prop construction will now be described. The prop which is used is preferably tubular and formed of a member D which is notched at one end as at D^1. At its opposite end the tubular member D is positioned about one of the centering rings C^2 as shown in detail in Figure 2. At its other end it has seated in it a hollow interiorly threaded member D^2 which is preferably provided with a flange D^3 and a projection D^4 which is seated in the notch D^1 of the tube D. A threaded relatively extended member D^5 is engaged in the threaded member D^2. The member D^5 may carry at its outer end an enlargement D^6 which may be generally spherical as shown and provided with one or more perforations D^7 through it. The perforations D^7 serve as a means of engaging the screw and turning it and instead of such perforations other means might be used for engaging and turning the screw. The generally spherical member D^6 is seated in a plate D^8 which rests upon the frame member C^3 and is provided with a depression D^9 to receive and place and retain the spherical member D^6.

Positioned about the tubular member D is a second and preferably much lighter tubular member E. This member may be in contact with or out of contact with the member D. At its outer

end the tube E is provided with an outer flared or enlarged section E^1. A thimble E^2 is positioned within the outwardly enlarged section E^1 of the tube E and is preferably of the same interior diameter as the main portion of the tube E. The thimble E^2 may have a laterally extending flange E^3 formed on it.

As shown in Figure 4, a modified form of thimble construction is illustrated. The thimble shown in that figure is used in connection with a tubular member E, E^1. This modified thimble is formed with a main generally cylindrical portion F which preferably corresponds in interior diameter to that of the member E, and this portion of the thimble rests within the enlargement E^1 of the tube E. At its outer end the thimble F is provided with an inclined or flared portion F^1 which may terminate in a laterally extending flange F^2.

When a wall is to be constructed, a form, in addition to the walls already described, is preferably used. Such a form is illustrated in Figures 1, 2 and 3 and is shown as made up of planks or other separable members G. These members are ordinarily perforated as at G^1 so that the tubular member D may extend through the form. The thimble member of whatever design is arranged so that its flange contacts or closely approaches the inner surface of the member or members G.

When the forms and props are in place, concrete H is poured or otherwise placed within the form, and the wall is built up with or without reinforcing. Any type of wall may be made, using my apparatus and method, which are equally applicable to a wide variety of walls and my apparatus and method may be used in connection with the construction of any sort of wall in which it is necessary to provide props for retaining walls or forms during the construction of the wall.

After the wall has been completed and it is desired to remove the props, that can be done readily because the load carrying portion of the prop, including particularly the tubular member D, is not in contact with the wall but merely lies within a perforation formed within it, and is retained or held out of contact with it, by the tubular member E. Since this is the case, the screw may be removed and the tube D and other parts may readily be pulled out. Thus the prop as a whole is removed and the relatively lighter retaining member E, with the thimble which is used with it, remains in the wall. Concrete or other filling material H^1 may then be put in position within this member and it remains in place permanently within the wall. The prop having been removed, it may be used again and again. The outer form made up of the members G may also be removed. Ordinarily the wall B, if it is located in a trench, has served as a retaining wall and thus lies between the surrounding material and the wall which has been built and, therefore, cannot be removed.

Where in the specification and claims the expression "wall" or "walls" is used in reference to the construction which is to be carried out within the form, it will be understood that I mean not merely a wall but any construction. Among others the construction to be formed might be a wall or pier or almost any structural member and my claims are to be understood as not being limited to a wall.

It will be realized that whereas I have herewith shown and described a practical operative device, nevertheless many changes might be made in the size, shape, number and disposition of parts without departing from the spirit of my invention and I wish therefore that my showing be taken as in a sense diagrammatic. In particular the shielding member which surrounds the jack-screw and which is of adjustable length might be made of a single member instead of being formed of two relatively movable parts. It might, for example, be formed with corrugations permitting it to be elongated and shortened by variations in the corrugations. Where the space adjacent the wall is limited and it might be difficult to remove the tubular member D, as a unit, this member may be made sectional so that the sections may be separately removed and thus the device may be used in extremely constricted quarters.

There is shown in Figure 5 a construction in which the outer sleeve which surrounds the member D is modified to reduce the contact between the two and to reduce the friction. In this form of the invention, an outer sleeve H is used and it is indented as at H^1. Such indentations may be circular or any other shape. Their effect is to position the sleeve H with respect to the member D but to limit the contact between the two. Thus when the member D is removed, the friction between the two is reduced. At the outer end of the member as shown in Figure 5, a thimble I is provided. It is generally similar to the thimble F as shown in Figure 4 but instead of having an outwardly extending flange, it may have a plurality of projecting members or tongues I^1 and these engage and are held within a pre-cast concrete ring or block I^2. This block or ring has its outer surface, as at I^3, inclined, grooved, roughened or otherwise shaped so that when the wall is cast about it, it and the thimble which is engaged in it will be held in the wall.

The use and operation of my invention are as follows:

It will be assumed that the device of this invention is to be used as a prop for retaining in position a pair of walls. As the walls are formed, channel members and frame members such as the members C and C^3 are put into position. A prop is positioned at suitable intervals along the channel members and it bears at one end against a channel member and at the other end against a frame member such as the member C^3. The props may be put in position as units in which the retaining tubular member E with the thimble E^2 are in position about the prop when it is put in position or the prop may be put in position separately. The retaining member E might be put in position, then the thimble inserted in it and then the tubular member D inserted afterward. However the prop is placed in position, when it is to be used, the parts are shown in detail in Figure 2 and they occupy the general relative positions shown in that figure. The distance between the forms for the wall cannot always be held uniform. For that reason the thimble construction is used and permits some relative movement of the thimble and the member E and thus the total length of these two members may be increased or decreased so that irrespective of the variation in the distance between the forms, a complete covering is provided for the prop D so that throughout the entire portion of its length which lies within the forms it is covered and will be held out of contact with the wall as the latter is constructed within the forms. When the wall has been formed and the prop is no longer necessary, it is removed bodily or in pieces and the member E, with the thimble E^2, will re-

main in position. The cavity within them may be filled as shown in Figure 3.

The thimble may be removed. Its removal is rendered easier with the tapered form of thimble shown in Figure 4. When the thimble is removed, the outer surface of the wall may be finished up smooth without any metal lips or parts projecting from it.

I claim:

1. In combination in a form spacing member, a load-carrying part, means associated with said member and surrounding said part and all of that portion of the member which lies within the form, said associated means being relatively weak and being formed of a plurality of parts mounted one about the other, and adapted to be relatively elongated and shortened.

2. In combination in a form spacing member, a load-carrying part, means associated with said member and surrounding said part and all of that portion of the member which lies within the form, said associated means being relatively weak and being formed of a plurality of hollow members positioned about said spacing member, said hollow members positioned one within the other, for relative elongating and shortening movement, the two members having substantially the same interior diameter.

3. In combination in a form spacing member, means adapted to permit withdrawal of the load carrying parts of the member from a structure cast about it after the form has been used in casting the structure, comprising a non-load carrying housing surrounding that portion of the spacing member which lies within the form, adapted to hold the same out of contact with the cast-structure during and after casting.

4. In combination with a form spacing member for use in casting a structure, means adapted to permit withdrawal of the load carrying parts of the member after the form has been used in casting said structure, comprising a non-load carrying housing surrounding that portion of the spacing member which lies within the form, adapted to hold the same out of contact with the said structure during and after casting, said housing adapted to remain embedded in the structure after it is completed.

5. In combination in a wall structure, a plurality of retaining walls adapted for use in casting a structure, and a prop adapted to position said walls, said prop comprising a hollow load carrying member, and a co-operating member, the two forming together a jack-screw, and a relatively light hollow member, said member being positioned about the jack-screw and adapted to hold the cast structure out of contact with the jack-screw.

6. In combination in a wall structure form, a plurality of retaining walls adapted for use in forming a structure, and a prop adapted to position said walls, said prop comprising a hollow load carrying member, and a co-operating member, the two forming together a jack-screw, and a relatively light hollow non-load carrying member, said member being positioned about a jack-screw and extending from end to end of that portion of the jack-screw which is to be surrounded by the said structure, and adapted to hold the structure out of contact with the jack-screw.

7. The method of forming a wall within a constricted space, which comprises the following steps: erecting within said constricted space retaining walls, placing in position between said walls, to retain them, an extensible prop, positioning about said prop a relatively light hollow non-load carrying member, forming a structure about said prop and in contact with said hollow member, withdrawing the prop from the hollow member.

8. The method of forming a wall within a constricted space, which comprises the following steps: erecting within said constricted space retaining walls, placing in position between said walls, to retain them, an extensible prop, positioning about said prop a relatively light hollow non-load carrying member, casting a structure about said prop and in contact with said hollow member, withdrawing the prop from the hollow member, and filling the interior of said hollow member after the withdrawal of the prop.

9. The method of forming a structure which comprises the following steps: erecting retaining walls, placing in position between said walls to retain them, an extensible prop, positioning about said prop, a relatively light and structurally weak hollow member, casting a structure about said prop and in contact with said hollow member, withdrawing the prop from the hollow member after the structure has dried sufficiently and leaving the relatively light member permanently within the structure.

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