

July 25, 1939.

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2,167,413

SUPPORT SUCH AS CENTERING, SHUTTERING, SCAFFOLDING, AND THE LIKE

Filed Nov. 27, 1937

3 Sheets-Sheet 1

FIG. 1.

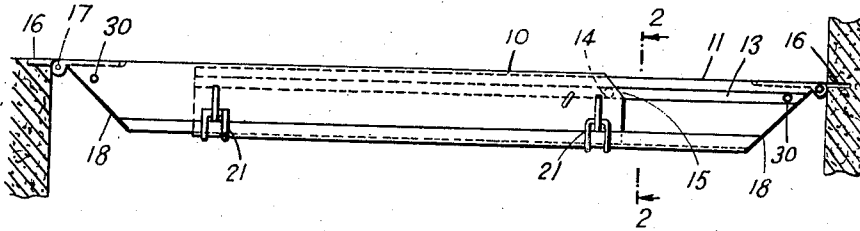


FIG. 2

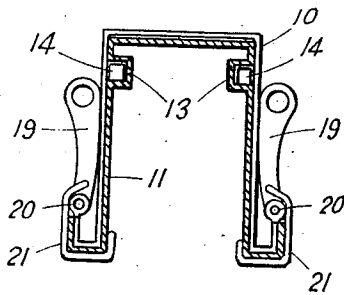


FIG. 3.

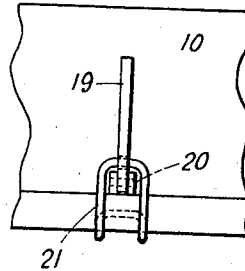


FIG. 4.

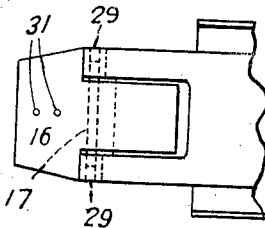
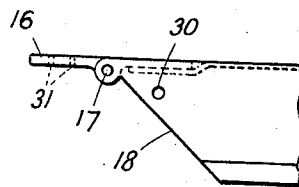


Fig. 5



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FIG. 6.

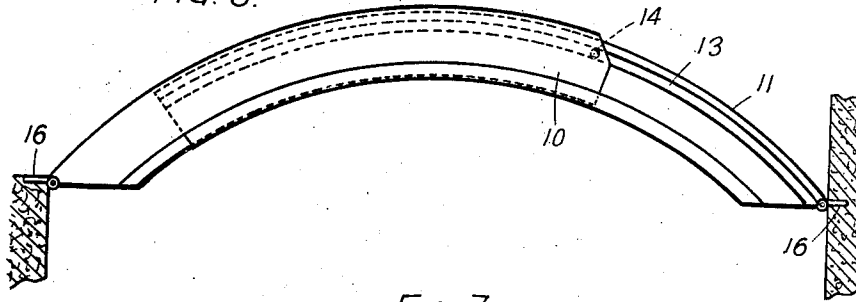


FIG. 7.

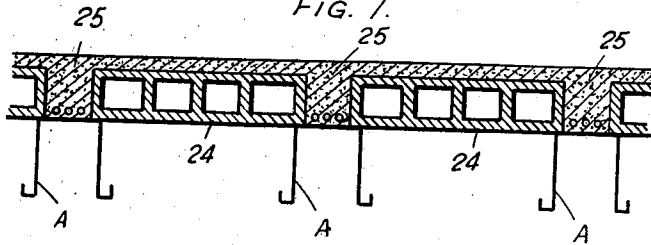


FIG. 8.

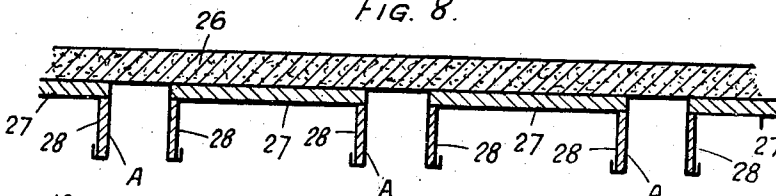
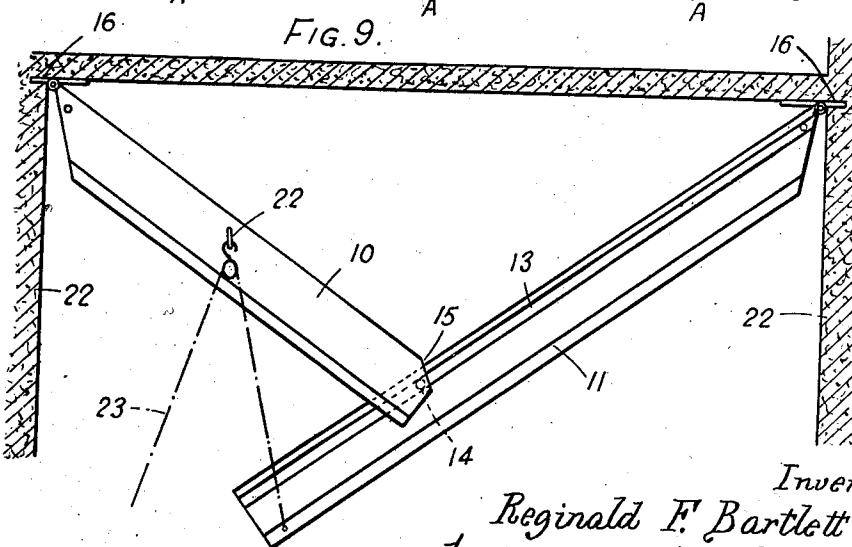


FIG. 9.



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FIG. 10.

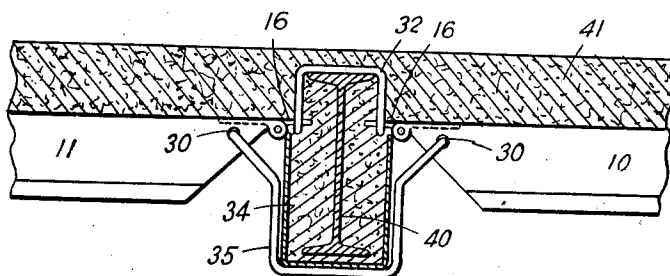
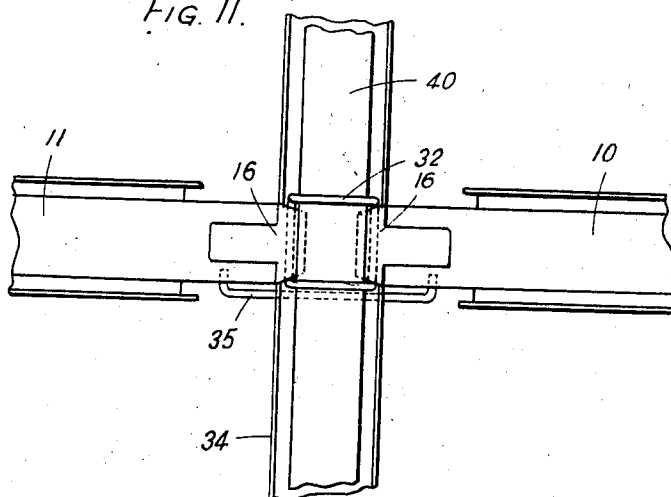


FIG. 11.



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UNITED STATES PATENT OFFICE

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SUPPORT SUCH AS CENTERING, SHUTTER-
ING, SCAFFOLDING, AND THE LIKE

Reginald Frank Bartlett, Weybridge, England

Application November 27, 1937, Serial No. 176,933
In Great Britain December 2, 1936

11 Claims. (Cl. 189—37)

This invention relates to an improved form of adjustable and collapsible supports, particularly adapted for use as a temporary support in the construction of concrete or like plastic floors but also useful as centering, shuttering and scaffolding in building operations generally.

One object of the invention is to provide a beam for use as a temporary support in building constructions which may be broken in its length and moved substantially perpendicularly from the surface it supports when the structure needs no further support.

Another object is to provide a beam which does not depend upon telescoping for development of the necessary reaction to the bending movement.

Another object is to provide a beam which breaks contact with the plastic material on disassembling by tension and not by shearing or sliding.

Another object is to provide a beam which can be erected from the floor below that to be built.

Another object is to provide an adjustable and collapsible beam or support consisting of interfitting members of open hollow section formed preferably from sheet metal and pivotally connected together by a sliding connection together with means for locking the members together when the support is in the desired position.

A further object is to provide means for locking the members of the beam or support together so that sagging is prevented.

A further object is to provide hinged supporting lugs at the ends of the beam or support to facilitate removal of the beam or support from the finished work.

According to the present invention the support or beam comprises at least two interfitting or nesting members of open hollow section formed from thin sheet metal or other suitable material pivotally connected together by a sliding connection, means being provided for locking the members together when the support is in the desired position. The connection is such that it allows the two members to move relatively in the manner of a sliding hinge which facilitates erection and dismantling as hereinafter described. The ends of the beam are provided with supporting lugs as usual but these lugs are hingedly attached to facilitate the removal of the beam from the finished work.

To enable the invention to be fully understood it will now be described by reference to the accompanying drawings, in which:

Fig. 1 is an elevation showing a support or beam

constructed according to the preferred form of the invention as applied to the construction of a hollow tile floor.

Fig. 2 is a part sectional end view on the line 2—2 of Fig. 1 drawn to a larger scale, and

Fig. 3 is a side elevation of a portion of the beam showing the locking clips.

Figs. 4 and 5 are a plan and side elevation respectively of one end of the beam showing the preferred method of hinging the supporting lugs.

Fig. 6 is a view similar to Fig. 1 but showing the invention applied to a construction in which the form used is an arc of a circle.

Fig. 7 shows diagrammatically in section the use of the invention for the construction of floors with hollow clay tiles or the like, and

Fig. 8 is a similar view showing a floor construction in which steel or wooden intermediate forms are used for solid slab floor construction.

Fig. 9 shows a method of erection or dismantling of the beam according to the invention.

Fig. 10 is a sectional elevation and

Fig. 11 is a plan view showing the invention applied to a further type of floor.

Referring to Figs. 1 to 3 the beam comprises the two flanged channel members 10, 11 of sheet metal bent into the form shown with the inner or nesting member 11 formed with two grooves or channels 13 with which rollers 14 carried on the inside of the outer member 10 engage (Fig. 2). Obviously the beam could be made with one groove and one roller and if desired the grooves could be replaced by slots. The sides and end of the member 10 are cut back or relieved at 15 adjacent to the rollers to enable the two members to swing about the rollers in the manner of a sliding hinge so that the member 10 can take up a position approximately at right angles to the member 11 as indicated in Fig. 9, the rollers 14 forming with the grooves 13 a sliding hinge or pivot point as will be understood. To rest the beam on the work as indicated in Fig. 1 each end of the beam is provided with a supporting lug 16 shaped as shown and pivoted at 17 to the sides of a slot formed in the end of the beam, the end of the latter being relieved at 18 to provide clearance for erection and collapsing and also recessed at 18a to support the adjacent end of the lug 16 when the beam is in position in the work. The hinges are preferably so arranged that the lugs cannot pivot beyond a position substantially level with the top of the beam. The pivot pin 17 may be left short in the hole on either side or alternatively a hole or lug is provided as shown at 29 and 30 respectively for the purpose of supporting the stirrups carrying

the centering of the supporting beam in cases where the floor is suspended from a cross beam made up of a rolled steel joist encased in plastic material or the like construction. When the beam has been erected in position as indicated in Fig. 1 the two members 10 and 11 are locked together by suitable means here shown as clips each consisting of a toggle lever 19 pivoted at 20 to the flange of the member 10 and engaging one end of a link 21 shaped to embrace the flange of the member 11 on each side. A lug or eye 22 is secured to the member 10 for attachment of a tackle 23 and several such lugs may be provided if desired.

A beam constructed as above described may be used in constructing a floor as follows:

Referring to Fig. 9. The two members 10, 11 having been assembled by nesting the one within the other and engaging the rollers 14 in the channels 13 the outer ends of the members are raised to the abutments 22a of the new floor level and the hinged lugs 16 are held in position in said abutments. This causes the two members to move relatively in the manner of a sliding hinge as shown. The tackle 23 is then applied and the inner end of the member 11 is raised until the two members are in alignment; the toggles 19 are then adjusted to hold the two members rigidly together (Fig. 1). The floor is then applied on the upper side of the beam and when it is finished the toggles are unlocked allowing the two members of the beam to be pulled down again into the position shown in Fig. 9 and finally the hinged lugs 16 are prised clear of the abutments and the beam is removed.

Figs. 10 and 11 show the application of the invention to a floor construction wherein the whole of the centering is slung from a cross beam such as a steel joist 40 embedded in some plastic material placed at the same time as the floor. In this construction an endless stirrup 32 of steelbar is placed over the joist 40 and the lugs 16 of the members 10, 11 are inserted in the loops of the stirrup 32 as shown and if necessary bound in place by light wire ties passed through holes formed in the lugs. The shuttering 34 of the joist 40 is then placed in position and held in place by a stirrup 35 supported in holes 30 formed in the members 10, 11 or if desired the holes 30 may be replaced by lugs over which the stirrup is hooked.

In disassembling the lugs 16 are prised clear shearing the light wire ties, if any, the stirrup 32 being left buried in the plastic material. Fig. 10 shows the plastic floor 41 in position.

Fig. 6 shows the invention applied to a curved beam, the members 10, 11 and lugs 16 being as described with reference to Fig. 1 except that the members 10, 11 are curved and the lugs 16 do not pivot beyond a position substantially level with the ends of the members 10, 11.

Fig. 7 shows the invention used to support a floor made of hollow clay or precast concrete tiles 24 with the main beams 25 of plastic material cast in situ. A series of beams A constructed according to the invention are indicated diagrammatically.

Fig. 8 shows a series of beams A supporting a floor consisting of a solid slab 26 of plastic material cast in situ, the spaces intervening between the means being supported by metal or wood forms 27 supported at the joint planes by wood or similar chocks 28 suitably spaced and resting on the out-turned flanges at the bottom of the webs of the beams A.

It will be understood that a beam constructed as hereinbefore described is rendered incapable

of sagging by the use of the locking clips referred to. The beam does not depend upon telescoping for development of the necessary reaction to the bending moment and in which the metal is not most economically disposed for this purpose and in addition the beam breaks contact with the plastic material on disassembling by tension and not by shearing or sliding. Further the beam can be erected from the floor below that to be built, which is a great advantage in practice. The improved beam is preferably formed from two inserted channel members of rectangular cross-section arranged with bases uppermost and having deep sides with out-turned flanged edges but other forms of open hollow section or sections with out-turned or plain edges may be employed. The webs of the channels can be pierced or latticed for lightness if desired, but the section should be so shaped that it is symmetrical in regard to a vertical central plane so that it is centrally loaded by the weight coming upon it.

Other forms of sliding pivotal connections may be employed for the members forming the beam and a beam may consist of more than two members. Various means may be designed for locking the members of the beam together when in the working position, and bolts may be used if desired.

Although the improved beam according to the invention is most usefully applied to the construction of floors and the like, it may be used for the supporting of vertical surfaces thus acting as a walling. In its curved form the beam may be used in the construction of arches and the like.

I claim:

1. An adjustable and collapsible support for use as a temporary support in building operations comprising two interfitting sheet metal members of open hollow section, a groove in one of said members, a fixed pivot on the other of said members engaging said groove and providing a sliding pivotal connection between said members and means for locking the said members together when the support is erected in position.

2. An adjustable and collapsible support for use as a temporary support in building operations comprising interfitting inner and outer channel members arranged with their bases uppermost said inner member having a groove in each side, a roller on each side of the outer member engaging in one of the grooves on the inner member and means for locking the said members together when the support is erected in position.

3. An adjustable and collapsible support for use as a temporary support in building operations comprising interfitting inner and outer channel members arranged with their bases uppermost the inner member having a longitudinal groove in each side, a roller on each side at one end of the outer member each roller engaging in one of the grooves on said inner member, the said end of said outer member being relieved adjacent to the rollers allowing relative movement between the two members in the manner of a sliding hinge and locking means for clamping the said members together when the support is erected in position.

4. An adjustable and collapsible support for use as a temporary support in building operations comprising in combination inner and outer sheet metal channel members, the inner member having a groove therein, a fixed pivot at one end of the outer member engaging and sliding in said groove, the said end of said outer member being relieved adjacent to said pivot, the end of each member remote from said pivot being shorter on

the bottom side than on the top, a hinged supporting lug pivoted to said ends of said members remote from the pivot and means for clamping the two members together when the support is erected in position.

5 5. An adjustable and collapsible support for use as a temporary support in building operations comprising in combination inner and outer interfitting sheet metal members of open hollow section, said inner member having a groove therein, a fixed pivot at one end of said outer member engaging and sliding in said groove, the end of said outer member adjacent to the pivot being relieved, the end of each member remote from
10 said pivot having a slot therein, a hinged supporting lug pivoted in each of said slots, means to prevent said lugs pivoting beyond a position level with the top of the support, said slotted ends of said members being shorter on the bottom side than the top and means for clamping
15 said members together when said support is erected in position.

25 6. An adjustable and collapsible support for use as a temporary support in building operations comprising in combination inner and outer interfitting sheet metal members of open hollow section, said inner member having a groove therein, a fixed pivot at one end of said outer member engaging and sliding in said groove, the end of
30 said outer member adjacent to the pivot being relieved, the end of each member remote from said pivot having a slot therein, a hinged supporting lug pivoted in each of said slots, means to prevent said lugs pivoting beyond a position
35 level with the top of the support, said slotted ends of said members being shorter on the bottom side than the top, outturned flanges formed on the open sides of said members, links embracing said flanges and toggle levers pivoted to said
40 flanges and engaging said links to clamp said members together when the support is erected in position.

7. An adjustable and collapsible structure for use in building operations comprising in combination a joist, supported in its length, a stirrup

placed over said joist and having loops therein at each side, two adjustable and collapsible supports each comprising two interfitting sheet metal members of open hollow section, one of said members having a groove therein, a pivot on the
5 other of said members engaging and sliding in said groove and hinged members at the ends of said members remote from said pivot, said hinge members being inserted in the loops in said stirrups, the said ends of said members remote from
10 said pivots having holes therein, a stirrup underlying said joist and having portions thereon engaging said holes and means for locking each of said supports when erected in position.

8. An adjustable and collapsible support for
15 use as a temporary support in building operations comprising two interfitting members of open hollow section, a sliding connection pivotally connecting said two members together so that relative movement can take place between the two
20 members in two planes, and means for locking the members together when the support is erected in position.

9. An adjustable and collapsible support for use as a temporary support in building operations comprising a plurality of interfitting members
25 of open hollow section, sliding connections pivotally connecting each pair of said members together, and means for locking the members together when the support is erected in position.

10. An adjustable and collapsible support for use as a temporary support in building operations comprising two interfitting members, and means including a pivot whereby the members may have
30 telescopic movement and a swinging motion about the pivot.

11. An adjustable and collapsible support for use as a temporary support in building operations comprising two interfitting members, means including a pivot whereby the members may have
40 telescopic movement and a swinging motion about the pivot, and means engaging both members for locking the members together when the support is in operative position.

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