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FORM HOLDER FOR CONCRETE WALLS

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Fig. 1.

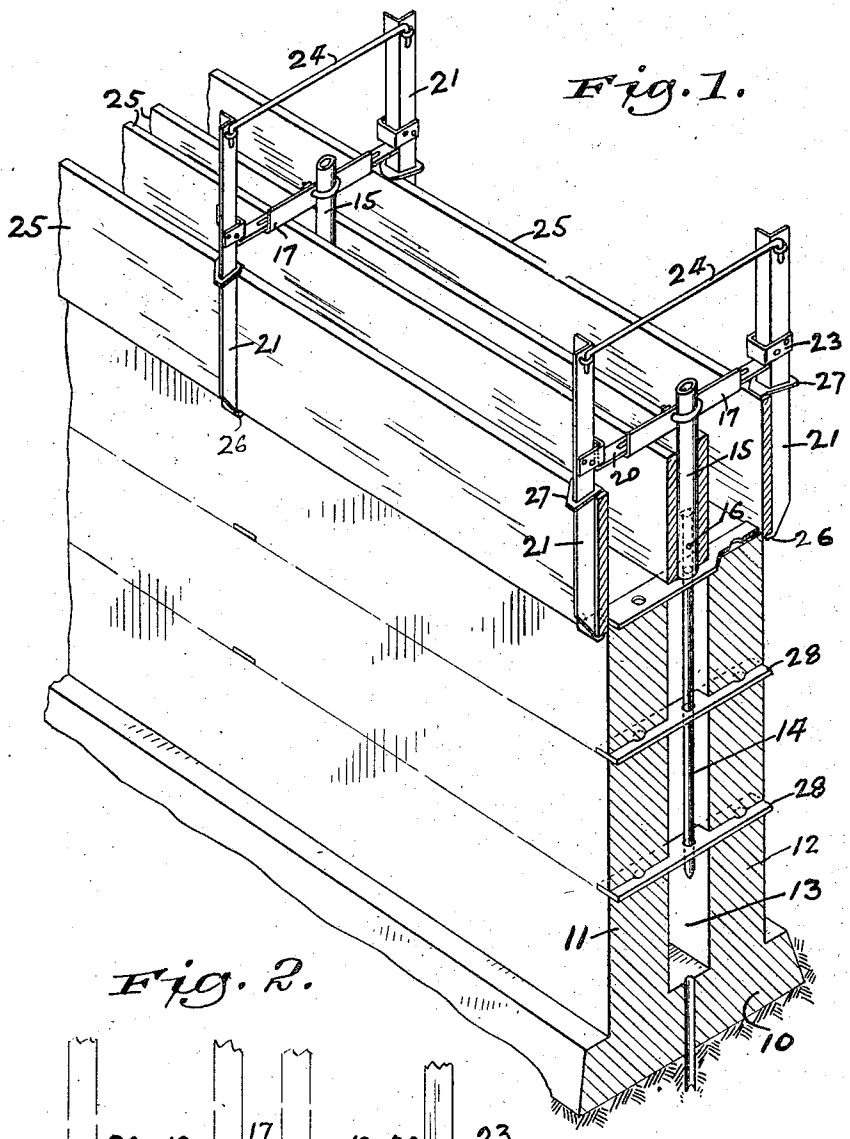
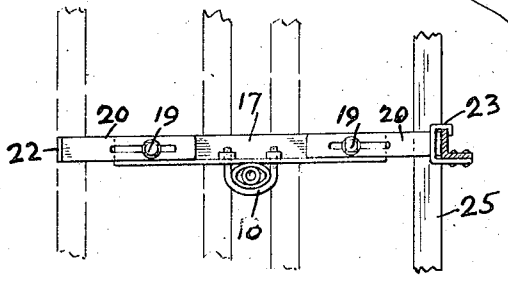


Fig. 2.



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UNITED STATES PATENT OFFICE.

ERNEST WATSON, OF WAUWATOSA, WISCONSIN.

FORM HOLDER FOR CONCRETE WALLS.

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To all whom it may concern:

Be it known that I, ERNEST WATSON, a citizen of the United States, and a resident of the city of Wauwatosa, county of Milwaukee, and State of Wisconsin, have invented a new and certain Improvement in Form Holders for Concrete Walls; and I declare the following to be a clear, exact, and complete description thereof, such as will enable persons skilled in the art to which the invention relates to make and use the same, reference being had to the accompanying drawing for an exposition of a constructional form in which my invention has been embodied.

My invention relates to devices adapted to form double concrete walls, which in the wall of a building are separated by an air space, the presence of which is recognized as conducive to the maintenance of a more equable temperature in the building at all seasons.

The invention comprises a portable apparatus which may be readily installed in position for sustaining the form or mold sections into which the concrete is poured in the construction of the wall, and to be quickly moved upon the completion of one course so as to be positioned for another pouring.

The invention comprises a central standard or post which is adapted to serve as a distance piece for the separation of the mold sections which demark the opposed inner surfaces of the walls which bound the air space, such standards or posts serving also to support cross heads, from which depend certain arms the purpose of which is to position the mold sections which demark the positions of the outer surfaces of the hollow wall.

The depending arms are supported at the ends of the cross head in a manner which enables them to be held rigidly in position during the operation of pouring the concrete. At the conclusion of this operation the rigidity of the arms may be relaxed so as to relieve the outer mold sections from the frictional engagement caused by the pressure of the wet concrete, and enable the said mold sections to be easily withdrawn prior to positioning for another operation. The said arms are detachable from the cross head, so as to permit the convenient placing of the form sections, and may be packed in small space for convenient transportation, at the completion of the work of erecting the wall.

The central standard or post is so constructed that a partial rotation of the same will free the inside mold sections from frictional engagement, to enable such mold sections to be easily withdrawn.

The central standard or post is moved upward as the erection of the wall progresses, and in such upward movement follows a fixed path which is projected at the time of laying the first course of concrete, so that perfectly true walls may be produced by the use of the simple devices comprising my invention.

The novel features of my invention will be pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a perspective view of a section of a hollow or double wall in the course of erection, and showning the application of my invention in the production of such wall.

Fig. 2 is a plan view on a line a little above the cross head, one of the depending arms of the latter being shown in section and the other omitted.

Referring now to the drawing which accompanies this specification, the numeral 10 indicates the usual footing of the wall of a building, the said footing being surmounted by two separated walls 11 and 12, having an air space 13 between them, as is usual in constructions of this nature.

Preparatory to the pouring of the concrete to form the footing 10, a succession of standards or posts 14 are stuck into the bottom of the trench and placed in such position as to be in the line of the central vertical plane of the wall throughout its extent. The standards or posts 14 will be employed in numbers and spaced a suitable distance apart, entirely around the building, so that when the form sections are in place, the pouring of a complete layer of concrete may be effected in quick order. I may here state that it is possible to completely pour a layer of concrete in the erection of the wall of a dwelling house in a surprisingly short time after the forms have been positioned in connection with my improvements, and that at the conclusion of the pouring of such layer the concrete in that portion of the wall which was first poured has received its initial set. Therefore the form holding devices may be expeditiously adjusted and the form sections arranged for the pouring of another layer of concrete in less time than is required for the pouring of such a layer.

The standards or posts 14 may be formed

conveniently of iron or steel rods pointed at their lower ends for easy setting in the ground at the bottom of the trench. A sleeve 15 of tubular formation, and elliptical in section for a purpose which will be hereinafter described, is attached to the upper end of the standard or post 14, by any convenient means, as for instance a pin 16 passing through both parts.

The cross head 17, conveniently formed as an angle bar, is adjustably secured upon the elliptical sleeve or flattened tube 15, by means of a shackle 18, but when once adjusted in position with relation to the standard or post 14, further adjustment of the cross head in the particular mentioned will not be necessary.

The horizontal flange of the cross head 17 is perforated for the reception of bolts 19 which pass through slots in longitudinal extensions 20 of the cross head, the said extensions lying in the angle of the cross head and being retained in any desired position by means of the bolts 19. The purpose of the slotted construction mentioned is to enable the extensions 20 to be adjusted longitudinally upon the cross head, so as to permit the distance between the arms 21 depending from the cross head to be varied for the production of walls of different overall thicknesses. The outer end of each of the extensions 20 is upturned as at 22, and a loop 23 attached to the depending arms 21 is adapted to receive the said upturned ends and support the said arms in proper vertical position upon the cross head. The depending arms 21 may be conveniently formed as short sections of angle iron, in order to endow the structure with the necessary strength, without unduly increasing the weight thereof.

After the standards or posts 14 carrying the cross heads 17 with the extensions adjusted to produce a wall of the desired thickness, have been aligned in the bottom of the trench, the arms are hung in position at the ends of the cross head. The upper ends of the arms 21 are provided with eyes or other means which are engaged by a spacer 24, acting both as a tension and compression member, and serving to maintain the said depending arms rigidly in position with their inner faces in parallel vertical planes. The loose form or mould sections 25, four of which are necessary in producing the double wall area, are placed as shown. The inner form sections bear upon the flattened tube 15 in the line of its longer diameter. The outer form sections bear against the lower opposed faces of the depending arms 21, which latter may be slightly inturned as at 26 to form a step upon which the outer form sections may rest, by reason of the engagement of the said step with the lower edge of the form section. Sliding clips 27 may encircle the depending arms just under the cross head, and may rest upon the upper edges of the form sections so as to retain the same in their position of engagement with the inner faces of the depending arms 21.

Upon completion of the pouring of the first course of the concrete, the spacers 24 are removed from engagement with the arms 21, and the latter are thus freed for a slight rocking movement, the loops 23 pivoting on the upturned ends 22 extending from the cross head. Such rocking movement of the arms 21 releases the outer form sections 25, so that the latter may be removed from the device. Following this operation, the further operations will be facilitated by lifting the depending arms from their engagement with the cross head. The cross head will now be given a turn of about 90°, and this partial rotation imparted to the flattened tube 15 will cause the longer diameter of the tube to stand in the line of the direction of the wall, and thus the inner form sections 25 are released from pressure and may be removed. By lifting upon the cross head 17, the standard or post 14 may be withdrawn from the ground.

For the purpose of determining the fixed path which the standards or posts 14 shall follow in their upward movement, I provide short strips 28, preferably of thin galvanized metal, and having a length equal to the overall width of the double wall. The said metal strips 28 are centrally perforated for the guidance of the standard or post 14, and are provided with perforations near their ends, into which the concrete may flow. After the standards or posts have been withdrawn upon the completion of the bottom course of concrete, the strips 28 are placed upon the top of such course, and the standards or posts 16 are passed through the central holes therein. The entrance of the pointed end of the standard or post into the hole previously formed in the base 10, will position the said standards or posts, the lower end of the tube 15 resting upon the uppermost metallic cross piece 28. The inner form sections 25 will be placed in their position of engagement with the flattened tube 15 in the line of the longer diameter of the latter. The depending arms 21 will be hooked upon the cross head, the outer form sections 25 placed in position and the structure made rigid by means of the spacers 24. This operation is followed entirely around the building. When all of the devices have been installed, another course of concrete is poured.

At the conclusion of such second pouring the devices are disassembled as before described, and then reassembled for the pouring of another course. Only slight care is necessary to see that in the pouring of the early courses, the standards or posts 14

maintain their position in the vertical plane of the centre of the double wall. Thereafter, with the standard or post restrained from vibrating movement by two of the cross pieces 28, the fixed path of upward movement of the standards or posts 14 in the progressive construction of the wall is assured.

The form sections 25 may be of any desired width and length and of any suitable material. The distance by which the standards or posts are separated in the direction of the length of the wall will be determined by the particular circumstances attending the construction. The compactness of my device contributes to its serviceability inasmuch as the depending arms are immediately detachable from the cross head, which latter may be easily removed from its connection with the standard or post. These four elements together with the spacer 24, may be packed in parallel and bundled in sets for convenient handling and storage, when not in use. The ease with which the devices embodying my invention can be positioned for one pouring of concrete and then positioned for another, has materially lessened the time heretofore required in similar operations.

As to the form or mould sections 25, my invention contemplates the use for these parts of low grade lumber, which upon the completion of the concrete work, is used for sheathing in the further building operations. It is not necessary, therefore, to provide special form or mould sections as a part of the equipment. When the work of pouring the concrete is finished, nothing should be taken away except the standards or posts 14 and their connected parts, which as before indicated may be packed in small space for transportation. The use of my invention greatly reduces the preliminary steps in casting the wall and obviates the transportation of large and bulky forms and moulds, such as now are generally used. The loose form or mould sections employed in connection with my invention, are merely temporary expedients, which are later incorporated in other relations as a permanent part of the building.

Although I have described my invention as primarily designed for use in the construction of hollow concrete walls, it is to be understood that my invention is not limited to such use, inasmuch as the post or standard with the cross-head and depending arms may be used to support the form sections used in the construction of a solid wall.

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

1. A device for supporting loose form sections used in erecting concrete walls, the said device comprising a standard or post adapted for vertical movement within the wall, a cross-head supported upon the said standard or post, and arms depending from the cross-head to hold such loose form sections in position for the casting of the wall.

2. A device for supporting loose form sections used in erecting concrete walls, the said device comprising a standard or post adapted to be vertically moved within the wall, a cross-head supported upon the said standard or post, arms depending from the cross-head to hold such loose form sections in position for the casting of the wall, and adjustable connections between the standard or post and the arms, whereby the distance between such arms may be varied in forming walls of different thickness.

3. A device for supporting loose form sections used in erecting concrete walls, the said device comprising a standard or post adapted to be vertically moved within the wall, a cross-head supported upon the standard or post, and depending arms removably mounted upon the cross-head to hold such loose form sections in position for the casting of the wall.

4. A device for supporting loose form sections used in erecting concrete walls, the said device comprising a standard or post adapted to be vertically moved within the wall, a cross-head supported upon the standard or post, depending arms rocking upon the cross-head, and means to sustain the said arms rigidly to hold such loose form sections in position for the casting of the wall.

5. A device for supporting loose form sections used in erecting concrete walls, the said device comprising a standard or post adapted to be vertically moved within the wall, a cross-head supported upon the standard or post, arms depending from the cross-head to hold such loose form sections in position for the casting of the wall, and a stop on the standard or post for maintaining its vertical position.

6. A device for supporting loose form sections used in erecting concrete walls, the said device comprising a standard or post adapted to be vertically moved within the wall, a cross-head adjustably supported upon the standard or post, and arms depending from the cross-head to hold the form sections in position for the casting of the wall.

7. A device for supporting loose form sections used in erecting hollow concrete walls, the said device comprising a standard or post to be arranged within the hollow wall and serving to space the form sections therein, a cross-head supported upon the standard or post, and arms depending from the cross-head to hold such outer loose form sections in position for the casting of the wall.

8. A device for supporting the form sections used in erecting hollow concrete walls,

the said device comprising a standard or post for arrangement in the hollow of the wall and serving to space the inner form sections, the said standard or post having a plurality of diameters, whereby when the post is given a movement of partial rotation the pressure of the longer diameter upon the inner form sections is relaxed, to permit the removal of such form sections.

9. A device for supporting the form sections used in erecting hollow concrete walls, the said device comprising a standard or post adapted for arrangement within the wall, a cross-head attached to the said standard or post and having removable arms for supporting the outer form sections carried by the cross-head, and means comprising a larger diameter of the standard or post for maintaining the inner form sections in position for the casting of the wall, the standard or post being rotatable to withdraw the longer diameter thereof from engagement with the inner sections, and release the pressure upon the latter.

10. A device for supporting the form sections used in erecting hollow concrete walls, the said device comprising a standard or post adapted for arrangement within the wall and for vertical adjustment with the progressive erection of the wall, a stop on the said standard or post for maintaining the latter in vertically adjusted position, a cross-head supported upon the standard or post, with arms depending therefrom to hold the outer form sections in position, the said standard or post being adapted to space the inner form sections to form the hollow in the operation of casting the wall.

11. In concrete wall construction, a plurality of cross pieces adapted for incorporation in the wall and provided with vertically aligned perforations, a post guided for vertical movement in the said perforations, and means at the top of the said post for supporting the form sections used in erecting the wall.

12. In concrete wall construction, a plurality of cross pieces provided with aligned perforations, a post guided for vertical movement in the said perforations, means on the post for engaging one of the cross pieces to support the post in its vertical position, and means at the top of the post for supporting the form sections used in erecting the wall.

13. In concrete hollow wall construction, a plurality of cross pieces having vertically aligned perforations, a post guided therein, means at the top of the post for supporting the outer form sections used in erecting the wall, and means on the post for spacing the inner form sections.

14. In concrete hollow wall construction, a plurality of cross pieces embedded in the wall and bridging the space between the sections thereof, a post supported interiorly of the wall by one of the said cross pieces and provided at its upper end with means for supporting the outer form sections used in erecting the wall, and also with means for spacing the form sections in the hollow of the wall.

15. In concrete wall construction, a plurality of cross pieces bridging the space between the wall sections and provided with vertically aligned openings, a post of different diameters, the part having the lesser diameter entering the said perforations to guide the post vertically and the part of larger diameter resting upon the upper cross piece to support the post in vertical position, and means carried by the enlarged part of the post for supporting the outer form sections used in erecting the wall.

16. In concrete wall construction, a plurality of cross pieces bridging the space between the wall sections and provided with vertically aligned openings, a post of different diameters, the part having the lesser diameter entering the said perforations to guide the post vertically and the part of larger diameter resting upon the upper cross piece to support the post in vertical position, and means carried by the enlarged part of the post for supporting the outer form sections used in erecting the wall, the enlarged diameter of the post serving also to space the inner form sections in the hollow of the wall.

17. In hollow concrete wall construction, a post of enlarged diameter at its upper end to space the form sections in the hollow of the wall, and provided with means for supporting the outer form sections, a plurality of cross pieces bridging the space between the wall sections and provided with aligned perforations for guiding the post in its vertical movements, the uppermost of such cross pieces supporting the post in vertical position by engagement with the enlargement thereof.

In testimony whereof, I have signed my name at Milwaukee, this 15th day of April, 1922.

ERNEST WATSON.

Witnesses:
W. F. WOOLARD,
H. C. BECK.