Sept. 10, 1929. W. R. SPROUL ET AL 1,727,791

CONCRETE BUILDING CONSTRUCTION

Filed March 26, 1928

Fig. 1

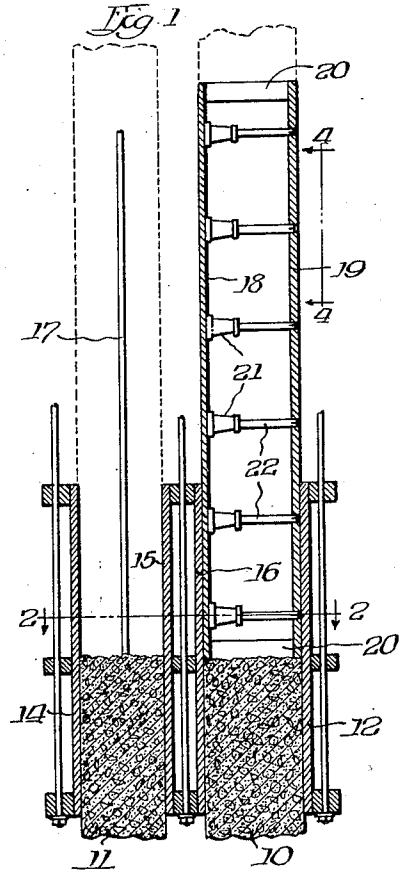


Fig. 3

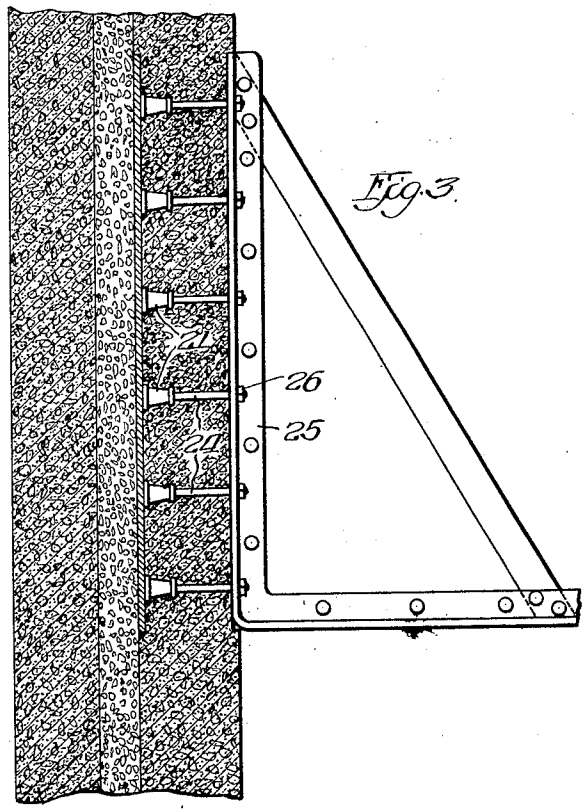
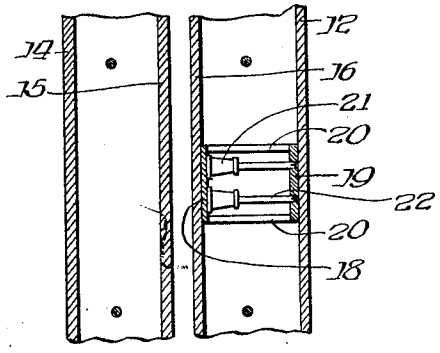


Fig. 2



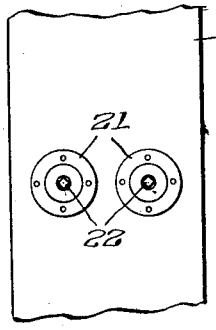


Fig. 4

Witness:

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UNITED STATES PATENT OFFICE.

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CONCRETE BUILDING CONSTRUCTION.

Application filed March 26, 1928. Serial No. 264,619.

This invention relates to concrete building construction, and pertains particularly to such construction wherein the walls are formed as monolithic structures by successive pourings of concrete. It is concerned with method and devices employed in conjunction with the use of so-called slip forms of the type wherein the forms which constitute the mold faces for the wall surfaces are elevated from time to time during the building up of the wall, to receive the successive pourings of concrete. The invention is concerned primarily with method and devices for the positioning and embedding in the concrete wall, in the course of its erection, of anchor members adapted to form fastenings or connections whereby metallic structure members, or the like, may be affixed to the wall as for the supporting canopies, joists or other parts of the building structure.

A general object of the invention is the provision of method and means whereby suitable anchorages may be provided in the concrete wall during the course of its erection, in accurately definite location and relationship, without involving any interference or complications in the construction or handling of the slip forms.

Another object is the provision of such method and means which involves a minimum handling of parts on the job.

Another object is the provision of method and means which will provide an arrangement whereby the attachment of the desired structural members to the wall in accurate position and with secure connection is facilitated, and without requiring chipping of the wall.

Yet another object is the provision of such method and means which will obtain a secure embedding and bonding of the anchorage members in the wall.

Other and further objects will be pointed out or indicated hereinafter or will appear to one skilled in the art upon an understanding of the invention or its employment in practice.

For the purpose of aiding in the explanation of the invention, we show in the accompanying drawing forming a part of this specification certain arrangements of means and apparatus whereby the invention may be utilized, but it is to be understood that these are presented for purpose of illustration only, as the invention is not to be regarded as limited to the particular structural forms here shown.

In said drawing

Fig. 1 is a part sectional elevation of a wall under construction, taken transversely of the wall, and showing the relationship of portions of the slip form and anchorage supports;

Fig. 2 is a fragmentary horizontal section taken on substantially line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional elevation corresponding to Fig. 1 but showing the wall portions in completed condition and a bracket attached to the inner wall, and

Fig. 4 is a fragmentary section illustrating a feature of the anchor support, same corresponding to a view taken at 4—4 of Fig. 1 but with the outer plate of the anchor support removed.

In many concrete buildings it is desirable to provide secure anchorage in the walls or other places for the connection of various structural members of the building. Such anchorages must be firmly seated in the wall and, if the connection of the supported members are to be accomplished satisfactorily, such anchorages must be accurately positioned and must be easily accessible. The present invention provides an arrangement and a method of operation whereby these and other important advantages are attained.

An understanding of the method and devices may be most clearly had by reference to the examples illustrated in the drawings. In Fig. 1 is illustrated the relation of certain parts at a certain point in the erection of a double concrete wall, the reference numeral 10 designating one of the collateral wall portions and the reference numeral 11 the other. Portions of the slip form panels are designated 12, 14, 15 and 16, the two first indicated being the panels for the outer wall surfaces and the two last mentioned being form panels for the inner or adjacent wall surfaces which bound an insulating space between the

collateral wall portions. It will be understood that these wall panels are carried on one of the customary frames whereby they may be elevated from time to time on the jack rods 17, to extend the mold cavity above the portions of the wall already poured, to accommodate the additional pourings of concrete. These form panels are guided by their supporting frame and the portions of the wall already poured, to remain in parallel relationship. The wall having been built up by successive pourings to a point where it is desired to provide a connecting arrangement for a structural member or the like, an anchor supporting frame is positioned in the desired location on the wall and in the mold cavity. The form of anchor supporting frame here shown comprises a back plate 18 and a face plate 19, which are maintained in the desired parallel relationship by spacers 20, to form a skeleton-like frame. In the desired locations and relationships, the anchor members or sockets 21 are secured to the back plate 18. These anchor members or sockets are threaded internally to take stub bolts 22, which are threaded therein and which have their other ends of polyhedral form and seated in apertures in the face plate 19. The assembling of these anchor supporting frames with the anchor members and stub bolts is done in the shop, where the work may be accomplished with facility and with accuracy. The face and back plates and spacers preferably are wood. The completed assembly of the anchor-supporting frame and the anchoring members forms a rigid structure wherein the anchor members are retained definitely and accurately in place, and the width of the frame, longitudinally of the anchor members, corresponding to the thickness of the wall in which the anchor members are to be embedded. So, the frame with its contained anchor members may be handled effectively and positioned with facility at the desired position in the mold cavity, the plates 18 and 19 cooperating with the opposite wall forms as guides, whereby the socket members 21 are automatically given the proper location with respect to the thickness of the wall. The pouring of the concrete then proceeds in the usual fashion, the concrete finding easy access into the space between the plates and around the anchor members and stub bolts. The slip form is elevated from time to time as the wall is built up. Thus, in the course of the procedure, all of the anchor members and stub bolts are closely embedded and bonded in the concrete.

After the wall has been built up to the desired height, and it is desired to make the connection of a structural member, the face plate 19 is torn out, thus leaving a depression in the face of the wall, into which depression the ends of the stub bolts project. These bolts are then engaged by a suitable wrench and screwed out of the anchor members and withdrawn from the wall. This leaves in the wall openings through which the connecting bolts 24 may be inserted from the outside and screwed into the anchor members, said connecting bolts being equipped at their outer ends for the connection of a bracket 25, or other structural member, as by means of nuts 26, and by virtue of the definite positioning of the anchor members obtained by the procedure and means above described, accurate locating of the connection bolts is thus automatically attained, so that they will register properly in the bolt holes punched in the structural member in accordance with the predetermined design of the structure. Thus the loss of time and labor involved in chipping the concrete or specially punching the structural members is obviated. Very secure anchorage and connection are obtained, as the anchor members are individually surrounded by the concrete and bonded therein. The nature of the anchor-supporting frame also accommodates the placing of reinforcing bars both horizontally and vertically in the wall and in any desired association with the anchor members. The guiding cooperation of the slip form with the frame insures the proper location of the anchor members in respect to the wall's thickness, and the desired vertical position of the anchor frame may be maintained by suitable guidance on the slip form frame.

What we claim is:

1. In the building art, a method which comprises arranging forms to provide a mould cavity for a wall portion, assembling and securing a plurality of separate anchoring members in a definite relationship, disposing same conjointly in their assembled relationship within the mould cavity and in cooperative association with the forms, disposing a concrete mixture in the mould cavity about the anchoring members, permitting the concrete to set with the anchoring members embedded therein, removing the forms, and securing a supported member to the anchoring members for support by the wall.

2. In the building art, a method of construction which comprises arranging forms to provide a mould cavity for a wall portion, mounting separate anchoring members in a definite relationship, connecting removable core members to said anchoring members, positioning the mounted members collectively within the mould cavity and in cooperative association with the forms, placing concrete mixture within the mould cavity and about the anchoring members and core members but leaving portions of the latter projecting from the concrete, permitting the concrete to set with the anchoring members and core members embedded therein, removing the forms and leaving the anchoring members and core members in the concrete, and sub-

sequently removing the core members from the anchoring members and from the concrete by manipulation of their projecting portions, inserting connecting members through the spaces left in the concrete by the removal of the core members, securing said connecting members to the anchoring members within the concrete structure, and attaching a separate member to the concrete structure through the medium of said connecting members.

3. A construction device for concrete structures comprising, in combination, a movable frame adapted for cooperation with opposite wall forms, a plurality of anchoring members mounted in the frame in definite spaced relationship, core members demountably connected with the anchoring members, said frame accommodating passage of fluid concrete into enveloping contact with said anchoring members and core members, portions of said frame being removable to afford access to the core members after they and the anchoring members are embedded in concrete within the frame.

4. Apparatus for concrete construction comprising, in combination, a substantially rigid movable frame adapted to be placed within the mold cavity of a concrete form, a plurality of separate anchoring members mounted in said frame in fixed relative positions, core members demountably associated with the anchoring members, portions of the frame adapted for cooperation with opposite sides of the form to determine the position of the anchoring members transversely of the wall, said frame being of open construction so as to afford access of concrete mixture to enveloping contact with said anchoring and core members.

5. Apparatus for concrete construction comprising a movable frame adapted to be positioned in the mold cavity of a concrete form, said frame having a removable portion adapted for contact with one of the mold surfaces of the form, a plurality of separate anchoring members mounted in definite spaced relationship in the frame and spaced from said removable portion thereof, and demountable core members mounted in fixed relationship with the anchoring members and terminating within the cross sectional area of the removable portion of the frame, the frame accommodating ingress of concrete mixture into enveloping contact with the anchoring members and core members.

6. Apparatus for concrete construction comprising, in combination, a movable frame adapted to be placed within the mold cavity of a wall form, said frame having front and back plates with their outer surfaces spaced apart approximately the thickness of the wall, anchoring members mounted in definite spaced relationship on the back plate, and core members supported by the front plate and removably associated with respective anchoring members, said frame accommodating ingress of concrete mixture into enveloping contact with the anchoring members and the core members.

7. Apparatus for concrete construction comprising, in combination, shiftable form panels spaced apart to afford an intervening mold cavity, a frame positioned between said panels and having contact therewith at the opposite sides of the mold cavity, said frame accommodating sliding movement of the panels along the same, anchoring members mounted in the frame in fixed relationship and demountable core members maintained in definite association with the anchoring members and extending in the frame into proximity with one of the form panels, said frame accommodating ingress of concrete mixture into enveloping contact with the anchoring members and core members, and the core members being removable from the concrete to afford openings accommodating attachment of connections to the anchoring members within the wall.

In testimony whereof we have hereunto subscribed our names.

WILFORD R. SPROUL.
HUGO LAYER.