United States Patent [19]

Stickler, Jr.

[11] **3,742,102**

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[54] **METHOD OF MAKING A CAST CONCRETE HOUSE HAVING INTEGRAL WALLS AND ROOF USING MOBILE INTERIOR FORMS**

[75] Inventor: **Charles W. Stickler, Jr.**, Mohnton, Pa.

[73] Assignee: **Gray Tech Industries, Inc.**, Mohnton, Pa.

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[21] Appl. No.: **200,060**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 123,539, March 12, 1971, abandoned.

[52] **U.S. Cl.**..... **264/32,** 52/79, 52/88, 52/90, 52/741, 249/185, 264/31, 264/219, 264/256

[51] **Int. Cl.**..... **B28b 7/04,** E04b 1/16, E04b 1/32

[58] **Field of Search**..... 264/31, 32, 219, 264/256; 249/178, 180, 194, 170, 161, 163, 171, 192, 10, 11, 12, 185; 425/62; 52/79, 87, 88, 90, 747

[56] **References Cited**

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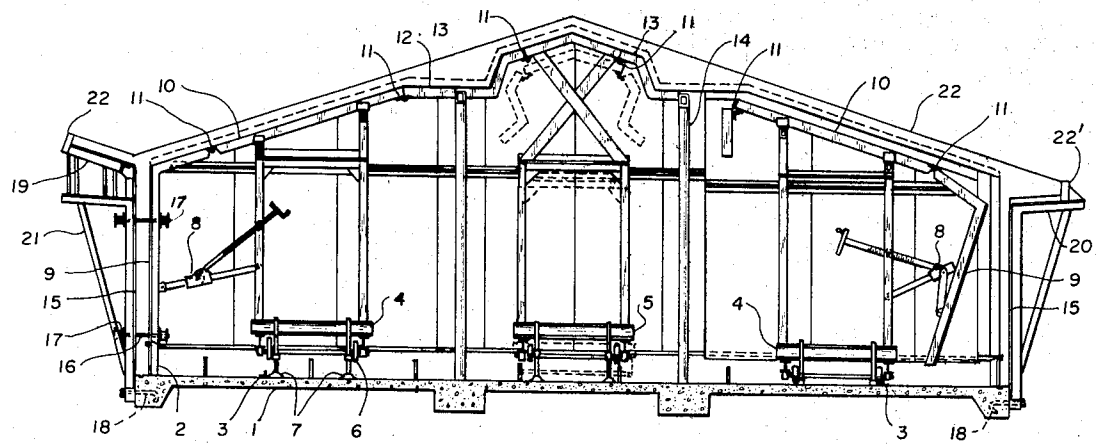
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Primary Examiner—Donald J. Arnold
Assistant Examiner—W. E. Hoag
Attorney—William J. Ruano

[57] **ABSTRACT**

This invention relates to a cast monolithic house and to a method for casting, simultaneously, the roof, end wall and sidewalls thereof at the site. The method involves hinging together roof and sidewall forming portions of a form and lifting such form into place by wheeled carriers which are guided by jigs on the floor of the house. Jacks, mounted on the wheeled carriers, will lift the form into place. Wall form positioning linkage is connected between the wheeled carriers and the sidewall forming portions of the form to retract or expand them into normal vertical position in wedging relationship with floor bucks serving as base portions of said sidewall forming portions.

6 Claims, 6 Drawing Figures



3 Sheets-Sheet 1

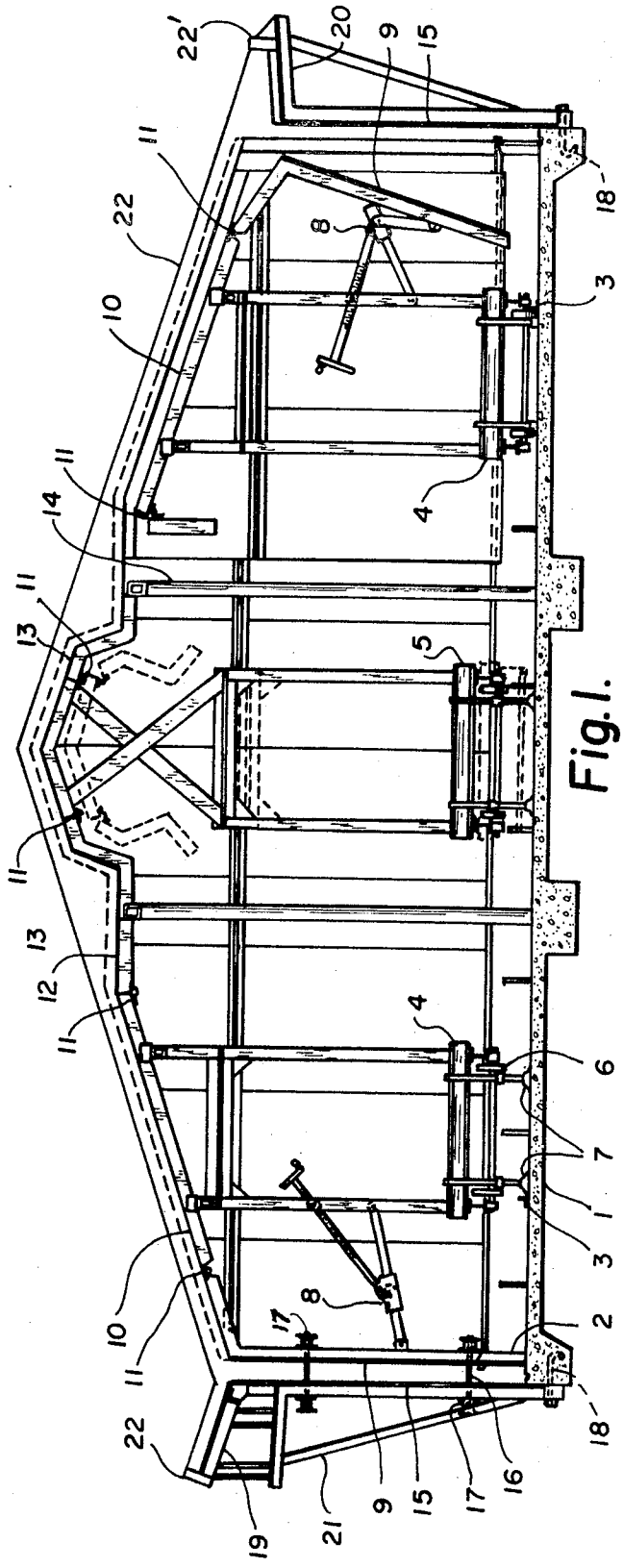


Fig. 1.

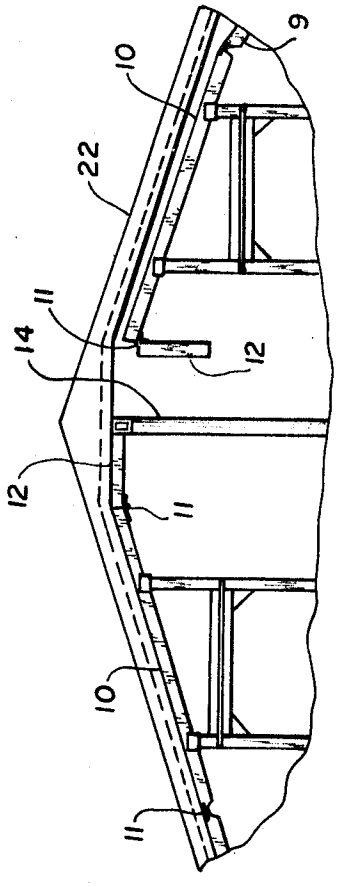


Fig. 2.

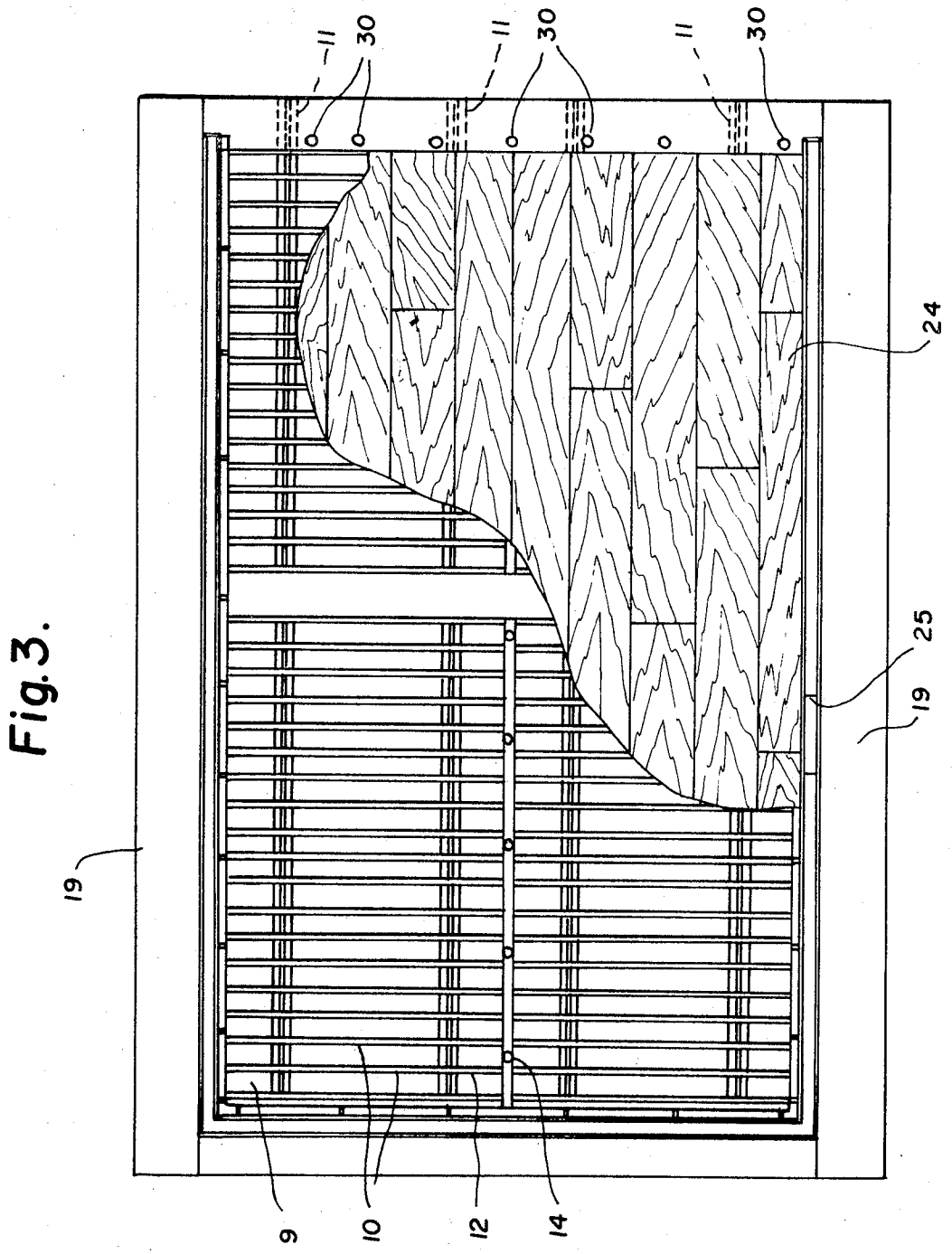
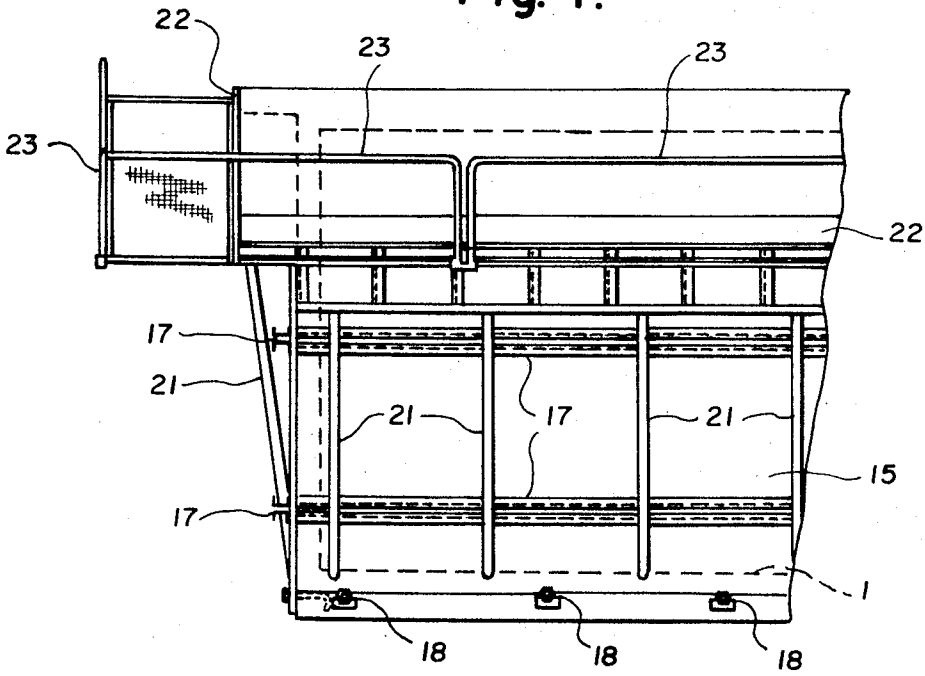


Fig. 3.

Fig. 4.



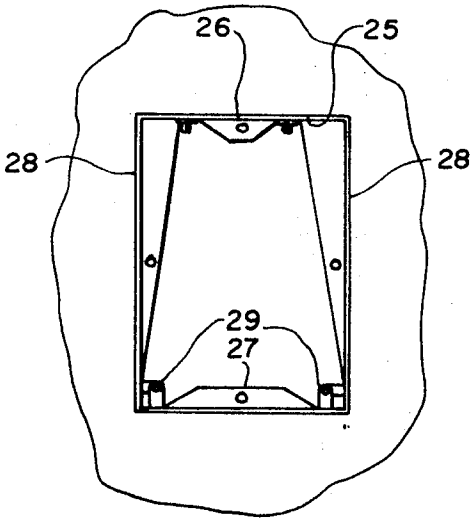


Fig. 5.

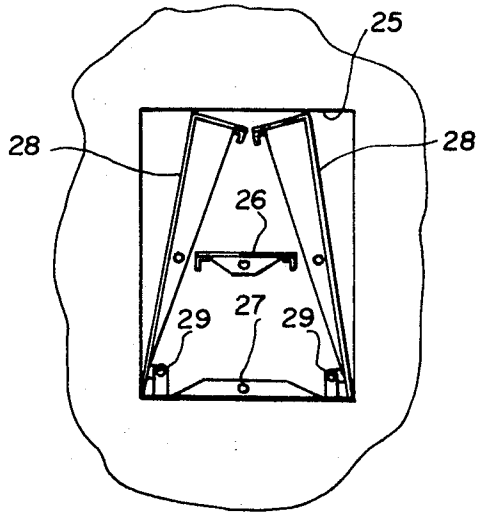


Fig. 6.

METHOD OF MAKING A CAST CONCRETE HOUSE HAVING INTEGRAL WALLS AND ROOF USING MOBILE INTERIOR FORMS

This invention is a continuation-in-part of my application Ser. No. 123,539, filed Mar. 12, 1971, now abandoned.

The invention relates to casting of a concrete house, — and, more particularly, to the casting, simultaneously, of the roof, two sidewalls and an end wall to rapidly cast a monolithic concrete house unit at the site.

In the past, attempts to reduce the cost of fabricating inexpensive homes have not met with success since it has been necessary to prefabricate partitions and outer wall portions in factories and then crate and ship them to the site for assembly. Such shipment and laborious effort at the site for assembling the prefabricated wall portions have added considerably to the overall cost as well as to the time for construction. Methods for permanently joining such wall portions have not proved satisfactory.

An object of the present invention is to provide a novel monolithic house construction and method of casting thereof at the site, which will overcome all the above mentioned disadvantages of prior methods.

A more specific object of the present invention is to provide a novel method including the use of vehicles with flat beds for erecting interior forms to a position for simultaneously casting the roof, two sidewalls and an end wall, and for thereafter withdrawing and removing the forms by the aid of said vehicles so as to easily, quickly and inexpensively cast the entire house at the site without the need of prefabricated outer wall portions.

Other objects and advantages will become more apparent from a study of the following description, taken with the accompanying drawings wherein:

FIG. 1 is an elevational view of an expanded forming system for casting a concrete house in accordance with the principles of the present invention;

FIG. 2 is a fragmentary elevational view of a modification for casting smaller homes;

FIG. 3 is a left end view showing the roof grid and forming plank of the structure shown in FIG. 1;

FIG. 4 is a view taken along line 4—4 of FIG. 3; and,

FIGS. 5 and 6 are elevational views of the window blockout shown in the pour and open positions, respectively.

Referring more particularly to FIG. 1 of the drawing, the prepoured concrete floor slab 1 is prepared for the reception of the casting machine by setting the interior form floor buck sections 2 and the floor guides 3 in place. The floor slab is designed and constructed to be adequate for use both as the floor of the house and as the base pad capable of supporting and positioning all the related forming equipment.

The floor slab is constructed of proper concrete and reinforcing steel and is placed as previous to all other construction as deemed necessary and to attain the adequate curing of the concrete required to be assured of proper strength.

The floor buck 2 is a fabricated angular section designed to serve a dual purpose. When fastened to the floor slab 1 with an adequate fastener, the floor buck will outline the interior wall of the house and will therefore serve as a positioning "jig" for accurate positioning of the main forming sections. Since the floor buck is an independent part of the forming system and attached to the related parts with mechanical fasteners, it can serve as a "spacer" for the inner wall forming section. It is designed to a proper height to allow the interior wall form 9 to retract from the wall, and assure proper clearance, to the floor slab, to allow the system to be removed from the structure without damage to either the structure or the equipment.

The floor guide 3 is a solid member of either wood or structural steel (angle or channel) that is fastened to the floor slab 1 if it is necessary for alignment to place the forming system to its approximate final position. From this position, the final adjustments can be made.

The the six interior form carriers 4 and 5 are rolled into position on the floor slab, three on each end. The two center interior form carriers 5 are not used for houses of a smaller version.

The interior form carrier is the main section of the casting machine. When positioned properly, and attached to the form buck 2 and similar carriers it is capable of forming one quadrant of the interior walls and roof of the house. The carrier is equipped with casters that may swivel or, two sets of wheels 6 at proper angles to facilitate movement in two directions.

Jacks 7 are mounted on the carrier frame to elevate the carriers to the proper height. All sections are hinged at all points necessary both to "set" the forms in pouring position and also to enable the forms to be "stripped" and have adequate clearance to allow the sections to be removed from the structure.

The interior form carriers 4 and 5 are designed to form the entire interior walls and roof. To accomplish this, all sections have vertical forms of sheet metal with attached parts required to form recesses such as wall "keys", electrical chases and etc. The form carriers in the rear quadrants will include the form skin for the rear wall and, the form carrier in the front quadrants will include the form for the gable of the open end of the structure. The roof is formed by using roof forming planks which will remain as an integral part of the structure. These planks are supported by a system of gridwork, which is the top section of the interior form carriers (See FIG. 3) and serve as the roof insulating material.

The center form carrier 5 is an optional part of the system to be used to construct a larger house by adding it to the basic system. By moving the interior form carriers apart and adding two center form carriers, you now have a six quadrant system to provide the larger house.

The form carrier wheels 6 are merely the method to position the casting machine in its proper position on the floor slab 1. They could be straight axles or swivel types and are designed for maximum efficiency and best possible weight distribution.

The form carriers are raised to the proper height by using the built-in screw jacks 7. By extending the wall form positioning linkage 8 the interior wall form 9 and a portion of the roof forming grid 10 move into position. This wall form positioning linkage could be any screw, lever, cam or linkage that will position and retract the interior wall form 9 to any position necessary to "pour" and remove the section with adequate clearance.

By swinging the hinged roof forming grids 12, 13 into position and fastening them to the temporary form sup-

port columns **14** the interior form set-up is completed. The hinges **11** are placed at all points on the forming system where it is necessary to "fold" the sections to be able to position all sections properly and to be able to remove the system from the structure. They are designed to be able to support the necessary weight requirements and are placed to assure that they will remain clean and maintenance free.

The temporary form support columns is a series of temporary shores, either wood, pipe or structural members that support the roof forming system, for the pouring operation. After the concrete is sufficiently "cured", the forming grids are detached from the columns and the system is removed. The columns however, stay in place to provide shoring for any additional time necessary to support the still curing, concrete roof. All reinforcement and roof forming plank **24** is placed at this point in the operating sequence.

The exterior wall form **15** is developed by assembling fabricated sections. The sections are designed to form the entire exterior wall and the roof eaves and can be expanded by adding sections to match the six quadrant house. This form **15** is fastened to the floor slab by using "cast-in-place" J-bolts **18** and supported by using form ties **16** fastened to the interior wall form **9.**

To set up the exterior forms **15** they must be positioned 7 inches from the interior wall form and attached to it by using form ties **16** and wales **17,** the wales serve both as a structure member of the wall forms **9** and **15** and as the clamping surface for the form ties **16.** The form is attached to the concrete floor slab through the use of cast-in-place J-bolts **18.** The extension forms allow the casting of either an upward **19** or downward **20** sloping eave.

This upward slope shape is developed by either adding a properly designed section to the eave form downward slope **20** or by hinging and sliding the wall form to achieve the desired shape.

The downward slope form section is attached to the exterior wall form **15** and is capable of forming the eave and is self-supporting when attached with eave form brace **21.**

The forms are now ready for the pouring of three concrete walls and the roof of the house.

The roof edge form **22** is attached to the form sections and is used to form the edge of the roof and is designed both to control the thickness of the concrete and to be used as the screed surface for finishing the roof. The scaffold **23** is attached to the exterior wall form **15** and is self supporting. This scaffold is designed to meet all specifications for safety factors.

This initial casting is keyed to receive the fourth wall after the interior forms are extracted. The fourth wall is poured through holes **30** in the roof (see FIG. **3**) thereby making it an integral part of the initial cast.

FIGS. **5** and **6** show door and window openings **25** cast with collapsible-block-outs **28, 28** pivoted on hinges **29.** FIG. **5** shows the assembled position and FIG. **6** shows the retracted position. A top removable section **26** and bottom section **27** complete the frame. An electrical chase is cast with the interior forms. An exterior wall form liner may be used to texture the exterior finish.

Thus it will be seen that I have provided a strong and durable cast concrete house having long life and I have also provided an efficient method for casting integrally and simultaneously the sidewalls, end wall and roof of such house, to quickly form a monolithic structure at the site without the necessity of transporting prefabricated sections; furthermore, I have provided a unique and very fast method for transporting, erecting and withdrawing the forms to enable casting of a unitary structure which is considerably stronger than structures heretofore constructed, and which is devoid of joints between the sidewalls, end wall and roof and which structure can be erected in an amazingly short time at amazingly low cost.

While I have illustrated and described a single specific embodiment of my invention, it will be understood, that this is by way of illustration only and that various changes and modifications may be contemplated within the scope of the following claims.

I claim:

1. The method of simultaneously forming a slanted roof and two vertical sidewalls of a building at the site to form a monolithic structure, comprising pivotally interconnecting a roof portion, comprising lowermost and uppermost pivotal sections, and a sidewall portion of a first interior form, raising said roof portion of said form vertically until said lowermost section is in place while said sidewall portion is partially retracted from a molding position and while said uppermost roof section is pivotally and downwardly retracted, thereafter pivotally moving said sidewall portion toward a vertical position and pivotally lifting said uppermost section of said roof portion of said form into close confronting relationship with a like uppermost section of an adjacent and like second interior form, said uppermost sections of both said roof portions being adapted to form the apex of said building, and pouring concrete between said sidewall forms and cooperating spaced sidewall forms and onto the roof portions of said interior forms, the roof portions of said interior forms having roof edge forms attached thereto to control the thickness of the concrete and to be used as a screed surface for finishing the roof.

2. The method recited in claim **1** including the step of screeding said concrete roof portions.

3. The method recited in claim **1** wherein said interior forms are each mounted on a wheeled carrier and are initially wheeled into place within the building to be constructed, and wherein said retracting movements and movements to a vertical position of said sidewalls are effected by jacking movements between said sidewalls and said carriers.

4. The method recited in claim **1** including a step of forming an end wall simultaneously with said sidewalls by pouring concrete between spaced cooperating end wall forms.

5. The method recited in claim **1** including moving said uppermost sections into close confronting relationship by abutting their free ends together.

6. The method recited in claim **1** wherein forming said close confronting relationship of said uppermost sections comprises abutting their free ends against a stationary post immediately below the apex of the roof.

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