

A. R. BALTZER.
METHOD AND APPARATUS FOR CONSTRUCTING CONCRETE BUILDINGS.
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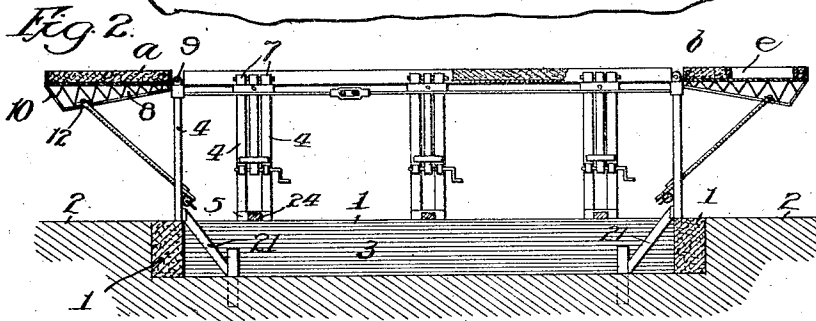
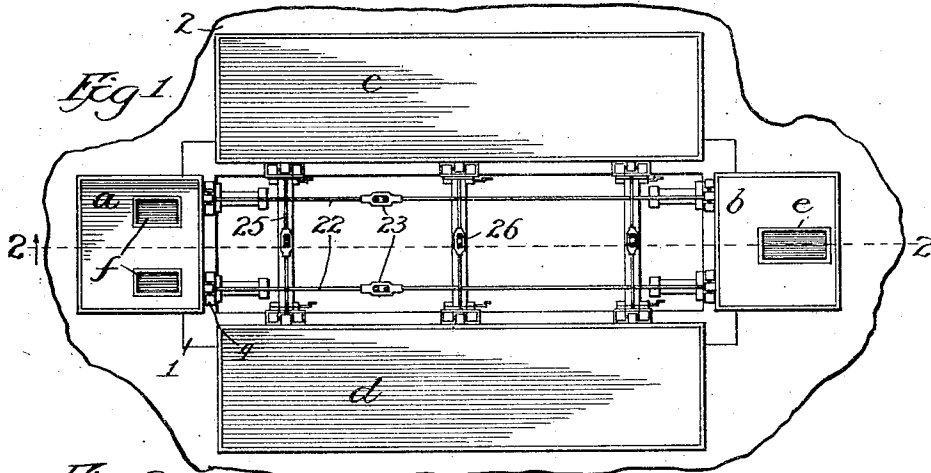
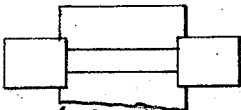
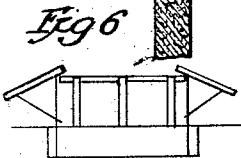
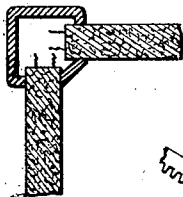
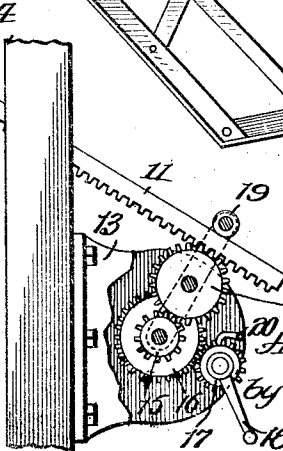
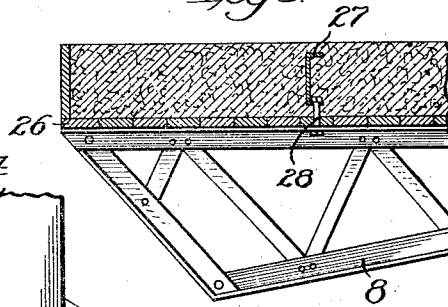


Fig. 4.



Witnesses:
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Fig. 3.



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UNITED STATES PATENT OFFICE.

AUGUST RASMUS BALTZER, OF MILWAUKEE, WISCONSIN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO CARL H. CRAWFORD, OF CHICAGO, ILLINOIS.

METHOD AND APPARATUS FOR CONSTRUCTING CONCRETE BUILDINGS.

1,035,766.

Specification of Letters Patent.

Patented Aug. 13, 1912.

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To all whom it may concern:

Be it known that I, AUGUST RASMUS BALTZER, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Methods and Apparatus for Constructing Concrete Buildings, of which the following is a specification:

This invention relates to an improved method and apparatus for constructing buildings of reinforced concrete and the like.

It is one of the objects of the invention to provide an improved method and apparatus whereby one of the walls of the building may be formed in an integral mass or unit of the desired height and length and thickness and allowed to set and finally be disposed upon a foundation upon which it is designed to permanently rest.

A further object of the invention is to provide an improved method and apparatus whereby a plurality or all of the walls of a building may be, if desired, simultaneously formed and exteriorly finished and simultaneously disposed upon their foundations after being allowed to set.

Further objects of the invention will be more particularly described in connection with the accompanying drawing and will be more fully pointed out in the appended claims.

In the drawing, Figure 1 is a plan view illustrating an apparatus embodying my invention disposed upon a foundation and supporting the walls of a building in the position in which they are to be formed. Fig. 2 is a sectional view on line 2—2 of Fig. 1. Fig. 3 is a sectional detail view of a portion of one of the wall supporting devices showing one method of attaching a wall thereto. Fig. 4 is a horizontal sectional view of one method of forming a corner by means of which the adjacent vertical ends of two walls are connected. Fig. 5 illustrates a form of mechanism for operating the wall supporting devices. Figs. 6 and 7 are diagrammatic views.

Like characters of reference designate similar parts throughout the different figures of the drawing.

As shown in the accompanying drawing,

1 designates foundation walls terminating at their upper ends on a level with the grade 2 55 and within which a basement 3, is formed. Wall supporting devices are provided, and as shown, each may consist of two up-rights 4, suitably connected at 5, at their base portions, and connected at their tops by 60 cap blocks 6, having bearings 7. Each pair of uprights is provided with a wall supporting arm 8, which is conveniently pivotally connected with its respective uprights at 9. The outer or free end 10 of each arm is 65 adapted to be swung about the pivot 9 from the horizontal position shown to a vertical position.

Mechanism is provided whereby each arm may be operated and such mechanism may 70 consist of a rack bar 11, pivotally connected at 12, with arm 8 and having its free end projecting between the uprights 4. As shown in Fig. 5, a yoke 13 is secured to the uprights 4, and carries a train of gears des- 75 igned by 14, 15, 16 and 17. Gear 14 meshes with the rack bar 11 and a crank 18 is provided for actuating gear 17 to operate the train and raise or lower the arm 8. A friction roller 19 serves to hold the rack bar 80 11 in mesh with the gear 14 of said train. A pawl 20 may be provided for locking the crank gear 17 for the purpose of holding the arm 8 in the position shown.

As illustrated in Figs. 1 and 2, two pairs 85 of uprights 4 are provided for each wall, *a* and *b*, and three pairs of uprights are provided for each side wall *c* and *d*. The up-rights 4 are disposed upon the foundation walls near their inner margins and the end 90 wall uprights are braced against inward displacement as indicated at 21. Opposite pairs of uprights for the end walls may be connected with each other near their upper ends by tension rods 22, which are advisably 95 provided with turn buckles 23 for the purposes of adjustment. It will be seen that the weight of the end walls *a* and *b*, acting through arms 8, normally tends to tip the upper ends of the uprights outwardly and 100 that this stress is sustained by the tire rods 22 whereas the inward pressure exerted through the rack bars to thrust the lower ends of the uprights inwardly is taken care of by braces 21. Thus it will be seen that 105 the loosely mounted uprights are rigidly

held on the foundation 1 in the exact position in which they are disposed thereon.

The uprights for the walls *c* and *d* are maintained in position as regards their lower ends by strut beams 24 while their upper ends are connected by tension rods 25 which are likewise provided with turn buckles 26 to provide for necessary adjustments.

When the mechanism described is set in position upon the foundation, the arms 8 are raised to an approximately horizontal position and a suitable bed may be formed by disposing boards (Fig. 3) 26 transversely of the arms 8, the boards being of a length equal to the desired length of the wall. The bed may be provided with end and side walls as indicated. Where the walls are reinforced with channel iron as indicated at 27, the same are conveniently utilized to anchor the wall to the arms 8 by means of bolts 28 or equivalent devices. Likewise doors and window frames *e* and *f* respectively may be laid upon the concrete beds before the concrete is placed thereon and the concrete walls may be made of any desired formation such as conditions may require.

Assuming that all of the arms and beds supported thereby are in the position shown, the cement will be disposed in the beds to form walls of the desired thickness and the parts will remain in the position shown until all of the walls have set and become firm. It will be noted that all of the outside walls may be simultaneously formed and it will be further noted that in the construction shown the supporting devices are applied to the inside surfaces of the walls thereby permitting exterior finishing of the walls when formed, which is a well known advantage. After the walls have set the cranks are manned by operators and all of the walls may be singly or simultaneously lowered from a horizontal to a vertical position and onto their respective foundations. It will be further noted that the arms 8 and the beds supported thereby can be easily and quickly raised to horizontal position when empty and that the weight of said walls causes them to normally seek a vertical position thereby enabling the operators to swing said walls into a vertical position wholly by gravity and merely by gradually releasing or withdrawing the supports therefrom. It will be noted that the walls are so disposed that they do not intersect when in a horizontal position so that there is nothing to prevent the simultaneous formation and exterior finishing of all of said walls. Furthermore inasmuch as the walls lie substantially wholly outside the vertical plane of their respective foundations there can be no interference in adjustment from the horizontal position shown to the vertical position.

It will be obvious that double walls with

air spaces and of any other formation may be constructed with the improved process and apparatus of my invention.

It is a well known fact that concrete walls can be formed supported at a slight inclination with respect to the horizontal and therefore if some of the walls are higher than others the higher walls can be inclined so that their upper margins will extend inwardly with respect to the vertical plane of the foundation, and overhangs the horizontally disposed side walls as shown in Figs. 6 and 7. Under these conditions the walls can be simultaneously lowered or swung with the end wall slightly in advance of the side walls. It will also be obvious that if all of the walls have a height in excess of the length of the arms the tops of the walls can all extend inwardly over the foundation and in overhanging relation with respect to each other.

I claim:—

1. A method of constructing concrete buildings which consists in forming in an approximately horizontal position a concrete wall, in supporting said wall at an elevation above a foundation on which it is designed to rest and in a manner to cause the wall, while so supported, to normally seek a vertical position, and in gradually releasing the support and permitting the wall to lower by gravity into a vertical position and on to said foundation.

2. A method of constructing concrete buildings which consists in forming a concrete wall in an approximately horizontal position, in supporting the wall at an elevation above the foundation on which it is designed to rest and in a manner to permit the wall to swing about an axis parallel to the foundation, in positioning the wall on one side of such axis and so that the wall will normally seek a vertical position, and in gradually releasing the support and permitting the wall to swing downwardly about said axis into a vertical position and onto said foundation.

3. A method of constructing concrete buildings which consists in forming in an approximately horizontal position a concrete wall, in supporting said wall at an elevation above a foundation on which it is designed to rest and in a manner to swing about an axis substantially parallel to such foundation, in disposing said wall wholly on one side of such axis and substantially outside the vertical plane of the foundation, and in gradually releasing the support from said wall and permitting it to lower into a vertical position and onto said foundation by gravity.

4. A method of constructing concrete buildings which consists in forming and exteriorly finishing in an approximately horizontal position a concrete wall, in support-

ing said wall at an elevation above a foundation on which it is designed to rest and in a manner to cause the wall, while so supported, to normally seek a vertical position, and in gradually releasing the support and permitting the wall to lower by gravity into a vertical position and onto said foundation.

5. A method of constructing concrete buildings which consists in forming and exteriorly finishing in an approximately horizontal position a concrete wall, in supporting said wall at an elevation above a foundation on which it is designed to rest and in a manner to cause the wall while so supported to normally seek a vertical position, and in gradually releasing the support and permitting the wall to lower by gravity into a vertical position and onto said foundation.

6. A method of constructing concrete buildings which consists in forming in an approximately horizontal position a concrete wall, in supporting said wall at an elevation above a foundation on which it is designed to rest and in a manner to cause the wall while so supported to normally seek a vertical position and with the wall lying wholly outside the vertical plane of said foundation, and in gradually releasing the support and permitting the wall to lower by gravity into a vertical position and onto said foundation.

7. A method of constructing concrete buildings which consists in forming and exteriorly finishing in an approximately horizontal position a concrete wall, in supporting said wall wholly above but adjacent to a foundation upon which it is designed to rest, and in swinging said wall downwardly into a vertical position and onto said foundation.

8. A method of constructing concrete buildings which consists in forming and exteriorly finishing in an approximately horizontal position a concrete wall, in supporting said wall wholly outside of and above a foundation upon which it is designed to rest and with its lower margin in parallel relation with such foundation, and in swinging said wall about an axis parallel with said foundation into a vertical position and onto said foundation.

9. A method of constructing concrete buildings which consists in forming and exteriorly finishing in an approximately horizontal position a concrete wall, in supporting said wall above a foundation and with its upper margin adjacent the vertical plane of the foundation and its lower margin lying wholly outside such vertical plane, and in shifting said wall into a vertical position and onto said foundation.

10. A method of constructing concrete buildings which consists in forming and exteriorly finishing in approximately horizontal positions all of the said walls of a building, in supporting all of said walls substan-

tially wholly outside the vertical planes of the foundation walls upon which said building walls are designed to rest, and in simultaneously swinging said building walls into vertical positions and onto said foundation walls.

11. A method of constructing concrete buildings which consists in simultaneously forming and exteriorly finishing in approximately horizontal positions all of the side walls of the building, in supporting all of said walls substantially wholly outside the vertical plane of the foundation walls upon which said building walls are designed to rest, and in simultaneously swinging all of said building walls into vertical positions and onto said foundation wall.

12. A method of constructing concrete buildings which consists in forming in approximately horizontal positions all of the outside walls of the building, in supporting all of said walls at an elevation above foundation walls upon which said building walls are designed to rest, and in simultaneously swinging said building walls into vertical position onto said foundation walls.

13. A method of constructing concrete buildings which consists in forming in approximately horizontal positions a plurality of outside adjoining walls of the building, in supporting said walls at an elevation above foundation walls upon which said building walls are designed to rest, and in simultaneously swinging said building walls into vertical positions and onto said foundation wall.

14. A method of constructing concrete buildings which consists in simultaneously forming and exteriorly finishing in approximately horizontal positions a plurality of outside adjoining walls of the building, in supporting said walls substantially wholly outside the vertical planes of foundation walls upon which said building walls are designed to rest during such formation and exterior finishing and in a manner to cause said walls to normally seek a vertical position, and in simultaneously releasing the support and permitting said walls to lower about the axes parallel with their respective foundation walls into vertical positions and onto said foundation walls.

15. In an apparatus for use in the construction of concrete buildings, an upright supporting member adapted to be supported adjacent the plane of the wall to be erected, an arm pivotally secured to said supporting member, said arm forming a horizontal support for the wall, means for holding said arm in a substantially horizontal position, and means for permitting said arm to swing by gravity on its pivotal support for properly positioning the wall with respect to the foundation.

16. In an apparatus for use in the con-

struction of concrete buildings, a plurality of upright supports arranged adjacent the planes of opposite walls of the building to be erected, arms pivotally secured to said uprights and adapted to be swung outwardly into a substantially horizontal position for supporting the walls during formation, means for holding said arms in extended position, means for permitting said arms to swing by gravity to a substantially vertical position and means connecting opposite uprights, substantially as and for the purpose specified,

17. In an apparatus for use in the construction of concrete buildings, a plurality of upright supports arranged adjacent the planes of opposite walls of the building to be erected, arms pivotally secured to said uprights and adapted to be swung outwardly into a substantially horizontal position for supporting the walls thereon during formation, means for holding said arms in extended position, means for permitting said arms to swing by gravity to a substantially vertical position, means connecting opposite uprights at or near their upper ends and struts or braces interposed between said uprights at or near the lower ends thereof.

18. An apparatus for constructing concrete buildings comprising movable means

adapted to support a concrete wall in a suitable position during formation and serving to place said wall in a permanent position upon a foundation by gravity.

19. A method of constructing concrete walls which consists in supporting and forming a concrete wall on a mold body disposed in a substantially horizontal position, and in a manner to cause the wall to normally seek a vertical position by gravity, and in restraining movement of said wall and mold body while the same are assuming a vertical position by gravity.

20. A method of constructing concrete walls which consists in supporting and forming a concrete wall on a mold body disposed in a substantially horizontal position and in a manner to cause the wall and its mold to normally seek a vertical position by gravity, with its gravity movement restricted to a predetermined course of travel, and in restraining the movement of said wall and mold body while the same are assuming a vertical position by gravity.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUST RASMUS BALTZER.

Witnesses:

E. SCHALLINGER,

CARL H. CRAWFORD.