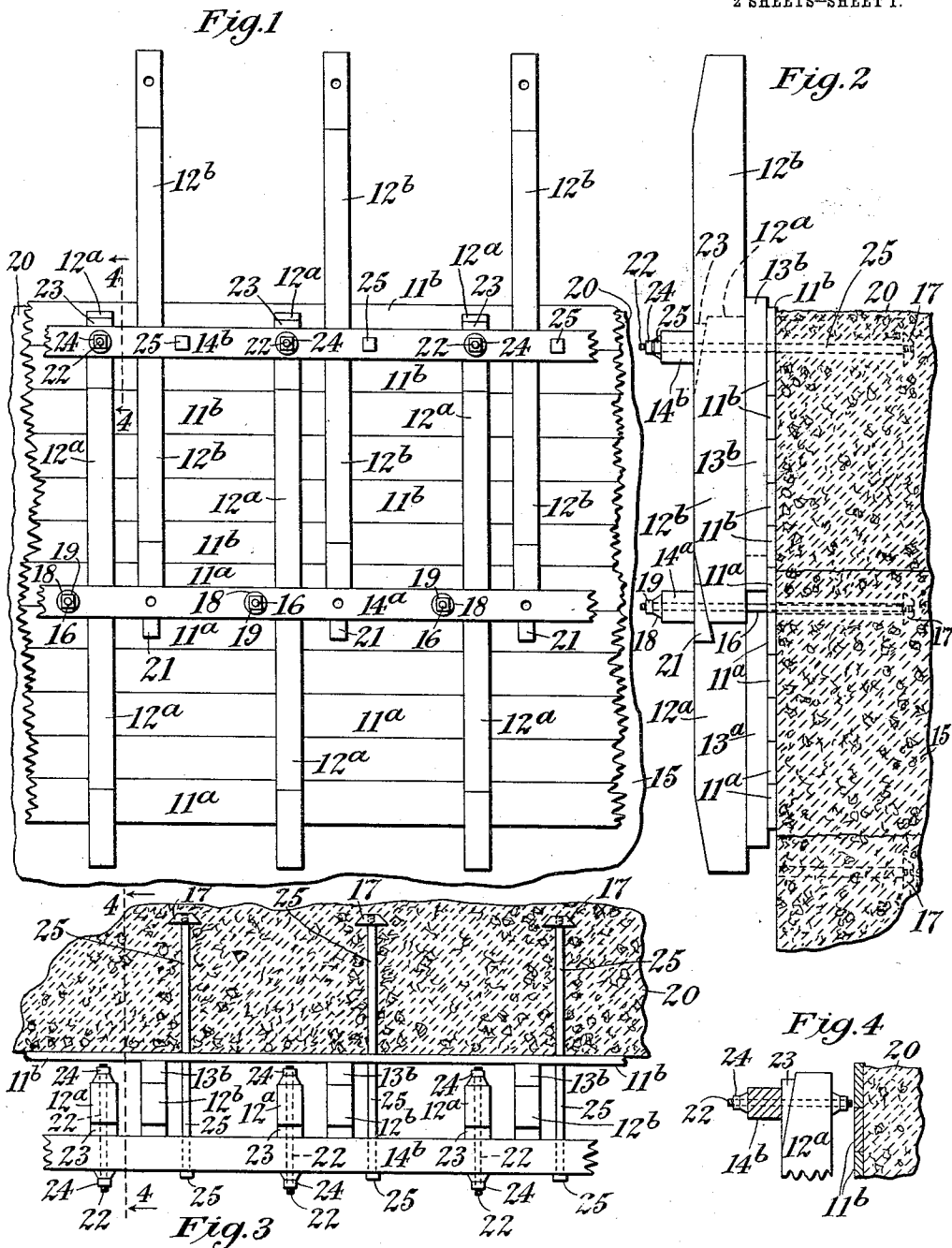


A. P. CRARY.
MOLD FORM FOR CONCRETE WALL CONSTRUCTION.
APPLICATION FILED OCT. 9, 1909.

1,042,648.

Patented Oct. 29, 1912.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 5

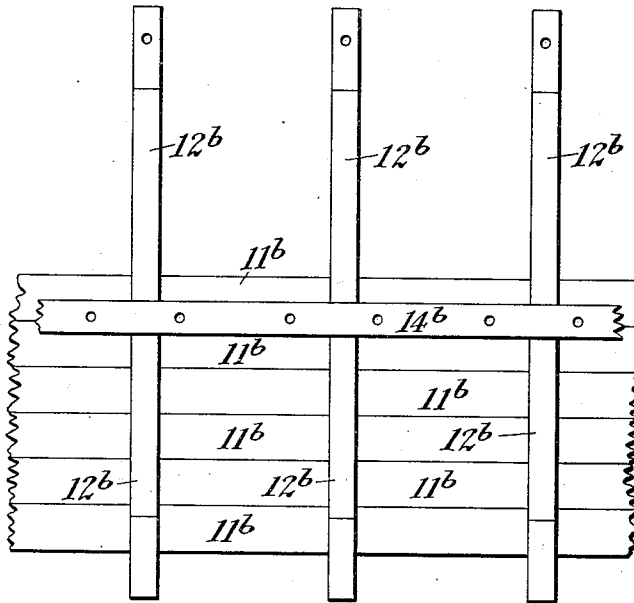


Fig. 6

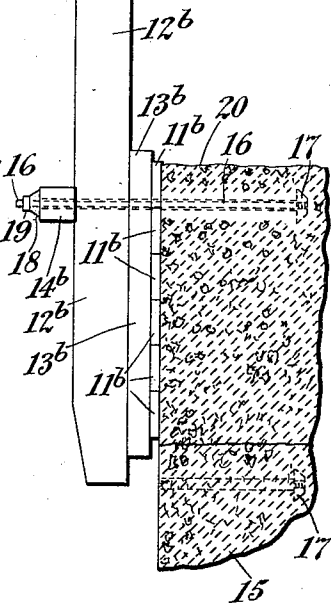


Fig. 7

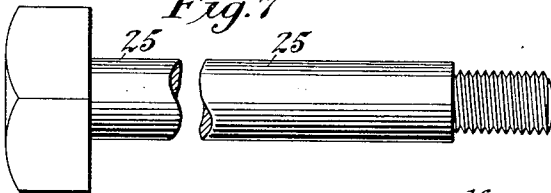


Fig. 8

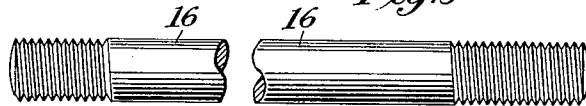


Fig. 9

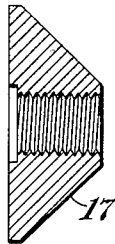
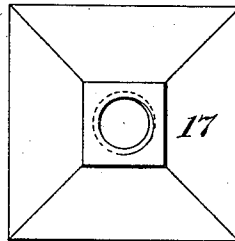


Fig. 10



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UNITED STATES PATENT OFFICE

ALEXANDER P. CRARY, OF NEW YORK, N. Y.

MOLD-FORM FOR CONCRETE-WALL CONSTRUCTION.

1,042,648.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed October 9, 1909. Serial No. 521,922.

To all whom it may concern:

Be it known that I, ALEXANDER P. CRARY, a citizen of the United States, residing at the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Mold-Forms for Concrete-Wall Construction, of which the following is a specification, reference being had therein to the accompanying drawings, forming a part thereof.

My invention relates to mold forms for concrete wall construction, particularly high, massive concrete work where the wall is thick or where only one face thereof is exposed, for example, dams, locks and other canal work, piers, bulkheads, retaining walls, and the like.

The general objects of the invention are ease and rapidity of construction, simplicity and economy.

More particular objects are to dispense entirely with outside braces, with ties through the wall, and with ties above the wall.

Further objects are to make possible the earlier shifting of the forms for a new wall layer, and to produce a smooth wall surface free from overhangs or other unevennesses.

Other objects are simplicity and inexpensiveness of form construction.

In carrying out my invention I provide substantially similar lower and upper forms adapted to be moved successively one above the other, the lower form being anchored to the finished portion of the wall and the upper form being supported by the lower form. Each form is provided with lagging forming a mold-face and with uprights projecting above the lagging and adapted to hold in place the form next above.

A feature of importance in carrying out the invention is that the uprights of adjoining upper and lower forms overlap side by side.

Several details of construction and combinations of parts are also included in my invention, as will hereinafter appear.

I shall now describe my invention with reference to the accompanying drawings and shall thereafter point out my invention in claims.

Figure 1 is a rear elevation of the complete mold in place on a wall in course of construction, portions being broken away. Fig. 2 is an end elevation of what is shown in Fig. 1, the wall being shown in section.

Fig. 3 is a plan view of what is shown in Figs. 1 and 2, the wall being in horizontal section to show the mold bolts. Fig. 4 is a detail vertical section on a plane indicated by the line 4—4 of Figs. 1 and 3 as viewed from the right. Fig. 5 is a rear elevation of the upper mold form of Figs. 1 and 2. Fig. 6 is an end elevation similar to Fig. 2, with the wall in section, but with the lower form removed and anchor-bolts substituted for mold-bolts in the remaining form. Fig. 7 is an enlarged side view of one of the mold-bolts, with a portion broken away. Fig. 8 is a similar view of one of the anchor-bolts. Fig. 9 is an enlarged axial section of one of the anchor-nuts. Fig. 10 is an end view of the same as viewed from the right of Fig. 9.

In the embodiment of my invention illustrated in the drawings, I provide two forms each movable the one above the other and each adapted in turn to support the other as the building of the wall progresses. Each of these forms comprises lagging forming a mold-face, uprights supporting the lagging and having free form-supporting upper portions projecting above the lagging, fillers spacing the lagging and the uprights, and a waling piece connecting together the uprights. The lagging, fillers, uprights and waling of each form are nailed or otherwise firmly secured together in a rigid structure. The two forms are substantially alike, the only difference being that in one of the forms the corresponding bolt-holes in the waling piece are offset toward the right from the uprights and in the other form toward the left, in order to facilitate the over-lapping side by side of the uprights of the adjoining upper and lower forms.

In the following description the same reference numerals are applied to corresponding similar parts in the two forms illustrated in the drawings, but for the purpose of more easily distinguishing between the two forms the letter *a* is affixed to the numerals which indicate parts of the form shown in the drawings as the lower form, the letter *b* is affixed in a corresponding manner to the numerals indicating parts of the form shown in the drawings as the upper form. It should be borne in mind that in practice each upper form successively becomes a lower form as the previous lower form is moved upwardly to in turn become an upper form.

The form shown in the drawings as the

lower form includes lagging 11^a carried by the uprights 12^a and spaced therefrom by fillers 13^a. The fillers 13^a are shown as projecting slightly both above and below the lagging 11^a, and the uprights 12^a project downward slightly below the lagging 11^a and the fillers 13^a, and project upward above the lagging 11^a a distance substantially equal or almost equal to the width of the lagging 11^a, and are shown as tapered on the outer sides at both ends. A substantially horizontal waling piece 14^a extends across the outer sides of the uprights 12^a substantially medially of their length and in proximity to the upper edge of the lagging 11^a, the waling piece being shown as located slightly below the upper edge of the lagging.

The lower form is supported by a completed and sufficiently hardened portion 15 of the wall and is held in place thereon by anchor-bolts 16 passing through the waling piece 14^a and lagging 11^a and entering holes in the wall 15 and screwing into anchor-nuts 17 permanently embedded in the wall, the holes in the concrete leading to the anchor-nuts 17 being of slightly larger diameter than the anchor-bolts 16 to permit of their easy insertion and removal. The outer ends of the anchor-bolts 16 are also screw-threaded and are provided with large washers 18 and ordinary nuts 19. The lagging 11^a has a mold-face in contact with the wall portion 15.

The lower form just described supports a substantially similar upper form which is held in place by the upwardly projecting portions of the uprights 12^a of the lower form, and the upper form is adapted to support and give shape to a freshly poured wall layer 20, as shown in Figs. 1 and 2. The uprights 12^a of the lower form act as cantalivers in retaining in place the upper form, the inward thrust of the lower portions of such cantalivers being received by the lagging 11^a and the outward pull at the median portions of these levers being received by the anchor bolts 16. This upper form includes lagging 11^b, uprights 12^b, fillers 13^b, and a waling piece 14^b, all substantially the same in construction, relative location and function as the corresponding parts in the lower form.

When the upper form is placed in position on the lower form the lower ends of the uprights 12^b and the lower ends of the fillers 13^b are inserted between the lagging 11^a and the waling piece 14^a of the lower form, and the upwardly projecting free ends of the uprights 12^a of the lower form enter between the lagging 11^b and the waling piece 14^b of the upper form, thereby producing an interlocked connection between the two forms. It is to be noted that the lower portions of the uprights 12^b of the upper form and the upper portions of the uprights 12^a of the

lower form overlap side by side, so that the uprights of one form do not interfere with those of another.

The adjoining mold-faces of the two forms are brought into alinement and the lower portion of the upper form held firmly in position by wedges 21 inserted between the outer tapered faces of the lower ends of the uprights 12^b and the waling piece 14^a. Means are provided to adjust the upper portion of the upper form forward and backward, to thereby bring the mold-face of the upper form into alinement or into other desired relation with the mold-face of the lower form. Such means comprise adjusting bolts 22 and wedges 23. The adjusting bolts 22 pass through the upper ends of the uprights 12^a of the lower form and through the waling piece 14^b of the upper form, and the wedges 23 are inserted between the sloping faces of the upper ends of the uprights 12^a and the waling piece 14^b. The adjusting bolts 22 are shown as provided with ordinary nuts 24. By loosening the wedges 23 and tightening the nuts 24 the upper portion of the upper form will be drawn inward or forward, while by a reverse operation the opposite effect is produced and the upper portion of the upper form is thrust outward or backward.

As a means for embedding the anchor-nuts 17 in the concrete and at the same time to provide holes leading thereto to receive the anchor-bolts 16, as hereinbefore described, mold-bolts 25 are employed to support from the upper form the anchor-nuts 17 which are to be thus embedded. These mold-bolts have body portions of larger diameter than the anchor-bolts 16 and have screw-threaded end portions of reduced diameter, as clearly shown in Fig. 7. The mold-bolts 25 pass through the waling piece 14^b and lagging 11^b and have screw-threaded engagement with the anchor-nuts 17 (Figs. 1, 2 and 3). The mold-bolts 25 mold holes in the concrete of larger diameter than the anchor-bolts 16 and of larger diameter than the screw-threaded bolt-holes in the anchor-nuts 17, permitting the easy insertion and removal of the anchor-bolts 16. When the fresh concrete of the upper wall layer 20 has sufficiently hardened, but before it has set hard around the mold-bolts 25, the mold-bolts are removed and the anchor-bolts 16 substituted therefor, and at this time the lower form is taken away preparatory to being placed in position as an upper form. This stage of progress is illustrated in Fig. 6.

In operation the lower forms are successively removed and placed above the upper forms and the anchor-bolts 16 successively replace the mold-bolts 25, which are successively moved to the then upper form. It is to be noted that there is always a lower form in place which furnishes support to

the wall. Because of this fact the forms may be reset much earlier than could otherwise be done and a great saving of time may be effected.

5 It is obvious that various modifications may be made in the construction shown and above particularly described within the principle and scope of my invention.

10 The arrangement of the mold-bolts, anchor-bolts and anchor-nuts, I have described and claimed in my co-pending application, Serial Number 521,921, filed October 9, 1909, and I therefore do not claim this feature *per se* in this application.

15 I claim:

1. A mold for concrete wall construction comprising two substantially similar forms arranged to vertically interlock and to be successively raised one above the other as the work progresses, each form comprising a 20 mold-face, uprights carrying the mold-face and projecting above the same, and a waling piece on the outer side of the uprights, the uprights of the two forms overlapping side by side and the uprights of the lower form 25 extending between the mold-face and the waling piece of the upper form.

2. A mold for concrete wall construction comprising two substantially similar forms 30 arranged to vertically interlock and to be successively raised one above the other as the work progresses, each form comprising a mold-face, uprights carrying the mold-face and projecting above the same, a waling 35 piece on the outer side of the uprights, the uprights of the two forms overlapping side by side and the uprights of the lower form extending between the mold-face and the waling piece of the upper form, and tying 40 and adjusting means between the uprights of the lower form and the waling piece of the upper form arranged to adjust the relative distance between the two and to tie the two together.

3. A mold for concrete wall construction 45 comprising anchors entering but not extending through the wall, a form supported by the anchors and comprising lagging forming a mold-face, uprights carrying the lag- 50 ging and projecting above the same, and a substantially horizontal waling piece at the outer sides of the uprights substantially medially of their length, and a second form similar to the first supported on the first and 55 braced wholly by the upwardly projecting portions of the uprights of the first, the uprights of the two forms overlapping side by side and the uprights of the lower form extending between the lagging and waling 60 piece of the upper form.

4. A mold for concrete wall construction comprising a form having uprights, a substantially horizontal waling piece connecting 65 together the uprights at their outer sides substantially medially of their length, and

lagging carried by the inner sides of the up- rights with its upper edge in proximity to the waling piece; and a second form like the first, one form being placed above the other so that the lagging of the two forms pro- 70 duces vertically continuous mold faces and the upper ends of the uprights of the lower form being received between the waling piece and the lagging of the upper form, the uprights of the two forms overlapping side 75 by side.

5. A mold for concrete wall construction comprising two substantially similar forms arranged to vertically interlock and to be successively raised one above the other as 80 the work progresses, each form comprising a mold-face, uprights carrying the mold-face and projecting above the same, a waling piece on the outer side of the uprights, the uprights of the two forms overlapping side 85 by side and the uprights of the lower form extending between the mold-face and the waling piece of the upper form, and fillers spacing the mold-face and the uprights.

6. A mold for concrete wall construction 90 comprising a form having uprights, a substantially horizontal waling piece connecting together the uprights at their outer sides substantially medially of their length, lag- 95 ging carried by the inner sides of the uprights with its upper edge in proximity to the waling piece, and fillers spacing the lagging and the uprights; and a second form like the first, one form being placed above the other so that the lagging of the two 100 forms produces vertically continuous mold-faces, the upper ends of the uprights of the lower form being loosely received between the waling piece and the lagging of the up- 105 per form, the uprights of the two forms overlapping side by side, and means for ad- justing the upper form forwardly and back- wardly relatively to the upper ends of the uprights of the lower form.

7. A mold for concrete wall construction 110 comprising a form having uprights, a substantially horizontal waling piece connect- ing together the outer sides of the uprights substantially medially of their length, lag- 115 ging carried by the inner sides of the uprights with its upper edge in proximity to the waling piece and with its lower edge above the lower ends of the uprights, so that the uprights project both above and below the lagging, the lagging forming a 120 mold-face, and fillers spacing the lagging and the uprights; a second form like the first, one form being placed above the other so that the lagging of the two forms pro- 125 duces vertically continuous mold-faces, the upper ends of the uprights of the lower form being loosely received between the waling piece and the lagging of the upper form and the lower ends of the uprights of the upper form together with the lower 130

ends of the fillers being received between the waling piece and the lagging of the lower form, the uprights of the two forms overlapping side by side, means for bringing the adjoining mold-faces into alinement, means for adjusting the upper form forwardly and backwardly relatively to the upper ends of the uprights of the lower form, and means for anchoring the lower form to the finished portion of the wall.

8. A mold for concrete wall construction comprising a form having uprights, a substantially horizontal waling piece connecting together the uprights at their outer sides substantially medially of their length, and lagging carried by the inner sides of the uprights with its upper edge above and in proximity to the waling piece, thereby leaving free upwardly projecting end portions of the uprights; anchor-bolts extending from the waling piece into the finished portion of the wall and supporting the form; a second form like the first adapted to be placed above the first and held in place by the upwardly-projecting end portions of the uprights, the upper ends of the uprights of the lower form being received between the waling piece and the lagging of the upper form, the uprights of the two forms overlapping side by side, and mold-bolts extending from the waling piece of the upper form and adapted to be embedded in the fresh concrete.

9. A mold-face for concrete wall construction, comprising two substantially similar forms arranged to vertically interlock and to be successively raised one above the other as the work progresses, each form comprising a mold-face, uprights carrying the mold-face and projecting above the same, a waling piece on the outer side of the uprights, the uprights of the two forms overlapping side by side and the uprights of the lower form extending between the mold-face and the waling piece of the upper form, tying and adjusting means between the uprights of the lower form and the waling piece of the upper form arranged to adjust the relative distance between the two and to tie the two together, and fillers spacing the mold-face and the uprights.

10. A mold for concrete wall construc-

tion, comprising two substantially similar forms arranged to vertically interlock and to be successively raised one above the other as the work progresses, each form comprising uprights, a substantially horizontal waling piece connecting together the outer sides of the uprights substantially medially of their length, and a mold-face carried by the inner sides of the uprights with its upper edge in proximity to the waling piece and its lower edge above the lower ends of the uprights, so that the uprights project both above and below the mold-face; the uprights of the two forms overlapping side by side and the uprights of the lower form extending between the mold-face and the waling piece of the upper form, and the uprights of the upper form extending between the mold-face and the waling piece of the lower form.

11. A mold for concrete wall construction, comprising two substantially similar forms arranged to vertically interlock and to be successively raised one above the other as the work progresses, each form comprising uprights, a substantially horizontal waling piece connecting together the outer sides of the uprights substantially medially of their length, and a mold-face carried by the inner sides of the uprights with its upper edge in proximity to the waling piece and its lower edge above the lower ends of the uprights, so that the uprights project both above and below the mold-face; the uprights of the two forms overlapping side by side and the uprights of the lower form extending between the mold-face and the waling piece of the upper form, and the uprights of the upper form extending between the mold-face and the waling piece of the lower form; anchors carried by the upper form and adapted to be permanently embedded in the concrete, and means adapted to tie the lower form to the anchors thus embedded and support the forms.

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

ALEXANDER P. CRARY.

Witnesses:

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H. V. DUTROW.