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APPARATUS FOR AND METHOD OF FORMING STRUCTURES OF CEMENTITIOUS OR OTHER HARDENING MATERIAL

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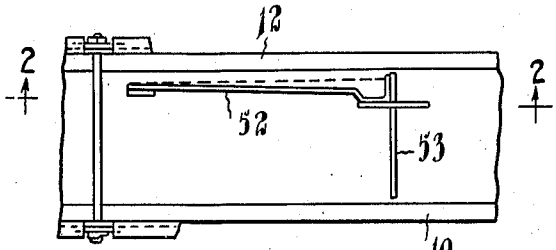



Fig. 1.

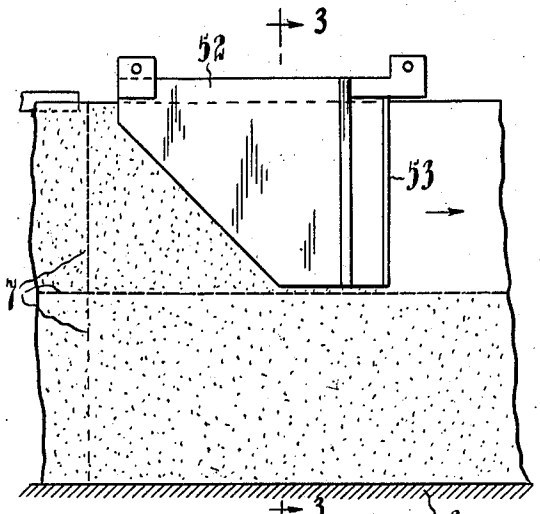



Fig. 2.

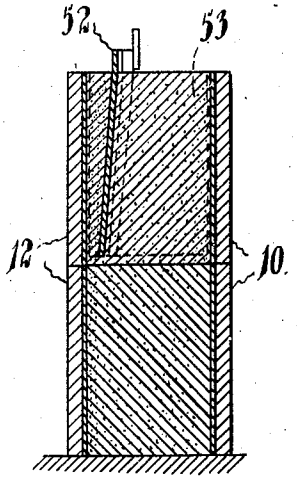



Fig. 3.

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## APPARATUS FOR AND METHOD OF FORMING STRUCTURES OF CEMENTITIOUS OR OTHER HARDENING MATERIAL

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11 Claims. (Cl. 25—131)

My invention relates to an improved method of constructing concrete walls or structures in which the wall is constructed progressively stage by stage, and in which the facing or exterior portion of the wall is formed of a surface concrete mixture which is backed by "main wall" material.

The object of my invention is to devise an improved method of placing and compacting the surface material and also conditioning the adjacent portions of the surface material and main wall material so that they will more perfectly knit together to form an integral structure.

I attain my object by means of the apparatus and method hereinafter described and illustrated in the accompanying drawing in which:

Fig. 1 is a plan view of part of the wall constructed in accordance with my invention and showing the means employed;

Fig. 2 a side elevation of the same partly broken away; and

Fig. 3 a section on the line 3—3 through Fig. 2.

In the drawing like numerals of reference indicate corresponding parts in the different figures.

Referring to the drawing, 6 indicates an ordinary footing on which a wall is supported.

The wall will usually be built up in a series horizontal courses, the horizontal courses being indicated by dotted lines 7. These lines, however, are not actual divisions in the structure as the sections are built, one after the other before there has been sufficient setting of the material to prevent the knitting or bonding together of the material in the adjacent and superimposed sections into a solid unitary wall. The wall is cast in a suitable form, the front wall of which comprises a series of sections 12, while the rear wall comprises sections 10 of suitable material. The front wall and rear wall sections are held in place in any desired manner during the pouring of the concrete and will remain in place until the wall has sufficiently set, and, in the case of the rear side, the sections may in some cases remain permanently in place.

As pointed out above, the object of the invention is to devise a method and means for forming a wall having a facing of finer material and a backing of coarse material, and it is desirable that the facing be carefully placed in position, and also densely compacted. It is also important that the surface material and backing material knit securely together so that there will be substantially no danger of separation when left exposed to the weather. I therefore provide the following means for accomplishing this result.

To prevent the material being positioned and compacted from flowing forwardly a transverse barrier 53 is provided near the forward end of the spacer and the wall material is fed into the wall at the opposite sides of the spacer but to the rear of the barrier having reference to the direction of travel of the agitating spacer unit as a whole.

Close to but spaced from the plate $12^a$ is a spacer 52 which serves also as an agitator to assist in compacting the surface material. The surface material is poured into the narrow space at one side of the agitator while the main body material is poured into the wide space at the other side. Means (not shown) are provided for moving the agitator lengthwise of the wall and simultaneously agitating it in the vertical plane. This spacer is provided with a widened filling end as will be seen from which the surface material may escape into the narrow portion. This spacer is so shaped that the narrow space is gradually decreased in width from front to rear and from top to bottom so that travel of the spacer tends to compact the surface material, which compacting is facilitated by the heavier large body of main wall material behind it. The agitation of the spacer not only compacts the surface material, but the adjacent portion of the main wall material, and thus the adjacent portions of the surface material and main wall material are conditioned to quickly merge together as soon as the spacer has passed and these portions contact one another.

This use of the spacer member has also another advantage, as it permits the use of quite a thin layer of surface material. This is due to the fact that the spacer serves to work the surface material downwardly into close contact with the material below it, and thus avoids the leaving of any gaps which might otherwise occur in the surface material.

As the spacer 52 moves longitudinally of the wall it is subjected to vibration. The narrowing of the space between the front form and spacer, having reference to the direction of travel of the spacer serves to compact the facing material, and the vibration of the spacer not only serves to assist in this compacting, but also serves to assist the flow of the facing material into its place in the finished wall. Further the agitation of the spacer serves to prepare the adjacent portion of the facing material, but also the adjacent surface of the main wall material so that they will flow rapidly together as the spacer passes in a condition in which they will readily merge or knit together without any distinct line between the materials.

I have found that in narrow spaces such as that occupied by the facing material between the spacer and form wall the weight of the material which has entered said space, (unless it is either of a very watery or of a dry powdery or granular nature, either of which is unsuitable for my purpose) is far too little to counteract the relatively great friction between the facing material and the adjacent surfaces of the spacer and form wall with which said facing material contacts, and therefore the plastic facing material will not position itself satisfactorily unless said friction is overcome by vibrating the spacer. The importance of vibrating the spacer to ensure the proper compacting and positioning of the facing material will therefore be apparent.

What I claim as my invention is:

1. A method of forming a structure of cementitious or other hardening material which comprises moving a spacer member in a plane substantially parallel to the face of the structure; supplying facing material at one side and main body material at the other side of the spacer member; and agitating said spacer member to compact the facing material; and allowing said facing material and backing material to contact and knit together after the spacer member has passed.

2. A method of forming a structure of cementitious or other hardening material, which comprises moving a spacer member in a plane substantially parallel to the face of the structure; supplying facing material at one side and main body material at the other side of the spacer member; agitating the facing material to compact it while said spacer member is passing; and allowing said facing material and backing material to contact and knit together after the spacer member has passed.

3. A method of forming a structure of cementitious or other hardening material which comprises supplying facing material at one side of and main body material at the other side of a spacing member; agitating the facing material to compact it by agitating the spacing member; and removing the spacing member after the facing material has been compacted to permit the facing material and backing material to contact and knit together into a unitary structure.

4. A method of forming a structure of cementitious or other hardening material which comprises supplying facing material at one side, and main body material at the other side of a spacer member, and agitating the spacer member to move the facing material into position and condition the adjacent portions of the facing material and main body material for intimately knitting together, and removing said spacer member to permit the prepared portions of the facing material and main body material to contact.

5. A method of forming a structure of cementitious or other hardening material, which comprises supplying facing material at one side and main body material at the other side of a spacer member; and agitating the spacer member to move the facing material into position and removing said spacer member to permit the prepared portions of the facing material and main body material to contact.

6. A method of forming a structure of cementitious or other hardening material, which comprises causing a spacer member to travel; supplying facing material at one side of and main body material at the other side of the spacer member; and agitating the spacer member while it is travelling to move the facing material into position and condition the adjacent portions of the facing material and main body material for knitting together after the spacer member has passed.

7. For use in forming structures of cementitious or other hardening material, the combination with a form wall of a spacer member arranged in spaced relation thereto and arranged to travel parallel to the wall; and means for vibrating said spacer member during its travel.

8. For use in forming structures of cementitious or other hardening material, the combination with a form wall of a spacer member arranged in spaced relation thereto and arranged to travel parallel to the wall; and means for vibrating said spacer member during its travel, said spacer member being arranged at an inclination to the form wall to provide a wide material receiving space adjacent its forward end and a narrow outlet space adjacent its rear end.

9. For use in forming structures of cementitious or other hardening material, the combination with a form wall of a spacer member arranged in spaced relation thereto and arranged to travel parallel to the wall; and means for vibrating said spacer member during its travel; said spacer member being arranged at an inclination to the form wall to provide a wide material receiving space at one side adjacent its forward end and a narrow rearwardly and downwardly directed outlet at its rear end.

10. For use in forming structures of cementitious or other hardening material, the combination with a form wall of a spacer member arranged in spaced relation thereto and arranged to travel parallel to said wall; and means for vibrating said spacer member during its travel; and a transverse barrier adjacent the forward end of said spacer member.

11. The method of forming a structure of cementitious or other hardening material, which comprises supplying facing material at one side and main body material at the other side of a spacer member, agitating the spacer member to move the facing material into position and compact the latter; and causing relative travelling movement between the spacer member and materials to permit the facing material and main body material to contact.

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