

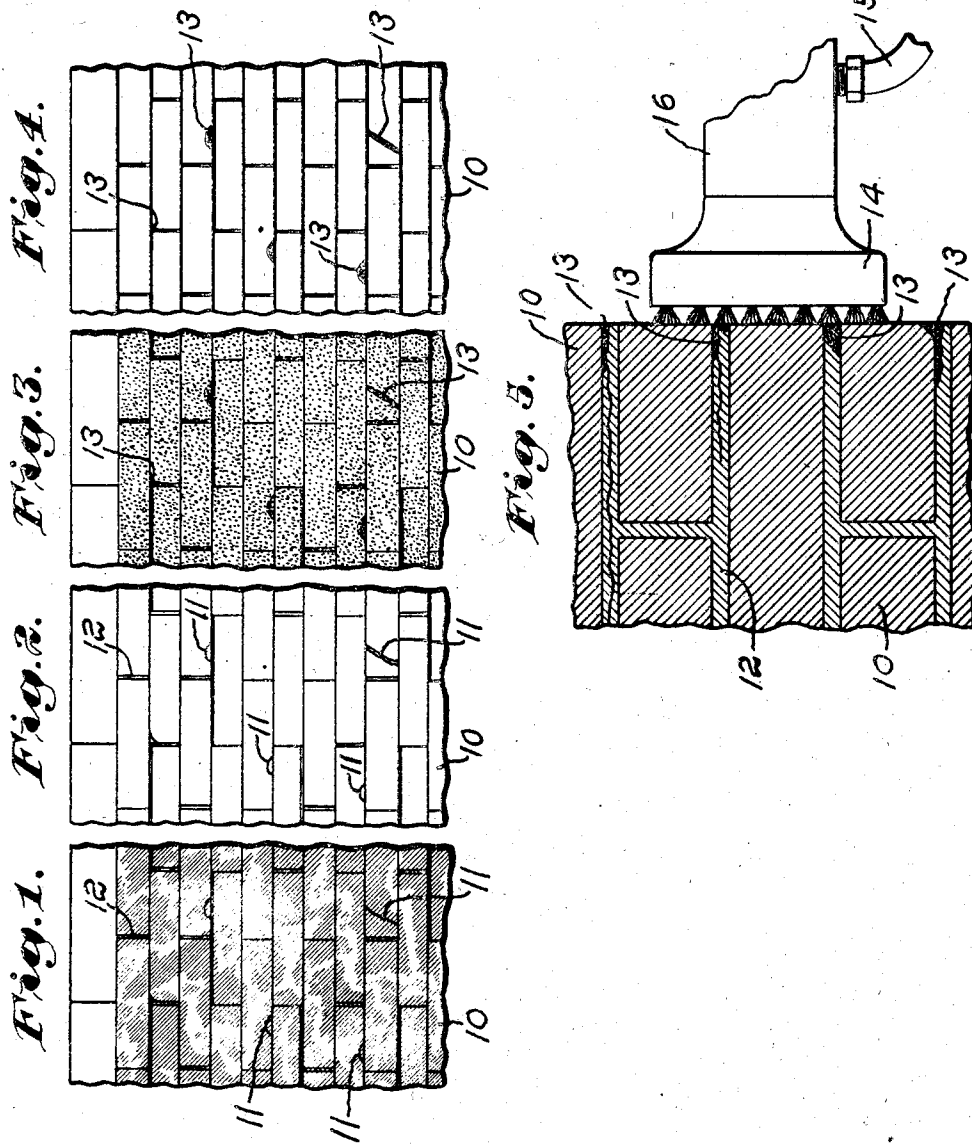
May 16, 1933.

W. L. HARLOW ET AL

1,909,763

METHOD OF WATERPROOFING MASONRY

Filed July 10, 1931



*Inventors:*  
*Woodward L. Harlow*  
*Howard S. Everngam*  
*John J. Whitney* *Att'y.*

## UNITED STATES PATENT OFFICE

WOODWARD L. HARLOW, OF WABAN, MASSACHUSETTS, AND HOWARD S. EVERNGAM, OF TARRYTOWN, NEW YORK, ASSIGNORS TO A. C. HORN SALES CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

## METHOD OF WATERPROOFING MASONRY

Application filed July 10, 1931. Serial No. 550,042.

The present invention relates to the art of treating walls and other exposed surfaces constructed of masonry or concrete to render the same waterproof, and aims to provide a new and improved method of accomplishing this object while, at the same time preserving, or permitting to be preserved, the characteristic outward appearance and architectural effects of the treated surface.

Reference may be made to the accompanying drawing representing selected portions of a masonry wall to which our improved method of treatment is adapted to be applied, and illustrating in the several views respectively the physical effects upon and general appearance of such wall before, during and after treatment in accordance with the preferred practice of our invention, it being understood, however, that no limitations are to be inferred therefrom as to the scope of the invention, the character of the treated object or surface, or the results thereby obtained other than as specified in the appended claims. Referring to the drawing, wherein like characters represent like parts,—Figure 1 is a front elevation of a selected portion of masonry wall surface before preliminary cleaning in accordance with the preferred practice of our improved method of treatment;

Figs. 2, 3 and 4, similar views showing the same portion of wall surface at subsequent stages of treatment, respectively, Fig. 2 representing the effect of the preliminary cleaning during which foreign dirt adhering to the surface and loosened or detached parts of the exposed wall structure, including the bonding element, have been removed, Fig. 3, showing conditions immediately after the application of an approved form of grout or cementitious filler and before the final dressing or cleaning operation, and Fig. 4 showing the said wall surface portion after final cleaning; and

Fig. 5, a transverse vertical section through the wall structure back of said wall surface portion, showing the filler introduced into all exposed openings therein, the same being represented in operative association with an approved form of applicator, which has been broken away rearwardly.

Walls and other surfaces of masonry, such as brick, stone, concrete, terra cotta, tile and the like, whether consisting of units of one or more of these materials bonded together with mortar or other cementitious material, or formed in one integral structure, invariably become more or less seamed or cracked with age and prolonged exposure to moisture and thermal changes. Although these openings occur with greater frequency in the bond they may also appear in the structural material itself, frequently in the form of pockets resulting from erosion and deterioration and fractures due to localized pressure, volumetric changes and other causes. In all such cases, and whatever the form or cause, water or moisture in greater or less volume enters the openings and, penetrating back of the exposed surface, causes damage to the interior, sometimes in places hardly discoverable at first and difficult of access, but frequently effecting deterioration of a progressive character.

By means of our present method the wall or treated surface is densified to a substantial depth by the introduction of a filling which aims to be as resistant to the action of the elements as the intact portion of the wall. And while this method is principally designed to rid the exposed surface of all openings through which water may enter with comparative freedom, it may also be made effective to render such surfaces, including those of the intact portion, substantially air-and-water-tight by preventing even moisture from percolating through the porous material. After the completion of the filling operation, all visible excess filling is then removed before setting to preserve the characteristic appearance of the treated wall surface.

With the foregoing and other objects in view our invention consists of the novel method of treatment hereinafter described and covered by the appended claims.

The masonry wall or surface to be treated is preferably first subjected to a thorough cleaning operation, any suitable means being employed to this end, to remove all loose and infirm substances or material,

thereby exposing any open seams, cracks, holes, recesses or other openings 11 in, through and back of the exposed surface of the structure, including the bond 12. All  
5 openings large enough to admit and retain mortar or other approved form of bond adapted to the purpose are then carefully filled in and closed with this material, either  
10 by tuck-pointing or in any other approved manner, to provide a substantial set body portion with a continuous durable surface integrating with the materials bonded.

After the above-described pointing operation, if found to be necessary, has been accomplished, the entire exposed wall surface  
15 is then subjected to an application of an approved form of grout 13. The latter, in addition to a cementitious or auto-solidifying substance, may include an admixture of inert  
20 matter, in which case it should be sufficiently fine to penetrate all openings in the treated surfaces. It may also contain, if desired, some approved form of pigment and/or waterproofing admixture.

25 It frequently happens in the practice of other methods of waterproofing walls, that small surface openings not easily visible but communicating with interior cavities and capable of conveying water thereto, as well  
30 as hardly discoverable cracks between the structural units and the bond, objectionable for the like reasons, are left unprotected. These constitute vulnerable spots in the armor, being frequent causes of serious trouble  
35 from leakage. It is necessary for proper correction of this condition that not only the outlet ends of these openings be closed but that any rearward passages be supplied to an appreciable depth with a substantial  
40 amount of filling to provide a firm support and resistant backing best illustrated in Fig. 5, for the outer closure. This result, particularly with respect to the cure of that extensive variety of fine cracks and other reduced  
45 openings of the type referred to, cannot be accomplished by the ordinary methods of waterproofing without destroying the architectural effect. We have found it expedient in commercial practice to resort to the use of  
50 suitable artificial applicators and pressure producing agents not only to apply the grout in the first instance to the treated surface generally but also thereafter to force its introduction into all openings to a substantial  
55 depth. By these means the supply of grout may be made continuous or intermittent, while the volume, force and direction are subject to the control of the operator. After its initial application the material is then  
60 tucked, tamped, jarred, rolled or otherwise impacted into the existing openings and passages before it has had time to set, and both operations may be performed simultaneously.

65 Among the artificial agents above referred to which have been found serviceable in ap-

plying our method may be mentioned, for example, a rotary stippling brush 14 preferably supplied interiorly with grout from a line hose 15 connected to the source of supply. Here the force of the discharge may be subject to hydrostatic or pneumatic pressure manually controlled. This brush is desirably also vibrated rapidly toward or away from the wall so that the grout or filling is simultaneously subjected to combined sweeping or rolling and reciprocatory or percussive movements. In many instances it may be found expedient, especially on roughened or broken surfaces, to employ some convenient form of hollow air-tight structure or caisson 16 containing a supply of grout and to apply this to limited areas, one at a time, until the entire surface thus treated is covered. The grout within the caisson is subjected to artificial internal pressure, exceeding atmospheric pressure, produced by suitable hydrostatic or pneumatic means, which forces the grout well into all exposed openings or passages in the wall.

To preserve the original architectural effect of the treated surface it is usually necessary, and particularly with the use of certain forms of grouts, to clean the surface of surplus material, as illustrated in Fig. 4, before this has had time to fully cure or set. In performing this cleaning operation care must at the same time be exercised not to disturb the filling in the impacted openings.

The operations above described will be found to prove adequate and effective in the large majority of cases to render masonry walls free from attack of water or moisture. If, however, the masonry be constructed of highly porous or absorbent material, then, in order to prevent all moisture from penetrating through the wall to the opposite surface, we have found it expedient to resort to a further and successive operation which consists in spraying on or otherwise applying to the exposed surface while in a dry absorbent state, a neutral wax, such as paraffin, heated or dissolved to assume a fluid state and thus adapted to readily enter and fill the outer pores of the masonry material. Upon hardening the wax forms a solid and desirably transparent film impervious to moisture and immune to the action of both acids and alkalis.

It should be observed that those prior methods of "waterproofing" masonry which consist solely or chiefly in the last described operation of waxing must fail to attain the desired end, if, as is usually the case, there are present in the treated surface sizeable openings too large for the wax to span, or, if spanned temporarily, are otherwise unprovided with firm cementitious material in sufficient quantity to supply an adequate and permanent backing support.

It will be understood that the scope of our

invention is intended to be commensurate with all obvious modifications thereof.

We claim:

1. The method of waterproofing masonry and the like, consisting of forcing a filling including an auto-solidifying substance to penetrate to a substantial depth into all openings in or communicating with an exposed surface, closing said openings, and then applying to the treated masonry surface a sealing substance impervious to moisture.

2. The method of rendering exposed masonry surfaces waterproof and damp-proof, consisting of removing from the exposed surface all loose material, then chinking in the larger openings with cementitious material, then applying pressure to force a grout of relatively thin cementitious material to penetrate and close all remaining openings in or communicating with the exposed surface in sufficient quantity to provide a substantial set backing for the exposed portion thereof, and then applying to the treated masonry surface an auto-solidifying waterproof substance in a fluid state to provide an imperforate seal.

3. The method of waterproofing masonry walls and the like, consisting of filling the larger exposed openings therein with a cementitious substance to become set, and then applying to the entire wall surface a grout, said grout being applied by a series of combined sweeping and percussive movements adapted to seal all openings and to drive the grout into the spaces rearward of and communicating with the exposed surface of the wall.

4. The method of waterproofing masonry and concrete walls, consisting of filling the larger exposed openings therein with an auto-solidifying substance to become set, and then applying to the entire wall surface a refined grout to seal all openings and provide a substantial set backing for the exposed portion thereof, said grout being applied by a succession of forward and lateral movements in combination.

5. The method of treating masonry and the like, consisting of introducing a refined cementitious filling by artificial pressure producing means into all openings in or communicating with the exposed surface to close the same and to provide a substantial concealed portion for the support of the exposed portion, the application of said filling to the exposed surface of the masonry and concrete being accompanied by a circulatory movement.

6. The method of treating masonry and the like, consisting of introducing a refined cementitious filling into all openings in or communicating with the exposed surface to close the same and to provide a substantial concealed portion for the support of the exposed portion, the introduction of said filling

into said openings being accompanied by a succession of percussive movements.

7. The method of treating masonry walls and the like, which consists in removing all loose material from the exposed surface, then chinking in the larger openings with an auto-solidifying bonding substance, then introducing into all remaining openings under forced air pressure a refined cementitious filling having a substantial concealed portion for the support of the exposed portion, the application of said refined filling being accompanied by combined circulatory and percussive movements.

8. The method of treating masonry surfaces, consisting of introducing a refined cementitious filling into openings in or communicating with the exposed masonry surface, the introduction of said filling into said openings being accompanied by pressure exceeding atmospheric pressure having a tendency to progressively urge said filling in all directions to close said openings and to provide an accumulation of material back of the exposed portion thereof.

9. The method of treating masonry walls and the like to render the same waterproof without impairing the architectural effects or modifying the characteristic outward appearance thereof, consisting of introducing a cementitious filling into openings in or communicating with the exposed surface, thereby sealing the outlet of said openings and providing a substantial rearward reinforcement for the exposed portion of the filling, then removing surplus filling adhering to the wall surface, and then applying to the treated surface a transparent substance impervious to moisture.

10. The method of waterproofing masonry walls and the like, consisting of forcing auto-solidifying substance into openings in or communicating with an exposed surface, thereby sealing the outlet of such openings and providing a substantial rearward reinforcement therefor, then cleaning the treated surface to remove superfluous material, and then waxing the treated surface.

In testimony whereof, we have signed our names to this specification.

WOODWARD L. HARLOW.  
HOWARD S. EVERNGAM.