

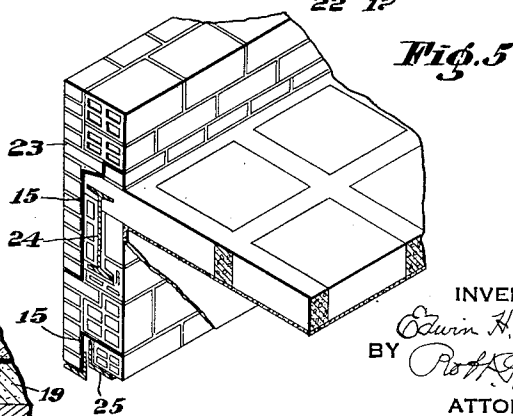
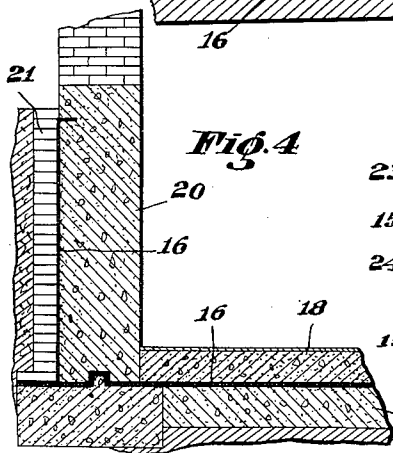
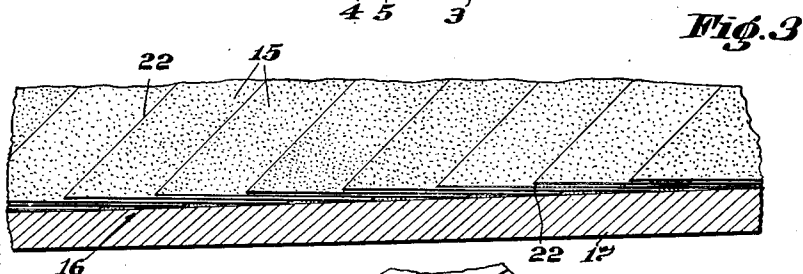
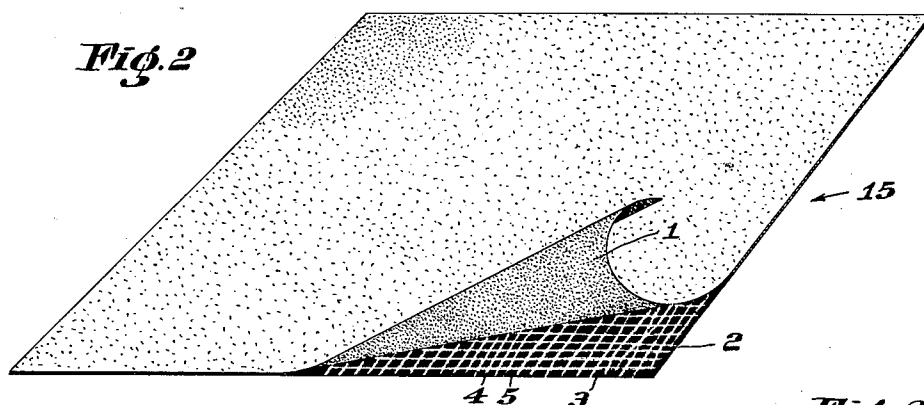
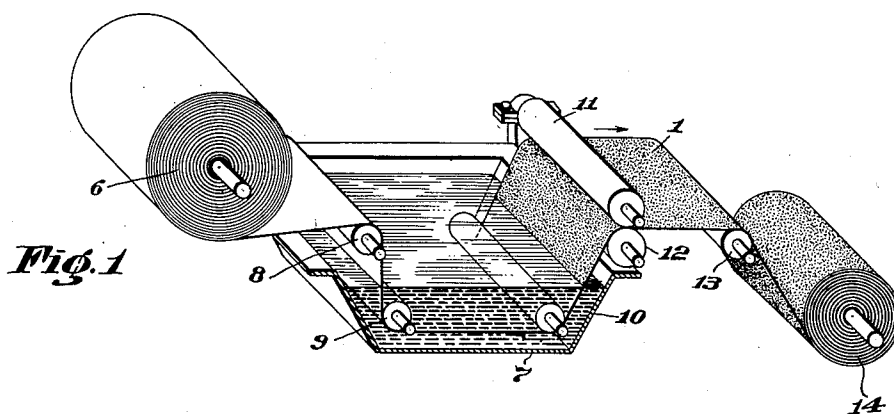
June 4, 1935.

E. H. WHITE

2,003,618

METHOD OF AND MEANS FOR WATERPROOFING BUILDINGS

Filed June 15, 1932



INVENTOR
Edwin H. White
 BY *Robert H. Lewis*
 ATTORNEY

UNITED STATES PATENT OFFICE

2,003,618

METHOD OF AND MEANS FOR WATER-
PROOFING BUILDINGS

Edwin H. White, Newark, N. J., assignor to
American Reinforced Paper Company, Attle-
boro, Mass., a corporation of Massachusetts

Application June 15, 1932, Serial No. 617,373

2 Claims. (Cl. 72-127)

This invention relates to a method of and means for waterproofing buildings and more particularly to the membrane system as distinguish from the integral system.

5 In the integral system an effort is made to render the floor or wall of a building waterproof by mixing concrete with a substance intended to render the concrete itself waterproof, whereas in the membrane system a special water-
10 proof layer is provided within the floor or wall structure or near a surface thereof.

It is important that this waterproof layer or membrane shall form a continuous water impervious sheet covering the entire area to be rendered waterproof so that water will not pass
15 therethrough even under pressure, and that the waterproofing layers be sufficiently elastic and flexible to prevent being ruptured by the formation of cracks in the floor or other structure with which the membrane is employed.

The membrane system of waterproofing may be employed to waterproof the basement of buildings, in the construction of floors for
20 laundries and dairies or to prevent the water from fire sprinklers from passing through a floor, in the construction of bridges, subways, tunnels and swimming pools and in various other building structures where water tight floors and walls are required.

Heretofore in employing the membrane system of waterproofing the floor and walls to be made water impervious have been covered with several
30 layers of felt, burlap or cotton fabric laid one over the other in overlapping relation and each layer when applied has been mopped or coated with a bituminous substance, such as asphalt, to firmly unite the adjacent layers and form a flexible waterproof membrane.

Burlap and cotton goods, however, are not water impervious, even when impregnated with asphalt since the fibres of the fabric will absorb
40 moisture and water will also tend to pass through the apertures or interstices of the weave, and felt is open to the objection that it tends to disintegrate in the presence of moisture.

In accordance with the present invention the so-called membrane is preformed to a plurality of sheets of material and is rendered inherently
50 waterproof by presaturating or impregnating at least one of the sheets of the multiply sheet material with a waterproofing substance, such for instance as asphalt, before the plurality of sheets are assembled together to form the multiply structure.

Since paper is of a homogeneous nature and devoid of the opening inherent in all woven or textile fabrics, it will act effectively to prevent the passage of water when combined as an
5 element with other sheet material by a waterproof adhesive, and an important feature of the present invention therefore consists in a multiply water impervious sheet material, one of the components of which consists of a water impervious sheet secured to the other components
10 by a waterproof adhesive either with or without a reenforcement between the component sheets.

In some cases it may be desirable to incorporate between the layers or component sheets a
15 reenforcement which, while adding strength to the multiply sheet material, will be susceptible of sufficient yield to accommodate the multiply sheet material to expansion and contraction without rupture even where the walls or floors
20 of the building should crack to any usual extent. Such reenforcement may be particularly desirable where the components of the multiply sheet material are mainly or wholly formed of paper sheets secured together by a waterproof
25 adhesive.

The reenforcement above mentioned may be variously contrived but in the present instance of the invention it is composed of interwoven
30 filaments such as spun or unspun fibres embedded in the waterproof adhesive between the components of the multiply sheet material.

It has been found in practice that where one or more of the components of the multiply sheet material is or are formed of paper the desired
35 impervious character may be secured by presaturating one or more of the paper sheets with a bituminous product, such as hot asphalt, whereby the paper sheet or sheets become permanently impervious to the passage of water
40 even under pressure; the result being that a preformed multiply sheet material is produced in which at least one sheet is presaturated or impregnated with a waterproof material before the sheets are united together by a waterproof
45 adhesive. The multiply sheet material thus formed comprises therefore a multiply sheet structure wherein at least one of the components is composed of a presaturated or impregnated
50 sheet.

The waterproofing membrane thus formed may be applied by a single operation and thereafter effectively prevent the passage of water
55 while at the same time being sufficiently yieldable or elastic to accommodate for expansion

or contraction even where the wall or floor of a building may be cracked to any usual extent.

The preformed multiply unspun sheet material described while well adapted for use in waterproofing buildings in accordance with the membrane system, may also be employed for other purposes, such for example as a flashing material for preventing water from entering the walls adjacent spandrels and around window and door heads.

The invention will be further understood from the following description when read in connection with the accompanying drawing illustrating several applications of the invention.

In the drawing:—

Fig. 1 is a perspective view of mechanism for impregnating or saturating a sheet of paper with a waterproofing substance;

Fig. 2 is a perspective view of a reenforced, multiply, waterproof paper employed in carrying out the present invention;

Fig. 3 is a perspective view showing a number of the sheets of Fig. 2 adhesively secured together in overlapping relation to form a water impervious layer or membrane for a floor;

Fig. 4 is a vertical sectional view through the floor and basement wall of a building made waterproof in accordance with the present method; and

Fig. 5 is a perspective view of a wall of a building provided with flashing formed of the reenforced, multiply, waterproof paper of Fig. 2.

The invention will be hereinafter described in connection with a preformed multiply sheet material where two sheets of paper constitute component parts of the material, but it is to be understood, of course, that this is only one of the many forms which the multiply sheet material may take, the essentials being that at least one of the component sheets of the multiply sheet material be so pre-saturated with a waterproofing material or rendered impervious to the passage of water.

Where two sheets of paper constitute the component parts of the multiply sheet material one at least of these sheets will be pre-saturated with a waterproofing material and then the two sheets 1 and 2, as shown, are firmly secured together face to face by a waterproof adhesive 3, such for instance as asphalt. The reenforcing material provided between the sheets 1 and 2 may be formed of spun or unspun fibres, filaments or woven material, and the sheets are shown as reenforced both longitudinally and transversely by straightened unspun fibres 4 and 5 secured between the sheets 1 and 2 by the adhesive 3.

While the reenforced paper just described is waterproof due to the waterproof adhesive 3 applied between the sheets of paper, the outer faces of the sheets of paper if exposed to moisture may tend to deteriorate over a period of years if frequently acted upon by water, and since it is desirable that the waterproofing material employed in a building shall last practically as long as the building itself, it is important that deterioration of the paper as a result of exposure to moisture be prevented.

This is accomplished by impregnating or saturating each sheet 1 and 2 with a waterproofing material, such as hot asphalt. The saturating material may be applied as shown in Fig. 1, by passing a sheet of paper supplied by the roll 6 through a tank 7 containing hot asphalt or other waterproofing material. The paper is shown as

passing over an upper roller 8 and beneath the rollers 9 and 10 supported in the tank below the surface of the coating material. The surface excess of the saturating waterproof material may be removed by passing the saturated paper between squeeze rollers 11 and 12 whereupon the saturated paper sheet may be lead over the roller 13 to the take up roll 14.

After the sheets of paper 1 and 2 have been impregnated with the waterproofing material, they may be reenforced by applying the fibres 4 and 5 between the sheets and pressing the sheets 1 and 2 together to cause them to be united by the asphalt coating 3. The reenforced paper 15 thus produced is not only completely impervious to water, but the material impregnating the sheet 1 and 2 will prevent these sheets from deteriorating even when exposed to moisture over a period of years.

In employing the membrane system to waterproof a building construction, the waterproofing membrane 16 formed of the sheets 15 may be applied to the upper face of a floor 17, as shown in Fig. 3. In many constructions, however, the waterproofing membrane is positioned between an upper floor area 18 and lower floor area 19, or between an inner wall area 20 and outer wall area 21, as shown in Fig. 4.

When the membrane system is used to exclude water from the basement of a building it is essential that the floor structure applied over the membrane be designed to withstand the hydrostatic pressure, and the same is true with respect to basement walls.

The waterproofing material 16 is formed in situ by laying any desired number of reenforced waterproof sheets 15, one over the other, in overlapping relation and completely covering each sheet 15 when applied with a coating or mopping of bituminous substance 22, such as hot asphalt. In the construction shown in Fig. 3 the membrane sheet 16 has a thickness throughout of not less than three sheets 15. This will be found sufficient in many constructions to withstand a substantial water pressure and its penetrating properties.

A waterproof membrane constructed as herein shown and described will be sufficiently flexible and elastic to remain intact when cracks form in the floor in which it is embedded, so that water entering such cracks will not pass through the membrane. If however, it should be desirable to increase the stretching properties of the membrane, the multiply paper 15 or the sheets 1 and 2 of which it is constructed may be crimped or crinkled to increase their stretching properties in one or both directions.

The waterproof multiply paper 15 is well adapted for use as a special flashing material adapted to prevent water from entering through the outer walls of a building, adjacent spandrels and window and door heads, and such use of the paper 15 is illustrated in Fig. 5 where it is shown as embedded in the wall 23 in position to prevent rain water from entering around the beams 24 and 25.

What is claimed is:—

1. The method of waterproofing the floor of a building construction which consists in forming a lower floor area, applying thereto successive layers of waterproof, multiply sheet material, each consisting of two sheets of impervious paper saturated with a waterproofing substance and reenforced by filaments adhesively secured

between the sheets, securing said layers together in overlapping relation by applying a bituminous binder over each sheet to form a flexible membrane having complete water impervious continuity throughout the floor area, and laying di-

5 ly upon said membrane the upper floor area.

2. The method of waterproofing a floor or wall of a building, which consists in forming the floor or wall area to be waterproofed, applying thereto

10 a composite flexible membrane sheet comprising

as a part of its components at least one layer of paper devoid of interstices and rendered waterproof by a bituminous product and strengthened by a series of unspun fibres embedded in the bituminous product to permit expansion and contraction without rupturing, and securing a number of such membrane sheets together in overlapping relation by a bituminous binder.

5

EDWIN H. WHITE. 10