

June 8, 1943.

H. C. KOCH

2,321,397

WATERPROOFING APPARATUS

Original Filed Dec. 18, 1939 5 Sheets-Sheet 1

Fig. 1.

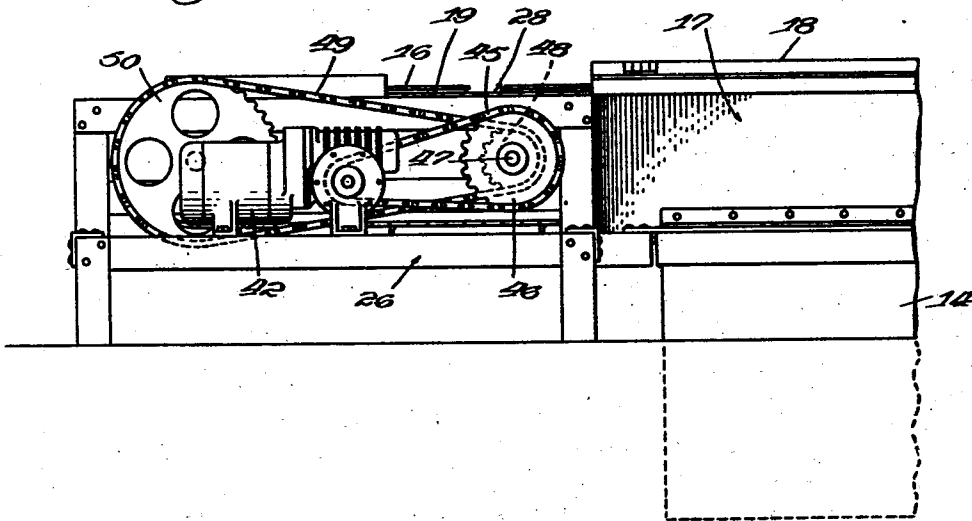
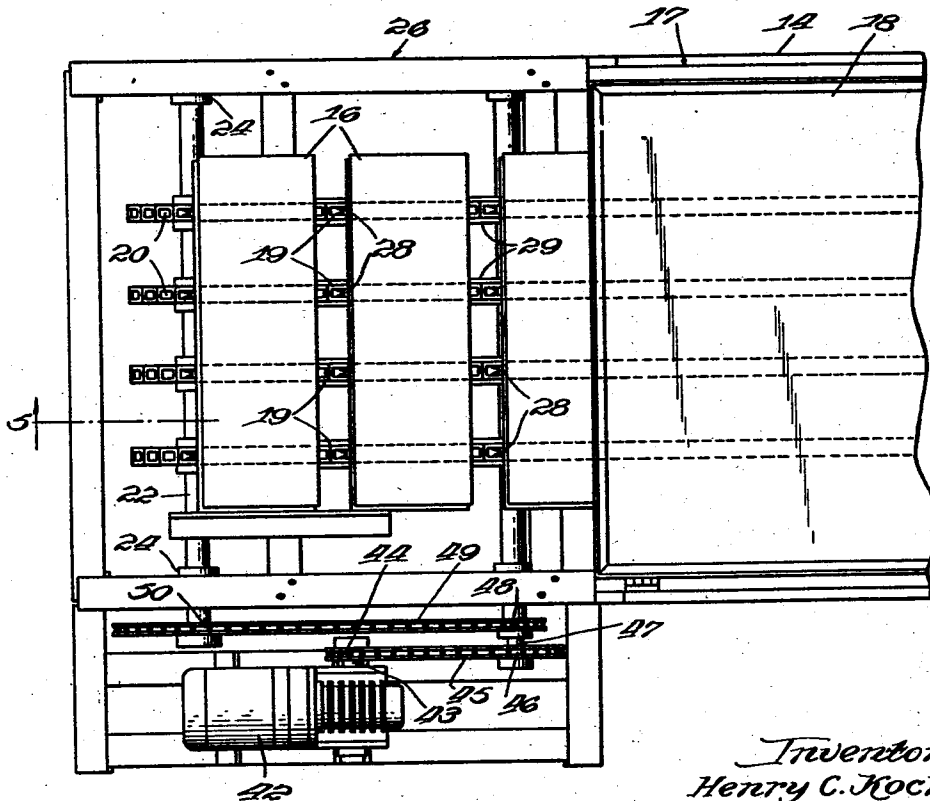


Fig. 2.



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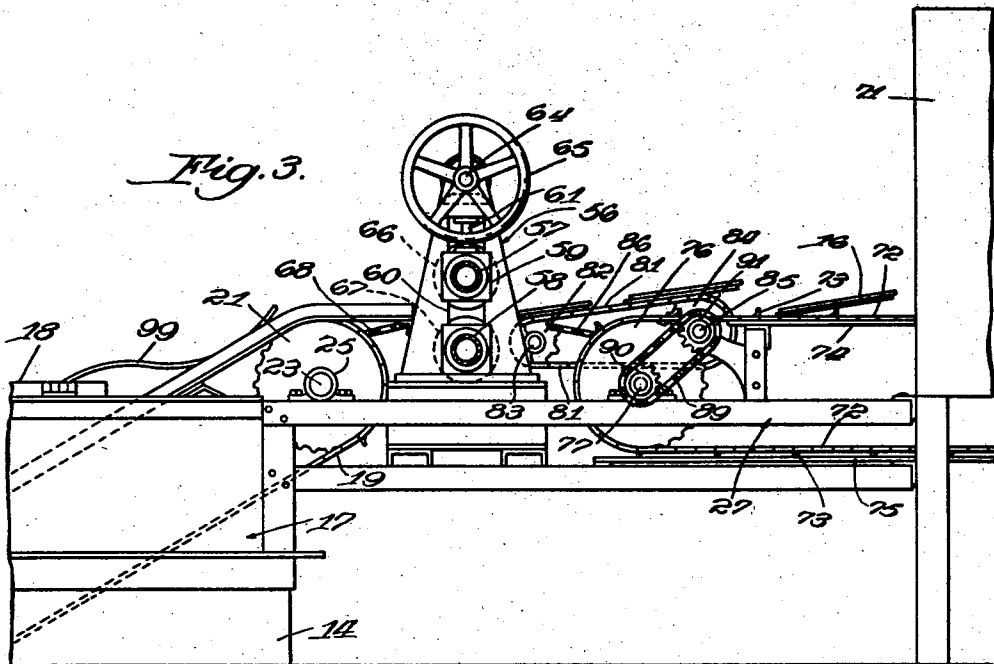
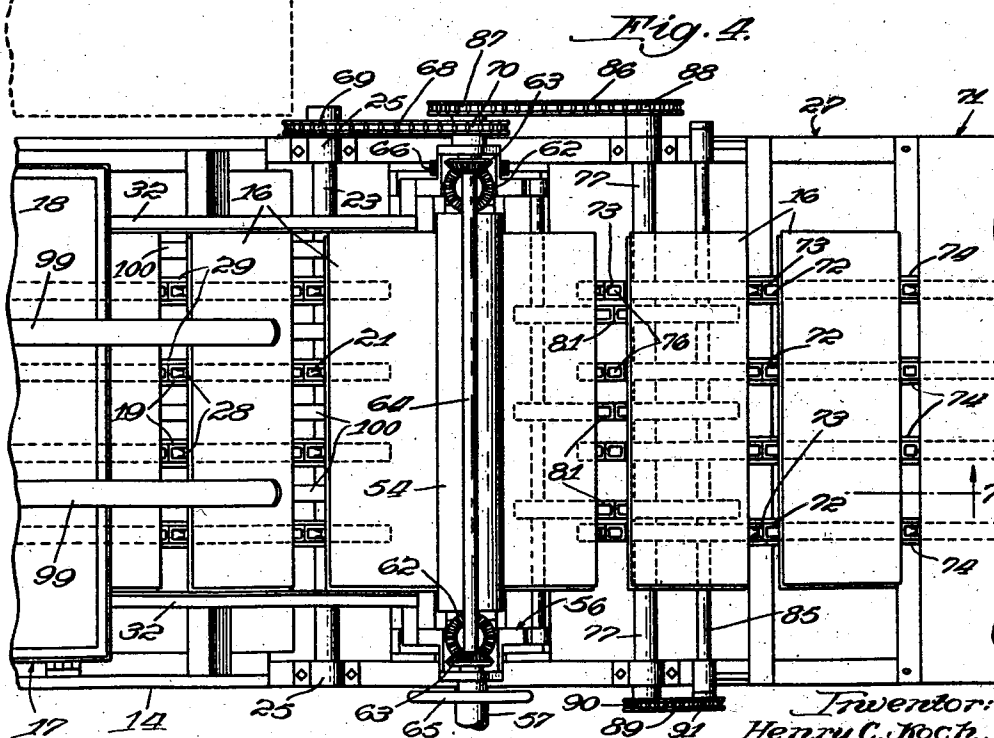
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WATERPROOFING APPARATUS

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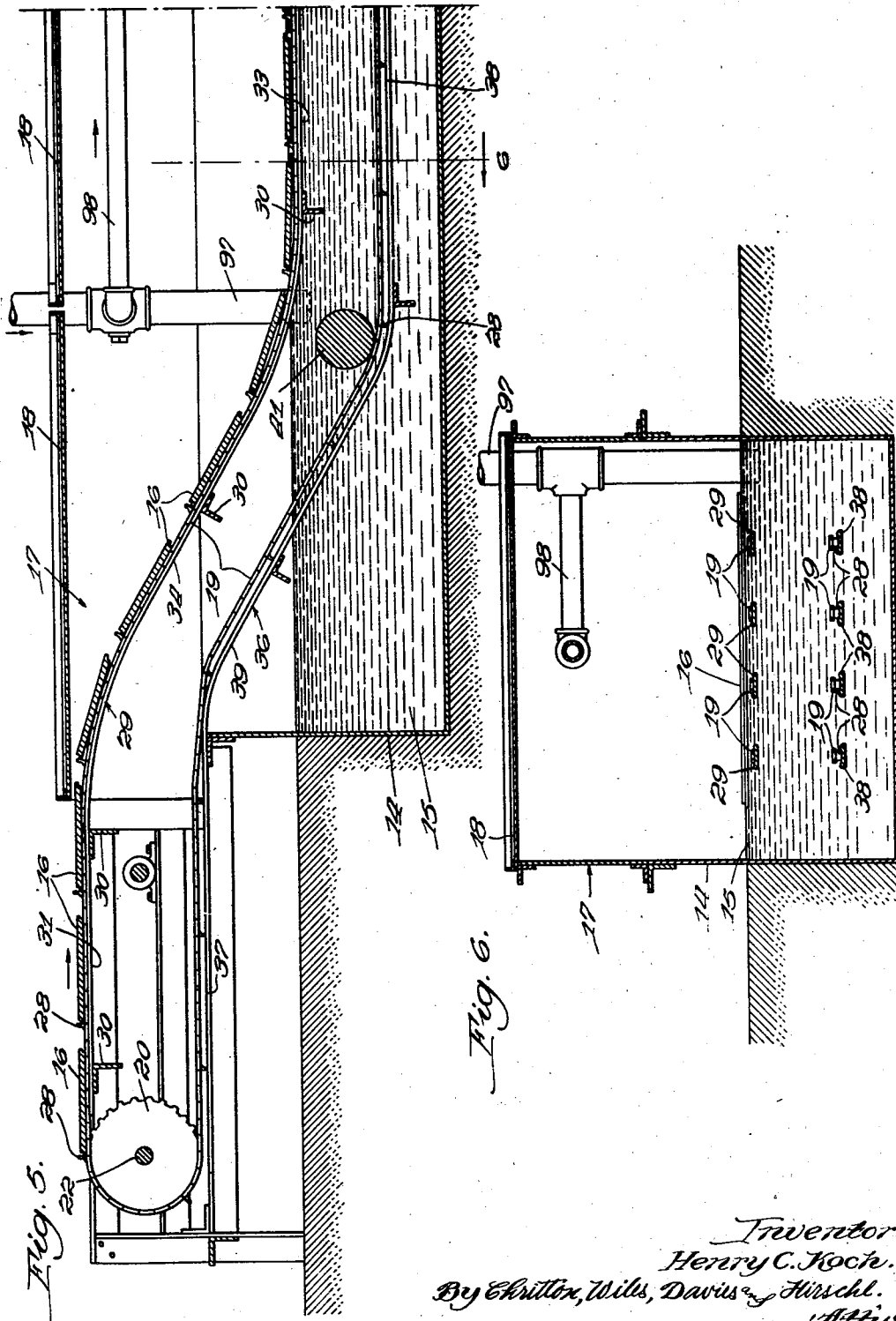
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WATERPROOFING APPARATUS

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5 Sheets-Sheet 3



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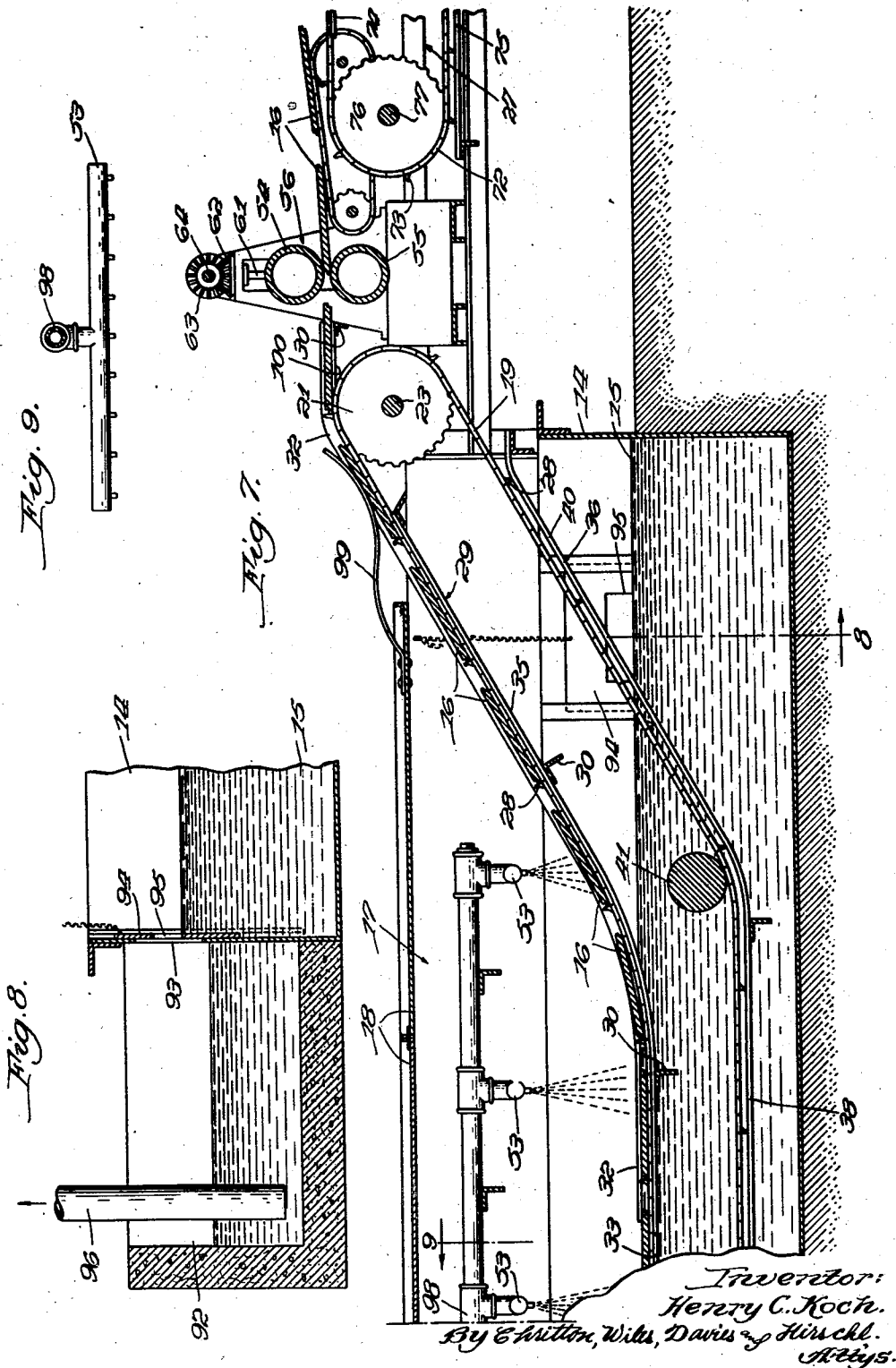
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WATERPROOFING APPARATUS

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5 Sheets-Sheet 4



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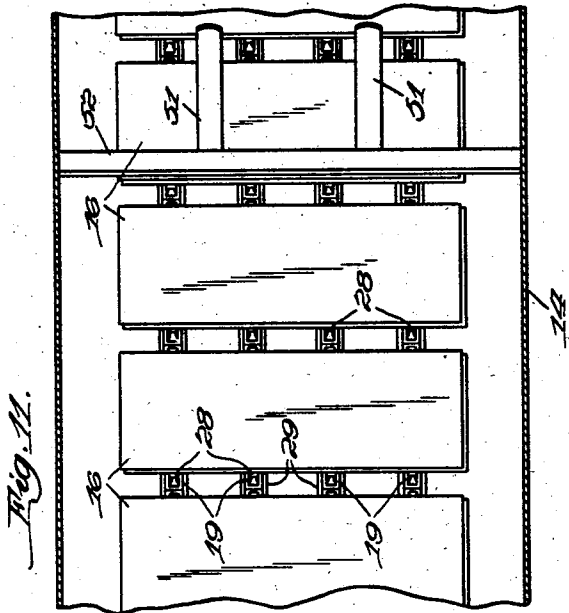
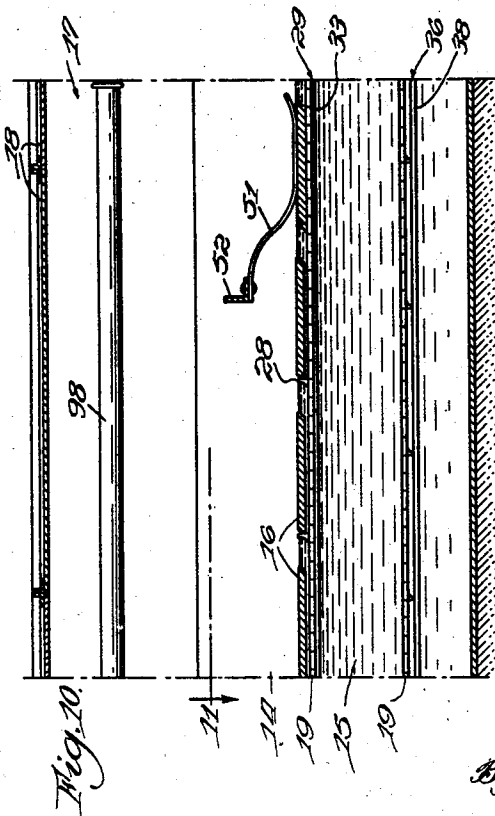
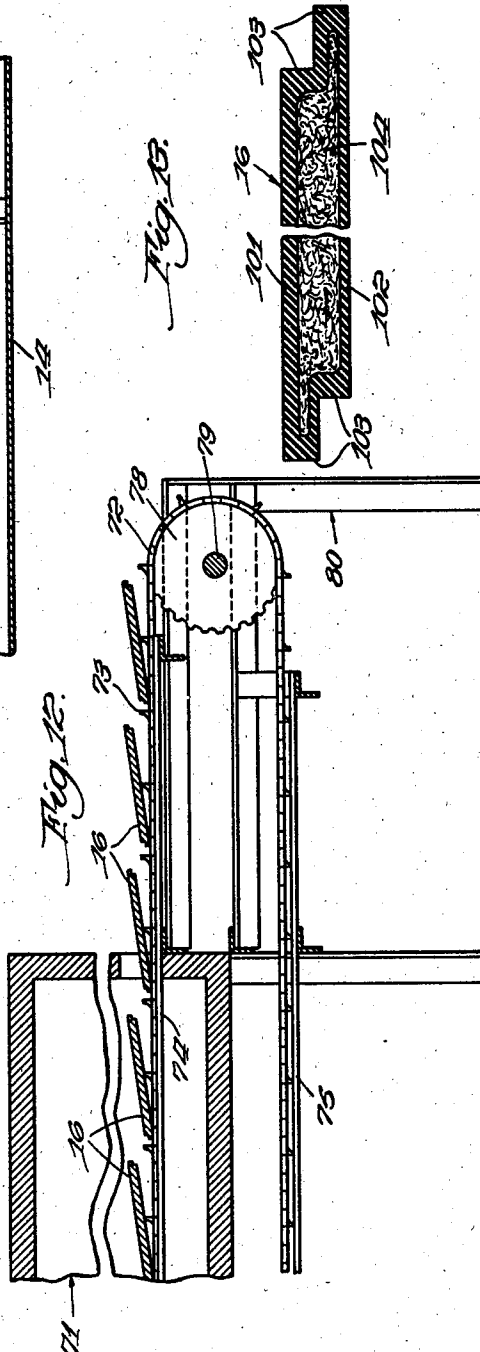
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WATERPROOFING APPARATUS

Original Filed Dec. 18, 1939

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,321,397

WATERPROOFING APPARATUS

Henry C. Koch, Chicago, Ill., assignor to Abbott
Coburn, Chicago, Ill.Original application December 18, 1939, Serial No.
309,896. Divided and this application April 9,
1941, Serial No. 387,724

8 Claims. (Cl. 91—46)

My invention relates generally to apparatus for the production of waterproofed material of fibrous character and provided, more especially, in the form of boards, blocks, or the like; and more especially, though not exclusively, to apparatus for the production of waterproofed boards of fibrous insulating material for use particularly, as siding for buildings more commonly provided on the surfaces thereof which in use are exposed to the weather, with a grit coating adhered thereto; the present application being a division of my pending application for United States Letters Patent Serial No. 309,896, filed December 18, 1939.

Usually in the production of such siding the base boards, which are formed of a wide variety of fibrous materials, such as for example wood fibers, straw fibers, or bagasse, or a mixture of certain of these fibers or a mixture composed of these fibers and other fibrous material, compressed into board form, such a base board, by way of example, being that known as "Insulite," are subjected to an operation whereby they become more or less completely impregnated throughout all of their surfaces with a hot waterproofing fluid, of such character that it penetrates into the boards and upon cooling to atmospheric temperature becomes hard, forming hard layers in all of the outer portions of the boards composed of the solidified impregnating fluid and the fibers penetrated and increased thereby, with the outer faces of the boards exposing their original texture; such as for example an asphalt compound as commonly provided for this purpose.

Boards of the general character above referred to contain in their natural state such a degree of moisture as to require, in accordance with methods of impregnation hitherto used, either the drying of the boards preliminary to the impregnation thereof, or the performance of the impregnating operation at a slow speed, reflecting on the cost of producing the finished boards.

It is therefore one of my objects to provide a novel apparatus for the impregnating of boards with waterproofing material, particularly of the character above referred to, whereby the boards may be impregnated with the waterproofing material to the desired depth, variable at the will of the operator, and uniformly, at a greater speed than hitherto possible and without producing warping or deformation of the boards or rendering the waterproof layers porous.

Another object is to provide a novel construction of apparatus for impregnating boards and

by which the impregnating operation may be performed quicker than hitherto possible.

Another object is to provide for the impregnation of each of the surfaces of the board to a uniform depth throughout its extent, and to provide for the varying of the thickness of the impregnated layers of the board in the opposite faces, one to the other as desired and of especial importance in connection with the economical production of building siding of the grit coated type, wherein the face portion of the board which is outermost when applied to use may be impregnated to a lesser depth than its inner face portion and still present, in combination with the usual adhesive coating applied to the outer face portion of the board for adhering the grit thereto, a structure which will be satisfactorily protected against the weather, and with an impregnated layer in its inner face portion of sufficient thickness to satisfactorily protect the board against access of moisture thereto through its inner face.

Other of my objects will be apparent from the following description of the invention.

Referring to the accompanying drawings, which illustrate an apparatus constructed in accordance with my invention:

Figure 1 is a view in side elevation of the entering end of the impregnating apparatus.

Figure 2 is a plan view of the part of the apparatus shown in Fig. 1.

Figure 3 is a view in side elevation of the delivery end of the impregnating apparatus.

Figure 4 is a plan view of the part of the apparatus shown in Fig. 3.

Figure 5 is an enlarged fragmentary sectional view taken at the line 5 on Fig. 2 and viewed in the direction of the arrow.

Figure 6 is a cross sectional view taken at the line 6 on Fig. 5 and viewed in the direction of the arrow.

Figure 7 is a fragmentary sectional view taken at the line 7 on Fig. 4 and view in the direction of the arrows.

Figure 8 is a fragmentary section taken at the line 8 on Fig. 7 and viewed in the direction of the arrow.

Figure 9 is a fragmentary sectional view taken at the line 9 on Fig. 7 and viewed in the direction of the arrow illustrating a portion of fluid-spraying means forming a part of the apparatus.

Figure 10 is a view in longitudinal sectional elevation of a portion of the impregnating apparatus intermediate its entering and delivery ends.

Figure 11 is a fragmentary plan sectional view taken at the line 11 on Fig. 10 and viewed in the direction of the arrow.

Figure 12 is a view in longitudinal sectional elevation of the delivery end of means for subjecting the boards, to which impregnating fluid has been applied, to the action of heat; and the conveyor for the boards; and

Figure 13, a broken cross-sectional view taken through a board impregnated with a waterproofing fluid in accordance with my invention.

The illustrated apparatus comprises a tank 14 shown as extending below the ground line, for holding a bath 15 of hot waterproofing material, as for example and preferably, of the character above referred to, by which fiber boards such as those of the character above described and usually approximately $\frac{1}{2}$ " thick and represented at 16, are to be impregnated; the tank being covered at its top by a housing 17 open at its opposite ends, the top of which is made of removable and replaceable cover sections 18 supported on the sides of the housing 17.

Associated with the tank 14 are continuously operating conveyor means for carrying the boards through the tank and in contact with the bath 15.

The conveying means referred to are shown as comprising a plurality of endless sprocket chains 19, shown as four in number, arranged side by side in spaced apart relation and engaging sprockets 20 and 21 secured to cross shafts 22 and 23, respectively, journaled at 24 and 25 on frameworks 26 and 27 located above the tank 14 at opposite ends thereof; the chains 19 having outwardly extending lugs 28 in alignment with each other crosswise of the apparatus and spaced apart on each chain a distance somewhat greater than the width of the boards to be conveyed through the tank.

The chains 19 between their ends extend into the bath 15 and are guided by tracks located beneath the upper and lower reaches of the chains.

The tracks for the upper reaches of the chains 19 are shown at 29 and are provided as relatively narrow strip members located beneath the upper reaches, respectively, of the chains and on which the links of the chains run.

The tracks 29 which are supported on cross bars 30 provided on the frameworks 26 and 27 and in the tank 14, extend substantially the full length of the space between the sprockets 20 and 21 and present straight, substantially horizontal, terminal portions 31 in front of the entering end of the tank 14; straight, substantially horizontal intermediate portions 33 extending into the tank 14 and located below the level of the bath 15; and inclined portions 34 and 35 located in the tank, the inclined portions 34 being located between the terminal portions 31 and the intermediate portions 33, and the inclined portions 35 at the opposite end of the tank.

The tracks for the lower reaches of the chains 19 are shown at 36 and are of the same construction as the tracks 29 and are supported in the same way, the tracks 36 having straight substantially horizontal terminal portions 37 adjacent the entering end of the tank 14; straight substantially horizontal intermediate portions 38; and inclined portions 39 and 40, all of these portions of the tracks 36 paralleling the corresponding portions of the tracks 29 above described for the upper reaches of the chains 19, the lower

reaches of the chains 19 engaging the tracks 36 at the lugs 28 on these chains.

To insure against upward displacement of the lower reaches of the chains 19 rollers 41 are provided in the tank 14 above the lower reaches of the chains 19 adjacent the lower ends of the inclined portions of these chains.

The drive for the conveyor chains 19 is shown as comprising a power device 42 of any suitable construction, the drive shaft 43 of which is connected with the sprocket shaft 22 to drive it at the desired speed by means of "step-down" sprocket and chain mechanism shown as comprising a small sprocket 44 on the shaft 43 connected by a sprocket chain 45 with a larger sprocket 46 on an intermediate shaft 47, and a small sprocket 48 on the intermediate shaft 47 connected by a sprocket chain 49 with a large sprocket 50 on the sprocket shaft 22.

From the foregoing it will be understood that in the use of the apparatus the boards, such as for example "Insulite" boards, to be impregnated with the waterproofing fluid, are applied one by one to the upper reaches of the chains 19 in the spaces between adjacent lugs 28, at the entering end of the impregnating apparatus, to the positions shown in Figs. 1 and 2 and in the continuing movement of the conveyor are carried through one end of the housing 17 into the bath 15 and thence out of the bath through the opposite end of the housing.

In the use of this apparatus the boards in the fore part of their movement in the bath 15 are caused to be only partially submerged therein, whereby the upper surfaces of the boards extend above the level of the bath; and thereafter the boards, in their continuing movement in the bath, are caused to become covered at their upper surfaces with the waterproofing fluid, for the purpose hereinafter explained.

Accordingly in the particular apparatus shown the bath 15 would be maintained at such a height that partial submergence only of the boards will result in the fore part of their movement in the bath, preferably at such height that the boards will be permitted to float in the bath and still extend into a position in which they will be engaged at their rear edges by the adjacent lugs 28 on the conveyor chains 19 for feeding them along the bath.

At the point at which it is desired contact of the waterproofing material with the upper surfaces of the board to be initiated, means, in the apparatus shown, are provided for forcing the boards downwardly to fully submerged position in the bath, these means comprising a series of spring fingers 51 (Figs. 10 and 11) supported on a cross bar 52 in the tank 14 and extending lengthwise of the tank and adapted to bear down on the boards as they pass below them and force the boards into fully submerged position.

The means referred to are supplemented by other means extending therebeyond in the line of travel of the boards, for continuing the supplying of the waterproofing fluid to the upper surfaces of the boards for the desired length of time; these means involving the showering of the heated waterproofing fluid upon the upper surfaces of the boards and comprising a plurality of spray pipes 53, shown as interconnected, extending crosswise of the tank 14 and in communication with a suitable source of the hot waterproofing material.

Located beyond, and adjacent, the delivery end of the tank 14 is a pair of hollow rolls 54 and 55

(Figs. 3, 4 and 7) serving as board-feeding means and means controlling the thickness and uniformity of the coating of waterproofing fluid allowed to remain on the board at this stage of the operation.

The rolls 54 and 55 are journaled in a stand 56 and are adapted to be maintained heated to the desired degree, as for example by steam supplied to the interior of these rolls through pipes 57 and 58 leading from any suitable source of steam supply and connected with the rolls in any suitable way, as for example in accordance with the common practice of supplying steam to hollow rolls for heating them.

The rolls 54 and 55 are relatively adjustable toward and away from each other for the purpose hereinafter described, as for example by mounting the journal boxes 59 for the upper roll 54 in vertical slideways 60 at opposite ends of the stand 56 and providing adjusting means for these boxes; the means shown for this purpose comprising vertical shafts 61 journaled in the stand 56 and having threaded connection at their lower ends with the boxes 59; bevel gears 62 on the upper ends of the shafts 61; bevel gears 63 on a shaft 64 extending crosswise of the apparatus and journaled in the stand 56, the gears 62 and 63 intermeshing, and a hand wheel 65 on the shaft 64.

In the construction shown the rolls 54 and 55 are connected together by gears 66 and 67 to cause the rolls to rotate at the same surface speed as the speed of travel of the conveyor chains 19, and are positively driven, to drive them in the same direction as these chains, as by a sprocket chain 68 engaging sprockets 69 and 70 on the shaft 23 and roll 55, respectively.

Located beyond the rolls 54 and 55 is a drying oven 71 through which the boards after passing through the rolls 54 and 55 are conveyed, for driving such of the water-proofing material as may remain on the surfaces of the boards, into the boards, by the action of heat, preferably leaving exposed the original texture of the face portions of the boards.

The oven referred to may be of any suitable construction and heated in any desirable way preferably to a temperature slightly below that which would injuriously affect the material of which the boards are made, as for example from about 350° F. to about 400° F.

The oven 71 has openings in its opposite ends; and means for conveying the boards through the oven are provided; the means shown for this purpose comprising a plurality of sprocket chains 72 (shown as four in number) spaced apart and extending longitudinally of the apparatus and provided with outwardly extending lugs 73 shown as spaced apart a distance somewhat less than the width of the boards. To support the chains 72 intermediate their ends, tracks 74 and 75, each of strip form, are supported to extend below the upper and lower reaches, respectively, of the chains 72, the upper reaches bearing at their links on the upper tracks 74 and the lower reaches bearing at their lugs 73 on the lower tracks 75.

At opposite ends of the conveyor the chains 72 engage sprockets 76 secured to a cross shaft 77 journaled on the framework 27 in front of the entering end of the oven 71 and sprockets 78 secured to a cross shaft 79 journaled on a framework 80 adjacent the discharge end of the oven, the upper reaches of the chains 72 extending through the oven; these chains being driven in the same direction, and at the same speed, as

the chains 19 by the means hereinafter described.

Means are provided for conveying the boards from the rolls 54 and 55 to the upper reaches of the chains 72, the means shown for this purpose comprising a series of sprocket chains 81 interspersed with the chains 72 and extending lengthwise of the apparatus and engaging sprockets 82 on a cross shaft 83 carried by the stand 56 and sprockets 84 carried on a cross shaft 85 journaled in the framework 27, the upper reaches of the chains 81 inclining upwardly and rearwardly from a point adjacent the rolls 54 and 55.

The chains 72 and 81 are driven through the medium of a sprocket chain 86 engaging a sprocket 87 on the lower roll 55 and a sprocket 88 on the shaft 77, and by a sprocket chain 89 connected with sprockets 90 and 91 on the shafts 77 and 85, respectively.

In practice it would be desirable to associate with the tank 14 a source of the hot waterproofing fluid, as for example in a still (not shown) wherein the waterproofing material would be maintained approximately at the temperature desired of the material in the bath 15, as for example about 400° F., and to continuously circulate the waterproofing material in the tank 14 to the still and back to the tank.

Accordingly in the arrangement shown the apparatus is provided with a sump 92 opening at 93 above its bottom into the upper portion of the tank 14 at the delivery end of the tank, a vertically adjustable gate 94 having an opening 95 registering with the opening 93 being provided to control the height of the bath 15. An outlet pipe 96 depends into the sump 92 and would lead to the inlet of the still referred to, the outlet of the still connecting with a pipe 97 which depends into the bath 15 at the entering end of the tank 14 and has a branch pipe section 98 through which a portion of the waterproofing material supplied to the pipe 97 from the still is supplied to the spray pipes 53. Any suitable means for thus circulating the waterproofing material, as for example pump means, would be provided.

The procedure for waterproofing the boards is as follows:

The boards 16 to be waterproofed are applied to the conveyor chains 19, at the entering end of the apparatus, to extend between adjacent lugs 28 on the chains 19, these chains serving to convey the boards into the entering end of the tank 14 and to the bath 15 in which the boards are only partially submerged in the bath as stated. In the continuing movement of the chains 19 the boards are carried beneath the presser fingers 51 which cause the boards to become fully submerged in the bath 15, and subjection of the upper surfaces of the boards to the waterproofing material continued by the showering of the waterproofing material from the spray pipes 53 to the upper surfaces of the boards in the conveying of the boards beneath these pipes; the boards passing between guides 32 the lower, inner ends of which are deflected outwardly. The boards in passing out of the tank 14 pass beneath spring fingers 99 secured to one of the cover sections 18 which serve to ensure against displacement of the boards as they are carried up the upper end of the incline and over the sprockets 21.

The chains 19 serve to feed the boards along guides 100 to the rolls 54 and 55 which advance the boards to the conveyor chains 31 and determine the thickness and uniformity of the coat-

ing of waterproofing material remaining on the boards at this point in their movement.

The conveyor chains 81 advance the boards to a position directly above the conveyor chains 72 and discharge them upon the lugs 73 of these chains as shown in Fig. 3; the boards thus assuming the tilted position shown in which position they are carried through the drying oven 71, wherein such of the waterproofing fluid as may remain on the surfaces of the boards upon entering the oven, is caused to penetrate into the boards by the heat to which it is subjected.

The heat in the oven 71 serves to drive into the boards such of the waterproofing material as may remain on the surfaces of the boards when passed into the oven, leaving exposed the original texture of the face portions of the boards.

The layers of waterproofing material in the opposite face portions and the edge portions of the finished boards, resulting from the operations stated, are thus caused to be composed of hard solidified waterproofing material and the fibers penetrated and indurated thereby.

The feature of the partial submergence of the flatwise positioned boards in the bath 15 of waterproofing material, followed by the contacting of the upper surfaces of the boards with the waterproofing material, is of great practical importance. By this procedure the heat of the hot waterproofing material in which the boards are partially submerged, serves to vaporize the moisture in the boards, and particularly because of the thinness of the boards, quickly drives it out of the boards through their upper surfaces before the waterproofing material is applied to the upper surfaces of the boards. Thus the boards are in a condition rendering them highly receptive to the application of waterproofing material to their upper surfaces to the desired depth, for producing the desired waterproofed layers in their upper portions, rendered impervious to moisture by reason of the fact that foaming or bubbling of the waterproofing material is avoided as such moisture as would produce this action has preliminarily been expelled from the boards as stated.

As will be understood, the boards would, by preference, be maintained partially submerged only for such length of time as necessary to drive out substantially all of the contained moisture, in the boards and subjected at their upper surfaces to the waterproofing fluid for a length of time sufficient to ensure in the finished boards the desired depth of layers of waterproofing material in their upper portions, it being understood that in these operations the waterproofing material penetrates the surrounding edge portions of the boards as also the bottom portions of the boards.

Preferably the boards are totally submerged for such length of time as to ensure in the finished boards a greater depth of layer of waterproofing material in their upper portions than in their bottom portions, it having been discovered that, by reason of some action, not known to me, the rate at which the waterproofing material penetrates downwardly through the upper portions of the boards, following the removal of the moisture therefrom as stated, is much faster than that at which the waterproofing material penetrates upwardly through their bottom portions, and in spite of the fact that the bottom portions of the boards are subjected to the action of the waterproofing material for a much

longer time than the upper portions of the boards, greater thicknesses of layers of waterproofing may be produced in the upper portions of the boards than in their lower portions. Thus, by way of example, boards having a lower layer of about $\frac{1}{4}$ " of waterproofing and an upper layer of about $\frac{1}{8}$ " may be produced.

This feature of differential thickness of waterproofing layers is of considerable practical importance, particularly in the case of grit-coated building siding especially from the standpoint of economy of manufacture. Such structures to meet the conditions of practice should have in the face portions thereof at the inside of the siding, a layer of waterproofing considerably thicker than that required at their opposite face portions, inasmuch as the outer face portions of the boards are commonly coated with a layer of adhesive for adhering the grit thereto and this, with the relatively thin waterproofing layer formed on the boards, is sufficient to protect against access of moisture to the interior of the boards through their outer faces.

In Fig. 13 I have illustrated an example of a board, the edge portions of which are so shaped, in accordance with common practice, as to form ship-lap joints with similar boards grouped with it in applying the board to use, which has been impregnated in accordance with the above described procedure. The hard waterproof layers in the upper and lower portions of the board and in its edge portions, produced by the impregnating operation, being shown at 101, 102, and 103, respectively; it being understood that the edge portions of the board normal to the edges shown would have hard layers of the waterproofing material formed therein as in the case of the edge portions shown.

The board shown in Fig. 13 has been impregnated in accordance with the preferred procedure above described, namely, to produce a thicker layer of the hard waterproofing material in its upper portion than in its lower portion, the layer 101 thus being shown as considerably thicker than the layer 102, these two layers in practice, by way of example, being about one-eighth inch and one-sixteenth inch, respectively.

As will be understood, the provision of the hard waterproof layers at the surfaces of the board greatly strengthens the board; and results in the leaving of a core, represented at 104 of the original untreated fibrous material; the feature of the provision of the layers 101 and 102 of different thicknesses, and still thick enough to serve their intended purpose, being an important factor in the economical production of the finished boards.

The removal of the moisture from the boards by the procedure as defined herein before applying the waterproofing material to the upper faces of the boards is of considerable practical importance as the possibility of air being driven from the boards by heat through the hot waterproofing material and causing foaming or bubbling of the waterproofing material, rendering the interior of the finished boards accessible to moisture, is avoided. As the boards are relatively thin the moisture therein is quickly expelled by the heat of the bath in which the boards are only partially submerged, which makes for the performance of the impregnating operation at great speed and at the same time avoids the necessity of heating the boards before initiating the impregnating operation.

As will be understood, the degree to which the

impregnating waterproofing material is caused to penetrate the boards would depend on the timing of the waterproofing treatment and the temperature of the bath (the hotter the bath the greater the penetration).

The squeeze rolls 54 and 55 serve to squeeze out all, or a portion, of such of the waterproofing material as may remain on the boards upon leaving the bath, and serve to cause such excess of waterproofing material as may be left on the upper and lower faces of the boards, to be rolled down to uniform thicknesses throughout the areas of these faces. The adjustability of the upper roll 54 serves to accommodate the apparatus not only to boards of different thicknesses, but to the performing of the above function in connection with boards of different thicknesses.

No claim is made herein to the article per se nor to the method disclosed herein, as the article and method form the subjects of my applications copending herewith and bearing Serial Nos. 379,118 and 309,896, filed February 15, 1941 and December 18, 1939, respectively.

While I have illustrated and described a particular construction of apparatus embodying my invention, I do not wish to be understood as intending to limit the invention thereto as the same may be variously modified and altered and the invention embodied in other forms of construction without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent, is:

1. Apparatus for applying waterproofing material to boards, blocks, or the like, of fibrous material, comprising a tank for hot waterproofing bath material, conveying means submerged in the bath closely adjacent its surface for conveying the articles through the bath in the tank with the articles only partially submerged in the bath in the fore part of their movement therein, and means for causing the articles, as they continue their movement in the bath, to be subjected at their upper face portions to hot waterproofing material.

2. Apparatus for applying waterproofing material to boards, blocks, or the like, of fibrous material, comprising a tank for hot waterproofing material, means for conveying the articles through the bath in the tank with the articles only partially submerged in the bath in the fore part of their movement therein, and means for causing the articles as they continue their movement in the bath to be fully submerged.

3. Apparatus for applying waterproofing material to boards, blocks, or the like, of fibrous material, comprising a tank for hot waterproofing material, means for conveying the articles through the bath in the tank with the articles only partially submerged in the bath in the fore part of their movement therein, means for causing the articles as they continue their movement in the bath to be fully submerged, and means

for showering hot waterproofing material to the articles.

4. Apparatus for applying waterproofing material to boards, blocks, or the like, of fibrous material, comprising, in combination: a tank for hot waterproofing material; conveyor means operating below and adjacent the surface of a bath of hot waterproofing material in the tank; means carried by said conveyor means to move articles to be coated in contact with the material of the bath with the upper surfaces of the articles out of contact therewith during the first part of their movement; means to subsequently bring material of the bath into contact with the said upper surfaces while the articles are still moved by the conveyor means as during the first part of said movement; and means to maintain a constant level of the bath material.

5. Apparatus for applying waterproofing material to boards, blocks, or the like, of fibrous material, comprising, in combination: a tank for a bath of hot waterproofing material; an endless conveyor means traveling about sprockets at the respective ends of the tank above the level of the bath therein; means for guiding the upper run of said conveyor means intermediate its ends, to travel below and adjacent the surface of the bath; means carried by said conveyor means to propel separate articles to be coated from a position above the level of the bath at the feed end of the conveyor means to a position of contact with the bath and to elevate said articles above the level of the bath at the delivery end of the conveyor means.

6. The structure of claim 5 wherein the propelling means is constructed and arranged to propel the individual articles while floating in the bath during at least the first part of their travel in contact therewith.

7. Apparatus for applying waterproofing material to boards, blocks, or the like, of fibrous material, comprising, in combination: a tank for a bath of hot waterproofing material; endless conveyor means comprising a plurality of sprocket chains; sprocket wheels at the respective ends of the tank above the level of the bath therein about which sprockets said chains travel; means guiding the intermediate portion of the upper run of said chains to travel below and adjacent the upper surface of the bath for a substantial distance in a substantially horizontal path, and down to and up from said intermediate position at the ends of its run; pusher means to act on articles lying freely on said chains during such ends of its run, to propel the articles along and freely floating on the bath during at least the initial portion of their contact therewith; whereby to lower said articles into contact with the bath and to elevate said articles out of such contact at the respective ends of the tank.

8. The structure of claim 7 with means to totally submerge the articles during the latter portion of their contact with the bath.

HENRY C. KOCH.

CERTIFICATE OF CORRECTION.

Patent No. 2,321,397.

June 8, 1943.

HENRY C. KOCH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 31, for "increased" read --incased--; and second column, line 43, for "view" read --viewed--; page 4, first column, line 35-36, for "be-force" read --before--; and second column, line 45, for "lever" read --layer--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of July, A. D. 1943.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.