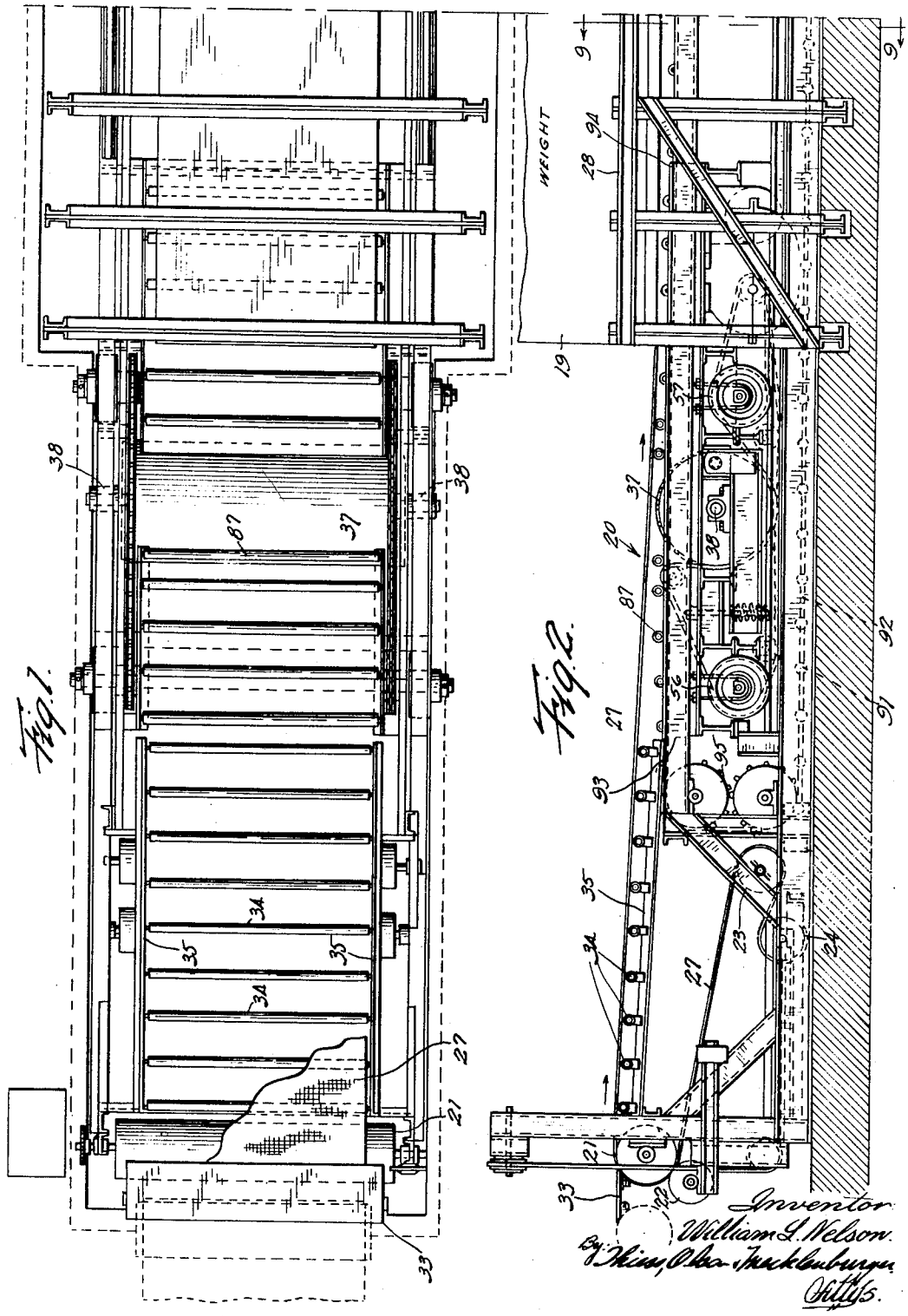
Nov. 7, 1950 W. L. NELSON 2,529,175

APPARATUS FOR TEXTURING ASBESTOS-CEMENT SHEETS

Filed March 9, 1946 6 Sheets-Sheet 1



Nov. 7, 1950 W. L. NELSON 2,529,175

APPARATUS FOR TEXTURING ASBESTOS-CEMENT SHEETS

Filed March 9, 1946 6 Sheets-Sheet 2

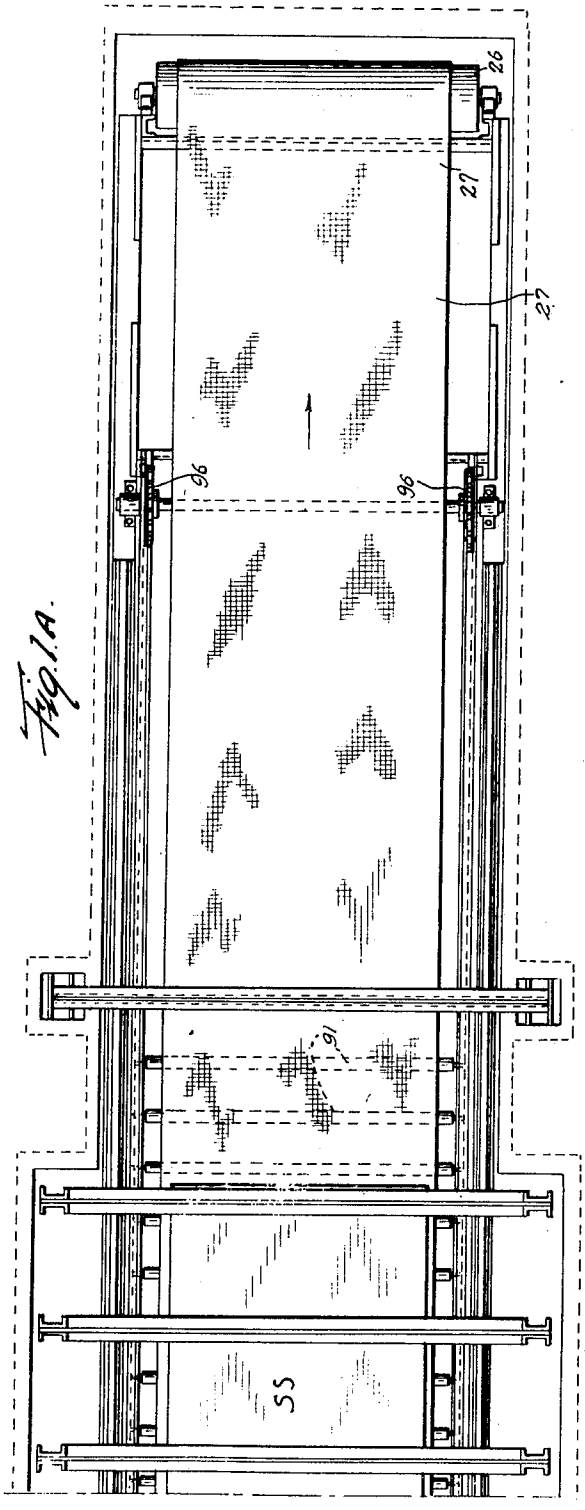


Fig. 1A.

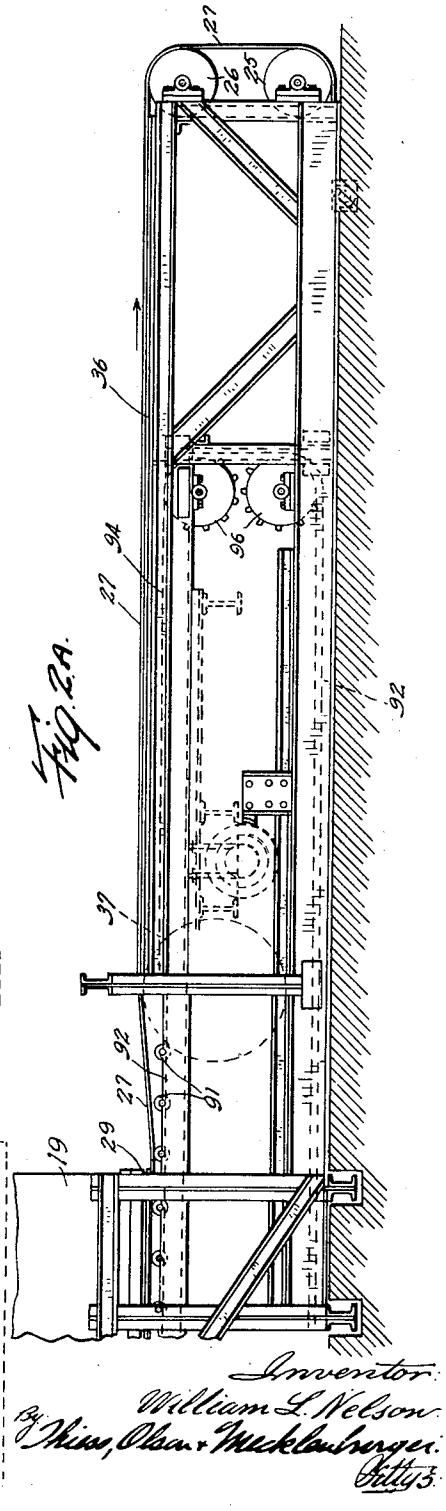


Fig. 2A.

Inventor
William L. Nelson
By Kiss, Olsen & Mecklenburger
Attys.

Published by AsbestosClaims.Law
asbestosclaims.law/library/21721/2

Nov. 7, 1950 W. L. NELSON 2,529,175

APPARATUS FOR TEXTURING ASBESTOS-CEMENT SHEETS

Filed March 9, 1946 6 Sheets-Sheet 3

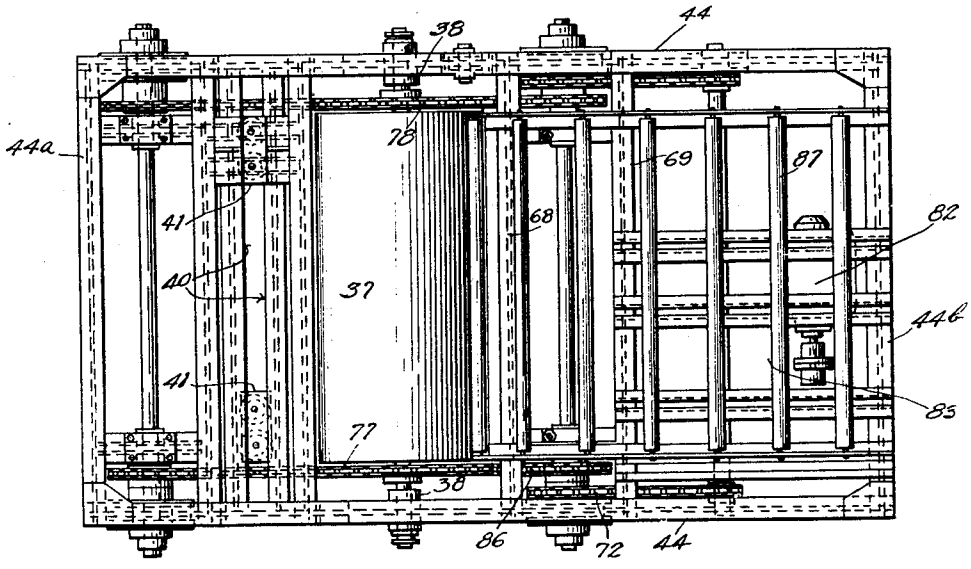


Fig. 3.

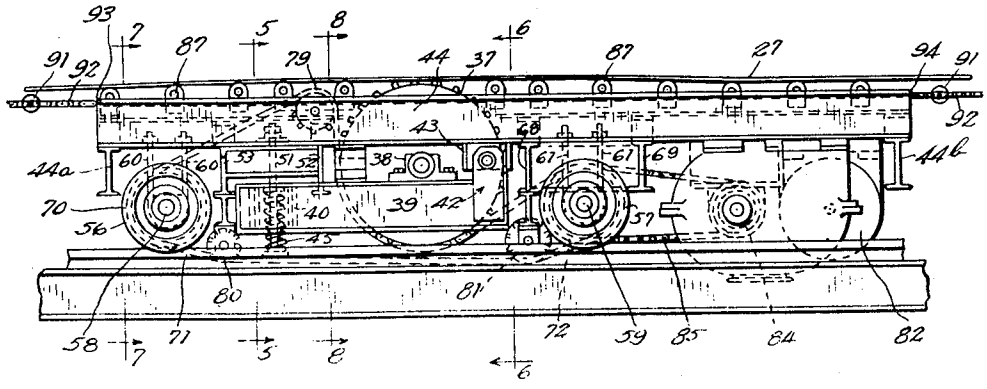


Fig. 4.

Inventor:
William L. Nelson.
By: Thiess, Olsen & Mecklenburger
Attys

Published by AsbestosClaims.Law
asbestosclaims.law/library/21721/3

Nov. 7, 1950 W. L. NELSON 2,529,175

APPARATUS FOR TEXTURING ASBESTOS-CEMENT SHEETS

Filed March 9, 1946 6 Sheets-Sheet 4

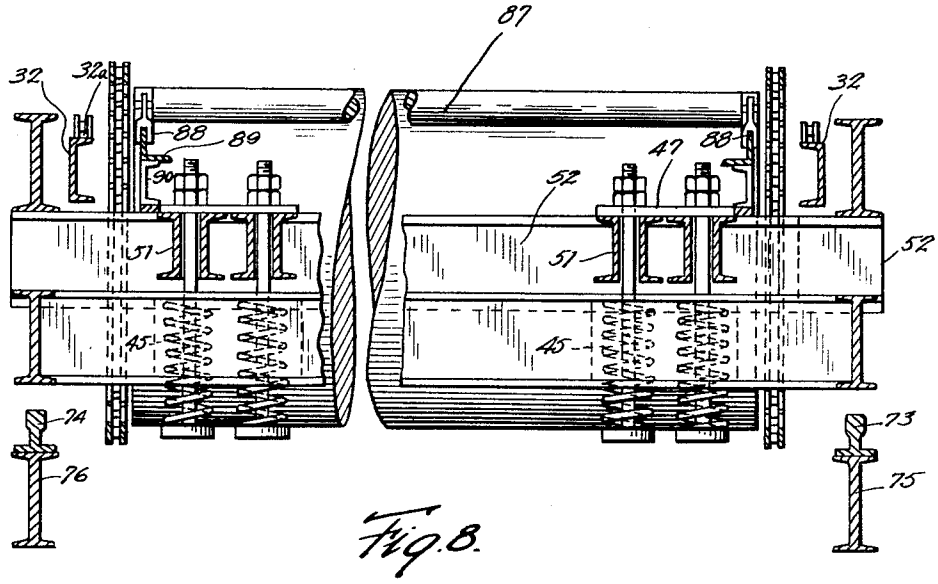


Fig. 8.

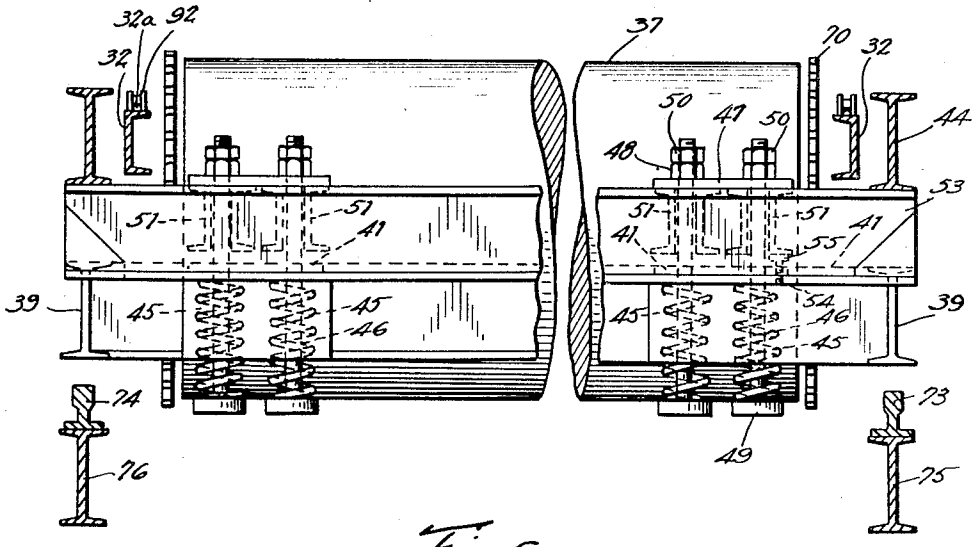


Fig. 5.

Inventor:
William L. Nelson.
By: Kiess, Olson & Mecklenburger.
Attys.

Published by AsbestosClaims.Law
asbestosclaims.law/library/21721/4

Nov. 7, 1950 W. L. NELSON 2,529,175

APPARATUS FOR TEXTURING ASBESTOS-CEMENT SHEETS

Filed March 9, 1946 6 Sheets-Sheet 5

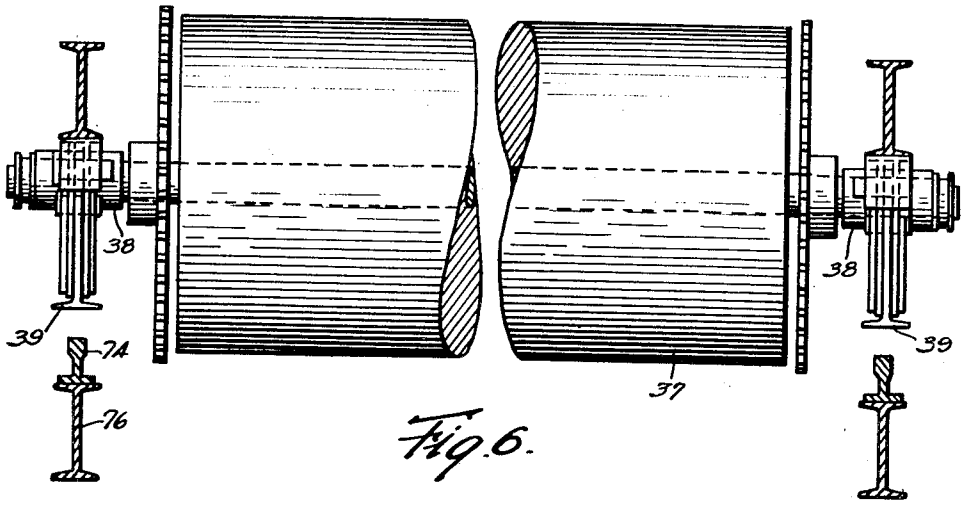


Fig. 6.

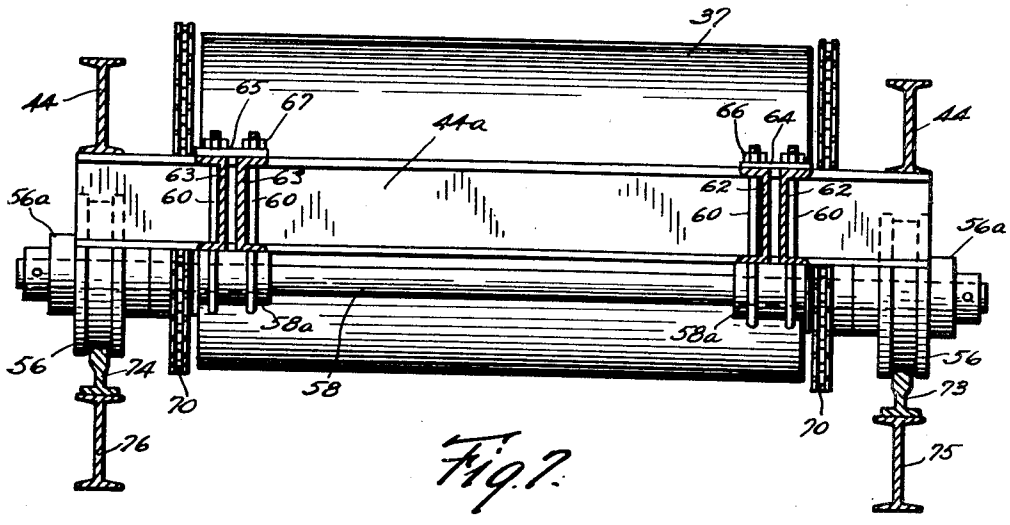


Fig. 7.

Inventor:
William L. Nelson.
By: Thiess, Olsen & Mecklenburger
Attys.

Published by AsbestosClaims.Law
asbestosclaims.law/library/21721/5

Nov. 7, 1950 W. L. NELSON 2,529,175

APPARATUS FOR TEXTURING ASBESTOS-CEMENT SHEETS

Filed March 9, 1946 6 Sheets-Sheet 6

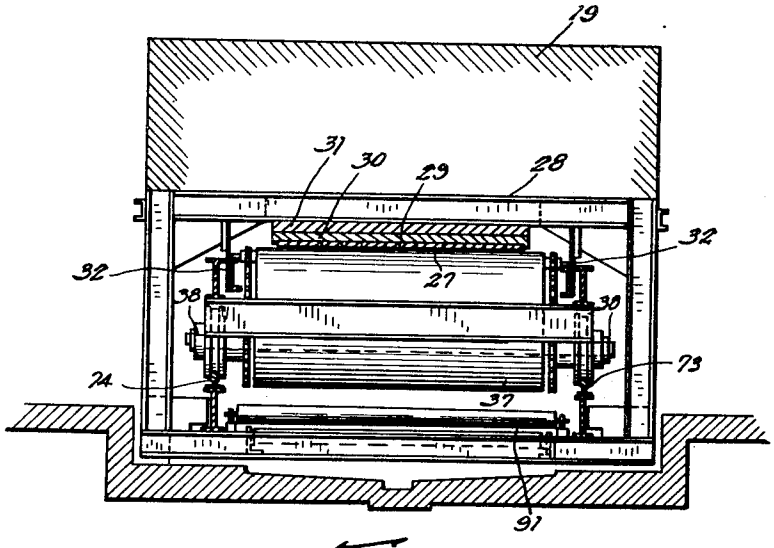


Fig. 9.

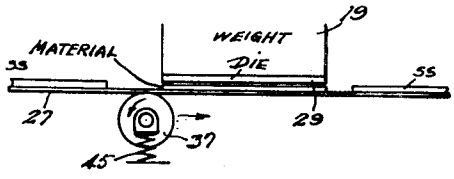


Fig. 10.

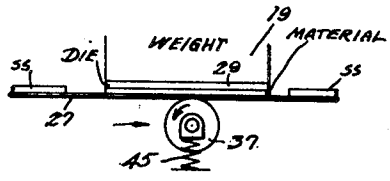


Fig. 11.

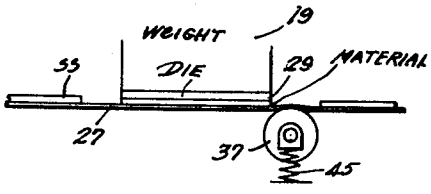


Fig. 12.

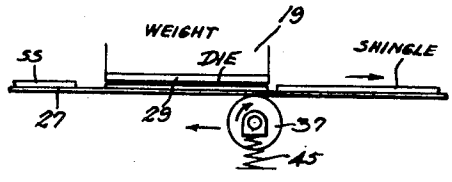


Fig. 13.

Inventor:
William L. Nelson.
By: Thiess, Olson & Mecklenburger.
Attys.

Published by AsbestosClaims.Law
asbestosclaims.law/library/21721/6

Patented Nov. 7, 1950

2,529,175

UNITED STATES PATENT OFFICE

2,529,175

APPARATUS FOR TEXTURING ASBESTOS-CEMENT SHEETS

William L. Nelson, Ferguson, Mo., assignor to United States Gypsum Company, Chicago, Ill., a corporation of Illinois

Application March 9, 1946, Serial No. 653,359

5 Claims. (Cl. 25—42)

1

The present invention relates to an apparatus for the texturing of asbestos-cement sheets, such as are commonly used for siding and roofing.

However, while the apparatus is primarily designed for that purpose, it will become evident that other plastic sheet material may be textured or otherwise ornamented by the same kind of apparatus.

Broadly speaking, therefore, it may properly be said that the present invention relates to a suitable apparatus for carrying out the method.

In many fields, particularly that in which it is desired to make textured finishes on wet formed asbestos-cement sheets, grave operating difficulties, as well as frequently unsatisfactory results, are encountered when a die is pressed downwardly against the wet sheet. The pressures and apparatus weights involved in forming textured finishes on material such as asbestos-cement sheets are such as inevitably to introduce operating difficulties. The press breakage has been exceptionally high since the pressure required to produce desirable finishes is many times incapable of being accurately estimated because it depends on certain unpredictably varying factors inherent in asbestos-cement sheets. Since the variations occur during the actual processing and texture application the operator cannot so foresee the pressure and other requirements which will produce the desired texture and at the same time preserve all of the desired structural characteristics of the sheets.

A further problem which must be solved in an apparatus for applying a textured finish to wet-formed material and which is to be of a sufficient speed to make the process substantially continuous is that of properly disposing of the liquid squeezed out of the material during the pressing operation. Not until material as hereinafter designated is actually worked in a die of the character here described does one realize the necessity of evolving novel material-supporting devices which, as the material is being textured, desirably permit the disposition of the liquid squeezed from the material. The use of a belt or a member for carrying the material into proper location with respect to the die is hereafter described, it being understood that the co-ordination of this belt or equivalent device and the structure thereof to achieve the desired disposition of the liquid is an important part of the completed invention as it is hereinafter described and claimed.

It is one of the objects of the present invention to produce a textured finish, for instance one

2

resembling the more or less weathered-appearing grain imitative of wooden shingles, on still wet and unset asbestos-cement sheets, of the type which are commonly produced by the well-known Hatscheck method, by means which involve a stationary horizontally supported die-plate against which the wet sheets, while suitably supported, are upwardly pressed by means of a heavy roller, so as to cause the transfer to the upper surface of the abestos-cement sheet of a negative replica of the configuration of the die-plate.

A further object of the present invention is to provide an apparatus comprising means for transferring a wet and limpid sheet of freshly-formed asbestos-cement to a position beneath a forming-die, and then, while the sheet is kept immovable, to compress said sheet linearly against the forming-die progressively from one side to the other until the desired design has been imparted thereto.

A further object of the invention relates to a travelling impression-producing carriage which moves first in one direction and then in the opposite direction beneath a properly supported sheet of asbestos-cement, said carriage being provided with a heavy pressure-roller which is resiliently urged upwardly against the under side of such a sheet while means are also provided to absorb any liquid that is squeezed from the sheet during the operation.

Other objects will become apparent from the further description hereinbelow when considered in connection with the drawings in which:

Figures 1 and 1A, when considered together, comprise a complete plan view of an apparatus in which the invention is practiced, the view being in two portions because it is intended that Fig. 1A should be considered as an extension of Fig. 1; if the entire plan view were small enough to be placed on one sheet, the details would be unduly obscured;

Figs. 2 and 2A similarly are to be considered together as an elevational side view of the apparatus shown in Figs. 1 and 1A;

Fig. 3 is a plan view of that part of the apparatus illustrated in Figs. 1, 1A, 2 and 2A which is hereafter designated as a movable truck or press-roller-carrying carriage frame, the dimensions utilized in this view being somewhat greater than those of the same parts in Figs. 1 and 2 and with certain parts omitted so as to clarify the showing;

Fig. 4 is an elevational side view of the roller-carriage shown in Fig. 3, the rail upon which the

Published by AsbestosClaims.Law
asbestosclaims.law/library/21721/7

carriage travels; a portion of the rail-supporting beams being shown at the bottom of this figure;

Figs. 5, 6, 7 and 8 are vertical cross-sectional views, in an enlarged dimension, of various details of the press-roller, its associated devices, and the frame in which the latter are mounted, taken on the lines 5—5, 6—6, 7—7, and 8—8, respectively, of Fig. 4, the indicated sections being so taken and one or more observable elements being so omitted in these views the better to illustrate certain desired structural details;

Fig. 9 is an elevational sectional view taken on the line 9—9 of Fig. 2,

Figs. 10, 11, 12 and 13 are purely diagrammatic elevational views of so much of the apparatus as is necessary to illustrate the process features of the present invention.

Referring first to Figs. 1, 1A, 2 and 2A, the apparatus comprises an elongated box-like frame 20 built up from a plurality of structural members, the function of which latter and the manner of joinder thereof with each other being sufficiently clear from the drawing to render a more detailed description of this frame unnecessary. The frame comprises mounting means for a plurality of belt-supporting and driving rollers, two sets of co-operating rollers 21—22 and 23—24 being situated at the left-hand or entry end of the machine and another set 25 and 26 being situated at the right-hand or exit end thereof. A web or belt 27 is carried on and threaded between said rollers and extends the entire length of the machine. This belt is of a suitable woven or felted material, capable of absorbing water from the sheets being pressed, and generally is long enough to become at least partly dried during each cycle of operation.

Wherever possible, brevity herein will be secured by omitting detailed explanation of various elements, the construction of which the drawing itself makes clearly apparent to those skilled in the art; for instance, it is not deemed necessary to describe the manner in which the just-referred-to belt carrying and driving rollers are journaled nor the manner in which the journals are mounted or supported on the various frame members. While this method of securing brevity will be employed throughout the specification, it is understood that applicant in no wise is intending thereby to describe less than a fully operative disclosure.

Positioned substantially centrally of the elongated box-like structure 20 is a die-mounting frame 28. The die proper 29 comprises a contoured plate, which latter may be secured to primary and secondary backing plates 30 and 31 (31 being fastened to the upper cross beams of frame 28) and is used to produce the design which is to be impressed on the work or material. Also as shown in Fig. 9 longitudinally extending chain supporting and guiding beams 32—32 are suspended from the transversely extending top cross beams of frame 28. In order to provide sufficient rigidity, the frame 28 at the parts above the die 29 is surmounted by a heavy weight, such as a concrete mass 19, sufficiently heavy to prevent upward displacement of the frame, and to furnish sufficient resistance to the action of the pressure-rollers.

The material, to the surface of which the die design is to be applied, is fed onto the web at the left or entry end of the machine. For purposes of illustration the material here considered is in the form of flat sheets of asbestos-cement S—S which has been formed in predetermined

ingredient proportions of which the details are no part of the present invention or disclosure. After being formed, these sheets or slabs are fed over an entry table 33 onto the belt 27 and are carried into die-pressing position before the material so hardens as to be unreceptive to the die design.

During its travel along its upper flight, the belt 27 is supported on several sets of rollers. The first of these, from left to right, comprises rollers 34 mounted on members 35—35 which serve to support the belt from the driving roller 21 until it overlies rollers associated with the pressing instrumentality. At the right or delivery end of the apparatus the belt and whatever work is carried thereby are supported on a table 36, which latter is positioned above the highest position which the hereafter described press roller can assume. The belt is driven from the feed-end of the machine, so that the belt will be slack where it supports the material to be impressed.

Movement of the belt 27 in the indicated direction carries the sheet forwardly (to the right, Figs. 2 and 2A) until the slab is positioned directly beneath the die 29. The latter may be of any desired material and the design thereon may be either raised or depressed. This die is mounted in the die frame 28 in such a way that it is firmly secured against movement when the hereinafter-referred-to pressures are set up as the slabs of material are pressed upwardly thereagainst.

During the time that the design is being imparted to the slab, the belt 27 is maintained stationary. After the design has been made in the material, the belt is again progressed to move the slab out from under the die and to the right, i. e., the belt moves over that portion of the frame which is shown in Figs. 1A and 2A. The treated slab is thereafter removed from the belt, where the latter overlies table 36, by means, such as a vacuum pick-up device, forming no part of the present invention and not here illustrated.

The means whereby the slab is pressed upwardly against the die comprise the rotatable, to-and-fro moving press-roller 37 which is operated beneath the belt to press the belt upwardly, wherefrom it follows that the slab supported on said belt beneath said die will also be pressed upwardly against the die with design-imparting pressure.

The press-roller 37 is supported in a movable pressframe or carriage, which latter is mounted on a truck having two pair of wheels. It should be immediately noted that the press frame or carriage is shown in full lines in Figs. 1 and 2 and in dotted lines in Figs 1A and 2A. The full line position illustrates the carriage in its extreme left-hand position and before it is moved to pass the roller 37 under the belt 27 to force a slab of material S—S upwardly against the die 29, whereas the dotted line position illustrates the position of the carriage in extreme right-hand position and after the press-roller has carried out its pressing function in one direction. It also may similarly function on its reverse travel as hereinafter more fully described.

The actual operation of the roller 37 in the performance of its pressing function will be described after the various structural elements thereof and the manner in which they are co-ordinated have been detailed.

The press-roller 37 is journaled in journal brackets 38—38 which are in turn mounted on pivotally movable yoke side members 39—39.

Cross beams 40—40 extend between the free outer ends of members 39—39 serving thereby to strengthen the roller-supporting yoke and also to provide mountings for spring abutment of thrust plates 41—41 which are welded to the top webs of the beams 40—40. The yoke side members 39—39 are rigidly secured to depending members 42—42 which latter are pivotally mounted on downwardly extending standards 43—43 welded to the bottom webs of main side frame beams 44—44. The main side beams 44—44 are cross connected by end main frame beams 44*a*—44*a*, this main structure being designedly constructed so that it is much more rigid in a horizontal plane than otherwise. It may therefore be slightly twisted to insure the four wheels upon which the carriage is mounted solidly equally contacting the rigidly supported rails 73—74 upon which the carriage truck travels to and fro. This novel concept in the carriage structure insures an operative interfitting between the carriage, wheels and rails, and is accordingly hereafter covered in subcombination claims.

Expansion springs 45—45 are each mounted (a pair thereof being located near the outer end of each yoke frame member 39) around studs or elongated bolts 46, the upper ends of which latter pass through fixed plates 47 and carry adjusting or take-up nuts 48 bearing against the upper surface of said plates 47. The bolts 46 have spring-thrust receiving heads 49 at their lower ends and lock nuts 50 at their upper ends. The springs 45 are accordingly confined between said overhead plates 47 and the bolt heads 49 so that said springs are under constant compression, the amount of which latter can be adjusted by manipulation of nuts 48.

The plates 47—47 are welded to the top of the upper webs of short longitudinally-extending frame members 51, the latter extending in pairs between transverse frame members 52 and 53. Said members 52 and 53 are secured to the underside of the main longitudinal frame beams 44—44.

A jack screw 54 is threadedly seated in the left-hand cross member 40 at the free end of the roller carrying yoke so that the head 55 thereof, because of its abutment against the bottom of fixed member 51, acts as an adjustable stop to the upward movement of the roller frame under the impetus of springs 45. The excess vertical extension of the working surface of said roller 37 can therefore be very carefully adjusted as dictated by the material to be printed or embossed and the pressure to be exerted, then desirably predetermined by manipulation of the nuts 48 and subsequent locking thereof by lock nuts 50.

The press-roller 37 is accordingly constantly spring-pressed upwardly to such extent that the upper linearly defined operating portion of said press roller, as predetermined by the just described adjustment and before the truck carries the roller beneath the die, is normally slightly higher than the bottom face of the die; in practice said excess vertical dimension may illustratively be indicated as about ¼ to ⅜ of an inch, insufficient to appear visually in the drawings. Therefore, when this roller is moved under the die, it must be forced downwardly relative to the die against the action of the upwardly thrusting springs, wherefrom the opposite reaction of the latter causes the roller to be urged upwardly against the belt and the slab supported thereon with sufficient pressure to impart the die design to the upper surface of the slab. This arrangement is an especially desirable one in that it permits ready adjustment of the pressure with which the press-roll is urged upwardly to coin the slab against the die. When it is realized that pressures of several thousand pounds are inherent in the here-described printing or material-coining process, the necessity of providing adjustments of relative simplicity is immediately apparent. For this reason the here-described spring-pressure procedure and the means for adjustably utilizing the same is deemed also worthy of sub-combination claims and the same are hereafter included. The use of a weight 19 to insure sufficient resistance has already been noted.

The truck or carriage frame upon which the press-roller 37 is mounted runs on two pairs of wheels 56—56 and 57—57, mounted on the ends of two stationary axles 58 and 59, respectively. The latter are hung from pairs of depending U-shaped hangers 60—60, 60—60 and 61—61, 61—61 with the closed part of the U passing under enlarged portions 58*a* on the axle 58. Two of such pairs of hangers (60—60, 60—60) are located to the left of the press-roller 37 (one pair adjacent each end of axle 58) and the other pairs (61—61 and 61—61) being located to the right of press-roller 37.

The U-shaped axle hangers draw the enlarged portions 58*a* of the axle 58 upwardly against short longitudinally extending structural members 62—62 and 63—63, which latter extend between and are secured to transverse members 44*a* and 53. Plates 64 and 65 overlie the upper webs of the members 62 and 63. These plates serve as bearing surfaces for the pull-up nuts 66 and 67 on the upper ends of the U-shaped hangers 62—62 and 63—63.

A similar construction provides the mounting for the axle 59, i. e., transverse members 68 and 69 extend under and are secured to main side frame members 44—44 and short longitudinally extending members similar to 62—62 and 63—63 extend between said members 68—69, thereby to provide abutment against which the pairs of U-shaped hangers 61—61 can be utilized to secure enlarged portions on the axle member 59 (similar to enlarged portions 58*a* on axle 58).

The wheels 56—56 and 57—57 are mounted on enlarged portions 56*a*—56*a* located at the upper ends of the axle member 58, it not being deemed necessary to describe the roller-bearing structure whereby said wheels are rotatably mounted on said portions 56*a*—56*a*.

Chain sprockets 70—70 are fixed to inwardly extending portions of the wheels 56—56 and 57—57 to drive the latter through the agency of a chain 71.

The wheels 56—56 and 57—57 roll along rails 73 and 74 mounted on I-beams 75 and 76, respectively, which latter are rigidly mounted on the floor of the structure housing of the herein described apparatus, and hence serve to propel the entire carriage, including the roller 37. Sprockets 77 and 78 are loosely rotatably mounted on the shaft of the press-roll 37 and are adapted to be operatively connected with said chain 71. Roller 37 hence is not positively driven. Idler sprockets 79, 80 and 81 are mounted in the positions best shown in Fig. 4; it is not deemed necessary to provide a detailed description of the journal structures upon which said sprockets are mounted. It is sufficient to point out that the chain 71 is so threaded over the so far described sprockets that movement thereof causes the

wheels 56 and 57 to rotate in such direction when the truck carriage is moved to the right that the press roller will rotate in the opposite direction by virtue of its contact with the under side of belt 27. By the same token, of course, rotation of said wheels to move the carriage to the left causes the press-roller to rotate in the opposite direction. The truck or carriage frame is moved to and fro along the rails 73 and 74 by the operation of a motor 82 suitably structurally mounted on the carriage frame at the right thereof, the motor operating through a reduction gearing 83 to drive a sprocket 84 with which chain 85 is connected. Said chain 85 is connected to drive sprocket 86 which for convenience is mounted on the same member as sprocket 72, i. e., on the wheel 57. Accordingly, operation of motor 82 drives the wheels on which the roller carriage is mounted.

We have heretofore described the manner in which the belt 27 in its travel along its upper flight to the right is first supported by rollers 34. Inasmuch as the belt preferably should be continuously supported until it overlies table 36, and inasmuch, further, as the truck carriage itself moves from the position shown in full lines in Fig. 2 to that shown in dotted lines shown in Fig. 2*a*, it is necessary to provide supporting rollers which are so associated with the roller-press carriage that said latter rollers can be continuously brought and maintained under the belt even though the said carriage moves as just described. Such belt support is provided first by locating a series of rollers 87 on the carriage frame itself. These rollers are mounted in brackets 88 fixedly positioned on longitudinally extending members 89 which in turn are mounted on members 90 supported on the main roller frame structure. The members 89 upon which the roller journal brackets 88 are mounted are so positioned that said rollers 87 are progressively higher from either end of the carriage frame toward the press-roll position. This can be best seen in Fig. 4 where it will be observed that the rollers 87 are definitely so positioned that the belt 27 is carried higher at the point where the press-roller underlies the same than at other points. This avoids contact of rollers 87 with the belt during the coining operation.

To insure that the belt and the material which may be carried thereby is supported by rollers at those zones where neither the rollers 34, the table 36, nor the rollers 87 on the carriage frame provide such support, further rollers 91 are provided, it being arranged that said rollers 91 are automatically placed beneath the belt in said zones which would otherwise contain no supporting rollers. These rollers 91 are mounted and carried by chains 92, the ends of which are attached one at the left-hand end of the carriage frame at 93 and the other at the right-hand end of the carriage frame at 94. The chain is geared to the sprockets 95 mounted at the left-hand end of the main frame, and the sprockets 96 mounted at the right hand end of said main frame. It will therefore be seen that as the carriage moves from right to left the chains 92 are drawn along by said carriage to place the rollers 91 beneath the belt at those points where said belt would otherwise not be supported. There need only be sufficient rollers on the chains 92 to support the belt, hence considerable portions of the belt will not have rollers thereon.

This matter of support is a vital consideration when partially set material is supported on the belt for carriage beneath the die. Slabs such as are herein intended to be coined are often composed of such materials that sagging of the slabs must be reduced to a minimum, otherwise weakening of such slabs may occur, it of course being necessary that the slab material shall be maintained in design-receptive condition, as such slabs are peculiarly responsive to weakening stresses when in unset condition. The provision of the just described rollers 91 is therefore an important factor in the present invention.

The hereinbefore referred to longitudinally extending beams 32 are suspended from the main apparatus frame in such manner that the carriage may move with respect thereto. The chains 92 are supported by and guided along the upper web of said members 32 in a manner best shown in Fig. 5. A raised bead 32*a* is formed on top of the upper web and thus serves as a guide to maintain the chain 92 as it is pulled back and forth by the carriage in proper alignment.

Accordingly, the belt 27 is well supported throughout its travel by sufficiently closed spaced rollers. Having now described the instrumentalities which comprise an apparatus in which the novel method of producing a textured finish on a slab of material can be effected, reference may be had to the diagrammatic showings in Figs. 10 to 13 in connection with the following description of the cyclic operation of said apparatus to carry out said novel method.

In Fig. 10 a wet-formed asbestos-cement slab S—S is shown as having been moved by the belt 27 to a position directly under the die 29. The carriage carrying press-roller 37 is in its extreme left-hand position. The upper linear element of the roller is accordingly located a definite predetermined vertical distance above the under surface of the die. It will be understood that the movement of the belt to the position indicated, i. e., to locate a slab directly under the die, causes (through properly positioned limit switches) the belt to stop, and the belt and slab are accordingly maintained stationary until further automatic or manual manipulation again moves the belt 27. It will be observed that another slab is positioned on the belt to the left of the die while a still further slab is positioned on the belt to the right of the die, the former slab (the one to the left) being the next one to be located beneath the die, and the latter (the one to the right) being that slab which has just been embossed and has been moved from beneath the die.

The stoppage of the belt through properly, preferably manually, controlled electrical means initiates movement of the carriage to the right. Fig. 11 illustrates diagrammatically the position of the press-roll 37 after it has been forced slightly downwardly in order to pass under the die and has correspondingly through its upwardly urged springs 45 been pressed upwardly against the underside of the belt. The carriage is driven through the heretofore described agency of the motor, and its associated chain drives to the right and the press-roller, while in its upwardly thrusting pressing position, thus rotates counterclockwise at the same speed as that in which the carriage is linearly progressed to the right, this being occasioned by its tight engagement with the belt 27. Fig. 12 illustrates the position of the operating instrumentalities after the carriage has been driven to its extreme right-hand position and has come to rest. When the

Fig. 12 position is reached by the carriage manual electric devices are brought into action to cause the belt 27 again to travel to the right a sufficient distance to carry the just referred to press slab from beneath the die and to position the next succeeding slab thereunder. The carriage may then be moved to the left, thereby pressing the slab S—S just positioned. This causes the roller again to be depressed and to be thrust upwardly with sufficient pressure to impress the die design upon the upper surface of the slab resting beneath the die. Once again the direction of wheel rotation and the threading of the chains with the sprockets is such that the press-roller moves in a direction opposite to that in which the carriage is traveling, i. e., when the carriage is driven to the left, the press-roller operates in a clockwise direction, and as hereinbefore explained, it is, however, possible through simple reversing switches to the motor power leads to insure that the press-roller operates in the proper direction irrespective of the direction in which the carriage is driven. The coining operation on the return movement of the press-roll (i. e. to the left) is illustrated by Fig. 13. After the carriage reaches its extreme left-hand position, it is maintained stationary and once again the belt is moved to the right to place a fresh unpressed slab beneath the die after the belt has been thus moved. Finally, the cycle is automatically repeated.

It will be observed that because of the hereinbefore described dimensions and the manner in which the press-roll is moved under the die, an exceptionally heavy pressure is provided as the roll is depressed against the upwardly operating spring thrust which of course occurs immediately the roll contacts either the left-hand or the right-hand edge of the die, which is just before the roll contacts the belt directly under the edge of the slab. The automatic correlation of the linear movement of the truck with the rotating speed of the press-roll insures that no drag arises as the roll rolls along under the belt, and at the same time insures that no drag is communicated to the undersurface of the overlying slab with consequent distortion of the design which is being impressed upon the upper face of said slab.

For the sake of simplicity, the carriage and its operating mechanism is not shown in Figs. 10 through 13, and the upward spring-thrust of the press-roll is diagrammatically illustrated by the spring 45.

As the carriage moves back and forth beneath the weight-surmounted die, the rollers 91 will be alternately pulled into position from either end, so that the belt 27 is never without adequate support. The rollers 34, 87 and 91 are all preferably ball-bearing-mounted so as to cause as little friction as possible between the belt and the rollers. Such bearings are not specifically illustrated as their construction is well known.

Under certain circumstances it may be desirable to effect the coining operation only when the roller 37 is moving in one direction. Therefore, upon its return movement the roller may be permitted merely to press the belt 27 against the die. This will not injure the die, and may serve a useful function in squeezing any excess water out of the material of which the belt may be made. Such an operation is to be considered as within the process claims of the present application.

In essence the apparatus provides means for transporting a slab of coinable material into coining position, means for exerting heavy linear pressure progressively upon a supported slab of the material whereby it will be pressed upwardly against a coining-die, and means for bringing supporting rollers under the belt whenever the press-roll carriage is not directly beneath the belt so as to permit the rollers 87 on the carriage to support the belt.

While the apparatus has been described in considerable detail in order to make its operation fully understood, it will be evident that considerable modification is possible, and that such equivalents as will be familiar to the art of machine-construction are to be considered as within the general scope and purview of the following claims, in which the inventor claims as his invention:

1. A machine for impressing a design into the surface of a plastic impressionable sheet of material which comprises a belt conveyor for said sheet, a die suspended above said belt, a spring-biased pressure-imparting roller mounted for reciprocal movement beneath said belt and adapted to press said belt and the thereupon supported sheet against said die, and means for reciprocally moving said roller.

2. A machine for impressing a design into the surface of a plastic impressionable sheet of material which comprises a belt conveyor for said sheet, a die suspended above said belt, a spring-biased pressure-imparting roller mounted for reciprocal movement beneath said belt and adapted to press said belt and the thereupon supported sheet against said die, means for reciprocally moving said roller, and means, connected with said last-mentioned means, for positioning belt-supporting means under said belt.

3. In a machine of the character described, the combination of a frame, rollers carried by said frame, a belt movable upon and supported by said rollers for a portion only of its travel; a set of spaced-apart rails beneath said belt; a wheeled carriage supported upon and movable on said rails; a heavy pressure-roller supported upon said carriage and means thereon for biasing said pressure-roller in an upward direction; a coining-die supported above said belt; a heavy mass in contact with said die; and means for reciprocatably moving said carriage upon said rails with the pressure-roller in intimate contact with the under surface of said belt, whereby said belt and slabs of impressionable plastic material carried thereby will be linearly and progressively pressed upwardly against said die.

4. A machine for impressing designs into the surface of freshly-formed slabs of unset cementitious material comprising a horizontally supported heavily weighted stationary die; linear transporting means positioned beneath but close to said die for transporting one of said slabs into a position immediately below said die; means for applying linear pressure progressively against the underside of said transporting means whereby to press the slab supported thereby strongly against said die so as to impress the slab with a negative replica thereof; means associated with said last-mentioned means to position a plurality of supporting rollers under said supporting means to support the said supporting means; means for moving said transporting means; and means for spring-biasing said linear pressure applying means upwardly against said transporting means and the slab supported thereon.

5. A machine for impressing designs into the surface of freshly-formed slabs of unset cementi-

tious material comprising an elongated framework; a movable transporting belt thereon composed of a moisture-absorbing and moisture-permeable material; means for intermittently moving said belt; a coining-die supported immediately above the central portions of said belt; a heavy mass of material in contact with the back side of said die; means for feeding slabs of unset cementitious material onto said belt; means, positioned beneath said belt and reciprocally movable thereunder, for pressing said belt against said die, said means comprising a press-roller and movable carriage associated therewith and means for alternately moving said carriage to the right and to the left; means for arresting the travel of said belt during the movement of said carriage; and chain-supported roller-means connected with said carriage and adapted to be positioned beneath said belt at points not occupied by said carriage.

WILLIAM L. NELSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,321,384	Mattison, Jr.	Nov. 11, 1919
1,726,541	Cole	Sept. 3, 1929
2,006,528	Walper	July 2, 1935

FOREIGN PATENTS

Number	Country	Date
22,409	Great Britain	1914

Published by AsbestosClaims.Law
asbestosclaims.law/library/21721/12