July 29, 1941. C. K. ROOS 2,250,918

COATING APPARATUS FOR RIGID BUILDING ELEMENTS

Original Filed Aug. 31, 1938 2 Sheets-Sheet 1

Fig. 1.

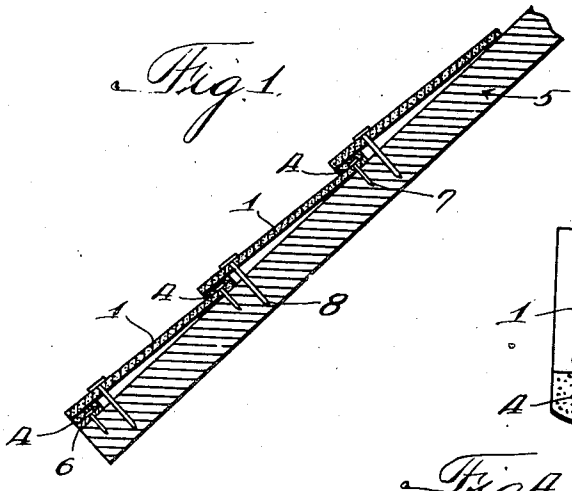


Fig. 2.

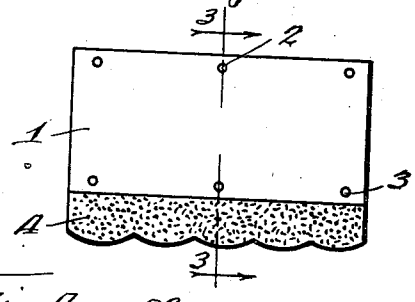


Fig. 4

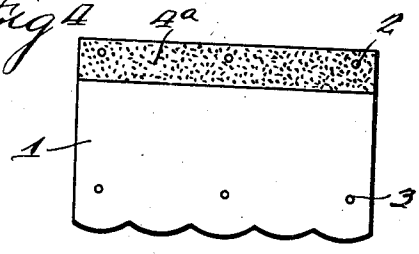


Fig. 3.

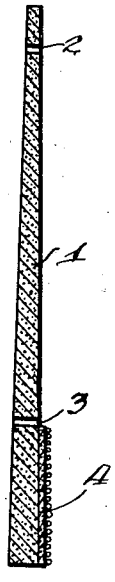


Fig. 5.



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COATING APPARATUS FOR RIGID BUILDING ELEMENTS

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Fig 6.

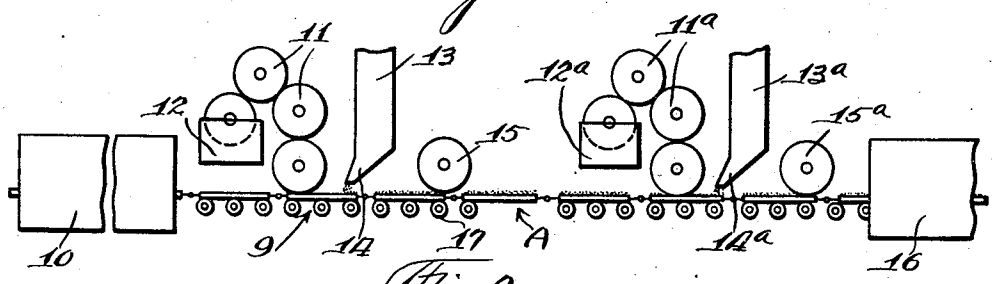


Fig 7.

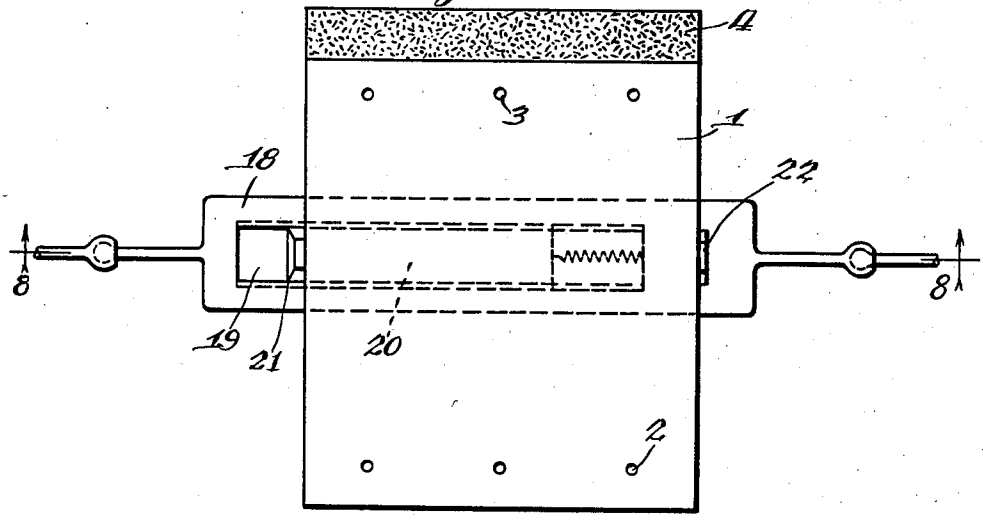


Fig 8.

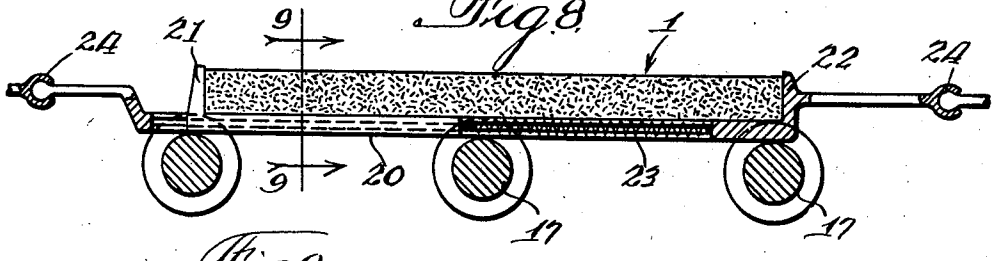
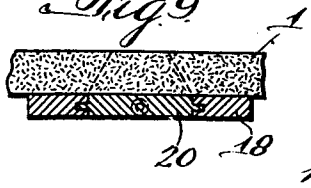


Fig 9.



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COATING APPARATUS FOR RIGID BUILDING ELEMENTS

Carlisle K. Roos, Wheaton, Ill., assignor to United States Gypsum Company, Chicago, Ill., a corporation of Illinois

Original application August 31, 1938, Serial No. 227,614. Divided and this application August 10, 1940, Serial No. 352,053

5 Claims. (Cl. 91—29)

This invention relates to apparatus for manufacturing rigid building elements, such as asbestos shingles having cushioning and sealing means associated therewith, which means are automatically effective to seal the joints between the overlapping shingles and provide a cushion to prevent breakage when the shingles are applied in the usual manner.

This application is a division of my copending application Serial No. 227,614, filed August 31, 1938.

The invention is particularly adapted for the manufacture of fractile roofing and siding elements of various types and forms wherein rigidity is an important factor, such as slate or asbestos shingles and siding, clay roof tile, and the like, as distinguished from asphalt roofing and siding either in shingle strip or roll form.

When rigid types of covering elements are applied to a building structure, they must overlap, whereby a portion of each rigid element surface is covered by another element to provide a weatherproof construction. The rigid fractile elements which the apparatus of this invention is adapted to produce are commonly secured by fasteners such as nails driven through preformed holes in the rigid covering element.

In applying asbestos cement siding or roofing, the workman starts at the bottom and then laps the next course over a portion of the bottom course and continues this method of application to the upper course or row. The overlap is preferably about 1¼ inches and the nail holes are so arranged on the rigid covering elements that the nails do not strike the overlapped edge of the underlying course.

When fastening rigid elements, such as asbestos cement shingles or siding, to a wall structure or roof, it is necessary that the nails be driven in with sufficient force to provide a snug fit between the overlapping elements. However, due to the fragile and brittle nature of asbestos cement shingles and the like, the workman will frequently overestimate the force to be applied by the hammer and thus break the shingle. This is a source of irritation to the workman who must remove the nails and replace the broken element with a new one, and also results in excessive costs for material and installation

On the other hand, if the workman does not drive home the nails with sufficient force to provide a snug fit, the building will not be weatherproof and moisture will be admitted to the structure which the covering was intended to protect. Thus, decay sets in with a resulting destruction of property and material loss to the owner.

Also, if the rigid covering elements are not secured snugly, the wind may cause them to rattle, to the annoyance of the occupants, and, because of the fragile nature of the rigid covering elements, they will often crack or be damaged to an extent that requires replacement. It is, therefore, an object to provide an apparatus capable of producing a substantially sound-proof covering element for building structures.

In many cases, if the rigid types of covering elements are fitted snugly and nailed securely in a manner to provide a weathertight fit, the structure itself, due to climatic conditions such as humidity and temperature changes, will set up strains and stresses within itself and subsequently loosen or crack the elements, and thus destroy their usefulness as a protection against the weather. This occurs in the same manner that plaster board walls frequently crack, due to the effect of atmospheric changes on the structure.

Furthermore, rigidly secured shingles, particularly of the slate type, will break loose and fall from the structure and endanger the lives of the occupants as well as the passerby. Once moisture is allowed to penetrate underneath the overlapping elements, it is an easy matter for frost to cause further prying apart and loosening to the extent that they may be rattled or torn off by the wind.

It is, therefore, an object of the present invention to provide an apparatus for manufacturing a rigid covering element, particularly of the asbestos cement shingle type, which element may be nailed securely in place without danger of breaking the element and wherein a resilient means is provided to cushion the effect of hammer blows and to maintain an effective seal between overlapping elements and prevent moisture entering therebetween, irrespective of variations in the structure itself which may be caused by weather conditions.

A further object is to provide an apparatus for the continuous quantity production of rigid fractile building elements and wherein the apparatus may apply a permanent sealing and cushioning strip to one or both faces of the building elements and wherein the cushioning strips may be restricted to the normal overlapping surfaces of the elements when they are applied to a building.

A further object is the provision of a coating machine for continuous quantity production comprising a conveyor and associated supporting elements and in which the conveyor comprises transversely rotatable links all mounted on a common axis and each link providing a supporting means for one of the fractile elements which may be releasably engaged thereby and rotated therewith.

Further objects will be apparent from the specification and the appended claims.

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In the drawings:

Fig. 1 is a sectional view through a roof having shingles of the type which may readily be manufactured by the apparatus of this invention.

Fig. 2 is a bottom view of one of the shingles illustrated in Fig. 1.

Fig. 3 is a transverse sectional view taken on a line substantially corresponding to line 3—3 of Fig. 2.

Fig. 4 is a top view of a shingle similar to that illustrated in Fig. 2 but with the cushioning and sealing element applied to the opposite side and adjacent the opposite edge.

Fig. 5 is a sectional view through a slightly different embodiment in which a strip of weatherproof cushioning material is applied to each side of the shingle adjacent opposite edges.

Fig. 6 is a diagrammatic view illustrating the apparatus for applying the weatherproof cushioning material to the rigid covering elements, particularly such as illustrated in Figs. 1 to 5 inclusive.

Fig. 7 is a top view of a portion of the shingle conveyor and illustrates a portion of the drag chain with one of the shingle elements supported thereon.

Fig. 8 is a longitudinal sectional view taken on a line substantially corresponding to line 8—8 of Fig. 7 and illustrates the method of clamping a shingle on a drag chain link.

Fig. 9 is a detailed sectional view taken on a line substantially corresponding to line 9—9 of Fig. 8.

Referring to the drawings in detail, the elements illustrated in Figs. 1, 2, and 3 comprise a rigid shingle in the form of an elongated slab 1. This slab is preferably tapered as illustrated in Fig. 3, although it may be of the same thickness throughout or assume various forms to conform with requirements. The slab is provided with a row of preformed holes 2 adjacent its upper edge and a second row of holes 3 adjacent its lower edge, although preferably more remote from the edge than the holes 2.

The shingle is provided with a comparatively narrow strip of resilient cushioning material 4 such as felt, cork, or the like, which may cover substantially the entire overlapping portion of the shingle when it is applied to a roof or side wall as illustrated in Fig. 1.

In applying the shingles to a roof structure 5, the workman starts at the bottom and secures a cant strip 6 to the structure to give the proper pitch to the shingles. He then lays the first course of shingles on the cant strip and the succeeding courses are applied as shown in Fig. 1 and secured by means of nails 7 through the upper row of holes and nails 8 through the lower row of holes.

The row of holes 3 is preferably positioned so that the nails 8 are closely adjacent the upper edge of the lower shingle so that the upper shingle may be snugly secured and the cushioning material 4 compressed to provide a weatherproof and soundproof joint. The cushioning material 4 is preferably in strip form after being applied to the shingle and is secured thereto by means of a sticky adhesive, preferably asphalt or similar material.

The cushion may comprise a suitable material such as cork, either in sheet or granular form, indented felt, sponge rubber, plain rubber, or other suitable materials of a like nature. The purpose of this material is to allow the workman to use sufficient force in driving home the nails so that an effective weatherproof seal is provided and the shock of the hammer blows is absorbed sufficiently to prevent the rigid fragile shingle from cracking. It will be apparent that the shock-absorbing and sealing coat may be applied over the entire undersurface of the shingle if desired. However, it is preferable to provide it only in strip form at the bottom of the shingle, as shown in Fig. 2. It is apparent that, if the felt or other resilient cushioning material is in the strip form shown, the workman may drive the nails in with considerable force, which will compress the cushioning and sealing material without danger of breaking the shingles.

Fig. 4 illustrates a slightly different form of shingle in which a cushioning strip 4a, similar to that previously described, is applied to the outer surface of the upper edge of the shingle as shown. This strip is, of course, properly secured by means of a suitable adhesive in the same manner as the strip 4 except that it is on the upper outside edge of the shingle instead of on the lower inside edge. In this embodiment the holes 2 may be in the same relative position in the shingle as shown in Fig. 2 and may extend completely through the resilient strip. The holes 3 are, of course, in the same position as previously described and the shingle is applied in the same manner as shown in Fig. 1. Either construction provides a suitable cushioning effect to absorb the hammer blows and also provides an efficient weatherproof seal.

The strip may be of any desired thickness and is of advantage in providing a thick butt effect on the shingled roof or side wall. It will be understood that the cushioning strip may be applied in sheet form by means of a suitable adhesive, or a coating of suitable adhesive such as asphalt or the like may be applied to the surface of the shingle and granular material such as cork granules may be applied to this adhesive to form a thick coating in the form of a strip which is illustrated and described.

In Fig. 6 is illustrated diagrammatically a suitable apparatus for applying the strips. The particular embodiment shown in Fig. 6 is adapted to apply granular material. However, it will be obvious that strip material may be applied by substituting a roll of the strip material for the spouts or containers illustrated in Fig. 6, which latter are used for directing the granular material onto the shingles as they are moved by the conveyor.

The apparatus for applying the strips comprises a conveyor 9 on which the shingles are mounted and may be moved either intermittently or continuously, as desired. The shingles are mounted on the conveyor and are first passed through a preheating chamber 10 by which they are brought to a predetermined temperature for coating. The asphalt or other adhesive is then applied by means of a series of heated rolls 11, one of which is mounted in an adhesive container 12. A supply of cork granules or other suitable resilient granular material is maintained in the container 13 and supplied to the coated surface by means of a spout 14 as the shingles pass thereunder.

The spout 14 is arranged to deliver a predetermined amount of the granular material to form a complete coating of a predetermined thickness on the asphalt or other adhesive while it is still in a tacky condition. The shingles then pass under a pressure roll 15 which presses

the granules into the tacky asphalt or other adhesive to form a permanent resilient layer.

In some cases it is desirable to apply a strip of the weatherproof material adjacent each edge of the shingle and on opposite sides thereof as illustrated in Fig. 5. The conveyor **9** is therefore constructed in such a manner that, after the shingle passes beyond the pressure roll, it may be inverted and the process just described may be repeated for applying the granule coating to the opposite side of the shingle. The apparatus for performing this function may be similar in all respects to that previously described and comprises an adhesive container **12***a*, adhesive applying rolls **11***a*, a granular container and spout **13***a* and **14***a*, respectively, and a pressure roll **15***a*. After the shingles have been coated, they may be passed through a cooling chamber **16** which may be provided with artificial cooling means such as fans and in which the shingles remain until the adhesive becomes sufficiently cool to keep the granules imbedded therein.

The conveyor **9** is supported on suitable transverse rollers **17** whereby the shingles are maintained in a position suitable for the application of the adhesive and the cork granules. The conveyor is so constructed that, when a shingle arrives at the zone marked A, the shingle and its support may be rotated to invert the shingle while retaining the surface to be coated in substantially the same plane.

One of the links of the conveyor is illustrated in Fig. 7 with a shingle slab **1** mounted thereon and comprises an elongated link **18** and an elongated slot **19** therein, in which slot is mounted a slidable jaw member **20**. This member is provided with an upwardly extending jaw **21** which co-operates with a similar jaw **22** on the link to clamp the shingle slab therebetween. A spring **23** is secured to the slidable member **20** and to the link as shown, whereby the shingle slab may be securely clamped in position as shown. The central portion of the link is preferably depressed as illustrated so that, when the link and slab thereon are rotated, the surface of the slab on which the coating is to be applied will always be in substantially the same plane. The links are provided at their ends with ball and socket joints **24** so that each individual link may be easily rotated. The rollers **17** may be grooved as shown in Fig. 8 to enable the depressed portion of the link to pass therethrough. The two coating mechanisms illustrated in Fig. 6 may be properly spaced and the rollers **17** may be omitted for a predetermined distance between the mechanism so that the shingle and link thereon may be rotated after a strip on one side has been coated and in order to position the shingle for applying a coat on the opposite side and adjacent the opposite edge.

It is intended, of course, that the invention should not be limited to the specific embodiment or embodiments disclosed herein, since modifications may be made, and it is contemplated, therefore, by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A conveyor for shingle-like elements comprising drag links, adjacent links being connected for transverse rotation and comprising two relatively slidable interengaging members adapted to engage and retain a shingle-like element therebetween whereby each link may be rotated to position either side of a shingle in substantially the same plane, and means adjacent said conveyor to adhesively apply cushioning material to predetermined areas of consecutive elements.

2. Apparatus for coating rigid, fractile shingles and the like comprising a drag-link conveyor having transversely rotatable links, means for securing a shingle on each link for horizontal movement, means for heating the shingles on said conveyor, a pair of longitudinally spaced coating means for coating a strip on each side of said shingle and adjacent opposite edges, said coating means being spaced to enable a link and shingle thereon to be inverted therebetween, each coating means comprising means for applying a layer of adhesive, means for applying a layer of resilient cushioning material, and means for pressing said material into said adhesive.

3. In a shingle coating machine, a conveyor for shingle elements comprising a plurality of aligned links pivotally connected for individual rotation on a longitudinal median line, each link having means to releasably clamp a shingle element thereon in a manner to present the upper surface of each shingle element in substantially the same plane, a support for said links and adapted to prevent rotation thereof, spaced means to apply a coating to the upper surfaces of said shingle elements, said link support being constructed to enable said links and shingle elements thereon to be inverted between said spaced coating means.

4. A shingle coating machine comprising conveying means, including means for securing consecutive shingles together with their upper surfaces substantially in the same plane, and constructed to enable said shingles to be inverted while connected together, means to apply a coating adjacent one edge of said shingles, means longitudinally spaced from said first coating means to apply a coating adjacent an opposite edge of said shingles, and means normally preventing inverting said shingles during coating operations and adapted to enable inverting thereof between said spaced coating means.

5. A coating machine for rigid fractile slabs comprising a conveyor for conveying consecutive slabs transversely secured thereon in surface alignment, a first adhesive applying means for applying a layer of adhesive adjacent one end of all of said shingles and corresponding in width substantially to the normal overlap, means to apply a coating of resilient granular material to said adhesive, a first means to apply pressure to said coating, a second adhesive applying means longitudinally spaced not less than the width of a shingle from said first coating means for applying a similar layer of adhesive adjacent the opposite ends of all of said shingles, a second means for applying a coating of resilient material to said second layer of adhesive, and means to apply pressure to said second coating, said conveyor being constructed to enable said slabs to be inverted between said first coating means and said second adhesive applying means while still secured to said conveyor.

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