United States Patent [19]

Lenzner

[11] **3,740,099**

[45] **June 19, 1973**

[54] **ROOF SHAVING MACHINE**

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[21] Appl. No.: **196,645**

Related U.S. Application Data

[62] Division of Ser. No. 752,597, Aug. 14, 1968, Pat. No. 3,698,972.

[52] **U.S. Cl.** **299/39,** 51/176, 145/4.1

[51] **Int. Cl.** **B27c 1/02**

[58] **Field of Search** 299/39; 51/176; 145/4.1

[56] **References Cited**

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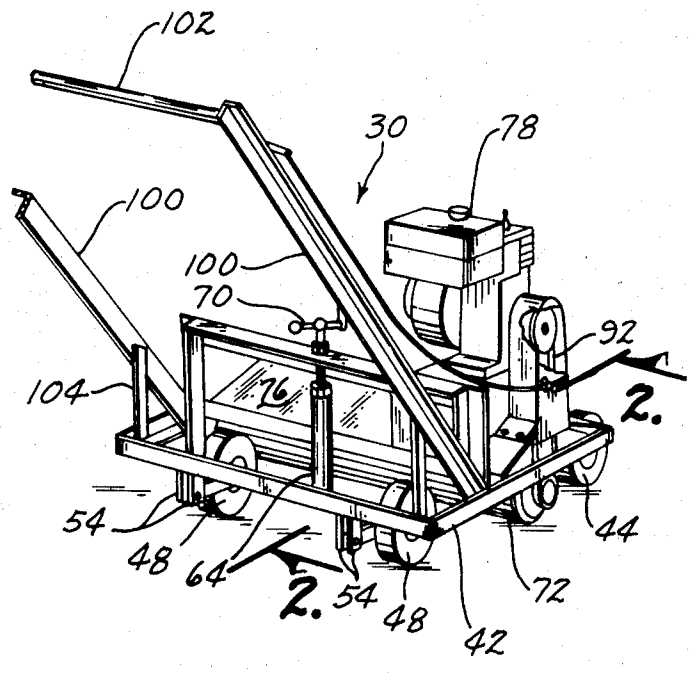
Primary Examiner—Ernest R. Purser

Attorney—Zarley, McKee & Thomte

[57] **ABSTRACT**

A machine for shaving expanded plastic on a roof structure wherein the machine includes a rotatable drum extending transversely of a frame carrying front and rear ground engaging wheels. The rear wheels are vertically adjustable to vary the thickness of the drum cut. The rear wheels are connected to the frame by a pair of pivotal arms and a vertically adjustable adjustment unit is connected between the frame and an axle from which the rear wheels are mounted. An engine is carried on the frame above the drum. A plurality of spaced apart longitudinally extending scarfing blades are provided on the exterior surface of the drum.

1 Claim, 8 Drawing Figures



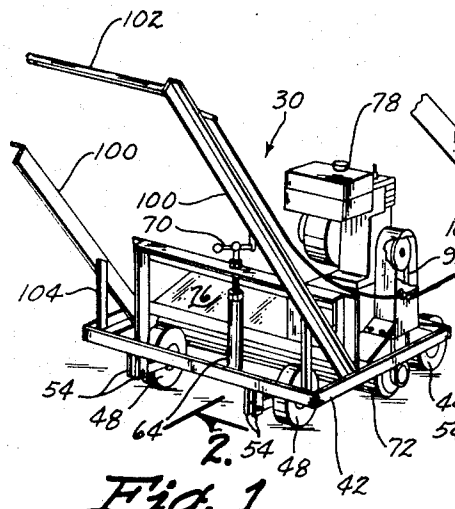


Fig. 1

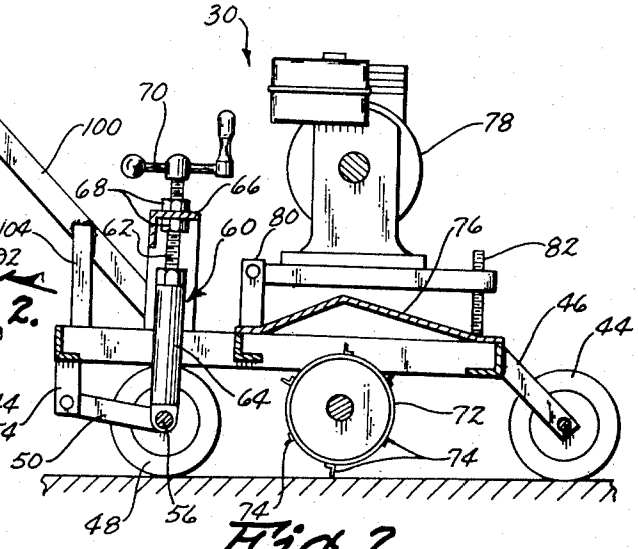


Fig. 2

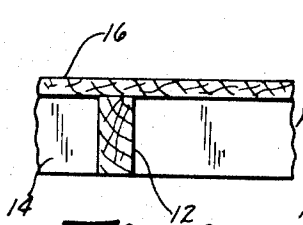


Fig. 3

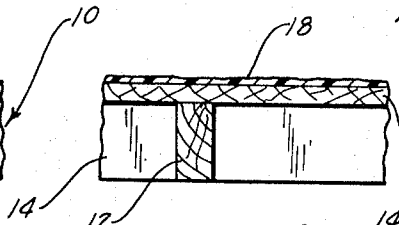


Fig. 4

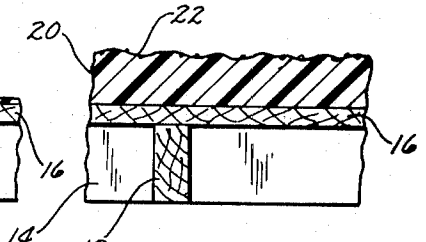


Fig. 5

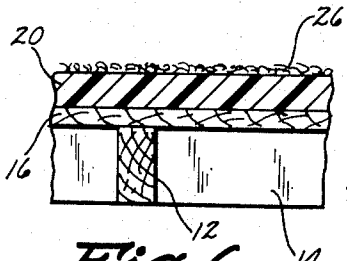


Fig. 6

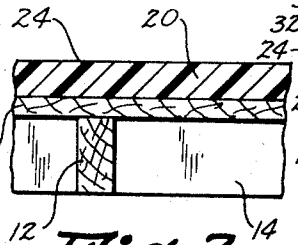


Fig. 7

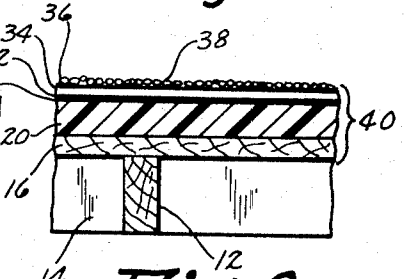


Fig. 8

ROOF SHAVING MACHINE

This is a divisional application of Ser. No. 752,597 filed Aug. 14, 1968, Method of Sealing And Insulating A Roof Construction and now U.S. Pat. No. 3,698,972.

A flat or slope roof structure or the like which is not shingled is sometimes covered with tar and tar paper and other protective coatings and perhaps some rock, mineral aggregate or other protective coatings. The sealing methods without shaving to a smooth surface are generally unsatisfactory.

It is a feature of this invention to apply a thin film of sprayed plastic onto the roof structure first. The spray plastic develops a cellular type which will immediately expand 20 to 30 times its film thickness and will set up in five to ten seconds and thereupon may be shaved to a smooth surface. The expanded layer of insulative plastic may easily be as thick as eight inches after having been sprayed on in a film having a thickness of one-twentieth inch to one thirty-second inch. The spraying of the cellular plastic includes using a blowing agent which decomposes to liberate a gas. This urethane or expanded plastic foam insulation can be applied to any roof deck whether it be wood, steel, concrete or other forms of roof decking material.

Upon completion of the application of the expanded cellular plastic, preferably urethane foam, the foam is shaved with a hand-operated shaving device including a rotatable cylinder carried on a frame driven by a gas engine. Longitudinally extending blades are formed on the cylinder and the cylinder is adjustably positioned above the working surface by adjustment of ground support wheels carried on a pivotal axis which may be raised and lowered to provide the desired cutting thickness. Next, the shavings are swept or vacuumed in preparation for application of tar, tar paper, or other protective coatings.

The cellular plastic urethane foam not only has sealing and insulative properties but provides substantial structural support strength and adds only a very minimum additional weight to the roof covering.

These and other features and advantages of this invention will become readily apparent to those skilled in the art upon reference to the following description when taken into consideration with the accompanying drawings wherein:

FIG. 1 is a perspective view of the shaving machine used in the method of this invention;

FIG. 2 is a cross-sectional view taken along line 2—2 in FIG. 1 of the shaving machine;

FIG. 3 is a fragmentary cross-sectional view of a roof structure before any covering material is applied;

FIG. 4 is a cross-sectional view showing a thin film of cellular plastic having been applied to the roof structure;

FIG. 5 is a cross-sectional view of the roof structure illustrating the cellular plastic in its expanded condition and having a rough outer surface;

FIG. 6 is a cross-sectional view of the roof structure illustrating the expanded plastic having been shaved with shavings remaining thereon;

FIG. 7 illustrates the roof structure after the shavings have been removed leaving a smooth surface; and

FIG. 8 is a cross-sectional view of the roof structure illustrating the laminated package of expanded plastic, tar, tar paper, tar and gravel or other protective coating.

The method of this invention involves a roof structure generally referred to by the reference numeral **10** in FIG. **3** which includes supporting 2 × 4s **12** and **14** on which flooring boards **16** are placed.

The first step in the method of this invention is to apply from a spray gun a thin film, one-twentieth to one thirty-second inches thick of preferably urethane cellular plastic **18** and then wait for approximately five seconds for it to expand 20 to 30 times its original thickness to the thickness shown in FIG. **5** at **20.** The outer surface **22** is rough and undulated and thus is shaved to a smooth surface **24** as seen in FIGS. **6** and **7.** The shavings **26** in FIG. **6** are produced by the machine generally referred to by the reference numeral **30** of FIGS. **1** and **2** and will be discussed in detail hereinafter.

The next step is the application if desired of tar **32** and tar paper **34** with a final layer of film of tar **36** onto the expanded urethane foam **24.** Finally, gravel or rock **38** is applied to the top film of tar **36** to complete the roof covering indicated at **40** in FIG. **8.**

The shaving machine **30** includes a frame **42** having front support wheels **44** positioned on downwardly and forwardly extending brackets **46.** Adjustable support depth gauge wheels **48** are carried on arms **50** pivotally connected to the rear of the frame **42** between a pair of downwardly extending brackets **54.** An axle **56** extends between the two wheels **48** and through the forward ends of the pivotal arms **50.** An upwardly extending adjustment unit **60** including a threaded bolt **62** and a socket sleeve **64** is provided wherein the bolt **62** extends through an upwardly extending frame member **66.** Lock nuts **68** are provided on opposite sides of the frame member **66** to retain the desired extension of the adjustment unit **60.** A handle member **70** is positioned on the upper exposed end of the bolt **62** for manual adjustment of the adjustment unit **60.**

The frame **42** intermediate its ends carries thereunder a powered rotatable cylinder **72** having uniformly spaced apart longitudinally extending cutting blades **74** around its periphery. A shield **76** extends above the cutting drum **72** to retain the shavings **26** below the shaving machine. A gasoline engine **78** is mounted on a stationary support **80** at the rear and is pivotally adjustable upwardly by a threaded bolt member **82** at the forward end which when adjusted upwardly tightens a drive belt **92** connected to the engine **78.** Accordingly the desired tension in the drive belt **92** is maintained by adjustment of the bolt **82** which pivotally raises and lowers the motor **78** about the pivotal axis extending through the support member **80** at the rear of the engine.

A rearwardly extending control handle **100** is provided for steering the shaving machine. The handle **100** includes a pair of side members interconnected by a cross member **102** and has upwardly extending support braces **104** at its lower end.

Thus it is seen that in operation a roof covering may be quickly, easily and inexpensively applied to most roof structures and provide effective sealing and insulating of the roof as well as increasing its structural strength through the use of the cellular plastic urethane foam at a minimum increase in total roof weight. The urethane foam is quickly applied without any messiness since it quickly sets up in five seconds or less and may be shaved to the desired smoothness. The final application of tar, tar paper and tar with a layer of rock or other protective coatings completes the roof covering

and provides the ultimate in a roof structure. It is apparent that if tar and tar paper and rock and other protective coatings were used to give the same insulative and sealing properties of the cellular expanded urethane the weight and cost would be extremely prohibitive. Further, urethane is an unusually fine material for this purpose since it is additionally not inflamable and practically no solvent will effect it thus the solvents in tars will not adversely effect the urethane foam. In addition it is extremely low in transmission of water vapor and absorption of water. The smooth shaved surface **24** provided by the shaving machine **30** provides an excellent surface for the adhesion of the tar material to the expanded cellular plastic **20.**

I claim:

1. A shaving machine comprising,

a frame having forward and rearward ground engaging wheels,

a rearwardly and upwardly extending handle connected to said frame,

a powered rotatable shaving drum on said frame between said forward and rearward wheels, and said drum having cutting means thereon,

said cutting means including longitudinally extending

scarfing blades,

said rearward wheels having height adjustment means to vary the cutting depth of said shaving drum,

the axis of rotation of said forward and rearward wheels and said shaving drum being disposed in parallel relationship, and said arms being pivotally connected to said frame rearwardly of said rearward wheels,

an engine being mounted on said frame above said shaving drum to power said shaving drum, and

said height adjustment means for said rearward wheels including an axle connected to a pair of arms pivotally connected to said frame rearwardly of said rearward wheels and a telescoping adjustment unit is connected between said axle and said frame for pivoting said arms thereby selectively varying the height of said shaving drum above a support and work surface, said adjustment unit being manually adjustable and including a threaded shaft received in a threaded sleeve and said threaded shaft being manually rotatable.

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