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ROOFING FASTENER

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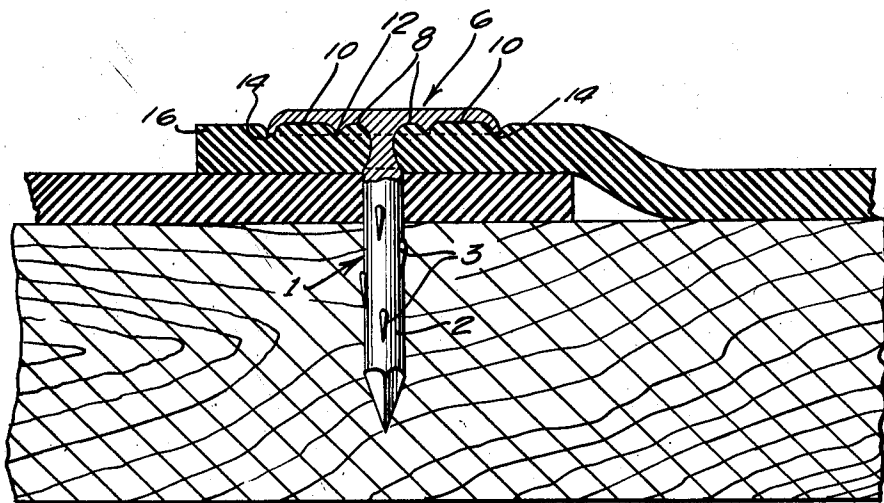
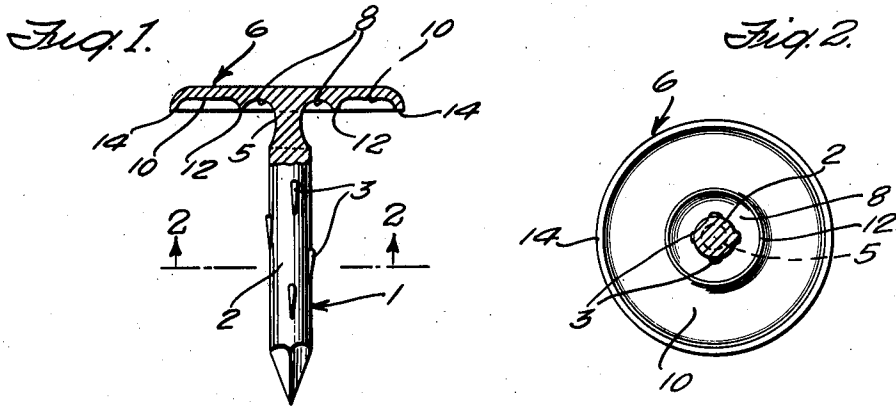


Fig. 3.

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ROOFING FASTENER

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5 Claims. (Cl. 108—33)

This invention relates to fasteners and particularly to those used in the fastening of covering sheets or elements. More especially the invention relates to fasteners for roofing sheets and roofing elements utilized in producing a watertight roof or covering construction.

In the application of covering sheets and covering elements, particularly those which are intended to produce a watertight construction, the problem of securing such sheets and elements while preventing such rupture or displacement of the material as will induce leakage in the roof or covering construction is ever present. In ordinary roof constructions, for example, which utilize roofing fabric composed of a fibrous base impregnated with a waterproofing saturant and usually coated to secure an impervious fabric, sheets or elements of such composition and structure are fastened by driving or otherwise passing the fastener through the fabric into an underlying support, for example, the roof deck.

Fasteners in the form of nails usually are used for this purpose. Such nails have shanks formed with barbs to prevent the nail pulling out of the underlying support under the actions of expansion and contraction due to heat and other causes. The intention has been in the use of such nails that the somewhat elastic quality of the saturant and coated fabric, especially when impregnated with a bituminous saturant, such as asphalt, or the plastic quality of the saturant or of the impervious coating, usually asphalt, carried by the fabric will cause these elastic and plastic materials to close about the shank of the nail to secure and maintain a seal to prevent leakage through the fabric around the nail. Little or no attention has been paid, however, to the condition that when the ordinary fastener or nail is forced through the fabric, and particularly when the head of the nail or fastener which bears upon the fabric is forced thereagainst to securely hold down the fabric to the underlying support or roof deck, damage to the fabric may result beyond the capacity of the elastic or plastic action to repair. The fabric becomes torn to an extent greater than can be overcome by the healing action of the saturant or of the coating carried by the fabric. Moreover, the heads of the nails have been formed without particular regard to the place at which the under surface of the head will contact the fabric being secured to the support and without regard to the necessary displacement of a portion of the fabric and of the saturant and coating carried thereby in passing the fastener there-

through to a position in which the head bears thereon. In many cases the heads of ordinary roofing nails are formed so that the fabric is squeezed away from the shank of the nail, thus being further ruptured and leaving an opening in the fabric around the nail for leakage of water through the roof construction.

The applicant's invention has for its object the provision of a fastener in which these objectionable features of the ordinary fasteners and particularly of roofing nails are overcome. The invention provides for maintaining the seal of the fabric and its saturant and coating around the nail and utilizes the force used for driving the nail or passing the fastener into the support to squeeze or press the fabric and its saturant and coating about the shank of the nail rather than forcing these materials away from the shank. The invention further provides a fastener or a nail which has the bearing surface of the head so formed as to increase the sealing action of the fabric and its saturant and coating and to provide a definite line or area of contact of the nail with the fabric, thereby to insure tightness of the head of the nail itself to the fabric to add to the leakage preventing seal.

These objects of the invention and a particular form in which it may be embodied are illustrated in the drawing, in which:

Fig. 1 shows a longitudinal section of the fastener of the invention.

Fig. 2 shows a section on line 2—2 of Fig. 1.

Fig. 3 shows one form of roof construction in which two roofing sheets are fastened by means of the fastening of the invention.

In Fig. 1 the nail 1 is formed with a shank 2 of usual diameter and length for the purpose. This shank, for example, may be about $\frac{1}{16}$ " (.100") diameter and $\frac{3}{4}$ " long. Roofing nails, however, may vary from about $\frac{1}{8}$ " diameter to about $\frac{3}{8}$ " diameter and in length from $\frac{1}{2}$ " to $2\frac{1}{2}$ ". The heads of the nails may vary from about $\frac{3}{8}$ " diameter to about 1" diameter. The shank 2 may be provided with barbs 3 or other means usually provided in such fasteners to secure a rough surface and to prevent withdrawal of the nail or its working out under the conditions of varying temperature, moisture, settlement, etc., which are experienced in building constructions.

Adjacent the place, as at 5 of Fig. 1, where the shank 2 joins the head 6 of the nail, the shank is reduced in diameter. The formation of the shank at this point is preferable with curved surfaces and avoiding of sharp edges. The por-

tion of reduced diameter merges by such curved surfaces into the undersurface of the nailhead.

This under or bearing surface of the nailhead, as may be seen in Fig. 1, is relieved, for example, by forming hollowed out or concave portions 8 and 10. The hollowed out portion 8 is of annular form in the particular embodiment illustrated and is separated from the hollowed out portion 10, also of annular form, by an annular ridge 12. The concave or hollowed out portion 8 merges with the surface of the reduced portion 5 of the shank and merges with the side surface of the ridge 12. The ridge 12 may be provided with a flat surface in a plane substantially perpendicular to the axis of the shank, or this ridge may have its upper or outer surface somewhat rounded. By the gradual merging of these surfaces, the squeezing of the fabric and of its saturant and of the coating carried thereby, as above referred to, may be so effected as to force the fabric and its impregnating and coating materials against the shank, that is, against the reduced portion thereof, and the portion of the shank immediately below the reduced portion. Thus the squeezing which will take place in the annular space formed by the surfaces 5 and 8 and by the side of the ridge 12 will be effective to insure the resealing of the hole formed by the nail in passing through the fabric and to provide and maintain resistance to leakage therethrough.

In order to provide further means for resisting entrance of the water through the nail hole into the roof construction, the nailhead is provided with a ridge 14 which in the particular example illustrated in Fig. 1 is substantially at the periphery of the head of the nail. The surface 10 of the hollowed out portion lying between the ridge 12 and the ridge 14 merges into the sides of these two ridges and as the nail is driven or forced into the underlying support or roof deck the fabric and its saturant and coating become squeezed between the two ridges 12 and 14, these ridges pressing in or indenting the fabric and squeezing it along the surfaces of these ridges to secure a tight contact. Moreover, slight displacement of the fabric and its saturant and coating may take place into the hollowed out space 10 without damage thereto and a substantially uniform distribution of such displacement around the annular space 10 may be secured without causing any rupture of the fabric due to uneven strain or force such as may occur with the ordinary roofing fastener. This ridge may be of substantially the same height as the ridge 12 or may be of slightly different height, depending upon the type of material with which the nail is to be used. Such a difference in height may be provided in order to secure more or less squeezing of the material into the hollowed out portions or depressions 8 and 10. The action of the ridges 12 and 14 may be seen in Fig. 3 where these ridges are shown indented in or impressed in the roofing sheet with the surface of the hollowed out portions 5 and 10 bearing evenly upon the sheet and slightly below the surface 16 of the sheet which is outside of the head of the nail.

The diameter of the reduced portion of the shank of the nail adjacent the head should not be so small as to unduly weaken the nail to cause it to bend or break at this point when driven through the roofing into the roof construction. The depth of the depression or recess 5 formed by this reduction of the shank for the nail of 1/10" (.100") diameter may be about .015" so that the reduced diameter would be about .070". This

depth of recess, however, may be made greater, for example, as much as .020", or may be less than .015", depending upon the type and thickness of the roofing material through which the nail is to be driven and the size of nail.

The depth of the hollowed out portions 8 and 10 on the underside of the head of the nail may be similar in dimension to that of the depression 5 at the reduced portion of the shank of the nail, that is, they may be of the degree of .015" to .020" for ordinary roofing materials.

The number of ridges, such as the ridges 12 and 14, may be varied and where a nail with a large head is used a greater number of ridges is preferred in order to limit the area of the roofing material which will be squeezed against each hollowed out or concave portion lying between the ridges. In general, however, it is a feature of the invention that at least a hollowed out portion or recess is provided adjacent the shank of the nail and this recess may be continuous with and substantially form part of the concavity provided by the reduced diameter of the shank of the nail. This hollowed out portion may be between a ridge 12 and the shank to squeeze the material against the shank as has been described. While, preferably, the surfaces of the hollowed out portions and the sides of the ridges merge, as has been described, it is within the scope of the invention to vary these forms while maintaining the feature that a space is provided between the ridge and the shank or between ridges into which the material being squeezed may be pressed by slight displacement of the material of the sheet.

Various modifications of the external form of the head of the nail may be made while utilizing the features of the invention. The ridges, if desired, in some cases may be discontinuous while securing the feature of squeezing or pressing the fabric against the shank or into the annular spaces. Other modifications will be apparent to those skilled in the art without departing from the spirit of the invention. The dimensions which have been given are intended to be those which are suitable for ordinary sheet roofing materials, particularly asphalt or bituminous impregnated and coated sheet roofing of usual thicknesses. Variations from the dimensions given, while maintaining the features of the invention to suit covering materials of different character and thicknesses, may be made.

Having thus described my invention I now claim:

1. A fastener having a head of substantially unyielding material and a shank rigidly attached thereto, a portion of said shank being of reduced cross-section adjacent the juncture of said shank with said head and forming a depressed surface on said shank, said head having a portion of the under bearing surface thereof depressed adjacent said juncture and extending about said shank, said depressed surfaces of said head and said shank merging to form an unyielding curved surface.

2. A fastener as in claim 1 in which the underface of said head is formed so as to provide an elevated contacting portion of the bearing surface of said head extending about said depressed surface of said head.

3. A fastener as in claim 1 in which the underface of said head is formed with a plurality of ridges extending about said depressed surface of said head with relieved portions therebetween.

4. A fastener as in claim 1 in which said bearing surface is formed by an annular ridge portion

adjacent the perimeter of the head and an annular ridge portion adjacent but spaced from the shank of the nail, said annular portions being separated from each other and from said shank by the depressed portions of said bearing surface.

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5. A roof construction comprising a sheet of asphalt saturated felt base roofing and a roofing nail driven therethrough into a support, the head of said nail being of rigid material to provide a substantially unyielding bearing surface, said nail having the portion of the shank thereof adjacent the head reduced in diameter to form a recess merging with a recess formed in the undersurface of said head adjacent the shank, said head being provided with an annular ridge on said undersurface extending about said recessed portion and

forming a portion which first contacts the roofing sheet when the nail is driven, said ridge indenting and being embedded in the surface of the roofing sheet, said nail being provided with a second ridge at the perimeter thereof and surrounding a second annular recessed portion of the undersurface of said head, said second ridge indenting and being embedded in the surface of said roofing sheet, the proportions of said recessed portions and of said ridges being such that by the embedding of said ridges in said fabric the fabric and its saturant are slightly deformed into said relieved and recess spaces of the nail to closely bear thereagainst.

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