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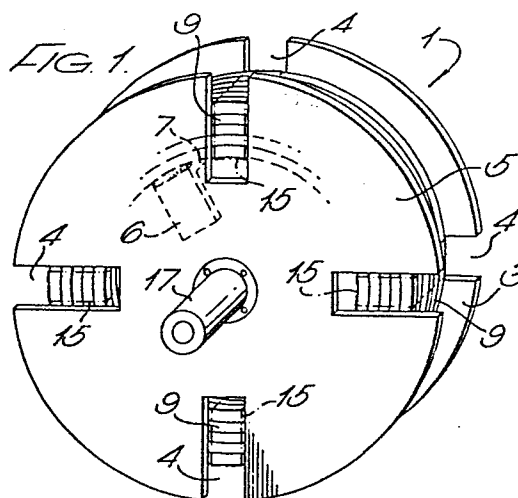
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54 **Method and apparatus for making a pile weatherstrip coil.**

57 A method and apparatus for making a coil (9) of pile weatherstrip or the like, comprising a reel (1) on which the coil (9) is formed, the reel being a central discontinuous core or hub (7) and two separable, spaced radially extending side walls (3,5) both of which have a discontinuous external periphery (4) to allow the formed coil (9) to be wrapped with at least one band (15). Preferably, means (10,11) is also provided for feeding the weatherstrip to the coil 9 under little or no compression. The side walls preferably comprise circular plates (3,5) with recesses (4) in their peripheries, to the inner faces of which plates projections formed by arms (7) of L-shaped members are connected to provide the core, the projections on one plate in the assembled reel being angularly offset relative to the projections on the other plate.



METHOD AND APPARATUS FOR MAKING A
PILE WEATHERSTRIP COIL

The present invention relates to a method and apparatus for making a coil of pile weatherstrip or
5 like crushable elongate material, and more especially, a coil of pile weatherstrip with a central barrier fin such as our FIN-SEAL strip. The invention is particularly suitable for making a coil of pile weatherstrip which has a central barrier fin
10 which projects beyond the sealing surface of the pile. We market such weatherstrip as HI-FIN weatherstrip.

In the past, such weatherstrip has been coiled in traditional fashion on a reel, in the same manner
15 as wire, and has been wound upon itself under tension. This means that once coiled, the weatherstrip in the coil is under compression. This is satisfactory for some weatherstrip, but with pile weatherstrip, there is a tendency for the
20 weatherstrip to be wound so tight that the pile is crushed. This can have an adverse effect on the performance of the weatherstrip. The damage to the weatherstrip is even worse when a barrier fin is provided, especially if it upstands from the pile,
25 because the barrier fin will be crushed, and more often than not, will be laid over the pile, sometimes one way and sometimes the other, so that when the weatherstrip is removed from the reel for installation in a window or door, the fin will be
30 laid over the pile in random fashion to the left and right, and may not upstand from the pile at all. As a result, the fin, instead of enhancing the sealing and other performance properties of the weatherstrip, will have an adverse effect.

35 The present invention seeks to overcome the

problems associated with the traditional coiling of weatherstrip on reels.

According to the present invention, we provide apparatus for making a coil of pile weatherstrip or
5 like crushable elongate material, comprising a reel on which the weatherstrip is to be wound, said reel having a central circumferentially discontinuous core or hub and two spaced side walls extending radially from the core, and separable from each
10 other, and both of which have a discontinuous circumferential periphery to allow weatherstrip wound upon the reel to be wrapped round with at least one band of tape or the like to prevent unreeling when it is removed from the reel after
15 separation of said side walls.

Preferably, the apparatus also includes means for winding the weatherstrip on the reel under minimum tension so that the coil is under little or no compression.

20 Each side wall could comprise a spider, generally in the form of a plurality of arms extending radially from a central region, and the central core or hub could be provided by a plurality of bars extending between opposed arms of the two
25 spiders, each of the bars being at the same spacing from the centre of the central region.

Preferably, however, the reel comprises two generally circular side plates, each with a plurality of recesses opening from their periphery
30 towards a central region, and between the recesses, projections which are preferably of equal length located at a greater distance from the centre of each side plate than the bottom of each recess, which form the discontinuous core or hub when the
35 two side plates are assembled concentrically together in parallel spaced relationship.

5 Preferably, each side plate has four recesses therein at 90° intervals, and each projection is spaced circumferentially about 30° from a recess, so that the plates can be assembled with their recesses directly opposite each other, with two projections between each pair of recesses, spaced about 30° apart, one connected to one plate and the other to the other plate.

10 The projections may be provided by L-shaped members, one of the limbs of each of which is secured to its respective plate, and the other limb of which forms the projection, and the free end face of which abuts the opposite plate.

15 Preferably, quick release means is provided to allow separation of the side walls. The quick release means may comprise nuts and bolts or pivoting latches. Preferably also, means is provided on at least one of the plates to assist in correctly aligning it with the other plate.

20 Preferably, each projection is lined, at least on its radial outermost face, with soft material, e.g. pile.

25 The means for winding the weatherstrip on the reel may comprise a feeder arm having a head with a T-shaped slot therein, which preferably lays the weatherstrip in position with the pile facing inwards, and which moves radially outwards for each layer so as not to tension the weatherstrip and lay it loosely on the reel. Preferably, the arm can
30 move from side to side axially of the reel to lay the weatherstrip on the reel. This arm may rotate around the reel, but it is preferred that the reel is rotated about a pivot axis located at the centre of its side walls so that the arm can move just from
35 side to side and radially in and out.

Also according to the present invention, we provide a method of making a coil of pile weatherstrip or like crushable material comprising winding the weatherstrip under minimum compression
5 onto a reel which has a central core with a discontinuous circumference and two spaced separable side walls extending radially from the core, and which have discontinuous peripheries, wrapping the resultant coil of weatherstrip with at least one
10 band of material to prevent unwinding of the coil, separating the side walls of the reel, and removing the banded coil of weatherstrip or like material from the reel.

Preferably, the method includes the step of
15 feeding the weatherstrip to the reel with an arm which is movable towards and away from a central rotational axis of the reel so that each layer of weatherstrip on the reel is laid gently onto the reel or a preceding layer under minimum
20 compression. Preferably, the arm is also moved to and fro to lay the weatherstrip on the reel.

Preferably, the reel is rotated relative to the arm and the weatherstrip is wound on the reel with its pile facing inwards. This is particularly
25 advantageous when a barrier fin is associated with the pile, because when the weatherstrip is coiled, the tip of the fin will lie on a circle of smaller diameter than the base of the fin, thus causing the free edge or tip to corrugate slightly. This then
30 supports the next outer layer of pile weatherstrip and acts as a cushion for it. This means that the resultant coil of weatherstrip has a resiliently deformable support built into it, which means that the whole coil is less likely to be damaged during
35 transit, and is itself self-supporting and

resiliently deformable.

The side wall may be separated by removing nuts from one end of a plurality of bolts extending between the side walls and holding the side walls together, or by releasing pivoting latches on the ends of the bars or other quick release means.

The invention is now described by way of example with reference to the accompanying schematic drawings, in which:-

FIGURE 1 is a perspective view of one possible construction of reel, with a coil of weatherstripping formed on the reel;

FIGURE 2 is an inside elevation of one side wall plate of the reel in Figure 1 with the coil still in the position in which it is wound and showing a feed arm for the weatherstrip;

FIGURE 3 is an end view of a dispenser head for laying the weatherstrip on the reel, and

FIGURE 4 is a section on the line IV-IV of Figure 4.

Referring to Figures 1 and 2 of the drawings, a reel 1 is shown, made up of two spaced side walls 3,5, each in the form of a circular plate, having a plurality of recesses 4 therein, extending from the periphery of the plate towards the centre. As shown, four recesses 4 are provided in each plate, at 90° spacings. On each plate, between each recess 4, a projection 7, provided by one arm of an L-shaped bracket 6, is provided, the other arm of each bracket 6 being secured to the side wall plate 3 or 5 in known manner, spaced approximately 30° from its respective recess 4. Thus, when the two

side wall plates as shown in Figure 2, with their
projection 7, are assembled in parallel spaced
relationship, as shown in Figure 1, with the
recesses in one plate opposite those in the other
5 plate, there will be two projections 7 extending
between each adjacent pair of recesses 4, one
projecting from the side wall plate 3 and the other
from the side wall plate 5, one spaced about 30° and
the other about 60° from each recess 4. It is
10 important, as will become apparent, that the
projections 7 lie on a circle, the radius of which
is greater than that on which the bases of the
recesses 4 lie. It will thus be appreciated that
the eight projections 7, formed by the projecting
15 arms of the brackets 6 provide a central, generally
circular, core or hub for the reel with a
discontinuous circumference on which a coil 9 of
weatherstrip or the like is to be formed.

The weatherstrip for the coil 9 is dispensed
20 from a feeder arm 20 which is shown in more detail
in Figures 3 and 4 to which reference is now also
made. The feeder arm 20 comprises a dispensing head
10 having a holder 21 with a T-shaped slot therein,
which is supported on an arm 11. The holder 21 is
25 supported on bolts 22 passing through the top of the
head 10. The position of the holder 21 in the head
10 can be varied by screwing up or unscrewing nuts
23 to accommodate weatherstrips of different
heights. The holder 21 is held in position by coil
30 springs 24 encircling the bolts 22 and located
between the holder 21 and the top of the head 10.
If desired, the holder 21 may be changed to
accommodate weather or other strips of different
widths by unscrewing completely the nuts 23 and
35 inserting a new holder.

The head 10 is movable towards and away from a rotational axis 13 of the reel, and is also movable to and from across the width of the reel between the side walls, so as to lay weatherstrip in place, as shown. By moving the arm outwardly away from axis 13 as each layer of weatherstrip is layered onto the reel, the weatherstrip is coiled under minimum compression so as not to crush the weatherstrip. It is preferred that the weatherstrip is guided as shown in Figure 3 by the T-shaped slot in the holder 21 in the head 10 with its pile facing inwards, especially if the pile incorporates a barrier fin. When there is a barrier fin, it is almost impossible to coil such weatherstrip with its barrier fin facing outwards, because the barrier fin acts as a flange on a T-beam. However, with the fin facing inwards, its free edge can collapse by zig-zagging or corrugating (it will lie on a circumference of smaller radius than the base strip of the weatherstrip). In the finished coil, this corrugated fin supports the next layer of weatherstrip, and provides a cushion effect, thus improving the durability of the coil and giving it a resilience which improves its recovery characteristics during transport. The arm 11 could be moved around the reel, but it is easier for the reel to be rotated, as shown, in the direction of the arrow B.

Once the coil 9 of weatherstrip has been built up as shown in the drawings, one or more bands 15 (four, one for each recess, are preferred) of tape, wire, string or the like are wrapped around the coil 9 to hold it in place, and the weatherstrip can then be severed from that on the supply arm 11. Ideally,

the bands 15 are formed of tape on which a trade mark or brand name can be printed. The provision of the discontinuous hub or core, and the recesses 4 providing a discontinuous periphery for the side walls 3 and 5, allows the band 15 easily to be placed in position.

After the coil 9 has been secured, the side walls 3 and 5 are separated from each other. This can be achieved by first releasing or removing quick release fittings or nuts and bolts (not shown) or preferably a single screw spindle 17. The banded coil can then be removed from the reel.

The walls 3,5 are shown as being spaced apart by the eight projections. A different number could be provided. The projections 7 are preferably lined, at least on their surfaces which support the inner layer of weatherstrip, with a soft material, e.g. pile material or foam, to prevent crushing of the weatherstrip.

The present invention also extends to a coil of pile weatherstrip wound by the method and apparatus described above.

The weatherstrip may be fed to the head 10 by a capstan, or by means of a pair of rollers, the speed of which is controlled to ensure there is little or no tension in the coil. The feed mechanisms are the subject of a further patent application in our name.

It will of course be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope and spirit of the invention. Coils of elongate material other than weatherstrip can of course be made using the apparatus and method of the invention.

CLAIMS:-

1. Apparatus for making a coil (9) of pile weatherstrip or like crushable elongate material, comprising a reel (1) on which the weatherstrip (9) is to be wound, said reel having a central core or hub (7) and two spaced side walls (3,5) extending radially from the core (7), characterised in that the core or hub (7) is circumferentially discontinuous and in that the side walls (3,5) are separable from each other, and in that both walls (3,5) have a discontinuous circumferential periphery (4) to allow weatherstrip (9) wound upon the reel (1) to be wrapped round with at least one band (15) of tape or the like to prevent unreeling when it is removed from the reel (1) after separation of said side walls (3,5).

2. Apparatus according to claim 1 characterised in that it further includes means (10,11) for winding the weatherstrip (9) on the reel (1) under minimum tension so that the coil (9) is under little or no compression.

3. Apparatus according to claim 1 or 2 characterised in that the reel (1) comprises two generally circular side plates (3,5), each with a plurality of recesses (4) opening from their periphery towards a central region, and between the recesses (4), projections (7) located at a greater distance from the centre of each side plate (3,5) than the bottom of each recess (4), which form the discontinuous core or hub when the two side plates (3,5) are assembled concentrically together in parallel spaced relationship.

4. Apparatus according to claim 3 characterised in that each side plate (3,5) has four recesses (4) therein at 90° intervals, and each

projection (7) is spaced circumferentially about 30° from a recess (4), so that the plates (3,5) can be assembled with their recesses (4) directly opposite each other, with two projections (7) between each pair of recesses (4), spaced about 30° apart, one connected to one plate (3) and the other to the other plate (5).

5. Apparatus according to claim 3 or 4 characterised in that the projections (7) are provided by L-shaped members (6,7), one of the limbs (6) of each of which is secured to its respective plate (3,5), and the other limb (7) of which forms the projection (7), and the free end face of which abuts the opposite plate (3,5).

6. Apparatus according to any one of claims 1 to 5 characterised in that quick release means (17) is provided to allow separation of the side walls.

7. Apparatus according to any one of claims 1 to 6 characterised in that means is provided on at least one of the plates (3,5) to assist in correctly aligning it with the other plate (3,5).

8. A method of making a coil (9) of pile weatherstrip or like crushable material characterised by winding the weatherstrip (9) under minimum compression onto a reel (1) which has a central core (7) with a discontinuous circumference and two spaced separable side walls (3,5) extending radially from the core (7), and which have discontinuous peripheries (4), wrapping the resultant coil (9) of weatherstrip with at least one band (15) of material to prevent unwinding of the coil (9), separating the side walls (3,5) of the reel, and removing the banded coil (9) of weatherstrip or like material from the reel.

9. A coil of weatherstrip or the like when

made by the apparatus of claim 1 or method of claim 8.

10. A coil of weatherstrip or the like when made by the apparatus or method described herein.

