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- 1 -

A DEVICE FOR MOUNTING INSULATION AND SEALING LAYER TO THE
OUTSIDE OF A ROOF

The present invention refers to a device for mounting in-
5 insulation and sealing layer to the outside of a roof and
retaining it thereon and incorporating a washer, which
is placed on the outside of the sealing layer and is
attached to an underlying fixed part of the roof struc-
10 ture by means of a fixing member, which extends through
an opening in the washer, through sealing layer and in-
sulation whereby the washer is provided with first locking
means for interlocking with cooperating second locking
means arranged in the underside of a covering washer
15 having an unperforated upper surface and a bigger outer
size than said washer, which covering washer is intended
when mounted to encase said washer between itself and the
underlayer.

For this method of fixing a sealing layer to insulation
20 and roof structure it has earlier been used sheet metal
washers which have been screwed or nailed to the beams
of the roof. The hole for the screw or hole has thereby
caused a great risk for leakage which is difficult to
master, at the same time as there has been problems in
25 obtaining an absolutely tight joint between the outer
periphery of the washer and the underlying sealing layer,
which is preferably a PVC-film.

A more recent design has used a washer of a semi-rigid
30 PVC-plastic, whereby the outer periphery of the washer
has been glued to the sealing layer, preferably by aid
of a liquid PVC-based adhesive. Also in this case the
central through-hole for the fixing member has caused
leak problems which are difficult to solve, at the same
35 time as it has proven itself that it has been difficult



to manufacture the PVC-washers without form defects which show themselves thus that the washers are warping so much that they become wavy instead of being plane. This has a detrimental effect on the washers' ability of giving
5 a tight engagement with its periphery against the sealing layer.

In a further embodiment a washer of PVC-plastic has been provided with a blind hole located in its surface facing
10 the sealing layer, in which blind hole a headless connecting screw has been screwed in, whereupon the connecting member by means of a tool, which is attachable to the outside of the washer, is screwed on to the roof structure and thereby also the washer against the sealing layer
15 and the insulation therebeneath. In this case the leakage which appeared along the bore of the connecting member has been eliminated but the problem of form defects remains. The PVC-washer will furthermore tend to yield when subjected to big forces e.g. at strong wind, whereby the
20 leak problem will furthermore increase at the same time as there is risk that the sealing layer will be torn apart at positions where the PVC-plastic cannot maintain its form and secure a sufficient contact.

25 According to still another embodiment of a fixing device for this purpose it has been used a profiled washer of plastic material which has a central opening for receiving a fixing member. This washer is then completed with a protective cap, which is fitted over the washer and which
30 will ascertain that there will be no fluid leakage between the opening of the washer and the fixing member. The protective cap is connected to the washer thereby that a peripheral flange at its open end is brought to snap behind an annular groove at the lower edge of the washer.

In order to be able to make the connecting snap-motion the protective cap when mounted must be located at a small distance from the base. This implies risks for leakage in conformity with the above said as the plastic washer as stated above hardly can be manufactured without form defects, either such which will occur immediately at the manufacture or later due to stresses, loads etcetera.

The present invention has for its purpose to present a device for mounting and retaining insulation and sealing layer to the outside of a roof of the type mentioned here-above and by the aid of which the above mentioned problems are eliminated, at the same time as the device is reliable and simple both to manufacture and to handle, and this has according to the invention been achieved thereby that the washer consists of a thin, formstable metal washer having through-holes, which define said first interlocking means, whereas the said second means of the covering washer are studformed projections protruding from the underside of the covering washer and being lockable in the holes of the washer, whereby the covering washer when locked to the washer, is intended to be connected to the sealing layer along its edge projecting outside the washer, e.g. by a glue joint.

25

The invention will hereinafter be further described with reference to two embodiments shown in the accompanying drawings.

30 Figure 1 shows in a schematic cross-section a device according to the invention applied to a roof of which a small portion is shown in cross-section,

Figure 2 shows in a planar view and a side view a covering washer forming part of the device according to the invention,

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Figure 3 is views corresponding to the views of figure 2 of a washer forming part of the device,

Figure 4 is a view corresponding to figure 1 of another embodiment of the device according to the invention,

- 5 Figure 5 is a view corresponding to figure 2 of a covering washer of the device according to figure 4, and
Figure 6 shows two views according to figure 3 of the washer forming part of the device according to figure 4.

- 10 In figure 1 is shown a roof beam in the form of a sheet steel profile, which together with other beams carry an insulating mat 2 laid thereupon. Above the insulation there is laid out a sealing layer 3 in the form of a PVC-film, which is secured to the roof beam 1 by means of a
15 connecting member 4 - in the embodiment shown, a screw - which extends through the sealing layer as well as through the insulation. The screw 4 also extends through a counter-sunk, central opening 6 arranged in a round metal washer
20 5, which is placed upon the sealing layer 3 and thereby distributes the forces on the screw over a larger area of sealing layer and insulation.

- In the metal washer 5, as can be better seen in figure 3, there is furthermore arranged connecting means 7 formed
25 as two diametrically opposite, mainly keyhole-shaped holes, each having a bigger hole portion 7a and a smaller hole portion 7b continuous with the bigger one. From figure 3 can further be seen how the central opening 6 has a counter-sinking 6a.

30

The metal washer 5 is by means of the connecting means 7 locked to a covering washer 8, which is better shown in figure 2. The covering washer 8, which has an unper-

forated upper surface, is at its underside provided with members 9 for interlocking cooperation with the connecting means of the metal washer and these cooperating members are formed as projections or studs located just in front of the holes 7 in the washer 5 and each being designed with a head 9a having a dimension which is somewhat smaller than the dimension of the bigger hole portion 7a in the washer but somewhat bigger than the dimension of the smaller hole portion 7b in the washer 5, and having a stem portion 9b having a somewhat smaller dimension than the smaller hole portion of the washer.

On the outer side of the covering washer 8 there is furthermore a ridge 10, which can be used as a handle or which can form a grip for a tool, whereby the covering washer 8 can be rotated to allow its member 9 to arrive in interlocking engagement with the connecting means 7 of the washer 5 after the projection heads 9a have been inserted through the bigger hole portions 7a.

20

As can be seen in figure 1 the covering washer 8 has a bigger outer dimension than the washer 5 and before the covering washer has been fitted a curable glue, preferably on PVC-basis, is conveniently applied on the sealing layer 3 or along the periphery of the covering washer 8, whereby a curing glue joint bond 11 is obtained between the sealing washer, which is preferably made in PVC-plastic, and the sealing layer.

In figures 4-6 is shown in views corresponding to figures 1-3 a modified embodiment of the device according to the invention with a screw 4, which connects an insulating mass 2 and a sealing layer 3 of PVC-foil to a roof beam 1 during intermediation of a washer 15, provided with a through-hole 16 with a counter-sinking 16a.

The washer 15 is provided with interconnecting means 17 formed as two diametrically opposite round holes, which cooperate with interlocking members 19 formed in a covering washer 18 of PVC-plastic, each of which members 19 being formed as two peg-parts 19a, 19b which are flexible in direction from each other, and which at their end portions have hook means 19c. When the projections 19 are pressed against the holes 17 in the washer 15 the peg parts will be urged against each other and they will again flex back when they have passed through the washer 15 whereby the hook members 19c will snap behind the washer 15 and effectively interlock the washer and the sealing washer.

Also in this case the outer edge of the sealing cover is preferably connected to the sealing layer at 11, e.g. by heat sealing, glueing or the like.

The invention offers a simple and efficient mounting device, which has a metal washer as a load carrying element, whereas the plastic covering washer will not have to carry any loads of importance whereby it is not sensible to form defects to the same extent as earlier devices of similar type.

The invention is not limited to the embodiments shown in the accompanying drawings and described in connection thereto but modifications are possible within the scope of the accompanying claims.

C L A I M S

1. A device for mounting and retention of insulation and sealing layer to the outside of a roof and comprising a washer, which is placed on the outside of the sealing layer and is attached to an underlying fixed part of the roof structure by aid of a connecting means, which extends through an opening in the washer, through the sealing layer and the insulation whereby the washer is provided with first locking means for interlocking with cooperating second locking means formed in the underside of a covering washer having an unperforated upper surface and a bigger outer size than said washer, characterized thereby, that the washer is a thin, form-stable metal washer (5, 15) having through-holes (7, 17), which define said first interlocking means, whereas the said second means of the covering washer (8, 18) are stud-formed projections (9, 19) protruding from the underside of the covering washer and being lockable in the holes of the washer, whereby the covering washer when locked to the washer, is intended to be connected to the sealing layer (3) along its edge projecting outside the washer (5, 15) e.g. by a glue joint (11) in a manner known per se.

2. A device according to claim 1, characterized thereby, that the holes (7) in the washer (5) are formed mainly in keyhole-shape with a first, bigger portion (7a) and a smaller portion (7b) continuous therewith, the projections (9) of the covering washer being provided with a stem portion (9b) of a somewhat smaller dimension than said smaller hole portion (7b), and with a head (9a) with a bigger dimension



than said smaller hole portion (7b), but smaller dimension than said bigger hole portion (7a), whereby the covering washer is intended to be mounted by the projections (9) being inserted through said bigger hole portion (7a) whereupon the covering washer (8) is
5 rotated until said projections engage in said smaller hole portions.

3. A device according to claim 1, characterized
10 z e d t h e r e b y, that the interconnecting holes (17) of the washer (15) are round, whereas the projections (19) are each designed as at least two pin parts (19a, 19b), which are arranged flexible and provided with hook members (19c) arranged to snap behind the
15 holes of the washer when the covering washer is pressed against the washer.

4. A device according to anyone of the preceding claims,
c h a r a c t e r i z e d t h e r e b y, that the covering
20 ring washer (8, 18) is made in PVC-plastic.

5. A device according to anyone of the preceding
claims, c h a r a c t e r i z e d t h e r e b y,
that the covering washer (8, 18) on its outside is
25 provided with means (10) for cooperation with a tool for rotating the covering washer.

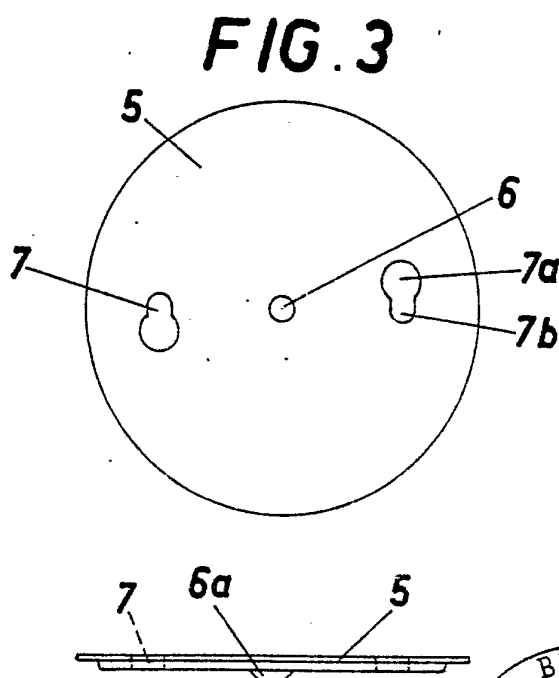
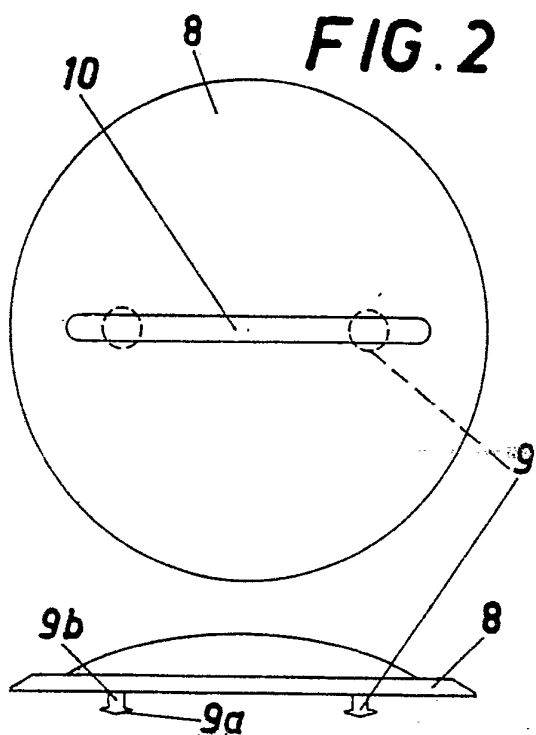
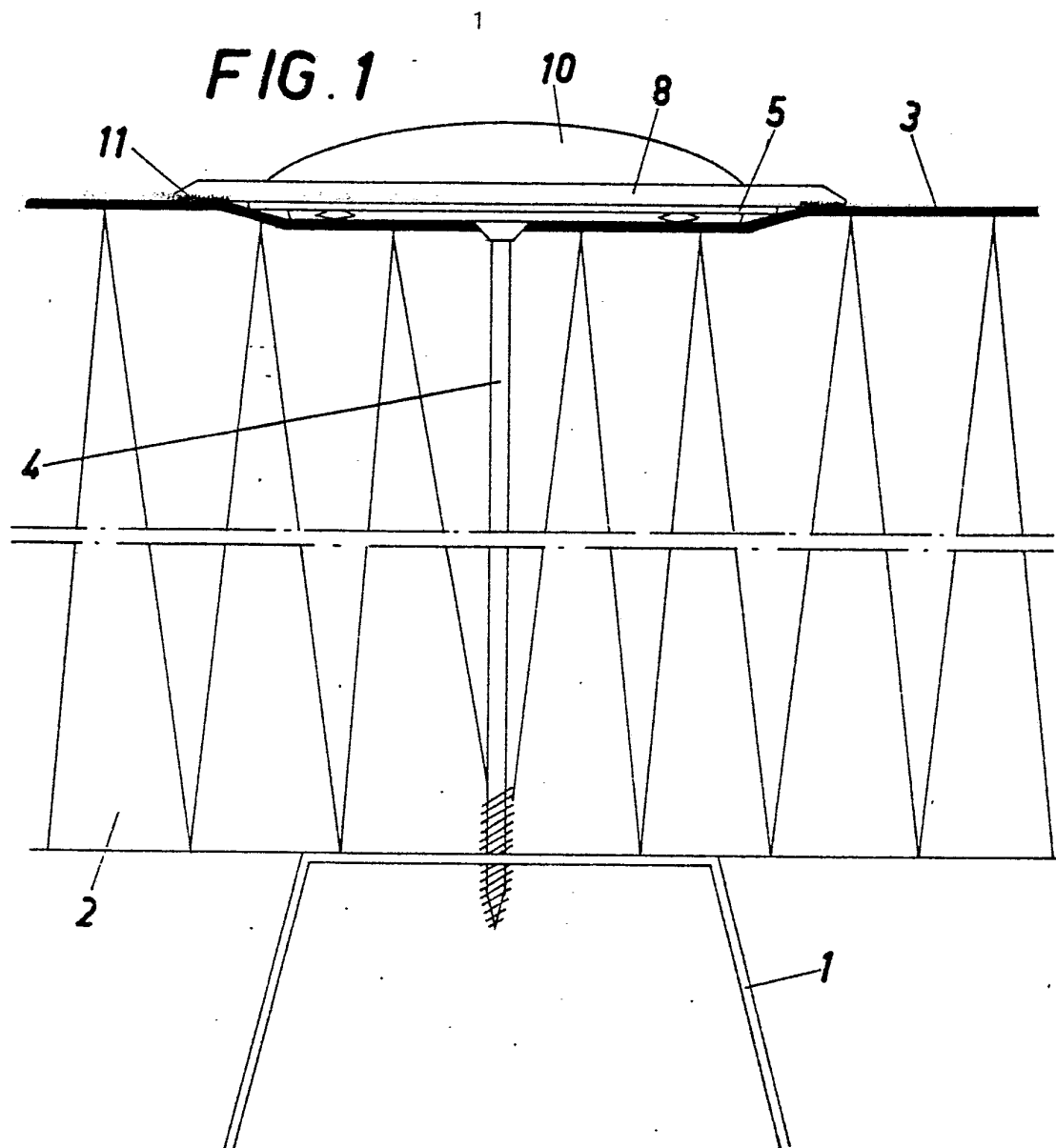


FIG. 4

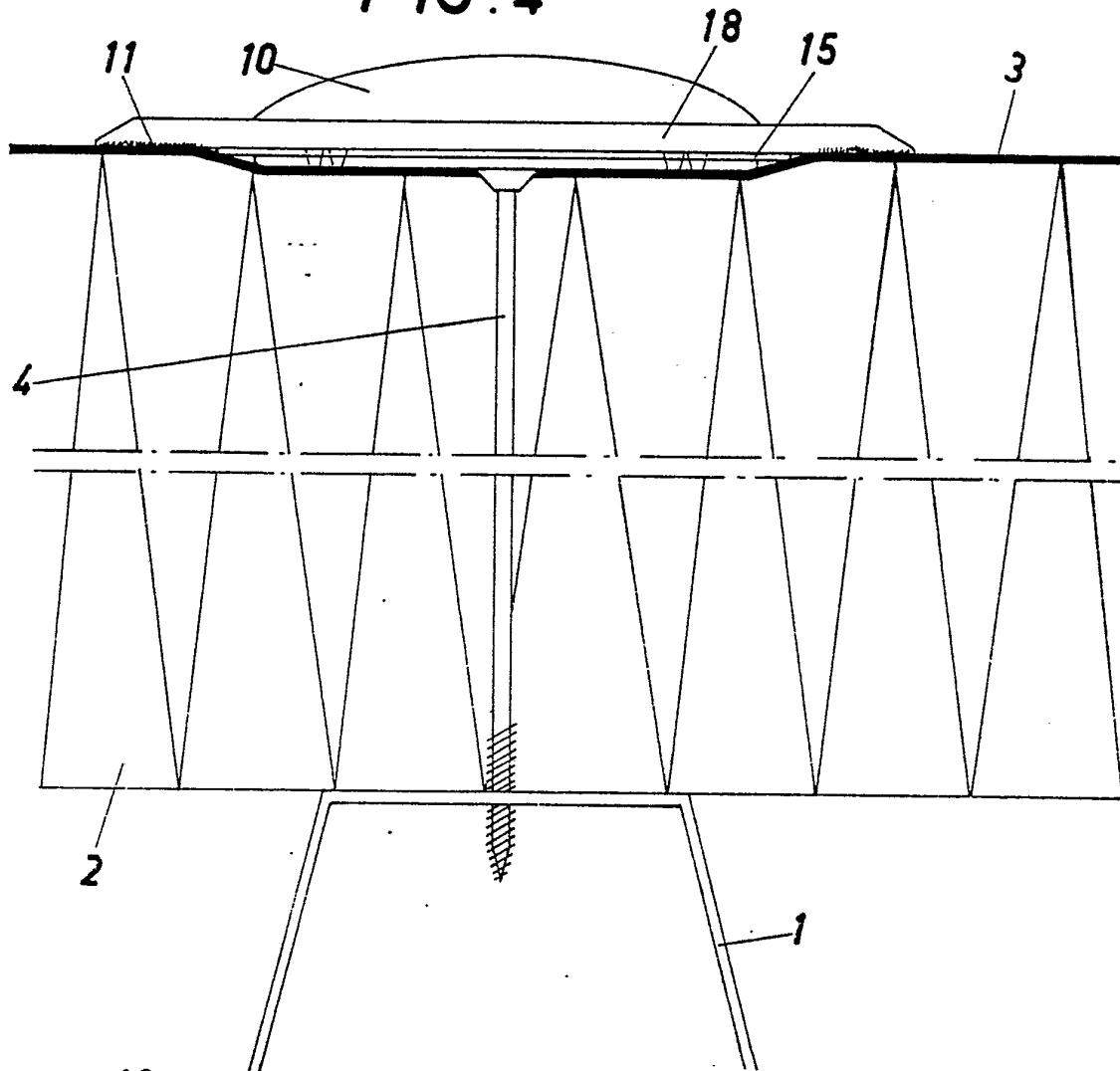


FIG. 5

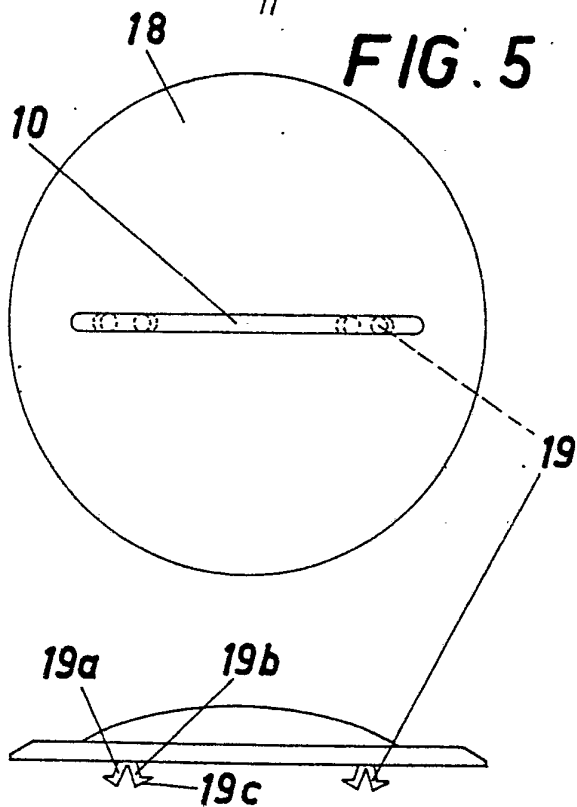
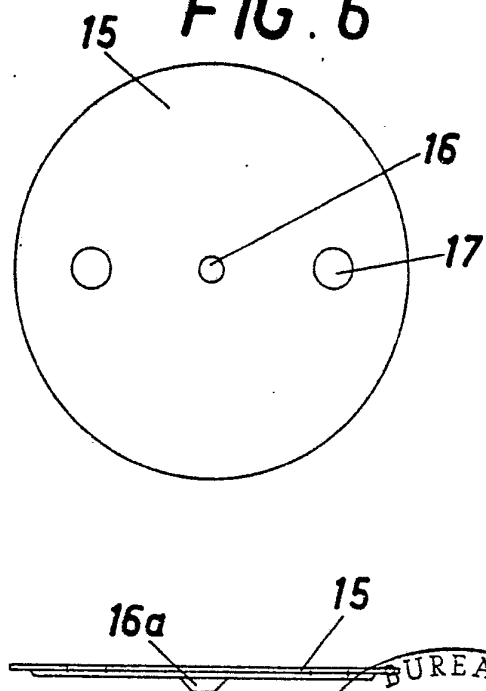
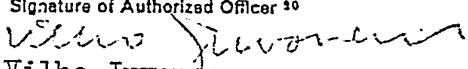


FIG. 6



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE80/00012

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³				
According to International Patent Classification (IPC) or to both National Classification and IPC 3				
E 04 D 3/36				
II. FIELDS SEARCHED				
Minimum Documentation Searched ⁴				
Classification System	Classification Symbols			
IPC ⁵	E 04 D 1/34, 3/36, 5/14			
Deutsche Kl	37c:2, 7			
US Cl	287-189.35; 52-511			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁶				
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴				
Category *	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁵		
A	SE, B, 399 579 published 1976, October 25, Sandqvist S A	1		
A	FR, A, 1 419 320 published 1966, February 17, Cover	1 - 5		
A	FR, A, 1 484 242 published 1967, September 13, Robertson Company	1 - 5		
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IV. CERTIFICATION				
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