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JOINT SEALING DEVICE FOR BUILDING WALL PANELS

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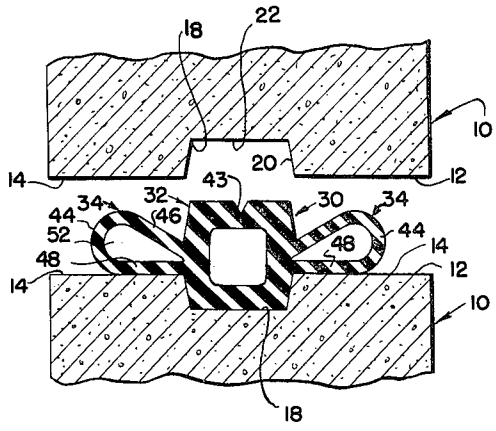



FIG. 1

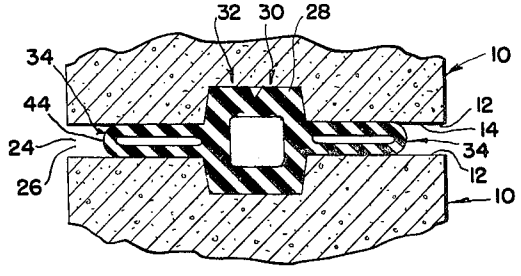
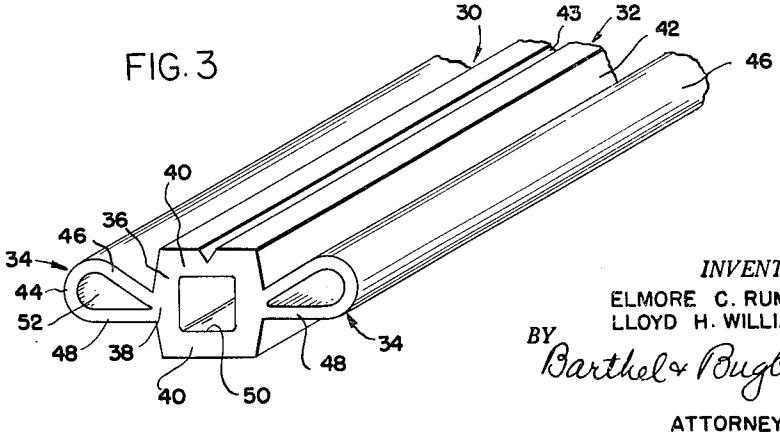



FIG. 2

FIG. 3




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# JOINT SEALING DEVICE FOR BUILDING WALL PANELS

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This invention relates to sealing devices and, in particular, to joint sealing devices for sealing the joints or gaps between the external wall panels of building structures.

At present, the outer walls or "curtain walls" of certain modern building structures have been formed by securing to the building framework large relatively thin panels or slabs of concrete, stone or other suitable material. Such panels, however, ordinarily possess variations in width due to unavoidable variations arising during manufacture. Furthermore, such panels also frequently either expand or shrink after they have been secured to the building structure, with the result that the joints between the vertical edge faces of the panels change in width after installation. Moreover, in certain modern building structures, where such panels are of considerable length, even as great as 35 feet, prior sealing devices installed between the vertical edge surfaces of such panels have required too much force to initially compress them during installation, yet have possessed too little expansibility to maintain adequate subsequent sealing action. Finally, where panels of such great length are placed edge to edge in this manner with prior sealing strips used in the joints between them, the concrete has enough "spring" to enable the upper and lower corners of adjacent panels to be brought almost into contact with one another while a considerable gap remains at the middle, because of the resistance to compression offered by such prior sealing strips, thereby creating an undesirable variable width of joint from end to end of the panels.

Accordingly, one object of the present invention is to provide a joint sealing device for external building wall panels which requires only a very light pressure to compress it initially during installation, thereby not only maintaining a more even width of joint between the panels that has heretofore been obtained, but also reducing the effort required of the workmen to shift such panels laterally during installation, as well as permitting expansion or contraction of the sealing device considerable distances to maintain the sealing action of the sealing device during subsequent life of the building, even though the widths of the joints or gaps between adjacent slabs changes widely subsequent to their installation.

Another object is to provide a joint sealing device of the foregoing character to be installed between the centrally-recessed vertical edge surfaces of adjacent building wall panels, the joint sealing device of the present invention having a hollow thickened main sealing portion or rib installed in the widened part of the joint lying between the bottom surfaces of the recesses and oppositely-extending thinner tubular lateral portions or fins secured to the main portion but seated in the narrower part of the joint lying between the outer portions of the facing edge surfaces.

Another object is to provide a joint sealing device of the foregoing character wherein the lateral portions of the sealing device extend close to the opposite outer and inner faces of the panels so as to leave only shallow recesses between the panels for filling with caulking material and thus reducing the cost of such material by reducing the amount of such material required.



Another object is to provide a joint sealing device of the foregoing character wherein the outer edge surfaces of the lateral portions of the sealing device are of convex configuration, thereby imparting a concave configuration to the caulking material applied thereto within the joint, and consequently facilitating the attenuation or thinning of the central portion of the caulking material as it stretches out laterally in response to the widening of the joint due to subsequent shrinkage of the panels, thereby maintaining a tightly sealed joint which resists the entrance of water or air.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawing, wherein:

FIGURE 1 is a horizontal fragmentary cross-section through the edge portions of adjacent centrally-recessed building wall panels showing a sealing device of the present invention installed in the recess of one panel and the other panel about to be moved laterally into sealed engagement therewith;

FIGURE 2 is a view similar to FIGURE 1, but showing the panels in their final positions with the sealing device sealing the joint between their edge surfaces; and

FIGURE 3 is a perspective view of the sealing device shown in FIGURES 1 and 2.

Referring to the drawing in detail, FIGURE 1 shows the adjacent portions of a pair of external building wall panels, generally designated **10**, having facing surfaces **12** including outer surface portions **14** and a central longitudinal recess or groove **18** having slightly inclined side walls **20** and a bottom wall **22**. In their installed positions (FIGURE 2), the edge surfaces **12** of the panels **10** are separated from one another by a joint or gap **24**. The gap **24** has narrow outer portions **26** between the outer edge surfaces **14** and a widened central portion **28** between the bottom surfaces **22** of the facing recesses **18**.

Installed in each joint or gap **24** between the adjacent edge surfaces **12** of each pair of panels **10** is a wall panel joint sealing device, generally designated **30**, according to the present invention. The sealing device **30** is in the form of an elongated strip or extrusion containing a thickened hollow main or central sealing portion or rib **32** adapted to fit into the central recesses **18** and thinner tubular laterally-extending auxiliary sealing portions or fins **34** secured to and preferably integral with the central or main sealing portion **32** and joined to the opposite side walls **36** of the latter at approximately the midportion thereof. The opposite side walls **36** of the fins **34** are preferably tapered outwardly away from one another toward their junctions **38** with the auxiliary sealing portions **34**, whereas the remaining side walls **40** interconnect the side walls **36**. The tapered portions **42** of the side walls **36** conform approximately in taper or inclination to the side wall surfaces **20** of the recesses **18** so as to fit snugly together (FIGURE 2). One of the side walls **40** has a longitudinal relief groove **43** of approximately V-shaped cross-section. The auxiliary sealing portions or fins **34** have widened convex approximately semi-cylindrical outer wall portions **44** and tapering or converging opposite side walls **46** and **48** joining one another at the junctions **38**, hence are of approximately pear-shaped cross-section (FIGURES 1 and 3) and extend longitudinally from end to end of the sealing device **30**. The main sealing portion **40** has a hollow cavity or passageway **50** of approximately square cross-section and the auxiliary sealing portions **34** have hollow cavities or passageways **52** of approximately pear-shaped cross-section.

The sealing device **30** is preferably formed by extrusion of an easily compressed resilient material requiring only a very light pressure for its compression herein generically termed elastomeric material and including

resilient synthetic plastic and resilient synthetic rubber. For the purposes of the present invention, two such suitable materials have been found to be closed-cell vinyl plastic sponge (expanded vinyl plastic) or the expanded synthetic rubber widely known throughout the elastomer industry as closed-cell neoprene sponge or expanded neoprene, the word "Neoprene" being the well-known registered trademark for such material produced by E. I. du Pont de Nemours and Co. of Wilmington, Delaware.

In the installation of the sealing device **30** during the erection of the building structure, let it be assumed that the framework of the building structure has been erected and panels **10** of molded or precast concrete or stone are being applied to the framework and secured thereto. Let it be assumed, for example, that one of the panels **10** has been thus secured with its outer surfaces **12** disposed vertical. The workman then preferably slides the coating of any suitable cement or adhesive to the side and bottom walls **20** and **22** of the recess or groove **18** in the panel **10** just installed. He then unwinds a suitable length of the sealing device **30** from the coil in which such devices are conveniently supplied, and presses the central portion **32** thereof snugly into the recess **18**, whereupon the adhesive layer retains the sealing device **30** in engagement with the panel **10** with the hollow fins **34** extending laterally along the surface portions **14** of the facing edge surfaces **12**. The relative positions of the parts are as shown in FIGURE 1.

Having thus secured the sealing device **30** to the installed panel **10**, the workman now swings or slides the next adjacent panel **10** sidewise into position, with its intermediate position shown in FIGURE 1 and its final position in FIGURE 2. As the second panel **10** is swung or slid into position, its outer surface portions **14** of the edge surfaces **12** engage and flatten out the side walls **46** and **48** of the tubular fins **34** from their distended positions of FIGURE 1 to their flattened positions of FIGURE 2, while the recess or groove **18** of the second panel **10** moves into mating engagement with the central sealing device portion **32**, as shown in FIGURE 2. The workman now secures the second panel **10** in position against the building framework and proceeds in the same manner to install subsequent panels **10** with their accompanying sealing devices **30**. Because of the distinctive shape and hollow construction of the sealing devices **10** and the easily-compressed resilient material from which they are made, as described above, very little force is required to move the second panel **10** from its intermediate position of FIGURE 1 to its final position of FIGURE 2.

At any convenient time after the panels **10** and their sealing devices **30** have been thus installed, a workman caulks the outer or exposed portions of the joints **24** with any suitable one of the numerous caulking compounds available on the open market and known to those skilled in the building construction art. Due to the fact that the ends or outer walls **44** of the fins **34** are convexly rounded, the corresponding surfaces of the caulking compound engaging them become concave, thereby rendering the layer of caulking compound in the remaining or outer portion **26** of the joint **24** thinner in its midportion than at the locations where it engages the joint surface portions **14**. As a result, if the panels **10** shrink or otherwise cause the joints **24** to widen after installation, the caulking compound stretches as the fins **34** by reason of their resilience expand from their flattened positions of FIGURE 2 toward their expanded positions of FIGURE 1, maintaining a tight water and air seal in the joints **24** between the panels **10**. In this manner, a permanent seal is provided in the joints **24** between the panels **10**, and expansion or contraction of the panels **10**, with corresponding narrowing or widening of the joints **24**, can take place without breaking the seal in the joints **24**.

What I claim is:

A joint sealing device for installation in the joint between the grooved edge faces of a pair of adjacent building wall panels, said device comprising an elongated body of elastomeric material including an elongated hollow main sealing portion extending longitudinally along said body and adapted to fit into the grooves of the panel edge faces and a pair of elongated tubular auxiliary sealing portions of approximately pear-shaped cross-section in their relaxed condition lying in a lateral plane passing through said main sealing portion secured at their smaller end to and extending divergently outward in opposite directions from said main sealing portion, said auxiliary sealing portions being adapted to fit into the joint outwardly of the grooves of the building panel, the maximum dimension of said main sealing portion transverse to said lateral plane being greater than the maximum dimensions of said auxiliary sealing portions transverse to said lateral plane.

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