United States Patent

Jenner

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[54] WEATHER SEAL FOR BUILDING STRUCTURES

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[52] **U.S. Cl.** **52/403**, 52/58, 52/90, 52/468

[51] **Int. Cl.** **E04b 1/68**

[58] **Field of Search** 52/57, 58, 300, 395, 396, 393, 52/461, 468, 90, 94, 403, 282, 495, 276, 278

[56] **References Cited**

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[57] **ABSTRACT**

Two elements of a building structure, such as upright modules or upwardly converging frame sections, are separated by an elastic joint including a rigid member with a three-legged profile, the central leg of the profile lying between confronting faces of the building elements while the two other legs extend laterally thereof on the outside of the structure. An insert of elastomeric sheet material is interposed between the building elements and the adjoining lateral legs of the rigid member, a tongue of this insert enveloping the central leg thereof and penetrating under pressure into cutouts of that leg.

7 Claims, 7 Drawing Figures

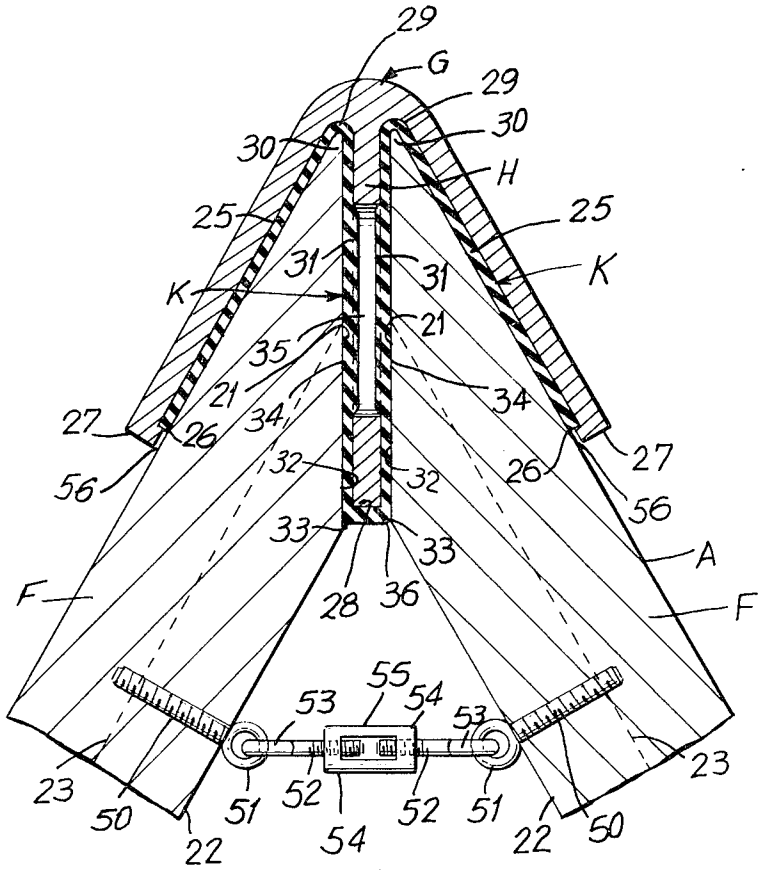


FIG. 1

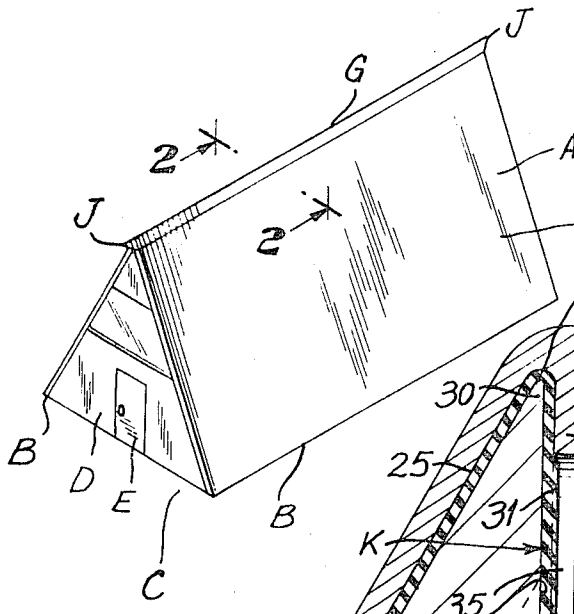


FIG. 2

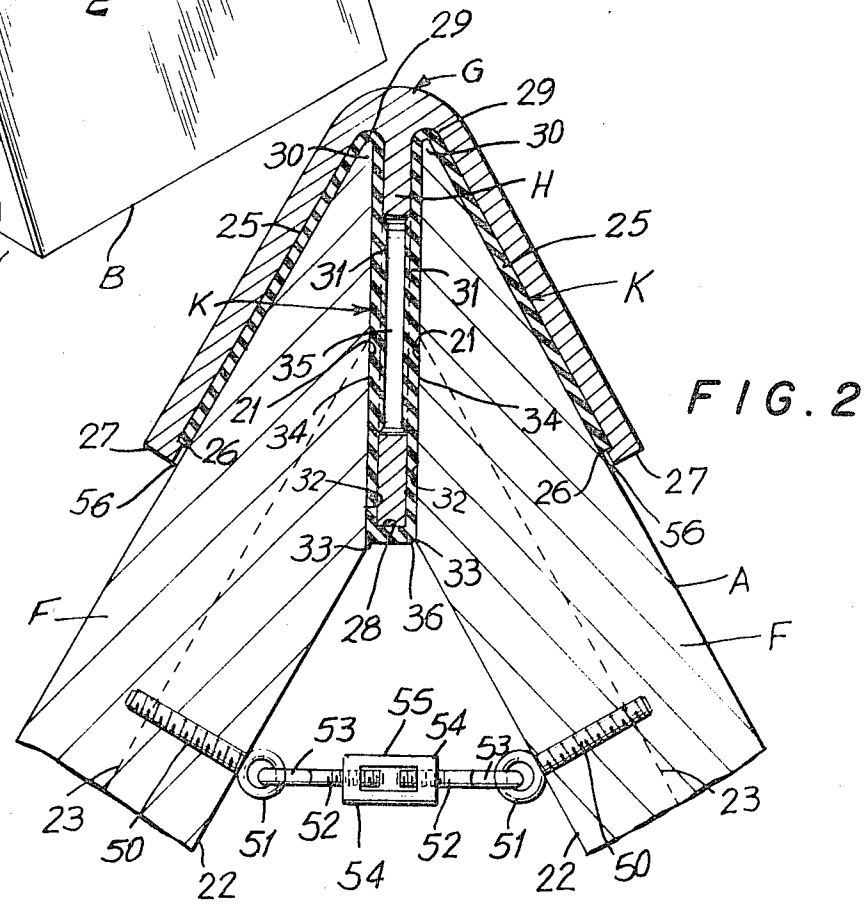
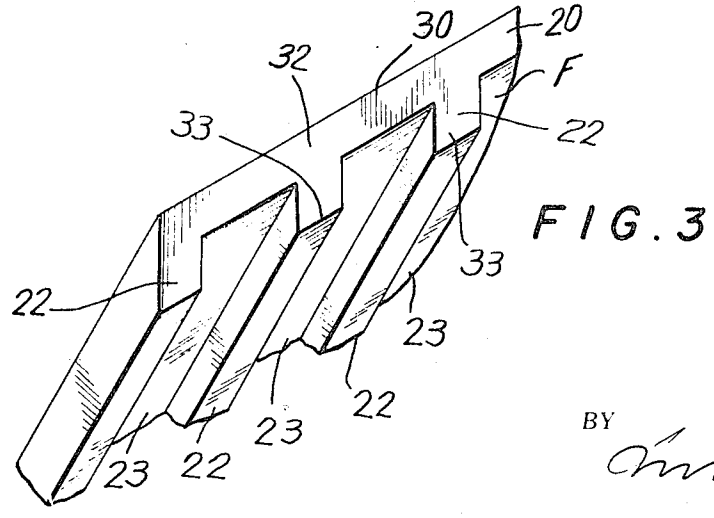


FIG. 3



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FIG. 4

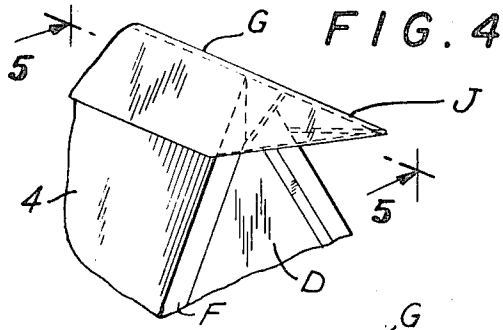


FIG. 5

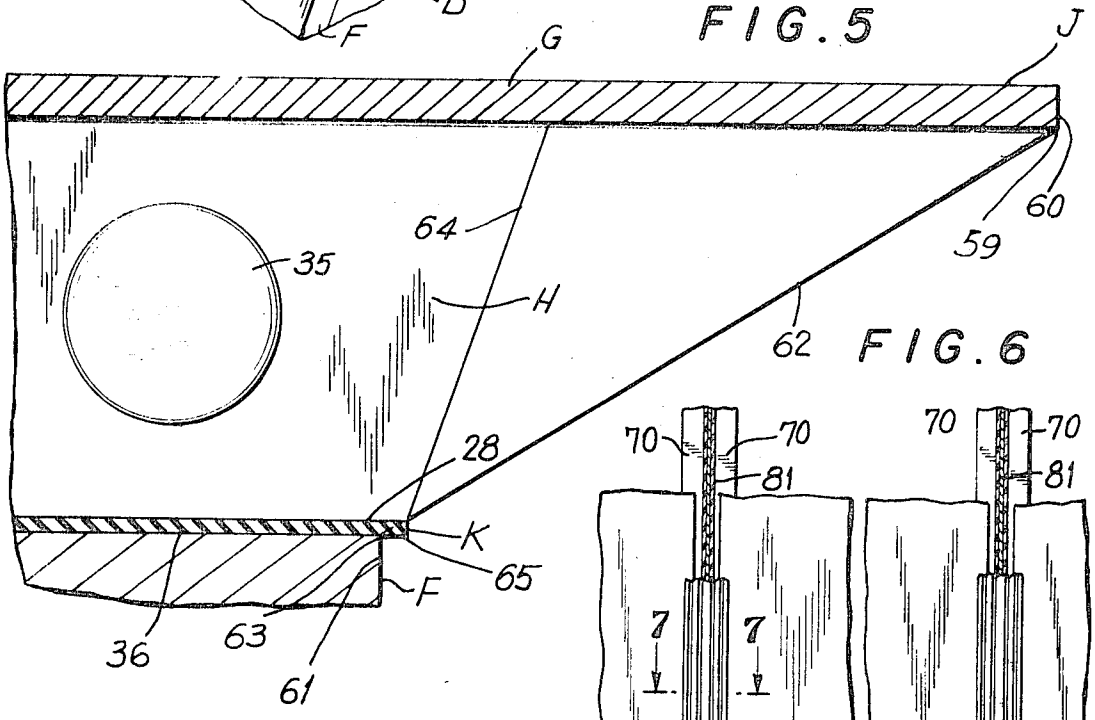
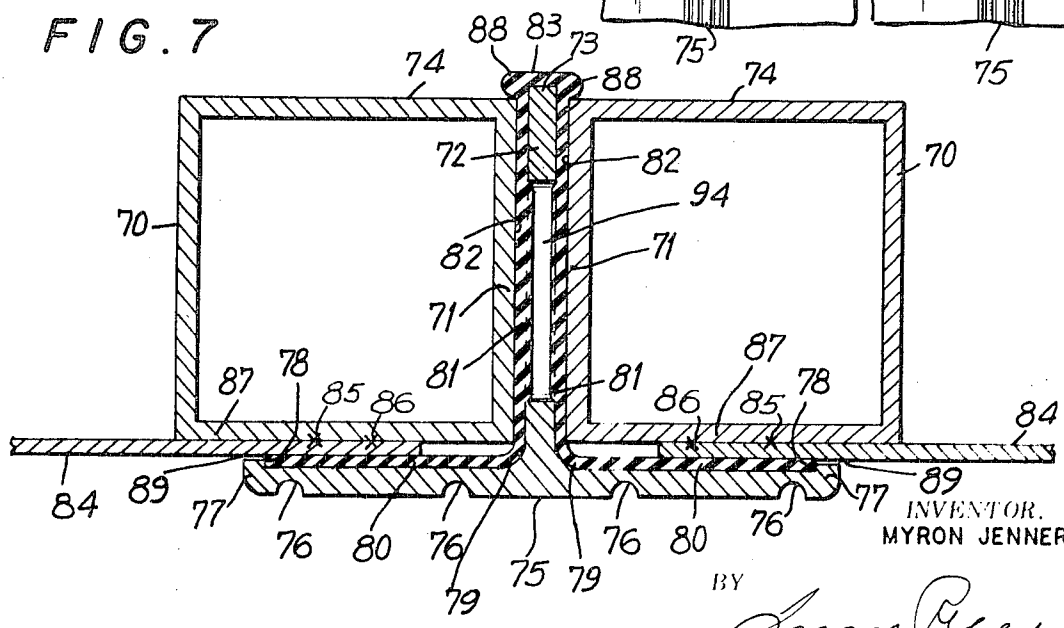


FIG. 6

FIG. 7



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WEATHER SEAL FOR BUILDING STRUCTURES

DESCRIPTION OF THE INVENTION

The present invention relates to an airtight and moisturetight weather seal for building structures.

The present invention will be particularly described in connection with the sealing together of assembled structural elements, such as vertical modules or upwardly converging sections of a so-called A-frame, but is generally useful in the sealing of assembled building structures against atmospheric penetration.

It is among the objects of the present invention to provide a convenient, readily applied, inexpensive durable seal for assembled building modules so that the junctions between confronting surfaces of such modules will be thoroughly and reliably sealed for the life of the building structure against entry of rain, snow, dirt or other atmospheric matter.

A more specific object is to provide a durable, readily applied, inexpensive and economical sealing arrangement for A-frame structures in which the top of the building adjacent the junction of the A-frames is suitably protected against entry of rain, snow, dust, smog and the like.

A further object is to provide a durable weather seal which can be readily applied to junctions in building structures, particularly in prefabricated building structures assembled on the erection side, and which will effectively prevent leakage without a need for frequent replacement or repair.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects I provide an insert gasket of elastomeric sheet material, advantageously of synthetic rubber, of substantial thickness and of limited compressibility, which envelops a rigid spacer within the narrow gap between the confronting faces of the structural elements to be joined together in a weatherproof manner.

The deformable insert of this composite joint may consist of natural rubber but I prefer to make it of synthetic elastomers derived from vinyl polymers, preferably butadiene or polystyrene polymers.

The elastic insert is advantageously covered by a protective plate, integral with the rigid spacer which may be of a three-legged cross section with its central leg projecting into the gap between the building elements and with the outer legs extending laterally to overlie respective shanks of the rubber insert.

Means are provided to compress the joint so that the gap between the confronting surfaces is completely closed. If these elements are vertical multistory stacked building modules to be assembled into a complete building structure, the vertical joints between the stacked modules also require sealing against the external atmosphere.

In connection with A-frame structures, the top junction along the apex of the A-frame also requires sealing and a similar structure is readily usable. The central leg of the rigid member, which is advantageously made of aluminum or wear-resistant plastic, may be formed with a series of openings to lessen the weight thereof and also to receive portions of the compressed elastomer. The pressing of the rubber into the openings will also hold the rigid member in place and prevent it from being squeezed upwardly and outwardly. The compression is desirably achieved by the weight of the roof and by providing fixtures pulling the adjacent structural elements together.

The flexible elastomeric material may be so dimensioned as to form thick edges at the extremities of the shanks of the insert beyond which the covering wings of the rigid member may extend without touching or abutting the top of the A-frame or the sides of the modules when the assembly is completed and the rubber insert has been compressed within the joint.

BRIEF DESCRIPTION OF DRAWING

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter more specifically described, and illustrated in the accompanying drawing, wherein like reference characters denote corresponding parts throughout the several views and in which:

FIG. **1** is a top perspective view of a weather seal according to the present invention, as applied to an A-frame construction at the top thereof, drawn to a reduced scale;

FIG. **2** is a transverse enlarged fragmentary sectional view through the top of the A-frame construction of FIG. **1**, showing the seal;

FIG. **3** is a fragmentary perspective view of a portion of the top of one of the oblique structural elements making up the A-frame;

FIG. **4** is a fragmentary top perspective end view of the end of the A-frame seal, drawn to a somewhat enlarged scale as compared to FIG. **1**;

FIG. **5** is a transverse vertical sectional view taken on the line **5**—**5** of FIG. **4** but drawn to a larger scale;

FIG. **6** is a fragmentary front-elevational view, partly in section of the sealing system as applied to vertical columns or stacks of modular building elements drawn to a reduced scale; and

FIG. **7** is a transverse vertical sectional view, on an enlarged scale, taken on the line **7**—**7** of FIG. **6**, showing the application of the seal to the adjacent elements of a modular building construction.

In FIGS. **1** and **2**, there is shown an A-frame structure A which, at its lower ends B, rests on the ground floor or slab base C and has a closed end D, with windows and a door E. The A-frame is made of two upwardly converging side members F. The seal itself consists of an inverted-V-shaped metallic member or ridge cap G with a depending central fin or blade H and outwardly projecting rain or weather shields J, the fin H constituting a central leg of the three-legged spacer profile.

Between the upper ends of the A-frame members F and the depending central fin H as well as the outer wings of the member G there is interposed a generally W-shaped rubber insert K.

The side members F are cut off obliquely at **20** (FIG. **3**) so as to present confronting parallel faces, as indicated at **21** in FIG. **2**.

In addition, the inner surfaces of the oblique side members F have ridges **22** and grooves **23** so as to grip and compress the rubber element K. This elastomeric element K has two oblique outer, downwardly extending shank portions **25**, which terminate in inwardly projecting ledges **26** above the lower edges **27** of the outer wings of rigid member G and also well above the lower edge **28** of the central fin H.

The rubber insert or gasket K extends upwardly to a point at **29** above and over the upper edges **30** of the oblique side members F, and then downwardly at **31**, along and between the beveled faces **32** of the side members F. The gasket then continues on each side of the central depending fin H to the lower edges **33** of the ribs **22**. The intermediate portion of the vertical sections **31** of gasket K are extruded at **34** into openings or cutouts **35** in the central fin H, thus holding the central fin in position.

The bight portion **36** of the gasket projects across the lower edge **28** of the fin H. To draw the two members F together at their top faces, an adjustable tie bolt may be provided, such as indicated in FIG. **2**.

This tie bolt has two embedded threaded members **50**, fitted into the ridges **22**, having eyes **51** **51** attached to eyes **53** of two threaded members **52** screwed into the ends **54** of a turnbuckle **55** to draw the two members F together at their upper ends whereby the faces **32** thereof press the rubber layers **31** against the central vertical member H.

It will be noted that the ends **27** of member G, while overlying the shanks **25** of rubber member K, are spaced from the

outer surfaces of the side members F, as indicated at **56** (see FIG. **2**). The turning of the buckle **55** may regulate the pressure of the rubber layers **31** against the faces **32** at the top of the member A, as well as against the central fin H.

In FIGS. **4** and **5** there is shown one overhanging extension J of the top of member G, serving to prevent entrance of rain, soot or other atmospheric materials into the composite joint G, K. This is accomplished by extending the top edge of member G to a point **60** well beyond the outer wall surface **61** of frame members F and cutting the sides of the member G obliquely downwardly, as indicated at **62**, to the upper corner **63** of the contacting members F.

The central fin H may be permitted to extend a short distance beyond the corner **63** and is cut slightly obliquely downwardly, as indicated at **64**. The rubber insulation K also extends slightly beyond the surface **61** of the members F, as indicated at **65**.

In an alternative form of this seal, as shown in FIGS. **6** and **7** where a number of vertical columns of stacked modules of rectangular (here square) cross section are assembled together, the modular corner legs **70** receive between their adjacent juxtapositioned faces **71***a* vertically extending central vane **72** of a T-shaped member **75** which may project inwardly a short distance, as indicated at **73**, beyond the transverse faces **74** of the corner columns **70**. The protective outer wings of this member, having vertical grooves **76** in their outer surface, is extruded or otherwise formed integrally with the central vane **72**.

The wings of member **75** have inwardly projecting terminal ledges **77**, which engage the edges **78** of a juxtaposed elastomeric member **79**, with laterally extending shanks **80** and inwardly extending portions **81** lying between the central vane or fin **72** and the confronting faces **82** of the columns **70**. These rubber portions **81** are the flanks of a V-section enveloping the inside end of the fin **72** and are integral with an adjoining bight portion **83** inwardly offset from the inside faces **74** of the columns or stacks **70**, this bight portion forming bulges **88** helping to lock the layers **81** in place.

The central vane or fin **72** has a large opening **94** to lessen its weight and to receive part of the rubber portions **81** under pressure. The exterior rubber portions **80** are pressed against outside faceplates **84** of the building which are welded in position at **85** and **86** to the outer stack faces **87**.

These columns are drawn together by means of clamping V-shaped plates—not shown—which embrace the adjacent double columns **70** and compress the rubber **81** to extrude it into the openings **84**.

It will be noted that the overlap at the end of the rubber portions **80** is such as not to result in contact between the wings of member **75** and the plates **84**, as indicated at **89**.

The points **59** and **65** in FIG. **5** have drip corners to prevent the water from entering the weather seal in either the form shown in FIGS. **1** to **5** or that of FIGS. **6** and **7**.

The rigid members G in FIG. **1** and **75** in FIG. **7** protect the gaskets K of FIG. **1** and **80** of FIG. **7** against the effects of rain, snow, ice, sunlight and ultraviolet radiation.

In order to hold the central fins H or **72** in position, the sides thereof may also be serrated or grooved or otherwise provided with a roughened surface so as to be firmly gripped by the rubber gaskets or inserts. Either of these central members, may also be provided with small protuberances or recesses over the entire face thereof, as may be the outer lateral wings of the rigid member G, **75**.

It will be noted that, in both disclosed embodiments, the elastic insert K or **79** is in the form of a unitary sheet which lines the contact surfaces of rigid member G or **75** and envelops the fin H or **72** constituted by its central arm. The ledges **26** or **27** at the free ends of the lateral wings of the rigid member, positively gripping the edges of the insert, lock the latter in position in cooperation with the interengagement between the cutouts of the fin and the adjoining flank portions of the sheet.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A seal for a junction between a pair of building elements having confronting parallel faces separated by a narrow gap and outer surfaces terminating at said confronting faces, comprising a rigid member with a three-legged profile including a central leg received in said gap and a pair of lateral legs lying flat against said outer surfaces, and a unitary sheet of elastic material enveloping said central leg and lining the sides of said lateral legs proximal to said outer surfaces; said sheet having a U-section with flanks interposed under pressure between said central leg and said confronting faces and shank portions separating said lateral legs from said outer surfaces.

2. A seal as defined in claim **1** wherein said lateral legs terminate in inwardly projecting ledges overhanging the free edges of said shank portions in positive engagement therewith and in spaced relationship with said outer surfaces.

3. A seal as defined in claim **2** wherein said central leg is provided with cutouts engaged by protruding parts of said flanks.

4. A seal as defined in claim **1** wherein said central leg projects inwardly beyond said confronting faces, said U-section having a bight portion with lateral bulges gripping said elements from a side remote from said outer surfaces.

5. A seal as defined in claim **1**, further comprising adjustable tie means engaging said elements from drawing same toward each other, thereby clamping said central leg together with said U-section between said confronting faces.

6. A seal as defined in claim **5** wherein said elements converge upwardly and have beveled upper ends constituting said confronting faces, said member straddling the top of said elements by its lateral legs, said tie means being disposed below said confronting faces.

7. A seal as defined in claim **6** wherein said tie means comprises a turnbuckle.

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