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(54) **ATTACHMENT BRACKET FOR A RAIL**

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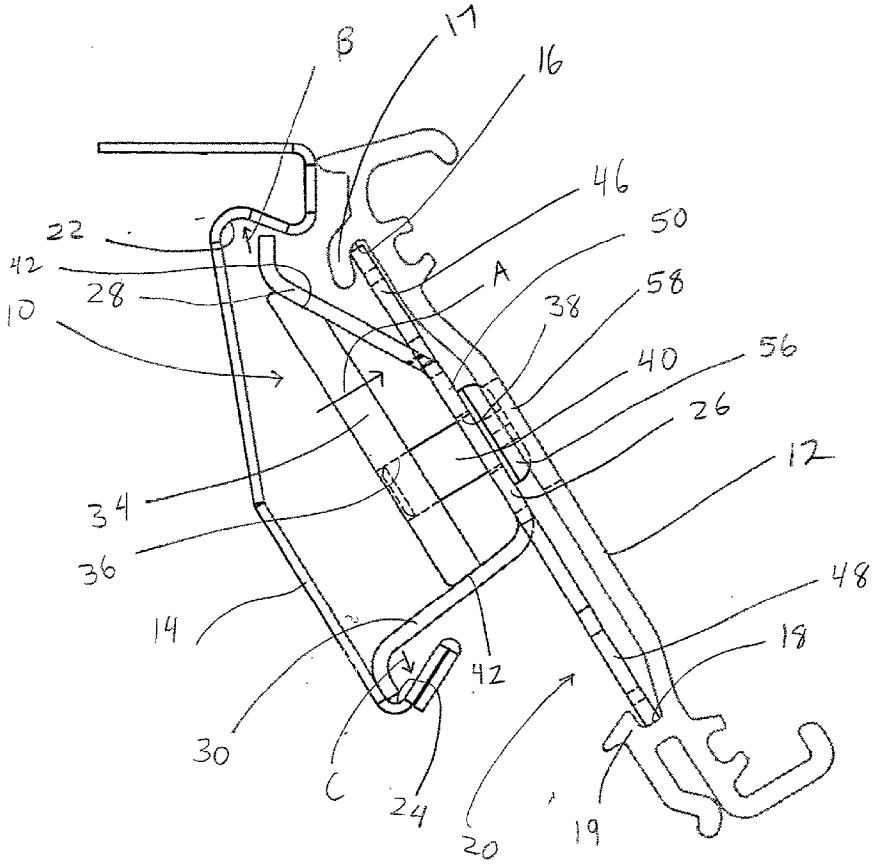
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(57) **ABSTRACT**

A bracket for coupling a rail having an upper slot and a lower slot to a shelf edge having an upper groove and a lower groove. The bracket comprises a central body portion, an upper flange extending generally upwardly from the body portion, a lower flange extending generally downwardly from the body portion, and a plate. The plate is received between the upper and the lower flanges such that as the plate is moved toward the body, the plate urges the upper flange and the lower flange into the upper and lower groove, respectively, to couple the bracket to the shelf edge. The bracket further comprises a first upper tang extending generally upwardly from the body portion and a first lower tang extending generally downwardly from the body portion, the upper tang and lower tang being shaped to be received in the upper and lower slot, respectively. At least one of the tangs has at least one tang groove therein to facilitate the attachment of the bracket to the rail.



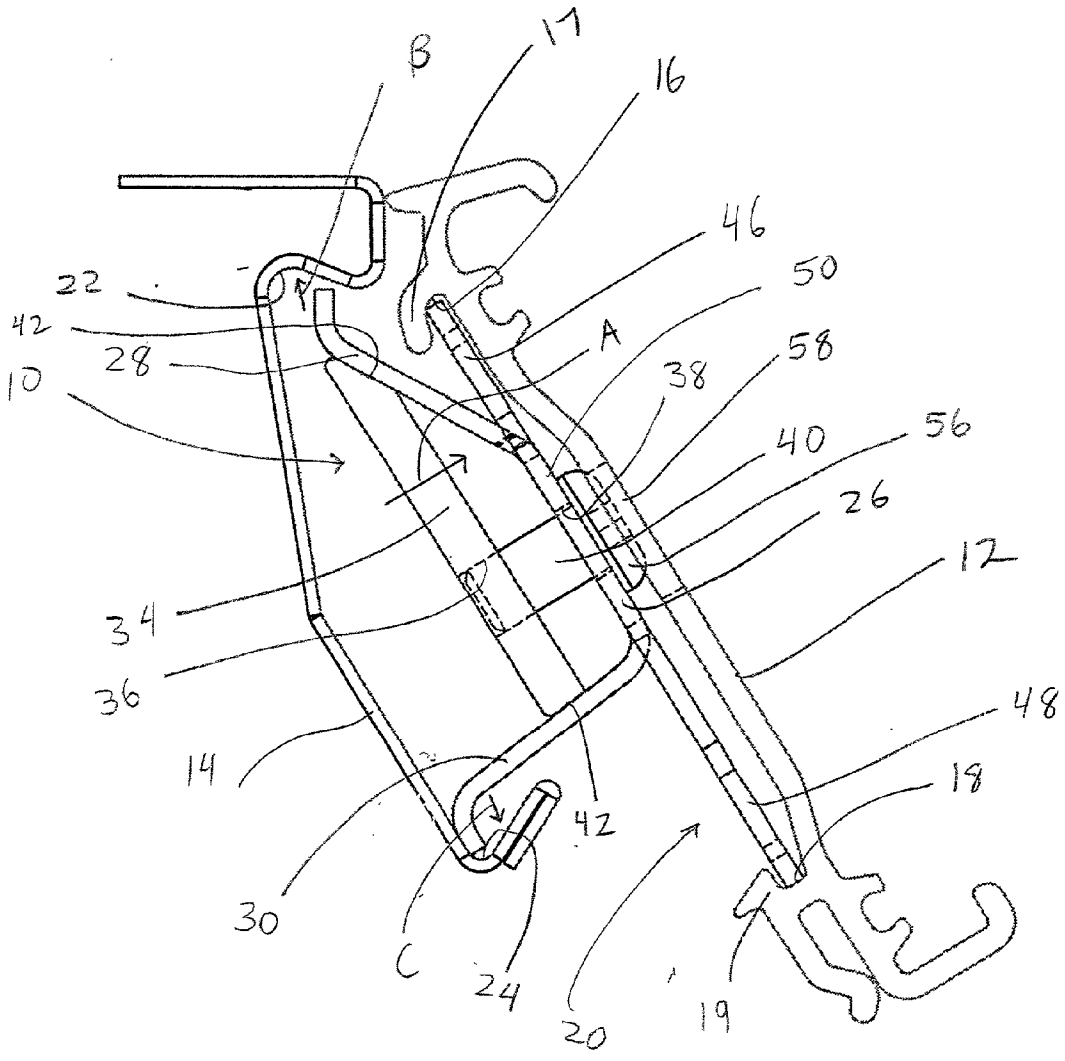

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FIG. 1

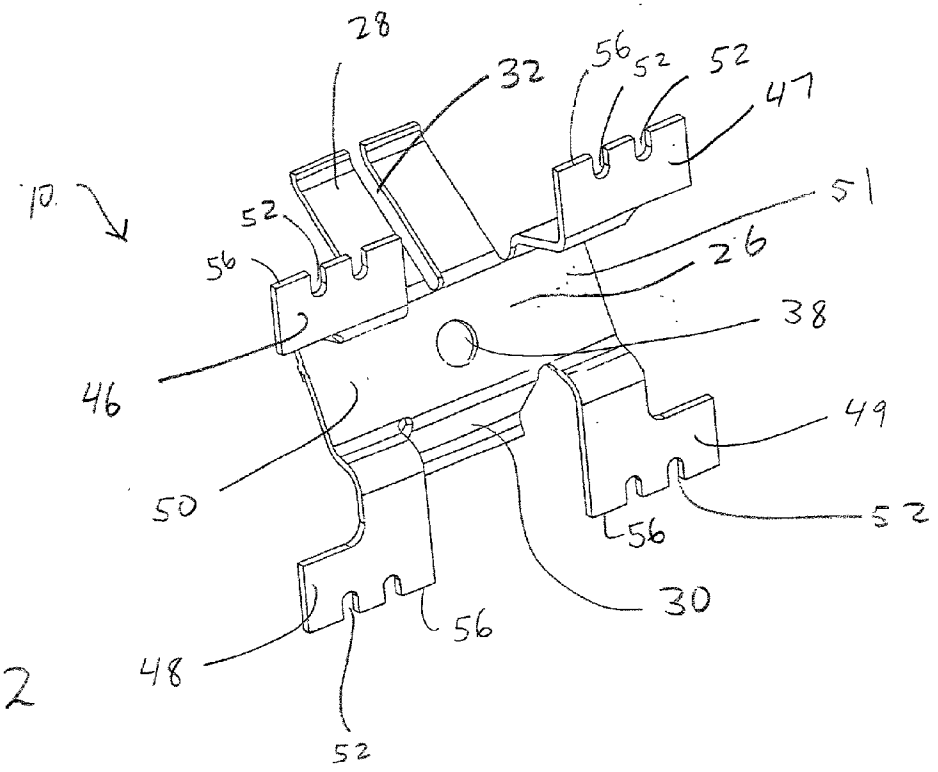

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FIG. 2

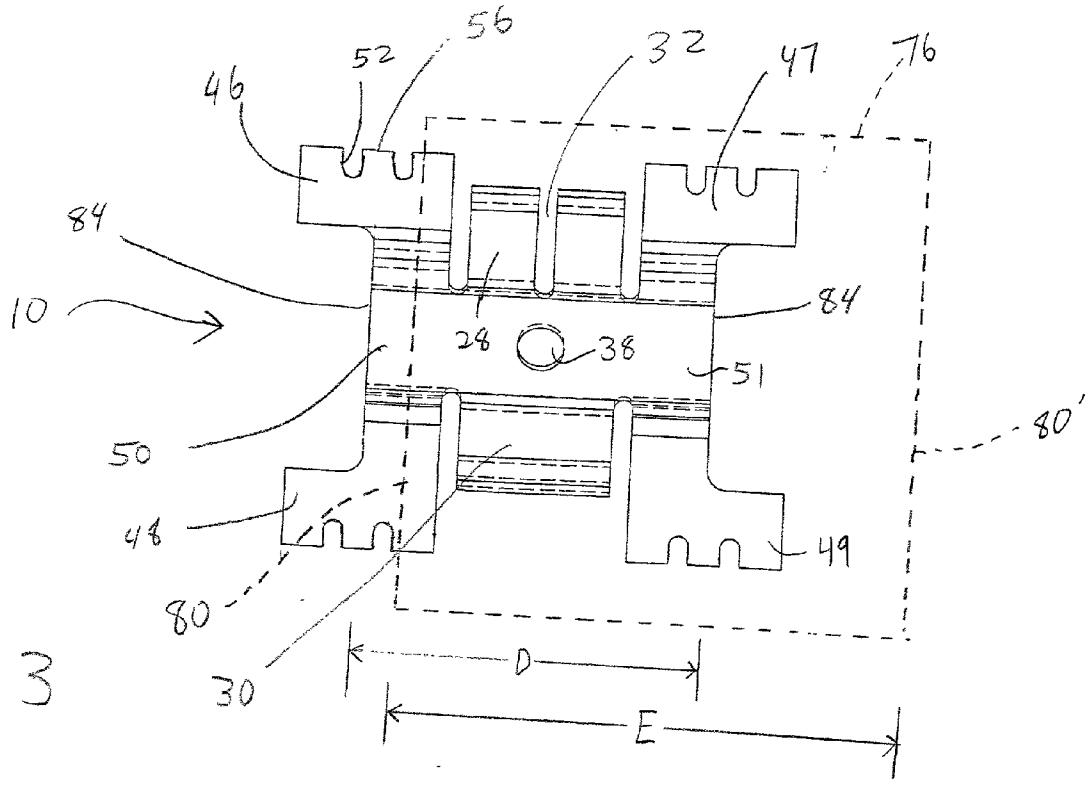

56
52
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32
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28
38
51
50
80'
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49
80
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D
E

FIG. 3

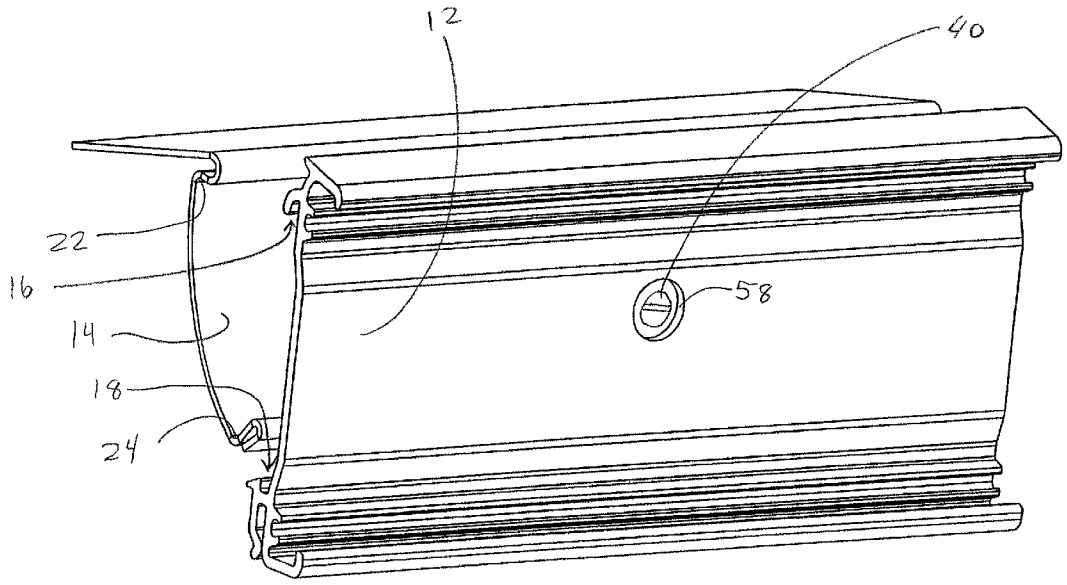


FIG 4

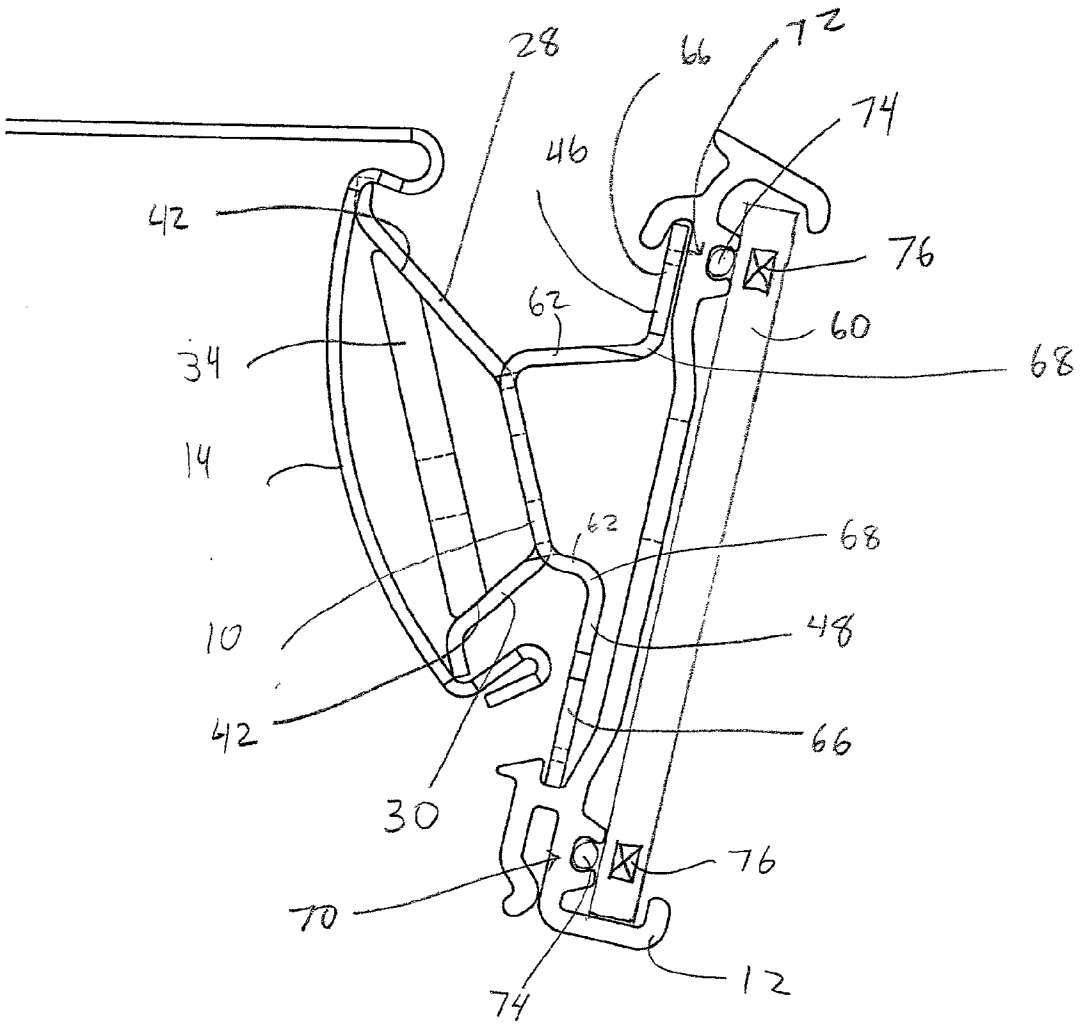


FIG 5

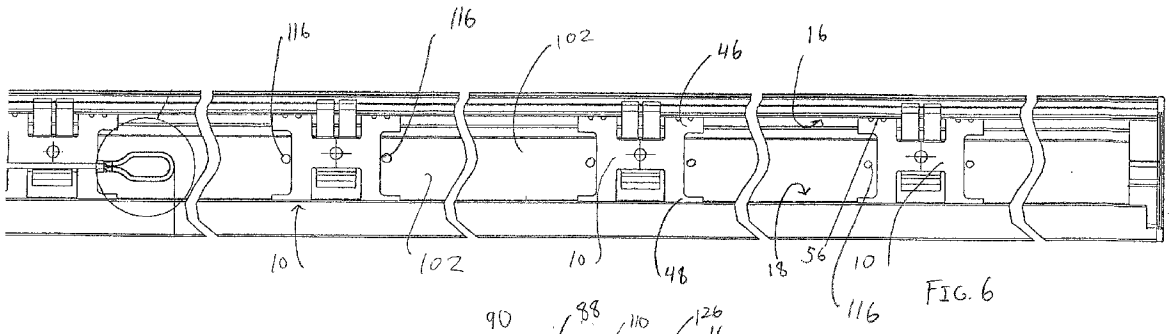

116
116
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46
16
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102
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48
18
56
10
116

FIG. 6

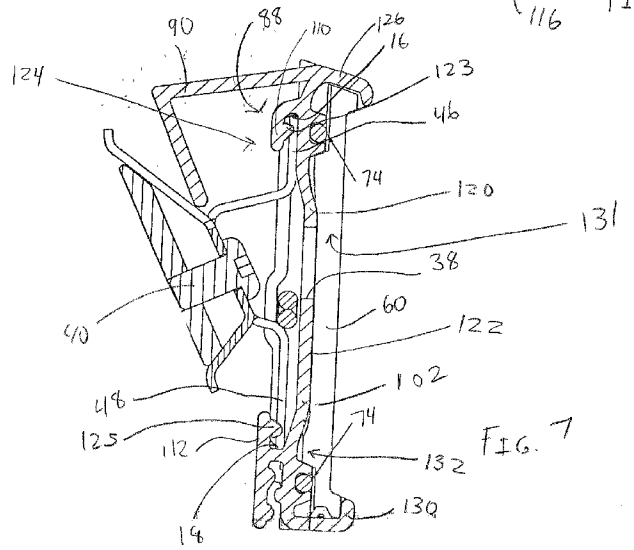

90
88
110
126
16
124
123
46
74
120
131
38
40
60
122
102
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74
125
112
132
130
18

FIG. 7

ATTACHMENT BRACKET FOR A RAIL

FIELD OF THE INVENTION

[0001] The present invention is directed to a bracket for use in an article information display system, and more particularly, to a bracket for coupling a rail to a conventional shelf edge for use in an article information display system.

BACKGROUND OF THE INVENTION

[0002] Article information display systems are commonly used to provide variable information about various products. The system typically utilizes price tags having a variable display surface, such as an LCD (liquid crystal display) surface, to electronically display information about an associated, adjacent product. For example, price, price per unit weight, or other information may be displayed on the LCD display. A system controller controls the information displayed on a price tag. In this manner, the displayed information can be updated from a central location, and the controller can be coupled to the check-out scanners to ensure that the check-out price is consistent with the displayed price. Such article information display systems may be used in supermarkets, drug stores, grocery stores, hardware stores, auto parts stores, or other settings where variable article information is desired to be displayed.

[0003] In order to install such a display system, an auxiliary rail that is designed to receive and interact with an electronic display tag is mounted to conventional store shelves. Existing store shelves are preferably retrofitted to receive the auxiliary rail thereon. The auxiliary rail includes a conductor loop running along its length, and the electronic tag includes a coil extending around its periphery. When the electronic tag is mounted with the auxiliary rail, the conductor in the rail communicates with the coil in the tag by inductive coupling to convey information from the controller to the tag.

[0004] Various brackets and attachment means have been designed for attaching an auxiliary rail to an existing conventional shelf edge. For example, U.S. application Ser. No. 09/253,338 filed Feb. 19, 1999, hereby incorporated by reference, discloses various attachment brackets. The bracket of the present invention provides several advantages over the attachment methods disclosed therein.

SUMMARY OF THE INVENTION

[0005] The present invention is a bracket that enables the installation of auxiliary rails and other components of an electronic display tag system onto conventional, preexisting store shelving assemblies. The bracket does not require any structural modification to preexisting shelving assemblies, is quickly and easily mounted to the shelf edge using conventional hand tools, and does not require removal of products from the shelves. The bracket also includes one or more rail receiving portions, such as grooves, to facilitate the attachment of the bracket to the rail, the grooves receiving melted portions of the rail when the rail is attached to the bracket by heat staking. Furthermore, the bracket of the present invention is shaped to reduce detuning of the electronic tags that are received in the rail, thereby improving the operating characteristics of the display system.

[0006] In particular, the present invention is a bracket for coupling a rail having an upper slot and a lower slot to a shelf edge having an upper groove and a lower groove. The bracket comprises a central body portion, an upper flange extending generally upwardly from the body portion, a lower flange extending generally downwardly from the body portion, and a plate. The plate is received between the upper and the lower flanges such that as the plate is moved toward the body, the plate urges the upper flange and the lower flange into the upper and lower groove, respectively, to couple the bracket to the shelf edge. The bracket further comprises a first upper tang extending generally upwardly from the body portion and a first lower tang extending generally downwardly from the body portion, the upper tang and lower tang being shaped to be received in the upper and lower slot, respectively. At least one of the tangs has at least one rail receiving portion therein to facilitate the attachment of the bracket to the rail.

[0007] The present invention is also directed to a rail for receiving an electronic display tag therein and for being coupled to a bracket. The rail comprises a central body having a front surface and a rear surface, an upper finger extending from the front surface, and a lower finger extending from the front surface and spaced from the upper finger. The upper finger and the lower finger define a channel to receive an electronic display tag therein. The rail further comprises an upper lip extending from the rear surface and defining an upper slot for receiving an upper tang of a bracket therein, the upper lip being shaped to maintain the upper tang in the upper slot. The rail further includes a lower lip extending from the rear surface and defining a lower slot for receiving a lower tang of the bracket therein, the lower lip being shaped to maintain the lower tang is the lower slot.

[0008] Other objects and advantages of the present invention will be apparent from the following description, the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] **FIG. 1** is an end view of one embodiment of the bracket of the present invention, shown mounted to a rail and a shelf edge;

[0010] **FIG. 2** is a perspective view of the bracket of **FIG. 1**;

[0011] **FIG. 3** is a front view of the bracket of **FIG. 1**;

[0012] **FIG. 4** is a perspective view of a rail coupled to a shelf edge;

[0013] **FIG. 5** is a side view of an alternate embodiment of the bracket of the present invention, shown with a rail, shelf edge, and display tag;

[0014] **FIG. 6** is a rear view of one embodiment of a rail of the present invention, with a plurality of brackets attached thereto; and

[0015] **FIG. 7** is a side view of the bracket of **FIG. 5**, shown with an alternate embodiment of the rail of the present invention, a shelf edge and a display tag.

DETAILED DESCRIPTION

[0016] As shown in **FIG. 1**, the bracket **10** of the present invention is used to couple a rail **12** to a conventional shelf edge **14**. The rail **12** includes an upper slot **16** and a lower slot **18** along its rear surface **20**, and the shelf edge **14**

includes an upper groove **22** and a lower groove **24**. The upper slot **16** is defined by an upper lip **17**, and the lower slot is defined by a lower lip **19**. The bracket **10** includes a central body portion **26**, and has an upper flange **28** extending generally rearwardly and upwardly from the body portion **26** and a lower flange **30** extending generally rearwardly and downwardly from the body portion **26**. The flanges **28**, **30** are shaped to be received in the upper and lower grooves **22**, **24** to couple the bracket **10** to the shelf edge **14**. The upper flange **28** includes a slot **32** (**FIG. 2**) to provide flexibility to the upper flange **28**. A plate **34** is received between the upper **28** and lower flanges **30**, and the plate **34** and the body **26** each include a hole **36**, **38** that receives a threaded fastener **40** therethrough. The plate **34** includes a pair of end surfaces **42** that engage the flanges **28**, **30**.

[**0017**] As shown in FIGS. **2-3**, the bracket **10** further includes first and second upper tangs **46**, **47** extending generally upwardly from the body **26**, and first and second lower tangs **48**, **49** extending generally downwardly from the body **26**. The tangs **46**, **47**, **48**, **49** are shaped to be received in the upper **16** and lower **18** slots of the rail **12** (**FIG. 1**), to couple the bracket **10** to the rail **12**. A first vertically extending arm **50** joins the first upper tang **46** and the first lower tang **48** (**FIG. 3**), and a second vertically extending arm **51** joins the second upper tang **47** and the second lower tang **49**.

[**0018**] The rail **12** is preferably made from plastic, and the bracket **10** is preferably formed of stainless steel or spring steel, although a wide variety of materials may be used, including non-metal materials. The rail **12** is preferably attached to the bracket **10** by heat staking, which entails heating the rail **12** and/or bracket **10** until portions of the rail **12** melt and conform around the bracket **10**, and allowing the melted portions to cool and harden. As shown in FIGS. **1-2**, each tang **46**, **47**, **48**, **49** preferably includes one or more grooves **52** formed therein. During heat staking operations, portions of the rail **12** surrounding the grooves **52** tends to melt and flow into the grooves **52** on the tangs **46**, **47**, **48**, **49**. In this manner, when the melted portions harden, the rail **12** is firmly coupled to the bracket **10**. The grooves **52** are preferably formed in an outer surface **56** of the tangs **46**, **47**, **48**, **49** and the grooves **52** preferably extend about 2 mm into the outer surface **56**. **FIG. 6** illustrates an alternate embodiment of the rail **102**, and as shown in **FIG. 6, a** plurality of brackets **10** may be coupled to a single rail **102** (or a rail **12**) in the above-described manner. However, it should be understood that only a single bracket may be sufficient to couple a rail **12**, **102** to a shelf edge **14**. The bracket **10** may also be attached to the rail **12**, **102** by an adhesive. The brackets **10** are preferably coupled to the rail **12** before being shipped to the customer. In this manner, the preassembled rail/bracket combination reduces the installation time for the customer.

[**0019**] In order to couple the bracket/rail assembly to a shelf edge **14**, the brackets **10** are placed loosely into the shelf edge **14** such that the upper flange **28** of each bracket **10** is received in the upper groove **22** and the lower flange **30** is received in the lower groove **24** (**FIG. 1**). The fastener **40** is then rotated to pull the plate **34** toward the body **26** of the bracket **10** (indicated by arrow A). The end surfaces **42** on the plate **34** engage the flanges **28**, **30**, thereby urging the flanges **28**, **30** into the grooves **22**, **24** (indicated by arrows B and C) until they are fixed within the grooves **22**, **24** by compression. The head **56** of the fastener **40** is preferably larger than the hole **38** in the body **26** such that the head **56** engages the body **26** during tightening to provide an opposing force during movement of the plate **34** in the direction of arrow A. A hole **58** is formed in the rail **12** to provide access to the head **56** of the fastener **40**, and the hole **58** is larger than the head **56** of the fastener **40** to allow the fastener to pass therethrough. After the rail/bracket combination is coupled to the shelf edge **14**, the hole may be covered **58** with any acceptable piece of sheet-like material, preferably an adhesive material that matches the color of the rail **12**. A generally cylindrical plug may also be received into the hole **58**. **FIG. 4** illustrates a rail **12** and shelf edge **14** after the rail **12** is attached to the shelf edge **14**.

[**0020**] In an alternate embodiment, the bracket **10** is of a two piece construction wherein the tangs **46**, **47**, **48**, **49** are made from a first piece of material, and the flanges **28**, **30** are made from a second piece of material. The second piece of material that includes the flanges **28**, **30** may be made from a thinner material, which provides more flexibility to the flanges, and is cheaper to manufacture. The first piece of material that includes the tangs **46**, **47**, **48**, **49** may be made from a relatively thicker piece of metal to provide robustness to the bracket **10**. The first piece and second pieces of material may be joined by a variety of conventional methods, including spot welding.

[**0021**] In yet another embodiment, the bracket **10** may include one or more holes in the tangs **46**, **47**, **48**, **49**. In this embodiment, when the tangs are heat staked to the rail, the melted portions of the rail **12** may flow through the holes formed in the tangs. Further alternately, dimpled or recessed portions may be formed in the tangs **46**, **47**, **48**, **49** to receive melted portions of the rail therein.

[**0022**] As shown in **FIG. 5**, the shape of the upper **46**, **47** and lower tangs **48**, **49** may be varied to change the display angle of the rail **12** and a display tag **60**. For example, the tangs may each include a generally horizontally extending section **62** and a generally vertically extending section **66** joined by an elbow **68** to vary the display angle. Thus, the bracket **10** of **FIG. 5** may be used on an upper shelf edge to angle the tag **60** downwardly for easier viewing and access. Similarly, an oppositely-angled bracket may be used to angle a rail and tag upwardly for use on a lower shelf edge. In the embodiment of **FIG. 5**, the end surfaces **42** of the plate **34** are both tapered to engage the flanges **28**, **30**.

[**0023**] As shown in **FIG. 5**, the rail **12** includes upper **72** and lower **70** channels for receiving a conductor **74** therein. The rail **12** receives a display tag **60** therein, and the tag **60** has a coil **76** extending around its periphery. The conductor **74** is used to transmit information and power to the coil **76** of the display tag **60** by means of inductive coupling. The coil **76** is electrically coupled to a capacitor, and the coil **76** and the capacitor are selected to resonate at a certain frequency, such as 50 kHz. It is known that the presence of conductive materials, such as metals, near the coil **76** may induce eddy currents in the coil **76**, which may change the inductance of the coil **76**. Thus, because the bracket **10** is preferably formed of metal, too much metal of the bracket **10** adjacent to the coil **76** can reduce the power delivered to the tag at the resonant frequency (i.e., "detune" the tag).

[**0024**] Accordingly, the bracket **10** is sized such that both of the vertical arms **50**, **51** cannot be adjacent the coil **76** at any one time. For example, **FIG. 3** illustrates the coil **76** of

the tag **60** superimposed in hidden lines over the bracket **10**, the coil **76** having a pair of vertically-extending segments **80, 80'**. It is seen that the vertical arms **50, 51** of the bracket **10** are located such that if one of the vertical arms **50** is superimposed over one of the vertically-extending segments **80** of the coil **76**, the other vertical arm **51** is not superimposed over the other vertically-extending segment **80'** of the coil **76**. In the illustrated embodiment, the horizontal distance D between the vertical arms **50, 51** is smaller than the horizontal distance E between the vertical segments **80, 80'** of the tag coil **76** for the smallest tag **60** that is expected to be used in the system. In this manner, both of the arms **50, 51** cannot simultaneously overlie the vertical segments **80, 80'** of the coil **76**, which helps to minimize detuning of the system. The vertical arms **50, 51** also each include a cutout **84** to reduce the amount of metal that is located adjacent the vertical segments **80, 80'** of the tag coil **76**. Additional cutouts may also be located in the horizontally extending portions of the bracket **10** to further reduce interference between the bracket **10** and the coil **76**. The angling of the flanges **28, 30** away from the body **26** also helps to reduce the detuning of the coil **76**.

[**0025**] When the rail **12** is mounted to the shelf edge **14**, it may be desired to provide a protective structure to prevent anyone from grabbing the top surface **88** of the rail **12** and pulling the rail **12** off the shelf edge **44** or bracket **10**. Accordingly, an alternate embodiment of the rail **102** shown in **FIG. 7** includes a cover **90** that extends generally rearwardly from a top surface **88** of the rail **12** to block access to the rear surface **20** of the rail **12**. The cover **90** blocks customers from wrapping a hand around the top surface **88** of the rail **12** to provide leverage for pulling the rail **12** off the shelf edge **14**. The cover **90** also blocks debris and other matter from falling behind the back of the rail **102**.

[**0026**] The rail **102** of **FIG. 7** includes a body **120** having a front surface **122** and a rear surface **124**. An upper finger **126** extends from the top surface **88** of the body **120**, and a lower finger **130** extends from the lower surface **132** of the body **120**. The fingers **126, 130** are shaped and located to define a channel **131** that receives a tag **60** therein. An upper lip **110** extends generally rearwardly and downwardly from the rear surface **124**, and defines an upper slot **16** that receives the upper tangs **46, 47** therein. A lower lip **112** extends generally rearwardly and upwardly from the rear surface **124**, and defines a lower slot **18** that receives the lower tangs **48, 49** therein. The upper lip **110** and lower lip **112** extend downwardly and upwardly, respectively, along the rear surface **20** of the rail **102** for a significant distance, such that the lips **110, 112** retain the upper tangs **46, 47** and the lower tangs **48, 49** of the bracket **10** therein. The lips **110, 112**, preferably extend a distance of about 0.100 to about 0.150 inches. In this manner, the bracket **10** may be received in the rail **102** without any other attachment methods such as heat staking, adhesives, or the like.

[**0027**] As shown in **FIG. 6**, the rail **102** includes a raised protrusion **116**, said as a dimple or a swedge, on either side of the bracket **10**. The protrusions **116** extend generally outwardly from the rear surface **124** of the rail **102** to limit the lateral sliding of the brackets **10** within the rail **102**. In this manner, the spacing of the brackets **10** is maintained to provide uniform support, and the fastener **40** is maintained in alignment with the hole **38** in the rail **102** to ensure access to the fastener **40**. In the embodiment shown in **FIG. 7**, the rail **102** includes a pair of upper protrusions **123** that extends generally inwardly from the upper lip **110** and a pair of lower protrusions **125** that extend generally inwardly from the lower lip **112**. The set of upper protrusions are located on either side of the the tag **60**, as are the set of lower protrusions **125**. The upper **123** and lower **125** protrusions limit the lateral sliding of the bracket **10** in the rail. The protrusions **123, 125** are preferably formed by swedging. Only a single pair of either upper **123** or lower **125** protrusion may be needed to block a single bracket **10** from sliding in the rail **102**, but both upper and lower sets are shown for illustrative purposes.

[**0028**] While the forms of the apparatus herein constitute a preferred embodiment of the invention, the present invention is not limited to the precise forms described herein, and changes may be made therein without departing from the scope of the invention.

What is claimed is:

1. A bracket for coupling a rail having an upper slot and a lower slot to a shelf edge having an upper groove and a lower groove, the bracket comprising:

a central body portion;

an upper flange extending generally upwardly from said body portion;

a lower flange extending generally downwardly from said body portion;

a plate received between said upper and said lower flanges such that as said plate is moved toward said body said plate urges said upper flange and said lower flange into said upper and lower groove, respectively, to couple said bracket to said shelf edge;

a first upper tang extending generally upwardly from said body portion; and

a first lower tang extending generally downwardly from said body portion, said upper tang and lower tang being shaped to be received in said upper and lower slot, respectively, at least one of said first tangs having at least one rail receiving portion therein to facilitate the attachment of said bracket to said rail.

2. The bracket of claim 1 wherein said rail receiving portion is a groove in said tang shaped to receive melted portions of said rail therein when said rail is attached to said bracket by heat staking.

3. The bracket of claim 1 wherein said rail receiving portion is a hole that receives melted portions of said rail therein when said rail is attached to said bracket by heat staking.

4. The bracket of claim 1 wherein said at least one first tang includes a plurality of rail receiving portions therein to facilitate the attachment of said bracket to said rail.

5. The bracket of claim 1 wherein the other of said first tangs includes at least one rail receiving portion therein to facilitate the attachment of said bracket to said rail.

6. The bracket of claim 2 wherein said tang groove is formed in an outer surface of said at least one first tang.

7. The bracket of claim 6 wherein said tang groove extends about 2 mm into said tang.

8. The bracket of claim 1 wherein said rail is shaped to receive an electronic tag having a coil, and wherein said first upper tang and said first lower tang are joined by a first arm,

and wherein said bracket further includes a second upper tang and a second lower tang extending from said body, said second upper tang and said second lower tang being joined by a second arm.

9. The bracket of claim 8 wherein said first and second arms are located such that at least one of said arms is spaced from a coil of an electronic tag received in said rail to reduce detuning of said coil when said tag is located adjacent said bracket.

10. The bracket of claim 8 wherein said coil includes a pair of laterally spaced vertical portions, and wherein the distance between said first and second arms is less than the distance between said vertical portions.

11. The bracket of claim 8 wherein each of said arms includes a cut-out to reduce detuning said coil.

12. The bracket of claim 8 wherein said rail includes a conductor for inducing a current in said coil of said electronic tag.

13. The bracket of claim 1 wherein said plate urges said flanges outwardly relative said plate when said plate is moved toward said body.

14. The bracket of claim 13 wherein said plate includes a pair of outer surfaces that engage said flanges when said plate is moved toward said body.

15. The bracket of claim 1 wherein said first tangs each include an elbow portion to angle said rail relative said bracket when said rail is mounted on said bracket.

16. The bracket of claim 1 wherein said body has a hole and said plate has a hole, and wherein said bracket further includes a threaded fastener passed through said hole in said body and through said hole in said plate such that rotation of said fastener causes said plate to move relative said body.

17. The bracket of claim 16 wherein a head of said fastener is larger than said hole in said body.

18. The bracket of claim 1 in combination with said rail.

19. The bracket and rail of claim 18 wherein said bracket is coupled to said rail by heat staking, and wherein said rail receiving portion receives portions of said rail therein.

20. The bracket and rail of claim 18 wherein said rail includes a conductor therein to exchange information and power with an electronic tag having a coil when said tag is received in said rail.

21. The bracket and rail of claim 18 further comprising a threaded fastener passed through said body and said plate such that rotation of said fastener causes said plate to move relative said body, and wherein said rail includes a hole to provide access to said fastener.

22. The bracket and rail of claim 21 wherein said hole in said rail is larger than a head of said fastener.

23. The bracket and rail of claim 22 further comprising a piece of sheet-like material covering said hole.

24. The bracket and rail of claim 22 further comprising a plug received in said hole.

25. The bracket and rail of claim 18 wherein said rail includes a cover extending generally rearwardly from a top surface of said rail to block access to a rear surface of said rail.

26. The bracket and rail of claim 18 wherein said upper slot is defined by an upper lip and said lower slot is defined by a lower lip, and wherein said upper lip is shaped to maintain said upper tang in said upper slot and said lower lip is shaped to maintain said lower tang in said lower slot.

27. The bracket and rail of claim 26 wherein said upper lip and said lower lip extend about 0.100 to about 0.150 inches along a rear surface of said rail.

28. The bracket and rail of claim 18 wherein said rail further includes a pair of protrusions to limit said bracket from sliding within said rail.

29. The bracket and rail of claim 28 wherein said protrusions extend into at least one of said upper slot and said lower slot, and wherein said bracket is received between said protrusions.

30. The bracket of claim 1 wherein said bracket is made from spring steel.

31. The bracket of claim 1 wherein said upper flange includes a generally vertically extending slot to provide flexibility to said upper flange.

32. The bracket of claim 1 wherein said first tangs are made from a first piece of sheet-like material, and wherein said flanges are made from a second piece of sheet-like material.

33. An assembly for connecting a plurality of electronic display tags to a shelf edge having an upper groove and a lower groove, the assembly comprising:

a rail having a front face including a channel for receiving electronic display tags therein, and a back side including an upper slot and a lower slot formed thereon; and

a plurality of brackets positioned along the back side of the rail, each bracket including:

(i) a body portion including a hole therethrough;

(ii) at least a first upper tang positioned in the upper slot of the rail and at least a first lower tang positioned in the lower slot of the rail, the tangs extending from the body portion and attaching the bracket to the rail;

(iii) at least one lower flange for positioning in a lower groove of a shelf edge and at least one upper flange for positioning in an upper groove of said shelf edge, the flanges extending from the body portion;

(iv) a plate positioned between the flanges and including a hole therethrough which aligns with the body portion hole;

(v) a fastener positioned through the aligned holes for holding the plate adjacent the flanges, the fastener rotatable to pull the plate into engagement with at least one of the flanges;

wherein the rail includes a plurality of holes therethrough for providing access to a head of each bracket fastener to facilitate adjustment thereof.

34. The assembly of claim 33 wherein the rail is formed of plastic and each bracket is further secured thereto via melted portions of the rail.

35. The assembly of claim 33 wherein each bracket is further secured to the rail by an adhesive.

36. The assembly of claim 33 wherein the rail includes multiples pairs of protrusions in the upper slot or in the lower slot, each bracket positioned between a respective pair of protrusions for limiting lateral movement thereof.

37. The assembly of claim 33 wherein each hole in the rail includes a front surface portion extending thereabout, and wherein the head of each bracket fastener is positioned in a

non-contacting arrangement relative to its respective, aligned rail front surface portion.

38. A rail for receiving an electronic display tag therein and for being coupled to a bracket, the rail comprising:

a central body having a front surface and a rear surface;

an upper finger extending from said front surface;

a lower finger extending from said front surface and spaced from said upper finger, said upper finger and said lower finger defining a channel to receive an electronic display tag therein; and

an upper lip extending from said rear surface and defining an upper slot for receiving an upper tang of a bracket therein, said upper lip being shaped to maintain said upper tang in said upper slot;

a lower lip extending from said rear surface and defining a lower slot for receiving a lower tang of said bracket therein, said lower lip being shaped to maintain said lower tang in said lower slot.

39. The rail of claim 38 wherein said upper lip and said lower lip extend about 0.100 to about 0.150 inches along said rear surface.

40. The rail of claim 38 further comprising a pair of spaced protrusions that extend into either said upper slot or said lower slot, said protrusions being located to receive said bracket therebetween to limit the lateral sliding of said bracket in said rail.

41. The rail of claim 40 wherein said protrusions extend from said upper lip or said lower lip.

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