(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 366 848 A2

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**21.09.2011 Bulletin 2011/38**

(51) Int Cl.:
***E04F 15/02*** *(2006.01)*

(21) Application number: **10163902.9**

(22) Date of filing: **26.05.2010**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR**
Designated Extension States:
**BA ME RS**

(30) Priority: **16.03.2010 TW 099107662**

(71) Applicant: **Tsai, Yao-Hung**
**North Dist Taichung City**
**404 (TW)**

(72) Inventor: **Tsai, Yao-Hung**
**North Dist Taichung City**
**404 (TW)**

(74) Representative: **Becker Kurig Straus**
**Patentanwälte**
**Bavariastrasse 7**
**80336 München (DE)**

## (54) Fastener for combination floor and combination floor using the same

(57) A fastener (10) for a combination floor (30) includes a base portion (20) having a through hole (202) for penetration of a nail (40) so as to secure the fastener (10) to a beam (32), two arm portions (22 , 24) extending from the same side of the base portion (20), and two tongue portions (26, 28) extending from one of the arm portions (22 , 24) along opposite directions for stopping against a male panel (34) and a female panel (36) respectively. Thus, the fastener (10) of the present invention can absorb thermal expansions of the male panel (34) and female panel (36).

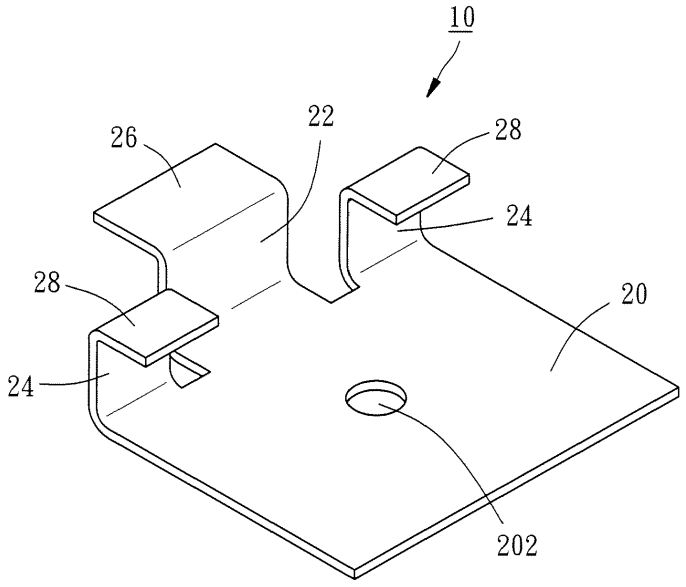


FIG. 1

EP 2 366 848 A2

## Description

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

**[0001]** The present invention relates generally to a fastener for a combination floor, and more specifically to a fastener that can absorb a thermal expansion of a combination floor.

#### 2. Description of the Related Art

**[0002]** A conventional outdoor combination floor includes a plurality of panels fixed by nails. Between two of the panels, a space is left to allow the thermal expansion of the panel due to changes in temperature. However, when the nail is nailed into the panel, the initial smooth surface of the panel is damaged and a strength weakened zone is created around the nail. The weakened zone will eventually crack and the crack will become progressively larger and larger under temperature change, causing the nail to become loose and causing break of the panels.

**[0003]** In order to eliminate the aforesaid drawbacks, UK Patent No. GB 2312687 discloses a floor fixing, including a base and two upstanding legs. Each of the upstanding legs extends vertically upwards from one of two opposite sides of the base and terminates in a tongue received in a recess provided in one side of a panel, thereby assembling the fixing with the panel without damage to the surface of the panel. However, the fixing has a right angle between the base and each of the upstanding legs to restrict the elastic deformation of the upstanding legs such that the fixing can't efficiently absorb the thermal expansion of the panels.

**[0004]** In addition, US Patent No. 7,546,717 discloses a timber covering for exteriors and interiors, comprising a plurality of strips fixed by means of fastening clips to a supporting framework. The fastening clip is located between two adjacent strips and provided with two opposite wings introduced in the grooves of two adjacent strips so as to reduce the lateral play of the strips. However, since the wings of the fastening clip are arranged in opposite direction, a large gap will be left between the strips. In order to prevent the fastening clip from being seen from the gap, and stop small objects, such as twigs, flowers, leaves, piece of paper, etc., from passing through the gap, the strips have an arrangement of mating projections and recesses to leave various gaps. In this way, the timber covering has the defects of complicated structure and high manufacturing cost.

### SUMMARY OF THE INVENTION

**[0005]** It is one objective of the present invention to provide a fastener for a combination floor, which has high elastic deformation ability to absorb thermal expansion of the combination floor panels.

**[0006]** To attain the above-mentioned objective, the fastener provided by the present invention comprises a base portion, a first arm portion, at least one second arm portion, a first tongue portion, and at least one second tongue. The first arm portion and the second arm portion both extend upwards from a side of the base portion. The first tongue portion extends horizontally from a top end of the first arm potion along a first direction away from the base potion for stopping against a female panel, and the second tongue potion extends horizontally from a top end of the second arm portion along a second direction opposite to the first direction for stopping against a male panel. By means of the aforesaid design, the fastener of the present invention can effectively absorb thermal expansions of the male panel and the female panel due to temperature variation.

**[0007]** In a preferred embodiment, the first tongue portion and the second tongue portion are coplanar, and the first tongue portion has an area greater than that of the second tongue portion; and further, a curved chamfer is formed between the base portion and the first arm portion, and between the first arm portion and the first tongue portion, and between the base portion and the second arm portion, and between the second arm portion and the second tongue portion for facilitating elastic deformation of the fastener of the present invention.

**[0008]** It is another objective of the present invention to provide a floor, which has a simple structure and is low cost in manufacturing.

**[0009]** To achieve the above-mentioned objective, the combination floor provided by the present invention comprises a male panel having a lower shoulder portion, a female panel having an upper shoulder portion facing the lower shoulder portion of the male panel and a recess adjoined with the upper shoulder portion, and the above-mentioned fastener. The base portion of the fastener is abutted against a bottom of the male panel. The first tongue portion is inserted into the recess of the female panel. The second tongue potion defines a notch with the second arm portion for engagement of the lower shoulder portion of the male panel. Accordingly, the combination floor of the present invention can be assembled easily to leave a minimum gap between the male panel and the female panel, thereby attaining the purpose of lowering the cost without complicated design.

**[0010]** Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]** The present invention will become more fully understood from the detailed description given herein below and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. 1 is a perspective view of a fastener according to a preferred embodiment of the prevent invention;
FIG. 2 is a lateral view of the fastener according to the preferred embodiment of the prevent invention;
FIG. 3 is a top view of the fastener according to the preferred embodiment of the prevent invention;
FIG. 4 is a perspective view of a combination floor using the fastener according to the preferred embodiment of the prevent invention; and
FIG. 5 is a partially sectional view of FIG. 4.

## DETAILED DESCRIPTION OF THE INVENTION

**[0012]** As shown in FIG. 1, a fastener **10** in accordance with a preferred embodiment of the present invention comprises a base portion **20**, a first arm portion **22**, two second arm portions **24**, a first tongue portion **26**, and two second tongue portions **28**.

**[0013]** The base portion **22** has a circular through hole **202** at a middle thereof.

**[0014]** Referring to FIGS. 2 and 3, the first arm portion **22** integrally extends upwards from one side of the base portion **20,** and defines a curved chamfer with the base portion **20.**

**[0015]** The second arm portions **24** integrally extend upwards from one side of the base portion **20** in such a manner that the second arm portions **24** are located on the same side as the first arm portion **22** and located at places corresponding to two opposite sides of the first arm portion **22** respectively. A curved chamfer is defined between each of the second arm portions **24** and the base portion **20**.

**[0016]** The first tongue portion **26** extends integrally and horizontally from a top end of the first arm portion **22** toward a direction away from the other side of the base portion **20**.

**[0017]** The second tongue portions **28** each extend integrally and horizontally from a top end of one of the second arm portions **24** toward a direction approaching the other side of the base portion **20**, and each define a curved chamfer with one of the second arm portions **24**. The first tongue portion **26** and the second tongue portions **28** are coplanar, and the first tongue portion **26** has an area greater than that of the second tongue portion **28**.

**[0018]** The structure of the fastener **10** is described as above, and the assembly process of a combination floor **30** using the fastener **10** of the present invention is outlined hereinafter.

**[0019]** Referring to FIGS. 4-5, the combination floor **30** comprises a plurality of beams **32**, a plurality of male panels **34**, and a plurality of female panels **36**.

**[0020]** The male panel **34** is placed on the beams 32 and has a lower shoulder portion **342** protruding from a bottom edge of one side thereof, and a concavity **344** recessed from a bottom surface thereof.

**[0021]** The female panel **36** is placed on the beams **32** in such a manner that the female panel **36** is spaced from the male panel **34**, and has an upper shoulder portion **362** protruding from a top edge of one side thereof and facing the lower shoulder portion **342** of the male panel **34** so as to define a gap **38** with the male panel **34**, and a recess **364** adjoined with the upper shoulder portion **362**.

**[0022]** When the male panel **34** and the female panel **36** are combined with each other by using the fastener **10**, the first tongue portion **26** of the fastener **10** is inserted into the recess **364** of the female panel **36** for stopping against the female panel **36**, and then a nail **40** is fastened to the beam **32** through the though hole **202** of the base portion **20** for securing the fastener **10**. Thereafter, the lower shoulder portion **342** of the male panel **34** is engaged with a notch **29** defined by the second arm portion **24** and the second tongue portion **28** such that the top surface of the base portion **20** and the bottom surface of the male panel **34** are abutted against each other, and meanwhile a head portion of the nail **40** is received in the concavity **344** of the male panel **34** without exposure, thereby completing the assembly of the combination floor **30**.

**[0023]** In conclusion, since the first arm portion **22** and the second arm portion **24** are located on the same side of the base portion **20**, the gap **38** defined between the male panel **34** and the female panel **36** can be reduced to a minimum after the assembly of the combination floor **30**, thereby preventing possible drop of small objects, such as twigs, flowers, leaves, pieces of paper, and etc., through the gap into the combination floor. Furthermore, the fastener **10** won't be seen from the gap **38** by means of the arrangement of the upper shoulder portion **362** of the female panel **36** and the lower shoulder portion **342** of the male panel **34**, so that the combination floor **30** has a smooth appearance and simplified structure to attaining the purpose of reducing manufacturing cost.

**[0024]** On the other hand, when the male panel **34** and the female panel **36** are expanded due to temperature variations, the female panel **36** will apply a force to the first tongue portion **26** of the fastener **10** to cause the deformation of the first arm portion **22** so as to absorb the thermal expansion of the female panel, and meanwhile the lower shoulder portion **342** of the male panel **34** will apply a force to cause the deformation of the second arm portion **24** of the fastener **10**. Under this circumstance, because a space is left between the female panel **36** and the first arm portion **22** of the fastener **10**, the first arm portion **22** of the fastener **10** can exhibit a high elastic deformation capacity as the force is applied thereon; moreover, the fastener **10** has the curved chamfer between the base portion **20** and the first arm portion **22**,

and between the first arm portion **22** and the first tongue portion **26**, and between the base portion **20** and the second arm portion **24**, and between the second arm portion **24** and the second tongue portion **28** for facilitating elastic deformation of the fastener **10**. As a result, the fastener **10** of the present invention can effectively absorb thermal expansions of the male panel **34** and the female panel **36**.

**[0025]** Besides, since the first tongue portion **26** is located between the second tongue portions **28**, and has an area greater than that of each of the second tongue portions **28**, the expansion force generated by the male panel **34** and the expansion force generated by the female panel **36** can be balanced with respect to each other for preventing the rotation of the fastener **10**.

**[0026]** The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

## Claims

1. A fastener (10) for a combination floor (30), **characterized in that** the fastener comprises:

   a main body having a base portion (20), a first arm portion (22), at least one second arm portion (24), a first tongue portion (26), and at least one second tongue portion (28), wherein the first arm portion (22) and the second arm portion (24) both extend upwards from a side of the base portion (20), and the first tongue portion (26) extends horizontally from a top end of the first arm potion (22) along a first direction away from the base potion (20), and the second tongue potion (28) extends horizontally from a top end of the second arm portion (24) along a second direction that is reverse to the first direction.

2. The fastener (10) as claimed in claim 1, which is **characterized in that** the fastener (10) comprises two said second arm portions (24) located respectively at two places corresponding to two opposite sides of the first arm portion (22), and two said second tongue portions (28) each extending horizontally from the top end of one of the second arm portions (24) along the second direction.

3. The fastener (10) as claimed in claim 1, which is **characterized in that** the first tongue portion (26) and the second tongue potion (28) are coplanar.

4. The fastener (10) as claimed in claim 1, which is **characterized in that** the first tongue portion (26) has an area greater than that of the second tongue portion (28).

5. The fastener (10) as claimed in claim 1, which is **characterized in that** the main body has a curved chamfer between the base portion (20) and the first arm portion (22), and between the first arm portion (22) and the first tongue portion (26), and between the base portion (20) and the second arm portion (24), and between the second arm portion (24) and the second tongue portion (28).

6. The fastener (10) as claimed in claim 1, which is **characterized in that** the base portion (20) has a through hole (202).

7. A combination floor (30), **characterized in that** it comprises:

   a male panel (34) has a lower shoulder portion (342) protruding from a bottom edge of one side thereof;
   a female panel (36) has an upper shoulder portion (362) extending from a top edge of one side thereof and facing the lower shoulder portion (342) of the male panel (34), and a recess (364) adjoined with the upper shoulder portion (362); and
   a fastener (10) fastened between the male panel (34) and the female panel (36), and having a base portion (20), a first arm portion (22), at least one second arm portion (24), a first tongue portion (26), and at least one second tongue portion (28); wherein the base portion (20) is abutted against a bottom of the male panel (34); the first arm portion (22) and the second arm portion (24) both extend upwards from a side of the base portion (20); the first tongue portion (26) extends horizontally from a top end of the first arm potion (22) along a first direction away from the base potion (20) and is inserted into the recess (364) of the female panel (36); the second tongue potion (28) extends horizontally from a top end of the second arm portion (24) along a second direction that is reverse to the first direction so as to define a notch (29) with the second arm portion (24) for engagement of the lower shoulder portion (342) of the male panel (34).

8. The combination floor (30) as claimed in claim 7, which is **characterized in that** fastener (10) comprises the two said second arm portions (24) located respectively at two places corresponding to two opposite sides of the first arm portion (22), and two said second tongue portions (28) each extending horizontally from the top end of one of the second arm portions (24) along the second direction.

**9.** The combination floor (30) as claimed in claim 7, which is **characterized in that** the first tongue portion (26) and the second tongue potion (28) are coplanar.

**10.** The combination floor (30) as claimed in claim 7, which is **characterized in that** the first tongue portion (26) has an area greater than that of the second tongue portion (28).

**11.** The combination floor (30) as claimed in claim 7, which is **characterized in that** the main body has a curved chamfer between the base portion (20) and the first arm portion (22), and between the first arm portion (22) and the first tongue portion (26), and between the base portion (20) and the second arm portion (24), and between the second arm portion (24) and the second tongue portion (28).

**12.** The combination floor (30) as claimed in claim 7, which is **characterized in that** the combination floor further comprises a plurality of beams (32) on which the male panel (34) and the female panel (36) are placed, and a nail (40) fastened to one of the beams (32) through a through hole (202) of the base portion (20) and provided with a head portion received in a concavity (344) of the male panel (34).

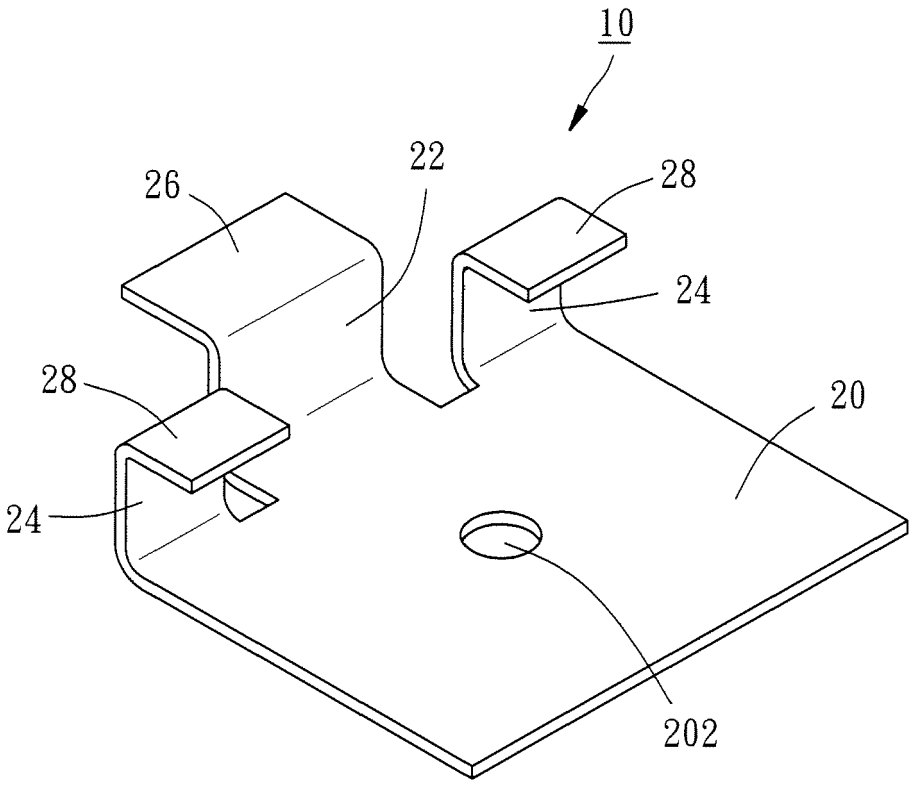


FIG. 1

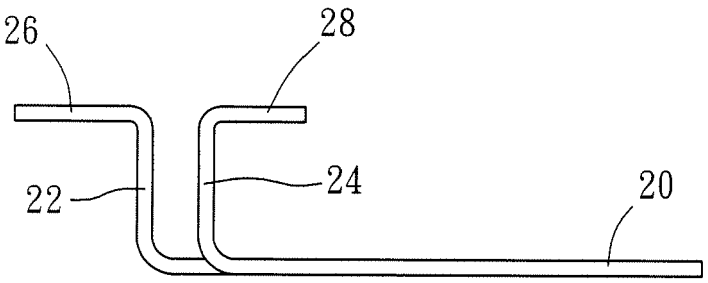


FIG. 2

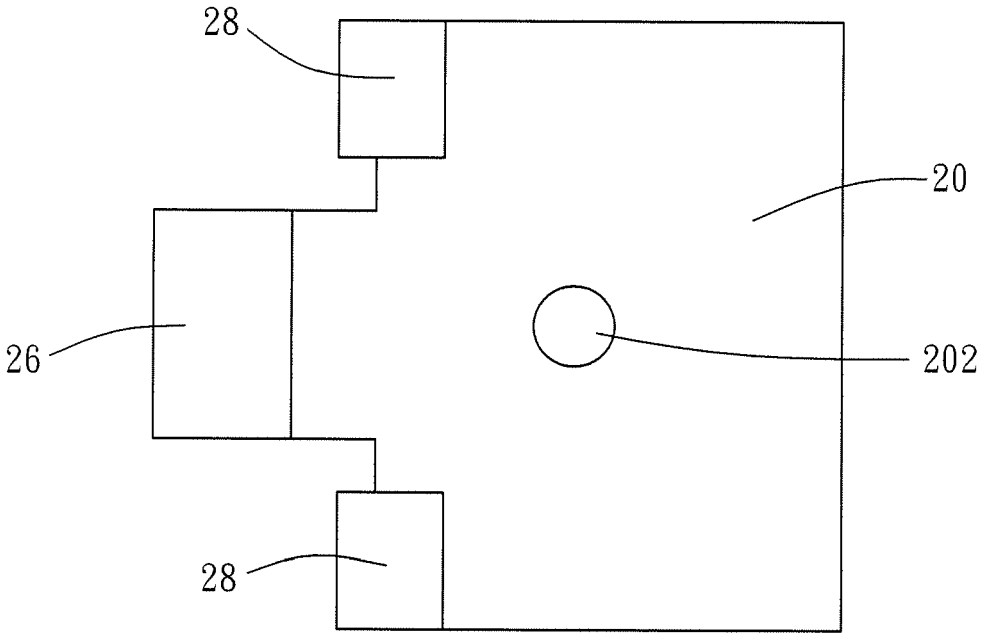


FIG. 3

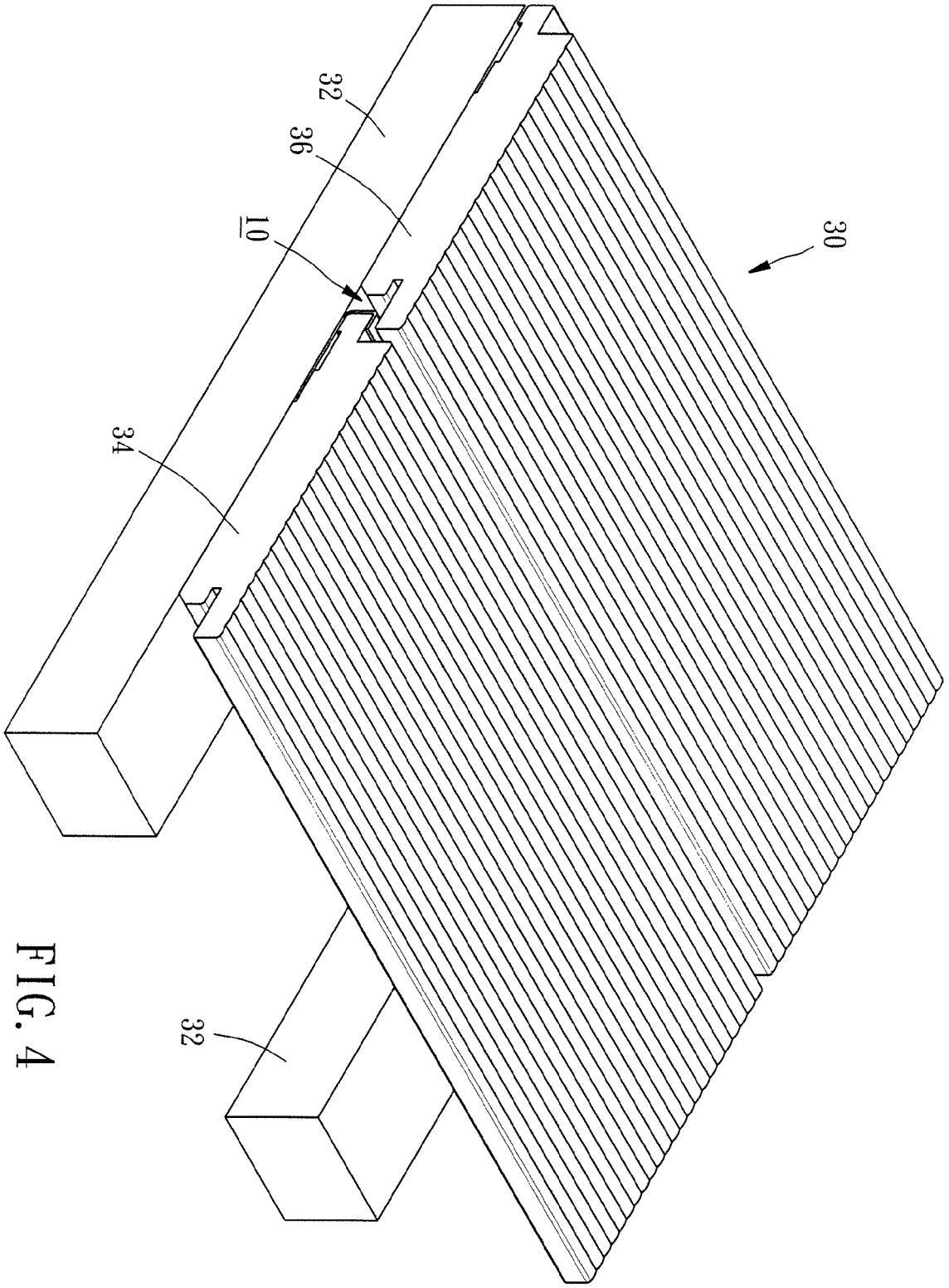


FIG. 4

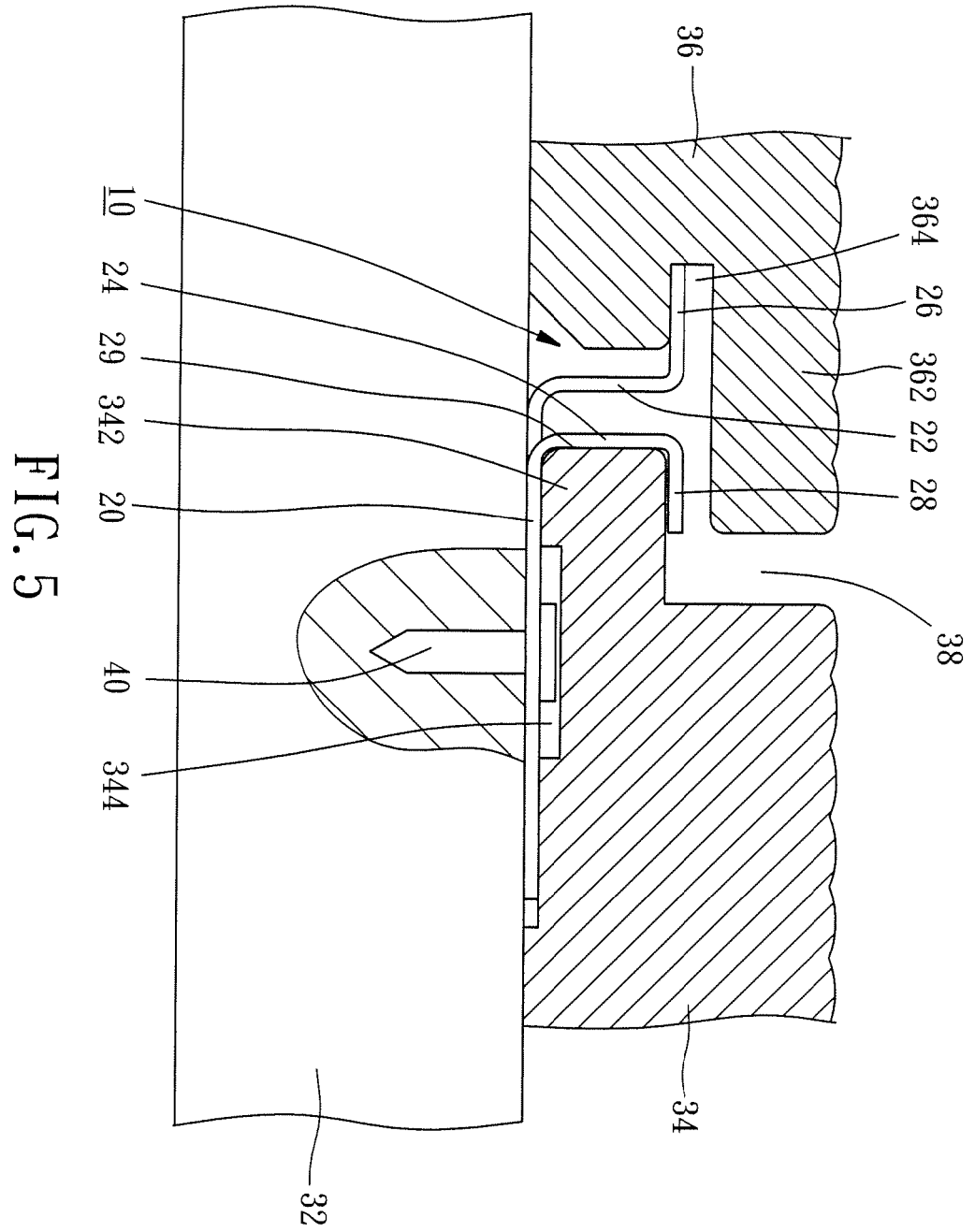


FIG. 5

## REFERENCES CITED IN THE DESCRIPTION

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

### Patent documents cited in the description


- GB 2312687 A **[0003]**
- US 7546717 B **[0004]**