

PATENT SPECIFICATION

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(54) A COUPLING DEVICE FOR CONNECTING TOGETHER TWO PARTS FORMING AN ARTICLE OF FURNITURE

(71) We, UNERMAN GREENMAN
BERGER LIMITED, a British Company of
Unity Works, Sutherland Road,
Walthamstow, London, E17 6BP, do
hereby declare the invention, for which we
pray that a Patent may be granted to us, and
the method by which it is to be performed,
to be particularly described in and by the
following statement:—

This invention relates to a coupling
device having two parts and which is
primarily intended for connecting two
sections of an article of furniture, especially
the connection of two panels in abutment
and at right-angles to one another.

Coupling devices of this kind, often
referred to as "knock-down" fittings, are
known and their principal use is in
connecting two chipboard panels forming
the side walls of cupboards or the like
structures. Fittings are known in which the
two parts have cooperating members, one of
which includes an inclined or camming
surface arranged to engage a part of the
other member such that rotation of the first
member produces a force on the second
member whereby in use the two panels
to which each member is respectfully
connected are drawn together.

In one such coupling device (British
Patent 1,447,387) the two parts comprise a
peg-like member adapted to be driven into
the end of one panel and a cylindrical
member for fitment into an aperture in the
second panel. The peg member is arranged
to engage a recess in the other part and
rotation of a screw causes an inclined
camming surface to engage a lug whereby
the first part is secured and drawn into the
second part. A disadvantage of this device is
that the peg is received in an end of the
panel and if this comprises chipboard secure
fixture therein is difficult. A further
disadvantage is that the two coupling parts
require different apertures and techniques
for fitment into respective panels.

In another coupling device one part
comprises a peg to be fixed into the edge of
one panel with the head portion projecting,
and a circular plate member received in a
recess in a second panel towards an edge
thereof with a bore through from the edge
into the recess. The plate member has a slot
around its periphery which opens into an
inwardly-facing involute curved surface. In
use the peg of one panel is passed through
the aperture in the other panel and the head
thereof engaged with the slot, whereupon
rotation of the plate member causes the
head to locate behind the involute surface
and a camming action is thereby produced.
In this device the plate member is loosely
located in the recess and the
aforementioned disadvantages apply also.

It is the purpose of this invention to
provide in a preferred construction, an
improved coupling device having two parts
each of which may be received in similarly
dimensioned apertures formed in the face of
two respective panels and in which when
said parts are assembled to the panels there
are no significantly projecting pegs or the
like, whereby the panels can be stacked for
storage or transport.

Further advantages which accrue from
specific and preferred embodiments
according to the invention are that on
locking the two parts together an expanding
force is generated within each part so that
firm fixing within the apertures in the panels
is ensured. Another advantage is that there
will be no loose fittings such as screws or the
like which require insertion before the
coupling parts can be mated.

According to this invention there is
provided a coupling device having first and
second parts adapted to be received and
retained in apertures formed in respective
furniture sections to be joined, the first part
having a rotatable plate-like member which
may be caused to project from a side surface
of the part on rotation of the member, the

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plate having a rim defining, by an inward face thereof, camming surface along its length, the second part having a recess defining a channel into which a portion of the plate member of the first part may move on rotation, rotation of said member causing the camming surface to engage a surface associated with the recess of the second part to pull the two parts together.

According to an embodiment of this invention there is provided a coupling device having first and second parts adapted to be received and retained in apertures of respective sections to be joined, the first part having a rotatable plate member which may be caused to project from a side surface of the part on rotation of the member, the plate having an upstanding rim with the inward face thereof forming a camming surface, the second part having a recess with a curved surface at the mouth defining a channel into which a portion at the plate member of the first part may move, rotation of said member causing the camming surface to bear against the radiused surface to pull the two parts together.

The first and second parts will be normally circular in plan, the side of the first part having a flat surface through which the plate may project. Each part may be divided diametrically whereby the plate member on rotation causes the first part to expand laterally along the division and the pulling force on the radiused surface acts to cause the second part to expand laterally along its division.

According to a second embodiment of this invention, there is provided a coupling device having first and second parts adapted to be received and retained in apertures of respective sections to be joined, the first part having rotatable plate member with a finger which may be caused to project from and beyond a side surface of the part on rotation of the member, the inner face of the finger being in the shape of a spiral to form a camming surface; the second part having a recess in a face surface and a rod extending across the recess under which the finger of the first part may locate, rotation of the member causing the camming surface to bear against the underside of the rod to pull the two parts together.

The first and second parts will be normally circular in plan, the side of the first part having a flat surface through which the finger may project. Each part may be divided diametrically whereby the member on rotation causes the first part to expand laterally along the division and the pulling force on the rod acts to cause the second part to expand laterally along its division.

Two embodiments according to the invention will now be described in the following with reference to the

accompanying drawings illustrating the said embodiments by way of example. In the drawings:—

Figure 1 is a front elevation of the coupling parts joined together,

Figure 2 is a cross-section along the line II—II in Figure 1 of the coupling,

Figure 3 is a plan view of the coupling part looking in the direction III—III of Figure 2,

Figure 4 is a section along IV—IV of Figure 3,

Figure 5 is a plan view of the plate member,

Figure 6 is an opened-up view of the coupling part carrying the plate member,

Figure 7 is an opened-up view of the other coupling part,

Figure 8 shows an opened-up view of the coupling part of a second embodiment,

Figure 9 shows an opened-up view of the other coupling part of the second embodiment,

Figure 10 shows an exploded view of the two coupling parts and furniture panels to be connected,

Figure 11 shows the two panels when in connection, and

Figures 12 and 13 show respectively front elevations and side view partially in section of the assembled panels and coupling parts.

Referring firstly to Figures 1 to 7 each part 1 or 2 is generally circular in plan with peripheral ridges 3 on the circular portion affording engagement with the surface of bores provided in the panels to be joined (cf Figures 10 to 13). An edge surface of the part 1 defined by a chord, is flat save for a projecting lug 13 which locates in a recess 12 on the corresponding part 2; said part 1 being further positioned by a raised lateral supporting wall 11. Each separate part 1 and 2 is moulded from a plastics material and flexibly hinged at 5, at an end of a diameter, and may be positioned when closed by a locating peg and socket 6 and 6' respectively. The plate member 9 as further illustrated in Figure 5 is provided with inwardly facing involute camming surfaces as defined by upstanding rims 14. Said plate member 9 is located within a recess 10 in part 1 so constructed as to set the axis of said plate member at an angle of approximately 10° to the plane of the surface of said part 1, and the inner surface to the rims 14 develop inwardly along the lengths to form a camming surface. Upon rotation of the plate member 9 by appropriate means: e.g. a screw head 4, provided at the centre of the member 1, the plate 9 projects through the flat edge of member 1 and passes between the radiused inner facing surfaces 15 of channel 7, the radially inner surfaces of rims 14 bearing against the surfaces 15 of projections 8, the

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surfaces being concentric with the rotational axis of plate 9.

As the camming surface progresses further into the channel 7 the two members are effectively pulled together to form a secure combination.

The coupling device is reusable and is especially suited for securing two chipboard panels mutually at right angles.

Figures 8 to 13 show a second embodiment of coupling device and also the method of securing two panels mutually at right angles using same. It will be understood that the way in which the coupling device is attached to the respective panels is the same as for the first embodiment already described.

Referring firstly to Figures 10 to 13, each part 1' or 2' is circular in plan with peripheral ridges 3' affording engagement with the inner surface of bores 4' and 5' provided in each of the panels 6' and 7'. The bores are formed by identical cutting tools. The edge surface of the part 1' is flat at 8' and allows an involutely curved finger 9' to project therethrough to enable it to pass beneath a rod 10' provided in a recess 11' of the other part 2'. The finger projects from a member 8² rotatable in the part 1'. Figure 11 shows the panels after coupling of the two parts and rotation of member 8² which pulls the parts together.

The construction of the parts and further features are described in conjunction with Figures 8 and 9.

The member 8² has its axis of rotation inclined at an angle of about 10° to the centre axis of the part 1 to enable the blade of a screwdriver to be engaged and the inner surface 9² of the finger develops inwardly along its length to form a camming surface. This surface plane is parallel to the axis of part 1 at the point where it engages the rod 10'.

The part 2 carries the rod 10' which is as shown so that the ends 10² may lie in recesses 10³ each side of the recess 11'.

Each part 1' and 2' is moulded from a plastics material and is divided diametrically but hingedly joined at an edge 12' and 13'. The part 1' has a bore 14' to receive a spigot 8³ of the member 8². The bore and spigot both have flats whereby rotation of the member 8² causes the two halves of the part 1' to be pushed outward to securely engage the bore 4'. The part 2', on the other hand, has tapered surfaces defining, on each side, the recesses 10³ and when the rod 10' is pulled upward by the applied force of the finger 9' it causes the two halves to be forced apart. Upward movement of the rod 10' is limited to about 1mm.

In a modification the member 8² is arranged to move two further metal parts,

such as plates, laterally outward to assist in securing of the part 1' into a bore.

This coupling device is reusable and is especially useful for securing chipboard panels.

In both the described embodiments the apertures or recesses may be cut into the panels using the same cutting equipment and the respective parts inserted therein, again using similar automatic insertion equipment.

WHAT WE CLAIM IS:—

1. A coupling device for securing together furniture parts, the device having first and second parts adapted to be received and retained in apertures formed in respective furniture sections to be joined, the first part having a rotatable plate-like member which may be caused to project from a side surface of the part on rotation of the member, the plate having a rim defining, by an inward face thereof, a camming surface along its length, the second part having a recess defining a channel into which a portion of the plate member of the first part may move on rotation, rotation of said member causing the camming surface to engage a surface associated with the recess of the second part to pull the two parts together.

2. A coupling device for securing together furniture parts, the device having first and second parts adapted to be received and retained in apertures of respective sections to be joined, the first part having a rotatable plate member which may be caused to project from a side surface of the part on rotation of the member, the plate having an upstanding rim with the inward face thereof forming a camming surface, the second part having a recess with a curved surface at the mouth defining a channel into which a portion of the plate member of the first part may move, rotation of said member causing the camming surface to bear against the radiused surface to pull the two parts together.

3. A coupling device for securing together furniture parts, the device having first and second parts adapted to be received and retained in apertures of respective sections to be joined, the first part having a rotatable plate member with a finger which may be caused to project from and beyond a side surface of the part on rotation of the member, the inner face of the finger being in the shape of a spiral to form a camming surface; the second part having a recess in a face surface and a rod extending across the recess under which the finger of the first part may locate, rotation of the member causing the camming surface to bear against the underside of the rod to pull the two parts together.

4. A coupling device according to any one



surfaces being concentric with the rotational axis of plate 9.

As the camming surface progresses further into the channel 7 the two members are effectively pulled together to form a secure combination.

The coupling device is reusable and is especially suited for securing two chipboard panels mutually at right angles.

Figures 8 to 13 show a second embodiment of coupling device and also the method of securing two panels mutually at right angles using same. It will be understood that the way in which the coupling device is attached to the respective panels is the same as for the first embodiment already described.

Referring firstly to Figures 10 to 13, each part 1' or 2' is circular in plan with peripheral ridges 3' affording engagement with the inner surface of bores 4' and 5' provided in each of the panels 6' and 7'. The bores are formed by identical cutting tools. The edge surface of the part 1' is flat at 8' and allows an involutely curved finger 9' to project therethrough to enable it to pass beneath a rod 10' provided in a recess 11' of the other part 2'. The finger projects from a member 8² rotatable in the part 1'. Figure 11 shows the panels after coupling of the two parts and rotation of member 8² which pulls the parts together.

The construction of the parts and further features are described in conjunction with Figures 8 and 9.

The member 8² has its axis of rotation inclined at an angle of about 10° to the centre axis of the part 1 to enable the blade of a screwdriver to be engaged and the inner surface 9² of the finger develops inwardly along its length to form a camming surface. This surface plane is parallel to the axis of part 1 at the point where it engages the rod 10'.

The part 2 carries the rod 10' which is as shown so that the ends 10² may lie in recesses 10³ each side of the recess 11'.

Each part 1' and 2' is moulded from a plastics material and is divided diametrically but hingedly joined at an edge 12' and 13'. The part 1' has a bore 14' to receive a spigot 8³ of the member 8². The bore and spigot both have flats whereby rotation of the member 8² causes the two halves of the part 1' to be pushed outward to securely engage the bore 4'. The part 2', on the other hand, has tapered surfaces defining, on each side, the recesses 10³ and when the rod 10' is pulled upward by the applied force of the finger 9' it causes the two halves to be forced apart. Upward movement of the rod 10' is limited to about 1mm.

In a modification the member 8² is arranged to move two further metal parts,

such as plates, laterally outward to assist in securing of the part 1' into a bore.

This coupling device is reusable and is especially useful for securing chipboard panels.

In both the described embodiments the apertures or recesses may be cut into the panels using the same cutting equipment and the respective parts inserted therein, again using similar automatic insertion equipment.

WHAT WE CLAIM IS:—

1. A coupling device for securing together furniture parts, the device having first and second parts adapted to be received and retained in apertures formed in respective furniture sections to be joined, the first part having a rotatable plate-like member which may be caused to project from a side surface of the part on rotation of the member, the plate having a rim defining, by an inward face thereof, a camming surface along its length, the second part having a recess defining a channel into which a portion of the plate member of the first part may move on rotation, rotation of said member causing the camming surface to engage a surface associated with the recess of the second part to pull the two parts together.

2. A coupling device for securing together furniture parts, the device having first and second parts adapted to be received and retained in apertures of respective sections to be joined, the first part having a rotatable plate member which may be caused to project from a side surface of the part on rotation of the member, the plate having an upstanding rim with the inward face thereof forming a camming surface, the second part having a recess with a curved surface at the mouth defining a channel into which a portion of the plate member of the first part may move, rotation of said member causing the camming surface to bear against the radiused surface to pull the two parts together.

3. A coupling device for securing together furniture parts, the device having first and second parts adapted to be received and retained in apertures of respective sections to be joined, the first part having a rotatable plate member with a finger which may be caused to project from and beyond a side surface of the part on rotation of the member, the inner face of the finger being in the shape of a spiral to form a camming surface; the second part having a recess in a face surface and a rod extending across the recess under which the finger of the first part may locate, rotation of the member causing the camming surface to bear against the underside of the rod to pull the two parts together.

4. A coupling device according to any one

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5 of Claims 1 to 3, wherein each part is of circular planform to be received in a bore forming the aperture in each section to be joined, the periphery of each part including projections to assist in retention of the part within the respective bore.

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10 5. A coupling device according to Claim 4, wherein the projections comprise a plurality of shoulders around the periphery of each part, each shoulder having a surface angled away from the direction of insertion of the part into the bore.

15 6. A coupling device according to any preceding claim, wherein the first part is divided along a diameter and arranged to expand along said diameter as the plate is rotated by surfaces of the plate acting on surfaces of the first parts on opposed sides of the division.

20 7. A coupling device according to any preceding claim, wherein the second part is divided along a diameter and arranged to expand along said diameter by forces acting on opposed sides of the divisions caused when the plate member of the first part engages same and the parts are drawn together.

25 8. A coupling device according to Claim 2, wherein the plate has an upstanding rim on each side thereof, the inside facing surface of each rim forming a curved camming surface.

30 9. A coupling device according to Claim 8, wherein the open face of the recess in the other part has two opposed projections, the surfaces of the projections which lie within the recess being curved to engage one with each inside facing surface of each rim.

35 10. A coupling device according to Claim 3, wherein the free ends of the rod extend laterally to engage cavities in the body of the second part each side of the recess and across which the base of the rod extends.

40 11. A coupling device according to any preceding claim, wherein the first part has a side surface part which is flat and from which the plate member projects, the flat

surface being such, as to overlie the face of the second part at the region of the recess.

12. A coupling device according to Claim 11, wherein cooperating projections and recesses are provided on the first and second parts to achieve alignment when said parts are brought together for coupling.

13. A coupling device according to any preceding claim, wherein each part includes a medial division with a hinge connection at one edge, each part being a one piece moulding of a plastics material with the hinge connection integral therewith.

14. A coupling device according to Claim 13, wherein each part is symmetrical about the medial division.

15. A coupling according to any preceding claim wherein each part includes either a rib or a groove on a face surface for cooperation with automatic insertion equipment to effect alignment on insertion into an aperture in a furniture part.

16. A coupling member according to any preceding claim, wherein the rotatable member includes lugs projecting from each side and forming the axis of rotation of the member, each lug being received in a corresponding bearing recess of the first part, one lug including a screw-head.

17. A coupling member according to any preceding claim wherein the axis of rotation of the rotatable member is inclined, with respect to the line of the junction between the two parts when joined, in a direction away from the second part.

18. A furniture coupling substantially as herein described with reference to Figures 1 to 7 of the accompanying drawings.

19. A furniture coupling substantially as herein described with reference to Figures 8 to 13 of the accompanying drawings.

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