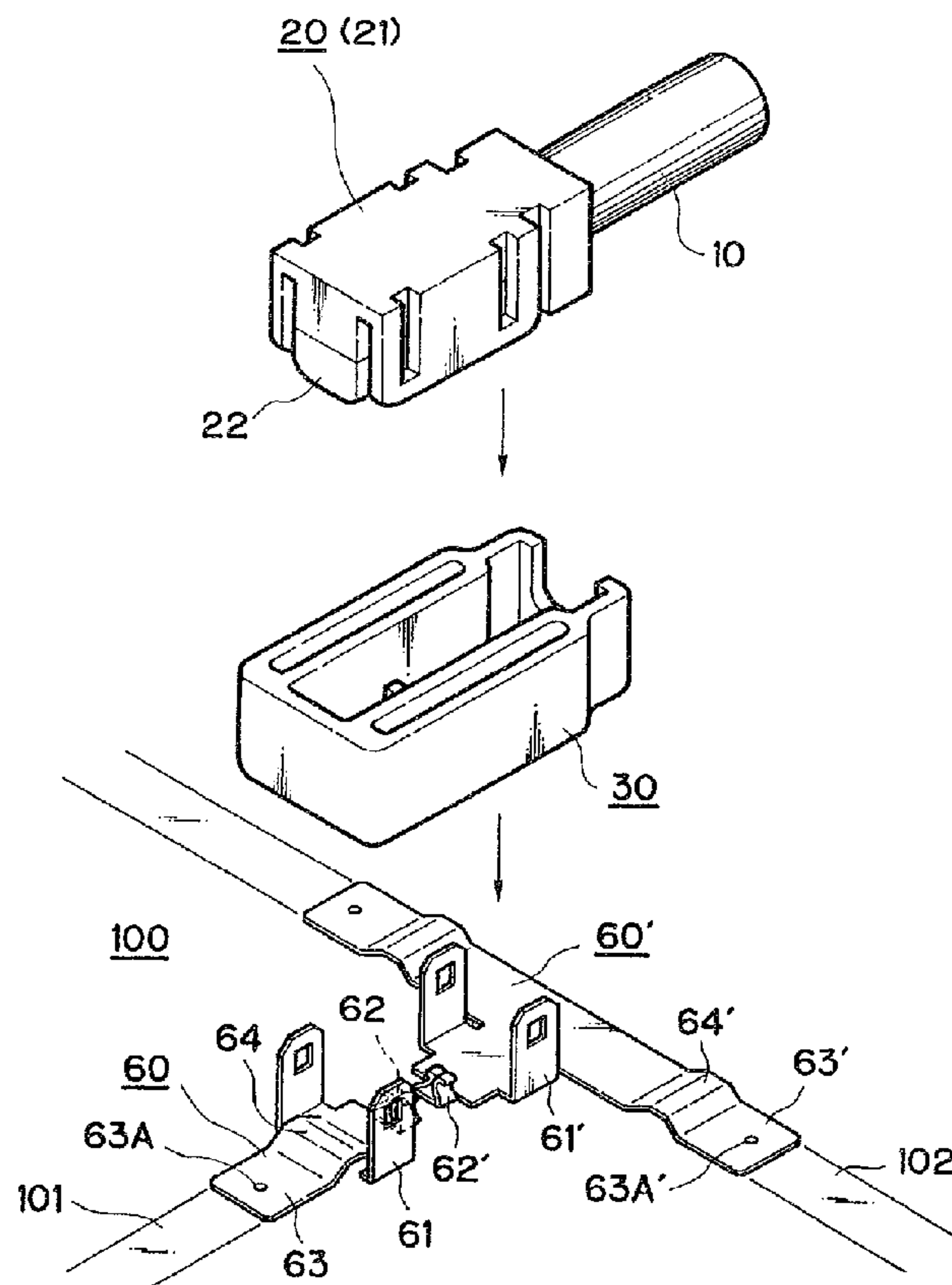




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(54) **CONNECTEUR D'ANTENNE**  
(54) **ANTENNA CONNECTOR**



(57) An antenna connector comprises a first housing for housing an end of a coaxial cable, first and second contact to be connected to a core wire and a shield wire, respectively, of the coaxial cable housed in the first housing, a second housing for housing the first housing, and a pair of conductive feeding metal plates. The feeding metal plates are arranged on and secured to a conductive antenna pattern formed on an insulative substrate and each of them has a first holder for receiving and holding the second housing and a second holder for receiving and holding the first and second contacts. When the first housing is housed in the second housing, the first and second contacts are engaged with and held by the second holder to plugably connect the coaxial cable to the antenna without disturbing an impedance matching and with a sufficient mechanical strength.

1    ABSTRACT OF THE DISCLOSURE

          An antenna connector comprises a first housing  
for housing an end of a coaxial cable, first and  
second contact to be connected to a core wire and a  
5    shield wire, respectively, of the coaxial cable  
housed in the first housing, a second housing for  
housing the first housing, and a pair of conductive  
feeding metal plates. The feeding metal plates are  
arranged on and secured to a conductive antenna pattern  
10    formed on an insulative substrate and each of them  
has a first holder for receiving and holding the  
second housing and a second holder for receiving and  
holding the first and second contacts. When the  
first housing is housed in the second housing, the  
15    first and second contacts are engaged with and held  
by the second holder to plugably connect the coaxial  
cable to the antenna without disturbing an impedance  
matching and with a sufficient mechanical strength.

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## Antenna Connector

BACKGROUND OF THE INVENTIONField of the Invention

5           The present invention relates to a connector  
for connecting an antenna and a cable, and more  
particularly to a connector for use in connecting a  
feeding cable to an antenna pattern formed on an  
insulative substrate (for example, a glass plate of  
10 a vehicle).

Related Background Art

          As means for connecting a coaxial cable to  
an antenna pattern formed on a glass plate, a method  
of taking out a core wire and a shield wire by  
15 stripping off an end of the coaxial cable and soldering  
them directly to a pair of contacts of the antenna  
pattern (one of which is a ground contact to which  
the shield wire is to be connected), and a method  
connecting the shield wire to a body (for example, a  
20 body of a car) and connecting the core wire to a  
feeding point of the antenna pattern through an  
auxiliary substrate have been known.

          In the former method, a process of stripping  
off the end of the coaxial cable and a termination-  
25 treatment of the wires take a long time, a mechanical  
strength of the contact points is weak, it is not  
possible to detach the cable from the antenna, and

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1 it is very inconvenient to carry the assembly. In  
the latter method, a sufficient impedance matching may  
not be attained because of a long distance between  
the end of the cable and the feeding point of the  
5 antenna, the mechanical strength is weak as it is in  
the first method (it is necessary to separately  
reinforce the auxiliary substrate by a tape), and it  
is not possible to detach the cable from the antenna.

10 SUMMARY OF THE INVENTION

In the light of the above, it is an object of  
the present invention to provide a connector which  
connects a coaxial cable to an antenna without  
disturbing an impedance matching with a sufficient  
15 mechanical strength and which permits the detachment  
of the cable from the antenna.

In order to achieve the above object, the  
antenna connector of the present invention comprises  
a first housing for housing an end of a cable, first  
20 and second contacts to be connected to a core wire  
and a shield wire, respectively, of the cable housed  
in the first housing, a second housing for housing the  
first housing, and a pair of conductive feeding metal  
plates arranged on and secured to a conductive  
25 antenna pattern formed on an insulative substrate and  
each having a first holder for receiving and holding  
the second housing and a second holder for receiving



1 and holding the first and second contacts.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a developed view of an embodiment  
5 of an antenna connector of the present invention,

Fig. 2 shows a perspective view of an end of  
a coaxial cable of the antenna connector of Fig. 1,

Fig. 3 shows a developed view of a first  
housing of the antenna connector of Fig. 1,

10 Fig. 4 shows a sectional view to illustrate  
a position in use of the antenna connector of Fig. 1,  
and

Fig. 5 shows a sectional view different from  
that of Fig. 4 to illustrate a position in use of the  
15 antenna connector of Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows a developed view of one embodiment  
of the antenna connector of the present invention.

20 As shown, the antenna connector comprises a first  
housing 20 for housing an end of a coaxial cable 10,  
a second housing 30 for housing the first housing 20,  
and a pair of conductive feeding metal plates 60.

Fig. 2 shows a detail of the end of the  
25 coaxial cable 10 to be housed in the first housing  
20. As shown, a first contact (press-fit or press-  
contacted contact) 40 extends through a coating 11a

1 of a core wire 11 of the coaxial cable to contact to  
the core wire, and a second contact (press-attached  
contact) 50 calks the shield wire 12. The first and  
second contacts 40 and 50 are externally accessible  
5 and have connecting members 41 and 51 protruded  
downward for connection with second holders 62 and 62'  
of a feeding metal plate to be described later. In  
the present invention, the shape and position of the  
connecting members are not restrictive.

10 As shown in Fig. 3, the first housing 20  
comprises upper and lower members 21 and 22. In the  
present embodiment, they are separate from each other,  
although they may be linked at their tops (which  
serve as a hinge).

15 Turning back to Fig. 1, the pair of feeding  
metal plates 60 and 60' are arranged in a generally  
T-shape on conductive antenna patterns 101 and 102  
formed on a glass plate 100, and they are plane-  
contacted and soldered to the conductive antenna  
20 pattern at ends 63 and 63' of branches.

The pair of feeding metal plates 60 and 60'  
have first holders 61 and 61' for receiving and  
holding the second housing 30, and second holders 62  
and 62' for accessing to the first and second contacts  
25 40 and 50 to receive and hold the first and second  
contacts (in the present embodiment, through the  
connecting elements 41 and 51 of the contacts),  
respectively.

1           The branches of the generally T-shaped feeding  
metal plates have kinks or crank-shaped grooves 64 and  
64' formed to extend outward across the ends of the  
branches. The grooves prevent preparatory solders  
5 applied to the ends of the branches of the feeding  
metal plates 60 and 60' from flowing out. Projections  
63A and 63A' are formed on the soldering planes of  
the ends of the branches which face the antenna  
patterns 101 and 102 to prevent crack which may other-  
10 wire be caused by a difference among thermal expansions  
of the feeding metal plate, to solder and the glass.

Figs. 4 and 5 show sectional views when the  
first housing 20 which houses the coaxial cable is  
housed in the second housing 30. They also show  
15 sectional views when the first housing is mounted on  
and held by the feeding metal plates 60 and 60'. Fig.  
4 shows a sectional view taken along a plane containing  
the first contact 40, and Fig. 5 shows a sectional view  
taken along a plane containing the second contact 50.

20           In Fig. 4, the first housing 20 comprises  
a first wall plane 24 which defines a top, a pair of  
opposing second wall planes 25 which define a cavity  
to house the coaxial cable and a pair of opposing  
third wall planes 26 externally of the second wall  
25 planes 25. The second housing 30 is of bottomless  
structure and comprises a pair of inner wall planes 31  
which engage with the first holders 61 and 61' (which



1 form a pair of opposing holding members) of the feeding  
metal plates 60 and 60', and a pair of outer wall  
planes 32 which are externally of the pair of inner  
wall planes 31 and engage with the third wall planes  
5 26 of the first housing.

As shown in Fig. 4, the first contact 40 which  
is press-contacted to the core wire 11 of the coaxial  
cable is connected to and held by the second holder  
62 of the feeding metal plate (which forms a pair of  
10 leaf springs) through the connecting member (downwardly  
extending tongue) 41.

As shown in Fig. 5, the second contact 50  
which is press-attached to the shield wire 12 of  
the coaxial cable is connected to and held by the  
15 second holder 62' of the feeding metal plate (which  
forms a pair of leaf springs) through the connecting  
member (downwardly extending tongue) 51.

When the antenna connector of the present  
invention is to be actually used, the feeding metal  
20 plates 60 and 60' are arranged on and secured to the  
conductive antenna pattern on the glass plate, and the  
second housing 30 is mounted on and held by the feeding  
metal plates 60 and 60'. On the other hand, the  
first housing 20 which houses the end of the coaxial  
25 cable 10 is housed in the second housing 30 mounted  
on and held by the feeding metal plates 60 and 60'.  
Thus, the first and second contacts 40 and 50 connected



1 to the core wire and the shield wire of the coaxial  
cable, respectively, are engaged with and held by the  
second holders 62 and 62' of the feeding metal plates.

Since the feeding metal plates 60 and 60'  
5 of the antenna connector of the present invention are  
of generally T-shape, the metal plates may make plane-  
contact to the glass plane at at least three points  
on the branch of each of the metal plates. Accordingly,  
the connector can be attached to the glass plane with  
10 a large mechanical strength.

Further, in the antenna connector of the  
present invention, the first housing 20 which houses  
the coaxial cable 10 is housed in the second housing  
30. Accordingly, the contact pair 40 and 50 which  
15 are connected to the core wire and the shield wire of  
the coaxial cable 10, respectively, are protected  
from the external.

The second housing 30 is held by the feeding  
metal plate formed on the glass plate to form the  
20 connector on the glass plate, the first housing 20  
which houses the coaxial cable 10 is used as the  
connector for the cable, and the cable connector and  
the connector on the glass plate are plugged in and  
out so that the attachment and detachment of the  
25 cable connector and the antenna connector are attained.

When the first housing 20 is housed in the  
second housing 30, the first and second contacts 40 and

1 50 are connected to the second holders 62 and 62'  
of the feeding metal plates 60 and 60'. Thus, the  
second housing 30 serves as a guide to correctly guide  
the contacts 40 and 50 to the holders 62 and 62' of  
5 the metal plates. Accordingly, when the cable  
connector is attached to or detached from the  
connector on the glass plate, there is no risk of  
twisting the holders by the contacts 40 and 50.

As seen from Figs. 4 and 5, in the antenna  
10 connector of the present invention, the distances  
between the first contact 40 which press-contacts  
the core wire of the cable and the metal contact 60  
for receiving and holding the contact 40 and between  
the second contact 50 which press-attaches the shield  
15 wire and the metal plates 60' for receiving and holding  
the contact 50 may be sufficiently short. Accordingly,  
a sufficient impedance matching is attained in the  
antenna connector which handles a high frequency  
electromagnetic wave, and the connection with a small  
20 standing wave is attained.

In the embodiment of the present invention, the  
antenna which is connected to the antenna pattern  
formed on the window glass of the vehicle has been  
explained although the present invention is not  
25 limited thereto but various modifications such as the  
connection with the antenna pattern formed on other  
insulative substrate may be made.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE  
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

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1. An antenna connector comprising:

a first housing for housing an end of a feeding  
cable;

5

first and second contacts to be connected to a  
core wire and a shield wire, respectively, of the  
cable housed in said first housing;

a second housing for housing said first housing;

and

10

a pair of conductive feeding metal plates being  
arranged on and secured to a conductive antenna  
pattern formed on an insulative substrate and each  
having first hold means for receiving and holding  
said second housing and second hold means for receiving  
15 and holding said first and second contacts.

15

2. An antenna connector according to Claim 1

wherein said feeding metal plates are of general T-  
shape and ends of branches thereof are soldered to

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said conductive antenna pattern.

3. An antenna connector according to Claim 2

wherein the branches of said feeding metal plates  
each has a kink or crank-shaped groove formed to

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outwardly protrude across the end of the branch.

4. An antenna connector according to Claim 3



1 wherein the ends of the branches of said feeding metal  
plates each has a projection facing said conductive  
antenna pattern.

5 5. An antenna connector according to Claim 1  
wherein said second holder is formed closely to the  
opposing sides of said feeding metal plates.

6. An antenna connector according to Claim 2  
10 wherein said second holder is formed closely to the  
opposing sides of said feeding metal plates.

7. An antenna connector according to Claim 3  
wherein said second holder is formed closely to the  
15 opposing sides of said feeding metal plates.

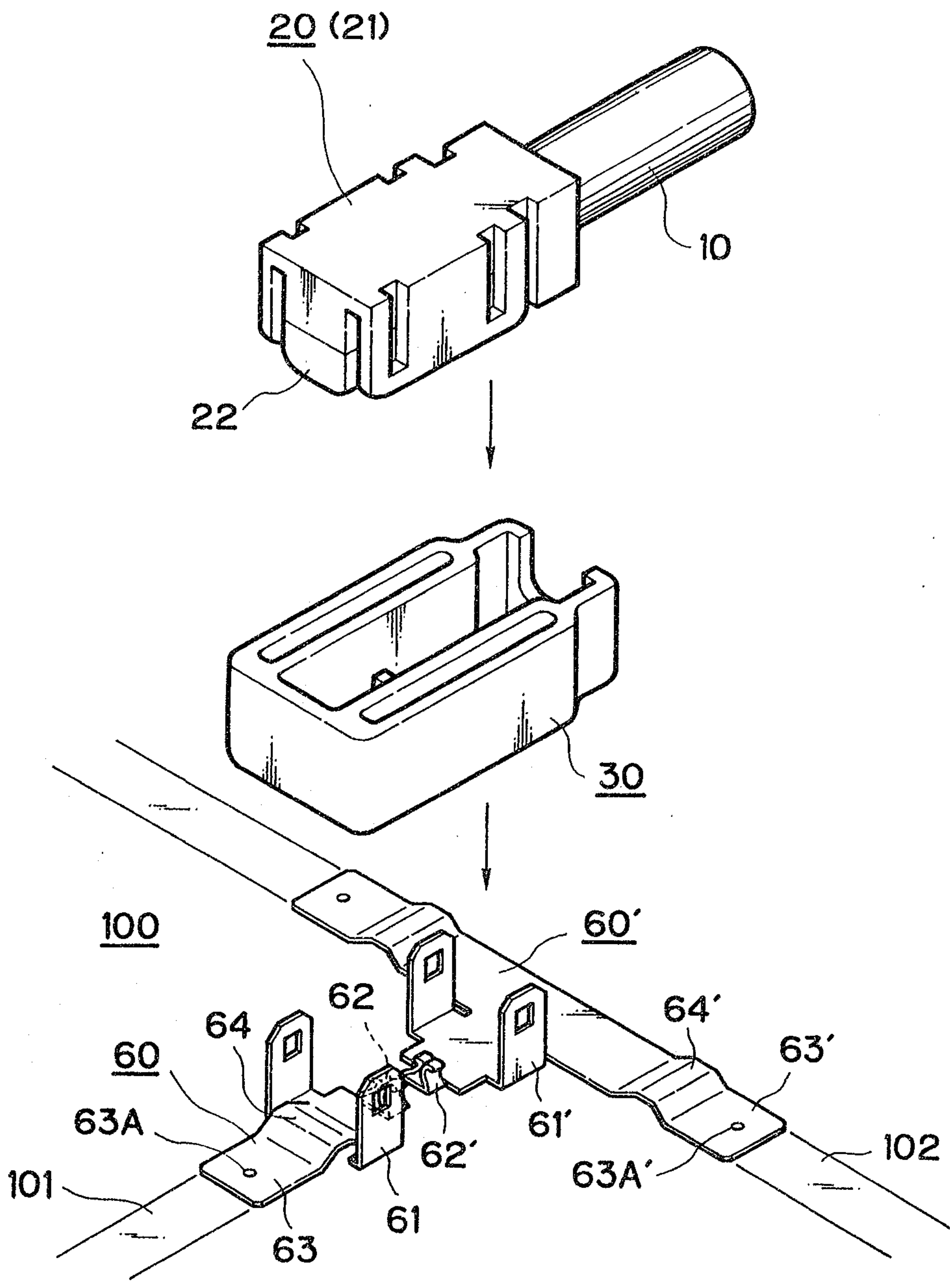
8. An antenna connector according to Claim 4  
wherein said second holder is formed closely to the  
opposing sides of said feeding metal plates.

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FIG. 1



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FIG. 2

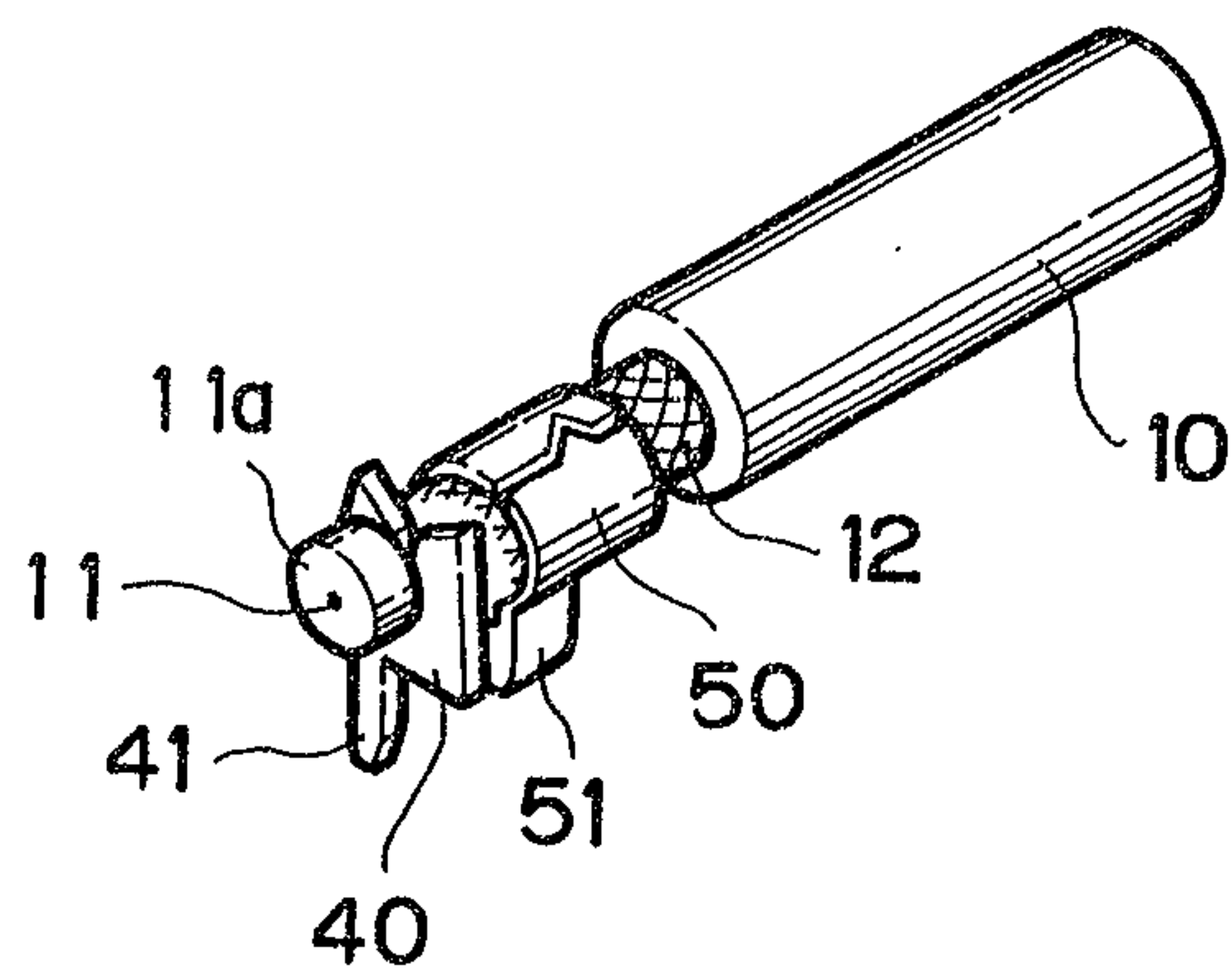


FIG. 3

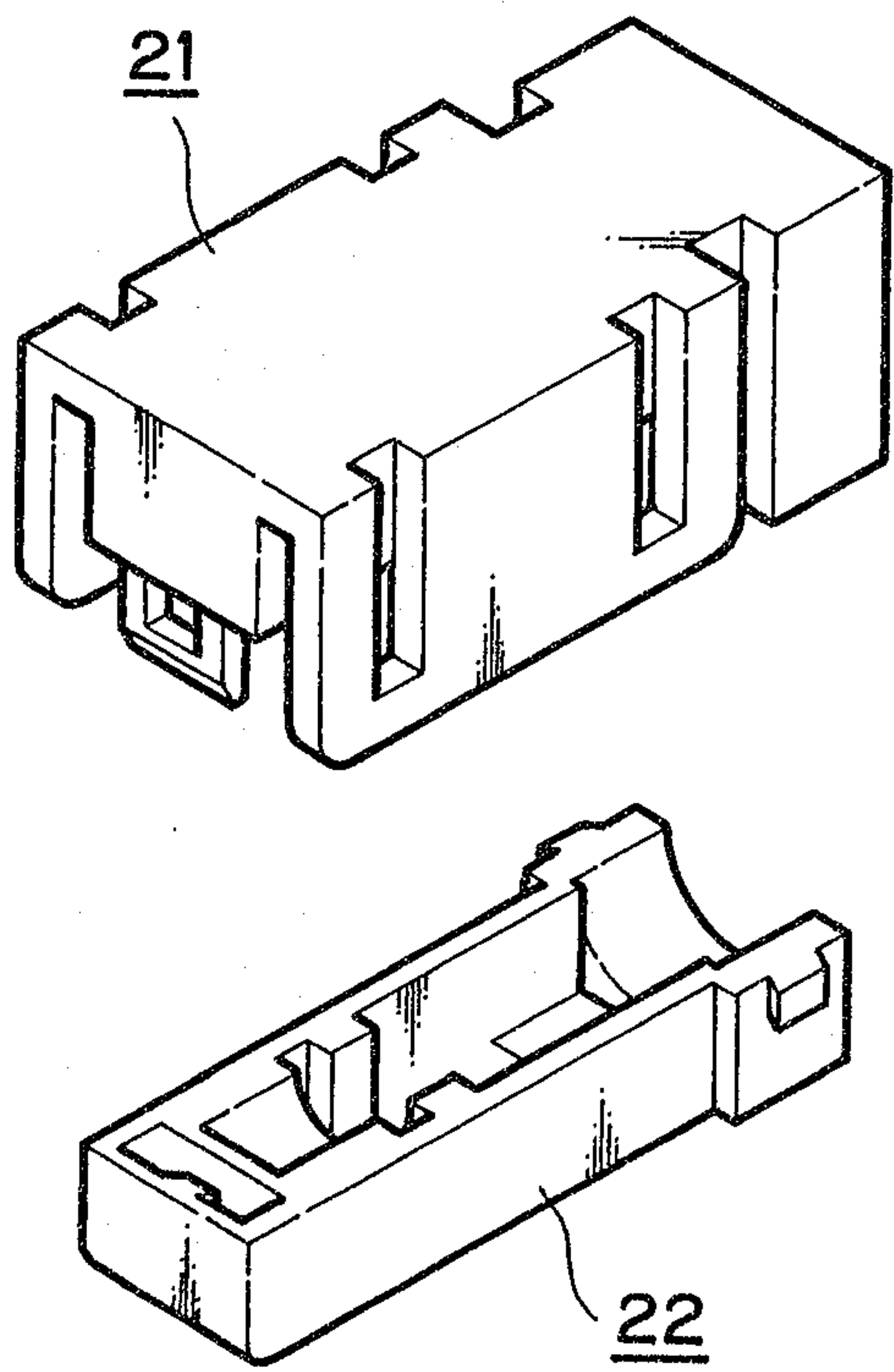




FIG. 4

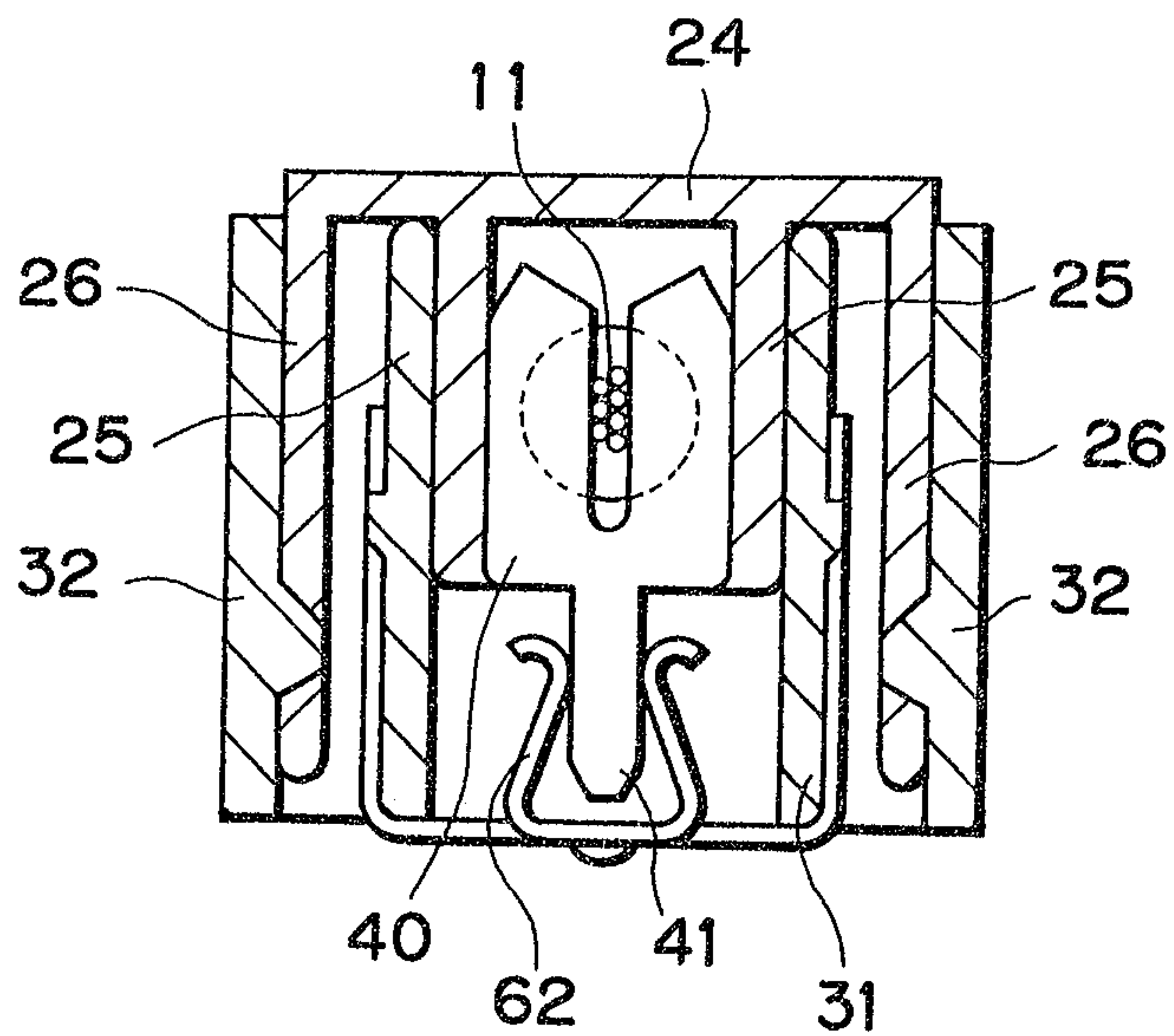
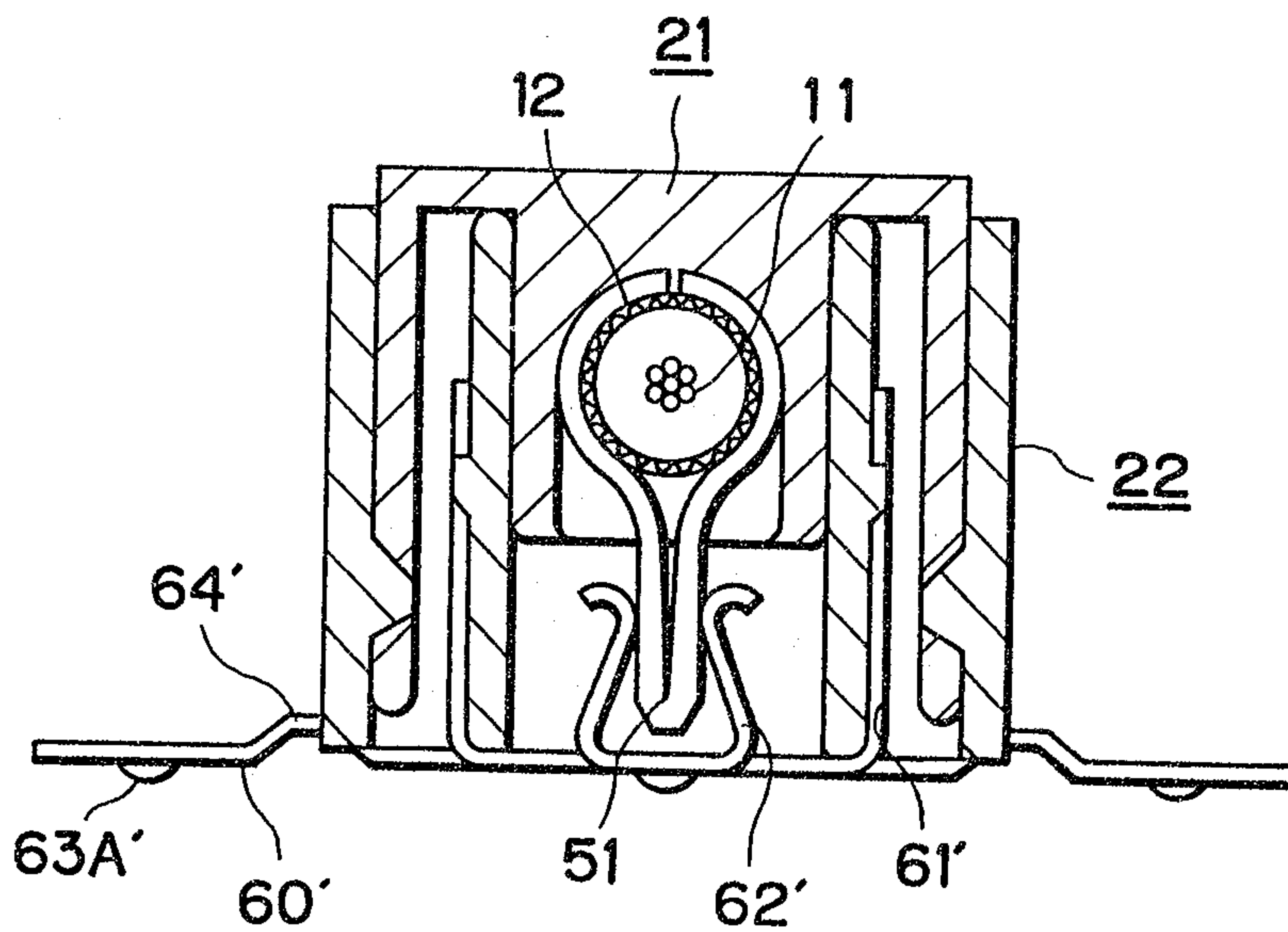


FIG. 5



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