CONVENTION APPLICATION FOR A STANDARD PATENT

We, CEGERU SOCIETY DE TRANSFORMATION DE L'ALUMINIUM PECHINEY, of 23, rue Balzac, Paris 75008 France hereby apply for the grant of a standard patent for an invention entitled:

"CONNECTOR FOR SCAFFOLDING OR SIMILAR STRUCTURE AND PROCESS OF ASSEMBLY THEREOF"

which is described in the accompanying complete specification.

DETAILS OF BASIC APPLICATION

Number of Basic Application: 8503319

Name of Convention Country in which Basic Application was filed: France

Date of Basic Application: 27 February, 1985

Our address for service is: C/- Spruon & Ferguson Patent Attorneys Level 33 St Martins Tower 31 Market Street Sydney New South Wales Australia

DATED this NINTEENTH day of FEBRUARY 1986

CEGEDUR SOCIETY DE TRANSFORMATION DE L'ALUMINIUM PECHINEY

By: Registered Patent Attorney.

TO: THE COMMISSIONER OF PATENTS AUSTRALIA
COMMONWEALTH OF AUSTRALIA
THE PATENTS ACT 1945
DECLARATION IN SUPPORT OF A
CONVENTION APPLICATION FOR A PATENT
In support of the Convention Application made for a patent for an invention entitled:
"CONNECTOR FOR SCAFFOLDING OR SIMILAR STRUCTURE AND PROCESS OF ASSEMBLY THEREOF"

I/We Léon Seraphin

Care of Cegedur Societe De Transformation De L'Aluminium Pechiney, 23, rue Balzac, Paris 75008, France
do solemnly and sincerely declare as follows:

1. I am/We are the applicant(s) for the patent.
   (or, in the case of an application by a body corporate)
   I am/We are authorised by CEGEDUR SOCIETE DE TRANSFORMATION DE L'ALUMINIUM PECHINEY
   the applicant(s) for the patent to make this declaration on
   its/their behalf.
   The basic application(s) as defined by Section 141 of the
   Act was/were made
   in France
   on 27 February, 1985
   by Cegedur Societe De Transformation De L'Aluminium
   Pechiney

2. I am/We are the actual inventor(s) of the invention referred
   to in the basic application(s).
   (or where a person other than the inventor is the applicant)
   RAMEL BAHLOUL
   of 13, rue Traversière
   Boulogne 92100
   France
   (respectively)

Set out how Applicant(s)
derive title from actual
inventor(s) e.g. The
Applicant(s) is/are the
assignee(s) of the
invention from the
inventor(s)

3. The basic application(s) referred to in paragraph 2 of this
   Declaration was/were the first application(s) made in a Convention
   country in respect of the invention(s) the subject of the application.

Declared at Paris this 13th day of February, 1986

Leon SERAPHIN
Signature of Declarant(s)

To: The Commissioner of Patents

11/81
A connector for scaffolding comprising a star-shaped portion with a central bore in which a vertical pole is fixed and a plurality of arms bearing at their ends an opening as well as a hooking portion which is fixed to the ends of the horizontal transverse members or bars of the scaffolding, characterised in that the openings in the arms of the star-shaped portion and the hook of the hooking portion have a side surface of pyramid-conical shape.
**FORM 10**

**COMMONWEALTH OF AUSTRALIA**

**PATENTS ACT 1952**

**COMPLETE SPECIFICATION**

**(ORIGINAL)**

**FOR OFFICE USE:**

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**Complete Specification Lodged:**

**Accepted:**

**Published:**

**Priority:**

**Related Art:**

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Complete Specification for the invention entitled:

"CONNECTORS FOR SCAFFOLDING OR SIMILAR STRUCTURE AND PROCESS OF ASSEMBLY THEREOF"

The following statement is a full description of this invention, including the best method of performing it known to us.
CONNECTOR FOR SCAFFOLDING OR SIMILAR STRUCTURE AND PROCESS OF ASSEMBLY THEREOF

The invention relates to a connector for scaffolding or similar structure permitting vertical poles to be connected to longitudinal transverse members or bars.

The connector substantially comprises a star-shaped portion with a central bore having a plurality of arms which at their ends each carry a pyramid-conical opening into which engages a pyramid-conical or conical hook.

A clip which is movable about a horizontal axis makes it possible to avoid accidental dismantling of the assembly.

Figure 1.
CONNECTOR FOR SCAFFOLDING OR SIMILAR STRUCTURE AND PROCESS OF ASSEMBLY THEREOF

The invention relates to a connector for scaffolding or similar structure permitting vertical poles to be connected to horizontal transverse members and/or bars; the connector may also serve as a connecting element between the poles and the inclined bracing bars of the scaffolding.

In the present designs, a scaffolding connector generally comprises an apertured portion in the form of a star, which is fixed to the vertical pole, and a cap member which is fixed to the end of the horizontal transverse members and/or bars, with the assembly being held together by a wedge-shaped key.

Such connectors therefore require three components of different shapes.

Moreover, when the scaffolding, as considered in plan view, has angular parts (other than 0 or 90°), cap members of a specific shape are then required.

The problem that the invention seeks to solve is therefore that of simplifying such scaffolding connectors by reducing to two the number of components necessary for mechanically connecting the vertical poles and horizontal transverse members or bars, a minor modification in the shape of one of the components further making it possible to make inclined angular connections (as considered in plan).

For the sake of facility of description, the components will be assumed to be in their position of use and the poles, bars and transverse members will be assumed to be cylindrical tubes. However, tubes of other cross-sections (square, polygonal, rectangular etc...) may be used by modifying the corresponding
shapes described.

According to the invention therefore the connector comprises:
- a star-shaped portion which is provided at its centre
  with a circular opening with its axis vertical, and which carries
  at the end of each of its arms a pyramid-conical opening, the
  axis of which is parallel to that of the central opening and
  whose large base is directed upwardly.

The pyramidal and conical surfaces preferably have the
same axis. The angles of the pyramid are tangential or external
to the cone, the latter being in secant or tangential relationship
to the pyramidal surface; the side surface of the cavity may therefore
assume all pyramid-conical shapes between a simple cone (inclusive)
and a simple pyramid (exclusive).

The central opening which is of a cylindrical general shape
comprises at least one horizontal annular bead which is interrupted
by at least one notch, the inside diameter of the bead being
equal to or slightly greater than the outside diameter of the
covering pole. That permits the star-shaped portion to be
fixed to the pole in the longitudinal direction thereof and in
respect of rotation about their common axis;
- a hooking portion comprising a connecting sleeve for
  connection to a horizontal bar (or transverse member) and a
  pyramid-conical hook which is complementary in shape to the pyramid-
  conical opening at the ends of the arms of the star-member.

When any angular connection (as considered in plan) is
desired, the hook is then purely conical. The sleeve portion
comprises at least one annular groove and at least one flat portion
permitting it to be rigidly fixed respectively in the longitudinal
direction and in respect of rotation about its axis, to the
covering bar or transverse member. When the bars or transverse
members are polygonal, there is evidently no need to provide the
flat.
The hooking portion further comprises a safety device to prevent accidental disassembly, formed by a clip which is movable about a horizontal axis which is fixed with respect to the upper part of the pyramid-conical hook and whose lower limb is disposed 'at rest' beneath the end of the arm of the star portion.

To facilitate setting horizontal bars or transverse members in position, the ends of the arms of the star-shaped portion are provided with a bevel or inclined surface which is at an angle ($\alpha$) of between 10 and 80° to the horizontal. Accordingly, when producing the hooking engagement, the clip naturally turns about its axis in an outward direction, slides along the end of the star portion, then returns to a position beneath the arm just under the effect of its own weight, where it then provides a connection which cannot accidentally come undone.

Therefore, dismantling of the connector requires intentional disengagement of the clip, by rotating it about its axis, from the end of the arm of the star portion, in the recess provided between the sleeve and the pyramid-conical hook of the hooking portion.

The star-shaped portion and the hooking portion may be made of suitable material such as steel, Al alloys etc.

However, when Al alloys are used, it is preferable to position a steel insert on the axis of the pyramid-conical hook, the insert projecting at the two ends, in order better to resist the shocks to which the assembly is subjected when it is set in position and/or dismantled.

The invention will be better appreciated by reference to the description of an embodiment which is illustrated in Figures 1 to 4.
A safety device to prevent 3934
is movable about a 3934
the upper part of 3934
is disposed at 3934
portion.

The transverse members 3934
shaped portion are 3934
which is at an angle 3934
accordingly, when 3934
naturally turns about 3934
by the end of the 3934
with the arm just 3934
then provides a 3934

requires intentional 3934
at its axis, from 3934
the recess provided 3934
hook of the hooking 3934
portion may be made 3934
etc.

preferable to position 3934
conical hook, the 3934
better to resist the 3934
it is set in

by reference to the 3934
illustrated in Figures 1 to

Figure 1 shows, on the left, an elevational view of half 3934
of an assembly connector according to the invention, and 3934
on the right, a view of half of the connector in axial section 3934
taken along line 1-1 in Figure 2.

Figure 2 shows a plan view of the Figure 1 assembly 3934
(excluding the upright pole and the horizontal bar).

Figure 3 is a view of the pyramid-conical volume (and the 3934
limits thereof) in horizontal section taken along line II-II 3934
in Figure 1, and

Figure 4 is an axial section of a pyramid-conical hook 3934
of Al alloy, containing a steel insert.

The star-shaped portion 1 comprises four arms which 3934
are each provided at their ends with a pyramid-conical cavity 3934
2, the axes 3 thereof being parallel to the axis 4 of the central 3934
opening 5 in the star-shaped portion 1. The upper part of 3934
each arm forms a bevel (or inclined surface), the slope (\(\phi\)) 3934
of which relative to the horizontal is at 170.

The central opening 5 which is of a cylindrical general 3934
shape comprises an annular bead 6 interrupted by two longitudinal 3934
notches 7, the pole 8 engaging thereinto.

When the pole 8 is not circular in shape, the notches 7 3934
may obviously be omitted.

The pole 8 is preferably fixed to the central opening 5 of 3934
the star-shaped portion 1 by magneto-forming, but it may also be 3934
fixed in position by mechanical expansion of the pole.

The hooking portion 9 comprises a sleeve 10 and a pyramid- 3934
conical hook 11 which are connected by an upper bridge portion 3934
and which are separated by a lower recess 12.

The hook 11 is formed by the combination of a truncated 3934
cone 12 and a truncated pyramid 13 having the same axis, the 3934
same apex and being in secant relationship; the angles 14
of the truncated pyramid 13, which are generally rounded, are therefore external to the cone 12.

The hook 11 comprises in its upper part two oppositely disposed bores 19 into which engage the ends of the safety clip 14; the safety clip 14 can therefore pivot about the axis 15 towards the recess 12 to release the end of the arm of the star-shaped portion 1.

The sleeve 10 comprises two annular grooves 16 and a flat 17 on to which the horizontal bar 18 is fixed. The overall diameter of the sleeve is equal to or slightly less than the inside diameter 10 of the tube (bar or transverse member).

The tubular bar 18 is fixed on the sleeve 10 preferably by magneto-forming but it may also be fixed in position by mechanical hammering or constriction of the tube.

Figure 4 shows the pyramid-conical hook 11 of an assembly portion 9 made of cast Al alloy, for example A-S136, on a steel insert 22 for example of 18-10 stainless steel which is disposed on the axis 3 of the hook and which projects at the two ends in the form of two curved heads 23.

The assembly connector according to the invention has the following advantages over the known arrangements:

- it is easy to fit, and
- it is secure against accidental dismantling.

This arrangement may also be used for similar structures such as shelving assemblies, pigeonhole or rack structures, display units, dismantleable supports, podiums, etc.
The claims defining the invention are as follows:

1. A connector for scaffolding comprising a star-shaped portion with a central bore in which a vertical pole is fixed and a plurality of arms bearing at their ends an opening as well as a hooking portion which is fixed to the ends of the horizontal transverse members or bars of the scaffolding, characterised in that the openings in the arms of the star-shaped portion and the hook of the hooking portion have a side surface of pyramid-conical shape.

2. A connector according to claim 1 characterised in that the pyramidal surface is in secant or tangential relationship to the conical surface and external thereto.

3. A connector according to claim 1 characterised in that the hook is frustoconical.

4. A connector according to one of claims 1 to 3 characterised in that the conical and pyramidal surfaces have the same axis parallel to the direction of the pole.

5. A connector according to one of claims 1 to 4 characterised in that the pyramidal and conical surfaces have the same apex.

6. A connector according to one of claims 1 to 5 characterised in that the hooking portion comprises a safety clip which is movable about a horizontal axis disposed in its upper part and which engages under the end of the arm of the star-shaped portion.

7. A connector according to one of claims 1 to 5 characterised in that the upper end of each arm comprises a bevel or an inclined surface at an angle of from 10 to 80° to the horizontal.

8. A connector according to one of claims 1 to 7 characterised in that the central bore of the star-shaped portion comprises at least one internal annular bead.
9. A connector according to claim 8 characterised in that said internal bead comprises at least one axial notch.

10. A connector according to one of claims 1 to 7 characterised in that the connecting sleeve of the hooking portion comprises at least one external transverse circular groove.

11. A connector according to claim 10 characterised in that the connecting sleeve of the hooking portion comprises an external longitudinal flat.

12. A connector according to one of claims 1 to 10 characterised in that the hooking portion of Al alloy comprises an axial insert which projects at the two ends.

13. A method of assembling the star-shaped portion to the pole or the hooking portion to a horizontal transverse member or bar characterised by using magneto-forming.

14. A method of assembling the star-shaped portion to the pole or the hooking portion to a horizontal transverse member or bar characterised by using mechanical hammering or expansion.

DATED this NINETEENTH day of FEBRUARY 1986
CEGEDUR SOCIETE DE TRANSFORMATION DE L'ALUMINIUM Pechiney
Patent Attorneys for the Applicant
SPRUSON & FERGUSON