DECLARATION IN SUPPORT OF A CONVENTION OR NON-CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

In support of the application No. (a) 16,824/76 made by (b) ARCA HOLDING S.A.

for a patent/patent of addition for an invention entitled (c) TIMBER HOUSE WITH LOG CABIN APPEARANCE WITH CROSS-JOINT TYPE CORNER JOINTS OF SHORT LOG WOOD PIECES

I, (d) Swen Ingemar Fernhof...

of (e) Ponte-Capriasca, Switzerland...

Centro Oxalis G...

do hereby and sincerely declare as follows:

1. (f) I am authorized by the abovementioned applicant for the patent/patent of addition to make this declaration on its behalf.

2. The basic application(s) as defined by Section 141 of the Act was/were made in the following country(c) or countries on the following date(s) by the following applicant(s):-

   in (i) by (j) Ingrid Briggita Elfstrom...

   in (i) by (k)...

   in (i) by (l)...

   in (i) by (m)...

3. (n) I am, We are the actual inventor(s) of the invention...

4. (p) 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 the subject of the application.

Declared at Ponte Capriasca this 14th day of September 1976.
I/We (a) ARCA HOLDING S.A.

APPLICATION ACCEPTED AND AMENDMENT:

ALLOWED 2/10/79

of (b) 21 Boulevard Royal

Luxembourg

hereby apply for the grant of a (c) patent or patent of addition for an invention entitled (d) TIMBER HOUSE WITH LOG CABIN APPEARANCE WITH CROSS-JOINT TYPE CORNER JOINTS OF SHORT LOG WOOD PIECES

which is described in the accompanying (e) provisionalcomplete specification.

I/We request that the patent may be granted as a patent of addition to

the patent applied for on application No. in the name of

I/We request that the term of the patent of addition be the same as that of the patent for the main invention or so much of the term of the patent for the main invention as is unexpired.

This application is a Convention application and is based on the following application or applications for a patent or patents or similar protection made in the following country or countries on the following date or dates:

No. (g) 75.09.099-3 in (h) Sweden on (i) 14 Aug. 1975.

No. (g) in (h) on (i) 19.....

No. (g) in (h) on (i) 19....

My/Our address for service is care of CLEMENT HACK & CO., Patent Attorneys, 140 William Street, Melbourne, Victoria, 3000, Australia.

Dated this 6th day of September 1979.

ARCA HOLDING S.A.
CLAIM 1. A wooden building of log cabin appearance with corner joints comprising short log members which are rebated and are mounted in alternating superjacent crossed-over configuration, have outwardly pointing stave ends and respective oppositely directed stubs with walls affixed thereto, said walls comprising horizontally extending boards, and in which corner joints an open cavity is provided on the outside of each log member in the region of the corner proper and each board, is provided with end tenons, each of which engages in a respective said cavity and is gripped by adjacent log members.
Complete Specification for the invention entitled: Timber house with log cabin appearance with cross-joint type corner joints of short log wood pieces
The invention relates to a wooden building having the appearance of a log cabin with corner joints formed by crossed-over interlocking logs, and in which building the corner joints are formed by short log members which are rebated and are mounted in alternate superjacent crossed-over configuration, having outwardly pointing stave ends and respective oppositely directed stubs to which the walls of the building, formed by horizontally extending boards, are attached.

The demand for log cabins, more particularly vacation buildings, has substantially increased in recent times. Genuine log cabins, however, call for skill in their production and require a large quantity of timber. They are therefore particularly expensive. Moreover, they suffer from numerous disadvantages, inter alia distortion due to drying, leakages and the like.

To reduce the timber consumption and to achieve better insulation as compared with genuine log cabins, while preserving, in a building, the appearance of a log cabin, it is already known to form the building corners from stacks of short log members which are alternately inter-leaved in a cross-over pattern and are screwed together, have stave ends which point outwardly and which log members are provided on the interior with rebated stems or stubs on which an external wall as well as an internal wall is mounted. In a known construction disclosed in German patent specification 186 837, the log members are first stacked one upon the other and screwed to each other to form corner posts.
The boarding for forming the external wall is then mounted from the interior. The boards for the internal wall, however, are mounted on separate nogging strips which are affixed to the log members, an insulating space remaining between the external and internal wall. The disadvantage of this embodiment however is that the outer boarding abuts behind the stave ends of the log members and must therefore have a smooth external surface, at least at the ends. The character of a log cabin will however thus be lost. Contact and mounting of the double-skinned frame partition wall which bears on the stacked log members is not very durable. In another embodiment described in the Swiss patent specification 433 675 the intersecting log members are provided with extended rearward gusset stubs on which a double-skinned frame partition wall is mounted. The ends of the outer wall boarding engage in dovetail configuration in grooves situated outside the joint in the transversely disposed log members. However, it is a disadvantage that the outer boarding is not in alignment with the stave ends. Moreover, anchoring of the boarding on the stave ends associated with the transversely extending wall is not advantageous.

By contrast, it is the object of the invention to construct a wooden building of the kind described hereinbefore in such a way that the boarding of the outer walls is directly socketed in the corner joints and the wooden building can be erected by the joining, in layers, of the log members and of the external boarding.
According to the invention, this problem is solved in that an open cavity is provided on the outside of each log member in the joint region and on the log stub, and the boarding, which extends flush with the stave ends on the outside of the framed partition wall with the curved surface facing the exterior, is provided with end tenons, each of which engages in such a cavity and is gripped by adjacent log members.

This design has firstly the significant advantage that the panel boards of the outer wall are a direct component of
the joint coupling, thus forming a firmly assembled unit providing for best possible anchoring. The panel boards give, in their flush position with the projection heads lying in the same direction, the appearance of continuous logs, thus conveying the impression of a genuine log-cabin. By inserting the panel boards into the joint a particularly tight coupling is created with the logwood pieces. The tightness is also sustained if the timber shrinks due to dryness.

The construction according to the invention enables a greatly simplified production and assembly of a timber house and is particularly suitable for the prefabrication of building components which can be assembled to produce houses of different size and with different layout. The construction can also be used advantageously for the production of cottages with a smooth joint.

Technically the house designed according to the invention corresponds to the requirements set for a framework house designed for permanent occupation. The present problems of log-cabins are eliminated. Stability, load bearing strength, tightness and durability can be guaranteed. Because of the relatively small amount of timber required pressure impregnation can be done at lower cost.

The house according to the invention is easier to assemble. The load bearing outer frame and the roof can be erected in very short time and it is possible during the building construction to perform the main portion of the construction and installation work under cover. The construction and installation material can also be stored under cover, if necessary, for nearly the whole building period.
This fact also presents the possibility of using winter as a time for building.

The simple construction allows the consumer to purchase a package of the material for a house which he finishes himself at considerably lower cost.

The material for the frame can be delivered, e.g., in portions each of which takes only little space. In principle it is possible for a customer to transport the entire house frame to the building site in a car, storing the logwood pieces in the boot and the panel boards on the roof.

By way of further explanation of the advantages of the invention the framework of a solid log-cabin with 6" timber logs contains about 14 m$^3$ of timber. For a hut designed according to the invention of corresponding size only about 3.6 m$^3$ timber is required. The rational method of working the timber also enables better utilization of the unhewn timber. Compared to a solid log-cabin with an effective area of 50 m$^2$, in a hut designed according to the invention (with high-grade insulation) an effective further area of about 3 m$^2$ is obtained.

Rational timber working, better utilization of the unhewn timber and the low consumption per m$^2$ habitable area of timber make it possible, according to the invention, to produce a timber house at costs which are considerably below the costs for log-cabins. The price for a house produced according to the invention is expected to be low enough to compete with most frame-houses on the market.

The house designed according to the invention corresponds in its external appearance to a traditional log-cabin. The joints are much stronger and present a more elegant shape.
The construction causes no limitation with regard to the size of the house, the form or the possibility to utilize all layouts.

The invention is described in more detail by means of the attached drawings, showing in

Figure 1 a cross-joint according to the invention with adjoining wall parts in a horizontal section,

Figure 2 the object of Figure 1 in a section following line II-II,

Figure 3 a tie of the house wall of Figure 1 in cross-section and on a larger scale,

Figure 4 an outer panel board in cross-section, with the external appearance of a log-cabin log,

Figure 5 the end piece of a panel board of Figure 4 in side view, and

Figures 6 and 7 the joint according to Figure 1 in two modified versions.

The wall construction shown in Figure 1 comprises outer walls 1 and inner walls 2 with ties 3 in between and insulation 4. Outer walls 1 consist of wooden panel boards 7 and ties 3 whilst the inner wall 2 can consist of a plaster panel. On the inside slabs 5 are attached, with a suitable ventilation gap from the outer wall 1, consisting of panel boards for insulation in appropriate conventional manner between ties 3. The ventilation gap between these slabs 5 and the inner surface of the outer wall is marked 6. The material for insulation 4 can consist of fibre-glass or mineral fibre mats.

The present description of the wall construction shows that this represents and concerns a conventional wall frame.
The difference lies in that this house with a conventional wall construction and a contemporary high-grade insulation forms a type of house which is provided with genuine cross-joints and externally looks like a log-cabin.

The invention consists of an outer wall of tongue-and-groove panel boards 7 of the type shown in Figure 4.

The wood for the production of the cross-joints consists of short logwood pieces 8 each of which preferably has the same length and a projecting head 9, a joint-neck 10 together with an inner joint-stump 11. The inner joint-stump 11 of the cross-joint can be used as a tie for inner and outer walls 1, 2 and essentially has the same function as the parts of log-cabins used in normal timber joints. Logwood pieces 8 are formed and prefabricated such that they can be easily mounted on site simultaneously with the erection of the wall frame which frame consists of outer panel boards 7 and the joints. As Figure 5 shows, the panel boards provided with tongue 12 and groove 13 have tapered end-tenons 14 which can have a width of, e.g., \( \frac{1}{4} \) of the width of the panel board and which form necks for insertion between joint-necks 10, which joint-necks 10 are formed and dimensioned such that they accept the end-tenons 14 of the panel boards 7. The panel boards of the two walls tied together by the joint abut with their ends 15, and these ends 15 of the tenons 14 are bevelled for proper seating.

The joint necks 10 can be provided with vertically aligned drill holes so that into each joint a full-length bolt can be inserted for the vertical joining of joints and walls.

The sides of joint-necks 10 to which tenons 14 are fitted are even and tenons 14 can be fixed to these even sides.
of joint-necks 10, e.g., by nails 16; as the following examples show the nails or other means of attachment, e.g., glue, can be omitted if on assembly of the walls and joints end tenons 14 are locked firmly to form a closed linkage between joint-necks 10, in which the projecting head 10 and joint-stump 11 of the logwood pieces 8 form heads which accept the twisting and axial forces.

To assure exact matching, and to achieve the aforementioned closed linkage, between joint-necks 10 and tenons 14 a tongue and groove arrangement 18, 19 is provided (see Figures 1 and 5).

Instead of the form of the joint-necks and rear joint-stumps 11 shown some other form can be developed, e.g., the so-called tenon-joint form or the forms shown in Figures 6 and 7 for a tension-proof dove-tail joint between tenons 14 of panel boards 7 and joint-necks 10. In this case a joint with an inner joint-stump which extends into the space between outer wall 1 and inner wall 2 is not needed as far as is shown in Figure 1. With such a modification a cold-bridge in the inner corners can be eliminated by application of insulating material between the inner joint corners and the adjacent inner wall corners. Also with the version shown in Figure 1 cold-bridges can be avoided, e.g., by bevelling at the joint-stumps 11 at the inner edges and by application of completely filling insulation material. In the bevelled joint 20 between the wooden panel boards 7 and the projecting heads 9 of the joints and in the bevelled joints 21 between the projecting heads 9 suitable packing can be applied.

In Figure 2 the inner end surfaces of the joint-stumps of logwood pieces 8 are marked with 11' and the inner surfaces
of joint-stumps 11 of the logwood pieces with 11".

To facilitate the assembly and the positioning of insulating slabs 5, ties 3 can be provided with vertical grooves 22 of the shape shown in Figure 3, i.e., grooves with rounded bevelled inner edge to simplify insertion of the edges of slabs 5 into the groove from the inside of the house.

In Figure 6 there is shown schematically, apart from the modified form for a closed linkage in joint 7 between tenons 14 of panel boards 7 and joint-necks 10, also a modification of inner wall 2 having basically the same form as outer wall 1, i.e., it consists of panel boards, so that the inside of the house (e.g., a weekend house) gives the impression, both from the outside and from the inside, as being built of solid timber. The insulation between walls 1, 2 can consist of foam plastic prepared on site. Alternatively the inner wall 2, can be attached to frame-work as shown in Figures 1 to 5, and the insulation can consist of modern high-grade insulating material such as wool fibre.

For purposes of simplification Figures 6 and 7 show only the dovetailing between a joint and two walls which meet at the joint in a horizontal section along the centre line of a panel board 7. For a better understanding these figures should be compared with Figure 1.

Figure 1 shows at 25 a false intermediate joint which can be arranged at a suitable position at outer wall 1, e.g., opposite a transverse inner wall or adjacent an entrance. The simple intermediate joints consist of short prefabricated logwood pieces 26 and the panel boards 7 are formed with tapered end pieces 27 which can overlap each other in the joint 25. Logwood pieces 26 are provided with ring grooves
28 and end pieces 27 of the panel boards are provided with notches to fit grooves 28. The intermediate joints are false in that sense that they do not have, or require, any continuation in the form of a transverse wall but are genuine in the sense that they allow settling of the logwood pieces 8 and of the panel boards of outer walls 1 as the timber dries. Desiccation of the walls, therefore, causes no further leaks. To pull the wall elements together after drying out the bolts in bolt holes 17 can be used.

It is apparent from the above that the house construction according to the invention not only looks like a log cabin but also functions like one. The house according to the invention can be compared to a log-cabin in which any superfluous wood in the timber outer wall has been removed so that only a timber panel exists between the joints; whilst the house according to the invention can also be compared to a framed house which has the advantages of a timber house (wall appearance and the possibility of settling during drying).

As already mentioned all elements for a house according to the invention can be prefabricated, i.e., produced in advance from timber with the right dimensions and shapes. The assembly of panel boards 7 and logwood pieces 8 is suitably carried out in the same way as the assembly of the logs of a log-cabin. One difference is, however, that every logwood piece 3 and associated panel board 7 are separate pieces and another significant difference is that the elements are much lighter than wooden logs and can therefore be handled by one person who need not be skilled.

The assembly can take place in such a way that for every cross-joint first a whole and half a logwood piece 8
(the half element can be produced by longitudinal division or in prefabrication) and (for the two walls 1 meeting at the joint) a whole and half a panel board 7, respectively, can be placed crosswise on the ground and are arranged at right angles to each other on the ground and which abut the joint-necks 10 of the logwood pieces 8 with their neck-shaped tenons 14. From then on whole logwood pieces and whole panel boards are used which are joined to the elements underneath where the logwood piece firmly ties the panel board in place when finishing the upper extent of the structure half a logwood piece 8 and half a panel board 7 are again used for the levelfitting of the walls meeting in the joint. After assembly the wall construction (and possibly joists and false logwood pieces 25 with long walls) forms a stable framework on which a roof is mounted. The inside installation of shelves, the application of insulation and the positioning of inner walls and other operations can be carried out in the normal manner for framed houses. The assembly of a house with joints and walls of the type shown in Figure 6 does not differ significantly from the above description and based on this can be easily understood.

Logwood piece 8 shown in the drawing and described as cross-joint (bevelled quarter-leaf joint) according to the invention can also be formed as a simple joint corresponding to a cross-joint with projecting heads 9 removed. By shaping joint-necks 10 and neck-like tenons 14 of panel boards 7 such that, together, they form a conventional dovetail-, for tongue-and-groove joint, e.g., in a joint according to Figure 7, a stable closed joint between the logwood pieces themselves, and between these and the wall elements, is
achieved which resists the twisting and axial forces. Furthermore, panel boards 7 can be extended at their ends 15 so that tenon 14 forms a neck and the extension covers a corresponding planed side of projecting head 9 (just as joint-stump 11 is covered by the panel board). A uniformly joined building component can be produced also from a logwood piece 8 and a panel board 7 by prefabrication (e.g., by glueing).
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A wooden building of log cabin appearance with corner joints comprising short log members which are rebated and are mounted in alternating superjacent crossed-over configuration, have outwardly pointing stave ends and respective oppositely directed stubs with walls affixed thereon, said walls comprising horizontally extending boards, and in which corner joints an open cavity is provided on the outside of each log member in the region of the corner proper and each board, is provided with end tenons, each of which engages in a respective said cavity and is gripped by adjacent log members.

2. A building according to Claim 1, in which the log members and the end tenons of the boards are so constructed that they form a torsion and axial thrust resistant positive joint in the corner joint for the log members relative to each other and for the log members and the boards relative to each other.

3. A building according to Claim 2, in which the corner joints have the form of cross-joints in cross-joint connections.

4. A building according to Claim 2, in which, in the corner joints, the joints between the horizontally extending boards and the log members are shaped as dovetail, comb or tenon joints.
5. A building according to any of the preceding claims, in which each log member has a relatively short stub which is orientated inwardly from the joint neck and is widened relative thereto to overlap part of a board and to support the latter and forms a head for absorbing axial thrust in the joint.

6. A building according to Claim 2, in which the thrust-resistant joint between each board and the respective log members is reinforced by fastening means which connect the relevant boards to the relevant log members in the joint.

7. A building according to any of the Claims 2 to 5, in which the axially resistant joints between the log members and the end tenons of the boards include comb joints each comprising a plurality of substantially transversely extending grooves and tongues.

8. A building according to any of the Claims 2 to 5, in which the axially resistant positive joints between the log members and the boards are dovetail, pin, comb or tenon joints or include such joints which advantageously form part of the joints between the log members.

9. A building according to any of the preceding claims, in which the building has the form of a framed partition wall building in which the external walls comprising boards form a base for noggings and internal walls at a distance from the external walls, the ventilation gaps and insulation of conventional framed partition wall buildings being provided at a distance from the external walls.
10. A method of constructing a building of log cabin appearance, according to Claim 1, in which method, to erect the corner joints of the building the required number of short log members, are produced from timber logs and previously shaped to have the form of end sections, of appropriate length, of logs of the form used for conventional log cabin construction, in such a way that on assembling a plurality of such log members into a joint each pair of two adjoining parallel log members forms a cavity which is open from the joint side with respect to the relevant wall, boards in the form of log skins being used to erect the external walls of the building, one end part of each of such boards which is to be connected to the relevant corner joint being preformed for insertion into the cavity between two adjoining parallel log members and to form an end tenon which fills said cavity to complement said log members so as to form together therewith a joint which is resistant to torsion which occurs in the wall and the joint and in which the torsional forces are absorbed by positive engagement, conventionally employed for the logs of log cabins, between the log members and by positive engagement of the log members around the end tenon of the relevant boards disposed between said elements, the relevant joint being constructed mainly in the same manner as a conventional timber joint by assembling a number of log members, the wall adjoining the joint being constructed by a corresponding number of separate boards the shaped end members of which are joined between adjoining log members and are connected thereto in the sequence in which the said log members are placed one upon the other.
11. A method according to Claim 10, in which the log members and the end tenons of the boards are preformed so that in their entirety they form a positive joint which is resistant to thrust forces which occur between the joint and the wall, for example a transversely extending tongue-groove joint with a pin point connection or a dovetail connection between log members and the corresponding boards when these are assembled.

12. A building substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

13. A method of constructing a building, as claimed in Claim 10 and substantially as hereinbefore described with reference to the accompanying drawings.

DATED THIS 6TH DAY OF SEPTEMBER, 1979.

ARCA HOLDING S.A.
By Its Patent Attorneys

CLEMENT HACK & CO.

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