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Remarks:

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divisional application to the application mentioned
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(54) **Natural tapered house log milling process**

(57) A process to enable the manufacture of tapered house building logs of various diameters, which would be used in hand-crafted round log construction, in both residential and commercial applications. A milling process would remove wood to create the lateral notches, also known as grooves or copes, on the underside of each wall log, while maintaining the natural taper of each whole log used. The convex curvature of the top of each

log is milled to match the concave curvature on the bottom of the log sitting directly above it, using a common curvature for specified diameters; in the process of planing the top and the underside of each log, the same degree of taper is achieved. Whole, round trees are utilized and the natural taper of each log is always maintained.

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Description**FIELD OF THE INVENTION**

[0001] This invention pertains to the construction of log walls and utilizes natural tapered whole logs which are fit together and laid horizontally on top of each other. Traditionally, this type of wall construction has always been done by hand, using a chainsaw. A lateral notch, also known as a groove or cope, is cut with a chainsaw from the underside or belly of each log, and runs the full length of each wall log. This is an extremely heavy, labour intensive and repetitive task. This invention will eliminate the time-consuming hard labour involved, but will still result in the hand-crafted look of tapered log walls. The art and craft of building with natural logs continues to gain appeal, and removing this labour intensive aspect of the construction will allow time for log builders to focus more on innovative and creative hand-crafted corner notches and other details unique to their own style of building.

DESCRIPTION OF THE PRIOR ART

[0002] There are various means by which horizontally stacked logs or milled timbers are notched or joined together. With conventional "milled" or "machine-cut" house logs, there is a huge amount of waste wood created. D-shaped logs and double tongue and groove style logs are machined out of dimensional timbers and then profiled to resemble "real logs". Lathed (round) logs are all milled to exactly the same diameter; the tip size of the tree determines the final size of the log. An enormous amount of waste wood is generated as the log is lathed down to its smallest dimension, often being as little as 6 inches in diameter. Up to 40% of the wood becomes waste.

[0003] Conventional milling systems are also limited in the length of logs that can be used. An unfortunate consequence is the practice of "end-butting" timbers within a wall; ie: 2 - 20 ft. pieces of log are butted end to end to create 1 - 40 ft. length. This negatively affects the building both esthetically and structurally and can cause air leak problems.

[0004] United States Patent No. 4,312,161 to Goldade teaches the shaping of elongate cylindrical structural members for their interfitting in the construction of walls or similar structures. This provides an example of machine profiled timbers that have been cut from whole logs.

[0005] United States Patent No. 4,903,447 to McDade teaches a variation on machine profiled logs which utilizes a double tongue and groove type of joinery and creates an exterior wall profile that resembles shiplap siding.

[0006] United States Patent No. 4,510,724 to Magnuson teaches timber construction which incorporates the natural taper of the timbers and uses a uniform notching system for corner joinery. However, this system again relies on each timber being profiled to exact matching dimensions, again generating substantial amounts of wood waste and increased costs. There are machines currently utilizing curved planer heads to peel logs. As well, hydraulic equipment is being widely used in the wood manufacturing sector to position logs, align them on a determined plane, rotate them and mill them as required. Laser levellers are used in conjunction to ensure accuracy.

SUMMARY OF THE INVENTION

[0007] There is a growing world-wide shortage of timber, thus, the reduced amount of wood that is being harvested must be used to maximum advantage, achieving the highest value-added possible. This invention allows for the full utilization of each naturally tapered log used in wall construction. Essentially, only the bark and a very small portion of log are unused, and the bark can be sold as landscape mulch.

COMPARATIVE TABLE SHOWING WOOD CONSUMPTION BASED ON TYPE AND SIZE OF LOGS USED

[0008]

Number of logs required to gain 120 inches (or 10 ft) in wall height:		
6" double tongue and groove	20 logs high	maximum obtainable length is 24 feet
8" double tongue and groove	15 logs high	maximum obtainable length is 24 feet
10" round lathed logs	12 logs high	13" average diameter logs must be used and 30-40% of the wood becomes waste; maximum obtainable length is 28 ft.
10" tip, 16" butt trees (natural tapered logs) - 13" average diameter	9.2 logs high	full length trees can be used (up to 55 ft. long) resulting in maximum height gain per round

[0009] There are also substantial savings in the cost of labour due to increased productivity when using a tapered log milling machine to create lateral grooves. It is estimated that this process will produce 6-8 times more lineal footage of lateral grooves per man day than a log builder using a chainsaw. This would allow increased time for the more individualized and creative aspects of craftsmanship involved in the log construction industry. As well, it is anticipated that the widespread use of this process would result in reduced incidence of back-related injuries now common in this industry, since the repetitive and prolonged use of the chainsaw to create lateral grooves would be eliminated.

[0010] Increased thermal mass of log buildings and higher R-values of log walls are achieved, due to the larger diameter of logs using the natural tapered milling method. Greater flexibility in design is also possible due to the long lengths of logs that can be used; no end-butting is necessary. Milled natural tapered logs would have the appearance and appeal of hand-craned or hand-scribed joinery.

DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a perspective view of a section of log wall illustrating the natural taper of the logs as they lay, alternating a butt 11 (largest diameter of a log) with a tip 12 (smallest diameter of a log) and achieving level every 2 rounds (a "round" is a single layer of logs around the complete perimeter of a building).

FIG.2 is an end view of a log wall illustrating the alternating butts 11 and tips 12 of logs and indicating common curvature 13, matching the milled convex surface of the top of each log to the milled concave surface on the underside of the log above it.

FIG.3 is an enlarged end view of a log wall illustrating the use of a common curvature 13 on various diameters of logs resulting in the exact matching of convex to concave surfaces, joining log to log and illustrating the amount of wood removal in the process: from the underside of a log 14 and from the top side of a log 15.

DETAILED DESCRIPTION OF THE INVENTION

[0012] This process utilizes a machine to create the lateral notch, also known as a groove or cope, on the underside of a house building log and to mill a matching convex surface on the top of each log, creating walls that maintain the natural taper of each whole log used (refer to FIG. 1). Referring now to FIG. 2, 13 the convex curvature of the top of each log will be milled to match the concave curvature on the bottom of the log sitting directly above it, using a common curvature 13 for specified diameters. A 16 inch diameter curvature is defined as being equal to any portion of the perimeter of a 16 inch circle. Similarly, a 10 inch diameter curvature equals any portion of the perimeter of a 10 inch circle; refer to FIG.3 13. The key factor in this process is to use logs of similar taper and mill them to *exactly* the same degree of taper. This is accomplished by positioning the log that is to be milled so that the top surface is on a horizontal plane. The concave groove is then cut into that surface. The log is then mechanically rotated 180 degrees so the opposite surface of the log is on top. Once again, hydraulic lifters and laser levellers position the log so that the top surface is essentially on a horizontal plane, with the log held in position so that the planing process results in creating the identical degree of taper in every log. A matching convex curvature is then milled on this surface. By using the same curvature throughout, no matter what diameter of log is used, level wall height is achieved every 2 rounds* (refer to FIG.1); this is contingent upon logs being stacked so that, at each end of the wall being built, a butt 11 (or largest diameter of a log) alternates with a tip 12 (or smallest diameter of a log); refer to FIG.1.

*A "round" is a single layer of logs around the complete perimeter of a building

[0013] In the process of milling and matching concave to convex surfaces, an extremely small amount of waste wood 14 and 15, is generated.

[0014] Trees grown in the same area have similar taper. Ideal house logs have 1 inch of taper in every 10 feet of length. If the taper is greater than that, the machine can still be used with the same results. Cutting blades with different curvatures would be used for different diameters of logs, however, with this concept, the same curvature blade and the same degree of taper in the logs used must be maintained for any one complete building. Logs ranging from 5 to 10 inches in diameter would use a 10" curvature blade. Logs ranging from 10 to 16 inches in diameter would use a 16 inch curvature blade. Logs ranging from 16 to 24 inches would use a 24 inch curvature blade.

[0015] A natural tapered house log milling machine would be designed so that the machine head would move down the length of the log, as opposed to the equipment being stationary and the log being turned and moved. This would enable logs of up to 55 feet in length to be milled.

Claims

1. A process for milling whole natural logs for log wall construction from selected logs of similar taper, the process comprising steps of:

planing a convex curvature on a longitudinal surface of each of the selected logs, the convex curvature having a curvature determined in accordance with a diameter range of the selected logs;
milling an opposite surface of each of the selected logs to form a concave curvature such that longitudinal surface and the opposite surface have an identical degree of taper, and to form a lengthwise lateral notch in the opposite surface to identically match the curvature of the convex curvature.

2. The process of claim 1, further including steps of mechanically rotating the log through 180° to expose the opposite surface and positioning the opposite surface in an essentially horizontal plane, prior to the planing process.

3. The process of claim 1, wherein the selected logs have a maximum, butt diameter approximately 15 cm (6 inches) greater than the minimum tip diameter.

4. The process of claim 3, wherein for selected logs the determined curvature is approximately equal to the maximum butt diameter.

5. The process of claim 1, wherein the determined curvature is about 25 cm (10 inches) when the diameter range of the logs is about 13 - 25 cm (5-10 inches).

6. The process of claim 1, wherein the determined curvature is about 41 cm (16 inches) when the diameter range of the logs is about 25 - 41 cm (10-16 inches).

7. The process of claim 1, wherein the determined curvature is about 61 cm (24 inches) when the diameter range of the logs is about 41 - 61 cm (16-24 inches).

8. A method for building a log wall construction from selected logs of similar taper, comprising:

milling a convex curvature on a longitudinal surface of each of the selected logs, the convex curvature having a curvature determined in accordance with a diameter range of the selected logs;
planing an opposite surface of each of the selected logs to form a concave curvature such that longitudinal surface and the opposite surface have an identical match of curvature of the convex curvature;
laying a first round of logs such that a butt end of each log abuts a tip end of an adjacent log, and the convex curvature of each log forms a top of the first round;
stacking a second round of logs on the first round such that each butt end of the second round of logs alternates with a tip end of the first round, and the lengthwise lateral notch of each log of the second round faces downwards and coincide with the convex curvatures of the first round; and
repeating the steps of laying and stacking to form the log wall construction such that every second round provides a level wall height.

FIG.1

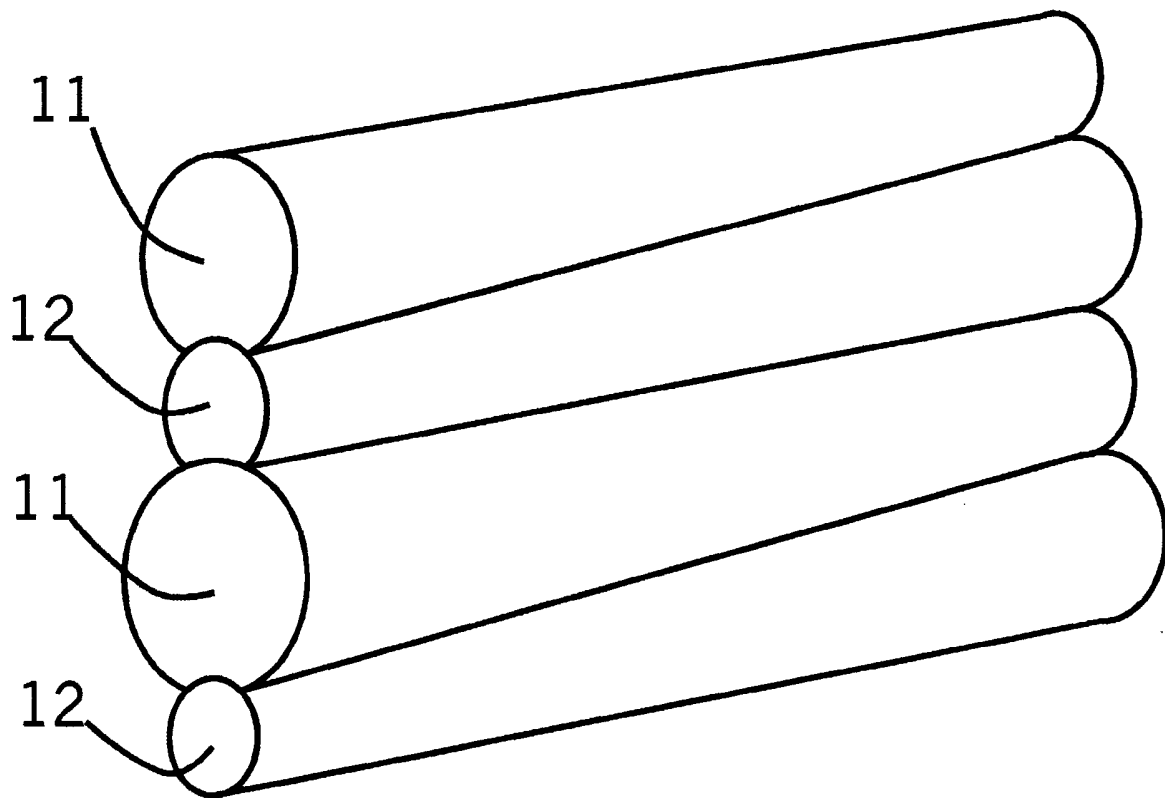


FIG.2

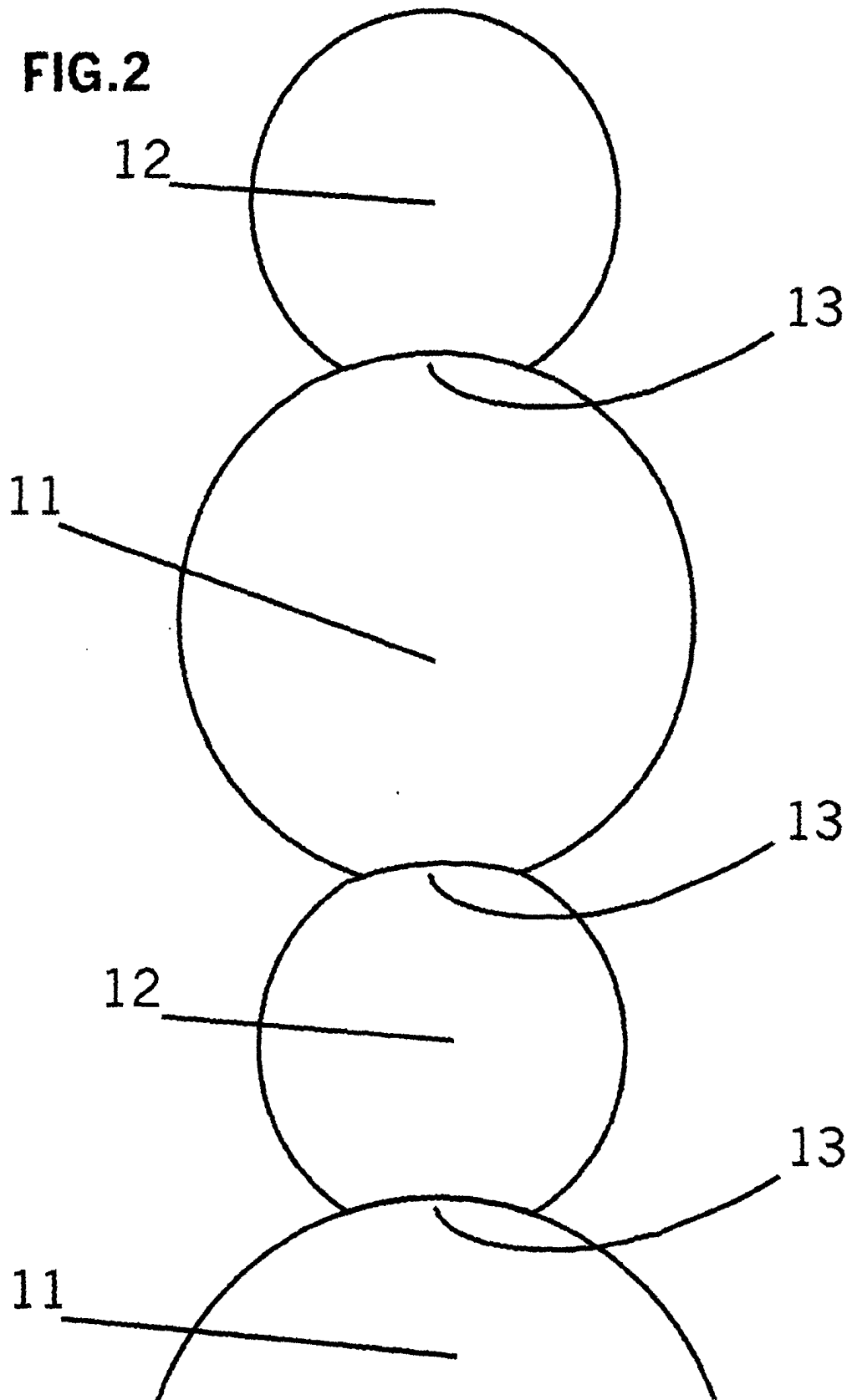
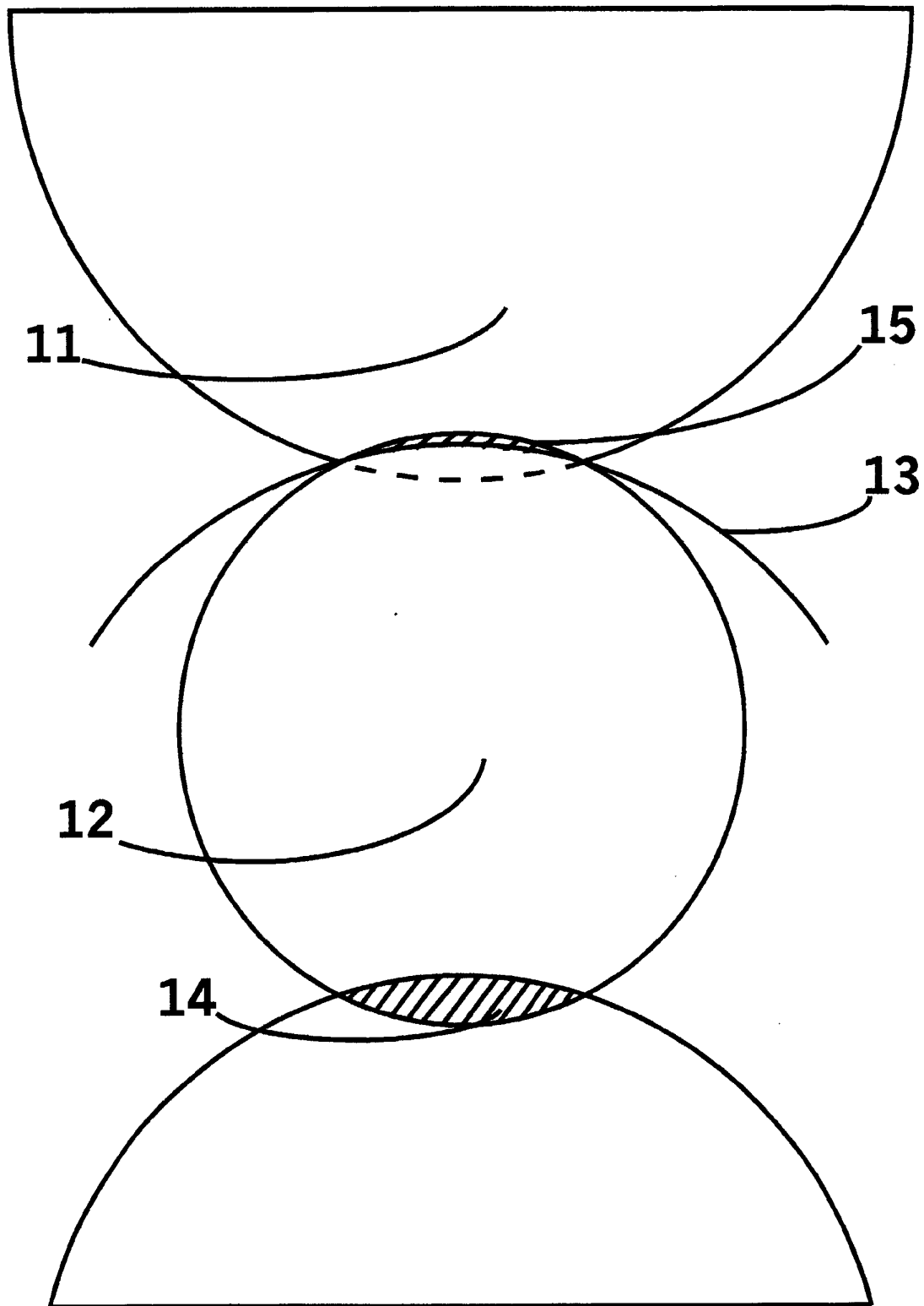


FIG.3





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EUROPEAN SEARCH REPORT

Application Number
EP 05 10 2362

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	CA 918 882 A (MASKUTA PROPERTIES LTD) 16 January 1973 (1973-01-16) * page 2, line 15 - page 3, line 17; claims 1,4; figures * -----	1-8	E04B2/70
A	BE 548 733 A (OUSSOW) 14 July 1956 (1956-07-14) * page 2, paragraph 10; figures 4,5 * -----	1-8	E04B
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E04B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		28 June 2005	Fordham, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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28-06-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
CA 918882	A	16-01-1973	CA 918882 A1	16-01-1973
BE 548733	A	NONE		