THE BRAIDER

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Braid Design

Many 'new' braids can also be designed by combining elements of UT-OT braids with flat braids, cylindrical braids and torus braids. In Fig. 901 a cylindrical UT-OT element with a right helix is interbraided with a Regular Knot.

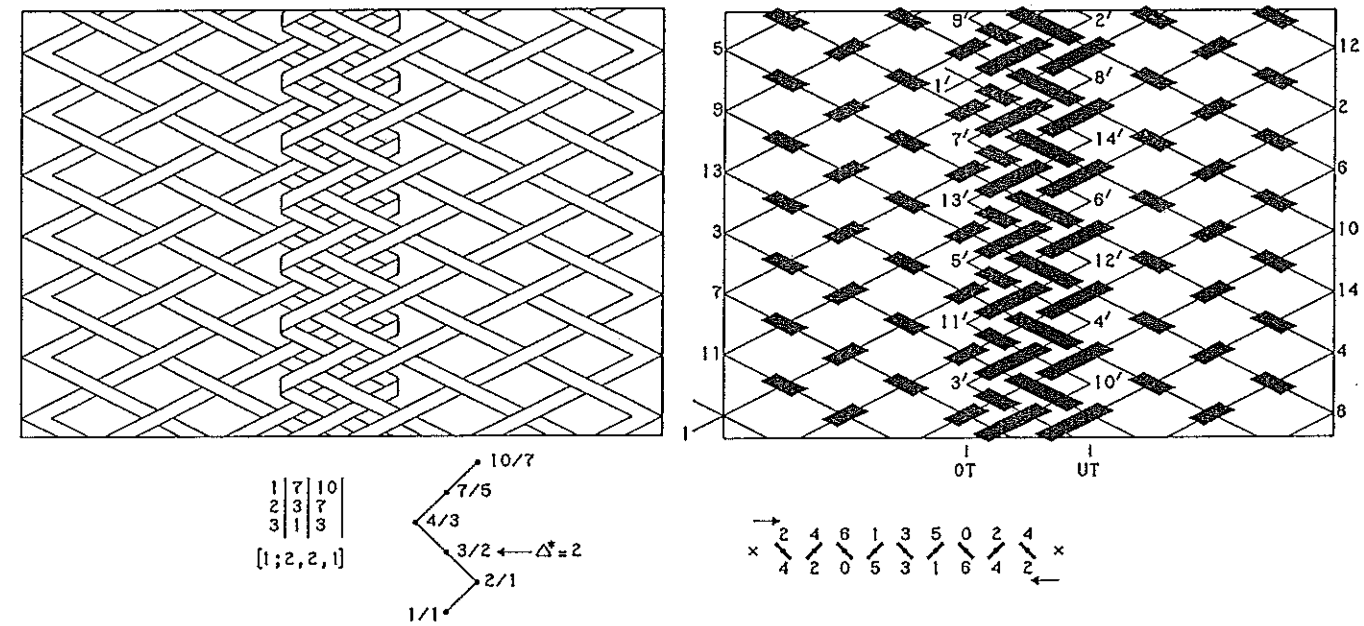


Fig. 901 — A Regular Knot interbraided with a cylindrical UT-OT element.

The algorithm diagram of the Regular Knot gives us the following half-cycle braiding algorithms:

half-cycle 1:			Free run.
half-cycle 2:	$i = 0$	:	o.
half-cycle 3:	$i = 0$	:	u.
half-cycle 4:	$i \leq 1$	:	$u - o$.
half-cycle 5:	$i \leq 1$	:	$o - u$.
half-cycle 6:	$i \leq 2$	:	$o - u - o - u$.
half-cycle 7:	$i \leq 2$	:	$u - o - u - o$.
half-cycle 8:	$i \leq 3$	:	$o - u - 2o - u$.
half-cycle 9:	$i \leq 3$	:	$u - o - 2u - o$.
half-cycle 10:	$i \leq 4$	:	$o - 2u - 2o - u - o$.
half-cycle 11:	$i \leq 4$	:	$u - 2o - 2u - o - u$.
half-cycle 12:	$i \leq 5$	:	$o - 2u - o - u - o - u - o$.
half-cycle 13:	$i \leq 5$	:	$u - 2o - u - o - u - o - u$.
half-cycle 14:	$i \leq 6$	:	$o - u - o - u - o - u - o - u - o$.

The half-cycle braiding algorithms for the interbraided OT-UT element are as follows:

half-cycle 1′:	$o - u$.
half-cycle 2′:	UT — $u - o$.
half-cycle 3′:	OT — $o - u$.
half-cycle 4′:	UT — $u - o$.
half-cycle 5′:	OT — $o - u$.
half-cycle 6′:	UT — $u - o$.
half-cycle 7′:	OT — $o - u$.

half-cycle 8′: UT — $2u - o$.
half-cycle 9′: OT — $2o - u$.
half-cycle 10′: UT — $2u - o$.
half-cycle 11′: OT — $2o - u$.
half-cycle 12′: UT — $2u - o$.
half-cycle 13′: OT — $2o - u$.
half-cycle 14′: UT — $2u - o$.

When the grain-side of half-cycle 1 and the grain-side of half-cycle 1′ are uppermost, the finished knot will have the grain-side uppermost. Note that the OT-UT interbraid has a right helix and hence it will show a right helix in the finished knot.

In Fig. 902 the interbraided cylindrical braids have each the OT elements incorporated in one of their bight-boundaries. Hence the **right** bight-edge of the **left** interbraided cylindrical braid shows a **left** helix and the **left** bight-edge of the **right** interbraided cylindrical braid shows a **right** helix. Thus when half-cycle 1 has the grain-side uppermost then also the half-cycles 4, 5; 8, 9; 12, 13 have the grain-side uppermost, while the half-cycles 2, 3; 6, 7; 10, 11; 14 have the flesh-side uppermost. The end of half-cycle 14 goes over into half-cycle 1, hence the flesh-side of half-cycle 14 goes over into the grain-side of half-cycle 1. Since such a surface change is undesirable, we should ensure that for strings in which the two opposing surfaces differ, the number of bights for each cylindrical braid is **even**; this will then also ensure that the surface pattern in each cylindrical braid is regular.

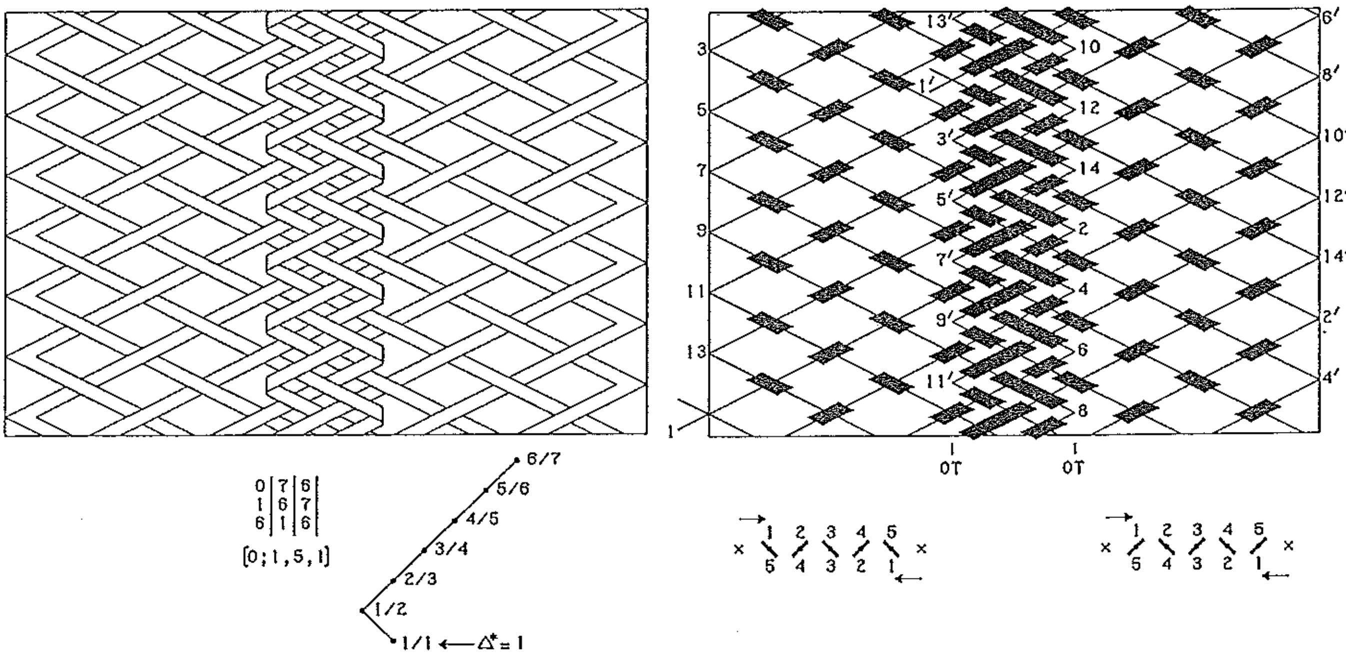


Fig. 902 — Two Regular Knots with their OT bight-edges interbraided.

The algorithm diagrams of the Regular Knots involved give us the following half-cycle braiding algorithms (note that the algorithm diagrams are associated with the Regular Knots involved and do not show codings associated with interbraiding):

half-cycle 1: Free run.
half-cycle 2: $i = 0$: OT — Free run.
half-cycle 3: $i = 0$: Free run.
half-cycle 4: $i \leq 1$: OT — o.

half-cycle 5:	$i \leq 1$	:	u.
half-cycle 6:	$i \leq 2$	:	OT — $o - u$.
half-cycle 7:	$i \leq 2$	:	$u - o$.
half-cycle 8:	$i \leq 3$	:	OT — $o - u - o$.
half-cycle 9:	$i \leq 3$	:	$u - o - u$.
half-cycle 10:	$i \leq 4$	:	OT — $o - u - o - u$.
half-cycle 11:	$i \leq 4$	:	$u - o - u - o$.
half-cycle 12:	$i \leq 5$	:	OT — $o - u - o - u - o$.
half-cycle 13:	$i \leq 5$	:	$u - o - u - o - u$.
half-cycle 14:	$i \leq 6$	:	OT — $o - u - o - u - o$.

half-cycle 1′:			$o - u$.
half-cycle 2′:	$i = 0$	:	$u - o$.
half-cycle 3′:	$i = 0$	:	OT — $o - u$.
half-cycle 4′:	$i \leq 1$	:	$2u - o$.
half-cycle 5′:	$i \leq 1$	:	OT — $2o - u$.
half-cycle 6′:	$i \leq 2$	:	$u - o - u - o$.
half-cycle 7′:	$i \leq 2$	:	OT — $2o - 2u$.
half-cycle 8′:	$i \leq 3$	:	$u - o - 2u - o$.
half-cycle 9′:	$i \leq 3$	:	OT — $2o - 2u - o$.
half-cycle 10′:	$i \leq 4$	:	$u - o - u - o - u - o$.
half-cycle 11′:	$i \leq 4$	:	OT — $2o - 2u - o - u$.
half-cycle 12′:	$i \leq 5$	:	$u - o - u - o - 2u - o$.
half-cycle 13′:	$i \leq 5$	:	OT — $2o - 2u - o - u - o$.
half-cycle 14′:	$i \leq 6$	:	$u - o - u - o - 2u - o$.

In Fig. 903 the two Regular Knots with their interbraided OT bight-edges have each 8 bights, hence a desired **even** number of bights.

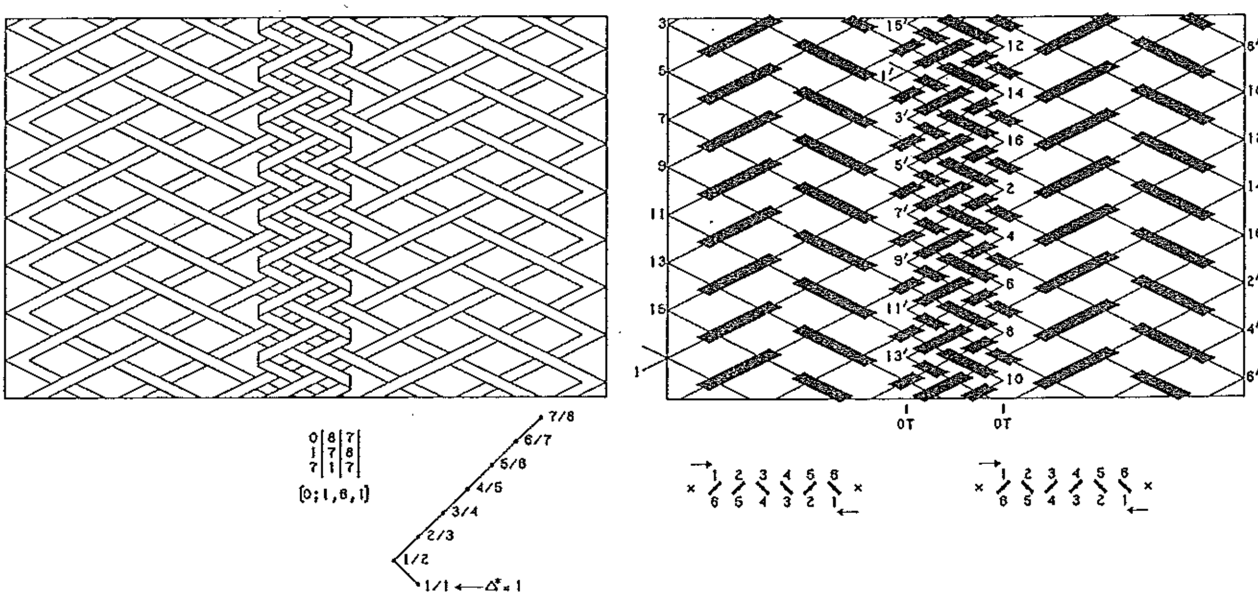


Fig. 903 — Two Regular Knots with their OT bight-edges interbraided.

The half-cycle braiding algorithms involved are read from their algorithm diagrams (note that the algorithm diagrams are associated with the Regular Knots involved and do not show codings associated with interbraiding):

half-cycle 1: Free run.

half-cycle 2:	$i = 0$	:	OT — Free run.
half-cycle 3:	$i = 0$	:	Free run.
half-cycle 4:	$i \leq 1$	:	OT — o.
half-cycle 5:	$i \leq 1$	:	o.
half-cycle 6:	$i \leq 2$	:	OT — $o - u$.
half-cycle 7:	$i \leq 2$	:	$2o$.
half-cycle 8:	$i \leq 3$	:	OT — $o - u - o$.
half-cycle 9:	$i \leq 3$	:	$2o - u$.
half-cycle 10:	$i \leq 4$	:	OT — $o - u - 2o$.
half-cycle 11:	$i \leq 4$	:	$2o - 2u$.
half-cycle 12:	$i \leq 5$	:	OT — $o - u - 2o - u$.
half-cycle 13:	$i \leq 5$	:	$2o - 2u - o$.
half-cycle 14:	$i \leq 6$	:	OT — $o - u - 2o - 2u$.
half-cycle 15:	$i \leq 6$	:	$2o - 2u - o - u$.
half-cycle 16:	$i \leq 7$	:	OT — $o - u - 2o - 2u$.

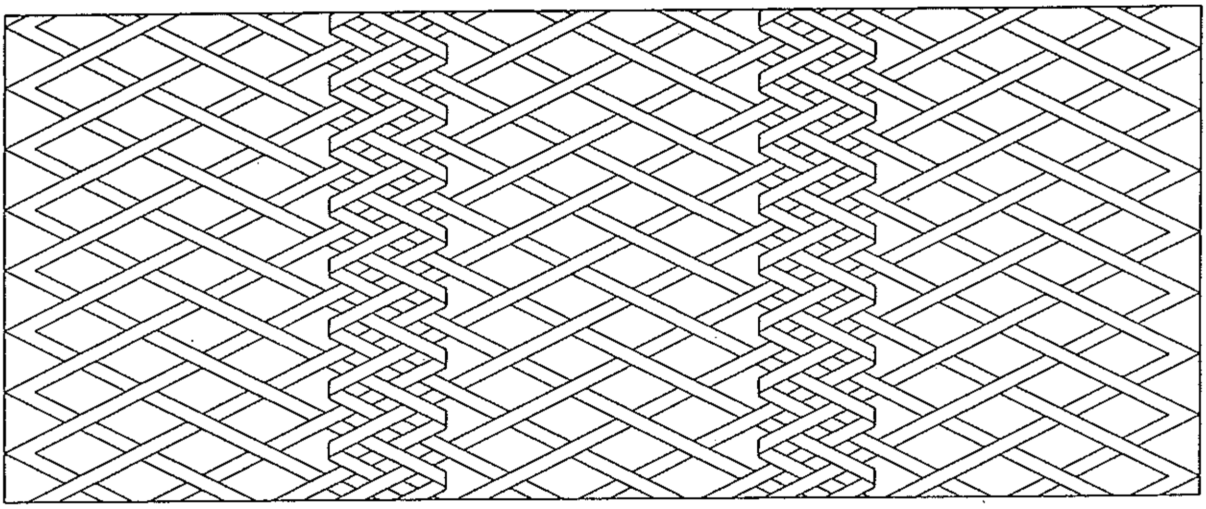
half-cycle 1′:			$o - u$.
half-cycle 2′:	$i = 0$	:	$u - o$.
half-cycle 3′:	$i = 0$	:	OT — $o - u$.
half-cycle 4′:	$i \leq 1$	:	$o - u - o$.
half-cycle 5′:	$i \leq 1$	:	OT — $2o - u$.
half-cycle 6′:	$i \leq 2$	:	$2o - u - o$.
half-cycle 7′:	$i \leq 2$	:	OT — $2o - 2u$.
half-cycle 8′:	$i \leq 3$	:	$2o - 2u - o$.
half-cycle 9′:	$i \leq 3$	:	OT — $2o - 2u - o$.
half-cycle 10′:	$i \leq 4$	:	$2o - 3u - o$.
half-cycle 11′:	$i \leq 4$	:	OT — $2o - 2u - 2o$.
half-cycle 12′:	$i \leq 5$	:	$2o - 2u - o - u - o$.
half-cycle 13′:	$i \leq 5$	:	OT — $2o - 2u - 2o - u$.
half-cycle 14′:	$i \leq 6$	:	$2o - 2u - o - 2u - o$.
half-cycle 15′:	$i \leq 6$	:	OT — $2o - 2u - 2o - 2u$.
half-cycle 16′:	$i \leq 7$	:	$2o - 2u - o - 2u - o$.

These braids with OT elements or OT-UT elements should not be confused with Crocodile Ridge braids which so commonly happens in the various publications on braiding. Crocodile Ridge braids do not contain OT or OT-UT elements, and hence the grain-side of the strings in these braids can always be uppermost.†

The cylindrical braid in Fig. 904 consists of three components, each with eight bights: the left component has its right bight-edge with OT elements interbraided with the left bight-edge with OT elements of the central component while this central component has its right bight-edge with OT elements interbraided with the left bight-edge with OT elements of the right component. By using the same string-colour for the left and the right component and a different string-colour for the central component, a beautiful

† It cannot be stressed enough that in braiding the nomenclature should inherently be associated with flat braiding material. Round braiding material tends to hide OT and UT elements and consequently for round-string braids the difference between braids with these elements and Crocodile Ridge braids tends to disappear.

knot will be obtained.



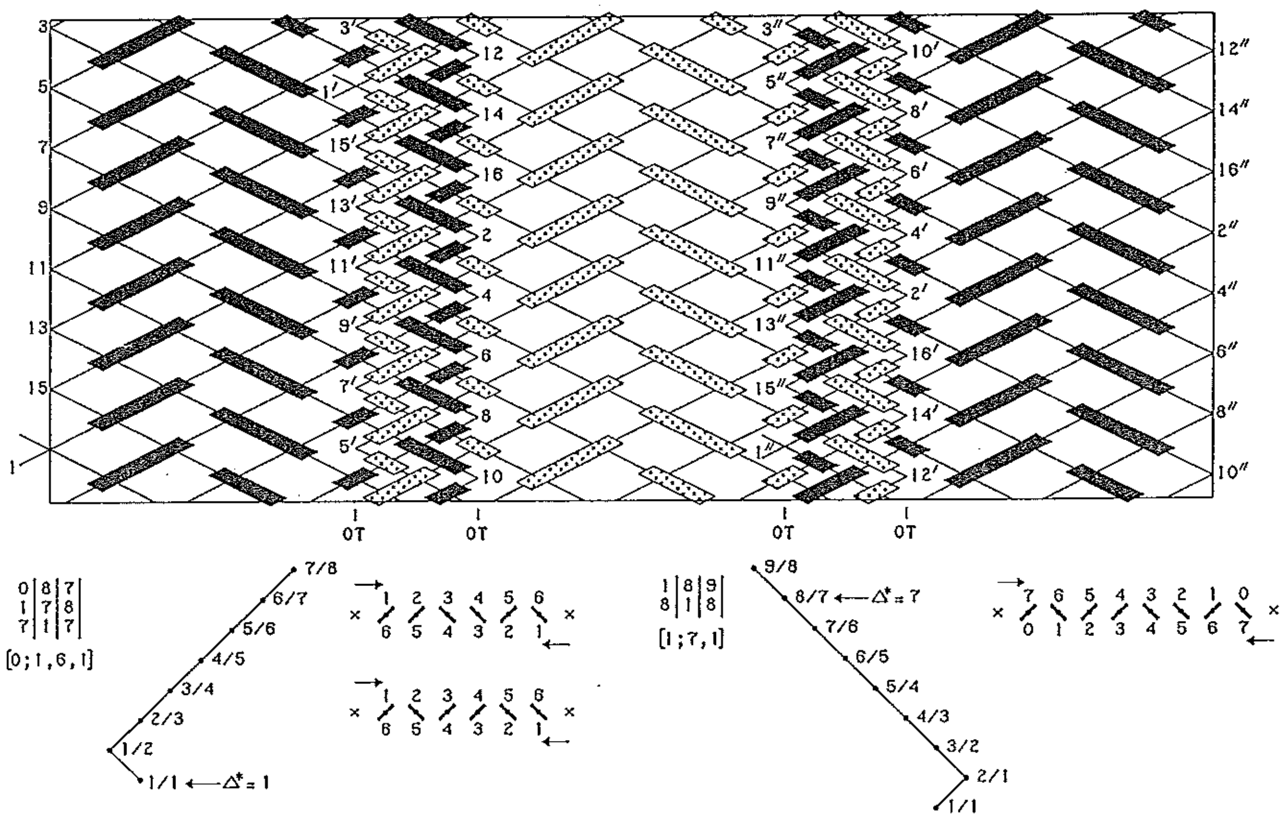


Fig. 904 — Interbraided OT bight-edges.

From the algorithm diagrams of the components we can again obtain the various half-cycle braiding algorithms (note that the algorithm diagrams are associated with the Regular Knots involved and do not show codings associated with interbraiding):

half-cycle 1:			Free run.
half-cycle 2:	$i = 0$	:	OT — Free run.
half-cycle 3:	$i = 0$	:	Free run.
half-cycle 4:	$i \leq 1$	:	OT — o.
half-cycle 5:	$i \leq 1$	:	o.
half-cycle 6:	$i \leq 2$	:	OT — $o - u$.
half-cycle 7:	$i \leq 2$	:	$2o$.

half-cycle 8: $i \leq 3$: OT — $o - u - o$.
half-cycle 9: $i \leq 3$: $2o - u$.
half-cycle 10: $i \leq 4$: OT — $o - u - 2o$.
half-cycle 11: $i \leq 4$: $2o - 2u$.
half-cycle 12: $i \leq 5$: OT — $o - u - 2o - u$.
half-cycle 13: $i \leq 5$: $2o - 2u - o$.
half-cycle 14: $i \leq 6$: OT — $o - u - 2o - 2u$.
half-cycle 15: $i \leq 6$: $2o - 2u - o - u$.
half-cycle 16: $i \leq 7$: OT — $o - u - 2o - 2u$.

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half-cycle $1'$: $o - u$.
half-cycle $2'$: $i = 0$: OT — $2u - o$.
half-cycle $3'$: $i = 0$: OT — $o - 2u$.
half-cycle $4'$: $i \leq 1$: OT — $o - 2u - o$.
half-cycle $5'$: $i \leq 1$: OT — $o - u - o - u$.
half-cycle $6'$: $i \leq 2$: OT — $u - o - 2u - o$.
half-cycle $7'$: $i \leq 2$: OT — $o - 2u - o - u$.
half-cycle $8'$: $i \leq 3$: OT — $2u - o - 2u - o$.
half-cycle $9'$: $i \leq 3$: OT — $o - 3u - o - u$.
half-cycle $10'$: $i \leq 4$: OT — $o - 2u - o - 2u - o$.
half-cycle $11'$: $i \leq 4$: OT — $o - u - o - 2u - o - u$.
half-cycle $12'$: $i \leq 5$: OT — $2o - 2u - o - 2u - o$.
half-cycle $13'$: $i \leq 5$: OT — $o - u - 2o - 2u - o - u$.
half-cycle $14'$: $i \leq 6$: OT — $u - 2o - 2u - o - 2u - o$.
half-cycle $15'$: $i \leq 6$: OT — $o - 2u - 2o - 2u - o - u$.
half-cycle $16'$: $i \leq 7$: OT — $o - u - 2o - 2u - o - 2u - o$.

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half-cycle $1''$: $o - u$.
half-cycle $2''$: $i = 0$: $u - o$.
half-cycle $3''$: $i = 0$: OT — $o - u$.
half-cycle $4''$: $i \leq 1$: $o - u - o$.
half-cycle $5''$: $i \leq 1$: OT — $2o - u$.
half-cycle $6''$: $i \leq 2$: $2o - u - o$.
half-cycle $7''$: $i \leq 2$: OT — $2o - 2u$.
half-cycle $8''$: $i \leq 3$: $2o - 2u - o$.
half-cycle $9''$: $i \leq 3$: OT — $2o - 2u - o$.
half-cycle $10''$: $i \leq 4$: $2o - 3u - o$.
half-cycle $11''$: $i \leq 4$: OT — $2o - 2u - 2o$.
half-cycle $12''$: $i \leq 5$: $2o - 2u - o - u - o$.
half-cycle $13''$: $i \leq 5$: OT — $2o - 2u - 2o - u$.
half-cycle $14''$: $i \leq 6$: $2o - 2u - o - 2u - o$.
half-cycle $15''$: $i \leq 6$: OT — $2o - 2u - 2o - 2u$.
half-cycle $16''$: $i \leq 7$: $2o - 2u - o - 2u - o$.

In the cylindrical braid of Fig. 905 the left and right components have been extended, which improves the appearance. Its associated half-cycle braiding algorithms are:

half-cycle 1: Free run.
half-cycle 2: $i = 0$: OT — o.
half-cycle 3: $i = 0$: u.
half-cycle 4: $i \leq 1$: OT — $2o$.

half-cycle 5:	$i \le 1$	:	$o - u$.
half-cycle 6:	$i \le 2$	:	OT — $u - 2o$.
half-cycle 7:	$i \le 2$	:	$u - o - u$.
half-cycle 8:	$i \le 3$	:	OT — $2u - 2o$.
half-cycle 9:	$i \le 3$	:	$2u - o - u$.
half-cycle 10:	$i \le 4$	:	OT — $o - 2u - 2o$.
half-cycle 11:	$i \le 4$	:	$o - 2u - o - u$.
half-cycle 12:	$i \le 5$	:	OT — $2o - 2u - 2o$.
half-cycle 13:	$i \le 5$	:	$2o - 2u - o - u$.
half-cycle 14:	$i \le 6$	:	OT — $u - 2o - 2u - 2o$.
half-cycle 15:	$i \le 6$	:	$u - 2o - 2u - o - u$.
half-cycle 16:	$i \le 7$	:	OT — $o - u - 2o - 2u - 2o$.

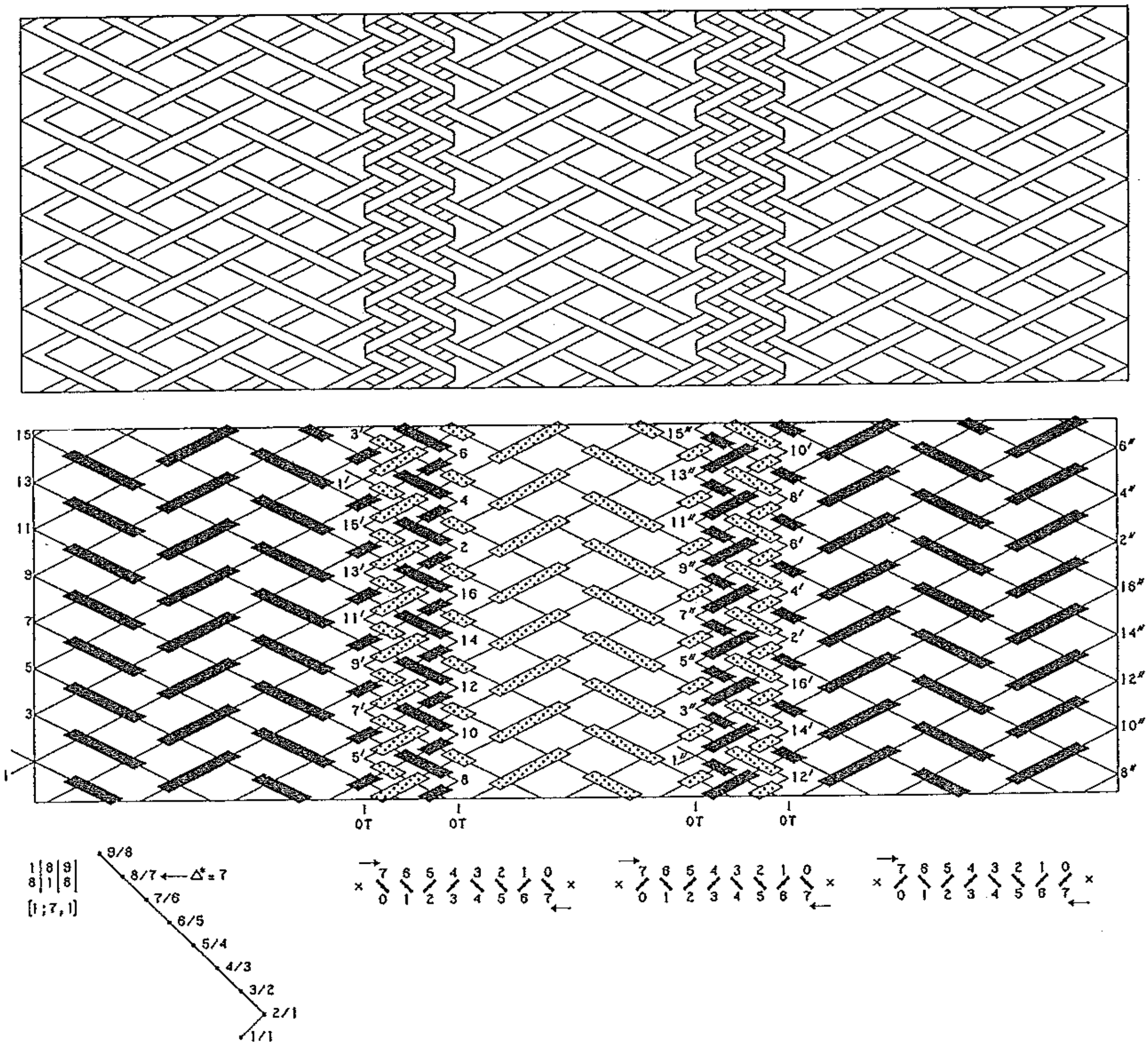

Fig. 905 — Interbraided OT bight-edges.

half-cycle 1′:			$o - u$.
half-cycle 2′:	$i = 0$	:	OT — $2u - o$.
half-cycle 3′:	$i = 0$	:	OT — $o - 2u$.
half-cycle 4′:	$i \le 1$	:	OT — $o - 2u - o$.
half-cycle 5′:	$i \le 1$	:	OT — $o - u - o - u$.

half-cycle $6'$: $i \le 2$: OT — $u - o - 2u - o$.
half-cycle $7'$: $i \le 2$: OT — $o - 2u - o - u$.
half-cycle $8'$: $i \le 3$: OT — $2u - o - 2u - o$.
half-cycle $9'$: $i \le 3$: OT — $o - 3u - o - u$.
half-cycle $10'$: $i \le 4$: OT — $o - 2u - o - 2u - o$.
half-cycle $11'$: $i \le 4$: OT — $o - u - o - 2u - o - u$.
half-cycle $12'$: $i \le 5$: OT — $2o - 2u - o - 2u - o$.
half-cycle $13'$: $i \le 5$: OT — $o - u - 2o - 2u - o - u$.
half-cycle $14'$: $i \le 6$: OT — $u - 2o - 2u - o - 2u - o$.
half-cycle $15'$: $i \le 6$: OT — $o - 2u - 2o - 2u - o - u$.
half-cycle $16'$: $i \le 7$: OT — $o - u - 2o - 2u - o - 2u - o$.

half-cycle $1''$: $o - u$.
half-cycle $2''$: $i = 0$: $2u - o$.
half-cycle $3''$: $i = 0$: OT — $o - u - o$.
half-cycle $4''$: $i \le 1$: $o - 2u - o$.
half-cycle $5''$: $i \le 1$: OT — $o - u - 2o$.
half-cycle $6''$: $i \le 2$: $u - o - 2u - o$.
half-cycle $7''$: $i \le 2$: OT — $o - 2u - 2o$.
half-cycle $8''$: $i \le 3$: $2u - o - 2u - o$.
half-cycle $9''$: $i \le 3$: OT — $o - 3u - 2o$.
half-cycle $10''$: $i \le 4$: $o - 2u - o - 2u - o$.
half-cycle $11''$: $i \le 4$: OT — $o - u - o - 2u - 2o$.
half-cycle $12''$: $i \le 5$: $2o - 2u - o - 2u - o$.
half-cycle $13''$: $i \le 5$: OT — $o - u - 2o - 2u - 2o$.
half-cycle $14''$: $i \le 6$: $u - 2o - 2u - o - 2u - o$.
half-cycle $15''$: $i \le 6$: OT — $o - 2u - 2o - 2u - 2o$.
half-cycle $16''$: $i \le 7$: $2u - 2o - 2u - o - 2u - o$.

The interbraided cylindrical OT-UT braid in Fig. 901 shows in the finished knot as a right helix, hence in order to balance its appearance we can add an interbraided cylindrical UT-OT braid which shows in the finished knot as a left helix. This has been done in Fig. 906, resulting in another beautiful knot. Its half-cycle braiding algorithms are as follows:

half-cycle 1: Free run.
half-cycle 2: $i = 0$: o.
half-cycle 3: $i = 0$: o.
half-cycle 4: $i \le 1$: $u - 2o$.
half-cycle 5: $i \le 1$: $u - 2o$.
half-cycle 6: $i \le 2$: $u - 3o$.
half-cycle 7: $i \le 2$: $u - 3o$.
half-cycle 8: $i \le 3$: $o - u - 2o - u - o$.
half-cycle 9: $i \le 3$: $o - u - 2o - u - o$.
half-cycle 10: $i \le 4$: $o - u - 3o - u - o - u$.
half-cycle 11: $i \le 4$: $o - u - 3o - u - o - u$.
half-cycle 12: $i \le 5$: $o - u - 4o - u - o - u$.
half-cycle 13: $i \le 5$: $o - u - 2o - u - o - u - o - u$.
half-cycle 14: $i \le 6$: $2o - u - 4o - 2u - o - u$.
half-cycle 15: $i \le 6$: $2o - u - 2o - u - o - 2u - o - u$.
half-cycle 16: $i \le 7$: $2o - u - 5o - 2u - o - 2u$.

half-cycle 17: $i \leq 7$: $2o - u - 3o - u - o - 2u - o - 2u$.
half-cycle 18: $i \leq 8$: $2o - u - 4o - u - o - 2u - o - 2u$.
half-cycle 19: $i \leq 8$: $2o - u - 3o - 2u - o - 2u - o - 2u$.
half-cycle 20: $i \leq 9$: $2o - 2u - 4o - u - o - 2u - 2o - 2u$.
half-cycle 21: $i \leq 9$: $2o - 2u - 3o - 2u - o - 2u - 2o - 2u$.
half-cycle 22: $i \leq 10$: $2o - 2u - 2o - u - 2o - u - o - 2u - 2o - 2u$.

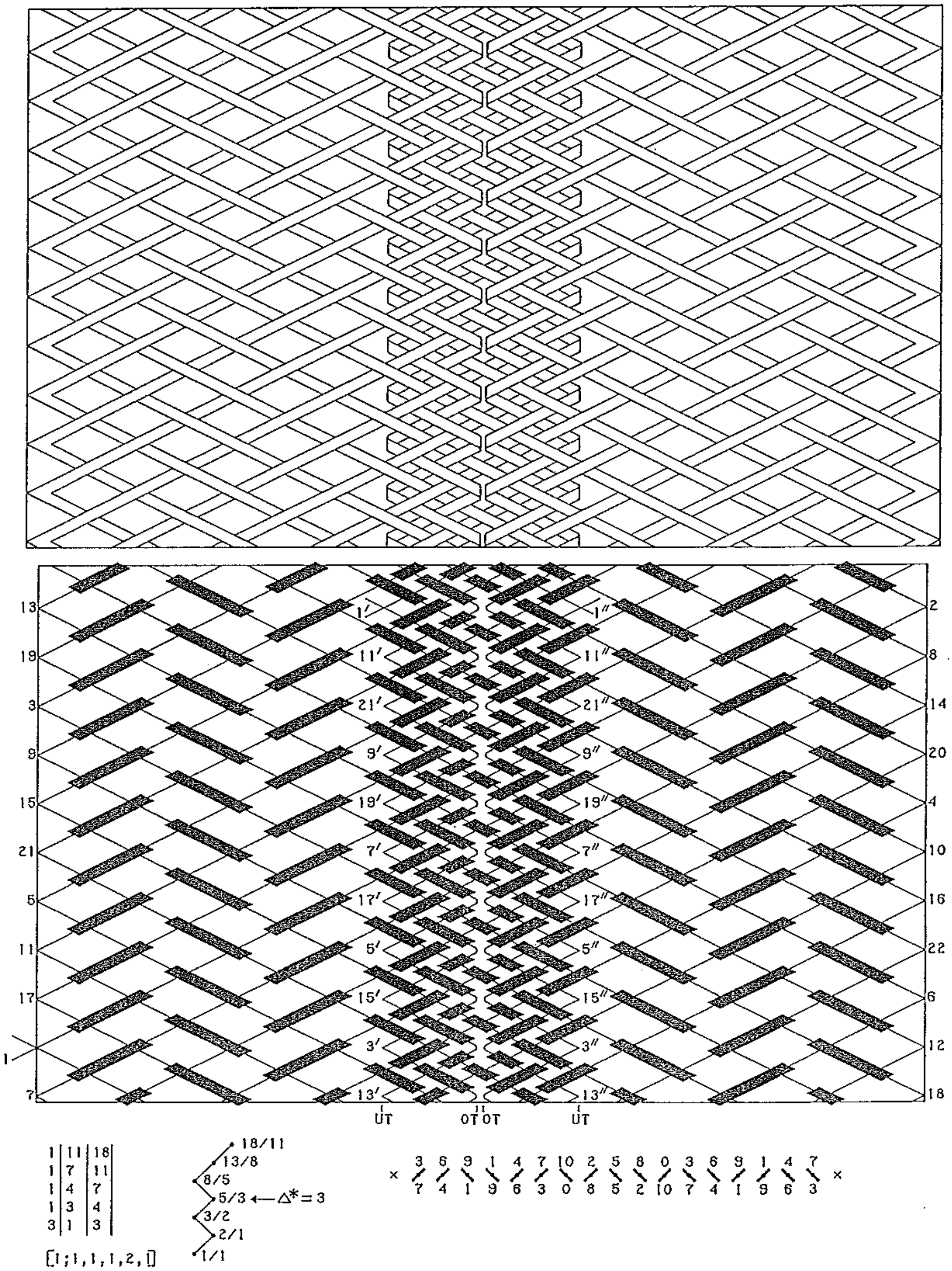

Fig. 906 — Two interbraided cylindrical UT-OT braids.

half-cycle $1'$:	$u - o$.	half-cycle $1''$:	$u - o$.
half-cycle $2'$:	OT — $o - u$.	half-cycle $2''$:	OT — $o - u$.
half-cycle $3'$:	UT — $u - o$.	half-cycle $3''$:	UT — $u - o$.
half-cycle $4'$:	OT — $o - u$.	half-cycle $4''$:	OT — $o - u$.
half-cycle $5'$:	UT — $u - o$.	half-cycle $5''$:	UT — $u - o$.
half-cycle $6'$:	OT — $o - u$.	half-cycle $6''$:	OT — $o - u$.
half-cycle $7'$:	UT — $u - o$.	half-cycle $7''$:	UT — $u - o$.
half-cycle $8'$:	OT — $o - u$.	half-cycle $8''$:	OT — $o - u$.
half-cycle $9'$:	UT — $u - o$.	half-cycle $9''$:	UT — $u - o$.
half-cycle $10'$:	OT — $o - u$.	half-cycle $10''$:	OT — $o - u$.
half-cycle $11'$:	UT — $u - o$.	half-cycle $11''$:	UT — $u - o$.
half-cycle $12'$:	OT — $2o - u$.	half-cycle $12''$:	OT — $2o - u$.
half-cycle $13'$:	UT — $2u - o$.	half-cycle $13''$:	UT — $2u - o$.
half-cycle $14'$:	OT — $2o - u$.	half-cycle $14''$:	OT — $2o - u$.
half-cycle $15'$:	UT — $2u - o$.	half-cycle $15''$:	UT — $2u - o$.
half-cycle $16'$:	OT — $2o - u$.	half-cycle $16''$:	OT — $2o - u$.
half-cycle $17'$:	UT — $2u - o$.	half-cycle $17''$:	UT — $2u - o$.
half-cycle $18'$:	OT — $2o - u$.	half-cycle $18''$:	OT — $2o - u$.
half-cycle $19'$:	UT — $2u - o$.	half-cycle $19''$:	UT — $2u - o$.
half-cycle $20'$:	OT — $2o - u$.	half-cycle $20''$:	OT — $2o - u$.
half-cycle $21'$:	UT — $2u - o$.	half-cycle $21''$:	UT — $2u - o$.
half-cycle $22'$:	OT — $2o - u$.	half-cycle $22''$:	OT — $2o - u$.

In Fig. 907 the left-hand Asymmetric Regular Knot with $A_l = 2$, $A_r = 1$, $x = 11$ has an OT right bight-boundary while the right-hand Asymmetric Regular Knot with $A_l = 1$, $A_r = 2$, $x = 11$ has an OT left bight-boundary. This beautiful knot can be braided over an oval or a conical foundation. Its half-cycle braiding algorithms are:

half-cycle 1 :	$L_1 \longrightarrow R$:	Free run.
half-cycle 2 :	$R \longrightarrow L_2$:	OT — u.
half-cycle 3 :	$L_2 \longrightarrow R$:	u.
half-cycle 4 :	$R \longrightarrow L_1$:	OT — $2o$.
half-cycle 5 :	$L_1 \longrightarrow R$:	$u - o$.
half-cycle 6 :	$R \longrightarrow L_2$:	OT — $u - o - u$.
half-cycle 7 :	$L_2 \longrightarrow R$:	$2o - u$.
half-cycle 8 :	$R \longrightarrow L_1$:	OT — $4o$.
half-cycle 9 :	$L_1 \longrightarrow R$:	$u - o - u - o$.
half-cycle 10 :	$R \longrightarrow L_2$:	OT — $u - o - u - o - u$.
half-cycle 11 :	$L_2 \longrightarrow R$:	$4o - u$.
half-cycle 12 :	$R \longrightarrow L_1$:	OT — $o - u - 4o - u$.
half-cycle 13 :	$L_1 \longrightarrow R$:	$o - u - o - u - 2o - u$.
half-cycle 14 :	$R \longrightarrow L_2$:	OT — $u - o - u - 2o - 2u$.
half-cycle 15 :	$L_2 \longrightarrow R$:	$4o - u - o - u$.
half-cycle 16 :	$R \longrightarrow L_1$:	OT — $o - u - 2o - 2u - 2o - u$.
half-cycle 17 :	$L_1 \longrightarrow R$:	$o - u - 2o - 2u - 2o - u$.
half-cycle 18 :	$R \longrightarrow L_2$:	OT — $u - 2o - 2u - 2o - 2u$.
half-cycle 19 :	$L_2 \longrightarrow R$:	$2o - 2u - 2o - u - o - u$.
half-cycle 20 :	$R \longrightarrow L_1$:	OT — $o - 3u - 2o - 2u - 2o - u$.

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half-cycle $1'$:	$R_1 \longrightarrow L$:	$u - o$.
half-cycle $2'$:	$L \longrightarrow R_2$:	OT — $o - 2u$.

half-cycle 3′ :	$R_2 \longrightarrow L$:	$2u - o$.
half-cycle 4′ :	$L \longrightarrow R_1$:	OT — $o - u - 2o$.
half-cycle 5′ :	$R_1 \longrightarrow L$:	$u - o - u - o$.
half-cycle 6′ :	$L \longrightarrow R_2$:	OT — $o - 2u - o - u$.
half-cycle 7′ :	$R_2 \longrightarrow L$:	$2o - 2u - o$.
half-cycle 8′ :	$L \longrightarrow R_1$:	OT — $o - u - 4o$.
half-cycle 9′ :	$R_1 \longrightarrow L$:	$u - o - u - o - u - o$.
half-cycle 10′ :	$L \longrightarrow R_2$:	OT — $o - 2u - o - u - o - u$.
half-cycle 11′ :	$R_2 \longrightarrow L$:	$4o - 2u - o$.
half-cycle 12′ :	$L \longrightarrow R_1$:	OT — $2o - 2u - 4o - u$.
half-cycle 13′ :	$R_1 \longrightarrow L$:	$o - u - o - u - 2o - 2u - o$.
half-cycle 14′ :	$L \longrightarrow R_2$:	OT — $o - 2u - o - u - 2o - 2u$.
half-cycle 15′ :	$R_2 \longrightarrow L$:	$4o - u - o - 2u - o$.
half-cycle 16′ :	$L \longrightarrow R_1$:	OT — $2o - 2u - 2o - 2u - 2o - u$.
half-cycle 17′ :	$R_1 \longrightarrow L$:	$o - u - 2o - 2u - 2o - 2u - o$.
half-cycle 18′ :	$L \longrightarrow R_2$:	OT — $o - 2u - 2o - 2u - 2o - 2u$.
half-cycle 19′ :	$R_2 \longrightarrow L$:	$2o - 2u - 2o - u - o - 2u - o$.
half-cycle 20′ :	$L \longrightarrow R_1$:	OT — $2o - 4u - 2o - 2u - 2o - u$.

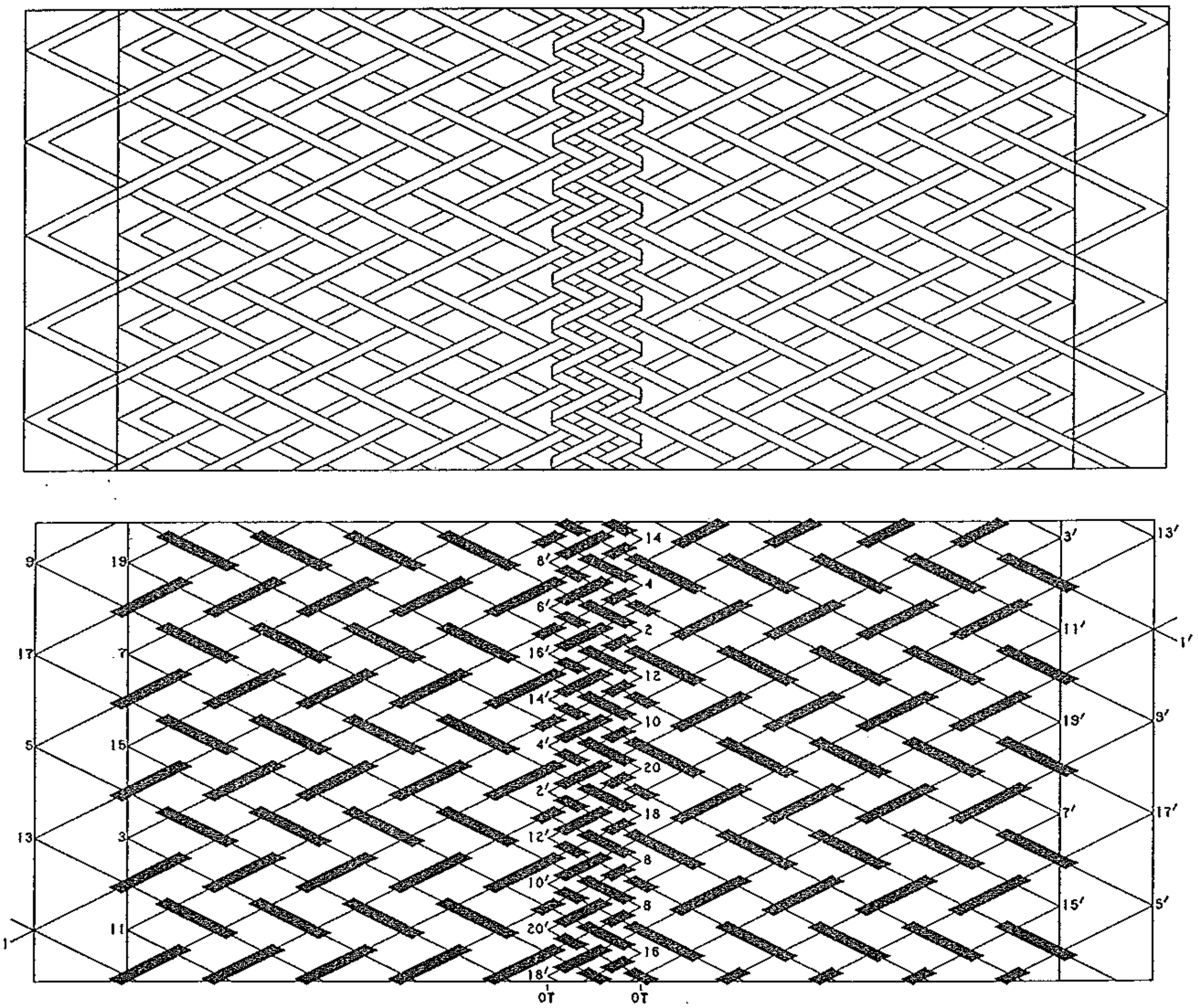

Fig. 907 — OT-edge interbraid of two Asymmetric Regular Nested Knots.

Fig. 908 shows an alternative coding along the sides of the interbraiding.

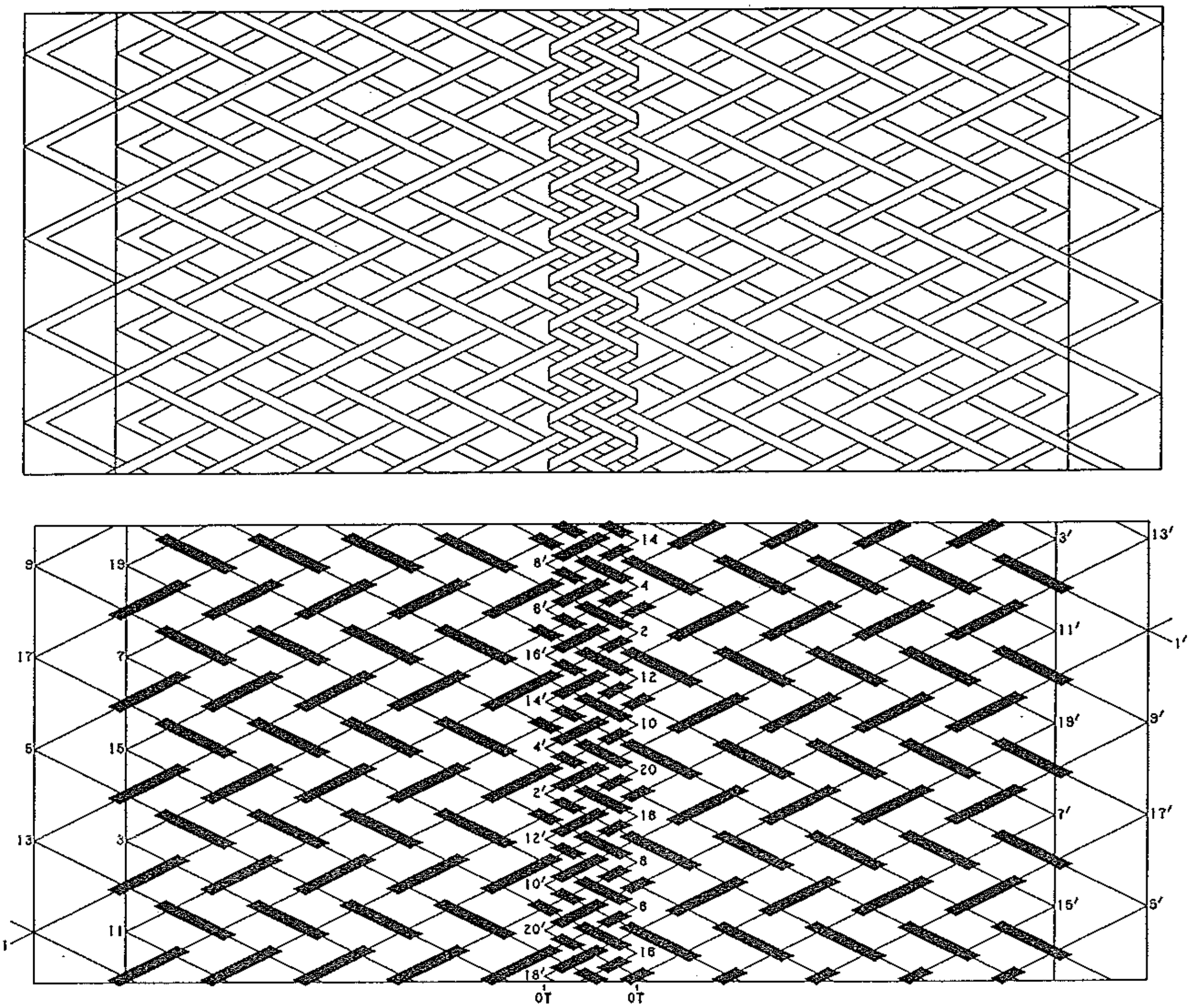

Fig. 908 — OT-edge interbraid of two Asymmetric Regular Nested Knots.

The associated half-cycle braiding algorithms are:

half-cycle 1 :	$L_1 \longrightarrow R$:		Free run.
half-cycle 2 :	$R \longrightarrow L_2$:	OT —	u .
half-cycle 3 :	$L_2 \longrightarrow R$:		u .
half-cycle 4 :	$R \longrightarrow L_1$:	OT —	$2o$.
half-cycle 5 :	$L_1 \longrightarrow R$:		$u - o$.
half-cycle 6 :	$R \longrightarrow L_2$:	OT —	$u - o - u$.
half-cycle 7 :	$L_2 \longrightarrow R$:		$2o - u$.
half-cycle 8 :	$R \longrightarrow L_1$:	OT —	$4o$.
half-cycle 9 :	$L_1 \longrightarrow R$:		$u - o - u - o$.
half-cycle 10 :	$R \longrightarrow L_2$:	OT —	$u - o - u - o - u$.
half-cycle 11 :	$L_2 \longrightarrow R$:		$4o - u$.
half-cycle 12 :	$R \longrightarrow L_1$:	OT —	$6o - u$.
half-cycle 13 :	$L_1 \longrightarrow R$:		$o - u - o - u - 2o - u$.
half-cycle 14 :	$R \longrightarrow L_2$:	OT —	$u - o - u - 2o - 2u$.
half-cycle 15 :	$L_2 \longrightarrow R$:		$4o - 3u$.
half-cycle 16 :	$R \longrightarrow L_1$:	OT —	$4o - 2u - 2o - u$.
half-cycle 17 :	$L_1 \longrightarrow R$:		$o - u - 2o - 2u - 2o - u$.

half-cycle 18 : $R \longrightarrow L_2$: OT — $u - 2o - 2u - 2o - 2u$.
half-cycle 19 : $L_2 \longrightarrow R$: $2o - 2u - 2o - 3u$.
half-cycle 20 : $R \longrightarrow L_1$: OT — $2o - 2u - 2o - 2u - 2o - u$.

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half-cycle 1′ : $R_1 \longrightarrow L$: $u - o$.
half-cycle 2′ : $L \longrightarrow R_2$: OT — $o - 2u$.
half-cycle 3′ : $R_2 \longrightarrow L$: $2u - o$.
half-cycle 4′ : $L \longrightarrow R_1$: OT — $o - u - 2o$.
half-cycle 5′ : $R_1 \longrightarrow L$: $u - o - u - o$.
half-cycle 6′ : $L \longrightarrow R_2$: OT — $o - 2u - o - u$.
half-cycle 7′ : $R_2 \longrightarrow L$: $2o - 2u - o$.
half-cycle 8′ : $L \longrightarrow R_1$: OT — $o - u - 4o$.
half-cycle 9′ : $R_1 \longrightarrow L$: $u - o - u - o - u - o$.
half-cycle 10′ : $L \longrightarrow R_2$: OT — $o - 2u - o - u - o - u$.
half-cycle 11′ : $R_2 \longrightarrow L$: $4o - 2u - o$.
half-cycle 12′ : $L \longrightarrow R_1$: OT — $2o - u - 5o - u$.
half-cycle 13′ : $R_1 \longrightarrow L$: $o - u - o - u - 2o - 2u - o$.
half-cycle 14′ : $L \longrightarrow R_2$: OT — $o - 2u - o - u - 2o - 2u$.
half-cycle 15′ : $R_2 \longrightarrow L$: $4o - 4u - o$.
half-cycle 16′ : $L \longrightarrow R_1$: OT — $2o - u - 3o - 2u - 2o - u$.
half-cycle 17′ : $R_1 \longrightarrow L$: $o - u - 2o - 2u - 2o - 2u - o$.
half-cycle 18′ : $L \longrightarrow R_2$: OT — $o - 2u - 2o - 2u - 2o - 2u$.
half-cycle 19′ : $R_2 \longrightarrow L$: $2o - 2u - 2o - 4u - o$.
half-cycle 20′ : $L \longrightarrow R_1$: OT — $2o - u - o - 2u - 2o - 2u - 2o - u$.

⋆⋆ *Asymmetric Regular Nested Cylindrical Braids where the $A = 1$ bight-edges with OT bight-elements are interwoven can be used in many applications and hence it is important to know their string-run relationships. Derive the relationships between first-return string-runs, the number of essential components and the $A > 1$ bight-edge.*

By combining the knot in Fig. 908 with its mirror-image, we obtain the knot in Fig. 909. Note that since the right-hand knot in Fig. 908 has an odd-number of nests on its right bight-edge and requires one essential string, its combined mirror-imaged knot (the central knot in Fig. 909) requires also one essential string. The braiding half-cycle algorithms associated with the knot in Fig. 909 are as follows:

half-cycle 1 : $L_1 \longrightarrow R$: Free run.
half-cycle 2 : $R \longrightarrow L_2$: OT — u .
half-cycle 3 : $L_2 \longrightarrow R$: u .
half-cycle 4 : $R \longrightarrow L_1$: OT — $2o$.
half-cycle 5 : $L_1 \longrightarrow R$: $u - o$.
half-cycle 6 : $R \longrightarrow L_2$: OT — $u - o - u$.
half-cycle 7 : $L_2 \longrightarrow R$: $2o - u$.
half-cycle 8 : $R \longrightarrow L_1$: OT — $4o$.
half-cycle 9 : $L_1 \longrightarrow R$: $u - o - u - o$.
half-cycle 10 : $R \longrightarrow L_2$: OT — $u - o - u - o - u$.
half-cycle 11 : $L_2 \longrightarrow R$: $4o - u$.
half-cycle 12 : $R \longrightarrow L_1$: OT — $6o - u$.
half-cycle 13 : $L_1 \longrightarrow R$: $o - u - o - u - 2o - u$.
half-cycle 14 : $R \longrightarrow L_2$: OT — $u - o - u - 2o - 2u$.
half-cycle 15 : $L_2 \longrightarrow R$: $4o - 3u$.

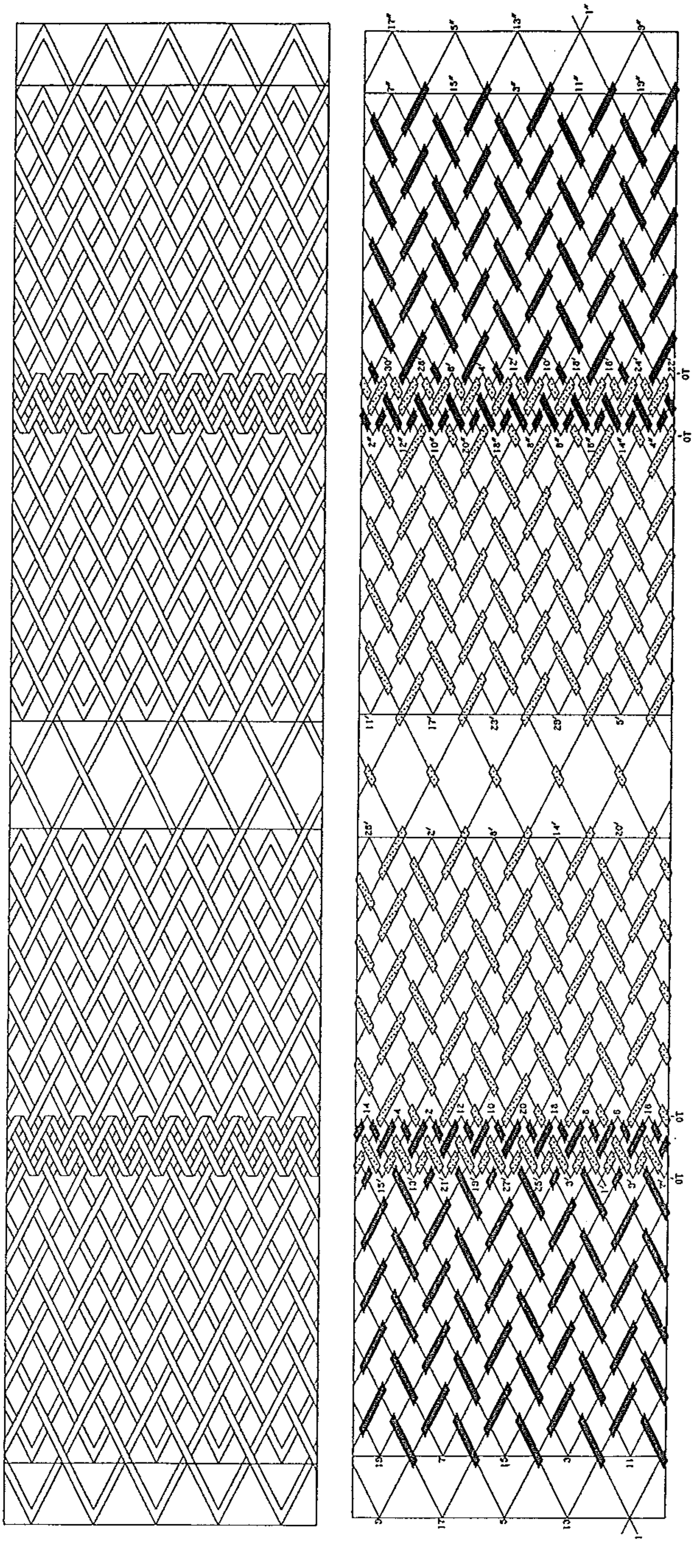

Fig. 909 — Combining the mirror-image of Fig. 908 with Fig. 908.

half-cycle 16 :	$R \longrightarrow L_1$:	OT — $4o - 2u - 2o - u$.
half-cycle 17 :	$L_1 \longrightarrow R$:	$o - u - 2o - 2u - 2o - u$.
half-cycle 18 :	$R \longrightarrow L_2$:	OT — $u - 2o - 2u - 2o - 2u$.
half-cycle 19 :	$L_2 \longrightarrow R$:	$2o - 2u - 2o - 3u$.
half-cycle 20 :	$R \longrightarrow L_1$:	OT — $2o - 2u - 2o - 2u - 2o - u$.
half-cycle 1′ :	$L \longrightarrow C_L$:	$o - u$.
half-cycle 2′ :	$C_L \longrightarrow L$:	$2u - o$.
half-cycle 3′ :	$L \longrightarrow R$:	OT — $o - u - o$.
half-cycle 4′ :	$R \longrightarrow C_R$:	OT — u .
half-cycle 5′ :	$C_R \longrightarrow R$:	u .
half-cycle 6′ :	$R \longrightarrow L$:	OT — $u - o - u - o - u - o$.
half-cycle 7′ :	$L \longrightarrow C_L$:	OT — $o - u - o - u$.
half-cycle 8′ :	$C_L \longrightarrow L$:	$2o - u - o$.
half-cycle 9′ :	$L \longrightarrow R$:	OT — $o - u - 3o - 2u$.
half-cycle 10′ :	$R \longrightarrow C_R$:	OT — $3u$.
half-cycle 11′ :	$C_R \longrightarrow R$:	$u - o - u$.
half-cycle 12′ :	$R \longrightarrow L$:	OT — $2o - u - 2o - u - 2o - 2u - o$.
half-cycle 13′ :	$L \longrightarrow C_L$:	OT — $o - 2u - o - 2u$.
half-cycle 14′ :	$C_L \longrightarrow L$:	$2o - 4u - o$.
half-cycle 15′ :	$L \longrightarrow R$:	OT — $2o - u - o - u - 2o - 3u - 2o$.
half-cycle 16′ :	$R \longrightarrow C_R$:	OT — $2u - 2o - u$.
half-cycle 17′ :	$C_R \longrightarrow R$:	$u - 2o - 2u$.
half-cycle 18′ :	$R \longrightarrow L$:	OT — $3o - 2u - 2o - 2u - 2o - 2u - o - u - o$.
half-cycle 19′ :	$L \longrightarrow C_L$:	OT — $o - 2u - 2o - u - o - u$.
half-cycle 20′ :	$C_L \longrightarrow L$:	$2o - 2u - 2o - 2u - o$.
half-cycle 21′ :	$L \longrightarrow R$:	OT — $2o - u - o - 2u - 3o - u - o - 2u-$ $2o - 2u$.
half-cycle 22′ :	$R \longrightarrow C_R$:	OT — $2u - 2o - 3u$.
half-cycle 23′ :	$C_R \longrightarrow R$:	$u - 2o - 2u - o - u$.
half-cycle 24′ :	$R \longrightarrow L$:	OT — $3o - 2u - o - u - 2o - u - o - u - 2o-$ $2u - 2o - 2u - o$.
half-cycle 25′ :	$L \longrightarrow C_L$:	OT — $o - 2u - 2o - 2u - o - 2u$.
half-cycle 26′ :	$C_L \longrightarrow L$:	$2o - 2u - 2o - 4u - o$.
half-cycle 27′ :	$L \longrightarrow R$:	OT — $2o - u - o - 2u - 2o - u - 2o - u - o-$ $3u - 2o - 2u - o - u$.
half-cycle 28′ :	$R \longrightarrow C_R$:	OT — $2u - 2o - 2u - 2o - u$.
half-cycle 29′ :	$C_R \longrightarrow R$:	$u - 2o - 2u - 2o - 2u$.
half-cycle 30′ :	$R \longrightarrow L$:	OT — $3o - 2u - 2o - 2u - 2o - u - 2o - 2u-$ $2o - 2u - 2o - 2u - o$.
half-cycle 1″ :	$R_1 \longrightarrow L$:	$u - o$.
half-cycle 2″ :	$L \longrightarrow R_2$:	OT — $o - 2u$.
half-cycle 3″ :	$R_2 \longrightarrow L$:	$2u - o$.
half-cycle 4″ :	$L \longrightarrow R_1$:	OT — $o - u - 2o$.
half-cycle 5″ :	$R_1 \longrightarrow L$:	$u - o - u - o$.
half-cycle 6″ :	$L \longrightarrow R_2$:	OT — $o - 2u - o - u$.
half-cycle 7″ :	$R_2 \longrightarrow L$:	$2o - 2u - o$.
half-cycle 8″ :	$L \longrightarrow R_1$:	OT — $o - u - 4o$.
half-cycle 9″ :	$R_1 \longrightarrow L$:	$u - o - u - o - u - o$.

half-cycle $10''$:	$L \longrightarrow R_2$:	OT — $o - 2u - o - u - o - u$.
half-cycle $11''$:	$R_2 \longrightarrow L$:	$4o - 2u - o$.
half-cycle $12''$:	$L \longrightarrow R_1$:	OT — $2o - u - 5o - u$.
half-cycle $13''$:	$R_1 \longrightarrow L$:	$o - u - o - u - 2o - 2u - o$.
half-cycle $14''$:	$L \longrightarrow R_2$:	OT — $o - 2u - o - u - 2o - 2u$.
half-cycle $15''$:	$R_2 \longrightarrow L$:	$4o - 4u - o$.
half-cycle $16''$:	$L \longrightarrow R_1$:	OT — $2o - u - 3o - 2u - 2o - u$.
half-cycle $17''$:	$R_1 \longrightarrow L$:	$o - u - 2o - 2u - 2o - 2u - o$.
half-cycle $18''$:	$L \longrightarrow R_2$:	OT — $o - 2u - 2o - 2u - 2o - 2u$.
half-cycle $19''$:	$R_2 \longrightarrow L$:	$2o - 2u - 2o - 4u - o$.
half-cycle $20''$:	$L \longrightarrow R_1$:	OT — $2o - u - o - 2u - 2o - 2u - 2o - u$.

When for half-cycle $1'$ the grainside is uppermost then the uppermost surface for the half-cycles of the central knot are (G indicates grain-side and F indicates flesh-side):

G	G	F	G	G	F
$1'$	$2'$	$3'$	$4'$	$5'$	$6'$
$7'$	$8'$	$9'$	$10'$	$11'$	$12'$
$13'$	$14'$	$15'$	$16'$	$17'$	$18'$
$19'$	$20'$	$21'$	$22'$	$23'$	$24'$
$25'$	$26'$	$27'$	$28'$	$29'$	$30'$

Hence the grain-side and flesh side of the string forms a balanced pattern in the central knot, which is an important requirement of course.

When we change the leftmost and rightmost interwoven knots in Fig. 909 to those in Fig. 910, we obtain a simple hour-glass knot. It should be braided over a suitable (braided) foundation.

Its half-cycle braiding algorithms are:

half-cycle 1 :		Free run.
half-cycle 2 :	$i = 0$:	OT — Free run.
half-cycle 3 :	$i = 0$:	OT — Free run.
half-cycle 4 :	$i \leq 1$:	OT — o.
half-cycle 5 :	$i \leq 1$:	OT — o.
half-cycle 6 :	$i \leq 2$:	OT — $o - u$.
half-cycle 7 :	$i \leq 2$:	OT — $o - u$.
half-cycle 8 :	$i \leq 3$:	OT — $o - u - o$.
half-cycle 9 :	$i \leq 3$:	OT — $o - u - o$.
half-cycle 10 :	$i \leq 4$:	OT — $o - u - o - u$.
half-cycle 11 :	$i \leq 4$:	OT — $o - u - o - u$.
half-cycle 12 :	$i \leq 5$:	OT — $o - u - o - u - o$.
half-cycle 13 :	$i \leq 5$:	OT — $o - u - o - u - o$.
half-cycle 14 :	$i \leq 6$:	OT — $o - u - o - u - o - u$.
half-cycle 15 :	$i \leq 6$:	OT — $o - u - o - u - o - u$.
half-cycle 16 :	$i \leq 7$:	OT — $o - u - o - u - o - u - o$.
half-cycle 17 :	$i \leq 7$:	OT — $o - u - o - u - o - u - o$.
half-cycle 18 :	$i \leq 8$:	OT — $o - u - o - u - o - u - o - u$.
half-cycle 19 :	$i \leq 8$:	OT — $o - u - o - u - o - u - o - u$.
half-cycle 20 :	$i \leq 9$:	OT — $o - u - o - u - o - u - o - u$.

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half-cycle $1'$:	$L \longrightarrow C_L$:	$o - u$.
half-cycle $2'$:	$C_L \longrightarrow L$:	$2u - o$.

half-cycle 3′ :	$L \longrightarrow R$:	$\mathrm{OT} — o - u - o$.
half-cycle 4′ :	$R \longrightarrow C_R$:	$\mathrm{OT} — u$.
half-cycle 5′ :	$C_R \longrightarrow R$:	u.
half-cycle 6′ :	$R \longrightarrow L$:	$\mathrm{OT} — u - o - u - o - u - o$.
half-cycle 7′ :	$L \longrightarrow C_L$:	$\mathrm{OT} — o - u - o - u$.
half-cycle 8′ :	$C_L \longrightarrow L$:	$2o - u - o$.
half-cycle 9′ :	$L \longrightarrow R$:	$\mathrm{OT} — o - u - 3o - 2u$.
half-cycle 10′ :	$R \longrightarrow C_R$:	$\mathrm{OT} — 3u$.
half-cycle 11′ :	$C_R \longrightarrow R$:	$u - o - u$.
half-cycle 12′ :	$R \longrightarrow L$:	$\mathrm{OT} — 2o - u - 2o - u - 2o - 2u - o$.
half-cycle 13′ :	$L \longrightarrow C_L$:	$\mathrm{OT} — o - 2u - o - 2u$.
half-cycle 14′ :	$C_L \longrightarrow L$:	$2o - 4u - o$.
half-cycle 15′ :	$L \longrightarrow R$:	$\mathrm{OT} — 2o - u - o - u - 2o - 3u - 2o$.
half-cycle 16′ :	$R \longrightarrow C_R$:	$\mathrm{OT} — 2u - 2o - u$.
half-cycle 17′ :	$C_R \longrightarrow R$:	$u - 2o - 2u$.
half-cycle 18′ :	$R \longrightarrow L$:	$\mathrm{OT} — 3o - 2u - 2o - 2u - 2o - 2u - o - u - o$.
half-cycle 19′ :	$L \longrightarrow C_L$:	$\mathrm{OT} — o - 2u - 2o - u - o - u$.
half-cycle 20′ :	$C_L \longrightarrow L$:	$2o - 2u - 2o - 2u - o$.
half-cycle 21′ :	$L \longrightarrow R$:	$\mathrm{OT} — 2o - u - o - 2u - 3o - u - o - 2u-$ $2o - 2u$.
half-cycle 22′ :	$R \longrightarrow C_R$:	$\mathrm{OT} — 2u - 2o - 3u$.
half-cycle 23′ :	$C_R \longrightarrow R$:	$u - 2o - 2u - o - u$.
half-cycle 24′ :	$R \longrightarrow L$:	$\mathrm{OT} — 3o - 2u - o - u - 2o - u - o - u - 2o-$ $2u - 2o - 2u - o$.
half-cycle 25′ :	$L \longrightarrow C_L$:	$\mathrm{OT} — o - 2u - 2o - 2u - o - 2u$.
half-cycle 26′ :	$C_L \longrightarrow L$:	$2o - 2u - 2o - 4u - o$.
half-cycle 27′ :	$L \longrightarrow R$:	$\mathrm{OT} — 2o - u - o - 2u - 2o - u - 2o - u - o-$ $3u - 2o - 2u - o - u$.
half-cycle 28′ :	$R \longrightarrow C_R$:	$\mathrm{OT} — 2u - 2o - 2u - 2o - u$.
half-cycle 29′ :	$C_R \longrightarrow R$:	$u - 2o - 2u - 2o - 2u$.
half-cycle 30′ :	$R \longrightarrow L$:	$\mathrm{OT} — 3o - 2u - 2o - 2u - 2o - u - 2o - 2u-$ $2o - 2u - 2o - 2u - o$.

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half-cycle 1″ :		$u - o$.
half-cycle 2″ :	$i = 0$:	$\mathrm{OT} — o - u$.
half-cycle 3″ :	$i = 0$:	$\mathrm{OT} — u - o$.
half-cycle 4″ :	$i \leq 1$:	$\mathrm{OT} — 2o - u$.
half-cycle 5″ :	$i \leq 1$:	$\mathrm{OT} — o - u - o$.
half-cycle 6″ :	$i \leq 2$:	$\mathrm{OT} — 2o - 2u$.
half-cycle 7″ :	$i \leq 2$:	$\mathrm{OT} — o - 2u - o$.
half-cycle 8″ :	$i \leq 3$:	$\mathrm{OT} — 2o - 2u - o$.
half-cycle 9″ :	$i \leq 3$:	$\mathrm{OT} — o - u - o - u - o$.
half-cycle 10″ :	$i \leq 4$:	$\mathrm{OT} — 2o - 2u - o - u$.
half-cycle 11″ :	$i \leq 4$:	$\mathrm{OT} — o - u - o - 2u - o$.
half-cycle 12″ :	$i \leq 5$:	$\mathrm{OT} — 2o - 2u - o - u - o$.
half-cycle 13″ :	$i \leq 5$:	$\mathrm{OT} — o - u - o - u - o - u - o$.
half-cycle 14″ :	$i \leq 6$:	$\mathrm{OT} — 2o - 2u - o - u - o - u$.
half-cycle 15″ :	$i \leq 6$:	$\mathrm{OT} — o - u - o - u - o - 2u - o$.
half-cycle 16″ :	$i \leq 7$:	$\mathrm{OT} — 2o - 2u - o - u - o - u - o$.

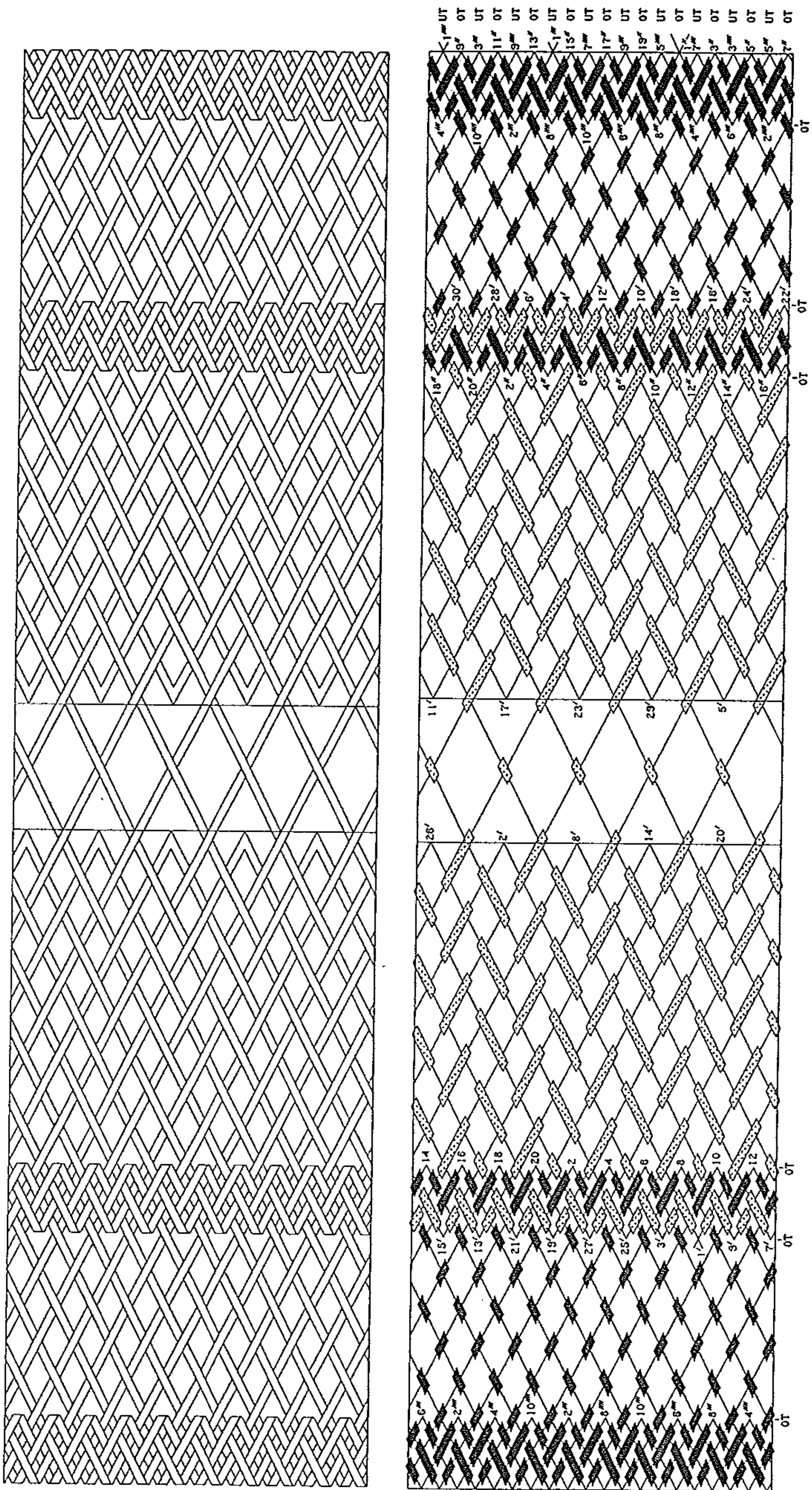

Fig. 910 — A simple Hour-glass Knot.

half-cycle 17″ : $i \leq 7$: OT — $o - u - o - u - o - u - o - u - o$.
half-cycle 18″ : $i \leq 8$: OT — $2o - 2u - o - u - o - u - o - u$.
half-cycle 19″ : $i \leq 8$: OT — $o - u - o - u - o - u - o - 2u - o$.
half-cycle 20″ : $i \leq 9$: OT — $2o - 2u - o - u - o - u - o - u$.

half-cycle 1‴ :	$u - o$.	half-cycle 1⁗ :	$2u - o$.
half-cycle 2‴ :	OT — $o - u$.	half-cycle 2⁗ :	OT — $2o - u$.
half-cycle 3‴ :	UT — $u - o$.	half-cycle 3⁗ :	UT — $2u - o$.
half-cycle 4‴ :	OT — $o - u$.	half-cycle 4⁗ :	OT — $2o - u$.
half-cycle 5‴ :	UT — $u - o$.	half-cycle 5⁗ :	UT — $2u - o$.
half-cycle 6‴ :	OT — $o - u$.	half-cycle 6⁗ :	OT — $2o - u$.
half-cycle 7‴ :	UT — $u - o$.	half-cycle 7⁗ :	UT — $2u - o$.
half-cycle 8‴ :	OT — $o - u$.	half-cycle 8⁗ :	OT — $2o - u$.
half-cycle 9‴ :	UT — $u - o$.	half-cycle 9⁗ :	UT — $2u - o$.
half-cycle 10‴ :	OT — $o - u$.	half-cycle 10⁗ :	OT — $2o - u$.

THE BRAIDER'S NOTEBOOK

We mentioned on pg. 1148 that braids with interbraided bight-edges, as for example in Fig. 902, are often confused with Crocodile Ridge Braids. The Crocodile Ridge Braid as counter part to Fig. 902 is depicted in Fig. 911.

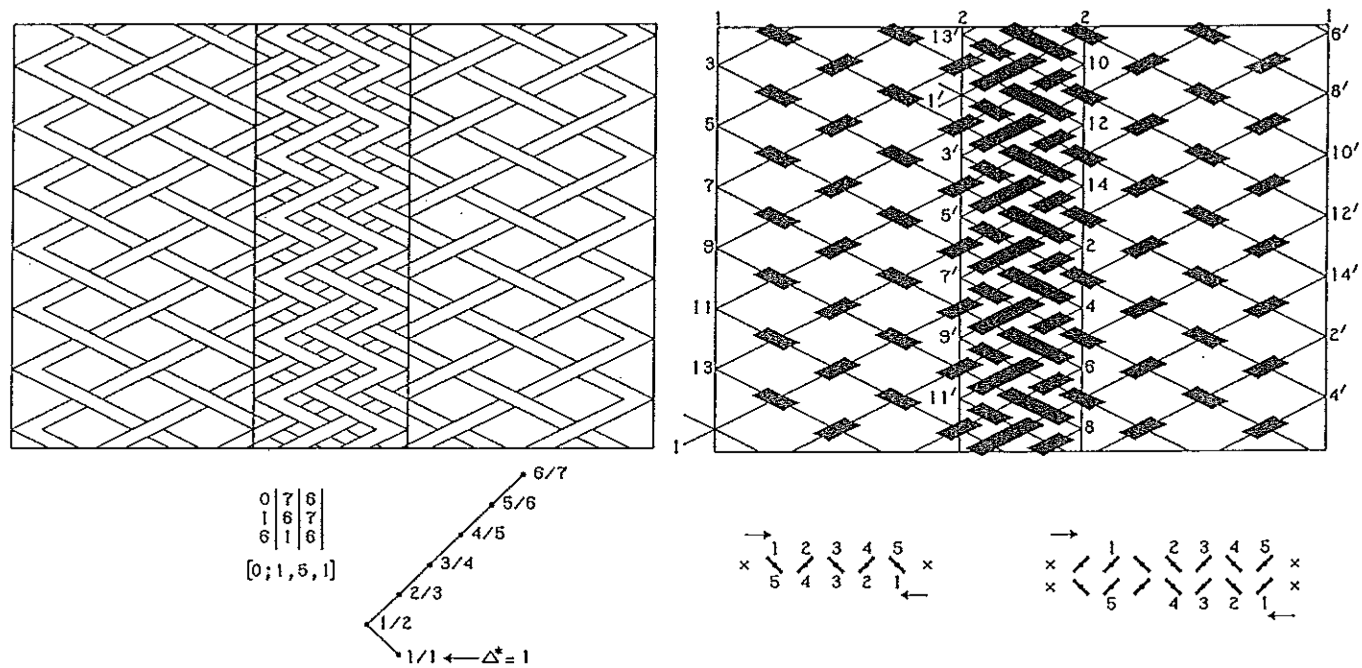

Fig. 911 — A cylindrical Crocodile Ridge Braid.

Its half-cycle braiding algorithms are:

half-cycle 1 :		Free run.
half-cycle 2 :	$i = 0$	: Free run.
half-cycle 3 :	$i = 0$	: Free run.
half-cycle 4 :	$i \leq 1$	: o.
half-cycle 5 :	$i \leq 1$	: u.

half-cycle 6:	$i \leq 2$	$: o - u$.
half-cycle 7:	$i \leq 2$	$: u - o$.
half-cycle 8:	$i \leq 3$	$: o - u - o$.
half-cycle 9:	$i \leq 3$	$: u - o - u$.
half-cycle 10:	$i \leq 4$	$: o - u - o - u$.
half-cycle 11:	$i \leq 4$	$: u - o - u - o$.
half-cycle 12:	$i \leq 5$	$: o - u - o - u - o$.
half-cycle 13:	$i \leq 5$	$: u - o - u - o - u$.
half-cycle 14:	$i \leq 6$	$: o - u - o - u - o$.
half-cycle 1′:		$o - u$.
half-cycle 2′:	$i = 0$	$: u - o$.
half-cycle 3′:	$i = 0$	$: o - u$.
half-cycle 4′:	$i \leq 1$	$: 2u - o$.
half-cycle 5′:	$i \leq 1$	$: 2o - u$.
half-cycle 6′:	$i \leq 2$	$: u - o - u - o$.
half-cycle 7′:	$i \leq 2$	$: 2o - 2u$.
half-cycle 8′:	$i \leq 3$	$: u - o - 2u - o$.
half-cycle 9′:	$i \leq 3$	$: 2o - 2u - o$.
half-cycle 10′:	$i \leq 4$	$: u - o - u - o - u - o$.
half-cycle 11′:	$i \leq 4$	$: 2o - 2u - o - u$.
half-cycle 12′:	$i \leq 5$	$: u - o - u - o - 2u - o$.
half-cycle 13′:	$i \leq 5$	$: 2o - 2u - o - u - o$.
half-cycle 14′:	$i \leq 6$	$: u - o - u - o - 2u - o$.

Hence its half-cycle braiding algorithms are those of the knot in Fig. 902 **without** the OT's.

If we interbraid in a similar way the bight-edges of two $p/b = 3/7$ under-over coded Regular Knots, then we obtain the two left diagrams in Fig. 912. This Cylindrical Crocodile Ridge Braid is a Regular Nested Cylindrical Braid ($A = 2$, $x = 4$, $y = 2$), and represents the limit case for this type of Cylindrical Crocodile Ridge Braid as far as the parts p are concerned.

Although its half-cycle braiding algorithms are

half-cycle 1:	Free run.	half-cycle 1′:	$o - u$.
half-cycle 2: $i = 0$	: Free run.	half-cycle 2′: $i = 0$:	$u - o$.
half-cycle 3: $i = 0$	: Free run.	half-cycle 3′: $i = 0$:	$o - u$.
half-cycle 4: $i \leq 1$	: Free run.	half-cycle 4′: $i \leq 1$:	$u - o$.
half-cycle 5: $i \leq 1$	: Free run.	half-cycle 5′: $i \leq 1$:	$o - u$.
half-cycle 6: $i \leq 2$	$: o$.	half-cycle 6′: $i \leq 2$:	$o - u - o$.
half-cycle 7: $i \leq 2$	$: o$.	half-cycle 7′: $i \leq 2$:	$2o - u$.
half-cycle 8: $i \leq 3$	$: o$.	half-cycle 8′: $i \leq 3$:	$o - u - o$.
half-cycle 9: $i \leq 3$	$: o$.	half-cycle 9′: $i \leq 3$:	$2o - u$.
half-cycle 10: $i \leq 4$	$: o - u$.	half-cycle 10′: $i \leq 4$:	$o - 2u - o$.
half-cycle 11: $i \leq 4$	$: o - u$.	half-cycle 11′: $i \leq 4$:	$2o - 2u$.
half-cycle 12: $i \leq 5$	$: o - u$.	half-cycle 12′: $i \leq 5$:	$o - 2u - o$.
half-cycle 13: $i \leq 5$	$: o - u$.	half-cycle 13′: $i \leq 5$:	$2o - 2u$.
half-cycle 14: $i \leq 6$	$: o - u$.	half-cycle 14′: $i \leq 6$:	$o - 2u - o$.

we would braid in practice the left-hand *over-under* coded Regular Knot (the $p/b = 3/7$ *over-under* coded Regular Knot with the half-cycles 1-14) via the $p/b = 3/4$ *over-under* coded Regular Knot from the $p/b = 3/1$ *over-under* coded Regular Knot (see *The Braider*, Appendix 1996).

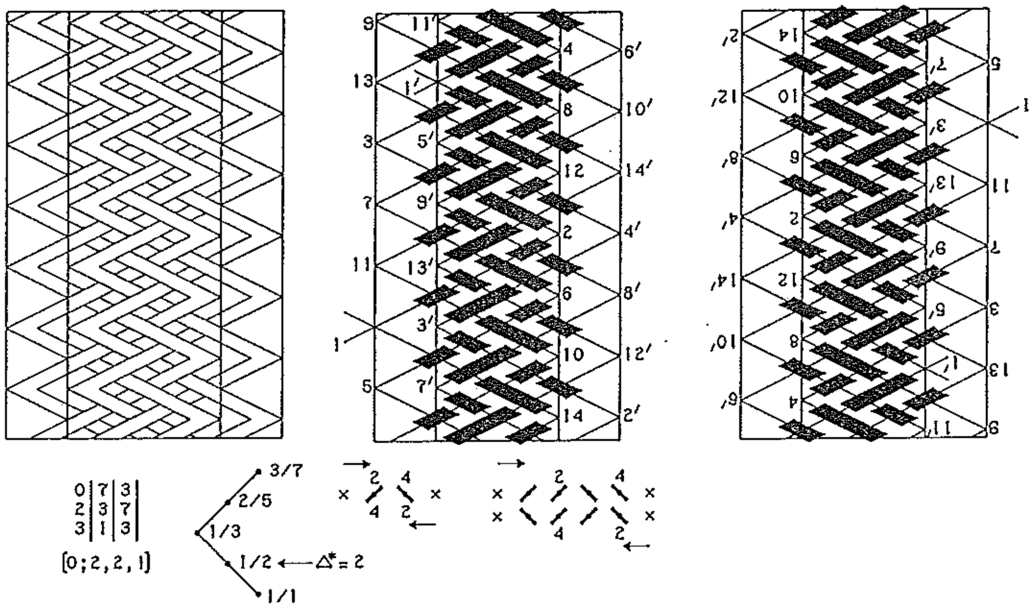

Fig. 912 — Cylindrical Crocodile Ridge Braid as Regular Nested Cylindrical Braid.

When we turn this braid through 180° we obtain its rightmost diagram in Fig. 912. This depicts the braid in the *Encyclopedia of Rawhide and Leather Braiding* by Bruce Grant, pp. 230-231, fig. 6.†

Note that we have met this knot in its imitation duplex form as the Double Twin Scallop Barcus Knot in Appendix 2000, pp. *vii-xii*.

A Sliding Lanyard Knot

In a lanyard we like to be able to adjust the necklace loop. This can be achieved by providing one end of the round braid used for the lanyard with a knot through which the other end of the lanyard round braid can slide. Fig. 913 depicts such a sliding knot for a four string round braid.

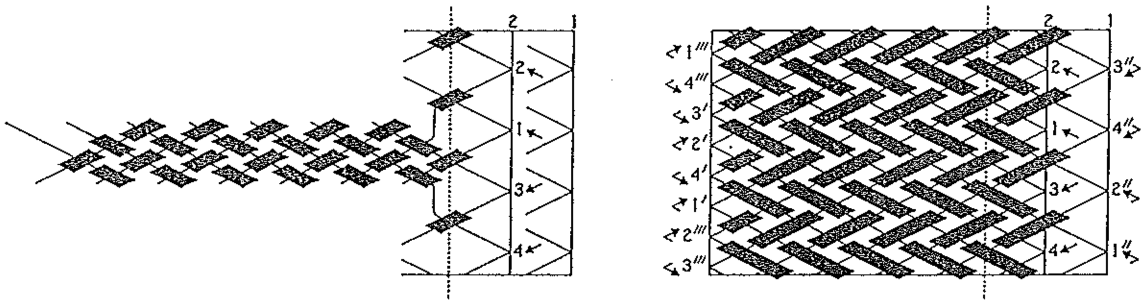

Fig. 913 — A Sliding Knot for a four-string round braid.

† Note that fig. 6 on pg. 231 in Bruce Grant's book does not show OT's on the inter-woven bight-boundaries; it thus depicts a Crocodile Ridge Braid. Hence note that the figs. 3-5 should also not have OT's (and neither UT's of course).

When 2.2 mm. wide string of 0.8 mm. thickness is used, the four-string round braid will be 4 mm. in diameter. The Sliding Knot will have a slightly oval cross section of approximately 11 by 10 mm. and will be approximately 17 mm. long.

After forming the loop in the four-string round braid, place its Sliding Knot end on top of the other loop-end and finish the Sliding Knot end as indicated in the left-hand diagram of Fig. 913 (the dotted line encircles the four-string round braid of the loop which was placed under its Sliding Knot end). Tie a Contrictor Knot over the four crossings on the dotted line in the left-hand diagram (these four crossings belong to the knot in the right-hand diagram of Fig. 913 at the position of the dotted line in that diagram).

The half-cycle braiding algorithms for the sliding knot (the knot depicted by the right-hand diagram in Fig. 913) are:

half-cycle 1 left of the dotted line : Free run.
half-cycle 2 left of the dotted line : Free run.
half-cycle 3 left of the dotted line : $u - o$.
half-cycle 4 left of the dotted line : $u - o$.

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half-cycle $1'$: $o - u - o$.
half-cycle $2'$: $o - u - o$.
half-cycle $3'$: $2o - 2u - 2o - u$.
half-cycle $4'$: $2o - 2u - o$.

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half-cycle $1''$: $u - 2o - 2u - o$.
half-cycle $2''$: $o - u - 2o - u$.
half-cycle $3''$: $2o - u - o - 2u - 2o - u$.
half-cycle $4''$: $2o - u - 2o - 2u - o - u$.

Remove the Constrictor Knot and any other temporary fixing arrangements that may have been used.

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half-cycle $1'''$: $2u - 2o - u - o - 2u$.
half-cycle $2'''$: $o - 2u - o - u - 2o - 2u$.
half-cycle $3'''$: $2u - 2o - 2u - 2o - 2u$.
half-cycle $4'''$: $2u - 2o - 2u - 2o - 2u$.

In this sliding knot $x = 11$, which is for practical applications the minimum value. A longer knot can be obtained by increasing the x-value by a multiple of 4.

A good colour-pattern for the sliding knot in Fig. 913 can be created by using one colour for the strings 1 & 4 and another colour for the strings 2 & 3. The colour-pattern thus obtained is shown in Fig. 914.

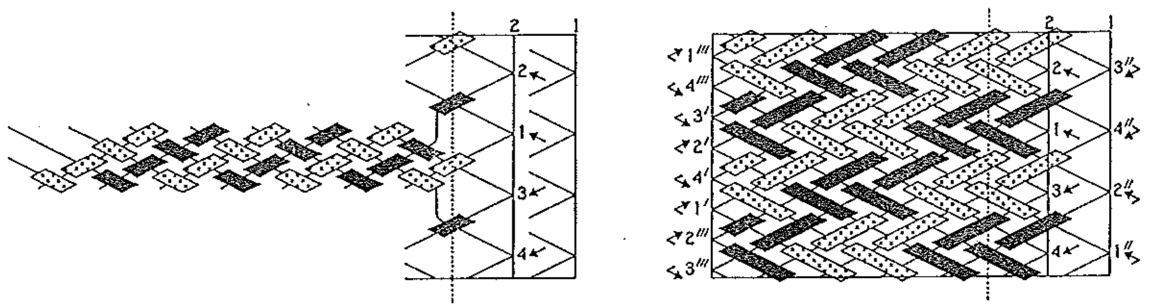

Fig. 914 — A good colour pattern for the knot in Fig. 913.