



No.51

AUGUST 2007.

CONTENTS

	pg.
A Braiding Project — Key-hanger No.4	1191
Braid Design	1210

A quarterly publication
for
the braiding artisan

Resale of this publication or copies thereof
is strictly prohibited

Copyright ©2007 by :

{ A.G. Schaake; 21 Sundown Cresc.; Hamilton; New Zealand.
D. Van Tassel; Box 335; Craig, Co 81626-0335; U.S.A.
F.J.M. Masurel; Ganzenzijde 4; 2317 XG Leiden; Nederland.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photo-copying, recording, or otherwise, without prior written permission.

This publication is available to braiding artisans only.

Copies may be obtained from :

A.G. Schaake,
21 Sundown Cresc.,
Hamilton,
New Zealand.

A Braiding Project — Key-hanger No. 4

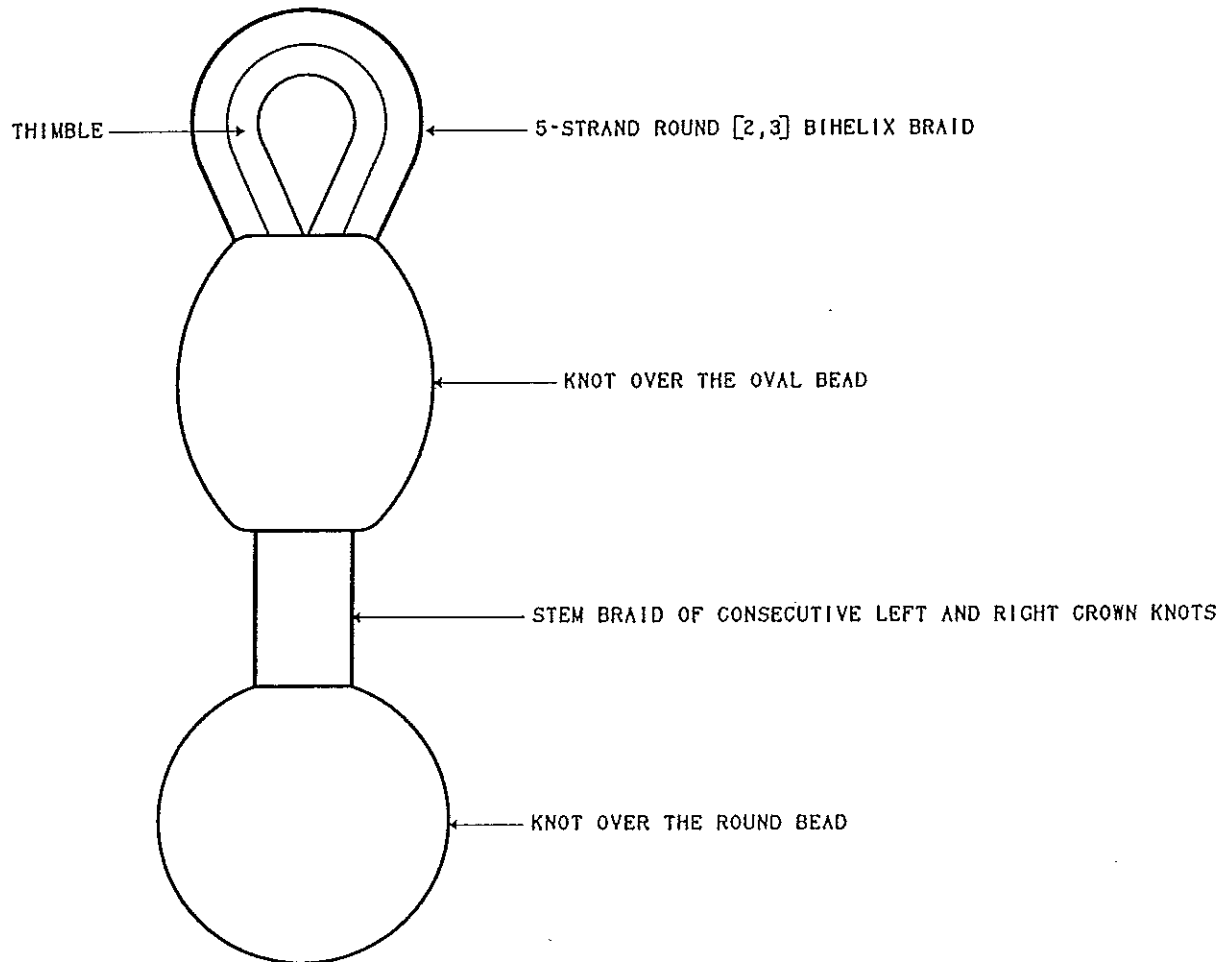


Fig. 935 — Key-hanger No. 4. Cord diameter 2 mm.

The braid forming the eye around the thimble of 25 mm. is a 5-cord [2, 3] Round Bihelix Braid as shown in Fig. 937[†], made at the centre of the cord lengths (cords approximately 60 cm. in length). This braid is put tightly around the thimble and both its 'ends' are then being secured together with the aid of a Double Constrictor Knot[‡] immediately below the thimble. The eight ends of the four cords having the same colour are placed around the two ends of the other coloured cord and this assembly is then wrapped over a length of 20 mm. with a single layer of tape. Over this we press a 26 mm. long oval bead, the hole of which has been enlarged to 8 mm.. This oval bead gets locked by the braid of the stem against the thimble with its 5 cord Round Bihelix Braid. The braid of the stem will be constructed from the eight cord-ends of the same colour. The two cord-ends of the other coloured string will serve as the core of the stem braid. The braid of the stem begins immediately below the oval bead and, as already mentioned, locks this bead firmly against the thimble with its 5-cord [2, 3] Round Bihelix Braid. The stem-braid consists of a sequence of alternating right and left 8-strand Crown Knots as shown in Figs. 936.

[†] Refer to *The Braider*, Issue No. 47, pp. 1114-1116.

[‡] See *The Braider*, Issue No. 47, pg. 1100, Fig. 845.

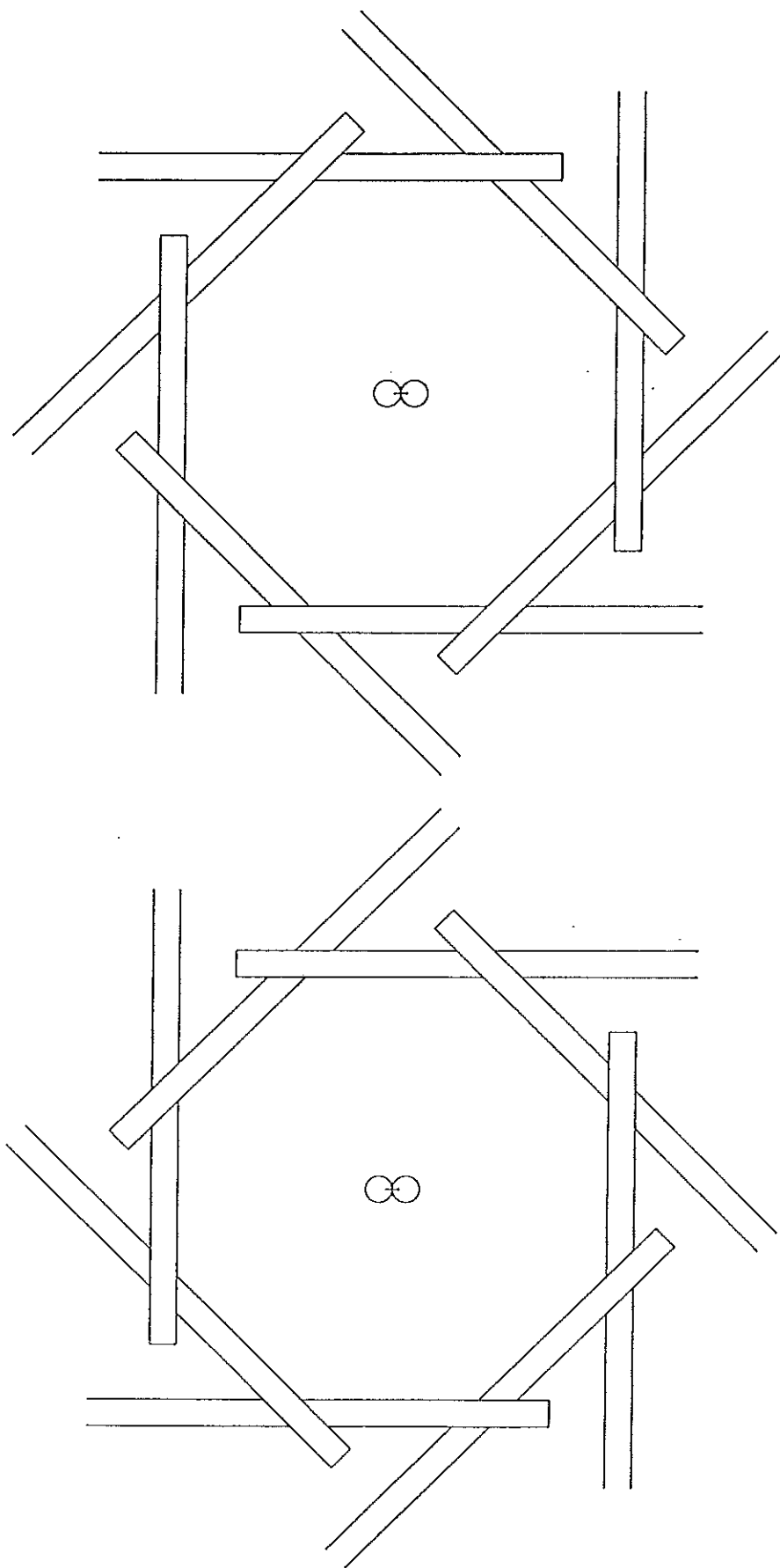


Fig. 936 — The alternating 8-strand right and left Crown Knots.

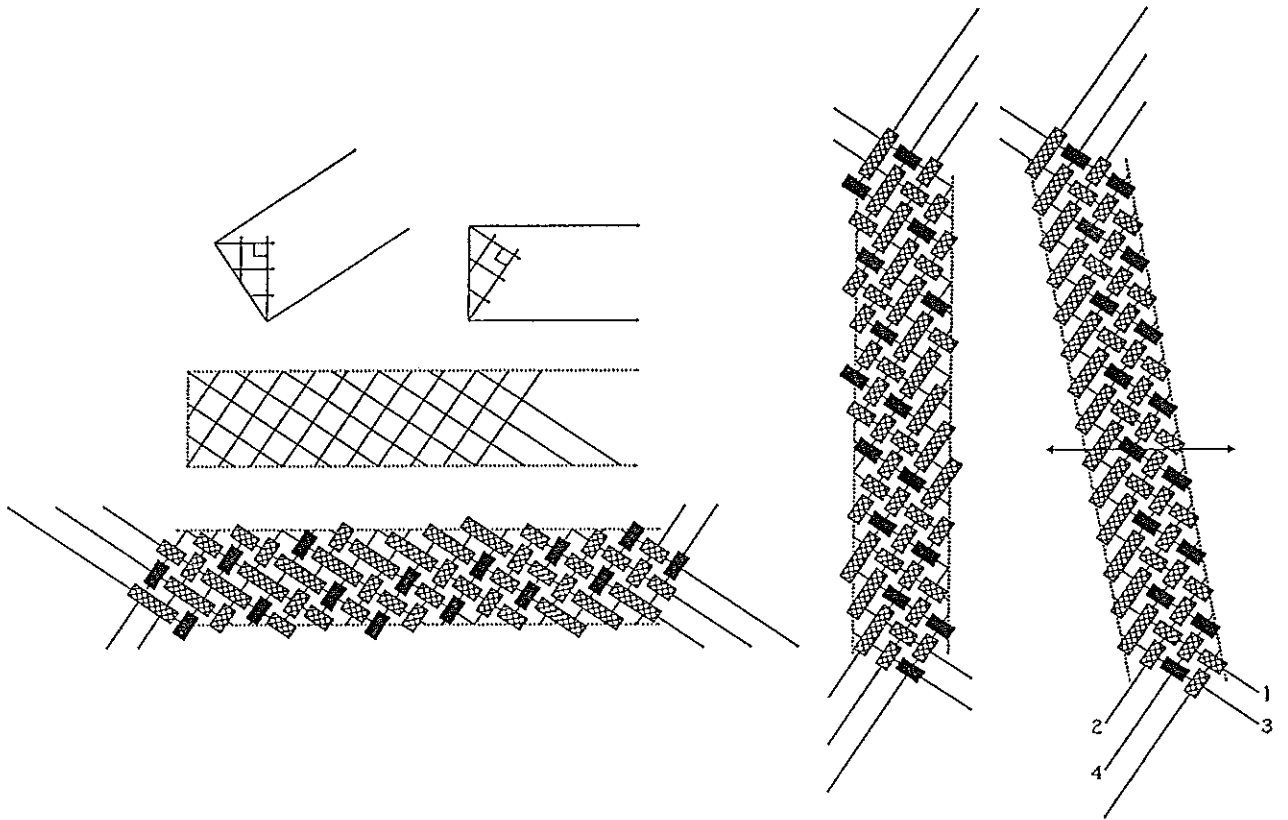


Fig. 937 — The 5-string Round Bihelix Braid with $[n_l, n_r] = [2, 3]$.

The nominal grid-diagram of the knot over the oval bead, immediately below the thimble, is depicted in Fig. 938 (left bight-edge towards thimble).

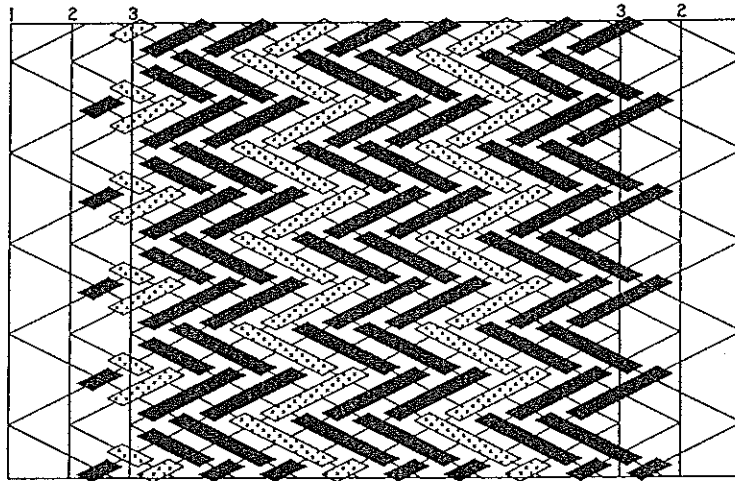


Fig. 938 — Nominal grid-diagram of the knot over oval bead adjacent to thimble.

The string-run specification of this Regular Nested Knot is $(22/16/22)\{132/123\}15$. Fig. 939 depicts one of the ways in which this knot may be braided. Note that this knot is an interbraid of a $p/b = 8/5$ over-under coded Regular Knot with two $p/b = 6/5$ over-under coded Regular Knots.

We braid this Regular Nested Knot first as depicted in Fig. 940 and after it has been completed in this manner, we partly rebraid the half-cycles $10, 10', 10''$ as shown in Fig. 939. Then we braid the Standing Ends of half-cycles $1, 1', 1''$ as shown in Fig. 939.

- half-cycle 2' : $i = 0$; $R_2 \rightarrow L_3$: $u - o - u - o - (1, s)2u - o$.
- half-cycle 3' : $i = 0$; $L_3 \rightarrow R_2$: $o - u - o - u - 2o - u$.
- half-cycle 4' : $i \leq 1$; $R_2 \rightarrow L_3$: $u - o - u - (1, s)2o - 2u - o$.
- half-cycle 5' : $i \leq 1$; $L_3 \rightarrow R_2$: $o - u - o - 2u - 2o - u$.
- half-cycle 6' : $i \leq 2$; $R_2 \rightarrow L_3$: $u - o - (1, s)2u - 2o - 2u - o$.
- half-cycle 7' : $i \leq 2$; $L_3 \rightarrow R_2$: $o - u - 2o - 2u - 2o - u$.
- half-cycle 8' : $i \leq 3$; $R_2 \rightarrow L_3$: $u - (1, s)2o - 2u - 2o - 2u - o$.
- half-cycle 9' : $i \leq 3$; $L_3 \rightarrow R_2$: $o - 2u - 2o - 2u - 2o - u$.
- half-cycle 10' : $i \leq 4$; $R_2 \rightarrow L_3$: $(1, s)2u - 2o - 2u - 2o - 2u - o$.

Then we braid the half-cycles 1'' to 10'' of the $p/b = 6/5$ over-under coded Regular Knot between the bight-boundaries L_2 and R_3 as depicted in Fig.940. Its half-cycle braiding algorithms, read from the lowermost algorithm diagram, are:

- half-cycle 1'' : $L_2 \rightarrow R_3$: $o - 2u - 2o - 2u - 2o - 2u$.
- half-cycle 2'' : $i = 0$; $R_3 \rightarrow L_2$: $2u - 2o - 2u - 2o - (2, s)3u - o$.
- half-cycle 3'' : $i = 0$; $L_2 \rightarrow R_3$: $o - 2u - 2o - 2u - 3o - 2u$.
- half-cycle 4'' : $i \leq 1$; $R_3 \rightarrow L_2$: $2u - 2o - 2u - (2, s)3o - 3u - o$.
- half-cycle 5'' : $i \leq 1$; $L_2 \rightarrow R_3$: $o - 2u - 2o - 3u - 3o - 2u$.
- half-cycle 6'' : $i \leq 2$; $R_3 \rightarrow L_2$: $2u - 2o - (2, s)3u - 3o - 3u - o$.
- half-cycle 7'' : $i \leq 2$; $L_2 \rightarrow R_3$: $o - 2u - 3o - 3u - 3o - 2u$.
- half-cycle 8'' : $i \leq 3$; $R_3 \rightarrow L_2$: $2u - (2, s)3o - 3u - 3o - 3u - o$.
- half-cycle 9'' : $i \leq 3$; $L_2 \rightarrow R_3$: $o - 3u - 3o - 3u - 3o - 2u$.
- half-cycle 10'' : $i \leq 4$; $R_3 \rightarrow L_2$: $(2, s)3u - 3o - 3u - 3o - 3u - o$.

Next, retract the end of half-cycle 10 over six crossings and replace these by $(6, s)7u$. Then retract the end of half-cycle 10' over two crossings and replace these by $(2, s, 2)5u$. Then retract the end of half-cycle 10'' over one crossing and replace it by $(1, s, 1)3u$.

Next, braid the Standing-End of half-cycle 1 as $3u - 3o - 4u$ from upper L_1 to lower R . Then braid the Standing-End of half-cycle 1' as $2o - 4u$ from upper L_3 to lower R . Then braid the Standing-End of half-cycle 1'' above half-cycle 10'' as $o - 10u$ from upper L_2 to lower R .

A knot similar in appearance to the Regular Nested Knot over the oval bead is depicted in Fig.941 (left bight-edge towards thimble).

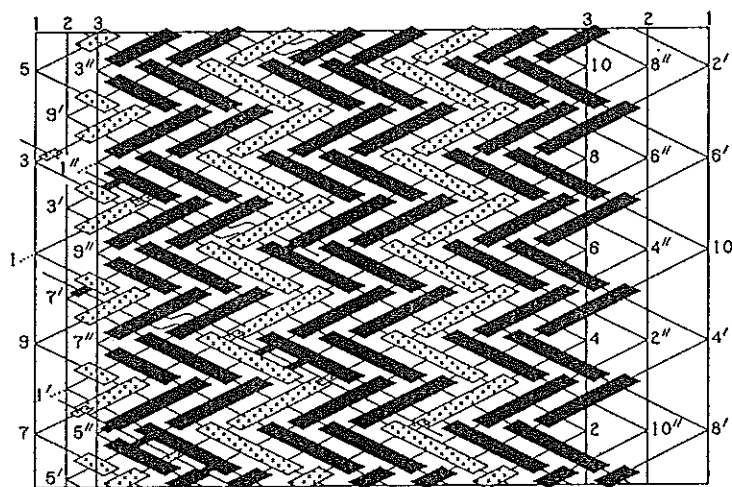


Fig.941 — A similar looking knot to the one in Fig.939.

The string-run specification of this Nested Knot is $(11/16/22)\{1_1 2_3 3_2 / 3_1 1_2 2_3\}15$. Fig.941 depicts one of the ways in which this knot may be braided. Note that this knot

is an interbraid of a $p/b = 7/5$ under-over coded Regular Knot with two $p/b = 6/5$ over-under coded Regular Knots.

We braid this Nested Knot first as depicted in Fig. 942 and after it has been completed in this manner, we partly rebraid the half-cycles 10, 10', 10'' as shown in Fig. 941. Then we braid the Standing Ends of half-cycles 1, 1', 1'' as shown in Fig. 941.

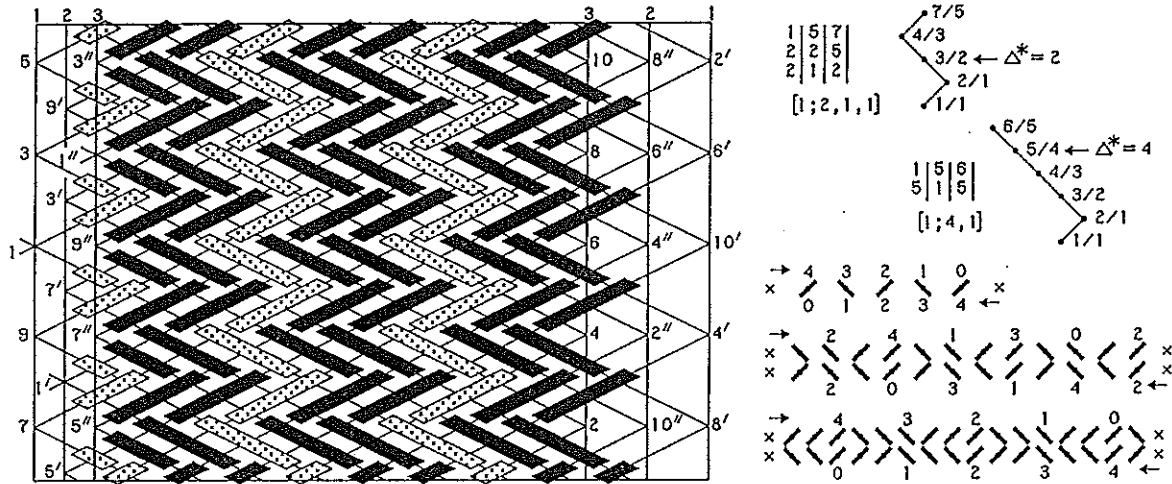


Fig. 942 — The initial braiding of the knot over oval bead adjacent to thimble.

Braiding begins with the $p/b = 6/5$ over-under coded Regular Knot between the bight-boundaries L_1 and R_3 as depicted in Fig. 942. Its half-cycle braiding algorithms, read from the uppermost algorithm diagram, are:

- half-cycle 1 : $L_1 \rightarrow R_3$: Free run.
- half-cycle 2 : $i = 0$; $R_3 \rightarrow L_1$: $(s)u$.
- half-cycle 3 : $i = 0$; $L_1 \rightarrow R_3$: o .
- half-cycle 4 : $i \leq 1$; $R_3 \rightarrow L_1$: $(s)o - u$.
- half-cycle 5 : $i \leq 1$; $L_1 \rightarrow R_3$: $u - o$.
- half-cycle 6 : $i \leq 2$; $R_3 \rightarrow L_1$: $(s)u - o - u$.
- half-cycle 7 : $i \leq 2$; $L_1 \rightarrow R_3$: $o - u - o$.
- half-cycle 8 : $i \leq 3$; $R_3 \rightarrow L_1$: $(s)o - u - o - u$.
- half-cycle 9 : $i \leq 3$; $L_1 \rightarrow R_3$: $u - o - u - o$.
- half-cycle 10 : $i \leq 4$; $R_3 \rightarrow L_1$: $(s)u - o - u - o - u$.

Next we braid the half-cycles 1' to 10' of the $p/b = 7/5$ under-over coded Regular Knot between the bight-boundaries L_2 and R_1 as depicted in Fig. 942. Its half-cycle braiding algorithms, read from the algorithm diagram immediately below the uppermost one, are:

- half-cycle 1' : $L_2 \rightarrow R_1$: $u - o - u - o - u - o$.
- half-cycle 2' : $i = 0$; $R_1 \rightarrow L_2$: $o - u - o - (1, s)2u - o - u$.
- half-cycle 3' : $i = 0$; $L_2 \rightarrow R_1$: $u - o - u - o - 2u - o$.
- half-cycle 4' : $i \leq 1$; $R_1 \rightarrow L_2$: $o - (1, s)2u - o - 2u - o - u$.
- half-cycle 5' : $i \leq 1$; $L_2 \rightarrow R_1$: $u - o - 2u - o - 2u - o$.
- half-cycle 6' : $i \leq 2$; $R_1 \rightarrow L_2$: $(s)u - o - 2u - o - 2u - (1, s)2o - u$.
- half-cycle 7' : $i \leq 2$; $L_2 \rightarrow R_1$: $2u - o - 2u - o - 2u - 2o$.
- half-cycle 8' : $i \leq 3$; $R_1 \rightarrow L_2$: $u - o - 2u - (1, s)2o - 2u - 2o - u$.
- half-cycle 9' : $i \leq 3$; $L_2 \rightarrow R_1$: $2u - o - 2u - 2o - 2u - 2o$.
- half-cycle 10' : $i \leq 4$; $R_1 \rightarrow L_2$: $u - (1, s)2o - 2u - 2o - 2u - 2o - u$.

Then we braid the half-cycles 1'' to 10'' of the $p/b = 6/5$ over-under coded Regular

Knot between the bight-boundaries L_3 and R_2 as depicted in Fig. 942. Its half-cycle braiding algorithms, read from the lowermost algorithm diagram, are:

- half-cycle 1'' : $L_3 \longrightarrow R_2 : 2o - 2u - 2o - 2u - 2o - u$.
 half-cycle 2'' : $i = 0 ; R_2 \longrightarrow L_3 : u - 2o - 2u - 2o - (2, s)3u - 2o$.
 half-cycle 3'' : $i = 0 ; L_3 \longrightarrow R_2 : 2o - 2u - 2o - 2u - 3o - u$.
 half-cycle 4'' : $i \leq 1 ; R_2 \longrightarrow L_3 : u - 2o - 2u - (2, s)3o - 3u - 2o$.
 half-cycle 5'' : $i \leq 1 ; L_3 \longrightarrow R_2 : 2o - 2u - 2o - 3u - 3o - u$.
 half-cycle 6'' : $i \leq 2 ; R_2 \longrightarrow L_3 : u - 2o - (2, s)3u - 3o - 3u - 2o$.
 half-cycle 7'' : $i \leq 2 ; L_3 \longrightarrow R_2 : 2o - 2u - 3o - 3u - 3o - u$.
 half-cycle 8'' : $i \leq 3 ; R_2 \longrightarrow L_3 : u - (2, s)3o - 3u - 3o - 3u - 2o$.
 half-cycle 9'' : $i \leq 3 ; L_3 \longrightarrow R_2 : 2o - 3u - 3o - 3u - 3o - u$.
 half-cycle 10'' : $i \leq 4 ; R_2 \longrightarrow L_3 : (1, s)2u - 3o - 3u - 3o - 3u - 2o$.

Next, retract the end of half-cycle 10 over one crossing and replace this by $(1, s)2u$. Then retract the end of half-cycle 10' over five crossings and replace these by $(5, s)6u$. Then retract the end of half-cycle 10'' over two crossing and replace it by $(2, s, 1)4u$.

Next, braid the Standing-End of half-cycle 1 as $o - 10u$ from upper L_1 to lower R . Then braid the Standing-End of half-cycle 1' as $2u - 3o - 4u$ from upper L_2 to lower R . Then braid the Standing-End of half-cycle 1'' above half-cycle 10'' as $2o - 4u$ from upper L_3 to lower R .

A round bead with a diameter of 24 mm. is placed at the end of the stem in a similar way as was done for the key-hangers No. 2 and No. 3. The nominal grid-diagram of the knot over this round bead at the end of the stem is depicted in Fig. 943 (left bight-edge towards thimble). Note that the knot depicted by the lower grid-diagram with its string-run specification $(2422/15/2242)\{1_1 5_6 4_5 3_4 5_3 2_2 / 4_1 5_2 1_3 2_4 5_5 3_6\}24$ is the mirror-image of the knot depicted by the upper grid-diagram with its string-run specification $(2422/15/2242)\{1_1 5_6 4_5 3_4 5_3 2_2 / 2_1 5_2 3_3 4_4 5_5 1_6\}24$.

We first braid these knots as depicted by the grid-diagrams in Fig. 944 (the upper knot in Fig. 943 is braided as shown in the upper grid-diagram in Fig. 944, and the lower knot in Fig. 943 is braided as shown in the lower grid-diagram in Fig. 944). Finally we work the ends of the strings away as shown in Fig. 945 (for the upper knot in Fig. 944 the string ends are worked away as shown in the upper grid-diagram in Fig. 945, and for the lower knot in Fig. 944 the string ends are worked away as shown in the lower grid-diagram in Fig. 945).

The nominal grid-diagram of the foundation knot in the upper nominal grid-diagram in Fig. 943 is depicted by the upper grid-diagram in Fig. 946 (string-run specification $(222/12/222)\{1432/2341\}16$). First we braid this foundation knot as shown by the lower grid-diagram in Fig. 946 (its associated half-cycle pattern is shown below it; refer to pp. 1203-1204 for the associated half-cycle tables and half-cycle braiding algorithms).

The nominal grid-diagram of the foundation knot in the lower nominal grid-diagram in Fig. 943 is depicted by the upper grid-diagram in Fig. 947 (string-run specification $(222/12/222)\{1432/4123\}16$). First we braid this foundation knot as shown by the lower grid-diagram in Fig. 947 (its associated half-cycle pattern is shown below it; refer to pp. 1204-1205 for the associated half-cycle tables and half-cycle braiding algorithms).

The interbraid for the upper and lower knots in Fig. 943 (half-cycles 1' - 16' in the upper and lower grid-diagrams in Fig. 944) is a $p/b = 5/8$ over-under coded Regular Knot. Its string ends in the upper and lower grid-diagrams in Fig. 945 are worked away identically. For its algorithm diagram and half-cycle braiding algorithms refer to pp. 1205-1206.

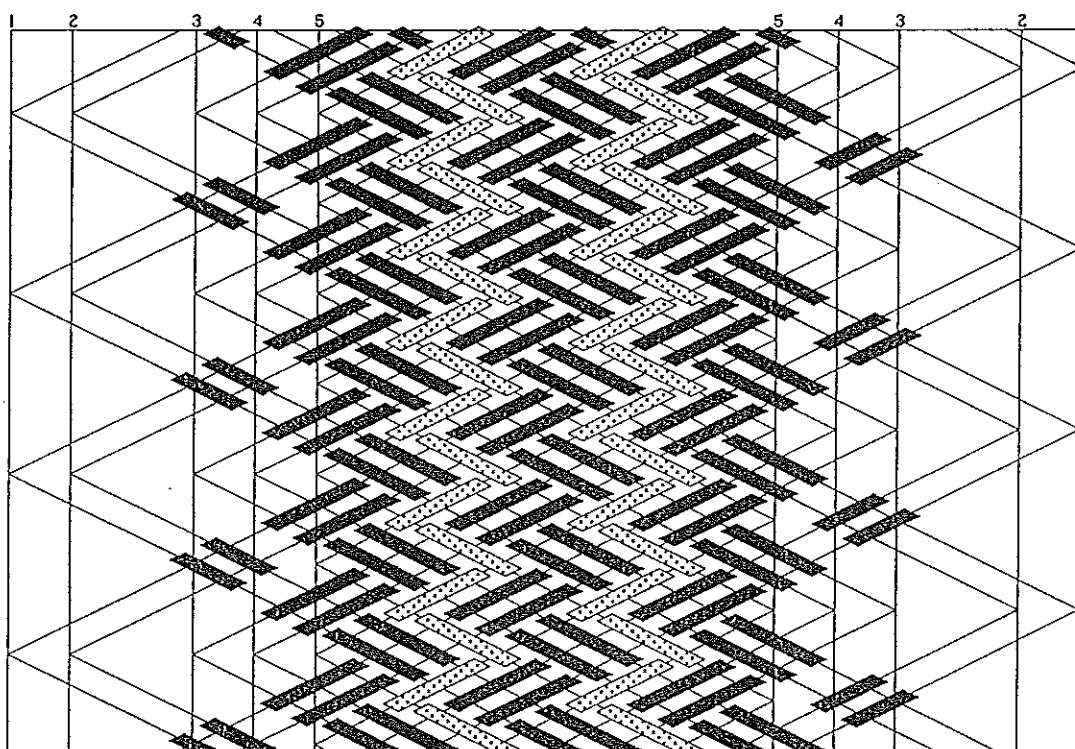
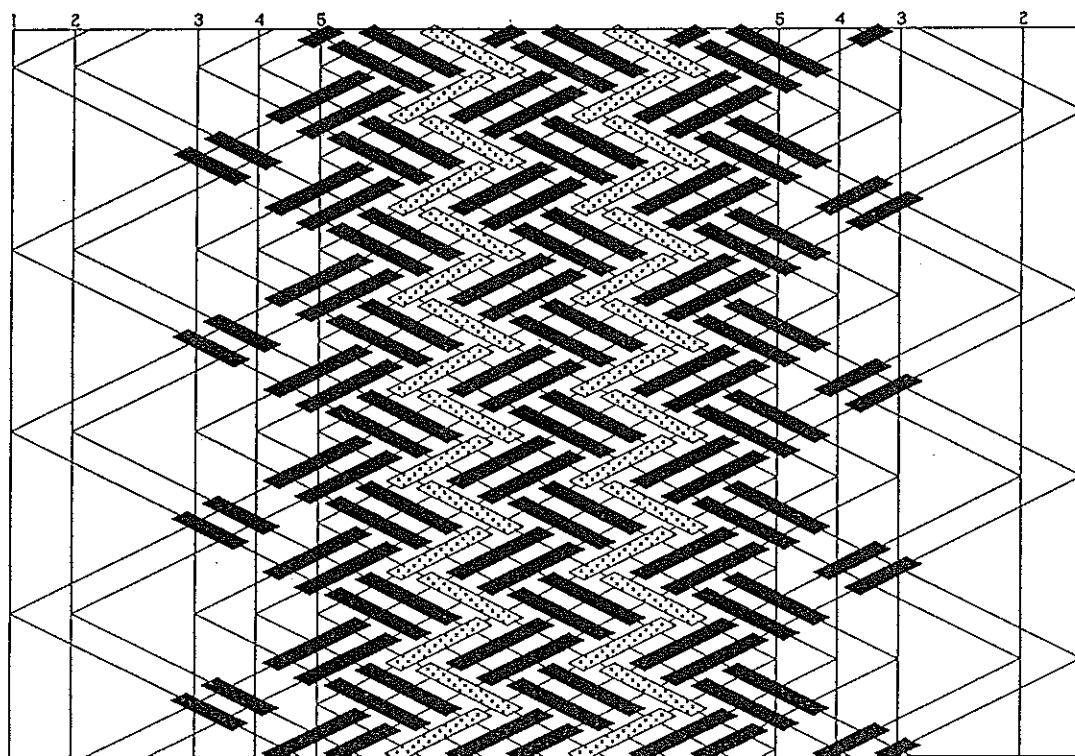


Fig. 943 — The knot over the round bead at the end of the stem.

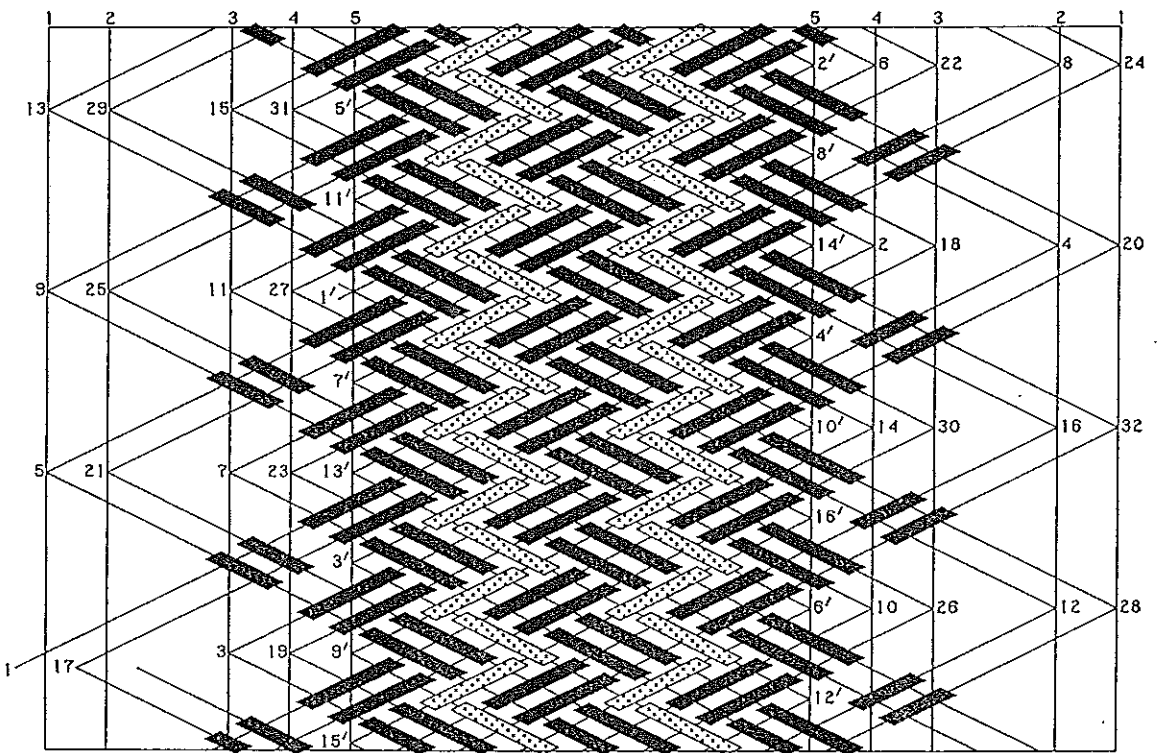
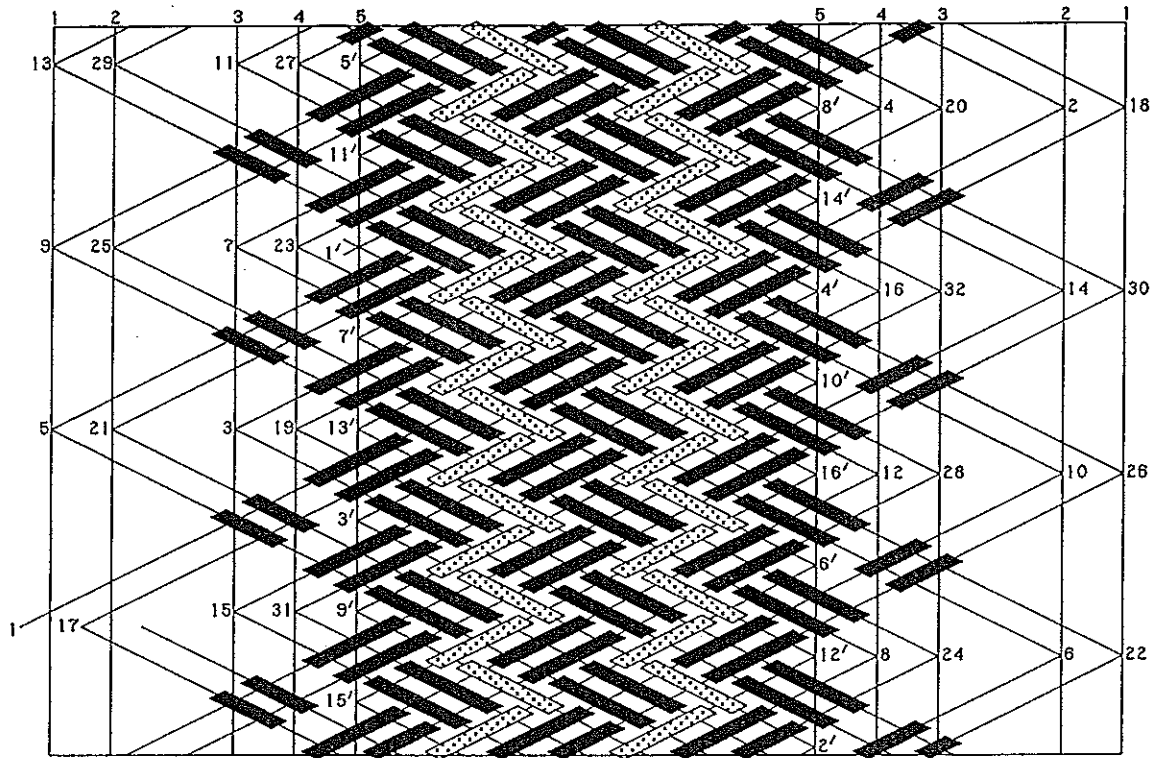


Fig. 944 — The knot over the round bead at the end of the stem.

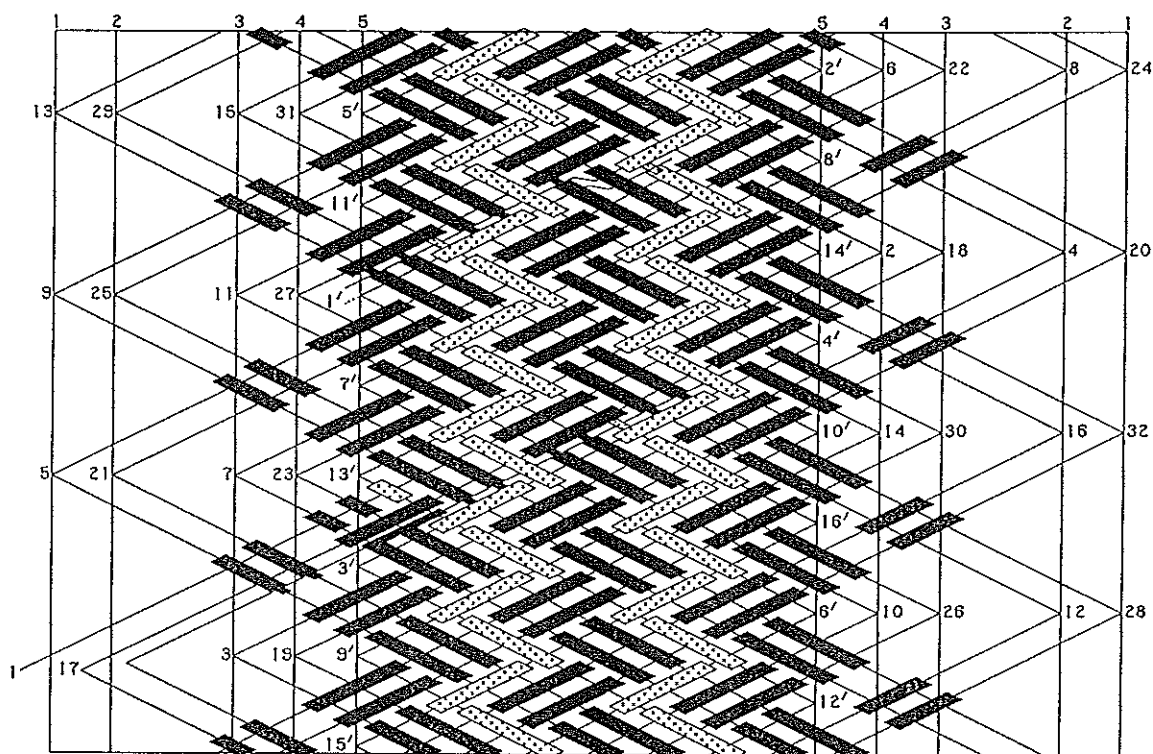
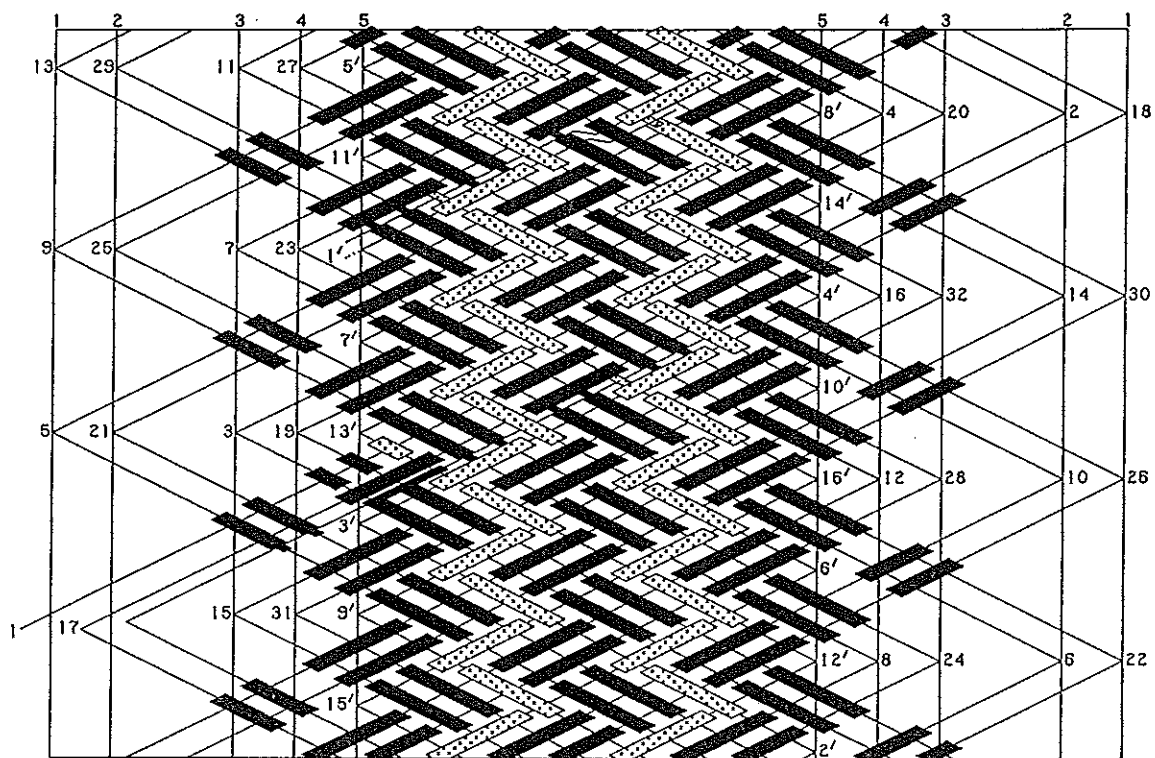


Fig. 945 — The knot over the round bead at the end of the stem.

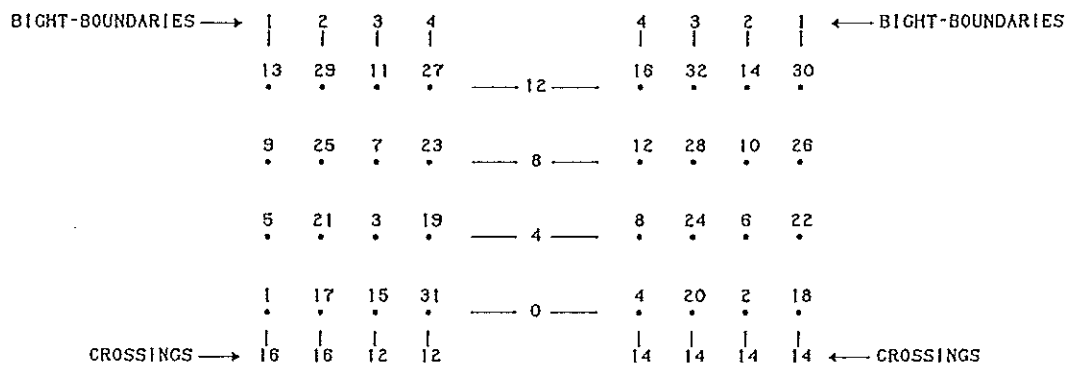
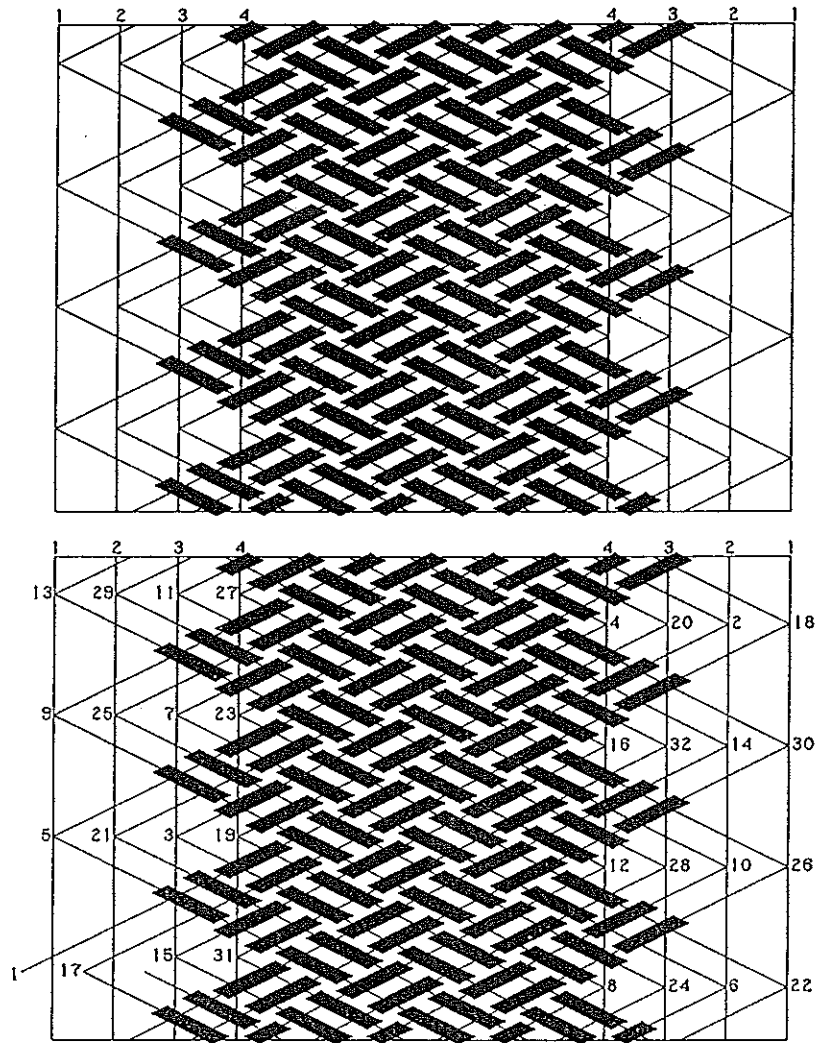
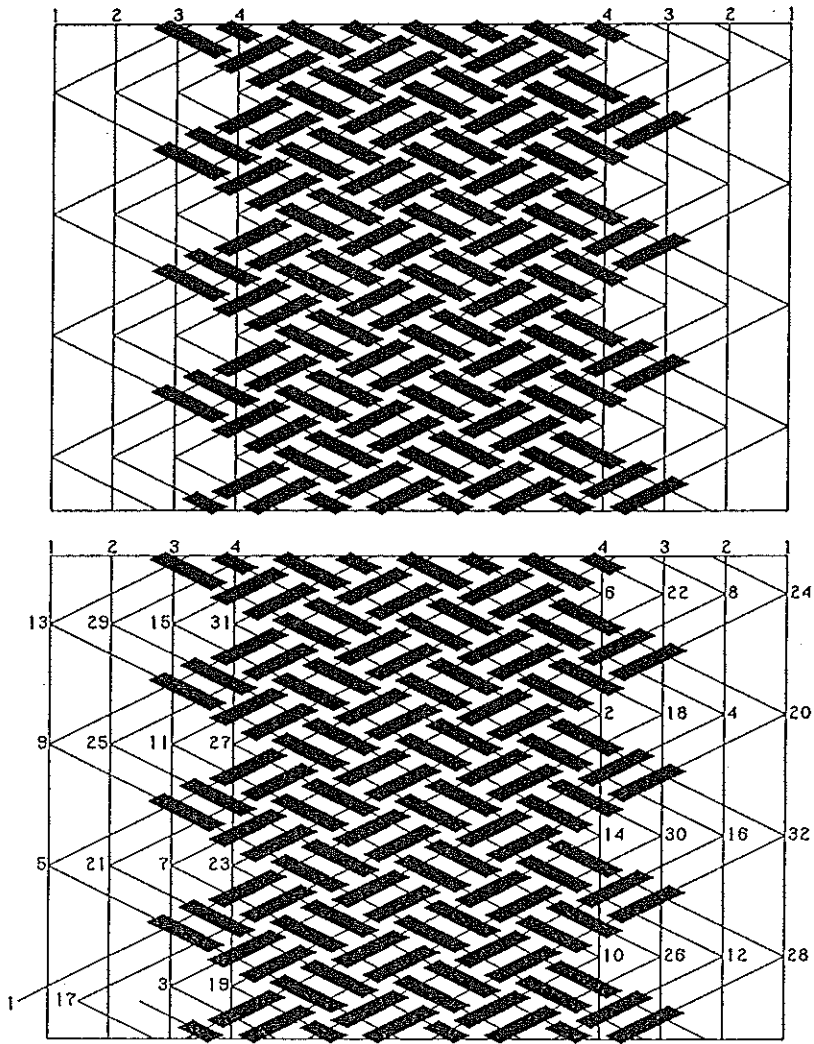


Fig. 946 — The knot over the round bead at the end of the stem.



BIGHT-BOUNDARIES →										← BIGHT-BOUNDARIES
	13	29	15	31	— 12 —	14	30	16	32	
	9	25	11	27	— 8 —	10	26	12	28	
	5	21	7	23	— 4 —	6	22	8	24	
	1	17	3	19	— 0 —	2	18	4	20	
CROSSINGS →										← CROSSINGS
	14	14	14	14		12	12	16	16	

Fig. 947 — The knot over the round bead at the end of the stem.

The half-cycle tables for half-cycles 1-16 in Fig. 946 are the two tables in Fig. 948.

The top table, labeled "L → R", is a 4x10 grid. The first four columns contain numbers 15, 5, 3, 9, 7, 13, 11, 13, 11, 9, 7, 5, 3, 15, 11, 13, 11, 9, 7, 5, 3. The last four columns contain letters 'u' and 'o'. Arrows on the right indicate a mapping from column 1 to 10, 2 to 9, 3 to 8, 4 to 7, 5 to 6, 6 to 5, 7 to 4, 8 to 3, 9 to 2, and 10 to 1.

The bottom table, labeled "R → L", is a 4x10 grid. The first four columns contain numbers 2, 4, 6, 8, 10, 12, 14, 14, 10, 6, 8, 10, 12, 14, 16, 2, 4, 6, 8, 10, 12, 14, 16, 2. The last four columns contain letters 'u' and 'o'. Arrows on the right indicate a mapping from column 1 to 10, 2 to 9, 3 to 8, 4 to 7, 5 to 6, 6 to 5, 7 to 4, 8 to 3, 9 to 2, and 10 to 1.

Fig. 948 — Half-cycle tables for the half-cycles 1-16 in Fig. 946.

From these tables we read the following half-cycle braiding algorithms :

- half-cycle 1. $L_1 \longrightarrow R_2$: Free run.
- half-cycle 2. $R_2 \longrightarrow L_3$: $(s)u$.
- half-cycle 3. $L_3 \longrightarrow R_4$: Free run.
- half-cycle 4. $R_4 \longrightarrow L_1$: $(s)o$.
- half-cycle 5. $L_1 \longrightarrow R_2$: $u - o$.
- half-cycle 6. $R_2 \longrightarrow L_3$: $(s)u - o - u$.
- half-cycle 7. $L_3 \longrightarrow R_4$: $o - u$.
- half-cycle 8. $R_4 \longrightarrow L_1$: $(s)o - u - o$.
- half-cycle 9. $L_1 \longrightarrow R_2$: $u - o - u - o$.
- half-cycle 10. $R_2 \longrightarrow L_3$: $(s)u - o - u - o - u$.
- half-cycle 11. $L_3 \longrightarrow R_4$: $o - u - o - u$.
- half-cycle 12. $R_4 \longrightarrow L_1$: $(s)o - u - o - u - o$.
- half-cycle 13. $L_1 \longrightarrow R_2$: $u - o - u - o - u - o$.
- half-cycle 14. $R_2 \longrightarrow L_3$: $(s)u - o - u - o - u - o - u$.
- half-cycle 15. $L_3 \longrightarrow R_4$: $o - u - o - u - o - u$.
- half-cycle 16. $R_4 \longrightarrow L_{1+}$: $(s)o - u - o - u - o - u - o$.

The half-cycle tables for the half-cycles 17-32 in Fig. 946 are the two tables in Fig. 949.

From these tables we read the following half-cycle braiding algorithms :

- half-cycle 17. $L_{1+} \longrightarrow R_1$: $u - o - u - o - u - o - u - o$.
- half-cycle 18. $R_1 \longrightarrow L_4$: $u - o - u - o - u - o - (1, s)2u$.
- half-cycle 19. $L_4 \longrightarrow R_3$: $o - u - o - u - o - u$.
- half-cycle 20. $R_3 \longrightarrow L_2$: $o - u - o - u - o - u - (1, s)2o$.
- half-cycle 21. $L_2 \longrightarrow R_1$: $u - o - u - o - u - o - 2u - 2o$.
- half-cycle 22. $R_1 \longrightarrow L_4$: $u - o - u - o - (1, s)2u - 2o - 2u$.
- half-cycle 23. $L_4 \longrightarrow R_3$: $o - u - o - u - 2o - 2u$.
- half-cycle 24. $R_3 \longrightarrow L_2$: $o - u - o - u - (1, s)2o - 2u - 2o$.
- half-cycle 25. $L_2 \longrightarrow R_1$: $u - o - u - o - 2u - 2o - 2u - 2o$.
- half-cycle 26. $R_1 \longrightarrow L_4$: $u - o - (1, s)2u - 2o - 2u - 2o - 2u$.
- half-cycle 27. $L_4 \longrightarrow R_3$: $o - u - 2o - 2u - 2o - 2u$.
- half-cycle 28. $R_3 \longrightarrow L_2$: $o - u - (1, s)2o - 2u - 2o - 2u - 2o$.

- half-cycle 29. $L_2 \rightarrow R_1 : u - o - 2u - 2o - 2u - 2o - 2u - 2o.$
- half-cycle 30. $R_1 \rightarrow L_4 : (1, s)2u - 2o - 2u - 2o - 2u - 2o - 2u.$
- half-cycle 31. $L_4 \rightarrow R_3 : 2o - 2u - 2o - 2u - 2o - 2u.$
- half-cycle 32. $R_3 \rightarrow L_{2+} : (1, s)2o - 2u - 2o - 2u - 2o - 2u - 2o.$

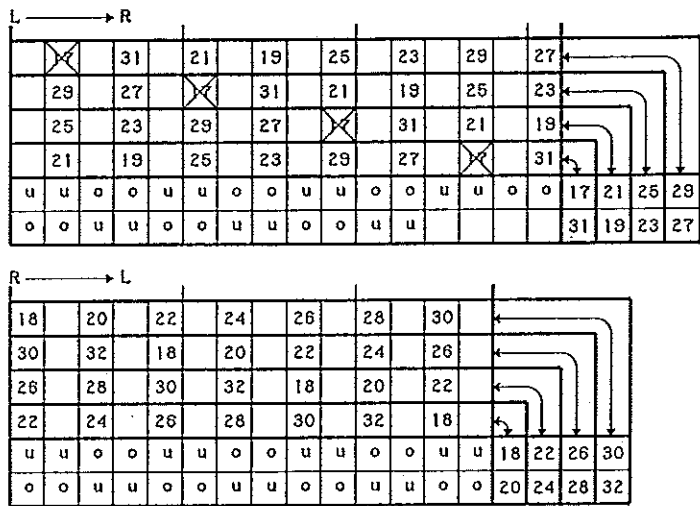


Fig. 949 — Half-cycle tables for the half-cycles 17-32 in Fig. 946.

The half-cycle tables for half-cycles 1-16 in Fig. 947 are the two tables in Fig. 950.

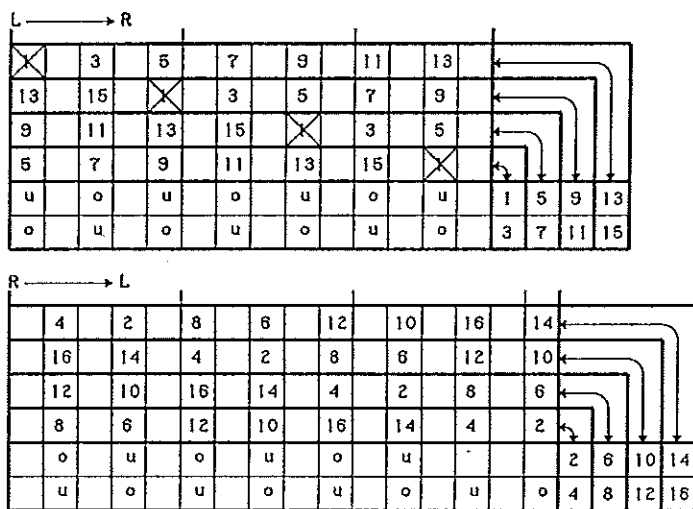


Fig. 950 — Half-cycle tables for the half-cycles 1-16 in Fig. 947.

- From these tables we read the following half-cycle braiding algorithms:
- half-cycle 1. $L_1 \rightarrow R_4 : \text{Free run.}$
 - half-cycle 2. $R_4 \rightarrow L_3 : \text{Free run.}$
 - half-cycle 3. $L_3 \rightarrow R_2 : \text{Free run.}$
 - half-cycle 4. $R_2 \rightarrow L_1 : u - (s)o.$
 - half-cycle 5. $L_1 \rightarrow R_4 : o - u.$
 - half-cycle 6. $R_4 \rightarrow L_3 : o - (s)u.$
 - half-cycle 7. $L_3 \rightarrow R_2 : u - o.$
 - half-cycle 8. $R_2 \rightarrow L_1 : u - (s)o - u - o.$
 - half-cycle 9. $L_1 \rightarrow R_4 : o - u - o - u.$
 - half-cycle 10. $R_4 \rightarrow L_3 : o - (s)u - o - u.$
 - half-cycle 11. $L_3 \rightarrow R_2 : u - o - u - o.$

- half-cycle 12. $R_2 \rightarrow L_1 : u - (s)o - u - o - u - o.$
- half-cycle 13. $L_1 \rightarrow R_4 : o - u - o - u - o - u.$
- half-cycle 14. $R_4 \rightarrow L_3 : o - (s)u - o - u - o - u.$
- half-cycle 15. $L_3 \rightarrow R_2 : u - o - u - o - u - o.$
- half-cycle 16. $R_2 \rightarrow L_{1+} : u - (s)o - u - o - u - o - u - o.$

The half-cycle tables for the half-cycles 17-32 in Fig. 947 are the two tables in Fig. 951. From these tables we read the following half-cycle braiding algorithms:

- half-cycle 17. $L_{1+} \rightarrow R_3 : u - o - u - o - u - o - u.$
- half-cycle 18. $R_3 \rightarrow L_4 : o - u - o - u - o - u.$
- half-cycle 19. $L_4 \rightarrow R_1 : o - u - o - u - o - u - o.$
- half-cycle 20. $R_1 \rightarrow L_2 : u - o - u - o - u - o - u - (1, s)2o.$
- half-cycle 21. $L_2 \rightarrow R_3 : u - o - u - o - u - 2o - 2u.$
- half-cycle 22. $R_3 \rightarrow L_4 : o - u - o - u - o - (1, s)2u.$
- half-cycle 23. $L_4 \rightarrow R_1 : o - u - o - u - o - 2u - 2o.$
- half-cycle 24. $R_1 \rightarrow L_2 : u - o - u - o - 2u - (1, s)2o - 2u - 2o.$
- half-cycle 25. $L_2 \rightarrow R_3 : u - o - u - 2o - 2u - 2o - 2u.$
- half-cycle 26. $R_3 \rightarrow L_4 : o - u - 2o - (1, s)2u - 2o - 2u.$
- half-cycle 27. $L_4 \rightarrow R_1 : o - u - o - 2u - 2o - 2u - 2o.$
- half-cycle 28. $R_1 \rightarrow L_2 : u - o - 2u - (1, s)2o - 2u - 2o - 2u - 2o.$
- half-cycle 29. $L_2 \rightarrow R_3 : u - 2o - 2u - 2o - 2u - 2o - 2u.$
- half-cycle 30. $R_3 \rightarrow L_4 : 2o - (1, s)2u - 2o - 2u - 2o - 2u.$
- half-cycle 31. $L_4 \rightarrow R_1 : o - 2u - 2o - 2u - 2o - 2u - 2o.$
- half-cycle 32. $R_1 \rightarrow L_{2+} : 2u - (1, s)2o - 2u - 2o - 2u - 2o - 2u - 2o.$

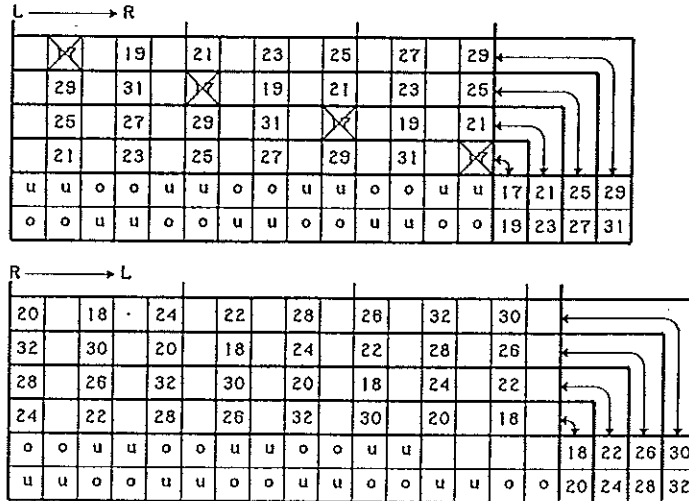


Fig. 951 — Half-cycle tables for the half-cycles 17-32 in Fig. 947.

The algorithm diagram for the $p/b = 5/8$ over-under coded Regular Knot interbraid for the foundation knots in Fig. 946 and Fig. 947 is shown in Fig. 952.

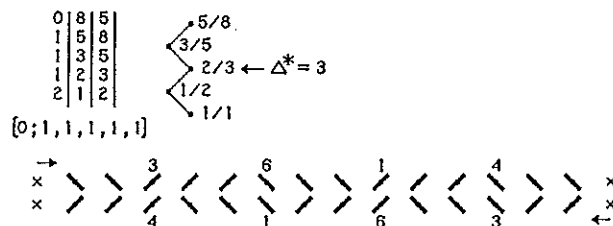


Fig. 952 — The algorithm diagram for the $p/b = 5/8$ over-under coded Regular Knot.

From this algorithm diagram we read the following half-cycle braiding algorithms:

- half-cycle 1' : $L_5 \longrightarrow R_5 : 2u - 2o - 2u - 2o - 2u$.
 half-cycle 2' : $i = 0 ; R_5 \longrightarrow L_5 : 2u - 2o - 2u - 2o - 2u$.
 half-cycle 3' : $i = 0 ; L_5 \longrightarrow R_5 : 2u - 2o - 2u - 2o - 2u$.
 half-cycle 4' : $i \leq 1 ; R_5 \longrightarrow L_5 : 2u - 2o - 2u - (s, 2)3o - 2u$.
 half-cycle 5' : $i \leq 1 ; L_5 \longrightarrow R_5 : 2u - 2o - 2u - 3o - 2u$.
 half-cycle 6' : $i \leq 2 ; R_5 \longrightarrow L_5 : 2u - 2o - 2u - 3o - 2u$.
 half-cycle 7' : $i \leq 2 ; L_5 \longrightarrow R_5 : 2u - 2o - 2u - 3o - 2u$.
 half-cycle 8' : $i \leq 3 ; R_5 \longrightarrow L_5 : 2u - (s, 2)3o - 2u - 3o - 2u$.
 half-cycle 9' : $i \leq 3 ; L_5 \longrightarrow R_5 : 2u - 3o - 2u - 3o - 2u$.
 half-cycle 10' : $i \leq 4 ; R_5 \longrightarrow L_5 : 2u - 3o - 2u - 3o - (s, 2)3u$.
 half-cycle 11' : $i \leq 4 ; L_5 \longrightarrow R_5 : 2u - 3o - 2u - 3o - 3u$.
 half-cycle 12' : $i \leq 5 ; R_5 \longrightarrow L_5 : 2u - 3o - 2u - 3o - 3u$.
 half-cycle 13' : $i \leq 5 ; L_5 \longrightarrow R_5 : 2u - 3o - 2u - 3o - 3u$.
 half-cycle 14' : $i \leq 6 ; R_5 \longrightarrow L_5 : 2u - 3o - (s, 2)3u - 3o - 3u$.
 half-cycle 15' : $i \leq 6 ; L_5 \longrightarrow R_5 : 2u - 3o - 3u - 3o - 3u$.
 half-cycle 16' : $i \leq 7 ; R_5 \longrightarrow L_5 : 2u - 3o - 3u - 3o - 3u$.

Next we work the string ends away:

Retract the Standing End of half-cycle 1 over 5 crossings and replace these first 5 crossings with $5u$ (see Figs. 944 & 945). Next braid the end of half-cycle 32 from lower L_{2+} to upper right: $2u - 3o - 9u$ (see Figs. 944 & 945).

Then retract the Standing End of half-cycle 1' over 5 crossings and replace these first 5 crossings with $5u$ (see Figs. 944 & 945). Next braid the end of half-cycle 16' from lower L_5 to upper right (immediately below half-cycle 1): $2u - 3o - 4u$ (see Figs. 944 & 945).

Note that the nominal grid-diagram of the foundation knot in Fig. 946 with $x = 12$ is similar to the nominal grid-diagram with $x = 16$ in Fig. 874 (see *The Braider*, Issue No. 48, pg. 1129).

The nominal grid-diagrams in Fig. 953 and Fig. 954 show some other interbraids on the nominal grid-diagram of the foundation knot in Fig. 946, while the nominal grid-diagrams in Fig. 955 show some other interbraids on the nominal grid-diagram of the knot in Fig. 898 (see *The Braider*, Issue No. 48, pg. 1142).

The string-run specifications for the nominal grid-diagrams in Fig. 953 are:

- Upper grid-diagram: $(2411/17/2242)\{1_1 4_3 5_5 3_4 4_6 2_2 / 2_1 5_2 3_3 4_4 5_5 1_6\}24$,
 with foundation knot $(222/12/222)\{1432/2341\}16$.
 Lower grid-diagram: $(2422/17/1142)\{1_1 5_6 4_5 3_4 5_3 2_2 / 2_1 4_2 3_3 5_4 4_5 1_6\}24$,
 with foundation knot $(222/12/222)\{1432/2341\}16$.

The string-run specifications for the nominal grid-diagrams in Fig. 954 are:

- Upper grid-diagram: $(2222/17/2242)\{1_1 3_6 5_5 4_4 3_3 2_2 / 2_1 5_2 3_3 4_4 5_5 1_6\}24$,
 with foundation knot $(222/12/222)\{1432/2341\}16$.
 Lower grid-diagram: $(2422/17/2222)\{1_1 5_6 4_5 3_4 5_3 2_2 / 2_1 3_2 4_3 5_4 3_5 1_6\}24$,
 with foundation knot $(222/12/222)\{1432/2341\}16$.

The string-run specifications for the nominal grid-diagrams in Fig. 955 are:

- Upper grid-diagram: $(28/15/2242)\{1_1 3_3 2 / 2_1 5_2 3_3 4_4 5_5 1_6\}24$,
 with foundation knot $(2/16/222)\{12/2341\}16$.
 Lower grid-diagram: $(25/18/2242)\{1_1 3_3 2_2 / 2_1 5_2 3_3 4_4 5_5 1_6\}24$,
 with foundation knot $(2/16/222)\{12/2341\}16$.

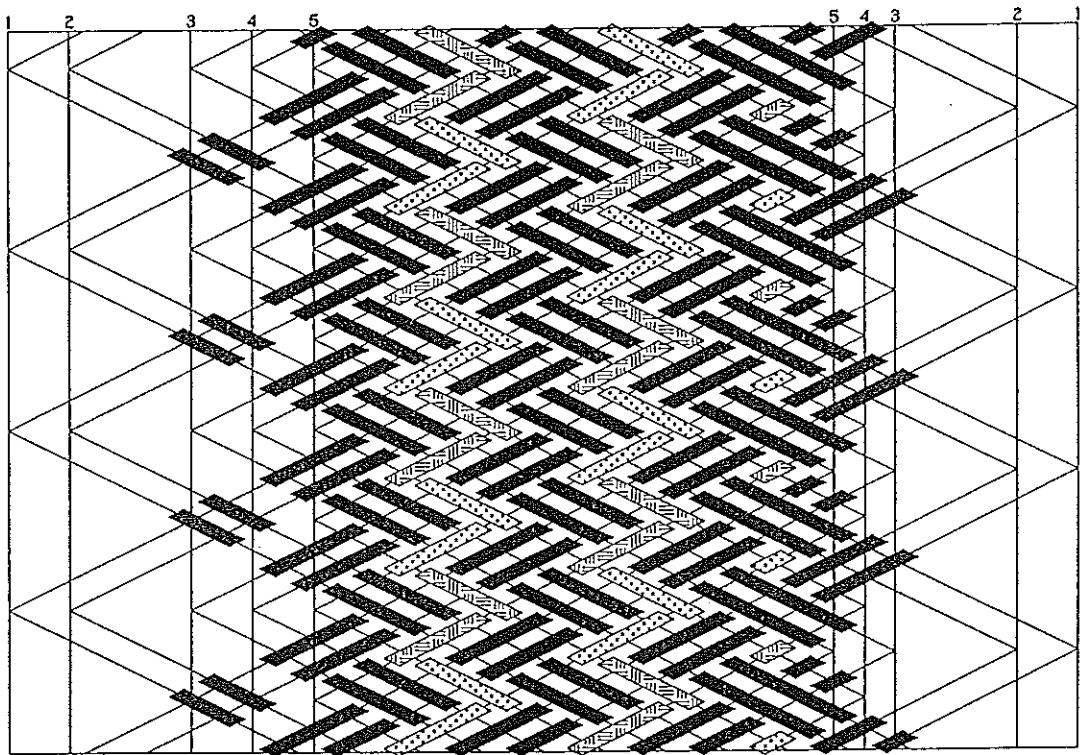
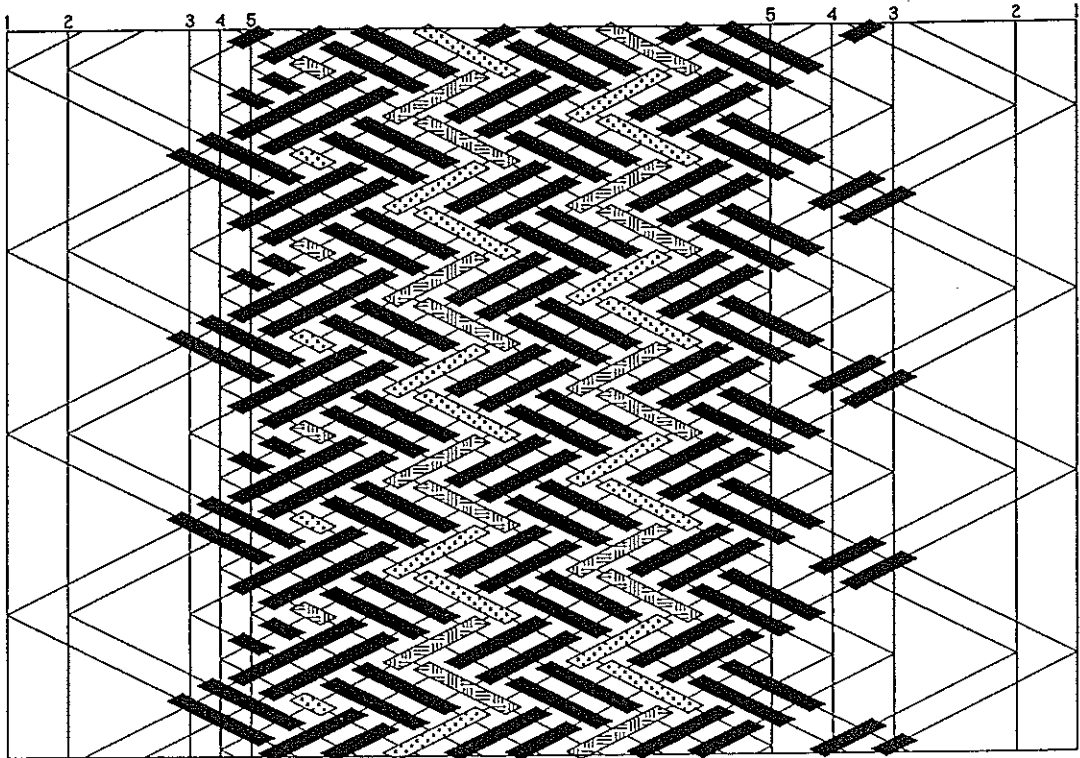


Fig. 953 — Refer to pg.1206.

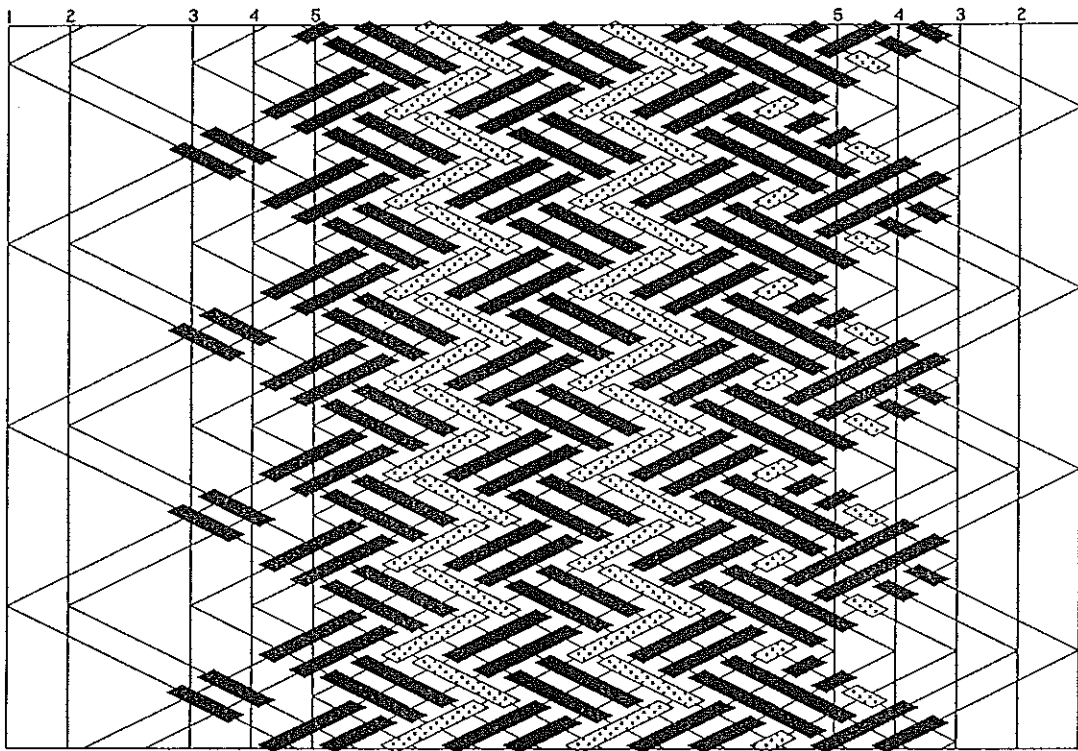
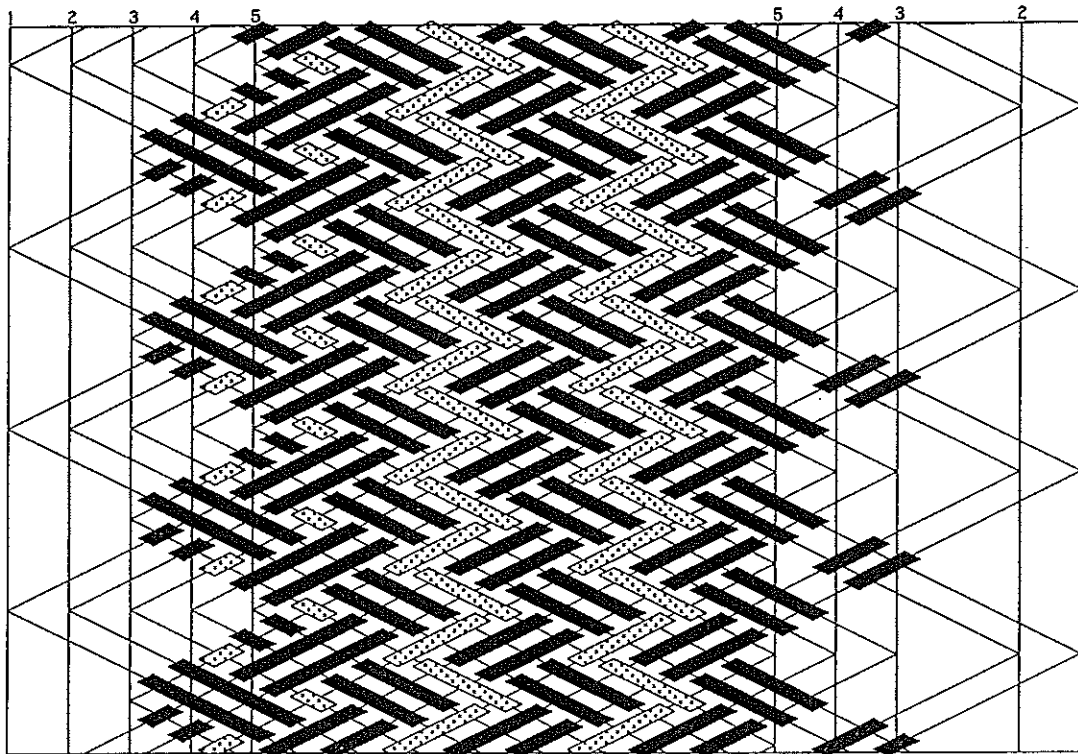


Fig. 954 — Refer to pg.1206.

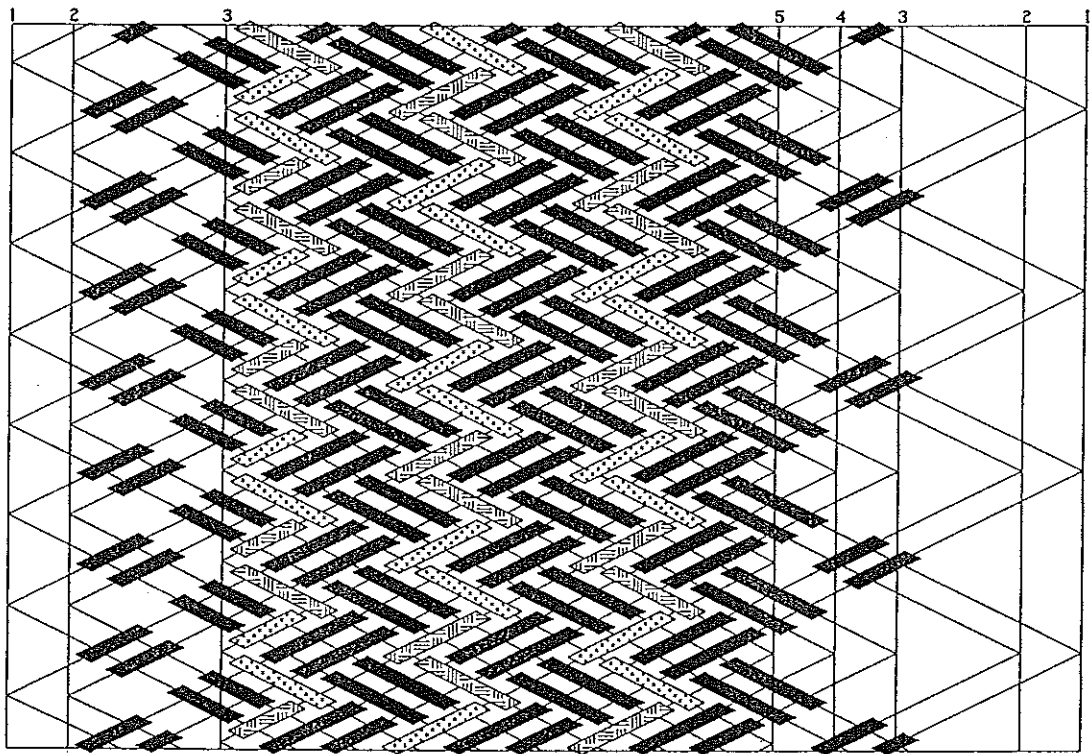
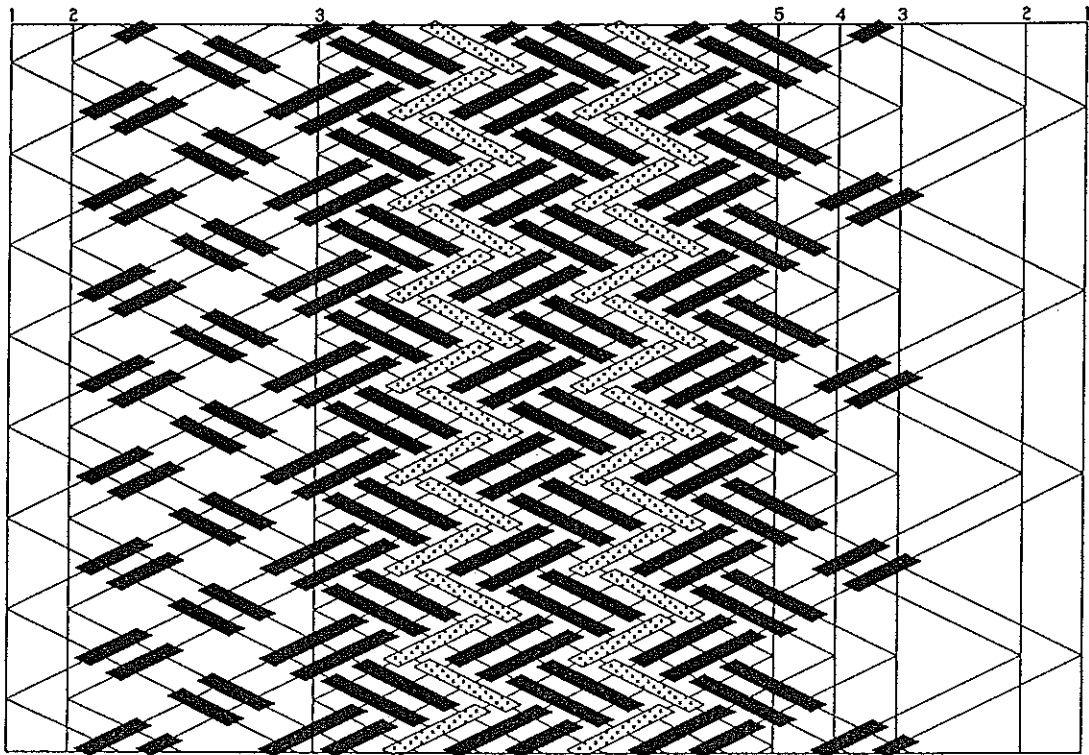


Fig. 955 — Refer to pg.1206.

Braid Design

Let's have, with the aid of a few examples, a little more general look at the braidforms we discussed in *The Braider*, Issues No. 49 and No. 50. Let's start with the round braid in Fig. 956 which we use in the design of the braid in Fig. 957.

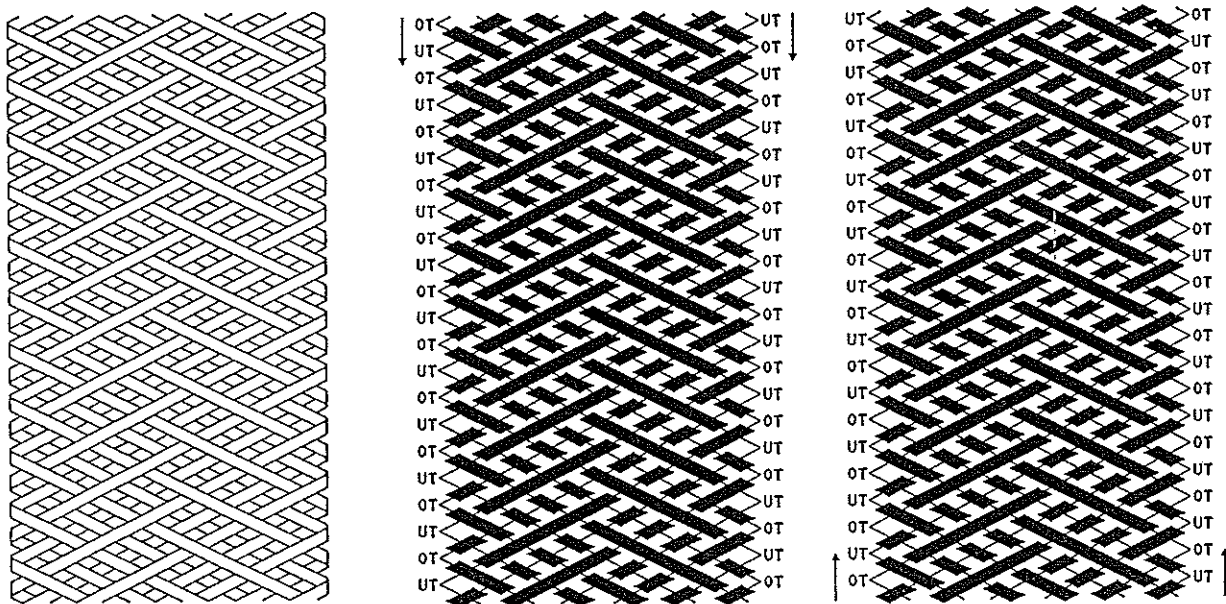


Fig. 956 — Round braid used in the design of Fig. 957.

Its half-cycle braiding algorithms are read from the algorithm diagrams in Fig. 957:

half-cycle 1:		Free run.
half-cycle 2:	$i = 0$: OT — $(s)o$.
half-cycle 3:	$i = 0$: u .
half-cycle 4:	$i \leq 1$: OT — $(s, 1)2o$.
half-cycle 5:	$i \leq 1$: $o - u$.
half-cycle 6:	$i \leq 2$: OT — $(s, 2)3o - (s)u$.
half-cycle 7:	$i \leq 2$: $u - o - 2u$.
half-cycle 8:	$i \leq 3$: OT — $2o - (s)u - o - u$.
half-cycle 9:	$i \leq 3$: $u - o - 3u$.
half-cycle 10:	$i \leq 4$: OT — $(1, s, 1)3o - u - o - u - (s)o$.
half-cycle 11:	$i \leq 4$: $u - 2o - 4u$.
half-cycle 12:	$i \leq 5$: OT — $3o - u - (s, 1)2o - u - o$.
half-cycle 13:	$i \leq 5$: $u - 2o - u - o - 3u$.
half-cycle 14:	$i \leq 6$: OT — $2o - (s)u - o - u - 2o - u - o$.
half-cycle 15:	$i \leq 6$: $u - o - u - o - u - o - 3u$.
half-cycle 16:	$i \leq 7$: OT — $(s, 2)3o - u - o - u - 2o - (s, 1)2u - o$.
half-cycle 17:	$i \leq 7$: $2u - o - u - o - u - o - 4u$.
half-cycle 18:	$i \leq 8$: OT — $3o - u - (1, s)2o - u - 2o - 2u - o$.
half-cycle 19:	$i \leq 8$: $2u - o - u - 2o - u - o - 4u$.
half-cycle 20:	$i \leq 9$: OT — $(2, s, 1)4o - u - 2o - u - 2o - 2u - (s, 1)2o$.
half-cycle 21:	$i \leq 9$: $2u - 2o - u - 2o - u - o - 5u$.
half-cycle 22:	$i \leq 10$: OT — $4o - u - 2o - (1, s)2u - 2o - 2u - 2o$.
half-cycle 23:	$i \leq 10$: $2u - 2o - u - 2o - 2u - o - 5u$.
half-cycle 24:	$i \leq 11$: OT — $(4, s)5o - u - 2o - 2u - 2o - 2u - 2o$.

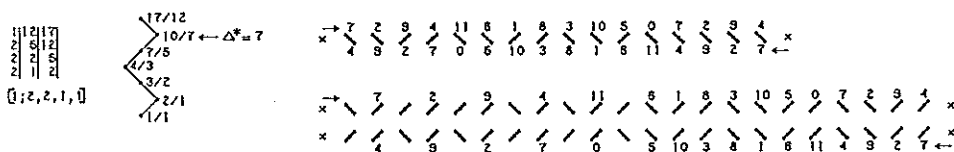
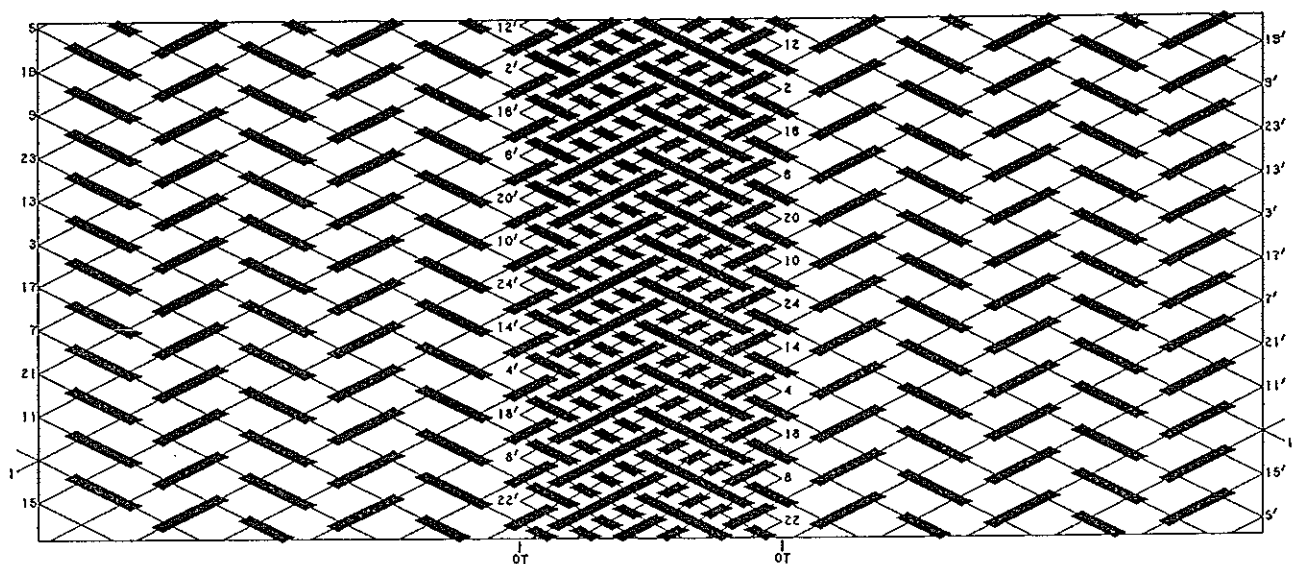
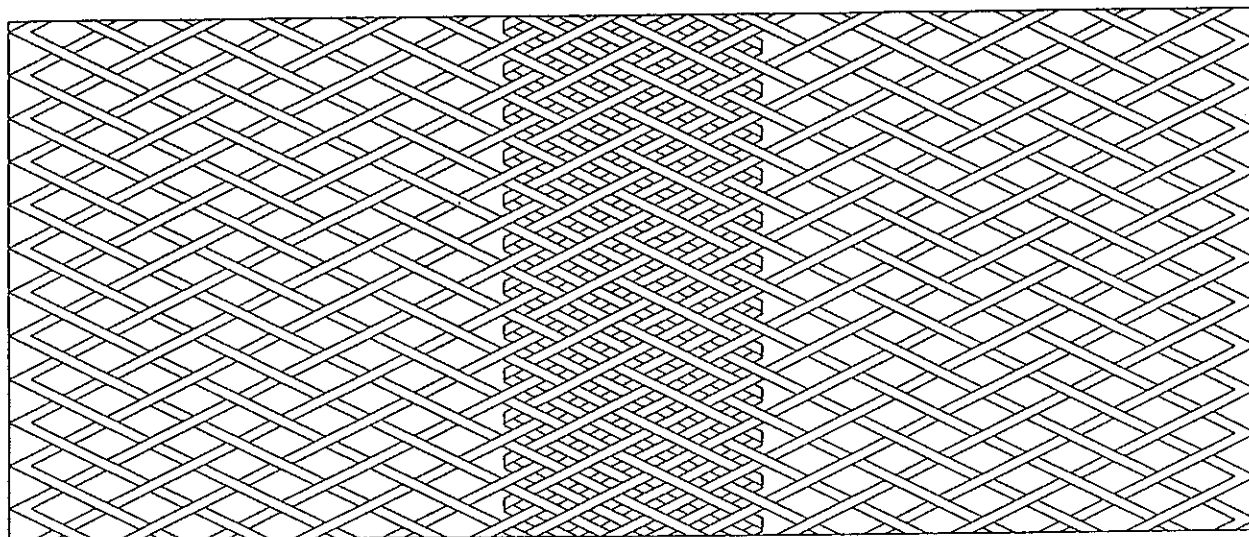


Fig. 957 — Interwoven bight-edges based on knot in Fig. 956.

- half-cycle 1' : $o - 2u - 2o - u.$
- half-cycle 2' : $i = 0$: OT — $u - 2o - 2u - (1, s)2o.$
- half-cycle 3' : $i = 0$: $o - 3u - 2o - u.$
- half-cycle 4' : $i \leq 1$: OT — $u - 2o - 2u - (1, s, 1)3o.$
- half-cycle 5' : $i \leq 1$: $2o - 3u - 2o - u.$
- half-cycle 6' : $i \leq 2$: OT — $u - (1, s, 1)3o - 2u - 3o - (s)u.$
- half-cycle 7' : $i \leq 2$: $u - 2o - 4u - 2o - u.$
- half-cycle 8' : $i \leq 3$: OT — $u - 3o - 2u - 2o - (s)u - o - u.$
- half-cycle 9' : $i \leq 3$: $u - o - u - o - 4u - 2o - u.$
- half-cycle 10' : $i \leq 4$: OT — $u - 3o - u - (s)o - u - 2o - u - o - u - (s)o.$
- half-cycle 11' : $i \leq 4$: $u - 2o - u - o - 4u - 2o - 2u.$
- half-cycle 12' : $i \leq 5$: OT — $u - 3o - u - o - u - 2o - u - (s, 1)2o - u - o.$

half-cycle 13':	$i \leq 5$:	$u - 2o - u - 2o - 4u - 2o - 2u.$
half-cycle 14':	$i \leq 6$:	OT $u - 3o - u - o - u - o - (s)u - o - u - 2o - u - o.$
half-cycle 15':	$i \leq 6$:	$u - o - u - o - u - 2o - 4u - 2o - 2u.$
half-cycle 16':	$i \leq 7$:	OT $u - (s, 3)4o - u - o - u - o - u - o - u - 2o - (s, 1)2u - o.$
half-cycle 17':	$i \leq 7$:	$2u - o - u - o - u - 2o - 5u - 2o - 2u.$
half-cycle 18':	$i \leq 8$:	OT $u - 4o - u - o - u - o - u - (1, s)2o - u - 2o - 2u - o.$
half-cycle 19':	$i \leq 8$:	$2u - o - u - 2o - u - 2o - 5u - 2o - 2u.$
half-cycle 20':	$i \leq 9$:	OT $u - (4, s)5o - u - o - u - o - u - 2o - u - 2o - 2u - (s, 1)2o.$
half-cycle 21':	$i \leq 9$:	$2u - 2o - u - 2o - u - 2o - 5u - o - u - o - 2u.$
half-cycle 22':	$i \leq 10$:	OT $u - 5o - u - o - u - o - u - 2o - (1, s)2u - 2o - 2u - 2o.$
half-cycle 23':	$i \leq 10$:	$2u - 2o - u - 2o - 2u - 2o - 5u - o - u - o - 2u.$
half-cycle 24':	$i \leq 11$:	OT $u - 5o - u - o - u - (s, 1)2o - u - 2o - 2u - 2o - 2u - 2o.$

Using flat string of course, let's first braid this braid **with** the OT movements and after that again, but **without** the OT movements. Compare the two results. We see that there is little if any difference between these two knots apart from their surface texture[†] — the experienced braider who pays attention to detail will detect a very slight difference though, depending on the width/thickness ratio of the string. For the shape of the two knots we observe that the central 'overlying' part of the interwoven knot components rises gently above their 'non-overlapping' parts.

Let's use the round braid in Fig. 956 again but rotated through 180° in Fig. 958. The half-cycle braiding algorithms for the half-cycles 1-24 are those on pg. 1210, while the half-cycle braiding algorithms for the half-cycles 1'-24' are as follows:

half-cycle 1':		:	$u - 2o - 2u - o.$
half-cycle 2':	$i = 0$:	OT $o - 2u - 2o - u - (s)o.$
half-cycle 3':	$i = 0$:	$2u - 2o - 2u - o.$
half-cycle 4':	$i \leq 1$:	OT $o - 2u - 2o - u - (s, 1)2o.$
half-cycle 5':	$i \leq 1$:	$o - 2u - 2o - 2u - o.$
half-cycle 6':	$i \leq 2$:	OT $o - u - (s)o - u - 2o - u - 2o - (s)u.$
half-cycle 7':	$i \leq 2$:	$u - o - 2u - 2o - 3u - o.$
half-cycle 8':	$i \leq 3$:	OT $o - u - o - u - 2o - u - o - (s)u - o - u.$
half-cycle 9':	$i \leq 3$:	$u - o - 3u - 2o - 3u - o.$
half-cycle 10':	$i \leq 4$:	OT $o - u - o - u - (1, s, 1)3o - u - o - u - o - u - (s)o.$
half-cycle 11':	$i \leq 4$:	$u - 2o - 3u - 2o - 4u - o.$
half-cycle 12':	$i \leq 5$:	OT $o - u - o - u - 3o - u - o - u - (s, 1)2o - u - o.$

[†] String which has a different surface texture for their two parallel wide sides, the upper surface of half-cycles 1, 4, 5, 8, 9, 12, 13, 16, 17, 20, 21, 24 differs from the upper surface of half-cycles 2, 3, 6, 7, 10, 11, 14, 15, 18, 19, 22, 23.

- half-cycle 20' : $i \leq 9$: OT — $2o - u - o - u - (s, 3)4o - 2u - 2o - u - 2o - 2u - (s, 1)2o$.
- half-cycle 21' : $i \leq 9$: $2u - 2o - u - 2o - u - o - 2u - o - u - o - 5u - o$.
- half-cycle 22' : $i \leq 10$: OT — $2o - u - o - u - 4o - 2u - 2o - (1, s)2u - 2o - 2u - 2o$.
- half-cycle 23' : $i \leq 10$: $2u - 2o - u - 2o - 2u - o - 2u - o - u - o - 5u - o$.
- half-cycle 24' : $i \leq 11$: OT — $2o - u - o - u - (4, s)5o - 2u - 2o - 2u - 2o - 2u - 2o$.

Let's with flat string first braid this braid with the OT movements and after that **without** the OT movements. Compare the two results. We see that the two knots differ greatly in the appearance of the bight-edges of the central 'overlying' part of the interwoven knot components and that this part lies distinctly above the rest of the knot, more or less as if the central 'overlying' part is a knot over a knot.

Let's now employ the round braid in Fig. 959 in the design of Fig. 960 (note that this round braid is identical to the round braid in Fig. 956).

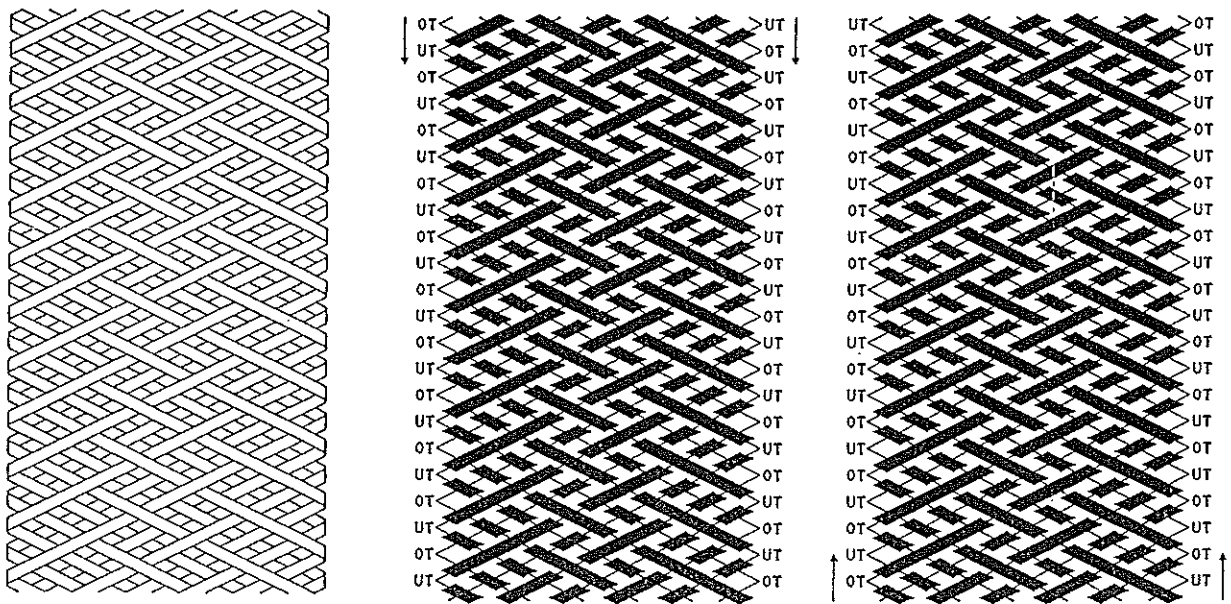


Fig. 959 — Round braid used in the design of Fig. 960.

The half-cycle braiding algorithms for the half-cycles 1-24 are those on pg. 1210 again, while the half-cycle braiding algorithms for the half-cycles 1' - 24' are as follows:

- half-cycle 1' : $2u - o - u - 2o$.
- half-cycle 2' : $i = 0$: OT — $2o - u - o - 2u - (s)o$.
- half-cycle 3' : $i = 0$: $3u - o - u - 2o$.
- half-cycle 4' : $i \leq 1$: OT — $2o - u - o - 2u - (s, 1)2o$.
- half-cycle 5' : $i \leq 1$: $o - 3u - o - u - 2o$.
- half-cycle 6' : $i \leq 2$: OT — $(2, s)3o - u - o - 2u - 2o - (s)u$.
- half-cycle 7' : $i \leq 2$: $u - o - 3u - o - 2u - 2o$.
- half-cycle 8' : $i \leq 3$: OT — $3o - u - o - 2u - o - (s)u - o - u$.
- half-cycle 9' : $i \leq 3$: $u - o - 4u - o - 2u - 2o$.
- half-cycle 10' : $i \leq 4$: OT — $3o - u - (1, s)2o - 2u - o - u - o - u - (s)o$.

- half-cycle 20': $i \leq 9$: OT — $4o - u - (s, 2)3o - 3u - 2o - u - 2o - 2u - (s, 1)2o.$
- half-cycle 21': $i \leq 9$: $2u - 2o - u - 2o - u - o - 4u - o - 3u - o - u - o.$
- half-cycle 22': $i \leq 10$: OT — $4o - u - 3o - 3u - 2o - (1, s)2u - 2o - 2u - 2o.$
- half-cycle 23': $i \leq 10$: $2u - 2o - u - 2o - 2u - o - 4u - o - 3u - o - u - o.$
- half-cycle 24': $i \leq 11$: OT — $4o - u - 3o - u - (s)o - 2u - 2o - 2u - 2o - 2u - 2o.$

Let's with flat string first braid this braid **with** the OT movements and after that **without** the OT movements. Compare the two results. Apart from any surface texture, the appearance of the two knots is nearly the same; there is only a slight difference in the appearance of the bight-edges of the central 'overlying' part of the interwoven knot components. Again as in the last case, the central 'overlying' part of the interwoven knot components lies distinctly above their adjacent 'non-overlapping' parts, more or less as if the central 'overlying' part is a knot over a knot. The 'overlying' part of the interwoven knot components will always lie distinctly above their adjacent 'non-overlapping' parts when the interwoven part of the knot components has the essential coding shown in Fig. 961 whether or not the OT movements are being employed.

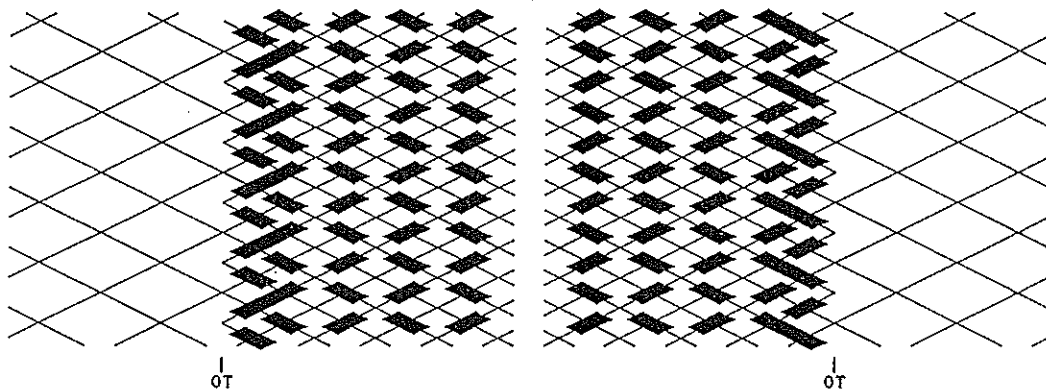


Fig. 961 — Upper central layer distinctly above the rest of the knot.

Whether or not the OT movements are being employed, the overlying part of the knot does not lie at its edges distinctly above the rest of the knot when the essential coding of the interwoven part of the knot components is as shown in Fig. 962.

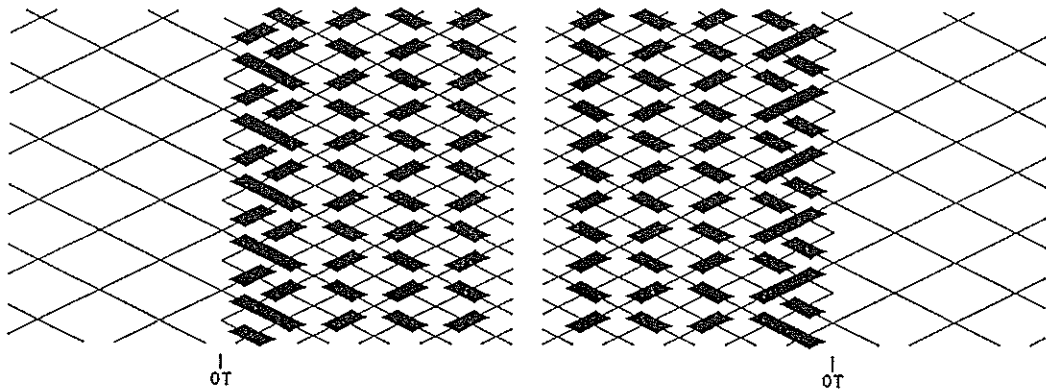


Fig. 962 — Upper central layer not distinctly above the rest of the knot.

