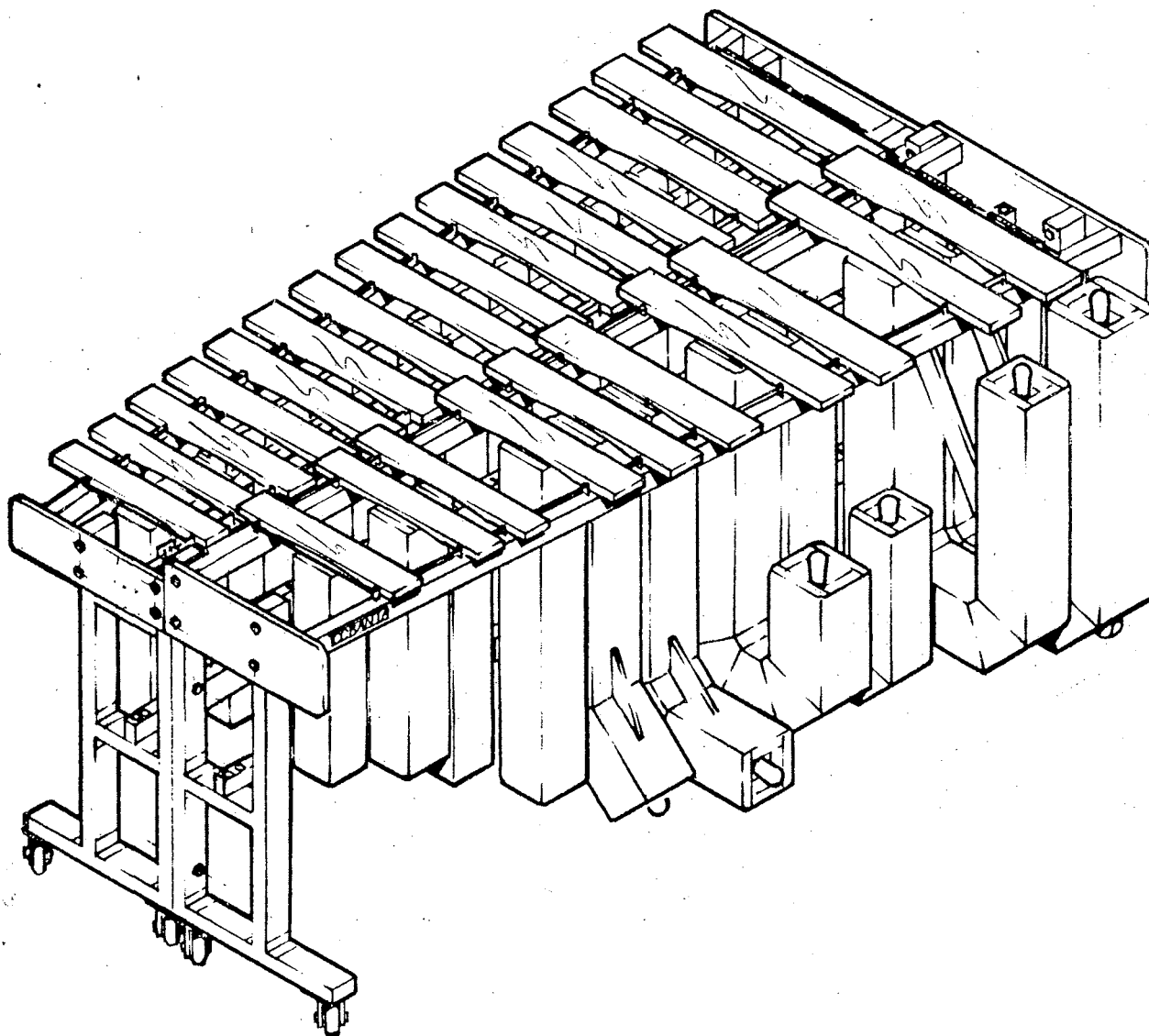


# OWNERS MANUAL

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## EXTENDED BASS MARIMBA



CCBANTA

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EXTENDED BASS MARIMBA  
OWNERS MANUAL

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CCBANTA COMPANY  
(Christopher C. Banta)  
232 Wyoming St.  
Pasadena, CA 91103  
818/798-7410

To the owner,

The information contained in this manual is proprietary and is provided as a courtesy to the owner of the EXTENDED BASS MARIMBA. The information is also provided so the owner can make the fullest use of this instrument.

Please do not start anywhere in this manual. It is recommended that a few additional minutes be spent in starting at the beginning and progressively reading throughout the entire manual.

Should an additional copy of this manual be required due to loss or for filing purposes, please request in writing. A copy will be forwarded at no charge.

Thank you,

  
Christopher C. Banta

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PART 1

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ASSEMBLY INFORMATION

# CARTON CONTENTS

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Carton Number	Contents
1 of 19	Naturals Bars and Resonator Support Rail Assembly
2 of 19	Accidentals bars and Resonator Support Rail Assembly
3 of 19	Naturals and Accidentals End Piece Assemblies (Large)
4 of 19	Naturals and Accidentals End Piece Assemblies (Small)
5 of 19	GGG Resonator
6 of 19	GGG# Resonator
7 of 19	AAA Resonator
8 of 19	AAA# Resonator
9 of 19	BBB Resonator
10 of 19	CC and G Resonators
11 of 19	CC# Resonator
12 of 19	DD Resonator
13 of 19	DD# and F# Resonators
14 of 19	EE and AA Resonators
15 of 19	FF and GG# Resonators
16 of 19	GG, FF#, and F Resonators
17 of 19	AA#, BB, and C Resonators
18 of 19	C#, D, D#, and E Resonators
19 of 19	Mounting Hardware Protective Vinyl Cover 1-pair #16 Mike Balter Mallets 1-pair #17 Mike Balter Mallets Spare shank of cotton cord

## INSPECTION FOR DAMAGE

---

### CARTONS

When all nineteen (19) cartons are received, inspect for damage to the outside of the carton. Look for badly smashed corners, large penetrations into the side(s), and any evidence of overall squashing of the carton.

If damage did occur, there is a chance the carton did what it was suppose to do - protect the inside contents.

### INSIDE CONTENTS

If the damage occuring was sufficiently powerful, it is possible the carton could not protect the inside contents. It will then be necessary to determine the severity of the actual damage.

The extent of the damage could range from a simple dent to a complete rearrangement and break-up of one or several components. If the damage looks as though it may have affected the integrity of specific components (Example: A crack in a resonator thus destroying it's air-tight integrity or a split in a bar thus causing it to vibrate at a slower frequency). Should the damage be worth reporting please record the findings either by a detailed description or polaroid photographs. Then contact the two following parties:

#### First

Consolidated Freightways

(The transporting company from Los Angeles)

Refer to "CFWY PRO NUMBER 292-59662-5 (LAC)

It is necessary to determined how the damage might have occurred. Consolidated Freightways may be able to provide this information.

Second

Christopher Banta (Instrument builder)  
232 Wyoming St.  
Pasadena, California 91103  
818/798-7410

A. Please phone and be prepared to give a detailed description of the damage.

B. Should the damage be of a severe nature, I (Chris Banta) will catch the next available flight to the owner's location where the instrument is being held to repair the problem(s).



## UNPACKING INSTRUCTIONS

---

Prior to unpacking the contents of all cartons, verify the quantity of nineteen (19) cartons total. Should one or more of the cartons be missing, please contact Consolidated Freightways and refer to "CFWY PRO NUMBER 292-59662-5 (LAC)".

The actual shipping date was 6/25/86, out of Los Angeles, California.

### CARTONS

When all nineteen cartons are verified, please open one-by-one. (It does not matter which order they are opened.) Open cartons with "FRAGILE" labels facing upward.

If a razor blade type box cutter, exacto-knife, or other sharp instrument, please use shallow cuts - just enough to break through the packing tape. CAUTION! Carton contents could be severely scratched or cut if deep, straight-through cuts are used. When the tape has been satisfactorily cut, opened the carton in a normal manner and remove the contents.

### PACKING FOAM

Every item in each carton is wrapped in white "microfoam". The microfoam is held together with brown packing tape. It should be a simple matter of just peeling the tape from the microfoam thus allowing the microfoam to fall off. Please do not use sharp knives or razor blades for this operation.

Once the foam is removed set all instrument components, out of the way until needed during the assembly stage.

## EXTENDED BASS MARIMBA INDIVIDUAL PARTS CHECKLIST

---

### A. RESONATORS

1. GGG
2. GGG#
3. AAA
4. AAA#
5. BBB
6. CC
7. CC#
8. DD
9. DD#
10. EED
11. FF
12. FF#
13. GG
14. GG#
15. AA
16. AA#
17. BB
18. C
19. C#
20. D
21. D#
22. E
23. F
24. F#
25. G

### E. MISCELLANEOUS

40. 1 pair mike balter #17 mallets
41. 1 pair mike balter #16 mallets
42. Shallow drop cover
43. Shank of 1/8" cotton cord
44. Owner's Manual

### B. BARS (and bar support RAILS)

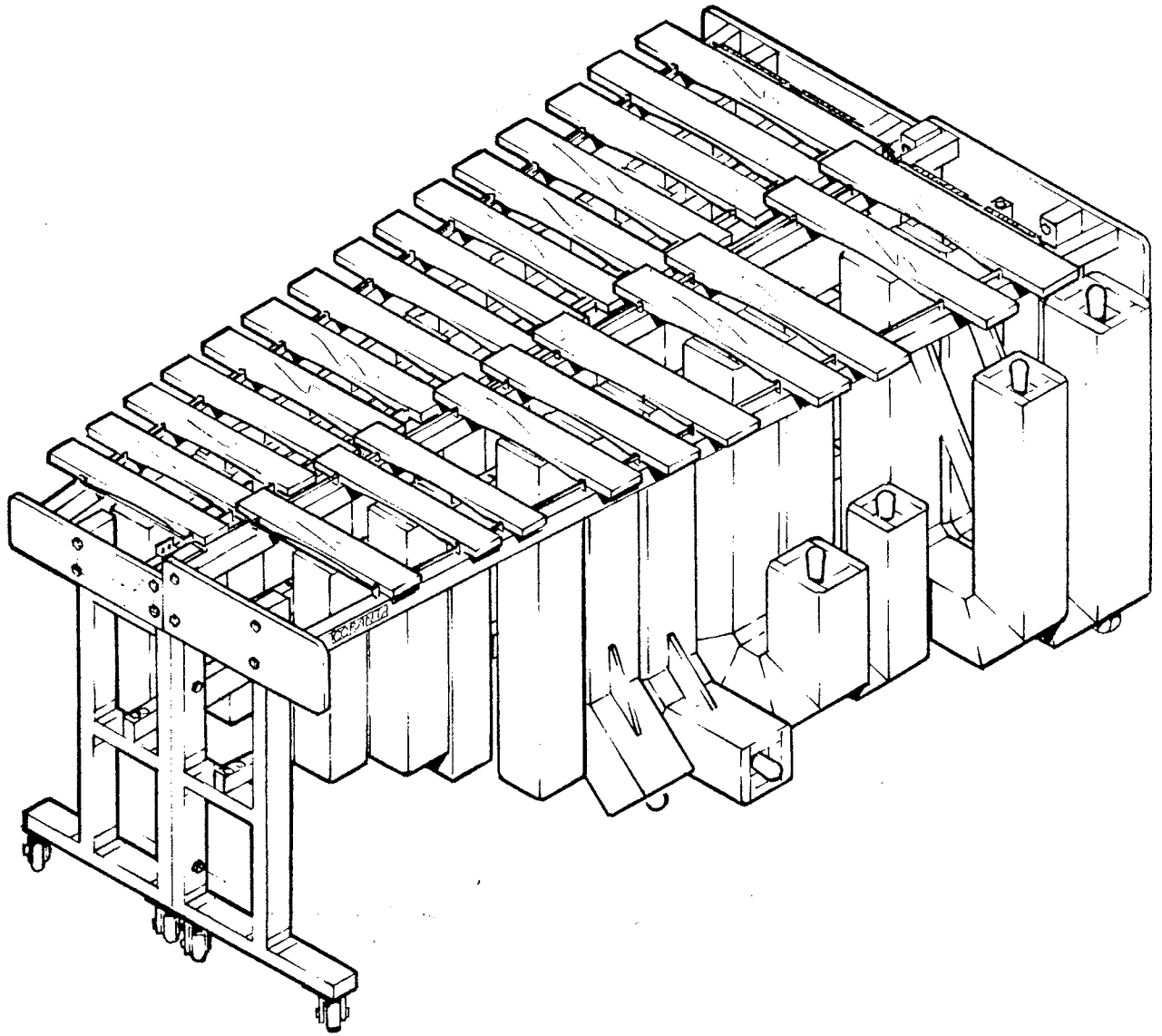
26. Bar Support Rail Assembly (naturals) (D)
27. Bar Support Rail Assembly (accidentals) (H)

### C. FRAME

28. Left End Piece Assembly (naturals) (B)
29. Right End Piece Assembly (naturals) (A)
30. Left End Piece Assembly (accidentals) (F)
31. Right End Piece Assembly (accidentals) (E)
32. Resonator Support Rail Assembly (naturals) (C)
33. Resonator Support Rail Assembly (accidentals) (G)

### D. ASSEMBLY HARDWARE

34. 5/16" x 4-1/2" bolts (16)
35. 5/16" x 4" bolts (16)
36. 5/16" x 3-1/2" bolts (4)
37. 5/16" washers (72)
38. 5/16" nuts (32)
39. 5/16" wing-nuts (4)



## STEP-BY-STEP ASSEMBLY INSTRUCTIONS

---

When assembling this instrument, enlist the help of two individuals. They will be very useful in holding and supporting the various components during the assembly stage.

### Assembly Tools

---

The only tools needed for assembly is two 1/2" open end (or closed end) wrenches and a rubber mallet. The wrenches are necessary for tightening a single bolt/washer/nut combination at the same time. The rubber mallet may be necessary to help drive the bolts into holes should insertion by hand become difficult.

### Identification of pieces

---

END PIECE ASSEMBLY is identified by a letter underneath the bottom support beam between both casters.

RESONATOR SUPPORT RAIL ASSEMBLY is identified by a letter on one of the cross beams.

BAR SUPPORT RAIL ASSEMBLY is identified by a letter on a single bar support rail (that supports the bars).

RESONATORS are identified by groups of letters (each pertaining to the resonator's pitch) on the top edge of the opening, opposite the stopper.

THIS MARIMBA IS NOT DESIGNED FOR CONSTANT ASSEMBLY/DISASSEMBLY. IT IS RECOMMENDED THAT IT STAY IN A PERMANENTLY SET-UP CONDITION.

\*\*\*\*\*

#### NOTE

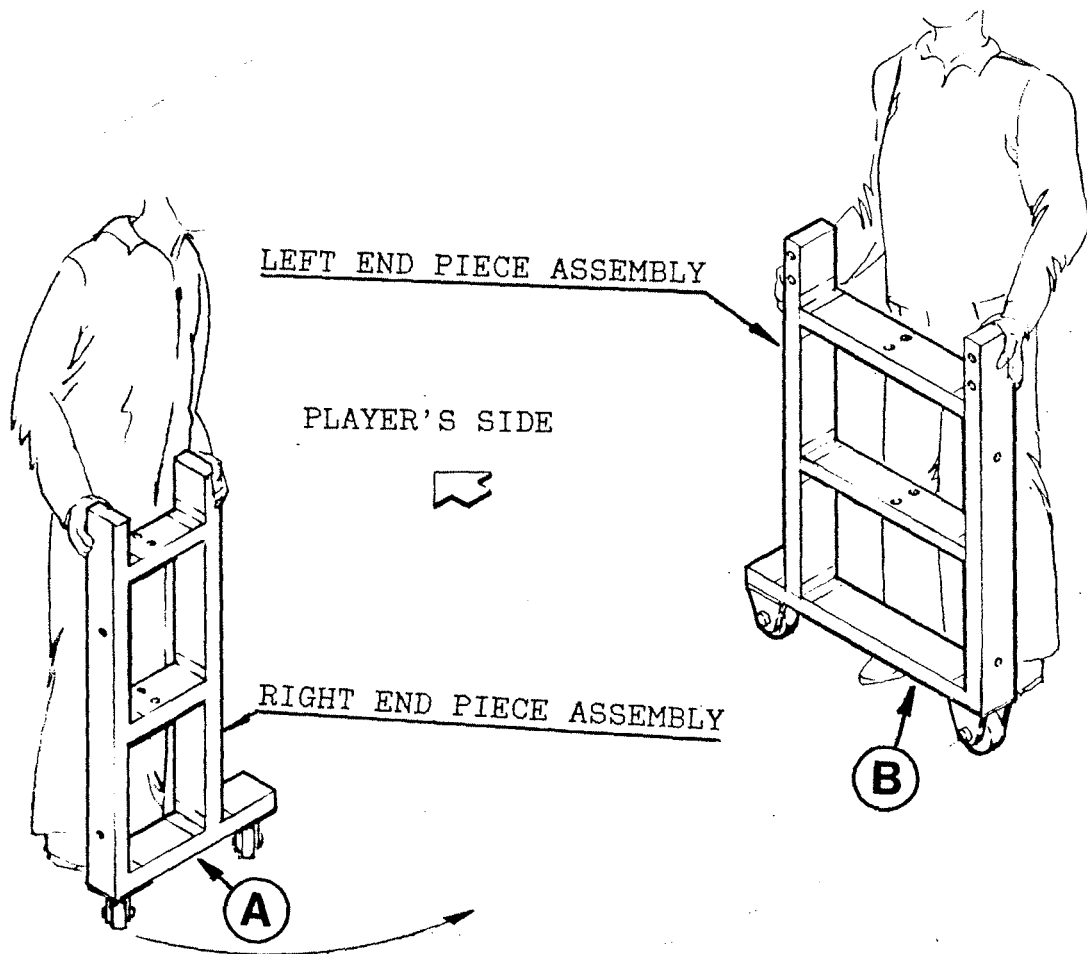
\*\*\*\*\*

Should there be any difficulty in the assembly of the Extended Bass Marimba, please contact:

Chris Banta at 818/798-7410.

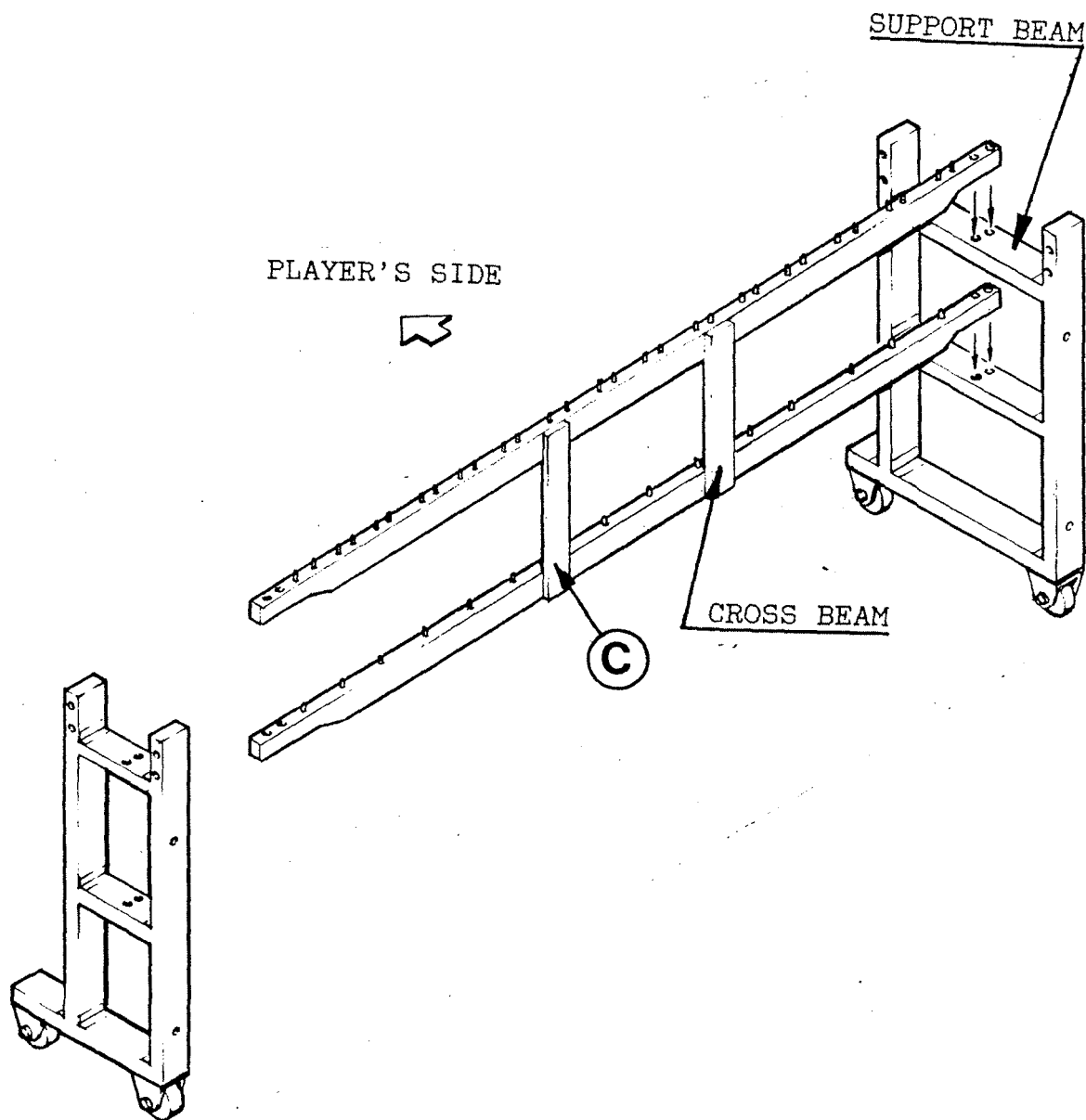
# STEP 1   NATURALS

Locate Right End Piece Assembly (A) and Left End Piece Assembly (B). Situate both End Piece Assemblies as illustrated with protruding bottoms oriented in the same direction towards player's side.



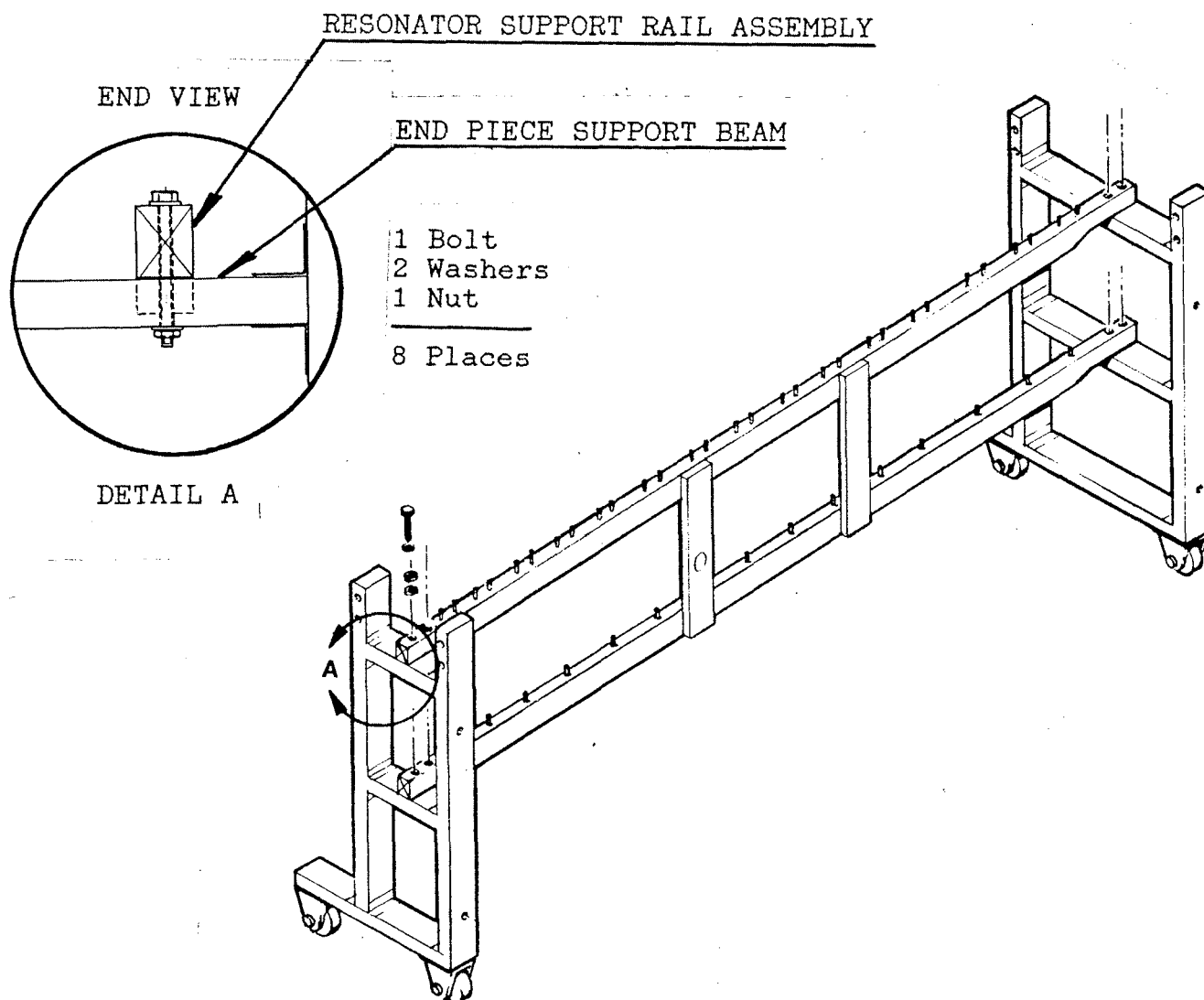
## STEP 2

Locate Resonator Support Rail Assembly (C) and place onto both End Piece support beams as illustrated. Orient cross beams away from player's side.



### STEP 3

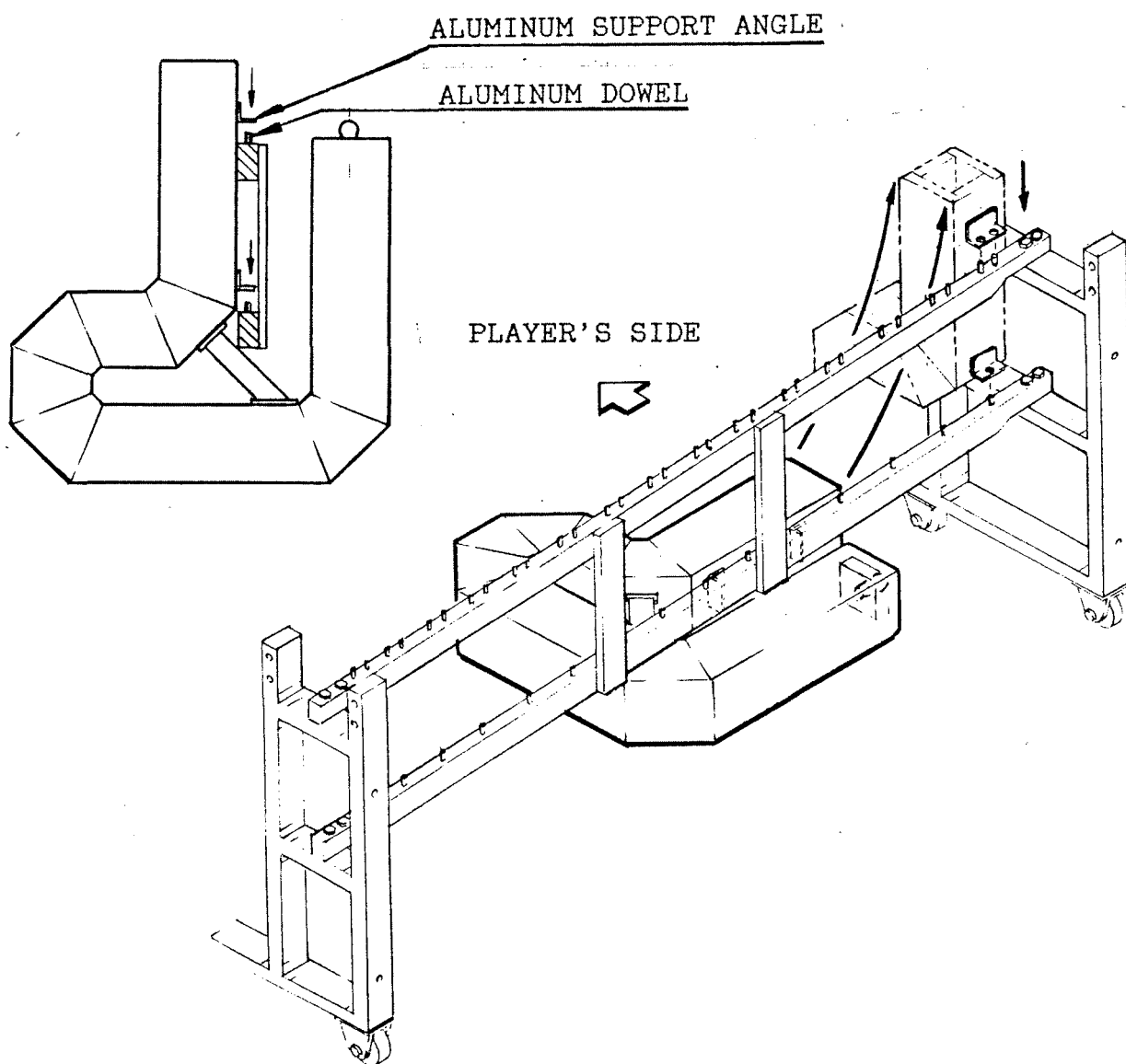
Bolt Resonator Support Rail Assembly onto both End Piece support beams as illustrated. Use eight 5/16" X 4" bolts with washers and nuts. Fasten together as shown by detail A. Tighten firmly-DO NOT OVER TIGHTEN.



#### STEP 4

Locate the following (naturals) resonators: GGG, AAA, BBB, CC, DD, EE, FF, GG, AA, BB, C, D, E, F, and G. (There should be a total of fifteen (15) resonators for this operation.) The resonator pitch can be located by viewing the edge of the open end.

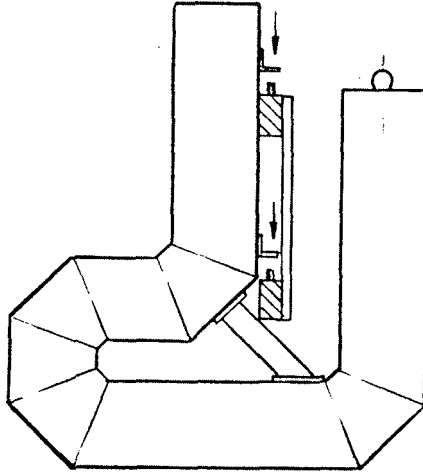
Starting with the "GGG" resonator on its side, slide the resonator underneath the Resonator Support Rail Assembly slowly tilting the stopper and open end upward.



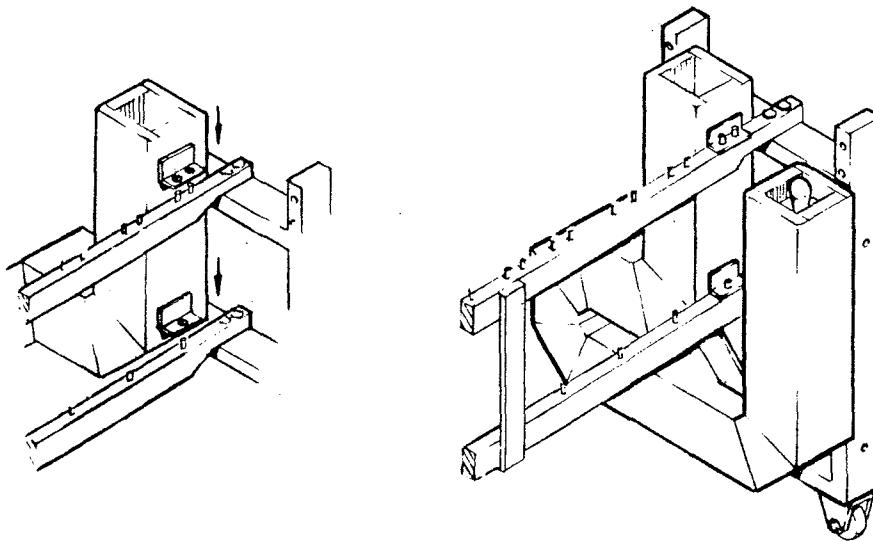


STEP 4 (continued)

Carefully pass aluminum support angles (on resonator) by resonator support rail beams. In a suspended fashion, ease resonator over aluminum dowels towards left end of Resonator Support Rail Assembly.



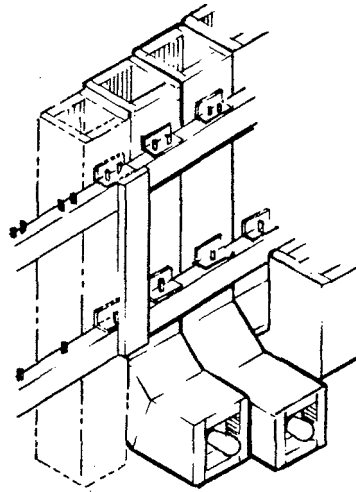
Line-up mating holes in aluminum resonator angles with aluminum dowels on "last end" position of Resonator Support Rail Assembly. Carefully push resonator onto dowels until aluminum angles rest firmly on Resonator Support Rail Assembly.



#### STEP 4 (continued)

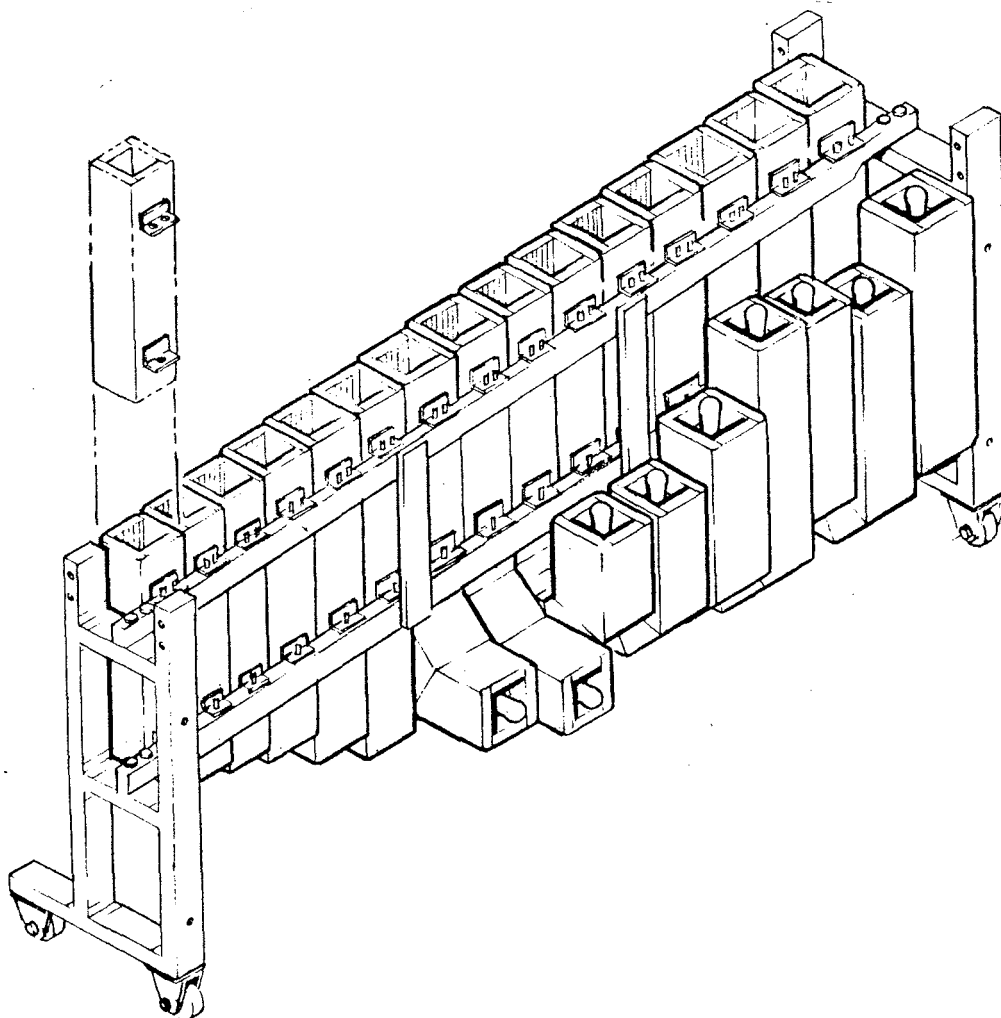
Continue adding the rest of the "naturals" resonators using the same process. Add resonators (one-by-one) in the following order:

AAA  
BBB  
CC  
DD  
EE  
FF  
GG  
AA  
BB  
C  
D  
E  
F  
G



STEP 4 (continued)

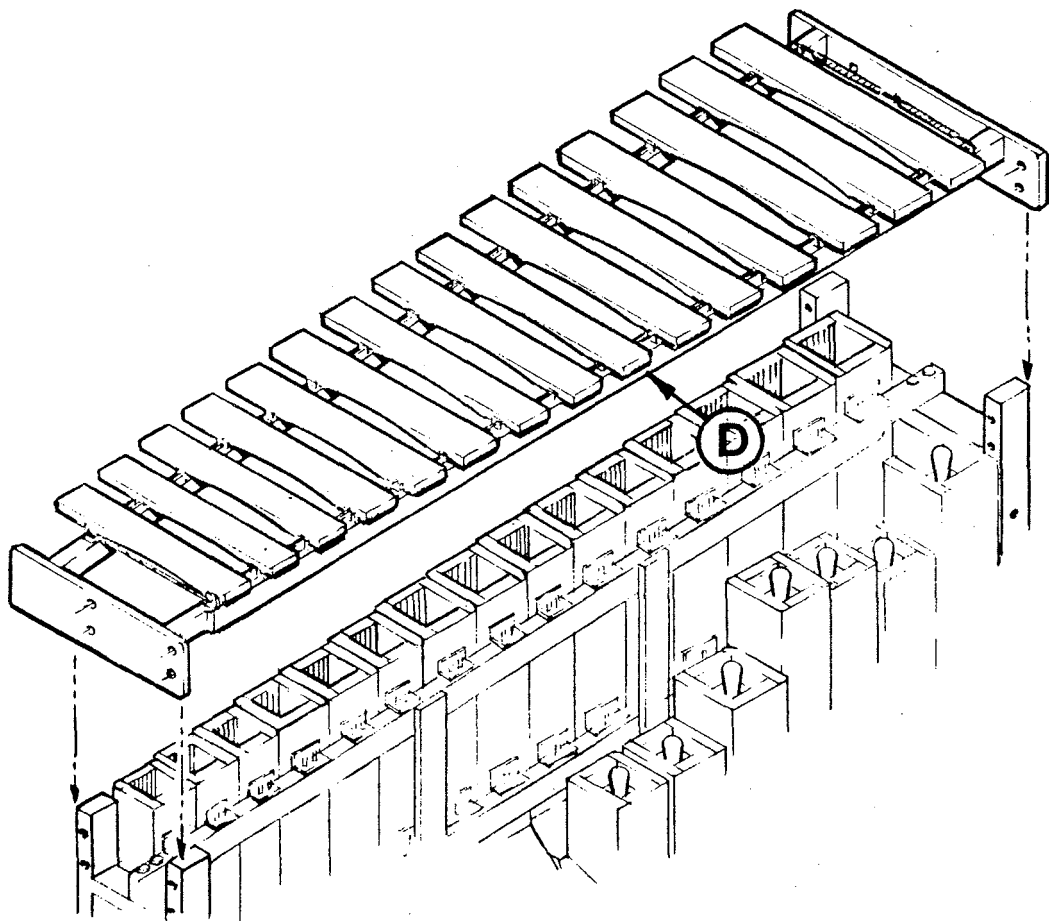
When completed, all "naturals" resonators should be resting securely on the Resonator Support Rail as illustrated.



A single check will verify the correct resonator in its correct location. Look at each resonator opening and visually observe the proper succession of notes starting with GGG, thru AAA, BBB, CC, DD, EE, FF, GG, AA, BB, C, D, E, F, and up to G.

## STEP 5

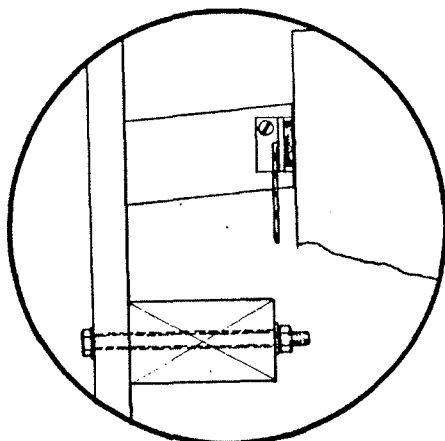
Using two people, lower (natural) Bar Support Rail Assembly (D) onto frame assembly. Attach both ends of the Bar Support Rail Assembly to the outside of each End Piece Assembly (as illustrated) with the longest bar (GGG) directly over the GGG resonator.



## STEP 5 (continued)

When lowered into place, insert eight 5/16" x 4-1/2" bolts with washers and nuts as illustrated. Fasten together as shown in detail B. Tighten firmly - DO NOT OVER TIGHTEN.

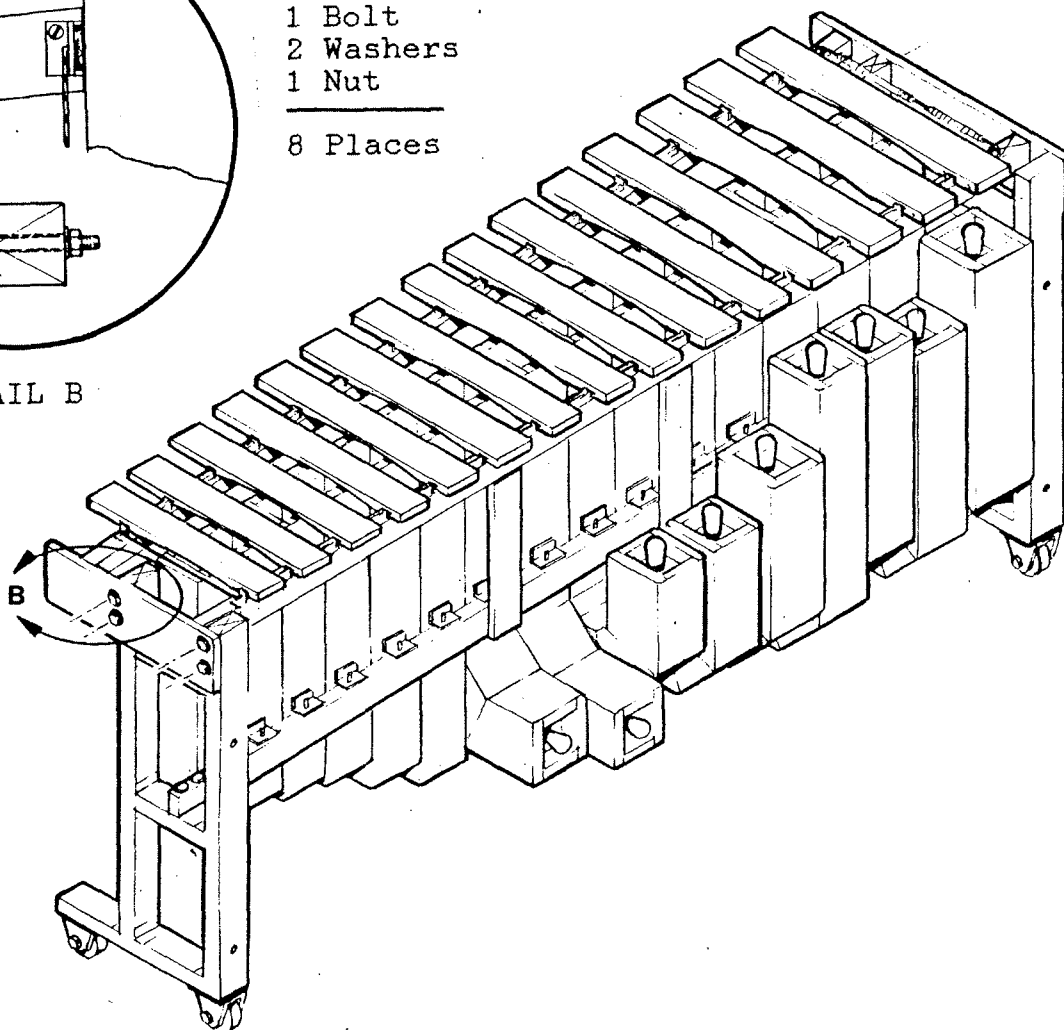
TOP VIEW



1 Bolt  
2 Washers  
1 Nut

8 Places

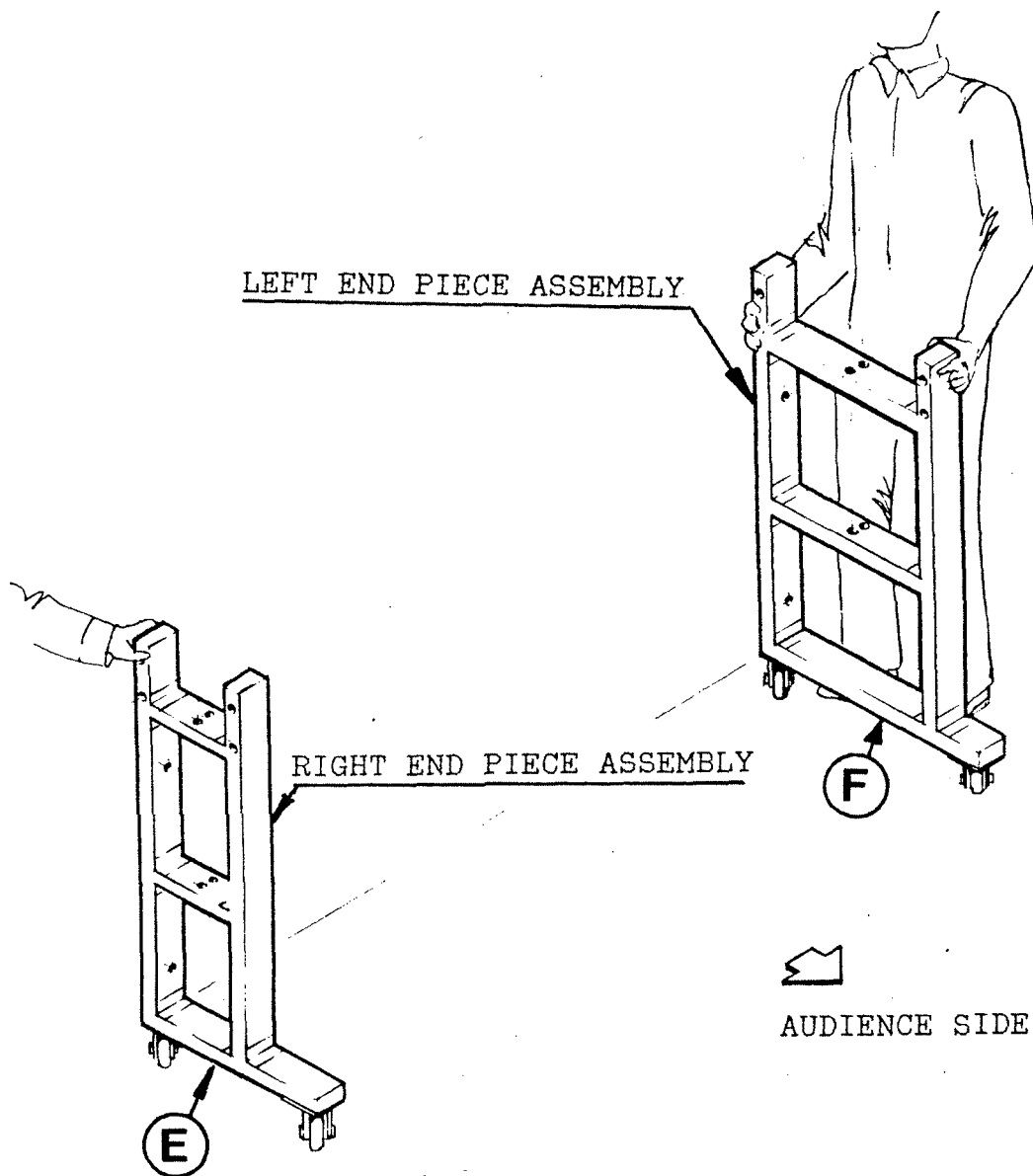
DETAIL B



This completes the assembly stage of the "naturals" half of the Extended Bass Marimba.

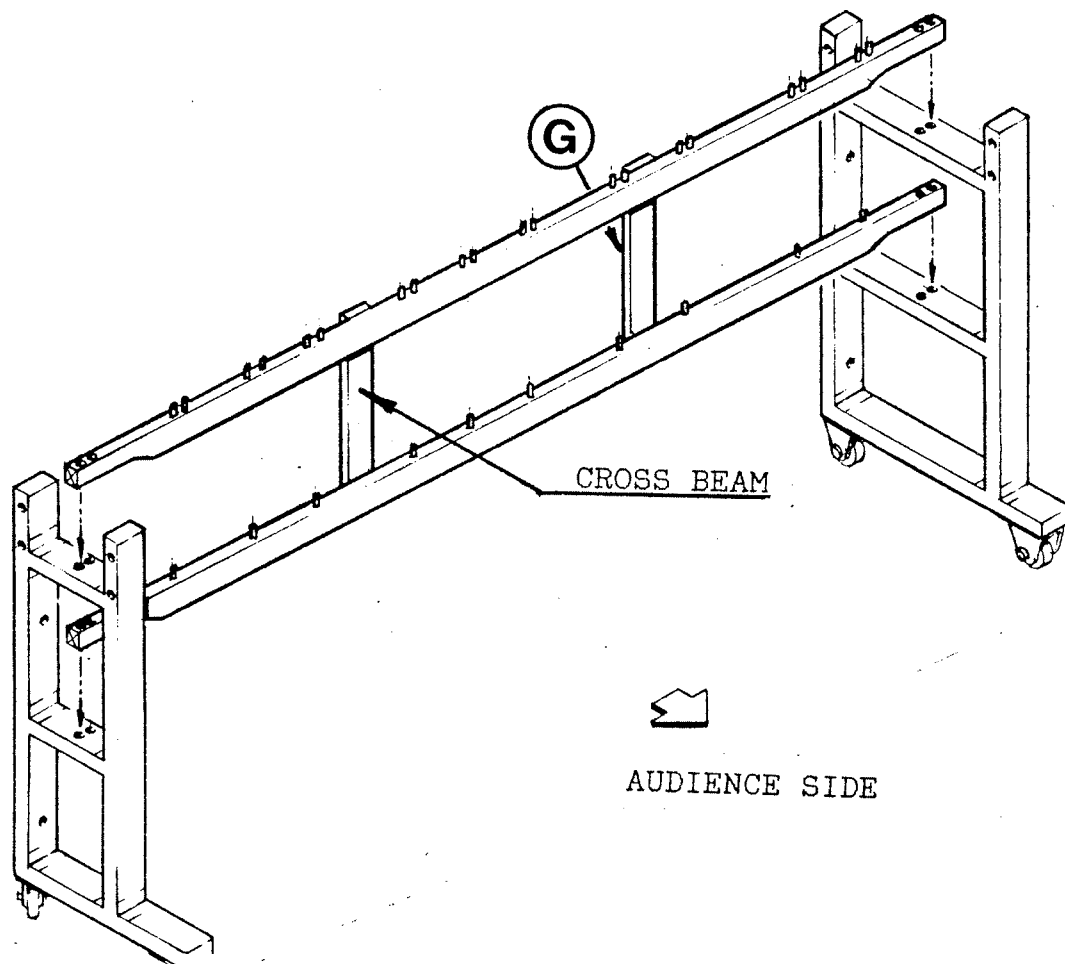
## STEP 6 ACCIDENTALS

Locate Right End Piece Assembly (E) and Left End Piece Assembly (F) [as seen by the player's side]. Situate both End Piece Assemblies as illustrated with protruding bottoms oriented in the same direction towards the audience side.



# STEP 7

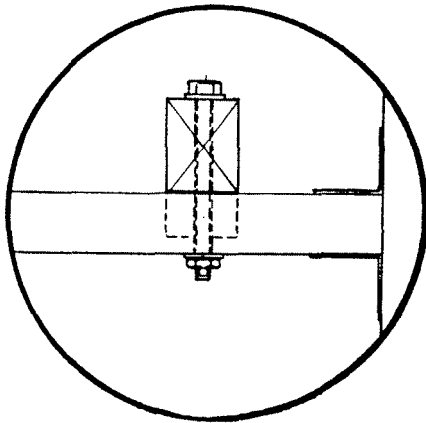
Locate Resonator Support Rail Assembly (G) and place onto both End Piece support beams as illustrated. Orient cross beams away from audience side.



## STEP 8

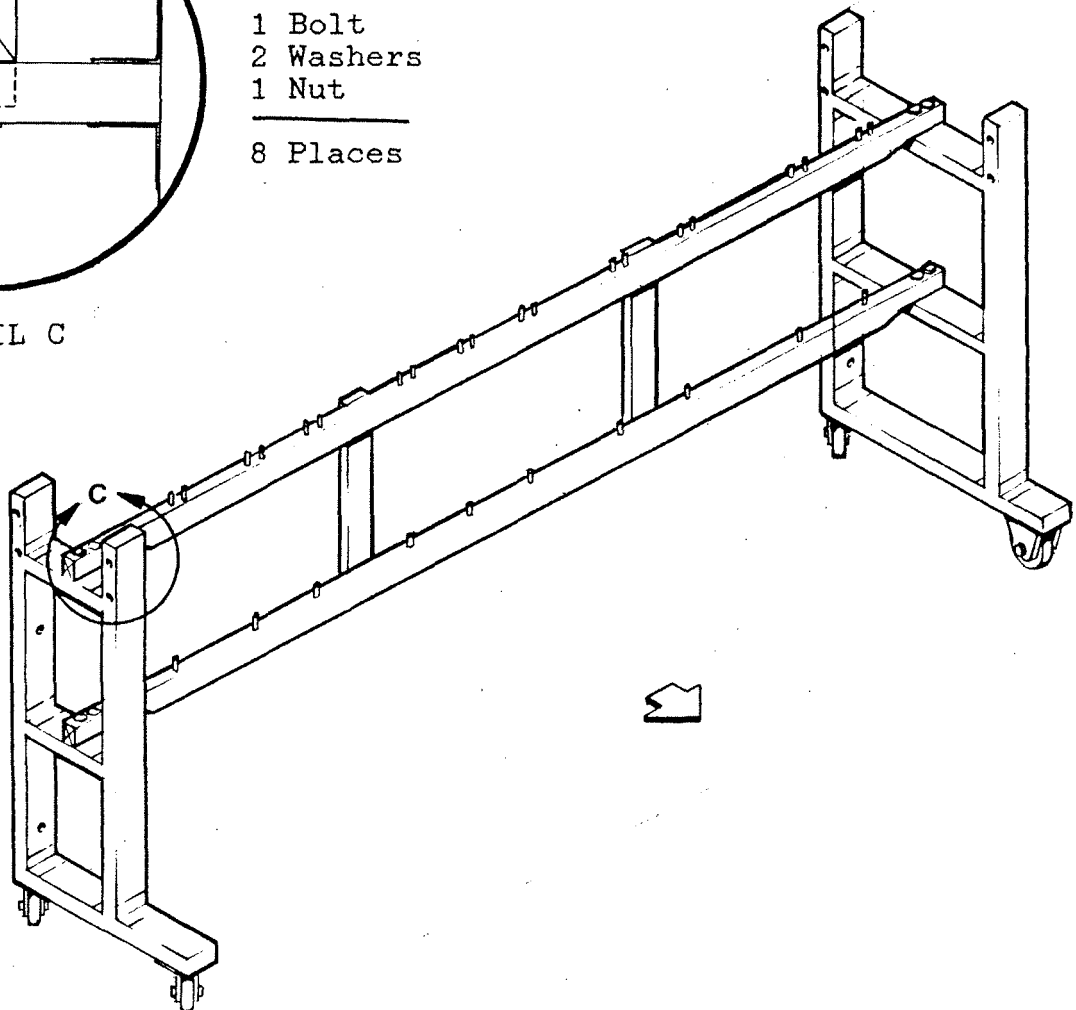
Bolt Resonator Support Rail Assembly onto both End Piece support beams as illustrated. Use eight 5/16" x 3-1/2" bolts with washers and nuts. Fasten together as shown by detail C. Tighten firmly - DO NOT OVER TIGHTEN.

END VIEW



- 1 Bolt
- 2 Washers
- 1 Nut
- 8 Places

DETAIL C

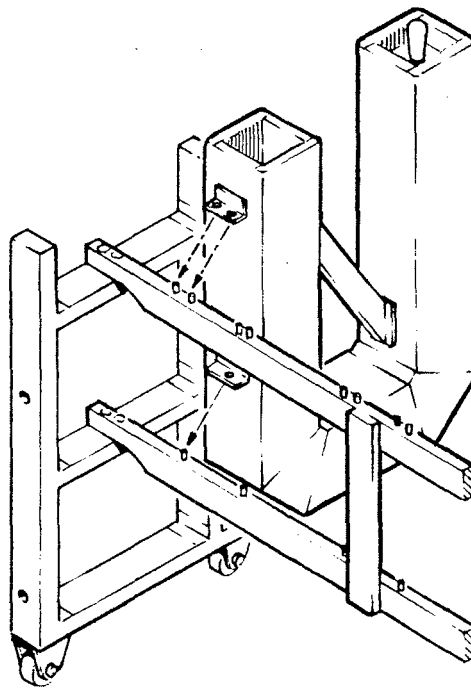
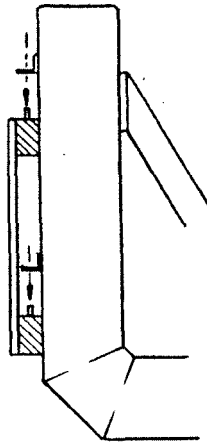




## STEP 9

Locate the following (accidental) resonators: GGG#, AAA#, CC#, DD#, FF#, GG#, AA#, C#, D#, and F#. (There should be a total of ten (10) resonators for this operation).

Starting with the GGG# resonator, line-up mating holes of aluminum angles with aluminum dowels at last end position of Resonator Support Rail Assembly as illustrated. Carefully push resonator onto dowels until aluminum angles rest firmly on Resonator Support Rail Assembly.



AUDIENCE SIDE



STEP 9 (continued)

Continue adding the rest of the "accidental" resonators using the same process. Add resonators (one-by-one) in the following order:

AAA#

CC#

DD#

FF#

GG#

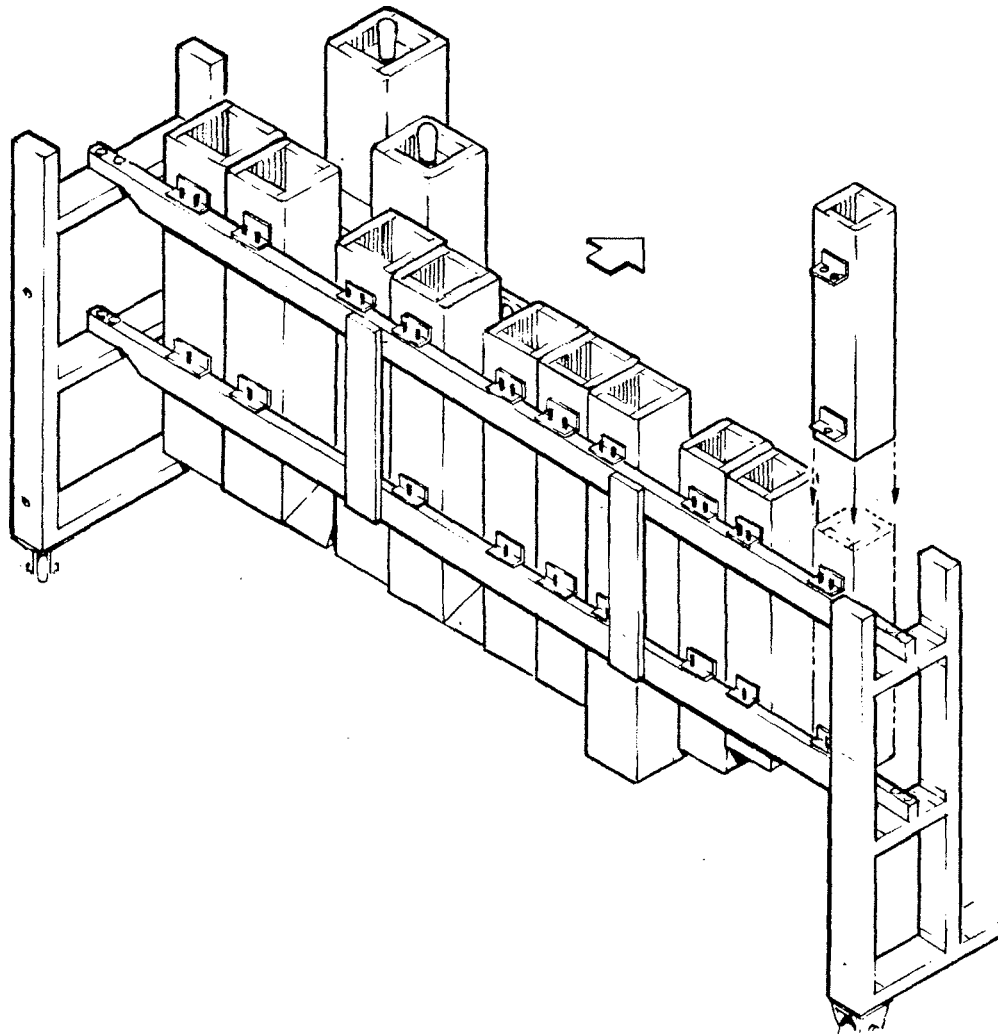
AA#

C#

D#

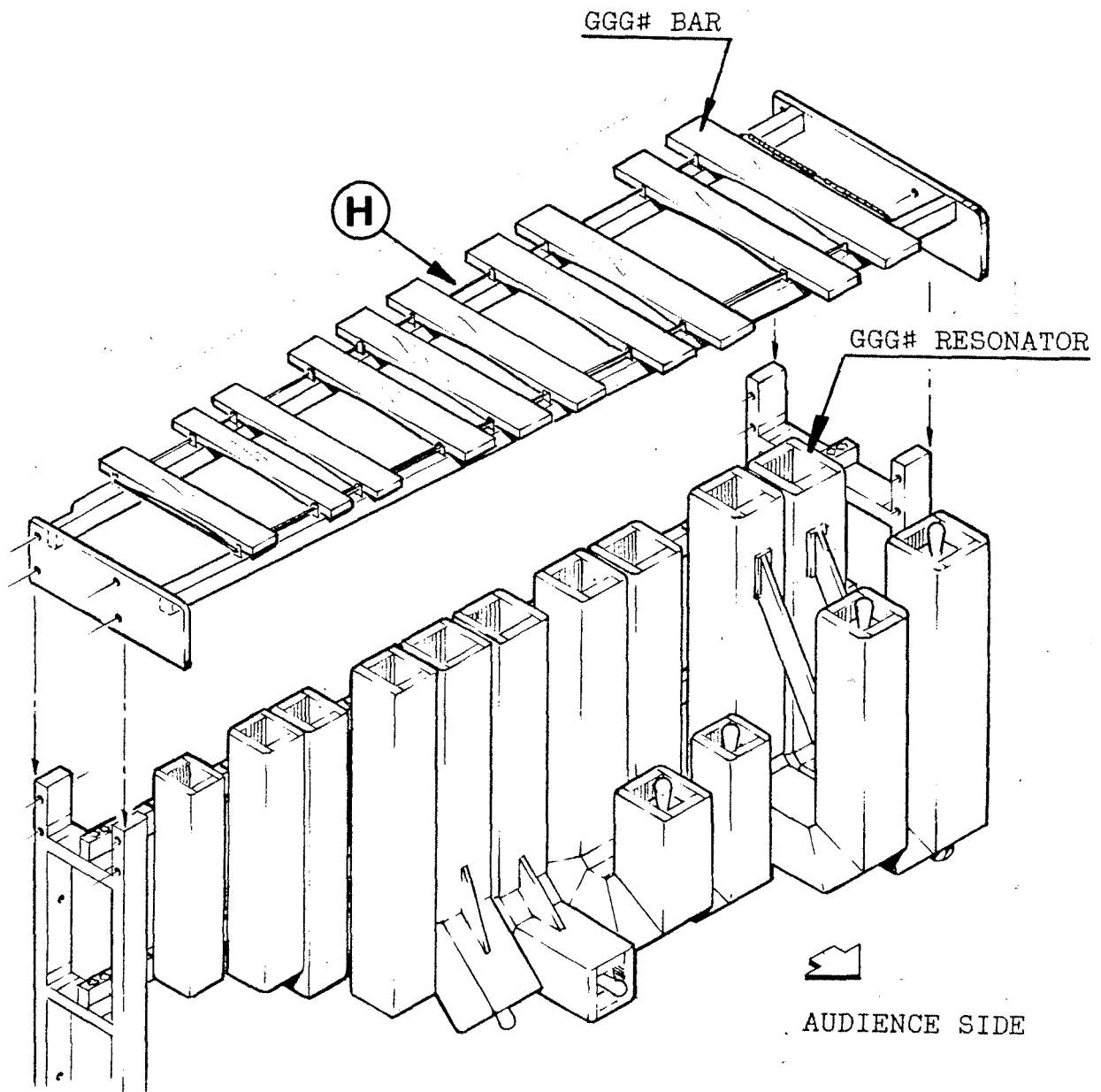
F#

When completed, all "accidental" resonators should be resting securely on the resonator support rail assembly, as illustrated.



## STEP 10

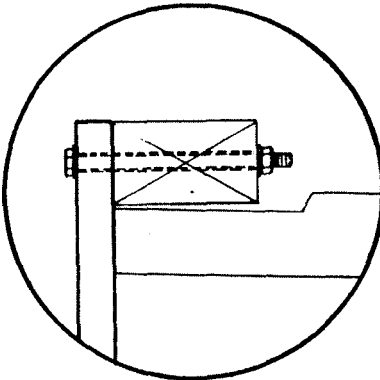
Again, using two people, lower (accidentals) Bar Support Rail Assembly (H) onto frame assembly. Attach both ends of the Bar Support Rail Assembly to the outside of the frame End Pieces with the longest bar (GGG#) directly over the GGG# resonator.



STEP 10 (continued)

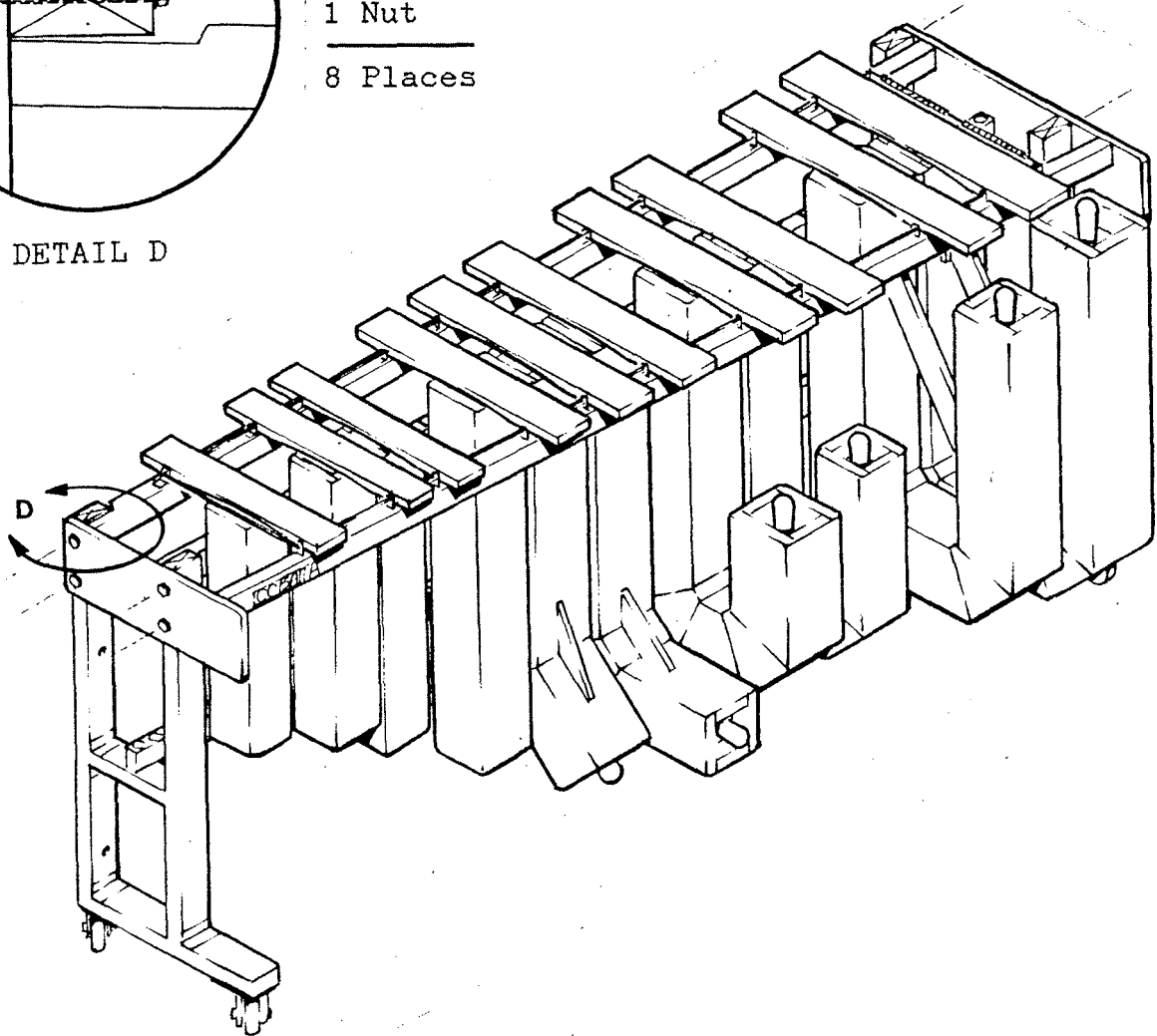
When Bar Support Rail Assembly is lowered into place, insert eight 5/16" x 4-1/2" bolts with washers and nuts as illustrated. Fasten together as shown in detail D. Tighten firmly - DO NOT OVER TIGHTEN.

TOP VIEW



- 1 Bolt
  - 2 Washers
  - 1 Nut
- 
- 8 Places

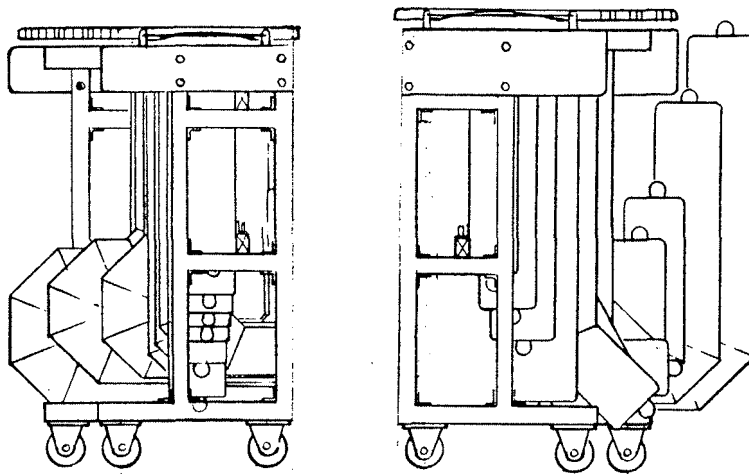
DETAIL D



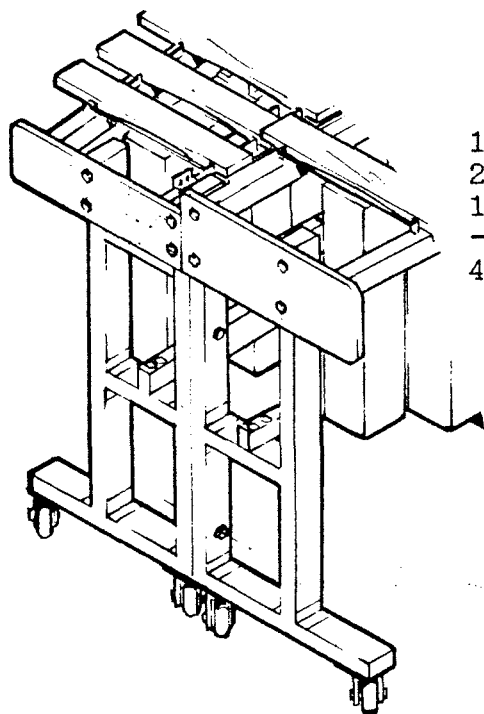
This completes the assembly stage of the "accidentals" half of the Extended Bass Marimba.

## STEP 11 Both Halves

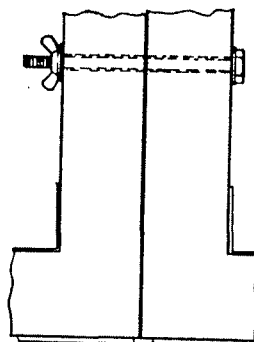
Join both ends of both halves of the Marimba together until they touch, as illustrated.



Secure both halves together with four 5/16" x 3-1/2" bolts, washers, and wing-nuts as shown in detail E. FINGER TIGHTEN ONLY.



- 1 Bolt
- 2 Washers
- 1 Wing-nut
- 
- 4 Places

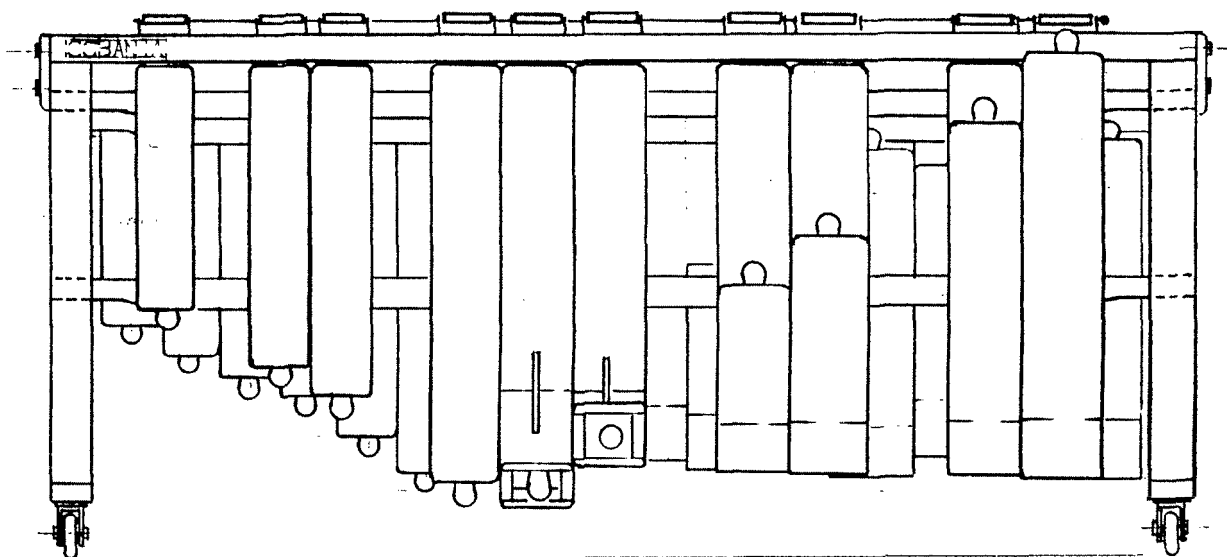


DETAIL E

This completes total assembly of the Extended Bass Marimba.

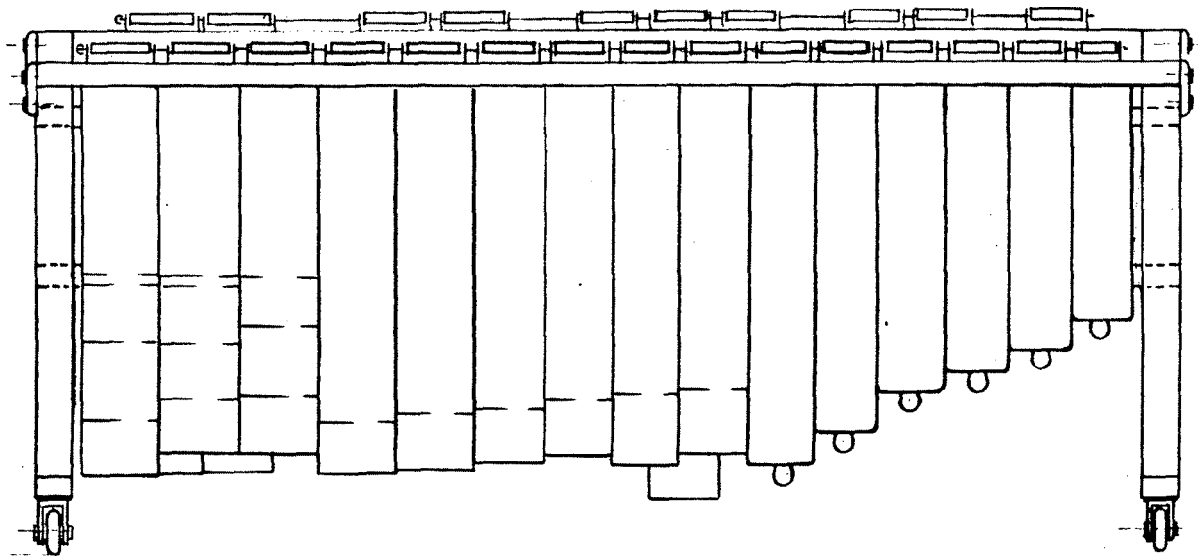
# EXTENDED BASS MARIMBA

Front View (Audience Side)



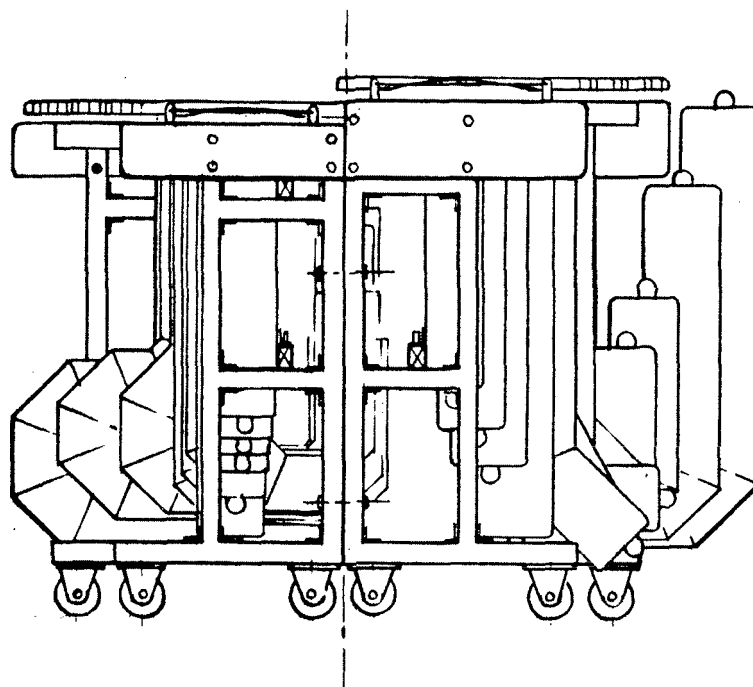
# EXTENDED BASS MARIMBA

Back View (Player's Side)



# EXTENDED BASS MARIMBA

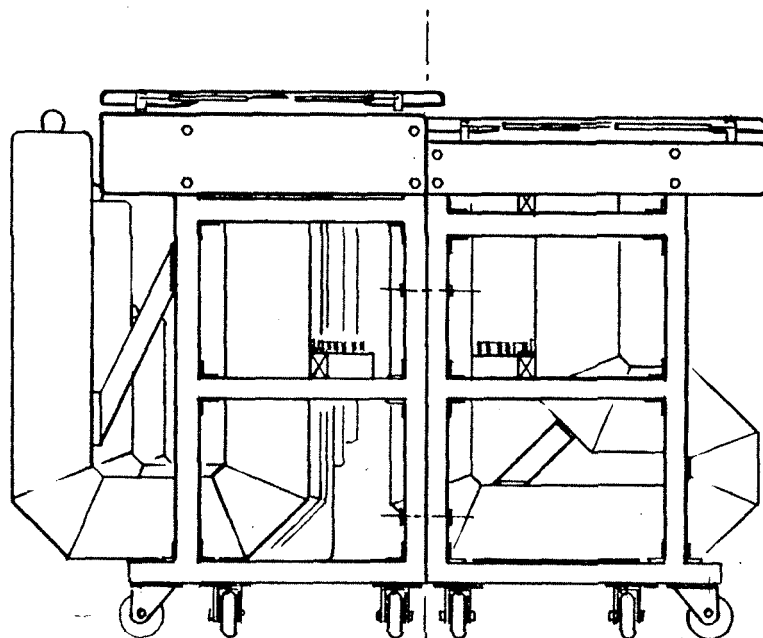
Right Side (Player's Side)





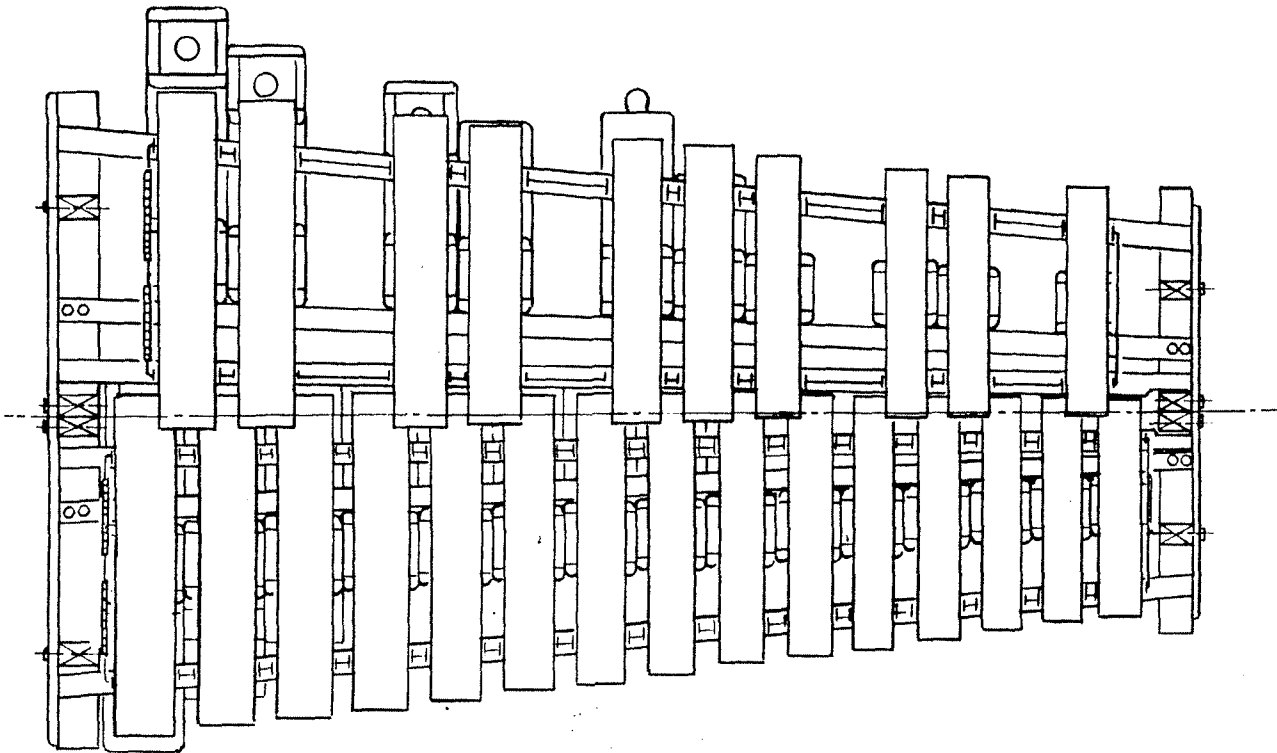
# EXTENDED BASS MARIMBA

Left Side (Player's Side)



EXTENDED BASS MARIMBA

Top View



PART 2

---

## INSTRUMENT SPECIFICATIONS

## EXTENDED BASS MARIMBA

### GENERAL SPECIFICATIONS

---

Designed and built by:

Christopher C. Banta - May 1986

#### Physical:

Height: 35" (Naturals)  
37" (Accidentals)  
Depth: 48"  
Width: 82"  
Weight: 425 lbs.

#### Materials:

Bars: African Padouk  
Resonators: White Pine  
Frame: Aluminum and Clear Fir

#### Finish:

Bars: Varithane #90 Gloss  
Resonators: Varithane #90 Gloss  
Frame: Medium Charcoal Lacquer

#### Musical:

Number of Notes: 25  
Tuning: Equal Tempered  
Pitch Standard: A-440Hz  
Musical Range:



Pitch Range: G1 to G3  
Frequency Range: 48.9Hz to 196.0Hz

EXTENDED BASS MARIMBA  
ENGINEERING DESIGN SPECIFICATIONS

1.0 PURPOSE

- 1.1 This specification establishes the baseline criteria when designing a class of keyboard percussion musical instruments known as an EXTENDED BASS MARIMBA.

2.0 DEFINITIONS

- 2.1 Bar - A rigid body of long rectangular shaped material capable of vibrating with extreme regularity.
- 2.2 Resonator - A device used for increasing the loudness of a pitch by resonance.
- 2.3 Cent - A small unit of measurement of division between two notes. 100 cents between half-steps. 1200 cents between octaves.

3.0 GENERAL

- 3.1 The Extended Bass marimba shall consist of three systems:

- 3.1.1 Mechanical (Bars)
- 3.1.2 Acoustical (Resonators)
- 3.1.3 Supportive (Frame)

- 3.2 The three systems shall be integrated to complete the Marimba as a whole.

- 3.3 Physical parameters shall be dictated by design with no useless or wasted parts, contours, or materialities.

3.4 Range

- 3.4.1 The Extended Bass marimba shall cover a musical range of G1 to G3 (48.9Hz to 196.0Hz).
- 3.4.2 The marimba shall be tuned to the pitch standard of A-440Hz unless specified otherwise.

3.5 Make-up

- 3.5.1 The marimba shall consist of two halves.

- A. One half shall contain the so called "Natural" notes.

G, A, B, C, D, E, F, G, A, B, C, D, E, F, & G

B. The other half shall contain the "Accidental" notes.

G#, A#, C#, D#, F#, G#, A#, C#, D#, & F#

3.5.2 When the two halves are joined together, the "Accidentals" half shall have the bars over hang the "Naturals" bars.

3.5.3 Both Halves shall be fastened together by means of four bolts and four wing nuts.

3.6 The marimba shall be constructed so the "Naturals bar height to ground level measures between 34' and 35-1/2".

3.7 The marimba shall be made mobile.

Each half shall have it's own set of casters for independent ease of mobility.

#### 4.0 MARIMBA BAR

4.1 The marimba bar represents the pitch producing component of the Extend Bass marimba.

4.2 The bar material used shall be that of the straight-grained hard wood class. (Depends on availability and quality.)

4.2.1 Wood - Preferred type:

A. African Padouk

B. Honduras Rosewood

4.2.2 Wood - Acceptable type:

A. Macacauba

B. Bubinga

4.3 The bar's length shall be determined from the engineered dimensions of the following notes:

4.3.1 Cello "C" (65.4Hz) - 22-1/2" long by 4-1/2" wide by 7/8" thick.

4.3.2 Tenor "C" (130.8Hz) - 18" long by 3-3/4" wide by 7/8" thick.

#### 4.3.3 Table - Bar sizing

	Note		Bar Length (Inches)	Bar Width (Inches)
Cello	GGG	(G1)	24 3/8	4 13/16
	GGG#		24	4 3/4
	AAA		23 5/8	4 11/16
	AAA#		23 1/4	4 5/8
	BBB		22 7/8	4 9/16
	CC	(C2)	22 1/2	4 1/2
	CC#		22 1/8	4 7/16
	DD		21 3/4	4 3/8
	DD#		21 3/8	4 5/16
	EE		21	4 1/4
	FF		20 5/8	4 3/16
	FF#		20 1/4	4 1/8
	GG		19 7/8	4 1/16
	GG#		19 1/2	4
	AA		19 1/8	3 15/16
	AA#		18 3/4	3 7/8
	BB		18 3/8	3 13/16
Tenor	C	(C3)	18	3 3/4
	C#		17 5/8	3 11/16
	D		17 1/4	3 5/8
	D#		16 7/8	3 9/16
	E		16 1/2	3 1/2
	F		16 1/8	3 7/16
	F#		15 3/4	3 3/8
	G	(G3)	15 3/8	3 5/16

4.4 The bars shall be shaved from the underside (opposite the playing side) in the form of a long shallow arch. (See Figure 1) The degree of shaving and depth of arch shall be determined by the final pitch.

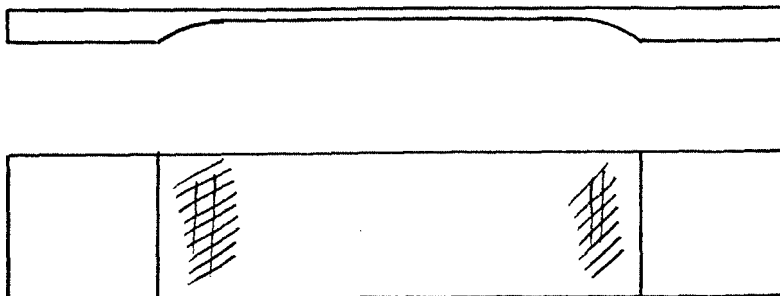


Figure 1

4.5 The bars shall be tuned to the following modes of vibration:

4.5.1 1st harmonic = Fundamental = Ratio - 1:1

4.5.2 4th harmonic = Two octave unision = Ratio 1:4

4.5.3 10th harmonic = One octave plus a major third = Ratio 1:10

4.6 Tuning accuracy shall be maintained within the following tolerances:

4.6.1 1st harmonic  $\pm$  1 cent\*

4.6.2 4th harmonic + 2 cents - zero cents

4.6.3 10th harmonic + 5 cents - zero cents

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\*NOTE: Tuning accuracy can be maintained by utilizing a tuning instrument having one cent resolution.  
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## 5.0 RESONATOR

5.1 The resonator represents the amplification component of the Extended Bass Marimba.

5.2 The resonator shall be the quarter-wavelength column type.

5.2.1 One end (opposite the open end) shall be plugged by means of an adjustable stopper. This is characteristic of the quarter-wavelength resonator.

5.2.2 Resonator length shall be determined using the formula:

$$L = \frac{\lambda}{f}$$

Where: L = Length in feet  
f = Frequency in Hertz  
 $\lambda$  = (Greek letter - Lambda)  
Speed of Sound. Approximately 1129  
ft/sec @ 70 degrees F.



5.2.3 Table - Resonator Lengths and cross-sectional dimensions.

			Cross Sectional I.D. (Inches)	Frequency	Quarter Wavelength w/o D.E.C. (70 degree F) (Inches)
<hr/>					
Cello	GGG	(G1)	4 1/16"	48.99Hz	69.14"
	GGG#		4	51.91	65.25"
	AAA		3 15/16"	55.00	61.58"
	AAA#		3 7/8"	58.27	58.13"
	BBB		3 13/16"	61.74	54.86"
	CC	(C2)	3 3/4"	65.406	51.78"
	CC#		3 11/16"	69.295	48.87"
	DD		3 5/8"	73.42	46.13
	DD#		3 9/16"	77.78	43.55
	EE		3 1/2"	82.41	41.10
	FF		3 7/16"	87.31	38.79
	FF#		3 3/8"	92.49	36.62
	GG		3 5/16"	97.99	34.56
	GG#		3 1/4"	103.83	32.62
	AA		3 3/16"	110.00	30.79
	AA#		3 1/8"	116.54	29.06
Tenor	BB		3 1/16"	123.47	27.43
	C	(C3)	3"	130.81	25.89
	C#		2 15/16"	138.59	24.44
	D		2 7/8"	146.83	23.07
	D#		2 13/16"	155.56	21.77
	E		2 3/4"	164.81	20.55
	F		2 11/16"	174.61	19.40
	F#		2 5/8"	184.99	18.31
	G	(G3)	2 9/16"	195.99	17.28

5.3 The stopper shall fit snug in the column thus creating an airtight fit. (See Figure 2)

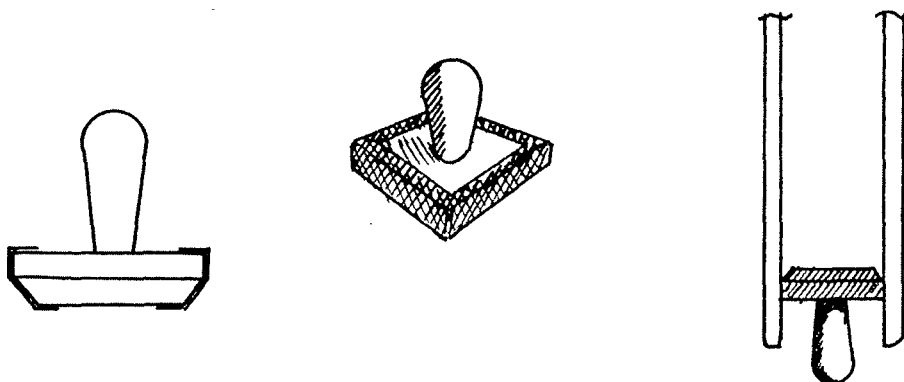


Figure 2

5.4 The resonator material shall be White Pine.

5.4.1 The material thickness shall be 3/4".

5.5 The cross-sectional shape shall be square.

5.6 Construction shall consist of butt-jointed method. (See Figure 3)

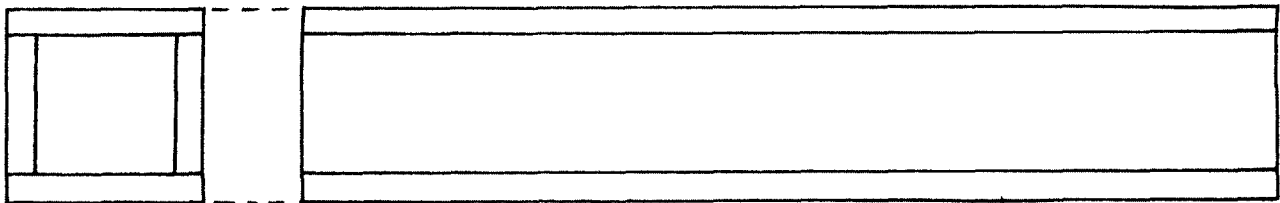


Figure 3

5.7 The length of the lower pitch resonators shall be dictated by the frequency of the note. These lower pitch resonators will require mitering so they can fit under the bar thus maintaining the specified playing height. (See Figure 4)

5.7.1 The miter angle shall be 22-1/2 degrees.

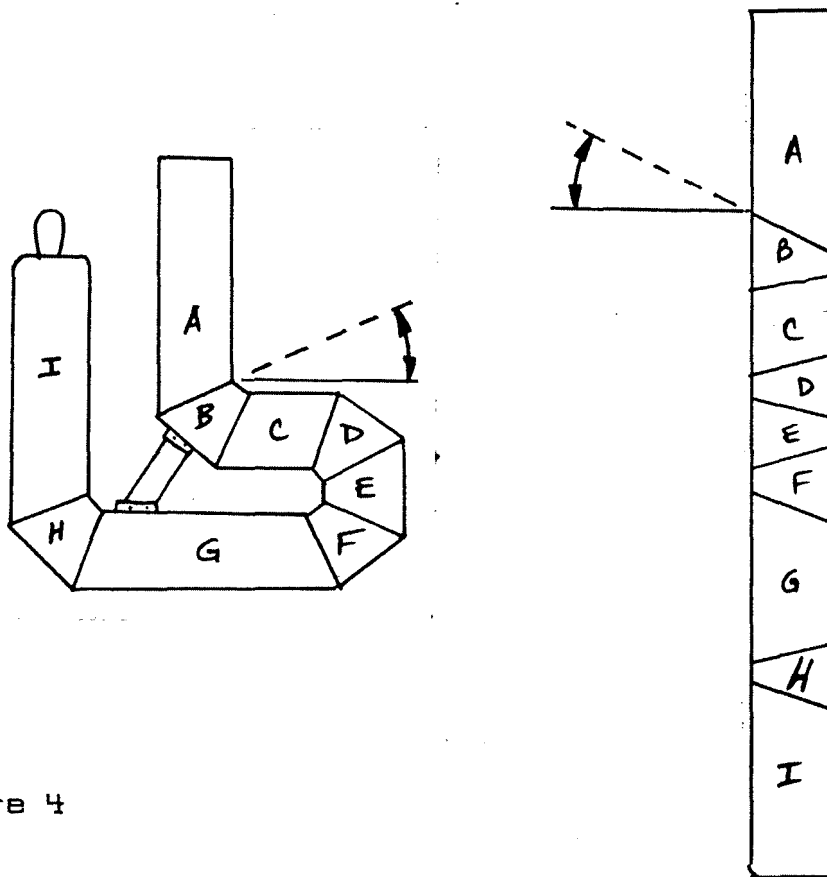


Figure 4

5.8 Applicable resonators shall be mitered using the "Resonator Cutting/Assembly Diagrams" (available through CCBANTIA CO.) for Extended Bass Marimba.

## 6.0 FRAME

6.1 The frame shall support both pitch producing components (bar) and pitch amplifying components (resonator).

### 6.2 Bar

6.2.1 The bar shall be held in place by means of a suspension system.

6.2.2 The suspension shall consist of a length of 1/8" diameter cotton cord looped through drilled holes in the bar in such a manner to join with the supports on the bar support rail. (see Figure 5)

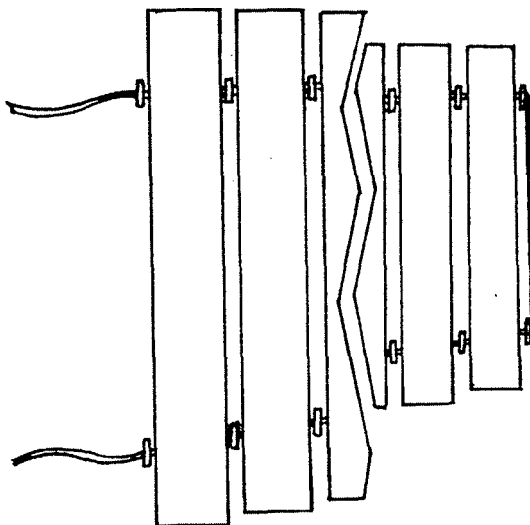


Figure 5

A. The bar supports shall be placed between bars at the node points. (See Figure 6)

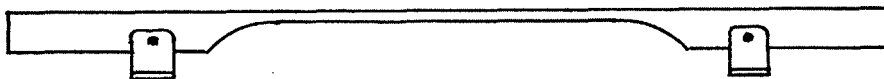


Figure 6

6.2.3 Each end of the cord shall terminate into two tension springs linked together to keep the slack out of the length of cord.

### 6.3 Resonator

- 6.3.1 The resonator shall be held in place, on two resonator support rails, using a combination of a drilled angle bracket and an aluminum dowel. This systems utilizes a gravity to hold the resonator in place. (See Figure 7)

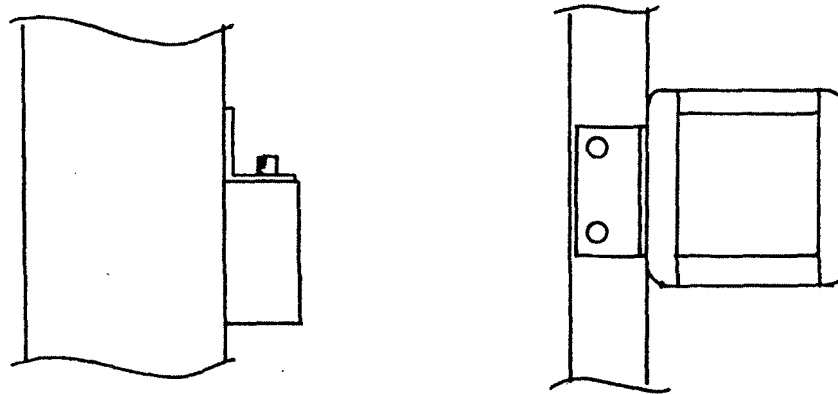


Figure 7

- 6.3.2 The spacing between adjacent resonators shall not exceed 1/8 inch.
- 6.4 Strips of felt shall be placed between interfacing parts to eliminate buzzes and rattles.
- 6.4.1 Felts may be placed in the following locations:
- A. Between resonator and resonator support rails.
  - B. Between angle bracket and resonator support rails.

### 7.0 FINISH

- 7.1 All components in the Extended Bass marimba shall have a protective finish.
- 7.1.1 Bars - Varithane (Gloss #90 on Satin #91).
  - 7.1.2 Resonators - Varithane (Gloss #90).
  - 7.1.3 Frame - Medium "Charcoal" metallic automotive (Satin)

## B.0 MISCELLANEOUS

B.1 The Extended Bass Marimba shall be equipped with the following items:

B.1.1 Shallow drop cover.

A. Black vinyl with soft interior.

B.1.2 Two pairs of mallets.

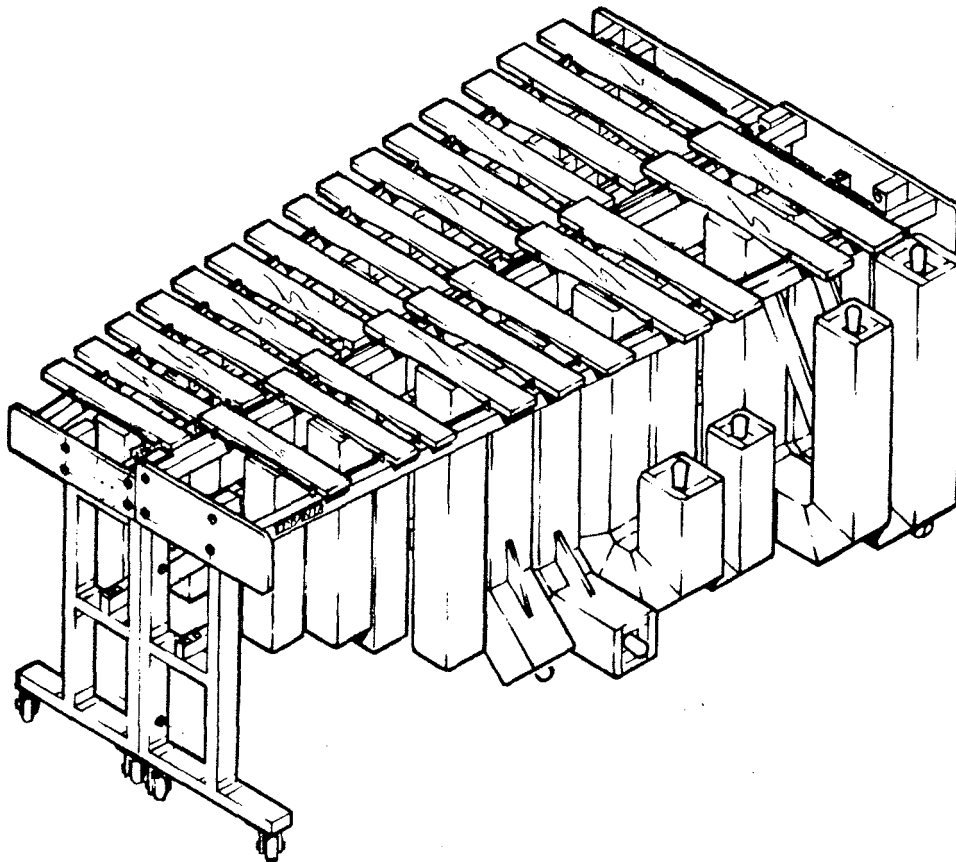
A. One pair of Mike Balter No. 17 (Bass Marimba)

B. One pair of Mike Balter No. 16 (Soft - low register standard marimba).

B.1.3 Instructions and documentation.

## 9.0 ILLUSTRATION

9.1 Front view as seen by the audience.



PART 3

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INSTRUMENT MAINTENANCE

## CLEANING

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### BARS

The finish on the marimba bars is a highly durable synthetic. The purpose of the finish is two-fold; first, it prevents the wood from absorbing moisture found in humid conditions and, second, it protects the wood from the constant strikes of the mallets.

Maintenance of such a finish is not really necessary however in bringing out the sheen, the bars may be sprayed with a furniture wax such as "Pledge", then wiped down with a soft cotton cloth.

The instrument will look especially brilliant during a live performance situation where a variety of overhead lighting is employed.

### RESONATORS

Resonators can be treated like the bars.

### FRAME

The frame may be wiped down with a slightly moistened (water) cloth for removal of dust.

### CASTERS

Maintenance of the casters is not necessary unless they get wet in which they should be dried to prevent rust. It is advisable to apply light grease between the wheel and the axle part of the caster to eliminate the possibility of squeaks.

## INSTRUMENT PROTECTION

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Never lay object(s) on the marimba nor the bars themselves. It is not a table. Damage to the bar may cause it's vibrational frequency to shift.

When the marimba is not in use, it should be covered with the shallow drop cover.

It is recommended that the Extended Bass Marimba not be exposed to continuous sunlight nor hot temperatures. Heat can bake the instrument thus shortening it's useful life.



## PARTS/REPAIR/REPLACEMENT

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In the course of time, portions of the Extended Bass marimba may require maintenance above and beyond the scope of this manual.

### BAR

The one component most likely to require attention is the bar itself. Any number of problems may occur. From simple dents to major breakage. Should a bar become split, cracked, or broken (into two or more parts), please contact:

Chris Banta at 818/798-7410

Usually a bar problem of this nature requires that the bar be removed from the Bar Support Assembly.

### BAR REMOVAL

The following steps may be utilized to remove one or all of the bars from the Extended Bass Marimba.

1. Un-hook the two springs at the end of the Bar Support Assembly.
2. Un-tie the cotton cord from one spring at the of the length of cord. Separate spring.
3. With the cord free from the spring, grab and pull the cord, from opposite end of the Bar Support Assembly, through the entire length of the assembly. Be careful to capture the green felt washers. (Actually called "front rail punchings" used on pianos.)
4. Return back to the spring side of the Bar Support Assembly and pull the remainder of the cord length out. At this point all bars will be resting on the Bar Support Assembly.
5. The problem bar is now easily accessible.
6. Save existing cotton cord and springs for the restringing process.

When the bar is removed it can be sent back to CCBANTIA CO. for servicing or replacement. (Replacement of a bar requires that an exact duplicate be made from the original sizing of the bar.)

#### RESTRINGING THE MARIMBA

Restringing the bars may be done by using the following steps. Use 1/8" diameter cotton cord for this process.

1. Prepare the end of the cotton cord by using hot glue to create a point. Take a 6" length of small guage multi-purpose wire (found at hardware store). Insert one end of the wire into the tip of the cotton cord (sideways) until the wire protrudes the other side of the cord. Bend the wire back on itself to create a large needle and thread-like device.
2. Insert wire into the hole of the beginning aluminum "I" bar support followed by the green felt washer, then the bar itself. When the wire passes out the other end of the bar hole, insert the wire through another green felt washer.
3. Feed the wire into the next aluminum "I" bar support and continue the process up one side of the row of bars and down the next side untill all the bars are strung up.
4. Pull the cord taught and tie the spring as close to the end aluminum "I" bar support as possible.
5. Hook both springs together. Springs will take the slack out of the cord.

#### RESONATORS

Resonators will not usually cause any trouble. However, it is possible for the stopper in the resonator to be tampered with thus causing the resonator's frequency to be different than the bar's frequency. It is vitally important that the stoppers not be changed. This causes a loss of coupling or can cause the resonance of the bar to be severly diminished.

The stoppers are set at CCBANTIA CO. to provide the greatest amount of resonance for this type of acoustic system.

Should a stopper be inadvertently adjusted, again please contact Chris Banta (818/798-7410) for advise on how to proceed.

## PLAYING TECHNIQUE RECOMMENDATIONS

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The height of the bars over the bar support rail has been selected to provide a safety zone for the bar's protection. If the bar is struck hard enough with a weighty mallet, it will "bottom-out" on the bar support rail. This should caution the marimba player that the bar is being struck too hard.

The bar should always be struck in the middle. This causes the bars to impart it's greatest amount of movement which will (acoustically) give the instrument it's greatest loudness. It must be remembered that the bar is not a synthetic drum head. It is a natural organic piece of wood that does not have unlimited flexing capabilities. It is capable of cracking when struck too hard!

### PROPER MALLETS

The mallets supplied with the marimba are made by Mike Balter. The catalogue numbers are #17 (Light blue) and #16 (Orange). Both have rattan handles.

Never use small, hard mallets such as plastic, metal, or bare wood. Their hardness may split the grains in the bars or cause dents in the finish.

Never strike the bar too hard. It is never necessary to exert that kind of force onto the bar. The bar only has a certain amount of resiliency before the wood fiber and structure breaks down, thus causing a flattened or dead sounding note.

Under normal playing conditions the bars should stay in tune and last for years.

## ROOM ACOUSTICS AND INSTRUMENT PLACEMENT

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### DEAD SPOTS

When performing in a small room some experimentation should be done to locate "dead spots". (Sometimes referred as "high pressure" zones.) A dead spot can prevent sound from emanating forth. This is why some notes sound louder than others when the instrument is placed in certain areas of the room.

When a dead spot is located, rest-assured, it is not the marimba - but a high-pressure point in the room. To cure this problem, simply move the marimba to another location within the room. Almost always the dead note(s) will be restored to full resonance. It is possible that other pitches might be affected the same way. This is the nature of room acoustics and their related characteristics.

A helpful test can be performed when a note is affected by a dead spot is found. Have someone walk around while the dead note is being played. That person should listen for changes in the loudness level of the dead note. A person (at a distance) always hears the marimba differently the player.

### HOT SPOTS

The opposite of a dead spot is a "hot spot". A hot spot may cause a certain marimba note to sound exceptionally loud in comparison to it's surrounding notes. The characteristics of hot spot are standing waves which are resonant or reflections between two parallel surfaces. The distance between two reflective surfaces happens to be a half-wavelength which matches the resonant frequency of a specific note. When the bar is

struck, it not only sets the resonator into resonance but the room as well.

A hot spot problem can be treated like dead spots. Simply move the marimba to another location until the specific note cannot set-off the hot spot resonance.

#### COUPLING

When the Extended Bass marimba is built, it goes through a complete coupling cycle. Once the pitch of the bar is tuned, the resonator has to be coupled to the bar so they work together to produce resonance as a unified system. The bar must remain in perfect phase with frequency of the resonator otherwise the resonance is severely impaired.

This coupling process is performed outdoors - away from any reflecting surfaces or enclosed areas. This ensures that each note is consistent with the next regardless of room interaction.

## LIVE PERFORMANCE AND RECORDING RECOMMENDATIONS

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### LIVE PERFORMANCE

The Extended Bass Marimba is a precision, acoustical musical instrument. It is necessary to learn and realize the limitations of an acoustic bass marimba.

It is impossible for the Extended Bass marimba to compete against loud amplified instruments such as guitars, organs, synthesizers, electronic drums, so forth. It does blend well with other acoustic instruments such as those found in a small ensemble. This marimba is very capable of blending in with larger groups, like percussion ensembles and orchestras.

Low frequency instruments tend to function best when coupled to the acoustics of the environment such as a room or hall. It is recommended, when possible, to place the instrument in a corner (with performer facing towards the audience) of the performing environment. This helps to reinforce the propagation of the low frequency notes.

### RECORDING

Since the low frequency notes are very subtle depending on mallet type, recording may provide a problem, although not impossible. However in the interest of high quality recording, it is recommended that microphones with large diaphragms (which are capable of picking up lower frequencies more easily) be used.

Microphones should be placed in such a manner as to not be struck by the mallets when played. They should be placed close enough to the bar's surface so that the mallet attack will be fully articulate.

Should the recording environment be sufficiently quiet, ambient microphones (microphones placed considerable distance away from the actual instrument) should be utilized for realizing the full potential of the low frequencies.

As with any endeavor, it is always advisable to experiment first. Several test recordings with playback on a wide-range, high sound system will exhibit any weaknesses in the recording technique.



PART 4

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TRANSPORTING THE INSTRUMENT

## TRANSPORTING THE INSTRUMENT

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### ROLLING

Should there be a need to move the marimba from one facility to another, simply roll it. Be cautious of cracks, holes, cables, and other objects that may interfere with the casters.

### CARTAGE

Should the distance between facilities be greater than adjacent buildings, utilize a cartage vehicle that has the ability to strap the instrument into place. Provide appropriate protection (such as a blanket) between the instrument and the vehicle's interior walls to prevent scratches or dents to the instrument.

DO NOT STACK ANYTHING ON THE MARIMBA.

### LIFTING

UNDER NO CIRCUMSTANCES SHOULD ONE PERSON ATTEMPT TO LIFT THIS INSTRUMENT ONTO A VEHICLE OR A LANDING. When possible, use entrance ramps or an elevator should the instrument to be brought up to a different level. Always separate the two halves prior to any lifting. Use a minimum of two persons per end when lifting.