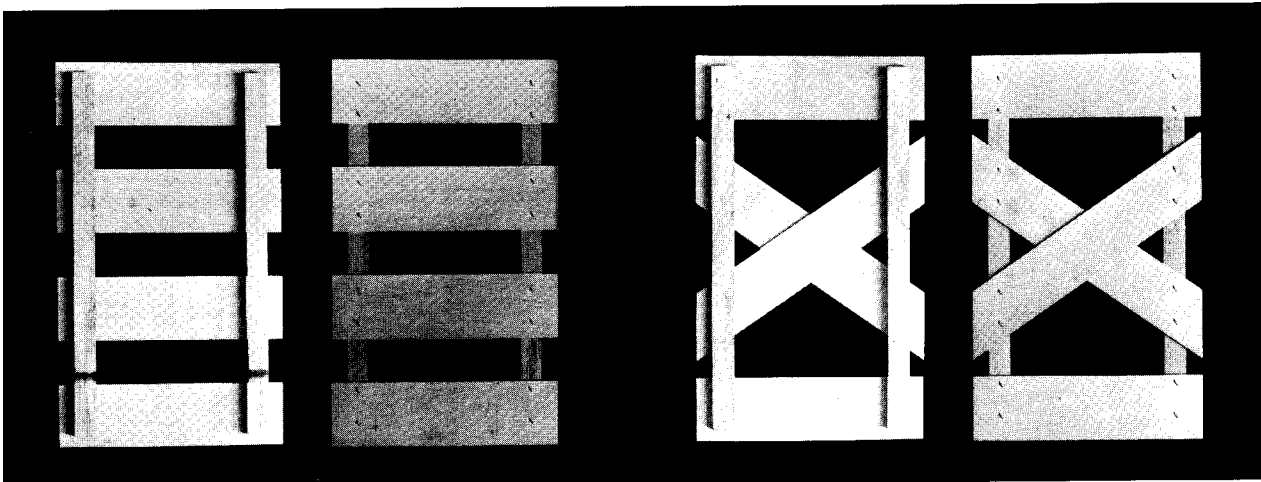


design facts

Volume 1 Number 10

Wirebound boxes and crates



TOPS
for
upright
crates

TOPS

Purpose

The purpose of the TOP on a container normally is to *protect* the contents. The amount of protection necessary usually will be dictated by the nature of the article and the methods of handling.

The *protection* necessary may vary from a TOP strong enough to act as:

1. A unit to merely hold the crate together, giving it extra strength, or,
2. A barrier to keep other objects away from the load or from falling into the crate, or to prevent pilferage, or,
3. Weight-supporting members strong enough to carry other objects stacked upon it.

Construction

Here are the various combinations of elements that normally may compose the TOP of a wirebound crate. Each combination is, of course, stitched together to make the unit.

1. Slats and battens.
2. Slats and liners.
3. Slats, battens, and wires.
4. Slats, liners, and wires.
5. Slats, battens, wires, and liners.

Methods of Attaching

Depending on the material of which they are made and the container blank for which they are designed, TOPS may be attached by the following methods:

1. Nailing.
2. With binding wires.
3. Held by a "pressure pack".
4. Held between double or interrupted rows of cleats on the blank.
5. Engaging a top row of cleats (3-layer top).

Technical Considerations

In making a TOP for a wirebound crate, there are various technical considerations which must be weighed. Those pertain to the design and quality of the top, and the machine on which it is made.

Design & Quality

A. Slats

Minimum width: 3-3/8" for straight edge slats.
2-3/4" for diagonal slats.

Overhang: See drawings of TOPS that follow.

B. Battens

Minimum Width: 7/8"

Thickness: Same as width of cleats, except on 3-level tops.

Maximum Spacing: *12"

C. Liners

Minimum width of outside liners:
3-1/8"

Minimum width of intermediate liners: 2-7/8"

Maximum distance between liners, or between liners and battens: *12"

D. Binding Wires

Same gage as intermediate wires on blank.

E. Number of Staples

Minimum number where slat and liner join - 4

Minimum number where any other elements join - 2

Minimum spacing of staples from edges or ends of slat, liner, or batten, see drawings that follow.

Staples normally are centered between edges of battens.

Size of Staples: See table below.

*Intermediate members may be added where necessary.

FOR UPRIGHT CRATES

Minimum Width of Batten & Minimum Size Staple

Combined thickness of faceboards and battens	Groups I & II Woods		Group III Woods		Group IV Woods	
	Minimum size of staple	Minimum width of batten	Minimum size of staple	Minimum width of batten	Minimum size of staple	Minimum width of batten
3/4" to 13/16"	7/8" - 16°	7/8"*	7/8" - 16°	7/8"*	7/8" - 16°	7/8"*
7/8" to 15/16"	1" - 16°	7/8"*	1" - 16°	7/8"*	1" - 16°	7/8"*
1" to 1-1/16"	1-1/8" - 16°	7/8"*	1-1/8" - 16°	7/8"*	1-1/8" - 16°	7/8"*
1-1/8" to 1-3/16"	1-1/4" - 15°	1-1/8"	1-1/4" - 14°	1-1/8"	1-1/4" - 14°	1-1/4"
1-1/4" to 1-5/16"	1-3/8" - 15°	1-1/8"	1-3/8" - 14°	1-1/8"	1-3/8" - 14°	1-3/8"
1-3/8" to 1-7/16"	1-5/8" - 15°	1-1/8"	1-5/8" - 14°	1-1/8"	1-5/8" - 14°	1-1/2"
1-1/2" to 1-11/16"	1-3/4" - 15°	1-1/8"	1-3/4" - 14°	1-1/8"	1-3/4" - 14°	1-1/2"
1-3/4" to 1-7/8"	1-7/8" - 14°	1-1/8"	1-7/8" - 14°	1-1/8"	1-7/8" - 14°	1-1/2"

*If 30° stitcher is used, the minimum width is 15/16".

Distance of First Staple From End of Batten

Length of staple	Distance from end of batten
7/8"	3/4"
1" to 1-1/8"	7/8"
1-1/4"	1"
1-3/8" to 1-7/8"	1-1/8"

Machine Limitations

The TOPS shown on these pages can be made on the BF-5T and BF-7T Top & Base Machines, the BF-5B Blank Machine, or the BF-5E End Machine. For some designs, additional equipment may be required. Where wires are used on a TOP, the Rock Fastener Machine is also needed. See "notes" on each page for the machines best adapted to make a particular design of TOP. The Machine Limitations shown may be exceeded in some cases by special arrangements of equipment.

The minimum spacing of battens depends on equipment available.

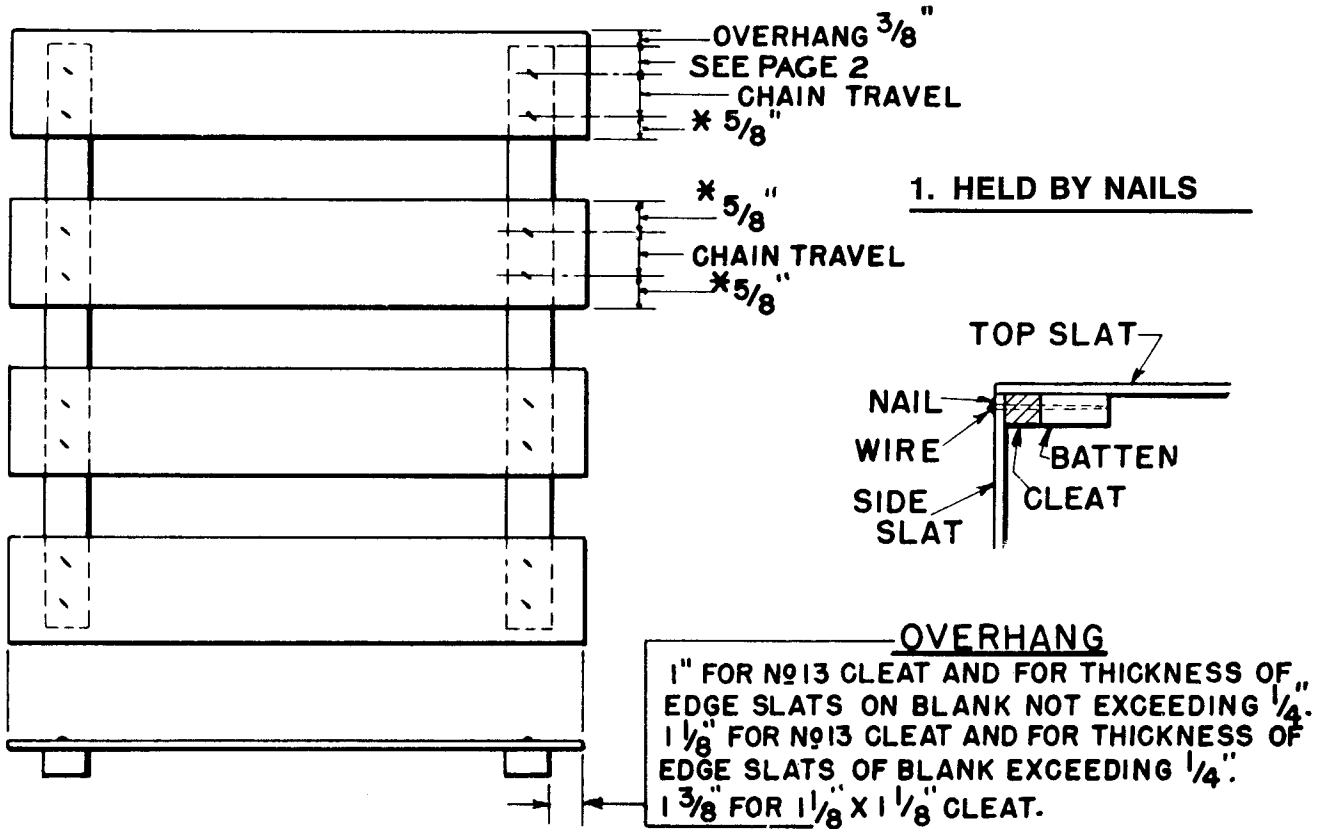
The maximum length of board (perpendicular to direction of travel through the machine) is approximately 48" for BF-5B, BF-5E, BF-5T and BF-7T Machines and 72" for BF-7T Machine.

Cutting Sizes

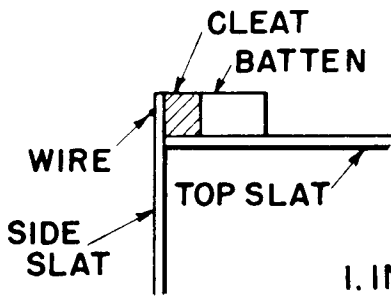
Cutting sizes of materials for TOPS can be found in *Supplement No. 1 of Design Facts No. 10.*

On the following pages, some TOPS are illustrated and identified according to the combinations of elements that normally compose them. The arrangement of slats, battens, liners, and wires on these TOPS provides Design & Quality Considerations, and the Machine Limitations.

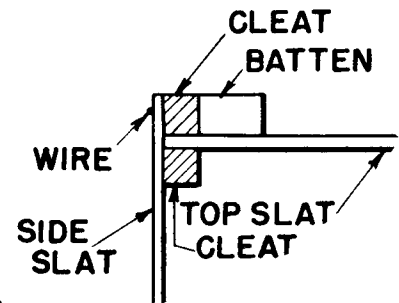
TOP Constructed of straight slats overhanging battens



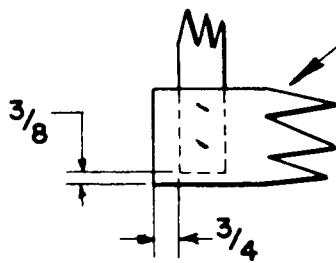
2. HELD BY "PRESSURE PACK"



3. HELD BETWEEN DOUBLE OR INTERRUPTED ROWS OF CLEATS



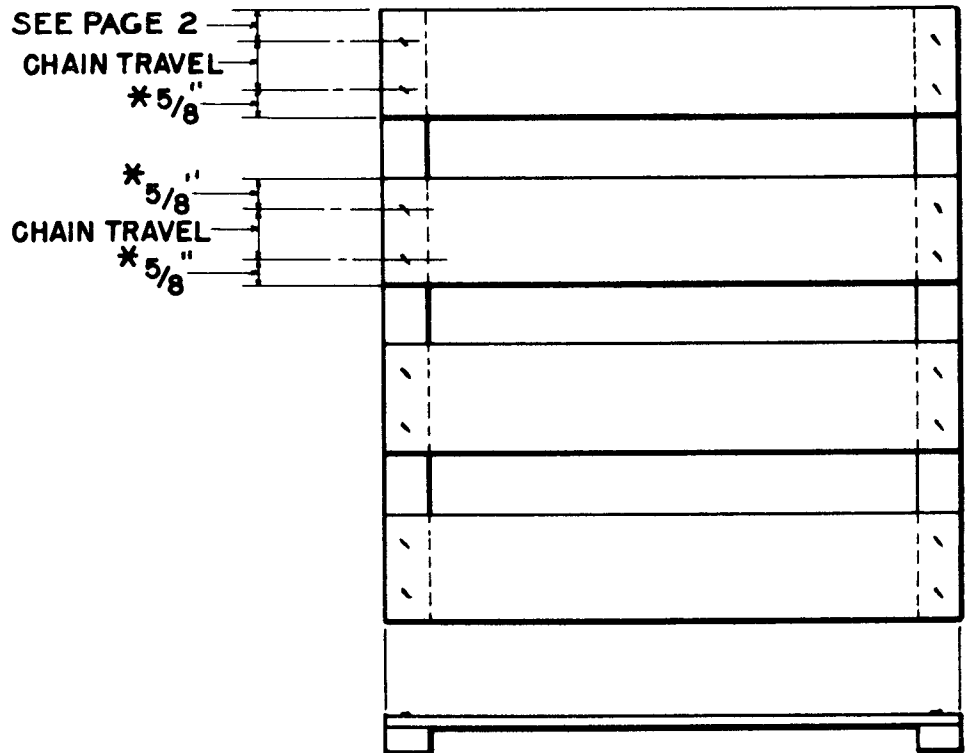
1. INVERT TOP TO ATTACH
2. NOTE CHANGE IN OVERHANG DIMENSIONS (BOTH EDGE SLATS)



Notes:

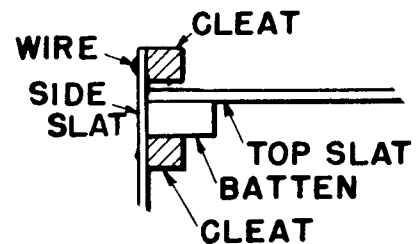
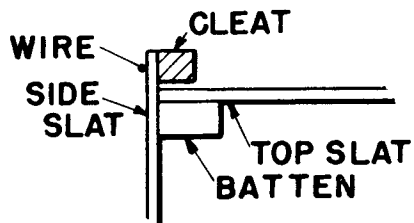
1. Overhang dimensions are Design Limits.
2. All other dimensions are *Minimum Quality Limitations.
3. May have one or more intermediate battens.
4. Can be made on following machines:
BF-5T, BF-7T, or
BF-5B with additional equipment.

TOP Constructed of straight slats and battens-no overhang



1. HELD BY "PRESSURE PACK"

2. HELD BETWEEN DOUBLE OR INTERRUPTED ROWS OF CLEATS

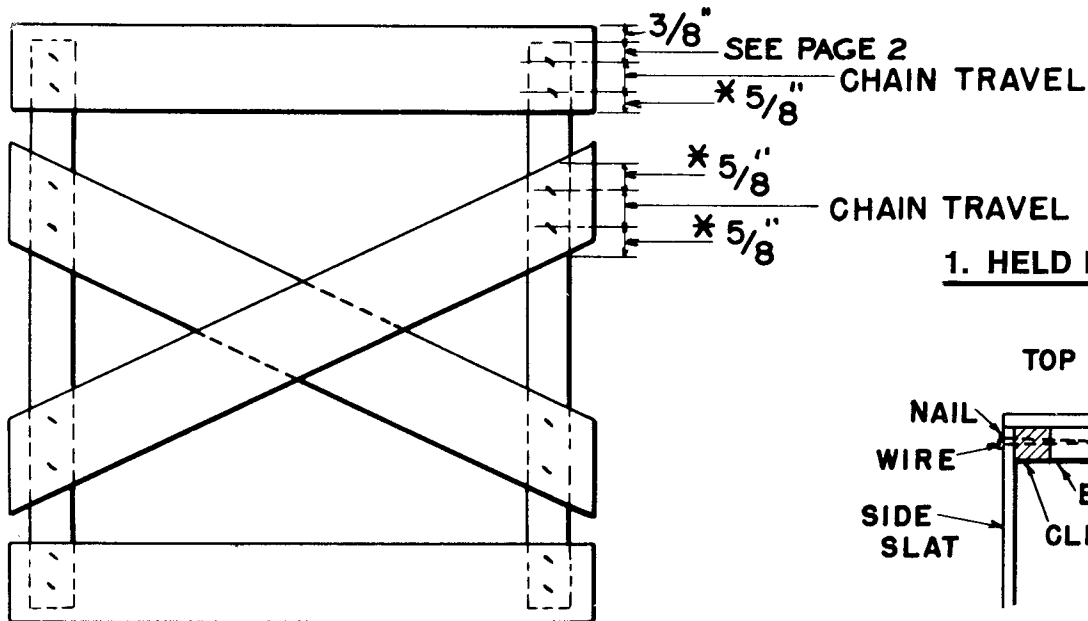


Notes:

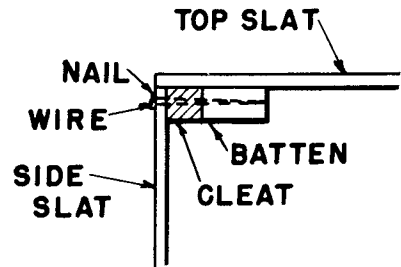
1. Top also may be used inverted in either case.
2. All dimensions are *Minimum Quality Limitations.
3. May have one or more intermediate battens.
4. Can be made on following machines:

BF-5T, BF-7T, or
BF-5B

TOP Constructed of diagonal slats and battens

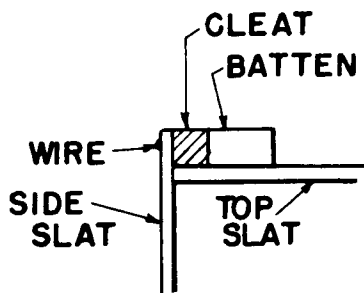


1. HELD BY NAILS

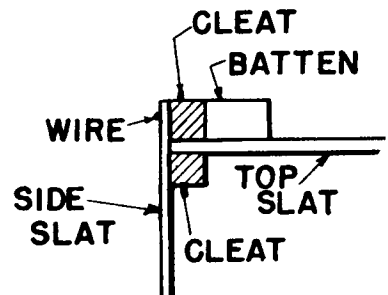


1" FOR NO. 13 CLEAT AND FOR THICKNESS OF " EDGE SLATS ON BLANK NOT EXCEEDING 1/4".
1 1/8" FOR NO. 13 CLEATS AND FOR THICKNESS OF EDGE SLATS ON BLANK EXCEEDING 1/4".
1 3/8" FOR 1 1/8" X 1 1/8" CLEAT.

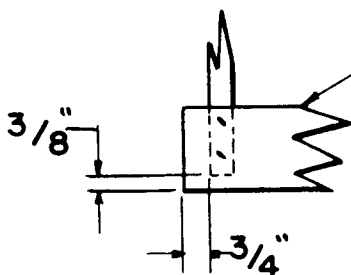
2. HELD BY "PRESSURE PACK"



3. HELD BETWEEN DOUBLE OR INTERRUPTED ROWS OF CLEATS



1. INVERT TOP TO ATTACH
2. NOTE CHANGE IN OVERHANG DIMENSIONS (BOTH EDGE SLATS)

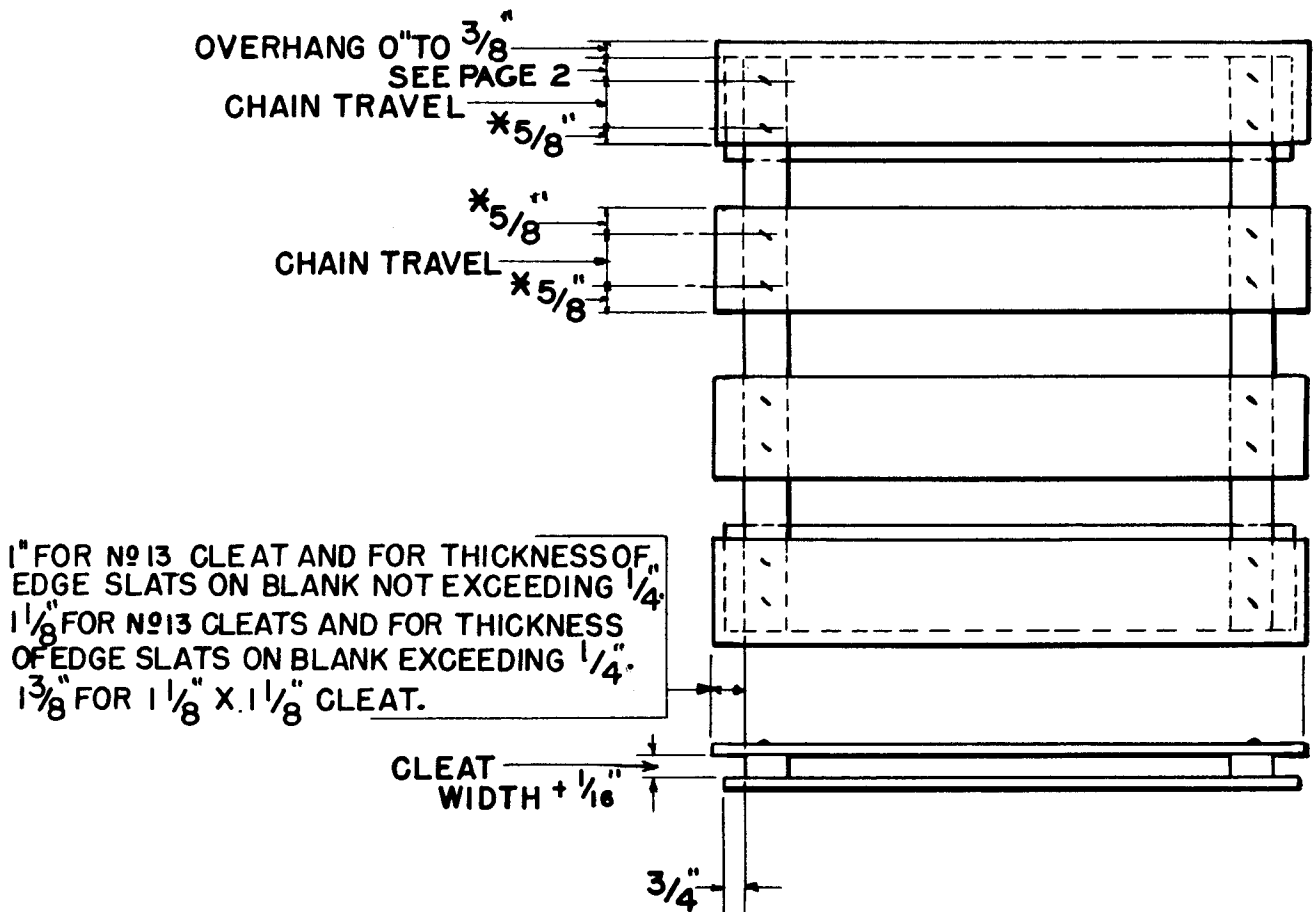


Notes:

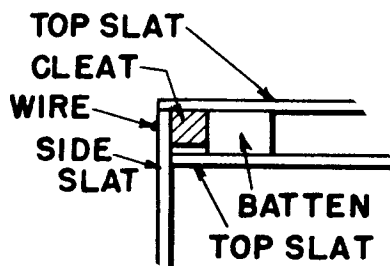
1. Overhang dimensions are Design Limits.
2. All other dimensions are *Minimum Quality Limitations.
3. May have one or more intermediate battens.
4. May have single, V or X diagonal slats.
5. May be double panel construction.
6. Can be made on following machines:

BF-5T BF-7T or

TOP Constructed of battens, 2 layers of slats



LOCKS ON TOP CLEAT OF BLANK

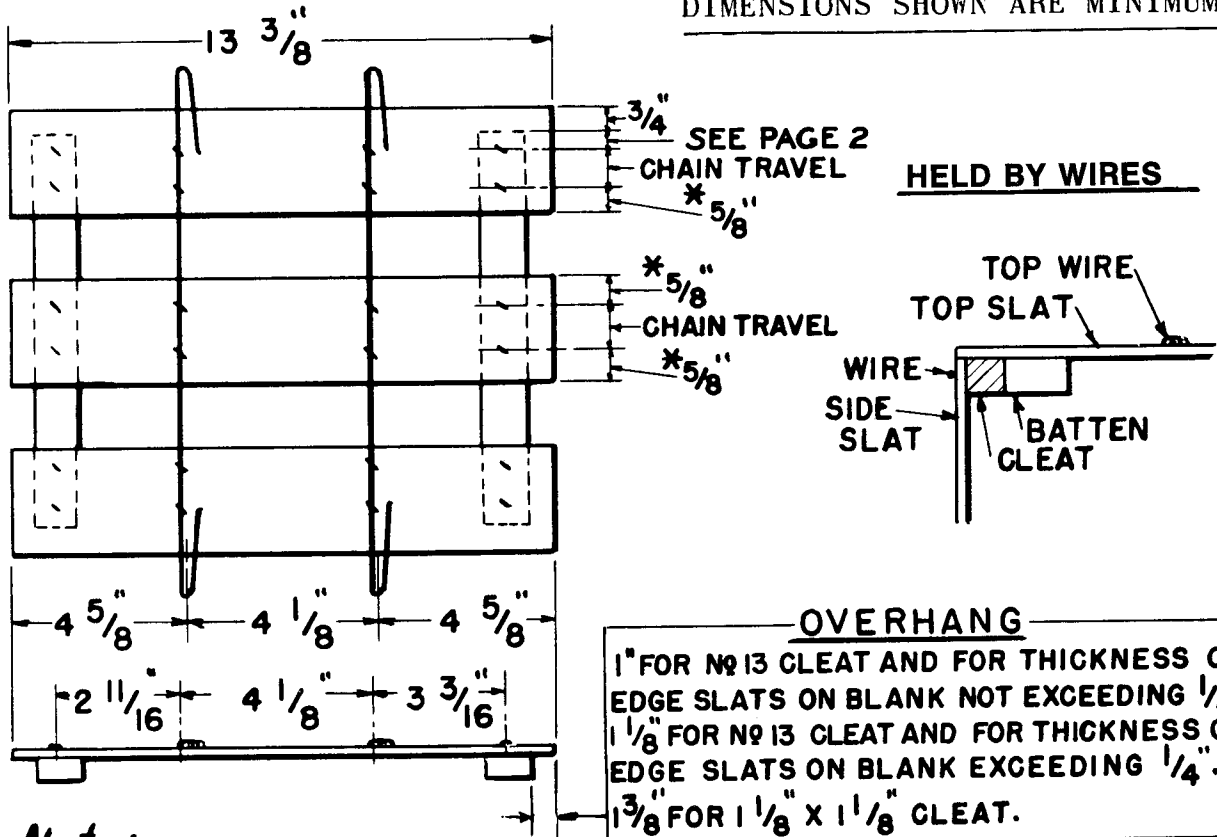


Notes:

1. Overhang dimensions are Design Limits.
2. All other dimensions are *Minimum Quality Limitations.
3. May have one or more intermediate battens.
4. Bottom layer normally composed of 2 or 3 slats only, none of which extends beyond ends of battens.
5. Can be made in two passes on following machines:
 BF-5T or BF-7T with additional equipment, or
 BF-5T or BF-7T with additional equipment, or

TOP Constructed of battens, slats, and wires

DIMENSIONS SHOWN ARE MINIMUMS

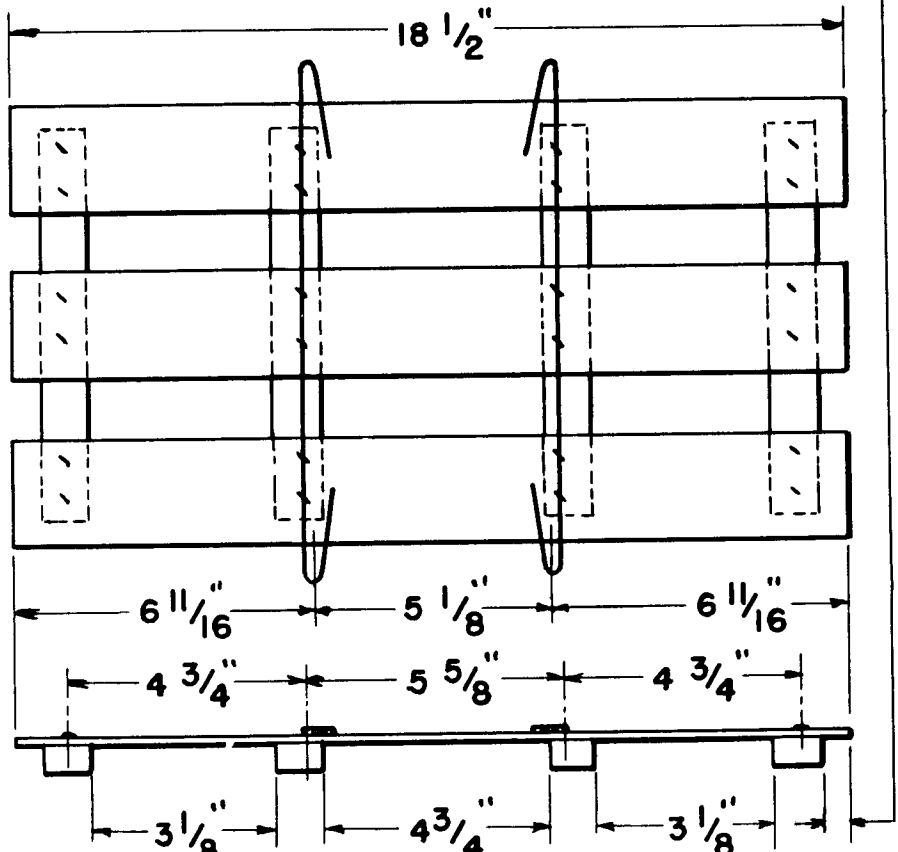


Notes:

1. Overhang dimensions are Design Limits.
2. Dimensions between rows of staples, and between battens are machine limits.
3. All other dimensions are *Minimum Quality Limitations.
4. Maximum combined thickness of slat and batten is $1\text{-}1/4$ ".
5. May have one or more intermediate battens.
6. Can be made on following machines:

BF-5T** & RF-5
 BF-5B** & RF-5
 BF-5E** & RF-5
 BF-7T** & RF-6

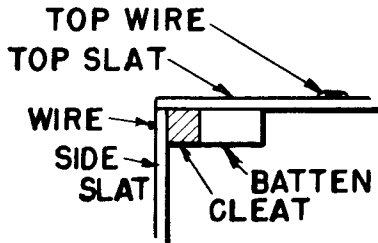
**With additional equipment.



TOP Constructed of battens, slats, wires, and liners

DIMENSIONS SHOWN ARE MINIMUMS

HELD BY WIRES



SEE PAGE 2

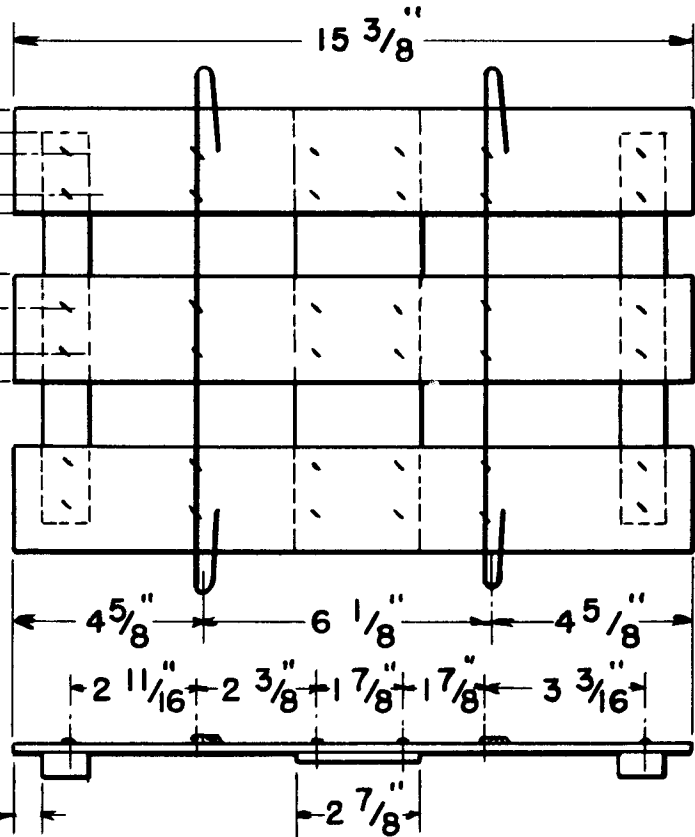
CHAIN TRAVEL

$\frac{3}{4}$ "

$\frac{5}{8}$ "

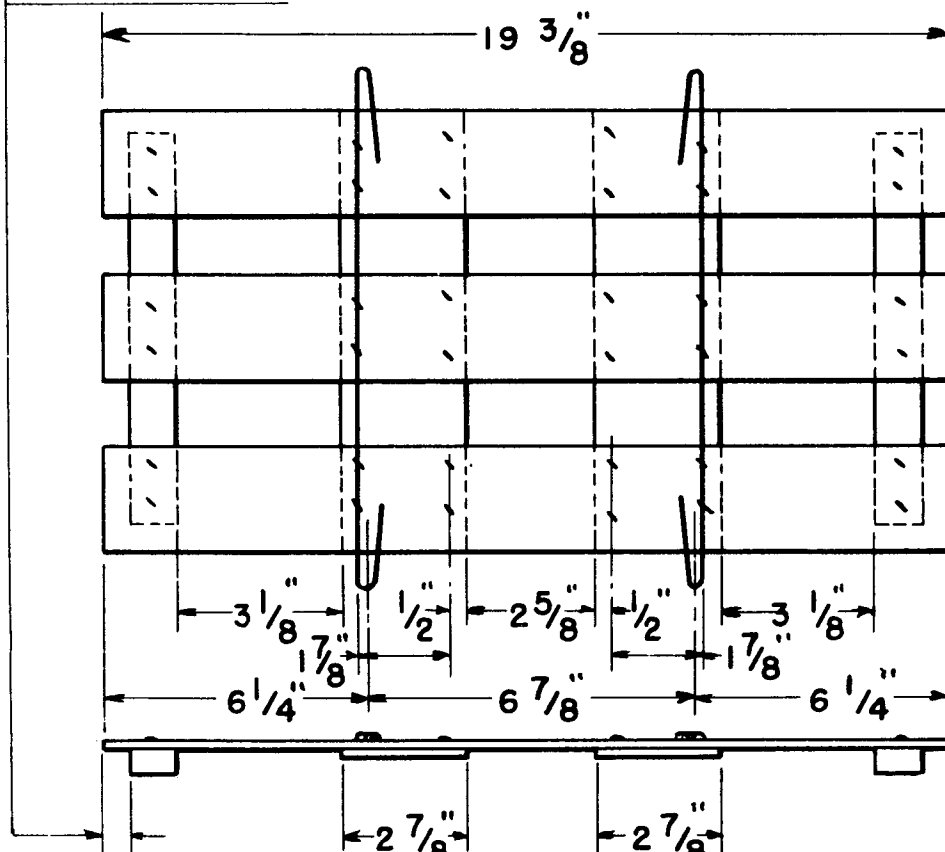
CHAIN TRAVEL

$\frac{5}{8}$ "



OVERHANG

1" FOR NO 13 CLEAT AND FOR THICKNESS OF EDGE SLATS ON BLANK NOT EXCEEDING $\frac{1}{4}$ "
 $1 \frac{1}{8}$ " FOR NO 13 CLEAT AND FOR THICKNESS OF EDGE SLATS ON BLANK EXCEEDING $\frac{1}{4}$ "
 $1 \frac{3}{8}$ " FOR $1 \frac{1}{8}$ " X $1 \frac{1}{8}$ " CLEAT.



Notes:

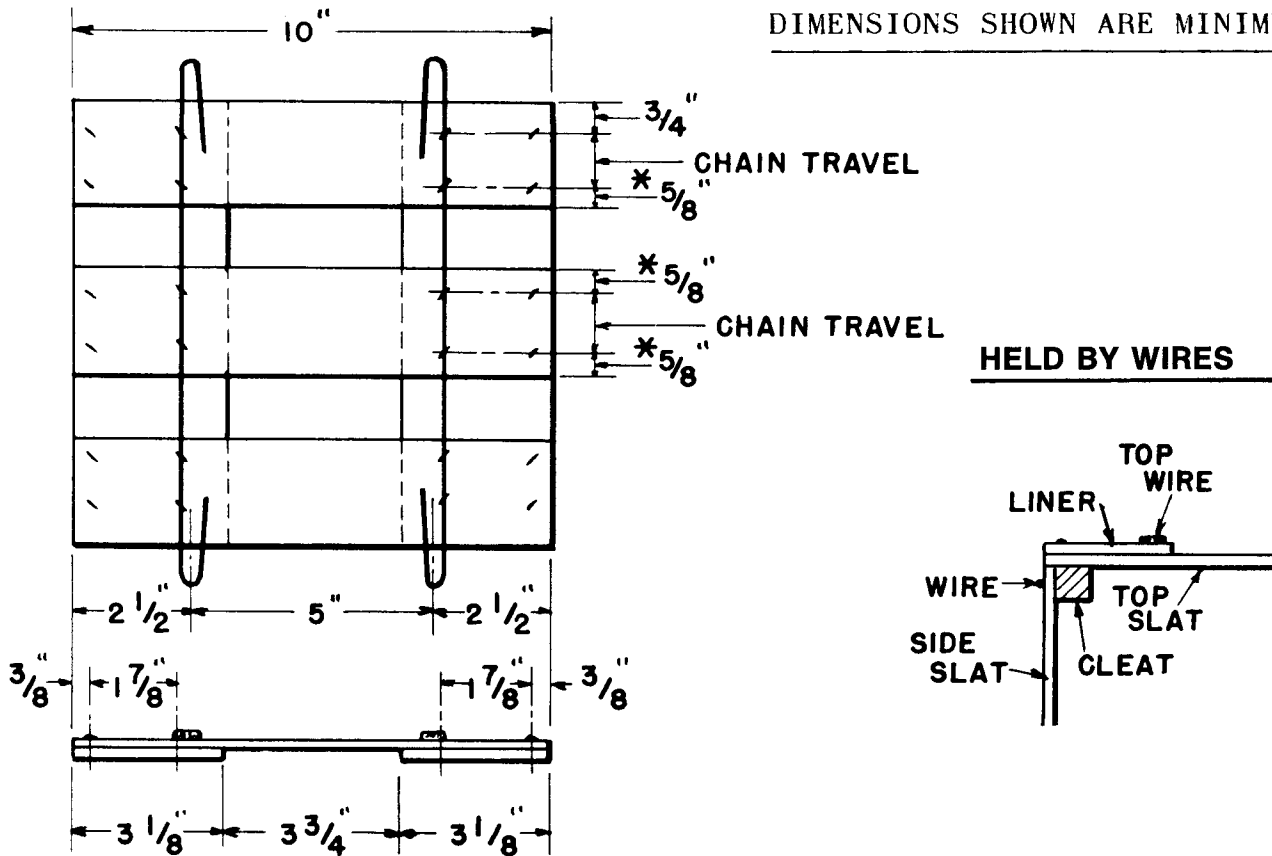
1. Overhang dimensions are Design Limits.
2. Dimensions between rows of staples, and between liners and/or battens are machine limits.
3. All other dimensions are *Minimum Quality Limitations.
4. Maximum combined thickness of slat and batten is $1 \frac{1}{4}$ ".
5. Can be made on following machines:

BF-5T** & RF-5
 BF-7T** & RF-6
 BF-5E** & RF-5

**With additional equipment.

TOP Constructed of slats, liners, and wires

DIMENSIONS SHOWN ARE MINIMUMS

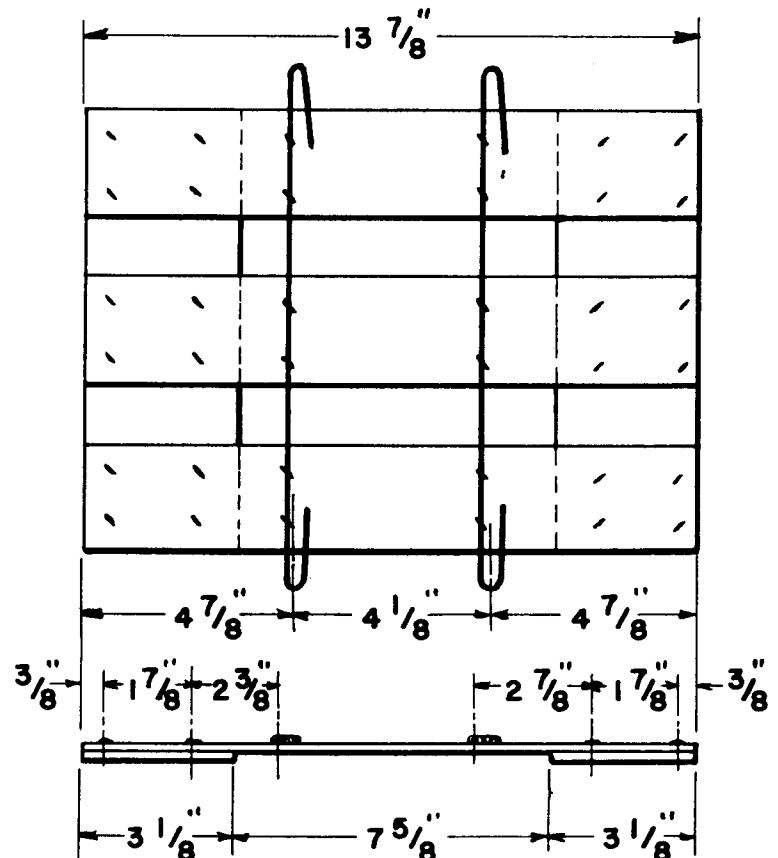


Notes:

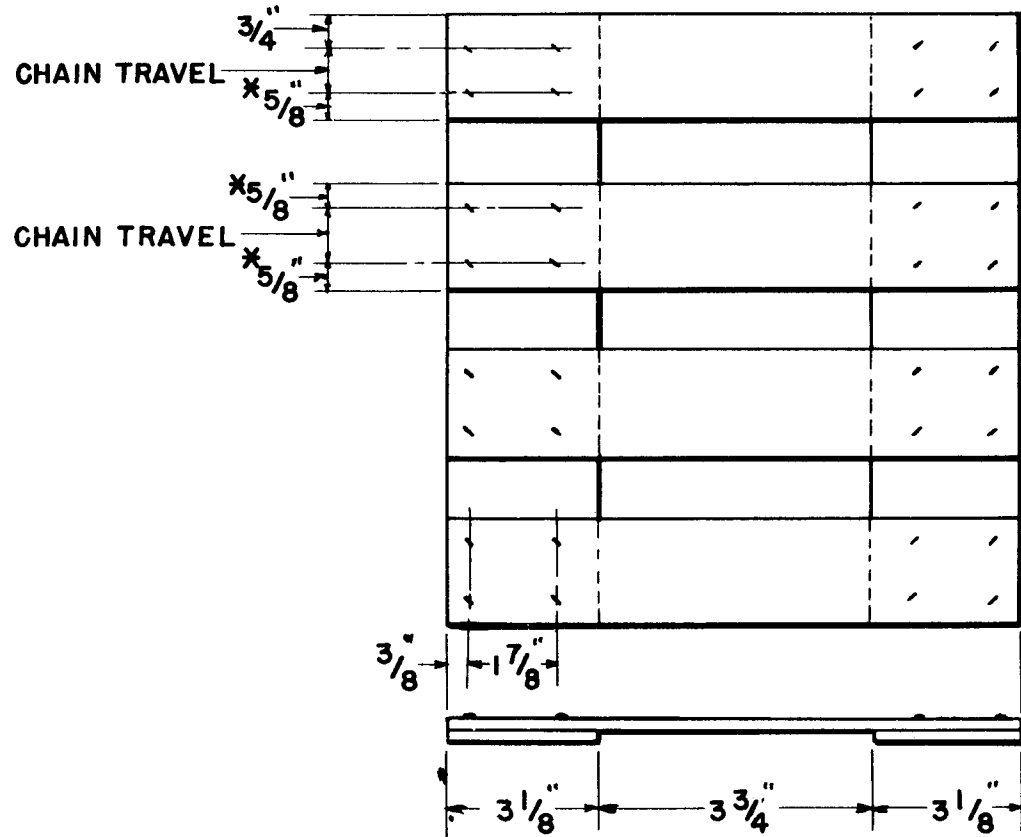
1. Dimensions between rows of staples, and between liners are machine limits.
2. All other dimensions are *Minimum Quality Limitations.
3. May have one or more intermediate liners.
4. Can be made on following machines:

BF-5E & RF-5,
 BF-5T** & RF-5
 BF-7T** & RF-6

**With additional equipment.

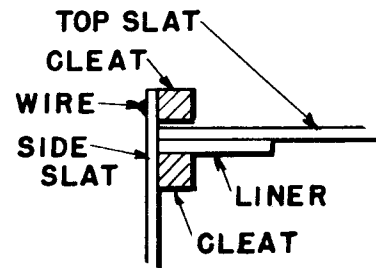
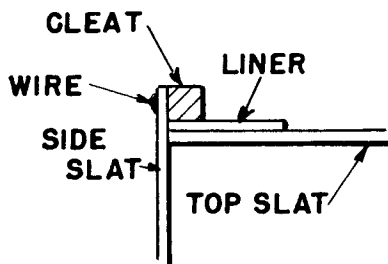


TOP Constructed of slats and liners



1. HELD BY "PRESSURE PACK"

2. HELD BETWEEN DOUBLE OR INTERRUPTED ROWS OF CLEATS



Notes:

1. Top also may be used inverted in either case.
2. Dimensions between rows of staples, and between liners are machine limits.
3. All other dimensions are *Minimum Quality Limitations.
4. May have one or more intermediate liners.
5. Can be made on following machines:

REF-5E or REF-5T with additional equipment

CUTTING SIZES MATERIALS FOR TOPS

In determining *cutting sizes for TOPS*, allowance should be made for *bearing strength* when parts fit outside the crate, and for *clearances* when parts fit inside the crate.

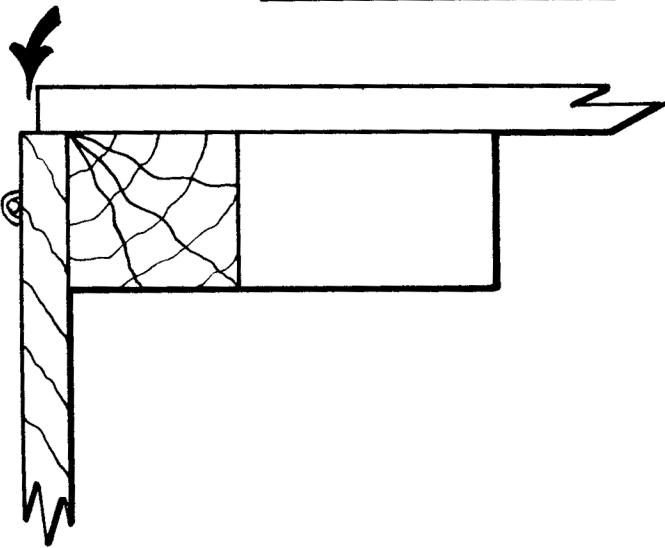
A top constructed of slats overhanging battens may be attached to the *outside* of a crate, or the same construction of top may fit *inside* the crate. In the first case, the

top slats should be long enough to gain *bearing strength* over the slats on the blank. In the second case, the top slats must be short enough to clear the slats on the blank when crate is closed.

The six illustrations on the following pages show what to look for in figuring cutting sizes for tops.

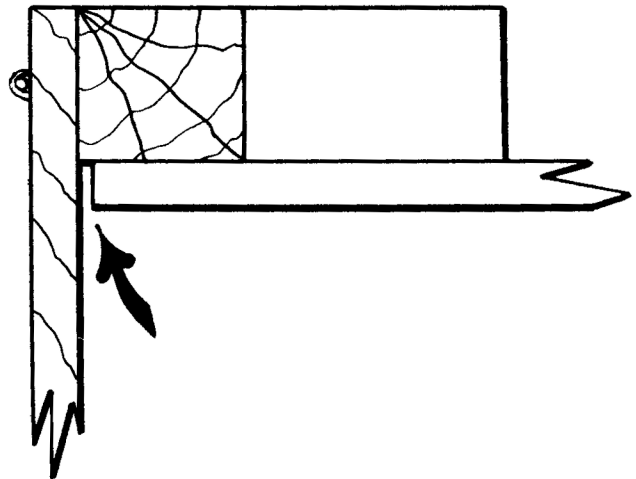
IN ORDER TO GET "GOOD FIT":

YOU NEED BEARING STRENGTH



WHEN TOP FITS OUTSIDE CRATE

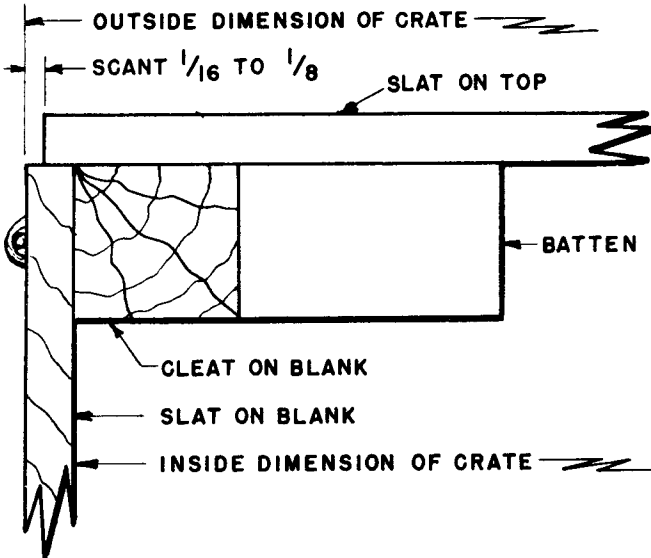
YOU NEED CLEARANCE



WHEN TOP FITS INSIDE CRATE

TOP 1

**Slats fit outside the crate.
Battens fit adjacent to cleats.**



BATTENS:

Should fit against the top cleats of blank at edges and ends.

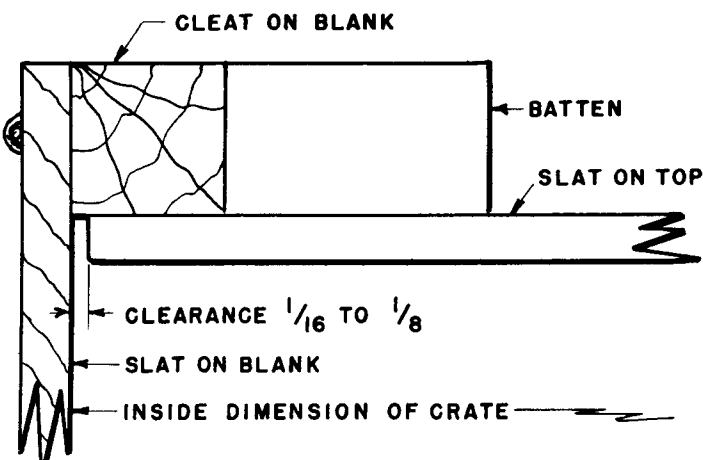
SLATS:

Ends of slats should extend beyond inside dimension of crate by at least $\frac{1}{2}$ the thickness of edge slat on blank. Should be $\frac{1}{16}$ " to $\frac{1}{8}$ " less than the outside dimension of crate at each end.

Slats overhang ends of battens by $\frac{3}{8}$ ".

TOP 2

**Slats fit inside the crate.
Battens fit adjacent to cleats.**



BATTENS:

Should fit against the top cleats of blank at edges and ends.

SLATS:

Should fit inside dimension of crate with clearance of $\frac{1}{16}$ " to $\frac{1}{8}$ " at each end.

Slats overhang ends of battens by $\frac{3}{8}$ ".

Layer of slats fit outside crate.

TOP 3 **Battens fit adjacent to cleats.**

Layer of slats fit inside crate.

TOP LAYER OF SLATS:

Ends of slats should extend beyond inside dimension of crate by at least 1/2 the thickness of edge slat on blank. Should be 1/16" to 1/8" less than the outside dimension of the crate on each end.

Slats overhang ends of battens by 3/8".

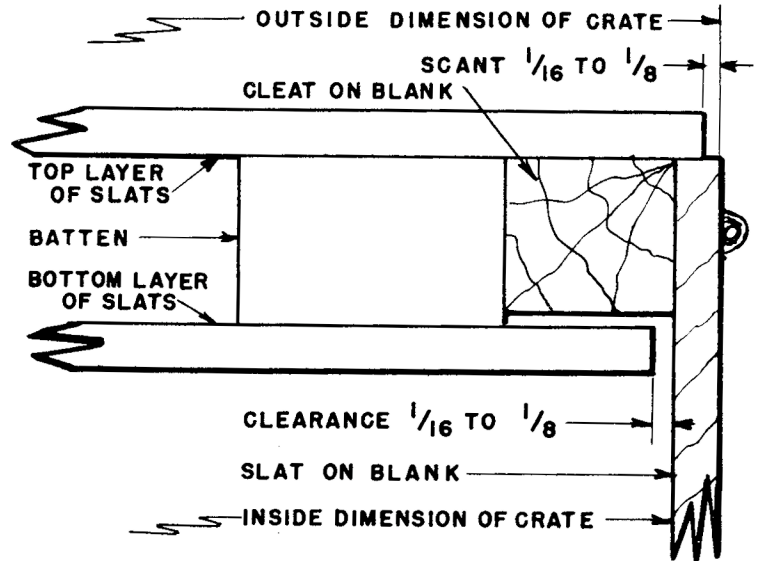
BATTENS:

Should fit against the top cleats of blank on edges and ends. Thickness of battens should be at least 1/16" more than width of cleat on blank.

BOTTOM LAYER OF SLATS:

Should fit inside dimension of crate with clearance of 1/16" to 1/8" on each end.

Edge of slats flush with ends of battens.



TOP 4 **Slats fit inside the crate.**

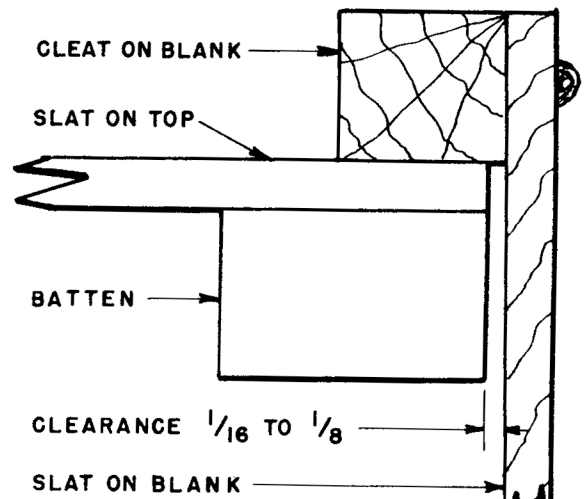
Battens fit inside the crate.

BATTENS:

Should fit inside dimension of crate with clearance of 1/16" to 1/8" at each end.

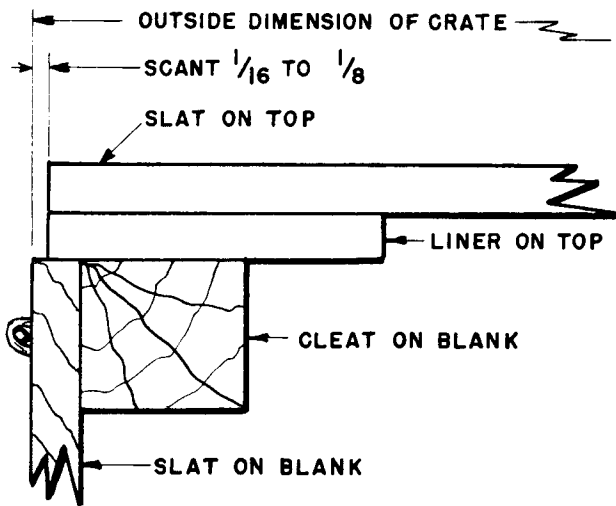
SLATS:

Should fit inside dimension of crate with clearance of 1/16" to 1/8" at each end.



TOP 5

**Slats fit outside the crate.
Liners fit outside the crate**



LINERS:

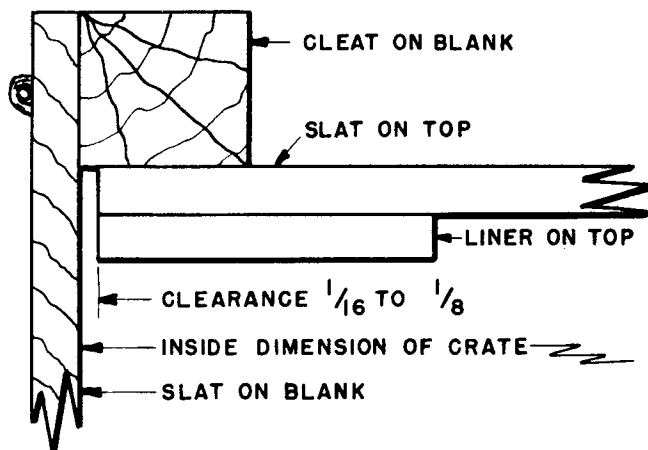
Should fit outside dimension of crate with clearance of $\frac{1}{16}$ " to $\frac{1}{8}$ " at each end.

SLATS:

Should fit outside dimension of crate minus $\frac{1}{16}$ " to $\frac{1}{8}$ " at each end.

TOP 6

**Slats fit inside the crate.
Liners fit inside the crate.**



LINERS:

Should fit inside dimension of crate with clearance of $\frac{1}{16}$ " to $\frac{1}{8}$ " at each end.

SLATS:

Should fit inside dimension of crate with clearance of $\frac{1}{16}$ " to $\frac{1}{8}$ " at each end.

Either liners or slats may be next to cleat.

