LOADING AND BRACING (TL & LTL) IN CLOSED OR OPEN TOP VAN TRAILERS OF CHARGE, DEMOLITION, LINEAR, HE M58, M58A1 & M58A2, AND INERT M68 & M68A1, IN METAL SHIPPING AND STORAGE CONTAINER

CAUTION: THE OUTLOADING PROCEDURES SHOWN HEREIN ARE ONLY APPLICABLE TO HIGHWAY MOVEMENTS, NOT TRAILER-ON-FLAT-CAR MOVEMENTS.

DO NOT SCALE

REVISIONS			

DRAFTSMAN: Div /TM	PROJ ENG: MWD/WRF		
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APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND: S. D. Byrd, TMS-S			
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC): William F. Ernst, U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL			
U.S. ARMY AMC DRAWING			
AUGUST 1988			
CLASS	DIVISION	DRAWING	FILE
19	48	4223	IIJ1006

PROJECT CA 236-86

GENERAL NOTES

A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 5).

B. THE OUTLOADING PROCEDURES CONTAINED HEREIN ARE APPLICABLE TO LINEAR DEMOLITION CHARGES, HE M58, M58A1, AND M58A2 AND INERT M68 AND M68A1, IN METAL SHIPPING AND STORAGE CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE SHIPPING AND STORAGE CONTAINER WITH CONTENTS.

C. FOR DETAILS OF THE SHIPPING AND STORAGE CONTAINER SEE THE DETAIL ON PAGE 3.

CONTAINER DIMENSIONS --7'-10-3/4" LONG X 54" WIDE X 25" HIGH.

GROSS WEIGHT (APPROX)
WITH HE COMP C4, M58 CHARGE, DODIC M025 ---------- 3,000 LBS.
WITH HE COMP C4, M58A1 CHARGE, DODIC M025 -------- 3,000 LBS.
WITH HE COMP C54, M58A1 CHARGE, DODIC M913 ------- 3,000 LBS.
WITH HE COMP C4, M58A2 CHARGE, DODIC M913 -------- 3,000 LBS.
WITH INERT, M68 CHARGE, DODIC M051 ---------- 3,000 LBS.
WITH INERT, M68A1 CHARGE, DODIC M051 ---------- 3,000 LBS.

CUBE ---------- 74.0 CUBIC FEET

D. THE LOADS AS SHOWN HEREIN ARE BASED ON 40'-0" AND 45'-0" LONG CONVENTIONAL TYPE VAN TRAILERS HAVING A MINIMUM INSIDE WIDTH OF 96". TRAILERS MAY HAVE WOOD, WOOD AND METAL OR ALL METAL FLOORS, HOWEVER, SIDEWALLS MUST BE WOOD LINED TO A MINIMUM HEIGHT OF 54" LONGER AND/OR WIDER TRAILERS MAY BE USED. THE SPECIFIED BRACING IS ADEQUATE FOR LOADS WEIGHING UP TO AND INCLUDING THE MAXIMUM WEIGHTS PERMITTED BY LAW.

E. SELECTION OF A VEHICLE USED TO TRANSPORT THE DESIGNATED ITEM MUST COMPLY WITH AR 55-355, CHAPTER 29, FOR EXPLOSIVES AND OTHER DANGEROUS ARTICLES, IN FULL.

F. GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT FOR A LOAD WILL BE THE RESPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF APPLICABLE LOADING REQUIREMENTS, AND THE SHIPPER WILL LOAD ACCORDINGLY. THE TOTAL WEIGHT OF THE LADING, OF THE DUNNAGE, OF THE TRACTOR, AND OF THE SEMI-TRAILER CARRYING THE LADING MUST NOT EXCEED THE MAXIMUM GROSS WEIGHT ALLOWED FOR THE STATE OR STATES THRU WHICH THE LOAD IS TO BE TRANSPORTED BY MOTOR CARRIER. LIKEWISE, THE GROSS WEIGHT ON A SINGLE OR TANDEM AXLE MUST NOT EXCEED THE MAXIMUM ALLOWABLE WEIGHT. IF THERE IS ANY DOUBT AS TO WHETHER THE TOTAL GROSS WEIGHT OR AXLE WEIGHT EXCEEDS THE MAXIMUM ALLOWED, WEIGHTS SHOULD BE VERIFIED BY ACTUALLY WEIGHING THE LOADED VEHICLE.

G. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE TRAILER CONSISTENT WITH STATE WEIGHT LAWS. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRAILER TO BE LOADED OR THE QUANTITY TO BE SHIPPED. HOWEVER, THE APPROVED METHODS SHOWN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING AND STAYING OF THE DESIGNATED ITEMS.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

H. THE "LOAD AS SHOWN" FOR THE FULL LOADS DEPICTED HEREIN IS BASED ON AN APPROXIMATE LADING WEIGHT OF 42,000 POUNDS. THE SPECIFIED BLOCKING AND BRACING FOR THE FULL LOAD IS ADEQUATE FOR THE RETENTION OF HEAVIER LOADS, IF IT IS DESIRED TO INCREASE THE LADING WEIGHT AND THE WEIGHT CAPACITY OF THE TRAILER PERMITS.

J. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN THE TRAILER WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEM, PROVIDING THE TOTAL LOAD IS COMPATIBLE. EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.

K. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.

L. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.

M. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED TRAILER LOADS. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. NOTE: STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD-RESTRAINING FLOOR DUNNAGE APPLICATION.

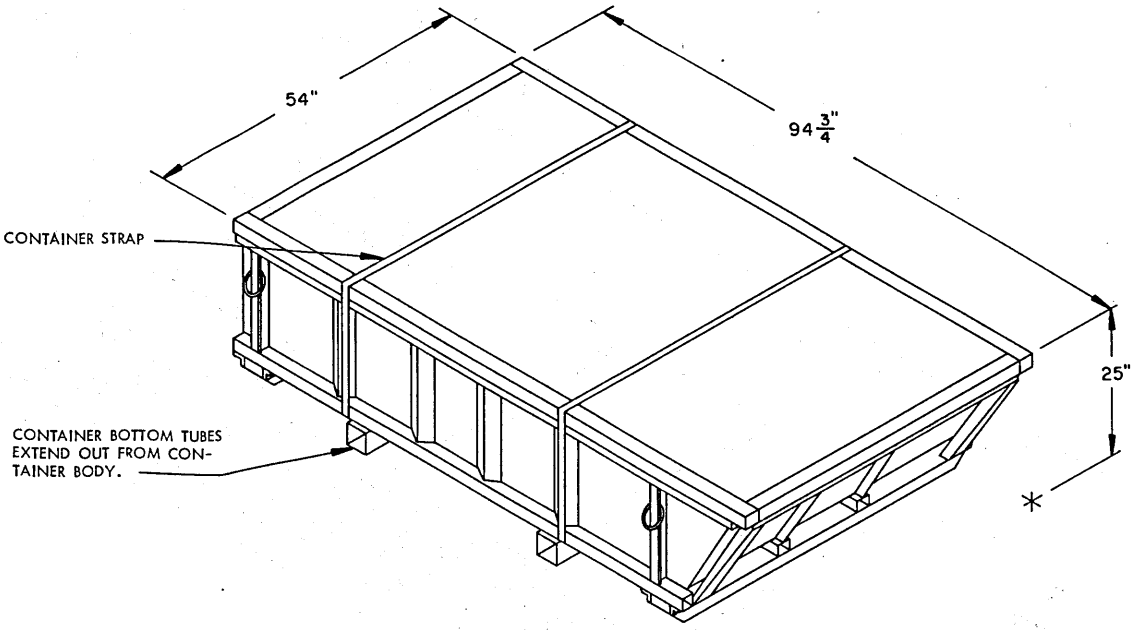
N. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE (1) SEAL WITH TWO (2) PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO (2) SEALS, BUTTED TOGEHTER, WITH TWO (2) PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 9.

O. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO A DEPICTED OUTLOADING METHOD.

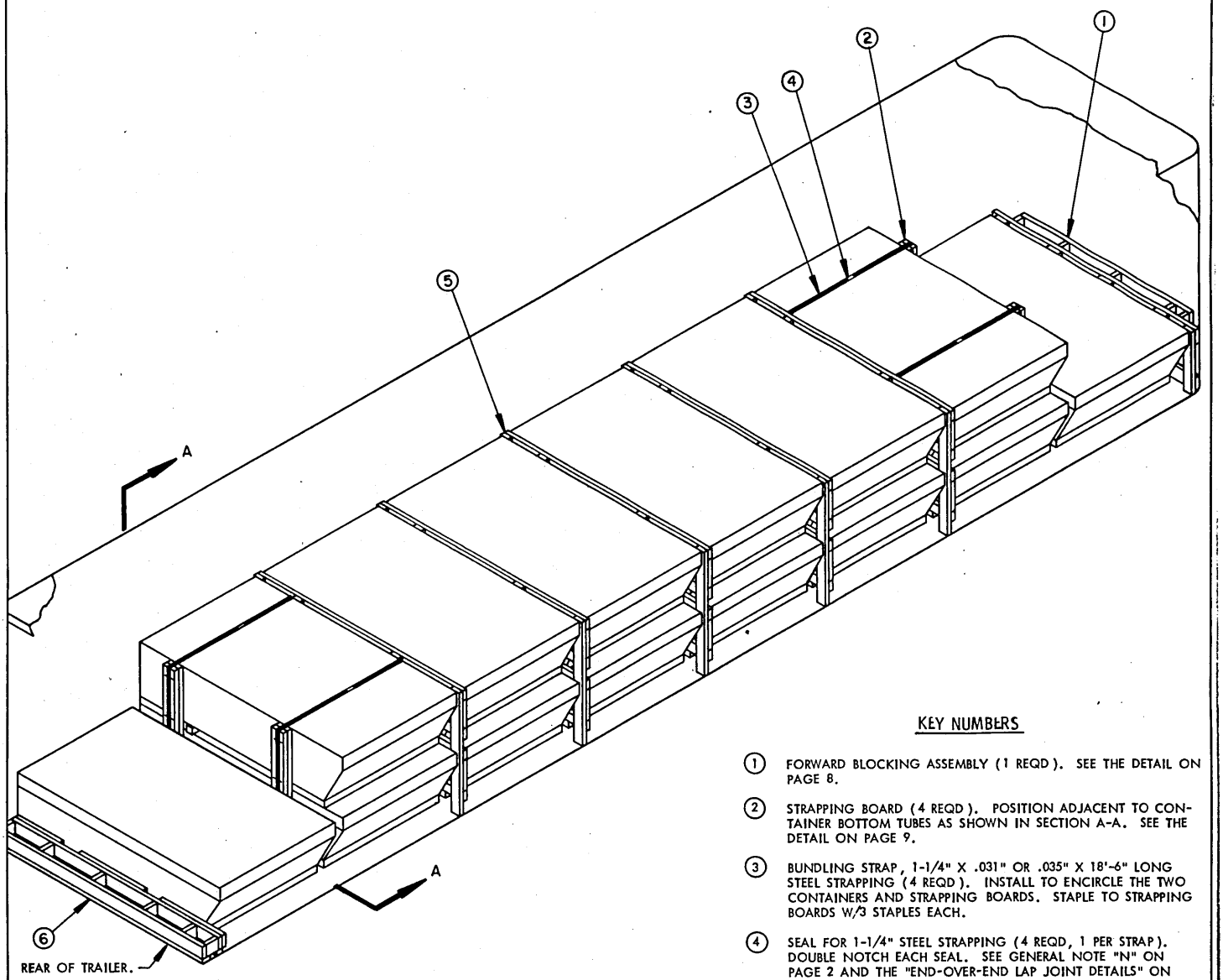
P. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM, AND ONE POUND EQUALS 0.454KG.

MATERIAL SPECIFICATIONS

LUMBER ---------- :	TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
NAILS ---------- :	FED SPEC FF-N-105; COMMON.
STRAPPING, STEEL ------- :	FED SPEC QQ-S-781; CLASS 1, TYPE I OR IV, HEAVY DUTY FINISH A, B (GRADE 2), OR C.
SEAL, STRAP ---------- :	FED SPEC QQ-S-781; TYPE D, STYLE I, II, OR IV, CLASS H, FINISH A, B (GRADE 2), OR C.
STAPLE, STRAP ---------- :	COMMERCIAL GRADE.



SHIPPING AND STORAGE
CONTAINER DETAIL



ISOMETRIC VIEW

KEY NUMBERS

(1) FORWARD BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 8.

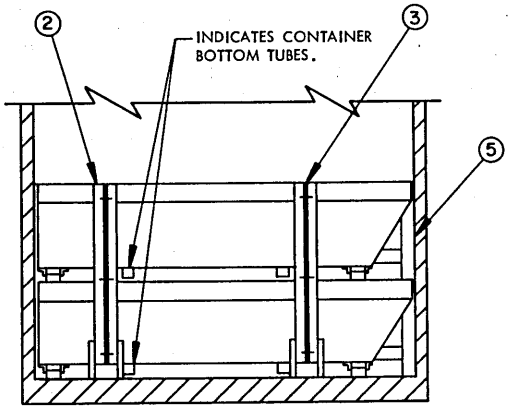
(2) STRAPPING BOARD (4 REQD). POSITION ADJACENT TO CONTAINER BOTTOM TUBES AS SHOWN IN SECTION A-A. SEE THE DETAIL ON PAGE 9.

(3) BUNDLING STRAP, 1-1/4" X .031" OR .035" X 18'-6" LONG STEEL STRAPPING (4 REQD). INSTALL TO ENCIRCLE THE TWO CONTAINERS AND STRAPPING BOARDS. STAPLE TO STRAPPING BOARDS W/3 STAPLES EACH.

(4) SEAL FOR 1-1/4" STEEL STRAPPING (4 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2 AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 9.

(5) SEPARATOR GATE-B (5 REQD). SEE THE DETAIL ON PAGE 8.

(6) REAR BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 9, AND SPECIAL NOTE 2 ON PAGE 5.



SECTION A-A

SPECIAL NOTES:

1. A 14-CONTAINER LOAD IS SHOWN IN A 40'-0" LONG BY 8'-0" WIDE (INSIDE DIMENSION) CONVENTIONAL TYPE VAN TRAILER. NARROWER TRAILERS CANNOT BE USED. LONGER TRAILERS MAY BE USED. SEE PAGES 6 AND 7 FOR FULL LOADS IN 45'-0" LONG TRAILERS.

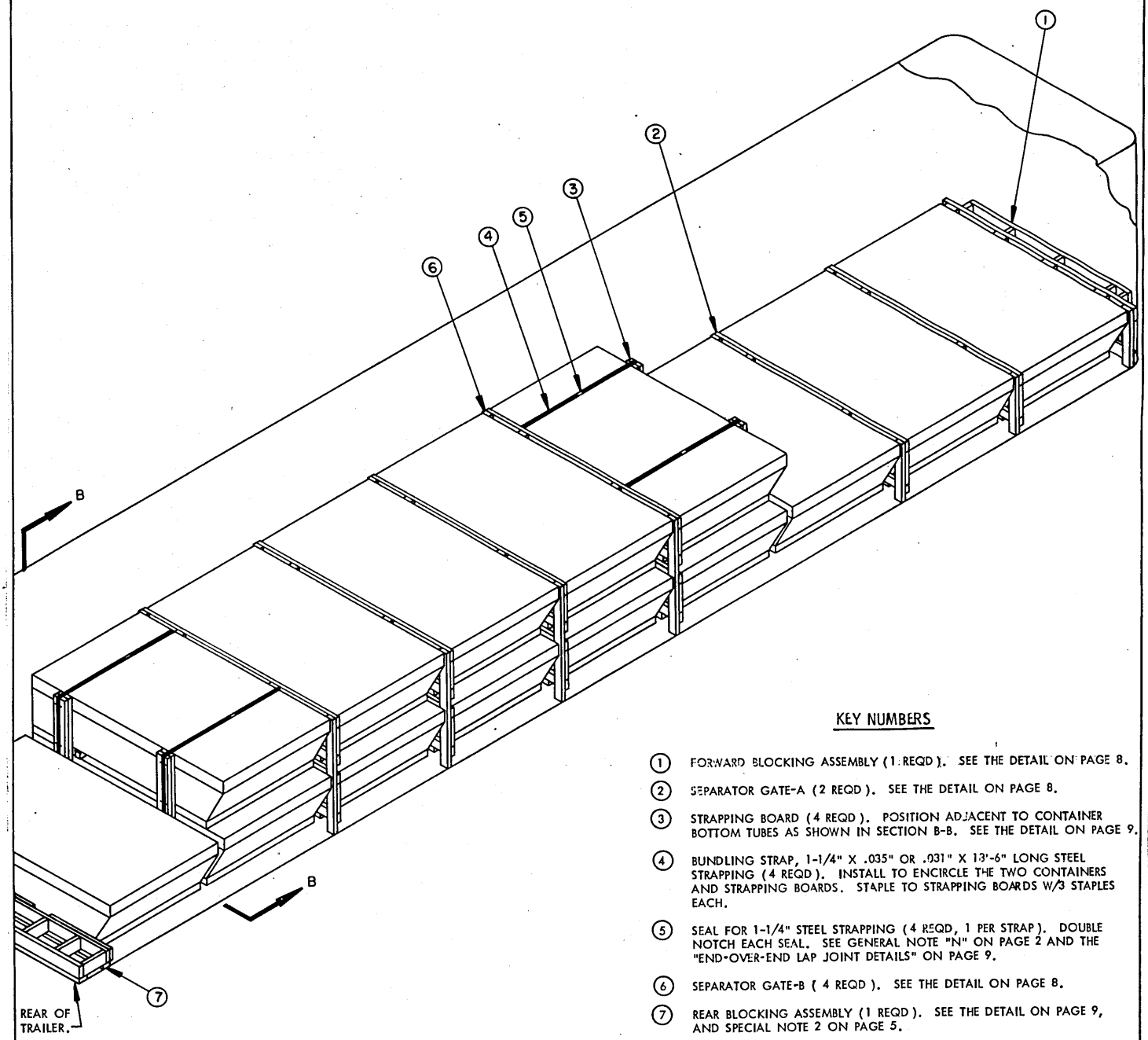
2. THE REAR BLOCKING ASSEMBLY, PIECE MARKED ⑥ ON PAGE 4 OR ⑦ ON PAGE 6, MUST BE FABRICATED SO THAT THE REAR HEADER OF THE ASSEMBLY IS IN CONTACT WITH THE DOORS OF THE TRAILER WHEN THEY ARE CLOSED. IF THE TRAILER HAS REAR CORNER POSTS, THE REAR HEADER OF THE ASSEMBLY MUST CONTACT THE CORNER POSTS AND ADDITIONAL 6" WIDE MATERIAL NAILED TO THE REAR HEADER OF THICKNESS(ES) REQUIRED TO CONTACT THE DOORS WHEN CLOSED.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 2" 2" X 4" 2" X 6"	3 319 96	3 213 96
NAILS	NO. REQD	POUNDS
10d (3")	609	9-1/2
STEEL STRAPPING, 1-1/4" X .031" OR .035" -- 74' REQD - 10-1/2 LBS SEAL FOR 1-1/4" STRAPPING ---------- 4 REQD ------ NIL		

LOAD AS SHOWN

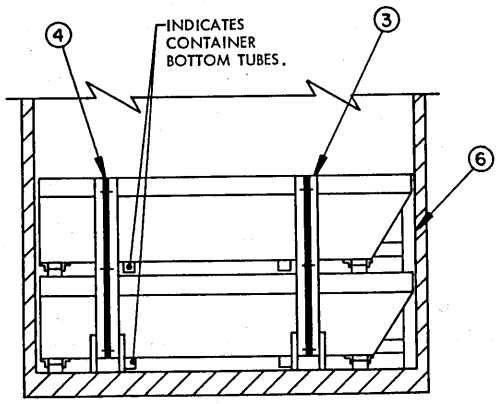
ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	14	42,000 LBS
DUNNAGE		644 LBS
TOTAL WEIGHT		42,644 LBS



ISOMETRIC VIEW

KEY NUMBERS

1. FORWARD BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 8.
2. SEPARATOR GATE-A (2 REQD). SEE THE DETAIL ON PAGE 8.
3. STRAPPING BOARD (4 REQD). POSITION ADJACENT TO CONTAINER BOTTOM TUBES AS SHOWN IN SECTION B-B. SEE THE DETAIL ON PAGE 9.
4. BUNDLING STRAP, 1-1/4" X .035" OR .031" X 13'-6" LONG STEEL STRAPPING (4 REQD). INSTALL TO ENCIRCLE THE TWO CONTAINERS AND STRAPPING BOARDS. STAPLE TO STRAPPING BOARDS W/3 STAPLES EACH.
5. SEAL FOR 1-1/4" STEEL STRAPPING (4 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2 AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 9.
6. SEPARATOR GATE-B (4 REQD). SEE THE DETAIL ON PAGE 8.
7. REAR BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 9, AND SPECIAL NOTE 2 ON PAGE 5.



SECTION B-B

14-CONTAINER LOAD IN A 45'-0" LONG X 96" (MIN INSIDE) WIDE CONVENTIONAL VAN TRAILER

SPECIAL NOTES:

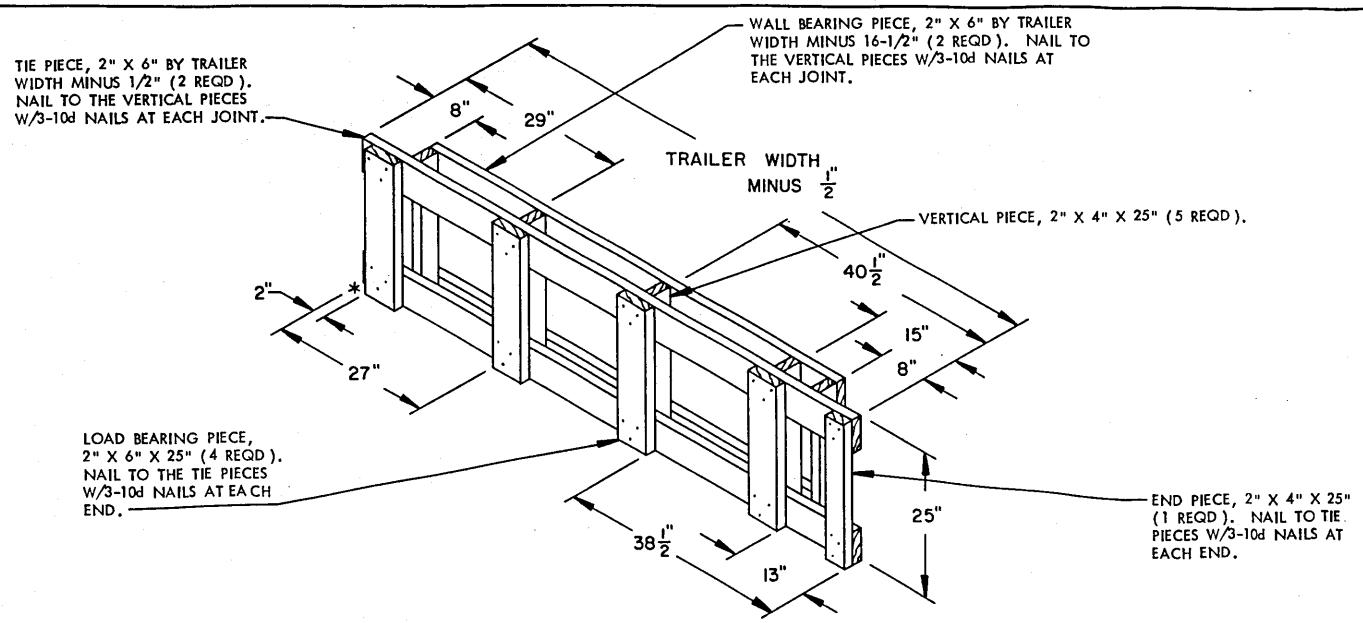
1. A 14-CONTAINER LOAD IS SHOWN IN A 45'-0" LONG BY 8'-0" WIDE (INSIDE DIMENSION) CONVENTIONAL TYPE VAN TRAILER. NARROWER TRAILERS CANNOT BE USED. LONGER TRAILERS MAY BE USED.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" 2" X 4" 2" X 6"	8 319 97	3 213 97
NAILS	NO. REQD	POUNDS
10d (3")	609	9-1/2
STEEL STRAPPING, 1-1/4" X .031" OR .035" -- 74' REQD -- 10-1/2 LBS SEAL FOR 1-1/4" STRAPPING ---------- 4 REQD -------- NIL		

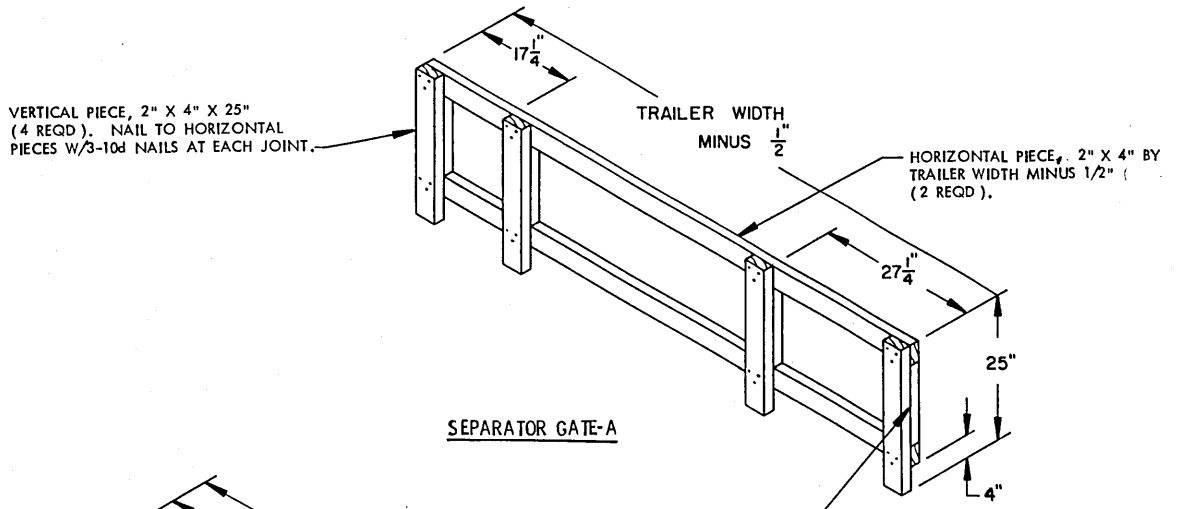
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	14	42,000 LBS
DUNNAGE		646 LBS
	TOTAL WEIGHT	42,646 LBS

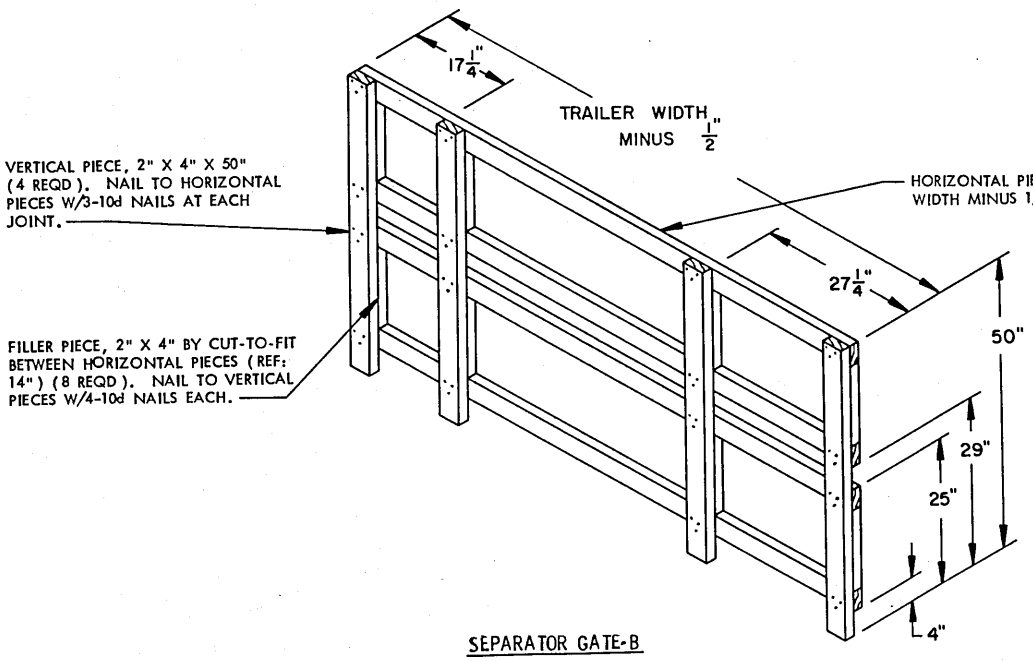
14-CONTAINER LOAD IN A 45'-0" LONG X 96" (MIN INSIDE) WIDE CONVENTIONAL VAN TRAILER



FORWARD BLOCKING ASSEMBLY



SEPARATOR GATE-A



SEPARATOR GATE-B

DETAILS

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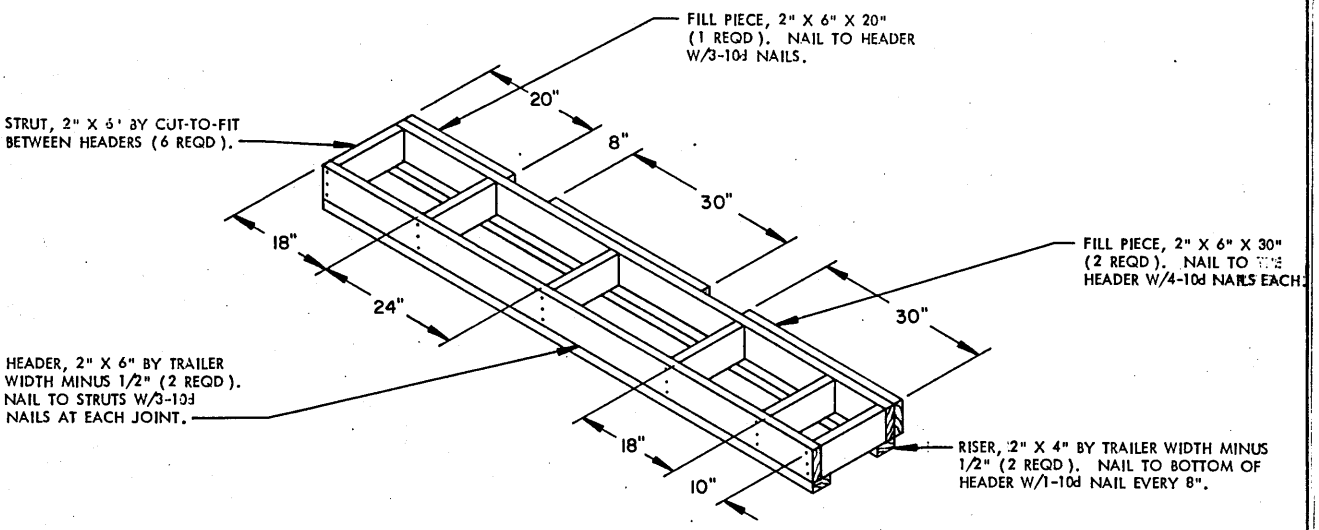
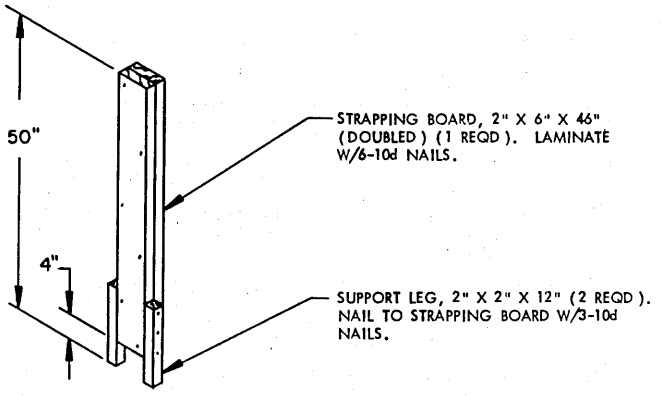
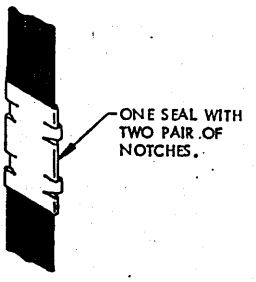


REAR BLOCKING ASSEMBLY

(SEE SPECIAL NOTE 2 ON PAGE 5)

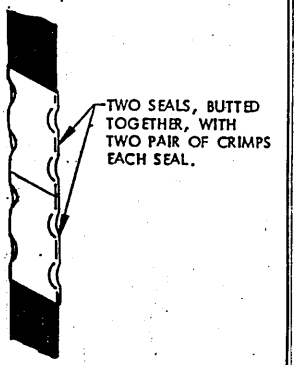


STRAPPING BOARD DETAIL



STRAP JOINT A

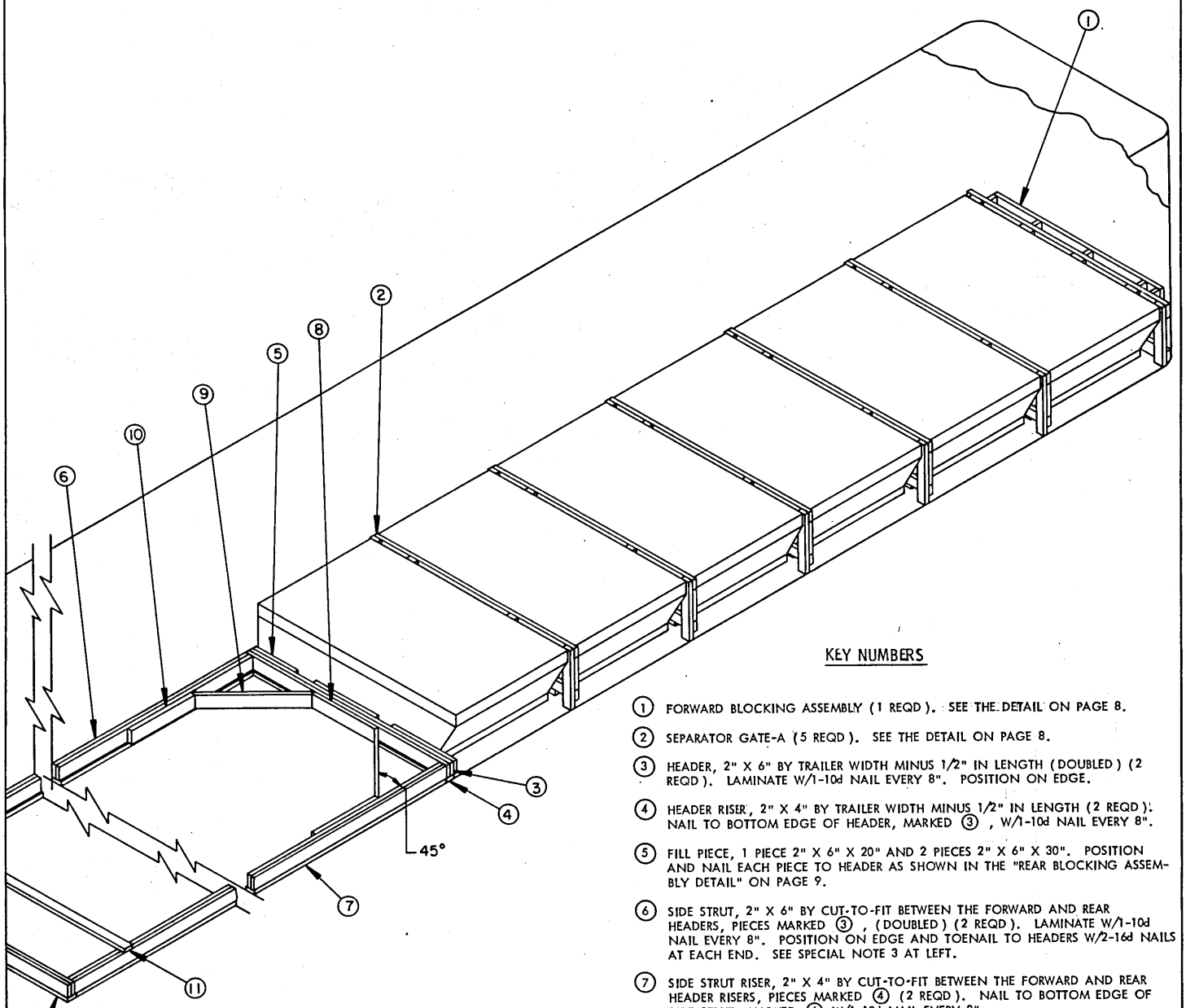
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



STRAP JOINT B

METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

END-OVER-END LAP JOINT DETAILS



ISOMETRIC VIEW

SPECIAL NOTES:

1. THE K-BRACE BLOCKING, SHOWN AS PIECES MARKED (3) THRU (11), IS ADEQUATE FOR RETAINING A MAXIMUM LTL LOAD OF 26,000 POUNDS.

2. ALL LTL LOADS, REGARDLESS OF THEIR SIZE, REQUIRE ONE STRUT BRACE POSITIONED NEAR THE REAR OF THE TRAILER AND NAILED TO THE SIDE STRUTS. IF THE SIDE STRUTS, PIECES MARKED (6), ARE LONGER THAN 7'-0", AN ADDITIONAL STRUT BRACE, PIECE MARKED (11), MUST BE APPLIED FOR EVERY 7'-0" OF SIDE STRUT LENGTH.

3. DEPENDING ON THE LENGTH OF THE TRAILER AND THE NUMBER OF CONTAINERS BEING LOADED, EACH OF THE SIDE STRUTS, PIECES MARKED (6), MAY NEED TO BE FORMED FROM MORE THAN ONE LENGTH OF MATERIAL, DOUBLED. IF SUCH IS THE CASE, THE SIDE STRUTS MUST BE SPLICED. SINCE SIDE STRUTS CONSIST OF DOUBLED 2" X 6" MATERIAL, SPLICING CAN BE ACCOMPLISHED BY OFF SETTING THE JOINTS IN ONE 2" X 6" LENGTH OF STRUT BY NOT LESS THAN 24" FROM THE JOINT IN THE OTHER 2" X 6" LENGTH. THE END OF EACH PIECE FORMING THE JOINT WILL BE NAILED W/3-10d NAILS IN ADDITION TO NAILS USED TO LAMINATE THE DOUBLED MATERIAL.

KEY NUMBERS

(1) FORWARD BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 8.

(2) SEPARATOR GATE-A (5 REQD). SEE THE DETAIL ON PAGE 8.

(3) HEADER, 2" X 6" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (DOUBLED) (2 REQD). LAMINATE W/1-10d NAIL EVERY 8". POSITION ON EDGE.

(4) HEADER RISER, 2" X 4" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (2 REQD). NAIL TO BOTTOM EDGE OF HEADER, MARKED (3), W/1-10d NAIL EVERY 8".

(5) FILL PIECE, 1 PIECE 2" X 6" X 20" AND 2 PIECES 2" X 6" X 30". POSITION AND NAIL EACH PIECE TO HEADER AS SHOWN IN THE "REAR BLOCKING ASSEMBLY DETAIL" ON PAGE 9.

(6) SIDE STRUT, 2" X 6" BY CUT-TO-FIT BETWEEN THE FORWARD AND REAR HEADERS, PIECES MARKED (3), (DOUBLED) (2 REQD). LAMINATE W/1-10d NAIL EVERY 8". POSITION ON EDGE AND TOENAIL TO HEADERS W/2-16d NAILS AT EACH END. SEE SPECIAL NOTE 3 AT LEFT.

(7) SIDE STRUT RISER, 2" X 4" BY CUT-TO-FIT BETWEEN THE FORWARD AND REAR HEADER RISERS, PIECES MARKED (4) (2 REQD). NAIL TO BOTTOM EDGE OF SIDE STRUT, MARKED (6) W/1-10d NAIL EVERY 8".

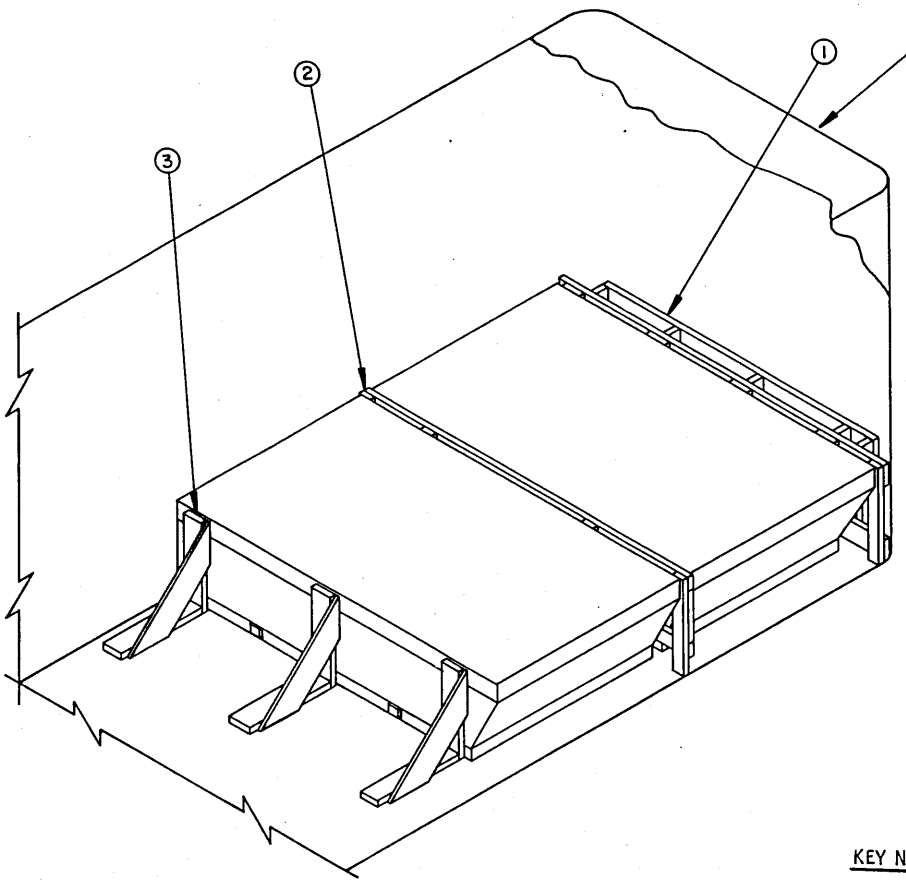
(8) CENTER CLEAT, 2" X 6" X 30" (1 REQD). NAIL TO A HEADER, PIECE MARKED (3), W/7-10d NAILS.

(9) DIAGONAL BRACE, 2" X 6" BY CUT-TO-FIT (2 REQD). DOUBLE BEVEL EACH END WITH 45° CUTS. INSTALL AT 45° ANGLE AS SHOWN AND TOENAIL TO A HEADER AND A SIDE STRUT, PIECES MARKED (3) AND (6), W/2-16d NAILS AT EACH END.

(10) SIDE CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO A SIDE STRUT, PIECE MARKED (6), W/8-10d NAILS.

(11) STRUT BRACE, 2" X 4" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (MINIMUM OF ONE REQUIRED). POSITION NEAR REAR OF TRAILER AND NAIL TO THE SIDE STRUTS, PIECES MARKED (6), W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 2 AT LEFT.

TYPICAL LTL (6-CONTAINER LOAD) IN A CONVENTIONAL TYPE VAN TRAILER



ISOMETRIC VIEW

KEY NUMBERS

(1) FORWARD BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 8.

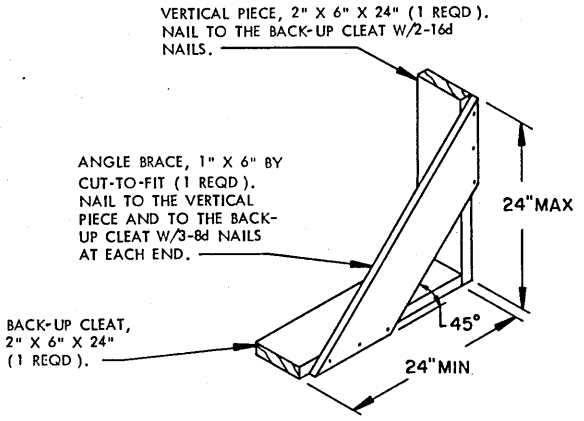
(2) SEPARATOR GATE-A (1 REQD). SEE THE DETAIL ON PAGE 8.

(3) LTL BRACE (3 REQD). SEE THE DETAIL BELOW. NAIL TO THE TRAILER FLOOR W/6-12d NAILS.

SPECIAL NOTES:

1. AN 8'-0" WIDE (INSIDE DIMENSION) CONVENTIONAL TYPE VAN TRAILER WHICH HAS A NAILABLE FLOOR IS SHOWN. WIDER TRAILERS CAN BE USED.

2. EACH LTL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL SUPPORT 2,000 POUNDS OF LADING; HOWEVER, DUE TO THE LENGTH OF THE CONTAINER, NOT LESS THAN THREE (3) BRACES WILL BE USED ACROSS THE WIDTH OF THE TRAILER.



LTL BRACE

TYPICAL LTL (2-CONTAINER LOAD) IN A CONVENTIONAL TYPE VAN TRAILER