

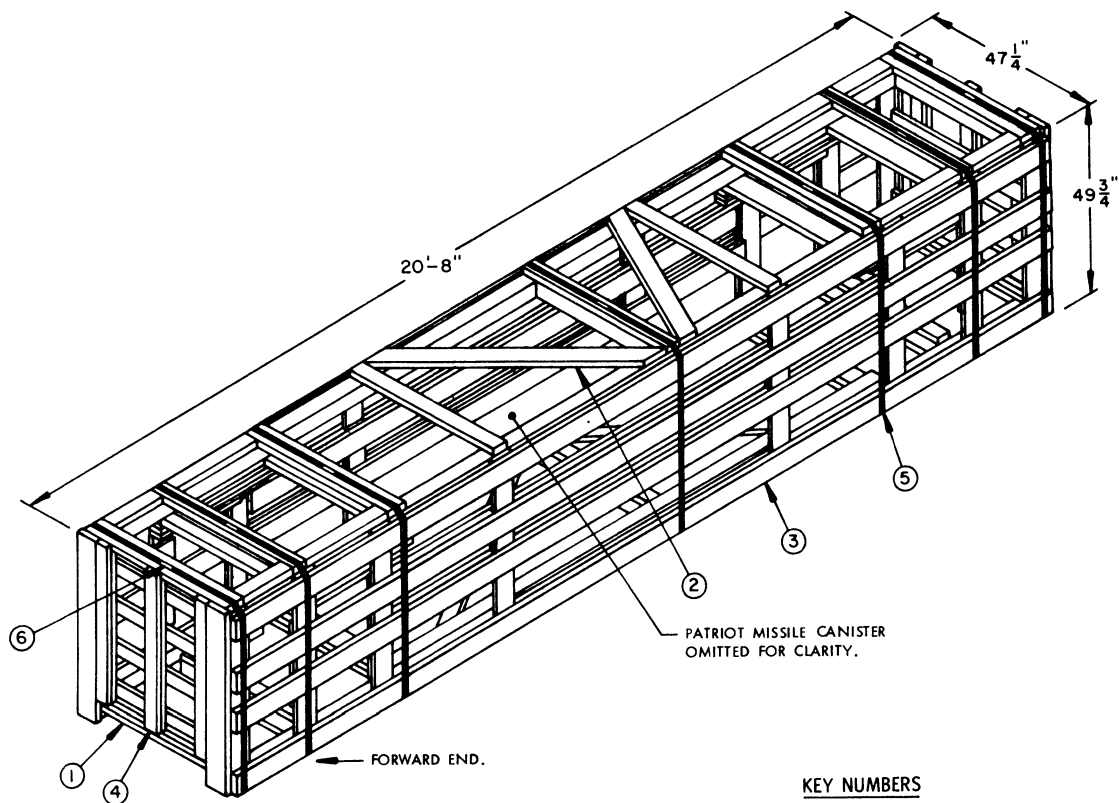
PATRIOT

PROCEDURES FOR CONSTRUCTION AND ASSEMBLY OF OVERPACK FOR MISSILE CANISTER (SHIPPING, STORAGE AND LAUNCH CONTAINER)

DO NOT SCALE

DATE OF DRAWING	NOVEMBER 1979			U S ARMY DEFENSE AMMUNITION CENTER AND SCHOOL DRAWING	
DRAFTSMAN	P.B.	CHECKER			P.S.H.
ENGINEER	R.W.S.	LOG ENG OFFICE			
ENGINEER	<i>[Signature]</i>	W & Const			
APPROVED	<i>[Signature]</i>		DWG SIZE	D	
DIRECTOR U.S. ARMY DEF. AMMO GEN & SCH			D-SARAC- 4500		

D-SARAC-4500



ISOMETRIC VIEW

KEY NUMBERS

- ① BASE ASSEMBLY (1 REQD). SEE THE "BASE ASSEMBLY DETAILS" ON PAGE 4 FOR CONSTRUCTION SPECIFICATION AND NAILING REQUIREMENTS AND GENERAL NOTE "H" ON PAGE 3.
- ② TOP ASSEMBLY (1 REQD). SEE THE "TOP ASSEMBLY DETAILS" ON PAGE 5 FOR CONSTRUCTION SPECIFICATION AND NAILING REQUIREMENTS AND GENERAL NOTE "H" ON PAGE 3.
- ③ SIDE ASSEMBLY (2 REQD). SEE THE "SIDE ASSEMBLY DETAILS" ON PAGE 6 FOR CONSTRUCTION SPECIFICATION AND NAILING REQUIREMENTS AND GENERAL NOTE "H" ON PAGE 3.
- ④ END ASSEMBLY (2 REQD). SEE THE "END ASSEMBLY DETAILS" ON PAGE 7 FOR CONSTRUCTION SPECIFICATION AND NAILING REQUIREMENTS AND GENERAL NOTE "H" ON PAGE 3.
- ⑤ UNITIZING STRAP, 1-1/4" X .035" X 18'-0" LONG (REF) STEEL STRAPPING (7 REQD). ENCIRCLE BASE, TOP AND SIDE ASSEMBLIES. SEAL EACH STRAP JOINT W/I SEAL. SEE GENERAL NOTE "H" ON PAGE 3.
- ⑥ SEAL FOR 1-1/4" STEEL STRAPPING (7 REQD, 1 PER STRAP). DOUBLE CRIMP EACH SEAL.

OVERPACK AS SHOWN

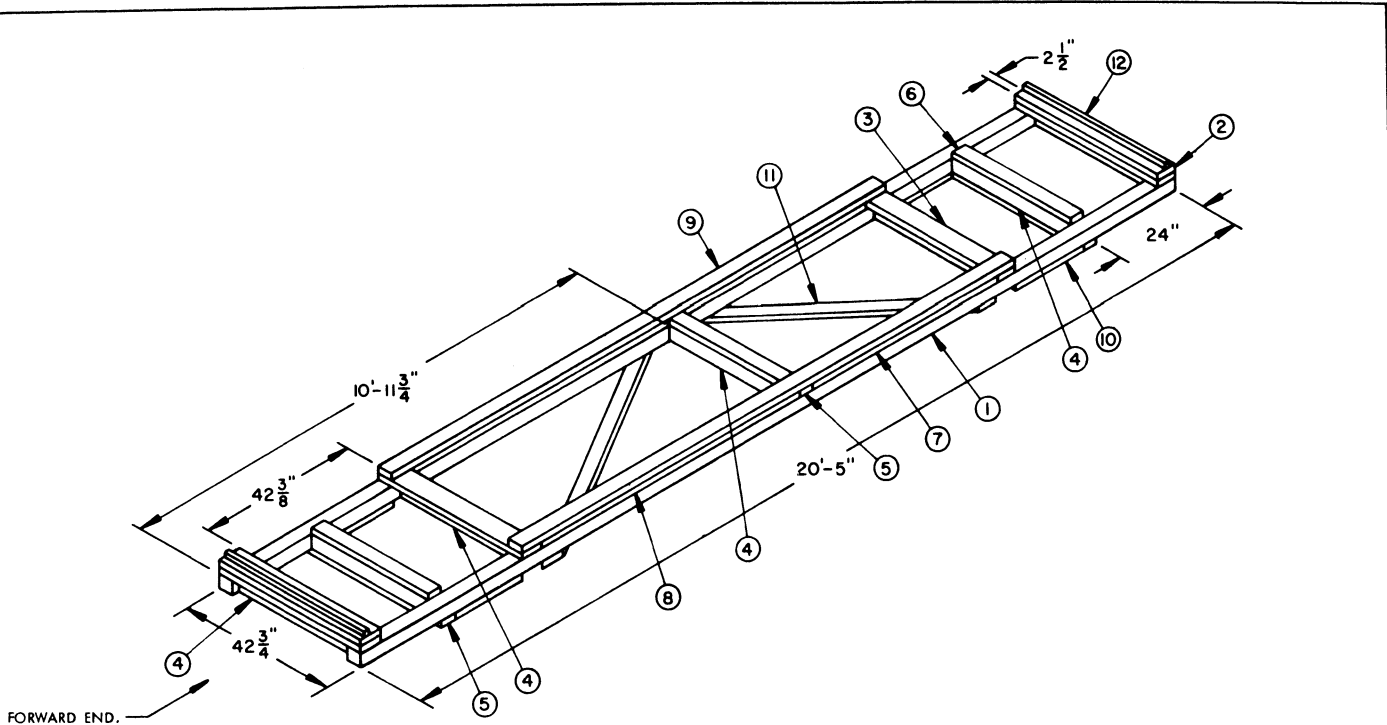
ITEM	QUANTITY	WEIGHT (APPROX)
BASE ASSEMBLY -----	1 -----	359 LBS
TOP ASSEMBLY -----	1 -----	353 LBS
SIDE ASSEMBLY -----	2 -----	645 LBS
END ASSEMBLY -----	2 -----	143 LBS
1-1/4" X .035" X 18'-0" STEEL STRAPPING -----	7 -----	18 LBS
SEAL FOR 1-1/4" STRAPPING -----	7 -----	NIL
TOTAL WEIGHT -----		1,518 LBS

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 SPECIFIED OVERPACK PROCEDURE IS APPLICABLE TO THE PATRIOT MISSILE CANISTER (SHIPPING, STORAGE AND LAUNCH CONTAINER) WHICH CONTAINS ONE PATRIOT MISSILE. SUBSEQUENT REFERENCE TO CANISTER MEANS CANISTER WITH ONE PATRIOT MISSILE.
- C. THE OVERPACK AS SHOWN IS FOR THE 3,750-POUND, 19'-6" LONG BY 42-3/8" WIDE BY 39" HIGH PATRIOT MISSILE CANISTER, WITH MISSILE.
- D. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-1/2" WIDE, 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- E. ALL 20'-5" LONG PIECES USED IN CONSTRUCTION OF THE ASSEMBLIES SHOULD BE CONTINUOUS AND WITHOUT SPLICES. IF THIS IS NOT POSSIBLE, SPLICING IS PERMISSIBLE. FOR SPLICING OF 4" X 4" X 20'-5" PIECES, SEE THE "SPLICE FOR 4" X 4" X 20'-5" PIECES" DETAIL ON PAGE 8. FOR SPLICING OF 2" X 6" X 20'-5" PIECES, SEE THE "SPLICE FOR 2" X 6" X 20'-5" PIECES" DETAIL ON PAGE 8.
- F. A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATING 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.
- G. DO NOT NAIL OR IN ANY OTHER WAY FASTEN DUNNAGE ASSEMBLIES TO THE CANISTER OR TO EACH OTHER. DUNNAGE ASSEMBLIES WILL FIT ONTO AND UNDER THE CANISTER AND WILL INTERLOCK SO THAT WHEN THE STEEL STRAPPING IS PUT ON, THE DUNNAGE ASSEMBLIES WILL BE HELD TOGETHER ON THE CANISTER. BY SIMPLY CUTTING THE STEEL STRAPPING AND LIFTING THE TOP, SIDE AND END ASSEMBLIES AWAY, THE CANISTER WILL BE FREE OF THE OVERPACK.
- H. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:
 1. PREFABRICATE ONE BASE ASSEMBLY, ONE TOP ASSEMBLY, TWO SIDE ASSEMBLIES AND TWO END ASSEMBLIES.
 2. SET ONE CANISTER ON THE BASE ASSEMBLY. FORWARD END OF CANISTER WILL BE SET ON FORWARD END OF BASE ASSEMBLY. MAKE SURE THAT CANISTER SKIDS ARE SEATED IN SPACES PROVIDED.
 3. SET THE TOP ASSEMBLY ON THE CANISTER. FORWARD END OF TOP ASSEMBLY WILL BE SET ON FORWARD END OF CANISTER. MAKE SURE THAT THE FOUR CANISTER LOCATOR PINS ARE SEATED IN THE HOLES PROVIDED.
 4. SET ONE END ASSEMBLY ON EACH END OF THE BASE ASSEMBLY. END ASSEMBLIES WILL FIT INTO THE BASE AND TOP ASSEMBLIES.
 5. SET ONE SIDE ASSEMBLY ON EACH SIDE OF THE BASE ASSEMBLY UP AGAINST THE CANISTER SO THAT THE ENDS INTERLOCK WITH THE END ASSEMBLIES AND FIT INTO THE BASE AND TOP ASSEMBLIES.
 6. INSTALL THE SEVEN PIECES OF 1-1/4" X .035" STEEL STRAPPING IN THE POSITIONS AS SHOWN ON PAGE 2 AND SEAL WITH ONE SEAL PER STRAP, DOUBLE CRIMPED.
- J. INDIVIDUAL PIECES OF ASSEMBLIES SHOULD BE CUT TO WITHIN 1/8" OF THE DIMENSIONS GIVEN IN THIS DRAWING AND DIMENSIONS OF EACH COMPLETED ASSEMBLY SHOULD BE AS CLOSE AS POSSIBLE TO THOSE GIVEN. SOME SMALL ADJUSTMENTS TO THE ASSEMBLIES WILL BE REQUIRED TO ALLOW THEM TO FIT TOGETHER ON THE CANISTER, BUT ASSEMBLIES MUST NOT BE FORCED TO FIT THE CANISTER OR EACH OTHER IF SIGNIFICANT CHANGES TO THE OVERALL DIMENSIONS OR STRUCTURAL INTEGRITY OF THE OVERPACK WILL OCCUR AS A RESULT.
- K. CAUTION: THE OVERPACKED CANISTER MAY BE LIFTED BY A CRANE/SLING BY REACHING THROUGH THE TOP OF THE OVERPACK AND USING THE CANISTER LIFTING RINGS OR BY USING THE SLING LOCATIONS FOR LOOP TYPE SLINGS PROVIDED ON THE BOTTOM OF EACH END OF THE OVERPACK. THE OVERPACKED CANISTER MAY BE LIFTED BY A FORKLIFT TRUCK BY REACHING THROUGH THE SIDE OF THE OVERPACK AND USING THE CANISTER FORKLIFT TRUCK FORK TINE POCKETS. UNDER NO CIRCUMSTANCES WILL THE OVERPACKED CANISTER BE LIFTED BY A CRANE/SLING USING ANY FACILITY OTHER THAN THE CANISTER LIFTING RINGS OR THE LOOP TYPE SLING LOCATIONS AND UNDER NO CIRCUMSTANCES WILL THE OVERPACKED CANISTER BE LIFTED BY FORKLIFT TRUCKS FROM THE BOTTOM OF EITHER END, OR FROM EITHER SIDE USING ANY FACILITY OTHER THAN THE CANISTER FORKLIFT TRUCK FORK TINE POCKETS. ALSO, IN NO CASE WILL MORE THAN ONE OVERPACKED CANISTER BE LIFTED AT A TIME, UNLESS THE LOOP TYPE SLING METHOD IS USED.
- L. MARKING OF THE CANISTER OVERPACK WILL BE IN ACCORDANCE WITH MIL-STD-129 AND US ARMY MISSILE COMMAND DRAWING 8026497. THE MARKINGS WILL INCLUDE CANISTER IDENTIFICATION INFORMATION AS REQUIRED; OVERPACKED CANISTER TOTAL WEIGHT, CUBE, LENGTH, WIDTH, HEIGHT, CENTER OF BALANCE LOCATION AND FORWARD END LOCATION; AND OVERPACKED CANISTER LIFTING POINT LOCATIONS AND PRECAUTIONARY LIFTING GUIDANCE, AS SPECIFIED IN GENERAL NOTE "K" ABOVE.

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 I, TYPE I OR II, HEAVY DUTY, FINISH B (GRADE 2).
SEAL, STRAP	FED SPEC QQ-S-781; TYPE D, STYLE I, II, OR III, CLASS H.
BOLTS	FED SPEC FF-B-584.
STEEL, STRUCTURAL	FED SPEC QQ-S-741; ROLLED PLATE.



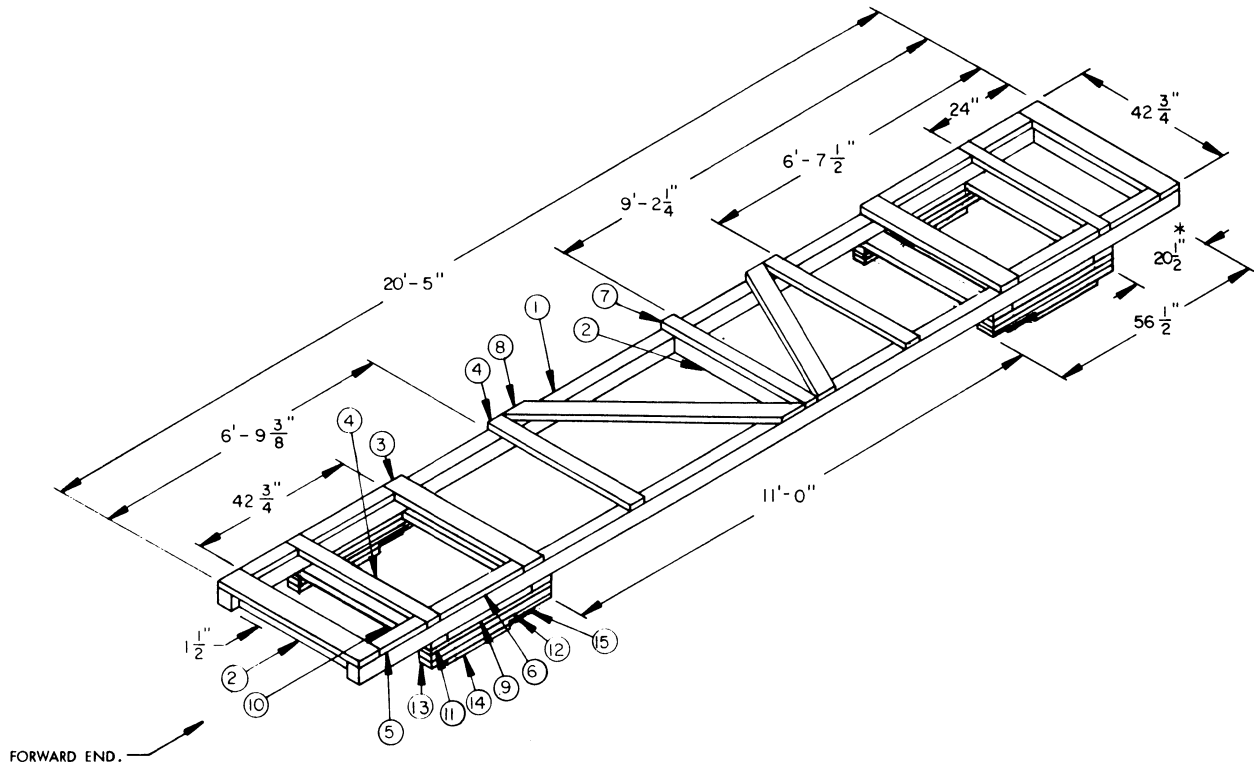
BASE ASSEMBLY

KEY NUMBERS

- ① 4" X 4" X 20'-5" (2 REQD). SEE GENERAL NOTE "E" ON PAGE 3.
- ② 2" X 6" X 42-3/4" (4 REQD). NAIL FIRST PIECE TO ENDS OF PIECES MARKED ① W/3-12d NAILS AT EACH END. NAIL SECOND PIECE TO FIRST W/1-10d NAIL EVERY 4".
- ③ 2" X 6" X 42-3/4" (2 REQD). NAIL TO PIECES MARKED ① W/3-12d NAILS AT EACH END.
- ④ 4" X 4" X 35-3/4" (7 REQD). TOENAIL TO PIECES MARKED ① W/2-16d NAILS AT EACH END.
- ⑤ 2" X 4" X 42-3/4" (3 REQD). NAIL TO PIECES MARKED ① W/2-12d NAILS AT EACH END AND TO PIECE MARKED ④ W/1-12d NAIL EVERY 4".
- ⑥ 2" X 4" X 35-3/4" (2 REQD). NAIL TO TOP OF PIECE MARKED ④ W/1-12d NAIL EVERY 4".
- ⑦ 2" X 4" X 56-3/8" (2 REQD). NAIL TO PIECE MARKED ① W/1-12d NAIL EVERY 4".
- ⑧ 2" X 4" X 6'-6-3/8" (2 REQD). NAIL TO PIECE MARKED ① W/1-12d NAIL EVERY 4".
- ⑨ 2" X 4" X 12'-5-1/4" (2 REQD). NAIL TO PIECES MARKED ③ , ⑤ , ⑦ AND ⑧ W/1-12d NAIL EVERY 4".
- ⑩ 2" X 4" X 20-1/2" (4 REQD). NAIL TO PIECE MARKED ① W/5-12d NAILS.
- ⑪ 2" X 6" BY CUT-TO-FIT (2 REQD). NAIL TO PIECES MARKED ① W/3-12d NAILS AT EACH END.
- ⑫ 2" X 2" X 42-3/4" (2 REQD). NAIL TO PIECE MARKED ② W/1-10d NAIL EVERY 4".

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	7	2
2" X 4"	71	47
2" X 6"	45	45
4" X 4"	62	83
NAILS	NO. REQD	POUNDS
10d (3")	40	1/2
12d (3-1/4")	253	4-1/4
16d (3-1/2")	28	1/2

BASE ASSEMBLY DETAIL



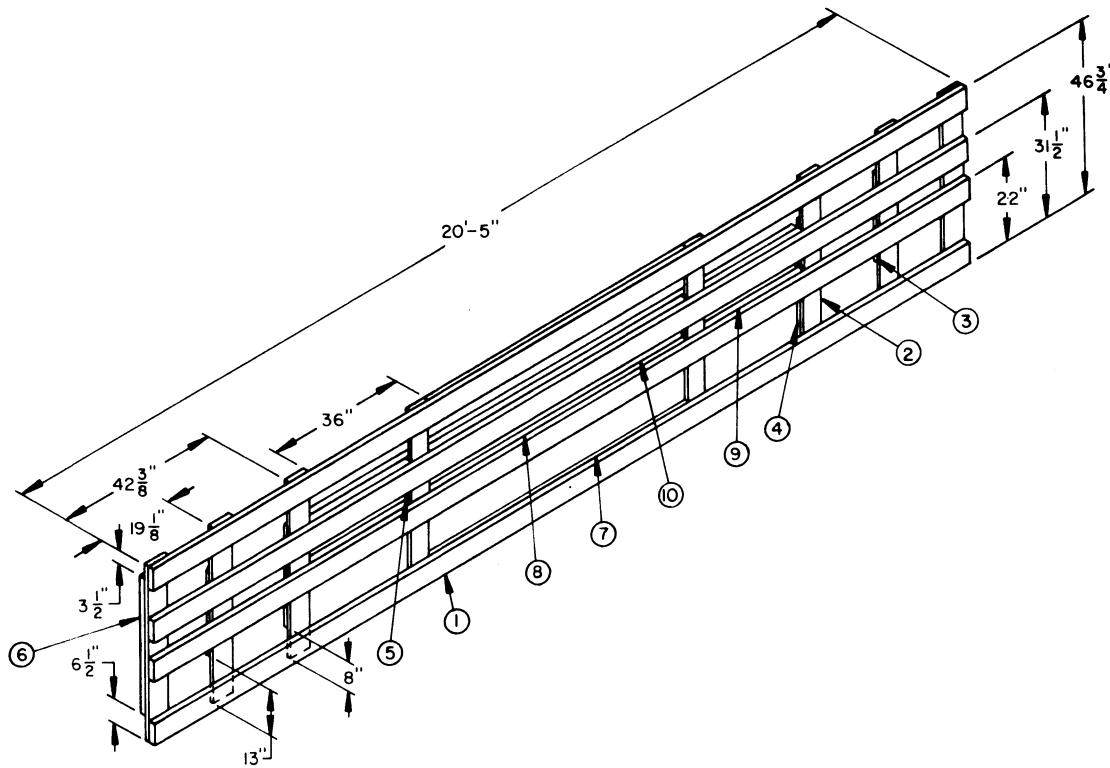
TOP ASSEMBLY

KEY NUMBERS

- ① 4" X 4" X 20'-5" (2 REQD). SEE GENERAL NOTE "E" ON PAGE 3.
- ② 4" X 4" X 35-3/4" (3 REQD). TOENAIL TO PIECES MARKED ① W/2-16d NAILS AT EACH END.
- ③ 2" X 6" X 42-3/4" (4 REQD). NAIL TO PIECES MARKED ① W/3-12d NAILS AT EACH END. ALSO, NAIL PIECES ON ENDS OF ASSEMBLY TO PIECES MARKED ② W/1-12d NAIL EVERY 4".
- ④ 2" X 4" X 42-3/4" (4 REQD). NAIL TO PIECES MARKED ① W/2-12d NAILS AT EACH END.
- ⑤ 2" X 4" X 15" (4 REQD). NAIL TO PIECES MARKED ① W/4-12d NAILS.
- ⑥ 2" X 4" X 24-1/4" (4 REQD). NAIL TO PIECES MARKED ① W/6-12d NAILS.
- ⑦ 2" X 4" X 42-3/4" (1 REQD). NAIL TO PIECES MARKED ① W/2-12d NAILS AT EACH END AND TO PIECE MARKED ② W/1-12d NAIL EVERY 4".
- ⑧ 2" X 6" BY CUT-TO-FIT (2 REQD). NAIL TO PIECES MARKED ① W/3-12d NAILS AT EACH END.
- ⑨ 2" X 4" X 25" (4 REQD). NAIL TO PIECE MARKED ① W/6-12d NAILS.
- ⑩ 2" X 4" X 42-3/4" (4 REQD). NAIL TO PIECES MARKED ① W/3-12d NAILS AT EACH END.
- ⑪ 2" X 4" X 36" (4 REQD). NAIL TO PIECES MARKED ⑤ AND ⑩ W/9-12d NAILS.
- ⑫ 2" X 4" X 36" (4 REQD). DRILL 1-1/4" DIAMETER BY 1/2" DEEP HOLE AS SHOWN BY "DETAIL PIECE ⑫ OF TOP ASSEMBLY" ON PAGE 8. NAIL TO PIECE MARKED ① W/9-12d NAILS.
- ⑬ 2" X 4" X 30" (4 REQD). RABBET ONE END AND DRILL 1-1/4" DIAMETER HOLE AS SHOWN BY "DETAIL PIECE ⑬ OF TOP ASSEMBLY" ON PAGE 8. NAIL TO PIECE MARKED ⑫ W/9-12d NAILS.
- ⑭ 1" X 4" X 19" (4 REQD). NAIL TO PIECE MARKED ⑬ W/8-8d NAILS.
- ⑮ STEEL PLATE, 1/4" X 3-1/2" X 7" (4 REQD). SEE "DETAIL PIECE ⑮ OF TOP ASSEMBLY" ON PAGE 8 FOR LOCATION OF HOLES TO BE DRILLED. NAIL TO PIECE MARKED ⑬ W/4-20d NAILS.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	6	2
2" X 4"	75	50
2" X 6"	52	52
4" X 4"	50	66
NAILS	NO. REQD	POUNDS
8d (2-1/2")	32	1/4
12d (3-1/4")	279	4-3/4
16d (3-1/2")	12	1/4
20d (4")	16	1/2
STEEL PLATE, 1/4" X 3-1/2" X 7" ----- 4 REQD ----- 7 LBS		



SIDE ASSEMBLY

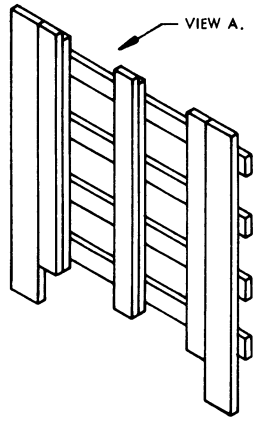
KEY NUMBERS

- ① 2" X 6" X 20'-5" (4 REQD). SEE GENERAL NOTE "E" ON PAGE 3.
- ② 1" X 6" X 46-3/4" (8 REQD). NAIL TO PIECES MARKED ① W/3-10d NAILS AT EACH JOINT. CLINCH NAILS.
- ③ 1" X 6" X 22-3/4" (2 REQD). NAIL TO SECOND PIECES MARKED ② FROM ENDS W/1-6d NAIL EVERY 4". CLINCH NAILS WHICH PROTRUDE.
- ④ 1" X 6" X 27-3/4" (2 REQD). NAIL TO THIRD PIECES MARKED ② FROM ENDS W/1-6d NAIL EVERY 4". CLINCH NAILS WHICH PROTRUDE.
- ⑤ 1" X 6" X 15" (2 REQD). NAIL TO FOURTH PIECES MARKED ② FROM ENDS W/1-6d NAIL EVERY 4". CLINCH NAILS WHICH PROTRUDE.
- ⑥ 2" X 2" X 36-3/4" (2 REQD). NAIL TO END PIECES MARKED ② W/1-8d NAIL EVERY 4". CLINCH NAILS WHICH PROTRUDE.
- ⑦ 1" X 6" X 6'-5-1/4" (2 REQD). NAIL TO TOP AND BOTTOM PIECES MARKED ① W/1-6d NAIL EVERY 4".
- ⑧ 2" X 6" X 6'-5-1/4" (2 REQD). NAIL TO A MIDDLE PIECE MARKED ① W/1-10d NAIL EVERY 4".
- ⑨ 2" X 6" X 30-1/2" (4 REQD). NAIL TO A MIDDLE PIECE MARKED ① W/1-10d NAIL EVERY 4".
- ⑩ 2" X 6" X 12'-5-1/4" (2 REQD). NAIL TO PIECES MARKED ⑤, ⑧, AND ⑨ W/1-10d NAIL EVERY 4".

BILL OF MATERIAL

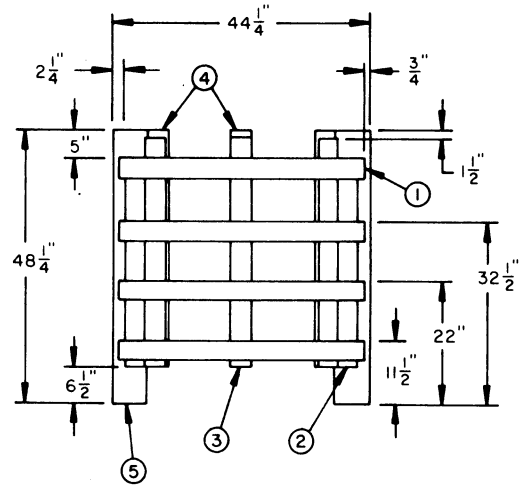
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	55	27
2" X 2"	6	2
2" X 6"	130	130
NAILS	NO. REQD	POUNDS
6d (2")	70	1/2
8d (2-1/2")	18	1/4
10d (3")	236	3-3/4

SIDE ASSEMBLY DETAIL



VIEW A.

END ASSEMBLY

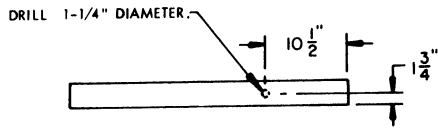


VIEW A

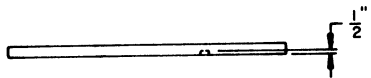
KEY NUMBERS

- ① 2" X 4" X 42-3/4" (4 REQD).
- ② 2" X 4" X 36-3/4" (2 REQD). NAIL TO PIECES MARKED ① W/2-10d NAILS AT EACH JOINT.
- ③ 2" X 4" X 40-1/4" (3 REQD). NAIL TO PIECES MARKED ① W/2-10d NAILS AT EACH JOINT.
- ④ 2" X 4" X 41-3/4" (3 REQD). NAIL TO PIECE MARKED ③ W/1-10d NAIL EVERY 4".
- ⑤ 2" X 6" X 48-1/4" (2 REQD). NAIL TO PIECE MARKED ② W/1-10d NAIL EVERY 4".

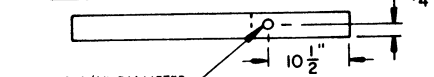
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	41	27
2" X 6"	8	8
NAILS	NO. REQD	POUNDS
10d (3")	94	1-1/2



TOP VIEW

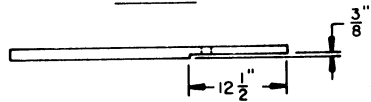


SIDE VIEW
DETAIL PIECE (12) OF TOP ASSEMBLY

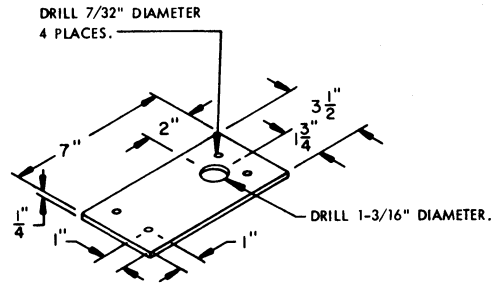


DRILL 1-1/4" DIAMETER.

TOP VIEW



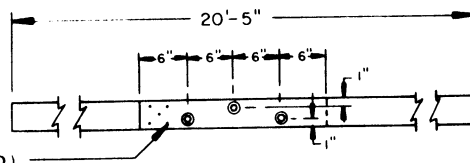
SIDE VIEW
DETAIL PIECE (13) OF TOP ASSEMBLY



DRILL 7/32" DIAMETER
4 PLACES.

DRILL 1-3/16" DIAMETER.

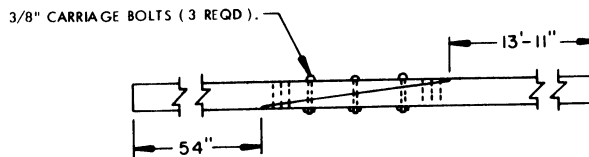
DETAIL PIECE (15) OF TOP ASSEMBLY



8d NAILS (10 REQD).

SIDE VIEW

NOTE: WHEN BUILDING BASE AND TOP ASSEMBLIES, HEADS OF CARRIAGE BOLTS SHOULD BE ON THE OUTSIDE OF THE ASSEMBLIES.

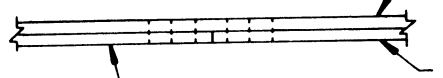


3/8" CARRIAGE BOLTS (3 REQD).

TOP VIEW

SPLICE FOR 4" X 4" X 20'-5" PIECES

PIECES MARKED (1) ON PAGES 4 AND 5. SEE GENERAL NOTE "E" ON PAGE 3.

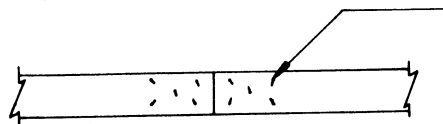


TOP VIEW

2" X 6" X 6'-5-1/4" (PIECE MARKED (6) ON PAGE 6) OR 1" X 6" X 6'-5-1/4" (PIECE MARKED (7) ON PAGE 6) (1 REQD).

2" X 6" X 10'-0" (1 REQD).

2" X 6" X 10'-5" (1 REQD)



SIDE VIEW

SPLICE FOR 2" X 6" X 20'-5" PIECES

PIECE MARKED (1) ON PAGE 6. SEE GENERAL NOTE "E" ON PAGE 3.

NAILS, 8d NAILS WHEN 1" X 6" X 6'-5-1/4" PIECE IS USED OR 12d NAILS WHEN 2" X 6" X 6'-5-1/4" PIECE IS USED (10 REQD). NAIL PIECES TOGETHER W/5 NAILS ON EACH SIDE OF SPLICE, AND WITH THE OTHER NAILS REQUIRED IN THE KEY NUMBERS ON PAGE 6. CLINCH NAILS AT SPLICE.

DETAILS