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Monorail Bridge Conveyor

PHASE II REPORT

CONTRACTOR - GOODMAN EQUIPMENT CORP.

DATE: APRIL 30, 1982

CONTRACT NO. U.S.D.O.E. - DE-AC01-78ET13346



U. S. Department of Energy
Assistant Secretary for Energy Technology
Division of Fossil Fuel Extraction
Mining Research and Development

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MONORAIL BRIDGE CONVEYOR

PHASE II REPORT

AS OF

APRIL 30, 1982

This report represents work on a program that was originated by the Interior Department's Bureau of Mines and was transferred to the Department of Energy on October 1, 1977.

J. GONSKI

GOODMAN EQUIPMENT CORPORATION
4834 SOUTH HALSTED STREET
CHICAGO, ILLINOIS 60609

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U. S. DEPARTMENT OF ENERGY
ASSISTANT SECRETARY FOR ENERGY TECHNOLOGY

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ABSTRACT

This report covers the second phase of a four-phase contract to develop and test a roof hung monorail bridge conveyor coal haulage system working behind a continuous miner. Phase II covers the fabrication and assembly of all the components in making up the Monorail Bridge Conveyor System.

The original concept presented had to be analyzed before final design could proceed. The analysis revealed that 24 ft. long bridge conveyor segments were the optimum length, the suspension system must have the vertical hinge point between bridges, the impact point of the coal transfer point and the suspension point itself, coincidental. The propulsion system is such that each bridge is self propelled in order to minimize side loading on the monorail. The conveyor belt drive is simple since it only has to drive one single 24 ft. conveyor.

The entire assembly of twelve conveyors has been pre-tested in our Murfreesboro, Tennessee shop. The electric circuit proved successful to operate from a manual control or automatically, and successfully proved the cycle of sequential starting and stopping.

1.0 EXECUTIVE SUMMARY

The inability to move coal away from the face has been the greatest "bottleneck" in coal mining during recent years. It is well established that the continuous miner can cut coal faster than is currently produced because of the downtime resulting from inadequate haulage facilities. This shortcoming is quite serious and adds to the cost of the coal produced. With the national commitment to developing the country's coal resources to meet the energy needs, this drawback will become more prominent.

Several attempts have been made in the past to overcome these coal transportation problems. Various types of mobile bridge conveyors, piggyback bridge conveyors, and other systems have been developed by industry to overcome these difficulties. The latest among these is the Serpentix. However, none of these has been fully effective, and each suffers from certain drawbacks. The Bureau of Mines has, therefore, developed a concept incorporating the best features of many of these past developments, with the expectation that most of the shortcomings of the past devices have been eliminated. They have therefore awarded the above contract entitled "MONORAIL BRIDGE CONVEYOR" to Goodman Equipment Corporation.

The general nature of the problem of lack of continuous face haulage and its impact upon the coal industry in the U.S. has already been alluded to above. Specifically, the continuous miners can produce considerably more coal than the capacity of shuttle cars to haul away, which is the method most commonly used currently. Thus, continuous miners generally operated between 33 and 50 percent of the time. The shuttle car method is inherently inefficient since time is wasted while changing cars and the miner has to be turned on and off repeatedly. It is evident that a continuous mode of haulage would be more desirable.

Unfortunately, this is not easily achieved. Several methods have been tried, but all of them suffer from serious drawbacks. None of these have been good enough to have significant impact upon the shuttle car system.

The Bureau of Mines has long recognized this problem and have recently developed a concept of the Monorail Bridge Conveyor. In this concept many of the deficiencies of past systems have been overcome. Hence, it appears to offer considerable merit and is worthy of further development.

It was the intent of Phase I of this program to develop the details of this concept and finalize the design which was completed in June, 1980 and now have completed Phase II. Phase II included the fabrication and assembly of the entire concept.

1.1 Phase II Scope

In October, 1980, Goodman Equipment Corporation initiated taking a contract bill of material #437866. This bill of material authorizes the manufacture and purchasing of all materials to cover entire scope of contract DE-AC-01-78ET13346. It also was divided into three different groups in order to distribute the workload and adhere to the projected completion date.

Group I

Goodman Equipment Corporation purchase, manufacture and assemble all conveyor drives and all electrical enclosures.

Group II

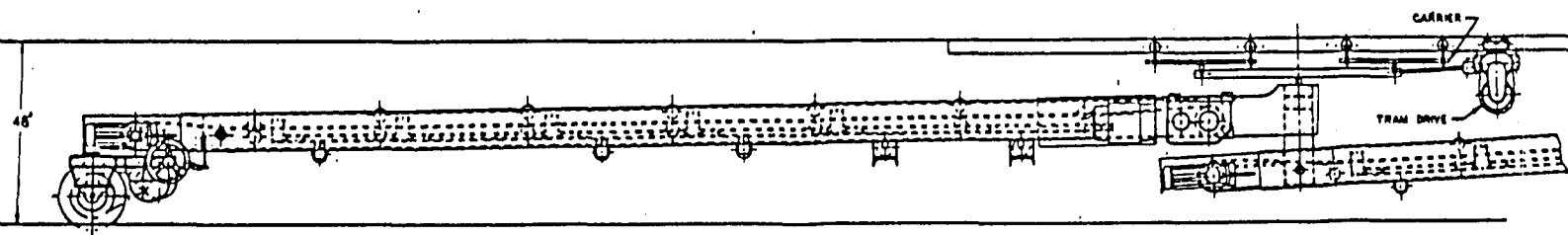
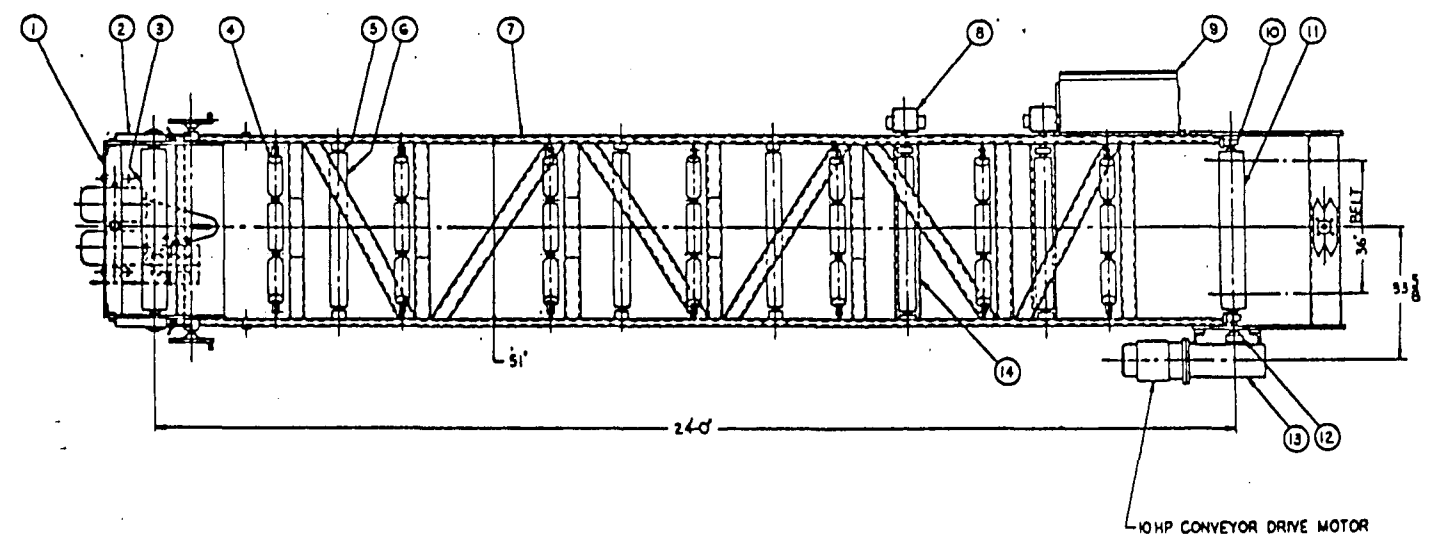
Goodman Conveyor Corporation purchase, manufacture and assemble all conveyor frames and rollers. They will also implement all the final assembly of components from Goodman Equipment Corporation.

Group III

Cleveland Crane and Engineering, a subcontractor, will supply the monorail portion of the system, which includes the carriers, drives, brakes, switches, hangers and all rail components.

Included also in the Phase II scope is the anticipated surface test layout at the Murfreesboro plant. The layout will show the outline of the support structure itself and three units of the conveyor system, inby, intermediate, and outby.

Inby Conveyor Frame	#201179 - Fig. 1
Intermediate Conveyor Frame	#201239 - Fig. 2
Outby Conveyor Frame	#201238 - Fig. 3



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MONORAIL BRIDGE CONVEYOR

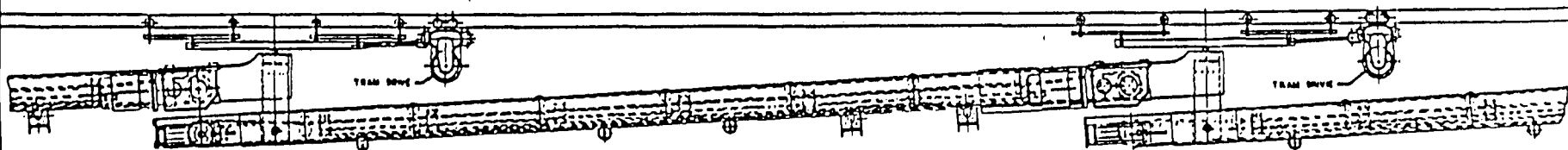
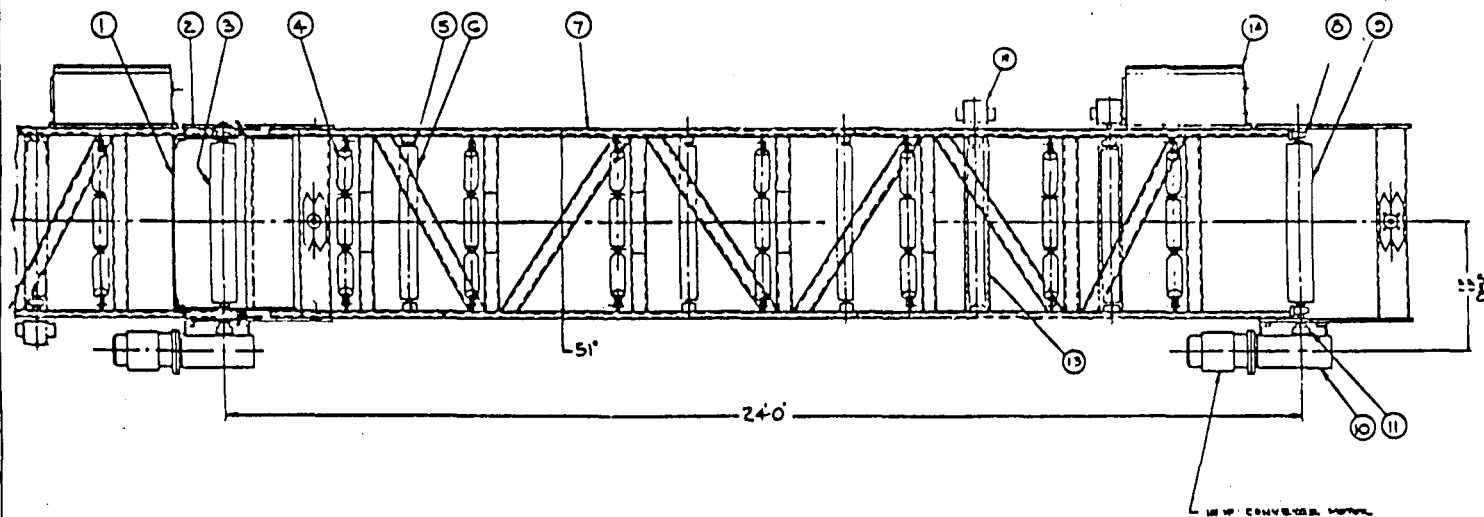
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3	1004190	COUPLER	10
4	1004115	DRIVE PULLEY	11
5	1004118	PILOW BLOCK	10
6	1004118	CONTRACTOR CASE	10
7	1004115	ROLLER/COMP	10
8	1004115	CONVEYOR FRAME	10
9	1004115	PILOW ROLLER	10
10	1004115	BRACKET	10
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12	1004115	ROLLER/COMP	10
13	1004115	ROLLER/COMP	10
14	1004115	ROLLER/COMP	10

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ASSEMBLY
MONORAIL BRIDGE CONVEYOR
201179

Figure 1

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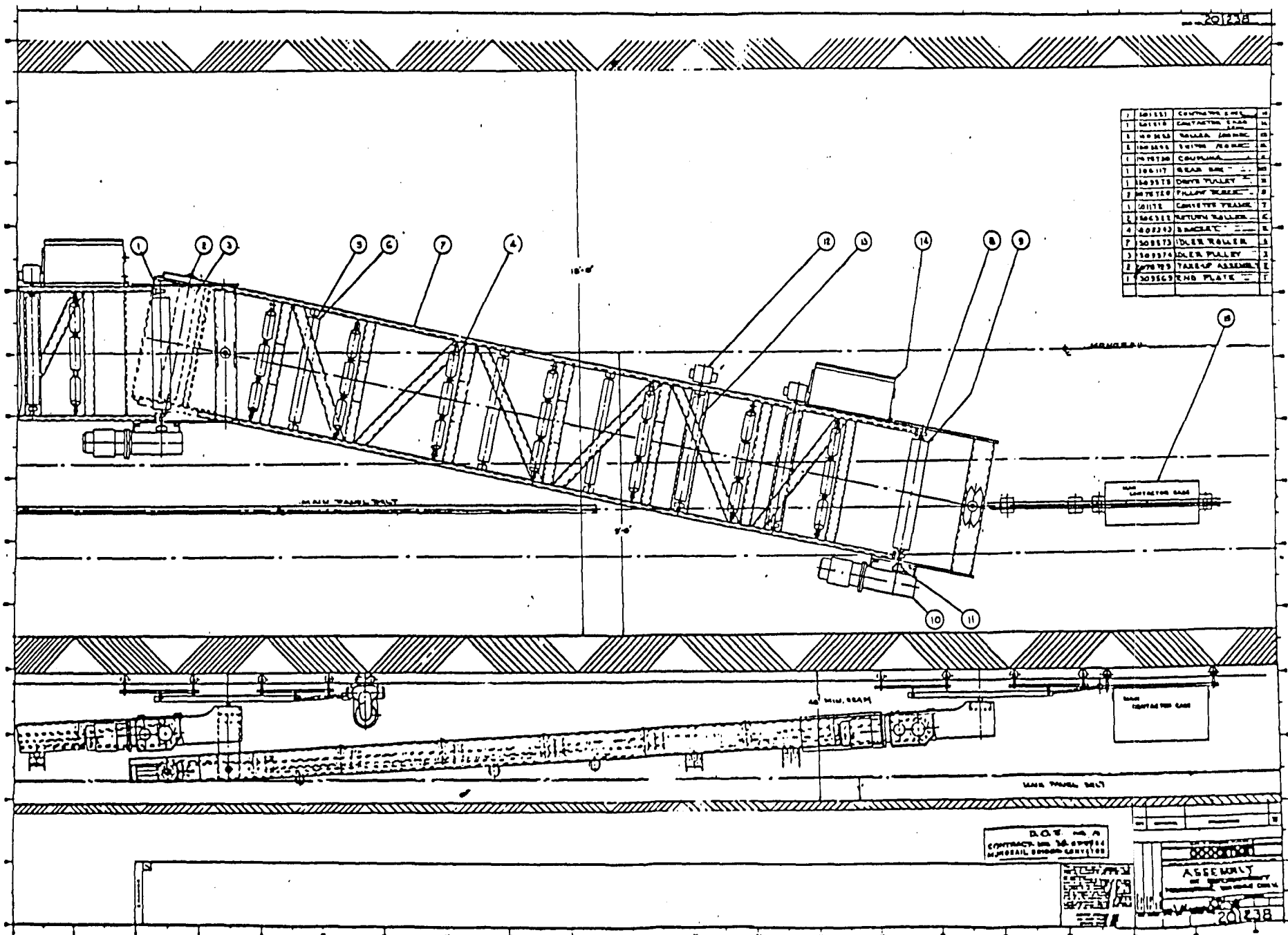
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13	100134	BRACKET	1
14	100136	BRACKET	1
15	100138	BRACKET	1
16	100140	BRACKET	1
17	100142	BRACKET	1
18	100144	BRACKET	1
19	100146	BRACKET	1
20	100148	BRACKET	1
21	100150	BRACKET	1

D.O.L.
CONTRACT NO. 76-01-0014
MONSIEUR BRIDGE CONVEYOR

goodman
ASSEMBLY
OF BIRMINGHAM
ORIGINAL PRICE OWNER
201239

Figure 2

Figure 3



1.2 Phase II Summary

On August 19, 1980, Goodman Equipment Corporation received a letter of authorization to proceed with Phase II. Authorization came from Coleton Weirich, Contracting Officer, Office of Procurement Operations, Department of Energy, Washington D.C. 20585.

With this letter of authorization, Goodman Equipment Corporation proceeded to issue a contract bill of material to initiate the purchase and manufacture of all components in Phase II.

Phase II was divided into seven categories. They are as follows:

- a. Fabrication
- b. MSHA/Approv./Components
- c. Update design drawings
- d. Design/Plan/Surface Test
- e. Prepare Phase II Report
- f. T.P.O. Approval Phase II

1.2.1 Fabrication

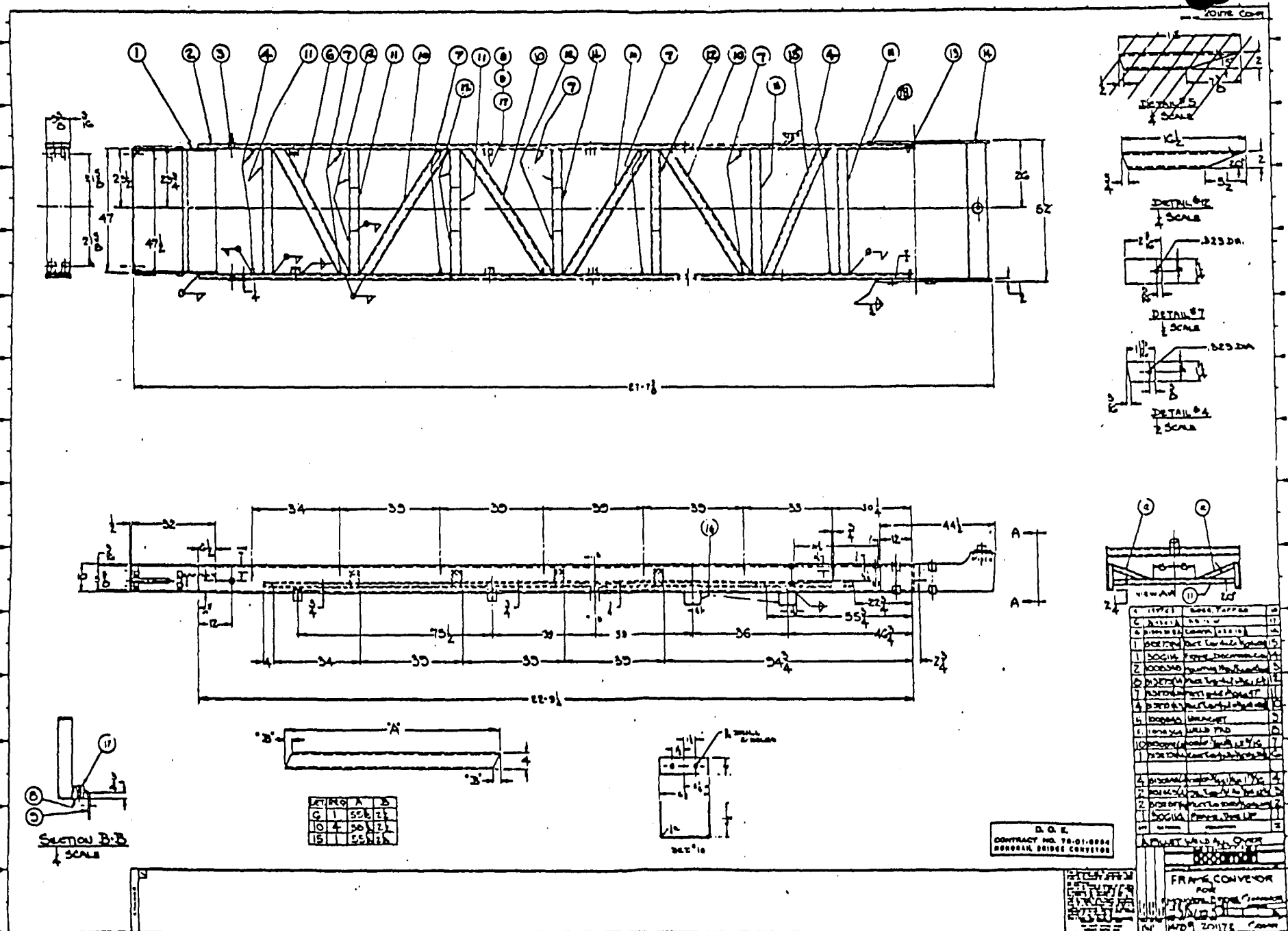
Once authorization was given to proceed with Phase II, Goodman Equipment Corporation issued orders by initiating a bill of material. With this, materials were ordered to start fabrication. Work began September 1, 1980.

The major components were as follows:

- | | | |
|----|-------------------------------|-------------------|
| 1. | 12 - Conveyor Frames | #201172 - Fig. 4 |
| | a. 12 Take-up Frames | #306116 - Fig. 5 |
| | b. 12 - Discharge Frames | #306114 - Fig. 6 |
| 2. | 12 - Suspension Frames | #306115 - Fig. 7 |
| 3. | 12 - Conveyor Drive Gear Case | #201174 - Fig. 8 |
| 4. | 1 - Push Button Case | #306142 - Fig. 9 |
| 5. | 1 - Headlight Switch Case | #306175 - Fig. 10 |
| 6. | 12 - Motor Control Case | #201218 - Fig. 11 |
| 7. | 1 - Master Control Case | #201220 - Fig. 12 |
| 8. | 1 - Wheel Support | #306402 - Fig. 13 |

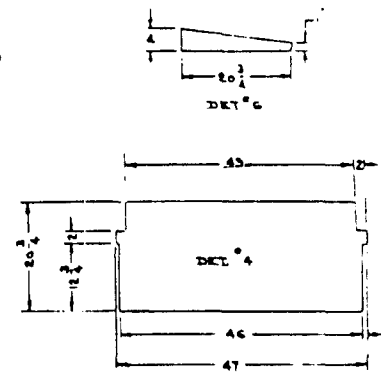
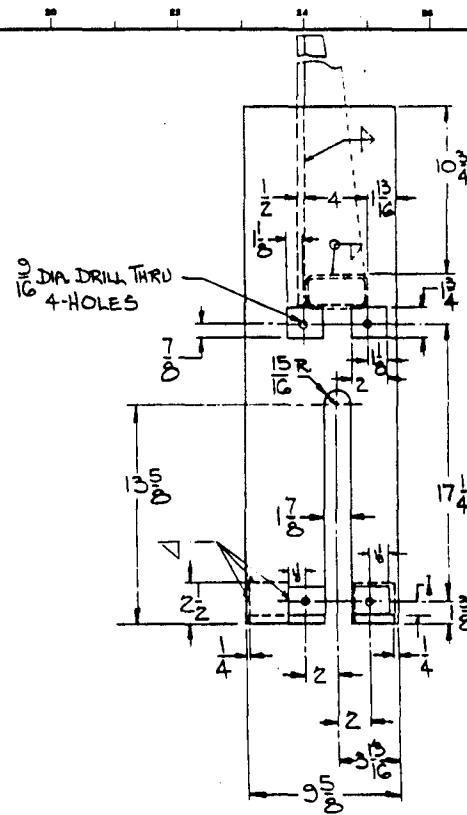
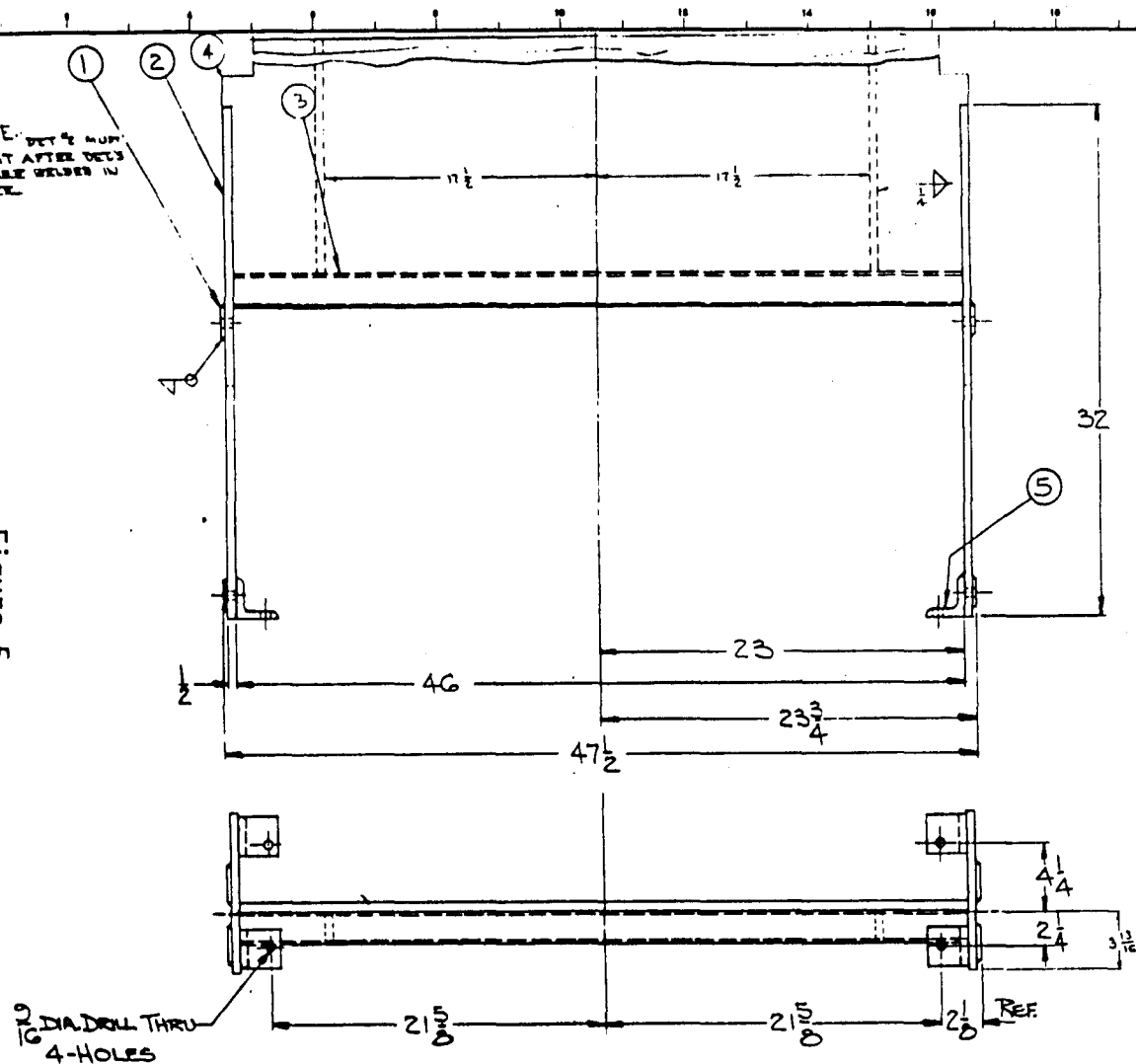
The above components were divided up in order to facilitate faster productivity. Therefore, the twelve conveyor frames, take-up frames, discharge frames and suspension frame were made at Goodman Conveyor Corporation in Murfreesboro, TN.

The remaining components, conveyor drive gear boxes, wheel support and all the electrical enclosures, push button case, headlight switch case, motor control case and master control case were made at Goodman Equipment Corporation in Chicago.



NOTE: DET 2 MUST
BE FLAT AFTER DETS
1 & 2 ARE WELDED IN
PLACE

Figure 5



2	010300 (1)	1074R 1/2 X 4 X 3/8 (1)	1
4	010071 (4)	ANGLE 2 1/2 X 2 1/2 X 1/2	1
1	010310 (1)	1074R 1/2 X 3/8 X 1/2 (1)	1
1	010270 (1)	1/2 X 2 1/2 X 1/2 1/2	3
2	010300 (4)	1074R 1/2 X 3/8 X 1/2	1
2	010420 (2)	1106R 1/2 X 1/2	1
QTY.	MATERIAL	DESCRIPTION	UNIT

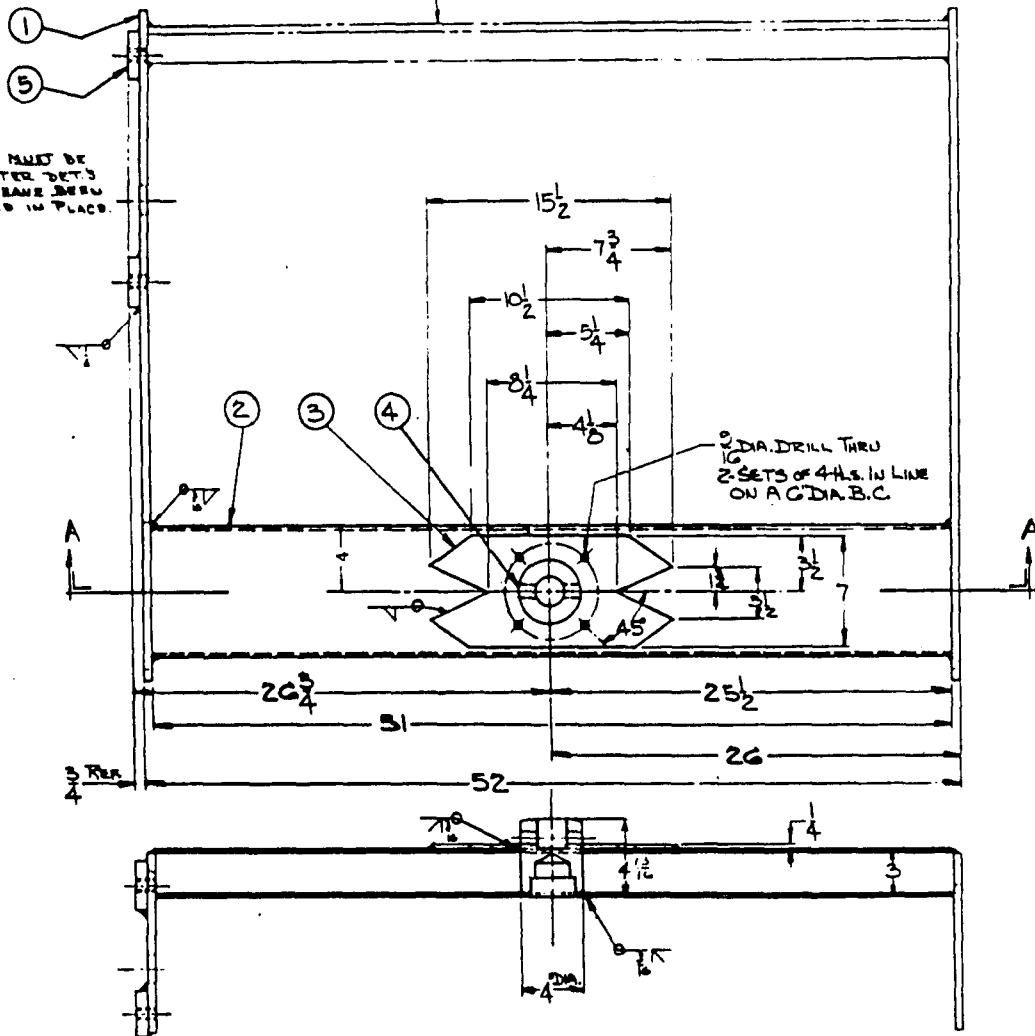
D. O. E.
CONTRACT NO. 78-01-0024
MONORAIL BRIDGE CONVEYOR

2. FILLET WELD ALL OVER

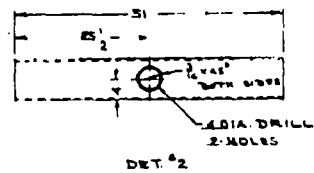
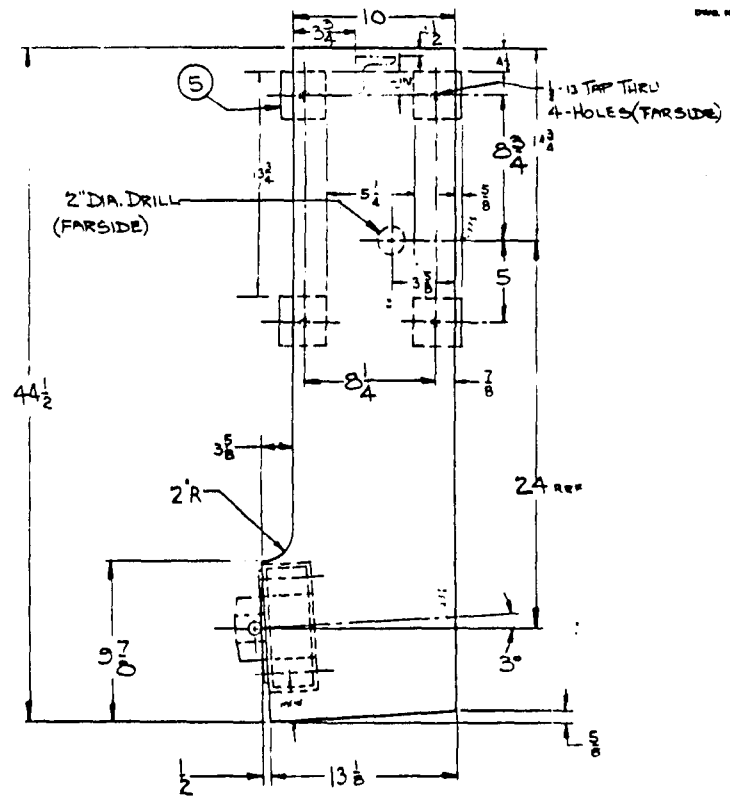
FRAME, TAKE UP
FOR CONVEYOR FRAME
MONORAIL BRIDGE CONVEYOR

306G 306116

NOTE:-
DET. 1 MUST BE
FLAT AFTER DET. 3
DET. 2 & 3 HAVE BEEN
WELDED IN PLACE.



SECTION A-A



DOE.
M.OI-8924
RAIL BRIDGE CONVEYOR

1	815017	1007/HR/4/2.15	251
4	815084	1007/HR/4/2.15	251
1	150357	RETIREMENT BENEFIT	
1	815000	1007/HR/4/2.15	251
1	815084	1007/HR/4/2.15	251
2	815015	1007/HR/4/2.15	251
QTY.	MATERIAL	DESCRIPTION	UNIT

FRAME DISCHARGE
FOR CONVEYOR FRAME
MONORAIL CONVEYOR

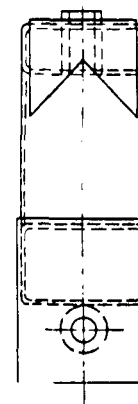
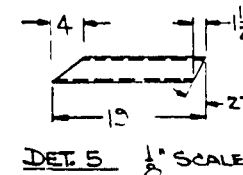
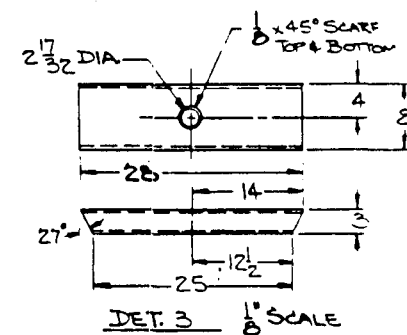
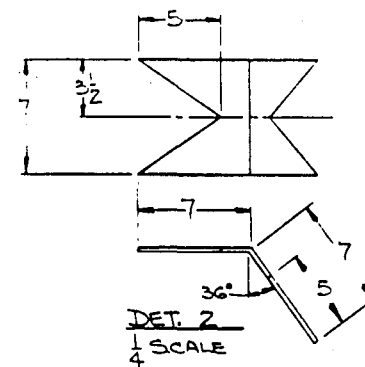
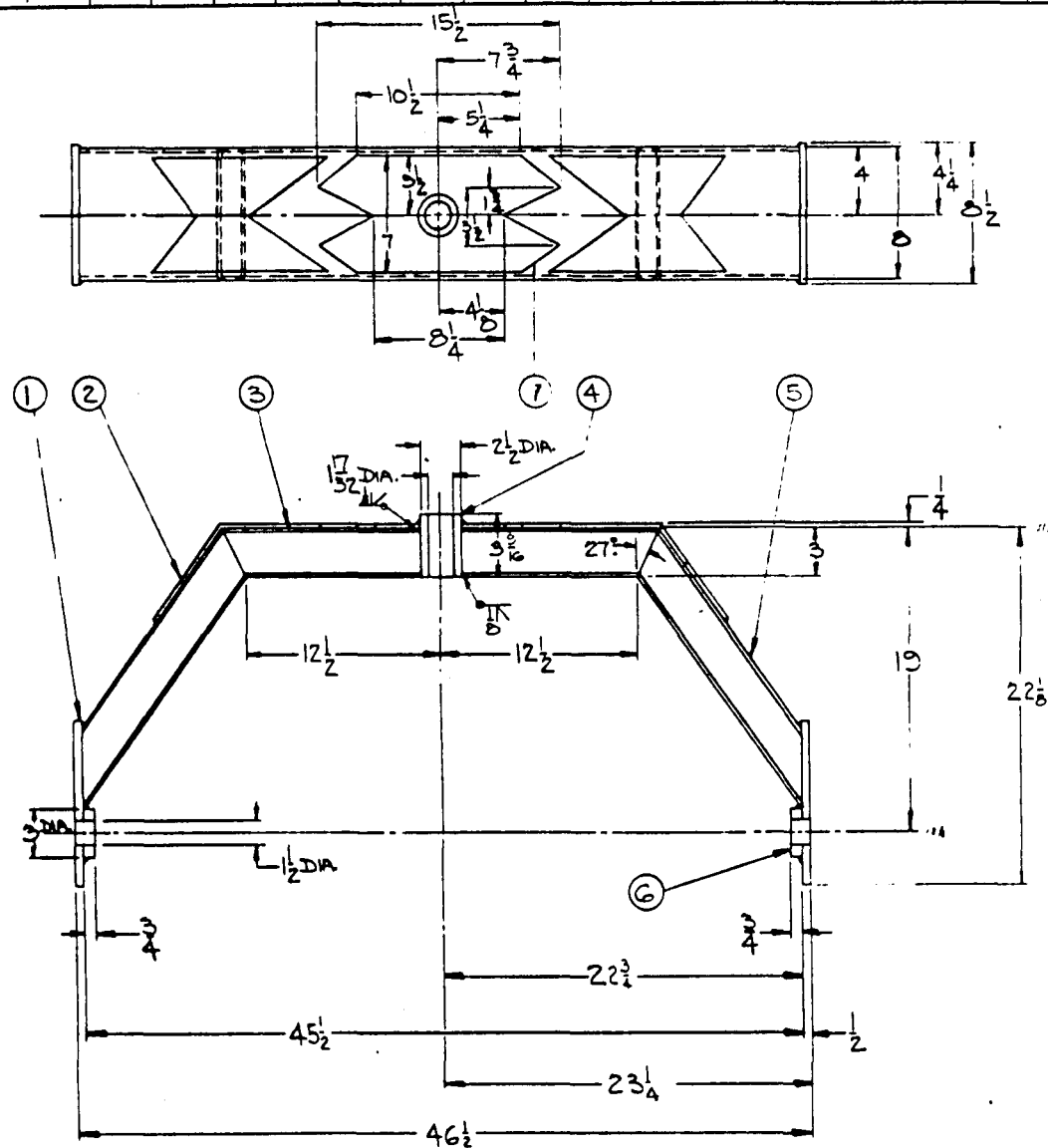


Figure 7

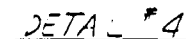
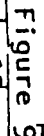
1	8073100(8)	1017/HR $\times \frac{1}{2} \times 7 \times 15 \frac{1}{2}$	
2	2152750(7)	311/2hr 300 $\times \frac{1}{2} \times 14$	
2	2152840(2)	200 $\times 3 \times \frac{1}{2} \times 13$	
1	807780(3)	500 $\times \frac{1}{2} \times 2 \times 14 = 7000$	
1	3112240(5)	500 $\times 3 \times \frac{1}{2} \times 20$	
2	2152500(5)	1017/HR $\times \frac{1}{2} \times 7 \times 14$	
2	2152500(2)	1017/HR $\times \frac{1}{2} \times 7 \times 14$	
Qty.	NATURAL	DESCRIPTION	UNIT PRICE

D. O. E
CONTRACT NO. 78-01-8924
MONORAIL BRIDGE CONVEYOR

3 Fillet Weld All Over except As

FRAME, SUSPENSION
FOR CONVEYOR
MONORAIL BRIDGE CONVEYOR

DATE	TIME	LOCATION	REMARKS
7/4	61#	30615	



7) DIMENSIONAL TOLERANCES
* % & FOR FRACTIONS
* 0.05 FOR DECIMAL DIM'S
* UNLESS OTHERWISE SPECIFIED

8) ALL WELDS MADE IN ACCORDANCE WITH
AWS STANDARDS
MUST BE CONTINUOUS & GAS TIGHT.

COMM - 01-8924
MORC - CONVEYOR

1	893110.06	107 HR 1/2 R x 1 1/4 = 7	
	893400.19	107 HR 1/4 R x 4 1/2 = 6	
2	893410.15	074 HR 1/2 R x 1 1/4 = 8	
1	893414.33	107 HR 1/4 R x 5 1/2 = 7	
1	509680	BOTTOM & SIDES	

CASE, WELDMENT
FOR PUSHBUTTONS
MONORAIL

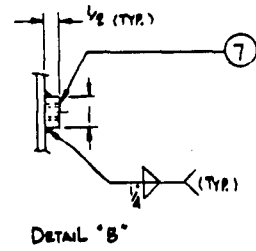
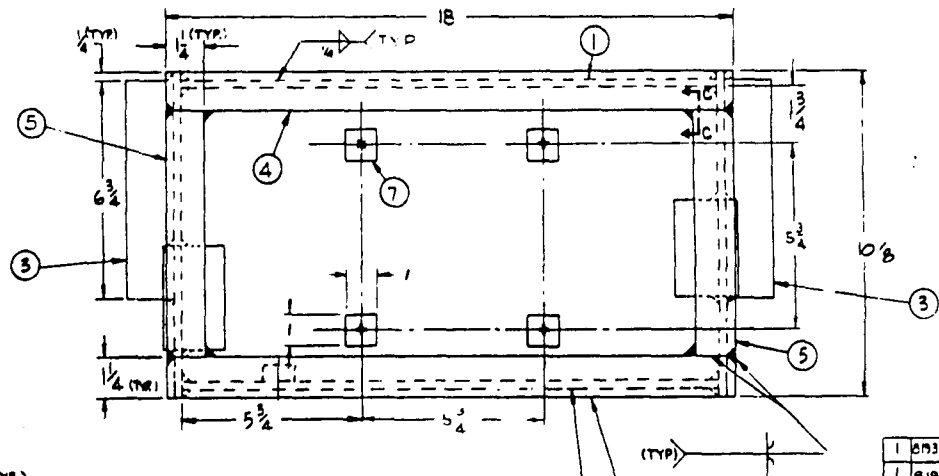
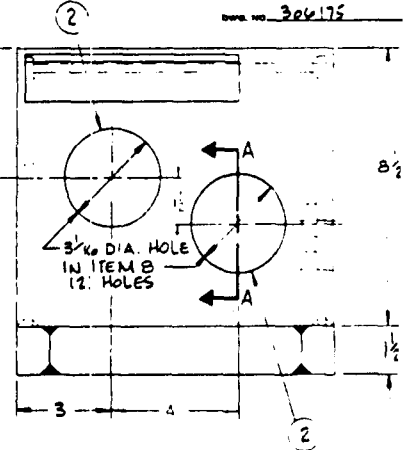
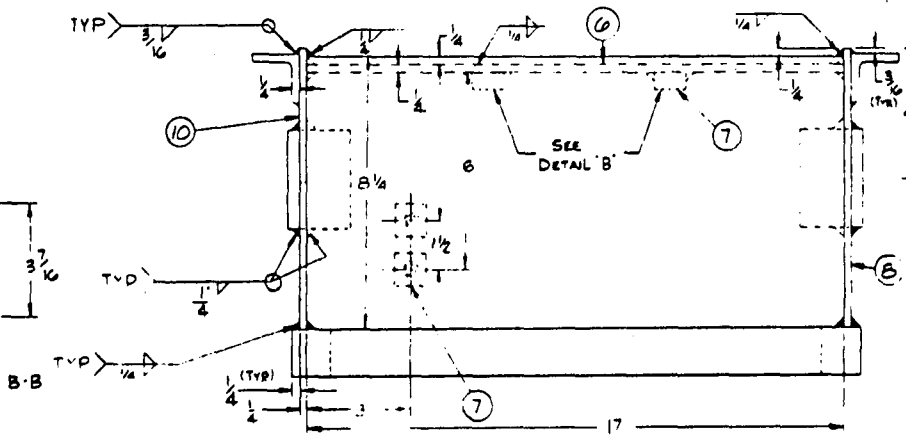
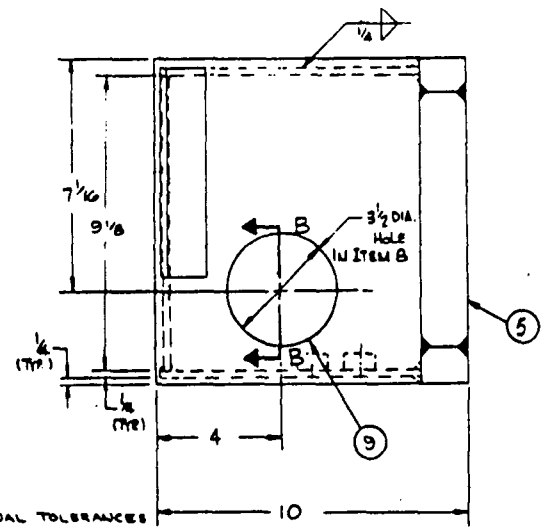
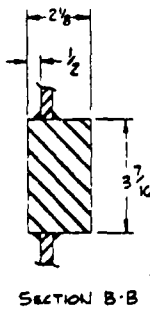
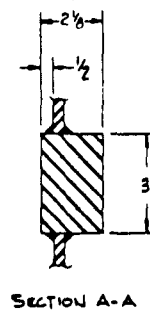


Figure 10
- 14 -

NOTE:
1) DIMENSIONAL TOLERANCES
± 1/64 FOR FRACTIONS
± .002 FOR DECIMAL DIM'S
UNLESS OTHERWISE SPECIFIED
2) ALL WELDS MADE IN ACCORDANCE
WITH AWS STANDARDS
MUST BE CONTINUOUS & GAS TIGHT.

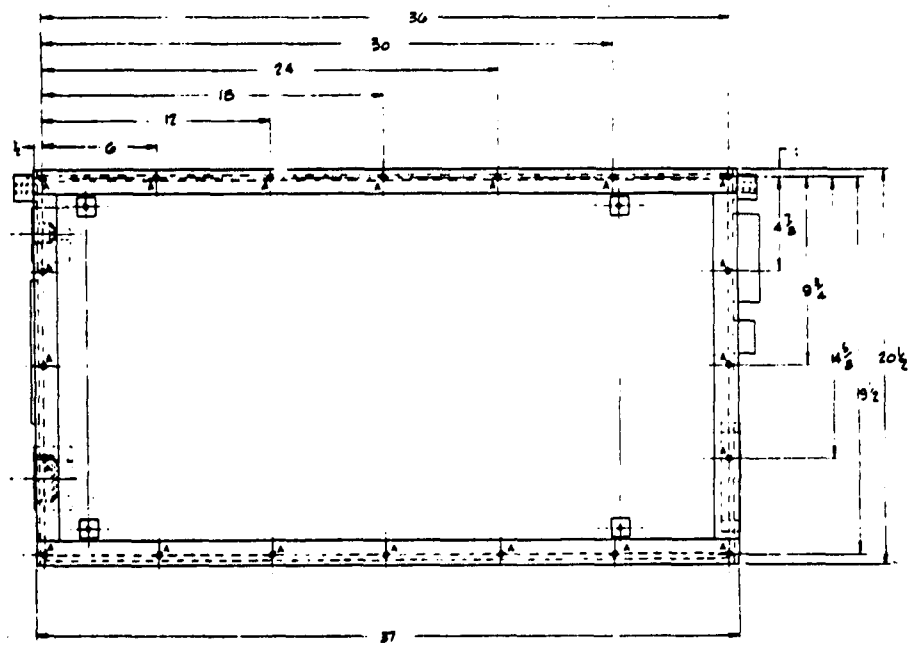
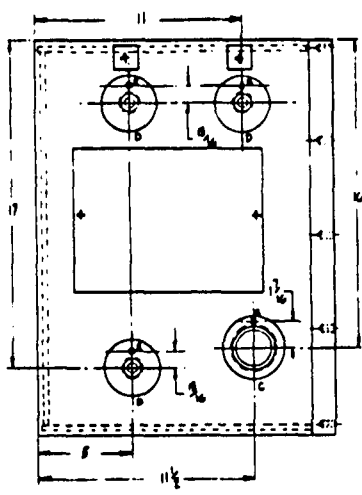
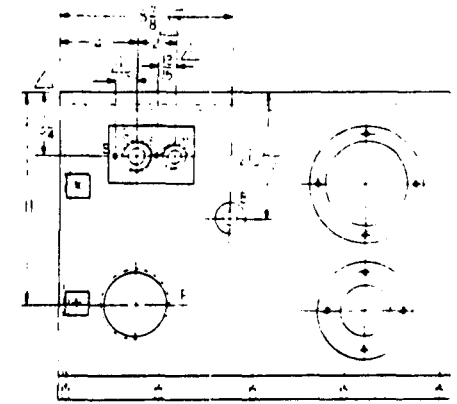
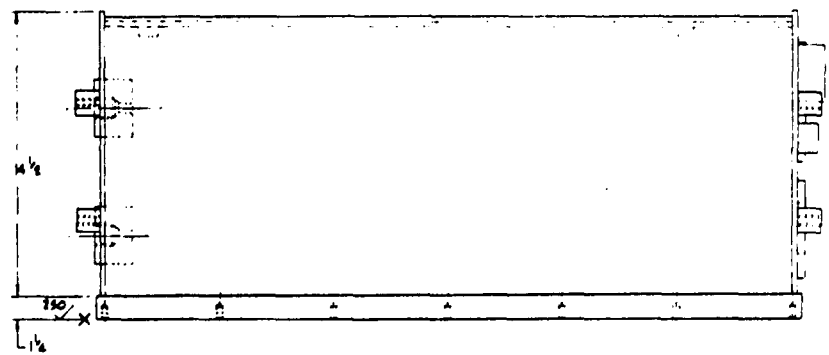
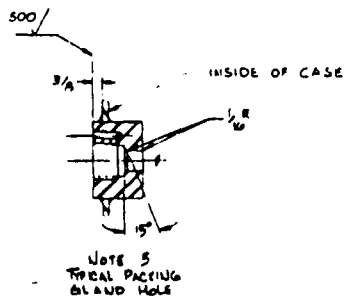
NOT TO BE CHANGED
WITHOUT APPROVAL
OF
T.J. 1-17-61

D.O.
CONTRACT NO. 01-8924
MONORAIL BRIDGE CONVEYOR

QTY.	MATERIAL	DESCRIPTION
1	05300.657	DIY 1/4" R. 84" 10 1/8
1	019104(20)	C 1010 6" 3/4" 10 1/8
1	01000(45)	1017 HE 1/2" R 8 1/2" X 10 1/8
6	1001562	BOSS, TAPPED 1/4" 20
1	01000(110)	1017 HE 1/2" R 9 1/2" X 17
2	01000(140)	1017 HE 1/2" R 1 1/2" X 1 1/2"
2	01000(140)	1017 HE 1/2" R 1 1/2" X 1 1/2"
2	01000(140)	1017 HE 1/2" R 1 1/2" X 1 1/2"
2	01000(140)	1017 HE 1/2" R 1 1/2" X 1 1/2"
2	01000(140)	1017 HE 1/2" R 1 1/2" X 1 1/2"
2	01000(140)	1017 HE 1/2" R 1 1/2" X 1 1/2"

CHANGE
000734
P. 80 R/D

300176
CASE, WELDMENT
FOR HEADLIGHT CONTROL
MONORAIL
90°
CARR 300175



DRILL AND TAP				
MATERIAL	SIZE	DEPTH	QUANTITY	REMARKS
A	3/8	1/2	20	
B	3/16	1/2		
C	1/8	THRU		REAR
D	1/8	THRU	1	Note 5
E	1/8	THRU	1	Note 5
F	1/8	THRU	1	
G	1/8	THRU	1	
H	1/8	THRU	1	NOTE 5

NOTE (CONT.)

1) ALL HOLES THAT AFFECT PLANARITY OF A SURFACE FORMING A FRAME ASSEMBLY MUST BE DIMENSIONED.

NOTE:

- 1) PAINT INSIDE WITH COAT OF PAINT. CASE USES RED THERMAL EXPAND. AND DO NOT PAINT MACHINES SURFACES.
- 2) "X" SURFACE MUST BE FLAT WITHIN .002 BETWEEN BOLT HOLES.
- 3) REMOVE ALL CORN FLOW MARKS, COBRES, ETC. AFTER CASE IS COMPLETED.
- 4) BLIND HOLES MUST BE TO THEIR DEPTH ON TOP DRILL INCLUDES DEAD POINT.
- 5) MINIMUM 1/4" STAKE OF PAINTING AT BOTTOM OF BLIND HOLES.
- 6) DIMENSIONAL TOLERANCES: .004 FOR TOLERANCES EXCEPT ON VERTICAL DIM. UNLESS OTHERWISE SPECIFIED.
- 7) SEE EQUIPMENT (A-1).

NOT TO BE EXCEEDED
UNLESS OTHERWISE
NOTED
11-25-51

20-219 CASE, WELDING

goodma

CASE, MACHINING

FOR MASTER COPY

Figure 12



Figure 13

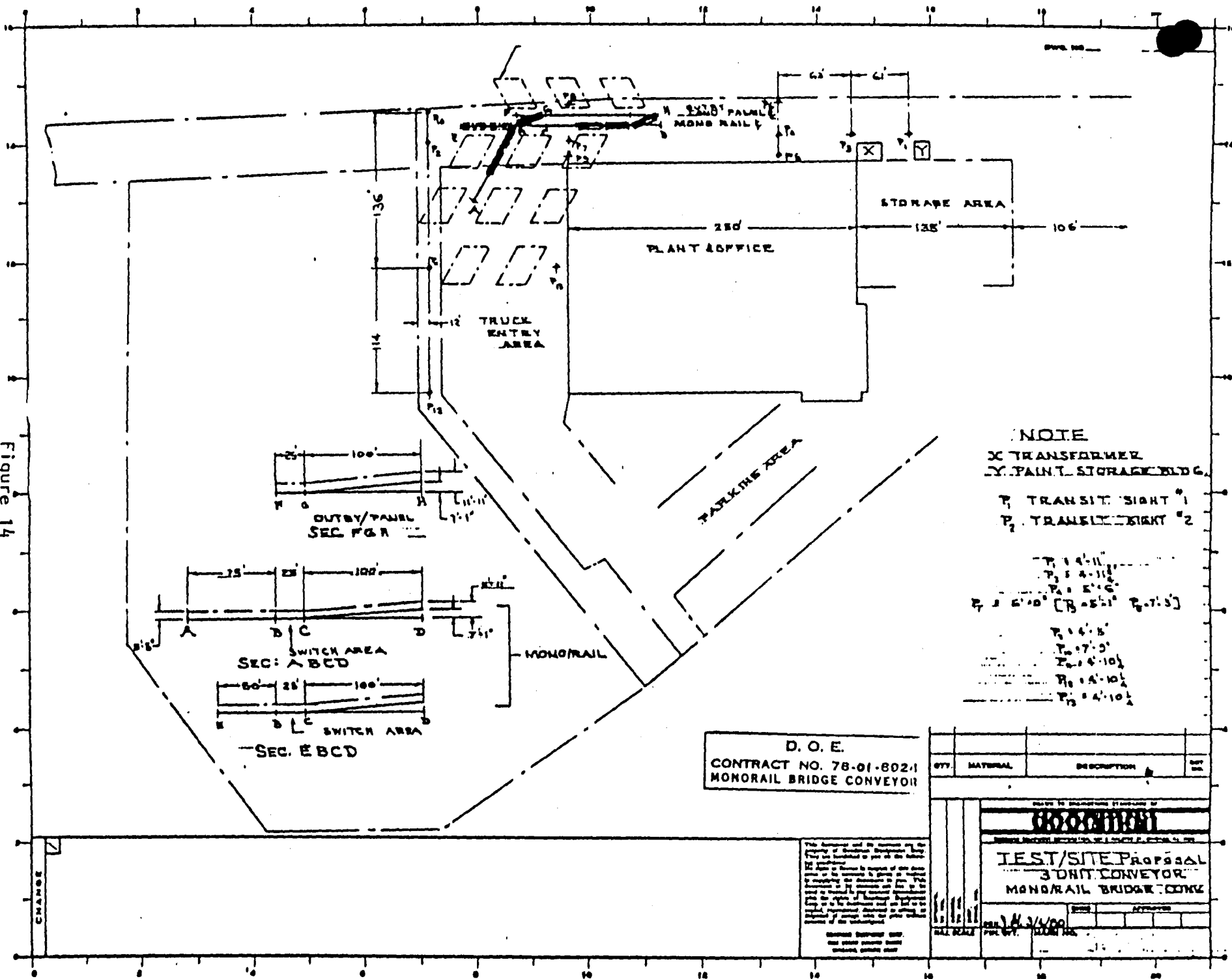
1.2.2 Update Design Drawings

All updating of drawings was done during their period of fabrication and assembly.

1.2.3 Design/Plan/Surface Test

Shown in Fig. 14.

Figure 14



2.0 FINAL FABRICATION

2.1 Conveyor Frame

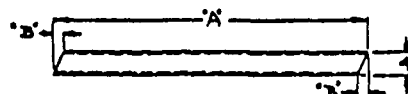
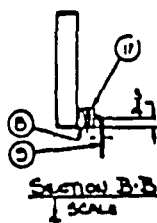
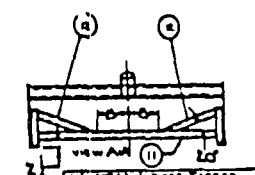
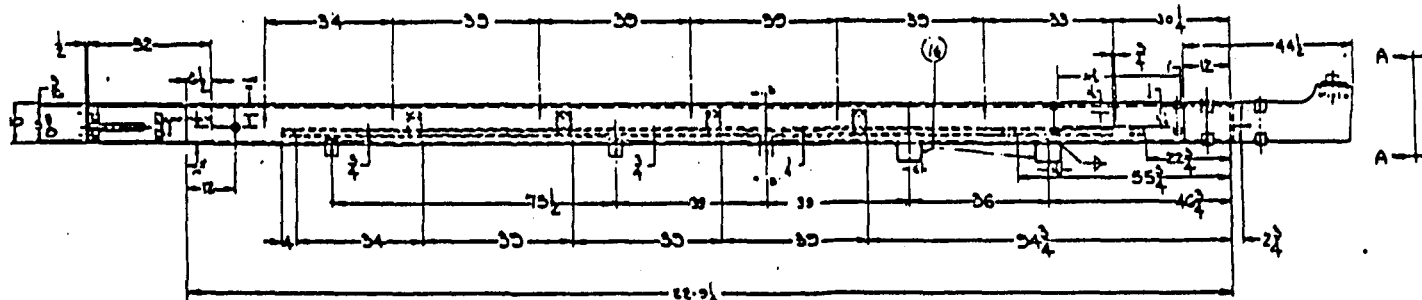
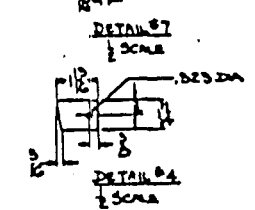
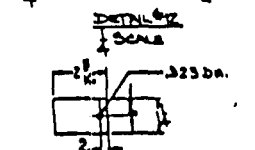
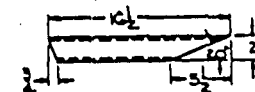
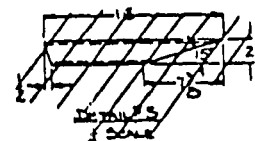
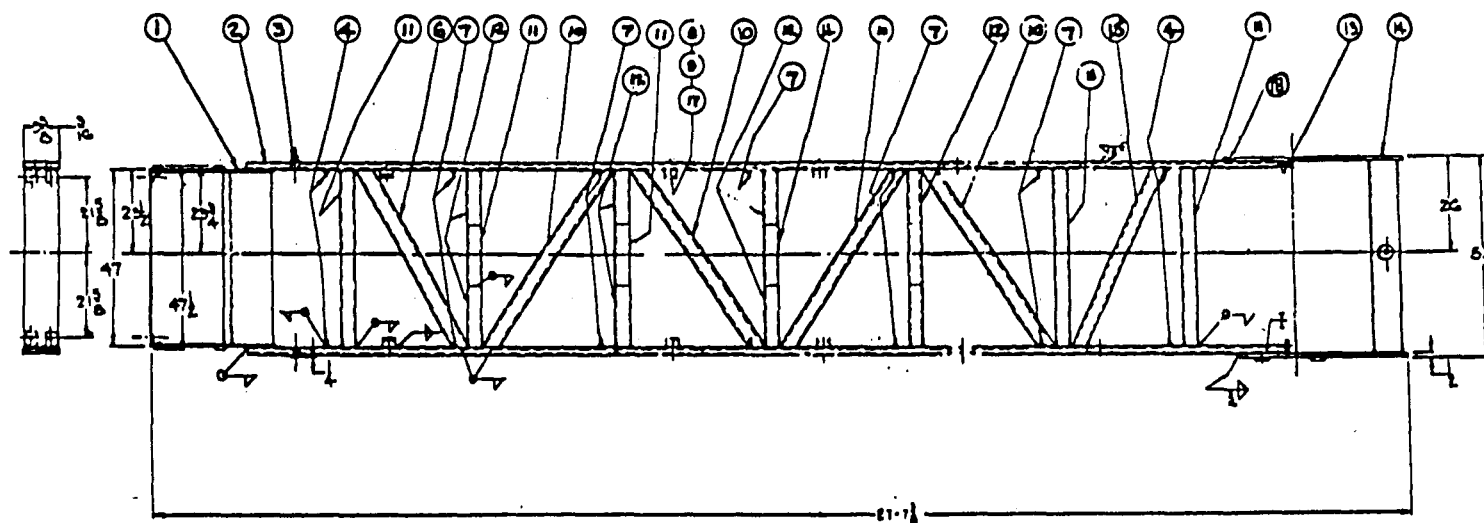
The weldment of conveyor frame #201172 consists of a pair of 2" x 10" x 3/16" lengths of wall rectangular tubing for side members, with 2" x 4" x 3/16 wall rectangular tubing for struts and braces. The assembly in weldment of these pieces makes up the center portion of the structure. When this structure is put together, the take-up frame #306116 and the discharge frame #306114 are welded to each end to complete the structure. With the two frames in place, we now have a complete box structure.

The conveyor frame, when completely welded per Drawing #201172, contains all the details necessary for supporting the cradled rollers, centrifugal switches, return rollers, take-up devices, conveyor drive and motor control cases.

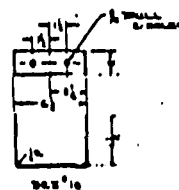
The twelve frames required for the project were constructed at Goodman Conveyor Corporation, Murfreesboro, Tennessee.

Both ends of completely assembled conveyor frame shown in Fig. 23 and Fig. 24.

Figure 15



NO.	A	B
1	525	21
2	525	21
3	525	21



D. G. E.
CONTRACT NO. 78-01-0084
GENERAL BUILDING CONSTRUCTION

1	STEEL	Struct. Frame	11
2	STEEL	Struct. Frame	12
3	STEEL	Struct. Frame	13
4	STEEL	Struct. Frame	14
5	STEEL	Struct. Frame	15
6	STEEL	Struct. Frame	16
7	STEEL	Struct. Frame	17
8	STEEL	Struct. Frame	18
9	STEEL	Struct. Frame	19
10	STEEL	Struct. Frame	20
11	STEEL	Struct. Frame	21
12	STEEL	Struct. Frame	22
13	STEEL	Struct. Frame	23
14	STEEL	Struct. Frame	24
15	STEEL	Struct. Frame	25
16	STEEL	Struct. Frame	26
17	STEEL	Struct. Frame	27
18	STEEL	Struct. Frame	28
19	STEEL	Struct. Frame	29
20	STEEL	Struct. Frame	30

FRAME CONVEYOR

CONVEYOR FRAME WELDMENT
#201172

1501118

2/

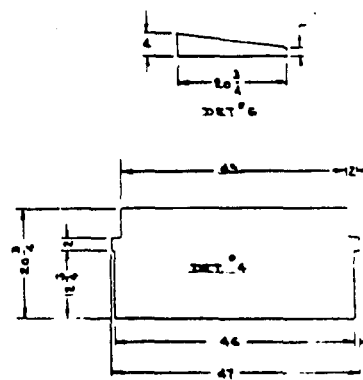
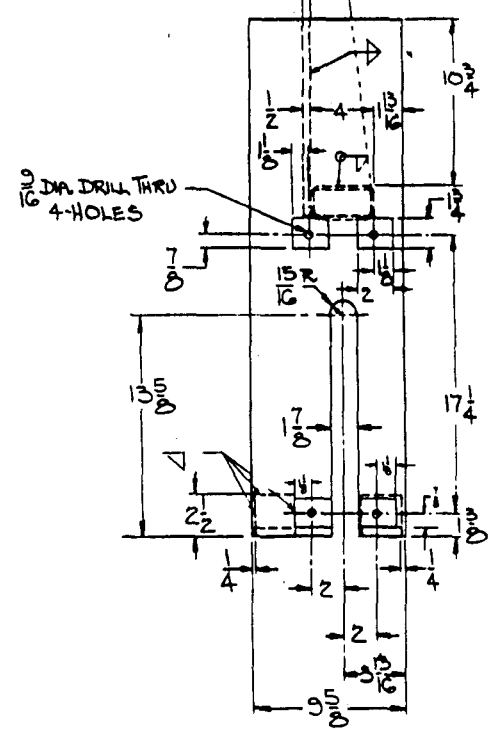
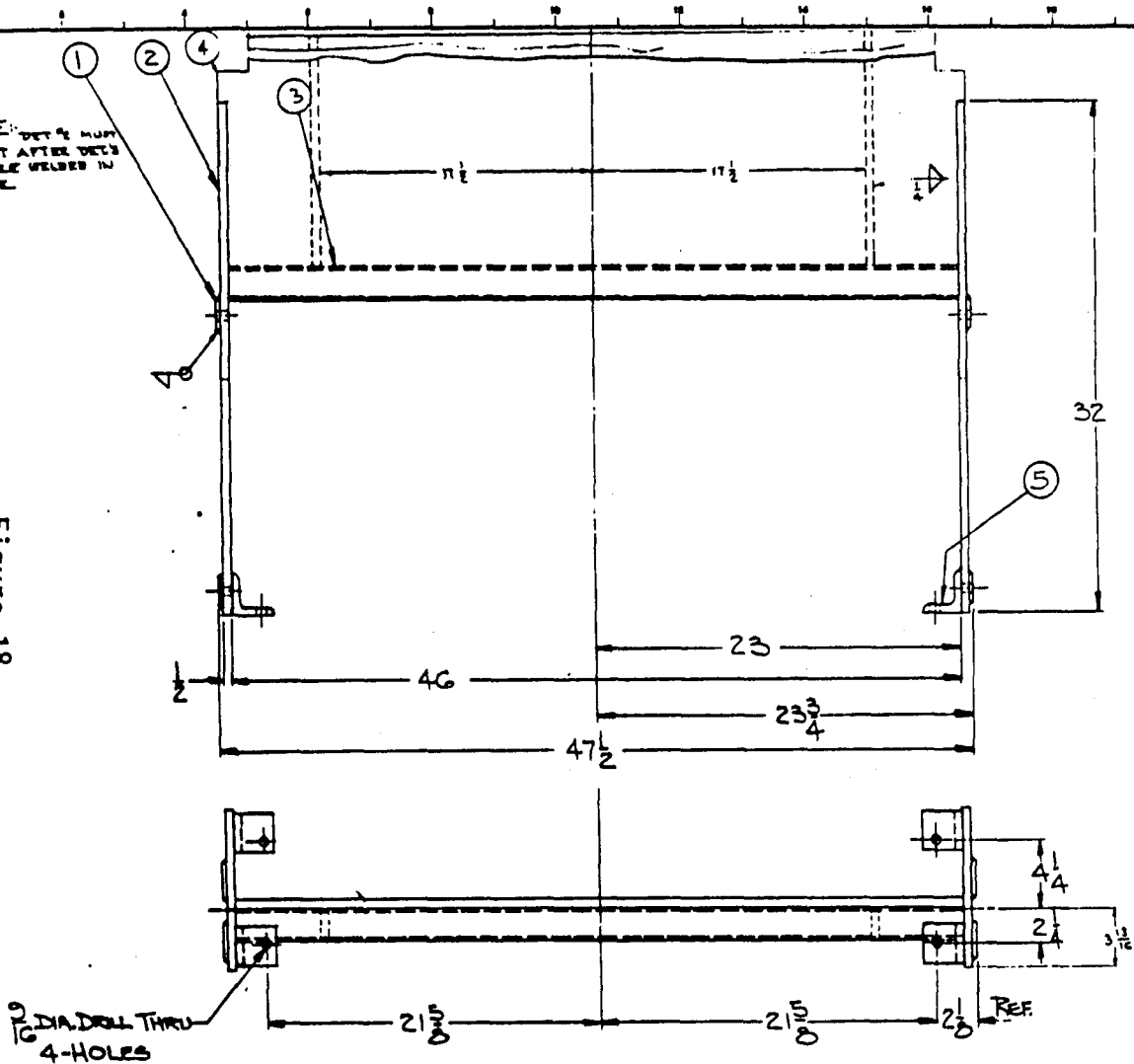


#201172 CONVEYOR FRAME
MINUS DISCHARGE & TAKE-UP FRAME

Figure 17

NOTE: DET 4 MUST BE FLAT AFTER DET 3 IS ARE WELDED IN PLACE

Figure 18

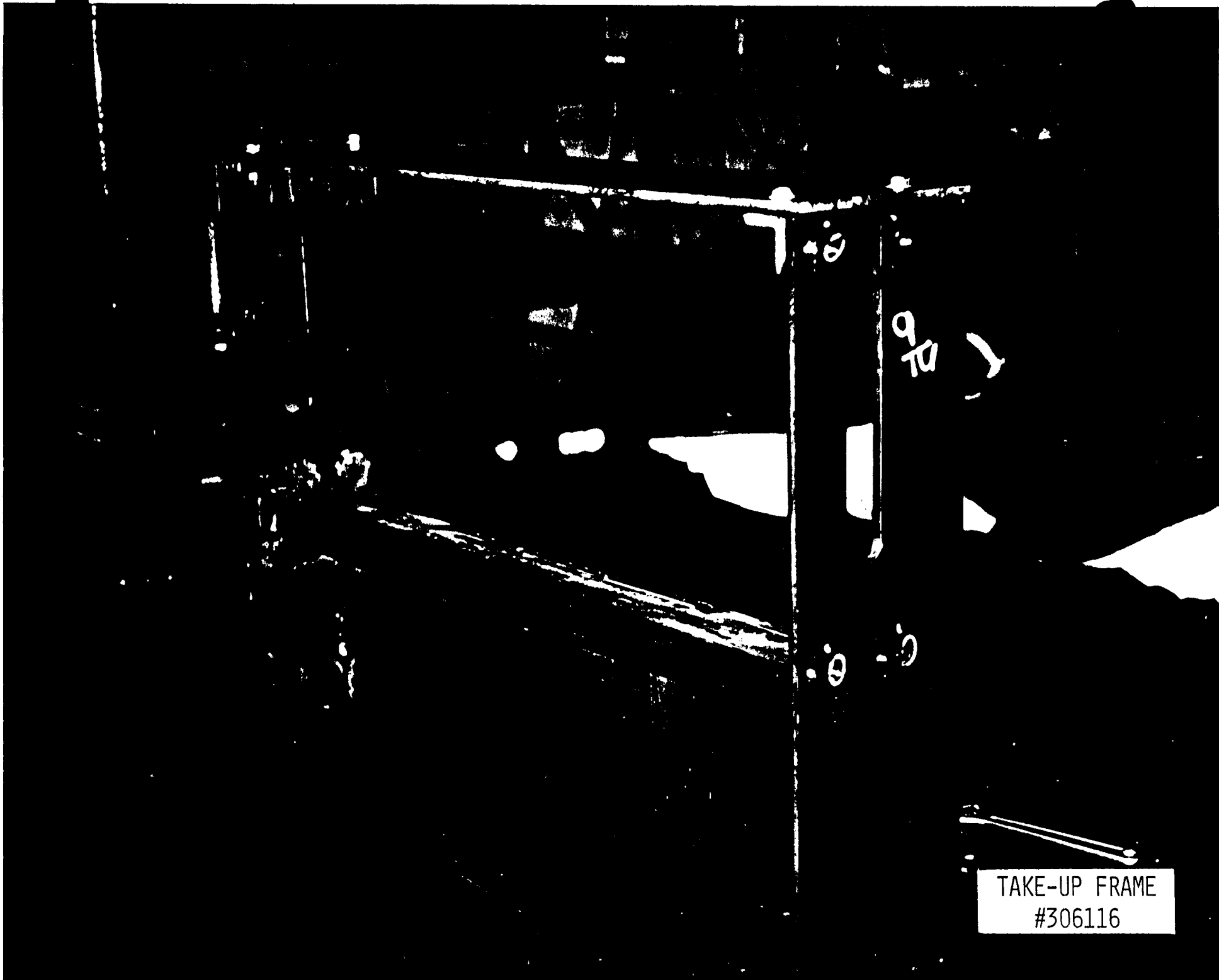


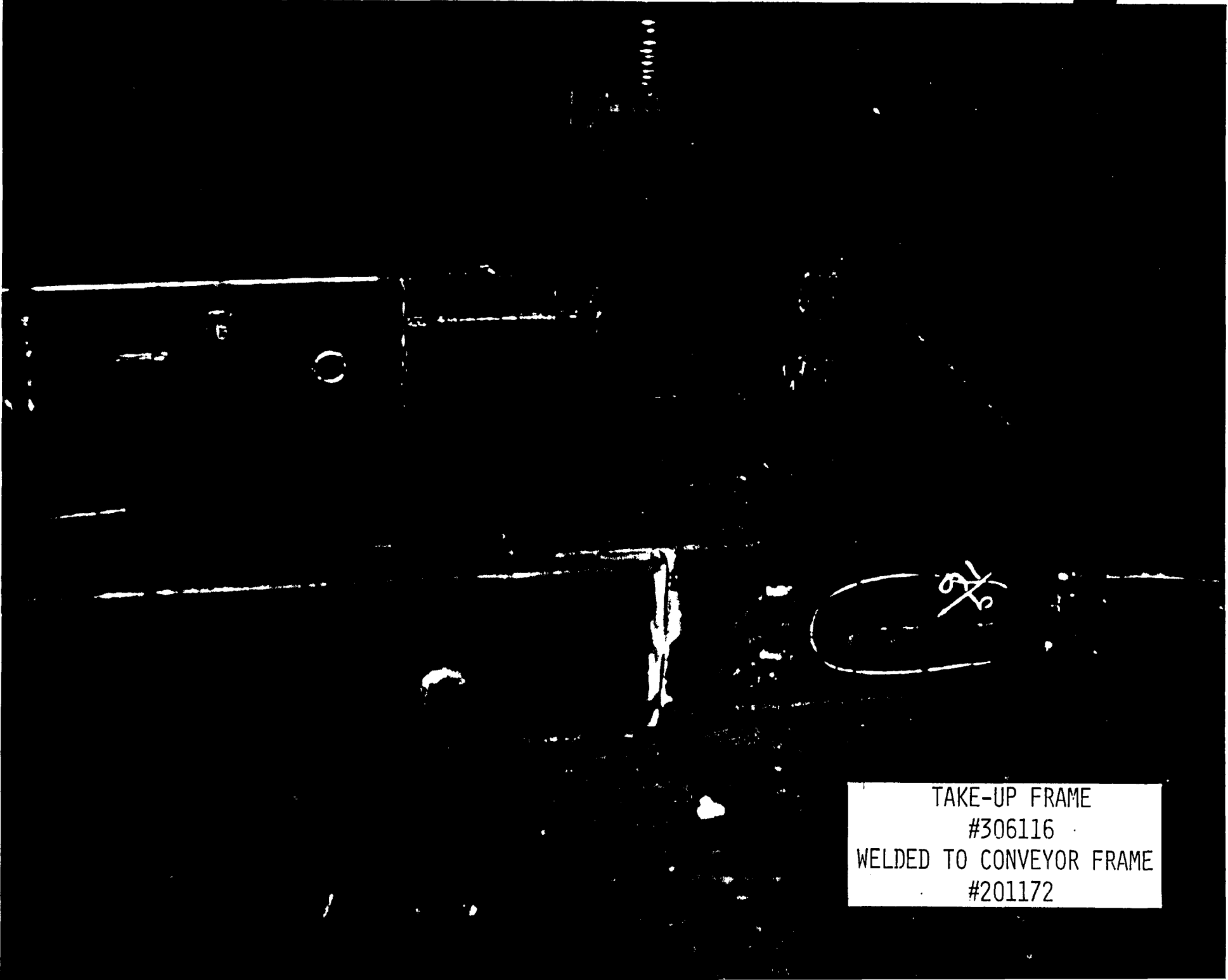
D. O. E.
CONTRACT NO. 78-01-0924
MONORAIL BRIDGE CONVEYOR

QTY	DESCRIPTION	UNIT
2	BRIDGE (10) BEAM 8 x 4 x 1/2 (10)	FT
4	BRIDGE (10) RAIL 2 1/2 x 2 1/2 x 1/2	FT
1	BRIDGE (10) RAIL 2 1/2 x 2 1/2 x 1/2	FT
1	BRIDGE (10) RAIL 2 1/2 x 2 1/2 x 1/2	FT
2	BRIDGE (10) RAIL 2 1/2 x 2 1/2 x 1/2	FT
2	BRIDGE (10) RAIL 2 1/2 x 2 1/2 x 1/2	FT
2	BRIDGE (10) RAIL 2 1/2 x 2 1/2 x 1/2	FT

FILLET WELD ALL CORNERS
FRAME, TAKE UP FOR CONVEYOR FOR MONORAIL BRIDGE CONVEYOR
306116

Figure 19

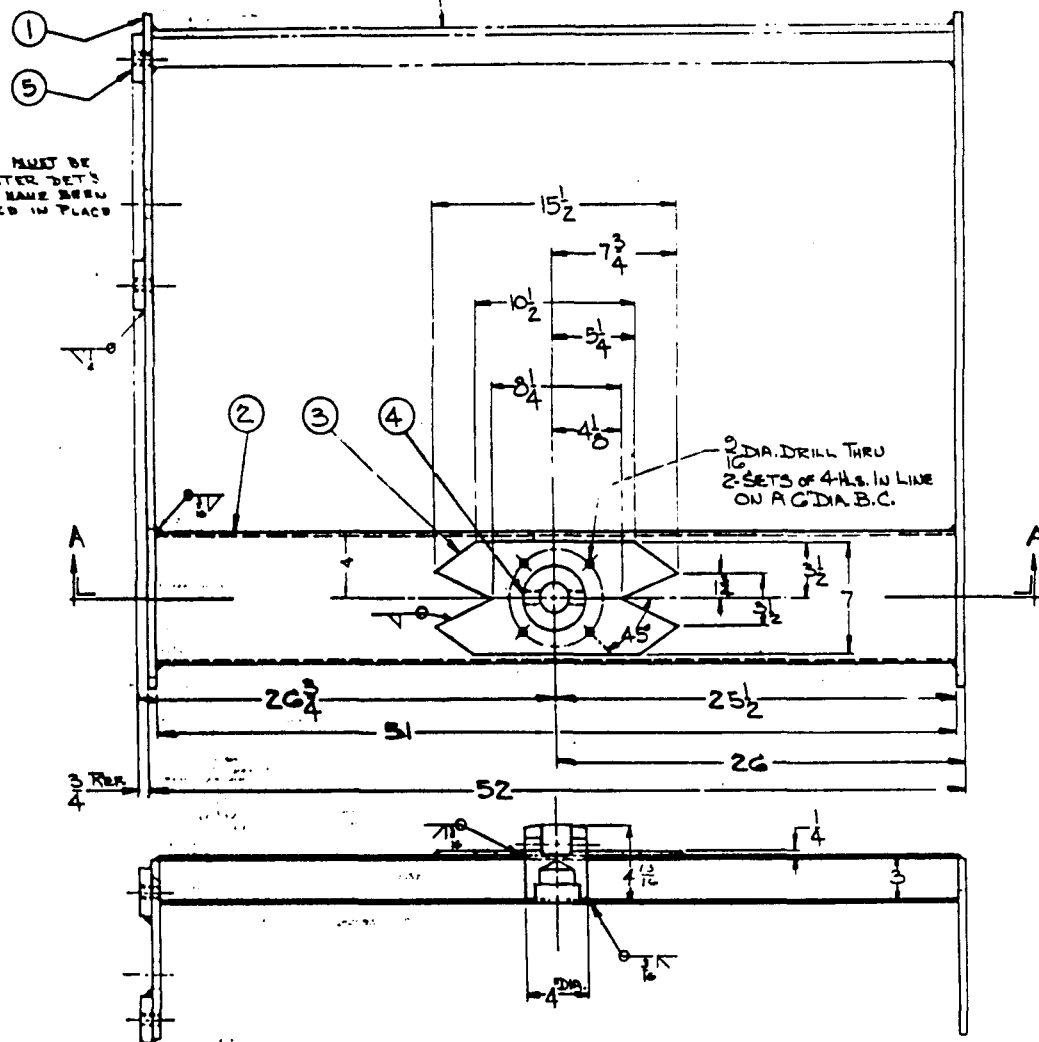




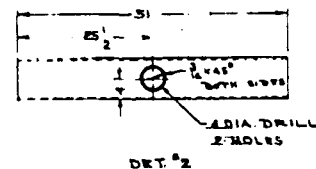
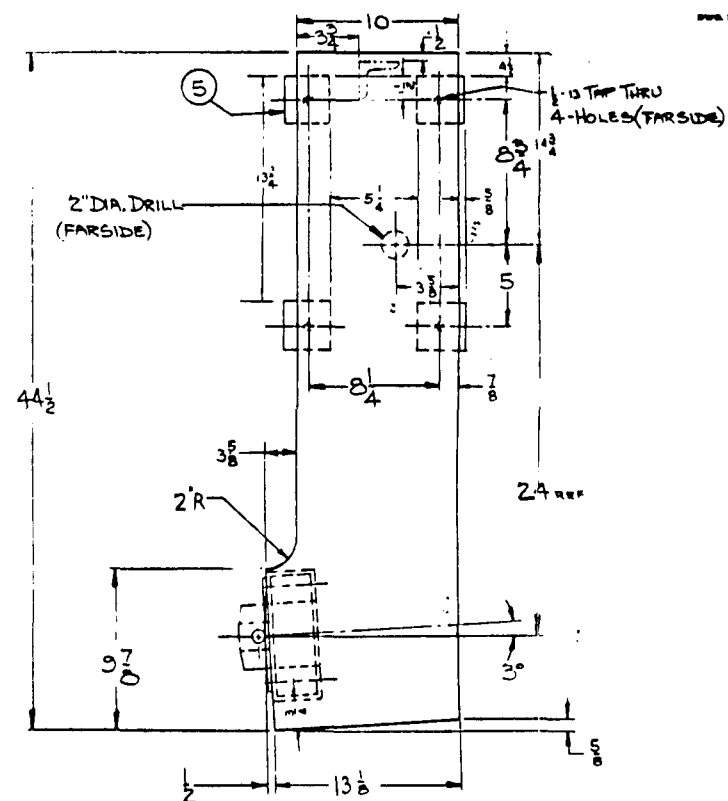
TAKE-UP FRAME
#306116
WELDED TO CONVEYOR FRAME
#201172

Figure 20

NOTE:
DET. 1 MUST BE
FLAT AFTER DETS
2 & 3 NAME BEEN
WELDED IN PLACE



SECTION A-A



DOE
9.01.6024
MAIL BRIDGE CONVEYOR

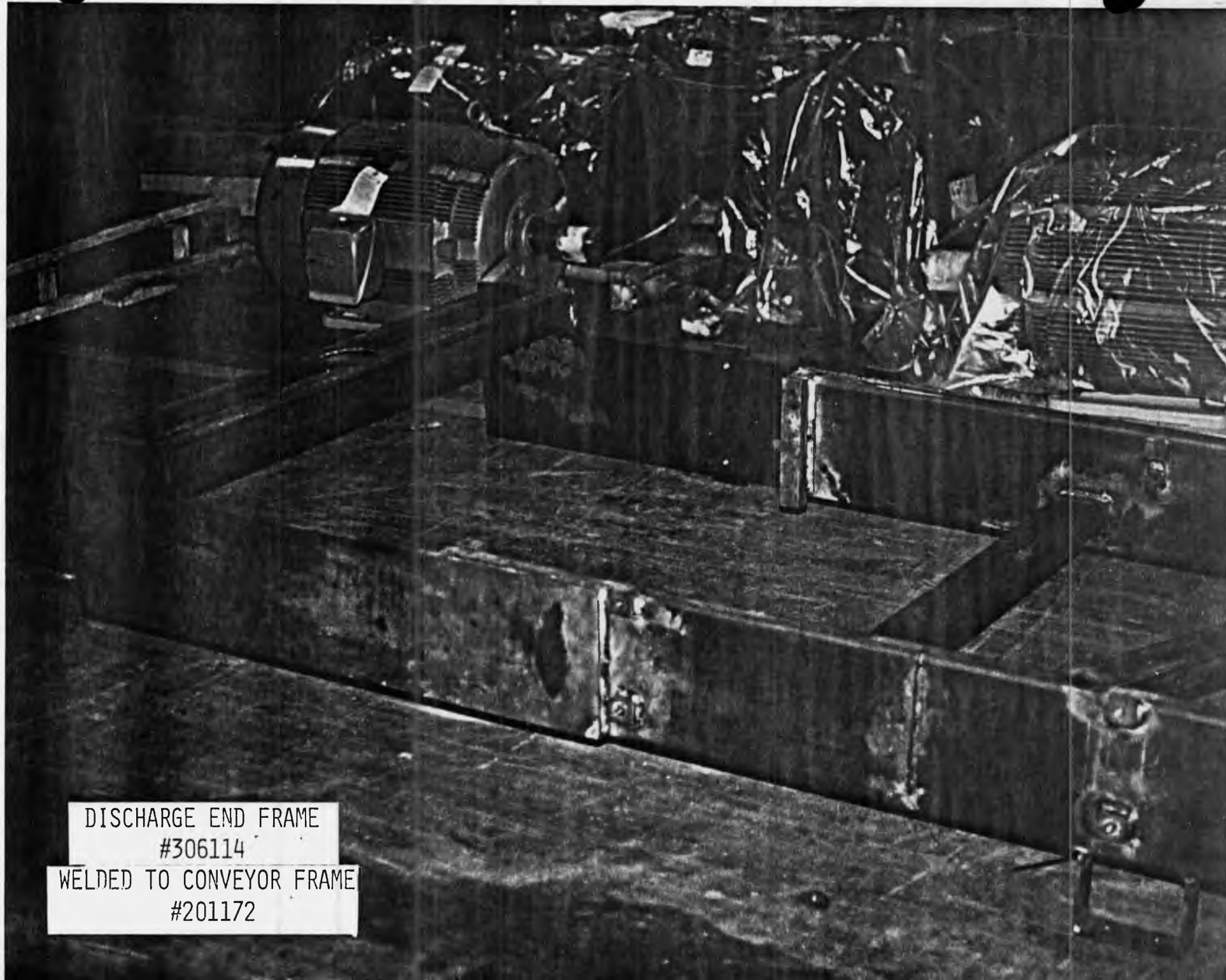
1	81501746	PO BOX 7732	MS	391
4	81505843	PO BOX 455	MS	392
1	1500971	PO BOX 100	MS	393
1	8150400	PO BOX 100	MS	394
1	8152740	PO BOX 100	MS	395
2	8150105	PO BOX 100	MS	396
OFF.	MATERIAL	DISPOSITION		

ALL FILLS WOULD ALL ORDER (EXCEPT A8)

3. FILLET WELD ALL OVER (EXCEPT A & B)

FRAME, DISCHARGE
FOR CONVEYOR FRAM

MONORAIL CONVEYOR



DISCHARGE END FRAME
#306114

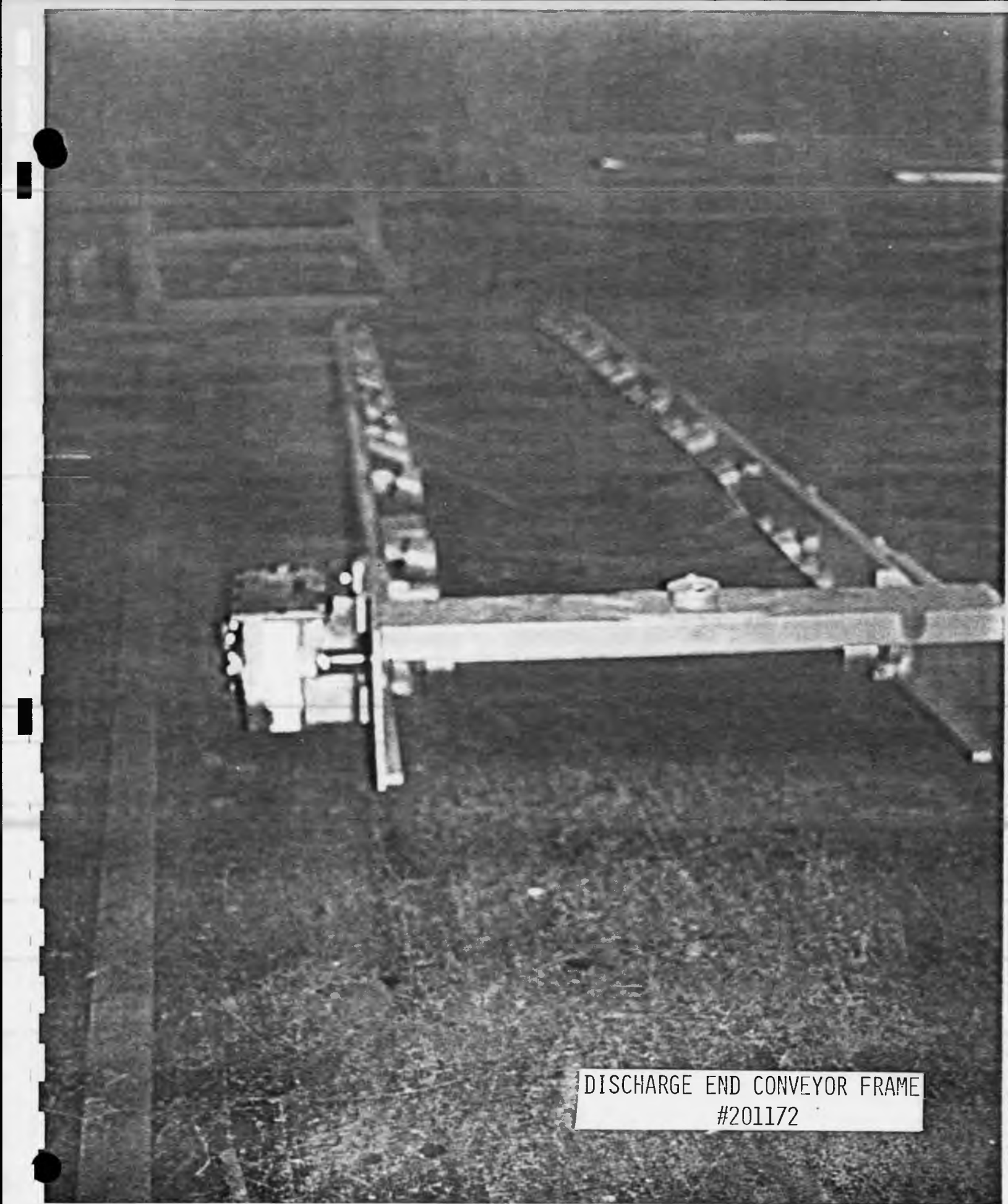
WELDED TO CONVEYOR FRAME
#201172

Figure 22



TAKE-UP END CONVEYOR FRAME
#201172

Figure 23



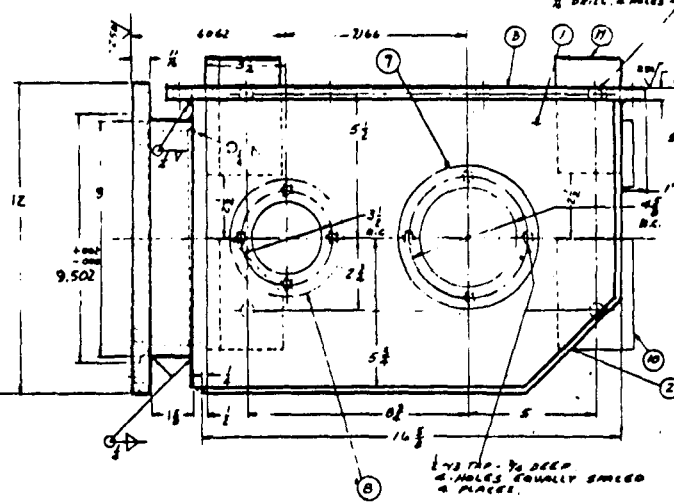
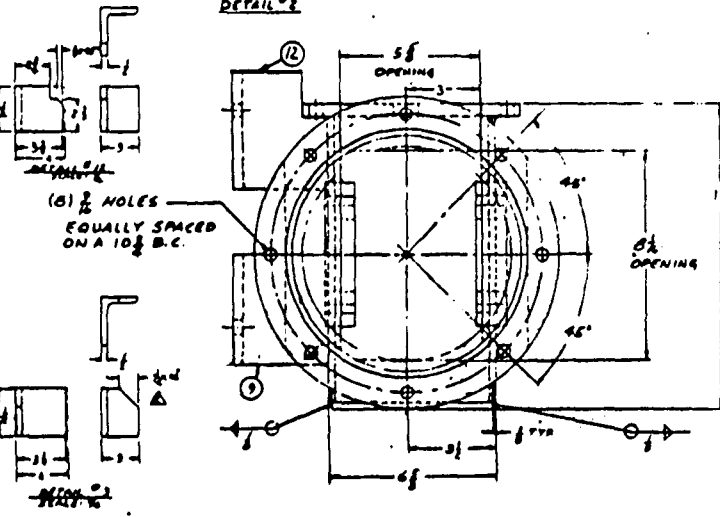
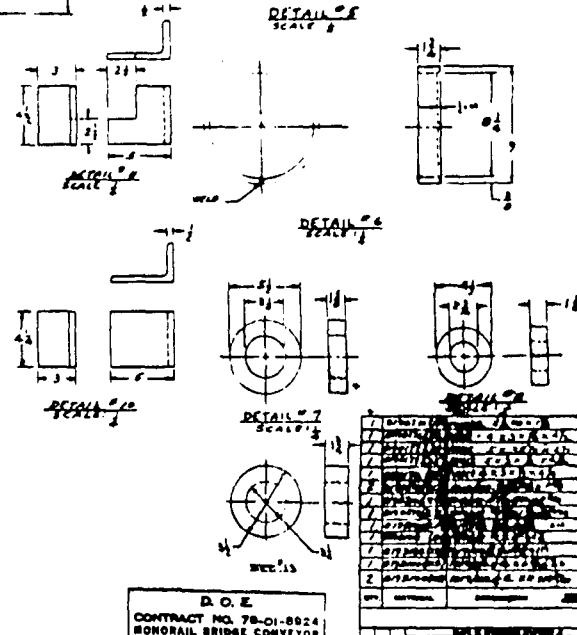
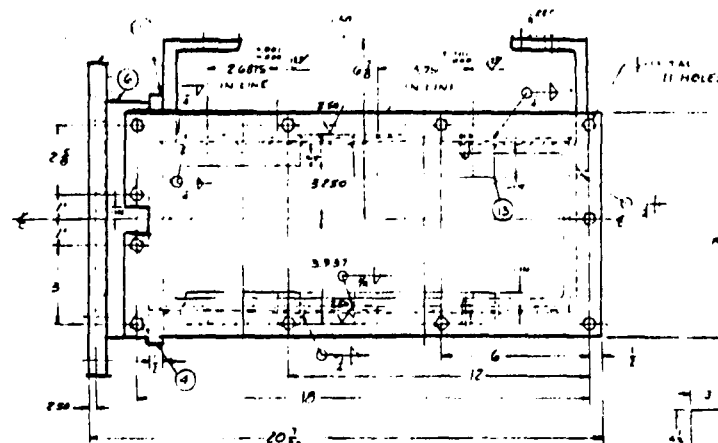
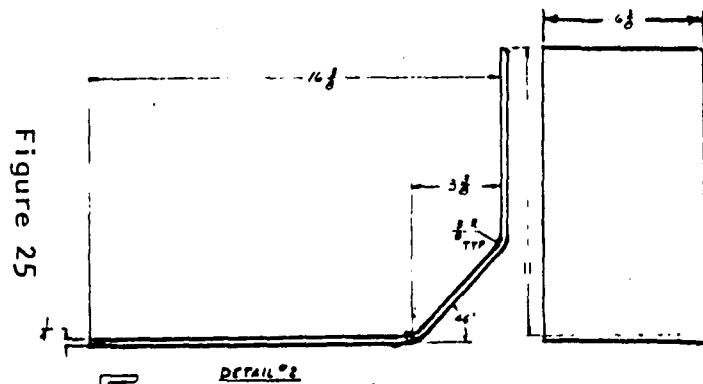
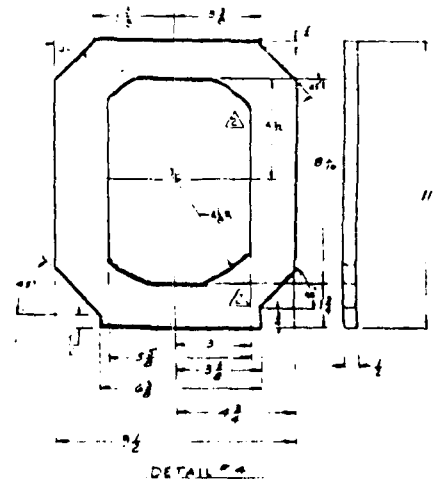
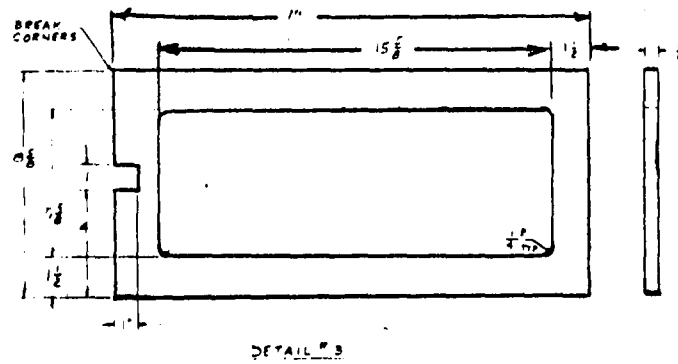
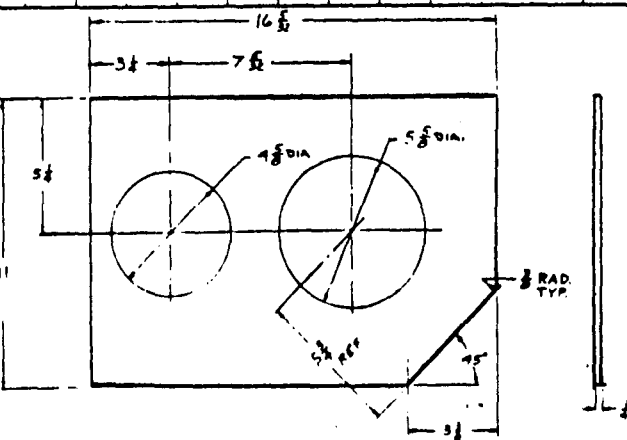
DISCHARGE END CONVEYOR FRAME
#201172

Figure 24

2.2 Conveyor Drive Gear Box

The twelve conveyor drive gear boxes #201174 were fabricated at the Goodman Equipment Corporation plant in Chicago. Design of the box lended itself to be made strictly of plate. The plate size can be used as flat, or could be bent or rolled to a specific form.

When the case is completed per drawing #201174, the case has provisions for a cover, motor mount, bearing retainers and a support structure for mounting to the side plate of conveyor frame.



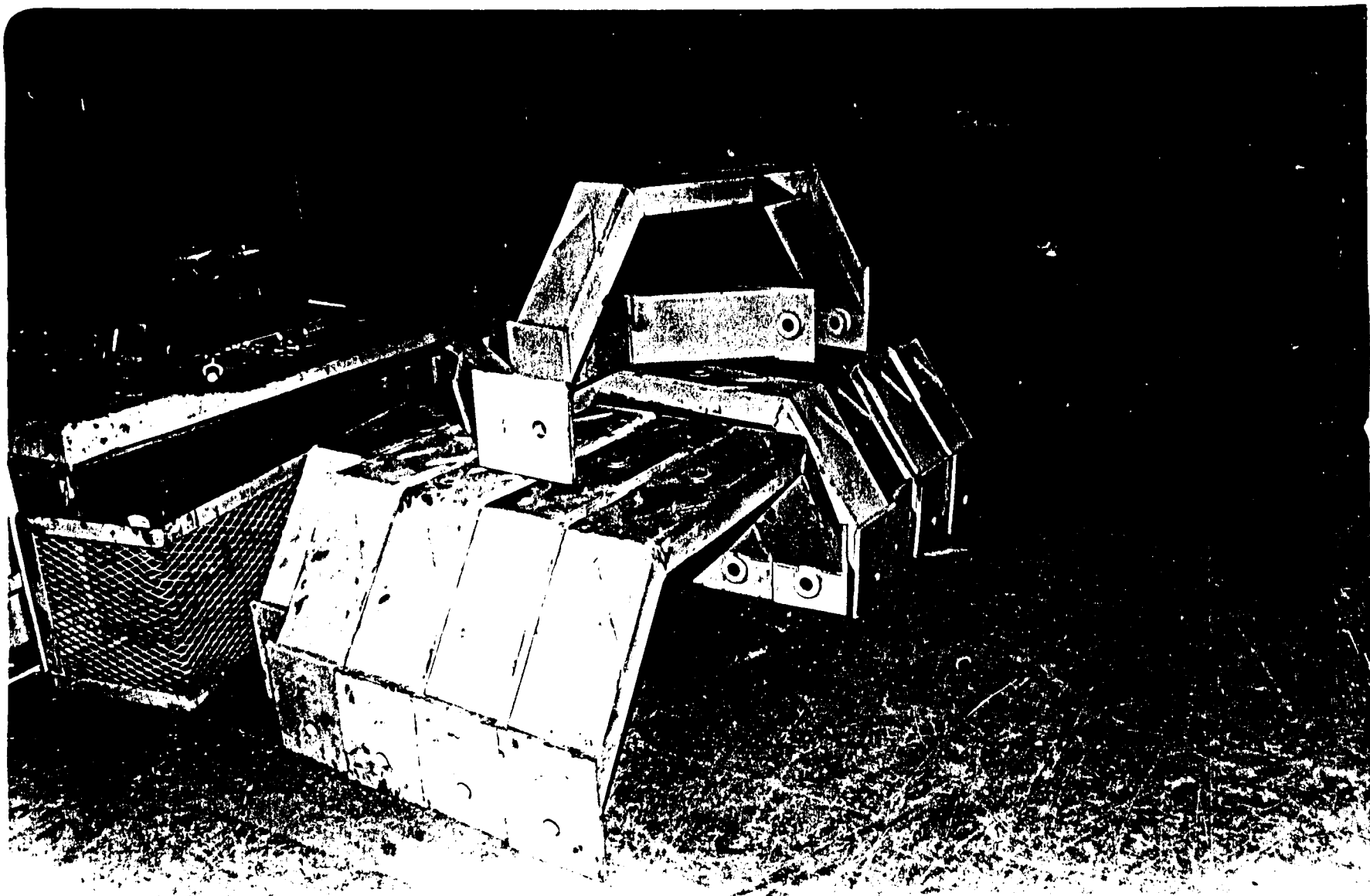
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CONTRACT NO. 78-01-8024
MONORAIL BRIDGE CONVERTER

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100. REVISED

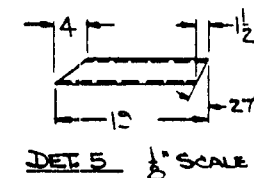
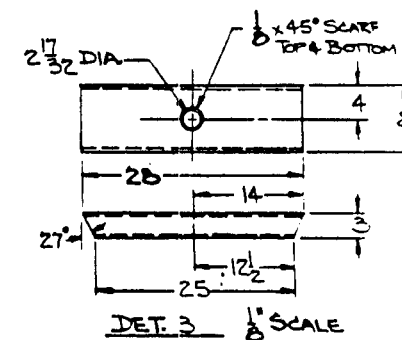
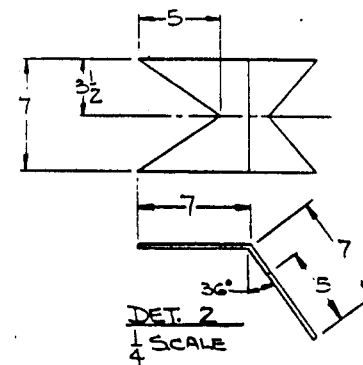
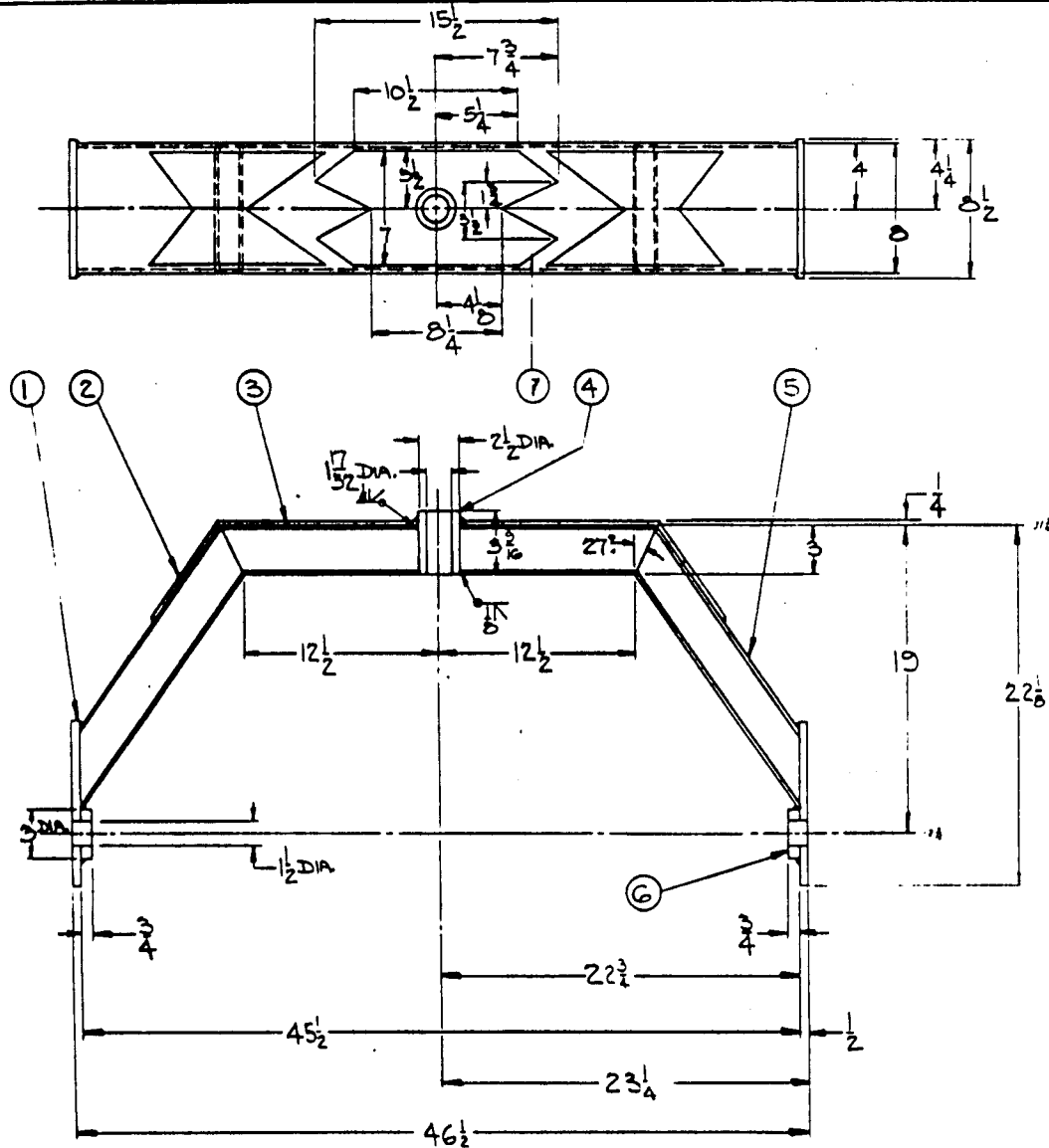
GEAR BOX
FOR CONVERTER
MONORAIL BRIDGE

2.3 Suspension System

The eleven suspension frames (Fig. 26) were fabricated at Goodman Conveyor Corporation in Murfreesboro, Tennessee. The weldment consists of 8"x3"x3/16 wall rectangular tubing. In order to gain additional strength in jointing areas of details, additional 1/4 scalloped plates were added. Upon completion of suspension frame per Drawing 306115, Fig. 27 and 27A, it will contain the provisions for mounting to the rail carrier as well as the pivot joint for conveyor frame support. The 306115 suspension frame is supported by Cleveland Crane carrier 2900856-000, Fig. 28. The final design of the suspension system is illustrated on Fig. 29 and Fig. 30, which cover the entire cross-section of all the details involved. The design allows the conveyor units to adequately move and flex through all the required motions and angles, whether in the horizontal or vertical plane.



SUSPENSION FRAMES
#306115

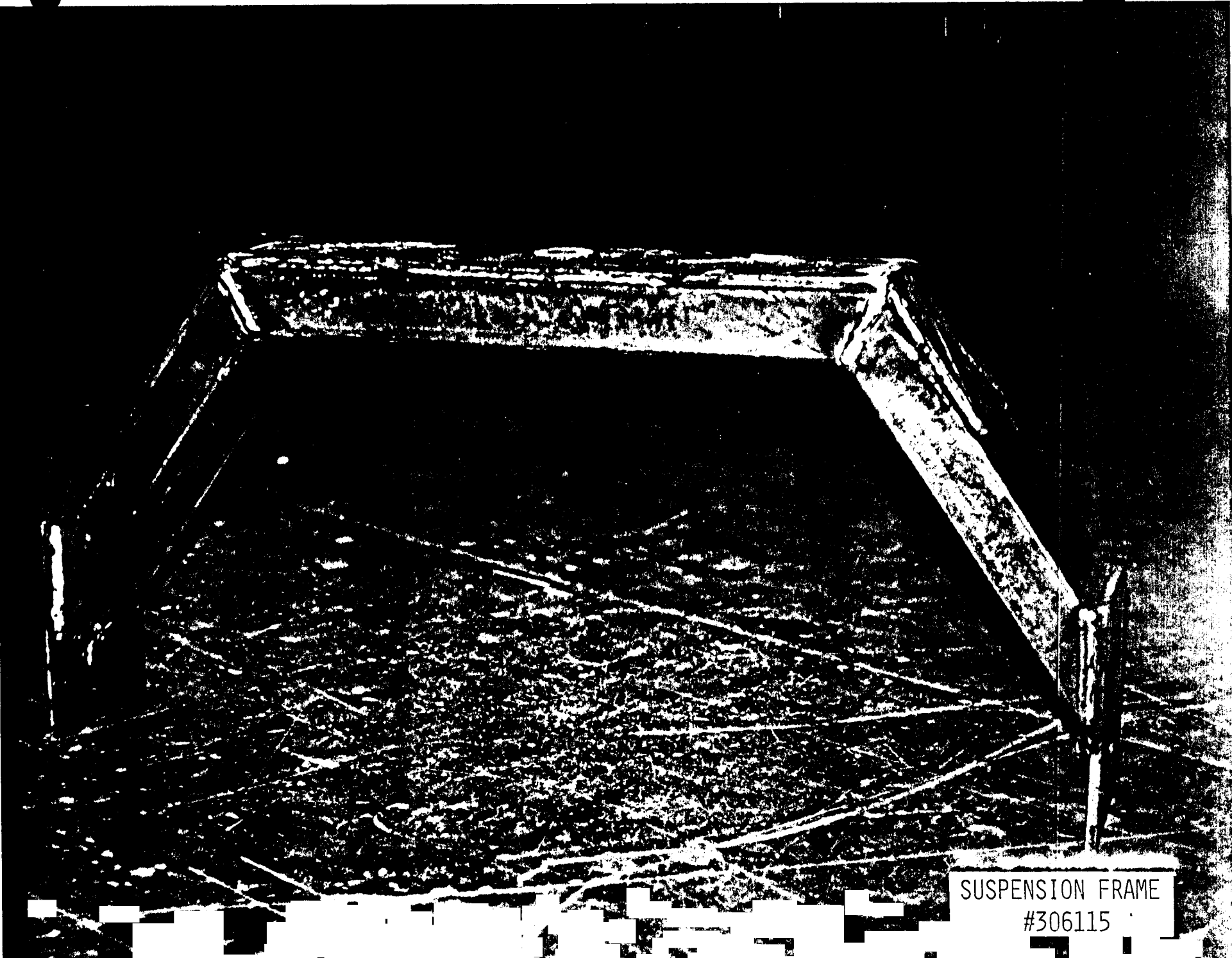


1	5931006 (2)	1017 NR 14 x 7 x 15 1/2	7
2	5931007 (1)	3n. Tue. 50 x 2 1/2 x 15	6
2	5931008 (2)	3 x 3 x 1/2 x 15	5
1	5931009 (2)	3n. Tue. 2 1/2 x 2 1/2 x 16 = 32	4
1	5931010 (1)	3 x 3 x 1/2 x 20	3
2	5931011 (2)	1017 NR 14 x 7 x 14	2
2	5931012 (1)	1017 NR 4 x 2 x 15 1/2	1
QTY.	MATERIAL	DESCRIPTION	Notes

D. O. E.
CONTRACT NO. 78-01-8924
MONORAIL BRIDGE CONVEYOR

3 FILLET WELD ALL OVER (EXCEPT AS NOTED)

FRAME, SUSPENSION
FOR CONVEYORS
MONORAIL BRIDGE CONVEYOR



SUSPENSION FRAME
#306115

Figure 27A

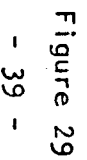
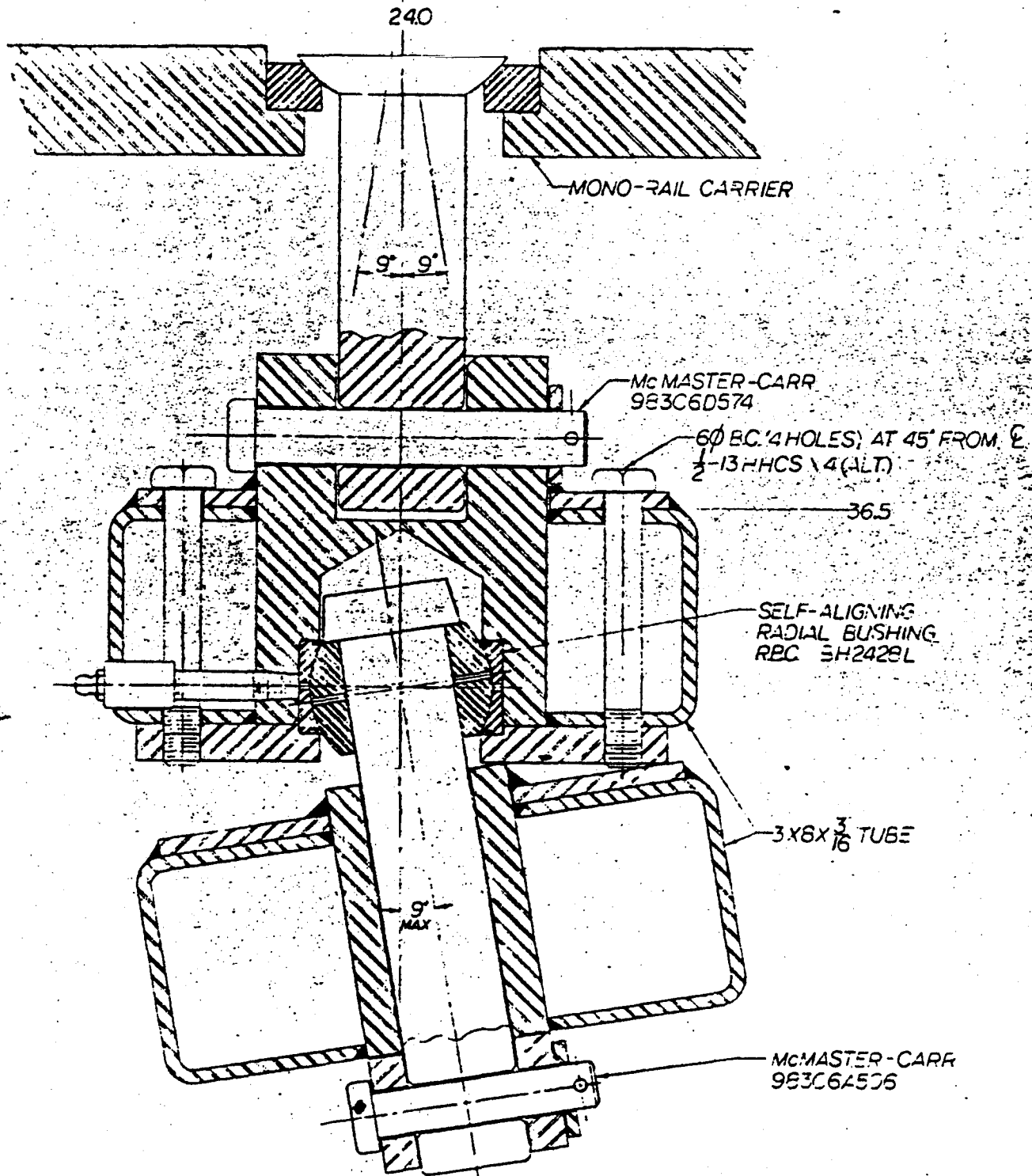


Figure 29

GOODMAN EQUIPMENT CORP
MONO-RAIL
BRIDGE CONVEYOR



SECTION B-B

NES 7/03/79A
SCALE: FULL
LAYOUT

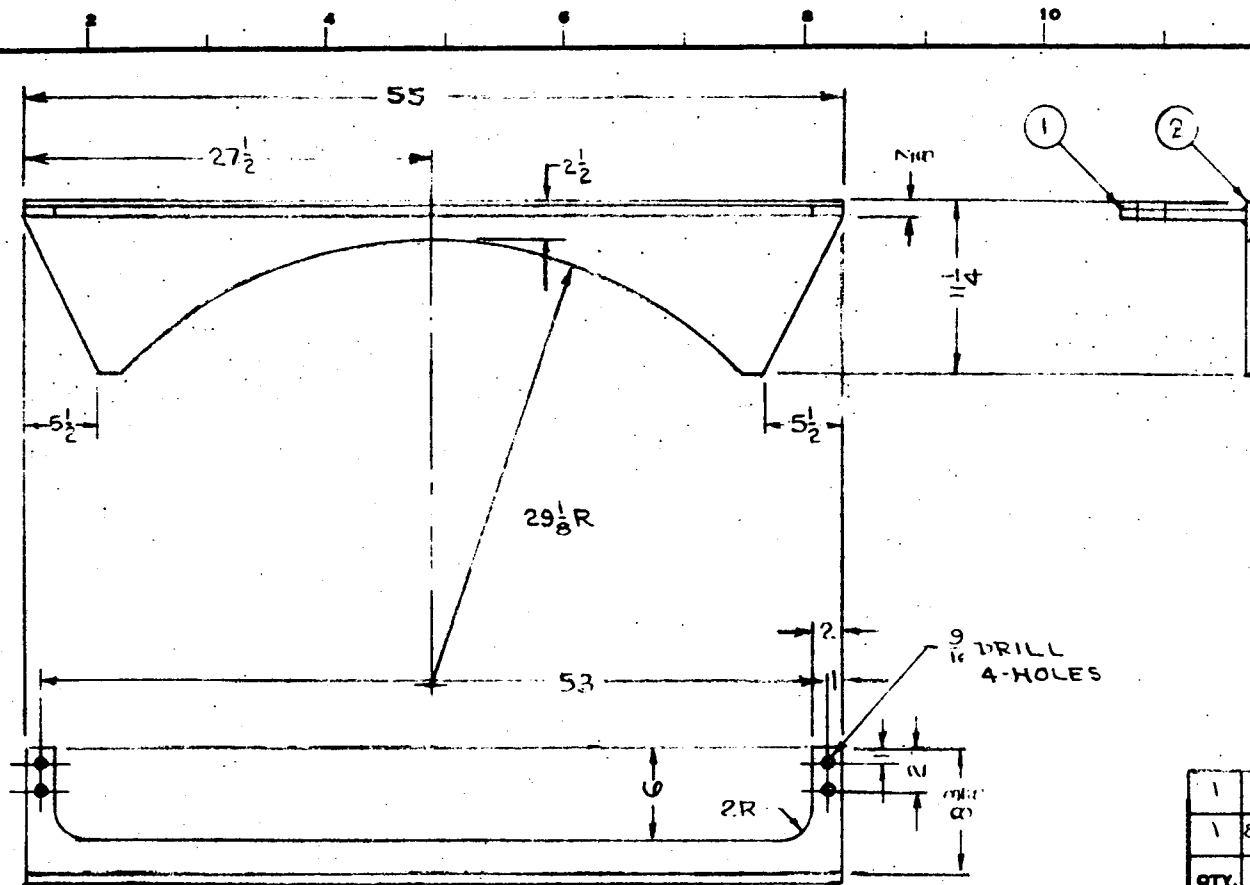
Figure 30

2.4 Steering Mechanism

The fork type steering system lent itself best to fit into the system from the standpoint of powering the wheels as well as steering. The two major details of the mechanism are the Wheel Support 306402-000, Fig. 31, and the motor/reducer Bracket 1510248-000, Fig. 32. When the Wheel Support is completed it will contain the mounting holes for motor/reducer, the swivel pin, and the mounting for the pillow block which supports the ball screw and nut.

24

Figure 32
- 43 -



DWG. NO. 1510248-000

D. O. E.
CONTRACT NO. 78-01-8924
MONORAIL BRIDGE CONVEYOR

QTY.	MATERIAL	DESCRIPTION	DET. NO.
1	8193102(45)	1017/HK 3/8 x 11 1/4 x 55	2
1	8193103(19)	1017/HK 1/2 x 8 3/4 x 55	1

DO NOT SCALE

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GOODMAN EQUIPMENT CORP.
4200 SOUTH HALSTED STREET
CHICAGO, ILLINOIS 60609

SPEC'D. BY 437866
IN NO. 201172
ASSEM. TO NO. 201172
REF. DWG. NO.

DRAWN TO ENGINEERING STANDARDS OF

GOODMAN

GOODMAN EQUIPMENT CORPORATION, 4200 S HALSTED ST., CHICAGO, ILL. 60609

SUPPORT

FOR MOTOR/REDUCER BRKT
MONORAIL BRIDGE CONV

9/24/80 CHKD. APPROVED

MARK NO. 1510248-000

CHANGE
166100.0.3
4/8/78

2.5 Electrical Enclosures

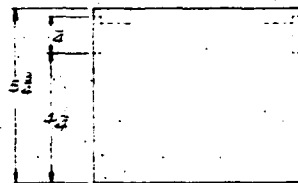
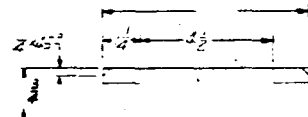
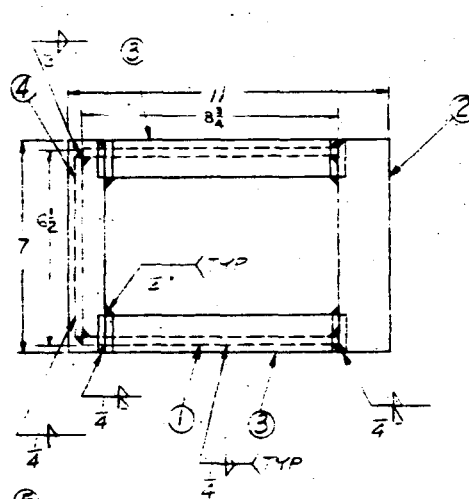
The Monorail Bridge Conveyor system necessitates four electrical enclosures which must be fabricated with the utmost care. Therefore, the fact that Goodman Equipment Corporation has had the experience of manufacturing this type of equipment resulted in the decision that it be built here.

The following enclosures are required and built in Chicago.

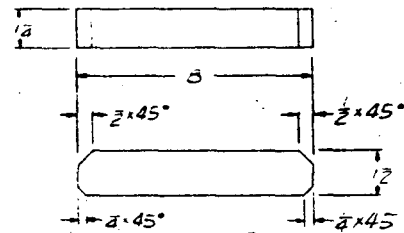
- | | |
|---|---------|
| 1 - 306142 Pushbutton Case (Weldment) | Fig. 33 |
| 1 - 306175 Headlight Switch Case (Weldment) | Fig. 34 |
| 12 - 201216 Motor Control Case (Weldment) | Fig. 35 |
| 1 - 201219 Master Control Case (Weldment) | Fig. 36 |

When fabrication was completed on each case, it was sent to welding inspection to be magnafluxed, to check for cracks and continuous weld penetration. The fact that the conveyors will be operating at the face with a ripper or borer necessitates completely explosion proof enclosures.

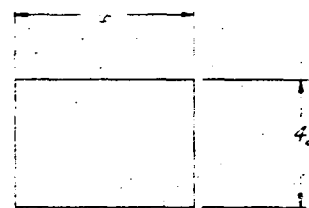
306142



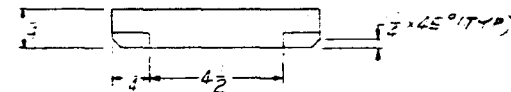
DETAIL #2



DETAIL #3



DETAIL #4



DETAIL #5

NOTE:

- 1) DIMENSIONAL TOLERANCES
± 1/16 FOR FRACTIONS
± .005 FOR DECIMAL DIM'S
UNLESS OTHERWISE SPECIFIED
- 2) ALL WELDS MADE IN ACCORDANCE WITH
AWS STANDARDS
MUST BE CONTINUOUS & GAS TIGHT.

NOT TO BE CHANGED
WITHOUT APPROVAL
OF THE
DESIGNER

CO. 01-8924
MG. 5 CONVEYOR

QTY.	REMARKS	DESCRIPTION	REV.
1	WELD		1
1	WELD		2
1	WELD		3
1	WELD		4
1	WELD		5
1	WELD		6
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1	WELD		100

CASE WELDMENT
FOR PUSHBUTTONS
MONORAIL

2 39" COMP. 306142

Figure 34
- 46 -

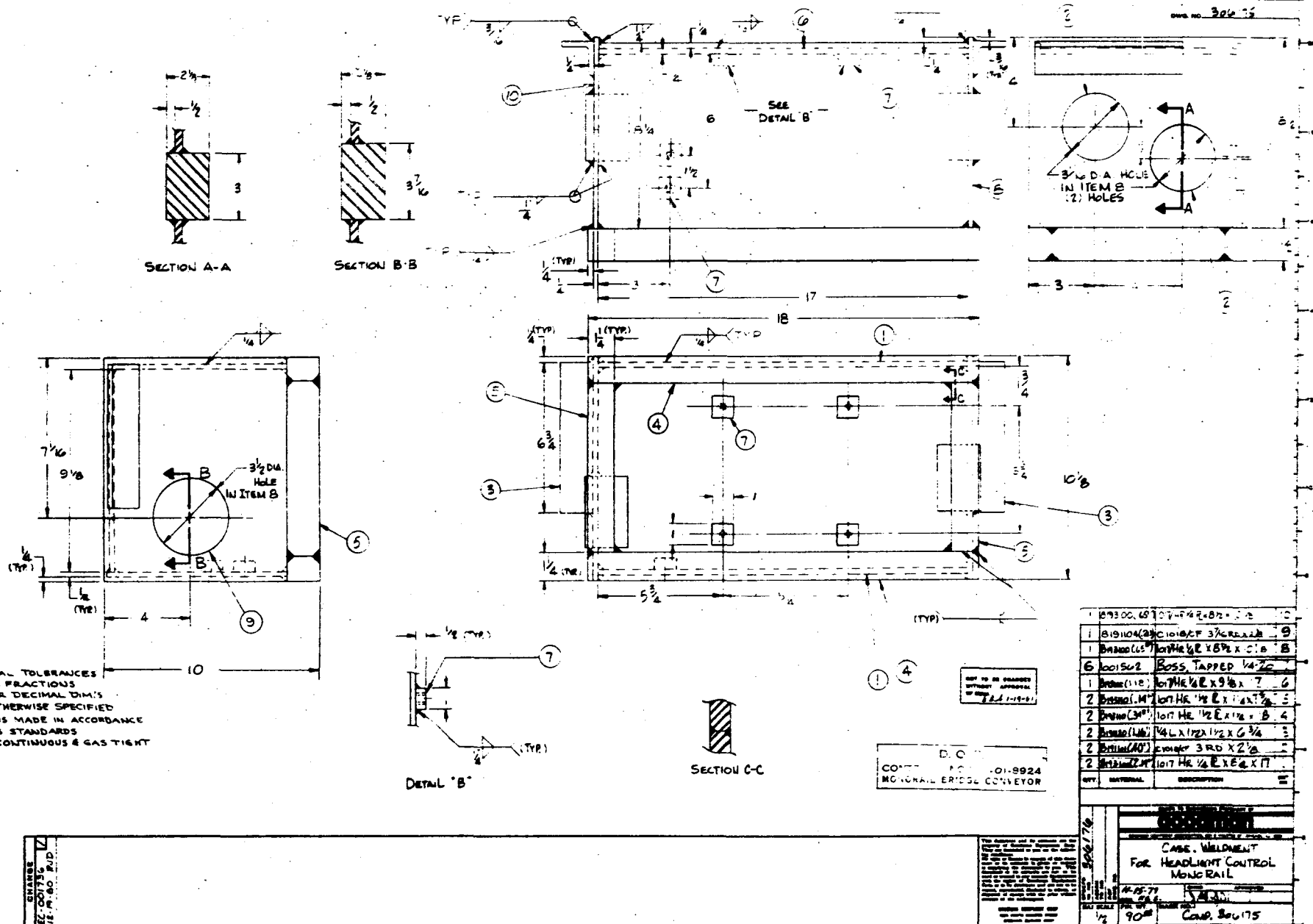
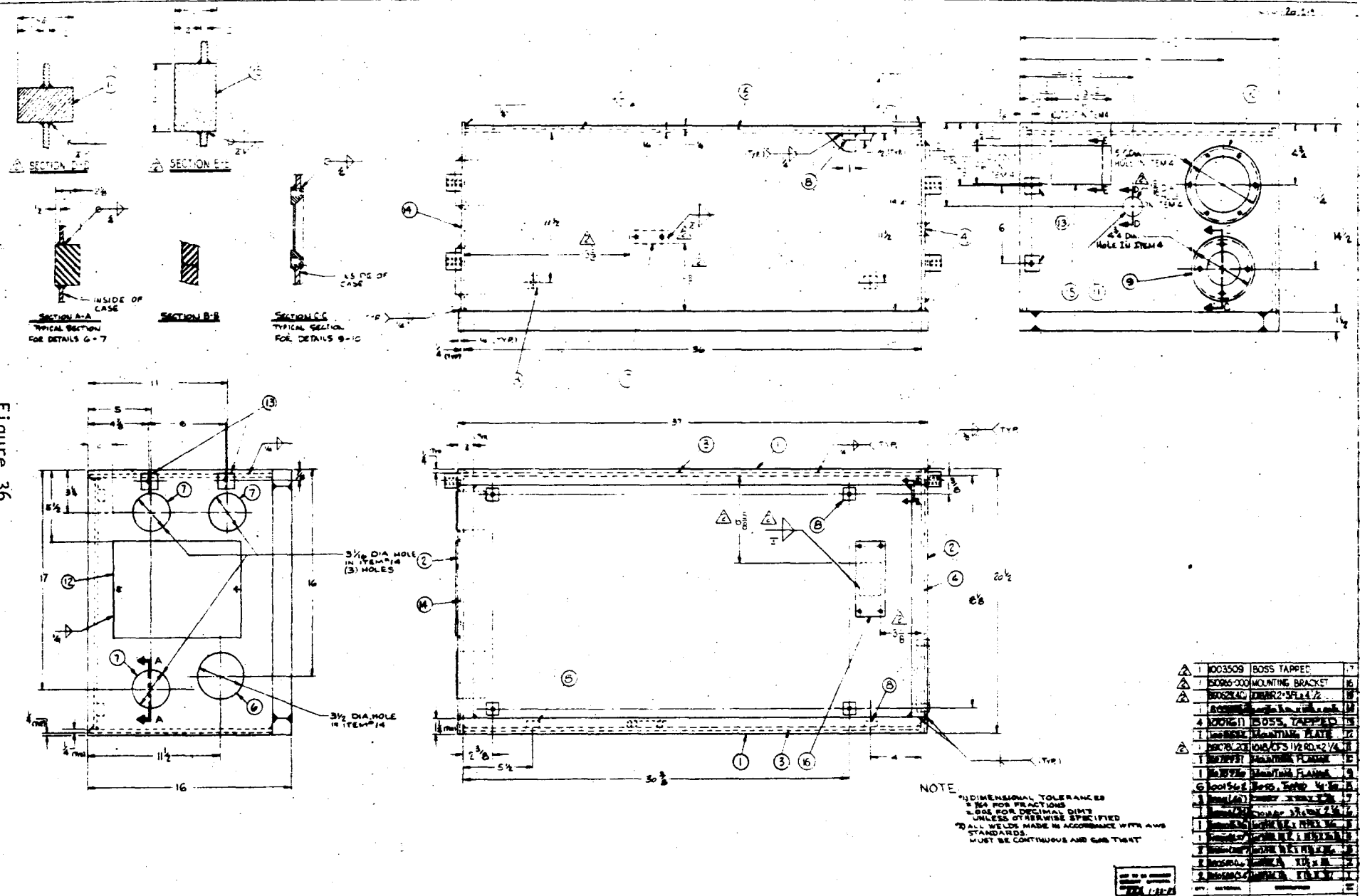


Figure 36



2.6 Conveyor Carrier and Supporting M.B.C. Structure

Cleveland Crane and Engineering, a subcontractor to Goodman Equipment Corporation, has completed the fabrication and assembly of all the contracted equipment.

The following Figures will identify the fabrication completed or being completed in the Cleveland Crane factory.

Figure 37	Carrier Frame
Figure 38	Load Bar Carrier
Figure 39	Curved Track
Figure 40	Straight Track
Figure 41	Roof Plate
Figure 42	Switch Frame



CLEVELAND CRANE
CARRIER FRAME

Figure 37



CLEVELAND CRANE
LOAD BAR CARRIER



CLEVELAND CRANE
CURVED TRACK

Figure 39



CLEVELAND CRANE
STRAIGHT RAIL

Figure 40

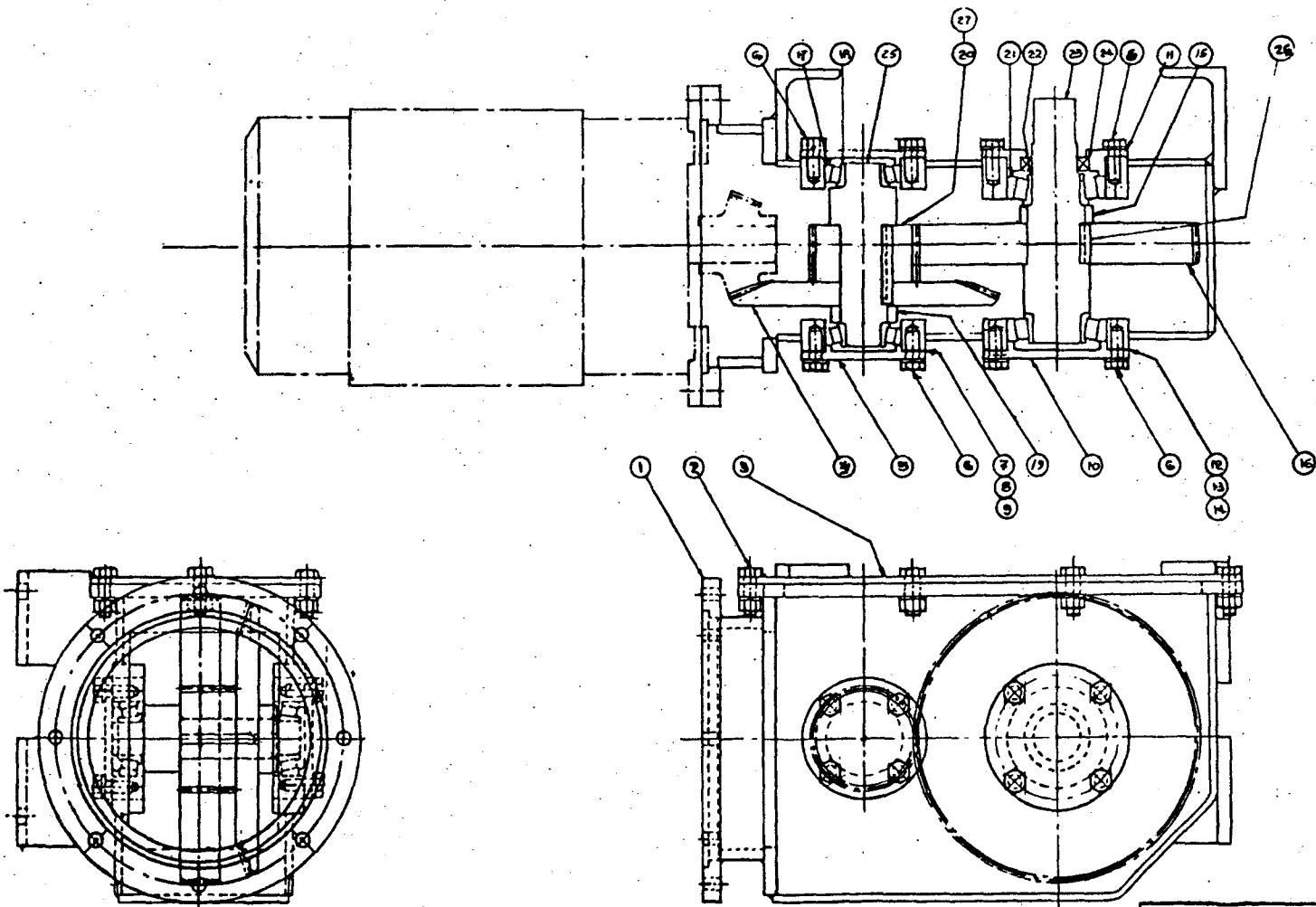


CLEVELAND CRANE
ROOF PLATES



CLEVELAND CRANE
SWITCH FRAME

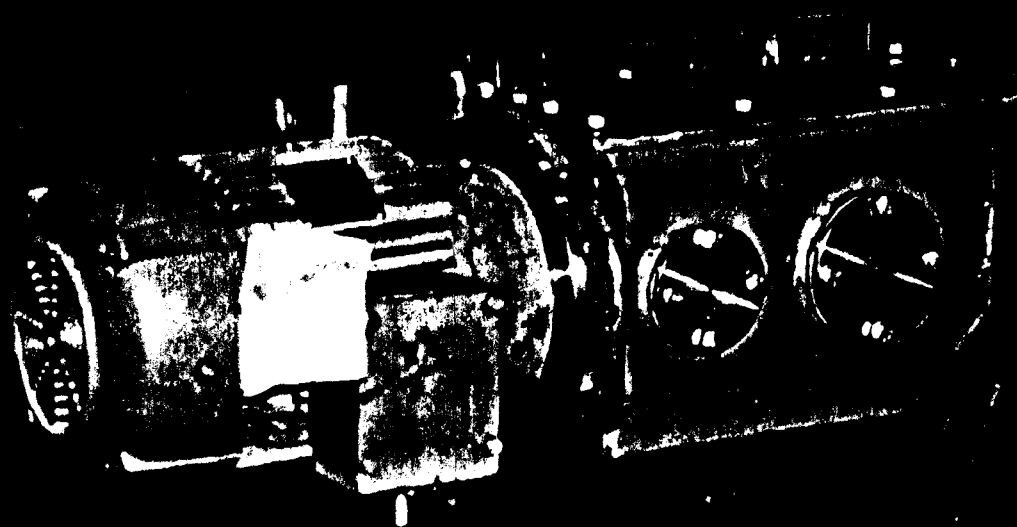
Figure 43



D.O.E.
CONTRACT NO. 78-01-0824
MONORAIL BRIDGE CONVEYOR

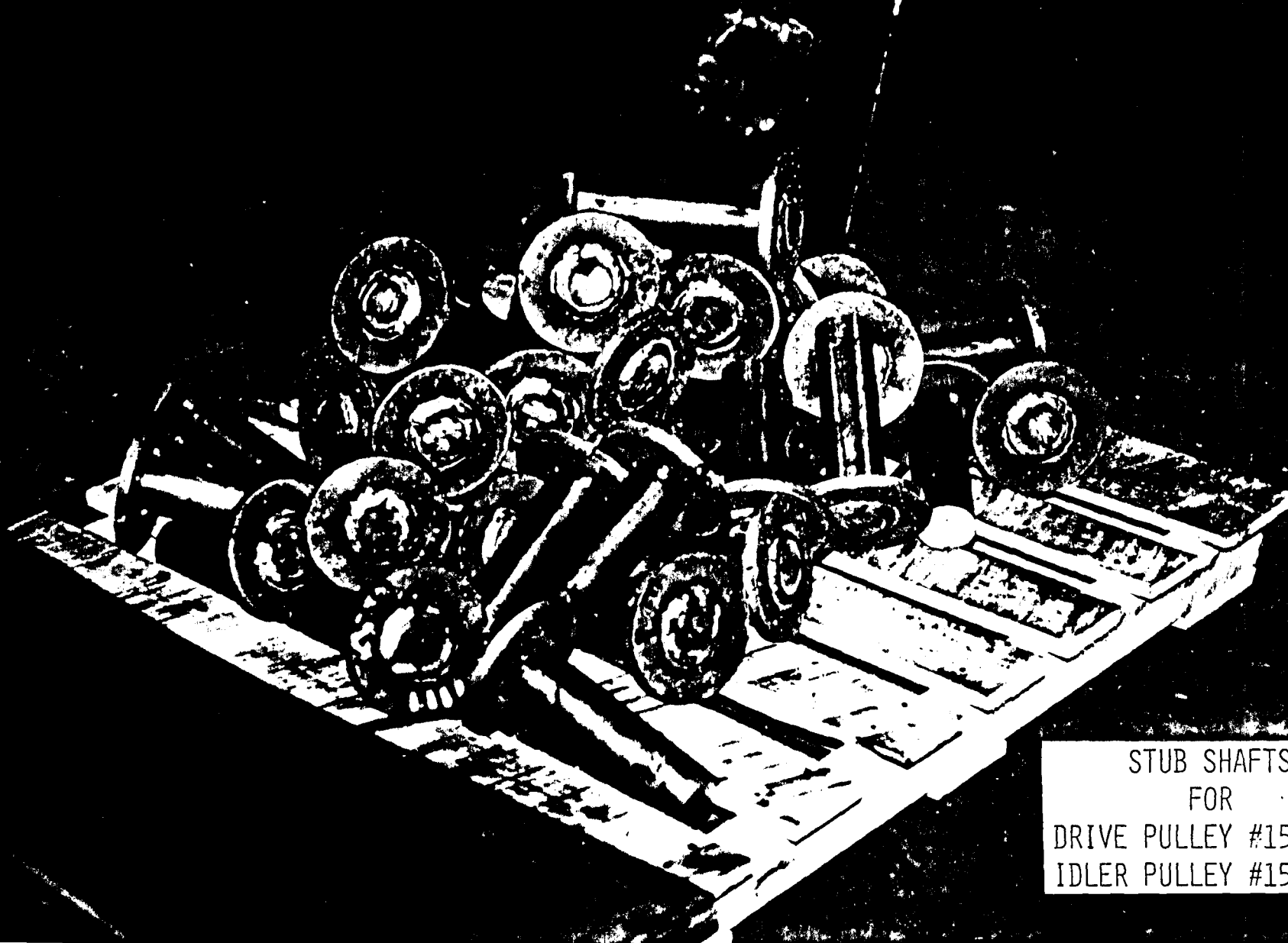
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1		2060255 KEY	28	
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1		2007007 SHAFT	30	
1		1209580 SHAFT	31	
2		2100002 GEAR (100)	32	
2		2109580 GEAR (100)	33	
1		2009580 SHAFT	34	
1		2009580 SHAFT	35	
1		2009580 SHAFT	36	
2		2009580 SHAFT	37	
1		2009580 SHAFT	38	
1		2009580 SHAFT	39	
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1		2009580 SHAFT	100	

GEAR BOX ASSY	
FOR CONVEYOR DRIVE	
MONORAIL BRIDGE CONVEYOR	
1/2 10/11	
1/2 190 306117	



CONVEYOR DRIVE
#306117
MOUNTED TO CONVEYOR FRAME
#201172

Figure 43A



STUB SHAFTS
FOR
DRIVE PULLEY #1509575
IDLER PULLEY #1509574



PULLEY SHELLS
DRIVE PULLEY #1509575
IDLER PULLEY #1509574

3.2 Electrical Components

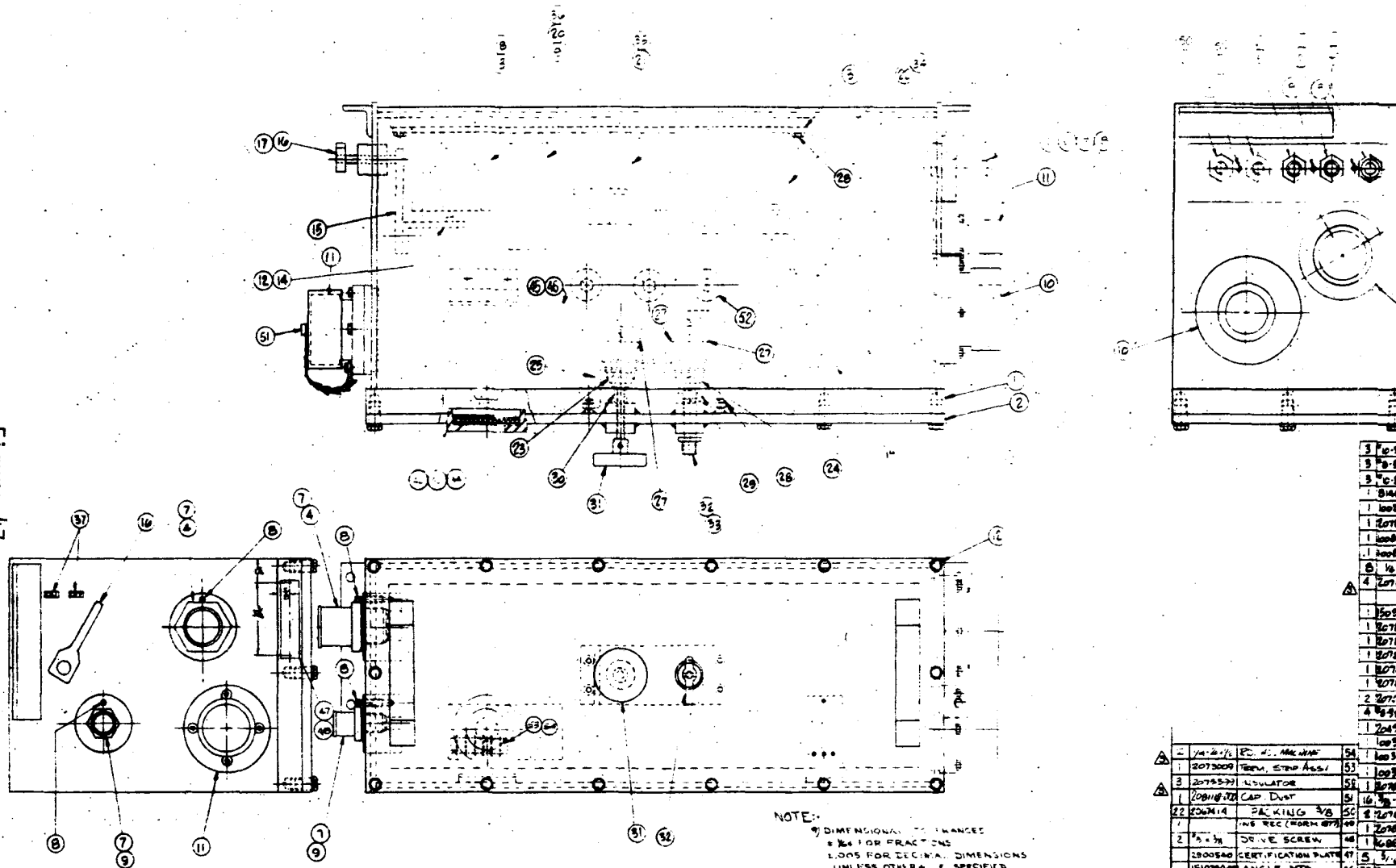
The electrical system is modular in design and consists of the following:

12 - 201218 Motor Control Cases	Fig. 47
1 - 201221 Master Control Case	Fig. 48 - 48A
1 - 306143 Pushbutton Control Case	Fig. 49
1 - 306177 Headlight Control Switch	Fig. 50

The twelve motor control cases are identical and control power input. They also direct and control power to the following:

1. Tram drive motors and brakes for inby conveyor and carrier drives.
2. Conveyor drives/manual and sequential.
3. Headlight switch to inby lights.
4. Pendant switch is for starting and stopping conveyor tram drives.

Figure 47
- 61 -



NOTE:

- 1) DIMENSIONAL TOLERANCES
+ .004 FOR FRACTIONS
+ .005 FOR DECIMAL DIMENSIONS
UNLESS OTHERWISE SPECIFIED
- 2) INTERNAL USE VOLTAGE = 115V AC
- 3) CABLE RANGE - 1000' - 750' FT
FOR GLAND # 800842 (SEE #4)
- 4) CABLE RANGE - 750' - 500' FT
FOR GLAND # 800842 (SEE #4)
- 5) CABLE RANGE - 500' - 250' FT
FOR GLAND # 800842 (SEE #4)
- 6) CABLE RANGE - 250' - 100' FT
FOR GLAND # 800842 (SEE #4)
- 7) CABLE RANGE - 100' - 0' FT
FOR GLAND # 800842 (SEE #4)

3	100842	FILE MS. L.W.	10
4	100842	FILE MS. L.W.	10
5	100842	FILE MS. L.W.	10
6	100842	FILE MS. L.W.	10
7	100842	FILE MS. L.W.	10
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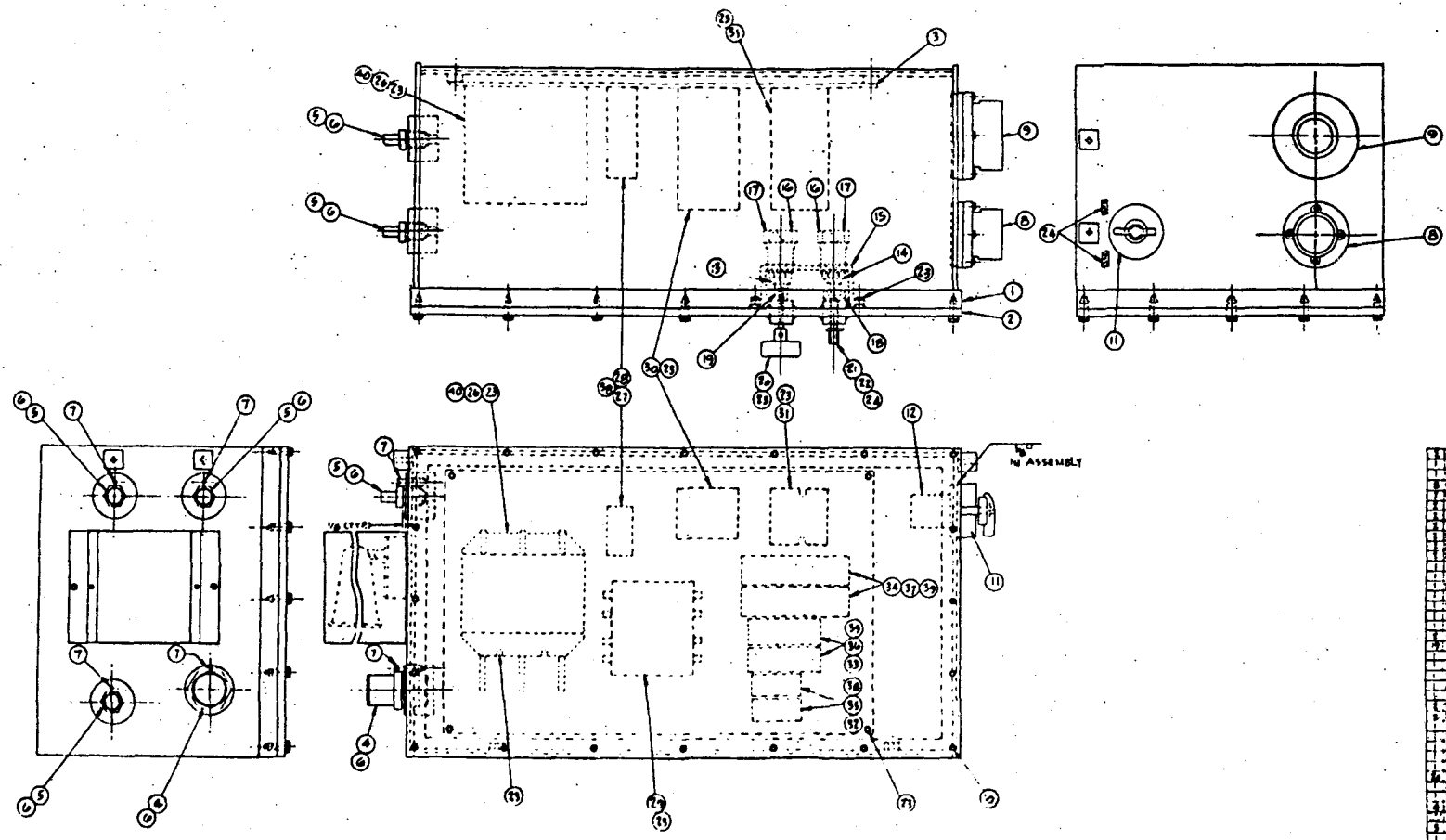
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2	100842	FILE MS. L.W.	10
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4	100842	FILE MS. L.W.	10
5	100842	FILE MS. L.W.	10
6	100842	FILE MS. L.W.	10
7	100842	FILE MS. L.W.	10
8	100842	FILE MS. L.W.	10
9	100842	FILE MS. L.W.	10
10	100842	FILE MS. L.W.	10
11	100842	FILE MS. L.W.	10
12	100842	FILE MS. L.W.	10
13	100842	FILE MS. L.W.	10
14	100842	FILE MS. L.W.	10
15	100842	FILE MS. L.W.	10
16	100842	FILE MS. L.W.	10
17	100842	FILE MS. L.W.	10
18	100842	FILE MS. L.W.	10
19	100842	FILE MS. L.W.	10
20	100842	FILE MS. L.W.	10
21	100842	FILE MS. L.W.	10
22	100842	FILE MS. L.W.	10
23	100842	FILE MS. L.W.	10
24	100842	FILE MS. L.W.	10
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26	100842	FILE MS. L.W.	10
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29	100842	FILE MS. L.W.	10
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31	100842	FILE MS. L.W.	10
32	100842	FILE MS. L.W.	10
33	100842	FILE MS. L.W.	10
34	100842	FILE MS. L.W.	10
35	100842	FILE MS. L.W.	10
36	100842	FILE MS. L.W.	10
37	100842	FILE MS. L.W.	10
38	100842	FILE MS. L.W.	10
39	100842	FILE MS. L.W.	10
40	100842	FILE MS. L.W.	10
41	100842	FILE MS. L.W.	10
42	100842	FILE MS. L.W.	10
43	100842	FILE MS. L.W.	10
44	100842	FILE MS. L.W.	10
45	100842	FILE MS. L.W.	10
46	100842	FILE MS. L.W.	10
47	100842	FILE MS. L.W.	10
48	100842	FILE MS. L.W.	10
49	100842	FILE MS. L.W.	10
50	100842	FILE MS. L.W.	10
51	100842	FILE MS. L.W.	10
52	100842	FILE MS. L.W.	10

goodman

CASE MOTOR CONTROLS
FOR
NOMORAIL

Goodman

Goodman

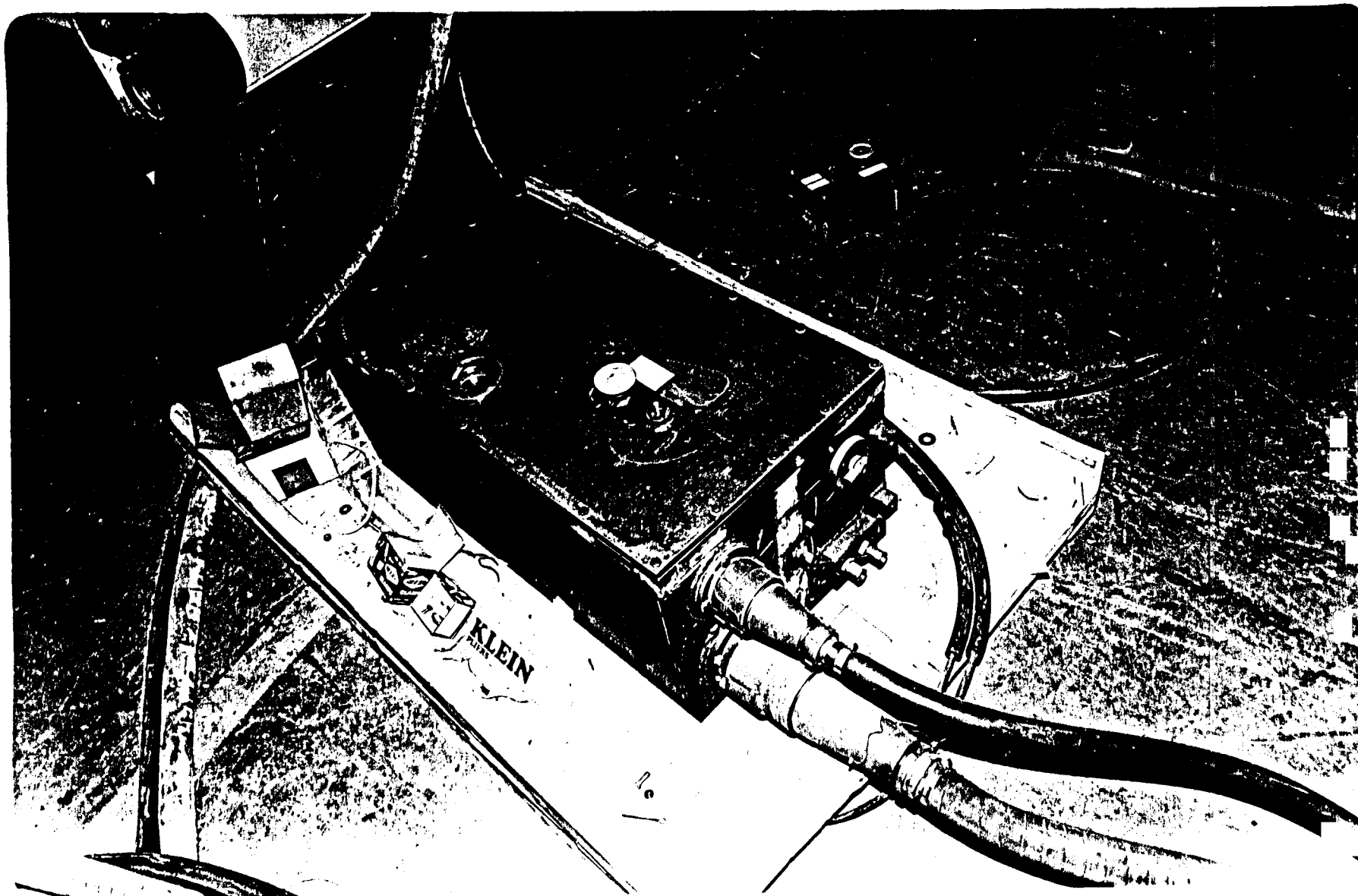


1	SCREW
2	SCREW
3	SCREW
4	SCREW
5	SCREW
6	SCREW
7	SCREW
8	SCREW
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10	SCREW
11	SCREW
12	SCREW
13	SCREW
14	SCREW
15	SCREW
16	SCREW
17	SCREW
18	SCREW
19	SCREW
20	SCREW
21	SCREW
22	SCREW
23	SCREW
24	SCREW
25	SCREW
26	SCREW
27	SCREW
28	SCREW
29	SCREW
30	SCREW
31	SCREW

Figure 48

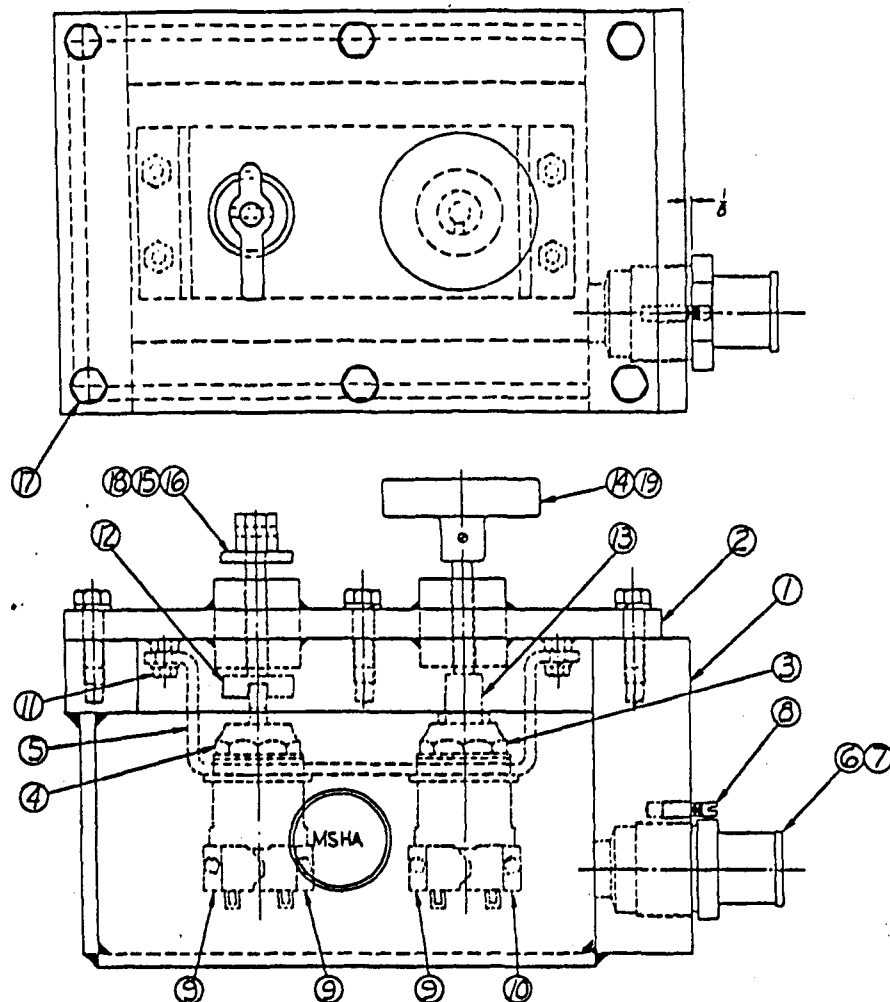
DOE
CONTRACT NO. W-48-60-1-001
BUNKER BRIDGE CONTROL

goodman
Case Master Controls
For
Unmanned
Control
Goodman



MASTER CONTROL CASE
#201221

306143



		25
		24
		23
		22
		21
		20
1	13180	NAMER. (DN-OF)
1	197467	NAMER. (FND-REV)
6	3/8-16x1	FBOLT, LW
1	81487	PIN
1	1002757	HANDLE
1	2078847	KNOB
1	1008428	ROD, PUSH-PULL SW.
1	1008429	ROD SEL SW.
4	1/4-20	FBOLT, LW
1	2078840	CONTACT BLK. N.C.
3	2078839	CONTACT BLK. N.O.
1	5/16x1	HEX SOC SET
5	2057194	PACKING, 1/4
1	168884	PACKING GLAND
1	1509687	BRACKET, MTS
1	2078838	SELECTION PUSH SWITCH
1	2078837	PUSH-PULL SWITCH
1	1509691	PLATE, COVER
1	430375	CASE, EACH
QTY	MATERIAL	DESCRIPTION

Figure 49

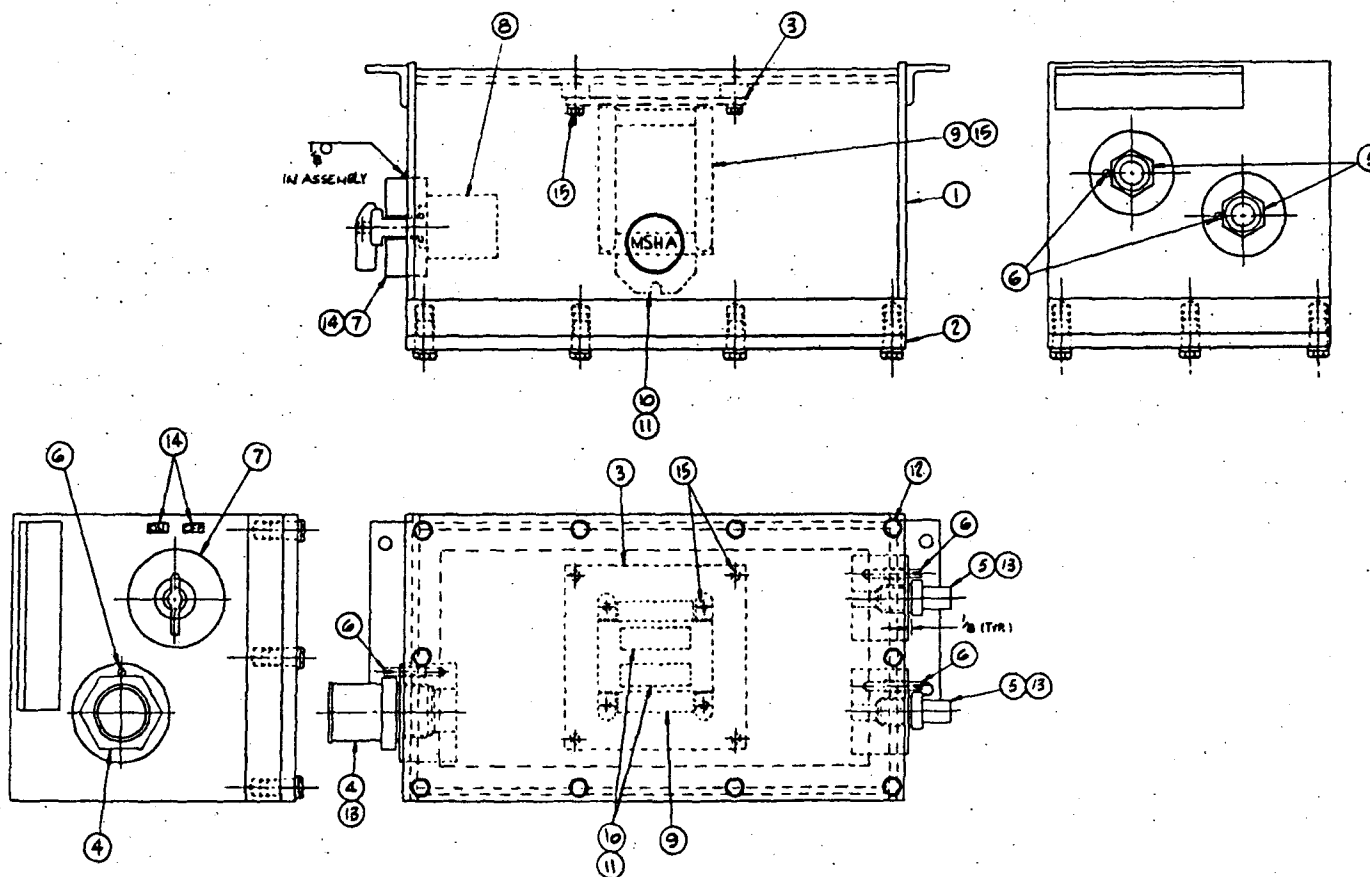
- 64 -

P.O.E.
CONTRACT NO. 78-01-0924
MONORAIL BRIDGE CONVEYOR

goodman
CASE, PUSHBUTTONS
FOR
MONORAIL
54 COMP 306143

- 65 -

Figure 50



8	1/4-20x1/2	F BOLT, L.W.	15
1	193180	NAME PLATE (ON-OFF)	14
45	2057194	PACKING, 1/8	13
10	1/4-20x1	F BOLT, L.W.	12
2	2057784	FUSE (30 AMP, 250V)	11
2	2057862	FUSE HOLDER	10
1	2065785	TRANSFORMER	9
1	2071969	LIGHT SWITCH	8
1	1504282	SWITCH HOUSING-COMR	7
3	3/16x1	HEX SOX. SET	6
2	64979	PACKING GLAND	5
1	209840	PACKING GLAND	4
1	430415	PANEL	3
1	430414	COVER	2
1	306176	CASE, MACHINED-COMR	1
QTY	NATURAL	DESCRIPTION	REV

D. W. S.
CONTRACT NO. 74-01-0044
MONORAIL BRIDGE CONTROL

GOODMAN
CASE, HEADLIGHT CONTROLS
FOR
MONORAIL
1/2 135° COMR 306177

3.3 Carrier and Tram Drive

Cleveland Crane and Engineering is supplying the following:

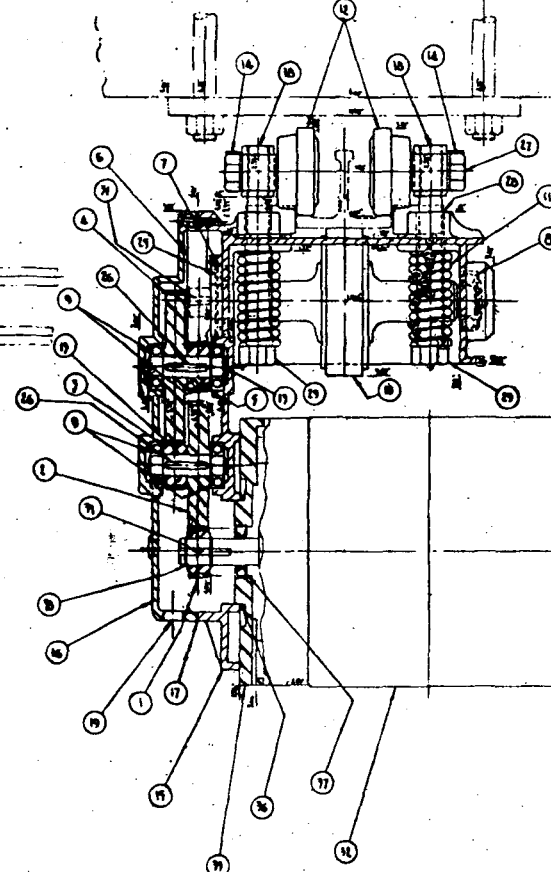
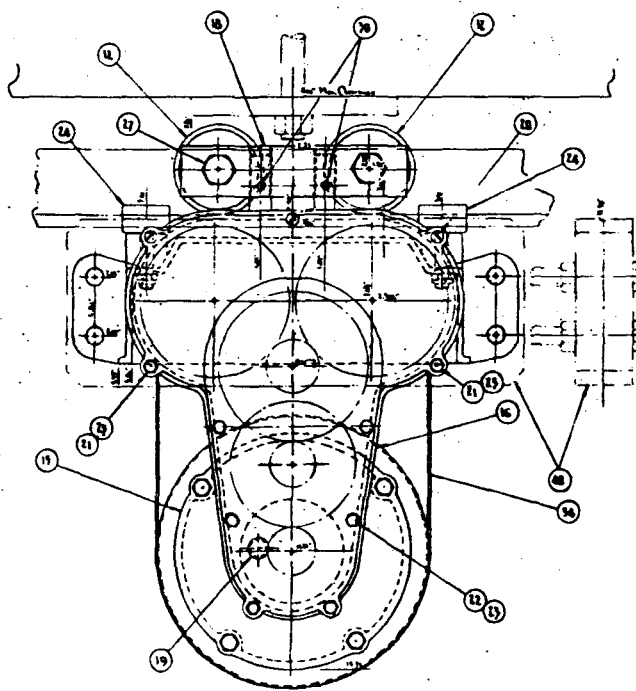
11 - 2900856-000 Carriers - Figure 51

These units contain eight rollers which ride the rail. They also contain the suspension structure to which the saddle frame attaches and in turn supports the conveyor frame.

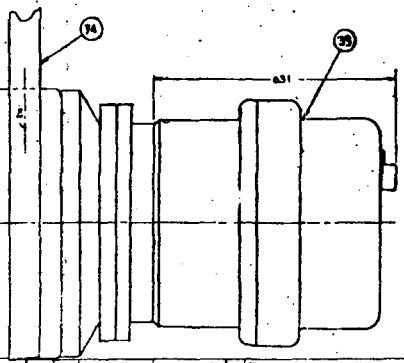
13 - 2900857-000 Tractor Assemblies - Figure 52

These drives provide the tractive effort for the inby conveyor as well as the track carriers. These assemblies are made up of 1½ HP single speed reversing, across the line Reliance motors, a reducer which is a standard Cleveland Crane unit and a Dings electric brake which sets when conveyor is stationary and released upon activating tram control.

The braking system was designed to hold on grades of 6½% and automatically set when drive is shut off. The brake is mounted on the rear of the tractor motor and is electrically released, and it does fulfill all the MSHA requirements.



31	1	D-16090-100	➔ PLUG, 1/8" - 5/16" DIA. TYPE PL
36	1	D-16094-408	➔ O'Ring
37	1	3TD-454	➔ FLARE ADAPTER, MOTOR
38	1	3TD-4506	➔ TUBIFLEX ADP, MOTOR
39	1	PS	➔ BRACKET - DIMS 60 X 60 (L X W)
40	1	PS	➔ MOTOR - REMAINS 16.5" X 20" X 20"
41	2	D-11117-000	➔ VOLT. - 270 - 250 V (100 WATT)
42	4	D-15860-070	➔ THERM. - 1/2" X 1/4" DIA. = 1/2"
43	4	PS	➔ THERM. - 1/2" X 1/4" DIA. = 1/2"
44	4	D-10077-210	➔ CURRENT
45	4	D-15818-015	➔ THERM. - 1/2" X 1/4" DIA. = 1/2"
46	2	D-17115-000	➔ VOLT. - 270 - 250 V (100 WATT)
47	2	K-05138	➔ TYPING - RECOMMEND
48	4	2TD-4516	➔ FLARE ADP, GUIDE
49	4	D-19217-712	➔ LOCKWASHER, 1/4"
50	4	D-17810-100	➔ THERM. - 1/2" X 1/4" DIA. = 1/2"
51	2	D-17860-000	➔ THERM. - 1/2" X 1/4" DIA. = 1/2"
52	2	D-19817-900	➔ THERM. - 1/2" X 1/4" DIA. = 1/2"
53	2	D-14810-032	➔ PLUG, PIPE 1/2"
54	2	ED-4452	➔ CLACK, HANGER ONLY
55	1	94-19954	➔ CLACK, TRACTOR APP
56	1	SM-19951	➔ TRACTOR COVER
57	1	4TD-4517	➔ TRACTOR FRAME

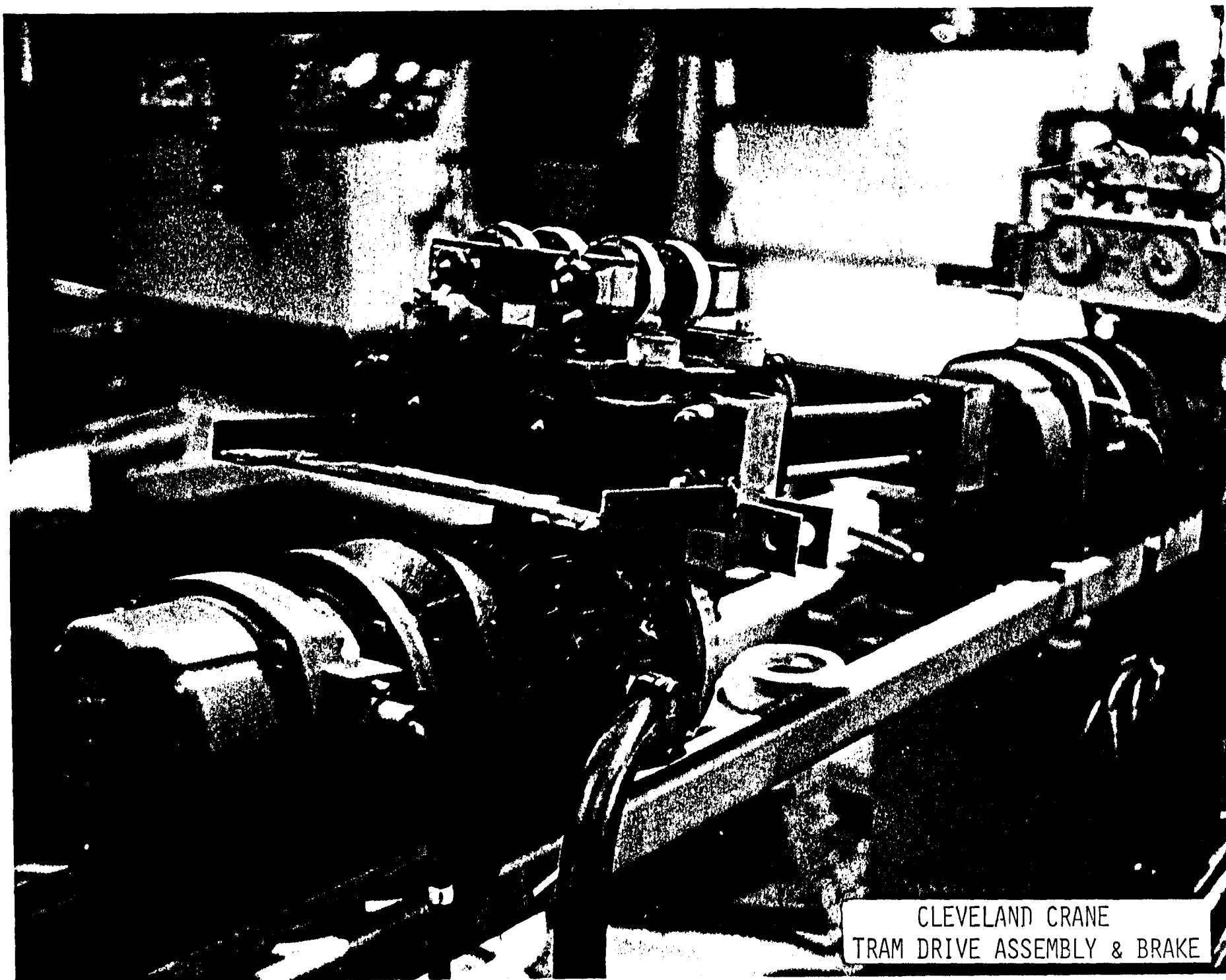


14	A	1K-17160-1	1-17160-100	5	PLATE, LOCK
15	2	K-17117	1-17117-000	5	SHAFT, INTERMEDIATE
16	A	9TD-4446		29	WHEEL ASST, F DR
17	A	K-19566	1-19566-000	5	TYRONS, HANGER
18	2	2K-19555-5	1-19555-300	5	DR SHAFT ASST (PULLEY SHAFT)
19	A		0-70100-103	5	GEARING - FRONT 121/4
20	2		0-70101-105	5	GEARING - FRONT 22/25
21	A		0-70101-106	5	GEARING - FRONT 22/25
22	2			29	GEAR, 211-HP-AXIAL IN THIS LINE
23	1			7	GEAR, 87-12P
24	1			29	GEAR, 611-12P
25	1			7	GEAR, 187-12P
26	1	9K-17119	1-17119-000	29	GEAR, 20T 12P
27	1			7	GEAR, 187-12P

47				
48				
49				
44				
41				
40	1	STD-4510	25	WAGNET ASSY, (CIV)
39	1	D-17111-700	2	MAX, 5" 79" 77Lg (MILITARY)
38	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
37	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
36	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
35	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
34	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
33	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
32	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
31	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
30	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
29	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
28	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
27	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
26	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
25	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
24	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
23	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
22	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
21	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
20	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
19	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
18	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
17	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
16	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
15	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
14	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
13	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
12	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
11	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
10	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
9	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
8	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
7	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
6	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
5	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
4	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
3	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
2	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07
1	1	77A	2	FLNG, "FLNG" - TORQUE 7700-07

[illegible]

TOLERANCES UNLESS OTHERWISE SPECIFIED XX = .010 XXX = .005 FRACTIONS, STRUCT. = 1/16 ANGLES = 14°



CLEVELAND CRANE
TRAM DRIVE ASSEMBLY & BRAKE

Figure 52A

- 68A -

4.0 FINAL ASSEMBLY

4.1 Conveyor Drives to Conveyor Frames

The conveyor drive is mounted at the discharge end of the conveyor frame, The gear case is held in place by four 1/2 x 1-1/2 bolts with lock washers.

At this particular point in assembly of the conveyor drive and conveyor frame, the drive consists of the following:

Gear Box #306117	Contains 7.7 right angle reduction
Adapter #1509559	Mounts to gear box and contains pilot and mounting holes for motor
Motor #2078789	10 HP 1750 RPM 60 cycle Westinghouse Electric

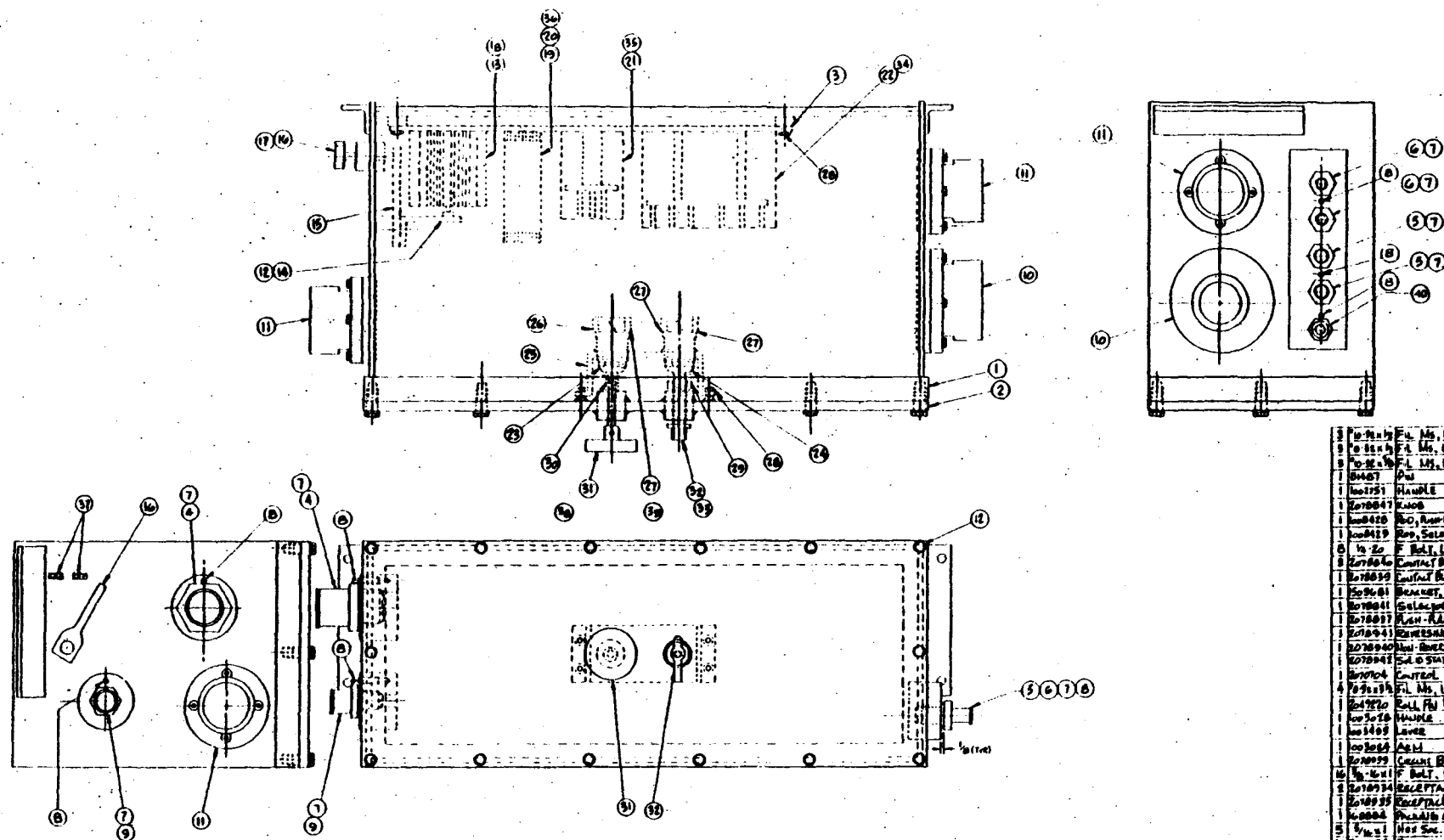
The output shaft of the speed reducer drives the conveyor belt pulley through a flexible coupling at a speed of 225 RPM or 400-450 FPM.

4.2 Motor Control Cases to Conveyor Frames

Each of the motor control cases #201218 is mounted to the conveyor frame by four 1/2 bolts and in such a position that it counter-balances the gear box drive.

There are 12 identical cases, one on each conveyor and mounted in identical areas. Each case contains the following outlets:

- 1 - Centrifugal switch
- 1 - Centrifugal switch
- 1 - Tram motor
- 1 - Tram bracket
- 1 - Headlight
- 1 - Power input



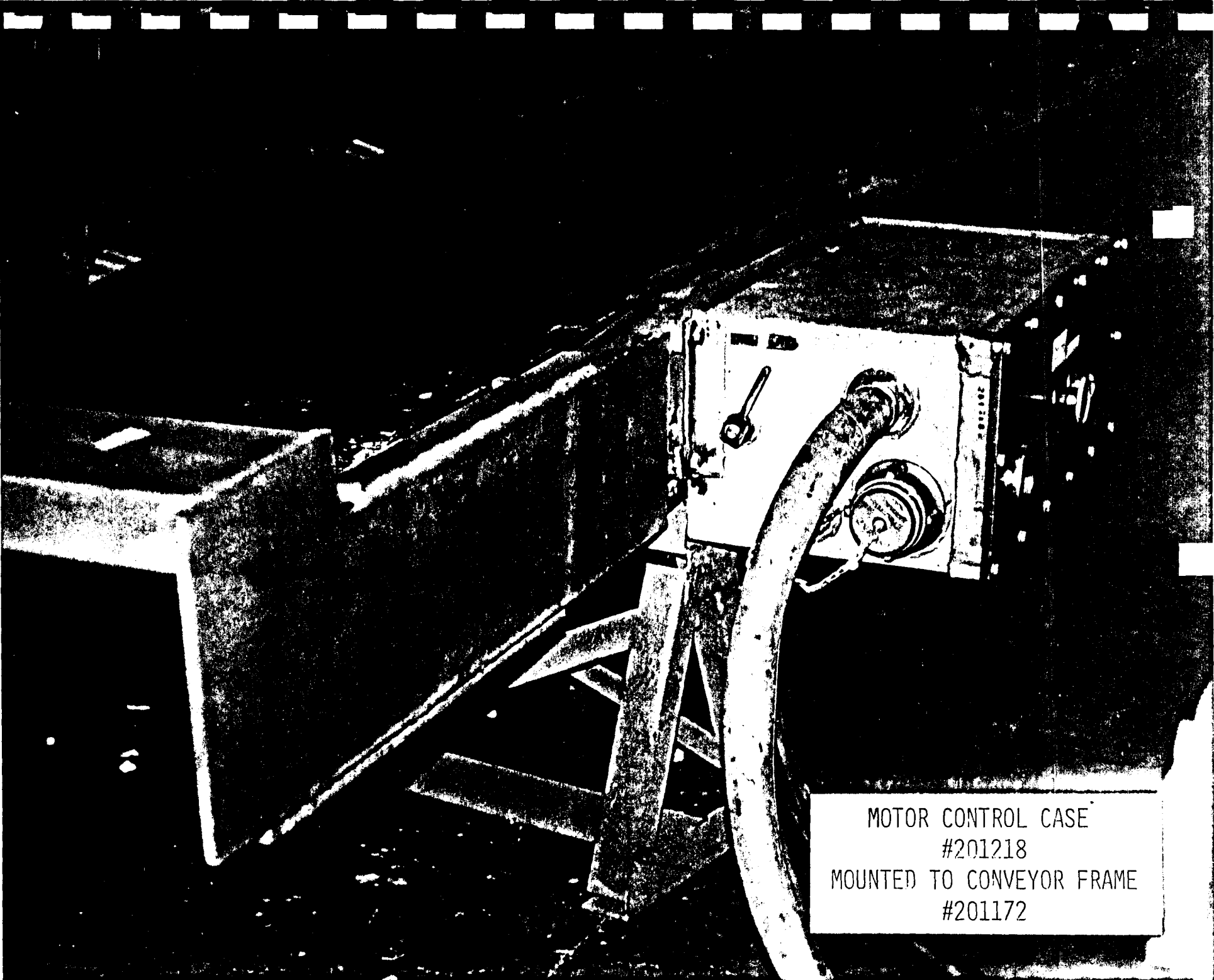
1	7-19-14	FL. MS. LW	
2	7-20-14	F. M. LW	
3	7-20-14	FL. MS. LW	
4	7-20-14	FL	
5	7-20-14	HANDLE	
6	7-20-14	KNOS	
7	7-20-14	NO. RAMPALL SWORN	
8	7-20-14	NO. SELECTION SWORN	
9	7-20-14	F. BOLT. LW	
10	7-20-14	CONTACT REC. N. C.	
11	7-20-14	CONTACT REC. N. O	
12	7-20-14	WHEAT, LIT.	
13	7-20-14	SELECTION SWORN	
14	7-20-14	ASH. ALL SWORN	
15	7-20-14	SELECTION SWORN	
16	7-20-14	W. B. SWORN	
17	7-20-14	SW. O. STAR TRAIL	
18	7-20-14	ENTERED RELAY	
19	7-20-14	FL. MS. LW	
20	7-20-14	FL. MS. LW	
21	7-20-14	HANDLE	
22	7-20-14	HANDLE	
23	7-20-14	FL. MS. LW	
24	7-20-14	FL. MS. LW	
25	7-20-14	FL. MS. LW	
26	7-20-14	FL. MS. LW	
27	7-20-14	FL. MS. LW	
28	7-20-14	FL. MS. LW	
29	7-20-14	FL. MS. LW	
30	7-20-14	FL. MS. LW	
31	7-20-14	FL. MS. LW	
32	7-20-14	FL. MS. LW	
33	7-20-14	FL. MS. LW	
34	7-20-14	FL. MS. LW	
35	7-20-14	FL. MS. LW	
36	7-20-14	FL. MS. LW	
37	7-20-14	FL. MS. LW	
38	7-20-14	FL. MS. LW	
39	7-20-14	FL. MS. LW	
40	7-20-14	FL. MS. LW	
41	7-20-14	FL. MS. LW	
42	7-20-14	FL. MS. LW	
43	7-20-14	FL. MS. LW	
44	7-20-14	FL. MS. LW	
45	7-20-14	FL. MS. LW	
46	7-20-14	FL. MS. LW	
47	7-20-14	FL. MS. LW	
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49	7-20-14	FL. MS. LW	
50	7-20-14	FL. MS. LW	
51	7-20-14	FL. MS. LW	
52	7-20-14	FL. MS. LW	
53	7-20-14	FL. MS. LW	
54	7-20-14	FL. MS. LW	
55	7-20-14	FL. MS. LW	
56	7-20-14	FL. MS. LW	
57	7-20-14	FL. MS. LW	
58	7-20-14	FL. MS. LW	
59	7-20-14	FL. MS. LW	
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61	7-20-14	FL. MS. LW	
62	7-20-14	FL. MS. LW	
63	7-20-14	FL. MS. LW	
64	7-20-14	FL. MS. LW	
65	7-20-14	FL. MS. LW	
66	7-20-14	FL. MS. LW	
67	7-20-14	FL. MS. LW	
68	7-20-14	FL. MS. LW	
69	7-20-14	FL. MS. LW	
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92	7-20-14	FL. MS. LW	
93	7-20-14	FL. MS. LW	
94	7-20-14	FL. MS. LW	
95	7-20-14	FL. MS. LW	
96	7-20-14	FL. MS. LW	
97	7-20-14	FL. MS. LW	
98	7-20-14	FL. MS. LW	
99	7-20-14	FL. MS. LW	
100	7-20-14	FL. MS. LW	

1	152738	PACKING GLAND
1		NAME
1		NAME
1	193180	NAME (on-off)
QTY	MATERIAL	DESCRIPTION

MADE IN BRITAIN
goodman
CASE, MOTOR CONTROLS
FOR
MONORAIL
Cone. 2011B

DOE
FEDERAL BUREAU OF INVESTIGATION
MEMORANDUM FOR THE DIRECTOR

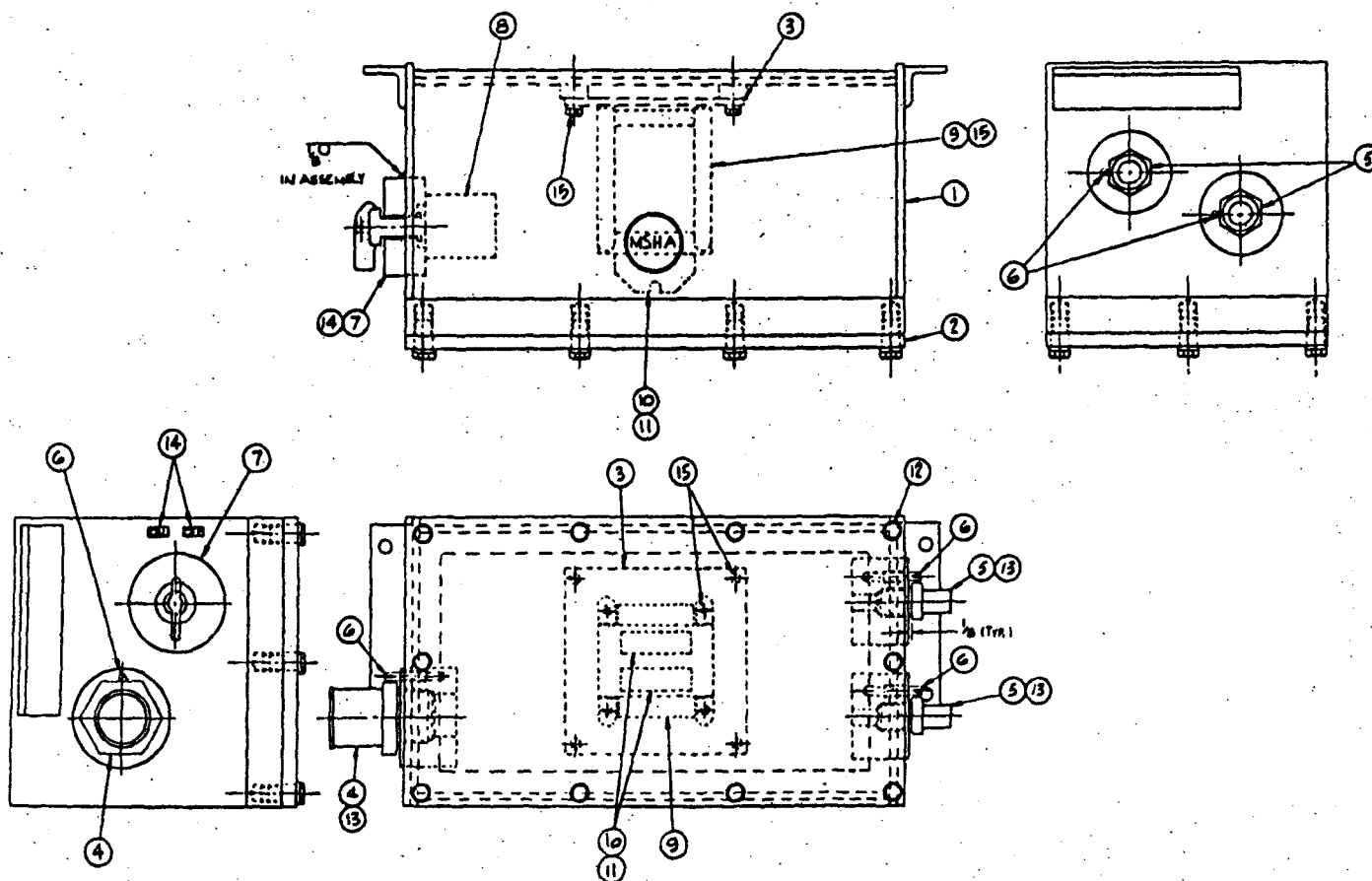
Figure 53



MOTOR CONTROL CASE
#201218
MOUNTED TO CONVEYOR FRAME
#201172

4.3 Headlight Switch Case to Inby Conveyor Frame

The headlight switch #306177 is mounted on the right hand side of the inby conveyor, just in back of the dual steering wheels. It controls just the two headlights which are mounted on the front plate. Each light has its own protective guard. The switch is MSHA approved and is easily accessible to the front operator who guides the steering mechanism of the inby conveyor, which follows either a borer or ripper.



8	1/4-20x1/2	F BOLT, L.W.	15
1	193180	NAME PLATE (ON-OFF)	16
45	2057194	PACING - 1/8"	13
10	5/16-11	F BOLT, L.W.	12
2	2057789	FUSE (30 AMP, 250V)	11
2	2057842	FUSE HOLDER	10
1	2057855	TRANSFORMER	9
1	2071969	LIGHT SWITCH	8
1	1304282	SWITCH HOUSING - CORR.	7
3	5/16-11	HEX. SCR. SET	6
2	164979	PACING GLAND	5
1	1609640	PACING GLAND	4
1	480415	PANEL	3
1	180416	COVER	2
1	300176	CASE, MOUNTED - CORR.	1
QTY	AMOUNT	DESCRIPTION	177

D. & E.
CONTRACT NO. 74-01-0044
MONORAIL BRIDGE CONTROL

BOOMMAN
CASE, HANDLINT CONTROLS
FOR
MONORAIL
CONV. 3-6-177

Figure 55

4.4 Steering Mechanism to Inby Conveyor Frame

The steering mechanism on the monorail bridge is mounted on the front end of the inby conveyor. The mechanism guides the inby conveyor into 60° crosscuts. A dual wheel connected by a threaded screw and nut provides right hand or left hand control.

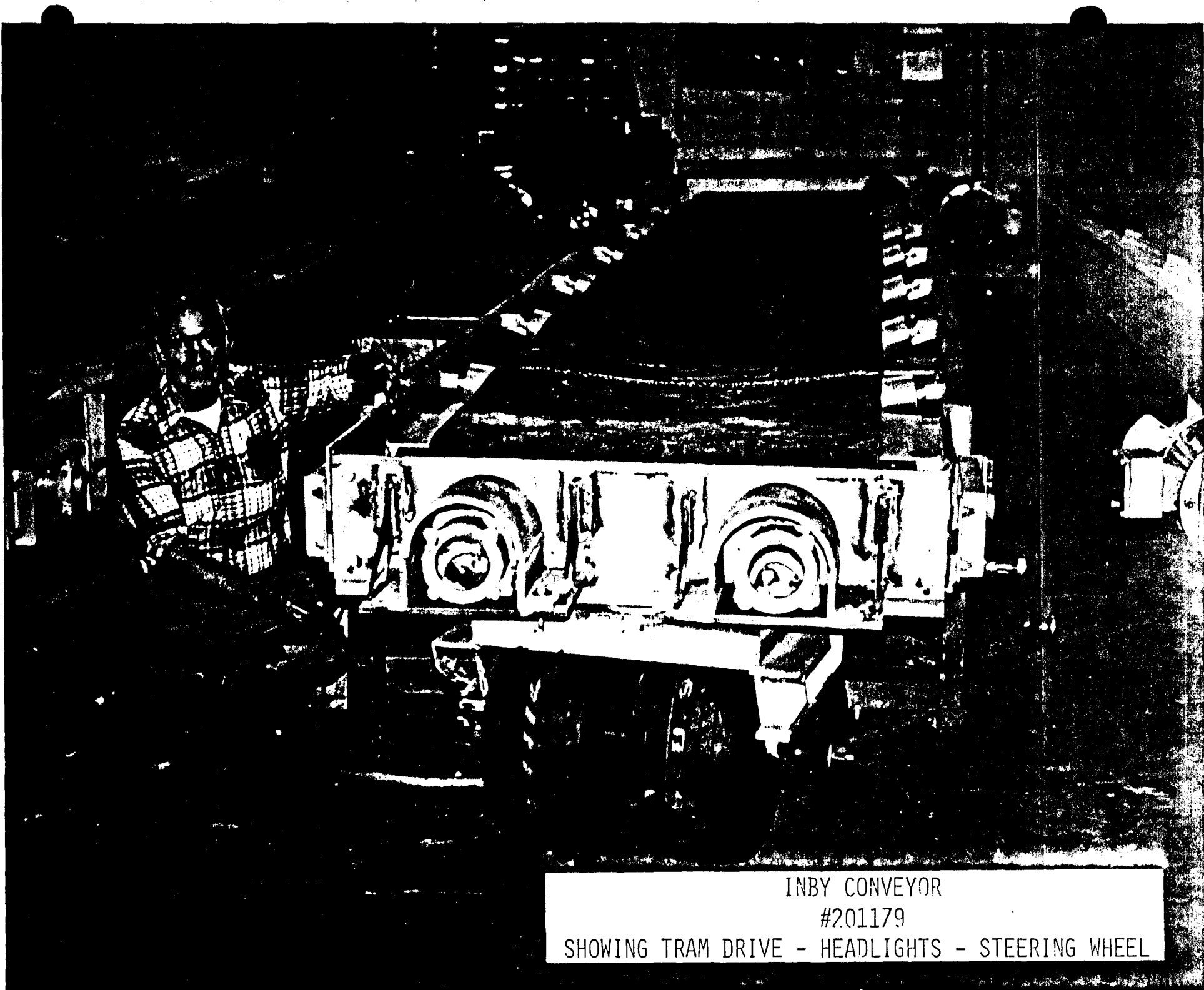
In the beginning of the design we had a choice of three different thoughts to go with on steering:

1. Center pivot, coaster wagon steering
2. Automotive king pin steering
3. Center mounted tires with fork type steering

The fork type lent itself best to fit into the system from a standpoint of powering the wheels as well as steering.

The mechanism is made up of the following parts, shown in Fig. 56:

- | | | |
|-----|-------------|------------------|
| 1 - | 430832 | - Front Plate |
| 1 - | 306402 | - Wheel Support |
| 2 - | 2080614-000 | - Bushing |
| 2 - | | Pillow Blocks |
| 1 - | 1510251 | - Shaft |
| 2 - | 425072 | - Wheels |
| 2 - | 2079948 | - Pillow Block |
| 1 - | 1009229 | - Threaded Screw |
| 1 - | | Threaded Nut |



INBY CONVEYOR
#201179
SHOWING TRAM DRIVE - HEADLIGHTS - STEERING WHEEL

5.0 SURFACE TEST PLAN

5.1 Outline of Plan on Test Site

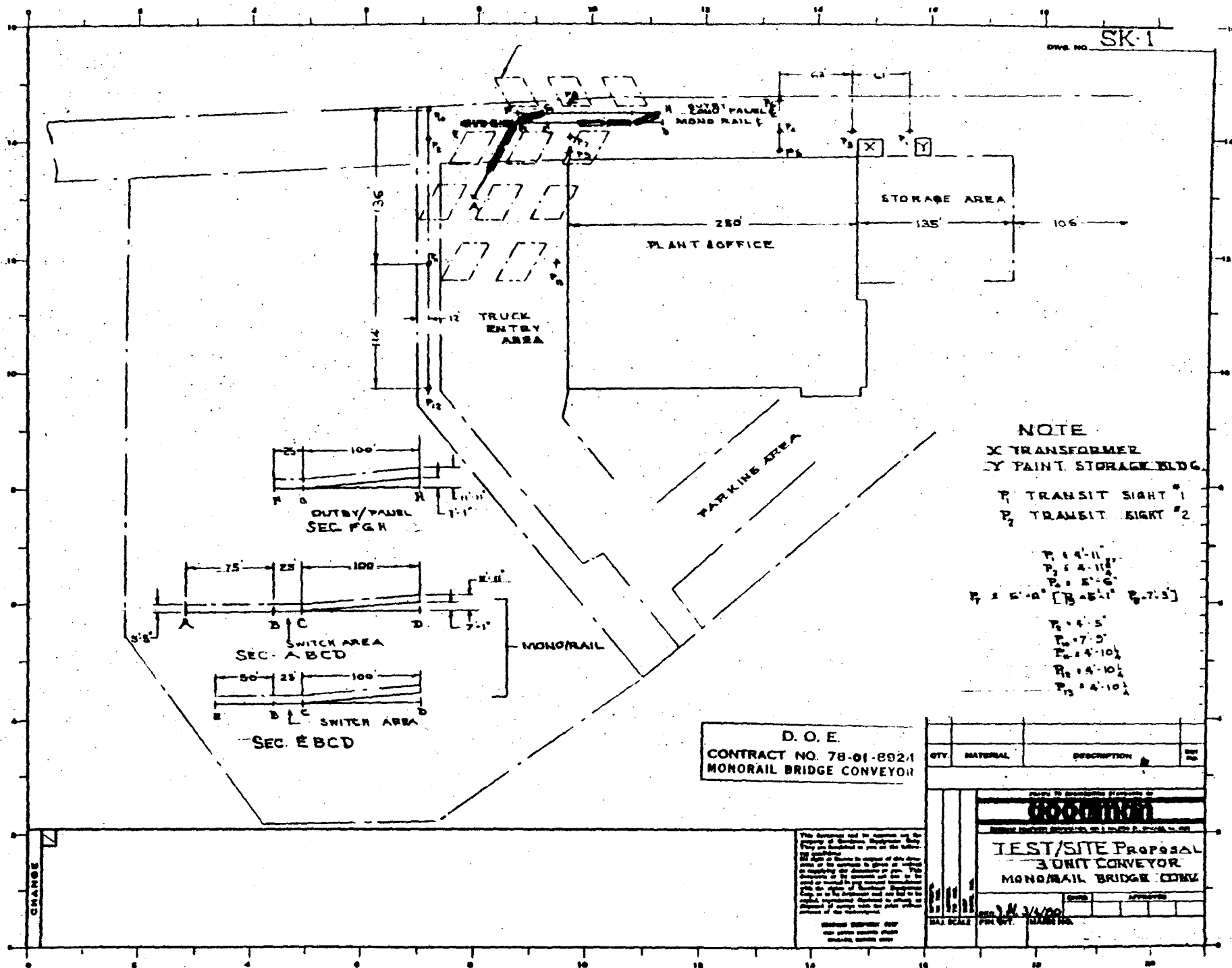
The outline plan of test site will be made per Figure 58. This shows the location of test facility at the Goodman Murfreesboro plant.

The test facility will be such as to simulate the underground demonstration and will strictly adhere to the plans and designs approved by the Bureau. The only difference between surface test and underground test will be that three conveyors will be involved rather than twelve.

This test will provide the means of traveling up and down a $6\frac{1}{2}\%$ grade, going through a switch and traveling through a straightaway.

The facility will be constructed under the direct supervision of Goodman Equipment Corporation personnel.

Figure 58
- 78 -



5.2 SURFACE TESTING

Construct Surface Facility

A surface testing facility will be constructed. As suggested earlier, this will be done at our Murfreesboro facility. The facility will be such as to simulate the underground demonstration and will strictly adhere to the plans and designs earlier approved by the Bureau.

The surface facility will be constructed under the direct supervision of Goodman personnel.

We will dynamically test the M.B.C. The M.B.C. System after installation will be tested to ensure smooth operation. The trials conducted will actually go through all the motions of conveying material and of moving the bridge sections along the monorail and across a switch. All the operations expected of the system will be conducted.

We will modify the M.B.C. and/or the surface test facility. Although this is not actually expected during the program, allowance has been made in the schedule to make any minor alterations in the system that may improve its operation underground. The modification will be made by Goodman.

We will demonstrate the Monorail Bridge Conveyor after completing the modifications and again testing the M.B.C. system. It will be demonstrated to the TPO, Bureau Staff, the Contracting Officer and/or his designated representative(s). At least two (2) weeks notice will be given to the TPO prior to this test. All the motions and activities expected of the system will be thoroughly tried during these runs.

5.3 Layout/Details of Surface Test Structure

Layout - Figure 59

Details - Figures 60-72

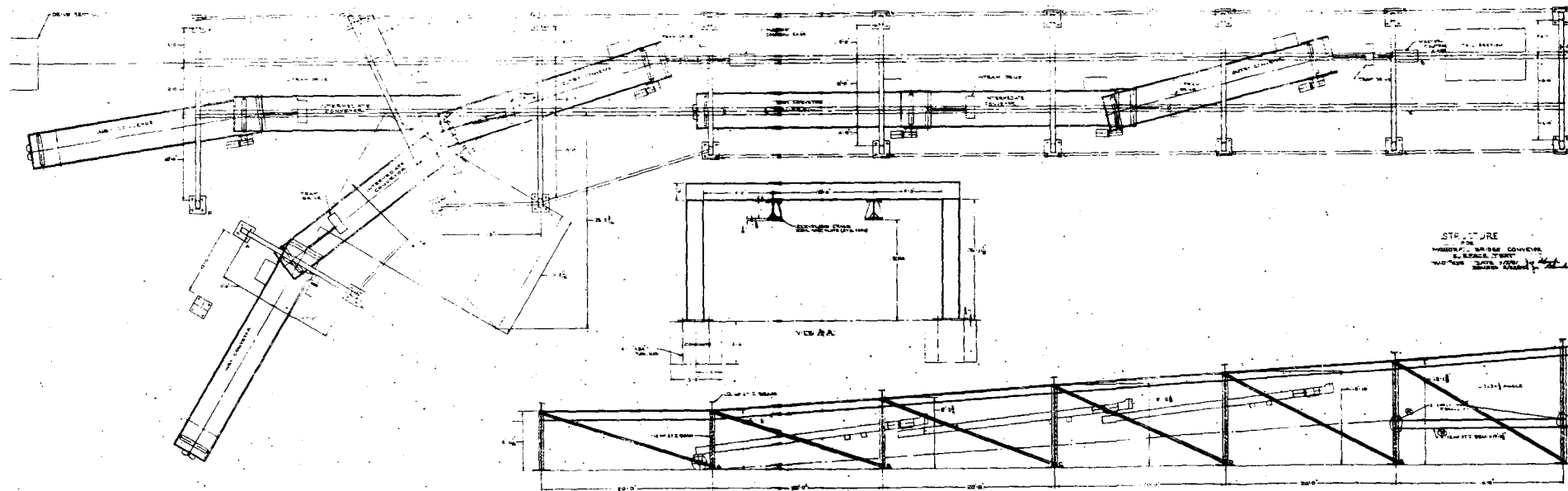
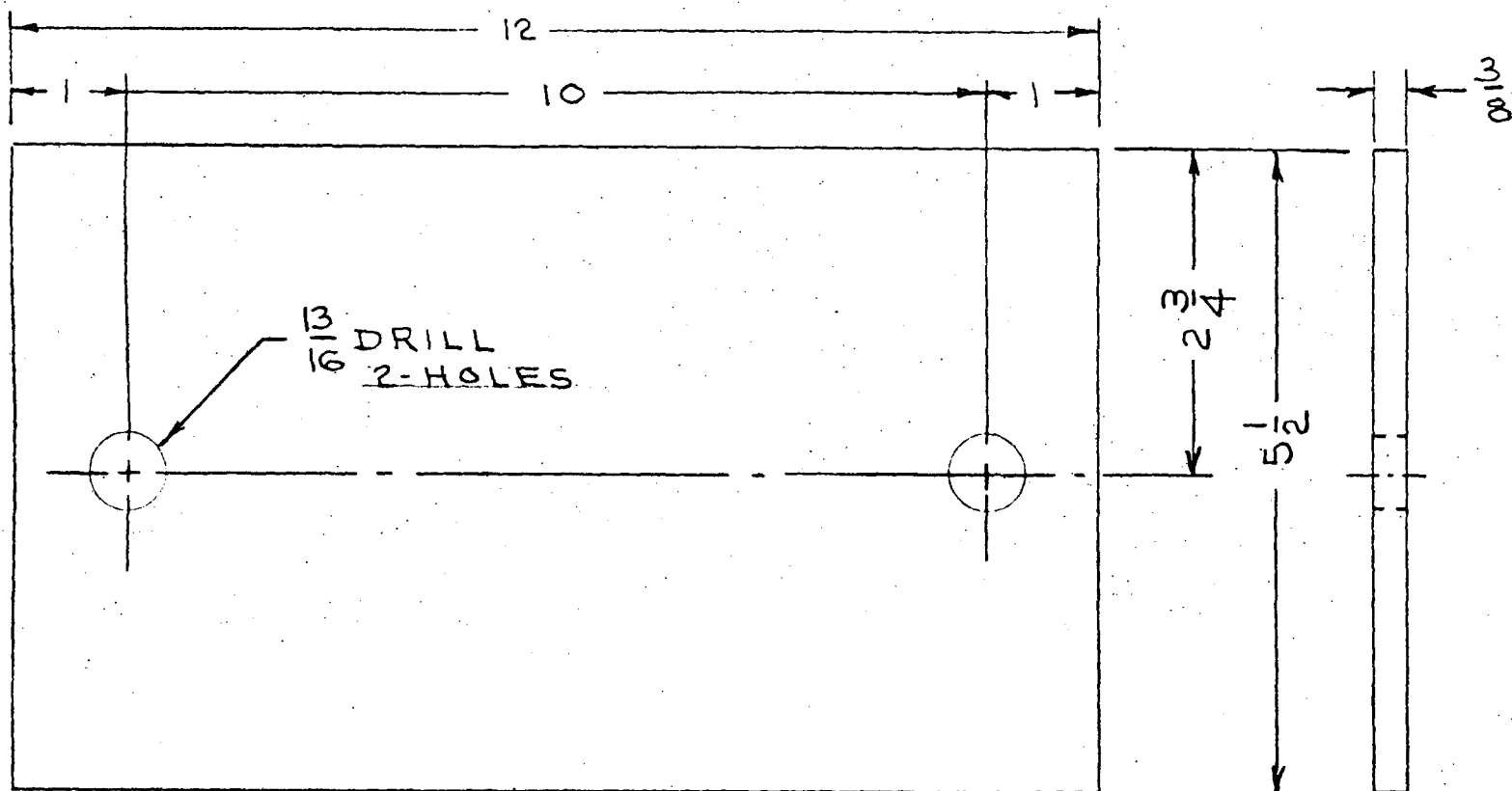


Figure 59



MAKE-72

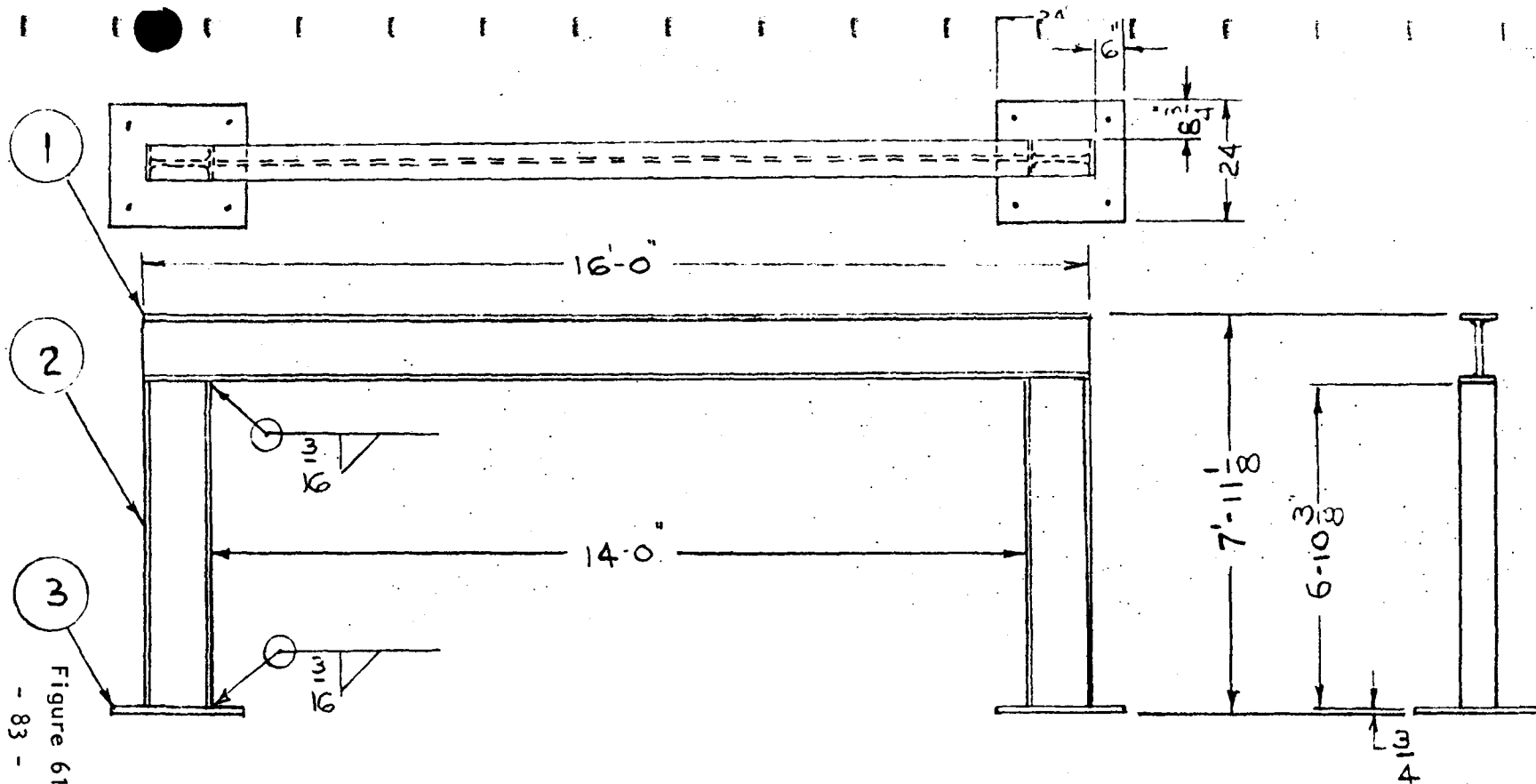
MATERIAL - 8193102 - 1017/R $\frac{3}{8}$ X $5\frac{1}{2}$ X 12

PLATE, MTG.
FOR RAIL

MONORAIL BRIDGE CONV.

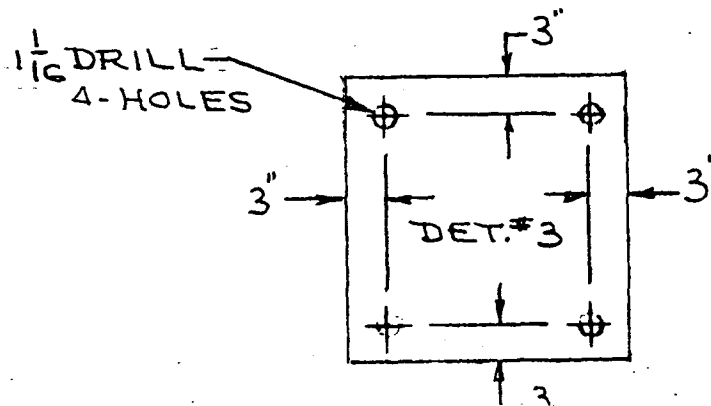
SK. - #1

J. Gorski 7/24/81



MATERIAL LIST		
DET.	QUAN	MATERIAL
1	1	12WF 27 (I BEAM) x 16'-0" LG.
2	2	12WF 27 (I BEAM) x 6'-10 3/8" LG.
3	2	24"X 24" X 3/4" PLATE (1017 HR.)

MAKE-2



FRAME SECTION "A-A"
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR
J. H. H. 7/8/81
W.O. #658
SK. #2

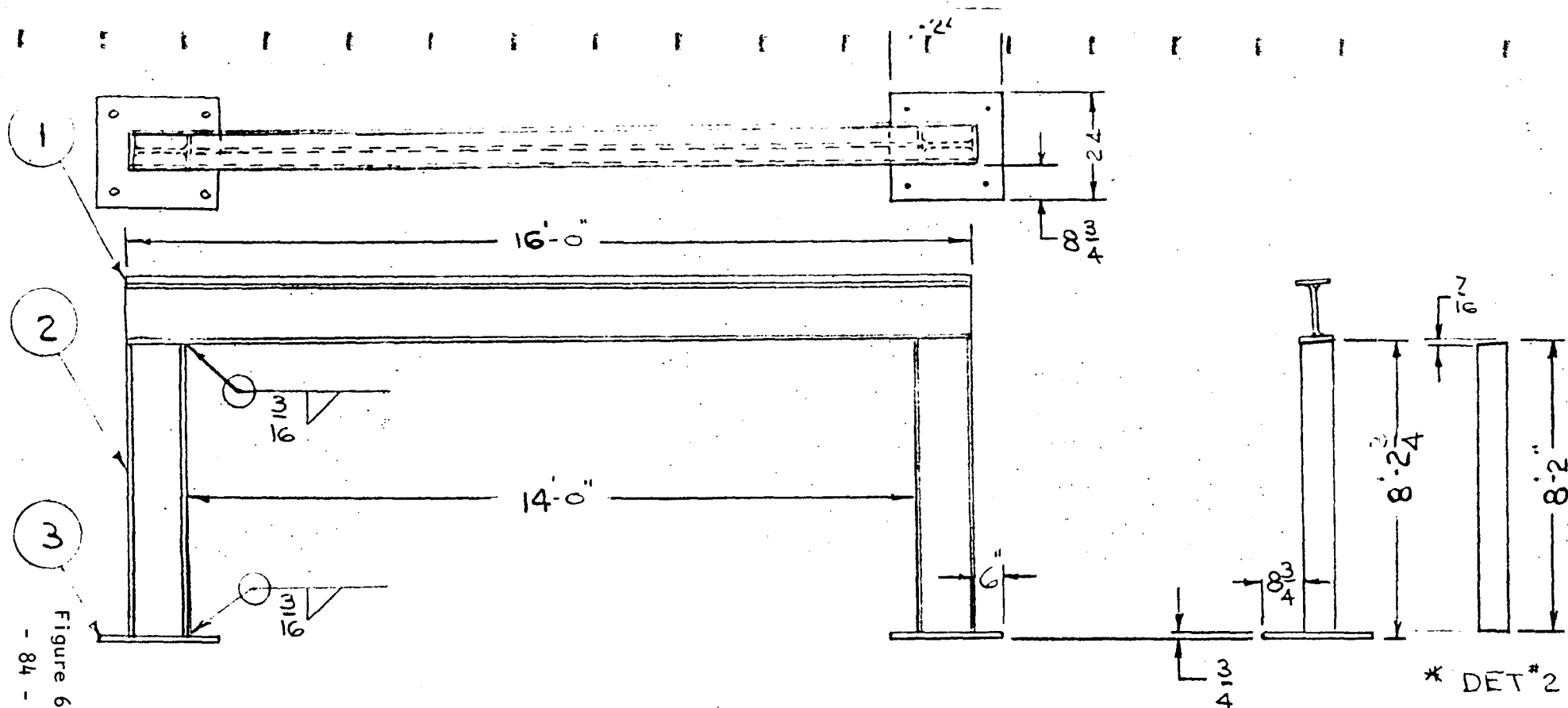
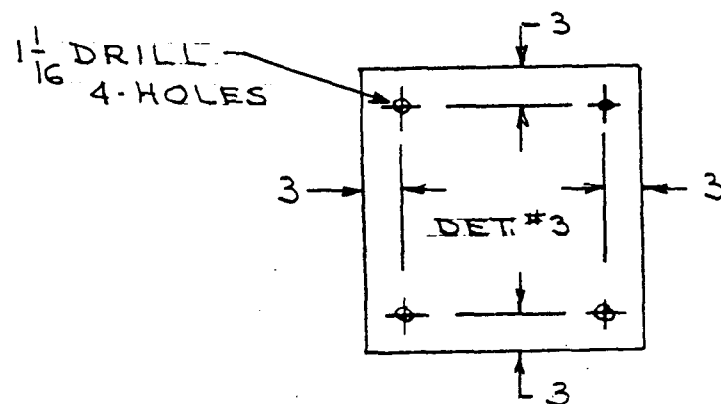


Figure 62
- 84 -

MATERIAL LIST		
DET.	QUAN	MATERIAL
1	1	12 WF 27 (I BEAM) X 16'-0" LG.
2	2	12 WF 27 (I BEAM) X 8'-2" LG
3	2	24" X 24" X $\frac{3}{4}$ PLATE (1017R)

MAKE-1



FRAME SECTION "B-B"
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR

J. Horvath 7/13/31
W.O. #558
SK. #3

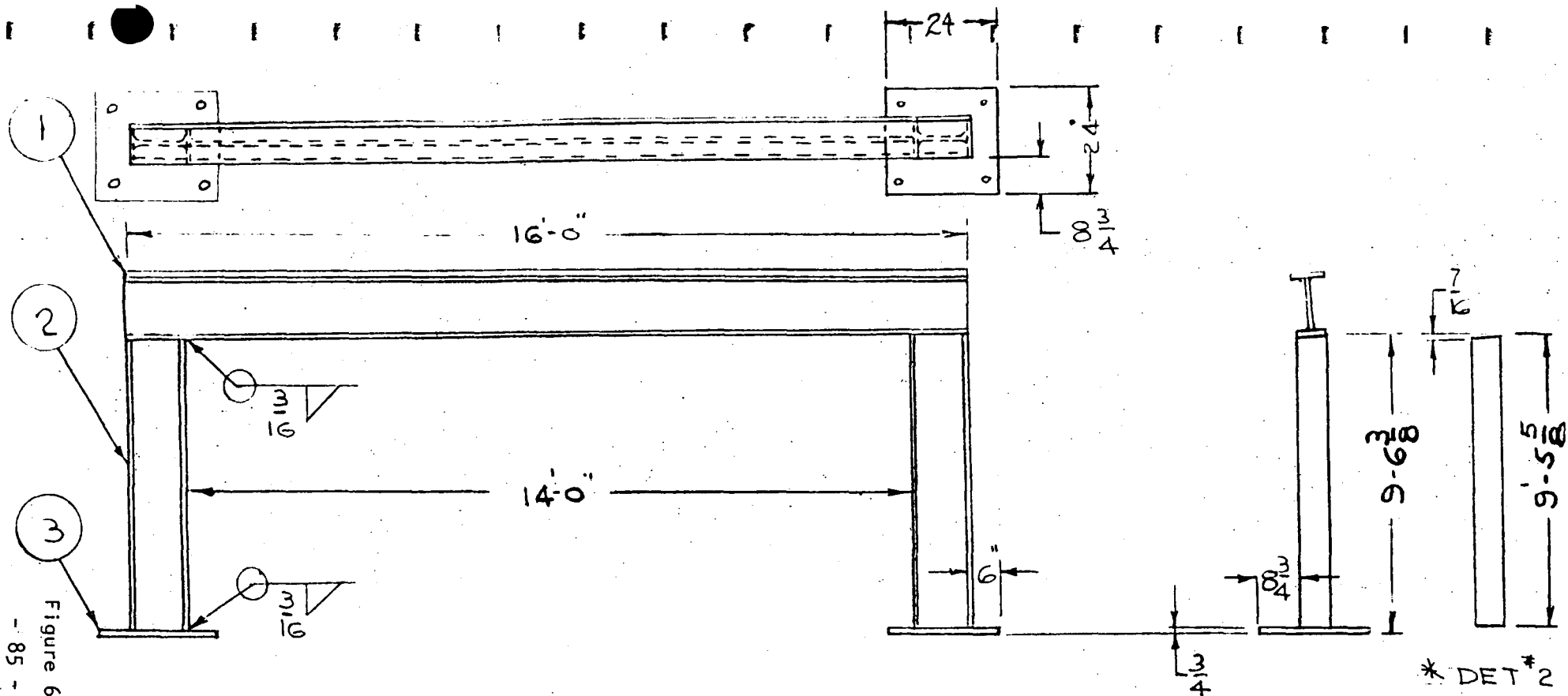
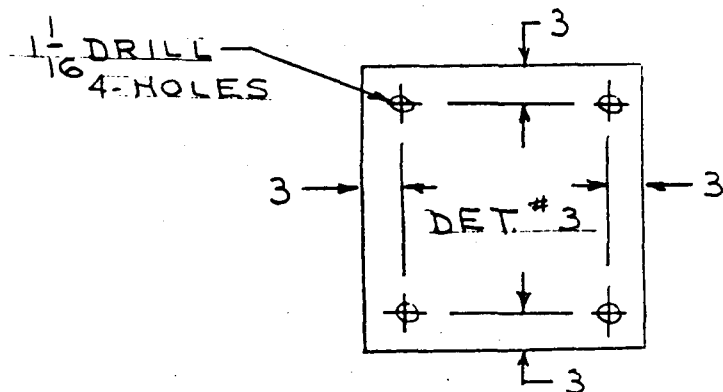


Figure 63
- 85 -

MATERIAL LIST		
DET.	QUAN	MATERIAL
1	1	12WF 27 (I BEAM) X 16'-0" LG.
2	2	12WF 27 (I BEAM) X 9'-5 5/8" LG.
3	2	24" X 24" X 3/4 PLATE (1017HR)

MAKE - 1



FRAME SECTION "C-C"
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR

J. Honsler 7/13/81
W.O. #658

SK. #4

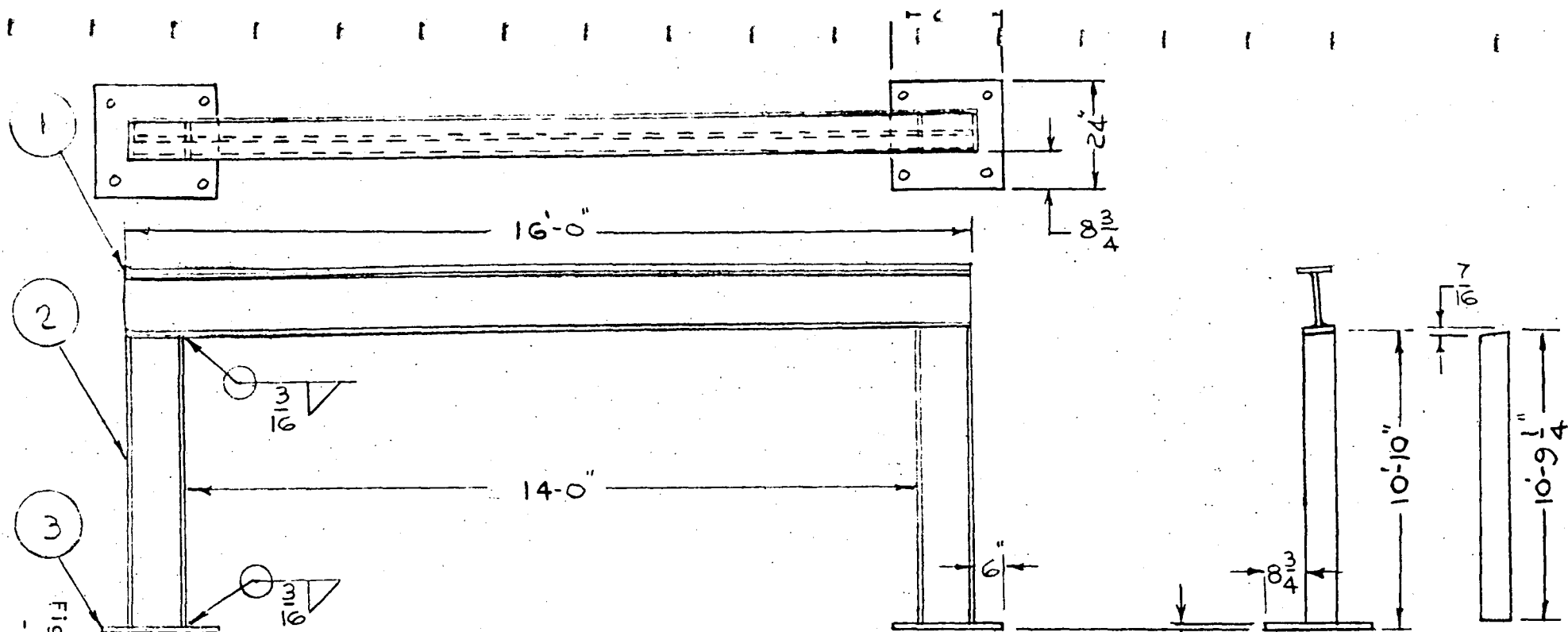
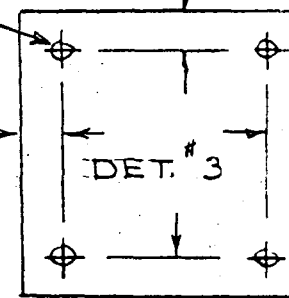


Figure 64
- 86 -

MATERIAL LIST		
DET.	QUAN	MATERIAL
1	1	12WF 27 (I BEAM) X 16'-0" LG.
2	2	12WF 27 (I BEAM) X 10'-9 1/4" LG.
3	2	24" X 24" X 3/4 PLATE (1017R)

1/16" DRILL
4-HOLES

MAKE-1



* DET #2

FRAME SECTION D-D
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR

J. B. B. 7/17/81
W.O. #658

SK. #5

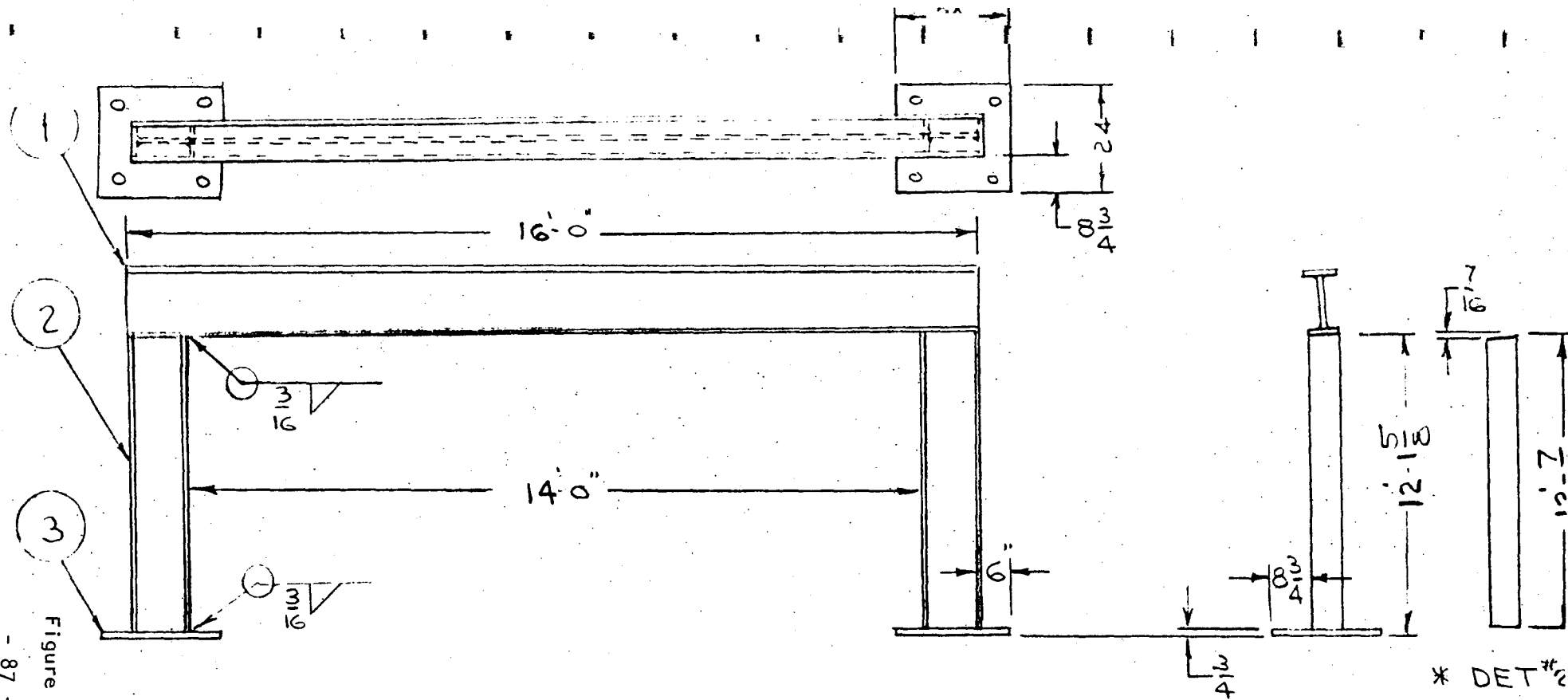
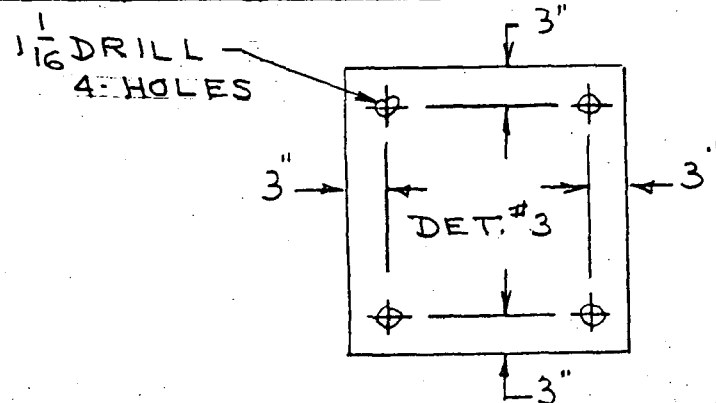


Figure 65

MATERIAL LIST		
DET.	QUAN.	MATERIAL
1	1	12 WF 27 (I BEAM) X 16'-0" LG
2	2	12 WF 27 (I BEAM) X 12'-1 1/2" LG.
3	2	24" X 24" X 3/4" PLATE (1017H)

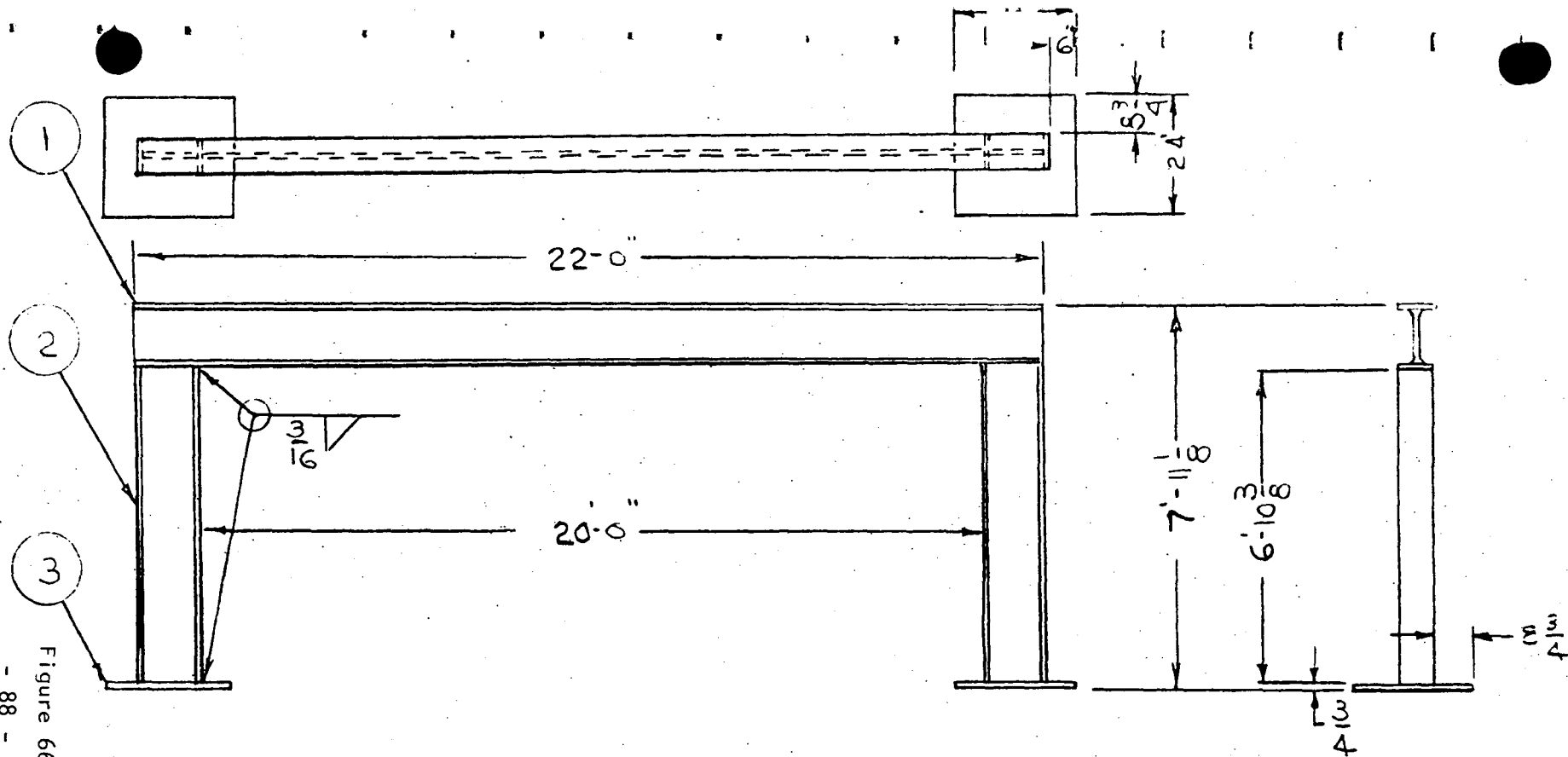
MAKE - 1



FRAME SECTION "E-E"
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR

J. Blanks 7/14/81
W.O. #658

SK. #6



- 88 -
Figure 66

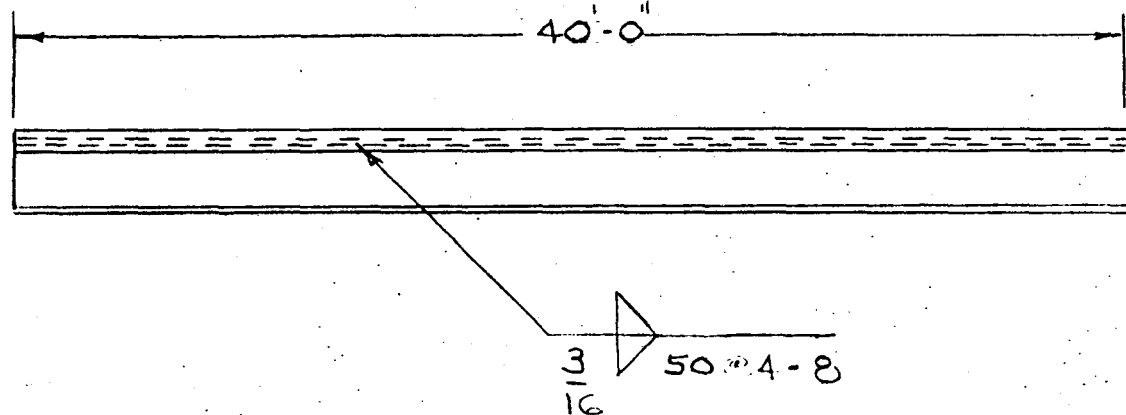
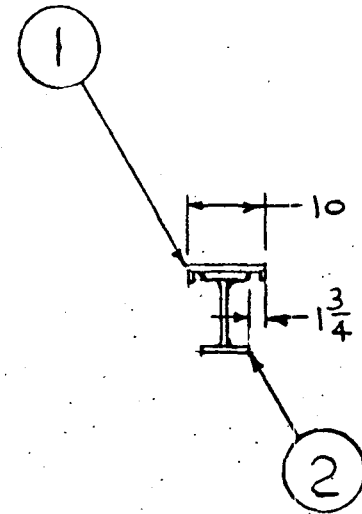
MATERIAL LIST		
DET.	QUAN.	MATERIAL
1	1	12W27 (I BEAM) X 22'-0" LG
2	2	12W27 (I BEAM) X 6'-10 3/8" LG
3	2	24" X 24" X 3/4" PLATE (1017H)

MAKE-2

FRAME SECTION F-F
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR

J. Sanki 7/24/81
W.O. # 658

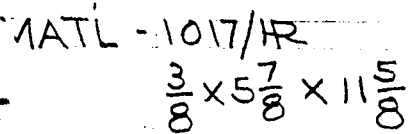
SK. - #7



MATERIAL LIST		
DET.	QUAN.	MATERIAL
1	1	10X1 1/2 X 8.4 (CHANNEL) X 43'-0"
2	1	12WF 27 (I BEAM) X 40'-0" LG

MAKE-8

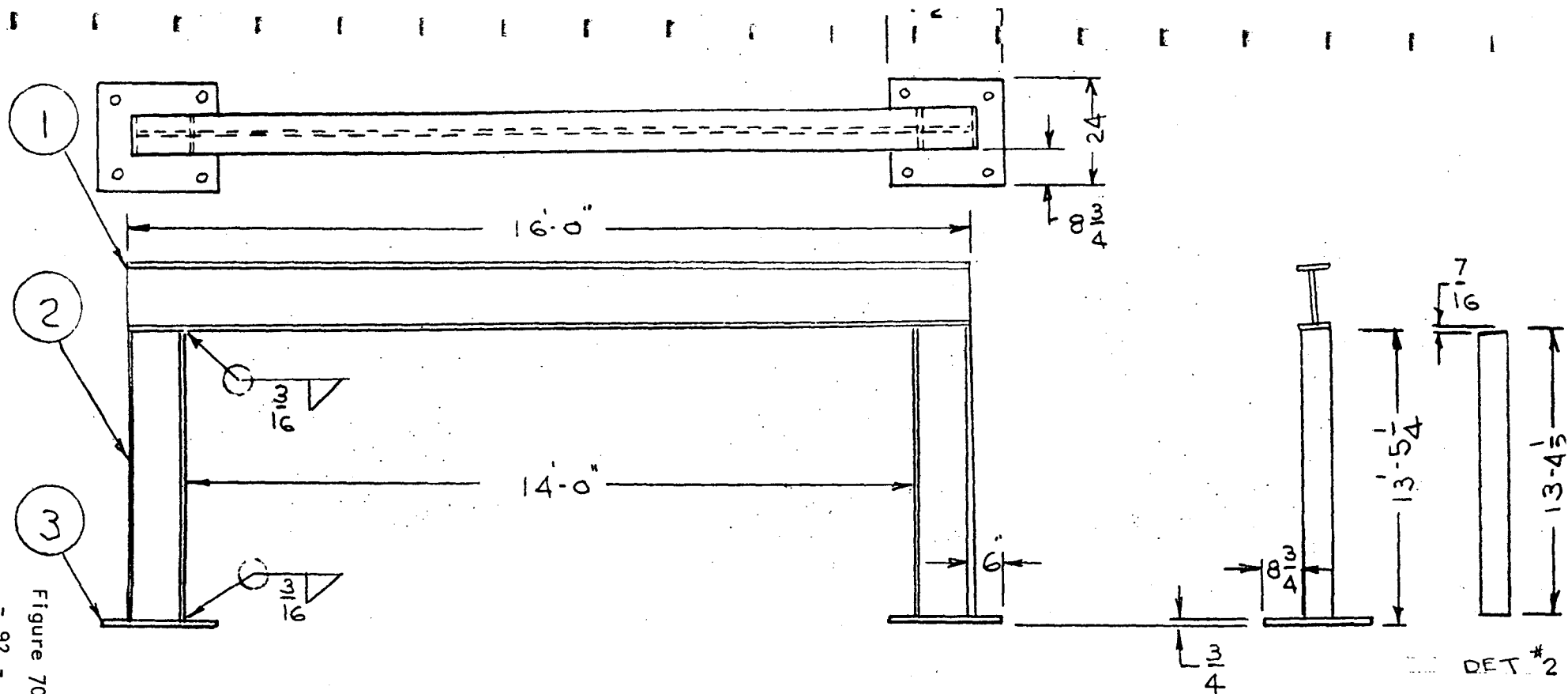
40' BEAM
 FOR SURFACE TEST
 MONORAIL BRIDGE CONVEYOR
 J. Honske 7/24/81
 W.O. # 658
 SK. # 13



SK. - # 14 - 91 -

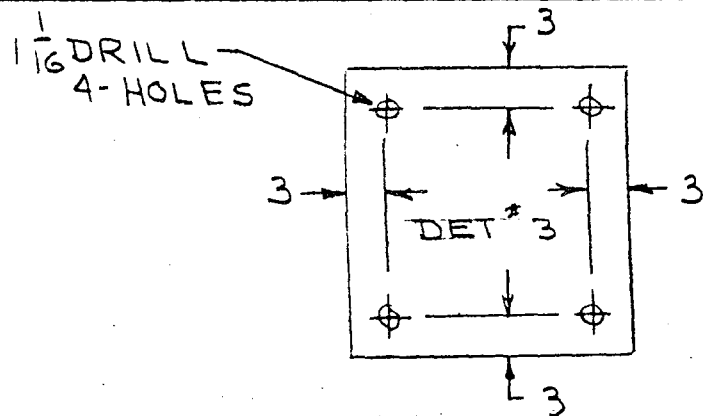
RIB
FOR MOUNTING PLAT
MONORAIL BRIDGE SC
J. *Donnell* 7/27
W. & G. S.

- 92 -
Figure 70



MATERIAL LIST		
DET.	QUAN.	MATERIAL
1	1	12WF 27 (I BEAM) X 16'-0" LG.
2	2	12WF 27 (I BEAM) X 13'-4 1/2 LG.
3	2	24" X 24" X 3/4 PLATE (1017 HR)

MAKE-1



FRAME SECTION "H-H"
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR

J. Slonka 2/25/82
W.O.# 658
SK # 15

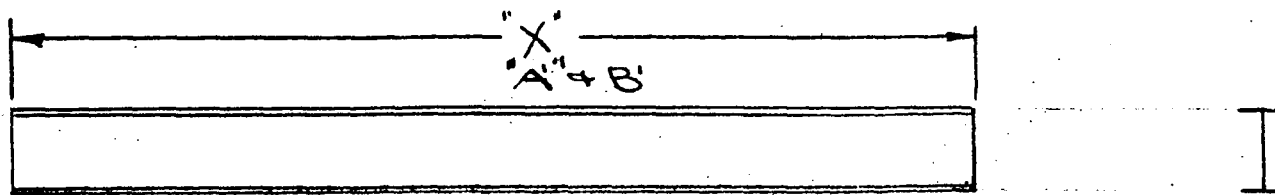


Figure 71
- 93 -

MATERIAL LIST		
DET.	QUAN.	MATERIAL
A	2	12 WF 27 (I BEAM) X 14'-0" LG.
B	2	12 WF 27 (I BEAM) X 17'-11 1/2" LG.
C	20	3 X 3 X 1/2 ANGLE X 24'-0"

I BEAM & ANGLE
FOR SURFACE TEST
MONORAIL BRIDGE CONVEYOR
J. Smith 3/1/8
W.O.# 658
SK # 16

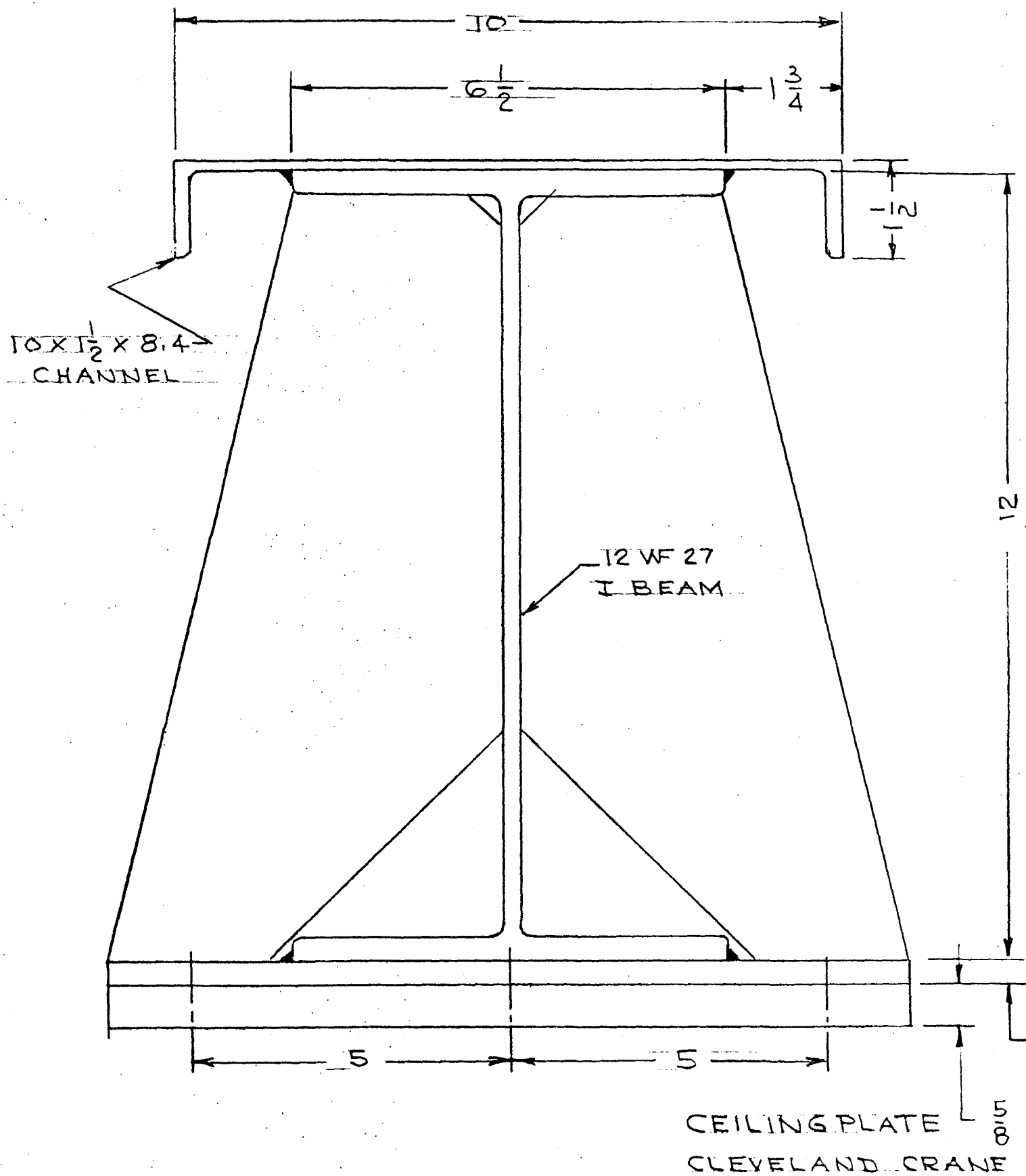


Figure 72

J. Honshie 7/5/81

3TD-4296

6.0 Final Summary

When Phase II was initiated it was divided into six (6) categories:

- I. Fabrication
- II. M.S.H.A. Approval
- III. Update Design Drawings
- IV. Design/Surface Test
- V. I.O.M. Manual
- VI. Phase II Report

In February, 1982, all the fabricated parts made at Goodman Equipment Corporation and Goodman Conveyor Corporation had been finished. All assemblies, both electrical and mechanical, were completed and shipped to Murfreesboro, Tennessee. Here, all the component parts were assembled to each of the twelve conveyor frames.

Upon completion of the assembly, all twelve conveyors were interconnected electrically. The first three conveyors contained the inby unit, intermediate and outby, each cascading one another similar to intended surface test arrangement. (Shown in Figure 74.)

The preliminary test proved that the electrical system could be controlled successfully, either manually or automatically. We also proved the capability of sequential starting and stopping, which is mandatory in this system of mining.

Earlier, in June of 1981, we visited the Cleveland Crane plant where we saw a successful operation of a carrier, tram drive and electric brake. The 8-wheel carrier had a 6,000 lb. weight (equal to weight of conveyor frame assembled with a load of coal on belt) driven on the straightaway track, through a switch, and up a 6½% grade (shown in Figure 73). Intermediate starting and stopping up and down grade created no problem. This demonstration, along with our pre-test at Murfreesboro of the electrical system, encourages our outlook of the project.

6.1 MSHA Approval Status

Upon conclusion of the preliminary test at Murfreesboro, we removed a motor control case #201218 from a conveyor not to be used in the surface test, and the headlight switch case #306177 from the inby unit #201179. These assemblies were shipped to Chicago for proper preparation prior to testing at MSHA. Both units are scheduled for testing the week of June 28. The other two remaining units, the pendant switch #306142 and the main control case #201220 must be used in the study of the surface test and thus will have to be sent to MSHA at a later date. The specifications required by MSHA of these electrical components brought about changes in our design, which prolonged our scheduled manufacturing time.

6.2 Public Exposure and Possible Change in Surface Test Area

A meeting was held in Bruceton, Pennsylvania on April 13, 1982

between the DOE and Goodman Equipment Corporation. The meeting demonstrated the joint DOE-Goodman development efforts. Mr. Claude Good, Acting Director, DOE, suggested that a portion of the MBC be shown to the public. To this, Goodman indicated to the DOE its desire to exhibit a full scale set up of the MBC at the American Mining Congress International Mining Show in Las Vegas, October, 1982.

It was also suggested at this meeting that we consider doing the surface test at the DOE Technology Center in Bruceton rather than our Murfreesboro, Tennessee facility, due to budget curtailment.

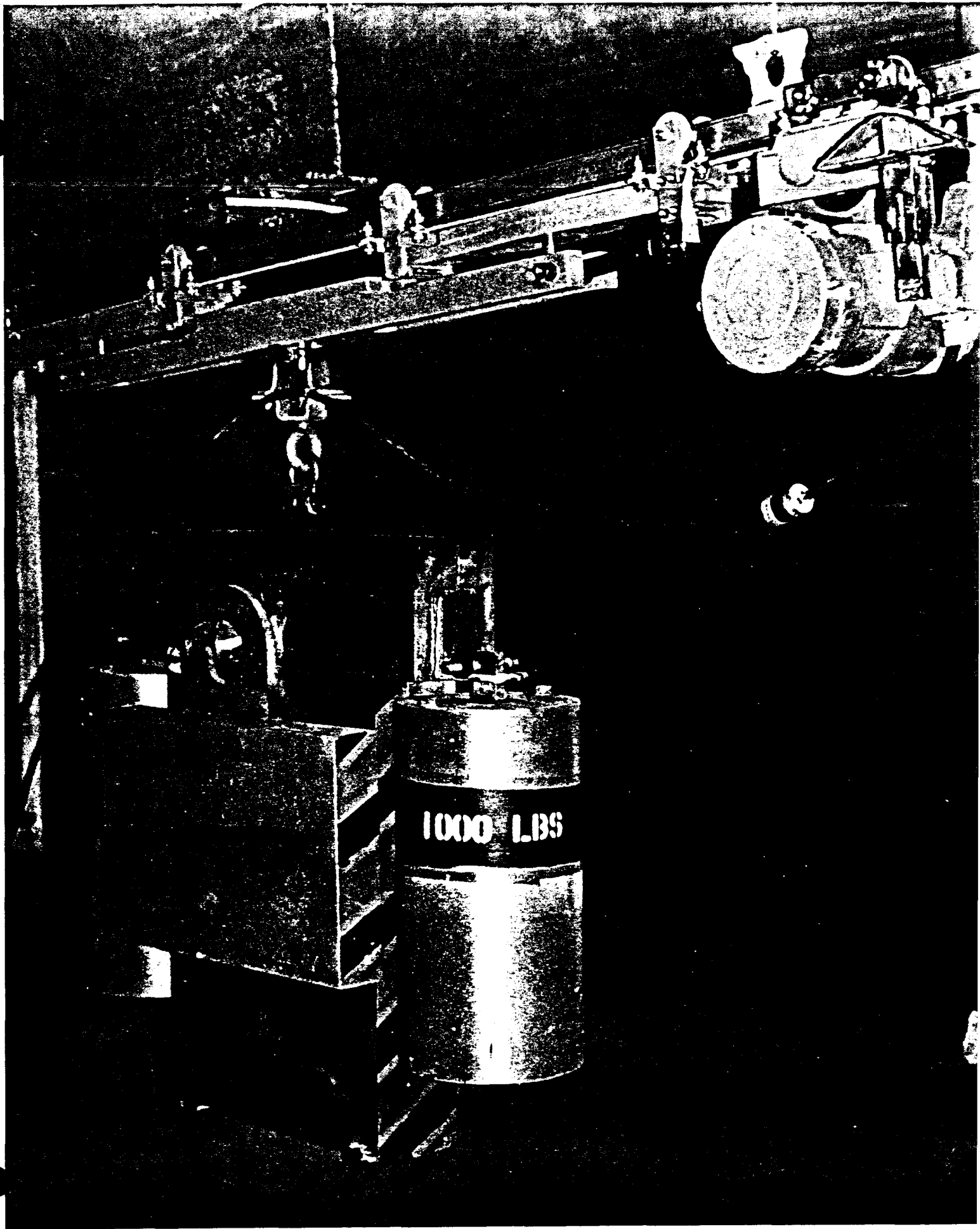
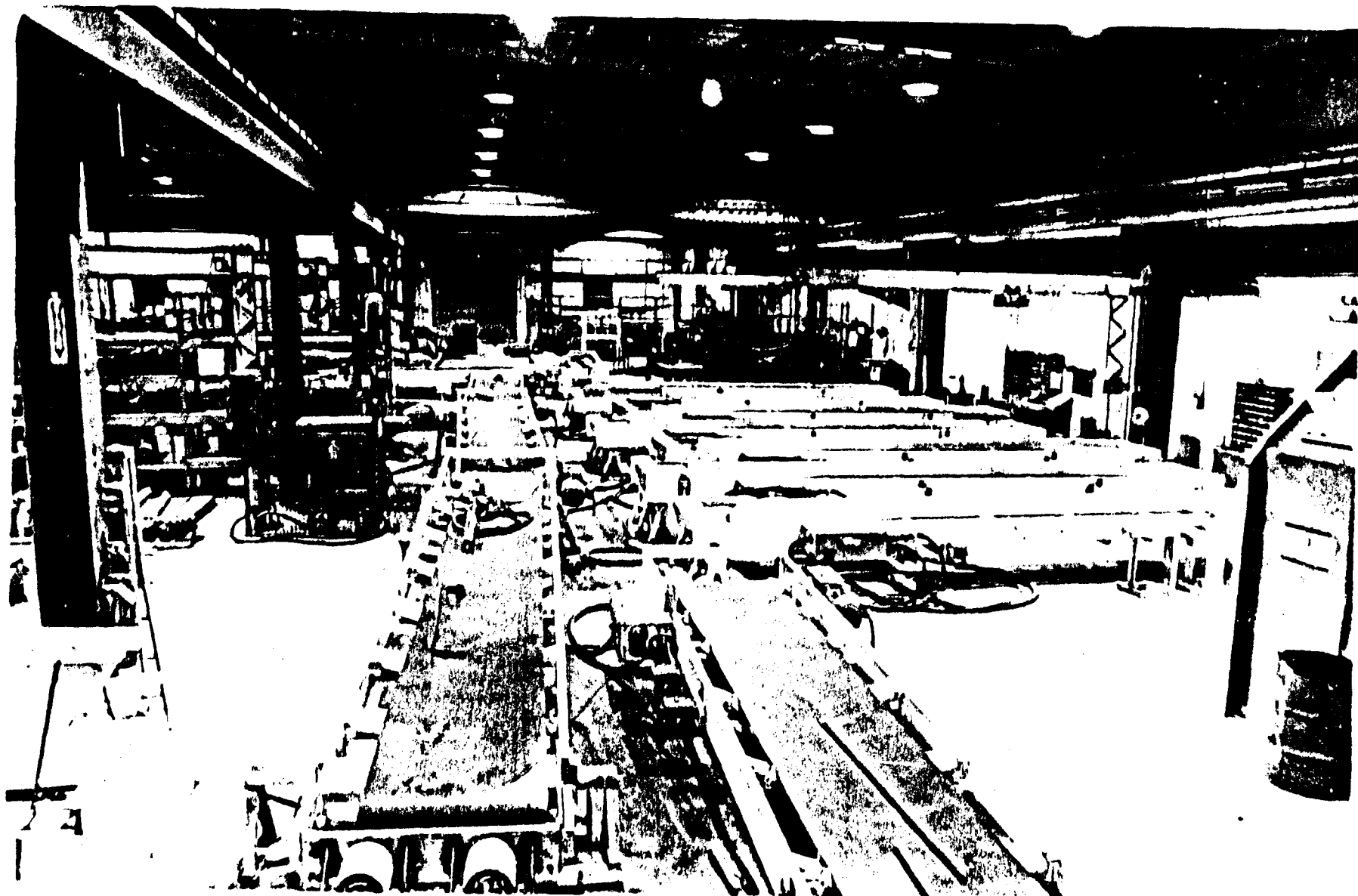


Figure 73



12 - CONVEYOR FRAMES
#201172