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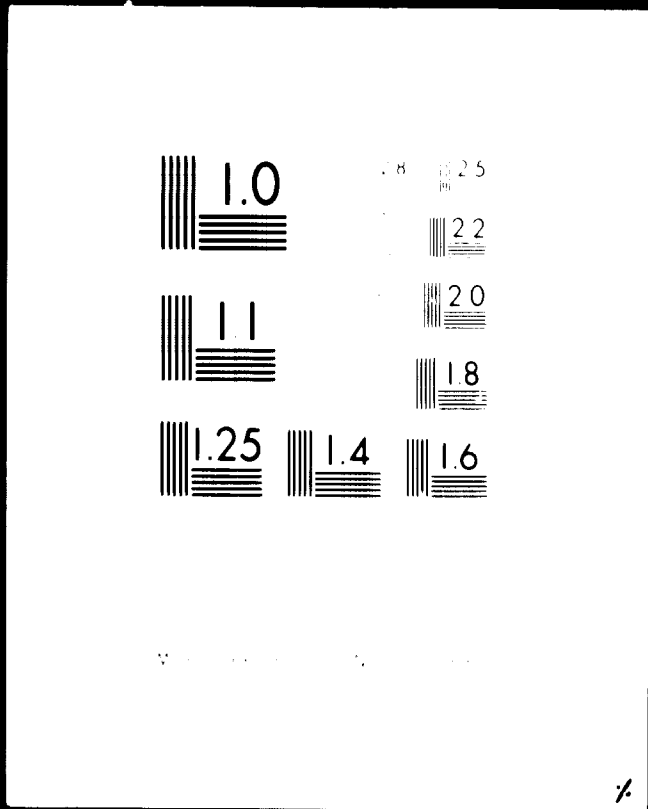
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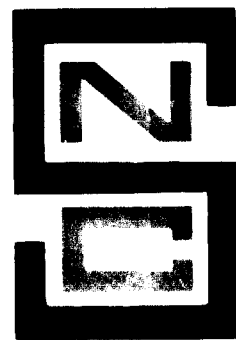
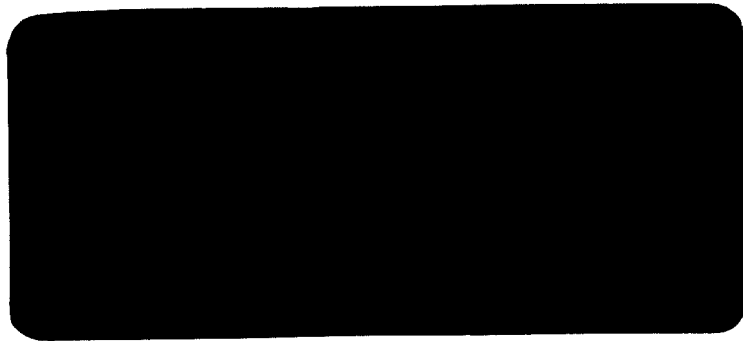
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1 OF 2



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02281



SURVEYER, NENNIGER & CHÊNEVERT INC.

CONSULTANTS

MONTREAL

02281

MANUAL ON PROCESS EQUIPMENT,
EXPERIMENTAL PROCESSING PLANT
FOR ASBESTOS PROCESSING
COCHABAMBA, BOLIVIA
SNC CONTRACT NO. 3250-0002

Prepared for: The United Nations Industrial
Development Organization
Vienna, Austria

Prepared by: Surveyer, Nenniger & Chenevert Inc.
The Mining & Metallurgy Division
Montreal, Canada

Distribution: UNIDO Six copies
SNC Four copies

Date: May 1973

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LIST OF DRAWINGS

Rotary Aspirator	D-8392
Live Bottom Bin	E-8516
Cyclone Collector	-
Dust Collector	70D-4976
Belt Conveyor	75118-F-1
Belt Conveyor	75118-F-2
Belt Conveyor	75118-F-3
Screw Conveyor	TK4210-B1
Impact Crusher	Z1-50423A
Rotary Dryer	TK4210-A1
Bucket Elevator	109-513D
Bucket Elevator	109-514D
Vibrating Feeder	831-228D
Standard Grader	D-6107
Screw Packer	D-9318-403
Portable Scale	-
Truck Scale	-
Fibre Screener	47385
Rock Screener	E-8513
Vibrating Screener	TZ15709
Paddle Trommel	E-4386
Rotary Air Lock Valve	D-9320-400
Equipment Flow-Sheet	No. 14

CHAPTER 1

1.0 INTRODUCTION

On March 5, 1970, the United Nations Industrial Development Organization awarded a contract to Surveyer, Nenniger & Chenevert Inc. to assist the Government of Bolivia in the implementation of an experimental production plant for asbestos processing in Cochabamba. The contract was revised on August 8, 1972 and the work to be performed by SNC was divided into four phases:

- Phase I : Evaluation of Asbestos Mineral Ore
- Phase II : Preparation of an Economic Study and Selection of Process.
- Phase III : Design of Process and Design of Processing Plant.
- Phase IV : Supply of Process Equipment, Erection of Process and Laboratory Equipment and Start-up of Plant.

Phase IV also requires the preparation of a manual detailing all process equipment, including parts identification of mechanical equipment. The manual also includes a list of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation as well as the final plant flowsheet.

The manual is intended for the maintenance superintendent, the scalping station leader, the mill foreman, the storekeeper and the purchasing agent. The second chapter dealing with the process equipment is divided into sections with a section for each type of equipment. A drawing showing the general arrangement of each type of equipment is also included.

CHAPTER 2

2.0 PROCESS EQUIPMENT

SECTION I

2.1 ROTARY ASPIRATOR

2.1.1 Description

The rotary aspirator is a 610 mm diameter screen mesh cylinder, mounted horizontally, so that it can rotate freely within a sheet metal casing. A motor-speed reducer drive rotates this cylinder. It is mounted at the discharge end of a gyratory screen to receive the oversize material. An aspirating hood is mounted 50 to 100 mm above the aspirator cylinder to separate the lighter opened asbestos fibers from the oversize rock particles. The rotary aspirator is base mounted and should be secured to the floor.

Speed:

Motor, 1440 rpm

Rotary aspirator, 48 rpm

Drive:

A 1 HP, 380 V, 3 ph, 50 cycle motor with V-belt sheave.

1 speed reducer TD-125, 1-1/2" bore, V-belt sheave.

2.1.2 Part Identification

The rotary aspirator is composed of seven main parts.

Reference drawing:

Fournier Steel Works Ltd. No D-8392, Rev. 1

"24" dia. Rotary Aspirator - General Arrangement", dated

1.4.72.

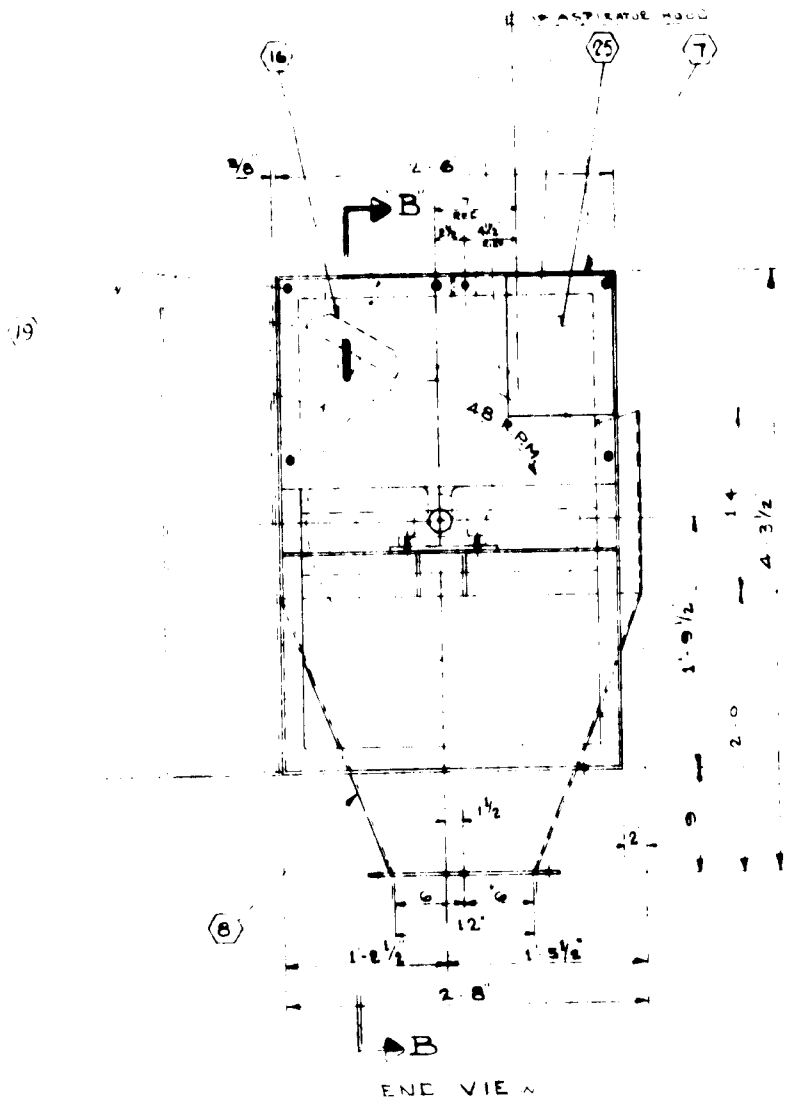
Part identification	Ref. No.
1. Rotor assembly	
2. Casing	
3. Motor	
4. Reducer	TD-125
5. Frame	
6. Hopper	
7. Screen	

2.1.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of operation:

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	V-belts A-60 (one matched set)	13
2	Pillow blocks #SY111	9

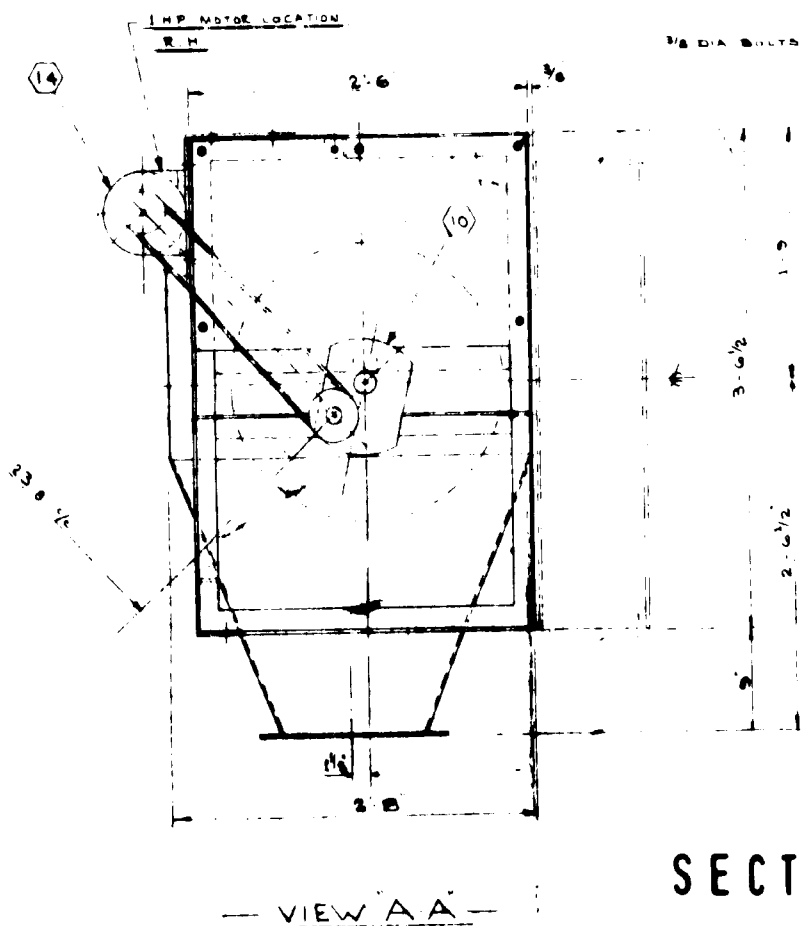
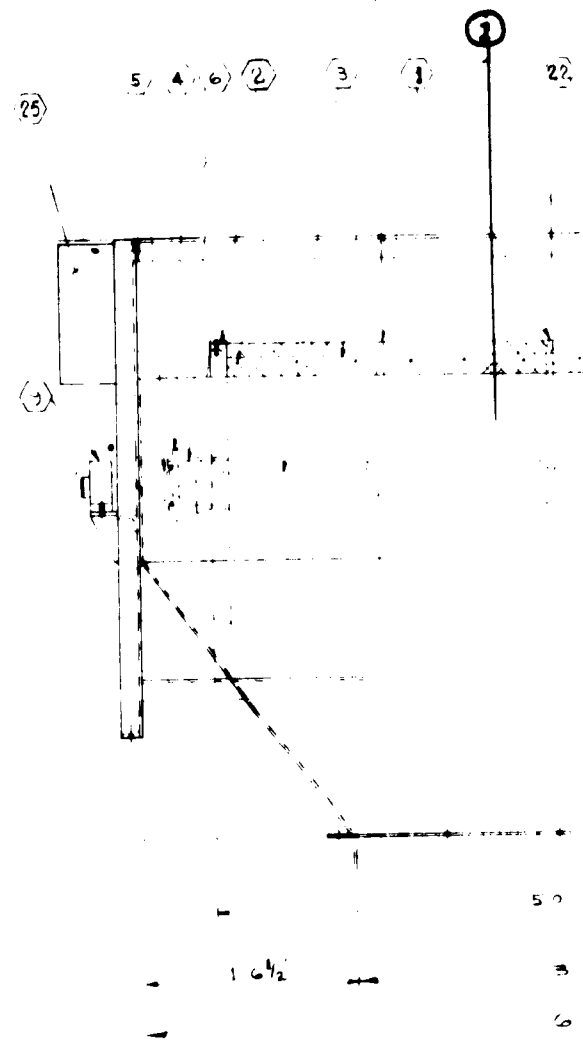
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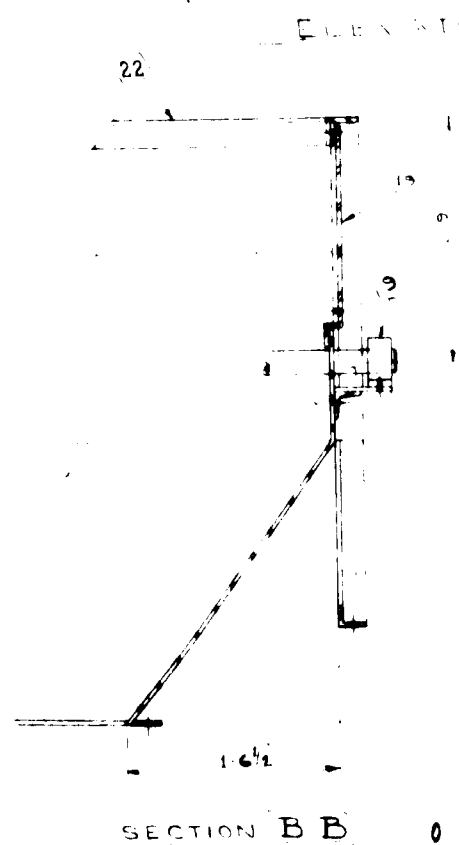
(19)

(8)

END VIEW



VIEW AA

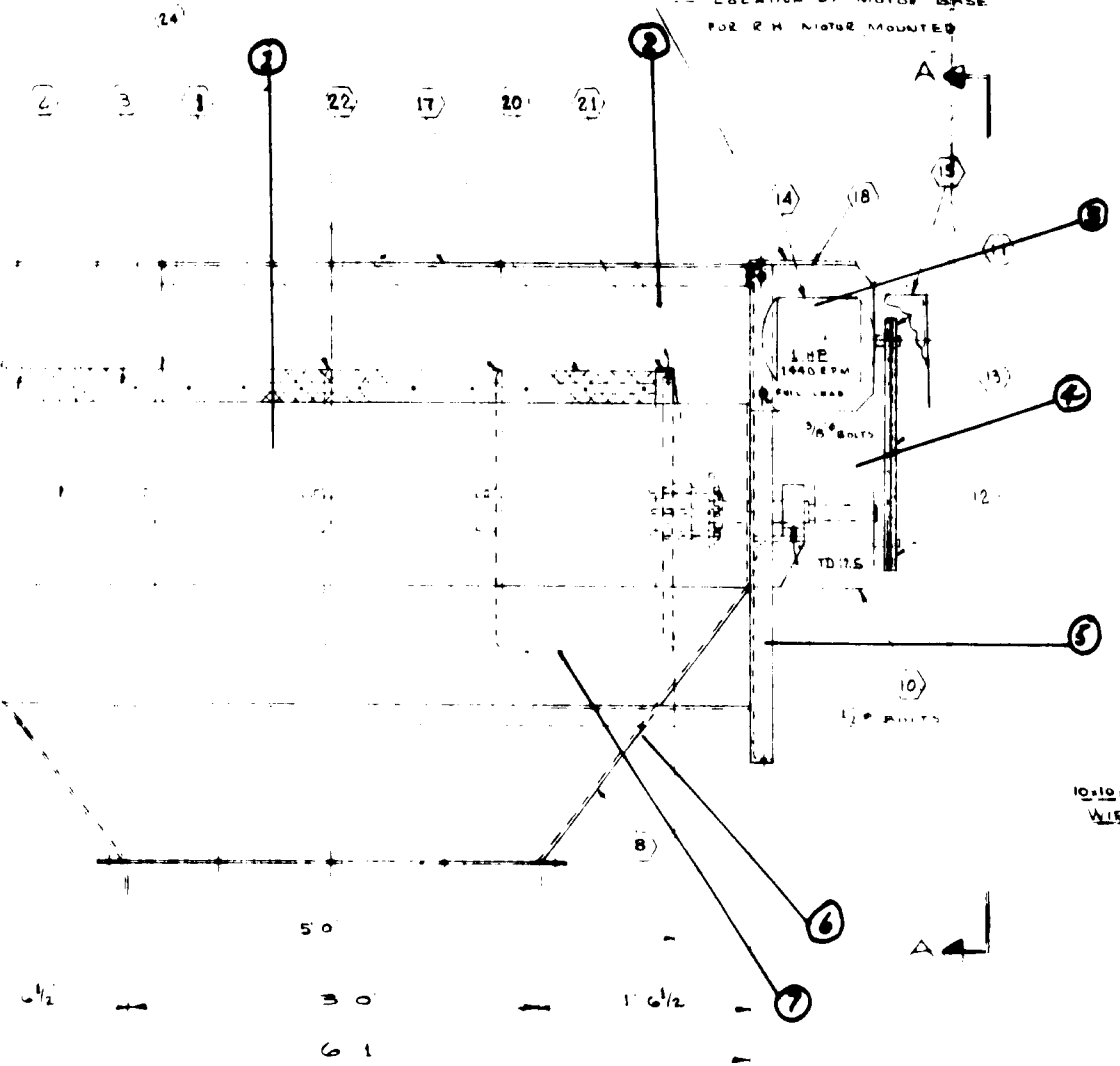


SECTION BB

SECTION 1

23 1/8" POP RIVET 5/16"

LOCATION OF MOTOR BASE
FOR R.H. MOTOR MOUNTED

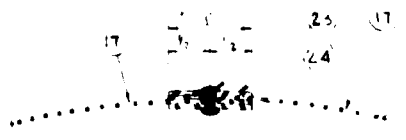


ELEVATION

NO	DESCRIPTION	DWG
1	CENTER RING	B-8394
2	END RING	B-8395
1	SHAFT	B-8396
2	TENSION DISC	
2	SAFETY COLLAR	
8	1/2 13 NC HEX HD. BOLT 1/2 LB	
1	FRAME	D-8393
1	HOPPER	D-8393
2	1 1/2" PILLION BLOCK (SKP) 6VH11C8	
1	REDUCER TO-125 1 1/2" BORE (FEMER)	
1	3/4" DRIVER SHEAVE 2 AGROOVE 3 1/2" O.D.	
1	1/2" DRIVER SHEAVE 2 AGROOVE 4 7/8" O.D.	
2	VEE BELT A-60 (MATCHED SET)	
1	1 HP MOTOR 1440 RPM 380/50/3 TEFC FRAME 113T	
1	SAFETY GUARD	D-8393
1	ADJUSTABLE SPEED DISTRIBUTOR	D-8393
1	10" DIA. 1/8" WIRE MESH 5'0" X 6'0"	
1	MOTOR BASE	D-8393
2	SIDE PANEL	D-8393
2	RETAINING RING	D-8393
32	1/4" DIA. CAP SCREW 1 LG	
1	LONGITUDINAL BAR	D-8393
12	DOME HEAD 1/8" POP RIVETS (SPANNED END TYPE)	
2	20 GA. STL SHEETS 1'0" X 4'0" LG	
1	MAGNETIC STARTER & WIRE	

10:10:0.05 DIA
WIRE MESH

ENLARGED VIEW
DETAIL X



SECTION C-C (AT LONG JUMP)

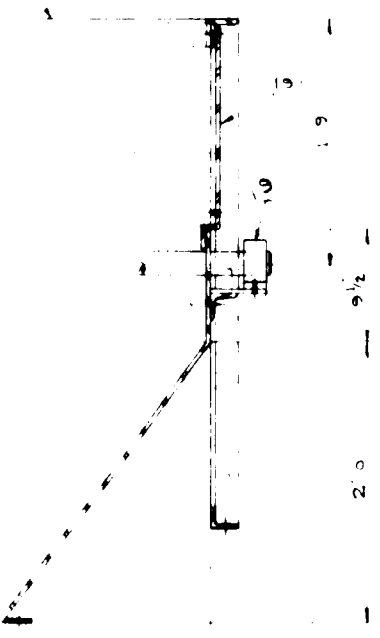
REF. DWG

- FOR DETAIL 1 SEE B-8394
- FOR DETAIL 2 SEE B-8395
- FOR DETAIL 3 SEE B-8394
- FOR DETAILS 3/4/5 SEE B-8396

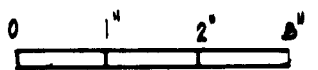
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SECTION 2



SECTION B-B



1	REVISED TO SUIT BOLIVIAN PROJECT.	D.D.	MAY 1970
FOURNIER STEEL WORKS LTD. BLACK LAKE, QUEBEC			
24" DIA. ROTARY ASPIRATOR GENERAL ARRANGEMENT			
SCALE	NO. 100'	DWG. NO.	D-8393
SHEET	297	APP.	

SECTION 2

2.2 LIVE BOTTOM BIN

2.2.1 Description

The live bottom bin consists of four .41 m diameter conveyor screws (2 with righthand flights and 2 with lefthand flights) mounted parallel and horizontally in a common casing and with separate independent drives to each pair of screws. It is designed to be mounted beneath a storage bin or hopper 1980 mm x 2900 mm and to permit the even removal of the product from the bin or hopper. The screws discharge the material through an opening in the bottom of the casing into a 360 mm diameter screw conveyor, where it is collected and transported to the appropriate discharge point.

Drive:

Two 3 HP, 380 V, 3 ph, 50 cycle motors with V-belt sheaves.

Two speed reducers - Crofts Radiation

Fan cooled worm gear reducer size 70, ratio 70/1, Type 'R' with V-belt sheaves and sprockets.

Speed:

Bin bottom conveyor screws, 5 rpm

Bin bottom discharge conveyor screw, 60 rpm

Motor, 1000 rpm

2.2.2 Part Identification

The live bottom bin is composed of eight main parts.

Reference drawing:

Fournier Steel Works Ltd. No.8516, Rev. B,

"Live Bottom Bin", dated 20.4.72.

Part identification:

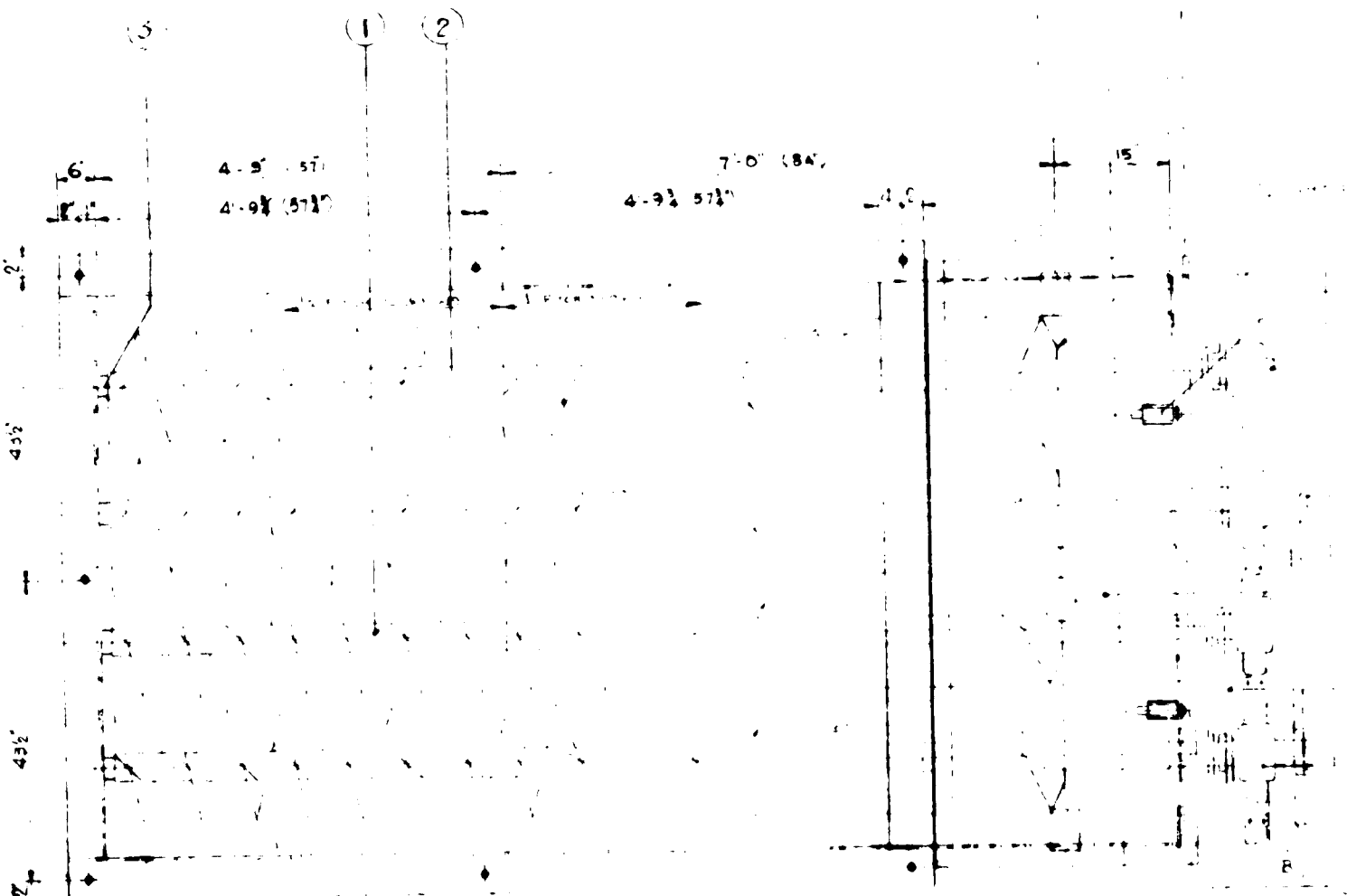
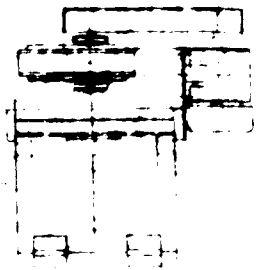
1. 2 40.64 cm bin conveyor screws (LH)
2. 2 40.64 cm bin conveyor screws (RH)
3. 1 36.96 cm conveyor screw
4. Casing
5. Electric motors
6. Bin cover
7. Support assembly
8. Drive assemblies

2.2.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	V-belts A-60 (one matched set)	A-60
4	V-belts A-55 (2 matched sets)	A-55
2	Length of 55 pitches of 1-1/4" ASA 100 roller chain	ASA 100
2	Connecting links for ASA 100 roller chain	ASA 100

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	Offset links for ASA 100 roller chain	ASA 100
2	Lengths of 84 pitches of 1-1/2" ASA 120 roller chain	ASA 120
2	Connecting links for ASA 120 roller chain	ASA 120
2	Offset links for ASA 120 roller chain	ASA 120
4	Bearings	#476213-207
2	Bearings	#476215-215



10'-1 1/2 (121 1/2)

2'-0 1/2 (34 1/2)

LINK BELT FB 2244
BUSHING 5/16"
1 1/2" P 1150 16 100 1/2
2 1/2" Dia 3048 8

SRPM

5 x 3 10" x 14" BEAMS INSIDE

(2) 5 1/2" x 7 1/4" x 14" QUADRA

SECTION 1

12 1/2" 16 1/8"

(13)

SECTION 2

Best Buy Part No.

26

25

24

31

23

5

7

42

4

12

50

2

4

6

1

3

6'-6 1/2" (78 1/2" Inside Frame)

12'-0" (144")

6'-7" (79")

12 7/8"

17 3/4"

17 3/4"

17 3/4"

17 3/4"

8

30

32

34

35

(10) LIAN BELT FB 22448H SPHERICAL ROLLER

BEARING FRAME 1111 3' Dia

100T 1 1/2" P 150 16 100 7/8 C 500000

2 1/2" Dia 300 28 3' Dia

40T 1 1/2" P 11 170

300000

20

19

36

1 1/2" P 11 170

300000

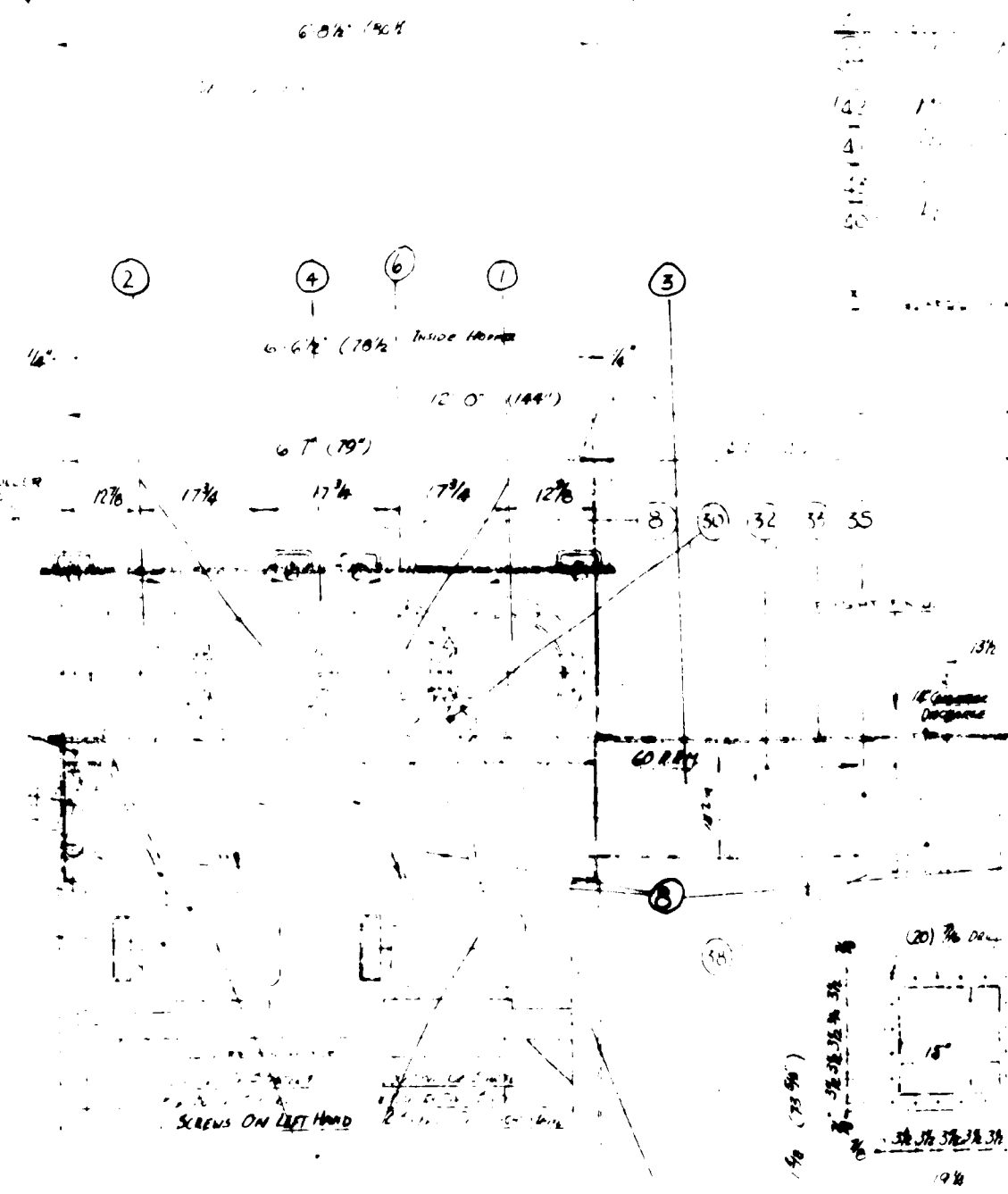
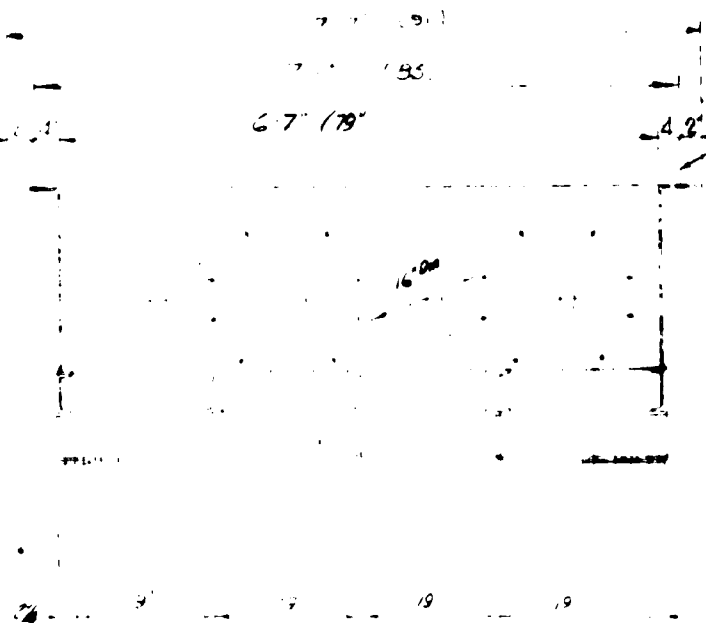
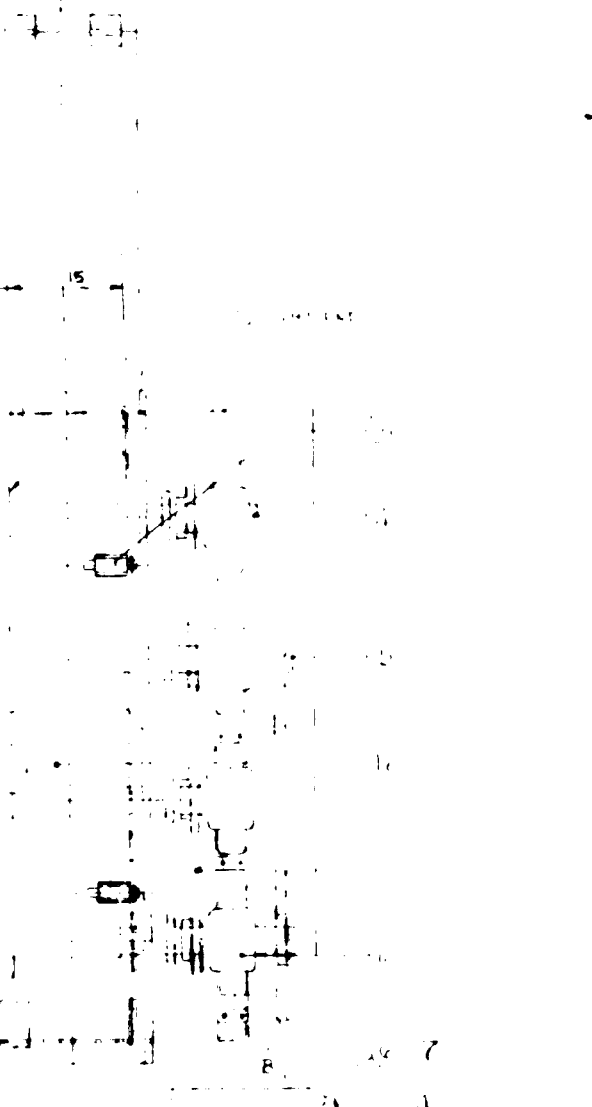
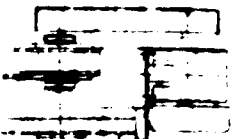
SCREWS ON LEFT HAND

(20) 3/8 Dia

18"

3/8 Dia 3/8 Dia 3/8

19 1/2"



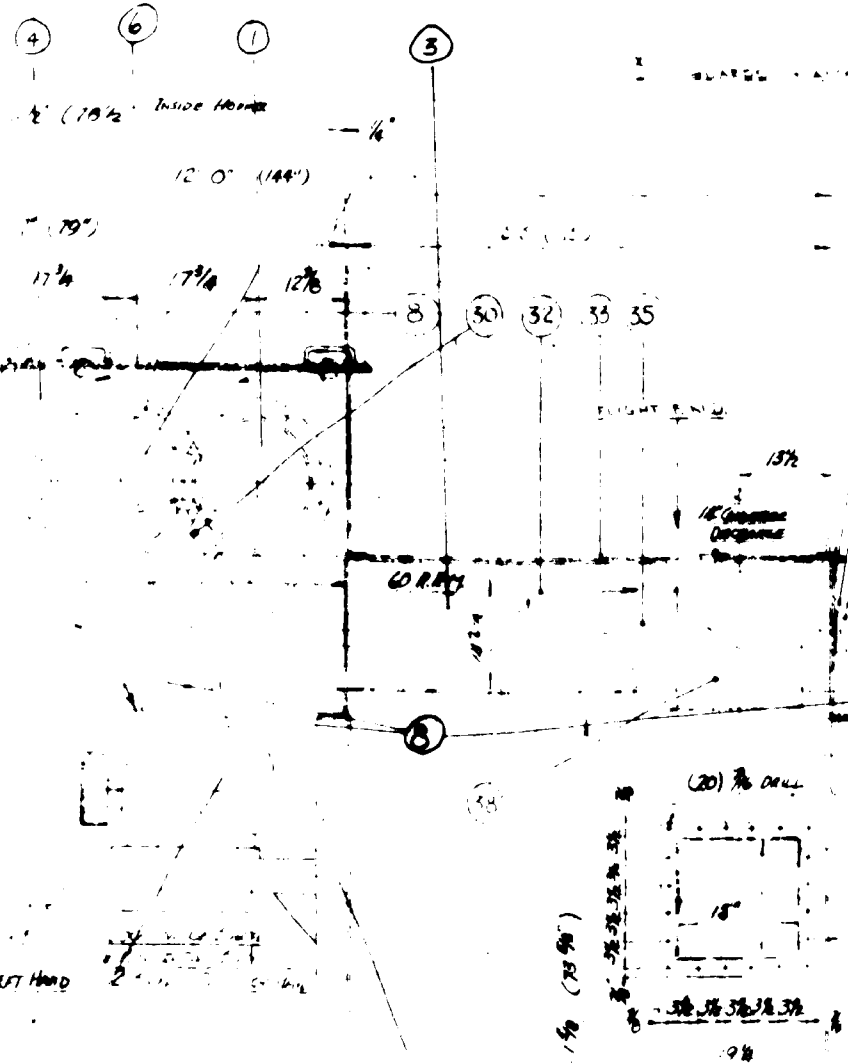
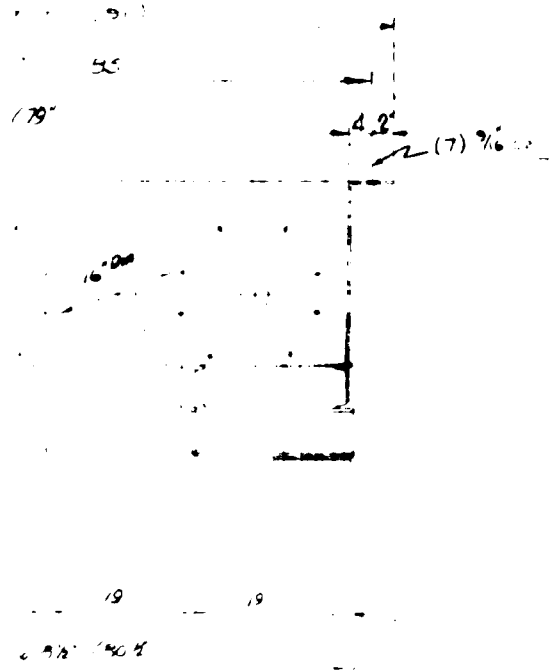
Item	Description	Quantity	Unit

Bill of Materials - Drive Specifications

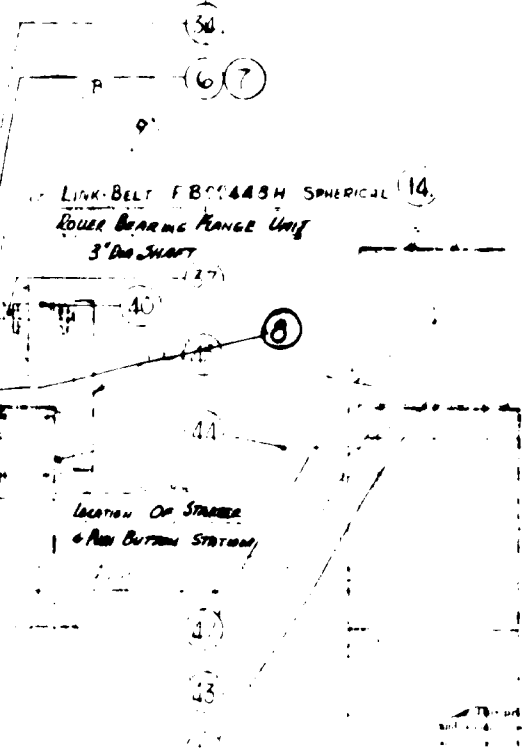
- (26) Electric Motors (2) 3/4 HP 1000 RPM TEFC 3/4" V. S. 5000
Frame No. 2137 (1700R Drives 2 Screws)
- (25) Motor Shields (2) 18" x 6" x 1/2"
- (24) Roller Chains (2) 1/2" x 3/8"
- (31) V-Belt (1) 3/4" x 3/8" A-51 5000 RPM CENTERS 15"
- (23) Fan Cooled Worm Reducer
Type R

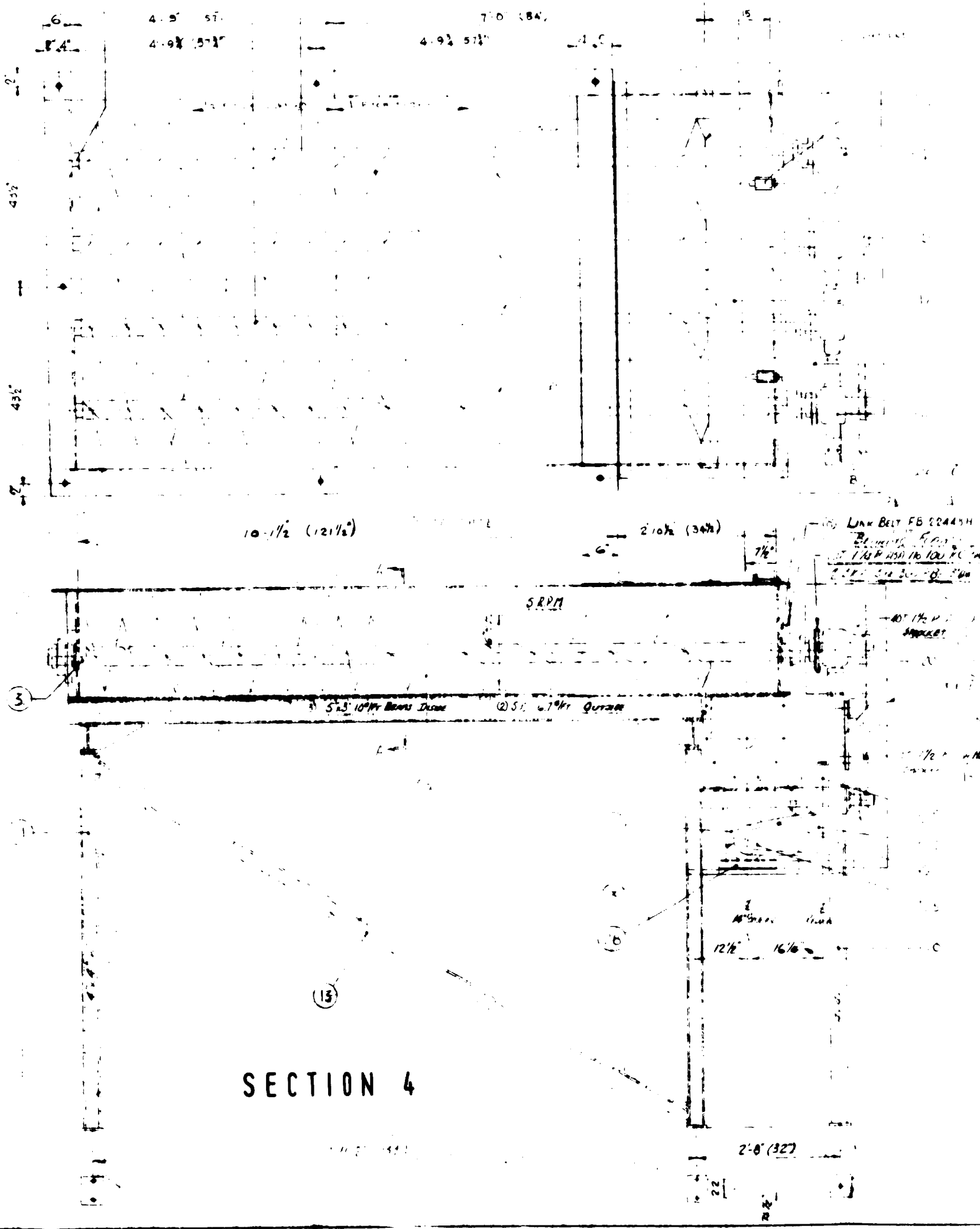
- (18) Shaft 1 1/2" Dia. 18" Long
- (17) Shaft 1 1/2" Dia. 18" Long
- (16) Shaft 1 1/2" Dia. 18" Long

- (62) Motor Shield 18" x 6" x 1/2"
- (41) Roller Chain 1/2" x 3/8"
- (43) V-Belt 3/4" x 3/8" A-51 5000 RPM CENTERS 15"
- (40) Fan Cooled Worm Reducer Type R



SECTION 3





SECTION 4

4.9' 5 1/2"

7'0" (84")

4.9 1/2 5 1/2"

10'-1/2 (121 1/2")

2'-0 1/2 (34 1/2")

7 1/2"

SRPM

5x5 10" W/ BEAMS INSIDE

(2) 5x5 6 7/8" QUAD

LINK BELT FB 22445H
 1 1/2" P 150 16 100 P.C.
 2 1/2" 5/8" 3/4" 8" 1/4"

10' 1/2" P
 3/4" 1/2"

12 1/2" 16 1/2"

2'-0" (32")

(3)

(13)

(6)

22

22

5-10

6' 5 1/2" (196)

② ④ ⑥ ① ③

6' 6 1/2" (78 1/2) Inside Hoop

12' 0" (144")

6' 7" (79")

(6) LINK BELT FB 22445H SPHERICAL ROLLER
ELEMENTS 50211111 50211111
112 P 1150 16 100 PC 50211111
2 1/2" Dia 304 28- 50211111

NOT 1 1/2" DIA 1120
SUPPORT

1 1/2" DIA 1120
SUPPORT

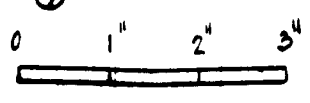
12 7/8 17 1/4 17 1/4 17 1/4 12 7/8 8 30 32 34 35

CORNER

SCREWS ON LEFT HOOD

SCREWS ON RIGHT HOOD

6' 1 1/8" (73 9/16)



2'-0" (32)

6' 3 1/2" (75 1/2)

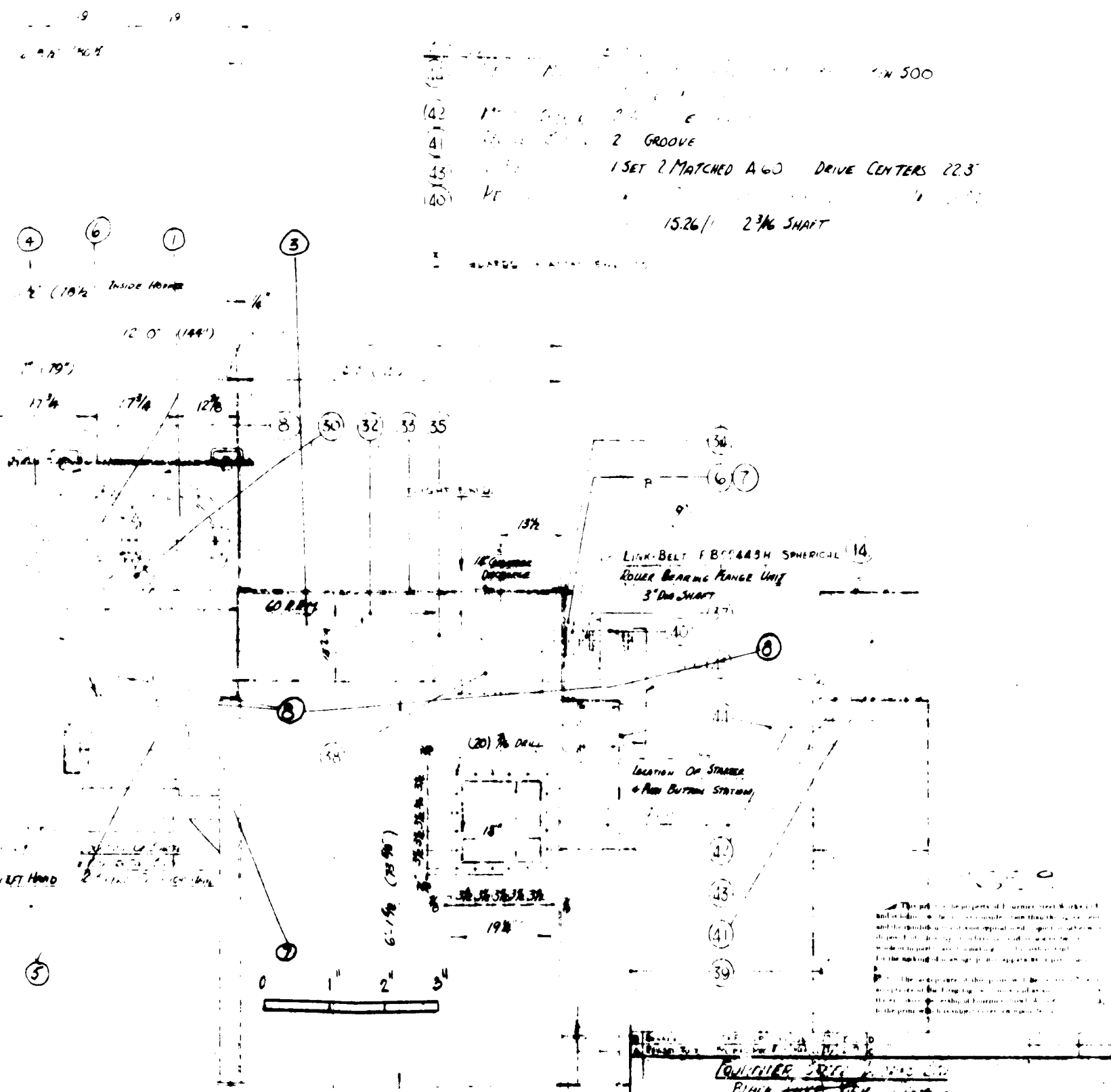
5' 7 1/8" (67 1/8)

SECTION 5

18
17
16

1. Link-Belt F800443H Spherical Roller Bearing Flange Unit
 2. 3" Dia Shaft
 3. 15.26/1 2 3/16 Shaft

(42) 1" Dia Shaft
 (41) 2 GROOVE
 (43) 1 SET 2 MATCHED A60 DRIVE CENTERS 22.3"
 (40) 15.26/1 2 3/16 SHAFT



QUINCY STEEL WORKS CO BIRLA ENGINEERING WORKS			
TITLE	LIVE BOTTOM BIN		
DETAIL	GENERAL ASSEMBLY		
DR	CH	DATE	APR 20 72
APP	SCALE	E-85/1	91

SECTION 6

SECTION 3

2.3 CYCLONE COLLECTOR

2.3.1 Description

The cyclone collectors are manufactured by Maestransa Y Fundicion Kaliffa, Cochabamba, Bolivia. Each cyclone consists of an upper cylindrical part welded to a conical lower body having an airlock valve at the bottom discharge spout. The inlet for the material laden air is at the upper half of the cylinder. The air is exhausted through an outlet on the top of the cylinder. The cyclone collectors are built in different sizes according to the air circuit.

Drive: Rotary Airlock Valve

A 2 HP, 380 V, 3 ph, 50 cycle electric motor

One Dodge Double Reduction No. 425, ratio 24.64/1 torque arm.

Speed:

The speed of the electric motor is 1500 rpm.

The speed of the rotary airlock valve is 20.8 rpm.

2.3.2 Part Identification

The cyclone collector is composed of seven main parts.

Reference drawing:

"Cyclone Collector", dated

Part identification:

1. Air outlet
2. Air baffle

3250-0002

3. Air inlet
4. Cylindrical part
5. Conical part
6. Discharge spout
7. Rotary airlock valve and drive assembly

2.3.3 List of Recommended Spare Parts

The manufacturer does not recommend any spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

Page 12 - Drawing of Cyclone Collector.

4

12	13	14	15
M.	70110-F-3		
SEARCHED	SERIALIZED	INDEXED	FILED
			DEPT. OF JUSTICE
			COMMUNICATIONS SECTION
			RECEIVED
			APR 11 1964
			FBI - NEW YORK

SECTION 4

2.4 DUST COLLECTOR

2.4.1 Description

The dust collector is a Wheelabrator Ultra-Jet Dust Collector, No. 11, Model 108 KD, Serial No. A-126874, exclusively manufactured by the Wheelabrator Corporation of Canada Limited, Oakville, Ontario. The dust collector operation in the mill is to clean the dusty air coming from different sources such as cyclone collectors, air separators and other dusty machinery or places. A fan of calculated capacity sucks the dusty air entering at the top of the collector. The dusty air then passes through a calculated number of filter bags which catch the dust. An automatic device cycles the process of air filtering and bag cleaning. The dust is gathered in a trough at the bottom of the collector and it is transported by a screw conveyor to the rotary air valve for discharge. The clean air is exhausted back into the mill or to atmosphere as desired.

Drive:

Screw conveyor - one 1-1/2 HP, 380 V, 3 ph, 50 cycles
with V-belt sheave and one CD218B-2 Dodge
Screw Conveyor drive with V-belt sheave.

Compressor - one 1-1/2 HP, 380 V, 3 ph, 50 cycles with
V-belt sheave

Fan - one 2 HP, 380 V, 3 ph, 50 cycles with
V-belt sheave

Speed:

The speed of the electric motor for the screw conveyor is 1400 rpm.

The speed of the screw conveyor is 30 rpm.

The speed of the fan motor is 1450 rpm.

The speed of the fan is 1786 rpm.

2.4.2 Part Identification

The dust collector is composed of fifteen main parts.

Reference drawing:

The Wheelabrator Corporation of Canada No. 70D4976

"General Arrangement of Ultra-Jet KD Cont. Auto. Dust Collectors Models 84 and 108", dated 13.11.70.

Part identification:**Ref. No.**

1. U Trough screw conveyor
2. Screw conveyor drive assembly
3. Support Assembly
4. Discharge spout
5. Hopper
6. Exterior catwalk and ladder
7. Main casing
8. Inside catwalk
9. Dustube
10. Baffle

3250-0002

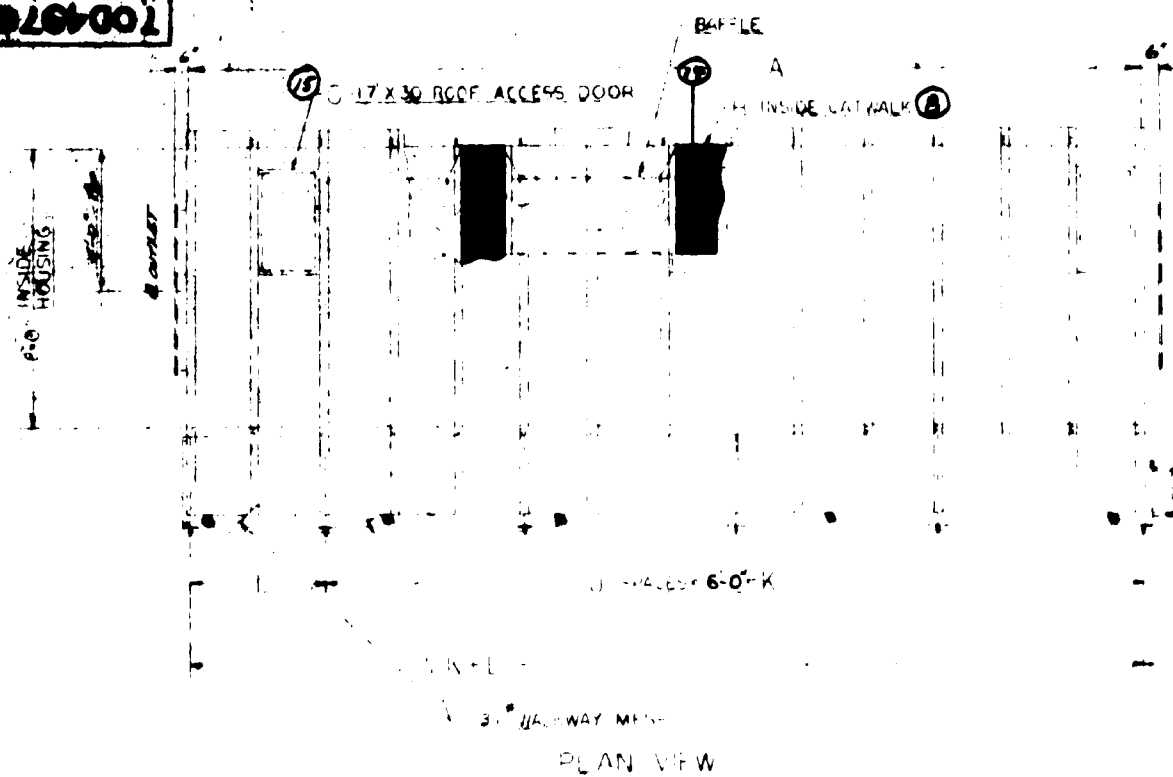
11. Inlet
12. Compressor assembly
13. Front access door
14. Walkway mesh
15. Roof access door

2.4.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
	Dust collector	
50	Dustubes polypropylene	298745
3	Aluminum venturi tubes	
10	Cages	292543
10	Snap lock clamps	292246
5	Timer fuses	
6	Rotary airlock seals	
1	Rotary airlock drive screw conveyor	
1	Tail shaft flange bearing	306031
1	Drop out seal assembly	BM 305136
20	Coupling bolts	
1	V-belt	A 64

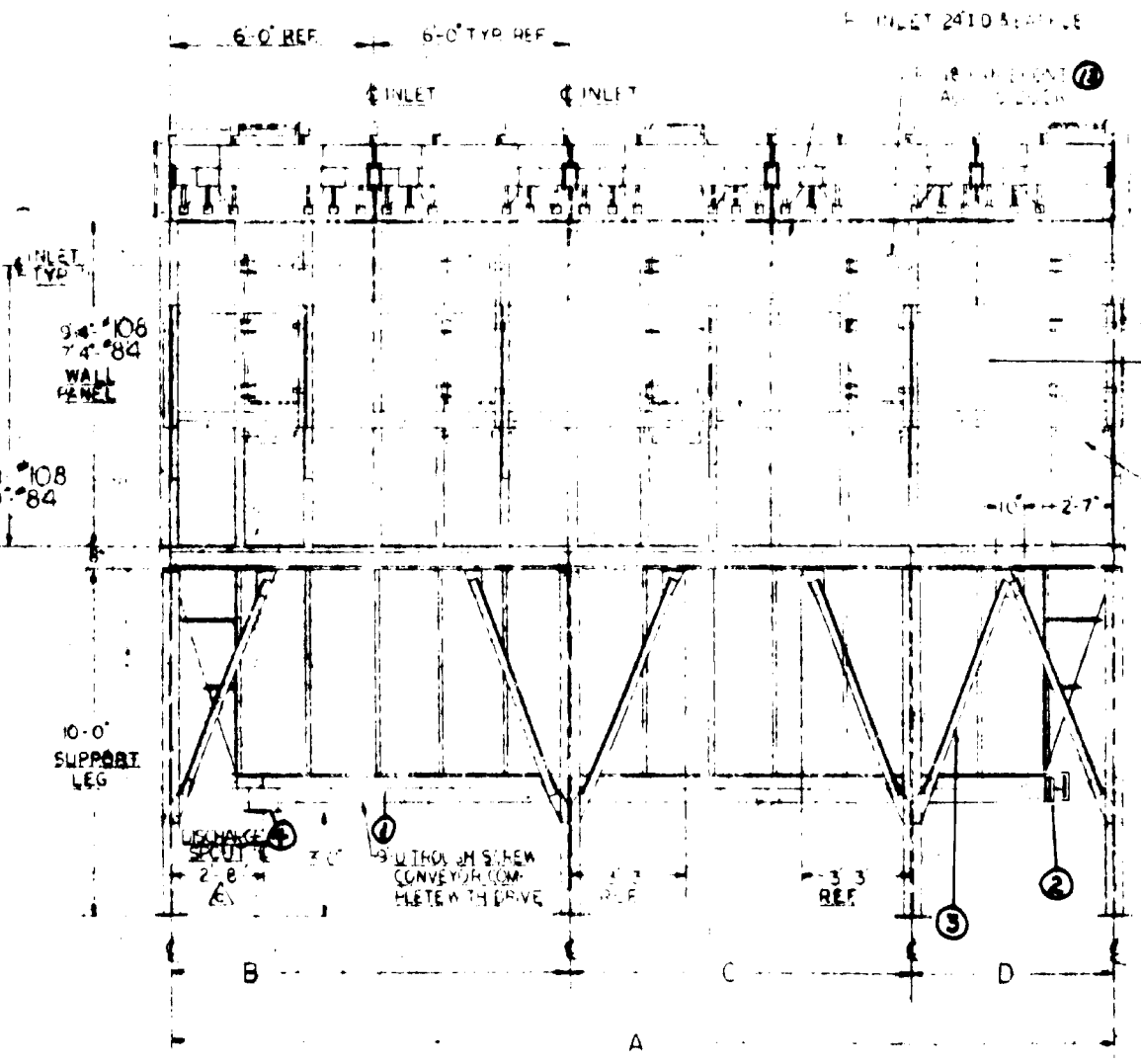
<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
	COMPRESSOR	
1	Set rings	
1	Set gaskets	
1	Set of eight valves	
1	Air intake filter	
2	Safety valves	
1	Check valve assembly	
1	Pressure switch	
1	Set drive belts	
	EXHAUSTER	
2	Bearings	
1	V-belt drive - 100 HP	



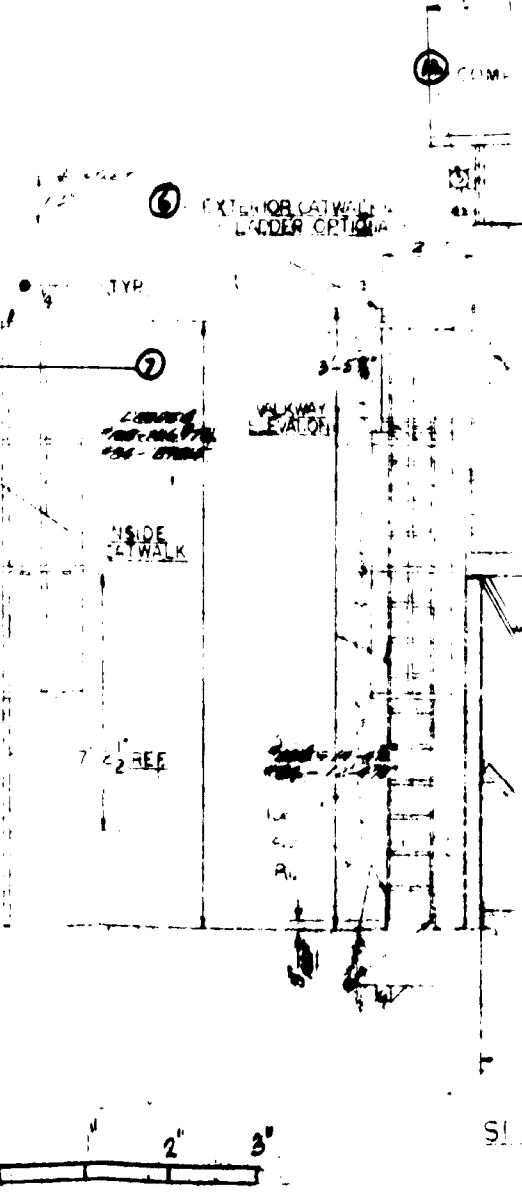
	UNIT 109	112
MODEL	184 108 84	108 84
VALVES	9 19	10 19
DUST COLLECTORS	9 90	10 90
CLOTH AREA SQ FT	190 170	300 195
APPROX UNIT WT	150 170	200 195
TIMERS		
A (C.D)	10 10	12 12
B (C.D)	10 10	12 12
D (C.D)	10 10	12 12
E (C.D)	10 10	12 12
F (C.D)	10 10	12 12
G (C.D)	10 10	12 12
H (C.D)	10 10	12 12
I (C.D)	10 10	12 12
J (C.D)	10 10	12 12
K (C.D)	10 10	12 12
L (C.D)	10 10	12 12
M (C.D)	10 10	12 12
N (C.D)	10 10	12 12
O (C.D)	10 10	12 12
P (C.D)	10 10	12 12
Q (C.D)	10 10	12 12
R (C.D)	10 10	12 12
S (C.D)	10 10	12 12
T (C.D)	10 10	12 12
U (C.D)	10 10	12 12
V (C.D)	10 10	12 12
W (C.D)	10 10	12 12
X (C.D)	10 10	12 12
Y (C.D)	10 10	12 12
Z (C.D)	10 10	12 12
EXTER CATWALK	134 134	141 141
CLADDER WT	240 268	240 268

PLAN VIEW

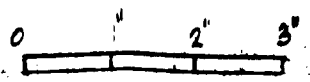
NOTE FOR DIMENSION LINE



FRONT ELEVATION



SECTION 1

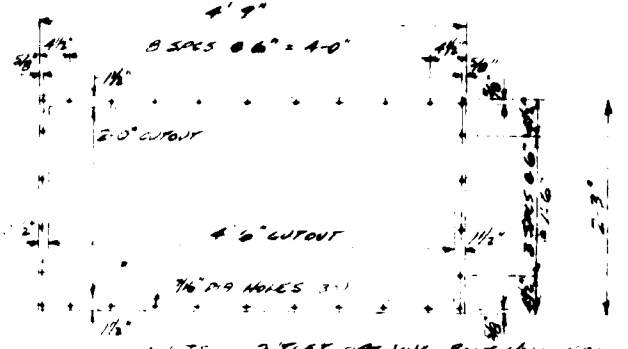
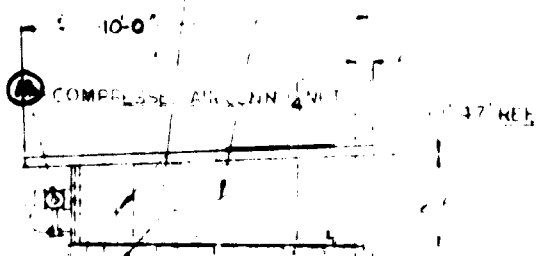


REV	BY	DATE	DESCRIPTION

UNIT	109	112	115	118	121	124	127	130	133	136	139	142	145	148	151	154
DEL	104	108	84	108	84	108	84	108	84	108	84	108	84	108	84	108
VES	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
AREA	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590
INIT WT	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
NET WT	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240

NOTE FOR MAN METER CONNECTIONS

TYPE - CLASS OR OTHERWISE
MAY BE LOCATED AT ENDS,
FROM END OF ONE SIDE

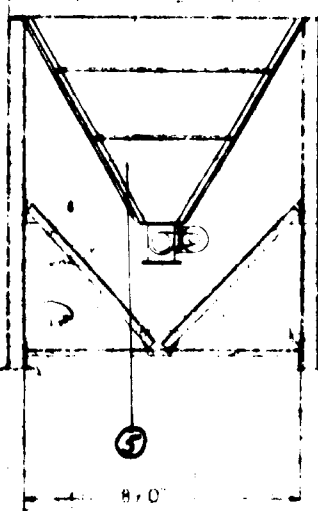


NOTE CUTLET OPENING MUST HAVE 2" DIA. (OPTIONAL - 95 (2000))

- INLET (1)
- BAFFLE (2)
- OUT TUBE (3)

OVERALL APPROX
22'-9 1/2" H08
20'-9 1/2" H84

- 1 UNITS DESIGNED FOR CONTINUOUS AUTOMATIC TIGHT OPERATION
- 2 M-RAM MAN METER ASSY (10" SHIPPED SEPARATE MOUNTING BY OTHERS SEE LOCAL)
- 3 ADJUSTABLE SOLID STATE TIMERS (SHIPPED SEPARATE MOUNTING BY OTHERS)
- 4 POWER SUPPLY TIMERS - 115 VOLTS - 50 60 CY
- 5 MODEL 84 7" I DUSTUBES
- 6 MODEL 108 9" I DUSTUBES
- 7 UNIT 127 MODEL 108 SHOWN
- 8 REFERENCE DRAWINGS
- 9 RECOMMENDED AIR PIPING LAYOUT - 7002020
- 10 FOUNDATION & LOADING LAYOUT - 7004472



SIDE ELEVATION

NOTE - FOR REFERENCE ONLY. SEE "MOUNTING AND ARRANGING" OR "CERTIFIED" GENERAL ARRANGEMENT FOR APPLICATION LAYOUT.

SECTION 2

ALL DIMENSIONS UNLESS OTHERWISE NOTED ARE PLUS OR MINUS .005 INCHES UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE NOMINAL UNLESS OTHERWISE SPECIFIED. THIS DRAWING AND THE DESIGN THEREON ARE THE PROPERTY OF WHEELABRATOR CORPORATION AND USE OF THIS DRAWING IS LIMITED TO THE PROJECT AND DATE SHOWN THEREON.

WHEELABRATOR CORPORATION WHEELABRATOR DIVISION MICHIGAN INDIANA U.S.A. WHEELABRATOR CORPORATION WHEELABRATOR CORPORATION		70D4976
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SECTION 5

2.5 BELT CONVEYOR

2.5.1 Description

The belt conveyors are manufactured by Jeffrey Manufacturing Company Limited of Montreal, Province of Quebec, Canada. Two inclined belt conveyors are designed to handle wet crocidolite ore at the head of the plant while the third horizontal conveyor will transport the rejects at the tail end of the plant.

Drive:

Two 1-1/2 HP, and one 5 HP, 380 V, 3 Ph, 50 cycle squirrel cage induction type electric motors with V-belt sheaves.

Two TD 415 and one TD 625 Dodge torque arm reducers with V-belt sheaves.

Speed:

The speed of the electric motors is 1500 rpm.

The speed at the output of the TD 415 reducers is 21 rpm and 22 rpm for the TD 625 reducer.

2.5.2 Part Identification

The belt conveyors are composed of eleven main parts.

Reference drawings:

Jeffrey Manufacturing Company Ltd. No. 751118-F-1, F-2, F-3

"General Arrangement of 18" W Belt Conveyor", dated 22.2.72, 20.2.72 and 23.2.72.

Part identification:

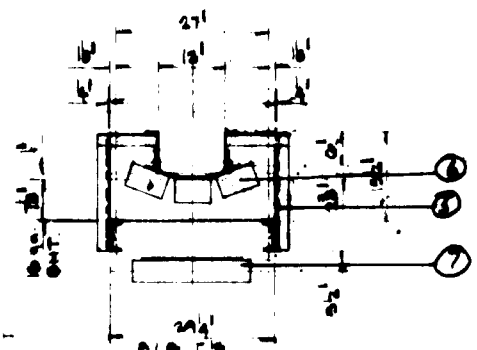
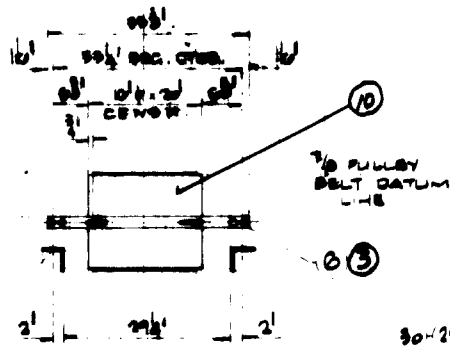
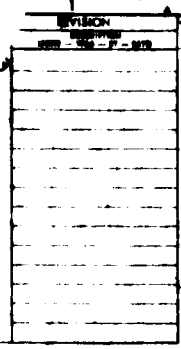
	Ref. No.
1. Drive assembly	
2. Drive shaft assembly	751118 A-4
3. Tailshaft assembly	751118 A-6
4. Support	75118 F-8
5. Frame assembly	75118 F-8
6. Troughing idler	323925
7. Return idler	323899
8. Belt	140
9. Head drum	
10. Tail drum	
11. Skirtboard	75118 G-10

2.5.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
4	BB34200 Troughing Idlers	323925
3	BB40 return idlers	323899
18	4" dia. roll for 18" wide belt troughing idlers	322059
2	SN22515 x 2-7/16" dia. roller bearing pillow blocks	SN 22515

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	SN22515 x 2-7/16" dia. roller bearings only	SN 22515
4	V-belt	A-75
2	Take-up blocks 1-15/16" dia. for Jeffrey Manufacturing 5cbs take-up	M3252F # 920437



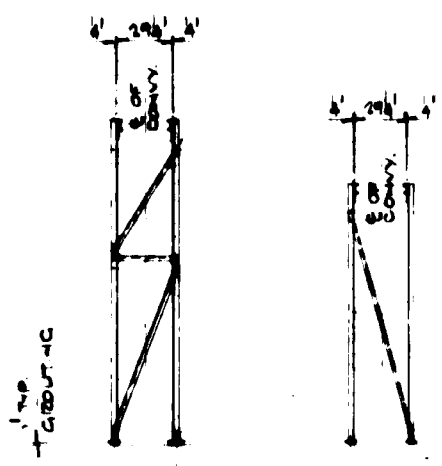
SECTION A-A
1'-0"

SECTION B-B
1'-0"

ONE - 18" WIDE INCLINED BELT CONVEYOR
 TO HANDLE: WET CROCIPOLITE ORE
 SIZE OF MATERIAL: -11
 WT/CU FT.: 95 LB.
 SPEED: 100 RPM
 CAPACITY: 25 MTPH BBO & CONT. FSD
 MTR: 12 HP @ 1500 RPM 300/3/30
 BBO: TO 416 TA DOUBLE BBO.
 RATIO 15/1
 DRIVER: 4.0" PD X 2 CR 90CT A SHEAVE
 DRIVEN: 18.0" PD X 2 CR 90CT A SHEAVE

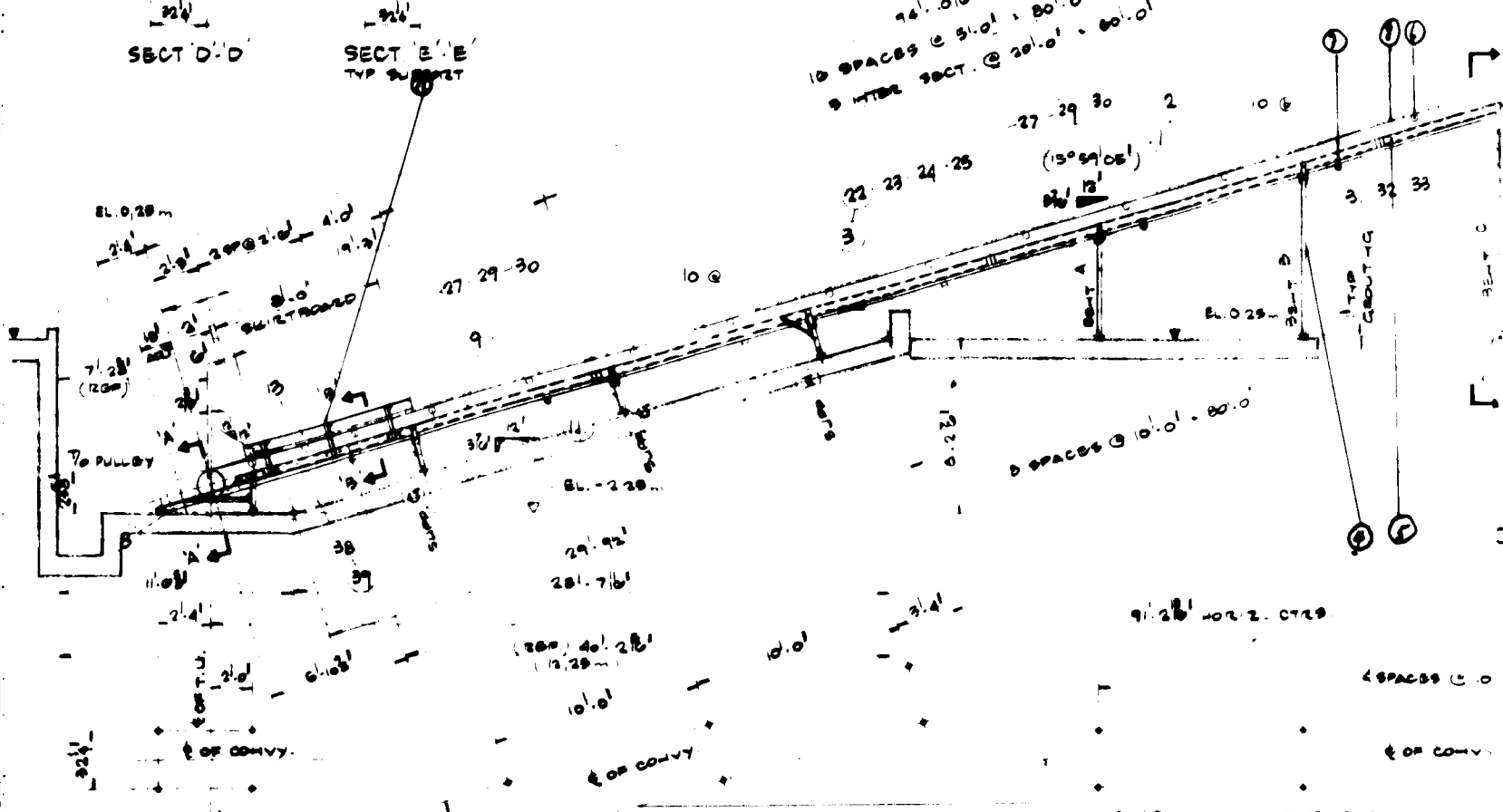
- ITEMS - BY CUSTOMER**
- 1) ALL ELECTRICAL CONTROLS & WIRING LESS MOTOR STARTER & WIRING TO MTR: CUSTOMER TO CONNECT IN FIELD EACH ITEM SH FSD SEPARATELY
 - 2) TEN OF FSD & DISCHARGE CHUTES

SHIPPING & TAGG-ING:
 ALL STRUCTURAL STEEL 5/8" TO 3/4" ROUND TOGETHER MARKED AND SHIPPED TO L. SECT. - 34 0000
 ALL STEEL SECT. TO BE MARKED - SHIPPED TO L. SECT. - 34 0000
 ALL MECHANICAL ASSEMBLY GRATED FOR SHIPMENT



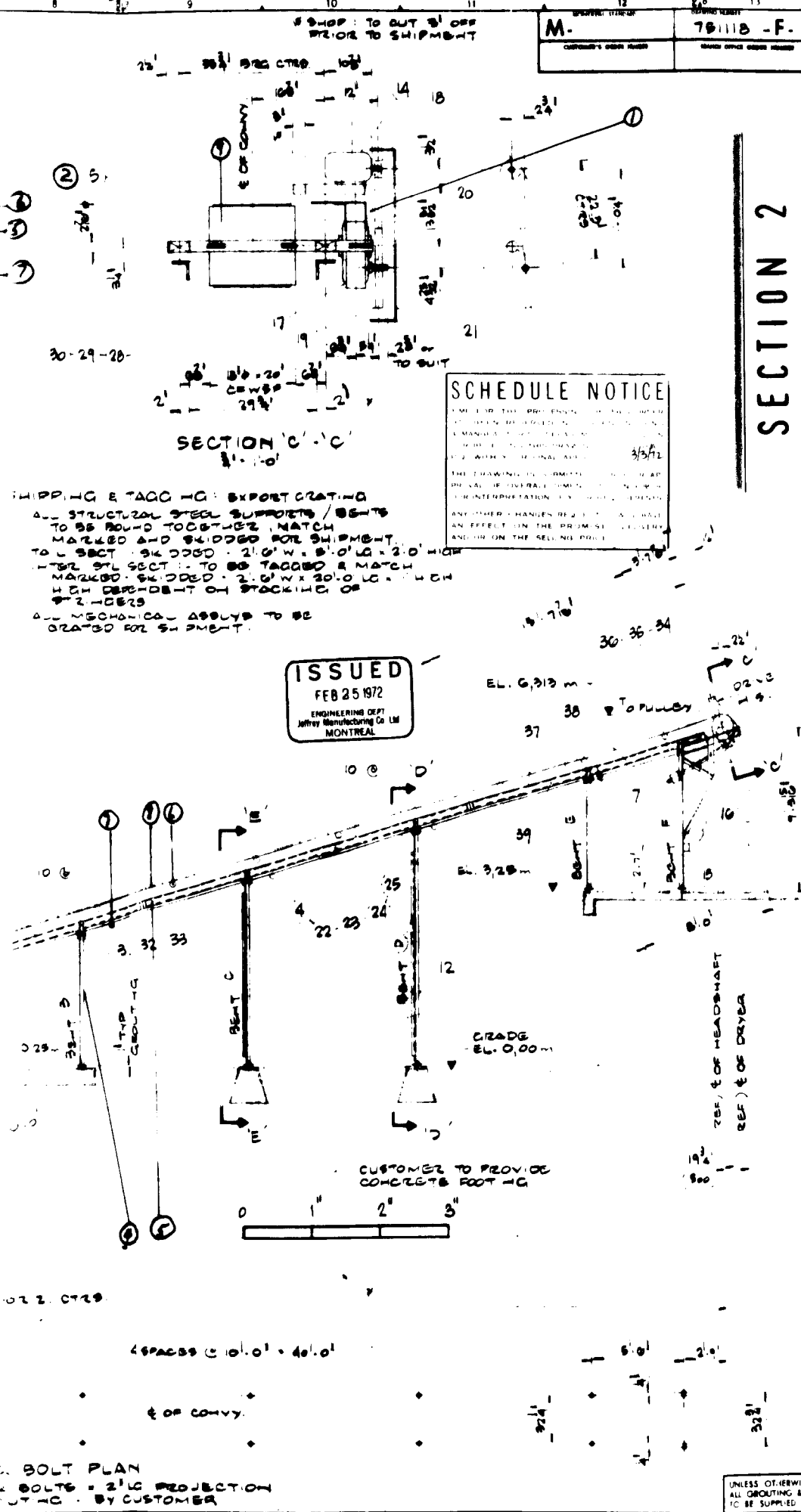
SECT D-D

SECT E-E
TYP. 2" DIA. TUB



SECTION 1

ANCHOR BOLT PLAN
 1" ANCHOR BOLTS - 2" LG PROJECT ABOVE GRADING - BY CUSTOMER



SCHEDULE NOTICE
 I AM IN THE POSITION OF ACCEPTING THE CONTRACT FOR THE SUPPLY OF THE MATERIALS AND WORKMANSHIP DESCRIBED IN THE DRAWING AND I HEREBY AGREE TO THE CONDITIONS OF THE GENERAL CONDITIONS OF SALE AND TO THE INTERPRETATION OF THE DRAWING AND ANY OTHER CHANGES HEREON. I WILL HAVE AN EFFECT ON THE PROMISE DELIVERED AND ON THE SELLING PRICE.

ISSUED
 FEB 25 1972
 ENGINEERING DEPT
 Jeffrey Manufacturing Co Ltd
 MONTREAL

SECTION 2

QUAN	MATL	MR	DESCRIPTION	PAT NO	CAT NO	ORG	DRU	MR
1			FT. OF 18" W CONV PLYWOOD					
1			BELT RMA GRADE 2, 2PLY WITH 3/4" TOP & 3/4" BOTTOM RUBBER COVERS A/B SHT					
2			NO 1 BUXICO FASTENERS					75118 A4
3			BB 34200 TROUGHING IDLERS					312915
4			BB 40 26T/12H IDLERS					312915
5			DRIVESHAFT ASSEMBLY					75118 A4
6			TAILSHAFT ASSEMBLY					75118 A4
7			DRIVE BELT SCRAPER					75118 A4
8			TAIL STEEL FRAME CR 2					75118 A4
9			TAIL INTGZ STL FRM CR 2					75118 A4
10			INTGZ STR. COVE. FRM CR 2					75118 A4
11			TEAM OF CONVEY SUPPORTS TAD NO. C. H. CR. 2					75118 B 2
12			TEAM OF CONVEY BEATS TAD NO. A-D CR 2					75118 B 2
13			SKT BOARD					75118 B 2
14			1/2 HP 300 220V COAR. INDUCTION TYPE MTR @ 800 RPM T.E.C. RPM NO. 45T 380V 50HZ 50 SHT					75118 B 2
15			MAGNETIC STARTER MODEL NO. CCE CR. 00 000 AR 50 SHT					75118 B 2
16			TEAM OF W/2 H.C FROM STARTER TO MOTOR - NOT CONNECTED X () LG. DOUBLE REDUCED ON REDUCER HAVING A RATIO OF 15.5 (12 RPM OUTPUT SPEED) 9/16 BUILT IN BACKSTOP (OUTPUT ROTATION CW WHEN FACING INPUT SHAFT) AND TAD 4 MTR MOUNT FOR 1/2 HP MOTOR 50 SHT					75118 B 2
17			4.0" ID. 2 GROOVE SECT. A SNEAVE BOSS 3/4" A/B SHT					75118 B 2
18			4.0" ID. 2 GROOVE SECT. A SNEAVE BOSS 1/2" A/B SHT					75118 B 2
19			2" OPEN V-BELTS A/B SHT					75118 B 2
20			2" OPEN TYPE BOLT GUARD					75118 B 2
21			22.5" x 2" LG CAP SCREWS					10101
22			22.5" x 2" LG CAP SCREWS					60001
23			22.5" x 2" LG CAP SCREWS					60001
24			22.5" x 2" LG CAP SCREWS					60001
25			22.5" x 2" LG CAP SCREWS					60001
26			22.5" x 2" LG CAP SCREWS					60001
27			22.5" x 2" LG CAP SCREWS					60001
28			22.5" x 2" LG CAP SCREWS					60001
29			22.5" x 2" LG CAP SCREWS					60001
30			22.5" x 2" LG CAP SCREWS					60001
31			22.5" x 2" LG CAP SCREWS					60001
32			22.5" x 2" LG CAP SCREWS					60001
33			22.5" x 2" LG CAP SCREWS					60001
34			22.5" x 2" LG CAP SCREWS					60001
35			22.5" x 2" LG CAP SCREWS					60001
36			22.5" x 2" LG CAP SCREWS					60001
37			HEAD INTGZ STL FRM 5/8" HEAD END CONVEY BEATS TAD NO. (C & E)					75118 B 2
38			JM HAMMOPLATES TAD JM					90007
39			UNIT NO. 21 - 02022 HO 75118					90000

PART SPECS :
 ALL STRUCTURAL STEEL MEMBERS TO BE PAINTED ON ONE COAT OF 230 OX DE PRIMER
 ALL MECHANICALS TO BE AS PER MFG STD.

TAG :
 JM - T - NO 21
 CUST - T - NO. 1

ONE 18' WIDE INCLINED BELT CONVEYOR
 TO HANDLE : WET COC DOLTS ORF
 SIZE OF MATERIAL : - 3" + 1"
 WT / CU FT : 85 TO
 SPEED : 100 RPM
 CAPACITY : 11 MTPH REQ TO CONT 160
 MTR : 12 HP @ 500 RPM 300 3. 50
 RED : TO 45 TA DOUBLE RED.
 RATIO 15 3/4
 DRIVER : 4 0' PD x 2 OR SECT 'A' SHEAVE
 DRIVER : 18 0' PD x 2 OR SECT 'A' SHEAVE

ITEMS BY CUSTOMER

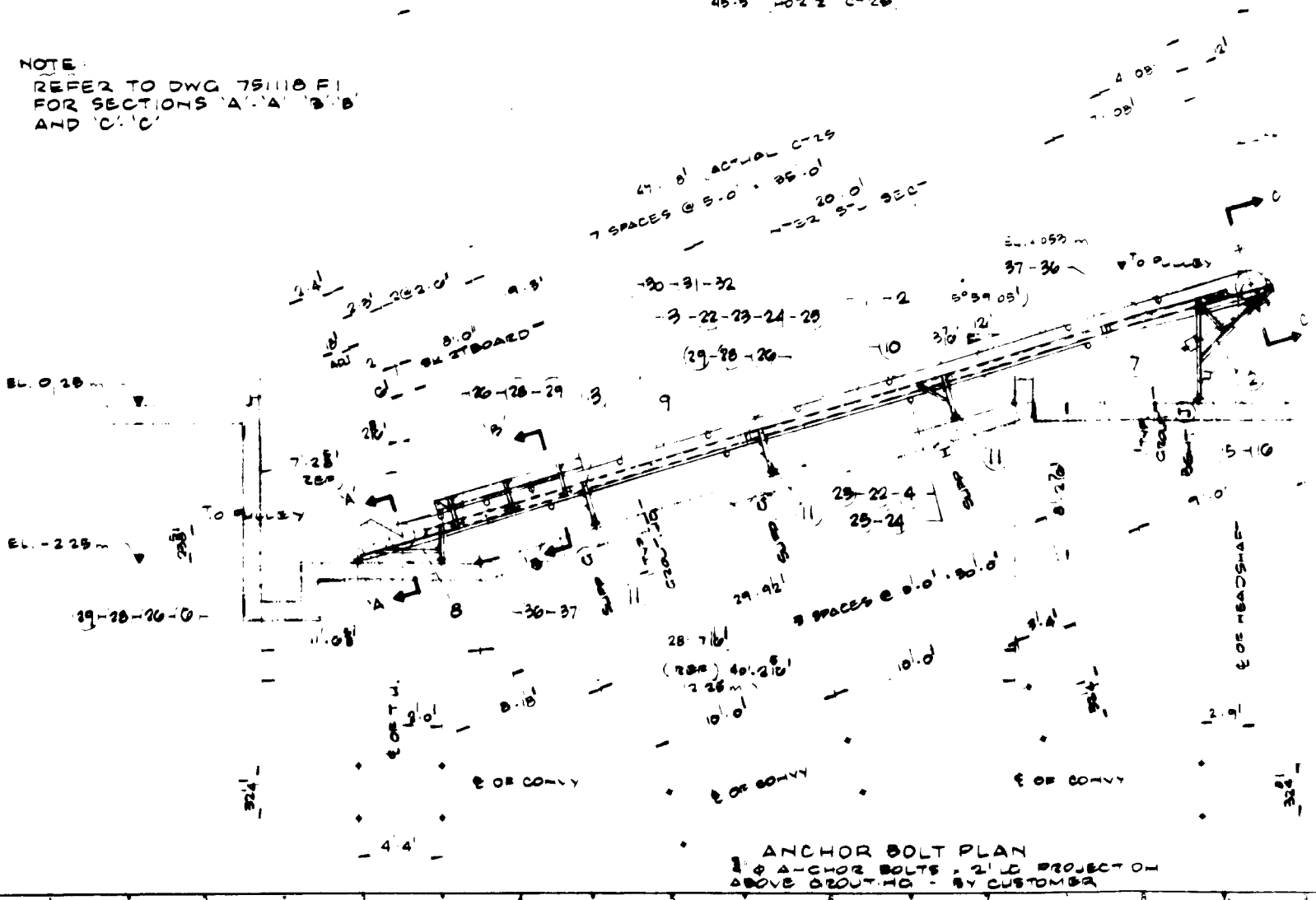
1. ALL ELECTRICAL CONTROLS & WIRING
 LESS MOTOR STARTER & WIRING TO
 NOTE : CUSTOMER TO CONNECT IN FIELD
 EACH ITEM SHIPPED SEPARATELY.
2. ITEM OF FEED & DISCHARGE CHUTES.

SHIPPING & TAGGING : EXPORT CRATING.
 ALL STRUCTURAL STEEL SUPPORTS : BOLTS
 TO BE BOUND TOGETHER, MATCH MARKED
 AND SKIDDED FOR SHIPMENT
 TAIL SECTION : SKIDDED 2' 6" W x 20' 0" L x 7" HIGH
 HIGH DEPENDANT ON STACKING OF STRONGERS
 ALL MECHANICAL ASSEMBLY TO BE CRATED FOR
 SHIPMENT.

SECTION 1

NOTE:
 REFER TO DWG 751118 F1
 FOR SECTIONS 'A-A', 'B-B'
 AND 'C-C'

40.9' 1022 C-20

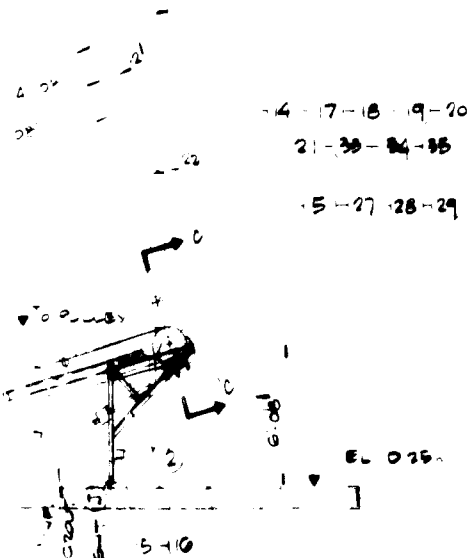


ANCHOR BOLT PLAN
 2" DIA ANCHOR BOLTS - 2' 10" PROJECT ON
 ABOVE GROUTING - BY CUSTOMER

SECTION 2

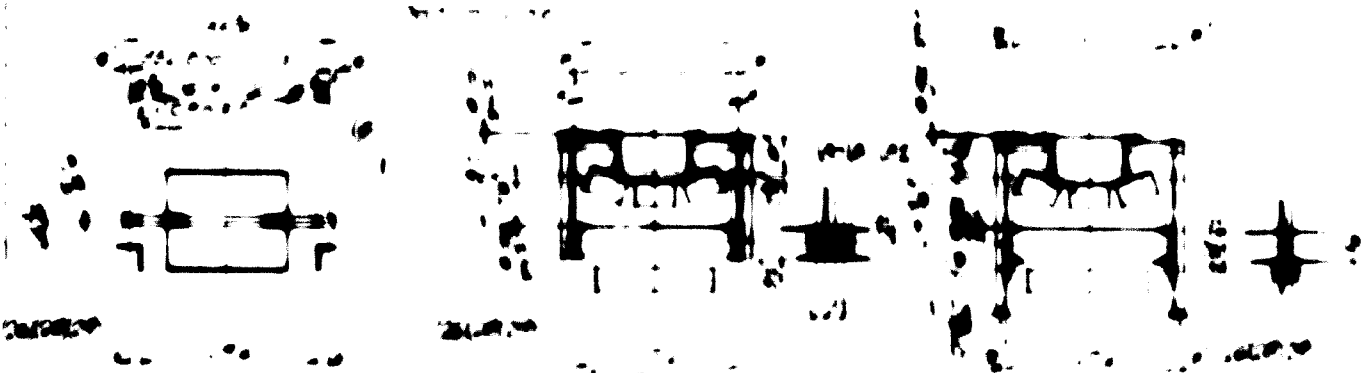
COMPY ASSEMBLY

ITEM NO.	DESCRIPTION	QTY	UNIT
1	DRIVE MOTOR	1	EA
2	DRIVE SHAFT	1	EA
3	DRIVE GEAR	1	EA
4	DRIVE BEARING	2	EA
5	DRIVE HOUSING	1	EA
6	DRIVE KEY	1	EA
7	DRIVE WORM	1	EA
8	DRIVE WORM GEAR	1	EA
9	DRIVE WORM KEY	1	EA
10	DRIVE WORM HOUSING	1	EA
11	DRIVE WORM BEARING	2	EA
12	DRIVE WORM HOUSING KEY	1	EA
13	DRIVE WORM HOUSING BEARING	2	EA
14	DRIVE WORM HOUSING HOUSING	1	EA
15	DRIVE WORM HOUSING HOUSING KEY	1	EA
16	DRIVE WORM HOUSING HOUSING BEARING	2	EA
17	DRIVE WORM HOUSING HOUSING HOUSING	1	EA
18	DRIVE WORM HOUSING HOUSING HOUSING KEY	1	EA
19	DRIVE WORM HOUSING HOUSING HOUSING BEARING	2	EA
20	DRIVE WORM HOUSING HOUSING HOUSING HOUSING	1	EA
21	DRIVE WORM HOUSING HOUSING HOUSING HOUSING KEY	1	EA
22	DRIVE WORM HOUSING HOUSING HOUSING HOUSING BEARING	2	EA
23	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING	1	EA
24	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING KEY	1	EA
25	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING BEARING	2	EA
26	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING	1	EA
27	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING KEY	1	EA
28	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING BEARING	2	EA
29	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING	1	EA
30	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING KEY	1	EA
31	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING BEARING	2	EA
32	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING	1	EA
33	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING KEY	1	EA
34	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING BEARING	2	EA
35	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING	1	EA
36	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING KEY	1	EA
37	DRIVE WORM HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING HOUSING BEARING	2	EA



ISSUED
 FEB 25 1972
 ENGINEERING DEPT
 Jeffrey Manufacturing Co Ltd
 MONTREAL

SCHEDULE NOTICE
 THE ENGINEER'S OFFICE
 HAS REVIEWED THE DRAWING
 AND IS SATISFIED THAT IT
 IS IN ACCORDANCE WITH THE
 REQUIREMENTS OF THE
 DRAWING SPECIFICATIONS
 AND IS HEREBY ISSUED FOR
 CONSTRUCTION.
 DATE: 3/3/72



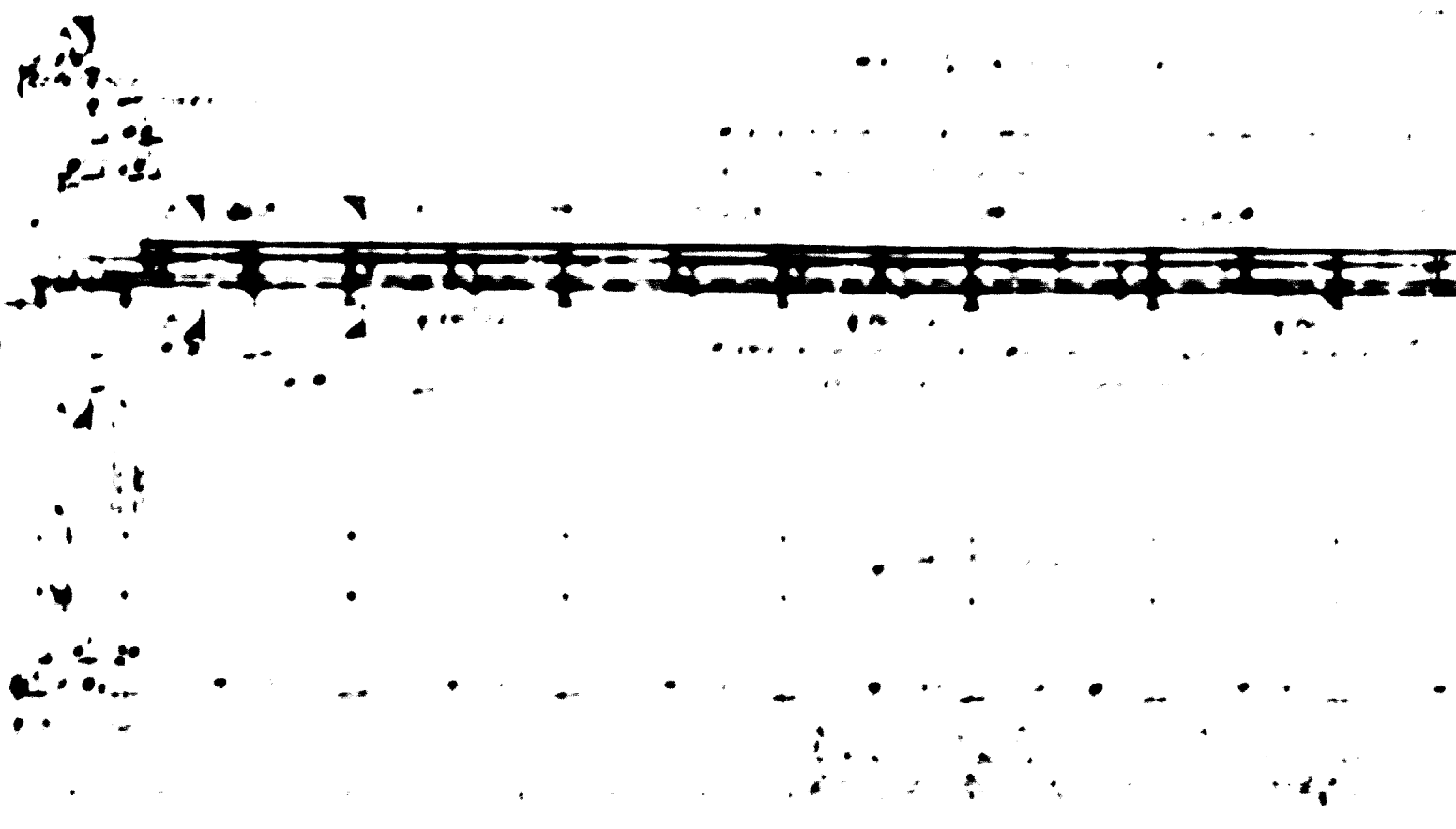
SECTION A A SECTION A A SECTION A A

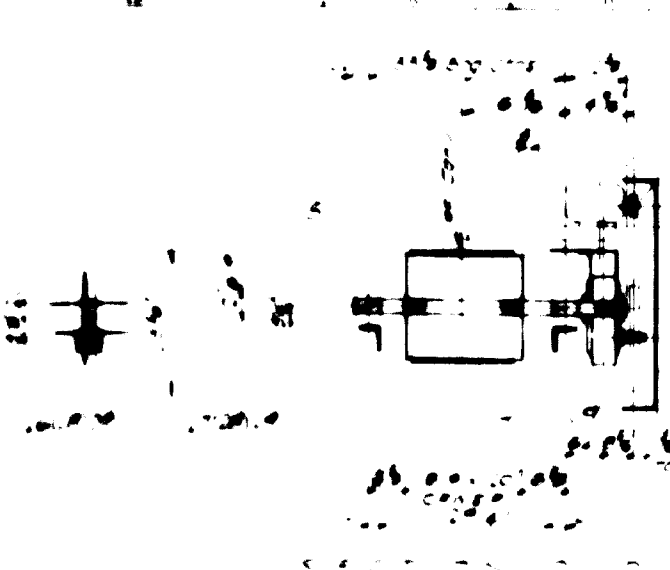
THE FOLLOWING TABLE GIVES THE MATERIALS AND DIMENSIONS OF THE PARTS SHOWN IN THE DRAWINGS. THE DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED. THE PARTS ARE IDENTIFIED BY THE LETTERS A THROUGH F. THE DIMENSIONS ARE GIVEN IN THE ORDER: LENGTH, WIDTH, THICKNESS. THE DIMENSIONS ARE GIVEN IN THE ORDER: LENGTH, WIDTH, THICKNESS. THE DIMENSIONS ARE GIVEN IN THE ORDER: LENGTH, WIDTH, THICKNESS.

Part	Material	Length	Width	Thickness
A	Aluminum	1.00	0.50	0.10
B	Steel	1.00	0.50	0.10
C	Aluminum	1.00	0.50	0.10
D	Steel	1.00	0.50	0.10
E	Aluminum	1.00	0.50	0.10
F	Steel	1.00	0.50	0.10

SECTION 1

SCHEDULE





SECTION 2

SCHEDULE NOTICE

ISSUED

GEN. ACCT OF
ON HOCA BEL
CONVEYCE
NO 5
00000000000000000000

- 1. 1/2" dia. x 1/4" thick plate
- 2. 1/2" dia. x 1/4" thick plate
- 3. 1/2" dia. x 1/4" thick plate
- 4. 1/2" dia. x 1/4" thick plate
- 5. 1/2" dia. x 1/4" thick plate
- 6. 1/2" dia. x 1/4" thick plate
- 7. 1/2" dia. x 1/4" thick plate
- 8. 1/2" dia. x 1/4" thick plate
- 9. 1/2" dia. x 1/4" thick plate
- 10. 1/2" dia. x 1/4" thick plate
- 11. 1/2" dia. x 1/4" thick plate
- 12. 1/2" dia. x 1/4" thick plate
- 13. 1/2" dia. x 1/4" thick plate
- 14. 1/2" dia. x 1/4" thick plate
- 15. 1/2" dia. x 1/4" thick plate
- 16. 1/2" dia. x 1/4" thick plate
- 17. 1/2" dia. x 1/4" thick plate
- 18. 1/2" dia. x 1/4" thick plate
- 19. 1/2" dia. x 1/4" thick plate
- 20. 1/2" dia. x 1/4" thick plate
- 21. 1/2" dia. x 1/4" thick plate
- 22. 1/2" dia. x 1/4" thick plate
- 23. 1/2" dia. x 1/4" thick plate
- 24. 1/2" dia. x 1/4" thick plate
- 25. 1/2" dia. x 1/4" thick plate
- 26. 1/2" dia. x 1/4" thick plate
- 27. 1/2" dia. x 1/4" thick plate
- 28. 1/2" dia. x 1/4" thick plate
- 29. 1/2" dia. x 1/4" thick plate
- 30. 1/2" dia. x 1/4" thick plate
- 31. 1/2" dia. x 1/4" thick plate
- 32. 1/2" dia. x 1/4" thick plate
- 33. 1/2" dia. x 1/4" thick plate
- 34. 1/2" dia. x 1/4" thick plate
- 35. 1/2" dia. x 1/4" thick plate
- 36. 1/2" dia. x 1/4" thick plate
- 37. 1/2" dia. x 1/4" thick plate
- 38. 1/2" dia. x 1/4" thick plate
- 39. 1/2" dia. x 1/4" thick plate
- 40. 1/2" dia. x 1/4" thick plate
- 41. 1/2" dia. x 1/4" thick plate
- 42. 1/2" dia. x 1/4" thick plate
- 43. 1/2" dia. x 1/4" thick plate
- 44. 1/2" dia. x 1/4" thick plate
- 45. 1/2" dia. x 1/4" thick plate
- 46. 1/2" dia. x 1/4" thick plate
- 47. 1/2" dia. x 1/4" thick plate
- 48. 1/2" dia. x 1/4" thick plate
- 49. 1/2" dia. x 1/4" thick plate
- 50. 1/2" dia. x 1/4" thick plate

PAINT SPECS
A. Structural steel members to be
painted. The coat of zinc oxide
primer A. Weather coat to be
45 for 1127 stars

SECTION 6

2.6 SCREW CONVEYOR

2.6.1 Description

The screw conveyor is manufactured by Link-Belt Limited, FMC Canada Ltd., Montreal, Quebec, Canada. It is a 304.8 mm diameter screw conveyor, 4270 mm long designed to operate at 50 rpm and capable of handling 12 metric tons per hour of Crocidolite ore weighing 85 lbs/cu.ft. on an incline of 17° 30'.

Drive:

One 5 HP, 380 V, 3 ph, 50 cycle electric motor with V-belt sheave.

One speed reducer mounted on shaft of screw with V-belt sheave.

Speed:

The speed of the electric motor is 1500 rpm.

The output of the speed reducer is 50 rpm.

2.6.2 Part Identification

The screw conveyor is composed of seven main parts.

Reference drawing:

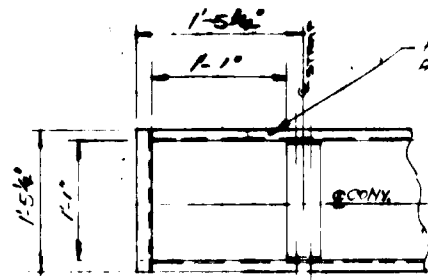
Link Belt Limited, No. TK-4210-B1, 'General Arrangement and Det. of 12" x 2-7/16" Screw Conveyor', dated 3.7.72.

Part identification:	Ref. No.
1. Drive assembly	
2. Trough	1/20
3. Shaft	1/11
4. Helicoidal flight	1/11
5. Inlet chute	
6. Discharge outlet	
7. Bearing	1/14

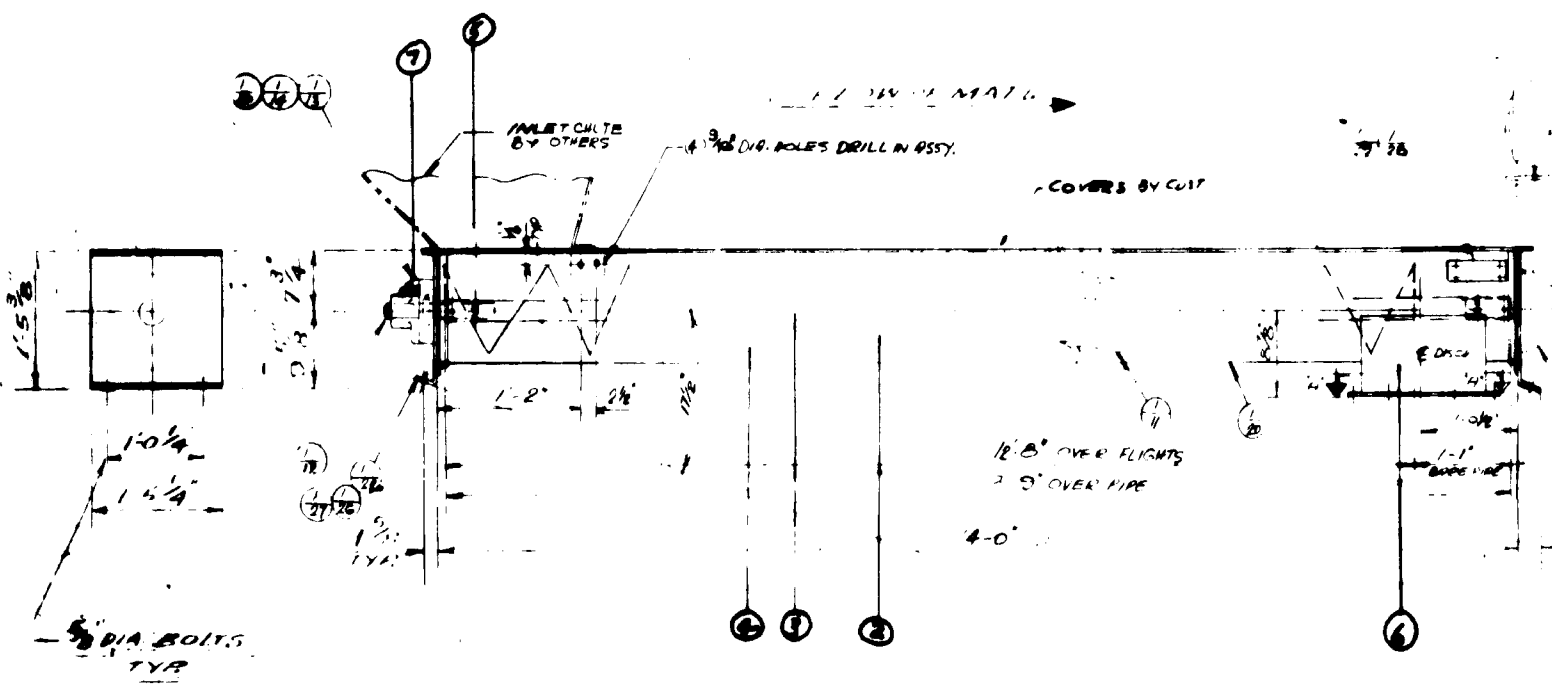
2.6.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

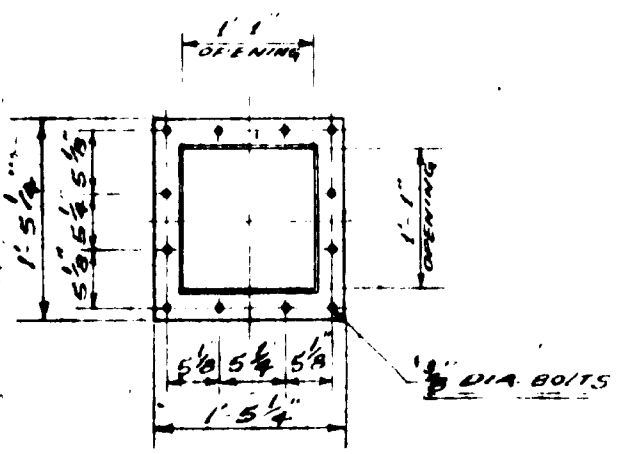
<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
1	Set of bearing seals and high speed gears for shaft mounted reducer on screw conveyor.	
4	V-belts	
1	Ball bearing	F3U239H



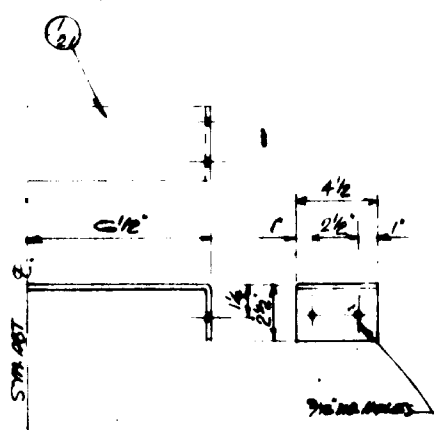
HOLES FOR INLET CHUTE TO BE DETERMINED AND DRILLED IN FIELD BY CUSTOMER

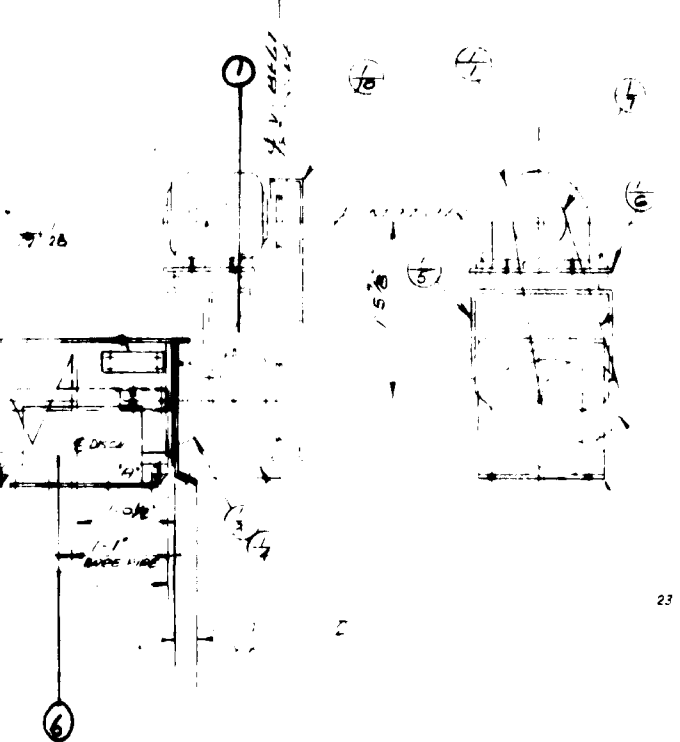


SECTION 1

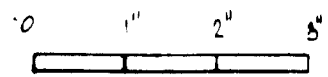


SECTION A-A





QUANTITY		MATERIAL LIST			
QTY	UNIT	SPECIFICATION	REFERENCE	REMARKS	
QTY	UNIT	MATERIAL	REFERENCE	REMARKS	
1		12" DIA. SCREW CONV. X 14" O' L.B.E. TO OPERATED BY EQ. A.R.M. TO HANDLE MATERIAL IN GOODLYTE ORE WEIGHING 65 LB. CU. FT. ON AN INCLINE OF 7 1/2° SHOP ASSEMBLE			
1		DRIVE DATA 5 HP. 1500 RPM 3/50/330V TEFC MOTOR W-8 MOUNTED TO CONVEYOR INSULATION LOSS (SUPPLY MATERIAL)			
2	1	200D24 SHAFT MOUNTED REDUCER	W-12		
3	1	1475Y134-K DRIVE SHAFT ASBY	W-13		
4	1	144Y54-E ADAPTER ASSY IN FELT SEAL			
5	1	24LY330-A MOTOR MTG BRACKET			
6	1	1320W402 FLANGE & SHAFT HOLES FOR MOTOR			
7	1	56" L. 28 WEEVE BORE 1/2" DIA HOLES (MOTOR)			
8	1	70" PL 28 WEEVE BORE 1/2" DIA HOLES			
9	2	B-55 V-BELT			
10	1	TK4210B-W2 V-BELT GUARD #14GR			
100	4	M.BOLT 5/16" X 1/2" GR4M4M CANLW			
100	1	SIEMENS CEMO 5121 STARTER INCBND 12 ENCL. SHTS CAN FUSED DISCONNECT 3 OVERLOADS, LOCKABLE DISCONNECT, PUSH BUTTON IN COVER 3/50/380 VOL 1/40/120 CONTROLS	(FM)		
11	1	12X1/4" SPECIAL R/H CONN SCREW W-18 WITH 3/4" FLIGHT MOUNTED ON 3/16" DIA 40 WIRE AND COLLARED FOR 2 1/2" DIA. HOLES IN 9" OVER PIPE, 18" OVER FLAT WITH 1/2" BORE PIPE AT EXCHANGE END	W-18		
12	1	2 1/2" DIA. END SHAFT			
13	2	2 1/2" DIA 8 1/2" DIA FELT SEAL ASSY W-16	W-16		
14	2	1 1/2" DIA 8 1/2" DIA REG FLANGE LOCK W-17	W-17		
15	4	2 1/2" DIA SCROLLING PLATE 1/4" X 1/4" LG			
16	4	M.BOLT 5/16" X 1/2" GR4M4M CANLW REG			
TROUGH					
20	1	67 7/8" DIA TROUGH 1 1/2" X 1 1/2" W-19	W-19		
21	1	1 1/2" X 1 1/2" DIA 1/2" DIA WEEVE SCOUT			
22	1	2 1/2" X 1 1/2" DIA 1/2" DIA WEEVE SCOUT			
23	1	65 1/2" DIA 20-E TROUGH END PLATE WITH FEET (BEND BOTTOM FOOT FOR 7 1/2° INCLINE)			
24	1	10" X 26" LG 1/4" PER 3/11 308-14			
25	20	1/4" X 1/4" DIA 1/2" LG			
26	4	#4 X 1/2" DIA 1/2" LG CANLW			
27	4	#4 X 1/2" DIA 1/2" LG CANLW			
28	4	#4 X 1/2" DIA 1/2" LG CANLW			
29	4	#4 X 1/2" DIA 1/2" LG CANLW			
30	5	1/4" DIA 1/2" LG		TO R 21	



SECTION 2

NOTE:
 PAINTING - ALL STEEL WORK TO BE GIVEN ONE SHOP COAT OF ZINC CHROMATE PRIMER
 - CONVEYOR SUPPORTS ONITE & HOPPER SPRUNG BY CUSTOMER
 - CUSTOMER TO LOCATE MOTOR SWITCH & PUSH BUTTON IN FIELD
 - WIRE BY CUSTOMER

DIMENSION TOLERANCES EXCEPT AS SPECIFIED			
FINISH	REVISIONS		
BY	DATE	BY	DATE
LINK-BELT LTD.	2-7-72		
BY	DATE	BY	DATE
LINK-BELT LIMITED	2-7-72	LINK-BELT LIMITED	2-7-72
TK 4210 BI		TK 4210 BI	

SECTION 7

2.7 IMPACT CRUSHER

2.7.1 Description

The impact crusher is a Hazemag impact crusher, model APK-20, serial No. P-8967, HCL No. HC 230, exclusively manufactured by Hazemag (Canada) Ltd., Pointe Claire, Quebec, Canada. This machine is also called an "impactor". Basically, an impactor consists of a housing, supporting and enclosing adjustable mechanisms equipped with impact plates of wear resistant alloys, and a rotor which turns at high speed on a horizontally mounted shaft. The rotor is provided with a multiplicity of steel "blow bars" or "striking blades" which projects from its periphery. In operation, material to be processed is fed into the housing and is thrown by the striking blades against the impact plates with force sufficient to result in cleavage. Further cleavage occurs due to collision between pieces of the material moving at high velocities within the housing. This process continues until the material has been reduced to the desired fineness at which point the particles can clear the crushing chamber and are discharged from the machine.

Capacity: 20 T.P.H.

Drive:

30 HP, 380 V, 3 ph, 50 cycle electric motor with reducer, ratio 1.84 and V-belt sheave.

Speed:

The speed of the electric motor is 400 rpm.

2.7.2 Part Identification

The Hazemag impact crusher is composed of nine main parts.

Reference drawing:

Hazemag m.b.h. Munster i.w. No. Z1-50423A, "Hazemag-Prallmuhle APK 20", dated 28.9.66.

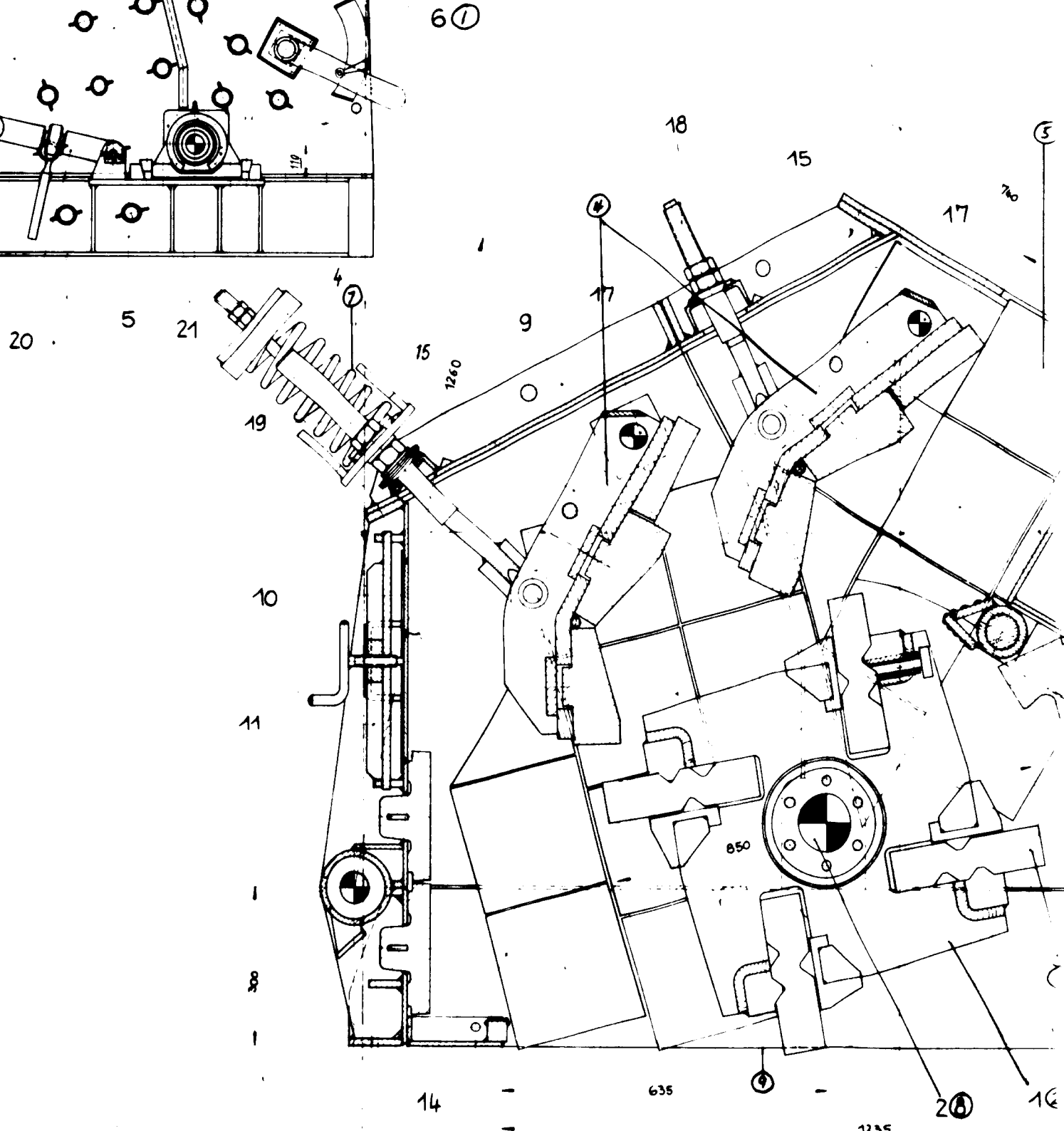
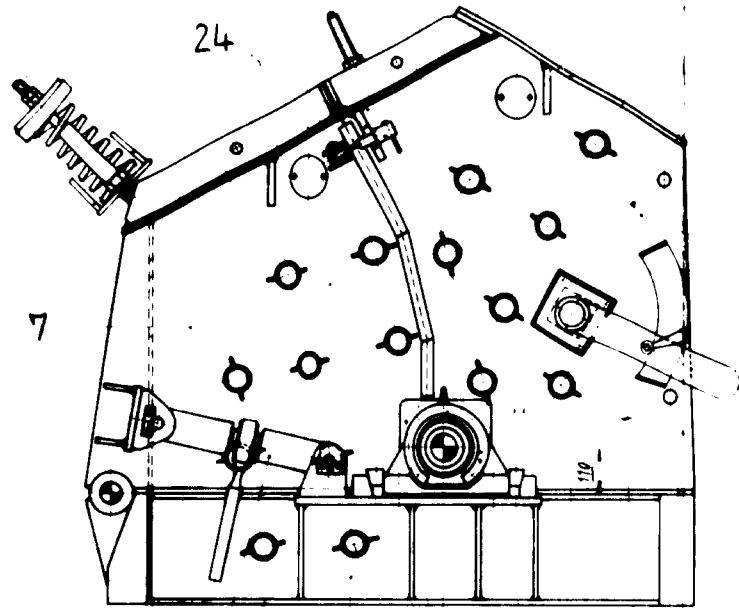
Part identification:**Ref. No.**

1. Housing
2. Rotor assembly
3. Blow bar
4. Impact plate assembly
5. Wear plate
6. Inlet
7. Safety spring
8. Main shaft assembly
9. Outlet

2.7.3 List of Recommended Spare Parts

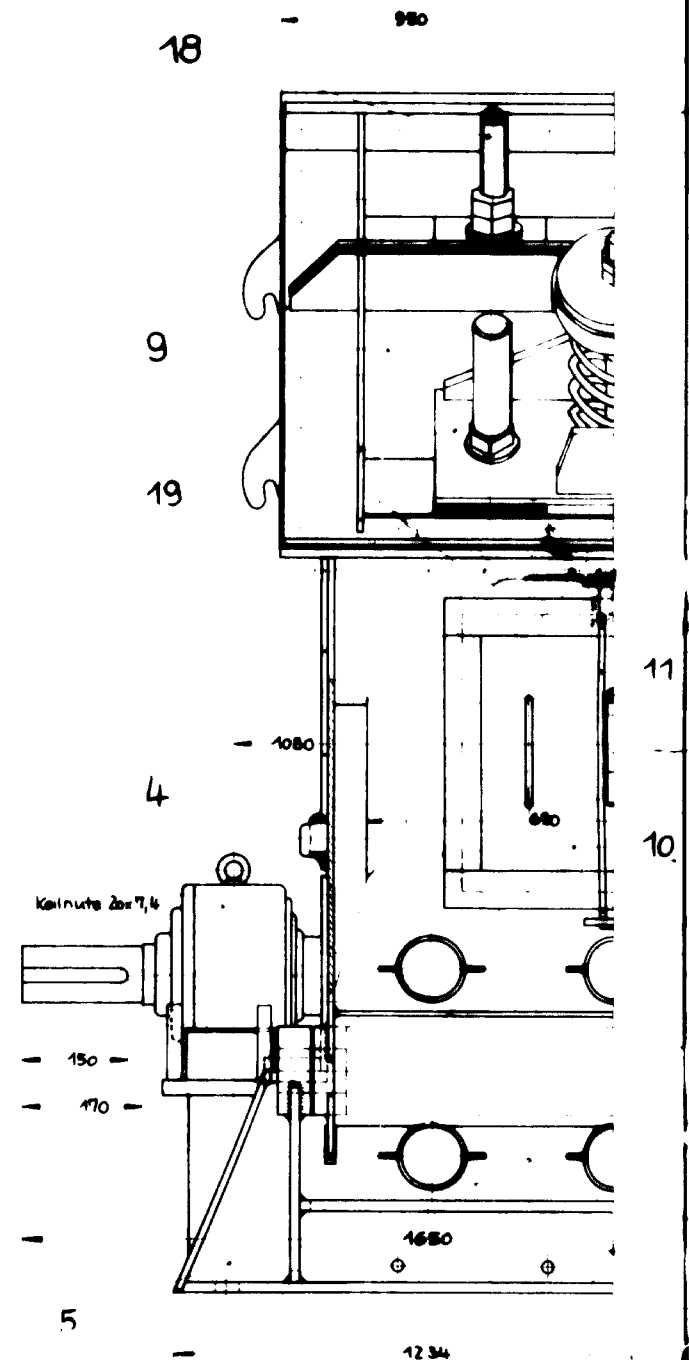
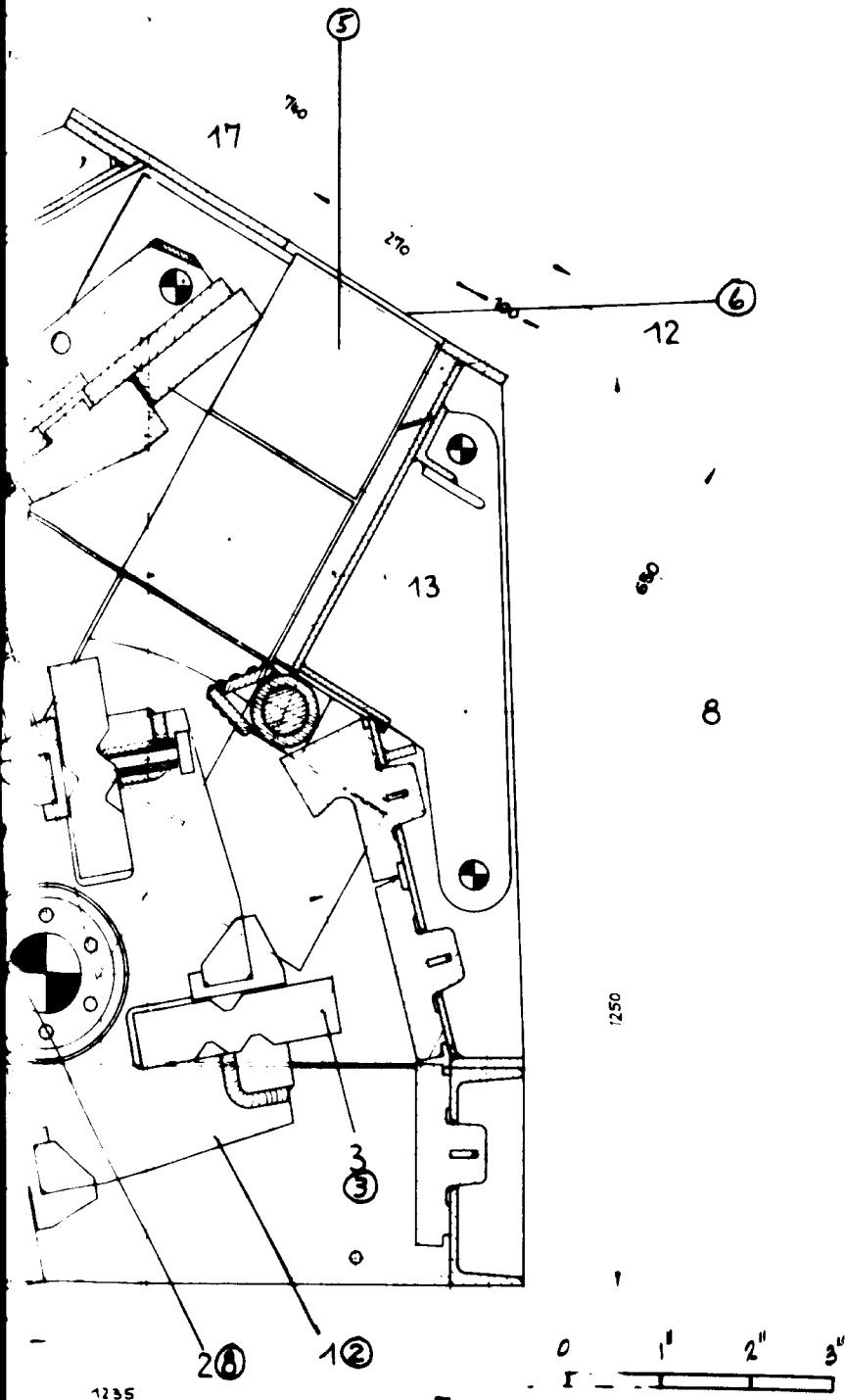
List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
8	Blow Bar Par.	HAZ 790
2	Roller Bearings	22318 CK
3	Impact Plate Par.	HAZ 763A
12	Wear Plates	HAZ 810
4	Wear Plates	HAZ 811
5	Wear Pieces	HAZ 816
8	Rotor Shoes	K3-22421B
1	Belt	52
1	Yoke	23
1	Disc sliding constant speed	50
1	Disc fixed constant speed	53
1	Disc fixed variable speed	65
1	Bearing, Thrust	43
1	Bearing, variable shaft	78
1	Bearing and collar, variable shaft	78A
3	Ultra Vee-belts matched set	5V-1400



SECTION 1

SECTION 2

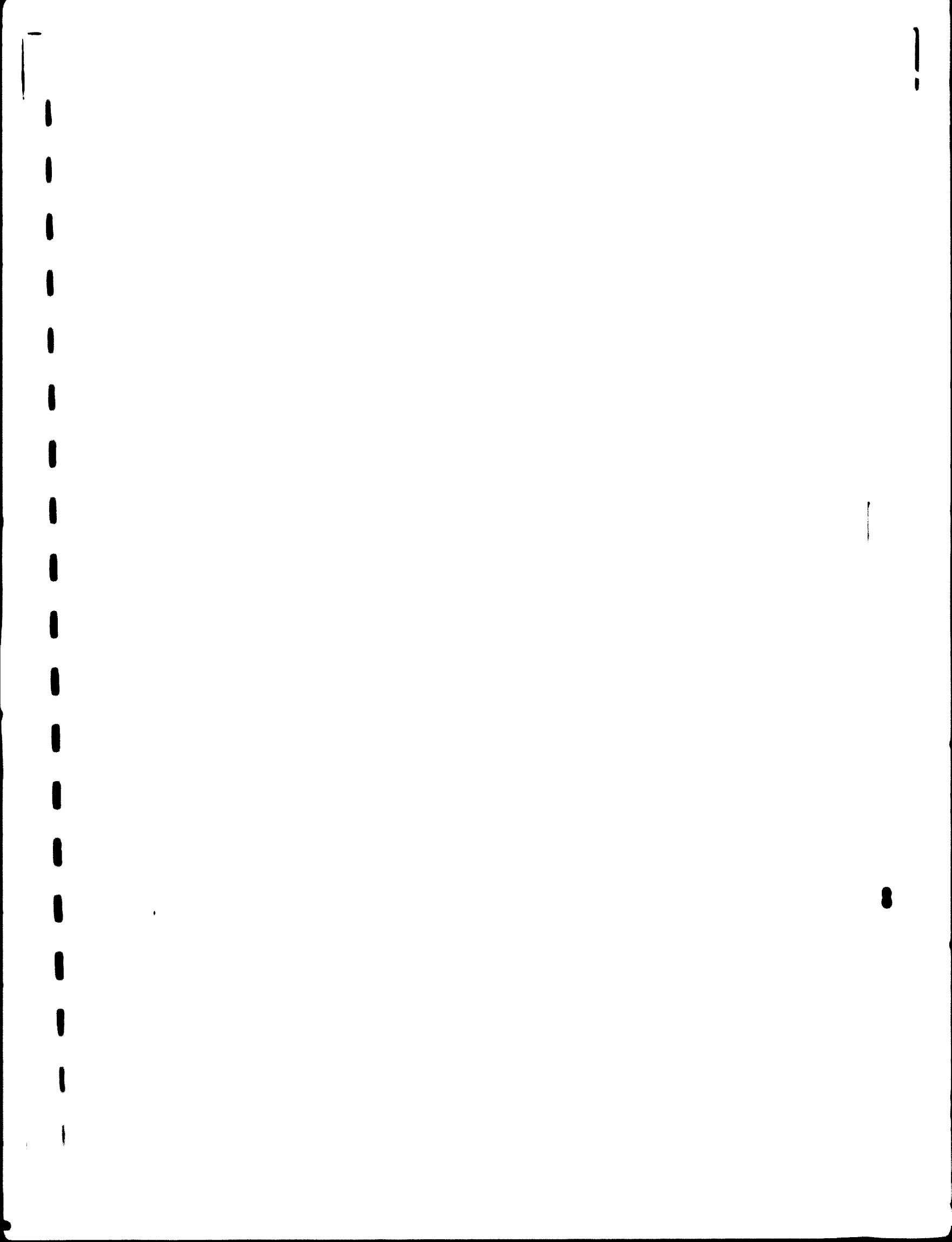


PAGE 30

	Datum	Name	Zustimmung	HAZEMAG m. B. H.
Gezeichnet	28. 9. 66			Münster i. W.
Geprüft				
Gegeben				
Maßstab				
1:5				Botr.
1:10				HAZEMAG-Prallmühle APK20
				Z 1- 50423

Alle Maßangaben in dieser Zeichnung beziehen sich auf die Zeichnung selbst. Die Zeichnung ist die alleinige Grundlage für die Ausführung und die Verantwortung für die Ausführung liegt bei dem Ausführer.

1235
1695



DESCRIPTION

2.0 INTRODUCTION

2.1 Description

The 8400 is a gas turbine engine manufactured exclusively by
 GE Aviation Ltd. (formerly GE Aviation Montreal) Quebec, Canada.
 The 8400 is a gas turbine engine designed for use in a continuous
 self-propelled aircraft. The engine is a turbo-propeller engine
 containing 27 turbine stages including 9.5 stage gas turbine section
 and 17.5 stage propeller section. The engine is designed to
 operate at a maximum temperature of 1500° F and in material
 of a yield strength of 110,000 psi. The engine is a
 self-propelled engine. The total weight of the engine is
 supported on a pedestal. The engine is attached
 to the aircraft by a series of rollers. The rollers
 total three and are spaced evenly. These thrust rollers
 are located on the lower side of the engine. The thrust roller
 assembly is supported by the engine.

2.2 Data

The 8400 is a gas turbine engine with a maximum power of 10,000 hp.

1. Turbine section

The 8400 is a gas turbine engine with a maximum power of 10,000 hp.

2. Propeller section

Speed:

The speed of the electric motor is 1500 rpm.

Worm gear reducer: input 1450 rpm, output 72.5 rpm.

2.8.2 Part Identification

The rotary shell dryer is composed of nine main parts.

Reference drawing:

Link Belt Limited, No. TK-4210-A1, "General Arrangement
400-20 Shell Dryer", dated 7.3.72.

Part identification:

Ref. No.

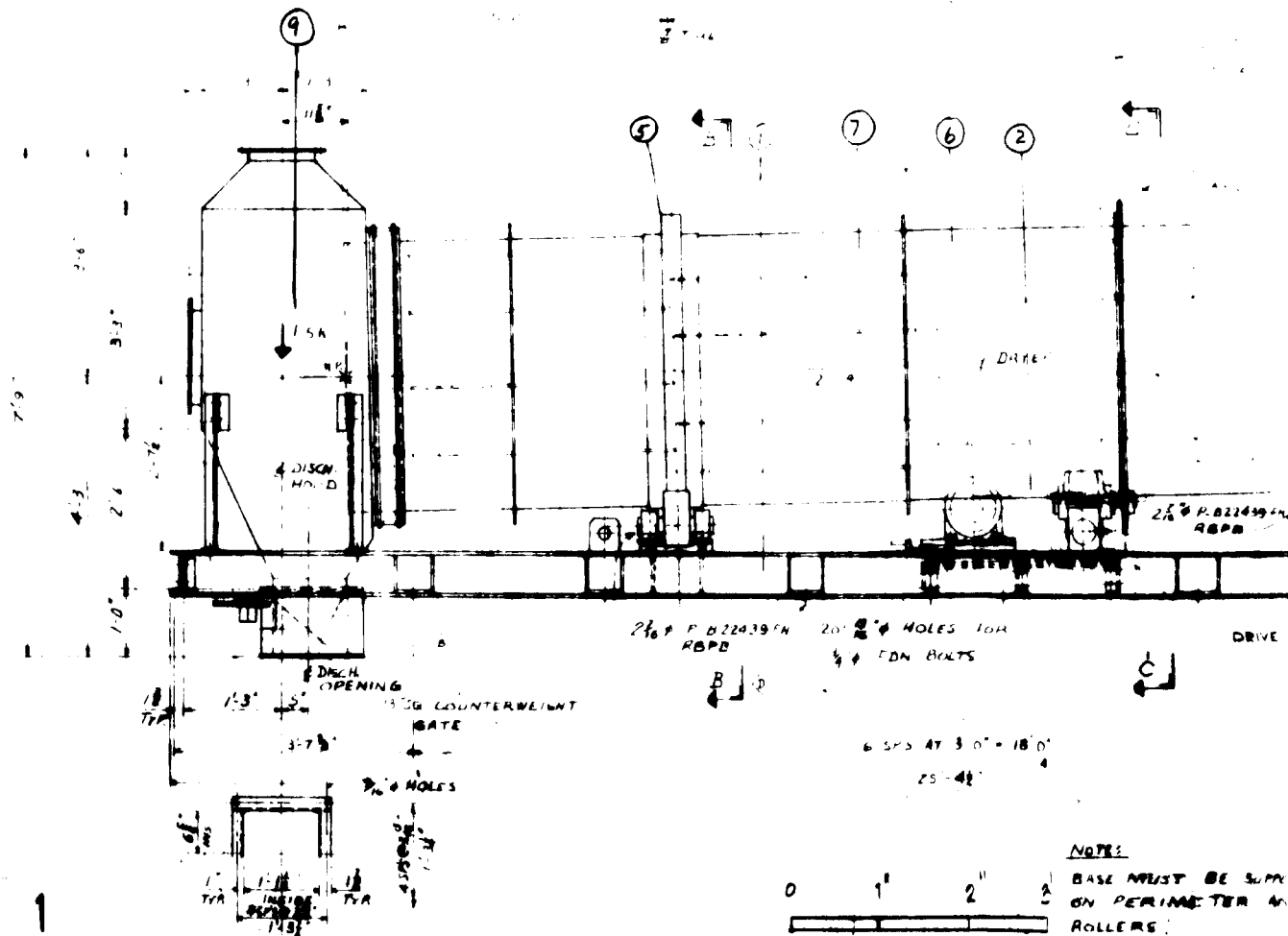
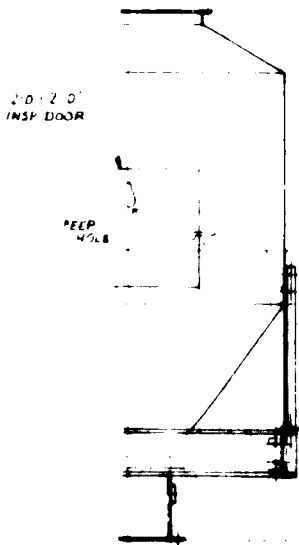
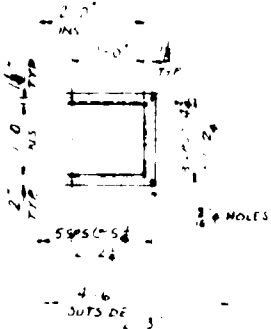
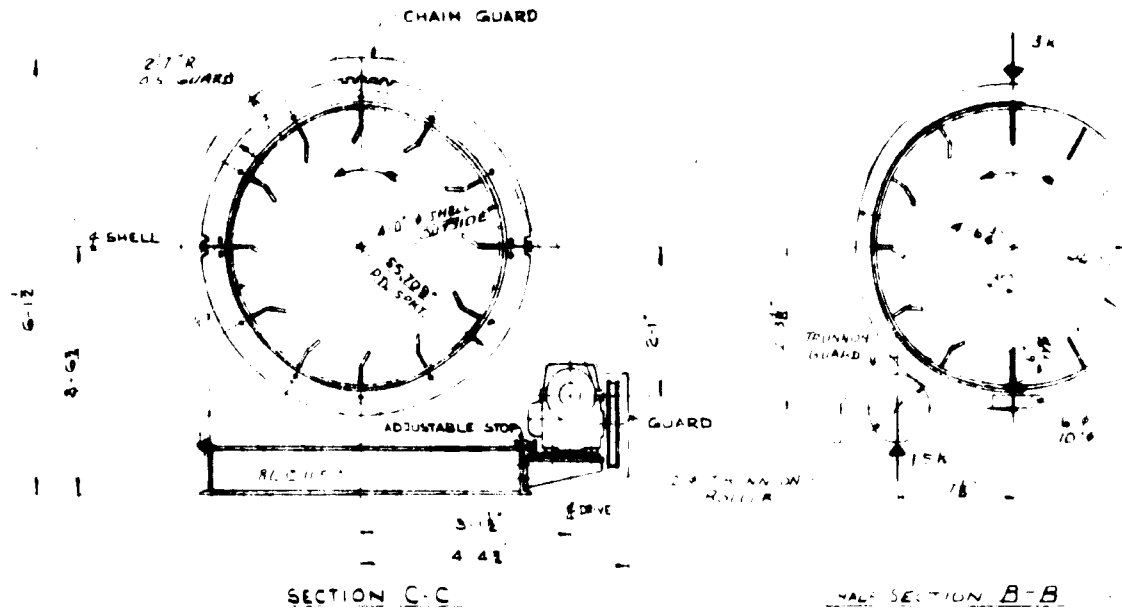
1. Base assembly
2. Drive assembly
3. Trunnion roller
4. Thrust roller
5. Tire
6. Lifters
7. Dryer shell
8. Combustion assembly
9. Discharge hood assembly

2.8.3 List of Recommended Spare Parts

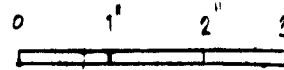
List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
1	Trunnion roll assy. c/w shaft and (2) bearings	
1	Complete set of seals and bearings for worm gear reducer.	
1	Spare RC 100 drive chain	
1	21T drive sprocket	
2	Variable speed belts	
1	Sahara belt seal	
1	Honeywell flame detector	
1	Set of thrust roller bearings and seal	
1	Set of spares for Simon Day valve consisting of (2) sets of wipers, 2 bearings and packers.	
2	1-7/16" bearings for exhaust fans	
2	V-belts	
1	Air burner assembly	
2	Regulator diaphragms	
1	Coil for Acco valve	
1	1CU 19A ignition chamber	
1	Viking H-113 3/4" pump c/w 1 HP, 380/3/50 motor and relief valve to handle 7 IPGM ALLK mounted on small fabricated base	
1	Item of engineering and shop work to mount pump on dryer base c/w pipe to burner	

1/4									
24									

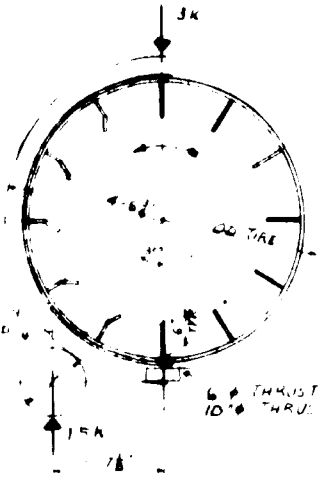


NOTE:
BASE MUST BE SUPPORTED ON PERIMETER BY ROLLERS.



DRYER DATA:

LINK BELT 400-20 ROTARY SHELL DRYER
 TO HANDLE 2.5 METRIC TONS PER HOUR OF
 CROCIDOLITE ORE WEIGHING APPROX 65 LBS/LYR.
 DRYING FROM 10% SURFACE MOISTURE TO A
 MOISTURE CONTENT OF 2%; INLET AIR
 TEMPERATURE 1200°F EXHAUST AIR
 TEMPER TO BE 250°F AND MATZ DISCHARGE
 TEMPER ABOUT 200°F



④
 6" THRUST ROLLER NOS
 10" THRUST ROLLER NOS

HALF SECTION B-B HALF SECTION A-A

DESCRIPTION		MATERIAL LIST		
TR 4210-A	QTY	SPECIFICATION	REFERENCE	REV
GROUP	ITEM NO	NAME DESCRIPTION MATERIAL		

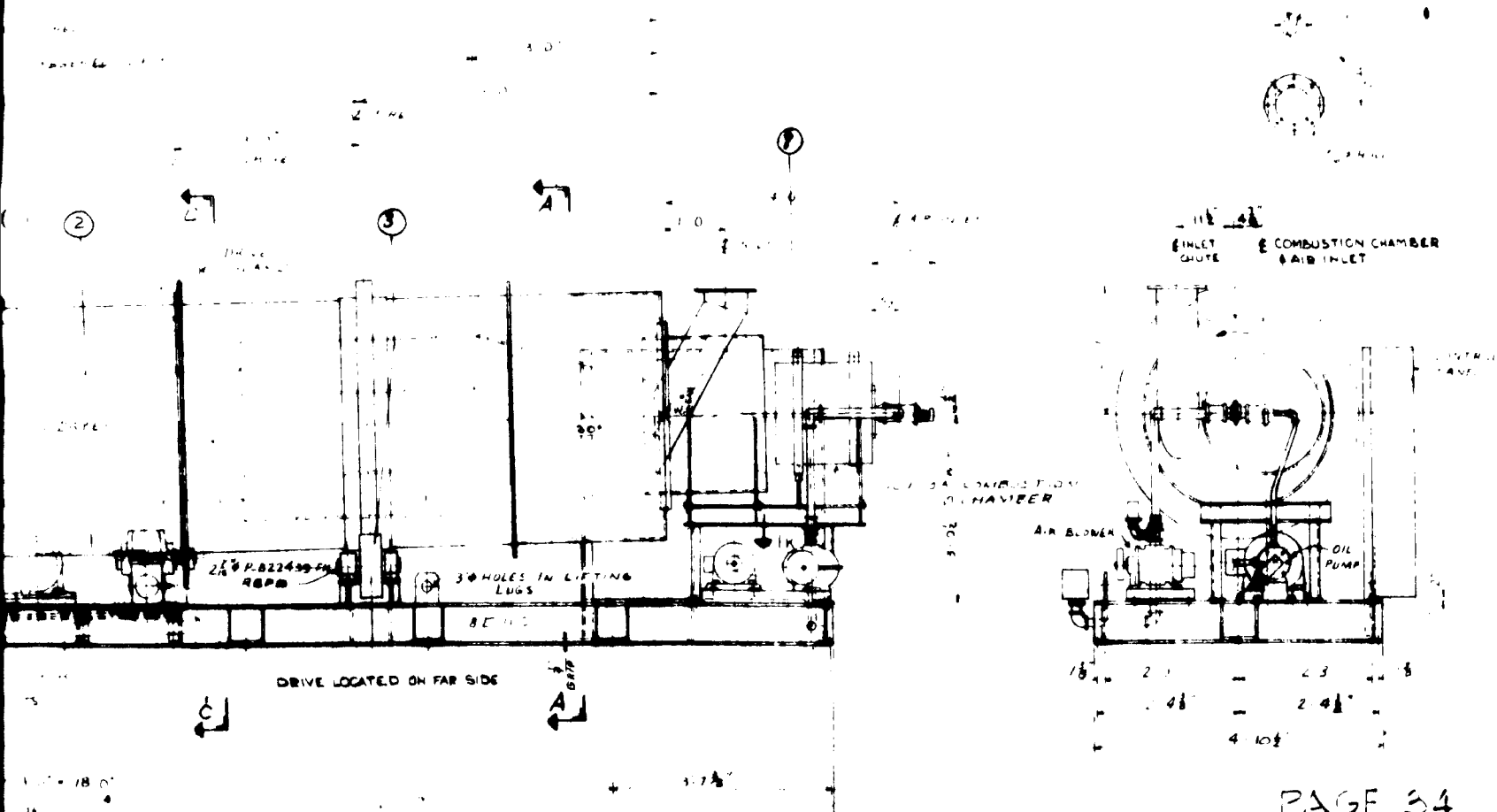
DRYER DRIVE DATA:

- LEWIS WE 500 WORM GEAR RED. RATIO 20:1
 INPUT 1450, OUTPUT 72.5 RPM
- 5HP 500 RPM TEL 3 50 380 V MOTOR
 FR 184 T CEMA DESIGN B CLASS B INSULATION
- RE 100 R NIN SORT 140 T 55 709" P.D. 14" INTC. SECT. VENT
 14" DIA
- RE 100 DRIVER PNT 21 T 8 191" P.D.
- LEWELLEN VARIABLE PULLEY DRIVE
 * 410/8 WITH ADJ. BASE, VARIATION RATIO 3:1
- RE 100 CHAIN DRIVE GUARD
- VARIABLE PULLEY DRIVE GUARD

PAINT:

ALL COMPONENTS TO BE COAT. W/ HI-HEAT
 ALUMINUM PAINT

DESIGN OF WREST ROLL UNDER BASE
 NOT PART OF THIS CONTRACT



PAGE 34

NOTES:
 BASE MUST BE SUPPORTED CONTINUOUSLY
 ON PERIMETER AND UNDER TRUNNION
 ROLLERS

SECTION 2

DIVISION TOLERANCES EXCEPT AS SPECIFIED		DATE OF TRUST	
DECIMAL	FRACTIONAL	2/11	2/11
TITLE		2/15	2/15
GENERAL ARRANGEMENT		1/14	1/14
400-20 SHELL DRYER		5/28	5/28
DRAWN BY		DATE	DESCRIPTION OF REVISION
LAWRENCE WENNIGER, ENGINEER			
THIS DRAWING IS THE PROPERTY OF FMC CORPORATION AND TRANSMITTED IN CONFIDENCE AND THE REPRODUCING OR USE OF THIS DRAWING IN WHOLE OR IN PART OF THE DESIGN AND DETAILS CONTAINED HEREIN IS PROHIBITED WITHOUT THE WRITTEN PERMISSION OF FMC CORPORATION			
DATE	CHECKED BY	DATE	DESCRIPTION
1/14	G.A.		
LINK-BELT LIMITED		TK 4210-A1	
SUBSIDIARY OF FMC CORPORATION			

SECTION 9

2.9 BUCKET ELEVATOR

2.9.1 Description

The Forano Bucket Elevators are manufactured by Forano Limited of Plessisville, Quebec, Canada. The bucket elevator is designed to elevate material at different heights by the use of a continuous chain with various size buckets mounted on it at calculated intervals to suit the feed of materials. A steel casing with an inlet spout at the bottom and a discharge spout at the top is provided to enclose the chain-bucket elevator. By varying the speed, the size of the buckets, their spacing, the length and strength of the chain, it can be adapted to the rate of feed and height desired. Elevators 1 to 5 inclusive are identical except for height. Elevator No. 6 is a larger elevator because of bulk capacity.

Drive:

One 3 HP, 380 V, 3 ph., 50 cycle electric motor with V-belt sheave.

One TD-525 Dodge Torque Arm gear reducer, ratio 25.54 to 1 with V-belt sheave.

Speed:

The speed of the electric motors is 1500 rpm.

The speed of the bucket elevators is 125 fpm.

2.9.2 Part Identification

The vertical continuous bucket elevator is composed of six main parts.

Reference drawings:

Forano Limited, Nos. 109-513D and 109-514D, "Assembly of BE-6 Vertical Continuous Bucket Elevator 18" x 48-1/2" Casing" and "#BE-1, BE-2, BE-2, BE-4 and BE-5 Vertical Continuous Bucket Elevators Assembly 12" x 39" Castings", dated 24.2.72.

Part identification:

Ref. No.

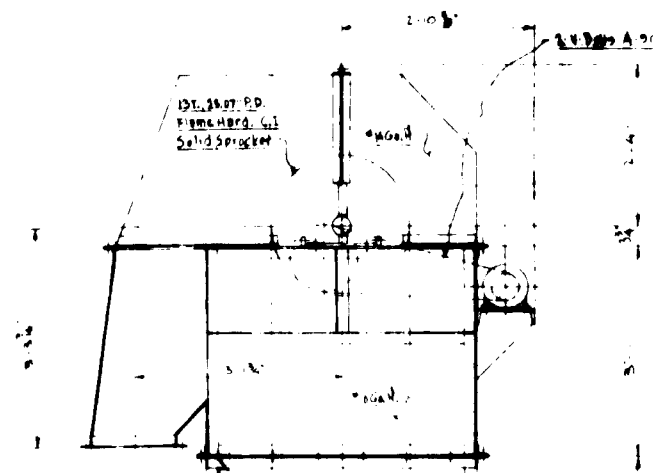
1. Drive Assembly
2. Head shaft assembly
3. Boot shaft assembly
4. Casing
5. Buckets
6. Chain and attachments

2.9.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	3 HP, 1500 rpm, T.E.F.C. electric motors, 380/3/50, Cema design B, frame No.182T, Class B insulation.	
2	No. TD-525 Dodge Torque Arm Gear Reducers, 25.54:1 ratio with back-stop, bushed for 2-7/16" dia. shaft.	TD-525
6	Sets (2 per set, matched) V-belts	A-75
4	S.N.-22515 x 2-7/16" C.I. pillow blocks, roller bearing type	SN-22515
2	16T, 20.50" P.D., 4.000" pitch, cast tooth C.I. solid sprockets, flame hardened teeth, for No. C-102B chain, bored 2-7/16", K.S. & S.S.	
2	11T, 14.20" P.D., 4.000 pitch, cast tooth C.I. solid sprockets, flame hardened teeth, for No. C-102B chain, bored 1-7/16", K.S. & S.S.	
85	Feet No. C-102B Numal Chain, 4.000" pitch, with No. K-2 Numal attachments every second pitch.	C-102B
130	8" x 5" x 7-3/4" 10 ga. medium front, steel, continuous elevator buckets, punched to suit K-2C-102B chain attachments.	
525	3/8" x 1-1/4" lg. sq. hot machine bolts with 3/8" dia. lockwashers.	
4	SKF 479207-107 ball bearings for TQ-23-6 take-ups.	SKF 479207-107
2	Sets (2 per set, matched) V-belts	A-90
1	13T, 19.42" P.D., 6.000" pitch, cast tooth, C.I. solid sprocket, flame hardened teeth, for No. C-110 chain, bored 2-7/16" K.S. & S.S.	

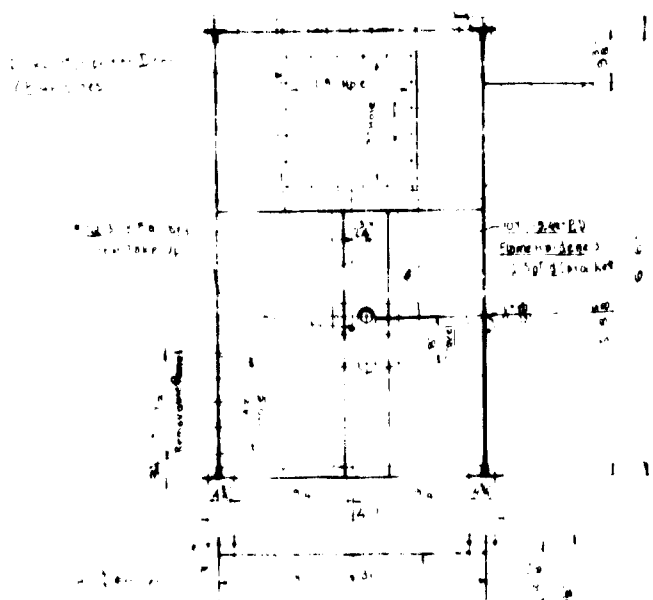
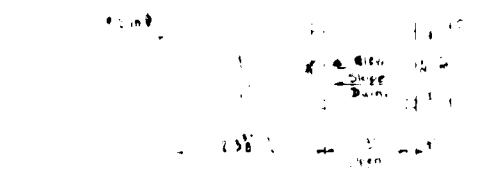
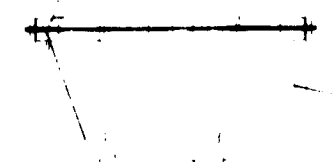
<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
1	10T, 19.42" P.D., 6.000" pitch, cast tooth, C.I. solid sprocket, flame hardened teeth, for No. C-110 chain, bored 1-15/16" K.S. & S.S.	
70	14" x 7" x 11-3/4" 10 ga., medium front steel continuous elevator buckets punched to suit K-2C-110 chain attachments.	
70	Feet No. C-110 Numal Chain, 6.000" pitch with K-2 attachments every second pitch.	
2	Ball bearings for TQ-31-8 take-ups.	



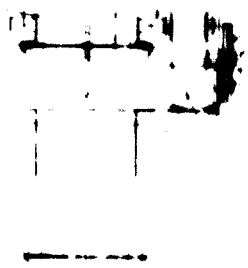
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2	1.50	1.50
3	1.50	1.50
4	1.50	1.50
5	1.50	1.50
6	1.50	1.50
7	1.50	1.50
8	1.50	1.50
9	1.50	1.50
10	1.50	1.50
11	1.50	1.50

⑥

- This drawing with
reference to the
drawing of the
sprayer nozzle
is to be used
as a guide only
and is not to be
used for
manufacture.

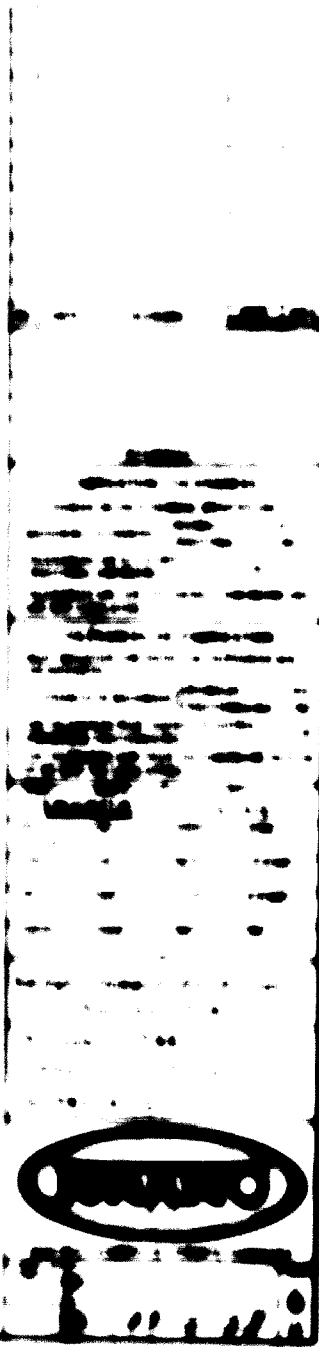


SECTION 1



SECTION 4
PUMP AND VALVE

SECTION 4



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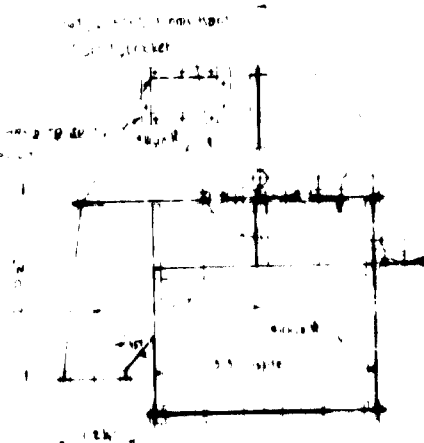
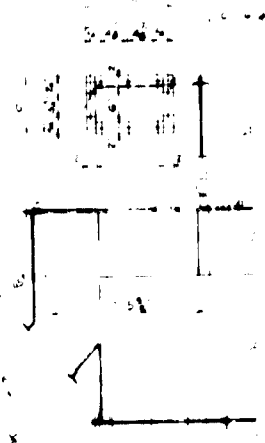
SECTION 2

2000
2000

2000 2000 2000 2000 2000 2000 2000 2000 2000 2000

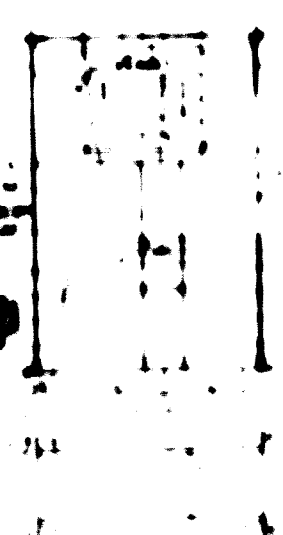
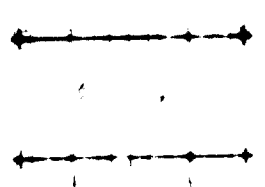
SECTION 6

C
D
E
F
G
H



Change Order
page B Detail Sheet

Change Order
page A Detail Sheet




1. Ben Guard
2. ...
3. ...
4. ...
5. ...
6. ...
7. ...
8. ...
9. ...
10. ...

SECTION 5

Page 2
Dist. 1000

FORWARD
CERTIFIED BY
CONSTRUCTION
DATE 12/19

Vertical strip containing various markings, possibly a scale or index, and a logo at the bottom.



SECTION 6

SECTION 10

2 10 VIBRATING FEEDER

2 10.1 Description

The Para-Mount Vibratory feeder is manufactured by Forane Limited of Pleasantville, Quebec, Canada. The feeder is designed to control the flow of bulk materials using the amplification principle of a two-mass spring system with a constant exciting force. The exciter drive assembly consists of an exciter frame mounted in the drive housing, between heavy duty rubber shear springs. Small eccentric counterweights mounted on the double extended shaft of the squirrel cage motor in the exciter assembly produce a constant rotating exciting force. The constant rotating exciting force results in accurate feed control regardless of normal voltage fluctuations. The anti-dumping characteristic of the Para-Mount vibratory feeder results in accurate, constant feed rate control regardless of material feedline variations.

Trough area

with square outlets, trough is inclined by 15° to guide

Slope

The feeder trough is inclined at a feed angle degree

and outlet angle degree relative to the horizontal

level.

Driver:

A one HP, 180 V, 1 ph., 50 cycle motor with double shaft extension with unbalanced exciting force counterweights

Speed:

Electric motor 900 rpm

2.10.2 Part Identification

The vibrating feeder is composed of eight main parts

Reference Drawing

Foran Limited, No. 811 22ND, Paramount Vibratory Feeder
APF 18-1", dated 11-1-57

Part Identification

Ref. No.

1. Trough

Drive assembly

811 22ND

3. Isolation springs

11 and 91

4. Supporting ribs

Electrical cables

6. Air hose A.B.F. line

7. Trough supports

8. Trough control line

2.10.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
1	One 1/2, 720 RPM, T.F.N.V. motor 100/1/50, frame 213 CV, class "B" insulation round frame no feet, double "C" flange on both ends, special regreassable anti friction bearings, double straight shaft extension, clockwise (CARRON)	
4	Aluminum shear mount PL RS100-10-13	R31-144A
2	Rubber for id (12" x 1 1/2" x 1/2") 5-1/8" I.D. x 1 1/2" thick (RS100-17-2)	R31-6A-2
2	"V.F." counterweight wheels with nuts	RS100-400 A
2	Adaptor plates (RS100-11)	R31-143A
2	1 1/2" dia security lock nuts	
12	5/8" dia Tens Bar	200R-101
8	1 1/2" dia Tens Bar	200R-081

SPRING SUPPORT BRACKETS
TO USE BY OTHERS

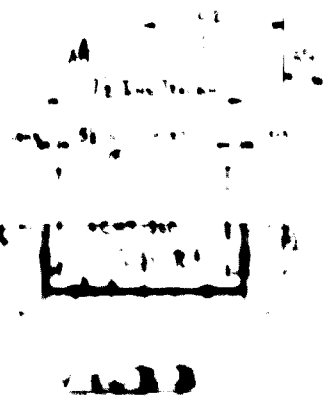
SECURITY LOCK NUT
UPPER SPRING SEAT
SPRING
LOWER SPRING SEAT

①

SUB DETAIL A

1. 1/2" DIA. BOLT
2. WASHERS
3. SPRING
4. NUT

1/2" DIA.

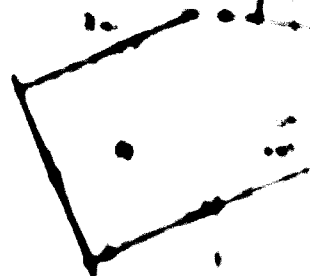
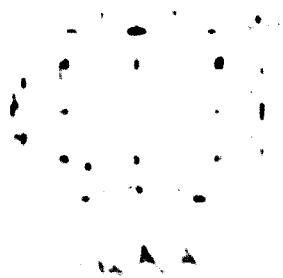


②

③

④

SECTION 1



1. 1/2" DIA. BOLT
2. WASHERS
3. SPRING
4. NUT

SUPPORT BRACKETS
E. OTHERS

SECTION 2

③

BUCKET ELEVATOR # BE 3

2.00 (78.740")

← BE # 2

1300

11215 11215

5.00

6.100

AD. 2000 11.5.11



AD. 2000 11.5.11

AD. 2000 11.5.11

SPRING SUPPORT BRACKETS
TO SUIT BY OTHERS

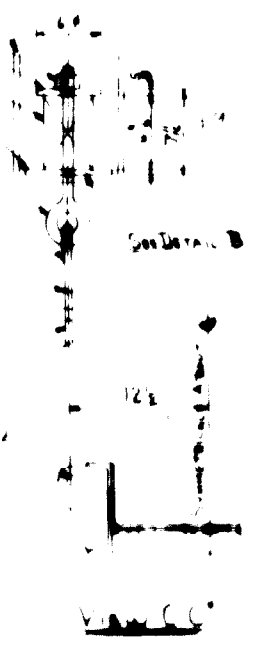
SECURITY LOCK NUT (4)
UPPER SPRING SEAT
2 SPRING #7D (YELLOW)

LOWER SPRING SEAT
3 1/2" EYE BOLT

6 1/2" THIMBLE
7 ROPE CLIP

8 1/2" WIRE ROPE

5 1/2" SHOCKLE (3 1/4")

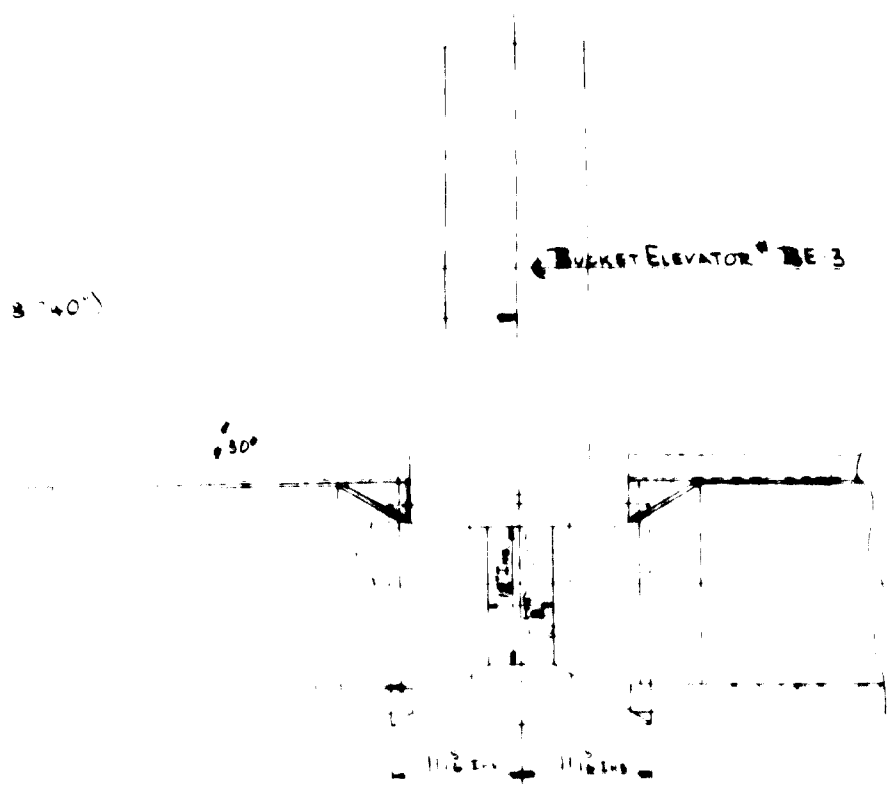


BUCKET ELEVATOR # BE 3

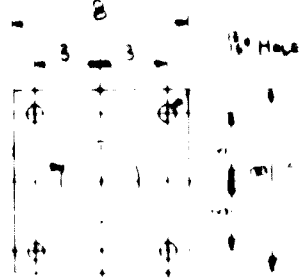
0.70 (27.55%)

3 (40%)

30°



SECTION 3



DETAIL B

THE LOWER SPRING SEAT FOR SPRING #7D
BY OTHERS TO BE BOLTED TO CUSTOMER
SUPPORTS. BOLTS BY CUSTOMER

LOAD
2500 POUNDS

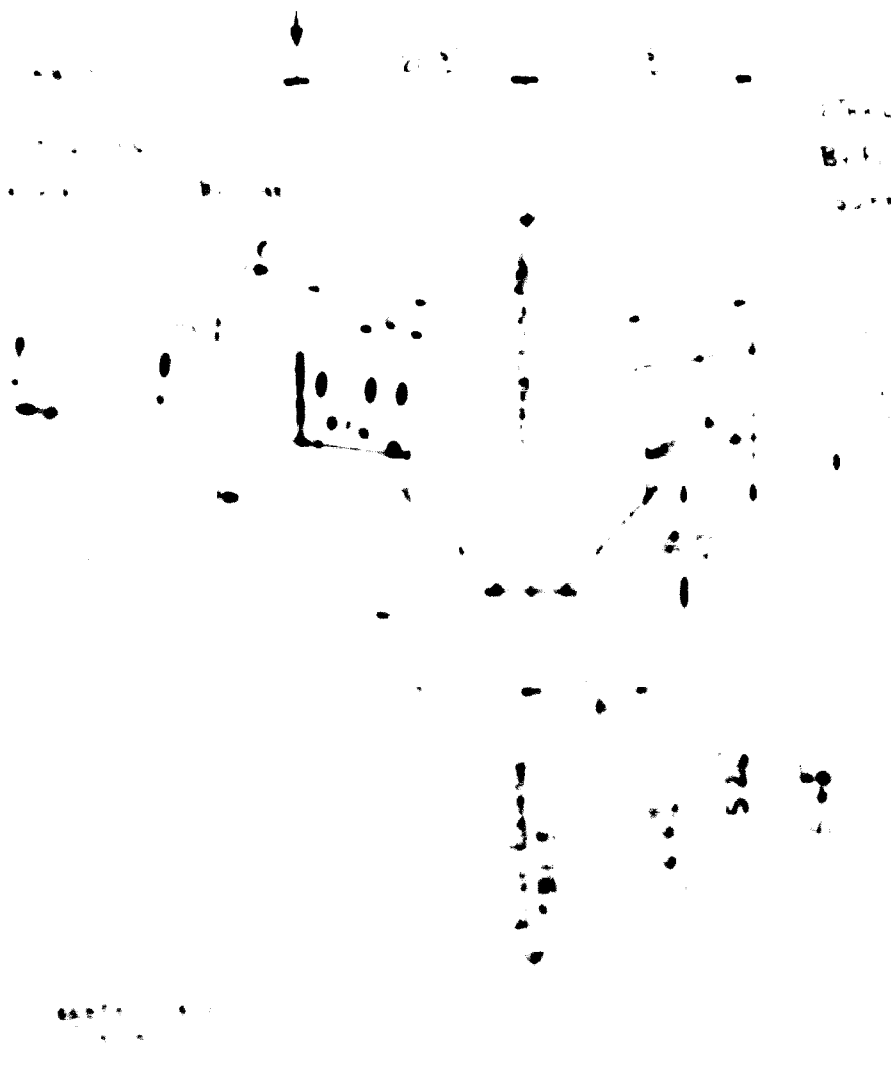


Table with multiple rows and columns, containing technical specifications and data. The text is mostly illegible due to scan quality.

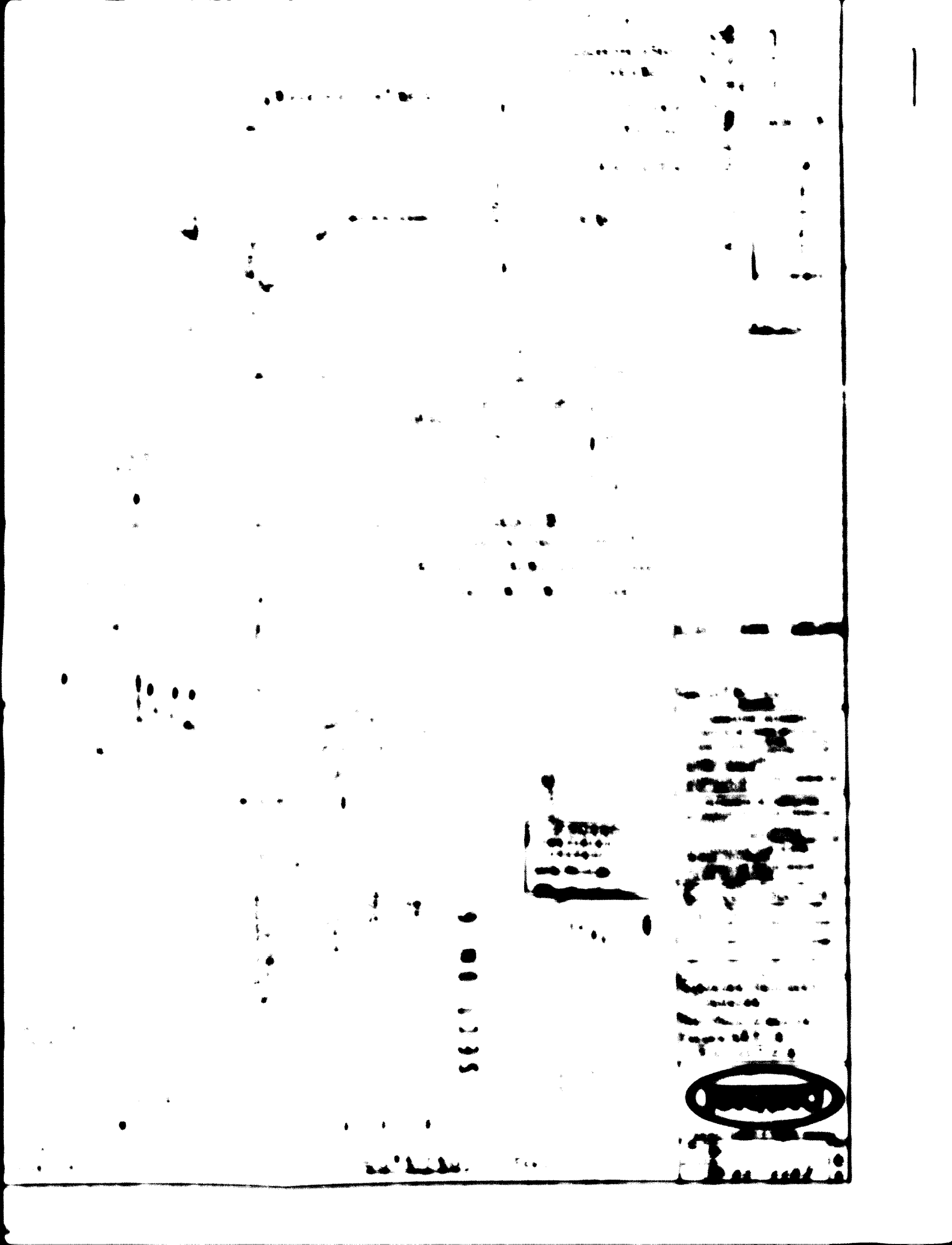


SECTION 6



SECTION 5

SECTION 5





[The following text is extremely faint and largely illegible due to low contrast and scan quality. It appears to be a list of items or a table with several columns and rows. The text is mostly blacked out or too light to read.]

1. The first part of the document

describes the general situation

and the objectives of the study

The second part of the document

describes

the methodology used

and the results of the study

The third part of the document

discusses the implications

of the study

and the conclusions drawn

The fourth part of the document

contains the references

and the appendixes

2. The second part of the document

describes the methodology used

and the results of the study

The third part of the document

discusses the implications

of the study

and the conclusions drawn

The fourth part of the document

contains the references

and the appendixes

The fifth part of the document

contains

the

SECTION 1

Item	No.	Description	Q'ty

PLEASE NOTE THAT EACH PAIR OF ARMS WITH
TOE BEGS. SHOWN E. BALANCED SEPARATELY

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(3)

PAGE 47

NOTE:
MAKE SURE THAT ALL ASSEMBLED PARTS
ARE DEFINITELY AIR TIGHT. IN ORDER TO
AVOID DUST LEAKS. CHECK END PLATES
COVERS AND CHUTE CAREFULLY.

SECTION 2

JAMES UNITED STEEL LIMITED HALL MACHINERY DIVISION SHERBOROKE QUE.			
TITLE: 26" DIA. STD. GRADER			
DETAIL: GENERAL ARRANGEMENT			
Scale:	Dr.:	Ch.:	App.:
			D-6107
			B

SECTION 12

2.12 SCREW PACKER

2.12.1 Description

The screw packer is a vertical type screw manufactured by Fournier Steel Works Ltd. of Black Lake, Quebec, Canada. It consists of a 356 mm diameter helicoidal conveyor screw mounted vertically to rotate within a 38.1 cm inside diameter tube. It is designed to compress loose asbestos fiber into burlap or plastic bags. Loose asbestos fiber is fed through a hopper into the open upper end of the tube. As the conveyor screw is rotated by the electric motor and gear reducer drive, the loose asbestos fiber is compressed and forced into the bag to be completely filled. The density of fiber compression is determined by the manual application of pressure to the brake drum which controls the rate of descent of the support frame.

Drive:

One 10 HP, 380 V, 3 ph., 50 cycles with V-belt sheave.

One Holroyd single reducer worm gear #5, type HV, ratio 10/1.

Speed:

The speed of the electric motor is 1500 rpm.

The speed of the vertical screw is 180 rpm.

2.12.2 Part Identification

The vertical screw packer is composed of ten main parts.

Reference drawing:

Fournier Steel Works Ltd., No. D-9318-403, Rev.2,

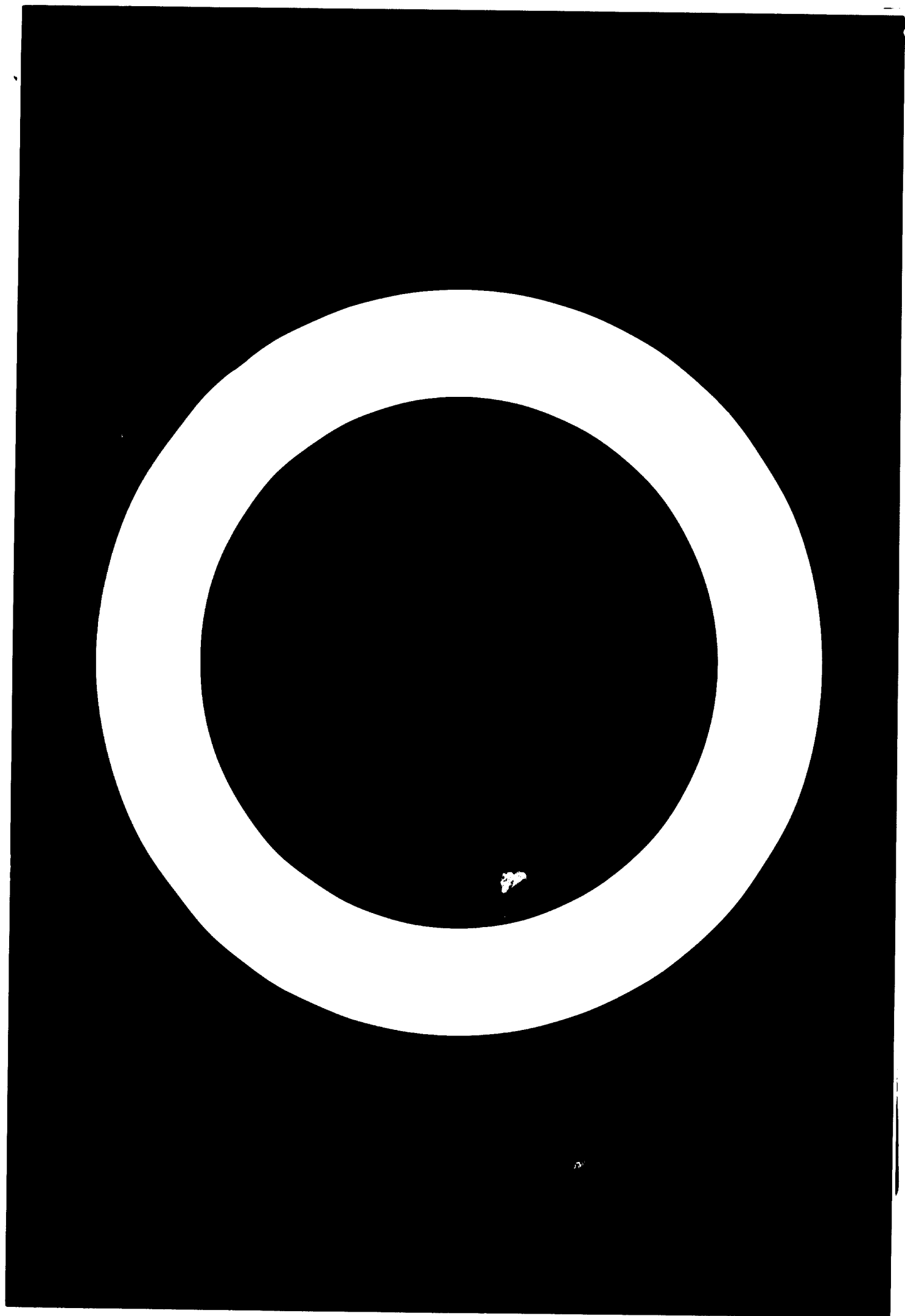
"Vertical Screw Packer Assembly", dated 24.4.72.

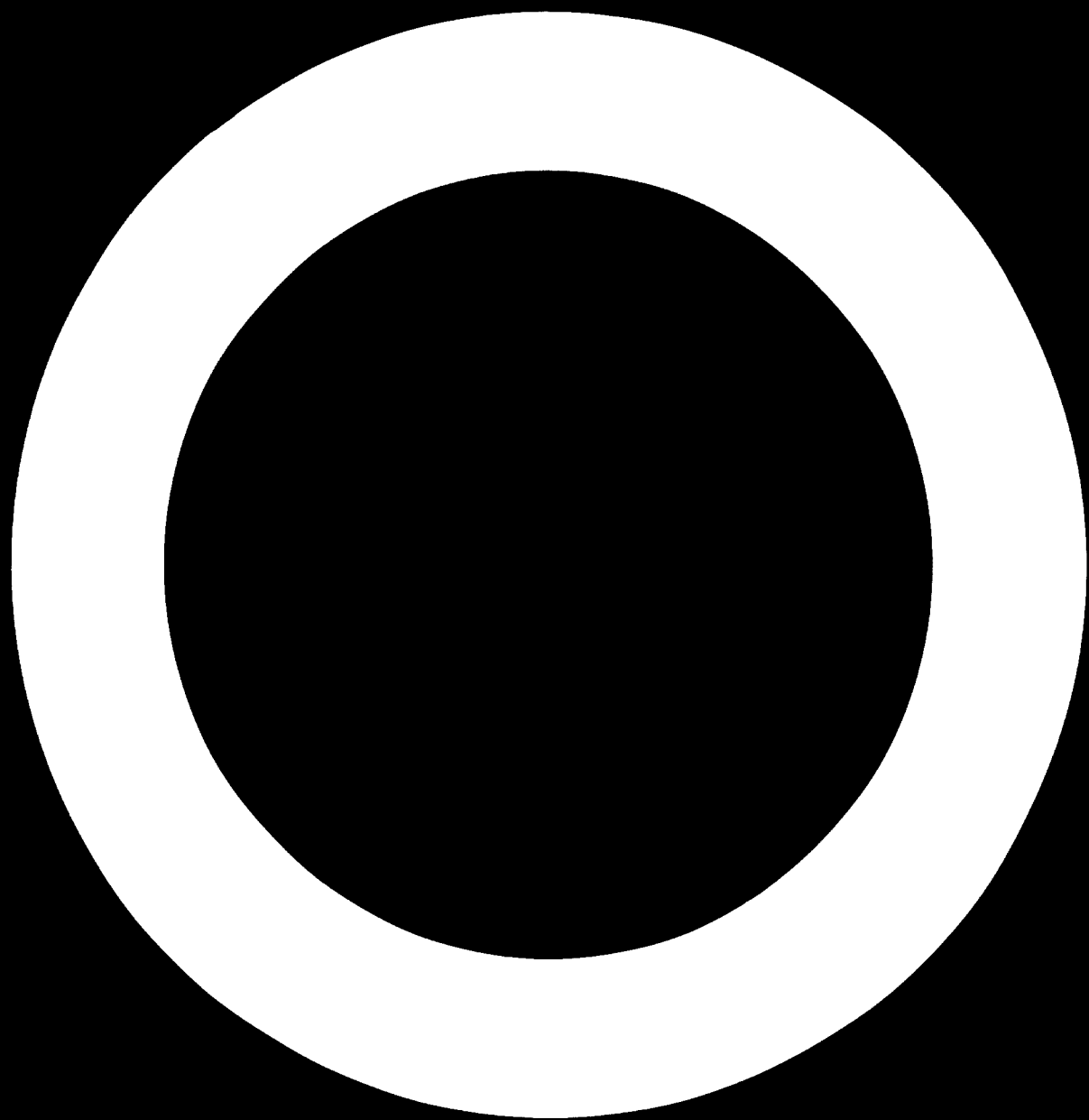
Part identification:	Ref. No.
1. Electric motor	1
2. Speed reducer	2
3. Coupling	5
4. Shaft	24
5. Arch breaker	27
6. Helicoid screw assembly	
7. Hand brake assembly	13
8. Hardwood rails	11
9. Bag support assembly	22
10. Frame assembly	

2.12.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	V-belts A-68 (one matched set)	A-68
2	Pillow blocks	FY-115

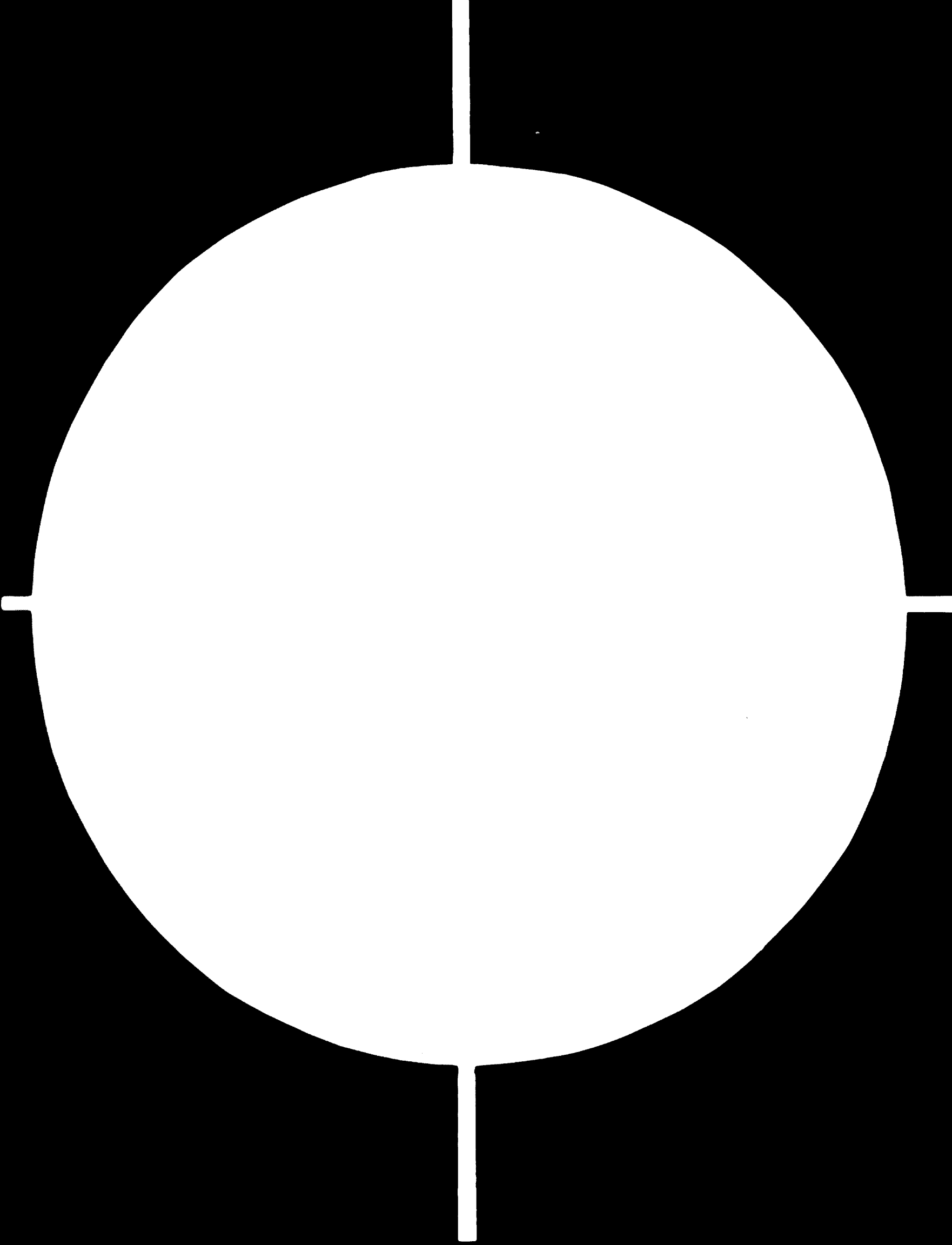




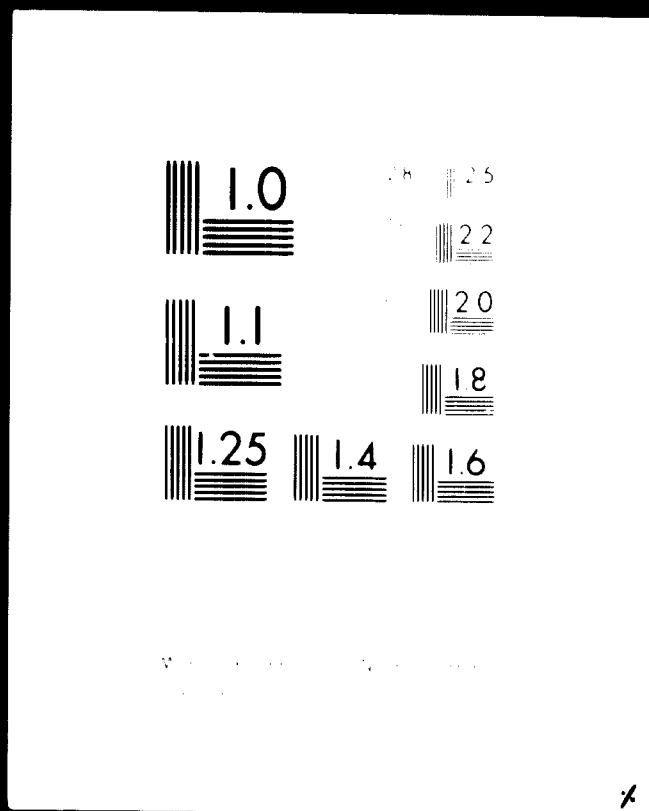
C - 821



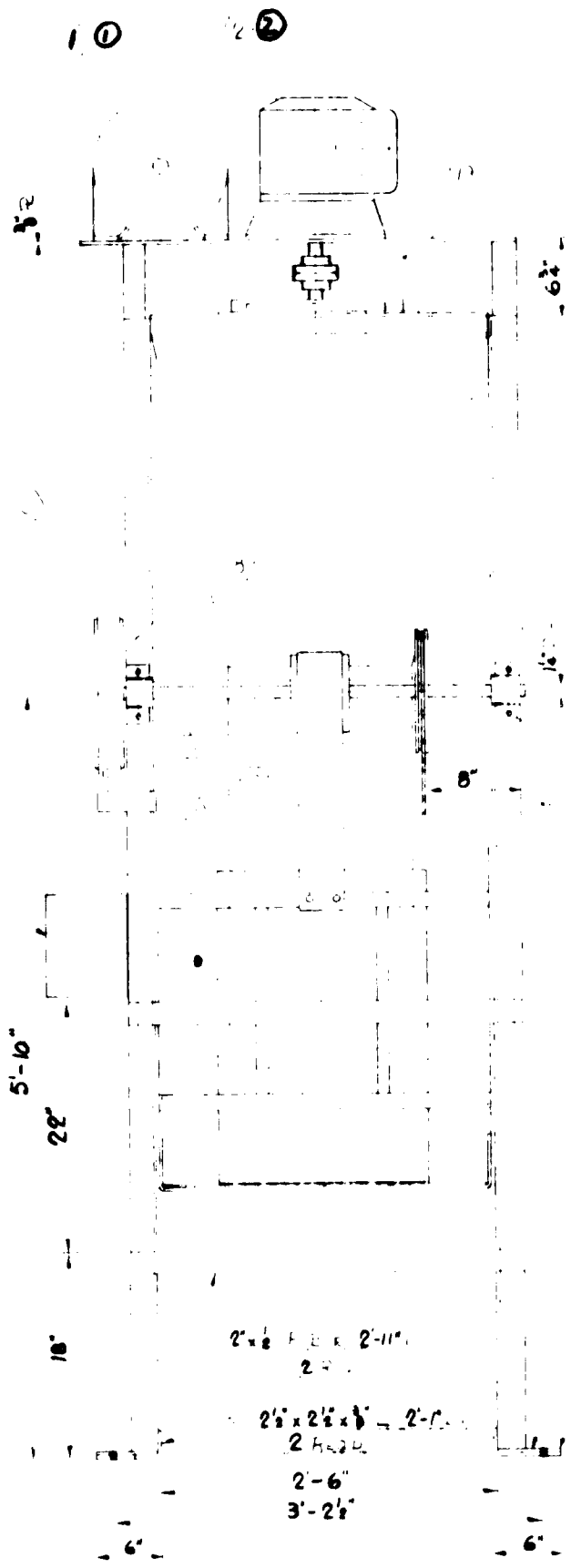
82.06.22



2 OF 2



24 x E



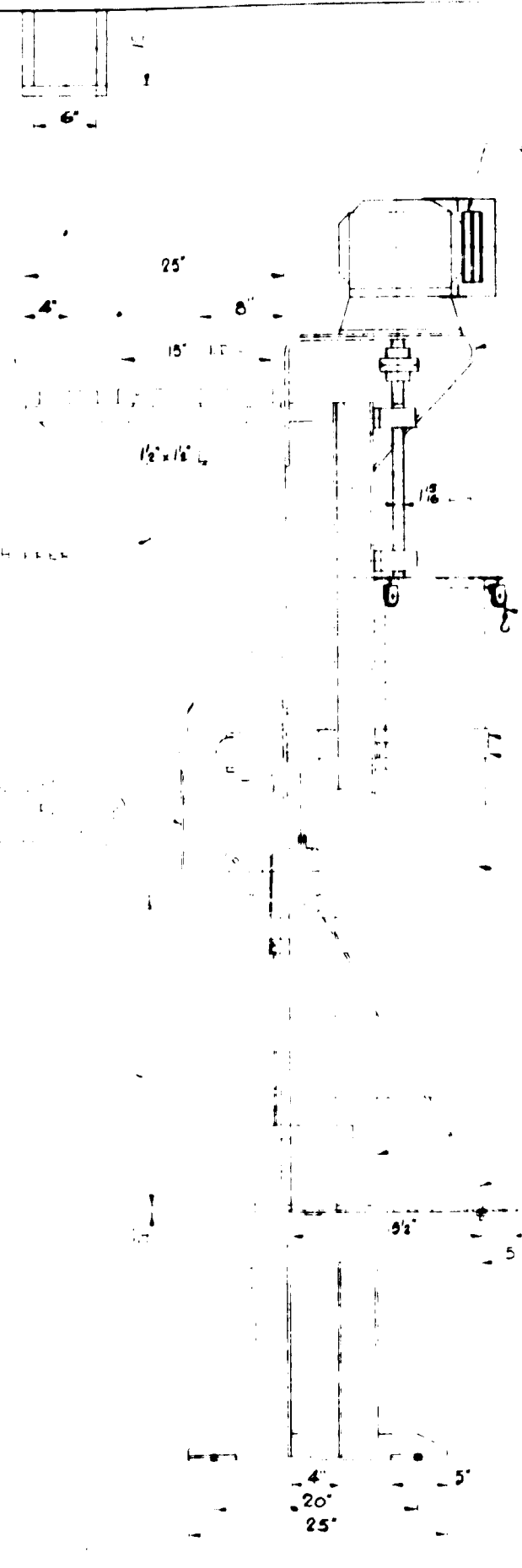
2" x 8" F.E.B. 2'-11"
2 R.

2 1/2" x 2 1/2" x 3/4" - 2'-1"
2 H.S.P.

2'-6"
3'-2 1/2"

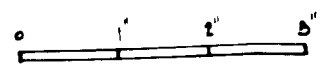
1/2" x 5" F.E.B. 5 3/8 L
4 H.S.P.

3/4" x 5" F.E.B. 3 1/2 L
4 H.S.P.



4'
20'
25'

SECTION 1



ONE MATCHED SET OF TWO
V-BELTS B-60

2" x 1/2" Flat Bars, Furnice
APPROX. AS SHOWN

(5) (3)

3" x 3" x 1/2" L

(7)

4" x 2" CHANNEL x 8'-3" L
4 REED

BAR HOOK & ONE ZINC WARE
(WIRE ROPES 1/2" DIA. EACH, 5/8" DIA. W/ 1/2" SWAGE)
EXHIBIT IN FIG. 10

(6) (8) ARCH BRACKET 1/2" x 1/2" x 1/2" L
SHIELD TO SHIELD

1 1/2" x 1/2" BAND

1 1/2" x 1/2" BAND (ONE IN FRONT AND ONE
BEHIND TO HOLD SHIELD BUT FRONT
ONE TO BE REMOVED)

(13) (7) 5/8" STEEL W. SCREW DRIVES IN
FOR SHIELD POSITION KEYS

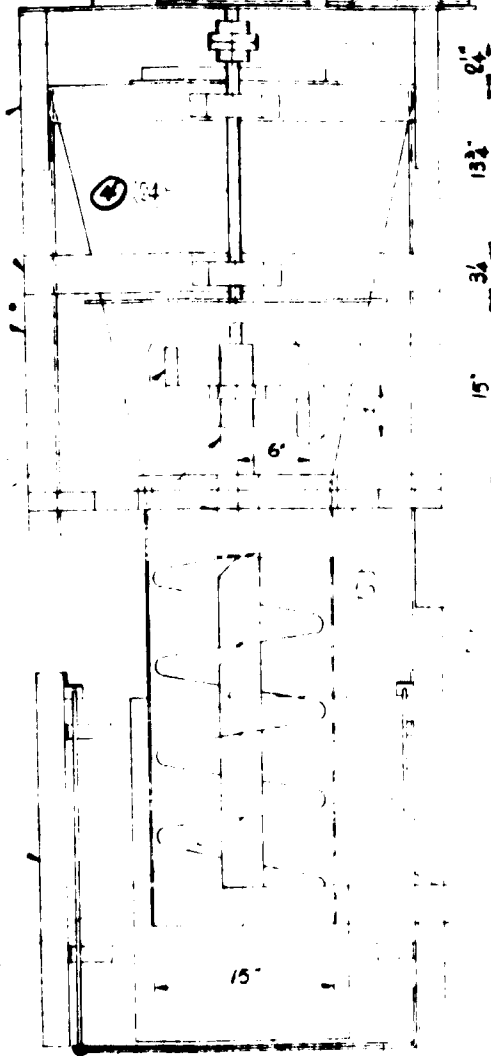
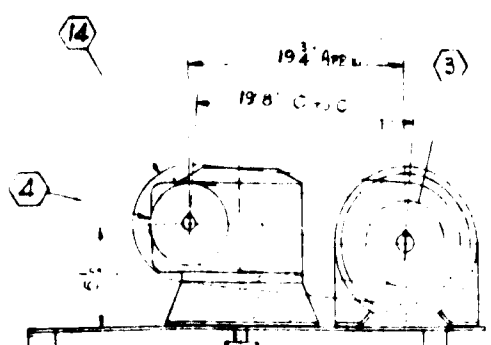
(12)

(1)

SHIELD (SEE DETAIL)

1/2" DIA. ROD (1 REED)

(6) (12)



SYM	QTY	DESCRIPTION	DWG NO
1	1	10 H.P. MOTOR, 1500 R.P.M. 530/503, FRAME 8137	
2	1	HAWKINS SMALL RED WIRE ROPE #5, TYPE HV, RATED 4 1/2	
3	1	6" P.D. 2 B-GROOVE V-BELT SHEAVE, 1 1/2" BORE	
4	1	7 1/2" P.D. 2 B-GROOVE V-BELT SHEAVE, 1 1/2" BORE	
5	1	ROPE FLANGED COUPLING, 2 1/2" BORE	
6	1	8 1/2" WIDE 13" DIA BRAKE DRUM WITH BRAKE BAND	
7	4	PILLOW BLOCK BALL BEARING	
8	1	5" WIDE 7" DIA SPLIT STEEL PULLEY 1 1/2" BORE	
9	1	4" WIDE FLAT RUBBER BELT	
10	1	10" P.D. FOR 1/2" DIA ROPE 1 1/2" BORE	
11	2	2" x 4" HARD WOOD RAILS	
12	1	1/4" DIA R.H. HEAT TND SCREW 1/2" PITCH	
13	1	1/2" DIA BRAKE WITH NOTCHED POSITIONING	
14	1	DRIVE SHAFT	
15	1	MAGNETIC STARTER WITH WIRE	

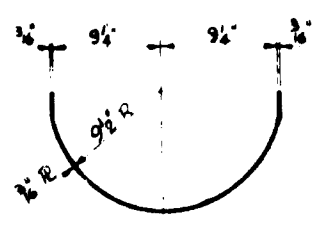
SECTION 2

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NOTE:
FOR PARTS DETAILS SEE DWGS.
Nos D-9516-411, 412 & 413.

PAGE 51



SHIELD DETAIL

2	REVISED TO SUIT BOLIVIAN PROJECT	D.D.	MAY 28/78
1	DRIVE CHANGED	D.D.	MAY 2/78

FOURNIER STEEL WORKS LTD.
BLACK LAKE, QUE. CANADA

VERTICAL SCREW PACKER
ASSEMBLY

ONE MATCHED SET OF TWO
V-BELTS B-62

194 APP L
198" CIRC

4	1	7/8" DIA 2 B GROOVE V BELT SHEAVE 1 1/2" BORE
5	1	FLANGE COUPLING 2 1/4" BORE
6	1	2 1/2" WIDE 13" DIA BRAKE DRUM WITH BRAKE BAND
7	2	PILLOW BLOCK BALL BEARING
8	1	3" WIDE 7" DIA SPLIT STEEL PULLEY 1 1/2" BORE
9	1	4" WIDE FEAT RUBBER BELT
10	1	10" P DIA FOR 2" DIA ROPE 1 1/2" BORE
11	2	2" x 4" HARD WOOD RAILS
12	1	1/4" DIA RH HELIX SCREW 1/2" PITCH
13	1	HALF BRAKE WITH NOTCHED POSITIONING
14	1	DRIVE SHAFT
15	1	MAGNETIC STARTER WITH WIRE

2" x 2" F.L.T. BRK. FINGER
APPROX. AS SHOWN

(5) (3) 3" x 3" x 1/4" L

(7) 4" x 2 1/2" CHANNEL x 0.3" L
4 R200

BAN HOOK & COUPLER
(WIRE ROPE 1/2" DIA. SASH WT
SUSPENDED BY TOP)

(6) (3) ARCH BREAKER 7/8" L
SUSPENDED BY TOP

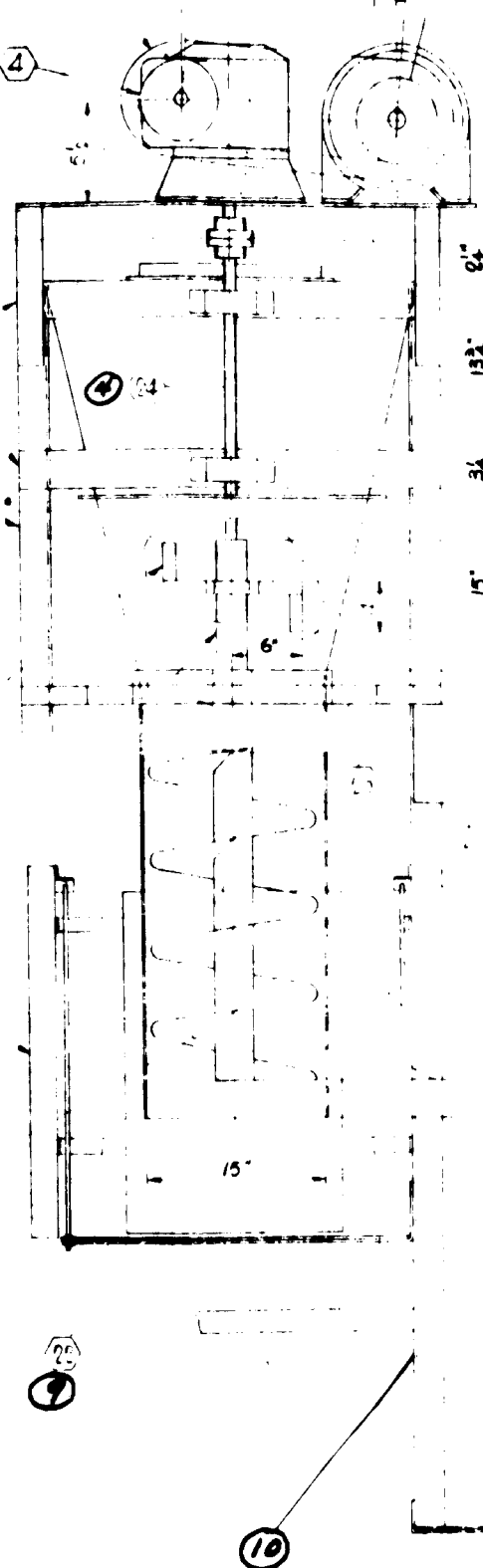
1 1/2" x 4" BAND
1 1/2" x 4" BAND (WELD REAR HALF IN
SASH. SASH WIRE BELT IS
MADE TO REMAIN TIGHT)

(13) (7) 3/8" S.P. SCREW DRIVERS
FOR SASH & DIAPHRAGM REST

(21) (1) (1)

SHIELD (AS DETAIL)

1/2" DIA ROD (C-REOD) (6) (12)



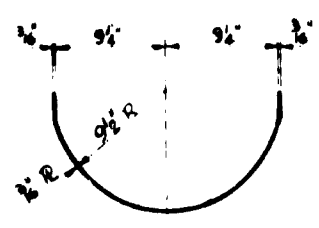
24"
15"
34"
5-64"
34"
2-8 1/2" 32"
34"
34"

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NOTE
FOR PARTS DETAILS SEE DWGS.
NOS D-9316-411, 412 & 413

PAGE 51



SHIELD DETAIL

SECTION 3

2	REVISED TO SUIT BOLIVIAN PROJECT	D.D.	May 28/78
1	DRIVE CHANGED	D.D.	May 2/78
FOURNIER STEEL WORKS LTD. BLACK LAKE, QUE. CANADA			
VERTICAL SCREW PACKER. ASSEMBLY.			
SCALE 1 1/2" = 12"	DR D.D.	FILE	PART NO.
DATE APR 24/78	CH APP		D-9318-403 2

SECTION 13

2.13 PORTABLE SCALE

2.13.1 Description

The portable beam scale is a Toledo scale, model 4181, serial No. 37203 exclusively manufactured by Reliance Electric Company, Toledo Scales & Systems, Windsor, Ontario, Canada. The beam scale has a graduated main beam of 50 Kg by 250 grams increments both front and back and has a sensitivity of 0.25 kilograms. Total capacity of 455 kilograms.

2.13.2 Part Identification

The portable beam scale is composed of six main parts. Reference Form 4417 - Reliance Electric Company, Toledo Scales & Systems.

"Parts list and Assembly Instructions Model 4181 Portable Beam Scale".

Part identification:	Ref. No.
1. Base Assembly	80251
2. Platform	80287
3. Lever Assembly	
4. Column	49834
5. Column rod	49802
6. Indicating strip assembly	

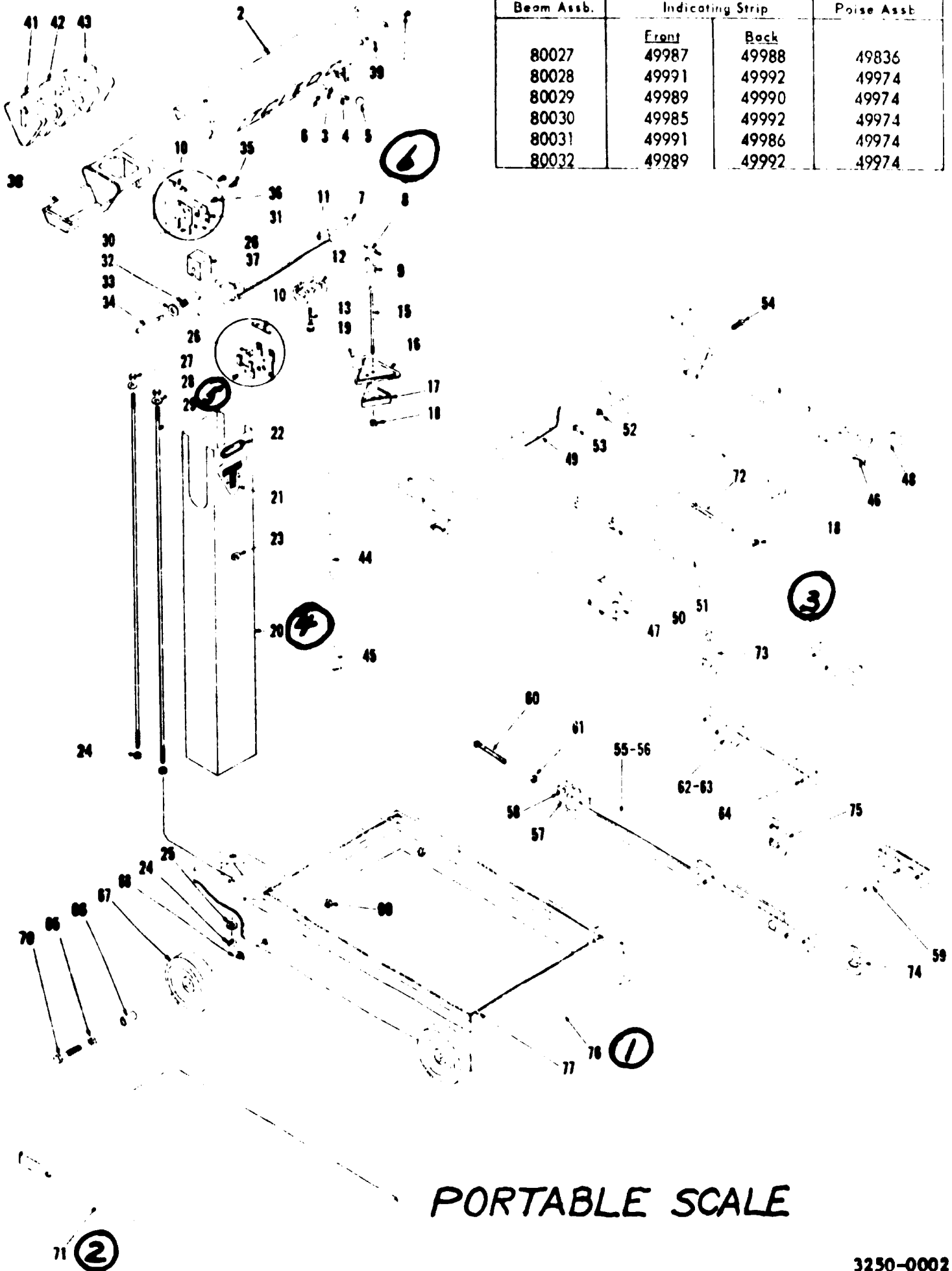
2.13.3 List of Recommended Spare Parts

The manufacturer does not recommend any spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

PARTS LIST

INDICATING STRIP AND POISE DATA

Beam Assb.	Indicating Strip		Poise Assb.
	Front	Back	
80027	49987	49988	49836
80028	49991	49992	49974
80029	49989	49990	49974
80030	49985	49992	49974
80031	49991	49986	49974
80032	49989	49992	49974



PORTABLE SCALE

SECTION 14

2.14 TRUCK SCALE

2.14.1 Description

The truck scale is a two section type "S" motor truck scale, model 20 tons, serial No. 11-3129 exclusively manufactured by Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois, U.S.A. This scale can be used for a maximum weight of 18.18 metric tons.

2.14.2 Part Identification

The truck scale is composed of seven main parts.

Reference drawing:

Fairbanks-Morse Part List and Instruction EM233 and EM236.

"Two section type "S" motor truck scale".

Part identification:	Ref. No.
1. Main lever assembly	80738
2. End ext. lever	
3. Transverse lever assy.	SD12P-1
4. Lever stand assembly	SGC-19
5. Bumper blocks	56861
6. Platform assembly	
7. Indicating scale and poise assembly	

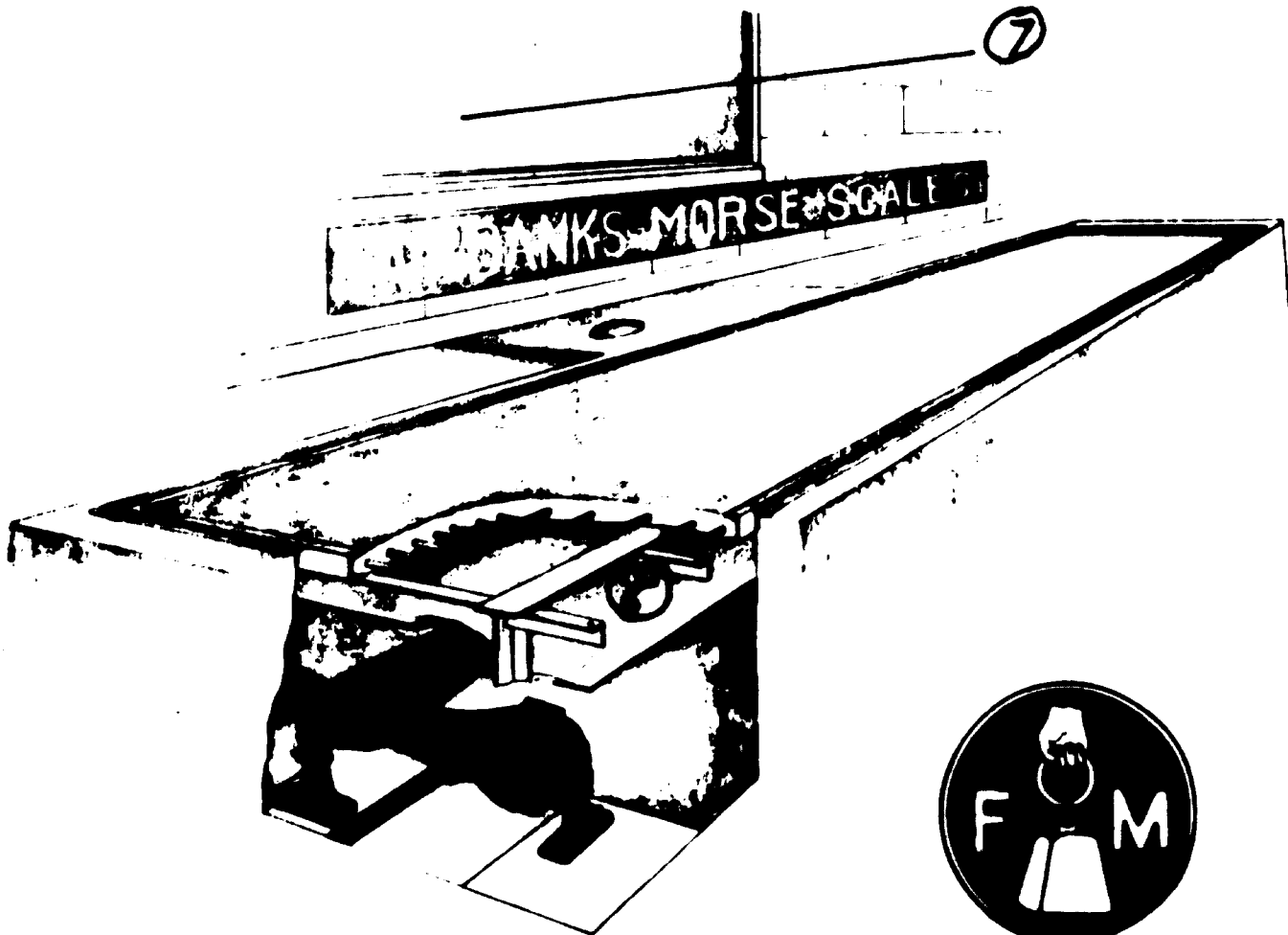
2.14.3 List of Recommended Spare Parts

The manufacturer does not recommend any spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

FAIRBANKS-MORSE

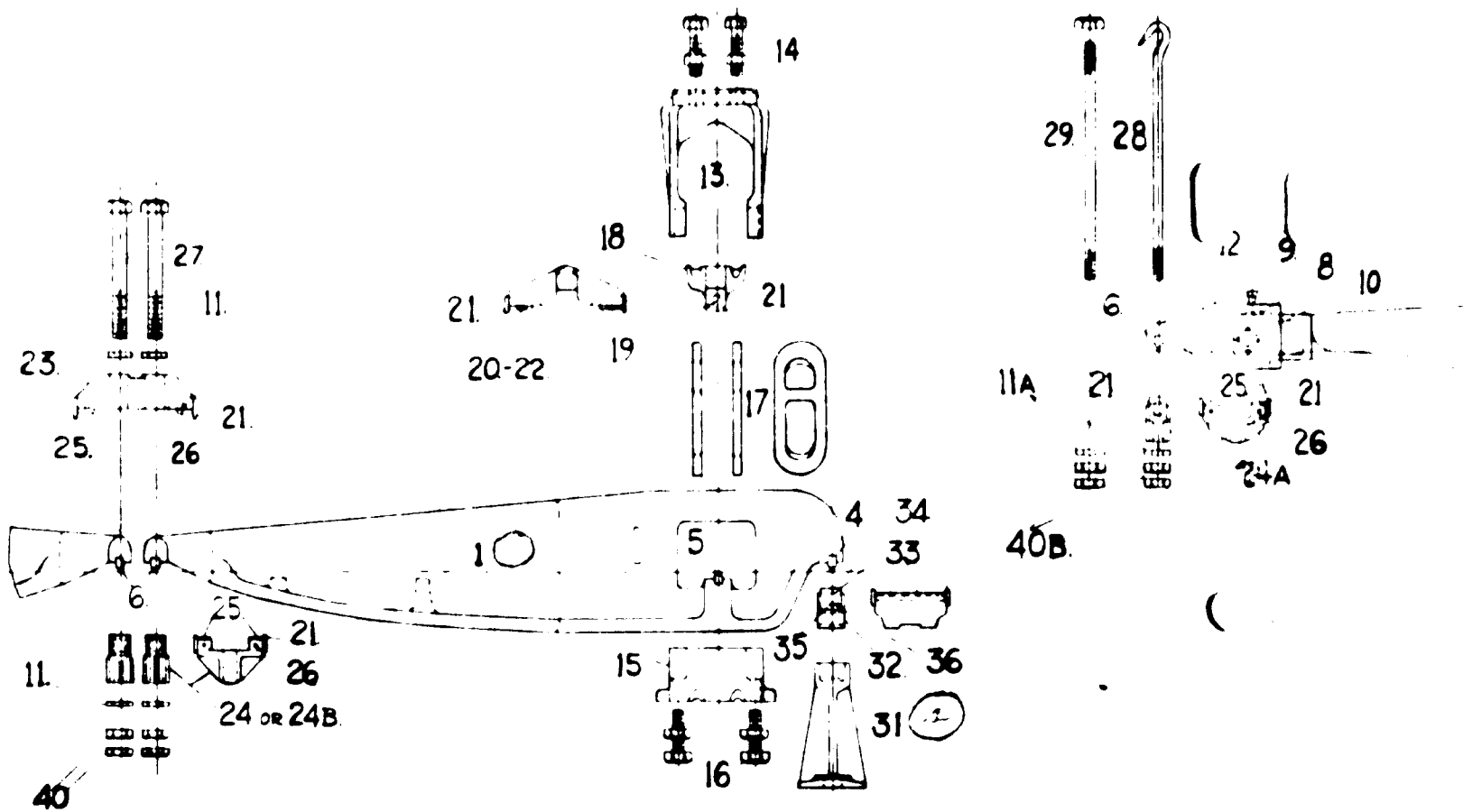
PARTS LIST & INSTRUCTIONS EM 233

TWO SECTION TYPE "S" MOTOR TRUCK SCALE

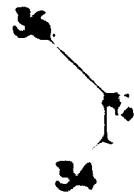
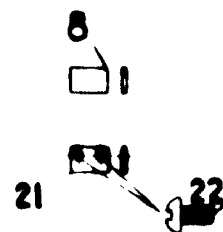
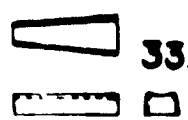
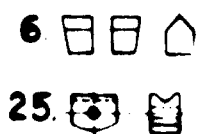
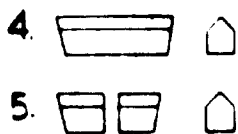
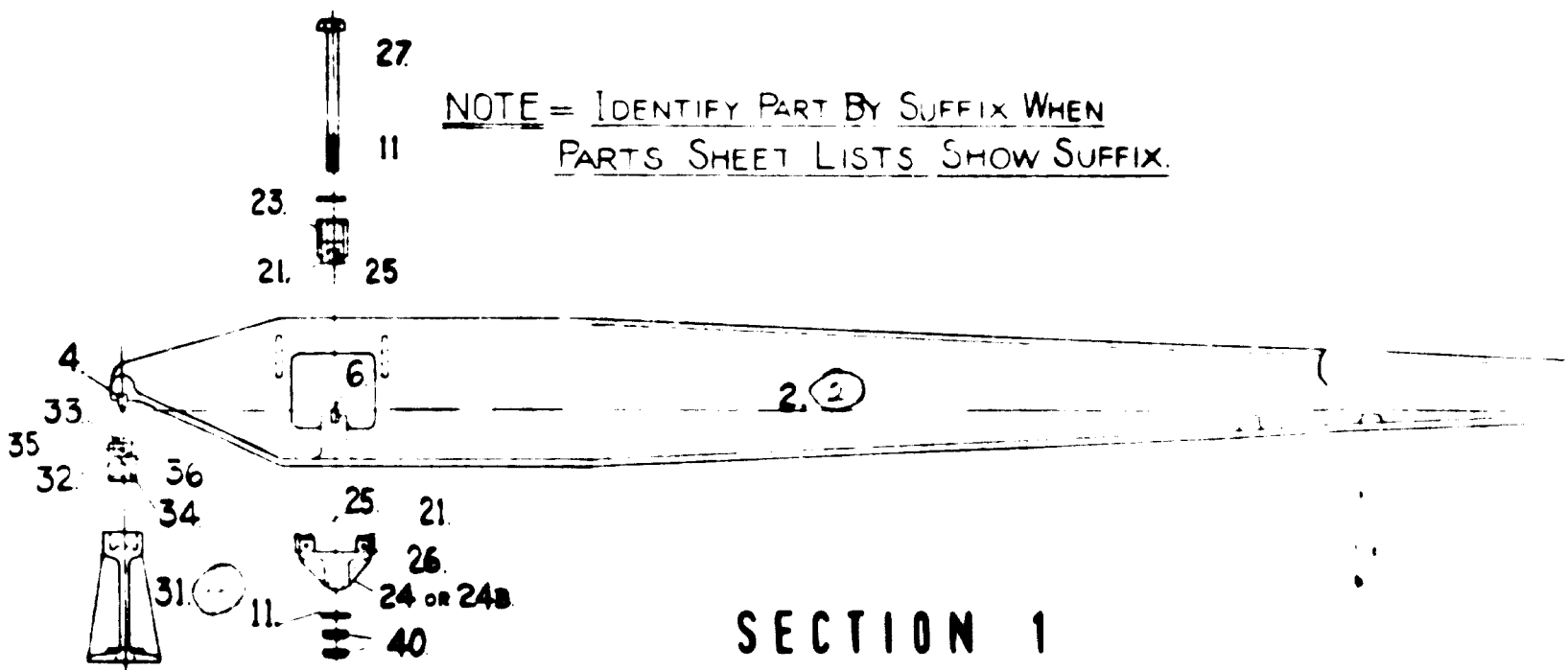


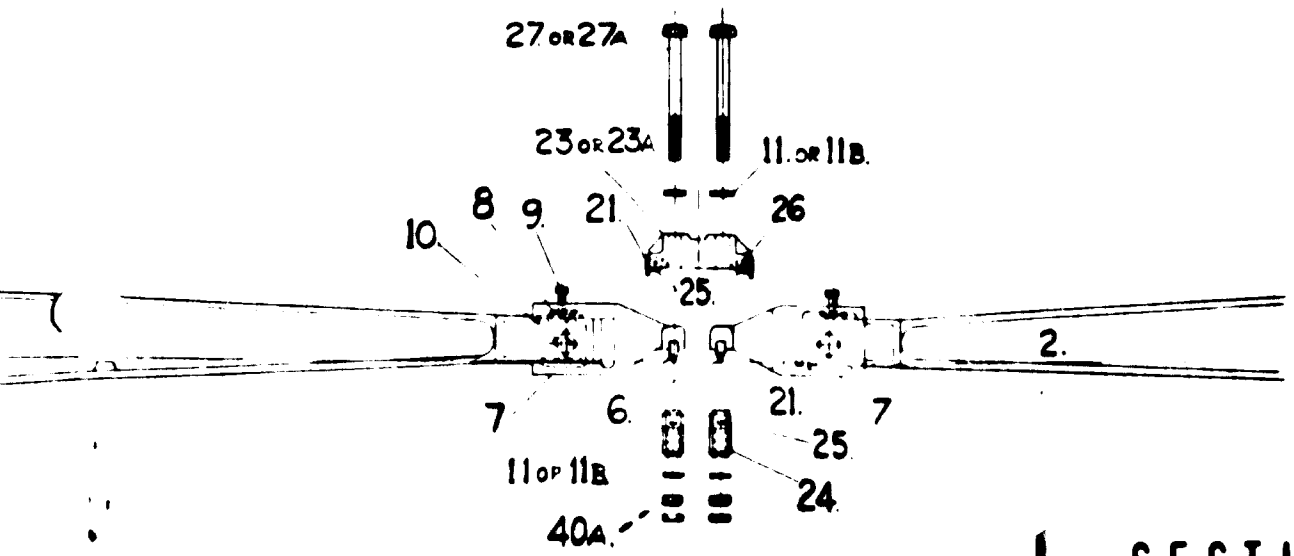
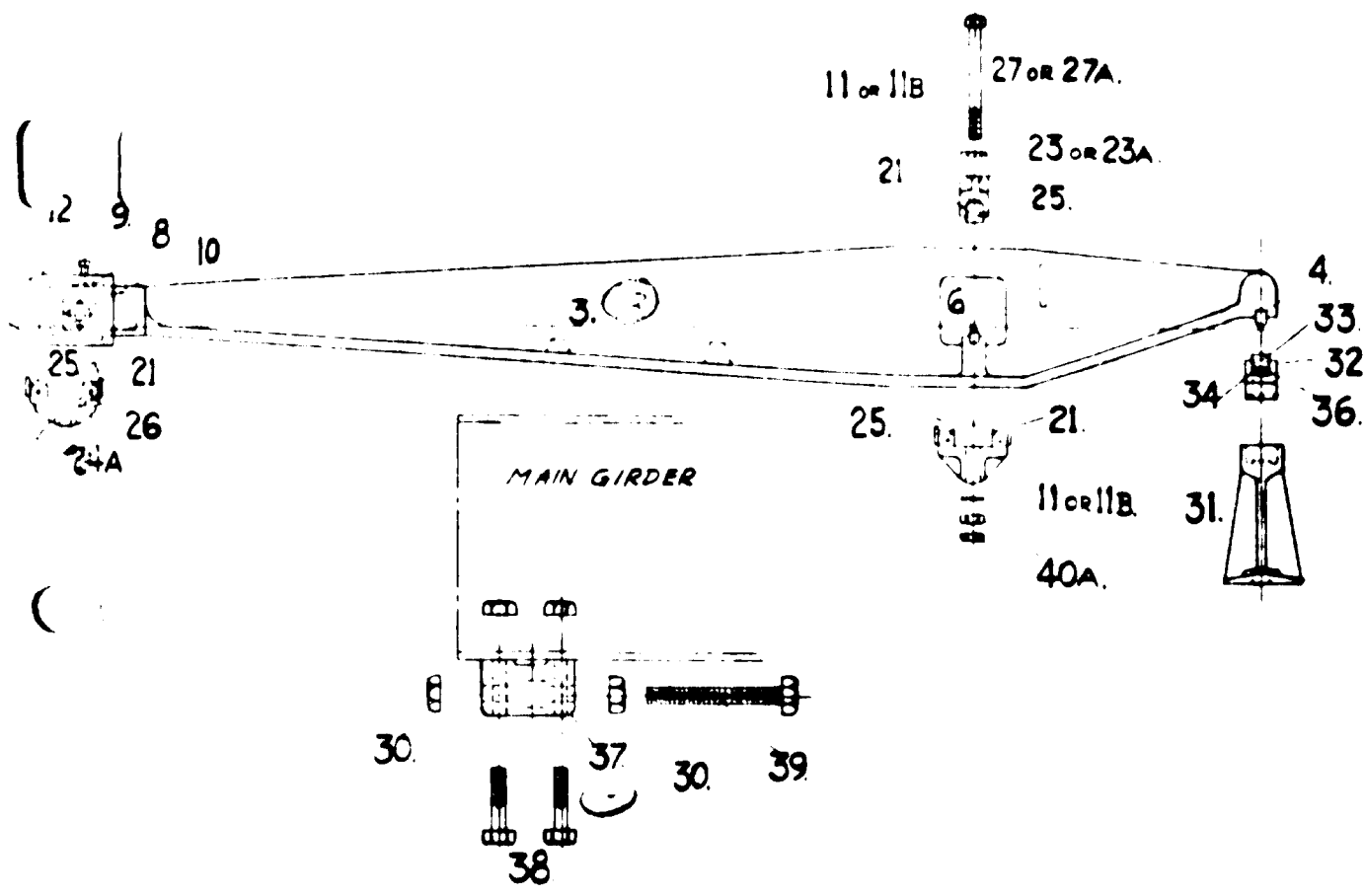
FAIRBANKS, MORSE & CO.

FAIRBANKS-MORSE BUILDING
CHICAGO 5, ILLINOIS

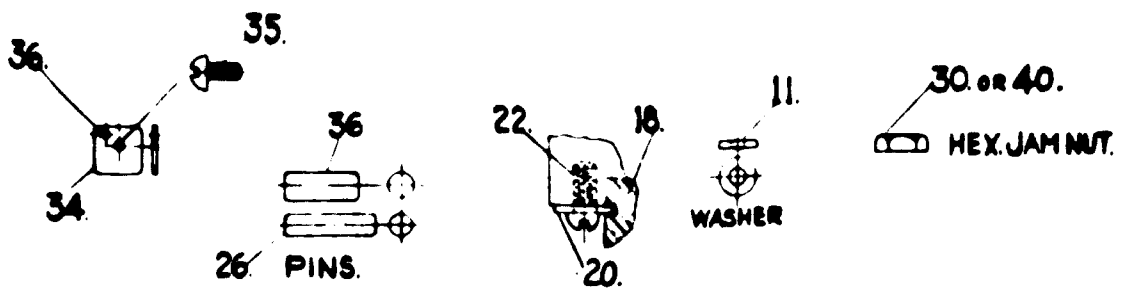


NOTE = IDENTIFY PART BY SUFFIX WHEN PARTS SHEET LISTS SHOW SUFFIX.





SECTION 2



SECTION 15

2.15 FIBRE SCREENER (FS)

2.15.1 Description

The fibre screener is a Rotex screener, model No.81, serial No. 090472, exclusively manufactured by the Orville Simpson Company, Cincinnati, Ohio. The screener has a single deck screen with a gyratory action that varies from a circular motion at feed end to an ellipsoidal motion at discharge end. The machine is base mounted and should be secured to the floor.

Screening Area:

4.7 square meters, screen is 3,050 mm long by 1520 mm wide.

Slope:

The screening surface is inclined at a fixed four degree angle relative to the base of the screener.

Speed:

The screening surface rotates at a speed of 227 rpm.

Stroke:

The circular motion of the screening surface has a 76.2 mm diameter.

Drive:

A 3 HP, 380 V, 3 ph., 50 cycle motor with V-belt, sheaves and drive head.

2.15.2 Part Identification

The fiber screener is composed of fifteen main parts.

Reference drawing:

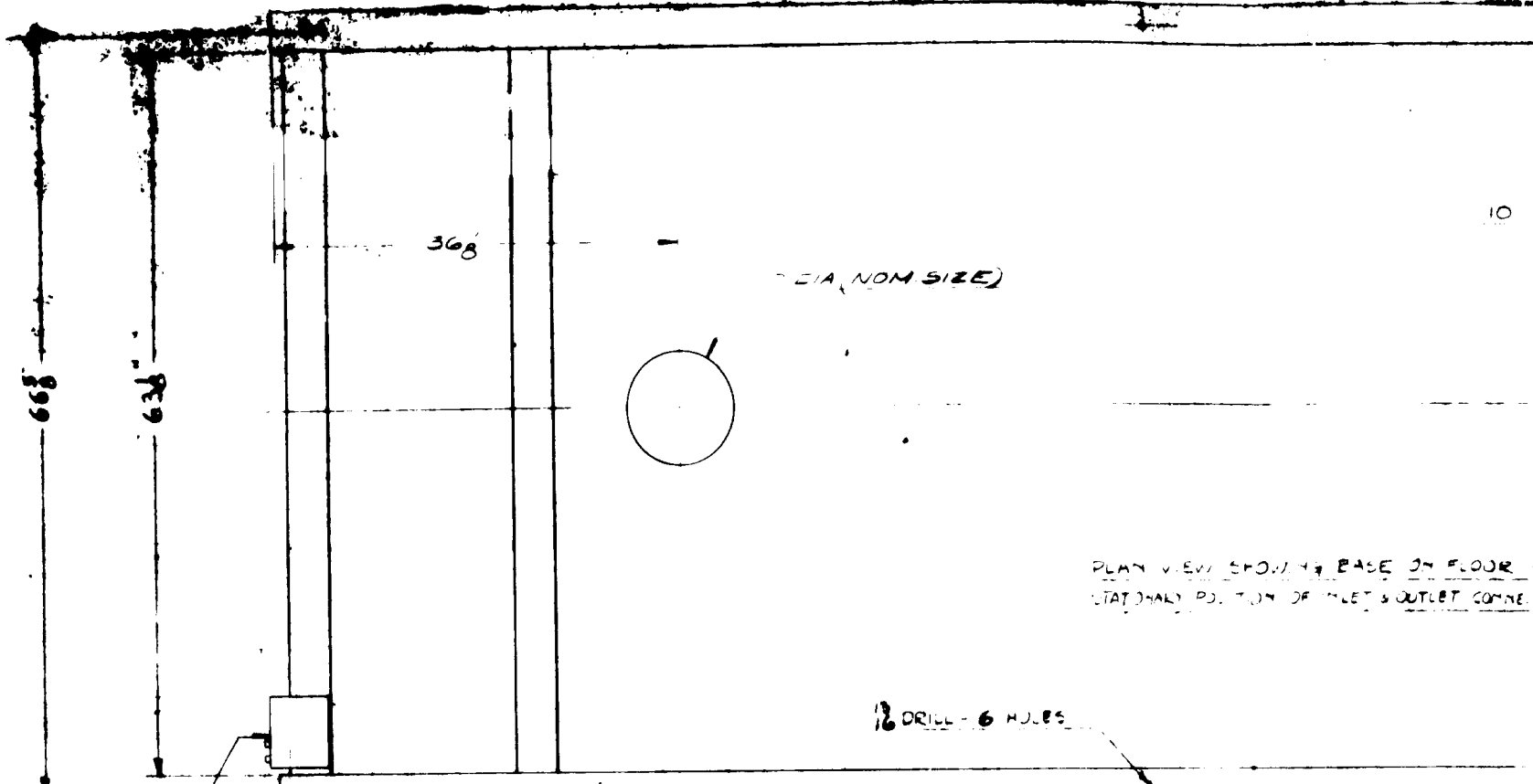
Orville Simpson Co. No. 47385, "Outline Drawing Rotex
No. 81 E.D.", dated 29.4.72.

Part identification:	Ref. No.
1. Base assembly	47390-E
2. Motor, Drive and Guard	22745-E
3. Drive head assembly	24568-E
4. Box frame assembly	47387-E
5. Drag link assembly (feed end)	9222-C
6. Crankpin assembly	24422-C
7. Slide bearing assembly	18628-C
8. Clamp handle assembly	21345-B
9. Top cover assembly	47386-E
10. Screen frame assembly	8015-E
11. Screen	
12. Bottom pan assembly	47389-D
13. Drag link assembly (discharge end)	24128-C
14. Perforated discharge end	47388-D
15. Connecting sleeves	29553

2.15.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	Screen frame assemblies	8015-E
4	Connecting sleeves, 10 in. dia.	29553
320	Rubber balls, 1-3/8 in. dia.	2311
2	Slide balls	27152
8	Rubber bushings, 3-1/4 in. O.D.	9200

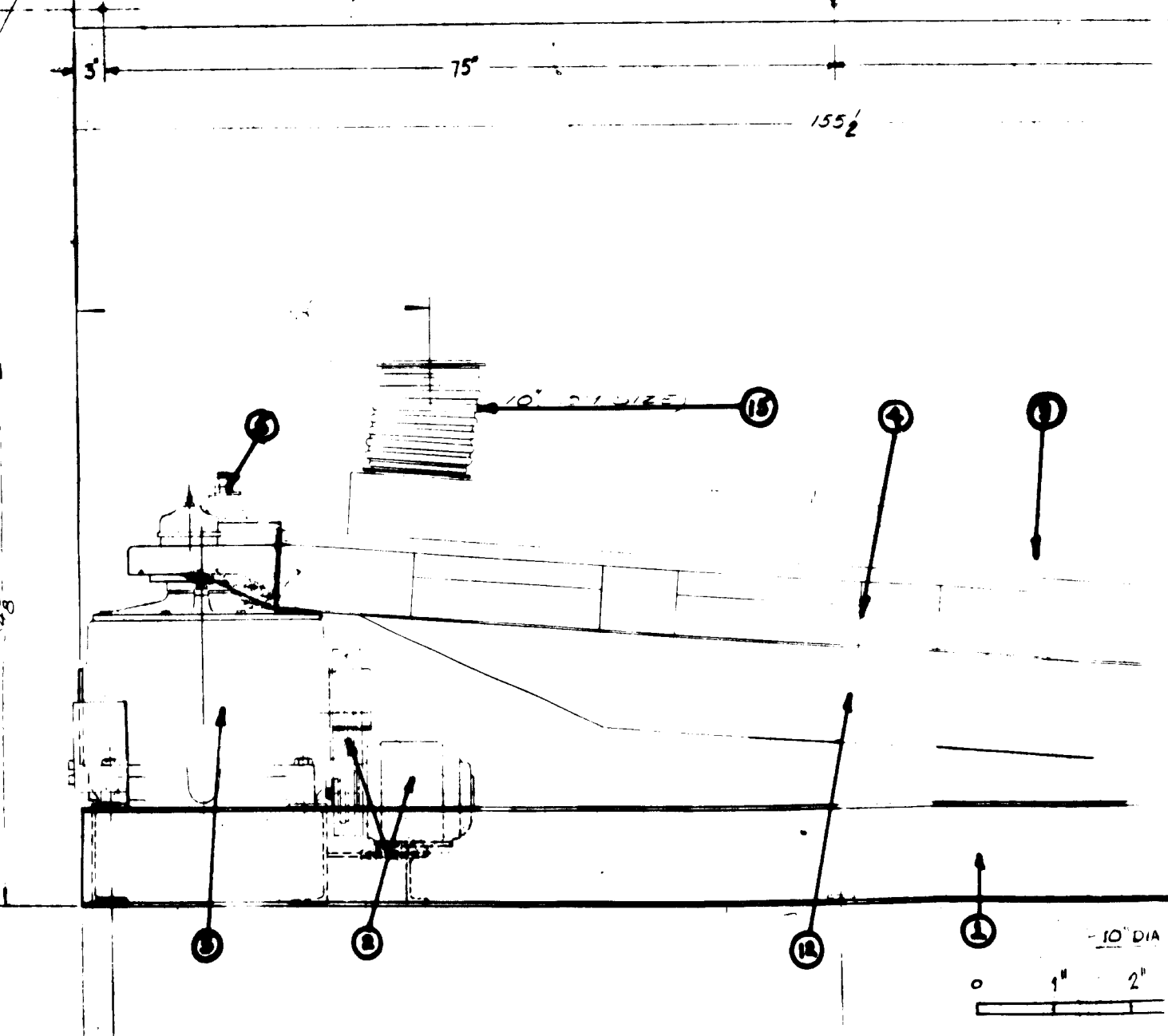


PLAN VIEW SHOWING BASE ON FLOOR
 STATORARY POSITION OF INLET & OUTLET CONNE.

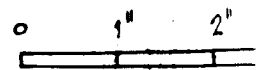
DRILL - 6 HOLES

STARTER

SECTION 1



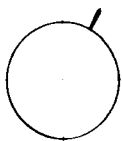
- 10" DIA



10" DIA.

368

10" DIA. (NON-SIZE)



PLAN VIEW SHOWING BASE ON FLOOR AND STATIONARY POSITION OF INLET & OUTLET CONNECTION

DRILL - 6 HOLES

66 1/2"

63 1/2"

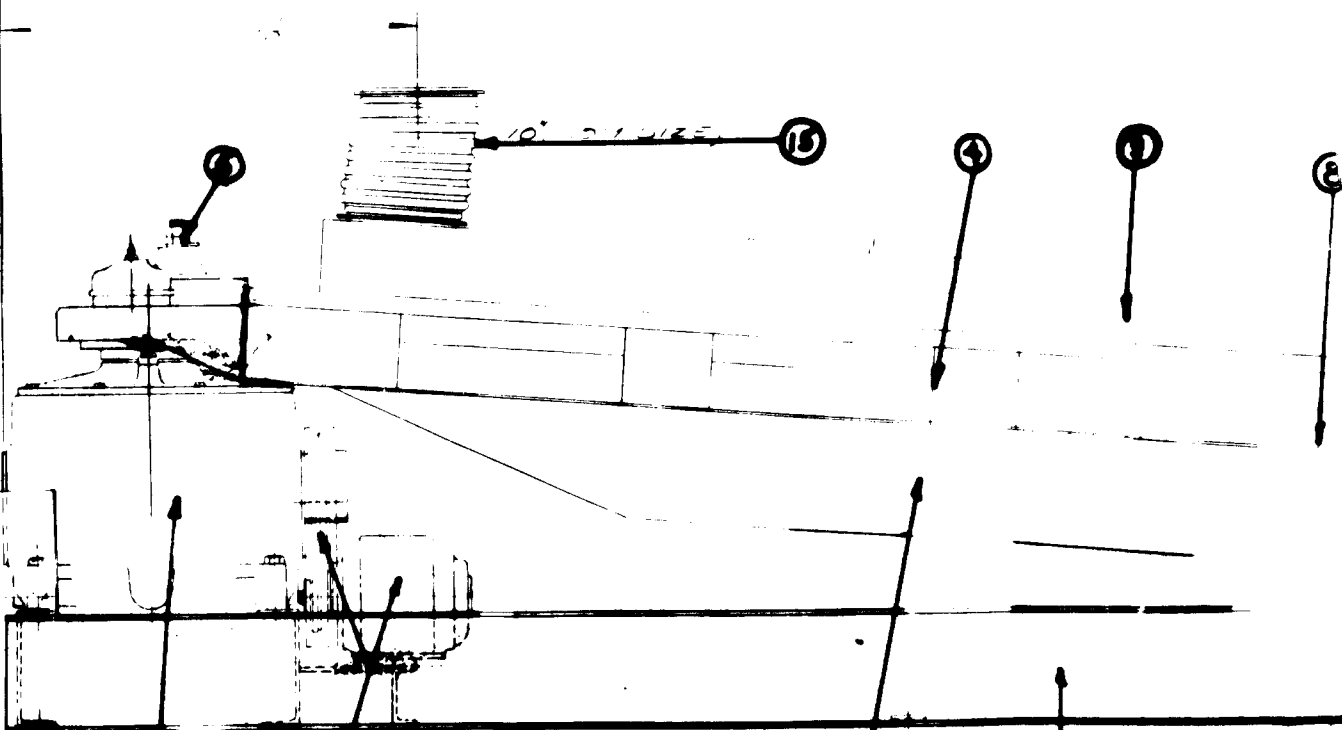
STARTER

3"

75"

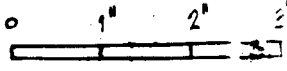
75"

155 1/2"



10" DIA. (NON-SIZE)

10" DIA. (NON-SIZE)

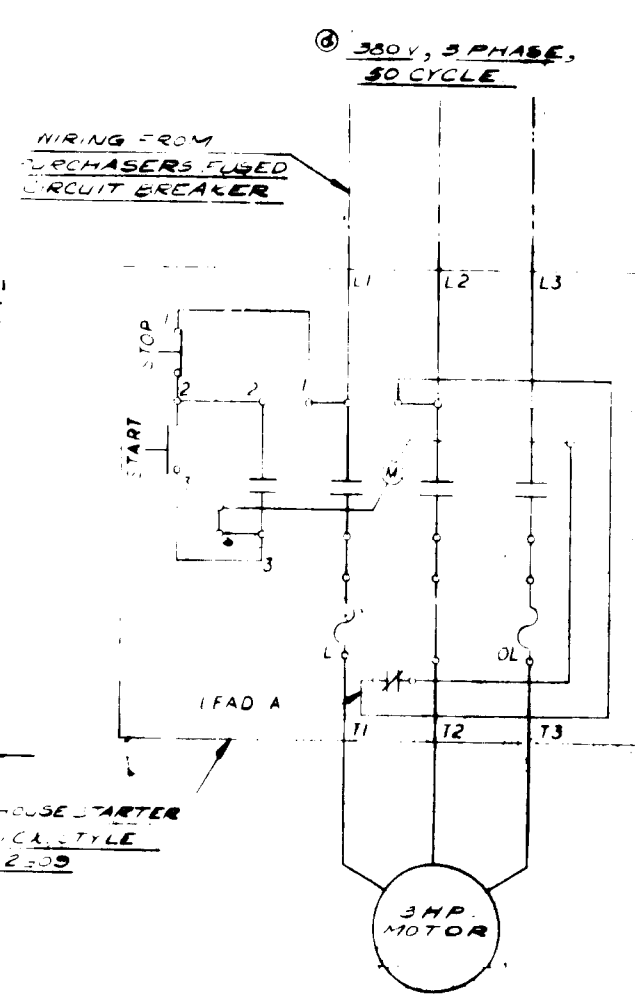
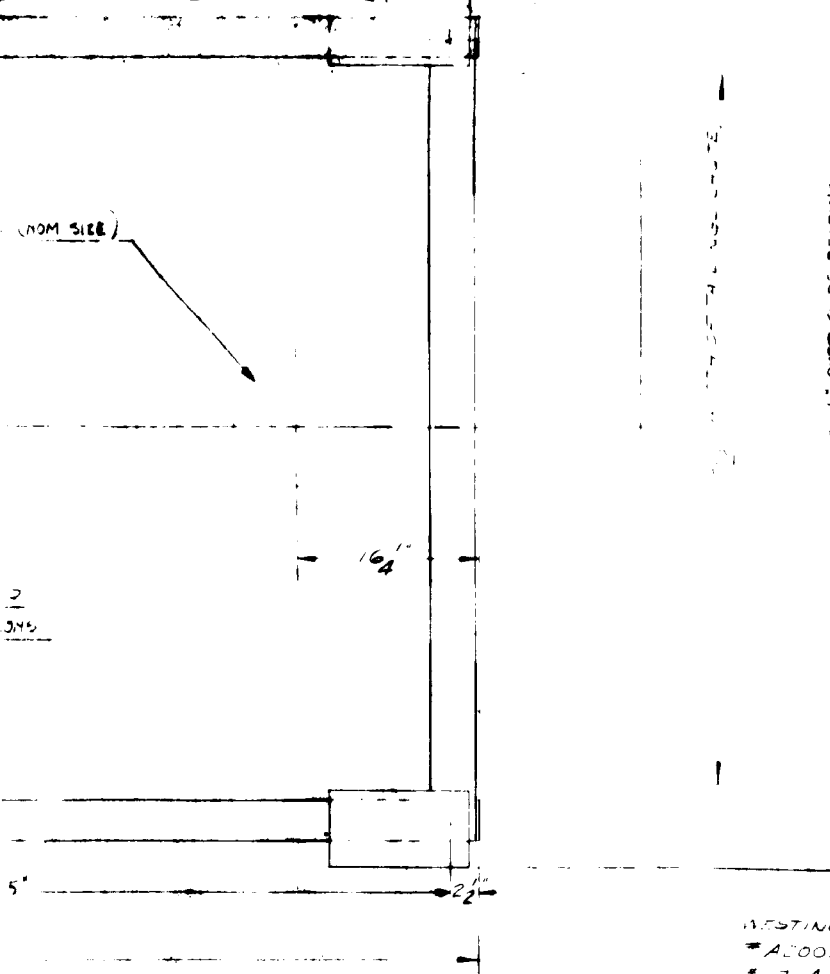


3"

75"

75"

SECTION 3

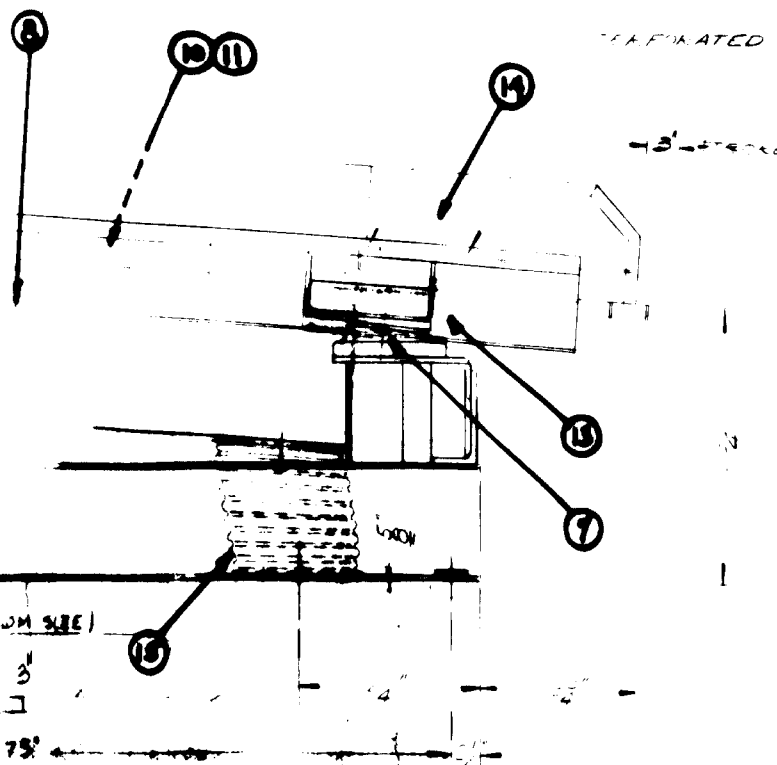


TESTING-HOUSE STARTER
 * A2000-CX STYLE
 * 7.2A @ 2500

SEE LACK STEER 47555 B

TERMINATED PLATE 47560 D

SECTION 4



2:	...	51030
2:	...	51030
6:	...	47555 B
7:	...	47555 C
1:	...	47555 E
3:	...	47555 F
4:	...	47555 G
4:	...	47555 H
18:	...	47555 J
19:	...	47555 K
13:	...	47555 L
5:	...	47555 M
9:	...	47555 N
M:	...	47555 O

PAGE 62

This print certified correct for Rotax Screener Model # 11
 Serial # 902472 Furnished to Lynn Mac Lusk Capital Corp
 Their Order # 72/147 Dated 3/23/72 Rec. # 900354
 The Orville Simpson Company's Order # 900354
 Dimensions for holes for foundation bolts are correct within limits of plus or minus 1/8".

THE ORVILLE SIMPSON COMPANY
 TR Steude

⑤ ADDED WIRING DIAG
 ⑥ ADDED STARTER
 ⑦ ADDED 47555 B
 ⑧ ADDED 47560 D

DATE	DESCRIPTION	BY	CHECKED
...

SECTION 16

2.16 ROCK SCREENER (RS)

2.16.1 Description

The rock screener is a Hydrive Gyrotory screener, model No. 3000F. 1971-1972, serial No. 72-3095, exclusively manufactured by Fournier Steel Works Limited, Black Lake, Quebec. The screener has double deck screens with a gyrotory action that varies from a circular motion at feed end to an ellipsoidal motion at discharge end. The machine is base mounted and should be secured to the floor.

Screening area:

9.4 square meters, i.e. 4.7 square meters per deck.

Screens are 3.050 mm long by 1520 mm wide.

Slope:

The screening surfaces are inclined at a fixed seven-degree angle relative to the base of the screener.

Speed:

The screening surfaces rotate at a speed of 186 rpm.

Stroke:

The circular motion of the screening surfaces has a 101.6 mm diameter.

Drive:

A 5 HP, 380 V, 3 ph., 50 cycle motor with V-belts and sheaves.

2.16.2 Part Identification

The rock screener is composed of ten main parts.

Reference drawing:

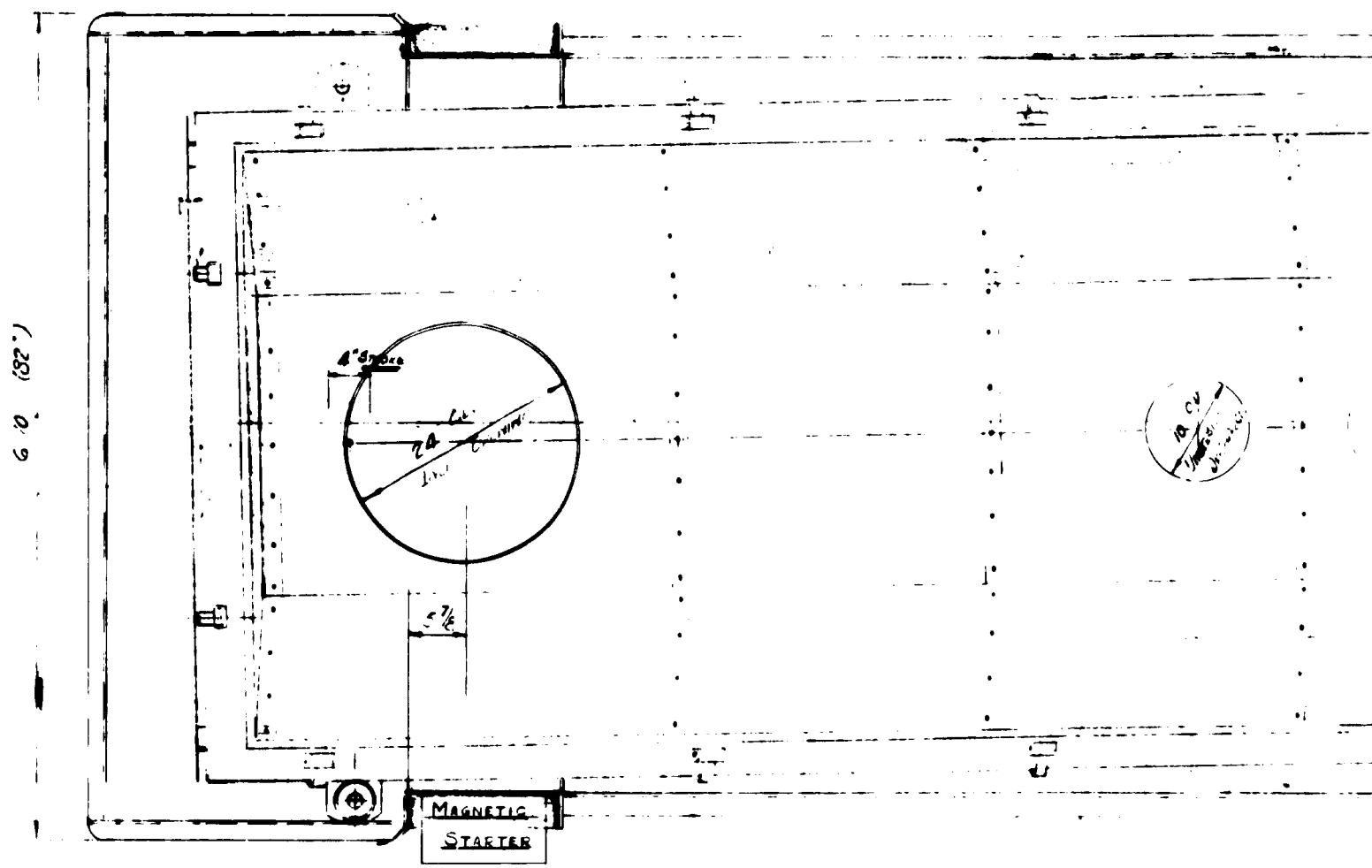
Fournier Steel Works Ltd. No. E8513, "General Assembly,
5'-0" by 10'-0" Hydrive Gyrotory Screen (Bolivian Project)",
dated 22 June 1970.

Part identification:	Ref. No.
1. Frame assembly	A-4
2. Motor and V-belt drive assembly	A-2
3. Drive head assembly	A-1
4. Screen pan assembly	A-3
5. Dust cover assembly	P-116
6. Screen frame assembly	P-44
7. Screens	P-47
8. Toggle clamp assembly	P-66, 67, 68
9. Drag Rod assembly	P-63
10. Vertical support rod assembly	P-60

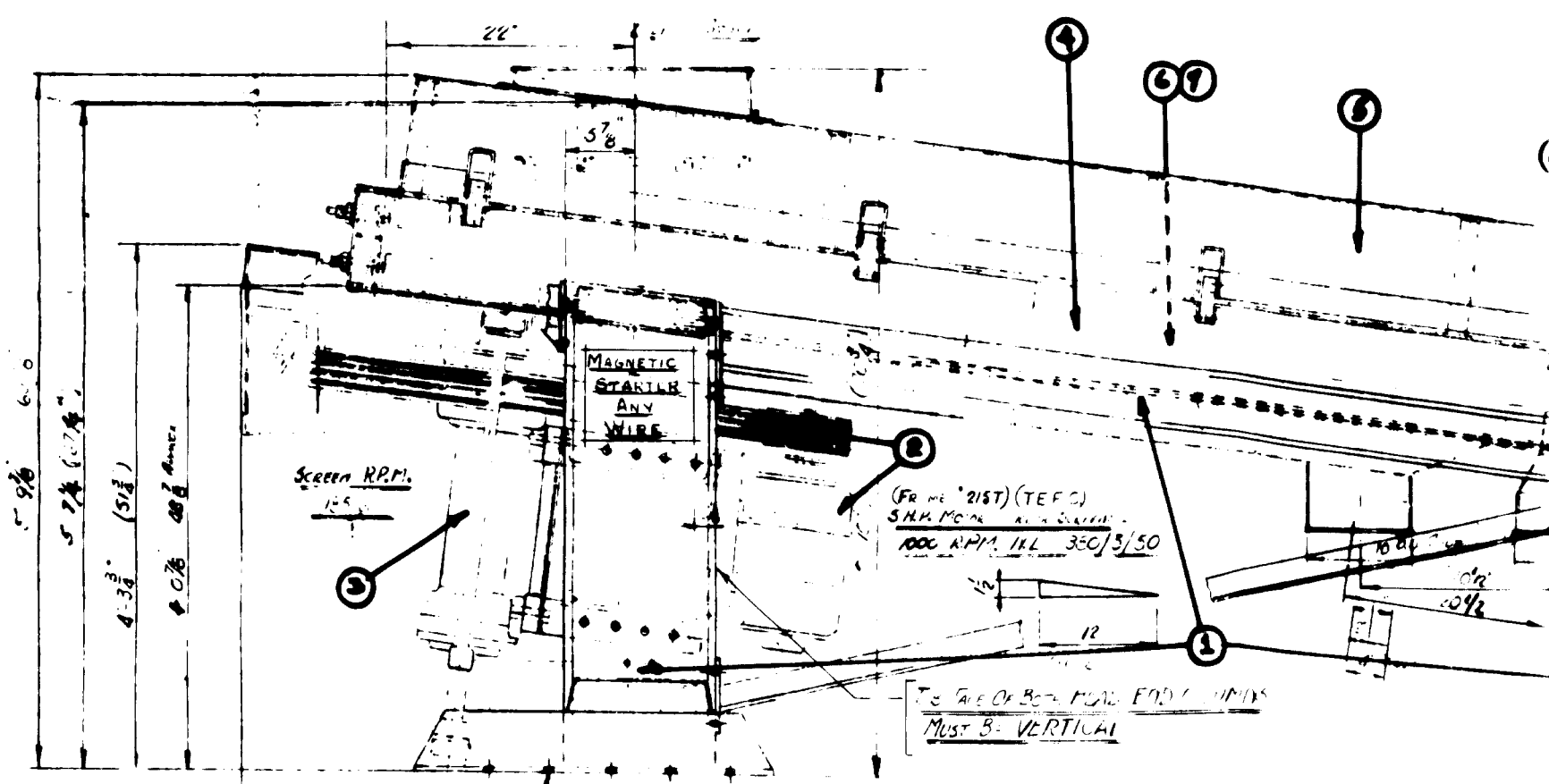
2.16.3 List of Recommended Spare Parts

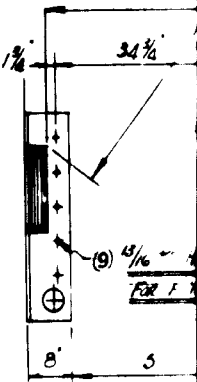
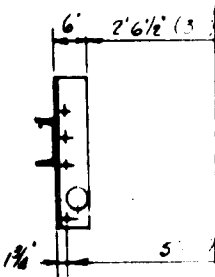
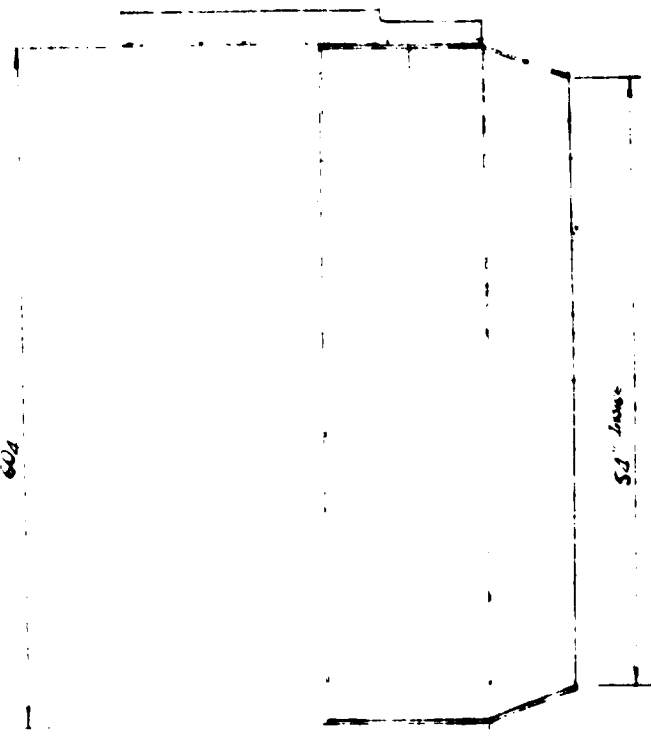
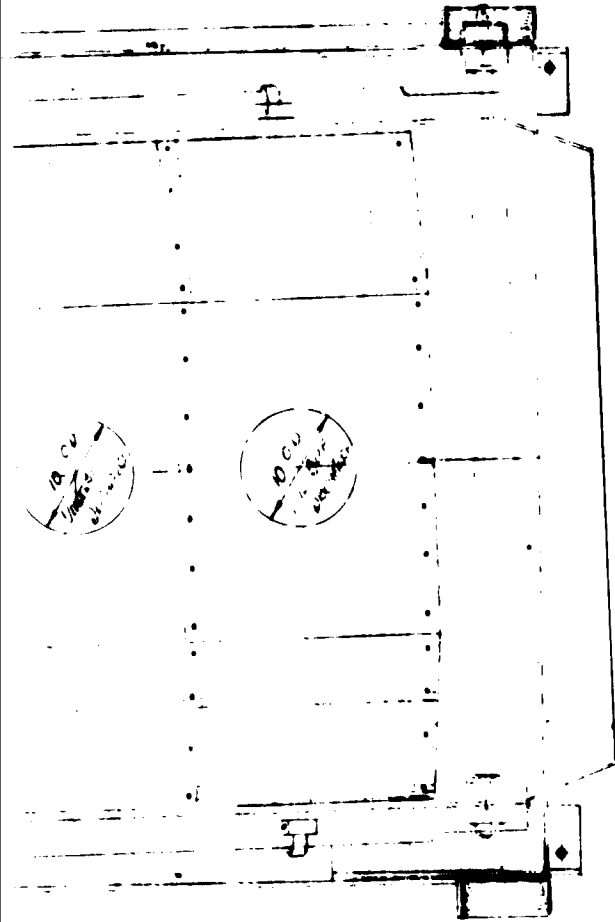
List of recommended spare parts based on normal operation
and maintenance of equipment during the first three years
of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
1	Bearing kasper plate	P-6
1	Bearing spring retainer ring	P-7
1	Spherical roller bearing No.22322/C3	P-11
1	Roller bearing No.221	P-12
1	Double row ball bearing No.3317/C3	P-13
2	Head pins	P-17
4	Head pin nuts	P-18
2	Bearing tapers	P-22
1	Pivot block	P-27
2	Felt seals	P-28
24	Rubber suspension rings	P-59
4	V-belts B-144	P-73
1	Distributor plate	

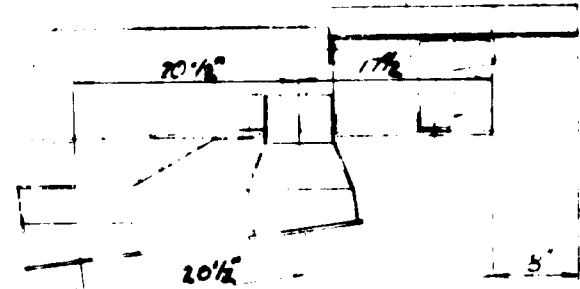


SECTION 1

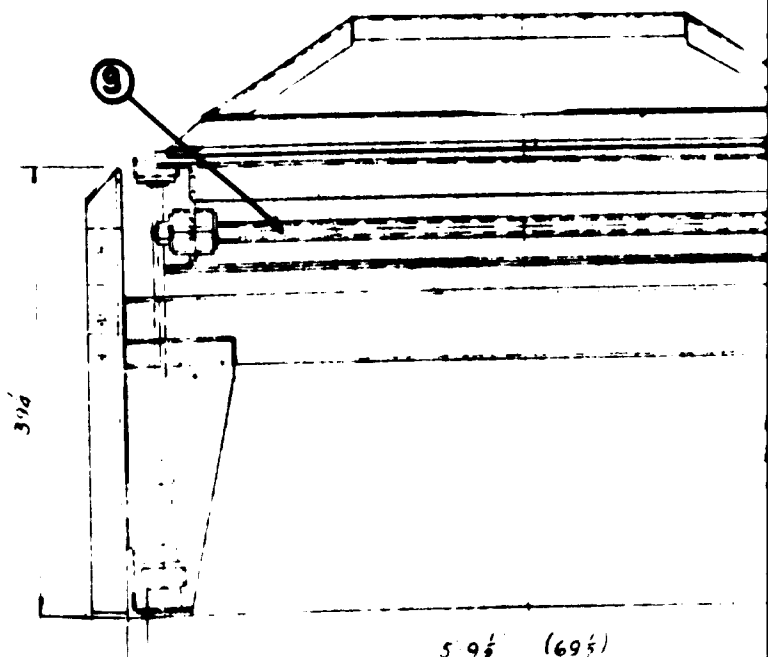
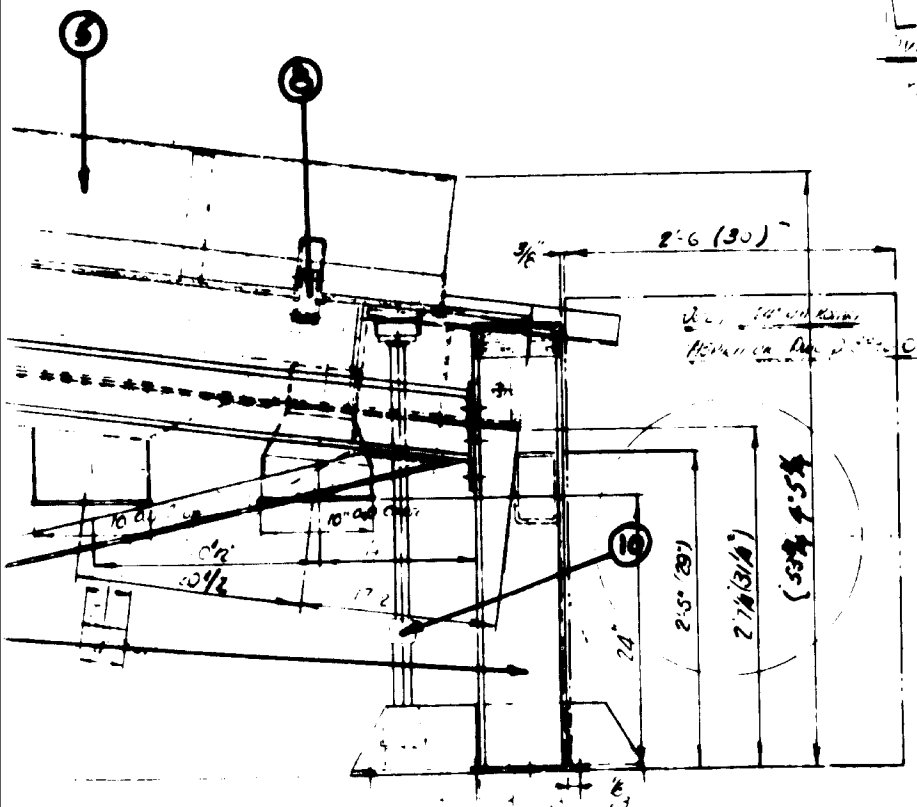




SECTION 2

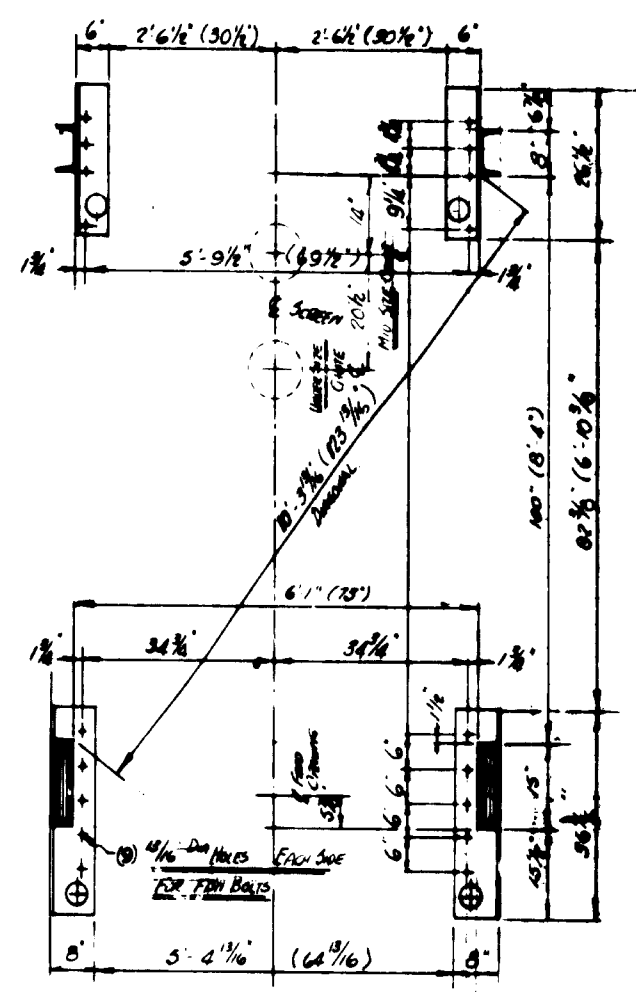
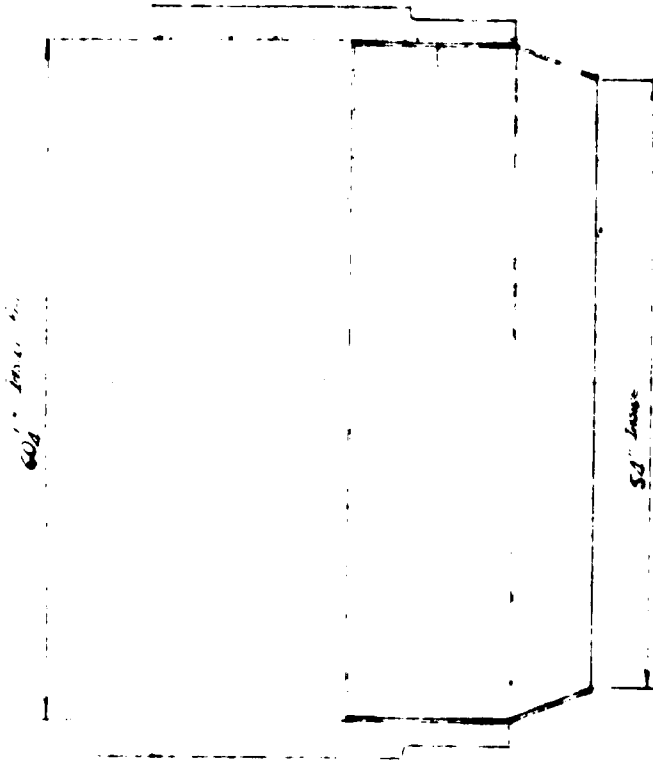


OVERALL TANK WITH ROTARY ASPIRATOR

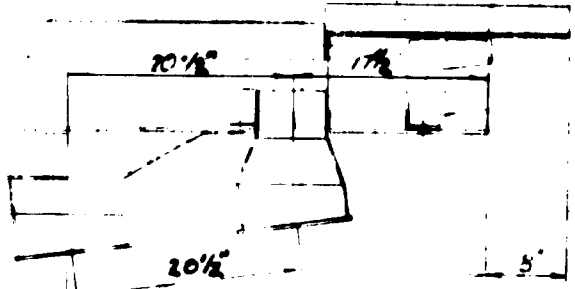


5' 9 1/2" (69 1/2")

Drawn	Checked	Approved

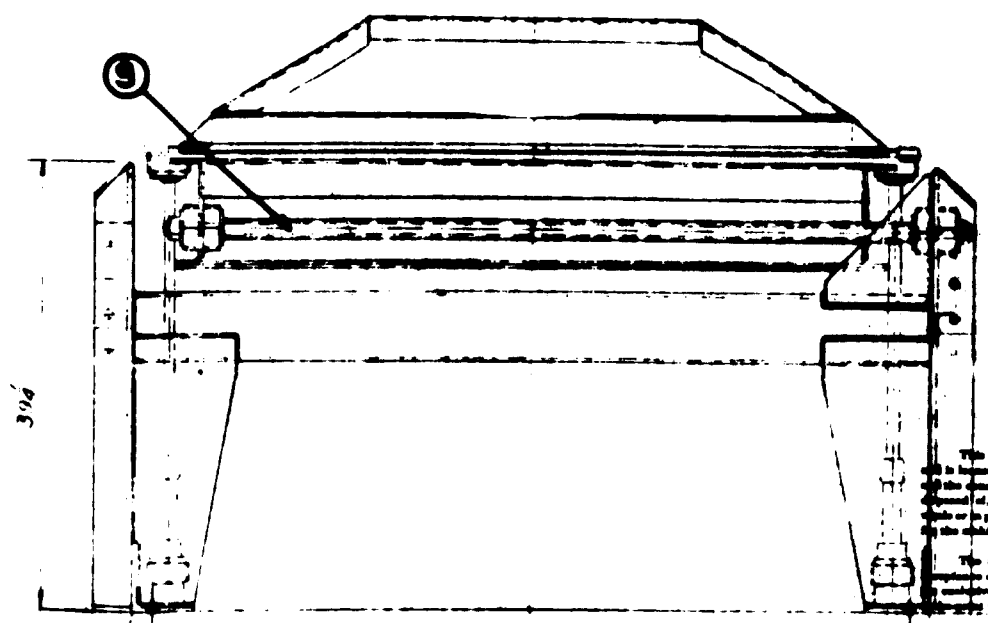
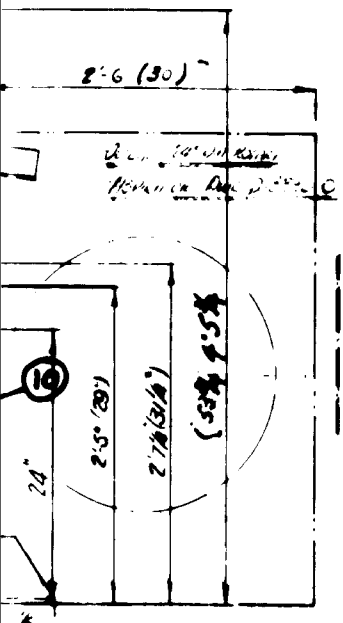


FLOOR LAYOUT SCALE 3/8" = 1'-0"



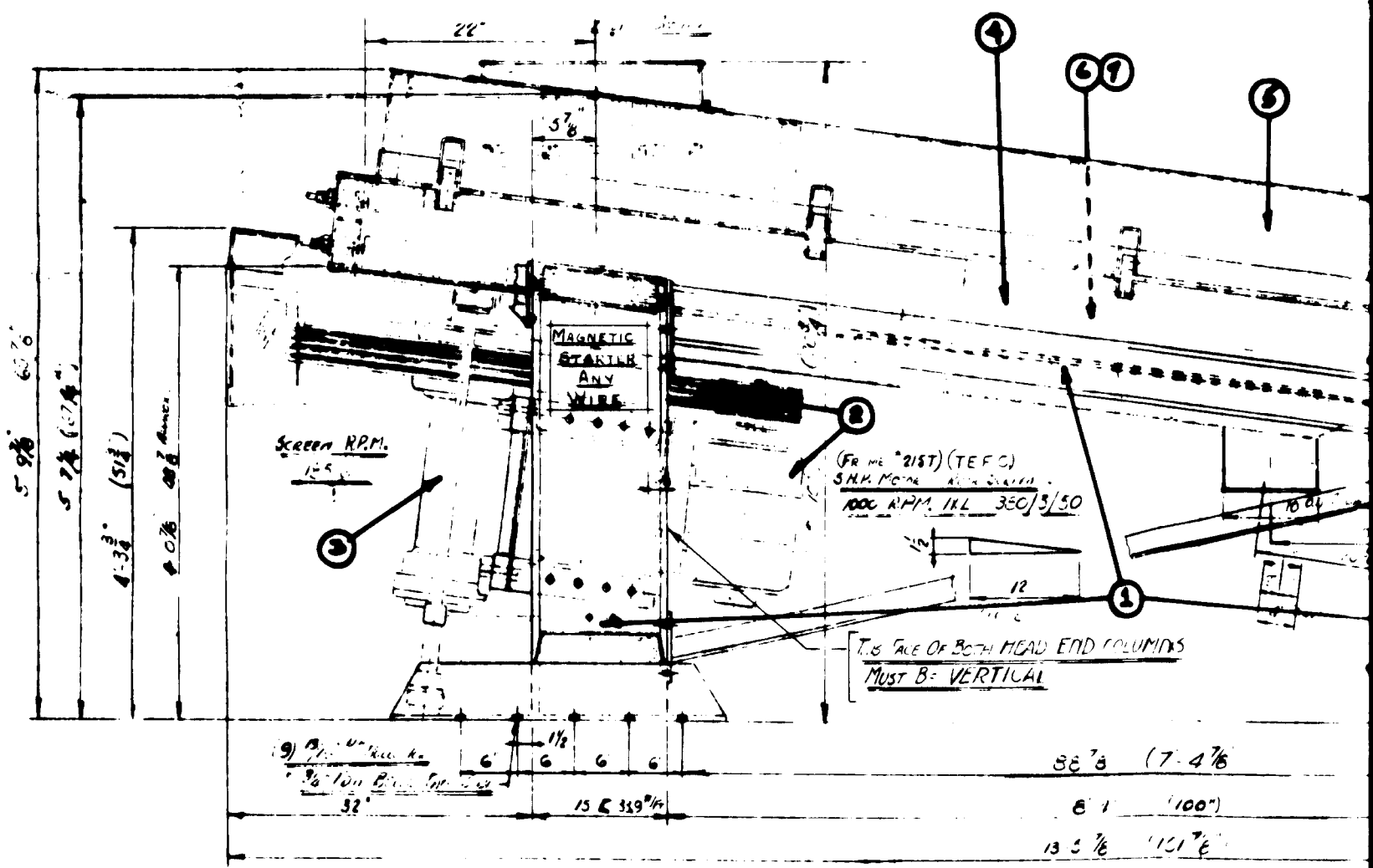
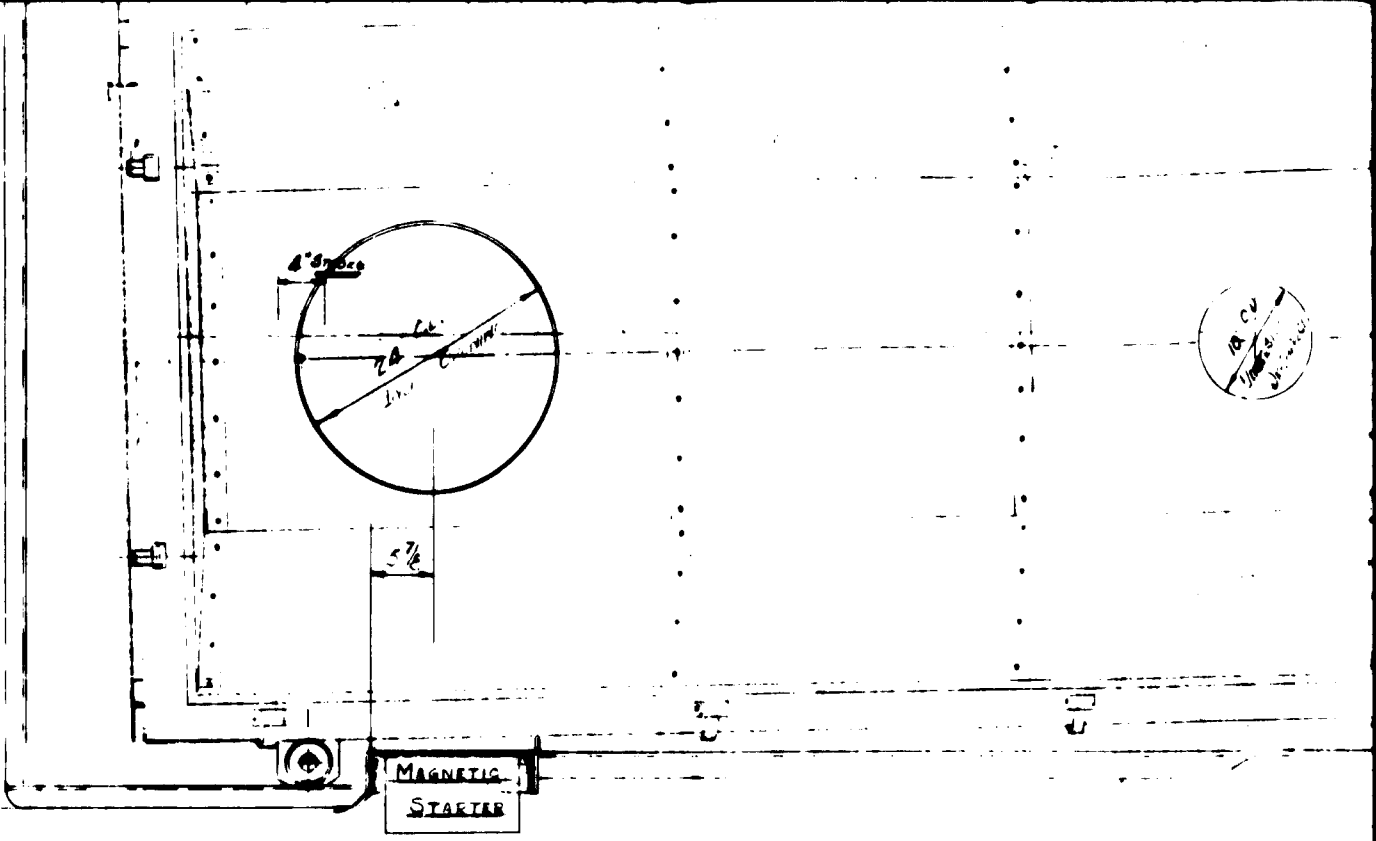
OVERSIDE TANK FOR ROTARY ASPIRATOR WITH ROTARY ASPIRATOR

SECTION 3



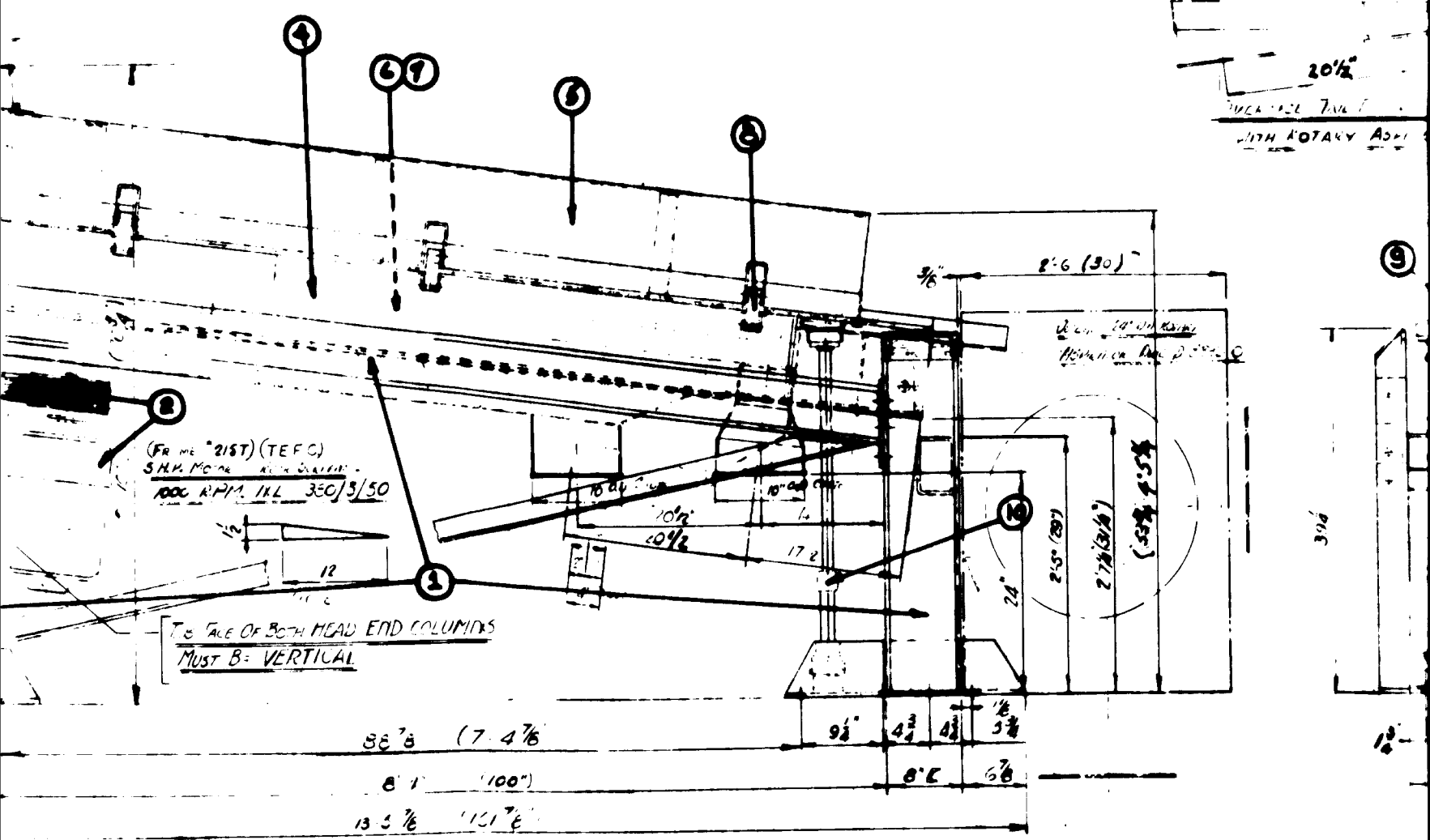
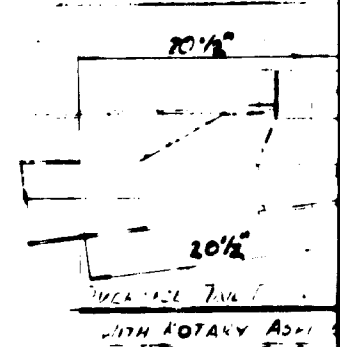
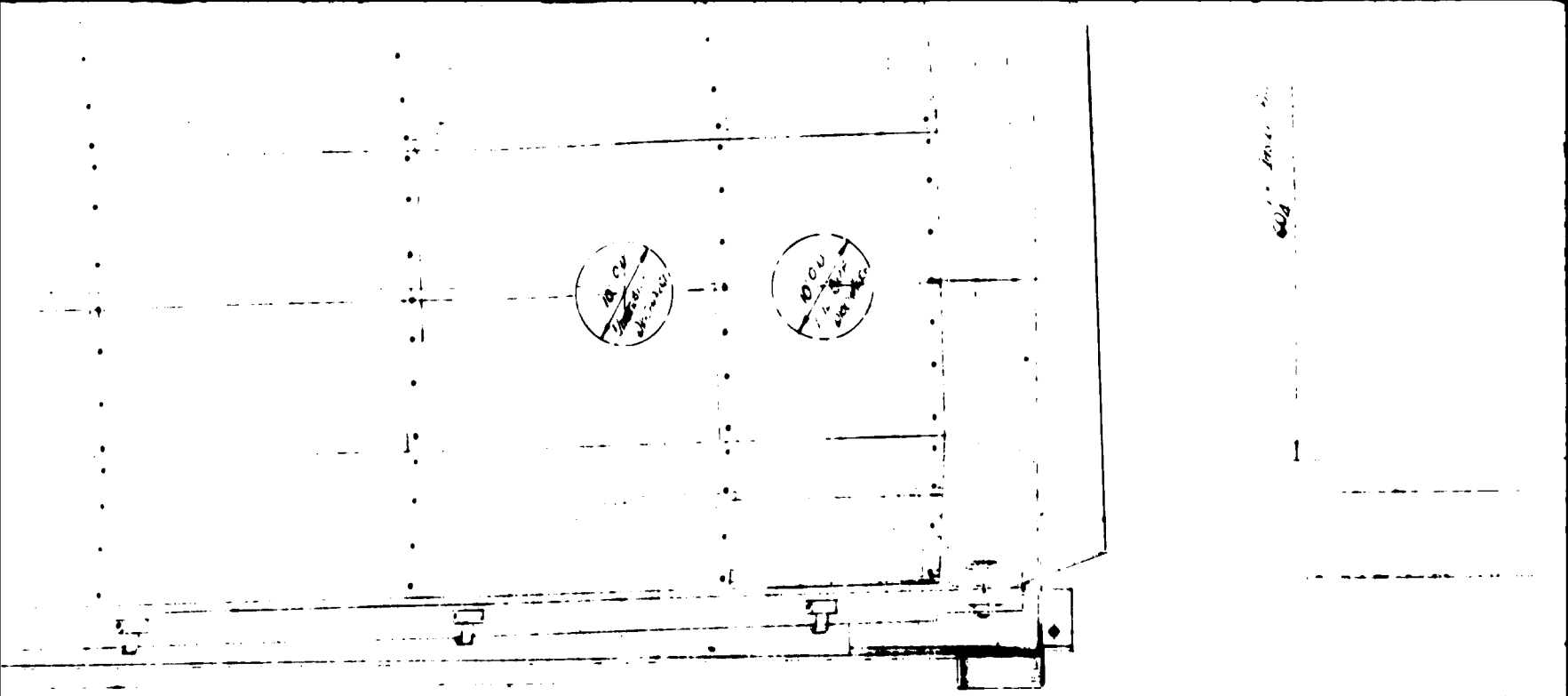
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6' 10" (32")

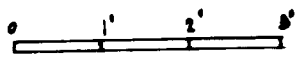


SECTION 4

NOTE: SCREEN SHOWN IN CENTER OR NEUTRAL POSITION



NOTE: SCREEN SHOWN IN CENTER OR NEUTRAL POSITION



SECTION 5

SECTION 17

2.17 VIBRATING SCREENER (VS)

2.17.1 Description

The vibrating screener is a Link-Belt model 65, type UP 138, manufactured by FMC of Canada Ltd., Toronto, Ontario. The screener has a single deck screen with unbalanced weight vibrator. The unbalanced pulley produces high-frequency vibrations whose amplitude can be field-adjusted. The machine is suspension mounted.

Screening Area:

1.75 square meters, screen is 2540 mm long by 790 mm wide and a deflection is located at discharge end.

Slope:

The screening surface is inclined at an adjustable angle; maximum angle is thirty degrees.

Speed:

The vibrator rotates at a speed of 1500 rpm.

Drive:

A 3 HP, 380 V, 3 ph., 50 cycle motor with V-belt and sheavea.

2.17.2 Part Identification

The vibrating screener is composed of six main parts.

Reference drawing:

Link Belt Limited No. TZ15709, "Dimension Drawing
for Single Deck UP/NRM Type, Vibrating Screen,
Model 65", dated 5 May 1972.

Part identification:

1. Drive assembly
2. Vibrator assembly
3. Box frame assembly
4. Screen frame assembly
5. Screen
6. Spring support assembly

2.17.3 List of Recommended Spare Parts

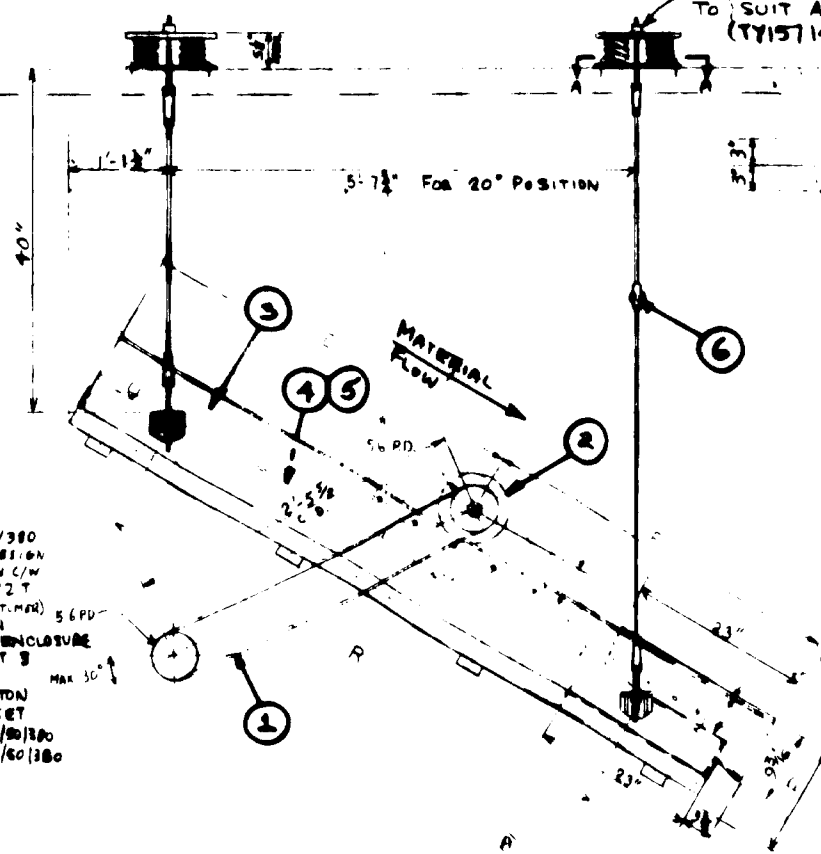
List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	Bearings	Series 22313LB/C3
1	Bearing cartridge	18182694-5
2	V-belt sets	2B75
12	Tension bolts, nuts and springs	

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
4	Spirolox rings for retainers	367W33-48
4	Spirolox rings for cartridge	367W33-70
2	Support springs	433W61-1
2	Bearing retainers	1818Y693-5
1	Bearing retaining ring	367W11-6
2	Vibrator bolt and nut assemblies	

6075171

CUST. TO MOVE SPRING MTG. TO SUIT ANGLE OF SCREEN (TY15714)



NOTE - 3 HP 1500 RPM 3/50/380
 TE FC. MOTOR CEMA DESIGN
 CLASS B INSULATION C/W
 SLIDE BASE FRAME 152 T
 (LOCATED IN FIELD BY CUSTOMER) 56 PD
 SIEMENS CEMA SIZE 1
 STARTER IN CEMA 12 ENCLOSURE
 C/W FUSED DISCONNECT 3
 OVERLOADS LOCKABLE
 DISCONNECT PUSH BUTTON
 IN COVER MANUAL RESET
 RUNNING LIGHT WITH 3/50/380
 LOAD CIRCUIT AND 1/60/380
 CONTROL CIRCUIT.



SECTION 1

PAINTING - ALL STEELWORK TO BE PAINTED
 AND AND PART OF RING CHROME
 PRIMER

40	124
134	145
36	48
54	66
72	90
90	114
108	140

QUALIFICATION FOR INSTALLATION
 DESCRIPTION OF UNIT: DRIVE AND CLOSER
 UPTO 380 VOLTS AND 3 PHASE TO BE ADVISED
 & DOUBLE SUSPENSION
 SURVEYOR: MERRILL & COMPANY, INC.
 DRAWN BY: HY2575

SECTION 18

2.18 PADDLE TROMMEL**2.18.1 Description**

The paddle trommel is a Duster, model 914.4 mm diameter, serial No.139-72 manufactured by Fournier Steel Works Limited, Black Lake, Quebec. The duster consists of a horizontal revolving cylindrical trommel contained inside of a vacuum chamber with co-axially mounted counter-rotating beaters. The machine is base mounted and should be secured to the floor.

Screening area:

7.27 square meters, i.e. 914.4 mm diameter by 2540 mm long.

Speed:

The revolving trommel rotates at a speed of 20.5 rpm and the paddle arms at 177 rpm.

Drive:

A 15 HP, 380 V, 3 ph., 50 cycle motor with V-belts, sheaves, chains, sprockets and speed reducer.

2.18.2 Part Identification

Fournier Steel Works Limited No. E7996, "36" Duster Assembly and Part List", dated 12 September 1972.

Part identification:

1. Frame support assembly
2. Drive assembly
3. Screw conveyor assembly
4. Shaft assembly
5. Screen assembly
6. Casing assembly
7. Paddle assembly

2.18.3**List of Recommended Spare Parts**

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
22	Paddle arms	B-DUS-417
2	V-belts (one matched set)	B-128
3	V-belts (one matched set)	B-158
132	Pitches of 1" A.S.A. 80 roller chain (11'-0" long)	A.S.A.80
76	Pitches of 1" A.S.A. 80 roller chain (6'-4" long)	A.S.A.80
2	Connecting links for roller chain	A.S.A.80
2	Offset links for roller chain	A.S.A.80
4	Rope packings	
4	Felt seals	

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
2	Packing glands	
2	Bearings	1315K
2	Sleeves	H-315
3	Bearings	1311-K
3	Sleeves	H-311
2	Bearings	1211K
2	Sleeves	H-211
2	Bearings	1222K
2	Sleeves	H-222

DRIVE GUARDS & ATTACHMENTS
 15 HP. 500 RPM. TEFC. ELEC. MOTOR 380V. 50 CY. 3 PH.
 MOTOR STARTER INCLUDING STOP/START PUSH BUTTONS AND ELEC.
 WIRE AND MOTOR.
 MACHINE DRIVE SHEEVES V. BELTS, SPROCKETS CHAINS E.T.C.
 TO MAINTAIN SPECIFIED TRIMMEL SPEED AT 20.5 RPM AND
 PADDLE ARMS SPEED AT 17 RPM
 SET OF 20 SQUARE MESH STAINLESS STEEL WIRE CLOTH, 0.0135
 WIRE DIA., 0.0265 FENNEL WIDTH, WITH 1 HORIZONTAL
 PERFORATIONS STAGGERED. STEEL PERFORATED HORIZONTAL
 SCREEN PLATES.

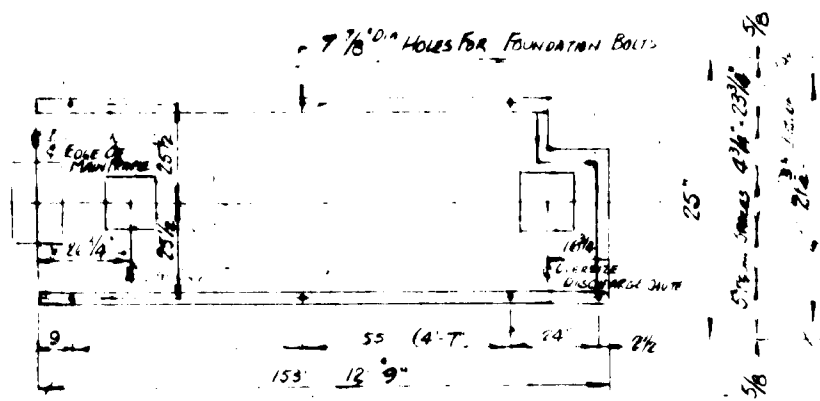
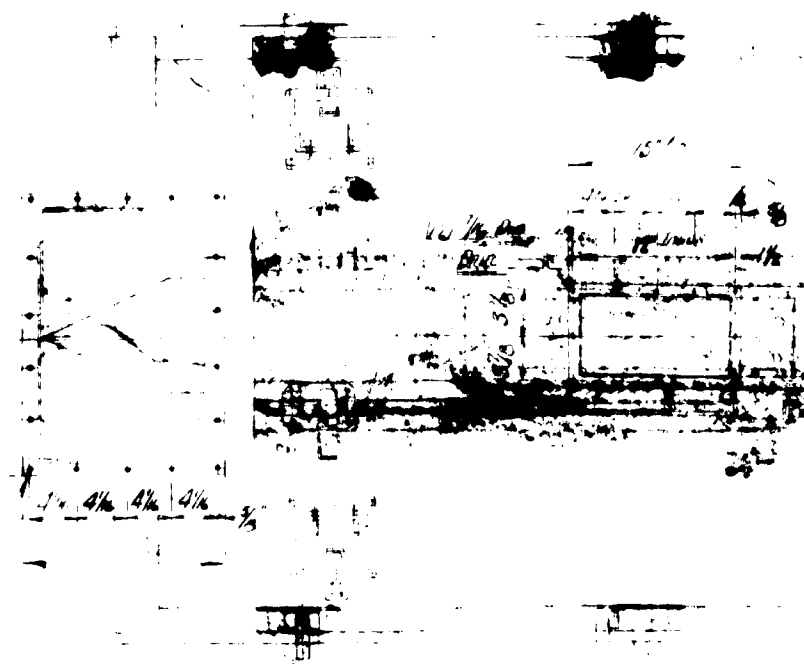
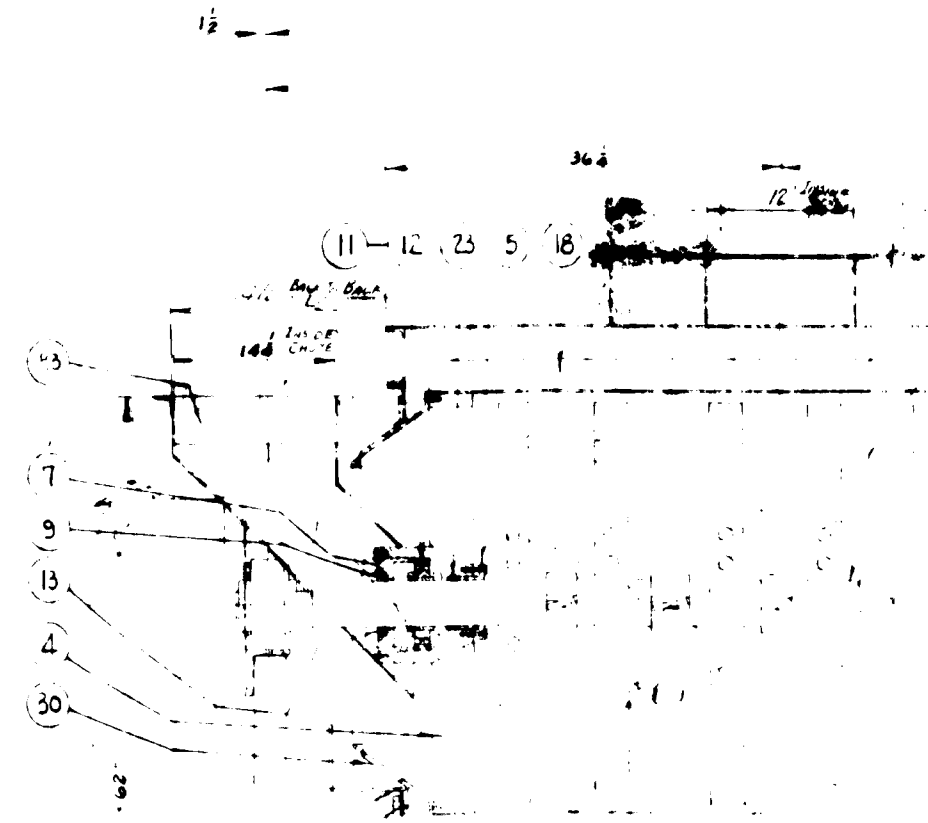
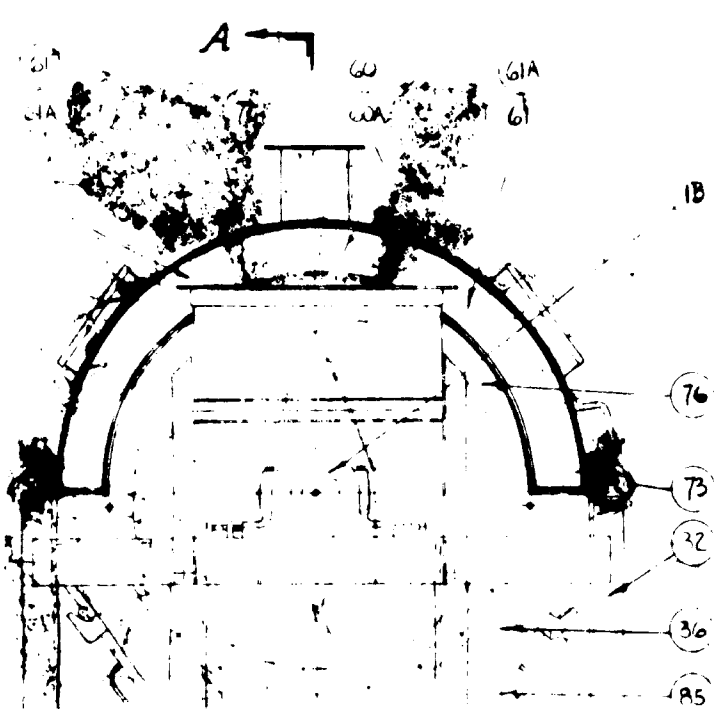


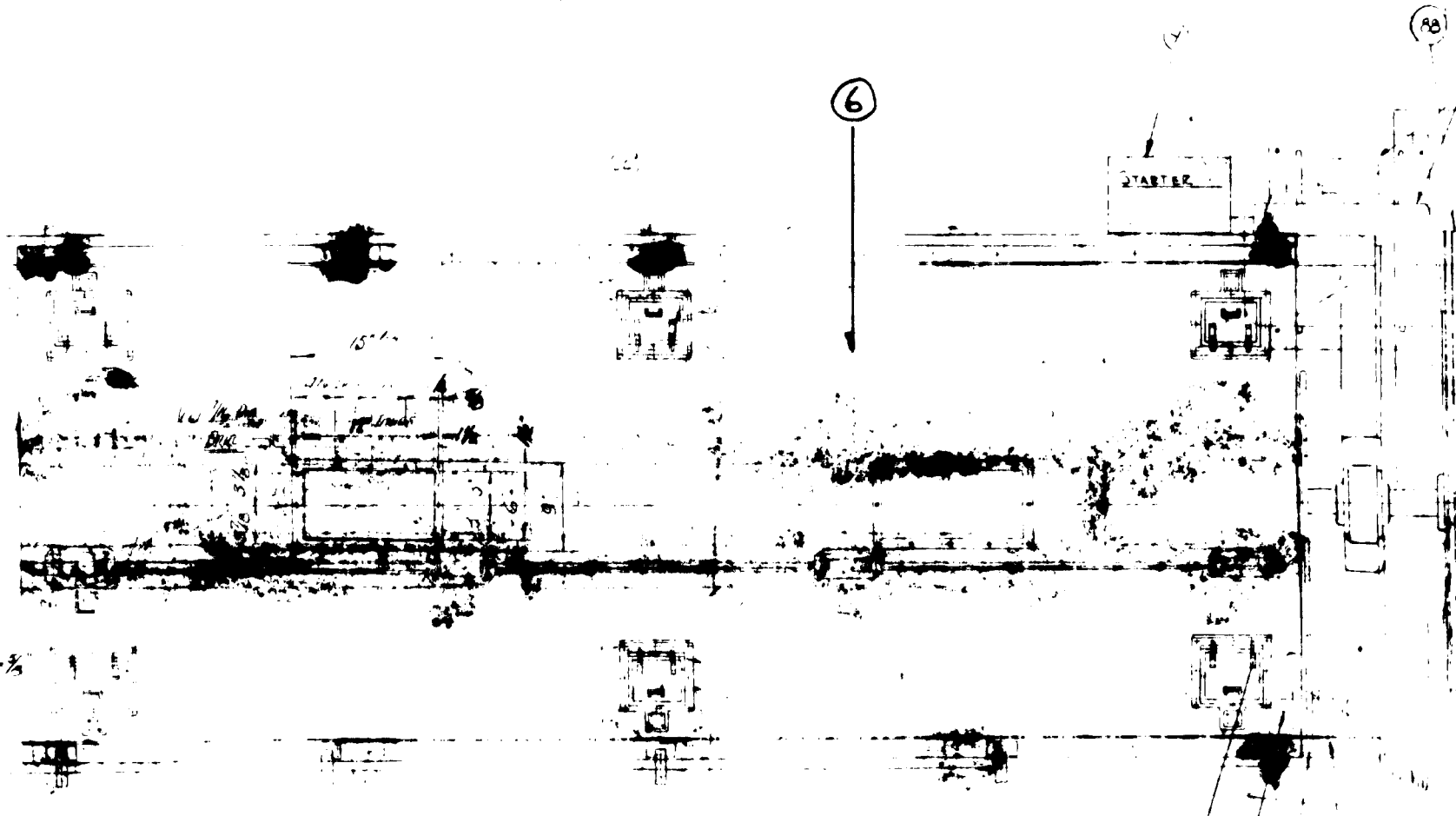
FIG. LAYOUT SCALE 1/2" = 10"



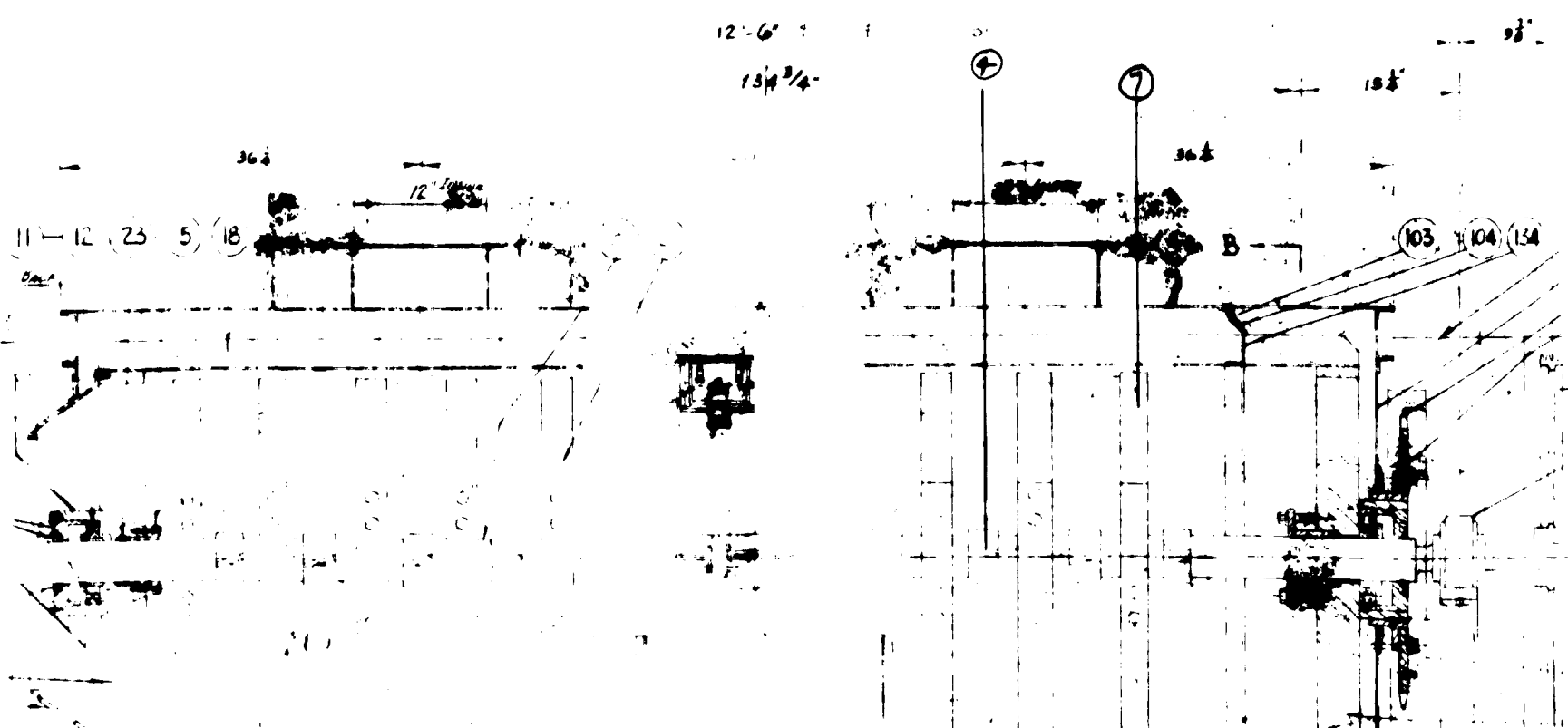
SECTION 1



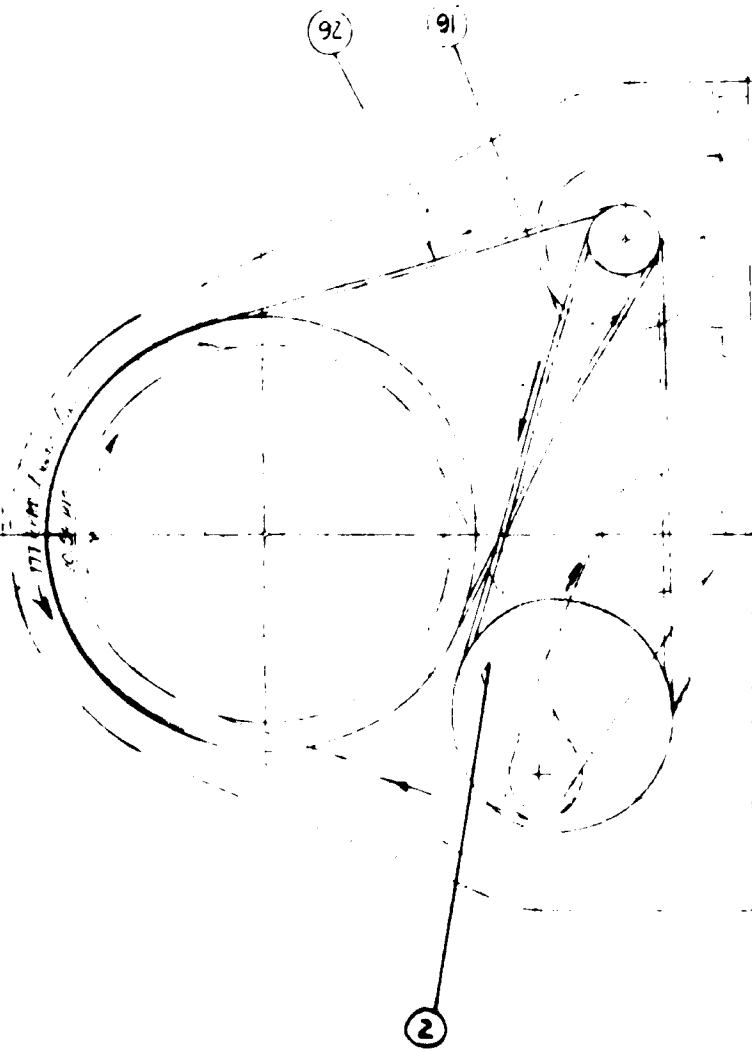
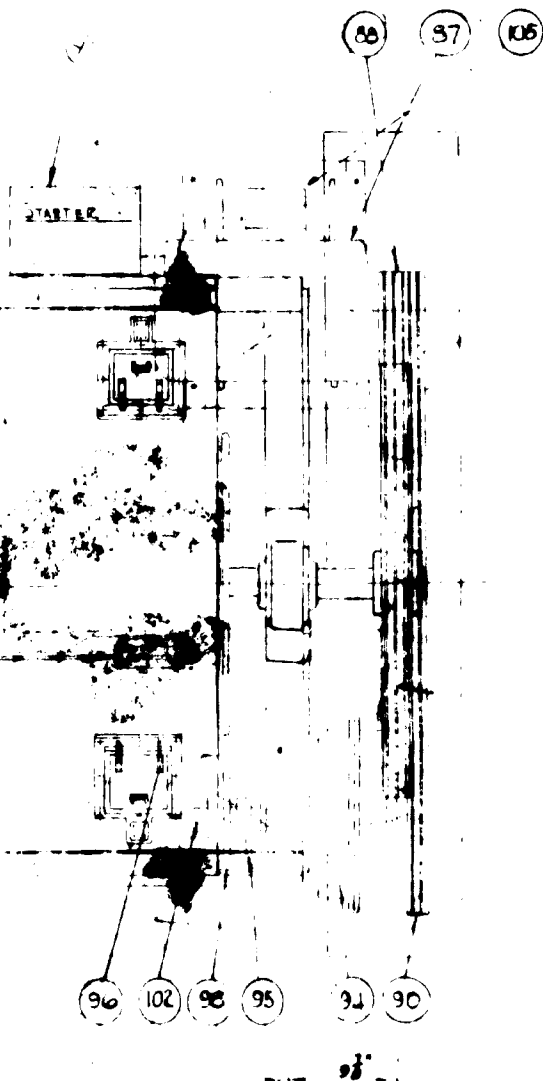
SECTION 2



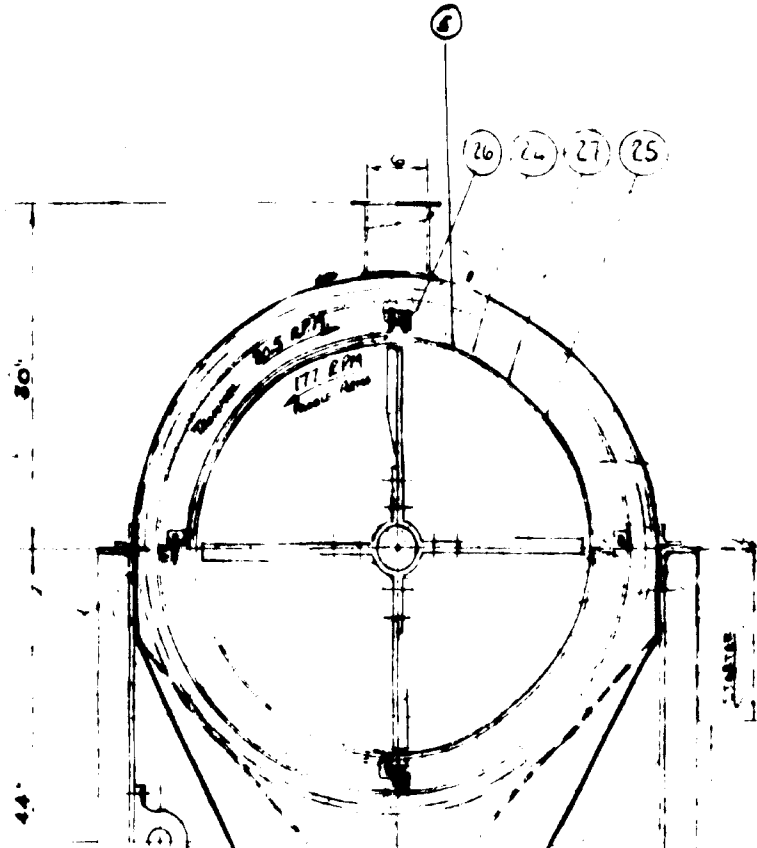
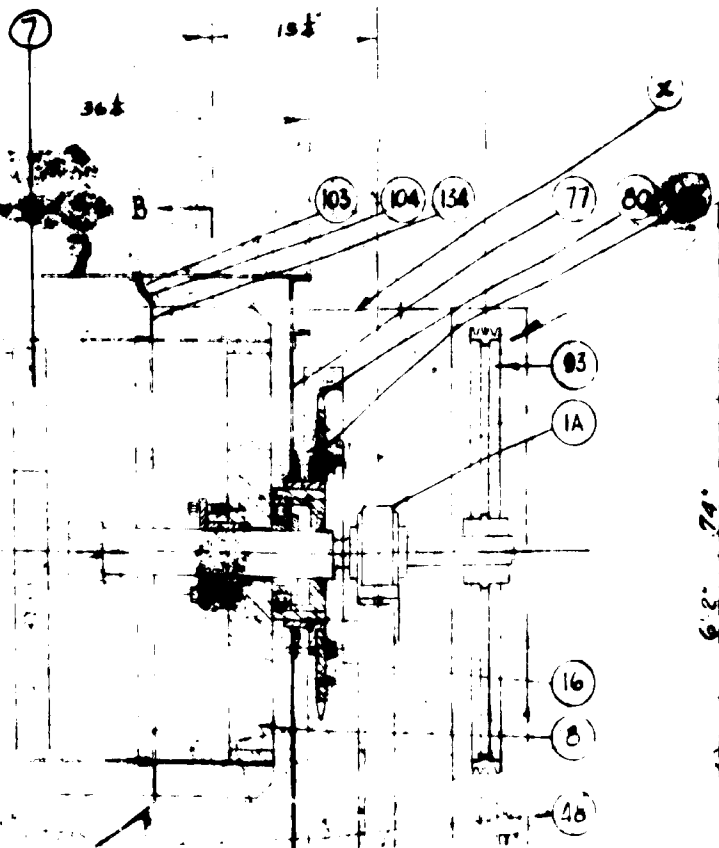
PLAN VIEW

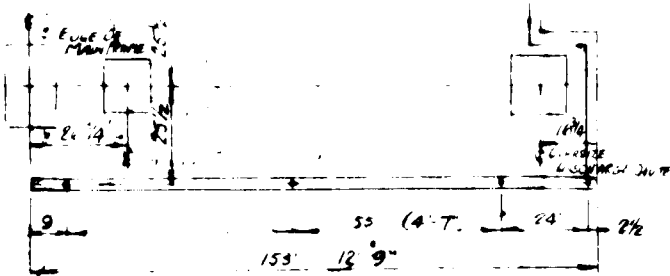


SECTION 3

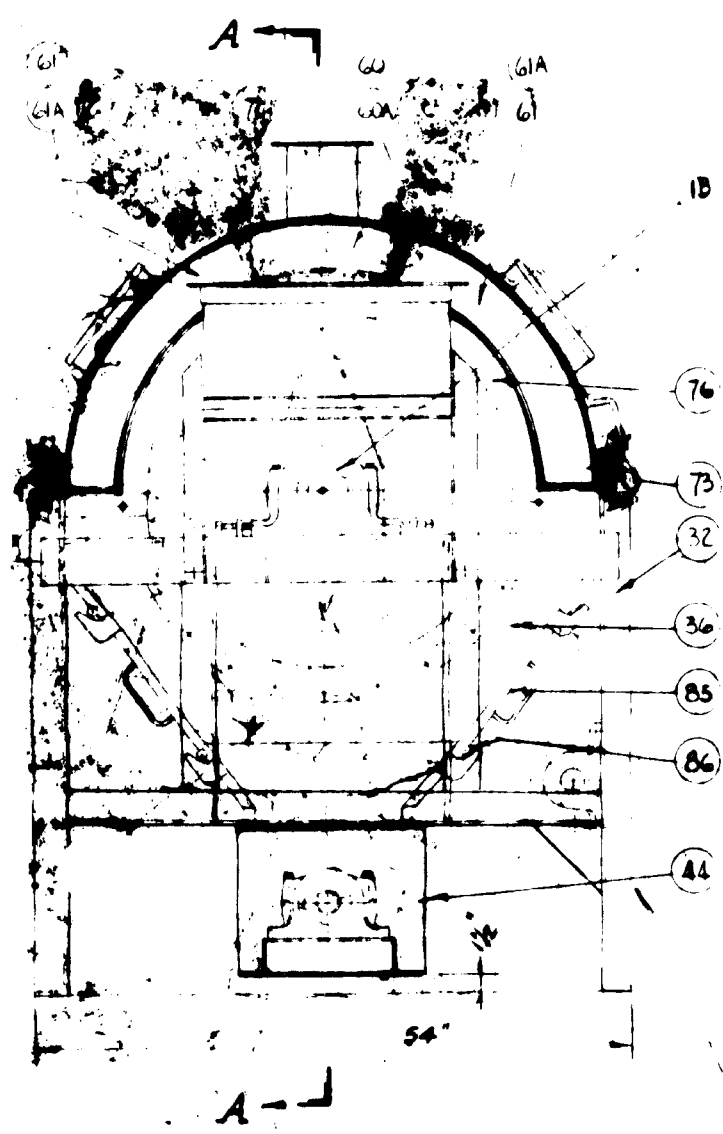
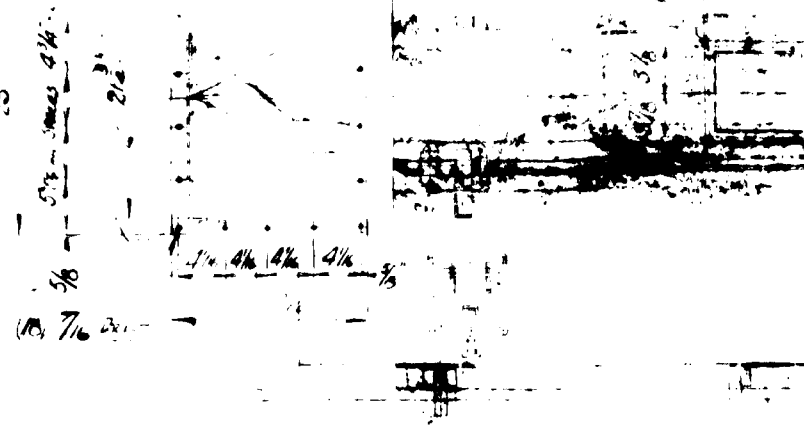


VIEW FROM SIDE



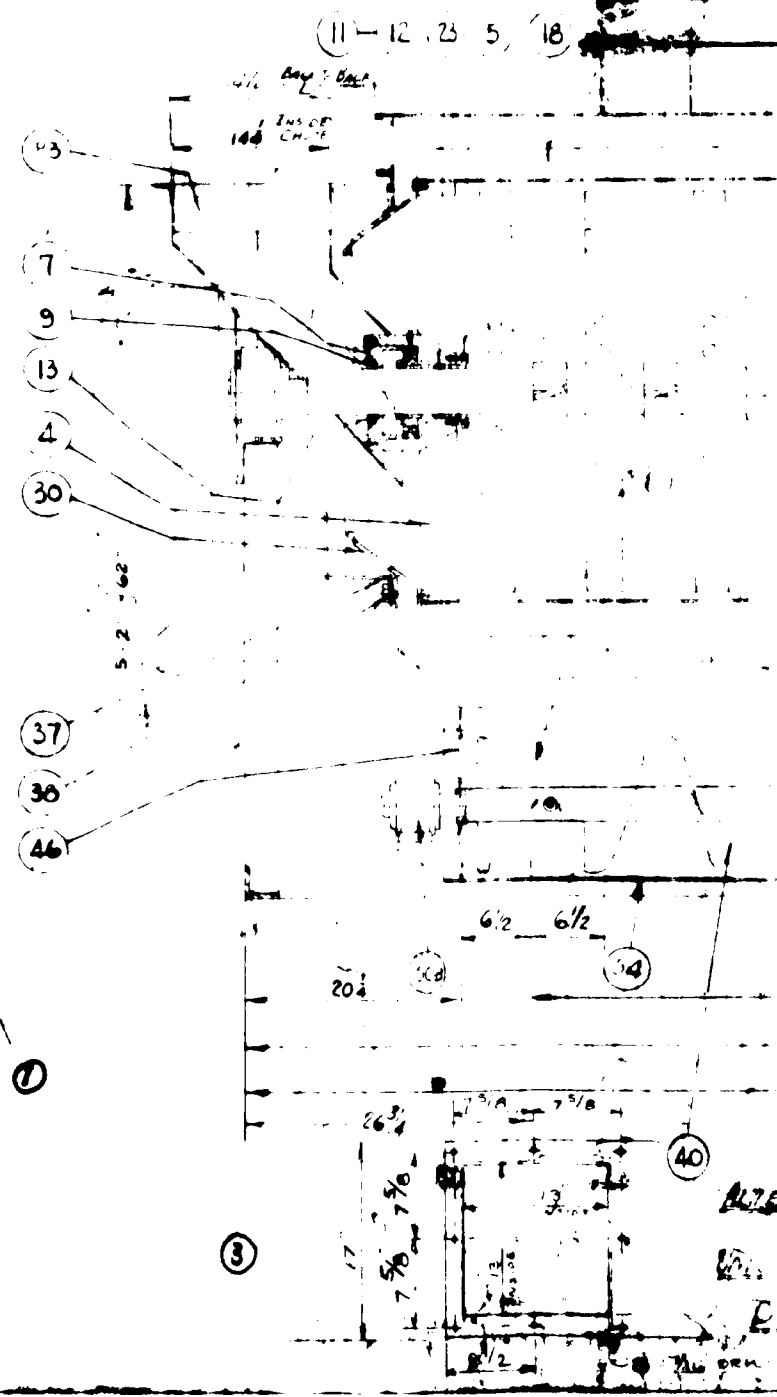


FLOOR LAYOUT SCALE 1/2" = 10'



FEED END

SECTION 4



PLAN VIEW

SECTION 5

12'-6"
13'-3/4"

96 102 98

11-12 23 5 18

6 7

36 1/2

12'-0"

Bay 1 Cont.
1st of Cont.

B

103

INSPEC
BY INCHAM CON. SECTION

6'-1/2 6'-1/2

20 1/2

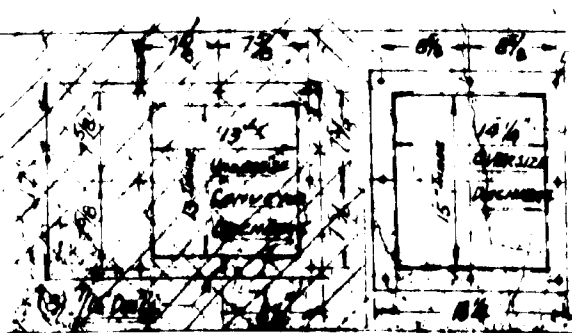
97 1/2

11'-4 1/2 13'-1/2

12'-9" 18'-0"

ELEVATION

~~ALTERNATIVE SECTION A1~~
WITH ALL CONVEYOR
DISCHARGES



3

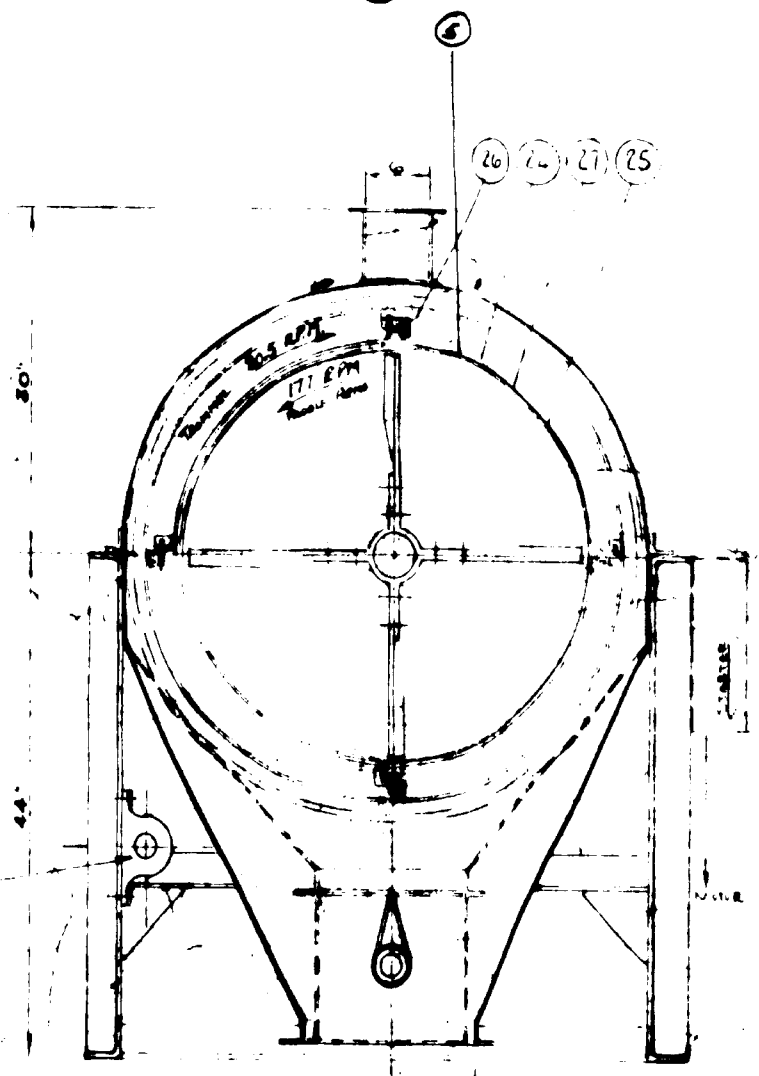
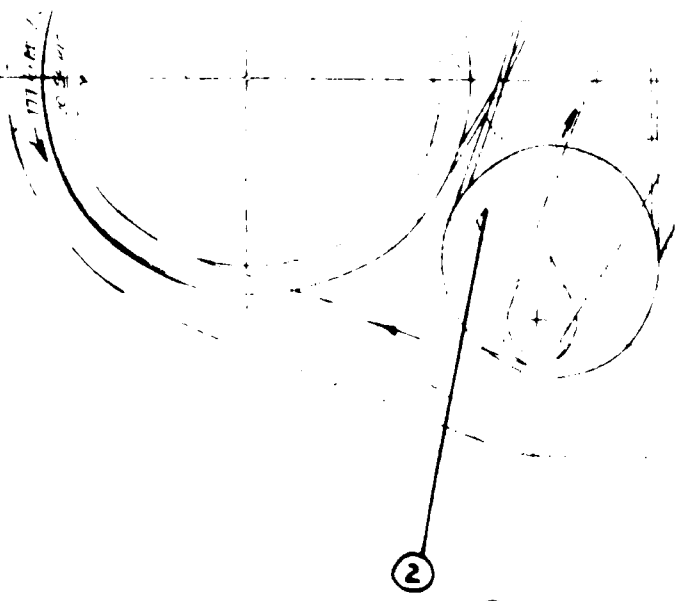
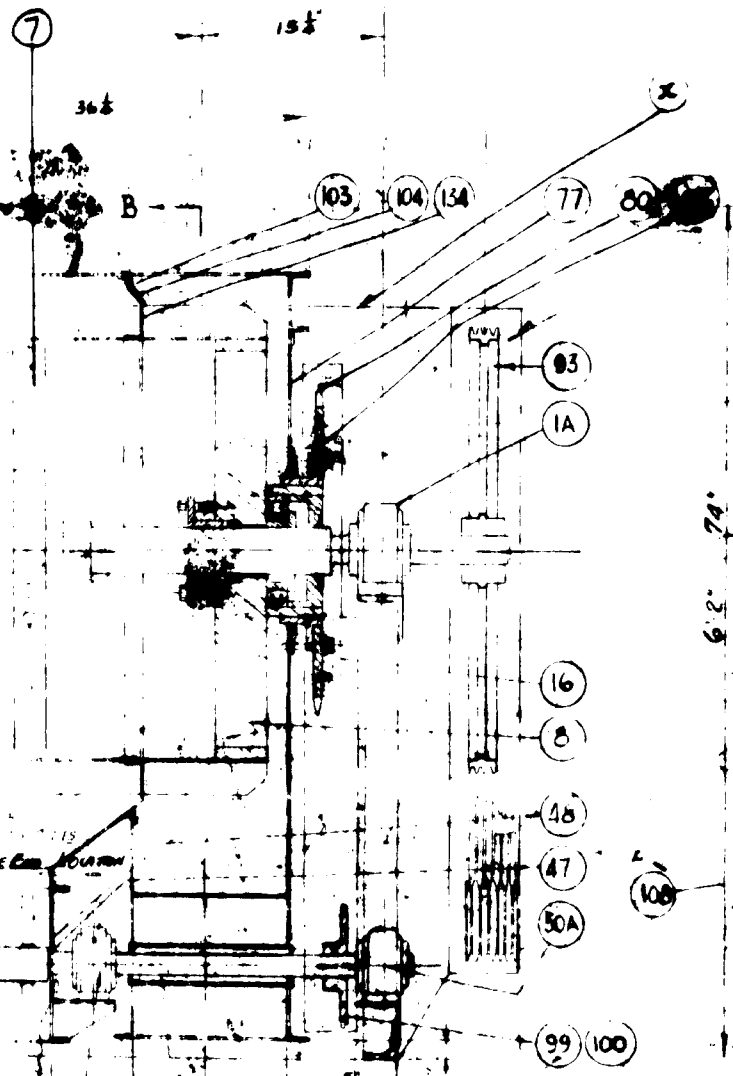
40

30 1/2

B

VIEW - P. 37

96 102 98 95 94 90



SECTION B-B

PAGE 74.

SECTION 6

This drawing is the property of Fournier Steel Works and is to be used only for the consideration of the design and the construction of the machine. It is not to be used for the purpose of making a duplicate of the machine or for the purpose of making a copy of the drawing for the use of any other person. The design is the property of Fournier Steel Works and is to be used only for the consideration of the design and the construction of the machine.

FOURNIER STEEL WORKS LIMITED			
BLACK LAKE, P. E. CAN.			
TYPE 36 DUSTER WITH REVOLVING THROMMEL			
GENERAL ASSEMBLY AND PART LIST			
Appr. M. L.	Chk.	DATE: 1927	ENG.
		SCALE: 1/2" = 1'	E



SECTION 19

2.19 ROTARY AIR LOCK VALVE

2.19.1 Description

The Rotary Air Lock Valve is made with a 6 vane steel rotor with rubber edge strips rotating in a steel cylindrical casing slightly larger in diameter than the steel rotor. The inlet opening at the top is circular while the discharge opening at the bottom is square. Both openings are smaller in width than the rotor tip spacing and are completely enclosed and are air and dust tight. As the rotor revolves at low speed, it presents equal size pockets relatively air tight on all sides to the inlet opening where they are filled with product and moved to the discharge opening of the Air Lock Valve. The circular opening should be mounted to the collector and the square opening to the ducting system.

Drive:

A 2 HP, 380 V, 3 ph., 50 cycle motor with V-belt sheaves.

1 Dodge - Double Reduction No.425 - Ratio 24.64/1

Torque Arm, V-belt sheave.

Speed:

Drive, 1500 rpm

Rotary Air Lock Valve - 20.8 rpm

2.19.2 Part Identification

The rotary air lock valve is composed of 6 main parts.

Reference drawing:

Fournier Steel Works Ltd. No. D-9320-400, "18" x 18"
Rotary Air Lock Assembly", dated 12 April 1972.

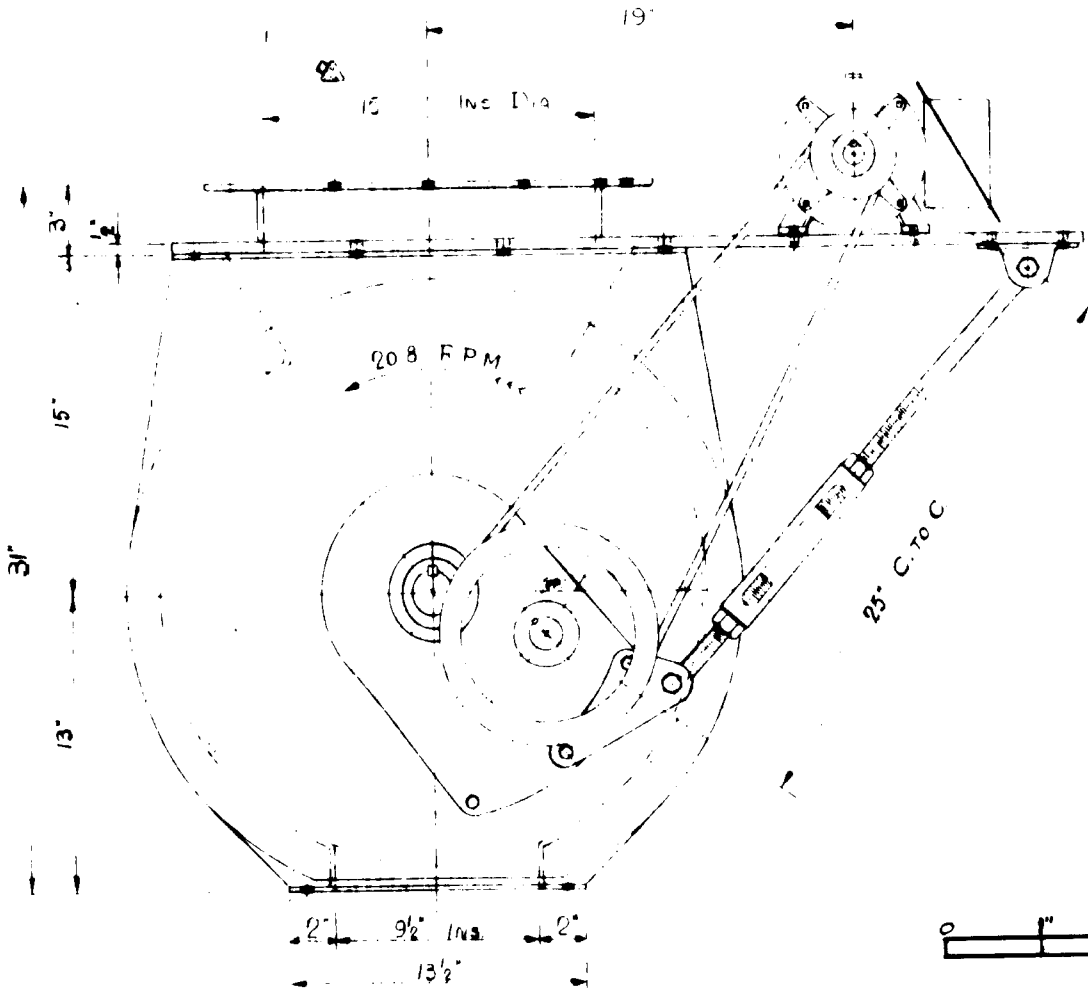
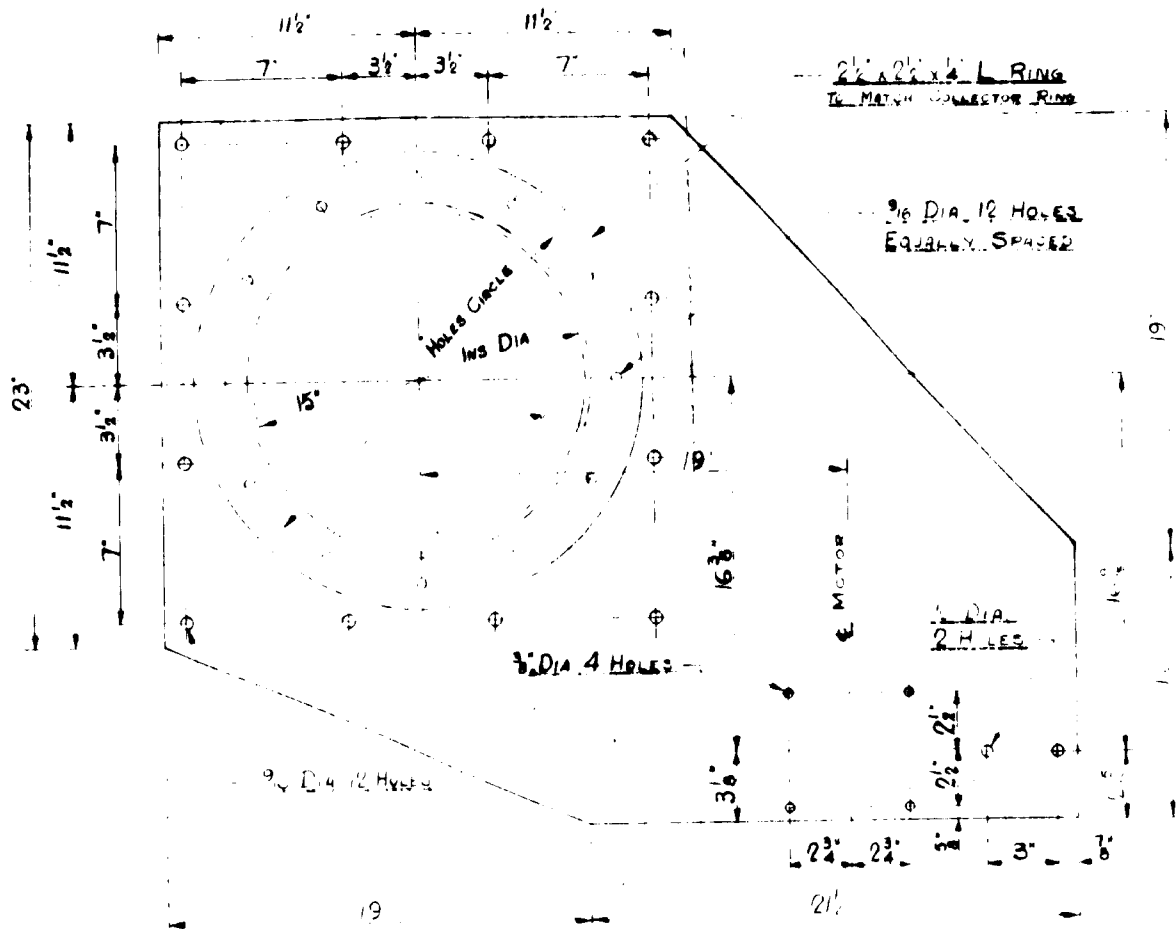
Part identification:

1. Motor assembly
2. Torque arm speed reducer
3. Casing
4. Inlet opening
5. Outlet opening
6. Rotor assembly

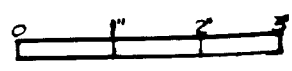
2.19.3 List of Recommended Spare Parts

List of recommended spare parts based on normal operation and maintenance of equipment during the first three years of plant operation.

<u>Quantity</u>	<u>Description</u>	<u>Ref. No.</u>
4	V-belts (two matched sets)	A-68
4	Flange bearings	FY-115
3	Sets rubber seal strips	



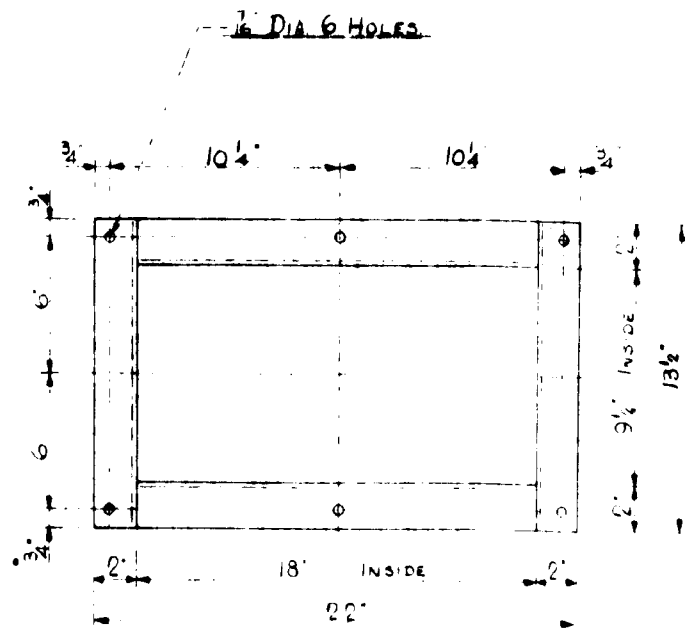
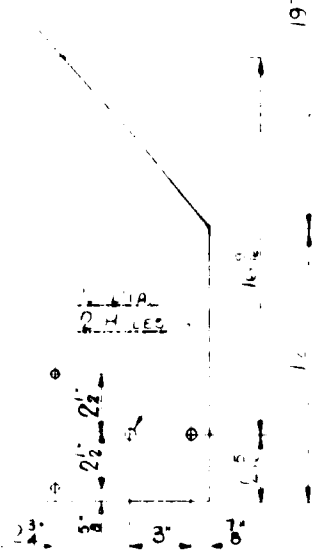
SECTION 1



SYM	QTY	DESCRIPTION
1	1	2 HP MOTOR
2	1	3 PH. 60
3	1	NO. TD 42
4	1	1 1/2" BORE
5	1	32" P.D. U
6	1	90° P.D. U
7	1	MATCHED
8	2	NO. FY
9	1	SAFETY
10	1	CASING
11	2	CASING
12	1	ROTOR
13	1	ROTOR ASSEMBLY
14	1	SET RUBBER
15	1	SET RETAINING

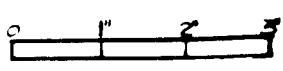
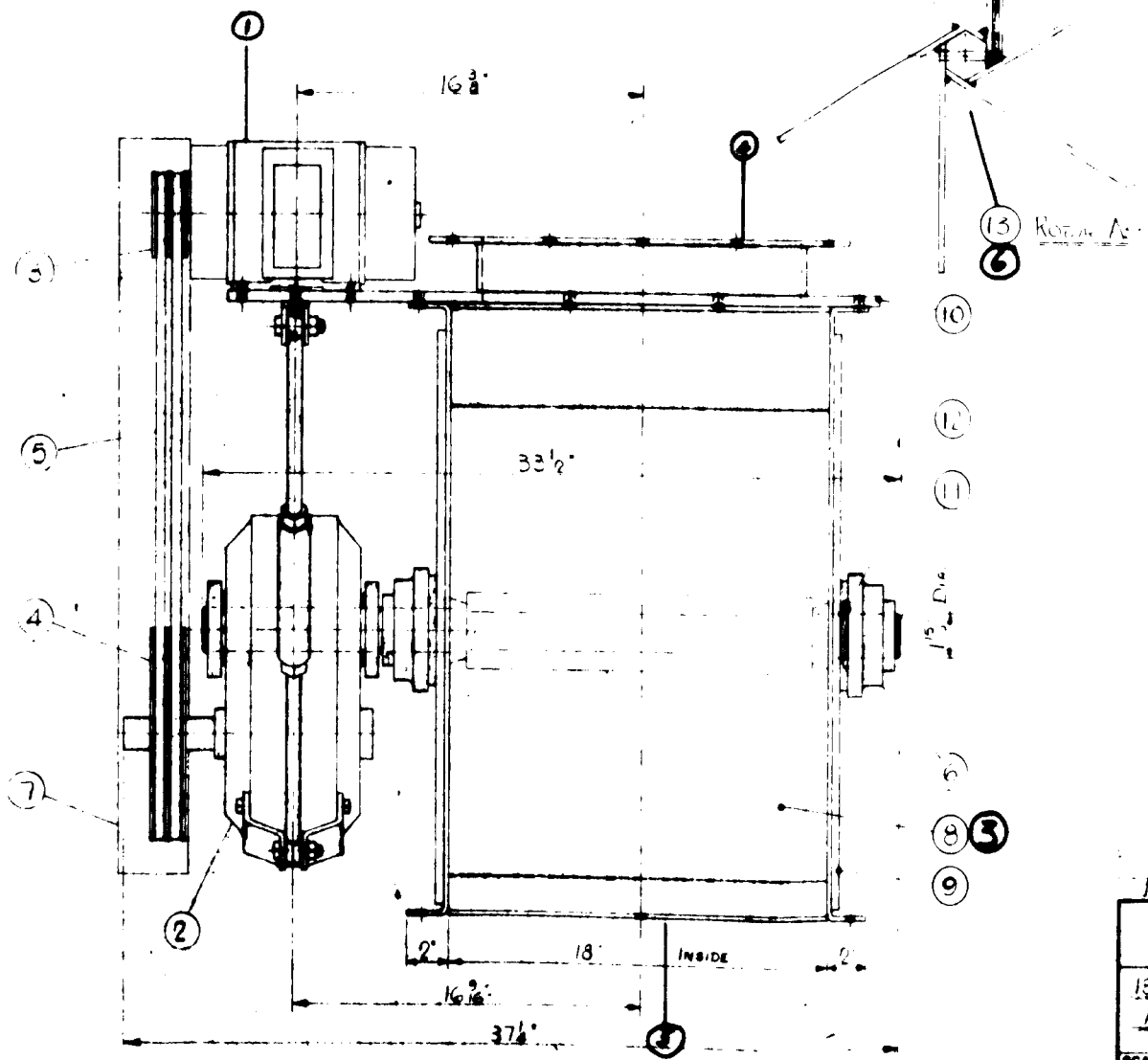
WATER L RING
MATCHED TO MOTOR RING

3/4" DIA. 6 HOLES
EQUIDISTANT SPACED



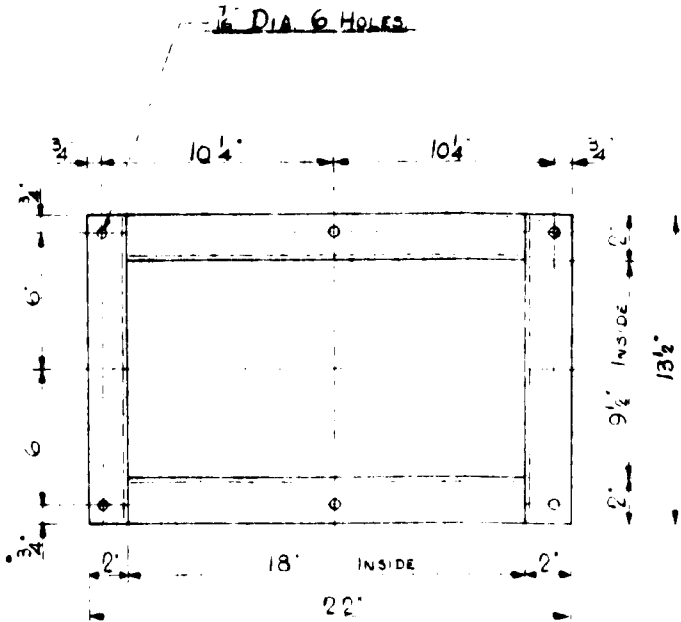
OUTLET FLANGE DETAIL

SECTION 2

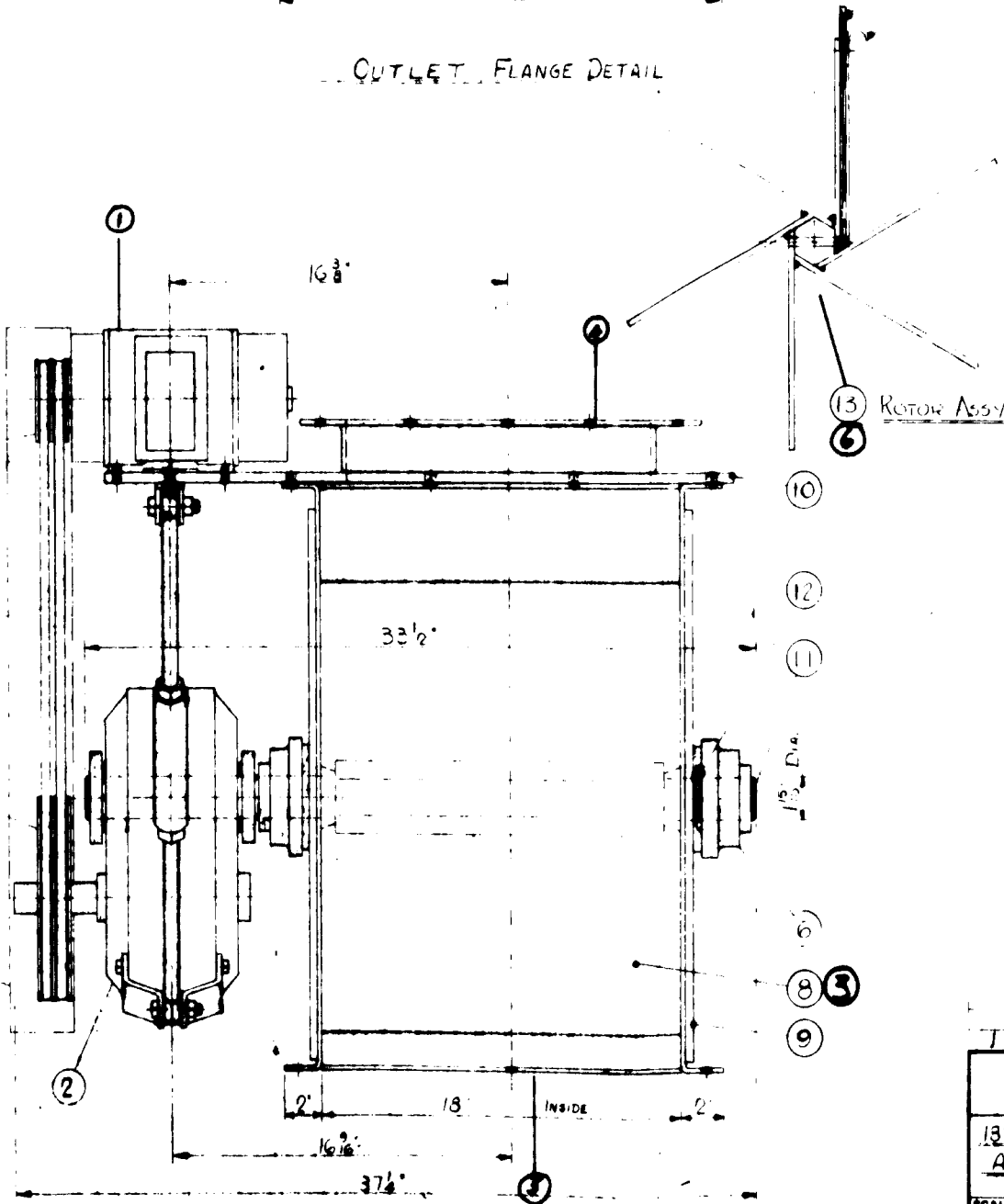


FOUR
18" x 18"
ASSEM
SCALE
3" = 18"
REV. 1/12/72

SYM	QTY	DESCRIPTION	DWG NO.
1	1	2 H.P. MOTOR 1500 R.P.M. 300 Volts 3 Ph. 60 Cyc. FRAME No. 1257	
2	1	No. TD 425 TORQUE ARM SPEED REDUCER 1 1/2" Bore Dia.	
3	1	32" P.D. DRIVER SKEAVE, 2-A GROOVES, 1" Bore	
4	1	30" P.D. DRIVEN SKEAVE, 2-A GROOVES, 1 1/2" Bore	
5	1	MATCHED SET OF TWO V-BELTS, A-60	
6	2	No. FY-115 FLANGED BEARING	
7	1	SAFETY GUARD	
8	1	CASING	
9	2	CASING END COVERS	
10	1	MOTOR SUPPORT TRAILER & FEED OR INLET OPENING	
11	1	SHAFT (ROTOR)	
12	2	FELT SEALS	
13	1	ROTOR ASSEMBLY	
14	1	SET RUBBER SEAL STRIPS 18 PCS/SET	
15	1	SET RETAINERS (RUBBER SEALS)	



OUTLET FLANGE DETAIL



SECTION 3

PAGE 77

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INLET OPENING WAS 18 1/4" DIA D D MAY 2/72

FOURNIER STEEL WORKS LTD.
BLACK LAKE QUE CANADA

18" x 18" ROTARY AIR-LOCK
ASSEMBLY

SCALE 3" = 18"	DR D D	FILE	PART NO	REV
CH				
MAY 1972	APP		D-9320-400	1

CHAPTER 3

3.0 EQUIPMENT FLOW-SHEET

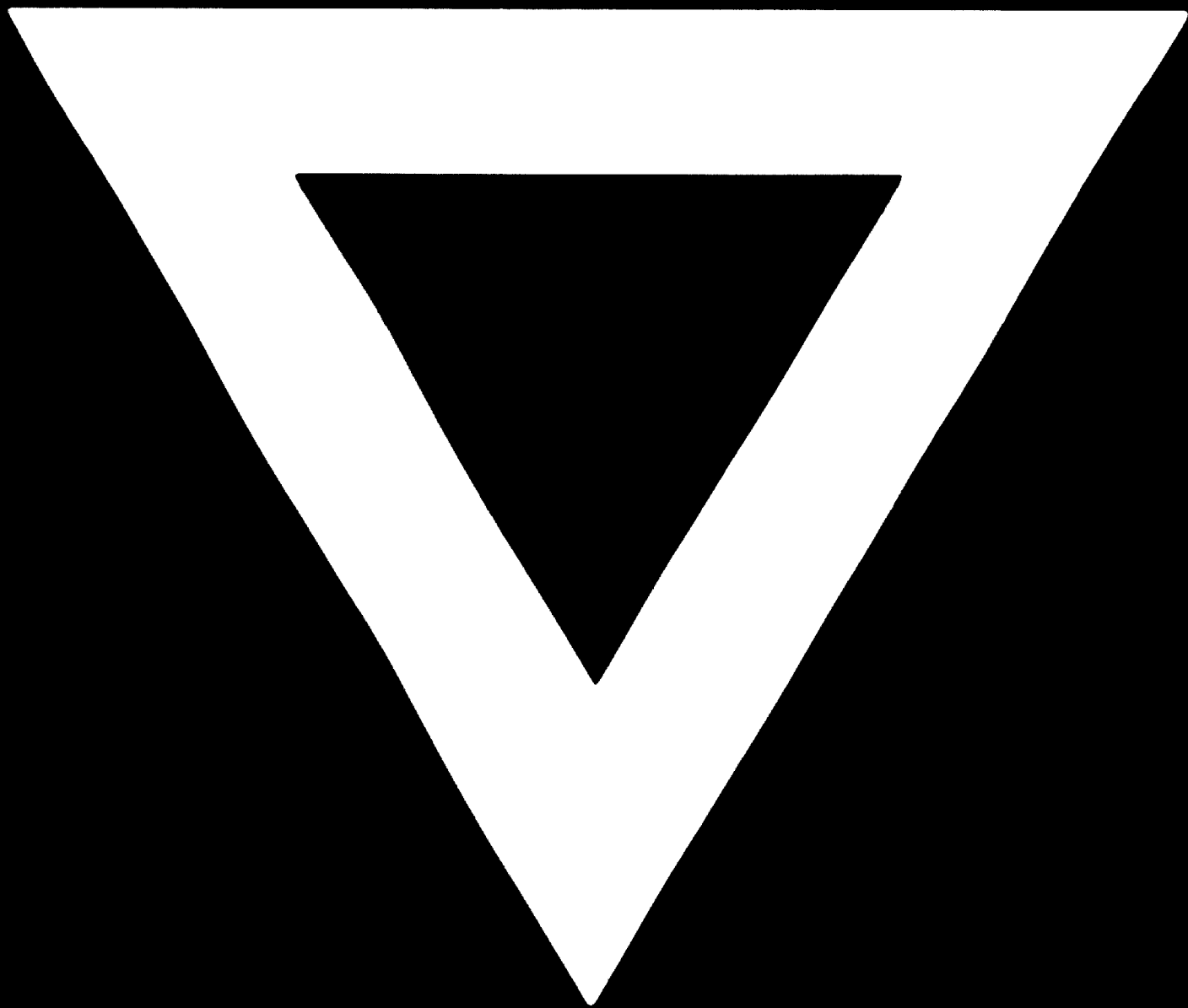
The Processing Plant final equipment flow-sheet is a one line drawing showing the flow of the material and the schematic process equipment utilized. It is enclosed in a separate pocket at the end of the manual.



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OF THIS DOCUMENT
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82.06.22