

Beech Aircraft Corporation

OVERHAUL SPECIFICATION


ENGINE STARTER TYPE 756 - MODEL C-45G AND C-45H

Overhaul Specification 9111


ISSUED June 1, 1953

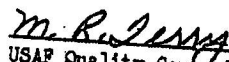
REVISED December 27, 1954


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OVERHAUL SPECIFICATION

PAGE 1 OF 10

TITLE ENGINE STARTER TYPE 756 - MODEL C-45G AND C-45H

ISSUED June 1, 1953

WRITTEN BY F. W. Cooper; Revised: T. R. Taylor REVISED December 27, 1954

1. SCOPE

1.1 Purpose.- The purpose of this specification is to authorize the use of reconditioned parts and provide reconditioning instructions for Eclipse-Pioneer Type 756 engine starters for use on Model C-45G and C-45H aircraft.

1.2 Application.- All reconditioning operations and repairs covered by this specification may be accomplished where required without further authorization. Repairs not authorized by this specification cannot be performed without further authorization.

1.3 List of Pages and Revisions.- This specification consists of the pages listed below. An asterisk (*) denotes the pages revised by the current revision.

<u>Page</u>	<u>Date</u>	<u>Description of Revision</u>	<u>Serial Effectivity</u>
1*	12-27-54	Record revision	Record change
2	6-1-53		
3	6-1-53		
4	6-1-53		
5*	12-27-54	Add Para. 3.4.1.(f)	Record change
6	6-1-53		
7	6-1-53		
8	6-1-53		
9	6-1-53		
10	6-1-53		

2. APPLICABLE PUBLICATIONS

- 2.1 Beech.-
 OS 7002 Cleaning Procedures for Reconditioned Aircraft
 OS 7003 Air Frame and Control Antifriction Bearings
 OS 7008 General Acceptable Quality Standards

2.2 Technical Orders.- Compliance with this specification constitutes compliance with the technical orders listed below.

- 03-5CA-57 Overhaul Instructions - Direct Cranking Electric Starters, dated February 28, 1952
 03-1-6 Operation and Service Instructions - Direct Cranking Electric Starters, dated March 30, 1943

3. REQUIREMENTS

3.1 Parts Involved:

3.1.1 Parts Not Used.- None.

3.1.2 Parts to be Reconditioned.- The following parts are to be reconditioned in accordance with the instructions contained herein. "Reconditioned" means the disassembly, cleaning, inspection and correction of discrepancies, repair and/or replacement of components, and modifications to incorporate changes in accordance with applicable engineering drawings to assure an operationally safe and serviceable aircraft.

Eclipse-Pioneer Type 756 Engine Starter

3.1.3 Parts to be New.- None.

3.2 Cause for Rejection.- The specific conditions listed below as well as damage or wear which cannot be corrected by one or more of the authorized repairs listed in Paragraph 3.4 of this specification is cause for rejection.

WRITTEN BY <i>J. McQuinn</i>	DATE ISSUED 6-1-53	OVERHAUL SPECIFICATION	
PROJECT ENGINEER <i>J. McQuinn</i>		ENGINE STARTER TYPE 756 - MODEL C-45G AND C-45H	
APPROVAL <i>J. McQuinn</i>	DATE REVISED	Beech Aircraft CORPORATION Wichita, Kansas	OVERHAUL SPECIFICATION NO. 9111
APPROVAL <i>J. McQuinn</i>			PAGE 2

3.2 Cause for Rejection.- (Continued)

- (a) Scrap armatures which have shafts worn beyond allowable tolerances, have loose commutator segments or have open or shorted windings.
- (b) Scrap brushes worn below 11/32-inch in length.
- (c) Scrap starter jaw assemblies and gears which have chipped teeth or chipped internal splines.

3.3 Reconditioning Operations:

3.3.1 Engine Starter Eclipse-Pioneer Type 756.-

- (a) Clean in accordance with OS 7002.
- (b) Disassemble.
- (c) Inspect for nonrepairable conditions.
- (d) Recondition bearings in accordance with OS 7003.
- (e) Magnetically inspect the driving barrel, annulus gear, planetary gears, spline nut, planetary cage bolts, driving pinion, starter jaw nut, starter jaw assembly, and screw shaft assembly.
- (f) Lubricate each clutch disc with a mixture of four parts (by weight) AN-G-25 grease and one part (by weight) AN-G-24 graphite. Retain the original order and position of the clutch discs to assure proper operation of the clutch.
- (g) Lubricate the clutch springs, the face of the spring ring assembly against which the clutch adjusting nut bears, the face of the clutch spacer against which the clutch springs bear and the helical threads of the spline nut with a mixture of AN-G-25 grease plus five percent by weight AN-G-24 graphite.
- (h) Check applicable parts for acceptable tolerances as specified in the tolerance chart.
- (i) Repair as necessary as authorized in Paragraph 3.4 of this specification.
- (j) Check for grounded or open field coil circuit.
- (k) Check for grounded or shorted armature.
- (l) Assemble starter.

WRITTEN BY <i>[Signature]</i>	DATE ISSUED 5-1-53	OVERHAUL SPECIFICATION ENGINE STARTER TYPE 706 - MODEL C-45G AND C-45H		
PROJECT ENGINEER <i>[Signature]</i>				
APPROVAL <i>[Signature]</i>	DATE REVISED	Beech Aircraft CORPORATION Wichita, Kansas	OVERHAUL SPECIFICATION NO 9111	PAGE 3
APPROVAL <i>[Signature]</i>				

3.3.1 Engine Starter Eclipse-Pioneer Type 756, - (Continued)

- (m) Adjust the starter clutch to slip within the limits of 285 to 315 pound-feet. To assure satisfactory clutch adjustment, the clutch must slip within these limits on three successive tries. Allow a one-minute cooling period between engagements and after three engagements, permit the clutch to cool to room temperature before making adjustments or further checking.

3.4 Authorized Repairs:

3.4.1 Engine Starter Eclipse-Pioneer Type 756, -

- (a) Scrap and replace brushes having a length less than 11/32-inch. New brushes must be seated until a minimum of 75 percent seat is obtained.
- (b) Scrap and replace grounded or shorted armatures. Re-surface rough or pitted commutators. Scrap and replace armature assemblies if the diameter of the commutator is less than 1-13/32 inches. If the depth of the undercut between commutator bars is less than 0.031 inch, carefully undercut the mica to a depth of 0.031 to 0.046 inch.
- (c) Scrap and replace field coil assemblies which have open, grounded, or shorted circuits.
- (d) Scrap and replace warped or grooved clutch discs. Maintain the original sequence and position of the old discs in the pack. When new discs are installed or when a complete new clutch pack is installed, run in the new discs by adjusting the clutch to slip at 150 pound-feet torque and operating the starter thirty times for periods of two seconds at a time, permitting the clutch to slip. Allow a one-minute cooling period between each two-second operating period. After thirty operations, increase the clutch setting to slip at 250 pound-feet torque and operate the starter three times for two-second periods, permitting the clutch to slip. Allow a one-minute cooling period between each two-second operating period. Adjust the clutch setting to slip at 300 ± 15 pound-feet and operate the starter a minimum of three two-second intervals, permitting the clutch to slip. The clutch must be adjusted so that it slips three consecutive times at this setting to be considered satisfactory.
- (e) Replace unserviceable gears, bearing, seals and other parts with new or serviceable parts.

WRITTEN BY <i>JH Cooper</i>	DATE ISSUED 6-1-55	OVERHAUL SPECIFICATION ENGINE STARTER TYPE 756 - MODEL C-45G AND C-45H		
PROJECT ENGINEER <i>JH Cooper</i>	DATE REVISED			
APPROVAL <i>Richard</i>		Beech Aircraft CORPORATION Wichita, Kansas	OVERHAUL SPECIFICATION NO 9111	PAGE 4
APPROVAL <i>[Signature]</i>				

OVERHAUL SPECIFICATION

PAGE 5 OF 10

TITLE ENGINE STARTER TYPE 756 - MODEL C-45G AND C-45H

ISSUED June 1, 1953

WRITTEN BY F. H. Cooper; Revised: T. R. Taylor REVISED December 27, 1954

3.4 Authorized Repairs.- (Continued).

- (f) Repair housings which are damaged by pitting around the terminal post holes by refacing the holes with a 13/16-inch diameter spot facer to a maximum depth of 3/32-inch. Housings repaired in this manner are satisfactory to use by placing two eclipaloy No. 70 brass washers, Part Number 56334, beneath the terminal post retaining nut, provided a minimum of 75 percent of the housing surface in bearing with the washer cleans up and is free of pits.

4. INSPECTION

4.1 General.- The starter will be inspected to the requirements of this specification and the general acceptable quality standards of OS 7008.

TOLERANCE CHART

Minimum serviceable brush length	11/32 inch
Minimum brush spring tension	24 ounces
Minimum diameter of commutator	1-13/32 inch
Minimum force required to compress jaw meshing spring to 13/16 inch	22.5 pounds
Force required to compress clutch spring to 21/32 inch	115 ± 10 pounds
Minimum thickness of clutch packing washer	.020
Minimum thickness of clutch thrust washer	.030

NOMENCLATURE	PERMISSIBLE WORN DIMENSION		PERMISSIBLE WORN CLEARANCE
	MINIMUM	MAXIMUM	
Driving barrel OD Liner ID	3.0900	3.0950	0.0050L
Armature shaft OD Ball bearing ID	0.5901	0.5906	0.0005L
Ball bearing OD Planetary cage ID	1.3775	1.3779	0.0003L
Ball bearing ID Pinion stud OD	0.3147	0.3147	0.0000L
Ball bearing OD Planetary pinion ID	0.8657	0.8662	0.0005L
Anti-drive end armature shaft OD Ball bearing ID	0.4717	---	0.0007L
Drive end armature shaft OD Ball bearing ID	0.5901	---	0.0005L
Ball bearing OD Anti-drive end head ID	---	1.2593	0.0001T
Ball bearing OD Drive end head ID	---	1.3779	0.003L
Driving pinion ID Driving pinion OD	0.9720	0.5907	---
Planetary pinion ID Planetary pinion OD	1.4220	0.8662	---

WRITTEN BY <i>J.W. Cooper</i>	DATE ISSUED 6-1-53	OVERHAUL SPECIFICATION ENGINE STARTER TYPE 756 - MODEL C-45G AND C-45H		
PROJECT ENGINEER <i>[Signature]</i>	DATE REVISED			
APPROVAL <i>[Signature]</i>		Beech Aircraft CORPORATION Wichita 1, Kansas	OVERHAUL SPECIFICATION NO. 9111	PAGE 6

PARTS LIST

ECLIPSE-PIONEER TYPE 756-21-A, 756-21-B, AND 756-21-C STARTERS

Index Number	Part Number	Nomenclature	Type
2	21536	Housing - drive end	A,B,C
6	21590	Screw - steel, 6 required	A,B,C
7	18357	Washer - steel, 6 required	A,B,C
10	14602	Jaw - starter	A,B,C
10	89633	Jaw - starter	A
10	121248	Jaw - starter	B
15	66854	Washer - neoprene	C
15	81087	Washer - neoprene	A
16	66853	Washer - seal steel	B,C
16	81086	Washer - seal steel	A
17	18428	Spring - jaw meshing	B,C
17	81092	Spring - jaw meshing	A
17	121241	Spring - jaw meshing	B
19	47093	Plate assembly - baffle	C
19	845483	Plate assembly - baffle	A,B
21	20507-7	Screw - steel AN505-6-5, 4 required	C
22	42425	Ring - pilot	A,B,C
23	20506-12	Screw - steel AN500-8-6, 3 required	A,B,C
24	20489-7	Washer - lock steel AN936-AB, 3 required	A,B,C
30	*15184	Shaft assembly - screw	A,B,C
30	*90193	Shaft assembly - screw	A
30	*121822	Shaft assembly - screw	B
34	15184	Shaft - screw	C
34	90193	Shaft - screw	A
34	121254	Shaft - screw	B
36	14986	Meshing - rod	C
37	121256	Screw - meshing	A
38	13235	Nut - clutch adjusting	C
38	121824	Nut - clutch adjusting	A,B
39	15191	Ring assembly - spring	C
40	121212	Spring - clutch, 9 required	A,B,C
41	15142	Spacer - clutch	A,B,C
42	14942	Ring - barrel snap	A,B,C
43	843982	Pack assembly - clutch	A,B,C
44	844219	Disc - clutch inner, 11 required	C
44	11450	Disc - clutch inner, 11 required	C
45	11451	Disc - clutch outer, 12 required	A,B
46	13210	Washer - clutch packing	A,B,C
47	42088	Spacer - clutch packing	A,B,C
48	21594	Barrel - driving	A,B,C
49	11565	Nut - spline	A,B,C
49	90192	Nut - spline	A
49	121253	Nut - spline	B
			C

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PROJECT ENGINEER <i>F. W. Cooper</i>				
APPROVAL <i>[Signature]</i>	DATE REVISED	Beech Aircraft CORPORATION Wichita, Kansas	OVERHAUL SPECIFICATION NO. 9111	PAGE 7
APPROVAL <i>[Signature]</i>				

PARTS LIST (CONTINUED)

<u>Index Number</u>	<u>Part Number</u>	<u>Nomenclature</u>	<u>Type</u>
50	21530	Washer - thrust	A,B,C
51	21593	Gear - annulus	A,B,C
52	42096	Strap assembly - window	A,B,C
53	4072	Nut - wing	A,B,C
54	85312	Shield - conduit half	A,B,C
55	50509	Shield	A,B,C
56	15674	Screw - steel, 4 required	A,B,C
57	18357	Washer - steel, 4 required	A,B,C
58	60249	Brush assembly, 4 required	A,B
58	839317	Brush assembly, 4 required	C
59	20506-7	Screw - brass AN500-B8-4, 4 required	A,B,C
60	20500-22 Com L	Washer - lock - bronze purchase PSA, 4 req	A,B,C
61	80330	Cap - bearing	A,B,C
62	11558	Screw - steel, 4 required	A,B,C
63	20503-9	Pin - cotter steel	A,B,C
64	11486	Nut - steel	A,B
64	844187	Nut - steel	C
65	46943	Cage assembly - planetary	A,B,C
66	20503-18	Pin - cotter steel AN380-2-3	A,B,C
67	13235	Nut - steel	A,B,C
68	20503-10	Pin - cotter steel AN380-2-2, 6 required	A,B,C
69	21533	Nut - steel AN320-5, 6 required	A,B,C
70	21529	Bolt, 3 required	A,B,C
71	46917	Cage - planetary No. 2	A,B,C
72	20504-14	Bearing - ball purchase SKF 6202-J/C3/MTI	A,B,C
73	46918	Cage - planetary No. 1	A,B,C
74	46914	Washer - large steel, 3 required	A,B,C
75	46915	Washer - steel, 3 required	A,B,C
76	117071	Spacer, 6 required	A,B,C
77	46913	Stud - planetary pinion, 3 required	A,B,C
78	20504-23	Bearing - ball purchase SKF 38Y/MTI	A,B,C
79	46916	Pinion - planetary, 3 required	A,B,C
80	21531	Spacer - bearing	A,B,C
81	21585	Pinion - driving	A,B,C
82	20521-7	Key - woodruff, steel	A,B,C
83	20504-14	Bearing - ball purchase SKF 6202J/C3/MTI	A,B
84	21532	Spacer	C
84	837625	Spacer	A,B
85	20504-13	Bearing - ball	C
85	842826	Bearing - ball purchase SKF 6202-2RS	C
86	838752	Spring - floating bearing	C
87	21524	Head - intermediate	A,B,C
88	84813	Armature assembly	A,B,C
89	7318	Cover - terminal	A,B,C
90	18917-1	Nut - brass, 3 required	A,B,C
91	20500-21 Com L	Washer - lock, bronze purchase PSA	A,B,C

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PROJECT ENGINEER <i>[Signature]</i>				
APPROVAL <i>[Signature]</i>	DATE REVISED	Beech Aircraft CORPORATION Wichita 1, Kansas	OVERHAUL SPECIFICATION NO.	PAGE
APPROVAL <i>[Signature]</i>			9111	8

PARTS LIST (CONTINUED)

<u>Index Number</u>	<u>Part Number</u>	<u>Nomenclature</u>	<u>Type</u>
92	14967	Lug - terminal	A,B,C
93	20500-9 Com L	Washer - lock steel purchase PBA, 2 required	A,B,C
94	6069-1	Washer - steel, 2 required	A,B,C
95	82280	Washer - insulation	A,B,C
96	56334	Washer - eclipaloy No. 70 brass	A,B,C
97	85313	Head assembly - anti-drive end	A,B,C
98	20507-7	Screw - steel	A,B
98	113852	Screw - steel, 4 required	C
99	20500-44	Washer - lock steel, 4 required	B,C
100	85319	Board assembly - brush	A,B,C
101	12582	Screw - steel AN500-A8-10, 2 required	A,B,C
102	2426	Washer - brass, 2 required	A,B,C
103	21010	Spring - brush, 4 required	A,B,C
104	50507	Head - anti-drive end	A,B,C
105	838008	Bearing and spacer assembly	C
106	20504-12	Bearing - ball	A,B
106	838007	Bearing - ball 8501-XIA purchase NP	C
107	837626	Spacer - bearing	C
108	29589	Insulator	A,B,C
110	85418	Yoke and field coil assembly	A,B,C
111	21014	Screw - steel, 4 required	A,B,C
112	21015	Pole shoe assembly, 4 required	A,B,C
113	127964	Coil assembly field	B,C
115	86183	Terminal, 4 required	B,C
116	84811	Post - terminal, 2 required	A,B,C
117	845312	Shim - insulating, 4 required	C
118	5111-116	Paper - coil insulating fish	C
120	21596	Yoke	A,B,C

* Non-procurable as a separate part.

SKF Industries, Philadelphia, Pennsylvania

NP New Departure, Bristol, Connecticut

PSA Philadelphia Steel and Wire Corporation, Philadelphia, Pennsylvania

WRITTEN BY <i>[Signature]</i>	DATE ISSUED 6-1-53	OVERHAUL SPECIFICATION ENGINE STARTER TYPE 756 - MODEL C-45G AND C-45H		
PROJECT ENGINEER <i>[Signature]</i>				
APPROVAL <i>[Signature]</i>	DATE REVISED	Cess Aircraft CORPORATION Wichita, Kansas	OVERHAUL SPECIFICATION NO.	PAGE
APPROVAL <i>[Signature]</i>			9111	9

TO	9111	9111	9111	9111	9111
FROM	OPERATIONAL SPECIFICATION	OPERATIONAL SPECIFICATION	OPERATIONAL SPECIFICATION	OPERATIONAL SPECIFICATION	OPERATIONAL SPECIFICATION
DATE	1966	1966	1966	1966	1966
BY	9111	9111	9111	9111	9111
REVISION	1	1	1	1	1

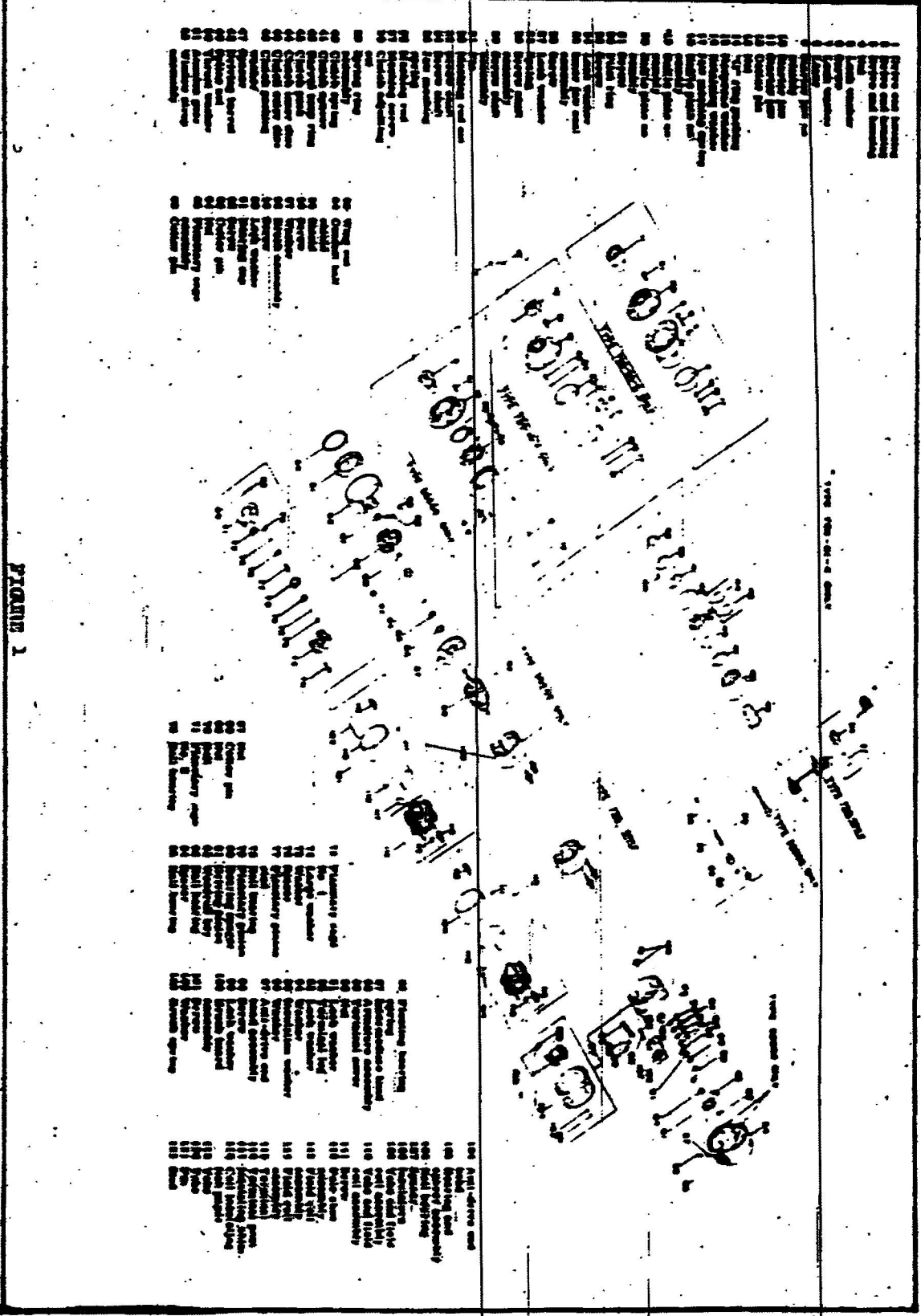


FIGURE 1

