

Letter Receipt.

TO Mr D.Gleen Starlin,
Chief, Personnel and
Training Branch,
Army Security Agency,
Arlington Hall Station
Arlington Virginia.

Reply and ANswer of Mr William
A Fletcher regarding seperation for
inefficiency, per letter 4 December
1946 WDGAS-61 received 5 December
1946. this reply and ahswer
consisting of Page 1- 7 and
Exhibits 2,3, 4, and Exhibit 5.inclusive.

Signature of Party

Date

Apt 703 The Academy
 1861 Columbia Road, N.W.
 Washington D.C.
 December 1946.

Mr G. Glenn Starlin,
 Chief, Personnel and
 Training Branch,
 Army Security Agency,
 Arlington Hall Station,
 Arlington Virginia.

Dear Mr Starlin:

1. This will acknowledge receipt of your letter dated 4 December 1946 ("WDGAS-61) relative to alleged charges against me. You state that I should reply to this letter within seven(7) days from the receipt thereof.

2. In order to have some coherency in this reply to said "charges" I shall arrange the subject-matter in the following order. Remarks
Answers and Conclusions.

REMARKS

A. At the onset Mr William A Fletcher did not anticipate any deliberate attempt to belittle his scientific attainments, until the receipt of the aforesaid dated 4 December 1946 letter (WDGAS-61), wherein number 3 section "b" displayed such an attempt, as a consequence, it would appear correction is in order.

B. And, as a matter of fact, in that, so much has been said about "coherency" in the charges against Mr William A. Fletcher, even though to date no guide is disclosed whereby the meaning with respect to the subject-matter have been revealed to anyone, only a conception of the instigators of the charges. Therefore it would appear justifiable and in order that for to have a logical relation of the parts, to the whole drafts subject-matter, it may be well to state herein what Mr William A Fletcher considers as being in "coherency".

C. Taking Webster's Collegiate Dictionary for the year 1921 page 195 thereof. "Coherency" Definition 2, Connection or congruity due to common principle or relationship; consistency." and page 217 Consistency definition 4. "Agreement or harmony; congruity, correspondence".

D. This does not mean that each word and subject matter of each subparagraph in each specification shall consist of the same words and same functional requirements, neither do they mean they shall be "stereotyped" as long as the main form of structural section arrangement is prepared in the following order.

- E. A. APPLICABLE SPECIFICATIONS (AS AMENDED OF 3 April 1946) OTHER PUBLICATIONS AND DRAWINGS (as applicable).
- B. GRADES, TYPES AND CLASSES (as applicable) OR CLASSIFICATION.
- C. MATERIAL AND WORKMANSHIP.
- D. GENERAL REQUIREMENTS.
- E. DETAIL REQUIREMENTS.
- F. METHODS OF SAMPLING INSPECTION AND TESTS.
- G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT.
- H. NOTES. THE ABOVE WOULD APPEAR TO BE INCOHERENCY.

F. It appears that this Agency still insists on using the word Detailed Requirements, which is an error, see outline of Form Joint Army-Navy Specification as amended as of 3 April 1946 and letter of Under Secretary of War dated 23 August 1946, quoting said outline page 8.

E. Detail Requirements

Example. Component parts- Desk-type electric fans shall consist of the following parts:

Base
Blade
Frame
Motor."

G. Therefore, it is essential one To ascertain the necessary facts. Two Digest these facts and draw the correct conclusions. The correct conclusions are the ones which are sound from a business standpoint, as well as from an engineering standpoint. Three. Present these conclusions so clearly and concisely that they can be grasped without effort or delay.

H. So in order to prepare a Tentative Specification it was decided that coordination of the so-called Draft Specifications prepared by Mr William A Fletcher on 17 September 1946 (waiting typist until 7 October 1946) would be an ideal arrangement, and as a result the said 17 September 1946 self written by William A Fletcher and presented in the typed form as of 7 October 1946 was based upon the information to be found upon the Exhibit No 1 attached to the specification file folder on the left hand (side) of the folder.

I. It will be fully apparent that the terms used in the submitted Exhibit No 1 was followed explicatively per the instruction of the Engineer in question.

J. During the course of the drafting of the Draft specification Mr William A Fletcher inquired why they did not use the "T.S.S." form of specification presentation. Mr William A Fletcher was asked what is a T.S.S. specification (Never heard the term used before) by the way such a partial type of T.S.S. specification is shown marked Exhibit No 2.

K. It appears that due to the diverse and variant statement reflected "in the specific instances and comments" which upon the surface they appear to be lacking in a logical relation of parts; incoherency of vital factors and arrangement, for this reason the "specific instances and comments are misleading and lacking in a true value and meaning pertaining to the subject-matter disclosed in the said Drafts.

L. And under the circumstances, it appears that due to the fact Mr William A Fletcher had the pleasure of meeting Doctor Kullback and Mr Starlin in the Office of Doctor Kullback on 30 August 1946 at which time it was mutually agreed and arranged that coordination of all drafts specifications would enable all parties concerned to produce "good specifications" the reasons at that time was advanced why this would be so desirable an arrangement.

M. On the other hand, it is now established beyond doubt no two persons can describe subject-matter to the satisfaction of both parties, unless there is a joint mutual understanding and frank cooperative discussion of the subject.

N. This is self evident from the diverse and variant "specific instances" which are, all things considered in conflict with the drafts as submitted by MR William A Fletcher, and notwithstanding, the fact that the "specific instances and comments" is proof that coordination is a very vital factor to good understanding in all matters.

C. This point

W.A.F. Dec 1946.

O. At this point obviously, it would appear that the definitions of vital words with a view to clarify the basic drafts disclosure is a paramount factor in such a light Mr William A Fletcher herewith presents their meaning. Taking Webster's Collegiate Dictionary for the year 1921, page 306 word Draft v.t 1. "To draw the preliminary sketch or plan of". page 759 Definition "Preliminary. Introduction preceding the main discourse, business, or subject." and similarly the meaning of Technical terms using the Preface of Chamber's Technical Dictionary of the year 1942 copy can be obtained in the Legal Section of R.&D Section, quoting in part "Preface. " Technical term . may be defined as a word or expression which has "special significance and value" to the person learned or dexterous in a branch of knowledge relating to some particular human activity or to some particular aspect of nature" and at any rate " Technical terms are in reality symbols adopted, adapted or invented by specialists and technicians to facilitate the Precise expression and recording of their ideas" and it follows that the safest authorities on the meaning of technical terms are those who understand and use them" and quote Chamber's.

P. Along this line undoubtedly, the words "Consistent and Applicable with their variant meanings , and which shows marked different usage in the drafts and cannot be substituted one for the other technically or otherwise to this end the following definitions, page 217 (Webster) Definition 1 Consistent. Possessing firmness, solid, 2 Having agreement with itself or with something else; having harmony among its parts; congruous. 3 Living or acting conformably to one's belief or profession", and definition page 51 Applicable capable of being applied; fit, suitable, or right to be applied." This alone will reveal quite divergent* from the "specific instances comments" as found in the letter of 4 December 1946. (WDGSA-61)
**views

Q. Mr William A Fletcher specific reply to the "Supplement" re "specific instances and comments" are to him to say the least he does not feel hurt rather thinks it is an accomplishment in having This Agency on Record. that they desire to have... "Tolerances on voltage and current requirements" and as a matter of fact..A contractor must be given tolerances to guide his work" further on the other hand, "Before these specifications could be used in connection with a development contract it would be necessary to rewrite the greater part of the subject-matter " end of quotation of 4 December (letter) 1946. (WDGSA-61).

R. And aside from this, Mr William A Fletcher will substantiate his finding from the said draft, preliminary material, that is part of the aforesaid Record.

ANSWER

4. It is further noted with thanks that a committee will review this perhaps unfinished Reply and Answer, due to the facts that Mr William A Fletcher did not receive the original copies of typed material from the Personnel Section of R.&D Branch until the morning of the tenth (10) of December 1946, and under the circumstances, it was impossible to correctly evaluate the "supplement" "specific instances cited to amplify the charges"

5. Therefore, aside from this, may I take for one example the specific instance" and comment as of sheet three(3) Number 5 section "a" to show the misleading and adverse meaning injected into the drafts specifications. Before pointing out the vital mis-representation, let us together look at the meaning of the words" CRITICAL OPERATING FEATURES.

Critical page 242. definition 5. (Physics Math, etc. pertains to ordesignating a transition point at which some property suffers a definite change" "Critical temperature" a temperature above which a substance can exist only in the gaseous state, no matter what pressure".

Operate page 675. Defination 2. "To produce or take effect; producing or taking effect."

Feature page 369 Defination 3. "Any marked characteristic; anything especially prominent or important".

Would it not then appear that the aforesaid words conveyed the impression for this purpose " a transition, a peculiar quality or part in producing or taking effect(feature) as in any marked characteristics . anything especially promient or important".

For this reason Size must represent a special feature is it not?

Why for example. Subminiature .type of Tube .then too. a very important feature and having other important factors co-related. Such as for example. The Tube's wall (size) forms a part in the vapors condensation and reabsorption processes which are very vital and in a large measure provides the means for producing the other thereafter named electrical factors numbered one and two (2).

And,withtheunderstanding , and knowledge that these features of the resultant bombardment of the Tube's wall, including the inherent substances formed therein. metallic vapor's critical operating, optical, resonance, and ionization potentials shows marked special features and not considered proper electrical characteristics, by all means all these factors are involved in this type of sub-miniature, Cold Cathode, triode, vacuum Tube.

As a matter of fact, the aboved named features are involved in the construction due to the inherent size having marked features. Yes, are to say the least very marked in the Tube's wall performance and construction details.

Along this line of reasoning, is it not a fact, that the critical operating factors, therein named are the direct outcome of the "collision" of the speedy electrons, with the atoms of the gas within the Tube, and that of the occluded gas of the interfacial layer found at the Tube's wall?

Wherefore, when the encounter takes place there is a state of excitation, which in the case of the excited gas, prdduces a sort of light . This production of light comes about from the energy given up as the disturbed molecules, or atoms or ion settles down to its stable neutral state. Therefore, certain feature of size are essential as herein disclosed .

In addition, the electrical characteristics, vapor pressure, current density, and voltage are to be so regulated that the resultant arc or glow discharge produces directly as much light (Glow) or arc) as possible. Because the conducting vapor depends upon the wall of the Tube to function effectively. Is it not apparent that size plays its important part .
Knowingly certain Tube's behaviour is dependent upon the wall for its usefull operation.

"Specific instance comments" is self evident in error.

6. "Specific instance " Number 1. "This specification was prepared for development contract"..... through to..... " as described"...

Answer"This specification (draft) was prepared for a development contract for s sub-miniature triode of the cold cathode type".. is true...which shall ..not will provide the means for "conducting strong currents" The words "must probably" depend on a gaseous arc discharge for operation" shows. ambiguity, susceptible to question, under the conditions as named "must" see Webster 642.

" must, necessary to a character or result," probably- page 767 (Webster) "In a probable manner; in likelihood; in or probability; as it is probably so."

6 Cont W.A.F.

*are

This would indicate to eliminate a "development" rather being of ~~it~~ would appear a "prophecy". Whereas there ~~metallic~~ particles of a "colloidal nature" interposed for example such as metallic mercury, usually found therein, which provide a means for, such a phenomena, in this light the statement is first non-essential verbiage Second mis-descriptive, lacking in true knowledge of the "development device". Again "Due to the extremely difficult operational requirement". Quired?, for self evident reasons, re "a gaseous arc-discharge". In particular the "operational requirements consists of certain pertinent current, voltage, and operating time data" as disclosed in the "draft" specification is in a precise and unequivocal language., and it follows that, physical features such as size and shapes may be specified as desirable" Erronous in that it conflicts with Development" as described in AR.850-25. in not stating a precise and not stating in unequivocal terms. vague and meaningless in light of "must probably depend".

Further this outline form "This..... through to... desirable" is mis-representation of Exhibit No 1 and Exhibit No 2, which states arc or Glow discharge. Therefore the specific instances and comments fails to interpret true facts and findings See B Type of Draft specification. Mr William A Fletcher deny the allegation in toto.

Number 2 :

7. "Considerable essential relevant information has been omitted from specification drafts."

Answer Mr William A Fletcher deny this allegation as being reflect: ive of the nature which fails to interpret true facts and findings as per the disclosure in the previous specific instance comment and conflicts with the evidence as shown on the marked Exhibit No 1 and Exhibit No 2. Therefore said comments is not precise and is not unequivocal, erronous.

8. Specific instance 2 a. "Section E. should definitely contain ~~re~~ mention ... "Cold Cathode"..... "concept of the Tube".

Answer The Technical terms used in the draft are precise and unequivocal to the Joint Partner (the manufacturer) in this specification. See A-1 of JAN-1A and Joint Army -Navy Specification JAN-1A For Electron Tubes" Index as of 1 May 1946 Page 1 of A.B.C. wherein it states in part as follows:

"A-1 Specifications The following specifications the issues in effect on date of invitation for bids form a part of this specification and bidders and contractors will provide themselves with the necessary Copies. A-1a, A-1b, A-1c, A-1d, A-1e, A-1f and A-1g and see B. Classes B-1 Classes of Tubes.. "This specification covers the requirements for many classes of Electron Tubes"..... "as follows" ... Cold Cathode Tubes, including Voltage Regulators end of quoting 1 May Page 1 of A.B.C. (1946). The above answer is self-explanatory. Specific instance comment not precise and not unequivocal in language and content. Therefore considered erronous.

9. Specific instance comment 2 b. "There should be detailed reference" of the Tube".

Answer Whereas AR-850-25 dated 30 June 1943 section 23 line 3 to line 6 quoting "It will not repeat matter covered by notes on drawings forming part of the specification, and will not contain matter contradictory to provisions in such other specifications." Draft complies with this requirement see JAN- 1 A specification

10. The specific instances and comments pertaining to Draft dated 8 Oct 1946 for Tentative Specification for Special Commutator, appears after very careful persual of the Numbers 1,2,3,4,5 and 5 including the subparagraphs comments shows the same trend in having far greater number of ambiguous, and misleading, in correct statement relative the significance and value yes special value of there conveyed meanings. with respect to the significance and values outlined in the "draft specifications the specific instances also runs in conflict with the accompanying Exhibit No 4, Exhibit ~~and~~ "o 5 ~~and~~. said Exhibits are self evident being capable of being understood in displaying the aforesaid errors mentioned..

11. It will be self evident with the limited time now at Mr William A Fletcher's disposal even though the drafts specifications left Mr William A Fletcher's desk on 18 September 1946, it follows that as the date of the "specific instances cited to amplify the charges was 4 December 1946. this alone allows consideration in this matter.

12. It appears that said "amplify" enabled the writer or writers to thereof much time to insert "afterthoughts" and check up readily on the draft as of 18 September 1946. So without taking each and every "s specific instance cited and comments statements which runs along the same basic concepts Mr William A. Fletcher at this time will relieve the Record of the further specific subject-matter by denying all allegations in toto. as being contrary to the purpose and intent of the drafts specifications as Filed on 18 September 1946. The Exhibits "o. 1,2,3,4,5 and Exhibit No 6 will reveal Mr William A Fletcher's position in this matter.

CONCLUSION.

2.

- I. That the relative relationship of the technical terms appears to have been overlooked.
- II. That the mis-conceptions of the wordage, allows no ground for adequate interpretation thereof(drafts).
- III. That until the correct conception of the Policy and intent of the Joint Army Navy Specifications standards are ascertained no "good specification can be considered ~~att~~ attainable by any Agency.
- IV. That incorrect dimension as shown on the submitted Drawing for use in the preparation of the so called Draft showed error in that the distance between the mounting screw head and the inner row of segment was only 1/32. of inch. this is indirect conflict with those Rules Promulgated by the National Safety Underwriters.
- V. That the statement as of "specific instance comment quoting " upon external radiation of any type" runs in conflict with good specification practice. because so many of the Legal Cases have showed the word "any" indicates a choice. So in this respect should the Manufacturer have designed his Tube so as to prevent only one external radiation from effecting the operation he would have complied with the term as used "any".
- VI That Whereas to prevent the usage of external energy both visible and invisible the word no. or all light energy would have covered the meaning in this case.
- VII Recapitulating good specifications can be written when policy is produced governing the formation of the essentials and its contents having a coordination of minds to provide workable concepts which then can be presented in a joint constructed manner,

VII Cont.

fundamental to good form and usefulness.

Respectfully submitted,

William A Fletcher
William A Fletcher.

12 December 1946

Engineer P-2,
Arlington Hall Station .
Arlington Virginia.

Enclosures; 4.

- Exhibit No 2 . Sample of partial T.S.S.
- Exhibit No 3. W.A.F To Whom it may Concern:
- Exhibit No 4. Draft created by One Legal Supervisor (Sample)
- Exhibit No 5. Sketch created by Mr William A Fletcher having
arrangement to show "Model could not work".

Copy No 2

Tentative Part of (T.S.S.)
 JAN-1A
 Specification

Draft 9.17

28 October 1946

TUBE, SUBMINIATURE
 COLD CATHODE, GAS TRIODE

A. APPLICABLE SPECIFICATIONS

A-1. Subsidiary Specifications. All specifications listed in Joint Army Navy 1A, where applicable, of the issue in effect on the date of invitation for bids or contract shall form a part of this specification, with the hereinafter "T.S.S." specified ratings and tests.

B. TYPE

B-1. This specification covers one type of Tube, Subminiature, Cold Cathode, Gas Triode.

C. MATERIAL AND WORKMANSHIP

C-1. See Section C, JAN-1A.

D. GENERAL REQUIREMENTS

D-1. See Section D, JAN-1A.

E. DETAILED REQUIREMENTS

E-1. The herewith attached sheet (T.S.S.) of Test Limits is a tentative part of Specification JAN-1A.

E-2. The provisions of Specification JAN-1A apply to this tube.

*Exhibit No 2**Sheet 1
1 of 2 Sheets*

Draft WTD

Pr V Z P 10/sec 3. M.S. *Submittals*

Description:

Cold Cathode Gas Triode

Ratings:

Absolute Maximum:

Ebb	Ecc	epx or epy	Ik	Ik	Rg	Rp	ipx	Ang T
Vdc	Vdc	v	ma	mAdc	ohms	ohms	-	°F
120	40	—	150, 50	—	—	—	—	-40 to 125

Tube Illumination
lm/sq

PTB to Ade.

Note 1

Note 2

Note 6

Test Cond.:

*Height:
 **Base: FLY. TYPE LEADS. 1 1/2 MIN. LEN. STH.
 **Lead Color: Yellow Black Red
 Element: k a g

*Diameter: MAX. .400 in.
 **Cathode: Cold Emitter
 **Envelope: T-3

Ref.	Test	Conditions	Min.	Max.
D-2	Raymond			
F-6a(2)	*Drop:	<i>approved contracting officer.</i>	—	—
F-6b(1)	*Vibration:	No Voltage		
F-3	Holding Period:	t = <i>until Tube's Failure</i>		
F-9a	+ Grid Ionization Voltage:	Ebb=0; Ecc-vary;	Es: 40	90 Vdc
F-9a	Anode Ionization Voltage:	Ecc=0; Ebb-vary; Rg=	Es: 150	— Vdc
F-9b	Grid Voltage Drop:	Ebb=0; Rg/Ic=10 mAdc; Note 3	Etd: —	— Vdc
F-9b	Anode Voltage Drop:	Rg=open Ecc=0; Rp/Ib=10 mAdc; Note 3	Etd: —	— Vdc
—	Transfer Current:	Ebb= Vdc; Ecc-vary; Rg=—; Note 4	Ic: —	— mAdc
—	Uniformity:	Ecc=0; Rp/Ib=10 mAdc; Note 3; Note 8		

Sample Outline of Draft - WTD. Sheet 2

Draft WFF

<u>Ref.</u>	<u>Test</u>	<u>Conditions</u>	<u>Min.</u>	<u>Max.</u>	
F-4	Life Test:	Group W ; Ebb= to Vdc; Rp/Ib= 2 mAdc; Note 5 16	t:	5000	hrs.
F-4b	Life Test End Point:	Grid Ionization Voltage	Ez:	40 - 90	vdc

Note 1: Tube life is a function of cathode current.

Life:	—	—	—	—	—	hrs.
Forward Current:	—	—	—	—	—	mAdc

Note 2: i_{px} is symbol for peak inverse anode current.

Note 3: A fixed resistor may be used and the supply voltage varied to give the current specified.

Note 4: In this test the grid resistor shall be adjacent to the grid. The grid current shall be increased gradually by increasing the grid supply voltage until the tube starts to conduct current to the anode. The grid current required to start conduction shall be within the limits specified.

Note 5: Grid connected to anode Breakdown voltage 150V

Note 6: The tube shall be subjected to normal room illumination/both dark and visible illumination (either natural or artificial, ~~of the value specified~~) shall not be effected by external visible or invisible light.

Note 7: Under the specified conditions the cathode glow shall be substantially uniform over the cathode surface; ~~and E-4d~~

Note 8: Paragraphs C-1a ~~and E-4d~~ of JAN-1A do not apply.

Note 9: The Tube shall operate under any or all ^{operating} regular positions.

Note 10: The "Letter" (Variation of ionization time) 5. microseconds.

+
*
** See JAN-1A Draft respectfully submitted
WFF

TO WHOM IT MAY CONCERN: (To be found in Draft Specification File.)

The "Model" presented for specification purposes does not present the true picture.. No correct description could be written . Because on the inherent defects, which may be for Security Reasons. Nevertheless, they must be taken into consideration , such as Rest Segment of each Ring 1,2,3, and Ring 4., in accordance with reference "Point Base Line". Zero(0).

To date specification Drafts were to bring out the saliant Points of the Case without attacking the Basic fundamental construction.

* The American Brass Co provides in the Handbook for Defination of segment "Any Plate, not a true half circle, is classified as a segment See Page 114. Anaconda Metal Products.

.....

Exhibit No 3...

COMMUTATOR

A. Applicable Specifications.

A-1. Subsidiary Specifications.

Copper

Brass

Insulating Material

Marking Shipments

B. Type.

B-1. Special Commutator. This specification covers one type of commutator intended for use with a cooperating brush arm and a plurality of brushes to switch several electrical signals.

C. Material and Workmanship.

C-1. Material. The best material commercially available *will* be used when a definite material is not designated.

C-2. Workmanship. All parts shall be manufactured and finished in a workmanlike manner ~~and~~ in accordance with the best commercial practice.

C-3. Screws and Washers. All screws and washers shall have the A. S. M. E. form of thread; commercially available screws shall be used. Any washers and lock washers used also shall be commercially available.

D. General Requirements.

E. Detailed Requirements.

D-1. Commutator. The special commutator comprises a disc of hard stiff insulating material with five concentric contact components mounted thereon in accordance with ^{the} drawing ~~hereto~~ attached which drawing is made a part ^{hereof} ~~of this specification~~.

E-2. Disc. The insulation disc shall be formed of Bakelite, Synthane or equal. It shall have an overall diameter of 6" and a center opening of 3/4".

Exhibit No ~~1~~

Draft of Legal Supervisor R. D. use for illustration
purpose W.A.F.

E-3. Contacts. The contact shall be formed of suitable bronze alloy.

E- Conformation of Contacts. Contacts shall be of normal arcuate conformation.

E- Arrangement of Contacts. The contacts ^{shall be} ~~are~~ arranged in five concentric circles. The location of each contact on the disc shall be fixed with relation to a radial reference line ^{in the disc} and measured, except where otherwise indicated, in a counterclockwise direction to a radial line bisecting the contact.

E- Outer Ring. There shall be in the outer line of contacts a contact extending 10° clockwise and 3° counterclockwise from the reference line. Ten additional 5° contacts spaced at intervals of 31.5° shall be provided. Between each two contacts in the outer row are fillers or dead contacts which serve merely to form a surface for a rotating brush and thus must effectively provide a smooth continuous surface with the first-mentioned contacts. Insulating air gaps on the order of 1° each shall be provided between adjacent contact segments.

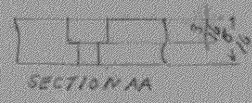
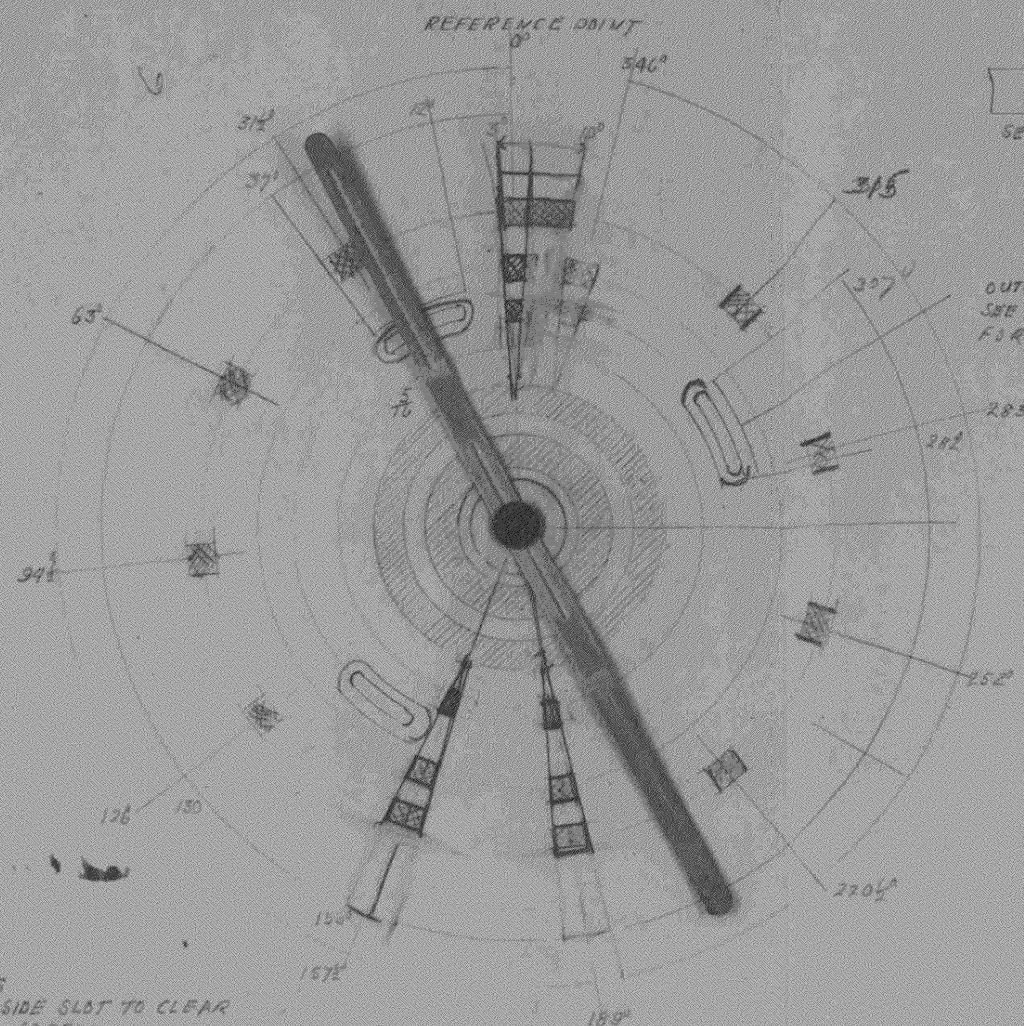
E- Second Row of Contacts. In the second row of contacts (counting from the periphery of the disc), there shall be centered on the reference line one contact identical in size with the 5° segments of the outer row of contacts. In addition, there shall be three 5° segments located at 157.5° , 189° and 346° from the reference line. These segments also shall be arranged with interspaced dead contacts air-insulated from the four contacts first-mentioned.

E- Contact Connections. Each of the live contacts shall have connected thereto on the lower side of the base disc a WECO # _____ lug or "equal" so that a soldered connection can be made thereto. The lugs shall be of such size, conformation and arrangement as substantially to eliminate the possibility of short circuiting any contact segments.

E- Mounting Slots. Arranged on a circle _____ inches in diameter concentric with the annular contacts are three mounting slots, the first occupying an arc from 12° to 37° from the reference line, the second occupying an arc from 130° to 155° , and the third, an arc from 282° to 307° , the slots being of such width as to receive No. 6 machine screws, all slots being widened to a depth of $3/16$ of an inch so as to permit the heads of such screws to be brought at least flush with the contact surface of the disc. *E x Helix No 4*

Exhibit Nos 99A.

46-4



OUTSIDE SLOTS $\frac{3}{16}$ " DEEP
SEE CROSS SECTION
FOR CLARITY

NOTES
INSIDE SLOT TO CLEAR
4/6 SCREW.
ALL SLOT POSITIONS MEASURED
FROM REFERENCE POINT (0°)
TO INNER SLOT

Exhibit No 5 created by M.
Kellum & Fletcher to show
Errors in Model

7176R			

1165