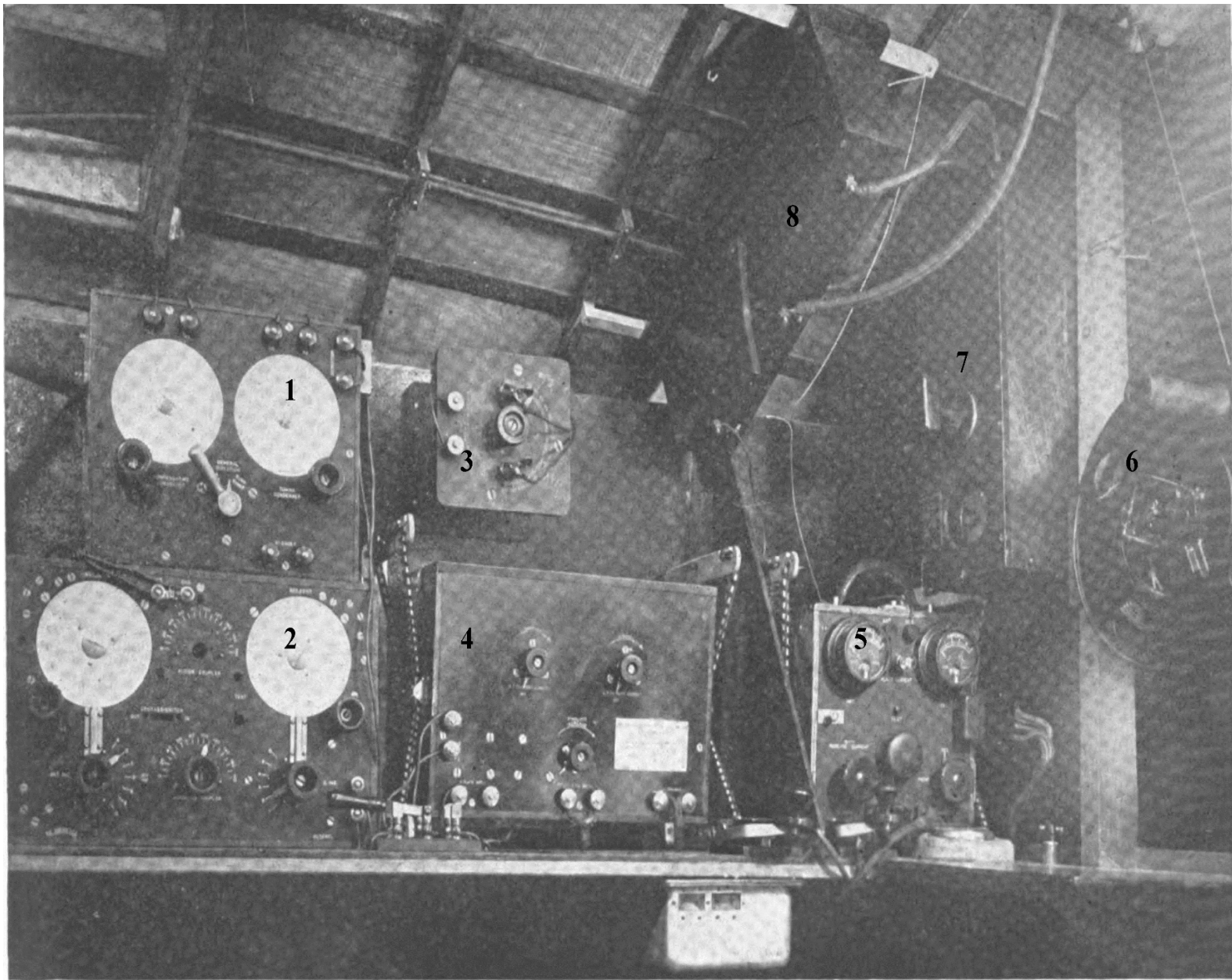


Identification of the Radio Equipment used on the NC-4 Plane

First trans-Atlantic Flight



The radio installation on the NC-3, the flagship of the NC squadron, showing the receiving set, radio compass, amplifier, radio telephone set, key and controls for the spark telegraph set, which is mounted on the wing

Fig.1

The initial article in the May 2016 TCA magazine on the flight of the NC-4 contained this picture, fig.1, of the radio equipment that held the vacuum tubes that made the first trans-Atlantic crossing possible. This author felt compelled to identify the devices used. They are numbered 1-8 as can be seen in the half-tone photo taken on the NC-3. It is, however, not known when the photo was taken, before or after the flight as they made many last minute changes just before the actual flight.

1. The device that is numbered 1 is the SE 1441-A radio compass controller. When the radio was used as an amplifier (number 4) in conjunction with the compass system, it was necessary to employ this device. The radio compass was used to determine the accuracy of the flight path with the US Navy ships below on the ocean surface. This was switched off when using the amplifier to communicate directly with those ships with the secondary tube transmitter or the primary wind driven spark gap transmitter. The pictures in figs. 2 and 3 are US Navy contemporary photos of the controller. The SE letters indicates it was a Navy design. It appears to have been made by the National Electrical Supply Co.

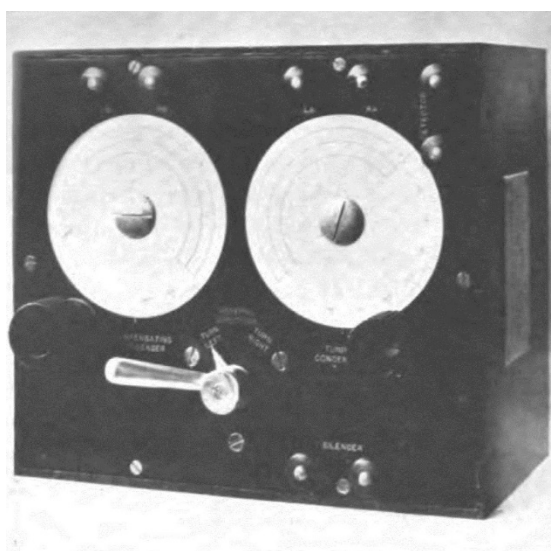


Fig. 2

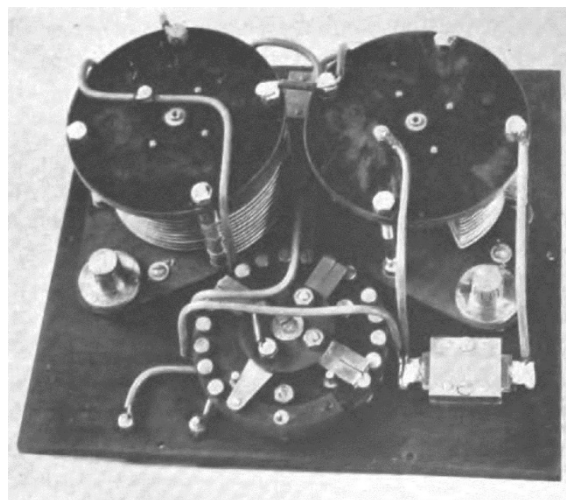


Fig. 3

2. Devise number 2 is the first standard radio the Navy made, the SE 950. The original layout of the SE 950 is shown in figs. 4 and 5. When the radio in fig. 4 is compared with the NC 4 picture it is obviously much larger. A special version of the SE 950 was made omitting the bottom half of the amplifying compass section of that radio and then installed on the NC-4. That section would have contained 3 Western Electric VT 1 tubes. The NC 4 radio designers concluded that they would use the top half of the 950, the tuning half alone and use the Moorhead SE 1444 tubes in another special section to amplify the signals. All the radio equipment used on the NC expedition was designed by the Radio Test Shop, Navy Yard, Washington, DC. The National Electrical Supply Co. made the original SE 950 from those Navy designs. The special version was probably altered by the Navy Radio Test Shop but this is just a guess by the author as it may have been done by the National Co.

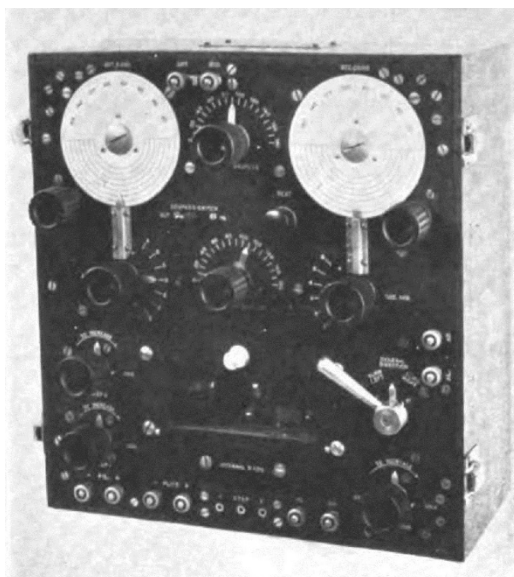


Fig. 4

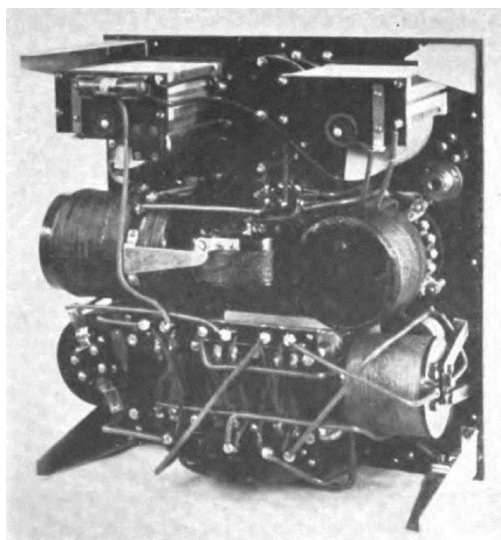


Fig. 5

3. The device that is numbered 3 is a bit of a mystery. No picture could be found but just a written description possibility but it appears to be a variable condenser probably used with the 6 stage amp (number 4). It is built like a General Electric product.

4. The number 4 device is a six stage amplifier used on the NC- 4 as both a radio compass amplifier and standard radio receiver-amplifier. The amp in the Navy photo in fig. 6 appears to be identical. Its circuits used three stages of RF amplification, one detector and 2 stages of AF amplification. All six tubes used in this amplifier were of the Moorhead SE 1444 type. When used as an amplifier as a compass it was known as the 1605-B unit and when used as a standard receiver amplifier it was known as the SE 1405-B. It was made by General Electric to the Navy Radio Test Shop specs. As can be seen in fig.6, the entire cabinet was suspended by an elastic cord system to prevent vibration.

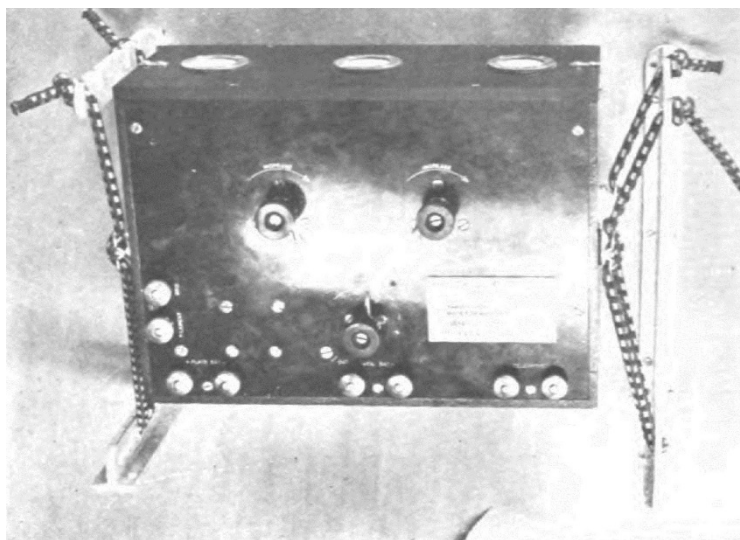


Fig. 6

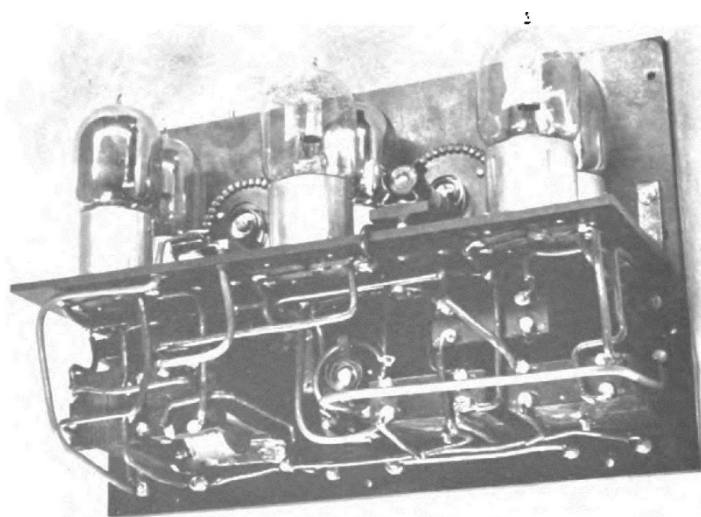


Fig. 7

5. The device numbered 5 presents another mystery. This set appears to be the CG 1104-A secondary transmitting set. The Navy picture in fig. 8 looks to be exactly the device numbered 5 in fig. 1. The vacuum tubes in the fig. 9 back view of this same transmitting set appear to be the Navy CG 1162 tubes. This is contrary to the General Electric claim that the CG 1144 transmitting tubes were used on the NC planes. It is possible that the photo in fig. 1 was taken before the flight and that a different unit was actually used, perhaps on all planes or only on the NC 4. A transmitter using CG 1144 tubes may have been placed on the NC planes just before the flight. Only this speculation explains the GE claim that CG 1144 tubes were used on the NC 4. In any case, the NC 3 removed the secondary transmitter, perhaps shown in fig. 8 because of weight. It also meant that the dynamo and the 2 12 volt wet cell batteries used to power that motor could be eliminated. This came back to haunt the NC 3 when it was forced to land on the water and without the wind to turn the blades on the primary spark gap the plane could only receive messages. It was a matter of luck that a ship spotted them and they were saved.



Fig. 8

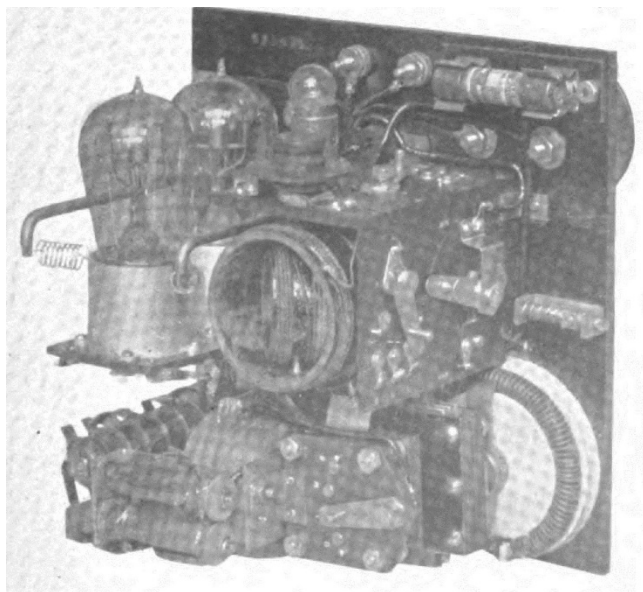


Fig. 9

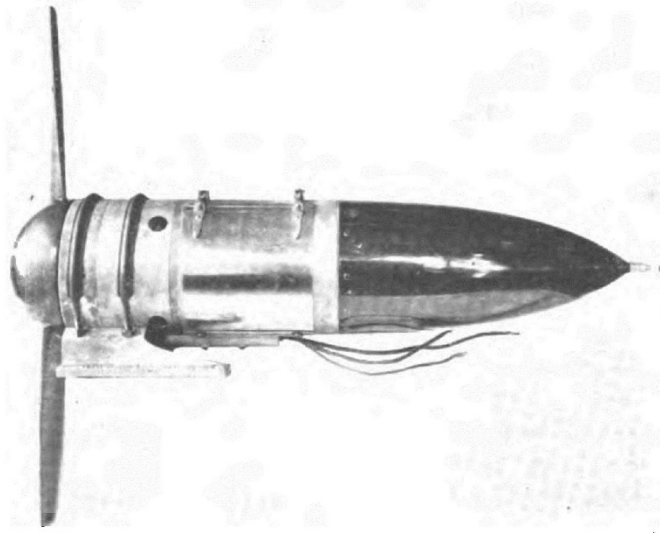


Fig. 11

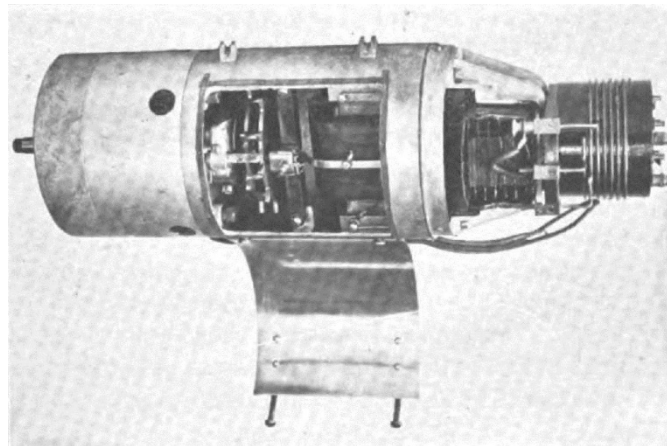


Fig 12

8. The device numbered 8 is the send-receive switch for the spark gap generator contained inside the wind driven generator shown in fig. 11 and 12. Two flame proof keys can barely be seen in the picture in fig. 1 between the amp and transmitter- the 4 and 5 devices. One or both of those probably contained an in use glowing lamp. One key was used for the spark gap and one for the vacuum tube transmitter. The pilot would have had one as well to communicate.

THE HEART OF THE WIRELESS ON THE NC 'PLANES



Also used on the Vickers Vimy
Trans-Atlantic Flight

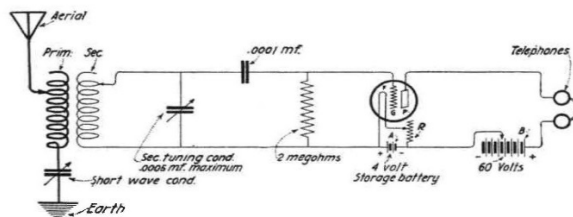
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Fig. 13

The ad in fig. 13 is from Radio Amateur News, August, 1919

Sources:

- Johnson, T, Jr, *Navel Aircraft Radio*. Expert Radio Aid, Navy Department, Washington, DC. Paper written for the IRE, 1920
- Kinney, E. M., *Radio Apparatus for Aircraft and Ground Stations*, Proceedings of the Engineers' Society of Western Pennsylvania, 1921.