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Hattie Meyers Junkin Papers - Writings: "What is This Thing Called Soaring", US Air Service , 1931-11

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Does Your Watch Keep Time Above the Clouds?

Aviation is conveying humankind into strata of temperatures with a rapidity never experienced before the airplane age. What is the effect of this on the timepieces of the pilot and his passengers? Temperature changes have a definite relation to the accuracy of a watch, and have always presented a distinct problem in watch designing.

Heat reduces the elasticity of the usual carbon steel hairspring (weakens it) while cold has the opposite effect. Were there no automatic compensating device in a watch, these ups and downs of temperature would cause a loss or gain of about seven seconds a day for a change of 1 [degree] Fahrenheit.

Watchmakers long ago realized this, but until 1766 no really adequate means had been devised to offset temperature effects on the hairspring. Automatic neutralization of the error at two extremes of temperature has been accomplished by using a balance wheel so constructed as to create an effect opposite to that brought about by the change in elasticity of the hairspring.

These effects are obtained by making the wheel rim of two metals with different coefficients of expansion—steel on the inside; brass on the outside. This bimetallic rim is cut at two places in its circumference—on opposite sides and near opposite ends of the balance arm, as the one full diameter "spoke" of the balance wheel is called. These cuts give two large rim sections with free ends. As brass expands or contracts more rapidly than steel, these free ends are forced inward toward the center when temperature rises; or outward when temperature falls. Thus the diameter of the balance wheel is reduced or enlarged and its rate of oscillation is maintained despite the decrease or increase of the elasticity of the hairspring. The changes in the diameter of the balance wheel counteract the respective effects of temperature variation on the hairspring.

This compensating balance wheel is now rendered unnecessary because an alloy called elinvar has lately been perfected for use in the hairspring of a watch. This and other nickel steel alloys won for their originator, Dr. Charles Edouard Guillaume, the Nobel Award in Physics, in 1920. For the past five years two American watch manufacturers have been carefully and exhaustively testing the use of elinvar in watch hairsprings and have recently placed them in railroad models of their standard watches.

As the elasticity of an elinvar hairspring is unaffected by temperature changes, it permits the use of a solid rim balance wheel of monometallic construction.

Elinvar cannot be permanently magnetized. This quality adds another radically important advantage to the use of elinvar in a watch hairspring. Watches equipped with elinvar hairsprings have solid rim, non-magnetic balance wheels and are safely worn around electrical apparatus.

They are immune to magnetization unless held right in an exceptionally strong magnetic field. Even in that case, an elinvar equipped watch resumes running as soon as withdrawn from a magnetic field of such strength as to permanently magnetize every steel part, and which put entirely out of commission watches with carbon steel hairsprings and bimetallic balance wheels.

These characteristics of elinvar have made possible the construction of a watch of more practical usefulness to those who work requires their being in the air.

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Industrial Notes

AT AN estimated saving of about a corner of a million dollars over leasing and shipping coals, the Navy has completed the task of buying 20 new Navy patrol planes from the Glenn L. Martin Company, Baltimore, Md., to the Fleet Air Base, Coco Solo, Panama.

The planes were flown to Coco Solo in six groups of three and four, the first section leaving late Hampton Roads, Va., August 29th, and the last group leaving Hampton Roads October 16th and arriving October 18th. The route followed was via Jacksonville and Key West, Fla., and Trinidad, B.W. Indies, a total distance of 2,500 miles. The new planes are attached to the U.S.S. Wright, aircraft tender and flagship of Aircraft, Scouting Force, and will operate from the Fleet Air Base, Coco Solo. Each plane, during the long

flight, carried two pilots, a radio man, and two mechanics. The flight operation was supervised by Lt. Col. V. H. Schaeffer.

At Glenn H. Curtis Airport, last month, a check for \$1,600 was presented to the American Red Cross, and another check for \$1,600 to the German Red Cross, representing the proceeds from the sale of tickets advertising the public to inspect the giant Douglas DCO-E. The presentation was made by J. S. Alford, president of the Currier-Wiegman Flying Service, to Edward B. Williams, executive director, who accepted the donation in behalf of the American Red Cross, to Dr. Paul Scherzer, German Consul, representing the German Red Cross, and Capt. Hans Neumann representing the DCO-E.

Observance throughout the United States, October 24th, of the twenty-fifth Anniversary of the first transcontinental telegraph service, which linked the isolated Golden West of frontier days with the East, enabled briefly the thrilling periods of American history typified by the Covered Wagon, the Pony Express, the Transcontinental Telegraph, the first Transcontinental Railroad and now the United Air Lines' coast-to-coast twenty-eight hour airplane service. The covered wagon has successfully borne the route chosen by such new forms of transcontinental communication and transportation.

Stanley E. Kraus, general traffic manager of United Air Lines, has just made a tour of practically the entire United system.

Industrial Notes

At an estimated saving of about a quarter of a million dollars over crating and shipping costs, the Navy has completed the task of ferrying 20 new Navy patrol planes from the Glenn L. Martin Company, Baltimore, Md., to the Fleet Air Base, Coco Solo, Panama. The planes were flown to Coco Solo in six groups of threes and fours, the first section having left Hampton Roads, Va., August 28th, and the last group leaving Hampton Roads October 6th and arriving October 10th. The route followed was via Jacksonville and Key West, Fla., and Trujillo, Honduras, a total distance of 2,300 miles. The new planes are attached to the U.S.S. Wright, aircraft tender and flagship of Aircraft, Scouting Force, and will operate from the Fleet Air Base, Coco Solo. Each plane, during the long flight, carried two pilots, a radioman, and two mechanics. The flight operation was supervised by Lieut V. H. Schaeffer.

At Glenn H. Curtiss Airport, last month, a check for \$3,600 was presented to the American Red Cross, and another check for \$3,600 to the German Red Cross, representing the proceeds from the sale of tickets admitting the public to inspect the giant Dornier DO-X. The presentation was made by J. S. Allard, president of the Curtiss-Wright Flying Service, to Edward B. Redman, executive director, who accepted the donation in behalf of the American Red Cross, to Dr. Paul Schwarz, German Consul, representing the German Red Cross, and Capt. Hans Neimann representing the DO-X. Observance throughout the United States, October 24th, of the Seventieth Anniversary of the first transcontinental telegraph service, which linked the isolated Golden West of frontier days with the East, recalled vividly the thrilling periods of American history typified by the Covered Wagon, the Pony Express, the Transcontinental Telegraph, the first Transcontinental Railroad and now United Air Lines' coast-to-coast twenty-eight hour airplane service. The central route has successively been the route chosen by each new form of transcontinental communication and transportation.

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