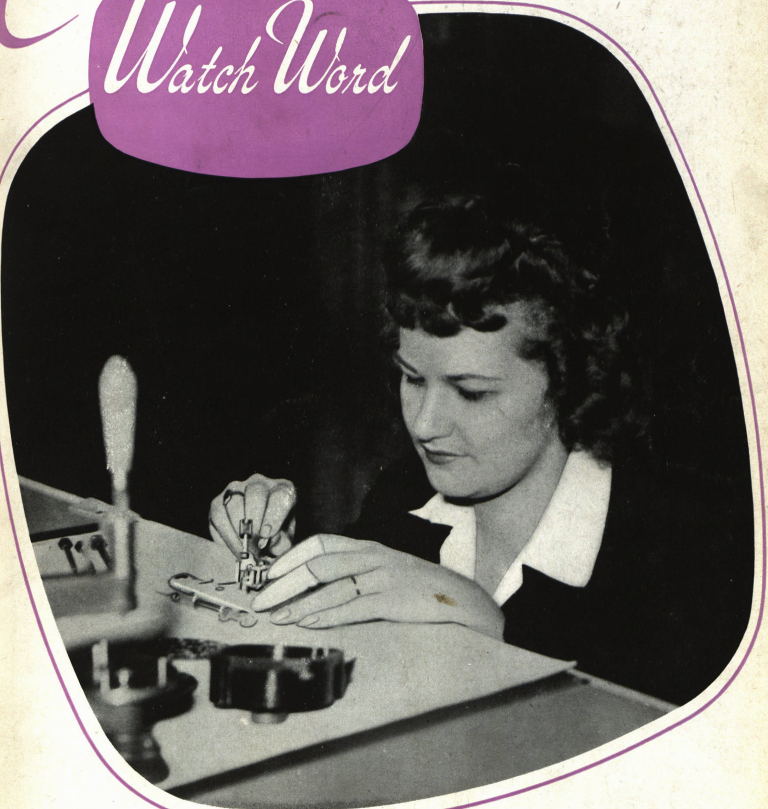
THE Watch Word



EDNA EGGERT ASSEMBLES
ELAPSED TIME CLOCK

(SEE STORY ON PAGE 3)

APRIL
1944

Five Clocks in One

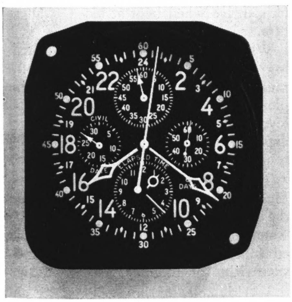
Herewith is a story which may be an indication of an important advance in American treatment of industrial problems. Two rival manufacturing firms, the Elgin National Watch Company, and the Hamilton Watch Company, by combining their resources of technical knowledge and skilled workers, and operating in direct conjunction with the United States Navy, have been able to put into production a needed implement of war, known as the Elapsed Time Clock.

By FRED BLAND

THE Elapsed Time Clock was undertaken at the request of the Navy Department, the Bureau of Aeronautics, to provide an American supply of this type of aircraft clock.

Prior to this time, Elapsed Time Clocks were being supplied the Navy Department through wholesalers receiving clocks of this type from Switzerland. As imports became more uncertain and the demands for this flight instrument increased, provision was made for American industry to take over.

Sitting at the drawing board is George Kirk, head of the Design and Engineering department. At his left pointing at an engineering drawing, is Fred Bland of the same department, author of the story on the Elapsed Time Clock. To Bland, Kirk and John Palm of the Finishing department credit for this story is due.



ELAPSED TIME CLOCK

The Elapsed Time Clock. The top small dial on the clock face is the stop watch minute totalizer. Looking counter clockwise the next small dial is the civil date indicator, by means of which pilot or navigator keeps track of the date. It records each 24 hours time interval. The small dial on the bottom of the face is the elapsed time recorder, which records the time elapsed from the beginning to the end of the flight. The fourth small dial is the continuous running second hand.

At the request of Commander Clyde W. Smith, head of the Instruments Branch, Bureau of Aeronautics, to President T. Albert Potter of the Elgin National Watch Company and to President Calvin M. Kendig of the Hamilton Watch Company, a conference was called on August 8, 1942 to discuss the possible pooling of resources, engineering, and production facilities involved in the manufacture of the Elapsed Time Clock. Two days later the engineering facilities of both concerns were cooperating in expediting the design of the Elapsed Time Clock (Spec. written May 1941). Several additions to the mechanism were made at the request of the Navy Department, as well as changes in the basic shape of clock case and dial, to bring these into conformity with standard Army-Navy aircraft instrument practice.

FIVE CLOCKS IN ONE

Basically, this clock is a standard 24-hour dial aircraft clock. Incorporated with this clock is a stop watch mechanism, operated by a control button, which will supply any interval of time, in seconds, up to an hour. Also incorporated with the clock is an elapsed time indicating mechanism, also operated by a control button, which will supply any interval of time, in minutes, up to 12 hours. Indication of the operation of

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Five Clocks in One for Fliers

(Continued from page 3)

the latter mechanism is given by a red dot showing through the dial.

The third mechanism incorporated in this clock is a civil date indicating mechanism which indicates the day of the month. Every 24 hours, at midnight, this mechanism automatically indexes to indicate the date. A reset button is provided to permit indexing manually, when necessary.

COOPERATE IN PRODUCTION

The actual manufacture of this complex unit was accomplished by the utmost cooperation between Elgin and Hamilton—this being the first time that two competing watch manufacturers combined their skill to produce vital aircraft timing devices needed by the Government. After the introductory conference, regular inter-plant conferences were held, both at Elgin and Hamilton, to solve the multitude of technicalities which arose. 245 of the parts going into this mechanism are manufactured by Elgin, and 153 of the parts are made by Hamilton—but both Elgin and Hamilton are assembling and finishing Elapsed Time Clocks. Therefore, to ensure perfect functioning of the clocks, both Elgin and Hamilton parts must be of the highest consistent quality—and both Elgin and Hamilton have an opportunity to inspect, test, assemble and finish each other's products. The manufacturing facilities of each were open to inspection by the other, as is the accounting of costs involved in production. All of this was essential to enable delivery of Elapsed Time Clocks to the armed forces in the shortest possible time.

The complexity of the Elapsed Time Clock can be envisioned in the fact that in a space of 3⅛ inches in diameter and 1½ inches deep are 398 separate parts—each part requiring the same skill and precision as is characteristic of fine watchmaking technique. The clock is read by means of five dials incorporated into one, while eight hands indicate the readings. In order to build the tools to make only their share of these parts, Elgin has expended over 60,000 man-hours in the Machine Division.

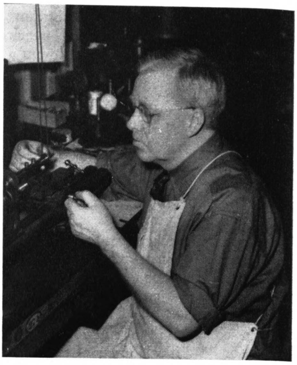
Elgin-produced parts used in the Elapsed Time Clock include all the plates and bridges, these being larger, in part, than plates ever before produced by Elgin. The case, made of durable shock-proof bakelite, is furnished by Elgin as well as the bezel, dial and a portion of the hands. The twin barrels, equipped with mainsprings over three feet in length, are Elgin products and offer a tremendous power reserve to carry the clock well beyond the eight-day specification requirements. Elapsed Time Clock accurate timing is assured by Elgin balance and escapement in which is incorporated the Elginite hair-spring, which assures precision time under all temperature conditions.

To conform to Army-Navy specifications, these Elapsed Time Clocks made by Elgin are put through heat and cold tests—from 32° below zero to 122° above zero Fahrenheit. The clocks are also subjected to a severe vibration of 3,000 vibrations per minute for at least 24 hours as well as being subjected to a magnetic field ten times as strong as the earth's magnetic field. And under all these conditions the Elgin Elapsed Time Clock must keep the same accurate and dependable time demanded of a high-grade watch.

ASSEMBLER
John Palm of the Finishing department instructs Edna Eggert in the method of assembling Elapsed Time Clock.

HOW THIS CLOCK HELPS OUR FLIERS

The Elgin Elapsed Time Clock is an integral unit of both the flight group of aircraft instruments and the navigation group. The elapsed time indicating mechanism is used to measure the time elapsed from the start of the flight; thus enabling the pilot to read directly the time that the plane has been in flight. This enables rapid calculation of distances covered and quantity of fuel reserves. The navigator, using this elapsed time indicating mechanism, can calculate the plane's position at any given moment by using the course traveled, the speed of the plane, and the time elapsed from the start of the flight, read directly from the Elapsed Time Clock.



MODEL MAKER
Sigurd Erickson, Elgin machinist and model builder of the Fine Tool job in the Machine department. Erickson is one of the craftsmen who spent many hours building models of the Elapsed Time Clock mechanism.

MODEL MAKER
Maurice Copely, Elgin machinist and model builder of the Fine Tool job in the Machine department. He too was employed in building models of the Elapsed Time Clock.

Use of the stop watch mechanism is made in checking the actual ground speed of the plane. Inaccurate estimation of wind velocity may cause errors in navigation; but the actual ground speed of the plane is supplied by starting the stop watch mechanism at a given check point and stopping it at another check point. Knowing the actual distance and the time elapsed, from his Elgin Elapsed Time Clock, the navigator can easily tell the plane's exact ground speed, consequently telling whether or not the estimated ground speed is being realized.

Time, like beauty, is relative and tricky, and varies in zones. Its computation is complicated by a somewhat irregular imaginary line, called the International Date Line, which extends across the Pacific ocean from North to South and separates the islands of the Pacific ocean so that those lying East of it carry the same date as the United States. Those West of it carry the same date as Japan and Australia.

When crossing the International Date Line a day must be either added or subtracted, depending on the direction of the traveller. Eastbound travellers add one day, westbound travellers drop one day.

The civil date indicating mechanism enters the scene here by keeping track of the days by an indexing system as they tick by in 24 hour intervals, regardless of which side of the International Date Line they are on, thereby giving pilots and navigators a mechanical method of coordinating their missions and of keeping track of the correct date.

Thus in a little over a year, the Elapsed Time Clock was engineered, tools were designed and built to make the 398 necessary parts, the timing requirements of rigorous Army-Navy specifications were met, and today these Elgin Elapsed Time Clocks are being delivered to the Army and Navy Air Forces.

Make Suggestions, They Pay Off

WORKERS have suggested ideas for increasing production that have yielded impressive results, according to a report by the Office of War Information.

In the last six months the volume of usable ideas in factory suggestion boxes has tripled, OWI said.

A great deal of the value of employee suggestion comes from the fact that war has diverted to factory employment thousands of workers without previous experience in things mechanical, electrical or chemical. Intelligent workers of this type, according to the War Production Board, are not held back in their ideas for improvement by any fixed notions about "impossibility."

MAIN PLANT

Casing Department

George E. Satske—Increase life of wooden block used for opening waterproof cases by making double opening for stem .... $ 3.00

Finishing Department

Geo. W. Nelson—(Reconsideration) Leading to action: Re: Balance staking punches 5.00

Gilding Department

Robert Sterricker—New type verifying boards 4.00

Inga Jensen—Leading to action 3.00

Machine Department

George Bolliger—Attachment to gear box of rubbing machine to prevent vibration 10.00

Plate Department

Claude Minkler—Shaft bearing support for Planner Machine 10.00

James Dillow—Leading to action 3.00

Esther Steiner—Leading to action 3.00

Power Department

Herman G. Hacker—Improved drain arrangement to steam compressor 10.00

Spring Department

Albert Weichert—Improved method of turning 8/0 and 21/0 balances 35.00

Train Department

Ira Orton—Improved guard for semi-auto counter sinking and drilling machine 20.00

Frank Knaak—Tumbling of center pinions to remove burr from staking shoulder and all pinions to assist in removing teeth cutting burr 20.00

Donald Bailey—Reduce cost of facing operation by use of spring on spindle 10.00

PLANT TWO

Automatics

E. Schroeder—Suggest a new style screw for Acme-Gridley Chuck Jaws $25.00

Final Assembly

Virginia Fillmore — Improvement on bench clamp for fuze 10.00

Sub-Assembly

C. Saint—Hardened Standard for setting up Cam polisher 20.00

Plate

V. E. Stevens—Suggest Cotter Pin to replace bolts on Solenoid switch on Bodine 5.00

E. A. Krumfus—Air attachment for Productomatic Machine 5.00

SAPPHIRE PRODUCTS

Acedize Department

Florence Bauman—Change in acidizing 10.00

Drilling Department

Donald Lange—Change design of cam on drilling 35.00

Inspection Department

Marlen Benter—Change design of gage table 35.00

Opening Department

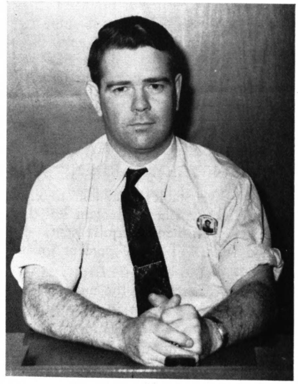
Henry Young—Pan for Wax .... $ 7.50

Don Walbaum—Countersink before polish hole 20.00

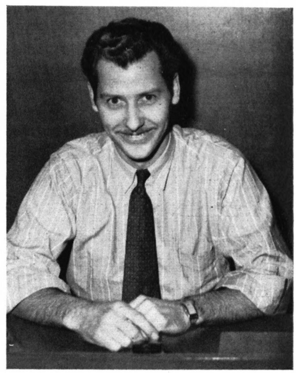
Production Department

Albert Swan — Chute for removing jewels 5.00

Promote Spring Department Men



William Dibb has been appointed jobmaster of the balance job in the Spring department. He has been an Elgin employee since 1941, except for a four months military leave of absence last year.



Keith Perry has been appointed roving jobmaster in the Spring department. Perry came to work with the Elgin National Watch Company in 1934, starting in the Plate department. He transferred to Research in 1936 and in 1937 was chief inspector, Material Inspection department. In 1942 he entered the Army Air Corps where he accumulated more than 300 hours flying time while undergoing flight instructor training. He was a Civil Air Patrol pilot before entering the service and was president of the Elgin Flying Club.