This Day in History… February 5, 1935

The Electric-Eye Perforator

On February 5, 1935, the US Post Office delivered its first stamps produced using the new electric-eye perforator. This new machine helped ensure better centering of stamps and resulted in a dramatic decrease in waste.

Prior to this, stamps were finished with the two-way perforator, which required a person to keep the web of printed paper in position as it was perforated. Human error and fatigue could lead to poor perforating and significant waste – up to 35%!

In 1930, mechanical expert Henry Holtzclaw consulted with B.K. Ford of the Western Electric Company. Ford was described as "the recognized expert on electric-eye control of mechanical devices" and suggested photoelectric cells be used to perforate US stamps. General Electric had been using photoelectric cells for similar purposes and provided theirs to the Bureau for testing.

The perforations produced with the electric eye machine were the same as previous stamps and the gauges were the same. However, the plates used to print the stamps were changed. They now had thick dashes that were 3/8 of an inch long and ¼ of an inch apart, which the Bureau referred to as "register marks." The machine's "electric eye" scanned these dashes, and the machine used a series of gears and motors to move the paper forward, backward, left, or right, to ensure near perfect centering.

The first electric eye perforator had three photoelectric cells to monitor these markings. Two cells were positioned to monitor the vertical dashes in the center gutter. A third photoelectric cell was positioned over the single horizontal mark "guide dash" that was printed in the right margin between the upper and lower panes. This cell was used to ensure the proper alignment of the pairs of pins that created the horizontal perforations. It also set the speed with which the web of paper traveled through the perforator. It was because of the location of this cell and its corresponding mark that the stamp plate numbers were moved from their usual positions to the ends of the third row of stamps from the top or bottom of the sheet.

Initially, fake stamps were created to test the new perforator. In the fall of 1933, the Post Office produced its first actual stamps with the machine. The 2¢ stamps, with plates numbered 21149 and 21150 were certified on October 13, 1933. The test was considered a success and the director of the Bureau of Engraving and Printing wrote to the Post Office Department saying, "The results of the test have proven satisfactory, and in order that further experiments may be carried on, it is necessary to place one perforating machine in actual production in order to demonstrate the feasibility of equipping all our machines in this manner."

Plate block of 10 2¢ Washington stamps from one of the first runs of the electric eye perforator.

The Post Office agreed, and the stamps were produced. They wanted to prevent these stamps from becoming rarities, in case the markings were changed or discontinued, so 9,518,000 stamps were produced. The Post Office held off on releasing the stamps until February 5, 1935, when they arrived at 62 post offices across the country.

The Bureau found that the horizontal line was too thick, and the ink didn't dry quick enough. So, two plates were created with a thinner bar that dried quicker (plates 21367 and 21368). These plates also saw a change in the vertical dashes – they weren't spaced as equally as they had been on the earlier set of plates. Another new plate was made in which the horizontal guide line was made thinner, and the vertical dashes were more uniform in size and spacing. These plates are classified into three different types. The first set of plates produced in 1933 are Type Ia, the second set are Type Ib and the third set Type I, which became the standard.

A new electric eye perforator, known as the pilot model, was introduced in late 1937. This new machine controlled all the vertical perforations and allowed for more precise horizontal control. As a result, the single horizontal line in the center was replaced with 19 horizontal dashes in the right margin. Another new machine came in 1939, which moved the horizontal line to the left sheet margin. Additional horizontal lines, known as frame bars, were added in the left sheet margin. With this change, the plate numbers were moved back to their normal positions next to the corner stamps.

The electric eye could perforate 50,000 to 60,000 sheets a day with only 3% waste. The Bureau of Engraving and Printing tested a variety of combinations of markings before settling on a standard early in the run of the Presidential Series of 1938. After that, the electric eye perforated almost all US stamps into the late 1950s. Electric eyes were also used for decades after that, but the USPS also found new ways to ensure good centering.

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