

Beginner's Corner

Reduction Lathe Errors

By **John A. Wexler**, NLG

In the first two installments of this column we explained the manner in which the Mint produces the dies that are used to strike U.S. coinage. The first installment provided a general overview of the die making process. In the second, we explored the 19th Century die making process more closely and looked at some of the things that could go wrong in that process. It is when things go wrong in the die making process that we end up with the varieties we love to collect. The focus last time was on punching errors. These are errors that occur as the final design elements are added to the dies. This time I would like to examine one of the very first things that could go wrong in the process.

As we already noted, the Mint first began using reduction lathes in 1836 when they introduced the French Portrait Lathe. In 1867, a new reduction lathe known as the Hill Reduction Lathe was introduced. Finally, in 1907 the Mint introduced the Janvier Reduction Lathe. They still use these today.

The purpose of these lathes was to transfer the design from a twelve to fifteen inch model known as a galvano to the face of a steel rod which would become the master hub. The face of the master hub is the same size as the coins which would be produced.

In the earliest years only the central design was on the galvano. Later, the lettering and other design elements around the rim were added. At the time of the introduction of the Janvier Reduction Lathe, the Mint started to include the first two digits of the date on the galvano. The reason that only the first two digits were placed on the galvano was to allow the master hub produced from that galvano to be used over a period of several years to produce master dies for that year. The master die then had the final two digits punched or engraved into it.

As already explained, this master die would then be used to produce hundreds (perhaps thousands) of working hubs. Each working hub would then produce hundreds

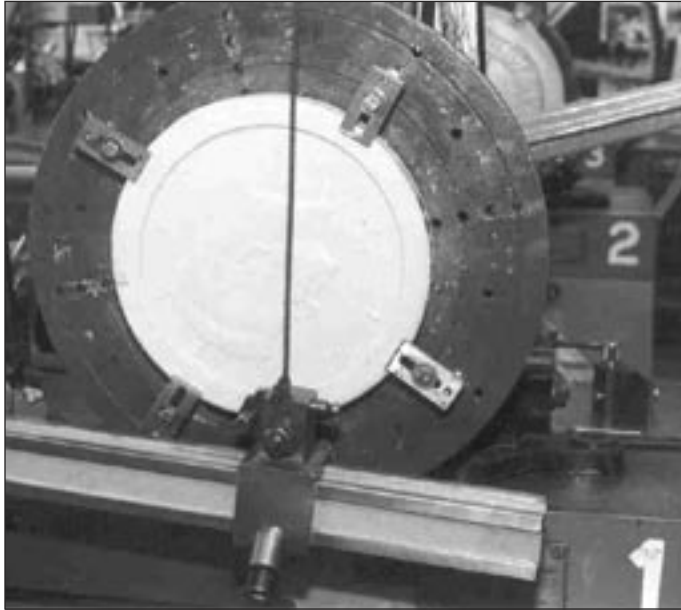
or thousands of working dies and the working dies would be installed into the coining presses to strike the coins.

Since the first step in the production of the master hub was the transfer of the design from the galvano to the master hub, this would be the first place that a mechanical error could occur.

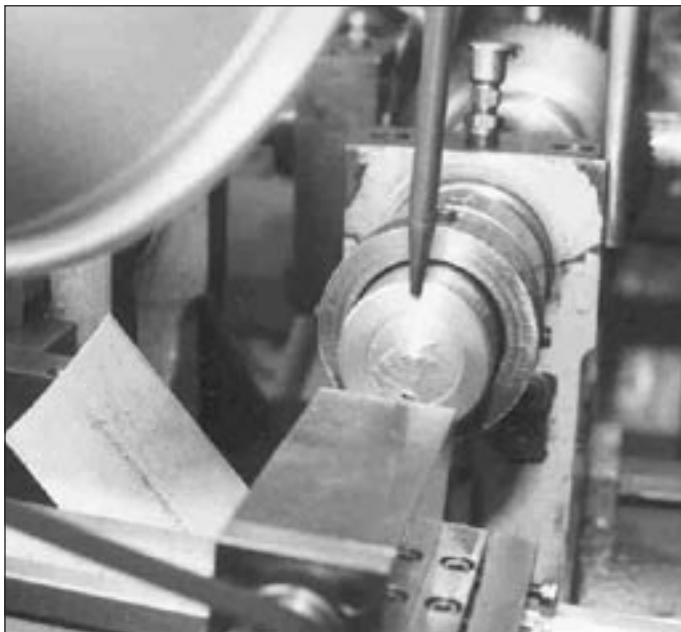


This photo shows several Janvier Reduction Lathes in use at the Philadelphia Mint. This photo was taken during a tour of the Mint that we were a part of in June of 1998. These lathes are used to transfer the design from a twelve to fifteen inch galvano onto the face of a steel bar that will become the Master Hub.

The reduction lathes are pantographs with two arms. One arm will trace out the design on the galvano while the other arm carves that image into the face of the steel rod that will become the master hub. It is a very slow and tedious process. To complete a single master hub it can take anywhere from a day and a half to two days.



This photo shows a galvano for the Kennedy half dollar. The device at the bottom of the galvano is tracing the image on the galvano.



Here we see the Master Hub for the Kennedy half dollar. It is in the same Janvier Reduction Lathe as the galvano in the previous photo. If you look closely, you can see the exact same orientation of the Kennedy profile. The device near the bottom is carving the part of the design being traced in the previous photo.

Here then is where that first error that we alluded to can occur. As the design on the galvano is being traced or as it is being carved onto the master hub, one of the arms may slip slightly and change orientation. Since the design is retraced numerous times, the area in which the arm slipped will have the same design carved into two slightly different locations. The result is a doubled image.

Keep in mind that this doubling is going to appear on the master hub. This master hub will produce a master die for a given year. That master die will produce all of the working hubs that in turn will then produce all of the working dies for that year. This means that all working dies for that year will have that same doubled image and consequently so will all of the coins of that denomination for that year.

But it gets worse. Remember, the master hub is used over a period of several years. This means not only will the doubled image appear on all coins of that denomination produced that year, it will be found on all coins of that denomination for all the years that the offending master hub is used to produce master dies. This identical doubling which spans multiple years is known as “series doubling” by some in the hobby.

One such doubled master hub was used to produce Lincoln cent hubs and dies for a period of several years from the early nineteen thirties into the nineteen fifties. The doubling can be clearly seen on Lincoln’s forehead and also as an extra fold of hair in the hair just above the forehead.



In this photo, we can see the extra lock of hair at the top of Lincoln’s head just above the front of his forehead.



This photo shows the reduction lathe doubling found on Lincoln's forehead on cents dating from the early thirties into the fifties. This doubling adds no extra value to the coins since it is far too common.

We frequently get reports from collectors new to the variety hobby that they have found Lincoln cents with this doubling. They want to know what their discoveries are worth. It is always difficult to tell them that their doubled coins have no extra value.

If you have a Washington quarter collection, take a look at the leaves, the lower left branch, and some of the letters of QUARTER on the reverse of your quarters dated from 1967 through 1974. The reverses of these quarters exhibit doubling in the lower left part of the reverse throughout all of these years. The culprit once again was reduction lathe doubling. Here also, as with the Lincoln cent already mentioned, there is no extra value for this doubling even though on early die state specimens throughout these years the doubling shows quite well.

Numerous other examples of reduction lathe doubling do exist for the modern coinage but these should serve to let you know what they look like and how they are produced.