

Replacing a Keywind Case Pusher

By Dave Coatsworth

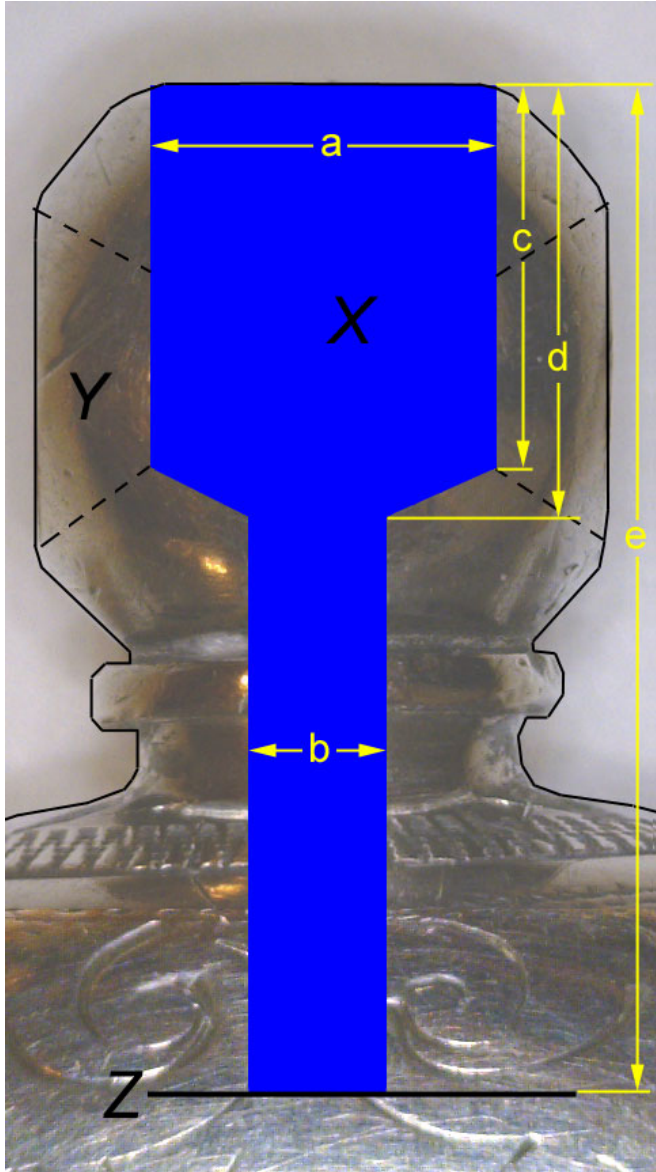
Occasionally a collector of keywind watches will come across an empty hunting case that is an exceptional case in all respects except that it might be missing some or all of its 'hardware'. By 'hardware', I am referring to the bow, pusher (sometimes also referred to as the 'plunger'), and case springs. Replacing the bow is a rather straight-forward task, provided a suitable replacement is available. The replacement of case springs merits its own article. In this article, we will cover the replacement of the pusher. For a keywind hunting case, the pusher is simply the button on top of the pendant that is pushed to release the front cover. Sounds fairly simple, right? But like many things in early American horology, the lack of standardization can complicate the task. The photo below illustrates this point. Note that, while the silver button is almost the same size on all of these pushers, the brass part that extends into the case varies considerably.



Recently I acquired a five ounce coin silver hunting case (pictured below) that was in very good condition except for the fact that it was missing its pusher. We will use this case as an example in illustrating the pusher replacement process.

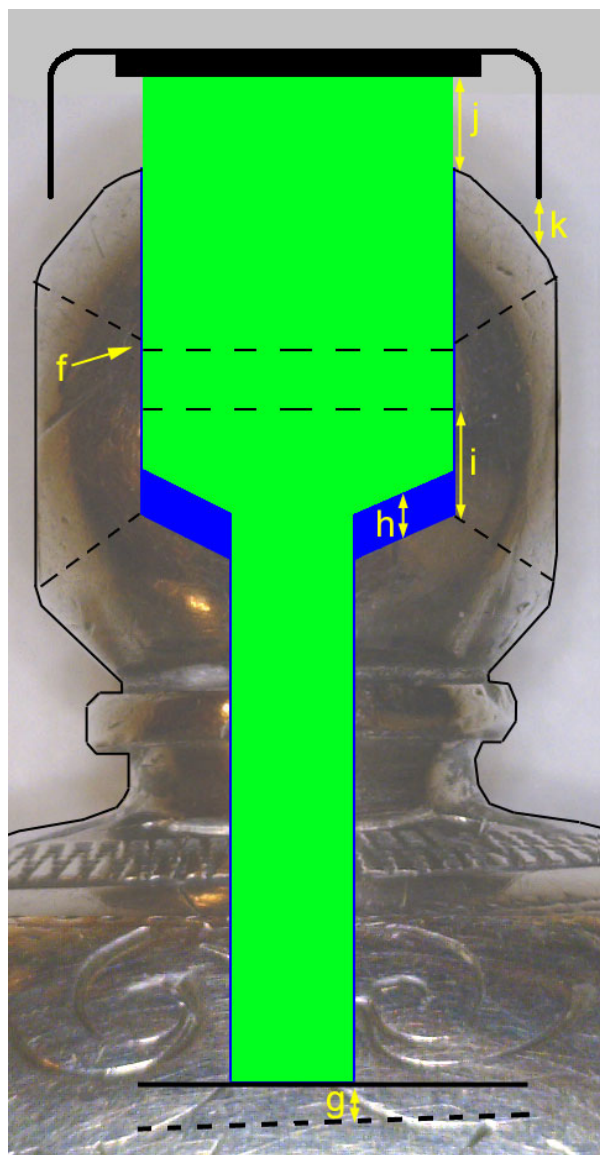


First, let's take a look down inside the pendant. What we see resembles a funnel. There is a wide milled out area at the top, which then tapers to a narrower milled hole. This smaller hole goes all the way through the pendant and into the case. The latch end of the front cover's latch spring sits directly under this hole so that it can be moved down, thus releasing the front cover, when the pusher is pushed. In addition to these vertical milled areas there are cone-shaped holes milled in the side of the pendant where the bow fits.



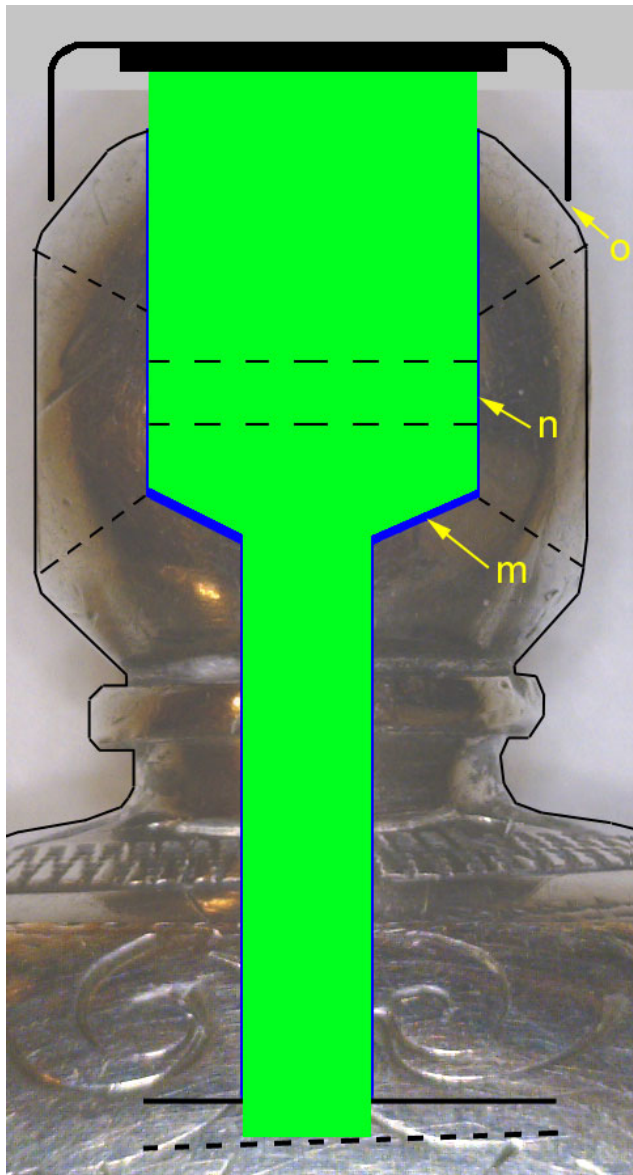
The photo above shows a cutaway view of the pendant in the sample case. Our first task in fitting a new pusher is to determine the measurements of the milled areas so we can find a pusher that is a close match. The blue area (labeled 'X') is the vertical milled area. The area labeled 'Y' is the area milled out for the bow. The line labeled 'Z' is the point where the milled hole enters the case body and the surface against which the latch spring rests. There are 5 measurements that we are interested in when finding a pusher that will fit. 'e' is the overall length of the hole. If we add the height of the button that sits above the pendant to this length, we have the minimum height of any pushers that can be considered for this job. 'a' and 'b' are the diameters of the upper and lower holes. 'c' is the depth of the upper hole to the point where the taper begins and 'd' is the depth to the start of the smaller hole. In some cases, this taper may be almost non-existent. In others, it will be curved. The shape of this taper may be relevant later when shaping the pusher shaft.

First let's measure the depth 'e' and the diameter 'b'. One easy way to do this is to get out your drill index and find the drill that just fits the hole. This will give you the diameter 'b'. If the latch spring 'Z' is in place, the distance the drill drops into the hole is 'e'. You can, of course, also use a depth gauge to measure 'e' as long as the probe on your depth gauge is smaller than the diameter 'b'. Next measure 'a', 'c', and 'd'. In most cases, these measurements can be taken with a digital caliper - 'a' using the inside diameter points and the other two using the depth probe.

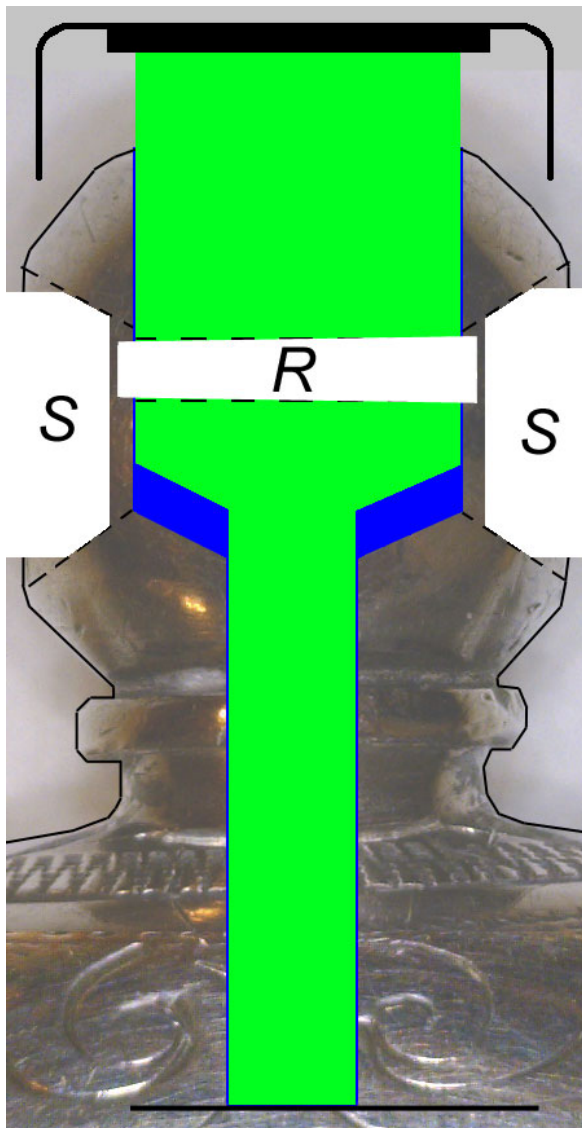


In selecting a pusher, we need to be aware of how the pusher will fit into the pendant. This is illustrated in the photo above with the green area representing an ideal pusher. In this picture, 'g' represents the distance that the latch spring must be deflected in order to release the cover. There are several areas where the pusher may 'bottom out'. We need to make sure all of these areas are greater than 'g' so that the pusher does not stop before the front cover is released. These areas are represented by 'h', 'k' and

'j'. However, we would ideally like to have the pusher bottom out along 'h' fairly soon after the cover is released so that the latch spring is not deflected too far. Therefore, 'h' should only be slightly larger than 'g'. 'k' and 'j' should be greater than 'h' as we really don't want the cap to be what stops the travel of the pusher. If 'k' is the stopping point, a groove will gradually develop around the pendant at this point since the coin silver is relatively soft. If 'j' is the stopping point, the top of the pendant will gradually 'mushroom', which will push the soft silver inward, pinching the pusher. In addition, there may already be a hole through the larger part of the pusher. If there is, this hole should be visible through the bow holes when the pusher is in both the up and the down positions. (If a pusher is available that is perfect in all respects except for the location of this hole, a new hole can always be drilled at 90 degrees from the existing hole.) The next photo shows the pusher in the 'down' position. Note that the pusher has bottomed out at 'm'. The cap is not touching the pendant at 'o' and the hole through the pusher ('n') is still fully visible through the bow holes.



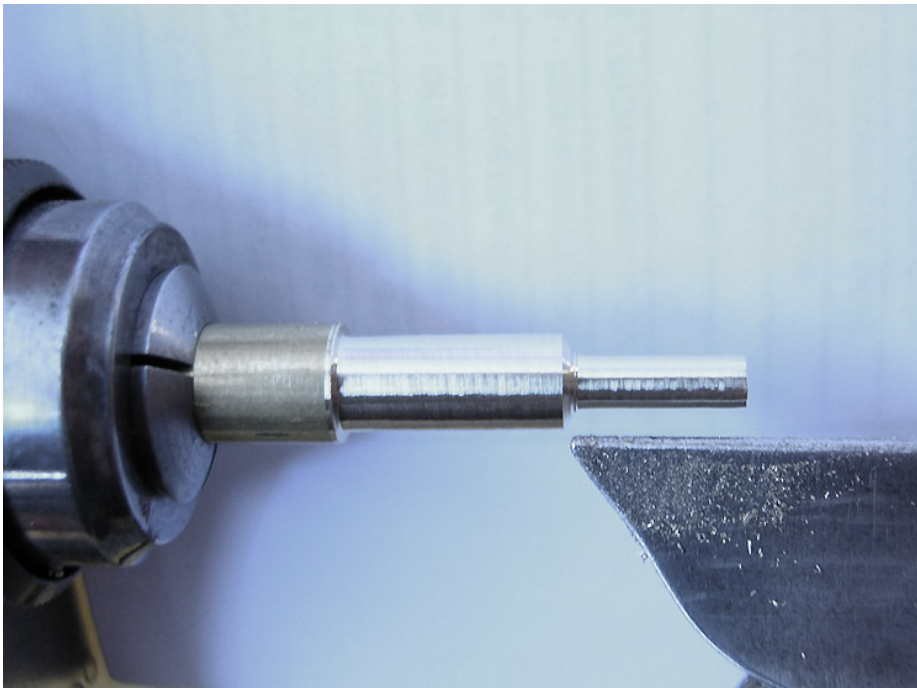
The next photo shows how the pusher is mounted and retained in the case. A taper pin is pushed through the hole in the pusher. This is 'R' in the photo. The pin must be longer than the diameter 'a' in the first photo to prevent the pusher from falling out. Its length must be trimmed, however, so that the pin will not touch the ends of the bow (represented as 'S') when the pusher moves up and down. In addition, when the pusher is in the 'up' position, we would like the pin to rest as close to the top of the bow holes as possible. Having excessive distance here will cause the pusher to feel loose in the vertical direction.



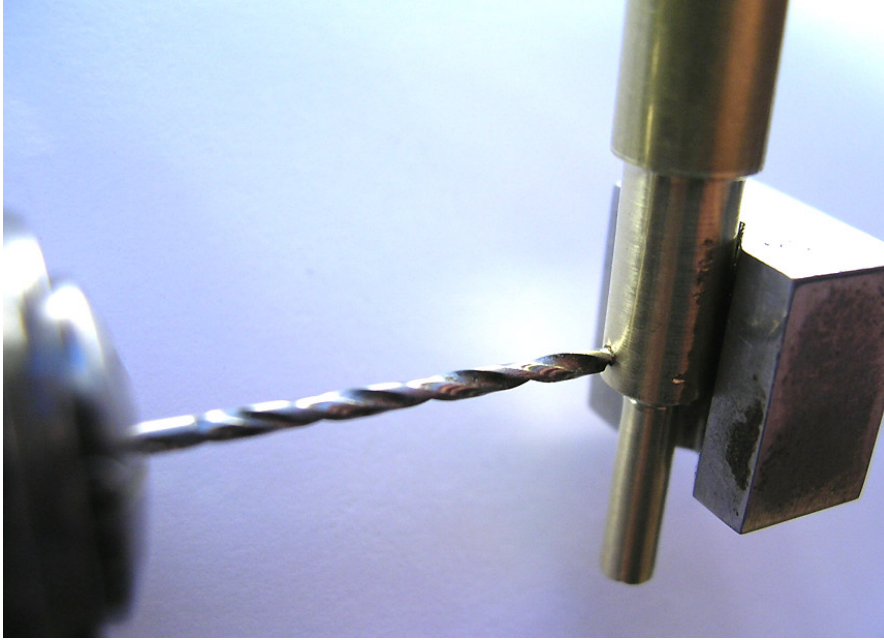
Now that we have an understanding of the technical details, let's turn to the practical issue of installing a pusher in this coin silver case.

In looking through my collection of pushers, I find several that have an appropriately shaped and sized cap, but none of these have a correct shaft. This is not an insurmountable problem as we can easily use the lathe to make a new shaft. I used the following procedure.

1. Select a pusher that has an appropriate cap for the case. Unsolder the cap from the shaft.
2. Select a piece of brass stock that is larger than the greatest width of the pusher ('a' in the photos above). Cut off a piece that is about 15mm longer than the length of the pusher ('e' in the photos above). Chuck this in your lathe so that just the last 10mm, or so, is exposed.
3. Move your graver rest over to the end of the piece and square it off nicely.
4. Now extend the piece out of the collet until about 5mm more than the overall length (length 'a') is exposed.
5. Turn the diameter of the exposed portion down to slightly less than diameter 'a'. (Not too much less as you don't want the pusher to wobble. You do, however, want it to move up and down in the pendant easily.)
6. Next, starting from the end, cut the diameter down to the smaller diameter ('b' in the photos above). The length you cut should be equal to 'e' minus 'd'.
7. With the two diameters cut, shape the transition between the two, assuming there is an angled or rounded transition in the pendant.



8. Remove the work piece from the lathe. Test fit it in the pendant. Make sure the pusher is bottoming out at 'm' just after the lid is released.
9. With the work piece in the pendant, mark the desired location of the cross hole through the bow holes. We want the cross hole to be near the top of the mark you made so that the pin will be at the top of the bow hole when the button is not pressed. (See 'R' in the photos above for the appropriate placement and diameter of the pin.) Center punch one side for drilling.



10. Select an appropriate drill bit. It should be about $\frac{1}{3}$ the diameter of the bow hole. You can adjust this slightly to match the taper pin that you happen to have. Then drill the cross hole. Note that we have not yet parted off the top of the pusher to provide something to hold on to while drilling. Now we will re-chuck the piece in the lathe and part the excess material from the top. You might want to leave this slightly long at first and adjust down for a perfect fit later.
11. Test the action of the pusher with the cap held on. Make sure the case opens properly and that the pusher is bottoming out where it should just after the case lid opens. Make sure the cap is as close to the pendant as possible without actually touching it. If there is too much of a gap, remove a little bit of material from the top of the shaft and try again.
12. Cut your taper pin to length. It should be just longer than diameter 'a'. Test fit it to make sure it extends equally out each end of the hole.



13. Solder the cap onto the new shaft. A 'third hand' comes in very handy here.
14. Place the pusher into the pendant and install the pin. Make sure the action of the pusher is still correct and re-install the bow.

