SCOPE-TRU™ ALIGNMENT BAR

US Patent # 8745914

"A BRIEF HISTORY"

In years past, I began to think about a better way to more easily install "***dovetail front/windage rear***" style rings; and, "***dovetail front/dovetail rear***" style rings.

During the late summer of 1997, I realized that the problem was, "***trying to get the rings into their bases in such a manner so that they were in alignment with each other, while at the same time being in nearly perfect parallel alignment with the axis of the bore***." What I wanted to achieve, was to *turn the front rotary dovetail ring into its base and ensure that the back surface of the ring was at 90 degrees to the bore line*. At this time, I found that I could do this by using an ordinary rafter square. Typically, I would use the distance of 3 inches from the edge of the square to the center of the ring. I would place the shorter leg of the square tightly in contact with the rear of the front ring—making certain that the center of the ring was at the 3 inch mark on the square. I would then subsequently measure the distance from the edge of the longer leg of the square to the center of the barrel immediately ahead of the receiver, and again take another measurement out near the end of the barrel. When I could get both numbers to be equal—that is, to be 3 inches at both the barrel immediately ahead of the receiver, and also out near the muzzle—I felt the rear of the ring was at 90 degrees to the bore, and subsequently, the hole within the ring was in a parallel line with the bore.

I would then install the rear ring using the windage screws, by visually centering it as much as possible, and then advancing the left windage screw a half turn, and then the right, and repeating this until both screws were tight, and hopefully, the ring would be nicely centered . The goal was to get the rear ring "centered" so that if one could project an imaginary line through the center of both rings, it would be parallel with the axis of the bore—of course this is wisely assuming that one did not want to utilize the utilitarian windage feature of this mount—but

rather—get everything properly centered, thereby keeping the windage adjustment of the scope turret as near as possible to "mechanical center."

If the rear base/rear ring/and windage screw combination was machined well, and the combination was such that the rear edge of the rear ring was indeed at 90 degrees to the axis of the bore, *how then could one tell if the imaginary line through the center of both rings was indeed in parallel alignment with the bore?* The rear side of the rear ring could indeed be at 90 degrees to the axis of the bore, but at the same time it could also be *out of center alignment* with the front ring—that is, it could be squared, but yet it could be shifted laterally, either left or right, from the front ring axis and bore axis.

To ensure good alignment, I would once again employ the use of the rafter square. I would place the short leg of the square against the rear surface of the rear ring—hoping that the longer leg of the square was touching the left edges of both the front and rear ring flanges at the same time—but typically I found that this was not the case. The left edge of the front ring flange was my constant, so the goal now became one of "*getting the left edge of the rear ring flange into line with the left edge of the front ring flange*." For example: if the left edge of the front ring flange touched the square, and the left edge of the rear ring flange was, say 1/32 inch too far to the right, leaving a 1/32 inch gap between the edge of the square and the left edge of the rear ring flange, I would loosen the left windage screw, and then advance the right windage screw until the left edge of the rear ring flange touched the square. Conversely, if there was a 1/32 inch gap between the left edge of the front ring flange and the square, I would reverse the procedure with the windage screws to bring about an acceptable alignment. A crude method, but it worked far better than anything I had ever tried before, and produced satisfying results. I found that ***this method would "square" both the front and the rear rings at 90 degrees to the receiver axis***, and that by utilizing a somewhat distant point—in this case the center of the barrel out near the muzzle—the end result was essentially that "***both the front and rear rings were now aligned on the same axis—and that very axis was now in nearly perfect parallel alignment with the axis of the bore***."

In mounting "***dovetail front/dovetail rear***" style rings, it was twice the work to mount the **two** rotary dovetail rings, as opposed to the old "regular" mounting system of **one** rotary dovetail ring in the front, and one windage adjustable ring in the rear—and, unlike these "regular" rings, there is no way to *laterally move the rear rotary dovetail ring to bring about some kind of true alignment*. One can however, turn one of the rings around 180 degrees. Or in some situations, one could move the front ring to the rear, and the rear ring to the front, in the hope of possibly bringing about better alignment. Beyond all this, in mounting the "*twin dovetail*" system, one is usually at the mercy of the position of exactly where the base screw holes in the receiver were initially drilled, and how all of the particular parts were initially machined.

Despite this potential "weakness" in "*twin dovetail*" rings and bases, I still preferred them over the regular "*dovetail front/ windage rear*" style mounting systems, as they had much cleaner lines, and they offered much more strength—especially if mounted on heavier recoiling rifles. In addition to this, *I had never used the windage feature of the "regular" style ring system any way, beyond employing the windage feature for the initial mounting of the base/ring/scope combination*. With this in mind, I had always feared that there was a potential for the windage screws to "shoot loose" under recoil, and subsequently affect the zero of the rifle. Although this problem had never happened to me, the potential was always there, and did cause some concern in my mind. Given this, I began to prefer the "*twin dovetail*" style ring system—admiring the cleaner lines, and respecting their much more robust strength, and stability.

Making the switch to "***dovetail front/dovetail rear***" style rings, and thus mounting them much more often***, it became clear to me that my system used to square not <u>one</u>, but <u>two</u> rings to the bore axis, was indeed going to take <u>twice</u> as long***. After mounting several ring and base combinations on numerous different rifles, I eventually came up with an idea to facilitate the process, as I envisioned a tool "*in my mind's eye*."

Concept design: what I wanted to achieve, was to "***bring the edge of the longer side of the square over to the right 3 inches—right into the center of the rings***."

To do so, I knew I would need a <u>continuous, one-piece bar</u>. With the longer end of the square no longer being present out near the end of the barrel, I would now have to utilize the concept of "***the 3-4-5 formula***." The purpose in doing so was because I knew that I would need a ***distant reference point somewhere out near the end of the barrel***. I would also need a way to *get the one-piece bar* ***centered*** *on that distant reference point out there on the muzzle end of the barrel*. In my mind, ***the solution was a one-piece rod that would "point exactly to the center line of the barrel" at a distant reference point out towards the muzzle. At the same time, both rings would ultimately "hold fast to the bar." Finally, it would offer a rear center pointer for the rear of the action tang, or the bolt plug*****, thereby gaining the advantage of an additional reference point.**

Therefore, the tool I designed in my mind's eye would likely speed up the process considerably, and eliminate the bother of the rafter square entirely, while at the same time achieving the very same functions. If the tool would work as I imagined, I felt it could reduce the time needed to accurately align the rings by about 75%. During this time when the idea began to solidify in my mind, I mounted a few more rings into their bases, and each time I did so, I would vow to myself, "to get that tool made."

Eventually, I decided to build the tool. *I spent several hours measuring numerous rifle barrel/receiver lengths, wanting the* ***overall length of the tool to be such that it would also work with shorter carbine rifles***, such as the Remington model 600 Mohawk, or the Ruger 10/22. With that in mind, I drew up the initial drawings with machining specifications, and then machined the first prototype of the tool. The ***first prototype*** *had a very long, sharp point*. Along with that tool, I also designed a ***second prototype*** *tool that employed a removable/replaceable tip*. My purpose in doing so was that in the unfortunate event of the tool being dropped onto a concrete floor—as such a drop could damage the pointer tip—the tip itself could be easily and cheaply replaced. This tip had a different shape than the long, slender tip of the first tool. It was "*stepped down*" to a smaller diameter cylinder, and then plunged to a point. I also designed a ***third prototype tool****, similar to the first one, but this time I made the tip somewhat shorter*. Eventually, after designing several more tip contours, I settled on the ***final contour***—the

contour style of the "original removable tip version"—but, ***unlike that tool, this tip would not be <u>removable</u>***. With a *non-removable tip*, there was no worry of any "*thread pitch issues that could cause potential concentricity problems of the tip to the shaft of the tool.*" In addition, the time to machine the tool—and the cost—could be reduced considerably.

For those with myopic issues, I also designed a plastic "*V- block*" that would fit the specific barrel contours of #1 through #6. The block had a *vertical index line on its face*, to assist individuals to more easily index the pointer of the tool to the center of the barrel. Some individuals cannot tell whether or not they have the pointer settled on the center of the barrel, as their eyesight may be too poor, or they cannot tell due to the small amount of distance between the tool pointer and the barrel. *However, the employment of the plastic block requires that the rifle be perfectly level, while at the same time the plastic block itself must be perfectly plumb. This is hard to achieve unless one has an accurate, reliable machine level. If one has such a level—which is expensive—and uses it to true both rifle and block, they are often times nudged out of true by the process of "leveraging the bar while turning the rings in." One has to continually check both rifle and block with the level to keep them true until the pointer of the bar is eventually lined up with the index line on the face of the plastic block*. I never used the block because it was much easier to focus on the one objective—to get the pointer centered on the barrel. I found it was far easier for me to focus on just that one objective, rather than the additional objectives of leveling the rifle and plumbing the block. Nevertheless, some individuals may have been able to benefit from the use of the block—but only if they employed the use of a good accurate level. Eventually, I made the decision to abandon the idea of the plastic block, and subsequently, it will not be offered for sale along with the **SCOPE-TRU™ ALIGNMENT BAR**.

When I used the tool for the very first time, to my surprise *I found out that it worked far better than I had anticipated*. With encouragement from my wife, I decided to pursue a course of action on the "tool project," which has led to the final development of the **SCOPE-TRU™ ALIGNMENT BAR**. The tools are CNC machined on a lathe from 1144 TG & P stock, and they will be offered for sale in both *one inch*, and *30mm* diameters.