diameter circle on the face of the gauge plug. It measures the change in distance between the plane of the target holder and the face of the gauge plug.

To align the target ring the gauge plug is positioned in the barrel and the gauging fixture is placed in the target holder and held with spring clips against the aligning surface. The dial indicator is then adjusted to touch the surface of the gauge plug and to give a null reading. The aligning fixture is then rotated and the dial indicator readings noted. The alignment nuts (differential nuts) are adjusted until a 360^{o} rotation of the aligning fixture in both directions shows no greater than .0002" variation in readings. This corresponds to a misalignment of .06 milliradians or less. The gauge plug is then rotated and the alignment rechecked.

H. Projectile Velocity Pins

Projectile velocity is measured with a series of four pins, spaced one centimeter apart, which make electrical contact with the projectile. To insure a good ground each pin has a companion grounding pin which is positioned to make contact shortly before the active pin. The pins are machined from 1/16" brass rod; a whisker .010" in diameter and .10-.15" long is turned on one end. These eight pins are positioned in a block so that the projectile contacts one-third of the whisker length.

The velocity pin block is designed to insulate each of the active pins (velocity pins) from each other and from ground and to provide a BNC Connection for each (Fig. 12). The velocity pins are stair-stepped so that each pin makes contact with the projectile on fresh metal to insure accurate knowledge of spacing. The spacing of each pin pair is measured with a Gaertner toolmaker's microscope. The average of three sets of measurements yields an accuracy of $\pm$10 microns, or about .1%.

Shortly before firing the velocity pin block is slipped into a close-fitting hole in the target ring and the electrical connections are made.