

additional bit is used to specify whether the counter begins from the largest or smallest value of the set defined by the first four characteristics.

FIG. 3 shows an example of performing relational differentiation encoding of the target  $T = 25$ . This target has a SMB or  $N$  equal to 5 (that is the target number is 5-bits and has a 1 in the senior most position). It also has an SMOB of 3 (the number of on bits) (SMOB= $R=3$ ). The one-to-many mapping discussed above establishes a combinatorial series of  ${}^{N-1}C_{R-1}$  active candidates. FIG 3 illustrates the bit patterns of each value between the smallest active candidate and the largest active candidates. Each value shown has a SMB of 5 and the SMOB of each value is listed above each bit pattern. The active candidates are those having a SMOB of 3. This expression equates to a combinatorial series consisting of the decimal numbers 19, 21, 22, 25, 26 and 28. The numbers 20, 23, 24, and 27 do not qualify as active candidates because their binary representation in 5-bits does not have the required SMOB=3.

As will be demonstrated, the system can encode and decode the number 25 for transmission and can distinguish it from among all of the other active candidates. The ( ${}^{N-1}C_{R-1}$ ) expression creates a one-to-many result series of  $M$  candidates. The target location within the series can be identified through its relational "intimacy" to the other active candidates.

Having selected  $T=25$ , the next step is to determine the number of active candidates to the left and right of the target as illustrated in Fig. 3. The first of these numbers is Armature 1, while the second number is Armature 2. As shown in Fig. 3, there are three active candidates (19, 21, and 22) to the left of the target number 25 such that Armature 1 is equal to 3. There are two active candidates (26 and 28) to the right of the target, such that Armature 2 is equal to 2.

Referring to FIG. 4, relational differentiation encoding may be used to compute an efficient representation of the target within the series defined by the target's SSR record as described above. In this example, the target number 25 is encoded by creating a combinatorial ordinal series of active candidates defined by the SSR record of the target. FIG. 4 shows the use of two armatures to differentiate the target from the set of active candidates. The first armature specifies the position of