To all whom it may concern:

Be it known that I, William H. Schenk, a citizen of the United States, residing at Gladstone, in the county of Jefferson and State of Nebraska, have invented a new and useful Puzzle Block, of which the following is a specification.

The device forming the subject matter of this application is a puzzle of that general type in which a plurality of bars are used, and the invention aims to provide, in a device of the sort mentioned, a plurality of bars, having interlocking notches defining passage-ways for plane key bars, no two of the bars being notched alike, and none of the bars, saving the key bars, being capable of end for end reversal, the operation of building up the puzzle into a complete form being exceedingly difficult.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that, within the scope of what is claimed, changes in the precise embodiment of the invention shown may be made without departing from the spirit of the invention.

In the accompanying drawings:—

Figures 1 to 20 are perspective views disclosing the various interlocking bars of the puzzle. Figure 21 is a perspective showing one of the key bars; Figure 22 is a perspective view showing the completed puzzle; Figure 23 is a perspective view showing the puzzle partially erected; Figure 24 is a perspective view showing a further step in the erection of the puzzle, certain of the bars being spaced from the erected portion of the puzzle and being shown in operative relation to each other, in some instances.

In carrying out the invention, there is provided a bar 1, shown in Figure 19, and provided in one edge with notches 22, 23 and 24, the notch 22 defining a terminal projection 25, the notch 24 defining a terminal projection 26, the notches 22 and 23 defining a projection 27, and the notches 23 and 24 defining a projection 28. The projections 27 and 28 may be denominated intermediate projections, to distinguish them from the terminal projections 25 and 26, the projections 25, 27, 28 and 29 all extending in the same direction. A notch 29 is formed in the bar 1 at right angles to the notch 22, and communicates with the notch 22, the notches 29 and 22 forming a reduced neck 30, and there being shoulders 31 and 32 at the ends of the notch 29. A notch 33 is formed in the body 1, at right angles to the notch 24, the notch 33 communicating with the notch 24, there being shoulders 35 and 36 in the bar, at the ends of the notch 33, the projection 28 being located at one end of the notch 33, the notches 24 and 33 forming a reduced neck 37.

The bar 2 has notches 38, 39, and 40, opening in the same direction, the notch 38 defining a terminal projection 41, and the notch 40 forming a terminal projection 42. The notches 38 and 40 form an intermediate projection 43, and the notches 39 and 40 form an intermediate projection 44, the projections 41, 43, 44 and 42 extending in the same direction. A notch 45 is fashioned in the bar 2 at right angles to the notch 38 and communicates with the said notch 38, there being shoulders 46 and 47 at the ends of the notch 45. The notches 45 and 38 define a reduced neck 48. A notch 49 is formed in the bar 2 at right angles to the notch 40 and communicates with the notch 40. The notch 49 forms a reduced neck 50 from which projection 44 extends, there being shoulders 51 and 52 at the ends of the notch 49.

The bar 3 is shown in Figure 18 and has notches 53, 54 and 55 opening in the same direction. The notch 53 forms a terminal projection 56, and the notch 55 forms a terminal projection 57. The notches 55 and 54 define an intermediate projection 58. A notch 62 is fashioned in the bar 2 at right angles to the notch 55 and communicates with the notch 55. The notches 62 and 55 define a reduced neck 61. Shoulders 64 and 65 exist at the ends of the notches 62 and 55 define a reduced neck 61. 60 and the notch 54 forms a reduced neck 66.

The device includes a bar 4 shown in Figure 17. The bar 4 has notches 67 and 68 which open in the same direction. The notch 67 forms a terminal projection 69, the notch 68 forms a terminal projection 70, and the notches 67 and 68 cooperate to define an in-
intermediate projection 71, all of the projections 69, 71 and 70 extending in the same direction. The notch 67 defines a reduced neck 72. A notch 73 is formed in the bar 4 at right angles to the notch 68 and communicates with the notch 65, there being shoulders 74 and 75 at the ends of the notch 73. The notches 73 and 68 connect to define a reduced neck 76.

The puzzle embodies a block 5, shown in Figure 6, the block or bar having notches 77, 78 and 79 which open in the same direction. The notch 77 forms a terminal projection 80, and the notch 79 forms a terminal projection 81. The notches 77 and 78 define an intermediate projection 82, and the notches 78 and 79 define an intermediate projection 83. The notch 77 forms a reduced neck 84, the notch 78 forms a reduced neck 85 and the notch 79 forms a reduced neck 86.

The device includes a bar 6, shown in Figure 5. The bar 6 has notches 87, 88 and 89, the notch 87 forms a terminal lug 90, the notch 89 forms a terminal projection 91, the notches 88 and 89 define an intermediate lug 93, and the notches 87 and 88 form an intermediate projection or lug 92. The notch 87 forms a reduced neck 94, the notch 88 forms a reduced neck 95, and a reduced neck 97 is formed by the notch 89, and by a notch 96 which is formed in the bar, at right angles to the notches 89, 88 and 87, the notches 89, 88 and 87 opening in the same direction, the notch 96 communicating with the notch 99. Shoulders 98 and 99 exist in the bar 6 at the ends of the notch 96. One of the constituent bars of the puzzle, numbered 7, is shown in Figure 8. This bar has notches 100 and 101 which face in the same direction. The notch 100 forms a terminal projection 102, the notch 101 forming a terminal projection 103. The notches 101 and 100 connect to define an intermediate projection 104. The notch 100 defines a reduced neck 105. A notch 106 is formed in the bar 7 at right angles to the notch 101 and communicates with the notch 101. The notch 106 and the notch 101 form a reduced neck 107. There are shoulders 108 and 109 at the ends of the notch 106.

The bar 8, shown in Figure 7, has notches 110, 111 and 112 which open in the same direction, the terminal projections appearing at 114 and 115 and the intermediate projections 116 and 117. The notch 110 forms a reduced neck 118. A notch 119 is fashioned in the bar 8 at right angles to the notches 111 and 112 and communicates with these notches, the notch 119 forming a neck 120 from which the projection 117 extends. Shoulders 121 and 122 exist at the ends of the notch 119.

One of the constituent bars of the puzzle is marked by the numeral 9 in Figure 16 and has notches 123, 124 and 125, all facing in the same direction, the terminal projections being marked by the numerals 126 and 127, the intermediate projections being denoted by the numerals 128 and 129, the reduced necks appearing at 130, 131 and 132.

Referring to Figure 15, there is shown a bar 10 having notches 133 and 134 which open in the same direction, the terminal projections appearing at 135 and 136, and the intermediate projection being denoted by the numeral 137. A notch 138 is formed in the bar 10 at right angles to the notch 135 and communicates with the notch 133. The notch 138 is offset from the notch 133, longitudinally of the bar 10, to define a shoulder 139 at one end of the notch 133. The notches 138 and 135 form a reduced neck 140, the notch 134 forming a reduced neck 141.

The bar 11 shown in Figure 13 has notches 142 and 143 opening in the same direction, the terminal projections being denoted by the numerals 144 and 145, and the intermediate projection being marked by the numeral 146. A notch 147 is formed in the bar 11, at right angles to the notch 143, and communicates with the notch 148. A shoulder 149 exists at one end of the notch 147. The notches 147 and 143 cooperate to define a reduced neck 150, the notch 149 forming a reduced neck 149.

The bar 12, shown in Figure 14, is provided with notches 151, 152 and 153, the notch 151 forming a terminal projection 154, the notch 153 forming a terminal projection 155, and the notches 151 and 152 cooperating to form an intermediate projection 156. The notches 152 and 153 define an intermediate projection 157. Notches 158 and 159 are formed in the bar 12 and are located at right angles to the notches 151 and 152, and 153, the notch 158 communicating with the notch 155, and the notch 156 communicating with the notch 155, and the notch 158 communicating with the notch 155, and the notch 156 extending. Shoulders 162 and 163 exist on opposite sides of the notch 158 and shoulder 164 and 165 exist on opposite sides of the notch 158.

In Figure 11, the block 13 has notches 166 and 167. The terminal projections are shown at 168 and 169, and the intermediate projection appears at 170. Notches 171 and 172 are formed in the bar 13 at right angles to the notches 166 and 167, the notch 171 communicating with the notch 166 and the notch 172 communicating with the notch 167. Shoulders 175 and 176 exist at the ends of the notch 171, and there are shoulders 177 and 178 at the ends of the notch 172.

The device embodies a bar 14 disclosed in
Figure 12 and having notches 179, 180 and 181, the terminal projections being shown at 183 and 184, and the intermediate projections at 185 and 186. Notches 187 and 188 are formed in the bar 14 at right angles to the notches 179, 180 and 181. The notch 187 defines a reduced portion 189 in the bar, and the notch 188 defines a reduced portion 190 in the bar, the projection 190 extending from the part 190. There are shoulders 192 and 193 on opposite sides of the notch 187 and there are shoulders 194 and 195 on opposite sides of the notch 188.

Passing to the bar 15, shown in Figure 10, it will be observed that this bar has notches 196, 197, 198 and 199, opening in the same direction, the terminal projections appearing at 200 and 201, and the intermediate projections at 202, 203, and 204. A notch 205 is fashioned in the bar at a short distance from the notch 199, the necks or reduced portions of the bar appearing at 206, 207 and 208, there being shoulders 209 and 210 in the bar, at the ends of the notch 205.

One of the bars which go to make up the puzzle, is shown in Figure 9 and is denoted by the numeral 16. The bar 16 has notches 211 and 212, opening in the same direction, the notches 213 and 214 defining an intermediate projection 215. The terminal projections appear at 213 and 214, the reduced portions or necks being marked by the numerals 216 and 217.

The bar 17 of Figure 4 is provided with notches 218, 219 and 220 opening in the same direction. The terminal projections appear at 221 and 222, and the intermediate projections at 223 and 224. The reduced portions of the bar, formed by the notches, are marked by the numerals 225, 226 and 227.

The bar 18 of Figure 3 is supplied with notches 228 and 229, which face in the same direction. The terminal projections are marked by the numerals 230 and 231, the intermediate projection being marked by the numeral 232. A notch 233 is formed in the bar at right angles to the notch 228 and communicates with the notch 228. The notch 233 defines a reduced portion or neck 234, there being a shoulder 235 at one end of the notch 233. The notch 229 defines a reduced portion 236 in the bar.

The bar 19 of Figure 1 is provided with notches 237 and 238 which face in the same direction, there being a shoulder 239 at the inner end of the notch 237 and a shoulder 240 at the inner end of the notch 238. The terminal projections are marked by the numerals 241 and 242, one of the intermediate projections being designated by the numeral 243. A shoulder 244 is formed on the part 242 at the outer end of the notch 238. A notch 245 is formed in the bar, at right angles to the notch 237, and a notch 246 is formed in the bar, the notches 245 and 246 opening in the same direction. There is a neck 247 in the bar, formed by the notch 245, the notch 246 defining a neck 248 and the notch 249, which opens in the same direction as the notches 246 and 245, defining a neck 250. There is a shoulder 251 at one end of the notch 245.

In Figure 2 is shown a bar 20 having notches 252 and 253 which face in the same direction, the intermediate projection being marked by the numeral 254 and the terminal projections by 255 and 256. There is a shoulder 257 in the bar, at one end of the notch 252. Notches 255 and 256 are formed in the bar, at right angles to the notches 252 and 253. The notch 258 defines a neck 260, and the notch 259 defines a neck 261. There is a shoulder 262 at one end of the notch 255, and there are shoulders 263 and 264 at the ends of the notches 251 and 252.

The puzzle includes four keys 21, of a common rectangular cross section from end to end, one of the keys being shown in Figure 21.

It is to be observed that the notches are so formed in the bars 1 to 20 that no two of these bars are alike. The puzzle, therefore, embodies twenty different pieces; and four pieces which are alike, the four pieces having a common construction and being represented by the key bars 21.

There is but one way in which the puzzle can be put together, and the positions of the various bars must be defined accurately. Since the terms "right" and "left" must be referred to the position of the operator, no more satisfactory system of co-ordinates can be thought of than to resort to the somewhat unusual but entirely clear expedient of describing the positions of the various bars by the points of the compass.

In erecting the puzzle, place two of the keys 21 E. and W. on a table, in parallel relation, as shown in Figure 23, to serve as a foundation. Place the bars 2 and 1 N. and S. on the keys 21, in parallel relation, the bar 1 being E. of the bar 2, the notches 38 and 39 of the bar 1 opening to the E. and the notches 22, 23 and 24 of the bar 1 opening upwardly, the notches 45 and 49 of the bar 2 opening to the E. and the notches 38, 39 and 40 of the bar 2 opening upwardly. Place the bar 3 E. and W. in the notch 25 of the bar 1, supported on the neck 30 and the shoulder 31 of the bar 1, in abutment with the terminal projection 25. The bar 3 rests in the notch 38 of the bar 2, supported on the neck 48, and the shoulder 46 of the bar 2, in abutment with the terminal projection 41, the projection 58 of the bar being above and aligned with the neck 48 of the bar 2, the notches 55, 54 and 53 of the bar 3 opening S. and the notch 62 of the bar 3 opening upwardly. Place the bar 4 E. and W. in the notch 29 of the bar 1, on 150.
the shoulder 35, and in the notch 39 of the bar 2, on the shoulder 51, the notch 73 of the bar 4 opening upwardly, the notches 68 and 67 of the bar 4 opening S., the bar 4 being located to the S. of the bar 3, in parallel relation thereto.

Place the bar 5 upright, to the W. of the bar 1, the bar 5 abutting against the projection 59 of the bar 3 and against the shoulder 65 of the said bar, the neck 80 of the bar 1 being received in the notch 77 of the bar 5. Place the bar 6 upright, to the W. of the bar 1, and to the S. of the bar 5, the neck 97 of the bar 6 being received in the space formed by the projection 71 of the bar 4, the shoulder 74 of the bar 4 and the projection 28 of the bar 1, the notch 89 of the bar 6 receiving the projection 83 of the bar 1. Place the bar 7 upright, to the S. of the bar 3, to the W. of the bar 2 and to the W. of the bar 5, the notch 106 of the bar 7 opening to the S. The neck 105 of the bar 7 fits in the notch 88 of the bar 3, and the lower portion of the notch 100 in the bar 7 receives the neck 48 of the bar 2 and the projection 58 of the bar 3. Place the bar 8 upright, to the W. of the bar 2, to the S. of the bar 4, and to the S. of the bar 7, the notches 110, 111 and 112 opening to the E., and the notch 119 opening to the S. The neck 118 of the bar 8 is received in the recess defined by the projection 89 of the bar 4 and the projection 44 of the bar 2, the projection 44 of the bar 2 and the portion of the bridge 50 that lies therebeneath being received in the lower part of the notch 110 in bar 8.

Place the bar 9 E. and W. to the S. of the bars 7 and 5, with the notches 125, 124 and 123 of the bar 9 opening to the N., the neck 132 of the bar 9 being disposed in the notch 89 of the bar 1, in abutment with the projection 27, and the neck 131 of the bar 9 disposed in the notch 88 of the bar 2, in abutment with the projection 48, the projection 128 of the bar 9 being received in the notch 100 of the bar 7. Place the bar 10 E. and W. to the S. of the bars 8 and 6, the neck 141 of the bar 10 being received in the notch 40 of the bar 2, and the neck 140 of the bar 10 being received in the notch 24 of the bar 1, in abutment with the projection 26, the shoulder 139 of the bar 10 being received in the notch 97 of the bar 6.

Place the bar 11 N. and S., to the E. of the bars 6 and 5, above the bars 3, 9, 4 and 10, the notches 142 and 149 of the bar 11 opening to the E., and the notch 147 opening downwardly. The projection 144 of the bar 11 is received in the notch 138 of the bar 10, the neck 149 of the bar 11 is received in the notch 39 of the bar 6, the projection 146 of the bar 11 is received in the notch 73 of the bar 4, the notch 147 of the bar 11 receiving the neck 132 of the bar 9 and the neck 150 of the neck 11 being received in the notch 78 of the bar 5. The projection 145 of the bar 11 is received in the notch 55 of the bar 3. The bar 11 may be mounted in place most conveniently by removing the bar 1, thereby giving the bars 6 and 8 some swinging movement E. and W., and permitting the bars 3, 9, 4 and 10 to have some relative swinging movement vertically, the bar 11 being worked into place endwise from N. to S., and after the bar 11 is in place, the bar 1 may be replaced under the bar 11.

Place the bar 12 N. and S. on the bars 10, 9, 3, and 6 on the other hand, and the bars 7 and 8 on the other hand, the notches 153 and 159 on the bar 12 opening toward the E., and the notches 151, 152 and 153 on the bar 12 opening downwardly. The notch 153 on the bar 12 cooperates with the bars 8 and 9, the projection 157 on the bar 12 is received between the bars 9 and 4, the notch 152 of the bar 12 receives the element 72 of the bar 4, the notch 151 of the bar 12 receives the part 141 of the bar 10, and the projection 156 on the bar 12 is received in the cooperating notches 67 and 134 of the bars 4 and 10. If the bar 12 now be slid to the W., the neck 161 of the bar 12 will be received in the notch 100 of the bar 7, and the parts 156 and 160 of the bar 12 will be received in the notch 110 of the bar 8.

The bar 13 is disposed N. and S. and is placed against the bars 5 and 6 to the E. thereof, the notches 171 and 172 of the bar 13 opening to the E., the neck 174 of the bar 13 being received in the notch 88 of the bar 6, and the neck 137 of the bar 13 being received in the notch 79 of the bar 5, on the bar 5. Next, one of the keys 21 is thrust downwardly through the notch 171 of the bar 13 and into the cooperating notches 55 of the bar 3 and 125 of the bar 9, to hold the bar 13 in place.

The bar 14 is disposed N. and S. against the bars 7 and 8, to the E. thereof, the notches 187 and 185 of the bar 14 opening to the E., the neck 190 of the bar 14 being received in the notch 111 of the bar 3, the projection 186 on the bar 14 abutting against the projection 117 on the bar 8, and the neck 189 of the bar 14 being received in the notch 101, of the bar 7, upon the projection 104. One of the keys 21 next is inserted downwardly through the notch 187 of the bar 14 and into the openings 54 of the bar 3 and 124 of the bar 9, to hold the bar 14 in place.

The bar 15 is disposed E. and W. to the N. of the bars 5 and 7 and is supported on the shoulder 192 of the bar 14, behind the projection 183 and on the shoulder 175 of the bar 13, behind the projection 169, the notch 196 of the bar 15 receiving the neck 107 of the bar 7, the notch 197 receiving one of the keys 21 that have been inserted, the notch 198
receiving the neck 86 of the bar 5, the notch 199 receiving the other key 21 that has been inserted, and the projection 204 on the bar 15 being received in the notch 79 of the bar 5.

The bar 16 is disposed E. and W. to the N. of the bars 8 and 6, the neck 217 of the bar 16 being received in the notch 180 of the bar 14, and the neck 216 of the bar 16 being received in the notch 179 of the bar 13, the lug 215 of the bar 16 abutting against the inner surface of the vertical bar 6.

The keys 21 which have been inserted vertically, as aforesaid, are removed, and the bar 17 is placed to the S. of the bars 7 and 5, the neck 225 of the bar 17 being received in the notch 179 of the bar 14, and the neck 227 of the bar 17 being received in the notch 166 of the bar 13, the end projection 221 of the bar 17 fitting in the notch 166 of the vertical bar 7, the neck 86 of the bar 5 being received in the notch 220 of the bar 17, and the lug 224 on the bar 17 abutting against the inner surface of the vertical bar 5.

The bar 18 is disposed E. and W. to the S. of the vertical bars 8 and 6, the neck 236 of the bar 18 being received in the notch 167 of the bar 13, and the neck 234 of the bar 18 being received in the notch 181 of the bar 14, the lug 232 on the bar 18 abutting against the inner surface of the vertical bar 6 and cooperating with the lug 215 on the bar 16.

The bar 19 is disposed N. and S. to the E. of the bars 5 and 6, the notch 246 of the bar 19 receiving the part 236 of the bar 18, the neck 240 of the bar 19 receiving the part 216 of the bar 16, the notch 237 of the bar 19 receiving the lug 224 on the bar 17, and the bar 19 fitting in the notch 87 of the bar 5 and in the notch 79 of the bar 5. During the mounting of the bar 19, the bar 13 may be removed temporarily to facilitate the placing on the bar 19.

The bar 20 is placed N. and S. to the E. of the bars 7 and 8, the neck 261 of the bar 20 being received in the notch 101 of the bar 7, and the neck 260 of the bar 20 being received in the notch 100 of the bar 8. The keys 21 finally are inserted vertically, and the device assumes the form delineated in Figure 22.

Briefly considered, the puzzle forming the subject matter of this application comprises twenty bars, numbered from one to twenty certain of which are arranged in two sets, one set being represented in Figure 22 by the bars 3, 9, 4 and 10, and the other of the sets being represented by the bars 15, 17, 16 and 18, the two sets above defined being disposed in parallel planes, the one set including a group of two bars 3—9, and a group of two bars 4—10, the other set embodying a group of bars 15—17 and 16—18, the bars in each group being disposed edge to edge. Others of the bars are arranged in sets 2—12—14—20 and 1—11—13—19, said sets of bars being disposed in parallel planes at right angles to the planes in which the first specified sets 3—9—4—10 and 15—17—16—18 are located, each of the sets 20—14—12—2 and 19—13—11—1 including two spaced groups, and each group embodying a pair of bars disposed edge to edge, the groups being represented by the bars 2—12, 14—20, 19—13 and 11—1, the bars of the groups of each set, for instance, the bars 14—20 and 16—18, being notched for interlocking engagement, and to form passages. Four others of the bars, to wit, the bars 8, 7, 5 and 6, are disposed at right angles to the bars of the sets and are notched for interlocking engagement therewith, no two of the bars numbered 1 to 20 being notched alike, four plain keys being inserted in the passages alluded to, in edge to edge relation with said four bars.

What is claimed is:

A puzzle of the class described comprising twenty bars, certain of which are arranged in two sets, the sets being disposed in parallel planes, each set including two spaced groups, and each group embodying a pair of bars disposed edge to edge, others of the bars being arranged in two other sets, said other sets being disposed in parallel planes at right angles to the planes in which the first specified sets are located, each of said other sets including two spaced groups, and each group embodying a pair of bars disposed edge to edge, the bars of the groups of each set being notched to receive the bars of a group of the other set in interlocking relation, and to form passages; four others of the bars being disposed at right angles to the bars of the sets and being notched for interlocking engagement therewith, no two of the bars being notched alike; and four plain keys being inserted into the passages, parallel to said four bars, and in edge to edge relation therewith.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM H. SCHENK.

Witnesses:

G. E. Knoell,

Harry Schenk.