To all whom it may concern:

Be it known that I, Oscar R. Troje, a citizen of the United States, residing at Ensley, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Toy Building-Blocks; and I do declare the following to be a full, clear, and exact description of the invention, as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates generally to toys, but more particularly to certain new and useful improvements in toy building blocks.

The primary object of the invention is to provide a toy building block with means whereby when it is used with other blocks in building up a structure of practically any form, the blocks will be held together in such a way that the structure will not be easily demolished by jarring or otherwise.

Another object of the invention is to provide a toy building block which can be used in connection with other similar blocks to form complex structures and ones of peculiar formations, the blocks being provided with means for holding them together other than the force of gravity which necessarily holds the blocks of other types together when formed into a structure.

A further object of the invention is to provide a set of toy building blocks having connecting means which will only be effective when the blocks are in certain positions or relations to one another, and hence intelligence and skill is required in assembling a structure with these blocks.

A still further object of the invention is to generally improve upon devices of this character by the provision of an extremely simple, strong, durable and inexpensive construction, and one which will be efficient and reliable in operation, and well adapted to the purpose for which it is designed.

With these and numerous other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be hereinafter fully described and claimed.

In the accompanying drawings, wherein several forms of the invention are shown:

Figure 1 is a view of a geometrical figure formed with the building blocks;

Fig. 2 is an enlarged view of a portion of the same, portions of the building blocks being broken away and in section to show the interior construction of the same;

Fig. 3 is a perspective view of one of the building blocks;

Fig. 4 is a similar view of another form of block;

Fig. 5 is a side elevation of a portion of a wall structure formed with a plurality of blocks of a modified form;

Fig. 6 is a front view of one of the modified forms of block, the corners of the block being broken away to show the interior construction thereof;

Fig. 7 is a perspective view of a further form of block, illustrating the manner in which several of them may be assembled;

Fig. 8 is a similar view of an arch in the act of being formed, and illustrating an additional form of block;

Figs. 9 and 10 are perspective views of a monumental structure formed of blocks showing the same in the act of being assembled and completely assembled respectively;

Fig. 11 is a perspective view of still further modifications, used in assembling an ornamental post or column;

Figs. 12, 13, 14 and 15 are perspective views of other modifications; and

Fig. 16 is a front elevation of a wall and arch or gateway constructed with the various forms of blocks shown in the other figures of the drawings.

In the embodiment of the invention shown in Figs. 1, 2 and 3 of the drawings, the building block 1 is of diamond-shaped configuration, and is provided with openings 2 which extend transversely through the block. These openings are arranged parallel to each other, and also parallel with the transverse axis of the block, that is, they are arranged parallel with the transverse plane passing through the opposite corners of the block. These openings 2 are here shown as being disposed substantially midway of the apices of the block and the transverse axis thereof, although it is to be understood that they may be disposed at any points between these parts. Fitted within the openings 2 are permanent bar magnets 3. These magnets 3 extend completely through the block and have their ends or in fact their pole faces cut off angularly and disposed flush with the sides of the same. The north pole of one of the magnets 3 is disposed on the side adjacent the side at which the south pole of the 110
other magnet is disposed. Hence, when another building block of this same construction is disposed adjacent this one, it will only be retained in position when one of the magnets therein is disposed in alignment with one of the magnets in this block and is turned so that the south pole of the magnet in the second block is arranged adjacent the north pole of the magnet in the first block or vice versa, this being due to the well-known attraction and repulsion of unlike magnetic poles and like poles respectively.

The same principle may be used in constructing a triangular-shaped block such as is also shown in Figs. 1 and 2 and also in Fig. 4 of the drawings. In this case, the block 4 is provided with two equal sides 5 and 6 which converge at an acute angle, and an opening 7 which extends through the block between the sides and being arranged parallel to the base of the block disposed substantially midway of said base and the apex of the block. A structure may be assembled with these triangular-shaped blocks in the same manner as one may be assembled with the diamond-shaped blocks.

In Figs. 1 and 2 of the drawings, a hexagonal figure is formed with both types of blocks, the diamond-shaped blocks forming the major part of the structure, while the triangular-shaped blocks 4 are disposed between the upper and lower projecting portions or halves of the diamond-shaped blocks. This merely illustrates how building blocks of different shapes and formations may be used together.

In Figs. 5 and 6 of the drawings, a slightly modified form of the invention is shown, in which the blocks 8 are of square-shaped configuration and the magnets are disposed closer to the opposite corners or apices thereof than in the two former cases. The advantage of a block of this construction will be apparent by referring to Fig. 5 wherein a portion of a wall constructed with the square-shaped blocks is shown. While the wall could be formed with the diamond-shaped and triangular-shaped blocks, yet this would be rather tedious and would not be as apparent to the limited knowledge of children.

In Fig. 7 a square-shaped block 9 is shown, but it is to be understood that the same principle may be used in connection with other shaped blocks, and in this form two opposite edges of the block are notched out as at 10 and the magnets 11, which in this case are of square-shaped configuration in cross section instead of being circular as in the former cases, are embedded in these notched out portions. The magnets 11 may be attached to the blocks and held in their embedded relation to the same by any suitable means, but the application of a suitable glue or cement is the preferable manner in which to do this. As before, the magnets extend in opposite directions, that is, the north pole of one magnet is disposed adjacent the side at which the south pole of the other magnet is disposed, and vice versa.

In Fig. 8 of the drawings, a pair of columns is shown formed from blocks of the construction just described, and placed above these columns and ready to be set upon the upper ends of the same is a block 12 of substantially semi-circular shape in front view. The lower or straight edge of this block 12 is notched away as at 13 and a pair of magnets 14 are embedded in the notches and attached to the block. These magnets extend the entire length of the block and have theirlike poles disposed at opposite ends of the same. The poles of the magnets of the blocks 9 will attract the unlike poles of the magnets of the block 12 and hold the latter in position to form an arch as shown in Fig. 8 of the drawings.

In Figs. 9 and 10 a pyramidal-shaped block 15 is shown, two opposite edges of which are notched out and provided with comparatively short bar magnets 16. The unlike poles of these magnets are disposed adjacent the base of the block to adapt it to be attracted and held to the adjacent side of one of the square-shaped blocks 9 in the form shown in Fig. 7 of the drawings. A structure similar to a monument may be formed with one of the blocks 15 in connection with a plurality of the blocks 9 as shown in Fig. 10.

Further modifications of the invention are shown in Fig. 11, wherein the blocks 17 are of cylindrical shape and provided with a centrally extending opening 18 in which is fitted a bar magnet 19. These blocks may be used in assembling a column, and if desired, this may be capped by a ball or spherical-shaped block 20 provided in the same manner with a bar magnet.

Fig. 12 illustrates another form of block 21 of rectangular configuration having bar magnets 22 equal in length to the width of said block and equal in thickness to the thickness of the same and attached to the ends thereof by glue or cement.

Additional modifications of the invention are shown in Figs. 13 and 14 of the drawings. The blocks here are of rectangular configuration, the block shown in Fig. 13 having an opening 23 extending longitudinally therethrough, and in this opening is a bar magnet 24, while the block shown in Fig. 14 is provided with a pair of transversely extending openings 25 having bar magnets 26 fitted therein. This latter form may be effectively used in building a wall structure with the ordinary "broken" brick like interlocking joints, as the blocks may be overlapped, the magnet at one end of one block being disposed in alignment with
the magnet at the other end of the adjacent block.

If desired, the semi-circular block 12 shown in Fig. 8 of the drawings may be provided at its ends with transversely extending magnets 27. In this case, the ends of the block are cut away, and one of the sides of the magnets are curved to form a continuation of the curved side of the block, the other sides of the magnets being straight and forming a continuation of the straight side of the block. Fig. 15 illustrates such modification.

In Fig. 16 of the drawings, an architectural structure in the form of a wall having a gate or archway therein is shown made up of several forms of building blocks constructed in the manner above described. This view also illustrates a modified form of the circular block 12, wherein the latter is provided with a magnet 28 embedded in the top of the same, and the use of such magnet.

While the invention is primarily intended for use in assembling architectural structures as shown in Fig. 16, yet it may be just as readily and effectively used for forming geometrical figures, one of which may partake of the nature of a hexagon as shown in Fig. 1. Hence, it is to be understood that the use to which the invention is put is not to be limited in any manner whatsoever.

From the foregoing description, taken in connection with the accompanying drawings, the construction, use and advantages of the invention will be apparent. It will be seen that the objects sought have been effectively carried out, as the blocks when assembled together will adhere to one another in such a manner that the structure will not be easily broken down or demolished by slight jarring.

Furthermore, by having the magnets extending in opposite directions through the blocks, that is, with their like poles disposed adjacent different sides thereof, the blocks will have to be fitted together in a particular way before they will adhere, and hence a certain amount of intelligence and skill is required to assemble a structure.

Obviously, many other modifications as to form, proportion, and other details of construction may be resorted to without departing from the spirit of the invention, and hence it is to be understood that the claims do not limit the invention to the exact construction herein shown and described.

I claim:

1. A toy building block having a permanent magnet attached thereto, said magnet being of sufficient magnetic strength to attach said block to another building block.

2. A toy building block having a permanent magnet embedded therein, said magnet being of sufficient magnetic strength to attach said block to another building block.

3. A toy building block having a permanent magnet embedded therein and having one exposed side.

4. A toy building block having a permanent magnet embedded therein and having one exposed side disposed flush with a side of the block.

5. A toy building block having a permanent magnet embedded therein and having two sides disposed flush with two sides of the block.

6. A toy building block having a permanent magnet embedded therein and having three sides disposed flush with three sides of the block.

7. A toy building block having a permanent magnet disposed at one of its edges, the ends and outermost sides of the magnet being disposed flush with the adjacent ends and sides of the block.

8. A toy building block having permanent magnets at two of its edges, the ends and outermost sides of the magnets being disposed flush with the adjacent ends and sides of the block.

9. A toy building block having a groove at one of its edges, and a permanent magnet disposed in said groove and having its ends and outermost sides disposed flush with the adjacent ends and sides of the block.

10. A toy building block having a pair of permanent magnets attached thereto and extending in different directions.

11. A toy building block having a pair of permanent magnets attached thereto with the like poles of the magnets disposed adjacent different sides of the block.

In testimony whereof I have hereunto set my hand.

OSCAR R. TROJE.