



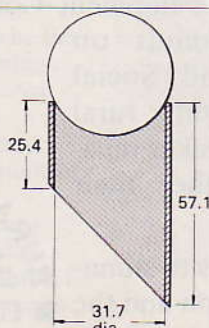
# Roller

*An educational and fun toy, this roller run was designed by Janet Carmichael for children in a playgroup as a development of the more conventional building bricks. In this case the children can test their constructions to see if they work with the ball arriving at the end of the run.*

**I**N making a toy for use by a children's playgroup, I had in mind particularly the older children in the group, ie those nearer five years of age rather than two and a half. I wanted something that was essentially constructional but which was also educational and would give them lots of fun and stimulation. The marble or roller run idea came about as a development of the constructional possibilities offered by wooden bricks, which the playgroup already had, and offers the chance to build various different constructions which can be 'tested' for their effectiveness, ie whether they will allow a ball to descend from one level to the next and so on to the ground. This principle will obviously need to be demonstrated to young children in the first instance, but once seen and understood, they quickly grasp the idea and can be very adventurous in planning various constructions of two, three or more tower stacks depending on the number of pieces available.

## Safety

Because this toy is to be used by youngsters, possibly under three years of age, the balls must be large enough not to constitute a choking hazard. The British Standard BS 5665 Part 1 says that no detachable part of



**FIG. 1**  
NO DETACHABLE PART OF THE TOY SHOULD FIT INTO A CYLINDER OF THESE DIMENSIONS

a toy should fit into a cylinder of the dimensions shown in (Fig. 1), and this ruled out the use of marbles which were my first choice, as they would fail this choke hazard test. The balls and dimensions of the runners therefore had to be enlarged to suit these safety criteria.

## Basic units

The construction that I opted for is based on a simple design which consists of two basic units: the runners and the building blocks or spacer cubes. The runner consists of a strip of wood set on a slope between two 'bricks' which can be built up into a tower using the extra cubes or spacers. The ball drops through a hole at the bottom of the runner to land on the runner below and so continue its downward path.

## Spacer cubes

These are made as shown in the drawing. The sides are cut out first and the rebates for the base and top pieces routed on either side to suit. Use a set square to check that the assemblies are accurate and thus easy to stack for a small child.

## The runners

I found that the most effective angle for the run was 4 degrees. Any steeper than this and the ball runs too fast, and any shallower than this and it runs unreliably. Much may depend on the size and weight of the balls you use, so some experimentation may be necessary.

The slopes of the runners are simply glued with pva between 72mm squares

of beech at the top. As the sloping strip is positioned fairly centrally, this is quite a strong assembly. At the lower end of the runner the sloping piece forms the bottom of the assembly and so to give further strength to these pieces 'lids' or tops are added. These are 72mm squares rebated on the underside to give a positive housing to the side pieces.

To help in the assembly, a simple jig was made up to give both the correct spacing between the blocks and also the right angle of slope (Fig. 2).



## Cutting the channels

I used a router to cut the ball grooves in the sloping pieces but had to do this in several passes because the bit I had was too small. You could of course make up the channels as three separate pieces and have no need to use a router at all.

## Holes

Surprisingly, the size of the hole is fairly critical. It is important that the ball hesitates slightly before dropping down because this adds a degree of anticipation and excitement for the kids. It also makes the game last longer. The hole I drilled was 39mm in diameter to accommodate a ball 38mm in diameter, so you can see it is a fairly tight fit.



# Run



All sorts of different layouts are possible using the runners and spacers, with limits only imposed by the number of pieces which have been made.

## Finish

Once all the pieces have been assembled, care should be taken to clean up all the pieces, rounding over all sharp edges to prevent damage to small fingers, and a non-toxic finish can then be applied. In my case I used several coats of polyurethane varnish, rubbed down in between.

## Conclusion

This little toy gives surprisingly good play value for what is essentially a very basic idea. It is, or can be, very inexpensive. I used beech throughout which cost £10.65. Made in furniture grade pine it would cost less than half of that or indeed it could be made from offcuts of various timbers which might even add to its visual and tactile appeal.

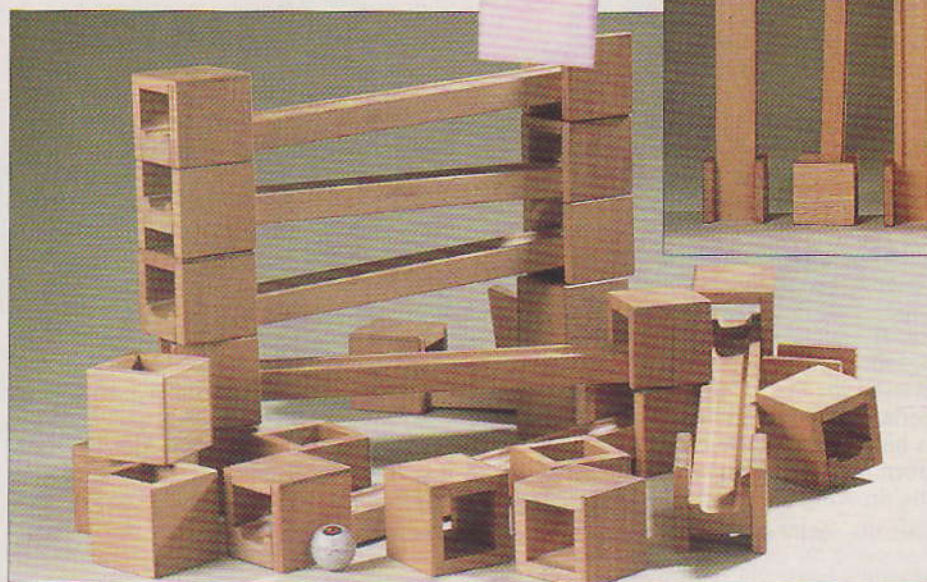


FIG. 3

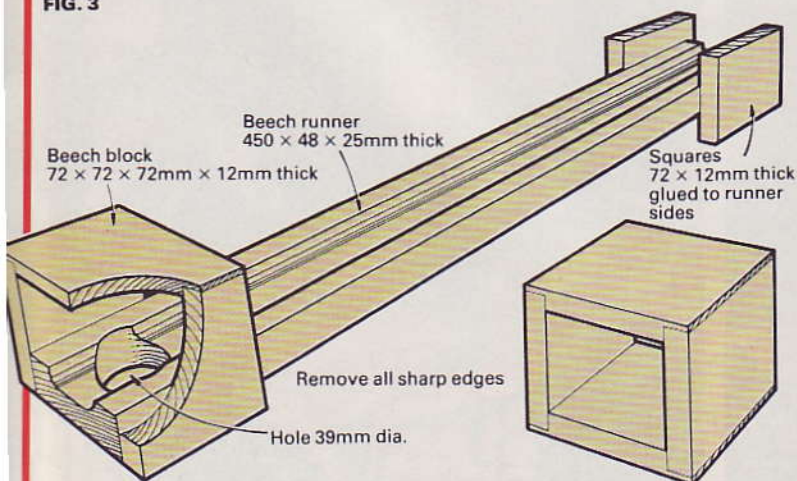


FIG. 4

