

# Design Specification

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## Function

1. Machine that ~~is~~ <sup>must be</sup> able to fire table tennis balls
2. Must fire balls with varying speed, direction and height, and hence <sup>must be</sup> adjustable
3. Should be capable of storing up to thirty balls
4. The balls must be automatically delivered to the projection system
5. Balls must be able to be fired/triggered by the player opposing the machine or by a random sequence (method to be ascertained)

## User

1. Must be built to suit needs of varying age and experience, so adjustable speed, height + direction.

## Control

1. The projection system needs a suitable device to control automatic loading of the balls and the random projection/controlled projection by opponent of machine.

## Energy

1. A low voltage power system is available to drive all necessary devices, however this option is not imperative.

## Materials

1. The materials must be robust enough to withstand everyday wear and tear; when it is being dismantled and put away or when it is in operation
2. The projection system (if mechanical) must be able to withstand constant operation.

## Aesthetics

1. There are no requirements for aesthetics however it should look professional and suitable materials should hence be selected for use.

## Environment

1. Local table tennis club, where it will come into contact with many ages, also may need to withstand temperature/humidity fluctuations from various seasons + times of year.

## Ergonomics/Anthropometrics

1. The projector, itself has little human interaction, however the remote device that could potentially trigger the firer must suit the users hand size or wrist size, depending on where it is to be located.

## Safety

1. The machine will be in contact with users of all ages, and inquisitive children of the table tennis club may want to touch it, hence any moving parts must be covered
2. A case/cage of some sort must be introduced for this reason.

## Quantity

1. More than one of these machines will be produced, and it is also more economical to do so, both from an environmental + money-related point of view

# Initial Concepts ①

controls will operate the machine's speed, and will trigger paddle to release ball



This solution is good for ease of use, apparent need simply press button and it can fire. rotating discs are continuously moving, activation of paddle releases the ball.

enclosed by a cage to keep small children away.

Aluminum folded cage in which balls are trapped.

gravity fed.



will be a long 1200mm long cage to hold 30 balls.

finish will be dip coated professional!

motor speed can be controlled by the pic board + remote.

being made out of PVC (polyvinyl chloride) it's very tough hard, plus, low friction.



attached with NS counters screws.

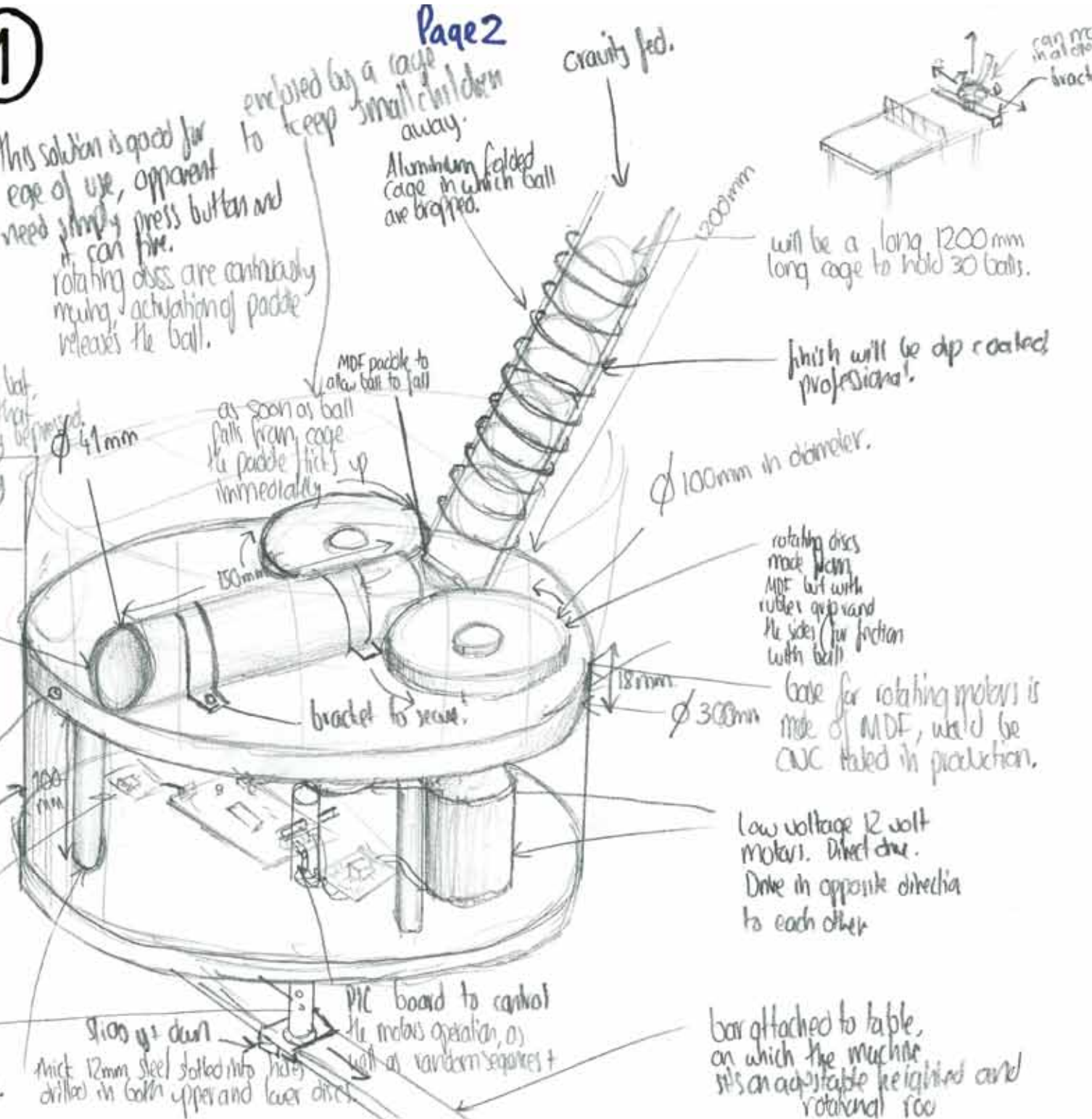
knobs hidden by flexi-ply cov. Varnish finish.

infra-red receiver.

rodley holes in which pins control adjustable height.

as soon as ball falls from cage a paddle flicks up immediately

MDF paddle to allow ball to fall



$\phi 100mm$  in diameter.

rotating discs made from MDF but with rubber grip around the sides for friction with ball

base for rotating motors is made of MDF, would be PVC taken in production.

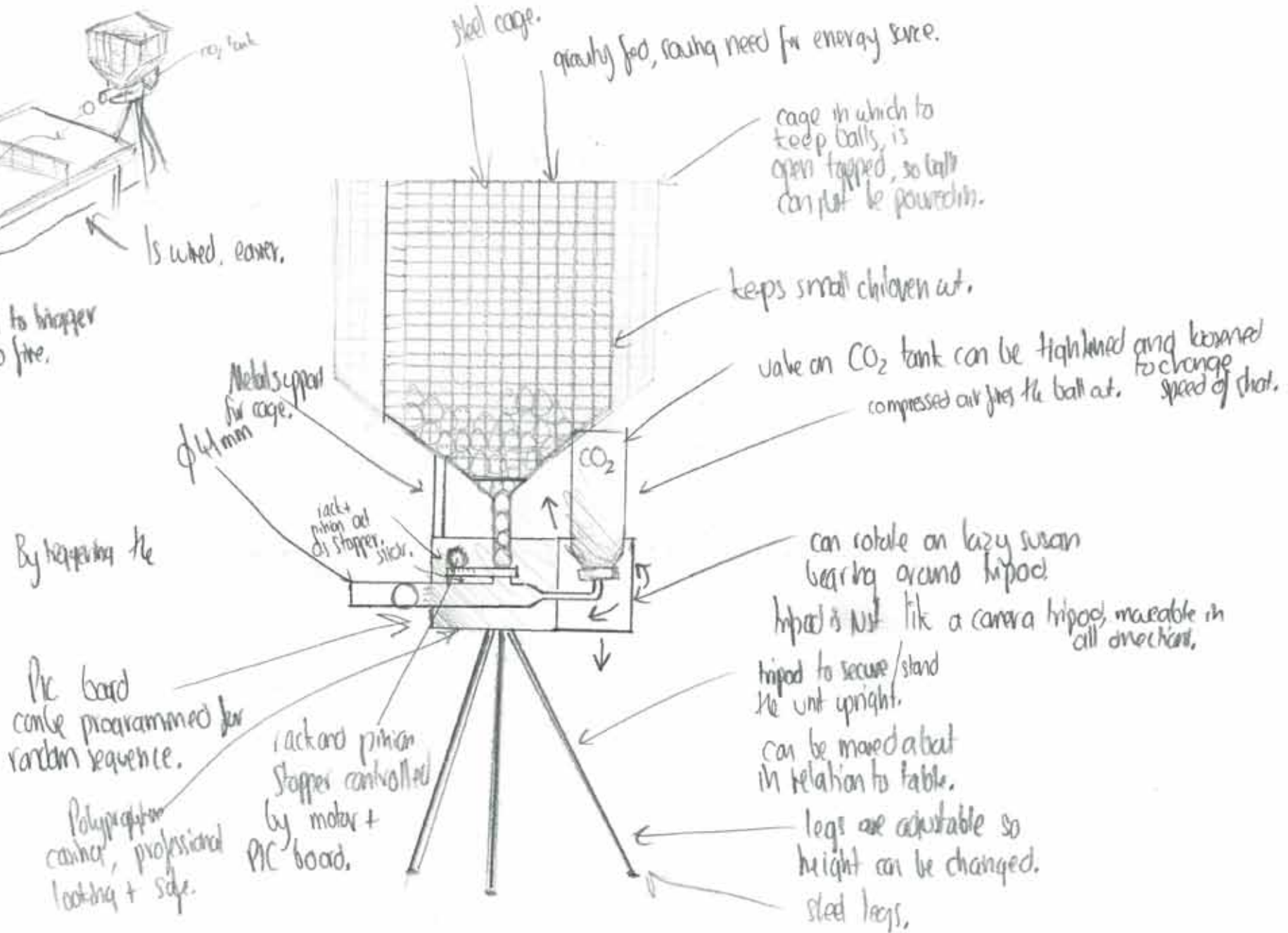
low voltage 12 volt motors. Direct drive. Drive in opposite direction to each other

PIC board to control the motor operation, as well as random squares +

nick 12mm steel slot into hole, drilled in both upper and lower discs.

bar attached to table, on which the machine sits on adjustable height and rotational row

# Initial Concepts (2)



# Initial Concepts ③

