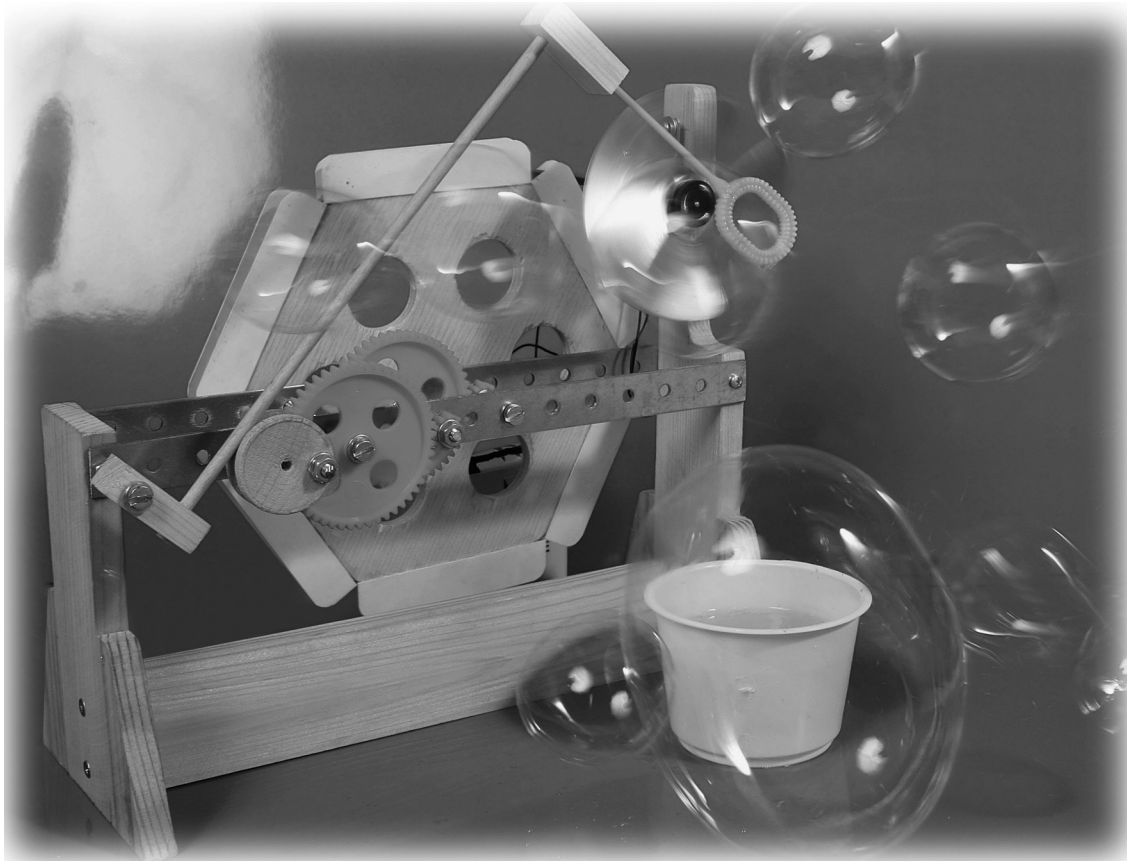
OPITEC

106.326

BUBBLE-Maker



Necessary tools and materials:

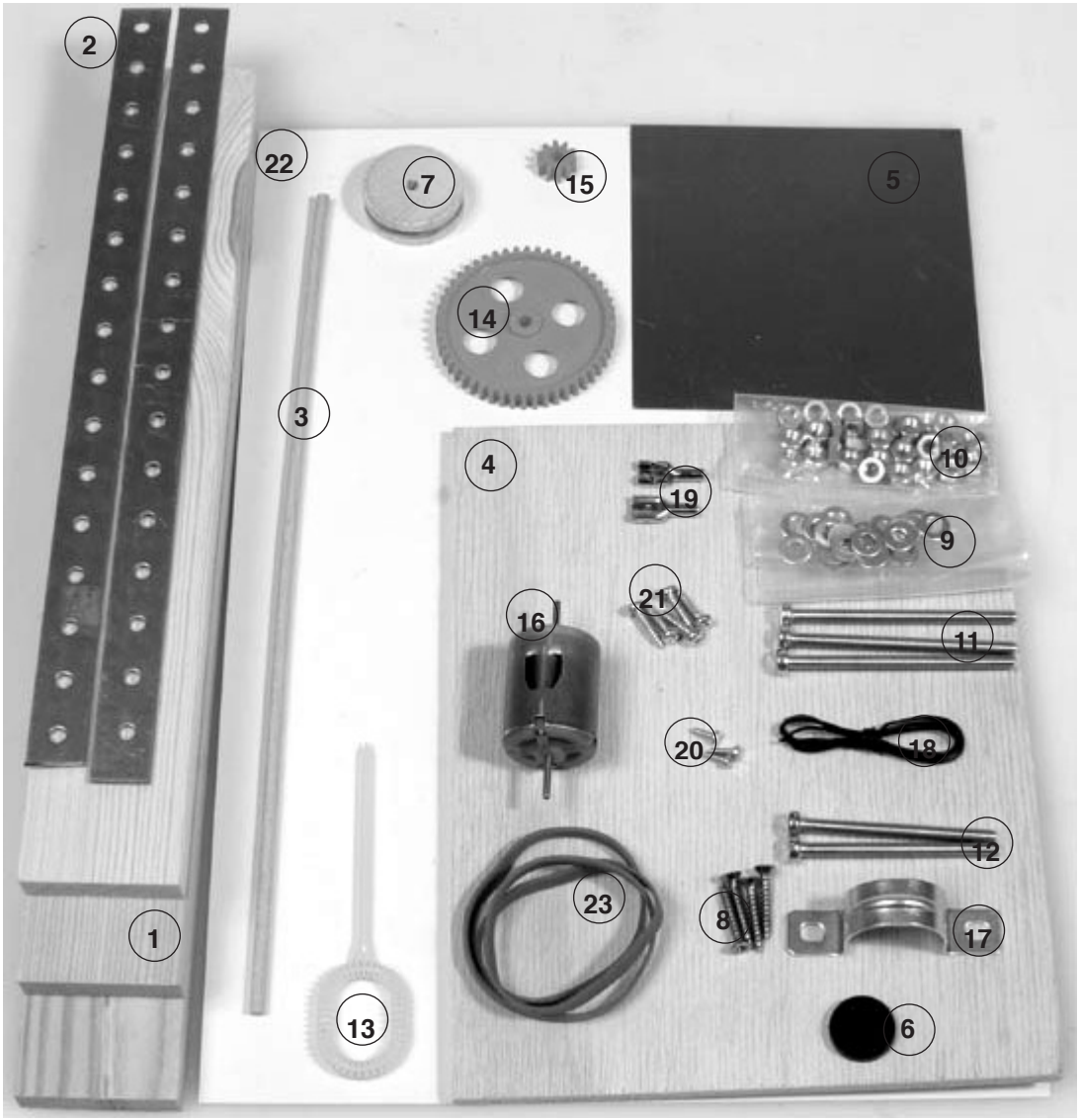
Fretsaw and board
Wood file, glasspaper
Pillar drill
Hole maker 2mm dia.+ 3.5mm
Cross and normal screwdriver
Allen key (7mm)
Wood glue, all purpose glue
Paints

Please Note

The OPITEC range of projects is not intended as play toys for young children.They are teaching aids for young people learning the skills of Craft, Design and Technolo- gy.These projects should only be undertaken and tested with the guidance of a fully qualified adult. The finished projects are not suitable to give to children under 3 years old. Some parts can be swallowed. Dan- ger of suffocation!

Material list

Part No.	Quantity	Descriptio	Size in mm	Use
1	3	Pine strip	10 x 40 x 250	Stand
2	2	Holed strip (16 holes)	1,5 x 15 x 240	Cross piece
3	1	Dowel	Ø 4 x 250	Bubble holder
4	1	Plywood	6 x 150 x 190	Drive
5	1	sheet	0,3 x 100 x 100	Fan
6	1	Propeller hub		Fan
7	1	Pulley	Ø 30	Drive
8	4	Screw	3 x 20	Fixing
9	20	Washers	M4	Drive
10	30	Nuts	M4	Drive
11	3	Machine screw	M4 x 60	Achse
12	2	Machine screw	M4 x 50	Achse
13	1	Bubble ring		
14	2	Gears	Ø 50, 50 Zähne	Drive
15	2	Gears	Ø 10, 10 Zähne	Drive
16	1	Motor		Drive
17	1	Fixing clip	23	Drive
18	1	Cable	500	Drive
19	2	Felt connectors	6,3	Drive
20	3	Machine screws	M2 x 6	Fan
21	5	Screws	2,9 x 13	Fixing
22	1	Plastic sheet	0,5 x 150 x 210	Drive
23	1	Rubber band	Ø 130 x 5	Drive



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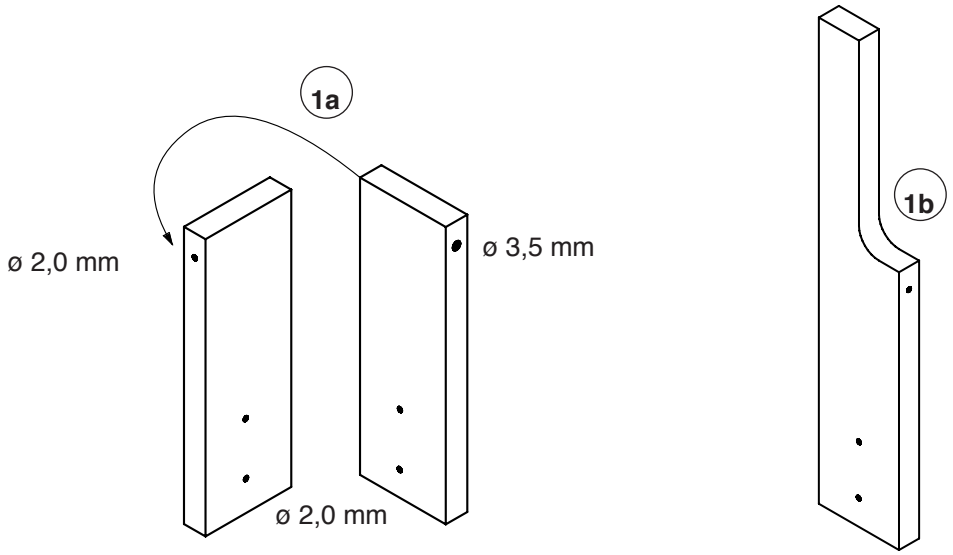
Making the stand:

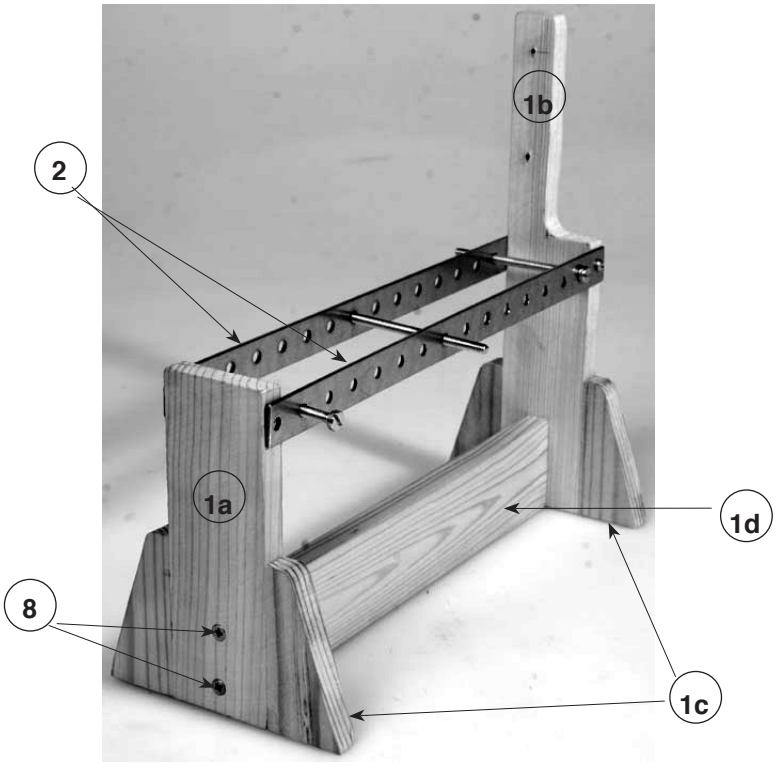
1. Mark out the pattern for the stand ends on the two pine supports (1a +1b) 10 x 40 x 250mm. Pierce the marked holes with a bradawl. Drill the holes first, then saw out the shape of the supports.



2. Mark out and saw the third support (1d) 10 x 40 x 250mm to 125mm long. Make and add the side supports (1a +1b) and glue them in place

3. Saw and clean up the ends of the holed supports (2) (16 holes long).

Note: Saw the metal strips so that none of the metal stands out over the supports.



4. Mark and out saw the four triangular end supports (1c) from the remainder of piece (1)
Sand to fit and glue them left and right of the ends.

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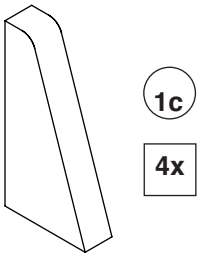
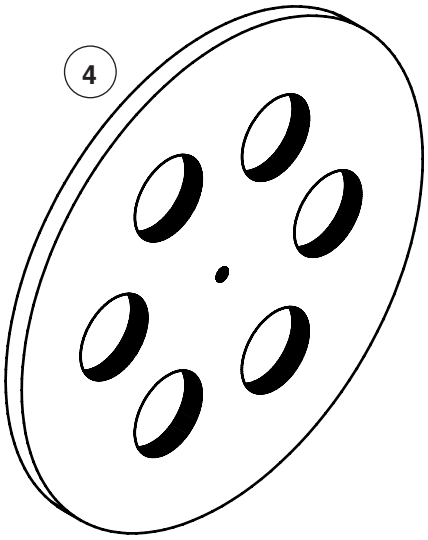


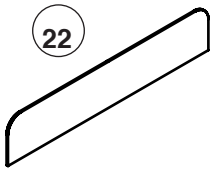
Constructing the drive system:

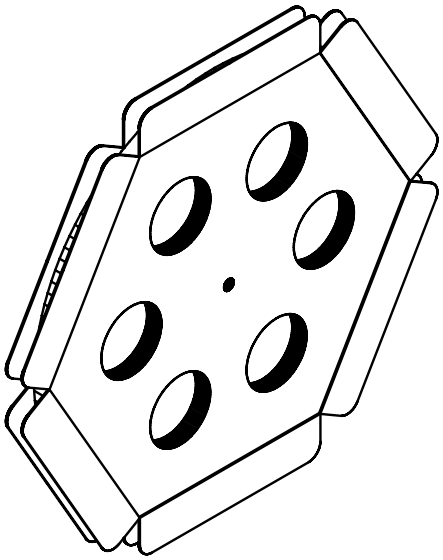
1. Use the patterns to mark out the drive wheel (4) onto the plywood sheet 6 x 150 x 190mm (Drawing page 11) mark the centre hole with a bradawl!

Note: The pattern can be changed (eg. With the pattern of 10 holes or without)

However the centre hole will stay the same 4mm dia, to fit the shaft

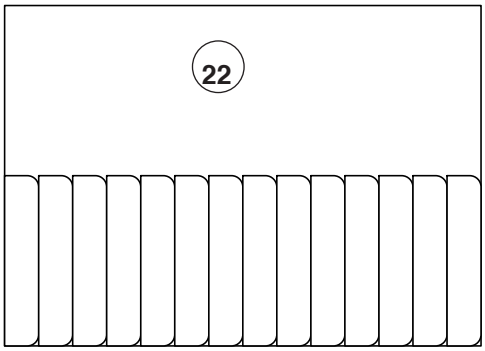






2. The 12 side guides 15 x 75mm (22) for the drive wheel are cut from the plastic foil
Mark out the shapes and cut around them with house hold scissors

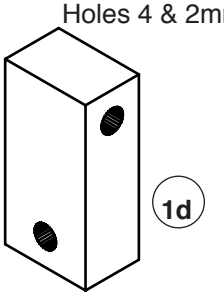
Note: Glue the parts (22) on to one side of the wheel at a time, leaving the first side to dry before starting on the second!

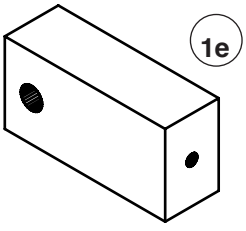


3. From the remainders of the wood (1) cut out parts (1d +1e) according to the pattern

Part 1d Connecting rod holder: Hole sizes 4mm dia. Sand to finish

Bubble ring holder: Holes 4 & 2mm dia. Sand to finish





4. Glue the plastic bubble ring in the end of part 1d with an all purpose glue

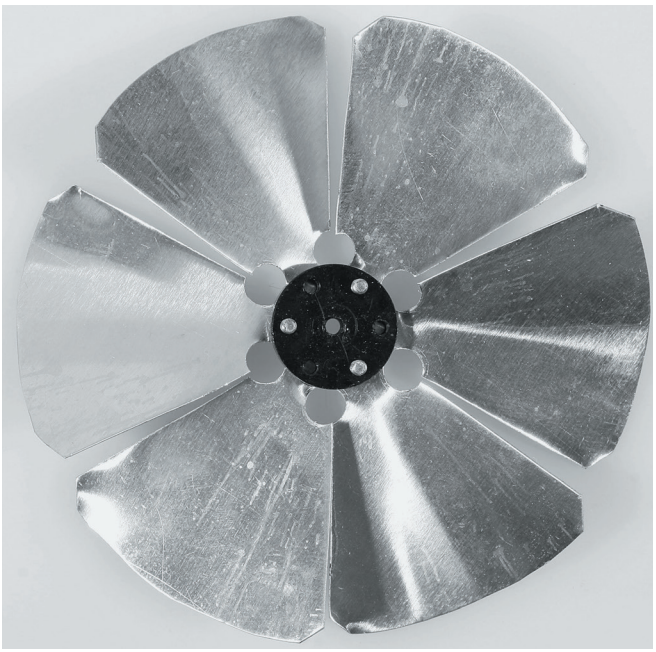
Note: Adjust the bubble ring and holder!

Constructing the drive system:

5. Trace the pattern for the fan blades on to the Sheet 100 x 100mm.
   Use a centre punch to mark the centre of the fan. Drill the hole!

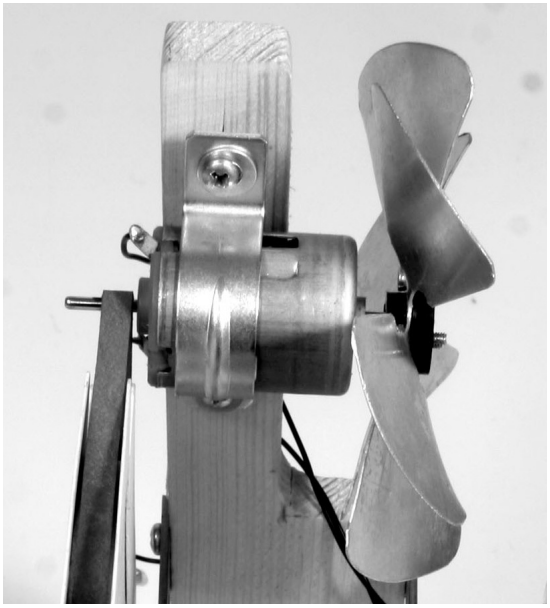
   Note: when drilling tape the Sheet to a flat piece of wood !

   Once the fan has been drilled cut out the individual blades with metal shears
   Remove any sharp edges with a file or emery cloth
   Shape the blade into a curve with the aid of a bottle as a former
   Finally carefully bend the blades at 30 degrees
   Mount the fan on the with three screws(20) to the hub as shown (6) the heads of the screws are on the metal side



6. Take the cable (18) and cut in half. Remove the insulation from about 10mm at one end and solder on a flat connector (17) or press it on with pliers.

   Fix a connector on the other cable as well.
   Connect each cable with a tab on the motor. Fit the motor with the U clip (17) and hold it in place using the two washers (9) and two screws (21)
   Fit the fan on the motor shaft



Assembling the drive system:

1. The drive system is assembled as follows:

1st shaft: consists of a long machine screw (11) a small gear wheel (15) 4 nuts (10) and 3 washers (9)

- Place a washer on the shaft and insert the machine screw in the 10th hole from the left (In the holed strip)
- From the inside add a nut and a washer, the gear , then washer plus a nut.; screw the parts together so that the machine screw passes through the opposite hole in the adjacent strip
- Now add two contra tightened nuts so that the machine screw can turn without undue Play
- Lastly adjust the gear and hold it in place with the two nuts

2nd shaft: consists of a long machine screw (11) a large gear (14) a small gear (15) with 4 nuts (10) and 5 washers (9)

- Insert the machine from the left (see photo) in the 8th hole
- From the inside add a nut and a washer, then the large gear (14) another washer and a nut; screw all these part together until the screw protrudes through the corresponding hole in the adjacent strip
- On the outside add a nut and a washer and tighten them until the holed strip. Then add the gear (15) a washer and a nut. Tighten all the parts together so that they turn easily
- Cut of any excess thread from the machine screw up to the nut

Adjust the middle gear until it engages with the gear on shaft 1. tighten in position.

Gear preparation: a large gear (14) a screw (12) and 3 nuts (10) and 4 washers (9) and the pulley (7)

- Take the large gear and drill another hole 20mm from the centre. Take the pulley (7) And drill a 4mm hole 11mm from the centre (see page 13)
- Saw machine screw (12) to 24mm and remove the burr from the saw cut
- Place a washer on the machine screw and insert it through the centre of the gear, add a washer and two nuts and a further washer, tighten and then lock them (contra tighten) in position

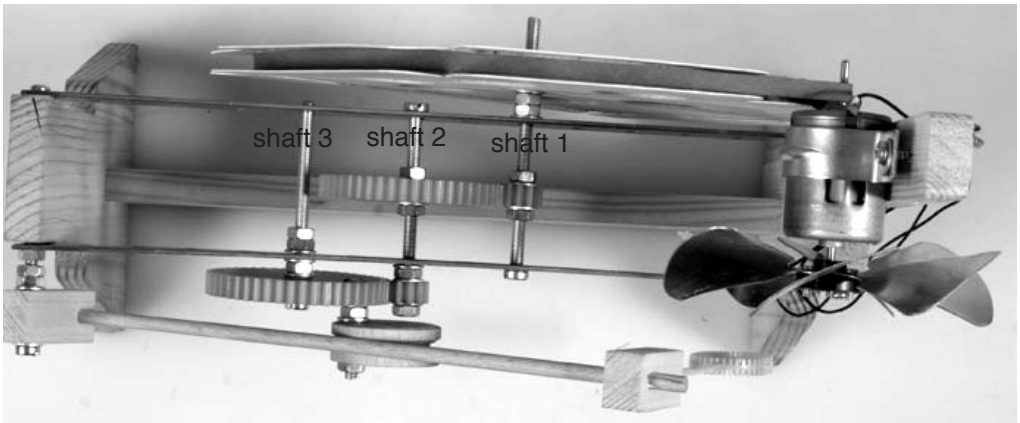
Add the wooden pulley, threading it through the eccentric hole, a further washer and a nut - tighten. (See photo below)

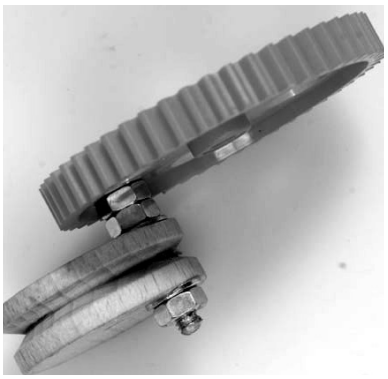
3rd shaft: Take a machine screw (11) the above gear assembly with 3 nuts (10) and 3 washers (9)

- add a washer from the right (pulley side) and through inset the screw through the middle of the gear. Add a washer then a nut and tighten
- Insert the screw from left through the 6th hole in the strip
- From the inside add a washer and two nuts so that the screw passes through the hole in the opposite strip. Tighten so that it rotates without play, cut off any excess thread down to 3mm

Drive wheel (2)

- Add a washer on the outside then the drive wheel and another washer and nut (Tighten so that the drive wheel is held tight)
- Test by turning the large drive wheel- the wooden pulley /cam should rotate as well.





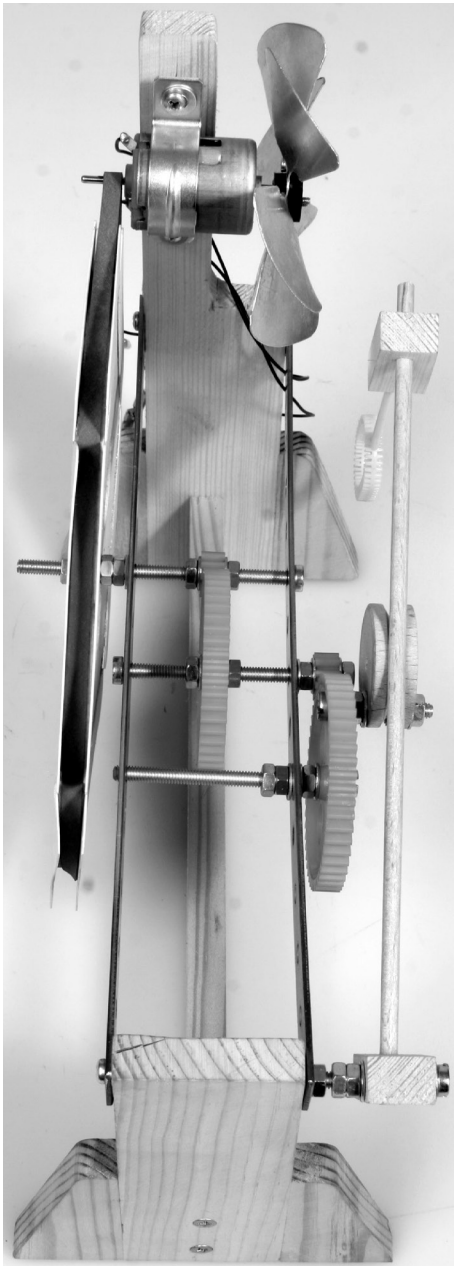
Final assembly:

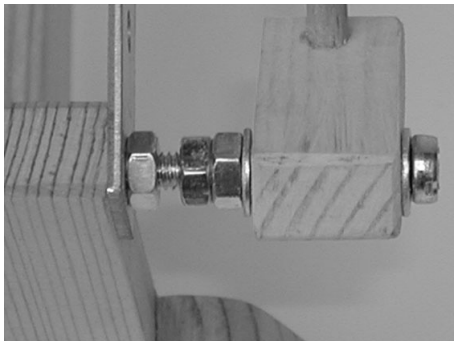
Shaft 4 (Take a short machine screw (12) push rod holder (1d) nuts (10) and 3washers (9)

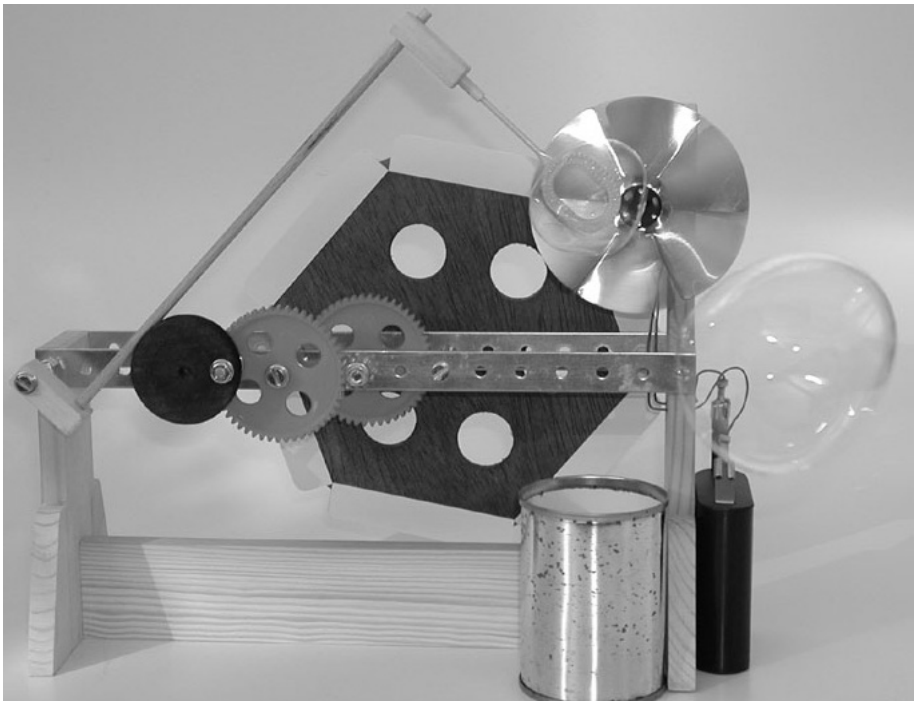
- Begin with a washer and then insert the machine screw through the connecting rod holder (1d)
- Add another washer and two contra tightened nuts, making sure that the assembly turns freely
- Insert the dowel connecting rod (3) into the hole in the holder (1d)
- Finally add a nut and washer. Screw the machine screw into the free 3.5mm dia hole in the side arm. Adjust the machine screw until the connecting rod parallel with the eccentric arm. Hold it in position by tightening the nut
- Fix the bubble ring to the holder
- Check the mechanism by rotating the drive wheel
- The bubble ring holder should move up and down

Function test:

- Connect the drive and the motor shaft with a rubber band (23)
- Connect the battery. The fan should blow the air in the correct direction. If not simply reverse the polarity of the connections on the battery
- Fill yoghurt cup with bubble solution and place it under the bubble ring
- Adjust the ring so that is in the best position to form lots of bubbles.







Bubble solution I

For small and medium bubbles

- Glycerine (85% from chemist)
- Carpet or upholstery or car wash shampoo
- Distilled water
- Kitchen measure
- Bottle with cap
- Spoon

Mix two parts (2 x tablespoons or 200ml) shampoo with one part glycerine (tablespoon or 100ml) with one part distilled water (100ml) or a table spoonful.
Mix together and store in bottle.

Bubble solution II

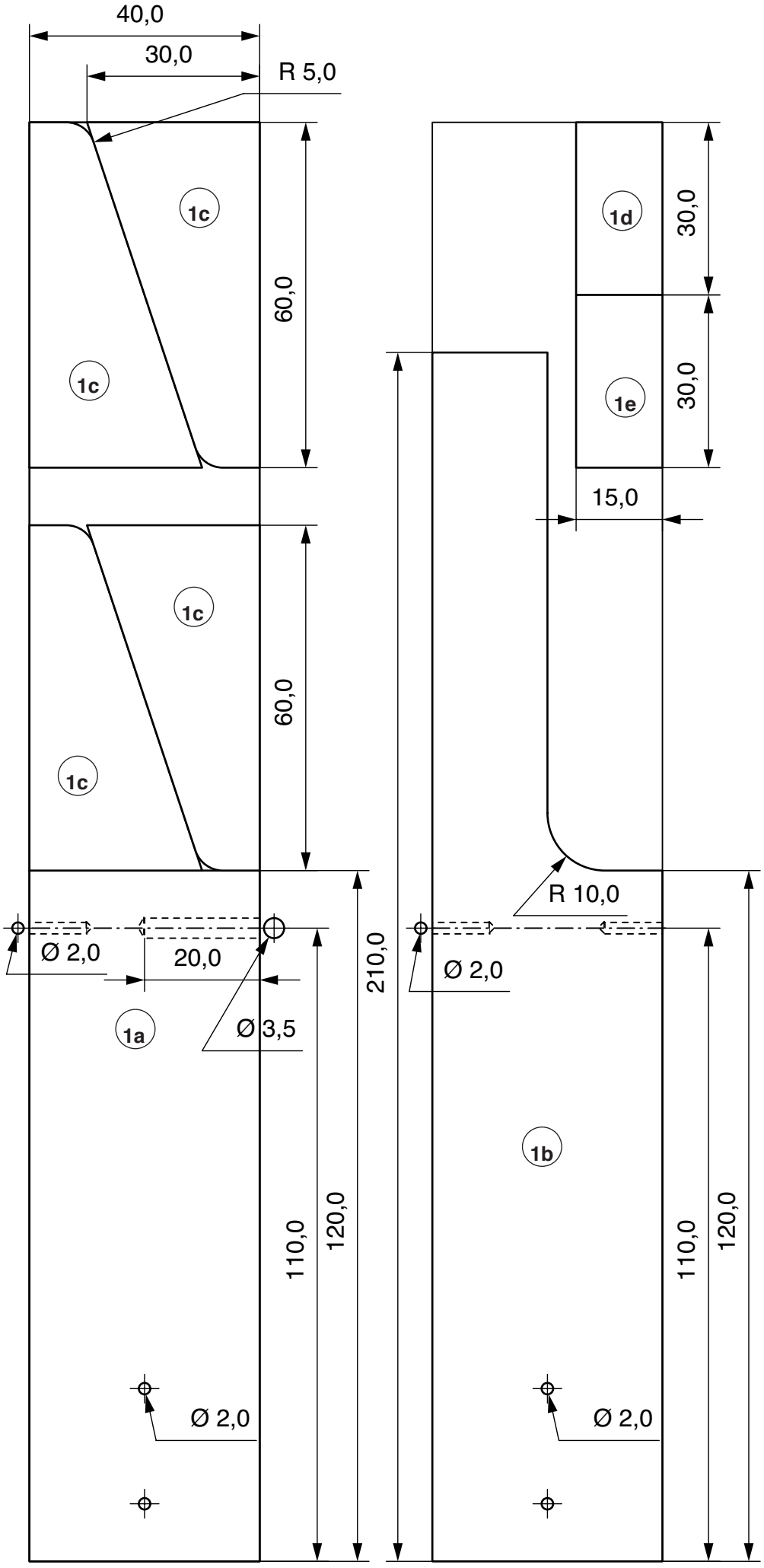
For bubbles within bubbles, long or multi bubbles try

- Glycerine (85%)
- Carpet shampoo etc
- Distilled water
- Kitchen measure

Bottle with cap
Mix five parts shampoo with 4 parts glycerine and one part distilled water
Stir well and store

Ready made bubble preparation is available from Opitec:

1000 ml Article no 444.053


40,0
30,0
R 5,0
1c
1c
60,0
1c
1c
60,0
1d
30,0
1e
30,0
15,0
R 10,0
Ø 2,0
20,0
1a
Ø 3,5
210,0
Ø 2,0
1b
110,0
120,0
110,0
120,0
Ø 2,0
Ø 2,0

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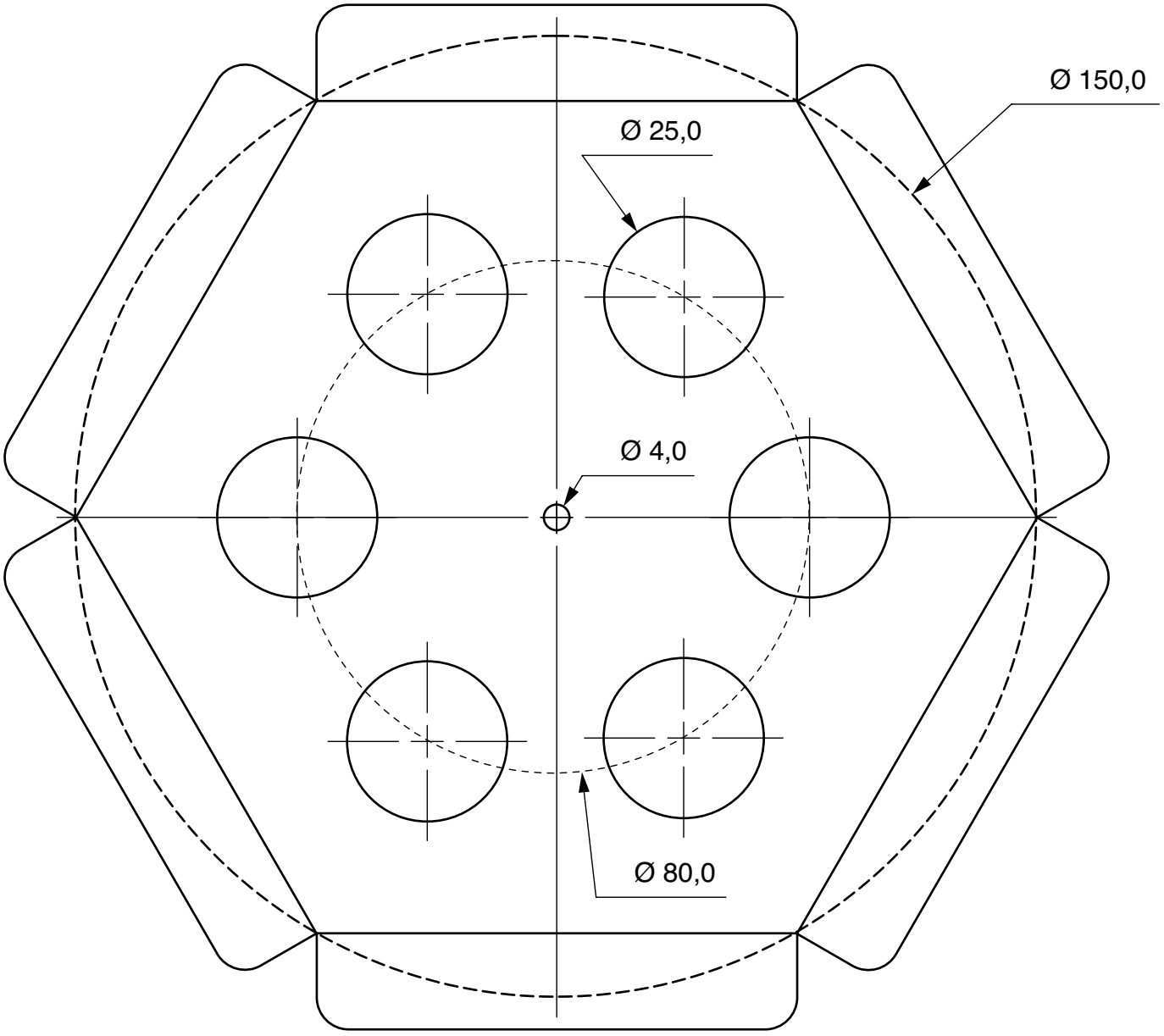
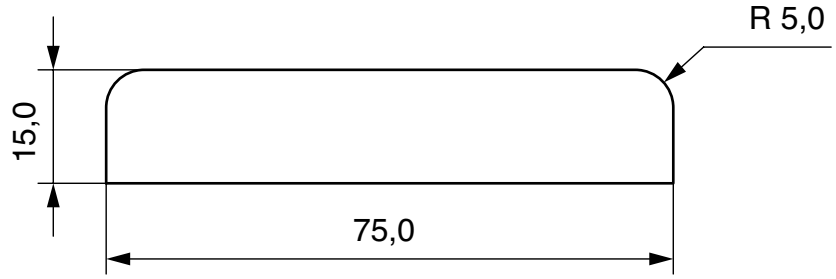
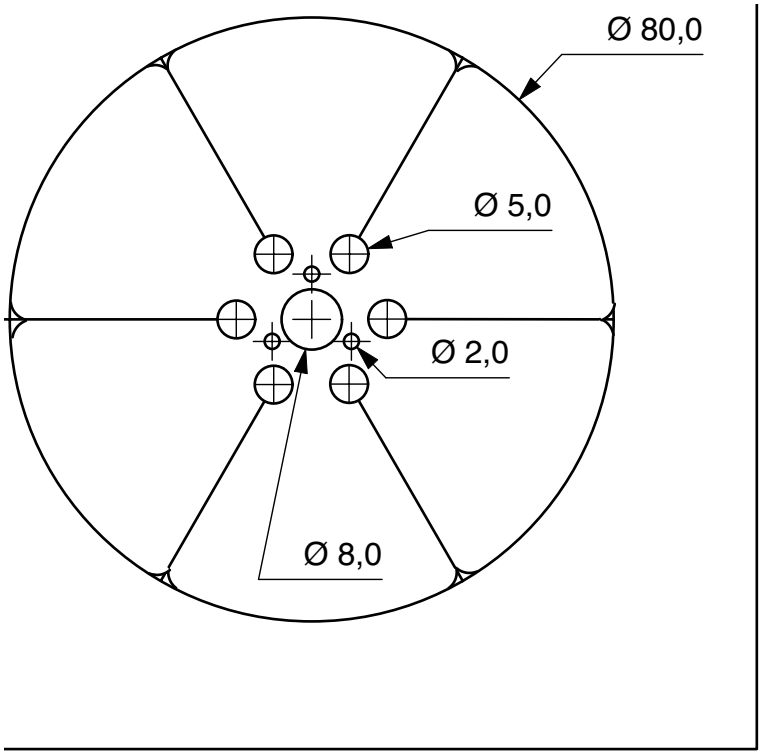
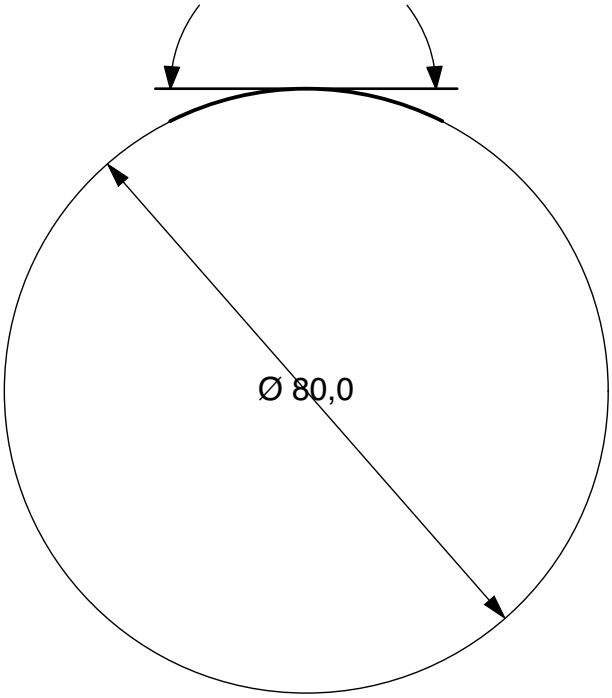
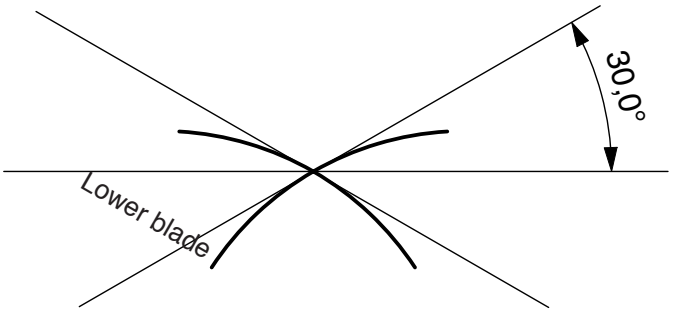
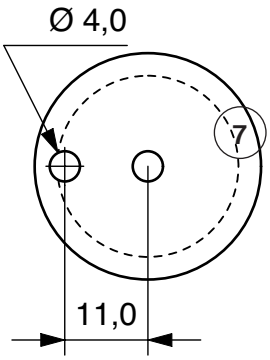

Ø 150,0
Ø 25,0
Ø 4,0
Ø 80,0

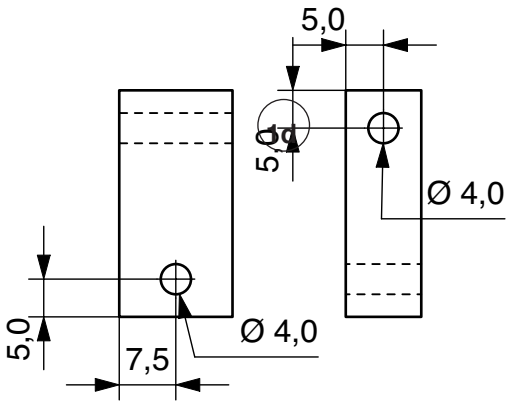

R 5,0
15,0
75,0

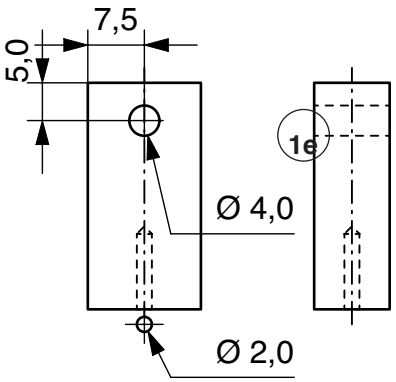

Ø 80,0
Ø 5,0
Ø 2,0
Ø 8,0


Ø 80,0


30,0°
Lower blade
Top blade


Ø 4,0
7
11,0


5,0
5,0
1d
Ø 4,0
5,0
Ø 4,0
7,5


7,5
5,0
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Ø 4,0
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