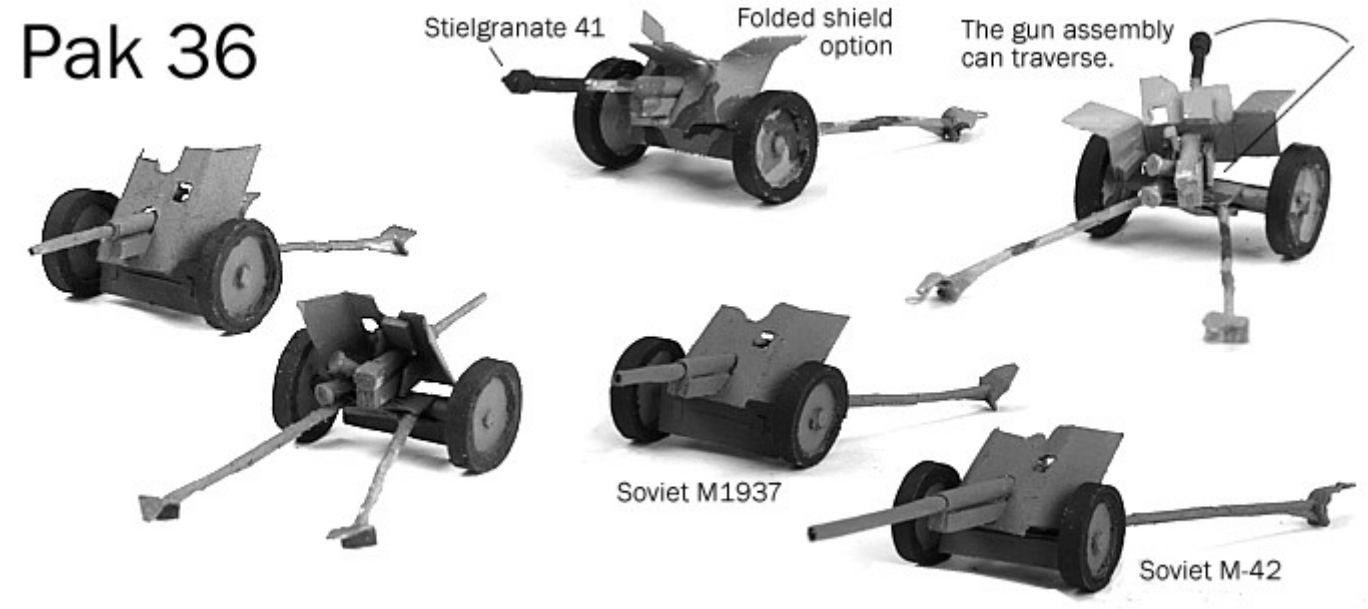
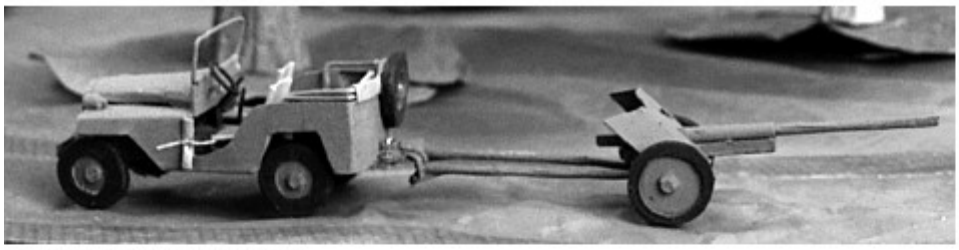
Constellation Miniatures

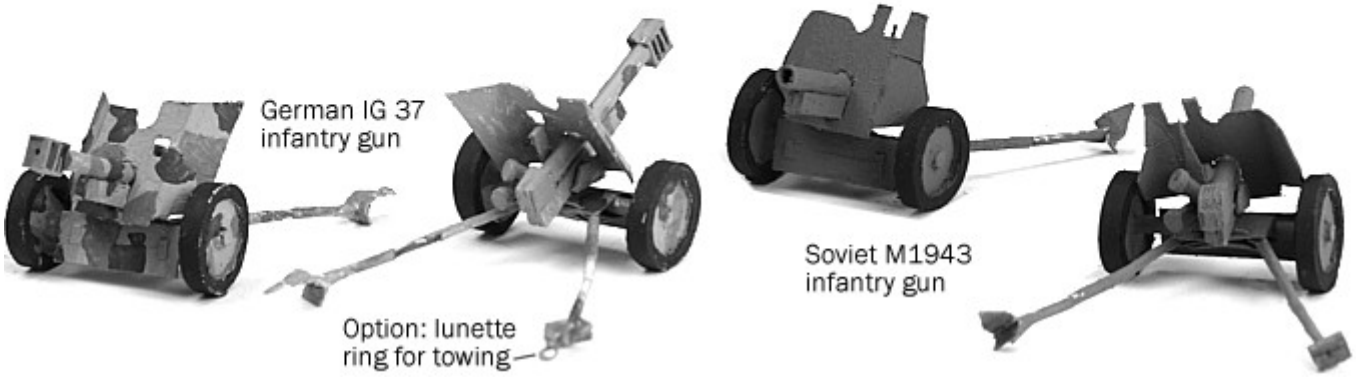
by Alexandre Karadimas

Make your own 1:64 miniatures with common household tools and materials





GAZ-64 jeep: booklet n°2



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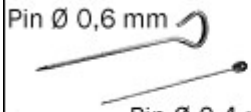
Visit the Youtube channel: https://www.youtube.com/@ToothpickMiniatures-wl7gf

Booklet 06 – Pak 36 Version 1.1– April 2026

Tooling, Materials and Production aspects

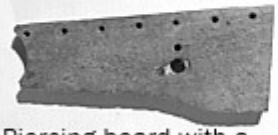
T01 Tools required for all Constellation Miniatures designs



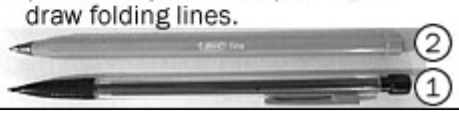

Pair of nail scissors


Small "snap-off blade" utility knife


Pair of thin pliers with a wire-cutting capability


Piercing board with a Ø 4 mm hole drilled through it, larger holes are useful

(1) Mechanical pencil Ø 0,7 mm or less (2) Roller pen (even a depleted one) to draw folding lines.

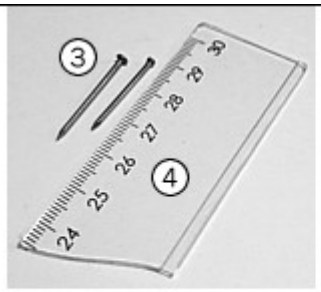


(*) Use a toothpick to apply glue to parts

(3) Set square in metric (4) Stationery hinge clips (5) Household glue, in liquid or gel form (*)

T02 Tools required for this design

(1) Metal file to deburr wire after cutting. (2) Permanent marker to mark metal wire. (3) Ø 1,1 mm nail, or object of a comparable diameter.



Recommended: a segment of a transparent ruler (4). (5) This ruler of the "aleph.pro" brand has matching measures on both sides, making it a small set square.

Always cut downwards on a cutting board and never towards any part of your body.

Please don't cut yourself.

Cutting board: a flat piece of wood, MDF, thick plastic or any other suitable material

M01

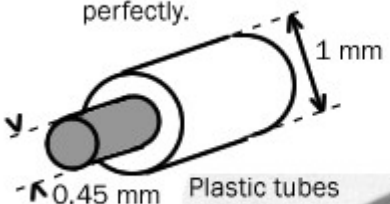
Cardboard used in packaging is technically called "thin cardboard". We will distinguish between "very thin" cardboard, as can be found for instance in packaging for biscuits (1), "regular" cardboard found for instance in breakfast cereal boxes or tissue boxes (2) and "thicker" cardboard (3).

Glue works better on the porous side of cardboard packaging. The smooth, printed side is better suited to be painted over. Glueing two smooth sides together doesn't work well.

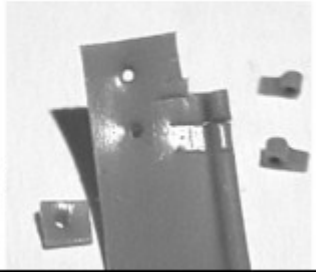
When accumulated in a front grille, the difference between regular and very thin cardboard becomes quite visible.

M02

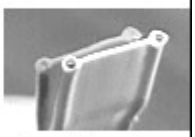
Double Wire Clips can be found in bread packaging for instance, they have very malleable wire. DWC plastic can be transformed into parts that match the wire perfectly.




Plastic tubes

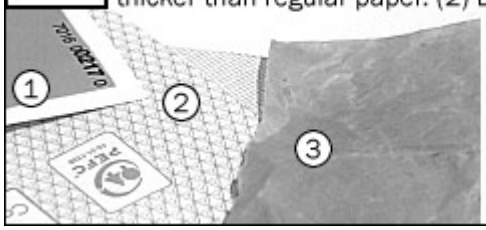


If you have double wire clips of slightly different thickness, sort them out and use only the thinner ones for this project.

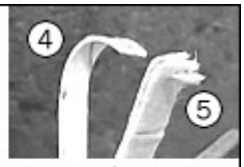


The basic car miniature will require at least three double wire clips, some special versions even more.

M03 (1) **Rigid Paper** can be found for instance in train tickets and magazine covers, it is thicker than regular paper. (2) Different patterns at the back of envelopes makes them a good source for **regular paper**, use a different pattern for each series of parts.

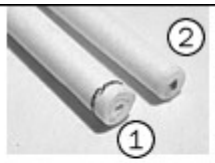


(3) **Thin Kraft paper** can be found in paper bags for fruits & vegetables.

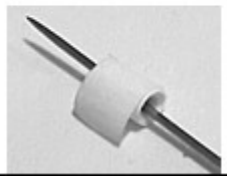


Rigid Paper is made of a single layer (4) whereas cardboard (5) is made of several layers that come apart when bent.

M04 (3) Ø 0,3 mm **thin wire** is typically sold as "florist wire" or "jewelry wire". (4) Ø 0,25 mm thin plastic-wrapped "freezer" wire can substitute for thin wire.



This design uses paper stems of ear cleaning swabs ("**Q-tips**"). It is necessary to use a variety that has a **hole** in its center (1). Note that different varieties have been marked differently (2) so that the workshop's materials supply remains manageable.



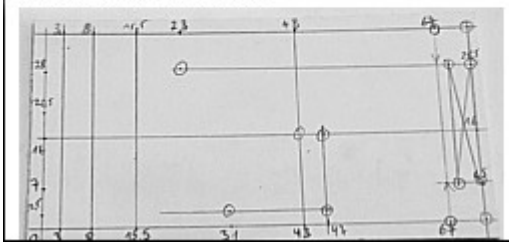
(5) Q-tips stems are a tight roll of paper. Conical shapes can be made by pushing in the center with a nail or a similar object.

Some parts have a simple design and are best draw in batches, using a ruler. Severals examples are shown in the Steps illustrations.

Other parts have a complex design, which would be too time-consuming to draw from scratch. In these cases we will first make a **template**, a piece of cardboard with all the markings needed to replicate these parts, as well as indications to modify and position them precisely afterwards.

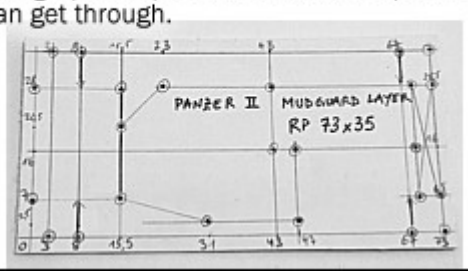
P01 **How to make templates**

1. On a white piece of cardboard, draw a rectangular frame and write the measures on all sides.



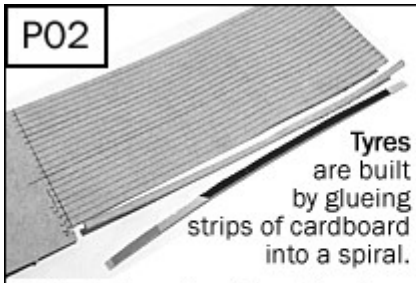
2. Use these marks as a grid to position points of the template. Draw the template.
3. Pierce the points as indicated then cut to shape.
4. Label the template. Draw the location of the folding lines with a distinct colour, also mark "special" dots.

First pierce with the Ø 0,4 mm pin then use the Ø 0,6 mm pin and wiggle it so the Ø 0,7 mm graphite tip of the mechanical pencil can get through.



Most templates are on page 6.

P02



Tyres are built by glueing strips of cardboard into a spiral.

2. Coil the strips around a pen to give it a shape.

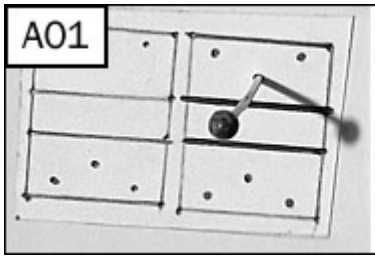
3. Start by glueing a portion of the strip to the wheel rim, so you can position it precisely at the depth you want. Let the glue harden.

1. For both ends of the strip, shave off about 1 mm from the smooth side, in order to avoid a visible "step" where the strips ends.

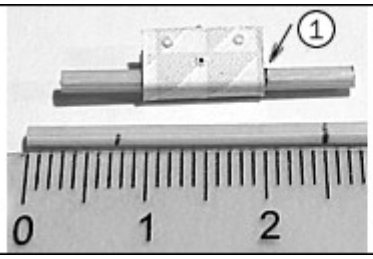
4. Glue the rest of the strip in a spiral, all at once. While the glue is still fresh, apply pressure on the spiral or rub it against a flat surface, so that the outward side has an even aspect.

Part A - Carriage & wheels

A01



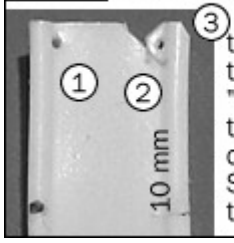
Use the **chassis** template to mark a piece of rigid paper with dots, connect them, then draw folding lines and perforate as pictured.



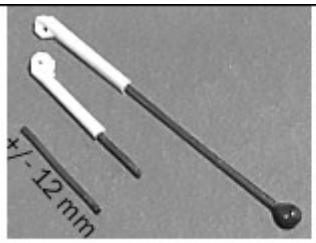
Cut a 25 mm piece of toothpick. Make a marking at 7,5 mm and use it (1) to position the chassis part when glueing the two parts together. Only one corner can be glued, it will become the upper side corner.

A02

Each trail of the split **gun trail** is made of three different pieces of DWC plastic each 10 mm long.



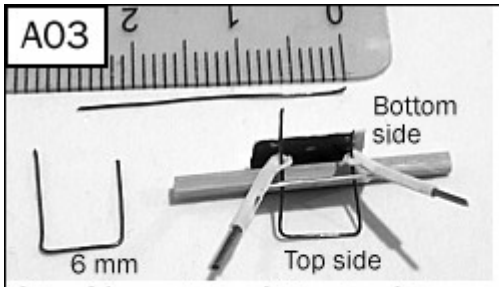
(1) Pierce the piece that connects to the gun chassis about 1 mm from the border and right next to the "tube", as depicted. (2) Cut around that hole and (3) also cut the tube diagonaly.
Separate the piece from the rest of the DWC plastic when it's done.



Use a thin pin to enlarge the tube opening and insert a piece of medium wire about 12 mm long.

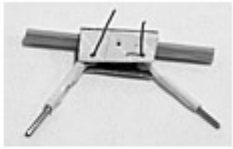
Note: for the trail elements, you can use larger or non standard DWC varieties.

A03



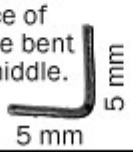
Cut a 24 mm piece of thin wire, fold about 9 mm on both sides so the central part is 6 mm long. Slide it into the chassis assembly from its top side.

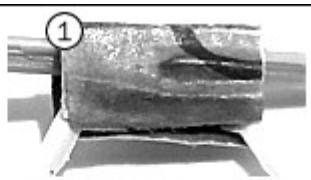
Bottom side view



Insert the trail ends onto the wire, then insert the wire throught the bottom side.
Be patient, this is a delicate step.

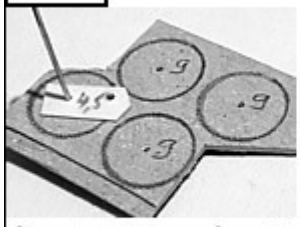
Fold the ends of the thin wire. Insert a 10 mm piece of medium wire bent 90° in its middle.





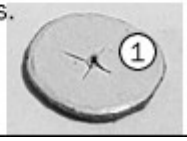
(1) Glue a piece of thin kraft paper (about 10 x 5 mm) on the bottom side, trapping the medium wire hook and the thin wire strands. Use a toothpick to push the wet paper.

A04 Pak 36 wheels

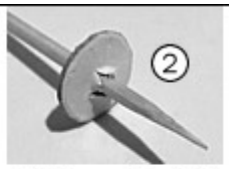


Glue two layers of regular cardboard together and use a 4,5 mm compass to draw **Ø 9 mm** circles.

Use nail scissors to cut out Ø 9 mm disks.

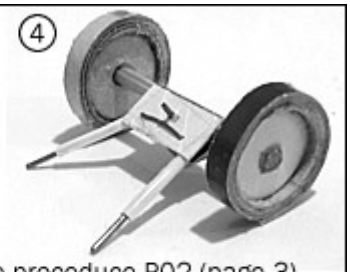


(1) Pierce the center of the disk with a thin pin, then cut two perpendicular lines across it.



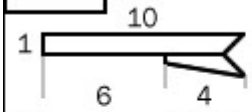
(2) Pierce the disk with a toothpick.

(3) Shave off the "petals".

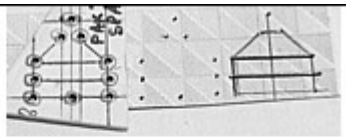


(4) Follow the proceduce P02 (page 3) to create Ø 12,5 mm wheels.
The **strips are 2,5 mm wide** and between **125 and 130 mm long**, depending on the cardboard used.

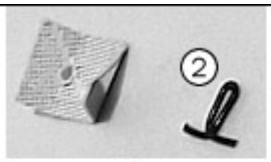
A05 Trailer ends



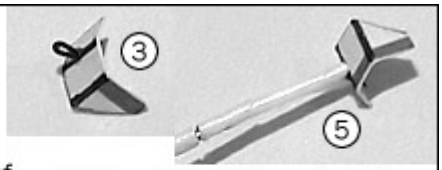
Cut a piece of DWC plastic as depicted above.



Make the spade parts from rigid paper. (1) Pierce the lower folding line in the middle.

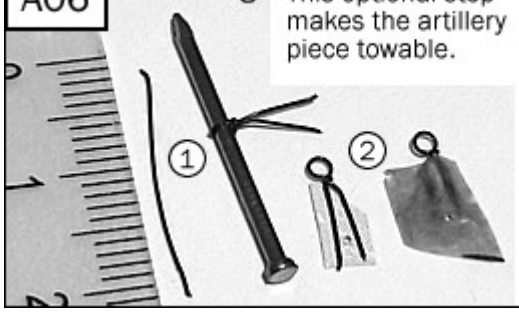


(2) Fold a 10 mm piece of thin wire in two. Leave 1 mm of the U-shape piece free when holding it in pliers, fold both ends to the side to create a T-shaped piece as shown above.



(3) Insert the T-shape into the folded spade part. (4) Insert about 10 mm of medium wire into the DWC part. (5) Insert the spade assembly into the DWC trailer end part.

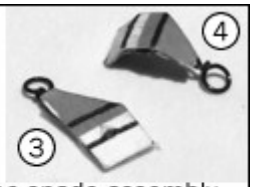
A06 Lunette ring



This optional step makes the artillery piece towable.

(1) Fold a 20 mm piece of thin wire in two then use a 1,1 mm nail to twist a loop.

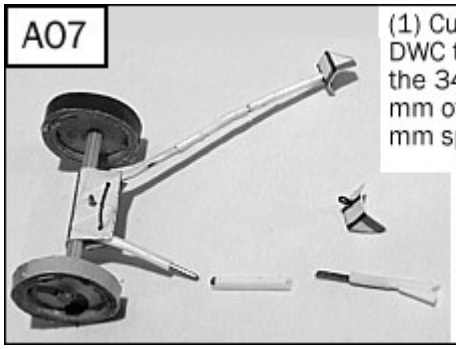
(2) Position the piece on a spade part and glue a piece of thin kraft paper on top of it. Use a toothpick to push the wet paper.



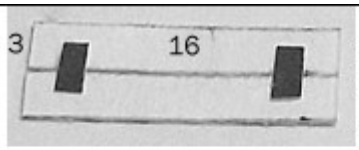
(3) Cut the excess of kraft paper then (4) use pliers to bend the spade assembly into shape.

The T-shaped wire part (Step A05) should be long enough to connect this part into the DWC part.

A07

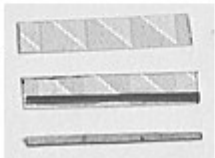


(1) Cut a 10 mm piece of DWC tube and assemble the 34 mm trail: 10+10+10 mm of DWC parts and a 4 mm spade part.



The **carriage shield** is made of two 16 x 3 mm pieces of rigid paper, held together by two 2 x 1 mm pieces of rigid paper.

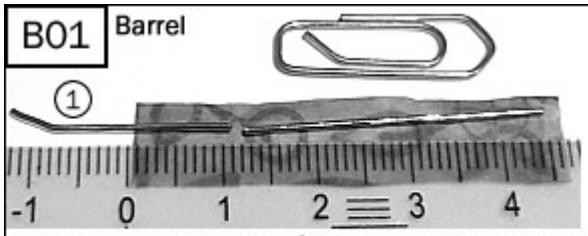
The M-42 antitank gun has 40 mm trails: 12+12+12 mm pieces of DWC plastic parts and a 4 mm spade part.



For the folded shield (transport mode) glue a thin strip of cardboard on the bottom side.

Part B - Gun & shield
Part C - Painting

B01 Barrel

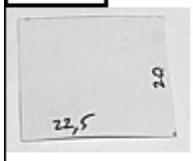


Cut a 12 mm-wide piece of thin kraft paper to the desired length (see dimensions page 6) then apply glue to one side. The internal wire piece doesn't have to be as long as the paper: use another piece of wire of the same diameter (1) when rolling the kraft paper around the wire (2).

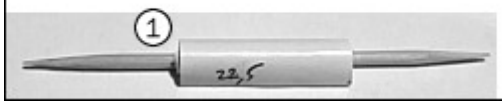
In this design, a piece of wire is necessary to build the barrel to the correct diameter. You can use 0,5 mm medium (DWC) wire for the Pak36 (37 mm weapon) and 0,7 mm wire from paperclips for the 45 mm soviet antitank guns.

Remove the wire pieces while the glue is still fresh.

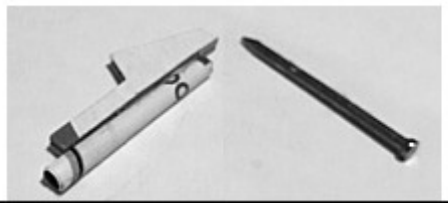
B02 Barrel reinforcement



Cut a 20 mm piece of smooth paper to the desired length (see page 06) then wrap it first around a toothpick to give it a cylindrical shape (1).

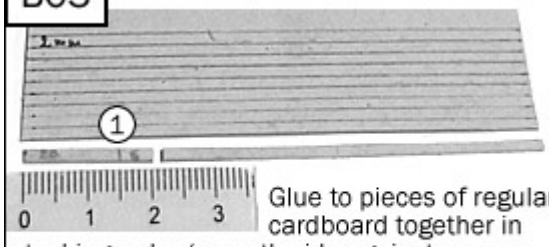


(2) Apply glue inside the piece of paper then wrap it around the barrel tube.



For the barrels of the infantry guns, wrap a 20 mm piece of smooth paper cut to the desired length around a Ø 1,1 mm nail.

B03 Recoil recuperator

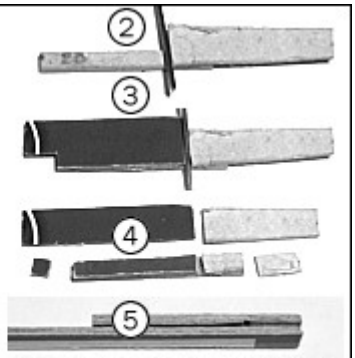


Glue to pieces of regular cardboard together in stacking order (smooth side against porous side). Draw and cut 2 mm stripes as you need.

Cut one segment to the length of the recoil recuperator (see table on page 7) then draw a line at 5 mm from one of the borders (1).

(2) Place a piece of DWC wire on this line, then glue leftover pieces of cardboard (single layer only) left and right to it (3).
Once the glue has hardened, cut the excess off (4).

Finally, glue the assembly to a 2 mm double-layer strip (5) and trim to fit when the glue has hardened.



Note: glue so one side is even; the uneven side will be underneath.

Pak 36
Templates
Scale 1:64
Page 1/1

Flip it along this side

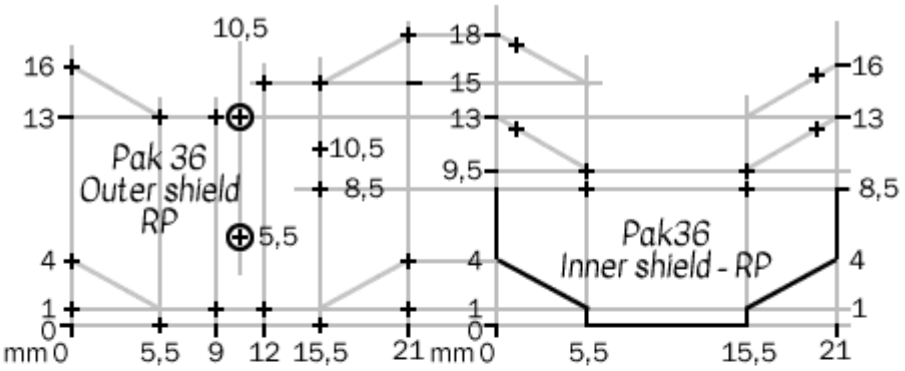
+ Pierce for 0,7mm

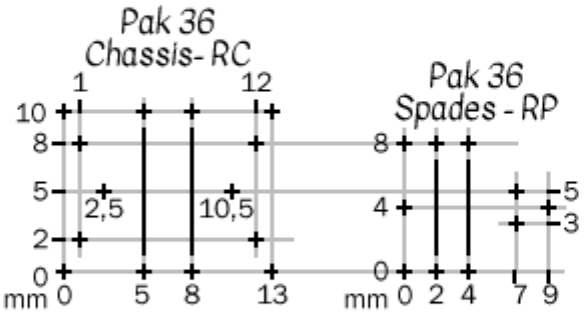
⊕ Special purpose

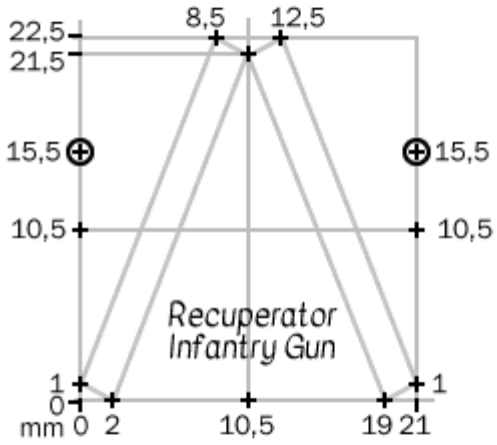
Folding line

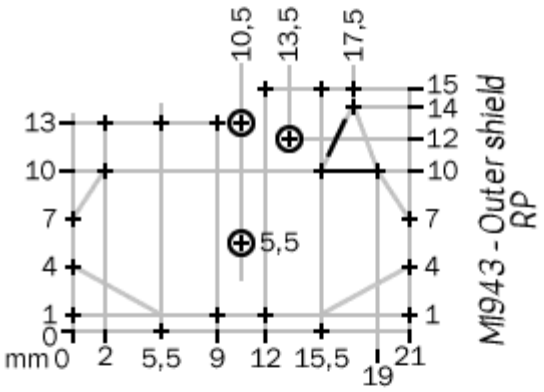
Connect to symmetrical counterpoint

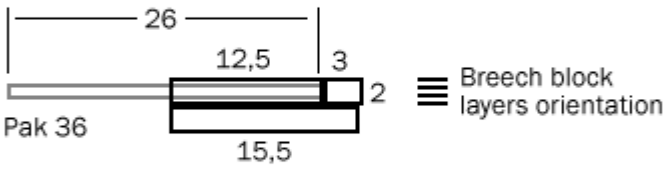
RC: Regular Cardboard
RP: Rigid Paper

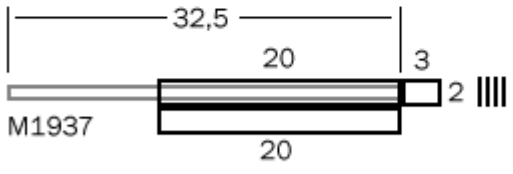


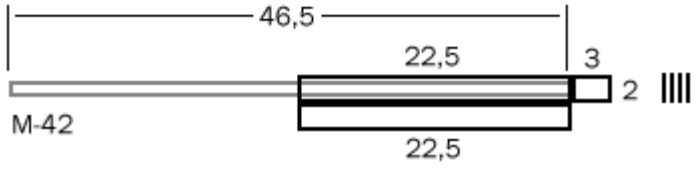


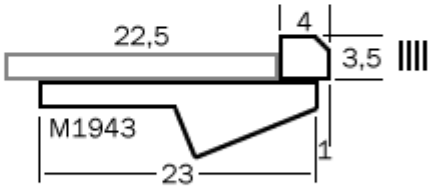


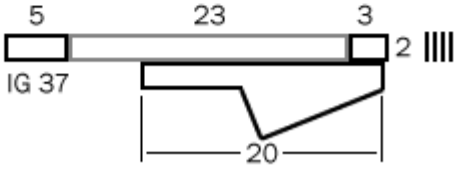








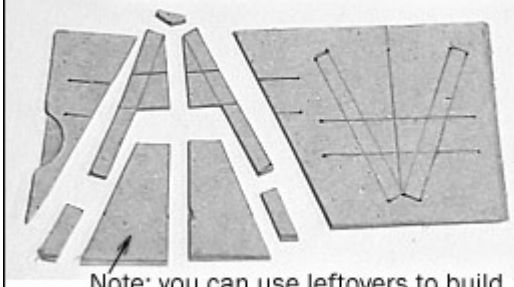




Diagrams on this page are not all at the same scale

B04

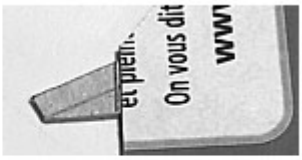
You can use an **elevated recuperator** for the infantry guns.



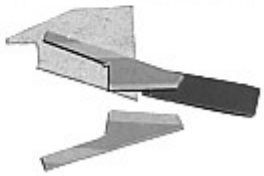
Note: you can use leftovers to build straight recuperators with them.

Glue two smaller pieces of cardboard together (in a stacking order) and use the template on it.

The pencil line is around 0,7 mm wide, comparable to the thickness of DWC wire, so it you place the piece on either side of the line you will have a gap within specifications.

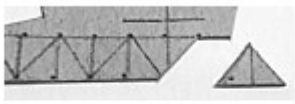


The rest of the procedure is as in the step B03.

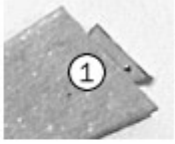


B05

Trunnion



Cut off the **trunnion** triangular parts as depicted. Place a dot on a lower corner to differentiate between left side and right side.

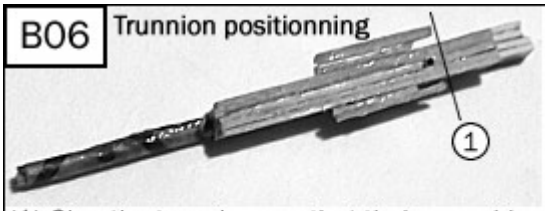


(1) Glue the triangular parts to a larger piece of cardboard so that a small band of about 1 mm remains free. This will create a visual gap between the trunnion and the recuperator.

(2) Once the glue has hardened, cut off the triangular assembly. (3) Cut off the top corner.

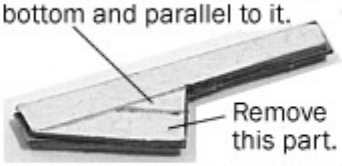
B06

Trunnion positionning



(1) Glue the trunnions so that their rear side is at the level of the back of the axle hole. The trunnion parts align on the bottom of the recuperator piece.

For the elevated recuperator, draw a line 3 mm from the bottom and parallel to it.



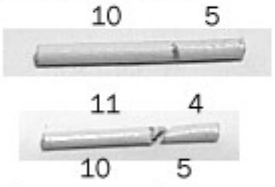
This is how the elevated recuperator piece should be positionned on the carriage.

Here as well, glue the trunnions so that their rear side is at the level of the back of the axle hole.
The trunnion parts align on the bottom of the recuperator piece (2).

B07

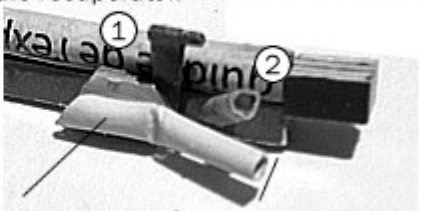
Controls and sights

Roll a 15 x 10 mm piece of smooth paper into a cylinder about 1,5 to 2 mm of diameter.



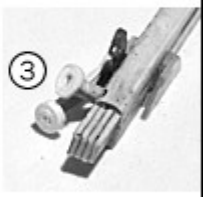
Cut about a 45° angle from the 10 mm marking as depicted.

(2) Glue the smaller part at an angle.
(1) Slide the sights between the trunnion and the recuperator.



Flatten at 5 mm from the tip and glue to the left hand side trunnion so that the other end is at the level of the recuperator's back.

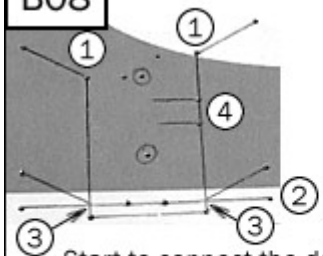
Sights: cut a 6 x 1,5 piece of regular cardboard and cut one end at a 45° angle. Glue a strip of thin kraft paper to it, trim the width to fit, use it to glue a 3 mm piece of DWC wire to its (smooth, not porous) side.

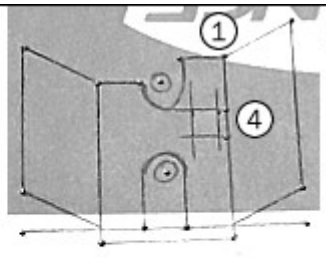


Finally, cut slices off a Q-tip stem, about 0,5 to 1 mm thick. (3) Glue them to the ends of the cylindric pieces.

B08

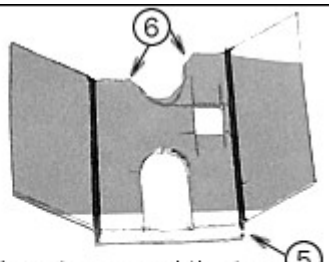
Shield





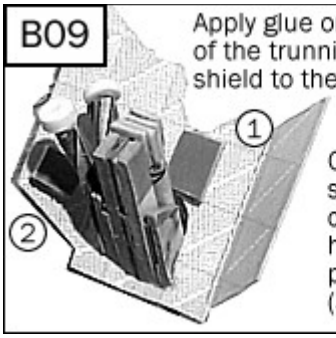
Start to connect the dots from the outside inwards. In order to keep the template easy to use, two points have to be made manually. The points (3) is located where the lines (1) cross line (2).

(4) Use the positioning dots to draw two perpendicular lines to line (1). Draw two parallel lines 0,5 mm and 2,5 mm from line (1), cut away the rectangle.

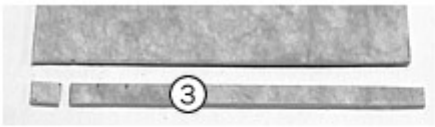


Draw a circle about 3 mm in diameter around the two "special purpose" dots (you can use the stem of a Q-tip as a guide) then remove as pictured. Remember to spare the shield's bottom 1 mm band (5) when cutting the hole for the gun. (6) Cut the corners to give them a rounder shape.

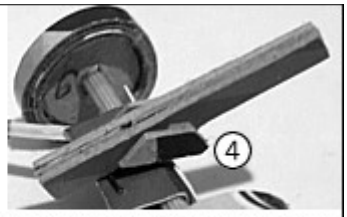
B09



Apply glue on the external side of the trunnions then glue the shield to the gun assembly.



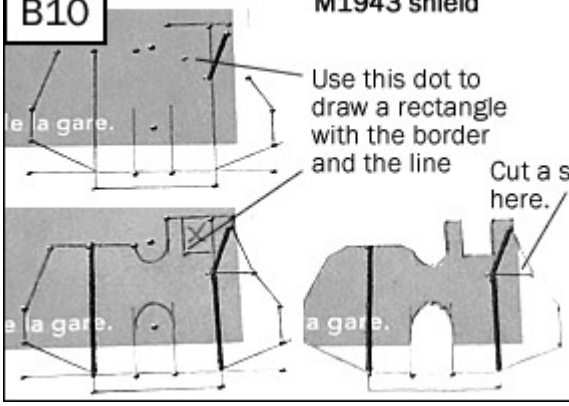
Optional: the Pak 36 can have two boxes on the inner shield, one 3 x 4 mm with its left side aligned to the center line (1) and another 3 x 2 mm box on the left hand side (2). To make these boxes, glue two thicker pieces of cardboard together and cut out a 3 mm strip (3), then cut to size.



For the elevated recuperator assemblies, it may be necessary to cut off the pointy ends of the trunnions.

B10

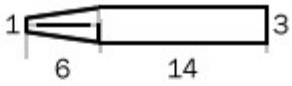
M1943 shield



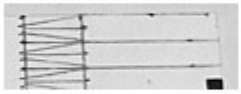
Use this dot to draw a rectangle with the border and the line

Cut a slit here.

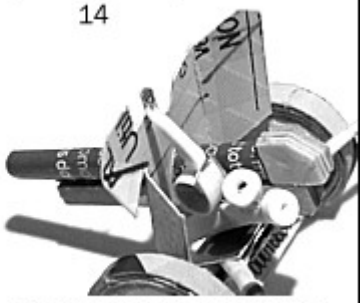
For the **M1943 sights**, cut a piece of rigid paper as depicted.



Cut half of the base for the 6mm part and fold it 90°.



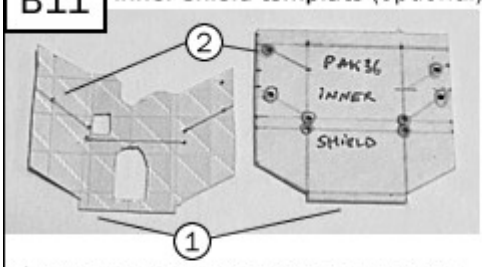
Use a Q-tip stem to roll and glue the 14 mm part onto itself.



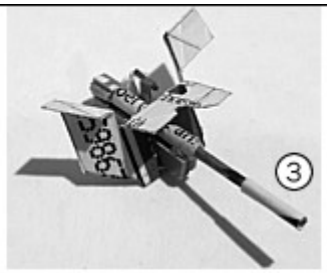
Glue to the side of the gun assembly as depicted.

B11

Inner shield template (optional)

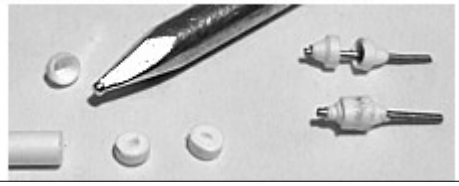


(1) Use the "lower band" to position the inner shield template to the shield's rear side. (2) Use these dots to draw the folding lines.



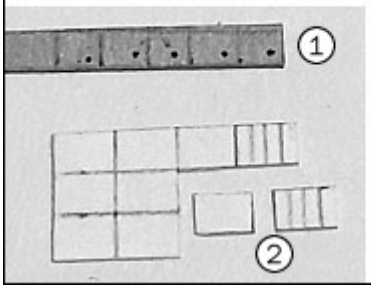
Cut the shield panels so they are free to be folded, as seen above.

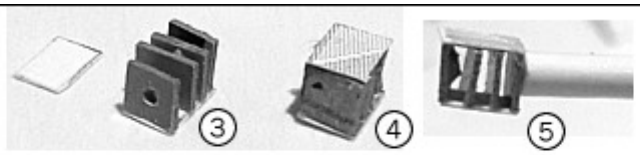
(3) A 7 x 4,5 mm piece of smooth paper has been rounded and glued onto the end of this barrel. This is the tube of the **Stielgranate 41**. The "shape charge" part is made from 1 mm slices of Q-tip stem, pushed by the tip of a nail into a bell shape, then slid on a 10 mm piece of wire and glued together back to back.



B12

The **IG 37 muzzle brake** is a delicate piece to make.





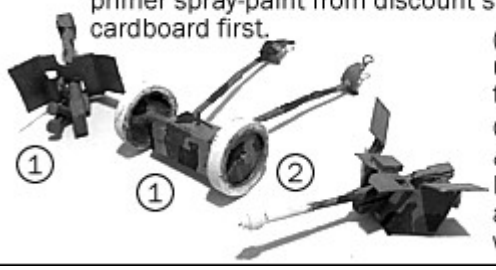
(1) Make a 3 mm strip of regular cardboard in order to have the exact same height for all parts. Draw at least four 3 x 3 mm squares on it and mark their upper side.

(2) Make two 4 x 3 mm pieces of rigid paper and apply glue to one of them. (3) Glue the squares on it, porous side rearwards, then apply glue to the second piece and close the shape (4). (5) When the glue has hardened, glue the muzzle break to the barrel.

Before stage (3) you can perforate the front square against some soft material like cardboard with a thin pin then a larger pin.

C01

(1) Paint the carriage and the gun assembly separately. Spray-paint a base-layer first. Do **not** use a water-based spray paint, it will warp the cardboard and paper parts. From experience, inexpensive grey primer spray-paint from discount shops is difficult to paint over. Experiment on a separate piece of cardboard first.



(2) Paint the main colour first, using the tyres or the barrels to hold the miniature.

Colours: (Soviet) mix Olive green & grey (late-war German) mix Light Yellow Ocre with grey, flecks are soviet olive and Burnt Sienna with grey. German Panzergrau is a darker medium grey.

Use a dark grey to paint the tyres (3), as well as the sight scope (4) and the Stielgranate 41 (5).