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# Modelling the Panzer IV in 1/72 scale

Alex Clark

*Consultant editor* Robert Oehler





**ALEX CLARK** was born in southern England in 1972, but has spent most of his life living in the north east. He was an enthusiastic aircraft modeller before switching to 1/72-scale armour in his early twenties. After completing a PhD in chemistry, he moved to Newcastle where he now works as a computer programmer for a scientific software company. He is married to Jeaninne and has two young sons.

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Consultant editor Robert Oehler  
Series editors Marcus Cowper and Nikolai Bogdanovic



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My wife, Jeaninne – who put up with my constant talk about writing this book, even though she has little interest in armour modelling!

Alex Clark, July 2004

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# Introduction

Small-scale armour modelling in 1/72 and 1/76 scales has become increasingly popular over the last few years. For 1/72 scale in particular, the abundance of new kit releases and aftermarket accessories is evidence enough. A small-scale modeller can now buy photo-etched detail sets, turned metal barrels and even resin interior detail sets. Some of the best kits exhibit detail worthy of 1/35-scale models from companies such as Tamiya and Dragon (DML). This book takes a look at some of the current examples of Panzer IV-based kits. It also focuses exclusively on 1/72 scale.

I became interested in small-scale armour at a time when the Esci range of kits was still readily available. Not only was this range extensive, the kits were also well detailed and affordable. My local model shop had far more choice in this scale than 1/76. Ever since then I decided to stick with just the one scale and not mix them together. I suppose in that sense I'm a bit of a purist! Many of the aftermarket detailing sets are also to be found in 1/72 scale. Although I enjoy scratch-building my own details, I will use aftermarket items when appropriate. Photo-etched sets are available for many 1/72-scale kits, yet in contrast are very uncommon for 1/76 scale. However, there are many excellent 1/76-scale kits to be found in both resin and injection-moulded media. It also appears to be the scale of choice for many of the smaller model companies, with an impressive number of kits available from the likes of Cromwell Models, Milicast and others. Attempting to include these in a book of this size would be an impossible task, so the decision to focus solely on one scale was also a practical one.

Although not as glamorous as some of the other German tanks, such as the Tiger and Panther, the Panzer IV was the mainstay of the German armour forces. It was built in large numbers and served in various incarnations throughout the course of the war. It also provided the basis for many different types of armoured vehicle built on a common chassis. Many of these are represented as kits or conversions and are also served well by the aftermarket sector.

Due to the sheer number of different Panzer IV related vehicles, I have concentrated on those based on later versions of the tank, the Ausf. H and J. I've attempted to select an interesting cross-section of vehicles with a representative from each of the following categories: Panzer, Jagdpanzer, Sturmpanzer, Sturmgeschütz and Flakpanzer. This selection also enables different painting and finishing techniques to be illustrated, such as a winter whitewash finish, mottled patterns and late war hard-edged camouflage. I hope that some of the techniques outlined will be useful for other types of vehicle – perhaps even for those interested in other scales as well.

Ultimately this book can only scratch the surface of such a broad topic. Nevertheless, I hope it provides some thought-provoking and useful ideas for modellers.

The range of aftermarket accessories now available in 1/72 scale is impressive and includes turned metal barrels, photo-etched detail sets, resin interiors and *zimmerit* sets.



# Tools and materials

Most of the tools I use can be found on any modeller's workbench and include craft knives, wet and dry paper, files, various glues and so on. I have a full set of micro drill bits and these have many uses, particularly for opening out solid gun barrels and aerial mounts. Although these can easily be rotated between the finger and thumb, I sometimes use them with a pin vice.

Several specialist tools are available for bending and folding photo-etched parts, such as the Hold and Fold and the Etchmate. Although I do own one of these, I only use it for larger parts such as fenders. Most of the time I simply use small, flat-nosed pliers in combination with one, or sometimes two, steel rules.



Although I've built up a range of modelling tools over many years, the small selection shown here are those I use most of the time. They include a pin vice, files, steel rule, various cutting and scribing tools, wire brush for cleaning files, callipers, tweezers and a pair of flat-nosed pliers.

Along with traditional polystyrene cement, there are a variety of other glues that I occasionally use. In particular, cyanoacrylate (superglue) is ideal for materials such as resin and metal. Many brands also offer the glue as a gel and I prefer this to the liquid variety for several reasons. It has a slightly longer drying time, which gives the opportunity to reposition parts. It also has the ability to cope with small gaps (because of this, it's sometimes referred to as gap-filling superglue). Specialist superglues such as those in the Zap-A-Gap range have other useful properties. Some are odourless, others have long setting times, but I've found that the standard gel suits most of my needs. Two-part epoxy glues are also useful as they are available with a variety of different drying times and form very strong bonds. Five-minute epoxy is my favourite as it gives plenty of time to reposition parts, but doesn't require a lengthy wait before allowing work to continue.

For filling gaps, I use Milliput two-part epoxy putty. For smaller gaps and in particular sink marks I find that liquid putty such as Mr Surfacer is useful. This is available in various thicknesses, labelled as 500, 1000 and 1200 grade. For representing cloth, tarpaulins and other similar materials I use Duro two-part putty. It has different properties to Milliput and an almost elastic nature that enables it to keep its shape more readily. It also forms creases and folds much better than Milliput.

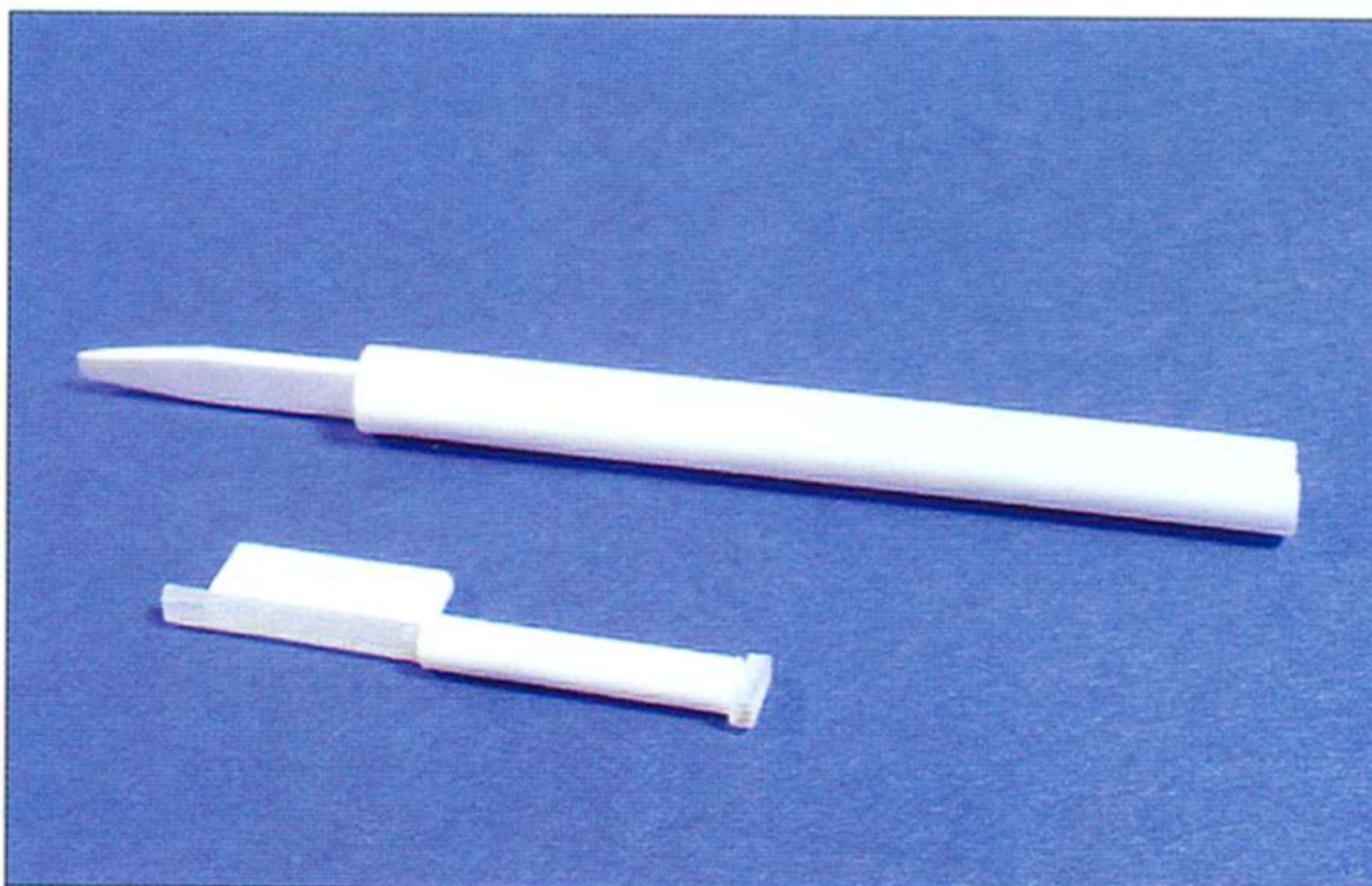
For creating *zimmerit* I use two homemade tools. Both are used to impress the pattern on to a thin layer of Milliput. The first tool is just a strip of plastic filed into a wedge shape at one end. The tip of this can be used to gently



I use a variety of glues suitable for different materials. For plastic I use polystyrene cement and occasionally liquid poly. For other materials such as resin and metal I generally use cyanoacrylate (superglue) gel. Two-part epoxy glues are also useful as they have a longer setting time than standard superglue.



Milliput two-part epoxy putty is ideal for filling gaps as it doesn't shrink on setting and is easy to sand smooth due to its hardness. Mr Surfacer is a liquid putty, ideal for filling sinkmarks and scratches. Duro is a two-part putty useful for representing cloth and tarpaulin items. It has different properties to Milliput and has a slightly elastic nature to it.



Modelling *zimmerit* in 1/72 scale has always been a challenge. Although there are now aftermarket photo-etched and resin *zimmerit* sets, there are still occasions when there is no choice but to follow a more homemade approach. I use Milliput as the raw material and a couple of homemade *zimmerit* tools to impress the pattern on it. One of these is chisel shaped whilst the other is formed from a ridged strip from the side of a CD case.



I've built up a large variety of plastic strip, rod, tubing and sheet over many years. The Evergreen brand from the USA is good, although there are other similar ranges available.

impress ridges into the putty. The second tool is made from a strip taken from the edge of a CD case. The edges have a series of evenly spaced ridges that are ideal for impressing *zimmerit* in this scale.

Plastic sheet, strip, tube and rod are essential for scratch-building. When used inventively almost any type of part can be crafted. However, scratch-building multiple copies of the same part is time consuming and often impractical. In such cases I usually resort to casting copies in resin. Although mould making and resin casting could be considered a fairly advanced technique, it isn't quite as daunting as it may appear. For simple items, one-part moulds are suitable and this greatly simplifies the process. The initial cost of the materials – RTV or silicone rubber for the mould and resin for the casting material – is relatively high, but a large number of moulds and parts can be made over time.



There are times when I need multiple copies of a scratch-built part. Silicone and RTV (Room Temperature Vulcanising) rubber are suitable for making moulds of such items. Some simple mould-making techniques are discussed later in the book.

Once a mould has been created from a master part, I use a two-part resin called Quickcast to make the copies. Although the initial cost of such resin is relatively high, a large number of parts can be made and I've found that it lasts a long time. This particular resin hardens in a matter of minutes and is ideal for making many small items, such as wheels, in a short space of time.

Further discussion of simple mould making and casting can be found in the chapter on the Sturmpanzer IV.

I use Humbrol enamels for most of my painting, but I also have a small selection of other types of paints. Vallejo Model Color acrylics have strong, vibrant colours and are very opaque. This makes them ideal for painting smaller details, especially when painting a light colour over a darker colour. Recently I've also started experimenting with Tamiya acrylics. Oil paints are useful for various weathering effects due to their strong colours and long drying time. They can also be mixed with enamels, which modifies the properties of the resulting mix. Along with a selection of good-quality paintbrushes I use a Badger 150 dual-action airbrush. I've found that the fine tip/needle assembly for this is suitable not only for fine lines but also for overall coverage of most small-scale models. For any serious amount of airbrushing work a compressor with moisture trap is essential. A pressure regulator is also highly desirable, especially when working on intricate, mottled camouflage schemes.



I use Humbrol enamels for the bulk of the painting I do. I airbrush these using a Badger 150 airbrush combined with a fine tip/needle assembly. I also have a small selection of other paints including Vallejo Model Color and Tamiya acrylics. These are excellent for painting smaller details, as the colours are opaque and vibrant. For weathering I also use oil paints and pigment powders

# Panzer IV Ausf. H in winter camouflage

<i>Subject:</i>	<i>Panzer IV Ausf. H in winter camouflage</i>
<i>Skill level:</i>	<i>Intermediate</i>
<i>Base kit:</i>	<i>Revell Panzer IV Ausf. H (03119)</i>
<i>Scale:</i>	<i>1/72</i>
<i>Additional detailing sets used:</i>	<i>PART Panzer IV Ausf. H photo-etched detail set (P72050)</i> <i>PART Panzer IV photo-etched fender set (P72063)</i> <i>Aber Panzer IV Ausf. H turned metal barrel (72L20)</i> <i>Warriors Winter Tank Crew (WA 72001)</i> <i>Warriors Winter Tank Riders # 1 (WA 72002)</i> <i>Warriors Winter Tank Riders # 2 (WA 72003)</i> <i>Karaya copper cable (0.6mm diameter)</i>

This chapter deals with a relatively straightforward build using one of Revell's excellent Panzer IV kits. This particular variant, a late Ausf. H, was released alongside an early version Ausf. J. Although both kits are very similar, there are some small detail differences, and these are provided on a separate sprue. Although there have been many excellent small-scale kits released since these appeared, they are still amongst my favourites in terms of accuracy and ease of construction.

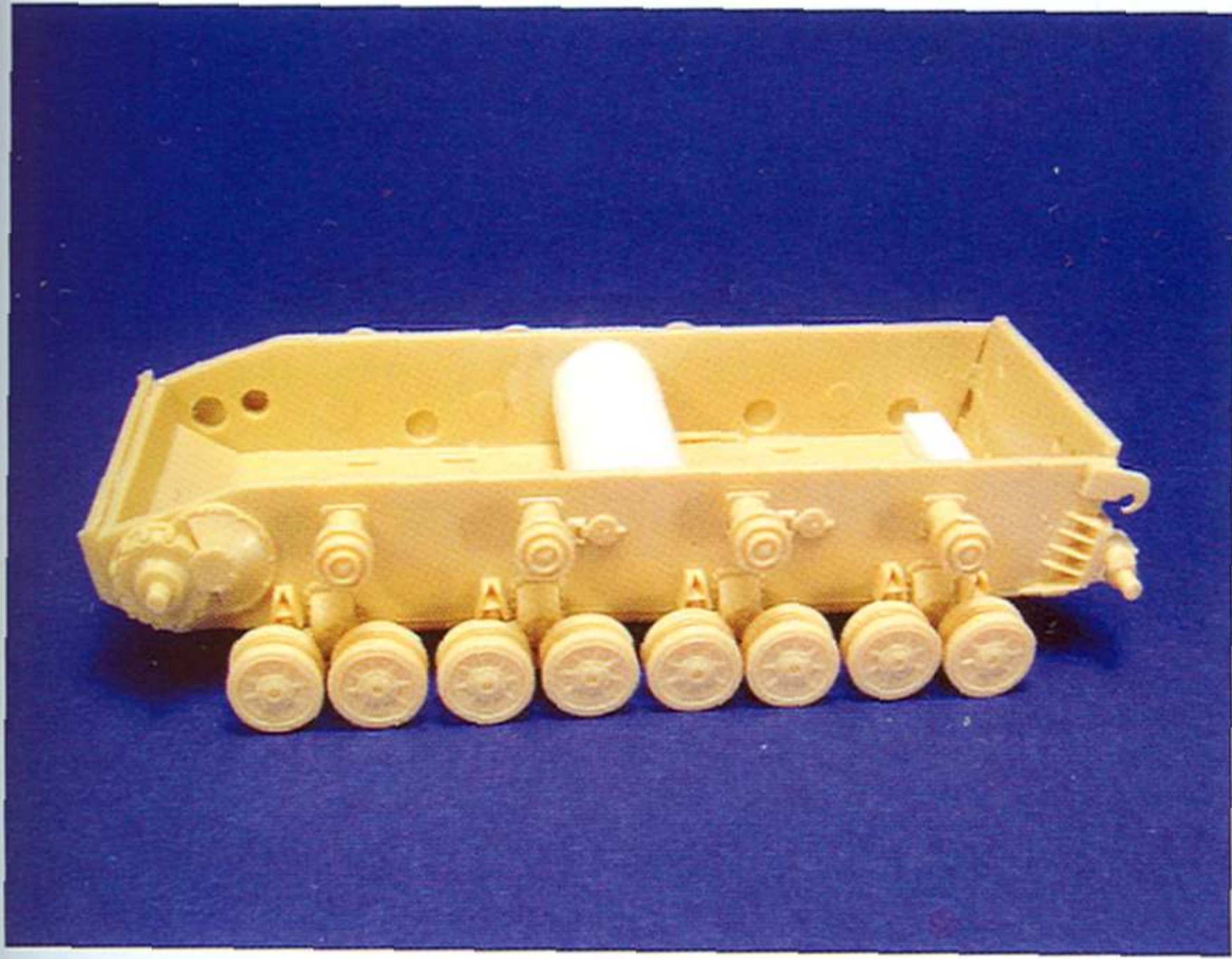
## Assembling link and length track

I built up the lower hull as per the instructions and then started work on the track. Revell favour the hard plastic link and length track and personally I prefer this to the alternative elastic-band style. The latter are single pieces and are usually made from a vinyl or rubber-like material. It's easier to achieve realistic track sag with link and length track and the plastic takes glue and paint much better. The main drawback of link and length track, especially in smaller scales, is that they can be very fiddly to put together. Fortunately the Revell parts are well engineered and fit together very well. There are several different methods that can be used to assemble them but I usually just glue the complete track runs to the lower hull before painting. The accompanying step-by-step photos illustrate one method of doing this.

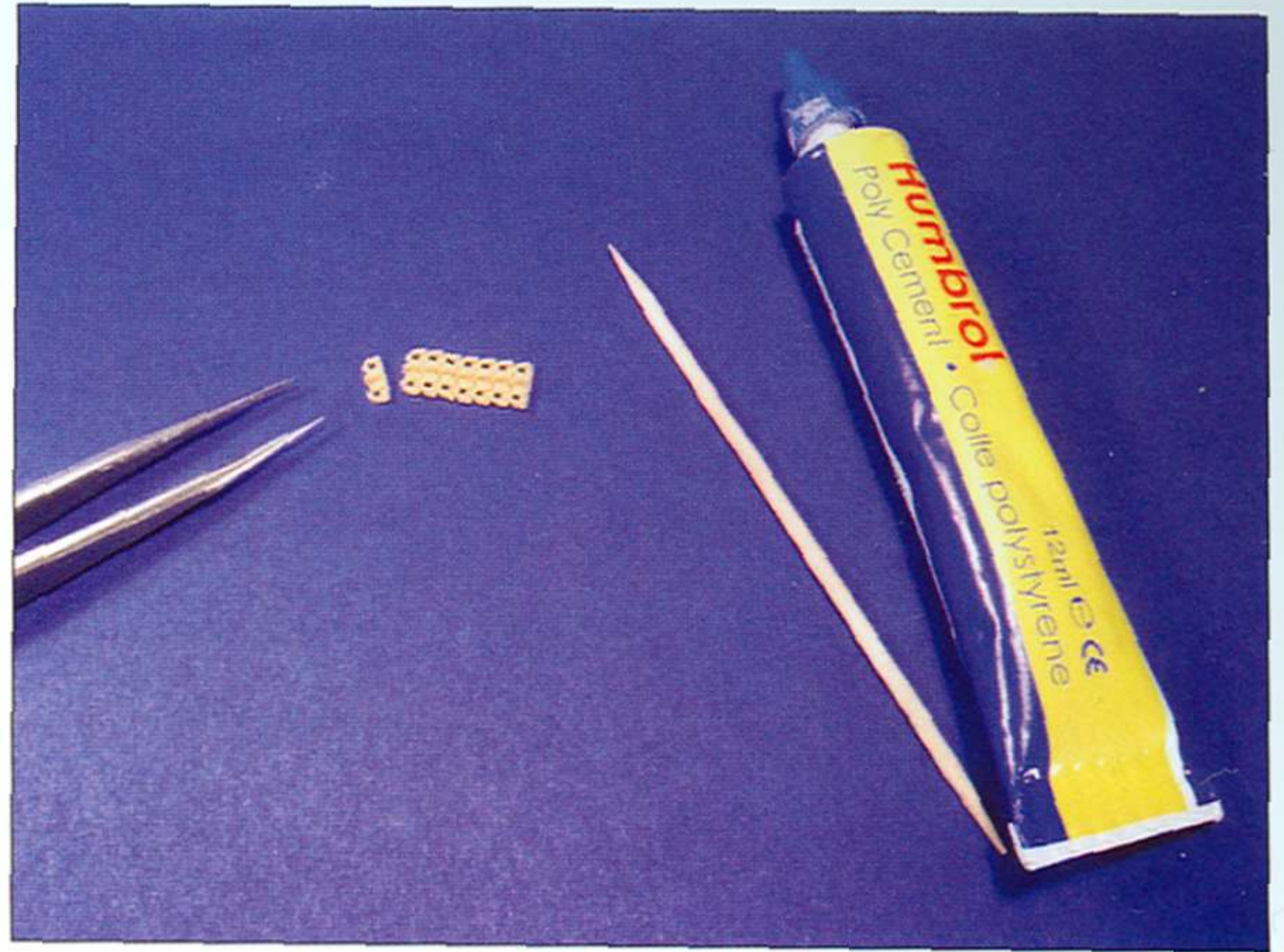
## General construction

With the lower hull complete I started work on the upper hull. Unfortunately some of the tools and other equipment are moulded directly onto the fenders. They are also a little 'flat' looking with no undercuts – probably a consequence of moulding limitations. Several photo-etched details sets are available for this kit, including a fender replacement set from the Polish manufacturer PART. These fenders have the benefit of a better treadplate pattern than that on the kit, as well not having any moulded-on tools. I decided to use this set and removed the kit fenders from the upper hull piece. Each etched fender is provided as a frame and several sections of patterned treadplate. I found it easier to discard the frame and cut out a plastic strip that matched the size of the fenders. Then it was just a case of gluing the treadplate sections to the strip. The photo-etched frame would be useful if representing heavy battle damage as it's easy to twist and bend, but it is much more delicate and difficult to work with.

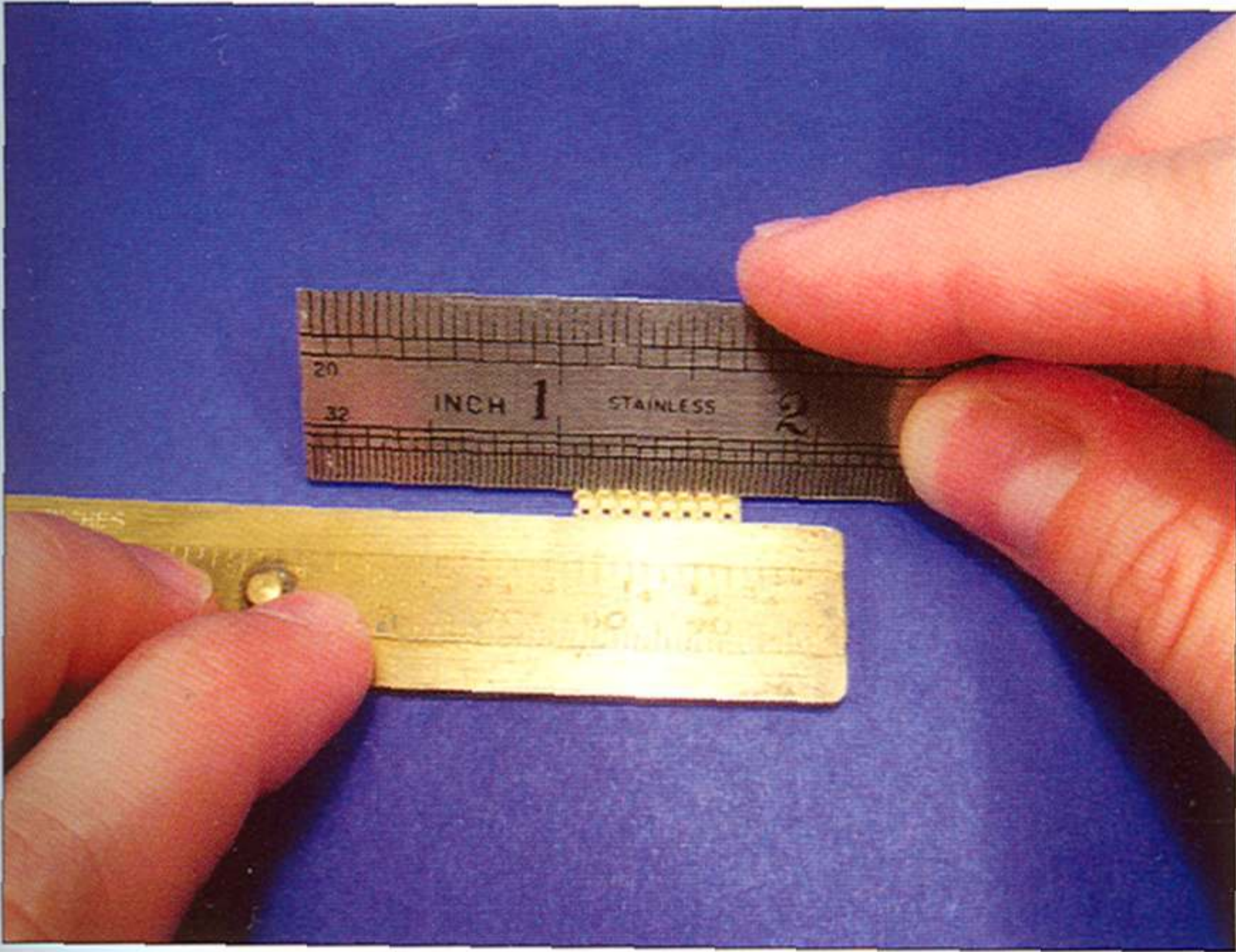
Most Ausf. H vehicles had *zimmerit* anti-magnetic mine paste applied to some of the hull and turret surfaces. With the kit fenders removed, I decided to



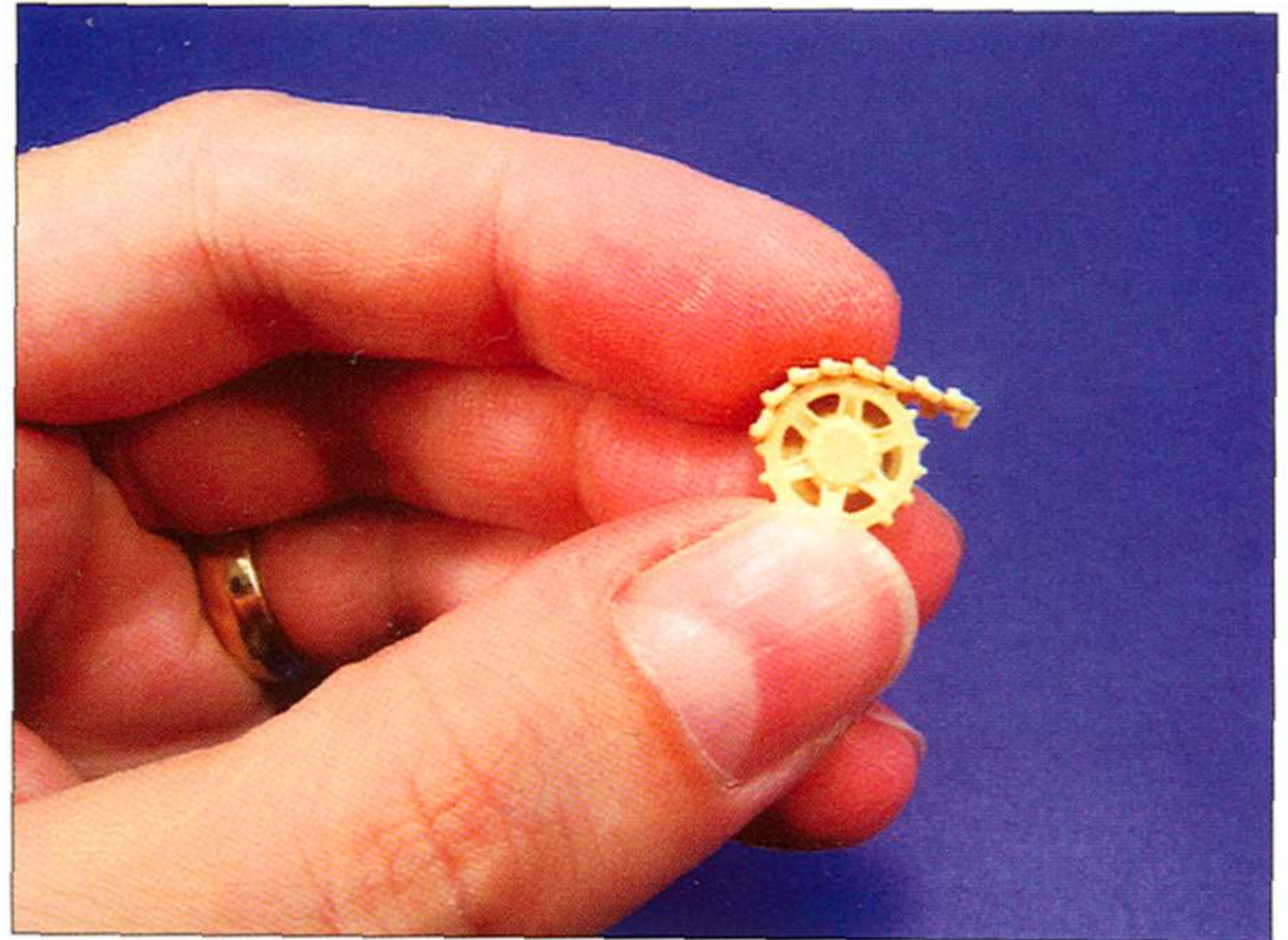
The lower hull and wheels were assembled as per the instructions. Note the white tube section that adds extra rigidity to the hull.



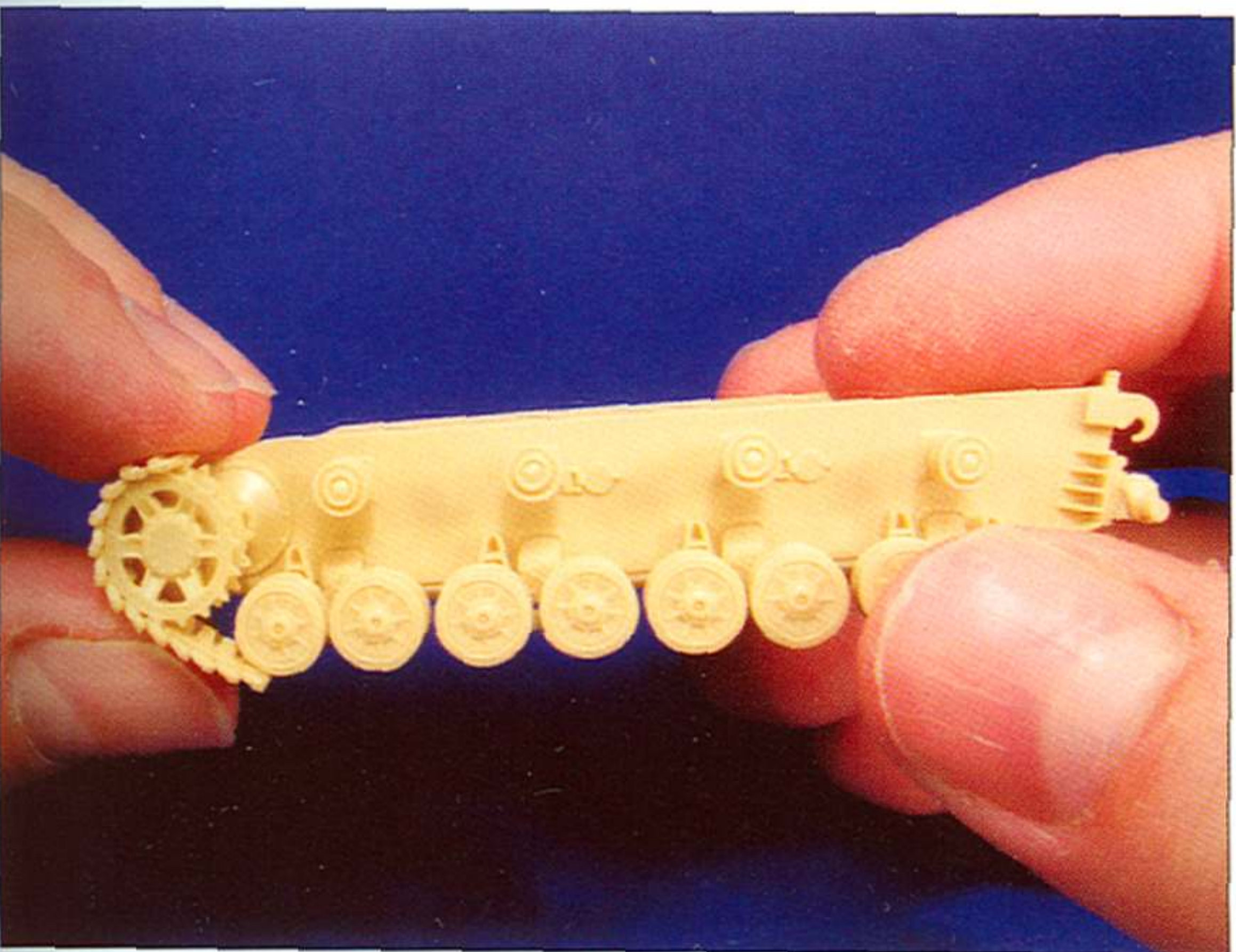
I started work on the track by gluing several individual links together. Tweezers and a toothpick are useful for this.



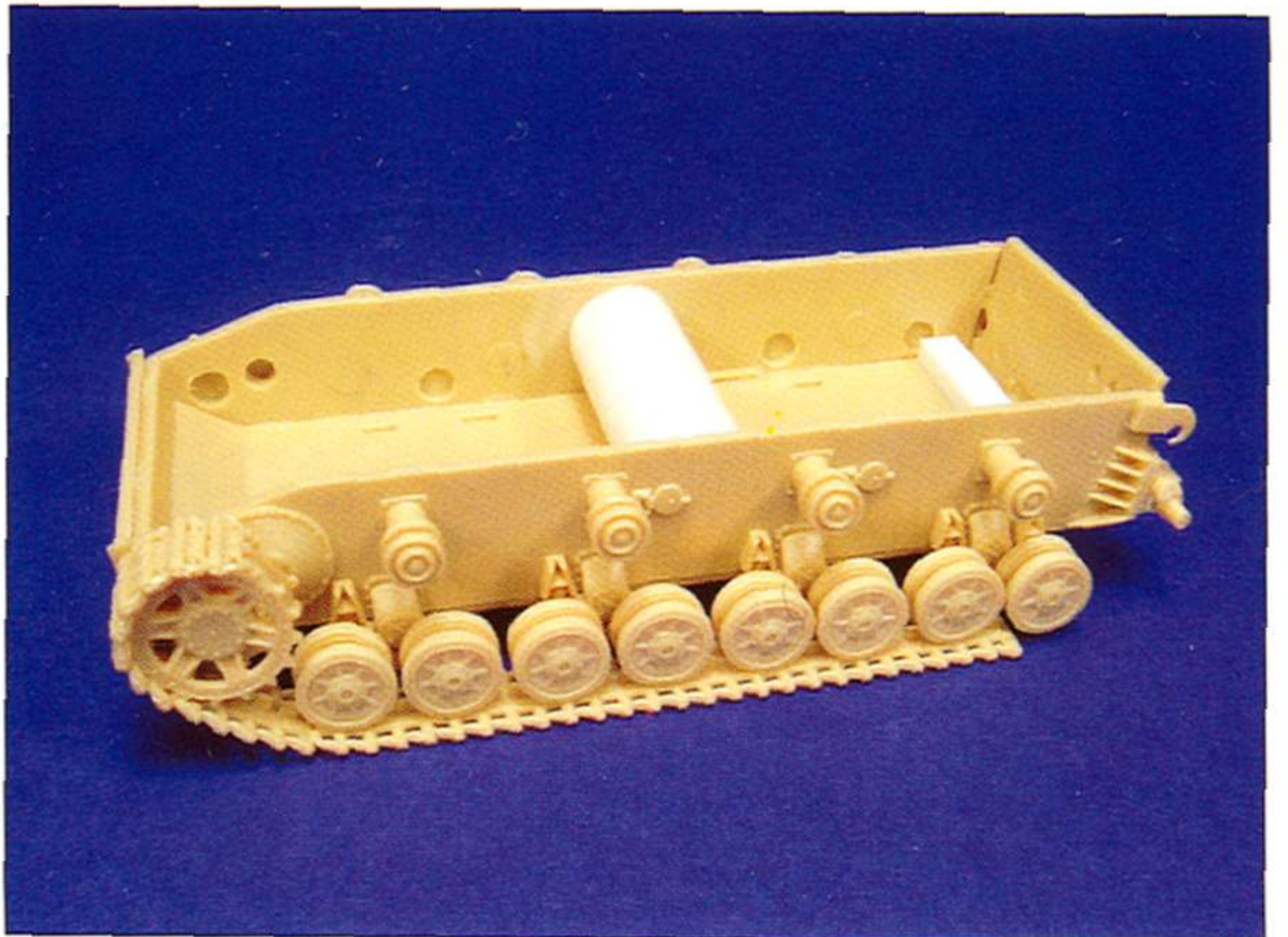
A steel rule is used to ensure all the links line up correctly once they've been glued together.



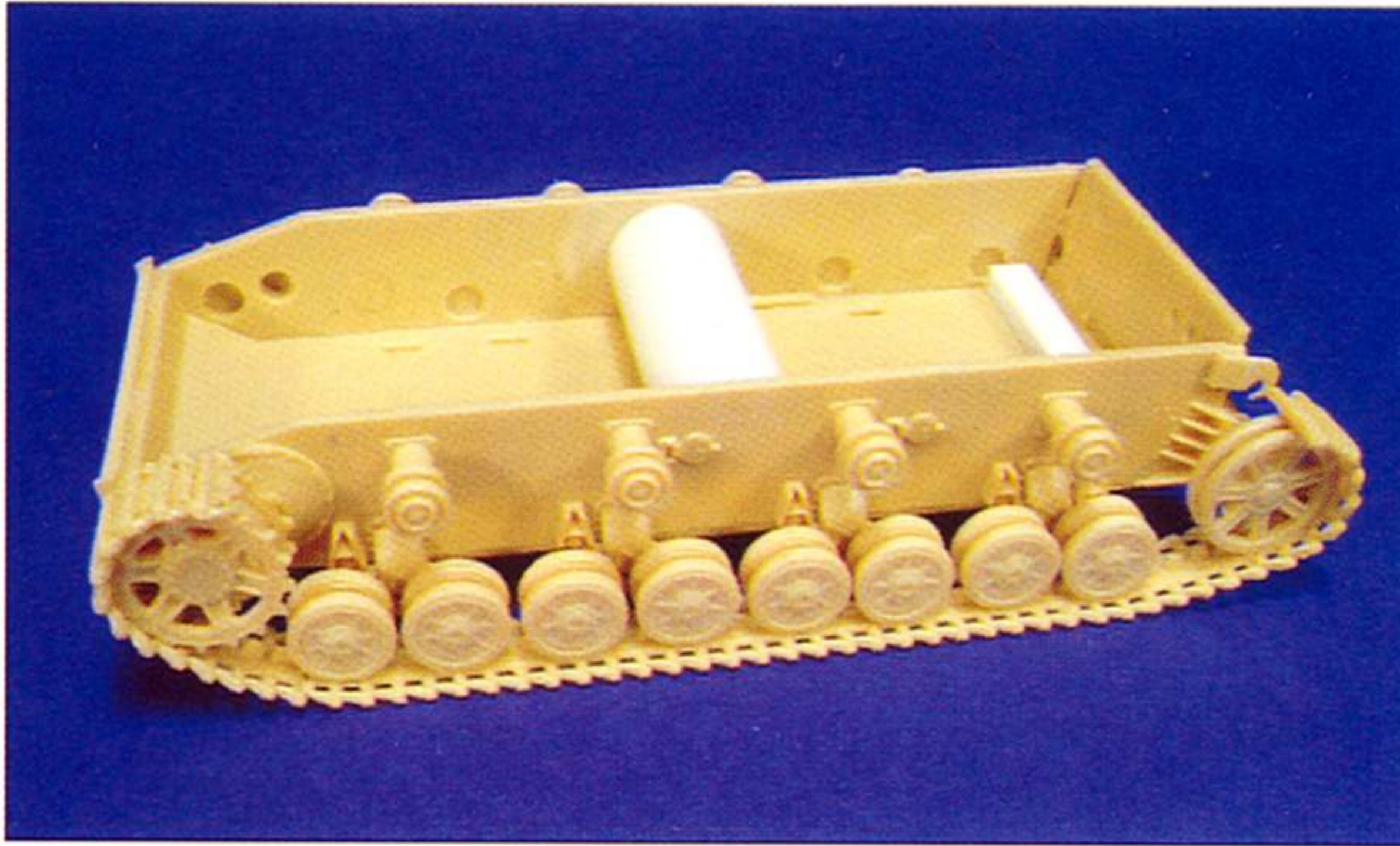
Before the glue fully sets, the length of track is bent around the sprocket.



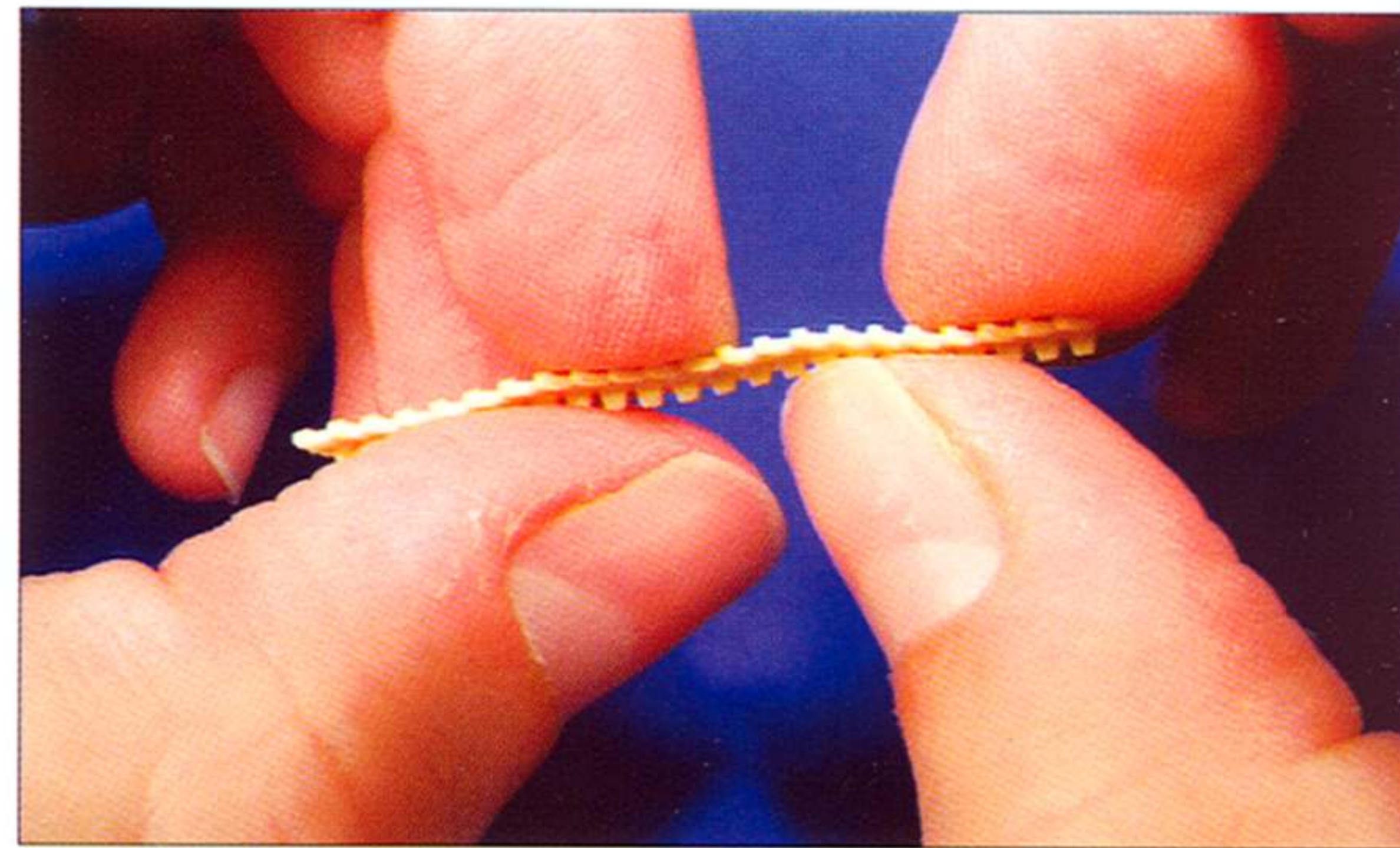
The sprocket is attached to the hull and a short run of track fitted between the sprocket and first roadwheel.



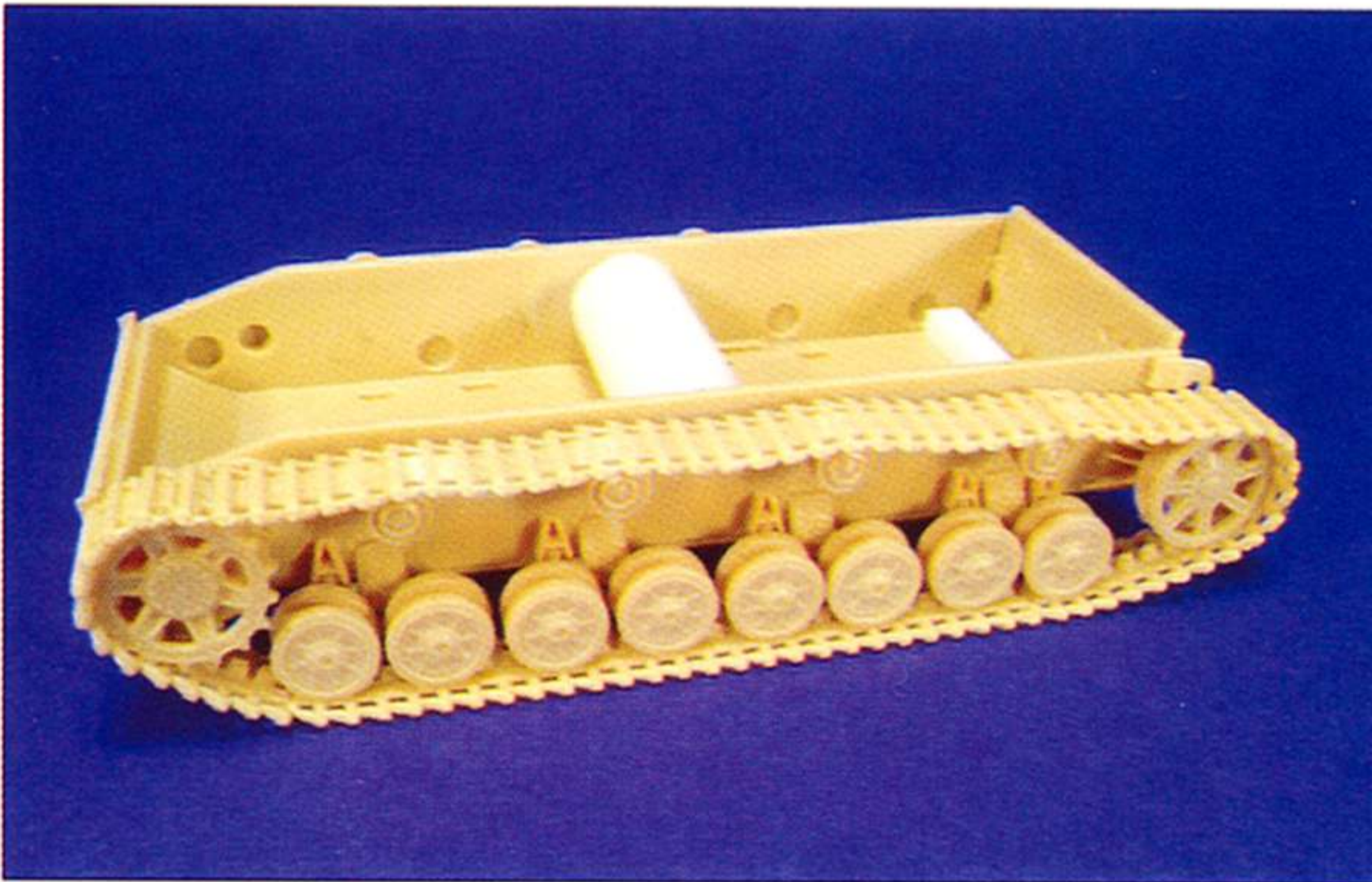
A long run of track is glued along the underside of the roadwheels.



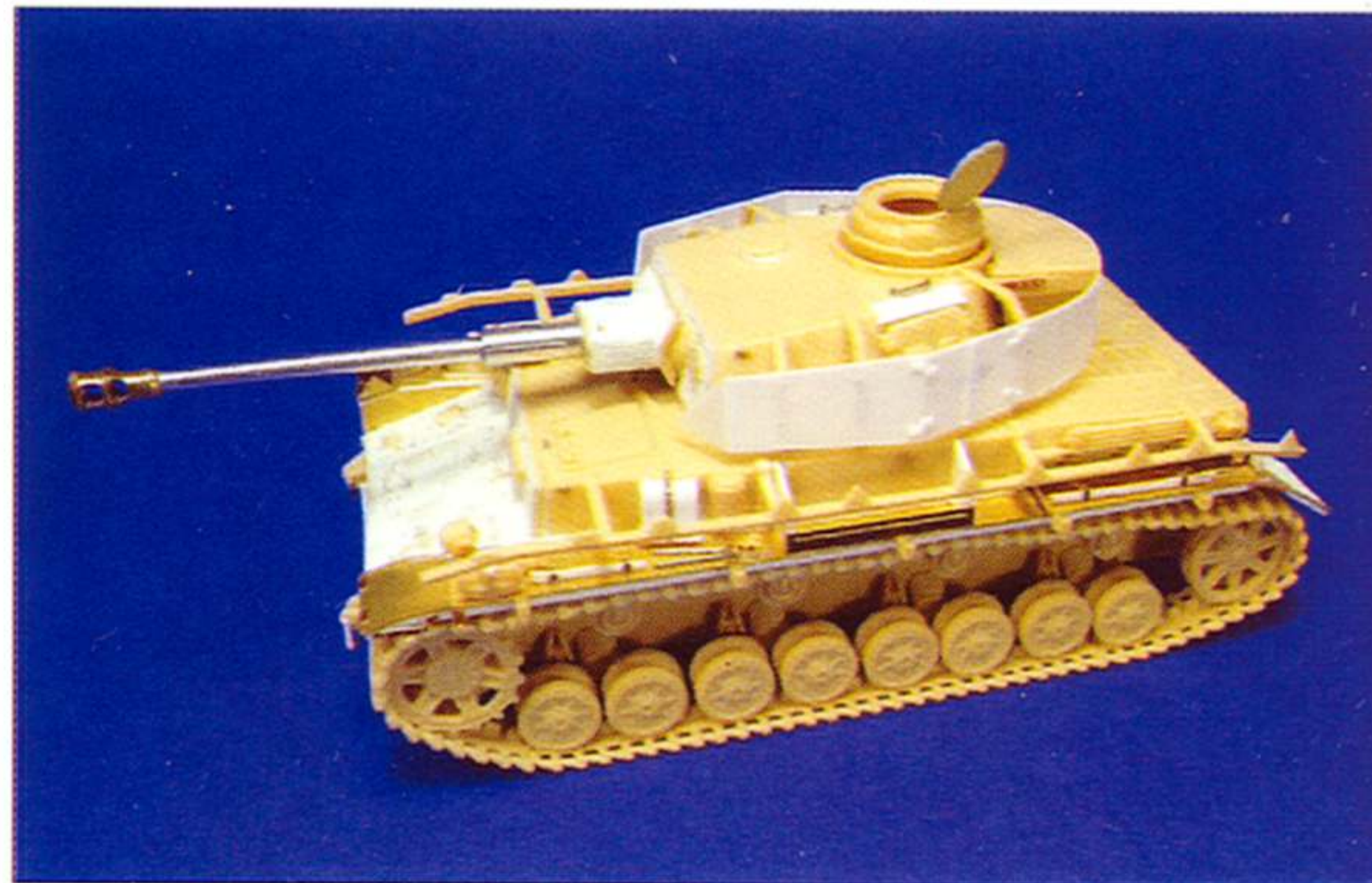
A track section is built around the idler in a manner similar to the sprocket.



Sag is represented along the top run of track by gently applying pressure and bending it in the appropriate places.



The completed left side track.

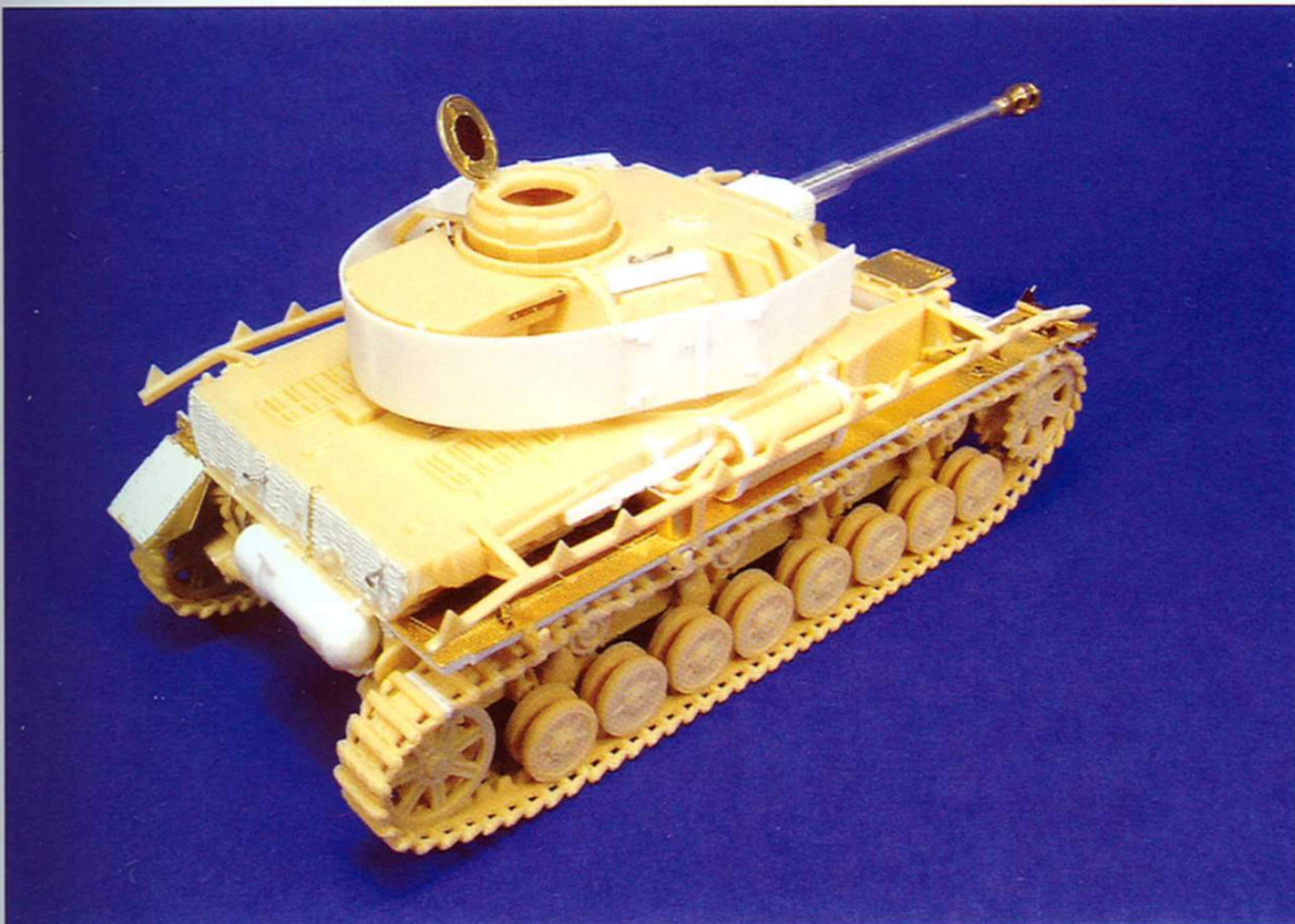


The finished model. Aber's turned barrel is superbly made and adds a lot to the model. The kit barrel is reasonable but the muzzle brake is undersized and doesn't have the crispness of the Aber version.

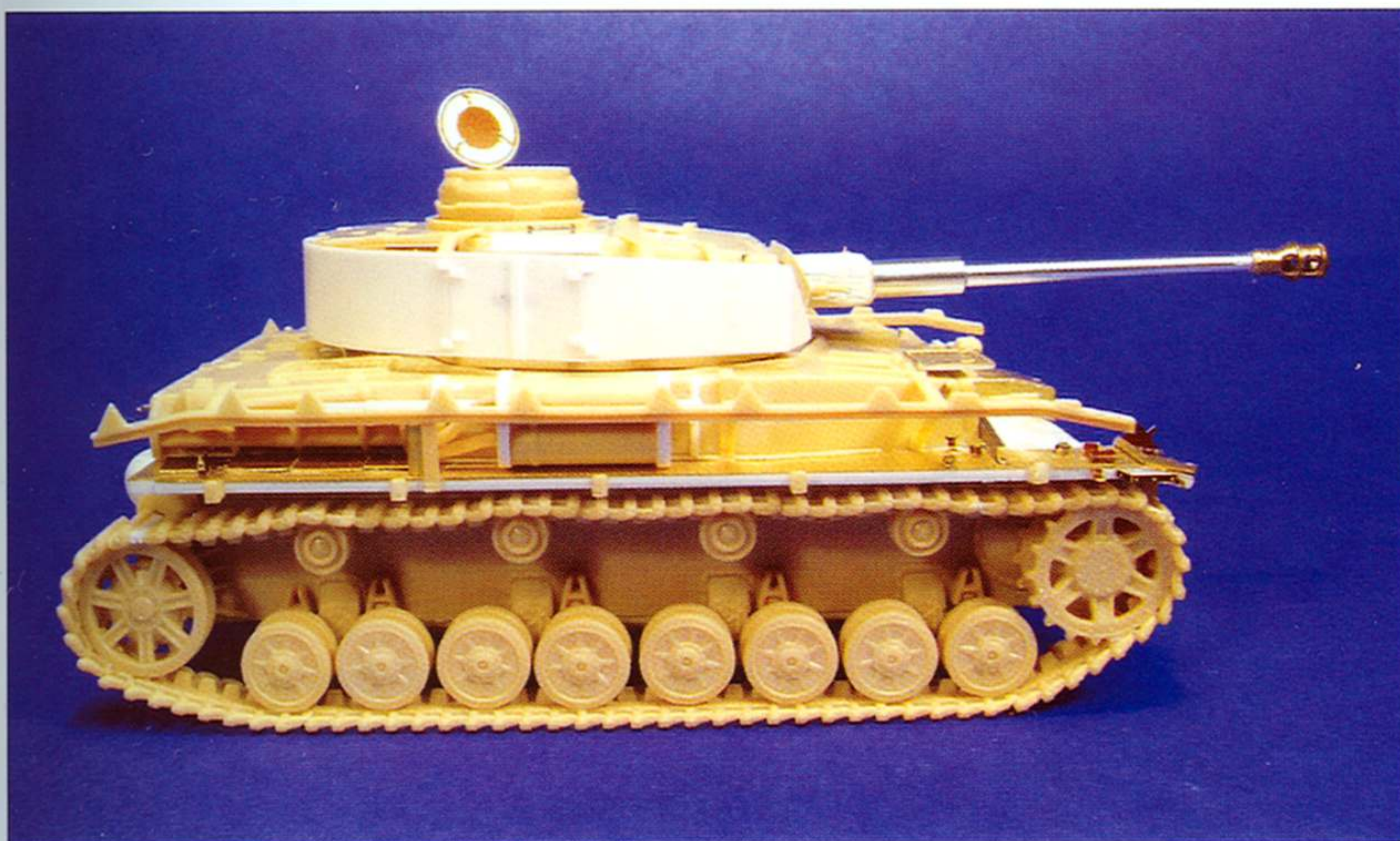
add the *zimmerit* before progressing. As the turret also has some *zimmerit* applied, I built the basic turret structure according to the instructions. *Zimmerit* isn't represented on the kit, although there are photo-etched *zimmerit* sets available as aftermarket items. I'm not overly impressed with these, as the ridges tend to look too flat. Several resin *zimmerit* sets are available from Atak and these look much better, although at the time of writing none for the Panzer IV. This just left the homemade options so I decided to use the traditional putty method with the *zimmerit* pattern imprinted onto the putty before it cures. An in-depth look at this method is given in the chapter on modelling the Jagdpanzer IV. Once all the *zimmerit* had been finished I attached the fenders and started working on the smaller details.

The various tool clamps and clasps had to be added to the photo-etched fenders and these are provided in the general Panzer IV detail set from PART. I rarely use all the parts from photo-etched sets and this time was no exception. The use of photo-etched parts for some items just isn't appropriate. This is particularly true for grab handles, tool handles and other non-flat shapes. For these I usually just substitute wire or plastic rod.

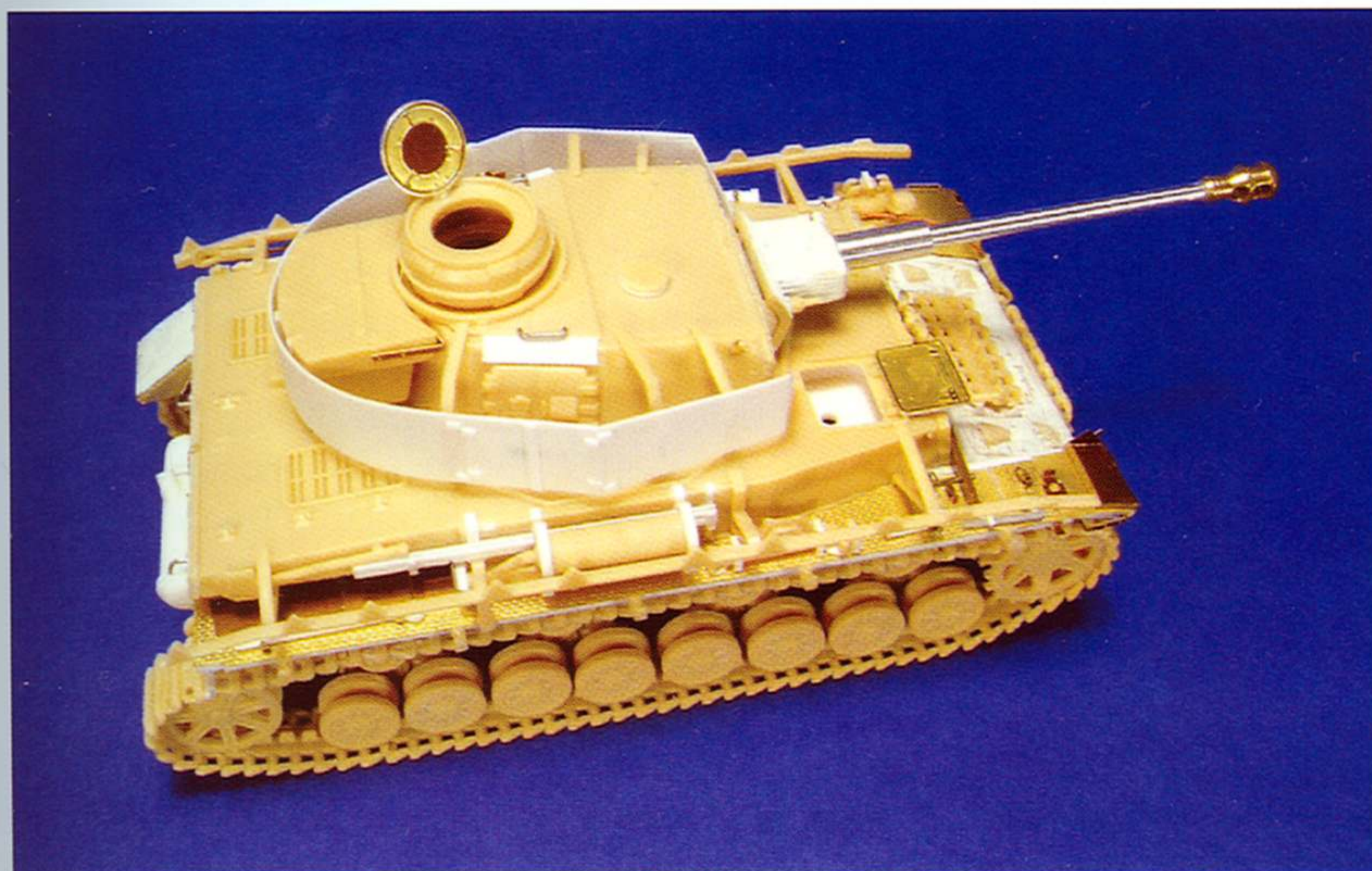
Once all of the tool clasps had been added, I made the tools themselves. Some of these were just modified kit parts whilst others had to be scratch-built from wire, plastic strip and rod. I then left all of the tools apart, so they would be easier to paint later. The towing cable is made from Karaya copper cable with the ends taken from a Revell Panzer III kit.



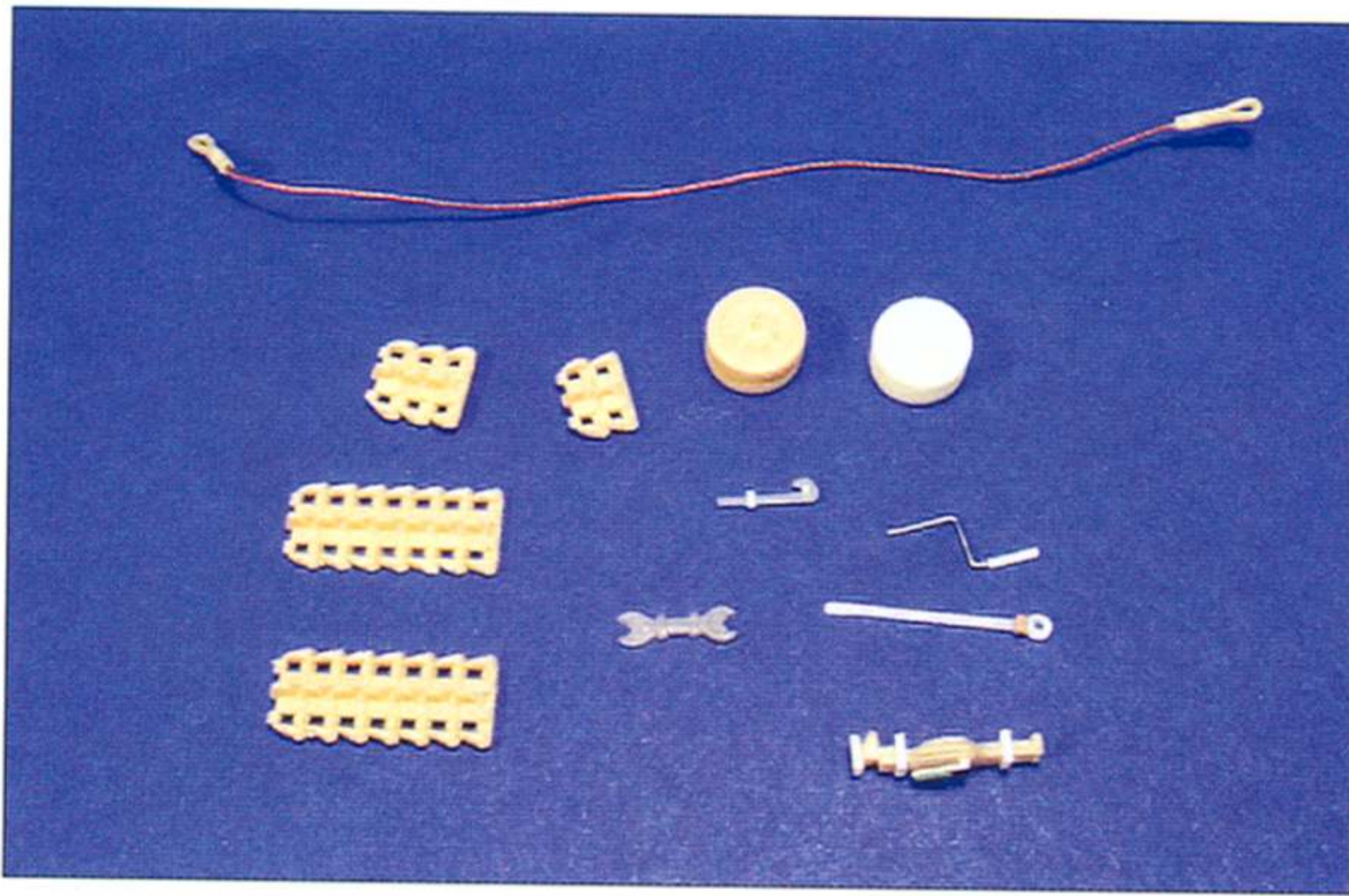
The exhaust muffler was scratch-built using plastic tube and strip. The kit piece is provided as two halves that are fiddly to clean up.



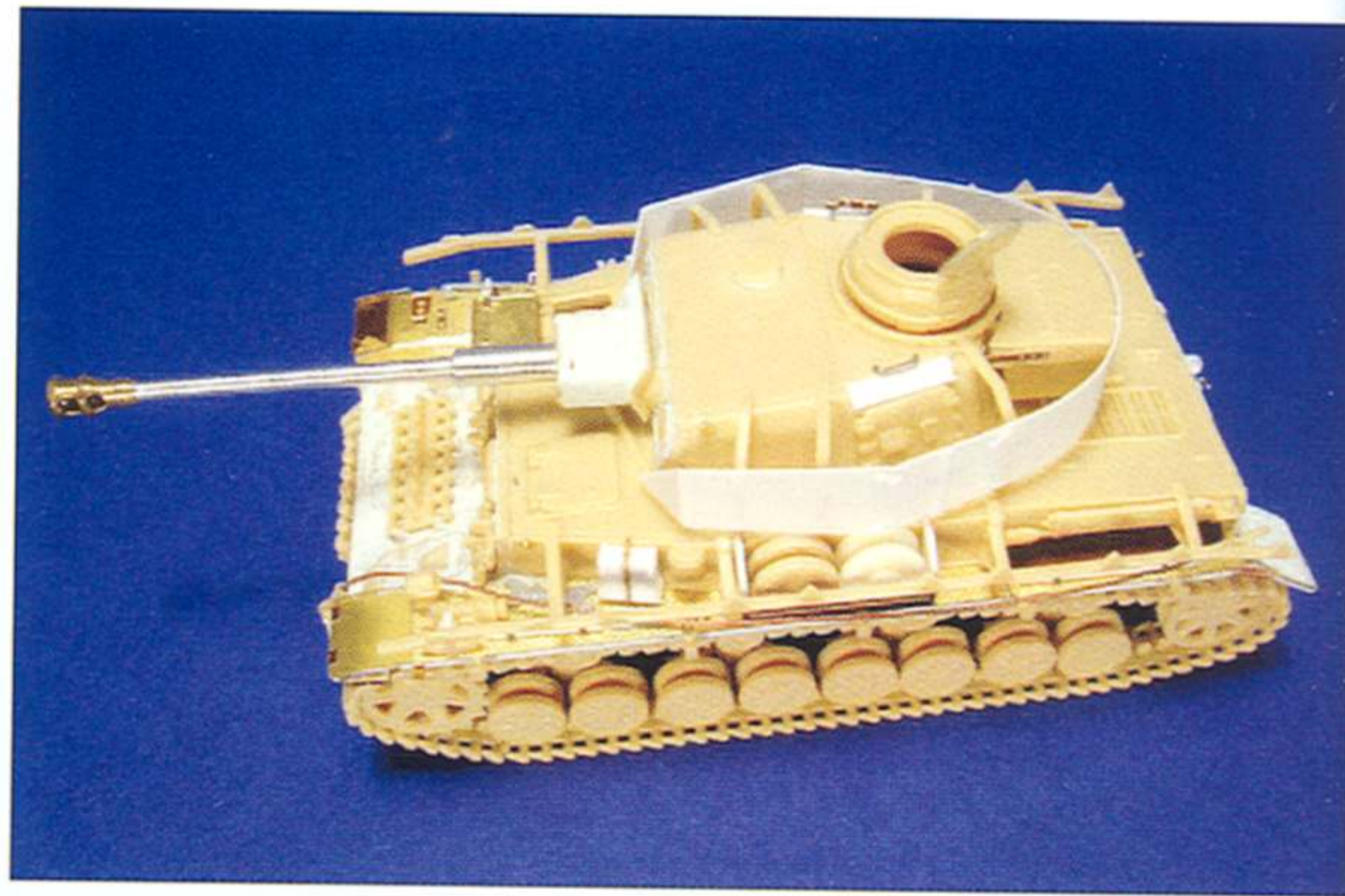
The turret *schürzen* provided in the kit is too thick, although the edges are chamfered to give the appearance of thinner panels. I replaced the kit parts with thinner versions cut from plastic sheet. I also thinned the *schürzen* supports and rails by trimming down the kit parts.



I used a number of items from the PART photo-etched detail sets. The patterned treadplate is from the fender detail set (although I replaced the photo-etched frames with plastic strip). The remaining details are from the general Panzer IV Ausf. H set.



Most of the tools were left separate from the model until after painting. The tow cable is from Karaya with the ends taken from the plastic cable in a Revell Panzer III kit. The grey-coloured tools are taken from the spares box. The remaining items are either scratch-built or modified kit parts



The tools are shown temporarily test fitted to the model.



The Zimmerit was created using Milliput modelling putty with the pattern created using homemade Zimmerit tools.



The Warrior's range of accessories includes several 1/72 figure sets. I combined three of these for the model – WA 72001 Winter Tank Crew, WA 72002 Winter Tank Riders # 1, and WA 72003 Winter Tank Riders # 2.

Many other details were also modified or replaced. The hull and turret *schürzen* rails and rail supports were all thinned to a more in-scale thickness. I also built a replacement exhaust muffler from plastic tube and rod. I decided not to fit any of the hull *schürzen* panels, as they would have hidden the running gear detail. On the real vehicle these panels were removable and there are many photos showing some or all of them missing. The turret *schürzen* provided in the kit is too thick, although the edges are tapered to give the impression that the parts are much thinner. There is a photo-etched set from PART that includes all the rails, supports and panels and I've used this set on some earlier models. Whilst it looks good it is fiddly to assemble and is quite fragile. So this time I decided to make the *schürzen* myself. This was quite a straightforward task and simply involved cutting replacement pieces from plastic sheet using the kit parts and scale plans as a guide.

At this point I'd finished construction of the kit but I wanted to add some figures. I've seen many photos of tanks and other armoured vehicles that are loaded with soldiers and I thought this would make for an interesting model. There are a resin crew figure set and a couple of winter tank rider sets in the Warriors range and these were perfect for the job. The figures are very well

detailed and realistic and only need removing from their moulding blocks, along with a little clean up. Each of the tank rider sets contains four figures, but I combined the sets and just selected a few that fitted the model the best. After cleaning up the figures I was ready to start painting the model.

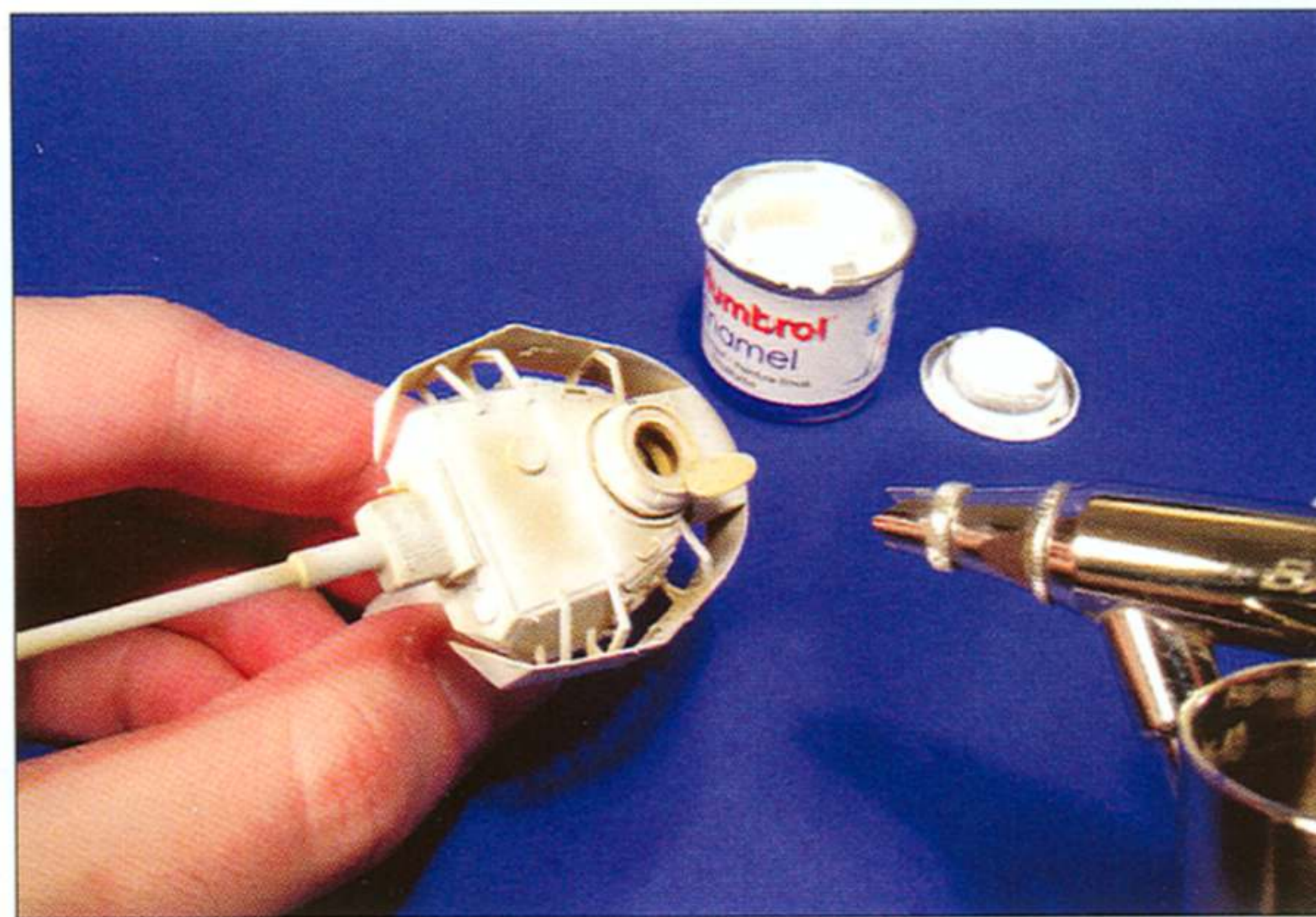
## Painting and weathering a whitewash finish

The model was given a couple of airbrushed coats of Humbrol Matt Brown Yellow (94). I usually use a lighter colour than this for German dark yellow, but I find a darker shade is better for winter finishes. Following this I lightly sprayed matt white over the turret and upper hull, leaving the base colour showing through in patches. Areas of the greatest wear and tear were left with more of the base colour showing through. These included the crew hatches and horizontal surfaces where the crew would walk and climb. Following this I gave the model a brushed coat of S.C. Johnson Klear acrylic floor varnish. This gives the model a tough finish with a slight sheen and protects the base colour through the weathering process.

Weathering began with the application of a pin wash around the details. This is a locally applied wash and is useful for adding some depth to the model. The wash was a mix of diluted black enamel and oil paint. Adding a small



The model was given a couple of thin coats of Humbrol Matt Brown Yellow (94).



A patchy coat of white was applied over the turret and upper hull.



I created scratches and chips of paint using the base colour applied with a small brush. I concentrated on the areas that would receive the most wear and tear such as crew hatches and horizontal surfaces where the crew would walk.



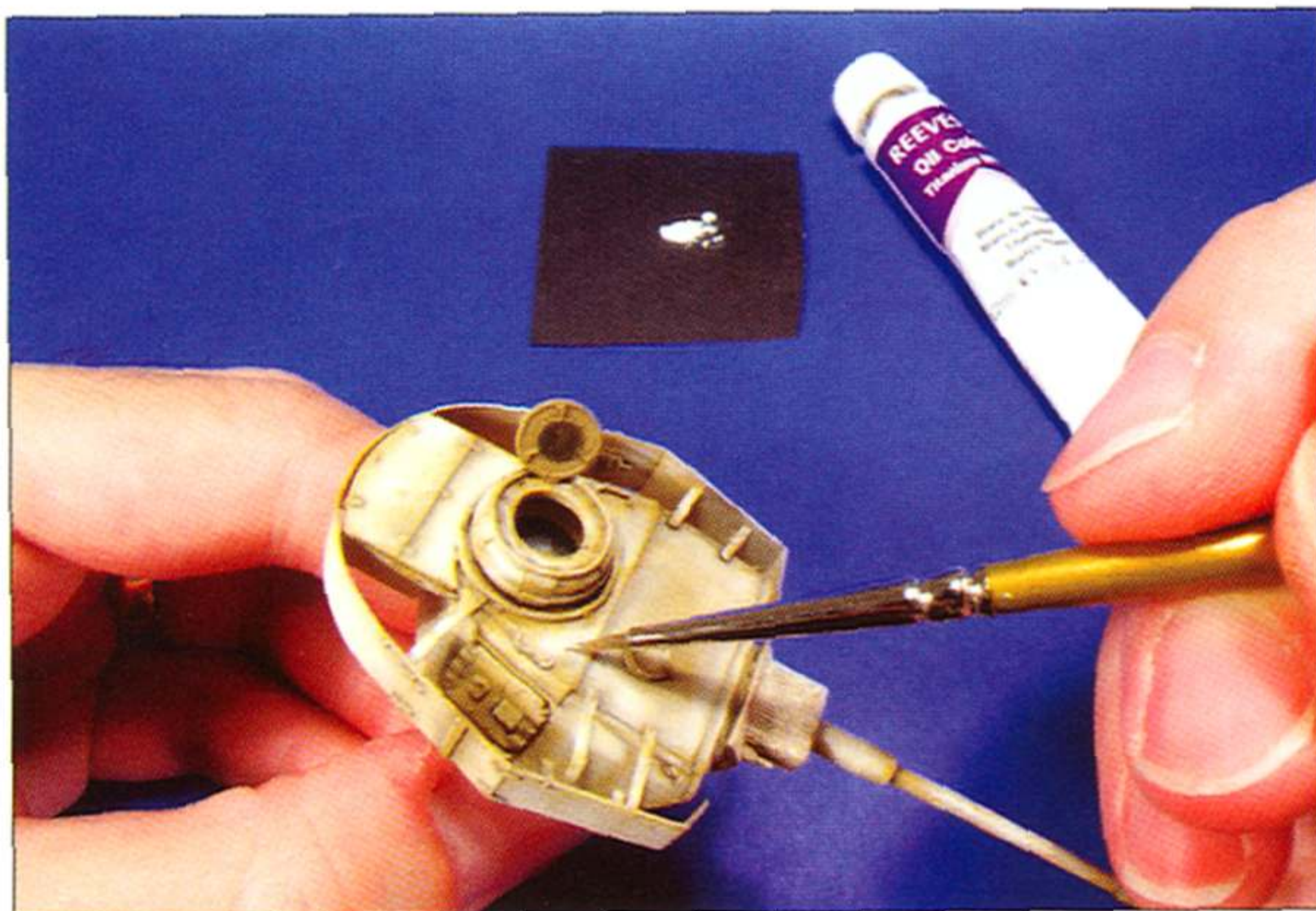
I usually give models a brushed coat of S.C. Johnson Klear acrylic varnish prior to weathering. This gives a slight sheen to the finish and helps prevent the colour underneath becoming stained with any washes.



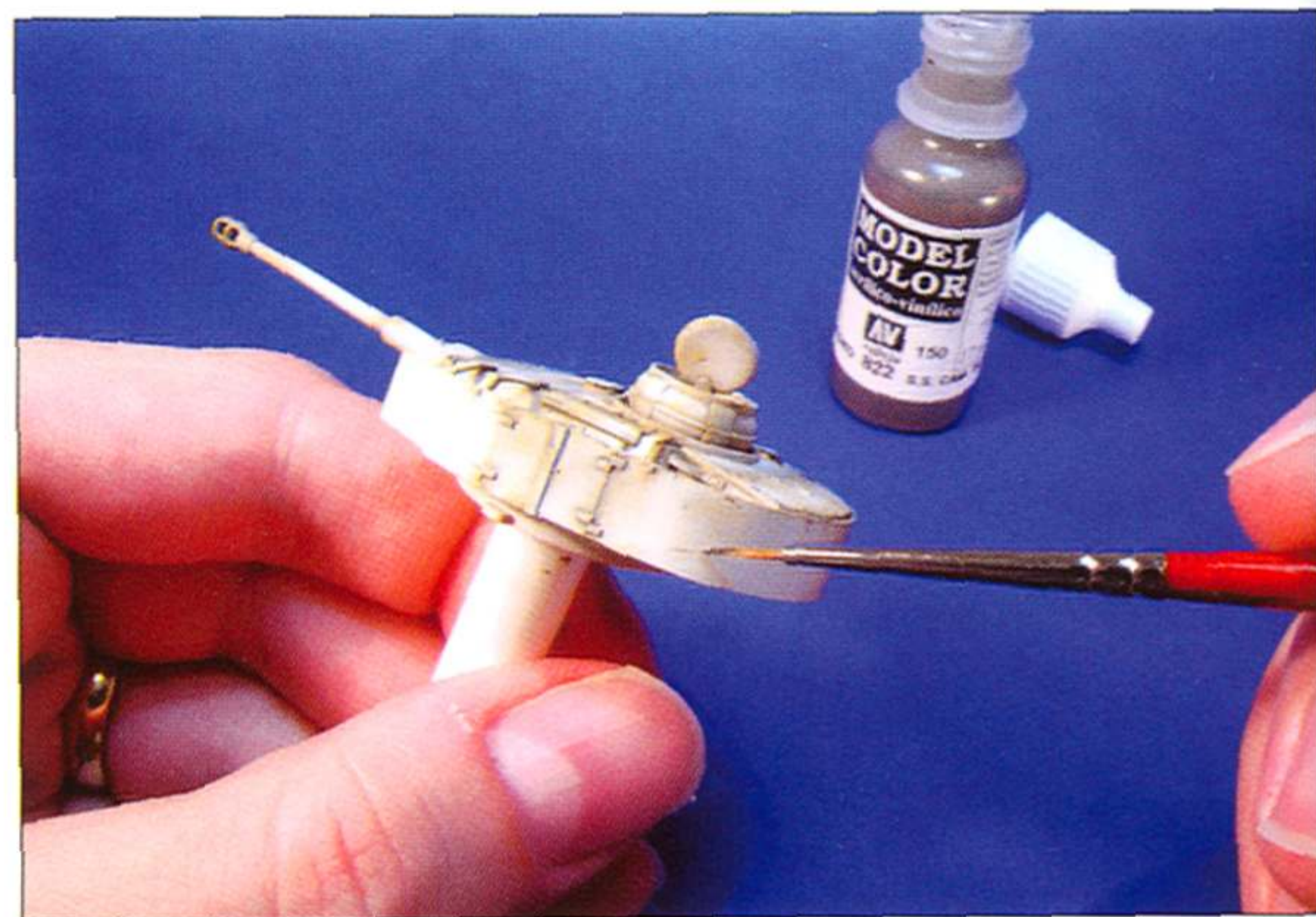
I enhanced the detail with the application of a pin wash. This was mixed from black enamel paint with a small amount of Burnt Umber oil paint. The wash is applied locally around the details and any excess can be removed with a little enamel thinners on a clean brush.



The base sand colour was dry brushed lightly over the model to help blend in the wash and enhance the effect of the whitewash wearing off raised areas.

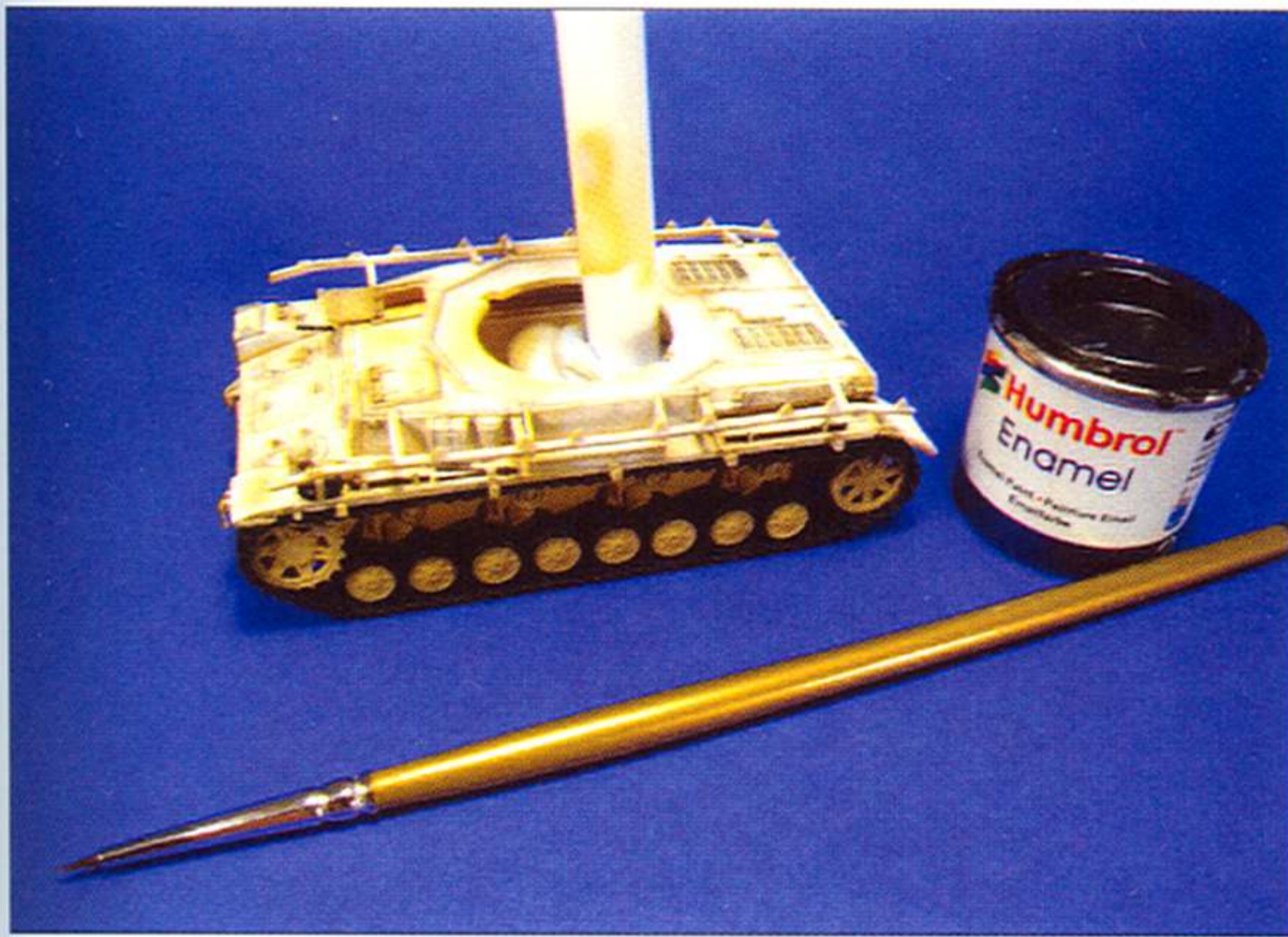


I used pure white oil paint to strengthen the tone of the whitewash by applying it in a manner similar to dry-brushing. A small amount of White Vallejo acrylic paint was then used to further enhance the whitewash.

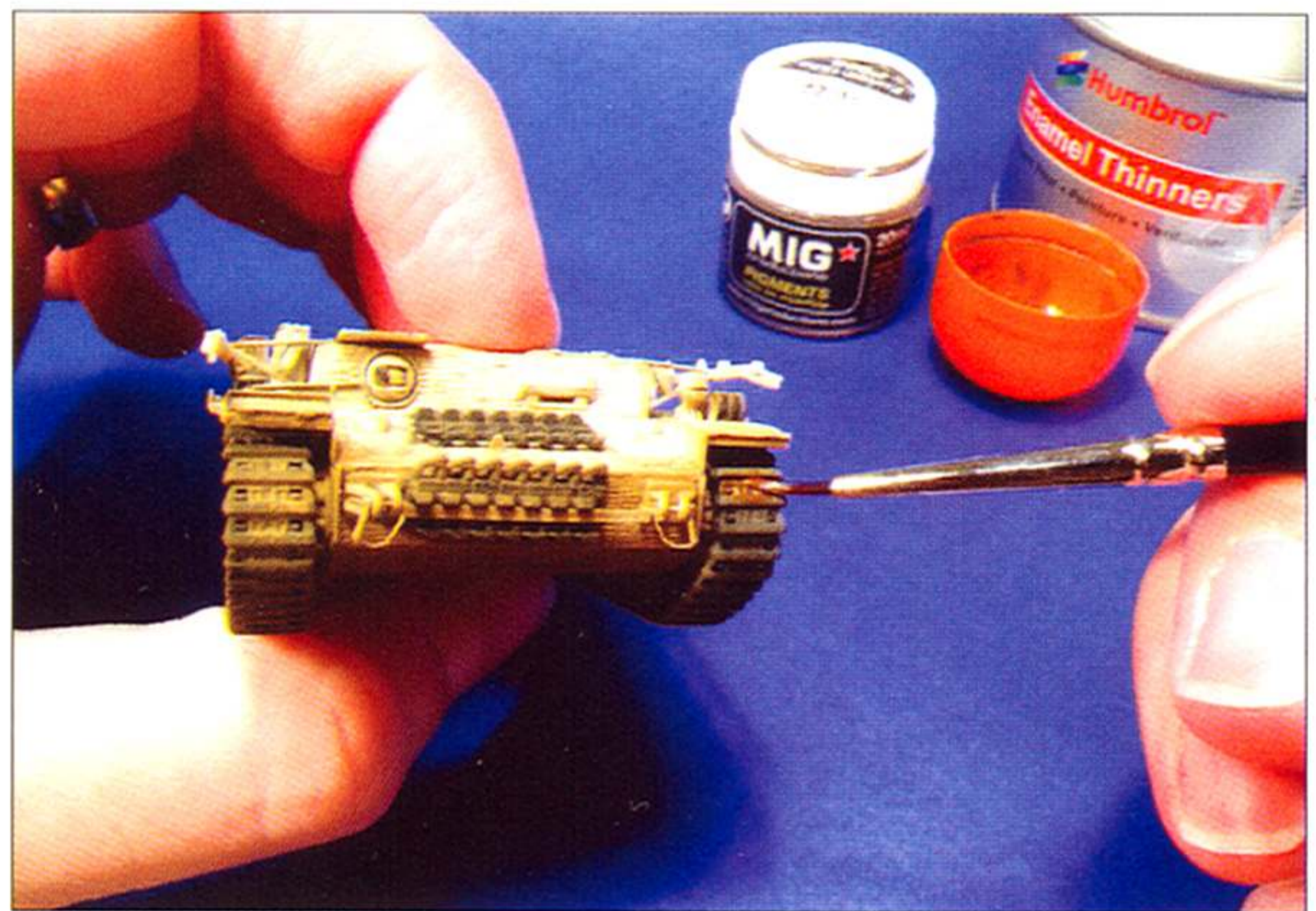


Small scratches and paint chips were added using Vallejo SS Camo Black.

amount of oil paint helps to extend the drying time of the wash and allows time to work with it once applied. This stage is quite time consuming but worth the effort. I left the model to dry thoroughly for a couple of days and then lightly dry-brushed the entire model with the base colour. Dry-brushing is particularly useful when working on whitewash finishes as it helps to give the impression of the white paint wearing off around the edges of the vehicle. Further weathering involved the application of more pin washes, this time using diluted Burnt Umber oil paint. I concentrated on applying this to the areas covered with *zimmerit* to add some apparent shadow (a black wash would have been too strong here). A little of this mix was also applied in streaks down the vertical surfaces of the model to represent general discolouration and rust. Certain areas of the whitewash were then strengthened by blending in some pure white oil paint followed by the application of Vallejo pure white acrylic using a small brush. I also used Vallejo acrylics for representing paint chips and scratches. For this I used SS Camo Black as it's not quite as harsh as pure black, although it's still important not to overdo this part of the weathering.



I painted the tyres, track and tools black. Following this I toned down the harshness of the colour with a light overspray of Dark Earth (29).



Some Mig Productions Europe Dust pigment was mixed with some enamel thinners and a small amount of matt varnish. I applied the mix to the wheels, track and some of the horizontal surfaces such as the areas that would see the most activity from the crew. Following this I created a similar mix but with some acrylic texture paste added. I then applied this to the lower hull sides.



I painted the tracks, tyres and tools matt black and when dry gave a light overspray of Dark Earth (29). I mixed up some Mig Production pigments with enamel thinners and a little matt varnish (this helps fix the pigments) and applied the mix to the lower hull and running gear. I then created a similar mix, but with some acrylic texture gel added, and applied this to the lower hull sides.

With the vehicle complete, I turned my attention to painting the figures. I again used Humbrol paints for the base colours and applied shading using a number of oil paint washes. Once they were dry I attached the figures to the model to finish it off.

The finished model, complete with its complement of winter tank riders. The figures were painted with Humbrol enamels and shaded with oil paints.



ABOVE I made sure the figures were also 'muddied up' to keep them consistent with the state of the vehicle.



RIGHT A good overhead shot showing the *zimmerit* applied to the turret and hull front.



ABOVE Note the interior face of the radio operator's hatch – it was painted *dunkelgelb* to match the exterior colour but was left unaffected by the whitewash.

BELOW The mud on the lower hull contrasts well with the whitewash camouflage.



# Modelling the Jagdpanzer IV

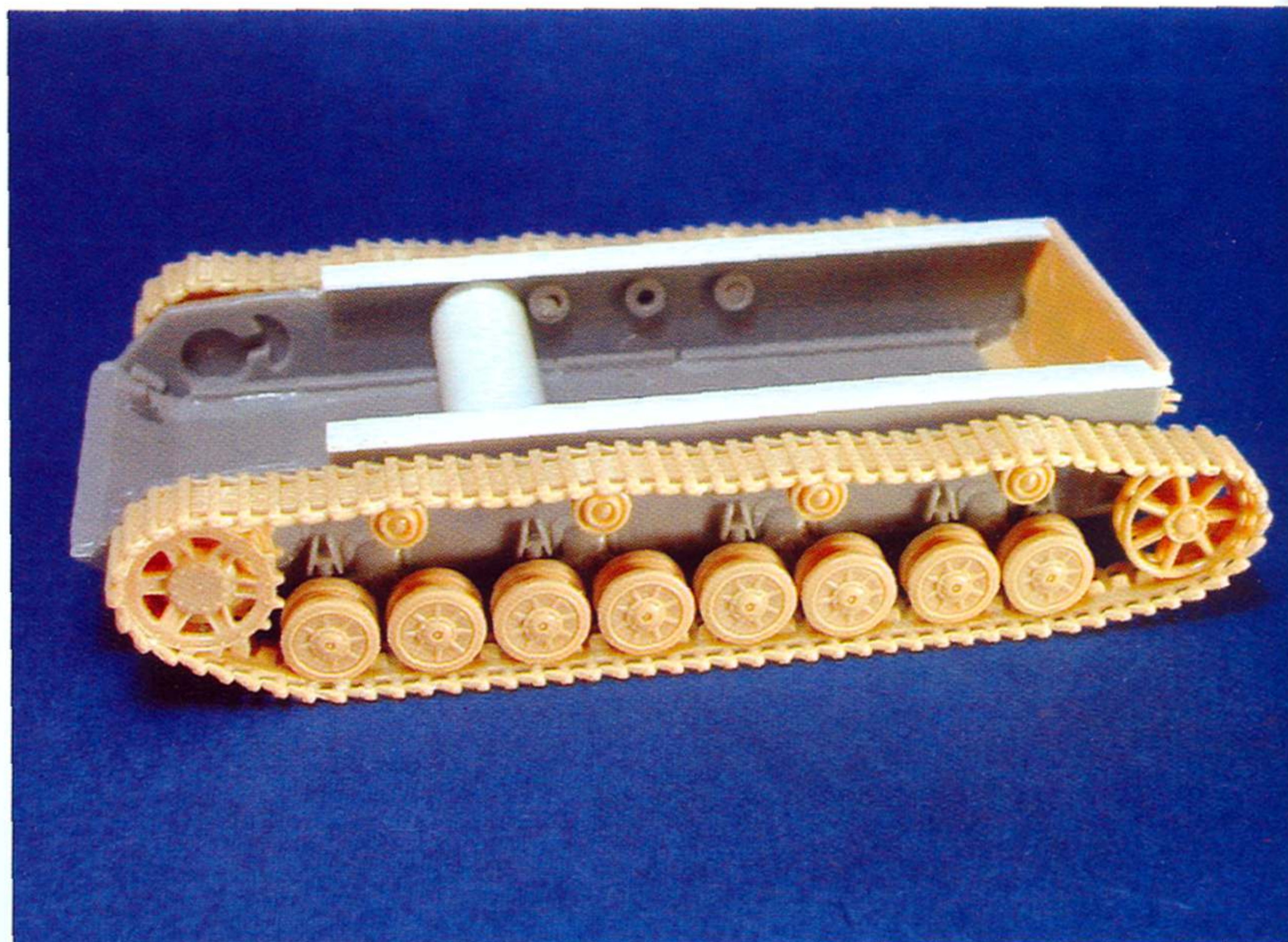
<i>Subject:</i>	<i>Jagdpanzer IV</i>
<i>Skill level:</i>	<i>Intermediate</i>
<i>Base kits:</i>	<i>Hasegawa Jagdpanzer IV late (MT51)</i> <i>Revell Panzer IV Ausf. H (03119)</i>
<i>Scale:</i>	<i>1/72</i>
<i>Additional detailing sets used:</i>	<i>PART Jagdpanzer IV photo-etched detail set (P72089)</i> <i>ARMO Jagdpanzer IV turned metal barrel (AR72754)</i> <i>Preiser German Tank Crew (no. unknown)</i>

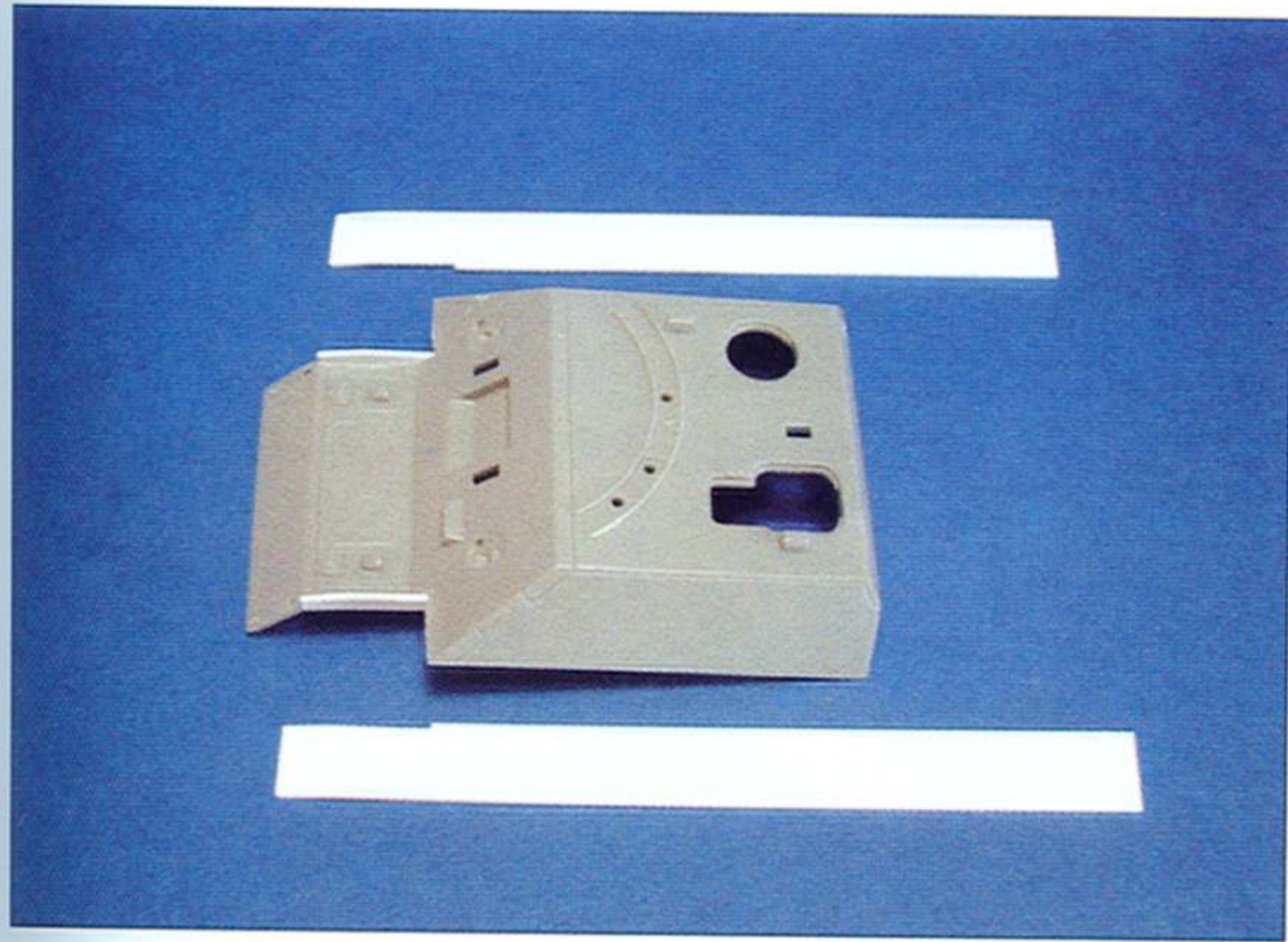
Three Jagdpanzer IV variants are available from Hasegawa, comprising early and late production vehicles fitted with the L/48 gun and the long-barrelled PzIV/L70. Having already built the L/70, I decided to work on the late model L/48. The kit is generally good, although the detail isn't quite up to the standard of Revell's Panzer IV kits. Because of this I decided to use parts from the Revell kit where I felt the detail was better. Fortunately the two kits are extremely close dimensionally, allowing easy interchange of many of the parts.

## Construction

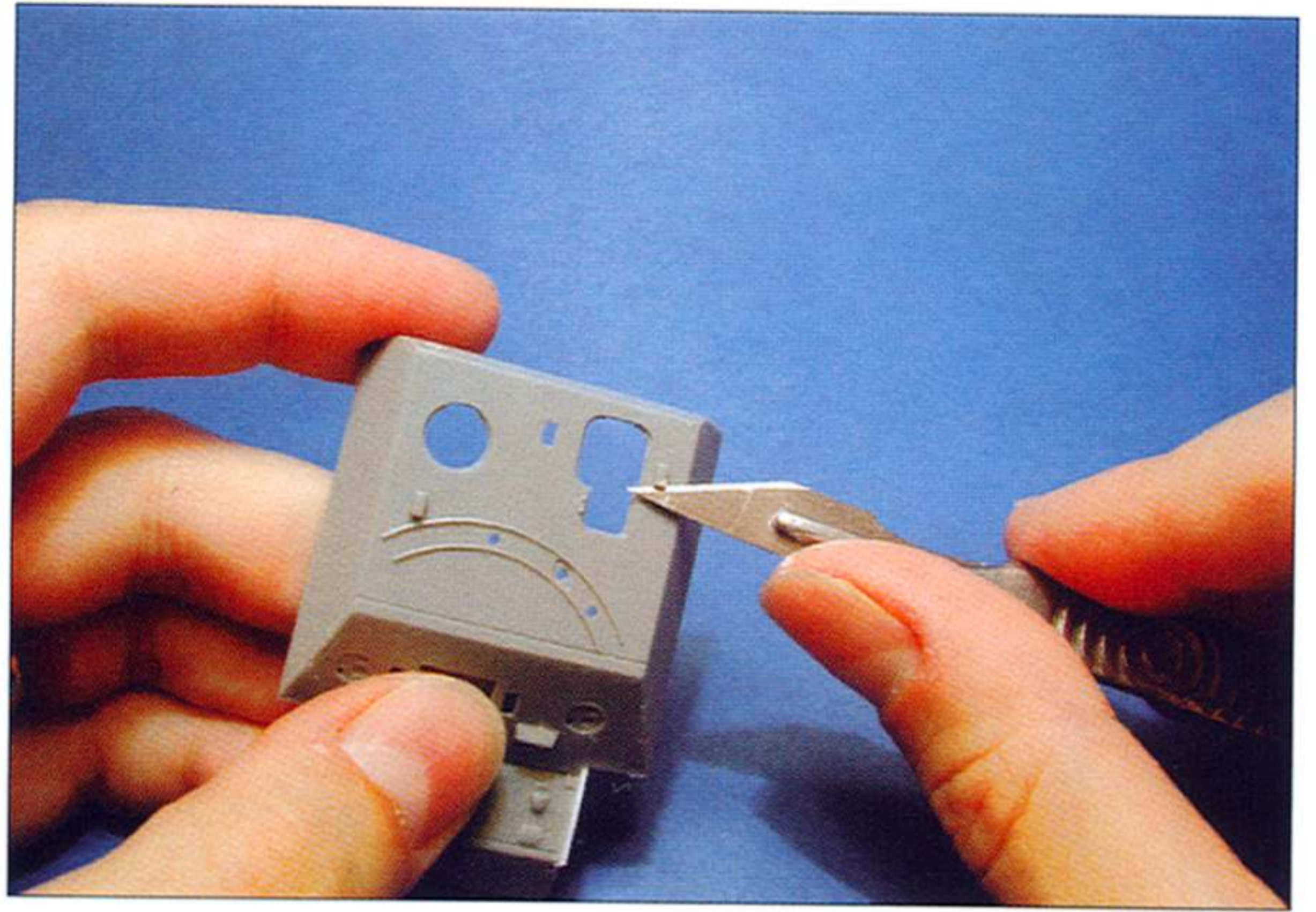
I started by assembling the lower hull, using the kit parts along with the rear hull plate from the Revell kit. The roadwheels are quite well done but the Revell equivalents just have the edge. The Revell wheels are also of the later type with pressed-steel hubs rather than the cast hub versions provided in the kit and these are more appropriate for a late version. The Hasegawa return rollers are of the earlier rubber-rimmed variety and were replaced with the later all-steel type provided by Revell. The Revell track parts are also much better than the poorly detailed Hasegawa items, so again I made use of the Revell versions.

The Revell Panzer IV wheels and track were combined with the Hasegawa lower hull assembly. The roadwheels from the Revell kit are of the later pressed-steel hub style and are more finely detailed than the Hasegawa versions. The Hasegawa track parts are poorly detailed rubber bands whereas the Revell track is composed of well-detailed link and length sections.

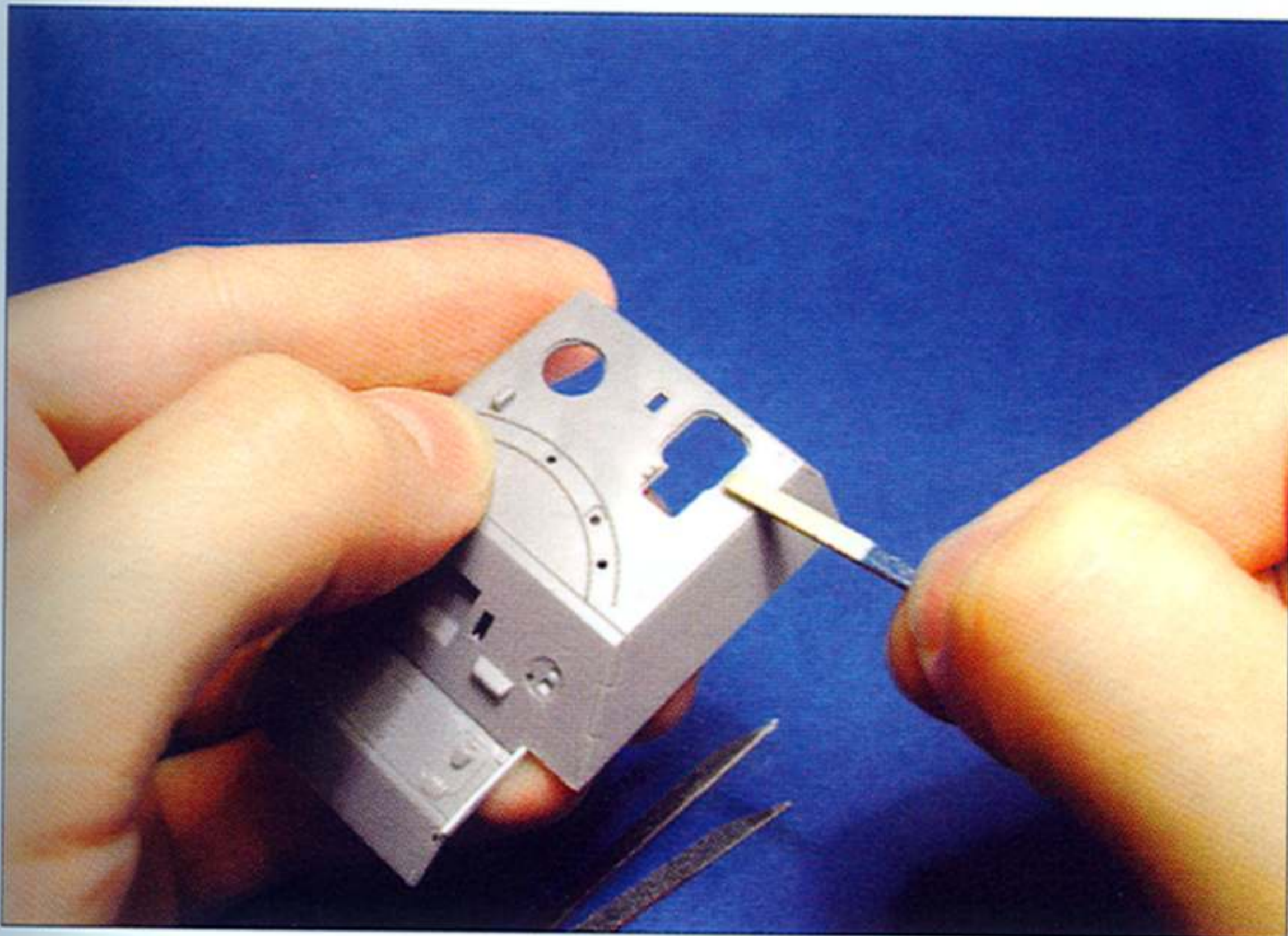




I removed the engine deck from the Hasegawa upper hull, ready for replacement with the superior Revell part. I also replaced the fenders with plastic strip and photo-etched treadplate. The kit fenders were first removed by carefully whittling them away.



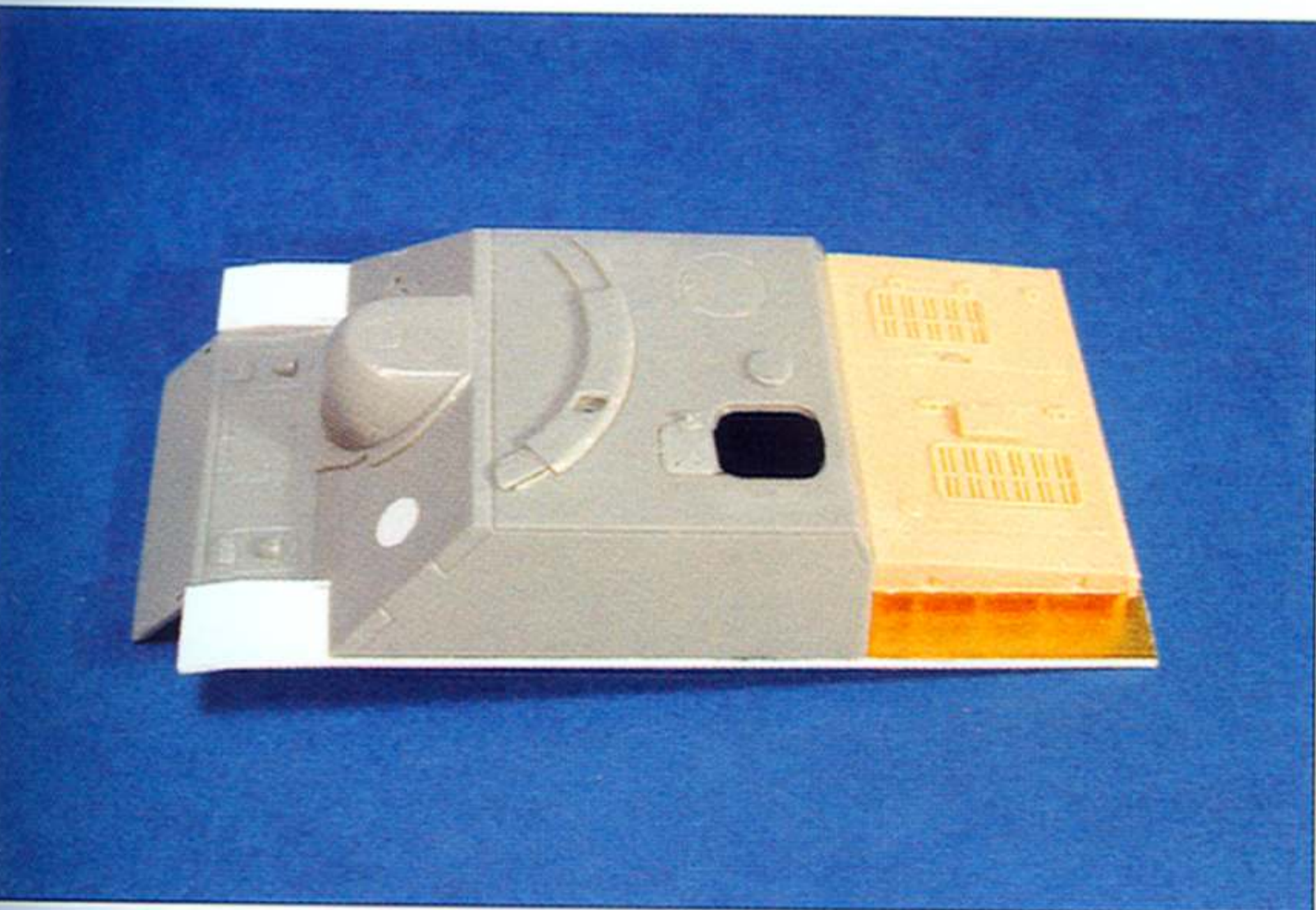
Some of the smaller kit details were removed ready for photo-etched or scratch-built replacements. A periscope housing is being taken off here by carefully skimming off successive layers until the bulk has been removed.



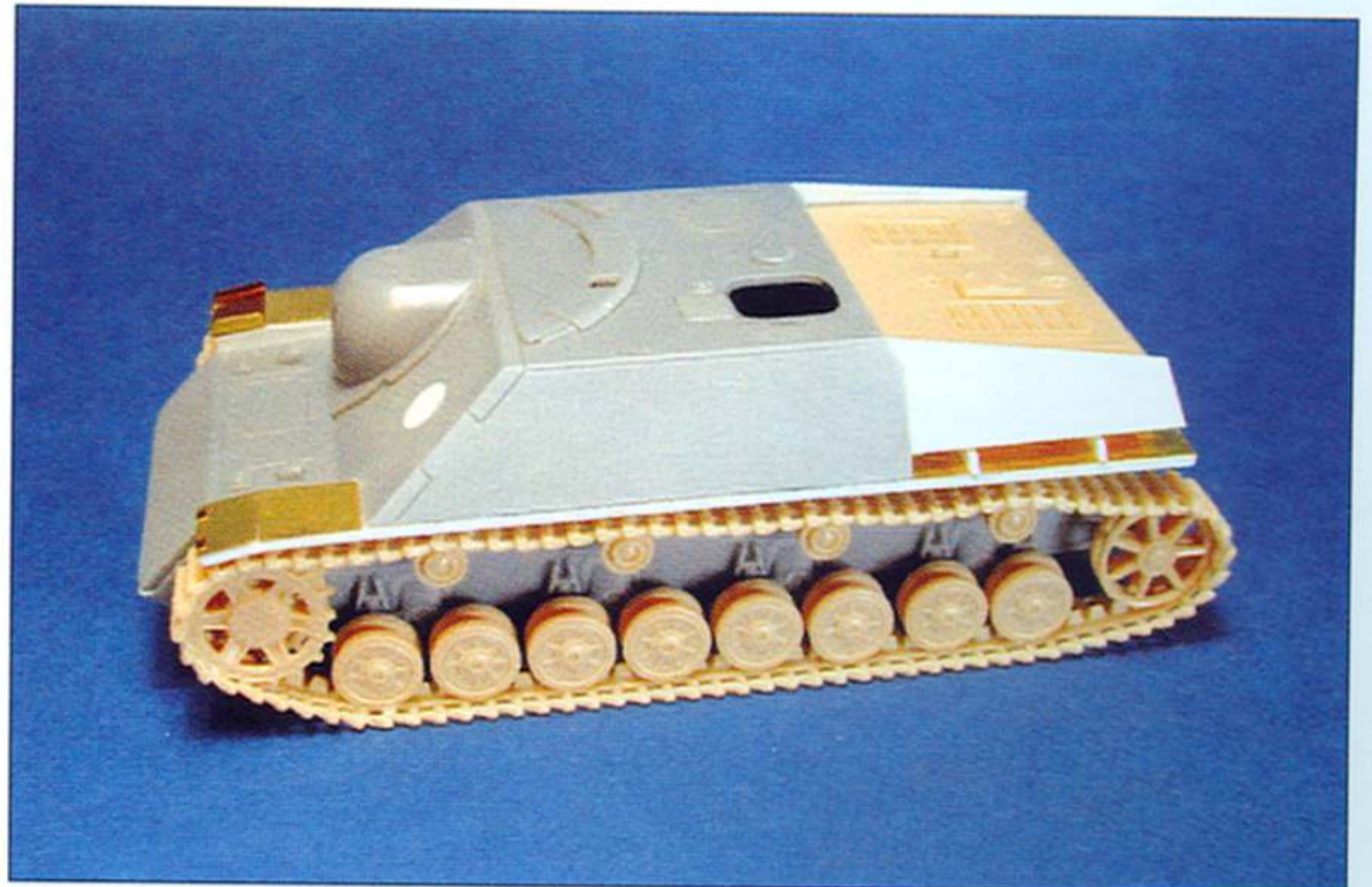
The area where the periscope was removed is tidied up with a fine-grade sanding stick.



The kit gun housing (right) needs some slight modification. The notch on the right-hand side should be larger and there is a curved indentation on the left side that needs to be cut out. The modified part is shown on the left.



The engine deck was removed from Revell's Panzer IV and mated to the Jagdpanzer hull part.

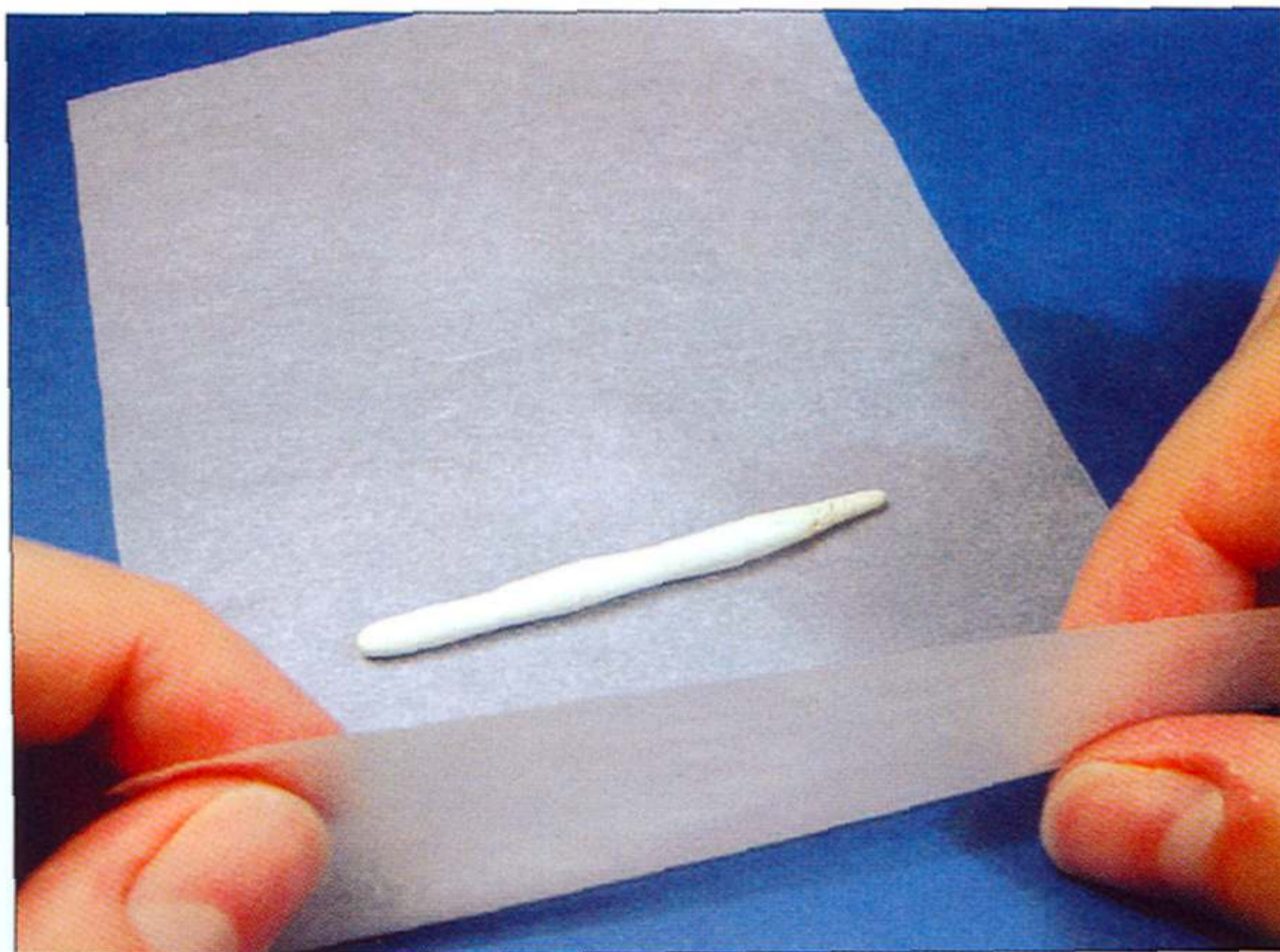


The upper hull assembly has been glued to the lower hull. The fenders have also been completed with the addition of brass sheet.

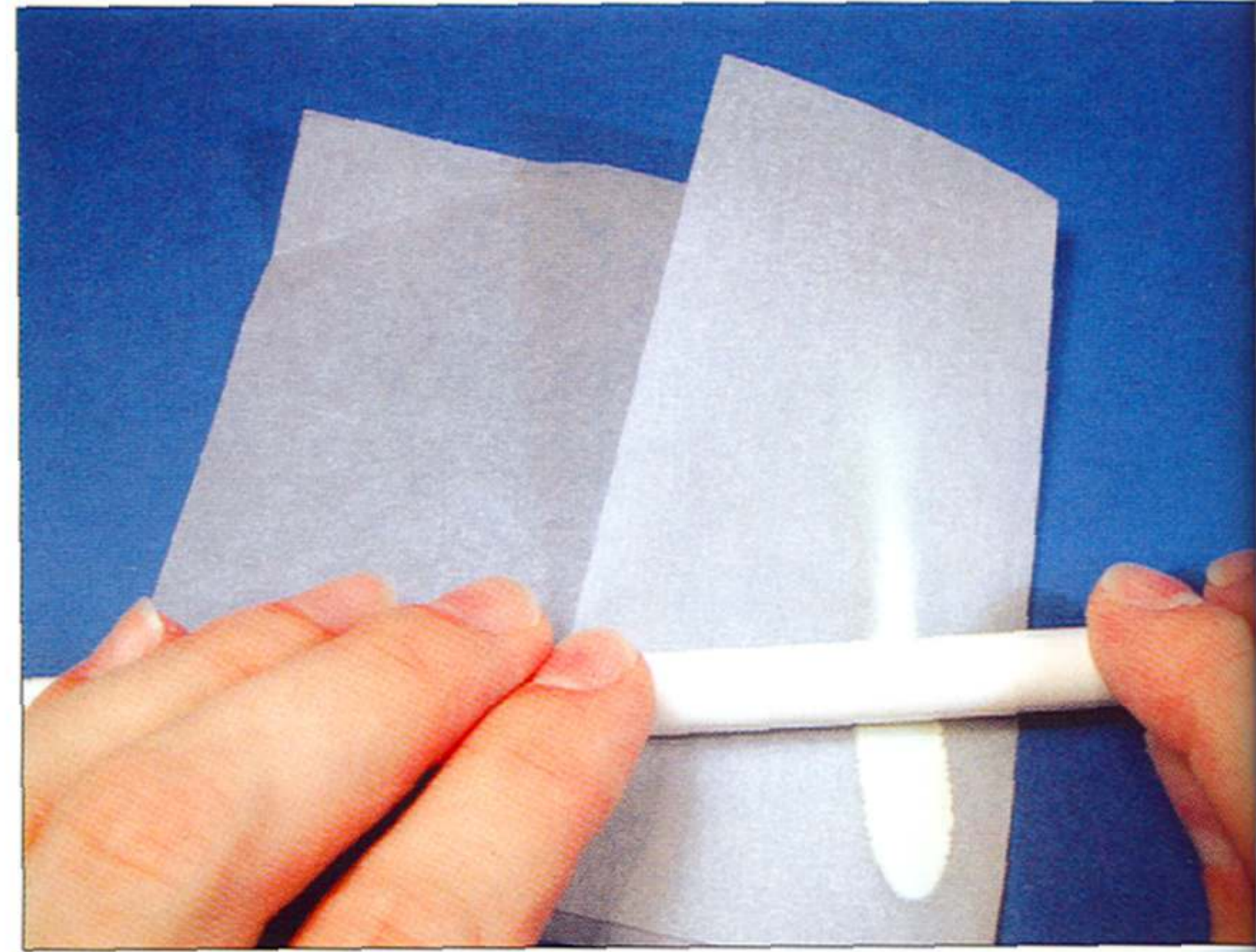
The upper hull is good, although the Revell engine deck has slightly fine detail. It also has the added benefit of not having any of the tools moulded onto it, in contrast to the Hasegawa version. I removed the complete Hasegawa deck section and cut the replacement from the Revell hull. I also wanted to improve the fender detail so I removed the kit ones and made replacements from plastic strip and photo-etched treadplate. Before fitting the fenders I removed some of the details I planned to replace later, such as the periscope housings and vision slot housing next to the main gun. I also thinned the edges of the commander's hatch opening from the interior face of the roof as I planned to leave the hatch open for a crew figure. The main gun housing then received a little reshaping to make it more accurate. There is a curved indentation on the left side that needs to be added (this allows the cover for the machine gun to swing open without hitting the housing). On the other side there is a notch to accommodate the edge of the vision slot and this needs to be enlarged. After doing this I glued all the main upper hull components together. The resulting assembly was then glued to the lower hull, and by this point the basic structure of the vehicle was almost complete. Thin sheet metal plates are fitted either side of the engine deck and I replaced the overly thick Hasegawa pieces with thinner items cut from plastic sheet. The kit gun barrel doesn't have an exactly circular cross-section but fortunately ARMO came to the rescue with a good turned aluminium replacement.

### Modelling small-scale *zimmerit* – step by step

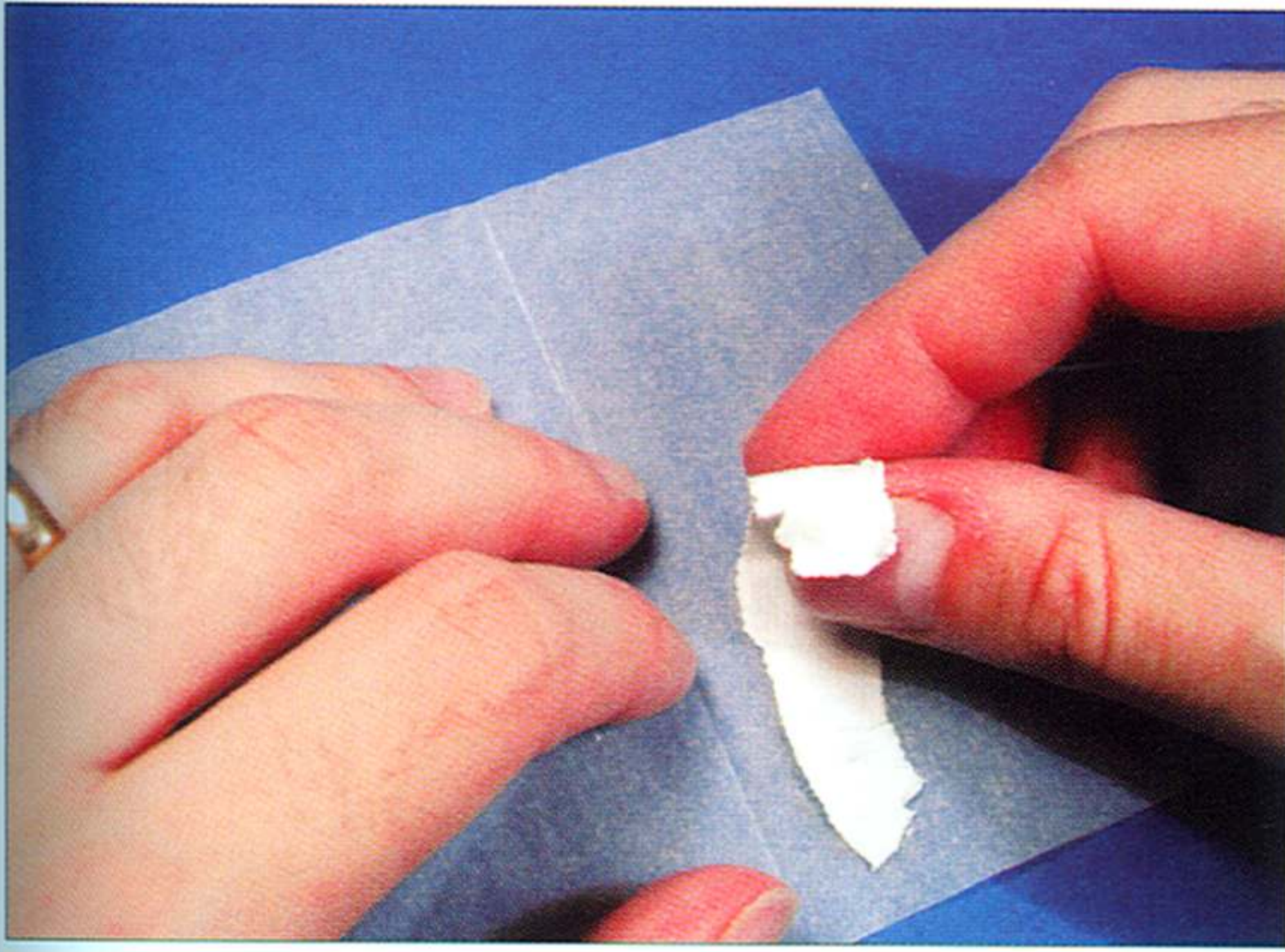
With the main shape of the model complete, I started application of the *zimmerit*. For this I used Milliput putty and some homemade *zimmerit* tools. For covering large areas, thin pieces of Milliput can be easily rolled out like raw pastry and applied directly over the whole area. For more complex areas, I tend to add small chunks of putty and smooth them out using plenty of water and the flat side of a scalpel blade. The first method is ideal for the relatively large smooth sides of the Jagdpanzer. I started by rolling out a long, thin piece of putty and then sandwiched it between a piece of folded greaseproof paper. It was then rolled flat using a thick piece of plastic tube. The thinner the putty the better, although this also means the resulting strip is more delicate and difficult to handle. I carefully removed the putty from the paper and placed it



Most of the early to mid version Jagdpanzer IVs were covered with *zimmerit* anti-magnetic mine paste. I represented this using Milliput modelling putty patterned with homemade *zimmerit* tools. The first step is to roll out a thin sausage-shaped piece of Milliput.



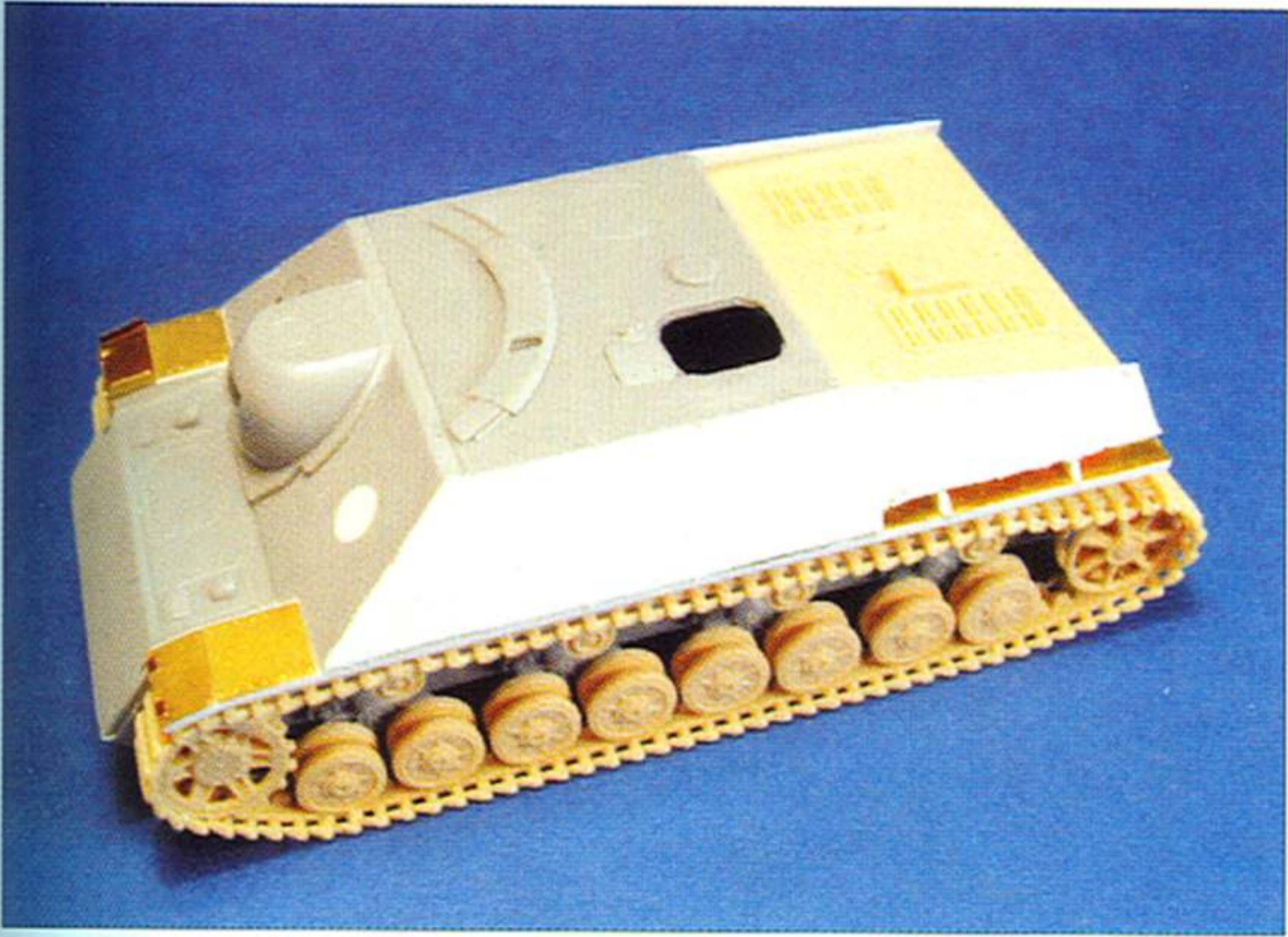
The Milliput is then rolled flat using a thick piece of plastic tube. Greaseproof paper helps prevent the Milliput from sticking.



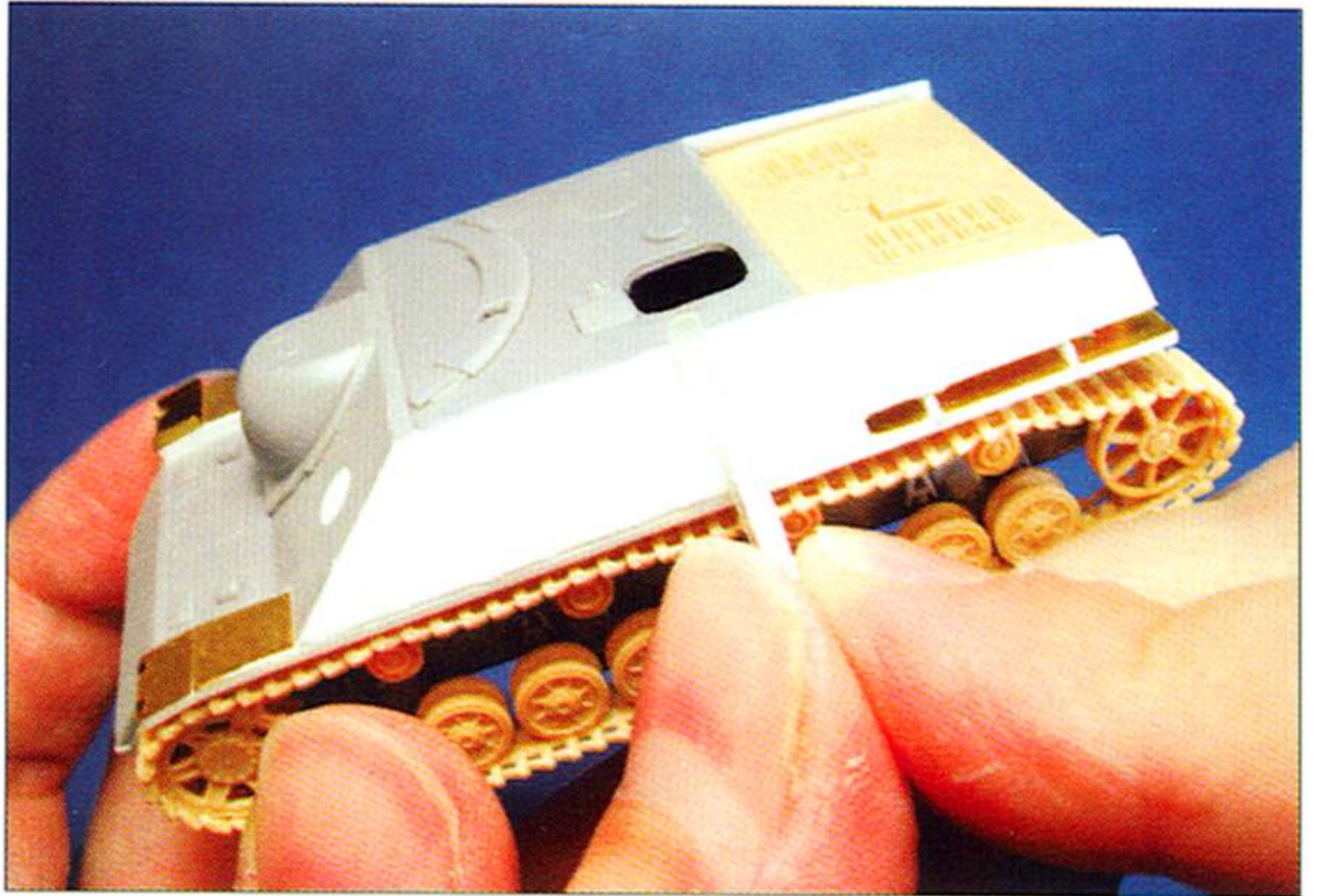
The piece of Milliput is now very thin and delicate so care is needed to remove it from the paper.



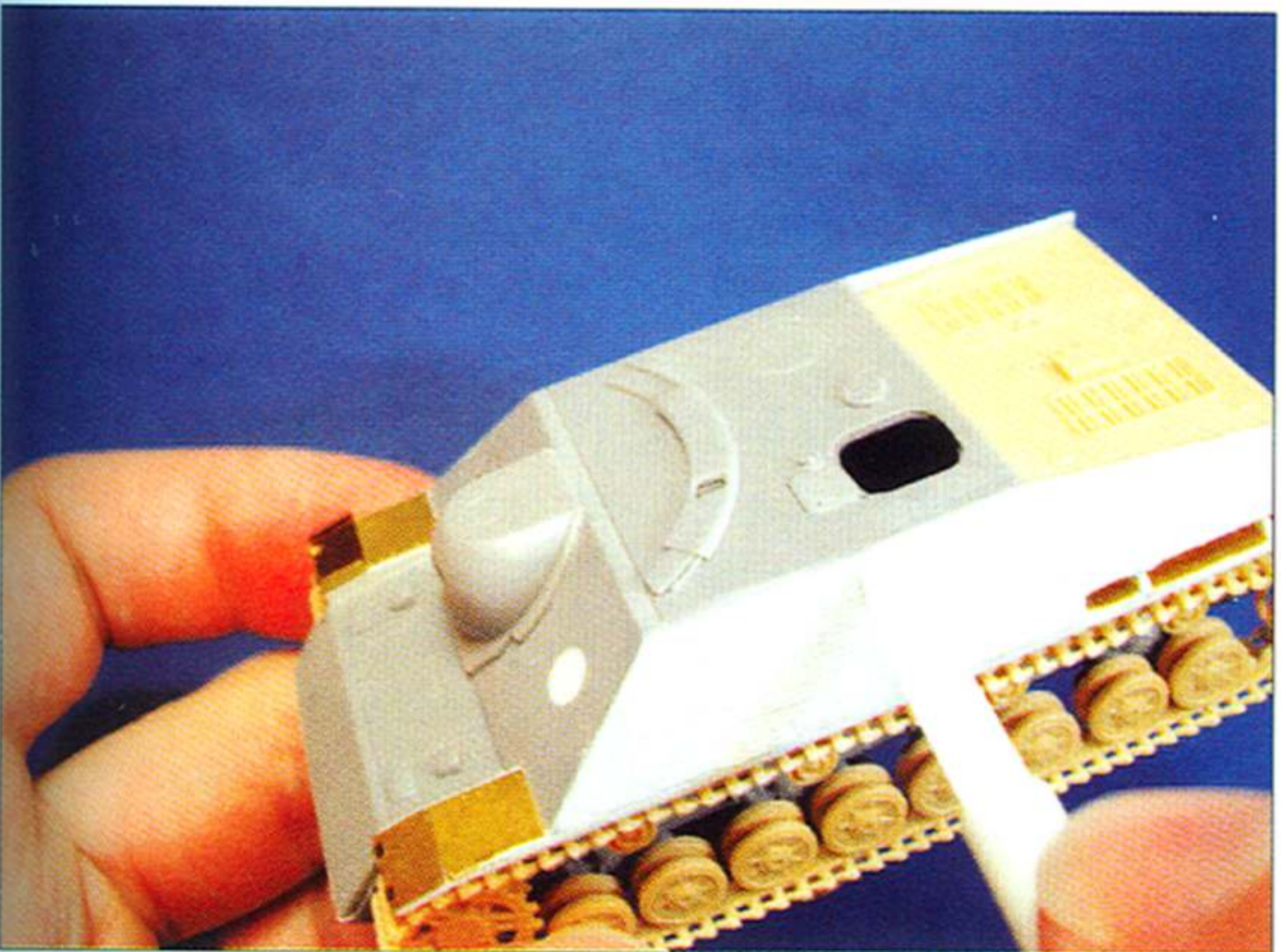
The Milliput is placed onto the model. If it is still a little too thick, it can be thinned some more by covering with greaseproof paper and applying gentle pressure.



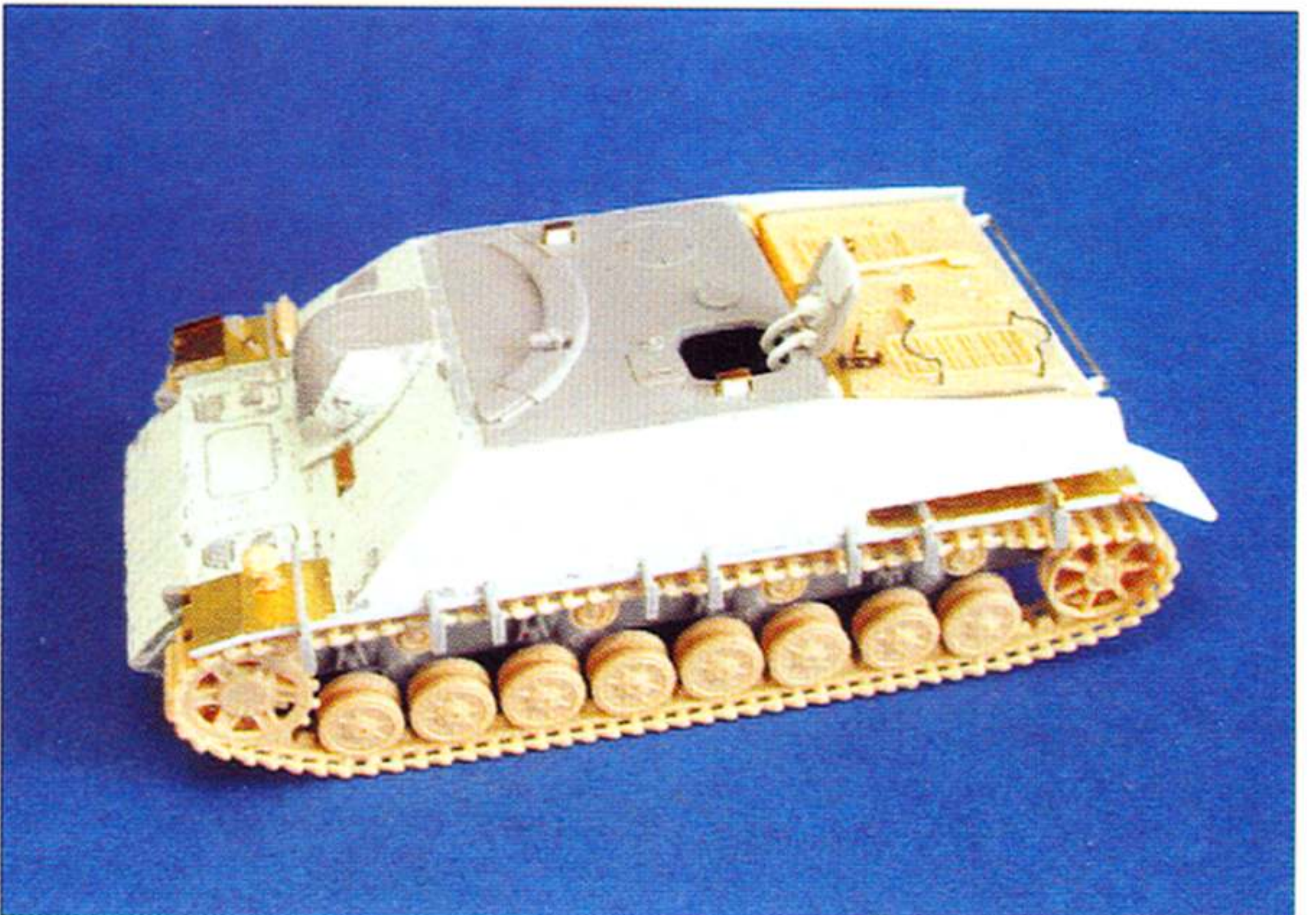
The Milliput is smoothed over with water and trimmed around the edges.



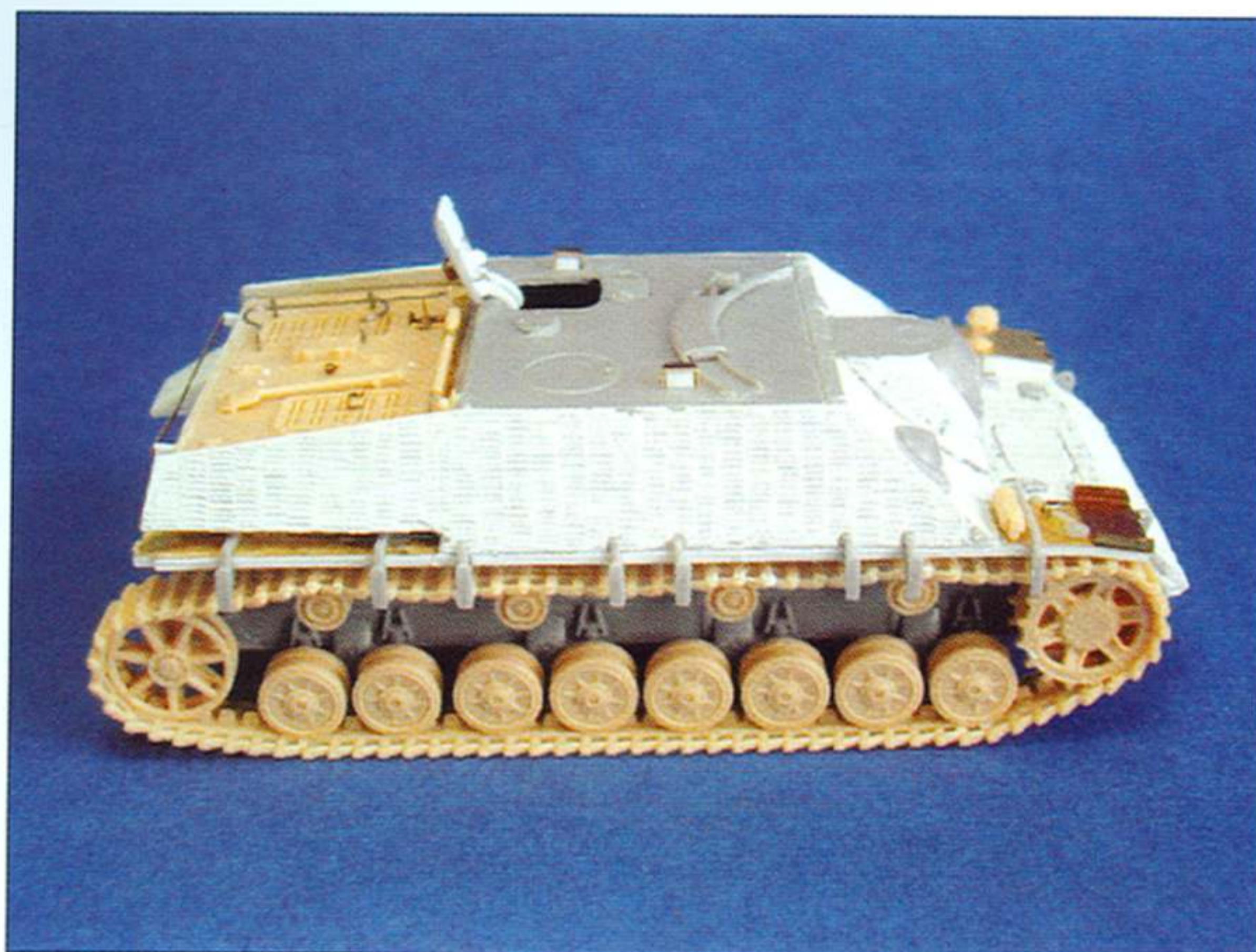
The characteristic *zimmerit* ridges are scribed into the Milliput using homemade *zimmerit* tools. The first stage creates a precisely spaced set of faint ridges using a strip from the side of a CD case.



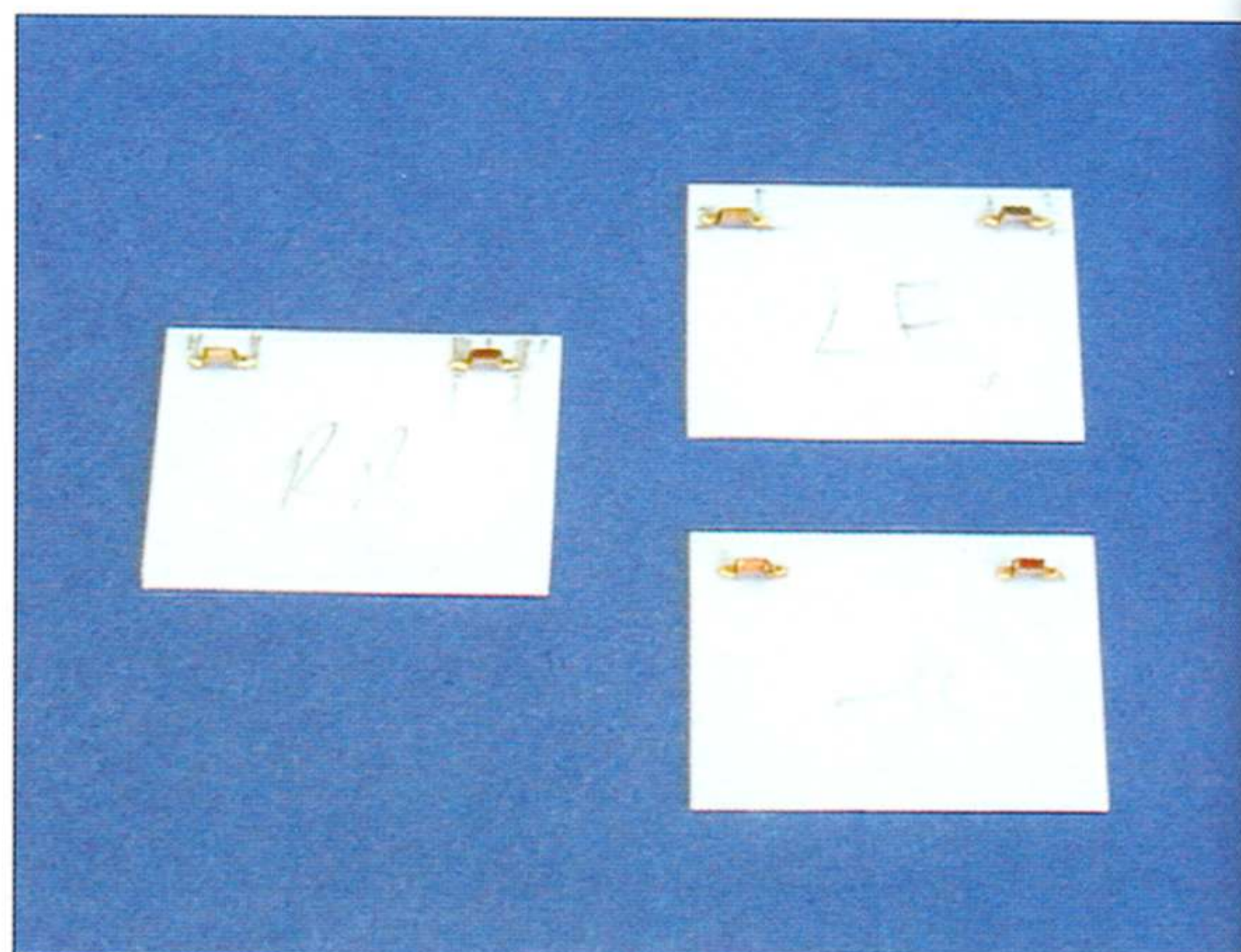
The second stage involves deepening the ridges and adding a small amount of unevenness to the spacing to add a little variety. Each section is left to fully cure before starting work on the next.



Several days later the whole vehicle is covered with *zimmerit*.



Many of the smaller details have now been added.



There are no *schürzen* included in the kit so I made my own from plastic sheet. Two small strips of brass were bent into bracket shapes and attached to the inner face of each plate. These are attachment points and simply hook over a series of brackets along the sides of the hull.



The crew figure is from the Preiser range. The headphones were created using a punch and die set and a strip of brass whilst the leads are thin copper wire.

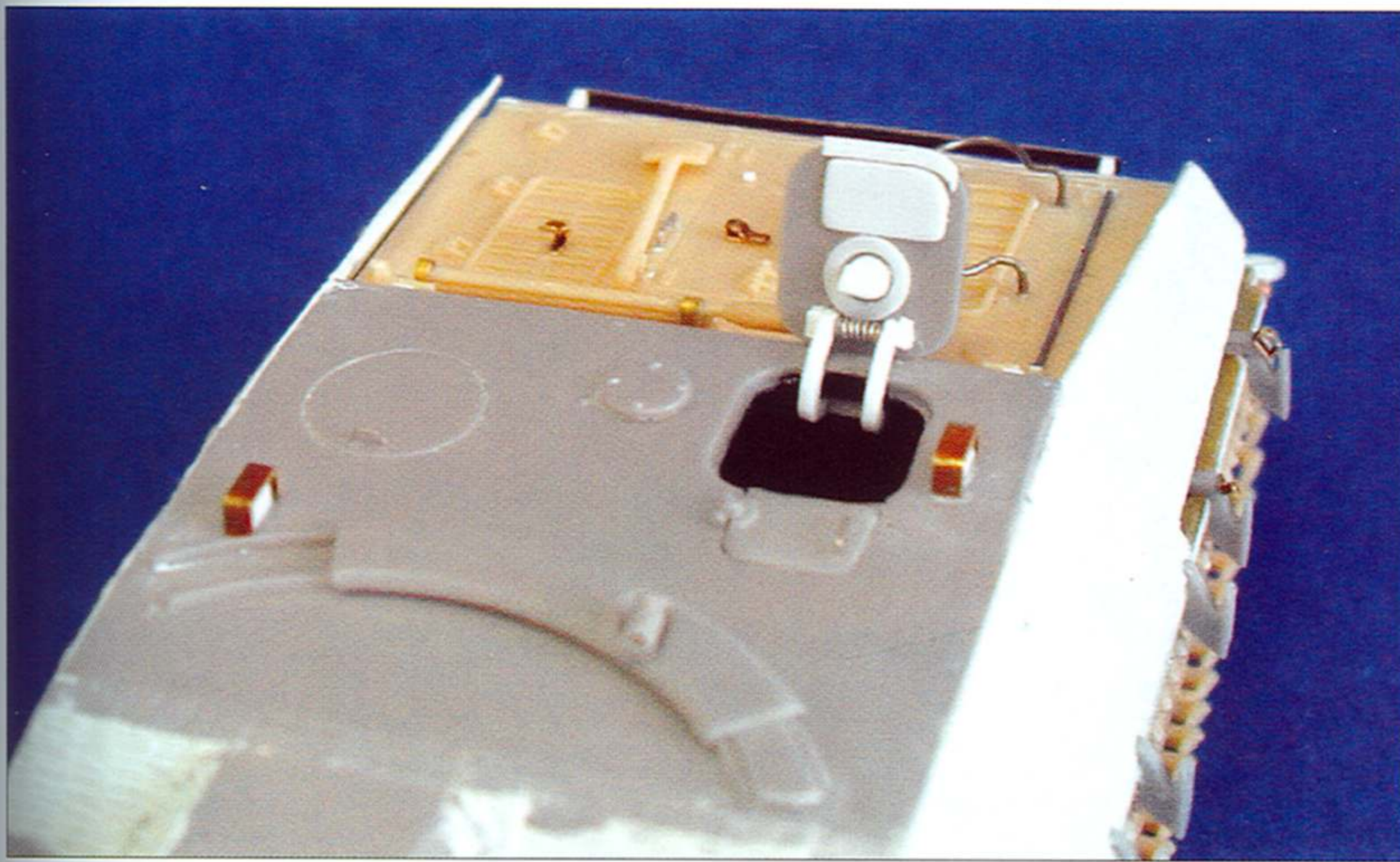
directly onto the model (I had previously scored and roughened up the plastic surfaces to give the putty something to grip to). I then trimmed the excess with a scalpel. These steps gave a uniformly thin covering of putty to the whole left side of the model. To imprint the *zimmerit* pattern I used a thin strip from the side of a CD case. The strip should be kept wet to prevent it from adhering to the putty and lifting it from the surface of the model. A complete column of ridges can then be completed at a time, so progress is fairly speedy. The resulting shallow ridges can then be used as a guide for the next step. This involves deepening the ridges and giving a little more variety and character to the pattern. A simple wedge-like tool is used for this and again plenty of water is needed. Although this step is quite time consuming it is easy to do if spread out over several days. After completing the left side and allowing it to fully cure, I applied the same method to the right side and the nose of the vehicle. The remaining areas that required *zimmerit* were smaller and more complex, so for these I applied several smaller pieces of rolled-out putty and smoothed them together with a wet scalpel blade. The wedge-shaped tool was then used directly to imprint the ridges.

Once all the *zimmerit* had been applied, most of the remaining work involved the addition of smaller fittings and details. Many of these came from the PART photo-etched detail set or were homemade from plastic strip and wire. The kit doesn't include *schürzen* so I cut some out from plastic sheet and made small attachment loops from brass strip.

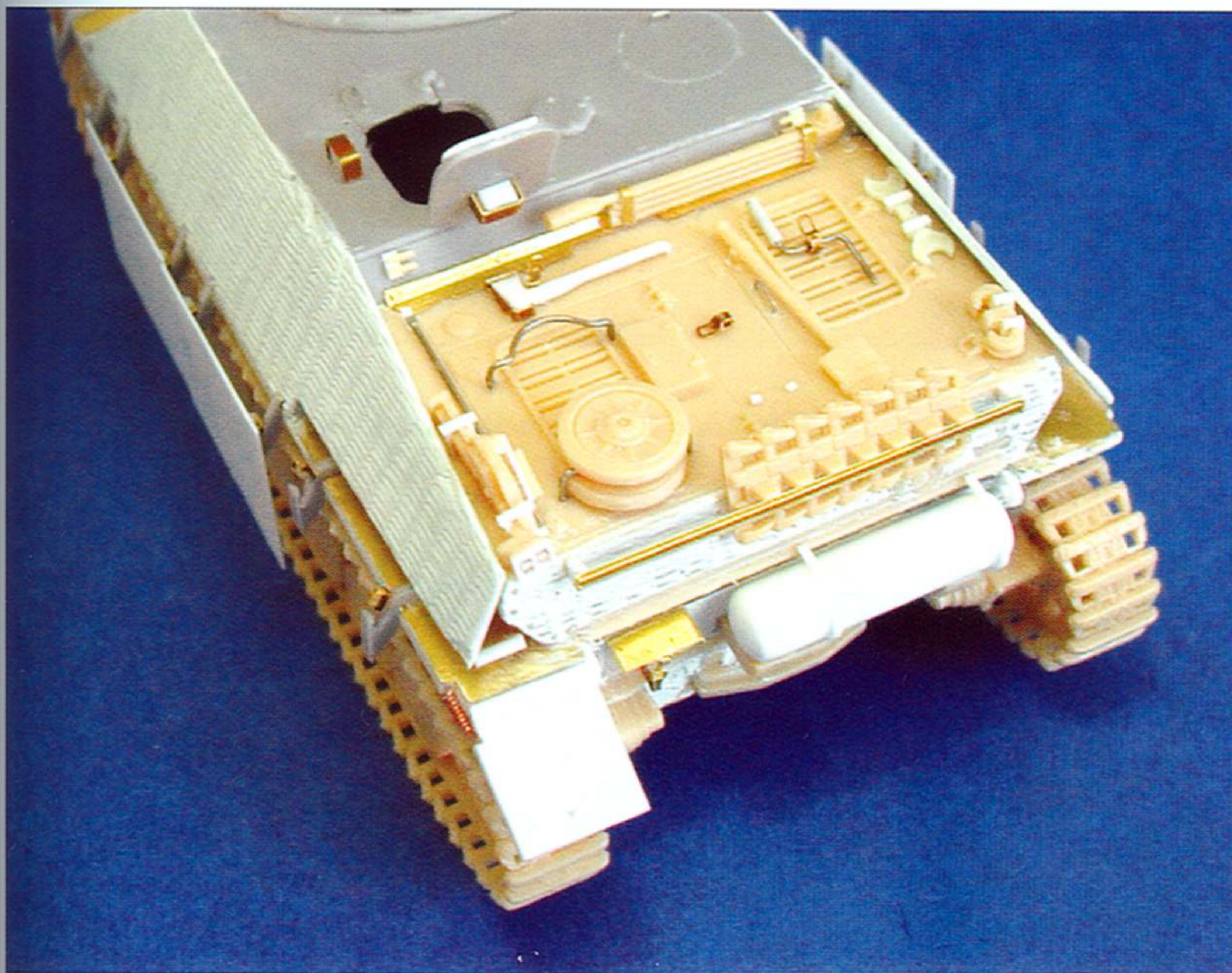
## Painting mottled camouflage

From the start of the project I had planned to model a specific vehicle. A colour plate for this can be found in a Russian publication – *Panzertruppen 1945 Organization and Armament* (Military Chronicle, 2001) – along with a black and white photo of the abandoned vehicle. The colour plate shows the vehicle with a dark yellow base coat and a mottled pattern of red-brown over this.

I used Humbrol enamels for all the main camouflage colours and started by applying two thin base coats of Radome Tan (148). A random mottled pattern was applied over this using heavily thinned Matt Rust (113) sprayed at low pressure. The pattern is gradually built up, so it is important to use very thin paint with as low a pressure as possible. A thinned Dark Earth (29) mix was then lightly airbrushed along all of the edges of the model and streaked randomly

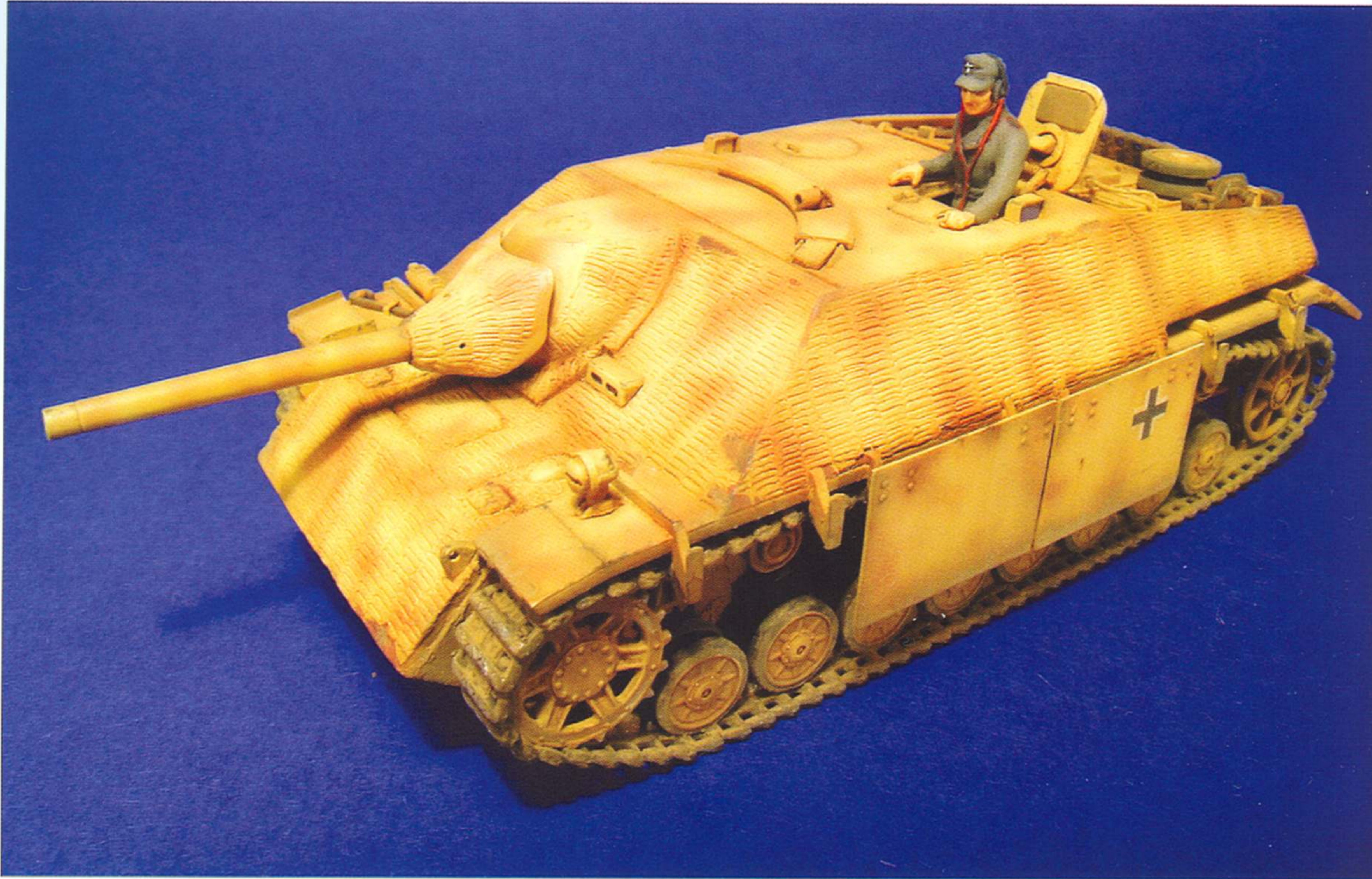


The inner face of the commander's hatch has no detail so I thinned it to a more scale thickness and added the hinges, periscope and pad detail.



Most of the tools and accessories were left off the engine deck to make painting them easier. They can be seen here test fitted to the model.

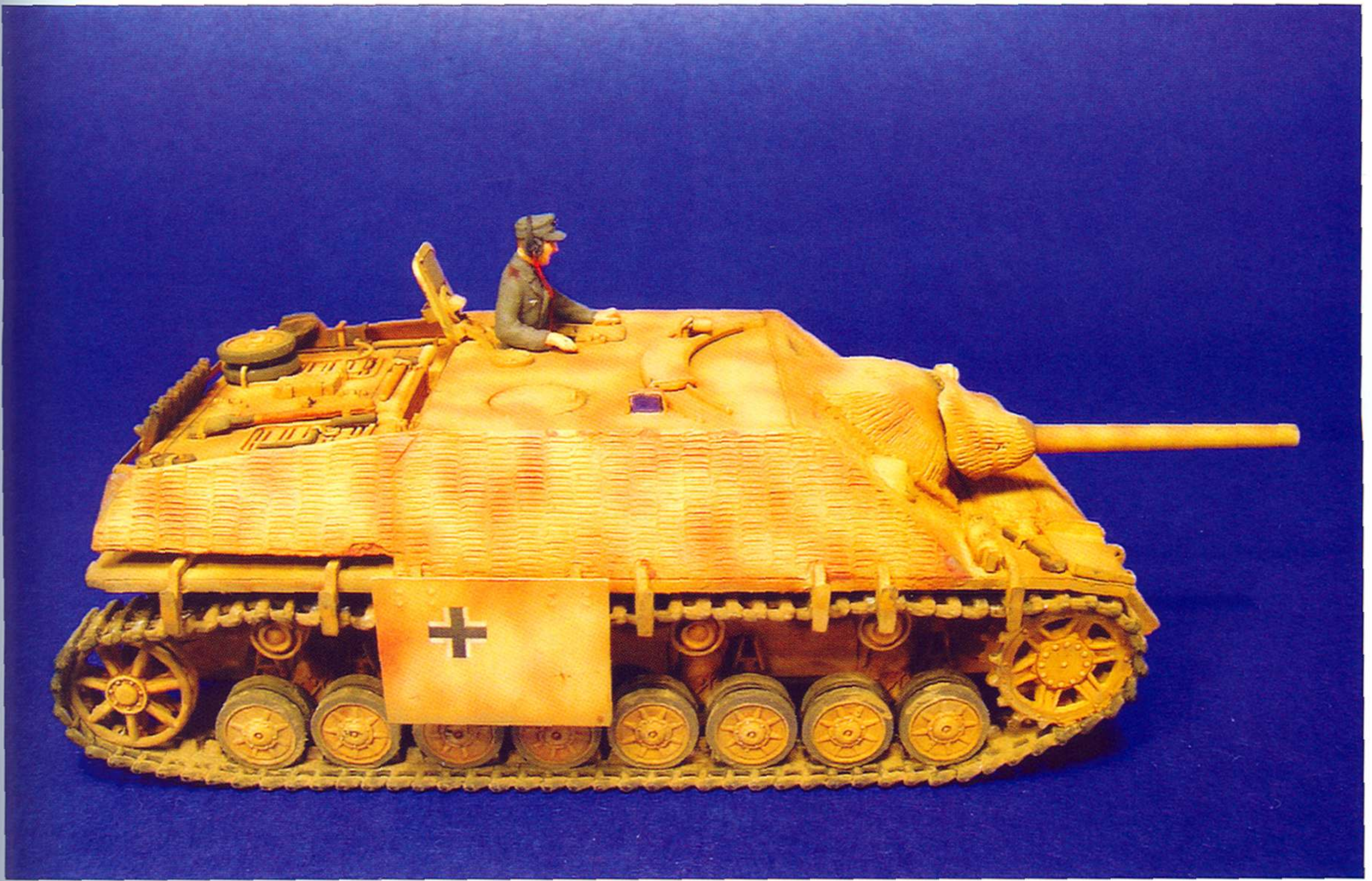
down the sides. This same mix was then darkened slightly with black and the procedure repeated. The only markings visible on the photo of the vehicle are crosses on the side skirts and these were taken from the Archer Dry Transfer range. I then gave the whole model a coat of S.C. Johnson Klear acrylic floor varnish to seal the markings. This also gives a tough, protective coat for further weathering with enamel and oil-based paints. I applied an overall thin wash of dilute Burnt Sienna oil paint, followed by localised pin washes of dark brown and black around the details and crevices. Small scratches and chips of paint were simulated using a sharp pencil and enhanced using a dark grey-brown mix applied sparingly with a fine brush. The smaller details were painted next, including the tools, tyres and track and the commander figure. The final stage of weathering was done using MIG Productions pigment powders to represent dust and mud. Europe Dust is a good colour for both dust and dried mud and this was mixed with thinners and a small amount of matt varnish to help fix it. I applied it liberally over the lower hull, running gear and some of the upper horizontal surfaces to finish the model.



ABOVE The model was painted with Humbrol enamels, using Matt Radome Tan (I48) for the dark yellow base colour and Matt Rust (I13) to represent the mottled red-brown camouflage.

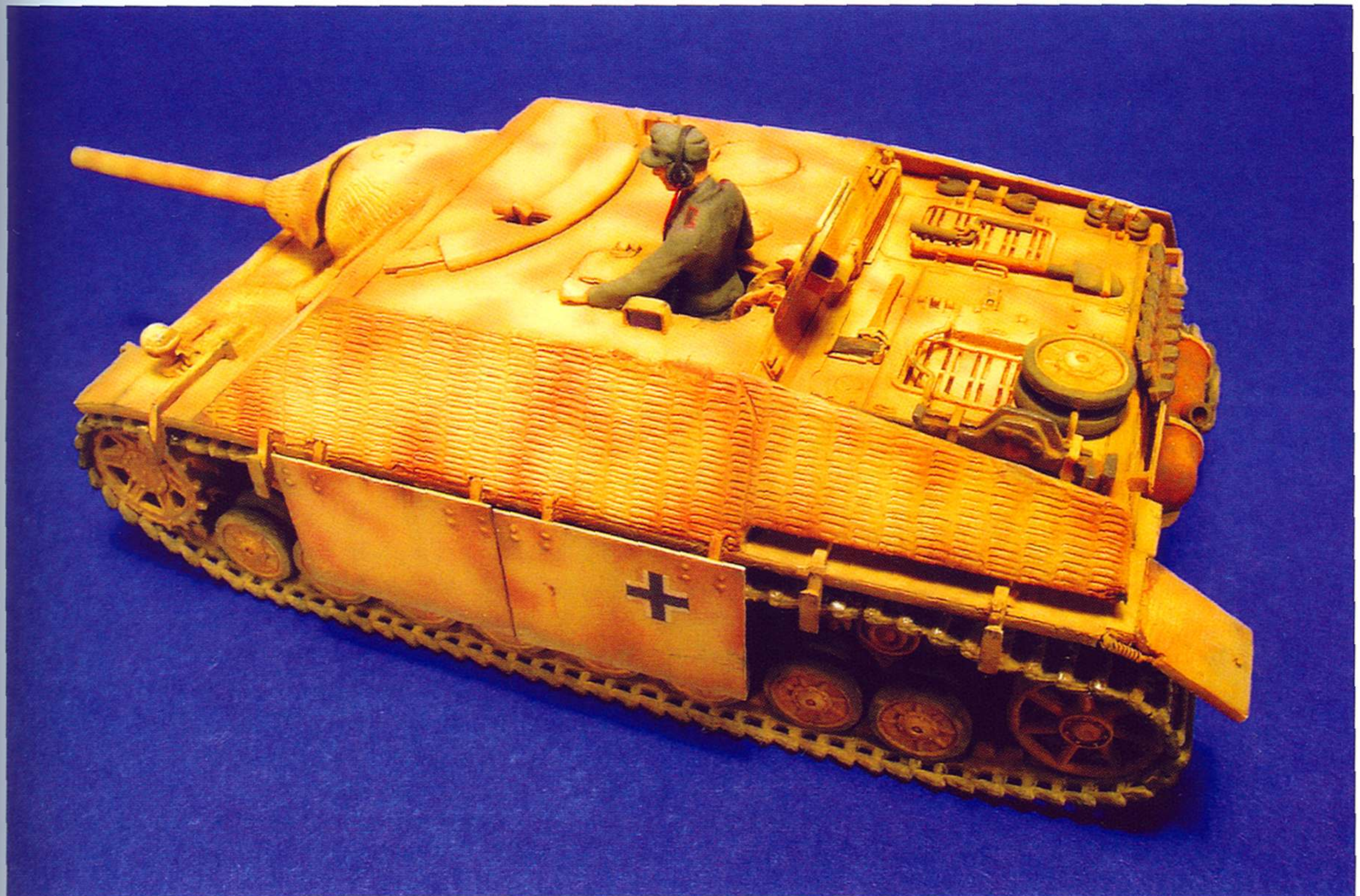
BELOW Weathering was done with several washes mixed from enamels and oil paints.





ABOVE The markings are dry transfers from the Archer Fine Transfer range.

BELOW The commander figure is from Preiser and had some additional headphone detail added.



# A late version Sturmpanzer IV

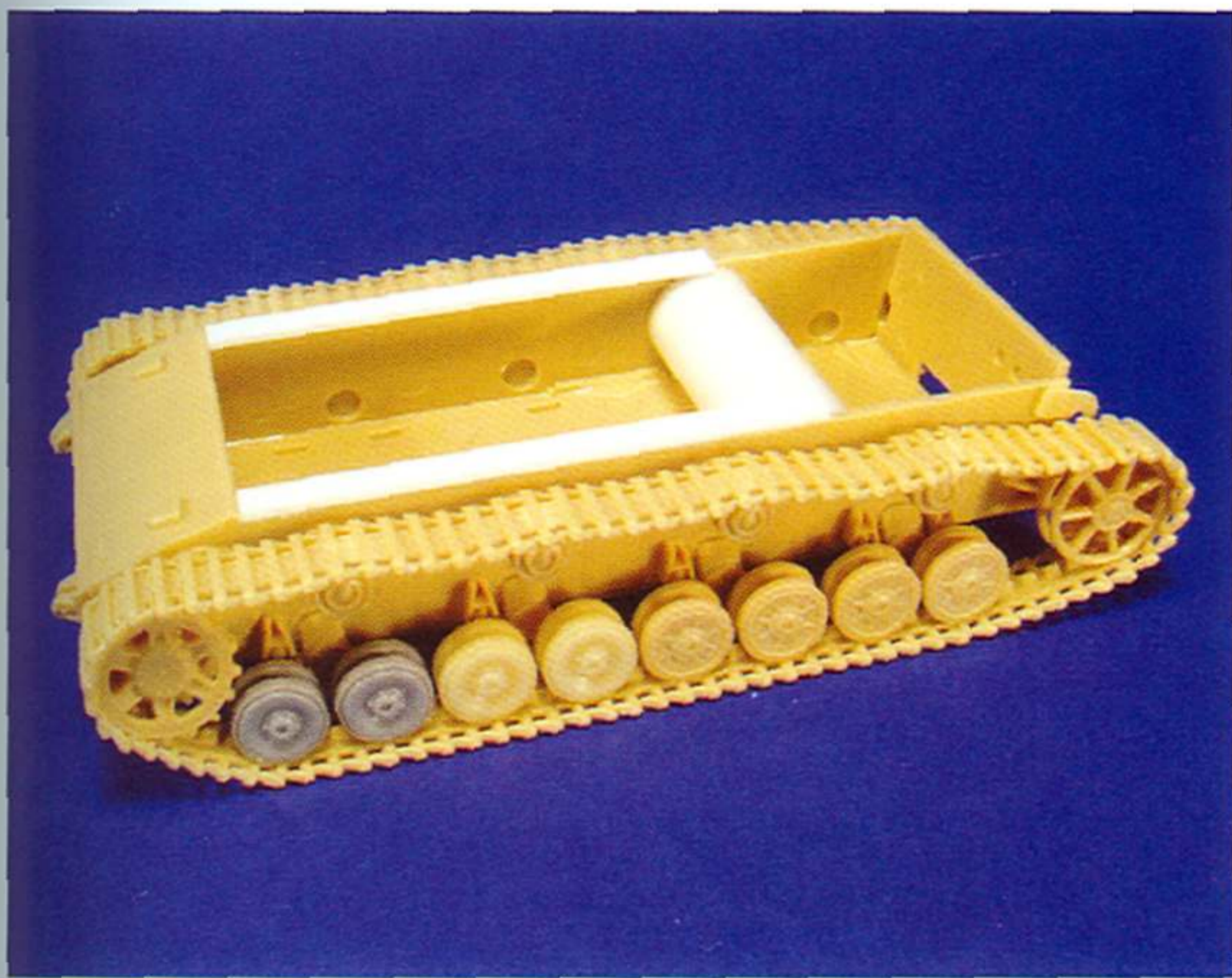
<i>Subject:</i>	<i>Late version Sturmpanzer IV</i>
<i>Skill level:</i>	<i>Intermediate/advanced</i>
<i>Base kits:</i>	<i>Revell Panzer IV Ausf. H (03119)</i> <i>Al.By Late Brummbär conversion (737)</i> <i>ARMO Late Brummbär conversion (AR72535)</i>
<i>Scale:</i>	<i>1/72</i>
<i>Additional detailing sets used:</i>	<i>PART Panzer IV Ausf. H photo-etched detail set (P72050)</i> <i>PART Panzer IV photo-etched fender set (P72063)</i> <i>Karaya copper cable (0.6mm diameter)</i>

Armour of the late war period is a particular favourite of mine, so when I decided to build a Sturmpanzer IV, I was keen to build a late version. The superstructure of the late version is quite different from that of earlier vehicles and is fitted with a ball-mounted machine gun above the driver's station. Along with this, late vehicles were often fitted with a full set of steel roadwheels and *zimmerit*. There are some interesting photos of vehicles that weren't fitted with *zimmerit* in a couple of Russian language books: *Panzertruppen 1945 Organization and Armament* (Military Chronicle, 2001) and *The Defensive Operation Near Lake Balaton* (Exprint Military Museum series, 2001). Another interesting feature of these vehicles is that only the front four wheels on each side are steel rimmed. Regarding camouflage, it appears that the vehicles were painted in a three-tone, hard-edged scheme with a predominance of green. In contrast, there is very little dark yellow and the pattern itself consists partly of small circular elements. All these factors made the vehicles quite appealing so I decided to model a similar one in small scale.

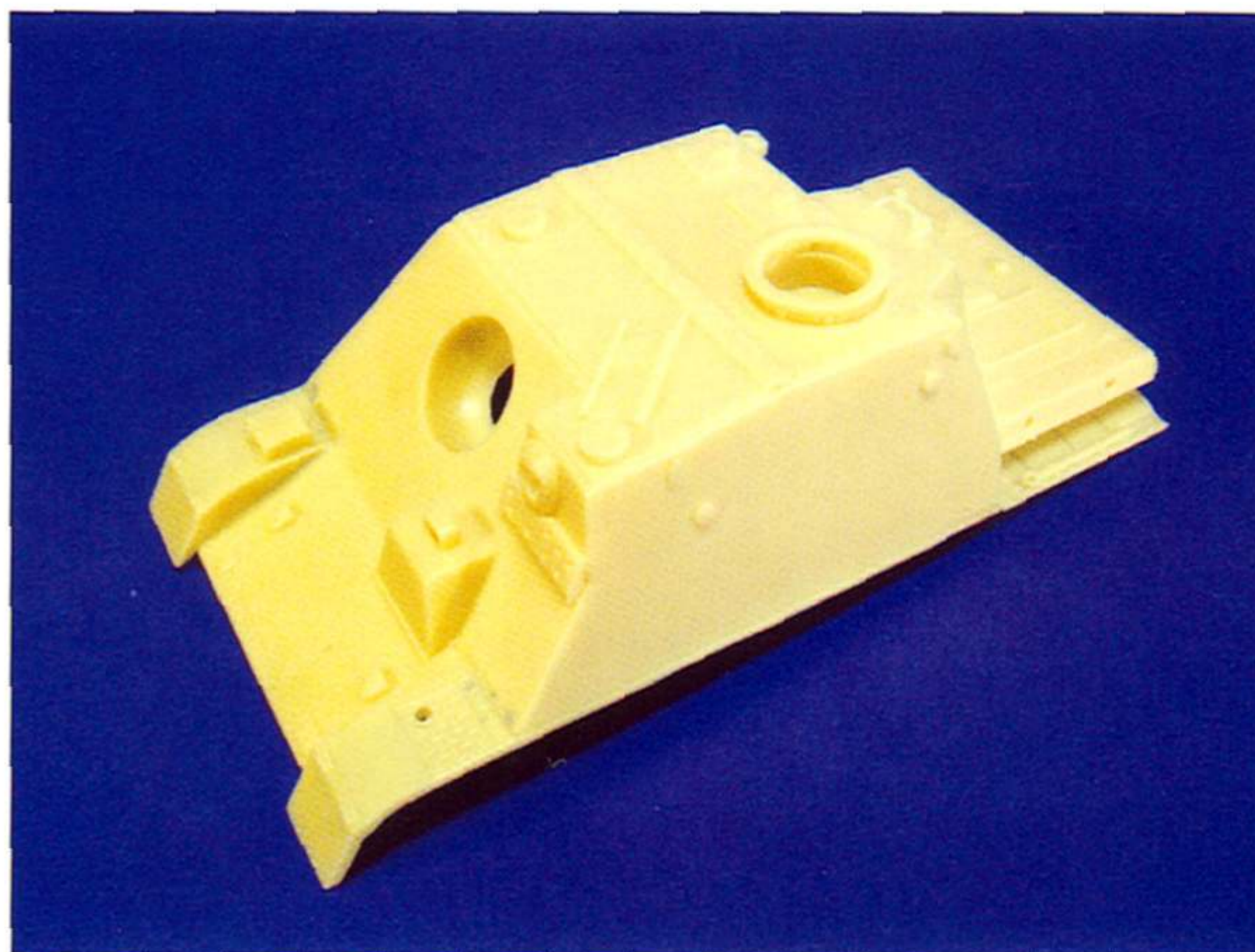
## A commercial resin conversion

There is currently no injection-moulded kit of the late-version Sturmpanzer IV. However, several resin conversions are available from ModelTrans, Armo and Al.By. At the time of writing, MR models have also announced a conversion for a future release. The ModelTrans and Armo conversions are for the Revell Panzer IV kits, whilst the Al.By set is for the Italeri/Eschi kit. I believe the latter is also available as two different sets: a complete conversion with many smaller items included, and a more basic set that just includes a replacement upper hull piece. I was only able to obtain the latter, so I had to find alternative sources for many of the smaller parts. I suspect this version of the set is intended for use with the Eschi Sturmpanzer IV and this would have provided many of the missing parts. Unfortunately this kit is long out of production, although the Eschi Panzer IV has been re-released by Italeri and the lower hull from this could be used instead. However, Revell's Panzer IV kit is superior both dimensionally and detail wise, so I planned to use this as the basis for the conversion.

I started by building up the lower hull of the Revell kit using the all-steel wheels from the ModelTrans conversion. The conversion provides four pairs of steel wheels (two per side) but I needed eight pairs for the particular vehicle I wanted to model. Luckily I had some spare wheels from a Hasegawa PzIV/70(V) kit that I was planning to build as an early production vehicle. The steel wheels fit very loosely to the Revell axles, so I filled the holes with plastic rod and then drilled smaller-diameter holes.



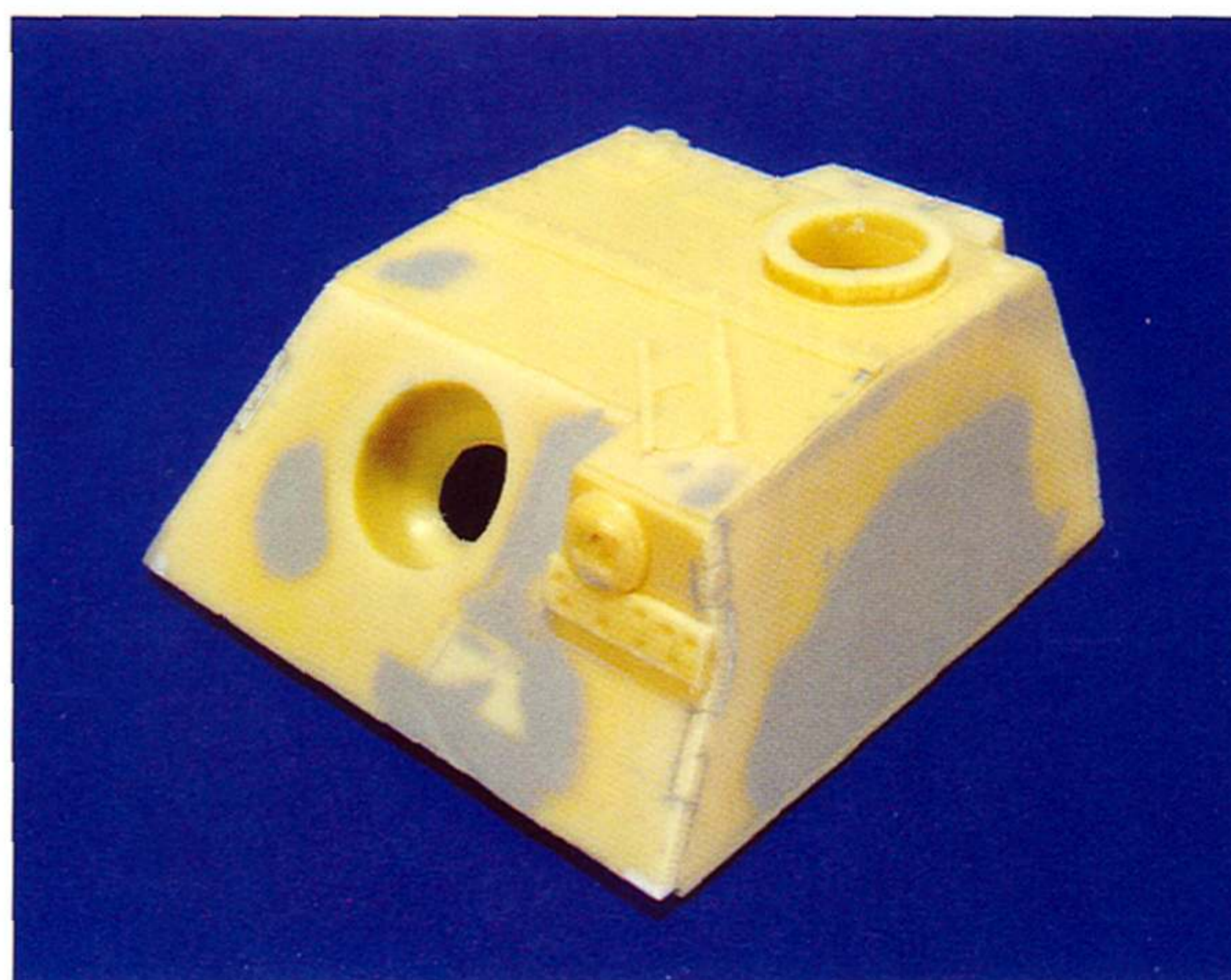
The Revell PzIV lower hull was built up as per the instructions but with eight pairs of steel wheels taken from a Hasegawa PzIV/70 kit and the ModelTrans conversion.



The Al.By conversion appears to be sold in two versions. One is a complete set that includes all the smaller parts required. The other consists of just the upper hull part. Unfortunately I was only able to acquire the latter.



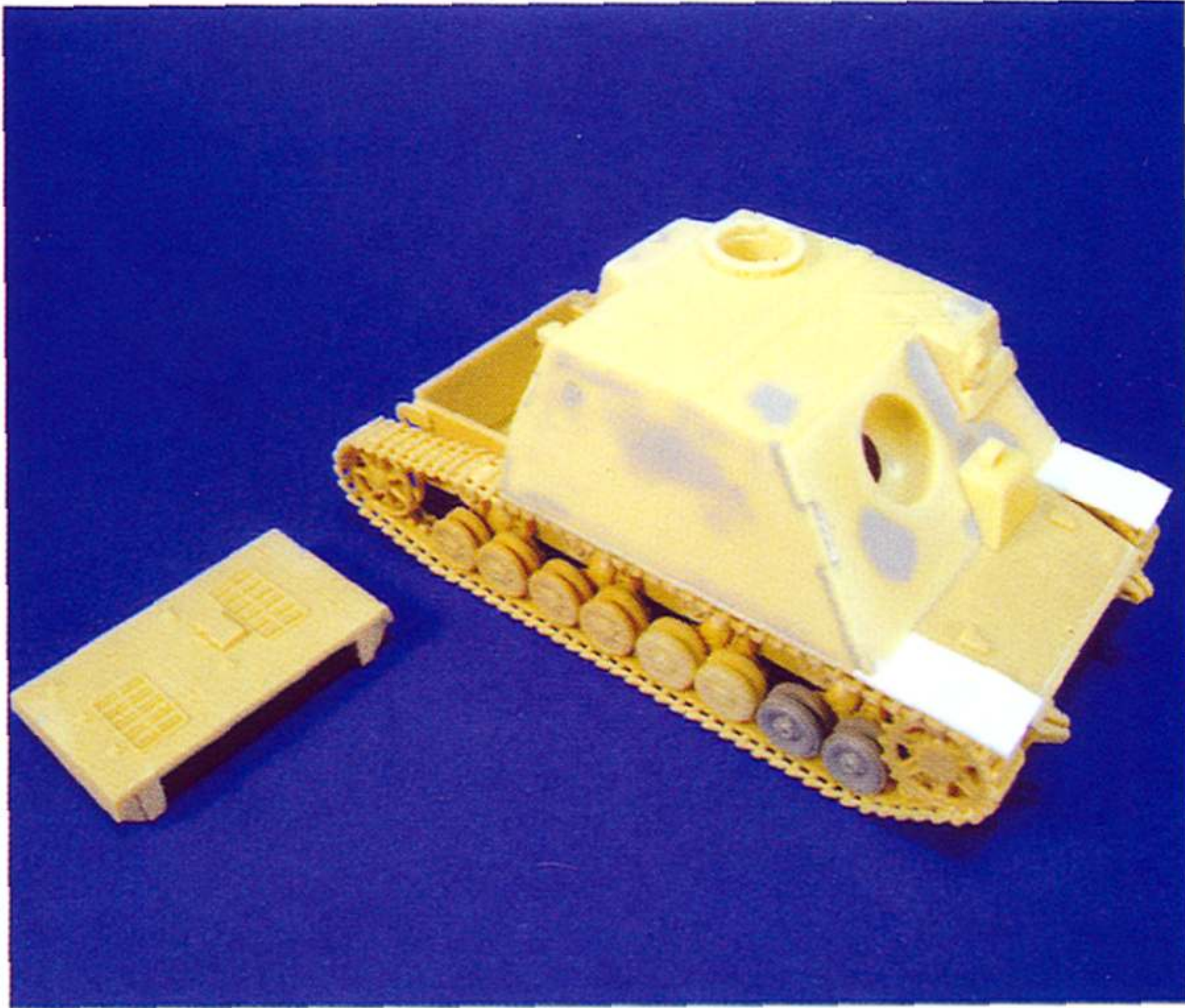
The conversion is for the Esci kit, but as the Esci hull is over-scale I removed the engine deck and glacis plate leaving just the main superstructure. There were some large, shallow sinkmarks in the resin part so I filled these in with Mr Surfacer liquid putty.



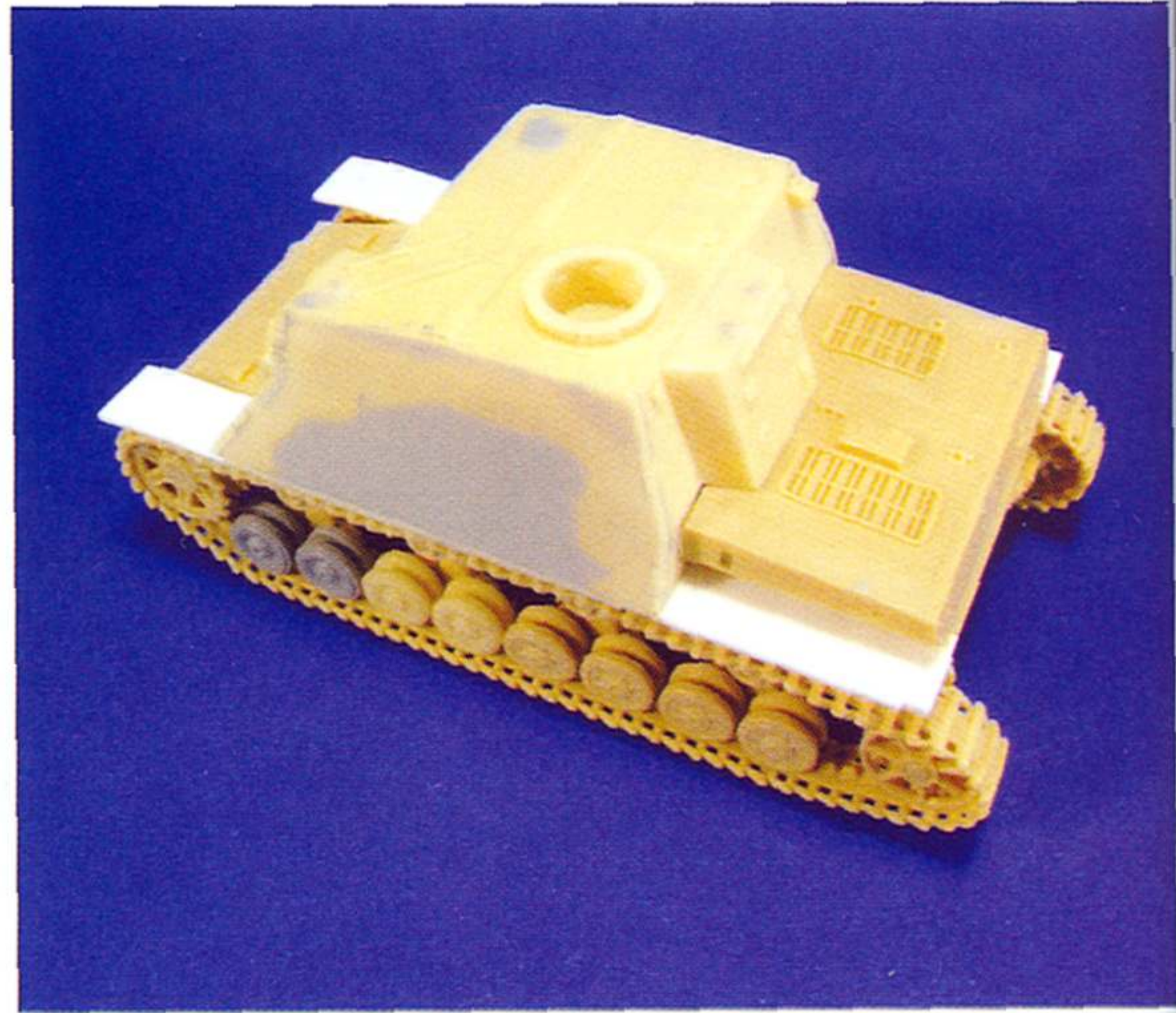
The sink marks on the main superstructure have been filled and sanded smooth.

As the Al.By conversion is for the Esci kit, the upper hull piece doesn't quite fit the Revell lower hull. The Esci kit and Al.By conversion are both over-scale lengthwise so I removed the glacis plate and engine deck and replaced them with the equivalents from the Revell kit. This reduced the overall length of the upper hull just enough to fit the lower part. As an added bonus the Revell replacements are also better detailed. The resin upper hull also has some shallow, but quite wide sinkmarks so I filled these with Mr Surfacer liquid putty (500 grade). A few coats of this were required, with each being lightly sanded down before application of the next.

As with the other models described in the book I created replacement fenders from plastic strip and photo-etched treadplate. The etched treadplate pattern is finer than that on both the Revell kit and the conversion part and has the benefit of not having any of the tools or equipment moulded on.



The engine deck and glacis were taken from the Revell PzIV kit. Fortunately they fit well to the Al.By part.



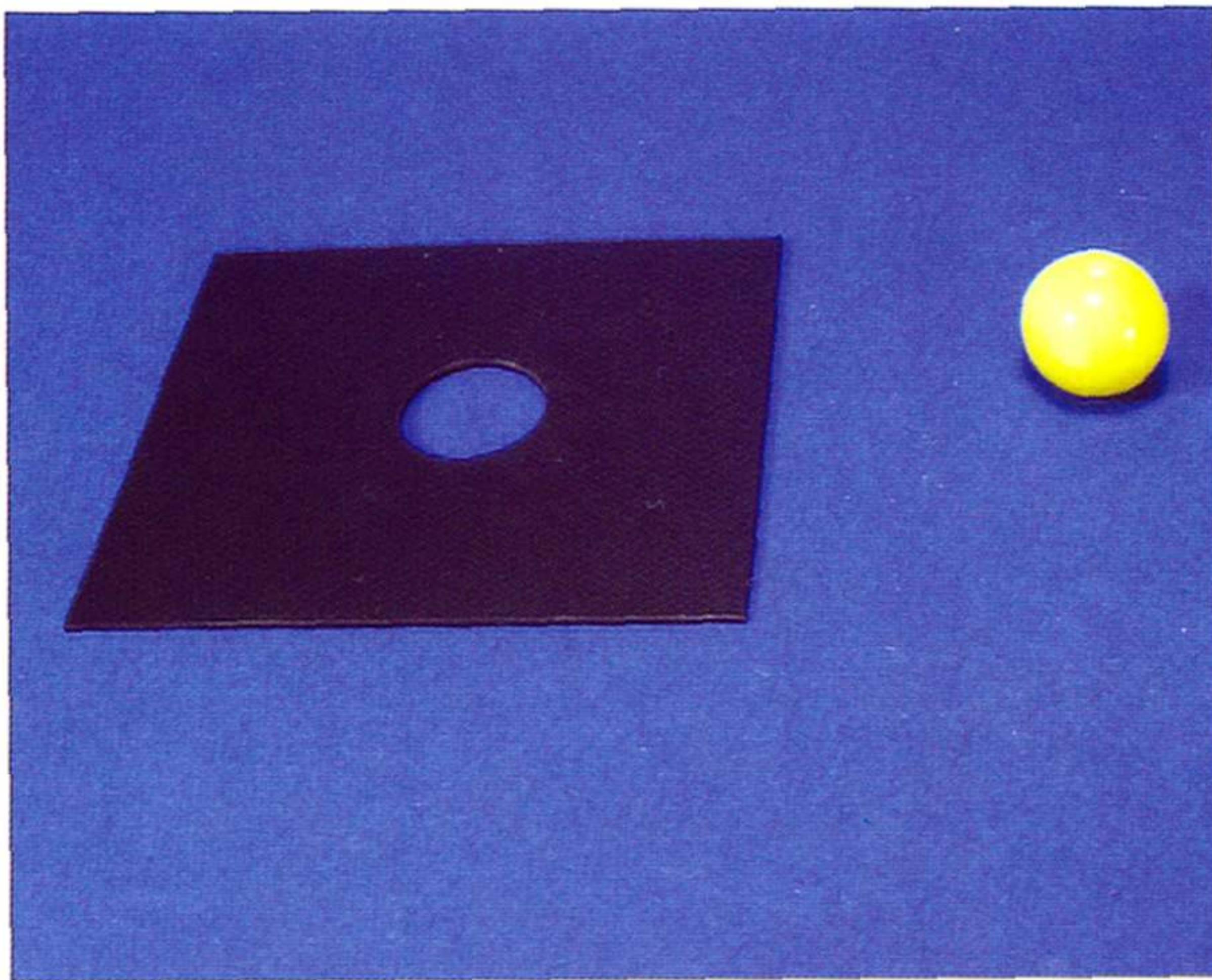
Fenders were cut from plastic sheet. Later they'll be covered with patterned photo-etched treadplate.

I planned to add the tools themselves after painting, and to use photo-etched tool clamps and clasps from the PART photo-etched detail set for the Panzer IV.

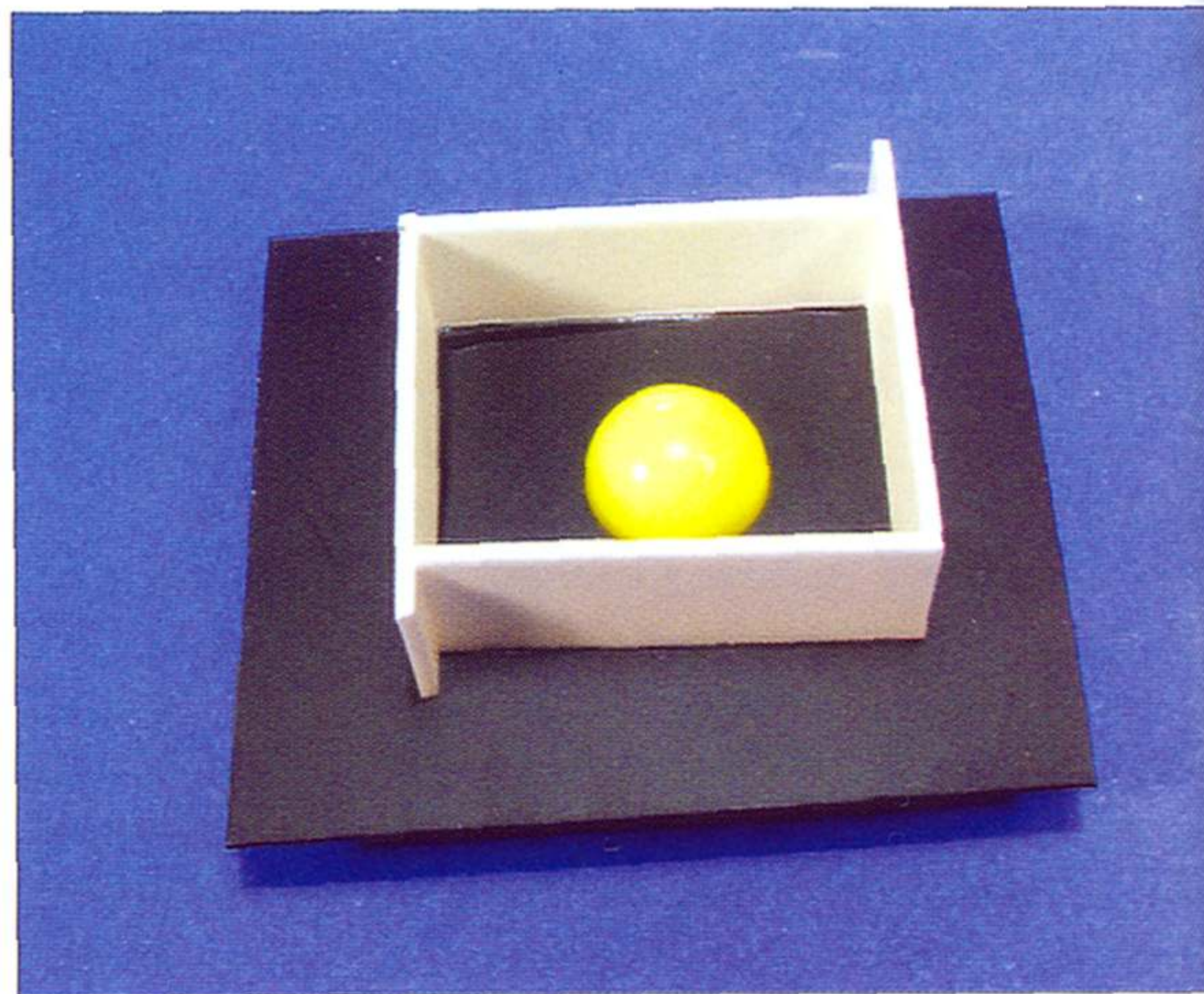
### Basic resin-casting techniques

One of the items missing in the Al.By conversion is the stubby main gun and ball mount. I used the excellent turned aluminium barrel from the Armo Sturmpanzer IV conversion. Hopefully this will be marketed as a separate item at some point. Unfortunately the ball mount on the Armo conversion is moulded integrally to the hull so I wasn't able to use this. Instead I purchased a glass bead of the correct diameter (approximately 1cm) from my local craft shop and cast a copy using a simple one-part mould. An easy method of doing this is illustrated in the accompanying step-by-step photographs.

Once the ball mount had been made, it just required a collar to hold it in place within the hull socket. I cut this from plastic sheet and added bolts made with a punch and die set.



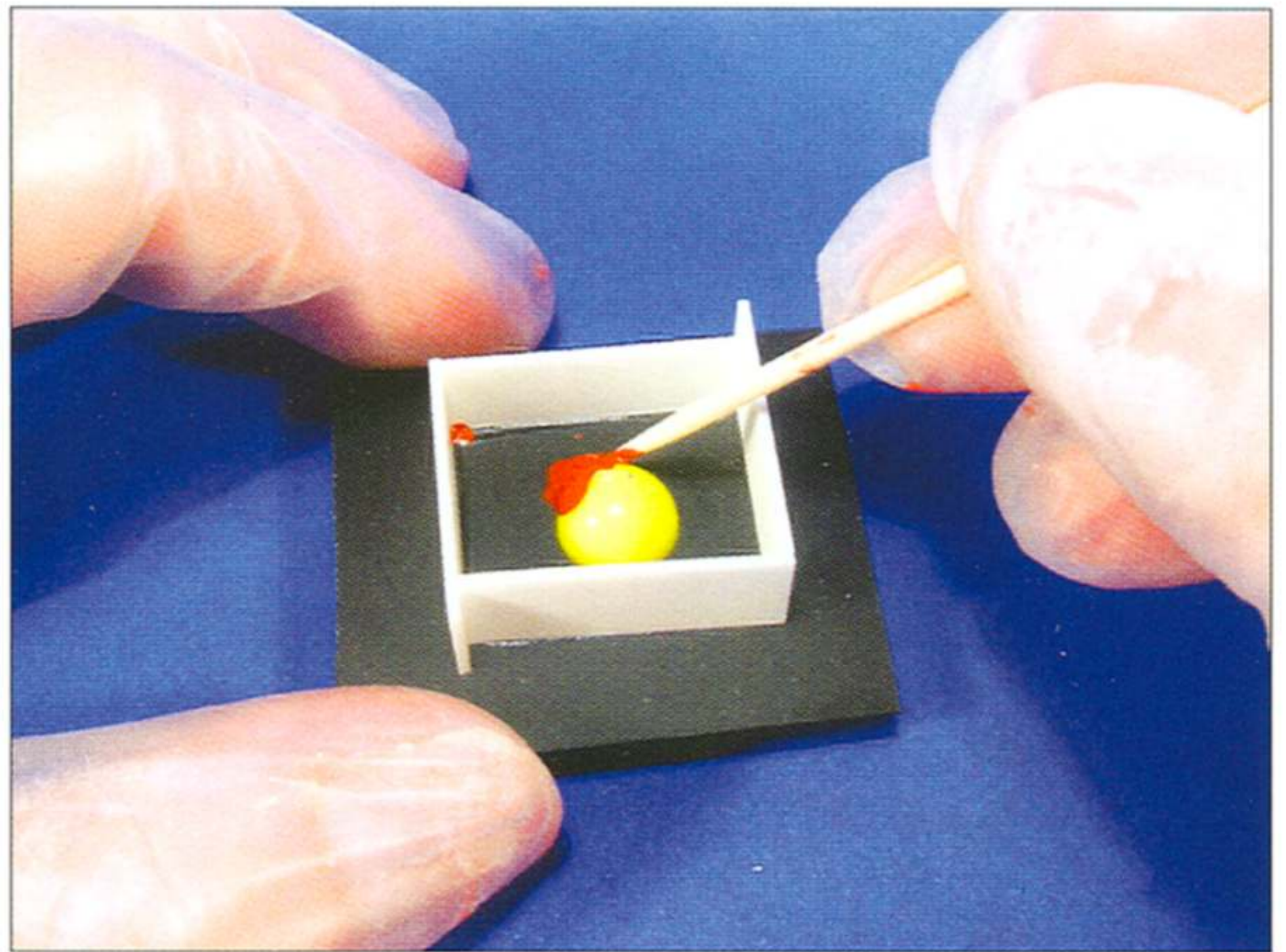
I had to find a source for the ball mount for the main gun. I bought a glass bead from a craft shop that was of the correct diameter (approximately 1cm) in order to cast a resin copy.



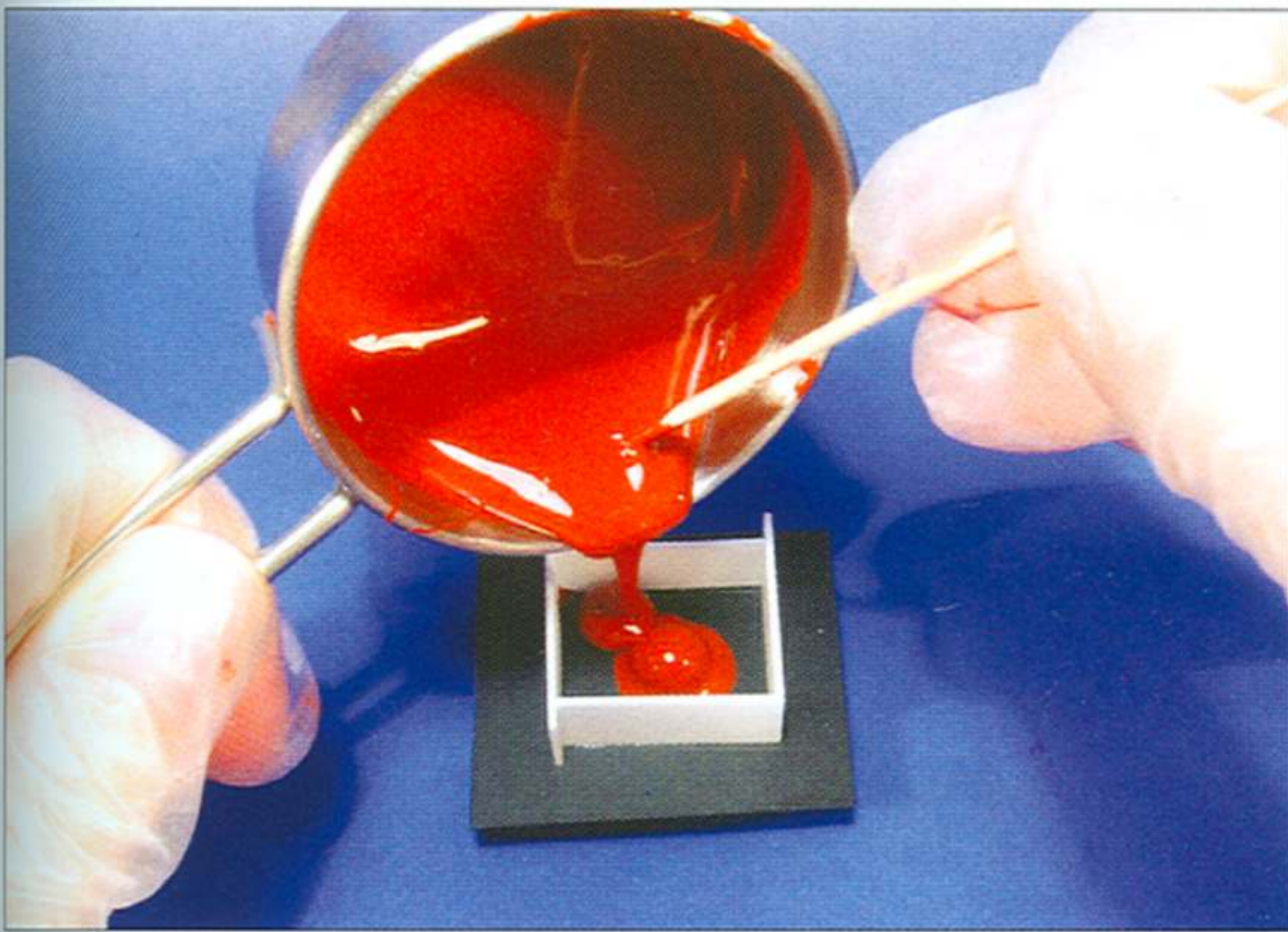
The bead fits snugly into a hole in a piece of plastic sheet. Sides are built up around the bead using plastic strip offcuts.



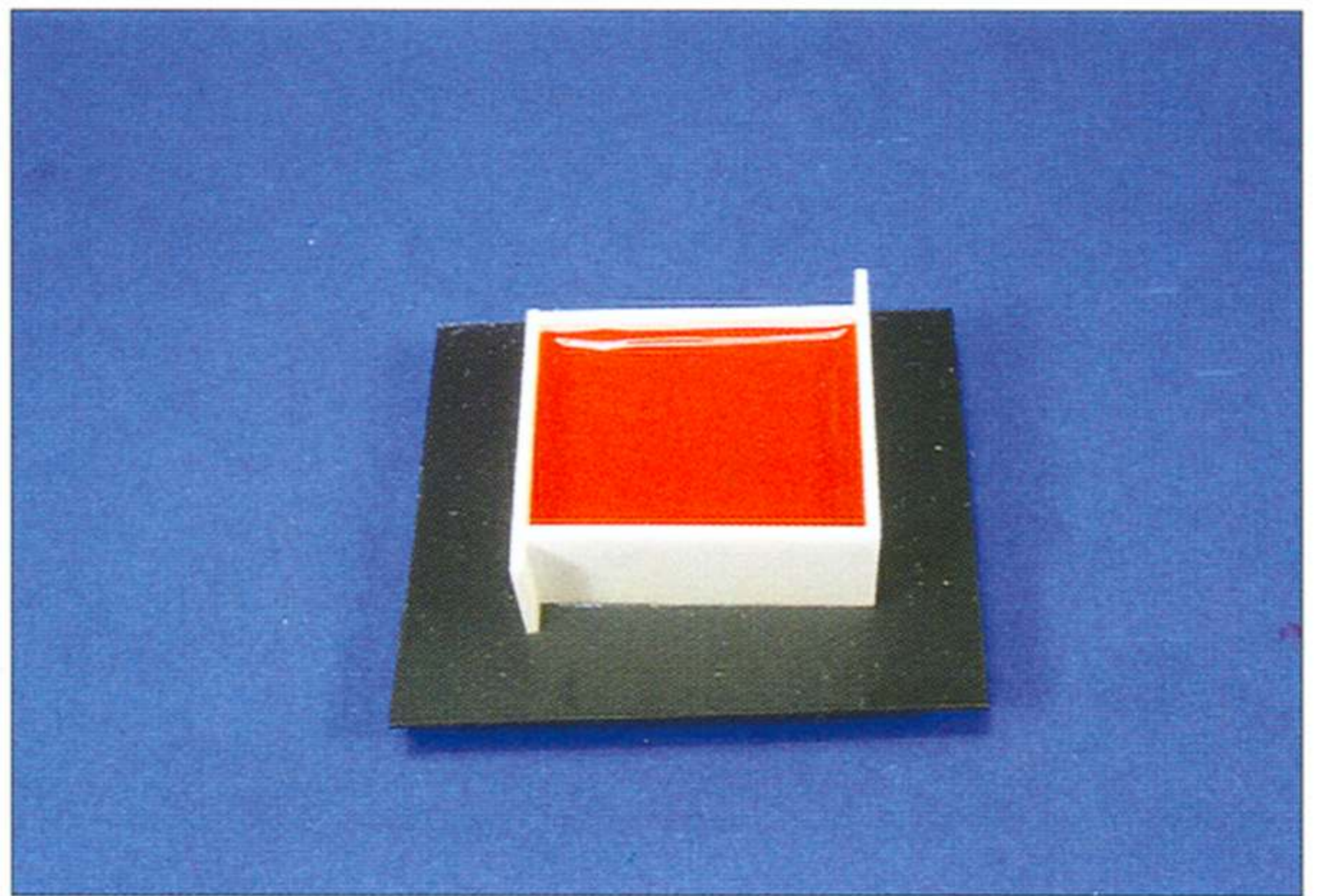
The silicone rubber is mixed with the provided catalyst.



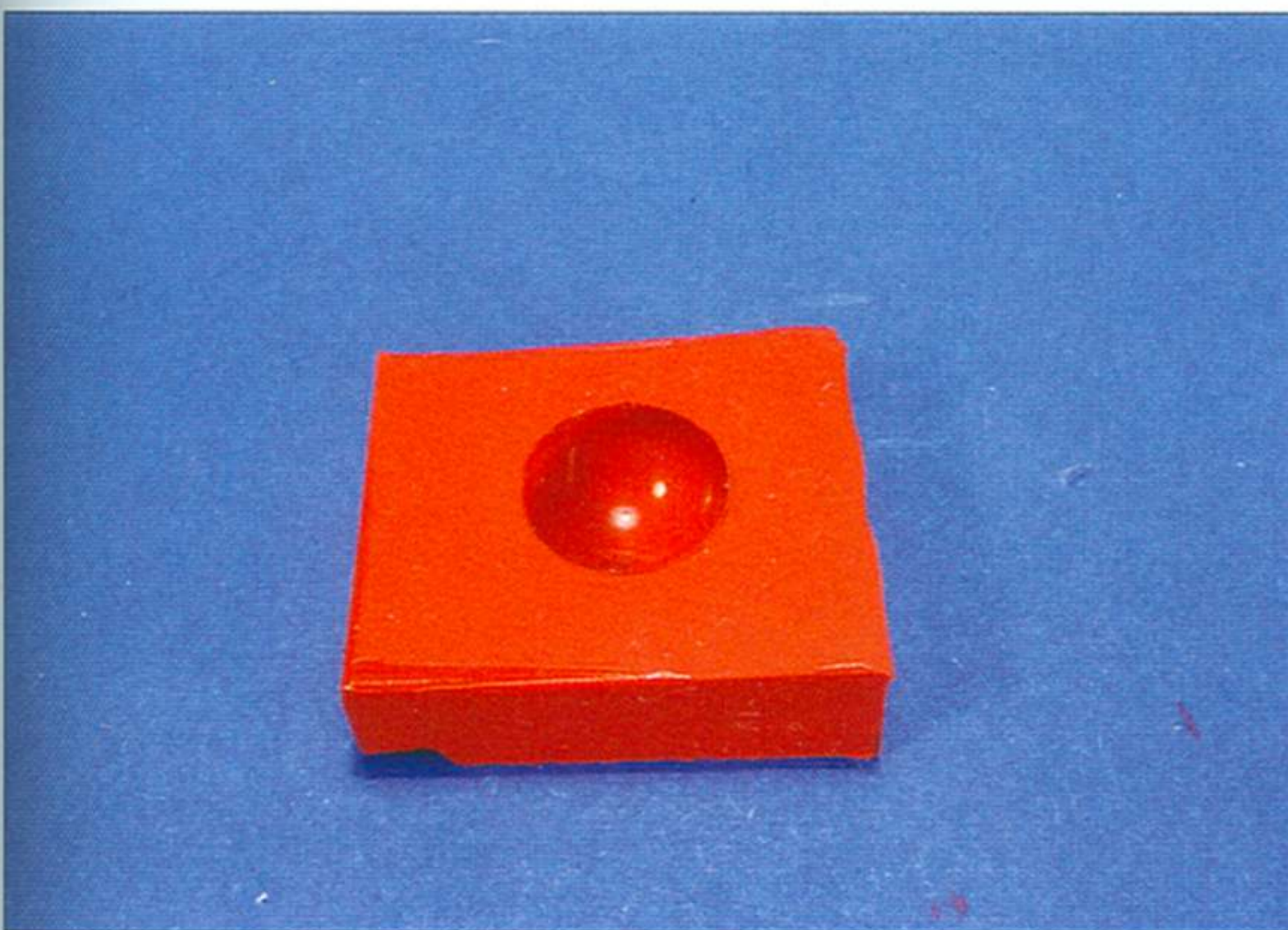
The master part is covered with a small amount of silicone rubber. This ensures it is completely covered and helps avoid air bubbles. In this case, the master part is very simple indeed and so this step probably wouldn't be necessary.



The silicone rubber is slowly poured over the master part.



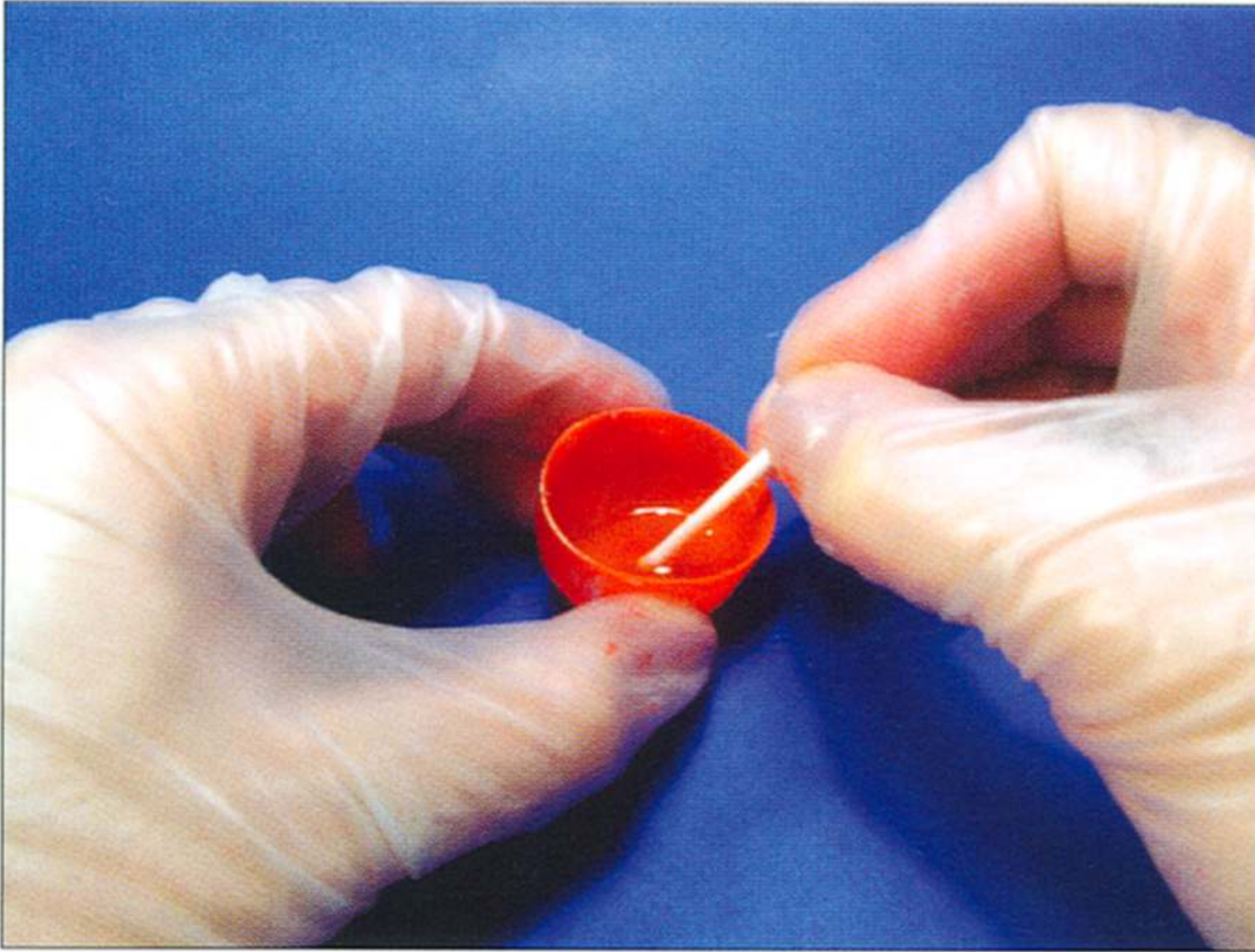
The silicone rubber cures within a few hours, although this is dependent upon the amount of catalyst added. I usually leave it overnight to ensure it's completely ready.



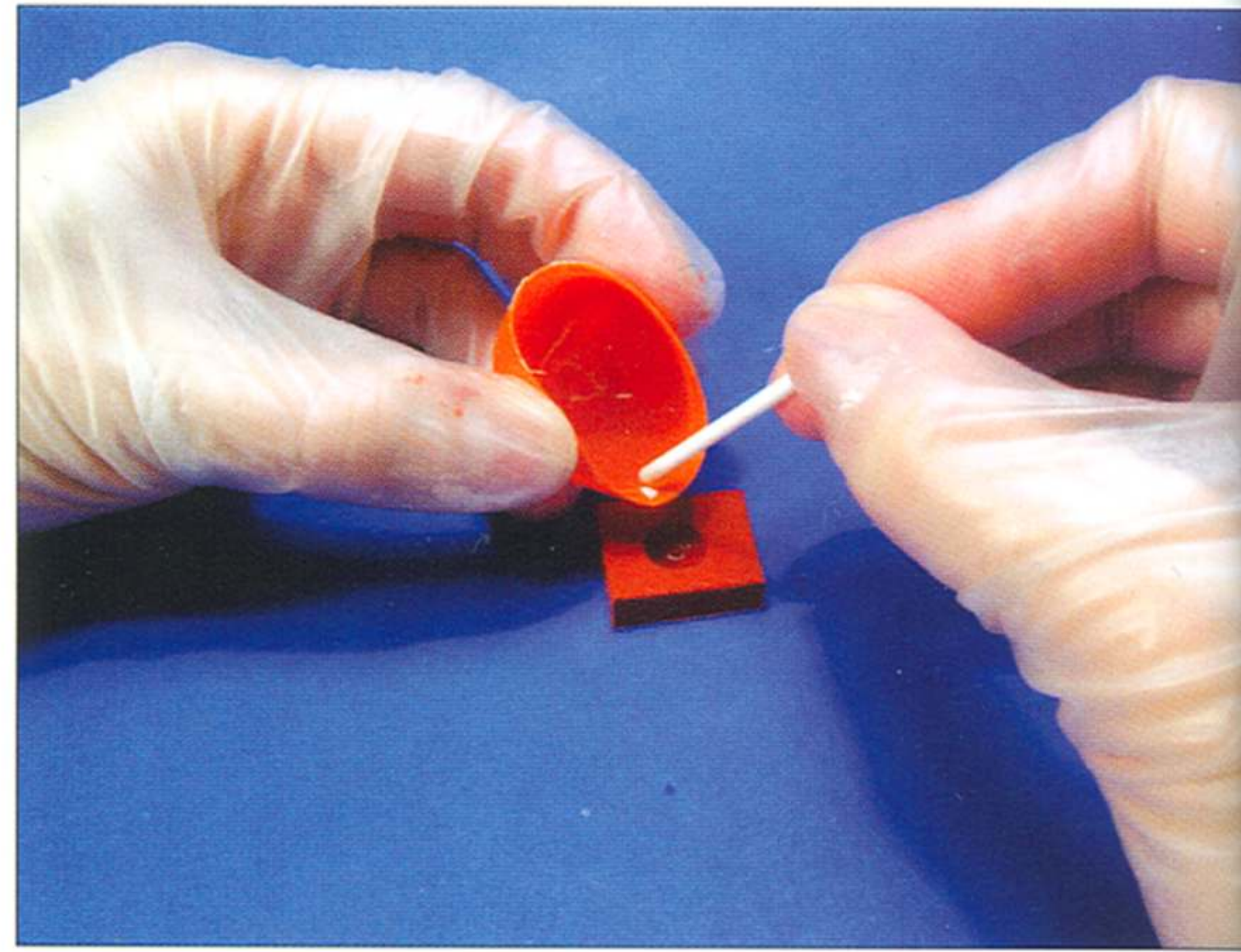
The finished mould, ready for casting some resin parts.



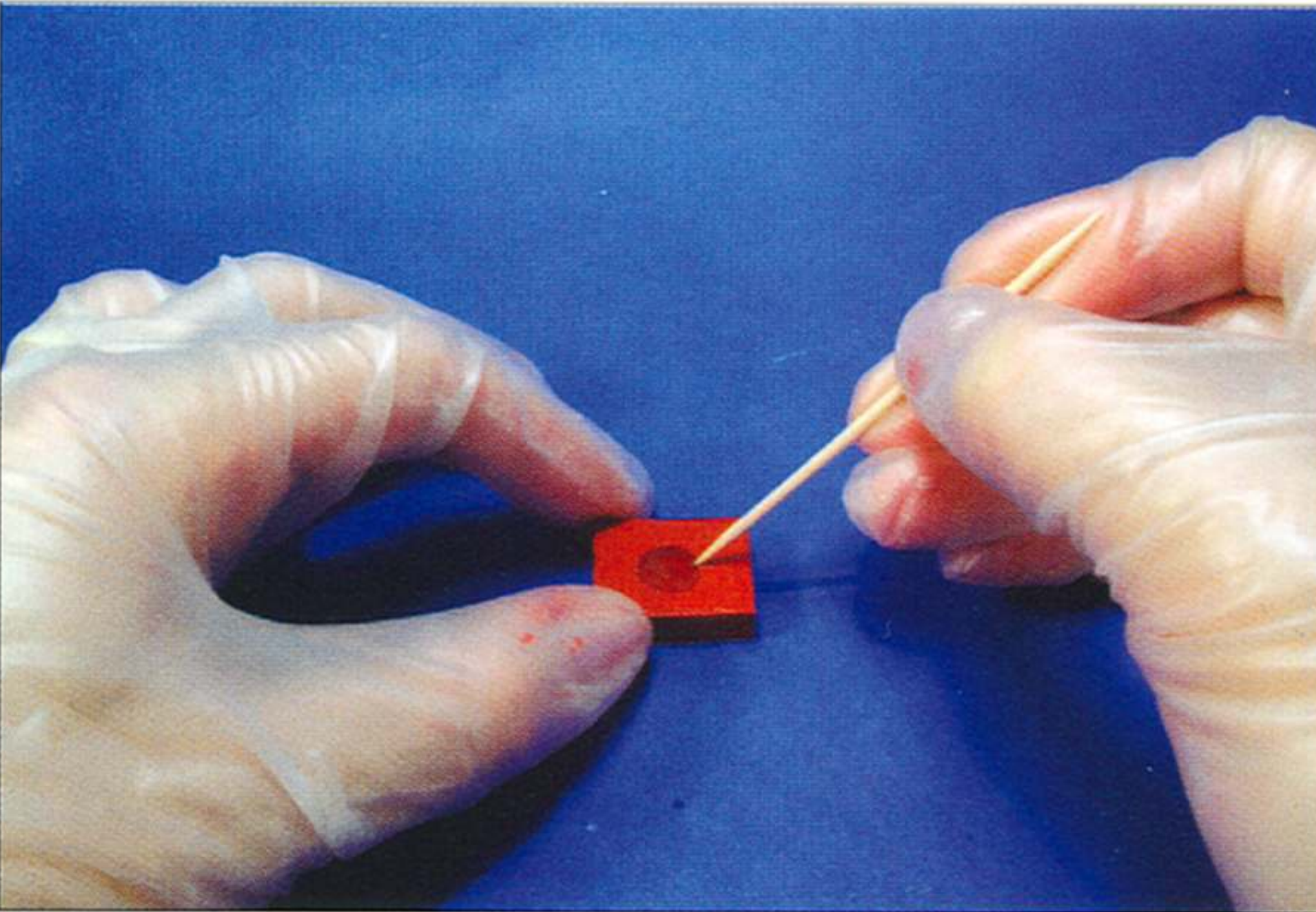
I use Quickcast two-part liquid resin and measure the quantities with small pipettes.



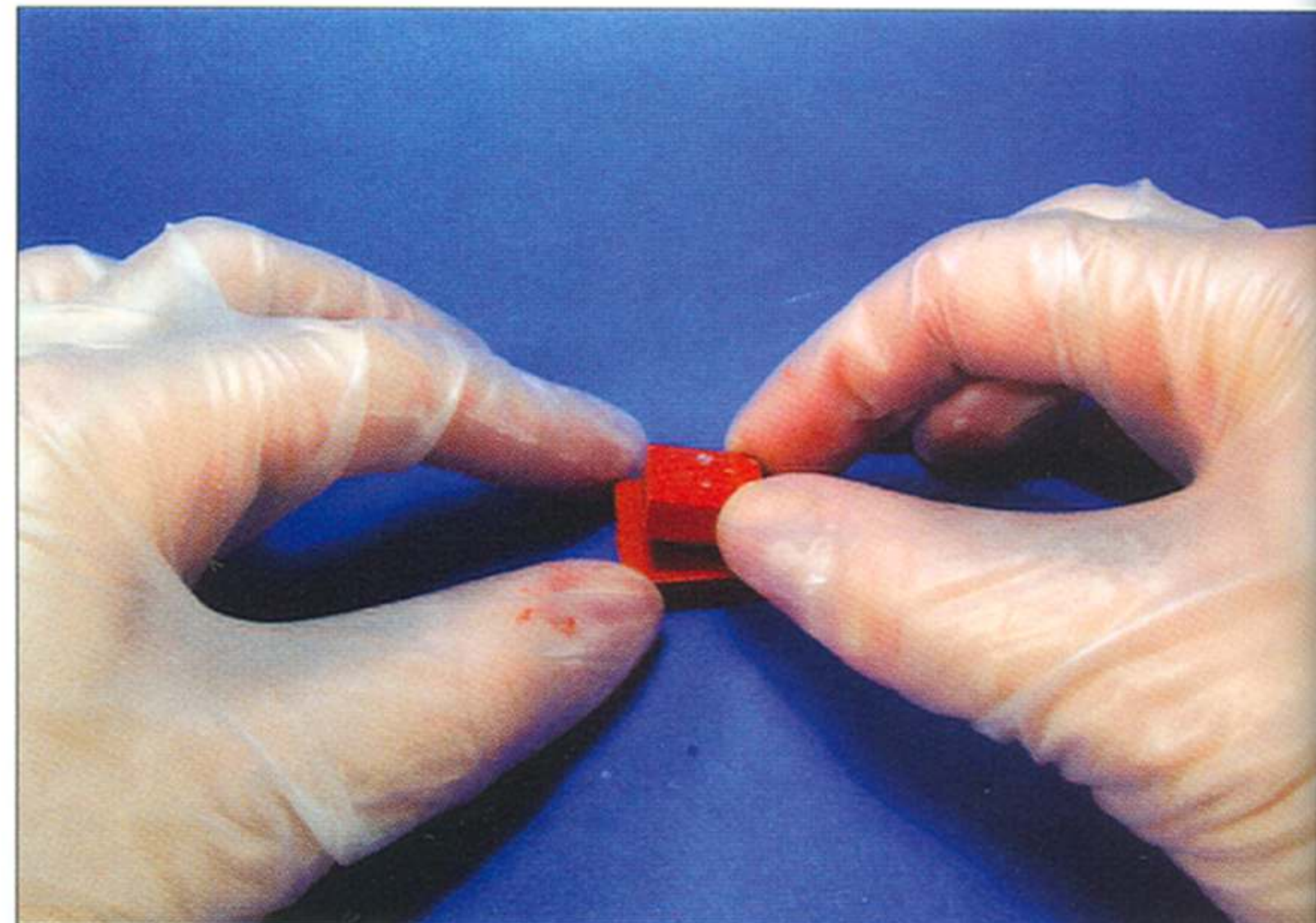
This particular resin cures in just a few minutes, so work has to progress quickly. It is best to mix up the smallest amount possible to make this easier.



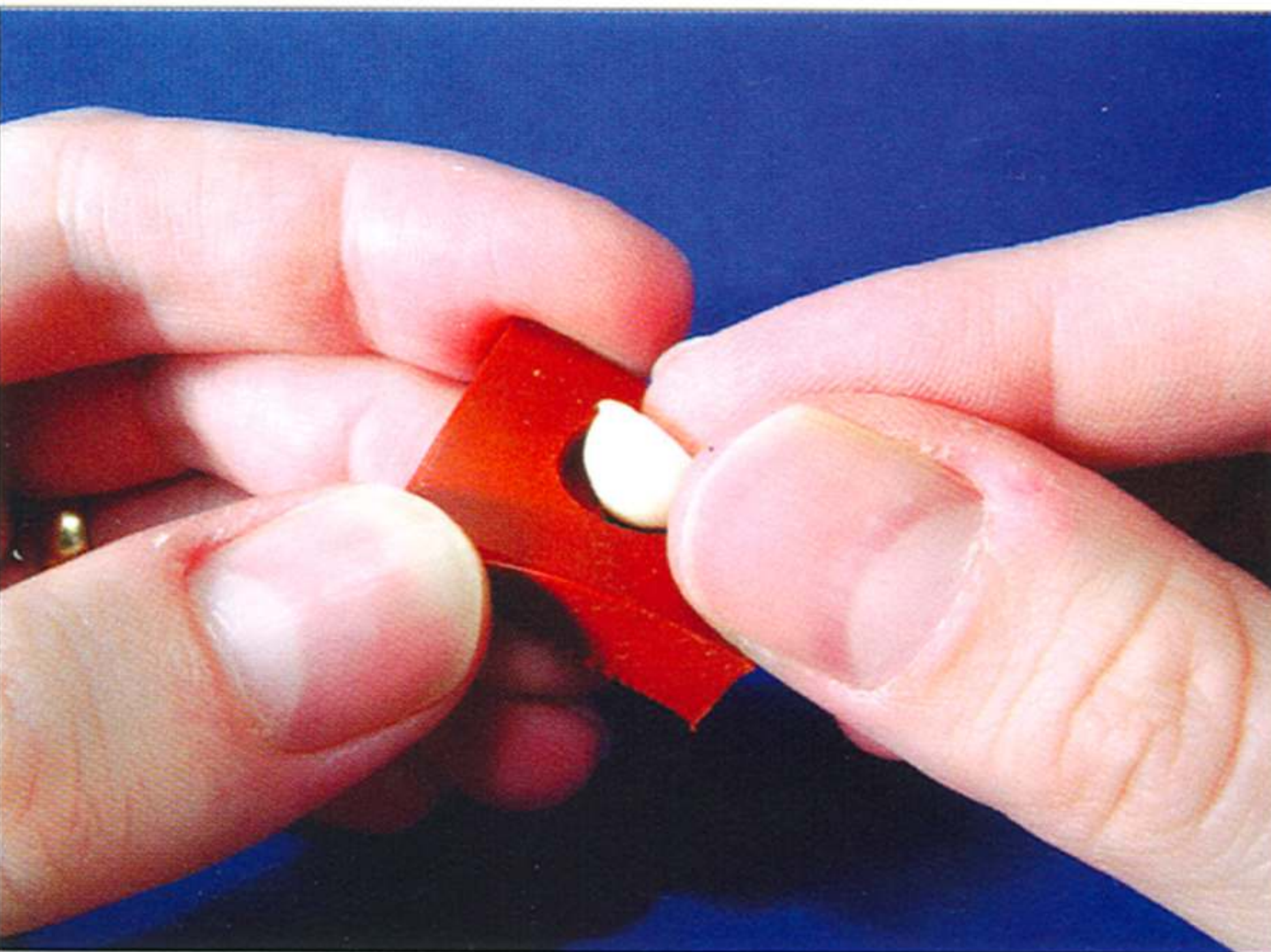
The resin is poured into the mould. Mould release agent is useful for more complicated parts but isn't necessary here.



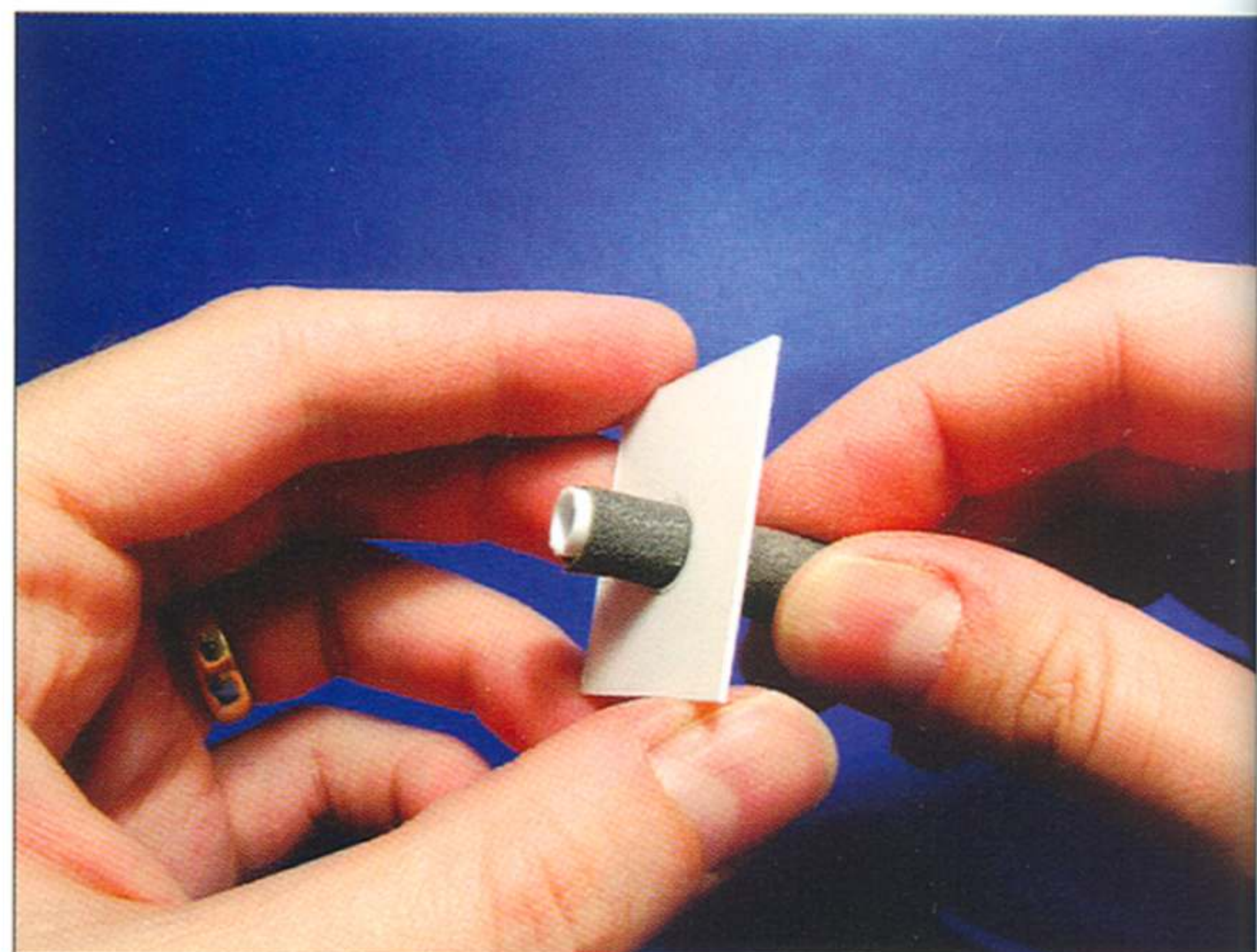
A sharpened cocktail stick can be used to remove any air bubbles.



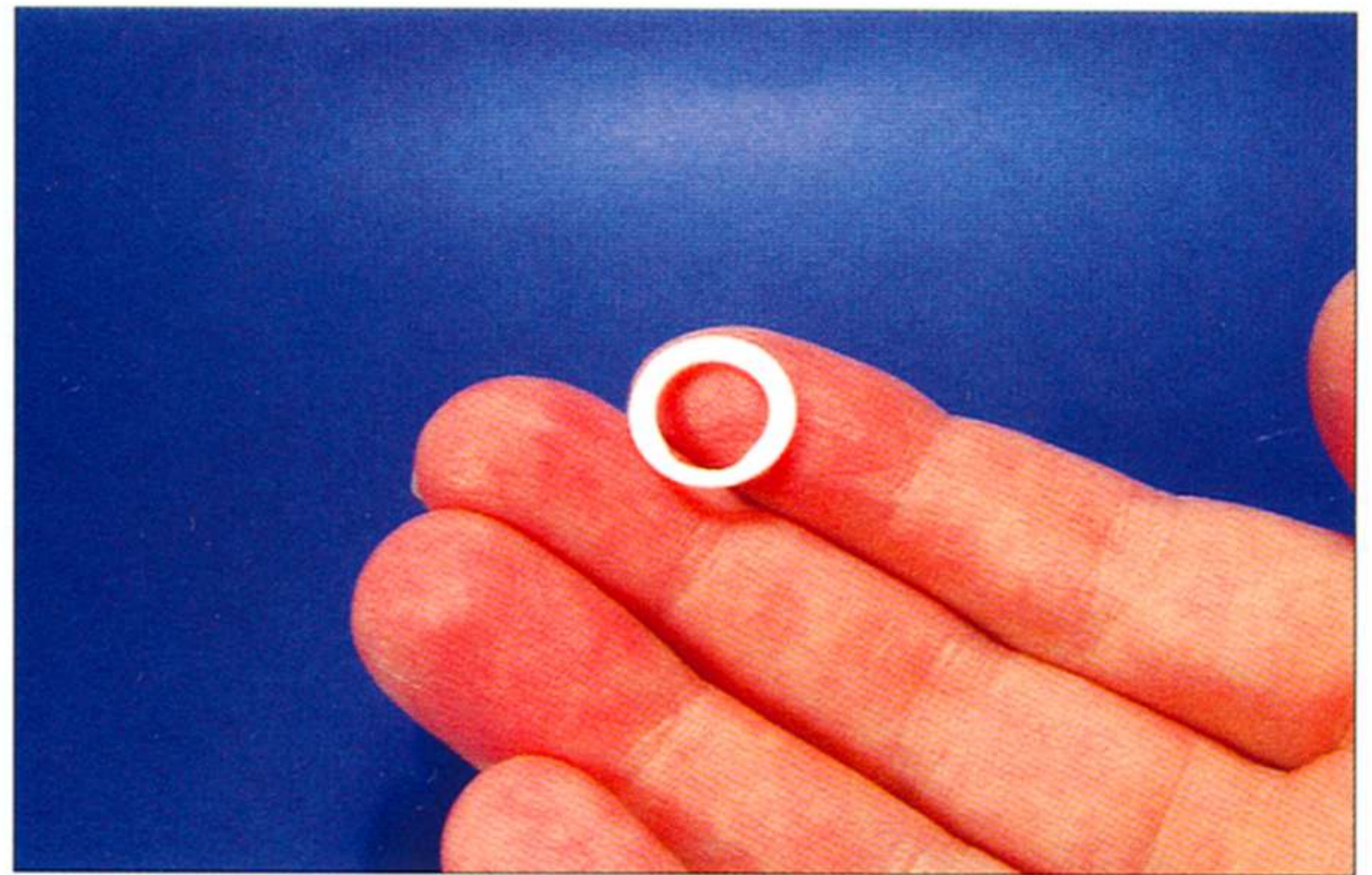
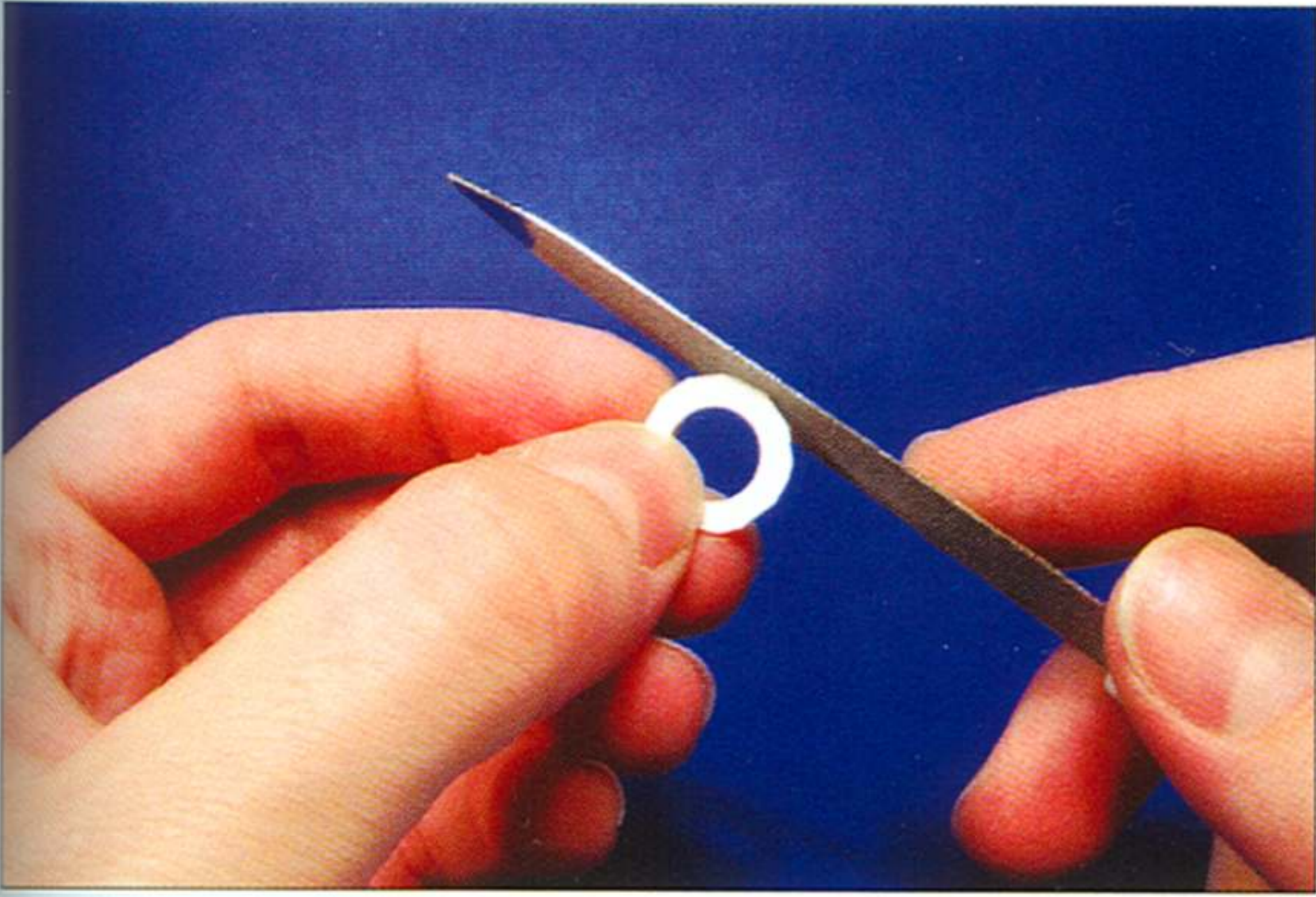
I place a piece of silicone rubber over the openings of one-part moulds in order to level the surface of the resin.



After 10 minutes the resin has set and the cast part can be popped out of the mould.



I also had to find an alternative source for the bolted collar that holds the ball mount in place. I cut an opening into some plastic sheet that was of the appropriate diameter.



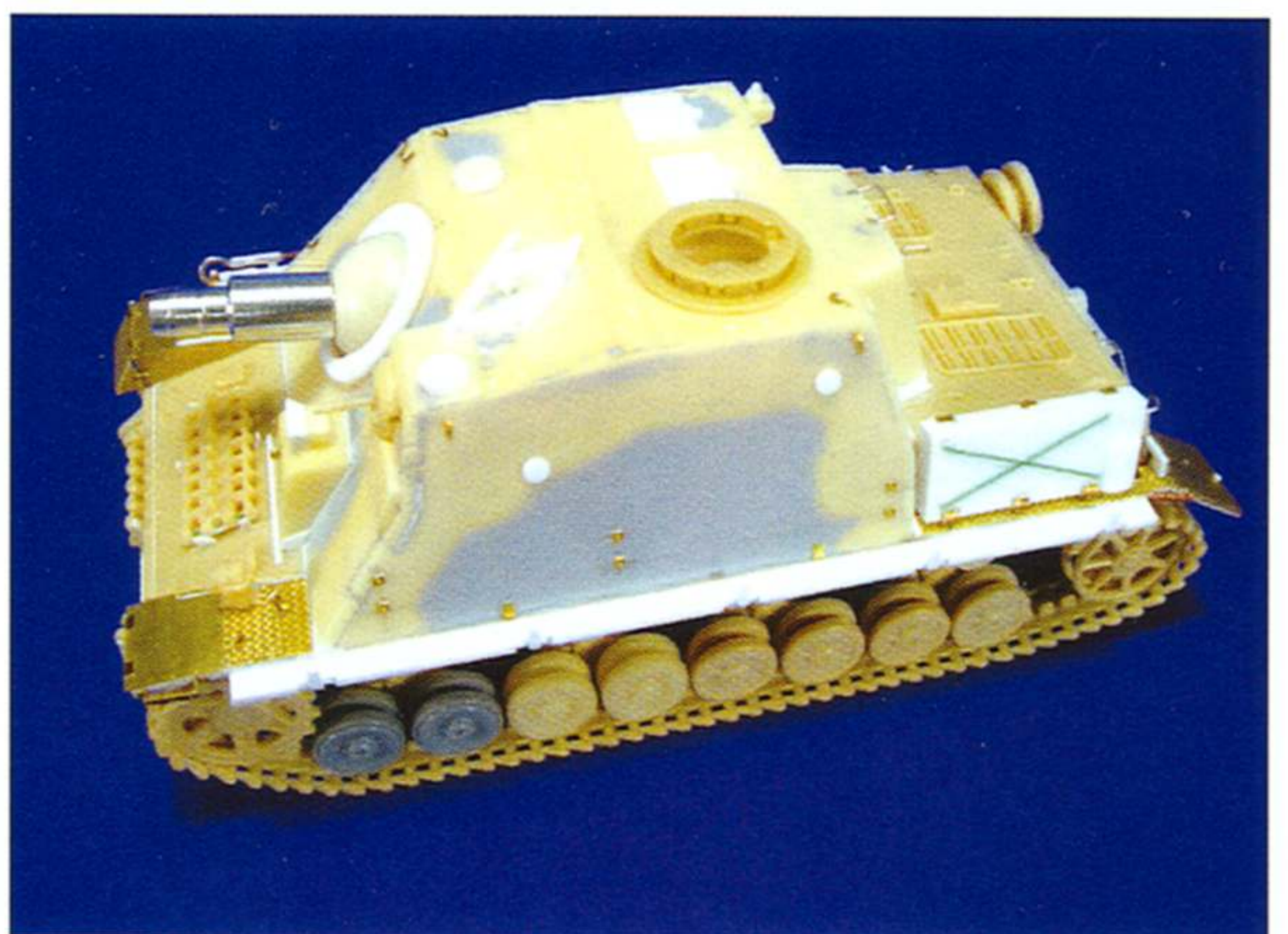
The collar is then cut from the sheet and cleaned up with a file.

The finished piece. All that's left to add is some bolt detail.

### Replacing inaccurate details

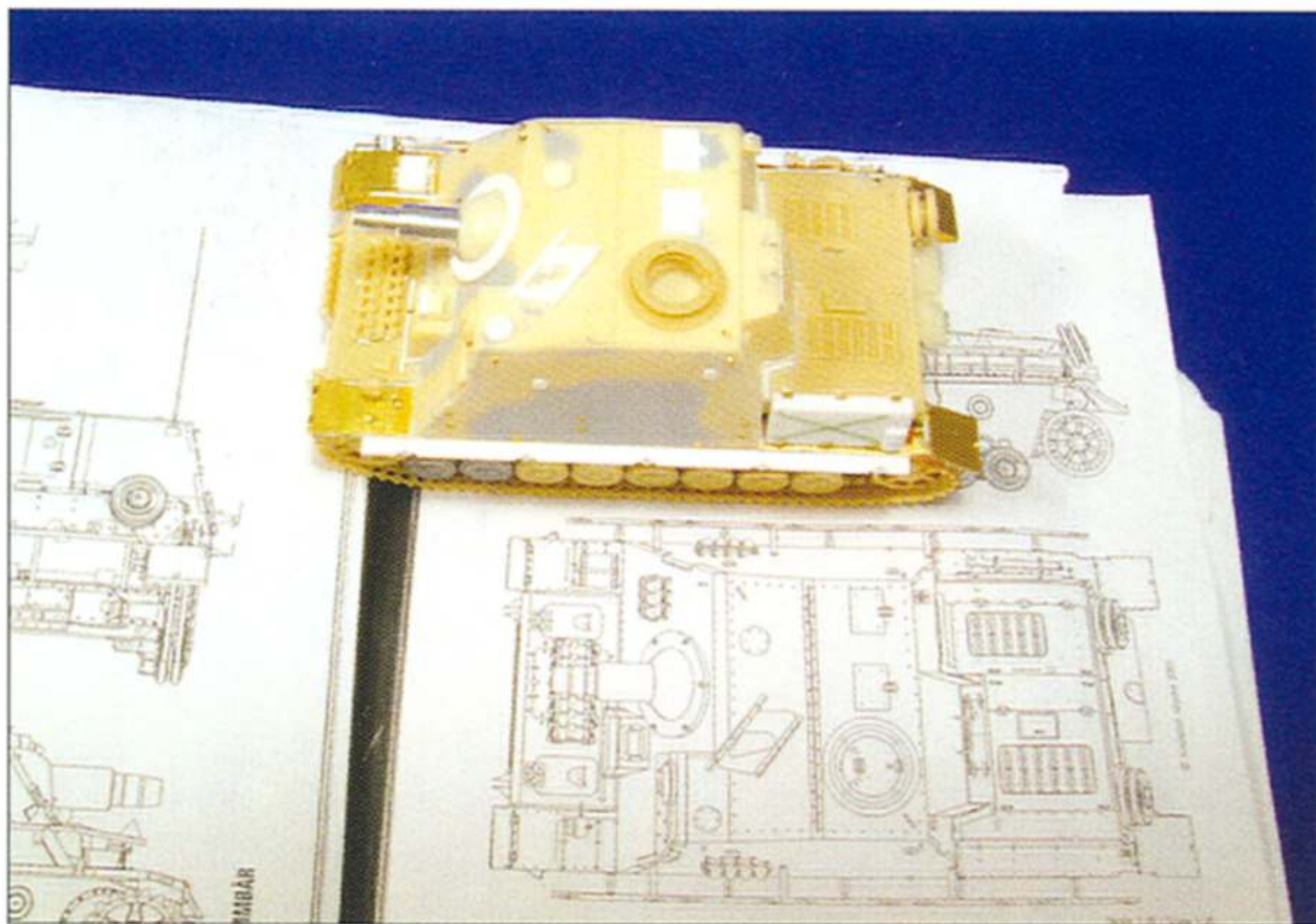
Some of the details on the resin superstructure aren't completely accurate and required some improvement. In particular, much of the roof detail will benefit from being modified or replaced. I scaled down the plans from the *Kagero Photosniper* book on the Sturmpanzer IV (no 12 in the series) and these proved invaluable when making the corrections. The two hatches alongside the cupola are badly positioned, being set too far back, so I sanded them off and cut replacements from plastic strip. The cupola itself is represented fairly well, but I replaced it with the cupola from a Revell StuG III. This has crisper definition, especially around the vision blocks. The circular ventilator covers were then replaced and the right-side one repositioned. Finally, the housing for the main gun sight is incorrectly positioned, so I removed it and made a new one from several sections of plastic strip cut to the appropriate shape.

Most of the remaining work involved adding photo-etched detail parts. Some of these are from the PART Panzer IV fender and general detail sets. Some parts were just formed from brass strip. I scratch-built the stowage box on the left rear side of the vehicle from plastic strip and stretched sprue, with photo-etched hinge detail from the spares box.

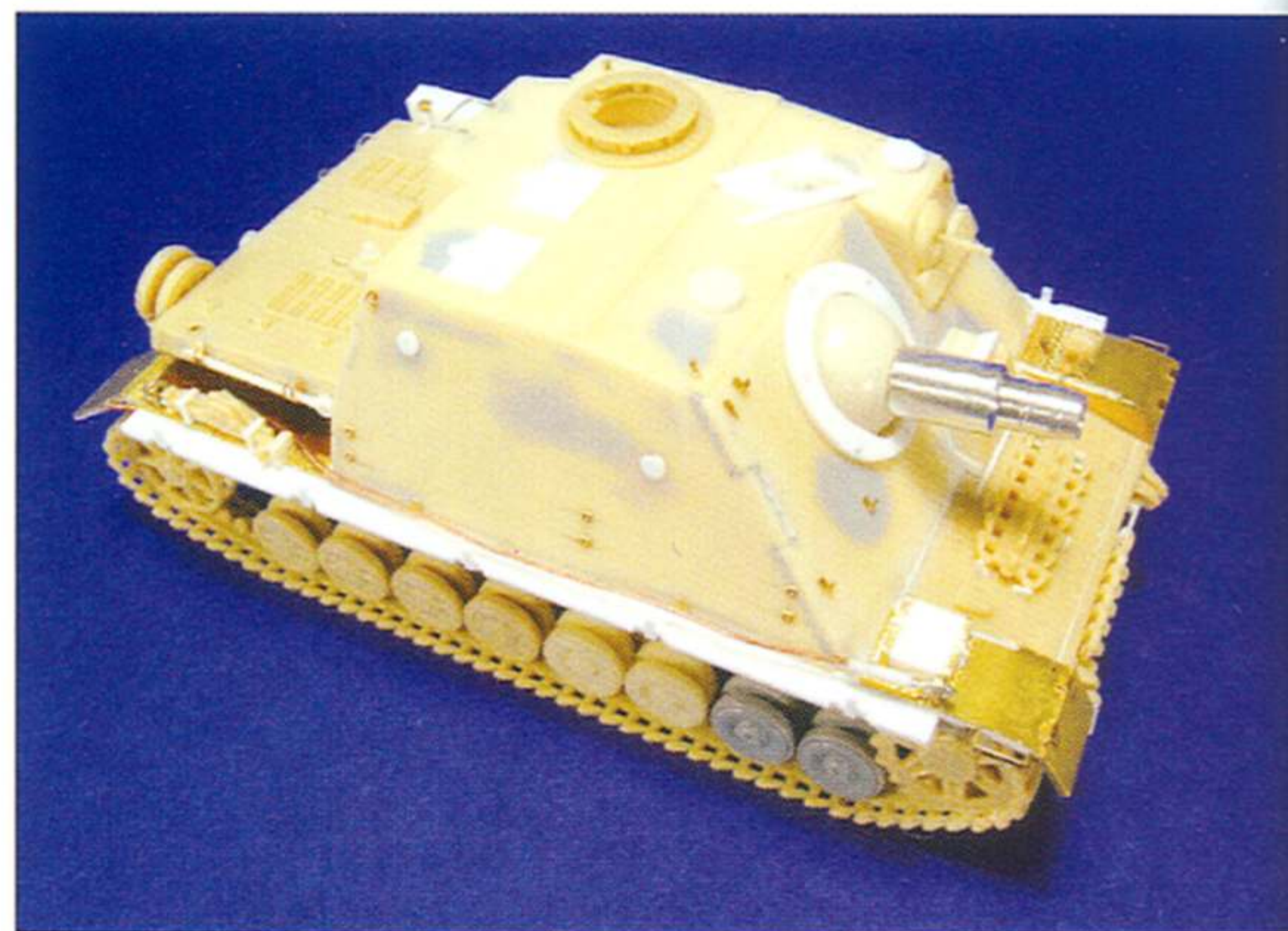


A number of details have been removed from the kit and replaced with scratch-built items. Most of these were on the rooftop and include the ventilators, gun sight housing and the two small hatches next to the cupola. All of these details are incorrectly positioned on the kit. Note also the replacement cupola, taken from a Revell StuG III kit.

Construction is almost complete now and all the photo-etched details have been added.



Plans from the *Kagero Photosniper* book on the Sturmpanzer IV (No. 12 in the series), along with museum photographs, were used as a basis for correcting the kit.



The tools are only temporarily attached and will be removed before painting. The tow cable is from Karaya.

## An unusual colour scheme

I started by giving the model a couple of thin coats of Humbrol Matt Cream (102). To reproduce the hard-edge camouflage I used White-Tac putty. This is temporary adhesive putty intended for general household use. A more detailed discussion of using White-Tac for masking is given in the chapter on *Kitbashing a final version Sturmgeschütz IV* that follows. I covered the areas that were to remain dark yellow and then applied the red-brown using Rust (113). Again the areas to remain this colour were covered with White-Tac and the final colour, Light Green (120), was applied. Removal of the White-Tac then revealed a crisp, somewhat garish camouflage pattern.

I toned down the camouflage colours by lightly over-spraying the base colour. Some post-shading with various shades of brown further toned down the bright finish and added some depth to the model and at this point I applied the markings. From the photographs these appear to be limited to white, three-digit numbers either side of the vehicle. For these I used dry transfers from the



The model was painted in a three-tone hard-edged scheme, with green being the dominant colour. White-Tac adhesive putty was used to mask the camouflage areas. This technique is described in more detail in the next chapter.



The markings are dry transfers from the MIG Productions range. They are limited to a three-digit number either side of the vehicle. By this stage the smaller details required painting, along with some weathering to complete the model.



The model was given a light overspray to tone down the harshness of the camouflage colours.

MIG Productions range sealed with a couple of brush-painted coats of Klear acrylic floor varnish. This also had the benefit of protecting the enamel paint from further washes and weathering.

I applied some localised pin washes using diluted black enamel with a little Burnt Umber oil paint. The oil paint delays the drying of the enamel slightly and gives a little more time to work with the colour once it's been applied. I followed this with a very light and subtle dry-brushing using Matt Brown Yellow (94). Small chips of paint were then represented using Vallejo Model Color SS Camo Black. I kept these to a minimum, with most of them being applied around the crew hatches and areas where the crew would walk.

The tyres, tracks and other details were then brush painted, which just left the addition of mud and dust. I formed a mud mix using some powdered household DIY filler with a little water and added some pigments to colour it. I kept the mix quite thick and applied it around the lower hull, wheels and track. Dust-coloured pigments mixed with enamel thinners were then applied around the horizontal areas such as the engine deck and superstructure roof. The final step was the addition of the tools and tow cable.

Hard-edged camouflage schemes can be difficult to reproduce and striking a balance between realism and aesthetic appeal isn't easy. Although I find it easier to recreate mottled camouflage, I was pleased with the result of this slightly unusual hard-edged pattern.



The finished model. The mud and dust was created from a mix of pigments, household DIY plaster and water.

The illusion of shadows and depth was created using pin washes.



A little dry-brushing was used on the model to help further blend the colours. Note the small spring attached to the rear fender.



Pigment powders were applied to the horizontal surfaces (particularly the hull roof and engine deck) to represent dried mud and dust.

# Kitbashing a final version Sturmgeschütz IV

<i>Subject:</i>	<i>Final version Sturmgeschütz IV</i>
<i>Skill level:</i>	<i>Advanced</i>
<i>Base kits:</i>	<i>Revell Sturmgeschütz III (03132)</i> <i>Revell Panzer IV Ausf. J (03122)</i>
<i>Scale:</i>	<i>1/72</i>
<i>Additional detailing sets used:</i>	<i>PART Panzer IV Ausf. J photo-etched detail set (P72062)</i> <i>PART Panzer IV photo-etched fender set (P72063)</i> <i>Aber StuG IV turned metal barrel (72L14)</i> <i>Extratech Panzer IV Driver's Compartment (72015)</i> <i>Karaya copper cable (0.6mm diameter)</i> <i>Milicast "US Foot Patrol" (FIG67)</i>

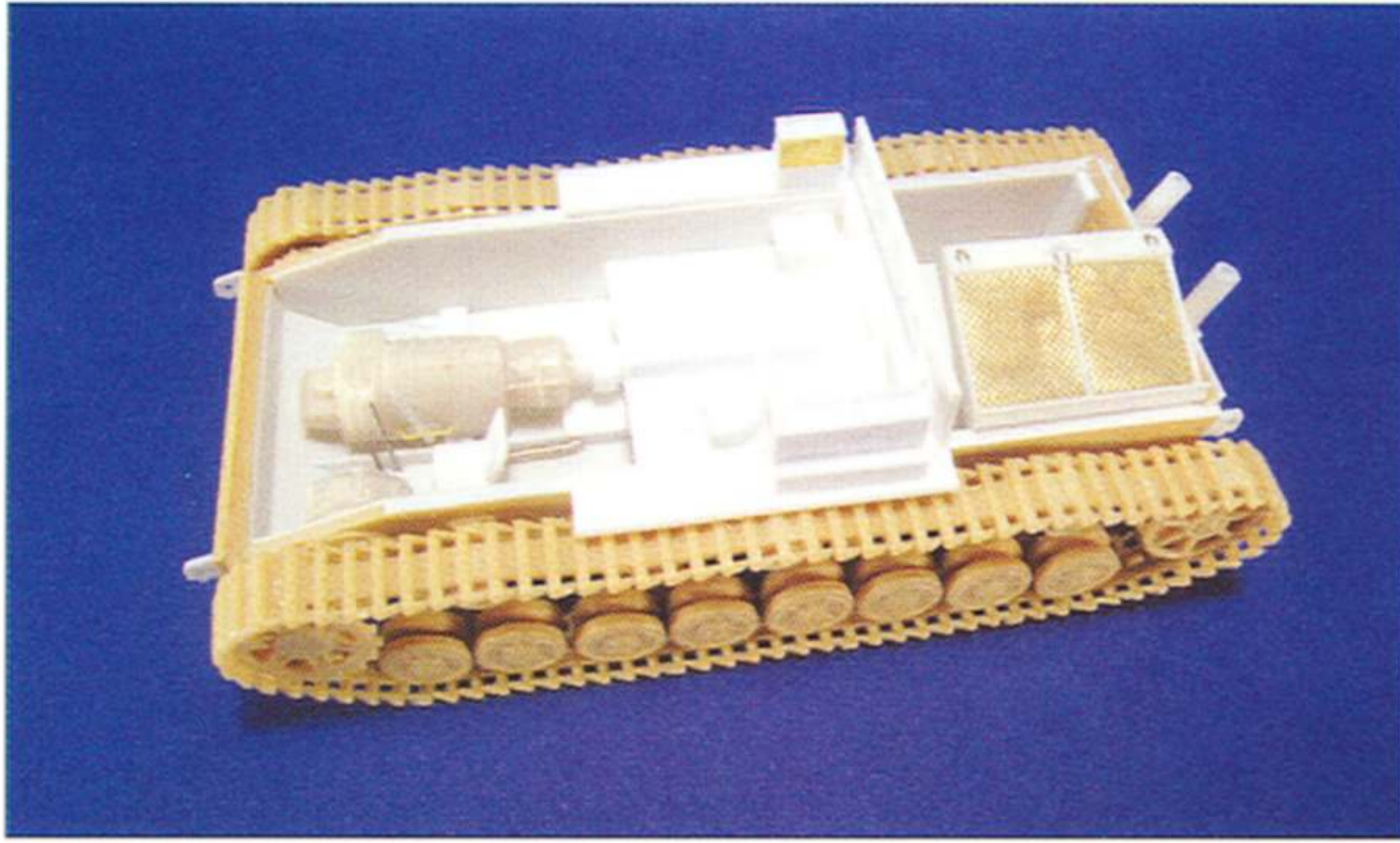
The only injection-moulded late-version Sturmgeschütz IV available in 1/72 scale is from Revell. Although most of the Revell armour kits are amongst the best currently on the market, the StuG IV is an early release and has several shortcomings. One of the main problems is that the upper hull is too flat, giving the model a squashed appearance. Other problems include inaccurate roadwheels and track, an extremely over-scale muzzle brake, and the fact that many of the smaller details are poorly represented. The release of the excellent Panzer IV Ausf. H, also from Revell, provided a simple solution to fixing some of these issues. The wheels, track and lower hull of the Panzer IV kit are far better than those in the StuG kit and can be easily substituted. This still leaves the problems with the upper hull, but the release of Revell's Sturmgeschütz III G provided the final incentive to push ahead with this project. The main superstructure of the StuG IV is almost identical to that of the StuG III and the example provided in the kit is accurate in both shape and detail. Ironically I didn't use any of the original StuG IV kit when building this model, preferring to combine the StuG III and Panzer IV, along with some scratch-building.

The StuG IV underwent many small modifications during its production run, most of these mirroring changes in the StuG III and Panzer IV designs. The number of return rollers was reduced from four to three per side and the vertical *flammentöter* mufflers replaced the earlier single-piece, cylindrical exhaust muffler. The towing hooks at both the front and rear of the vehicle were simplified by drilling out hull-side extensions. These modifications and more are highlighted in the accompanying photos. Fortunately the StuG III kit is a late Ausf. G version and so I didn't need to make any specific modifications to this. The Panzer IV kits represent a late Ausf. H and an early Ausf. J, and so more changes were made to the parts provided by these kits.

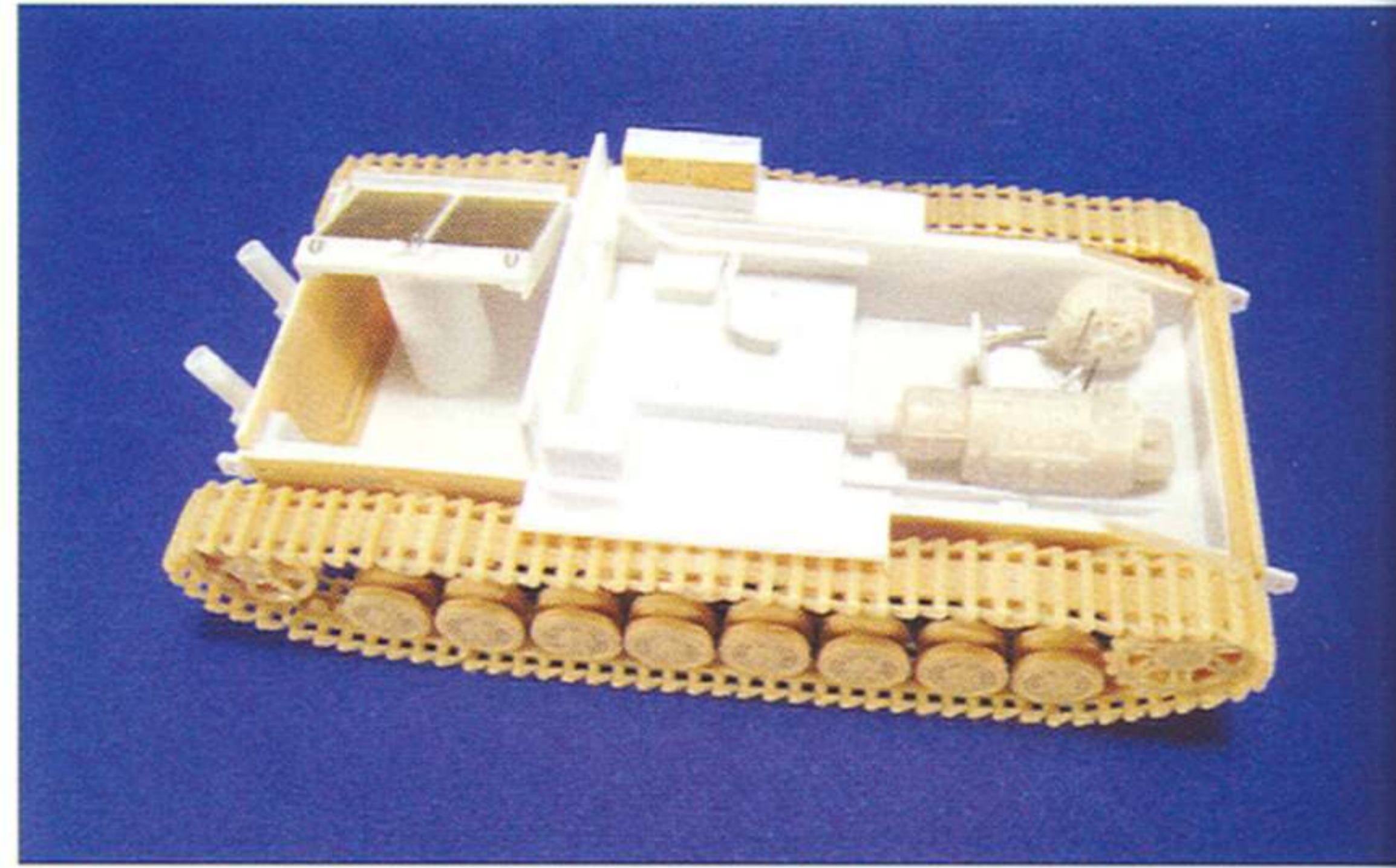
As well as favouring late-war armour, I also enjoy modelling abandoned and knocked-out vehicles as they provide good opportunities to simulate damage and to apply heavier than usual weathering. With this in mind I planned to build the StuG as an abandoned vehicle. There are many wartime photos that show abandoned vehicles bogged down in mud, or stuck in shell holes, so I decided to model a similar scene.

## Improving accuracy through kitbashing

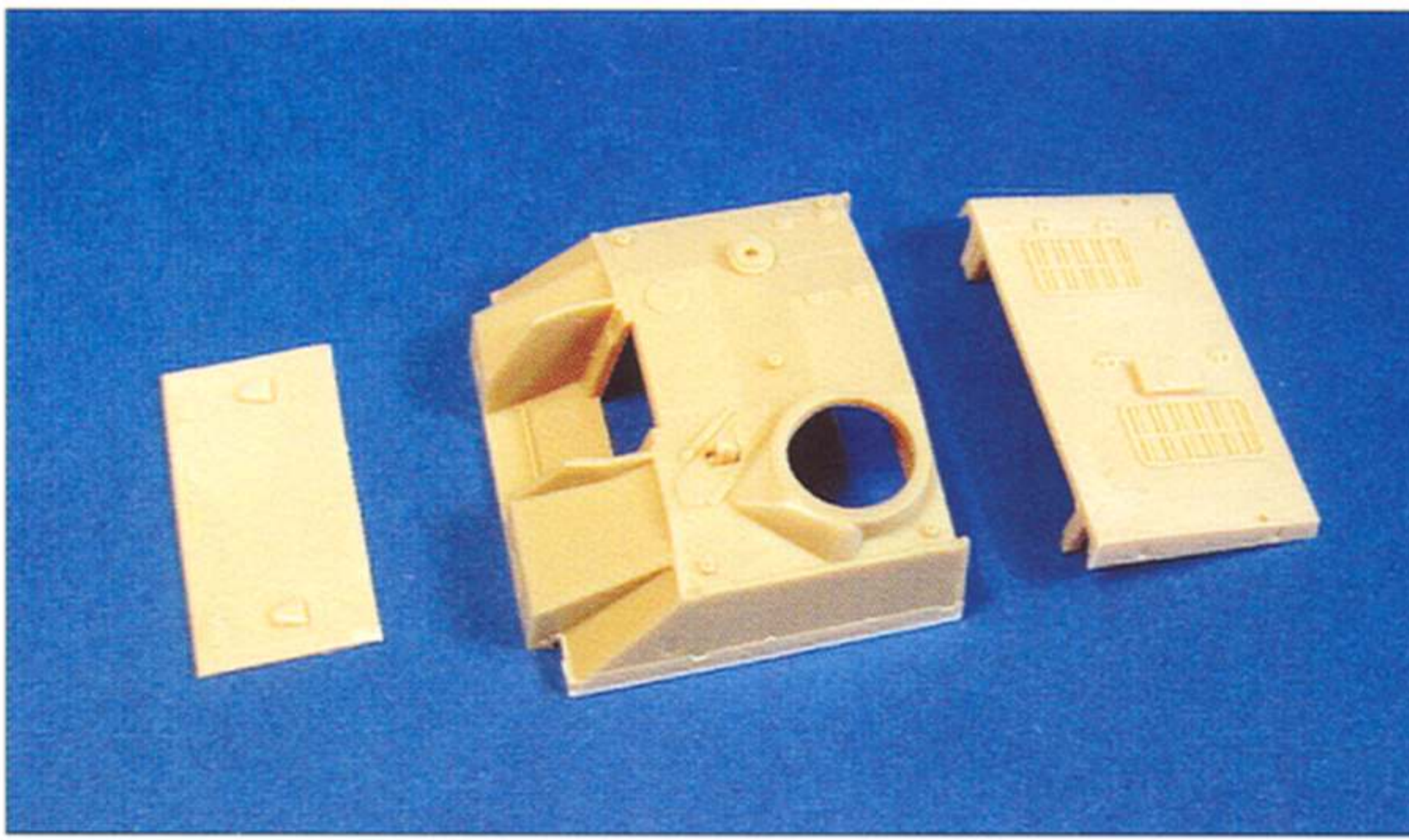
I started work by assembling the lower hull of the Panzer IV kit. I cut off the two rectangular plates on the hull front where the towing units are fitted and



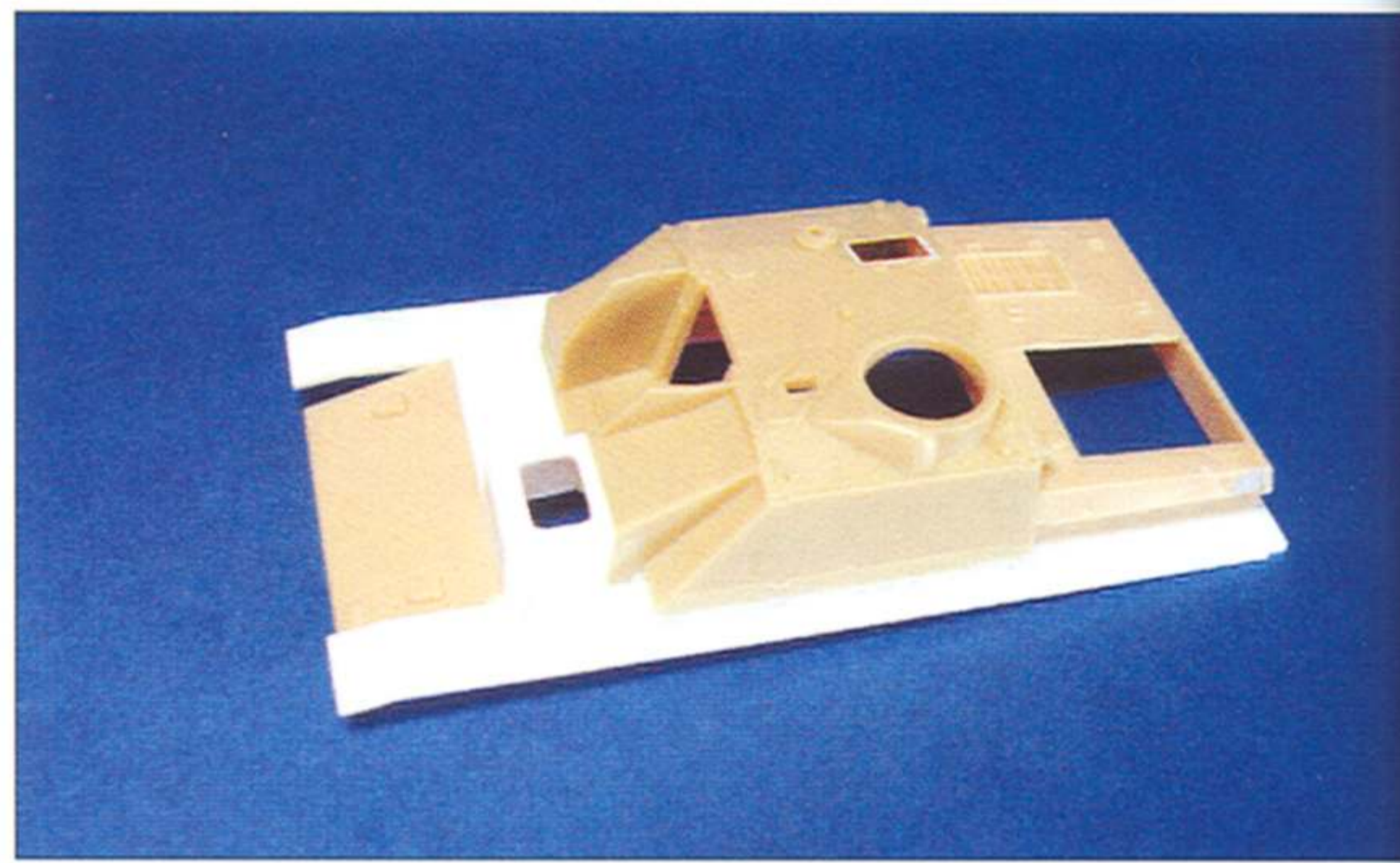
The lower hull is based on that of the Revell Panzer IV kit. A partial interior has been added, as several of the hatches will be left open. The Revell kit provides four return rollers per side whereas late vehicles featured three per side. I removed the mounts for the central two rollers and refitted one of them in the centre.



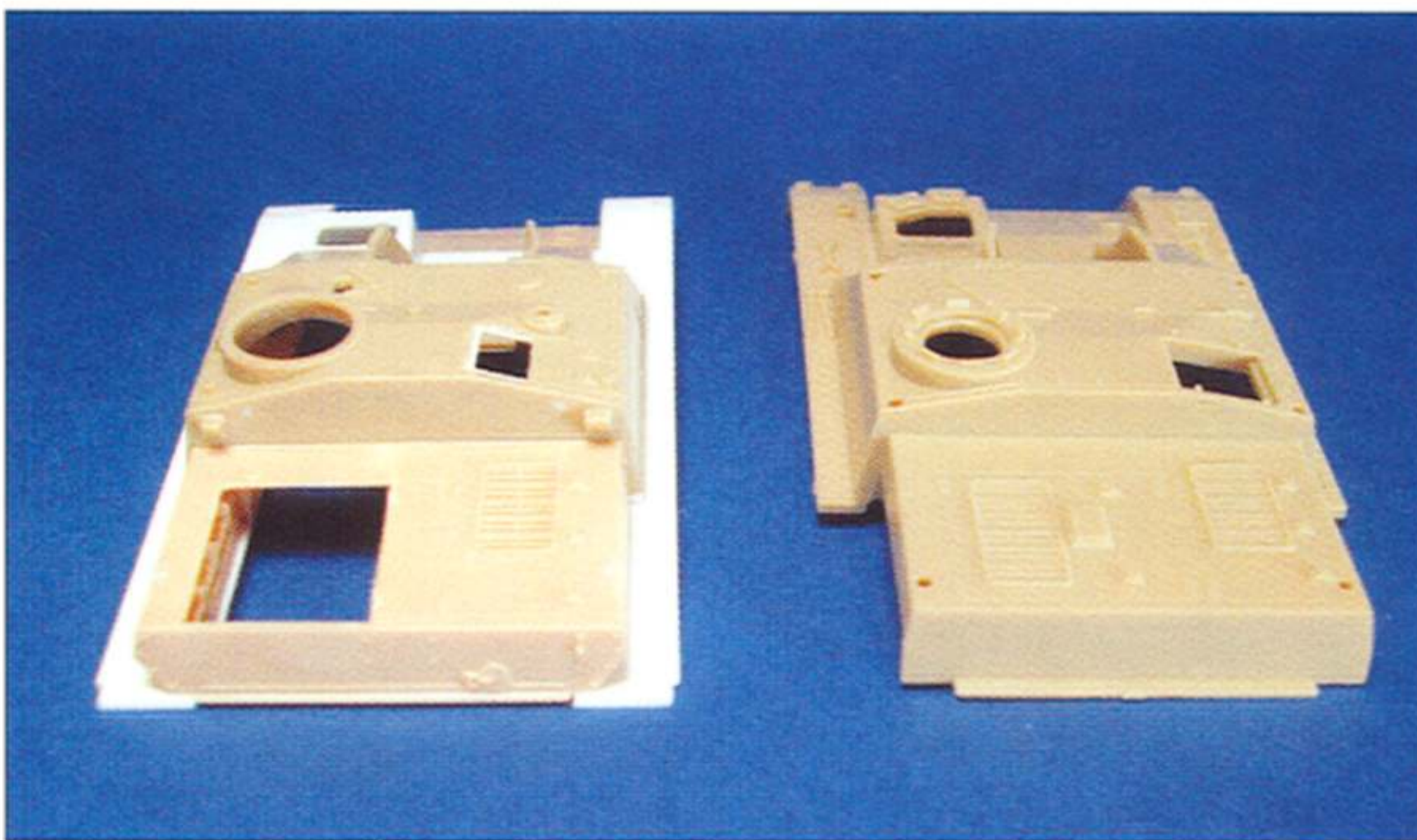
The interior detail is a mix of scratch-built parts and resin items from Extratech's Panzer IV driver's compartment.



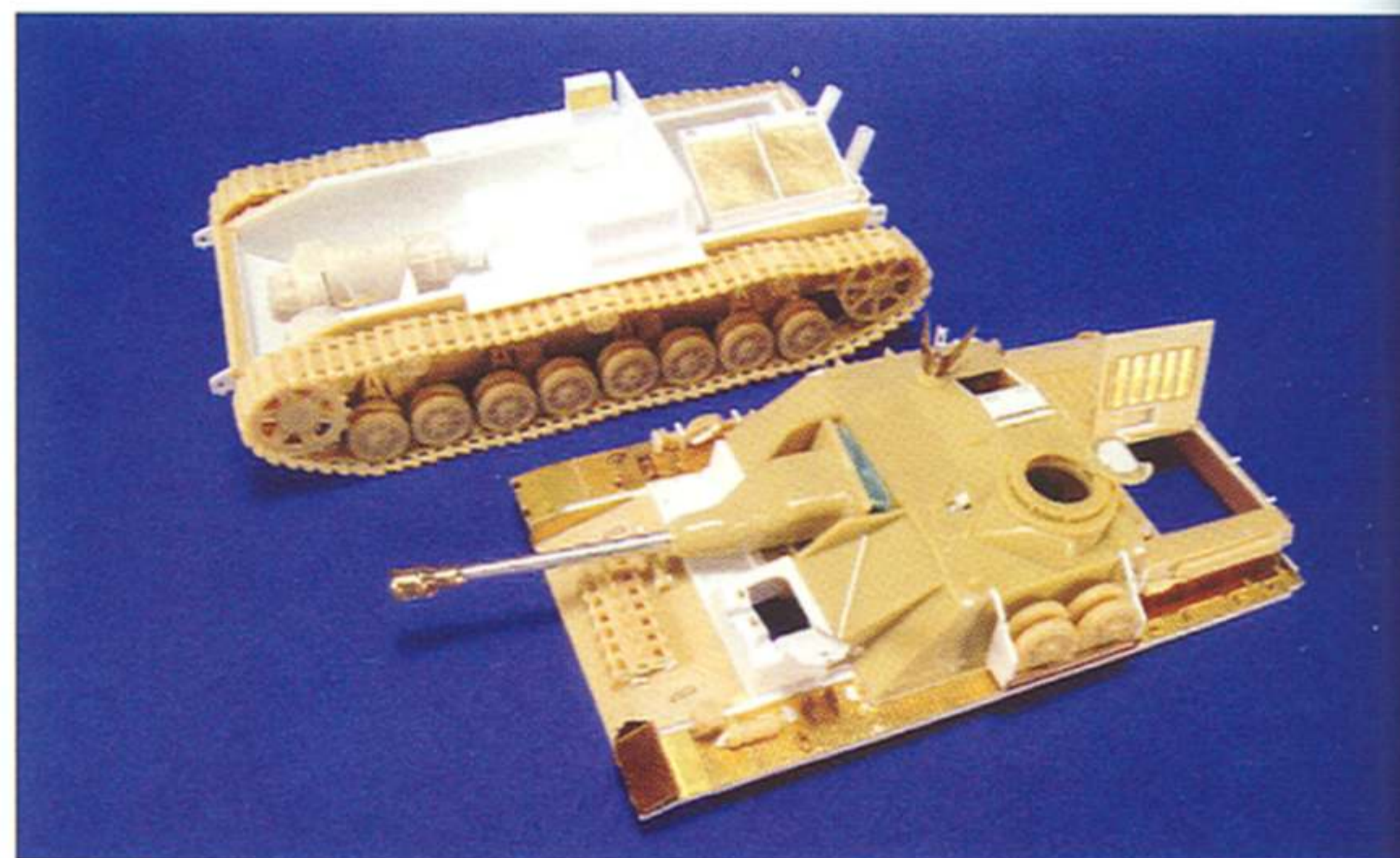
The glaucis plate and engine deck were taken from the upper hull of the Revell Panzer IV. Revell's StuG III kit has provided the main fighting compartment section.



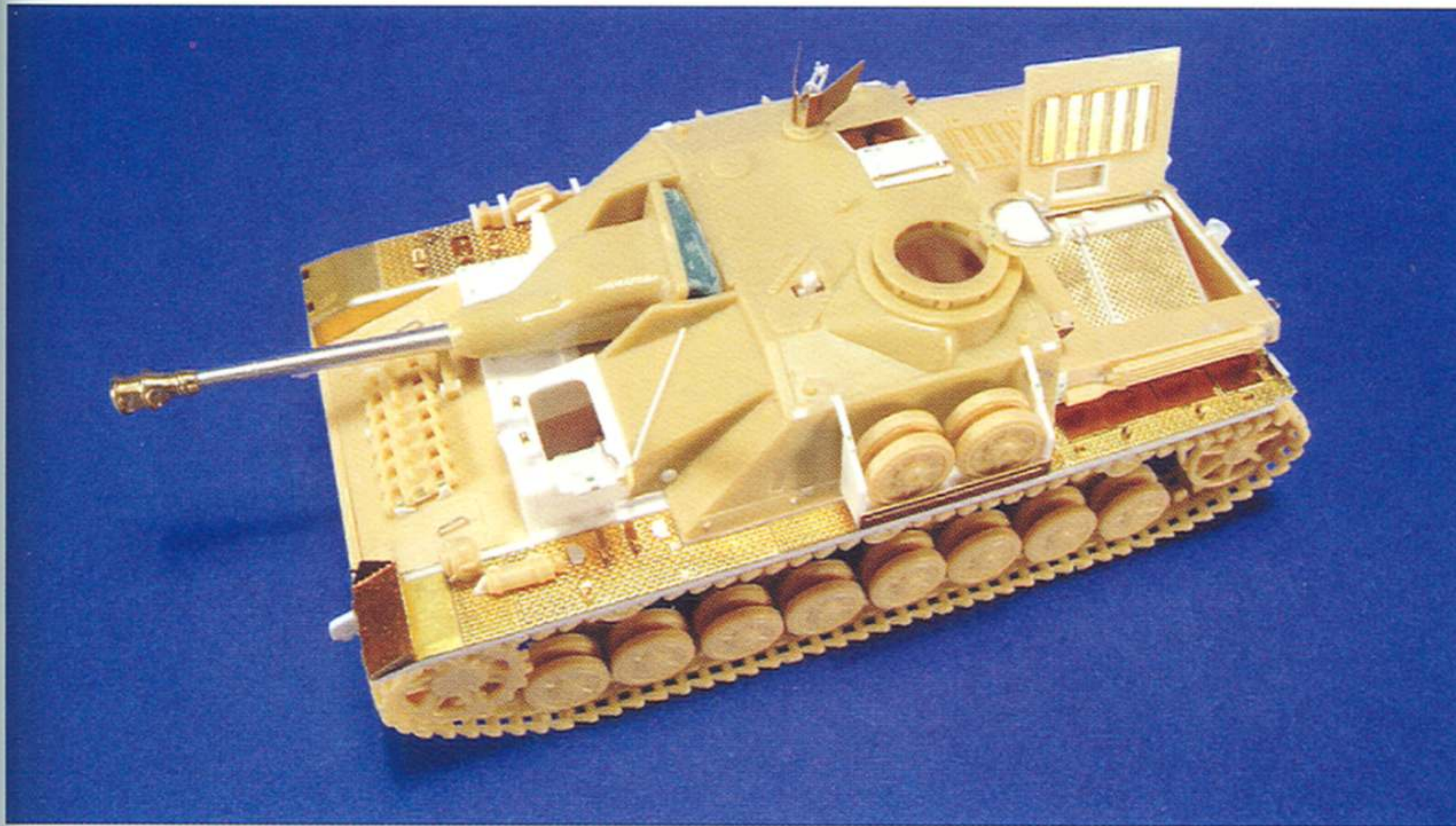
The basic shape of the upper hull is complete. Fenders and the driver's compartment have been scratch-built with plastic sheet. One of the engine deck hatches has been opened up, ready to show some engine bay detail.



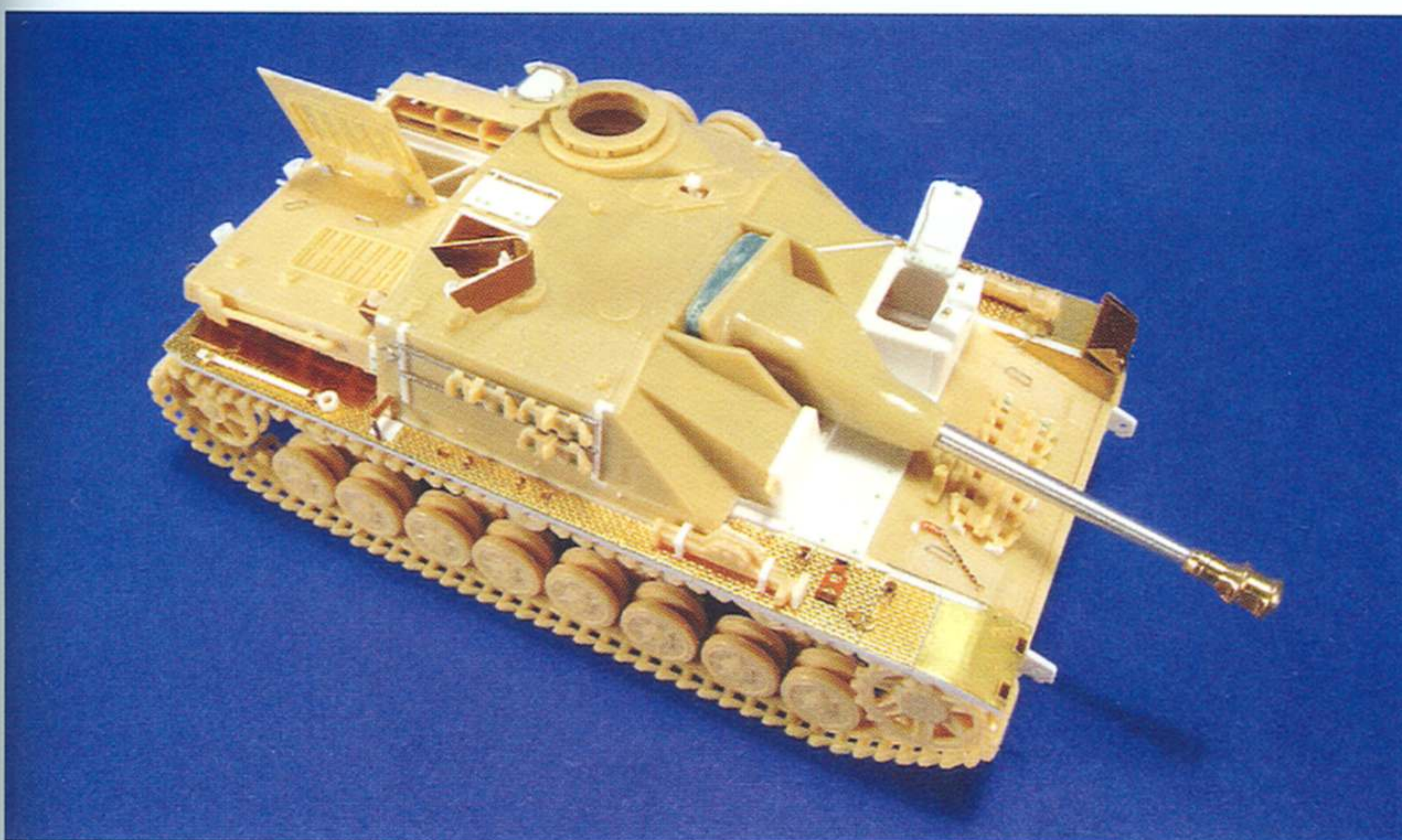
Comparison of the new upper hull against Revell's StuG IV. This kit is one of Revell's earliest small-scale armour kits and is certainly not up to the standard of later kits. One of the major dimensional faults involves the height of the fighting compartment. It is far too flat and gives the kit a very squashed appearance.



The completed upper and lower hull halves were left separate ready for painting. Some of the smaller external details are temporarily attached but will be painted separately.



Most of the details were either scratch-built or taken from photo-etched sets for the Panzer IV and StuG III.



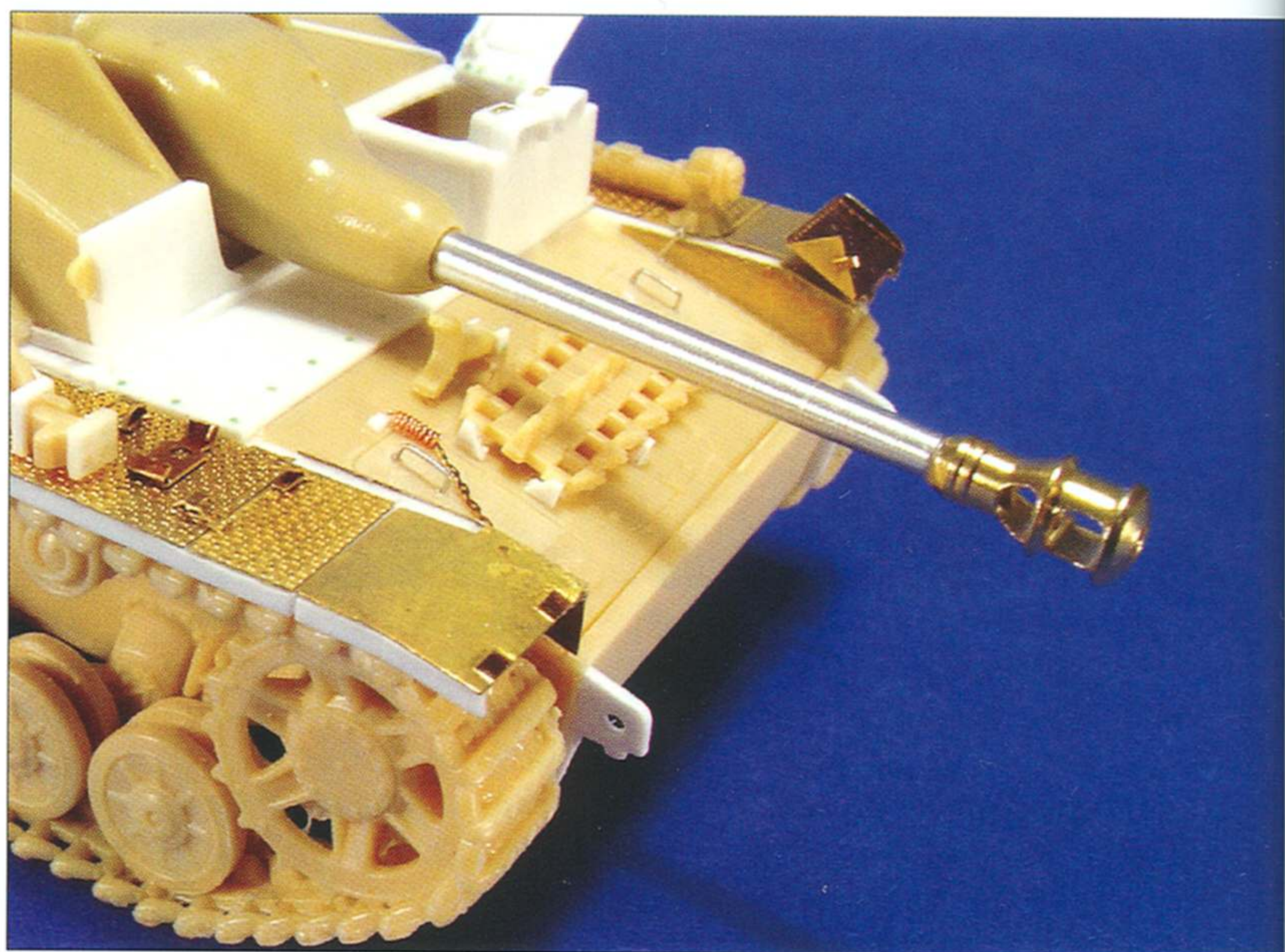
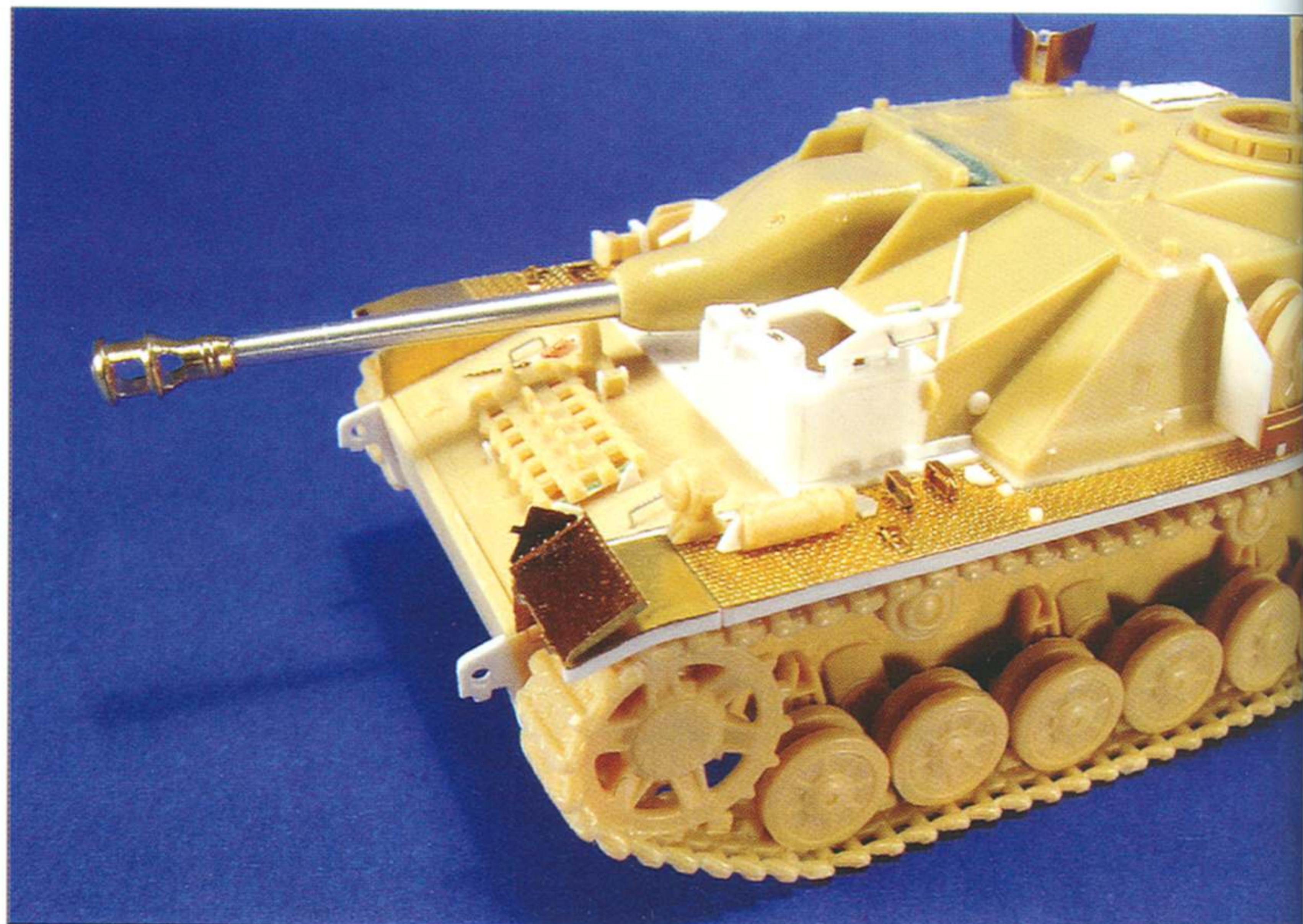
The gun mantlet rain cover is made from Duro two-part putty.

sanded the area smooth. Some drilled hull-side extensions were then cut from plastic strip. I also modified the rear central towing hook to match that found on the final version of the Panzer IV Ausf. J hull. After attaching the wheels I built up the link and length track around them and then started work adding a partial interior. For this I used some of the parts from the Extratech driver's compartment set for the Panzer IV along with a number of scratch-built items. I kept the detail simple, as the interior would only be visible through the relatively small hatches. I also wanted to leave one of the engine deck hatches open so I scratch-built the radiator grill assembly from plastic sheet covered in photo-etched mesh.

I built the upper hull from three main segments. The glacis plate and engine deck were taken from the Panzer IV kit whilst the fighting compartment was taken from the StuG III kit. Plastic strip spacers are required along the bottom of the fighting compartment in order to increase its height. Just a little filing was then necessary to give a good fit between the three parts. New fenders were cut from plastic strip and covered with photo-etched treadplate. A rectangular section of plastic sheet is required to fill the gap between the glacis plate and the front of the fighting compartment – the Panzer IV hull is considerably longer than that of the StuG III, so this acts as a spacer. Some bolt head/rivet detail was added to the plate using thin cross-sectional slices of stretched sprue.

With this done the main upper hull shape was complete, so I started to add a few interior details to this part. I scratch-built a basic gun breech as parts of

The final version of the Panzer IV chassis featured drilled hull-side extensions at both the front and rear of the vehicle. It was a simple job to cut these from plastic sheet.



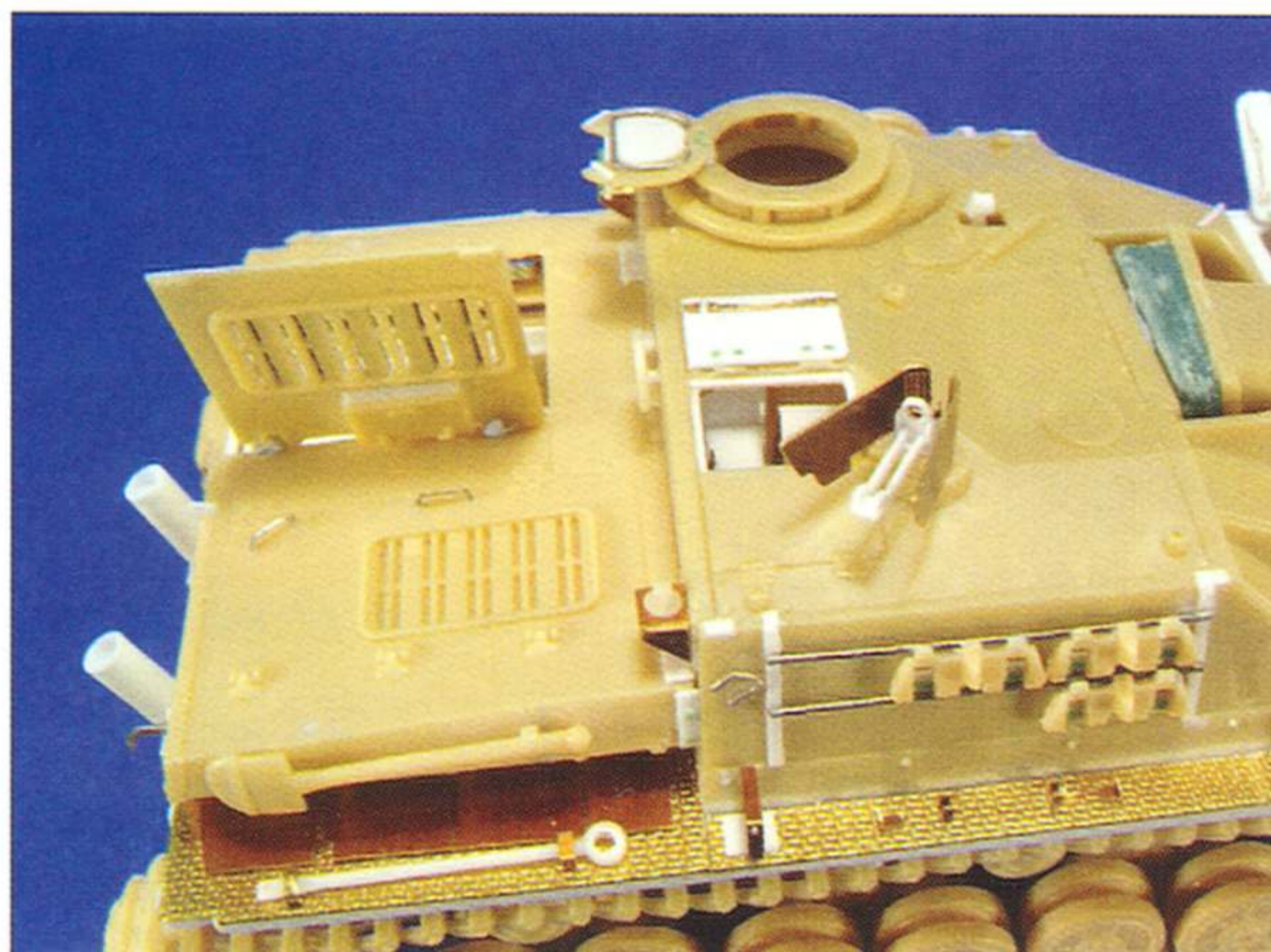
The gun barrel is from Aber and features an excellent muzzle brake. The muzzle brake provided in the StuG IV kit is far too large and that in the StuG III kit doesn't have the finesse of the Aber barrel.

this can be seen through the open crew hatches. As with the rest of the interior, I wanted to give the impression of detail, rather than spend too much time on detail that wouldn't be seen. This just left a number of smaller items to be added to the exterior. For these I used a mix of commercial photo-etched parts and scratch-built details, as illustrated by the accompanying photographs.

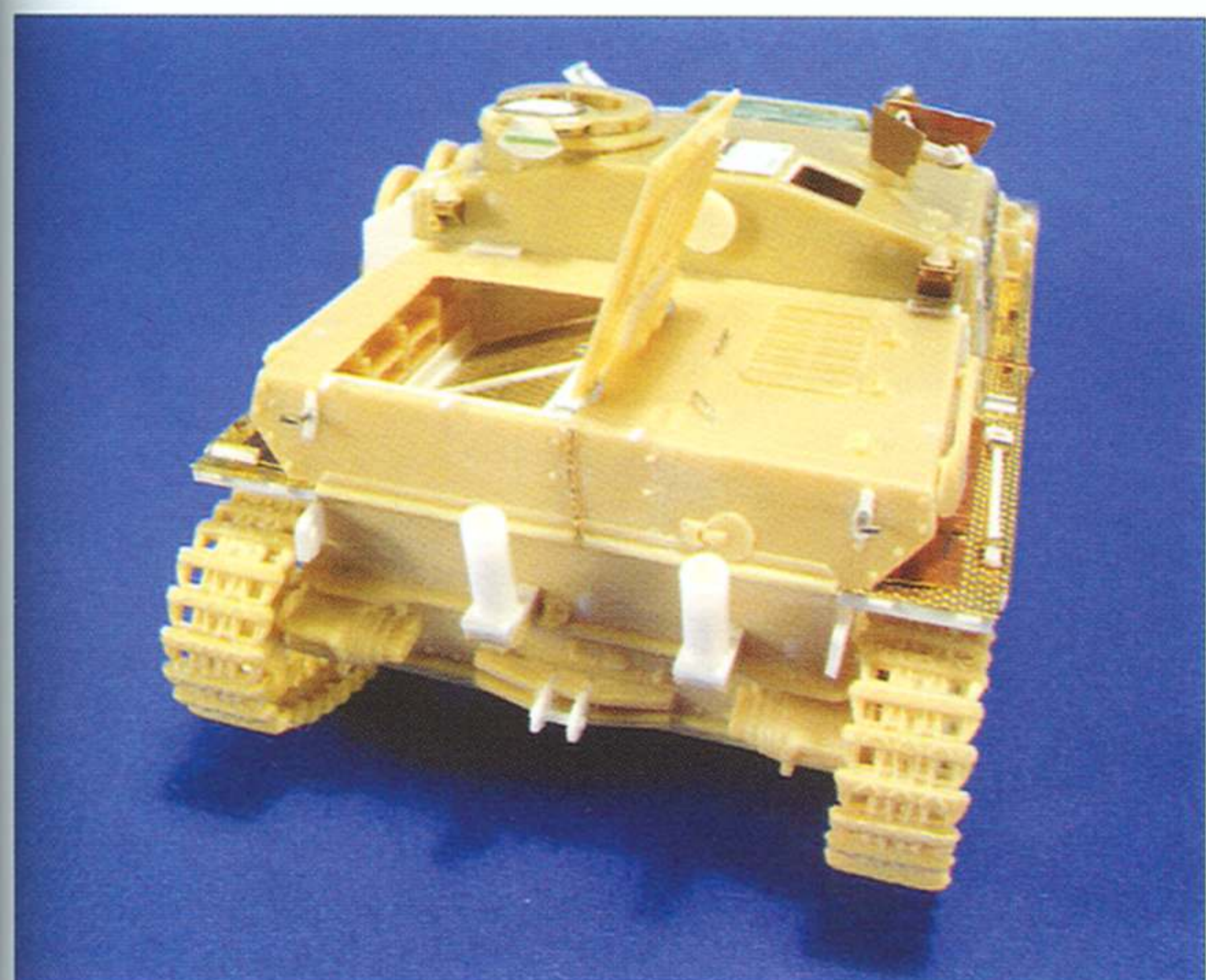
Before starting to paint the model, I constructed the basis of a simple scene by carving a piece of polyfoam to shape. This foam is denser than polystyrene and harder wearing. It can be easily sanded and cleanly cut with a knife and is especially useful for giving depth to dioramas. (Special thanks to Mark Neville from my local model club for kindly supplying me with enough to last a lifetime!) I then cut out a chunk from the centre of the foam and this was just large enough for the model to fit snugly into. This would give the appearance of the vehicle sinking into the mud. I then put the base aside in order to finish the vehicle itself.



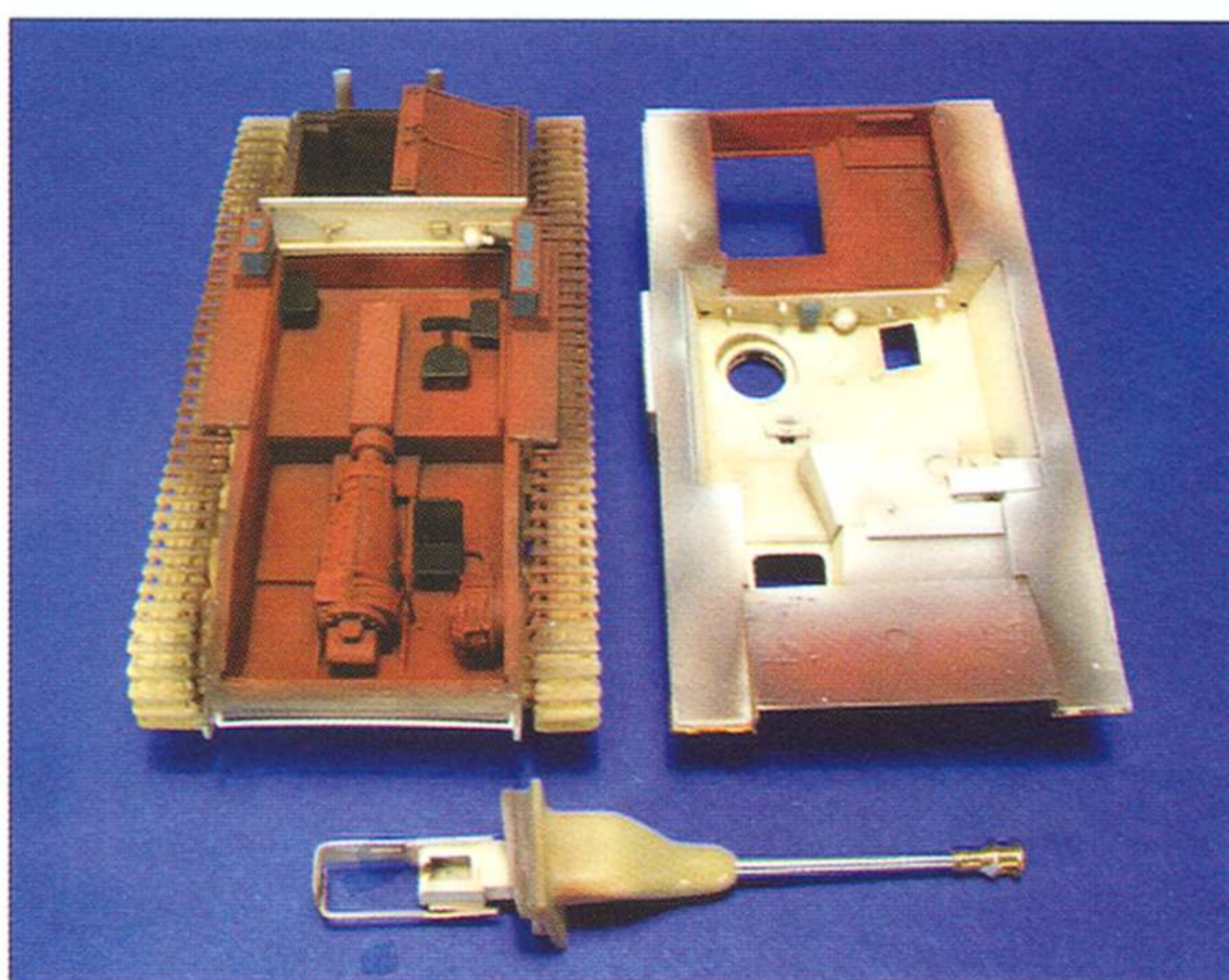
The radiator within the engine compartment was scratch-built using plastic sheet and Airwaves photo-etched mesh.



Late version StuG III and IV featured a remotely controlled machine gun fitted to the turret roof. The mounting for this was scratch-built and the gun shield taken from the StuG III photo-etched set from PART.



Vertical *flammentöter* exhausts were a feature of late Panzer IV variants, along with the late style central towing bar. Drilled side-hull extensions can also be seen here.



The interior was pre-shaded with a base coat of matt black. This was followed by a mix of Humbrol Brick Red (70) with a small amount of red. The upper areas of the interior were painted with an ivory mix using white with a little Radome Tan (148) added.

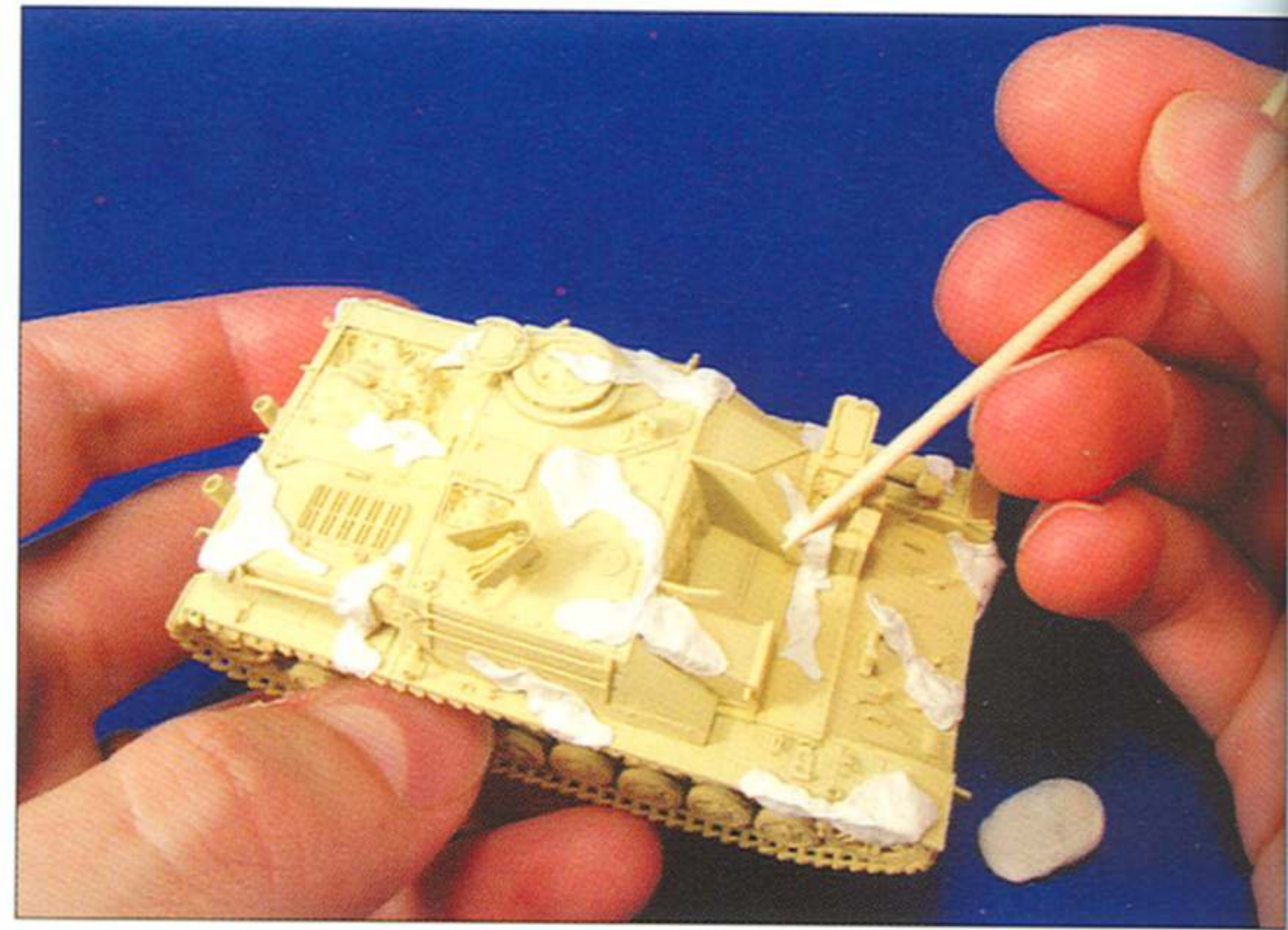
I painted the interior of the vehicle matt black to act as a pre-shading colour. Humbrol Brick Red (70) was mixed with a small amount of red to give an approximation to red-oxide primer and patchily sprayed over the black. The upper areas of the interior were then painted with an ivory colour created from matt white with a little Radome Tan (148). Several pin washes followed to create further shading and depth. I then glued the upper and lower hull halves together and masked off the open hatches ready for painting the exterior.

## Painting hard-edged camouflage

I gave the exterior of the model a couple of thin coats of Humbrol Radome Tan (148). The camouflage colours I used over this were Light Green (120) and Matt Rust (113). To achieve the hard-edged camouflage pattern I masked off the various areas with White-Tac household putty. This is a general purpose, slightly adhesive  
(continued on page 42)



The base colour is Radome Tan (148) applied in a couple of thin coats.



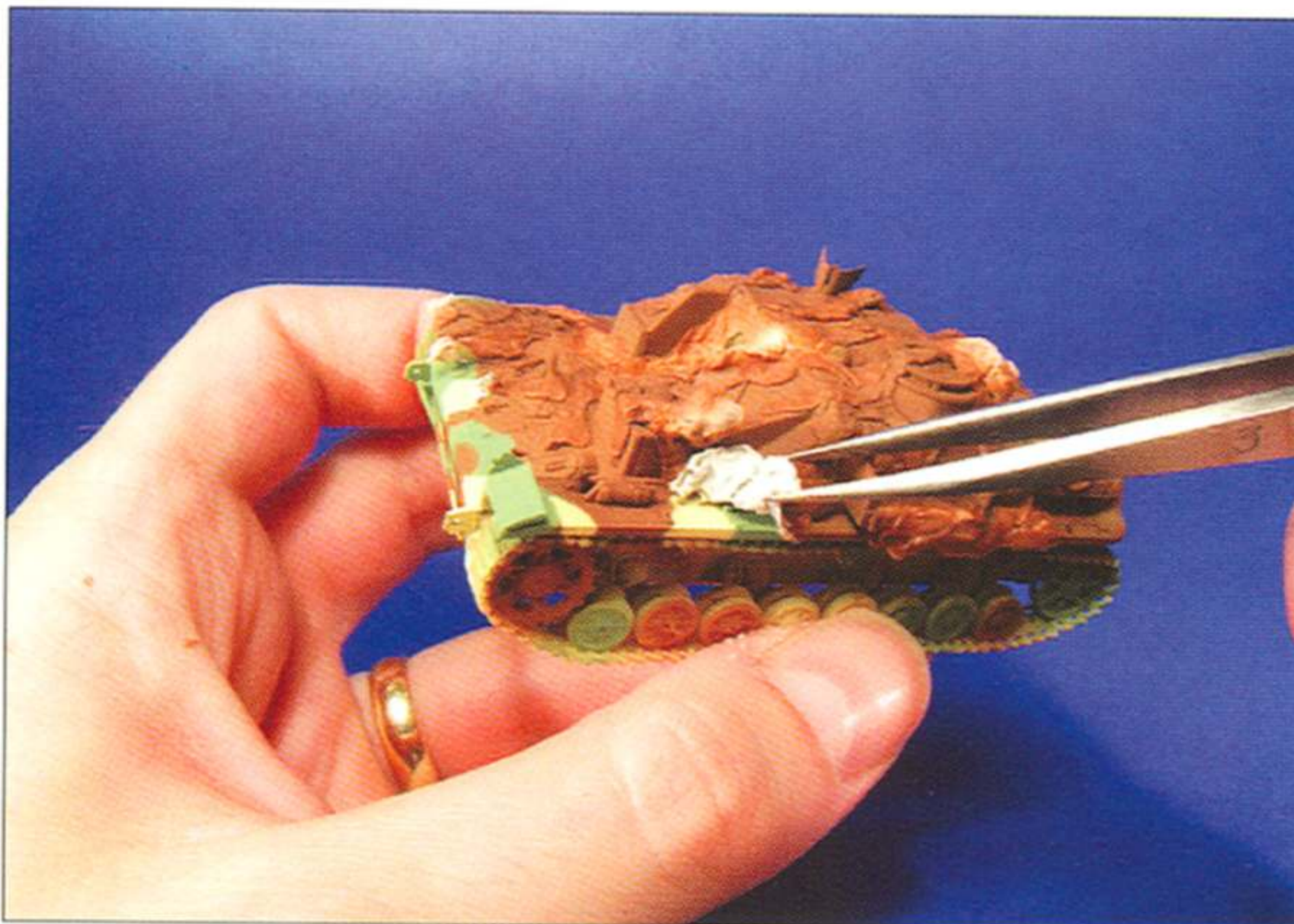
In order to achieve a hard-edged camouflage pattern, I masked off areas that were to remain in the base colour with White-Tac adhesive. Small pieces were rolled out and placed on the model. I used a cocktail stick to flatten each piece and form them into the desired shapes.



The next colour applied was Light Green (120). As with the base colour, this is quite light but will darken during the later painting stages.



The areas that are to remain green have now been masked off with White-Tac.



The basic camouflage was completed with Matt Rust (113). Then the moment of truth! All of the White-Tac is carefully removed to (hopefully) reveal a nice clean hard-edged camouflage pattern.



Any small imperfections can easily be corrected using a small brush, but in this case the result was good and didn't require any additional corrections.



In its current form the model looks very garish and toy-like. A light overspray of either the base colour or another similar colour helps blend the finish and tones it slightly. I usually add enough thinners to give the mix the consistency of a wash.



Post-shading further blends the colours. A dilute mix of Dark Earth (29) and black is subtly airbrushed along the edges and recesses. This also helps add a little depth to the model.



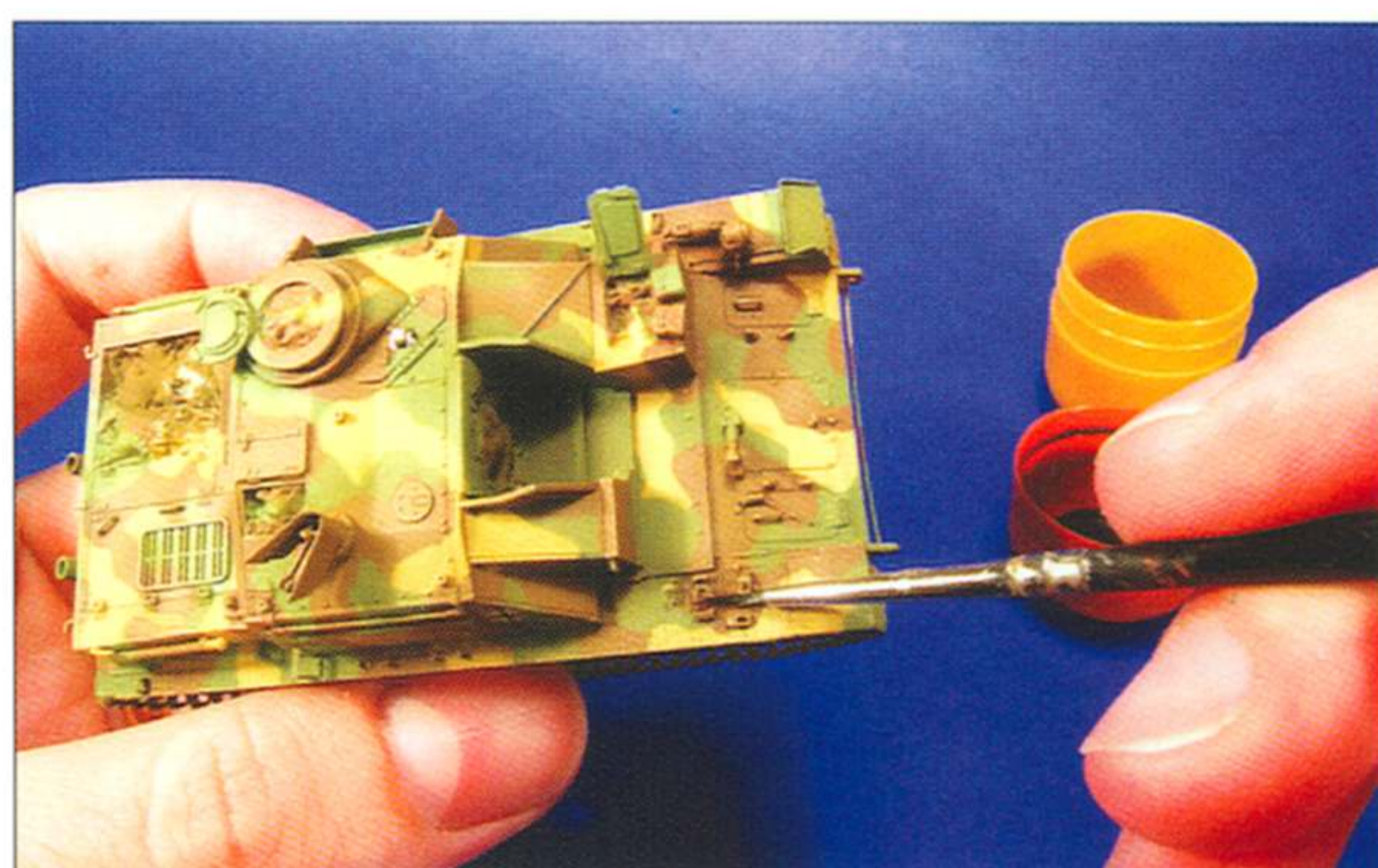
The model looks much less bright and toy-like now but is still quite clean looking.



I added some markings from the Archer Dry Transfer range. Many late-war vehicles appear to carry only a few markings so I just applied three crosses.



I'm not a big fan of dry-brushing but used in moderation it is still a useful technique. I gave the complete model a very light treatment using Matt Brown Yellow (94).



I gave the model a couple of thin coats of Klear acrylic floor varnish to seal the markings and provide a tough, semi-gloss finish ready for further weathering. A dilute mix of black and a small amount of Burnt Umber oil paint was applied around all the details and left to dry for a few minutes. Excess was removed using a clean brush dipped in thinners. This type of localised wash is often called a pin wash.



With the pin-wash complete, the model has a shaded and slightly grimy, weathered appearance.



Small chips of paint and scratches were represented using Vallejo Model Color paint. I used SS Camo Black as this is dark, but not as harsh as pure black.

putty and due to its relatively low adhesive properties is ideal for masking. It is also very soft and malleable so conforms easily to complex shapes and details. The step-by-step procedure I use is shown in the accompanying photographs.

Once the camouflage was complete, I very lightly over-sprayed the model with the base colour to tone down the garishness of the camouflage. This was followed by some dark brown post-shading to add depth and tonal variety to the model. The markings are from the Archer Dry Transfer range and consist simply of three crosses. Late-war vehicles generally had fewer markings than those found earlier in the war and it kept the specific identity of the vehicle being modelled generic. I then gave the model a very light dry-brushing using Matt Brown Yellow (94).

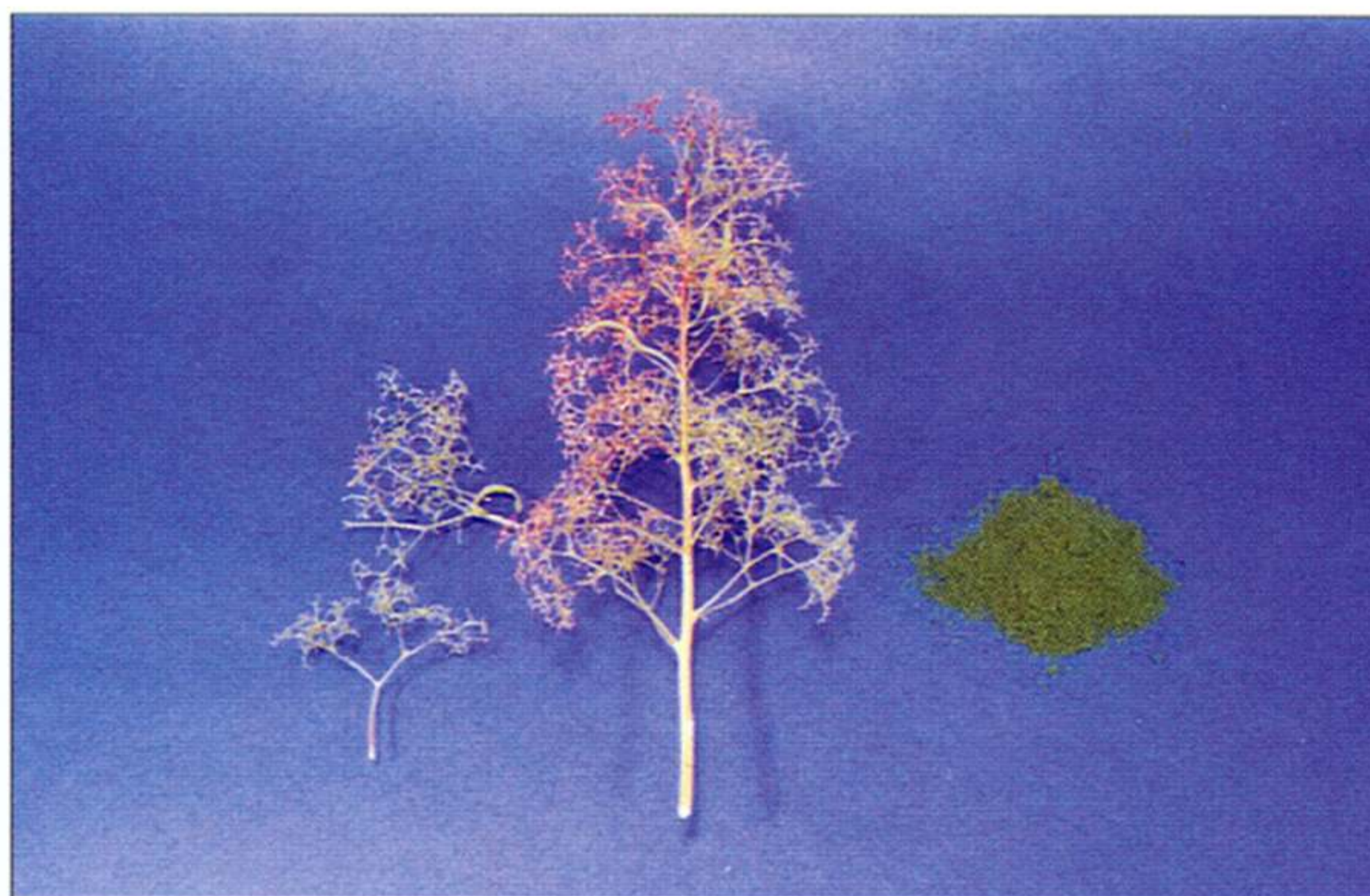
A couple of brushed coats of S.C. Johnson Klear acrylic varnish sealed the markings and the colours underneath ready for the application of some pin washes. I applied these around the smaller details using thinned dark brown and black enamels mixed with a little oil paint. Numerous small scratches and paint chips were then added using Vallejo acrylic paints. At this stage most of the weathering was complete so I started painting the details. I painted the tyres and track matt black and gave them a light overspray of dark earth to tone down the harshness of the colour. For dried mud I used pigment powders mixed with a little plaster and water. I applied this around the lower hull and slightly up the sides of the vehicle. I still wanted to represent some damp mud and more dust but before doing so I moved back to completing the groundwork.

## Creating a small scenic setting

For the scene I wanted to depict a US soldier who had just stumbled across the abandoned vehicle. As I had a vignette in mind, rather than a full-blown diorama, I kept the remaining elements of the setting to a minimum. I decided to just include a single tree along with some bushes and grass. The tree was created using Seafoam, a natural product that is chemically treated to help preserve it. I cut a piece to size and painted it various shades of brown. I also painted several other smaller pieces that would be used later for the bushes. When dry, I sprayed the main "branches" with photographic mounting glue and dipped them into some loose foliage material I'd bought from a model railroad shop. This was a medium green colour and looked a little flat and monotonous, so I then sprayed a very dilute black mix from underneath the tree to add a little artificial shadow. Highlights were added using bright yellow lightly sprayed from above. I used the same process for the bushes and when complete put them



A small base was carved out of polyfoam. I kept the base fairly deep to enable a depression to be cut out for the model to sit in. Polyfoam is quite rigid but easy to carve. It also responds well to sanding.



I wanted to feature a single tree in the vignette along with some bushes. I used a natural product called Seafoam for the main structure of the tree and scatter/foilage material for the leaves.

all to one side until the main groundwork had been finished. The figure came from the Milicast resin range and is from a set of five walking US soldiers. The level of detail and crispness of the casting is very impressive and the figures were ideal for the scene I had in mind. I chose to use just one figure, although I painted all the figures at the same time. The main colours used were Humbrol enamels with some washes and shading applied using oil paint/enamel mixes.

For the mud, I mixed up a thick mixture using dried plaster, acrylic texture gel, and Tamiya dark brown acrylic paint. I also added a small amount of very fine sand and various lengths of Woodland Scenics grass. I applied the mix over the foam base and then gently embedded the model into it. I also applied some of the mixture around the lower hull of the vehicle. I left the base to dry overnight then drilled small holes for the bushes and tree. I added some grass around the front of the base using hanging basket liner bought from a gardening centre. This comes as a solid piece and the strands can be teased out. There is a nice mix of green and yellow-green shades so there is no need to paint it. The strands may be slightly over-scale for small-scale work, although I justified it as being coarse wild grass! This just left the addition of the figure and spare roadwheel to the ground near to the vehicle. I painted the edges of the foam base matt black and added a small etched nameplate. I obtained this from a UK company called Name It.

I don't tend to build many vignettes or dioramas so many of the techniques were new to me. I certainly enjoyed setting the vehicle in an appropriate environment so it's something I'll be returning to in the future.



I used a single figure for the scene and selected one from the Milicast US Foot Patrol set. I painted all the figures together as I plan to eventually use all of them for other projects.



The Milicast figures are excellent and the crisp detail makes painting them easy. I used Humbrol paints for all the base colours then applied various washes and highlights using a mix of enamels and oil paints.



44 | The completed scene. The groundwork was created using the same muddy mix applied to the vehicle.



Another overall view of the finished vignette.



ABOVE Note the interior face of the radiator hatch on the engine deck is painted in red oxide primer.

BELOW The coarse grass is hanging basket liner bought from a gardening centre. It's perhaps a little over-scale but the colour and appearance of it is very realistic.





ABOVE The figure has a good pose that fits perfectly with the small scene.



LEFT I left one of the spare roadwheels lying on the ground. Note also the tow cable at the rear of the vehicle.

# Flakpanzer IV Wirbelwind

<i>Subject:</i>	<i>Flakpanzer IV Wirbelwind</i>
<i>Skill level:</i>	<i>Master</i>
<i>Base kits:</i>	<i>Hasegawa Flapanzer IV Wirbelwind (MT48) Revell Panzer IV Ausf. H (03119)</i>
<i>Scale:</i>	<i>1/72</i>
<i>Additional detailing sets used:</i>	<i>PART Wirbelwind photo-etched detail set (P72055) ARMO Wirbelwind turned metal barrels (AR72714) Extratech Panzer IV Driver's Compartment (72015) Milicast "British Squaddies at rest" (FIG61)</i>

Although ungainly and top-heavy looking, I've always found the Wirbelwind oddly appealing. Many years ago I built Esci's 1/72-scale version, but the kit has long been out of production. Fortunately Hasegawa came to the rescue with a reasonably accurate model based on their range of Panzer IV kits. Although a small amount of work can greatly improve the kit, I decided to give it a complete overhaul.

Wirbelwinds were built on reconditioned Panzer IV hulls, mostly Ausf. G and Ausf. H, although there is photographic evidence of Ausf. J hulls being used. Hasegawa's kit is based on an Ausf. G hull, but I decided to build my model with late-version Ausf. H details. This again gave me the opportunity to use Revell's excellent Panzer IV kit as a basis for the model. I also decided to replace the overly thick Hasegawa turret with a more in-scale, scratch-built item. In the end, the flak gun was the only major item I used from the Hasegawa kit and even this was further detailed and modified. As with the StuG IV model described earlier, I planned from the start of the project to depict an abandoned, slightly damaged vehicle, so this gave me another opportunity to model some interior detail.

The first job involved smoothing the inner faces of the lower hull sides and filling the ejector pin marks. Usually these wouldn't be seen, but as some of the interior would be visible it was a necessary chore. Once done, I removed some of the suspension units and repositioned them at slightly different angles. I planned to display the model on a small scenic base, so an articulated suspension would add a little more interest. I then assembled the wheels and tracks.

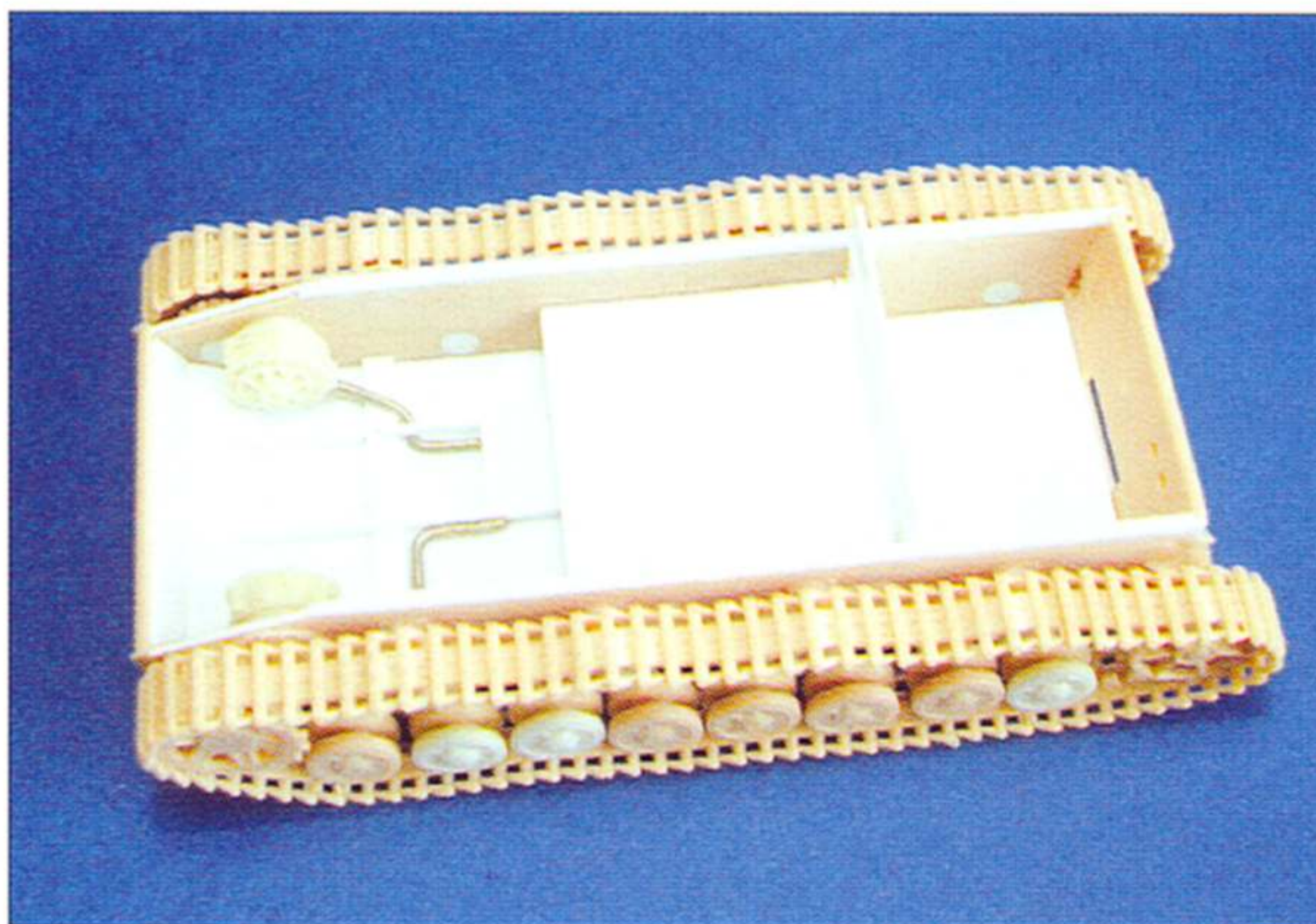
## **Adding interior detail**

The hull interior detail was mostly confined to the driver's compartment. For this I used a mix of parts from the Extratech Panzer IV interior set and some scratch-built items. The Extratech set provided the main transmission and brake drum housings along with some photo-etched parts. The transmission housing was missing some smaller details but it was a simple job to add these. The rest of the interior was made from various bits of plastic rod, tube and strip. The central portion of the hull, underneath the turret, is barely visible so I only added some basic detailing to this area. As I'd decided to keep the engine deck hatches closed, the engine bay wouldn't be visible so I didn't add any further detailing here.

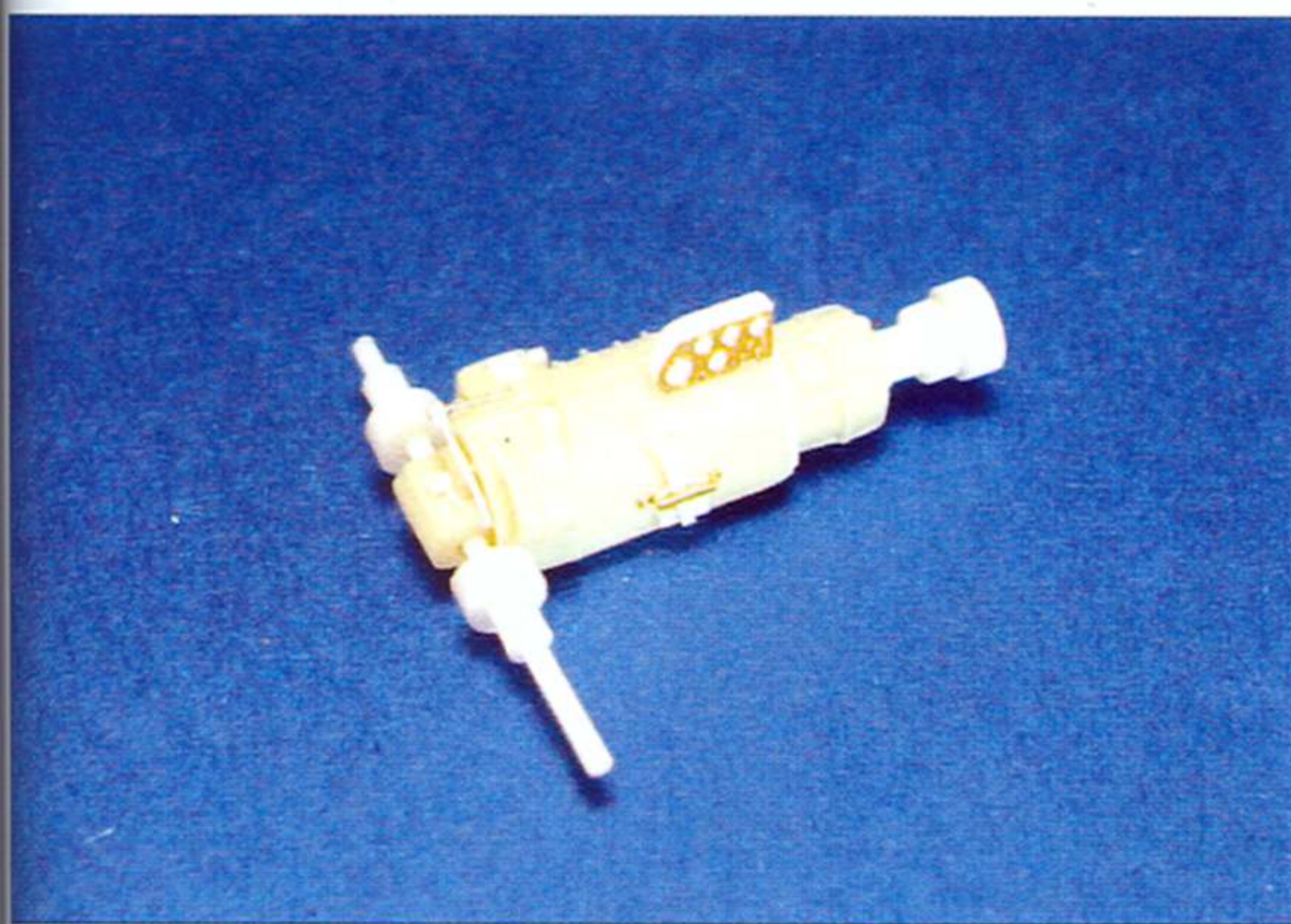
Most of the work done on the upper hull involved removing the fenders. As is my usual practice, these were replaced with plastic sheet versions covered with photo-etched treadplate. Photo-etched tool clasps and clamps would be



The Revell lower hull has been completed. Some of the suspension units were removed and repositioned at different angles.



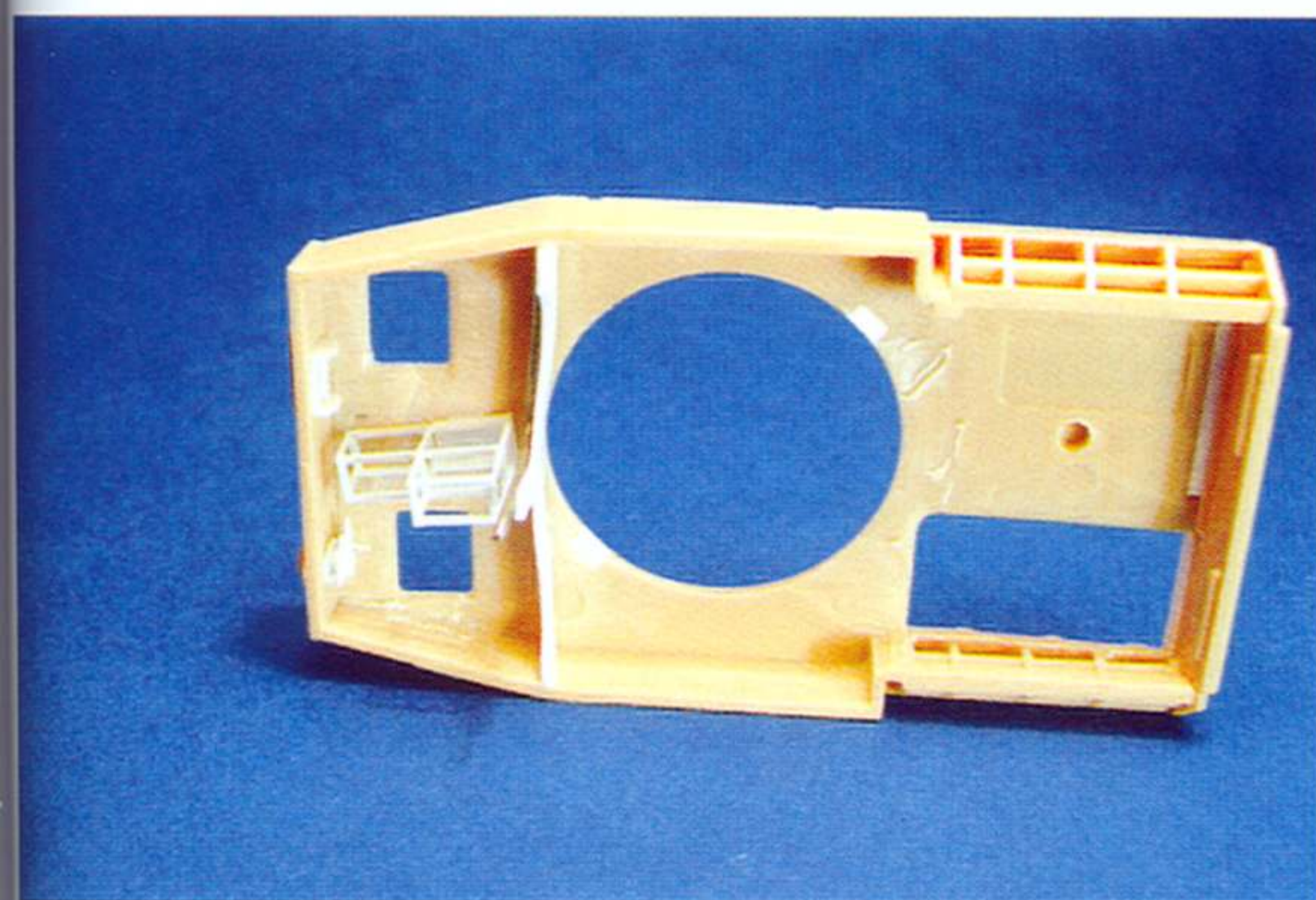
Some basic details have been added to the driver's compartment using plastic strip and wire. The brake drum housings are from the Extratech Panzer IV driver's compartment.



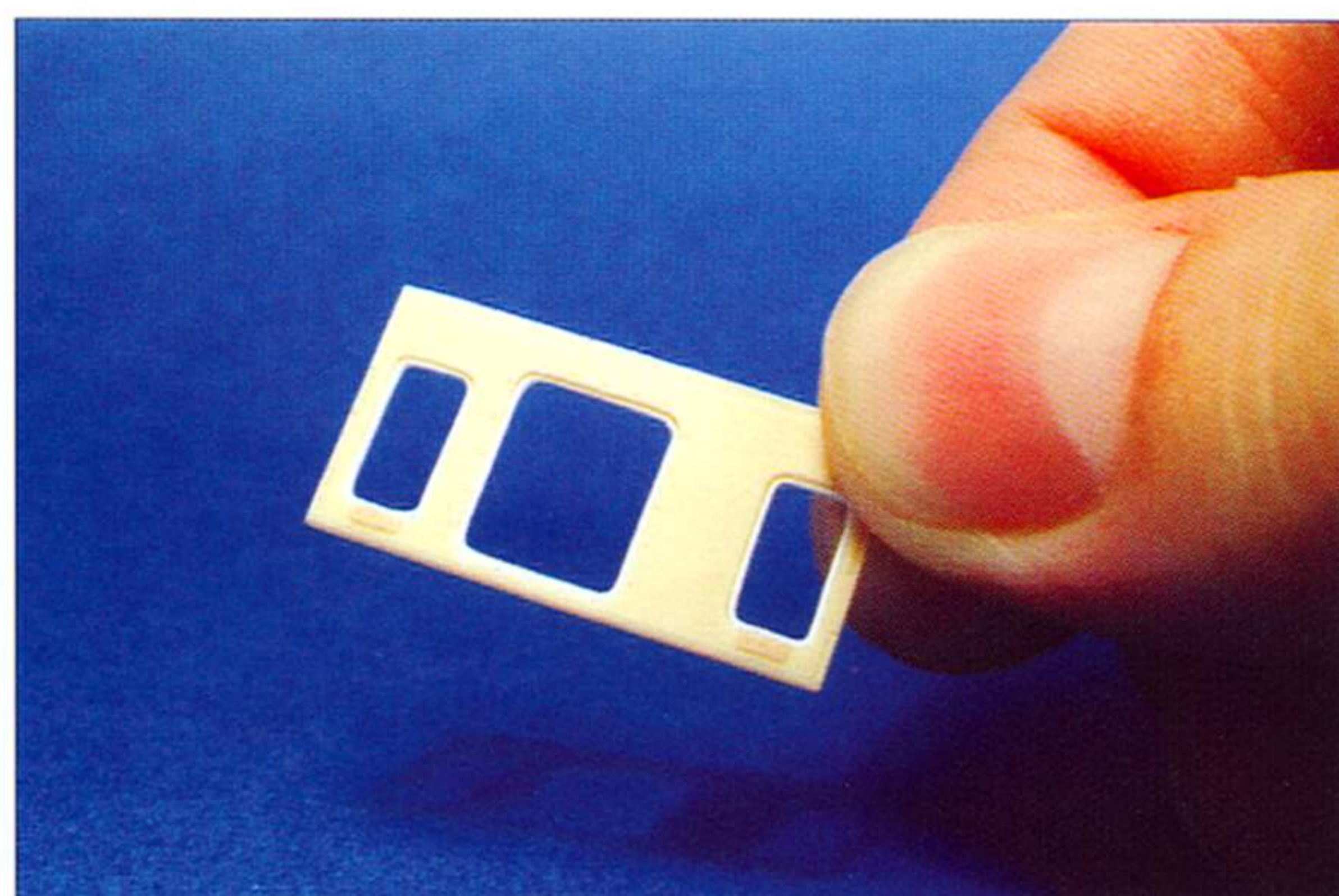
The transmission housing is also from the Extratech driver's compartment set. I made some minor corrections and added some additional small details. The modified part was then left separate from the interior until after painting.



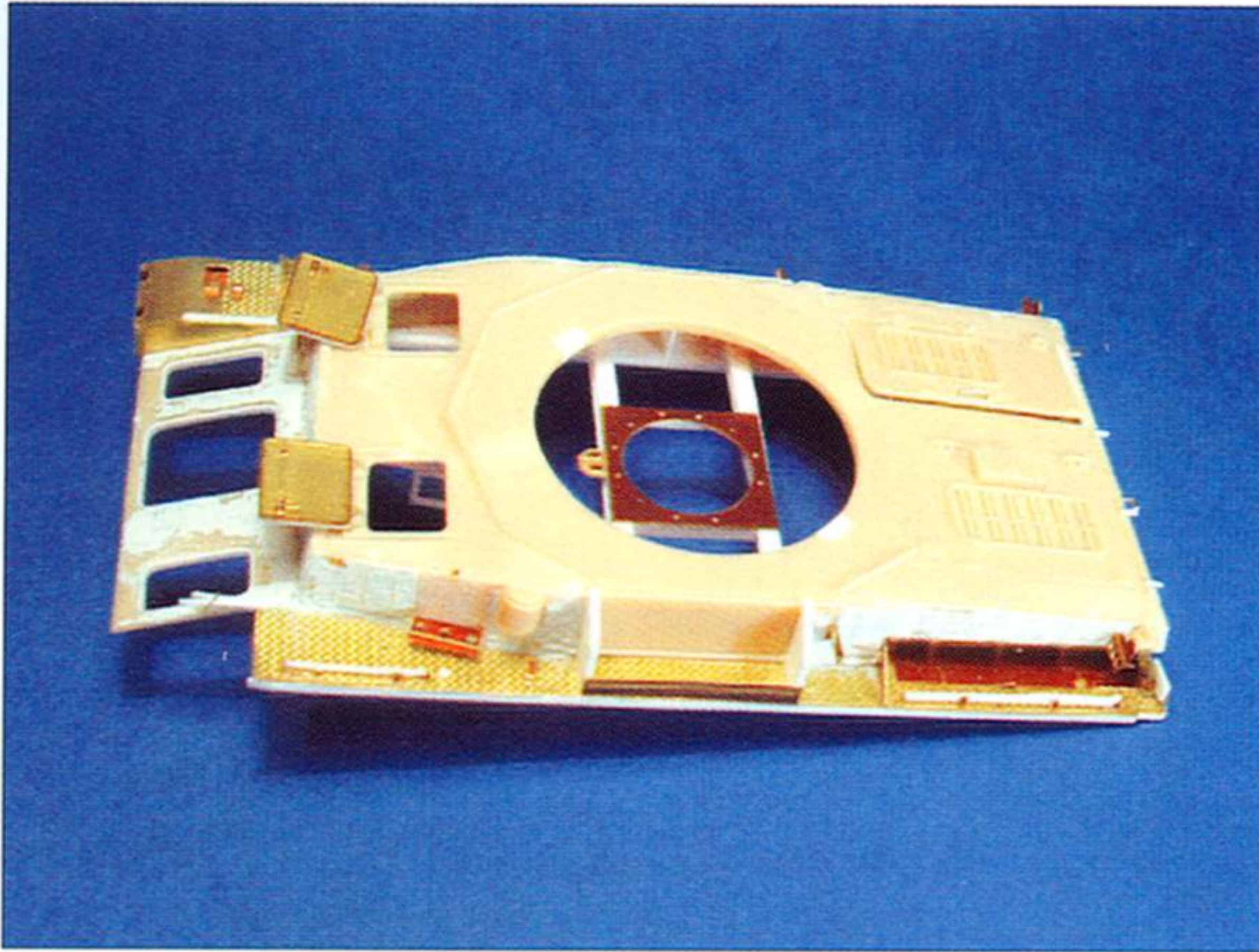
Further detailing has been added to the interior and the driver's compartment is now complete. As the engine compartment was to remain closed I didn't add any detail here. The central portion of the hull interior is barely visible and so I only added the most basic of detail.



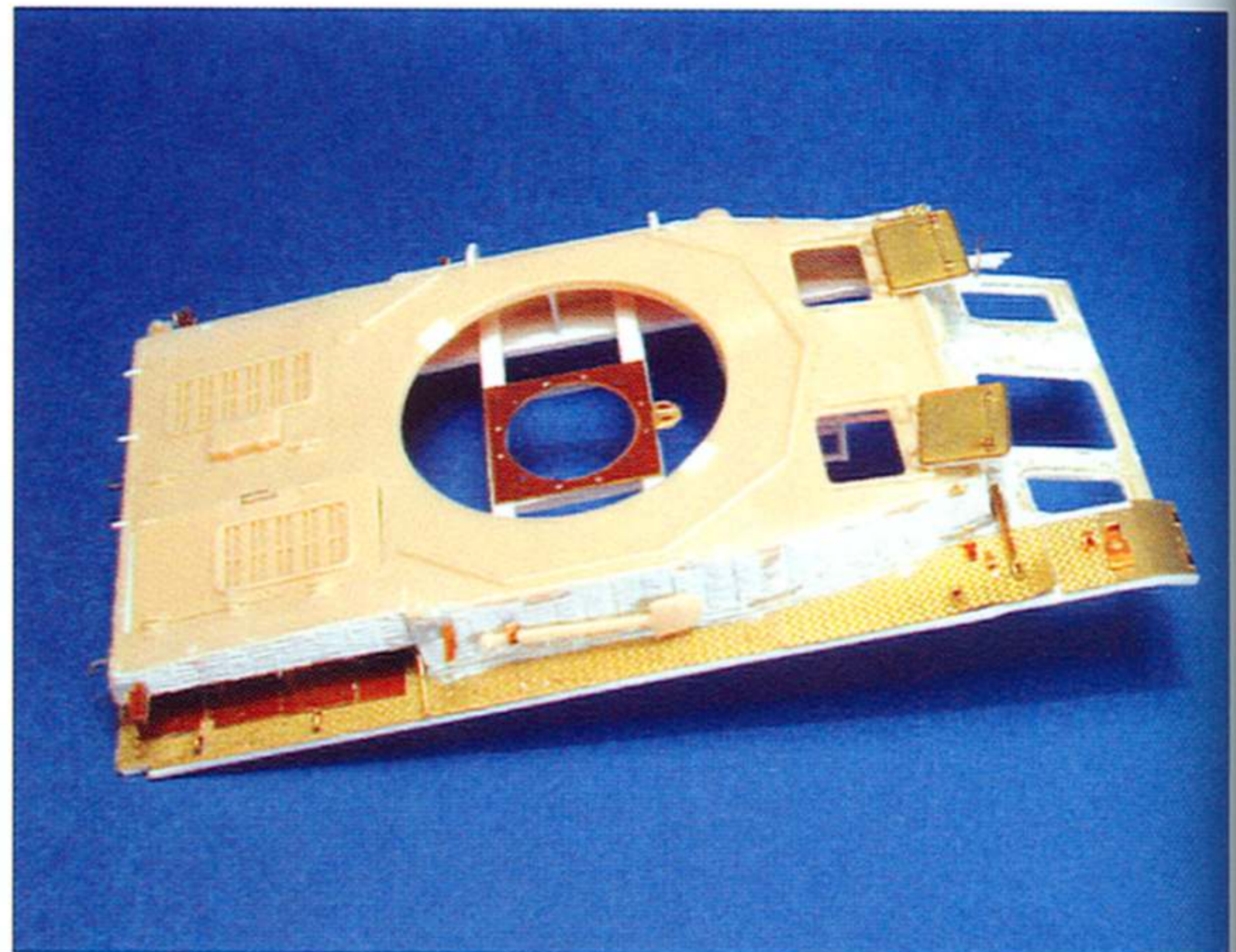
I thinned the underside of the upper hull around the hatch areas to give a more in-scale appearance. Details added here included the radio rack frame, machine gun mount and driver's vision slot.



I opened up all the hatches on the glacis plate using a scalpel and cleaned up the holes with thin sanding sticks. An inner lip was added around each opening using thin plastic strip.



The fenders have been added to the upper hull. These were made from plastic strip covered in photo-etched treadplate. Many other small details have also been added including the tool clamps, crew hatches (note the damaged radio operator's hatch) and spare wheel holder.



The *zimmerit* was made from Milliput putty. The ridges were created using a couple of homemade *zimmerit* tools. Note also the framework across the underside of the turret ring opening. The flak gun assembly sits on this and can then rotate.

added later. I added some interior detail to the underside of the upper hull, in particular the frames for the radio racks between the driver and radio operator hatches.

At this point I added the *zimmerit*. This covers most of the front hull, the rear hull plate and the hull sides (both lower and upper halves). As with the Panzer IV and Jagdpanzer IV described earlier, I used Milliput and some homemade *zimmerit* tools. The most time-consuming part was then adding all the smaller photo-etched details to complete the hull.

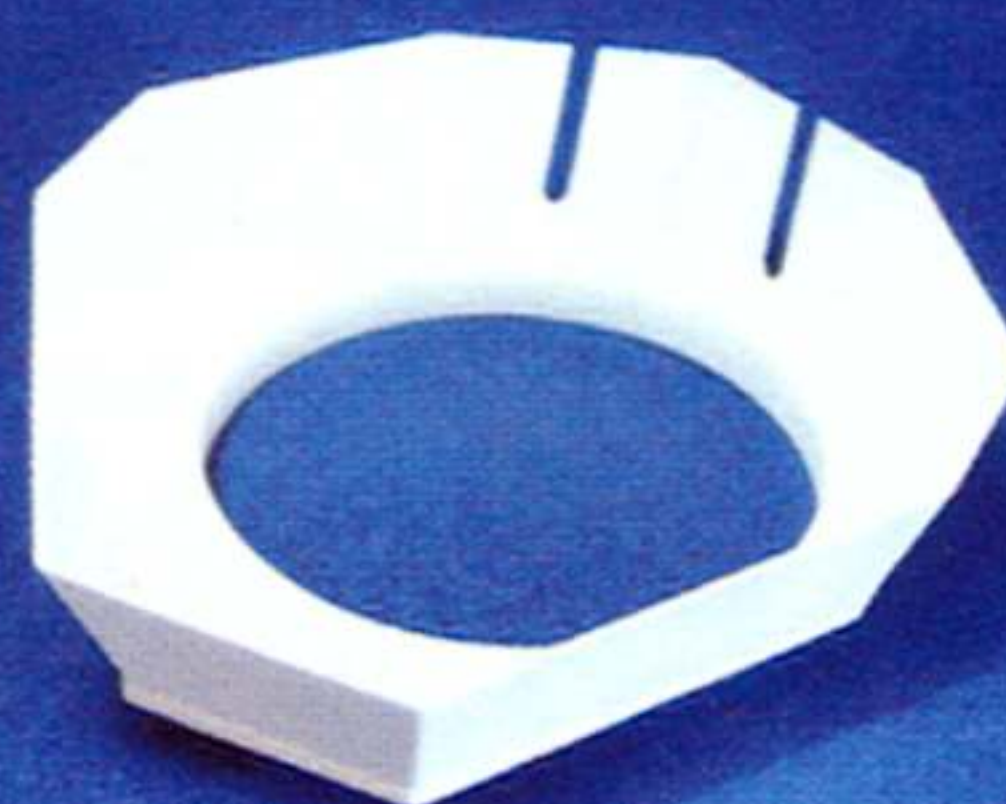
## Scratch-building the turret

The Hasegawa turret is reasonably well proportioned but the sides are overly thick. I considered a few alternative ways to improve this including using a photo-etched replacement from PART and thinning the kit parts. I just wasn't keen on the idea of a photo-etched turret and it would be extremely difficult to properly thin all the faces of the kit turret from the inside. The only other alternative was to scratch-build one from plastic sheet, so this was the option I selected. Another problem with the kit turret is that the base is solid but in reality should be opened up. Scratch-building the turret would also solve this problem and although the turret shape is complex, the individual parts are just flat panels. The accompanying photographs show the various stages I followed in order to construct the new turret. I started by cutting out the base plate from plastic sheet and forming a section of plastic strip into a circle for the turret ring. I added the lower panels to this base piece – a step that required patience to ensure the shape was accurate and symmetrical. The upper panels were then cut out and glued into place and this completed the basic shape. There are weld seams around the edges of the panels where they join each other, and to represent this I glued very fine stretched-sprue segments along each edge. The sprue was then softened with liquid poly glue and the welded effect reproduced by impressing ridges along the sprue with the blunt edge of a scalpel blade.

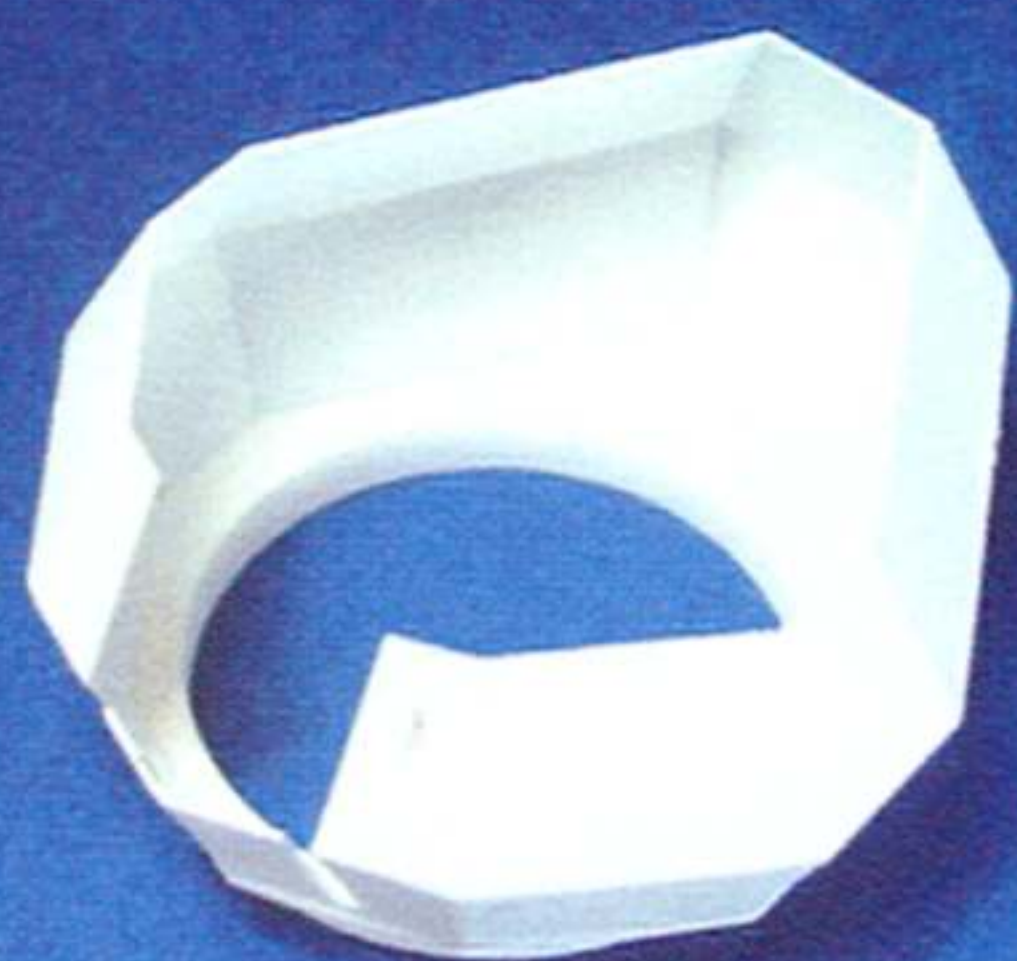
The flak gun provided in the Hasegawa kit is a little crude in places and lacks some detail. I used the central gun mount parts as a basis for a better-detailed version and replaced the moveable gun mounts on either side. The kit gun barrels are overly thick so I used turned aluminium replacements from Armo, which look much better. (Aber also markets very nice brass replacements.) Once complete the model was ready for painting.



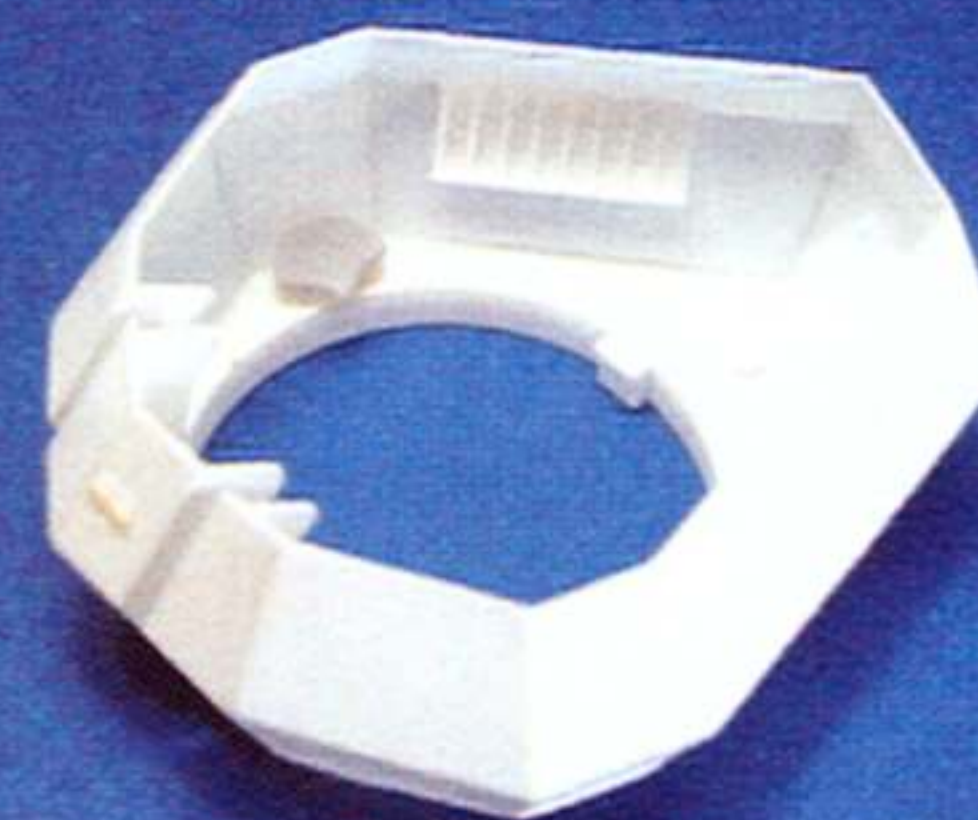
Once the hull had been completed I started work scratch-building a replacement turret. Here the base has been cut from plastic sheet and the turret ring added. The ring is simply a section of plastic strip curved around the circular opening of the turret base.



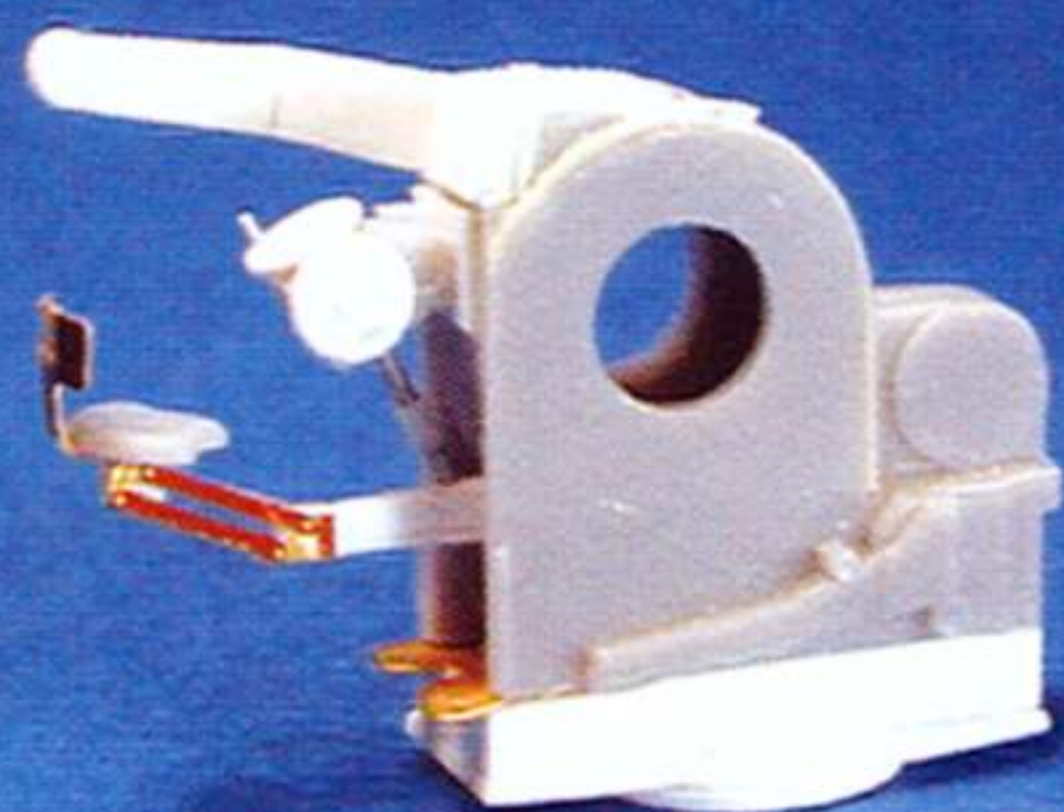
The individual panels that make up the turret are simple in shape but it is crucial that they are precisely made. If a single angle is incorrect it will adversely affect the position of every other panel.



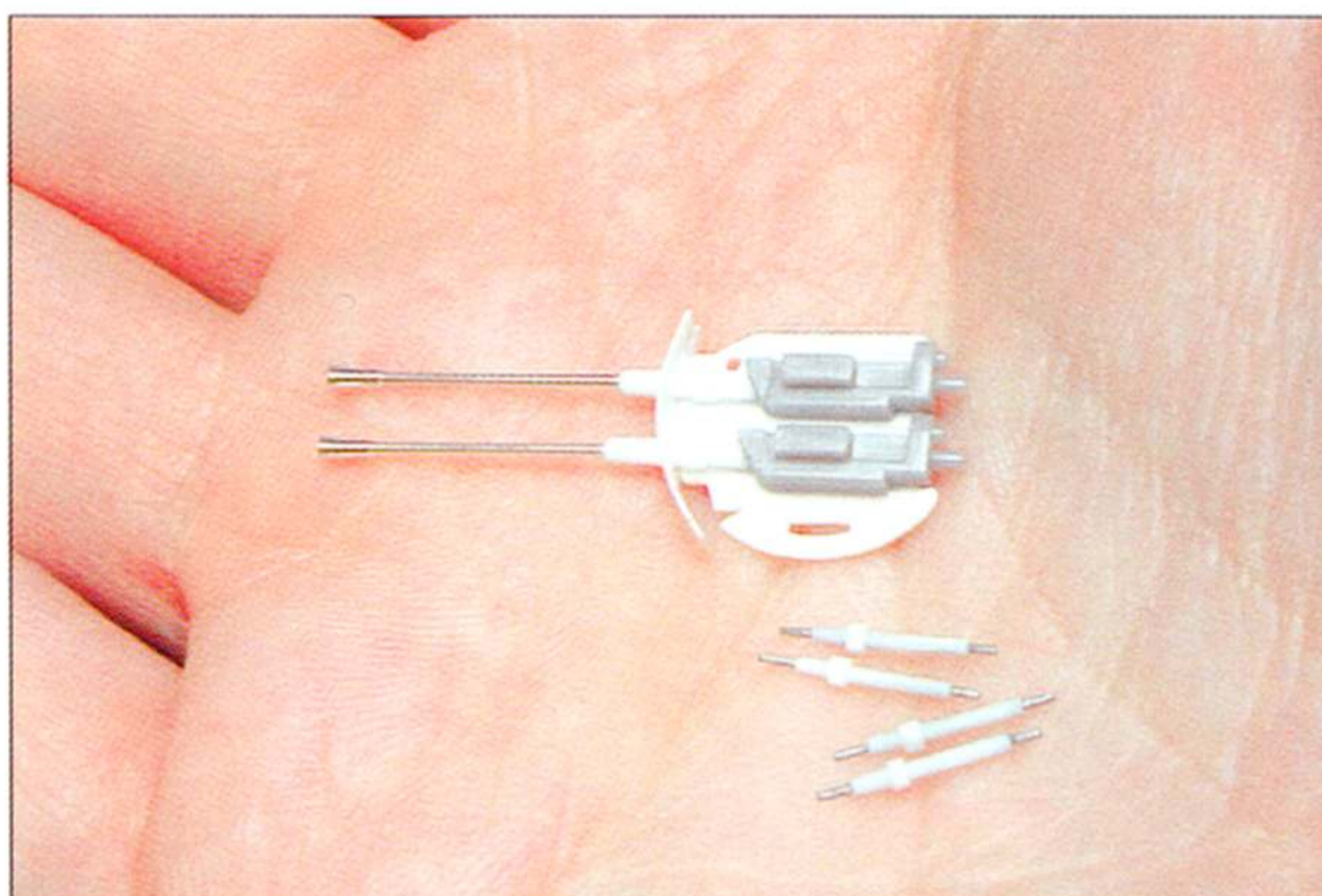
The upper row of panels has now been added and the turret is starting to take shape.



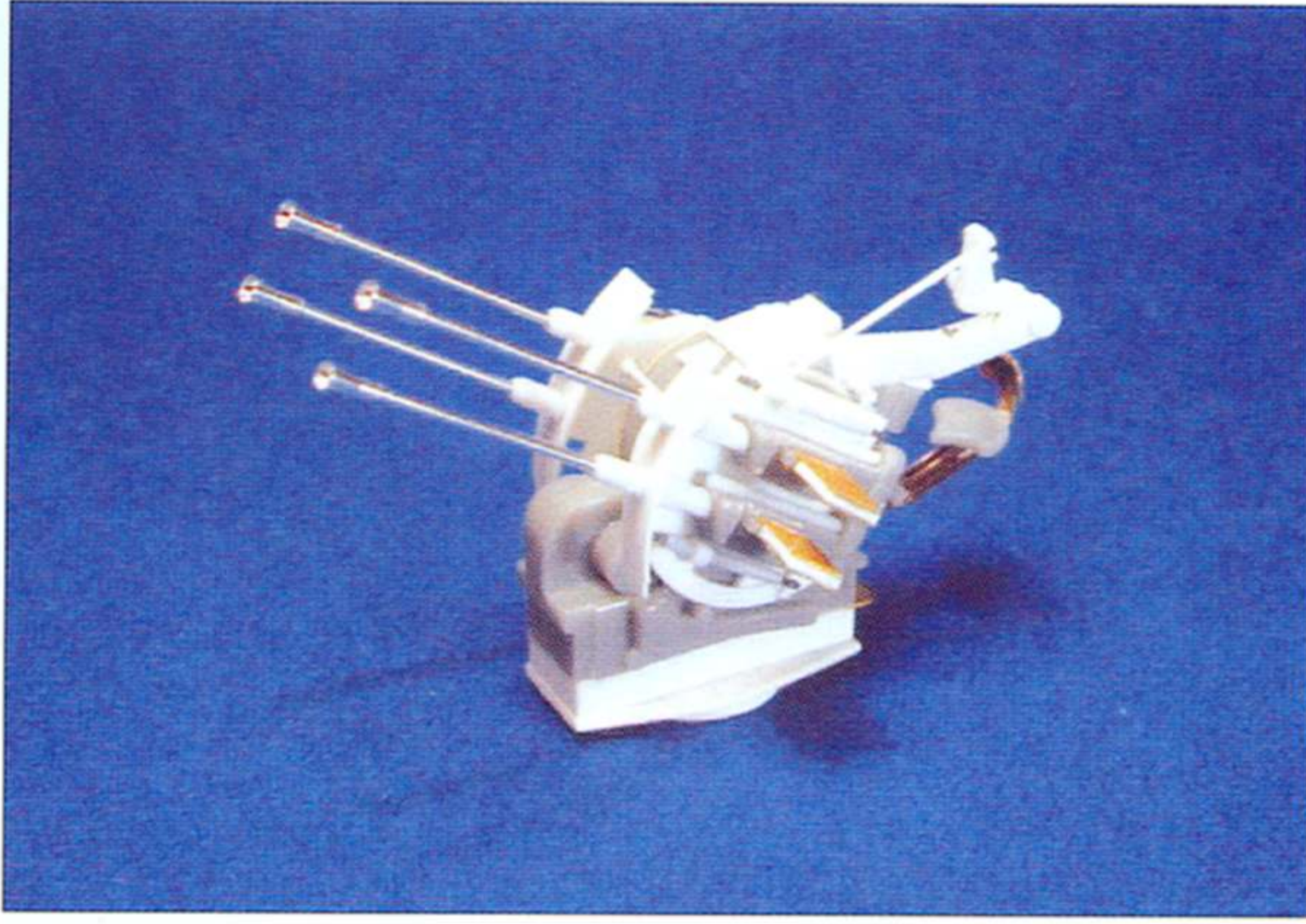
The completed turret. A few details within the turret can be seen here, such as ammunition holders and seats. Although not easily visible on the photograph, there are a series of weld lines along the turret edges. I represented these using thinly stretched sprue softened in liquid glue. Whilst still soft I imprinted shallow ridges along each section to give the appearance of weld seams.



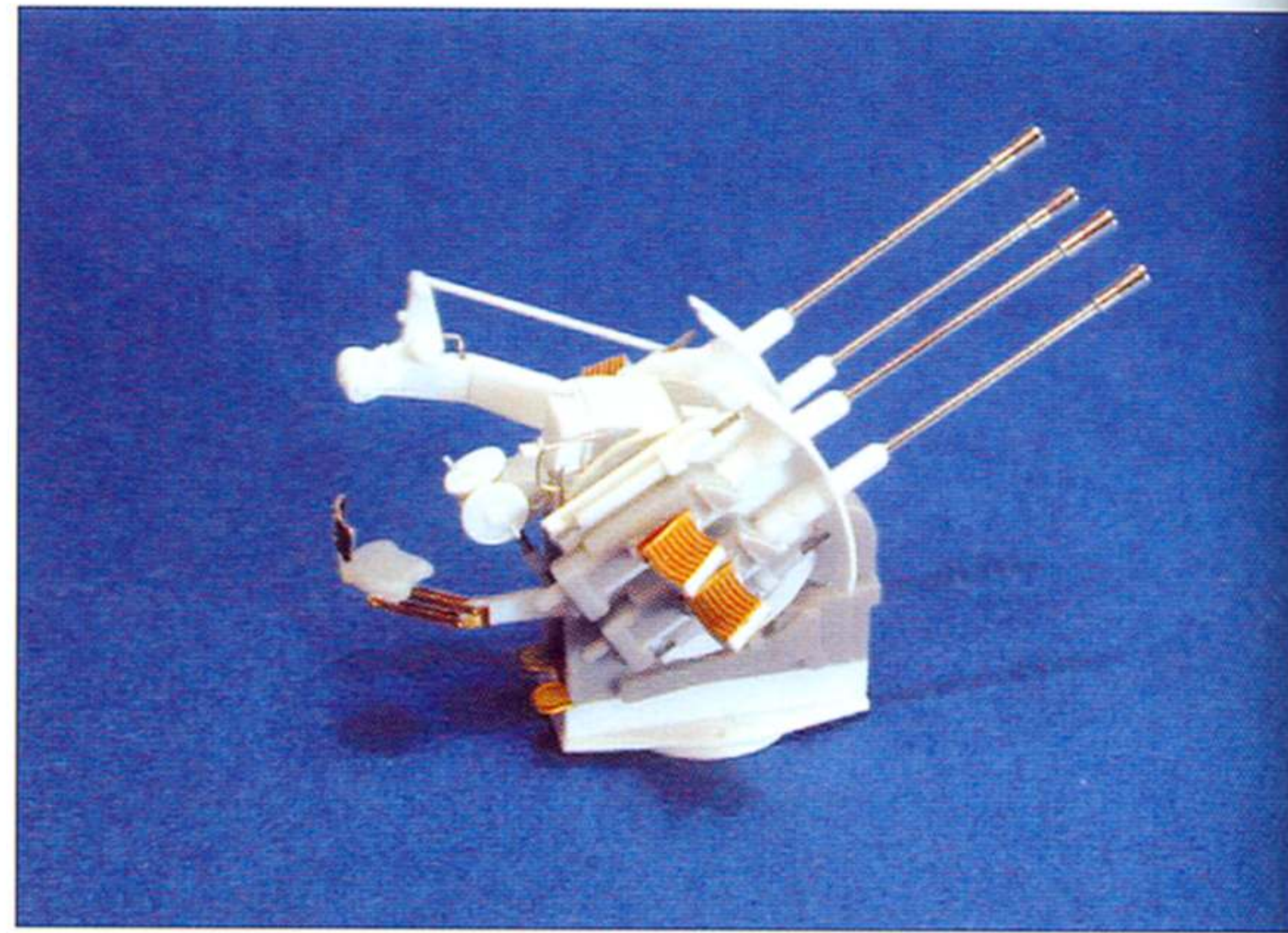
The flak gun mount provided in the Hasegawa kit is reasonably well shaped but the detail is a little soft and chunky. I used the basic assembly but replaced and improved some of the details.



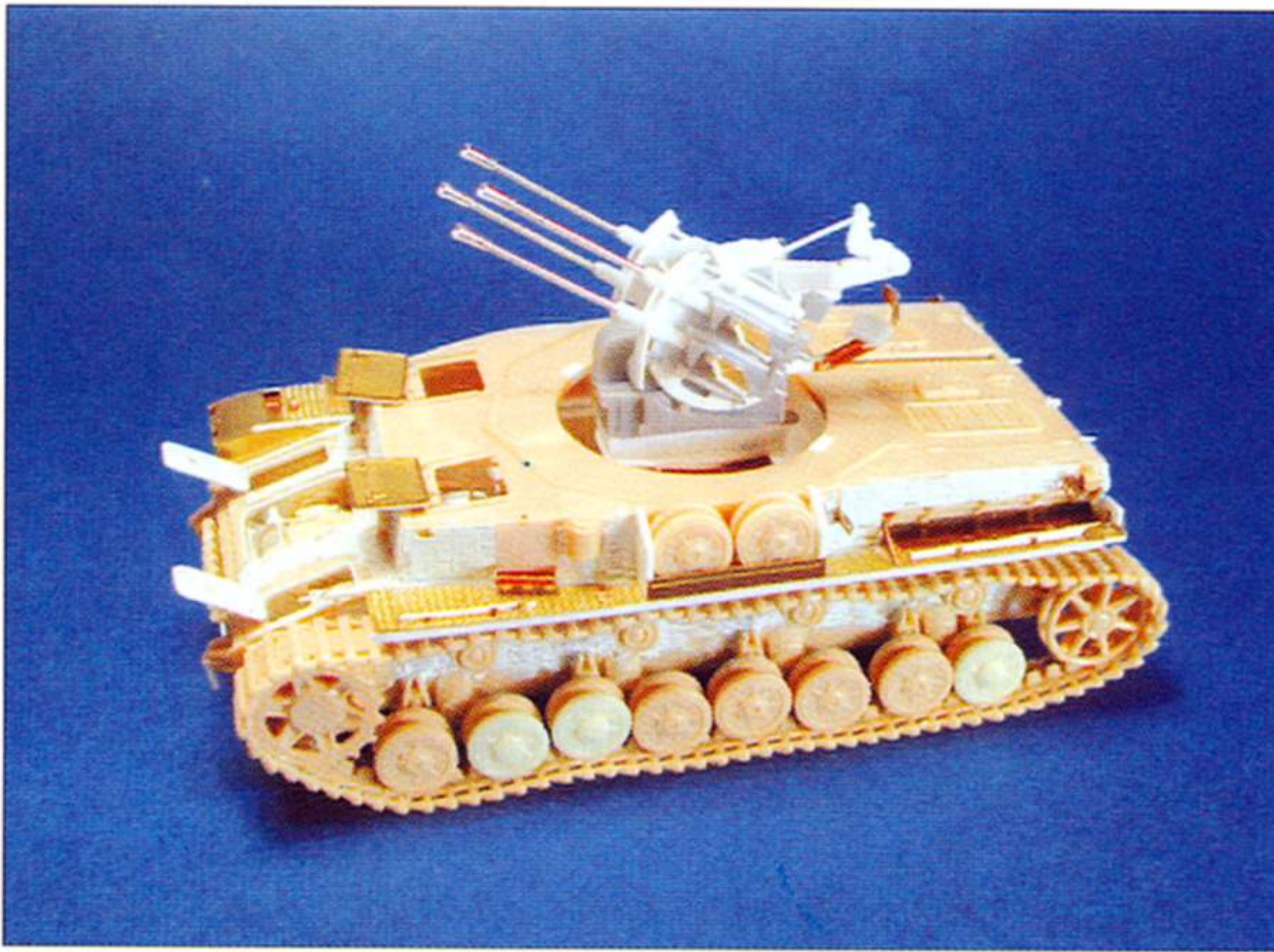
The flak guns are attached in pairs to two plates mounted either side of the gun mount. The kit parts are overly thick so I made replacements. The gun barrels in the kit are also too thick but turned metal replacement barrels are available from Armo and Aber. These are both good and much thinner than the kit parts. The Armo versions can be seen here.



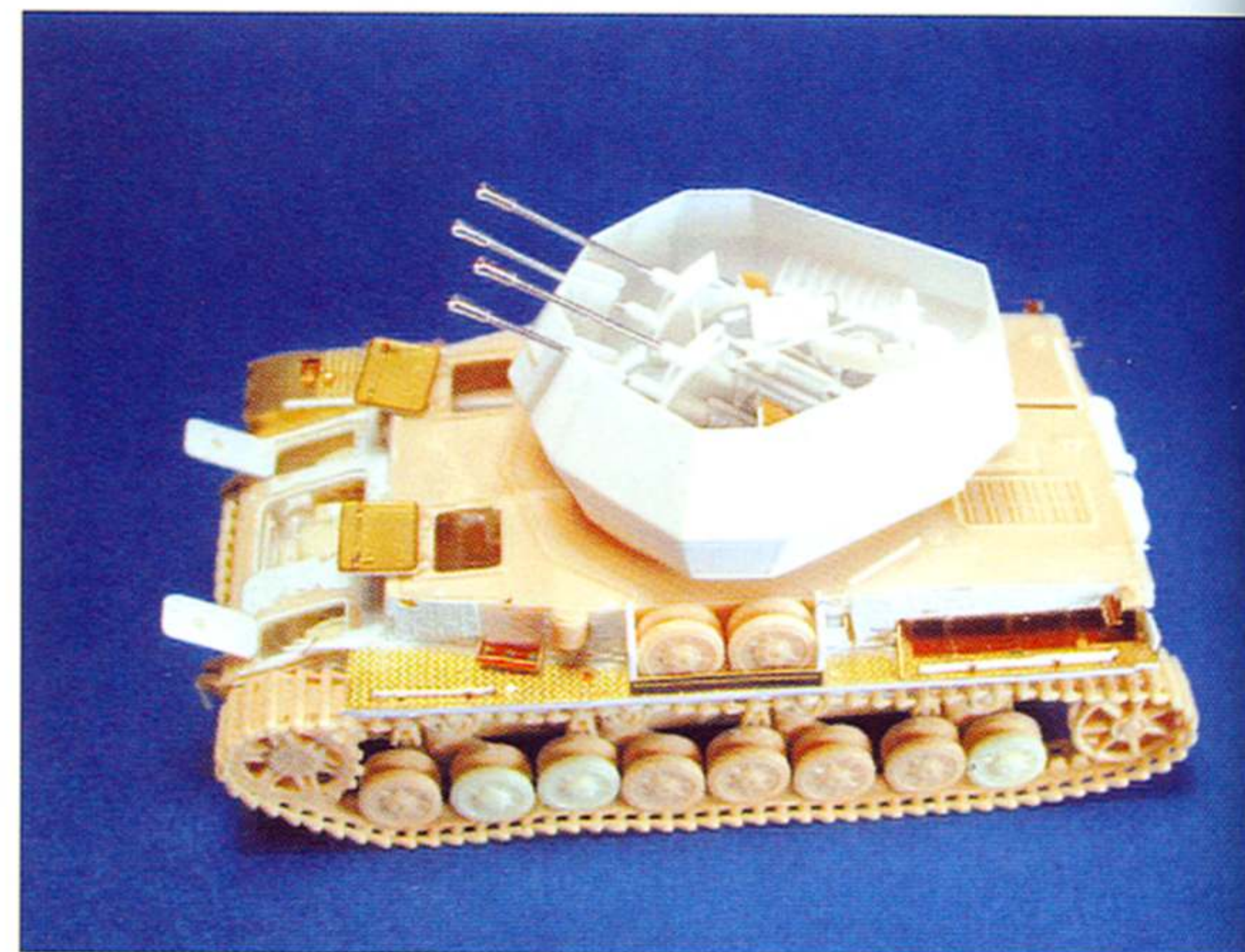
The finished flak gun. The ammunition clips were made from plastic strip covered with photo-etched parts from the PART Wirbelwind set.



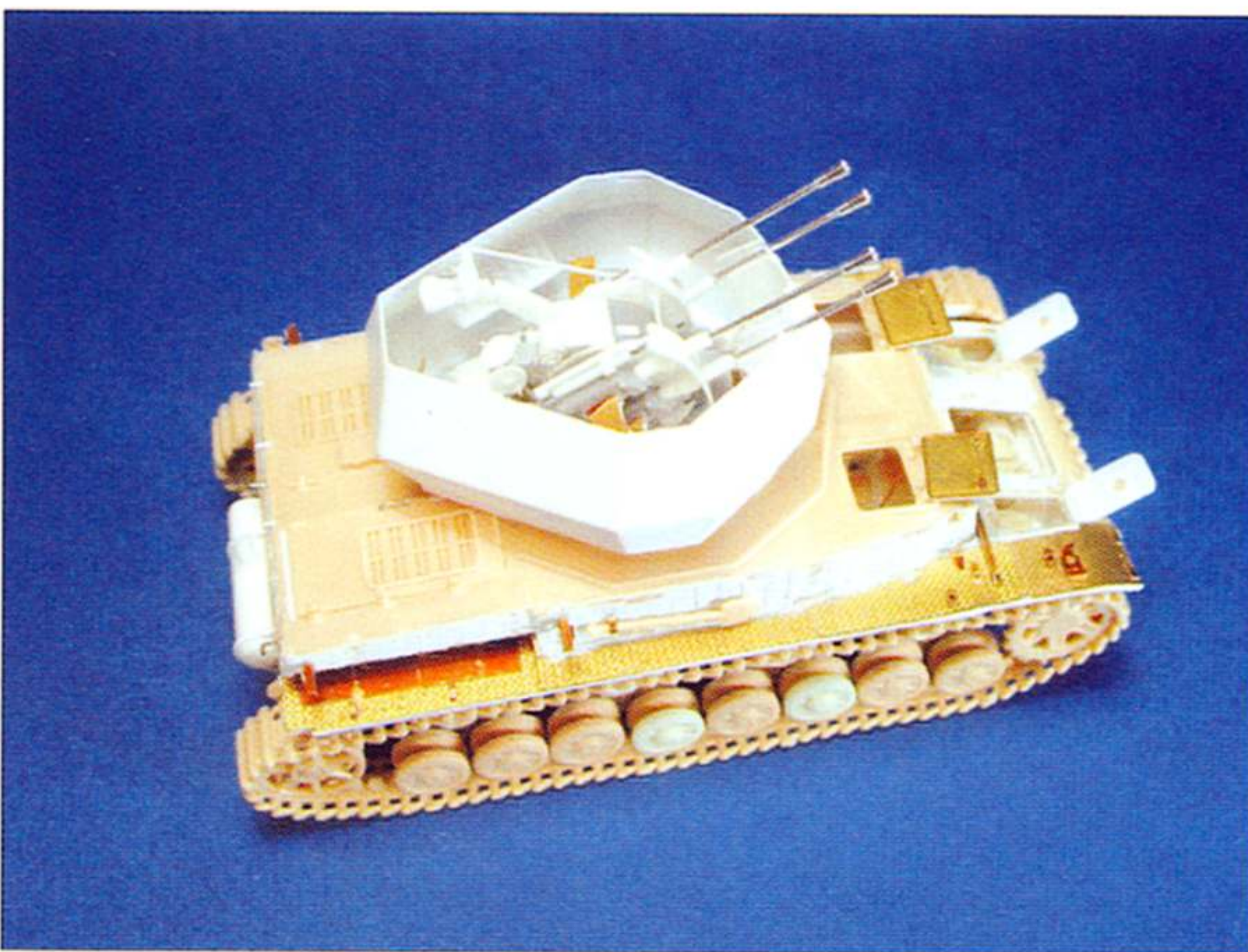
A lot of care is needed to line up the barrels correctly. Even the smallest deviation will be noticeable to the eye.



The gun is test fitted to the hull. The upper and lower hull halves are just temporarily attached.



Construction is virtually complete, ready for the interior to be painted.



I positioned the radio operator's hatch at an angle as if one of the hinges had been damaged. This was based on a wartime photo of an abandoned vehicle.

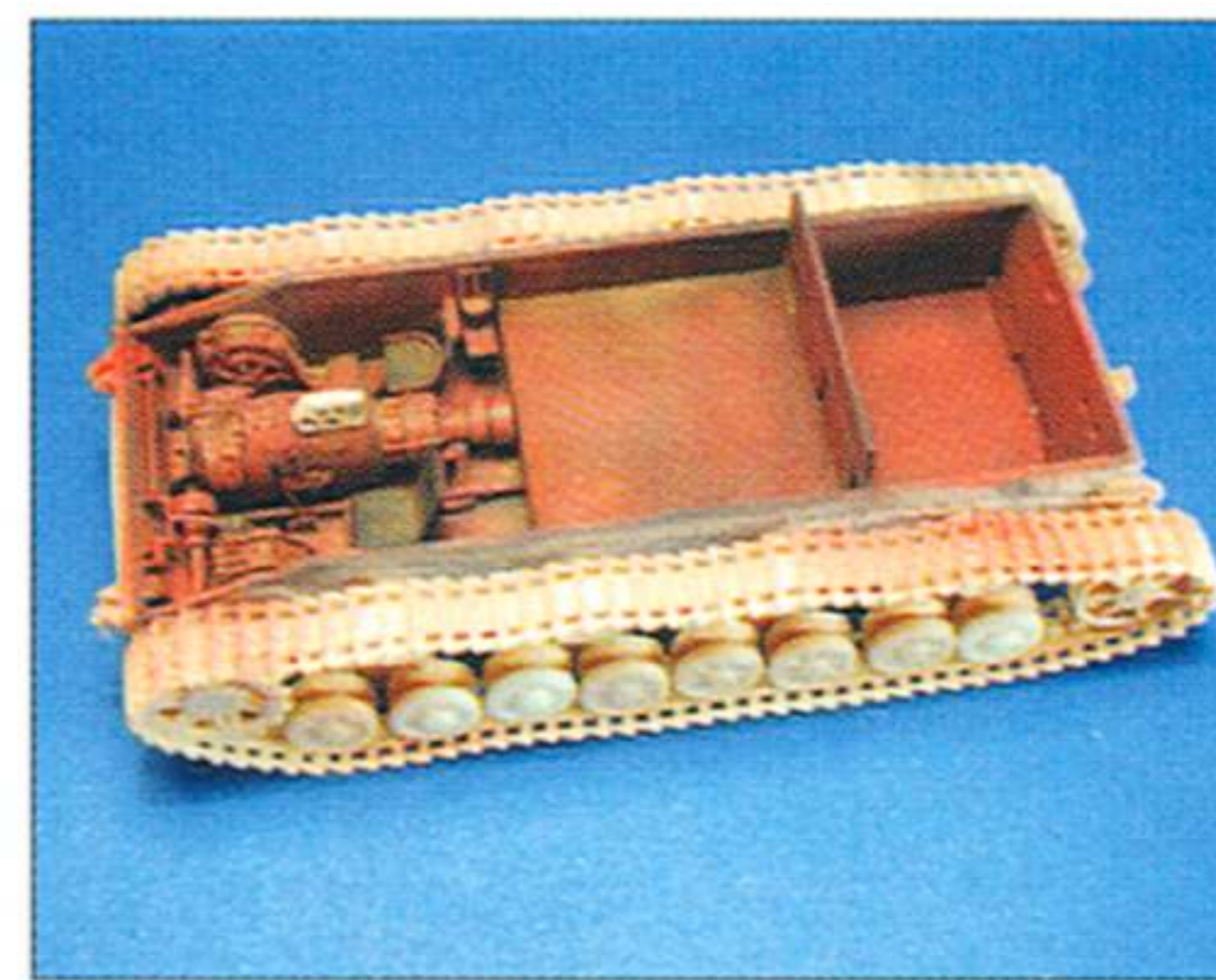


The model was left as several sub assemblies to help ease painting.

## Painting and finishing

I started by giving the interior a base coat of matt black. This would act as a pre-shading colour and was followed with an overspray of a red oxide mix based on Humbrol Brick Red (70) and a little Matt Scarlet (60). The upper areas of the interior were then painted an ivory colour mixed from Matt White and a small amount of Radome Tan (148). Several pin washes were applied around the details using black enamel mixed with Burnt Umber oil paint. I mixed a little Humbrol Matt Flesh with the red oxide colour created earlier and used this to lightly dry-brush the lower areas of the interior. I then painted the smaller details such as the seats and driver's control panel, which just left the addition of some dust and dry mud using various coloured pigment powders. I was then able to glue the two halves of the hull together and mask the openings in preparation for painting the exterior.

I planned to finish the vehicle in a standard three-tone scheme consisting of dark yellow with large sprayed patches of green and red-brown. I followed my usual procedure for this type of finish and started by applying a couple of coats of Humbrol Matt Radome Tan (148). The camouflage colours were applied over this using Army Green (102) and Matt Rust (113). A light overspray of the base colour was followed by post-shading with several shades of dark brown. The markings were applied next and consisted of three crosses taken from the Archer Dry Transfer range. The application of a thin, brushed coat of Klear acrylic floor varnish was followed by several pin washes. I then added a variety of chips and

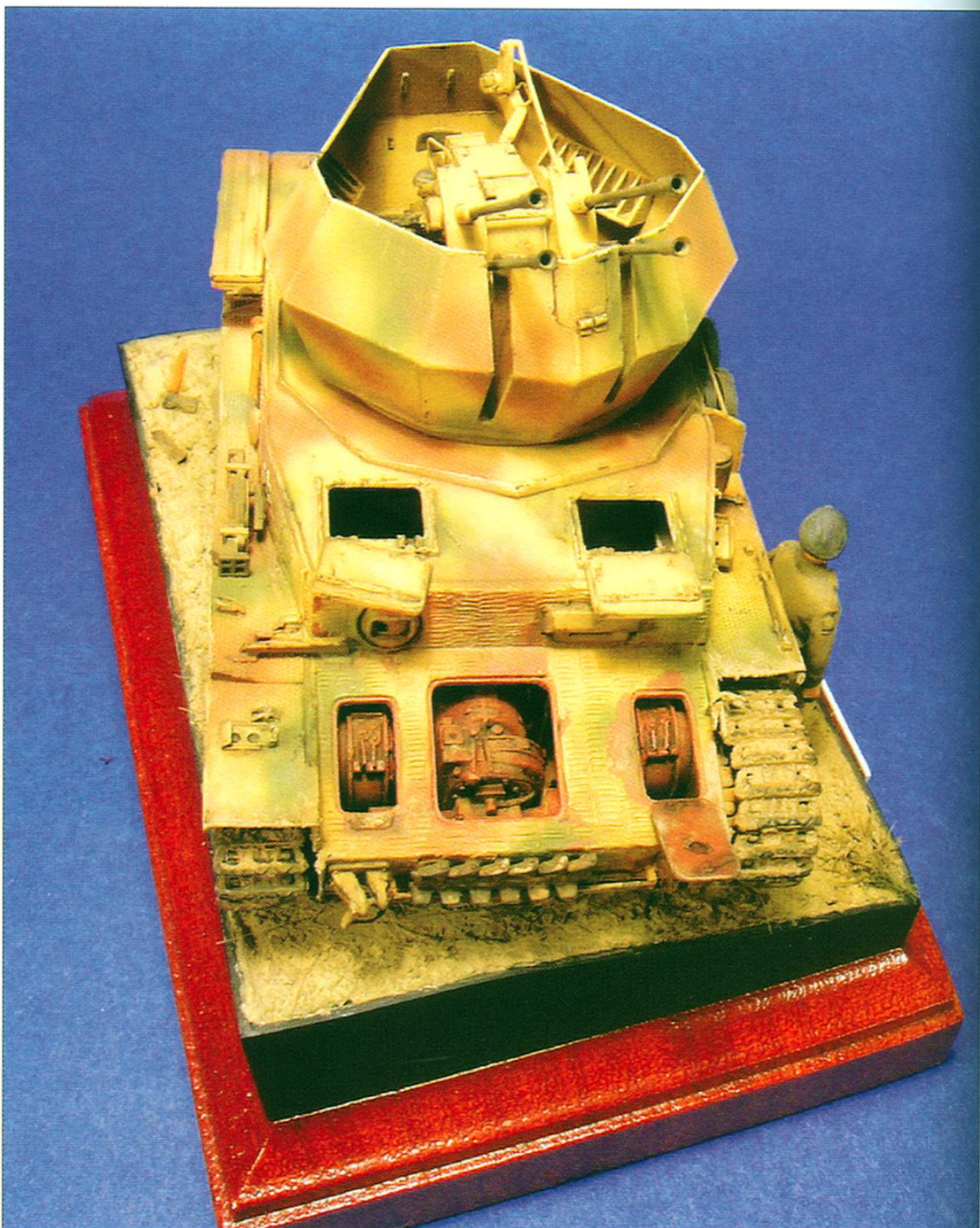
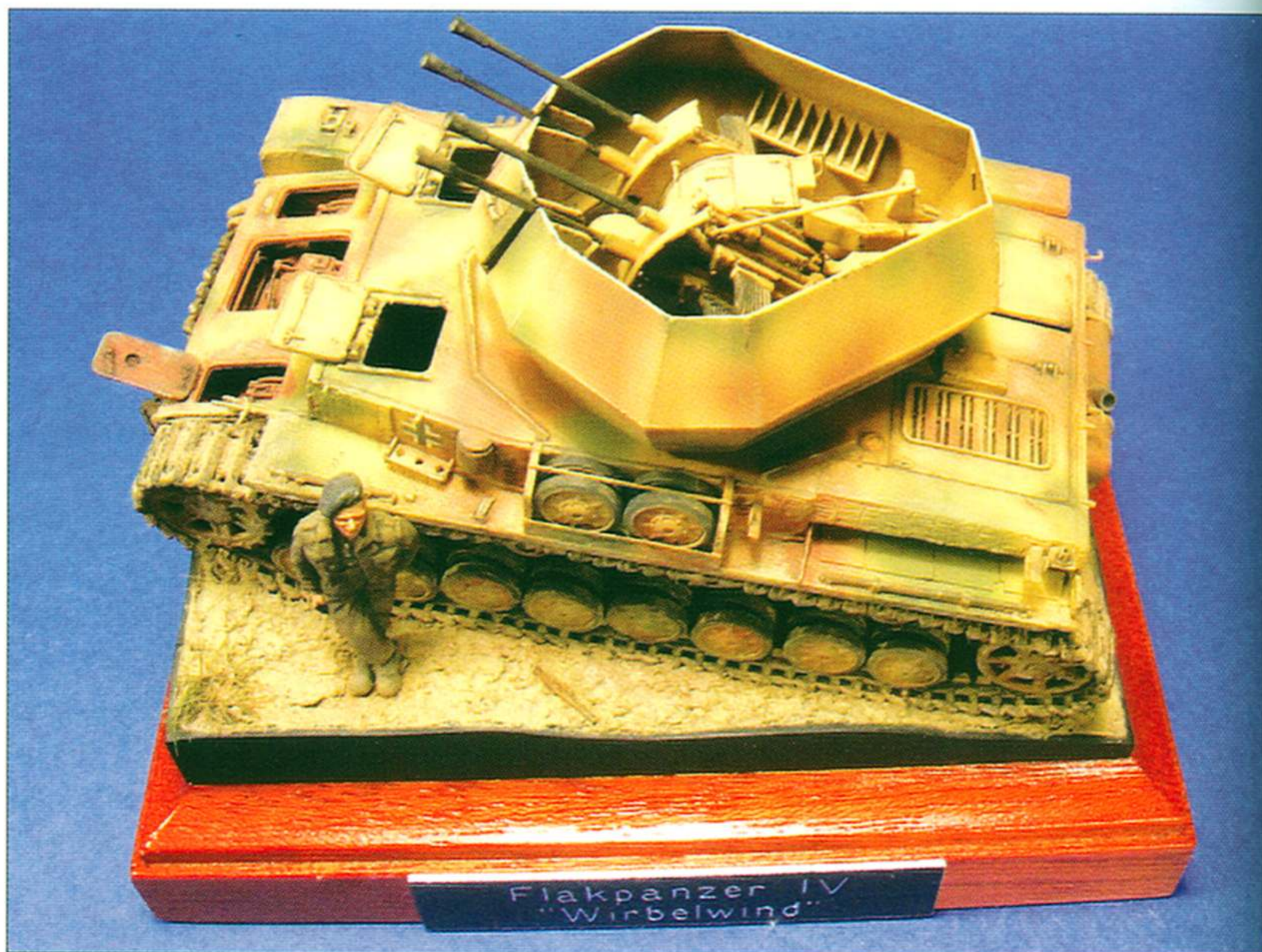


ABOVE The lower hull interior is shown painted here. A red oxide mix was made using Humbrol Brick Red (70) and a little Matt Scarlet (60). This was lightly applied over a black pre-shading undercoat. As the model was to represent an abandoned vehicle with open hatches, I applied plenty of dried mud and dust using pigment powders.

BELOW The finished model as part of a simple scene.



This photo gives a good view of all the extra detail added to the flak gun.



I left the right-side brake drum access hatch missing. As with the damaged radio operator's hatch, this was based on a genuine wartime photo.



scratches using Vallejo acrylic paints. These were concentrated on the engine deck and around the driver and radio operator hatches. At this point I painted and weathered the remaining details – tyres, track and exhaust – before finishing the weathering by the application of dust-coloured pigment powders to the horizontal surfaces.

I decided to keep the groundwork simple, in order to complement the model rather than detract from it. I've got a small horde of wooden bases purchased from various model shows and I selected the smallest one that the model would acceptably fit on. In order to add some depth to the scene I used polyfoam. I cut out a small block that was slightly smaller than the wooden base and then carved an angled slice off the top to provide a slope. I also cut two grooves for the tracks to fit into. I've seen dioramas where the tank appears to almost float on the ground, so doing this gives the correct impression of weight.

The exhaust muffler was painted matt black and the rust represented with various shades of pigment powders mixed with enamel thinners.



The groundwork was created by mixing household DIY plaster with water and pigment powders. Note the axe lying on the ground alongside the vehicle.

The groundwork itself is a mix of DIY powdered plaster, water and mud-coloured pigment. A small amount of fine-grade sand and static grass added some additional texture. Unlike the StuG IV base, where the mud was modelled as being slightly damp, I wanted the mud on this scene to appear dry. By only adding a small amount of pigment, the mix will dry quite pale giving the appearance of dry mud. I added a figure from the Milicast set British Squaddies At Rest. The figure I chose has a nicely casual stance and I was able to lean him against the vehicle – perhaps as though posing for a photograph – and this completed the scene.

### **Wirbelwind in detail**

Whilst building the Wirbelwind I was fortunate enough to have a good set of detail photographs of the real thing. These were sent to me by a Canadian friend, Bob Grimster, and are of one of the few known surviving vehicles. Bob kindly offered these for use within this book so a selection of them is presented here.

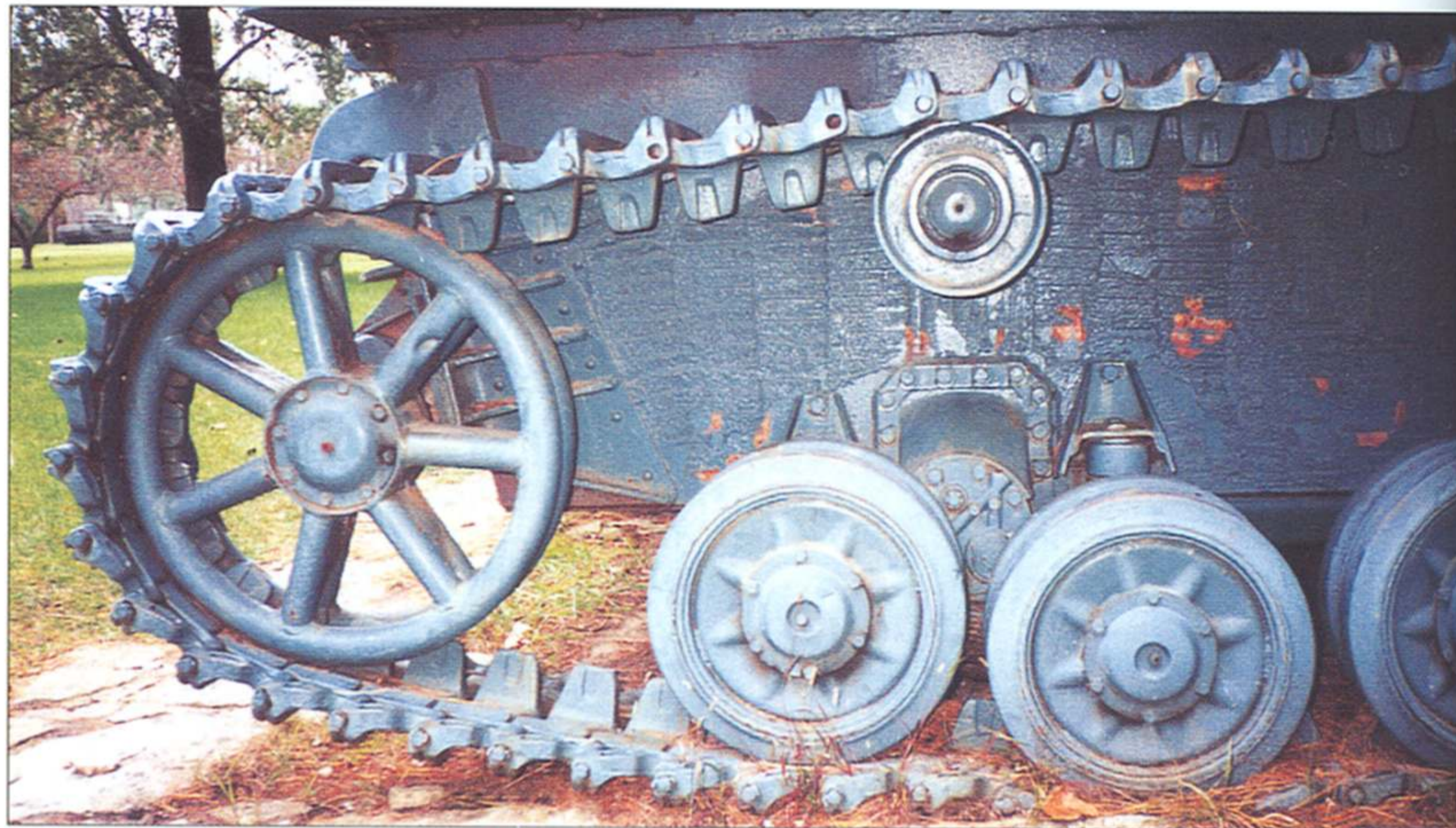


ABOVE One of the few surviving Wirbelwinds can be found at Camp Borden in Ontario, Canada. (Bob Grimster)



LEFT A close-up of the left-side sprocket. This is the type of sprocket found on later versions of the Panzer IV, the Ausf. H and Ausf. J. (Bob Grimster)

The idlers are of the welded tubular style. The roadwheels are of the late type with pressed-steel rather than cast hubs. Note also the *zimmerit* on the lower hull. (Bob Grimster)

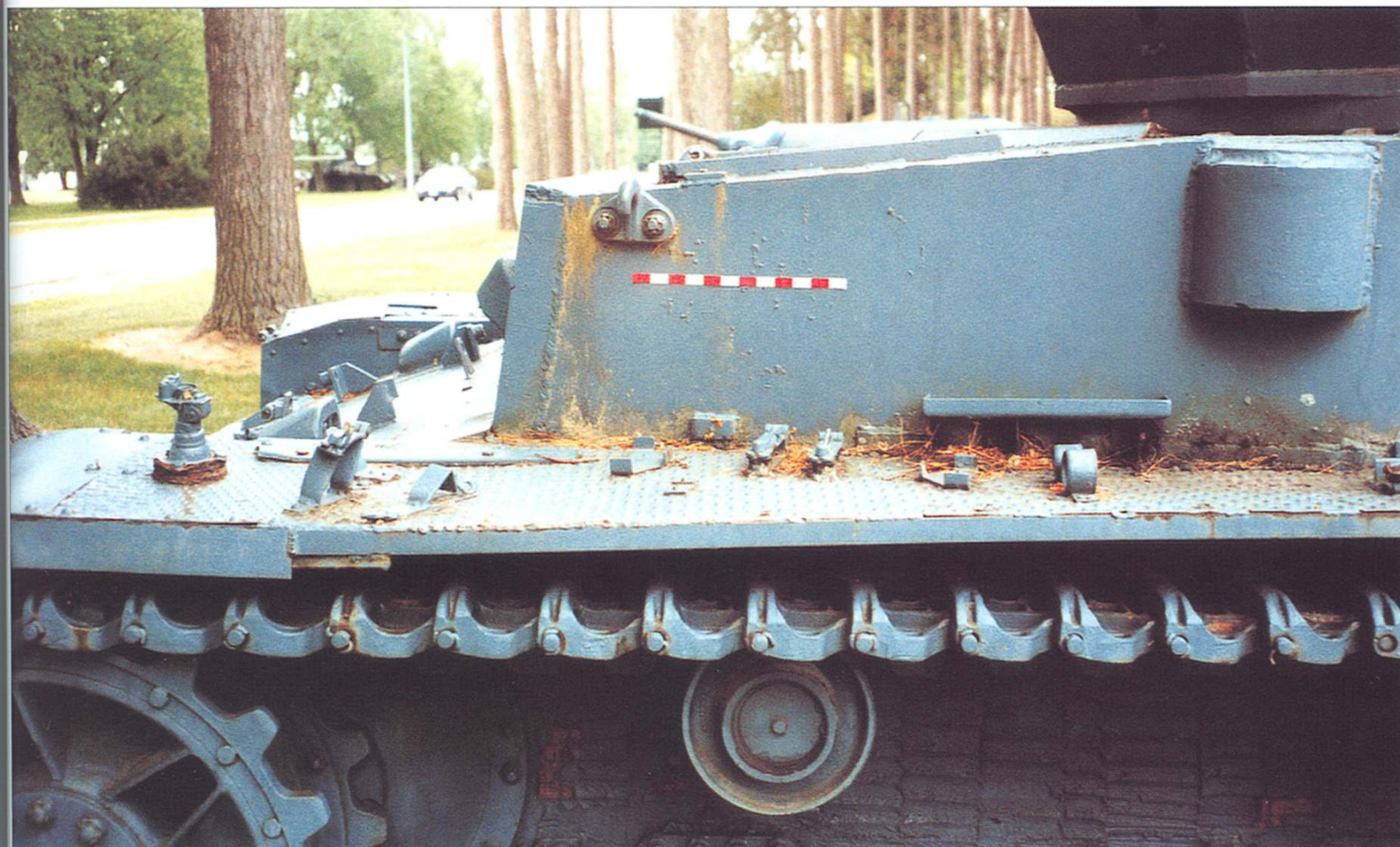


The right side of the glacis plate showing the steering brake access hatch. Some of the tool clasps can also be seen, including the flat part that holds the head of an axe. (Bob Grimster)



ABOVE The *Kugelblende* (armoured ball mount for a machine gun) can be seen in the centre of the picture. To the right of this is the driver's vision slot. (Bob Grimster)

BELOW A close-up of the front, left side of the hull. The cylindrical object on the far right of the picture is an air exhaust outlet for the steering brakes and transmission. (Bob Grimster)



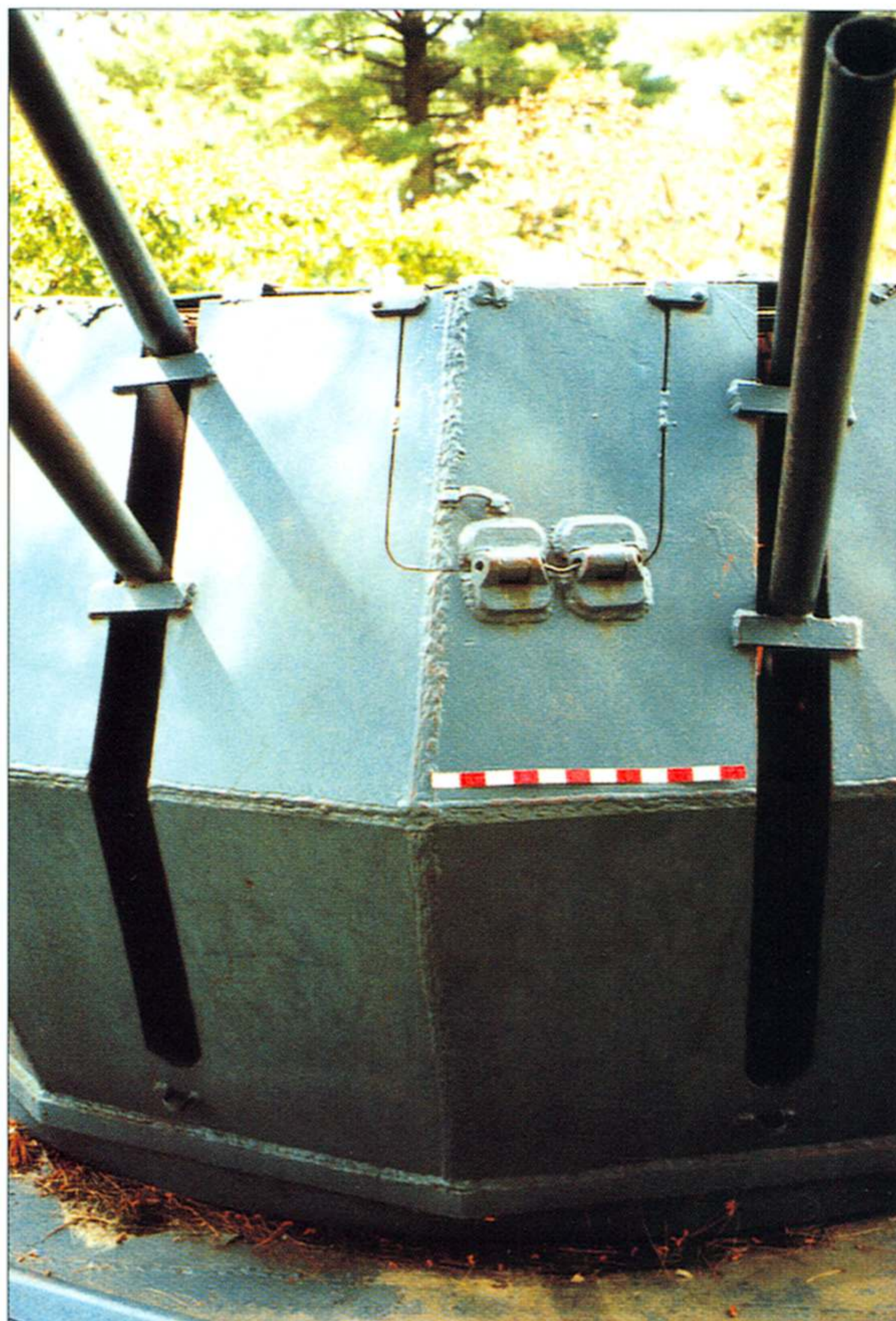
The left-side fender viewed from above. The holder for the wooden jack block can be seen (the rectangular plate with three holes) along with other tool clasps and fittings. (Bob Grimster)



Another view of the tool clasps on the left-side fender. (Bob Grimster)



ABOVE The driver's hatch. The shape of the strip guard around the edge is characteristic of later versions of the Panzer IV. (Bob Grimster)



RIGHT The turret front. Details of the flap that opens outwards for ground combat can be seen. Note that the gun barrels are not originals. (Bob Grimster)

BELOW An overall view of the hull rear showing that the exhaust muffler and mounts are missing. Note the fender supports either side of the hull. It's not clear whether these were wartime modifications or were fitted after the war. (Bob Grimster)



# Gallery

This chapter presents three further models based on the Panzer IV chassis. The models were all built before I started work on this book and full-length magazine articles have been published previously. References for these articles are listed within the text discussing each model.

## Panzer IV Ausf. H

Shortly after the appearance of Revell's Panzer IV kits, PART released several photo-etched detail sets for them. Extratech had already released a couple of interior detail sets for Hasegawa's Panzer IV Ausf. G kit, so armed with all of these I decided to model a destroyed vehicle.

The Extratech resin sets are for the driver's and engine compartments and I just added a little extra detail to each. Rather than build the model as if the complete vehicle had been burnt out, I built most of the right side running gear as per the instructions. For the left side I removed the rubber portion of each wheel, as if burnt away in an intense fire. Most of the damage was modelled on this side including broken track and cracked armour plate on the lower hull (alongside the engine compartment). I cut the engine deck section from the main upper hull part and completely removed one of the access hatches. To add a little more interest I cut the right-side hatch out and reattached it as if it was slightly open. I kept the engine deck assembly separate from the main body of the vehicle, as I wanted to model it as if it had been dislodged from the hull by an internal explosion in the engine compartment. I also removed the glacis plate and thinned it to a more to scale thickness from the underside. The three hatches (two for the brake housings and a larger hatch in between for access to the transmission housing) are all moulded shut. I carefully removed them with a fresh scalpel and cut replacements from plastic sheet. I then removed the fenders from



This knocked-out Panzer IV was the first model I built that depicted a completely destroyed vehicle.

The model is based on Revell's Panzer IV Ausf. H. The photo-etched details are from several PART sets – fenders, schürzen and general detail set.



the remaining part of the upper hull and replaced them with photo-etched items from the PART set. The photo-etched replacements are easy to bend and twist out of shape and are ideal for representing heavy damage. The various tool clamps and clasps were also taken from PART photo-etched sets and I left most of these in the open position, as I didn't plan on adding any of the actual tools.

The turret and fighting compartment interiors also had to be scratch-built and this was done using standard modelling materials. The turret sides are solid, so I cut the rectangular hatch openings out. Unfortunately the turret sidewalls are very thick so I carved and sanded away most of the plastic from the interior side to create a more to scale thickness (this also had the benefit of making it easier to cut the openings out). I also replaced the kit hatches with some scratch-built items. As only some of the turret interior would be visible, I simplified many of the details and concentrated on the gun breech. Once the interior had been added I used Milliput putty to create the remains of *zimmerit*. I added this to the turret front and the front of the hull, but only in small patches as most of it would have burnt off when the vehicle was destroyed. Next followed the trickiest bit of work on the turret: adding the *schürzen*. I used the PART photo-etched set for this, using both the support frames and panels themselves. I made sure I added these as late as possible during construction as the resulting framework is quite fragile.

I painted the complete model, interior and exterior, with Humbrol Matt Black to act as a pre-shading base colour. The rust colours were added next by gradually building up sprayed, patchy layers of various rust-coloured mixes. I applied various other colours in streaks – red, orange, yellow and black – with a small paintbrush and blended them with thinners. This gives some variation and depth to the finish. As the vehicle was not supposed to be completely burnt out, I painted part of the right side in the original colours of dark yellow and olive green. I did weather these areas quite a bit though, simulating rust, paint chips and smoke discoloration.

I created a small vignette for the model based on groundwork made from modelling putty. I scattered some cat litter 'rubble' around where the vehicle

RIGHT The interior detail is a mix of commercial resin items and scratch-built parts. The engine and driver's compartment are from Extratech whilst the turret interior and fighting compartment are scratch-built.



BELOW I made a small base with groundwork created from putty and cat litter. The fence is a modified model railroad accessory. The signpost is just textured plastic rod with a sign that was printed on a computer printer.





The model and groundwork were painted and weathered with Humbrol enamels.

would sit and attached a damaged fence and signpost to the base. Once the base had been painted I attached the model to finish the scene off.

Full-length articles on this model can be found in the Japanese magazine *Armor Modelling Extra* No. 4 and the French bilingual magazine *Minitracks* Issue No. 5.

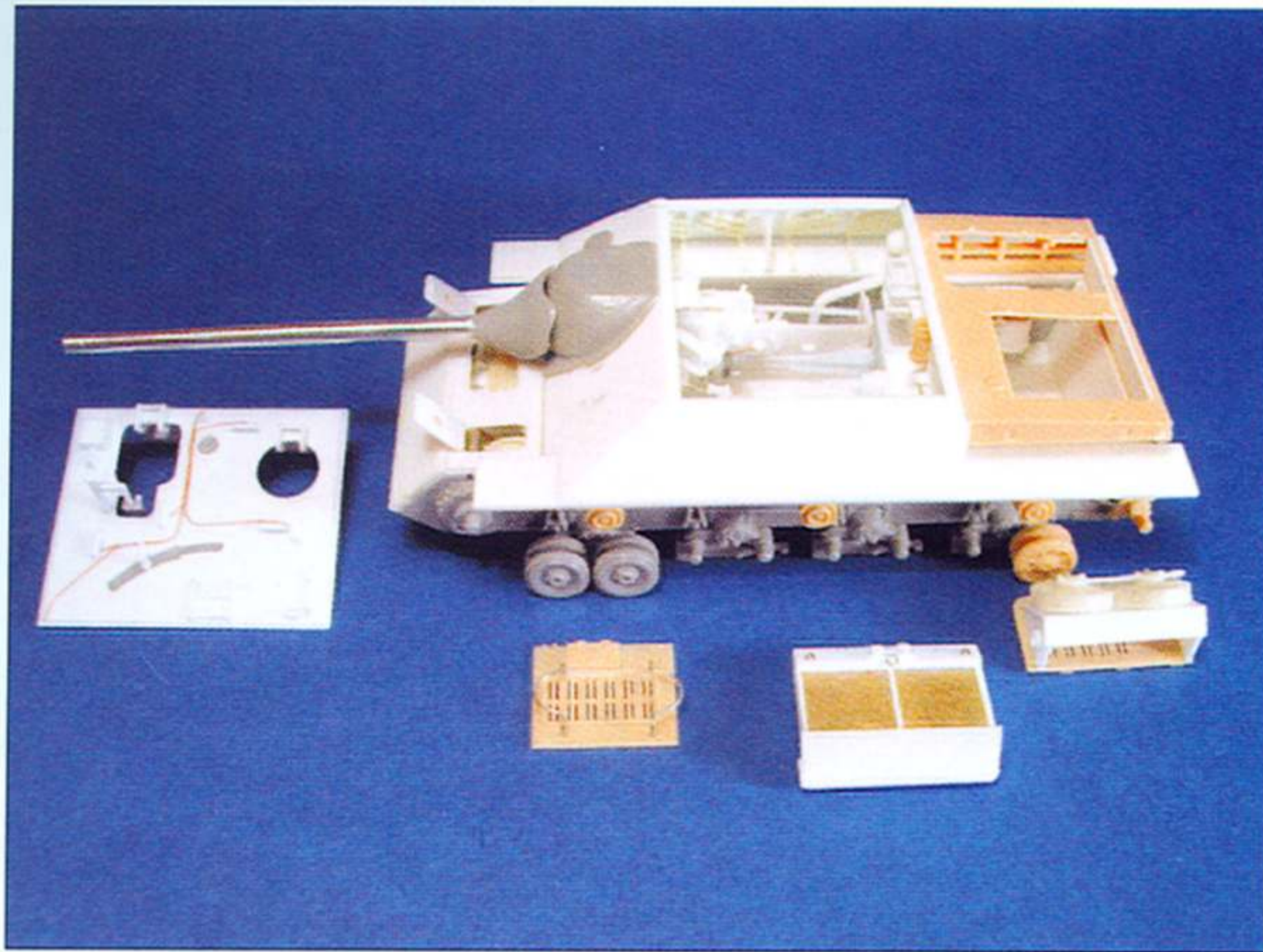
## **Panzer IV L/70 (V)**

Building a vehicle interior is a challenging task, especially when most of the detail will be clearly visible. Prior to building this particular model I'd only built partial interiors or, in the case of the destroyed Panzer IV, I'd simplified the detail that was difficult to see. In contrast this model has a removable superstructure roof and so virtually all of the fighting compartment detail can be clearly seen.

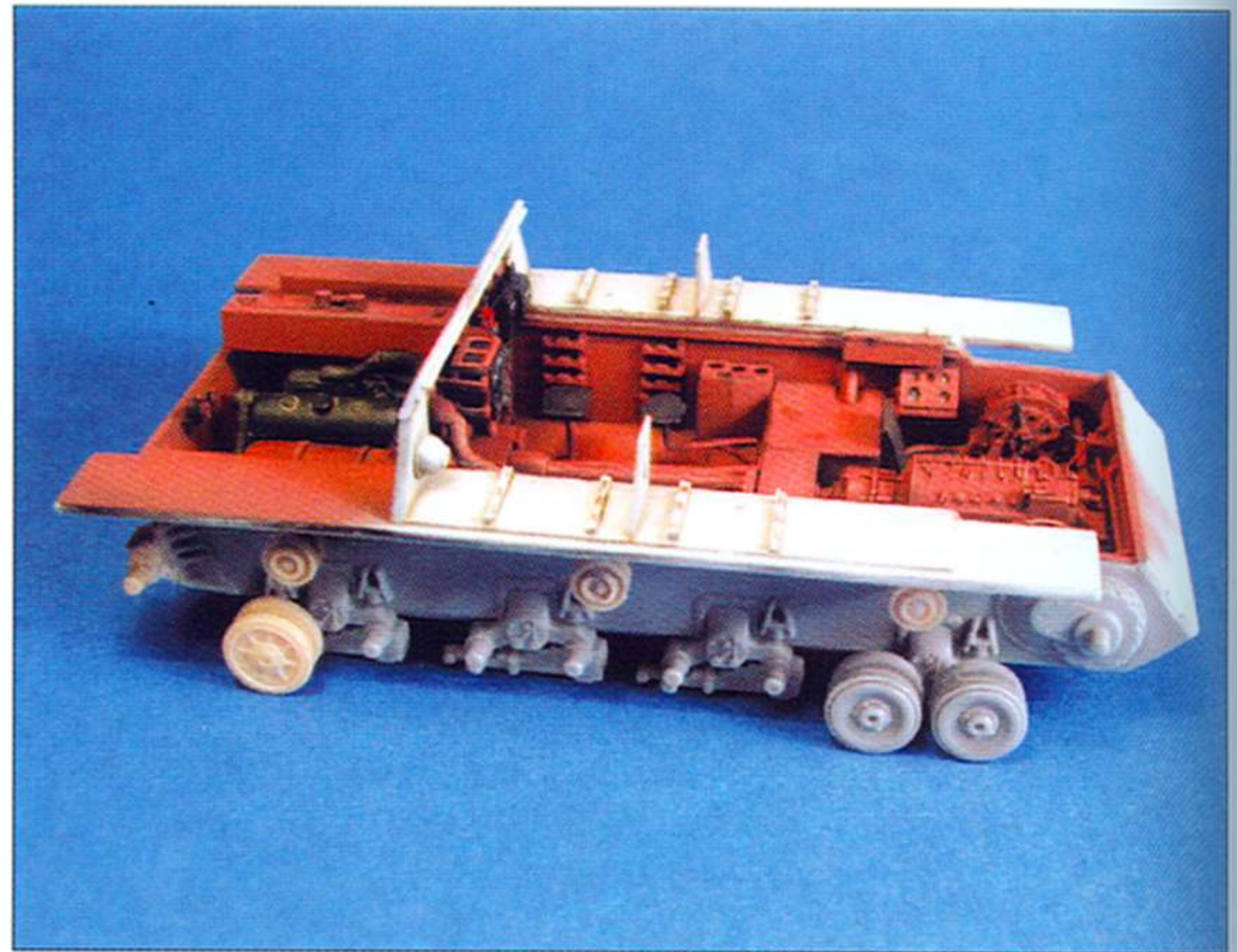
The main structure of the model was built using the lower hull tub from the Hasegawa PzIV L/70 kit, along with the wheels and track from a Revell Panzer IV. The engine deck was also taken from the Revell kit. The rest of the upper hull was then scratch-built from plastic sheet. This allowed me to give a correct scale thickness to all of the armour plate sections and they were interlocked in a manner similar to the real vehicle.

The overall shape of the vehicle is quite simple, so building up the exterior was a relatively simple task. In contrast, the interior has a fair amount of complexity. Fortunately I had a little help in the form of the Extratech resin driver's compartment for the Panzer IV, along with plenty of good reference material. I was able to use both the transmission housing and the two brake drum housings from the Extratech set and I then scratch-built the remaining detail.

The most time-consuming part of building the interior was the construction of the main fighting compartment. In particular, the scratch-built gun breech assembly required a lot of effort but this was worthwhile as it's such a noticeable part of the fighting compartment. All the other details were also scratch-built, starting with the larger, basic shapes first and gradually building up the smaller details. One challenge was to realistically represent the numerous ammunition racks fitted along the hull sidewalls. I made a couple of these from plastic strip and cast multiple copies in resin. I certainly wouldn't have looked forward to making each one individually! The racks should really be hollow, but due to their very small size I simplified the shape by keeping them solid.



Probably the most complex project I've completed so far is this Panzer IV/70(V) with a complete interior. The grey parts are from the Hasegawa kit whilst the sand-coloured parts are from a Revell Panzer IV kit. Apart from the turned aluminium gun barrel from Armo, the rest is mostly scratch-built.



The only commercial items I used in the interior were the brake drums and gearbox housing from Extratech.



The model was finished in a three-colour scheme of dark yellow, red-brown and olive green. The markings are from the Archer Dry Transfer range.



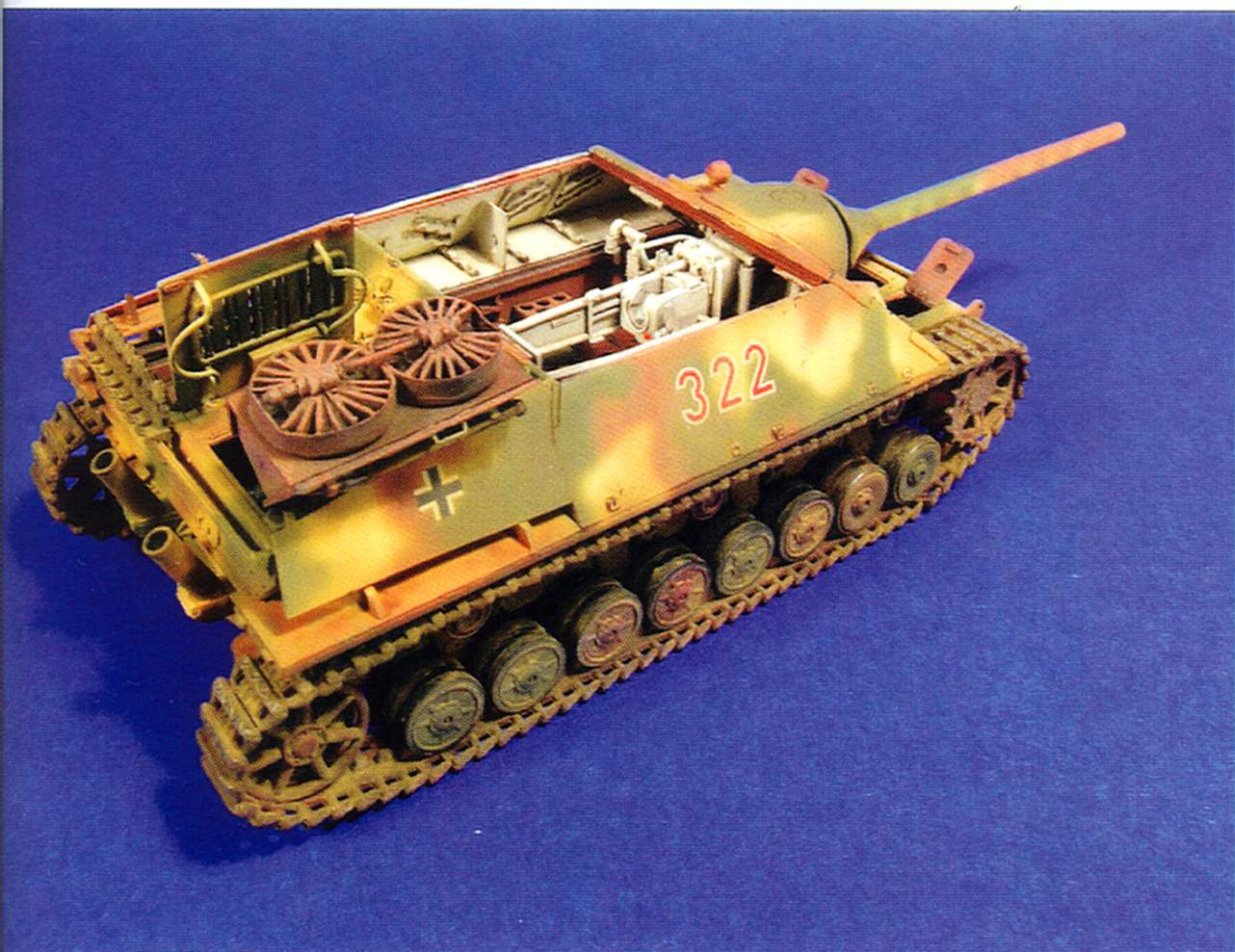
With the roof removed the complete fighting compartment interior can easily be seen.

A Panzer IV resin engine and engine compartment is available from Extratech, which I had used on the destroyed Panzer IV. After examining the engine in more detail I decided to scratch-build my own for this particular model. The main problem with the resin version is its size: it is far too small (a fact I hadn't realised when I had used it earlier). Luckily I was able to base a scratch-built replacement on the excellent 1/35 version from CMK. I also decided against using the Extratech radiator piece as again it appears to be under-scale and I wasn't overly impressed with the detail on it. The only part I did use from the resin set were the two cooling fans as these are quite nicely done. I did however remove the fans from the solid box-like assembly they sit on and I scratch-built a hollow replacement. Other smaller details, such as wiring, were then added to the engine bay.

Once the interior had been built up, I gave it a couple of coats of Humbrol Matt Black (33) that would act as a pre-shading coat. This was followed by a mix of Brick Red (70) and pure Red that was sprayed lightly over the base colour. I then masked off the lower hull areas and sprayed a couple of coats of



The two hatches on the engine deck were left open to allow the engine bay detail to be seen.



The weathering is subtle, with just a little mud and dust around the lower hull, and a few small areas of worn, chipped and scratched paint.

white that had a small amount of Radome Tan (148) mixed in. Washes of black and Burnt Umber oil paint were applied around the details and the interior was finished off with some careful brush painting of the crew seats, radios, etc.

The exterior details were mostly photo-etched items from the PART detail set, along with some other items from the spares box. I replaced the Hasegawa main gun with a turned aluminium replacement from ARMO. The interior was then masked off and the exterior was given a couple of thin coats of Radome Tan (148). The camouflage colours were applied using Army Green (102) and Matt Rust (113) followed by the addition of markings from the Archer Dry Transfer range. To complete the model I applied my usual weathering treatment involving post-shading, localised pin washes, addition of small paint chips and the use of pigments to represent dust and dried mud.

This was a very time-consuming model to build and in a way it was quite a relief to finish it! Much of the time was spent collecting references and researching the nature of the interior.

Full-length articles on this build can be found in *AFV Modeller* Issue 10 and *Minitracks* Issue No. 7.

## Panzer IV L/70 (A)

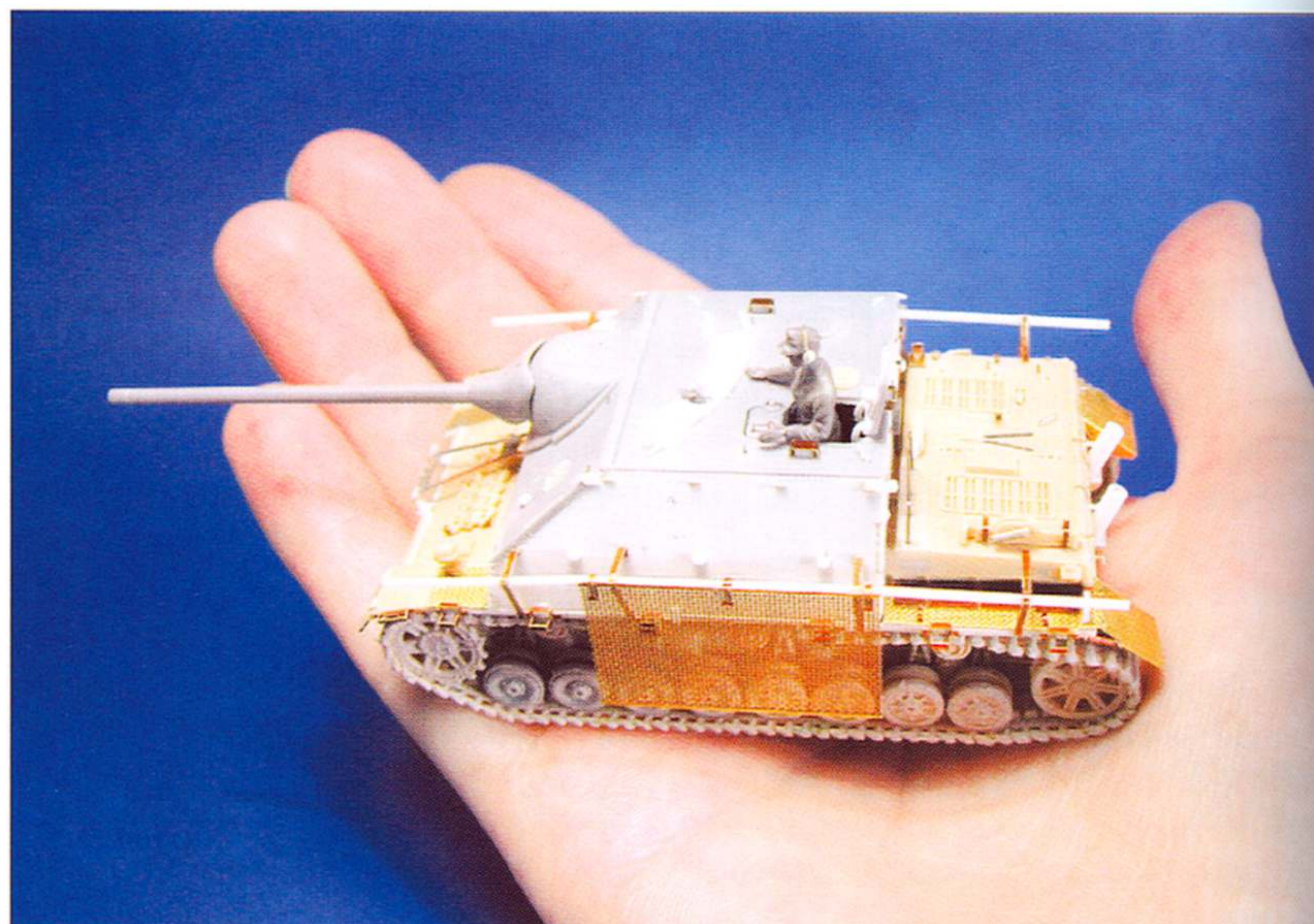
There are several resin conversion kits and sets available for this vehicle but at the time of writing no injection moulded kit. The overall shape of the vehicle is quite simple and parts from both Revell's Panzer IV Ausf. J and Hasegawa's Panzer IV/70(V) provide a good basis for a homemade conversion. For a project such as this a good set of scale plans is vital and I found these in the *PanzerTracts* book on the Jagdpanzers (No. 9 in the series). This book contains an excellent set of 1/35-scale plans for the final production version.

The Revell Panzer IV kit provided the lower hull, engine deck and glacis plate. One major modification I made was to reduce the number of return rollers from four to three per side. I also added drilled-out side extensions to the hull front and rear to replace the front towing brackets provided in the kit. The *flammentöter* exhaust mufflers provided with the kit are undersized so I replaced these with drilled-out plastic rod sections. The final change to the lower hull involved modifying the rear hull towing bracket to depict the style used on late Panzer IV hulls.

I then started work on the main superstructure. I cut the central portion from the Hasegawa upper hull and then removed the sides and rear to leave just the roof and front part. New side plates were then cut from plastic sheet, with the interlocking section of each panel added using a panel-scribing tool. The fenders are just plastic strip covered with photo-etched treadplate. A subtle cast texture was reproduced on the *topfblende* mantlet using stippled liquid glue and this was gently sanded when dry.

I had to scratch-build the gun travel lock, as the particular design appears to be unique to this vehicle. The frame was constructed from wire, soldered together. The details were then added using plastic and brass strip and thin plastic tubing.

I added a number of further small details, particularly on the hull roof and engine deck, and these were either scratch-built or were spare parts from photo-etched sets.



The converted Panzer IV/70(A) just before painting. Sand-coloured parts are from the Revell Panzer IV Ausf. J kit, grey parts are from the Hasegawa Panzer IV/70(V) kit and white parts are scratch-built. The brass details are a mixture from several PART photo-etched detail sets.



The *schürzen* used on these vehicles was of the late-style mesh type and PART provides a photo-etched set of these for use with the Panzer IV Ausf. J. These are very well made with a suitably fine mesh pattern, so I just had to scratch-build the mounting rails using plastic rod with the ends drilled out. The support brackets were then made using thin brass strips. Just before painting I applied some modelling putty around the lower hull, wheels and track to represent mud.

I finished the model in a late-war scheme with green used as the base colour. It's likely that late-production vehicles would have had a hard-edged camouflage scheme but I decided to just spray the camouflage. For the green I used Humbrol Army Green (102). Over this I sprayed small patches of Brown-Yellow (94) followed by the addition of markings taken from the Archer Fine Transfer range. A brushed coat of Klear acrylic varnish then gave the model a tough, slightly glossy finish ready for weathering. I applied some post-shading using a dilute Dark Earth (29)/black mix. A black oil paint pin wash was then applied around all the smaller details and after this was dry I lightly dry-brushed the model using a lightened version of the base green colour. The running gear and lower hull were sprayed with a pale grey-brown mix to simulate dried mud. This was followed by a darker mix to represent damp mud. I then ground up some pale stone pastel chalks and applied this around the horizontal upper hull areas to represent dust. Small chips of paint were simulated using a sharp pencil, these effects being confined to areas around the crew hatches and engine deck. These were applied around the hatches and other areas of wear. After painting the smaller details such as the tools and periscopes, I turned my attention to the crew figure in order to finish the model. This particular figure is from Preiser and just required a little detail to the headphones.

A full-length article can be found in the Polish magazine *Model Hobby* (17) Issue No 3.

The model was finished in a late-war scheme featuring a dark green base colour. The commander figure is from Preiser and has some additional headphone detailing.



ABOVE The markings were confined to crosses either side of the vehicle and on the rear hull plate. Note the finesse of the PART photo-etched side skirts. The mesh pattern is extremely fine.

BELOW Mud was reproduced using model filler painted with various shades of brown enamel paint.



# References and websites

The following is a listing of some of the most detailed references related to the Panzer IV and its sub-variants. This is only a small list and is in no way complete, but does reflect some of the material most readily available to the modeller.

- Achtung Panzer #3 – *Panzer IV*  
Achtung Panzer #5 – *StuG III & IV*  
Culver, Bruce *Panzer IV in Action* (Squadron Signal, 1975)  
Forty, Jonathon *Tanks in Detail – PzKpfw IV Ausf. A to J* (Ian Allen Publishing, 2002, ISBN 0711029318)  
Greenland, Tony *Nuts & Bolts Vol. 10 – Hummel* (Heiner F. Duske)  
Greenland, Tony *Nuts & Bolts Vol. 14 – Nashorn* (Heiner F. Duske, 2001)  
*Ground Power* No. 042 (1997, 11)  
Hjermstad, Kevin *Panzer IV Medium Tank, 1939–1945* (Squadron Signal, 2000, ISBN 0897474139)  
Jentz, Thomas and Doyle, Hillary *New Vanguard 37: Sturmgeschütz III and IV* (Osprey Publishing, 2001, ISBN 1841761826)  
Jentz, Thomas and Doyle, Hillary *New Vanguard 39: PanzerKampfwagen IV Ausf. G, H & J 1942–45* (Osprey Publishing, 2001, ISBN 1841761834)  
Jentz, Thomas *Panzer Tracts 4 – Panzerkampfwagen IV* (Darlington Productions, 1997, ISBN 0964879344)  
Jentz, Thomas *Panzer Tracts 9 – Jagdpanzer* (Darlington Productions, ISBN 0964879336)  
Ledwoch, Janusz *AFV 94 – Sturmgeschütz IV* (Wyndawnictwo Militaria, ISBN 8372190526)  
Ledwoch, Janusz *AFV 140 – Flakpanzer* (Wyndawnictwo Militaria, ISBN 83862091166)  
Ledwoch, Janusz *AFV 141 – PzKpfw IV Vol. 1* (Wyndawnictwo Militaria, ISBN 83721995X)  
Ledwoch, Janusz *AFV 147 – PzKpfw IV Vol. 2* (Wyndawnictwo Militaria, ISBN 8372191190)  
Ledwoch, Janusz *AFV 150 – Jagdpanzer IV* (Wyndawnictwo Militaria)  
Ledwoch, Janusz *AFV 152 – Panzer IV/70* (Wyndawnictwo Militaria, ISBN 837219131X)  
Ledwoch, Janusz *AFV 178 – Hummel* (Wyndawnictwo Militaria, ISBN 837219159X)  
Military Chronicle *Panzer IV/70(V)* (ISBN unknown)  
Mucha, Krystof *Panzer IV Sd.Kfz 161* (Kagero, 2002, ISBN 838908810X)  
*Panzers At Samur* No 1.  
Perret, Bryan *New Vanguard 28: PanzerKampfwagen IV Medium Tank 1936–1945* (Osprey Publishing, 1999, ISBN 1855328437)

- Perret, Bryan *New Vanguard 34: Sturmartillerie and Panzerjäger 1939–45* (Osprey Publishing, 1999, ISBN 1841760048)  
Scheibert, Horst *The Panzer IV Family* (Schiffer Books, ISBN 088740359X)  
Spielberger, Walter J. *Der PanzerKampfwagen IV und Seine Abarten* (Motorbuch Verlag, 1984, ISBN 4879434026)  
Terlisten, Detlev *Nuts & Bolts Vol. 13 – Flakpanzer IV* (Heiner F. Duske)  
Trojca 04: *Sd.Kfz 166 Sturmpanzer Brummbär* (Trojca Publishing, 1998)  
Trojca 05: *Sd.Kfz 161 Panzer IV Ausf. F/F2/G* (Trojca Publishing)  
Warmachine No 17: *Jagdpanzer IV/L/70* (ISBN 1930607458)

## The Panzer IV on the web

There are many websites that contain information on the Panzer IV series. Listed below are some of the main sites that cover the topic in detail.

- <http://ourworld.compuserve.com/homepages/willphelps/>  
<http://www.achtungpanzer.com/pz3.htm>  
<http://ww2armor.jexiste.fr/Panzer4/EnglishVersion/Head.htm>  
<http://www.ontheway.us/articles/articles.htm> (articles on modelling the Panzer IV in 1/72 scale, including kit comparisons)  
<http://www.missing-lynx.com/articles/small/acpz4/acpz4.htm>  
(article dealing with Revell's Panzer IV kits)

## General modelling websites

Most of the general armour modelling websites contain Panzer IV content of some sort. This may be as part of model galleries, articles and discussion groups or forums. The websites I visit most frequently are listed here.

- <http://www.missing-lynx.com>  
<http://www.track-link.net/>  
<http://www.ww2modelmaker.com/>  
<http://www.armorama.com/>  
<http://pmms.webace.com.au/>  
My own personal website, which showcases many of my 1/72-scale armour models including those found in this book, can be found at:  
<http://www.btinternet.com/~alex.clark2/smallscale/index.htm>

# Museums and collections

There are a significant number of Panzer IVs and Panzer IV-based vehicles still in existence in both museums and private collections spread throughout the world. The best-known museums such as Bovington, Saumur, Munster, Kubinka and Aberdeen Proving Grounds all have different examples of Panzer IV-based vehicles on display. Many of the lesser-known museums have examples as well.

## **Panzer IV Ausf. D**

Aberdeen Proving Grounds, USA  
Bovington Tank Museum, UK

## **Panzer IV Ausf. F2**

Aberdeen Proving Grounds, USA

## **Panzer IV Ausf. G**

NIIBT Research Collection, Kubinka, Russia  
Panzermuseum, Munster, Germany

## **Panzer IV Ausf. H**

Saumur Armour Museum, Anjou, France  
Panzer Museum, Thun, Switzerland  
BWB, Koblenz, Germany  
Pozuelo de Alarcon Barracks, Madrid, Spain  
El Goloso Barracks, Madrid, Spain  
El Pardo Barracks, Madrid, Spain  
Becker Collection, France  
American Armour Foundation Museum, Danville,  
VA, USA  
Central Military Museum, Bucharest, Romania



A Flakpanzer IV Wirbelwind at CFB Borden in Ontario, Canada.  
(Bob Grimster)

## **Panzer IV Ausf. J**

Saumur Armour Museum, Anjou, France  
Panssarimuseo, Paralo, Finland  
Kbely Military Museum, Prague, Czech Republic  
Partisan Museum, Banska Bystrica, Slovak Republic  
Dukla Pass, Slovak Republic  
Israeli Armour School, Latrun, Israel

## **Sd.Kfz 164 Nashorn**

Aberdeen Proving Grounds, USA  
NIIBT Research Collection, Kubinka, Russia

## **Sd.Kfz 165 Hummel**

Panzermuseum, Munster, Germany  
Saumur Armour Museum, Anjou, France  
Fort Knox, Kentucky, USA

## **Flakpanzer IV Wirbelwind**

CFB Borden, Canada  
Koblenz, Germany

## **Flakpanzer IV Ostwind**

*None known to be preserved.*

## **Flakpanzer IV Möbelwagen**

Auto und Technik Museum, Sinsheim, Germany  
Saumur Armour Museum, Anjou, France

## **Panzer IV L/70 (V)**

Aberdeen Proving Grounds, USA  
Vimy House, Ottawa, Canada

## **Panzer IV L/70 (A)**

Saumur Armour Museum, Anjou, France

## **Waffenträger leFH 18/1 Heuschrecke**

Aberdeen Proving Grounds, USA

## **Waffenträger leFH 18/40**

Imperial War Museum, Duxford, England

## **Sturmpanzer IV Brummbär**

Aberdeen Proving Grounds, USA  
NIIBT Research Collection, Kubinka, Russia  
Panzermuseum, Munster, Germany

## **Sturmgeschütz IV**

Museum Orla Białego, Skarżysko-Kamienna, Poland

# Kits and accessories

The basic Panzer IV kits provided in plastic are from Revell and Hasegawa. Revell has the Panzer IV Ausf. H and J versions in their range. They also provide a Sturmgeschütz IV kit but as it is one of their earliest releases it suffers from a number of inaccuracies and deficiencies. Hasegawa manufactures numerous Panzer IV and Panzer IV-based vehicles. Their kits include the Panzer IV Ausf. F1, F2 and G versions as well as a series of Jagdpanzer IV vehicles in the guise of the Jagdpanzer IV L/48 with and without muzzle brakes and a Panzer IV L/70 (V). The Panzer IV chassis also provides them with two versions of the Flakpanzer: the Wirbelwind and the Ostwind. Italeri offers re-releases of the old ESCI line of kits in 1/72 scale as well. At present only the Panzer IV Ausf. G is



Revell Panzer IV Ausf. H. Without doubt this is one of the best small-scale Panzer IV kits currently available. (Revell GmbH & Co. KG)



Revell Panzer IV Ausf. J. Most of the parts of this kit are the same as those provided in the Ausf H kit. A separate sprue provides a few different parts. (Revell GmbH & Co. KG)

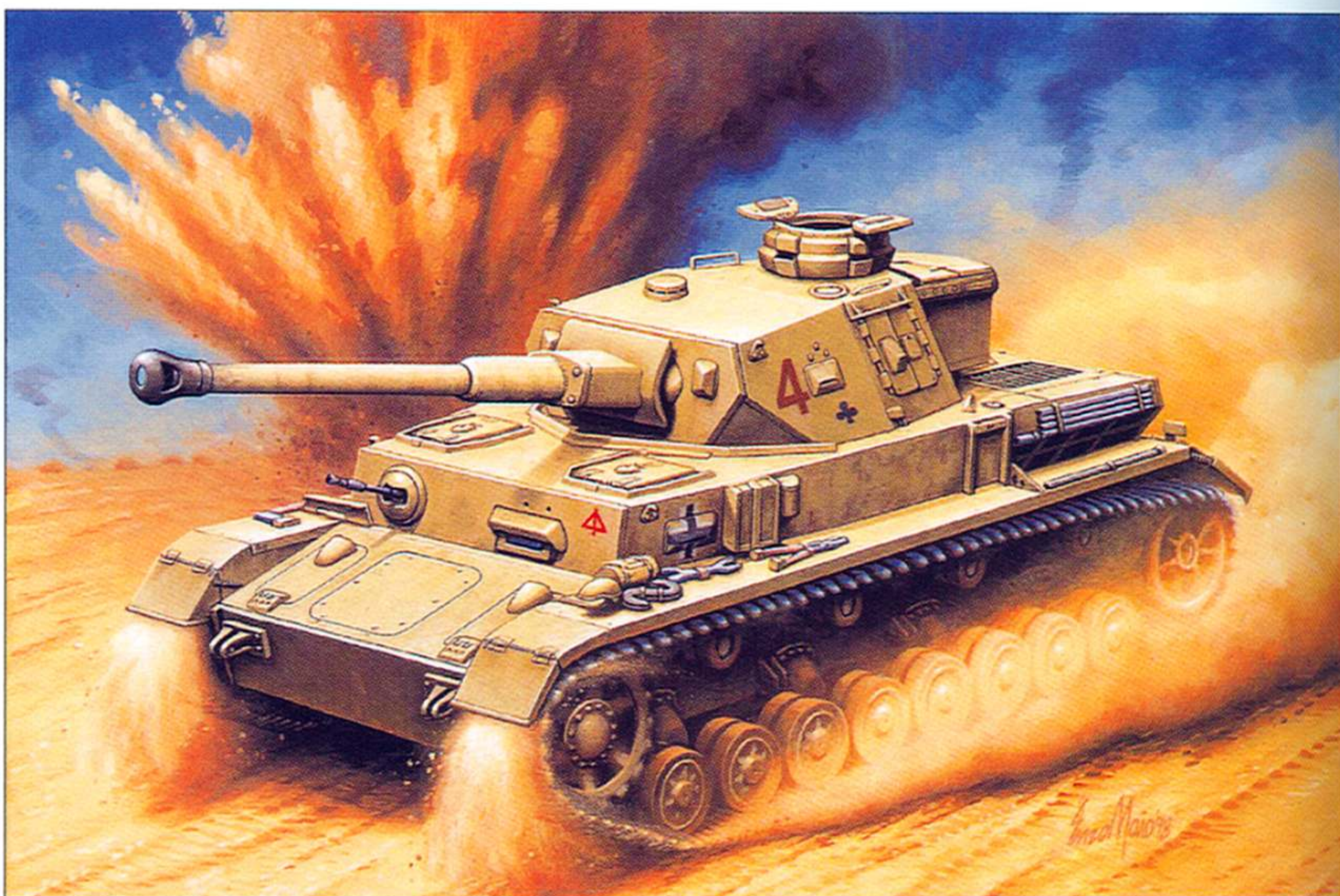
Revell Sturmgeschütz IV. This is one of Revell's earlier releases and not up to the high standards of most of their other kits. (Revell GmbH & Co. KG)

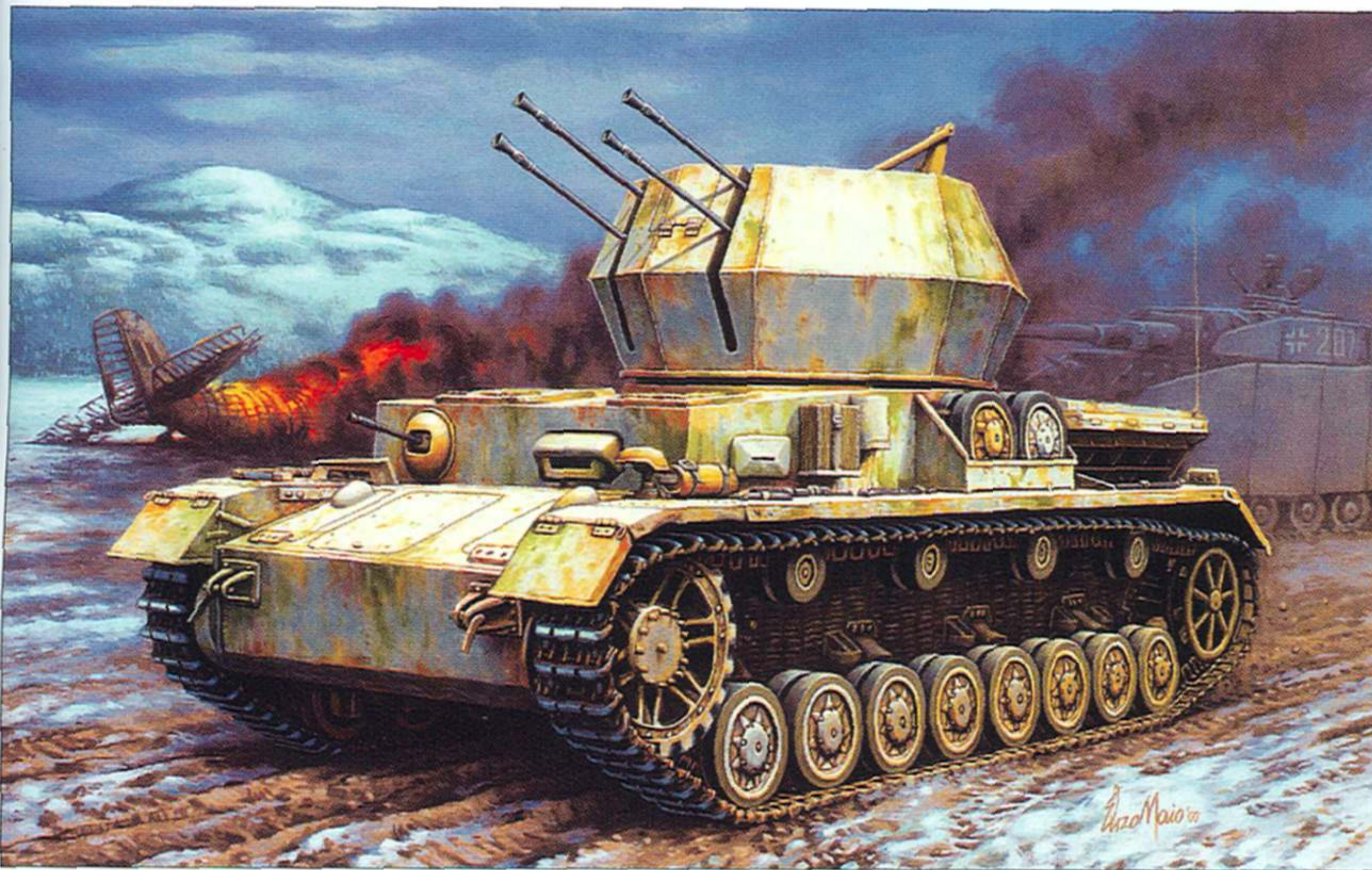


Hasegawa Panzer IV Ausf. F1. This is generally a good kit but is let down by poor wheels and inaccurate tracks. (© Hasegawa Corp.)



Hasegawa Panzer IV Ausf. F2. This is essentially the Ausf. F1 kit but with a different gun barrel. The similar Ausf. G is also available as a different kit. (© Hasegawa Corp.)





Hasegawa Flakpanzer IV Wirbelwind. This is a good kit and the wheels are an improvement over those in Hasegawa's Panzer IV kits. A Flakpanzer IV Ostwind is also available. (© Hasegawa Corp.)



Hasegawa Panzer IV/70(V). This is one of three kits based around a common set of sprues – the other two being an early and a late Jagdpanzer IV/48. All three are good models that are only let down by their tracks. (© Hasegawa Corp.)



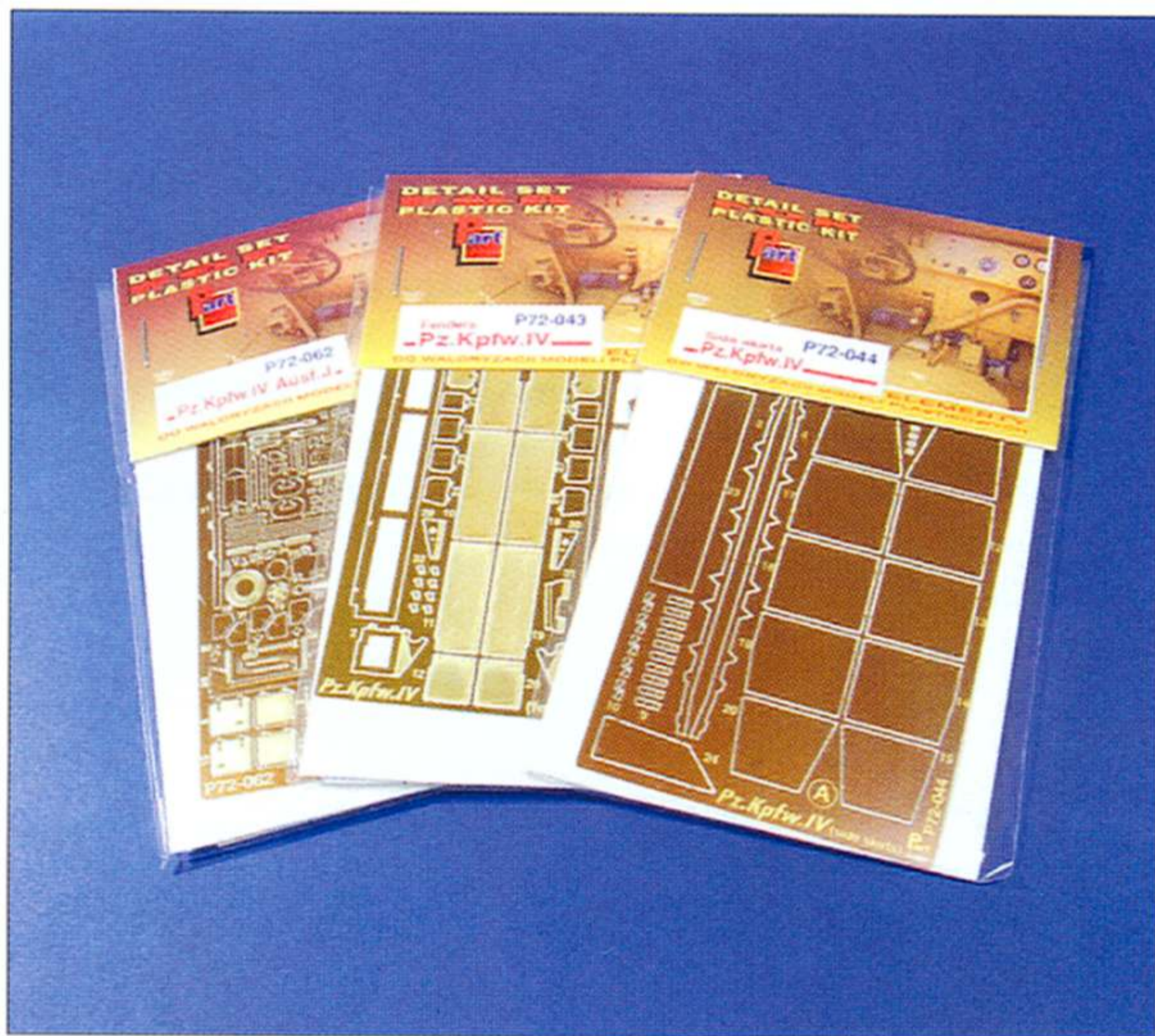
Italeri Panzer IV. This is a re-release of the old ESCI kit that is now out of production. It has some dimensional problems but builds into a reasonably good model. (Italeri S.p.A.)

available but based on the number of ex-ESCI kits being released by Italeri it would only seem natural that other versions (Hummel, Brummbär, Wirbelwind) will appear on the shelves of model and hobby shops at some point. Polish manufacturer Mirage Hobby has announced a series of Panzer IV vehicles as well. Included are some of the earlier versions such as the Ausf. C and D with the short-barrelled 75mm gun.

Resin aftermarket manufacturers have provided the small-scale modeller with a great many opportunities to convert the available kits into something other than a basic Panzer IV. Even the most obscure versions are to be found. Resin manufacturers also have many interior detail sets available to provide the modeller with the opportunity to show off engines and transmissions.

Photo-etched material for the various Panzer IV models is available from companies such as PART, Eduard and Extratech. They provide a great number of photo-etched sets for all the mainstream injection moulded plastic kits. Available from PART are sets for each basic vehicle, fender sets, *zimmerit* sets and *schürzen* panels for the Ausf. H and J variants. Photo-etch provides many of the smaller details associated with the various fittings found on armoured vehicles. Etched components are supplied for tool clamps and the tools themselves.

Machined brass and aluminium barrels have become almost as common in 1/72 scale as in the larger 1/35 scale. Aluminium barrels are produced by manufacturers such as Armo, Aber, Schatton and Microrealistix. Barrels are available for all versions of the 75mm main gun used on Panzer IVs including the short-barrelled KwK 37 L/24 and the long-barrelled KwK 40 in both L/43 and L/48 lengths. Of particular note, Aber has begun producing barrels complete with machined brass muzzle brakes to replace the kit moulded parts. Barrels are also available for the kits of Panzer IV variants, including minute 20mm barrels for the Flakpanzer IV Wirbelwind and 37mm barrels for the Flakpanzer IV Ostwind.



Just a few of the many photo-etched sets available for small-scale Panzer IV kits. These particular sets are from PART of Poland. Eduard and Extratech also have a range of sets for kits based on the Panzer IV.



Turned aluminium and brass barrels are now becoming commonplace for small-scale models. Those shown here are from Aber, Army in Detail and Armo.

**Table 1: Panzer IV and Panzer IV-based kits (plastic)**

Vehicle	Manufacturer
Panzer IV Ausf. F1	Hasegawa MT41
Panzer IV Ausf. F2	Hasegawa MT42
Panzer IV Ausf. G	Hasegawa MT43 Italeri (Ex-ESCI) ESCI 8023, 8058, 8309 (out of production)
Panzer IV Ausf. H	Revell 03119
Panzer IV Ausf. J	Revell 03122
Flakpanzer IV Wirbelwind	Hasegawa MT48 ESCI 8063, 8310 (out of production)
Flakpanzer IV Ostwind	Hasegawa MT47
Jagdpanzer IV L/48	Hasegawa MT49 ESCI 8056 (out of production)
Jagdpanzer IV L/48 (Late)	Hasegawa MT51
Jagdpanzer IV L/70 (V)	Hasegawa MT50
Sturmgeschütz IV	Revell 03101 (out of production)
Sturmpanzer Brummbär	ESCI 8065, 8311 (out of production)

**Table 2: Panzer IV detail sets**

Vehicle	Detail set	Description
Panzer IV Drivers Compartment	Extratech K7215	Resin
Maybach HL120 TRM	Extratech K7216	Resin
Panzer IV Tracks	Extratech V72028	PE
Panzer IV Tracks	Part P72068	PE
Panzer IV Tracks	Schatton	White Metal
Panzer IV Tracks w/Ostkettens	Model Trans 72026	Resin
Panzer IV Ammo Crates	MIG 72069	Resin
7.5cm KwK L/48 Ammo	Schatton 7212	Turned Brass
15cm Ammo (Hummel)	Schatton 7220	Turned Brass
Steel Roadwheels	Schatton 7225	Resin

**Table 3: Photo-etch sets**

Vehicle	Detail set	Description
Panzer IV Ausf. F1	Extratech V72029 Eduard 22025 PART P72053	Basic detail set Basic detail set Basic detail set
Panzer IV Ausf. F2	Extratech V72030 Eduard 22025	Basic detail set Basic detail set
Panzer IV Ausf. G	Extratech V72031 Eduard 22026	Basic detail set Basic detail set

	PART P72051 PART P72052	Basic detail set Solid Schürzen
Panzer IV Ausf. H	Extratech V72035 Eduard 22029 PART P72044 PART P72050 PART P72054 PART P72059	Basic detail set Basic detail set Schürzen (Solid) Basic detail set Zimmerit (undamaged) Zimmerit (damaged)
Panzer IV Ausf. J	Extratech V72038 PART P72020 PART P72062 PART P72063 PART P72064	Thoma Schürzen (Mesh) Thoma Schürzen (Drilled) Basic detail set Fenders Thoma Schürzen (Mesh)
Flakpanzer IV Wirbelwind	PART P72055 PART P72057 PART P72070 PART P72071 Eduard 22040	Basic detail set Turret replacement Zimmerit (undamaged) Zimmerit (damaged) Zimmerit (undamaged)
Flakpanzer IV Ostwind	PART P72056 PART P72058 PART P72070 PART P72071 Eduard 22040	Basic detail set Turret replacement Zimmerit (undamaged) Zimmerit (damaged) Zimmerit (undamaged)
Jagdpanzer IV L/48	PART P72089 PART P72091 Eduard 22043	Basic detail set w/fenders Schürzen panels Zimmerit (undamaged)
Jagdpanzer IV	L/70 PART P72090	Basic detail set w/fenders
Sturmgeschütz IV	Extratech V72008 PART P72108 PART P72109 PART P72110	Basic detail set w/Schürzen Fenders Schürzen panels Basic detail set

**Table 4: turned barrels**

Description	Detail set	Usage
7.5cm KwK 37 L/24	Armo AR72708 Aber 72L-13	Panzer IV Ausf. A – F1 Panzer IV Ausf. A – F1
7.5cm KwK 40 L/43	Armo AR72707 Aber 72L-12	Panzer IV Ausf. F2/G Panzer IV Ausf. F2 (Round muzzlebrake)
7.5cm KwK 40 L/48	Aber 72L-18 Aber 72L-20 Armo AR72737 Micro-Realistixx 72102	Panzer IV Ausf. J Panzer IV Ausf. H Panzer IV Ausf. G/H/J Panzer IV Ausf. G/H/J
7.5cm StuK 40 L/48	Aber 72L-14	Sturmgeschütz IV
7.5cm L/70	Armo AR72747 Micro-Realistixx 72094 Army in Detail AD72004	JagdPanzer IV L/70 JagdPanzer IV L/70 JagdPanzer IV L/70
2.0cm FlaK	Aber 72L-09 Armo AR72714 Schatton 7201 Micro-Realistixx 72082 Army in Detail AD72001	FlakPanzer IV Wirbelwind FlakPanzer IV Wirbelwind FlakPanzer IV Wirbelwind FlakPanzer IV Wirbelwind FlakPanzer IV Wirbelwind
3.7cm Flak	Armo AR72728 Schatton 7202	FlakPanzer IV Ostwind FlakPanzer IV Ostwind
8.8cm PaK 43 L/71	Aber 72L-17	Nashorn

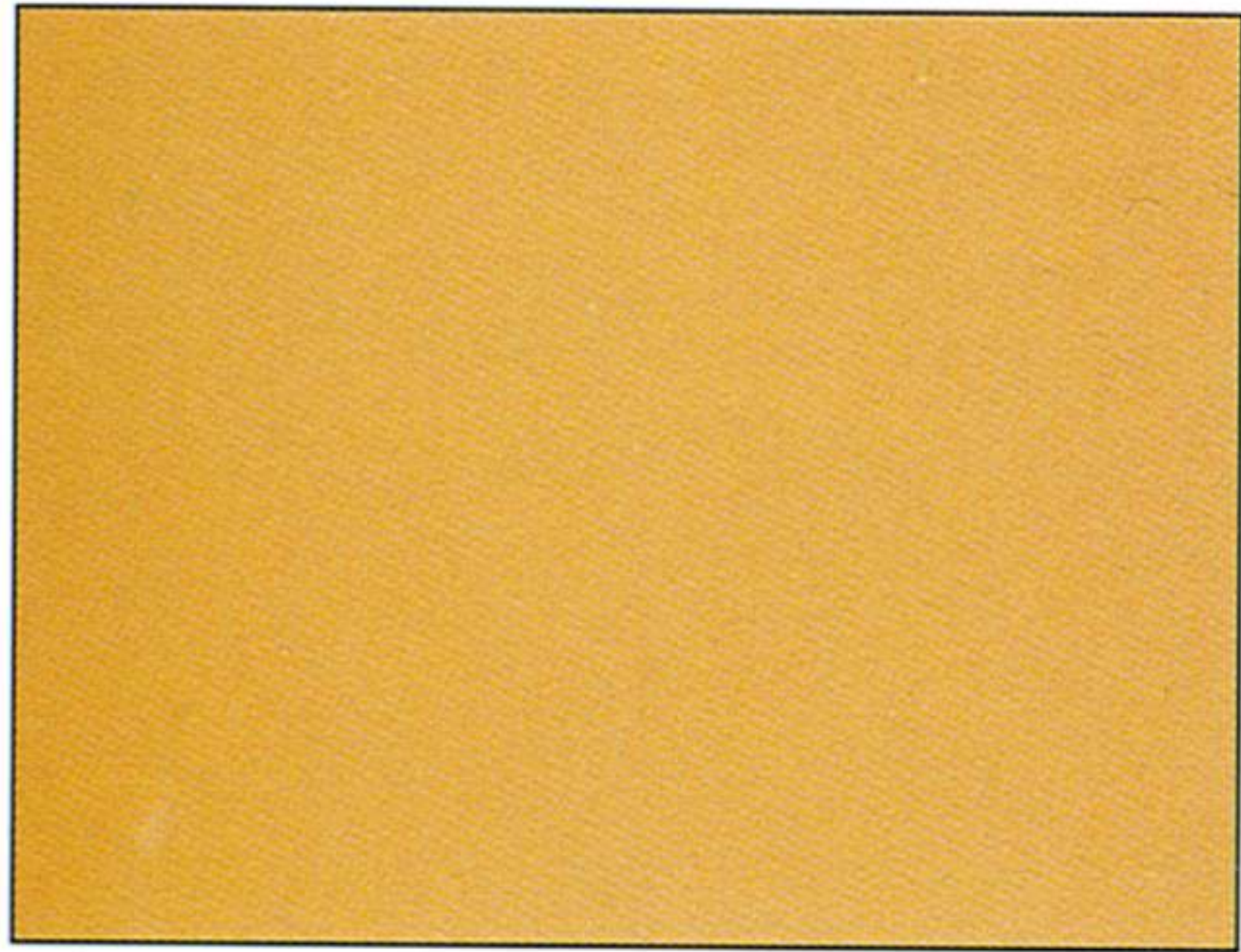
**Table 5: conversion sets**

<b>Vehicle</b>	<b>Manufacturer</b>	<b>Media</b>
Bergepanzer IV	Planet Models MV022 TP Models 72108	Resin Resin
Flakpanzer IV Kugelblitz	MR Models 7215 KORA 7204 Planet Models MV023 Schatton 7209 TP Models 72109 Armo 72561	Resin Resin Resin Resin Resin Resin
Flakpanzer IV Möbelwagen I	MR Models 7213 Model Trans 72015	Resin Resin
Flakpanzer IV Möbelwagen II	MR Models 7214	Resin
Flakpanzer IV Wirbelwind	MR Models 7209	Resin
Jagdpanzer IV E39 Vomag	MR Models 7227	Resin
Jagdpanzer IV 'Null Serie'	Armo AR72532	Resin
Jagdpanzer IV L/48	Armo AR72530	Resin ( <i>Zimmerit</i> body)
Jagdpanzer IV L/70 (A)	Fine Scale Factory TL014 KORA 7217 Model Trans 72012 Model Trans 72040 TP Models 72100	Resin Resin Resin ( <i>w/PE Schürzen</i> ) Resin Resin
Jagdpanzer IV L/70 (V)	Armo AR72531	Resin ( <i>Zimmerit</i> body)
Panzer IV Ausf. F2/G	MR Models 7246	Resin
Panzer IV Ausf. H – Krupp Vorschlag	Model Trans 72014	Resin
Panzer IV Ausf. J	Planet Models MV020	Resin
Panzer IV Schmallturm	Planet Models MV021 TP Models 72107	Resin Resin
Panzer IV Hydrostat	Model Trans 72011	Resin
Panzerbeob. IV Ausf. H	Piomodels PI0009H Armo 72537	Resin Resin
Panzerbeob. IV Ausf. J	Piomodels PI0009J	Resin
Sd.Kfz 165 Hummel (Early)	Schatton 7214	Resin/PE/Aluminium
Sd.Kfz 165 Hummel (Late)	Schatton 7215	Resin/PE/Aluminium
Sd.Kfz 165 Munitions Hummel	Schatton 7216	Resin/PE
Sd.Kfz 164 Nashorn	Planet Models MV030 Schatton 7219	Resin Resin/PE/Aluminium
Sturmpanzer IV Brummbär	Planet Models MV029 TP Models 72112 TP Models 72113	Resin Resin Resin ( <i>w/Zimmerit</i> )
Sturmpanzer IV Brummbär (Early)	MR Models 7210 TP Models 72111	Resin Resin
Sturmpanzer IV Brummbär (Late)	MR Models 7216 KORA 7219 TP Models 72101 TP Models 72102	Resin Resin Resin Resin ( <i>w/Zimmerit</i> )
Dicker Max 10.5cm K18	TP Models 72128	Resin

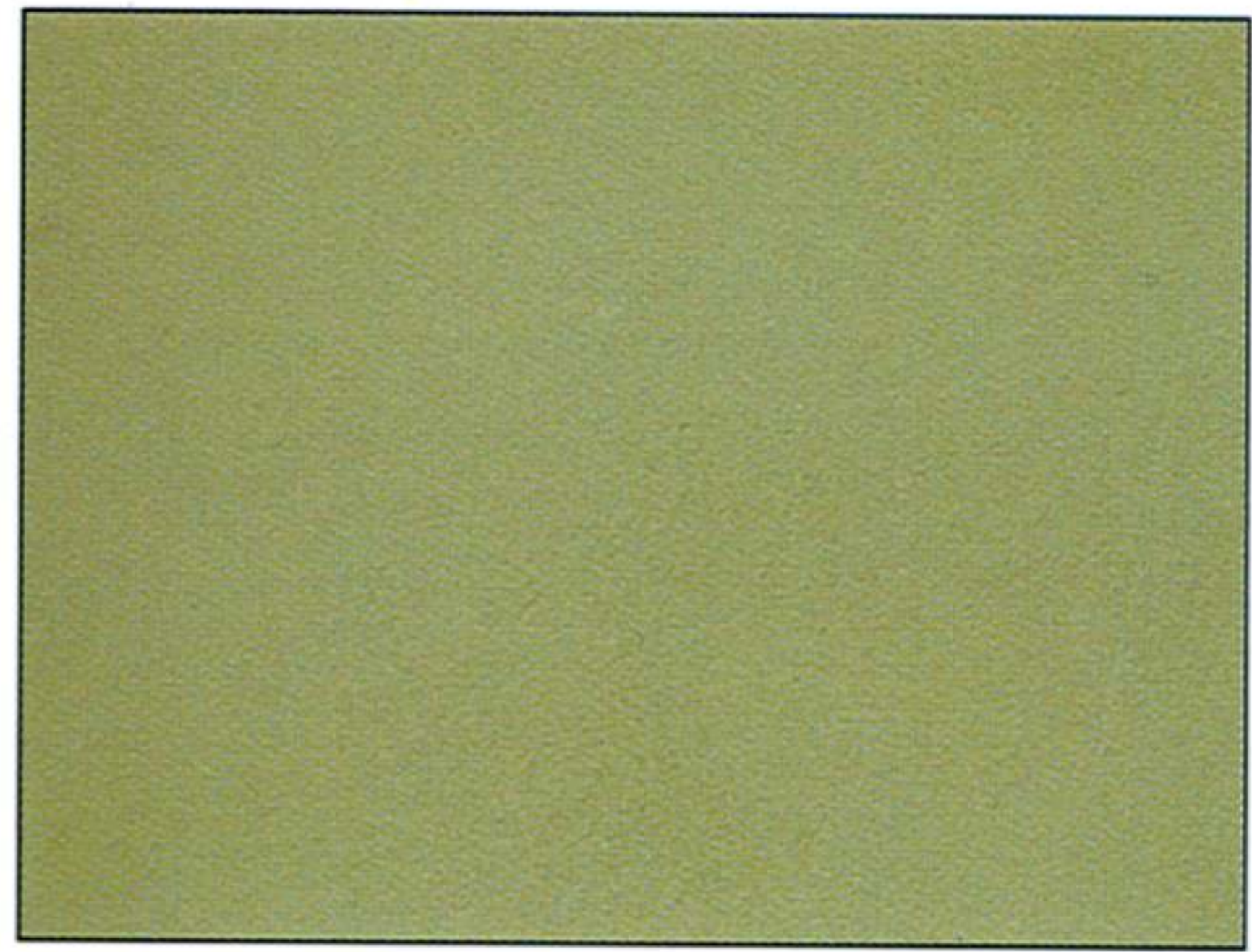
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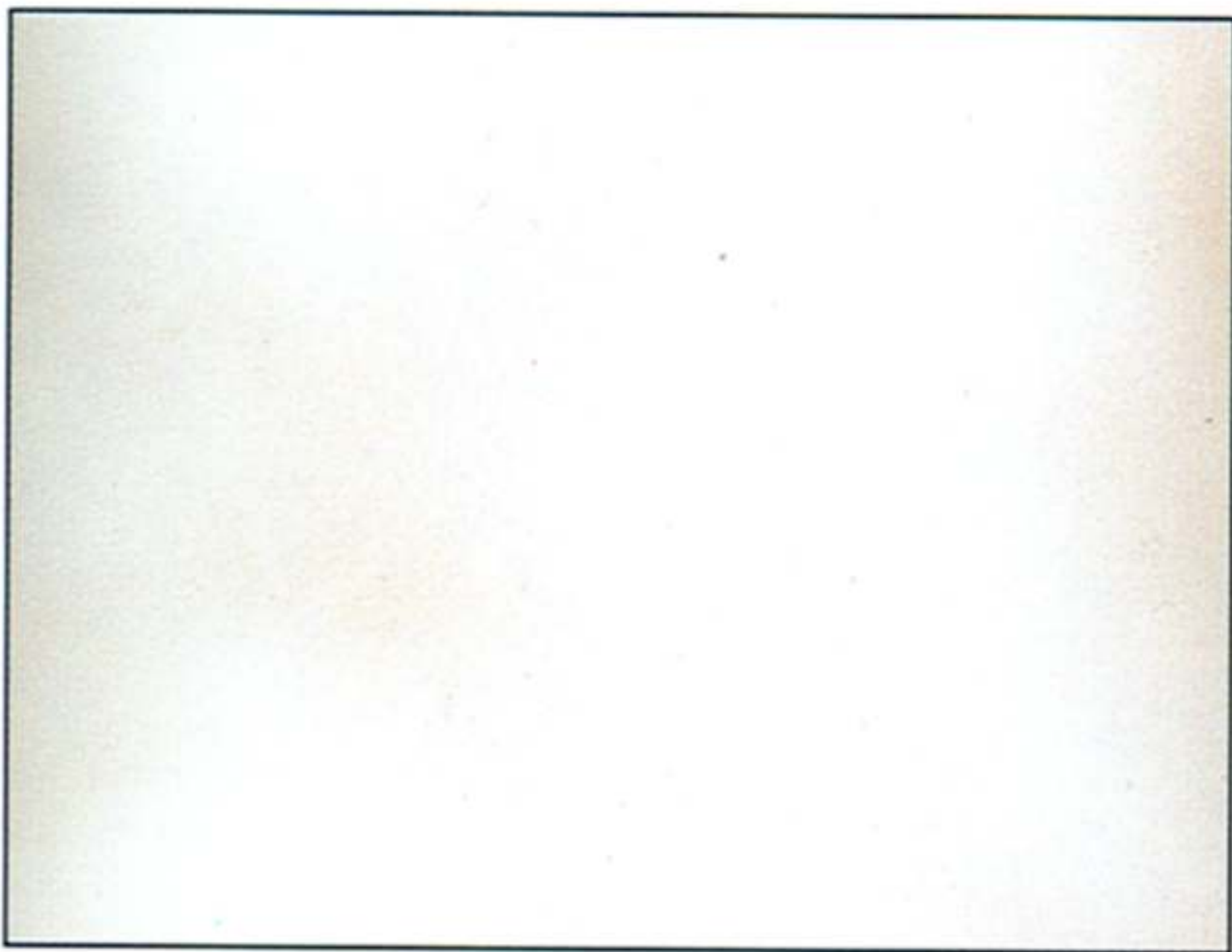
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1.



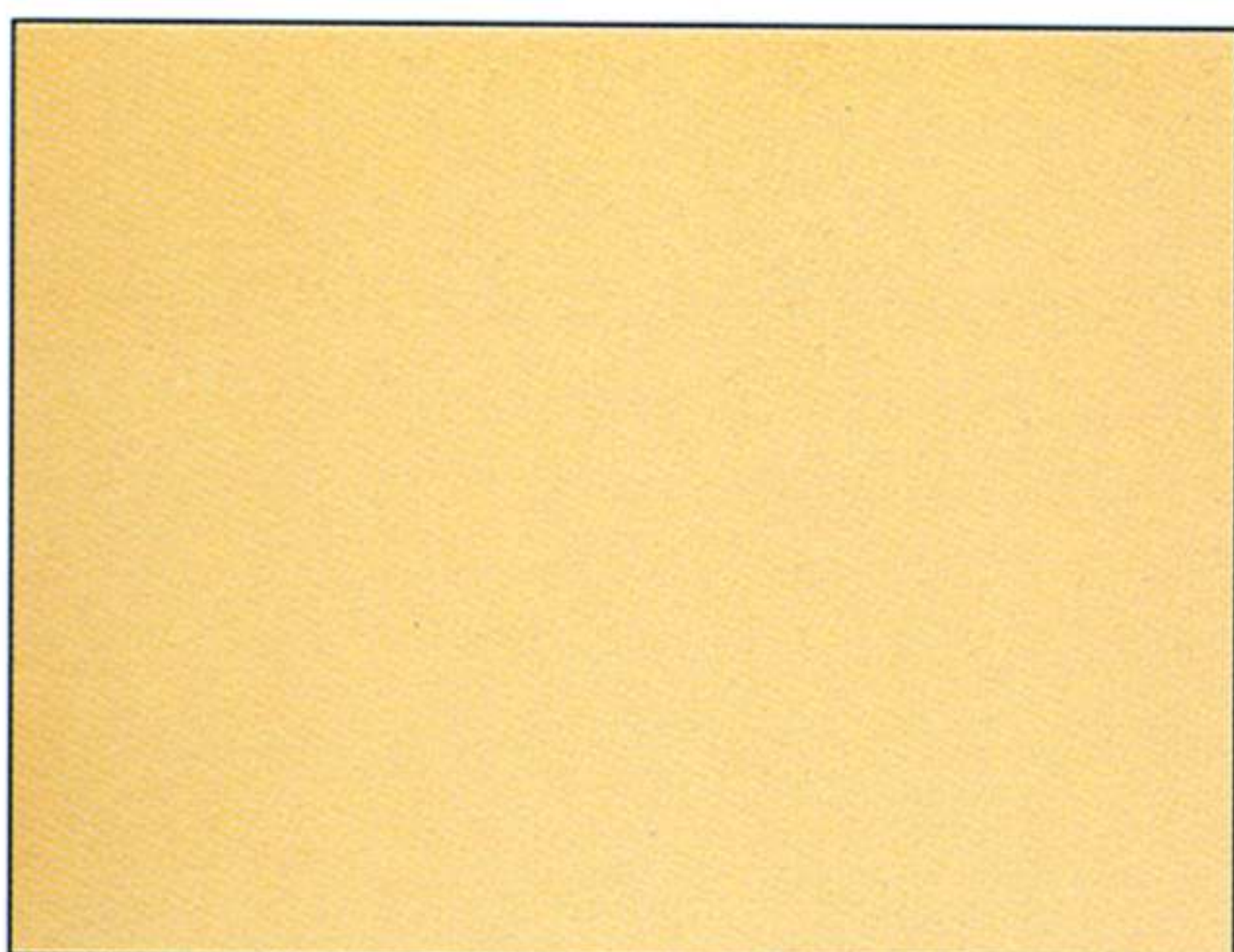
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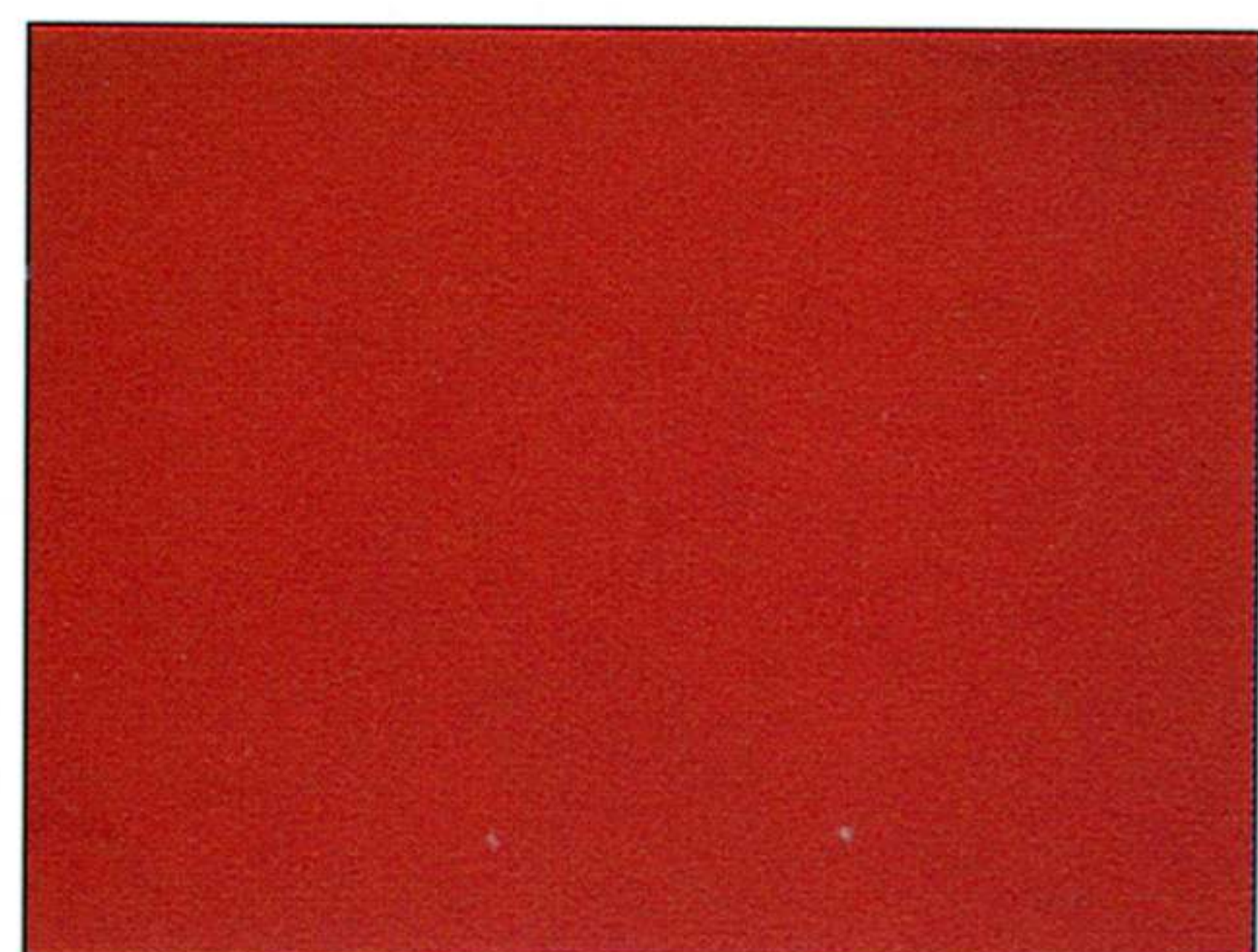
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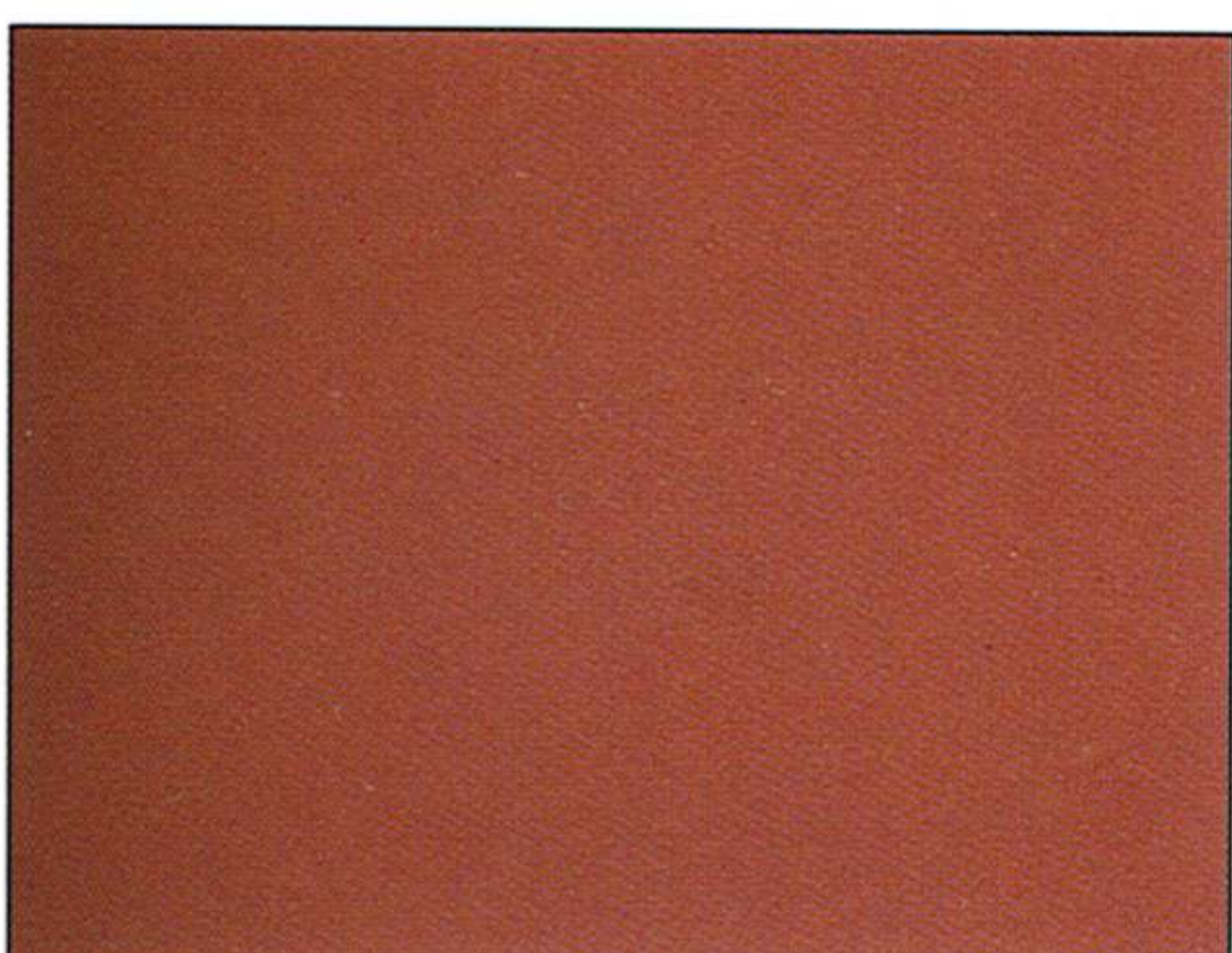
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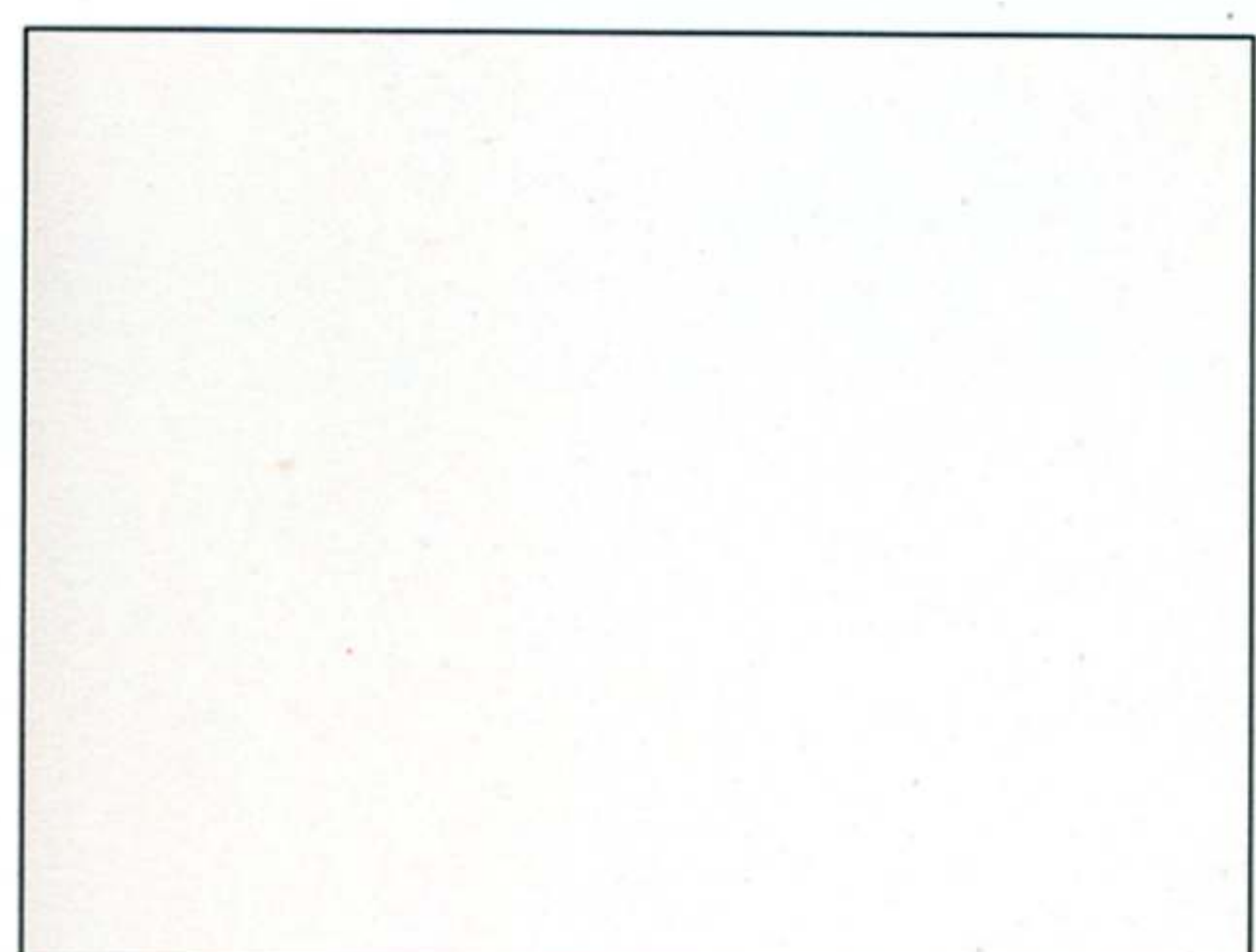
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4.



8.

### **A note on colour**

Obtaining precise and authentic colour mixes can be a contentious issue. Many factors can influence the apparent colour of a real vehicle, most notably the variety of weathering effects. Even the outdoor lighting conditions on any particular day will have an effect. Different batches of the same paint may show variation and the way the paint is applied – by the crew in the field for example – will also impact on the colour. From a modelling perspective, the appearance of the colours I use changes throughout the various weathering and shading processes I execute. Due to all of the above factors, I tend not to spend too much time worrying about precise shades. The samples here merely represent my preferences for obtaining various colours.

### **5. Humbrol Matt Light Green (120)**

This colour was used on the Sturmpanzer IV and Sturmgeschütz IV to represent Olive Green (Olivgrün). Although quite light, it darkens after weathering. I find this shade of green works well on vehicles with hard-edged camouflage.

### **6. Humbrol Matt Radome Tan (148), Humbrol Matt Rust (113) and Humbrol Matt Army Green (102). Further oversprayed with Matt Radome Tan (148) and Matt Dark Earth (29)**

These are the camouflage colours I used to paint the Wirbelwind. The shades of each colour have changed due to the light oversprays of Radome Tan and Dark Earth. Weathering will change the colours further.

### **7. Humbrol Brick Red (70) and Matt Scarlet (60)**

For red-oxide primer I mix a little Matt Scarlet with Brick Red. I don't worry too much about getting the exact proportions right each time.

### **8. Humbrol Matt White (34) and Matt Radome Tan (148)**

For the ivory (elfenbein) interior colour, I mix a small amount of Radome Tan (148) with Matt White (34).

### **1. Humbrol Matt Brown Yellow (94)**

This is the colour I use to represent Dark Yellow (dunkelgelb) as the base colour under whitewash finishes.

### **2. Humbrol Matt Brown Yellow (94) with a light overspray of Humbrol Matt White (34)**

This combination of colours provides the starting point for a whitewash finish. The white is applied in a patchy manner.

### **3. Humbrol Matt Cream (102)**

This colour was used to represent Dark Yellow (dunkelgelb) on the Sturmpanzer IV. Although quite light, it darkens after weathering.

### **4. Humbrol Matt Rust (113)**

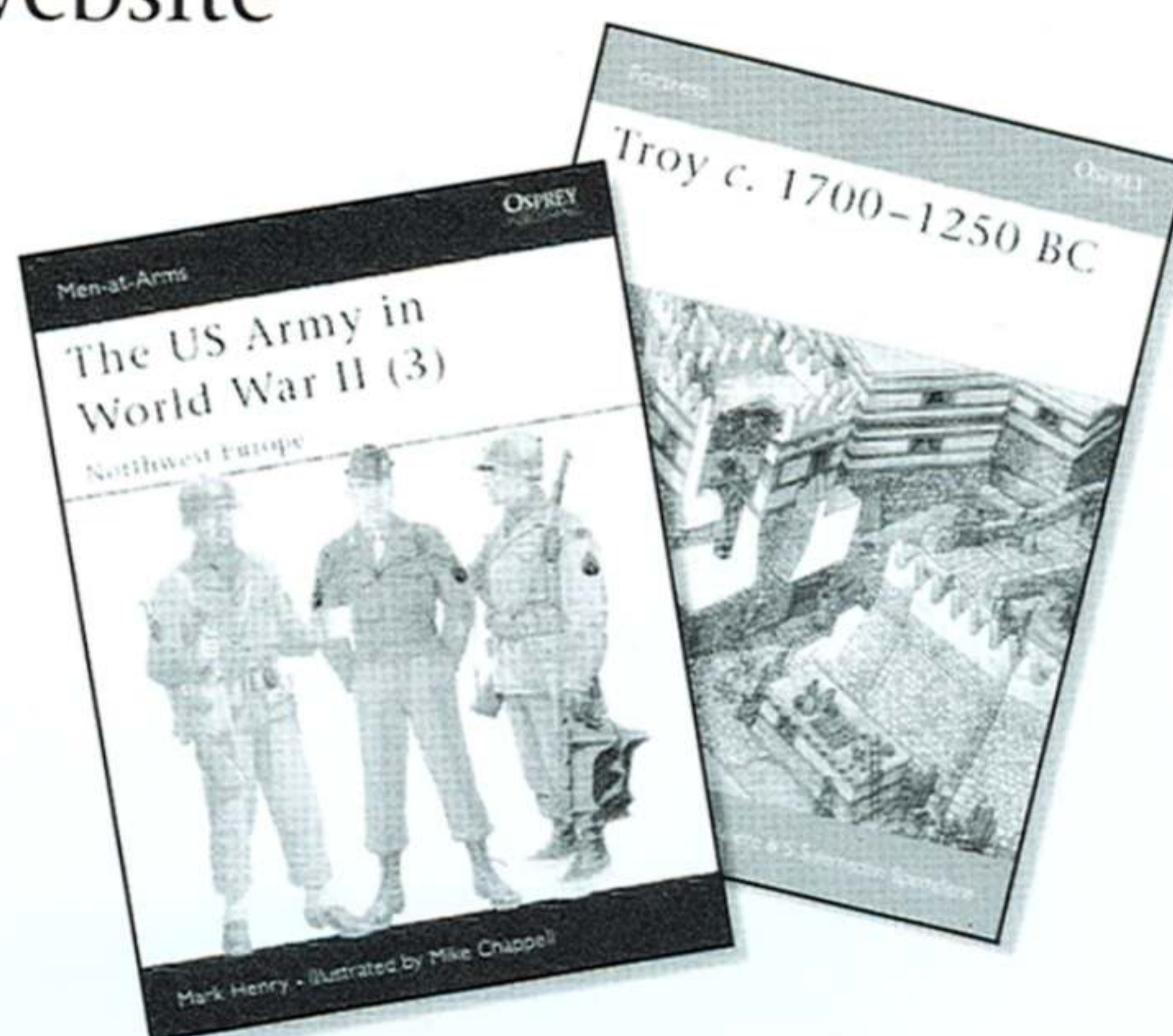
I use this colour to represent red-brown (Rotbraun). It was used on all the models in this book that feature red-brown camouflage.

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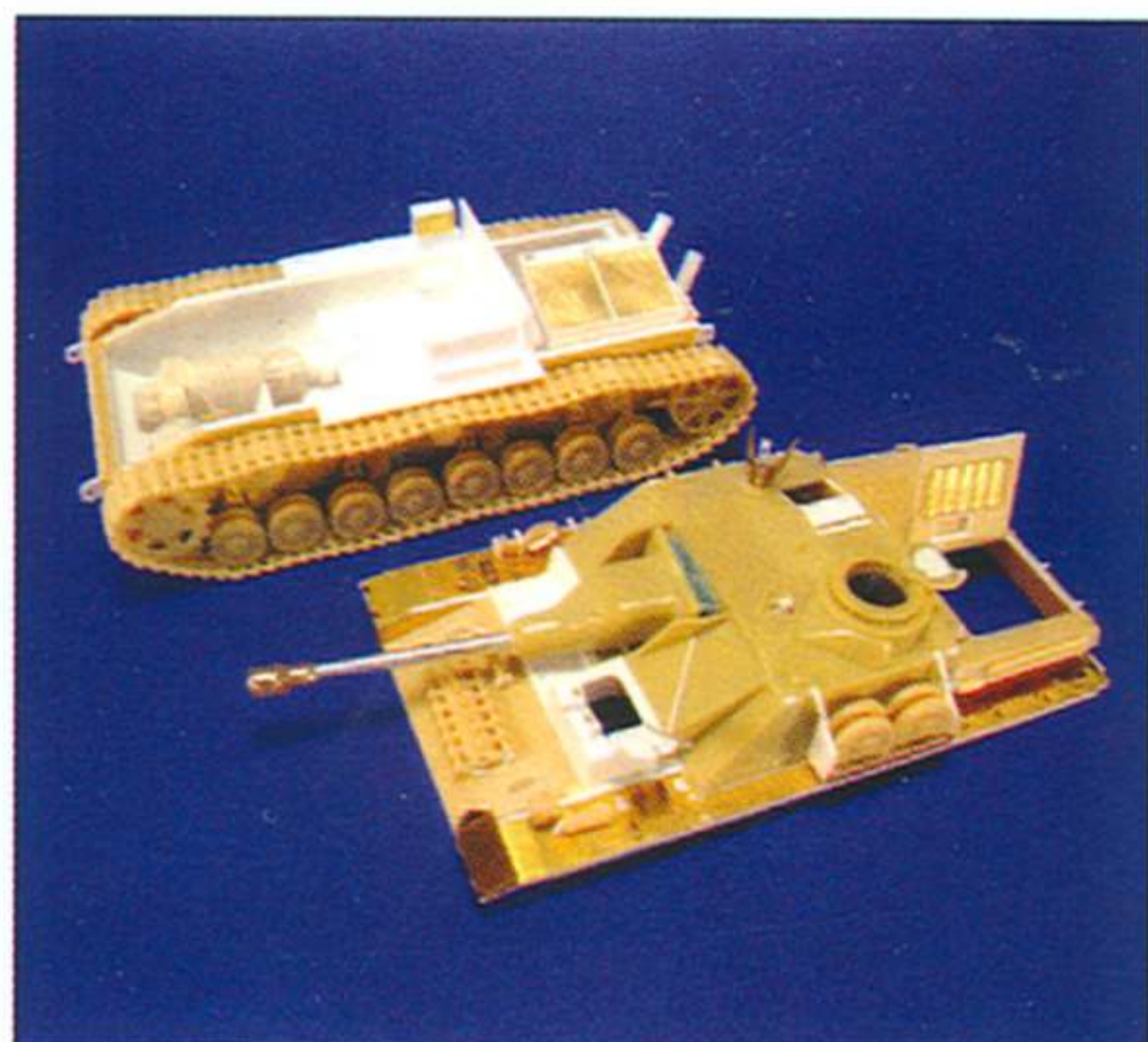
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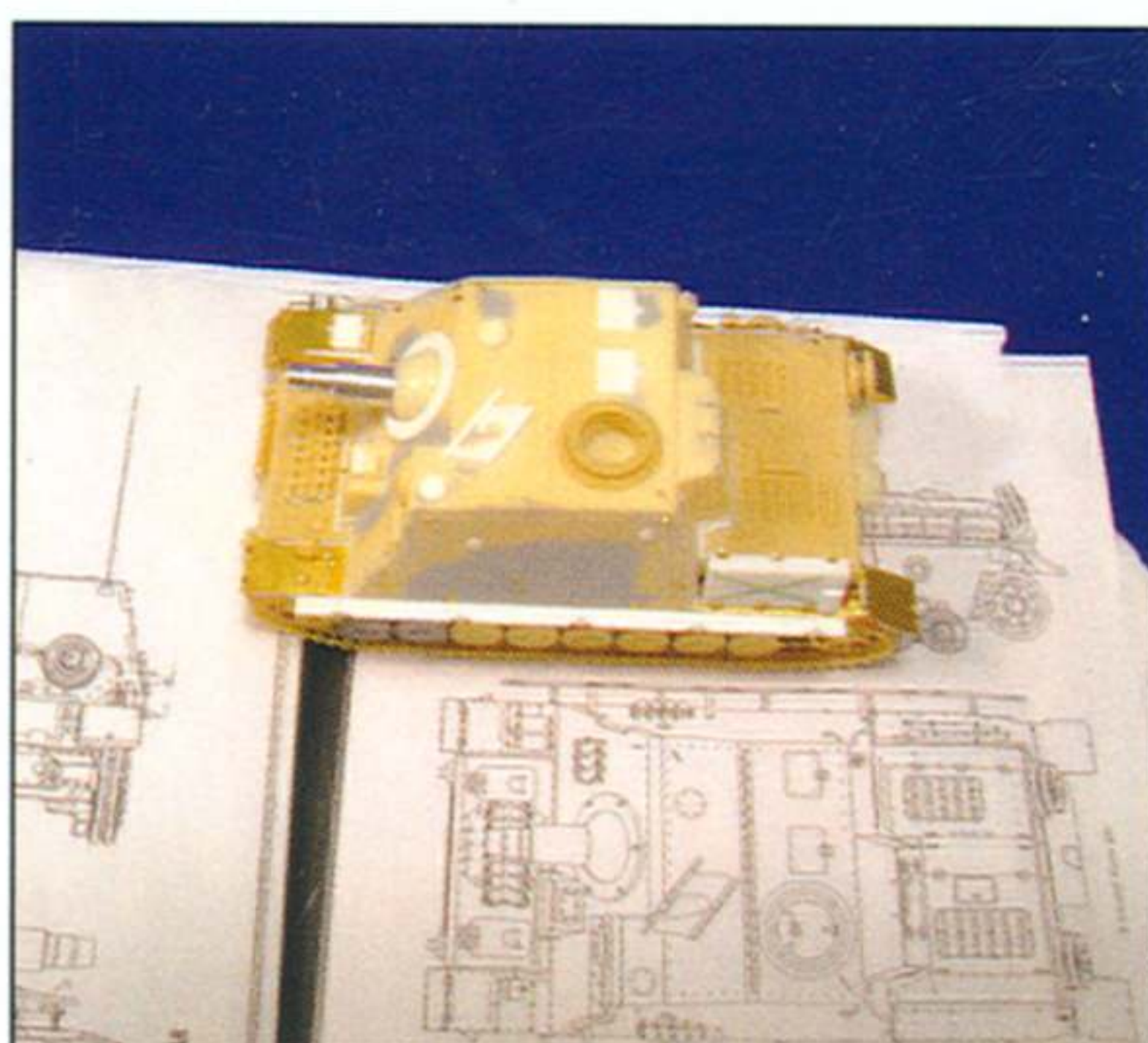
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