

# How to build a car

Martin Sodomka



TECHNICAL  
FAIRY TALES  
EDITION



It wasn't the first time that Arnie, a lame rat, had had to stay at home. 'If you think that we're going to let ourselves get caught with your hobbling about then forget it.' Lanky Jack, the leader of the gang, was as hard as nails. Arnie digested the bad news and in no time at all his eternally good mood had disappeared.



He didn't take it that badly though, since he had an amazing friend - Bill the sparrow. Bill passed the nights away in a car repair shop and, in any given situation, always knew what to do. He had absolutely no sense of humour, but despite that Arnie never grew tired of him.

'Why are you so keen to go around with them? They'll only be getting up to something anyway,' said Bill. 'Tell you what. Listen. We're going to build ourselves a car.'

'Oh, goodness! Why did Lucy have to go too?' Arnie said absent-mindedly. 'But then again I understand how she feels - what can I do here? What did you say you were going to build?'

'Not me, but us. We are going to build a car - a small, fast, beautiful racer.'

'Is that possible?'

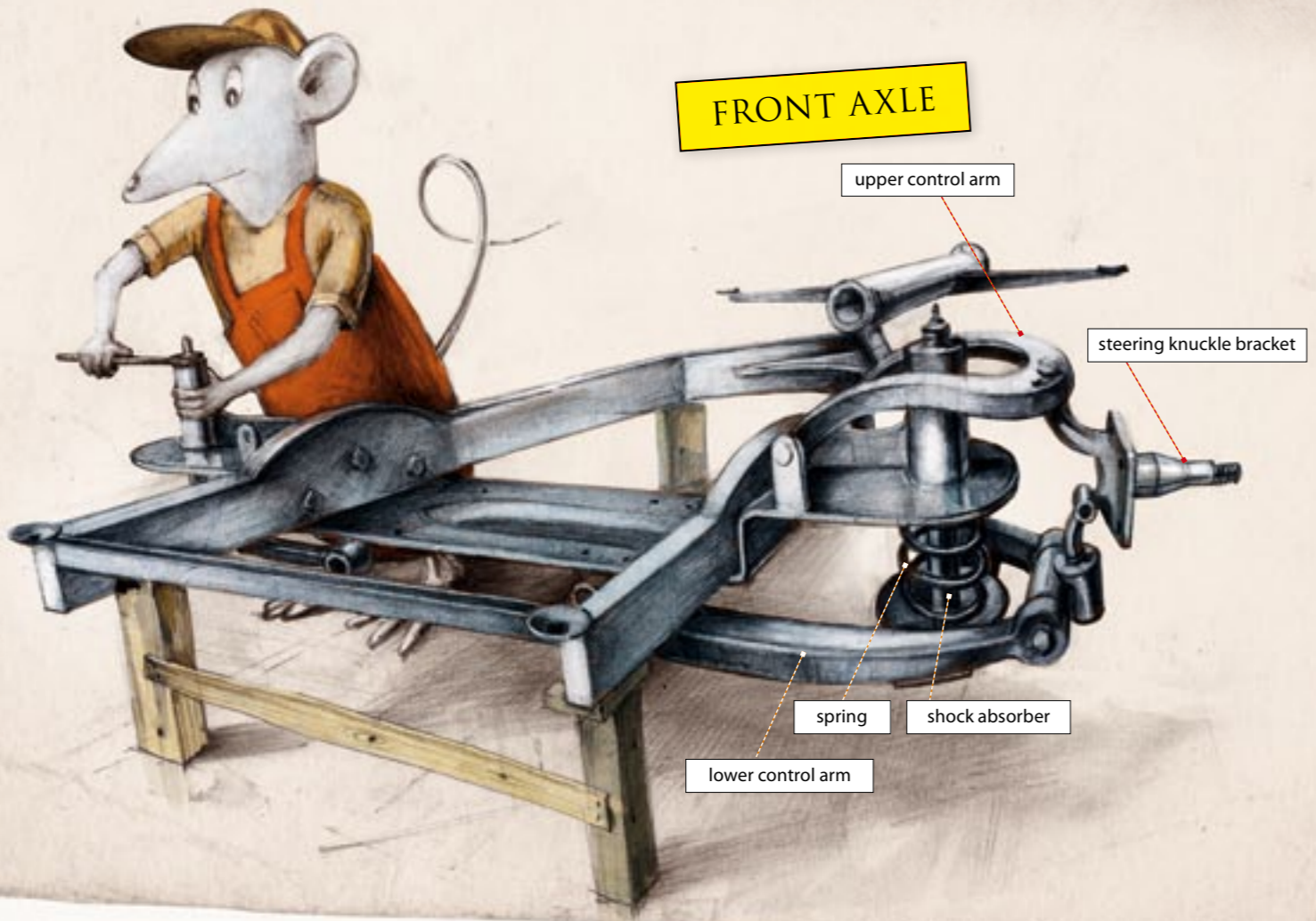
'You know what Grouchy says, don't you? Anything is possible.'

'Why mention that crook Grouch?'

'Steady on Arnie. Grouch isn't such a bad bloke, and the whole point is that without him we can't build anything.'

'Can't build what?'

'A car for goodness' sake. Pull yourself together, Arnie. Don't keep thinking about those jobs and come and have a look at what I've got.'



**FRONT AXLE**

upper control arm

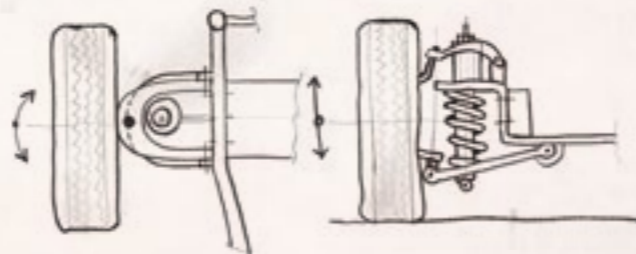
steering knuckle bracket

spring

shock absorber

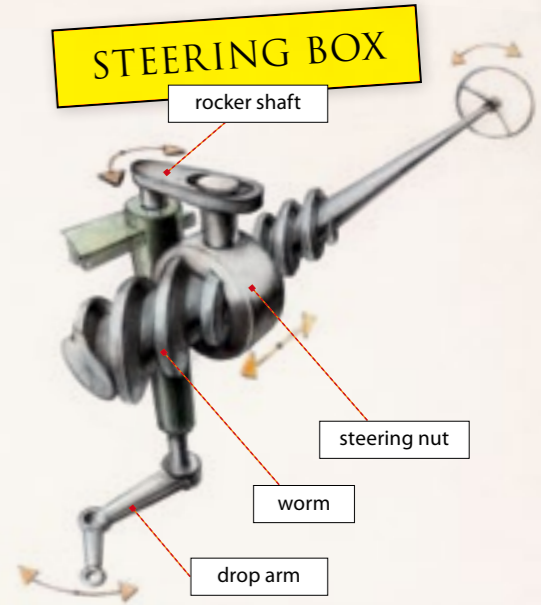
lower control arm

'Arnie, come and see what the front shock absorbers will look like,' began Bill first thing in the morning. 'I've drawn it here. A coil spring will be wound between the upper and lower control arms. Then we have to put a shock absorber into the middle of the spring because, if it wasn't there, the car would lurch about over every bump and we wouldn't be able to steer it. The shock absorber softens the spring in the same way as if a ball were to hit the ground but didn't bounce at all.'



'I've got the steering system all worked out now. We're going to use a worm – don't screw your face up Arnie. A worm is a kind of special toothed wheel, or helix in fact. When you turn the steering wheel, it moves a toothed nut, which is fixed to the worm at the front and the back. That moves the drop arm, which is connected to the track rods, and they turn the wheels.'

After lunch, Christian turned up.  
 'Well, my lovelies, I've found some wonderful bearings, and they'll turn the wheels.'  
 'That's good that they'll turn - that's what one expects from them. And has anyone thought how we're going to stop them?'  
 'Well, I hope with a brake.'  
 'Or with a tail, like lanky Jack, when he once stole a bike and then didn't know how to stop it.'  
 'And did he stop it?'  
 'No, he came a cropper,' grinned Arnie.  
 'Right, so it doesn't matter if we scrap that idea then and go next door and have a look in the workshop how car brakes work.'  
 'Yeah, OK. So let's go clever clogs. It's a scream with you today.'



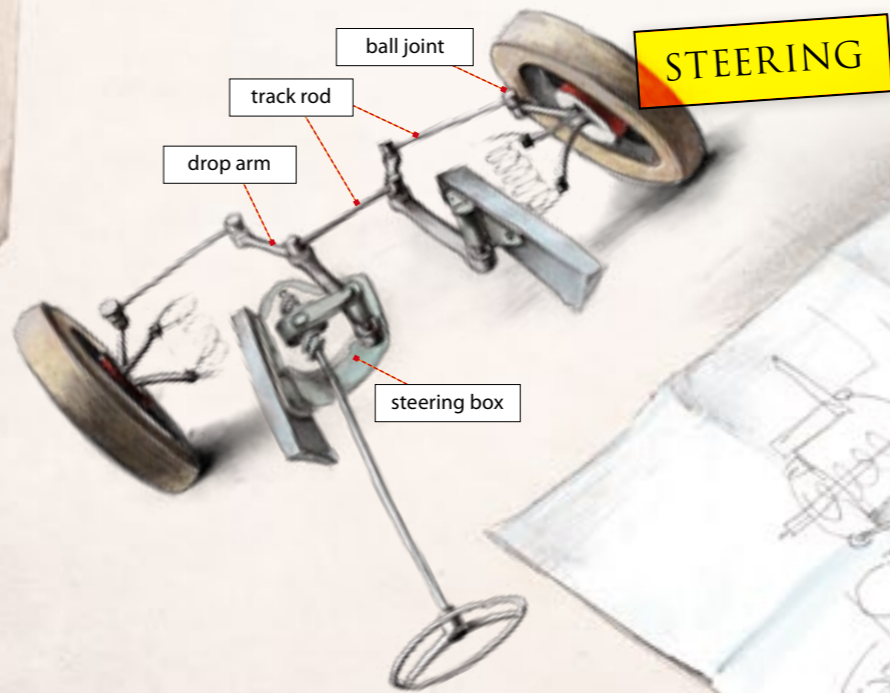
**STEERING BOX**

rocker shaft

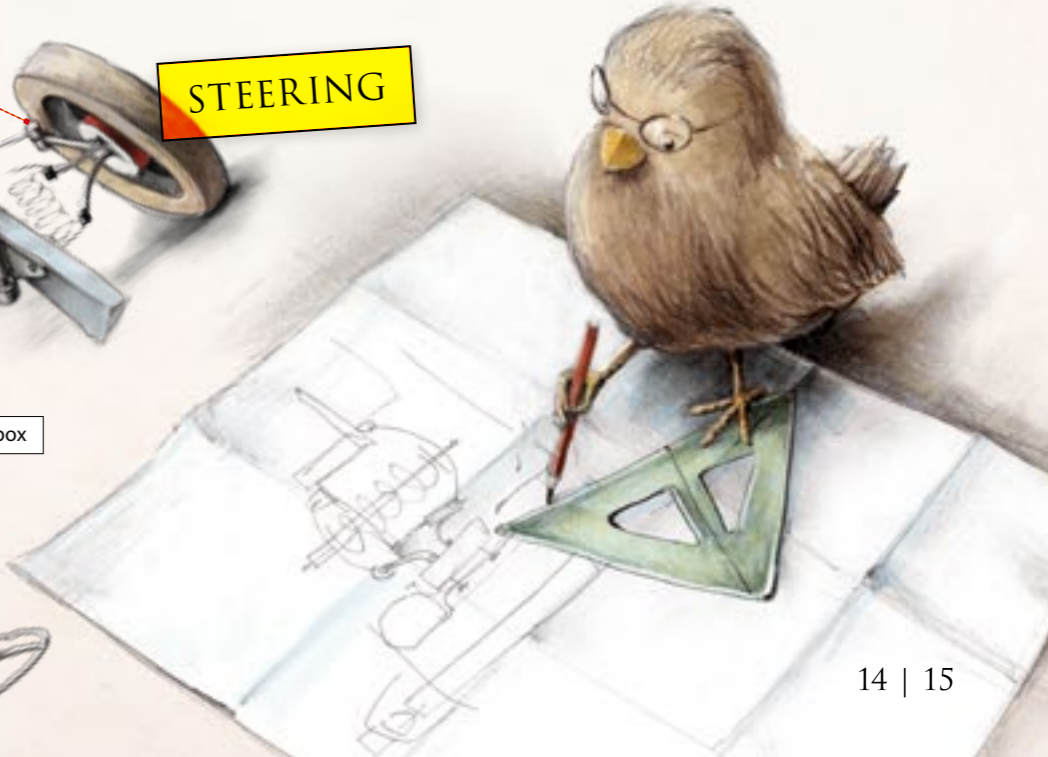
steering nut

worm

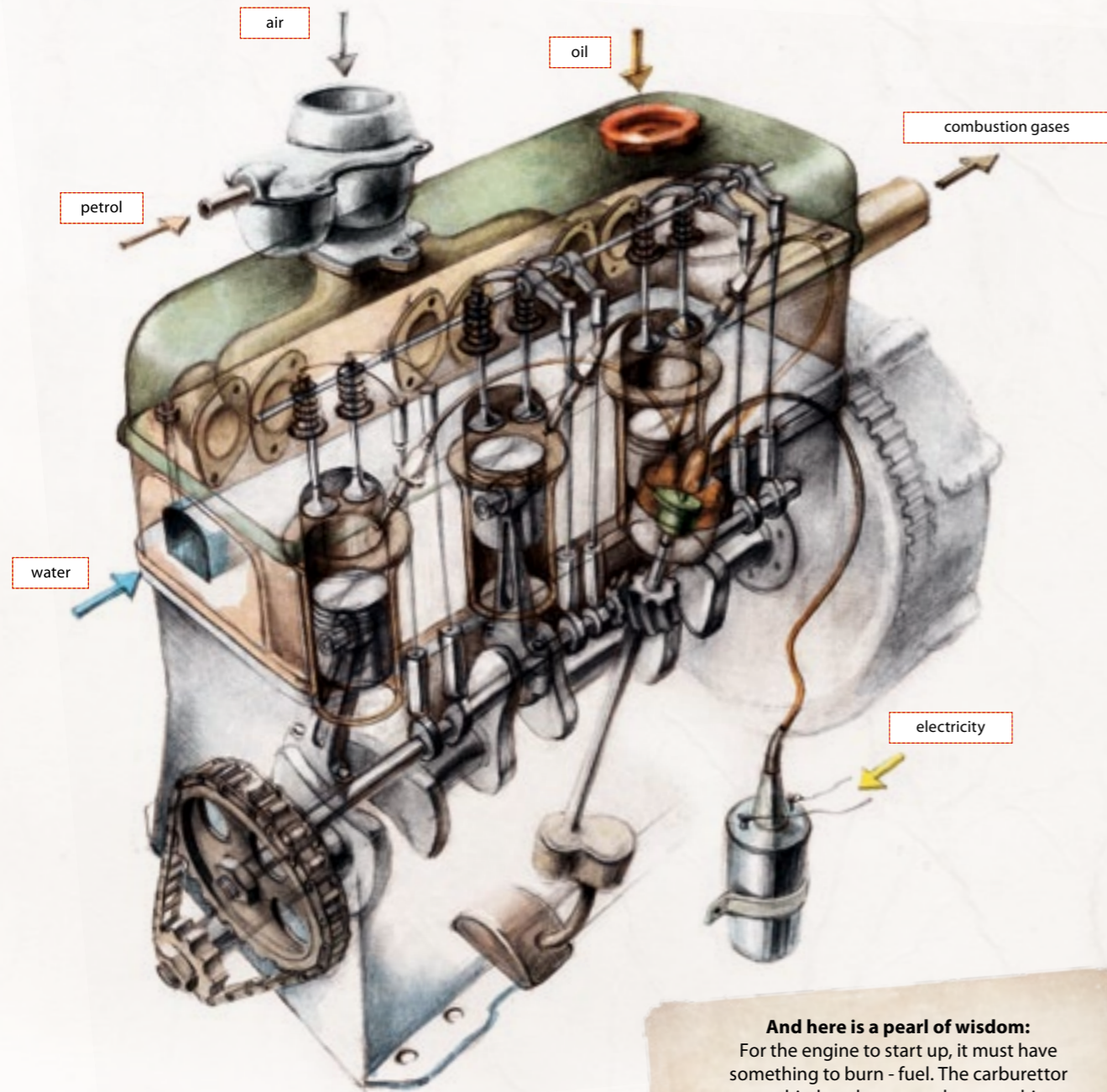
drop arm



**STEERING**

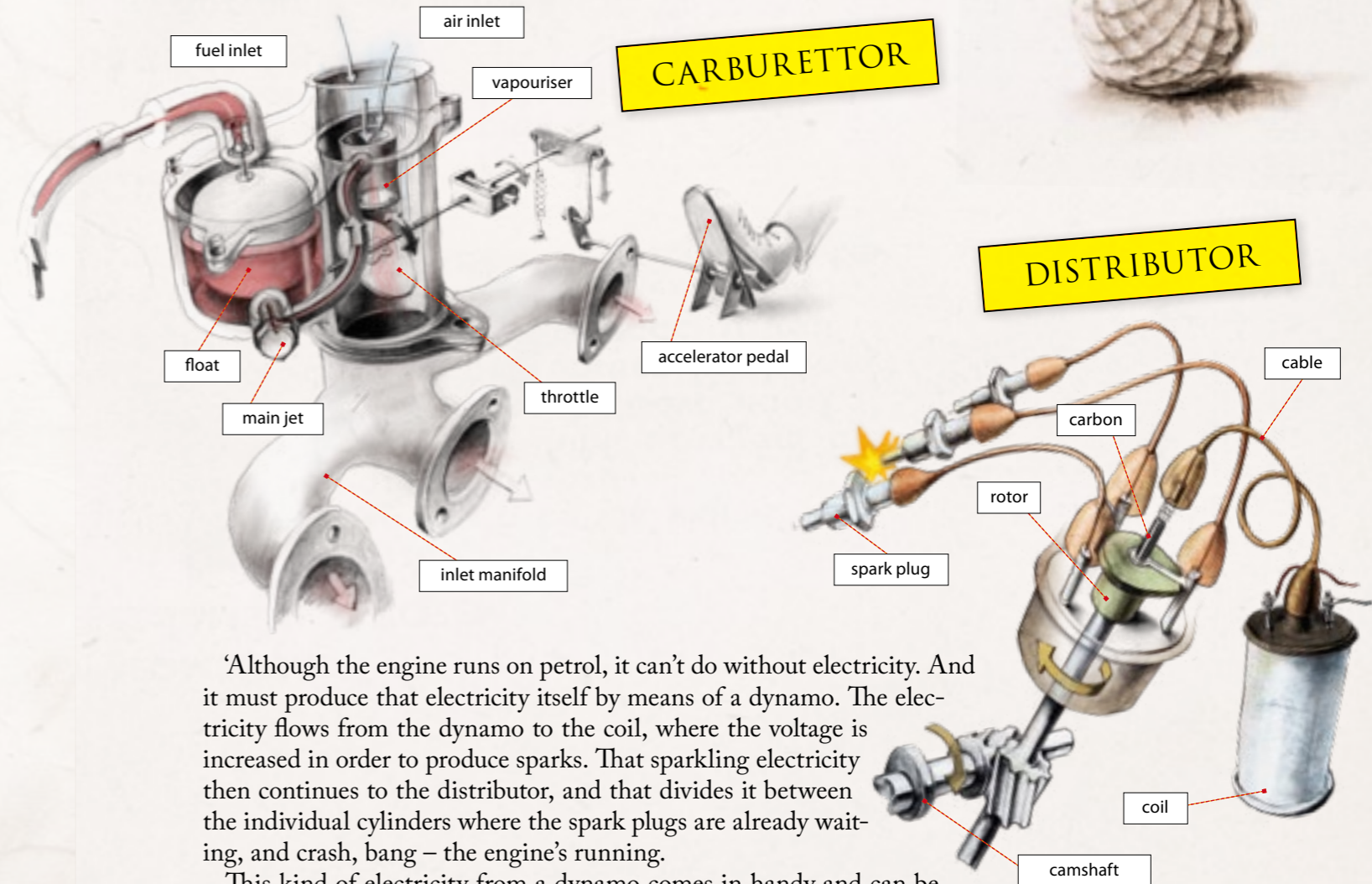


In this diagram you can see, apart from other things, everything that goes into the engine and what comes out of it



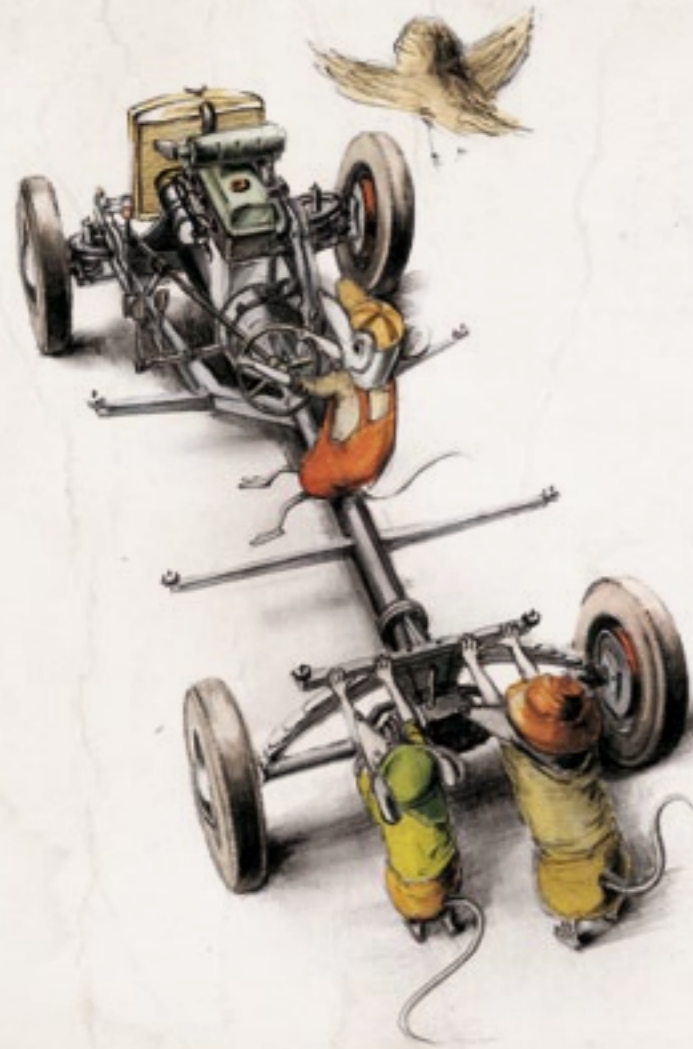
**And here is a pearl of wisdom:**  
 For the engine to start up, it must have something to burn - fuel. The carburettor sees to this, but there must be something to ignite the fuel. For this there are spark plugs, a distributor, a coil, and a dynamo.

'Have a dekkko at this diagram. Petrol can't flow into the cylinders just like that. It must be vapourised into tiny droplets. The carburettor is used for this - one is enough for all the cylinders. The vapourised mixture of air and petrol is then distributed through the inlet manifold. The whole thing works in a similar way like when Lucy sprays on scent from a bottle of perfume.'



'Although the engine runs on petrol, it can't do without electricity. And it must produce that electricity itself by means of a dynamo. The electricity flows from the dynamo to the coil, where the voltage is increased in order to produce sparks. That sparkling electricity then continues to the distributor, and that divides it between the individual cylinders where the spark plugs are already waiting, and crash, bang - the engine's running.

This kind of electricity from a dynamo comes in handy and can be used, for example, for lighting at night. Or, if Christian were to track down a battery, then during a trip we could store the electricity in that and then the car would start with an electric starter motor.'



First thing the next day Lanky Jack's former gang (Titch, Lucy and Fred) met up with Arnie, Bill and Christian. They had a simple plan: to take the car secretly to a new hiding place and, if Jack caught them, then they would simply have to beat him off. But everything went off smoothly and within half an hour they were safe.

Titch's uncle had a splendid car repair shop and had lent it to our friends without hesitation. However, Jack would doubtless not put up with such a treacherous act and everyone would really have to be on their guard.

## DESIGN



'Well, we've had a bit of a lark about, haven't we? Now we can continue merrily on our way. I can at last show you my designs for the bodywork. Have a look. What do you think?' Bill laid out his drawings and a discussion ensued. It didn't last long, although a bitter argument broke out between Arnie and Bill. Thankfully, both gradually came to an agreement and work on the bodywork was able to begin.

PAINTING THE BODYWORK

'Here Fred, how come you've never told us that you trained to be a painter?'

'Did you ever ask?'

'We might've suspected it. Your graffiti on the wall was always the best.'

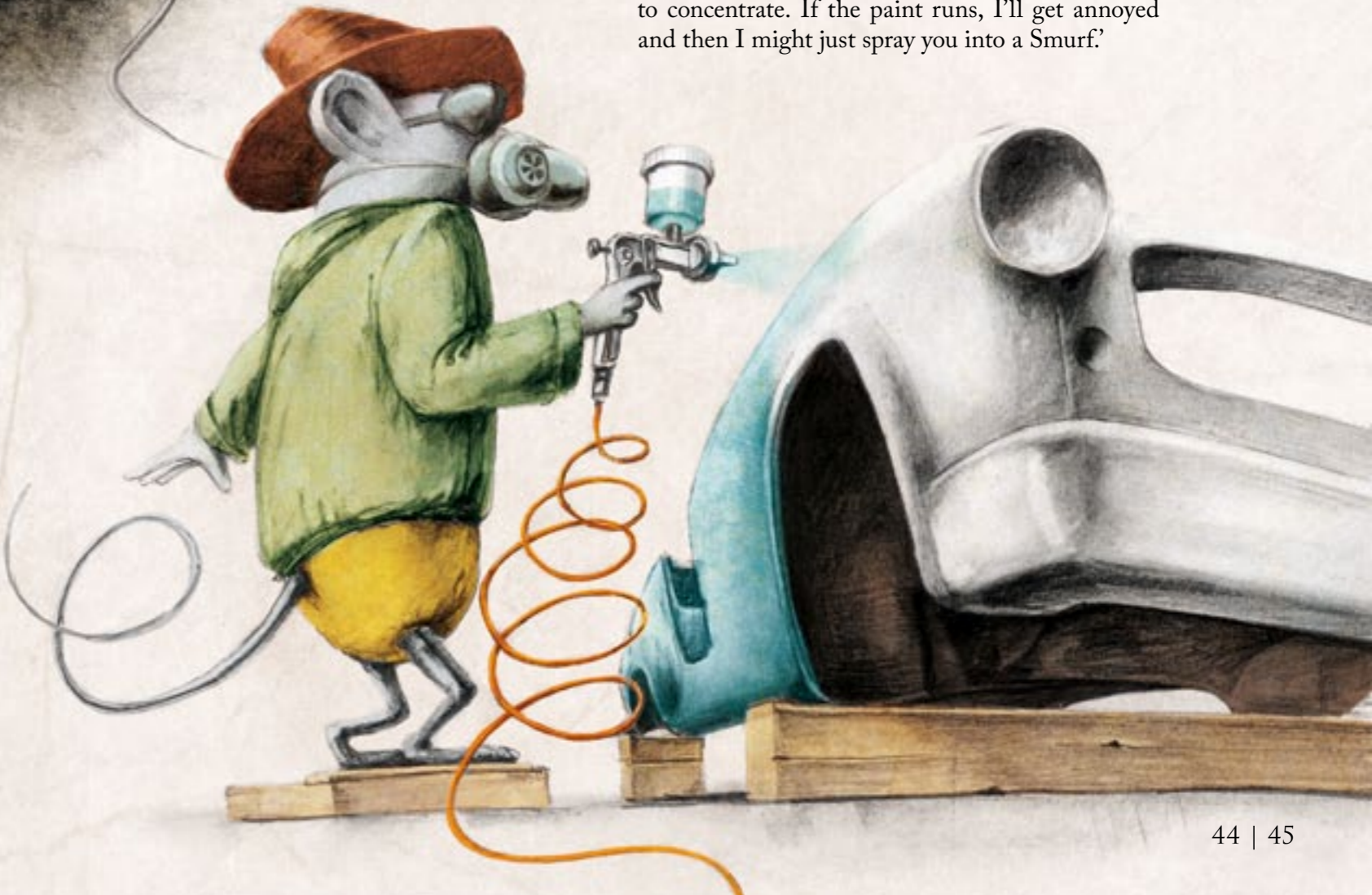
'Thanks Arnie, but don't speak to me now; I need to concentrate. If the paint runs, I'll get annoyed and then I might just spray you into a Smurf.'

'Unfortunately, we won't be able to hammer out the sheet metal sections and clean up the welds perfectly. We'll therefore have to fill in all the unevennesses and then sand it over. Otherwise the bodywork would look like a dustbin. Finally, everything will be sprayed with a primer, which protects the sheet metal against corrosion. Then we can get on with the painting.'

'Lucy, can you choose a colour? Choose any colour you like, as long as its pale blue.'

'Or, violet maybe?'

'Definitely. So, we've decided Christian. Start looking for the paint – pale blue please.'



## FITTING THE BODYWORK TO THE CHASSIS

'Arnie, get Shorty to put his back into it a bit more, will you!'

'I'm not Shorty, I'm Titch. Arnie, how can you be mates with that feathered mouse?'

'Argue away boys. You've got about another ten seconds for that before I drop it on your legs and then I'm going home to bed.'

'Over to me a bit.'

A bit more.

Down!

We're there!'



## TEST DRIVE

'Get in, we're going for a ride. Fred, Titch, don't be afraid, you're going for a ride too. Lucy, you must come with us, a ride in a cabriolet without a pretty girl is not allowed.'

'You really want to take me?'

Bill bent over to Arnie and whispered: 'Although it doesn't seem like it on the face of it, you've hooked her in an extremely complicated way.'






Two friends, Arnie the rat and Bill the sparrow, decide to build themselves a car. They gain an important ally, Christian the frog, who is able to provide everything necessary and the work can happily commence. Our heroes are no saints, nor are they stars of the animal kingdom. They live on the outskirts of town among old yards, car repair shops and a large scrap yard. In this world a quick mind and a sharp tongue will certainly not come amiss. In the course of the story, in which Arnie and his friends have to overcome innumerable unexpected difficulties during the car's construction, the reader will learn how a car is put together and how it works. From a reading of the book it will be possible to understand the principles of an engine, clutch, brakes, distributor and many other things.

For children from the age of 6



 b4u publishing

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FAIRY TALES  
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ISBN

