

# club



News magazine for members  
of the fischertechnik-club



# Foreword



Title picture: All the Christmas goodies are certainly eaten up by now, and the joys of Winter are calling for real fischertechnik fans – and that must include you – this certainly means playing and building with your new fischertechnik Building Set!

As you read through this number, you'll be bound to realise what it was that we found most moving: a visit from two blind children with the nun who was looking after them. Without any help

from others, these blind children had put together really great fischertechnik models – some of them even motorised! The visit spurred us on to realise a plan we had been thinking about for a long time: to bind two of the Club Magazines as one issue and put it out in Braille – and, of course, to distribute it free of cost to blind children. Perhaps fischertechnik can help blind children to set about doing things for themselves once more and express themselves in their chosen profession!

Here's another report that will interest you: fischertechnik has won the 1972 Great Tour d'Europe Rally! More precisely, the team that carried off the victory, Kurt Waldner and Hans Vogt of Germany, carried fischertechnik advertising on their Opel Ascona, right through Europe for nearly 9000 miles! Then we have chosen other reports for you from all the ones sent in by the many fischertechnik reporters. We'd like to thank everyone who sent reports in to us: suggestions for models to build, new fischertechnik ideas, and many other good things.

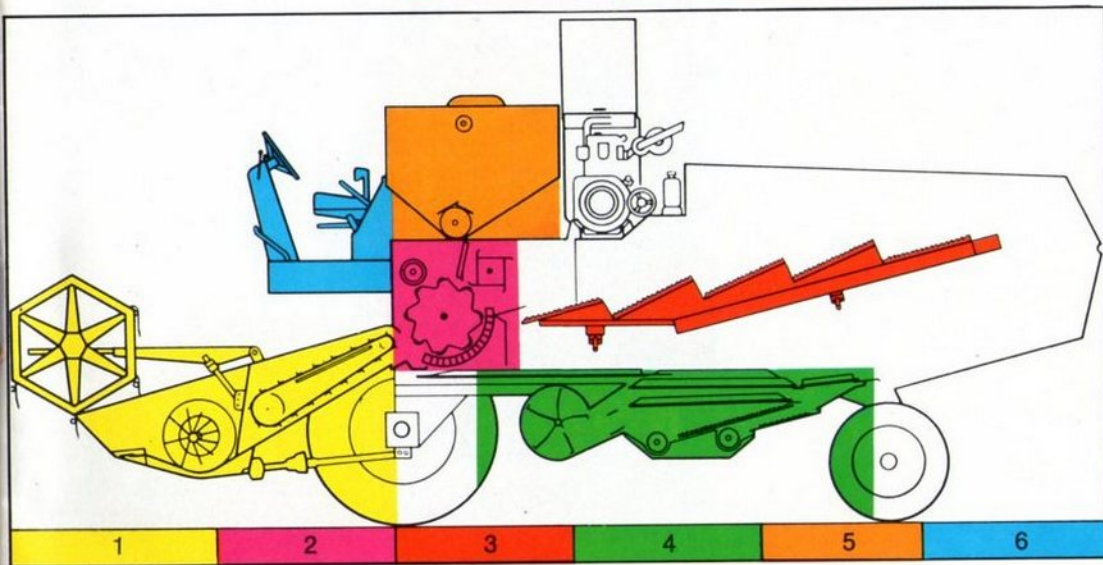
Your . . .

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# Visit to the Fischer Works

At the end of October last year, Sister Reinholda from the Blind People's Home at Heiligenbronn near Schramberg in the Black Forest visited us with two blind children: Otto Schwelling, 15, who, when he was a small child, was run over by a lorry and lost his sight, and Dieter Nutto, 12. They both showed us models they had built in their spare time without any help: Otto had built a harvester with cutting (1) and threshing mechanism (2), a corn reservoir (5) with a discharging spiral (3, 4), and a seat for the driver (6).



The model was powered by a fischertechnik motor and worked just like a real harvester. Otto's parents had a farm, and he had been able to climb onto a real harvester and grope all over it with his hands — and from this experience he was able to reconstruct it. Dieter had also built a beautiful model crane — and this was particularly difficult for him since he had been blind from birth. Don't you think these two made splendid efforts?



Herr Fischer pinned on to both boys the new Club badge which is awarded for excellent models, and told them that their visit had encouraged the firm to issue the Club Magazine in Braille. Otto and Dieter, and certainly all other blind fischertechnik fans, will be able to start now enjoying their Club Magazine!



Another visit we had was from Rolf-Dieter Voebel, 12, from Hagen-Haspe. In the competition organised for Toy Week 1971 by the Federation of Toy manufacturers, Rolf had won one of the three major prizes – visits to important toy factories. During his holidays, Rolf used a short pause in his parents holiday trip to dash into a toy shop and fill in an entry form for the competition. Rolf tells us that he is in Form 7 of a Secondary School, and that ever since his sixth school year he has been able to do technical work with fischer-technik. No wonder it's his favourite subject!

The winner of the matchbox prize puzzle in a precedent issue also came to see us in October (below). This was Heiner Weber, 8, from Solo-

thurn in Switzerland. Heiner has been playing with fischertechnik ever since he was 6. He had built all on his own: an earth-moving machine which drills forwards and digs sideways; the machine travels while it is carrying out these functions. For an eight-year-old a really fine model!

We are continually surprised what excellent constructions – many of them completely new – are built by so many young fischertechnik fans of all ages!



Our above photograph: Rolf-Dieter Voebel from Hagen-Haspe, on his visit to the Fischer works at Tumlingen in the Black Forest, together with Artur Fischer.

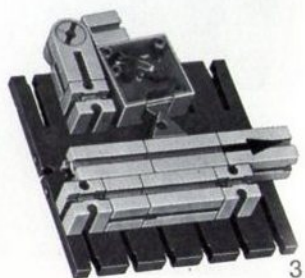
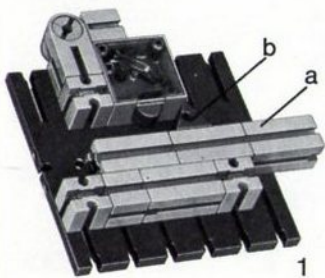
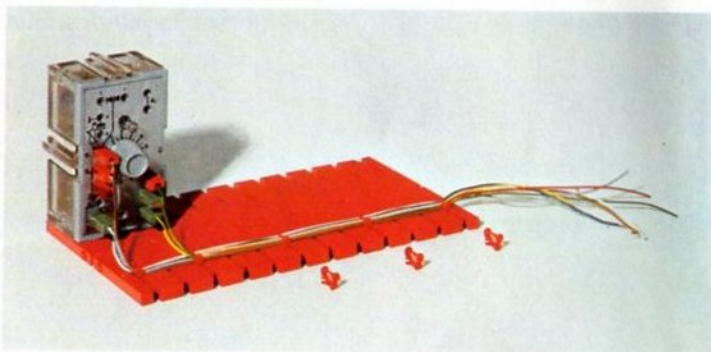


# New from fischertechnik

Before we come to fischertechnik novelties, we want to show you two new ways of using building elements which have been familiar for a long time. One of these has to do with the laying of wires. Up to now, these trailed about in untidy bundles, or they had to be secured with adhesive tape, which wasn't exactly the ideal solution. Now every new employee who comes to us has, over two or three weeks, to work for some days in each of the most important departments, to learn the business. One of our newer employees, who had to spend two days working in the model building department, found in the course of his work that wires could be fastened securely and neatly with chain links from the supplementary kit 022 — fastened both to base plates and to building blocks.

Another example is the "roll-over switch" which can be activated by a machine or apparatus in one direction only. The fischertechnik switch is pushed into the elbow joint. When the edge (a) is pushed to the left by the trip cam (b), the key is switched on (picture 2); when the edge is pushed back by the trip cam, the key is not activated, because the whole key has been turned away by the elbow joint mounting (Picture 3).

Now for the novelties. So that you can buy more fischertechnik cable rolls as you need them, we have slightly altered the make-up of the supplementary kit fischertechnik 06. This now holds 6 cams and four cable rolls. These cable rolls are indispensable, particularly for the construction of cranes.

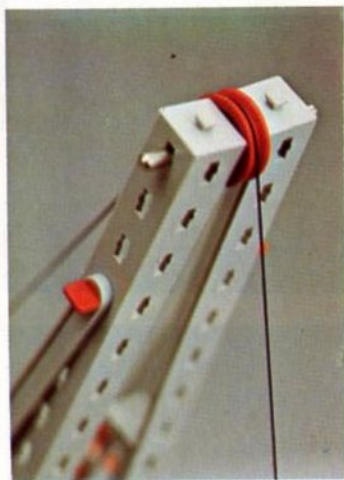


# fischertechnik

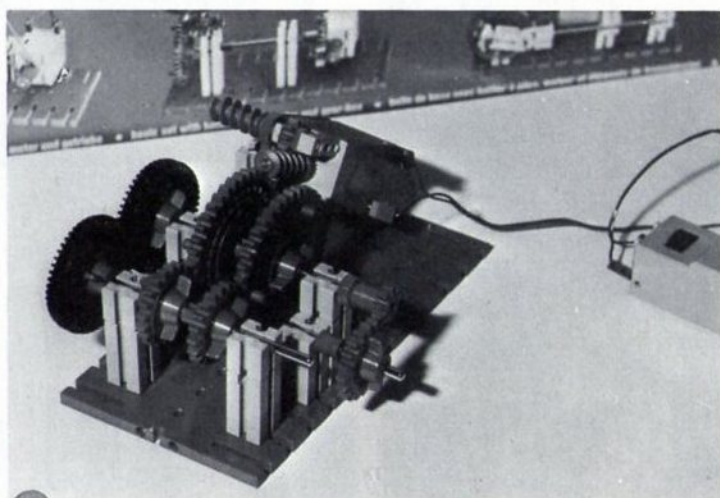
## model ideas and reports from Europe and overseas

The two pictures below show the inset of the coils and the new supplementary kit 06.

We should like today to introduce you to 7 out of some 200 fischertechnik Reporters.



1. Martin Moll (11), Graz, Austria: "I was born on 16. 2. 61. Graz, which is the second largest city in Austria, has the world's biggest arsenal, and also a unique double spiral staircase dating from 1942. My model – inspired by the machines in a factory – was built with fischertechnik sets 300, 01 and 04."



2. Stephan Ude, Lima, Peru:  
"I live in Lima-Rinconada del  
Lago, up in the mountains.  
There are mine-galleries here,  
where we dig for malachite,  
and also many caves. My  
hobbies are cycling, collect-  
ing stamps and, first and  
foremost, making models  
with my fischertechnik sets."

3. Christoph Tschopp (12),  
Menziken, Switzerland: "I  
live in Menziken, in the Aar-  
gau canton, an industrial



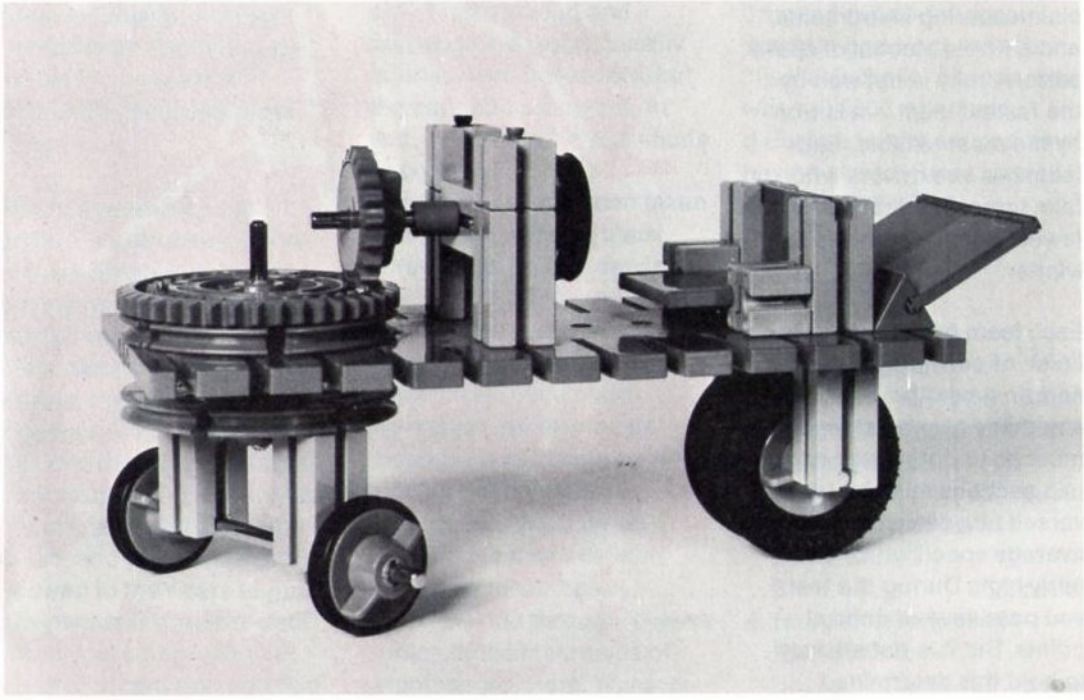


township of 5,000 inhabitants. The main industries are tobacco and metal-working and there are also two factories for knitted goods and a company which makes drinks. The two photos show how the town has grown in 60 years. The last photo shows

the townhall, built in 1907. It has remained practically unchanged down to the present day. The gymnasium annex is only used on special occasions, because 13 years ago new school premises, including a gymnasium, were built. A large indoor swim-

ing-bath was inaugurated in June, 1971. In my spare time I often go swimming, but best of all I play a great deal with my fischertechnik sets. My model is based on the post-office vehicles to be found at railway stations."

(Continued p. 18)



# fischertechnik and the Tour d'Europe

Before the start of Europe's longest and most difficult motor rally, Kurt Waldner came from Horb to our factory with his new Opel-Ascona RS. On right and left sides it proudly bore the trademarks of fischertechnik and Fischer-plugs.

In rallies, all types of car are allowed, and the engines are sealed before the start of the rally. You are allowed to have extra petrol tanks, struts to strengthen the car roof, specialmeasuring instruments, and a whole arsenal of spare parts. A rally is not won by the fastest team – it is won by the most reliable. Each team has two drivers who take turns. The team with the fewest penalty points is the winner.

Each team has to reach the finish of each stage by a certain time. Above all, a number of special tests must be undergone: i. e. certain sections must be traversed at a determined average speed which is fairly high. During the test, you pass several control points. But it is not all easy to hold this determined



speed, especially as you may be travelling at night, on a stretch completely unknown to you, on bad unsurfaced roads. It could be, for instance, at night in Finland during a snowstorm, in pouring rainfall in Rumania, or on zigzag mountain roads in Montenegro.

On the 9th October, 51 teams started out on the long journey. The Russian Ambassador, Falin, sent off the only DAF; the film star Martin Held entered a Skoda. The first stage was from Erbach into Denmark, and from there by ferry to Norway. At the Swedish frontier, drivers changed their summer tyres for ones with spikes. The journey through the North of Sweden was in driving snow. The first special tests came in Finland. Average speeds were about 48 mph for the higher class and 44 mph for the lower class of car.

The comradeship of rally drivers is exemplary. If one of them breaks down, immediately two or three others stop to help him. Then came the first stretch in Russia, from Leningrad to Moscow. In Moscow, drivers had one day off to rest from their exertions. The cars were put into a closed parking place, and drivers were not allowed to their cars to make any necessary repairs until two hours before the start. From Moscow, the route led

over snow-covered roads to Brest, a distance of 750 miles. The frontier had to be reached before midnight. From here to Zakopane, deep in snow; it didn't stop snowing until the frontier of Hungary was reached. There, the drivers changed tyres once more.

At this point, Waldner and Vogt lay in second place. In Rumania there came perhaps the hardest test of all: 61 mph in pouring rain on softened roads.

In Bulgaria they travelled in thick fog, on roads that were at times blocked by cows, pigs and donkeys. Here, there was an accident. In the fog, one team was steering by following the line of telegraph poles alongside the road. Where the telegraph lines crossed the road, the driver left the road and hurtled into a wood. Luckily injuries were not severe, but the car had to drop out. At last, in Turkey, the sun shone once more.

The lead had now been taken over by the Russian team, Girdauskas and Madreviz in a VAZ. It is worth noting that the Russians were the only team to be accompanied by a completely equipped workshop vehicle. In one instance, a complete front axle was changed on a Moscovitch. Waldner and Vogt had to make do with their own resources.

The route led through Thessalonica to the mountains of Montenegro. Here, Waldner

and Vogt were really able to show what their driving ability was made of. On the steep, narrow and stony mountain roads, they caught up so many points that they were able to force the Russian team out of first place. The crucial moment came in the last night-stage from Zagreb into Austria. Waldner and Vogt had four Russian teams ahead of them, and the roads were so narrow that overtaking was not possible. But they held the lead they had gained. The Russian team was able to reduce the number of points in that lead, but it could not break it. Then the situation stayed unaltered right up to the finish, at the Spa House in Travemunde. On the 23rd October, 39 teams reached the finish. 12 had dropped out on the way. Waldner and Vogt, in their "fischertechnik" Ascona, had won the 9000 mile Tour d'Europe for the second time, having already been overall winners in 1969.

The results:

1. Waldner/Vogt —  
Horb/Stuttgart —  
Opel-Ascona RS 48 points
2. Girdauskas/Madreviz —  
Kaunas/Riga —  
VAZ 53 points
3. Falkenberg/Maarfeld —  
Delmenhorst —  
BMW 65.2 points
4. Haugland/Antonsen —  
Kjeller/Oslo —  
Skoda 66 points

# News from the fischer- technik Club

Dear Club Member,

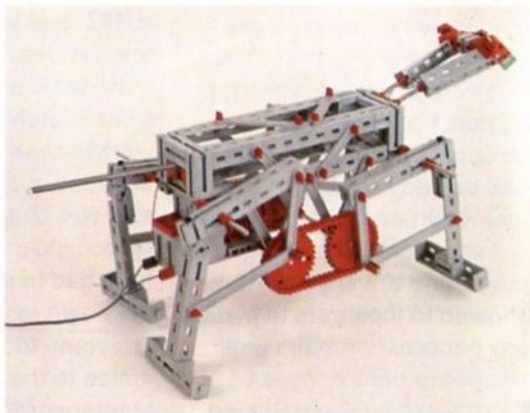
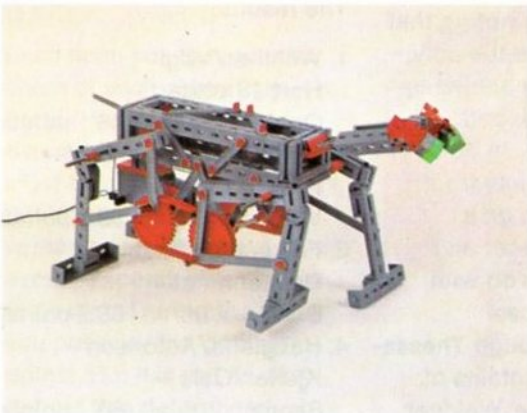
This time, the model we are introducing is the most fun to build of any we have seen made from fischertechnik parts. Our Member Horst Stäcker of Bremerhaven has made a fischertechnik cat that walks with a rolling gait, forwards or backwards, on four legs, climbs over small obstacles, and has two glowing green eyes. The best thing is for you to follow the instructions and build the cat for yourselves, and then you'll be just as enthusiastic as we were in the factory. The technical problem — how to get a four-legged animal model to move — has been solved in a masterly way.

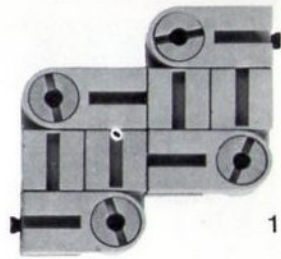
And now here's an interesting puzzle using four fischertechnik elbow joints. This puzzle was sent in by Member Henning Bossow from Hamburg. The question is: how do you separate the elbow joints shown in picture 1 with just a few movements? You can use this puzzle as a brainteaser for your friends.

In putting the elbow joints together, you begin as shown in picture 2. Without having pushed them all the way into each other (picture 3), they are now all connected (picture 4). At the end there is just one firm block (picture 1). Have lots of fun trying this one out! In this number too, we want

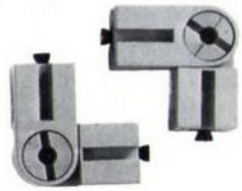


to give you some suggestions for small Statics models. You can now buy the Statics parts you need, everywhere, in the Statics supplementary kits 031-038. With the Statics supplementary kits you can also build the models shown on page 12 of the issue. Even if you now have only the fischertechnik Basic

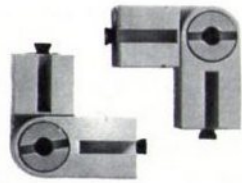




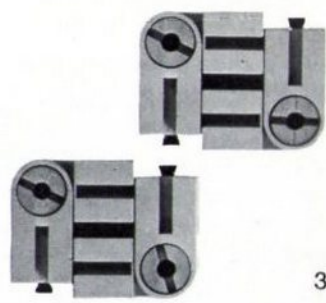
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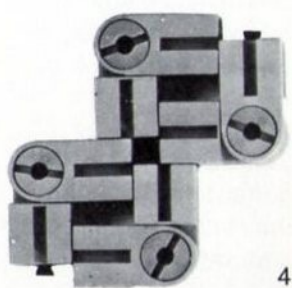
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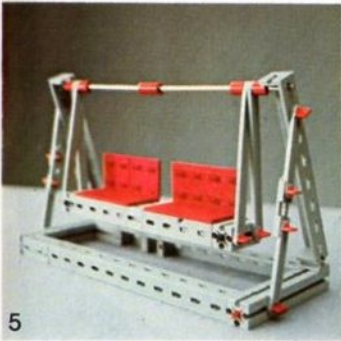
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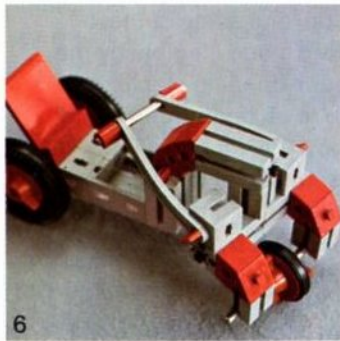
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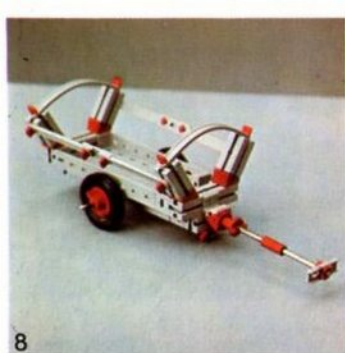


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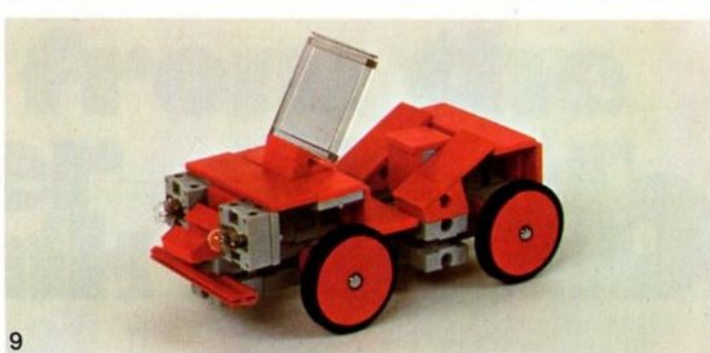
the supplementary kits fischer-technik 011 and 012.

We should like very warmly to thank all Club Members who took part in the Winter 1971-72 model building competition. This year also we shall probably run another model building competition. Now to the great fischertechnik Reporters competition. You – the fischertechnik fans – have once more exceeded all our expectations! Instead of receiving just a few dozen reports, we had over 200 from Germany alone! This is an amazing quantity, since the real fischer Reporters had to go to a good deal of trouble: models had to be built and then photographed or sketched. Photographs or transparencies had to be procured of the locality

Building Set, you can already build these models by buying the little supplementary kits. Picture 5 shows a Hollywood Swing without roof. Picture 6 a three-wheel car. Picture 7 an electric cart, and Picture 8 a covered wagon. A particularly attractive model is the little car (Picture 9) which you can build using the building blocks and rectangular panels from



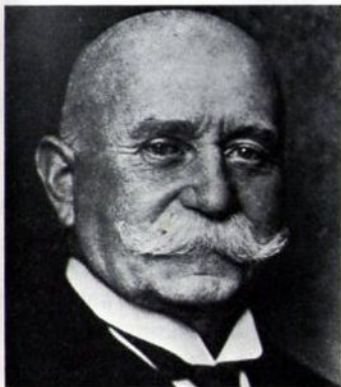
and of the Reporter, and finally a short article had to be written. Nobody must feel disappointed if, in spite of all his efforts, he didn't manage to get into the Club Magazine this time. As in all contests and sporting events — whether it's motor rallies or marathon races — there may be 100 or more entrants, and only one can win, and very few manage even to get up among the leaders. But it's more important to take part than to win, because everyone who takes part increases his own capabilities. We should like to thank sincerely every Reporter who competed; everyone will receive the promised Club Pin and a small token of recognition. The choice was difficult for us, and if we have decided on one or two contributions which will be printed in subsequent issues, this is not to be taken as a valuation. Another question we have to consider is whether the accompanying pictures will reproduce well. Some contributors have forgotten to put an address on their letters. Some letters had addresses only on the enve-



lope, and some of these were made illegible by the letter-opening machine. So to all contributors who have not yet had a letter from us, we'd like to say: please write to us once more. And this time, please remember the address!

We hope the Reports will please you and that they will give you some good ideas. This concludes the Reporter competition for the time being.

# Great Inventors and Discoverers



The history of the invention of rigid dirigible airships is already 100 years old as a technical revolution, but really still only in its beginnings. It is the history of a plan pursued with incredible energy. It will forever be associated with the name of Count Ferdinand Zeppelin. Count Zeppelin was born in 1838 and grew up on his father's estate near Konstanz on Lake Constance. After his schooling he went to an officers' training academy and, at the end of his term, graduated as a Lieutenant. After this he studied Political Science at Tübingen. In the wars of American Independence in 1863/64, he took part as a neutral observer. During these years, he saw a balloon go up for the first

time, and from that moment onwards he was obsessed by this experience. He took part as an officer in the two wars of 1866 and 1870/71. However, it was not long before, at the age of 52, his reform proposals made him unpopular, and he was condemned to retirement. At that period, his life work proper began — the building of airships that would bear his own name — Zeppelin. With pencil drawings he cleared his own ideas about the more important construction principles. In the cigar-

shaped outline he drew circular struts which were connected by lengthways struts which ran the whole length of the ship. But such a construction could be carried out only in a tough and elastic material — aluminium.

At this time Zeppelin might just as well have tried to build his airship from pure gold, since in 1875 a kilogramme of aluminium cost about £ 300.

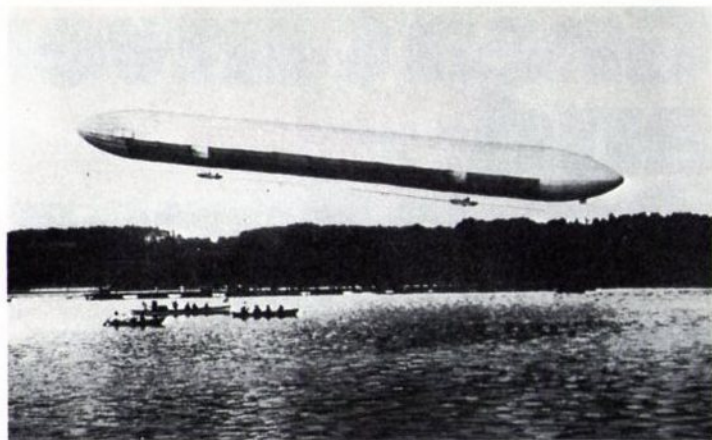
However, by the 1870s, the price of aluminium had fallen to about £ 200, and a few



years later, this newfangled material was sufficiently cheaper to permit the Count to think seriously about building his airship. He applied for a patent on his idea. A host of obstacles, unthinkable to us today, stood in his way. His fellow Germans wrote him off as an idiot. Many caricatures show him as a cavalry general, vainly trying to take off into the air. But Count Zeppelin was not to be distracted, and he invested the whole of his not inconsiderable private fortune in the plan.

The first Zeppelin was built with a diameter of 12 metres and a total length of 128 metres. There is the simplicity of genius in the idea of building the airship in a floating hangar on Lake Constance. This saved the high cost of land for an airport. On 2nd July 1900 the cigar shaped Zeppelin LZ 1 was towed out of its floating hangar for the first time, and a vast crowd followed its first starting manoeuvres. After a 15-minute test flight, the flying monster landed on the water, in the vicinity of Konstanz.

This successful test flight was followed by other ones. But gradually, Count Zeppelin's money was being exhausted. He hoped for contributions from public and private investors, but these did not materialize, and at the beginning of 1901 he had to dissolve the company he had formed.



It was not until 1904 that he secured an audience with the King of Wurttemberg, and managed to persuade the King to authorise a lottery whose proceeds would finance the building of Zeppelins. With these funds he was able to build the second Zeppelin which was ready on 30th November 1905.

The first test flight was successful but marred by technical hitches. But immediately afterwards the airship was wrecked, because it had been anchored to the ground at both ends, and when a storm broke out, the envelope was ripped. LZ 2 had to be scrapped.

Count Zeppelin, however, did not let himself be discouraged. He fetched the wreckage of LZ 2 from the Allgäu back to Lake Constance, and built his third Zeppelin. In October 1908, LZ 3 made its first test flight. This went off without any hitches, and the speed of the new Zeppelin was three times that of LZ 1.

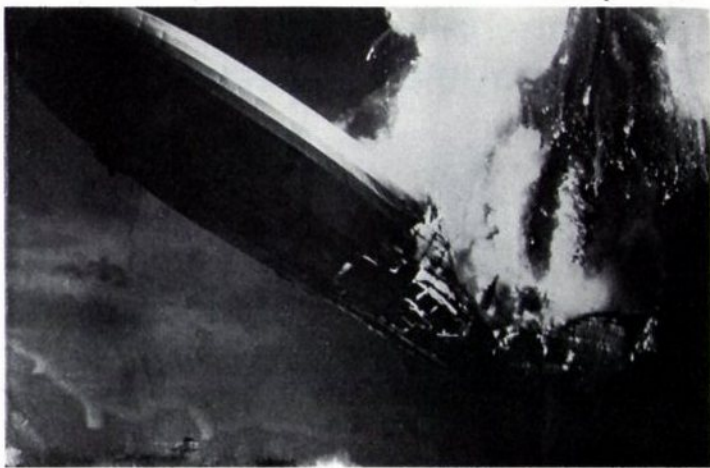
Now at last the public was ready to support the Zeppelin plan. The Ministry concerned in Berlin approved new spending for the construction of a larger hangar on Lake Constance. A second lottery raised the money necessary for construction.

Then in 1907 the decisive turning point came. The maiden voyage of the LZ 3 from Mannzell to Ravensburg and back at a speed of 9 metres a second was a triumphant success. The War Ministry bought the Zeppelin. At last money began to flow into Count Zeppelin's empty coffers.

A storm in December sank the "Reichshalle" on Lake Constance, and LZ 3 was destroyed; the Count immediately started on the construction of a fourth Zeppelin. This had a length of 136 metres, a capacity of 15,000 cubic metres, and engines of 200 hp. The test flight was over a course of 212 miles, an unheard-of feat for those days. The German



Parliament now granted a sum of two million marks, with the condition that the airship must cover a journey of at least 437 miles in 24 hours. This trip, once more, ended in disaster. After an emergency landing, the ground crew could not hold the ship. A soldier was dragged up into the air with the ship; fearing for his life he pulled desperately at any levers he could find, when a sheet of flame tore the ship apart. The soldier eventually escaped unharmed because he was able to jump off into a tree. Count Zeppelin, now 70, and already a German success symbol, was yet again faced with the collapse of all his life's work. Late at night he travelled back to Friedrichshafen by train, to find himself awaited on the platform by a silent crowd of thousands. This was a demonstration of admiration and deep sympathy such as had never been seen before in the technical world. Only 36 hours after the accident, 2 million marks in contributions had arrived. The German Crown Prince headed a drive for funds entitled "German People's National Contribution." A few months later, contributions had swelled to six million; with these funds, Zeppelin established the company "Luftschiffbau Zeppelin GmbH". In a new reinforced concrete hangar in Friedrichshafen, the LZ 5 was built. This Zeppelin was the sensation of the



first International Airship Travel Exhibition in Frankfurt. Now Zeppelins began to be employed for air travel. A travel company was formed: "Deutsche Luftschiffahrt AG" and operated its first Zeppelin, named "Deutschland" in June 1910. Already on the first test flight there was another grave mishap when a storm forced the "Deutschland" down onto the top of the Teutoburger Forest. But during the next four years there were no accidents worth mentioning. Zeppelins

became a familiar sight for Germans, and there were soon Zeppelin fields in many German towns. In spite of the fact that great success was now in sight for him, Count Zeppelin was embittered that the German General Staff had decided to use Zeppelins for military purposes. Ferdinand Count Zeppelin died on 8th March 1917, aged 82, from pneumonia. His death came seven years before the

(Continued p. 20)

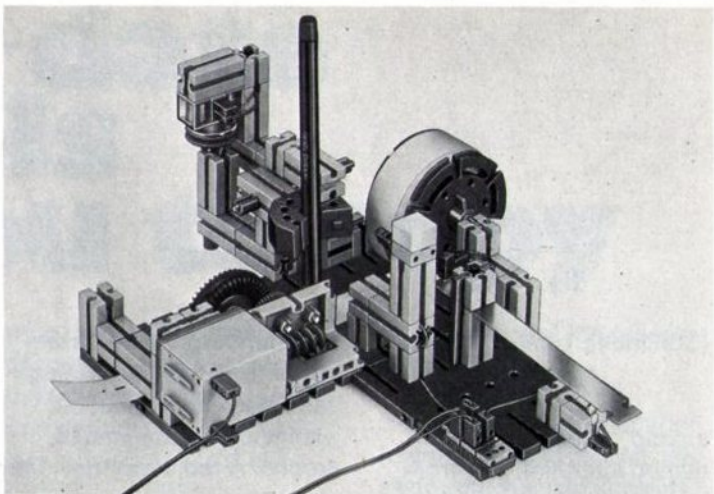
# fischertechnik model ideas and reports from Europe and overseas

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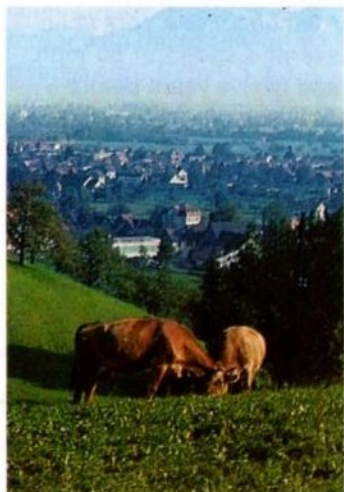
4. Thomas Brantner, 11, of Schramberg. Thomas lives with his parents and three brothers in the middle of the five-valley town. He writes: "I have used fischertechnik for many years now. I've got the most important Building Kits. fischertechnik has helped me to understand many things in the technical world. I built this ski lift — my big brother helped me."



5. Michael Dünkel, 13, of Annweiler. "I was born on 5. 8. 1958 in Pirmasens. Now I live with my parents and my two sisters in Annweiler, 6.500 inhabitants, at the foot of the former Staufenburg Trifels. My hobbies are: building with fischertechnik, stamp collecting, sport and photography. I got the idea of building a Morse apparatus through reading a book on inventions."



6. Tobias Schmidheini, 12, from Balgach in Switzerland. "I live in a country village and belong to the 5th class of a primary school. With my fischertechnik I build machines, cranes, rack railways and many other things. In our family we love playing the card game called "Skat". That is why I built a card shuffling machine – the cards go in at the top right hand, in two piles, and at the bottom left you can take the cards out one by one."



7. Friedrich-Karl Weide, from Hilden. "One fine Sunday morning I went with my father, my brothers and my sisters to the airport at Düsseldorf, I immediately noticed the flight control tower – and I copied it in a fischertechnik model."



(Continued from p. 17)

airship "Graf Zeppelin", named after him, flew from Friedrichshafen over the Atlantic to New York at an average speed of 80 mph, and twelve years before a Zeppelin flew round the world in twelve days. In 1932, Zeppelins were placed in passenger service between North and South America. On 6th May 1937 the airship

"Hindenburg", after having made the Atlantic crossing ten times in one year, fell victim to a terrible catastrophe. A radio reporter, who was commenting on the landing from the airport, froze the blood of millions of listeners as he described, from the scene of the tragedy, how 11 of the 37 passengers and 39 of the crew of 51 perished in the flames. This disaster appeared to seal the fate of the Zeppelins. For

23 long years, Zeppelins were ranked among the technical monstrosities of the past. But in Autumn 1970, the world press published the plans of an American professor to build atom-powered vertical take-off airships, 326 metres long and 37 metres high. We shall soon see whether the genius of Count Zeppelin, after nearly 100 years of history, can contribute to solving some of mankind's future problems.

### Club Contacts

These Club Reporters would like to correspond with other Club Members:

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## fischertechnik®

### To make you think:

Out of 100 Children in a town:

- 30 have a fischertechnik basic set
  - 14 have a statics set
  - 24 have a motor set.
- Of the 30 who have the basic set, 7 have a basic set and a statics set, 15 have a basic set and a motor set, and 3 have one

of each set. Of the 24 who have motor sets, one has a motor set and a statics set.

1. How many children have only one fischertechnik set of each kind?
2. Why have the children with only a motor set or a statics set not properly started on the fischertechnik programme?

# Up-to-date models for you to copy

Today's road traffic conditions demand the shortest possible reaction time from every road user. Reaction time is the time between becoming aware of a dangerous situation and reacting to it — e.g. by applying the brakes. There are various machines and methods for measuring reaction time. Try, without help at first, putting together a reaction time test machine from your fischertechnik building elements. Your friend or your father will certainly come forward to take the part of the man being tested.

**Task to be solved:**  
A signal lamp which lights up suddenly has to be put out by the person being tested in the shortest possible time, by pressing a key. At the same time as the signal lamp lights up, a time switch mechanism is set working, and this is switched off when the person being tested presses the key.

An indicator mounted on the shaft of the time switch mechanism shows, on a scale, the reaction time of the person being tested. If you prefer to work from building instructions, then

read on. To build the model described you need at least the following building sets: one each of 200; mot. 1; mot. 2; e—m 1; and 2 of e—m 3.

The keys from e—m 3 may also be put together out of separate building elements as in pictures 6 and 7. In place of the two supplementary kits e—m 3, 3 supplementary kits 01 are necessary.

Building instructions for a fischertechnik reactiontime testing apparatus.

1. Development of the electrical switching (diagram 1). When the key A is pressed, the signal light E and the time switch mechanism D are simultaneously switched on.

The cam driven by the motor D, with the dog F, frees switch C. Even when key A is opened, the motor D goes on running until the person being tested pushes key B or until the dog F, after one revolution, switches C off. The indicator G is mounted on a shaft with the pulley. It shows on a scale the reaction time between the lighting of the

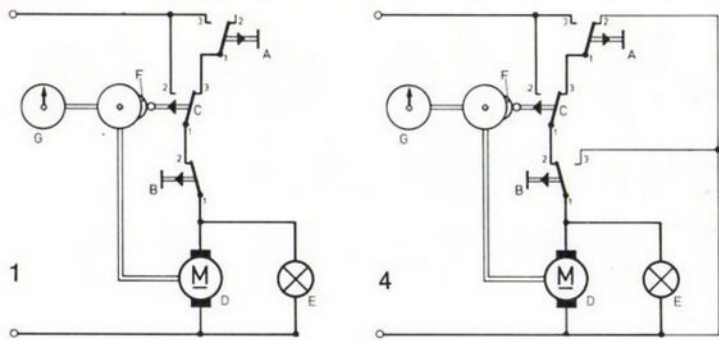
signal lamp and the pressing of key B.

2. Mechanical construction (diagrams 2 and 3). The time switch mechanism consists chiefly of the fischertechnik motor with the reduction gearbox m 1,5—m 0,5 put on. In hole No. 2 of the angle gear the short shaft with gear wheel is inserted and on it, as in picture 2, the pulley with the dog F is fastened.

If the motor is connected to the transformer and the regulator turned full on, then the pulley requires about 0,5 seconds for a complete revolution. The scale is drawn on cardboard, cut out, and stuck on the shaft.

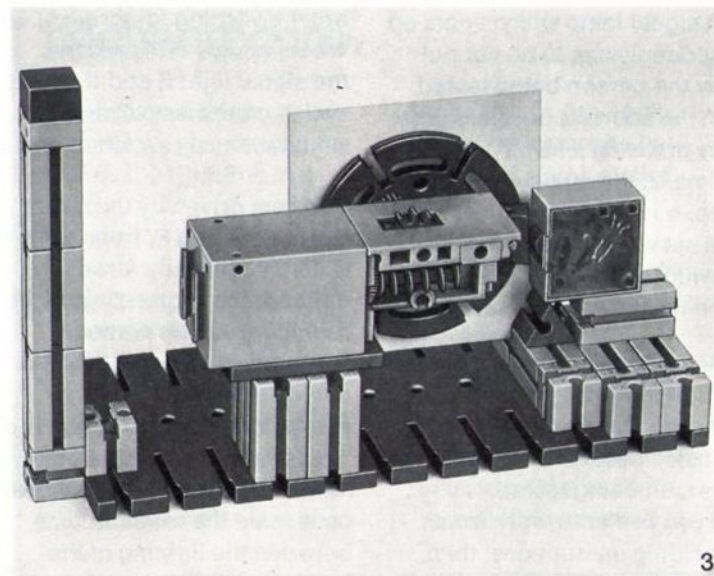
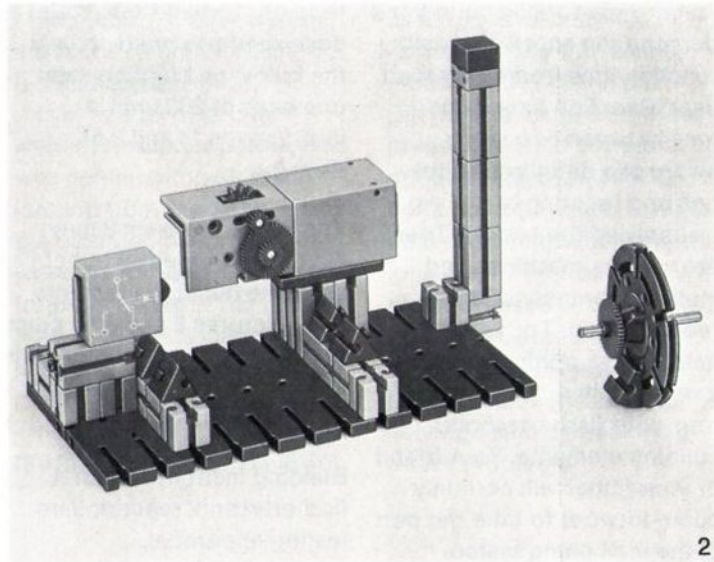
Every large degree on the dial with a figure marks 0,1 seconds or, expressed as a fraction, 1/10 second. The indicator is made from a building block 2 with an angle block 1 as the pointer.

It is fastened to the shaft with the aid of the winch drum. The pointer and the dog F are set so that the switch C is pressed when the indicator stands at 0,5.

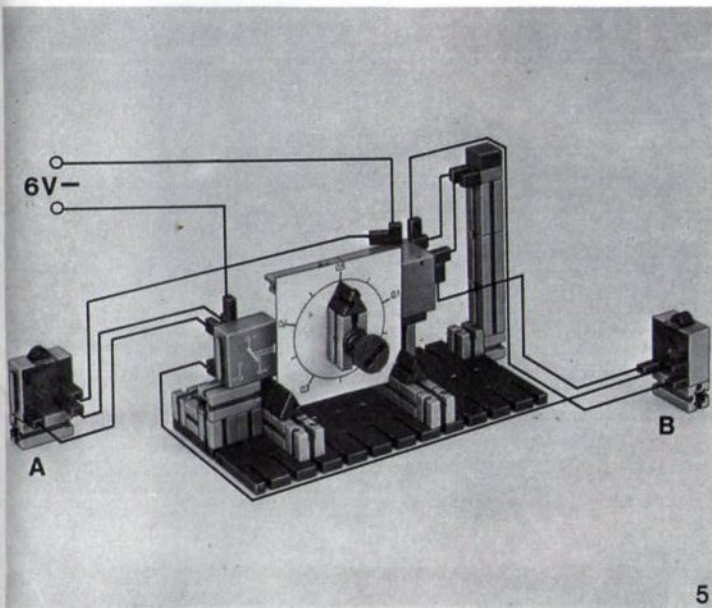


## Wiring

If the model is wired according to the switching plan in diagram 1 and switched on by pressing switch A, then the dog, according to the position of the motor, runs over switch C and the motor is switched on again. The dog rests on switch C only when a smaller current is provided by adjustment of the transformer. This additional run of the motor, when not required, can be avoided by a so-called short circuit of the motor on switching off. The switching plan in diagram 4 is in the main identical with diagram 1. For shortcircuiting, however, terminal No. 2 of switch A and terminal No. 3 of switch B are connected with the minus pole (thin line). Diagram 5 shows the completed model with wiring according to the switching plan in diagram 4. The connecting wire to key A should be long enough to be activated under a table, for instance, so that the person being tested does not notice the switching on of the lamp.



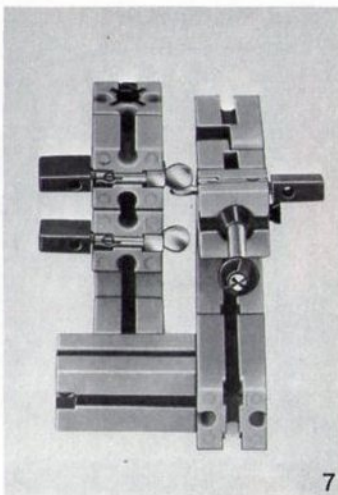
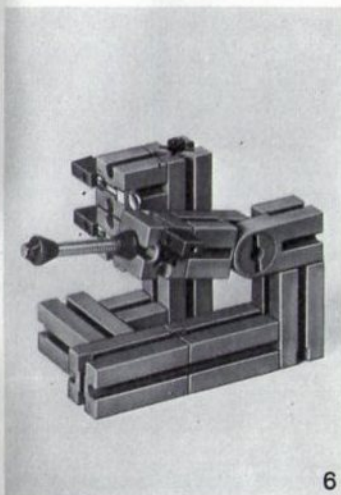
Switches A and B can both be replaced by switches you



make up yourself, as in diagrams 6 and 7.

**How to use the test apparatus.**

The tester presses switch A, and this lights the lamp and at the same time activates the time switch mechanism. The person tested must press switch B within the shortest possible time and hold it down until the reaction time is read off from the scale.



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