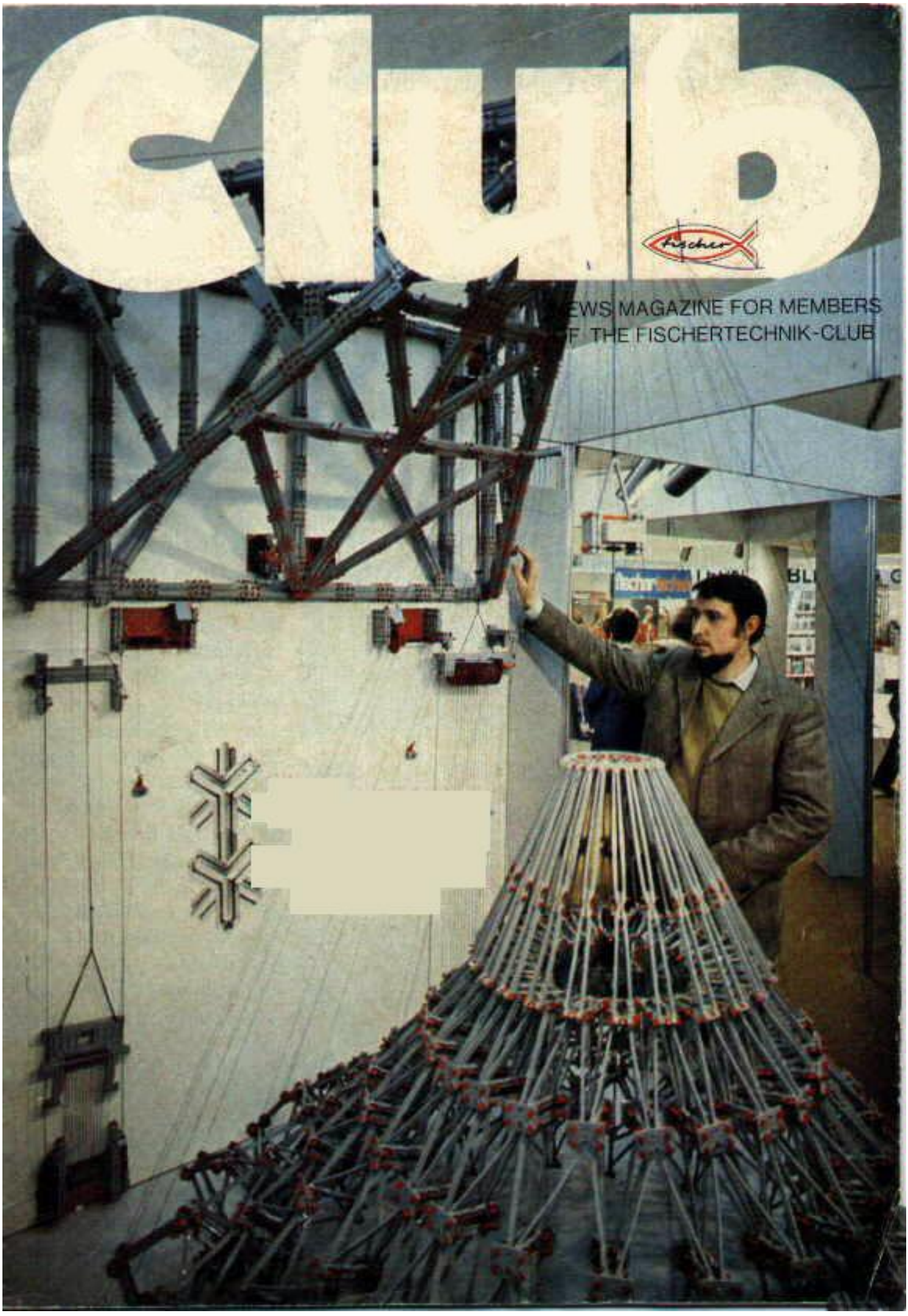
club



EWS MAGAZINE FOR MEMBERS
F THE FISCHERTECHNIK-CLUB

Introduction

An initial glance at the outside and inside of this edition will immediately reveal changes: we have become more modern. At the same time this new format makes it possible, without increasing the number of pages, to offer more in the way of information and construction ideas as well as club gossip. A further improvement is our intention to provide regular columns such as 'Latest from fischertechnik Engineering', 'Latest from fischertechnik Club', 'Current News on Construction under Licence' etc. We welcome suggestions from you on the last-named topic. You must understand, however, that this only applies to models of a fairly advanced kind.

The frontpiece this time shows a large-scale model which was exhibited at the Nürnberg toy fair at the beginning of February. The dome, weighing almost twenty five pounds, is controlled by a Fischer motor through pulley blocks. A second motor can be used for additional moving operations. The dome consists almost entirely of static parts and is completely mobile of its own accord. This means that at first it is like a closed flower, which then unfolds through appropriate control, drops down when the central point is raised and finally forms into a dome. A fantastic model, which has proved very popular.

And now have fun with this edition of the Club Magazine

Yours,

Oscar for Toys 1970

In the November 1970 edition we informed you of the forthcoming presentation in Paris of the "Oscar for toys" for the most valuable box of building bricks from an educational and scientific point of view, and promised at the same time to give a report of this ceremony.
The 6th November 1970 was the appointed day. Herr Fischer, who had travelled to Paris with a few close colleagues, was at the 29th Salon de l'Enfance punctually at 12 noon. The atmosphere was festive, in keeping with the forthcoming event. Ten "Oscars for toys" were to be presented for the various toy sections. Herr Fischer was the only German among the prizewinners, a fact which naturally attracted attention. A live telephone interview had already been broadcast on the European wavelength from Saar on the previous evening, and a further station was expecting a conversation immediately after the ceremony. There were also the numerous press journalists who were present at the presentation.

With the compliment "Your toy is one of the most beautiful in the world, the French Information Minister Jacques Baumel presented Herr Fischer with the document and medal as the first of those firms awarded distinctions. Modestly, almost shyly, the head of the Fischer works submitted to the flashing of the photographers' bulbs and the applause, but was clearly pleased at the honour conferred on him.
It was the first time such a thing had happened in the German toy industry: fischertechnik toys have been on sale for only five years and have already been crowned with the highest French award. In France the quality of our toys was given early recognition: in 1966 and 1967 we received the "Diploma for the best toy", which is awarded annually by "Loisir Jeune"
We are naturally very pleased at these successes and are proud of them.

Toy Fair 1971

Those were strenuous days. The Nürnberg Toy Fair from 6th to 12th February 1971 was once again far too great for the fair facilities of Nürnberg. The throng of inquirers, buyers, visitors, toy merchants from every country, was too great.

fischertechnik devotees were prepared to expect a sensation this time "from the house of the grey Fischer wall-plugs". On the big fischertechnik stand in the light-weight hall of the Nürnberg fairground the new "hobby programme" in the fischertechnik system was presented before the eyes of the astonished public.

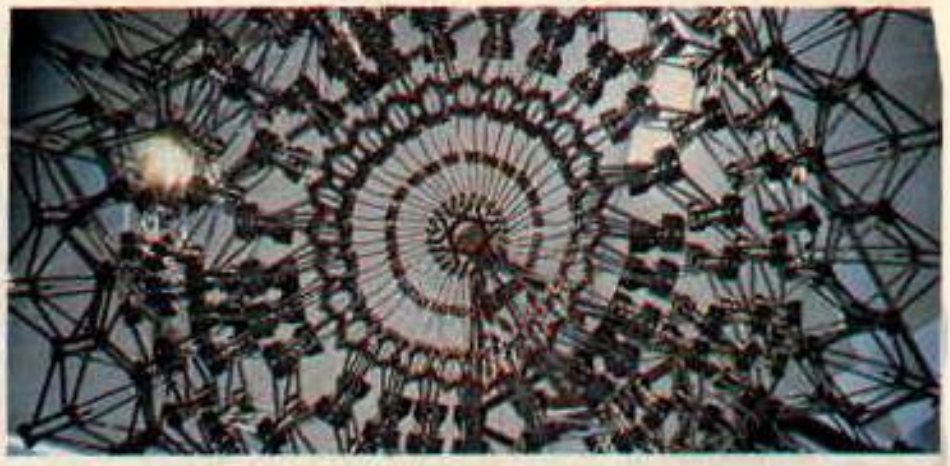
Artur Fischer has developed boxes of building bricks with the units familiar to you, for which the term "toy" no longer has any real meaning. It is a spare-time building programme for the discriminating. The basic box contains the essentials for all hobby building boxes. In hobby box 2 are found motor and gear parts, hobby S contains the static components and hobby 3 the electro-mechanics. hobby box 4 lifts fischertechnik engineering into the realm of pure mechanics; it contains the building blocks for the controlling and direction by light, heat and sound. A hobby handbook is supplied with each of these individual hobby building bricks, designed for the relevant building box, with technical hints, directions and ideas, so that each owner of a fischertechnik hobby programme can occupy his spare time as usefully as possible.

A hobby book is also to appear shortly, in which further working models from the field of engineering will be described. This book should make it clearer still that all the principles of modern engineering can be illustrated with the fischertechnik system.

The photos already show that the whole of engineering can now be mastered under the fischertechnik system.

Visitors to the Nürnberg Toy Fair were never tired of playing around with the working models on display. There was a small machine there which presented a gold piece on a platform. If someone stretched out their hand to it, the fischertechnik electronic system snatched it away from under their nose. A contact was tripped through photocells and the new electronic building blocks, which caused the platform containing the gold piece to tilt downwards.

An electronic organ from the fischertechnik hobby programme provided music in conjunction with a portable radio as amplifier. This list of fascination models could be continued almost indefinitely. The model represented on the title page occupied the centre of the stage



It is described in the introduction on page 2.

The figure opposite shows a view from beneath into the mobile dome.

The Nürnberg Toy Fair has closed its doors. The hobby programme has been carried out by fischertechnik devotees to the far corners of the world, and for you also, dear club members, it will soon be exhibited at your fischertechnik dealer's, so that you yourselves can get acquainted with the new possibilities of the fischertechnik engineering system.

New from fischertechnik

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Supplementary Kit 022
(Drive Chain)
As you have no doubt already found out, the fischertechnik chain is very versatile. Here are some interesting suggestions as to how it can be used:
1) The chain can be turned to pull or carry loads, (figure 2)
2) When the chain is put around two gear wheels it is possible to build a caterpillar vehicle (e.g. a bulldozer and the like) (figure 3)
3) By connecting two or more links with a standard block the result is another type of chain, (figure 4)
4) The links of the chain can also be used singly as connecting pieces between basic blocks (figure 5)


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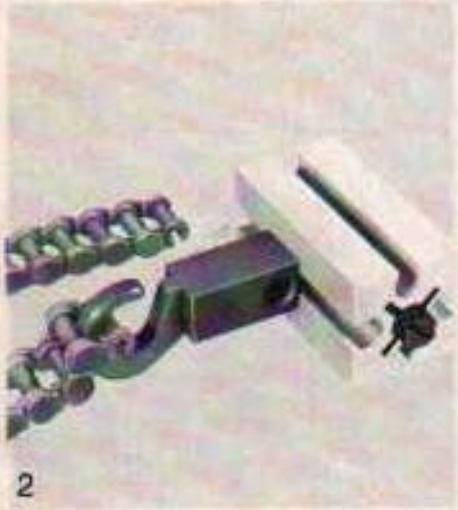
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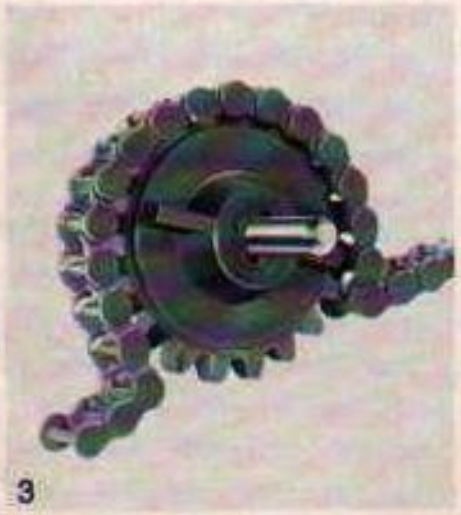
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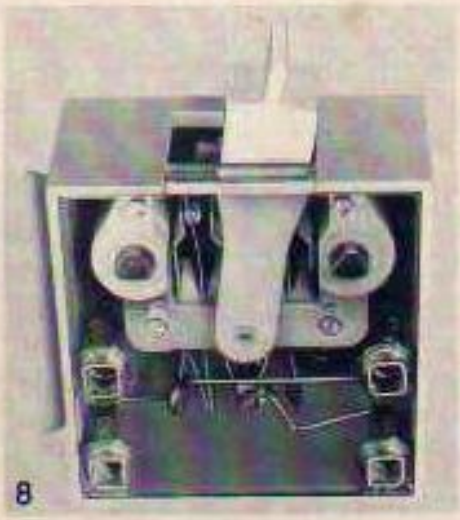
Supplementary Kit e-m 3
(figure 6)
This little pack contains the following parts:
1 Press-button switch (fig. 7)
1 Changeover switch (fig. 8)
1 Lead with green plugs (40 cms). 1 Lead with green plugs (20 cms). 1 Lead with red plugs (40 cms). 1 Lead with red plugs (20 cms).
The switches have a transparent casing so that the switching procedure can be clearly observed.
Do you know the difference between a change-over switch and a press-button switch?
The change-over switch changes it's state by a single operation and stays in this state until a further operation is made.
With the press-button switch, a return position unit is built in, and this brings back the contact again to the starting position after it's operation.
To build various steering devices etc., both parts can be used again and again.

Supplementary Kit e-m 4
(Figure 9)



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This kit contains the following parts: -
5 Light caps - white, green, yellow, and red, as well as red with a circular opening for a lens lamp. 2 leads with red and green sockets (30 cms). 1 Light cube base, complete with bulb.
If you have lost a light cap, need more leads, or if a lamp has burnt out - this pack will provide a welcome substitute.
Now, another hint for everyone who would like something special for their birthday.
The fischertechnik transformer (mot. 4) (figure 10), - which in technical language is called a "trafo" for short, - makes the battery case, with

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it's tiresome changing of batteries, superfluous, and makes for carefree experiments. Household power is provided by the Electricity Station with an alternating current of 220 V (240 V in the U.K.).
However, this voltage is extremely dangerous for experiments and so for our tests the voltage changer (transformer) is used and this reduces the mains voltage from 220 V (240 V in the U.K.) to a safe level. By using the top terminals and the rotating knob at the top for the casing we have at our disposal direct power between 0 and 6.8 volts. On the side terminals alternating power of about 6 volts is at our disposal.
The trafo is adjustable by degrees and allows the reversal of the circuit directions. In other words, one can for example make a vehicle go alternatively forwards and backwards very quickly. (It should be noted that the current refers to a medium load).
The fischertechnik mini-mot. definitely requires a transformer. It is obvious that a very small motor is designed from the point of view of safety for a high voltage. Whoever wants to experiment properly should therefore purchase a transformer. It has been proved by the German Electrical Association (V.D.E.), and is of course suitable for use in other countries.

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Olympia III

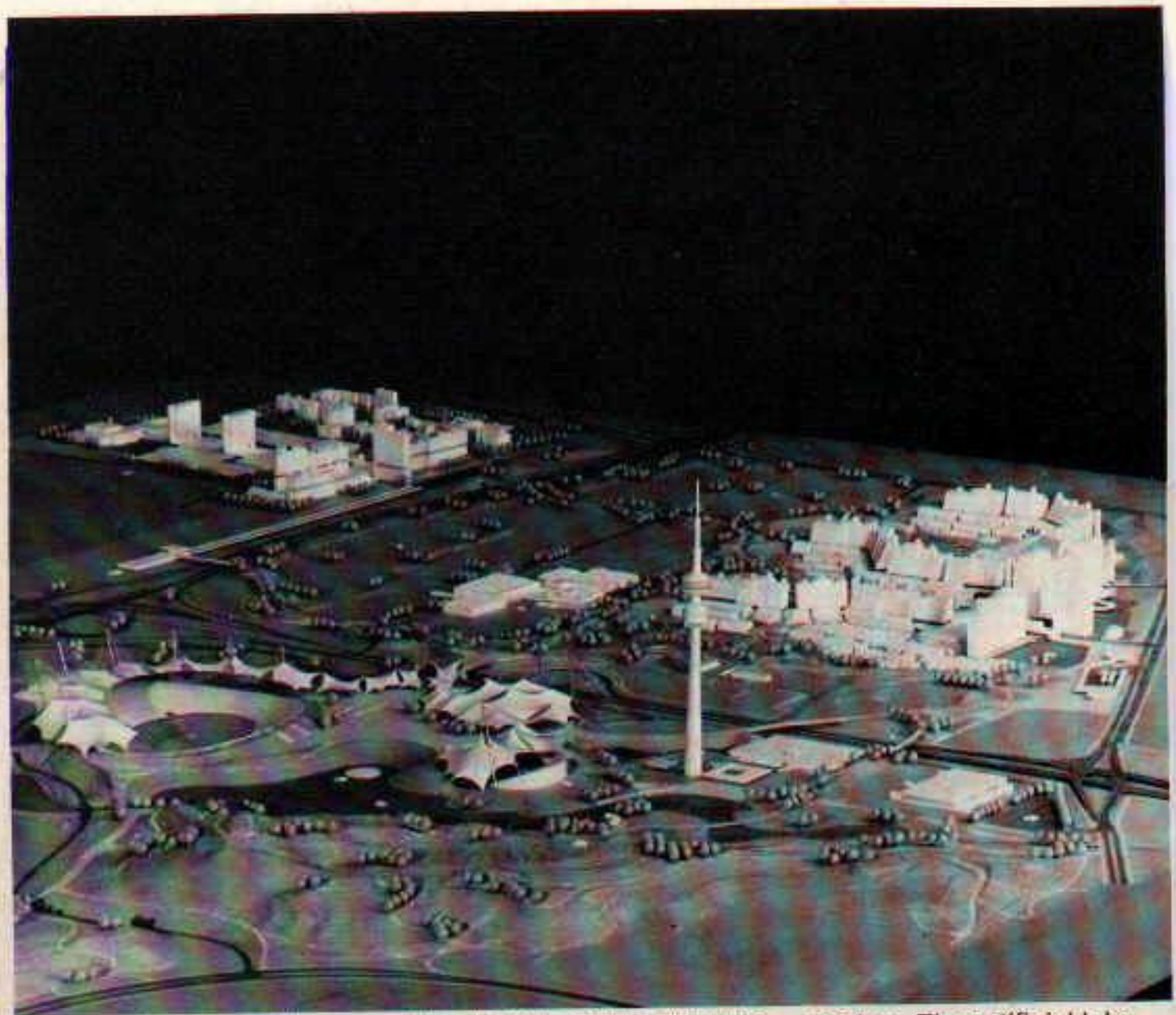
XX. Olympic Games 1972

Preparations for Olympics in Munich

Herr Willi Daume opened the official exhibition of the German Olympic Committee at the Dortmund 'Kaufhof' Store, with a demonstration of the preparations for the Olympic Games that will be

held at Munich (photo below). The layout of the Olympic grounds and terrain at Munich is shown in the plan on the next page.
The two colour pictures on the following page were taken at the Dortmund exhibition and show the standard equipment for the Olympic Village, as well as the art plaque of the 'Edition Olympia'.

After the extracts from the history of the Olympic games which were given in the two preceding club magazines, we publish today a preview of the 1972 Munich Olympics. In order to coordinate all the major projects connected with the games, the Olympic Committee was formed as early as June 1966. The chairman of our NOC (National Olympic Committee), Willi Daume, is also chairman of the Olympic Committee. The list of members includes many well-known names. Along with ministers and chief burghermasters one finds Olympic champions, world recordholders - even Nobel prizewinners. The President of the Federal Republic, Dr. Heinemann, has assumed overall responsibility. All building work will be carried out by the Olympic Building Company, headed once again by famous and well-known names, with managers for about 4,000 building workers, among them Germans, Jugoslavs, Italians, Austrians, Turks, Greeks, Arabs, Africans, Chinese, Indians and Pakistanis - a fact which augurs well for the future international character of the games. The Olympic site in Munich has a colourful history. Once a parade ground of the Bavarian army, it became one of the first aerodromes in Germany and was finally used after the last war as a dumping ground for almost 11 million cubic metres of rubble from the destroyed city. There is now a parkland there with around 5,000 trees, 21 miles of roads and paths, many miles of cables and wires, a few restaurants and - as is only fitting in Munich - a large beer garden.
The focal point will be the Olympic Stadium with 48,000 seats and room for 32,000 more standing, with heating pipes under the football pitch. A gymnasium is being built for indoor hand-ball and gymnastics which will have room for 12,000 spectators, while the swimming pool will accomodate approximately 9,000 spectators. The latter will be supplemented by a heated open-air pool just over half a mile away. A



75,000 cub. cm roof, the architectural centre piece of the games, supported partly on 260 ft high columns, covers about half of the stadium, the gymnasium, the swimming baths and part of the approach roads. Doubts have already been cast on the stability of this structure, but it will be completed well in advance and will be able to demonstrate the correctness of its designers' calculations during a whole winter. The roof is made of a transparent plastic, which rests on a steel net with 30 × 30 inch meshes. The artificial lake which borders the main sports facilities in the south will be another 40,000 sq. ft. larger than this roof.

A covered stadium accomodating 5,000 spectators is being built for the track cycling competitions. A new

stretch of autobahn has been selected for the team events. Plans have been made for a volley-ball hall in a large complex of buildings between the Olympic Stadium and the Olympic Village near the television and radio centres. A number of pitches and training areas for hockey and other types of sport will lie nearby. The riding stadium near the horse racing track in München-Riem will be the showplace of the Olympic riding and dressage events. The archers will hold their competitions in the biggest park in Munich, the "Englische Garten".

About 4 miles from the Olympic site will be situated the shooting range and an artificial stretch of water for rowers and canoeists. Natives of Munich make this comparison: the beer consumption of 225 October festivals corresponds to the volume of the basin, which measures 2230 meters long, 140 meters wide and on average 3,50 meters deep. At the edge of this stretch of water 25,000 grandstand seats, in addition to finishing stage, boathouse and administrative building are being built.

The fencers, wrestlers and judo competitors will meet in converted fair halls. A basketball hall is also being built on the fairground.

One building project is already completed: in the midst of the confusion of the many building sites stands the 290 meter high Olympic tower, a new landmark in Munich, whose rotating restaurant commands a magnificant view over the town and the whole region of the Lower Alps.

In the Olympic Village accomodation for 12,000 sportsmen and sportswomen together with their coaches is under construction, with

all ancillary facilities, from sauna baths to swimming pools, a business centre, customs post, theatre, churches and guest rooms; even the meals programme for each

individual competition day has already been fixed. 4,000 journalists from the press, radio and television will be accomodated in thirteen blocks of houses and work in the specially designed press centre with an area of 18,000 squ. m. The news network provided will contain among other things hundreds of new telex lines and telephones apparatuses for a million calls daily. Finally, the radio station in nearby München-Raisting will even be expanded, in order to provide better transmission of the Olympic television programmes overseas by satellite. The German Post

Office is making arrangements to deal daily with thousands of written requests for Olympic postmarks on special stamps. Like the communications network, the approach roads in and around Munich will be extended and improved by 1972. Underground, railways, tramway, new roads and autobahns, additional air and rail links - all are provided for under the Olympic plans. Approach roads almost exclusively are involved here, as the Olympic Games in Munich will be famous for their short cuts, since all the sports arenas are within easy walking distance of each other. There is one exception: the road to Kiel. For there is a second Olympic city in Germany in 1972. In the Kiel Bay the sailing regattas are taking place, and a 300 meter long Olympic Centre is being built parallel to the shore of the Baltic. It will be a special event if, on two rest days between the regattas, a dozen big sailing-vessels from all over the world assemble for a windjammer parade in the Kiel fiord.

The whole of the building work, the organization and all the preparations are being carried out by the most up-to-date methods. Computers are being used, and the exact hourly time-table for the individual sports has already been decided. Up-to-date techniques are not only being used in the planning, however, but in the actual competitions themselves. The jumping and throwing distances, for instance, will be measured by calculating the angle from the edge of the arena. In the Black Forest, at the Junghans watch factory in Schramberg, work is proceding on fully automatic, electronic time-measurement systems, whose accuracy to a thousandth of a second guarantees complete reliability in the judging. The times will be faded in as digital figures into the television pictures and at the same time transmitted directly to the analysis computer. (You will find an article on "Computers" in this edition of the Fischer Club Magazine.).

In the Olympics of ancient Greece there were splended artistic supporting events in addition to the athletic competitions. Pierre Coubertin has also urged that the sports events should be supplemented by functions of an artistic and social kind. Munich, a city with a high cultural reputation, has deve loped ambitious plans in this connection. Theatre, circus, music festivals, symphony concerts with orchestras from all over the world, chamber music in the castle park, jazz festivals, art exhibitions, student gatherings, youth camps - the list of functions planned seems endless. They should give the world a new picture of Germany. Apart from the sporting events themselves, this is the real meaning of this mammoth show for us all. Thousands are planning, calculating and working for this, millions of contributions are required, and a large-scale advertising campaign has already been launched all over the world with this aim in view.

It is not only the XXth Olympic Games which will be held in Munich in 1972. The world will experience in 1972 how Germany has changed inwardly and outwardly in the last two decades.

News from the fischer-technik Club

Dear Club Members,
The recent Christmas period has once again brought us a host of inquiries from all over the world. They contain very many interesting things and we are glad that you are all showing such enthusiasm. Not to mention the applications from new members all over the world. The postcards were literally brought in bucket loads into our offices and there are once again cards from the remotest countries and places among them. The Fischer Club is gradually spreading over the whole world.
At this point, however, we have a request to make of you once again. Please be so good as to complete the cards in clear and legible block capitals. With foreign names which are unfamiliar to us, in particular, we often have great difficulties in deciphering the addresses. We are helping each other if we complete the cards carefully and legibly, as all members will then be certain that their names and addresses will be entered correctly in the club card index from the start, and there will be no delays in the sending of the club magazines. Many thanks for your cooperation.
All previous editions of the Club Magazines are unfortunately out of print, so we can no longer supply back-numbers.

We should also like to take this opportunity to thank you for the many Christmas greetings which you sent to us at the factory.
Your club card, by the way, does not lose its validity with the expiry of a calendar year, so you do not need to send it to us. And another point: the club magazine appears at intervals of three to four months, and not monthly, as many of you assume. The long interval of time between the individual editions is necessary because of the long period of preparation.
In this edition we should like to present you with a model which has been designed by our club member H. Stöcker in B. It is for a stamping machine, such as are in very common use today. For instance, a date stamp is found on every milk cone.

Our model shows matchboxes being stamped. The lowest box is pushed out of a shaft in each case in a regular rhythm onto a table, stamped with the date there and then passed along a conveyor belt to storage.
The following parts are required:
Basic construction units from Boxes 400 and 400 S, mot. 1 + mot. 2, 2 × 022, 06, 014 for the table, 010 and 011 for the inner lining of the shaft.

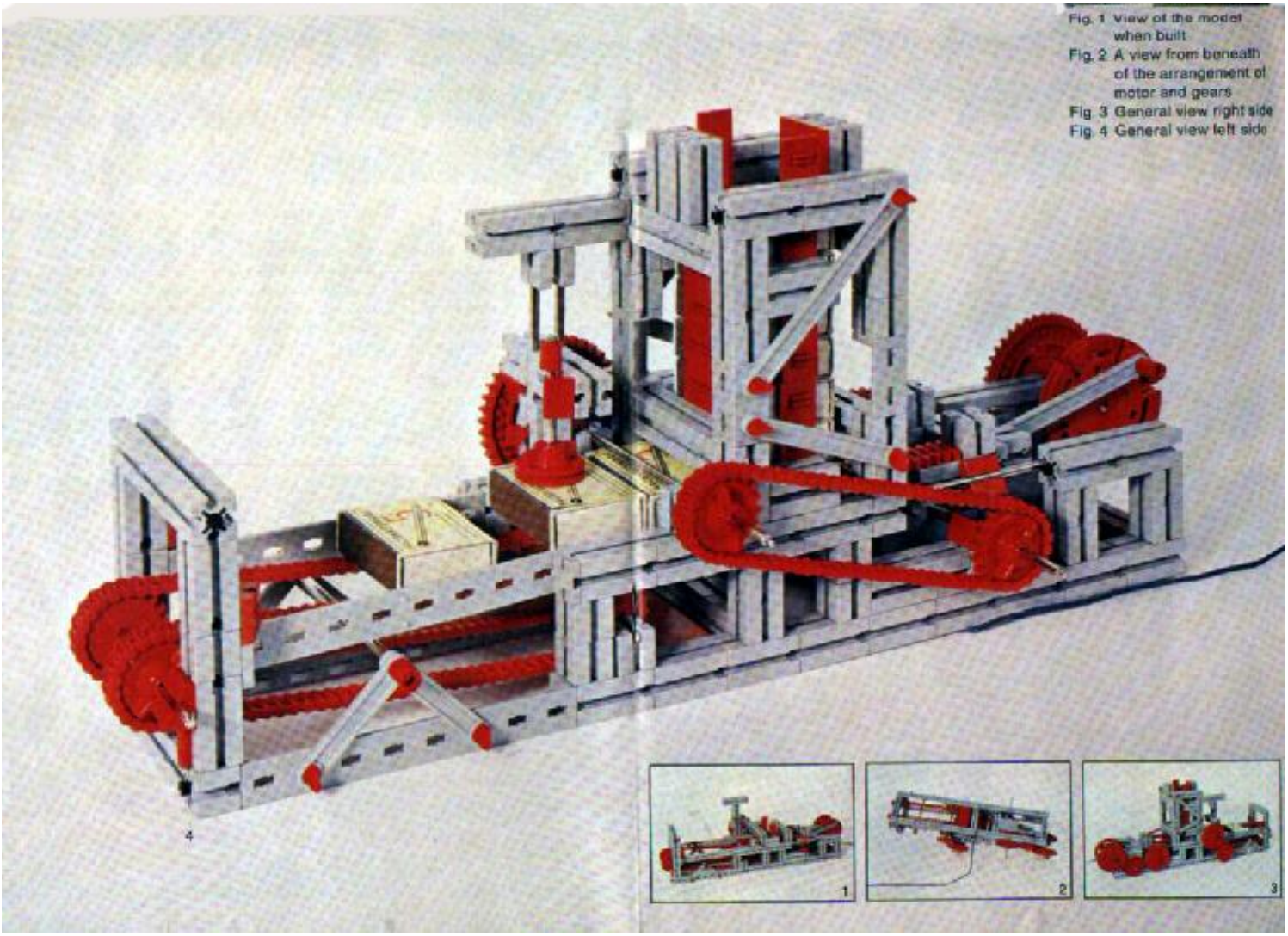


Fig. 1 View of the model when built
Fig. 2 A view from beneath of the arrangement of motor and gears
Fig. 3 General view right side
Fig. 4 General view left side

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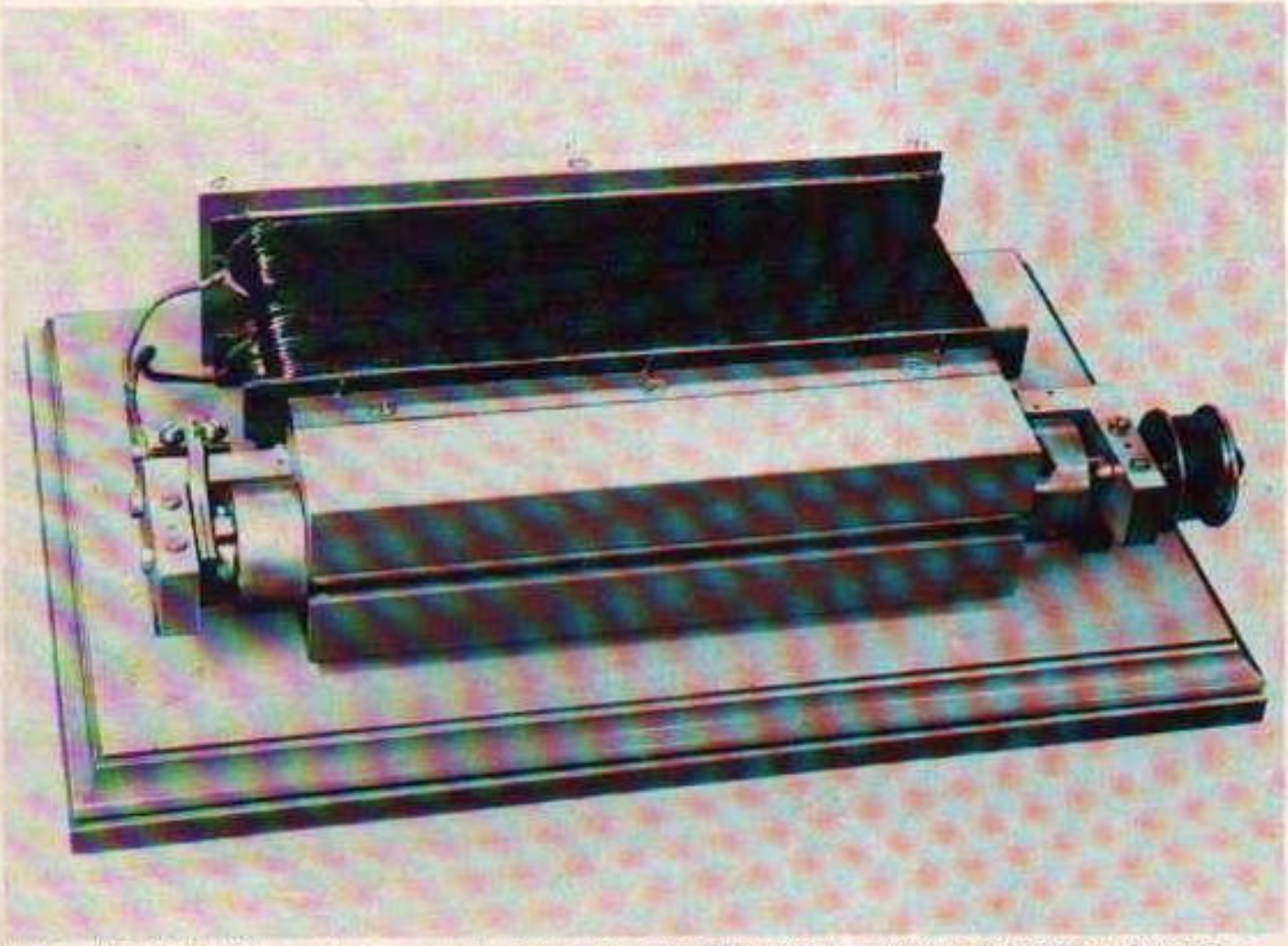
Great Discoverers and Inventors

Werner von Siemens

Electricity was known in ancient times, and investigators studied its mysterious invisible force. But the real age of electricity did not begin until the 19th century. The name of Werner von Siemens is the first in a line who made it possible for us today to obtain power from a plug for all possible purposes, at very little cost and at almost any time and any place.

Werner von Siemens was born as the fourth of 14 children on 13. 12. 1816 on an estate near Hannover. What did a bright young man do in those days, who was interested in natural sciences, but whose parents did not have any money to send him to the school of engineering? He became a soldier. In 1835 the young Siemens from the engineering corps of the Prussian army came to the artillery engineering school in Berlin. There the famous Georg Simon Ohm (the unit of electrical resistance was named after him) was one of his teachers. In the following years Siemen's parents died. The fresh-faced young officar, now transferred to Magdeburg, took care of his sisters who were not yet of age. Werner had discovered a process for gilding and silvering objects by electrical means. He now wanted to use moneymaking inventions to support his sisters, but he got into financial difficulties. His brother Karl came to the rescue, and succeeded in selling the first Siemens invention, galvanic gilding, in London for £ 1500. Werner gave up haphazard experimenting and concentrated on tests with electricity. In Berlin he built in collaboration with the mechanical engineer Halske the first reliably functioning dial telegraph. The Prussian general staff realized how valuable rapid and reliable communication of news can be. Lieutenant Siemens was called on to set up a telegraph commission. A year later, 1847, followed another important discovery, the insulation of underground telegraph lines by a new material, guttapercha. Werner Siemens realized the importance of his two discoveries for the future. On 10. 11. 1847 he founded the telegraph construction firm of Siemens & Halske, which as early as 1848 laid the first telegraph line of any length from Berlin

Werner von Siemens



to Frankfurt. Further orders followed. The calling of an officer could soon no longer be reconciled with that of a manufacturer. Werner von Siemens left the service. The volume of business become greater, brothers Karl in England and Wilhelm in Russia helped out. The building of a 6,250 mile long telegraph cable between Europe and India from 1868 to 1870 gained world-wide fame for the firm Siemens & Halske. Their chief made further researches and made new discoveries, for instance safety devices for railway lines, which were springing up everywhere.

Werner von Siemens published his most important invention on 17. 1. 1867 with a lecture to the Berlin Academy of Sciences on "the conversion of working power into electric current without the use of permanent magnets. He called the machine a "dynamo", a name which is still in current use. The most important part of the dynamo, the so-called shuttle armature, had been invented by him previously for the improvement of his telegraphs. Once again he recognized immediately the

full importance of his discovery.
The dynamoelectric machine can transform mechanical energy into electrical energy, and generate current. But a machine which has the opposite function, an electric motor, must in principle have exactly the same appearance. You can check this for yourselves. Give one turn to a Fischer motor and connect a high gear in front of it, so that it reaches a high speed.
If you now connect a bulb to the lead wires instead of the battery, it lights up. After the teething troubles of the dynamo had been overcome - the Frenchman Gramme and the Siemens Engineer-in-chief v. Hefner-Alteneck improved the armature winding - a dynamo drove the first small electric locomotive in 1879. The first electric tramway was in Berlin in 1881. In 1889 there were four trams, each having the novelty of the contactor bow which is still in current use today. The Siemens plans for an underground were first realized in London in 1890.
Werner von Siemens was also ahead of his times in other respects. On the 25th anniversary of the founding of his firm, he had a share of the profits paid out to the workers and employees, and laid the foundations of an old-age pension and sickness scheme. These were his reasons: "A successful experiment brings more joy than the acquirement of hundreds of thousands".
It was thanks to this foundation that the Physikalisch-Technische Reichsanstalt was created. He also collaborated in the drawing up of German Patent Law. Of the honours which were bestowed on him, two deserve a mention: in 1860 he became honorary doctor, and in 1888 a life peerage was conferred to him. These honours meant little to him; he felt rewarded by his life, because it represented "successful labour and useful work".
Werner von Siemens died on 6. 12. 1892 in Berlin-Charlottenburg.
In Berlin there stands an undisputed monument to this great inventor and industrialist - Siemensstadt, a part of West Berlin.

Technology in the Present-day World

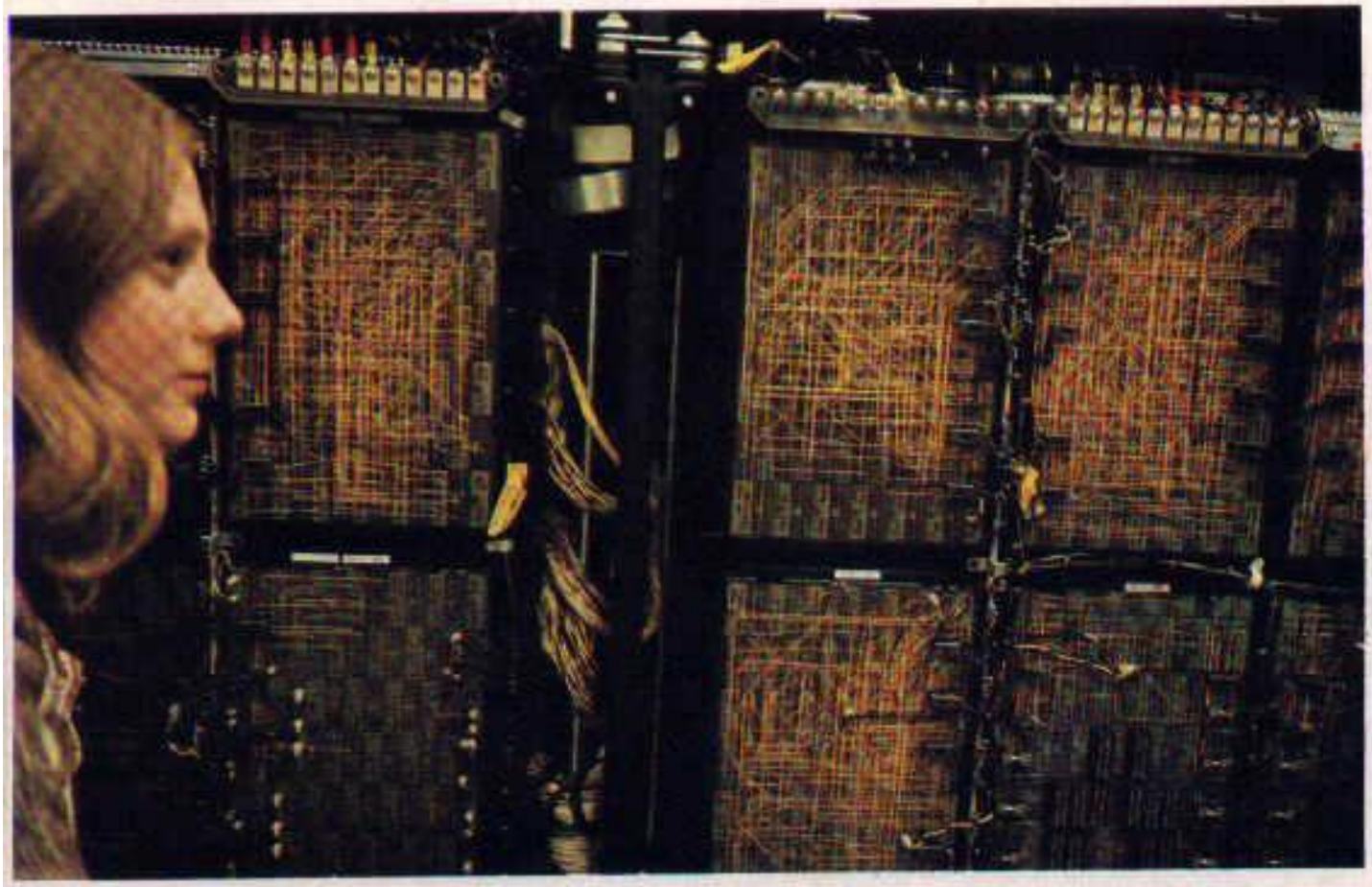


Fig. view into the inner life of an IBM-computer

What is a computer?

What does a computer think? And how does a computer think? Let's be clear: only humans can really think. And it is also humans who tell the computer what it has to do. This "telling it what it has to do" is called by the expert "software". This comes - like the delicious soft ice - from the English word soft (German "weich") - in our case anything written on paper. The hard core of the matter, on the other hand, is called "hardware", that is the actual electronics. So now you know the two technical expressions around which everything turns in the computer world. But how does the thing actually work, you may ask. The principle is quite simple. The computer has a large number of switches which can be in one of two states: In/Out, or Yes/No, Plus/Minus, Zero/One, as one wishes. At first one used relays like those contained in the Fischer electronics boxes. But these switches are too slow for modern computers. Today integrated semi-conductor units perform their work in incredibly short times. How then does the computer calculate with its Zero/One switches? It does it with dual arithmetic. Dont be afraid at the strange word: dual means the same as "two". Counting

is not, therefore, here based on the ten-figure system (decimal system) familiar from our schooldays, but on two figures. The mathematician Leibniz had realized as early as the 17th century that one can represent any number with only two figures.
It is best to write out the figures from 1–10 side by side in both systems as an example:

1 =	L
2 =	LO
3 =	LL
4 =	LOO
5 =	LOL
6 =	LLO
7 =	LLL
8 =	LOOO
9 =	LOOL
10 =	LOLO

Adding, therefore, would look like this:

3	LL
+4	+LOO
7	LLL

(it is not always so easy as this, of course, mathematicians can tell you a lot more about it).
Rather complicated, you'll say. For this very reason dual arithmetic is completely comprehensible only to mathematical experts. This complicated method of calculating can only be performed by nimble switches. A million times faster, in the long run, than any human brain could calculate.

And this, in fact, is exactly what a computer does: calculation, minutely broken down into many single steps, performed in fractions of a second. Man breaks down the tasks for the computer and translates them into a "machine language" for it, so that the computer can carry out the tasks set it in a sequence of logical steps.
There are certain intermediate stages of machine languages, commands, programming languages etc. The people who think in this language are called programmers and operators. Their mental work, the software, determines to a large extent the functioning of the computers or electronic brains. The electronics of the latter cannot, of course, get by with the actual calculating machine alone. Nobody can calculate without a memory: even the machine must

"remember" certain things, hence the so-called store. "Zero" information or "One" information is stored there in magnetized or non-magnetized form on small magnetic rings and called on if required. Once again, unimaginable numbers of "bits" are recorded or called on in fractions of a second. Not other technical term? A "bit" is the smallest unit of information, either Zero or One (e. g. the figure 8 consists of 4 bits, as we saw earlier).
Calculating machine and store are the two basic elements of a computer. Other instruments are also used for the input and out-put of the data; from the good old punched card up to the modern scanning apparatus with television picture screen.
Well, that was just a first glimpse into the wonderful and complicated field of electronic data processing (EDP). To learn dual counting correctly, future programmers attend course lasting several weeks. In order to know how transistors function as electronic switches, one must be a qualified electronics engineer. And university physicists and mathematicians design programmes for the solution of involved problems - a wide field. All the same, you know now the principles of EDP technology and can take part in the conversation if the subject of "electronic brains" comes up.

Current News on Construction under Licence

A life without technical aids and automation is scarcely imaginable today. Elektro-mechanical or electronic control is essential for automation.

Of the many possible fields of application open to us, we have selected the automatic opening of a garage door for closer examination. We wish to address with the following experiment mainly club members who already possess a solid grounding in Fischer engineering techniques. Minimum requirements for the building of the model are the building boxes: 200, 200 S, mot. 1, mini-mot. 1, e-m 2, e-m 3, e-m 5 and I-e 2.

Object of experiment

1. Open door before driving in.

The garage door to be opened automatically by a light signal from the car headlight.

2. Close door after driving in.

If the car is in the garage, the door will be closed again operating by a push-button.

3. Open door before driving out.

If the driver wishes to leave the garage again with his car, he operates the same push-button and the door opens.

4. Close door after driving out.

The closing of the garage door again takes place through light signals from the car headlight.

5. Securing of door against unauthorized persons.

In order that the door cannot be opened by unauthorized persons, it must not swing up until repeated flashes have been given.

Advantages

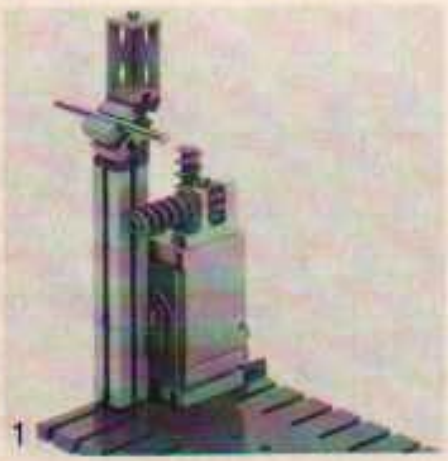
The driver does not need to get out in order to open the door before driving in, and does not need to get out to close the door after driving out.

This is the problem, which contains all the information which you require in order to solve it. You can now set to work with a researcher's zeal and seek the solution on your own bat, without reading the following text, which contains the exact building instructions. The completed model is shown on the back of this edition.

Assembly

It is recommended that the assembly should be carried out in the following sequence:

1. Mounting of the electrical drive (Figs. 1 and 2).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2. Assembly of the garage door (Fig. 3).
3. Fitting of the garage door (Figs. 4 and 5).
4. Fitting of the current reversing switch a (Fig. 5). The axis with terminal board c and the angle brick with connecting piece b serve as switching cams for the current reversing switch.
5. Addition of the disconnector (Fig. 6). The disconnector is composed of individual parts. The bolt e and the axis with terminal box d serve as switching cams for the disconnector.
6. Assembly of the starting button f (Fig. 8).
7. Electrical circuit according to circuit diagram (Fig. 7) and wiring (Fig. 8). When the starting button f is operated the motor must start up and opens the door. If the motor runs in the wrong direction, the correct polarity can be set on the adjustment head of the transformer.

Step by step system and electronic control

The step by step system counts the light pulses of the car headlight. The photo-resistance g mounted on the base plate by the garage door in Fig. 9 is connected as a light absorber to the electronic switch rod. The current for the switch rod is supplied from the lateral alternating current connection of the transformer.

The photoresistance g is connected correctly if on switching on the lamp h on the battery rod a switching noise can be heard in the electronic switch rod. A lamp can also be connected to the sockets 3 and 4 of the switch rod as a control which lights up when the photoresistance is illuminated.

Assembly of the step by step system

The drive of the controller cylinders is provided by the mini-mot. It is recommended that the assembly should be carried out in the following steps:

1. Mounting of the mini-mot. i, the push-button j and the already constructed starting button f as per Fig. 10.
2. Mounting of the controller cylinders and the fischer-technik-push-button as per Fig. 12.
3. Fitting of the controller cylinders with 3 circuit-breakers as per Fig. 11. The axis k in the turntable 1 in Figs. 11 and 12 is used as a switching cam for the starting button f. The terminal board m connects the axis k with the plug socket n to the controller cylinder, in order to prevent mutual twisting. It must be borne in mind here that the plug socket n (Fig. 11) is selected between the markings 360° and 90° for this connection and the correct switching sequence is thereby ensured.
4. Electric circuit as per circuit diagram Fig. 13 and wiring Fig. 14. The relay o from e-m 5 is connected with its control connections a and b to the sockets 3 and 4 of the electronic switch rod, so that the relay changes its switching position when the photoresistance is illuminated.

The push-button on the controller cylinder and the switching member of the relay are so wired that an alternating circuit is produced.


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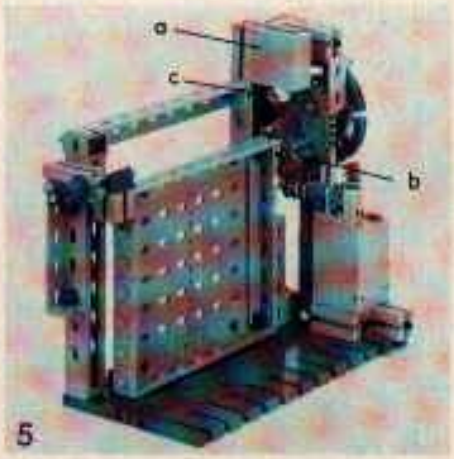

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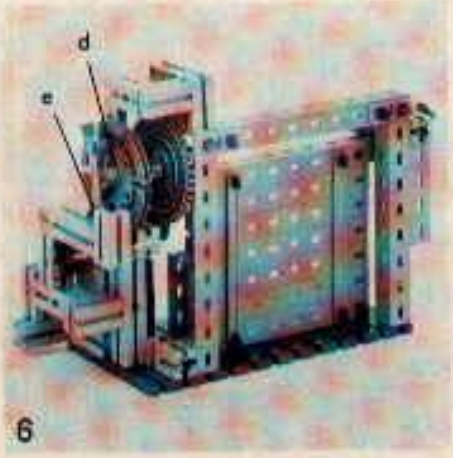

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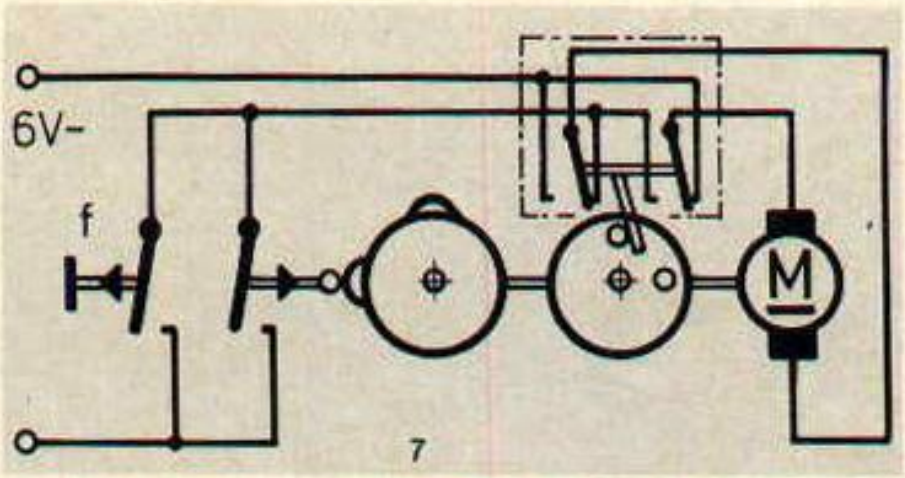
The closed contact (socket 2) of the push-button and the closed contact (socket 2) of the relay switching member must be connected with a cable. The two open contacts are likewise connected with each other. The middle contact 1 of the relay is connected to the mini-mot., which drives the controller cylinders.

Mode of operation of the step by step system

If the total circuit is laid out as in Figs. 13 and 14, on the switching on of the transformer the controller cylinders will start up until the next circuit breaker. As soon as one of the circuit breakers touches the pushbutton, the cylinder stops. If the wiring is perfect, the controller cylinder must turn forward one step when the photoresistance is illuminated. In so doing the circuit breaker on the controller cylinder runs down from the push-button and the controller cylinder remains stationary until the lamp is extinguished, the relay changes over and the



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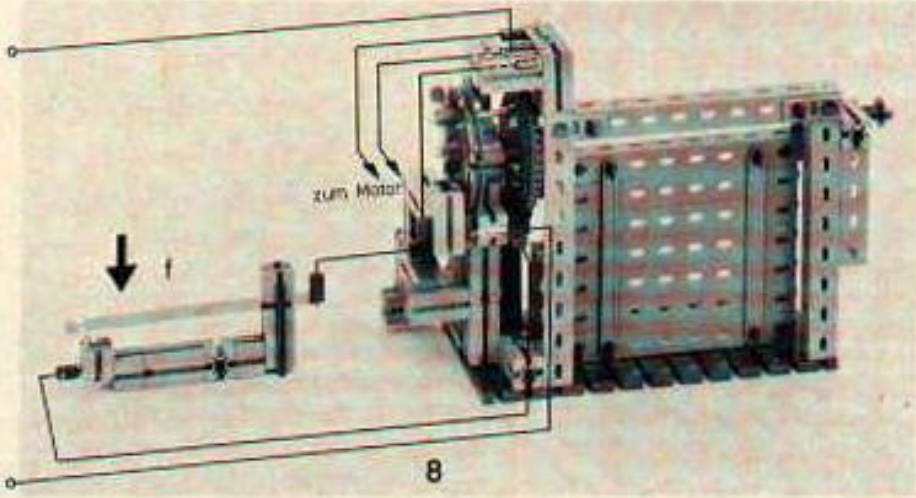

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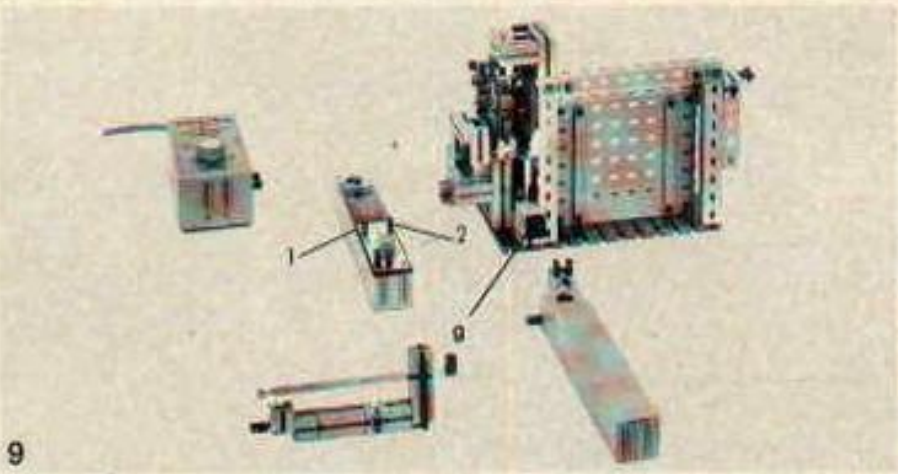

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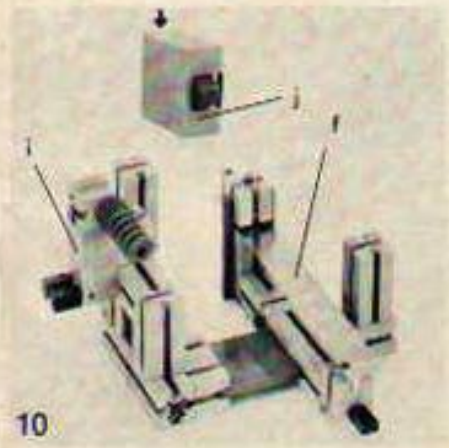

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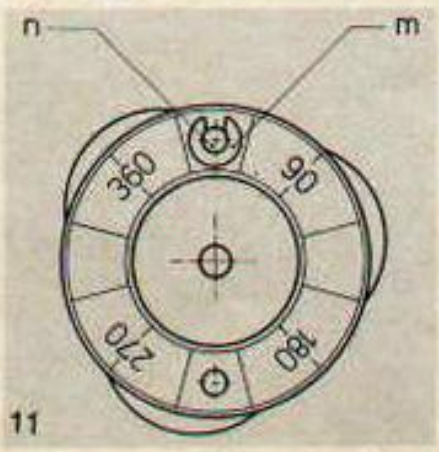

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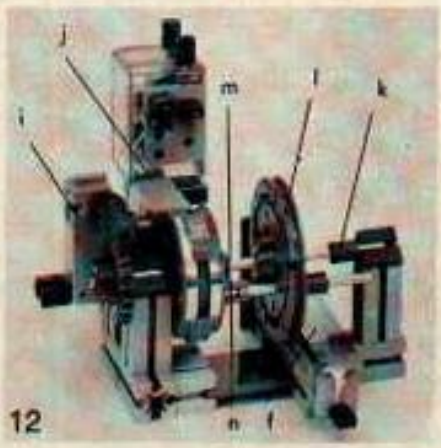

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controller cylinder proceeds to the next circuit breaker. The table in Fig. 14 shows the operation of such a step on the controller cylinder.

Opening and closing of the door

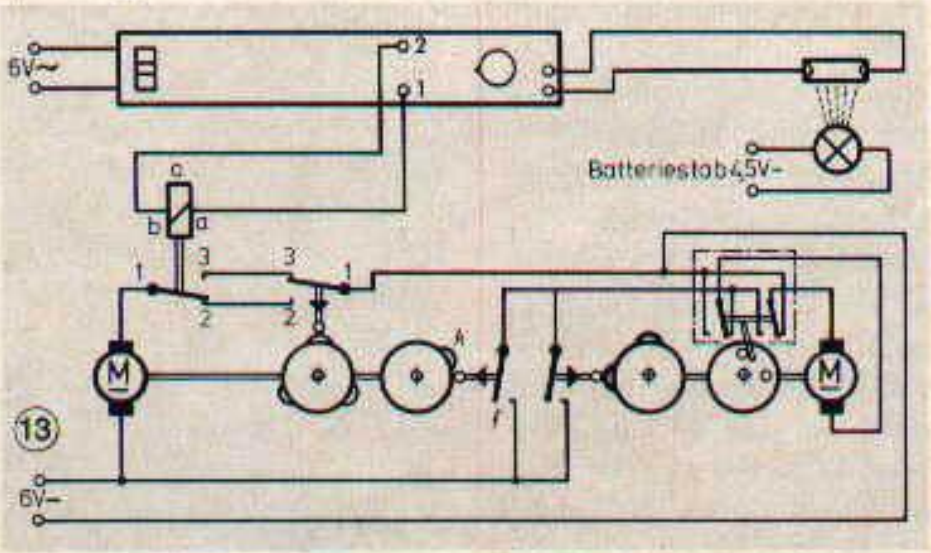
After three flashes of the headlight, represented in the model by battery rod and lamp, the starting button f (Fig. 13) is pressed by the switching cam k of the turntable and the door opens. If the car is in the garage, the door will be re-closed by manual operation of the starting button f.

For driving out the starting button f is again operated manually and the door opens.

If the car has already been driven out, the door can be re-closed by three flashes.

Changing the number of flashing pulses

If another number of flashing pulses is required, the corresponding number of circuit breakers on the controller cylinder simply needs to be changed. For instance, if the door is not to open until 4 flasches of the headlight have been given, the controller cylinder must also be fitted with 4 circuit breakers.



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Scheinwerfer	Relais	Taster	Schaltwalze	Motor	Relais	Taster und Schaltwalze
aus	abgefallen	gedrückt	steht			
ein	angezogen	gedrückt	läuft			
ein	angezogen	nicht gedrückt	steht			
aus	abgefallen	nicht gedrückt	läuft			
aus	abgefallen	gedrückt	steht			

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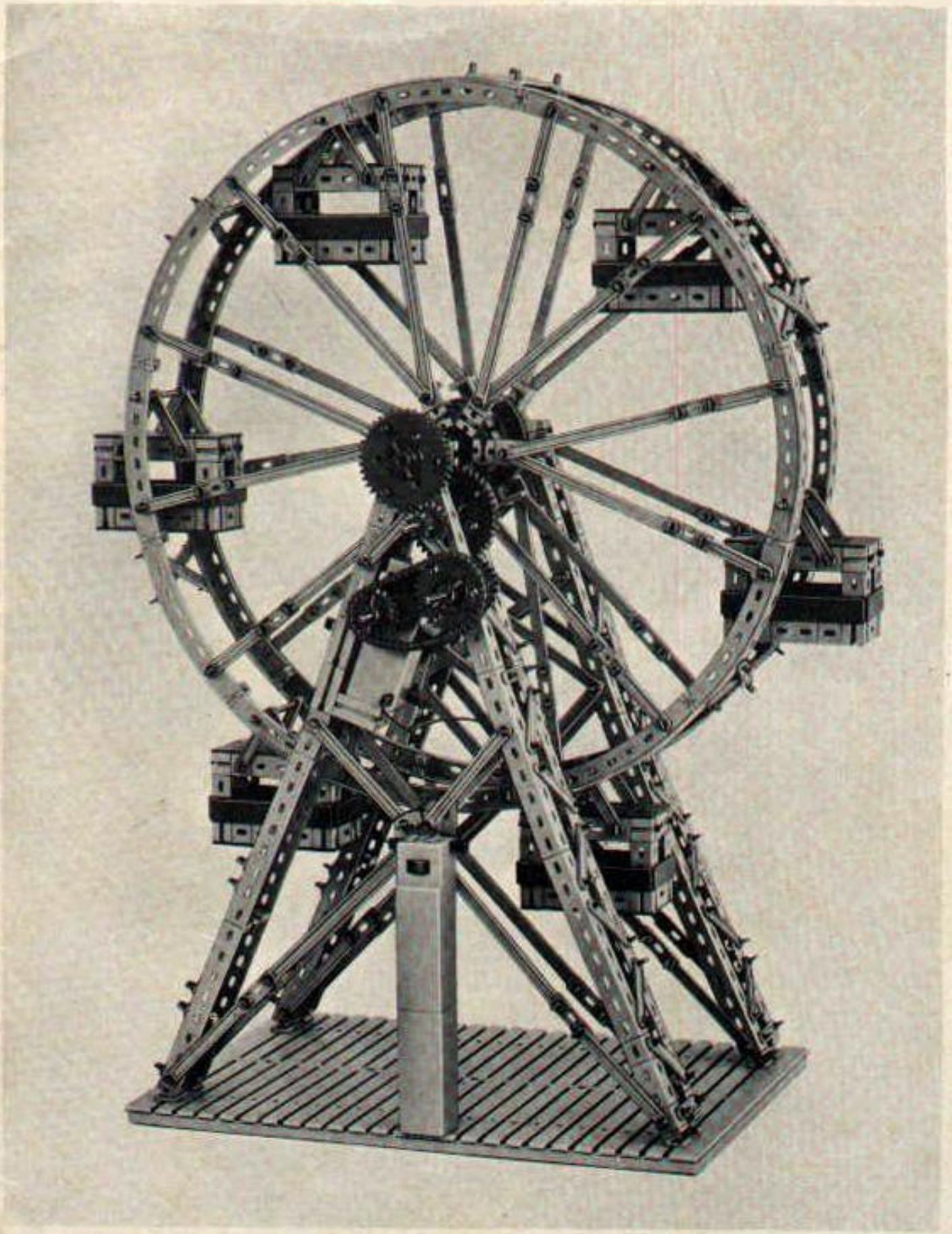

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