

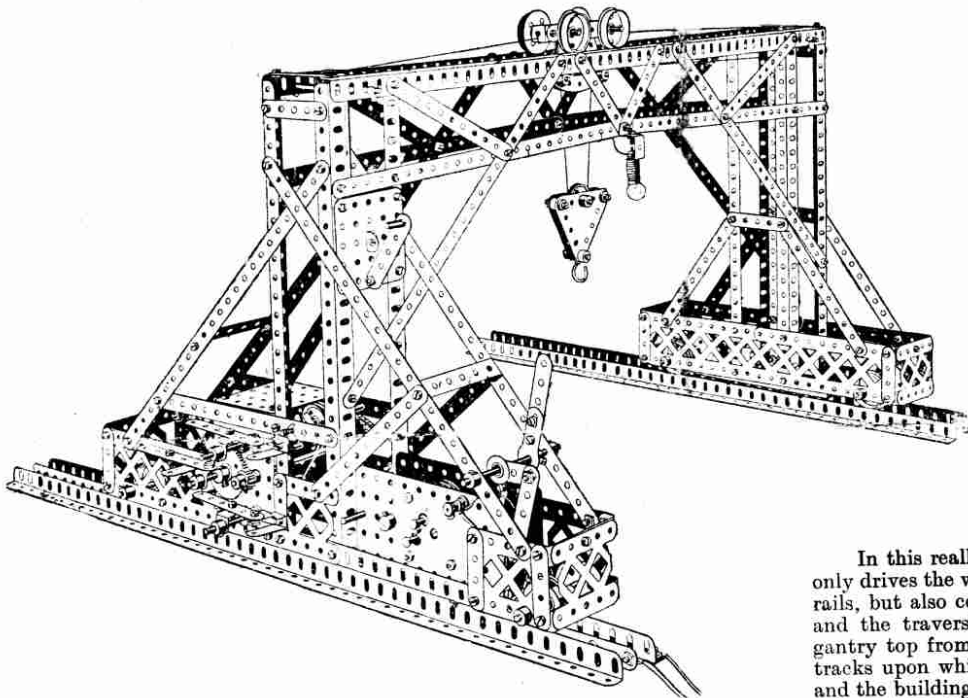
MECCANO

MAGAZINE

PRICE

1d

TO HELP MECCANO BOYS TO HAVE MORE
FUN THAN OTHER BOYS



Travelling Gantry Crane.

This excellent model was awarded one of the First Prizes in our 1919-20 £200 Prize Competition.

Commencing with this issue it is our intention to illustrate in each number of the *Meccano Magazine* an entirely new Meccano Model. These, in many instances will be models which have won prizes in our Competition, of which the above is a fine example. All the models which we shall illustrate will be included in the new Meccano Manual which is now in active preparation. We are glad to give this advance information of good things to come to our readers.

In this really instructive model the Electric Motor not only drives the whole gantry frame to and fro along the lower rails, but also controls the raising and lowering of the load, and the traversing movement of the crane trolley on the gantry top from one side to the other. The two lower rail tracks upon which the gantry runs consists of angle girders and the building up of the gantry feet carrying the travelling

wheels, can readily be followed from the illustration. The raising and lowering of the load, as well as the traversing of the crane trolley is controlled by the reversing levers at the front of the nearer gantry base. A small electric globe may be fitted at the centre of the gantry, as indicated, to increase the attractiveness of the model.

Our illustration is small in size as we are limited for space, but this fine model will be fully illustrated and described in the forthcoming new Meccano Manual.

EDITORIAL.

Thanks to my Readers.

It has been impossible for me to reply to each of the thousands of correspondents who have congratulated me on the new style *Meccano Magazine*, and I want to thank you all now. In its new form the *Meccano Magazine* has received a warm welcome, and the many new features which it is intended to introduce will ensure an ever-increasing popularity for it.

New Features.

Up to now a great deal of our space has been occupied by Guild matters, and owing to the immense popularity of this movement, this was inevitable. In future I hope to give more space to purely Meccano matters, and especially to those features which will enable boys to get more pleasure from

Meccano model building. We have a lot of new models ready and I am going to see that Meccano boys get first news and proper descriptions of these through the *Meccano Magazine*.

The Fascination of Electricity.

In this issue I am beginning a series of articles on the fascinating subject of electricity. Electricity plays such an important part in our every-day life that every boy should get to know as much about it as possible. I have no hesitation in saying that the boy who adds electricity to his outfit by means of one of the new Meccano Electrical Accessory outfits gets many times more fun than a boy who neglects this wonderful side of the hobby.

More New Meccano Parts.

Since the last issue of the *Meccano Magazine* some new and very valuable Meccano accessory parts have been designed, and these

are now in process of manufacture. I hope to be able to give you illustrations and descriptions of them in our next issue.

Exchange Old Meccano Parts for New Ones.

Occasionally I receive letters from boys who tell me that some of their Meccano parts have become damaged or rusty either from accident or through having been left in a damp quarter for a long time, and to each of these boys I write that if they will return the parts to Meccano Limited, they will be supplied with entirely new and up-to-date parts on payment of half-list prices. I want this concession on the part of our Company to be widely known. There is not the same pleasure in building models with defective parts as with perfect ones, and it is the Company's earnest wish that every Meccano boy's outfit should be kept bright and up to date on the easiest possible terms.

Horaby Clockwork Trains.

I am sorry that so many of my readers have had to be kept waiting for these trains. We knew the demand would be very large, but we did not anticipate that it would be quite so big as has proved to be the case. Both dealers and boys are charmed with these trains and those boys who have been lucky enough to obtain them so far are having good times at home. More machines and more workpeople are being added to the Company's Train Department, and very soon I hope all demands will be filled.

The M.M. on Sale at your Dealers.

Do not forget that the *Meccano Magazine* can now be obtained through your regular dealer. To prevent disappointment, however, you should place an order with him to have a copy saved for you regularly. If you prefer to have it direct from us it will be necessary for you to send 6d. in stamps for the next six issues.

The Editor

New Essay Competition.

We have noted with pleasure the great interest taken in the recent Essay Competitions, and the unfailing popularity of this form of competition among Meccano boys. We are, therefore, announcing a new one, and we look forward to receiving a record number of entries.

The subject of the Competition is "How I would run the *Meccano Magazine* if I were Editor."

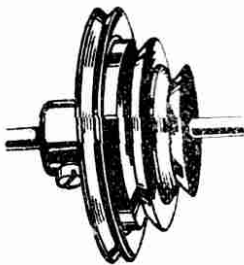
The Competition is open to all readers of the *Meccano Magazine*.

An Inventor's Outfit "B" will be awarded for the best Essay, with other awards for Essays showing special merit.

The closing date is February 19th, and the result will be announced in the March-April issue of the Magazine.

Write on one side of the paper only, about 500 words. Give your name and address and age on the back of each sheet, and address the envelope "Meccano Ltd., Essay Competition, Binns Road, Liverpool."

Meccano Cone Pulley.



A useful new Meccano accessory part which enables the user to drive a lathe or other machine at three different speeds. Our illustration shows the actual size of the pulley.

Meccano Cone Pulley .. 1s. 6d. each.

Life Story of Meccano

By FRANK HORNBY.

(Continued.)

As I have already said, our bolts are made from steel, and if they were sent out to you in the condition they come from the machines they would very quickly rust. To prevent this they are very carefully and thoroughly cleaned with chemicals, after which they are poured into an electrically operated plating vat which coats them with brass. During the whole of the brassing process they are turned over and over thousands of times, and by this means not only plated, but thoroughly polished.

After this they are sent to an Inspection Department where each bolt is inspected before it is assembled to a nut. We do this to fully ensure that faulty bolts will be rejected and not allowed to be placed into outfits. We have scores of girls whose sole work it is to assemble our nuts and bolts together, and although the cost of this is naturally very large, we feel that the results secured and the satisfaction given to all who build Meccano models amply repays us.

In this issue of the *Meccano Magazine* you will notice that we have included a photograph of a section of one of our departments. This is what we call our tool room, and the men employed in it are experienced, highly skilled and highly paid. It is in this room that the whole of the tools for making Meccano parts are made. Our tools are made from what is called high-speed steel, which contains a large percentage of carbon. It comes to us in bars about 12ft. long and when new tools of any kind are required pieces are first cut off from this bar of suitable length by a power operated machine called a saw.

The pieces then go to one of the shaping machines to have all their sides machined flat and true. Some of the shaping machines work horizontally, and these are used mostly for outside flat surfaces; others work ver-

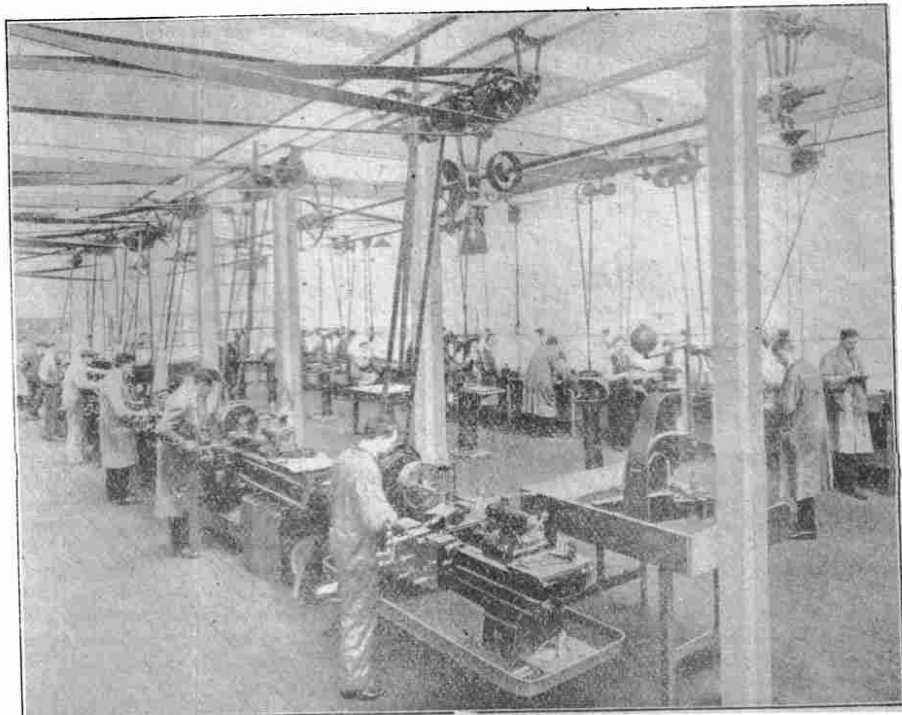
tically, and these are used mainly for inside machining or when a special outside shape is required. From there the shaped pieces go to a tool maker on the bench who takes charge of them from that point, and who is responsible for the final completed tools. He first marks out the shape of each tool on each piece, and then passes them back to a skilled machine man, who either turns them in a lathe, mills the surfaces in a milling machine, or shapes them in a shaping machine, exactly to the markings of the tool maker. The latter workman now takes them back to the bench and finally fits the whole of the parts of the tools together.

Certain parts, principally those which do the actual cutting, are then passed to a hardener to be tempered and hardened. The hardener must be a specialist at his work, otherwise the tools would be spoiled by incorrect handling. After they have been through this process each tool is ground down further to give a good cutting edge and to ensure perfect flatness. The whole of the parts of the tool are then sent back to the tool-maker on the bench, who assembles them and makes the final adjustments.

In this room we make the whole of our tools for producing the various Meccano parts, press tools for blanking and piercing, cutters for cutting gear wheels, all our drills, taps and dies, &c. It is really the quality of our work in this room which decides the final accuracy and quality of the finished Meccano parts, and you will understand, therefore, how essential it is that we employ none but the best class of labour.

The machines in this department work to one-thousandth part of an inch, which, of course, helps considerably to ensure the final accuracy of the tools. There are many kinds of tools but only one best, and that is the kind we believe in. A cheap or badly made tool may do good work for a short time, but it has no length of life, and as we require a very large output indeed from each tool, it pays us to have none but the very best.

(To be continued.)



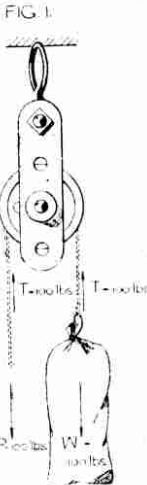
A Section of the Meccano Tool Making Department.

A Simple Explanation of Pulleys.

Ever since man was created he has used his brains to devise means of overcoming the difficulty of moving great masses of material, and one of the first machines he invented was the "Pulley."

A pulley is a circular wheel made of metal or wood, which revolves on its axle. Its circumference is grooved to take a rope or chain, and it is supported by a framework called a block. As a rule, a strong hook is attached to the block for the purpose of hanging the pulley or carrying the weight which is being lifted.

Let us imagine that we are engaged on a building, and that it is necessary to raise blocks of stone weighing about 100lbs. to the first floor. The effort required to lift a block of this weight and carry it up a ladder is very great, but if we rig up a tackle, it can be lessened considerably. A man can pull much better than he can lift, and if we arrange a beam in the wall with one end slightly projecting, and fix a pulley to this, we find that by hauling on the rope which



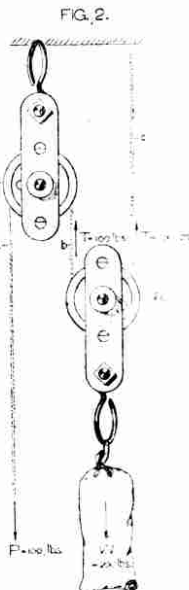
passes over the pulley the weight can be raised much more easily and quickly. A pulley of this kind is called a "fixed pulley," and it will be readily seen from Fig. 1 that the power used in hauling the weight up is just slightly greater than the weight of the object itself. The machine acts just like a scale which balances exactly when each pan carries the same weight.

As soon as the weight on one side is increased or decreased the perfect balance is disturbed. If the man holding the rope keeps the block still, the pull he makes is just equal to its weight; if he increases his pull, the load goes up; if he decreases it, the load runs down.

The pressure on the beam, however, will be twice the weight of the load, for it has to support the pull exerted by the man as well as the weight of the block itself.

Supposing, however, the weight to be moved is much larger—say 200 lbs.—the effort required to haul this up would be double the effort required to raise 100lbs., or in other words, we should have to engage two men. By a little arrangement of the tackle, however, we need still only employ one man.

We already have our pulley fixed to the beam, and all that we need extra is another pulley, "B," as shown in Fig. 2. The hook is attached to the load, and if a man hauls on the rope, he is enabled to raise 200lbs. with the same exertion that



he previously raised 100lbs. The explanation is simple. There are two distinct parts in the cord "b" and "c," by which the load is suspended, and the strain on each part must be the same, 100lbs. Now the strain on the two parts of the rope, "a" and "b," passing over the fixed pulley "A" is the same in each case as before—that is, 100lbs., so that the man pulling must only be exerting a force of 100lbs. to lift 200lbs.

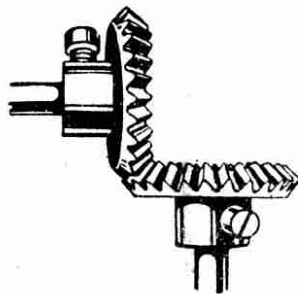
We say that the "mechanical advantage" is 2 because the pulley enables the man to do twice the work he can do alone. It must be borne in mind, however, that he is not doing it as quickly as if the rope were passing over a fixed pulley. As a matter of fact, the load only travels at half the speed, so that what is gained in power is lost in speed.

Interesting Notes for Keen Builders.

The new parts which have recently been introduced in the Meccano system have delighted thousands of Meccano boys, and the following simple illustrations of the uses of a number of them will prove interesting. Boys who have already become familiar with these new parts, and have used them in other ways than those outlined below, may like to make use of this column in order to explain such uses to other Meccano boys. The name and address of any contributor will be printed with his paragraph, and wherever possible a suitable illustration showing the use of the part will be given.

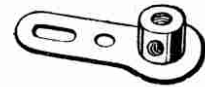
Bevel Gears.

The bevel gears now supplied in the Meccano outfit act exactly in the same way as bevel gears used in engineering. When two rotating shafts or rods are connected together at right angles so that one may drive the other, bevel gears are used, the rotation of one shaft being thus conveyed to the other at the same speed when the bevels are the same size like the Meccano bevels. The two bevels when in mesh form a right angle and the teeth of the bevels are, therefore, cut at an angle of 45°. The illustration shows two shafts connected by bevel gears in this way.



Rods or shafts at right angles have previously been connected in the Meccano system by contrate wheels and pinions, but the bevel gears are much superior and are based on proper engineering practice. There is less friction in the bevels than with the contrate wheel and pinion, and further the bevels do not require such accurate setting.

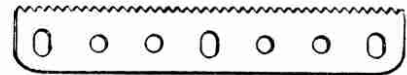
Threaded Crank.



62A. Threaded Cranks ... each 0 6

The boss of this crank is internally threaded which makes the part available for many uses in building models. For instance, it may be used when fitted with a Meccano threaded pin, at one end to form a crank handle for setting up the tail stock spindle of a model lathe for gripping the work or, if a screwed rod be inserted through the threaded boss of the crank, rotation of the screwed rod will cause the crank to move along the rod and thus a traversing motion may be given to any part of the model to which the web of the crank is connected.

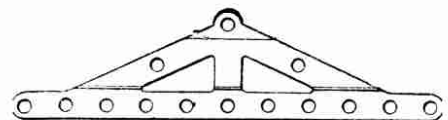
Rack Strip.



110. Rack Strips, 3 1/4" ... each 0 3

This is one of the most useful parts now in the Meccano system, and when used with a pinion or a worm a variety of interesting movements may be obtained, such as a fine adjustment for focussing a camera or for raising or lowering a platform, for adjusting a theodolite or the tool carrier of a lathe. By overlapping the ends of several rack strips and connecting them by bolts and nuts a longer rack may be obtained. A very large contrate gear wheel may be made by bolting together a number of rack strips and then bending them round into a circle the spokes of this large gear wheel being made by 5 1/2" double angle strips placed across the wheel and bolted to the rack strips at opposite sides. With such a large contrate wheel a pinion could be arranged to mesh and thus drive with a slow rotary movement a large wheel or other model. The rack strip also, when driven by a pinion, could be used to obtain the to and fro movement of a planing machine, the pinion of course needing to be reversed as the rack reaches the end of the stroke.

Girder Frame.



113. Girder Frames ... each 0 4

The girder frame, besides being useful for decorative purposes such as at the top of a model, can also be used for inserting in models as a strengthening piece. The pitch of the holes in the girder corresponds with the standard pitch throughout the Meccano system and it can, therefore, readily be fitted in with the other Meccano parts. It may also be used as a roof truss, and when inverted the lower perforations at the apex make excellent bearings for the wheel axles of a vehicle. By combining several girder frames together a strong bridge girder may be built, or the legs of a tower. It will be noticed that the ends of the girder frame are slightly set back in order that when one girder frame is connected to another the connected girders are in the same plane.

The Meccano Guild

A Fellowship of Meccano Boys

The objects of the Meccano Guild are:

- (a) To make every boy's life brighter and happier.
- (b) To foster clean-mindedness, truthfulness, ambition, and initiative in boys.
- (c) To encourage boys in the pursuit of their studies and hobbies, and especially in the development of their knowledge of mechanical and engineering principles.

This great movement gathers strength daily, and as Meccano boys all over the country get to know of it they are joining up in increasing numbers. The little enamelled badge of membership worn by Meccano boys is now a familiar sight, and members are glad to recognise fellow-members by this token and to accept them as loyal friends.

The Guild Certificate has met with a warm and enthusiastic reception from all our members, thousands of whom have written to me to say that they are delighted to have it, and that it will be framed and hung prominently in their bedrooms, so that they may always be reminded of the splendid objects for which our Guild has been formed.

To new Meccano boys and to new readers of the *Meccano Magazine* I would say that each member of the Meccano Guild, when he is enrolled, receives a beautiful enamelled badge of membership, and a special Guild Certificate. I am always happy to correspond with any of our new boys, to explain to them fully the objects of the Guild, and to supply them with forms of application for membership.

Guild Notes.

By the SECRETARY.

I repeat the announcement made in our last issue that handsome bronze medallions will be awarded to Club members who read the best papers at meetings of their Clubs. Each Club will be allotted two medallions, one for each Winter session, and they will be given to the boys who deliver the best papers. Any subject may be selected—Engineering, Electricity, Wood-working, Stamp Collecting, &c. Boys may get assistance from any source and they may have their papers illustrated by lantern slides, drawings, models, or in any other way. After they have been read, the papers must be sent to me with comments by the Club Leader.

I most earnestly hope that all Club Leaders will help me to make this part of Meccano Club work very successful.

Let me again remind all Meccano Guild members that special prizes are to be given to members in connection with our £250 Best Model Competition.

Meccano Club activity is now in full swing, and from all quarters Club secretaries are sending me their syllabuses showing their programmes for the winter. The number of affiliated Clubs is steadily increasing and the only difficulty in the way of very many others being ready for affiliation is the want of a suitable room. I am always very happy to help in this matter by corresponding with local authorities, and I am glad to say that in many instances I have been able to exercise considerable influence in this direction.

Quite recently Meccano Clubs have been established in connection with Red Triangle Clubs in Cardiff and Manchester. I have found that the secretaries of Red Triangle Clubs are specially keen and anxious to help boys all they can, and I am quite sure that any boys who approach them on the question of forming a Meccano Club will

receive a very courteous reception, and that their proposals will be carefully considered. Every Red Triangle Club should have its Meccano Club and its regular weekly Meccano night.

Club Notes.

BRISLINGTON MECCANO CLUB has now secured a Club-room in the local Parish Hall; members very keen.

"ALL SOULS" MECCANO CLUB (Liverpool).—Excellent start made under the patronage of Rev. Father Southworth. An Exhibition of models is being arranged for December.

CARDIFF Y.M.C.A. MECCANO CLUB.—Club meetings have now been started, and any Cardiff boy wishing to join should apply to the Secretary, Cardiff Central Y.M.C.A.

ELLERSLIE MECCANO CLUB (School Club).—Members extraordinarily keen; a novel feature is an Aero Section of the Club for construction of model aeroplanes; also a Club Library. Mr. E. Wiggitt-Thompson, the Club Leader, is arranging lectures, &c., and an interesting season is assured.

CARSHALTON AND DISTRICT MECCANO CLUB, recently affiliated, has very energetic Leader in Mr. E. Atkins. Excellent list of rules and syllabus drawn up which augurs well for future of Club.

ST. ANN'S MISSION MECCANO CLUB (Newcastle-on-Tyne).—Club Leader reports "Club re-opened for Winter session on Monday, September 6th. On October 5th a very successful Exhibition of Models was held in the Mission Room. The models were judged by Mr. Routledge, of Messrs. Hawthorn, Leslie & Co., Ltd., and the prizes were afterwards distributed by Mrs. Routledge. Canon East was also present and spoke words of encouragement to the members of the Club." There is a big list of prize-winners, much too long to print here, and Miss Draycott, the Club Leader, hopes to hold an Exhibition on a much larger scale next March.

ST. THOMAS' MECCANO CLUB (Exeter).—Mr. W. Pelley has kindly consented to act as Club Leader in succession to Mr. Willmin, and a happy successful session is promised.

SMALL HEATH MECCANO CLUB.—Mr. Edge, the Club Leader, is introducing a "Games Night" occasionally, and this should greatly increase the feeling of good-fellowship among members. There is still room for more members, and boys wishing to join should apply to Mr. Edge, 131, Whitehall Road, Small Heath, Birmingham.

SPARKBROOK MECCANO CLUB continues to make excellent progress and Mr. F. E. Bolt, the Club Leader, has interested a Sunday School teacher in the Club, and hopes to get other teachers to help him in the good work among boys. Winter session opened with business meeting and lantern display. A lecture on "Divers and their work" was given by the Club Leader, and members will shortly visit the Bell Foundry of Messrs. Gillett & Johnson. The athletic side is very well looked after, and recently the boys had an exciting five-mile "hare and hounds" across fields and through woods on a beautiful afternoon. Club night is the night of the week.

ST. MARTIN'S MECCANO CLUB (West Acton).—Boys tremendously keen. Club is being run in conjunction with a troop of Scouts, but membership is not restricted to Scouts. Now West Acton boys, rally round the enthusiastic Club Leader, Mr. H. L. Sutton, 29, Birch Grove, Acton, W.3, and you are certain of a fine time.

STANLEY ROAD MECCANO CLUB (Worcester), recently affiliated, under the leadership of Mr. C. H. Cook, who, in the words of his Secretary, Master R. J. Greenway, "makes the meetings 100 times more interesting." Mr. Cook's wide experience with boys—he is the Headmaster of Stanley Road Council School—should prove of inestimable value to the Club.

Club Leaders desiring mention in these notes should forward reports of present session before December 31st 1920, for inclusion in the next "Magazine."

Newly Affiliated Meccano Clubs

ALL SOULS' M.C. (LIVERPOOL).

President—Rev. Father Southworth, 39, Sackville Street, Liverpool.
Club Leader—Mr. T. J. Roberts, 170, Dryden Street, Liverpool.

CARDIFF Y.M.C.A. MECCANO CLUB.

Club Leader—Mr. N. C. Craven-Whitehead, Central Y.M.C.A., Cardiff.

Secretary—

Club Address—Central Y.M.C.A., Cardiff.

ELLERSLIE M.C.

Club Leader—Mr. E. Wiggett-Thompson, "Ellerslie," Bickington, Barnstaple.

Secretary—Master E. H. Browne, "Ellerslie," Bickington, Barnstaple.

Club Address—"Ellerslie," Bickington, Barnstaple.

CARSHALTON & DISTRICT M.C.

President—Mr. Andrews, Carshalton, Sutton, Surrey.

Club Leader—Master E. H. Atkins, "Strawberry Cottages," 46, Mill Lane, Carshalton, Sutton, Surrey.

KING STREET M.C. (LUTON).

Club Leader—Mr. S. Burgoyne, 58, Wellington Street, Luton.

Secretary—Master W. Humby, 34, Adelaide Street, Luton, Beds.

OLD KENT M.C. (LONDON).

Club Leader—Mr. W. Chittenden, 285, Old Kent Road, London, S.E.

Secretary—Master W. Filce, 22, Yalding Road, London, S.E.

STANLEY ROAD M.C. (WORCESTER).

Club Leader—C. H. Cook, Esq., Stanley Road Council School, Worcester.

Secretary—Master R. G. Greenway, 173, Wyld Lane, Worcester.

Club Address—Stanley Road Council School, Worcester.

SOUTHVILLE M.C.

Club Leader—Mr. Stickler, 19, East Street, Bedminster, Bristol.

Secretary—Master R. L. Dyer, 4, Morley Road, Southville, Bristol.

Meccano Guild Correspondence Club.

Since my announcement in the last issue of the *Meccano Magazine* I have received large numbers of letters from boys who desire to be put into communication with fellow members, and this is being done as rapidly as possible. No Guild member need now feel lonely. He can correspond with a real friend and learn what is happening outside his own little circle. Members desiring to join the Correspondence Club should read the following regulations carefully. If any boy wishes to correspond with a Meccano boy in any other language than English, or in any other country, he should state his wishes clearly in his first letter.

RULES.

1. All correspondence will be arranged by the Guild Secretary.
2. Applications for enrolment with the Correspondence Club must state name, age, and address of applicant and father's occupation.
3. The first letter written must be sent through Headquarters; after that, correspondence will be carried on direct.
4. Photographs may be exchanged, but correspondents are not allowed to either send or ask for presents or gifts of any kind whatever.
5. The Guild Secretary has the right to call on any member at any time for the letters he has received as a result of introduction through the Correspondence Club.
6. Boys desiring to discontinue correspondence should mutually arrange with their partners, and also inform the Secretary.
7. A request for enrolment signifies that the applicant accepts these rules as binding and final, and that he intends to loyally abide by them.

Wanted a Guild Motto.

The idea of adopting a motto for our Guild appears to have caught on amongst our members. A large number of suggestions have been received, and I give below a few of the best. If you have a suggestion which you think is an improvement on these send it along:—

- "Live Pure, Speak True, Right Wrong, and Honour the King."
- "Aim High."
- "If you fail, try again."
- "Unity is Strength."
- "He Conquers who Endures."
- "I will either Discover a Way or Make One."
- "Nulle Secundus" or "Second to None."
- "Play the Game."
- "Mens sana in Corpore Sano."
- "Determined Perseverance will bring Success."
- "Better Your Best."
- "Good Workers, Good Sportsmen, Good Comrades."
- "Push on and Accomplish."
- "Hasten Slowly."
- "Give and Take."
- "Esto Quod Videris" meaning "Be what you appear."
- "Progress."
- "Be British."
- "Deeds, not words."
- "Think before you act."
- "Strive Hard, and Aim High."

Guild Recruiting Campaign.

The grand Guild Recruiting Campaign, announced in the last issue of the *Meccano Magazine*, has commenced well and already enthusiastic members all over the country are taking part in it. As I said in our last issue, there are many thousands of boys in this country who are using Meccano regularly, and who yet have never heard either of the *Meccano Magazine* or the Meccano Guild. Any member who makes the Guild and its work known to another Meccano boy is doing both himself and the Guild a service. The aim of our President is to bring all Meccano boys into this great movement, to work together for good times, mutual help and friendship, and clean, happy lives.



To each of you who recruits three new members to the Guild a very beautiful medallion will be awarded, which I am illustrating again in this issue for the benefit of the many new readers. This medallion will be despatched *immediately* the three new recruits have been enrolled. A large number have already been won, and I have received letters of high praise for them from the recipients.

As a special award the boy who obtains the largest number of recruits between September 1st, 1920, and March 1st, 1921, will receive an exact duplicate of the medallion but in solid gold with his name engraved on it, and to the boy who recruits the next greatest number, a solid silver medal will be awarded similarly engraved. Every boy desiring to share in this Grand Recruiting Campaign should notify me and I will send him a number of Guild Application Forms. He should write his own name and address and the date on the back of these so that they may be recorded in his favour. He must also send in a full list of his recruits, with names and addresses, before March 15th, 1921.

Change of Address.

Subscribers should immediately notify the Editor of any change of address. Send a postcard giving the old and new address, so that records may be kept up-to-date.

Meccano and Electricity.

The introduction of electricity to the Meccano system opens up a world of wonderful possibilities for any keen intelligent boy. Meccano itself, as a building system, is one of the wonders of this progressive age. Not only does one get that deep pleasure and satisfaction of building, but there is the thrill of achievement which comes of constructing a piece of mechanism that is perfect in every detail and that responds instantly to the touch of the builder. Allied with electricity the joy of building is increased a hundred fold—for a boy may now not only build models that can be operated by electricity, but he can carry out his own experiments far off the beaten track.

The purpose of this series of articles is to give boys a clearer insight into the meaning and properties of electricity so that they will be better equipped to understand and carry out their experiments; and boys in difficulties at any time are invited to send in questions which the writer will endeavour to answer as fully and as clearly as possible.

What is Electricity?

This question has puzzled scientists and thinkers throughout the ages. The early Greeks gave this wonderful power its name from "electron," which means amber, because they found that when amber was rubbed with a dry cloth it developed the mysterious power of attracting light particles of matter. Later it was found that electricity could be generated by using certain acids and metals in conjunction, and that it seemed to run along wires; hence came the idea that it was a fluid, and to-day we talk of a current of electricity. During recent times many important discoveries have been made, and we now believe that electricity is a series of ether waves. Wires are used merely to direct the power in certain channels, and with the introduction of wireless telegraphy and telephony a much wider field is opened up.

Scientists have discovered that the atoms which make up any object, are themselves composed of tinier particles, which are in reality electrons. Thus all matter is composed of electricity of power, and if the problem of releasing this power can be solved, we shall have stupendous sources of energy available, beside which our present sources of power—like steam and hydraulic—immense as we now conceive them, will be small and puny. The solving of the problem may not be far distant for the whole scientific world is now anxiously but confidently awaiting its announcement.

Next Article—
Different Kinds of Electricity.

Results of Meccano Essay Competitions.

The task of adjudicating on the essays sent in for the three recent Competitions has been a very pleasurable one. Apart from the extraordinary large number of entries, the essays submitted were almost all excellently written and well composed. Unfortunately, every one cannot win a prize, but there are many boys who, with a little more care and perseverance, will certainly figure in future prize-lists.

In the two essays concerning the Guild a good many entrants lost marks through putting forward fantastic schemes which are quite impracticable, and these boys should bear in mind that simple, straightforward, commonsense schemes receive more consideration than risky experiments.

In the essay "Which is more enjoyable, building a Meccano Model, or playing with it, and why?" the standard reached was very high. Sound arguments were put forward for each side, but in some instances the "Instruction derived" was confused with the "Joy of building." Owing to the excellence of the essays submitted in this Competition, we are increasing the awards, as will be seen below:—

Essay Competition No. 1.

Prize: Inventor's Outfit "B."

Master D. Shrapnel (age 13), 254, Court Oak Road, Harborne, Birmingham.

Essay Competition No. 2.

Prize: Inventor's Outfit "B."

Master W. Wigmore (age 14), 14, Sherard Gardens, Eltham, London, S.E.9.

Essay Competition No. 3.

Prizes: Two No. 2 Outfits.

Master Max Covill (age 15), Orchard Leigh, Rodwell, Weymouth.

Master G. P. Meredith (age 16), Wolverley Vicarage, Kidderminster, Worcestershire.

3rd Prize: No. 1 Outfit.

Master E. Joyce (age 13), 8, Edinburgh Road, Walthamstow, Essex.

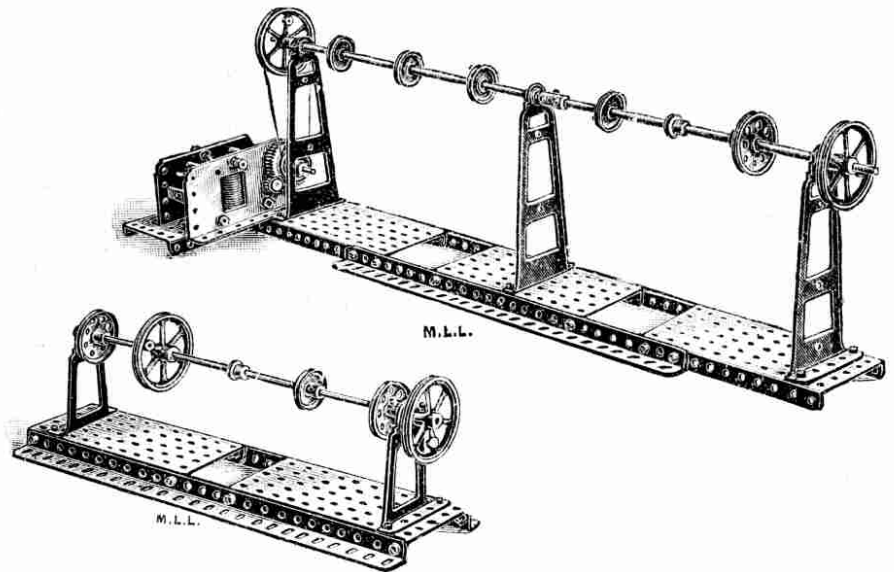
Prize Essay on "Which is the more enjoyable, Building a Meccano Model, or Playing with it, and Why?"

However you look at the question, and whatever your own opinion may be, there is one solid fact which cannot be disputed, namely, that in a box of Meccano there is enjoyment for every boy, be he big or small, and whether he prefers building models or playing with them. The pleasure is always there, waiting to make the boy who opens the box whistle and sing at his work as only a happy boy knows how. But there is one kind of boy who gets the most enjoyment of all out of his outfit—the boy who has imagination.

To this boy, the table at which he sits is a great humming workshop, such as the Meccano factory which Mr. Hornby ascribes in the *Meccano Magazine*, he himself is the chief engineer; the Meccano Manual before him contains his neatly-drawn plans and instructions for the building of the great steel bridge which is to be thrown across a river. At last, this feat of engineering is accomplished, and the bridge spans the water, a well-proportioned structure of shining steel girders. Next day the engineer receives an order for a large crane; and so the game goes on.

When the model is made, however, there is an even greater field for using imagination. Power being supplied by a Meccano motor, the crane raises bales of cotton to the top storey of the warehouse; the bridge swings to allow ships to pass down the river; the loom

Meccano Shafting Standards.



Meccano Shafting Standards are designed on the Meccano system with equidistant holes $\frac{1}{2}$ " apart. Our illustrations show how, with the aid of these standards and the regular Meccano parts, strong and serviceable shafting may be constructed.

Large Standards	..	..	..	..	..	1s. 3d. each.
Small	..	..	..	..	..	10d. ,,

weaves cloth for the use of the Meccano Girl's dolls, and all the hundreds of other models perform their duties in the smooth, silent Meccano way. A Meccano outfit is a thousand games in one and costs less than many useless toys—just remember that, you parents.

There are so many models illustrated in the fat Manual of Instructions that every branch of engineering is well represented. (I can never decide which to make next!) So that the answer to the question we are discussing depends a good deal on which model is being built. In the case of a large structure such as the Eiffel Tower or the Tower Bridge the chief pleasure is in the building; girder after girder is bolted into its place, and from the table a firm and rigid building shapes itself under the Meccano boy's cunning fingers. But there are some very good examples of the other class; for instance, in making the Meccanograph you are all the time impatient to be making designs, and the fun begins when the model is finished. The same applies to many of the ingenious models with which the Manual is stocked.

While admitting that we learn patience, dexterity, and practical knowledge from the building of Meccano models, I consider that the greatest enjoyment is obtained in playing with them; for while the model is working we may study the movements of its working parts, learn a great deal about machinery, and, at the same time, enjoy a game with a toy which is unsurpassed in good workmanship, popularity, and interest.
Max Covill.

Extracts from some of the Competing Essays.

The young boys who are only starting to build with Meccano, build merely for the fun of working the model. But gradually the engineering instinct overcomes this childish trait of wishing to turn a handle and see it work.—T. Moore, Bray.

When building with Meccano you lose all that "want something to do" feeling, for your brain as well as your hands is employed.—Will Lavis, Heavitree.

And it's a great comfort to mother because it is not a noisy pastime—she likes seeing me build.—Joseph Latter, Portlade-by-Sea.

When a model is built it becomes a toy; while it is being built it is a science.—G. P. Meredith, Kidderminster.

No one on earth can understand the joy that is the Meccano Boy's when he overcomes his little difficulties.—W. F. Smith, Crownhill.

Boys with more expensive outfits may have greater enjoyment playing with the big models, but when it comes to building I can have just as much enjoyment as they can.—Chas. Barraclough, Bradford.

Meccano gives to boys the greatest joy on earth—the joy of achievement.—L. Smith, Barnsley.

The New Meccano Catalogue



This beautiful new catalogue should be in the hands of every Meccano boy.

Besides illustrating and describing each outfit and explaining the simplicity and beauty of the Meccano system, it gives full particulars of the new Electrical Accessory Outfits, Meccano Clockwork and Electric Motors, the Hornby Clockwork Train System which is making such a deep impression throughout the country; the Tin Printed Clockwork Trains and Vertical Steam Engines. It also contains two full pages of illustrations of Prize-winning Models in the Big Meccano Competitions, and a fully illustrated list of the entire range of Meccano parts, including the new and valuable ones which have been recently added.

The demand for "Meccano Products" following the announcement in our last issue has been very heavy indeed, but there are still thousands of Magazine readers who have not taken advantage of this splendid offer.

We wish every reader of the *Meccano Magazine* to possess one of these beautiful booklets. A copy will be sent FREE on receipt of your postcard. Write to-day.

A New Grand Meccano Prize Competition £250 in prizes

A new big Meccano Model Building Contest has started, and we want every Meccano boy to know all about it. There will be hundreds of prizes awarded, including nine prizes in cash to the value of £100, and Meccano Outfits to the value of not less than £150. This time the Competition will be divided into three sections.

1. For boys under 10 years of age.
2. For boys between 10 and 14 years of age.
3. For boys over 14 years of age.

In addition to these prizes the Meccano Guild is offering three awards of £5 each in cash to the member of the Guild who gains the best prize in his Section. Forms of entry may be obtained either from your dealer or from us.

There are no restrictions or entrance fees. Any Meccano boy can enter, and the competitor sending in a simple model made with a No. 0 stands just as good a chance of winning a prize as one sending in a complicated model made from a No. 6 Outfit. This Competition will close on April 15th, 1921.

Happy all day
long, with
MECCANO
The Engineering Hobby

No Skill or
study needed
The genius is in the parts



Outfits from 6/- to 180/-
May be obtained at

Every boy
to-day wants
to build with

MECCANO
The Engineering Hobby
Give your boy his hearts
desire
Outfits from 6/- to 180/- obtainable from



Hurrah right
away

Working
Model
of a
Girder
Crane

MECCANO
Engineering for Boys.
Give your Boy a Meccano to-day

Complete
Outfits
6/- to 180/-



These are reproductions of Lantern Slides in beautiful colours, which will be used in Cinemas and Theatres all over the country this Winter to advertise Meccano.

Meccano boys should look out for these.

MECCANO



OUR MAIL BAG

The Editor has a little talk in this column with his Meccano boys. Whether he has space to reply to them all here or not, he is always glad to hear from them. He receives hundreds of letters each day and only those which deal with matters which are likely to interest other Meccano boys can be dealt with here. Correspondents will help the Editor if they will write on one side of the paper only.

Walter S. Warner, Manchester.—Glad to hear that you consider your Guild Certificate "simply ripping." You confirm the general verdict. The Meccano Equatorial Mounting which you found so useful in your astronomical work was designed by a prominent scientist for his own use.

K. Connor, Seven Kings.—Sorry you are having such difficulty in securing a Club Room. Why not get into touch with the Scouts officials and get their consent to use one of their rooms one night each week? Get them interested in the Guild movement, as so many of our members all over the country have done. They are always courteous and helpful.

Betty Hoddinott, High Ham.—Certainly you can join the Guild, Betty, and it won't be necessary for you to pretend to be a boy. We welcome both yourself and your brother as members. You would be surprised if you knew the number of girls who build Meccano models, read the *M.M.*, and are members of the Guild.

B. Crawley, Liverpool.—"I am not a proud sort of a chap, but I can tell you what I am proud of belonging to such a fine organisation as the Meccano Guild." This feeling goes right through the Guild, Ben, and it makes us full of confidence for the future. Your musical accomplishments are noted, and when we need a "Guild musician" we will get you to tootle for us.

G. B. Mann, Peckham :—

"There was a poor boy who was sad,
His friends could not make him look glad,
With Meccano, however, he's happy for ever,

He's no longer a sad little lad."

Splendid, Charles; we wonder if you could tell us about the young poet of Peckham. Glad you take the new *M.M.*

W. Brunskill, Barrow-in-Furness.—Your suggested motto "Aim High" is very good, and will be considered. We note your suggestion for altering the phrase in our heading.

Jack Reynolds, Sydney, N.S.W. :—

"Meccano is the best of toys,
At Christmas time to give to boys.
They play with it from morn till night,
And never, never, have a fight."

We know the first three lines are true, Jack, but we should have had our doubts about the last line if you hadn't used two "nevers."

E. Barten, Stourport.—If we are any judge at all you will do all the good you can, not only for Meccano, but for anyone with whom you come in contact. Our heart goes out to the hundreds of Meccano boys who, like yourself, have lain in bed for years. They are patient, lovable boys. We are happy to know that Meccano has given you so many pleasurable hours, and we welcome you into our Guild.

Mrs. G. Thorpe, Rhuddlan.—"No wonder all Meccano boys think such a lot of 'our Mr. Hornby. I think we mothers do, too.' Our President's friends increase in number daily. We are always glad to have news of your little son Kit.

R. Allan, Blakemore.—We are never too busy to reply to such nice letters as you send us. It pleases us immensely to see that yourself and your young brother are such pals. We have many, many men, twice your age, who are members of the Guild, and are giving much time and thought to furthering its objects. You can do much good work for the Guild and its members if you set your mind to it. We are very glad that Meccano has been your companion for so many years.

G. P. Meredith, Kidderminster.—"You are the first editor to whom I have ever written, and I think your *Magazine* is the best I have ever read. Whenever I meet a boy for the first time I always say 'Have you Meccano?' and if he has we never lack topics for conversation." It is just that friendliness amongst boys which we are so anxious to cultivate. Any boy who writes as you do has got the right spirit, and is our warm friend.

Bob Harding, Market Hill.—"I am delighted with the Certificate. I approve of the objects entirely; as Daddy says, 'Meccano is the best toy and the best firm he has ever come across.'" You make us feel proud, Bob.

Master C. Gaze (and many others).—As you have already signed an application form it will not be necessary to fill up another one to get a new badge. Just send a remittance of 7d. in stamps, explaining that you are a member, but require a new badge, and one will be forwarded to you by return.

S. Messer, Stoke Newington :—

Who invents the Sprocket Chain,
And then the Hornby Clockwork Train?
He must have a tremendous brain,

Frank Hornby!

Who tries to make us happy boys,
With lots of new-invented toys
Like trains that run and make no noise?

Frank Hornby!

Who, when he reads these lines to-day
Will tap his head and gently say,
"Poor kid, his mind has gone astray?"

Frank Hornby!

He didn't do or say anything like that. On the contrary, he seemed highly pleased to receive such a nice tribute.

Mr. J. Blair, Bishopton, writes: "It does not need any testimony of mine to say how delightful boys find the Meccano Outfits; I bought my boy an Outfit at Xmas; I am only sorry I delayed so long." Your tribute to the joys of Meccano is very welcome; allow us to congratulate you for demonstrating it in the practical way of starting a Meccano Club and helping us with this splendid work among boys.

J. Borrowdale, Wellington.—Congratulations on winning first and special prizes at the Wellington show, with your Pit Head Gear. We hope you received your entry form safely, and that you will be equally successful in the Big Meccano Prize Competition.

G. Fairclough, Haydock (and many others).—Bi-monthly means every two months, and not twice a month as many boys imagine.

How to get the Meccano Magazine regularly

The Meccano Magazine is now sold by most of the regular Meccano dealers, but in order to prevent disappointment you should place an order with your dealer for a copy of each issue to be reserved for you. The price of each issue is 1d. If you experience difficulty we will mail you a copy regularly on receipt of 6d. for the next six issues, or 1s. for the next twelve.

Meccano Manuals of Instructions



There are two Meccano Manuals of Instructions, and no Meccano boy is properly equipped unless he has them both. Book No. 1 is the regular manual which goes with the main Meccano outfits. It contains illustrations and full instructions for making 323 fine models; some of the models have been designed by our own staff of experts, and others are prize-winning models contributed by Meccano boys, from every country in the world. Price 2s. 6d. (postage 3d. extra).

Meccano Manual, Book No. 2, has only recently been published, and it contains illustrations and instructions for building 100 entirely new models, very many of them prize winners. It contains Tanks, Guns, Submarines, Searchlights, and other warlike models; also a new series of simple and intensely-interesting scientific experiments which any boy can make and which impart a lot of useful knowledge. Price 1s. 3d. (postage 2½d. extra).

Prices of Meccano

No.	Description	Price
0	Outfit with full instructions for building	6/-
1	do.	10/-
2	do.	20/-
3	do.	30/-
4	do.	50/-
5	do.	do. (Carton) 70/-
*5	do.	do. (Wood) 100/-
*6	do.	do. (") 180/-

*In well-finished cabinet with lock and key.

Accessory Outfits

No.	Description	Price
0a	converting a No. 0 into a No. 1	5/-
1a	do. do. 1 do. 2	11/-
2a	do. do. 2 do. 3	12/-
3a	do. do. 3 do. 4	22/-
4a	do. do. 4 do. 5	17/-
5a	do. do. 5 do. 6	Car. 65/-
5a	do. do. 5 do. 6	Wood 95/-
	Inventor's Outfit "A"	10/-
	Inventor's Outfit "B"	25/-
	Meccano Clockwork Motor	12/-

Each Meccano outfit is complete with all parts and tools necessary for building models. Full instructions are included, and the youngest boy can commence to build at once without study. An accessory outfit may be purchased at any time, enabling bigger and more interesting models to be built. Additional parts may also be purchased separately, at prices given in our published lists.

Remember that though boys play with Meccano for pleasure, and though they get more genuine fun from it than from any other toy, it also gives them a sound knowledge of engineering. Through playing with Meccano, many a bright boy has been started on a prosperous career in one of the most important and profitable professions—engineering and mechanics.

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