

A DOUBLE-ENDED LOCO

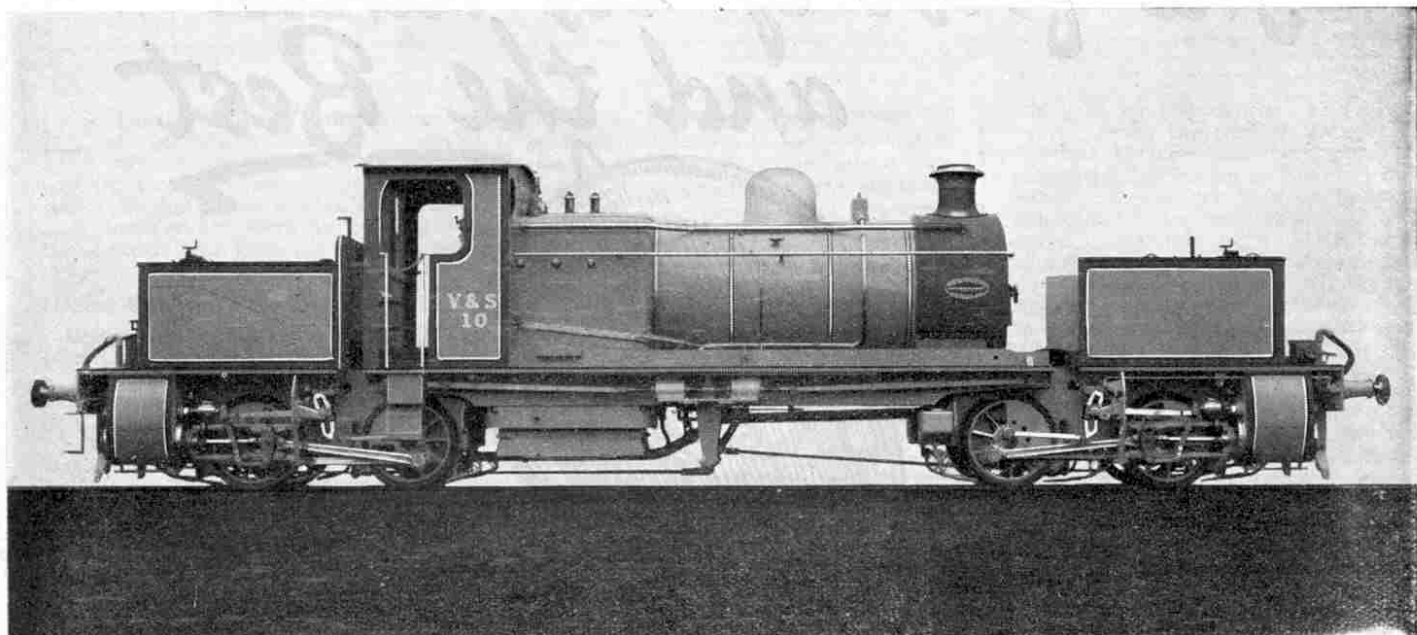


Photo courtesy]

[Messrs. Beyer, Peacock & Co. Ltd.]

Our illustration shows a powerful 0-4-4-0 Garratt locomotive which is giving excellent service on a Works Railway. This loco regularly traverses 97-ft. radius curves and hauls 150-ton trains up gradients of 1 in 20.

ONE of the most remarkable features of modern locomotive development is the manner in which abnormal requirements have been met by the ingenuity of designers. Among the most interesting of the many types of special locomotives embodying such devices is the Garratt articulated loco.

The primary purpose of articulated locomotives in general is to provide for easy negotiation of difficult curves. While this is, of course, a valuable feature of the Garratt, its main object is to provide a range of power that cannot be attained with the more conventional type of loco.

Turn-tables Eliminated

The Garratt consists of two separate engine units connected by a frame carrying the boiler. These units are placed one at each end of the boiler frame, so that the latter is left quite free for the accommodation of the boiler. The result of this arrangement is that the size of the boiler is limited only by the loading gauge, as the fuel and water are carried on the engine frames.

There are no axles beneath the firebox, so that this can be made of any depth and volume within reason, with correspondingly good steaming qualities and fuel economy.

These engines are "double-enders," in fact as well as in appearance, for they will run equally well in either direction, thus avoiding the necessity for long turn-tables. Reversing is generally done by screw-gear, but in the largest engines steam reversing-gear is used instead. Steam-operated brakes are fitted, with hand-braking in addition for the rear unit, and both units are provided with sanding apparatus.

Water-Tank and Boiler

The rear tender carries a combined water-tank and fuel-tank, the shovelling

plate of the latter projecting into the cab. The front unit carries a plain water-tank, and the two tanks are connected by a levelling pipe carried along the outside of the girder frame, with flexible connections to the pipes beneath the tanks. Either tank can be isolated if required.

In meeting the growing demands for engines of greater power, designers were always faced with the difficult problem of providing a boiler that would fulfil requirements. The result was the building of boilers with very long barrels, which were both expensive and unsatisfactory. The Garratt loco solves this problem completely, for its boiler can be made equal to all demands, at the same time being built on the simplest possible lines.

The First Garratt

Having briefly outlined the general characteristics of Garratt locos, it will be of interest to turn to particular engines and their work. The first Garratt was designed and built in 1909 by Messrs. Beyer, Peacock & Co. Ltd., for the 2 ft. gauge line of the Tasmanian Government Railways. This loco was necessarily of comparatively small size. It was of the 0-4-4-0 type with compound cylinders—high pressure 11 in. by 16 in., low pressure 17 in. by 16 in. Its wheel diameter was 2 ft. 7½ in., and its total weight, full, 33½ tons. At 75 per cent. boiler pressure it had a tractive effort of 14,334 lbs.

This loco proved very satisfactory, and was followed by larger Garratts, specially designed to meet a variety of difficult requirements on the main line, which had a gauge of 3 ft. 6 in. The weight to be hauled and the speed demanded, together with the restrictions in regard to axle-load and fixed wheel-base, made it im-

possible to obtain successful results from the ordinary type of locomotive, and the Garratt was the only solution.

Garratts Used in Africa

Since that time the progress of this type of loco has been rapid, notably in Africa on those lines that have limitations as regards track gauge and axle-load similar to those existing in Tasmania. Recently two engines have been built for the Trans-Zambesi Railway for general service on a line 175 miles in length. The gauge of this line is the standard South African gauge, 3 ft. 6 in. The motor trucks of these two locomotives are each of 2-6-2 formation, and the total wheel-base is 56 ft. 8 in. with a rigid wheelbase of only 8 ft. The firebox is of a specially deep type and is designed to burn wood fuel.

The original locos on this line were of the ordinary 4-8-0 type and they hauled loads of from 300 to 350 tons, whereas the Garratt engines are capable of hauling from 600 to 700 tons. Although their tractive effort is so great—about 31,250 lb. at 75 per cent. boiler pressure—the axle-loads are only about 10½ tons. The boilers are of the Belpaire type. The cylinders are 15 in. in diameter by 22 in. piston stroke, and are fitted with inside admission valves with Walschaerts gear. The leading tank carries 2,000 gallons of water and the rear tank 1,000 gallons, and the full weight of the engine is 95½ tons.

Other African railways have adopted the Garratt as being the most efficient locomotive for their requirements, and at present there are about 60 of these engines either actually running or under construction.

(Continued on page 313)

*The first of its kind—
and the Best*



The
B.T.H.
B 4. VALVE

The B.T.H. Type B4 Valve was the first valve taking only 0.25 amperes at 6 volts sold in this country and is acknowledged as the supreme valve for use as a Low Frequency power amplifier for loud speaker work.

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How Wireless Valves are Made

An Industry of Marvellous Exactitude and Efficiency

LAST month we dealt with the making of the bulb containing the anode filament and grid, and we learned how the electrodes were mounted in the stem. In this instalment we are to consider the detailed work in building up the elements that form the essential part of the valve and are contained in the bulb.

Making the Grid

Before the mount can be built up completely, the grid must be made. This is a very important operation. In the B.T.H. valves, the grid consists of a spiral of molybdenum wire, which is supported by another wire also of molybdenum. Each turn of the spiral is either lashed by this wire to the support, or welded to it by electricity.

We were surprised to find that the whole of the work in connection with the manufacture of B.T.H. valves is carried out by girls. It was wonderful to see how accurately their delicate fingers manipulated the minute detailed work of making the grids and of welding the wires in position, and then it was that we ceased to wonder why girls were employed in preference to men!

The wires are wound on the grids by little hand-machines, the number of turns of wire in the spiral and the length of the grid itself being checked carefully before it is built into the valve, for it is very important that the turns of wire in the grid should be evenly spaced. The same care is exercised in selecting the wire used for making grids, for the diameter of the wire used, as well as the diameter of the grid itself, must be kept exactly to the dimensions that have been previously determined to be the most suitable for each particular kind of valve.

Mounting the Electrodes

In the next process the electrodes are brought into position, and at this stage of manufacture great care must be taken, for many of the faults that develop later may be traced to lack of care in mounting the electrodes. The nickel anode is usually mounted first by means of an electrical welding machine. This welds the anode to the correct nickel wire that projects from the "pinch," or glass tube, by which the welds are held. The grid is next placed inside the anode and is welded to the appropriate lead. After this has been done, the filament, which is usually a straight piece of tungsten wire of specified diameter and of carefully-measured length, is introduced down the grid and the ends are secured to the two nickel supports.

The mount is now complete except for special treatment in the case of some particular types of valves. In these the valve at this stage is dipped in, or painted with, a mixture of chemicals generally

termed a "getter," the use of which will be explained later. If the mount is so treated, it is placed on one side to dry, and then the positions of the electrodes are adjusted so that the grid and anode are concentric, or evenly placed, and the filament is adjusted until it is centrally situated within the grid.

Sealing and Evacuating the Bulb

When the mount is dry, with the electrodes correctly adjusted, the next process is to seal it in the bulb, and this is accomplished by placing the mount on a peg of a sealing-in machine. A number of these pegs are fixed vertically on the outer edge of a horizontal disc, some two or three feet in diameter. An operator places the mount on a peg and slips over it the bulb. The disc carrying the peg then moves a short distance, bringing the cylindrical portion of the bulb into a gas-fire, which so heats the glass that it falls inward round the bottom end of the stem, and thus seals the mount in position inside the bulb with an air-tight joint. The disc with its pegs rotates continuously, stopping only a few seconds as each peg comes before the operator, so that there is a constant stream of mounts being sealed in their respective bulbs. The operation is accomplished in almost as short a space of time as it has taken to describe it.

On leaving the sealing machine the valve is next submitted to an exhausting process, by which all the air is removed from inside the bulb. This is another very important process of manufacture,

and calls for considerable judgment and experience on the part of the operators.

When a valve has been completely exhausted it is known as "hard," while a valve that has not been so thoroughly exhausted is termed "soft." If a soft valve is correctly handled by the user of a receiving set it may make an efficient detector, but if used for amplifying it will not give satisfactory results. Valves employed for amplifying purposes require a very high degree of vacuum. To obtain this the valves are heated to a high temperature while connected to a powerful vacuum pump by the short length of glass tubing that has remained attached to the top of the bulb since it was blown at the very first stage in its career.

Eliminating the Gases

During the exhausting process it is necessary not only to exhaust the air, but also to drive out the gases contained in the metal of the electrodes and later to absorb the residue of these gases when the bulb is sealed, so that a permanent high vacuum will be maintained. This is accomplished by passing a current through the filament of the valve while the anode and grid are maintained at a high positive potential, by which they are thus subject to bombardment by electrons from the filament. As a result the anode and grid become very hot, and the chemicals with which the valves are painted become deposited on the walls of the bulb, in which position they gradually absorb the gases driven out of the electrodes by the heat. In some cases a different procedure is adopted and a special "getter" is used. When the anode becomes hot the "getter" volatilises and is deposited on the bulb as a fine coating of silvery metal, making the glass of the bulb something like a mirror.

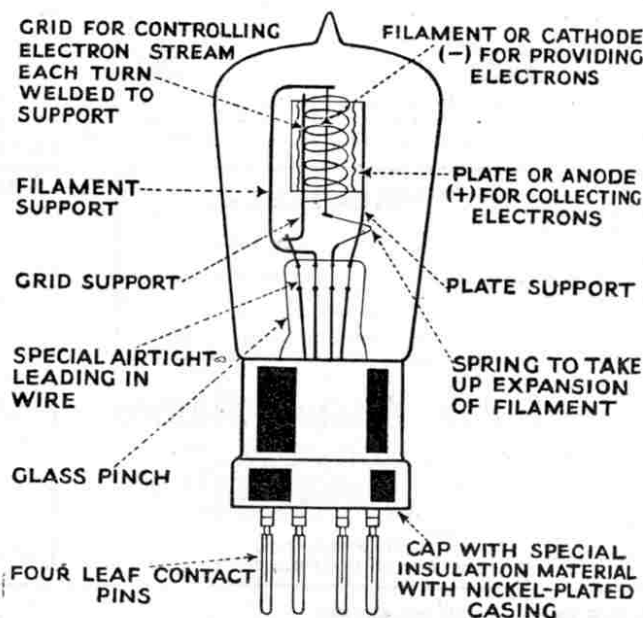
In either case the pumps exhaust most of the gas that is liberated from the electrodes, but the process is completed by the volatilisation of the "getter," thus ensuring a very hard vacuum.

When the exhausting process has been carried out completely the bulb is sealed by closing the tube through which exhaustion has taken place. The tube is heated and twisted off, leaving on the bulb the characteristic "pip" or sharp point with which we are all familiar.

Careful Testing

The exhausted bulbs with their electrodes sealed inside are now ready for finishing off, and as a preliminary are fitted with a nickel-plated shell, to which they are fastened by a special insulating paste. The standard four-pin plug is fitted inside the shell, the copper wires connected to the electrodes being threaded through the holes in the disc beside the pins.

(To be continued)



The above diagram illustrates a B.T.H. valve of the R Type in which the filament is of pure tungsten, the grid a molybdenum spiral, and the anode nickel. This type of valve works well as a detector or amplifier, the normal working voltage on the anode being 20 to 80 volts and on the filament 4 volts with a consumption of approximately 0.63 ampere.

Stamps for Sale

(See also page 308)

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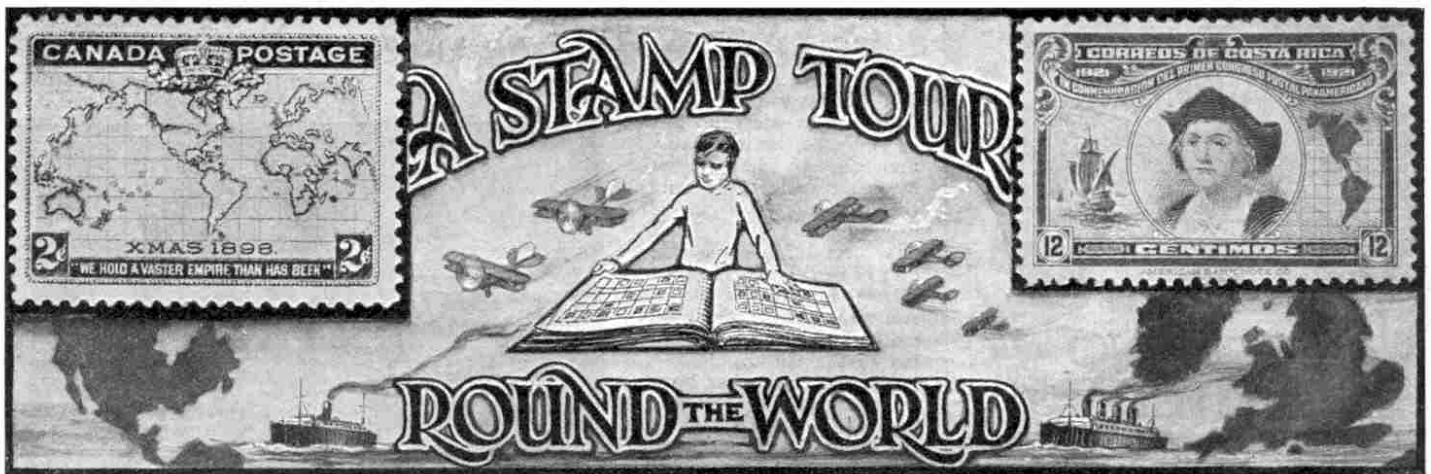
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II. NEWFOUNDLAND, CANADA AND UNITED STATES

LEAVING Liverpool and home far behind, and passing southward down the Irish Sea, we reach the open waters of the great Atlantic. It is about 2,000 miles to Newfoundland, the first country on our long list, and so we shall have plenty of time during the voyage to make a survey of our floating home. We examine the wireless cabin; the bridge, with its wonderful control instruments; we explore the ship's stores and the hold and spend some time with the look-out. But what interests us most is the engine-room with its great turbines, and close at hand the huge boilers and furnaces. With all these attractions the time quickly passes until one morning we are greeted with the news that Newfoundland is in sight. Eagerly we make our way to the bows to catch our first glimpse of the American continent, and we feel that our tour has indeed really commenced.

The Newfoundland Coast

The coast of Newfoundland is bleak, rocky and barren. The



brown cliffs, some 300 ft. in height, stretch to the right and to the left as far as the eye can see, broken here and there by deep inlets similar to the fjords of Norway. We pass through one of these inlets, called "The Narrows," about one-third of a mile wide and flanked on each side by hills 600 ft. in height. As we proceed we find that the inlet narrows to 600 ft., and turning suddenly at the end of this stretch we are at St. John's, the capital of Newfoundland. Here we board the waiting fleet of aeroplanes to make a tour of the island. Quidi Vidi Village (1923, 8 cents) is reached and passed and soon we arrive at Placentia, 63 miles from St. John's. Placentia, the old French capital, is a small sea-port on the eastern coast of Placentia Bay and is one of the principal



centres of the herring fishery. It is prettily shown on the 20c. value of the current pictorial series, this particular value having been issued only a few months ago.

Flying northward we pass over the south-west arm of Trinity (1923, 2c.), the coast here being typical. The 5c. value of the same series shows a nearer view of the cliffs. It was here that the U.S. "Niagara" landed the American end of the first Atlantic telegraph cable in August 1858. Continuing along the coast we arrive at Cape Bonavista, "the landfall of Cabot," as the 3c. of the 1897 issue states. The set of stamps to which this belongs was issued to commemorate the 400th anniversary of the discovery of Newfoundland by John Cabot, whose portrait appears on the 2c. value. The 1c. of the same set also commemorates the 60th year of the reign of Queen Victoria.

The Paper-Mills

Flying westward and inland, we come to the Grand Falls on Exploits River. These are near to Newfoundland's only railway, which runs from St. John's to Port-aux-Basques in the extreme S.W. of the island, with a short branch to Placentia. The Grand Falls form one of the most impressive sights of the island and are well shown on the 10c. stamp of the 1910 issue. In the foreground are the paper-mills that make vast quantities of paper, chiefly for newspapers, from wood-pulp. After proceeding about 60 miles in a north-westerly direction we come to the Humber River and follow its course for nearly fifty miles to its mouth. On the way we pass many beauty spots, such as are shown on several values of the 1923 set. The 4c. shows a "Quiet Nook," the 6c. the "Upper Steadies," the 10c. the "Humber River Canon," and the 15c. "Near the Little Rapids." On all these stamps we see the beautiful hills and woods that are typical of the



magnificent scenery of the country. At the mouth of the Humber is the Bay of Islands, of which we are given a glimpse on the 12c. stamp of the same issue. This stamp also shows the curiously-shaped hill named Mount Moriah.

Now our visit to Britain's oldest colony is finished and we turn southward to rejoin our ship, which has been skirting the south coast of the island while we have been journeying inland.

Canada and Quebec

Our stay in Canada is of short duration, for we shall only visit Quebec, a city that is the destination of most of the Atlantic liners that sail up the river St. Lawrence. Quebec, which is built on the north

bank of the river at the point where it is joined by the St. Charles, celebrated the tercentenary of its foundation in July 1908. Canada commemorated the occasion by issuing a handsome series of stamps, which seem to be becoming rather



scarce. At the present catalogue prices they should be well worth obtaining, since a considerable rise in prices seems inevitable.

Jacques Cartier, who is portrayed on the 1c., was the first known white man to visit Quebec. He founded a large Indian village at this point in 1535 and gave it the name of Stadacona. Samuel Champlain, whose portrait is also on the 1c. stamp and whose house is shown on the 5c. illustrated here, founded the present city in July 1608.

A view of Quebec is shown on the 10c. stamp, which is one of the handsomest stamps ever issued, the engraving being almost microscopic in its detail, and under a strong magnifying glass its full beauty may be seen and studied.

(Continued on page 313)



The Secretary's Notes

This month will see the opening of the First Winter Session of 1924 for the majority of Meccano Clubs in this country. A few have already held their first meetings and, judging from their encouraging reports of attendance, a very successful session should be assured.

A valuable hint on club management was recently given to me by the Leader of one of the foremost clubs in this country.

A Leader's Suggestion

As it deals with a means of increasing club funds, the suggestion should prove of interest to most Club Leaders. My correspondent for several years past has made a practice of sending out a number of circular letters to the leading residents in the district. These letters, which may be printed or duplicated, give a short account of the club's institution and activities, and invite the recipient to become an Honorary Member of the club at the cost of a small subscription, 2/6 a year in this particular case. Honorary Members are entitled to visit the club at any time during the Session, and when the good work of the club is realised, a practical interest in the club's future is almost invariably taken. The club in question obtained nearly £10 last year from this source alone, and I strongly recommend the adoption of this scheme by other clubs.

Club Membership Cards for the Winter Sessions are now available, and Club Secretaries should make prompt application for supplies, stating the number of members on the club roll. For the information of newly-affiliated clubs I would say that these membership cards are neatly printed in green, and in addition to setting out the Guild Rules, contain space for the insertion of the club programme. Club membership cards are supplied free of charge to every affiliated club, one being provided for each member.

Secretaries! Please Note

Numerous clubs will, no doubt, decide to run a football team during the autumn and winter months, as was the case with many last year. It has been suggested on several occasions that a Meccano Football League should be instituted and a Challenge Cup offered to the winning team. While this suggestion is one that we hope to be able to adopt at some time in

Meccano Football League

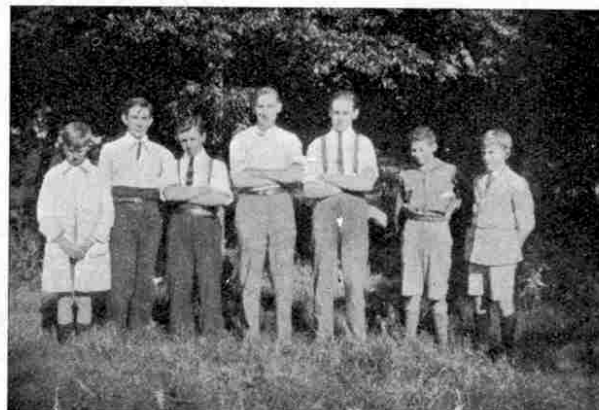
the future, there are several difficulties in the way at present, chief of these being the question of distance. In the majority of cases the Meccano Clubs are so far apart that the journey for the visiting team would be far too long and expensive an undertaking. As new clubs are being formed almost every month, however, this obstacle will eventually be overcome, and then it will be possible to establish a Meccano Football League.

In whatever part of the world a Meccano boy may be, he invariably manages to find other Meccano enthusiasts, and the formation of a club is usually the result. This has certainly been the experience of Master Charles Edwards, of South America, who is a keen model-builder and a member of the Guild.

Meeting five other boys interested in the Meccano hobby, he soon organised the St. Alban's Meccano Club—certainly the smallest club ever started—and was appointed the first Secretary.

The club has its home at Venado Tuerto, in the Argentine, and two months after its foundation the membership had been increased to eleven. It has now been established well over a year and continues to make good progress. Unfortunately, Master Edwards was compelled to resign his post in November of last year owing to a change of residence, but he still continues to take an active interest in his old club.

The photograph on this page was taken at a recent picnic held by the club, and



shows Master Edwards on the extreme right of the group. The Leader, Mr. H. A. Poole, is the centre figure, on his right is the Club Treasurer, Master S. Davies, while the new Secretary, Master Dennis McCarthy, is standing on the left. All Guild members will doubtless wish this club a long and prosperous life, and we trust that the success of the first South American club will encourage other Guild members abroad to "go and do likewise!"

Meanwhile, there are several clubs in certain parts of the country that are within easy distance of each other. Edinburgh, Kilmarnock, Glasgow, London, Birmingham, Surrey, South Yorkshire and Lancashire all boast a number of Meccano Clubs, and I shall be very glad to send full particulars to any Leader or Secretary wishing to arrange inter-club matches. A Guild map will be published shortly in the "M.M." showing the locality of every Meccano Club in the country, and reprints will be available for use in club-rooms.

A Guild Map

As I have mentioned on several occasions, it is the President's desire to make this a record year in the history of the Guild. A similar wish has been expressed every year since the institution of the Guild in 1919, and up to the present it has always been fulfilled. For the last six years the number of Guild members has grown steadily day by day, until now there are nearly 40,000 Meccano boys all over the world who are wearing the Guild badge. Unfortunately, there are many more boys who have never even heard of Meccano or the Guild, and it is they who must be found and interested if 1924 is to be another record year.

Six Years' Progress

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CLUB NOTES

Claygate Juvenile Club (Meccano Section).—The new session commenced on September 6th and the programme includes Model Engineering, Carpentry, Upholstery, Needlework and Knitting. The club is making splendid progress and is now in a sound financial position. The cost of building the club-room has been entirely defrayed, while there is also a substantial bank balance in hand. Cloth badges incorporating the club's initials are issued to all members, and these have proved a very great attraction. A Supper was given on 17th September by the Club Committee to the President, Vice-Presidents, Committee, helpers and other friends who assisted at the recent Club Sports which proved so successful. About 50 people were present and a very enjoyable evening was spent. Club roll: 32 girls, 30 boys. *Leader:* Mr. J. W. Haynes, "Fontmell," Covers Road, Claygate.

West View (Nottingham) M.C.—Club members recently visited the Electricity and Gas Works, Pits and several Water and Engineering Works, and an enjoyable afternoon's camp was held in some local woods in August. Club activities for the present session include Lectures, Model Building, Competitions, various Hobbies, Debates and Games, and the club Library is again being well patronised. Members have also been making experiments with a field telephone which requires neither battery nor wires and, if the tests are successful, further particulars will be given in the "M.M." Club roll: 30. *Leader:* Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

St. Mary's (Newington Butts) M.C.—A very successful Summer Session concluded in July with the club's annual outing to Keston, where an enjoyable day was spent. Other interesting events during the session were visits to the Tower, London Docks, Science Museum and the City of London Electric Light Works. During the present session the club will again take a prominent part in Guild activities in London. The opening meeting was held at the beginning of last month, and an interesting programme was drawn up. This includes Lantern Lectures, Competitions and Model Building, and it was also decided to hold a Grand Exhibition on 15th November. Several applications for membership have already been received and the club intend to make every effort to maintain their position as the largest Meccano Club in the world. Club roll: 103. *Secretary:* Mr. C. Curle, 37, Pullen's Buildings, Peacock Street, S.E.11.

Australia

Adelaide M.C.—Club meetings are divided into three parts. First of all business matters are discussed, then models are built and explained, and finally a competition is held. Models built during the past session include a Meccano Electric Loco (which successfully pulled Hornby rolling-stock round a long track); a Telegraph System made from the Meccano Electrical Set, by which messages in Morse code were sent and received; a Meccanograph and a Meccano Changing Colour Disc. It is also worth recording that butter has been made in the Meccano Churn. At one meeting members were called upon to make 10-minute speeches on various chosen subjects, some of the more interesting being "Do you approve of smoking?" "The greatest man of the 18th and 19th centuries," and "What could we most easily do without?" The club motto is *Labor omnia vincit*—"Work conquers all." Club roll: 16. **Secretary:** Master R. E. Cornish, 100, Walkerville Terrace, Walkerville, Adelaide, South Australia.

Glenelg M.C.—Though only a year old, this club now boasts an active membership of 62, and is divided into three sections, Junior, Senior and Stamp Collectors. Each Section is in charge of a Sub-leader who lectures on subjects set by the Leader. Meetings are held every Monday evening in the local Scouts' Hall, where debates and model-building competitions are regularly arranged. Club roll: 62. **Secretary:** Master R. Squire, 41, Osmond Road, St. Leonards, Glenelg, S. Australia.

India

Calcutta M.C.—The programme for the Summer Session includes model building, carpentry, papers by members and outings to places of interest. A Concert and Exhibition will be held shortly, when the club will co-operate with local Meccano dealers. A model workshop and club library are well patronised by the members, the majority of whom are keen Boy Scouts. Club roll: 20. **Secretary:** Master A. N. Roy Chowdhry, 35-2, Beadon Street, Calcutta, India.

South Africa

Wynberg M.C.—At a recent club meeting the third quarterly report was read and discussed, after which Messrs. M. A. and L. G. Sylvester were elected Vice-Presidents. A visit paid to a local power station near the docks proved very interesting and enjoyable. Unfortunately the club recently lost its President, Mr. Duveen, for a few months, while Mr. A. J. Lewis, the late Secretary, has already left South Africa and is now in England. A new Club Secretary has recently been appointed, and we wish him every success in his new duties. Club roll: 79. **Secretary:** Mr. E. A. F. Hall, Boundary Road, Rondebosch, C.P., South Africa.

Durban M.C.—Started only a few months ago, this club was affiliated with the Guild in April. A recent meeting for the discussion of plans, enrolment of members, etc., was presided over by the Mayor of Durban, who is the Club's President. Meetings are being held once a fortnight in a local hall, and there is every indication of this club taking a prominent place in South African Guild records. Club roll: 30. **Leader:** Mr. G. E. Patterson, 360a, Berea Road, Durban.

Proposed Clubs

North Shields M.C.—Efforts are being made to form a Meccano Club in this town, and with the loyal co-operation of Guild members living in North Shields, a club should prove very successful. Any Meccano boy interested should write for full particulars to Master Wilfred G. Coates, 17, Lovaine Place, North Shields.

London Clubs' Rally

A Meccano Guild Rally of all the clubs in London and Greater London is being held on Saturday, 1st November, 1924. A varied programme of interest to all Meccano boys has been arranged. Either the Guild Secretary or his representative will attend, and it is hoped that every London club will be fully represented. It should be understood that the Rally is not confined to club members only, and all Guild members in London are cordially invited to attend. The Guild Rally is being held in the club-room of the Holy Trinity Meccano and Radio Club at the Parish Hall, Richmond Road, near the Angel, Islington, London. The meeting starts at 7.0 p.m. and the hall may be easily reached by several bus routes, trams from King's Cross or by the Underground Railway.

Sixth Annual Exhibition

As announced in our September number a Sixth Annual Exhibition has been arranged by the Holy Trinity Meccano and Radio Club. Several London clubs are co-operating in this exhibition, and a splendid display of working Meccano models is assured. The chief attraction, which should appeal to all railway enthusiasts, will be a miniature railway system complete with electric and clockwork locomotives and the latest additions to the Hornby Train System. Further particulars may be obtained from Mr. Stuart Wilson, of 29, Thornhill Road, Barnsbury, London, N.1.

How to Run a Meccano Club

by the
Guild Secretary

(Continued)

There can be no question as to the good effect of competitions in which members can take part under well-regulated conditions. Competitions stimulate and maintain interest, and cultivate that desire to excel that is so valuable an asset when boys launch forth into the world of business. In the syllabus of every club, therefore, certain nights should be devoted to competitions either in Meccano or any other subject.

The arranging and carrying out of such nights will be found to be a great stimulus to the club in general. The competitions in Meccano subjects may include speedy and accurate building of specified models in the Meccano Manuals; improvements in the design of some particular model; clever adaptation of new Meccano parts, or accurate and intelligent description of the construction and use of a selected Meccano model, etc.

The work of invention may also be carried out collectively by a small group of boys as well as by individuals. In the case of a group the members should decide beforehand upon the new model or movement that will form the subject of their attempt, so that their plans will be fully laid before the actual work of building commences at the club meeting. In both individual and collective inventing more than one meeting may be necessary in order to complete the model ready for adjudication.

The Guild Headquarters watch with special interest the inventive efforts of Meccano boys, and I am always particularly pleased to receive photographs or drawings of new models or practical suggestions for new movements.

Special Meccano Evenings

Apart from these competitions, however, the illustrating of mechanical principles with Meccano should provide many interesting evenings. For instance, the Leader might suggest on one particular evening that the members should illustrate

a general engineering principle such as "Transfer a horizontal motion into a vertical motion, increasing the speed." As there are several methods of doing this, it will be interesting to note the different ideas put forward.

On another evening a talk might be given on some such subjects as "The Inclined Plane," or "Pulleys." At another meeting the Leader might exhibit photographs of some engineering structure—a giant crane, for instance—and suggest that the members should construct a model as nearly as possible resembling the original. If the effort is carried out by the whole club and a combined model is built, each member may himself build some particular part, so that when all are fitted together the model is complete.

Interesting evenings also may be spent in studying some of the special Meccano models—the Chassis or Meccanograph, for instance—and for such occasions arrangements can be made with Guild Headquarters to have some model built and sent on loan to clubs. The following interesting models may be obtained for this purpose:

- (1) Transporter Bridge, without motor.
- (2) Workshop, working by electric motor.
- (3) Chassis.
- (4) Concrete Breaking Machine, small model working by clockwork motor.
- (5) Girder Suspension Bridge.
- (6) Derricking Crane, working by electric motor. This is a particularly good model for demonstrating the principle of the crane.

Three weeks' notice should always be given in order to allow sufficient time for the required model to be assembled. The only expense to the club is the return postage on the model.

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Visits to Local Works

The Leader should also endeavour from time to time to make arrangements for members to inspect local engineering works and factories. In a seaport town, for instance, the docks may be visited, and perhaps some large steamer inspected.

(To be continued)

Meccano Club Secretaries

No. 1. Master W. J. ROBERTSON



As Secretary of King Edward's Meccano Club, of Birmingham, Master Robertson has contributed a great deal towards the present flourishing condition of this club. Succeeding Master A. Tims, the first Secretary and Founder of the club, Master Robertson became Secretary in October 1923, and enthusiastically devoted his spare time to organising club activities. He is a keen cyclist, model-builder, and stamp-collector, and was recently awarded a Special Merit Medallion in recognition of his good club work. In recommending Master Robertson for the award, the Club Leader, Mr. Ian McMaster, described him as being "tireless in his zeal and organising work."

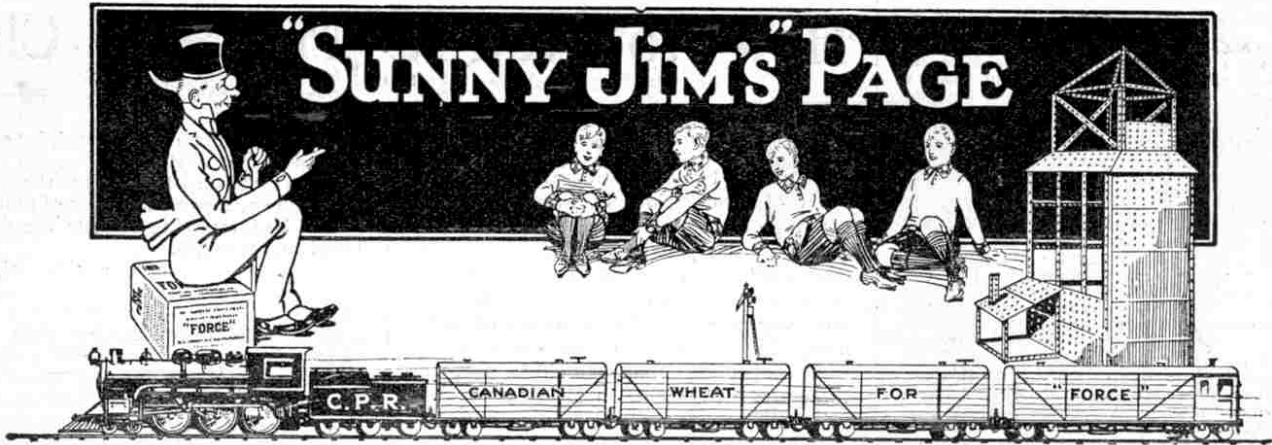
All Guild members will join us in congratulating the King Edward's Meccano Club on the possession of so energetic and capable a Secretary, and wish them every success in the coming session.

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The story of "FORCE" starts on the horizon-wide wheatlands of Canada, long before Summer brings the droning reaping machine. It starts with the ploughing of the land and the sowing of the seed. Wheat is the finest cereal ever known to mankind. In this one cereal we have all the protein, starch, minerals and salts needed to keep the body in good health. We have more than this—we have these valuable foods present in the correct proportions for complete nourishment.

When Summer comes to the wheatlands the grain is tall and ready to ripen to that rich golden colour familiar to all of us who have visited the English countryside at harvest time.

After the reaper and binder has done its work the

shocks of corn are carried for threshing, the grain is loaded into wagons for transportation to the tall grain elevators at the railside, and from these it is transferred into the big covered freight cars of the Canadian Pacific Railway.



Now let us go to the "FORCE" Mills at Ayr in Ontario and see the journey of the wheat from its arrival there to the time when it leaves for England, transformed into flavoured flakes of "FORCE."

First the new grain is cleaned and re-cleaned until every particle is perfect. The cleansed whole wheat is then passed into great steam cookers where it is cooked with barley malt. It is the clever addition of barley malt at this stage that gives to "FORCE" its wonderful flavour and assists in making it so wholly digestible.

When cooked, the wheat is rolled out into flakes which are then toasted to a rich crisp brown. While still warm, and still untouched by hand,

the flakes are boxed by machinery and then packed for shipment. Next time you go to the grocer's look around you. You will soon spot the familiar yellow "FORCE" packet with "Sunny Jim" on the front of it. That is the packet you must ask mother to let you buy, because it contains the very same wonderful flavoured nourishing food about which we have just been talking. Mother will let you have "FORCE" if you ask her because it needs only the addition of hot milk to make a delightful dish for breakfast or supper. You will want to eat "FORCE" because, first and foremost, it is good to eat, nice to eat, delicious to eat. Secondly you need "FORCE" because it is ideal for keeping up a high standard of health and strength. A box of "FORCE" has 1,260 units of energy in it. An equal weight of eggs has only 474. Steak, which we all know is good food, can only show 768 units, while an equal weight of codfish comes right down on the list with a mere 240 units.

So, boys, for health and strength, and for a jolly fine food, too, EAT "FORCE." Send now for the free sample offered on this page. It will give you a chance to prove to mother what a really fine food you have discovered. Then make sure she gets it for you regularly!!!

Yours forcefully,

Sunny Jim

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If you prefer, send a Postcard.

WRITE PLAINLY PLEASE



This Month's Short Story

Waiting Will
Caught a chill,
Took wrong pill,
Now he's still.

* * * *

- Q. Why does a duck go into the water?
A. For divers reasons!
Q. Why does he come out?
A. For sun-dry reasons!
Q. Why does he go in again?
A. To liquidate his bill!
Q. And come out again?
A. To take a run on the bank.

* * * *

Puzzle No. 36

A grocer who was called upon to weigh 1 lb. of tea for a customer in a hurry found that his weights had been mislaid. It was essential that this particular customer should be served, however, and suddenly the grocer had an inspiration. He knew that the left-hand side of his scale held a pint or more of water, also he had a metal paper-weight that weighed six-and-a-half ounces, and a vessel that held exactly half-a-pint of distilled water. He sat and thought for a minute or two, and then contrived a method of weighing exactly 1 lb. of tea. How did he do it?

THE LIMIT!

After a particularly trying day an editor went home with his nerves on edge and at once sought refuge in his study, well away from the noises of the household. He sat down by the fire and was gradually feeling calmer, when the cat, which had been sitting there too, got up slowly and walked across the room.

The editor started, then turned on her and said indignantly:

"Now, what are you stamping round here for?"

* * * *

Teacher: "Now, Dick, how many ribs have you?"

Dick: "I don't know, mum, I'm so ticklish I can never count 'em?"



PAPER EVERYTHING

The wife of one of the new rich was having her palatial mansion re-decorated. Painters and paper-hangers swarmed like ants, and slapped on gilt paint by the bucketful.

One morning the foreman approached the mistress of the house. "I've just finished the morning-room," he said. "What next?"

"You can do the study on Friday," said the lady.

"What shall we do in the interim?"
"Oh, paper that, too!"

Answers to Last Month's Puzzles

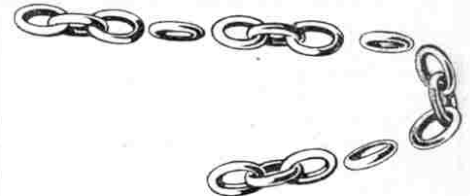
No. 31. Missing names of flowers:—
1. Pink. 2. Iris. 3. Anemone. 4. Daisy.
5. Pansy. 6. Lobelia. 7. Harebell.
8. Rose. 9. Gentian.

* * * *

No. 32. 3/9.

* * * *

No. 33.



The jeweller took one piece, broke the three links, and welded the other four pieces together with them.

EGGS TRORDINARY!

"Do you say that your hens 'sit' or 'set'?" asked the precise schoolmaster of the busy housewife.

"It never matters to me what I say," was the quick reply. "What concerns me is to learn, when I hear the hen cackling, whether she is laying or lying."

NOT THAT MAN.

Roy Simpson, negro labourer, was putting in his first day with a gang whose foreman was known for getting the maximum amount of labour out of his men. Simpson was set on to carry heavy timbers and ties until at the close of the day he was completely tired out. Before he knocked-off he approached the foreman and said: "Mister, you sure you got me down on the pay-roll?"

The foreman looked over the list of names he held. "Yes," he said finally. "here you are—Simpson—Roy Simpson. That's right, isn't it?"

"Yaas, boss," said the negro, "dat's right. I thought mebbe you had me down as Samson."

"IT'S NEVER TOO LATE . . ."

A man went to a judge and asked whether he could bring suit for slander against a man who had called him a rhinoceros.

"Why, certainly," said the judge. "When did he call you that?"

"About three years ago."
"Three years ago! And you only start your action to-day?"

"But, your honour, it was only yesterday that I saw a rhinoceros for the first time."

* * * *

- Q. Why are potatoes like gate posts?
A. Because they both propagate.

THE "Tongue-twister" epidemic appears to have subsided altogether for the time being, and I am going to take advantage of the peaceful interval to draw attention to other equally interesting but less strenuous amusements.

I have had many requests from time to time for puzzles connected in some way with Meccano, and I give below a very interesting one suggested by Master James B. S. Curr, 19, Well Street, Paisley, to whom the monthly prize of 5/- has been awarded. The problem is to fill in the blanks in the following sentences with names of Meccano Parts. In one or two instances, where the name of a part consists of more than one word, only one of these words has been used, but in each case sufficient is given to enable the particular part to be identified:—

Puzzle No. 34

Dick was only a — of a lad, and he thought his — was an — old —. Dick's wage scarcely enabled him to buy sufficient —, let alone his favourite —. Even a — will turn, however, and presently Dick became convinced that he could — out of the old — an increase in wage. Without any beating about the —, he — his — and — himself for the attempt. He took no chances, however. There was some risk that his employer would — and — him, and therefore Dick held himself ready to — round on his —, — through the door and — for his life.

* * * *

Puzzle No. 35

Can you join these nine rings by four straight lines?



(Contributed by Ronald Storey, Scarborough).

* * * *

Dick: "Father, what does transatlantic mean?"

Father: "It means to cross the Atlantic."

Dick: "Does 'trans' always mean to cross?"

Father (very sharply): "Yes."
Dick: "Then I suppose transparent means a cross parent!"

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Wood inlaying—To prepare working drawings—To renovate a grandfather's clock—To make garden arbours, arches, seats, summer-houses, etc.—To use metal-drilling tools—To renovate mirrors—To mend china—To do fretwork—To lime-white poultry-houses—To do gold and silver-plating—To clean a watch—To mend keyless and ordinary watches—To distemper ceilings and walls—To make picture frames—Curtain fitting—Make and fix roller blinds—Lay carpets—Repair a wire mattress—Re-tyre and renovate a perambulator—Make or repair a camera—Repair and renovate sewing machines—Make or repair a gramophone—Instal electric bells—How to cure damp walls, leaky roofs, etc., etc.

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FROM ALL MECCANO DEALERS

Competition Corner

THIRD COMPETITION

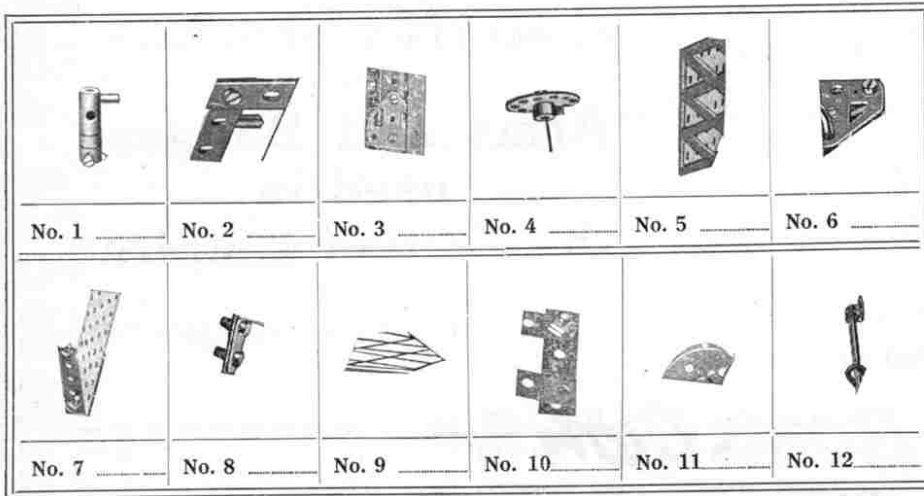
For Lynx-Eyed Readers

FIRST PRIZE : Hornby No. 2 Pullman Set. SECOND PRIZE : Meccano No. 1 Radio Receiver

THIRD PRIZE : Pair Meccano Headphones.

CONSOLATION PRIZES : 12 Meccano Writing Pads ;
12 Meccano New Complete Manuals (1924).

FIRST SET



INSTRUCTIONS FOR COMPETITORS :

Very varied have been the competitions announced in the "M.M." from time to time, but none have proved so extraordinarily popular as the last two for "Lynx-Eyed Readers." Altogether several thousands of entries were received, and since the closing date of the last set we have had numerous and insistent requests from readers asking for more Puzzle Pictures. One enthusiastic Meccano boy writes that owing to his close study of the manual in connection with these contests he now knows far more about the models, how they are built and the uses of the various parts than he knew before. There is no doubt that these competitions do help to make the construction of models clear, while they also act as a splendid test of a boy's powers of observation. We are therefore announcing a third competition in this series, and we hope that every reader of the "M.M." will try his best to win one of the twenty-seven splendid prizes offered.

The pictures illustrated above have all been taken from models illustrated in the 0-3 Manual (either edition No. 23 or 24) and competitors are advised to work from these recent manuals.

As in the two previous contests, there will be three sets of pictures in all, and the last set will be published in the Christmas "M.M." Competitors must attempt to solve all three sets to qualify for a prize. *No entries are to be sent in until the last set has appeared.*

The First Prize will be awarded to the competitor who sends in an entry containing the correct numbers of all the models from which the pictures were taken. In the event of two or more competitors sending in correct entries neatness of writing will be considered and the prizes awarded in order of merit. If no competitor succeeds in correctly numbering all the pictures the prize-winners will be those whose entries are most nearly correct.

NOTE.—It should be clearly understood that competitors will not be required to tear out the pages containing the Puzzle Pictures. The dotted lines are provided for the competitors' convenience only. All entries must be sent in on post-cards.

Tenth Photo Competition

A Beach or Riverside Scene

By the time this number of the "M.M." appears, most of our readers will have returned from their holidays, and those who took cameras with them will be looking through their prints and recalling various happy hours at the seaside or in the country. Holiday photographs have a special interest of their own, and therefore we have decided to announce another photographic contest—the Tenth—the subject of which is:—"A Beach or Riverside Holiday Scene."

Following our usual custom, this competition will be divided into Section A for those under 16 years of age, and Section B for those of 16 years and over.

Prints may be mounted or unmounted and may be made by any process, daylight or gaslight. An important condition of the competition is that every entrant must write his name, address and age on the back of each print submitted, and must also state by whom the photograph was developed and printed. In the event of a tie for a prize, photographs which have been developed and printed by the competitor will naturally receive preference.

Four prizes will be offered in this contest—Meccano No. 1 Radio Receivers as first prizes and Meccano goods to the value of 5/- as second prizes in each section.

The closing date for readers in the United Kingdom is 31st October, and for Overseas readers 31st January, 1925. Entries should be marked "Photo Contest" in the top left-hand corner of the envelope.

Result of "Bargain Hunt" Competition

This novel competition, "bargain-spotting"—the first of its kind to be announced in the "M.M."—has proved an unqualified success. The majority of the stamp collectors among our readers took full advantage of the opportunity to test their knowledge of stamp values, and "bargain-hunting" post-cards arrived in large numbers every day up to the closing date. The voting was very close, and though a large number of competitors agreed on the first two items, the third seemed to cause considerably more difficulty in its selection.

All votes have been carefully counted, with the following results:—(1) Hillier, of Horsmonden; (2) Norris & Co., of Alfreton; (3) Witherick of Coventry, and Lisburn and Townsend of Liverpool, a tie. The only entry bearing these names in their correct order was sent in by R. Heath, of Sheepscombe, Stroud, who has therefore been awarded the first prize. His choice of a 10/6 packet of stamps has been forwarded to him, and we congratulate him on his successful judgment.

As no other competitors sent in correct entries, the other three prizes offered have been awarded to those whose post-cards corresponded most closely with the general order of voting. J. Ormston, of Blaydon-on-Tyne, D. W. Bryant, of Highgate, London, and George E. Scragg, of Stockport, are therefore entitled to free advertisements in the "M.M." in which to announce their own bargains or wants.

The additional prize offered to the dealer in whose advertisement the biggest stamp bargain was found was awarded to Mr. Hillier, of Horsmonden, who is a regular advertiser in our pages.

We hope to announce another competition of this character in the near future, in which other readers as well as stamp collectors can take part.

FOR OVERSEAS READERS

Result of "Favourite Model" Competition

Curiously enough, the results of this Section of the Essay Contest on "My Favourite Model and Why I Like it" were something similar to those in the Home Section. In the latter section the Chassis was by far away the most popular model in the Manual of Instructions, and in the Overseas Section the Limousine headed the list by a large majority. The entries received were not quite so numerous as usual, but they were generally of a very high standard and exceptionally neatly written.

This Overseas Section was sub-divided into two further sections—(A) For those of 12 and under, and (B) for those over 12 years—and Hawk-Eye cameras were offered as prizes in each section. The winner of Section A was Leonard Fisher, aged 12, who sent in a well-considered and well-written essay on the pleasures to be derived from constructing the Meccano Limousine. (If Master Fisher will let us know his address his camera will be sent to him). Senji Sammie, of Madras, was awarded the prize in Section B for his bright and clever essay on the merits of the Meccano Loom, and a Hawk-Eye camera has been despatched to him.

IMPORTANT

We are constantly asked to supply back numbers of the "M.M." We print only sufficient copies to fill our regular orders, and as a rule back numbers cannot be supplied. In order to prevent disappointment our readers are advised to place a regular order with a Meccano dealer, a newsagent, or direct with us. (Subscription rates on page 320).

The **FIRST NUMBER** of the **NEW VOLUME** of

The Boy's Own Paper

1/- MONTHLY - AND WORTH IT!

OCTOBER, 1924. 72 large pages

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Delivered carriage paid to approved orders for 10/- with order. Balance 10/- monthly if satisfied. Money back in full if disappointed. **CATALOGUE Post Free** Complete range of Models **J. G. Graves Ltd. Sheffield.**

10/ NOW

Enamelling a Bicycle

by "ROVER"

Now that the season of rainy days and muddy roads is again approaching, cyclists will do well to overhaul their machines and make them weather-proof so that they will be in readiness for the winter months. Perhaps the plated parts have been allowed to become slightly rusty, and if so all rust should be removed and the parts well polished. The working parts should be well oiled and all bright parts rubbed over with a greasy rag or lightly smeared with vaseline or petroleum jelly. Although such a covering naturally causes the surface to retain dust and mud, it is a simple matter to remove the grease when required, thus revealing the clean and bright plating beneath.

Doubtless the enamel on the frame will have chipped off in several places. If it is intended to use the cycle during the winter instead of storing it away as some people do, it will be found well worth while to re-enamel it at home, and when this has been done you will have a smart-looking machine, well prepared to withstand the bad weather of the winter months.

What You Must Have

Enamelling a cycle is not a difficult matter, and all the necessities may be obtained for three or four shillings. You must have a tin of some good brand of black enamel, a medium-sized brush with soft hairs, a piece of emery paper, some pumice-powder and an old three-cornered file.

The work should be carried out in a fairly warm room, which should be as clean as possible and free from dust. All accessories, such as pump, bell, saddle, lamp, etc., should be removed from the cycle and the wheels should be taken out, so that only the frame remains. All

bearings should then be cleaned out with paraffin and well oiled, surplus oil being removed from the frame with a clean rag. The frame should be suspended in a convenient position and the old enamel removed by lightly rubbing with the file, the surface being made smooth with the emery cloth. Then wipe over the frame with a clean damp cloth and the cycle should be ready for the first coat of enamel.

Enamelling the Wheels

The wheels are treated in a similar manner to the frame, the tyres being removed and the rims and spokes scraped and rubbed with emery to remove the old enamel. If the rims are plated it may be decided to enamel them completely, as more often than not the plating is rusty in places, owing to the rim-brakes having worn it away. Even if the plating is in good condition it is a difficult job to successfully enamel only a portion of a rim and to leave the original plating. You could attempt the job, however, and if you are not successful you will always be able to go over the whole rim again with the enamel.

FIXING A CYCLOMETER

Cyclometers are usually fitted on the left-hand side of the front wheel spindle, as illustrated above. A striker (not shown) secured to a spoke engages the "star" wheel projecting from the cyclometer, and operates the mechanism with every revolution of the wheel.

Three Coats of Enamel Required

While the first coat is drying every precaution should be taken to prevent any dust from settling on the wet enamel. When quite dry, the frame should be rubbed over with a cloth and pumice-powder and water, or with a piece of worn emery paper. The frame should then be washed thoroughly in clean water, and after it has dried the second coat may be applied. When it has dried it is treated in the same way as the first coat, pumiced, washed, and dried as before.

(Continued on page 313)

Ride a Bicycle

But be sure it's a good one

Agents for:—
Raleigh All-S eel—Prices from £8-0-0
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Stamps for Sale

(See also page 298)

COLONIAL AND FOREIGN, including mint, war and high value Colonials. Pick any 50 for 2/-. Many good stamps.—Miss M. Saunders, 78, Church Lane, London, S.E.7.

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Opportunities—everything. Liabilities—none.
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To all requesting approvals and enclosing 2d. postage, we will send Free, 60 diff. stamps (Cat. 6/-), 1 perforation gauge and a watermark detector. Wembley Stamps on every letter.—J. Pickering, Market Place, Holt, Norfolk, England.

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(Advertisement Rates on page 320)

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£7 LATHES for £6!

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You will find it splendid fun to cut out and fix up your own games and you can have six for 1/-, or 1/2 post free, sent to your own home.

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This book gives more practical information about building wireless instruments than others at ten times the price.

HOW TO ERECT, CONNECT AND MAKE all kinds of wireless apparatus, including crystal and dual amplification sets, one and two-valve amplifiers, also the latest two, three and four valve tuned anode receivers. 160 pages including diagrams.

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The pages of the "M.M." offer you a world-wide market. For a small charge of 10/- per column inch (2½ inches wide), your advertisement is brought to the notice of thousands of potential customers each month. An advertisement in the "Meccano Magazine" will be read by over 100,000 readers in all parts of the world.

Rates and Specimen Pages on request.

Advertisement Manager,
"Meccano Magazine"
BINNS ROAD, LIVERPOOL

Air Race Thrills

An exciting new game which claims to give the players all the thrills of aviation without any of the attendant risks, has recently been sent to us by the makers. "Flip-o-Hoy" consists of a strong board, 26" x 17½", on which are drawn an outer circle or aerial course and an inner circle known as the propeller course, on account of the swinging propeller mounted in the centre. Each player has a well-made model aeroplane fitted with revolving wheels and propellers, and the board is designed to represent the view as seen from an aeroplane in flight. Travelling over the aerial course the plane experiences various adventures such as stunting, gaining altitude, and engine trouble, while the propeller course is marked out with numbers, signifying awards and incidents that occur in aviation.

"Flip-o-Hoy" (which is made by Mr. H. W. Woods, of Farnborough, Hants.), is an ideal game for winter evenings, and an illustration with further particulars will be found on page 317.



Readers frequently write to me asking if I can recommend books that are both of interest and of use. In this column I review books that I consider specially appeal to Meccano boys. I do not actually supply these books, which may be obtained either through any bookseller or direct from the publishers.

All About Our Wonderful Ships

By Archibald Williams

(Casell & Co. Ltd. 7/6 net).

Ships have a great fascination for young and old alike, for there is an element of romance about even the most disreputable tramp steamer. To the landsman every ship is more or less a mystery, and in "All About Our Wonderful Ships" the author succeeds in dispelling something of this mystery without destroying any of the romance. He tells us how ships are designed and built and describes the wonderful machinery, hidden away in their interiors, that propels them steadily across the oceans of the world. He takes us on imaginary tours of inspection of vessels of various types, ranging from giant Atlantic liners to fussy little tugs, and he shows us how each is perfectly adapted to its special purpose. Altogether Mr. Williams has succeeded in producing a book that will appeal to all British boys, and more particularly so to those interested in the sea. The book is well illustrated with numerous plates and figures.

"The New Photographer,"

(41, North John St., Liverpool. Price 2d Weekly).

This interesting photographic paper more than maintains its high standard of excellence, and indeed becomes increasingly attractive. It caters specially for the beginner, and those of our readers who feel that the results they are obtaining are not proportionate to the labour and money they are expending would do well to become regular subscribers and so acquire a good photographic education at the small cost of 2d. per week. In addition to clearly-written and well-illustrated articles, there are competitions so graded that every reader has a chance of winning a prize, no matter how small his photographic abilities may be. Of particular interest is a great holiday competition with cash prizes amounting to £165. Full details will be found in the current issue, and a free copy will be sent to any of our readers who applies mentioning the Meccano Magazine.

"Wireless World and Radio Review."

(Wireless Press, London. Price 4d. Weekly).

This publication is a radio review in the best sense of the term. The latest issue to hand, No. 265, includes the first of three important contributions by Professor E. Mallett on sound in relation to wireless. Users of frame aerials will read with keen interest a description of a receiver specially designed for use with such aerials. Another article describes the wireless equipment of aeroplanes of the U.S. Post Office Department.

CATALOGUES RECEIVED

The 1925 catalogue recently issued by Messrs. Hobbies Ltd. (Dereham, Norfolk) is a most interesting production and as a guide to the selection of outfits and materials for fretwork it is unequalled. No less than 640 different designs for fretwork articles are included and over 80 pages are devoted to the tools and materials required for some 20 other pastimes, such as bent iron work, picture-framing, strip-work, wood-carving, etc. The catalogue, which contains more than 200 pages and is beautifully printed and illustrated, will be sent post free for 1/-. With each copy is included free an excellent design for a fretwork bureau.

A New Meccano Model (cont. from p. 285)

a Worm (33, Fig. D) which engages a Gear Wheel (34). On the spindle of (34) is a Pinion (35), which engages and drives the 3½" Gear Wheel (11), thus rotating the shovel.

On the 3½" Rod (36) is wound the Cord (37) for raising and lowering the jib (38), and on the 6" Rod (39) is wound the Cord (40) for raising and lowering the shovel (41). The Rod (36) is journalled in a Trunion bolted underneath the Strip (42) and carries a 1½" Gear Wheel (43), which is engaged by a Pinion (44) on an 8" Rod (45). This is driven by a 1½" Sprocket Wheel (46) from the 1" Sprocket Wheel (26) on the motor spindle (47).

The spindle (45) is slideable by the rotation of an 8" Rod (48) operated by the Crank (49), the Rod being journalled in the ends of a 5½" x ½" Double Angle Strip (50), a Coupling (51) carrying a 1" Rod which engages between two Collars on the Rod (45). In this way the Pinion (44) may be meshed with the Gear Wheel (43) in order to raise or lower the jib, or a 1" Gear Wheel (52) on the Rod (39) may be engaged with a 1" Gear Wheel (53) to raise or lower the shovel arm (38).

The Rod (28) is slideable by a 4½" Strip (54) pivoted at (55), the outer end of which engages between two Cranks (56). These grip on either side of a 1½" Gear Wheel (57), several washers being placed between the Cranks to take up the slack. The shovel (41) is carried on a sliding frame consisting of Angle Girders (58) to which are bolted Racks (59). These are engaged by ½" Pinions (60) on a 3½" Rod. A 50-toothed Gear Wheel (61) is driven by a ¾" Pinion (62) on a 3½" Rod (63) operated by the hand-wheel (64). The bottom of the shovel is released by a Cord (65) connected to a sliding Rod (66), the end of which enters the aperture of a Flat Bracket (67).

Parts required:			
2 of No.	1A	1 of No.	28
1	" "	2	" "
1	" "	2	" "
6	" "	2	" "
1	" "	1	" "
4	" "	1	" "
1	" "	5	" "
5	" "	195	" "
7	" "	24	" "
4	" "	1	" "
6	" "	1	" "
4	" "	1	" "
7	" "	3	" "
2	" "	1	" "
4	" "	5	" "
4	" "	36	" "
7	" "	3	" "
6	" "	2	" "
11	" "	4	" "
4	" "	2	" "
2	" "	2	" "
8	" "	36	" "
2	" "	1	" "
1	" "	1	" "
7	" "	3	" "
4	" "	1	" "
1	" "	2	" "
5	" "	2	" "
8	" "	2	" "
1	" "	1	" "
2	" "	2	" "
4	" "	4	" "
2	" "	4	" "
4	" "	2	" "
5	" "	1	" "
1	" "	4	" "
9	" "	3	" "
1	" "	4	" "
7	" "	1	" "
1	" "	1	" "

Electric Motor

A Novel Stamp Album

Messrs. Geo. Philip & Son Ltd. (32, Fleet Street, London, E.C.4) are publishing a novel form of Stamp Album (price 7/6), combined with an Atlas that will appeal to many stamp collectors who are interested in Geography. The publishers will send full particulars to any reader on his mentioning the "M.M."



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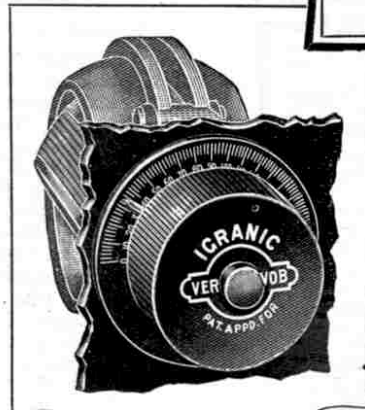
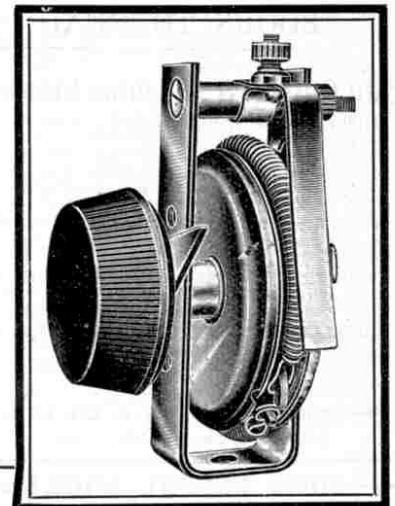
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How to Run a Miniature Railway System—*(Continued from page 293)*

the trip-piece will operate the reversing gear again, but in the opposite direction, when the engine reaches it on its backward journey.

In order to make a success of reversing from the track it is necessary for the train to have sufficient momentum for the loco to run quite clear of the trip-piece before changing its direction, so as to allow time to lower the trip-piece and get the track clear.

The method of braking from the track by means of the special rail is similar, except that the alternative trip-piece is used. This actuates another lever projecting from the underside of the loco (B, Fig. 2).

After reversing or braking from the track the loco mechanism may be restored to its original condition by means of the levers in the cab. The Hornby No. 2 Tank Loco mechanism is exactly the same as that of the No. 2 Loco, so it requires no further description.

No. 1 Loco

The Loco in the No. 1 Set has reversing gear and brake, controlled from the cab in the manner already described, the left-hand lever operating the brake and the right-hand lever the reverse. This loco can be braked but not reversed from the track. For the purpose of braking, each No. 1 Hornby Train Set contains a special curved rail fitted with a lever and a trip-piece.

The No. 1 Tank Loco is the same as the No. 1 Loco in construction and operation.

Other Locos

The Zulu Loco is not fitted with reversing gear, but may be braked either from the cab or from the track in the same manner as the foregoing locos. A curved brake rail is supplied with every Zulu Set.

The George V. Set Loco is not reversible but may be braked from the cab. Incidentally, it may be mentioned that this set has curved rails making a circle 1 ft. 6 in. in diameter.

Straight Brake Rails

In addition to the curved braking and reversing rails already mentioned, a straight rail fitted with one lever and trip-piece is also made and sold separately. By means of this rail the No. 2, No. 1 and Zulu Locos may be braked from the track, and the fact that this brake rail is straight is of particular value in bringing the train to a standstill in a station in a realistic manner.

Before any loco is set to work it should have all its gears and bearings oiled thoroughly with good machine-oil, such as that used for sewing machines and typewriters. The bearings on all rolling stock should also be oiled. While doing this it is advisable to see that the trunnions are not bent inwards so that they press against the side of the wheels thus preventing free running. It is also necessary to guard against any oil getting on to the rails, and to prevent this the face of the rails should be occasionally rubbed over with a clean rag.

NEXT MONTH:—**Points and Crossings—a simple layout.**

Runaway Engine in Flames

MECCANO BOY INTERVIEWS FIREMAN HERO

A THRILLING incident took place on a London suburban train a few weeks ago when an engine-fireman's brave act saved five hundred City workers from a terrible disaster.

One morning the passengers waiting at Tottenham Station were horrified to see the 8.44 a.m. High Barnet to Broad Street (London) train dash through the station at 50 miles an hour.

The engine was enveloped in flames and the driver and fireman were clinging for their lives to the back of the tender, whither they had been driven by the terrific heat. A few seconds later the driver, William Barnett, was thrown from the swaying engine, but luckily he rolled clear of the train as it swept by. He was picked up and taken to hospital suffering from injuries to the head.

George Bowles, the fireman, knowing that certain disaster awaited the train unless it was stopped, climbed back through steam and flames into the cab, and although he was suffering great pain from burns, he succeeded in bringing the train to a standstill, thereby saving many lives.

On the following day I visited Fireman Bowles at his home at Forest Gate, and found him little the worse for his adventure, with the exception of burns on the arms. In fact he made light of the whole affair, although he confessed that he did not want another experience like it!

"At the time of the accident," he said, "our engine (a 4-4-0 tank loco) was running backwards, that is, coal-bunker first. Just outside High Barnet the vibration of the engine must have caused the steam outlet in the smoke box

to close, and this shut off the steam-blast that 'draws' the fire. The result was that the back-draught from the smoke-stack to the furnace forced fire and smoke straight into the cab.

"The flames shot up to a height of ten feet, and we were driven back along the tender by the heat and fumes, which became unbearable. We stood on a narrow ledge and clung with our hands to the rail at the top. Meanwhile the engine was completely out of control, and we tore through Tottenham Station at a terrific speed. It was here my mate

was thrown off, although I did not see him go as he was on the opposite side.

"As the train flew past Woodside Park Station I realised that it would mean certain disaster if it reached the next station, Finchley, as it would be thrown from the rails at the junction there. Also a train was due on the down line, which in passing was bound to strike me as I hung in my present position. A momentary impulse came over me to jump from the engine, but instead I pulled my cap down over my face and dashed back into the cab. Groping amid the flames I found the regulator, closed it, applied the brakes and the train came to a standstill.

"The passengers, who had scarcely realised the peril they had been in, continued their journey in another train. That is all there is to tell," modestly concluded Fireman Bowles.

When I left Mr. Bowles I told him I felt sure all Meccano boys would join me in appreciating his splendid act and in wishing him well.

H.L.



Photographed by

our Representative

Fireman Geo. Bowles**Lives of Famous Engineers—***(continued from page 279)*

canal, about 600 men in all being employed.

After two years' work 22 miles of the canal had been cut and finished, and 409 yards of the Harecastle tunnel cut and vaulted. Further progress on the tunnel was very slow, however, and it was not until 1777—five years after Brindley's death—that the work was completed. The cutting of the remainder of the canal went forward without any striking incidents and does not call for further mention.

Close of Brindley's Career

Brindley afterwards planned a number of other canals. Some of these he executed himself, but many of them were carried out by others. He was also called upon to give his opinion upon plans prepared by other engineers for various canals, one of the most important of which was the Leeds and Liverpool Canal, 130 miles in length, which brought the manufacturing district of Yorkshire along the valley of the River Aire into communication with Liverpool and the intermediate districts of Lancashire.

Brindley's career was now drawing to a close, for like many other famous engineers, he died at a comparatively early age. His mode of life—long hours of work, irregular meals and exposure to all kinds of weather—gradually undermined his constitution, and one day, while surveying a branch of one of his canals, he caught a chill from which he

never recovered. He was ill only a few days, and died on 27th September, 1772, in his 56th year.

A Self-Taught Genius

Brindley was one of the most remarkable of all self-taught engineering geniuses. He could scarcely read and was therefore unable to profit by the recorded experiences of others. The only education he had was the result of his own observation and experience. He tackled his problems as they came along and overcame them by sheer ability, added to great determination. It is curious to learn that, when any specially serious difficulty occurred in the progress of one of his undertakings, he used to go to bed and remain there for two or three days until he had thought out a way of dealing with the trouble!

Brindley's self-confidence and independence are well illustrated by the following story. The King of France, hearing of the remarkable success of his work for the Duke of Bridgewater, desired to see him, and sent a message inviting him to inspect the Grand Canal of Languedoc. Brindley replied: "I will have no journeys to foreign countries unless to be employed in surpassing all that has been already done in them."

NEXT MONTH:—**Telford: His Bridges, Roads and Canals**

LOTT'S BRICKS

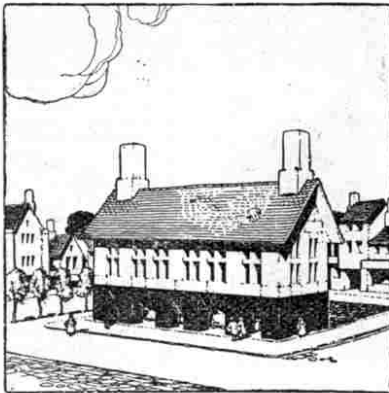
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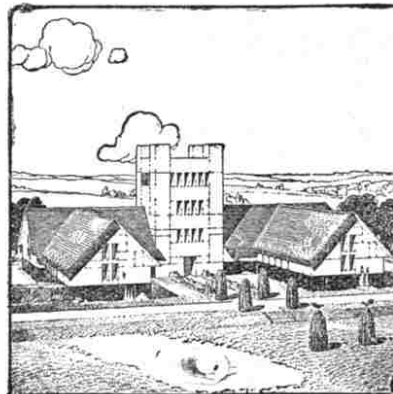
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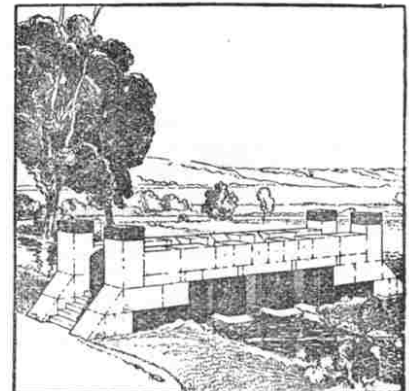
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BRIDGE

From Box No. 3 (Series B).



LOTT'S BRICKS LTD., WATFORD, England

Enamelling a Bicycle—(cont. from page 307)

Now comes the most important part—the application of the third and last coat of enamel. The appearance of the whole work depends on the manner in which this coat is put on. The secret of successful enamelling lies in applying the enamel thinly and evenly, and this result is obtained by taking light and regular strokes with the brush. It is important to remember that too much enamel on the brush will result in the enamel running and spoiling the even surface. Particularly with the third coat even and regular strokes should be used and the enamel applied as lightly as possible. The result, when quite dry, should be a smooth, shining surface, and with care and patience it is not difficult to closely imitate that "straight-from-the-shop" appearance of a new cycle.

Special Methods

For those with sufficient time and patience better finish may be obtained after the third coat has stood for two or three days, by rubbing the frame with a wet flannel dipped in pumice powder. The rubbing should be gently and evenly done and continued until a smooth, dull surface has been obtained. The powder should then be washed off, and the frame dried and painted with a coat of transparent finish, which should be worked-in well and evenly. When quite dry, the job should satisfy even the most discriminating owner.

Sometimes special instructions are issued with certain enamels, and if these differ from those given above they should be carefully followed, as different enamels often require different applications.

NEXT MONTH:—**CYCLE LAMPS****A Double-Ended Loco**—(cont. from p. 295)**Garratts Useful at Home**

A particularly interesting example of the capabilities of the Garratt locomotive is to be seen at the works of Messrs. Vivian & Sons, Ltd., at Swansea. Here the conditions are very severe as regards loads, gradients and curves, and the ordinary type of loco has been found unequal to the work. A specially-designed Garratt was therefore installed early this year, and has been completely successful. This engine regularly hauls loads of 150 tons up a gradient of 1 in 20, and negotiates curves of 97 ft. radius without the slightest difficulty, maintaining admirably steady running throughout.

Through the courtesy of the makers we are able to reproduce a photograph of this special loco, from which an excellent idea of the Garratt principle may be obtained. The success of this loco is of particular importance as it points to a means of overcoming the many difficulties inseparable from works railways, where often space is limited and conditions generally are far from ideal from a railway point of view.

It is interesting to learn that the London and North Eastern Railway recently took delivery of a Garratt locomotive, and that the London, Midland and Scottish Railway will shortly follow suit.

Things Not Always what they Seem!

Novel Fancy Costume constructed with Meccano

WE are continually receiving accounts describing strange uses which our ingenious readers have found for Meccano. We have heard, for instance, that Meccano nuts and bolts make admirable substitutes for buttons and that Meccano strips are ideal for making rabbit-hutches! But we have never before heard of Meccano being used to hold up a pair of legs!

Yet this was the novel idea conceived by Mr. Walter Smith, of Harrogate, the originator of the unique clown costume illustrated on this page. We are sure that all our readers will think that the wearer of this costume must have found it extremely tiring to have to stand on his hands for so long—until they learn the secret of the costume!

In reality, although the costume is upside down, the man inside it is in an ordinary standing position. The clown's chest thus forms the wearer's back and the clown's arms are really the wearer's legs! The comical head is held in the hands of the man inside the costume and can be moved about in a very natural manner. The patch on the trousers is at



the same height as the head of the wearer, and it is made of thin gauze so as to enable the wearer to see ahead and also—very necessary!—obtain plenty of air.

The greatest difficulty in carrying out the idea was to find something to support the two dummy legs of the clown in the air. A wooden framework was at first tried, but it proved to be useless on account of its heavy weight and absolute rigidity. Then it was that Meccano came to the rescue, and legs were made of angle girders, etc., and securely strapped to the wearer's shoulders. Here they bent and swayed in a most realistic manner and yet remained quite firm.

We are not surprised to learn that Mr. Smith was awarded the first prize in a local carnival

for his clever idea, and no doubt many of our readers will remember this novel costume when next they enter carnival or fancy-dress parade. It is not advisable to wear it at a fancy-dress dance, however, as someone might wish to shake hands, which would be decidedly awkward for all parties!

A Stamp Tour Round the World—

(Continued from page 299)

The story of the battle between Generals Montcalm and Wolfe is well known to most of us, for it is an outstanding incident in the history of this great Dominion. Opposite Quebec in the middle of the river is the Isle of Orleans, where James Wolfe, the English general, a young man of thirty-three, was encamped with 7,000 men. Montcalm was in possession of Quebec with a much larger force. Wolfe took his force up the river, however, and climbing the precipitous bank they advanced on the town from the rear. The fight was soon over and Quebec came into the possession of the English, but both Wolfe and Montcalm were killed on the battlefield.

The Niagara Falls

We now travel by aeroplane to Niagara Falls. Following the course of the St. Lawrence river we pass Montreal, and in a few hours' time find ourselves flying over Lake Ontario. This is the first of the five great lakes, and between this lake and Lake Erie the Falls are situated, about 500 miles from Quebec.

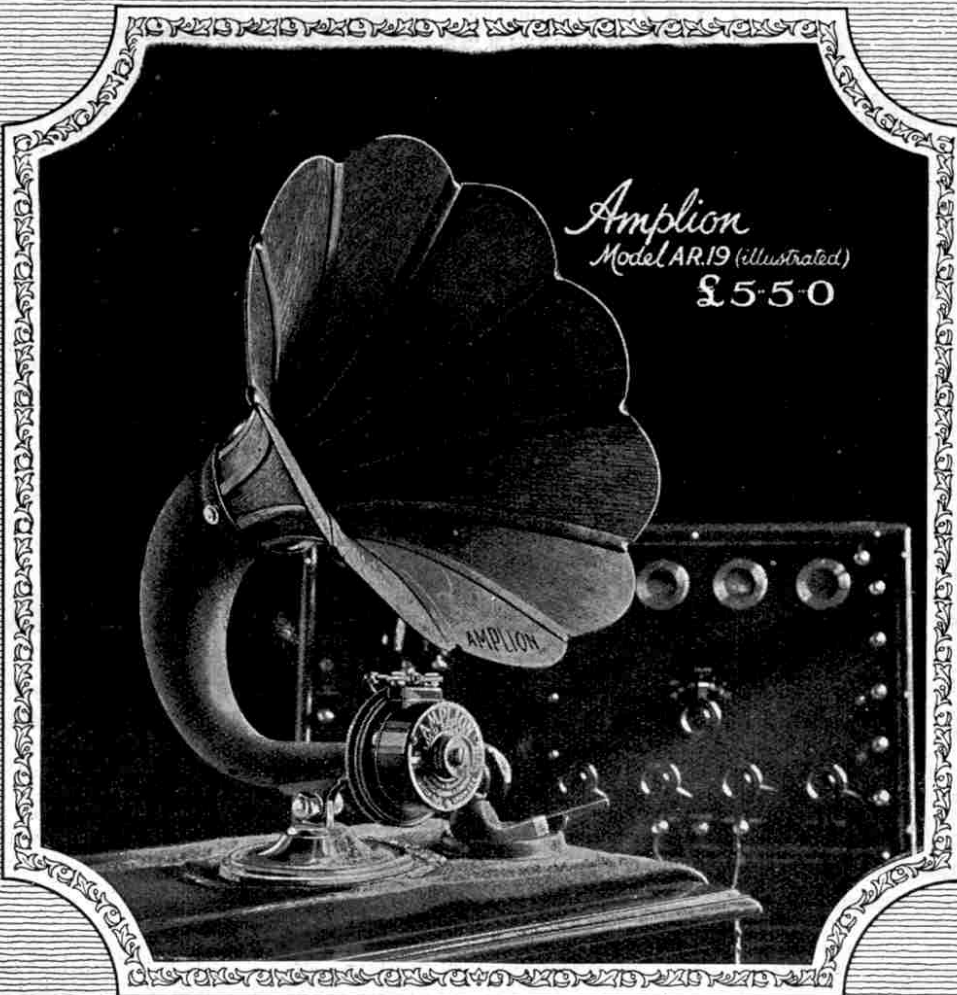
Who can describe the magnificence of this scene? The river St. Lawrence is divided by Goat Island, and here it plunges over a cliff 158 ft. in height. But

it is not the height of the fall that makes Niagara unique, it is its breadth and the volume of water that falls over its edge every day. The Horseshoe Fall, as the Canadian half is named on account of its curved shape, is 2,600 ft. in breadth and the American Fall is 1,400 ft. in breadth, bringing the total breadth to more than three-quarters of a mile, over which an average of 220,000 cubic feet of water pass every second! The manner in which some of the enormous energy of this mighty fall is utilised to produce electrical energy on a vast scale is described in our article on Hydro-electric Power Stations on page 280.

The United States have issued two very excellent view stamps showing the Niagara Falls, one being the 5c. value of the 1901 issue, in commemoration of the Pan-American Exhibition at Buffalo. This set really illustrates various ways and means of transport, Niagara Falls being included to show the marvellous bridge that crosses the river a little below the Falls. The second view of the Falls is shown on the 25c. value of the current series which was issued in 1923.

NEXT MONTH:—**UNITED STATES, BERMUDA, etc.**

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