

By Frank Hornby

LAST month I stated that I was postponing until later in this series of articles a full description of the Meccano factory, but I feel that I must mention here one of its most highly specialised and fascinating departments—that in which Meccano models are designed and built. In this great room expert model-builders are at work all day long in improving and developing existing models, or designing entirely new ones. Scarcely a month passes without some notable new machine or mechanism being introduced to the world of real engineering, and immediately sufficient details are available our designers set to work to reproduce these inventions in Meccano. In this manner Meccano keeps pace with developments in all branches of engineering.

It is in this department also that proposed new parts are tried out. In the course of their work the model-designers are continually producing new movements, or modifications of old ones, and it frequently happens that they feel the need of a new part to perform a particular function, or for a slight change in the shape or size of an existing part. However attractive a proposed new part may appear, it is not adopted without the fullest consideration. First of all a dimensioned drawing of it is made, and from this a sufficient number of samples are prepared. These samples are then built into a variety of models and tested in every possible way to make certain that the part fulfils the two essential conditions for inclusion in the Meccano System—first, that it is a miniature reproduction of a real engineering part; and second, that it has a wide range of utility, and is not just a "stunt" part for building one spectacular model. If these conditions are fulfilled, the part is added to the Meccano System, which thus extends steadily in all directions without ever abandoning its aim and ideal of being "Engineering in Miniature." In addition to the new parts that are evolved in this manner, suggestions for new parts are received every day from Meccano enthusiasts, and each one is submitted to the searching tests that I have just described.

Another interesting part of the work of our model-experts consists in building, improving and perfecting the models that win prizes in our various competitions. The splendid quality of these prize-winning models has always been a source of the keenest interest to me. The great £500 world contest that has just closed seems likely to surpass all earlier contests in the quality of the entries, and I shall be very busy during the next two or three weeks in supervising the judging of the large number of entries. This contest provides another indication of the remarkable manner in which Meccano is seized upon with the utmost eagerness by the boys of succeeding generations in all parts of the world. As I look at the models submitted, I feel that the engineering of the future is in safe hands.

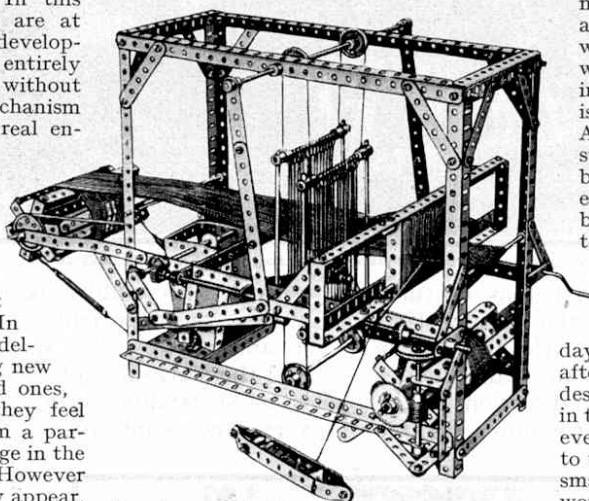
It is a large part of our business to provide models for dealers to give practical demonstrations of the possibilities of Meccano. These models vary in size according to the window space available, but most of them are very large, and all are fitted with electric motors, so that they are capable of working away for hours on end without any attention whatever. Some of them also are fitted up with electric lights, and at night these lights, in combination with rapidly moving mechanism, form an irresistibly attractive picture. At certain times of the year we have a large staff of model-makers busily engaged in building these models, carefully adjusting the electrical fittings, and testing the mechanism before they are despatched to their destinations.

The activities of our model-building department provide another striking demonstration of the enormous growth of the Meccano System. In the earliest days of Meccano, and in fact for many years after it was first placed on the market, I personally designed and built every model that appeared in the Meccano Manuals of Instructions. To-day, even if I were to devote the whole of my time to this work, I could not carry out more than a small fraction of it. Even now, however, the work of model designing is carried out under my direct personal supervision, and all doubtful matters are referred to me for decision. I have never relaxed my determination that every model associated with the Meccano System should be designed and constructed on correct

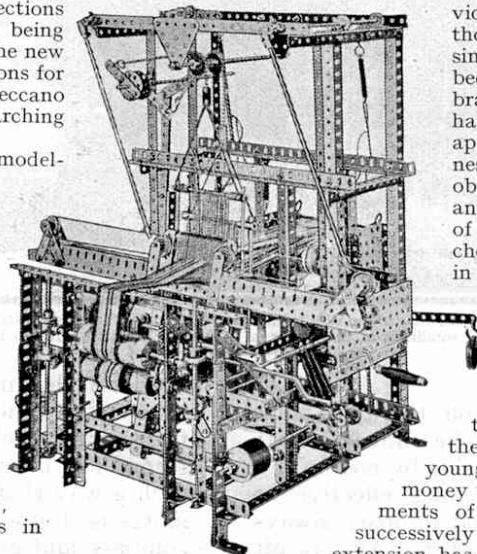
engineering principles. I have always attached the utmost importance to this accuracy, and as a result Meccano to-day plays a unique part in the development of sound engineering knowledge.

In 1926 occurred the 25th anniversary of the introduction of Meccano, and it was distinguished by an outstanding event, namely the introduction of Meccano in colour. Previously all parts of the Meccano System, except those made of brass, were finished in nickel; since that time plates and pulley wheels have been enamelled red, and strips, girders and brackets green. The use of these coloured parts has brought about a great improvement in the appearance of models by introducing a brightness and realism that previously could not be obtained. This step was taken only after long and careful consideration, but the popularity of the decision was shown by an immediate chorus of approval from Meccano enthusiasts in all parts of the world.

Meccano is made up for sale in a number of outfits of various sizes, which have been developed year by year from the single outfit in which my invention first appeared. Gradually the number of outfits grew until they ranged from No. 1, the smallest, to No. 7, the largest. Then there arose a demand for smaller outfits for young boys who had the Meccano spirit but little money to spend; and in order to meet the requirements of these boys there have been introduced successively a No. 0, a No. 00 and a No. 000 Outfit. No extension has been made at the other end of the scale,



The two models illustrated here afford another striking example of the development of Meccano. Above is the first Meccano Loom, in which all movements had to be made separately by hand. Below is a later model, in which the movements are carried out automatically by turning the handle.



for the No. 7 Outfit contains a complete miniature engineering equipment, capable of reproducing practically every type of structure and mechanism.

In planning these outfits my guiding principle has been that of steady and gradual progress from small things to great, without any gaps, overlappings or difficulties of any kind occurring between the various stages. For instance, a boy may purchase a No. 1 Outfit. He takes this home and gradually works his way through the models shown in the Manual of Instructions contained in the Outfit. Presently he turns his attention to the more elaborate and more interesting models that he sees grouped together on two pages at the end of the Manual, and he becomes eager to build these. He is unable to do this at present, however, because he lacks various parts; these larger models require larger outfits. In the ordinary way the purchase of a No. 2 Outfit, the next larger, would involve this boy in acquiring a number of parts that he already possesses. Therefore, in order to avoid the unnecessary cost thus incurred, what are known as "Accessory" or "A" outfits have been prepared to provide bridges leading from one standard outfit to the next higher. Thus a boy who has a No. 1 Outfit, and wishes to convert it into a No. 2, may do so by purchasing a 1A Accessory Outfit, and thus acquiring all the new parts he needs without any useless expenditure on parts that he already possesses.

A boy who contents himself with building the models that are illustrated and described in the Meccano Manuals of Instructions inevitably gains a sound general knowledge of engineering design and principles, but very few boys stop there! From the time when a boy first commences to use Meccano he has before him a constant encouragement and stimulus to make slight changes in the construction of the various models. From this he is led on almost imperceptibly to build models entirely from his own ideas, and then he has become, in the true sense of the word, an inventor.

The educational value of Meccano does not end here, however; it extends to every boy, even those who have no special aptitude for engineering, and who certainly have no intention of taking up engineering as a career. Every boy is interested in knowing "how things work," and why they work in their own particular manner. Until recent years boys who wished to understand how the world's giant engines and machines work had to be content with book descriptions; but Meccano has brought about a revolution in this respect. By means of Meccano a boy can build miniature models of an almost endless variety of engines and machines; and these models actually work on the same principles as the originals. The result is that, instead of a vague and often inaccurate idea of the most important mechanisms, the Meccano boy has a real and definite knowledge of how these work—a knowledge that, once gained, is never lost.

A very striking illustration of the practical nature of the

education provided by Meccano is to be found in schools for the blind. It is naturally an extremely difficult matter to convey by description, to a boy who has been blind from birth, a true conception of, say, a motor car. If, however, Meccano models of a gear-box, differential gear, steering mechanism, etc., are placed before him, so that he can handle each unit separately and follow by the sense of touch its incorporation in the chassis, he can gradually build up a mental picture of the complete car.

He can actually feel the difference in the drive obtained by changing the gears in the gear-box; he can feel the clutch gradually take up the drive from the engine; and he can note exactly what happens in the differential as a car turns a corner. Then, when next he hears a motor car start up, or change gear to negotiate a steep hill, he can visualise exactly what is happening. In a similar manner a blind boy may acquire exact knowledge of a wide variety of engines and machinery.

Quite apart from all these advantages Meccano plays a wonderful part in training the hand and the eye to work together efficiently.

This is the case from the very first. Even the smallest boy who sets out to build a simple model has to think and make decisions at every step. When, in the course of building, another part is required, he has to decide which part it is, where it is to be placed, and how it is to be fitted and fixed in position. This mental process continues throughout the building of every model, and quite unconsciously the Meccano boy acquires a habit of first thinking out a problem and then coming to a definite decision—a habit that is of the greatest possible value to him in later life.

While he is acquiring this habit the Meccano boy is learning the value of form and design, and that the different members of a crane or a bridge are not inserted haphazard or merely for the sake of ornament, but to serve a definite purpose in resisting some stress or strain, and in adding to the combined strength of the whole structure.

Further proof of the fact that Meccano is real "Engineering in Miniature" is afforded by the extensive and increasing use that is made of it by inventors, many of whom write to express their high appreciation of the assistance it affords them in making models and mechanisms of all kinds, and thus translating their ideas into practice. The same appreciation is expressed also by engineers and engineering firms who make use of Meccano regu-

larly in their every-day work. Other letters come from science masters and masters in technical colleges, who find that their ever-changing requirements in models and apparatus are fulfilled by Meccano in a unique manner.

I am very proud of these testimonials to the efficiency of Meccano. They show that, although it is primarily a constructional toy, it is based on such sound principles that there are practically no limits to its possible extension. Next month I hope to refer to a few of the most notable instances in which Meccano has proved itself of service.



The room in which "Mechanics Made Easy" parts were assembled for packing into Outfits.

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ALL MECCANO models are built on mechanical principles, and work like the real thing. The parts are interlocking, and each model can be taken to pieces and set up again without loss of time.

All the cranes are screw-driven, and the large wheels and pulleys, self-lubricated, and every MECCANO model presents a beautiful attractive appearance.

Everything provided. Nothing Extra to Buy.

THE FAMOUS WRIGHT AEROPLANE
In Miniature. MADE ENTIRELY OF MECCANO PARTS.

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EVERY BOY is given an opportunity of exercising his ingenuity and creative faculties. The beautifully illustrated book of instructions, containing 44 models, gives only a hint of what can be accomplished with MECCANO.

MECCANO—A Fascinating Hobby for Young or Old.

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MECCANO No 1 6/-

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A Beautifully Illustrated Manual of Instructions with each Outfit.

Reproduction of a Meccano advertisement that appeared in Gamages Catalogue, 1910.