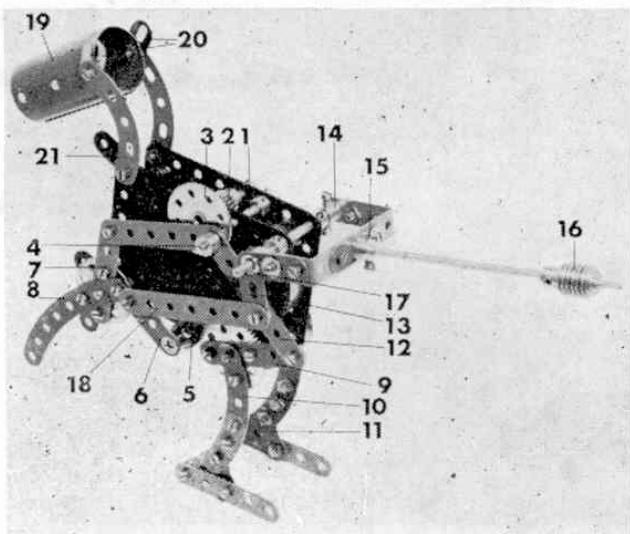


# COME STEEPLECHASING

... with this fun-packed Meccano Model described as a "Steeplechaser" by its builder, D. J. Turnham of Old Marston, Oxford

Above, laughs galore can be had with this Meccano "Steeplechaser" designed and built by D. J. Turnham of Old Marston, Oxford! Below, another view of the "Steeplechaser" showing almost its entire construction. This is an outstanding model considering its performance in relation to its simplicity.



GENERALLY SPEAKING Meccano is regarded as a fully-fledged miniature engineering system. This is as it should be, but it does not mean that Meccano must *only* be used for the reproduction of genuine engineering structures. On the contrary, the system can be, and often is, used to make more light-hearted models such as the steeplechaser featured in this article. (You will see from the accompanying photographs that the model does look something like a horse and, as it performs two movements—a "prance" followed by a "step"—the title "Steeplechaser" seemed particularly appropriate to me!—Spanner.)

So as to keep the quantity of parts used in the model as low as possible, the horse was built round a No. 1 Clockwork Motor, the Motor thus not only providing the power for the movements, but also serving as the major part of the horse's body. Before actual construction is begun, however, the drive pinion is removed from the Motor which is then wound. A  $1\frac{1}{2}$  in. Rod 1 is mounted in the Motor sideplates, six holes from the brake lever, where it is held in place by Collars positioned one each side of one of the plates. The inner Collar acts as a retainer to limit the expansion of the Motor mainspring thus preventing it from fouling a  $\frac{1}{2}$  in. Pinion 2 mounted on a  $1\frac{1}{2}$  in. Rod, held in the sideplates by a Collar and an 8-hole Bush Wheel 3. A Threaded Pin 4 is fixed to this Bush Wheel as shown, while the Pinion engages with the main drive gear wheel of the Motor. Held by a Collar in the opposite edges of the sideplates, in line with the above  $1\frac{1}{2}$  in. Rod, is a  $\frac{1}{2}$  in. Rod on which a  $\frac{1}{2}$  in. Pinion 5 and a Crank 6 are securely fixed.

Turning to the left foreleg, a  $2\frac{1}{2}$  in. Strip 7 is bolted across an 8-hole Bush Wheel, a spacing Washer being mounted on each securing Bolt. Fixed by  $\frac{3}{8}$  in. Bolts to this assembly, as illustrated, is a 4 in. Stepped Curved Strip 8, a Nut on each Bolt being used as a spacer, in this case. The right foreleg is similarly built, except that Strip 7 is omitted, then both legs are mounted tight on a 2 in. Rod journalled in the corner holes in the Motor sideplates. The Rod, of course, is passed through the bosses of the Bush Wheels. One end of a 3 in. Strip is lock-nutted to Strip 7, the other end being slipped onto Threaded Pin 4.

In the case of the left hindleg, a  $2\frac{1}{2}$  in. Strip 9 is bolted across a 57-teeth Gear as also is a  $2\frac{1}{2}$  in. Curved Strip 10, the latter, at right-angles to the former, running only to the centre of the Gear and being spaced from it by a Washer. Curved Strip 10 is extended three holes by a similar Curved Strip to which a  $2\frac{1}{2}$  in. Strip 11 is bolted, the joint being strengthened by a 1 in. Corner Bracket. In the right hindleg, Strip 8 is omitted and an 8-hole Bush Wheel is substituted for the 57-teeth Gear, but otherwise construction is similar. Both legs are mounted on a 2 in. Rod, journalled in the Motor sideplates, with the 57-teeth Gear engaging Pinion 5. A 3 in. Strip 12 is lock-nutted, at one end, to Strip 9, the other end being slipped onto Threaded Pin 4 where it is held in place by a Collar.

The tail unit acts as a counterbalance and is built up from a Bell Crank 13 connected to an ordinary Crank 14 by a  $2\frac{1}{2} \times 1$  in. Double Angle Strip. Bolted

## PARTS REQUIRED

1—3	2—18a	5—38	4—90
2—4	1—19a	1—46	2—90a
4—5	4—24	7—59	2—111c
2—10	2—26	2—62	1—115
1—16	1—27a	1—62b	1—128
3—17	1—32	2—89b	2—133a
		No. 1 Clockwork Motor	1—216

to this Double Angle Strip is a Double Arm Crank 15, in the boss of which a 5 in. Rod is fixed. A Worm 16 is mounted on this Rod. Cranks 13 and 14 are now secured on a 3½ in. Rod 17 held by Collars in the upper rear corner holes of the Motor sideplates. To obtain balance, it is important that an equal length of surplus Rod should project through the bosses of the Cranks at each side. A 3½ in. Strip 18 is lock-nutted between Bell Crank 13 and Crank 6, as shown, the end of Rod 17 serving as a stop for the Strip.

Finally, the head is very easily built from a Cylinder 19 to which two Fishplates 20 and two 2½ in. Stepped Curved Strips 21 are bolted, the former to represent the ears and the latter, the neck, being fixed tight to the upper front corners of the Motor sideplates.

With the model completed it is "trimmed" by first ensuring that the forelegs are in alignment and that it stands firmly on its balancing feet in the "prance" position. Crank 6, the angle of the neck and the position of Worm 16 on its Rod are then adjusted until the model performs a "prance" successfully without falling over backwards. It is advisable to fit two Grub Screws in the boss of the Gear and each Bush Wheel used in the legs.

The movements of the horse are mainly dependent on the action of the tail counterbalance on Pinion 5. When the tail is horizontal, the Pinion climbs around the 57-teeth Gear simulating a prance, but when it is vertical, a step is made.

#### PARTS REQUIRED—A WORKSHOP IN ONE

2—2a	3—16	103—37b	1—111c
2—3	2—16a	36—38	1—115a
7—5	1—17	1—45	1—125
1—6	4—20b	3—53a	1—130a
2—8a	1—21	9—59	2—133a
5—8b	1—22	1—70	1—166
4—9a	3—23a	4—72	2—186
4—9b	1—26	2—89a	2—186a
2—9d	1—26c	1—94	5—188
2—10	1—27	1—96	1—190a
2—12a	1—27a	1—96a	1—191
1—15	1—27d	2—103f	2—195
1—15b	107—37a	1—109	2—235f

1 E15R Motor

## Mechanical Engineer

### Training in the Fleet Air Arm

*Continued from page 425*

Mechanical Engineering. The fourth year is spent on Front Line service at Naval Air Stations for field experience and the fifth back again at H.M.S. Condor. The fifth year being devoted almost entirely to technical training, and at the end of this course, Aircraft Artificers—as they then are—have a thorough training behind them in both the practical and theoretical skills needed, which is recognised by the T.U.C. as being equivalent to civilian apprenticeships. During the fourth and fifth years, entrants can sit for their Higher National Certificate, studying in their own time, but most Artificers prefer to leave this until they have reached the rank of Petty Officer.

The training given to Artificer Apprentices is to say the least, very expensive and because of this the Navy have to ensure that they do get a minimum of return on their investment. The minimum signing-on period is 12 years, man's time, running from the age of 18. At the age of 30, which is the first available time for leaving the service, a further 10 years can be signed on for to give release at the age of 40—after 22 years service—which is then pensionable.

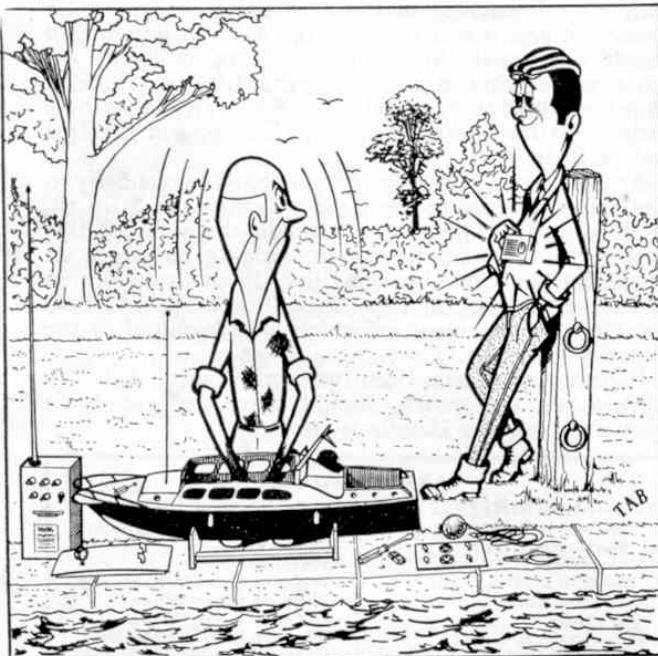
When one considers the rate of pay, at first it would seem a little low, but on subsequent inspection bearing in mind that one is paid 7 days a week and accommodation and food, etc., are provided, they are comparable to civilian pay. First year Artificer Apprentices earn 9/- a day, fourth year Artificer Apprentices earn 22/3d. a day, Leading Hands earn 37/9d. a day, whilst Petty Officers earn 48/9d. a day.

Whilst at H.M.S. Condor the Editor was very impressed by the accent placed on leadership training. In addition to the parade ground work and leadership lectures, extensive facilities are conveniently available in the local area for venture training which includes camping, canoeing, hill walking and sailing. During an air trip in the Sea Prince aircraft, piloted by Lt. Cdr. S. C. Farquhar, which is held on the station for practical aerodynamic instruction and for giving trainees air experience, we spotted several groups on venture training in the snow covered Scottish hills. This flight really was something to be remembered, as your Ed. sat in the Navigator's seat at the side of the pilot, flying low over the snow covered Scottish hills, in brilliant sunlight, with the red Naval tents standing out vividly against the white background.

A real surprise was in store on landing, as Lt. Cdr. Farquhar decided to test the station's alertness. He landed short on the main runway, and called the tower up to say the aircraft had crashed, to test reactions of the fire, ambulance and rescue crews. Within seconds your Ed. was being dragged from his seat by an asbestos-clad, hatchet wielding, rescue crew member. Quite an experience, and reassuring to know that these chaps are on the ball, all the time.

Modellers in Scotland will be pleased to note that H.M.S. Condor has an Open Day on July 20th, which will feature both flying and static aircraft displays.

We would like to thank Captain J. W. Mott M.V.O., Commanding Officer of H.M.S. Condor and his fellow officers for their kind hospitality and co-operation which enabled this feature to be produced.



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1 E15R Motor

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*Continued from page 425*

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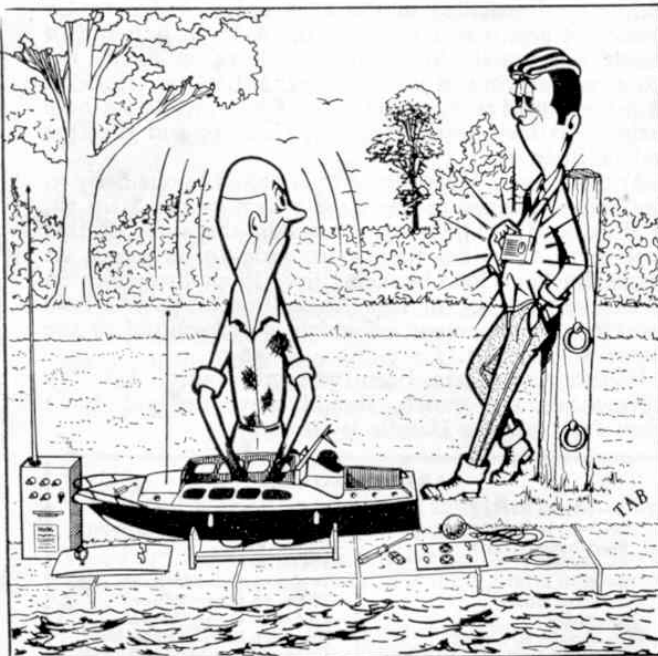
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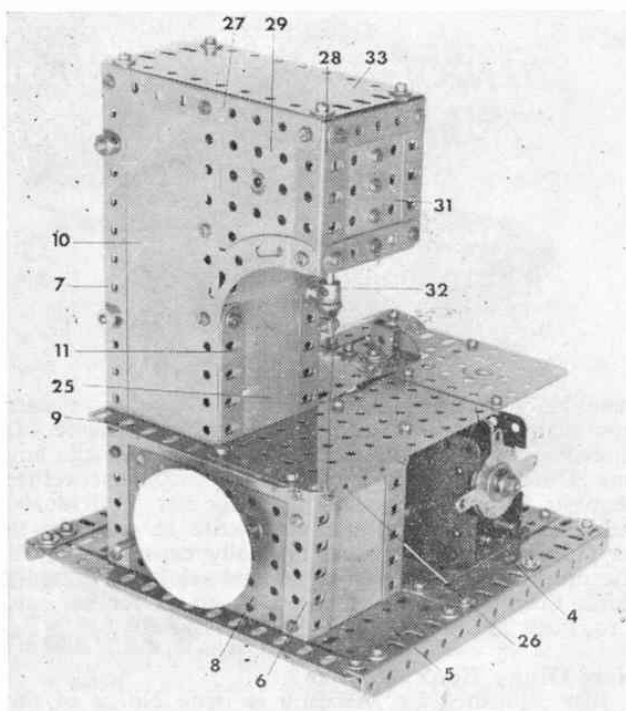
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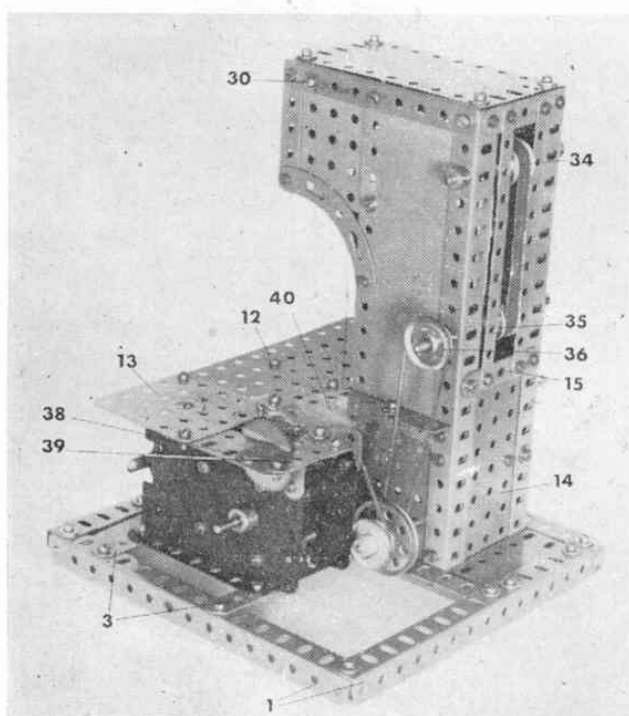
"Good afternoon gentlemen, here is the shipping forecast for today Saturday the . . ."





## A WORKSHOP IN ONE

Spanner describes an amazing  
Meccano Woodworking Machine  
that actually "works" with real wood



IN MY years with the M.M., I must have seen literally thousands of Meccano models, a high proportion of which have been really excellent affairs. It is only natural that some of these have appealed to my own personal tastes more than others, but I do not think I am any different from most readers in finding working models usually more appealing than static constructions. By working models, of course, I mean models which incorporate the movements or basic principles of a prototype, rather than reproduce the actual work done by a prototype. The former (such as the Punching Machine on page 456 which performs the movements without punching the holes) are quite common, whereas examples of the latter are more difficult to find. In view of this, I was delighted with the Woodworking Machine featured below, not only because it is a full working model—which would have been enough in itself—but also because it is really four models in one!

Yes, four models in one, all of which can be used to some degree in the cutting and shaping of wood! It incorporates a vertically-mounted fret saw, a circular sanding disc, an endless sanding belt and a little circular saw. The first three features work extremely well using a real fret saw blade and proper sand paper, as the case may be, and it is only the circular saw which is perhaps not quite so successful. This is represented by a 50-teeth Gear, a circular saw blade no longer being included in the Meccano system, and so its cutting properties are not particularly good. It does, however, cut to a certain extent—especially balsa wood, which is really the material best suited to the machine as a whole, bearing in mind that it is after all a model. Power for all operations is supplied by an E15R Electric Motor.

Despite the varied movements of the model it is not by any means a complicated construction. A square base is built up from four  $7\frac{1}{2}$  in. Angle Girders 1, two of which are joined through their seventh holes by a further  $7\frac{1}{2}$  in. Girder 2. Bolted between this Girder and one Girder 1 are two  $4\frac{1}{2}$  in. Strips 3, the securing Bolts holding one of these also helping to fix a  $4\frac{1}{2} \times 1\frac{1}{2}$  in. compound flexible plate 4, obtained from two  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plates, in position. Another  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plate 5 is bolted to front Girder 1 as shown.

Two similar constructions, each consisting of a  $3\frac{1}{2}$  in. Angle Girder 6, and a  $9\frac{1}{2}$  in. Angle Girder 7, joined by a  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flat Plate 8, are now fixed one to the vertical flange of Girder 2 and the other to one Girder 1. In each case, the top of Girder 6 is connected to Girder 7 by a  $4\frac{1}{2}$  in. Angle Girder 9, at the same time fixing a  $9\frac{1}{2} \times 2\frac{1}{2}$  in. Strip Plate 10 and a  $3\frac{1}{2}$  in. Angle Girder 11 in the positions shown, Girder 11 projecting a distance of one hole below Girder 9. A  $5\frac{1}{2} \times 2\frac{1}{2}$  in. Flat Plate 12, extended by a  $2\frac{1}{2} \times 2\frac{1}{2}$  in. Flat Plate 13, is bolted to the horizontal flanges of Girders 9 in such a way that it extends the full width of the base. A  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flat Plate 14, overlayed at each end by a  $2\frac{1}{2}$  in. Strip 15 is bolted between the lower ends of Girders 7.

Before going any further with the casing, the major part of the operating mechanism should now be fitted. First, however, two Fishplates placed one on top of the other are lock-nutted to one end of two  $3\frac{1}{2}$  in. Strips 16, also placed one on top of the other. Lock-nutted through the second holes of these Strips is a Single Throw Eccentric 17, then a fine fretwork blade about  $3\frac{1}{2}$  in. long is clamped by a Bolt between the Fishplates.

Powered by an E15R Electric Motor, this 4-in-1 Meccano Woodworking Machine can be used to cut and shape balsa wood. Note the "endless" sanding belt.

An underside view of the model showing the drive to fret saw and sanding disc mechanism.

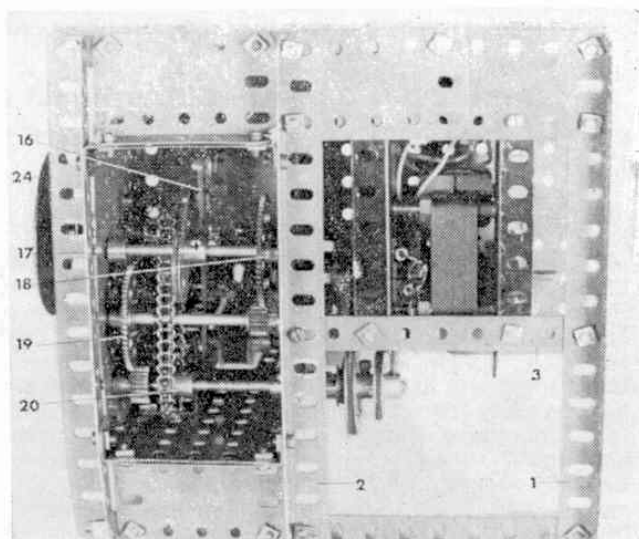
This blade is inserted in one of the holes in Flat Plate 12, the other ends of Strips 16 being lock-nutted to a  $1 \times 1$  in. Angle Bracket bolted to the inside of Plate 14, and the Eccentric is fixed on a  $3\frac{1}{2}$  in. Rod held by a Collar and a 60-teeth Gear Wheel 18 in Flat Plates 8. In mesh with Gear 18 is a  $\frac{7}{16}$  in. Pinion mounted, along with a 57-teeth Gear Wheel 19, on a second  $3\frac{1}{2}$  in. Rod journalled in Plates 8. Gear 19, in turn, meshes with a  $\frac{1}{2}$  in. Pinion on a 5 in. Rod mounted in Plates 8 and also carrying a 1 in. Sprocket Wheel 20, a Collar, a  $\frac{1}{2}$  in. Pulley 21, a  $1\frac{1}{2}$  in. Pulley 22 and a 1 in. Pulley 23, the last three all with bosses and all positioned outside Plates 8. The first three items lie between the Plates with the Collar and the Pinion holding the Rod in place.

Bolted to the outside of one Plate 8 is a Double Bent Strip which, along with the Plate itself, provides the bearings for a 2 in. Rod, on the outside end of which a Face Plate 24 is fixed. Mounted on the inside of the Rod is a Collar, holding the Rod in place, and a  $\frac{3}{4}$  in. Sprocket Wheel, connected by Chain to Sprocket Wheel 20.

The rest of the casing can now be finished. A  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plate 25, curved outwards at the top, is bolted to Girders 11, while a  $3\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plate is bolted between Girders 6 at the front, the securing Bolts also fixing a  $2\frac{1}{2}$  in. Strip 26 to the tops of the Girders. Bolted to the top of each Girder 7, at right angles, is a  $4\frac{1}{2}$  in. Angle Girder 27, to the end of which a  $2\frac{1}{2}$  in. Angle Girder 28 is fixed, also at right angles, with the securing Bolt helping to fix a  $2\frac{1}{2} \times 2\frac{1}{2}$  in. Flat Plate 29 in position, as shown. A Long Threaded Pin 30 with a Collar mounted on its end is fixed to the inside of one Girder 27, then Girders 28 at each side are joined by a further  $2\frac{1}{2} \times 2\frac{1}{2}$  in. Flat Plate 31 edged at the top and bottom by a  $2\frac{1}{2}$  in. Strip. Bolted to the inside of this Plate are two  $1 \times 1$  in. Angle Brackets, the end holes in the free lugs of which provide guides for a  $2\frac{1}{2}$  in. Rod on which a Collar and an End Bearing 32 are fixed, the Collar being positioned beneath the lug of the upper Angle Bracket. The fret-saw blade is clamped in the End Bearing, then a  $2\frac{1}{2}$  in. Driving Band is slipped over Threaded Pin 30 and over a Bolt fixed in the Collar, the latter therefore acting as a stop to prevent the Rod being pulled too far upwards by the elastic action of the Driving Band. A  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plate 33 is bolted to the tops of Girders 27.

Now journalled in the third holes down of Angle Girders 7 is a  $3\frac{1}{2}$  in. Rod held in place by Collars. Mounted in the centre of the Rod are two  $\frac{3}{4}$  in. Flanged Wheels 34 fixed face to face to form a drum. Another two similar Flanged Wheels 35 are mounted on a 4 in. Rod journalled in the ninth holes down of the Girders and held by Collars. A 1 in. Pulley 36 is fixed on the inside end of this Rod, being joined to Pulley 21 by a 6 in. Driving Band. Two  $5\frac{1}{2}$  in. Narrow Strips, one each side of the drums, are fixed between Strips 15.

An E15R Motor is next bolted to Strips 3, a  $\frac{1}{2}$  in. Pulley on its output shaft being connected by a Driving Band to Pulley 22. Two 1 in. Corner Brackets are then fixed one to each upper rear corner of the Motor sideplates, and in these is journalled a  $2\frac{1}{2}$  in. Rod held in place by a  $\frac{1}{2}$  in. Pulley with boss and a 50-teeth Gear Wheel 37. This Gear represents the circular

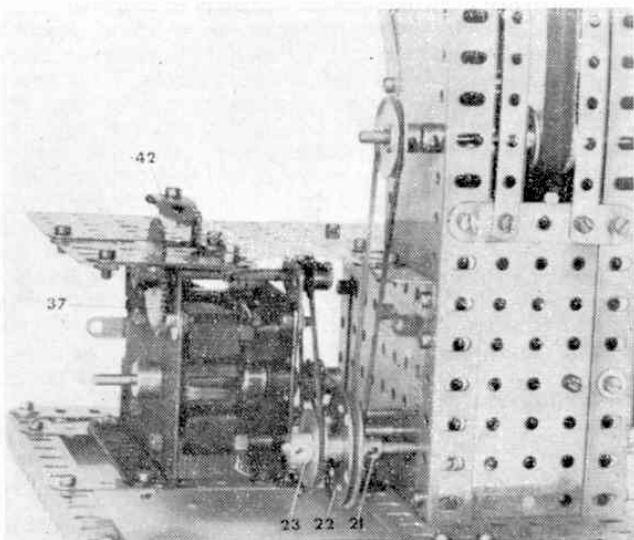


saw and is driven by a Driving Band between the  $\frac{1}{2}$  in. Pulley and Pulley 23. A work table around the saw is supplied by two  $2\frac{1}{2}$  in. Flat Girders 38 joined by a 2 in. Strip 39 and bolted to Flat Plate 13. Inside Flat Girder 38 is connected to Angle Girder 9 by a shaped  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plate 40 at the same time fixing a  $\frac{1}{2} \times \frac{1}{2}$  in. Reversed Angle Bracket in position. Bolted to the free lug of this, but spaced from it by two Washers on the shank of the securing Bolt is a curved  $1\frac{1}{2}$  in. Strip 41 serving as a guard for the saw blade.

So far, then, we have the model built and the saw attachments completed. All that remains to be finished are the sanding attachments and these present no great problem. In one case, a circular disc 2 in. in diameter is cut out of 1 piece of sandpaper and stuck onto Face Plate 24 with a suitable adhesive such as Bostik 1 or Evostik. In the other case, a strip of emery paper  $\frac{3}{8}$  in. wide and  $8\frac{3}{8}$  in. long is passed round Flanged Wheels 34 and 35, and the ends joined to form an "endless" belt. Ideally, the ends should not overlap, but should be "butt-jointed," using a strip of adhesive tape stuck to the back of the emery paper across the join.

In operation, the model is tremendously impressive, but I must stress that it is a model so don't expect too much from it.

See page 455 for Parts List.



A close-up view of the Motor mounting and initial drives to the various operating features.