

No. 37-1 AC

MECCANO LIMITED, LIVERPOOL 13, throughout the world

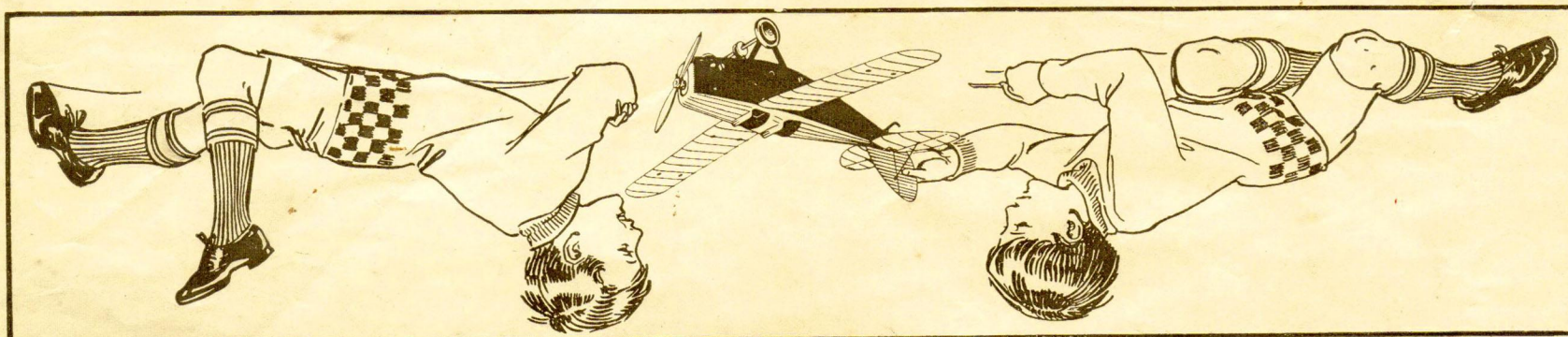
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AEROPLANE CONSTRUCTOR OUTFIT No. 1

Instructions

for



AEROPLANE CONSTRUCTOR OUTFITS

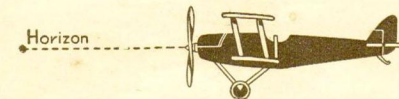
The aeroplane is rapidly taking its place as a regular means of high speed transport, and the time is not far distant when we shall use it as readily as to-day we employ the train, the steamship, and the motor car. Now is the time for every boy to learn how aeroplanes are designed and constructed, and to recognise at a glance the different types. The best way of doing this is to build aeroplanes for himself, and the Aeroplane Constructor Outfits have been designed specially for this purpose. This folder shows how to construct six different types of aeroplanes, but other fine models may be built by varying the positions of the parts.

How an Aeroplane flies

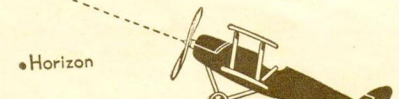
The fun of building with Aeroplane Constructor Outfits is greatly increased if you know something of the way in which a real aeroplane is controlled in flight. What strikes anyone examining an aeroplane for the first time is the simplicity of the manœuvring mechanism, everything being done by two levers. The first of these, the control column or "joy-stick," is not unlike the gear lever of a motor car, and is connected to two controls, the ailerons and the elevators. The ailerons are small movable flaps arranged along the trailing or rear edge of the wings, and the elevators form one of the two main parts of the tail unit. The other lever, the rudder bar, is near the floor of the cockpit and is operated by the feet. This bar controls the rudder, which is the second main portion of the tail unit.

Joy-Stick and Rudder

The joy-stick is the most fascinating factor in the control of an aeroplane. If you wish to fly level, you keep the stick in a central and vertical position. If you move it forward, the elevators are depressed and the machine promptly puts down its nose and tries to dive. If you pull the stick backward, the elevators are raised and the nose of the machine rises. Movement of the stick to left or right brings the ailerons into action. If you move it to the left, the left wings will go down; if you move it to the right, the right wings will drop. This raising and lowering of the wings is termed "banking."



When the control column or "joy-stick" is vertical, the elevator is horizontal, and the machine flies parallel with the ground.



When the stick is pulled back, the elevator is raised and the machine climbs.

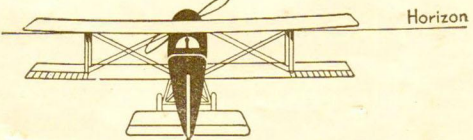


Pushing the stick forward causes the machine to put down its nose and dive.

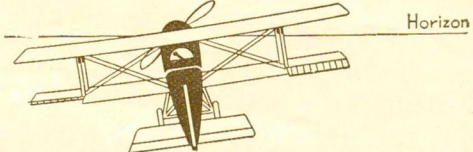
If you find that the aeroplane is veering to the left, you put on right rudder by moving the right foot gently forward; and similarly veering to the right is corrected by applying left rudder. If you wish to turn the aeroplane round, however, you must not attempt to do it by rudder alone, because in that case the machine would skid in a similar manner to a motor car racing round a bend on an unbanked road. You cannot bank the air, so you bank the aeroplane. That is to say, you apply rudder and bank together in the direction in which you wish to turn.

When a pilot has entered the cockpit of his machine, and ascertained that his engine is running well, the chocks are removed from under the wheels, and the machine is taxied into the wind. It is kept pointing in the correct direction by means of the rudder, and the pilot prevents the tail from rising and the machine going on to its nose by keeping the joy-stick a little back from the neutral position. As the speed increases, the stick is slowly moved to the point at which all controls are neutral, and when the correct speed has been attained the machine almost imperceptibly becomes air borne. In alighting, the sequence of these operations is reversed, the machine gliding to land with the engine cut out.

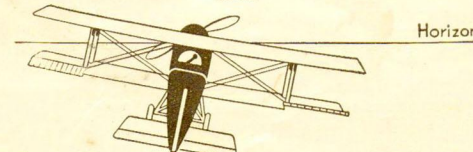
The aeroplanes used for training purposes have two cockpits, one in front of the other, the controls in each being exactly the same, and connected together. This arrangement enables the instructor, who sits in the front cockpit, to see exactly what manipulations are being made by the pupil behind, and to correct them accordingly. The instructor and his pupil communicate with each other by means of ear tubes attached to their helmets.



When the joy-stick is vertical the machine flies on an even keel, the wings being parallel with the horizon.

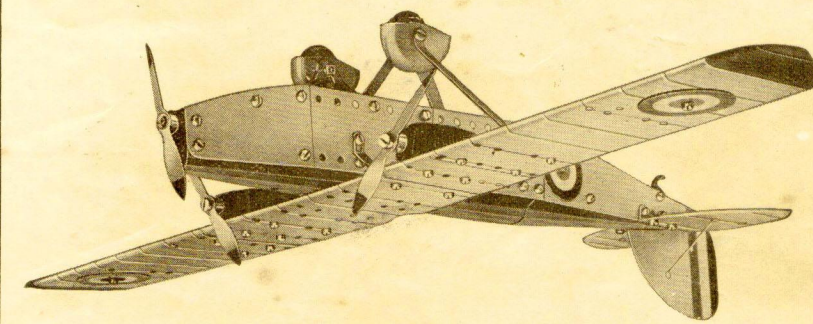


When the stick is moved over to the left, the ailerons on that side are raised and the wings go down, producing left bank.

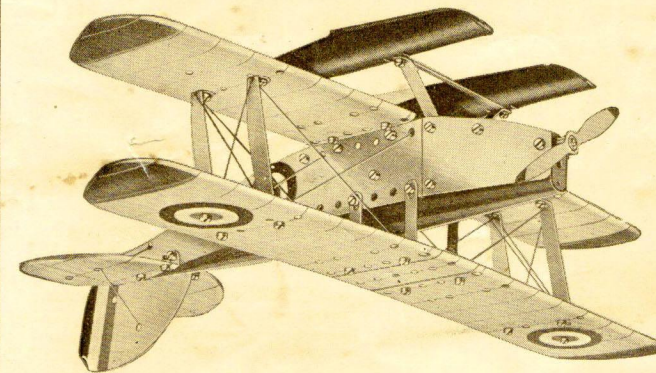


A right bank is brought about by moving the stick to the right.

Another fine model that can be built with Aeroplane Constructor Outfit No. 2 (or No. 1 similar in design to the famous "Southern Cross" flown by the late Sir Charles Kingsford Smith. It is a triple-engine monoplane air liner and is similar in design to the famous "Southern Cross" flown by the late Sir Charles Kingsford Smith.



Another interesting model that can be built with Aeroplane Constructor Outfit No. 2 (or No. 1 and No. 1a Outfits combined). Instructions for building these aeroplanes are given, one of these being of similar design to the Italian Macchi machine that holds the world's speed record.

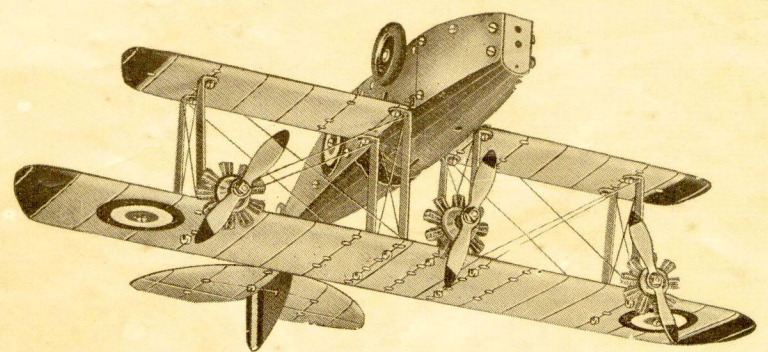


Now that you have experienced the pleasure of building model aeroplanes you will be keen on proceeding further with this wonderful hobby. You may do this by purchasing a No. 1a Aeroplane Constructor Accessory Outfit, which many additional models can be built, or you may increase the scope of your No. 1 Outfit by adding to it separate parts from time to time. The four illustrations on this page show the types of machine you can build when you have a No. 1a Accessory Outfit. These include models of light aeroplanes, seaplanes and flying boats, and commercial air liners of both monoplane and biplane types. Ask your dealer for a complete illustrated Price List.

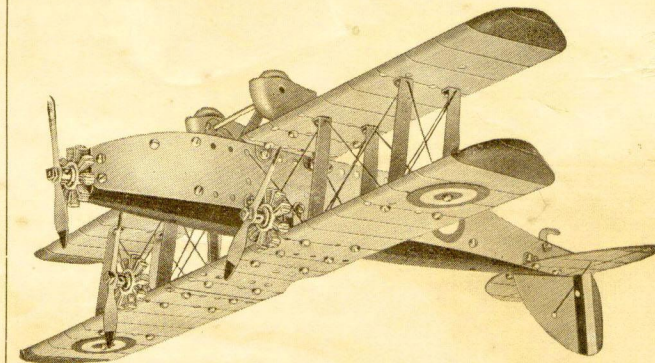
AEROPLANE CONSTRUCTOR ACCESSORY OUTFIT No. 1a

will enable you to build many additional models

Many amphibians and flying boats can be built with Aeroplane Constructor Outfit No. 2. This is an example of the many true-to-type biplanes that can be built with the No. 2 Outfit (or No. 1 and No. 1a Outfits combined). It is of a triple-engine amphibian.



A triple-engine biplane constructed with Aeroplane Constructor Outfit No. 2. This is an example of the many true-to-type biplanes that can be built with the No. 2 Outfit (or No. 1 and No. 1a Outfits combined).



AEROPLANE CONSTRUCTOR PARTS									
No.	Mainplanes		No.						
P1	Large, Top, R.H.	P2 Top, L.H.	P52	Collar	...				
P1a	Bottom, R.H.	P2a Bottom, L.H.	P53	Landing Wheel	...				
P3	Small—R.H.	P4 L.H.	P54	Rubber Driving Band	...				
P7	Centre Section Plane	...	P55	Tail Skid	...				
P8	Extension Plane	...	P56	Rear Bracket for Propeller Shaft	...				
P10	Tail Plane—R.H.	...	P57	Tie Rod for Floats	...				
P11	" " L.H.	...	P58	Undercarriage Vee Strut and Wheel Shield—R.H.	...				
	Fuselage Top		P59	Undercarriage Vee Strut and Wheel Shield—L.H.	...				
P13	Front	P14 Middle	P15 Rear						
	Fuselage Sides								
P16	Front	P17 Middle	P18 Rear, R.H.						
		P18a Rear, L.H.							
P19	Fuselage Underside	P20 Front							
	Interplane Struts								
P24	Staggered—R.H.	P25 L.H.							
P26	Angled—R.H.	P27 L.H.							
P28	Interplane Strut—Straight	...							
P29	Centre-Section Strut—Straight	...							
P30	Floater and Centre Section Strut—Angled	...							
P31	Wing Stay	P32 Rudder (Military)							
P34	Propeller—Large	...	*P101	Identification Marking—Large	...				
P35	" Small	...	*P102	" Small	...				
P40	Base for Engine Casing	...	12	Angle Bracket, 1/2" x 1/2"	...				
P41	Top for Engine Casing	...	14	Axle Rod, 6 1/2" long	...				
P42	Floater, Complete	...	16a	" 2 1/2"	...				
P43	Radial Engine—Small	...	23a	Fast Pulley, 1/2" diameter	...				
P44	Rubber Tyre for Landing Wheel	...	34	Spanner	...				
P46	Radial Engine—Large	...	537a	Nuts 537b Bolts, 7/32" long	...				
			540	Hank of Cord	...				
			611c	Bolts, 1/2" long	...				

*The series includes identification markings in the correct colours of 16 different countries.
†The large Mainplanes (Parts Nos: P1 and P2) can be obtained without civil registration letters, for use with Military Identification Markings, to special order.

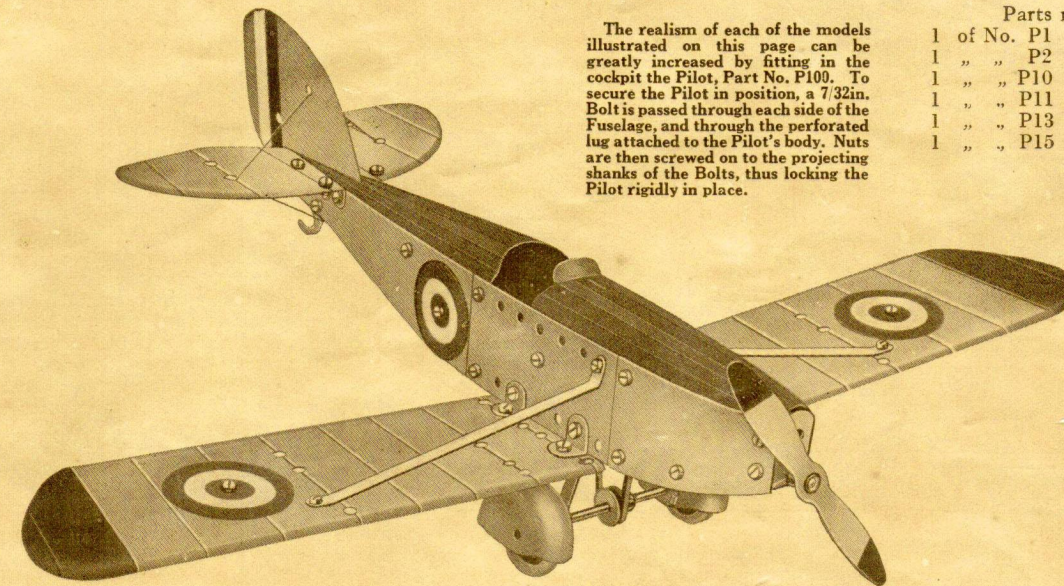
CONTENTS OF AEROPLANE CONSTRUCTOR OUTFIT No. 1									
No.	Quantity	No.	Quantity						
P1	Mainplane—Large, Top, R.H.	1	P52	Collar	...				
P1a	" Bottom, R.H.	1	P53	Landing Wheel	...				
P2	" Top, L.H.	1	P54	Rubber Driving Band	...				
P2a	" Bottom, L.H.	1	P55	Tail Skid	...				
P8	Extension Plane	...	P56	Rear Bracket for Propeller Shaft	...				
P10	Tail Plane—R.H.	...	P58	Undercarriage Vee Strut and Wheel Shield—R.H.	...				
P11	" L.H.	...	P59	Undercarriage Vee Strut and Wheel Shield—L.H.	...				
P13	Front	1	P62	Axle Rods, 3 1/2" long	...				
	Fuselage Sides		P63	Screwdriver	...				
P16	Front...2	P17 Middle...2	P64	Rudder (Civil)	...				
		P18 Rear, R.H.	1						
		P18a Rear, L.H.	1						
P19	Fuselage Underside	...	P75	No. 1 Aero Manual	...				
P20	" Front	...	P100	Pilot	...				
P24	Interplane Strut—Staggered—R.H.	2	12	Angle Brackets, 1/2" x 1/2"	...				
P25	" " L.H.	2	14	Axle Rod, 6 1/2" long	...				
P28	" Straight	4	23a	Fast Pulley, 1/2" diameter	...				
P29	Centre Section Strut—Straight	4	34	Spanner	...				
P31	Wing Stay	...	537a	Nuts	...				
P34	Propeller—Large	...	537b	Nuts, 7/32" long	...				
P44	Rubber Tyre for Landing Wheels	2	540	Hank of cord	...				
			611c	Bolts, 1/2" long	...				

Model No. 1 Low Wing Monoplane

Aeroplanes are of two main types, monoplanes, having only one wing, and biplanes having two wings. Monoplanes may be sub-divided into three classes, known respectively as the low wing, the high wing, and the parasol types. They are usually faster than biplanes of similar weight with engines of equal power, and a better view is to be obtained from them. The landing speed of monoplanes is generally higher, however, and biplanes are more stable in the air.

Model No. 1 is a monoplane of the low wing type. Machines of this type are often regarded as the best for speed, and have greatly increased in popularity during recent years. They are largely used on German air lines, notable examples being the Junkers machines.

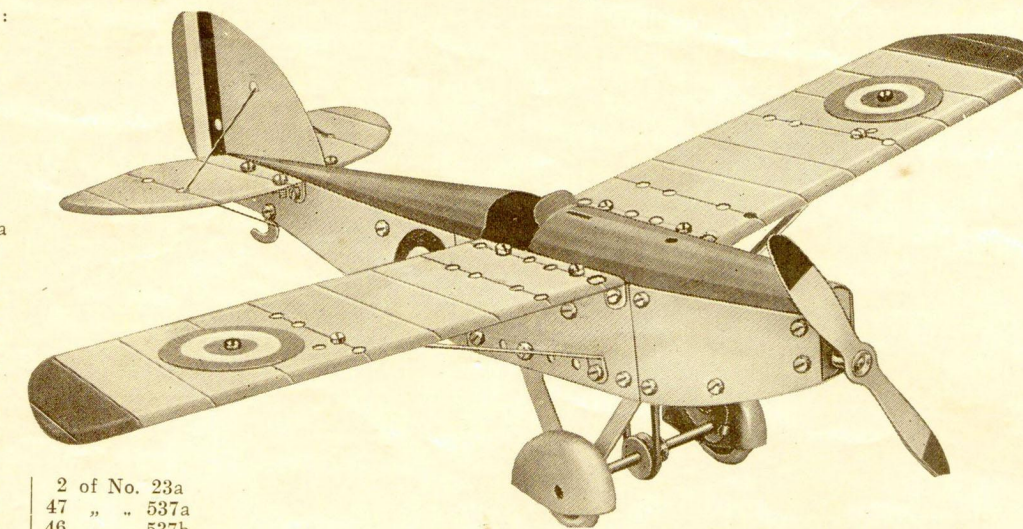
A typical British low wing monoplane is the Percival "Mew Gull" single-seater high-speed machine. It is fitted with a 200 h.p. D.H. "Gipsy Six" engine that gives it a top speed of 225 m.p.h.



The realism of each of the models illustrated on this page can be greatly increased by fitting in the cockpit the Pilot, Part No. P109. To secure the Pilot in position, a 7/32" Bolt is passed through each side of the Fuselage, and through the perforated lug attached to the Pilot's body. Nuts are then screwed on to the projecting shanks of the Bolts, thus locking the Pilot rigidly in place.

Parts required:	
1 of No. P1	2 of No. P16
1 " " P2	2 " " P17
1 " " P10	1 " " P18
1 " " P11	1 " " P18a
1 " " P13	1 " " P19
1 " " P15	1 " " P20
	2 " " P31
	1 " " P34
	2 " " P44
	1 " " P52
	2 " " P53
	1 " " P54
	1 " " P55
	2 " " P56
	1 " " P58
	1 " " P59
	1 " " P62
	1 " " P64
	8 " " 12
	2 " " 14
	2 " " 23a
	43 " " 537a
	42 " " 537b
	1 " " 540
	1 " " 611c

Parts required:	
1 of No. P1	1 " " P2
1 " " P10	1 " " P11
1 " " P13	1 " " P15
1 " " P16	2 " " P17
2 " " P18	1 " " P18a
1 " " P19	1 " " P20
2 " " P31	1 " " P34
1 " " P34	2 " " P44
1 " " P52	2 " " P53
1 " " P54	1 " " P55
1 " " P56	2 " " P58
1 " " P59	1 " " P62
1 " " P64	1 " " P64
8 " " 12	1 " " 14
1 " " 14	



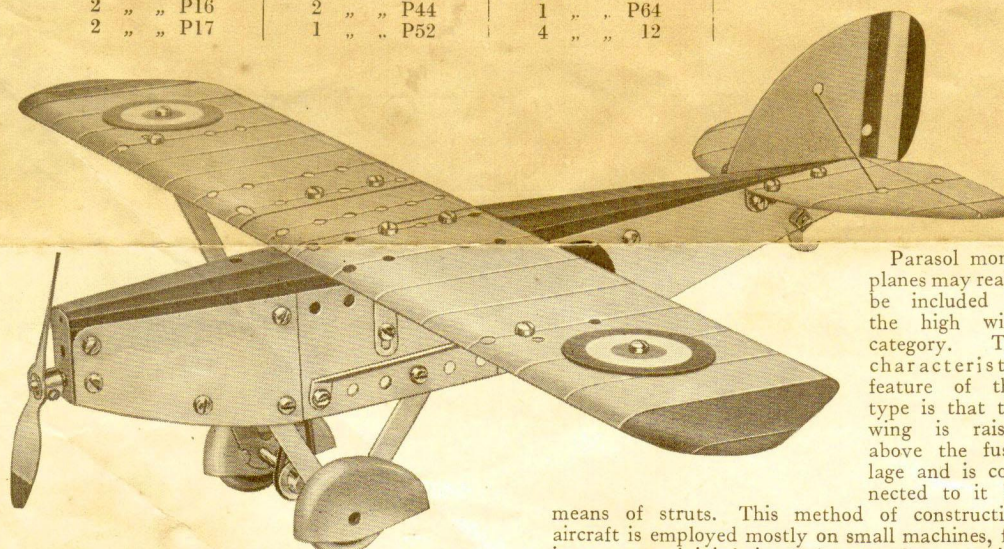
High wing monoplanes are usually more stable than the low wing type, and the view downwards is much better, being practically unobstructed. Machines of this type are used in all parts of the world, and they range from small single-seater machines to huge aircraft seating as many as 34 people.

The B.A. "Double-Eagle" is a good example of a British light high wing monoplane of the cabin type. This is a six-seater in which the pilot's compartment is in front of the passenger cabin. Other notable machines include the Heston "Phoenix," a five-seater of similar type. A good example of a military high wing monoplane is the Westland "Lysander" army co-operation machine.

Model No. 2 High Wing Monoplane

Model No. 3 Parasol Monoplane

Parts required:	
1 of No. P1	1 of No. P18
1 " " P2	1 " " P18a
1 " " P8	1 " " P19
1 " " P10	1 " " P20
1 " " P11	2 " " P29
1 " " P13	2 " " P31
1 " " P15	1 " " P34
2 " " P16	2 " " P44
2 " " P17	1 " " P52
	2 of No. P53
	1 " " P54
	1 " " P55
	2 " " P56
	1 " " P58
	1 " " P59
	1 " " P62
	1 " " P64
	4 " " 12
	1 of No. 14
	43 " " 23a
	42 " " 537a
	1 " " 537b
	1 " " 540
	1 " " 611c



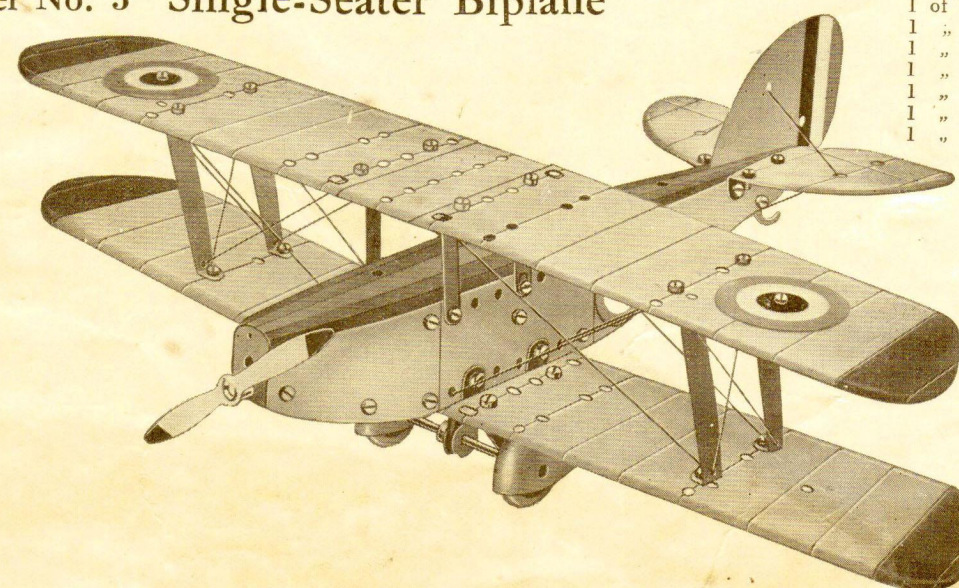
Parasol monoplanes may really be included in the high wing category. The characteristic feature of this type is that the wing is raised above the fuselage and is connected to it by means of struts.

This method of constructing aircraft is employed mostly on small machines, for in many ways it is inferior to the type of construction in which the wing is bolted firmly to the fuselage. One great disadvantage is that the struts required to keep the plane in position offer great resistance to the wind, and thus detract considerably from the all-round performance of the machine.

Parasol monoplanes are now little used in Great Britain, but in France this type is quite popular. Well-known examples are made by the Morane-Saulnier and Potez firms.

Model No. 5 Single-Seater Biplane

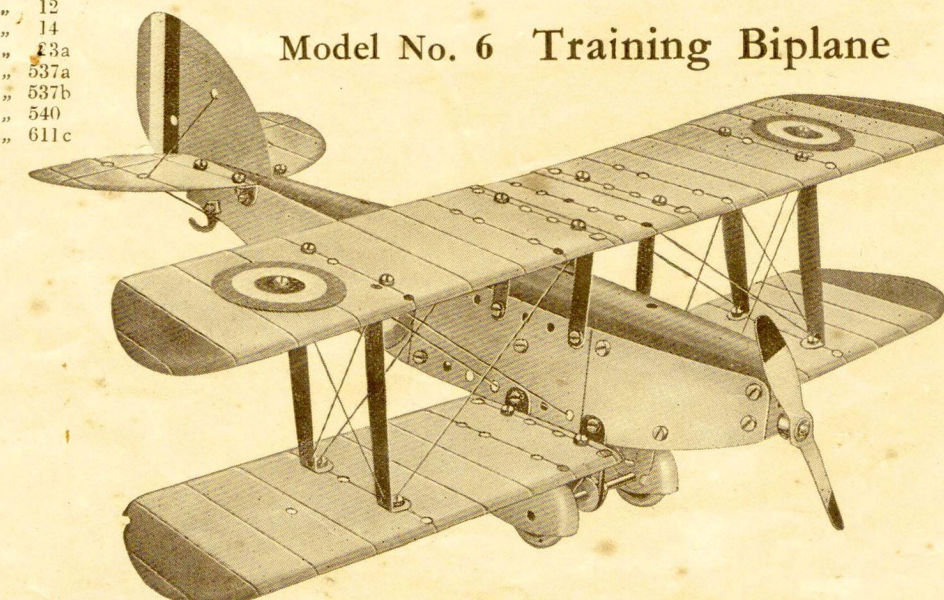
In the early days of Aviation the single-seater civil biplane was very popular with the private owner who did not require a machine large enough to enable him to be accompanied by one or more passengers. Many civilian pilots regarded this limitation as a drawback, however, and two- and three-seater biplanes rapidly came into favour. During recent years the monoplane has very largely superseded the biplane, and today there is no single-seater civil type of biplane produced either in this country or abroad. Two-seater biplanes are still used, however, for training purposes, and there are several types of light biplanes seating from five to seven passengers, machines of this capacity being used extensively on internal air services.



Parts required:	
1 of No. P1	1 of No. P13
1 " " P1a	1 " " P15
1 " " P2	2 " " P16
1 " " P2a	2 " " P17
1 " " P8	1 " " P18
1 " " P10	1 " " P18a
1 " " P11	1 " " P19
	1 " " P20
	2 " " P24
	2 " " P25
	4 " " P29
	1 " " P34
	2 " " P44
	1 " " P52
	2 " " P53
	1 " " P54
	1 " " P55
	2 " " P56
	1 " " P58
	1 " " P59
	1 " " P62
	1 " " P64
	8 " " 12
	1 " " 14
	2 " " 23a
	55 " " 537a
	54 " " 537b
	1 " " 540
	1 " " 611c

Parts required:	
1 of No. P1	1 of No. P64
1 " " P1a	8 " " 12
1 " " P2	1 " " 14
1 " " P2a	2 " " 23a
1 " " P8	53 " " 537a
1 " " P10	52 " " 537b
1 " " P11	1 " " 540
1 " " P13	1 " " 611c
1 " " P15	
2 " " P16	
2 " " P17	
1 " " P18	
1 " " P18a	
1 " " P19	
1 " " P20	
2 " " P24	
2 " " P25	
4 " " P29	
1 " " P34	
2 " " P44	
1 " " P52	
2 " " P53	
1 " " P54	
1 " " P55	
2 " " P56	
1 " " P58	
1 " " P59	
1 " " P62	

Model No. 6 Training Biplane



The requirements of a good training machine are many. It must be easy to fly and must be stable; its maximum speed must be fairly high, but its landing speed must be low. A biplane is best suited to comply with these conditions, and ordinary light aeroplanes are now frequently employed.

A training machine has been taken as a prototype for Model No. 6. The most famous machine of this type is the Avro 504, first designed and constructed in 1913. Since then it has been in constant service in all parts of the world. In 1932 it was replaced by the Avro "Tutor," which has been adopted by many light aeroplane clubs. The Avro 626 is an advanced training machine for complete instruction in all duties.

INSTRUCTIONS

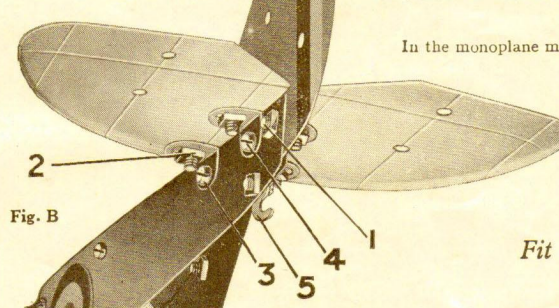
How to Build Model Aeroplanes with Aeroplane Constructor Outfit No. 1

Commence by building up the Fuselage, the details of which are clearly shown in the illustrations. The manner in which the propeller drive is arranged is shown in Fig. A. The Propeller is secured to one end of the 61" Axle Rod 1, and the Rod is then pushed through the lower hole in the Fuselage Front. A 1/2" Pulley 2 is placed on the Rod together with the Rubber Driving Band 5. The end of the Axle Rod 1 is then pushed through the hole in the Propeller Shaft Bracket 3. The 61" Axle Rod 1 is kept in place by means of the Collar 4. The 3/4" Axle Rod (part No. P62) is pushed through one Undercarriage Vee Strut and Wheel Shield and a 1/2" Fast Pulley 6 and Rubber Band 5 are placed on the Axle. When fitting the Driving Band in position take care to see that it is twisted in such a manner that the Propeller rotates in a clockwise direction when the model is moved forward. A Rubber Tyre is now fitted to one Landing Wheel and the complete wheel is then placed in the Wheel Shield of the second Undercarriage Vee Strut. The end of the 3/4" Axle is then passed through the hole in the Undercarriage Vee Strut and through the centre hole in the Landing Wheel. A Rubber Tyre is next fitted to the second Landing Wheel and the complete wheel is placed in its Wheel Shield. To do this the 3/4" Axle is drawn slightly to one side and is then pushed back so that one end of the Axle passes into the centre hole of the Landing Wheel. Each Landing Wheel is locked in position on the Axle by rolling the Rubber Tyre to one side with the fingers so that the grub-screw is exposed and it may then be rotated by the Screwdriver.

After the Landing Wheels have been secured in place the Driving Band may be placed round the groove in the 1/2" Pulley 2 and also round the groove of the Pulley 6. The Pulleys 2 and 6 are then locked in position on their respective Rods by means of the grub-screws in their bosses.

ASSEMBLING THE TAIL PLANES AND RUDDER

The method of assembling the Tail Planes and Rudder is shown in Fig. B. Two each Tail Plane and the Front Bracket 2 of each Tail Plane is secured to the fuselage by a 1/2" Bolt 3. A 1/2" Bolt 4 is passed through the rear Angle Bracket the Fuselage Side and Top Rear sections, and through the rear Angle Bracket. A Nut is placed upon the end of the Bolt and the Bolt is screwed up tightly so that the Tail Planes are locked rigidly to the rear of the fuselage of the model. The Tail Skid 5 of place between the Fuselage Side Rear sections by means of a 7/32" Bolt, pushed into position between the ends of the Fuselage Side Rear sections, the lug fitting into the slot in the Fuselage Top Rear section. It is held by the 7/32" Bolt 1.



METHOD OF FITTING THE MAINPLANES

In the monoplane models (with the exception of Model No. 3), the Mainplane sections are secured to the fuselage by means of Angle Brackets. In Model No. 3, two Wing Stays and two Centre Section (Straight) Struts are used to support the wing above the fuselage. The wing is composed of two Large Mainplane sections, and one Extension Plane which are overlapped and bolted together.

In the biplane models, when the top wing is "staggered," that is to say, is not mounted vertically above the lower wing, the Staggered Interplane Struts are used. In other biplane models, the Straight Interplane Struts are employed.

The method of securing the bracings (lengths of Meccano Cord) between the Struts will be clear from the illustrations.

Fit an Aero Clockwork Motor into your Model Aeroplanes.

Ask your dealer for prices and full particulars.

Special Note: The Military Identification Markings (P.101 and P.102) shown on the Mainplanes and Fuselage in the models illustrated are not now included in this Outfit. The Mainplanes and the Fuselage now carry civil registration letters. The Military Rudder shown is replaced by a Civil Rudder.