

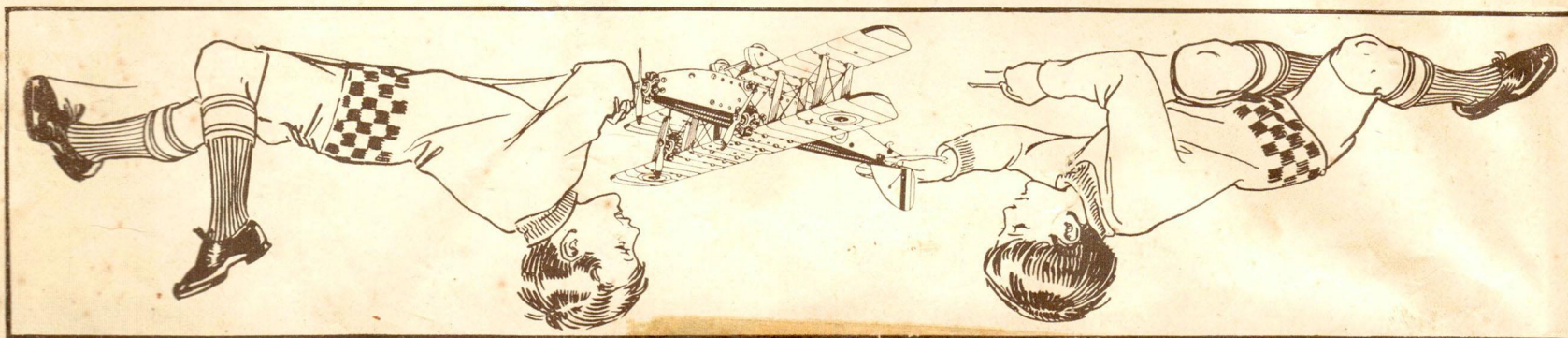
MECCANO LIMITED, LIVERPOOL 13, throughout the world

Copyright by



AEROPLANE CONSTRUCTOR OUTFIT No. 1

Instructions



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 today 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 many other equally realistic 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 manoeuvring 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 edges 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."

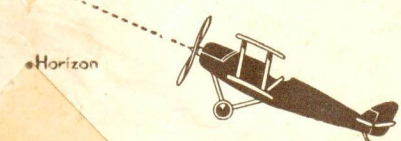
If you find that the aeroplane is veering to the left, you put on right rudder by moving the right foot gently forward; and similarly veering to the right is corrected by applying left rudder. If you wish to turn the aeroplane round, however, you must not attempt to do it by rudder alone, because in 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 checks 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.

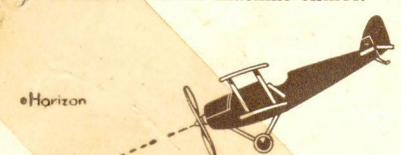
The aeroplanes used for training purposes have two cockpits, one in front of the other, the controls in each being exactly the same, and connected together. This arrangement enables the instructor, who sits in the front cockpit, to see exactly what manipulations are being made by the pupil behind, and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



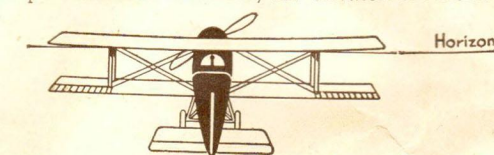
When the control column or "joy-stick" is vertical, the elevator is horizontal, and the machine flies parallel with the ground.



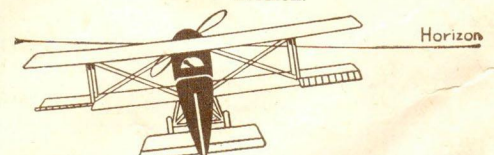
When the stick is pulled back, the elevator is raised and the machine climbs.



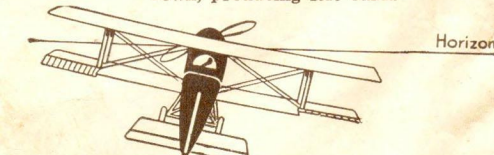
Pushing the stick forward causes the machine to put down its nose and dive.



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

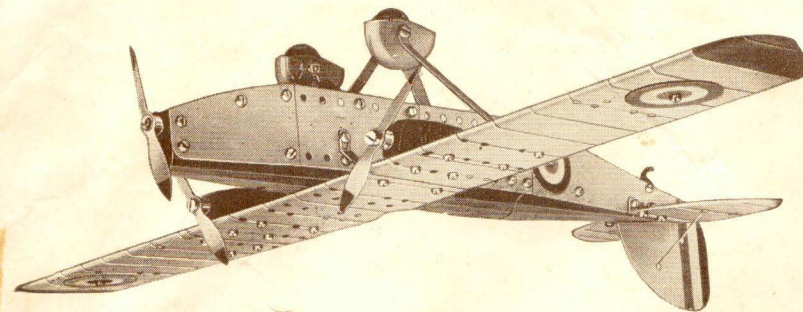


When the stick is moved over to the left, the ailerons on that side are raised and the wings go down, producing left bank.

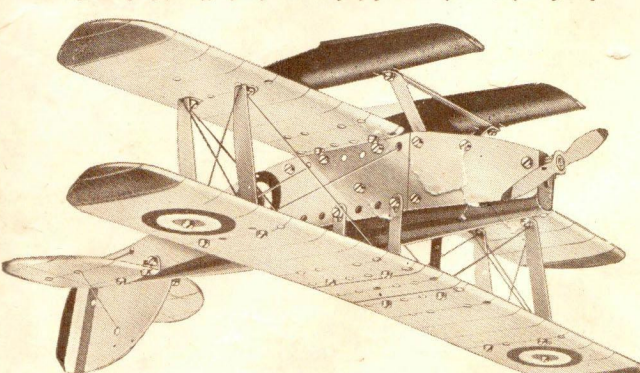


A right bank is brought about by moving the stick to the right.

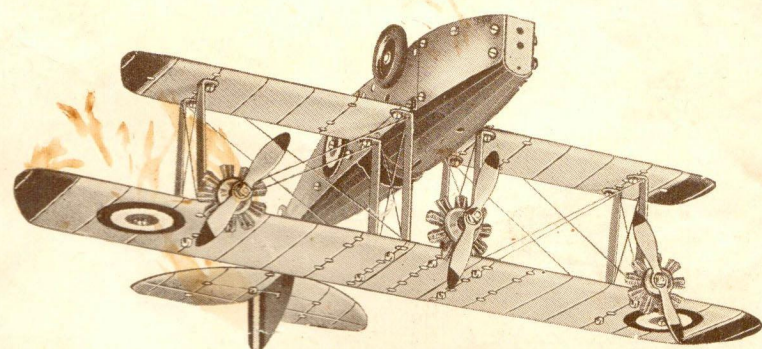
Another fine model that can be built with Aeroplane Constructor Outfit No. 2 (or No. 1 and No. 1a Outfits combined). It is a triple-engine monoplane air liner and is similar in design to the famous "Southern Cross" flown by the late Sir Charles Kingsford Smith.



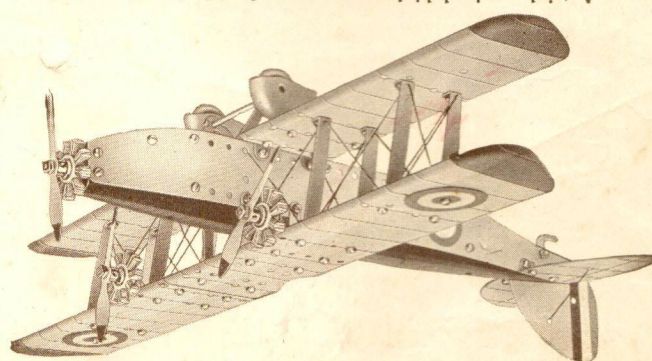
Another interesting model that can be built with Aeroplane Constructor Outfit No. 2 (or No. 1 and No. 1a Outfits combined). Instructions for building three seaplanes are given, one of these being of similar design to the Italian Macchi machine that holds the world's speed record.



Many amphibians and flying boats can be built with Aeroplane Constructor Outfit No. 2 (or No. 1 and No. 1a Outfits combined). This illustration shows one of the most interesting of them. It is a model 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 No. 2 Outfit (or No. 1 and No. 1a Outfits combined).



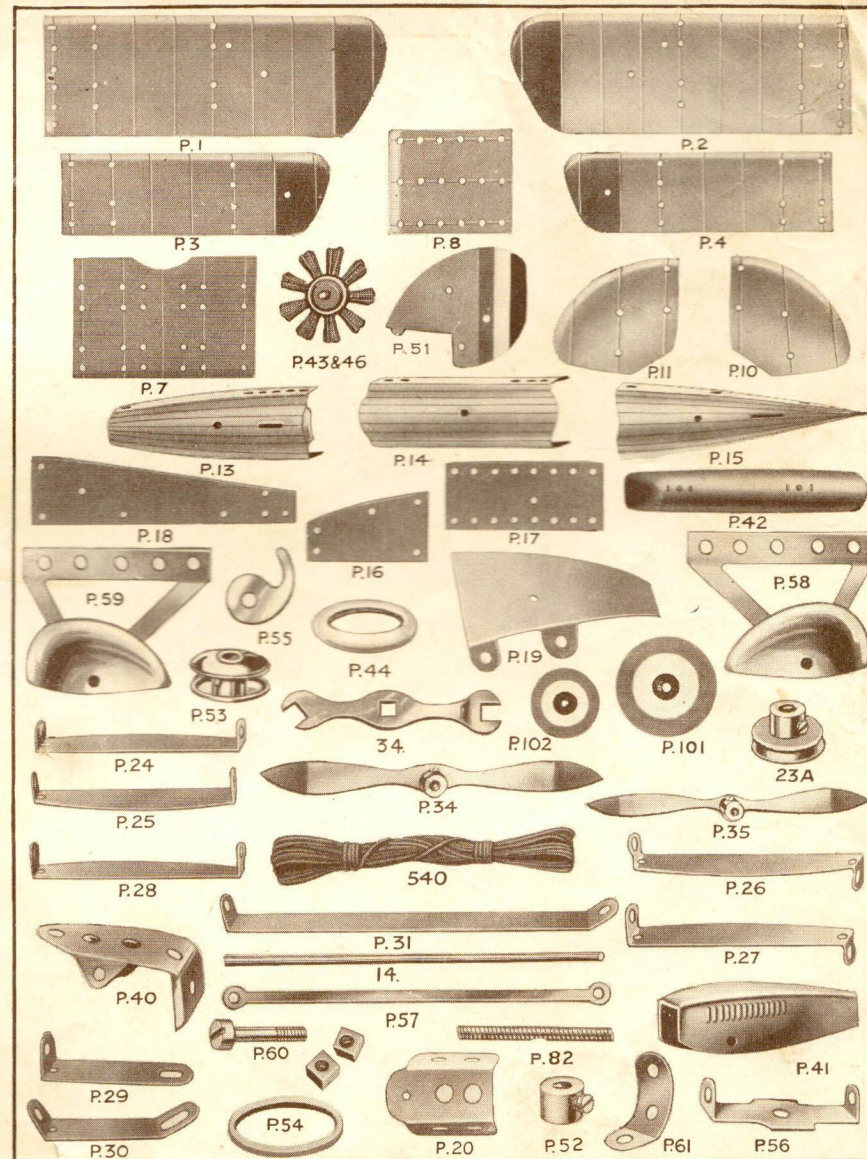
AEROPLANE CONSTRUCTOR ACCESSORY OUTFIT No. 1a

will enable you to build many additional models

AEROPLANE CONSTRUCTOR PARTS			
No.	Mainplanes	No.	Accessories
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.
P13	Front P14 Middle P15 Rear	P59	Undercarriage Vee Strut and Wheel Shield—L.H.
P16	Front P17 Middle P18 Rear, R.H.	P60	Pivot Bolt with Two Nuts
P19	Fuselage Underside P20 Fuselage Interplane Struts—Front	P61	Engine Bracket
P24	Staggered—R.H. P25 L.H.	P62	Axle Rod, 3 1/2" long
P26	Angled—R.H. P27 L.H.	P63	Screwdriver
P28	Interplane Strut—Straight	P64	Rudder (Civil)
P29	Centre Section Strut—Straight	P65	Adjustable Tail Wheel
P30	Float and Centre Section Strut—Angled	P75	No. 1 Aero Manual
P31	Wing Stay P32 Rudder (Military)	P76	No. 2 Aero Manual
P34	Propeller—Large	P100	Pilot
P35	" Small	P101	Identification Marking—Large
P40	Base for Engine Casing	P102	" Small
P41	Top for Engine Casing	P12	Angle Bracket, 1/2" x 1/2"
P42	Float, Complete	P14	Axle Rod, 6 1/2" long
P43	Radial Engine—Small	P16a	" 2 1/2" "
P44	Rubber Tyre for Landing Wheel	P23a	Fast Pulley, 1 1/2" diameter
P46	Radial Engine—Large	P34	Spanner
		P82	Screwed Rod, 1" long
		P57a	Nuts 5/16" Bolts, 7/32" long
		P540	Hank of Cord
		P611c	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 ... 1
P1a	" " Bottom, R.H. ... 1	P53	Landing Wheel ... 2
P2	" " Top, L.H. ... 1	P54	Rubber Driving Band ... 1
P2a	" " Bottom, L.H. ... 1	P55	Tail Skid ... 1
P7	Centre Section Plane ... 1	P56	Rear Bracket for Propeller Shaft ... 2
P8	Extension Plane ... 1	P57	Tie Rod for Floats ... 1
P10	Tail Plane—R.H. ... 1	P58	Undercarriage Vee Strut and Wheel Shield—R.H. ... 1
P11	" " L.H. ... 1	P59	Undercarriage Vee Strut and Wheel Shield—L.H. ... 1
P13	Front ... 1	P60	Pivot Bolt with Two Nuts ... 1
P14	Middle ... 1	P61	Engine Bracket ... 1
P15	Rear ... 1	P62	Axle Rod, 3 1/2" long ... 1
P16	Front ... 2	P63	Screwdriver ... 1
P17	Middle ... 2	P64	Rudder (Civil) ... 1
P18	Rear, R.H. ... 1	P65	Adjustable Tail Wheel ... 1
P18a	Rear, L.H. ... 1	P75	No. 1 Aero Manual ... 1
P19	Fuselage Underside ... 1	P76	No. 2 Aero Manual ... 1
P20	Front ... 1	P100	Pilot ... 1
P24	Interplane Strut—Staggered—R.H. ... 2	P101	Identification Marking—Large ... 1
P25	" " L.H. ... 2	P102	" Small ... 1
P28	" " Straight ... 4	P12	Angle Bracket, 1/2" x 1/2" ... 8
P29	Centre Section Strut—Straight ... 4	P14	Axle Rod, 6 1/2" long ... 1
P31	Wing Stay ... 2	P16a	" 2 1/2" " ... 1
P32	Propeller—Large ... 1	P23a	Fast Pulley, 1 1/2" diameter ... 2
P34	Rubber Tyre for Landing Wheel ... 2	P34	Spanner ... 1
		P82	Screwed Rod, 1" long ... 60
		P57a	Nuts ... 38
		P540	Hank of Cord ... 1
		P611c	Bolts, 1/2" long ... 2

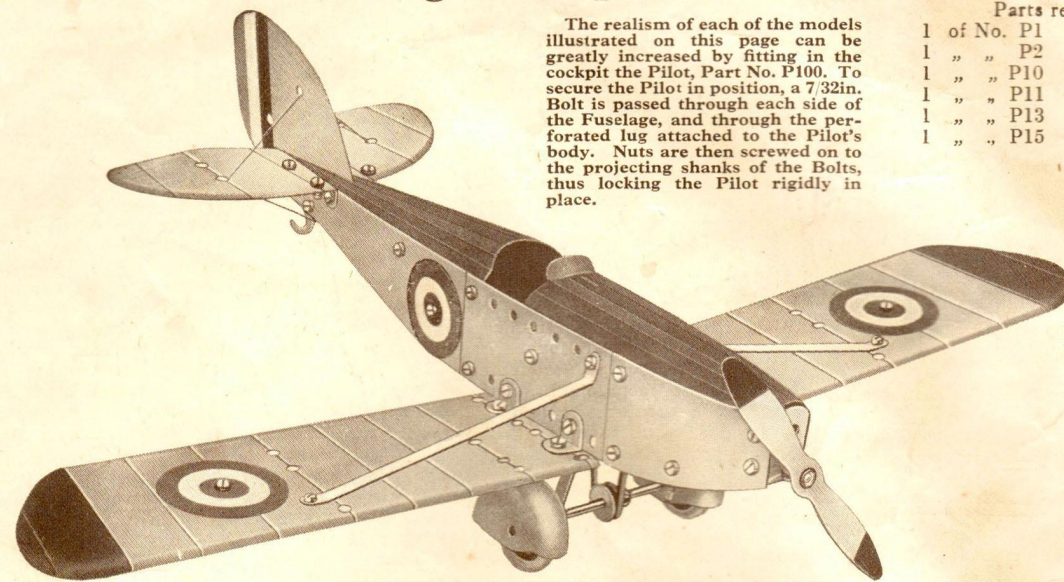


Model No. 1 Low Wing Monoplane

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, middle wing and the high wing 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.

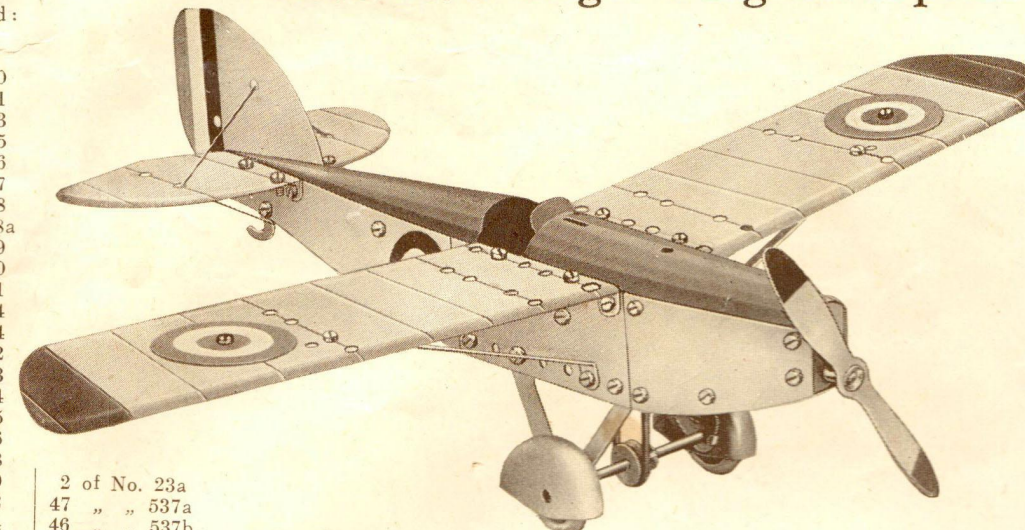
A typical British low wing monoplane is the Miles "Magister," a two-seater training machine. It is fitted with a 130 h.p. D.H. "Gipsy Major" engine that gives it a top speed of 145 m.p.h.



The realism of each of the models illustrated on this page can be greatly increased by fitting in the cockpit the Pilot, Part No. P100. To secure the Pilot in position, a 7/32in. 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 " " P8	1 " " P18
1 " " P10	1 " " P18a
1 " " P11	1 " " P19
1 " " P13	1 " " P20
1 " " P15	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
	1 " " 14
	2 " " 23a
	43 " " 537a
	42 " " 537b
	1 " " 540
	1 " " 611c

Model No. 2 High Wing Monoplane



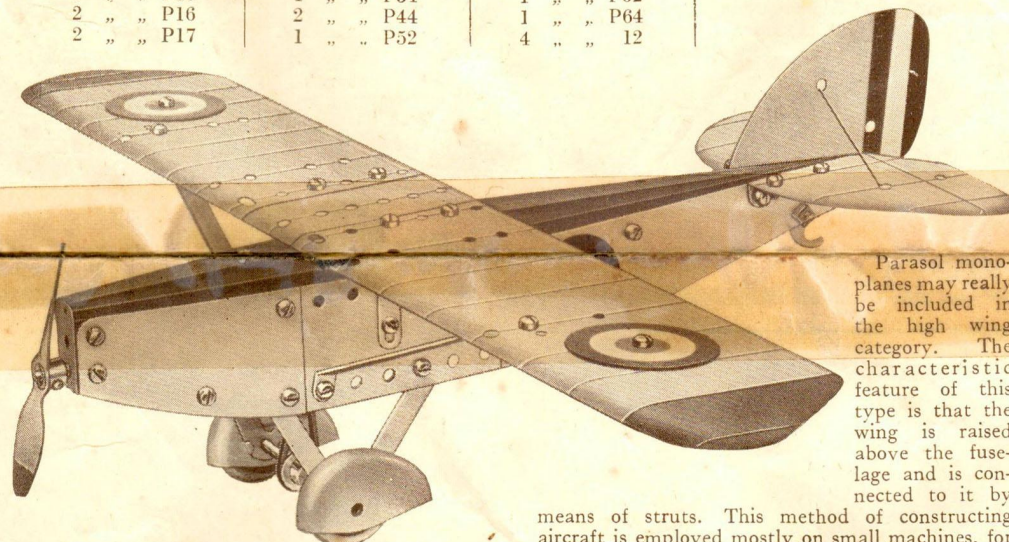
Parts required:	
1 of No. P1	2 of No. P16
1 " " P2	2 " " P17
1 " " P10	1 " " P18
1 " " P11	1 " " P18a
1 " " P13	1 " " P19
1 " " P15	1 " " P20
2 " " P16	2 " " P31
2 " " P17	1 " " P34
1 " " P18	2 " " P44
1 " " P18a	1 " " P52
1 " " P19	2 " " P53
1 " " P20	1 " " P54
2 " " P31	1 " " P55
1 " " P34	2 " " P56
1 " " P44	1 " " P58
2 " " P52	1 " " P59
1 " " P53	1 " " P62
1 " " P54	1 " " P64
1 " " P55	8 " " 12
2 " " P56	1 " " 14
1 " " P58	
1 " " P59	2 of No. 23a
1 " " P62	47 " " 537a
1 " " P64	46 " " 537b
8 " " 12	1 " " 540
1 " " 14	1 " " 611c

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 40 people.

A British example is the Wicko two-seater light cabin monoplane, which is fitted with a 130 h.p. D.H. "Gipsy Major" engine, and has a top speed of 140 m.p.h. 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. 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 " " P55
	2 " " P56
	1 " " P58
	1 " " P59
	1 " " P62
	1 " " P64
	4 " " 12
	1 of No. 14
	2 " " 23a
	43 " " 537a
	42 " " 537b
	1 " " 540
	1 " " 611c



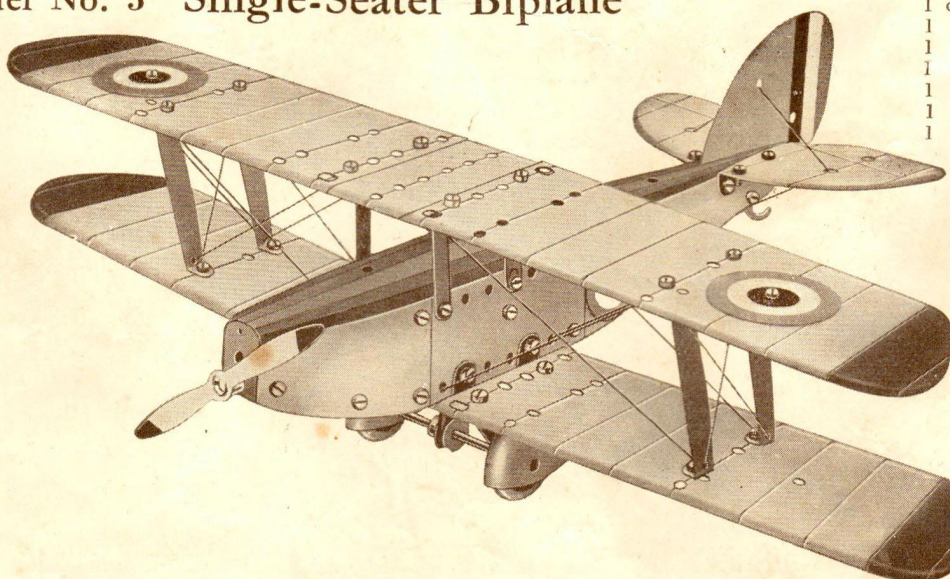
Parasol monoplanes may really be included in the high wing category. The characteristic feature of this type is that the wing is raised above the fuselage and is connected to it by means of struts. This method of constructing aircraft is employed mostly on small machines, for in many ways it is inferior 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 in this country. 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	1 " " P17
1 " " P8	2 " " P18
1 " " P10	1 " " P18a
1 " " P11	1 " " P19
	1 " " P20
	2 " " P24
	2 " " P25
	4 " " P29
	1 " " P34
	2 " " P44
	1 " " P52
	1 " " 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

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" 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 8. The 61" Axle Rod 1 is kept in place by means of the Collar 4. The 31" Axle Rod (part No. P62) is pushed through one Undercarriage Vee Strut and Wheel Shield and a 1" 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 31" 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 31" 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" 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 means of the 1" Bolt 3. A 1" Bolt 4 is used to secure the Tail Plane to the Fuselage Side and Top Rear section. A Nut is placed upon the end of the 1" Bolt 4 and the Bolt is screwed up tightly. The Tail Plane is then locked rigidly to the rear of the Fuselage by means of the 7/32" Bolt 5 of the Fuselage Side Rear section, 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

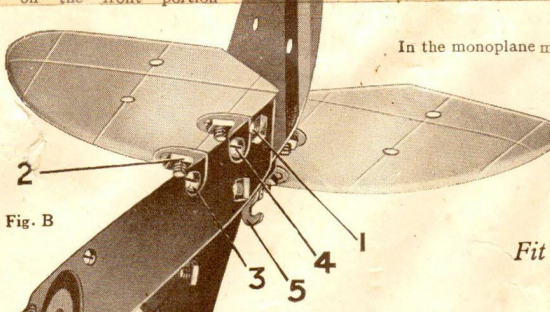
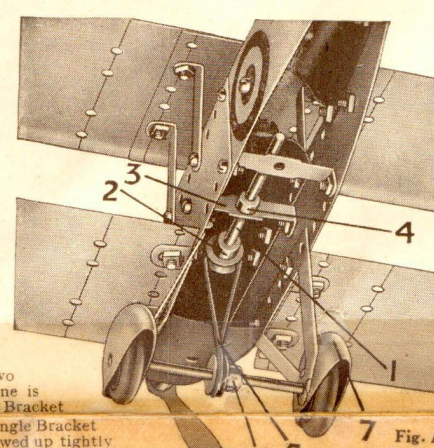
In the monoplane models (with the exception of Model No. 3), the Mainplane sections are secured to the fuselage by means of Angle Brackets. In Model No. 3, two Wing Stays and two Centre Section Struts are used to support the wing above the fuselage. The wing is composed of two Large Mainplane sections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

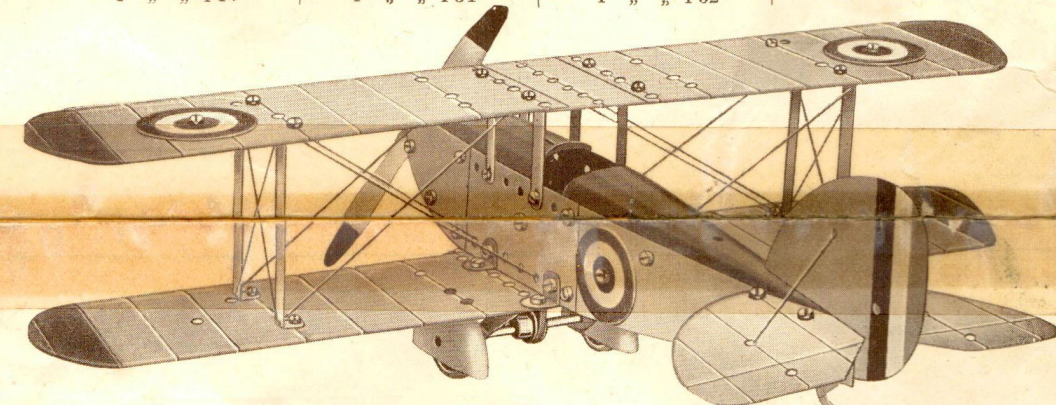
Fit an Aero Clockwork Motor into your Model Aeroplanes.

Ask your dealer for prices and full particulars.



Model No. 4 Standard Light Biplane

Parts required:	
1 of No. P1	2 of No. P16
1 " " P1a	2 " " P17
1 " " P2	1 " " P18
1 " " P2a	1 " " P18a
1 " " P8	1 " " P19
1 " " P10	1 " " P20
1 " " P11	4 " " P28
1 " " P13	4 " " P29
1 " " P15	1 " " P34
	2 of No. P44
	1 " " P52
	2 " " P53
	1 " " P54
	55 " " 537a
	54 " " 537b
	1 " " 540
	1 " " 611c

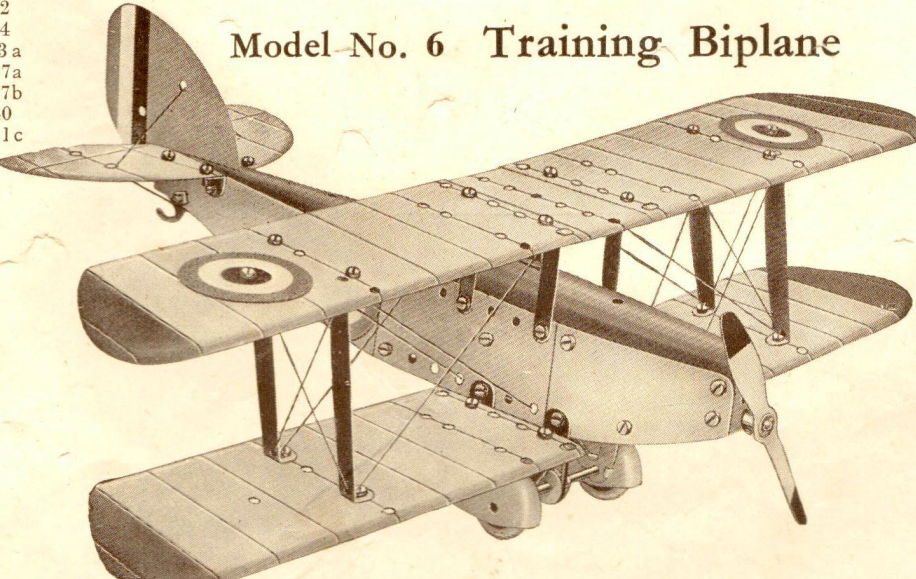


For many purposes it is almost essential that a machine should be fitted with two planes. A Service aeroplane, for instance, must not only be fast, but must also be capable of carrying a good load at both high and low altitudes. The great wing area of a biplane, although it involves a slight decrease in speed, gives the machine a greater carrying capacity.

Model No. 4 is a biplane of the light type. These machines are used extensively for civilian work, and also by the R.A.F. Machines of this kind have been specialised in by British aircraft designers, and British light biplanes are the best in the world.

One of the most widely-known single-seater light aeroplanes is the Gloster "Gauntlet." Several two-seater biplanes are produced in this country, typical examples being the D.H. "Hornet Moth" cabin biplane, and the Avro "Tutor," which has open cockpits.

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 well 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.

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.