

MECCANO

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AEROPLANE CONSTRUCTOR INSTRUCTIONS

FOR OUTFIT

No. 2



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No. 31.2AC

MECCANO

AEROPLANE CONSTRUCTOR

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 Meccano Aeroplane Constructor Outfits have been designed specially for this purpose. This Manual shows how to construct twenty different types of aeroplanes, but a large number of other splendid models may be built by varying the positions of the parts.

How to build Model Aeroplanes with Meccano Aeroplane Constructor Parts.

Commence by building up the fuselage, the details of which are clearly shown in the illustrations. Where a Radial Engine is fitted to the nose it should be bolted to the Fuselage Front before the Fuselage Underside is fixed.

Fig. A shows the arrangement of the propeller driving mechanism. The Propeller is fixed to the Axle Rod 1, which is pushed through the lower hole in the Fuselage Front. A Pulley 2 is placed on the Rod, together with the endless Spring Cord Belt 5, and the Rod is then passed through the Double Angle Strip 3. The Rod is gripped by the Collar 4. The arrangement of the Spring Cord 5 over the Pulleys 2 and 6 is clearly shown in Fig. A.

Fitting the Radial Engine Units and Engine Casings (Water-cooled type)

To attach a Radial Engine unit to the Wing (see Fig. C), an Angle Bracket 1 is bolted to the wing and the projecting screwed shank 2 of the Radial Engine pushed through the lug in the Bracket 1 and held in place by the Nut 3. Two Nuts locked on the centre spindle of the Engine hold the Propeller in place.

To attach an Engine Casing unit (representing a water-cooled engine), to the wing, first bolt the Engine Casing Base to the underside of the wing by two Bolts. Next pass a Pivot Bolt through the boss of a small Propeller and screw a Nut on the end of it. Pass the projecting end of the Pivot Bolt through the hole in the Front of the Engine Casing Base and lock the Bolt in place by another Nut.

The Engine Casing Top is placed over the Base piece, and a $\frac{3}{4}$ in. Bolt is passed through the holes in the sides of the Top, and through the perforated lugs in the Base.

Tail Planes and Rudder.

The assembly of the Tail Planes and Rudder is shown in Fig. B. Two Angle Brackets are bolted to each Tail Plane, and the Front Bracket 2 of each Tail Plane is secured to the fuselage by a $\frac{7}{32}$ in. Bolt 3. A $\frac{3}{4}$ in. Bolt 4 is passed through the rear Angle Bracket of one Tail Plane, through the Fuselage Side Rear Sections, and through the rear Angle Bracket of the second Tail Plane. The tail skids 5 (a Flat Bracket) is held in place by means of a $\frac{7}{32}$ in. Bolt. The Rudder is held in place rigidly by the $\frac{7}{32}$ in. Bolt 1.

Where the landing wheels are mounted independently, a Pivot Bolt is first passed through the end hole in a Wing Stay (in the case of monoplane models) and a 1in. Fast Pulley, complete with Rubber Tyre, is slipped on the Pivot Bolt. A Nut is next placed on the Pivot Bolt and adjusted so that the Pulley can rotate freely. The projecting end of the Pivot Bolt is passed through the hole in the Undercarriage V Strut and the Bolt locked in place by a second Nut.

Equip your aeroplane models with a Meccano Aero Clockwork Motor. Ask your dealer for prices and full particulars.

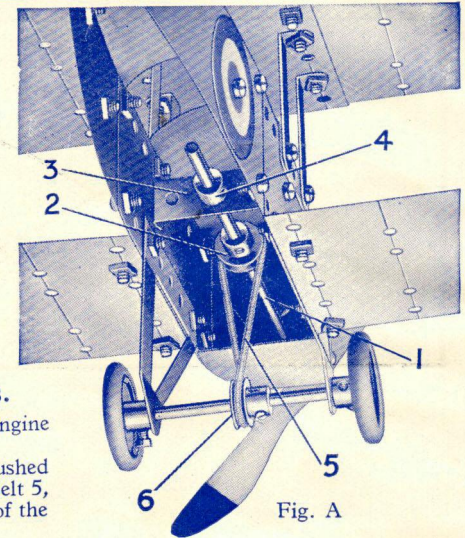


Fig. A

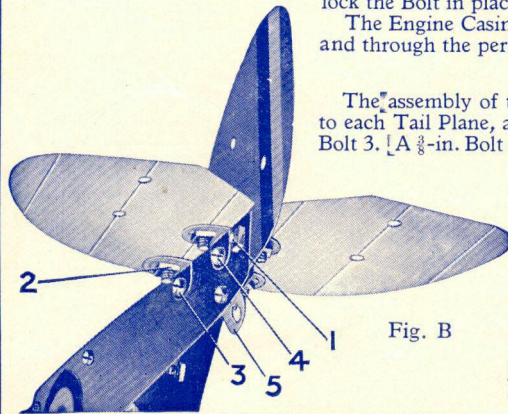


Fig. B

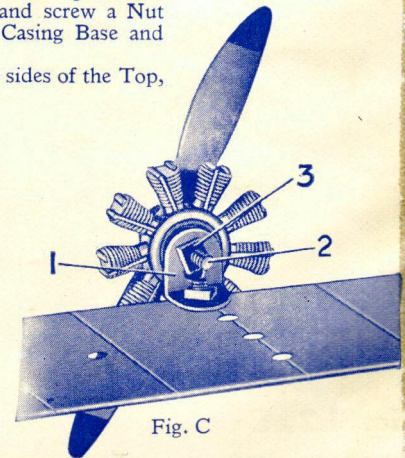


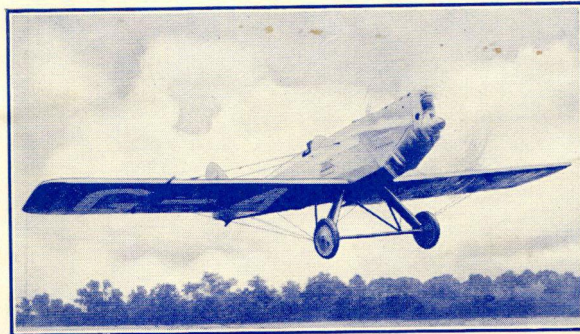
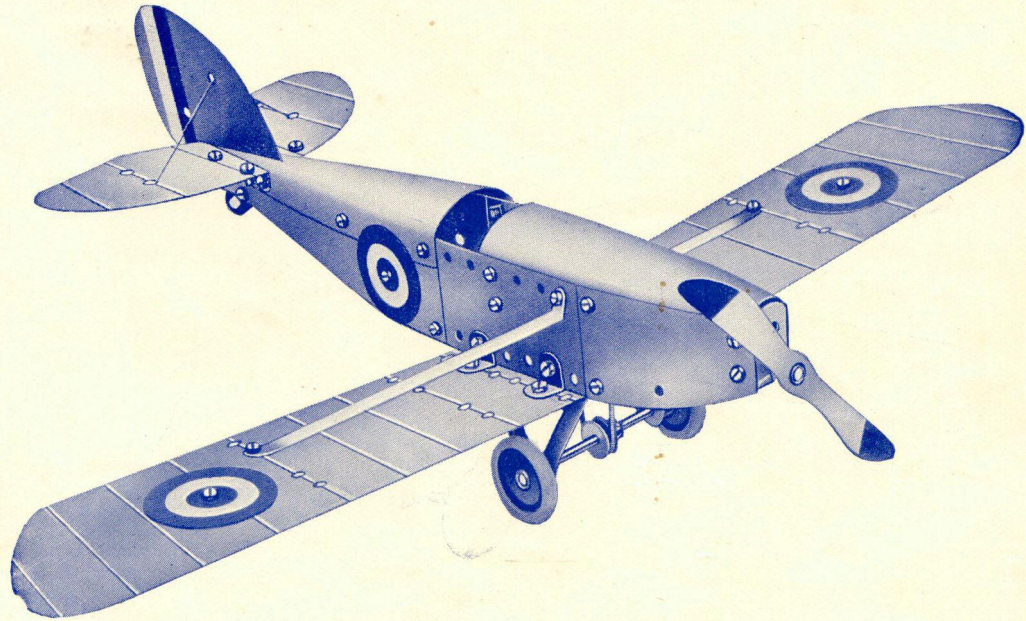
Fig. C

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 they are largely used by German air lines. Captain Frank Hawks used a low wing monoplane for his record-breaking flights.

A typical British low wing machine is the Avro "Avian Monoplane." Other notable British monoplanes of this type are the D.H. "Tiger Moth," the Blackburn-Segrave "Meteor," the Hendy 302, and the Monospar, the last three being of the cabin type.



An Avro "Avian" monoplane landing.
This is a monoplane of the low wing type.

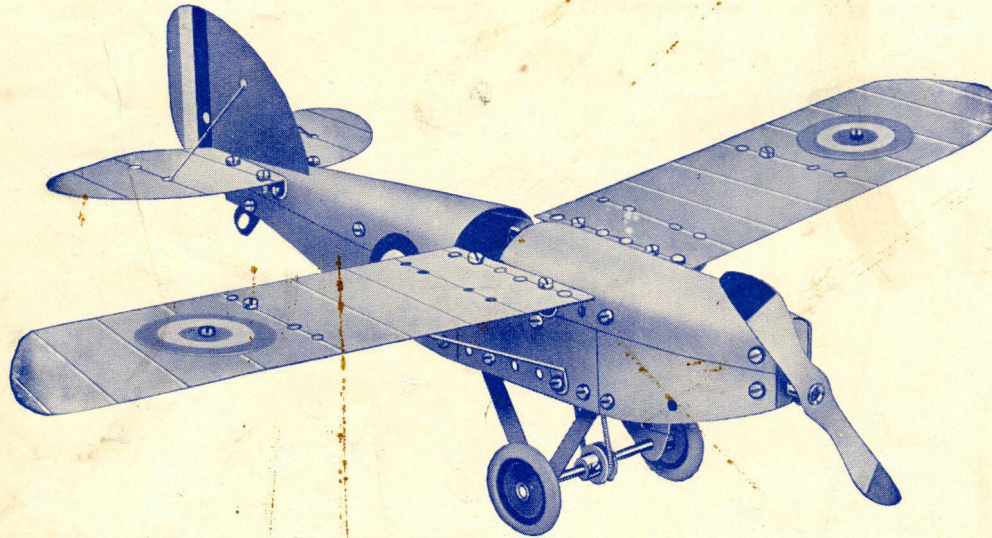
Parts required :

1 of No. P1
1 " " P2
1 " " P10
1 " " P11
1 " " P13
1 " " P15
2 " " P16
2 " " P17
2 " " P18
1 " " P19
1 " " P20

2 of No. P31
1 " " P32
1 " " P34
2 " " P36
2 " " P37
1 " " P38
1 " " P39
2 " " P44
1 " " 14
1 " " 16B
2 " " 22

2 of No. 23A
1 " " 58A
1 " " 58C
1 " " 59
1 " " 510
8 " " 512
45 " " 537A
44 " " 537B
1 " " 540
2 " " 548
1 " " 611C

Model No. 2 High Wing Monoplane



Parts required :

1 of No. P1
 1 " " P2
 1 " " P10
 1 " " P11
 1 " " P13
 1 " " P15
 2 " " P16
 2 " " P17
 2 " " P18
 1 " " P19
 1 " " P20

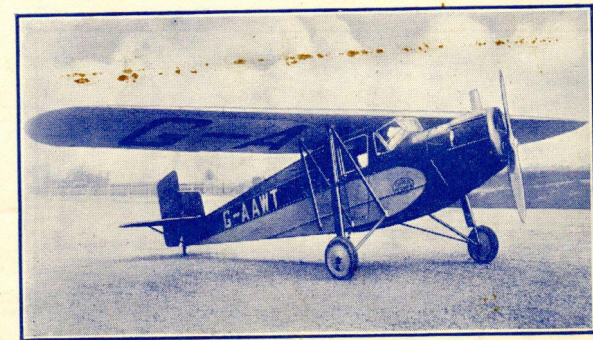
2 of No. P31
 1 " " P32
 1 " " P34
 2 " " P36
 2 " " P37
 1 " " P38
 1 " " P39
 2 " " P44
 1 " " 14
 1 " " 16B
 2 " " 22

2 of No. 23A
 1 " " 58A
 1 " " 58C
 1 " " 59
 1 " " 510
 8 " " 512
 47 " " 537A
 46 " " 537B
 1 " " 540
 2 " " 548
 1 " " 611C

High wing monoplanes are probably the most popular monoplane aircraft. They 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 30 people. The "*Spider*" machine employed by the Duchess of Bedford on her numerous famous flights is of this type.

The de Havilland "*Puss Moth*" is a good British example of a high wing monoplane, while other notable machines include the Comper "*Swift*," the Desoutter Coupé, the D.H. "*Hawk Moth*," the Civilian Coupé, the Avro V and VI, the Vickers "*Viastra*," and the Westland "*Wessex*."

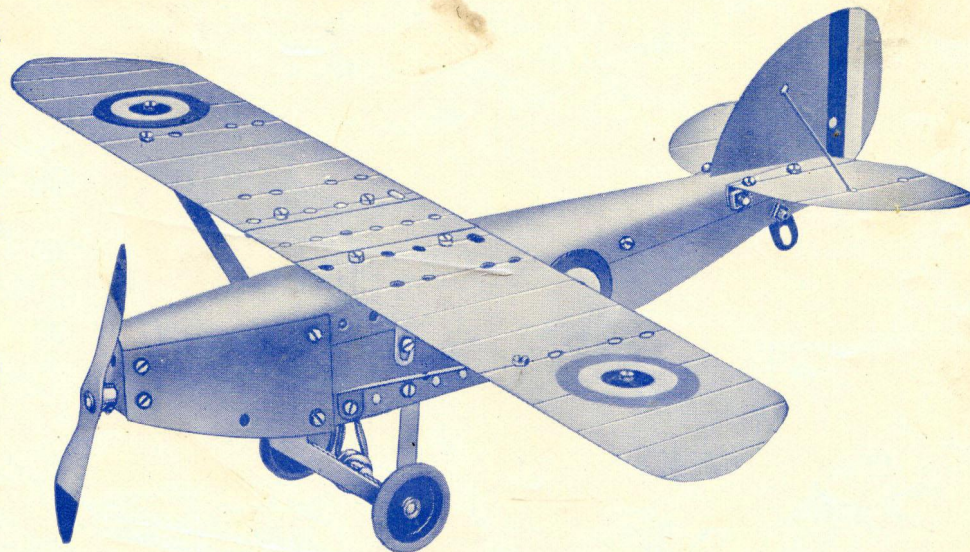


The Desoutter monoplane fitted with "Cirrus Hermes" engine. This machine has numerous excellent flights to its credit.

Model No. 3 Parasol Monoplane

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.

Typical British prototypes are the Boulton and Paul "Phoenix" and the Westland "Widgeon." These are both light aeroplanes and each possesses accommodation for two people.

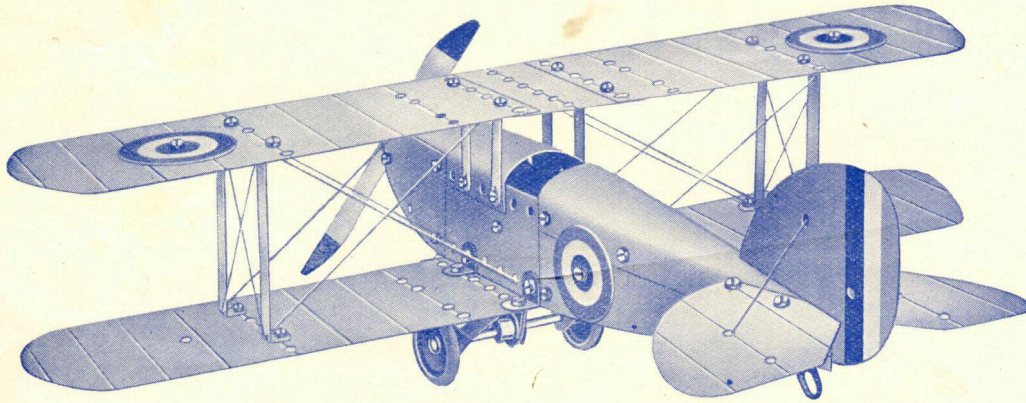


The Westland "Widgeon," a typical parasol monoplane. This machine is a two-seater and is made by the Westland Aircraft Works, Ltd.

Parts required :

1 of No. P1	2 of No. P29	2 of No. 23A
1 " " P2	2 " " P31	1 " " 58 A
1 " " P8	1 " " P32	1 " " 58 C
1 " " P10	1 " " P34	1 " " 59
1 " " P11	2 " " P36	1 " " 510
1 " " P13	2 " " P37	4 " " 512
1 " " P15	1 " " P38	41 " " 537 A
2 " " P16	1 " " P39	40 " " 537 B
2 " " P17	2 " " P44	1 " " 540
2 " " P18	1 " " 14	2 " " 548
1 " " P19	1 " " 16 B	1 " " 611 C
1 " " P20	2 " " 22	

Model No. 4 Standard Light Biplane



In England biplanes are still more numerous than aeroplanes of the monoplane type. For many purposes it is almost essential that a machine should be fitted with two wings. A Service aeroplane, for instance, must not only be fast, but also capable of carrying a good load at both low and high 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 mostly for civilian flying, although they are also employed in the R.A.F. It was on light aeroplanes that the wonderful flights to Australia were made by Mr. Bert Hinkler, Air Commodore Kingsford-Smith, and Mr. C. W. A. Scott, and from Australia by Mr. J. A. Mollison.

The most popular British light biplane is the D.H. "Moth." Other typical machines of this type are the Avro "Avian," the Blackburn "Bluebird," and the Robinson "Redwing."

2 of No. P1
2 " " P2
1 " " P8
1 " " P10
1 " " P11
1 " " P13
1 " " P15
2 " " P16
2 " " P17
2 " " P18
1 " " P19
1 " " P20

Parts required :

4 of No. P28
4 " " P29
1 " " P32
1 " " P34
2 " " P36
2 " " P37
1 " " P38
1 " " P39
2 " " P44
1 " " 14
1 " " 16B
2 " " 22

2 of No. 23A
1 " " 40P
1 " " 58A
1 " " 58C
1 " " 59
1 " " 510
8 " " 512
57 " " 537A
56 " " 537B
1 " " 540
2 " " 548
1 " " 611C

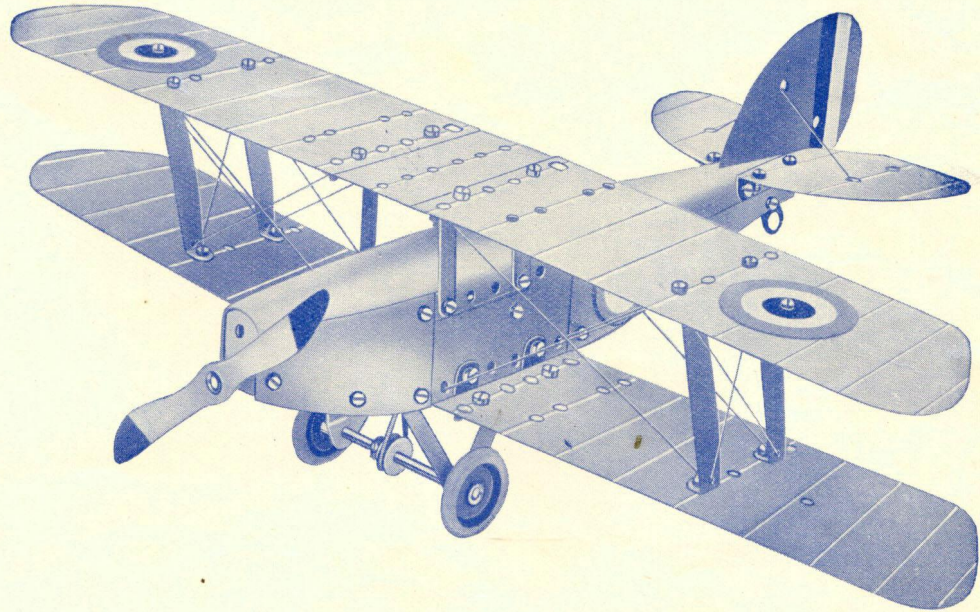


The de Havilland "Gipsy Moth," the most popular light aeroplane in the world.

Model No. 5 Single-Seater Fighter

Single-seater fighter machines are very fast aeroplanes, the function of which is to patrol certain sections of sky so that no enemy aircraft can pass. Recently a new type of machine known as the interceptor fighter has been produced. This is an extremely fast craft, capable of climbing high enough to intercept enemy bombers intent on raiding London, and whose approach is not discovered until they pass the coast. In these aeroplanes military load and fuel capacity are sacrificed to an exceedingly fast climb and a high maximum speed.

The world's best single-seater fighter probably is the Bristol "Bulldog," a machine that is used in the R.A.F. and in the Air Forces of many foreign countries. At present the Hawker "Fury" is the only type of single-seater interceptor fighter used in the R.A.F.



The Bristol "Bulldog," which is claimed to be the world's best standard single-seater fighter aeroplane.

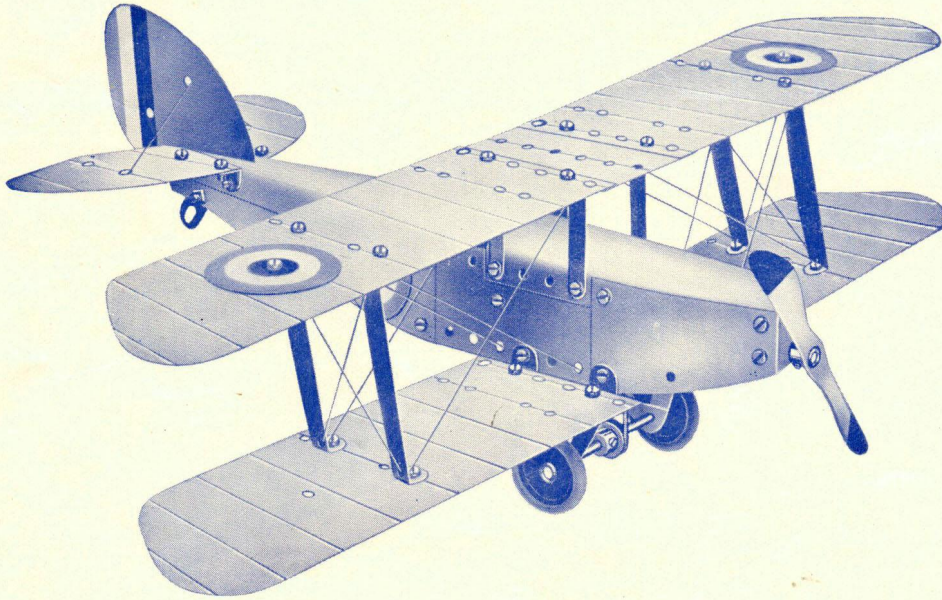
Parts required :

2	of	No.	P1
2	"	"	P2
1	"	"	P8
1	"	"	P10
1	"	"	P11
1	"	"	P13
1	"	"	P15
2	"	"	P16
2	"	"	P17
2	"	"	P18
1	"	"	P19
1	"	"	P20

2	of	No.	P24
2	"	"	P25
4	"	"	P29
1	"	"	P32
1	"	"	P34
2	"	"	P36
2	"	"	P37
1	"	"	P38
1	"	"	P39
2	"	"	P44
1	"	"	14
1	"	"	16B

2	of	No.	22
2	"	"	23A
1	"	"	40P
1	"	"	58A
1	"	"	58C
1	"	"	59
1	"	"	510
8	"	"	512
57	"	"	537A
56	"	"	537B
1	"	"	540
2	"	"	548
1	"	"	611C

Model No. 6 Training Biplane



Parts required :

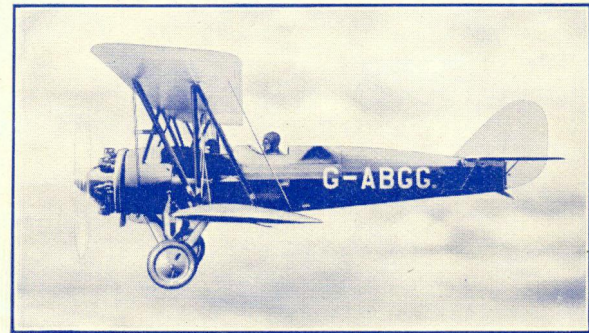
2 of No. P1
2 " " P2
1 " " P8
1 " " P10
1 " " P11
1 " " P13
1 " " P15
2 " " P16
2 " " P17
2 " " P18
1 " " P19
1 " " P20

2 of No. P24
2 " " P25
4 " " P29
1 " " P32
1 " " P34
2 " " P36
2 " " P37
1 " " P38
1 " " P39
2 " " P44
1 " " 14P
1 " " 16B

2 of No. 22
2 " " 23A
1 " " 58A
1 " " 58C
1 " " 59
1 " " 510
8 " " 512
55 " " 537A
54 " " 537B
1 " " 540
2 " " 548
1 " " 611C

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, while its landing speed should 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, and it is still one of the best aircraft for its particular purpose. A more modern training machine is the Avro "Trainer," and another typical school aeroplane is the Hawker "Tomtit."



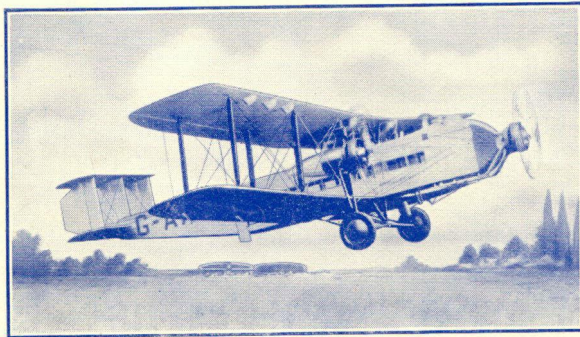
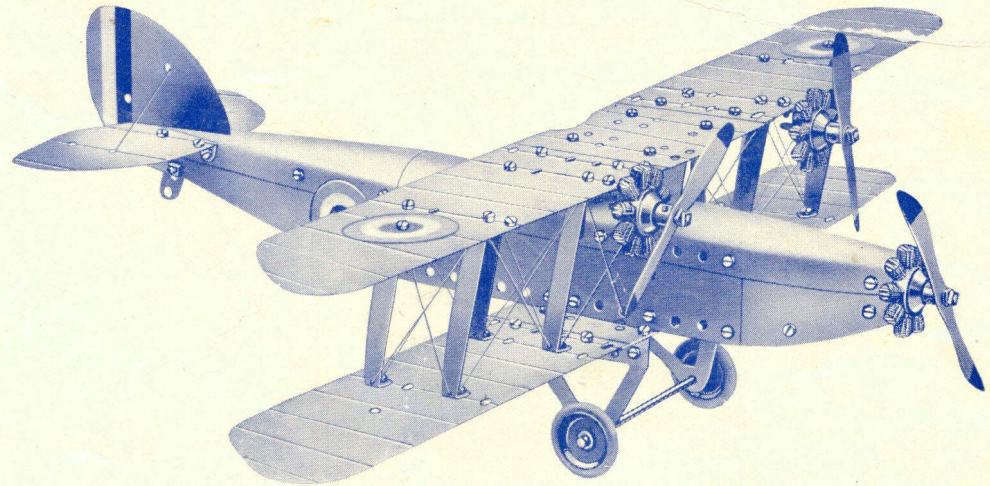
A pupil undergoing instruction in the Avro 626, the most up-to-date training machine produced by the famous firm of A. V. Roe & Co. Ltd.

Model No. 7 Triple-engined Air Liner

All the passenger-carrying machines employed on the cross-Channel services of Imperial Airways Ltd., are equipped with at least three engines. This is to ensure the safe operation of the services, for these machines can maintain flight with one engine out of commission. Thus in the event of engine failure while the machine was over the water, land could be reached without mishap.

Model No. 7 is a triple-engined biplane similar to those used by Imperial Airways Ltd. and by many other air line companies all over the world.

The only triple-engined biplane air liner constructed in Britain is the Armstrong Whitworth "Argosy," a machine that is fitted with Armstrong Siddeley "Jaguar" engines. The "Argosy" has seating accommodation for 20 passengers, a maximum speed of 110 m.p.h., and an endurance of 5½ hours at a speed of 95 m.p.h.

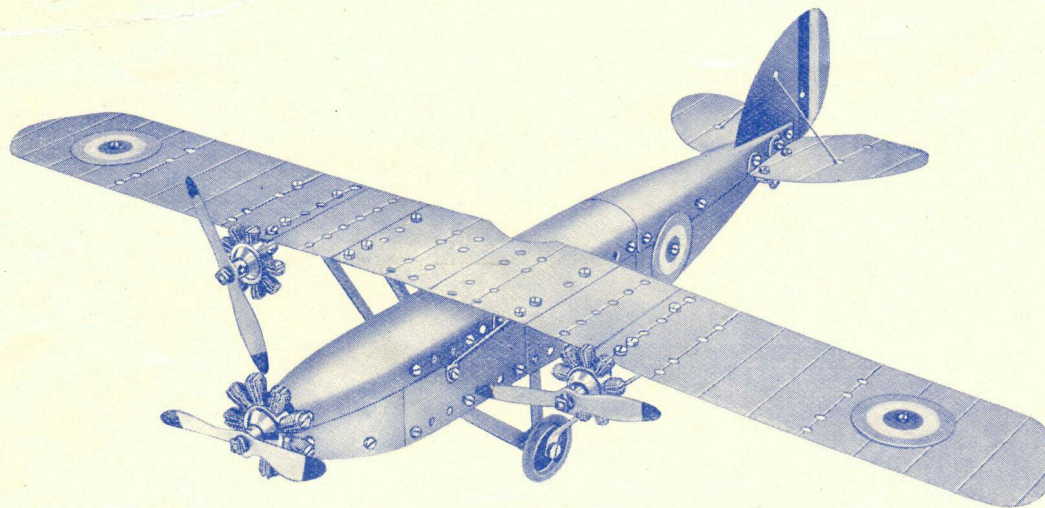


An Armstrong Whitworth "Argosy" taking off from an aerodrome. These machines are used on the "Silver Wing" cross-Channel services of Imperial Airways Ltd.

Parts required :

2 of No. P1	1 of No. P20	3 of No. P43
2 " " P2	4 " " P24	2 " " P44
1 " " P7	4 " " P25	1 " " 16B
1 " " P8	4 " " P29	2 " " 22
2 " " P10	1 " " P32	1 " " 510
1 " " P11	1 " " P34	10 " " 512
1 " " P13	2 " " P35	84 " " 537A
1 " " P14	2 " " P36	76 " " 537B
1 " " P15	2 " " P37	1 " " 540
2 " " P16	1 " " P38	2 " " 548
4 " " P17	1 " " P39	1 " " 611C
2 " " P18	1 " " P40	
1 " " P19	1 " " P41	

Model No. 8 Triple-engined Cabin Monoplane



The high wing monoplane is rapidly increasing in favour with air line companies, and it is possible that before long it will completely oust the biplane. One fact that makes it popular with passengers is that from the interior an unobstructed view of the country over which the machine is flying can be obtained.

Undoubtedly the most famous triple-engined commercial monoplane is the Fokker F.VII-3m, for machines of this type, in addition to being extensively used on the air lines of the world, are similar to the famous "*Southern Cross*" on which Air Commodore Kingsford-Smith has made so many record-breaking flights.

Model No. 8 is based on a machine of this type. Such machines are usually fitted with radial air-cooled engines, although very occasionally water-cooled engines may be employed.

Parts required :

1 of No. P1	4 of No. P17	2 of No. P44
1 " " P2	2 " " P18	2 " " 22
1 " " P7	1 " " P19	2 " " 147B
2 " " P8	1 " " P20	1 " " 510
1 " " P10	4 " " P30	6 " " 512
1 " " P11	2 " " P31	63 " " 537A
1 " " P13	1 " " P32	60 " " 537B
1 " " P14	2 " " P36	1 " " 540
1 " " P15	2 " " P37	2 " " 548
2 " " P16	3 " " P43	1 " " 611C

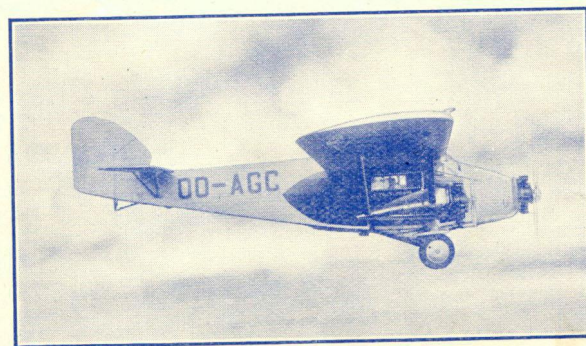
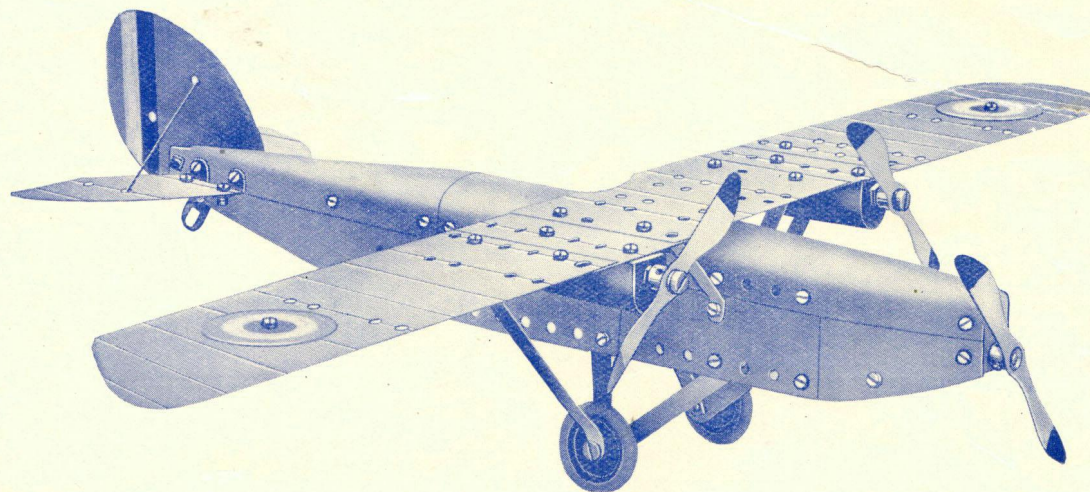


This machine, a Fokker F.VII-3m. monoplane, is of the same type as Air Commodore Kingsford-Smith's famous "*Southern Cross*."

Model No. 9 Triple-engined Cabin Monoplane

Model No. 9 shows a machine in which the air-cooled engines have been replaced by three of the water-cooled type. An example of this is the Bordelaise D.B.70, which can be fitted with either three 700 h.p. Lorraine "Orion" air-cooled engines, or three 600 h.p. Hispano-Suiza water-cooled engines. This machine is of special design, being fitted with twin fuselages.

Several types of triple-engined monoplanes are constructed in this country. These include the Avro "Five," "Six," and "Ten," which are based on the Fokker F.VII—3m; the Vickers "Viastra" and the Westland "Wessex."



A triple-engined monoplane, the Westland "Wessex." This machine has been constructed for "Sabena," the Dutch air line company.

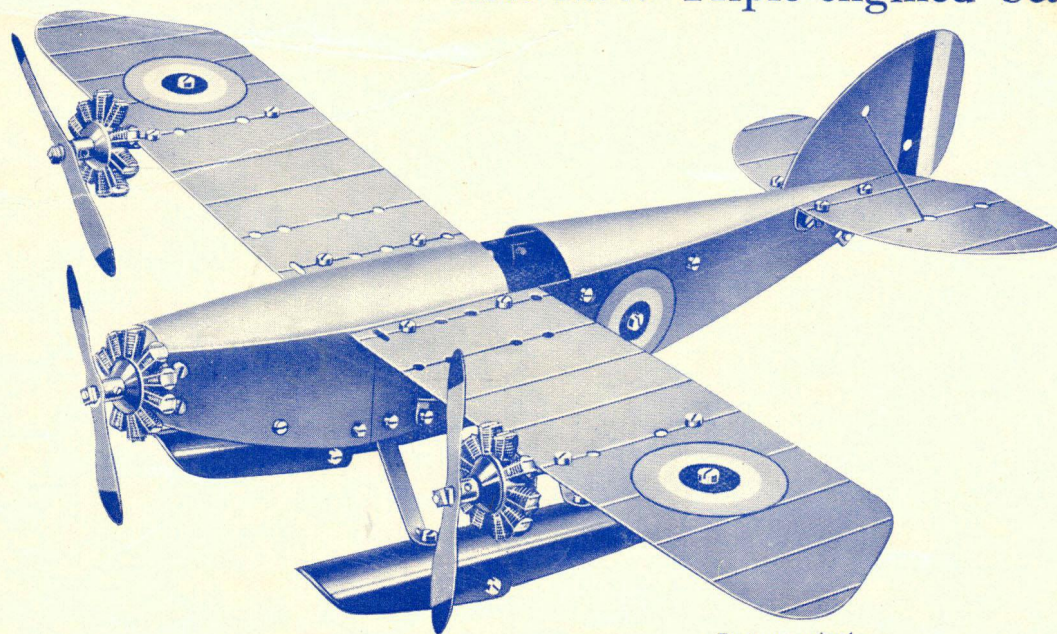
Parts required :

1 of No. P1
1 " " P2
1 " " P7
2 " " P8
1 " " P10
1 " " P11
1 " " P13
1 " " P14
1 " " P15
2 " " P16
4 " " P17
2 " " P18

1 of No. P19
1 " " P20
4 " " P30
2 " " P31
1 " " P32
2 " " P36
2 " " P37
1 " " P40
1 " " P41
2 " " P44
1 " " 14

2 of No. 22
1 " " 59
2 " " 147B
1 " " 510
4 " " 512
67 " " 537A
64 " " 537B
1 " " 540
2 " " 548
2 " " 611'
1 " " 611C

Model No. 10 Triple-engined Seaplane

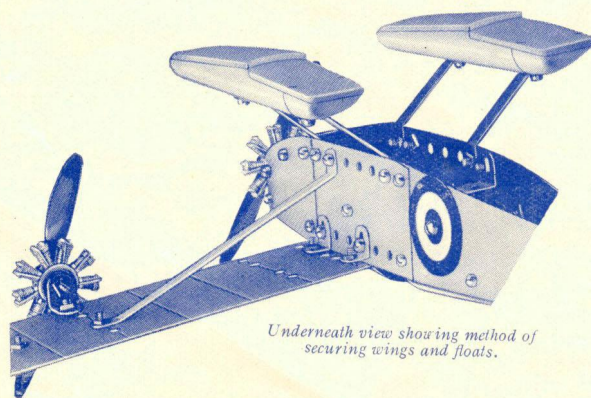


All aircraft of the multi-engined type are naturally safer to fly than single-engined machines, for if one of the engines should fail the machine can still carry on, and it is not necessary for a forced descent to be made. Seaplanes and flying boats that are passing over water can usually alight safely on the surface, except during stormy weather, but there is always the danger that if the machine is not found very quickly a storm may spring up that it is unable to survive. For this reason forced descents are to be avoided if possible, and a triple-engined machine is therefore the safest type for marine work.

A seaplane of the multi-engined type is shown in Model No. 10, which is modelled on the Short "Valetta," the world's largest seaplane. It was in a "Valetta" that Sir Alan Cobham made his latest survey flight in Africa.

Parts required :

1 of No. P1	2 of No. P37
1 " " P2	1 " " P38
1 " " P7	1 " " P39
1 " " P8	3 " " P43
1 " " P10	1 " " 14
1 " " P11	1 " " 16B
1 " " P13	2 " " 22
1 " " P15	2 " " 23A
2 " " P16	1 " " 58A
2 " " P17	1 " " 58C
2 " " P18	1 " " 59
1 " " P19	1 " " 510
1 " " P20	10 " " 512
4 " " P29	45 " " 537A
2 " " P31	44 " " 537B
1 " " P32	1 " " 540
3 " " P34	2 " " 548
2 " " P36	1 " " 611C



Underneath view showing method of securing wings and floats.

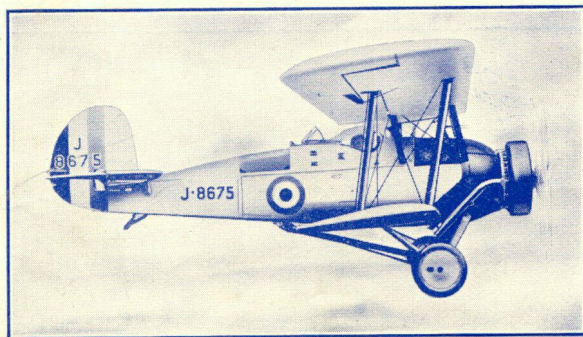
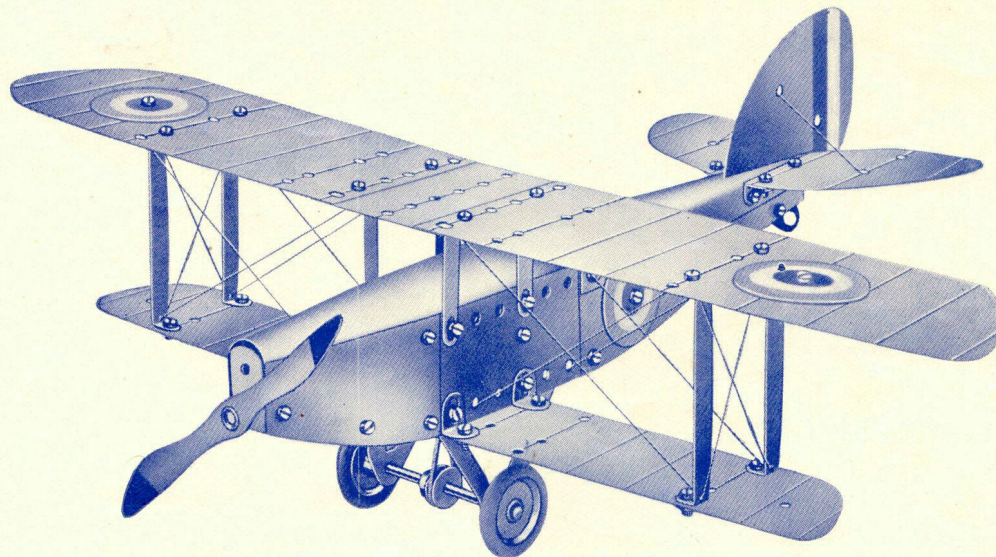


*The world's largest seaplane, the Short "Valetta," taxi-ing.
The small wake left by the machine should be noted.*

Model No. 11 Unequal-Chord Sesquiplane

A sesquiplane is, literally, a machine with one-and-a-half wings. In general practice, however, the term is applied to all biplanes in which one plane is shorter than the other. This method of construction is particularly favoured for fighting machines, and for other aeroplanes where a good "speed range" is required. This means that the machine must have a fairly high maximum speed, together with a low stalling point.

A machine of this kind has been taken as the prototype for Model No. 11. The most famous British unequal-chord sesquiplane is the Handley-Page "Gugnunc," the machine that took part in the last Guggenheim Safety Contest in America. Other typical examples are the Armstrong Whitworth "Atlas" Army co-operation machine and the Bristol "Bulldog" single-seater fighter.



Armstrong Whitworth "Atlas" machines similar to the one illustrated are extensively used in the R.A.F. for Army co-operation purposes.

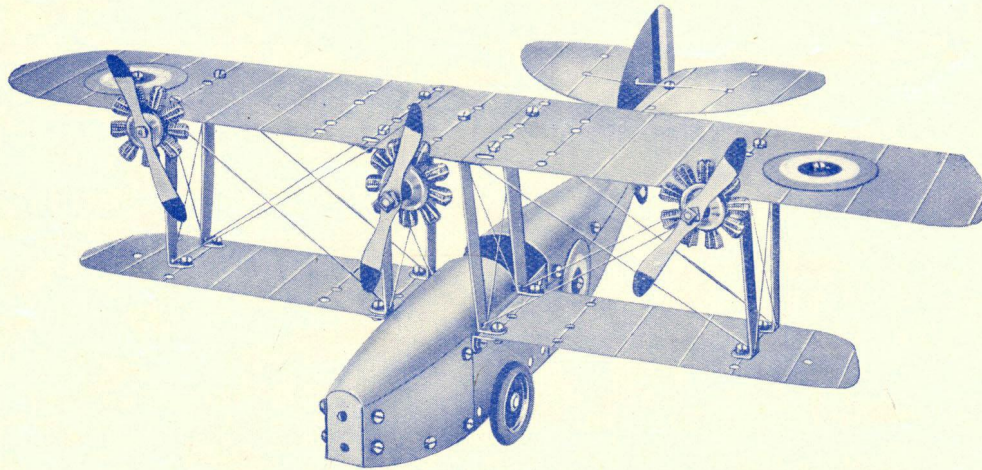
Parts required :

1 of No. P1
1 " " P2
1 " " P3
1 " " P4
1 " " P8
1 " " P10
1 " " P11
1 " " P13
1 " " P15
2 " " P16
2 " " P17
2 " " P18
1 " " P19

1 of No. P20
4 " " P28
4 " " P29
1 " " P32
1 " " P34
2 " " P36
2 " " P37
1 " " P38
1 " " P39
2 " " P44
1 " " 14
1 " " 16B
2 " " 22

2 of No. 23A
1 " " 58A
1 " " 58C
1 " " 59
1 " " 510
8 " " 512
51 " " 537A
50 " " 537B
1 " " 540
2 " " 548
1 " " 611C

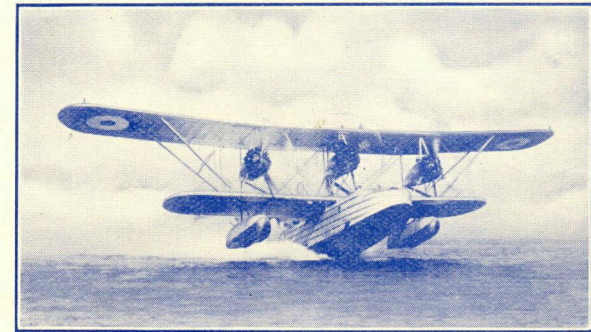
Model No. 12 Triple-engined Flying Boat



The triple-engined type is probably the most popular flying boat constructed in this country. The use of three engines makes it possible for a heavy load to be carried and also adds greatly to the security of the machine, for even if one engine gives out, the other two are sufficient to maintain the machine in flight.

Model No. 12 shows a triple-engined flying boat fitted with beaching wheels. An early British machine similar to this model was the Saunders "Valkyrie," while modern types are the Blackburn "Iris" and the Supermarine "Southampton Mark X." The "Iris" is fitted with three Rolls-Royce "Condor" water-cooled engines, while the "Southampton Mark X" employs Armstrong Siddeley "Panthers." An unusual feature of this machine is that the hull is flanked with stainless steel up to the chine or water line.

Parts required :		
2 of No. P1	1 of No. P19	2 of No. P44
2 " " P2	1 " " P20	1 " " 16B
1 " " P7	2 " " P26	2 " " 22
1 " " P10	2 " " P27	1 " " 510
1 " " P11	4 " " P28	8 " " 512
1 " " P13	1 " " P32	55 " " 537A
1 " " P15	2 " " P35	54 " " 537B
2 " " P16	2 " " P36	1 " " 540
2 " " P17	2 " " P37	2 " " 548
2 " " P18	3 " " P43	

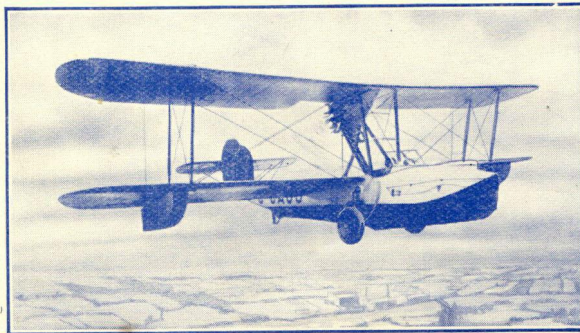
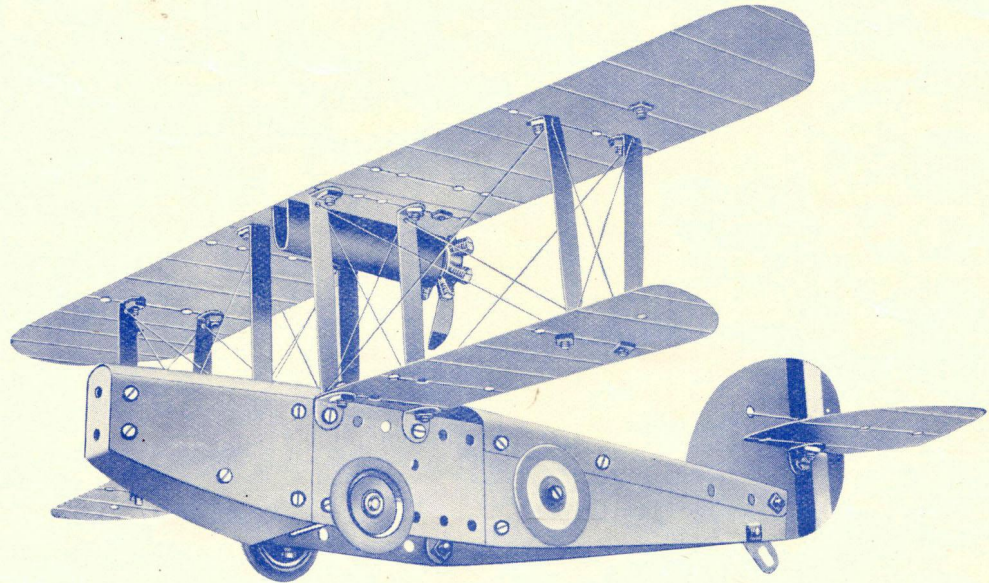


Taking off in the Supermarine "Southampton Mark X," a flying boat fitted with Armstrong Siddeley "Panther" engines.

Model No. 13 Single-engined Biplane Amphibian

Single-engined biplane flying boats and amphibians are constructed in Canada, America, France and Italy, although in this country there is not a great deal of attention paid to them, British designers having more faith in marine aircraft of the multi-engined type. A single-engined amphibian was produced in this country as early as 1912, however, and since then many similar machines have been constructed. The Supermarine "Seagull," "Sea Eagle," and "Scarab," and the Canadian Vickers "Vedette" are all of this type. The Schneider Trophy was won in a single-engined Supermarine "Sea Lion" flying boat in 1922.

The majority of single-engined flying boats employ pusher airscrews and are usually constructed so that they are easily adapted for use either as flying boats or amphibians. They can be obtained with either air-cooled or water-cooled engines and Model No. 13 shows a single-engined flying boat fitted with an air cooled engine and a pusher airscrew.

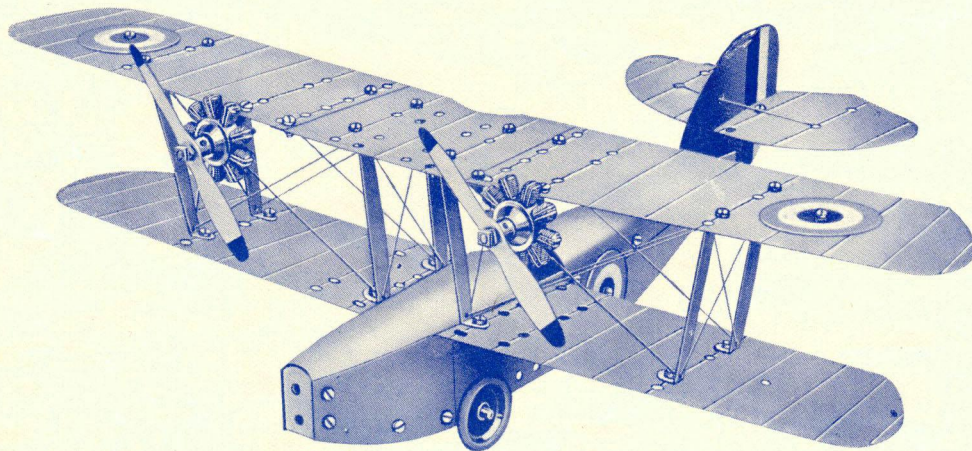


Machines similar to the Canadian Vickers "Vedette," shown above, can be put down on either land or water.

Parts required :

1 of No. P1	2 of No. P17	1 of No. P41
1 " " P2	2 " " P18	1 " " P43
1 " " P3	1 " " P19	2 " " P44
1 " " P4	1 " " P20	1 " " 16B
1 " " P8	8 " " P28	2 " " 22
1 " " P10	1 " " P32	1 " " 510
1 " " P11	1 " " P35	7 " " 512
1 " " P13	2 " " P36	54 " " 537A
1 " " P15	2 " " P37	54 " " 537B
2 " " P16	1 " " P40	1 " " 540
		2 " " 548

Model No. 14 Twin-engined Amphibian

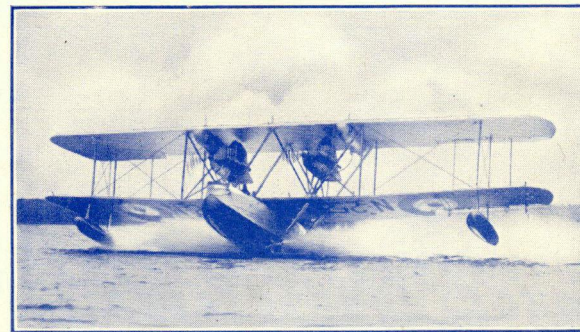


Parts required :

1 of No. P1	2 of No. P18	2 of No. P44
1 " " P2	1 " " P19	2 " " 22
1 " " P3	1 " " P20	1 " " 510
1 " " P4	8 " " P28	8 " " 512
1 " " P8	1 " " P32	52 " " 537A
1 " " P10	2 " " P35	41 " " 537B
1 " " P11	2 " " P36	1 " " 540
1 " " P13	2 " " P37	2 " " 548
1 " " P15	1 " " P40	1 " " 611
2 " " P16	1 " " P41	
2 " " P17	2 " " P43	

An amphibian flying boat is a machine capable of taking off from, or alighting on, either land or water. The landing gear for use when alighting on an aerodrome is in actual practice so arranged that it can be raised or lowered while the aeroplane is in flight. This type of machine is of particular value for operation over country such as that experienced in Canada, where often no safe landing ground can be found on which to make a forced descent, but where an airman will nearly always be able to find a sufficiently large stretch of water on which to alight.

In this country designers of flying boats specialise mostly on large machines, but several amphibians similar to Model No. 12 have been constructed here. Among them may be mentioned the Supermarine "Swan" commercial flying boat, and the Supermarine "Seamew" military amphibian. Of the larger twin-engined flying boats it is probable that the Supermarine "Southampton" is the most reliable type in the world.

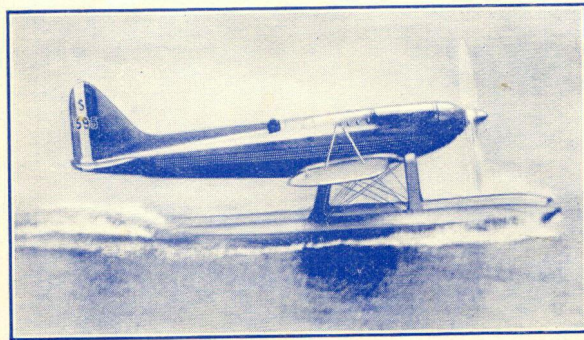
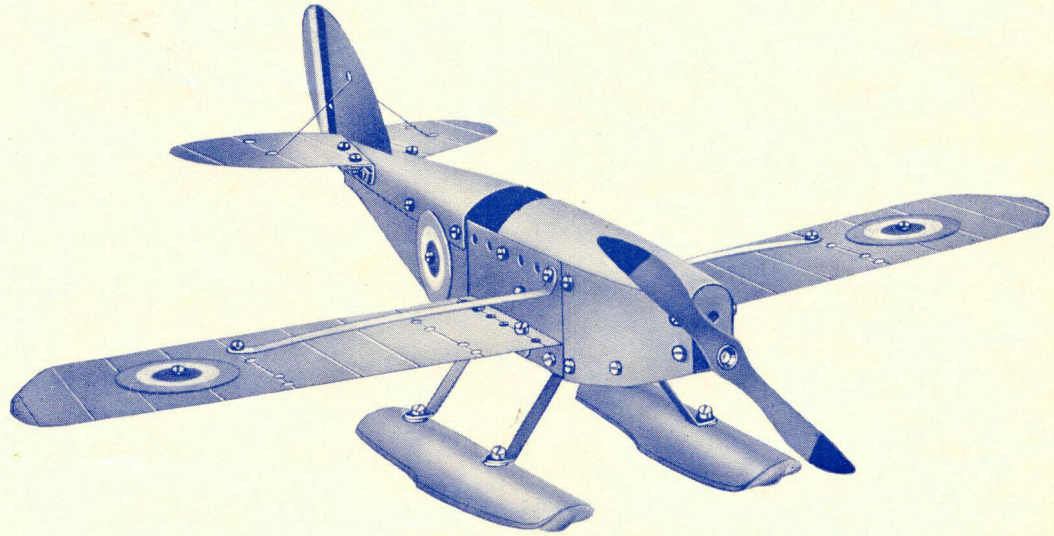


Another Supermarine flying boat. This is the "Southampton" that is extensively used by the R.A.F.

Model No. 15 Racing Seaplane

In recent years the low-wing monoplane seaplane has become the accepted type where high speeds are required, and even the Gloster Aircraft Co. Ltd., who for many years favoured the biplane construction for their Schneider Trophy machines, have at last abandoned it in favour of the monoplane. A model of the low-wing racing seaplane type of machine is shown on this page.

The Vickers Supermarine Rolls-Royce S.6B, winner of the Schneider Trophy Contest in 1931, and holder of the world's air speed record, is of this type. The high-speed machines of other countries also are usually of the monoplane seaplane type, and a particularly interesting one is the Italian Macchi M-67. This machine, which is fitted with an Isotta-Fraschini engine, was produced for the Schneider Trophy Contest in 1929.



Taxi-ing before taking off in the Vickers Supermarine Rolls-Royce S.6B, on which a new record for the Schneider Trophy Contest was set up this year.

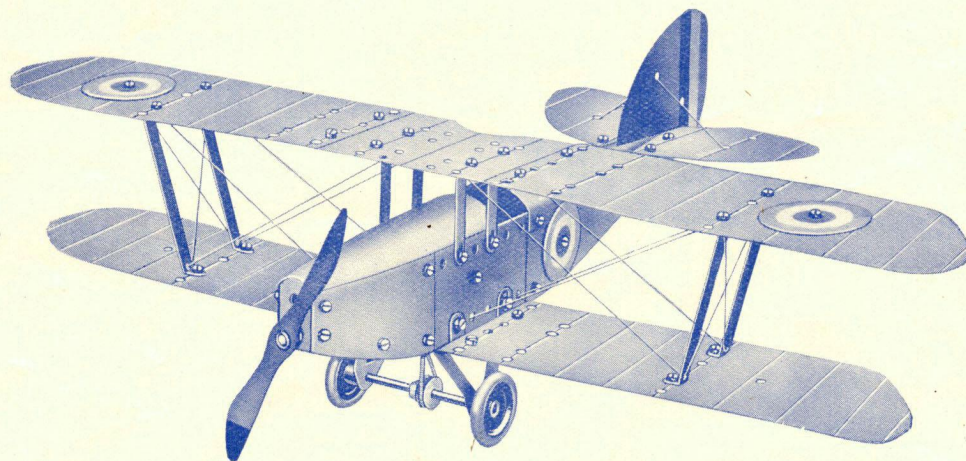
Parts required :

1 of No. P1
1 " " P2
1 " " P10
1 " " P11
1 " " P13
1 " " P15
2 " " P16
2 " " P17
2 " " P18

1 of No. P19
1 " " P20
4 " " P30
2 " " P31
1 " " P32
1 " " P34
2 " " P36
2 " " P37
2 " " P42

1 of No. 14
1 " " 59
1 " " 510
8 " " 512
41 " " 537A
44 " " 537B
1 " " 540
2 " " 548

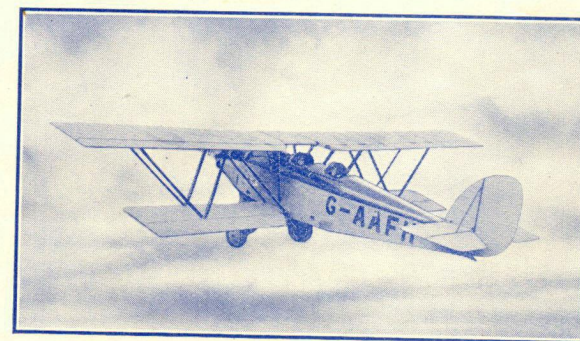
Model No. 16 Unequal Span Biplane



Biplanes of unequal span, or sesquiplanes, vary considerably in individual design, although the principle on which they are constructed is the same in all cases. Model No. 16, for instance, should be compared with Model No. 11. In the latter model the span of the lower plane is considerably less than that of the upper one, while the chord, or the width of the plane from the leading or front edge, to the trailing or rear edge, differs in the two planes.

On Model No. 16, however, the wings are nearly of equal length, while the chords of the upper and lower planes are equal. If machines of equal size similar to these models were fitted with similar engines of the same power, the one resembling Model No. 11 would have the higher maximum speed, and that similar to Model No. 16 the slower landing speed. The first one would have the better speed range.

2 of No. P1	Parts required :	2 of No. 22
2 " " P2	2 " " P26	2 " " 23A
1 " " P7	4 " " P29	1 " " 58A
1 " " P10	1 " " P32	1 " " 58C
1 " " P11	1 " " P34	1 " " 59
1 " " P13	2 " " P36	1 " " 510
1 " " P15	2 " " P37	8 " " 512
2 " " P16	1 " " P38	59 " " 537A
2 " " P17	1 " " P39	58 " " 537B
2 " " P18	2 " " P44	1 " " 540
1 " " P19	1 " " 14	2 " " 548
1 " " P20	1 " " 16B	1 " " 611C

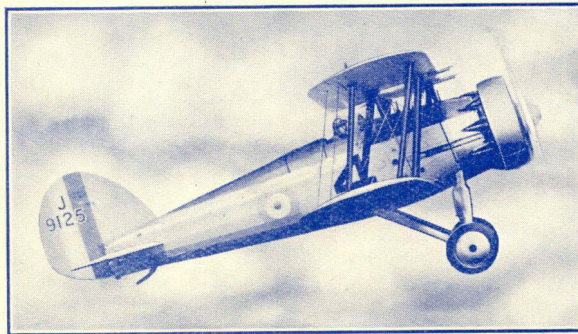
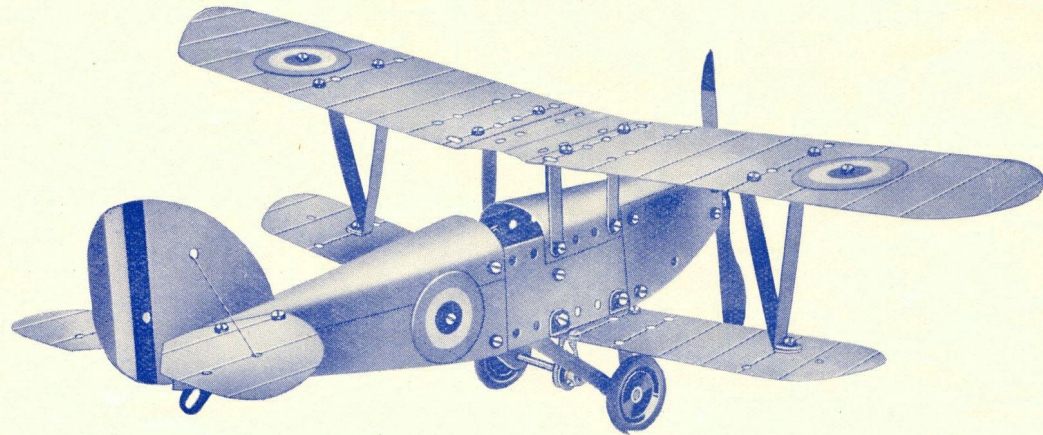


This unequal span biplane, the Parnall "Elf," is a light machine specially designed to provide the maximum safety for its occupants.

Model No. 17 Single-Seater Fighter

There are a great many types of single-seater fighting aeroplanes produced in various parts of the world. The model illustrated on this page resembles the Armstrong Whitworth "Siskin" machine, which until recently was used extensively in the Fighter Squadrons of the Air Defence of Great Britain. It has been replaced by such machines as the Bristol "Bulldog" and the Hawker "Fury" interceptor fighter.

Purely fighting machines have a greater endurance than the interceptor fighters mentioned in describing Model No. 5, for their duty is not to wait on the aerodrome until enemy machines approach, but to make regular patrols and to ensure that no enemy craft passes through their own section. Thus their powers of climb may be sacrificed to speed.



One of the world's deadliest fighting machines, the Gloster S.S.19.
It is equipped with six machine guns.

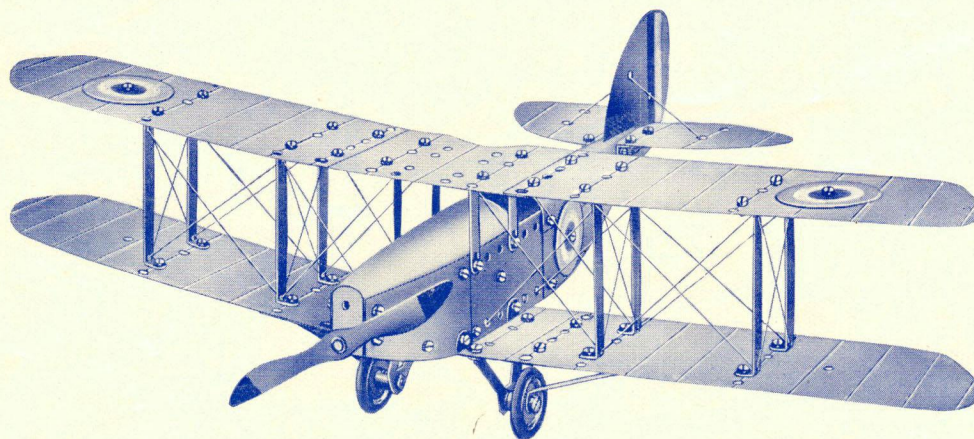
1 of No. P1
1 " " P2
1 " " P3
1 " " P4
1 " " P7
1 " " P10
1 " " P11
1 " " P13
1 " " P15
2 " " P16
2 " " P17
2 " " P18
1 " " P19

Parts required :

1 of No. P20
2 " " P24
2 " " P25
4 " " P29
1 " " P32
1 " " P34
2 " " P36
2 " " P37
1 " " P38
1 " " P39
2 " " P44
1 " " 14
1 " " 16B

2 of No. 22
2 " " 23A
1 " " 58A
1 " " 58C
1 " " 59
1 " " 510
8 " " 512
53 " " 537A
52 " " 537B
1 " " 540
2 " " 548
1 " " 611C

Model No. 18 General Purpose Military Machine

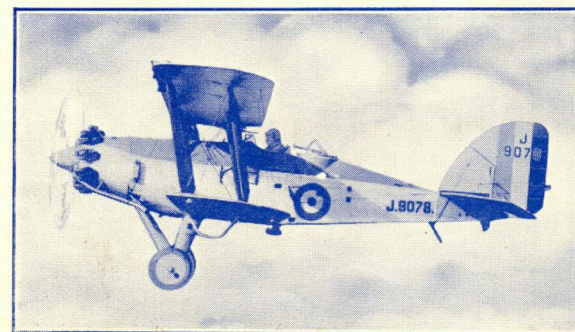


General purpose machines are, as their name implies, aeroplanes that have been specially designed to enable them to be used for various military purposes with the very minimum of alteration. Thus they can be used for bombing, Army co-operation, reconnaissance and many other purposes, while a machine designed expressly for one of these services would not be able to carry out the others as efficiently. The two most popular general purposes machines used in the R.A.F. are the Fairey III F and the Westland "Wapiti." These machines are used by various squadrons, the "Wapiti" being employed greatly by those stationed in Iraq, in which country it has seen much war service.

The model illustrated on this page depicts a general purpose machine. It will be seen that it bears a striking resemblance to the Westland "Wapiti" also illustrated.

Parts required :

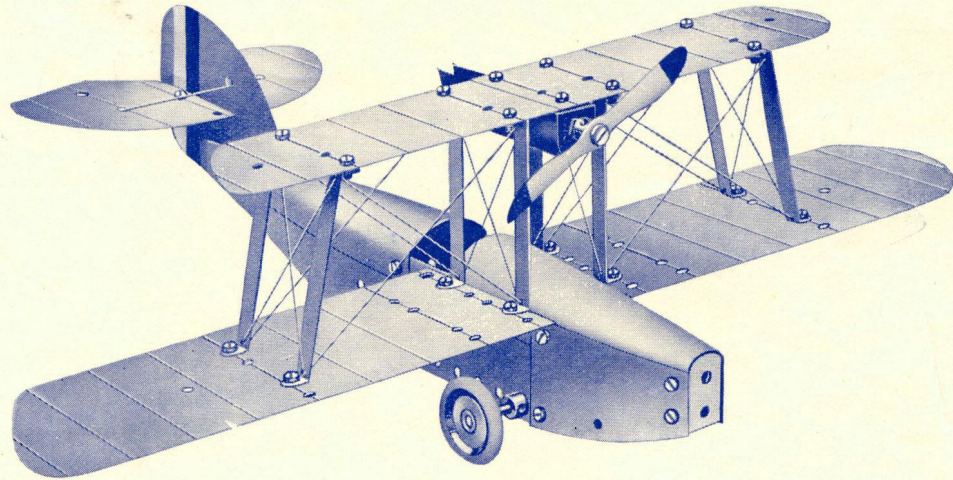
2 of No. P1	1 of No. P20	1 of No. 14
2 " " P2	8 " " P28	1 " " 16B
1 " " P7	4 " " P29	2 " " 22
1 " " P10	2 " " P31	1 " " 59
1 " " P11	1 " " P32	2 " " 147B
1 " " P13	1 " " P34	1 " " 510
1 " " P15	2 " " P36	8 " " 512
2 " " P16	2 " " P37	72 " " 537A
2 " " P17	1 " " P38	71 " " 537B
2 " " P18	1 " " P39	1 " " 540
1 " " P19	2 " " P44	2 " " 548
		1 " " 611C



A general purpose machine, the Westland "Wapiti," used by many squadrons of the R.A.F. in various parts of the world.

Model No. 19 Italian Bomber

Sesquiplanes similar to Model No. 19 are not constructed in this country nor in many others, this type being favoured most particularly by the Italian Società Italiana Caproni, although all the machines constructed by this firm are not sesqui-planes. The most unusual feature of the type depicted in our model is that the longer wing is the lower and not the upper one. The machines of this design at present constructed by the Caproni firm are all bombers, and are fitted with anything up to six engines. The six-engined bomber is known as the Caproni Ca.90P.B. This machine is the largest bombing aeroplane at present in existence, and is the possessor of six world's records. It is equipped with six 1,000 h.p. Isotta-Fraschini "Asso-1,000" engines. This huge aeroplane has a loaded weight of about 66,000 lb., but in spite of this it has a maximum speed of 127.3 m.p.h. and a stalling speed of only 55.9 m.p.h.

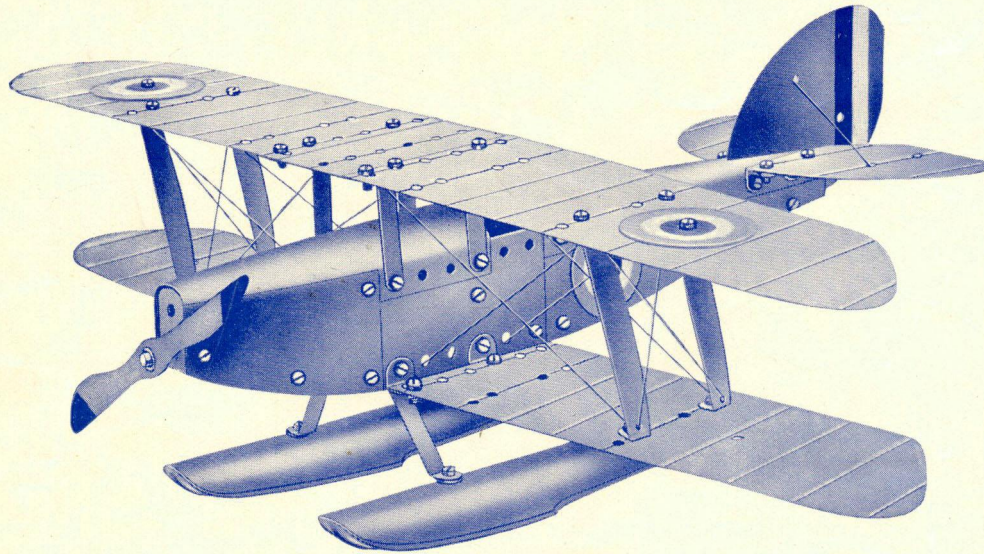


The six-engined Italian Caproni bomber, which is the world's largest bombing machine.

Parts required :

1 of No. P1	2 of No. P18	2 of No. P44
1 " " P2	1 " " P19	3 " " 16B
1 " " P3	2 " " P26	2 " " 22
1 " " P4	4 " " P28	1 " " 147B
1 " " P7	2 " " P30	1 " " 510
1 " " P10	1 " " P32	6 " " 512
1 " " P11	1 " " P35	50 " " 537A
1 " " P13	2 " " P36	49 " " 537B
1 " " P15	2 " " P37	1 " " 540
2 " " P16	1 " " P40	2 " " 548
2 " " P17	1 " " P41	1 " " 611

Model No. 20 Light Seaplane



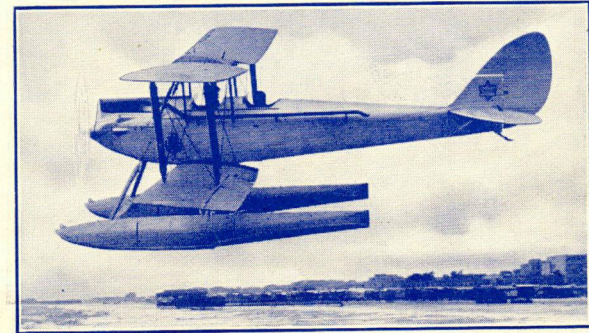
Most of the light aeroplanes constructed in England can be obtained either as landplanes or fitted with floats for operation from water. The fitting of floats to a light aeroplane appreciably reduces the maximum speed, and makes the machine more difficult to fly. The floats are made of duralumin, an aluminium alloy that is exceedingly light and also does not readily corrode.

Seaplanes are not frequently seen in this country, but in Canada they and flying boats are almost the only types of aircraft used. In the winter the seaplanes have their floats removed and skis fitted in their place. The aeroplane is then able to take off from, or alight on, stretches of ice or frozen snow with perfect safety.

Model No. 20 shows a light aeroplane such as a "Moth," a "Bluebird," or an "Avian" fitted with floats in place of the normal land undercarriage.

Parts required :

2 of No. P1	1 of No. P20	2 of No. P44
2 " " P2	2 " " P24	1 " " 14
1 " " P8	2 " " P25	1 " " 59
1 " " P10	4 " " P29	1 " " 510
1 " " P11	4 " " P30	8 " " 512
1 " " P13	1 " " P32	63 " " 537A
1 " " P15	1 " " P34	62 " " 537B
2 " " P16	2 " " P36	1 " " 540
2 " " P17	2 " " P37	2 " " 548
2 " " P18	2 " " P42	1 " " 611C
1 " " P19		



A D.H. "Gipsy Moth" seaplane nearing the surface of the water.

MECCANO AEROPLANE CONSTRUCTOR PARTS

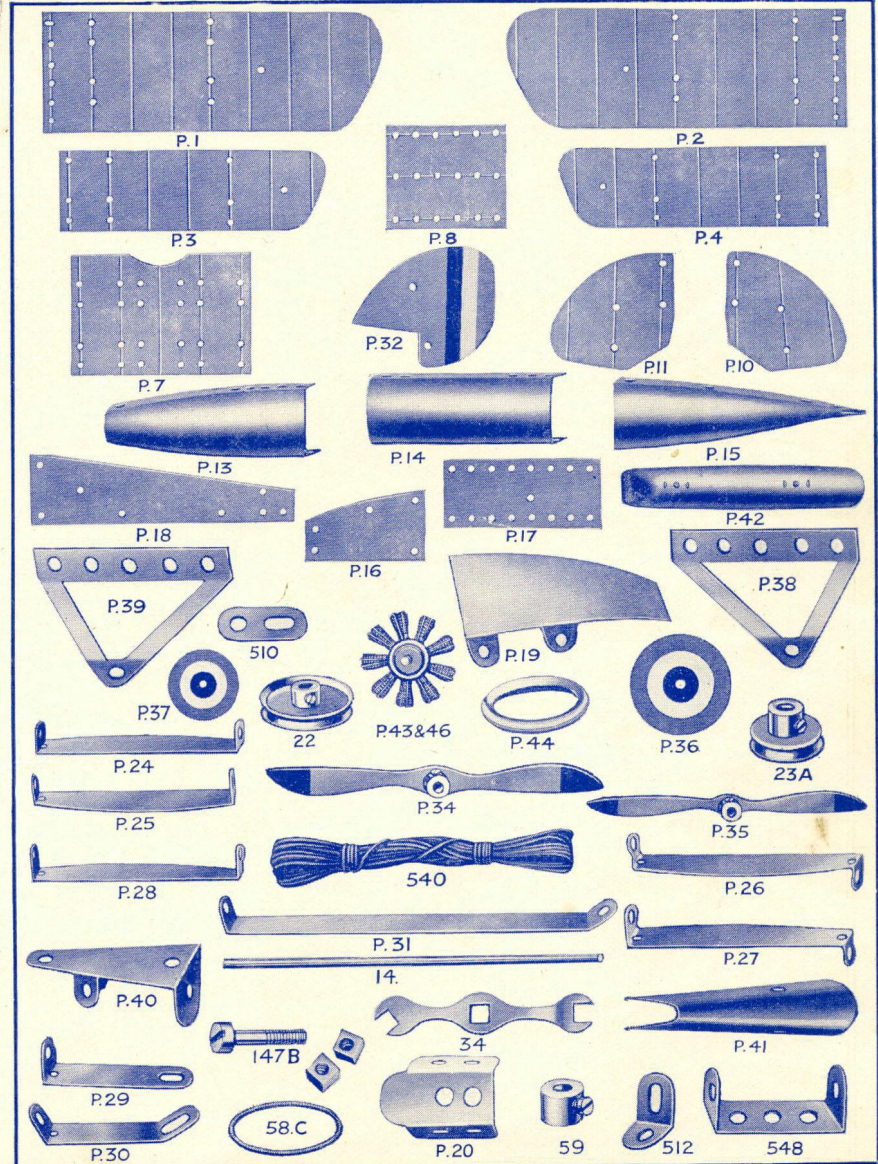
No.	Main Plane	No.	Undercarriage V Strut—L.H....
P1	Large—R.H.	P2	L.H.
P3	Small—R.H.	P4	L.H.
P7	Centre Section Plane ...	P42	Float Complete ...
P8	Extension Plane ...	P43	Radial Engine—Small ...
P10	Tail Plane—R.H. ...	P44	Rubber Tyre for Landing Wheels ...
P11	" —L.H. ...	P46	Radial Engine—Large ...
P13	Fuselage Top	14	Axle Rod— $6\frac{1}{2}$ " long ...
P14	Middle	15A	" — $4\frac{1}{2}$ " " ...
P15	Rear	16B	" — $3\frac{1}{2}$ " " ...
P16	Fuselage Side	22	Fast Pulley—1" dia. ...
P17	Middle	23A	Fast Pulley— $\frac{1}{2}$ " dia. ...
P18	Rear	34	Spanner ... 36 Screwdriver ...
P19	Fuselage Underside	58A	Spring Cord Coupling ...
P20	Front	58C	Spring Cord— $5\frac{1}{2}$ " long ...
P24	Staggered—R.H.	59	Collar ...
P25	Angled—R.H. ...	147B	Pivot Bolt with 2 Nuts ...
P26	Angled—R.H. ...	510	Flat Bracket ...
P27	Angled—L.H. ...	512	Angle Brackets— $\frac{1}{2}$ " x $\frac{1}{2}$ " ...
P28	Straight ...	537A	Nuts ... 537B Bolts $\frac{7}{32}$ " long ...
P29	Centre Section Strut—Straight ...	540	Hank of Cord ...
P30	Float & Centre Section Strut—Angled ...	548	Double Angle Strip— $1\frac{1}{2}$ " x $\frac{1}{2}$ " ...
P31	Wing Stay ...	611	Bolt $\frac{3}{8}$ " long ...
P32	Rudder ...	611C	Bolts $\frac{3}{8}$ " long ...
P33	Propeller—Large ...		
P34	Propeller—Small ...		
P35	Identification Disc—Large ...		
P36	Identification Disc—Small ...		
P37	" —Small ...		
P38	Undercarriage V Strut—R.H....		

CONTENTS OF MECCANO AEROPLANE CONSTRUCTOR OUTFIT NO. 1

No.	Main Planes—Large—R.H.	Quantity.	No.	Undercarriage V Strut —R.H.	Quantity.
P1	" —Small—L.H.	2	P38	" V " —L.H.	1
P2	" —Small—L.H.	2	P39	" V " —L.H.	1
P8	Extension Plane	1	P44	Rubber Tyre for Landing Wheels	2
P10	Tail Plane	1	14	Axle Rod— $6\frac{1}{2}$ " long	1
P11	Tail Plane—L.H.	1	16B	" — $3\frac{1}{2}$ " "	1
P13	Fuselage Top—Front ... 1	1	22	Fast Pulley, 1" dia.	2
P14	Middle ... 2	2	23A	" — $\frac{1}{2}$ " "	2
P15	Rear ... 1	1	34	Spanner ... 1	36 Screwdriver ... 1
P16	Fuselage Side—Front ... 1	1	58A	Spring Cord Coupling	1
P17	Middle ... 2	2	58C	Spring Cord $5\frac{1}{2}$ " long 1	59 Collar ... 1
P18	Rear ... 1	1	510	Flat Bracket	1
P19	Underside ... 1	1	512	Angle Brackets— $\frac{1}{2}$ " x $\frac{1}{2}$ "	8
P20	Front ... 1	1	537A	Nuts ... 60	537B Bolts, $7/32$ " Long 58
P21	Staggered—R.H.	2	540	Hank of Cord	1
P22	" —Straight	4	548	Double Angle Strips— $1\frac{1}{2}$ " x $\frac{1}{2}$ "	2
P23	" —Straight	4	611C	Bolts, $\frac{3}{8}$ " long	2
P24	Centre Section Strut—Straight	4			
P25	Wing Stay	2			
P26	Rudder	1			
P27	Propeller—Large	1			
P28	Propeller—Small	1			
P29	Identification Disc—Large	2			
P30	Identification Disc—Small	2			

CONTENTS OF MECCANO AEROPLANE CONSTRUCTOR OUTFIT NO. 2

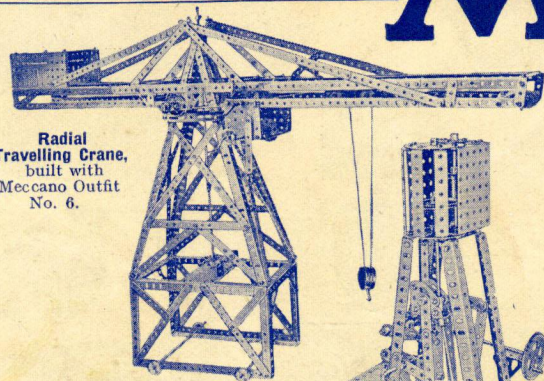
No.	Main Planes	Quantity.	No.	Undercarriage V Strut—L.H.	Quantity.
P1	Large—R.H. 2	2	P39	Base for Engine Casing	2
P2	Small—R.H. 1	1	P40	Top for Engine Casing	2
P3	Small—L.H. ... 1	1	P41	Top for Engine Casing	2
P7	Centre Section Plane ...	1	P42	Float Complete 2	2
P8	Extension Plane 2	2	P43	Radial Engine—Sm.	2
P10	Tail Plane—R.H. 1	1	P44	Rubber Tyre for Landing Wheels	2
P11	Tail Plane—L.H. ... 1	1	14	Axle Rod, $6\frac{1}{2}$ " long	1
P13	Fuselage Top	1	15A	" — $4\frac{1}{2}$ " "	1
P14	Middle 1	1	16B	" — $3\frac{1}{2}$ " "	1
P15	Rear 1	1	22	Fast Pulley, 1" dia.	2
P16	Fuselage Side	2	23A	" — $\frac{1}{2}$ " "	2
P17	Middle 4	4	34	Spanner ... 1	36 Screwdriver ... 1
P18	Rear 2	2	58A	Spring Cord Coupling	1
P19	Fuselage Underside 1	1	58C	Spring Cord, $5\frac{1}{2}$ " long	1
P20	Fuselage Front 1	1	59	Collar 1	147B Pivot Bolt with 2 Nuts 2
P21	Staggered—R.H. 4	4	510	Flat Bracket	1
P22	Angled—R.H. 2	2	512	Angle Brackets— $\frac{1}{2}$ " x $\frac{1}{2}$ "	12
P23	Angled—L.H. ... 2	2	537A	Nuts ... 100	537B Bolts, $7/32$ " long 100
P24	Straight ... 8	8	540	Hank of Cord	1
P25	Centre Section Strut—Straight	4	548	Double Angle Strips— $1\frac{1}{2}$ " x $\frac{1}{2}$ "	2
P26	Float & Centre Section Strut—Angled	8	611	Bolt $\frac{3}{8}$ " long	2
P27	Wing Stay ... 2	2	611C	Bolts, $\frac{3}{8}$ " long	2
P28	Rudder ... 1	1			
P29	Propeller—Large 1	1			
P30	Propeller—Small 3	3			
P31	Identification Disc—Large	2			
P32	Identification Disc—Small	2			
P33	" —Small	2			
P34	Undercarriage V Strut—R.H.	1			



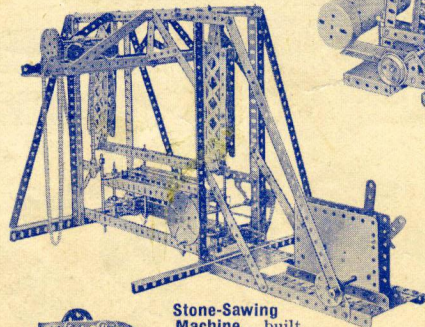
Ask your dealer for a complete price list of Meccano Aeroplane Parts.

MECCANO

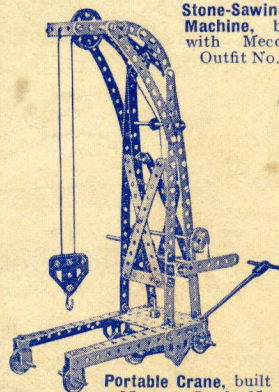
Radial Travelling Crane,
built with
Meccano Outfit
No. 6.



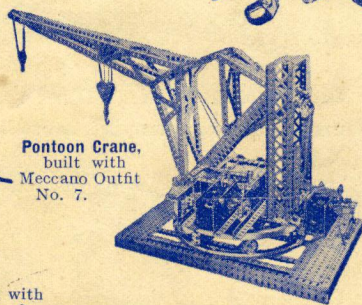
Vertical Marine Engine,
built
with Meccano
Outfit No. 5.



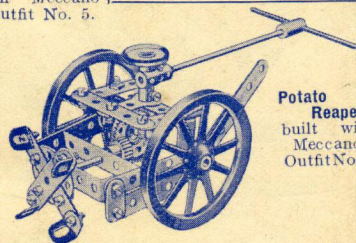
Stone-Sawing Machine,
built
with Meccano
Outfit No. 6.



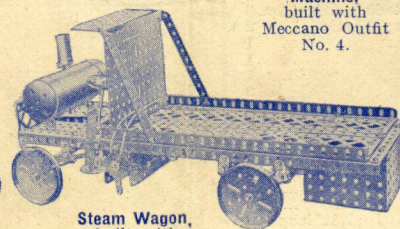
Portable Crane, built with
Meccano Outfit No. 6.



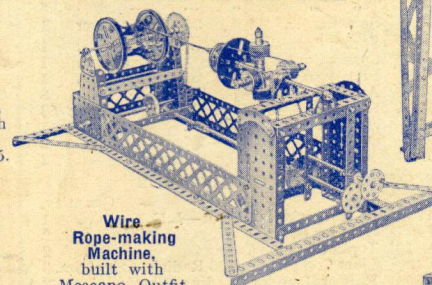
Pontoon Crane,
built with
Meccano Outfit
No. 7.



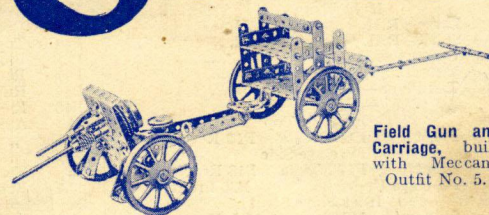
Potato Reaper,
built with
Meccano
Outfit No. 5.



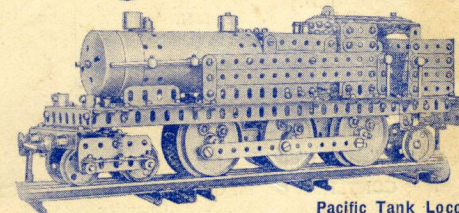
Steam Wagon,
built with
Meccano Outfit
No. 3.



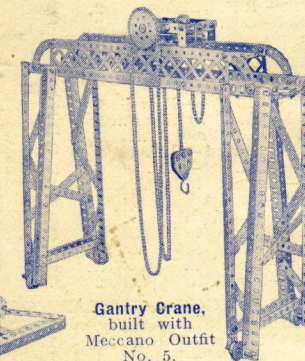
Wire Rope-making Machine,
built with
Meccano Outfit
No. 4.



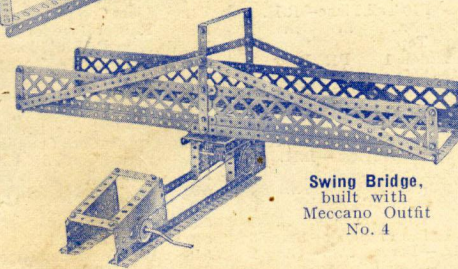
Field Gun and Carriage, built
with Meccano
Outfit No. 5.



Pacific Tank Locomotive, built with
Meccano Outfit
No. 7.



Gantry Crane,
built with
Meccano Outfit
No. 5.



Swing Bridge,
built with
Meccano Outfit
No. 4.



Grandfather Clock, built with
Meccano Outfit
No. 7.

MECCANO ENGINEERING IS THE BEST FUN IN THE WORLD!

In the same way that you are able to build accurate models of the world's aircraft with your Aeroplane Outfit, so with the famous Meccano constructional system you can build real working models of the world's most wonderful engineering structures. To-day a crane, to-morrow a steam wagon, the day after a motor chassis. A Meccano Outfit will give you endless enjoyment, hundreds of thrills; and all the time you are building and inventing models you will be learning some of the secrets of engineering.

Meccano is real engineering in miniature—all the parts are miniatures of the corresponding parts in engineering practice. They are all standardised and interchangeable and can be used over and over again to make hundreds of different working models.

The selection of Meccano models illustrated here shows the wonderful possibilities of the Meccano System. Ask your dealer for a complete illustrated price list.