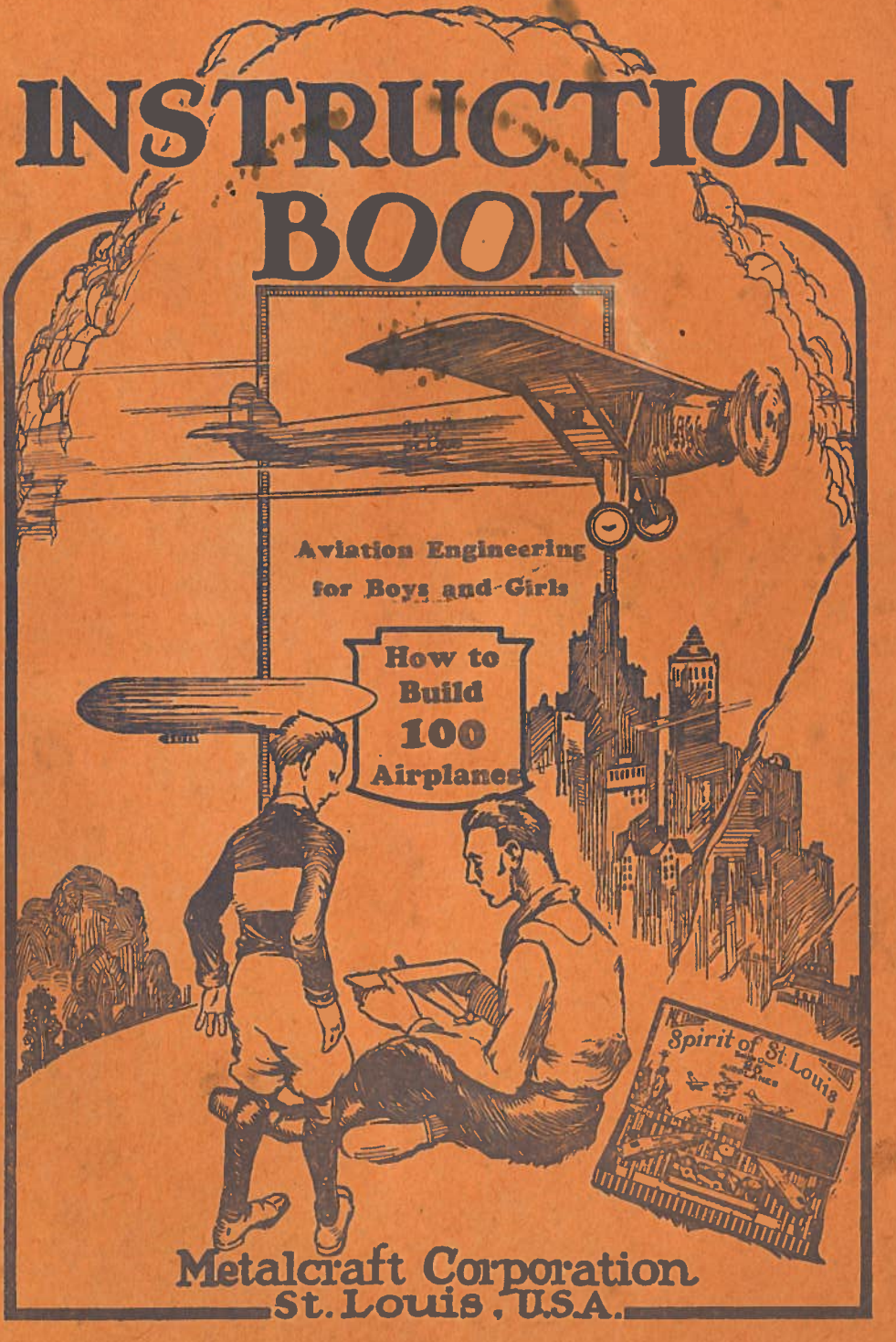


INSTRUCTION BOOK

Aviation Engineering
for Boys and Girls

How to
Build
100
Airplanes

Metalcraft Corporation
St. Louis, U.S.A.



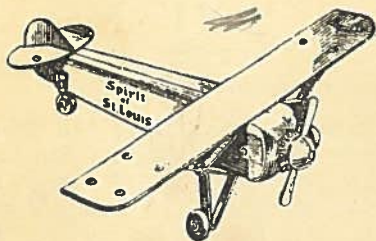
The "ACE" of Toys

The
SPIRIT
OF
ST. LOUIS
CONSTRUCTION SET

No. 820

Copyrighted by Metalcraft Corporation, 1928.

Spirit of St. Louis



Model No. 1

"SPIRIT OF ST. LOUIS"

First, take body pieces No. 17, see chart on pages 21 and 22, set right and left in position, place rudder in slot in rear. While these parts are held in place, take screw No. 21, run it through center hole in rear brace No. 18, then insert screw through rear body, being sure to match up with hole in rudder, after which add the second rear brace No. 18. Put on the nut and tighten, keeping braces in vertical position. Now add stabilizer No. 3, by placing it flat on top of fuselage, then sliding it toward rear in the slot between rudder and fuselage. Bolt together with No. 26 screws and nut, after which add screw No. 25 and wheel No. 10A to complete rear of plane.

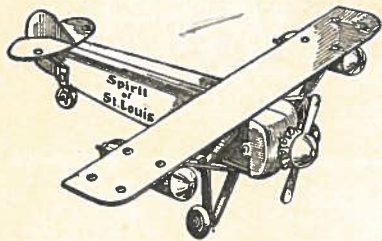
Next, take upper wing No. 13, which you will note has eight small holes (the lower wing having extra slots is not used on this model). Lay wing across top of front end of fuselage and bolt

wing braces No. 16 in place, adding small brackets No. 12 on either side, from upper part of cabin to center hole in each side, bolting to cabin first as other end of bracket attaches landing gear No. 11. By matching up the holes in the landing gear with those on lower end of bracket and the center of either side of front wing brace, you are ready to add the wheels which is done by placing wheel on bolt No. 25, then a nut next to wheel, then insert bolt through hole in landing gear, fastening with a second nut, then tighten. This permits the wheel to revolve freely.

Now you are ready for the engine, etc.

Take engine frame No. 6, insert a screw, No. 8, in each of the nine openings (the heads of screws to be on inside of frame); after all the screws are in place insert cup or thimble No. 9, (open side first) to keep them in place. Now that the engine is ready, take nose part No. 4 run screw No. 23 through tip of nose all the way, then slip bushing No. 7 over screw into nose, after which propeller No. 1 is slipped over bushing; then slip the engine (smooth side front) over the screw and bolt on front of cabin No. 5. Bolt cabin to front of plane, with screw No. 22.

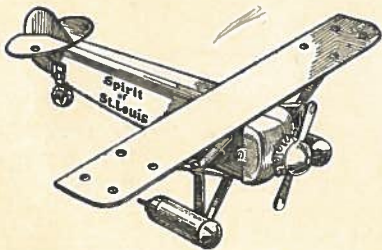
You now have a plane such as used by Lindy on his flight to Paris.



Model No. 2

"MONOPLANE with two auxiliary gas tanks"

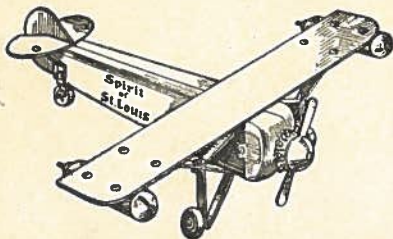
Add No. 19 Hoods to bottom of wing as shown above, then place Nose No. 4 on each end of hood, attaching with long bolts.



Model No. 3

"SEAPLANE"

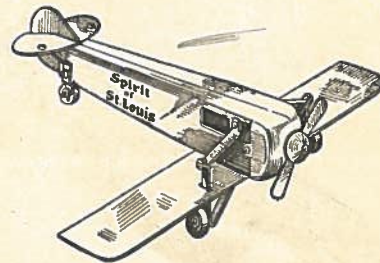
Remove wheels and attach the tanks instead of the wheels to make the seaplane.



Model No. 4

"BOMBING PLANE"

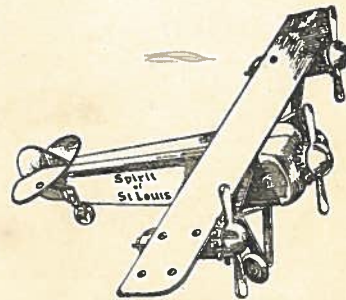
Attach tanks to bottom side of wing in outside holes.



Model No. 5

"BREMEN" MONOPLANE

Remove upper wing and wing braces No. 16, slipping landing gear No. 11 through slots in lower wing No. 14 and bolting ends of landing gear to brackets No. 12. Also remove motor from front of cabin, leaving only the nose No. 4, bushing No. 7 and propeller.

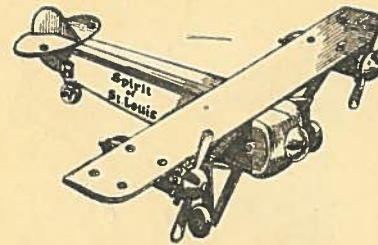


Model No. 6

"THE AMERICA"

Tri-motor Fokker — the ship Lieutenant Commander Byrd flew across the Atlantic in.

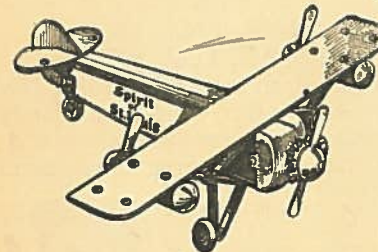
Add the two engines, which are assembled the same as the main engine, using nose, bushing, propeller and motor, after which motor hood No. 19 is bolted under upper wing, using same screws and nuts that are now in place at ends of wing braces. Now slip end of screw on which engine is assembled, through the hood and add a nose No. 4 on rear.



Model No. 7

"FOKKER PLANE"

To make a two-motor monoplane, remove front of cabin. Unscrew, taking out engine, thimble, propeller and bushing, bolting the nose only to front of cabin and put back in place.

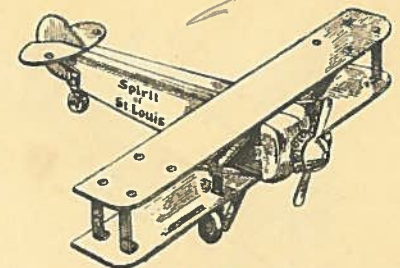


"DE PINEDO'S AROUND THE WORLD PLANE"

Model No. 8

"MONOPLANE with 1 pull and 2 push motors"

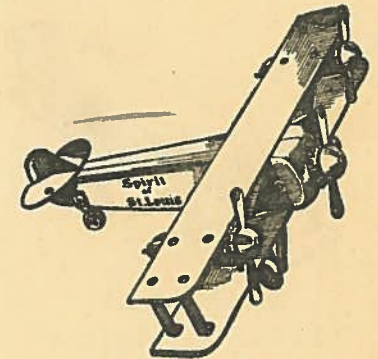
Replace engine and propeller on cabin—then reverse the side motors so propellers and motors are back of wing bushing.



Model No. 9

"WACO ONE MOTOR BI-PLANE"

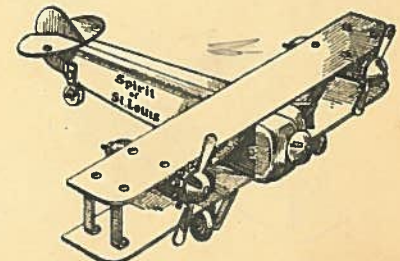
Add wing braces No. 16 and upper wing using wing ties No. 20 on each corner to fasten wings together.



Model No. 10

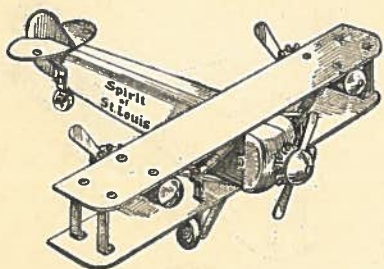
"KEYSTONE 3 MOTOR BI-PLANE"

Add two side motors.



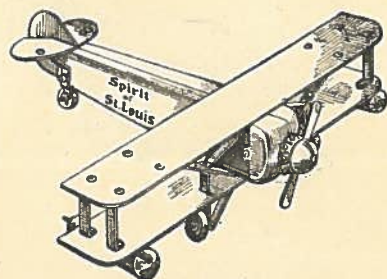
Model No. 11
"MAIL PLANE"

Remove engine and propeller from cabin replacing nose and cabin only.



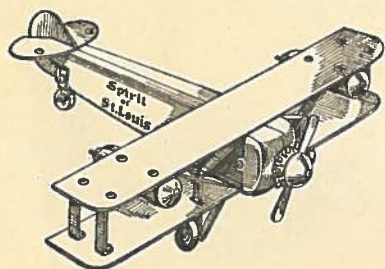
Model No. 12

Replace engine and propeller on cabin—then reverse the side motors so propellers and motors are back of wing pushing.



Model No. 15
"MARTIN BOMBER"

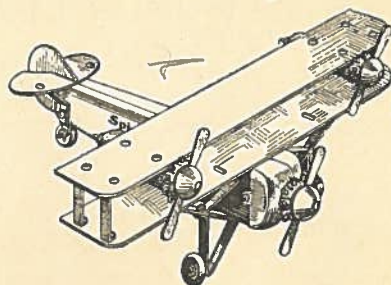
Attach the tanks to lower side of bottom wing, fastening with same bolts that hold the wing ties No. 20.



Model No. 13

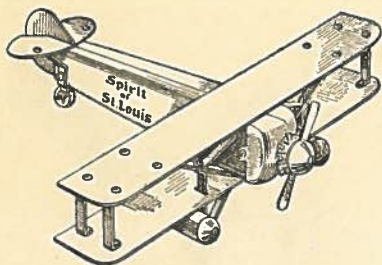
"BI-PLANE with two auxiliary gas tanks"

Remove propeller and motor from extra motors, replacing nose on back of hoods No. 19.



Model No. 16
THREE MOTOR BIPLANE

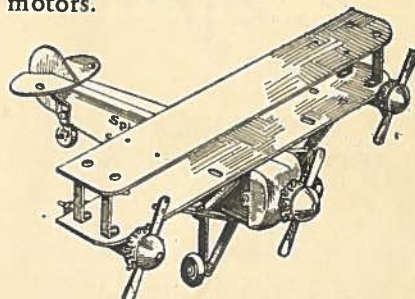
Is built the same as Model No. 1, placing lower wing immediately on top of the fuselage, then adding the upper wing and extra motors.



Model No. 14

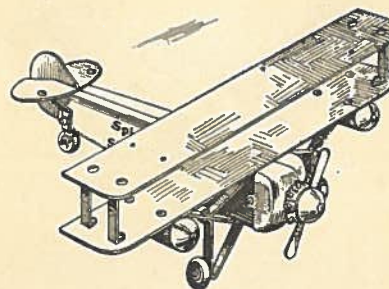
"DOUGLAS WORLD CRUISE TWO WING SEAPLANE"

Remove the wheels and attach the tanks instead of the wheels.



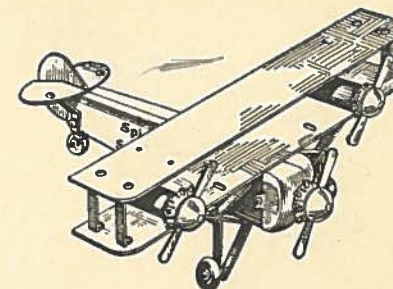
Model No. 17

Move extra motors to the bottom of lower wing, attaching them with same bolts that hold wing ties.



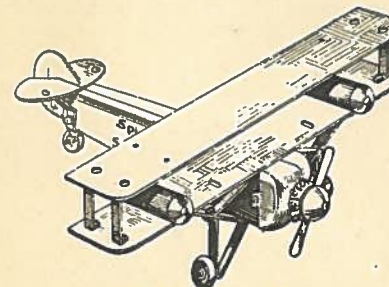
Model No. 18
PLANE WITH EXTRA GAS TANKS

Remove the propeller and engine from extra motors, moving them to the second holes where they will serve as auxiliary gas tanks.



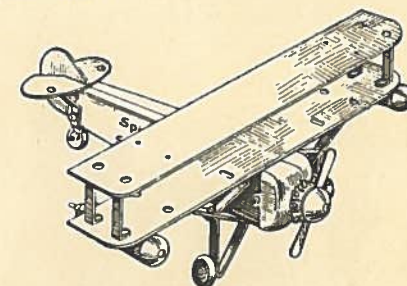
Model No. 21

The auxiliary motors should be moved into the second holes on top of the lower wing so they are pulling.



Model No. 19

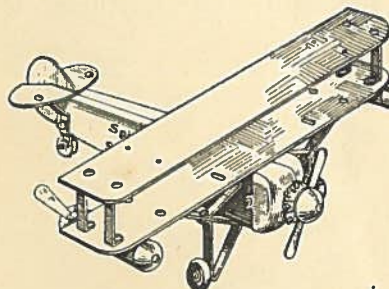
Place the tanks on top of lower wing instead of underneath.



Model No. 22

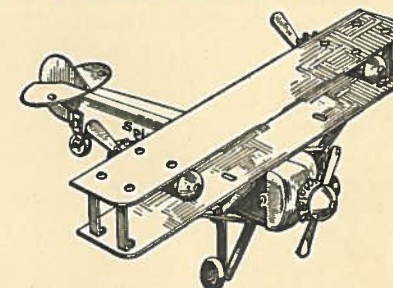
BOMBING PLANE

Attach auxiliary gas tanks on the bottom of lower wing with the same bolts that hold the wing ties, so they will serve as bombs.



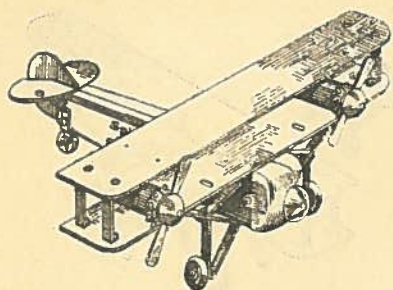
Model No. 20
1 PULL AND 2 PUSH MOTOR PLANE

Attach the two motors to the bottom of lower wing as shown in picture with the propellers behind, so that these two motors are pushing.



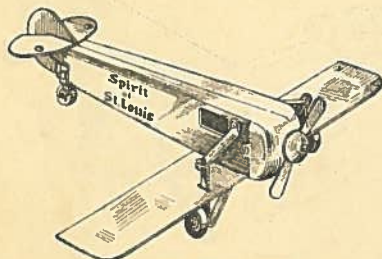
Model No. 23

The two auxiliary motors should be attached to the upper wings so that they are pushing, as shown in illustration.



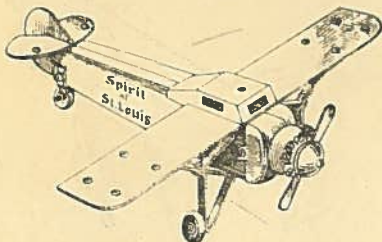
Model No. 24
SIKORSKY TWIN ENGINE
18 PASSENGER

Remove the center propeller and engine so that you have a two motor Sikorsky Plane.



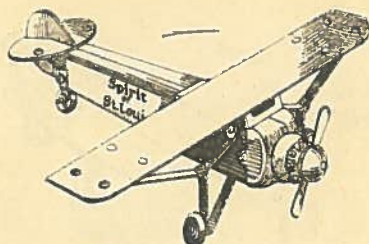
Model No. 25
"AIR PROPELLED SNOW
GLIDER"

Can be made as shown above or the lower wing can be omitted. Add pontoons to the landing gear for runners instead of wheels.



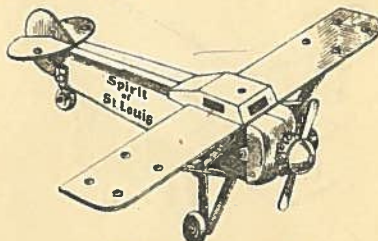
Model No. 26
"WOOLAROC"

Build same as Model No. 1, adding nose extension No. 31 to main motor, setting cabin No. 32 on top of wing.



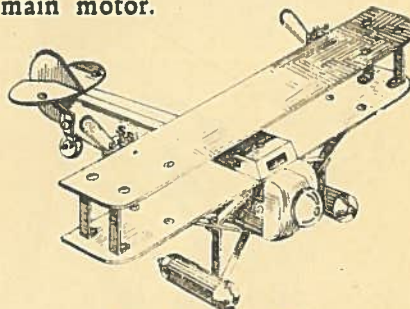
Model No. 27
Ruth Elder's
"AMERICAN GIRL"
or Stinson Monoplane

Remove No. 16 wing braces from Model No. 1. Place cabin No. 32 under wing and use No. 36 tie strap to connect No. 12 brace and landing gear to the bottom of outer holes on wing. Place No. 31 nose extension on main motor.



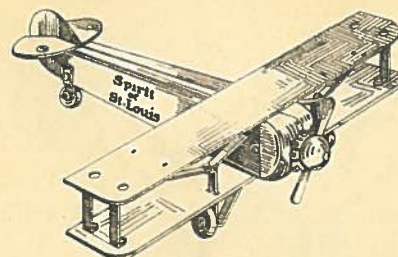
Model No. 28
"THE PRIDE OF DETROIT"

Build similar to Model No. 26, except omit nose extension on main motor.



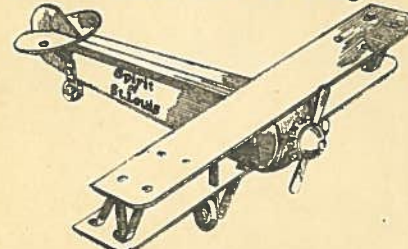
Model No. 29
"PUSH-MOTOR SEAPLANE"

Add top wing to model No. 28 putting on push motors with No. 12 braces. Push motors to be made with No. 4 noses. Remove main motor and attach pontoons.



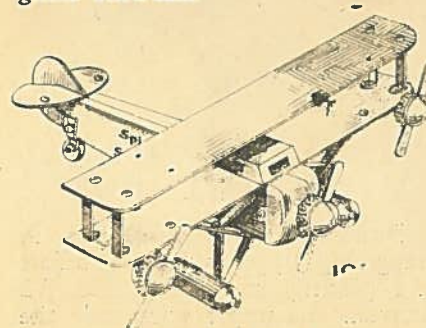
Model No. 30
"BUHL-BOEING-DOUGLAS
INTERNATIONAL"
or Capt. Giles Hess'
"BLUEBIRD"

Build same as Model No. 9, leaving off wing braces No. 16 and using instead tie strap No. 36 to connect No. 11 and 12 to extreme outer end of upper wing. Use long wing ties No. 36 to connect outer ends of wings.



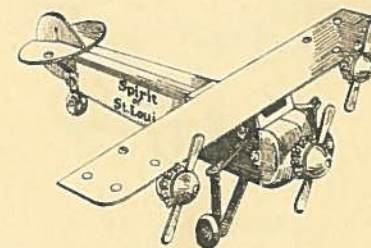
Model No. 31
"WACO", "LAIRD" or
"LINCOLN-PAGE"

Build same as Model No. 30, eliminating wing ties No. 36 and using end struts No. 34 and 35, so that the upper wing is staggered forward.



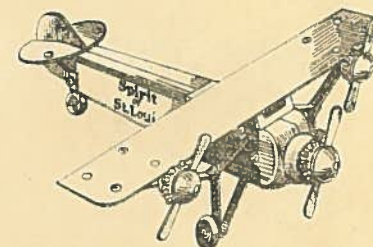
Model No. 32
Make auxiliary motors from

No. 4 noses attaching with No. 12 brace.



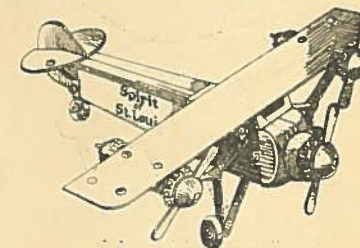
Model No. 33
"COLONIAL"

Use one wing only, bolt cabin under, use no braces except No. 12 and landing gear. Now add extra motors, omitting No. 19, attaching with No. 12 braces.



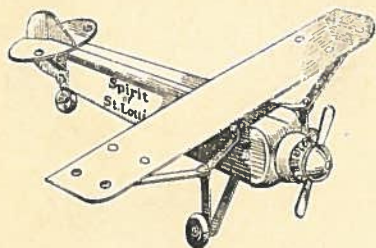
Model No. 34
"THE SOUTHERN CROSS"

Add nose extension No. 31 to Model No. 33, also straps No. 36 to outer ends of wing.



Model No. 35
"BACH"

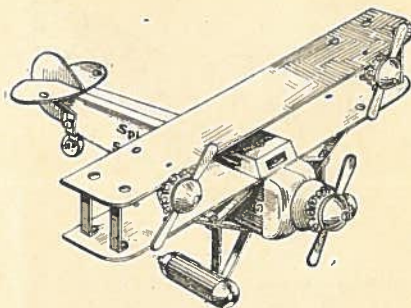
Add part No. 19 to the auxiliary engines on No. 34.



Model No. 36

Stiles' "DRAGON FLY"

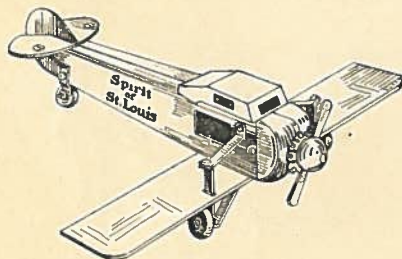
Build similar to Model No. 1, omitting No. 16 wing braces and raising the wing above the body by connecting No. 36 brace from part 11 and 12 to outer end of wing.



Model No. 39

TRI-MOTOR SEAPLANE

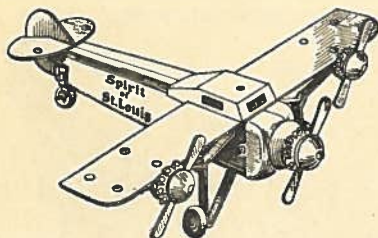
Build same as No. 32 adding cabin head extension and attaching auxiliary motors to upper wing.



Model No. 37

"MOHAWK"

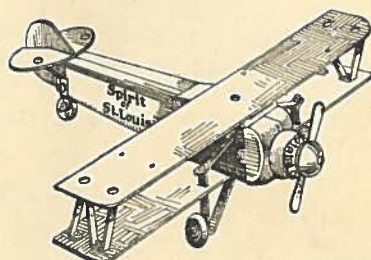
Build same as Model No. 8, adding Cabin No. 32.



Model No. 38

French "AVIMETA"

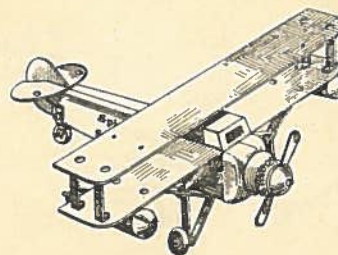
Build same as Model No. 34, adding nose extension No. 31, placing cabin No. 32 above wing.



AIR-KING '27

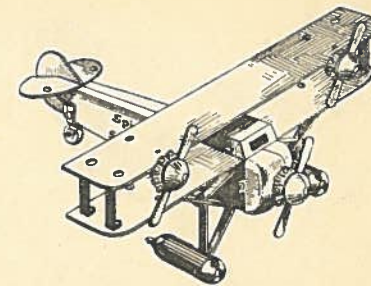
Model No. 40

Build similar to Model No. 9, staggering upper wing as before and placing extra cabin No. 32 between the upper wing and the body, as shown in above illustration. Add nose extension No. 31.



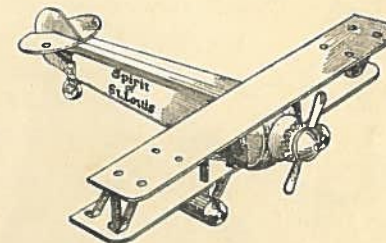
Model No. 41

This plane is built similar to the model No. 22 bombing plane, but has in addition a pilot's cabin and a cabin head extension. To add the pilot's cabin, the cabin front and motor must be taken off by removing No. 22 bolt,—the cabin can then be bolted to the body with the 1/4 inch bolts which also fasten the No. 12 brackets. Before replacing the cabin front, add the cabinhead extension No. 31.



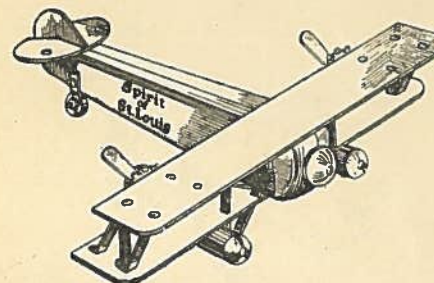
Model No. 43

This seaplane is built like Model No. 42—using the motor hoods No. 19 instead of the large No. 28 and 29 pontoons.



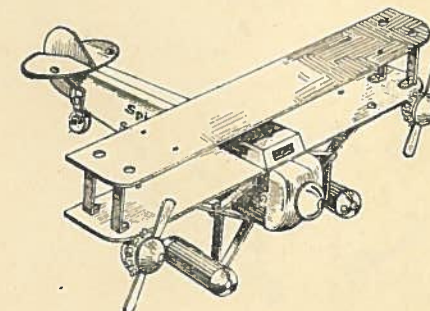
Model No. 44

This model differs from Model No. 39 in that the tanks are used as in Model No. 14 instead of the large pontoons.



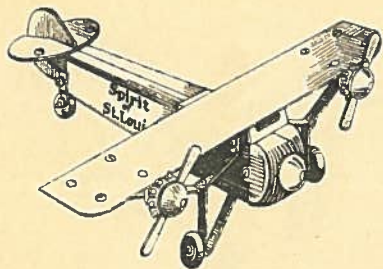
Model No. 42

Use auxiliary motors made from No. 4 Noses and attaching cabin front extension No. 31. Attach pontoons to lower wing to represent gas tanks.



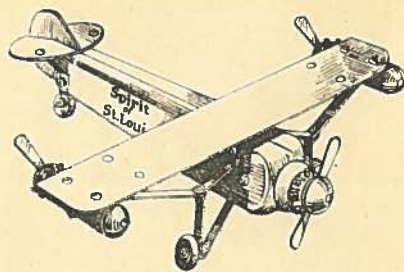
Model No. 45

Eliminate main motor and build auxiliary motors with No. 4 Noses attaching with No. 12 wing brace.



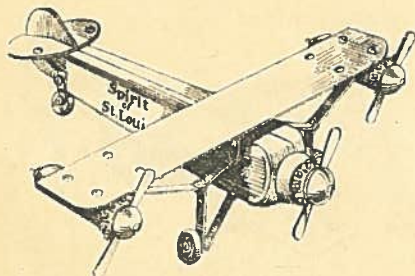
Model No. 46

Use No. 36 tie strap in attaching wings and make auxiliary motors with No. 4 Noses attaching with No. 12 brace. Omit main motor.



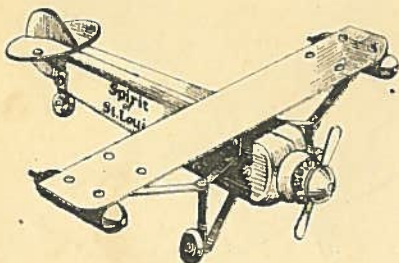
Model No. 49

Add auxiliary motors to model No. 48 placing motors so that they push instead of pull.



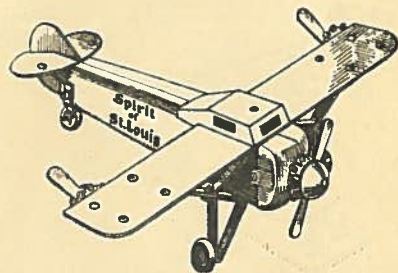
Model No. 47

Build similar to No. 46 omitting pilot's cabin. Make auxiliary motors with No. 19 hood and attach main motor using No. 31 cabin head extension.



Model No. 48

Remove auxiliary motors from model No. 47 keeping motor hoods on to represent bombs.

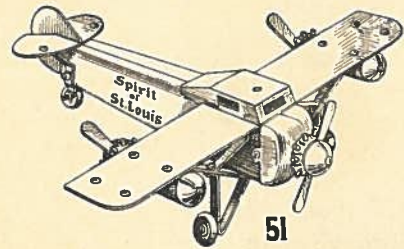


Model No. 50

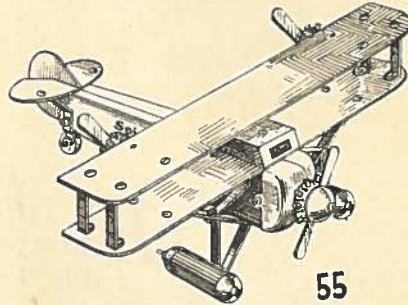
Build same as Model No. 1 attaching pilot's cabin and auxiliary motors made from Noses No. 4.

BY THIS TIME you will have had a thorough training in building various models of aeroplanes and should be able to build additional models without detailed instructions, by simply receiving the suggestions given in the illustrations, so that hereafter we are showing illustrations only, from which you can build your own models.

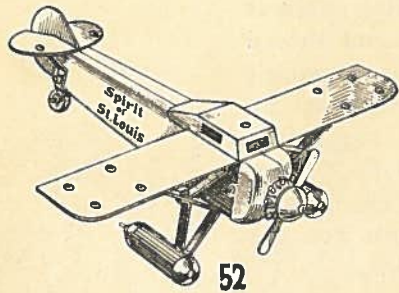
Although we are illustrating over one hundred different planes that you can build, this set of parts will build many more models. Work out the new models yourself and see how many you can build. Whenever you see a picture of a different aeroplane get your set out and you will find that you can imitate it. You can name almost any model you build from pictures of different aeroplanes.



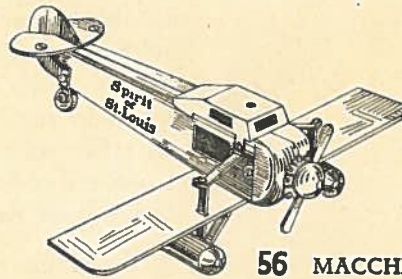
51



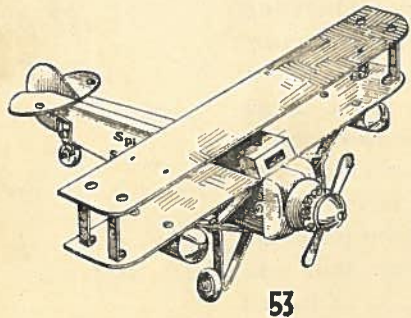
55



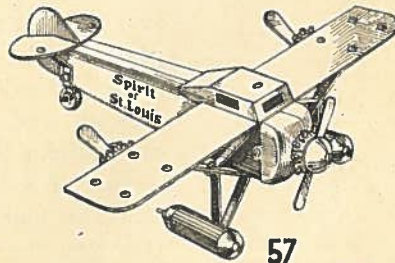
52



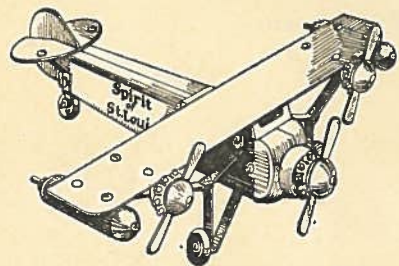
56 MACCHI



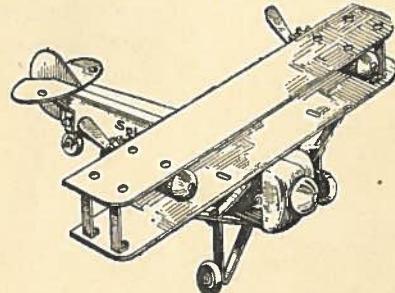
53



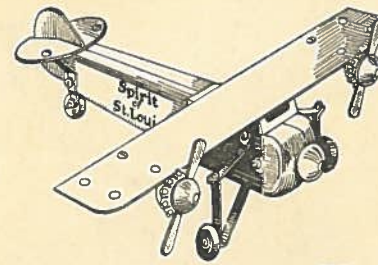
57



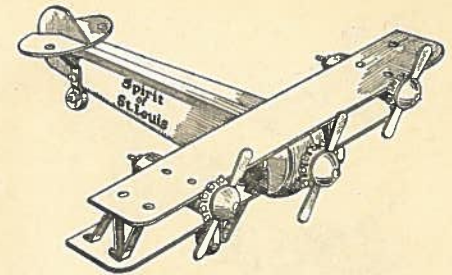
54



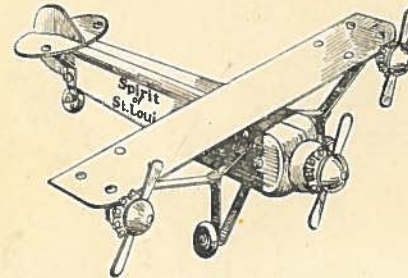
58



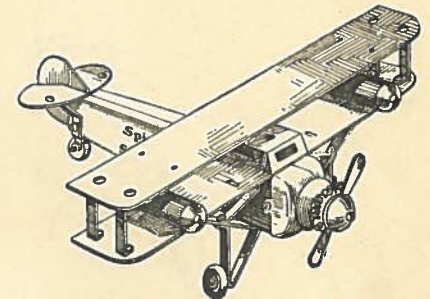
59



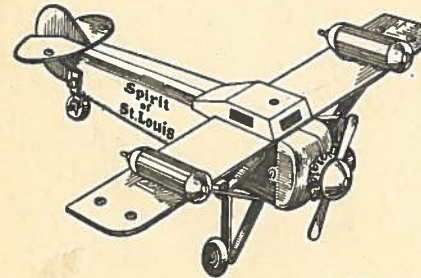
63



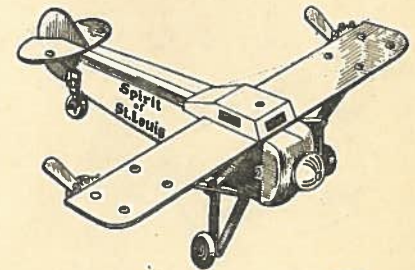
60



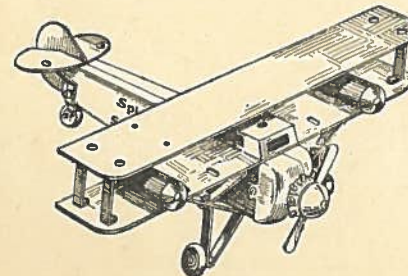
64



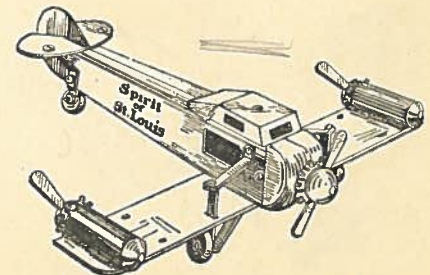
61



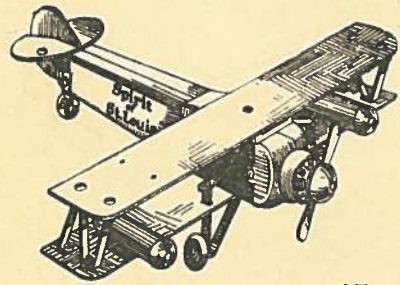
65



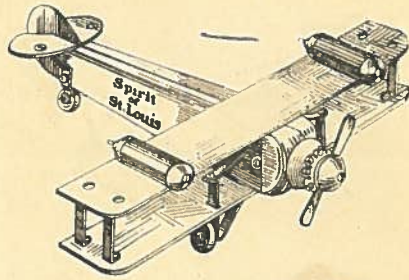
62



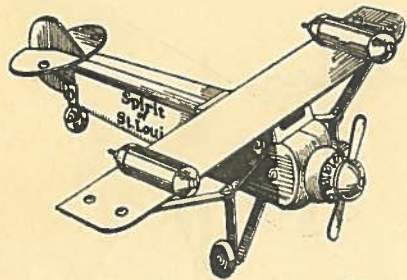
66



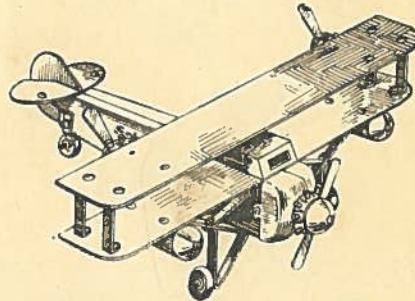
67



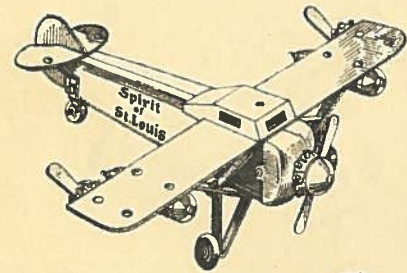
71



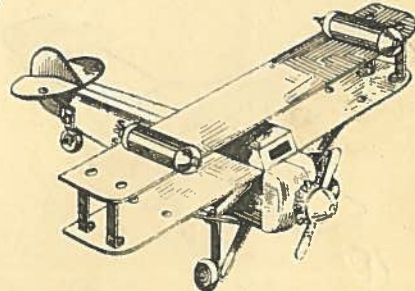
68



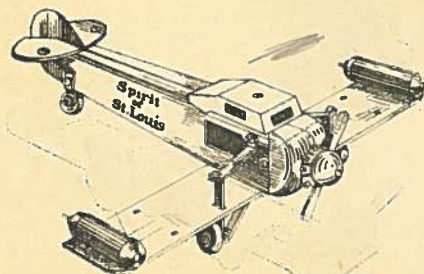
72



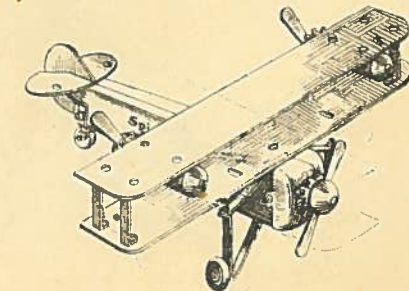
69



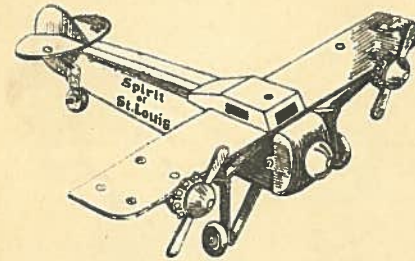
73



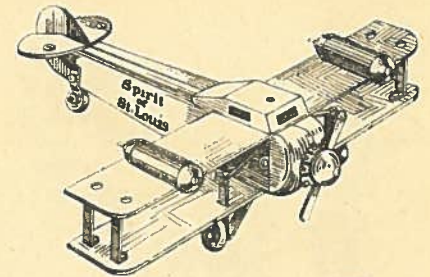
70



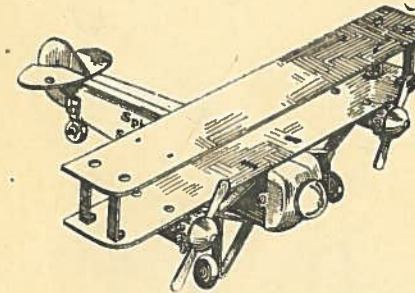
74



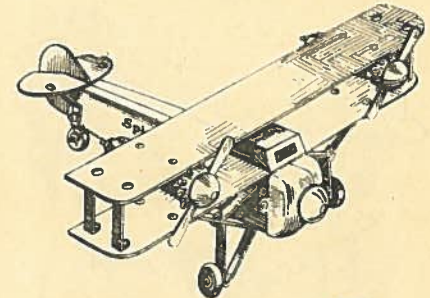
75



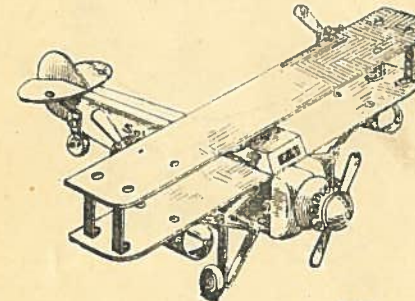
79



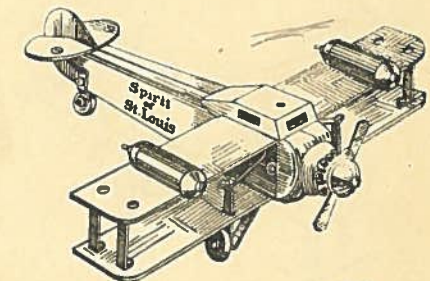
76



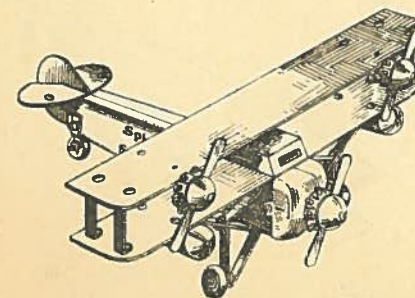
80



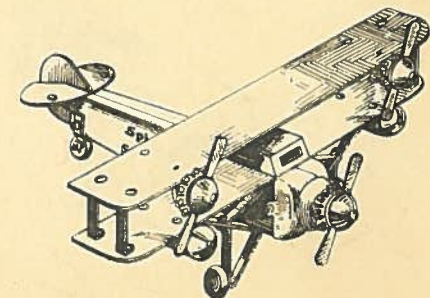
77



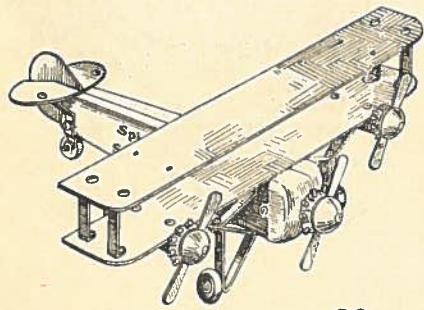
81



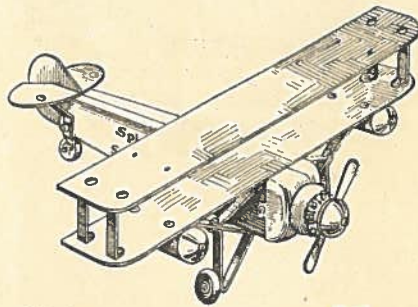
78



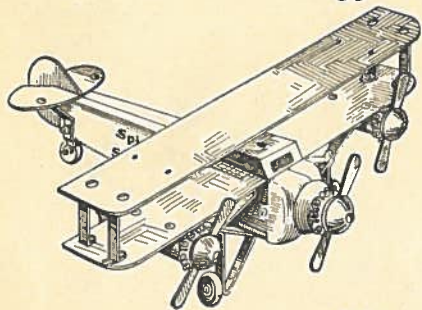
82



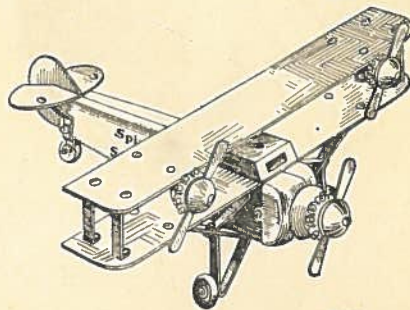
83



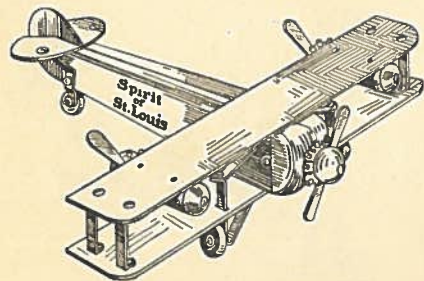
87



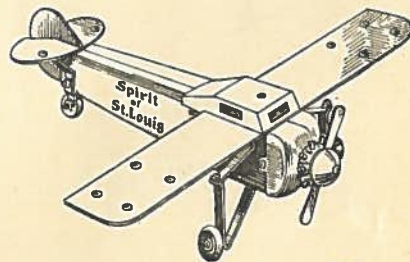
84



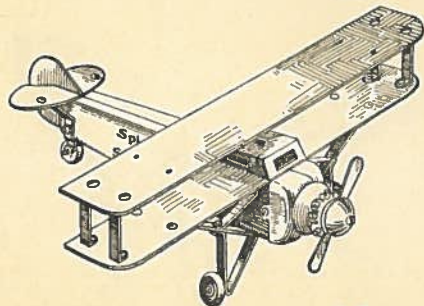
88



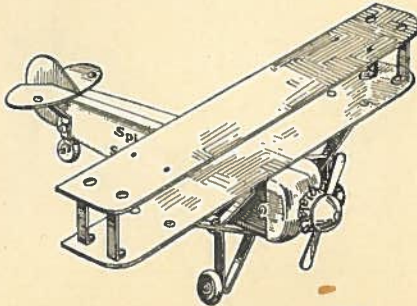
85



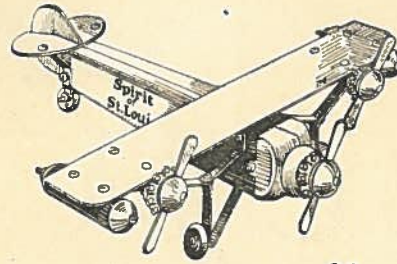
89



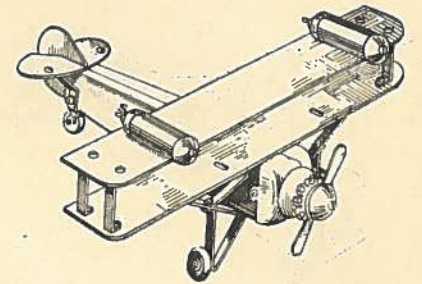
86



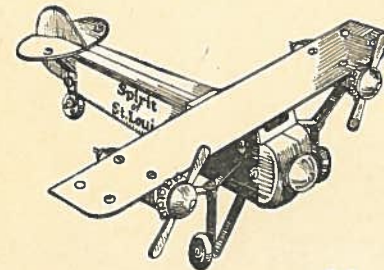
90



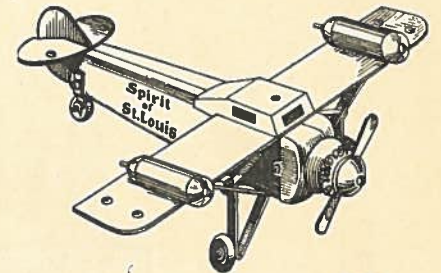
91



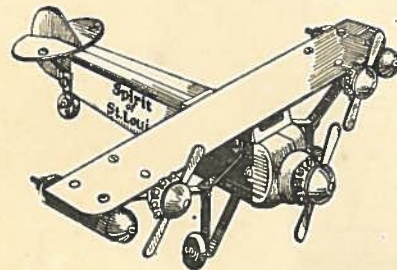
95



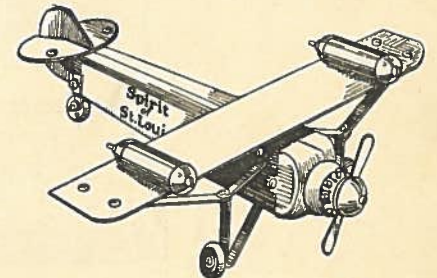
92



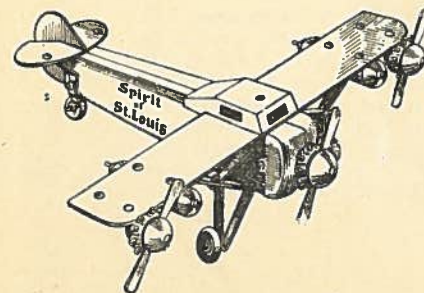
96



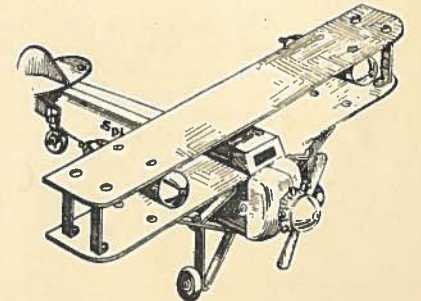
93



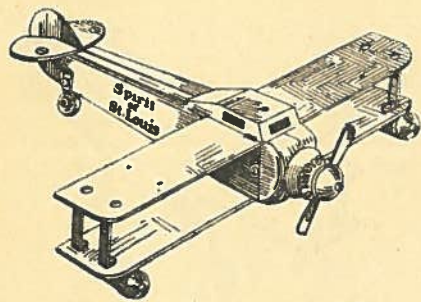
97



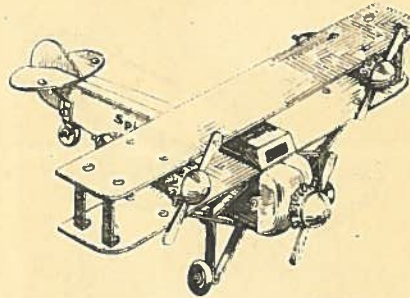
94



98



99

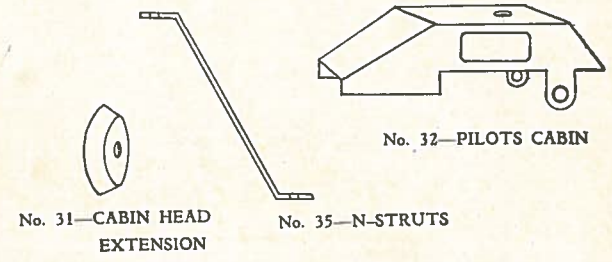


100



No. 830

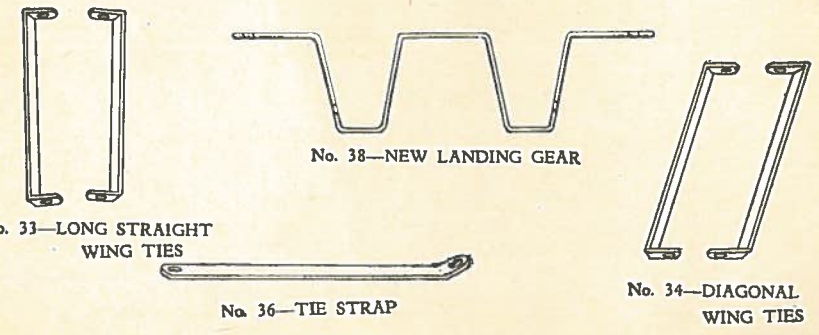
The above is an illustration of a set, which builds over 250 models. With it is included an Instruction Book, printed in two colors, showing the elementary principles of Aviation for boys and girls. It also tells all about Airplanes, how they are operated from start to finish, how it feels to fly and takes the reader on a very interesting imaginary flight. Every boy should have this book. Many boys and girls prefer to have more than one set of the Spirit of St. Louis. If you wish to purchase another set, we suggest you secure our No. 830. Your dealer has it or will get it for you.



No. 31—CABIN HEAD EXTENSION

No. 32—PILOTS CABIN

No. 35—N-STRUTS

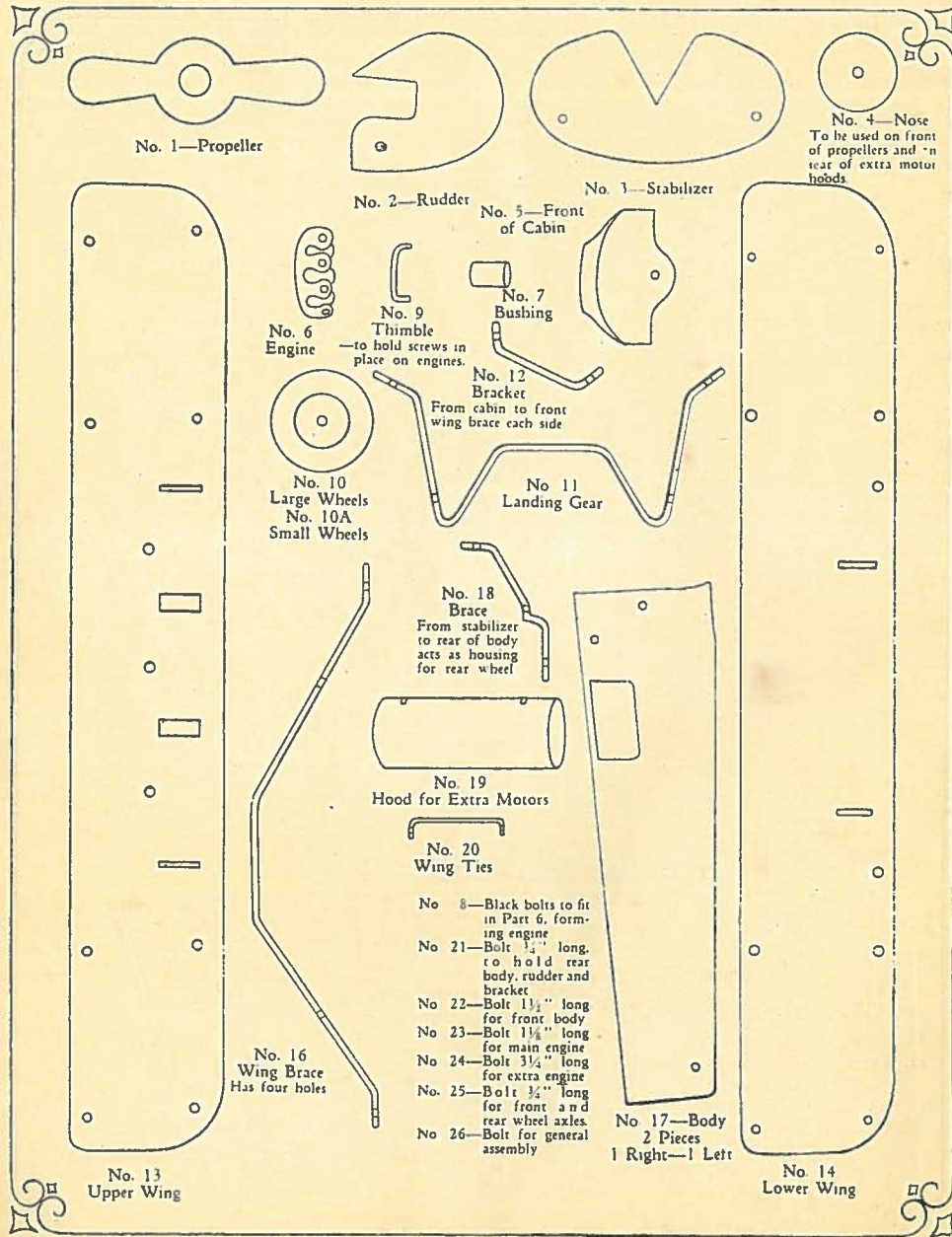


No. 33—LONG STRAIGHT WING TIES

No. 38—NEW LANDING GEAR

No. 36—TIE STRAP

No. 34—DIAGONAL WING TIES



NOTICE

This set has been carefully packed and should be complete. If any parts are missing write us direct giving a description and the number of the parts short, including postage for mailing. To determine left or right body, assume you are sitting in the plane.

This set contains the following parts:

No. 1 Propellers	3	No. 18 Rear Wheel Braces	2
No. 2 Rudders	1	No. 19 Auxiliary Motors	2
No. 3 Stabilizer	1	No. 20 Wing Ties	4
No. 4 Nose	9	No. 31 Cabinhead Extension	1
No. 5 Cabin Head	1	No. 32 Pilot Cabin	1
No. 6 Engine	3	No. 33 Long Wing Ties	4
No. 7 Bushing	3	No. 34 Diagonal Ties	4
No. 9 Thimbles	3	No. 35 "N" Struts	2
No. 10 Large Wheels	2	No. 36 Tie Strap	2
No. 10a Small Wheels	1	No. 8 Black Screws	27
No. 11 Landing Gear	1	No. 21 $\frac{3}{4}$ " Bolts	6
No. 38 Flat Landing Gear	1	No. 22 $1\frac{1}{2}$ " Bolts	5
No. 12 Body Braces	4	No. 23 $1\frac{1}{8}$ " Bolts	5
No. 13 Upper Wing	1	No. 24 $3\frac{3}{8}$ " Bolts	2
No. 14 Lower Wing	1	Nuts	42
No. 16 Wing Braces	2	No. 26 $\frac{1}{4}$ " Bolts	26
No. 17 Body Parts, (1 right and 1 left)	2	Combination Screw- Driver Wrench	1

No. 820

"SPIRIT OF ST. LOUIS"

United States Patent No. 1,674,637.

METALCRAFT CORPORATION
St. Louis, U. S. A.

Metalcraft
"SPIRIT OF ST. LOUIS"
Aircraft Toys
are very interesting.

Numbers of boys have written us that they have as many as six sets of the "SPIRIT OF ST. LOUIS" so that they can have their own flying field, with squadrons of airplanes. By combining two or more sets, very interesting planes can be completed, such as planes with three wings, double-deck planes, and numerous ideas can be worked out.

This set will build many more than the 100 planes shown, in fact it will build several hundred, including, "The Friendship," the "Southern Cross," and Capt. Wilkins "North Pole Plane." The following are some of the aircraft toys we make.

No. 810 "SPIRIT OF ST. LOUIS" sells for \$1.50 east of the Rocky Mountains and builds over twenty-five planes. It is an excellent set to combine with the one you now have, as it is low priced and the parts are interchangeable. You will eventually want several of these sets, so you will have your own squadron for your air field.

Number 830 sells for \$5.00 east of the Rocky Mountains and builds over 250 planes, including all those built by other sets and hundreds in addition. With it is included a very interesting story on aviation written by a St. Louis aviator, which describes just how a plane is flown, and the aviator takes you for an imaginary flight in this narrative.

Number 880 the "Los Angeles" sells for \$5.00 east of the Rocky Mountains and builds large sturdy models of almost every kind of dirigible. It builds our own navy ship the "Los Angeles." It builds Capt. Nobile's ill fated "Italia" which was lost at the North Pole. It builds the English "R-100" which is to go into trans-Atlantic passenger service between England and America and the "Graf Zeppelin" "L-127," the huge trans-Atlantic Zeppelin being built in Germany for trans-Atlantic service and a tour around the world. When complete, it is a beautiful toy, 28 inches in length. Not only boys but grown-ups admire and want it.

No. 890 Hanger. An air-field is not complete without a hanger. We have one for the airplanes that retails for \$1.25 east of the Rocky Mountains, that you can build yourself in a few minutes time. It not only is built and looks like the real hangers but it comes in the same realistic, rust-proof galvanized finish that real hangers are made out of.

You can secure any of the above from your dealer, and if he does not have the item you want, he can obtain it for you. Start your complete airfield and see how much fun you will have, and how much you will learn about aviation.