



AMATEUR MECHANICS

HELL-DIVER *Flying Model of U.S. Navy Planes*

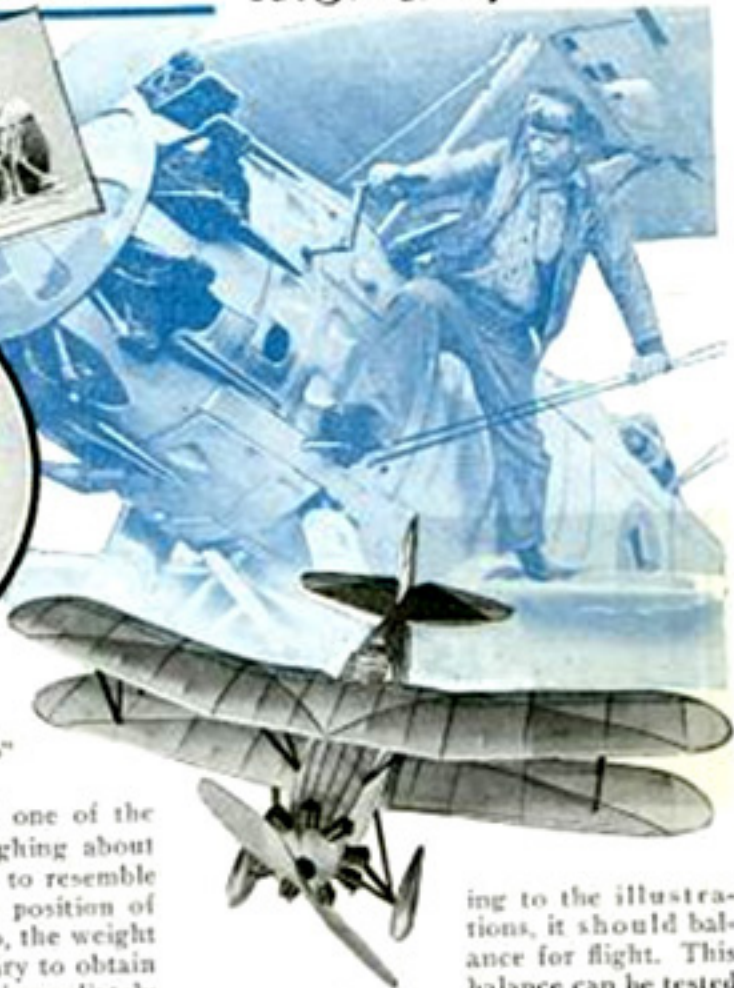
By JOSEPH S. OTT



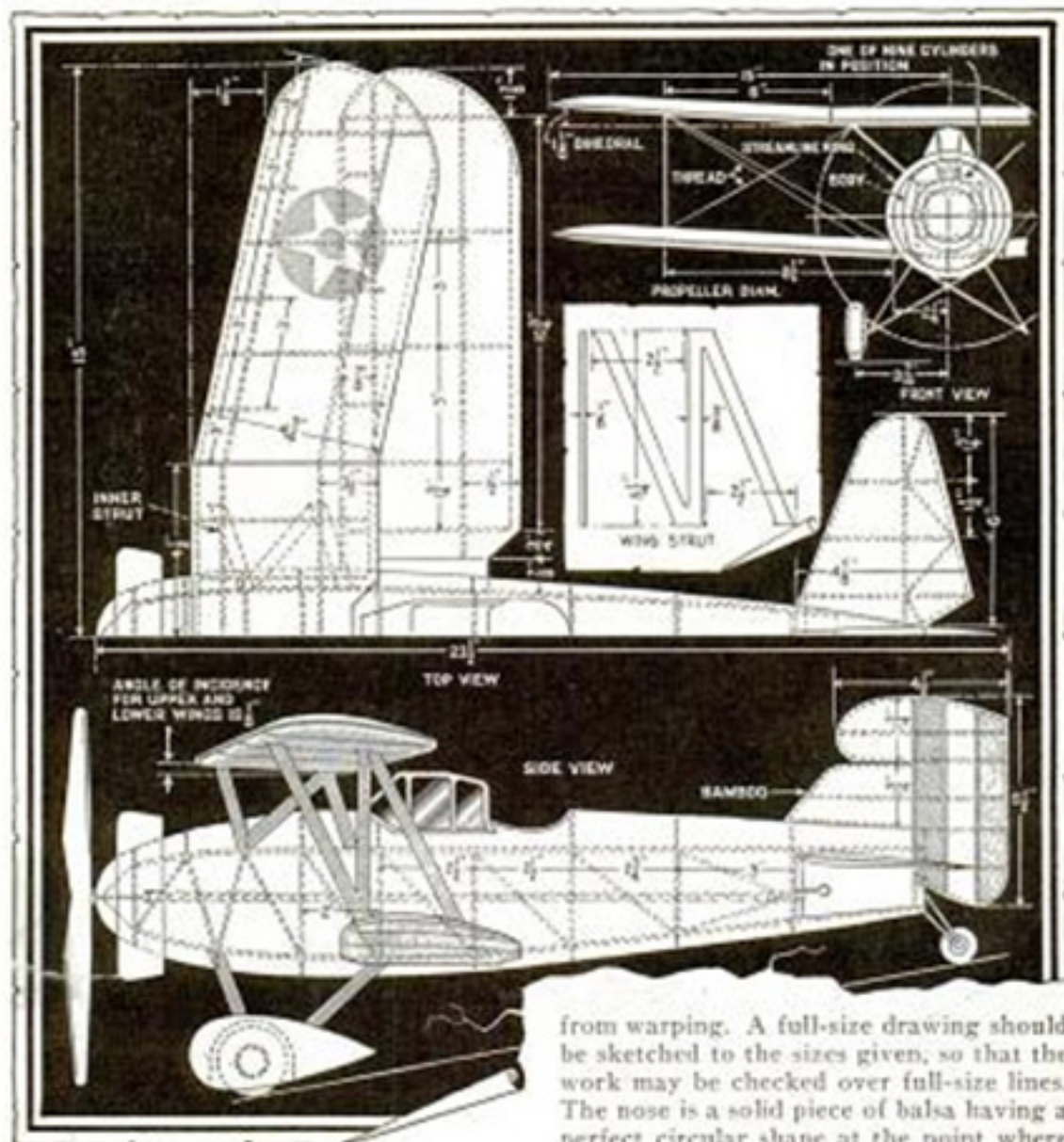
Courtesy Metro-Goldwyn-Mayer

Wallace Beery. Starred in "Hell Divers"

HERE'S a 31-in. model of one of the navy's "hell-divers" weighing about $3\frac{1}{2}$ oz. It is built accurately to resemble the real ships except for the position of the wings. On the large ship, the weight of the motor makes it necessary to obtain balance by locating the wings immediately behind it, whereas on the model, the motor extends through the entire fuselage and necessitates bringing the wings farther back. Also, to offset the tendency of the model from becoming tail-heavy, the wheels and housings and propeller must be made slightly heavier than a true-scale model. For the hell-diver, a heavy grade of balsa was used, and, when built accord-



ing to the illustrations, it should balance for flight. This balance can be tested by lifting the plane with the two forefingers placed at the wing tips, about $1\frac{1}{2}$ in. from the leading edge. When the model is raised and the tail remains on an even keel, it may be assumed that the model's center of gravity is far enough forward to prevent any sudden climbing, which will cause it to stall during flight. However, it may be necessary to add a small weight,



and after it is dry, the assembly should be sanded down to conform to a streamline shape. The attachment of the landing gear is securely cemented to the side of the wheel housing and an extra bamboo brace is added from the strut to the top. The leading edges of the landing gear struts are reinforced with bamboo.

The tail wheel is attached with bamboo struts tied securely and cemented to a wire axle. The upper ends of the brace are forced into the rear-fuselage upright. All of the round parts of the rudder and fin are bent bamboo. The straight sections may be filled in with balsa. The ribs are $\frac{1}{2}$ in. thick and approximately $\frac{1}{4}$ in. deep. The sections on the tail units should not be any thinner, as the covering will tend to stick together. The small angular bracing from the spar to the rear trailing edge on the rudder and stabilizer helps considerably to prevent these thin sections from warping. After the rudder and stabilizers have been attached to the body, the windshield should be completed. It is built of small uprights and crosspieces. Cellophane is cemented to the inside of the frame. The ribs in the top and lower wing are alike and 23 are required, 13 for the top wing and 10 for the lower one. The ribs are spaced far apart, and to maintain the curve, a small part of a rib, called the nose rib, is placed between each one. Each rib



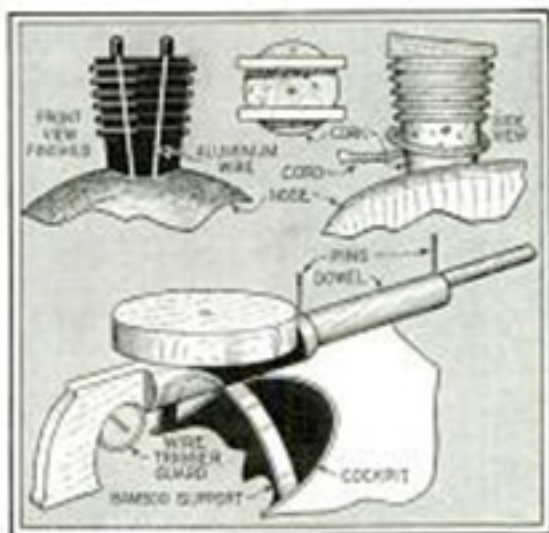
Book or Magazine Held Open in Convenient Position with Trousers-Hanger

Trousers-Hanger Holds Book Open

When working from directions given in a book or magazine, an ordinary trousers-hanger will be found useful for holding the pages open. The hanger keeps the pages flat and tight so the book can be hung up in a convenient place over the workbench.

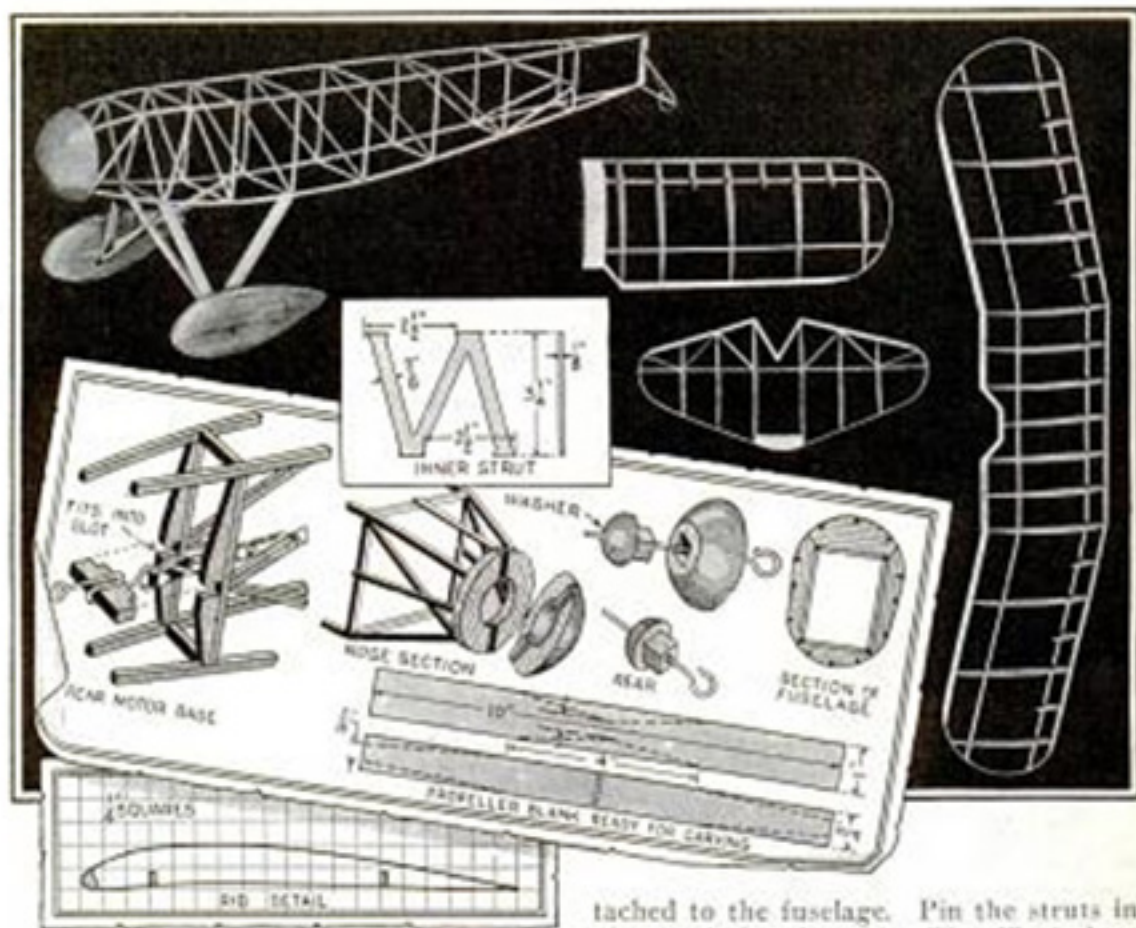
A Simple Chemical Ink Eraser

You can easily prepare a chemical ink eraser that will leave the paper perfectly clean. Prepare or purchase a 2-per-cent solution of potassium permanganate. Place this in a small bottle having a rubber cork with a glass dropping rod attached, and mark it No. 1. Into a similar bottle, marked No. 2, place a similar amount of ordinary photographers' hypo solution. You can obtain a few ounces of this from any photographic shop, or get a box of the dry powders and mix enough for several ink-erasing outfits. To use the chemicals, apply a little of solution No. 1 on the ink, let it remain a few seconds and blot. Then apply solution No. 2. In a few seconds the dark stain, caused by the permanganate, will disappear, taking the ink mark with it. Remove excess liquid with a blotter. If one application does not remove the stain, repeat the process after washing out the hypo with water or applying enough permanganate to neutralize all of the hypo that has soaked into the paper.



is cut out with a razor blade, and the entire set is pinned together and sanded to conform to one general shape. The wing

(Continued to page 114A)



FLYING MODEL OF HELL-DIVER

(Continued from page 639)

tips are bent bamboo. Use a wide piece of bamboo, so that it can be split into four sections, which will keep them alike. On the lower wing, the small section near the body is a solid piece of very light balsa. This is cemented directly up against the body as illustrated.

The struts that hold the wings together and against the body are all of the "N" type. They are $\frac{1}{8}$ in. thick and $\frac{3}{8}$ in. wide. After the wing has been covered, it is attached to the body, which should also be covered before the wings are placed in position. The struts should be laid out, so that the front that attaches to the wing will be sure to raise the leading edge. Before attaching the wings to the body, make certain that they are not warped or distorted. If they are slightly out of form, pin them on a flat surface to the correct position, and respray the covering at that part with water, so that shrinkage will correct the twist. The top wing is then at-

tached to the fuselage. Pin the struts in place and also the wing. The dihedral on the lower wing is taken care of by the length of the outer strut.

The correct shape of the propeller blank is illustrated. After cutting the original block to the shape specified, carving an angle on opposite sides should be a simple matter. The propeller block as specified will give the required pitch and will eliminate the necessity of figuring which way it should be cut. The gradual decrease in blade angle is taken care of and the only attention that need be given is to have a true streamline form and to balance the blade so that it will revolve smoothly without vibration. The shaft is attached by forcing through the center and bending back the front part into a U-shape, then drawing it firmly into the propeller hub. Apply cement on the outside and on the inside where the shaft attaches. Be sure that the propeller shaft is first placed through the motor nose or plug and then attached to the propeller. Kits containing parts to build this model can be purchased, so that it is a comparatively easy matter for any boy to build one.