

Capt. Swanson

RANKIN, TEXT



A COMPLETE
AVIATION
INSTRUCTION
SYSTEM
by **TEX RANKIN**

BOOK IV

PRIMARY FLYING INSTRUCTION

RANKIN TEXT

A COMPLETE AVIATION
TRAINING SYSTEM

By

TEX RANKIN

BOOK IV

PRIMARY FLIGHT INSTRUCTION

LESSONS 1 to 11



Published by

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PORTLAND, OREGON

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Portland, Oregon

Printed and bound by James, Kerns & Abbott Co.

Printed in U. S. A.

BOOK IV.

PRIMARY FLIGHT INSTRUCTION

LESSONS 1 to 11

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FLYING STRAIGHT AND LEVEL**FLIGHT LESSONS TWO AND THREE**

(Flying time: 30 min.)

The first ten minutes of Lesson Two will be a review of Lesson One. This is done to familiarize you more thoroughly with the controls and their action. The next five minutes will be devoted to flying straight and level. The full fifteen minutes of Lesson Three will be devoted to straight and level flying.

In the beginning you will find it more difficult to fly straight and level than to make turns. In this text we will deal with the straight and level flying. See that your safety belt is on securely and that your telephone helmet fits properly. (The openings for the speaking tubes must be exactly over the centers of your ears, otherwise you will not hear your instructor distinctly.) Notice your instruments and also the gasoline gauge. Remember the temperature of the oil should not ordinarily exceed 160 degrees (F.) and the minimum temperature of both oil and water should be at least 120 degrees (F.) before taking off. The oil should be warm enough to maintain the correct pressure on the oil gauge.

The **oil pressure** gauge on both air cooled and water cooled aircraft engines should be observed every few minutes while flying and any increase or decrease in the reading should be reported to the instructor if he does not have a gauge in his cockpit. Observe all the safety rules in starting the engine. If the plane has been sitting idle for more than a few minutes, it is always best to put the blocks under the wheels and warm up the engine and the oil. Before you taxi out onto the runway, always look to see whether or not another plane is coming in to land, and be sure that no plane is sitting on the runway. It is impossible to see directly ahead of you in most planes until the tail gets up into level flying position, and this doesn't happen until the plane has started down the runway. So always be certain that no obstacles are in your pathway before you begin the take-off.

In taxiing out to the take-off position, remember your lessons on taxiing; do not be in too much haste. Haste and carelessness always invite trouble. Be careful, go slow and use a lot of good old common "horse sense" in everything you contemplate doing in aviation. If you do get into a bad spot, don't get excited; hold your head, do the thing your judgment tells you is best, and you will never have any

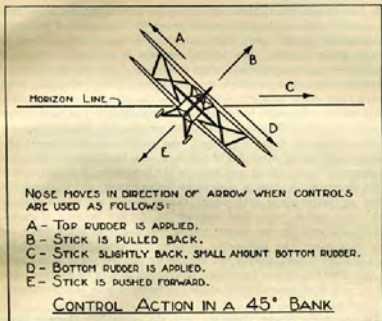


FIG. F12

caused to make a turn with the nose remaining level with the horizon. See Figure F12.

If the stick is pulled back too far and too much bottom rudder is used at the same time, the nose will remain level on the horizon, but the turn will be tightened up to the point of spinning. Therefore, only enough stick and rudder should be used together, during a 45 degree turn, in order to maintain an easy and steady turn. Under no circumstances should you attempt to force the speed of the turn above normal.

If the air strikes your face from the lower side when making a turn it is due to the fact that the aircraft is slipping, or sliding sidewise toward the earth; this is caused by too much top rudder, the angle of bank being too steep or the diameter of the turn too large. Remove the feet from the rudder pedals momentarily and observe whether or not this overcomes the difficulty; if not, you are then certain that it is not due to the use of too much top rudder. This is an important point to ascertain at this moment, because if the slipping is due to the holding of too much top rudder and you should erroneously de-

away from the take-off area or runway so that other planes can land if they wish without worrying about your taking-off under them as they glide in for their landing. When you do turn around, after first making sure that no other planes are on the take-off area, coming in for a landing, or just taking-off, glance back once more over your shoulders and be sure that no other planes are gliding in for a landing. If not, look ahead on each side of you to be sure that no planes are landing or taxiing across your take-off path. Perhaps you may think we are taking too many precautions. Such is not the case, however, for most accidents are caused by negligence and carelessness right on the ground. All of the precautions set forth above are of the utmost importance and should be carried out at all times, regardless of whether you are in a hurry or not. It has been said that courtesy and safety go hand in hand.

If a strong gusty wind is blowing you must not climb very steeply at low altitudes. When an airplane passes through a strong vertical air current (gust, or bump) the reaction on the airplane is exactly the same as when the angle of attack is increased. This is illustrated in Figure F16, which shows an airplane flying almost level longi-

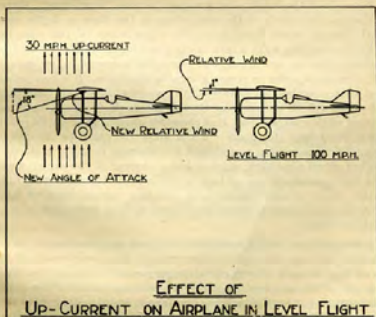


FIG. F16

PRIMARY FLYING

PART ONE

NOMENCLATURE

(NOTE: N.A.C.A. standard definitions are used in this nomenclature wherever possible.)

Aerobatics: A term sometimes used to define acrobatic flying.

Aerology: A term sometimes used to define Aeronautical Meteorology.

Aileron (N.A.C.A. definition): A hinged or pivoted movable auxiliary surface of an airplane, usually part of the trailing edge of a wing, the primary function of which is to impress a rolling moment on the airplane.

Air Brakes: Any contraption attached to the fuselage, landing gear strut, interplane strut, etc., for the purpose of creating additional drag and thereby providing a slower landing speed. They are operated mechanically from the pilot's cockpit. Up to the present time air brakes have not been generally used.

Air Commerce: As defined by the Department of Commerce, Aeronautics Branch, means "transportation in whole or in part by aircraft of persons or property for hire, navigation of aircraft in furtherance of a business, or navigation of aircraft from one place to another for operation in the conduct of a business."

Aircraft: As defined by the Department of Commerce, Aeronautics Branch. Aircraft means "any contrivance now or hereafter invented, used or designed for navigation of or flight in the air, except a parachute or other contrivance designed for such navigation, but used primarily as safety equipment."

Aircraft (N.A.C.A. definition): Any weight-carrying device or structure designed to be supported by the air, either by buoyancy or by dynamic action.

Air Bumps: Two causes, (1) due to the vertical action of convectional currents, caused by the air being expanded by an increase in temperature. These bumps are noticeable near the surface of the ground on a hot day and gradually extend upward, reaching an altitude of three to four thousand feet by mid-afternoon. They are sometimes referred to as "lifting bumps", inasmuch as they usually lift the airplane upward; another form (2) is caused by sudden in-