

COMMENTS ON THE LOENING M-1 TWO SEAT FIGHTER

by

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Grover C. Loening, the pioneer American airplane designer, developed a two seat fighting airplane and submitted it to the U. S. Army for evaluation as a monoplane fighter for use on the Western Front should World War I have continued on to 1919. Considering the fact that few genuine American designs were produced during this period of aircraft engineering, the following official comments made by the late Alexander Klemin will be of interest to World War I hobbyists. This airplane, while originally designed with two rudders, was produced as a prototype for testing with a single rudder. This basic airplane design served as the prototype for a batch of these airplanes built by the U. S. Navy at the Naval Aircraft Factory in the early twenties and also for a race plane entered by the U. S. Navy in the famed Pulitzer Trophy classic.

Military Characteristics:

Armament: Two synchronized Marlin machine guns fire forward through the propeller. In their present position, the guns are quite inaccessible for the correction of gun jams in flight. They should be located with the rear portion within reach of the pilot. One Lewis type gun is mounted on a Scarff mount in the pilot's rear. While one is very effective on account of its good range of fire, two guns should be used in a fighting airplane of this type.

Range of Fire: The range of fire of the rear gun is very good, it being entirely clear above. Double rudders are used allowing gun fire directly to the rear but giving two blind spots on either side. The other blind spots are directly below and fore and aft, are unusual in this type of airplane. The two forward guns are fixed, synchronized, firing through the propeller.

Vision: The vision of the pilot is fair to good, being clear above fore and aft, though limited forward and below. The vision of the gunner is excellent, allowing observation in almost all directions with little moving about.

Controllability and Stability: The control surfaces are apparently of sufficient size to give good controllability, and are well located and the stability should be satisfactory.

Weight: The weight given of 2090 for the complete airplane appears to be very low. The Bristol Fighter fitted with the 300 HP engine (Hispano-Suiza) offers a very good comparison.

Power plant complete weighs as follows:

Motor Dry with Hub	596 lbs.
Radiator	70
Connections	6
Water	117
Propeller	35
Fuel tank and connections	50

Oil tank and connections	8
Control	5
	<u>880 lbs.</u>

The ratio of bare structural weight to the total of the Bristol Fighter is 3.1. This represents good construction. Using these figures, the weight of the Loening Fighter with two hours of fuel supply aboard becomes:

Power installation	880 lbs
Fuel	336
Oil	30
Crew and Clothing	360
2 Marlin guns	48
2 Synchronizers	14
1 Cartridge Box	5
1000 Rounds of Ammunition	66
Aldes sight	5
1 Lewis m.g.	26
5-97 round drums	40
1 Scarff mount	23
2 Oxygen apparatus	26
1 Fire extinguisher	6
	<u>1865 lbs.</u>

TABLE OF COMPARATIVE PERFORMANCES

	<u>DH-4</u>	<u>BRISTOL</u>	<u>LOENING</u>
Gross weight	3557	2653*	2700
Wing area	436	405	318
H.P. Max.	400	300	300
Load/H.P.	8.9	8.85	9.0
Speed at 5000 ft.	---	128	133
Speed at 10,000 ft.	128	122	129
Speed at 15,000 ft.	123	117	124
Load/sq.ft.	8.2	6.6	8.5
Climb to 5,000 ft in min.	4m.36s	5m.30s	4m.10s
Climb to 10,000 ft in min.	10m.45s	10m.0s	9m.30s
Climb to 15,000 ft in min.	20m.18s	18m.0s	16m.30s
Service Ceiling	20,000 ft.	22,000 ft.	21,000 ft.

* Partial military load.

The performance though good is no better than aircraft in production.

Design: The size of the radiator appears to be too small for this engine. The Bristol radiator which gives excellent cooling, has a honeycomb area of 4.75 sq.ft. set vertically and directly exposed to the propeller slipstream. With the radiator enclosed partially, and mounted at an angle to the slipstream, proper allowance for an increase in area should be made. There is almost no cowling over the engine giving poor streamlining and offering high resistance. In a high speed airplane of this type, it is very objectionable to have the engine exposed.

Wings: The monoplane wing gives somewhat better efficiency than the biplane

wing cellule. Also the method of bracing with four struts should have a lower resistance than the conventional biplane bracing of struts and cables. This gain is, however, considerably offset by the excessive cutout at the junction of the wing with the fuselage which tends to reduce the lift and the lift/drag ratio. The low aspect ratio also develops a low light/drift ratio.

With the wing area increased to take care of the correct weight and recommended loading, the wing span approaches 42 ft. It would be very difficult if not impossible to construct a sufficiently strong wing of 42 ft. span stayed at one point in this manner.

General Comments: In general the 3-view drawing shows neat, compact and well coordinated fighter airplane design. The probable performance and other military qualities, while good, are not better than aircraft now in service. To produce a performance of marked superiority over present airplanes, requires a loading of less than 8 pounds per horsepower. It does not appear possible with present day construction to carry guns and necessary crew equipment for a two place fighter with less than 400 H.P., and still maintain this light power loading.

The above remarks are taken from R.D.M. No. 300, Aeronautic Research Department, Airplane Engineering Department, McCook Field, Dayton, Ohio, July 1918.

WHAT SIZE PHOTO DO YOU TAKE?

In the hopes of building up our sagging correspondence section the following is offered as food for thought. It represents the views of one of our members on the subject of film size for aircraft photos:

"For the last few years the 616 camera has been out of production. I searched the city here and finally found one that took fair pictures. They were OK until recently. However, the quality sure isn't what I was getting with my $2\frac{1}{4} \times 3\frac{1}{4}$ Speed Graphic.

What the story boils down to is this. Since I have had such a rough time with a 616 I have given it up and "regressed" (in the terms of most collectors) to the smaller size. I might add that this regression was caused by the loss of 8 beautiful negatives on a Boeing 307. Knowing that the 616 wasn't up to par I have been taking a few of the smaller shots of each rare plane so it was not a total loss. However, in the future, it seems to me that collectors will either have to become more broad-minded and accept the smaller negatives or limit their trading. This is not too good or even a desirable situation. The history can best be done by more people. We are limiting ourselves by accepting only the one size, for new blood cannot come in. The 616 is hard to find and youngsters just starting will find this obstacle hard to overcome. I'm not complaining, just voicing an opinion on what I think could become a serious situation. I like 616 negatives, but I take 120. In England they use 35mm film and this is even more serious."

This problem is one that involves many of our members. What do you think about it? What are your opinions? Let's hear from members like Ed Deigan and John Mitchell who have changed from 616 to 620. What about 4×5 ? $2\frac{1}{4} \times 3\frac{1}{4}$?