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11th Part of Report No. A. & A. E. E. /783.

2 SEP 1942

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT

BOSCOMBE DOWN

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Kittyhawk I. A. L. 229.

(Allison V1710-F.3.R)

Take-off and landing trials, with and without overload fuel tank.

A. & A. E. E. Ref:- 4481/1-A.S. 75/3.
M. A. P. Ref:- R. A. 1871/D. A. N. A. 1.

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This report deals with the aircraft (or equipment) as tested, action to remedy defects or decisions to accept items not in strict compliance with the specification are matters for decision and action by the Ministry of Aircraft Production.

Report No.	Title
6th Part of A. & A. E. E. /783.	A. K. 572 - Fuel consumption trials.
7th do.	A. K. 572 & A. L. 229 - Radio trials - Communication sets.
8th do.	A. K. 572 - Rate of climb and P. E. measurements.
9th do.	A. L. 229 - Fuel consumption trials and range flight with a long range jettisonable ventral tanks fitted.
10th do.	A. L. 229 - Performance tests with an external fuel tank fitted.

SUMMARY

Take-off trials have been made with an overload fuel tank fitted beneath the fuselage, and take-off and landing trials without the tank.

The results using $\frac{1}{4}$ flap corrected to standard atmosphere and zero wind were:-

With tank - Take-off run	385 yds.
Without tank " " "	355 yds.
" " Landing run	410 yds.

1. Introduction.

Take-off and landing trials were made on Kittyhawk A. L. 229 with and without an overload fuel tank fitted beneath the fuselage. Trials with the tank were made at varying flap angles to determine the optimum setting. Trials without tank were then made using the same optimum flap angle found from previous trials.

Tests with tank were made on 6th May 1942.

Tests without tank were made on 31st July 1942.

2. Condition of aircraft relevant to tests.

The condition of this aircraft was fully described in the 10th Part of Report No. A. & A. E. E. /783. During the second set of tests, which were made with the overload tank in place, special flame damping exhausts were fitted of the type described in the 4th Part of Report No. A. & A. E. E. /783.

The respective loadings were:-

	Weight lb.	C.G. position.
With overload tank	8840	26.2 ins. aft of datum
Without " "	8485	26.4 " " " "

Details of the propeller are given in the Appendix.

3. Results.

3.1. With external tank fitted. Take-off trials were made with the flaps fully up, and with the flaps $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and fully down. It was found that $\frac{1}{4}$ flap

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gave considerable improvement in take-off and climb away over the case where flap was used. This improvement was also obtained with larger flap settings it was not so marked. Thus $\frac{1}{4}$ flap is the best setting for take-off and the results under this condition were:-

Corrected to standard atmosphere and zero wind.

Take-off run	385 yds.
Distance to clear 50 ft.	625 "
Boost	45 $\frac{1}{2}$ ins. of Hg.
R.P.M.	2900
Flaps.	$\frac{1}{4}$ down.

Under the conditions of test the measurements were:-

Mean wind	4.9 m.p.h.
I.C.A.N. height.	+80 ft.
Ground temperature	+14 $^{\circ}$ C
Take-off run.	355 yds.
Distance to clear 50 ft.	580. "

The take-off paths for 0 and $\frac{1}{4}$ flap are plotted in Fig.1.

3.2. Without external tank. Take-offs were measured using $\frac{1}{4}$ flap as above, and in addition landings were measured. The results were:-

Corrected to standard atmosphere and zero wind:-

Take-off run	355 yds.
Distance to clear 50 ft.	635 yds.
Boost	44 $\frac{1}{2}$ ins. of Hg.
R.P.M.	2900
Flaps	$\frac{1}{4}$ down.
Landing run	410 yds. (with brakes)
Flaps	fully down
Landing A.S.I.	73 m.p.h.
Approach A.S.I. used	100 m.p.h.

Under the conditions of test the measurements were:-

Mean wind	7.9 m.p.h.
I.C.A.N. height	+200 ft.
Ground temperature	+20 $^{\circ}$ C
Take-off run.	295 yds.
Average landing run.	375 yds. (with brakes)

The take-off path is plotted in Fig.2.

4. Take-off technique

Before take-off the elevator trimmer should be set to neutral, and some right rudder trim should be used. The best take-off is obtained by raising the tail as early as possible and pulling the aircraft off the ground. There is a tendency to swing right during the run but this is easily corrected.

Illustrations:-

Fig.1. Take-off path with overload tank at 0 and $\frac{1}{4}$ flap.
Fig.2. " " " without " "

APPENDIX

PROPELLER DETAILS

Type of propeller	Curtiss Electric
Serial No.	9690
Maker's No.	C532D-F30
Diameter	11 ft. 0 in.
No. of blades.	3
Direction of rotation	Right-hand.
Serial No. Hub.	L-5996-P
" " Blade No. 1.	34294
" " " " 2.	34295
" " " " 3.	34296
Pitch range	30°
Coarse pitch setting.	56°
Fine pitch setting	26°

A. & A. E. E. Calibration.

Station:- 42" radius.

	<u>Pitch setting.</u>	
	<u>Fine</u>	<u>Coarse</u>
Blade No. 1.	25°55'	56°00'
" " 2.	26°00'	55°58'
" " 3.	26°08'	56°06'

CIRCULATION LIST

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flap settings
and the

KITTYHAWK. I A.L.229

TAKE OFF PATH

WITH OVERLOAD TANK FITTED. WEIGHT ~ 8840 LBS.

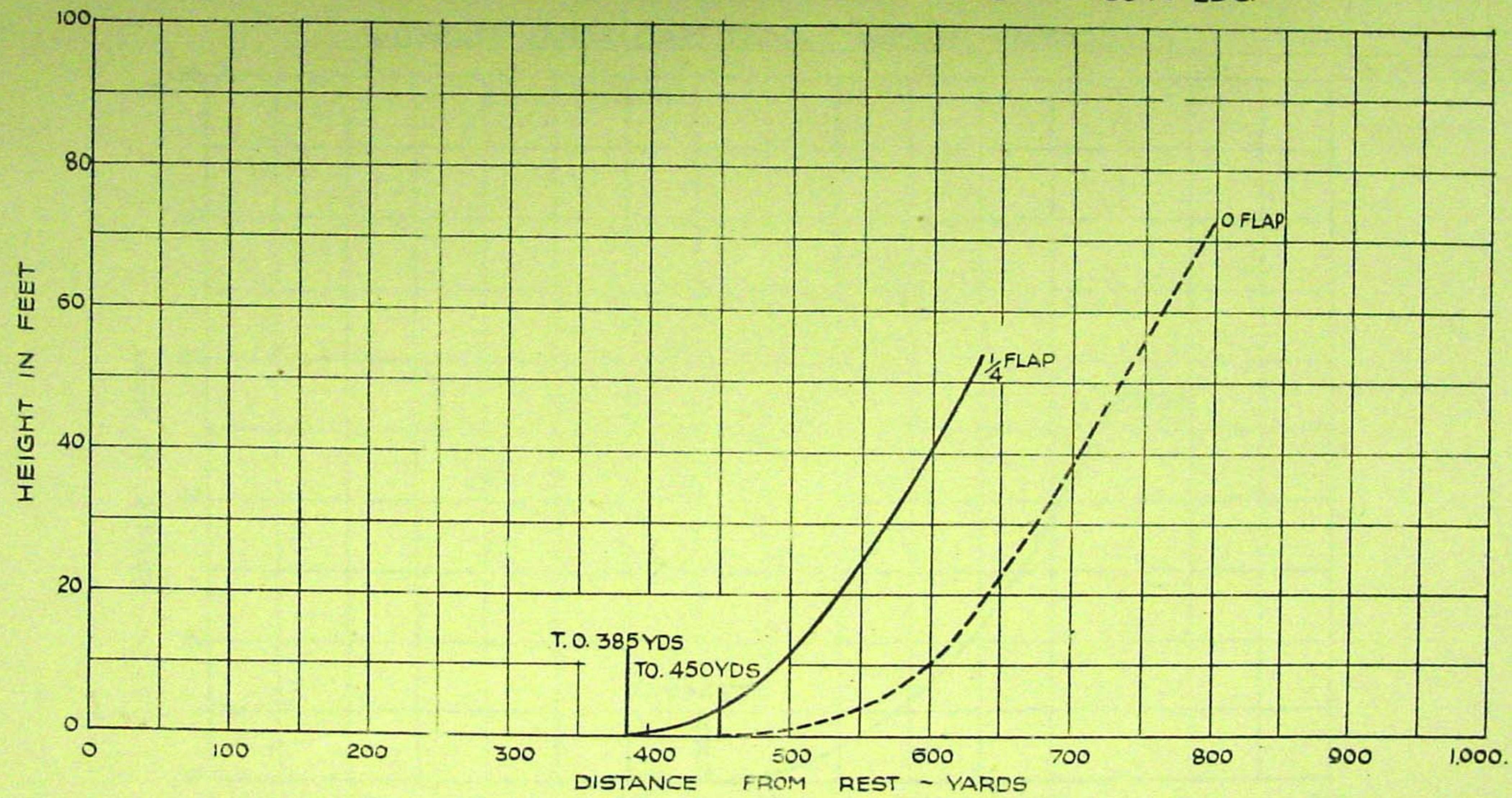


FIG. 1

KITTYHAWK. I A.L. 229

TAKE OFF PATH

WITHOUT OVERLOAD TANK. WEIGHT ~ 8485 LBS.

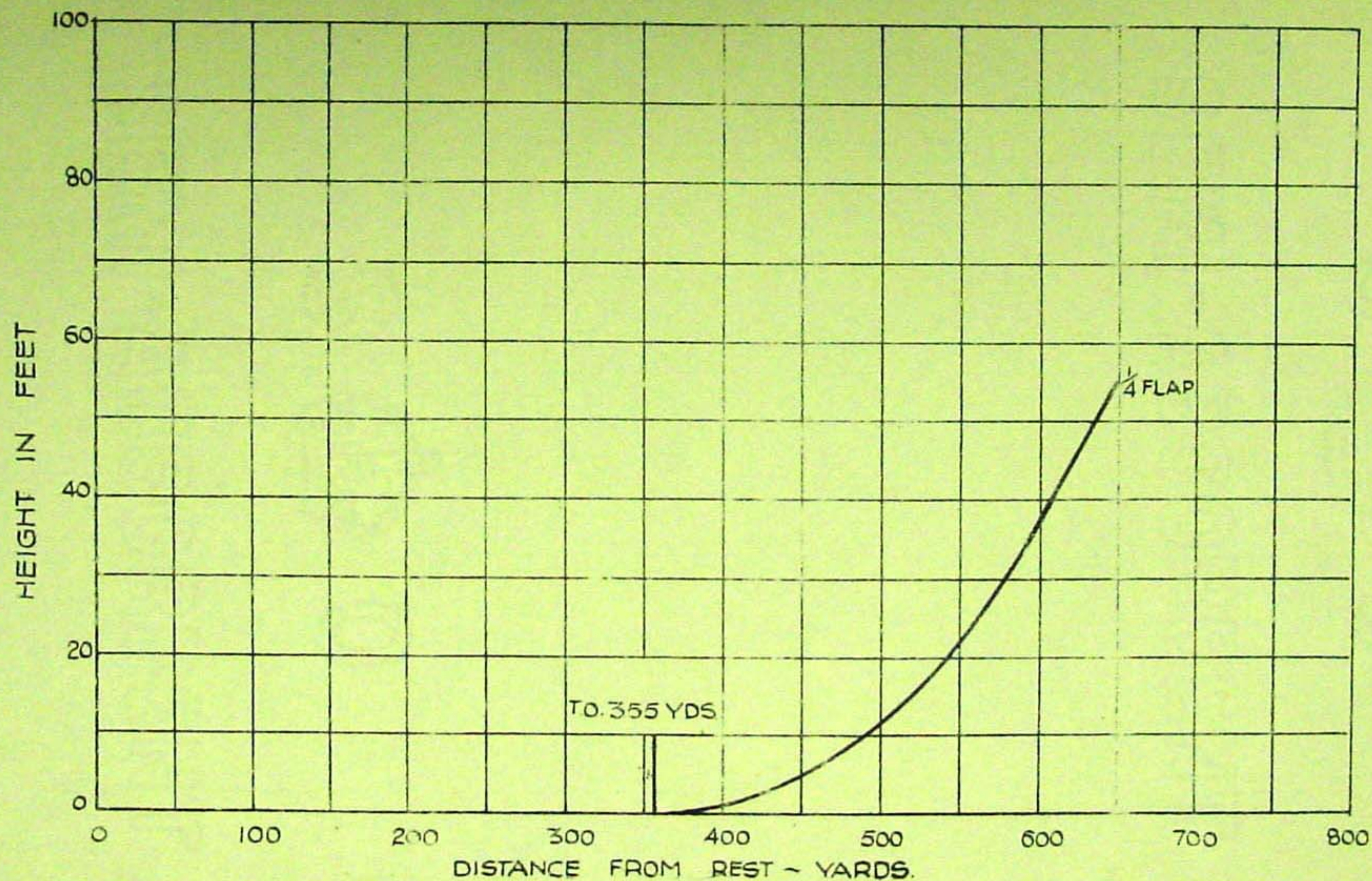
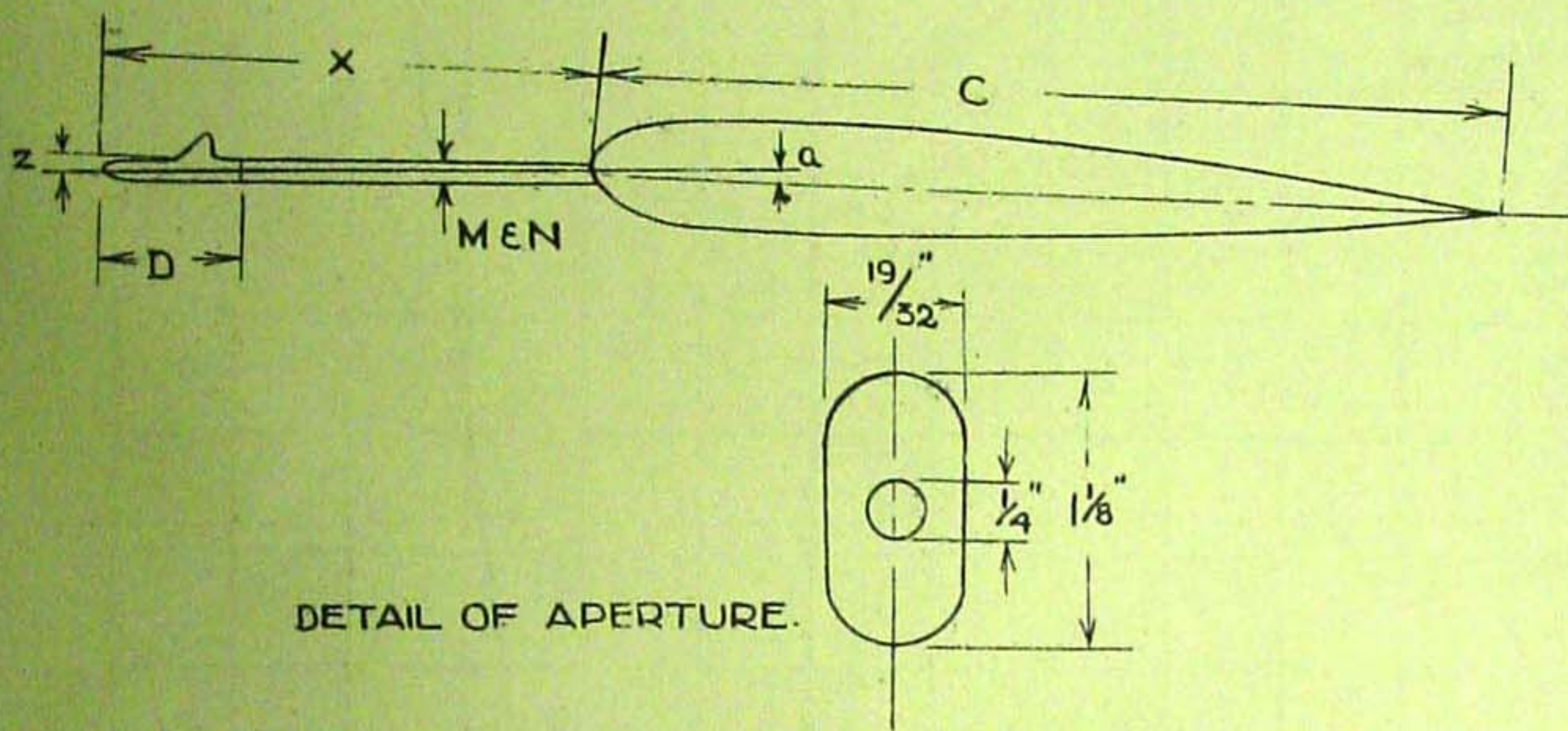


FIG. 2

KITTYHAWK II FL-220

PRESSURE HEAD POSITION.



DETAIL OF APERTURE.

Type of Pressure Head	KOLLISMAN TYPE D 24V. D.C. ORDER N ^o 16828.
Ratio of Aperture of Tube to External Dia. of Static Tube.	SEE SKETCH
Incidence of Main Plane (adjacent to Pressure Head)	+1° - 24'
a Angle of Static Tube to Chord of Main Plane	-1° - 00'
Nose of Static to Main Plane (Minimum distance)	1' - 8 1/16"
D " " " " Supporting Strut.	9"
Z " " " " Chord line	1/32"
X " " " " M.P. Leading Edge (parallel to chord)	1' - 6 7/16"
C Length of Chord at Section	4' - 4 1/8"
M Major axis of Strut	} 1 3/16" DIA.
N Minor " " "	
Distance from Plane of Symmetry	16' - 0 1/2"
Position	LEADING EDGE OF PORT WING.
Semi span	16' - 7 3/4"
Wing Section	
Ratio of Thickness to Chord of Aerofoil Section adjacent to Pressure Head.	9%

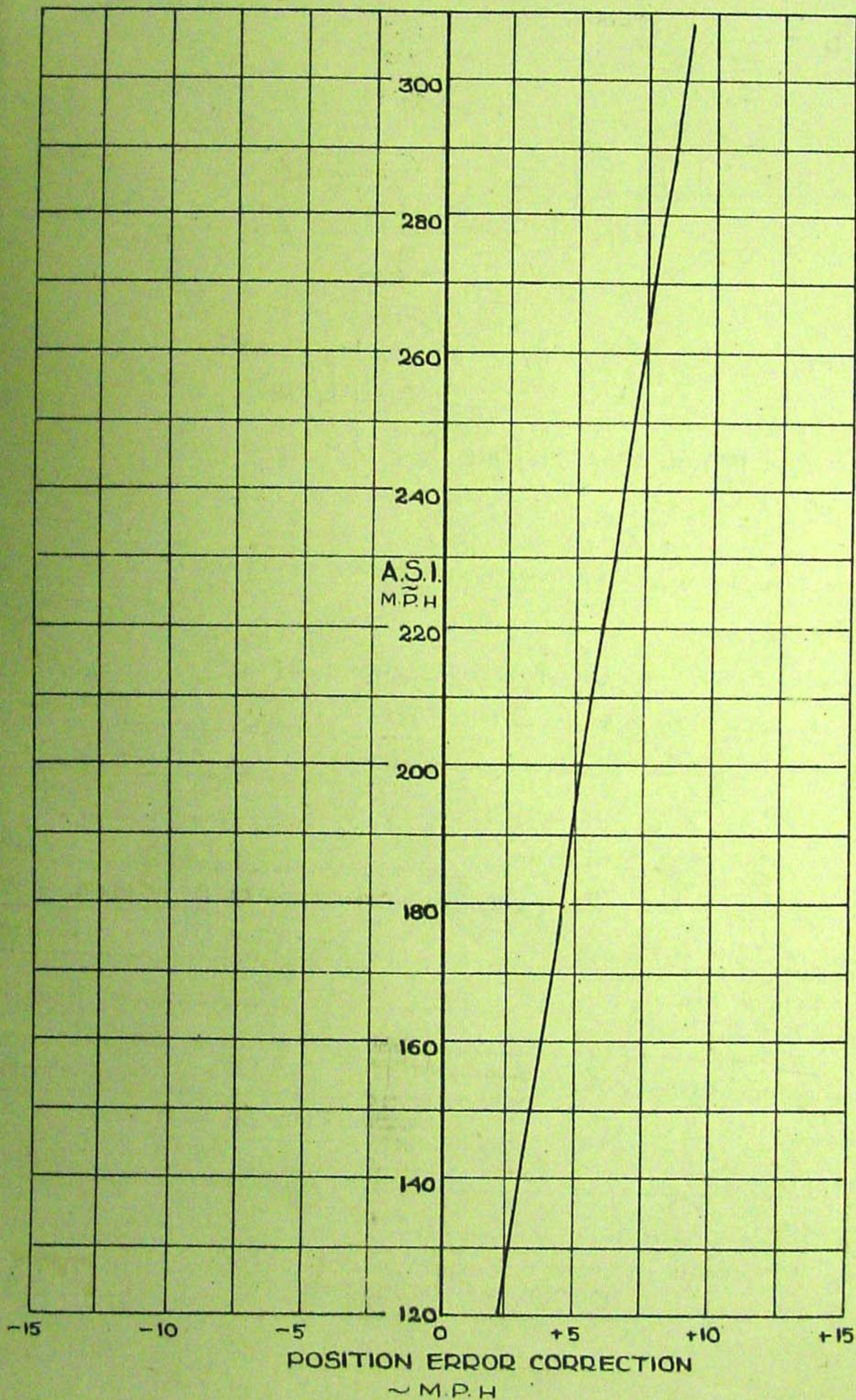
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KITTYHAWK II FL 220

FIG 4.

(MERLIN V 1650-1)
WEIGHT ~ 8910 lbs.

POSITION ERROR CORRECTION.



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