Sept. 13, 1955 A. HASBROUCK 2,717,489

COOLING COWL FOR JET ENGINES

Filed Dec. 11, 1951 2 Sheets-Sheet 1

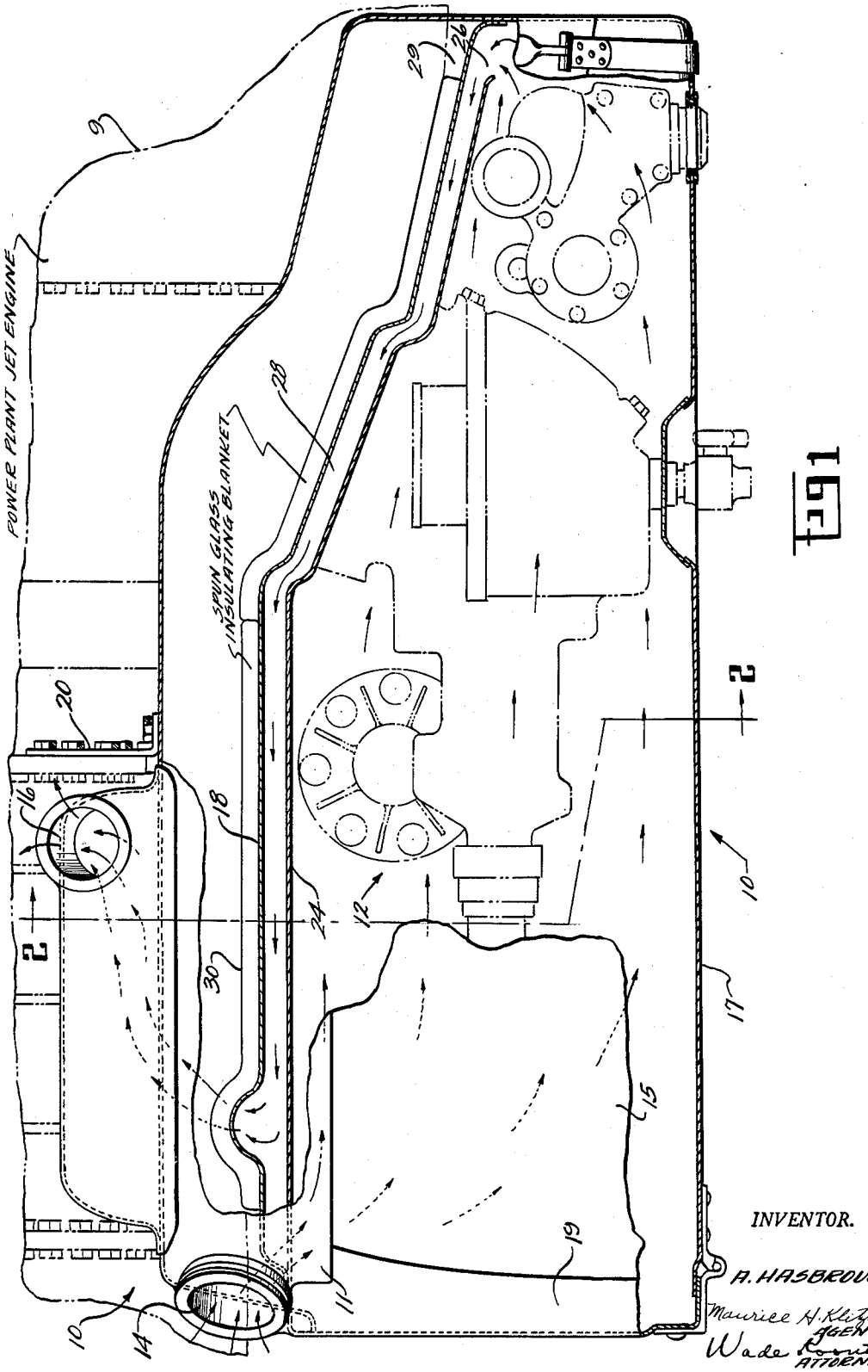


Fig. 1

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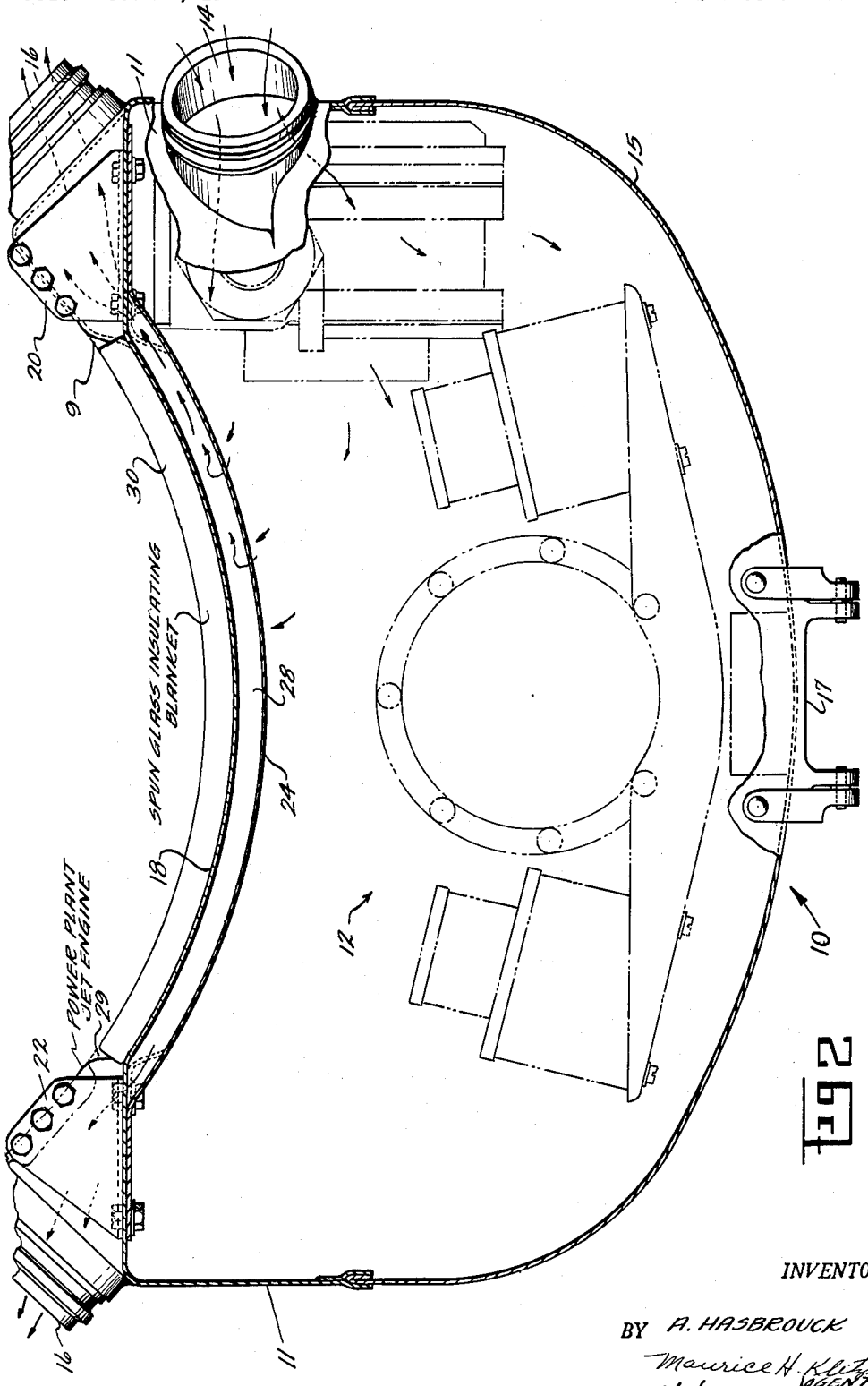


FIG. 2

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COOLING COWL FOR JET ENGINES

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6 Claims. (Cl. 60—35.6)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without payment to me of any royalty thereon.

This invention relates to a system for cooling the components of a jet engine. Since the components of the engine are in a large part subject to radiant heating from the engine, it is an object of this invention to cool the engine components so that they may perform accurately and adequately.

Another object of this invention is to provide a cooling system which will not greatly increase the drag on the airplane.

Another object of this invention is to remove the high ambient temperature air from the engine components located below the jet engine.

A further object of this invention is to prevent the high temperature issuing from the jet engine from radiating through the jet engine casing and heating the air surrounding the engine components to a high temperature.

The average temperature of the engine case immediately above the engine components and at 100% engine speed is 700° F. In order for the engine components to operate accurately it has been found necessary to hold the ambient temperature at 160° F., therefore, a still further object of this invention is to provide a cooling system which will maintain 160° F. temperature around the engine components.

The objects of the invention may be realized by the following detailed specification and accompanying drawings. In the drawings, similar parts have like numbers wherein:

Figure 1 is a side view partially in cross-section showing the lower part of the jet engine, a cowling surrounding the engine components located below the engine, and the flow of air through the cowling.

Figure 2 is a partial cross-sectional view taken on line 2—2 of Figure 1 showing one of the inlet ports and the contour of the cowling.

Referring to Figures 1 and 2, the cowling **10** encloses engine components **12**, shown in phantom lines, which comprise the fuel pump, fuel control, fuel flowmeter, pressurizing valve, dump valve, and ignition system located below the jet engine **9**. The cowling **10** comprises a permanent upper shield **11**, connected to but spaced from the engine **9**, a removable access panel **15**, which is preferably of one piece as shown but which may be made of two halves, and an underside door **17** with the ignition system mounted thereon, said door **17** being hingedly connected to the forward portion **19** of the cowling **10** so that upon opening of the door **17** or removal of said panel **15** easy access to the components for repairing or replacement is provided. Shield **11** contains air inlets **14** located on each side of the cowling for the passage of air into the cowling, and air outlets **16** for the exit of air therefrom. The top portion **18** of shield **11** is formed to surround the under portion of the engine **9** and spaced therefrom by being concaved. The shield **11** is attached to the engine by brackets **20** and **22**. A panel **24** is spaced from

the top portion **18** and is coextensive therewith and connected thereto such as by welding. The panel **24** is supplied with an opening **26** toward the rear of said panel for the passage of air therethrough. The panel **24** and upper portion **18** form a shallow passageway **28** which acts as a heat exchanger since the air flow through the air passageway continually removes a large portion of the high temperature air before it gets an opportunity to radiate through the panel **24** to the engine components **12**. Some heat radiating through the panel **24** will be picked up by the air flow from the inlet port **14** beneath the panel **24** and carried through the heat exchanger to the outlet **16**. A spun glass insulating blanket **30** is provided in the space **29** between the engine **9** and the top portion **18** of the shield **11**. This insulating blanket aids in protecting the critical component units from the radiant heat of the engine.

In operation air enters at inlets **14** passing rearwardly underneath the panel **24** and over the engine components **12**, up through the opening **26** in panel **24**, then forwardly through the heat exchanging shallow passageway **28** and then out through openings **16** to the atmosphere.

Inaccuracies result when the engine components operate in higher temperatures. Through this arrangement an operating temperature not exceeding 160° F. may be maintained about the engine components at speeds between 400 miles per hour and 522 miles per hour.

It is apparent, the specific invention shown above has been given by way of illustration and not by way of limitation and that the structures above described are subject to wide variation and modification without departing from the scope or intent of the invention, all of which variations and modifications are to be included within the scope of the present invention.

Whereby I claim:

1. A cooling system for cooling the components of an aircraft engine comprising a cowling provided with inlet air ports at the forward end thereof and outlet air ports at the sides thereof enclosing the engine components, said cowling being spaced from but connected to the engine, adjacent the upper portion of the cowling there is provided a panel having an opening at the rear portion thereof, said panel being coextensive with, spaced from, and connected to the upper side of the cowling to form a heat exchanging shallow air passageway near the top of said cowling, whereby said entering through the inlet port at the forward end of the cowling passes over the engine components to the rear and then is directed up through the opening in said panel and forward through the air passageway to the air outlets.

2. The combination of claim 1 wherein an insulating blanket is provided in the space between the engine and the cowling for protecting the passageway from heat from the engine.

3. A cowling enclosing the components of an engine, said cowling being spaced from and connected to the engine, and extending along the underside thereof, a spaced panel in said cowling coextensive with and adjacent to the upper portion of the cowling and connected thereto to form a heat exchanging shallow passageway, an inlet port below said panel at the forward end of said cowling for the entrance of air rearwardly, an opening at the rear end of said panel for the entrance of air into said shallow passageway, an outlet port at the side of said cowling for the exit of air from said cowling.

4. A combination of claim 3 wherein an insulating blanket is provided in the space between the engine and the cowling for protecting the passageway from heat from the engine.

5. A cowling enclosing the components of an engine, said cowling having a top portion adjacent said engine which is concavely curved partially surrounding said en-

gine, and a concave panel spaced from said top portion of said cowling to form a heat exchanging shallow passageway, and openings in said cowling and panel for permitting the flow of air therethrough.

6. A cowling enclosing the components of a jet engine, said cowling comprising an upper concaved shield having downwardly extending sides and inlet and outlet air ports, a removable access panel interlocking with said shield, a door hinged to the underside of said access panel, the opening of said door and the removal of said panel permitting access to the engine components.

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