E. H. SHERBONDY.

TURBO COMPRESSOR MOUNTING.

APPLICATION FILED APR. 2, 1918.

1,309,549.

Patented July 8, 1919.

3 SHEETS—SHEET 1.

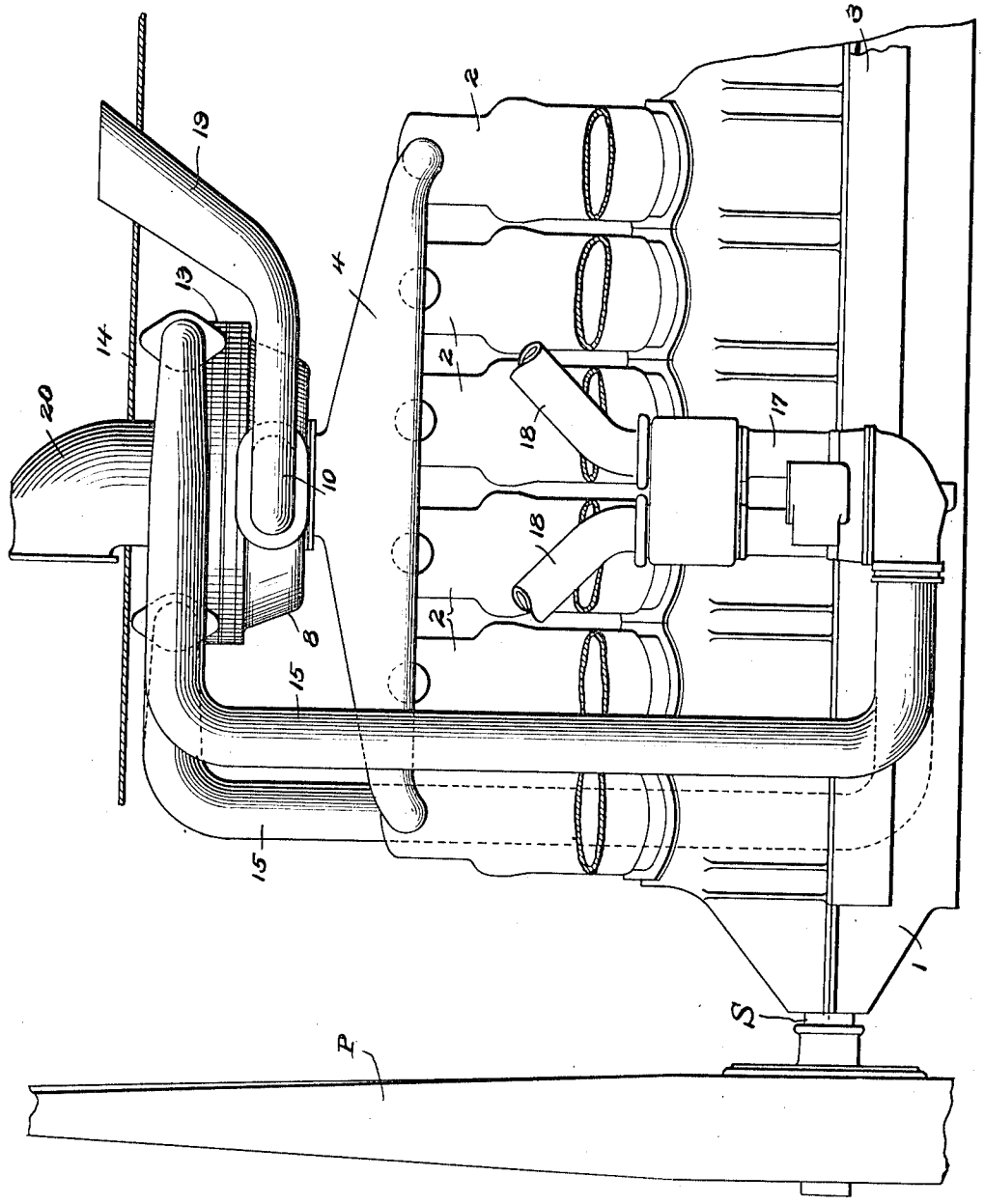


FIG. 1.

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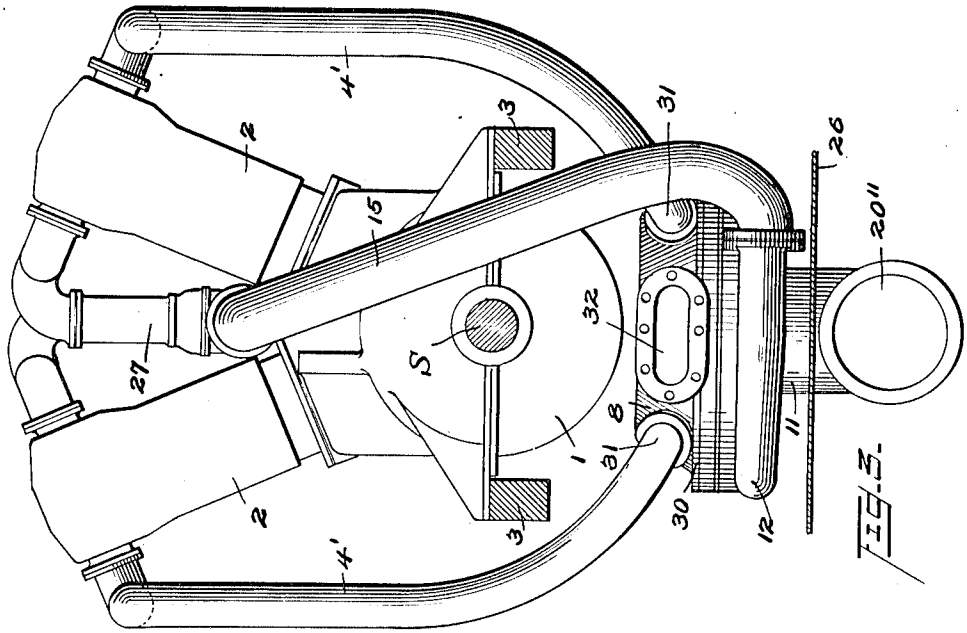


FIG. 3.

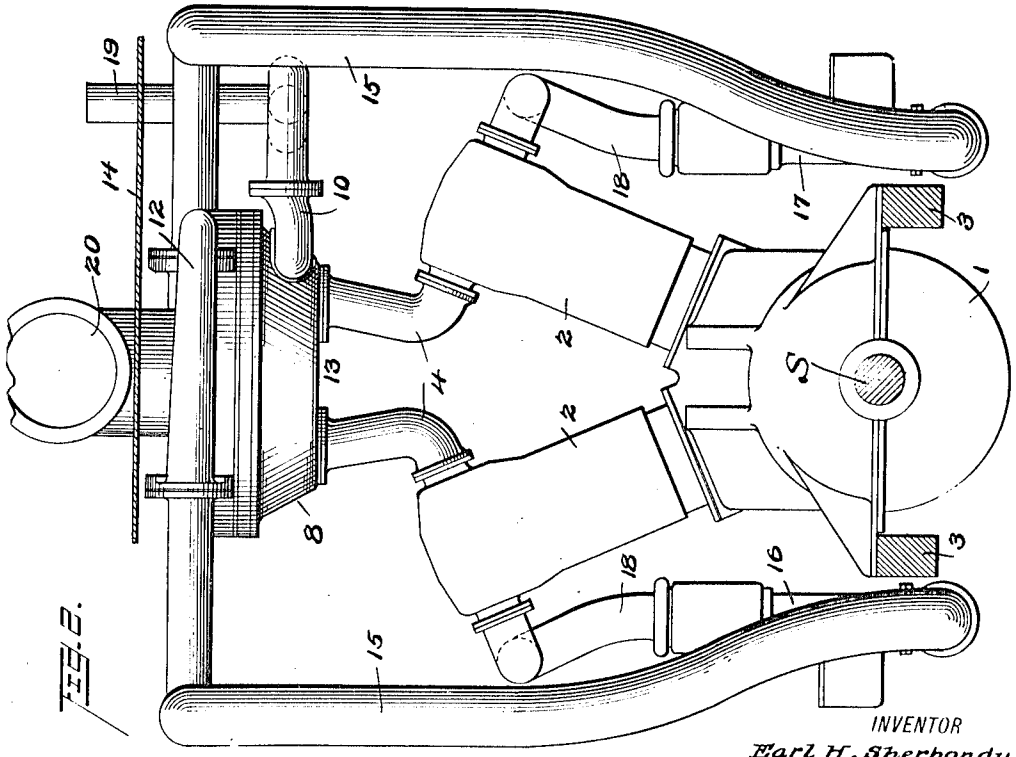


FIG 2.

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3 SHEETS—SHEET 3.

FIG. 5.

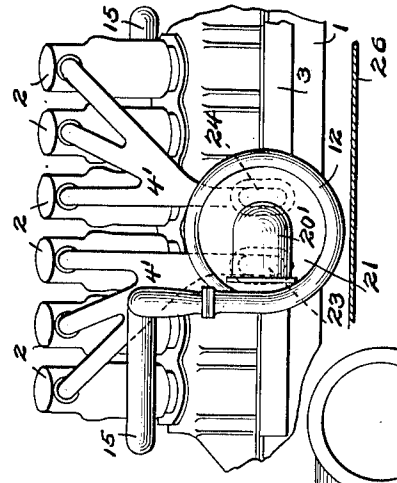


FIG. 6

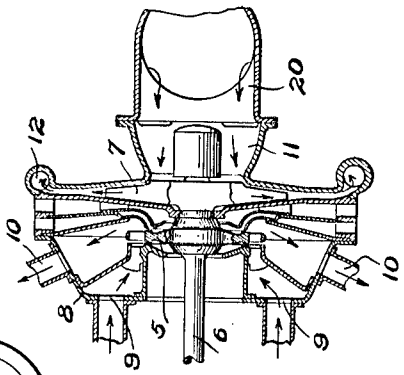
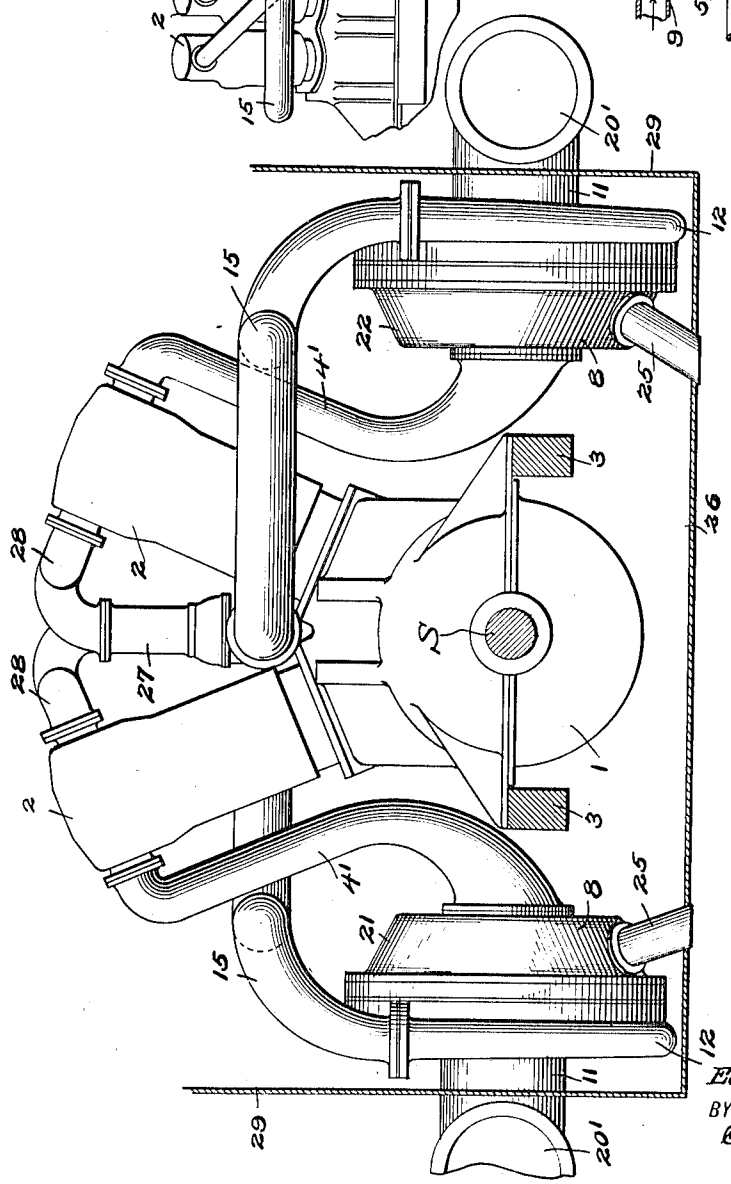


FIG. 4.



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EARL H. SHERBONDY, OF CLEVELAND, OHIO.

TURBO-COMPRESSOR MOUNTING.

1,309,549. Specification of Letters Patent. Patented July 8, 1919.

Application filed April 2, 1918. Serial No. 226,287.

To all whom it may concern:

Be it known that I, EARL H. SHERBONDY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Turbo-Compressor Mountings, of which the following is a specification.

This invention relates to means for positioning a turbo-compressor on an engine.

The turbo-compressor is designed to be operated by the exhaust gases from an internal combustion engine and consists of a turbine wheel, upon which the gases impinge and a blower wheel mounted on the same shaft and rotated by the turbine wheel, as more particularly described in my co-pending case, filed Mar. 14, 1918, Serial Number 224,356.

The air compressed by the compressor wheel pumps air to the carbureter to maintain a constant air supply regardless of the height at which the airplane may be.

It is an object of the invention to locate the turbo-compressor in such a way that it itself, will take up a minimum of space, that the mounting will be as simple as possible and that the exhaust pipes leading into the turbo-compressor will be as short as possible.

It is the further object of the invention to so locate the turbo-compressor that air may be readily led thereto from the exterior of the fuselage.

Other objects and advantages will appear as the description proceeds.

In the drawings, Figure 1 represents a side view of the turbo-compressor mounted above the engine; Fig. 2 is an end view of the same; Fig. 3 is an end view showing the turbo-compressor mounted below the engine; Fig. 4 is an end view representing two turbo-compressors mounted on opposite sides of the engine; Fig. 5 is a side view of the same; and Fig. 6 shows certain details in the turbo-compressor itself.

Referring now to the drawings in which similar reference characters indicate similar parts, an internal combustion engine of the airplane type is indicated in Fig. 1, the crank case thereof being indicated at 1, the cylinders at 2, supported on suitable beams 3.

As is usual in installations of V-type engines in an airplane fuselage, the crankshaft S of the engine is substantially horizontal and substantially parallel to the longitudinal axis of the fuselage.

As shown in Fig. 2, the engine is of the V-type and in the embodiment shown in Fig. 2, the exhaust pipes 4, are positioned on the inside of the V. The engine may carry a propeller P of any desired type.

Referring now to Fig. 6, the turbo-compressor consists of the turbine wheel 5 mounted on the shaft 6, on which the compressor wheel 7 is mounted. The turbine casing 8 carries ports 9 through which the exhaust gases are led into the casing 8, thence through the buckets of the turbine wheel 5 and out through the exhaust ports 10, all as more particularly described in my co-pending application, serial number 224,892, filed March 26, 1918. The air passes into the blower wheel through the opening 11, is compressed and passes into the air delivery pipe 12, from whence it is led to the carbureter.

Referring now to Fig. 1, the turbo-compressor designated generally 13, is shown mounted on and supported by the two exhaust manifolds 4, the two manifolds serving to carry the exhaust gases into the casing 8 through the two ports 9, at the same time providing two points of support for the turbo-compressor unit. The turbo-compressor in this instance, is mounted to turn on a vertical axis and is fitted between the top of the manifold 4 and the top of the fuselage 14. The air compressed by the compressor wheel 7, is delivered into the delivery pipe 12 and passes thence into the pipes 15, which lead it to the two carbureters 16 and 17 on opposite sides of the engine. Inlet pipes 18 carry the carbureted mixture to the inlet manifolds (not shown).

The gases after having passed through the buckets of the turbine wheel, escape through the ports 10 and thence to the atmosphere through the final exhaust pipe 19.

The inlet mouth 11 is provided with an air intake horn 20, which passes through the top of the fuselage and faces in the direction of travel of the airplane, so that the rush of air past the vehicle will aid the ingress of air into the mouth 11. The horn 20 is also

preferably located in the blast from the propeller P, the additional air pressure resulting therefrom, still further aiding the ingress of air into the air intake mouth 11.

The simplicity of the mounting, its compactness and its ready accessibility are important features of this invention and may at this point be emphasized.

Fig. 2 shows the exhaust manifold on the inside of the V. If, however, the engine is of the Liberty type, which has the exhaust manifolds on the outside, the turbo-compressor could still be mounted substantially as shown in Fig. 2, necessitating a slight re-arrangement of the points of entry of the exhaust pipes into the turbine casing 8; this re-arrangement being described in detail in my co-pending case, Serial Number, 224,892, filed March 26, 1918.

Referring now to Fig. 4, two turbo-compressor units 21 and 22 are shown, located on opposite sides of the V-type engine.

Two exhaust manifolds 4′, lead the exhaust gases from the cylinders 2 to each of the turbo-compressor units 21 and 22, the gases passing into the turbine through ports 23 and 24. The exhaust manifolds 4′ are flanged at their lower end and are rigidly attached to the casings 8 of the turbo-compressor units, so that these units are practically supported by the exhaust manifolds 4′. The exhaust gases after having passed through the turbine wheel, escape to the atmosphere through the final exhaust pipe 25, which leads out below the body of the fuselage 26.

The collector rings 12 of the turbo-compressors connect with air delivery pipes 15, which lead the compressed air to the carbureters 27, but one of which is shown in Fig. 4, located inside the V. Intake manifolds are shown at 28. The air delivery pipe 15, from one turbo-compressor, may lead to the front of the engine as shown in Fig. 5 and the other one may lead around to the rear of the engine, both then passing into the carbureters located between the cylinders.

The turbo-compressor units are provided with air intake horns 20′, connected with the intakes 11 of the compressor wheels 7, passing out through the side 29, of the fuselage and facing in the direction of travel of the airplane. The horns 20′ are also preferably located in the propeller blast, for reasons above pointed out, in connection with the horns 20.

In this modification, it is evident that the turbine wheel and compressor wheel rotate on an axis at substantially right angles to the direction of travel of the airplane and substantially at right angles to the longitudinal axis of the engine. It should be noted also, that the space under the overhanging V cylinders is utilized in this particular mounting of the turbo-compressor units. Of course, if desired, but one, instead of two, turbo-compressor units may be used.

In Fig. 4, the exhaust pipes are shown on the outside of the V as in the standard Liberty motor. It is evident, however, that even with the exhaust pipes on the inside, this particular mounting could still be used, but would be less desirable because then the carbureters would be on the outside and so would interfere to some extent, with this mounting.

Referring now to Fig. 3, an engine of the Liberty type is shown with the exhaust pipes 4′ located on the outside of the V, as shown also in Fig. 4. The turbo-compressor unit designated 30, is here shown mounted below the engine, just reversed from the position shown in Fig. 2. The turbine casing designated 8, is provided with inlet ports 31 and exhaust ports 32. Only one exhaust 32 is shown in Fig. 2, the other being located on the opposite side of the casing 8, as more particularly illustrated in my said co-pending application 224892.

The collector ring 12 of the compressor wheel, is connected to an air delivery pipe 15, which leads the compressed air to one or more carbureters 27, located inside the V.

The air intake mouth 11, may be provided with a horn 20″, passing out through the bottom 26 of the fuselage facing in the direction of travel of the airplane and positioned in the propeller blast for reasons already stated in connection with the horn 20.

In this modification, the shaft 6 of the turbo-compressor is substantially vertical. The turbo-compressor unit is out of the way and so will not interfere in any way with the accessibility of the valves, spark plugs and other devices located at the top of the cylinders 2.

In the modification shown in Fig. 3, if the exhaust pipes were on the inside of the V, the turbo-compressor 30, could still be mounted substantially as shown; a slight re-arrangement of the exhaust pipes perhaps, being necessary.

The exhaust pipes 4′ in Fig. 3, as well as in the other modifications, serve as the main support for the turbo-compressor units to which they are attached, thus saving the building of separate brackets, standards or other devices to hold the turbo-compressor units in position. This dual function of the exhaust pipes represents an important simplification and saving of space, which is of particular advantage in an airplane fuselage where space is so limited.

It should be understood that the invention may be carried out in other ways than

as shown and that the disclosure should be considered in an illustrative sense and not in a limiting sense.

I claim—

1. The combination with a V-type airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor mounted on said engine and adapted to be operated by the waste gases from the engine to supply air for combustion to said engine and means to support said turbo-compressor so that its axis is substantially vertical.

2. The combination with a V-type airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor mounted on said engine and adapted to be operated by the waste gases from the engine to supply air for combustion to said engine, means to support said turbo-compressor so that its axis is substantially vertical and air intake means for said turbo-compressor extending outside the airplane fuselage and facing in the direction of travel of the airplane.

3. The combination with a V-type airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor mounted on said engine and adapted to be operated by the waste gases from the engine to supply air for combustion to said engine, means to support said turbo-compressor so that its axis is substantially vertical and air intake means for said turbo-compressor extending outside the airplane fuselage and facing in the direction of travel of the airplane, said air intake means being also positioned in the propeller blast.

4. The combination with a V-type airplane engine, provided with a substantially horizontal crankshaft, of exhaust manifolds positioned on the inside of the V, a turbo-compressor adapted to be operated by the waste gases from the engine to supply air for combustion to said engine, said turbo-compressor being attached to and supported by said exhaust manifolds so that its axis is substantially vertical.

5. The combination with an airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor adapted to be operated by the waste gases from the engine to supply air for combustion to the engine and means for mounting said turbo-compressor so that its axis is substantially vertical.

6. The combination with an engine, provided with a substantially horizontal crankshaft, an exhaust manifold therefor, a turbo-compressor adapted to be operated by the waste gases from the engine to supply air for combustion to the engine, the turbo-compressor being attached to and supported by said exhaust manifold so that its axis is substantially vertical.

7. The combination with an airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor adapted to be operated by the waste gases from the engine to supply air for combustion to the engine, means for mounting said turbo-compressor so that its axis is substantially vertical and air intake means for said turbo-compressor facing in the direction of travel of the airplane.

8. The combination with an airplane engine, provided with a substantially horizontal crankshaft, an exhaust manifold therefor, a turbo-compressor adapted to be operated by the waste gases from the engine to supply air for combustion to the engine, the turbo-compressor being attached to and supported by said exhaust manifold so that its axis is substantially vertical and air intake means for said turbo-compressor facing in the direction of travel of the airplane.

9. The combination as claimed in claim 7, the said air intake means being also positioned in the propeller blast.

10. The combination as claimed in claim 8, the said air intake means being also positioned in the propeller blast.

11. The combination with an airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor adapted to be operated by the waste energy from the engine to supply air for combustion in the engine, the turbo-compressor being located so that its axis is substantially transverse with respect to the longitudinal axis of the engine.

12. The combination with an engine, provided with a substantially horizontal crankshaft, an exhaust manifold associated therewith, a turbo-compressor adapted to be operated by the waste energy from the engine to supply air for combustion to the engine, the turbo-compressor being attached to and supported by said exhaust manifold so that its axis is substantially transverse with respect to the longitudinal axis of the engine.

13. The combination with an airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor adapted to be operated by the waste gases from the engine to supply air for combustion in the engine, means to support said turbo-compressor so that its axis is substantially transverse to the longitudinal axis of the engine and air intake means for said turbo-compressor passing outside the fuselage and facing in the direction of travel of the airplane.

14. The combination with an airplane engine, provided with a substantially horizontal crankshaft, of a turbo-compressor adapted to be operated by the waste gases from the engine to supply air for combustion to the engine, an exhaust manifold, said turbo-

compressor being attached to and supported by said exhaust manifold so that its axis is substantially transverse to the longitudinal axis of the engine and air intake means for said air compressor extending outside the fuselage and facing in the direction of travel of the vehicle.

15. The combination as claimed in claim 13, said air intake means being also positioned in the propeller blast.

16. The combination as claimed in claim 14, said air intake means being also positioned in the propeller blast.

In testimony whereof I affix my signature.

EARL H. SHERBONDY.