

Steam Car Developments and Steam Aviation

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The Besler Steam-Driven Aeroplane.

At the Oakland Airport, California, U.S.A. a short time ago a silent 'plane slanted across the sky, showing a thin trail of white vapour. It was so silent in operation that spectators heard the pilot shout a greeting to those on the ground. He banked into a turn, and was watched sliding to a landing, and, with the propeller spinning backwards – roll to a stop in less than a hundred feet. This was Mr. William Besler giving his first demonstration flight, and it was, we think, for the first time in history that a man had flown in a steam-driven aeroplane.

This steam driven machine is the achievement of two brothers—Messrs. George and William Besler, and is the result of experimental pioneer work carried out by them during the past three years. Through their endeavours—undertaken with a good deal of secrecy—the steam-driven aeroplane, the possibilities of which have long been discussed, as become an accomplished fact. Our American correspondent, to whom we are indebted for the following particulars, tells us that passengers on the stem 'plane in full flight are able to carry on a conversation as easily as when riding in an open motor car. The pilot, when flying at 200 ft. altitude, called to the spectators below, and heard their answering calls.

During the demonstration Mr. Besler made three flights, taking off, circling about, and landing, to show the ease of control. What was generally remarked upon was the almost complete silence. The constant, wearing vibration of the internal combustion engine was gone; the elastic pull and push of the steam engine had supplanted it. Each time as the machine swooped down and the landing wheels touched ground, the pilot pulled back a small lever at the side of the cockpit and the steam engine at the nose of the 'plane instantly reversed, whirling the propeller backwards, creating a powerful braking effect which reduced the landing runs to a very short distance.

This is one of the fundamental characteristics of a reversing steam engine and that which can never be imitated by an explosion motor. There is, moreover, the fact that the reversed propeller applies its braking effect above the centre of gravity of the machine, and thus prevents it nosing over in a quick stop. Brakes applied to the landing wheels of a steam-driven 'plane are not necessary. On an I.C. 'plane landing wheel brakes—suddenly applied—have been a cause of somersaulting, and a ground crash. It is said that the Besler

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'plane, coming in at 50 m.p.h., can sit down, and come to a stop, in a field scarcely 100 feet square.

Turning now to the power-plant, this, of course, is of Doble Steam Motors and Besler's design and manufacture; and its main details are already familiar to many of our readers. The production of steam automatically, at a practically constant pressure and degree of superheat, from the forced-feed or flash steam generator, and the patented electric controls, by which it is accomplished; are fully described in the Doble-Besler Patent Specification, which we reproduce on another page.

The steam generator is fed with water by a steam donkey pump, the exhaust from which is first taken through a Feed-water heater, before finally passing into the condenser. The burner is similar to that described in our May 1931 issue of "S.C.D." The whole of the power plant is installed at the nose of the aeroplane, with the engine forward of the steam generator. The engine is a 2-cylindered compound, double-acting of a V-design, with the cylinders H.P. 3 inches and L.P. 5¼ inches bore, by 3 inches stroke. It develops 150 B.H.P. at 1,200 lbs. (temperature 800 degrees Fahr.) steam pressure, and about 1,650 revolutions per minute. The engine was not built particularly for lightness—it weighs 180 lbs.—and by using special aircraft materials, its weight could be lessened.

The steam generator tubing is coiled into flat spirals, and totals about 500 feet in length. The lower coils, into which the feed-water is introduced, are of tube about 3/8 of an inch bore, and the upper coils from which the superheated steam is drawn off, are about 5/8 of an inch bore. The water supply to the coils is thermostatically controlled to keep the steam temperature constant irrespective of the steam pressure.

Under the fuselage nose is the condenser—which is simply a section of an ordinary petrol car radiator, and this is said to be sufficient to recover more than ninety per cent. of the water from the exhaust steam

At the start of a flight, the pilot climbs into the cockpit and flips over a small switch. The electric blower immediately goes into action, driving air mixed with oil spray into the combustion chamber. Here, an electric spark ignites the mixture and sends a sheet of flame roaring downwards among the spiral boiler coils. A minute or so later, steam pressure is high enough for take-off. All the pilot has to do from then on, (as regards the power unit) is to operate the throttle and the reverse lever.

The tests have shown that ten gallons of water is sufficient for a flight of 400 miles. By increasing the size and efficiency of the condenser, the Besler Brothers believe they can make this amount of water last indefinitely.

The prospect of steam 'planes on the skyways opens up fascinating possibilities. Burning, as they do, ordinary furnace oil of so high a flash point that it merely smoulders if struck by the flame of a blowtorch, steam power plants have little to fear from the menace of fire. Moreover, fuel oil is cheap, sufficient for a hundred-mile trip can be bought for 1s. 8d.

At any height above a thousand feet a steam-driven 'plane is quite inaudible from below, this would give it particular value for military work.

AND STEAM AVIATION

Noiseless war 'planes have long been sought; but attempting to muffle the noise of an I.C. aerial engine reduces its power to such an extent that the plan is impracticable. A steam power plant, silent by nature, would permit of long-distance raids above the clouds by 'planes giving off no tell-tale drone of motors to warn the enemy, or to aid in directing anti-aircraft fire.

It is interesting to speculate upon the possibilities of steam on the airways of the stratosphere. In the thin atmosphere of this region, ten miles, or more, above the surface of the earth, experts predict, the high speed transport ships of the future will fly. The chief stumbling block at present is the internal combustion motor. It steadily loses power as it ascends, and it has been said that a motor, which delivers 150 H.P. at seal level, will only give about half that power when it has climbed to 20,000 feet altitude. At 30,000 feet the sea level horse power of 150, will probably have dwindled to about 45 horse power. And you are then only half way to the stratosphere!

Superchargers, driving a blast of air into the carburetter to make up for the reduced pressure in rarefied atmospheres, help these internal combustion motors, but they never completely prevent loss of power at high altitudes. On the other hand, a steam engine loses no power at all with altitude, and it gains in efficiency the higher it climbs—partly because the exhaust back-pressure is less in thin air than at sea level. Thus it seems that the perfecting of steam power aerial units will be an important step towards conquering the stratosphere.

There are several other engineering firms actively engaged in developing stem aviation, and we give some brief details herewith. These may perhaps, be of interest to our readers. In the first place, we are indebted to the "Daily Telegraph" of April 16, 1934, for the following extract:

Details are now available of the steam-driven aeroplane which has been under secret construction on the outskirts of Berlin for many months. The inventor is Herr Huettner, chief engineer of the Klengenbergr electricity works.

The machine is not yet finished, but the plans, according to the "Berliner Tageblatt" have been submitted to experts and found to be theoretically satisfactory. They have been elaborated down to the smallest detail, and give rise to the following expectations:

Range: 60 to 70 hours non-stop flight.

Speed: 230 m.p.h. on starting, rising to a maximum of 260 m.p.h. when the "ceiling" is reached.

Maximum height: 43,000 ft.

Load: One ton for a non-stop flight of 60 hours.

Engine Power: 2,500 h.p.

Length: 6 ft. Breadth: 108 ft.

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If practice agrees with theory, a non-stop flight will be possible to Japan, Capetown, San Francisco, Rio-de-janeiro, or Singapore, of more than one-third of the circumference of the earth.

REVOLVING BOILERS.

The secret of these claims is said to lie in the fact that for the first time Herr Huettner has succeeded in solving the problem of a satisfactory ratio of weight to power.

Herr Huettner's solution consists of a revolving boiler combined with a steam turbine. If successful it will, of course, also be applied to motor-cars.

The fuel used is oil gas, and in view of the great power developed, Herr Huettner has adopted twin propellers, revolving in opposite directions.

In March last the Daily Telegraph Prague Correspondent reported that an article in the Czechoslovak newspaper "Prager Tagblatt," giving details of Herr Huettner's invention, has led to the arrest of the Berlin correspondent of that paper.

The following steam-aviation items have also been received from various sources:

In Akron, Ohio, last autumn, a local inventor, Harold C. Johnson, announced the completion of a steam engine with two opposed cylinders, weighing, complete with boiler, only 146 pounds. Some months earlier, it became known that the Great Lakes Aircraft Company, at Cleveland, Ohio, was working upon an experimental steam-driven biplane. Recent dispatches from France reported that a Paris mechanic had perfected a light steam power plant for aeroplanes. Another news item, coming from Sweden, told of steam-turbine engineers who are working on a new-type turbine for aircraft use; while a third—from Italy—carried the information that G. A. Raffaelli, an aeronautical engineer, had announced a steam engine for stratosphere machines. But we think, it was the two California inventors—the Besler Brothers—who first achieved steam-driven flight.

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Some adventures with a Rejuvenated Stanley Steam Car of 1912 Vintage.

BY RALPH NEVILLE.

One day when passing a scrap iron dump near Nottingham, I saw what appeared to be a vehicle which bore no resemblance to the ordinary inhabitants of the "bone-yard."

On close inspection, after removing at least the remains of four cars and a heap of tyres; I discover the remains the Stanley, the accumulation of rust and