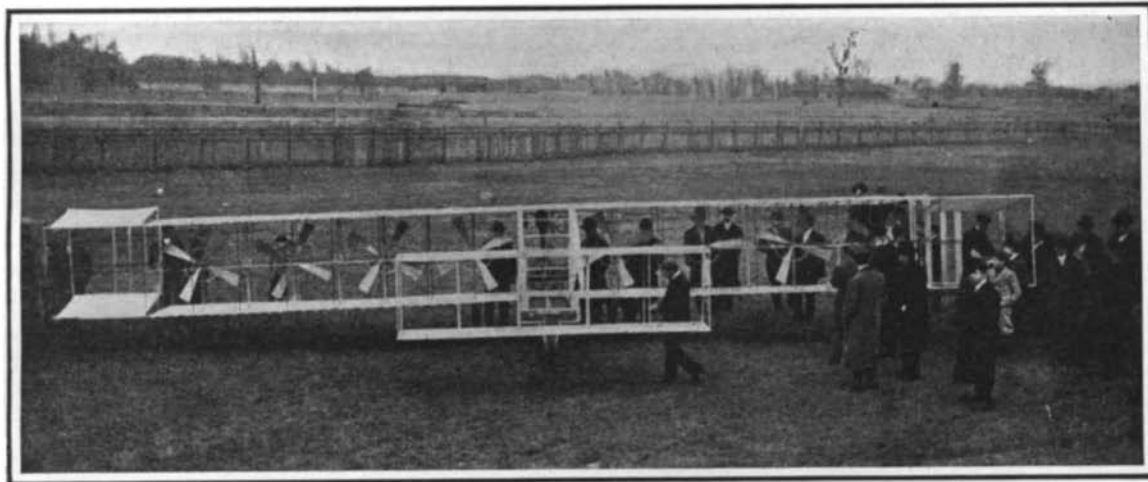


30,000 tons, to which America will be able to add 15,000 tons. In 1909 the capital invested in this industry will certainly exceed \$30,000,000. The price of the metal has fallen below 18 cents per pound.

**A NOVEL FRENCH AEROPLANE.**

The peculiar aeroplane illustrated on this page is that of M. Givaudan. It has recently been constructed at Vermorel. It is of the multicellular type, and consists of two concentric drums mounted near the ends of a body framework that passes through the center of each, and carries at its forward end a tractor screw. These drums are united by small planes spaced uniformly apart, thus forming a cellular structure. The front cell thus formed is movable in every direction, while the rear one is stationary. The carrying surfaces of this machine are so formed, that the machine will have the same amount of supporting surface whatever its lateral inclination may be, so that when it tips to one side in making a turn, or from any other cause, the weight carried per square foot of surface remains the same; while, on the other hand, the center of gravity being situated below the center of pressure, the machine will return automatically to its normal position and be in equilibrium. The two cells are placed sufficiently far enough apart, so that the front one will not interfere seriously with the one at the rear. There are no rudders, the movement of the front cell both sideways and up and down being used in place of these to direct the machine both laterally and in a vertical plane.

The radiating planes of the drums act as carrying and stabilizing surfaces. Only the projecting surface of these radiating planes is counted upon as useful carrying surface. Within both the front and rear drums there is a horizontal cross shaft supported upon the main frame. The front cell rests on the main frame by a bearing, which makes it possible for this cell to oscillate about a vertical axis, while the horizontal shaft just mentioned can oscillate upon a horizontal axis.



**Front view of the Kimball biplane.**

The notable features of this machine are the multiple propellers and rudders between the planes at the rear of the wing tips.

Inclination of the front cell in a vertical direction varies the angle of incidence, and causes the machine to rise or descend; it thus takes the place of the horizontal rudder. Inclination of the cell in the horizontal direction fulfills the rôle of the vertical rudder. This double movement of the cell is obtained by means of a rod connecting two levers of sufficient length to make the operation of the cell possible without too great fatigue. The levers have a band-brake arrangement to hold the cell in the position in which it is set.

The machine rests on four wheels, the front pair of which can be turned in order to steer the machine. The wheels are fitted with suitable springs to absorb the shock when landing. The propeller is 2.4 meters (7.87 feet) in diameter, and is driven from the motor through reduction gears. The motor is a special eight-cylinder V engine of the air-cooled type. The bore and stroke are 90 and 120 millimeters (3.6 and 4.8 inches) respectively. The motor develops 40 horsepower and weighs 80 kilogrammes (176 pounds) including the fly-wheel, two carbureters, and magneto. All the valves are mechanically operated from a single camshaft. This motor, notwithstanding its light weight and the fact that it is air-cooled, has been run several hours consecutively. M. Givaudan is one of the first men to construct a motor of the V type and place it upon the market.

This new aeroplane is very interesting, but it is doubtful whether a freakish machine of this kind can be made to operate satisfactorily. If any successful trials are made, we shall be glad to apprise our readers of the fact.

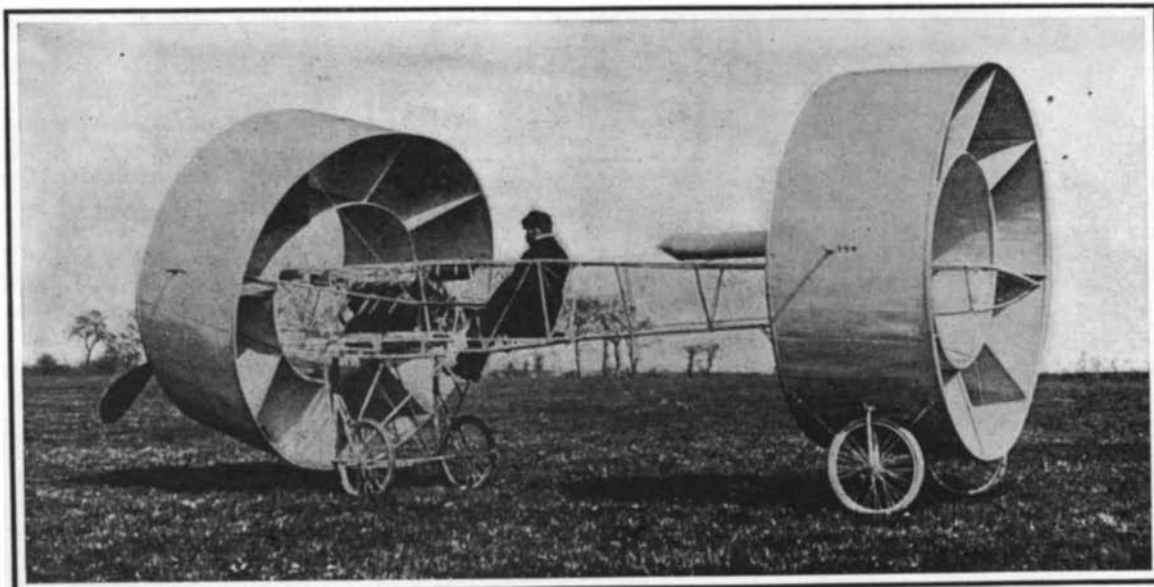
**SOME NEW AMERICAN AEROPLANES.**

Recent activity by members of the Aeronautic Society has resulted in the production of several new aeroplanes at Morris Park, one or two of which have

already been given their first trials. At the present time there are completed or under construction upon the society's grounds, a monoplane, four biplanes, and one triplane, as well as a new helicopter.

One of the novel machines now completed, and which has already undergone several tests, is the triplane of

the propellers will draw the air back below the middle plane, and thus tend to check or neutralize the interference of the lower plane. The two propellers, which are driven in opposite directions by chains from the motor, are 8 feet in diameter, with an 11-foot pitch. They are made of wood and have quite narrow blades,



**The Givaudan circular aeroplane—a new French machine of novel design.**

Morris Bokor. This machine is shown in one of our illustrations. Its three planes have a spread of 26 feet and a width of 6 1/2 feet, making a total surface of 507 square feet. A 14 x 2 1/2 foot horizontal rudder has 70 square feet additional supporting surface, while the tail, consisting of two pairs of surfaces at a sharp dihedral angle, is 14 feet long and has 72 square feet. The total weight of the machine, with water, oil, and gasoline, and with Mr. Bokor on board is 1,181 pounds,

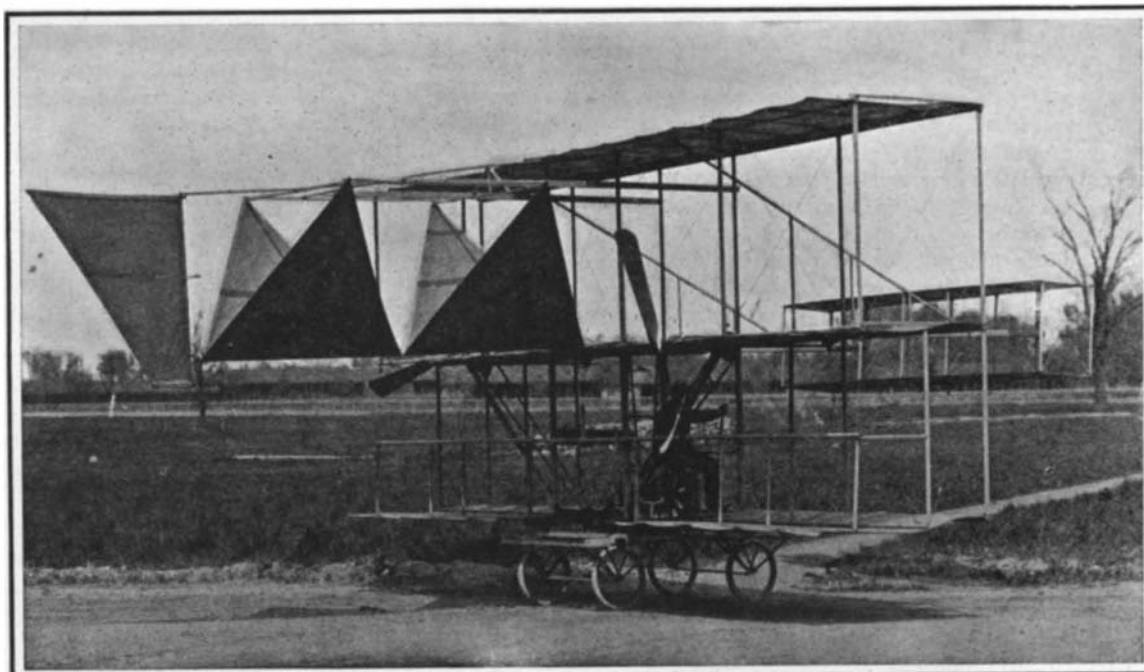
covered partly with cloth. The propellers make one revolution to 3 1/2 of the motor. They gave 248 pounds thrust at 500 R. P. M. with the machine held stationary. The motor used is a four-cylinder, 4 x 4-inch, A and B four-cycle automobile motor. The inventor claims 38 horse-power for it at 1,800 R. P. M., but this figure is probably somewhat high. The motor alone weighs 310 pounds, but with all accessories including a 15-pound magneto, a 30-pound Livingston radiator, 30 pounds of water, and 34 pounds of fuel and fuel tank, the weight is 419 pounds.

The main feature of the Bokor aeroplane is the use of a pendulum seat for the aviator, which is connected by cables to the ends of the lower plane at the rear. The outer rear parts of this plane are supported upon flexible trusses running along it, and which are in turn carried upon hinged rods extending back from the vertical uprights at the ends of the planes.

When the machine tips to one side or the other the aviator's seat remains horizontal and exerts a pull upon the flexible rear edges of the lower plane, thus giving it the proper inclination to cause the machine to right itself again. Another feature of this aeroplane is the tail, consisting of two large tetrahedral-like cells, which should aid in giving the machine stability. Since the photograph reproduced herewith was taken, the inventor has mounted his aeroplane upon skids. In starting, the whole machine is placed upon a four-wheeled chassis, to enable it to run along upon the ground. This chassis is left behind when the machine rises. In all probability, however, a larger engine will have to be installed before the triplane can be made to soar.

The other American aeroplane which we illustrate is that of Mr. Wilbur M. Kimball, the secretary of the Aeronautic Society. Mr. Kimball, it will be remembered, last fall built a helicopter consisting of a large number of small propellers. In constructing his bi-

*(Continued on page 431.)*



**Three-quarter rear view of the Bokor triplane.**

The double V-shaped tail and swinging aviator's seat (which warps the lower plane) are this machine's main features.

**NEW FRENCH AND AMERICAN AEROPLANES.**