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Editor's note: Hugh T. Harrington, editor emeritus of the Journal of the American Revolution (allthingsliberty.com), is an independent researcher and author whose books include, Remembering Milledgeville (History Press, 2005), More Milledgeville Memories (History Press, 2006), Civil War Milledgeville (History Press, 2005), and biography of 1890s magician, Annie Abbott, "The Little Georgia Magnet" (Createspace, 2010). His articles have appeared in the Journal of Military History, Georgia Historical Quarterly, America's Civil War, Southern Campaigns of the American Revolution, American Revolution, Muzzle Blasts, and others. He has written extensively on Sherlock Holmes and is a member of the Baker Street Irregulars. He lives in Gainesville, Georgia.

William Martin and his Glider - 1909

by Hugh Harrington

At the turn of the 20th century clever men across the world were struggling with the myriad of problems associated with manned flying machines. Among them was William H. Martin, born in 1855 at Canton, Ohio. He was primarily a farmer, although he studied engineering in his spare time. Ever since childhood he had liked to make things. In the 1890's he turned his attention to manned flight.

William & Almina Martin with model of glider

Photo used by permission of the McKinley Presidential Library and Museum, Canton, Ohio

He would make toy models he could launch into the air by hand or power with rubber bands. His experimentation led him to a high-wing monoplane design (1). He filed for a U.S. patent January 3, 1908 (2). His design had some unusual, even unique, features. His intention was to have his aircraft capable of manned flight powered by a motor driving two propellers, positioned in tandem, revolving in opposite directions. However, he was unable to acquire a light, yet powerful motor. Therefore, his aircraft remained a glider.

The most unusual characteristic of his design is two "sheets," or "balancing planes" as he called them, which extend from the lower frame of the aircraft at an angle and attach near the center of each side of the wing. As seen head on, these two sheets form a "V", with the upper ends of the "V" attaching near the middle of the wing on either side of the frame.

Martin explains the function of these two sheets in his patent application:

"*Now my invention comprehends two general principles, one serving to effect the automatic adjustment of the aeroplane to such an angle to the horizontal as to cause it to have a buoyant tendency from the resultant upward pressure against its lower aides. The other principle, is to provide for the automatic balance, or self-righting quality of the aeroplane as against the tendency to dip sidewise about its axial line of flight."*

This author's interpretation of the above is that the pressure of air moving against the underside of the wing will cause the wing to "have a buoyant tendency." The angled sheets provide a "self-right quality" due to air pressure pressing on the sheets when they are not moving directly, edge-on, through the air.

Martin continued explaining the functioning of the sheets in the patent application:

"*If from the wind or other extraneous disturbing forces, the aeroplane is tilted sidewise it will be seen that the angle which the sheet makes to the vertical is less than formerly and the angle which the other sheet makes to the vertical will be greater, consequently the more nearly horizontal surface will be in a position to be pressed upwardly with the greater power than the more nearly vertical surface and consequently the machine will at once right itself, producing an automatic balancing effect. These sheets I term balancing planes.*"

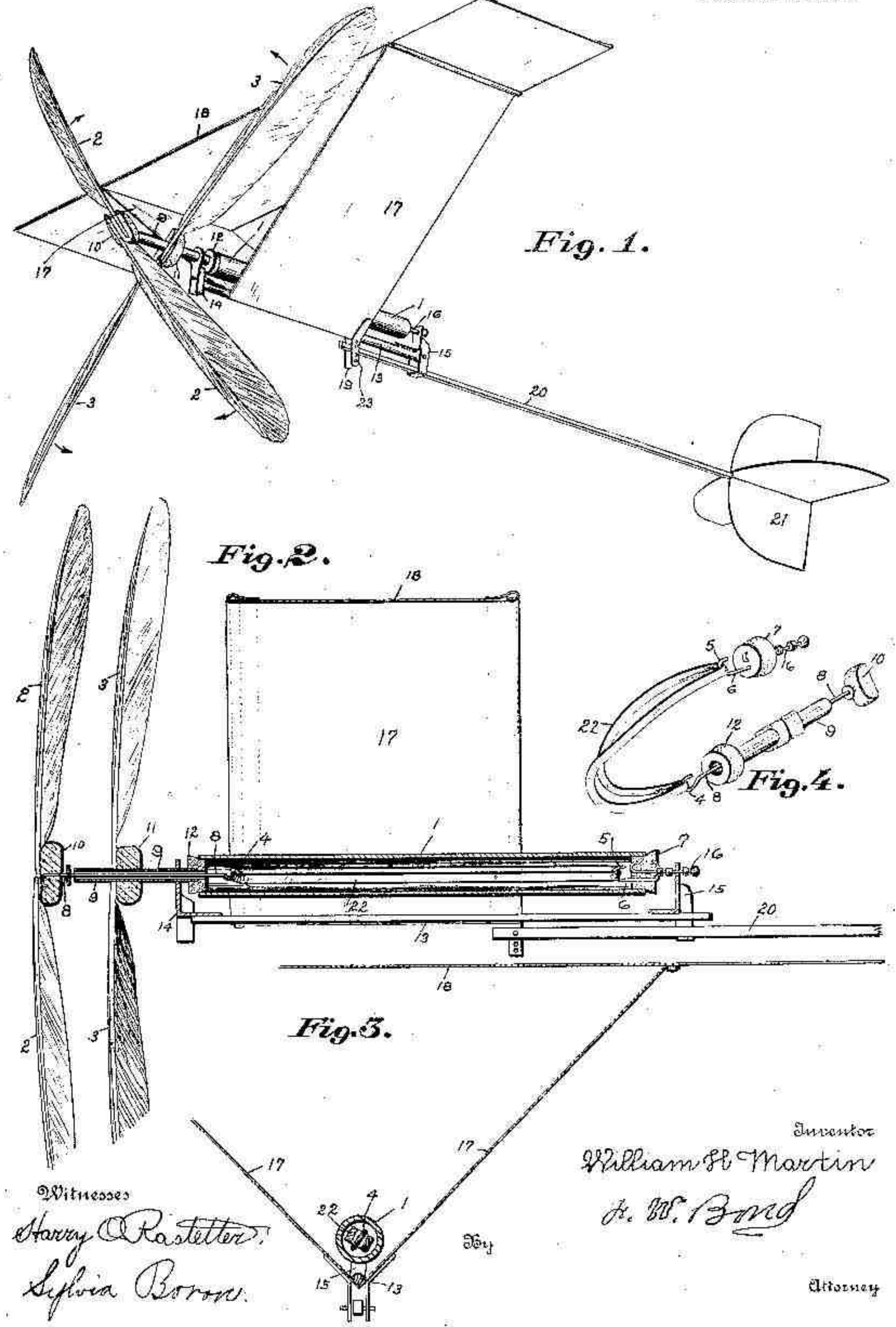
It is clear in the patent application that Martin's principle invention claim, or discovery, was the sheets/balancing planes which he believed would provide stability in full-sized aircraft as well as in toys. The sheets/balancing planes are entirely flat, as is the wing. None are provided with a curvature in either the patent application diagram or in 1909 photos of the glider.

Martin first appeared in the Canton, Ohio, *Repository* on January 22, 1908, where he explained the features of his patent application.(3) He kept tinkering with his models, and over the winter of 1908-9, he made his full-sized glider.

W. H. MARTIN.
FLYING MACHINE.
APPLICATION FILED JAN. 3, 1908.

935,384.

Patented Sept. 28, 1909.
2 SHEETS—SHEET 1.



UNITED STATES PATENT OFFICE.

WILLIAM H. MARTIN, OF CANTON, OHIO.

FLYING-MACHINE.

935,384. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed January 3, 1908. Serial No. 409,232.

To all whom it may concern:

Be it known that I, WILLIAM H. MARTIN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Flying-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing, making a part of this specification, in which,—

Figure 1 is a perspective view of the entire device in the position of flight. Fig. 2 is a vertical longitudinal section. Fig. 3 is a partial transverse section taken through the aeroplane. Fig. 4 is a detail view showing the torsional power spring and its attachments, detached from its inclosing frame, and Figs. 5 and 6 are diagrammatic views illustrating the principle upon which my flying machine is constructed.

The present invention has relation to flying machines more particularly designed as toys, but I do not desire to be confined to toys, owing to the fact that by an enlargement of the machine proper and providing suitable power, rudders, &c., the device may be applied to flying machines other than toys.

Similar characters of reference indicate corresponding parts in all the figures of the drawing.

In order that the principle of my flying machine may be better understood, I have shown in Figs. 5 and 6 diagrams giving an analysis of principles. My invention belongs to that class of devices in which an aeroplane is propelled through the air by two rotating propellers revolving in opposite directions about an axis arranged in the general line of flight.

In Fig. 5 A, B represents the axial line of the propellers, which latter tend to advance the machine in the direction of the arrow. C, D is the cross section of the aeroplane 18, the plane of which is parallel to the axial line A, B and a considerable distance above the same. From a point at or near the axis A, B, see Fig. 6, two sheets 17, 17, extend upwardly at equal diverging angles to the vertical and at their upper and outer ends are joined on to the aeroplane 18 at the points E and F near the outer ends of said aeroplanes.

Now my invention comprehends two general principles, one serving to effect the automatic adjustment of the aeroplane to such an angle to the horizontal as to cause it to have a buoyant tendency from the resultant upward pressure against its lower sides. This is shown in Fig. 5. The other principle, illustrated by Fig. 6, is to provide for the automatic balancing, or self-righting quality of the aeroplane as against the tendency to dip sidewise about its axial line of flight.

Referring to Fig. 5, it will be seen that if the propellers be located at A and a rudder at B and the propelling power be exerted in the line A, B, the frictional resistance of the aeroplane C, D will be so far above the line A, B that it will turn the aeroplane backwardly, causing the axial line A, B to be tilted to A′, B′ and the aeroplane C, D to be canted backwardly to the plane C′, D′ as shown in dotted lines, which gives the proper angle for the resultant upward pressure of the air to buoy up the aeroplane.

Referring now to Fig. 6, if from the wind or other extraneous disturbing forces, the aeroplane is tilted sidewise to the dotted line position, it will be seen that the angle which the sheet A, 17, E makes to the vertical is less than formerly and the angle which the other sheet A, 17, F makes to the vertical will be greater, consequently the more nearly horizontal surface A′, F′ will be in a position to be pressed upwardly with a greater power than the more nearly vertical surface A′, E′ and consequently the machine will at once right itself, producing an automatic balancing effect. These sheets 17, 17 I term balancing planes. I will now proceed to the description of my machine as constructed under these principles.

In Figs. 1 to 3 of the drawing 17, 17 are the balancing planes and 18 the aeroplane seen in Figs. 5 and 6. 1 represents a frame, preferably cylindrical, within which is located a spring to impart rotary motion to the propelling blades 2 and 3 and consequently includes the axial line of the propellers. In the drawing I have shown the spring to consist of a torsional rubber band, which is connected to hooks 4 and 5, the hook 5 being formed upon the short bar 6 which is attached to the head 7. The hook 4 is formed upon the inner end of the shaft 8, and said shaft extends through the hollow shaft 9, in which it has its bearings, and a short distance beyond said hollow shaft to the outer end of shaft 8 is attached the head

10, to which the propeller blades 2 are attached in any substantial manner. The hollow shaft 9 has its bearings in the bracket 14 and against the head 10 and is attached to the head 12 which in turn is attached to the cylindrical frame 1 with which it rotates. On the hollow shaft 9 is fixed the head or hub 11 to which the propelling blades 3 are attached. Below the cylindrical frame 1 is located any suitable frame bar 13, to which is fixed the upwardly projecting brackets 14 and 15. The bracket 14 provides a bearing for the hollow shaft 9 and the bracket 15 on its upper end provides a bearing for the short shaft 16, which has a head upon its rear end to prevent it from being drawn forward and out of its bearing. The shaft 16 is fixed to the center of head 7, which is fixed to the cylindrical frame 1 and rotates with it. To the bar 13, or its equivalent, are fixed the balancing planes 17, to which the aeroplane 18 is attached. The aeroplane 18 and the balancing planes 17 consist of suitable frames of wood or other material upon which light material such as paper or other suitable material is attached. The balancing planes 17 are located at an angle to each other and extend downward and toward each other from the aeroplane, to which they are attached at equal angles presenting a V-shaped form, and are so arranged for the purpose of atmospherically maintaining the aeroplane 18 in a horizontal position laterally while in flight as heretofore described.

It will be understood that when the aeroplane 18 is in a true horizontal position laterally as in full lines in Fig. 6 and tilted at an angle upward to the line of flight as in dotted lines in Fig. 5, while in flight, the resistance and sustaining power will be equal on the two balancing planes 17, but when the aeroplane 18 is thrown out of a true horizontal position laterally as in dotted lines in Fig. 6, (but remains at an angle tilted upward to the line of flight in the direction of flight, as in dotted lines Fig. 5) then the plane 17 approaching the nearest to the vertical will have less resistance and sustaining power as it approaches the vertical, (at which the sustaining power will be zero), and the opposing sheet will increase in resistance and sustaining power as it approaches the horizontal, (at which it will have its maximum resistance and sustaining power), or in other words if the machine leans to either side of the greater weight or load (which in the toy is the cylinder or frame with its attachments), the supporting surface and power on the side to which it leans will be increased, while on the other side they will be diminished, which will cause the aeroplane to right itself and be sustained in a true horizontal position laterally and the machine will be held in proper position and will not have a tendency to roll laterally while in flight.

To the bar 13, or its equivalent, is attached the bracket 19, which is for the purpose of connecting the rudder bar 20, below the aeroplane, and the rudder bar 20 is so connected that it can be adjusted and held in fixed adjustment and at any desired angle to the bar 13 and the axis of the propeller. This is brought about by means of the rudder bar 20 resting in a loop of bracket 15, in connection with a series of holes in bracket 19 and a pin connecting the same to the rudder bar. The rudder bar 20 is provided on its rear end with a combined vertical and horizontal rudder 21, of the usual construction.

The rubber band 22 is connected to the hooks 4 and 5, and when power is desired to be stored, the cylinder or frame 1 is held against rotation by clasping it with the thumb and forefinger of one hand and the shaft 8 together with the propelling blades 2 are rotated by placing the forefinger of the other hand against one of the propelling blades 2, and rotating it until the desired amount of energy is stored, after which the cylindrical frame 1 and the aforesaid blade are quickly and simultaneously released and rotary motion is imparted to the cylindrical frame 1 and the shaft 8 in opposite directions, thereby imparting opposite rotary motion to the propelling blades 2 and 3, which are so arranged that the toy or flying machine will be drawn or propelled forward through the air. In the drawing I have illustrated a rubber band such as 22, but it will be understood that any other motor or source of power may be used.

For the purpose of utilizing the properties of the balancing planes 17 and at the same time to support the machine and maintain it at the proper angle to the line of flight and maintain it in a horizontal position laterally, the machine is caused to tilt backward as heretofore described by placing the propeller shaft far enough below the aeroplane 18 so that when the propeller blades 2 and 3 are rotated they will draw the machine forward and the aeroplane will tilt backward on account of the air resistance which the aeroplane 18 and the balancing planes 17 meet with, causing the entire machine to assume an angle upward to the line of flight in the direction of flight. The rudder bar 20 being adjustable, the rudder 21 can be raised or lowered to any desired position. in relation to the line of flight. When so adjusted the horizontal rudder will be forced upward by striking the air while in flight until the upward pressure on the rudder equals the tilting influence caused by the location of the propeller axis below the aeroplane and the whole machine is thus held poised at the desired angle to the line of flight. It will be understood that if the rudder is set so that the line of flight of the machine is a horizontal line, then increasing the speed of the machine through the air, will cause it to rise and decreasing the speed will cause it to fall. For this reason it will be understood that the angle of the aeroplane to the line of flight is not permanent, but must be changed to suit prevailing conditions and requirements.

The object and purpose of rotating the blades 2 and 3 in opposite directions is to cause their torsional effect on the aeroplane to neutralize each other.

I claim—

1. A flying machine, comprising an aeroplane, a motor, reversely rotating and concentric propellers with axes located at a distance below the aeroplane and two balancing planes arranged on opposite sides of the propeller axis and extending in V-shape relation from the propeller axis to the aeroplane at equal angles and connecting with the aeroplane at points between the outer ends of the same and the middle.

2. A flying machine, comprising a rotatable frame, heads secured to said frame, a motor located in said frame, a rotatable shaft provided with propelling blades, a hollow shaft located around the aforesaid shaft and fixed to one of the heads of the rotatable frame, propelling blades connected to said hollow shaft, an aeroplane located above the frame, balancing planes located in V-shaped relationship with reference to each other and below the aeroplane, a rudder bar provided with a rudder, and bearings for the frame and hollow shaft.

3. A flying machine, comprising a rotatable frame, heads fixed to said frame, a motor located in said frame, a hollow shaft secured to one of the heads fixed to the rotatable frame, said hollow shaft being provided with propelling blades, a shaft located within the hollow shaft and carried by said hollow shaft, propelling blades fixed to the shaft carried by the hollow shaft, an aeroplane located above the rotatable frame and balancing planes located in V-shaped relationship with reference to each other, and below the aeroplane, a bar with bearings adapted to carry the ends of the rotatable frame, and a rudder.

4. In a flying machine, upwardly divergent balancing planes, an aeroplane supported upon the top of said balancing planes and extending beyond the point of connection of the balancing planes, shafts rotatable in opposite directions located at the lower angle of the upwardly divergent balancing planes, said shafts being provided with propelling blades, means for imparting rotary motion to said shafts in opposite directions and a rudder bar provided with a rudder.

5. In a flying machine, an aeroplane, balancing planes located below the aeroplane and arranged in V-shaped relation to each other and at equal angles to the aeroplane, and connecting with the aeroplane at points inside the outer ends of the latter, a motor located below said aeroplane, shafts located at the lower angle of the balancing planes and adapted to rotate in opposite directions and provided with propelling blades, a rudder bar with rudder and means for adjusting the rudder bar and rudder at an angle to the aeroplane.

6. In a flying machine, an aeroplane, balancing planes connected to said aeroplane at points inside the outer ends of the same and extended downward from said aeroplane at equal angles and in V-shaped relation with reference to each other, a motor located below said aeroplane, shafts located at the lower angle of the balancing planes and adapted to rotate in opposite directions, propelling blades secured to said shafts and an adjustable rudder bar and rudder.

7. In a flying machine, an aeroplane, balancing planes located below said aeroplane and connecting with the latter at equal angles at points inside the outer ends thereof and converging toward each other downwardly, a motor located below said aeroplane, rotating blades actuated by the motor, a shaft carrying the blades and located at the lower ends of the balancing planes, and a rudder bar provided with a rudder, said rudder being located below the aeroplane and arranged to oppose the tilting of the aeroplane and hold it at an angle to the line of flight.

8. In a flying machine, an aeroplane, balancing planes located below said aeroplane and connecting with the same at equal angles at points inside the outer ends of the same, a motor located below said aeroplane, rotating blades actuated by the motor and having their axial line below the aeroplane, a frame supporting the motor and propeller blades, and an adjustable rudder bar provided with a rudder, said adjustable rudder bar being connected to the motor frame in fixed relation and having a horizontal blade whereby the aeroplane is caused to adjust itself at an angle to the line of flight by the location of the axial line of the propellers below the aeroplane.

9. In a flying machine, upwardly divergent balancing planes, an aeroplane supported upon the top of said balancing planes and extending beyond the points of connection with the same, shafts rotatable in opposite directions, said shafts being located at the lower angle of the balancing planes and provided with propelling blades, means for imparting rotary motion to said shafts in opposite directions and a rudder.

10. In a flying machine, an aeroplane, balancing planes located below said aeroplane and extending downward and toward each

other from the aeroplane; a motor located below said aeroplane; rotating blades actuated by said motor, and having their axial line below the aeroplane and below the greater resistance to the device while being propelled through the air, and a rudder having a horizontal blade arranged to oppose the tilting of the device caused by locating the axial line of the propellers below the aeroplane and below the greater resistance to the device while being propelled through the air, and having a vertical blade to direct and control its course.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM H. MARTIN.

Witnesses:
J. A. JEFFERS,
F. W. BOND.

W. H. MARTIN.
FLYING MACHINE.
APPLICATION FILED JAN. 3, 1908.

935,384. Patented Sept. 28, 1909.
2 SHEETS—SHEET 2.

Fig. 5.

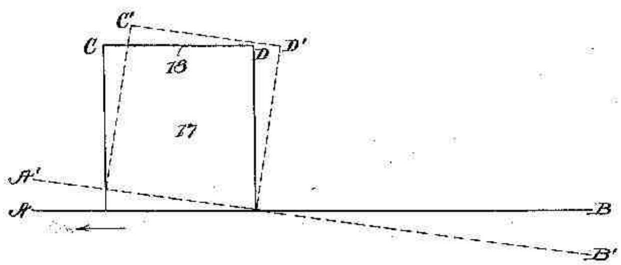
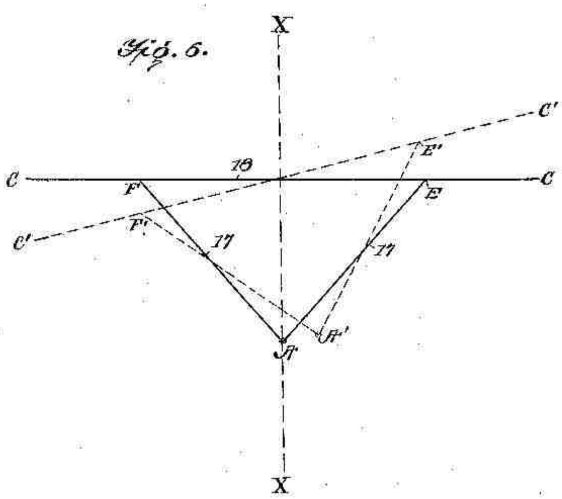


Fig. 6.



WITNESSES
L. H. Schmidt
Edw. W. Byrn

INVENTOR
WILLIAM H. MARTIN,
BY Munn & Co.
ATTORNEYS

In February 1909, the journal, *Aeronautics,* obscurely describes the glider as having 230 square feet of supporting surface and weighing 176 pounds. Also, the aircraft's "balancing planes each have 75 sq. ft., and the horizontal rudders each 12 by 3 ft., with balancing planes on them (acting as vertical and horizontal rudders), of from 15 to 20 sq. ft. There are vertical and horizontal rudders both in front and rear, steering right, left, up or down."(4)

Aeronautics commented that "a horse has been used to tow the machine into the air. Mr. Martin's two boys, aged ten (Charles) and sixteen years (Thobern), have taken rides and claim it '*beat coasting with a sleigh all hollow*.' Mrs. Martin can properly lay claim to be the first woman in America to make a powered flight, even if the power did come from <u>outside</u> the machine. The flights of the boys were from 200 to 300 feet and the height attained in Mrs. Martin's flight was between 30 and 40 feet."(5) Mrs. Almina Martin may have been the first woman to fly in a glider. Besides piloting, Almina "Minnie" Martin also sewed the fabric for the aircraft.

Martin Glider on the family farm

photo used by permission of the McKinley Presidential Library and Museum, Canton, Ohio

In June 1909, Martin appeared on the front page of the *Repository*, which announced that Martin would take his "aeroplane" to New York. He had a contract with the Aeronautic Society of New York to make flights at the Morris Park racetrack in Westchester, "the center of aeronautic activity," where the Aeronautic Society was holding trials and exhibitions as preliminaries ahead of contests which would begin June 26th. Martin was accompanied by his wife and 30-year-old son, William. The glider would be towed into the air with an automobile instead of a horse.(6)

Tuesday June 15 was a big day in the life of Martin. His craft made the only flights of the day. The *Philadelphia Inquirer* commented that *"Martin's 'glider' has no motor, but depends for its motive power on a rope attached to a swiftly moving automobile on terra firma. With a pilot on board to operate its great vertical wings and its fore and aft rudders, the monoplane today left the earth easily and gracefully, maintaining an altitude of about fifteen feet. It went several times around the track."* (7) The *Boston Herald* described the same flight, but added that the flight ended when *"something snapped and it retired to its quarters for repairs."* (8)

The glider apparently did not need a great deal of piloting. Some of the flights on June 15th were flown by sand bags rather than a pilot. Later in the day "a horse jockey begged to be given the opportunity of sitting in the machine and he was given the chance, acquitting himself fairly well. Martin directed the speed of the motor car used for motive power", reported the *Repository*. The newspaper quoted Martin as saying, "My machine got into the air at least a dozen times and while no special effort was made for height, it reached an altitude of thirty feet. The jockey was eager to rise in the air, but I was more conservative. My machine, I believe, fully demonstrated itself as to balancing properties. The operator must balance the other machines tried." Martin concluded, "I believe my machine is superior to any entered in the New York exhibit." (9)

Back in Ohio the *Repository*, desperate for information, included 3 front page sentences on the flight, then spent five paragraphs on an interview with "Bill", the Martin family horse. "Bill's head drooped and jealousy entered his heart when he heard that his boss down in New York City was flying by the aid of a motor car – the hated rival of all horses." (10)

Since Martin had actually gotten his aircraft into the air, his contract with the Aeronautic Society of New York was extended so that he could fly in the contest beginning June 26th. However, to cover their bets and be sure that there would be some motor-powered flights, the Aeronautic Society also contracted with Glenn Curtiss who had a proven machine.

The Exhibition at Morris Park was a popular event, described by the *New York Times* as "one of the most successful events of the kind ever held in this country." Five thousand people were in attendance to watch an assortment of flying machines and other oddities. One feature was a "balloonatics" obstacle course. Seven men were to run and jump over obstacles with hydrogen balloons attached to their bodies. The results were hilarious, as the men were pitched and tossed into the air by the balloons. Another crowd favorite was an aircraft which was found to be too large to be taken out of the shed in which it had been assembled.(11)

There was also an exhibition of a "wind wagon" which was similar to an automobile frame with an 8-foot propeller, attached to a 24-horsepower 4-cylinder, air-cooled motor, spinning at the front for propulsion. It drove around the track at 30 mph. Another event was a helicopter powered by two men peddling furiously. It did not get off the ground. Two hot-air balloons were inflated and sent up with a man and a woman; both successfully parachuted to the ground.(12)

There were two real highlights of the day. One was the "sensational real flying" of Glenn H. Curtiss who made two straightaway flights and one circle of the track. The other was the crash of the Martin Glider.

Martin began his flight from the south end of the track. By the time he reached the grandstand the Kissel tow car was going 40 mph. The glider made a series of sudden pitches and tosses from side to side. At one point it was at a 45 degree bank with left wing low. Clearly out of control, it then dived into a fence. Twenty people were sitting on the fence at the time but somewhat miraculously none were seriously injured. Martin escaped with bruises and scratches. The glider was wrecked. The cause of the crash was that the tow rope from the automobile broke, leaving the glider to make its only un-tethered flight.(13)

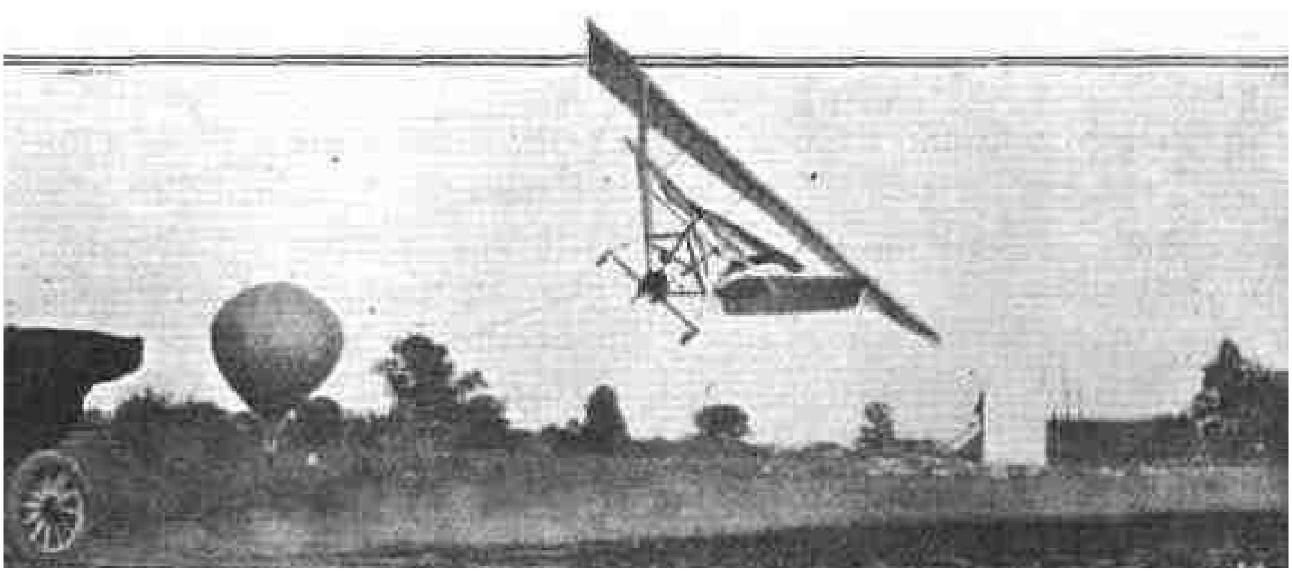


Image reproduced from Flight magazine 1909

Martin repaired his glider and was planning on shipping it back to Canton when he received a request from the editor of *Scientific American* to remain and make further flights.(14) On July 5, Glenn Curtiss made three flights over a mile and three quarters in front of 15,000 enthusiastic onlookers. He took the top prize. Martin did not fly, nor did his wife. Instead, a former jockey, George Thompson, made several flights.(15) It is not known why the Martins chose not to fly.

Upon his return to Ohio, Martin said that he would make several flights on his farm. He was still hoping to acquire a light and powerful motor, but that was not to be. In September of 1909 the Martin Glider was viewed by the public in a static exhibit in Canton.(16)

The aeronautical world was passing Martin by at a furious rate. Aircraft with motors and capable of sustained flight were making strides that he could only dream about. The journal, *Flight,* wrote in July 1909 a scathing assessment of Martin's exhibition at Morris Park: "*Of the other demonstrations which were given, the most notable was that made by Mr. Martin on a motor-towed glider. His experiments afforded one more example of the foolhardiness of tests of this character, for we have always maintained that there is little or nothing to be learned through being towed behind a car in this manner, and that a great deal of unnecessary risk attaches to the operator. Merely regarded as a method of initial ascent, the exigencies of the situation may doubtless justify the means, but as a test in itself, the towing of a glider behind a car is absolutely inconclusive. The presence of the tow-rope is a restriction on the operation of the machine, and a menace to what natural stability it may possess. Indeed the conditions do not represent the problems of flight in the least. Mr. Martin at Morris Park was no more successful than others have been before him at this game, for he ended up his short and erratic aerial journey by being pitched off his machine over a picket fence, which the machine itself demolished.*(17)

Martin may not have had a place in the future of aviation but he still found that flying was fun and flew his glider for pleasure. Perhaps Bill, the horse, returned to his duties and towed the glider into the air on quiet afternoons. On August 27, 1909, Martin's grand-daughter Blanche Martin, was enjoying watching the flying on the family farm. On that day she flew the glider for the first time. She flew twice on that day, in fact. What she had no way of knowing was that she was likely the youngest person to ever have piloted a glider. Her flight may still be a milestone in aviation history. Having been born on January 2, 1903 she was only 6 years old. Her father, who had also piloted the glider, was William Martin, Jr. One cannot but wonder if her mother knew about the flights before they took place. Little Blanche is said to have *"laughed when 30 or more feet above the ground as the machine soared from side to side in the grasp of the wind."* (18)

Martin received the patent certificate in the early days of October 1909.

The glider and Martin faded from the public view. Eventually, experiments with flight and even family entertainment faded into memory. The fire of flight still burned in Martin's soul, but the ability to contribute to the rapid growth in aircraft technology was beyond his grasp. Martin's place in the sun was passed. It was for others to move ahead in aviation.

In May of 1927 Charles Lindbergh flew across the Atlantic and into history. Within a week, Martin was again in the news. The *Repository* in Canton wrote that "the success of the recent non-stop flight from New York to Paris by Captain Charles Lindbergh in an aeroplane, was due largely to the balancing planes on the machine, in the opinion of William H. Martin." The article quotes Martin as saying, "Without the balancing plane, the aviator must at all times keep the plane balanced or he will fall. It would not have been possible for Lindbergh to have fallen asleep several times, as he says he did, yet continue on his way to his successful goal in Europe."

The article does not spell out just what part of the *Spirit of St. Louis* corresponded with the balancing planes of Martin's patent.(19)

A week later the *Repository* covered the history of Martin and his glider again. In this article is told the sad tale of the old aviator, *"whose hair and long beard are now white, but whose enthusiasm for flying is not a whit diminished, carries in his pocket his patent certificate. It is yellowed now with age, and the leather case on which is printed 'Mum & Co., Patent Agency,' is well worn, but it is displayed with pride by this veteran inventor."* (20)

The Lindbergh flight inspired great interest in all things connected with aviation. In 1928, Ohio Representative, John McSweeney, visited Martin and looked at the glider which had been stored in the Martin barn for almost 20 years. McSweeney contacted the Smithsonian Institution hoping the Institution would want it. They did. In late January 1929, the glider arrived at the Smithsonian. To Martin's delight, his old glider was now in its honored and "last resting place." (21)

In 1936, a visitor to the Smithsonian saw the glider hanging alongside the *Spirit of St. Louis*. When told of its location, Martin "had the happiest moment of his life when he realized that his contributions to air pioneering had been memorialized by the preservation of his machine."

The label on the display read:

> *Martin Glider. Made in 1908 by William H. Martin, Canton, Ohio, based on his aeronautical experiments begun in 1887. Last flown* [publicly] *in 1909 at the old Morris Park Race Track, New York City.*
> *It was launched like a kite, rising about 50 feet, being towed by a horse or automobile. The pilot, usually Mr. Martin, sat on the boards between the wheels and operated the direction and altitude controls. Lateral balance was inherent due to the use of sloping surfaces, known as 'dihedral.' The length of the flights was about 250 feet, being limited by the size of the field.*
> *In this machine, several members of Mr. Martin's family made flights, including Mrs. Almina Martin (his wife) and Miss Blanche Martin, then 8* [sic] *years old. As many as 25 trips were made in one afternoon.*
> *- Gift of William H. Martin* (22)

Martin died in March 1937. His obituary in the *Repository* and follow-up article a day later covered his aeronautical career for a fresh audience. The *New York Times* also carried Martin's obituary, mentioning his achievements as well as that his wife "believes herself the first woman in the United States to pilot a glider." The unnamed granddaughter who flew at age 6 is said to have flown with "fixed controls." Sadly, the *Times* reported that "Mr. Martin's last years were spent in seeking recognition for his monoplane patent rights. His stabilizer rudder and elevator device, he said, were the basic design for today's ships."(23)

Mrs. Almina Martin, "the first woman to ride in a glider in the United States, having operated one of the craft constructed by her husband," died in December 1944.(24) After her husband's death she commented that "it has been a long time, but I will never forget the thrill of those flights. It was just like floating on air, and I felt as safe riding through the air as I do now in my rocking chair. My husband undoubtedly discovered principles far in advance of his day."(25)

The decades passed. History and the world of aviation seemingly had forgotten about Martin and his glider. However, in the early 1970's, the Stark County Historical Society, now the William McKinley Presidential Library & Museum, initiated inquiries to the Smithsonian with the idea of returning the glider to Canton, Ohio. It was troubling that the Smithsonian at first was unable to find any trace of the glider. Eventually, it was discovered that at some distant time the glider had been removed from display and stored in an obscure warehouse. It took seven years to cut through the bureaucratic red tape nightmare to acquire the glider from the Smithsonian.(26)

The historical society did not really receive a glider from the Smithsonian. What they received was "a box of sticks and three wheels." To restore the glider cost over $7,500 and began with "laying sticks side by side and saying this one looks like it goes here." The pieces had been numbered but there was no key to the numbering system. So restoration was no simple process - it took 18 months to transform the box of sticks into the Martin Glider we see today.(27)

The restored Martin Glider proudly hung in the Stark County Historical Society museum for a couple of decades. Then, as had happened at the Smithsonian, it was dismantled and placed in storage as the exhibit space was needed for other items. Years passed. Then the Military Aircraft Preservation Society (MAPS) asked the Wm. McKinley Presidential Library & Museum for the loan of the glider. The glider was moved to the MAPS facility where volunteers once again reassembled it, replacing a few parts that had deteriorated in storage.(28)

photo by Hugh Harrington

Since 2005 the Martin Glider has hung in the MAPS museum adjacent to the Akron-Canton Regional Airport. It hangs above the vintage, yet more modern aircraft, which later took to the air that had once held aloft the Martin Glider.

Photo courtesy of MAPS Air Museum, North Canton, Ohio

Footnotes:

1. It has often been asserted that his monoplane design was the first to be applied to an aircraft. While unusual, this clearly is not the case as he was preceded by others including Santos-Dumont and Bleriot with powered aircraft. His also was not the first monoplane glider, having been preceded by half a century by George Cayley.
2. United States Patent Office. William H. Martin, of Canton, Ohio. Flying Machine; #935,384 patented Sept. 28, 1909. The patent contains diagrams and a detailed, and somewhat obscure, discussion of the aircraft.
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4. W.H. and Mrs. Martin and the Boys Make Towed Flights at Canton, *Aeronautics, the American Magazine of Aerial Locomotion,* vol. IV, No. 2, February 1909, p. 68-69.
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6. New York Will See Martin Fly, *Repository* (Canton, OH), June 2, 1909, p. 1.
7. Aeronauts and Aviators Gather at Morris Park, *Philadelphia Inquirer*, June 16, 1909, p. 5. It should be noted that the article is datelined June 1. Actually, the date should be June 15.
8. Martin's glider in Flight, *Boston Herald*, June 16, 1909, p. 14.
9. Thinks Airship Best in Tests, *Repository* (Canton, OH), June 19, 1909, p. 1.
10. Martin Flies in New York; Uses Auto, Old Bill Weeps, *Repository* (Canton, OH), June 16, 1909, p. 1
11. Aeroplane Flights at Aeronautic Society Exhibition, Martin In Towed Flight Barely Escapes Serious Accident, *Aeronautics, the American Magazine of Aerial Locomotion*, Aeronautics Press, St. Louis, vol. 5, no. 2, August 1909, p. 53-56.
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21. Kenney, Kimberly A., *Canton's Pioneers In Flight*, Charleston, SC: Arcadia Publishing, 2007, p. 98.
22. William Martin, Pioneer Aeronaut, Dies Here at 82, *Repository* (Canton, OH), March 25, 1937, p. 1.
23. Smith, Dennis R., Lack of Proper Engine Kept Local Air Pioneer From Aviation Fame, *Repository* (Canton, OH), March, 28, 1937, p. 18.
24. William H. Martin, Pioneer in the Monoplane Field Dies in Ohio at 82, *New York Times*, March 26, 1937.
25. Mrs. Almina Martin Dies at 78 in Home, *Repository* (Canton, OH), December 8, 1944.
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Invasion Stripes for D-Day

Invasion stripes were alternating black and white bands painted on the fuselages and wings of World War II Allied aircraft, for the purpose of increased recognition by friendly forces to prevent or reduce the prospect of friendly aircraft being shot down by U.S. and British forces during and after the Normandy Landings. As a generalization, the D-Day markings were three white stripes and two black, each eight to eighteen inches wide on the wings and fuselages, depending on aircraft size. Wing stripes were variously placed on the undersurfaces or top and bottom, depending on the time available. Fuselage stripes frequently encircled the entire airframe.

In 1944, in the months leading up to the invasion of Nazi occupied France, the Allied planners of Operation Overlord realized that on the day of the invasion - D-Day - the skies over the invasion zone would be filled with aircraft - waves of Allied fighters and photo reconnaissance planes, bombers, troop-carrying gliders and their tow planes. They were expected to be met by fierce *Luftwaffe* opposition. The existing system for identifying friendly aircraft, Identification Friend or Foe (IFF), would in all probability be overwhelmed by the sheer number of aircraft over the beaches, so a plan was developed to mark all Allied aircraft with black and white stripes. Tests showed that the stripes were easily visible on the ground and in the air - easier to see than the usual national markings that Allied aircraft bore, so a simple order - “if it ain't got stripes, shoot it down” - could be given out to Allied gunners and pilots. For fear of the *Luftwaffe* getting wind of the scheme and confusing the issue by painting their own stripes, the plan was a closely guarded secret.

Air Chief Marshal Sir Trafford Leigh-Mallory, commanding the Allied Expeditionary Air Force, approved the plan on May 17, 1944. A small scale test exercise was flown over the Overlord invasion fleet on June 1, to familiarize the ships' crews with the markings, but for security reasons, orders to paint the stripes were not issued to the troop carrier units until June 3 and to the fighter and bomber units until June 4. By the end of the day on June 4, 1944, nearly every Allied tactical aircraft in Great Britain was painted with ‘‘invasion stripes’’. D-Day was originally scheduled for the 5th, but weather forced a delay, which probably allowed more RAF and USAAF planes to receive the new paint schemes. The harried ground crewmen scrambled for paint and brushes while they prepared their aircraft for their missions. It was said that the enormous quantity required for thousands of aircraft exhausted most of the black and white paint in Britain.

Stripes were applied to fighters, photo-reconnaissance aircraft, troop carriers, twin-engine medium and light bombers, and some special duty aircraft, but were not painted on four-engine heavy bombers of the U.S. Eighth Air Force or RAF Bomber Command, as there was little chance of mistaken identity — few such bombers existed in the Luftwaffe. The order affected all aircraft of the Allied Expeditionary Air Force, the Air Defence of Great Britain, gliders, and support aircraft such as Coastal Command air-sea rescue aircraft whose duties might entail their overflying Allied anti-aircraft defenses. To stop aircraft being compromised when based at forward bases in France, D-Day stripes were ordered removed a month afterward from the upper surfaces of airplanes, and completely removed by the end of 1944.

C-47s towing Waco CG-4s

Waco CG-4

In the early hours of June 6, thousands of aircraft, all bearing invasion stripes, headed for the skies over Normandy. As D-Day unfolded, friendly fire incidents were thankfully few. And, strangely, the *Luftwaffe* just didn't show up - only three German aircraft overflew the beaches that day. Two of the pilots, ace Josef “Pips” Priller and his wingman Heinz Wodarczyk, were said to be hung over from some serious partying the night before. By December 1944, he black and white stripes had served their purpose and air units had been ordered to remove them. But the photographs of the airplanes survive to remind us of one of the most striking symbols of that day 74 years ago. And, in commemoration of the 70th Anniversary of D-Day, the Royal Air Force painted a Eurofighter Typhoon with invasion stripes, so once again the alternating black and white stripes would be seen over European skies.

Letter from historian, Adam Berry:

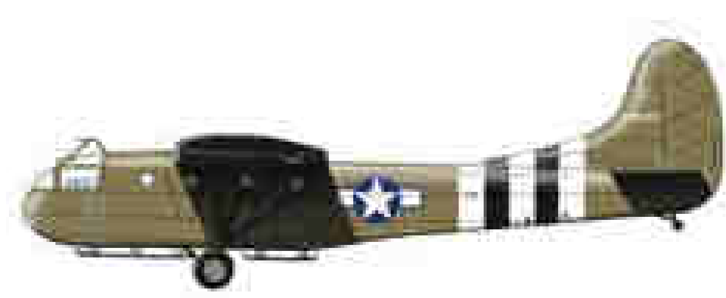
Invasion stripes were varied over a short period and for major operations in order to prevent German manipulation of the markings. For D-Day, stripes were applied to wrap around the entire rear fuselage as well both upper and lower wing surfaces. This did not include aircraft that would operate at a height from which they could not be seen from the ground, i.e. Heavy Bombers. However, you will notice that some RAF heavy bombers did have them, and this was because, for major operations, aircraft like the Halifax operated at low levels towing gliders.

In July 1944, orders were revised to remove the stripes from the upper fuselage and upper wing surfaces so that they could only be seen from the ground. This was mainly in response to reports that the stripes considerably affected an aircraft’s camouflage when viewed from above by enemy fighters. This helps when it comes to dating images. If, for example, you see a C-47 flying with full invasion stripes (all around the fuselage and upper wing surfaces) you know this image must have been captured during a very small time frame, June to July, 1944. After that, very faint remnants of upper fuselage and wing stripes may be visible. It is also worth noting that the official order didn't reach units until 3 June, just less than three days before D-Day was launched. As such, stripes were poorly applied and rushed, often applied using sweeping brushes. Photographic evidence shows that on many aircraft stripes were uneven, not straight, and often dripping. That is not to say that some units didn't take more care over applying them, especially in the long term, but if you own a war-bird today and want it to be authentic, it needs to look messy! For Operation Varsity, the markings appear to have changed again, with some aircraft showing no markings to the Wings at all.

All of this was in response to the friendly fire incident over Sicily in July, 1943, where US Naval and land-based anti-aircraft batteries fired upon a flight of C-47s carrying elements of the 82nd Airborne Division with devastating effects. The accident was caused by an improper ability to identify friendly aircraft from enemy, especially as (like this article quite right explains) the "Star and Bar" USAAF marking was very difficult to see even at a low level.

Adam Berry - Author "And Suddenly They Were Gone" and "A Breathtaking Spectacle - A history of US IX Troop Carrier Command." https://airandspace.si.edu/stories/editorial/stripes-d-day

On the following page is a partial copy of the order giving painting instructions for D-Day invasion stripes. Although stripes were not prescribed for troop-carrying gliders in this document, there certainly were incidences in which the paint scheme also appeared on the gliders.



SUPREME HEADQUARTERS
ALLIED EXPEDITIONARY FORCE
OPERATION MEMORANDOM
NUMBER 23
18 April 1944

DISTINCTIVE MARKING – AIRCRAFT

1.OBJECT

The object of this memorandum is to prescribe the distinctive markings which will be applied to U.S. and BRITISH aircraft in order to make them more easily identified as friendly by ground and naval forces and by other friendly aircraft.

2. SCOPE

a. the instructions contained herein will apply to the following types of U.S. and British aircraft:

(1) Fighters and fighter-bombers.
(2) Tactical and photographic reconnaissance aircraft.
(3) Aircraft employed in spotting for naval gunfire and field artillery.
(4) Light bombers.
(5) Medium bombers.
(6) Troop carrier aircraft, including four engine types.
(7) Glider tugs, including four engine types.

b. These instructions will not apply to the following classes of aircraft:

(1) Four engine bombers.
(2) Air transports.
(3) Gliders.
(4) Night fighters.
(5) Seaplanes.
(6) All aircraft of RAF Bomber Command, which will continue to carry their standard night camouflage.

3.GENERAL

a. The instructions contained herein will be effective on the day of the assault and thereafter until it is deemed advisable to change. Aircraft will be given distinctive markings as shortly before the day of the assault as is possible in order to protect the effectiveness of their use.

b. These instructions are in no way intended to change the present U.S. and BRITISH national markings now in use, namely, the USAAF white star on a white horizontal bar; and the RAF red, white and blue roundel.

4. DISTINCTIVE MARKINGS

a. Single engine aircraft

(1) Upper and lower wing surfaces of the aircraft listed in paragraph 2 above, will be painted with 5 white and black stripes, each eighteen inches wide, parallel to the longitudinal axis of the airplane, arranged in order from center outward: white, black, white, black, white. Stripes will end six inches in board of the national markings.

(2) Fuselages will be painted with five parallel white and black stripes, each eighteen inches wide, completely around the fuselage, with the outside edge of the rearmost band eighteen inches from the leading edge of the tailplane.

b. Twin engine aircraft

(1) Upper and lower wing surfaces of the aircraft listed in paragraph 2 above, will be painted from the engine nacelles outward with five white and black stripes, each twenty-four inches wide, arranged in order from center outward: white, black, white, black, white.

5. BRIEFING

Army, Navy and Air Commanders will disseminate complete information concerning these distinctive markings to all troops under their commands no earlier before the day of the assault than will insure the complete distribution of the information.

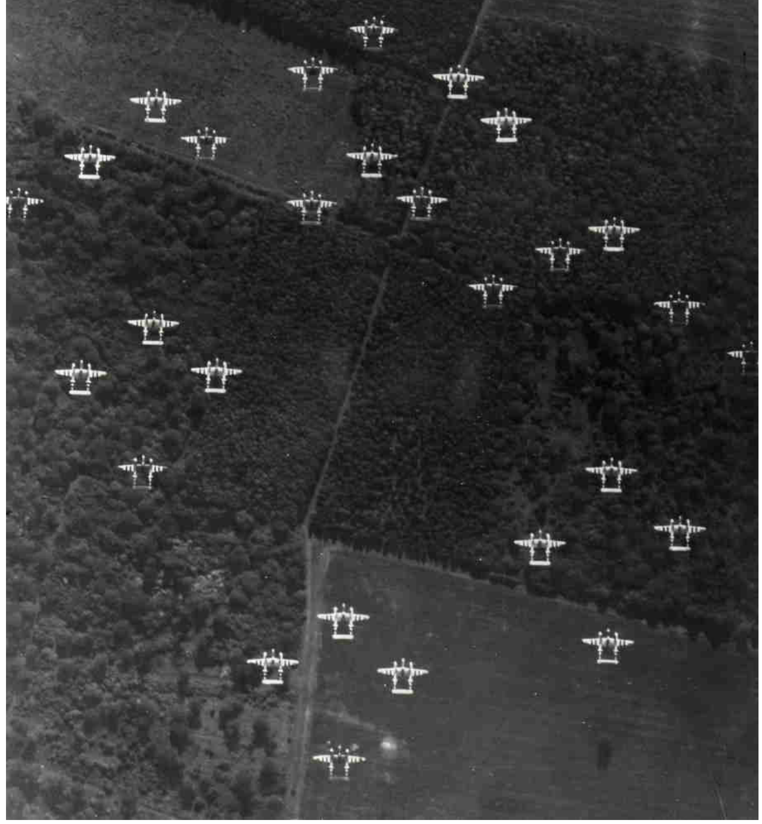
by Command of General EISENHOWER

W. B. SMITH
Lieutenant General, U.S. Army
Chief of Staff

A formation of United States Army Air Forces Lockheed P-38 Lightning fighters was photographed during WWII as it roared over an unidentified foreign field. It's hard to spot the familiar US insignia of the white star on a blue circle, but thanks to the black and white stripes worn by the Lightning fighters, they stand out easily.

C-47 performing a "snatch pick-up" on a Waco CG-4

Sources:
airandspace.si.edu/stories/editorial/stripes-d-day
military.wikia.com/wiki/Invasion_stripes



P-38s with invasion stripes - easy to spot

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