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MONTGOMERY ET. AL. V. THE UNITED STATES. No. 33852, COURT OF CLAIMS OF THE UNITED STATES.

Claims 4, 16, and 28 of Montgomery patent No. 831173, directed to "a curved aeroplane with means for changing its curvature, and a horizontal tail behind, with means for swinging it vertically." were held not to be infringed by defendant's device which consisted of the combination of an aeroplane and stabilizer therefor.

Claims 12, 17, and 18, covering "plural curved aeroplanes one in advance of another, and a horizontal tail surface behind the last aeroplane, and means for swinging said tail surface vertically," were also held not to be infringed by defendant's device.

Claims 9, 12, and 32, directed to an aeroplane curved parabolically from front to rear, were held to be clearly dissimilar from the Government structure.

Before Booth, Chief Justice, and Judges Green, Moss and Graham. The opinion of the Court, delivered by Chief Justice Booth, follows in full text:

The petition alleges that under the act of June 25, 1910, 36 Stat. L. 851, plaintiffs are entitled to recover for an infringement by the Government of claims 4, 9, 12, 16, 17, 18, 28 and 32 of Letters Patent 831173 granted on September 18, 1906 to John J. Montgomery, now deceased. The Government denies infringement and challenges the validity of the patent.

A preliminary question of title is called to our attention. On July 27, 1914, the plaintiffs assigned an undivided interest in the patent to Frank A. Garbutt. The consideration for the assignment was a duty imposed upon Garbutt to attempt to reconcile the conflicting claims of Montgomery with other inventors in the same art and procure for the Montgomery patent a sufficient recognition to entitle the owners of the patent to realize it worth in money; failing in this, to institute suits for infringement of the patent. Garbutt did commence two suits, both were dismissed without prosecution to a conclusion, and subsequently, i.e., after this suit was commenced, Garbutt reassigned his interest in the patent to the plaintiffs. We think in view of the result of this suit that the contention of the defendant is unimportant.

The petition alleges infringement of claims 4, 9, 12, 16, 17, 18, 28 and 32 of Montgomery's patent. There are 46 claims in the Montgomery patent.

The plaintiff's suit is predicated largely upon a contention that Montgomery, the patentee, was a pioneer in the art and his patent a basic patent; that he was the first to invent the principle of wing warping to secure equilibrium and lateral control essential to flying; that the other elements of his machine disclose the principles of stability and rudder control, all of which, or their equivalents, are embodied in the Government machines, offered as exhibits of infringing devices. The record in the case is most voluminous and involved and has required exacting attention and labor.

The first vital issue depends on whether from the record it is the be held that Montgomery was a pioneer inventor and his device a basic patent. If so, his claims, as repeatedly adjudicated, are to be accorded a broader construction than were the situation otherwise. Unless it may be said and established by proof that the inventor has a patent which performs a function which was not performed before, he is not entitled to be designated a pioneer inventor. Westinghouse v. Boyden Power Brake Co., 170 U. S. 537.

Inventors Sought to Imitate Winged Animals

Attempts to construct flying machines did not, of course, originate with Montgomery. The art is old, its progress was slow, the early development crude and impracticable. Inventors many decades ago studied the flight of winged animals and sought without success to imitate their motions and bring into being a device that would accomplish, with the aid of man, what flying birds, eagles, vultures, etc., did with natural ease. This record is replete with a large number of exhibits, publications and patents which antedate Montgomery by years, disclosing the extent of sustained interest in the art, and efforts made to accomplish flying in a heavier-than-air machine.

Montgomery first centered his attention upon the subject in 1883; from this date until 1886 he conducted a number of experiments with some sort of a mechanism designed as a "glider." He does not seem, at this time at least, to have

Montgomery turned his attention to other and distinctive inventive fields; he contributed nothing to this particular art during this period. In 1903 he renewed his experiments. During that year he came in contact with one Baldwin, a balloonist, who had been making successful glides from a hot air balloon in a parachute.

Baldwin became interested in Montgomery's efforts and the two entered into a contract, whereby Montgomery was to construct his device, and if it proved successful in descending from a balloon with a man on board the two were to engage in public exhibitions and divide the profits. Montgomery and Baldwin disagreed before before any actual experimentation with the prospective glider obtained, and Montgomery thereafter entered into a somewhat similar contract with another balloonist. Montgomery had constructed in May, 1904, a large machine to meet the requirements of the Baldwin contract, and in the summer of 1904 carried on some experiments in at the ranch of Peter Cox, in California. The exact and detail structure of his machines is not disclosed. The experiments made consisted in elevating the machine to a desired height by suspending it from a wire to which was attached, stretched between two poles.

At the proper time it was released to ascertain its gliding qualities. Other tests were made by resorting to a steep hill, when men, by means of a rope, pulled it down the incline, Montgomery holding onto the device. Just how many and the exact character of the tests so made is impossible of determination. It is sufficient to observe that they were quite numerous. In March, 1905, Montgomery attached his machine to a hot-air balloon, and having secured the services of an aeronaut by the name of Maloney to make the test the machine with Maloney in the saddle seat was released from the balloon at a high altitude and safely glided to earth. On July 8, 1905, Maloney attempting the same experiment lost his life, the machine failing to function.

On April 26, 1905, Montgomery filed his application for the patent in suit. The patent was granted, on September 18, 1906.

We have epitomized Montgomery's early efforts, with respect to which a great volume of proof has been adduced, solely because the plaintiffs have sedulously insisted that the facts are sufficient to antedate the effective date of invention to a time which would exclude reference to certain prior art. A careful analysis of the record upon this point is conclusively convincing that the proof signally fails to sustain the contention. Out of fifty-two prior patents and publications cited in the record all but eight bear dates which make them statutory bars, provided they disclose the structure of the patent in suit.

The courts have uniformly held that to show anticipation as against issued letters patent some drawing, some model, some positive means of identification must appear. Oral testimony is regarded as insufficient and unreliable for this purpose. Without exception it is to be discarded, for, however free from intentional misrepresentation, it is usually tinctured with the interest of the parties in the litigation and necessarily characterized with acute limitations of the possibility of particular and precise descriptions of the device and its comparison with another. Symington Co. v. National Malleable Castings Co., 250 U. S. 383; Deering v. Winona Harvester Works, 156 U. S. 286; The Barbed Wire Patent, 143 U. S. 275; Torrey v. Hancock, 184 Fed. 61, Emerson & Norris Co. v. Simpson Bros. Corp., 202 Fed. 747.

The flight of April 29, 1905, took place three days after Montgomery's application for a patent was filed, and is available solely as proof on the point of operativeness.

Details of Early Machines Not Disclosed

It is impossible from the record to abstract with any degree of accuracy the detail structure of Montgomery's early machines. He preserved no data, kept no record of measurements, and left no reliable information from which a court or one skilled in the art might profit from what he did, or ascertain the means he employed to do it. At best, the evidence is probative on the single point that the patentee did on the dates stated do the things described, and discloses only the happening of the chronicled events.

True, Chanute in 1894, in his book Progress in Flying Machines, devotes an article to Montgomery's experiments, in which he outlines in general terms the Montgomery machines, from which one may abstract a conception of general lines of construction; however, it is clear from what was therein said, and the results of the tests described, that it would be hazardous indeed to ascribe to Montgomery a distinct conception at this time of those fundamental principles of aerodynamics, which finally culminated in the invention of the airplanes which it is now claimed infringe the patent in suit. If, however, Chanute's article did disclose the specific features of Montgomery's device, then the article itself stands as a statutory bar to the validity of the patent. Montgomery's articles and address printed in the record found publication years after his application for the present patent had been filed and granted, and are purely ex post facto.

To fly in a heavier-than-air machine, one capable of bearing aloft a man, exacted the creation of a device that would function in a variety of ways. First, it must be capable of soaring from the ground. Second, equilibrium when aloft is indispensable. Third, directional control was equally essential. Fourth, stability must be accomplished

Soaring, equilibrium, control, and gliding were concededly indispensable. Noted scientists from an early date discovered the above requisites if a successful flying machine was to materialize. The difficulties encountered were not so much in the discovery and recognition of the principles involved, although tedious and prolonged, as in the means available to apply them in a practical manner.

The claims of the Montgomery patent which disclose the invention we think may be grouped. First, those which are directed toward the accomplishment of equilibrium and lateral control, dealing especially with a change in wing curvature to accomplish the purpose. This group, we think, comprehends claims 4, 16 and 28. Claim 16 being typical and most comprehensive of the group we quote it at this point:

"A curved aeroplane with means for changing its curvature, and a horizontal tail behind, with means for swinging it vertically."

The second group may be said to be directed to the relative arrangement of the supporting and control surfaces, and would include claims 12, 17, and 18. Claims 17 we regard as typical of this group and therefore quote it:

"In an aeroplane device, plural curved areoplanes [*sic*] one in advance of another, and a horizontal tail-surface behind that last aeroplane with means for swinging said tail-surface vertically."

The third group is made up of certain claims which, in addition to the foregoing, are predicated upon or limited to a specific type or character of supporting surfaces, define in the claims as "curved parabolically." In this group we place claims 9, 12, and 32. Claim 9 we regard as typical and quote it:

"An aeroplane curved parabolically from front to rear, its front portion being rigid, and its rear portion adjustable, with means for adjusting said rear portion relatively to the front portion, to change the surface of the aeroplane."

Originality and novelty ascribed to the first group reside in the alleged fact that the claims disclose a form of construction whereby through a change in the curvature of the wings, integral with the wing surfaces, equilibrium and lateral control of the machine in flight are secured. Wing surfaces on planes enable the airplane to soar; they furnish, through the reaction of currents, the "lift" and support; when once aloft they function to maintain equilibrium and lateral control, the vital necessity for which is obvious. If the operator desires to turn in either direction, or the lateral equilibrium of his plane is disturbed, he may accomplish the former and retake the latter by a process of change in two wing surface.

Originality Claimed

In Wing Curvature

Montgomery, securing the front portion of his wing rigidly and unmovable to his structure, so adjusted the rear portion relatively to the front portions as to change the surface of his wings by a change in their curvature. He did, by the application of a control device, make it possible to lower one side of the rear portion of his wings, which at the same time functioned to permit the other side of the rear portion to rise and thereby evolved this principle of wing warping. This was accomplished without changing angularly the wing surface, and the claimed novelty resides in making the change of curvature integral with the wings themselves, i.e., the wing itself respondent to the movement without the introduction of hinged ailerons. The result was a change in the rear cambered sections of the wings and offered to air currents the essential characteristics of an increased lift upon one side of the plane and a decrease life on the other, enabling the airplane to turn in either direction

Montgomery was not the first to recognize or avail himself of the principle of changing the form of wing surface to attain the desired result. On the contrary, he encountered at the outset of his application for a patent two prior patents embodying the conception and was compelled to limit his claims to avoid the patented structures. Beeson on January 24, 1888, secured a patent No. 376937, for a structure.

Beeson relied upon a curved plane, to the rear portion of which he hinged an elongated element functioning upwards and downwards, which manifestly served to angularly vary the surfaces of his wing.

Boswell's patent No. 728844 [*May 26, 1903*], disclosed a conception of the structure embodied in certain of Montgomery's claims as filed. Boswell's structure also obtained an angular change in wing surface.

The Commissioner of Patents rejected the patentee's claims 1, 2, 3, 4, 17, and 24 upon the patent cited above. Montgomery submitted amendments in answer to the rejections, in which he said:

"The essential distinction of this aeroplane with respect to its capability of changing surface, is that such change is affected and lies wholly within its own integral borders, by a change in its own curvature, in contradiction to a general angular change such as results from the relative movement of a section attachment like the hinged tail of the reference."

We need not indulge citation to disclose the legal effect of this proceeding.

From the Revue de L'Aeronautique, vol. 4, published at Paris in 1893, we cite the following quotation:

"It is known that the characteristic of a spiral is to turn about a center from which it is always receding and (fig. 27) that all tangents, at no matter what point of the curve

"This curvature is indispensable to a moving surface to enable it to obtain the maximum support in the air. It is also applicable and indispensable to individual feathers and to propeller blades.

"It may be termed the universal sustentation curve of flight and support in the air.

"The arching, as regards the degree of curvature of the concavity of the wings, will vary according to the speeds and loads, but without ever losing the character of a spiral. For all wings, without exception, small or large, the central or starting point C of the spiral curve coincides with the front of the wing; the Figures 26 and 27, representing two absolutely similar spirals, afford an example of this. On that of Fig. 26 is seen a full line which shows the shape of a large wing; on Fig. 27 the full line represents another wing, but much smaller. The horizontal lines H indicate the direction of translation. The same wing may change its degree of curvature during flight, but it will be only a modification of spiral.

Laws Common to All Wings Are Explained

"All wings, of whatever shape and nature they be, must obey the same laws. It can not be otherwise, because the difficulties of locomotion in the atmosphere especially when the latter is disturbed, and the manoeuvres of starting from any landing on the ground will be the same for all aerial machines. Aeroplanes will also inevitably undergo great changes in their weight through the consumption of fuel or be being lightened if they let fall any part of their load to earth.

"From all this arises the necessity of being able to guide or to retard or accelerate the speed of transmission. And to be able to attain this end it is necessary that the wings should be capable of making four principal movements during flight:

"1. To be moved forward or backwards in their entirety.

"2. To be folded up, so as to diminish or extend their surface.

"3. To be warped.

"4. To vary at will the curvature of the universal curve.

"All the combinations of frameworks, of articulation, of tendons and membranes are made with this end in view.

"Because of the great difficulties which accompany the question of speed, we have been obliged to make wings for slow speed and high speed machines."

Lilienthal in 1895 demonstrates in his Letters Patent 544816 a distinct conception of the value and functioning of curved wings in a flying machine.

Lilienthal was a distinguished engineer and scientist; he successfully accomplished thousands of glides, bave [*sic, gave*]to the art publication of his experiments, and is prominently recognized by more than one outstanding scientist as contributing to the art most vital and necessary principles of the way in which air currents may be utilized in flying machines.

On May 26, 1906, Orville Wright and Wilbur Wright, of Dayton, Ohio, received their patent 821393.

The two Wrights first became interested in aviation in 1896. They were close students of the science, and early in their careers became convinced that equilibrium and control were the vital factors to be obtained if a heavier-than-air machine was every to materialize. To this end they devised in July, 1899, a method of twisting or warping wing surface. A model was constructed along this line, a model clearly disclosing the conception of shifting one wing surface forward or back relatively to the other, and warping them by the same movement. This model was tested and responded satisfactorily.

Man-Carrying Model Constructed by Wrights

In 1900 the Wrights constructed a man-carrying model and it was tested at Kitty Hawk, N. C., in September and October, 1900. This particular machine, a glider, speaking now of wing surfaces, was so constructed that adjustments, connecting the wings by flexible joints with upright posts, enabled the operator, "lying prone in a cradle," to actuate a wing warping effect by the sidewise movement of his body. The machine was flown a number of times with an operator on board during some of the flights, and without one at other times.

It is true that the wing warping was accompanied by changing the relative position of the wings in flight, and not in the precise manner the patent in suit at a later point of time disclosed; but the demonstration of the effectiveness of the principle was firmly established. Lateral control and equilibrium were obtained for the first time effectively, leaving open to subsequent inventors the solution of a better method, if possible, to obtain the identical result. The Wrights, so far as the record herein is concerned, were the first to construct a device which successfully functioned in the desired way.

The Wrights were assiduous in experimentation. In July, 1901, at Kitty Hawk tests of a larger machine were made in the presence of a number of persons, including one very distinguished scientist. These tests involved a number of flights, and many of them were decidedly successful. Without recounting in detail the number of tests made by the Wrights, and the success which followed their scientific and laborious investigation of the art, it is sufficient to state that on December 17, 1903, the Wrights demonstrated the possibility of successful fling in a heavier-than-air machine, [*undecipherable*] in an obvious manner. By reason of this construction it will be seen that

the aeroplanes, a reverse movement of the forward corners of the lateral margins on the other side of the machine occurring simultaneously. During this operation each aeroplane is twisted or distorted around a line extending centrally across the same from the middle of one lateral margin to the middle of the other lateral margin, the twist due to the moving of the lateral margins to different angles extending across each aeroplane from side to side, so that each aeroplane surface is given a helicoidal warp or twist."

The claims of the patent, 18 in number, disclose clearly the structure specified. Beyond dispute is the established fact from evidence of not only oral witnesses but many written documents that the Wrights did embody in their aeroplane a complete conception of and means of imparting to the rear portions of an aeroplane wing a change therein which was intended to and did function to "present to the atmosphere different angles of incidence," and "were capable of being moved to different angles relatively to the normal plane of the body of the aeroplane."

Index and Digest of Latest Federal Court Decisions

Patents

PATENTS: Infringement: Aeroplanes.–Where patentee claims an aeroplane having wings that were shaped the same on top and bottom, and were curved parabolically from front to rear, whereas wings of defendant's airplane were not identical in contour with respect to top and bottom, and the change effected in their surfaces was an angular change brought about by "hinged ailerons," and the use of these hinged ailerons was shown to be old in the art, held: The patent structure was not infringed. Patent 831173 claims 4, 16, 28.–Montgomery v. The United States. (Court of Claims of the United States).–Yearly Index Page 968, Col. 1 (Volume III).

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PATENTS: Infringement: Airplanes.–Where patentee claimed the combination of two aeroplanes, one in advance of the other, and a rudder in the rear, whereas defendant's device consisted of one airplane and a stabilizer, and the prior art showed the combination of an airplane and a rudder or stabilizer, held: No infringement; when considering the combination as an airplane and rudder it was met by prior art; when considering the two tandem airplanes as a airplane and a stabilizer the rear airplane did not function as did defendant's stabilizer. Patent 881173, claims 12, 17 and 18.–Montgomery v. The United States. (Court of Claims of the United States).–Yearly Index Page 968, Col. 1 (Volume III).

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PATENTS: Infringement: Airplanes.–Claims 9, 12 and 32 of Patent 831173, directed to an airplane curved parabolically from front to rear, held: Not infringed by the defendant's airplane and stabilizer combination..–Montgomery v. The United States. (Court of Claims of the United States).–Yearly Index Page 968, Col. 1 (Volume III).

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Inventors Sought to Imitate Winged Animals

Attempts to construct flying machines did not, of course, originate with Montgomery. The art is old, its progress was slow, the early development crude and impracticable. Inventors many decades ago studied the flight of winged animals and sought without success to imitate their motions and bring into being a device that would accomplish, with the aid of man, what flying birds, eagles, vultures, etc., did with natural ease. This record is replete with a large number of exhibits, publications and patents which antedate Montgomery by years, disclosing the extent of sustained interest in the art, and efforts made to accomplish flying in a heavier-than-air machine.

Montgomery first centered his attention upon the subject in 1883; from this date until 1886 he conducted a number of experiments with some sort of a mechanism designed as a "glider." He does not seem, at this time at least, to have conceived the idea of soaring from the ground and remaining aloft in a device under control. What he was attempting was the construction of a machine that might be released from high altitudes and glide safely to earth under control. From 1886 until 1903 Montgomery turned his attention to other and distinct inventive fields; he contributed nothing to this particular art during this period. In 1903 he renewed his experiments. During that year he came in contact with one Baldwin, a balloonist, who had been making successful glides from a hot air balloon in a parachute.

Baldwin became interested in Montgomery's efforts and the two entered into a contract, whereby Montgomery was to construct his device, and if it proved successful in descending from a balloon with a man on board the two were to engage in public exhibitions and divide the profits. Montgomery and Baldwin disagreed before any actual experimentation with the prospective glider obtained, and Montgomery thereafter entered into a somewhat similar contract with another balloonist. Montgomery had constructed in May, 1904, a large machine to meet the requirements of the Baldwin contract, and in the summer of 1904 carried on some experiments at the ranch of Peter Cox, in California. The exact and detail structure of his machines is not disclosed. The experiments made consisted in elevating the record of measurements, and left no reliable information from which a court or one skilled in the art might profit from what he did, or ascertain the means he employed to do it. At best, the evidence is probative on the single point that the patentee did on the dates stated do the things described, and discloses only the happening of the chronicled events.

True, Chanute in 1894, in his book Progress in Flying Machines, devotes an article to Montgomery's experiments, in which he outlines in general terms the Montgomery machines, from which one may abstract a conception of general lines of construction; however, it is clear from what was therein said, and the results of the tests described, that it would be hazardous indeed to ascribe to Montgomery a distinct conception at this time of those fundamental principles of aerodynamics, which finally culminated in the invention of the airplanes which it is now claimed infringe the patent in suit. If, however, Chanute's article did disclose the specific features of Montgomery's device, then the article itself stands as a statutory bar to the validity of the patent. Montgomery's articles and address printed in the record found publication years after his application for the present patent had been filed and granted, and are purely ex post facto.

To fly in a heavier-than-air machine, one capable of bearing aloft a man, exacted the creation of a device that would function in a variety of ways. First, it must be capable of soaring from the ground. Second, equilibrium when aloft was indispensable. Third, directional control was equally essential. Fourth, stability must be accomplished, and finally, the means to descend when desired was no less important.

Soaring, equilibrium, control, and gliding were concededly indispensable. Noted scientists from an early date discovered the above requisites if a successful flying machine was to materalize. The difficulties encountered were not so much in the discovery and recognition of the principles involved, although tedious and prolonged, as in the means available to apply them in a practical manner.

The claims of the Montgomery patent which disclose the invention we think may be grouped. First, those which are directed toward the accomplishment of equilibrium and lateral control, dealing especially with a change in wing curvature to accomplish the purpose. This group, we think, comprehends claims 4, 16, and 28. Claim 16 being typical and most comprehensive of the group we quote it at this point:

"A curved aeroplane with means for changing its curvature, and a horizontal tail behind, with means for swinging it vertically."

The second group may be said to be directed to the relative arrangement of the supporting and control surfaces, and would include claims 12, 17, and 18. Claims 17 we regard as typical of this group and therefore quote it:

"In an aeroplane device, plural curved areoplanes one in advance of another, and a horizontal tail-surface behind that last aeroplane with means for swinging said tail-surface vertically."

The third group is made up of certain claims which, in addition to the foregoing, are predicated upon or limited to a specific type or character of supporting surfaces, defined in the claims as "curved parabolically." In this group we place claims 9, 12, and 32. Claim 9 we regard as typical and quote it:

"An aeroplane curved parabolically from front to rear, its front portion upwards and downwards, which manifestly served to angularly vary the surfaces of his wing.

Boswell's patent No. 728844, disclosed a conception of the structure embodied in certain of Montgomery's claims as filed. Boswell's structure also obtained an angular change in wing surface.

The Commissioner of Patents rejected the patentee's claims 1, 2, 3, 4, 17, and 24 upon the patent scited above. Montgomery submitted amendments in answer to the rejections, in which he said:

"The essential distinction of this aeroplane with respect to its capability of changing surface, is that such change is effected and lies wholly within its own integral borders, by a change in its own curvature, in contradiction to a general angular change such as results from the relative movement of a section attachment like the hinged tail of the reference."

We need not indulge citation to disclose the legal effect of this proceeding.

From the Revue de l'Aeronautique, vol. 4, published at Paris in 1893, we cite the following quotation:

"It is known that the characteristic of a spiral is to turn about a center from which it is always receding and (fig. 27) that all tangents, at no matter what point of the curve, form similar angles with the radius; it is thus possible to trace spirals of greater or less curvature.

"This curvature is indispensable to a moving surface to enable it to obtain the maximum support in the air. It is also applicable and indispensable to individual feathers and to the propeller blades.

"It may be termed the universal sustentation curve of flight and support in the air.

"The arching, as regards the degree of curvature of the concavity of the wings, will vary according to the speeds and loads, but without ever losing the character of a spiral. For all wings, without exception, small or large, the central or starting point C of the spiral curve coincides with the front of the wing; the Figures 26 and 27, representing two absolutely similar spirals, afford an example of this. On that of Fig. 26 is seen a full line which shows the shape of a large wing; on Fig. 27 the full line represents another wing, but much smaller. The horizontal lines H indicate the direction of translation. The same wing may change its degree of curvature during flight, but it will be only a modification of spiral.

Laws Common to All Wings Are Explained

"All wings, of whatever shape and nature they be, must obey the same laws. It can not be otherwise, because the difficulties of locomotion in the atmosphere especially when the latter is disturbed, and the manoeuvres of starting from any landing on the ground will be the same for all aerial machines. Aeroplanes will also inevitably undergo great changes in their weight through the consumption of fuel or by being lightened if they let fall any part of their load to the earth.

"From all this arises the necessity of being able to guide or to retard or accelerate the speed of transmission. And to be able to attain this end it is necessary that the wings should be capable of making four principal movements during flight:

"1. To be moved forward or backwards in their entirety.

"2. To be folded up, so as to diminish or extend their surface.

"3. To be warped

"4. To vary at will the curvature of the universal curve.

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"Because of the great difficulties which accompany the question of speed, we have been obliged to make wings for slow speed and high speed machines."

Lilienthal in 1895 demonstrates in his Letters Patent 544816 a distinct conception o fthe value and functioning of curved wings in a flying machine.

Lilienthal was a distinguished engineer and scientist; he sucsecsfully accomplished thousands of glides, have to the art publication of his experiemtns, and is prominently recognized by more than one outstanding scientist as contributing to the art most vitaland necessary principles of the way in which air currents may be utilized in flying machines.

On May 26, 1906, Orville Wright and Wilbur Wright, of Dayton, Ohio, received their patent 821393.

The two Wrights first became interested in aviation in 1896. They were close students of the science, and early in their careers became convinced that equlibrium and control were the vital factors to be obtained if a heavier-than-air machine was ever to materialize. To this end they devised in July, 1899, a method of twisting or warping wing surface. A model was constructed along this line, a model clearly disclosing the conception of shifting one wing surface forward or back relatively to the other, and warping them by the same movement. This model was tested and responded satisfactorily.

Man-Carrying Model Constructed by Wrights

In 1900 the Wrights constructed a man-carrying model and it was tested at Kitty Hawk, N. C., in September and October, 1900. This particular machine, a glider, speaking now of wing surfaces, was so constructed that adjustments, connecting the wings by flexible joints with upright posts, enabled the operator, "lying prone in a cradle," to actuate a wing warping effect by the sidewise movement of his body. The machine was flown a number of times with an operator on board during some of the flights, and without one at other times.

It is true that the wing warping was accompanied by changing the relative position of the wings in flight, and not in the precise manner the patent in suit at a later point of time disclosed; but the demonstration of the effectiveness of the principle was firmly established. Lateral control and equilibrium were obtained for the first time effectively, leaving open to subsequent inventors the solution of a better method, if possible, to obtain the identical result. The Wrights, so far as the record herein is concerned, were the first to construct a device which successfully functioned in the desired way.

The Wrights were assiduous in experimentation. In July, 1901, at Kitty Hawk tests of a larger machine were made in the presence of a number of persons, including one very distinguished scientist. These tests involved a number of flights, and many of them were decidedly successful. Without recounting in detail the number of tests made by the Wrights, and the success which followed their scientific and laborious investigation of the art, it is sufficient to state that on December 17, 1903, the Wrights demonstrated the possibility of successful flying in a heavier-than-air machine, motor

Index and Digest Of Latest Federal Court Decisions

SYLLABI are printed so that they can be cut out and pasted on Standard Library-Index and File Cards, approximately 3 by 5 inches, usually employed in libraries and filed for reference.

COURTS: Court of Claims: Jurisdiction: Enforcement of Judgment against United States.—Where plaintiff's case rests solely on the failure of the United States to comply with a judgment plaintiff has already obtained, held: Whatever plaintiff's rights may be, the Court of Claims has no jurisdiction of the case and is powerless to enforce them.—Benedict, Trustee, v. United States. (Court of Claims).—Yearly Index Page 968, Col. 7 (Volume III).

Patents

PATENTS: Infringement: Airplanes.—Where patentee claimed an airplane having wings that were shaped the same on top and bottom, and were curved parabolically from front to rear, whereas wings of defendant's airplane were not identical in contour with respect to top and bottom, and the change effected in their surfaces was an angular change brought about by "hinged ailerons," and the use of these hinged ailerons was shown to be old in the art, held: The patent structure was not infringed. Patent 831173, claims 4, 16, 28.—Montgomery v. The United States. (Court of Claims of the United States).—Yearly Index Page 968, Col. 1 (Volume III).

PATENTS: Infringement: Airplanes.—Where patentee claimed the combination of two airplanes, one in advance of the other, and a rudder in the rear, whereas defendant's device consisted of one airplane and a stabilizer, and the prior art showed the combination of an airplane and a rudder or stabilizer, held: No infringement; when considering the combination as an airplane and rudder it was met by prior art; when considering the two tandem airplanes as an airplane and a stabilizer the rear airplane did not function as did defendant's stabilizer. Patent 831173, claims 12, 17 and 18.—Montgomery v. The United States.—(Court of Claims of the United States).—Yearly Index Page 968, Col. 1 (Volume III).

PATENTS: Infringement: Airplanes.—Claims 9, 12 and 32 of Patent 831173, directed to an airplane curved parabolically from front to rear, held: Not infringed by defendant's airplane and stabilizer combination.—Montgomery v. The United States. (Court of Claims of the United States).—Yearly Index Page 968, Col. 1 (Volume III).

in an obvious manner. By reason of this construction it will be seen that with the particular mode of construction now under construction it is possible to move the forward corner of the lateral edges of the aeroplane on one side of the machine either above or below the normal planes of the aeroplanes, a reverse movement of the forward corners of the lateral margins on the other side of the machine occurring simultaneously. During this operation each aeroplane is twisted or distorted around a line extending centrally across the same from the middle of one lateral margin to the middle of the other lateral margin, the twist due to the moving of the lateral margins to different angles extending across each aeroplane from side to side, so that each aeroplane surface is given a helicoidal warp or twist."

The claims of the patent, 18 in number, disclose clearly the structure specified. Beyond dispute is the established fact from evidence of not only oral witnesses but many written odcuments that the Wrights did embody in their aeroplane a complete conception of and meeans of imparting to the rear portions of an aeroplane wing a change therein which was intended to and did function to "present to the atmosphere different angles of incidence," and "were capable of being moved to different angles relatively to the normal plane of the body of the aeroplane."

and Rubber Co. v. Pennsylvania Rubber Co., 164 Fed. 557; Henry v. City of Los Angeles, 255 Fed. 769, 780.

The sequential history of the art circumscribed the opportunity for inventive genius as to the construction of wing surfaces at the time Montgomery resigned his structure. The latitude for novelty in this respect was limited to sui generis forms and modes of adjustment. The necessity for curved wings and wing warping had been anticipated.

It had been successfully demonstrated in an empirical way, and was distinctly recognized as an established principle of aeroplane flight, so that Montgomery, as the history of his application for and allowance of patent expressly discloses, was limited to the precise disclosure of his claims in this respect. Preceding 1905, inventors were active in the art. Intensive study and experimentation were in progress on a large scale, and the record absolutely precludes the possibility of assigning to Montgomery more than his claims specifically call for, and to that precise limitation we think his patent is restrained, including the claims grouped in group one. The defendant furnished the plaintiffs with plans and specifications of two flying machines, illustrative of the character of machines being used by the Government at the time the petition herein was filed. Both parties have used and relied upon these machines as determinative of the issue

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