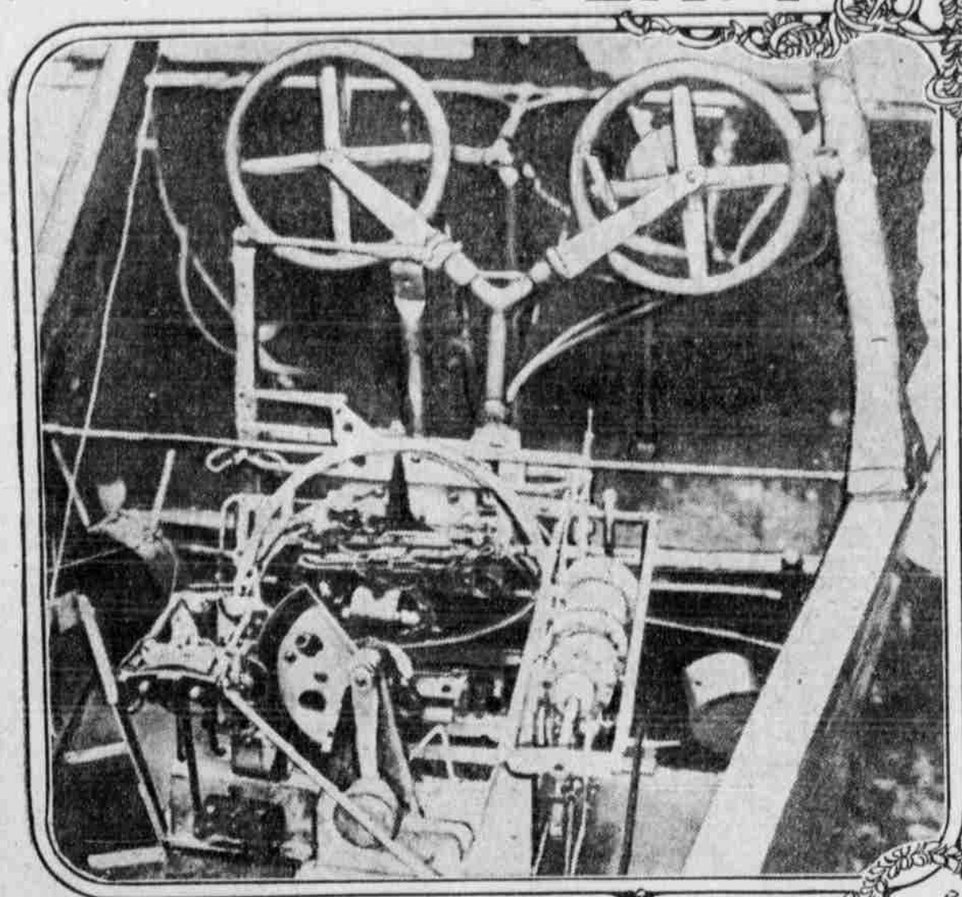
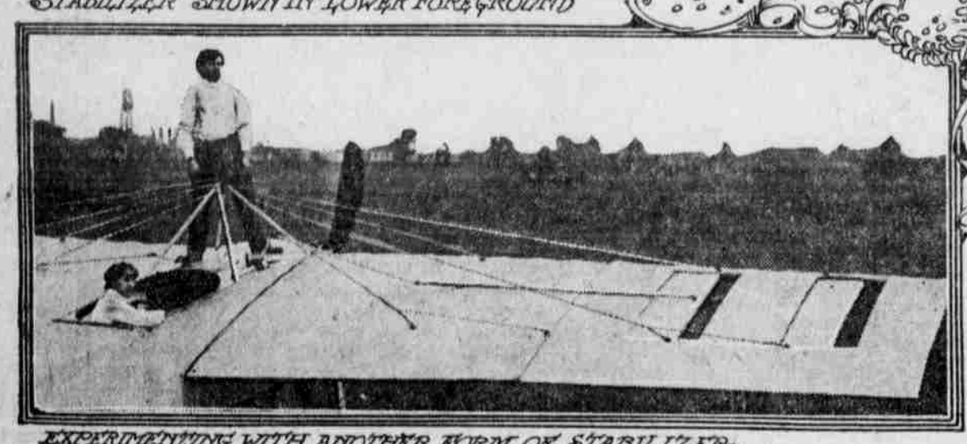
AEROPLANE STABILIZER INVENTED AT LAST



STABILIZER SHOWN IN LOWER FOREGROUND



EXPERIMENTING WITH ANOTHER FORM OF STABILIZER.

L. LAWRENCE SPERRY, SON OF THE INVENTOR.

ELMER E. SPERRY of New York city has given aviation a new start, inasmuch as he has provided a way to rob it of some of its most insidious perils. His apparatus is an automatic stabilizer, which maintains the equilibrium of the flying machine no matter how fickle may be the condition of the air aloft. Don't let this term stabilizer puzzle you a bit; you can just as well substitute the more familiar word "balancer."

If you happen to have access to a list of aeronautical accidents during the last two years, especially where the heavier-than-air flying machine is concerned, you will find that the majority of the catastrophes have been attributed to "loss of control." Loss of control is merely another way of saying that the air pilot was caught napping or taken suddenly unawares, and before he could apply the usual facilities to right his machine the air craft was dashing earthward and utterly beyond human arrest. Perhaps it was a sudden gust of wind, the sweep of a cross current, or even an "air hole" that started the upsetting or tipping movement, but the result was disaster. The outcome is not difficult to explain if one half realizes the airman's problem.

The aviator, when once afloat aloft, has a task pretty much akin to that of the slack-rope performer. His machine can reel from side to side or tip lengthwise with the utmost ease, especially if the aeroplane be of comparatively light weight and of the racing type. From the moment the pilot takes his seat, if the wind currents be variable, he has to juggle continually with his wing-tips or ailerons to prevent too much lateral rolling, and, too, to a lesser degree, he has to manipulate the tail-planes to check any pitching or tossing on the part of the head of the aeroplane. The lateral control he exercises by shoving his body sidewise against an enveloping yoke, and the longitudinal correction he applies by means of a lever, which he either pushes away from him or draws toward him, as the case requires. In time, the skilled airman does this more or less involuntarily, responding to the motions of his craft. Unhappily, however, his corrective efforts are relatively sluggish, and they are applied only after the aeroplane has obtained a considerable angle of heel or pitch.

It is perfectly plain that the aviator, at best, when depending upon his own initiative, but poorly imitates the efforts of a soaring bird, which can maintain its poise steadily even though the wind be fitful and the change of force extreme. Apparently, the bird does this without rocking violently in its endeavor to hold itself balanced; but simply because the eye cannot trace the sweep of its wing-tips, we do not see how it keeps itself poised. Mr. Sperry, by his stabilizer, has made this secret of natural flight clear to us. The bird is sensitive to the first oncoming disturbing current and instinctively acts to offset it. By catching the upsetting force in its very beginning, only the slightest flexing of the wing-tips is necessary to meet the contingency. In other words, the bird never permits the wind to get the upper hand of it—it meets the approaching menace, so to speak, promptly and neutralizes it at once. If the bird were as relatively insensitive as the aviator, the changeful wind or gusty air currents would mean the same danger to it that they do to the pilot.

Mr. Sperry has substantially changed all this by his gyroscopic stabilizing apparatus, and how successfully he has achieved this end was proved by his winning the $10,000 prize offered by the French aviation commission. There were 57 competitors entered in that contest of aeroplane safety devices, and the American victory is one in which we should take a good deal of pride. By that success aviation broadly acquires a new element of practicability, and the flying machine will have far wider fields of daily usefulness open to it. We are now within reach of that state of the art where flying will be as safe as yatching; the air pilot will have little more to do than simply to steer his machine to right or to left, or up and down, as he may desire—the stabilizer will keep him from upsetting and will even check him should he deliberately trespass toward the hazardous in some wilful movement.

Now a gyroscope will ordinarily react against the external disturbing force, no matter in what direction that upsetting effort is applied. How then does Mr. Sperry make use of the gyroscope in stabilizing the aeroplane, and, especially, how does he produce harmony of action when he utilizes four of these remarkable little spinning flywheels?

The four gyroscopes are combined in pairs—one pair to regulate the flexing of the wing tips and the other pair to prompt the shifting of the tail planes. Now, each pair must be "dead" to the force which calls for action in the other, and, again, there must be an even measure of conflict between the two gyroscopes constituting a pair. That is to say, the gyroscopes for lateral stabilizing are opposed to each other like two persons facing and alternately pushing and pulling each other to obtain the right of way. Suddenly some one tries to clear the patch by shoving them from one side, and, instinctively, to maintain their own balance, they unite against the intruder. It is just in this fashion that Mr. Sperry unites by seeming opposition each pair of gyroscopes so that they will be absorbed in their mutual struggle until aroused to service in the designed plane of mutual action.

Each gyroscope is not any bigger, including its casing, than a fair-sized fist, and don't suppose that the persistent tendency to hold to their chosen planes is in itself capable of exerting the force that directly pulls the controlling wires that work the several stabilizing surfaces. Their mission is to "feel" the need of action and to call into service mechanism of sufficient vigor to do what the pilot would otherwise accomplish by swinging his body or working a lever. In the latest form of his stabilizer Mr. Sperry has recourse to a power apparatus which he calls a servomotor. This servomotor is driven by electricity, and is a sturdy apparatus, instantly responsive to the call of the gyroscopes. To it are led the control wires, and these are operated immediately upon the first arrival of a tilting or tipping gust of wind. Without a stabilizer the aeroplane may be unbalanced a goodly number of degrees before the pilot is alive to the situation, and the movement acquires even a greater amplitude before he can check it. With the Sperry stabilizer, on the other hand, the flying machine is held to its equilibrium well inside of a zone of one degree.

Have you ever lost your way in a fog? Well, if you have, then you may appreciate the variety of ways in which an aviator may go astray when aloft. Once above the clouds the horizon disappears, and, within some limits, he may not know whether he is going up or down or whither his machine is heading. His poise, when advancing, is always an angular one, and he may think himself going straight ahead, while, in fact, he is actually descending.

But the risks in climbing skyward, without knowing the angle of that ascent, may be equally perilous. A small wind disk is associated with the mechanism of the stabilizer. This little plate is so swung that it always "feels" the full force of the arriving air current as the aeroplane sweeps on. It is associated with a pressure measuring mechanism, and this pressure corresponds to speed in miles per hour. This velocity is indicated by a little dial in front of the aviator, so that he can know, if watchful, how fast his craft is going and whether or not there is lifting force enough against the aeroplane's wings to keep the machine safely afloat.

When, ascending, the pilot turns the nose of his machine upward he offers a broader surface of his wings to the oncoming air, and what he thus loses in movement forward he gains in rise, just like the motion of a kite, when you pull the string and square its face more nearly with the wind. Now, the aeroplane must move onward at a prescribed minimum speed; this velocity differs with different machines, and below this speed the air current has not force enough to sustain the craft. Should an aeronaut, seeking to climb too fast, halt the speed forward in order to increase the rapidity of rise, he is sure to start plunging backward if that velocity drop ever so little below the prescribed minimum required for support. Here is where the little wind gauge plays its vital part.

Automatically, should the aviator be heedless or unaware of his peril when within a certain limit of the nonsustaining speed, the wind gauge, through associate mechanisms, turns the tail planes so that that end rises, while the head of the machine dips, and, instead of soaring, starts upon an earthward volplane. In that earthward sweep the craft acquires increased speed, gains renewed supporting pressure, and is once more under safe control.

This control, however, is taken out of the hands of the pilot pro tem. until the required safety speed has been thus obtained. This same provision provides against that much feared contingency, the stopping of the propulsive motors during flight. It was an accident of this sort that almost cost the lives of an aviator and his wife here a little over a week ago. By desperate efforts that pilot managed to keep the zigzag volplaning of his craft within some bounds, and by great good luck the machine landed in the water.

In sweeping around upon a circular flight, especially if the turn be at all short, the ordinary aviator has a multiplicity of things to do: He must regulate his wing tips or ailerons, function the tail plane and, at the same time, manipulate the rudder. The trouble is that the rudder and the tail plane become somewhat interchangeable in their actions because of the heeling angle assumed by the craft. This is ticklish work and has caused many accidents and cost a number of lives. With the Sperry stabilizer this hazard is removed. The pilot will have nothing to concern himself about except the path he wishes to follow—the little gyroscopes will look out for the rest, as has been amply proved during the exacting tests in France when the shifting of the pilot and his mechanic set up disturbing forces that would have meant certain destruction in an unstabilized aeroplane.

Now you know just what Mr. Sperry has done for aviation. He has mastered a very hard problem, and he has made his mastery complete.

FIREMEN.

Bill—Who's your friend?

Jill—Oh, he's a fireman.

"What kind of a fireman, the kind that wears a red shirt or the kind who has a smutty face?"

FUNNY DANCING.

Patience—I noticed, last night, that George has tango eyes.

Patrice—Why do you call them tango eyes?

"Because they dance so funny."

NEBRASKA IN BRIEF.

Mrs. Theron Nye, one of Fremont's earliest pioneers, died.

The equipment of the volunteer fire department at Ohiowa has been increased.

Three negro box car robbers are confined in the new county jail at Plattsmouth.

Robert Wynn of Chicago addressed a mass meeting of Superior citizens on the subject of water power.

The Dodge county teachers' institute will be held at Fremont this week. A strong program has been scheduled.

Nebraska's apple crop this year will reach 2,200 acording to forecasts by the department of agriculture at Washington.

Material has been received at Ohiowa for the installation of electric street lights. The work of installation wil start at once.

The furniture and equipment donated to the Franklin academy from the Weeping Water academy is being prepared for shipment.

George Dill of West Point, former night marshal and later in the cream and poultry business, has moved his family to Schuyler.

Omaha's Ak-Sar-Ben fall festival will be held September 30 to October 10. Electrical parade evening of Oct. 7. Fraternal parade Oct. 8.

The Cuming county teachers' institute has closed at West Point. The attendance was larger than ever before and the programs were successful.

Glenn Welch, son of Mr. and Mrs. Harry Welch of Hastings, is suffering from a severe case of blood poisoning resulting from stepping on a rusty nail.

The German-American picnic, which was to have been held at Seward September 21, has been postponed indefinitely, on account of the war in Europe.

The Holiness camp meeting at Weeping Water, under the auspices of the Nebraska conference of Menonite brethren has closed a ten day session.

The city council of Superior opened a new well hich first filled with water and then with quicksand. It is thought that a new location must be found for the well.

James McKerne, who was thrown under a car at the Rock Island sandpit, near Fairbury, died. His legs wer amputated and he received fatal internal injuries.

Garnett Hartlet, a well digger, was overcome by gas resulting from blasting and plunged to the bottom of a sixty-foot shaft at Plattsmouth. He was instantly killed.

The five-year-old son of Charles Roland was drowned in a bayou of the Little Blue river, a mile southwest of Fairbury. The body was recovered but life could not be restored.

An appeal for funds has reached D. M. Rosenburg of Hastings from his brother, who is stranded in Antwerp, Belgium. He fled from Russia when hostilities broke out.

Business men at Plattsmouth are planning to build a pontoon bridge across the Missouri for the convenience of farmers on the Iowa side who trade in Plattsmouth.

Lowney Belnay, colored, has been bound over to the district court on a charge of burglarizing a Rock Island boarding car, near South Bend. His trial was held at Plattsmouth.

Mrs. P. E. Becker was seriously injured, John Bacon sustained a fractured collarbone, and three others received more or less serious bruises from which they will recover, when an auto in which all were riding struck a Burlington fast train near Exeter.

Dittman's department store of Falls City was destroyed by fire. The loss is $30,000, with insurance of $18,000. The fire originated in a new stock stored in the cellar. Despite a high wind firemen succeeded in confining the blaze to the building where it originated.

The Young & Bolton lumber yard at Hebron was destroyed by fire. The fire department exerted every effort, but the flames could not be controlled in time to save the yard and a hard fight was necessary to keep the fire from spreading to adjoining buildings. The loss will reach $20,000.

At a meeting of the directors of the Callaway fair association, it was unanimously decided to not hold a fair this fall. The association, because of bad weather last fall, went behind several hundred dollars, and owing to present circumstances it was deemed best to not attempt to hold a fair this season.

Dr. Kigin, state veterinarian, attended a meeting of fifty farmers six miles north of Beatrice. The object of the meeting was to induce farmers to take sanitary precautions against the spread of hog cholera. The farmers have agreed to carry out measures advocated by the government and state veterinarian and a disinfecting spray pump will be bought and used in each township.

Nebraska City has filed a suit against the light and water company, alleging that impure and dirty water is furnished patrons. The city asks for the dissolution of the franchise granted the company.

A special election was held in Ravenna for the purpose of voting on a proposition to issue bonds to construct a sewer system. The vote stood 115 for and forty-eight against, there being but a light vote cast. This proposition was voted on and carried about two months ago, but legal technicalities made it necessary to hold another election.

BUILDING CRACKED

NORMAL BOARD KICKS ON CHADRON STATE DORMITORY.

PASSENGER RATE THREATENED

Commission Fears Application of Oklahoma Case to Nebraska Two-Cent Law.

Lincoln.—The state normal board has taken up the question of a defective building and a proposed department for the study of defective childeen. J. R. Gettys, a membes of the board, reported that the new dormitory at the Chadron normal, built by Mr. Mulholland of South Dakota, was defective. He said there were cracks under the roof near the eaves and open spaces not intended by the architect, that the floor in the top story is not in good condition and the flooring is poor and the cement floor in the basement is crumbling, and cracked. The building was to have been finished by June 1, yet there are no outside doors in the structure. The board instructed the scretary to notify the contractor if the building is not filnished and in good condition by September 7, the board will take the job off his hands and finish it. The architect who designed the structure was asked to inspect it.

Mr. Gettys made a verbal report in favor of establishing a new department in all four state normal schools, commencing with the Peru school. He advocated a department for the study of defective children with an expert in charge who will be able to instruct teachers how to discover defects in children and how to care for such children. The board took no action, but asked for a written report on the subject.

May Affect 2-Cent Law.

Death knells may be sounded one of these days for the 2-cent passenger law, now effective in Nebraska. And when that time comes the 3-cent specter, which played ghost until the federals courts spoke, will assume form as far as travelers in this state are concerned.

This is the conclusion reached by the state railway commission after reading the recent decision of the interstate commerce commission in the case of the corporation commission of Oklahoma against the Santa Fe and other roads of that state.

In the proceeding on which is based this startling announcement it was alleged that the interstate fare of 3 cents per mile through Arkansas, Missouri and Oklahoma was unreasonable and discriminatory to the extent that it exceeded the 2-cent fare maintained in the three states. The prayer was for the establishment of a 2-cent fare on all interstate business between the three states.

In discussing the problem in the decision the federal regulatory body cites the United States suprme court decision giving authority to regulate purely intrastate rates where interstate rates are seriously affected thereby. That is where the cloud rises on the Nebraska horizon. It means in short that if the Nebraska 2-cent passenger rate is found to interfere with a through rate, then the Nebraska rate can be raised to meet the demands of the occasion. It is a grave danger, according to the state commission, and one that threatens freight traffic as much as passenger business.

Open Season for Ducks.

The publication of a news item that the open season on ducks did not begin until October 1, has brought in a flood of letters to Game Warden Rutenbeck asking about the law. The game warden has kept his stenographer busy trying to untangle the mystery and gives out that the open season for wild duck, geese, brant, cranes and game water fowls, begins Tuesday, September 1 and will close Wednesday, December 16.

Assistant State Engineer Hero.

Friends of "Cy" Mason, assistant state engineer, who stopped a runaway team at Fremont the other day and saved the lives of a woman and two little children, will make efforts to land a Carnegie medal for him. The deed is termed, by those who saw it, as one of the bravest they ever witnessed.

Accept Craddock's Plans.

The State Normal board at its regular meeting decided to accept the plans prepared by J. H. Craddock of Omaha for a new model school building at the Peru normal school to cost in the neighborhood of $80,000, bids to be considered at the next meeting of the board, October 1.

Firms Rush to Exhibit.

Novel and unique farm machinery exhibits will be one of the features of the state fair this fall.

During the last few years, declares a machinery expert, many improvements in machines have been captured by companies outside the alleged trust. Small manufacturers have rushed in, eager to show their improved, up-to-date models.

A long list of implement and machinery firms have already signed contracts with the State Board of Agriculture.