This invention relates to aeroplanes and particularly to a device for facilitating landing. When an aeroplane approaches the landing field it frequently descends at such an angle to the ground that there is grave danger of the aeroplane nosing into the ground and turning over unless the elevator is actuated by the pilot at just the right instant and to the proper extent to offset the downward angle of the plane. Experienced pilots usually are able to properly time the movement of the elevator so as to effect a proper landing but student or amateur pilots frequently crash owing to the failure to use the good judgment necessary under the circumstances. Also when landing in the dark even competent pilots are apt to misjudge their distance from the ground with disastrous results.

It is also sometimes necessary for the pilot to abandon the plane while in midair, and take to the parachute, leaving the plane to glide down of itself, balanced at such an angle by the stabilizers as will allow it to properly glide to earth, but which will cause it to crash upon contacting with the ground.

The principal object of my invention is to provide a device by means of which the elevator of the plane will be automatically turned to elevate the nose of the plane at just the right moment so that the aeroplane will assume the desired horizontal position upon reaching the ground, and regardless of the action of the pilot, or of his absence from the plane in certain cases. Accidents due to faulty judgment and control, or entire lack of control, as above outlined, will therefore be largely lessened if not entirely eliminated.

A further object of the invention is to provide a device for the purpose, the actuating member of which may be placed in operative or non-operative positions, or readily disconnected from the elevator at the option of the pilot, in the event he does not desire or need the aid of the automatic functioning device.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Fig. 1 is a side elevation of an aeroplane partly broken out showing my landing control attachment applied thereto and initially functioning with the approach of the aeroplane to earth.

Fig. 2 is a similar view showing the position of the control device after it has completed its elevator actuating movement.

Fig. 3 is an enlarged fragmentary side elevation of the connection means between the elevator and the actuating arm.

Fig. 4 is a side elevation of the control device showing a modified manner of connecting the same to the elevator.

Referring now more particularly to the characters of reference on the drawings and particularly at present to Figs. 1 to 3 the numeral 1 denotes the fuselage of any ordinary aeroplane having the usual elevator 2 at the back arranged for movement in a vertical plane and manually controlled from the stick or lever 3 disposed in the pilot's cockpit of the plane, and connected to the elevator in the customary manner. Depending from the fuselage centrally of its width and preferably adjacent the lever is an arm which is pivoted intermediate its ends at the bottom of the fuselage so as to have a relatively short portion above the pivot and a long portion below. The portion below the pivot or which depends below the body is of such length that when projecting substantially at right angles to the fuselage its lower end will be some distance below a line L projected from the bottom of the front landing wheels 5 to the tail-skid 6. By reason of this arrangement the arm will obviously engage the ground and tend to move rearwardly, before the wheels engage the ground. A snap action spring 7 is secured at its lower end to the arm below its pivot and at its upper end to the fuselage in such relation to said pivot as to tend to maintain the arm either in a fully depressed position, as shown in Fig. 1, or in
closely folded relation against the bottom of the fuselage, as shown in Fig. 2.

A turnbuckle 7 is preferably associated with the spring at its upper end to enable the tension of the same to be altered. A stop 8 is positioned to prevent the spring from pulling the arm down further than a predetermined position relative to the fuselage without interfering with the upward rearward movement of the arm.

To cause the above movement of the arm from a depending to a folded position to move the elevator up regardless of the manipulation of the same by the pilot, a connecting unit U extends from the upper end of the arm to the upper elevator control arm 9.

This unit comprises a snap hook 10 or other member which may be readily and detachably applied to any one of a number of holes 11 in the upper portion of the arm, a turnbuckle 12, a tension spring 13, and a length of wire or cable 14. The turnbuckle of course enables the tension of the spring to be altered while the row of holes 11 enables the elevator pulling unit to be connected to the arm so as to move the elevator different distances with the same extent of movement of the arm as may be desired. The provision of the spring in the elevator control line provides an automatic equalization in position of the elevator with regard to the air pressure, which is governed by the speed at which the plane approaches the ground.

In operation for instance almost as soon as the arm engages the ground it will be thrown back to its fully folded position by reason of the initial frictional engagement of the arm with the ground and the subsequent pulling action of the spring 7. The elevator will therefore be raised to its fullest extent as far as the functioning of the arm is concerned. If the speed of the aeroplane is considerable such extent of raising of the elevator might cause the plane to again rise in the air. The relatively great air pressure then pressing against the elevator however has a tendency to depress the same. This depression is actually effected by reason of the spring 13, which yields and lengthens the unit U to an extent depending on the comparative strength of the air pressure and spring. The snap action spring prevents this pressure from lowering the arm and thus destroying the tendency of the elevator to remain raised. If the speed of the machine as it approaches the ground is relatively slow or as the speed decreases as the plane moves along the ground, the air pressure on the elevator is lessened and the angle of the same gradually increases as the resistance to the spring 13 is less. Thus the angle of the elevator becomes automatically set according to what the conditions demand, since it is obvious that for different speeds different elevator settings are necessary to accomplish the same result, and the greater the speed the less should be the angularity of the elevator.

In the above showing the arm is connected direct to the elevator independent of the manual control wires. In the arrangement shown in Fig. 4 the unit U is shorter and extends only from the upper end of the arm 15 to the swing arm 15 which is connected to the control lever 15 and from which the wires 18 extend to the elevator.

In either case the upper end of the actuating arm is positioned so as to be convenient for the pilot to couple or uncouple the snap hook of the pull unit. The coupling feature is desirable since it may be desired to retain the control arm folded when in actual flight, without the elevator being turned upwardly or without the action of the spring 13 having to be constantly offset by a pull on the manually controlled lever.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. In an aeroplane, an elevator, an arm pivoted on and depending from the aeroplane to be engaged by the ground and moved rearwardly, connection means between the arm and elevator to pull the latter to an elevating position when the arm is thus moved rearwardly and a snap-action spring mounted in connection with the arm tending to hold the arm both in depending and rearwardly moved positions.

2. In an aeroplane, an elevator, an arm pivoted on and depending from the aeroplane to be engaged by the ground and moved rearwardly, connection means between the arm and elevator to move the latter to an elevating position when the arm is thus moved rearwardly, and means resisting return movement of the arm to a depending position after it has once been moved rearwardly a predetermined extent.

3. In an aeroplane, an elevator, an arm pivoted on and depending from the aeroplane to be engaged by the ground and moved rearwardly, connection means between the arm and elevator to move the latter to an elevating position when the arm is thus moved rearwardly, and means acting on the arm to move the same to its rearward limit after it has been once swung rearwardly by engagement with the ground through a certain arc.

4. In an aeroplane, an elevator, an arm pivoted on and depending from the aero-
plane to be engaged by the ground and moved rearwardly, connection means between the arm and elevator to move the latter to an elevating position when the arm is thus moved rearwardly, said means including a member for detachable coupling with the arm, and means enabling the arm to be held in a rearward and substantially horizontal position against the fuselage of the aero-plane when said member is uncoupled from the arm.

5. In an aero-plane, an elevator, an arm pivoted intermediate its ends on the aero-plane and depending from the fuselage to be engaged by the ground and moved rearwardly; the upper end of the arm projecting into the cockpit of the fuselage, and a connection between the upper end of the arm and the elevator to pull the latter upwardly with the rearward movement of the arm; said connection including a hook adapted for detachable coupling with the upper end of the arm.

In testimony whereof I affix my signature.

WALTER L. ISOM.