

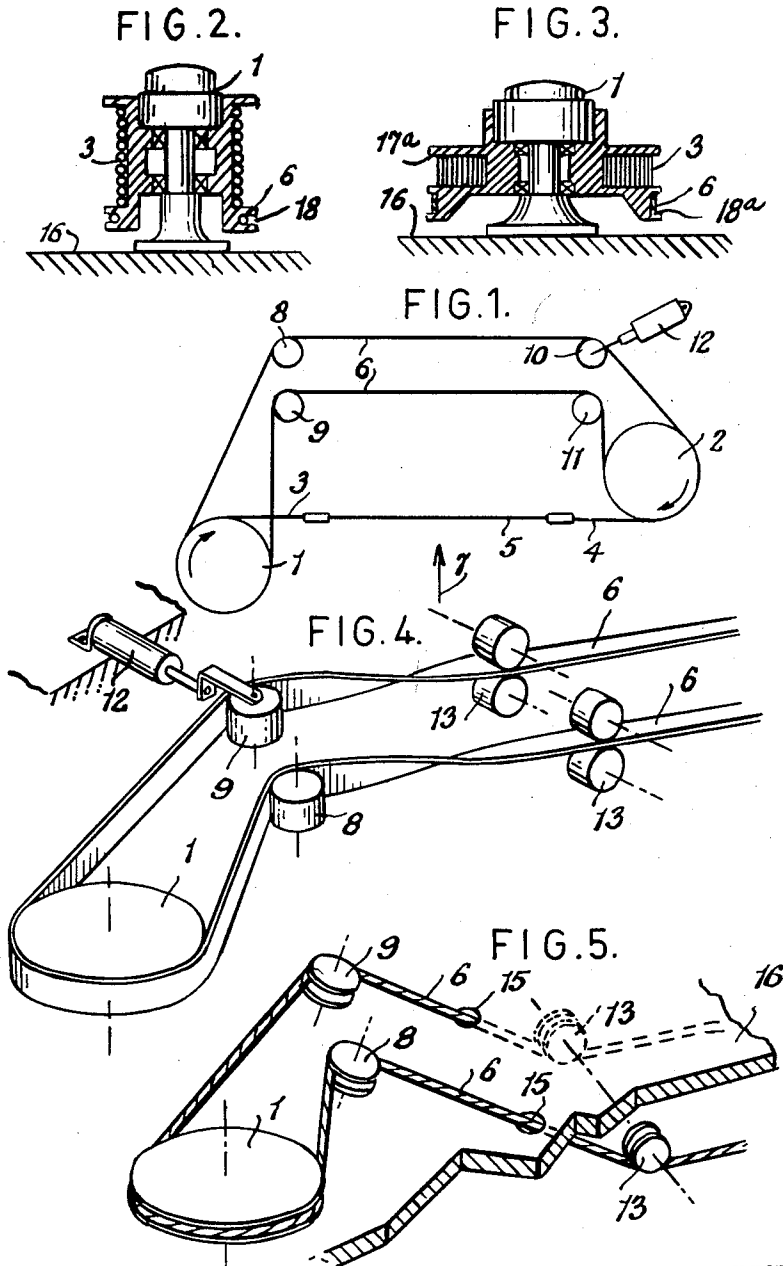
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ARRANGEMENT FOR ARRESTING LANDING AIRPLANES BY MEANS OF A WIRE

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ARRANGEMENT FOR ARRESTING LANDING AIRPLANES BY MEANS OF A WIRE

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The present invention relates to an arrangement for arresting landing aeroplanes by means of a wire, net or the like connected to brakes disposed on either side of a landing runway.

Upon arresting a landing aeroplane by means of a hook engaging the arresting cable, the stability of the arresting operation must not be ignored. An excessively asymmetrical loading will subject the aeroplane to jerks which, on landing, are unpleasant to the pilot who will instinctively attempt to correct the movement, resulting in an increased asymmetry involving the possibility of de-tireing, and where the asymmetry is great, this involves the direct risk of the aeroplane canting over, especially if it is one provided with a narrow undercarriage. These problems can be met by feeding out equal lengths of the arresting wire from both brakes. The slippage which may, in this case, occur at the hook, if for example, the aeroplane does not contact the arresting wire squarely at the center but slightly laterally thereof, will produce forces which tend to stabilize the aeroplane.

Because of this, in some arresting devices, such as are used on board aircraft carriers for example, a single brake has been employed to act on the arresting wire on both sides of the runway. In the case of aeroplane carriers no substantial problem is involved in providing the space required for this purpose below the landing deck. For ground airports the corresponding arrangement is sometimes employed which, however, results in extremely expensive installation cost, since the wire must be passed underground from the brake disposed at one side of the runway, below the runway and over to the opposite side thereof. In order to avoid any trouble due to differential elasticity of the wires on one or the other side, it is, in addition, often necessary to resort to the solution of providing an artificial length on the shorter side. This will result in an increase of the masses of inertia which will have to be set in motion. One way of reducing these masses is to dispose the brake centrally beneath the runway, but in such case too, the cost of installation will be materially increased.

The present invention is mainly characterized in that the brakes for both sides of the arresting wire are interconnected by an endless wire, chain, cable or similar flexible element for synchronizing the rotational speeds of the brakes during the arresting operation. A distinct advantage following from the invention resides in the fact that the brakes may be connected on or above the landing runway, whereby the installation will be simple and easy to be made at existing runways, since the runway need not be closed off during the period required for making the installation.

The synchronizing wire may be one of substantially smaller dimension than the arresting wire and braking wires, since only a portion of the braking load will be transmitted from one brake to the other. Such a small gauge wire can be placed on the runway without any risk. If the hook of the aeroplane which is intended to engage the arresting wire should fail to properly engage it, it will not hook onto the small gauge synchronizing wire disposed beyond it. Even greater safety to prevent this will be attained if the synchronizing wire is flattened

and is placed with its flat face directed toward and is lying against the surface of the landing runway.

With the above-stated objects, and other objects which may hereinafter appear in view, we have utilized the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawing, wherein an illustrative embodiment of the invention is disclosed,

FIG. 1 shows diagrammatically the structure and operation of the improved aeroplane arresting apparatus;

FIG. 2 is a vertical sectional view of a brake drum having two grooves for respectively receiving the arresting cable and the synchronizing cable;

FIG. 3 shows a brake drum having two grooves for a flat arresting cable and a similar synchronizing cable;

FIG. 4 shows how a synchronizing cable is arranged in a manner to lie flat against the surface of a runway, and

FIG. 5 shows how the synchronizing cable is caused to be disposed below the landing surface or runway.

In the drawing and with particular reference to FIG. 1, the numerals 1 and 2 designate brake drums disposed on either side of a landing runway. Brake wires 3 and 4 are wound around the respective drums 1 and 2, said wires being connected by an arresting or catching wire 5. When the landing aeroplane contacts the wire 5 by the engagement of the hook on the aeroplane with said wire, the wires 3 and 4 and the connected wire 5 are resistantly let out from the brakes.

The brake drums 1 and 2 are connected by an endless synchronizing wire 6 encircling the drums. The direction of approach of an aeroplane is indicated by the arrow 7. The synchronizing wire 6 is disposed on the runway forwardly of the arresting wire 5, as seen in the direction of approach of the aeroplane. This is made possible by extending the wire 6 over guide pulleys 8, 9, 10 and 11 which are located in advance of the brake drums 1 and 2.

Designated at 12 is a pneumatic or hydraulic wire-tensioning device which is anchored to the runway and is connected to the guide pulley 10. This tension device has the dual function of first, tensioning the wire 6 in conjunction with the plane interception, so that upon movement of the wire 6, air or liquid under pressure will in a well-known manner, be applied to the wire tensioner, causing the latter to attract the guide pulley 10, and second, to limit the tension exerted on the wire 6 so that its strength limit will not be exceeded. Owing to the fact that the wire 6 is not initially tensioned, it will normally lie on the surface of the runway, and it thus cannot, especially if it is flat, get caught by the catching hook of the aeroplane. Upon the outset of the catching operation the wire 6 becomes tensioned and it is thereby lifted above the surface of the runway and prevented from abrasively contacting or scraping against the same. FIG. 4 shows how the synchronizing cable 6 is arranged to lie flatly against the face of the runway or landing surface. The cable therein shown is a flat band and it is turned so that its face lies parallel to the face of the landing surface by means of the rollers 13 which are spaced away from the pulleys 8 and 9 so that the flat band, constituting the cable 6 will be turned 90°. In this view of the drawing the tensioning device 12 is shown as applied to the pulley 9 rather than to the pulley 10 as in FIG. 10.

Although the simplest installation can be obtained with the synchronizing wire lying on the runway, it will be within the scope of the present invention to dispose the wire below the surface of the runway. In FIG. 5 is shown the manner in which the synchronizing cable or wire may be located beneath the runway or landing surface. Therein the brake 1 is located above the landing surface as are the pulleys 8 and 9. The cable, after leaving the pulleys 8 and 9, passes through apertures 15 in the runway 16 to

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reach the under side of the landing surface or runway where it is guided by the pulleys 13.

As shown in FIG. 2, the brake drums 1 and 2 are each provided with two grooves indicated respectively at 17 and 18. The groove shown at 17 receives the arresting wire 3 and the groove shown at 18 receives the synchronizing cable 6. The drum shown in FIG. 3 shows how a flat band used in place of the arresting wire 3 is received in groove 17a with the synchronizing band serving as cable 6 received in the groove 18a.

Having thus described an embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What we claim is:

1. An arrangement for arresting landing aeroplanes by means of a wire or the like constituting an arresting device, said wire being connected to brakes disposed on either side of the landing runway, the brakes being connected by an endless cable separate from the arresting wire constituting a flexible element for synchronizing the rotational speeds of both of the brakes during the arresting operation.

2. An arrangement for arresting landing aeroplanes as provided for in claim 1, characterized in that the syn-

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chronizing cable is placed on the landing runway beyond the arresting wire as seen in the direction of approach of a landing aeroplane, the cable being extended about guide pulleys.

3. An arrangement for arresting landing aeroplanes as provided for in claim 1, wherein the synchronizing cable is disposed below the landing surface.

4. An arrangement for arresting landing aeroplanes comprising, a pair of spaced-apart brakes having rotative drums, an arresting cable extending between the brakes, pulleys located forwardly of the brakes in the direction of the landing movement of an aeroplane, an endless brake-synchronizing cable separate from the arresting cable extending around the brake drums and engaging with the pulleys, said cable being disposed below the arresting cable, and a tension device operative on the synchronizing cable to tension the same during the aeroplane-arresting operation.

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