Jan. 9, 1934. F. BURGHARDT 1,942,534

CENTRIFUGAL BRAKE FOR AN AIRPLANE ANTENNA WINCH

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Fig. 1

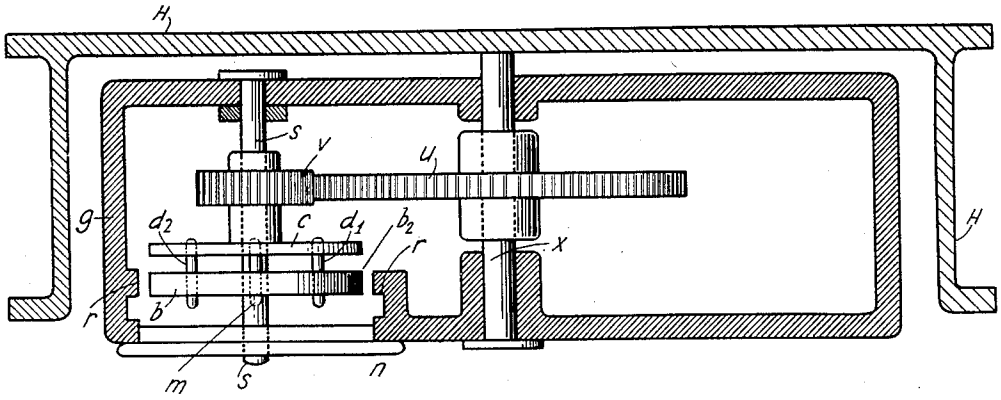


Fig. 2

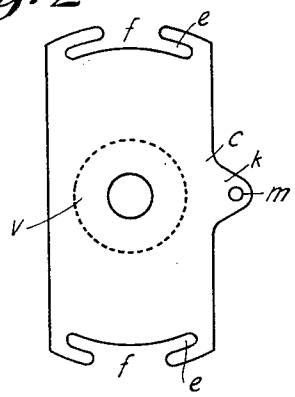


Fig. 2a

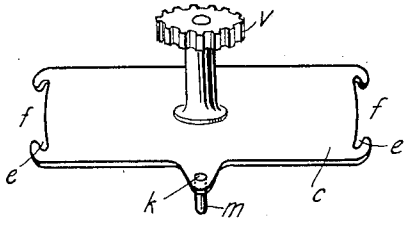
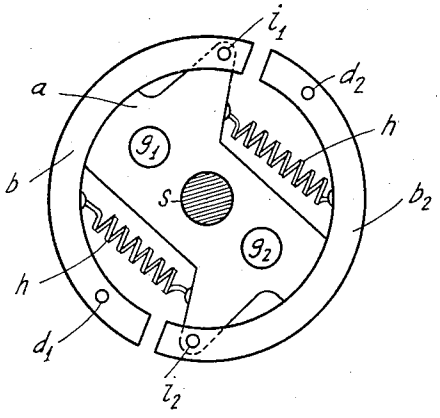


Fig. 3



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Fig. 4

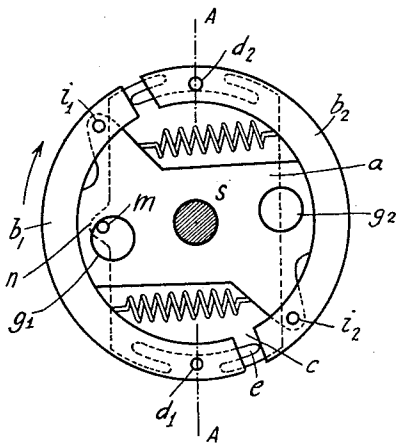


Fig. 4a

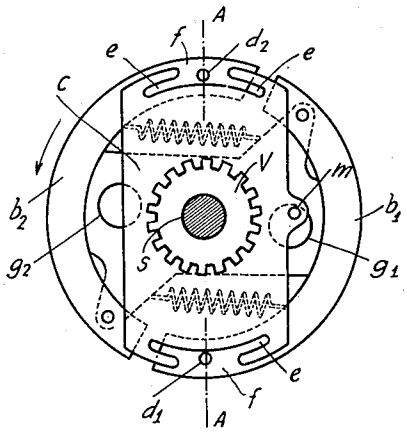


Fig. 5

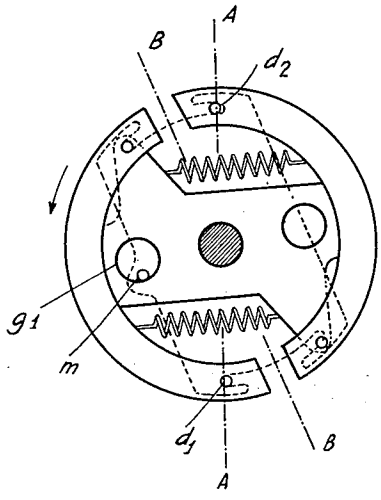
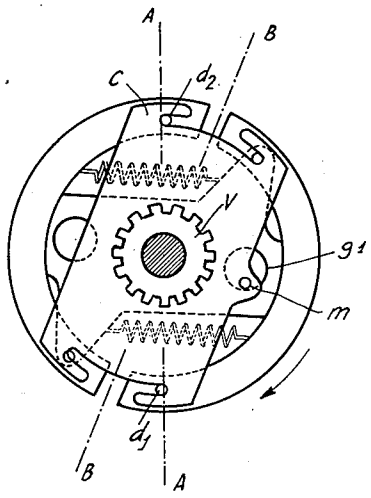


Fig. 5a



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UNITED STATES PATENT OFFICE

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CENTRIFUGAL BRAKE FOR AN AIRPLANE ANTENNA WINCH

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Application April 29, 1930, Serial No. 448,319, and in Germany June 8, 1929

3 Claims. (Cl. 188—82)

An airplane antenna consists as a rule of a metal wire (rope) of more or less great length and being at its end weighted by a weight, said wire being wound around a winch drum when the same is not in use. For rendering the aerial operative the winch is unlocked so that on account of the action of the weight attached at the end of the aerial plus its dead weight, the aerial becomes unreeled from the drum and thus causes the winch to revolve. In order that the unwinding speed may be limited, the winch as a rule is furnished with a centrifugal brake.

When pulling in the aerial this operation should be accomplished very speedily and easily (for instance, prior to an emergency landing) without being hindered by the centrifugal brake. With this end in view it has been suggested in the prior art to interpose between the winch drum and the axis driving the centrifugal weights of the brake an element adapted to couple the said two parts only in one direction. This free-wheel clutch (pawls and ratchet, ball slip clutch, etc.) causes the centrifugal weight brake to rotate only in the sense corresponding to that of unwinding the antenna, while when winding the antenna up, the axis of the centrifugal weights is entirely uncoupled or disengaged.

Now, the following invention makes it possible to insure automatic release or disengagement of the brake action in dependence upon the direction of rotation of the winch without the use of a free-wheel clutch.

The invention is based upon the understanding that, in so far as the disengagement of the brake action is concerned, it is not necessary at all to disengage the centrifugal-weight brake, indeed, that it is entirely sufficient to lock the centrifugal weights in the direction of rotation where braking is undesirable, by the agency of an automatically acting locked "slide" so that they are prevented from flying apart. A slide of this kind is simpler and cheaper than a free-wheel clutch; it acts with greater reliableness and allows of a compact assembly of winch and retarding device. The said slide most suitably is coupled with the winch by a convenient transmission gear and it is provided with drive or energizing means such as a bolt stop claw or the like adapted to entrain the centrifugal brake in both directions of rotation. The locker elements may be constructed in this manner that the fly-wheel weights are provided with suitable pins or bolts, and the slide with corresponding locker slots in such a way that in the direction of rotation in which the brake action is to be blocked, the slide becomes so positioned relative to the centrifugal brake that the said pins come to engage in the locker slots of the slide, so that the fly-wheel weights are thereby locked and prevented from flying apart. In the case of the opposite direction of rotation, the driver slide is displaced in relation to the fly-wheel brake so as to assume an unlocking position in such a way that the pins of the brake come to be positioned opposite the opening of the locker slots so that the fly-wheel weights are enabled to fly apart unimpededly as soon as a certain rate of speed has been attained.

One embodiment of the basic idea of the invention is illustrated in the accompanying drawing by way of example. Fig. 1 shows a general arrangement embodying the basic idea partly in section, with omission of certain unessential details. The brake depending upon the action of fly-wheel weights is accommodated within a stationary casing wherein also the shaft x of the antenna winch H is supported. The driver slide c is supported inside the case revolubly about the axis s, and the same is furnished with a gear wheel v which is in mesh relation with a larger toothed wheel u keyed upon the winch shaft x. A bottom view and a perspective view, respectively, of slide c is illustrated in Figs. 2 and 2a, respectively. To act as a driving means adapted to drive the centrifugal weights the slide is provided with a bolt m attached to its extension k, and as a locking means adapted to lock the fly-wheel weights with the locker slot e with openings f. The centrifugal-weight brake is revolvably disposed upon the axis s inside the ring-shaped friction surface fixedly arranged in the casing g. As can be seen from Fig. 3 the centrifugal brake comprises a carrier plate a supported upon the shaft s, and two centrifugal weights (brake shoes) $b1$, $b2$, flexibly connected therewith by the pins $i1$, $i2$. Said shoes $b1$, $b2$, when unlocked, are capable of deviating outwardly against the action of the springs h about their pivots $i1$, $i2$ upon a certain rate of speed having been attained, so that by their friction against the stationary ring surface r the desired retarding action is obtained.

Fig. 4 shows a bottom view and Fig. 4a a top view of the co-acting drive slide c and the centrifugal-weight brake in unlocked condition. The assumption is here made that the rotation of the brake in clockwise direction (looking from below, Fig. 4) corresponds to the unreeling of the antenna wire. The bolt m of the slide then engages the side of the opening $g1$ of the carrier

plate *a* of the brake and thus causes the centrifugal brake to revolve. Incidentally the locking bolts *d*1, *d*2, of the fly-wheel weights come to be positioned in the openings *f*, *f*, of the locker slots *e*, *e*, of slide *c*, so that they become unlocked and are capable of flying freely apart.

In case of contrary direction of rotation the slide occupies a position in relation to the fly-wheel brake which is shown in Fig. 5 looking from below, and Fig. 5*a* looking from above. The longitudinal axis of the drive slide is turned (see Fig. 5) in relation to the fly-wheel brake from its previous position AA into position BB in anticlockwise direction. Incidentally the drive bolt *m* moves inside the opening *g*1 until it strikes again a new stopping point whereby the centrifugal brake is entrained again. However, the locking pins *d*1, *d*2, have now entered the locker slots *ee* of the slide and thus prevent the rotating fly-wheel weights from deflecting.

In the foregoing description of the brake gear the assumption has been made that unwinding of the antenna corresponds to left-hand rotation of the winch or right-hand rotation of the centrifugal brake (see Fig. 4). If, in case of different conditions of mounting, the antenna is to be wound about the winch in the opposite direction so that its unwinding would correspond to right-hand rotation of the winch, and to left-hand rotation of the fly-wheel brake, it will be understood that the brake gear can be readily adapted to this changed condition. For if the brake is designed symmetrically in relation to the median plane so that the locker pins *d*1, *d*2 project both anteriorly as well as posteriorly, then it will be sufficient in order to alter the coordination of the locking and the release of the fly-wheel weights, after removal of the cover *n*, to lift the carrier plate *a* with its fly-wheel weights *b*1, *b*2, off of the shaft *s*, to tilt the same over, and fit them on the shaft again in such a way that the drive pin *m* will now come to engage in the opening *g*2 of the brake.

I claim:

1. In signalling apparatus to be used on aircraft, a reel adapted to extend and draw in the signal absorption member comprising a rotatable drum, a gear fixed to said drum, a driven gear meshing with said first named gear, brake means cooperating with said driven gear, and positive means for rendering said brake means operative when said driven gear is rotated in one direction and for rendering said brake means inoperative when rotated in the other direction.

2. An arrangement as claimed in claim 1 in which said brake means comprises a member associated with said gear for rotation therewith, a speed retarding member pivoted at one end on said last named member, a rocker member rotatably mounted with respect to said gear, and means on said rocker member for preventing radial movement of said speed retarding member when the driven gear is rotated in one direction.

3. In a radio antenna reel comprising a rotatable drum adapted to extend and draw in a signal absorption member, a stationary casing within said drum, a pair of shafts within the casing, a first gear fixed to one of the shafts, a second gear meshed with the said first gear and movable on the other shaft, a rocker member having diametrically opposite engaging lugs integral with said second gear, a bolt at right angles to said slots, a plate having apertures for engaging said bolt, a pair of centrifugal brakes arranged to extend outward, a pair of spirally wound springs holding said brakes in a non-braking position, and a plurality of locking studs mounted on said brakes to engage the lugs in said rocker member to place the brakes in a braking position within the stationary casing when the rotatable drum is turned in a direction to extend the signal absorption member.

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