Aug. 2, 1927. 1,637,354

K. ROTTGARDT

ANTENNA REEL

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Fig. 2.

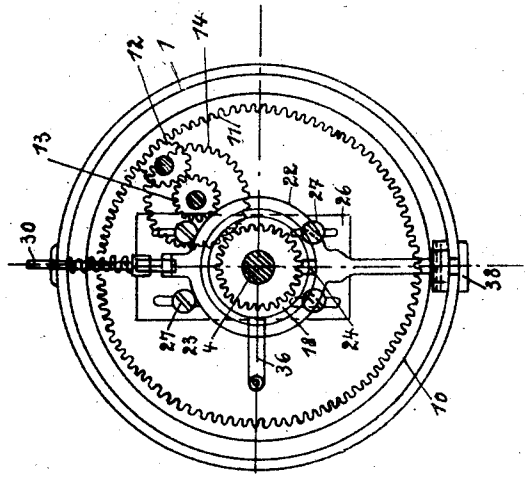
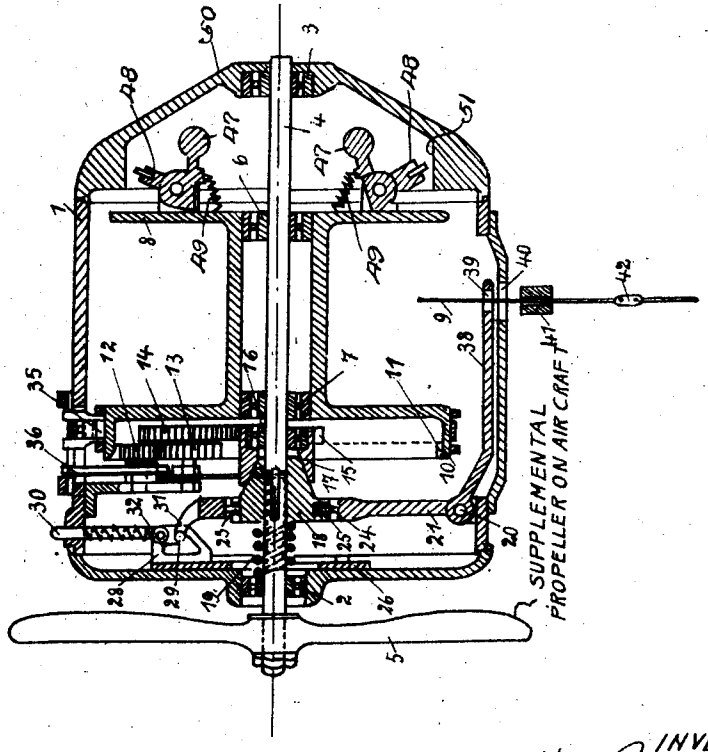


Fig. 1.



SUPPLEMENTAL PROPELLER ON AIR CRAFT

INVENTOR
BY Karl Rottgardt
Pennie, Davis, Marvin & Edmonds ATTORNEYS

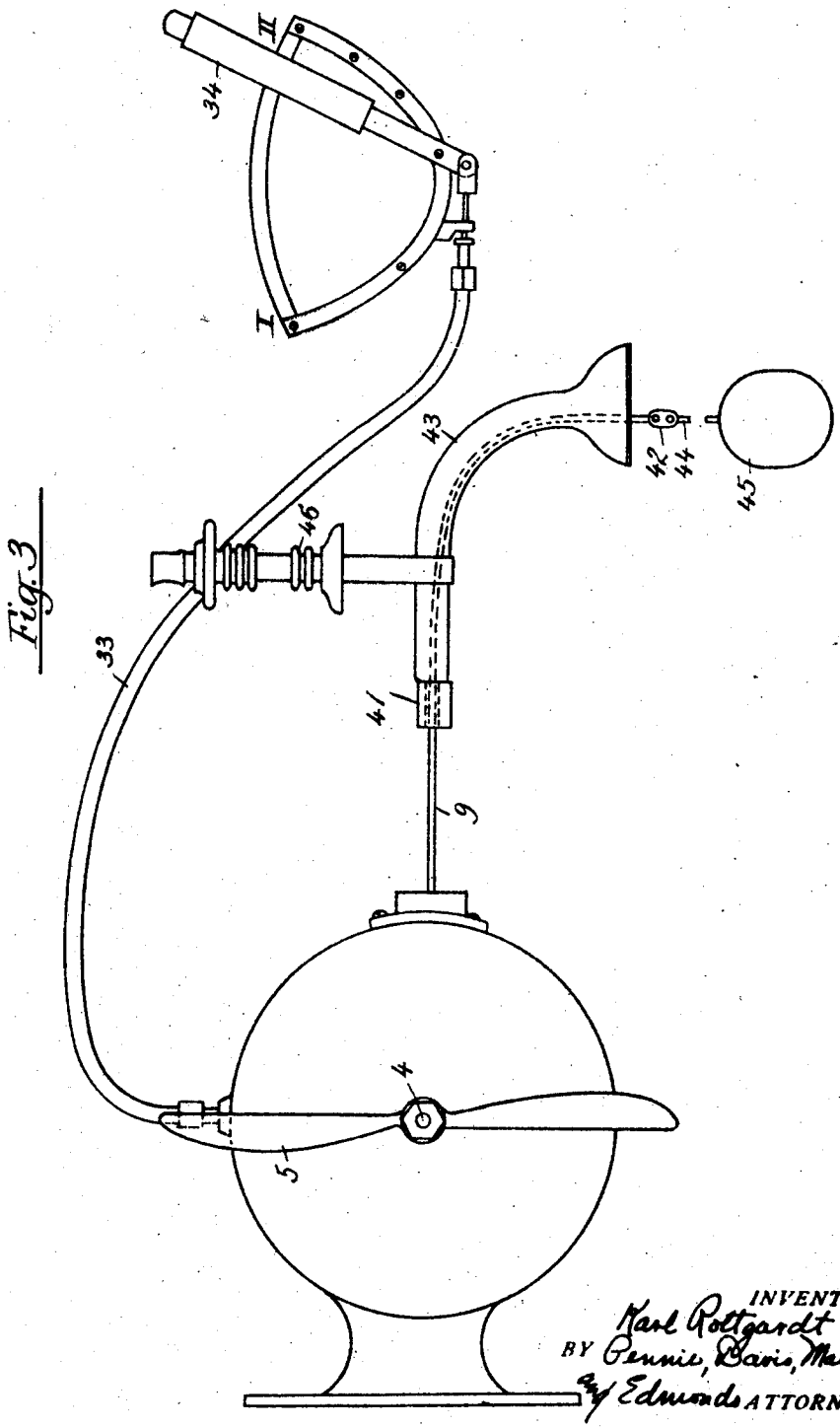
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Fig. 3



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UNITED STATES PATENT OFFICE.

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ANTENNA REEL.

Application filed August 26, 1921, Serial No. 495,599, and in Germany January 16, 1918.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

The invention relates to a reel or drum, for retractile antennæ, for use particularly in wireless stations on air-craft. According to the invention an antenna-reel of this kind is so constructed that it can be fitted in a suitable position on the air-craft as desired and can nevertheless be controlled with ease and certainty from the pilot's seat. The usual arrangement in which the antenna-reel is built in the immediate vicinity of the pilot's seat gives rise to possibilities of danger to the operator from high potentials and also takes up a relatively large amount of room in a space which is already taxed to the utmost. Further, the new antenna-reel guarantees a reliable and rapid winding and unwinding of the aerial conductor and also, by simple means, can be made to operate automatically.

In accordance with these objects, a reel is provided which may be mounted in any convenient place and may be driven by suitable means such as an aeroplane motor or a separate propeller. A clutch is interposed between the drum and the driving means, and a brake which may be operatively connected to the clutch, is provided for slowing down and arresting the drum after the antenna is wound. The clutch and brake are preferably so interconnected that when the clutch is engaged the brake is released and vice versa.

Manually operable means are provided for controlling the position of the clutch and brake, so that the reel may be controlled from any desired point. This may be effected through a Bowden wire, links and levers, or any other suitable means.

The clutch and brake are preferably operated by automatic means as well as manual means, so that the clutch will be disconnected and the brake applied when a predetermined length of antenna wire is wound on the drum. This may be accomplished by attaching to the cable at any desired point a stop which will engage an arm connected to the clutch so as to release the clutch and apply the brake when the winding operation is complete.

A preferred embodiment of this invention is illustrated in the accompanying drawings, in which Fig. 1, is a longitudinal section of the reel;

Fig. 2 is an end view from the propeller end of Fig. 1 shown partly in section with the cover plate removed; and

Fig. 3 is a general arrangement of the reel, antenna and controls.

Referring to the drawings, in the casing 1 there is journalled by means of the ball bearings 2 and 3 the shaft 4, on one end of which, projecting from the casing, the propeller 5 is keyed. On the shaft 4 by means of the ball bearings 6 and 7 the drum 8, on which the antenna conductor is coiled, is revolubly mounted. One side of the drum 8 is provided with an extension 10 provided with internal teeth 11. These are in connection, through the toothed wheels 12, 13 and 14, which are mounted in bearings attached to one of the cover-plates of the casing 1, with a second toothed wheel 15 which is freely rotatable on the shaft 4 by means of the ball bearing 16. The nave of the toothed wheel 15 is provided with a conical recess 17 into which a conical clutch 18, which is movable longitudinally but not revoluble on the shaft 4 and, is pressed by means of the spring 19, so that the driving shaft 4 is thereby connected through the toothed wheels 15, 14, 13, 12, 11 with the drum 8. For disengaging this clutch there is provided a yoke lever 21 which can swing about a pivot 20 and which has an annular part 22, surrounding the cone 18 with an intervening space and provided with inwardly directed pins 23 and 24 which engage in an annular groove 25 in the cone 18 and displace said cone 18 when the lever 21 is swung outwards. The movement of the lever 21 is effected by means of a slide 26 which is movable, by means of slots, along the pins 27 which are fixed in one of the cover-plates of the casing 1. The slide 26 is provided with a projection 28 which has an opening with two resting places for the roller 29 fitted at the end of the lever 21 and can be displaced with the help of a spring-actuated disengaging pin 30, which is coupled to the projection 28. When the lever end 29 is in the resting place 31 of the projection 28 the drum 8 is in connection with the driving shaft 4 and the propeller 5, while in the other resting place 32, which is occupied when the slide 26 is pushed downwards, the lever 21 is swung outwards against the action of the spring 19 so far that the clutch 18 remains out of the contact with the hollow cone 17 of the toothed

wheel 15 and the connection is therefore broken. The disengaging pin can be controlled by means of a Bowden wire from the hand lever 34. Instead of this any other suitable form of control can, of course, be employed, as for example, a rod or an electric or pneumatic control.

In order quickly to arrest the drum 8 after disconnecting the driving shaft 4 a brake can be fitted, which may, for example, be a band brake 35 as shown. The operation of this brake must be so connected with the control of the lever 21 that the brake is applied after the antenna conductor 9 has been completely coiled, i. e. after releasing the clutch 17, 18, and is again disconnected before the next engagement of the clutch. This can be attained if, for example, a lever 36 which moves the brake in one way or another is so connected with the slide that, when the end 29 of the lever 21 is transferred from the position of engagement 31 to the disengaged position 32, the brake is applied, and conversely, when the process is reversed, is released.

In order that the clutch 17, 18 may be disconnected by the antenna conductor itself when coiled up the lever 21 is provided with a further arm 38 which has a hole 39, through which as well as through the opening 40 in the casing 1 the outgoing antenna conductor passes. On the conductor 9 there is fitted a freely displaceable member 41, which is of such a diameter that it cannot pass through the hole 39 in the arm 38 of the lever. A catch 42 fixed to the conductor 9 presses the member 41 against the lever arm 38 when the antenna conductor is wound up and so causes the lever 21 to swing outwards into the resting place 32, whereby the disconnection of the clutch 17, 18 and, in the given case the application of the brake 35 is effected. The antenna conductor 9 has at one end a paraffined portion 44 and a weight 45 and, when being wound up or unwound, is guided through the bent tube 43 which arrests the member 41. The tube 43 is electrically connected with the antenna connection 46.

The whole arrangement is manipulated in such a way that, for the purpose of winding up the antenna the hand-lever 34 is brought into the position I. The disengaging pin 30 is thereby, by means of the Bowden wire 33, caused to act on the lever 21 and effects its transference from the position 32 to the position 31 and the engagement between the driving shaft 4 and the drum 8. When the antenna conductor is wound up by power by means of the propeller 5 it presses, by means of the catch 42, the member 41 against the lever arm 38, which again causes the lever to swing out into the position 32 and thus again releases the clutch 17, 18. At the same time the brake 35, which is thereby brought into action, stops the drum 8. If the antenna conductor is to be again unwound, the hand lever is moved into the position II, whereby the disengaging pin 30 is so influenced by the wire 33, that the brake 35 is released and the drum 8 can rotate. In order to prevent a too quick winding and unwinding of the antenna conductor 9, a centrifugal brake can be provided which may consist of weights 47 connected to the drum 8 and friction blocks 48 connected to them. When the speed of rotation exceeds a given number these blocks 48, overcoming the action of the controlling springs 49, make contact with a track 51 which is provided on the adjoining cover 50 of the casing 1 and in this way effect the braking action.

I claim:

1. A reel for retractile antennæ comprising a revoluble drum, an antenna wire adapted to be wound on said drum, driving means therefor, a clutch coupling said driving means to said drum, a lever for operating said clutch, said lever having a hole therein through which passes the antenna wire, a stop on said wire adapted to engage said lever and operate it to release said clutch when the antenna is wound to the desired length, and an extension on said lever engaging a cam which may be manually operated to engage and disengage said clutch.

2. A reel for retractile antennæ comprising a revoluble drum, an antenna wire adapted to be wound on said drum, driving means therefor, a clutch coupling said driving means to said drum, a lever for operating said clutch, said lever having a hole therein through which passes the antenna wire, a stop on said wire adapted to engage said lever and operate it to release said clutch when the antenna is wound to the desired length, and a Bowden wire connection to said lever whereby said clutch may be manually engaged and disengaged from any desired position.

3. A reel for retractile antennæ comprising a revoluble drum, driving means therefor, an antenna wire adapted to be wound on said drum, a clutch for coupling said driving means to said drum, a lever for operating said clutch, a brake adapted to act on a portion of said drum operatively connected to said lever whereby said brake is applied when said clutch is disengaged and said brake is released when said clutch is engaged, said antenna wire passing through a hole in said lever and having a stop thereon adapted to engage said lever to release said clutch and apply said brake when a predetermined length of wire has been reeled in.

4. A reel for retractile antennæ comprising a revoluble drum, driving means therefor, an antenna wire adapted to be wound on said drum, a clutch for coupling said driving means to said drum, a lever for operat-

ing said clutch, a brake adapted to act on a portion of said drum operatively connected to said lever whereby said brake is applied when said clutch is disengaged and said brake is released when said clutch is engaged, said antenna wire passing through a hole in said lever and having a stop thereon adapted to engage said lever to release said clutch and apply said brake when a predetermined length of wire has been reeled in, and an extension on said lever whereby said clutch and said brake may be manually operated.

5. A reel for retractile antennæ comprising a revoluble drum, driving means therefor, an antenna wire adapted to be wound on said drum, a clutch for coupling said driving means to said drum, a lever for operating said clutch, a brake adapted to act on a portion of said drum operatively connected to said lever whereby said brake is applied when said clutch is disengaged and said brake is released when said clutch is engaged, said antenna wire passing through a hole in said lever and having a stop thereon adapted to engage said lever to release said clutch and apply said brake when a predetermined length of wire has been reeled in, and an extension on said lever engaging a cam which may be manually operated to operate said clutch and brake simultaneously.

6. In a reel for retractile antennæ comprising a drum, driving means therefor, a clutch connecting said driving means and said drum and adapted to act on said drum, a lever operatively connected to said clutch adapted to be engaged by a stop on the antenna wire to disengage said clutch and apply said brake when a predetermined length of antenna wire has been reeled in.

7. A reel for retractile antennæ comprising a driving shaft, means for driving said shaft, a drum revolubly mounted on said shaft, an antenna wire adapted to be wound on said drum, a clutch member revolubly mounted on said shaft, transmission means connecting said drum and said revolubly mounted clutch member, a second clutch member slidably but not rotatably mounted on said shaft adapted to releasably engage said first-mentioned clutch member, a yoke connected to said slidably mounted clutch member having a projecting arm through an opening in which passes said antenna wire, an adjustable stop on said wire adapted to engage said yoke arm and operate it to disengage said clutch when a predetermined length of cable has been reeled in.

8. A reel for retractile antennæ comprising a driving shaft, means for driving said shaft, a drum revolubly mounted on said shaft, an antenna wire adapted to be wound on said drum, a clutch member revolubly mounted on said shaft, transmission means connecting said drum and said revolubly mounted clutch member, a second clutch member slidably but not rotatably mounted on said shaft adapted to releasably engage said first-mentioned clutch member, a brake operatively connected to said slidably mounted clutch member and adapted to act on said drum, manually operable means for engaging and disengaging said clutch and applying and releasing said brake, a yoke connected to said slidably mounted clutch member having a projecting arm through an opening in which passes said antenna wire, an adjustable stop on said wire adapted to engage said yoke arm and operate it to disengage said clutch and apply said brake when a predetermined length of cable has been reeled in.

9. In an automatic reeling device, a drum, a driving mechanism, a clutch for controlling the connection of said driving mechanism to said drum, a flexible member connected to said drum to be wound thereon, a lever for actuating said clutch, a part of said lever being adjacent to the part of said flexible member not wound on the drum, a traveller slidably mounted upon the said part of the flexible member, and a stop fastened to the flexible member, whereby, when the drum winds the flexible member up to a predetermined point, the stop will cause the traveller to contact with the lever and shift the clutch.

10. In an automatic reeling device, a drum, a driving mechanism, a clutch for controlling the connection of said driving mechanism to said drum, a flexible member connected to said drum to be wound thereon, a lever for actuating said clutch, a guide for said flexible member, a part of said lever being adjacent the flexible member between said guide and said drum, a traveller slidably mounted on said flexible member between said guide and said lever, and being limited in its sliding movement by said guide and lever, and a stop fastened to the flexible member, whereby when the drum winds the flexible member up to a predetermined point, the stop will cause the traveller to contact with the lever and shift the clutch.

In testimony whereof I affix my signature.

DR. KARL ROTTGARDT.