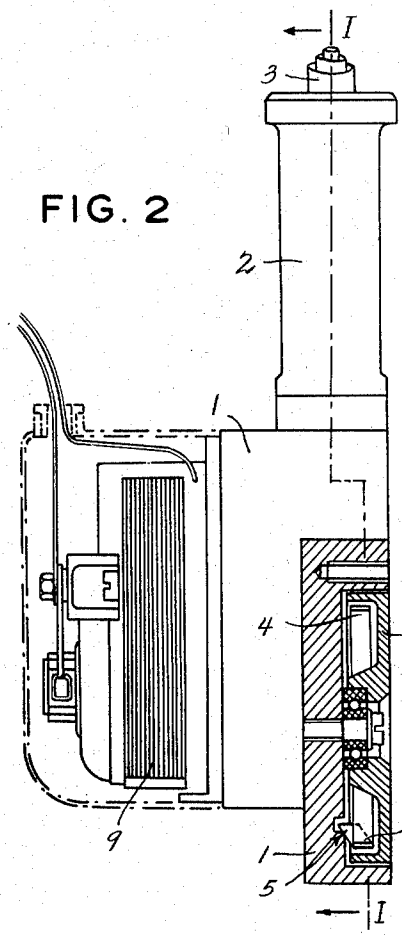
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FIG. 2



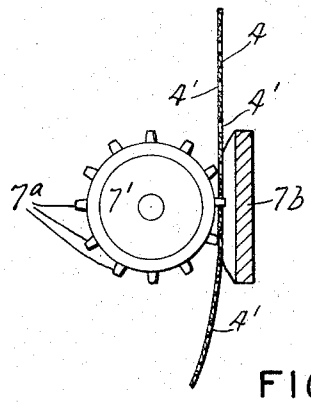
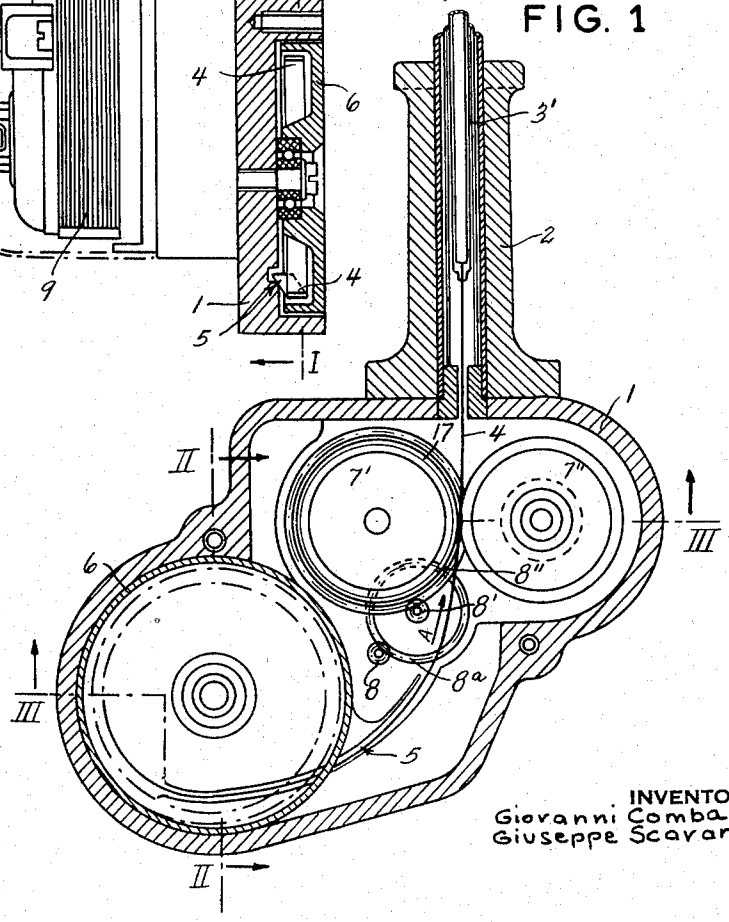


FIG. 5a

FIG. 1



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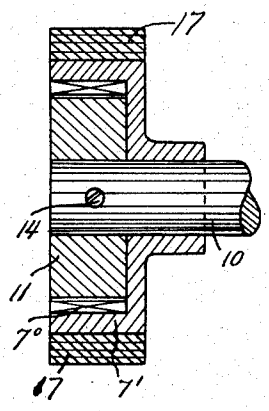


FIG. 6

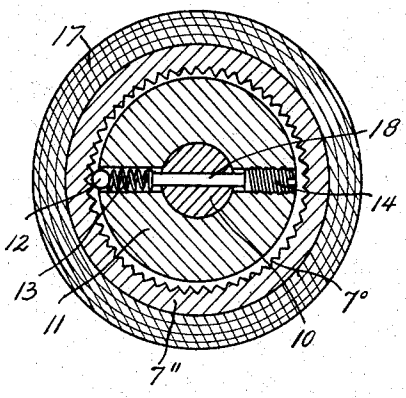


FIG. 5

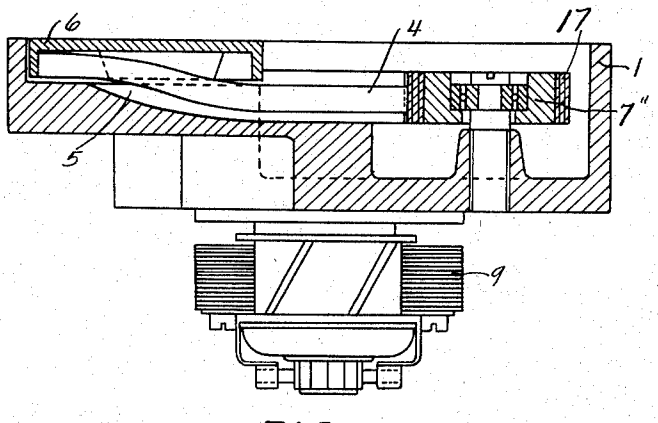


FIG. 3

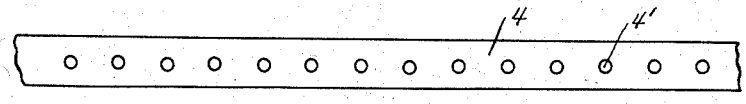


FIG. 4

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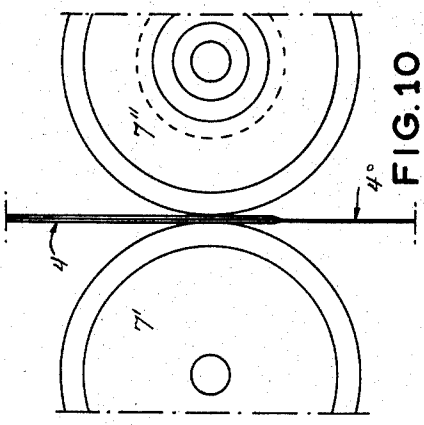


FIG. 10

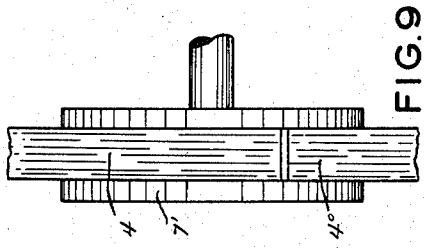


FIG. 9

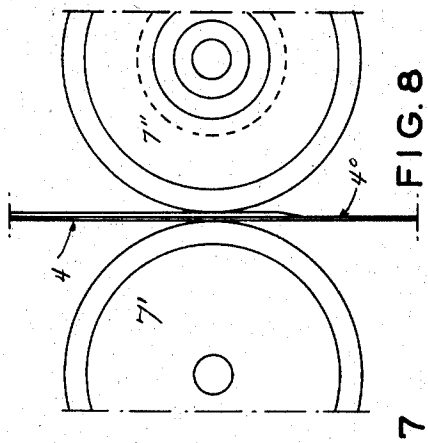


FIG. 8

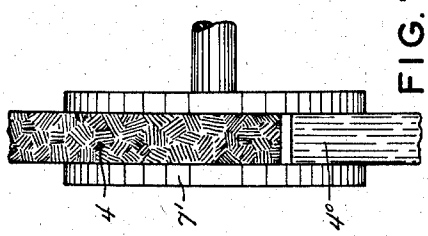


FIG. 7

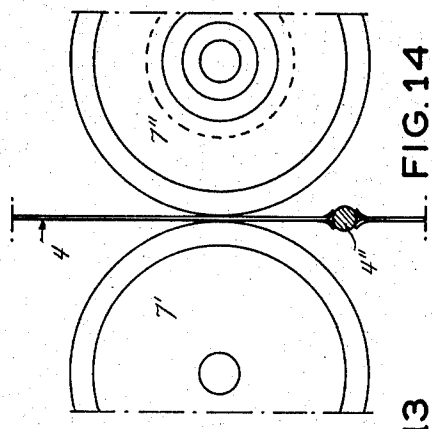


FIG. 14

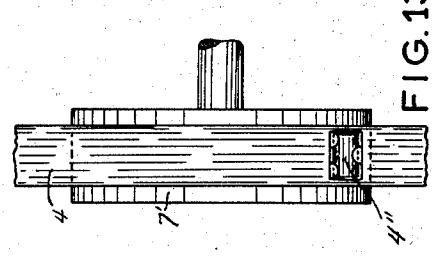


FIG. 13

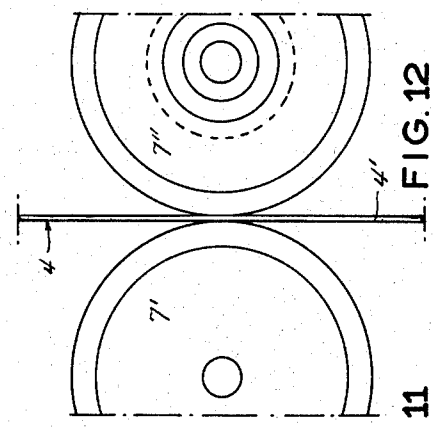


FIG. 12

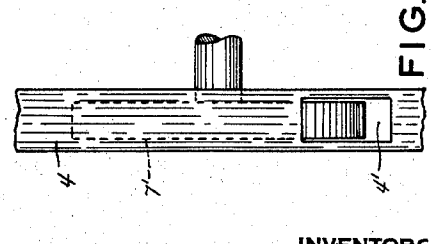


FIG. 11

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United States Patent Office 2,907,416 Patented Oct. 6, 1959

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DRIVING MECHANISM FOR EXTENSIBLE ANTENNAE

Giovanni Comba and Giuseppe Scavarda, Turin, Italy

Application June 11, 1952, Serial No. 292,952

Claims priority, application Italy November 5, 1951

1 Claim. (Cl. 189—26)

The present invention relates to telescopic aerials for use with radio receivers or transmitters, for example, those mounted on automobiles. These aerials comprise a plurality of elements slidable telescopically one within the other to occupy the smallest possible space when not in use, and extensible to the required length to transmit or receive signals.

Devices for controlling the extension or retraction of such an aerial have already been proposed. These devices were generally of a complicated nature and rather expensive to manufacture.

An object of the present invention is to provide a control device as aforesaid of a simple and reliable construction.

According to the invention there is provided for adjusting the length of a telescopic aerial, a device comprising a flexible ribbon attached at one of its ends to the innermost element of the aerial, and adapted to be driven intermediate its ends in either longitudinal direction to project or retract the inner elements of the aerial to vary the length of the latter, the other, or free end of said ribbon being located inside a hollow drum, whereby, in the telescoped position of the aerial, a substantial part of the length of the ribbon is coiled up inside said drum.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Fig. 1 is a view of a device according to the invention in section on the line I—I of Fig. 2,

Fig. 2 is a sectional view on line II—II of Fig. 1,

Fig. 3 is a sectional view on line III—III of Fig. 1,

Fig. 4 is a plan view of a piece of a preferred ribbon;

Fig. 5 is a transverse sectional view of a safety device for terminating displacement of the ribbon when the aerial reaches its end position,

Fig. 5*a* is a fragmentary side elevational view, partly in section, illustrating certain details of construction,

Fig. 6 is a fragmentary longitudinal sectional view of the device illustrated in Figure 5,

Figs. 7 and 8 show a modification of the ribbon **4** in which one portion of the tape is overlaid with a material having a roughened surface,

Figs. 9 and 10 show a modification of the ribbon **4** in which one portion of the tape is thickened,

Figs. 11 and 12 show a modification of the ribbon in which one portion of the tape is cut out, and

Figs. 13 and 14 show a modification of the ribbon in which it is provided with an enlarged stop member such as a ball or roller.

The device comprises a main casing **1** of metallic or insulating material to be fixed on the side of a car adjacent the radio. When the said casing **1** is not of insulating material, it must be mounted on the car by means of an insulating mounting or plate.

The telescopic rod aerial **3** is carried on the casing **1** by means of a mounting **2**, the aerial **3** comprising as usual, a plurality of rod elements slidable one within the other telescopically.

The central rod element **3'** of said aerial **3** is connected to a springy ribbon or wire **4**, for example of steel strip, which moves within a guide channel **5** formed in the casing **1** and, in the telescoped position of the aerial, is wound up inside a drum **6**, freely mounted within the casing **1**.

The ribbon **4** passes between two contacting rollers **7'—7''** whereof one **7''** is freely mounted, while the other **7'** is driven through reduction gearing **8, 8°, 8', 8''** by a small electric motor **9** fitted to the outside of the casing **1** and supplied through a reversing switch (not shown) that allows the motor to drive in either direction at will.

When the motor **9** drives the roller **7'** so as to propel the ribbon **4** in the direction of arrow A the ribbon **4** is uncoiled from the drum **6** and extends the aerial to the required length.

By reversing the direction of rotation of the motor, the ribbon **4** is urged back into the drum **6** via the channel **5**, and the aerial attached thereto is retracted.

The rollers **7'—7''** (or at least the driving one **7'**) preferably have an outer peripheral covering **17** (see Figs. 3, 5 and 6) of a resilient material with a high coefficients of friction, in order to ensure propulsion of the ribbon **4**.

This propulsion may be improved by suitably roughening the ribbon's surface, for example by indenting it, or forming a series of holes **4''** in the ribbon as shown in Fig. 4.

Should the ribbon **4** be suitably indented or have holes punched therein, the propelling roller **7'** may have corresponding projections so as to provide a positive drive.

Means are preferably provided for stopping the advance of the ribbon **4** when the aerial is completely extended or retracted.

Such means may comprise any known type of trip switch (not shown), that switches off the motor **9** of these two extreme positions of the aerial.

Preferably, according to the invention, we interpose in the transmission an overload-release clutch that slips when the opposing torque reaches a fixed value, so that the motor **9** in such a case then rotates with a fixed load, without moving the aerial.

Such a safety device may be fitted to the propelling roller **7'** as shown in Figs. 5 and 6. In this case the roller **7'** is mounted on a shaft **10** so as to be free to rotate thereon. The roller **7'** is formed with a series of inside peripheral teeth **7°**, co-acting with a yieldable member, for example a small ball **12**, urged against the teeth **7°** by a spring **13**, the ball **12** and spring **13** being carried within a radial through hole in a hub **11** keyed to the shaft **10** by a pin **18**.

Obviously the torque that can be transmitted by such a device depends on the pressure of the ball **12** against the teeth **7°**, said pressure being adjustable by means of a screw **14** engaging in the hub **11** to compress the spring **13**. A similar result may be obtained by allowing the rollers to slide on the ribbon in the field outside the desired limits of movement.

For instance, the ribbon in this field **4°** may be smoother and thinner than the portion **4** so that the rollers will easily slide, as shown in Figures 7 and 8, 9 and 10. In case of the positive drive, the holes need not be formed in the ribbon in this region or preferably may be replaced by continuous opening **4'** whereby the projection on the roller turns freely without moving the ribbon, as shown in Figures 11 and 12.

In a further modification the ribbon may have two small balls or rollers **4''** mounted thereon at the desired limit positions so as to rotate freely between the two rollers without driving the ribbon, as shown in Figures 13 and 14.

In case of a roller **7'** with projection **7***a* co-acting with

holes in the ribbon, the other roller that serves only as bearer and conductor may be replaced by a plane plate, for example, a slide *7b* so as to reduce the size of the device, as shown in Fig. *5a*.

We claim:

In combination with a telescopic aerial, means for adjusting the height of said aerial comprising a housing provided with a hollow post receiving said aerial, a hollow coiling drum rotatably disposed in said housing, a flexible springy steel ribbon extending from said coiling drum to a position under said aerial, the central axis of said drum being at right angles to, but laterally displaced from the longitudinal axis of said aerial, friction rollers in said housing between said drum and said post and contacting the faces of said ribbon, said housing being provided with a guide channel communicating with the interior of said drum and extending along an arcuate path toward said friction rollers, said guide channel being flat in transverse direction from the plane of said drum to that of said aerial, and forming a support for said ribbon during driving of the latter from its coiled position around the drum to its uncoiled position under said aerial, in either direction by said friction rollers, and means for driving at least one of said rollers.

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