

May 24, 1955

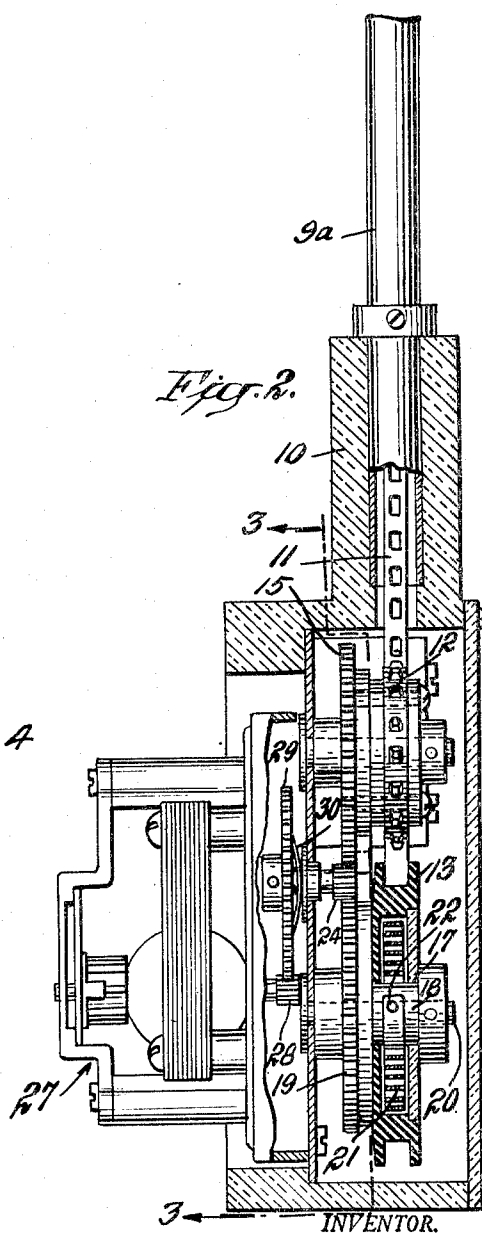
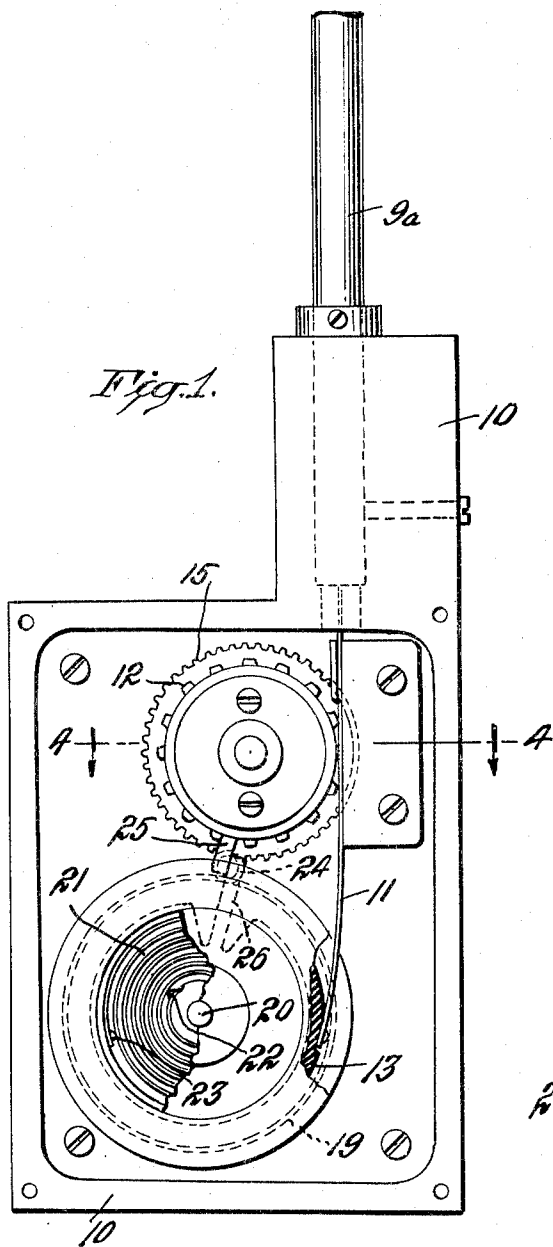
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2,709,220

EXTENSIBLE AND RETRACTABLE ANTENNA

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

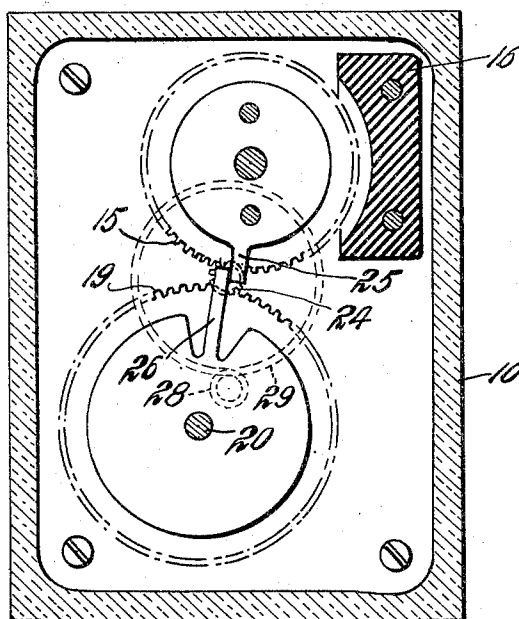
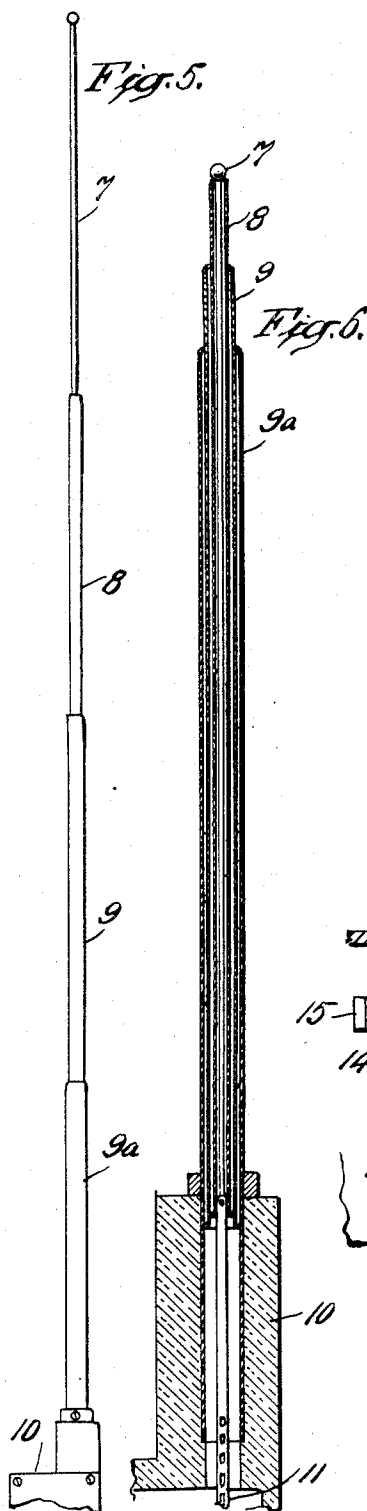
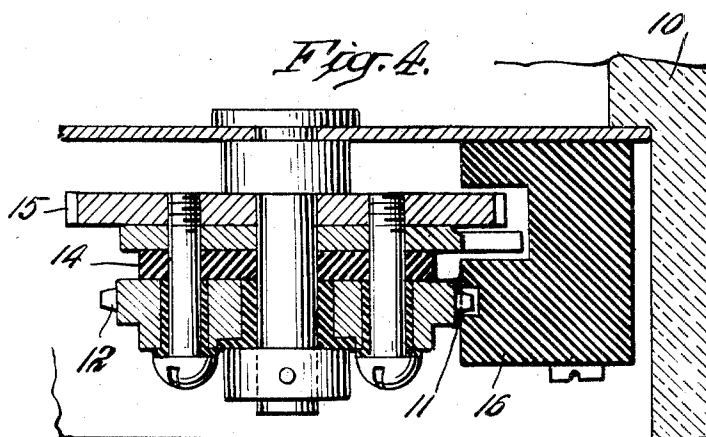


Fig. 3.



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EXTENSIBLE AND RETRACTIBLE ANTENNA

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7 Claims. (Cl. 250—33)

The invention herein disclosed relates to antennas of the collapsible and extensible type largely used on automobiles.

Objects of the invention are to provide power mechanism for extending and retracting the antenna, which can be controlled by a simple push-button switch operation to withdraw or to project the antenna to any desired extent and which will automatically stop at the end of movement in each direction and stop even though the switch be accidentally or purposely held closed.

Special objects of the invention are to provide such mechanism in simple, compact form, small in size so as to take up but little room, of rugged, durable construction consisting of but relatively few, readily manufactured and assembled parts.

Other special objects of the invention are to provide an antenna of the character indicated which can be produced and installed at relatively low cost and which in regular use will require no special servicing or the like.

Other objects attained by the invention and the novel features of construction, combination and relation of parts constituting the invention, are set forth or will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention. Structure, however, may be modified and changed as regards the immediate illustration, all within the true intent and scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a front elevation of the mechanism with front cover removed and extensible antenna broken away, with parts shown stopped in the antenna extended position;

Fig. 2 is a broken vertical sectional view on a plane substantially at right angles to Fig. 1;

Fig. 3 is a vertical sectional view on substantially the plane of line 3—3 of Fig. 2, showing parts stopped in the antenna lowered position;

Fig. 4 is an enlarged broken horizontal sectional view on substantially the plane of line 4—4 of Fig. 1;

Figs. 5 and 6 are broken and part sectional views showing the antenna sections in extended and lowered positions, respectively.

The antenna illustrated consists of upper, intermediate and lower collapsibly related, slidingly connected sections 7, 8, 9, the lower and larger tubular section 9a being supported in an insulating base 10.

A perforated tape 11, usually of steel, connected with the lower end of the upper section provides the immediate means for raising and lowering the sections. This tape, after passing over a drive sprocket 12, winds and unwinds on a drum 13.

The sprocket 12 is shown as mounted in insulated relation at 14, on the face of a gear 15, and the tape is shown held in engagement with the teeth of the sprocket by a guide block 16 of insulating material.

The drum 13 is shown of insulating material rotatably

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mounted at 17 on the hub 18 of a gear 19 rotatable on a fixed supporting shaft 20.

A spiral spring 21 is shown connected at its inner end at 22 with the hub of gear 19 and at its outer end at 23 with the inside of the drum 13, the drum being hollow to freely accommodate the spring.

The sprocket carrying gear 15 and drum supporting gear 19 are located in line and both driven in the same direction by an intermediate pinion 24.

Gears 15 and 19 have a different number of teeth. As an example, the sprocket gear may have eighty teeth and the drum gear ninety teeth. This differential drive of the two gears from the single pinion is to enable the use of companion stops on the two gears which will engage at one side only after a predetermined number of revolutions of the gears in one direction, and then engage at the opposite side only after the same number of revolutions in the opposite direction.

These stops are designated 25 and 26, being shown as short radial projections on the face of the sprocket gear 15 and drum gear 19, respectively, adapted to clear for eight revolutions, in the illustration, and to engage on the ninth revolution of the gears.

The spring coupling between the lower gear 19 and the drum tensions the straight length of tape between the sprocket and drum and serves to wind the tape tightly on the drum and to release it in straight, tensioned condition to the sprocket, and this spring coupling enables the drum to compensate for the increasing or decreasing superimposed layers of tape on the drum.

The pinion 24 provides a positive drive to both sprocket and drum gears and the difference in the number of teeth on these gears enables the stops to clear for the desired number of revolutions and to then interlock and stop the gears when that predetermined number of revolutions one way or the other, has been completed.

Drive of the pinion 24 is effected in the illustration from an electric motor 27 having a pinion 28 in mesh with a gear 29. The latter is coupled to pinion 24 by a slip clutch 30 tensioned to drive the sprocket to effect raising and lowering of the antenna sections and to slip when the stops of the main gears come together in either direction.

This slip clutch thus provides a safety measure permitting the motor to continue in operation after the gears have been stopped. Thus if the antenna is held while the switch is on or if it should strike a solid object, no harm will result.

The reduction gearing from the motor to the drive sprocket and drum enables use of a small, light motor which takes up little space and requires little energy. The whole unit can thus be relatively light and small, requiring little space in a car, and this unit can be easily installed. Furthermore, it is so simple as to require no servicing or attention.

Any approved form of control switch may be employed, such as the one illustrated, in the form of a double-throw toggle switch for energizing the motor, which is reversible in opposite directions.

What is claimed is:

1. Gearing for effecting extension and retraction of an extensible antenna or the like, comprising a perforated flexible tape for connection with said antenna or the like, a driving pinion, a sprocket gear operated by said driving pinion and having teeth operatively engaging said perforated tape, a second gear operated by said driving pinion and having a different number of teeth from said first gear, radially projecting stops carried by said gears proportioned and positioned to mutually engage and stop rotation of the gears after a predetermined limited number of rotations thereof, a drum for winding the tape concentrically mounted in respect to the second gear and

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a spring coupling between said second gear and drum arranged to tension the tape between the sprocket and drum.

2. Gearing for effecting extension and retraction of an extensible antenna or the like, comprising a perforated flexible tape for connection with said antenna or the like, a driving pinion, a sprocket gear operated by said driving pinion and having teeth operatively engaging said perforated tape, a second gear operated by said driving pinion and having a different number of teeth from said first gear, radially projecting stops carried by said gears proportioned and positioned to mutually engage and stop rotation of the gears after a predetermined limited number of rotations thereof, a drum for winding the tape concentrically mounted in respect to the second gear and a spring coupling between said second gear and drum arranged to tension the tape between the sprocket and drum, a motor and reduction drive gearing from said motor to said pinion including a slip clutch tensioned to release upon cooperative engagement of the stops aforesaid.

3. Gearing for effecting extension and retraction of an extensible antenna or the like, comprising a perforated flexible tape for connection with said antenna or the like, a driving pinion, a sprocket gear operated by said driving pinion and having teeth operatively engaging said perforated tape, a second gear operated by said driving pinion and having a different number of teeth from said first gear, radially projecting stops carried by said gears proportioned and positioned to mutually engage and stop rotation of the gears after a predetermined limited number of rotations thereof, a drum for winding the tape concentrically mounted in respect to the second gear and a spring coupling between said second gear and drum arranged to tension the tape between the sprocket and drum, including a spiral spring connected at its opposite ends with said second gear and with the interior of said drum.

4. Gearing for effecting extension and retraction of an extensible antenna or the like, comprising a perforated flexible tape for connection with said antenna or the like, a driving pinion, a sprocket gear operated by said driving pinion and having teeth operatively engaging said perforated tape, a second gear operated by said driving pinion and having a different number of teeth from said first gear, radially projecting stops carried by said gears proportioned and positioned to mutually engage and stop rotation of the gears after a predetermined limited number of rotations thereof, a drum for winding the tape concentrically mounted in respect to the second gear and a spring coupling between said second gear and drum arranged to tension the tape between the sprocket and drum, said tape being of metal, an insulating guide for

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the tape passing over the sprocket and insulating mountings for the sprocket and drum.

5. Gearing for effecting extension and retraction of an extensible antenna or the like, comprising gears of different tooth number, a common drive pinion for said gears, stops carried by said gears positioned to mutually engage to stop rotation of the gears after a predetermined number of revolutions thereof, a sprocket member carried by one of said gears, a perforated tape for connection with said extensible antenna or the like operatively engaged by said sprocket member, a drum member for winding said tape carried by the other gear and a spring coupling interposed between one of said gears and the member carried thereby.

6. Gearing for effecting extension and retraction of an extensible antenna or the like, comprising gears of different tooth number, a common drive pinion for said gears, stops carried by said gears positioned to mutually engage to stop rotation of the gears after a predetermined number of revolutions thereof, a sprocket member carried by one of said gears, a perforated tape for connection with said extensible antenna or the like operatively engaged by said sprocket member, a drum member for winding said tape carried by the other gear and a spring coupling interposed between one of said gears and the member carried thereby and including a helical spring secured at one end to said gear and secured at the opposite end to the member carried by the gear.

7. Gearing for effecting extension and retraction of an extensible antenna or the like, comprising gears of different tooth number, a common drive pinion for said gears, stops carried by said gears positioned to mutually engage to stop rotation of the gears after a predetermined number of revolutions thereof, a sprocket member carried by one of said gears, a perforated tape for connection with said extensible antenna or the like operatively engaged by said sprocket member, a drum member for winding said tape carried by the other gear and a spring coupling interposed between one of said gears and the member carried thereby, a reversible motor, drive gearing from said motor to said drive pinion and a slip clutch interposed in the line of gearing described, tensioned to release upon engagement of the stops aforesaid.

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