343-872

CROSS REFERENCE

SEARCH ROOM

Feb. 24, 1959 I. BENIS ET AL 2,875,442

MOTOR VEHICLE ANTENNA

Filed March 24, 1955

Fig. 1

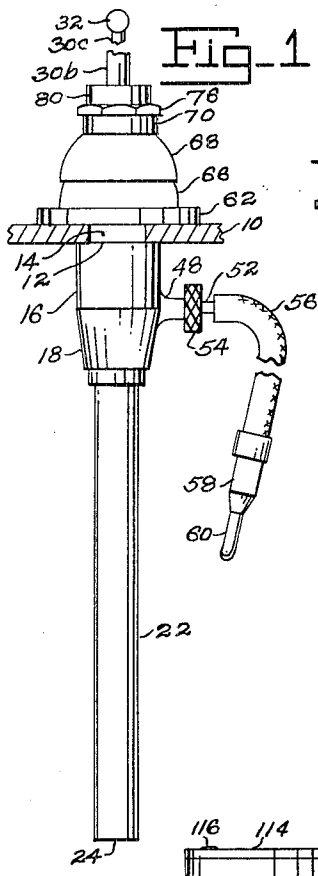



Fig. 2

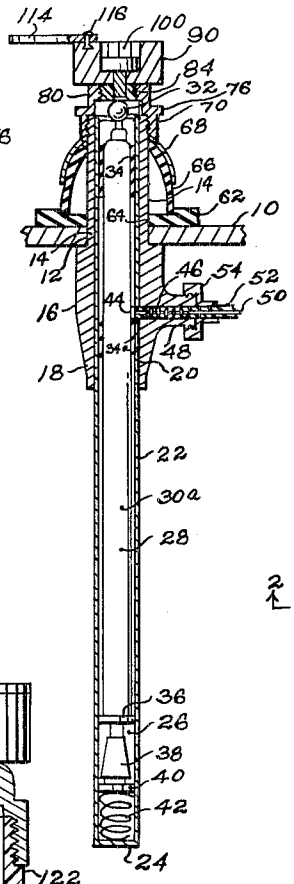
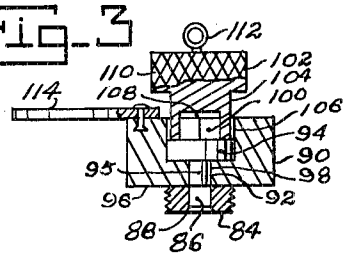



Fig. 3



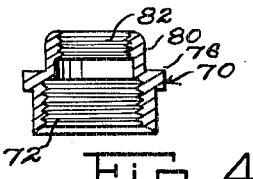




Fig. 4

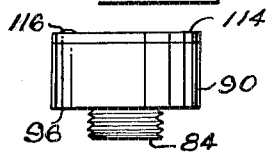



Fig. 5

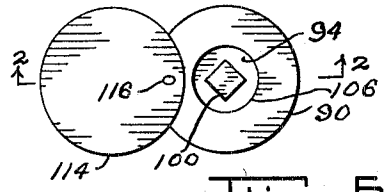



Fig. 6

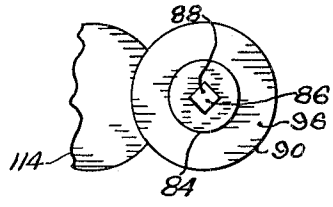



Fig. 7

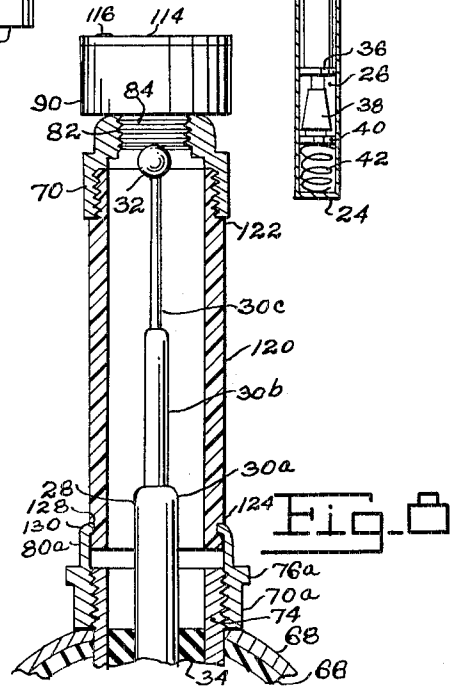



Fig. 8

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# MOTOR VEHICLE ANTENNA

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Application March 24, 1955, Serial No. 496,462

8 Claims. (Cl. 343—889)

This invention relates to improvements in radio antennae for use in motor vehicles.

An object of the invention is to provide a novel and improved motor vehicle radio antenna in which there is a housing into which the elongated telescoping sections forming the antenna are retractable when not in use, or when a shorter than maximum antenna is desired, and including novel locking means for blocking extension of the antenna.

Another object of the invention is to provide a novel and improved motor vehicle antenna which includes a tubular housing into which the various sections of the antenna are receivable slidably when the antenna is not in use, the housing being provided with an outer open end through which the various extensible elements are retractible, and constructed and arranged with separable closure means carried by the open end, with inherent locking means, for maintaining said housing outer end in locked disposition when not in use.

A further object of the invention is to provide a novel and improved self locking automobile radio antenna in which there is a self locking closure means carried jointly by the outer end of the antenna housing and a locking body key, so that when the key is turned suitably, the self locking closure means is released from the engagement with the antenna housing, allowing the antenna to be extended, while when the key is turned in the opposite direction, or otherwise actuated, the self locking closure means is engaged, to entirely close and lock the antenna housing.

Still another object of the invention is to provide a novel and improved self locking automobile antenna construction which may be employed with most existing antennae for conversion thereof to the self locking type disclosed herein, without extensive or expensive alterations in the motor vehicle itself, or use of complicated tools or the like.

Still a further object of the invention is to provide a novel and improved self locking automobile radio antenna construction, which is simple in design, inexpensive to manufacture, highly effective in use, and rugged in life, so that its maintenance costs are negligible and its replacement will not be needed during the normal life of the motor vehicle.

These and other objects and advantages of the invention will become apparent from the following description of a preferred embodiment thereof, as illustrated in the accompanying drawings, forming a part hereof, and in which,

Figure 1 is an elevational view showing a portion of the body or cowl of a motor vehicle in section, with an antenna mounted in an opening formed therein, the antenna being partly retracted.

Figure 2 is a sectional elevational view taken through the device of Figure 1, substantially on plane 2—2 of Figure 6, with the locking device in locking position on



the antenna, and the antenna fully retracted inside the antenna housing.

Figure 3 is a sectional elevational view taken substantially on plane 2—2 of Figure 6, showing the detachable lock portion of Figure 2, on a larger scale, and with the key in engagement with the lock, the lock being however shown separately from the rest of the antenna.

Figure 4 is a sectional elevational detail view taken substantially on plane 2—2 of Figure 6, showing the base nut of the locking device, apart from the antenna of Figure 2.

Figure 5 is a front elevational view of the locking device seen in Figure 3, but with its closure in closing position.

Figure 6 is a top plan view of the locking device shown in Figure 3, omitting the key for clarity of illustration.

Figure 7 is a bottom plan view of the device shown in Figure 3.

Figure 8 is a sectional elevational view similar to that of Figure 2, but on a larger scale, and showing a modified form of the invention, for receiving radio signals while the antenna is still not exposed, the drawing showing the locking means in position on the antenna extension, and the antenna rods partially extended as shown, permitting radio reception.

Where motor vehicles are employed with radio receivers mounted on the vehicle, whip type antennae have been used for picking up the broadcast station signals, such antennae being formed of a plurality of mutually telescoping antenna rods disposed in a housing mounted inwardly of a hole formed in the cowl, hood, fender or other similar part of the body of the motor vehicle. When the radio receiver is to be used, the rods are pulled out, to a length of several feet above the hole in the fender, for reception of broadcasts. It has been found that such readily extensible telescoping rods constitute a continuous temptation to children and others, to pull them out, and possibly break them off, so that the antenna is no longer usable. Similarly, when a mechanic is to do work on the car, or to replenish or check the water supply, or the oil supply in the engine, there is a good likelihood that damage may come to the antenna rods unless they are not only kept fully retracted inside their housing, but also that they cannot be pulled out to extended position without the owner's consent.

The present invention provides means whereby such an antenna may be maintained retracted inside its housing at all times, except when the owner desires it to be extended, by means of releasably locking construction forming a part of the antenna. As a result, the owner may lock his antenna in closed or retracted position, knowing that it will not be damaged. Further, according to a modified form of the invention, radio reception may still be carried on even when the antenna is in locked position, when the modified form of construction is employed.

In order to understand clearly the nature of the invention, and the best means for carrying it out, reference may now be had to the drawings, in which like numerals denote similar parts throughout the several views.

As seen in Figures 1 and 2, there is a body, cowl, fender or similar portion **10** of a motor vehicle, to which the antenna is to be attached, a hole **12** being formed in the body **10** to receive the reduced central upper portion **14** of the antenna base housing **16**. The antenna base housing **16** is reduced at **18**, and has an axial bore **20** formed therethrough to receive the tubular or cylindrical sleeve or housing **22** which is closed at the bottom by a floor wall **24**. A cylindrical chamber **26** is thus formed inside the tubular housing **22**, to receive the extensible telescoping rod assembly **28**.

The telescoping rod assembly **28** is formed of several

antenna rods such as 30*a*, 30*b*, 30*c*, of which 30*c* is the smaller in outside diameter to fit slidably inside rod 30*b*, which in turn fits slidably inside rod 30*a*, the topmost rod 30*c* having a ball 32 secured to and carried at its upper end. Since the telescoping rods 30*a*, etc., are formed of metal, for radio reception, and the tubular housing 22 is also formed of metal preferably, it is necessary for the telescoping rod assembly 28 to be electrically insulated from the tubular housing 22, which latter is grounded through housing 16 and the automobile body 10, to the car chassis. Accordingly, an insulating bushing 34 is seated in a fixed position inside the upper end portion of the tubular housing, made of rubber, plastic or the like, and fixed in position in any suitable manner.

At the bottom, there is an insulating washer 36, secured to the bottom end of the outermost telescoping rod 30*a*, and movable therewith, with a further insulating downward extension 38 secured in turn to and movable with another insulating washer 40, thus maintaining the spacing of the rod 30*a* from electrical contact with the interior of the tubular housing 22. A spring 42 is disposed inside the tubular housing 22 below the washer 40, so as to exert upward bias on the telescoping rod assembly 28, to automatically cause the same to project out of the upper end of the tubular housing 22 when no obstruction is present, and permitting the user to grasp the upper end of the rod 30*c* by its ball end 32, and pull out one or more or all of the telescoping extensible rods to their extended receiving positions. It is seen that the upper end of the tubular housing 22 is reduced, to block pulling out of the entire telescoping rod assembly, and in any event, the insulating bushing 34 and intermediate bushing 34*a* blocks this.

In order to effect electrical contact with the telescoping rod assembly 28, a brush member 44 is pressed against the side of the outer rod 30*a* by a spring 46, extending through an arm 48 of the housing 16, a wire 50 bearing insulating material 52 maintaining contact with the brush member 44, and maintaining brush 44 insulated from the housing 16, together with the conductor of wire 50. A nut 54 may be employed for aiding in retaining the brush and spring in place, and to facilitate assembly.

Additional braided metallic insulating shielding covering 56 may be employed to shield wire 52, and the whole may terminate in a pin jack plug 58 with a conductive plug 60 insertable into an electrical jack connected to the radio receiver. As the reduced upper end 14 of the antenna base housing 16, extends through the hole 12 formed in the cowl 10 of the vehicle, an insulating washer or grommet 62, formed preferably of soft rubber or the like, is disposed in the position shown in Figures 1 and 2, with the reduced portion 14 of the housing 16 extending through the hole formed at 64 through the grommet 62. A spherical hard rubber rotating base or hood 66, surmounted by a metal similarly curved cover plate 68, is also seated on the reduced upper end of the housing 14, both members 66 and 68 having openings formed therethrough to receive the housing 14. The opening in the rubber base 66 may be enlarged in a direction perpendicular to the plane of Figure 2, to allow angular adjustment of the housing 22 and 16 relative to the plane of the vehicle cowl 10, as needed to insure a snug fit, depending upon whether the cowl surface is curved or not. It is seen from Figure 2 that the upper surface of the soft rubber washer 62 is recessed to receive the lower portion of the hard rubber hood 66, to maintain it in position.

A retaining nut 70, seen also on an enlarged scale in sectional elevation in Figure 4, has its lower portion threaded internally as at 72 to fit securely onto the externally threaded upper end of the housing 14, as at 74, the nut having external flats as at 76 to permit grasping the same with a wrench for turning it as needed, to loosen or tighten it on pipe 74. The upper portion 80 of the nut is reduced, as seen best in Figure 4, and is internally threaded at 82 for engagement with the depending rotatable nut engaging threaded member 84. From Figures 2, 3 and 7, it is seen that the rotatable locking member 84 is carried by and rotatable with an axial rectangular cross sectioned pin 86, the lower end 88 of which is peined over for secure engagement with the axial opening in locking member 84, for turning therewith. A lock body 90 has an axial bore 92 formed therein, in which the positioning collar 94 is rotatable, the collar 94 being integral with the pin 86, and it being seen that the portion 95 of pin 86 which lies above the lower edge 96 of the lock body 90, is cylindrical to turn freely in the reduced lower bore 98, in the manner shown, relative to the lock body 90. There is also an upper extension 100 which is integral with the collar 94, and of smaller cross section than the collar 94, this extension being in one form rectangular in cross section as seen best in Figure 6.

Since the entire assembly of members 100, 94, 95, and 84 are all thus integrated for movement together about their common axis, it is seen that a key 102 may be employed to turn this composite assembly relative to the enclosing lock body 90. The key 102 is provided with a reduced lower extension or shank 104 slightly smaller in diameter than the enlarged bore portion 106, and having a downwardly open recess 108 having a corresponding cross section similar to that of the rectangular shaft extension 100 so as to fit thereover when inserted through the opening 106 surrounding the lock stud 100. The key or wrench 102 may have its central portion 110 knurled or otherwise shaped for easy turning, and may have an eyelet or ring at 112 to fit onto a key ring.

As seen best in Figures 2, 5 and 6, there is a closure cap or plate 114, pinned pivotally by pin 116 to the lock body 90, for being swung over to close the chamber 106 when in locked position. Since the insertion of the key 102 in the manner of Figure 3 permits turning of the threaded engaging member 84 in the threaded portion 82 of the nut 70, it is seen that when the key is removed after this is done, the rotary portion or body 90 of the lock is free to rotate with respect to the threaded engaging member 84, since member 84 and its integrated portions 100, 94, 95 and 86, all turn together relative to the encasing lock body 90. Hence, without the aid of the key 102, it is impossible for the average person to remove the lock 90 from the nut 70, and hence it cannot be possible to pull out the telescoping rods 30*a*, 30*b* and 30*c* from their tube 22, since turning the locked lock body 90*w* when in the position of Figure 2, will not turn the threaded member 84 loose from nut 70. It is understood of course, that while the shape of the lock stud 100 is shown as rectangular in Figure 6, other shapes may be used for it and the key 102, to make it more difficult for unauthorized persons to open the lock, the rectangular shape being only by example.

Figure 5 shows how the lock looks with its cover 114 swung into closed position. When the owner of the car desires to use his radio, he has only to insert the key 102 as shown in Figure 3, turn the key to turn member 84 out of engagement with nut 70, and disengage lock 90 therefrom, at which time, the spring 42 shown in Figure 2 pushes the telescoping assembly 28 upwards sufficiently to project ball 32 from the tube 22, and it can then be pulled all the way out to extended receiving position, the brush 44 serving to block movement of the washer 36 therepast as explained.

Referring now to Figure 8, it is seen that here is a modified form of the invention, which permits radio reception while the antenna is otherwise locked. In this view, there is the locking device 90 similar to that shown in the other views, and a base nut 70 similar to that shown in the other views, except that the octagonal shoulder 76 may be omitted in the modified form. From Figure 8, it is clear that the locking device has its threaded engaging member 84 threadedly engaged when in locked

position, with the reduced upper threaded bore **82** of the nut **70**, so that the lock body **90** is turnable thereon but not dislodgeable therefrom unless use is made of the key **102**. However, there is a tubular housing extension member **120**, made of plastic or glass tubing or similar non-metallic tubing which allows the radio waves to penetrate the same. The extension **120** is threaded at its upper end **122** into the nut **70**, as shown, and may be of a length of several inches, so that the spring **42** may push the telescoping rods **30***c*, **30***b*, etc., up into the interior of the extension **120**, making them accessible to impingement of the radio waves thereon for radio reception.

At its lower end **124**, the plastic tubular extension **120** is provided with an annular groove **128** into which the upper edge **130** of the lower nut **70***a* may be pressed or spun, for firm engagement of the nut **70***a* with extension **120**. The lower nut **70***a* is in turn provided with internal threads for engagement with the upper end **74** of the tubular metallic housing **22** of the device, in the same manner as for nut **70** in Figures 1 and 2. With the highly sensitive radio receivers employed in motor vehicles today, it has been found possible to receive with good loud tone, most of the metropolitan radio broadcast stations within a reasonable distance therefrom, while the arrangement shown in Figure 8 is used, and with some quite sensitive receivers, even further distance reception is possible. Since the extension **120** is non-conductive, the contact of the ball **32** with the member **84** does not ground the antenna. At the same time, there is no likelihood of any meddlers breaking off the antenna rods **30***c*, etc., since they are safely inside the protective extension **120**.

Although the invention has been described in specific terms, it will be understood that various changes may be made in size, shape, materials and arrangement without departing from the spirit and scope of the invention as claimed.

We claim:

1. An antenna comprising a tubular housing having an upper outlet opening, a plurality of mutually telescoping antenna rods disposed in said housing and extensible telescopically therefrom out of said upper outlet opening of said housing, and connectable to a radio receiver for reception of radio wave energy, locking base means carried on said end of said housing, and defining an opening through and out of which said antenna rods are extensible when in unlocked position, locking means threadedly engageable with said locking base means so as to block said opening when in locked position, so as to block extension of said antenna rods out of said housing, and key means for unlocking said locking means to unblock said locking base means opening.



2. An antenna according to claim 1, characterized further in that said tubular housing is formed of metallic material which is normally a shield to radio wave energy, whereby, when said antenna rods are retracted inside said housing, they are shielded thereby from reception of radio wave energy.

3. An antenna according to claim 1, characterized further in that said tubular housing is formed of metallic material which is normally a shield to radio wave energy, and wherein said antenna rods are insulated from said tubular housing, whereby, when said antenna rods are retracted inside said housing, they are shielded thereby from radio wave energy reception.

4. The antenna according to claim 1, characterized further in that said tubular housing is formed of metallic material forming a shield against reception by said antenna rods of radiant energy while retracted therein, said rods being insulated from said tubular housing, and wherein there is an extension means carried substantially at said upper outlet end of said tubular housing, and formed of material which is free from shielding effect upon said rods underlying said extension means while said rods extend through said extension means, whereby those portions of said rods extending through said extension means are free to receive unshielded radiant energy therethrough, and wherein said locking base means is carried on the outer end of said extension means.

5. The construction according to claim 1, wherein said device comprises resilient means acting between said antenna rods and said tubular housing so as to exert resilient bias thereon tending to cause said rods at least in part to become extended out of said housing.

6. The construction according to claim 4, wherein said extension means is formed of tubular plastic material.

7. The construction according to claim 4, wherein said extension means is formed of glass.

8. The construction according to claim 4, wherein said extension means is formed of tubular non-metallic composition.

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