May 4, 1948. J. W. IRBY 2,440,689

EXTENSIBLE ANTENNA SUPPORT

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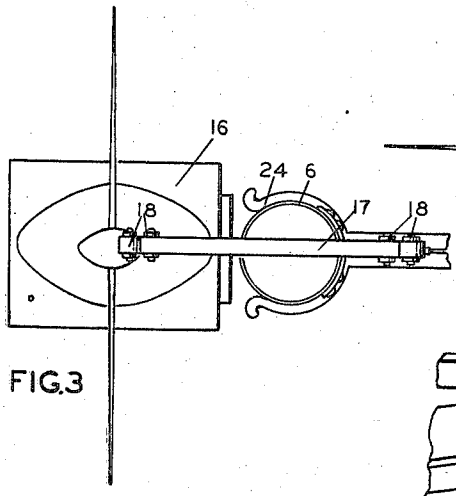


FIG.3

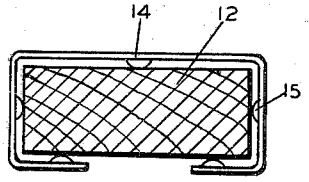


FIG.4

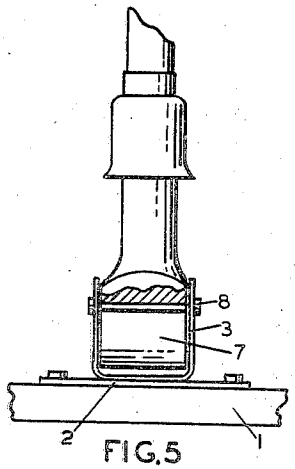


FIG.5

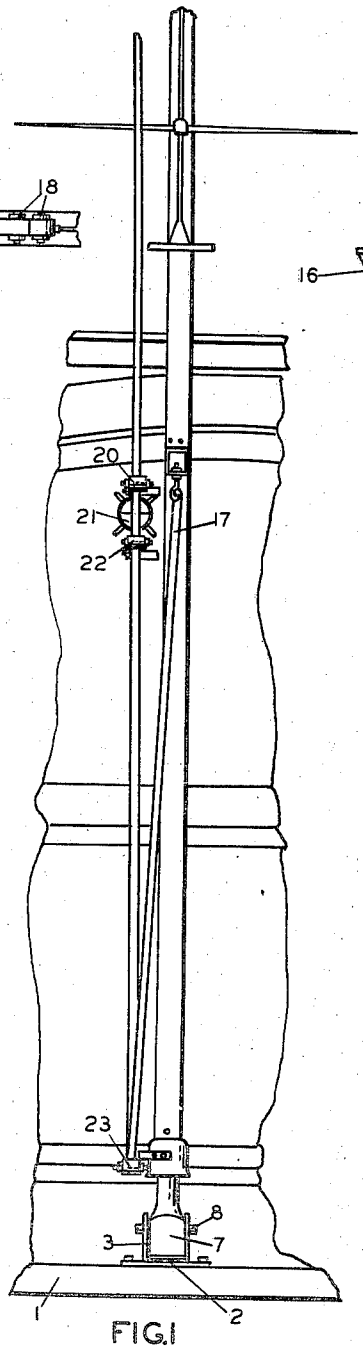


FIG.1

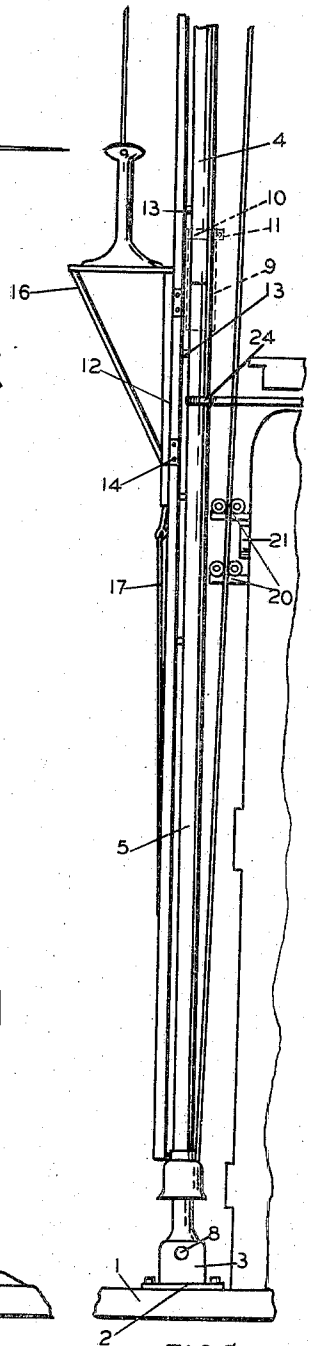


FIG.2

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EXTENSIBLE ANTENNA SUPPORT

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5 Claims. (Cl. 250—33)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The invention to be hereinafter described relates to automatic indicating devices for extensible antenna supports.

It is of prime importance often to determine the elevation of a radio beam, one particular application of the information thus obtained being used in the landing of planes. It has long been common practice to set up an antenna at predetermined distances from the transmission set and raise it to various heights until the center of the beam is reached, recording that for reference. A number of such readings could then be plotted in the form of a graph. This necessitated a great deal of delay as well as many individual or separate operations, all pretty simple in themselves yet, in the aggregate, totalling considerable work and corresponding delay.

The present invention eliminates the above and other objections and provides a simple, efficient, compact and quickly producible device whereby the antenna may be quickly and easily raised to any desired height, within a given range, and that height automatically indicated to an observer.

The device is particularly designed as a piece of mobile equipment. To that end, provision is made for mounting it on a truck which, however, is only indicated here.

In order to more clearly disclose the construction, operation and use of the invention, reference should be had to the accompanying drawings forming part of the present application. Throughout the several figures of the drawings like reference characters designate the same parts in the different views.

In the drawings:

Fig. 1 is a side view of the lower section of the invention in use;

Fig. 2 is a right hand view of Fig. 1;

Fig. 3 is a top plan view of the tape guide pulleys;

Fig. 4 is a fragmentary view of the guide clip coupling the antenna bracket to the guide rail; and

Fig. 5 is an enlarged fragmentary view of the pivot mounting of the sectional bar.

In the present instance the antenna is mounted on a bracket and the bracket with antenna is raised or lowered to the desired point. It is this device for raising and lowering, in combination with the tape arrangement and its observation at

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a given point, which comprise the meat of this application.

Referring to the drawings in detail 1 indicates the running board of a truck or other suitable vehicle. On running board 1 is suitably mounted a base plate or other foundation or support 2 provided with parallel spaced ears 3 between which is swingably disposed the lower end of a sectional tubular mast or post which provides adequate support for the antenna, carriage, bracket or the like. Preferably, this mast consists of three separable sections 4, 5, and 6 each of about eight feet in length. The lower section is provided with a diametrical slot 7 adapted to be set down on or straddle a pin 8 passed through ears 3. The opposite end of the lower section is provided with a sleeve 9 rigidly fixed thereto. The free end of sleeve 9 is split to provide a clamp 10, drawn to clamping position by the usual thumb nut 11, to secure in aligned position the next or middle section. This middle section carries a similar sleeve provided with a like clamp for similarly securing in place the third section, giving a total length of twenty-four feet. That is a definite, fixed length of post or tube. The running board of the vehicle will usually be about one foot above ground, so that the top of the full length mast will be approximately twenty-five feet above ground. The exact height, of course, may be accurately determined very readily.

Each mast or post section carries a rail section 12, firmly secured thereto in any suitable manner but spaced therefrom by spacers or blocks 13. Sections 12, of course, are so disposed that they will align continuously, in assembled position. Preferably, though not necessarily, rail 12 is rectangular in lateral cross section. That construction makes it possible to use a very simple and efficient clip, shoe or rider 14 which embraces rail section 12 in free sliding movement. To avoid binding between clips 14 and sections 12, ball surfaces 15 are provided on the inner faces of clips 14. These surfaces space the edges of the clips as well as most of the inner surfaces of the clips from the rail sections and greatly facilitate sliding motion between them.

Clips 14 are firmly secured to the carriage, platform or other antenna support 16 on which any desired type of antenna may be disposed.

To raise the antenna, a graduated steel measuring tape 17 is used having its opposite ends fastened to carriage 16.

From the upper connection to carriage 16, tape 17 passes through two sets of guide rollers 18 mounted in suitable brackets 19 on the upper

end of the upper section of the tubular post, downwardly through guide rollers 20 on the truck body, across the path of lens 21 on the truck, through a second set of rollers 22 below the lens, on down to and through another set of guide rollers 23 on the running board 1 and thence to its second connection to the lower side of carriage 16. For accuracy, lens 21 is provided with a suitable reading line.

The tubular mast or post is maintained erect or in operative position by a strong though yielding forked clamping arm 24 securely fixed to the truck body. This clamp is so disposed as to receive, embrace and securely hold the upper end of the lower section of the tubular mast, as the mast is swung upwardly between its clamping ends.

In operation, the desired number of sections of the tubular post or mast are clamped together, the slotted end of the lower section is seated on pin 8 and the assembled sections are then swung upwardly toward the truck and forced into holding position between the spring jaws of the clamping arm 24. Then one end of the tape 17 is secured to the carriage, passed successively through the intervening sets of rollers, across the path of the lens and again connected to the opposite side of the carriage, making a loop completely about the post and carriage.

The details of the roller couples are well known, one of each pair being cut out or grooved to receive the tape and the other having a plane or unflanged body to fit that groove or channel, the tape fitting and feeding snugly and smoothly between. Further illustration or description would add nothing to a clear understanding and would only unnecessarily increase the size and bulk of the record.

Tape 17 is used both as a means of changing the height of the antenna and as means of instantly indicating its height at all times. The weight of the carriage and antenna must be counteracted, of course, to prevent dropping of the carriage back to its original position or starting point. This may be done in various ways and, in itself, is no part of the present invention. Either a clamp or holding device applied directly to the tape or a brake may be applied to one of more of the rollers. Or an appreciable spring or weight pressure on one of the rollers of a pair may produce substantially the same result, requiring greater pull on the tape to force it through that pair. It is hardly necessary to state that this movable and, therefore, extensible antenna, is provided with the usual flexible conductors and corresponding connections.

It has been stated, in general terms, that the invention may be used for locating the center of a radio beam for many desired purposes. In such cases the antennas would be receivers. The device is equally usable in transmission, as will be readily understood. In that case changing height of the antenna will, of course, correspondingly change height of center of the transmitted beam, as desired.

It is thought that the construction, operation and use of the invention will be clear from the preceding detailed description.

Many changes may be made in the construction, arrangement and disposition of the several parts of the invention within the scope of the appended claims without departing from the field of the invention and it is meant to include all such within this application wherein only one preferred form has been illustrated purely by way of example and with no thought or intention of limiting the application thereby.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. In combination, a supporting mast pivotally mounted to swing vertically to and from operative position, a resilient clamping arm yieldingly maintaining said mast in operative position, a rail carried by and in spaced relation to said mast, a carriage travelling freely on said rail, an antenna mounted on and movable with said carriage, a flexible graduated member connected to opposite ends of said carriage whereby said carriage may be travelled longitudinally of said rail in either direction, an observation lens in fixed position relatively to said mast, carriage and flexible member, and means for guiding said flexible member before said observation lens whereby the exact elevation of said antenna may be observed at all times.

2. In combination, a supporting mast, a rail carried by and in spaced relation to said mast, a carriage on said rail, an antenna mounted on and movable with said carriage, clips carried by said carriage and embracing said rail in free sliding and guiding relation thereto, a flexible graduated member connected to the opposite ends of said carriage whereby said carriage may be travelled longitudinally of said rail in either direction, an observation lens in fixed position relatively to said mast, carriage and flexible member, means engaging said flexible member and counteracting the weight of said carriage and antenna and means for guiding said flexible member before said observation lens whereby exact elevation of said antenna may be observed at all times.

3. In combination, a supporting mast, a rail carried by and in spaced relation to said mast, a carriage reciprocably mounted thereon, an antenna mounted on said carriage and movable therewith, guide rollers disposed adjacent the opposite ends of the aforesaid mast, a flexible graduated member extended in loop form about said guide rollers and having its opposite ends connected to the opposite ends of the aforesaid carriage whereby said carriage may be reciprocated, means engaging said flexible means and counteracting the weight of said carriage and antenna, and means for guiding said flexible member before an observation lens whereby exact elevation of said antenna may be observed at all times.

4. In combination, a supporting mast, a rail carried by and in spaced relation to said mast, a carriage on said rail, an antenna mounted on and movable with said carriage, clips carried by said carriage and embracing said rail in free sliding and guiding relation thereto, means carried by said clips and spacing them antifrictionally from said guide rail, a flexible graduated member connected to the opposite ends of said carriage whereby said carriage may be travelled longitudinally of said rail in either direction, an observation lens in fixed position relatively to said mast, carriage and flexible member, and means for guiding said flexible member before said observation lens whereby exact elevation of said antenna may be observed at all times.

5. In combination, a supporting mast pivotally mounted to swing vertically to and from operative position, a resilient clamping arm to yieldingly maintain said mast in said operative position, a rail carried by and in spaced relation to said mast, a carriage reciprocally mounted thereon and traveling freely on said rail, an antenna

mounted on and movable with said carriage, clips carried by said carriage and embracing said rail in free sliding and guiding relation thereto, means carried by said clips to space them antifrictionally from said guide rail, guide rollers disposed adjacent the opposite ends of the aforesaid mast, a flexible graduated member extended in loop form about said guide rollers and having its opposite ends connected to the opposite ends of the aforesaid carriage whereby said carriage may be traveled longitudinally of said rail in either direction, an observation lens in fixed position relative to said mast, carriage and flexible member, means engaging said flexible member to counteract the weight of said carriage and antenna, and means for guiding said flexible member before said observation lens whereby the exact elevation of said antenna may be observed at all times.

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