

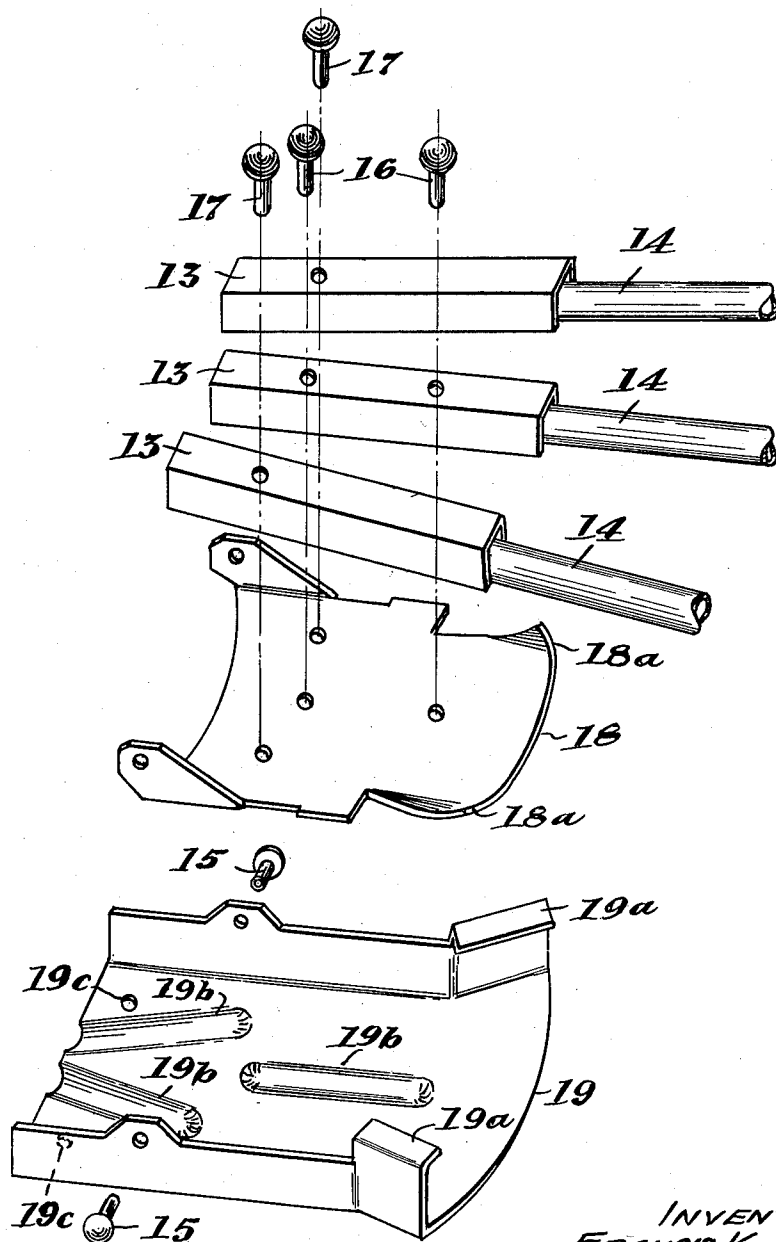
April 5, 1960

F. K. SAUL, SR
COLLAPSIBLE ANTENNA

2,932,028

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3 Sheets-Sheet 1



INVENTOR
FRANCIS K. SAUL SR

By *Smart & Biggar*

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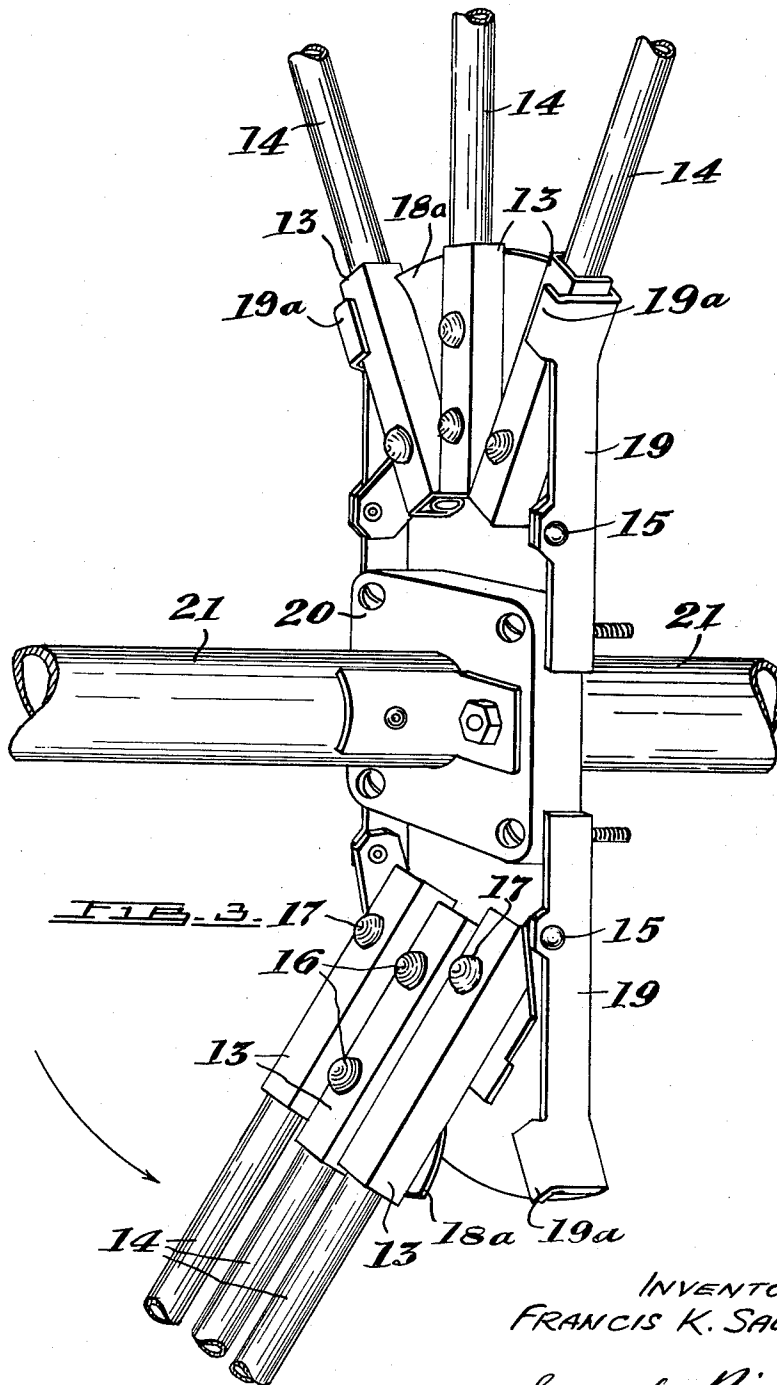
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COLLAPSIBLE ANTENNA

Francis K. Saul, Sr., Delhi, Ontario, Canada

Application January 5, 1959, Serial No. 785,010

9 Claims. (Cl. 343—881)

The invention relates to an antenna of the type commonly used for reception of television signals and is particularly concerned with an antenna which can be collapsed for shipping purposes.

Prior to the invention several types of collapsible antennas have been developed which permitted shipping the antenna in a relatively small container. One type of known antenna structure which had the advantage of small shipping size also had the serious disadvantage that it must be assembled by use of nuts and bolts, so that the installer required a considerable length of time to erect the antenna. This gave rise to the need for an antenna using clamps to eliminate the use of nuts and bolts. Antenna structures were developed using spring clamps which permitted rapid unfolding of the antenna, but difficulty was encountered in supporting the antenna elements so that they would not be weakened by vibration caused by wind. In many cases the antenna elements were scored by the spring clamps as the elements were swung into position and it was found that the elements when subject to vibration such as that caused by wind would in time break at the points where they had been scored by the spring clamps.

The present invention provides a collapsible antenna having spring operated fan clamps permitting rapid erection of the antenna and also provides protective members which reinforce the antenna elements while permitting them to be more firmly fixed in position. A collapsible antenna according to the invention comprises an antenna boom, a bridge member fixed crosswise of the boom, a plate pivotally attached to the bridge member so that the plate can swing from a position parallel to the bridge member to a position parallel to the antenna boom, an elongated antenna element, fastening means pivotally attaching the element to a surface of the plate so that the element can swing in a direction parallel to the surface of the plate, a protective member closely fitted about the element at least in the area of the plate and adapted to provide at least three right-angled corners alongside the element, locking means adapted to engage the three right-angled corners of the channel-shaped member at a position removed from the fastening means thereby in conjunction with the fastening means to hold the element parallel to the surface of the plate, the locking means comprising an upturned edge of the plate and a flange fixed to an edge of the bridge member, the flange and the upturned edge forming a socket engaging the three right-angled corners of the protective member.

The protective member is preferably of rectangular-shaped cross-section, and the locking means engages the channel-shaped member by a rectangular-shaped seat formed by a flange of the bridge member so that the antenna element is held firmly in its operative position and is reinforced against vibration or other stress. The various parts of an antenna assembly according to the invention are adapted to be riveted together thereby providing a more economical type of assembly. The an-

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tenna elements fold close to the antenna boom so that a minimum size of shipping carton is required.

The invention will be further described with reference to the accompanying drawings in which:

5 Figure 1 is an exploded perspective view showing the various parts used in a three-element assembly.

Figure 2 is a perspective view of the parts shown in Figure 1 when assembled together, and

10 Figure 3 is a perspective view of a complete antenna element assembly of the conical fan type.

The same reference designations will be used for similar parts shown in the three figures of the drawings.

Referring to Figures 1 and 2, aluminum antenna elements 14 are covered by channel-shaped protectors 13 made of steel or aluminum. Rivets 16 and 17 are used to fasten the protectors 13 and the elements 14 to a spring plate 18 having upturned edges 18a which can be made of steel or aluminum. When the protectors 13 and the elements 14 are riveted to the plate 18 the middle element is fastened by two rivets 16 which hold the middle element rigidly to the plate 18 while the outside elements are able to pivot along the surface of the plate 18 around the rivets 17. The spring plate 18 with the elements 14 riveted to it is fastened by rivets 15 to bridge member 19. The spring plate 18 can be pivoted with rivets 15 as pivot points (see Figure 3) so that the antenna can be folded for shipping and storage purposes with the long elements 14 parallel to the boom 21 of the antenna.

When the antenna is to be installed in operative position the three elements 14 are drawn away from the boom 21 (Figure 3) and the spring plate 18 swings down so that it lies against the bridge member 19.

The outer elements 14 are locked in their proper positions by pulling them aside from the middle element 14 until the protectors 13 are against and under the flanges 19a at which time the spring edges 18a of the plate 18 snap up and lock against the protectors 13 thereby holding the elements 14 securely. This action also locks the middle element 14 which is riveted securely to the spring plate 18.

The grooves 19b (Figure 1) are put into the bridge member 19 in order to strengthen this part. The reinforcing channel-shaped protectors 13 prevent the aluminum elements 14 from being scored by the sharp edges 18a of the spring plate 18. If greater protection is desired the protectors 13 may be made out of square tubing. The protectors 13 should have right angled corners so that secure engagement is obtained with the edges 18a of the spring plate 18.

Figure 3 shows a straight fan type assembly, or in other words the element clamps are at right angles to the boom 21. On some antennas it is necessary to use bent clamps in order to tilt the fanned antenna elements. This effect is obtained by bending the bridge member 19 across its width between the holes 19c (Figure 1) and the holes for the rivets 15. The clamp assemblies shown in Figure 3 are mounted on an insulator 20 as required by some antenna designs but the insulator 20 can be replaced by a metal plate as required by other designs. On certain antennas only the two outside elements of each assembly of elements are required and in this case the middle element is omitted.

What I claim as my invention is:

1. A collapsible antenna comprising, an antenna boom, a bridge member fixed crosswise of the boom, a plate pivotally attached to the bridge member so that the plate can swing from a position parallel to the bridge member to a position parallel to the antenna boom, an elongated antenna element, fastening means pivotally attaching said element to a surface of said plate so that said element can swing in a direction parallel to said surface of said plate, a protective member closely fitted about said element at

least in the area of said plate and adapted to provide at least three right-angled corners alongside said element, locking means adapted to engage the three right-angled corners of the channel-shaped member at a position removed from said fastening means thereby in conjunction with said fastening means to hold said element parallel to said surface of said plate, said locking means comprising an upturned edge of said plate and a flange fixed to an edge of said bridge member, said flange and said upturned edge forming a socket engaging said three right-angled corners of said protective member.

2. A collapsible antenna as claimed in claim 1 in which the protective member is of rectangular cross-section.

3. A collapsible antenna as claimed in claim 2 in which the flange fixed to an edge of the bridge member is U-shaped and adapted to fit the protective member, the upturned edge of the plate being resilient and adapted to be depressed to permit the protective member to enter the flange, said upturned edge being adapted to spring up to lock the protective member against the flange.

4. A collapsible antenna as claimed in claim 3 comprising, two elongated antenna elements and a locking means for each at opposite edges of the plate, each antenna element being fitted with a protective member and mounted to the plate in the manner specified in claim 3, said antenna elements being adapted to swing one to each edge of said plate.

5. A collapsible antenna as claimed in claim 3 comprising, two elongated antenna elements and a locking means for each at opposite edges of the plate, each antenna element being fitted with a protective member and mounted to the plate in the manner specified in claim 3, said antenna elements being adapted to swing one to each edge of said plate, a third elongated antenna element fitted with a protective member and fixed to the plate so as to extend in a central position with respect to said two elongated antenna elements.

6. A collapsible antenna as claimed in claim 1 comprising, two elongated antenna elements and a locking means for each at opposite edges of the plate, each antenna element being fitted with a protective member and mounted to the plate in the manner specified in claim 1, said antenna elements being adapted to swing one to each edge of said plate.

7. A collapsible antenna as claimed in claim 1 comprising, two elongated antenna elements and a locking means for each at opposite edges of the plate, each antenna element being fitted with a protective member and mounted to the plate in the manner specified in claim 1, said antenna elements being adapted to swing one to each edge of said plate, a third elongated antenna element fitted with a protective member and fixed to the plate so as to extend in a central position with respect to said two elongated antenna elements.

8. A collapsible antenna as claimed in claim 1, comprising, two elongated antenna elements and a locking means for each at opposite edges of the plate, each antenna element being fitted with a protective member of rectangular cross-section and mounted to the plate in the manner specified in claim 1, said antenna elements being adapted to swing one to each edge of said plate.

9. A collapsible antenna as claimed in claim 1 comprising, two elongated antenna elements and a locking means for each at opposite edges of the plate, each antenna element being fitted with a protective member of rectangular cross-section and mounted to the plate in the manner specified in claim 1, said antenna elements being adapted to swing one to each edge of said plate, a third elongated antenna element fitted with a protective member of rectangular cross-section and fixed to the plate so as to extend in a central position with respect to said two elongated antenna elements.

No references cited.