May 13, 1969 W. O. REINITZ 3,444,512

RAILWAY SIGNAL APPARATUS

Filed Feb. 28, 1966 Sheet 1 of 2

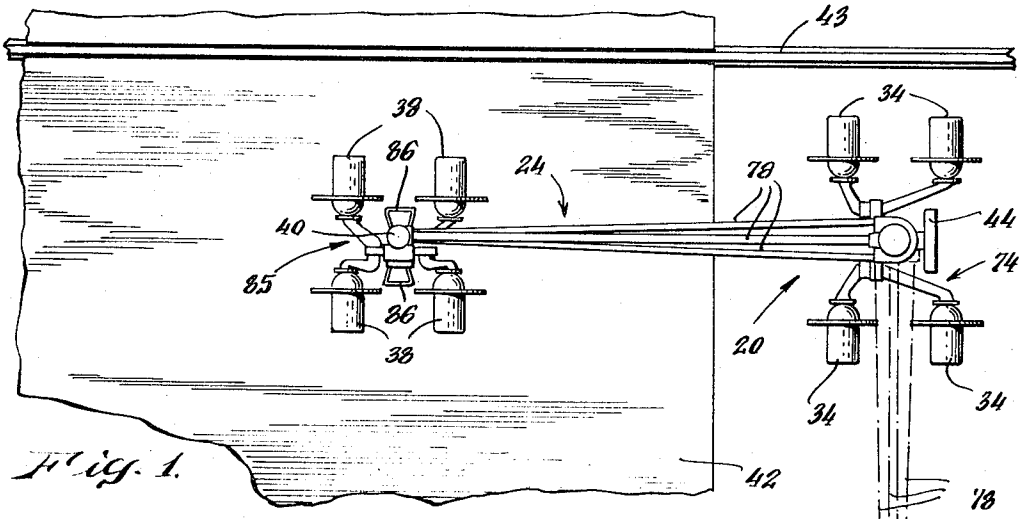


Fig. 1.

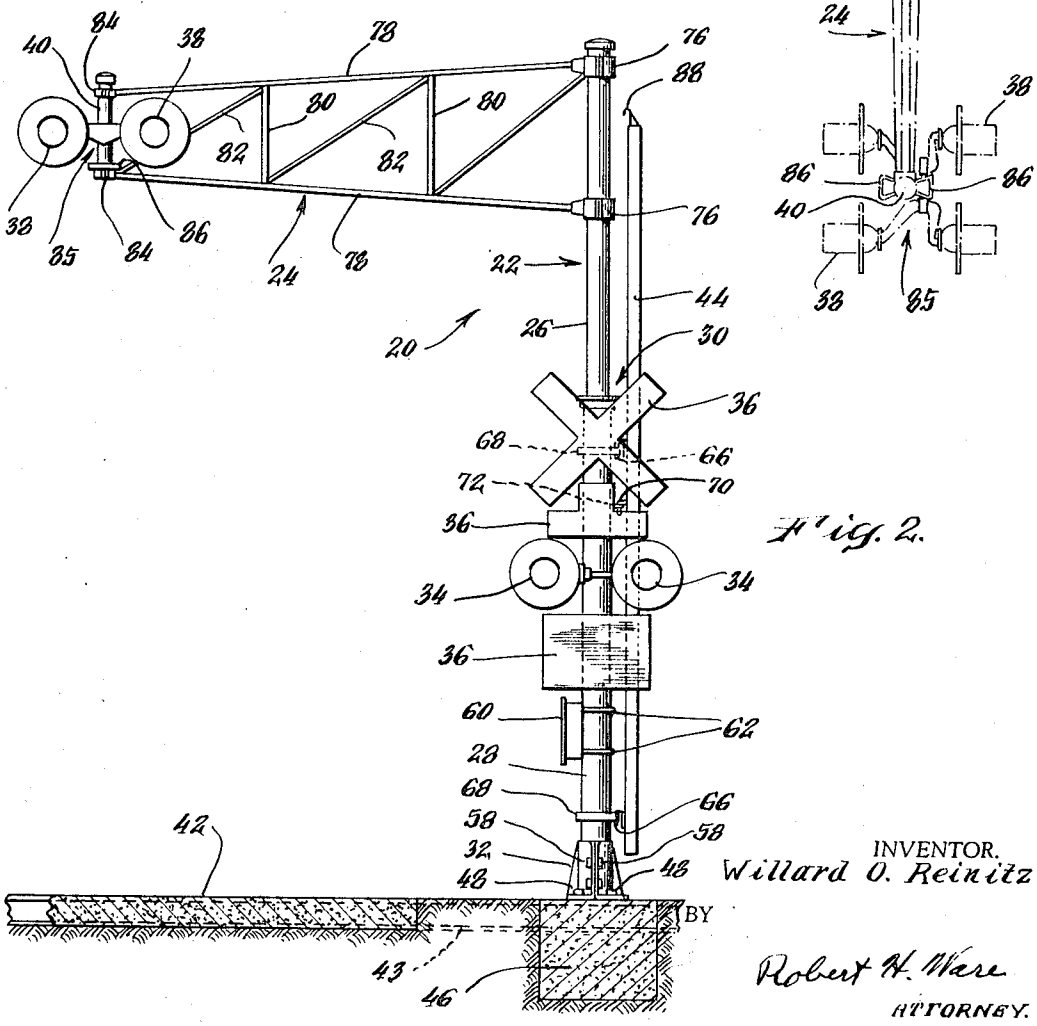


Fig. 2.

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RAILWAY SIGNAL APPARATUS

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Fig. 5.

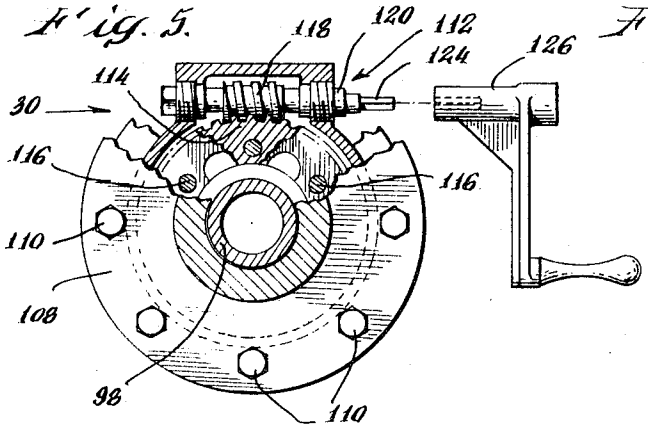


Fig. 4.

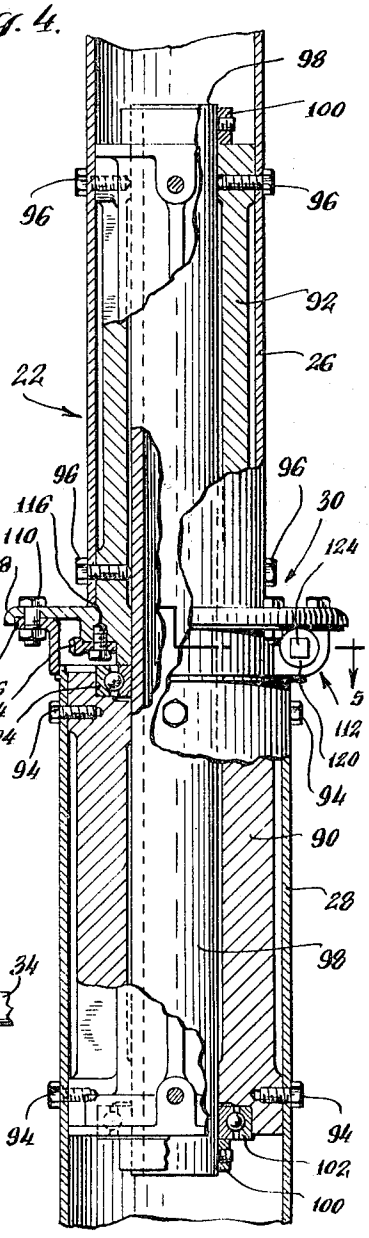


Fig. 3.

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RAILWAY SIGNAL APPARATUS

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U.S. Cl. 340—47 8 Claims

ABSTRACT OF THE DISCLOSURE

Railroad-highway crossing signal units each incorporating a stationary vertical lower mast surmounted by a vertical, rotatable upper mast connected to the top of the lower mast by mast-rotating means, with a signal-bearing cantilever arm extending over the highway from the top of the upper most, and with a separate, independent signal displayed on the stationary lower mast.

This invention relates to railway signal apparatus, more particularly it relates to a swing away railway crossing signal unit and a signal mast therefor.

The invention provides a vertical mast mounted to the side of an intersection of a roadway and a railroad right of way. The mast is divided into two portions; the bottom portion is fixed to the ground. Mounted thereto are flashing lamps and other crossing signals for warning pedestrians and motorists. A cantilever is mounted to the upper portion of the mast, normally over the roadway and has flashing lamps and, if desired, other pedestrian and motorist warning signals mounted thereto. The upper portion of the mast may be rotated with respect to the lower portion of the mast at a position above the fixed warning signals mounted to the lower portion of the mast for servicing the signals and signs mounted to the cantilever. A ladder is provided, normally mounted to the mast, that may be then used for servicing the signals and signs mounted to the cantilever.

Many railroad crossings are provided with flashing lamps for signalling motorists and pedestrians that a train is approaching or crossing the intersection. In most instances, such lamps have hithertofore been mounted on fixed vertical masts at the side of the roadway. However, in congested areas, just as it is desirable to suspend ordinary traffic signals directly over the intersection so that they may be distinguished from other signs and lights, the same is true for railway crossing signals. Thus, according to the prior art, they are often suspended from a cantilever mounted to the upper portion of a vertical mast at the side of the railway crossing.

Such signal masts provide a major problem in servicing. If they are fixed, some means must be provided for access to the signals mounted at the end of the cantilever. If a catwalk is provided so that a man can walk the cantilever to the signals, the mast and cantilever must be greatly strengthened, becoming costly, large, and unsightly. If a ladder is used for access to the signals mounted to the cantilever, there is a danger that a maintenance crew may be injured by negligent motorists. There is also some danger that pedestrians or motor vehicles may be injured by the movement of the ladder to and away from the signals.

One prior art technique of avoiding these difficulties has been to mount the vertical mast to a turntable base at or near ground level so that the entire mast may be rotated to rotate the cantilever 90°, parallel to the roadway. There it may be serviced at the side of the road. Some difficulties with this prior art technique are: Once the signals have been rotated, they are no longer operative to warn motorists of the approach or passage of

trains. Because the turntable supports the entire mast and cantilever structure, it is a large and expensive unit. Because it is at or near ground level, it is attractive to vandals who often rotate the cantilever or injure the turntable unit making it inoperative.

It is, therefore, an object of the present invention to provide an improved swing away railway crossing signal unit.

Another object of the invention is to provide a novel signal mast for a swing away railway crossing signal unit of the above character.

Still another object of the invention is to provide a signal mast of the above character to which crossing signs and signals may be fixedly mounted.

A further object of the invention is to provide a railway signal mast of the above character to which a terminal box may be fixedly mounted.

Another object of the invention is to provide a railway signal mast of the above character to which a portable ladder may be mounted for storage and removed for use, where, when and as required.

Still another object of the invention is to provide a railway signal mast of the above character for supporting a cantilever that may be rotated through an angle of at least 90°.

A still further object of the invention is to provide a railway crossing unit providing a high degree of safety to maintenance crews and highway users during maintenance or repair.

Yet another object of the invention is to provide such a railway crossing signal unit that is simple and pleasing in appearance.

Still another object of the invention is to provide a highway signal unit of the above character, the rotative parts of which are unobtrusive and practically vandal proof.

A further object of the invention is to provide a signal mast of the above character which is characterized by ease of rotation.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth. The scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a plan view of the railway signal apparatus of the present invention showing how the cantilever thereof may be rotated through an angle of 90°;

FIGURE 2 is a front elevation, partly in cross section of the railway signal apparatus of FIGURE 1;

FIGURE 3 is a side elevation, partly in cross section, of the railway signal apparatus of FIGURE 1 and with the cantilever arm swung to its servicing position and with portable ladder in like position;

FIGURE 4 is a fragmentary cross section, partially cut away, taken along the line 4—4 of FIGURE 3; and

FIGURE 5 is a fragmentary cross section, partially cut away, taken along the line 5—5 of FIGURE 4.

The same reference characters refer to the same elements throughout the several views of the drawings.

Now referring to FIGURES 1 and 2, the swing away railway crossing signal unit of the present invention is generally indicated at **20**. It comprises a vertical mast, generally indicated at **22**, and a horizontal cantilever, generally indicated at **24**, mounted thereto. The mast **22** comprises two portions; upper mast **26** and a larger diameter lower mast **28**. Upper mast **26** may be ro-

tated with respect to lower mast **28** at a pivot, generally indicated at **30**. Lower mast **28** is fixed to the ground at base support **32**. Thus, four flashing lamps **34** and signs **36** may be fixedly mounted to lower base **28**. Four flashing lamps **38** may be mounted to a jury mast **40** at the end of cantilever **24**.

In normal operation the cantilever **24** is left in the position shown in full lines in FIGURE 1 to suspend the flashing lamps **38** over the roadway **42** so that the cantilever **24** is parallel to the rail **43**. For servicing, the upper mast **26** is rotated with respect to the lower mast **28** at the pivot **30** to the position shown in dotted lines in FIGURE 1. The lower signal lamps **34** and signs **36** do not rotate so that the crossing signal unit **20** is still operative to warn motorists or pedestrians of the approach or passage of a railroad train. During servicing the flashing signals **38** are suspended at the side of the road **42**, as shown in FIGURE 1. Road and railway traffic does not present a danger to maintenance and repair crews, nor does the activity of the crews interfere with traffic or pedestrians or present any danger thereto. A ladder **44** is mounted to the fixed lower section of mast **28** so that maintenance crews need be provided with a minimum of equipment for servicing the signal unit **20**.

More specifically and still referring to FIGURES 1 and 2, a base support **32** may be formed to one or more cast pieces mounted to a concrete foundation block **46** to the side of the roadway **42** by means of bolts **48**. Lower mast **28** may be, for example, an eight inch diameter aluminum pipe twelve feet, six inches long. It may be clamped in base support **32** by means of bolts **58**. A standard signal terminal box **60** is mounted thereto, for example by straps **62**. Wiring may be contained within the mast **28**. Signs **36** are mounted to the mast by means of straps or clamps **64**. The ladder **44** may be supported to the lower mast **28** by means of hooks **66** fitted into holes (not shown) in clamps or straps **68**. A hasp **70** is mounted to a rung of the ladder **44** and engages a staple **72** welded to the lower mast **28** (see FIGURE 3) so that the ladder may be secured thereto by means of a padlock (not shown).

Again referring to FIGURES 1 and 2, fixed flashing lamps **34** are mounted to the lower mast **28** by means of conventional arms and straps or clamps generally indicated at **74**. Cantilever **24** is mounted to upper mast **26** by means of clamps **76**. Cantilever **24** is constructed conventionally out of three tubular arms **78** connected by struts **80** and tension members **82**. A jury mast **40** is supported at the end of cantilever arm **24** by means of clamps **84**. Flashing lamps **38** are mounted to jury mast **40** by conventional arms and clamps or straps generally indicated at **85**. A pair of strap hangers **86**, **86**, best shown in FIGURE 1, are also mounted to jury mast **40**. The hangers **86** may be engaged by a pair of hooks **88** (see also FIGURE 3) mounted at the top of the ladder **44**.

The upper mast **26** may be rotated with respect to the lower mast **28** by means of the pivot **30**, best seen in FIGURES 4 and 5.

Pivot **30** comprises a base pivot head **90** and a top pivot head **92**. Pivot heads **90** and **92** may be of cast metal and are ribbed to reduce their weight. Base pivot head **90** is located within lower mast **28** and is fixed thereto by means of screws **94**. Top pivot head **92** is fixed to upper mast **26** by means of screws **96**. A tubular center shaft **98** is within the top pivot head **92** and base pivot head **90** and is retained therein by means of retaining collars **100**, **100**. Center shaft **98** is fixed to rotate with upper mast **26** and top pivot head **92**. The pointed ends of screws **96** are arranged to engage center shaft **98** when they are tightened. Base pivot head **90** is arranged to rotate with respect to center shaft **98** and bearing **102** is provided to reduce friction therebetween. A second bearing **104** is mounted between top pivot head **92** and base pivot head **90** as shown. Both bearings are arranged to sustain axial loads. Bearing **104** is arranged to sustain downward axial loads and bearing **102** to sustain upward axial loads.

Base pivot head **90** provides a flange **106** and top pivot head **92** provides a second flange **108**.

Flanges **106** and **108** do not frictionally engage due to the axial support provided at bearing **104**. However, flanges **106** and **108** are provided with eight bolts **110** which may be tightened to fix the upper mast **26** with respect to the lower mast **28** at any of eight angular positions.

Referring to FIGURE 5, flanges **106** and **108** also provide a housing for a worm gear mechanism, generally indicated at **112**. A worm gear **114** is mounted to top pivot head **92** by means of screws **116**. It may be rotated by means of a worm **118** mounted on shaft **120**. Shaft **120** is mounted in bearings. The bearings are mounted in base pivot head **90** (see FIGURE 4). Worm **118** is keyed to the shaft **120**. The end **124** of shaft **120** is provided with a key which may be engaged by crank **126**.

As previously stated, in normal operation the cantilever **24** is located over the roadway **42**, as seen in FIGURES 1 and 2. Bolts **110** are tightened to prevent rotation of upper mast **26** with respect to lower mast **28**. A ladder **44** is mounted to lower mast **28** and is padlocked thereto. When it is desired to effect maintenance repair of the flashing lamps **38** or signs (not shown) mounted to the cantilever **24**, the maintenance man climbs ladder **44**, engages a crank **126** with shaft **120**, removes bolts **110**, and rotates the cantilever **24** to the side of the road **42**, as shown by dotted lines in FIGURE 1. He then replaces the bolts **110** to prevent any rotation of the upper mast **26** and removes the padlock from the hasp **66** and staple **72**. The ladder **44** may then be suspended against the cantilever **24** with the hooks **88** engaged with a hanger **86**. After maintenance the ladder is replaced and padlocked to the lower mast **28**. The bolts **110** are removed and the cantilever **24** cranked over the roadway **42**, the bolts **110** are then replaced and tightened, and the maintenance man leaves, taking the crank **126** with him.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A railway crossing signal unit comprising:

(A) a vertical lower mast having a lower end anchored to a supporting base;

(B) a vertical upper mast;

(C) a cantilever mounted on said upper mast;

(D) at least one signal mounted to said cantilever;

(E) at least one signal mounted to said lower mast; and

(F) means for rotating said upper mast with respect to said lower mast;

(G) with said vertical lower mast and said vertical upper mast overlapping one with the other over a short common juxtaposed length of each mast at the upper end of the vertical lower mast and the lower end of the vertical upper mast, within which overlapping length there is positioned the means for rotating said upper mast with respect to said lower mast,

whereby said rotating means is vertically spaced upward above the supporting base by substantially the entire height of the vertical lower mast.

2. The signal unit defined in claim **1** wherein said signals are flashing lamps.

3. The signal unit defined in claim **1** wherein said rotating means comprises a worm gear mounted to one of said masts and a worm mechanism mounted to the other.

4. The crossing signal unit defined in claim **1**, and:

(G) means for bolting said upper mast to said lower mast.

5. The signal unit defined in claim **1**, and:

(G) a ladder; and

(H) means on said lower mast for mounting said ladder thereto.

6. The signal unit defined in claim 1 wherein said rotating means comprises:

(a) a center shaft mounted to one of said masts, and

(b) a pair of bearings between said center shaft and said other mast, and

(1) at least one of said bearings mounted to receive both axial and radial forces between said masts.

7. The signal unit defined in claim 6, including:

(A) An upper pivot head mounted to said upper mast,

(B) a lower pivot head mounted to said lower mast,

(C) with the center shaft being mounted to one of said pivot heads and extending into the other,

(D) and with the pair of bearings being mounted between the center shaft and said other pivot head, whereby said center shaft and said bearings provide the overlapping juxtaposition of the two masts and the rotating means positioned therein.

8. The signal mast defined in claim 7, further including:

(A) a worm bear mounted to one of said pivot heads, and

(B) a worm mechanism engaged therewith mounted to the other of said pivot heads.

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U.S. Cl. X.R.

248—45; 308—227