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**Harp**

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(54) **CROSSING WARNING EQUIPMENT MOUNT**

(2013.01); **H02G 3/0493** (2013.01); **H02G 3/14** (2013.01); **H02G 3/081** (2013.01)

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(58) **Field of Classification Search**  
CPC ..... B61L 29/00; B61L 29/08; B61L 29/24; B61L 29/26; B61L 29/28  
See application file for complete search history.

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 298 days.

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(21) Appl. No.: **15/688,924**

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*Primary Examiner* — Robert J McCarry, Jr.

- (51) **Int. Cl.**  
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**H02G 3/14** (2006.01)  
**G10K 1/38** (2006.01)  
**H02G 3/04** (2006.01)  
**G10K 1/26** (2006.01)  
**H02G 3/08** (2006.01)

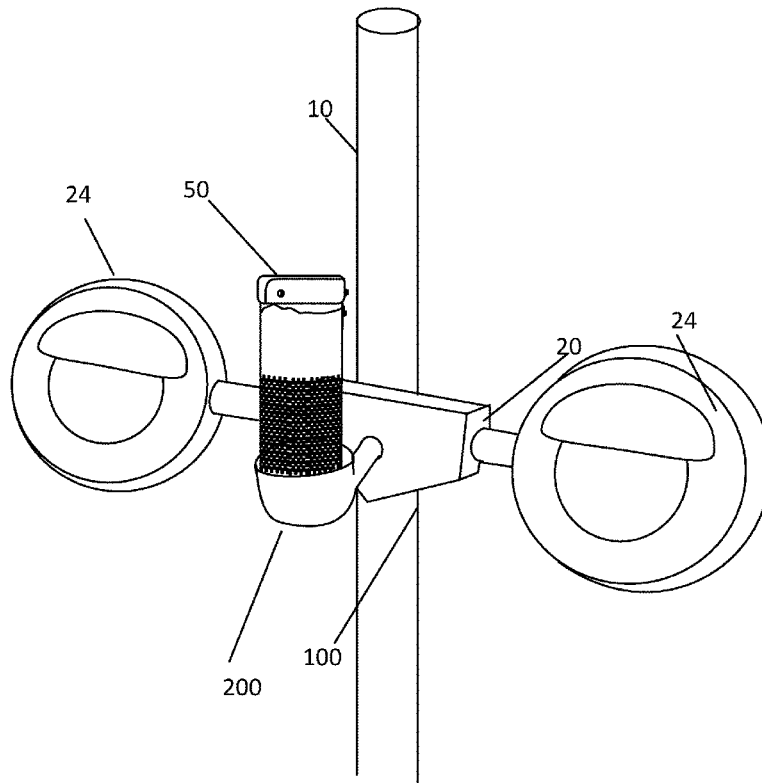
(57) **ABSTRACT**

A cover plate for a junction box may include a plate portion configured to cover an opening of the junction box. The cover plate may include a mast portion configured to couple with equipment configured to be mounted on a mast. The cover plate may include an offset portion coupling the mast portion with a front side of the plate portion.

- (52) **U.S. Cl.**  
CPC ..... **B61L 29/246** (2013.01); **B61L 29/28** (2013.01); **G10K 1/26** (2013.01); **G10K 1/38**

**14 Claims, 6 Drawing Sheets**

300



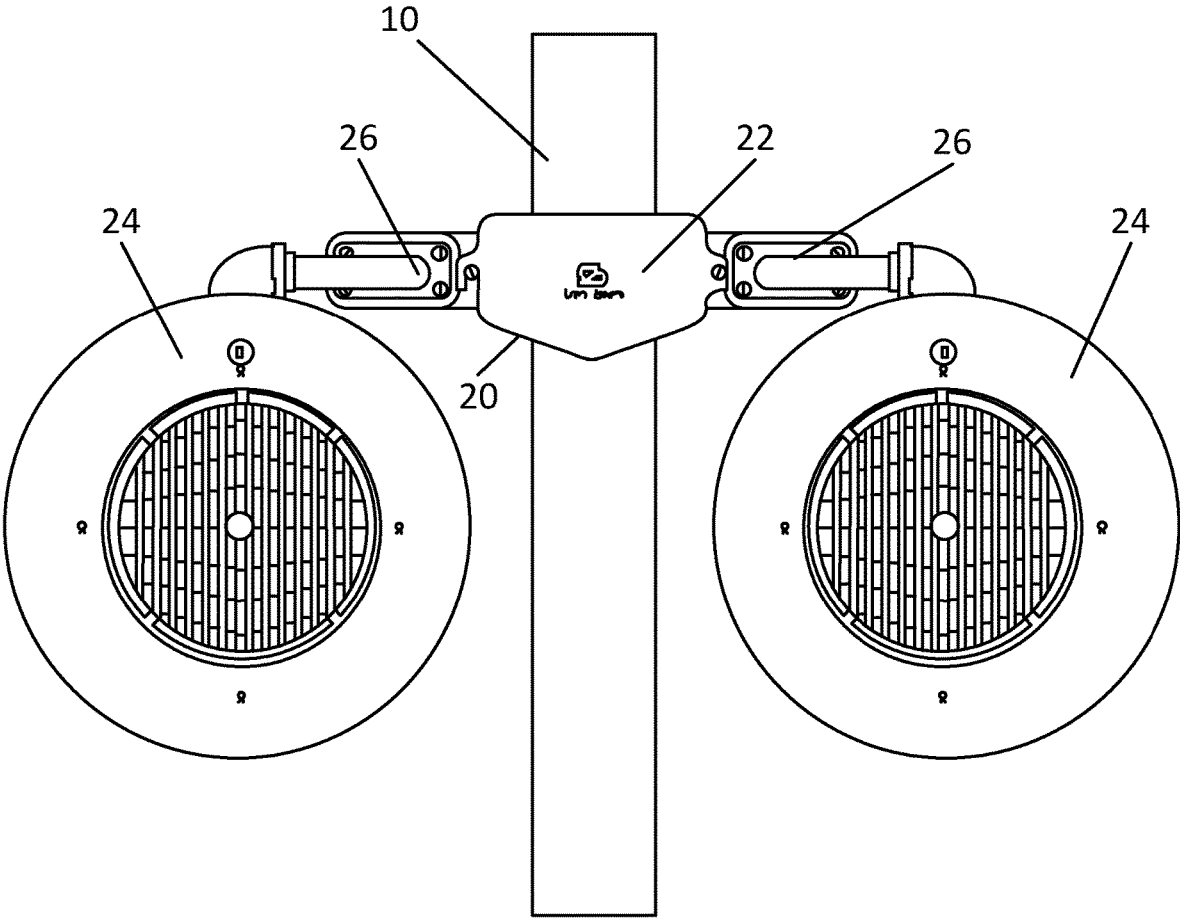


FIG. 1  
(Prior Art)

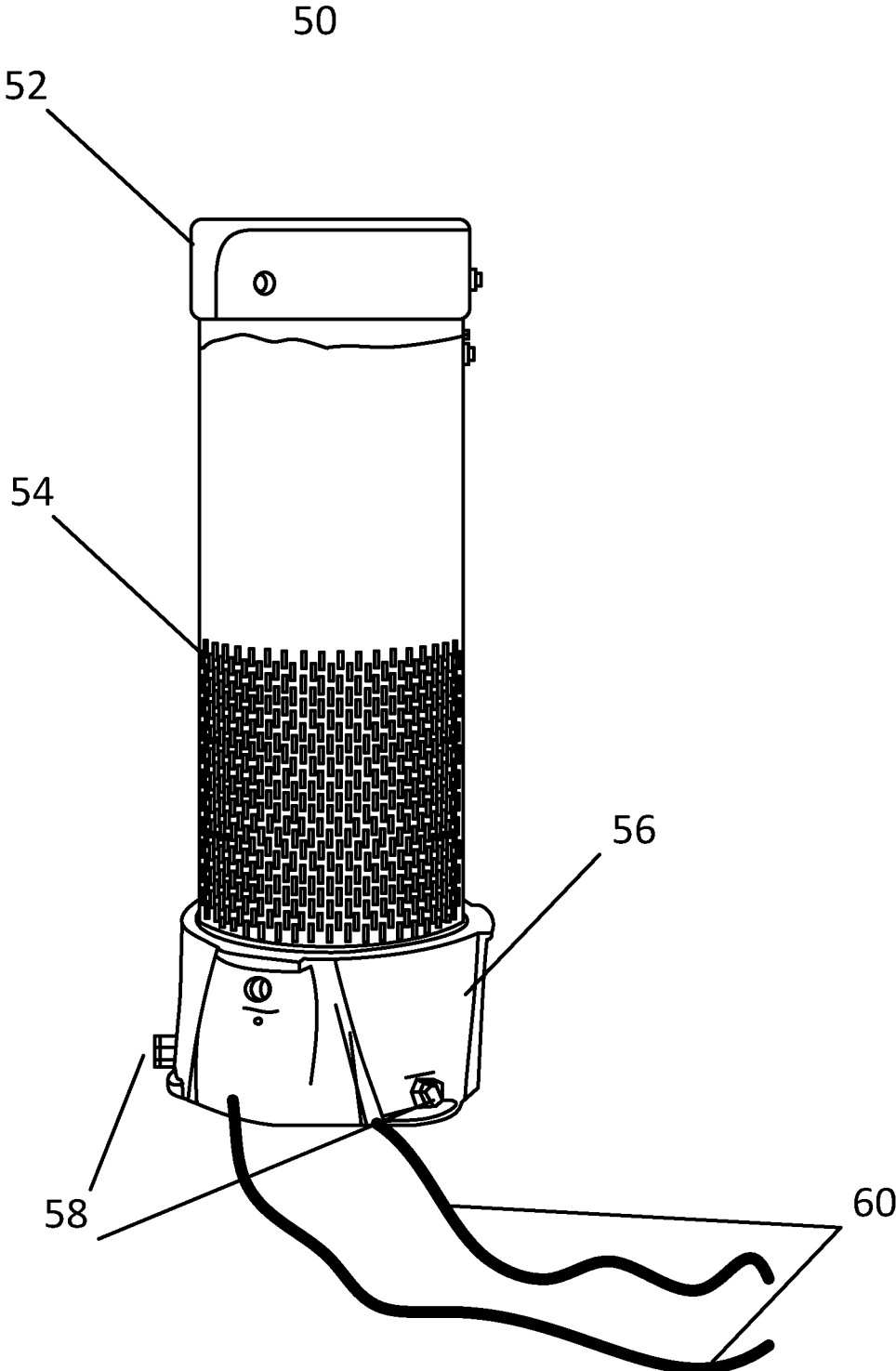


FIG. 2  
(Prior Art)

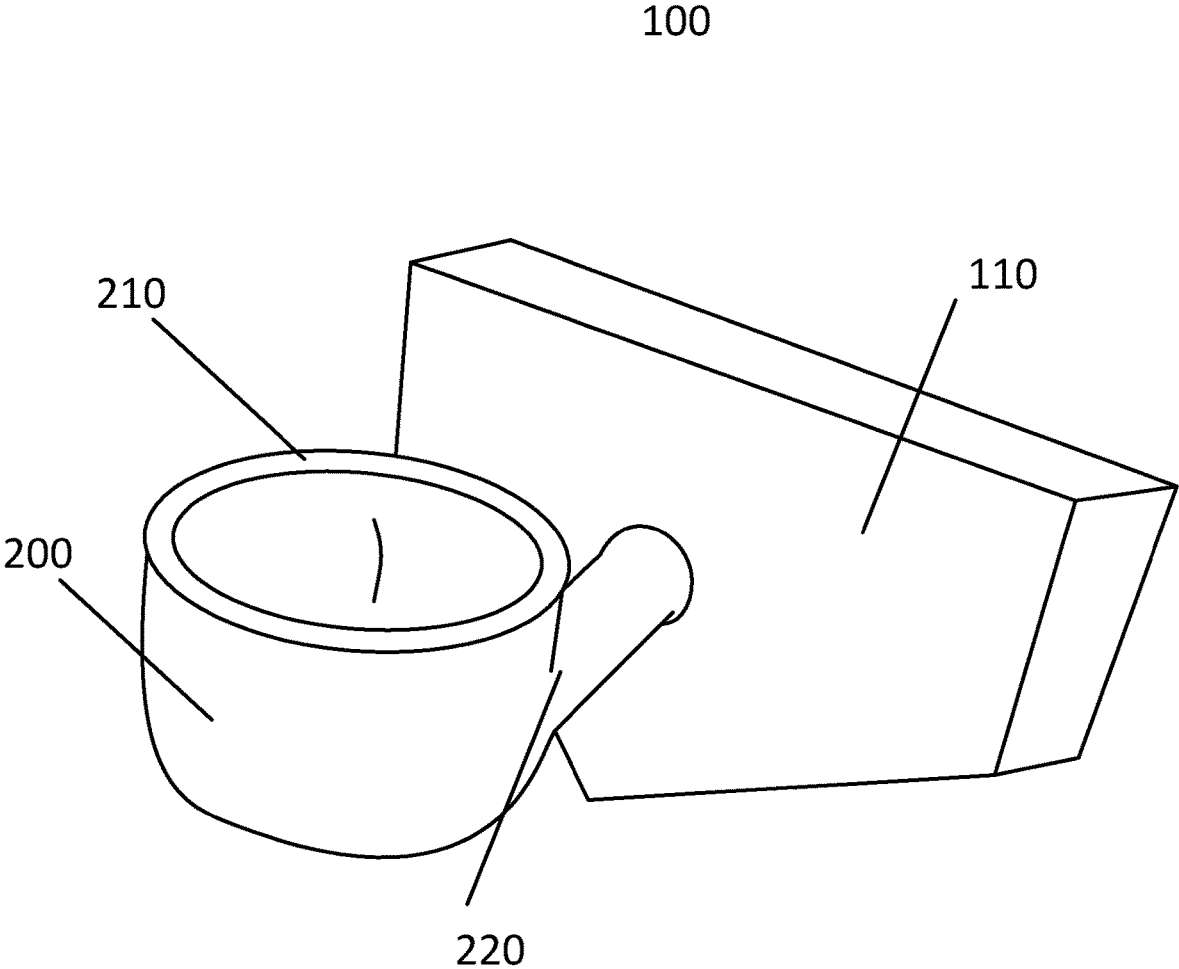


FIG. 3

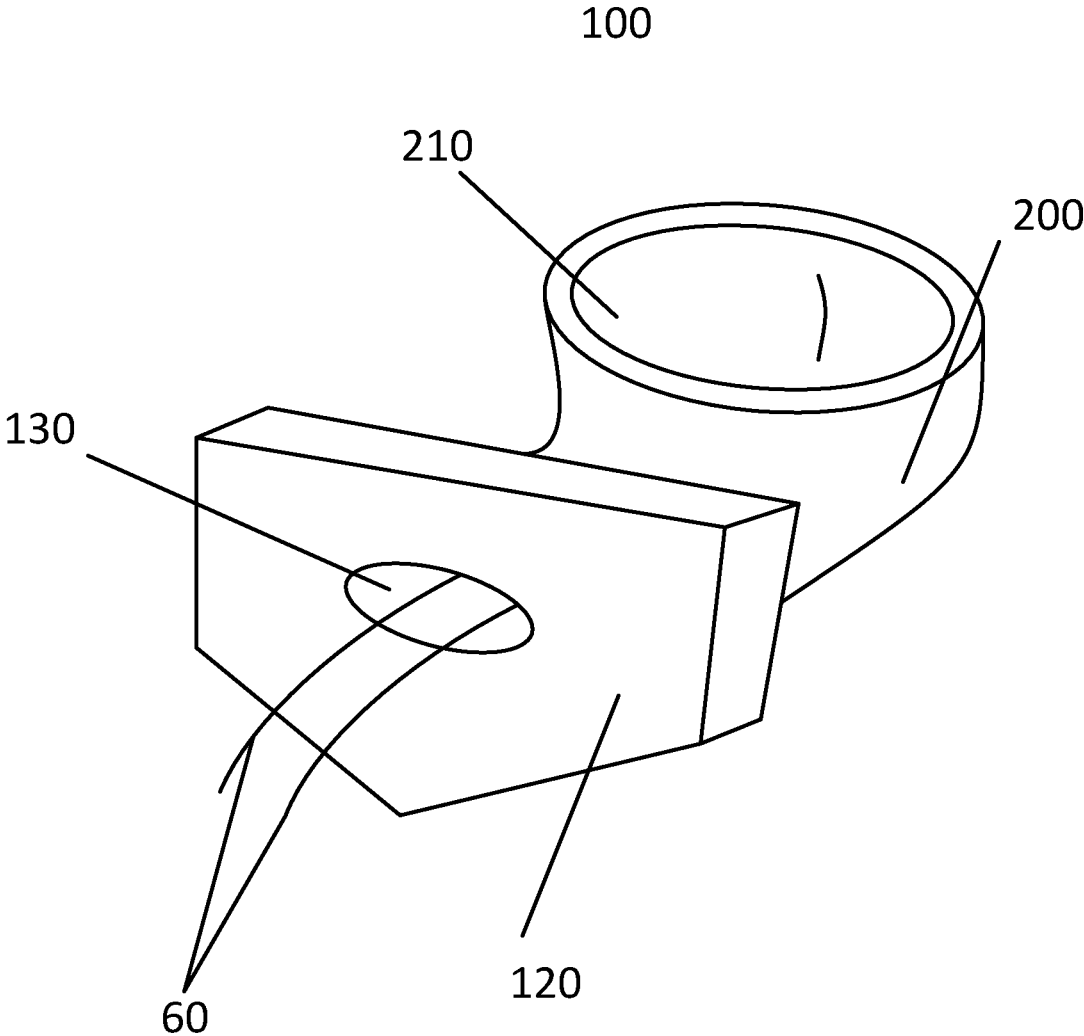


FIG. 4

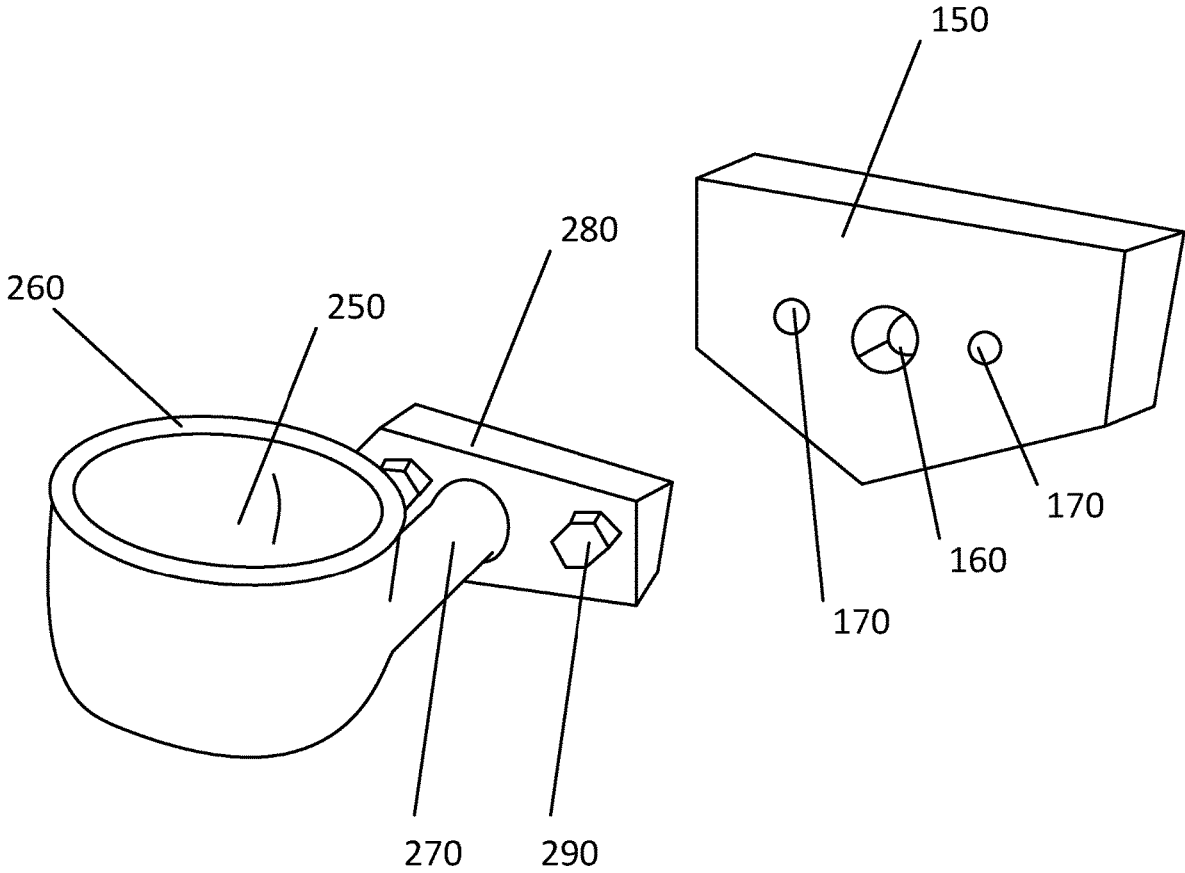


FIG. 5

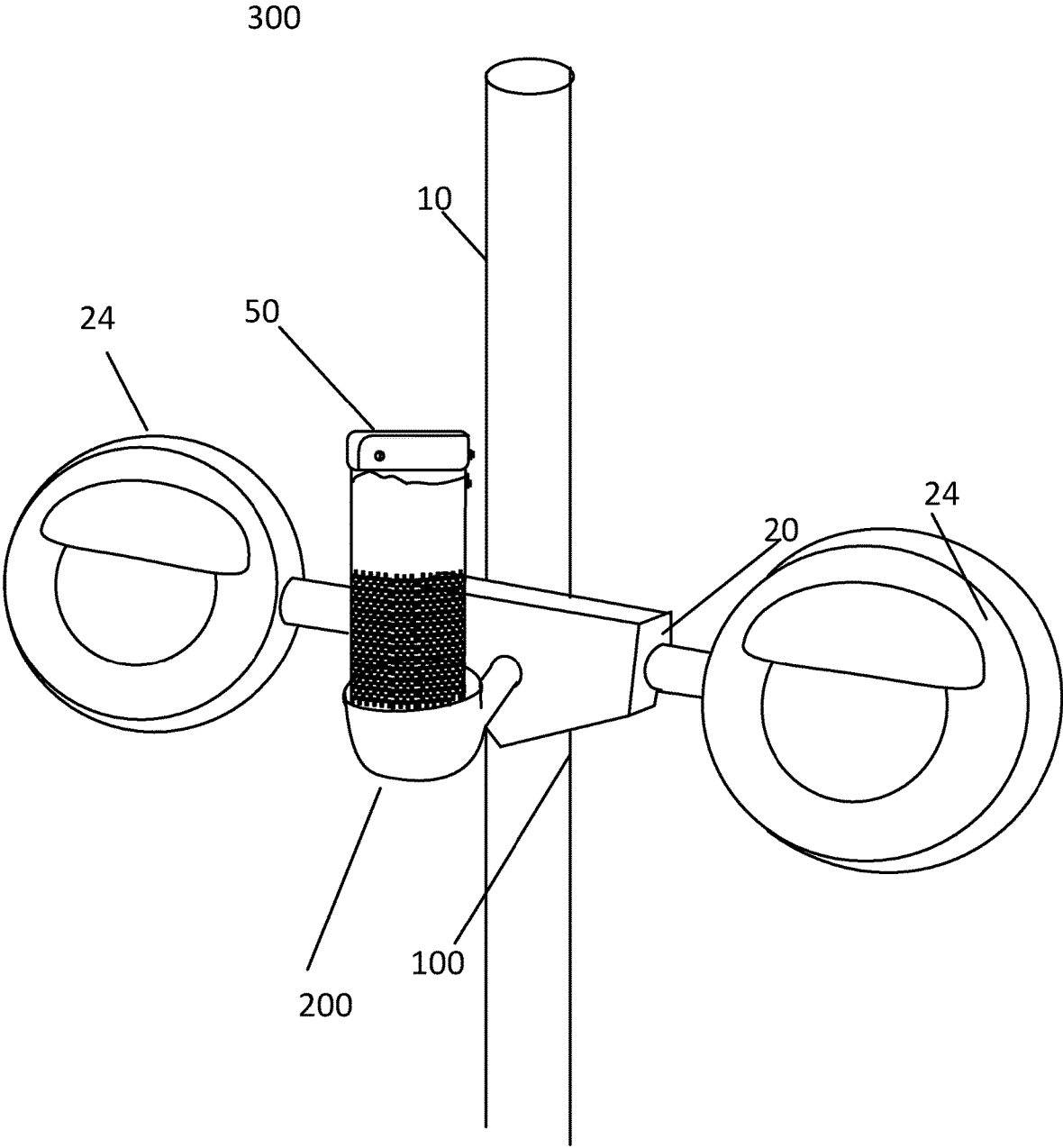


FIG. 6

**CROSSING WARNING EQUIPMENT MOUNT**

## BACKGROUND

Grade crossings are locations at which railroad tracks cross other thoroughfares, such as roads and sidewalks. To prevent traffic from the other thoroughfares from being struck by trains on the tracks, grade crossings are equipped with warning equipment. The warning equipment may include signs, flashing lights, audible alarms such as warning bells, retractable gates, and/or other equipment. Some of this warning equipment may be mounted on one or more masts. For example, warning bells are often mounted at the tops of such masts, which can be 16 feet or more above ground. This height can make bell maintenance or repair challenging and unsafe. Retrofitting masts to mount bells lower can also be difficult due to the existing bell wiring being disposed within the mast and protruding only at the top of the mast. For example, an installer may have to drill into the mast, potentially damaging wiring and/or other systems within the mast.

## SUMMARY

Systems and methods described herein may provide mounts for warning equipment such as warning bells. These mounts may be configured so that they can be mounted relatively low on a mast (e.g., not at the top of the mast) and without drilling holes in the mast. For example, in some embodiments, a mount may be integrated into a cover plate for a box that holds electrical equipment (e.g., a junction box for flashing lights). The cover plate may be fixed to the box at the time of box manufacture and/or assembly, or the cover plate may be retrofitted to the box by swapping out an old cover plate for a cover plate described herein.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation view of a mast and flashing light assembly.

FIG. 2 is a perspective view of a bell.

FIG. 3 is a perspective view of a cover plate including a bell mount according to an embodiment of the invention.

FIG. 4 is a perspective view of a cover plate including a bell mount according to an embodiment of the invention.

FIG. 5 is a perspective view of a cover plate and a bell mount according to an embodiment of the invention.

FIG. 6 is a perspective view of a mast, bell, and flashing light assembly according to an embodiment of the invention.

## DETAILED DESCRIPTION OF SEVERAL EMBODIMENTS

Systems and methods described herein may provide mounts for installing and/or retrofitting warning bells onto cover plates for junction boxes. For example, grade crossings may include flashing lights mounted to a mast. The flashing lights may be controlled by electronics in a junction box. FIG. 1 is a front elevation view of a mast 10 and flashing light assembly. The flashing light assembly includes junction box 20, which may be mounted to mast 10. For example, junction box 20 may be mounted to mast 10 by hardware such as screws, bolts, brackets, u-bolts, etc.; welded to mast 10; or otherwise attached to mast 10. Flashing lights 24 may be coupled to junction box 20 by arms 26. Wiring may run from junction box 20 through arms 26 to flashing lights 24.

Junction box 20 may include a removable cover plate 22. Cover plate 22 may be removed to reveal wiring inside junction box 20. For example, the wiring may run from junction box 20 to flashing lights 24 as noted above. Wiring may also run inside mast 10. Wiring inside mast 10 may include the wiring that supplies power and/or control signals to flashing lights 24 as well as other wiring. For example, the other wiring may include wiring that supplies power and/or control signals to one or more warning bells mounted on mast 10. Cover plate 22 may be removably coupled to a body of junction box 20 by hardware such as screws or bolts, or cover plate 22 may be removably coupled to the body of junction box 20 by one or more hinges. These coupling options are presented as examples only, and cover plate 22 may be removably coupled to the body of junction box 20 in any fashion.

FIG. 2 is a perspective view of a bell 50. Bell 50 may include enclosure 52 enclosing an electromechanical or electric bell. For example, the bell may be an electric bell including a downward-facing horn speaker configured to output sound at 82 dBA or 94 dBA (measured at 3 meters from the bell) at 160 pulses/minute or 200 pulses/minute. The bell may be supplied by a 9-15 Vdc (nominal 12 Vdc) signal. The signal may be supplied through wires 60, which may be integrated into bell 50 or may be attached to bell 50 at leads (e.g., at the bottom of bell 50) (not shown). These bell characteristics are presented as examples only, and other bells may be housed within enclosure 52. Enclosure 52 may include vents 54 configured to encourage sound emission from the bell inside enclosure 52.

Bell 50 may include mounting portion 56. Mounting portion 56 may be configured to mount to the top of a pole or other protruding element. For example, mounting portion 56 may be configured to mount to the top of mast 10. To couple bell 50 to mast 10 or other element, one or more clamp bolts 58 may be disposed in mounting portion 56. For example, some embodiments may include three clamp bolts 58. Other embodiments may include other mounting hardware. Mounting portion 56 may be sized and configured to fit over mast 10 or other element having a diameter of four inches or five inches in some embodiments, although other configurations for other mast 10 sizes may be possible.

FIGS. 3 and 4 are perspective views of a cover plate 100 including a bell mount 200 according to an embodiment of the invention. FIG. 3 shows front side 110 of cover plate 100, and FIG. 4 shows back side 120 of cover plate 100. Cover plate 100 may be made of cast aluminum in some embodiments, although other materials may be possible. Cover plate 100 may be configured to mount to junction box 20 of FIG. 1. For example, cover plate 100 may be configured to be removably coupled to junction box 20 by hardware such as screws or bolts (not shown), or cover plate 100 may be removably coupled to the body of junction box 20 by one or more hinges (not shown), depending on the configuration of junction box 20. In some embodiments, cover plate 100 may be coupled to junction box 20 at the time of junction box 20 assembly. In some embodiments, cover plate 100 may be retrofitted to junction box 20 in the field (e.g., after junction box 20 has been mounted to mast 10).

Cover plate 100 may include bell mount 200. Bell mount 200 may be formed integrally with cover plate 100. For example, when cover plate 100 is a cast aluminum element, bell mount 200 may be formed of the same piece of cast aluminum. In other embodiments, bell mount 200 may be coupled to cover plate 100 (e.g., by welding, hardware, or in some other fashion).



Bell mount **200** may be configured to mount bell **50** or other equipment. Accordingly, bell mount **200** may include mast portion **210**. Mast portion **210** may be a hollow cylindrical section extending upwards (e.g., oriented parallel to mast **10** when cover plate **100** is installed on junction box **20** coupled to mast **10**). Mast portion **210** may have a diameter (e.g., oriented perpendicular to mast **10** when cover plate **100** is installed on junction box **20** coupled to mast **10**) sized to accept mounting portion **56** of bell **50**. For example, mast portion **210** may have a diameter of four inches or five inches in some embodiments, although other configurations for other mast portion **210** sizes may be possible.

Bell mount **200** may be connected to front side **110** cover plate **100** by offset portion **220**. Offset portion **220** may be a hollow section spacing mast portion **210** away from cover plate **100** to provide clearance for bell **50** from cover plate **100** when bell **50** is coupled to mast portion **210**.

The hollow interior of offset portion **220** may be continuous with the hollow interior of mast portion **210**. Hole **130** on back side **120** of cover plate **100** may provide access to the hollow section of offset portion **220** and mast portion **210**. Accordingly, wires **60** supplying the power signal to bell **50** (e.g., as described above) may be fed from the interior of junction box **20**, through the hollow section of offset portion **220** and mast portion **210**, to bell **50**. For example, wires **60** may run through the interior of mast **10** and may be accessible inside junction box **20**. When junction box **20** is installed, or when cover plate **100** is retrofitted to previously-installed junction box **20**, an installer may be able to access wires **60** and connect them to bell **50**, shortening wires **60** if desired (e.g., if wires **60** are long enough to power a bell mounted at the top of mast **10**).

FIG. **5** is a perspective view of a separate cover plate **150** bell mount **250** according to an embodiment of the invention. In this embodiment, cover plate **150** and bell mount **250** may function similarly to cover plate **100** and bell mount **200** of FIGS. **4** and **5**, respectively. For example, cover plate **150** may be configured to be removably coupled to junction box **20** by hardware such as screws or bolts (not shown), or cover plate **100** may be removably coupled to the body of junction box **20** by one or more hinges (not shown), depending on the configuration of junction box **20**. Bell mount **250** may be configured to mount bell **50** or other equipment at mast portion **260**, with space for wires **60** to run through mast portion **260** and spacer portion **270**. Cover plate **150** may include hole **160** for wires **60** to run from junction box **20** into spacer portion **270** and mast portion **260** to bell **50**.

However, unlike cover plate **100** and bell mount **200** of FIGS. **4** and **5**, cover plate **150** and bell mount **250** may be detachably coupled to one another. For example, bell mount **250** may include bracket **280** and hardware **290** (e.g., screws, bolts, or other hardware). Cover plate **150** may include mounting points **170** configured to couple with hardware **290**.

FIG. **6** is a perspective view of a mast **10**, bell **50**, and flashing light **24** assembly **300** according to an embodiment of the invention. Assembly **300** is an embodiment wherein junction box **20** has been configured or retrofitted with cover plate **100** and bell mount **200**. Bell **50** is shown mounted to bell mount **200**. Due to this configuration, bell **50** may be mounted significantly lower than the top of mast **10**, providing easier access to bell **50** for installation, maintenance, and/or replacement. Additionally, because bell **50** may be mounted to bell mount **200** on removable cover plate **100**, a user attempting to access wiring (e.g., wires **60**) may do so by removing cover plate **100**, rather than cutting into mast **10**. Furthermore, in embodiments wherein junction box **20**

has been retrofitted with cover plate **100** and bell mount **200**, a user may have installed cover plate **100** and bell mount **200** without drilling or cutting into mast **10** to access wiring and/or create mount points for mounting hardware.

While various embodiments have been described above, it should be understood that they have been presented by way of example and not limitation. It will be apparent to persons skilled in the relevant art(s) that various changes in form and detail can be made therein without departing from the spirit and scope. In fact, after reading the above description, it will be apparent to one skilled in the relevant art(s) how to implement alternative embodiments. For example, mast **10** may include other junction boxes for other electrical equipment besides junction box **20** for flashing lights **24**. Cover plate **100**, **150** and bell mount **200**, **250** may be configured to be installed and/or retrofitted onto other junction boxes.

In addition, it should be understood that any figures which highlight the functionality and advantages are presented for example purposes only. The disclosed methodology and system are each sufficiently flexible and configurable such that they may be utilized in ways other than that shown.

Although the term “at least one” may often be used in the specification, claims and drawings, the terms “a”, “an”, “the”, “said”, etc. also signify “at least one” or “the at least one” in the specification, claims and drawings.

Finally, it is the applicant’s intent that only claims that include the express language “means for” or “step for” be interpreted under 35 U.S.C. 112(f). Claims that do not expressly include the phrase “means for” or “step for” are not to be interpreted under 35 U.S.C. 112(f).

What is claimed is:

1. A cover plate for a junction box, the cover plate comprising:
  - a plate portion configured to cover an opening of the junction box;
  - a mast portion configured as a hollow cylindrical section and to couple with equipment configured to be mounted on a mast; and
  - an offset portion coupling the mast portion with a front side of the plate portion, the offset portion comprising a hollow interior, wherein the hollow cylindrical section of the mast portion is continuous with the hollow interior of the offset portion and forming a hollow inner portion with a first opening at a top of the mast portion and a second opening at a back side of the plate portion, and wherein the hollow inner portion provides space for wires to run from the junction box through the plate portion, the offset portion and the mast portion.
2. The cover plate of claim **1**, wherein the offset portion is detachably coupled to the plate portion.
3. The cover plate of claim **1**, wherein the plate portion, the mast portion, and the offset portion are integrally formed.
4. The cover plate of claim **1**, wherein the equipment comprises a bell.
5. The cover plate of claim **1**, wherein the junction box is a junction box for a flashing light system.
6. The cover plate of claim **1**, wherein at least one of the plate portion, the mast portion, and the offset portion comprises aluminum.
7. The cover plate of claim **1**, wherein the plate portion is detachably coupled to the junction box.
8. A method of configuring a junction box, the method comprising:
  - coupling a cover plate to an opening of the junction box, the cover plate comprising:

a plate portion configured to cover the opening of the junction box,

a mast portion configured as a hollow cylindrical section and to couple with equipment configured to be mounted on a mast, and

an offset portion coupling the mast portion with a front side of the plate portion, the offset portion comprising a hollow interior,

wherein the hollow cylindrical section of the mast portion is continuous with the hollow interior of the offset portion and forming a hollow inner portion with a first opening at a top of the mast portion and a second opening at a back side of the plate portion, and

wherein the hollow inner portion provides space for wires to run from the junction box through the plate portion, the offset portion and the mast portion.

9. The method of claim 8, further comprising installing the equipment on the mast portion.

10. The method of claim 9, wherein the installing comprises attaching at least one wire disposed within the junction box to the equipment.

11. The method of claim 8, further comprising coupling the junction box to a mast.

12. The method of claim 8, wherein the coupling of the cover plate to the opening of the junction box is performed after the junction box has been coupled to a mast.

13. The method of claim 8, wherein the equipment comprises a bell.

14. The method of claim 8, wherein the junction box is a junction box for a flashing light system.

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