May 23, 1967 D. R. TURNBULL 3,321,160

ROTATABLE POLE BASE CONSTRUCTION

Filed Feb. 23, 1965 3 Sheets-Sheet 1

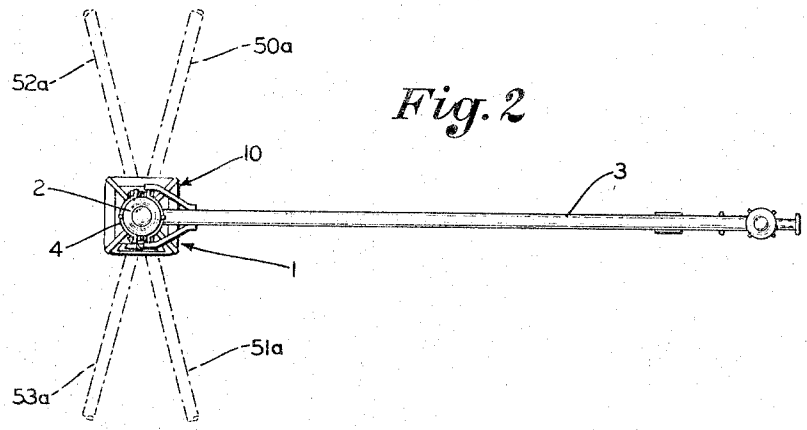


Fig. 2

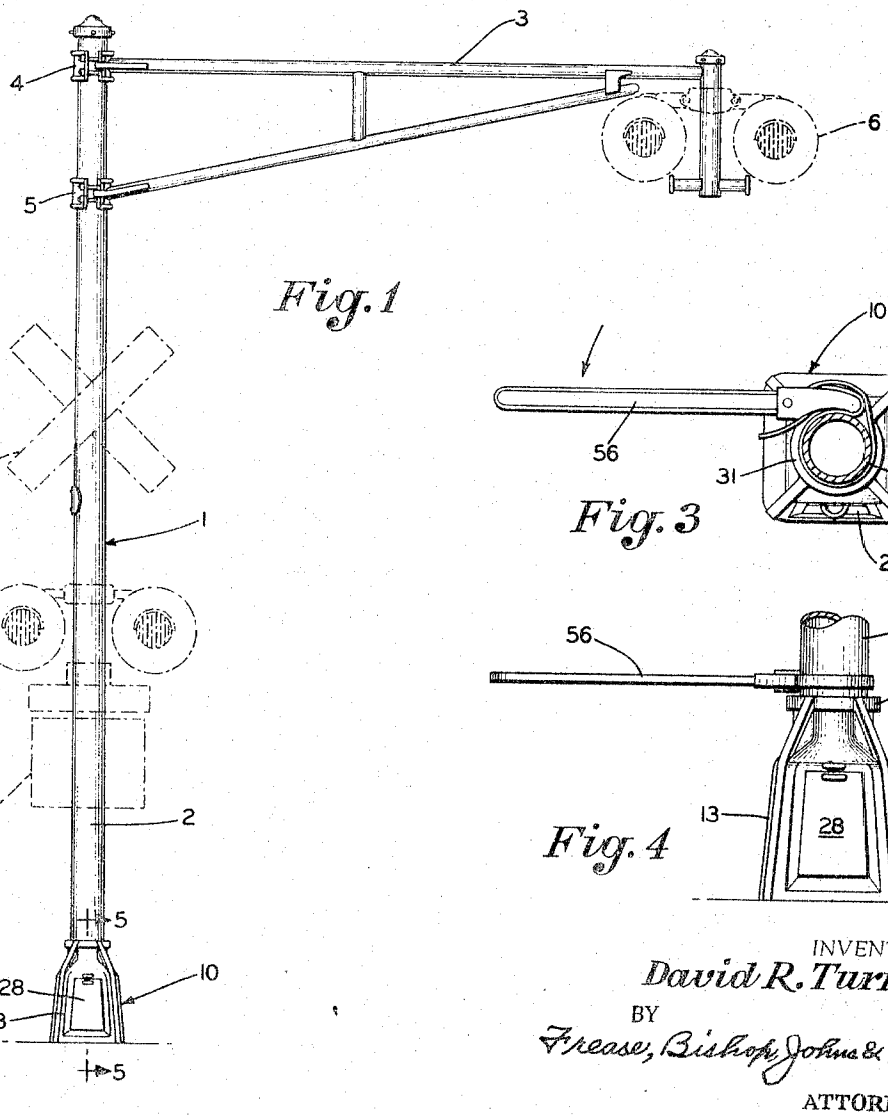


Fig. 1

Fig. 3

Fig. 4

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ROTATABLE POLE BASE CONSTRUCTION

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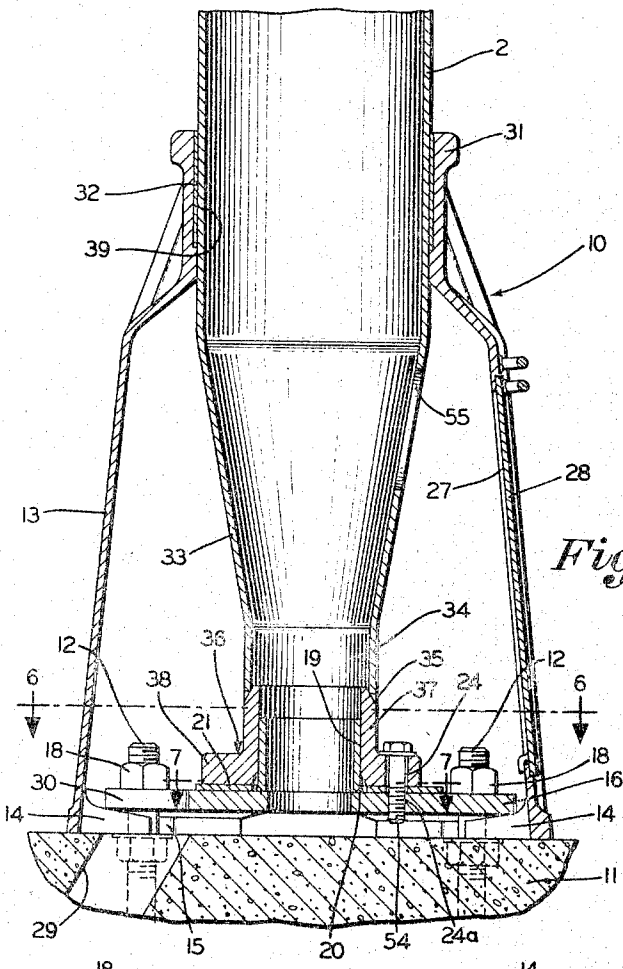


Fig. 5

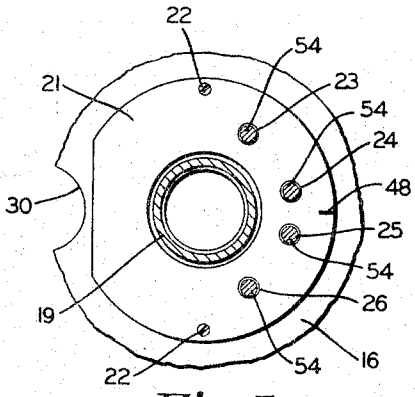


Fig. 7

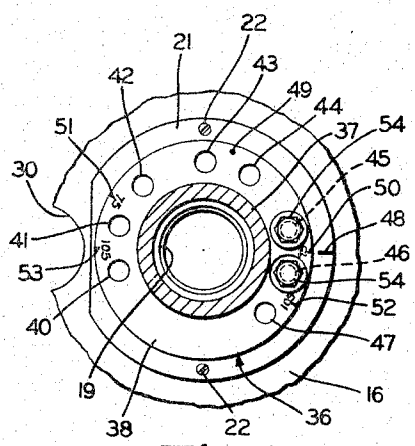


Fig. 8

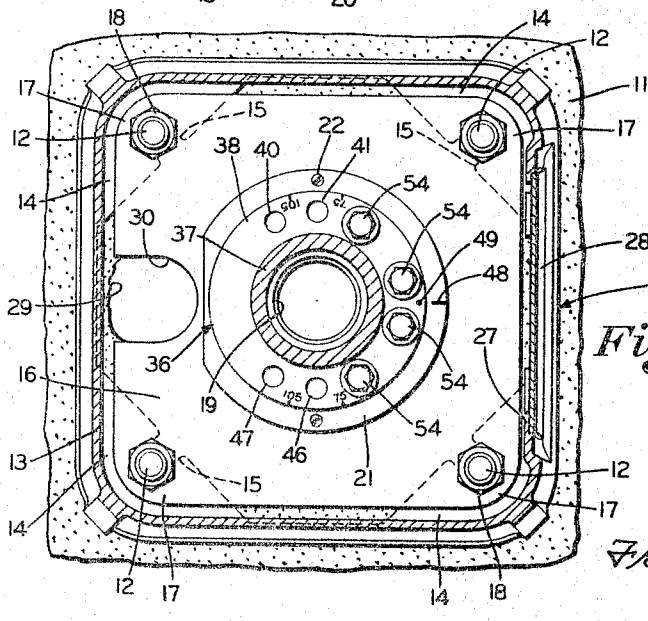


Fig. 6

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ROTATABLE POLE BASE CONSTRUCTION

Filed Feb. 23, 1965 3 Sheets-Sheet 3

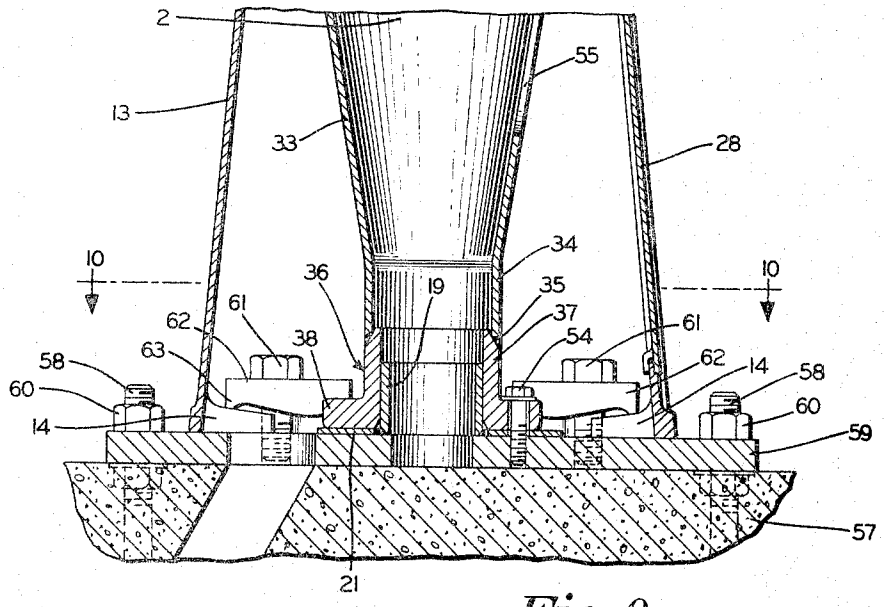


Fig. 9

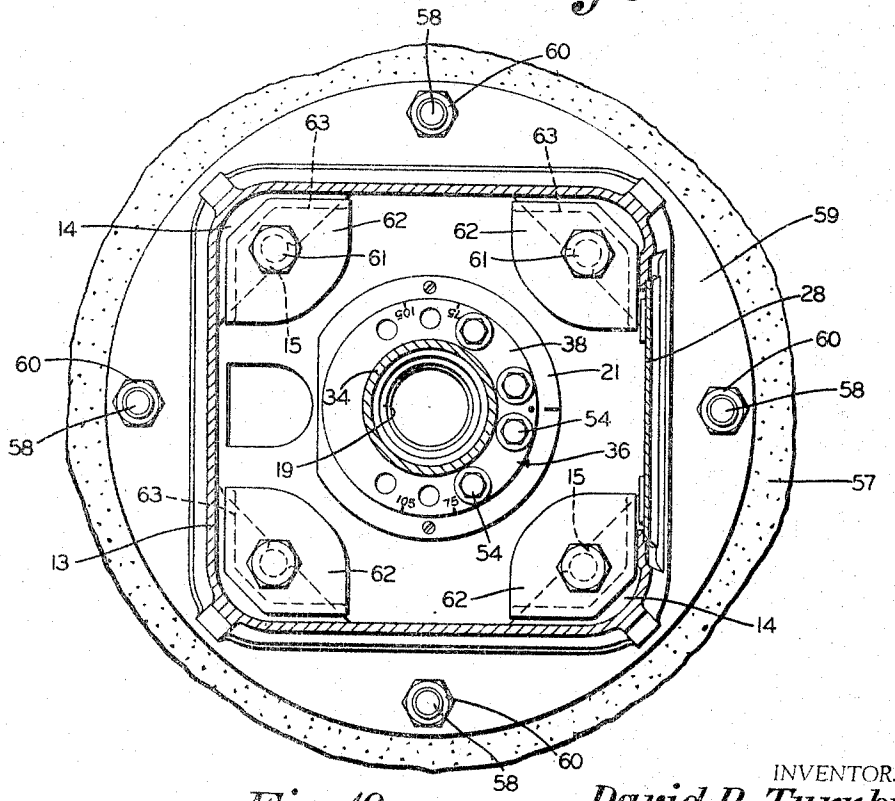


Fig. 10

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United States Patent Office 3,321,160 Patented May 23, 1967

3,321,160

ROTATABLE POLE BASE CONSTRUCTION

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Filed Feb. 23, 1965, Ser. No. 434,451
6 Claims. (Cl. 248—45)

The invention relates to poles for supporting signals, lights, etc., which may be located along a railroad, highway, bridge, or other location where overhead signals or lights may be desired or required; and more particularly the invention relates to a base construction for a pole permitting relative rotation between the pole and pole foundation, so that an arm or the like mounted on an upper portion of the pole normally located to extend over a traveled railroad track or highway, may be swung to a position adjacent or alongside of the railroad track or highway for safely servicing, maintaining or repairing the signal or light means supported usually at the end of the arm.

There are many examples of requirements for tall poles to be erected close to a railroad track or highway for supporting railroad signals, flashers, traffic lights, street lights, etc., at or adjacent the end of an arm mounted on an upper portion of the pole to position the supported signal or light directly over or above the railroad track or highway.

For safety reasons, it is desired and may be required that the signal or light supporting end of the arm, which normally is located above the highway or railroad track, must be swung to a position clear of the highway or railroad track when inspecting, repairing, replacing or otherwise servicing or maintaining the supported signal or light.

Several arrangements have been available for such arm movement. The supporting arm may be mounted for swinging or rotating on the pole, at the location where the arm is mounted on the pole. Also, the pole itself may be adapted for rotation relative to its base or the foundation which supports the pole. The expedient of swinging the arm at the pole-arm mount at the top of the pole, on the pole is not satisfactory for many reasons including the obvious inaccessibility of the mounting joint or coupling between the arm and pole, and the necessity of insuring a fixed joint at this location which will perform satisfactorily to securely hold the arm except when rotated.

Prior rotatable base constructions for poles erected along railroads sometimes have involved very complicated and expensive constructions including ball or roller bearing mountings, gears, worm gears, and the like, for rotating the poles when desired.

Since the requirement for rotating such poles for signal maintenance, etc., is only occasional, and since many poles may be involved along a railroad right-of-way, the added expense of complicated and expensive rotatable base constructions for such poles becomes an economic burden; even though the location of the rotatable means at the base satisfies an accessibility requirement.

The poles normally involved may be either cylindrical or tapered tubular metal poles. Such poles may be fifteen to twenty or more feet long and six to ten or twelve inches in diameter, for example, and the arm mounted at the upper end of the pole may be ten to twenty feet long. Bearing means is required to permit ready rotation of the pole when the occasion demands although this may be infrequent. Simplicity, accessibility and ease of operation also are required for applying force to rotate the pole in either direction. No known prior device has been available satisfying the combined requirements indicated.

Accordingly, it is a general object of the present invention to provide a new base construction for preferably

a tubular metal pole, adapted to support signal or light means at the end of an arm or bracket mounted on an upper portion of the pole, normally to hold the signal or light means in a fixed position over a railroad track or highway, and permitting rotation of the pole to position the signal or light means alongside of the railroad track or highway for safely gaining access to the signal or light means for servicing, maintenance, etc., in which the rotatable support for the pole has a simplified but strong construction permitting occasional easy turning of the pole on the base in either direction using a simple strap wrench and the like.

Also, it is an object of the present invention to provide a new base construction for preferably tubular metal poles with which rotatable adjustment may be made between the lower end of the pole and the base or foundation on which the pole is supported, and in which spaced bearing and journaling support means is provided between the pole and supporting base to accommodate circumferential and thrust loading acting radially and axially of the axis on which the pole is rotatable.

Moreover, it is an object of the present invention to provide a new rotatable pole base construction having relatively rotatable complementary, spaced, radial and thrust bearing means, and having means for clamping the relatively rotatable parts together in fixed position at any one of a plurality of different selected positions of rotatable adjustment.

Also, it is an object of the present invention to provide a new rotatable pole base construction having relatively rotatable parts adapted to be clamped together in fixed position at any one of a plurality of different selected positions of rotatable adjustment, in which certain of said relatively rotatable parts cooperatively serve as components of the means which secure the base construction in fixed position on a permanent base foundation.

Finally, it is an object of the present invention to provide a new rotatable pole base construction for preferably tubular metal poles which eliminates difficulties heretofore encountered in the art, eliminates costly base structures heretofore involved, achieves the stated objects in a simple, effective and inexpensive manner, and solves problems and satisfies needs existing in the art.

These and other objects and advantages, apparent to those skilled in the art, from the following description and claims, may be obtained, the stated results achieved, and the described difficulties overcome, by the apparatus, combinations, parts, elements, subcombinations, arrangements, relationships, and constructions which comprise the present invention, the nature of which is set forth in the following general statement, preferred embodiments of which—illustrative of the best modes in which applicant has contemplated applying the principles—are set forth in the following description and shown in the drawings, and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the improved rotatable pole base construction of the present invention may be stated in general terms as including a base housing, an adapter plate, lower radial support bearing means on the plate, thrust ring bearing means on the plate surrounding said lower radial support bearing means, upper radial support bearing means on the housing spaced above said adapter plate, means for clamping the housing and plate together to hold the upper and lower radial support bearing means in axial alignment, a pole having a flanged lower end forming lower sleeve and flange portions, the pole having a cylindrical portion spaced above its lower flanged end; the lower end of said pole being telescoped within said base housing with the cylindrical pole portion journaled in said base housing upper radial support bearing means, and with the pole end sleeve portion telescoped over said

lower radial support bearing means and said pole end flange portion resting on said thrust ring bearing means; and releasable means for locking the pole to the adapter plate in various selected positions of rotatable adjustment between the pole and plate.

By way of example, embodiments of the improved rotatable pole base construction are shown in the accompanying drawings forming part hereof in which:

FIGURE 1 is a side elevation of a railroad signal pole installation equipped with the new rotatable base construction;

FIG. 2 is a plan view of the pole construction illustrated in FIG. 1 showing various positions of rotatable adjustment in dot-dash lines;

FIG. 3 is a section of the pole on a larger scale looking downward just above the base illustrated in FIG. 1 showing the use of a simple strap wrench for rotating the pole in one direction relative to its base or foundation;

FIG. 4 is a side elevation of the parts shown in FIG. 3;

FIG. 5 is an enlarged vertical sectional view of the improved rotatable pole base construction taken on the line **5—5**, FIG. 1;

FIG. 6 is a plan sectional view taken on the line **6—6**, FIG. 5;

FIG. 7 is a fragmentary view taken on the line **7—7**, FIG. 5;

FIG. 8 is a fragmentary view showing some of the parts shown in FIG. 6 in one position of selected adjustment;

FIG. 9 is a view similar to FIG. 5 showing a modified form of construction; and

FIG. 10 is a plan sectional view taken on the line **10—10**, FIG. 9.

Similar numerals refer to similar parts throughout the drawings.

A typical railroad signal pole is indicated generally at **1** in FIG. 1 and comprises a tubular pole member **2** and an overhead cantilever support arm **3** mounted at **4** and **5** on the upper end of pole **2**. The signal pole installation may support any desired number of signal or sign devices such as shown in dot-dash lines at **6**, **7**, **8**, and **9**.

In accordance with the invention signal pole **1** is supported rotatably with respect to its foundation by the improved rotatable base construction generally indicated at **10**. A typical permanent concrete foundation embedded in the ground is indicated at **11** from which anchor bolts **12** extend upwardly. An elongated and generally rectangular base housing member **13** having corner flanges **14** projecting inwardly of each corner at the bottom end of base **13** rests on foundation **11**, the corner flanges **14** preferably being slotted to **15** to receive anchor bolts **12**.

An adapter plate **16** rests on corner flanges **14** at each of the corners **17** of plate **16**; and the anchor bolts **12** extend through holes in the plate corner portions **17** whereby adapter plate **16** is clamped to and held in alignment with base housing **13** and base housing **13** is clamped to foundation **11** by nuts **18** threaded on the upper ends of anchor bolts **12**.

A lower radial support bearing sleeve **19** is preferably welded at **20** centrally to adapter plate **16** and preferably is formed of stainless steel. A preferably stainless steel thrust ring bearing **21** is secured preferably by screws **22** on the upper surface of adapter plate **16** and surrounds support sleeve **19**. Thrust ring **21** is provided with a series of four holes **23**, **24**, **25**, and **26** (FIG. 7) matching a similar series of threaded holes in plate **16** immediately below thrust ring holes **23** to **26**, such as threaded hole **24***a* in plate **16** (FIG. 5).

Base **13** may be provided with an access opening **27** closed by a door **28**. A hole **29** for a cable entrance may be formed in foundation **11** communicating through a slot **30** in adapter plate **16** with the interior of housing **13**.

The upper end of housing **13** is provided with an upwardly extending axial sleeve **31** in which an upper radial support bearing sleeve **32** preferably formed of stainless steel is mounted, spaced axially above the lower radial support bearing sleeve **19**, thrust ring bearing **21**, and adapter plate **16**.

In accordance with the invention, the lower end of pole **2** is telescoped within base housing **13** and pole **2** preferably has a tapered section **33** terminating in a reduced diameter portion **34** welded at **35** to an end flange fitting **36** having a sleeve portion **37** and a flange portion **38**.

The sleeve portion **37** of fitting **36** is received over, surrounds and is journaled on the lower radial support bearing sleeve **19**. Flange portion **38** of fitting **36** is received on and is endwise supported on thrust ring bearing **21**. A cylindrical portion **39** of pole **2** immediately above tapered portion **33** is journaled in the upper radial support bearing sleeve **32** carried by base housing sleeve portion **31**.

Fitting flange **38** preferably is formed with a series of holes **40**, **41**, **42**, **43**, **44**, **45**, **46**, and **47** as illustrated in FIGS. 6 and 8. Thrust ring **21** preferably is provided with an index mark **48**. Flange **38** is provided with an aligning and centering index mark **49**; and also with 75°-marks **50** and **51**, and 105°-marks **52** and **53**, at either side of centering mark **49**.

When index marks **48** and **49** are aligned as shown in FIG. 6, arm **3** on railroad signal pole **1** extends outward over the railroad track in a position such as illustrated in full lines in FIGS. 1 and 2. When so located, holes **42**, **43**, **44**, and **45** in flange **38** are aligned with holes **23**, **24**, **25**, and **26**, respectively, in thrust ring **21**, so that torque bolts **54** may be received therein as illustrated in FIGS. 5, 6, and 7 to securely clamp the pole **2** in the fixed position illustrated in FIGS. 1 and 2.

An opening **55** may be formed in the tapered portion **33** of pole **2** for cable or conduit access between the compartment formed by base **13** and the interior of pole **2**.

When it is necessary to service signals or other components carried by pole arm **3**, door **28** may be opened, the four torque bolts **54** illustrated in FIG. 6 are removed, a strap wrench indicated at **56** in FIG. 3 is applied to the pole just above base sleeve **31** and the pole is rotated until one of the 75° or 105°-marks **50–53** is aligned with the index mark **48** on thrust ring **21**.

Thus, FIGS. 2, 3 and 8 illustrate counterclockwise rotation of pole **2** to bring the 75°-mark **50** in alignment with index mark **48**. This locates pole arm **3** in the dot-dash position **50***a* indicated in FIG. 2 when the parts are in the position **50***a*, two torque bolts **54** may be inserted in the holes **45** and **46** of flange **38** and through holes **24** and **25** in thrust ring **21** and received in the matching threaded openings in adapter plate **16** below holes **24** and **25**. In this manner pole **2** is securely clamped in adjusted position before servicing operations are performed, which now may be accomplished safely on devices carried by arm **3**.

Rotation of pole **2** to bring the 105°-mark **52** in alignment with index mark **48** locates arm **3** in the dot-dash position **52***a* of FIG. 2. Similarly, clockwise rotation of the pole to bring the 75° or 105°-mark **51** or **53** in alignment with index mark **48** will locate arm **3** in either of positions **51***a* or **53***a* shown in FIG. 2. In any of the adjusted positions of arm **3**, two torque bolts **54** may be used to lock fitting **36** in adjusted position.

It is manifest that strap wrench **56** may be used readily to rotate the pole to any of the selected adjusted positions indicated when servicing is required. Rotation also is accomplished with considerable ease and without requiring large forces to be applied to wrench **56** because of the journaling of the lower end of the pole **2** in spaced sleeve bearings **19** and **32** and on thrust ring bearing **21**.

Furthermore, the bearing and mounting arrangement for pole **2** within base **13** provides a very stable support for pole **2** in all positions of adjustment when the members are clamped and locked together by torque bolts **54**.

The modified construction illustrated in FIGS. 9 and 10 involves installations of the improved rotatable pole base construction with a standard base housing member **13** and a standard pole **2** on existing foundations **57** having tie rods **58** located on a bolt circle having a diameter larger than can be received within the lower end of base **13**.

In such instances an adapter plate **59** is used of sufficient size to be secured to tie rods **58** by nuts **60** located outside of base **13**. Adapter plate **59** is provided with a lower support bearing sleeve **19** the same as in the construction of FIG. 5. Sleeve **19** is received within and journals fitting **36** on the lower end of pole **2**. A thrust ring bearing **21** is interposed between fitting **36** and adapter plate **59**. Pole **2** in FIG. 9 may be rotated between the various adjusted positions described in connection with FIGS. 1 and 2 and is securely clamped to adapter plate **59** by torque bolts **54**.

Base **13** in FIG. 9, however, is clamped to adapter plate **59** by bolts **61** and clamp lugs **62**. Bolts **61** are threaded into adapter plate **59** and pass through slots **15** in base corner flanges **14**. The three corner feet **63** on lugs **62** engage the base corner flanges **14** as shown in FIGS. 9 and 10.

Accordingly, the improved construction of the present invention provides a new rotatable pole base construction which is simple, practical and low in cost; which is adapted for tubular metal poles regardless of the diameter thereof; which enables occasional rotation of the pole with respect to the base without complicated and expensive rotatable mounting and rotation producing devices; which permits a simple strap wrench to be used to rotate the pole with respect to its base or foundation in either direction when required; which involves spaced radial and thrust journal bearing support means accommodating circumferential and thrust loading acting radially and axially of the axis on which the pole is rotated; which provides for locking the pole in various selected positions of rotatable adjustment; which eliminates difficulties heretofore encountered in the art, achieves the stated objects, accomplishes the many new functions and results described, and solves problems which have existed in the art.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed.

Moreover, the description and illustration of the invention is by way of example and the scope of the invention is not limited to the exact structures shown because the sizes of the various parts and components may be varied and the uses to which the structures are adapted may be changed, without departing from the fundamental principles of the invention.

Having now described the features, discoveries and principles of the invention, the construction, operation and use of preferred forms thereof, and the advantageous, new and useful results obtained thereby; the new and useful discoveries, principles, apparatus, combinations, parts, elements, subcombinations, arrangements, structures, relationships and constructions, and mechanical equivalents obvious to those skilled in the art are set forth in the appended claims.

I claim:

1. Rotatable pole constructions including, a base housing, an adapter plate, lower radial support bearing means on the plate, thrust ring bearing means on the plate below and surrounding said lower radial support bearing means, upper radial support bearing means on the housing spaced above said plate, means for clamping the housing and plate together to hold the upper and lower radial support bearing means in axial alignment, a pole having a flanged lower end formed with lower sleeve and flange portions, the pole having a cylindrical portion spaced above said lower flanged end, the lower end of the pole being telescoped within said housing with the cylindrical pole portion journaled in said base housing upper radial support bearing means, and with the pole end sleeve portion telescoped over said lower radial support bearing means and said pole flange portion resting on said thrust ring bearing means, and releasable means engaged between the flange portion and plate for locking the pole to the plate in various selected positions of rotatable adjustment of the pole with respect to the plate.

2. The construction set forth in claim **1** in which a foundation is provided for the base, and in which anchor bolts extend from the foundation and engage the base housing and plate to connect the plate with the housing and the housing with the foundation.

3. The construction set forth in claim **1** in which a foundation is provided for the base, in which anchor bolts extend from the foundation and are connected with the plate, and in which the base housing is clamped to the plate.

4. The construction set forth in claim **1** in which cooperative index means are provided on the pole and plate to indicate selected positions of rotatable adjustment of the pole with respect to the plate.

5. The construction set forth in claim **1** in which the releasable means engaged between the pole and plate includes a first series of circumferentially spaced holes formed in the pole end flange portion, a second series of spaced holes formed in the plate matching the location of and being aligned with certain of holes of the first series when the pole is in normal position, certain of said holes in each series being aligned when the pole is rotated with respect to the plate selected predetermined distances in either direction from said normal position, and bolt means engageable with aligned holes for locking the pole with respect to the plate selectively in normal and various selected positions of the rotatable adjustment.

6. The construction set forth in claim **5** in which a primary index indicator is provided on the plate, and in which a plurality of index selectors are provided on the pole end flange portion adapted to be aligned selectively with said primary index indicator to indicate various positions of selected rotatable adjustment between the pole and plate.

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