

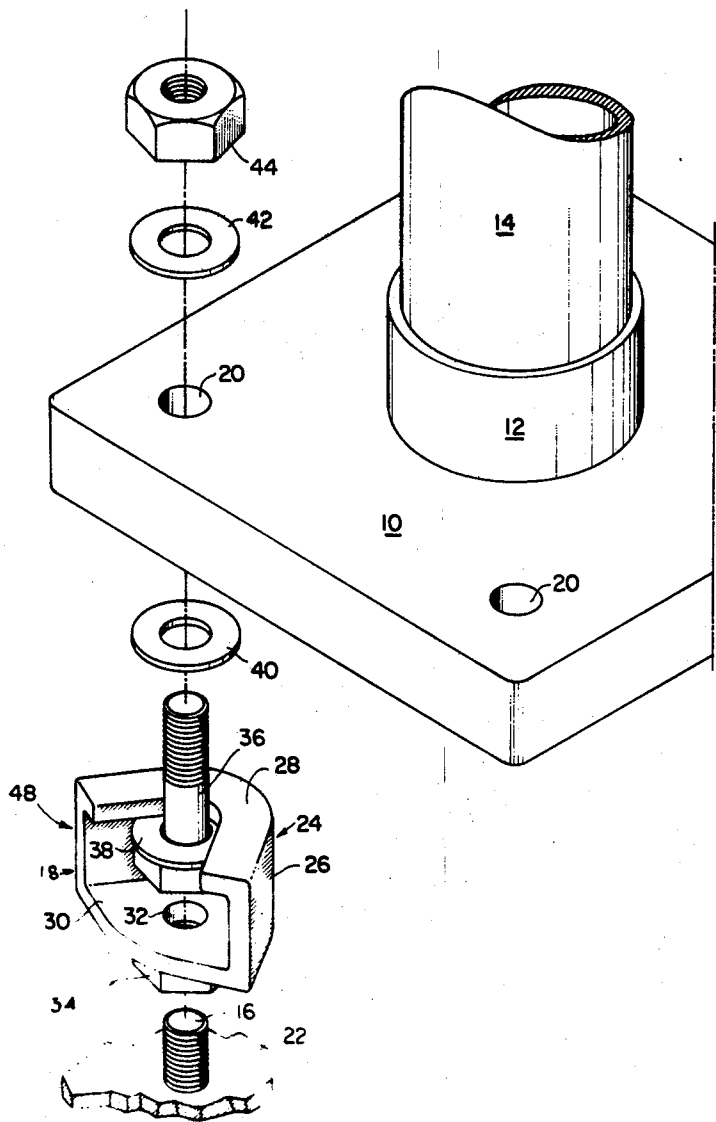
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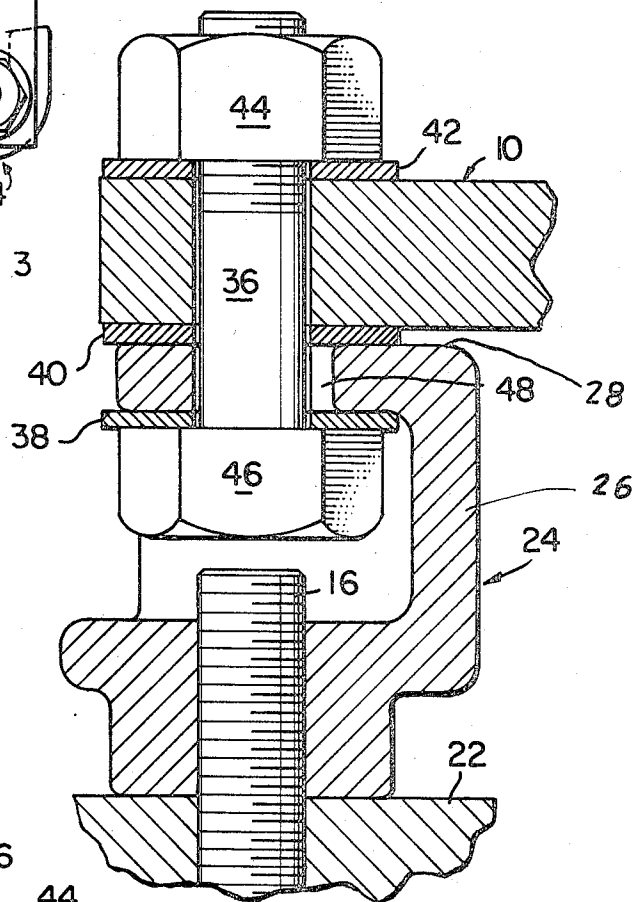
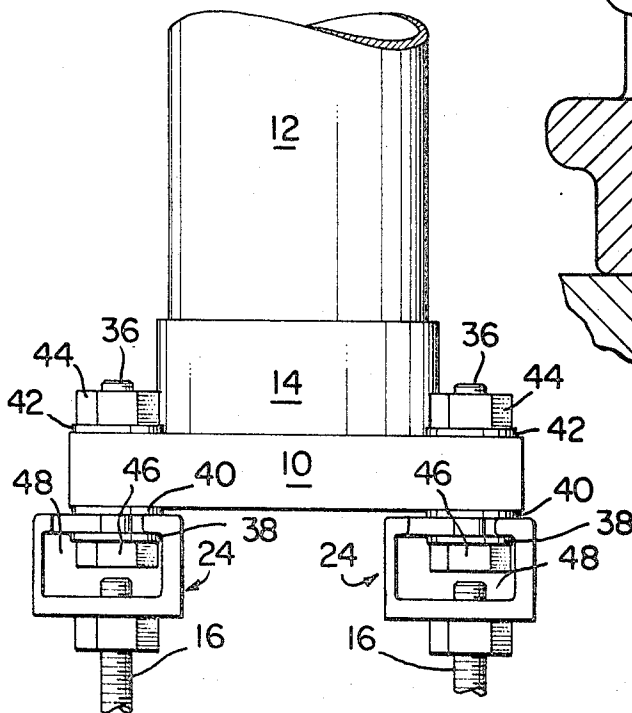
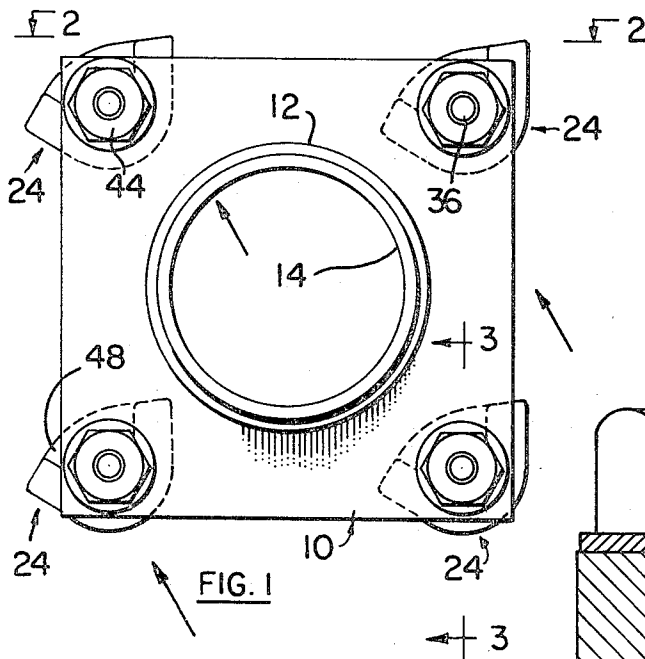
[54] BREAK-AWAY COUPLING FOR POLES
4 Claims, 4 Drawing Figs.
[52] U.S. Cl. 248/158,
85/61, 85/50, 85/51; 94/1.5; 52/298, 52/573,
287/20, 256/13.1
[51] Int. Cl. F16m 13/00
[50] Field of Search 248/158,
44; 52/709, 298, 573; 287/20; 85/51, 50, 61;
40/125I; 94/1.5; 256/13.1; 151/41.76

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ABSTRACT: A pole-supporting member, a fixed foundation, and coupling means connecting said member to said foundation with a controlled force and in such a manner that, when subjected to horizontal impact of a given value, the pole is automatically disengaged from the coupling and is free to move in the direction of the impact.

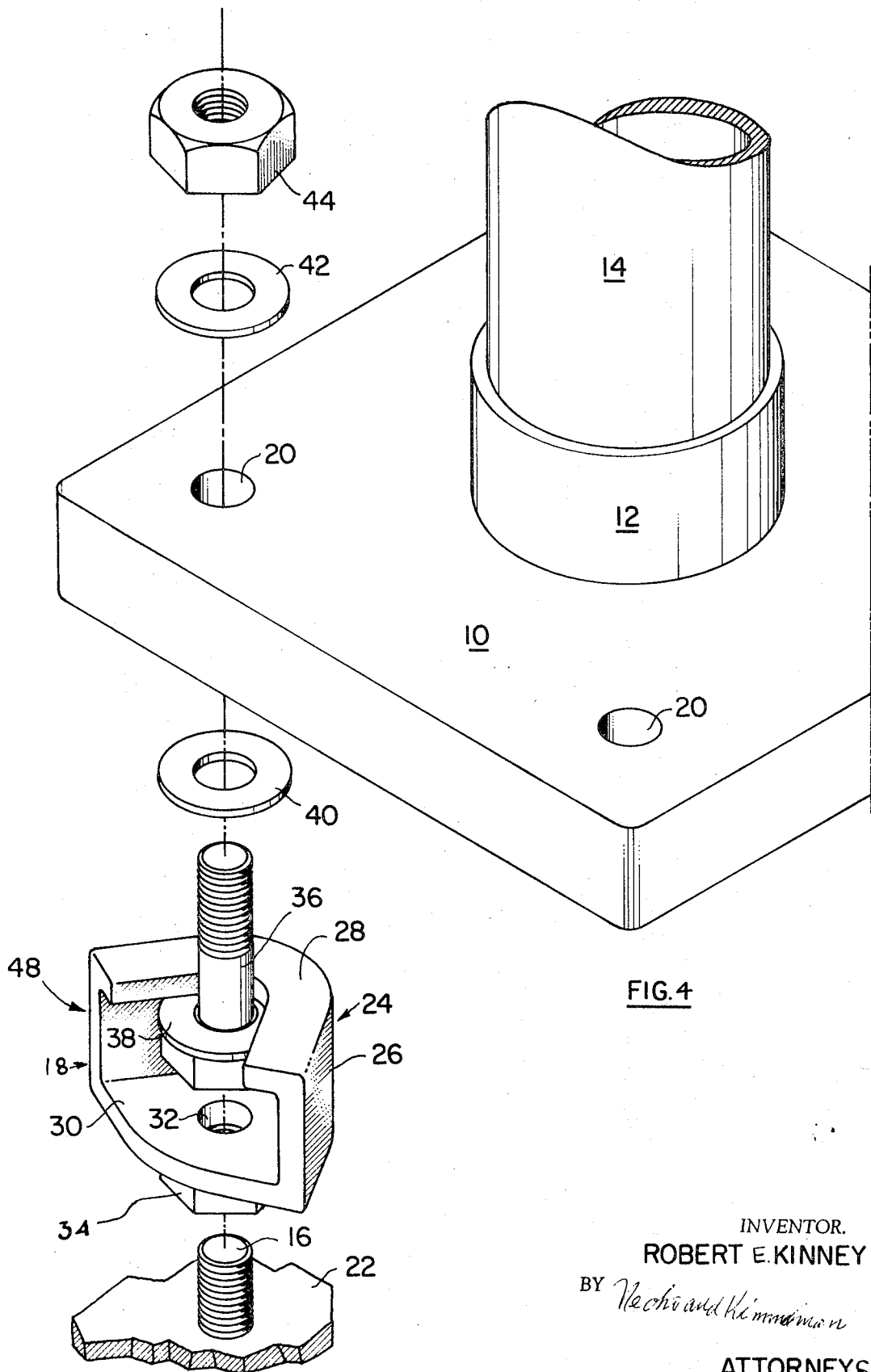




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BREAK-AWAY COUPLING FOR POLES

THE BACKGROUND

Traffic light standards, utility, and other poles, are plentifully used on, and along the shoulders of, roadways, and except for breaking off when the accidental impact is hard enough, they constitute the proverbial "immovable object" in the path of a speeding vehicle, with disastrous results to the vehicle and its occupants, whether the pole breaks off or resists the impact applied.

To reduce the ever-mounting toll of personal injury and property damage, it has heretofore been proposed to provide various forms of breakaway couplings, but all such couplings of which I am aware have been complicated and expensive, and have been incapable of nice adjustment according to the force of impact against which it is desired to protect. It has also been proposed to use spring-loaded poles which bend on impact. Such poles are not wholly desirable because of the expense involved and because the rebound which may occur can cause considerable further damage.

The object of this present invention is to provide an improved breakaway mounting which is inexpensive to make and easy to use; which is adjustable as to the resistance presented, and which is dependable in its operation.

THE INVENTION

The invention consists of a pole-receiving and supporting member, a fixed foundation, a coupling member secured to said foundation, and means for detachably securing said supporting member to said coupling means in such a manner that, when struck by a vehicle having a given momentum, the pole and its supporting member are automatically detached from said coupling so as to dissipate some of the force of impact and correspondingly, to reduce the damage and injury which normally follow if the same impact is resisted by an immovable and unbreakable pole.

IN THE DRAWINGS

FIG. 1 is a top plan view of a pole mounting embodying the invention, the same being shown in actual use.

FIG. 2 is an elevational view looking in the direction of line 2-2 on FIG. 1.

FIG. 3 is an enlarged sectional view looking in the direction of line 3-3 on FIG. 2.

FIG. 4 is an enlarged, exploded, perspective view showing how the breakaway coupling detachably secures the pole-supporting member to the foundation.

The pole-receiving and supporting member consists of: a base plate 10 provided with a collar, or sleeve 12, for receiving the lower end of a pole 14; studs 16 suitably secured to the foundation by couplings 18 secured to the studs, and means for securing the base plate to couplings detachably, and with a controlled friction factor which determines the impact force under which the pole will break away from the coupling.

The base plate 10 and collar 12 can be made of any material which is strong enough to support the pole to be mounted. The pole may have a tight fit in collar 12 or it may be secured thereto. Base plate 10 has a number of openings 20 which are hereinafter further referred to.

Studs 16 are secured to the roadway in any suitable manner, such as by sinking their lower ends in concrete, or they may be provided with flanges 22 which are embedded in the roadbed. The number of studs 16 corresponds to the number of couplings 18 and their locations correspond to the locations of holes 20 in base 10.

Each coupling 18 includes a housing 24 formed of a sidewall 26, a top wall 28, and a bottom wall 30 which is provided with an opening 32 and a threaded nut 34 for engagement with a stud 16. Sidewall 26 and top wall 28 are cut away to provide a V-shaped opening which is generally designated by numeral 48. The means for detachably securing base plate 10 to the coupling includes a bolt 36, washers 38 and 40, and preferably but not necessarily washer 42. The materials for washers 38

and 40 and housing 24 are chosen to give a desired low coefficient of friction between the washers 38 and 40 and the housing 24. For example, coupling 18 can be made of iron or steel or the like, and washers 38 and 40 can be made of graphite-impregnated bronze, or the like.

To mount a pole according to this invention, a number of studs 16, which correspond to the number of openings 20 in base plate 10, are secured to the roadbed, and coupling members 18 are secured to the studs by means of nuts 34. Holes 32 permit vertical adjustment and make precise machining unnecessary. The base 10 is secured to the top wall 28 of a housing 24 by passing bolts 36 through washer 38 and then passing the bolt through opening 48 to the position of FIG. 4. The bolt is then passed through washer 40 and through an opening 20 in base plate, to be engaged by nut 44 with or without the intervention of washer 42. It will be noted that by tightening nut 44, the base plate 10 can be clamped with the force needed to sustain the pole in its vertical position against wind pressure and minor impacts of an order not calculated to cause serious damage or injury. Because base 10 is of a relatively large area and is secured at a number of space points, the pressure exerted by each nut 44 need not be great enough to cause serious binding at the shearing, or break away plane. Since washers 38 and 40 and housing 24 have a relatively low coefficient of friction, it is possible to tighten clamp base plate 10 to coupling 48 while still permitting bolt 36 to move out of disengagement with its coupling under an impact of predetermined value.

The total resistance to impact is, in part, a function of the mass of the pole and its supporting base 10. Therefore, other things being equal, the heavier the pole and its base, the greater its resistance to movement. Since the minimal mass of the pole and its support is fixed, it is necessary to minimize the mass of the devices by which the pole is attached, at minimum. According to my invention, this is accomplished by reducing the weight of the attaching devices to that of the nuts 44 which clamp the base in position. This is made possible by fixing foundation studs 16 to the road bed, by securing couplings 18 to the studs, and by providing holes 20 which more than compensate for the added weight of nuts 44. This feature of my invention also greatly facilitates the operation, which consists of screwing couplings 18 in position; assembling bolts 36; lowering base plate onto bolts 36, and applying nuts 44. By this arrangement, tightening nuts 44 sufficiently to hold the pole will not produce a degree of binding at the shearing plane which would seriously increase the resistance to impact, which will, to a great extent be a function of the coefficient of friction of washers 38 and 40 and coupling 48.

I claim:

1. Means for detachably securing a vertical pole to a fixed support, said means including:

a plurality of spaced vertical studs fixedly secured to the road bed;

a base plate adapted to support a pole;

a plurality of couplings secured to said studs, respectively; each coupling comprising a top wall having a laterally extending opening therein leading from the edge toward the center thereof for the passage of a bolt therethrough, with the head of the bolt bearing against the underside of said top wall;

said base plate having openings for the passage therethrough of the upper portions of said bolts, respectively;

a lower washer carried by and disposed between the head of the bolt and the underside of the top wall of each coupling;

an upper washer carried by said bolt and disposed between said top wall and said base; and nuts for engaging the portions of the bolts which pass through said opening to clamp said base and said washers to said top walls.

2. The structure defined in claim 1 wherein the washers and coupling are made of material having a low coefficient friction

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value permitting the base to move laterally off of the couplings.

3. The apparatus defined in claim 1 wherein said top wall is made of iron and at least one of said washers is made of bronze.

4. Means for detachably securing a vertical pole to a fixed support, said means including:

a plurality of spaced vertical studs fixedly secured to the road bed;

a base plate adapted to support a pole;

at least one coupling secured to said stud;

said coupling comprising a top wall having a laterally, inwardly extending opening therein for the passage of a bolt

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therethrough, with the head of the bolt bearing against the underside of said top wall;

said base plate having at least one opening for the passage therethrough of the upper portions of said bolt;

a lower washer carried by and disposed between the head of the bolt and the underside of said top wall of said coupling;

an upper washer carried by said bolt and disposed between said top wall and said base; and

a nut for engaging the portion of the bolt which passes through said opening to clamp said base and said washers to said top wall.

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