July 21, 1936. E. R. BERK 2,047,992

HIGHWAY GUARD

Filed April 22, 1935 2 Sheets-Sheet 1

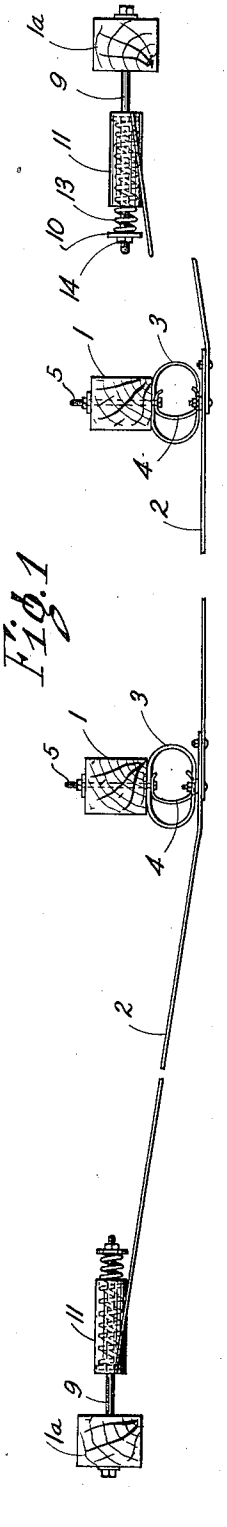


Fig. 1

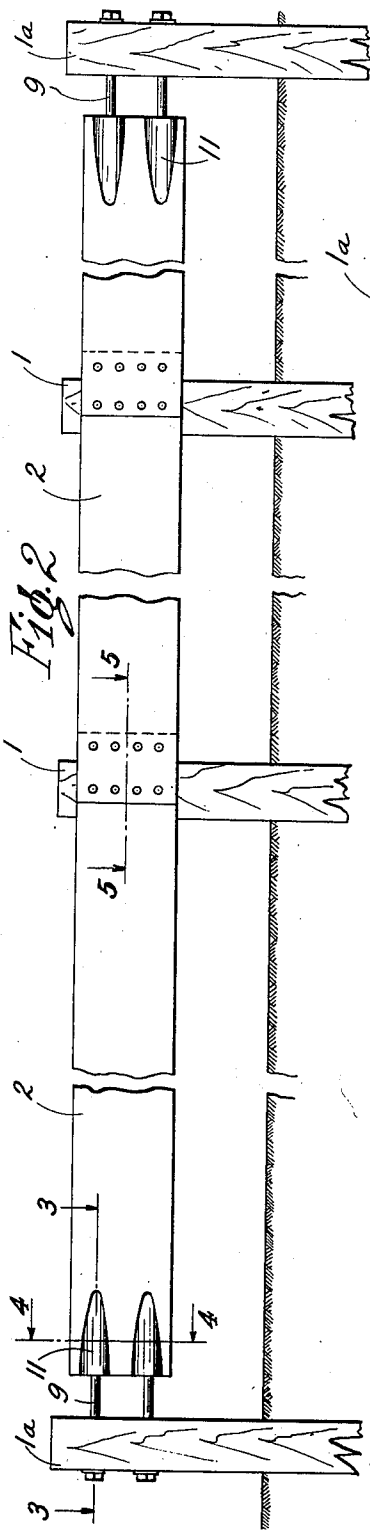


Fig. 2

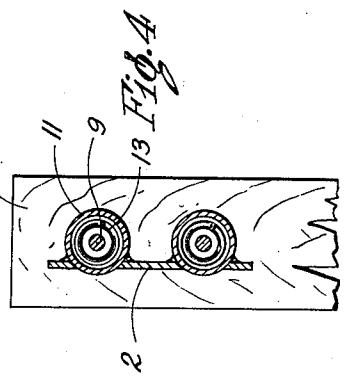


Fig. 4

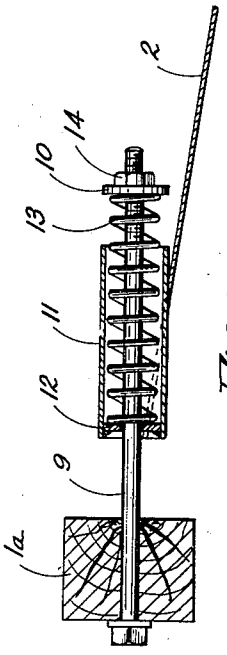


Fig. 3

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HIGHWAY GUARD

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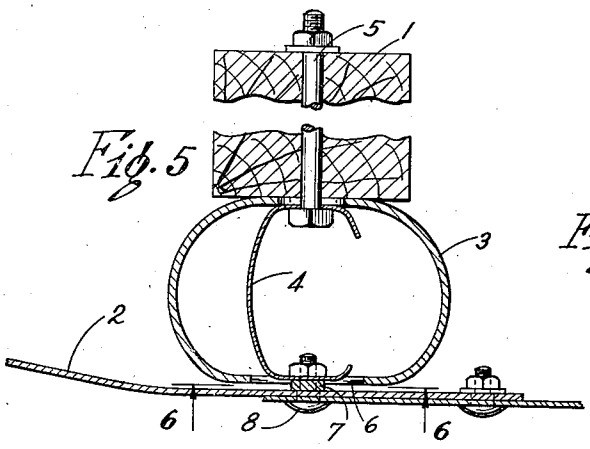


Fig. 5

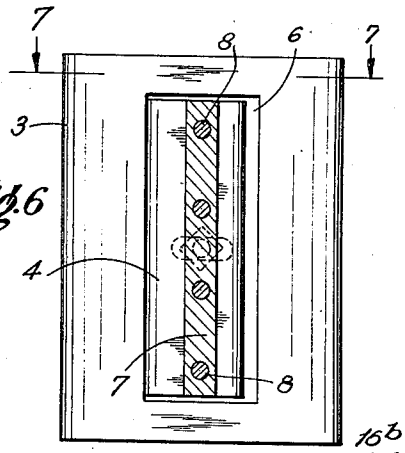


Fig. 6

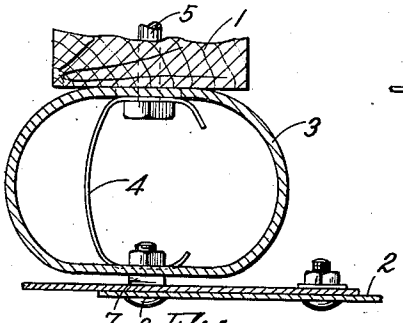


Fig. 7

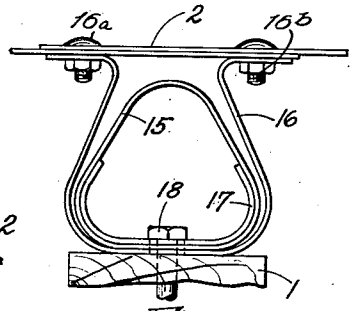


Fig. 8

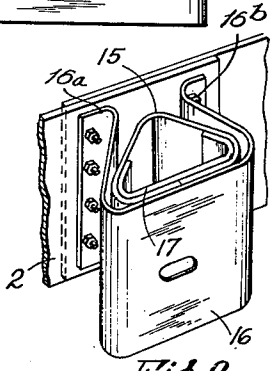


Fig. 9

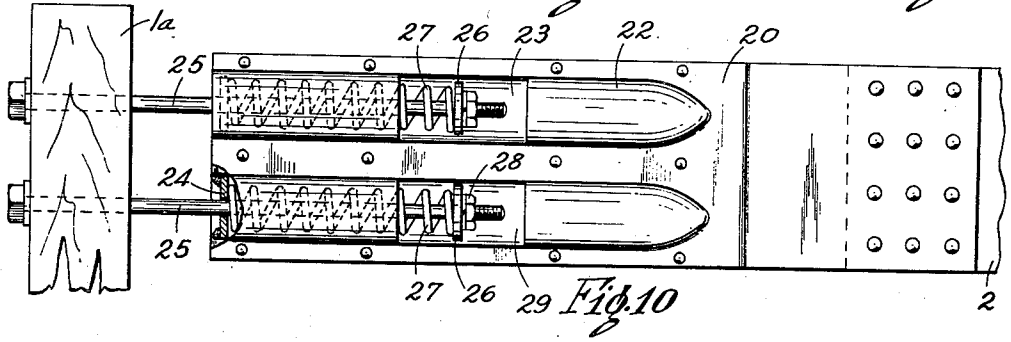


Fig. 10

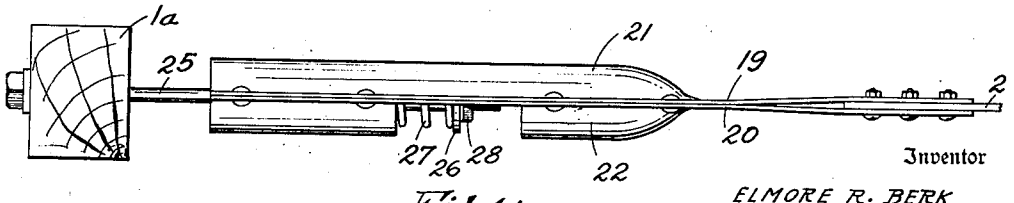


Fig. 11

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Patented July 21, 1936 2,047,992

UNITED STATES PATENT OFFICE

2,047,992

HIGHWAY GUARD

Elmore R. Berk, Canton, Ohio, assignor to Republic Steel Corporation, Youngstown, Ohio, a corporation of New Jersey

Application April 22, 1935, Serial No. 17,583

9 Claims. (Cl. 256—13.1)

This invention relates to highway guards and particularly to new and improved means for supporting the guard rail and resisting forces to which the rail is subjected in use.

My invention will be understood by reference to the drawings of embodiments of my invention which accompany and form a part of this specification.

In the drawings:

Figure 1 is a fragmentary plan view of a highway guard embodying my invention.

Figure 2 is a fragmentary elevational view of the highway guard shown in Figure 1.

Figure 3 is an enlarged detailed plan view partly in section taken on the line 3—3 of Figure 2.

Figure 4 is a sectional elevational view taken on the line 4—4 of Figure 2.

Figure 5 is an enlarged detailed sectional view taken on the line 5—5 of Figure 2.

Figure 6 is a sectional view taken on the line 6—6 of Figure 5.

Figure 7 is a sectional view taken on the line 7—7 of Figure 6.

Figures 8 and 9 are plan and perspective views respectively, of a modified form of post spring connection.

Figures 10 and 11 are plan and elevational views respectively of a modified form of end construction.

With reference to the drawings Figures 1 and 2 thereof illustrate a preferred embodiment of my invention which includes a plurality of supporting posts 1 and end posts 1a positioned along a highway, and a metal rail member 2 extending past the posts 1 on the highway side thereof. Each of the posts 1 is provided with a tubular spring member 3 and a curved rail supporting spring member 4, both of which are secured to the posts by bolt 5. The spring 4 extends from its post end through a slot 6 in the tubular spring 3. Its free end is secured to the rail 2 with an intervening spacer block 7 as by means of a plurality of bolts 8. The spring 4 thus normally supports the rail out of contact with the tubular spring 3. (See Figures 5, 6, and 7.) The rail 2 may consist of a plurality of sections secured together in end to end relation.

Figures 1, 3 and 4 illustrate means for applying longitudinal tension to the rail member. This means consists of an anchor which may take the form of a bolt 9 secured to the end post 1a having a stop 10 thereon, a spring housing 11 having a spring abutment 12, and a spring 13 mounted within the spring housing 11 between the stop 10 and the spring abutment 12. An adjusting nut 14 is threaded on the end of the anchor 10 for varying the compression of the spring 13.

Figures 8 and 9 illustrate a modified form of post spring connection including a tubular spring 15, and a curved spring member 16 secured at its midportion to the posts 1, surrounding the tubular spring 15 and spaced therefrom, and normally supporting the rail 2 out of contact with the tubular spring. The ends of the spring 16 are secured to the rail 2 as at 16a and 16b. A supplemental spring 17 may be positioned within the spring 15, if desired. The springs 15, 16 and 17 are secured to the post by means of bolt 18.

When light loads are applied to the rail at an angle either between the posts or at one of the posts, the rail supporting springs and the end tensioning springs cooperate to resist and absorb such loads. When the loads are in excess of the load resisting ability of the rail supporting springs, the rail moves laterally and contacts with the tubular springs. Thereupon, the tubular springs as well as all the springs cooperate to resist and absorb such heavy loads applied longitudinally as well as transversely of the rail. For example in the post spring construction illustrated in Figures 5, 6, and 7 the slot 6 permits the rail to move longitudinally to a limited extent under light loads applied to the rail. When under excessive loads the rail tends to move beyond said limited extent, the spacer blocks 7 engage the vertical side of the slots 6, and thereupon the tubular springs 3 also resist further longitudinal movement of the rail. Similarly, light loads applied transversely of the rail move the rail toward the posts. This movement is resisted by the springs 4 until the rail contacts with springs 3 when that spring also resists further movement of the rail. In the modified post spring construction illustrated in Figures 8 and 9 when light loads are applied longitudinally as well as laterally of the rail the rail supporting springs 16 permit the rail to move longitudinally as well as laterally to a limited extent and such light loads are resisted and absorbed by the springs 16 and the end springs 13. When loads are applied to the rail which are greater than the load resisting ability of the springs 16 these springs yield and the rail comes into contact with the tubular springs 15. The tubular springs 15 resist and absorb the heavy loads. In this way the end and rail supporting springs cooperate to resist and absorb the light loads while all the springs cooperate to resist and absorb heavy loads.

Where the rail is subject to changes in temperature resulting in variations in the length of the rail due to expansion or contraction of the rail, the rail supporting springs and the end springs cooperate to compensate for variations in the length of the rail and maintain the rail in tension at all times. The rail supporting springs permit the rail to move longitudinally a limited amount and when the rail is under expansion forces the end springs compensate for the increased length of the rail and when the rail is under contraction forces the end springs resist such forces.

Figures 10 and 11 illustrate a modified form of end construction for applying longitudinal tension to the rail. This construction comprises front and rear plates **19** and **20**, respectively, which are secured together and to the extremities of the rail. Longitudinally extending, substantially semi-tubular portions **21** and **22** are formed in the plates **19** and **20** respectively, so that when the plates are assembled these portions form spring housings **23** which are provided with spring abutments **24**. Anchor means which may take the form of bolts **25** extend into the housings **23** and are provided with stops **26**. A spring **27** is mounted within each of the housings **23** between the spring abutment **24** and the stop **26**. A nut **28** is threaded on the end of each of the bolts **25** for varying the compression of the springs **27** on the rail **2**. The portion **22** of the rear plate **20** is preferably cut away as at **29** to provide access to the adjusting nuts **28**.

Having thus described my invention so that those skilled in the art may be able to practice the same what I desire to secure by Letters Patent is defined in what is claimed.

What I claim is:

1. A highway guard including a plurality of posts, a metal rail extending past a plurality of said posts, tubular springs at the posts, and other springs at the posts extending beyond the tubular springs and positioning the rail normally out of contact with the tubular springs.

2. A highway guard including a plurality of posts, a rail extending past a plurality of said posts, tubular springs at the posts, other springs at the posts supporting the rail normally out of contact with the tubular springs, the said other springs being resistant to light loads and yieldable under heavy loads applied lengthwise and transversely of the rail, the tubular springs being resistant to heavy loads applied lengthwise and transversely of the rail and transmitted to them by the rail.

3. A highway guard including a plurality of posts, a rail extending past a plurality of said posts, tubular springs at the posts, other springs at the posts supporting the rail normally out of contact with the tubular springs, the said other springs being resistant to light loads and yieldable under heavy loads applied lengthwise and transversely of the rail, the several springs at any post cooperating to resist heavy loads applied lengthwise as well as transversely of the rail.

4. A highway guard including a plurality of posts, a rail extending past a plurality of said posts, tubular springs at the posts, other springs at the posts supporting the rail normally out of contact with the tubular springs, a rail tensioning spring anchored at the ends of said rail and resistant to light loads applied lengthwise of the rail, the several springs cooperating to resist heavy loads applied lengthwise as well as transversely of the rail.

5. A highway guard including a plurality of posts, a rail member extending past a plurality of said posts, anchor means at the ends of the rail resistant to light loads applied lengthwise of the rail, tubular spring members mounted on the highway side of said posts, and other spring members normally supporting the rail out of contact with the tubular springs, the said other springs being resistant to light loads and yieldable under heavy loads.

6. A highway guard including a plurality of posts, a rail member extending past a plurality of said posts, rail supporting spring members mounted on said posts, and tubular spring members mounted on the posts between the rail and the posts and being normally out of contact with the rail and provided with openings through which said first mentioned spring members extend.

7. A highway guard including a plurality of posts, a rail member extending past a plurality of said posts, rail supporting spring members mounted on said posts, and tubular spring members mounted on the posts between the rail and the posts and within the rail supporting springs and being normally out of contact with the rail.

8. A highway guard including a plurality of posts, a rail member extending past a plurality of said posts, rail supporting spring members mounted on said posts, tubular spring members mounted on the posts between the rail and the posts and within the rail supporting springs and being normally out of contact with the rail, and supplemental springs positioned within said tubular springs.

9. A highway guard including a plurality of posts, a rail extending past a plurality of said posts, tubular springs at the posts, other springs at the posts supporting the rail normally out of contact with the tubular springs, the said other springs being resistant to light loads and yieldable under heavy loads applied lengthwise and transversely of the rail, the tubular springs being resistant to heavy loads applied lengthwise and transversely of the rail, and a rail tensioning spring positioned at the end of said rail and attached thereto.

ELMORE R. BERK.