March 8, 1932. C. M. DAVISON 1,848,516

RAILROAD CROSSING GUARD

Filed April 2, 1929 2 Sheets-Sheet 1

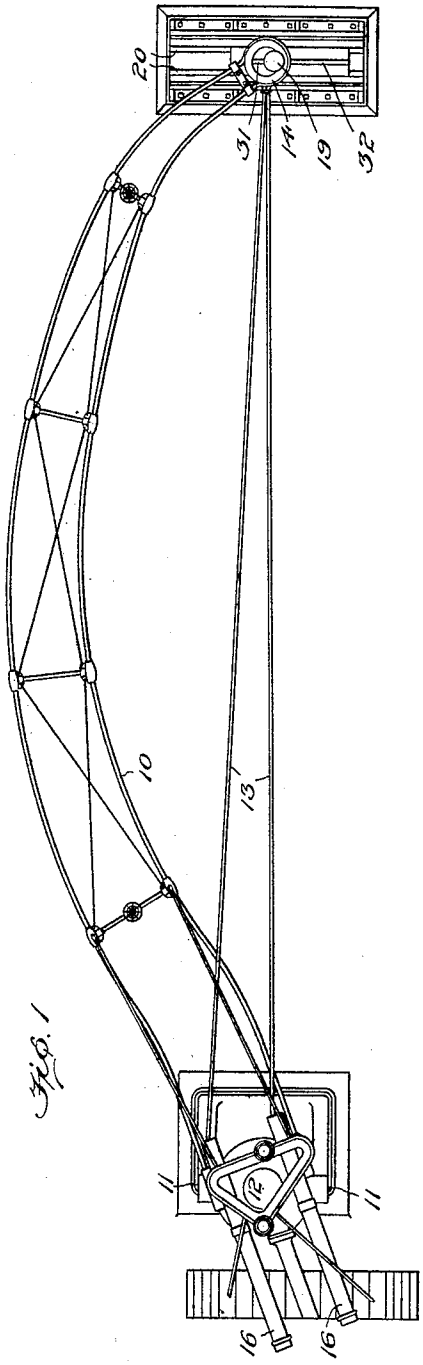


Fig. 1

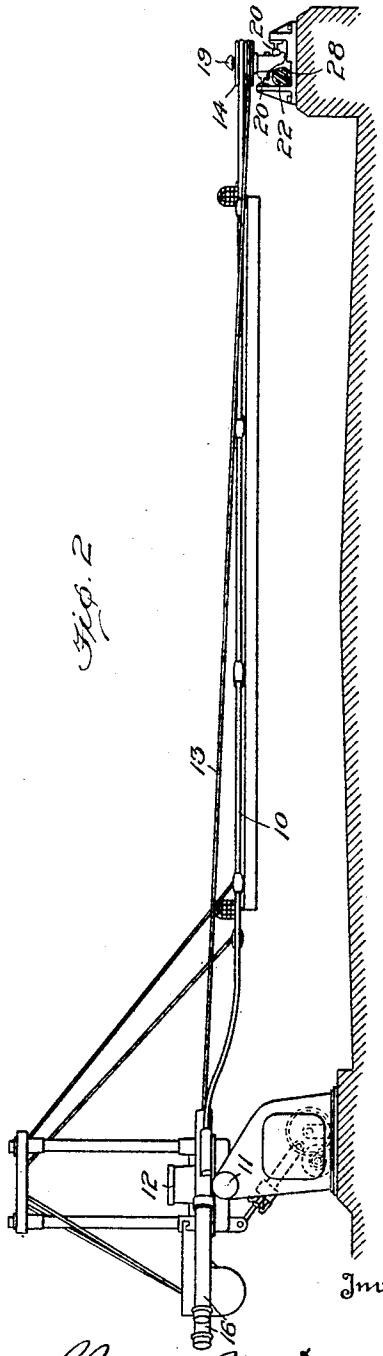


Fig. 2

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Filed April 2, 1929 2 Sheets-Sheet 2

Fig. 3

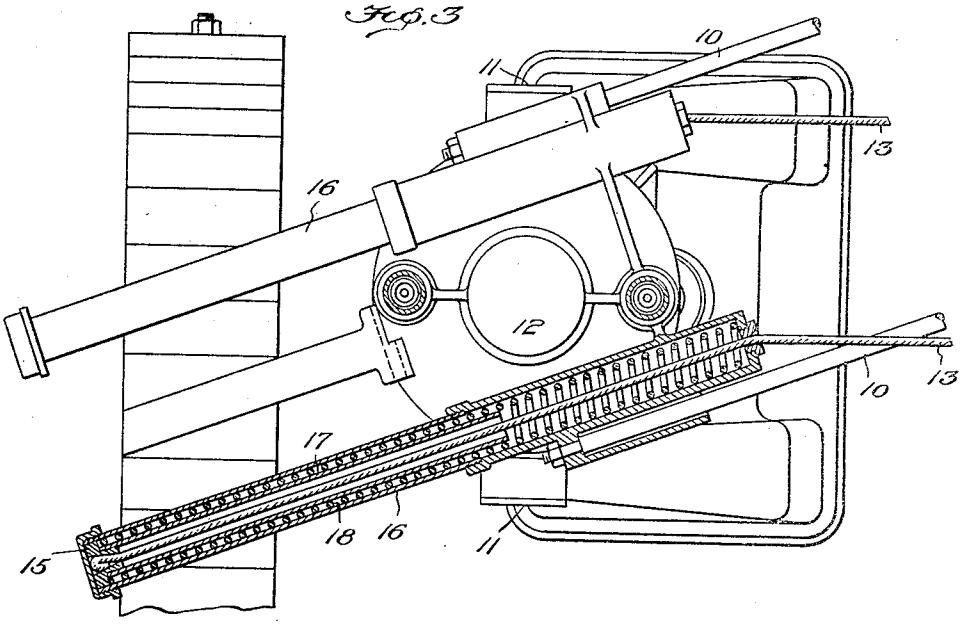


Fig. 5

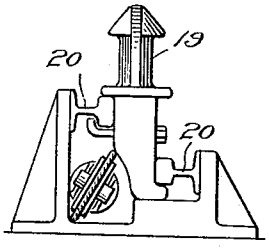


Fig. 4

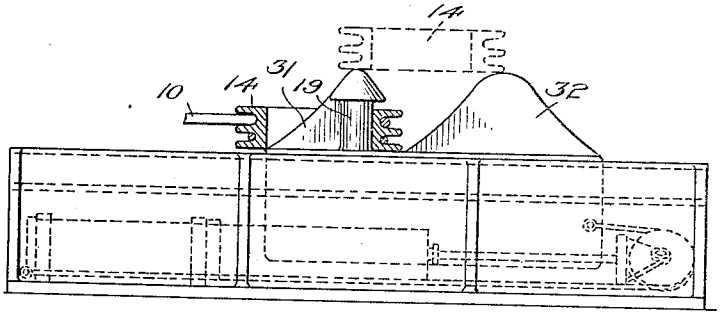
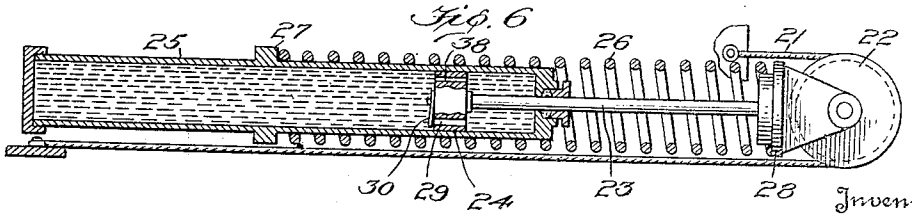


Fig. 6



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UNITED STATES PATENT OFFICE

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RAILROAD CROSSING GUARD

Application filed April 2, 1929. Serial No. 351,903.

This invention relates to improvements in railroad crossing guards for use at railroad grade crossings.

The object of the invention is to provide novel and efficient means for effecting deceleration of a vehicle and bringing the same to a full stop within a predetermined distance less than the distance between the guard and the railroad tracks.

More particularly, the invention contemplates a guard comprising a pivoted support and a barrier, the latter being flexible and capable of withstanding stresses that would be placed upon it by an approaching vehicle and transmitting such stresses to other means for restraining movement of the vehicle and ultimately bringing it to a full stop.

Preferably, the supporting member for the flexible barrier is of rigid construction and pivoted at one side of the road to swing in a horizontal plane, means also being provided for yieldingly restraining swinging movement of the support by an approaching vehicle. The barrier is preferably in the form of a cable adapted to span the road at that side of the support from which vehicles approach the tracks to be guarded. The support and cable are spaced apart from one another a distance sufficient to permit the cable to be deflected but not to an extent that the vehicle will impact against or damage the support. This spacing of the barrier and support may be accomplished by forming the support with an offset intermediate portion and attaching the cable forming the barrier to said support at points so it will span said offset portion. The cable barrier is carried on the support, so that the cable can be raised when the guard is elevated from across the roadway, as during the absence of trains at or in the vicinity of the crossing.

Another object consists in arranging the flexible barrier on its support in such fashion as to increase the resisting power which it is capable of withstanding. As stated, this flexible barrier is preferably a wire cable and by permitting it to be flexed without stretching, upon initial impact of an approaching vehicle, the strains or loads which it can carry without breaking are greatly increased. This result is preferably obtained by attaching the cable at one end to the support by some yielding means and permitting such yieldingly attached end to travel a distance which will permit the cable to flex a predetermined distance before said yielding end is brought to a stop, after which further flexing of the cable is prevented and the strains transmitted to a snubbing device with which the cable support engages at the side of the road. The yielding means for this purpose function solely for that purpose and, in practical operation, have no effect on the retardation of a vehicle impacting against the cable. In fact, such yielding means need be of only sufficient strength as to take up slack in the cable under normal conditions and prevent said cable sagging to a point where it may engage the wheels of a vehicle below their vertical center.

With these and other objects in view, the invention consists in certain novel details of construction and combinations and arrangements of parts, all as will be hereinafter more fully described and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawings,

Figure 1 is a top plan view of a guard embodying the present improvements;

Fig. 2 is an elevational view of the guard in the position it assumes when lowered across a road;

Fig. 3 is a detailed view, partly in section, illustrating the attachment of one of the cable ends to its support, so as to permit flexing of said cable;

Fig. 4 is a side elevation of the snubbing device for the guard;

Fig. 5 is a transverse view of said snubber; and

Fig. 6 is a detailed view of the oil cylinder of the snubbing device.

In the preferred embodiment of the invention, the guard consists of a support 10 for the flexible barrier, said support being of rather rigid construction. Said support is pivoted to swing in a vertical plane about a center 11 in a horizontal plane about a center indicated at 12. The mechanism for raising and lowering the guard forms no part of

the present invention, so that the same need not be described in detail herein. The same is true of the mounting of the guard, it only being necessary that it be capable of swinging in a horizontal plane as well as in a vertical plane.

Carried by said support 10 is the barrier proper of the guard, said barrier being in the form of a cable 13, whose ends are attached to the pivoted end of support 10 and whose intermediate portion is placed around the annular member 14 at the free end of said support. This barrier is adapted to flex in order to increase the strains which it may withstand when impacted against by an approaching vehicle. For this reason, support 10 is bowed or offset intermediate its free end and its pivoted end, said cable spanning this offset portion and the space between the two parts being at least as great as the extent to which said cable may flex. This flexing of the cable when impacted against by an approaching vehicle, is obtained by having one or both of its ends yieldingly or movably attached to support 10. In the present instance, each end of said cable 13 is firmly secured to a block 15 slidably mounted in a cylinder 16 on the pivoted end of said support 10. Attached to said block 15 is a tubular member 17, and interposed between said block and one end of cylinder 16 is a coil spring 18 which normally causes said block to occupy a position at one end of said cylinder with the free end of sleeve 17 spaced from the other end of said cylinder a distance that will permit the end of the cable to move in cylinder 16 and allow the cable to flex to the desired extent. In actual practice, a 5/8" plow steel cable has been used for the barrier, and its ends have been attached, as described, to permit a movement of 18 inches thereof, this giving a 5-foot flexing of the cable when engaged by an approaching vehicle. With this arrangement, the cable is capable of withstanding approximately 27,000 pounds, or 13½ tons, whereas, if it could not flex, it could not stand as high as 1500 pounds. After the tubular member 17 carried by block 15 at the ends of the cable has gone solid against the end of cylinder 16, the cable can not flex any further, and the strains are then transmitted to the snubbing device hereinafter described.

This snubbing device may assume various constructions, but in the present instance it is illustrated as consisting of a snubbing post 19, movable along guides 20, said snubbing post having attached thereto a cable 21 which passes over a sheave 22 and has its opposite end fixedly attached in a desirable way to a portion of the base on which the snubbing mechanism is mounted. Sheave 22 is journaled on the rod or stem 23 of a piston or plunger 24 slidable in an oil cylinder 25 against the pressure of oil in said cylinder as well as the pressure of a coil spring 26 surrounding the oil cylinder and interposed between a shoulder 27 on said cylinder and a collar 28 on rod 23. When the snubbing post 19 is moved by a swinging movement of support 10 and barrier 13, the chain or cable 21 tends to move sheave 22 inwardly, thereby forcing the plunger head 24 inwardly. The oil in the cylinder resists such movement of the piston or plunger head 24, but, due to clearance around said plunger head and a comparatively small duct 38 extending through said head, the oil between the head 24 and one end of cylinder 25 escapes, so as to permit a movement of sheave 22, whereupon snubbing post 19 and the support 10 are likewise permitted to move. After whatever force that has been exerted on the guard to swing said parts is relieved or removed, spring 26 tends to force sheave 22 away from cylinder 25, and under these conditions the oil that has previously escaped around the other head 24 is free to flow through a comparatively large duct 29 in said head. This duct 29 is closed at one end by a flap valve 30, said valve being adapted to close duct 29 when sheave 22 is moved toward the cylinder 25.

When installed, the guard is arranged so that a vehicle approaching the railroad crossing will engage the barrier 13 and if it impacts against the same, said cable will first be flexed and after its limit of flexing has been reached, the entire guard, together with snubbing post 19, will move toward the railroad crossing, as just described. However, if a vehicle should possibly gain entrance of the gates at opposite sides of the crossing while the gates were in elevated position and not clear said crossing before the gates have been lowered (due to an approaching train), support 10 must, of course, be capable of moving in the direction opposite to that previously described, so that the vehicle can clear the tracks. This is accomplished by having the snubbing post 19 formed at one side with a vertically disposed web 31, whose upper end surface is inclined so as to guide the annular member 14 upwardly until it will clear the upper extremity of said snubbing post, as indicated in dotted lines in Fig. 4. After member 14 has cleared snubbing post 19, the vehicle can then push the guard aside and clear the tracks. Upon return of the guard, after the vehicle has passed through, the annular member 14 engages a web 32 adjacent the snubbing post 19 and elevates the same so that it will pass over said snubbing post until the opening therein registers with the snubbing post, whereupon it will drop into its normal position around said snubbing post.

A flexible barrier of this type, carried by a supporting member, the barrier being adapted to flex a predetermined extent, whereupon it, together with its support, is

adapted to move in a horizontal plane against the forces exerted by the elements of the snubbing device, provides a guard against which a vehicle traveling at a fairly high rate of speed can impact without danger of damaging the vehicle to any appreciable extent. It will be understood that the initial flexing of the cable itself has no effect on deceleration of the moving vehicle, the cable merely serving the purpose of transmitting the forces exerted thereon to the snubbing device. The flexing of the cable is only important in that it can, under such conditions, withstand greater strains. For the above reasons, the tension of springs 18 in cylinders 16 need only be such as to be capable of returning the cable (after flexing) and maintaining it in a position or vertical plane a short distance above the vertical center of various vehicle wheels. In view of the comparative lightness of these springs 18, therefore, the flexing of the cable in actual operation is substantially instantaneous with the impact of the vehicle. From the foregoing, it will be clearly seen that the support 10 is not engaged by the vehicle and is used primarily for the purpose of raising and lowering the cable.

In the drawings, the guides 20 of the snubbing mechanism are shown as extending parallel to the center line of the roadway. Under these conditions, the support 10 must flex somewhat as it swings horizontally, but the extent of this flexing may be reduced by arranging guides 20 at an angle to the center line of the road. For instance, the guide 20 which is between post 19 and the pivotal center of support 10 is essentially a thrust member in that it prevents movement of post 19 laterally toward the road. Therefore, altering the position of the guides 20 so that they are inclined toward the road, flexing of the support will naturally be reduced. Furthermore, the post 19 naturally has a tendency to bind on the guide 20 that resists the lateral movement referred to, so that this binding action may, likewise, be reduced by inclining the guides toward the roadway.

What I claim is:

1. A railroad crossing guard comprising a support pivoted for horizontal movement, a barrier supported on and positioned to one side of said pivoted support, and means for resisting swinging movement of said support, said flexible barrier being yieldingly supported on said support to permit flexing thereof, the extent of flexing being less than the distance between said barrier and support.

2. A railroad crossing guard comprising a pivoted support having an offset portion and adapted to be positioned across a road, means for yieldingly maintaining said support across a road, and a flexible barrier carried by said support and spanning the offset portion thereof.

3. A railroad crossing guard comprising a substantially rigid support pivotally mounted adjacent one end to swing in a horizontal plane, means connected to the opposite end of said support for holding the same against swinging movement until a predetermined pressure is imposed thereon, and a flexible barrier positioned to one side of the pivoted barrier, and means for limiting flexing of said barrier before a vehicle engages said support.

4. A railroad crossing guard comprising a rigid support pivoted to swing in a horizontal plane, said support having a horizontally offset portion adapted to extend transversely across a road, a flexible cable attached to said support and spanning said offset portion thereof, and means for limiting flexing of said cable to a distance less than that between the normal position of the cable and said support.

5. A railroad crossing guard comprising a pivotally mounted support adapted to be positioned across a road, and a flexible barrier carried by said support and spaced to one side thereof, one end of said barrier being yieldingly attached to said support to permit flexing thereof and said barrier being movable with the support when the latter moves on its pivotal center.

6. A railroad crossing guard comprising a support adapted to be positioned across a road, said support being pivoted to swing in a horizontal plane, a barrier carried by said support and spaced to one side thereof, one end of said barrier being yieldingly attached to said support, and means for yieldingly maintaining said barrier and support in position across said road.

7. A railroad crossing guard comprising a support adapted to be positioned across a road and pivoted at one end to swing in a horizontal plane, a flexible barrier having its ends attached to said support and spaced from said support throughout the major portion of the length thereof, one end of said barrier being yieldingly attached to said support, and means for yieldingly maintaining said support and barrier in position across a road.

8. A railroad crossing guard comprising a support adapted to be positioned across a road and pivoted at one end to swing in a horizontal plane and upwardly from said plane, a snubbing device adapted to be engaged by the other end of said support, and a flexible barrier carried by but spaced from the major portion of said support and said barrier being movable with the support when the latter moves on its pivotal center.

9. A railroad crossing guard comprising a support pivoted at one end to swing in a horizontal plane and upwardly from said plane and adapted to extend across a roadway, said support having an offset inter-

mediate portion, and a cable spanning said offset portion fixedly attached at one end to said support and yieldingly attached at its other end to said support and said barrier being movable with the support when the latter moves on its pivotal center.

CLARENCE M. DAVISON.