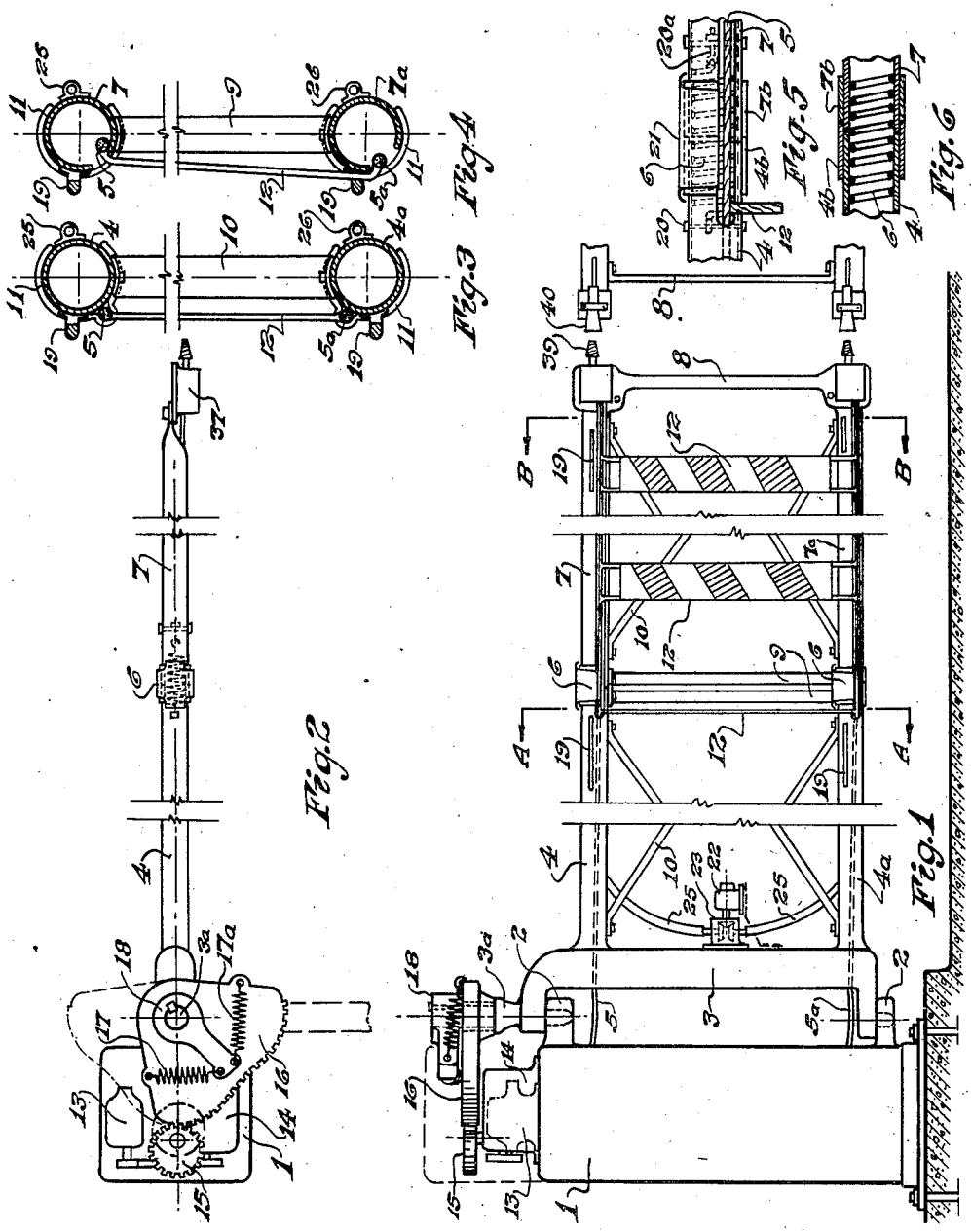
Feb. 23, 1943. E. D. SAWYER 2,311,967

HORIZONTAL SWINGING GATE-SUPPORTED YIELDABLE BARRIER

Filed Nov. 21, 1938 2 Sheets-Sheet 1



Witnesses
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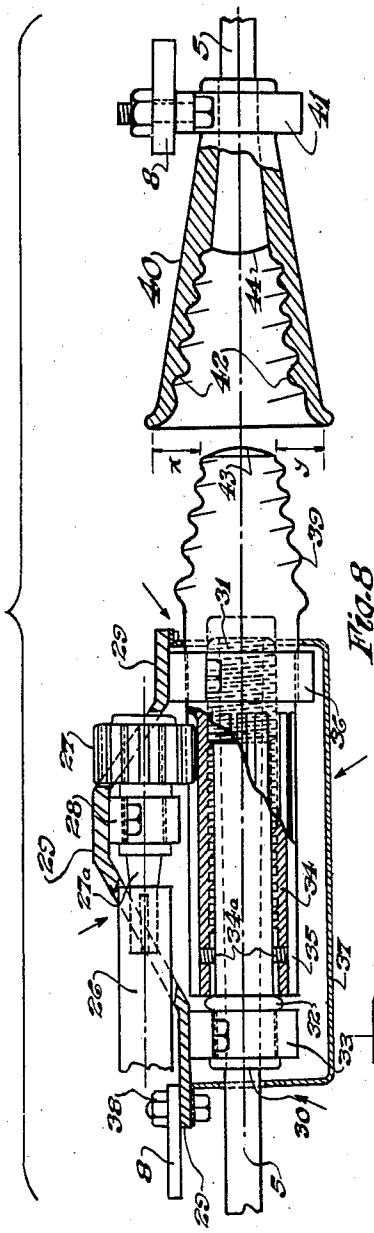


Fig. 8

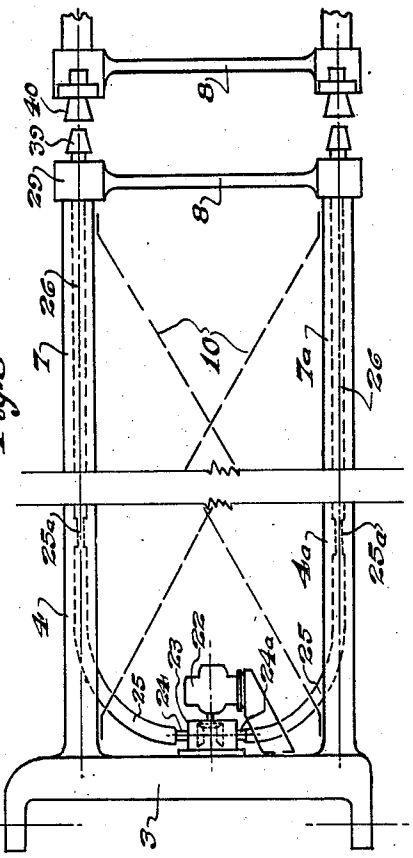


Fig. 7

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HORIZONTAL SWINGING GATE-SUPPORTED YIELDABLE BARRIER

Emerson D. Sawyer, Chicago, Ill.

Application November 21, 1938, Serial No. 241,523

7 Claims. (Cl. 39—1)

My invention relates to certain novel improvements in post type yieldable barriers, and has for its principal object the provision of an improved construction of this character, which is applicable for use on those bridges or highways where the general advantages and protection afforded by a regular type yieldable barrier with high columns are desired, but the architectural requirements restrict the use of columns or pylons.

The present invention relates more especially to those improved details of construction which make it possible to efficiently obtain the general object stated above.

Another object of this invention is to provide a means of functioning a swinging type barrier entirely by remote control in a manner more efficient than has been accomplished heretofore.

Various methods of swinging horizontal movable gates or barriers across the roadway for the purpose of obstructing traffic have been used, such as ordinary motor transmission machinery, hydraulic devices, thrust arms and the like, and various methods have also been used for locking the outer ends of the gates or barrier arms by hook and link devices. And further, various other methods have been used to minimize the damage incident to impact at the time these swinging gates or barriers are hit. To provide novel and more efficient means for these three functions are further objects of this invention.

Yieldable barriers have been installed on quite a number of bridges within the past few years, and have demonstrated their efficiency as roadway protection devices, and it is the object of this invention to make these efficient yieldable barriers available for use on those more ornate structures where the architectural fraternity have heretofore taken exception to the structural fabrication necessary with ordinary up and down motion yieldable barrier devices.

Other objects will appear hereinafter.

The invention consists in the combination and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a general elevational view of the typical post type yieldable barrier shown swung across the roadway.

Fig. 2 is a top view showing the swinging apparatus which moves the supporting arms of the barrier from alongside of the roadway to across the roadway.

Fig. 3 is a sectional view taken on the line A—A of Fig. 1.

Fig. 4 is a sectional view taken on the line B—B of Fig. 1.

Fig. 5 is a detailed view of the flexible joint in the gate rail.

Fig. 6 is a detail showing the preferred cross section of the spring as shown in Fig. 5.

Fig. 7 is a diagrammatical outline elevational view showing the various parts which function the barrier locking device.

Fig. 8 is a detail of one of the barrier locking devices.

Yieldable barrier devices when in an operative position across the roadway where they are capable of stopping a moving vehicle must necessarily offer an impact surface capable of contacting the front of a small passenger car just below the bumper line and extend high enough to engage a substantial part of the forward portion of a large truck, and likewise the strength or retarding ability of yieldable barrier devices should be sufficient to overcome the impact of the general type of vehicle using the roadway. By this statement I desire to bring out the fact that the various parts as shown in the drawings, and described in this specification, must be devised or designed so as to be of the proper proportions and of the proper strength to fulfill the conditions required for a commercial application of these improvements.

Referring particularly to Fig. 1, the numeral 1 indicates the post or posts placed at the side of the roadway and numeral 2 indicates a pair of hinged supports or pivots on the roadway side of the posts. Numeral 3 indicates a frame forming the heel end of the swinging gate which is mounted to swing on the two pivot points 2. Attached to the frame 3 are the top and bottom rails 4 and 4a of the gate arm which supports the cables or flexible payout members 5 and 5a. These flexible payout members 5 and 5a emerge from the posts 1 inside of which they are attached to suitable braking apparatus such as described in my Patent No. 1,828,296, dated October 20, 1931. The payout members 5 and 5a, being flexible, permit the gate arm to swing through its 90 degree angle without interference and maintaining the payout members 5 and 5a intact.

Coil springs 6 are partially inserted and secured in the open ends of rails 4 and 4a, and on the outer ends of coil springs 6 the extension gate rails 7 and 7a are secured, hence with the vertical bracing members 8 and 9, together with the light tie members 10, the gate arm becomes a semi-rigid swingable frame, which if struck in approximately its mid portion, would flex sufficiently due to the spring connections 6 allowing the gate to be swung in the direction of the impact without material damage other than a distortion of the springs 6. Although I have only shown one set of springs in the drawings, such a construction can be efficiently made so

that several flexible joints of the gate arm are available. The cables 5 and 5a are at all times supported vertically by the gate arm frame, as the cables 5 and 5a are either strung through the rails 4 and 4a or clipped to them by means of small spring clips 11. These cables 5 and 5a extend to the end of the gate arm and terminate in a locking device which will be hereinafter described. Flexible strands 12 serve to join the horizontal strand cables 5 and 5a so as to form a visible net and this net is preferably placed on the impact side of the semi-rigid gate frame.

From this description it is readily seen that when flexible members 5 and 5a are joined securely to like members extending out from the opposite posts, this net work so formed will serve as an effective retardation means for overcoming the impact of a vehicle, especially so when the braking or snubbing devices housed within the posts 1 are brought into play so as to forcefully retard the pulling out of cables 5 and 5a from within the posts.

Now referring more particularly to Fig. 2, mounted on the post 1 is the motor 13, geared to the speed reducer 14, which turns an eccentric pinion 15. This eccentric pinion 15 in turn engages a cam shaped geared rack 16. This rack 16 is mounted so as to swing horizontally on a pivot shaft 3a, and at the same time engage the eccentric pinion 15. The pivot shaft 3a is an integral part of the frame 3 so that any angular motion of the pivot shaft 3a induces a like angular movement of the whole gate arm. But it will be noticed that the geared rack 16 is not secured to the pivot shaft 3a, but is mounted so as to turn the shaft 3a through the medium of two springs 17 and 17a and an eared collar 18. The collar 18 is secured to the pivot shaft 3a.

The object of this spring mounted device for turning the gate arm is to gradually overcome the inertia of the gate arm both at the start and stop of its 90 degree movement, and further so as to avoid the loosening up of the swinging mechanism due to repeated use.

It will be noted that the curved gear rack 16 is not formed on concentric circular lines centering on the pivot shaft 3a, but instead it will be noted that the eccentric pinion 15 has as many teeth in its full circle as there are in the 90 degree segment of the curved rack 16 and hence one complete turn of pinion 15 would move the gate arm through its required 90 degree angular turn. But although the gate arm itself is cushioned against sudden movement by the springs 17 and 17a, it is further desired to start the gate arm swinging at a slow speed from position at the curb, increase its speed during the swing through its intermediate position, and then slow down coming to a stop directly across the roadway in position to stop traffic.

It will be realized from this description that a motor of standard speed with a standard commercial speed reducer geared thereto can be made to move the gate arm through its 90 degree motion without any perceptible jerk, tending to shake the gate apart, and at the same time cause the motor to serve as a brake in checking the swinging motion of a gate arm at either extremity of its travel. The motor 13 with the above described mechanism exerts its full power most efficiently through the small radius from the center of the rotation to the center of the teeth on pinion 15 both at the start and stop of the swinging movement, and at the same time is capable of affording fairly uniformly accelerated and decelerated speed to the swinging gate arm.

Assuming that the two gate arms are swung directly across the roadway, and the sections of the net forming the yielding barrier device are locked together at the center of the roadway and then the whole barrier device is struck by a vehicle, the gate arm in being deflected out of line would not strip the gear teeth on the eccentric pinion 15 or the gear teeth of rack 16, as the springs 17 and 17a could be constructed just strong enough so as to function successfully for their normal purpose in gently swinging the gate arm horizontally but not be strong enough so as to cause the gate arm to be broken when the gear teeth are stalled.

In considering this cushioning and variable speed angular movement of the gate arm in relation to a like movement of the gate arm on the opposite side of the roadway, the mechanism as described permits of a rather more accurate stopping of the two gate arms in direct opposition to each other across the roadway. Nevertheless due to the variation of temperature, wind, weather and minor distortions of the gate frames, it is improbable that the two gate arms will coincide in alignment within an inch or two at the best for very long. Hence the use of locks consisting of hooks and links has not proved entirely satisfactory, as the links have got to be so large to insure engagement that if the barrier net is struck, even when they are engaged, there is a strong possibility of the hook becoming disengaged, thus leaving the yielding barrier device ineffectual. Draw bar locks encounter the same difficulty and when designed strong enough and functioning by remote control become so cumbersome as to be inefficient. The type of lock necessary for a commercially adaptable yielding barrier device supported on light weight swinging gate arms of a semi-collapsible construction would necessarily have to be light weight, very compact, self-centering, positive locking, and reliable. Such a locking device is described in the latter part of this specification.

Referring to Fig. 3, which is a cross section view of the gate frame at about the line A—A of Fig. 1. The top rail 4 and the bottom rail 4a are shown as of a tubular construction, with the clip springs 11 holding the horizontal cable strands 5 and 5a on the front side of the rails 4 and 4a, meaning on the side on which the impact blow is normally received. Attached to the rails 4 and 4a also are preferably shown cushion strips or blocks 19. The object of these cushion strips is to prevent deformation of the rails 4 and 4a at the time of impact until such time as the rails 4 and 4a have been forced along the roadway far enough so as to bring the flexible retardation members 5 and 5a into action with their attached braking apparatus housed in the posts.

Fig. 4 is a section on the line B—B of Fig. 1, showing a tubular type of rail 7 and 7a with a slotted group made therein so as to allow the cables or flexible members 5 and 5a to be shrouded within the rails 4 and 4a for neatness of design as well as providing a more compact gate construction.

Fig. 5 is a detailed view showing the method of securing the spring 6 within the adjacent ends of rails 4 and 7. The collars 4b and 7b are welded to the ends of rails 4 and 7 for the purpose of increasing the strength of the wall of rails 4 and 7. The springs 6 as shown are designed

to snugly fit inside of the rails **4** and **7** and are preferably made of a section as shown in Fig. 6. The bolt **20** passing through rails **4** and **7** is the means of securing the springs **6** solidly enough within the rails **4** and **7** so as to provide sufficient strength and rigidity to maintain the whole framework of the gate arm in proper alignment for general operation. Provided the gate arms are formed of several collapsible sections then the strain on the springs **6**, more especially in the upper rail of the gate frame, will be abnormally heavy in order to maintain the proper alignment of the gate frame. Such a strain would necessarily have to be induced in this spring **6** after it is placed within the adjacent lengths **4** and **7** of the gate rail, and hence it would be necessary to afford an adjustment I-bolt **20***a*, which would be accessible through the horizontal slot of the rail **7** as shown in Fig. 4. The spring clips **21** serve as an additional junction unit for the sections of rails **4**, **4***a*, **7**, and **7***a*, and also provide a weatherproof housing for this junction point. These spring clips **21** as shown in Fig. 5 would shroud slightly more than half the circumference of the rails **4** and **7**, and must necessarily be thrown clear at the time of impact due to the distortion of this joint in the gate frame, but being spring clips they could be readily replaced in position.

Where such a device as a swinging, gate-supported, yielding barrier is used on a wide roadway, and the number of panels of the semi-rigid gate frame exceeds two then it would be preferable to have the cables **5** and **5***a* threaded through the first sections of the rails **4** and **4***a* and emerge out of the ends of these first sections and then be strung along the outside of the succeeding sections of rails **4** and **4***a* or within an open slot of the rails **7** and **7***a* such as are shown on Fig. 3 and Fig. 4. The object of this alternate construction is to provide a more desirable means for wider roadways where the majority of the impact tests would fall in the middle third of the roadway, and thus cause a more direct pull through the main pivot of the gate arm just in front of where the cables **5** and **5***a* emerge from the posts. At the time of impact the primary contact of a vehicle with the barrier device will be taken by the small buffer strips **19** and then the secondary blow will fall on the rails **4**, **4***a*, **7** and **7***a*, tending to distort the springs **6** and then the blow of the impact will begin to pull against a retardation effort of the cables **5** and **5***a* and subsequent to this the springs **6** if distorted far enough by the force of the impact would tend to shear off the limited strength I-bolts **20***a*, allowing the mid roadway sections of the gate arm to be either pulled free of the cables **5** and **5***a* by the disengagement of the clip springs **11**, or else cause the springs **6** to pull from within the rails **7** and **7***a*, allowing the mid roadway section of the gate frame to be carried along with the cable network to such an extended position as these cables **5** and **5***a* have to assume in order to develop retardation sufficient to overcome the impact of the speeding vehicle.

It is readily seen from the foregoing that it is not intended that the gate frame which primarily supports the roadway net cables in their normal position across the roadway shall remain absolutely intact and swing away from the flexible net arrangement at the time of impact, as the interval of time consumed by an impact test does not allow sufficient time for the rigid part of the gate frame to swing back but this gate frame must necessarily be so constructed as to separate in sections and be carried along with the net so that after the vehicle has been stopped, a minimum of work or maintenance is required in replacing the various parts of the rigid frame and its attached cable net section in their original condition.

Heretofore the various devices suggested for such an emergency safety device have been entirely wrecked due to impact or else to thoroughly bent out of shape that major repairs are necessary. With my invention it is obvious that a more adaptable and commercially feasible device is obtained than by the earlier suggested devices.

It is essential that the cables **5** and **5***a* must necessarily be at least horizontal or slightly arched upward when in their normal position so as to be practically a uniform distance above the roadway surface, so as to present practically the same front to an oncoming vehicle whether that vehicle be traveling near the side of the road or in the center of the road, hence it is illogical to have the cables **5** and **5***a* supported by their own tension from the end of the gate arms to the posts, as the sag induced would greatly vary the elevation of the cables above the roadway surface. Also unless the gate frames themselves are made abortively heavy, it is practically impossible to maintain the cables **5** and **5***a* in their proper normal position and height unless they are supported at short intervals by the rigid gate frames of a yieldable barrier device of this nature. This is in contrast to the regular type of yieldable barrier device in which the cable network is continuous at all times and is moved above the roadway when inoperative. The latter type of barrier net can be stretched tight enough to be held practically horizontally.

After the yielding barrier device has been hit and run out due to an impact test, the cables **5** and **5***a* can be recoiled either by the hand or by an associated recoiling motor attached to the brake drum as will be readily understood by those skilled in this art. Provided a recoiling motor is desired for this purpose, then the apparatus would be supplemented by a ratcheting device for the brake drum similar to that shown and described in my United States Letters Patent No. 1,654,606 dated Jan. 3, 1928. Such a ratcheting arrangement and recoiling motor attachment would obviate the necessity of temporarily releasing the frictional devices which serve to retard the payout cables **5** and **5***a*, at the time the cables **5** and **5***a* are recoiled.

In order to develop the full strength of cables **5** and **5***a* as effectual retarding means in overcoming the impact of a car, it is necessary that the locking devices which join the outer ends of these cables together near the center of the roadway must necessarily be as strong if not stronger than the cables themselves, and when locked, must positively stay locked until the operator chooses to unlock them by means of his remote control. Such an effectual arrangement of parts constituting a locking device and the means for operating the same are best shown in Figs. 7 and 8.

Referring more particularly to Fig. 7. This view is taken of the mid roadway portion of the two gate frames when swung opposite one another across the roadway, and the pivot end of the left hand gate, and the elevational view as shown is

taken from the oncoming side of the barrier device looking toward the danger zone. The members **4** and **4***a*, **7** and **7***a*, which are the top and bottom rails of the swinging gate frames and the outer end vertical braces **8** are the same for each of the two swinging gate frames which make up the barrier, but in having a locking arrangement there must necessarily be a male and a female connection to that lock, and it is preferable, as shown, to have a fixed female section of the locking device attached to the right hand swinging gate frame, as you look at the barrier device from the oncoming side, shown in Fig. 7. The right hand gate frame must necessarily receive the majority of the impact blows in stopping vehicles as the traffic is mainly on the right hand side of the road. Further having the female section of the locking devices on this right hand gate frame obviates the necessity of having any movable parts of the locking device or functioning parts mounted on this right hand gate frame. The male portion of the locking devices is mounted on the left hand gate frame, and the movement that is imparted to the male portion of the locking devices is obtained from a mechanism consisting of motor **22** and a combination speed reducer **23** turning the shaft **24** in a clockwise direction and the shaft **24***a* in a counterclockwise direction. Attached to the shafts **24** and **24***a* are sections of flexible shafting **25**. These sections of flexible shafting **25** terminate in slip couplings **25***a* placed adjacent the joints in the gate frame where springs **6** are located, as shown in Fig. 1. Into each of these slip couplings **25***a* is fitted another reach of flexible shafting **26**. These flexible shaftings **26** extend to the outer end of the left hand gate frame as shown in Fig. 7, and on the end of each of these flexible shaftings **26** and slidably attached thereto are driving pinions **27** as shown in Fig. 8. The pinions **27** are mounted to turn concentric with bearings **28**, which in turn are preferably secured to the pad **29** on the near side of the spreader bar **8** of the left hand gate frame, as also shown in Figs. 7 and 8. The members **26** and **27** are mounted in apertures in pads **29**.

These pads **29** will be secured to the spreader bar **8** so that in case the barrier network shall be caused to be moved longitudinally with respect to the gate frame due to impact, then the pads **29** can be forcibly disconnected from the gate frame or more especially the spreader bars **8**, carrying with them, of course, the locking devices intact together with the pinions **27**, stub shaft **27***a*, and the bearings **28**, the stub shaft **27***a* being slidably disconnectible from the flexible shaft **26**.

Now referring more particularly to Fig. 8 in conjunction with Fig. 7. It is noted here that it is intended that the ables **5** and **5***a* shall be of non-rotating fabrication so as to avoid any spinning action of these cables or any tendency to twist at the time that a heavy load or tension pull is placed upon them. Each of the cables of the left hand gate frame terminates in a sleeve socket **30**, at one end of which there is a threaded portion **31** and at the other end of which is a shouldered hub **32**. The shouldered hub **32** is secured from rotation in a tight bearing **33**, which in turn is attached to the pad **29** at the end spreader **8** of the left hand gate frame. Shrouding the threaded portion **31** of the sleeve socket **30** is an internally threaded spindle **34**, the outer surface of which is formed into teeth **35** that properly mesh into the pinion **27**. The bearing **36** is also attached to the pads **29** and therefore supported by the end spreader **8**.

The threaded spindle **34** is free to turn in the bearing **36** so that with any rotating motion imparted to the spindle **34** by the pinion **27** in engagement with the rifled teeth **35** causes the spindle **34** to move forward due to its internal engagement with the thread **31**, and that forward motion is limited by the stop lugs **34***a*. Conversely, when the pinion **27** is rotated in the opposite direction the spindle **34** is capable of being pulled backward until it is stopped by the shouldered hub **32**. It is seen therefore that this mechanism as so far described consists of a functioning unit mounted on a pad **29** weatherproofed by an appropriate housing **37** and the whole unit is capable of detachment from the gate frame or vertical spreader **8** and from the flexible shafting **26** when a heavy outward or horizontal pull is exerted at the bolted slotted connection **38**. The internally threaded spindle **34** of each of the above units terminates at its outer end in a spirally formed, round-edged threaded tip **39** which forms the male portion of the locking device, as shown in Fig. 8. This threaded tip **39**, which forms the male part of the lock, is at all times projected outside of the housing **37**, and when the lock is in its open position the outermost end of this tip **39** will swing free of the female portion of the locking device which is attached to the opposite gate arm.

Now referring to Fig. 7. On the right hand semi-rigid gate frame is mounted the female section of the two locking devices which are indicated in detail by numeral **40** also on Fig. 8. These female sections of the locking device are held firmly in the bearings **41** which are in turn slidably attached to the end bar **8** of the right hand swinging gate frame as viewed in Fig. 7. This slidable method of attachment is similar to that of the bolts **38** as described above. The female socket **40** forms within its inner end a tapered socket for securing the cables **5** or **5***a* to the socket **40** with a leaded connection capable of developing the full strength of the non-rotating cables **5** or **5***a*. This female socket **40** within its outer end forms a hollow spirally threaded pocket **42** which can be engaged securely by the outer end **39** of the male portion of the lock.

Thus it is seen that by turning the pinion **27** due to its connection with the motor **22** through the speed reducer **23** and flexible shafts **25** and **26**, the spindle **34** can be made to advance its tip **39** into the pocket **42**, but no firm engagement of the tip **39** with the pocket **42** is possible until the tip **39** is well within the pocket **42**, and its ultimate engagement is only possible during about the last turn of the tip **39** of the spindle **34**. It is during this last turn that the spiral thread of the tip **39** forms an ultimate full engagement of all the threads between the tip **39** and the threaded pocket **42**, thus developing sufficient strength to enable the cables **5** or **5***a* to exert their maximum pull on the braking apparatus in the posts **1**. The bearings **36** are also slidably attached to and supported by the end spreader **8** through the pads **29**. The slidable attachment in connecting these bearings **36** and **33** to this spreader **8** by the pads **29** has for its object the securing of bearings **36** and **33** to the spreader **8** for the normal operation of the barrier locking device, but the pads **29** are only so securely attached that at the time of impact these two bearings **36** and **33** may together with the pad **29** be slipped free of their connection with the spreader **8** as the cables **5** and **5***a* are pulled or jerked free of the semi-rigid gate frame. Such a semi-secure attachment of the bearings

36 and 33 is obtained by slotting the hole on the post side of the securing bolts 38. The use of non-spinning or non-rotating cable for the members 5 and 5a will obviate the possibility of this locking device becoming detached at the time of impact.

In order to prevent the two parts of the locking device from becoming jammed together, I prefer to show the male tip 39 as terminating in a convex end 43 and also having the innermost part of the pocket 42 also terminate in a convex surface 44. These two rounded points of contact will serve to prevent the locking device from jamming when the pinion 27 exerts its full effort in advancing the spindle 34.

Again referring to Fig. 8. It will be noted that the outermost end of the pocket 42 and the spindle tip 39 vary in diameter by the dimensions X plus Y. This increased diameter of the opening of pocket 42 over the end of the tip 39 provides a means for self-centering of the locking device. When such a general type of barrier device as described must be installed on a fairly wide roadway, it is found that the outer tips or ends of the swinging gate frames will not necessarily stop in exactly the same position during each operation. This variation produces a condition which must be obviated by the locking device itself, or in other words the locking device must become a self-centering device. It must be capable due to its movement of bringing the two ends of the two gate frames into proper position directly opposite one another before the final locking operation takes place. In referring to Fig. 8 it is seen that the two outer ends of the swinging gate frame could be as much out of line in any direction equal to the distance X or Y, and still the lock would function properly.

As stated in the foregoing portion of this specification, the various parts of a successful barrier device of this nature must have all the parts mechanically proportioned both for operation and strength, and this holds true for the various portions and parts of the pertinent locking device just described, and more especially so in regard to the length and pitch of the advancing thread 31 in regard to the over-all length of the lock, the spindle outer surface 35 and the pertinent shape of the threads spirally formed on the outside of tip 39 and the inner pocket 42.

The mechanical efficiency of a locking device such as described lends itself to a minimum weight of material required, and a compactness of design which is a vital necessity in devising a swinging gate frame of a light weight commercial construction, but I do not restrict this general barrier design as being capable of proper functioning with the above described type of locking device only, as a locking device consisting of a knob engaging with a pocketed socket similar to that shown in my United States Patent No. 1,699,545 dated Jan. 22, 1929, but used for horizontal contact instead of vertical contact, together with a torque motor actuating a latch to insure against disengagement during impact, will function properly with semi-rigid gate frames of light weight construction. With such a lock as this, it would be desirable to have one of the swinging gate frames come into place across the roadway just ahead of the opposite gate frame, so as to insure a forceful contact of the two portions of this alternate type of locking device.

Various other locking devices have been devised which require an excessively heavy and rigid gate frame, both to sustain the weight of the locking device and to insure its proper operation and alignment. This is stated more especially to bring out the commercially feasible advantages of this novel type of gate construction, including the major features of partial collapsibility of the gate frames at the time of impact, the efficient method of swinging the gate frames into position and the means of effectually locking the two ends of the cable network together so as to develop the full efficiency of the braking or retarding devices associated with the barrier construction.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise detail of construction set forth, but desire to avail myself of such variation and modification as come within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent, is:

1. A yieldable barrier comprising a pair of payout cables, arranged one above the other at each side of a roadway; a sectional swinging gate, slidably connected with each pair of said cables; means for detachably connecting the outer ends of said cables; means carried by one of said gates for operating said cable connections; and means incorporated in said operating means, arranged to permit rupture of said operating means without releasing said cable connecting means.

2. The barrier specified in claim 1 in which the cable connecting means are adapted and arranged to engage and disengage upon relative rotation of their parts.

3. The barrier specified in claim 1, in which the cable connecting means consist of tapered, threaded inter-fitting socket and tip members arranged to engage and disengage upon relative rotation.

4. The barrier specified in claim 1, in which the cable connecting means consist of tapered, threaded, inter-fitting socket and tip members arranged to engage and disengage upon relative rotation and the operating means consist of flexible shafts.

5. A yieldable barrier comprising a pair of pay-out cables, arranged one above the other; a sectional swinging gate slidably connected with said cables; springs flexibly connecting the sections of said gate; and a connection between each spring and a gate section, arranged to release upon impact of a vehicle before the connected spring is materially distorted.

6. The barrier specified in claim 5, in which the spring connections are arranged to rupture to release them.

7. The barrier specified in claim 5, in which the spring connections are frangible, readily renewable bolts arranged to rupture to release them.

EMERSON D. SAWYER.