To all whom it may concern:

Be it known that we, FRANCIS W. COOPER and HENRY STEADWORTHY, both subjects of the King of Great Britain, and both residents of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Anchors and Clips for Rails and the like, of which the following is a full, clear, and exact description.

This invention relates to improvements in rail anchors, rail clips and the like, and the object of the invention is to provide simple, durable, efficient and inexpensive means for securing a rail to a tie plate, base plate, rail chair, tie spacer or other element to hold the rail down on any such plate or device, and also to hold the rail against movement in its longitudinal or in its lateral direction relatively to the plate or other element.

A further object is to provide a rail holding device capable of holding a rail against longitudinal movement equally well in either direction.

A still further object is to provide means which, when used with a shouldered tie plate or the like, will hold a rail base tight against the plate shoulder.

Another object is to provide a device of this character adapted to hold a spike to a plate and against creeping up due to rail undulation.

Still another object is to provide a one-piece device of this character capable of accommodating itself to variations in the size of plates, rails and spikes.

Yet another object is to provide a device of resilient character which will yield to certain relative movements of the rail and plate without injury to itself, and which will take up wear and so maintain an efficient grip during long periods of service.

Another object is to provide a device which may be easily applied to and removed from a rail without injury to itself or to the rail.

A further additional object is to provide a device for use in conjunction with a standard spike and which tends to distort the spike in driving, whereby the spike is more securely held in a tie.

Various other objects and advantages will be apparent to those skilled in the art from the following disclosure.

The device comprises essentially a member hooked at one end to engage under a tie plate or the like and at the opposite end to engage over a rail base, the hook of the upper end being preferably but not necessarily in the form of a loop or eye which has sufficient resiliency to protect the device against breakage, to take up wear, and to obtain and maintain a very tight grip on the rail and plate when forced to its final position. The device is adapted for insertion through an opening in a tie plate or the like and for use in conjunction with a standard spike driven through the opening to force the device into proper position relatively to the plate and rail. The device is provided with means to engage the head of the spike and hold the same against upward creepage due to rail undulation.

In the accompanying drawings which illustrate certain but by no means all possible embodiments of the invention:—

Fig. 1 is a cross sectional view of a rail base and tie plate illustrating the clip or anchor in position.

Fig. 2 is a side elevation of the anchor in position on fragments of a plate and rail base.

Fig. 3 is a fragmentary view similar to Figure 1 showing the device in process of application and illustrating the method of application.

Figs. 4 and 5 are fragmentary views similar to Figure 1 illustrating modifications of the device.

Figs. 6, 7 and 8 are fragmentary views of the lower hook end of the clip illustrating various possible formations thereof.

Figs. 9 and 10 are fragmentary views similar to Figure 1 illustrating further modified forms of clip.

Fig. 11 shows the device used solely as an anti-creep.

In the above described drawings a conventional type of tie plate has been illustrated for purposes of example and also standard spikes, but it will be understood that the invention is not in any way limited to use with a plate or with spikes as illustrated, but is applicable by suitable dimensioning to any form of plate, chair, tie spacer or other device to which it may be designed to secure a rail or which it may be desired to secure to the base of a rail, such for example as gauge bars between switch points. It will also be understood that the standard track spikes illustrated may be replaced by spikes of special design.
or by other fastenings if the nature of the use so requires.

Referring more particularly to the drawings, 11 designates the base of a rail and 12 a conventional form of tie plate disposed thereunder and provided at one side with a shoulder or rib 13 against which one edge of the rail base abuts, and also with an opening 14 adjacent the edge opposite from the shoulder of sufficient size for the insertion of the clip, designated as a whole by the numeral 15, and also for the reception of a spike 16 of standard or other suitable form and dimensions.

The clip 15 comprises by preference, a strip of flat spring steel bent rather sharply upon itself at one end to form a hook 17 and bent toward the opposite end and toward the same side as the hook 17 to form a comparatively large loop or eye 18, which is preferably slightly open as indicated at 19, Figure 3, when the clip is not in use. The extremity of the bar of metal forming the loop 18 is preferably straight for a short distance, as indicated at 20, so as to have an appreciable bearing surface on the upper face of the rail base when in position, as illustrated in Figure 1 and other figures. It will be understood that the invention is not confined in any way to the relative size of the hook 17 and loop 18 or to the curvatures thereof illustrated, as such details may be modified as desired.

The shank 21 of the clip, that is to say, the part between the hook 17 and the loop 18, may be formed in a variety of ways of which only some are illustrated and hereafter described. One form which has been found very serviceable and efficient is illustrated in Figures 1 and 3 and embodies a short reverse curve 22 immediately above the hook 17 forming a slight projection from the line of the shank and on the same side as the hook 17, which projection or offset will bear against the edge of the tie plate defining the opening 14 under the edge of the rail base. It is customary to so position the spike holes in tie plates that the edge of the rail base slightly overlies the hole, and in connection with the present invention it is desirable to observe the same precaution in order that the projection or offset 22 may engage under the rail base. The reason for this is that in the remotely possible contingency of the hook 17 opening or breaking the projection 22 will hold the clip against upward withdrawal, so that the clip remains serviceable to hold the rail against the plate shoulder 13. Above the offset 22 the shank of the clip may be substantially straight, as indicated in Figures 1 and 3. Preferably the hook 17 is so disposed with relation to the shank that in the ideal condition of the clip the back 23 of the hook projects beyond the plane of the shank, as shown in Figure 3.

In the forming of the hook the shank may be so flexed that the back of the hook does not project appreciably or at all out of the plane of the shank but it will be understood that modification may be made in this detail of construction if desired. The essential point is to maintain a bearing between the back of the hook and the spike at least at, and preferably below, the lower surface of the plate 12. The loop 18 is so disposed with relation to the shank that it projects slightly beyond the back of the shank forming a hump 24, the primary purpose of which is to form a projection above the head of a fully driven spike to hold the spike down and against upward creepage due to undulatory movement of the rail or to vibrations. It will be noted in Figure 1 that the shank of the hook is spaced slightly away from the edge of the rail base and the only contact between the rail and clip is at the top of the rail base where it is engaged by the tip 20 of the loop.

The clip shown in Figures 1 and 2 is applied by passing it through the aperture 14 of the plate and positioning it at approximately the inclination shown in Figure 3 with the hook 17 engaged as far under the tie plate as possible and the portion 20 touching the upper edge of the rail base. A spike is then inserted through the aperture 14 and will assume the inclined position shown in Figure 3 with the hump 24 of the hook engaging the tapered point of the spike and the hump 24 engaging the body of the spike. The spike is now driven home and in the first part of the driving as the tapered point passes the hump 23 the spike is swung inwardly and the portion 20 engaging the rail base slightly over the plate edge and forces the loop 18 up and over the rail base to substantially the position shown in Figure 1. Owing to the inclination of the upper surface of the rail base the loop operates to force the rail tightly against the plate shoulder 13 and also exerts a wedging or camming action to bind the rail base tightly down on the plate. As the spike is driven the projection or offset 22 of the clip shank, which is in engagement with the edge of the plate aperture 14, forms a fulcrum point about which the clip tends to swing. As the spike holds the hook 17 against backing away it follows that any straightening up action from the position of Figure 3 is effected only by flexion of the hook shank which serves to accentuate the projection or offset 22, as will be observed by comparison of Figures 1 and 3. It will also be observed that this flexion is caused by the engagement of the spike with the humps 23 and 24 of the hook which are located respectively below and above the fulcrum point or offset 22. The flexion of the clip operates to force the spike very tightly against the outer edge of the plate aperture.
14. Toward the end of the driving the back lip 25 of the spike head passes down over the hump 24 of the clip and forces the lip 18 even farther up on the rail base than is shown in Figure 1. The clearance between the clip shank and the rail base facilitates this movement. At about the time that the lip 25 is passing the hump 24 the flared or wedge-shaped throat 26 of the spike engages the outer edge of the plate aperture and forces the spike bodily toward the rail as it is driven. In the final part of the driving the back lip 25 of the spike passes under the hump 24 allowing the loop to slack back slightly. This movement of the loop is, however, wholly or largely counteracted by the wedging action of the spike throat 26 in the plate aperture which forces the spike bodily toward the rail. In the standard spike illustrated the flare, which is a 1:12 taper, is distributed equally on the front and back of the spike. It must be remembered, however, that in many types of spike all the throat flare is placed at the front of the spike and that with such spikes the spike will follow the sloping lower portion of the hump with substantially no slackening of the pressure in the loop 18. A slight tightening or compression of the loop 18 in excess of that which will obtain in the service position shown in Figure 1 is also beneficial. This will, in addition to securing the spike more firmly, increase the effective wedging action of the loop 18.

In Figure 4 there is illustrated a modification of the device which places the metal of the clip in direct compression between the spike head and the edge of the rail base, with the result that the rail is positively urged toward the plate shoulder by the spike instead of only through the agency of the more or less resilient loop. Before the clip is applied the loop 18 is slightly open as in Figure 3 but is designed to ultimately close up completely. This loop can therefore yield only to vertical movement and not to horizontal movement as well as in the previously described form but the larger loop gives perhaps greater resiliency. The greater resiliency of a larger loop may be accomplished by a reduced grip in the vertical direction but any such reduction is more than offset by the direct action of the spike and the tighter clamping of the rail against the plate shoulder. The double reversed curve in the shank of this form of clip also gives greater resiliency in the vertical direction and to a certain extent relieves the offset 22 from stress due to tension in the shank. It will be understood that a shank of double reversed curvature is not necessarily equipped with a larger loop than a straight shank clip.

In Figure 5 there is illustrated a modification in which the hook 17 is in the form of a small substantially closed loop 17* and the shank 21 is a single continuous curve from the back 24 of the loop to the back 23 of the hook, the offset 22 of previous forms being entirely absent and the clip having no engagement with the inner end of the aperture but having a definite engagement with the edge of the rail base. In this form of clip the rail is urged against the plate shoulder both by the upper loop and by the shank of the clip but lacks the properties derived from the offset 22. The loop formation of the hook 17 may be applied to any of the forms except those shown in Figures 9 and 10.

The nose or extremity of the hook 17 may be flat and formed to bear squarely on the lower surface of the tie plate when the hook is in position, as shown in Figure 1, or may be formed to lie at a slight angle to the lower surface of the plate when in operative position, as indicated at 28, Figure 4. This latter formation has the advantage of facilitating the application of the clip in that it provides for full surface bearing while the hook is in the inclined position of Figure 3 and which position allows the clip to project farther up through the plate aperture and thus facilitates the engagement of the loop with the upper edge of the rail base. This will be more apparent when considered in comparison with the action of the hook end shown in Figure 3, which has an edge bearing on the plate during application and which edge
bearing tends to hold the clip in a much lower position relatively to the plate than when it is in operation. It will thus be seen that the form of hook end shown in Figures 1 and 3 is slightly more difficult of initial positioning but that the clip loop will slide up over the rail base with greater ease than with the hook formation shown in Figure 4. On the other hand, owing to the formation shown in Figure 3, the clamping power may perhaps be limited owing to the rise of the clip in swinging to final position, whereas with the form shown in Figure 4 the clamping power is somewhat increased owing to the fact that the rise of the clip in swinging to final position is less than in the other form. The reason for this is that the latter form keeps the pivotal point about which the hook swings more nearly centered in the clip than does the form shown in Figures 1 and 3. A compromise of the two forms is shown in Figure 6 and lies in the provision of a bearing edge 29 intermediate the inner and outer edges of the hook nose. The form of hook end shown in Figure 1, which provides a surface bearing, is less subject to wear due to vibration and other causes than is the edge bearing shown in Figures 4 and 6, in which forms the edge tends to cut into the plate and cause a very slight reduction of the clamping pressure in course of time. A compromise between the surface bearing and the single edge bearing is illustrated in Figure 7 and resides in the provision of a concave nose for the hook which provides a pair of spaced edges 30. The double edged bearing thus provided will result in less cutting into the plate but will have the characteristics of the flat end of Figure 1. Any desired combination of these various forms of nose may be made as well as other formations without departing from the spirit of the invention, and the invention is in no way limited to these particular formations nor to the particular angles of bearing edges illustrated.

For various reasons it may be found desirable to slightly crown the nose of the hook from side to side as indicated in Figure 8 and this crowning may be combined with any of the formations shown in Figures 1, 4, 6 and 7 or with any other end formations, or the end of the hook may be flat from side to side. The crowning shown in Figure 8 has some advantage in the application of the clip owing to a slight arching which is sometimes found in plates and which is especially incident to the punching of the aperture 14. The crowning of the hook nose is, however, of some importance in the operation of the device. If the rail tends to move longitudinally relatively to the plate it will tend to carry the upper end of the clip with it. The lower end being engaged in the aperture cannot move bodily and therefore the clip would tend to incline slightly in the longitudinal direction of the rail. Without crowning this would result in a line or point bearing between the clip and plate at one side only of the clip. With crowning, the nose of the hook will merely roll on the plate and the bearing surface will be substantially unaffected and will remain substantially midway between the sides of the clip, with the result that the stresses will remain uniformly distributed and substantially central in the mass of material instead of being concentrated at one side thereof. It will be understood that the canting or rocking of the clip just described is in practice more theoretical than actual, for the reason that with a properly dimensioned clip of proper temper the grip is so great that the rocking or tilting of the clip, if any, is so slight as to be unnoticeable. It will also be seen that owing to the very short vertical distance between clip engagement with the plate bottom and rail base top that any actual movement of the loop in the longitudinal direction of the rail must necessarily be very small. The condition is comparable with the conditions prevailing in a stress testing machine in which the levers remain practically stationary but are formed as if for movement. The bearing portion 20 of the loop may be similarly crowned although this is not deemed necessary on account of the resiliency of the loop.

In Figure 9 there is illustrated a further embodiment of the invention in which the clip, designated 150, is of substantially rigid construction instead of the resilient construction of the forms already described. It is desirable even in the so-called rigid construction to provide a certain amount of resiliency, and therefore the upper end of the clip is looped as at 158 but has an end bearing on the rail base instead of the bearing shown in the other figures. It will be understood, however, that such a loop formation may be omitted if there is no variation in the thickness of the plate and rail base. The omission of the loop would yield a substantially rigid structure, as shown in Figure 10, but as there is always a certain variation in the thickness of plates and rail bases and in the dimensions of spikes and the location of plate apertures, such a rigid construction should generally be used in connection with shims as may be necessary to compensate for the above noted lack of uniformity. The clips shown in either Figure 9 or 10 may be applied in substantially the same way as the resilient clips already described and secured in position by a spike driven outside the clip through the plate aperture. Owing to the lack of resiliency these forms of clip exert merely a pinching or camming action on the rail.
base and plate, and the throat between the hooks or jaws must be sufficiently deep to allow for lateral movement in application according to the variations in thickness of plate and rail. In such a form of clip it may not be possible to drive a spike fully down and in addition, owing to the lack of resiliency, reliance must be placed on shimming or further driving of the spike to compensate for wear or stretching of the clip. Obviously a rigid clip has not the same capability as a resilient clip of withstanding the various stresses incident to service. One or both of the surfaces bearing on the plate and rail may be crowned as already described and if desired the lower hook may be also formed as described in connection with any of Figures 4, 6 and 7.

In the resilient form of clip the lump 24 at the back of the loop, which lump overlies the spike head, operates to hold the spike down in the position to which it is driven. If it is desired to eliminate the definite lump, as shown for example in Figures 1 and 4, a similar holding effect may be obtained by providing one or more recesses 22 in the back or outer side of the clip for the reception of the back lip 25 of the spike head. In the rigid forms of clip illustrated in Figures 9 and 10, it is desirable to provide a plurality of such recesses in order that, as the spike is driven farther down to take up wear, it may be releasably locked at each new position by engagement in one of the recesses. The angle formed by the meeting of the loop and the shank of the earlier described forms or by any projection is to be regarded as forming a recess and as the full equivalent of the recesses 32. It will also be understood that the provision of recesses on a clip for the purposes of locking a spike against upward movement is not confined to the particular embodiments of the invention herein disclosed but is applicable to other embodiments and also to entirely different forms of clips or of anchors which may or may not depend for their operation upon co-operation with a spike.

The operation of the device will, it is thought, be fully understood from the foregoing description and it remains only to point out that the clip serves not only to urge a rail toward a plate shoulder or the like and to hold a rail down on a plate but serves also to hold a spike securely to a plate so that the upward creepage of the spike, which is a well known phenomenon resulting from undulatory movement of the rail, is prohibited and the spike is maintained in proper relation with the plate. In fact, when assembled, the rail, plate, clip and spike are virtually locked together and must move as a unit. The clip will exert a grip so tight on the rail and plate and exert such a great holding effort that there will be under ordinary conditions no longitudinal movement of the rail relatively to the plate.

Any tendency to such movement of the rail produces a cramping tendency in the clip which only serves to increase the grip. Obviously, it is immaterial to the gripping power of the clip in which direction the tendency to longitudinal rail movement is exerted. Furthermore, a reversal of the direction of tendency to rail movement has no appreciable loosening effect on the clip. The importance of this feature will be appreciated by those skilled in railway construction and maintenance who are familiar with the loosening effect of reversal of pressure in certain types of rail anchors or anti-creepers.

The number of clips or anchors per rail is of course dictated by the conditions of service. A single clip in each plate to which the rail is anchored will usually be found sufficient and in this case the clip should be on the unshouldered end of the plate as illustrated. But if desired two clips per plate may be used, the clips being located one on each side of the rail. With crowned plates such as are now in general use, the clips should be located in the middle of the plate or at the highest point of the crowning, so as to be relieved as much as possible of the stresses due to rail undulation. If clips are used with flat plates they may be placed at either or both edges of the plates by inserting them through the ordinary spike holes which have been suitably enlarged.

While the device has been illustrated and described as positioned with loop uppermost, it will be understood that it may be inverted and will exert substantially the same holding effect, although the application may not be as easy. In such a case the clip will swing to operative position about a point of engagement with the rail base.

Although the description and illustration have been confined substantially to tie plates or the equivalent, it will be understood that the clip may be used equally well to attach rails to metal ties, the spike being replaced by any suitable holding device which will exert a similar action although ordinary spikes will serve as their effectiveness is in no way dependent on the wooden ties used under tie plates but depends on co-operation with whatever device replaces the plate. In the same way the clip may be used to attach devices, such as anti-creepers, to the rail. For the purposes of the following claims, tie plates and the like, metal ties, anti-creepers and other devices are deemed to be included in the term "device located under rail" or equivalent expression.

Heretofore the device has been described and illustrated as a combined clip and anti-creeper, that is to say, a device holding the
rail down as well as holding the rail against movement in its longitudinal direction. Devices similar to those shown in Figures 1 to 10, or any suitable modifications thereof, may be used purely as anti-creepers in connection with tie plates, base plates, tie spacers or similar devices or even with metal ties, by slightly altering the dimensions of the clip so as to embrace only the rail base, as shown in Figure 11. The clip, designated 15, when in position, engages the rail so tightly as to be substantially immovable thereon and enters into an opening or recess 14 of the plate as previously described, so as to be held against movement, in the longitudinal direction of the rail, independently of the plate. The provision of an opening or recess in the plate is immaterial as long as the plate presents shoulders against which the clip may bear. The clip is preferably held in operative engagement with the rail by means of a spike 16 or other device driven behind it, as already described. It will be noted in Figure 11 that the plate opening 14 is necessarily extended under the rail to expose sufficient of the bottom of the rail base for engagement by the clip. In this arrangement the clip serves to urge the rail against the plate shoulder and therefore to clamp the rail to the plate in this respect exactly as described in connection with the clip of Figure 1. This form of clip also serves as a spike lock but the hump 24 may be omitted in this and other forms if the locking feature is not desired.

It will be understood that the form of clip shown in Figure 11 may, with slight modification of back curvature, be used without a spike or equivalent element separate from the tie plate or the like, by suitably dimensioning the plate aperture 14 to engage the back of the clip. In such use of the clip, the application is effected by raising the rail, forcibly applying the clip thereto and then lowering the rail to force the lower end of the clip into the plate opening 14 so that the clip is held in compression between the rail base and the back or outer wall of the opening 14.

Having thus described our invention, what we claim is:

1. Means to clamp together a rail and a device located thereunder comprising, a clamping member engageable under such device beneath a rail and with the upper surface of the rail base, means engageable with the said device to hold the clamping member in operative position, said clamping member being formed to releasably lock the holding means in holding position.

2. Means to yieldingly clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable at one end under such device and at the other end with the upper surface of the rail base.

3. Means to yieldingly clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable at one end under such device and at the other end with the upper surface of the rail base, and means to hold the clamping member in operative position.

4. Means to clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable under such device and with the upper surface of the rail base, and means engageable with the clamping member and device to releasably lock the clamping member, rail and device together, the clamping member being formed to releasably lock the holding member relatively to clamping member and to the device.

5. Means to clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable under such device and with the upper surface of the rail base, and means to swing the clamping member in a vertical plane to exert a clamping action and clamp the rail and device tightly together.

6. Means to clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable under such device and with the upper surface of the rail base, and designed to be swung about a point of support to exert a clamping action and clamp the rail and device tightly together.

7. Means to clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable under such device and with the upper surface of the rail base, and fulcrumed on said device for movement in a vertical plane, and holding means adapted to engage the clamping means on opposite sides of the fulcrum point.

8. Means to clamp together a rail and a device located thereunder comprising a resilient clamping member engageable under such device and with the upper surface of the rail base, and fulcrumed on said device for movement in a vertical plane, and holding means adapted to engage the clamping means on opposite sides of the fulcrum point and to wedge the clamping means into operative position.

9. Means to clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable under such device and with the upper surface of the rail base, and means to exert a wedging action and swing the clamping means in a vertical plane into operative position.

10. Means to clamp together a rail and a device located thereunder comprising, a resilient clamping member engageable under such de-
vice beneath a rail and with the upper surface of the rail base, and holding means adapted to engage the clamping member below its point of engagement with the device and above its point of engagement with the rail base and to be spaced from the clamping member between such points of engagement.

11. A clamping means according to claim 10 fulcrumed between the points of engagement with the holding means and on the opposite side from said holding means.

12. A clamping means according to claim 10, fulcrumed on the said device between the points of engagement with the holding means and on the opposite side from said holding means, said holding means having engagement with the said device substantially on a level with the fulcrum point of the clamping member.

13. Means to clamp together a rail and a device located thereunder, including a strip of material hooked at one end to engage under such device and bent upon itself at the opposite end to engage the upper surface of the rail base.

14. Means to clamp together a rail and a device located thereunder, including a strip of resilient material hooked at one end to engage under such device and bent upon itself at the opposite end to form a resilient loop engageable with the upper surface of the rail base.

15. Means to clamp together a rail and a device located thereunder, including a strip of material hooked at one end to engage under such device and bent upon itself at the opposite end to form a loop adapted to lie above a rail base with the end of the strip in engagement with the rail base, the loop thereby substantially closed and exerting a resilient holding effort.

16. Means to clamp together a rail and a device located thereunder, including a strip of material hooked at one end to engage under such device and bent upon itself at the opposite end to form a resilient loop engageable with the upper surface of the rail base and means to forcibly engage the clamping member and the rail, whereby the loop exerts a camming action on the inclined upper surface of the rail base to clamp the rail and device together, the loop being thereby substantially closed and exerting a resilient holding effort.

17. Means to clamp together a rail and a device located thereunder, including a strip of material hooked at one end to engage under such device and bent at the opposite end to form a loop adapted to lie above a rail base with the end of the strip in engagement with the rail base and an offset portion in said clamping member between the hook and loop adapted to bear against the said device and constitute a fulcrum point for the clamping member.

18. Means to clamp together a rail and a device located thereunder, including a strip of material hooked at one end to engage under such device and bent at the opposite end to form a loop adapted to lie above a rail base with the end of the strip in engagement with the rail base, the clamping member being formed intermediate the hook and loop for engagement with the edge of the rail base.

19. Means to clamp together a rail and a device located thereunder, including a strip of resilient material hooked at one end to engage under such device and bent upon itself at the opposite end to form a resilient loop engageable with the upper surface of the rail base, the said loop being slightly open before application of the member, and means to forcibly engage the clamping member and the rail, whereby the loop exerts a camming action on the inclined upper surface of the rail base to clamp the rail and device together, the loop being thereby substantially closed and exerting a resilient holding effort.

20. Means to clamp together a rail and a device located thereunder, including a strip of resilient material hooked at one end to engage under such device and bent upon itself at the opposite end to form a resilient loop engageable with the upper surface of the rail base, the resilient member being reversely curved between the hook and loop to form a projection engageable with the said device and with the edge of the rail base.

21. Means to clamp together a rail and a device located thereunder, including a strip of resilient material hooked at one end to engage under such device and bent upon itself at the opposite end to form a resilient loop engageable with the upper surface of the rail base, the clamping member being reversely curved between the hook and loop to form a projection engageable with the said device and with the edge of the rail base.

22. Means to clamp together a rail and a device located thereunder, including a strip of resilient material hooked at one end to engage under such device and bent upon itself at the opposite end to form a resilient loop engageable with the upper surface of the rail base, the clamping member being reversely curved between the hook and loop to form a projection engageable with the said device and with the edge of the rail base, and means engageable with the clamping member above and below said offset to forcibly engage the projection with the said device and with the edge of the rail base, thereby to effect a clamping action and a compression of the loop.

23. Means to clamp together a rail and a device located thereunder, including a strip of material hooked at one end to engage under such device and bent at the opposite
end to form a loop adapted to lie above a rail base with the end of the strip in engagement with the rail base, the back of the hook and the back of the loop projecting beyond the intervening material of the strip to form bearing surfaces for engagement with a holding member.

24. Means to clamp together a rail and a device located thereunder, including a strip of material hooked at one end to engage under such device and bent at the opposite end to form a loop adapted to lie above a rail base with the end of the strip in engagement with the rail base, and a projection on the clamping member above said hook adapted to bear against the said device and constitute a fulcrum point for the clamping member, the back of the hook and the back of the loop projecting beyond the intervening material of the strip to form bearing surfaces above and below the fulcrum point for engagement with a holding member.

25. Means to clamp together a rail and a device located thereunder including a clamping member presenting an upturned hook at its lower end for engagement with the lower surface of such device and means at its upper end for engagement with the upper surface of a rail base, the said hook being formed to have substantially an edge bearing on the device in operative position of the clamping member.

26. Means to clamp together a rail and a device located thereunder including a clamping member having a hook for engagement under such device, and means for engagement with the upper surface of the rail base, the said hook being crowned from side to side, whereby the hook has rolling engagement with the device to maintain the centre of stress as nearly as possible in the centre of the member in the event of oscillation or tendency to oscillation of the member in the longitudinal direction of the rail.

27. Means adapted to underlie a rail base and a projection on said means below which the head of a spike may be forcibly passed in driving, the said projection operating to hold the spike against upward creepage.

28. Means to clamp together a rail and a device located thereunder including a member formed to underlie said device beneath a rail and to overlie the rail base, the said member being recessed to receive the head of a spike driven adjacent the member to hold the spike against upward creepage.

29. Means to clamp together a rail and a device located thereunder including a member formed to underlie said device beneath a rail and to overlie the rail base, and means applicable to hold the member in clamping position, the member being formed to project over the upper end of said holding means to retain the same in operative position.

30. Means adapted to underlie a tie plate or the like beneath a rail and having a recess to receive the head of a spike driven adjacent or through said plate to releasably lock the spike to the plate and hold the spike against upward creepage.

31. A rail anti-creeper including a device to underlie a rail and a resilient clip adapted of itself when operatively positioned to frictionally engage a rail and to resist relative movement longitudinally of the rail and to have abutting engagement with said device to hold the clip positively against movement in the longitudinal direction of the rail relatively to said device.

32. A rail anti-creeper including a device to underlie a rail and a resilient clip adapted of itself when operatively positioned to frictionally engage a rail and to resist relative movement longitudinally of the rail and to have abutting engagement with said device to hold the clip positively against movement in the longitudinal direction of the rail relatively to said device, and means to hold the clip in operative engagement with the rail.

33. In combination, a rail clip adapted to overlie and underlie a rail base, and a spike adapted to be driven on the opposite side of said clip from a rail to hold the clip in rail gripping position, said clip having a hump past which the spike head may be driven and engageable with the top of the spike head to hold the spike down in clip holding position.

34. A rail anticreeper comprising an apertured plate to underlie a rail, a resilient clip to be inserted through the plate aperture and to frictionally engage the under surface of the plate and the upper surface of a rail base on said plate to resist relative movement of the rail and plate in the longitudinal direction of the rail, the said clip being held against movement by the rail relatively to the plate by its engagement in the plate aperture.

35. A rail anticreeper comprising an apertured plate to underlie a rail, a resilient clip to be inserted through the plate aperture and to frictionally engage the under surface of the plate and the upper surface of a rail base on said plate to resist relative movement of the rail and plate in the longitudinal direction of the rail, the said clip being held against movement by the rail relatively to the plate by its engagement in the plate aperture, and means inserted through the plate aperture in compression between the edge of the aperture and the clip and serving to hold the clip in operative relation with the plate and rail.

36. Means to yieldingly clamp together a rail and a device located thereunder compris-
ing a resilient clamping member looped at its upper end adapted by reason of resiliency developed from compression of the loop in application to press upwardly on the under surface of such device and to press downwardly on the upper surface of the rail base.

37. Means to yieldingly clamp together a rail and a device located thereunder comprising a resilient clamping member looped at its upper end adapted by reason of resiliency developed from compression of the loop in application to press upwardly on the under surface of such device and to press downwardly on the upper surface of the rail base, and means to hold the clamping member in operative position, the said clamping means being formed with a projection adapted to be displaced by application of the holding means and to return to normal position to releasably retain the holding means in holding position.

39. Means to yieldingly clamp together a rail and a device located thereunder comprising a resilient clamping member looped at its upper end adapted by reason of resiliency developed from compression of the loop in application to press upwardly on the under surface of such device and to press downwardly on the upper surface of the rail base, the said clamping member being in abutting engagement with said device to positively hold the same against movement relative to the device in the direction of rail length.

In witness whereof, we have hereunto set our hands.

FRANCIS W. COOPER.
HENRY STEADWORTHY.