The invention relates to a steel band for wooden railway sleepers, having two overlapping band parts, whereof one band part has a plurality of slots and the other band part has a plurality of stamped-out oblique noses, which engage the slots of the overlapping band part and thus lock the band parts under tension. Since, for various reasons, these stamped-out oblique noses have to be arranged comparatively close behind each other, these noses are comparatively short, so that while they lock the two band parts together under tension, they do not secure the two band parts adequately against being lifted off each other. This lifting off and hence complete loosening of the clamping band may occur on shrinkage of the sleeper or also even if the band is not tightened sufficiently.

To eliminate this drawback, it has been proposed to make one of these oblique locking noses, this being the last nose viewed from the band end, longer, and after overlapping of the band ends to bend this nose over backwards, i.e., in the direction of the band end, so that this nose serves as securing means against lifting off of the band parts. Since, however, in this case, this stamped-out securing nose has to be bent over by 180° altogether and in addition around sharp edges of the slotted band part, overstressing of this securing nose occurs, which even during bending round results in fracture thereof or cracking on the nose, so that subsequent fracture of this nose may occur, for example when such a bound sleeper falls off a stack of sleepers. A clamping band with this securing nose, therefore, has not been put to any practical use.

Hitherto, therefore, it has been necessary to use clamping bands provided with lateral slots on both band parts, these overlapping parts being then connected together by a special toothed fastener, engaging the slots of both band parts. This clamping band is not only more expensive to manufacture, but requires also a troublesome and time-consuming connection of the two band parts.

The present invention is based on the problem of making possible a satisfactory firm connection of the two band parts while obviating a special toothed fastener, i.e., in a clamping band of the simple type mentioned at the beginning, which connection prevents with maximum certainty loosening and lifting of the two band parts off one another. According to the invention, the end of the nose band part has a securing nose, which is longer than the locking nose and is arranged obliquely in the opposite direction to these noses, on overlapping passes through a slot of the slot band part and is made so long, that after bending over it prevents loosening and lifting off of the band parts. Since this securing nose arranged at the end of the nose band part, in this bending over, is bent back on the slot band part, that is to say, the angle of bend formed when this nose is stamped out is diminished again, there occurs, in contrast to the above-mentioned securing nose, no overstressing, but on the contrary, a strengthening of the nose by the cold work in bending back, the bending stresses produced on stamping out this securing nose being diminished or eliminated. This securing nose, provided according to the invention, therefore produces a reliable connecting together or securing of the two band parts against loosening and lifting off.
FIG. 6, overlaps the web 9 of the band part 2b over a considerable width b, lifting of the two band parts 2a, 2b off one another is also prevented. Bending over of the second securing nose 7 with the bent-over nose part 7a according to FIG. 6 produces effective securing against lifting of the band end 10 off the nose band 2a. Advantageously, according to the invention, not only the two securing noses 6 and 7, but also the locking noses 4 in addition are bent over on to the slot band part 2b, as is illustrated in FIG. 6 by the bent-over nose ends 4e.

A particularly favorable effect is obtained according to the invention with the use of pressing or striking rams 4 if both the two securing noses 6 and 7 and the locking noses 4 are bent over and pressed down on to the slot band part 2b by means of a ram or a plurality of rams with such considerable force that, as shown in FIGS. 6 and 7, considerable deformation occurs both of the nose ends 6a, 7a, 4a and of the webs 9 of the slot band part 2b pressed by these nose ends. If desired, first the securing nose 6 is bent over by means of a pressing or striking ram, and then bending over of the second securing nose 7 and the locking noses 4 is then effected by means of one or several rams. In this operation, by first bending over the securing nose 6, the band part 2b is displaced in the direction Z relative to the band part 2a, so that the locking noses are thereby pressed against the slot edges 11, whereupon by subsequent bending of these locking noses and securing nose 7, these noses are bent over the slot edges 11, as shown in FIG. 6, and pressed down.

If desired, a single ram may be used for bending over and pressing all the noses 6, 7 and 4, the pressing face of said ram being arranged parallel to the overlapped parts 2a, 2b.

Bending over and deforming carried out according to the invention with pressing or striking rams has many advantageous effects. It produces increased tensile strength of the two band parts. By the considerable deformation according to FIGS. 6 and 7, compression of the band parts is effected in such a manner that the tensile force Z according to FIG. 7 is applied to the noses 4 with a comparatively short lever arm a, which is less than double the thickness s of the two band parts. The bending moment acting on the nose will thus be considerably reduced, in contrast to the known construction according to FIG. 8. In the prior clamping band, the tensile force Z is applied to the upper slot edges 11 of the band part 2b, that is to say, with the lever arm a1 (equal to double the band thickness s) on the noses 4.

The strength of the connection is furthermore increased by the fact that the noses 4 are bent back opposite to their original angle of bend of about 60° (FIGS. 4 and 5) according to FIGS. 6 and 7, so that therefore the bending stresses produced in stamping out the noses are diminished. In addition, in the pressing operation according to the invention, the noses 4, 4a are upset, so that cold working and hence higher strength of the noses is produced.

By the compression of the two band parts 2a, 2b with considerable deformation, considerable frictional forces are set up between said parts, so that therefore loading of the noses by the tensile force Z is reduced by this frictional resistance. In this connection it should be borne in mind that in the stamping of the slots 5, the band part 2b is bent somewhat, so that on overlapping of the band parts, at first only the lateral edges 12 rest on the band part 2a, while the webs formed by the slots 5 are arched upwardly somewhat. Due to the powerful deformation according to the invention by means of pressing or striking rams, these webs 9 are then pressed down with the noses 4a, 6a, 7a, so that a powerful surface pressing extending over the entire area of the overlapped band parts 2a, 2b, and hence a high frictional force is produced.

By the bending over or pressing down of the locking noses 4 all the noses are brought to bear uniformly on the slot edges 11 so that the tensile force Z exerted on the band parts 2a, 2b is distributed entirely uniformly over all the locking noses, including the securing nose 7.

Since this last mentioned nose is bent over in the same direction as the securing noses, this securing nose according to FIGURES 6 and 7 has at the same time the effect of a locking nose and therefore also takes up the tensile force Z.

FIGURES 6 and 7 show that by the bending over and deformation of the locking noses 4, the nose ends 4a are so deformed that they are pressed not only by an edge but rather by a surface 13 in the width b on the webs 9.

Due to this overlapping of the locking noses in the width b therefore the locking noses also effectively prevent lifting off of the band part 2b, that is to say they support the securing function of the noses 6 and 7.

FIGURE 7 shows that due to the powerful pressure not only the noses 4a but also the webs 9 are deformed and are partly pressed into the openings 14 of the band part 2a, which have been formed by the stamping out of the noses 4. This pressing of the webs 9 into the openings 14 has the further effect that, in the absence of the tensile forces Z, loosening that is to say relative displacement of these band parts in the direction D is prevented by the fact that the pressed in webs 9 are pressed against the slot edges 15 of the band part 2a, that is to say they prevent this displacement and hence support the action of the securing nose 4a.

In the prior construction of a clamping band according to FIGURE 8 rectangular slots 16 with sharp corners are provided in the band part 2b. This construction means a considerable weakening of band part 2b with regard to tensile strength. For increasing this tensile strength according to the invention as may be appreciated from FIGURE 2, slots 8 are provided which are adapted to the noses 4 tapered wedge-shaped in width, that is to say they are trapezoidal, so that the tensile-stressed cross section, weakened by these slots, is reinforced. The tensile strength is also increased by the fact that the corners of these trapezoidal slots, at least however the corners 18 situated on the trapezoid base 17, are rounded so that the notch effect occurring under tensile stress is thereby eliminated.

According to FIGURE 8 in the prior construction the securing nose 19 shown in chain lines is bent in the direction B round the sharp edges 20 of the band part 2b into the final position 19a, which results in overstressing or fracture of this securing nose.

The clamping band according to the invention is not only suitable for hooping wooden railway sleepers but also for binding other wood parts such as for example trunks, beams or planks and the like. Such hooping is of particular advantage when fine wood is concerned.

What I claim is:

1. A clamping structure for an object, such as a wooden railroad tie, comprising:

   a clamping band snugly encircling said object, said band having two overlapped parts which are secured together, one of said parts being remote from said object and having a series of spaced-apart slots therethrough separated by web portions, the other band part being disposed between said object and said one band part and having a series of spaced-apart, substantially identical locking noses projecting toward said one band part and inclined at similar angles toward one end of said other band part, said other band part also having a securing nose projecting toward said one band part and inclined in the opposite direction with respect to said locking noses, said securing nose being longer than said locking noses, said noses being stamped out of said other band part so that openings are formed in said other band part below said noses and said openings are
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separated by further web portions, said noses projecting through said slots and the free end portions thereof being bent back toward said other band part so that they extend substantially parallel with said one band part and overlie and snugly engage the web portions of said one band part, the adjacent edges of the web portions of said one band part bearing tightly against all the noses between the ends thereof so that the band parts are held against lateral shifting and against relative vertical movement with respect to each other.

2. A clamping structure for an object, such as a wooden railroad tie, comprising:

a clamping band snugly encircling said object, said band having two overlapped parts which are secured together, one of said parts being remote from said object and having a series of spaced-apart slots therethrough separated by web portions, the other band part being disposed between said object and said one band part and having a series of spaced-apart substantially identical locking noses projecting toward said one band part and inclined at similar angles toward one end of said other band part, said other band part also having a securing nose projecting toward said one band part and inclined in the opposite direction with respect to said locking noses, said securing nose being longer than said locking noses, said noses being stamped out of said other band part so that openings are formed in said other band part below said noses and said openings are separated by further web portions, said noses projecting through said slots and the free end portions thereof being bent back toward said other band part so that they overlie and snugly engage the web portions of said one band part and extend generally parallel with said one band part, said web portions of said one band part partially overlying and snugly engaging the web portions of said other band part and the remainder thereof overlying said openings and being displaced downwardly into said openings so that the band parts are held against lateral shifting and against relative vertical movement with respect to each other.

3. A clamping structure according to claim 2, in which the securing nose is located at one end of the series of locking noses, and including a second securing nose located at the other end of the series of locking noses, said second securing nose being longer than said locking noses and being inclined in the same direction as said locking noses and being bent down into snug engagement with a web portion of said one band part.

4. A clamping structure according to claim 2, in which the slots are trapezoidal in form and all of the noses progressively narrow in width toward the free ends thereof.

5. A clamping structure according to claim 2, in which the corners of the trapezoidal slots are rounded.

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