The present invention relates to improvements in anchors for gratings.

Gratings such as used in floors and stair steps in industrial plants commonly have their edge portions supported by shelf-like projections secured to the structure of the building. Various expedients have been used for fastening the gratings to such supports, but all of those with which applicant is familiar have presented difficulties from a practical standpoint.

An object of the present invention is to provide an anchor for gratings which is simple in construction, easy to apply and effective in service.

A further object is to provide an anchor for gratings which is simple and cheap and yet possesses the necessary strength to perform its functions.

A further object is to provide a grating anchor which may be readily mounted in place from a position above the grating, which may be readily removed from operative position when desired, but is not at all likely to come loose in service.

A further object is to provide an improved grating construction and anchor therefor well adapted to meet the needs of commercial service.

Various objects will appear as the description proceeds.

Referring to the drawing:

Figure 1 is a fragmentary top plan view showing part of a grating having applied thereto an anchor embodying the principles of the present invention;

Figure 2 is a sectional view taken along the plane indicated by the arrows 2—2 of Figure 1;

Figure 3 is an end view taken in the direction of the arrows 3—3 of Figure 1;

Figure 4 is a sectional view taken along the plane indicated by the arrows 4—4 of Figure 2;

Figure 5 is a view similar to Figure 1 but illustrating the applicability of an anchor embodying the present invention of one size to a grating the main bars of which are spaced closer together than are the main bars of the grating illustrated in Figure 1;

Figure 6 is a top plan view of a main bar of a grating showing a modification of an anchor engaging lug struck out from said main bar;

Figure 7 is a sectional view taken along the plane indicated by the arrows 7—7 of Figure 6;

Figure 8 is a top plan view of a main bar of a grating showing a further modification of an out-struck lug for engaging an anchor according to the present invention; and

Figure 9 is a sectional view taken along the plane indicated by the arrows 9—9 of Figure 8.

In the grating illustrated in the drawing, the numerals 10—10 indicate main bars, which, as shown in Figures 3 and 4, are of general rectangular cross section. Said bars are disposed in parallel relationship with each other and their upper edges are recessed for the reception of cross bars 11. Said cross bars 11 are secured to the main bars 10—10 preferably by means of welding, the welding deposit being indicated by the numeral 12. The edge portions of the grate are commonly supported by shelf-like structures.

Figure 2 illustrates in cross section an angle bar, indicated by the numeral 13, suitable for this purpose. As shown in Figures 1 and 2, the adjacent ends of the parallel main bars 10—10 rest upon the horizontally extending flange of an angle bar 13. The present invention provides means for fastening said main bars 10—10 to said angle bars 13 whereby said main bars will be securely held down.

According to the present invention, two adjacent main bars 10—10 are provided with lugs 14—14 extending from adjacent sides thereof. It is at present preferred to swedge these lugs from the material of the main bars 10—10, said lugs 14—14 extending therefrom in cantilever relationship with their corresponding main bars 10—10. Assuming a grating having a substantially horizontal upper surface, the upper surfaces of the lugs 14—14 will be disposed at an angle of about 30 degrees from a horizontal plane. Said lugs 14—14 serve as abutment means for grating anchors embodying the principles of the present invention.

One of the advantages of the present invention is that the anchors may be applied by a workman located above the grating which is being secured in position. Another advantage is that one size of anchor will operate efficiently for gratings having different spacings between the main bars. A standard spacing between the main bars common in commercial gratings is about one inch. Another standard spacing between the main bars of commercial gratings is about three-fourths of an inch or a little less.

The anchor for cooperating with the lugs 14—14 of the main bars 10—10 is indicated by the numeral 15. Said anchor 15 is a channel member bent into substantial U-shape, having the two legs 16 and 17. The legs 16 and 17 may be provided with slots 18 and 19, respectively. Disposed within the slots 18 and 19 is the bolt 20 having the head portion 21 provided with the screw driver slot 22. Disposed between the head 21 and the adjacent portion of the leg 16 of the anchor
The washer 23 having a portion 24 adapted to be turned up against a flat portion of the head 21. Said head 21 is illustrated as being of hexagonal contour, this being a convenient shape for providing a flat side portion for cooperation with the turned up portion 24. The lower extremity of the bolt 20 is provided with the nut 25 which is located within the channel of the leg 17. Said channel receives said nut 25 with sufficient closeness so that turning of said nut in said channel is prevented. The lower extremity of the bolt 20 may be upset (as indicated by the numeral 26) after bolt and nut 25 have been assembled in the anchor 15.

The outer extremity of the leg 16 is swedged to provide a middle portion 27 and two tips 28 and 29. During the swedging operation the middle portion 27 will be raised slightly above the adjacent bottom of the channel forming the leg 16 to provide more or less rounded shoulders 30–30 adapted to abut against the lugs 14–14.

The material of the anchor 15 is bendable, and either or both of the tips 28 or 29, each being severed from the mid portion 27 in the swedging operation, may be bent down over one or both of the lugs 14–14 to hold the anchor against movement toward the left as the parts are viewed in Figures 1, 2 and 5.

Figures 6 and 7 illustrate another modification in the form of a lug for cooperation with the anchor 15. As shown in said figures the lower portion of each of the two adjacent main bars 10–10 is severed along one plane, indicated by the section line 33–33. In Figure 6, the adjacent metal being swedged to form an angularly projecting lug 31 adapted to form an abutment functioning similarly to the corresponding abutment 14 illustrated in Figures 1 to 5.

Figures 8 and 9 illustrate another modification, in which the lower edges of the two adjacent main bars 10 have portions swedged toward each other in the form of bulges, as indicated by the numeral 32. Said bulges 32 operate as lugs similarly to the functions of the lugs 14–14 illustrated in Figures 1 to 5 and the lug 31 illustrated in Figures 6 and 7.

In practice the dimensions of the horizontally projecting portion of the angle member 13 will vary. However, the anchor 15 will be sufficiently bendable and the length of the bolt 20 will be such as to accommodate the variations in the dimensions of the angle member 13 that are encountered in practice. Furthermore, by reason of the slots 18 and 19 in the legs 16 and 17 the bolt 20 may be moved back and forth. The bolt 20, washer 23 and nut 25 will be mounted in assembled relationship with the legs 16 and 17 and the extremity of the bolt 20 will be upset, preferably at the factory. At this time the edge portion of the washer 40 will be flat and both tips 28 and 29 will extend in generally parallel relationship with the mid portion 21 of the swaged end of the leg 16.

In mounting the anchors, the workman will be located above the top of the grating. The bolt 20 will be inserted to sufficient extent so that the two legs of the anchor can slip easily, one leg under the projecting flange of the anchor member 13, the other leg slipping over the lugs 14. Said lugs will have been swedged out at the factory at regions adjacent to the adjacent edge of the grating. The workman will hold up the anchor with a short length of wire, a piece of string, or the like, and will locate the anchor with respect to the lugs 14–14, so that the tips extend a short distance, say about a quarter of an inch, beyond the lugs 14–14, the shoulders 30–30 being useful for this purpose. The workman will then tighten up the bolt 20, using a screw driver or the like for this purpose. The workman will bend one or both of the tips 28–29 over the lugs 14. Inasmuch as the material of the anchor is relatively soft, the workman can easily bend one or both of the tips 28 or 29 without danger of pushing the anchor away from the lugs. After the bolt 20 has been tightened to the desired degree, the edge portion 24 of the washer will be turned up against a flat face of the head 21 of said bolt 20, whereby to prevent accidental turning of said bolt.

The anchor 15, being channel-shaped in cross section, will have requisite strength without sacrificing the factor of ready bendability of the tips 28 and 29.

As indicated above, in gratings as commonly sold in this country the minimum spacing between main bars is about three-fourths of an inch or a little less. The maximum spacing may be in the neighborhood of an inch. It is not necessary to stock more than one size of anchor to cover these differences in spacing between the main bars. In other words, an anchor having a maximum width of a little less than three-fourths of an inch will serve for the larger spacing referred to. The angularity of the swaged in lugs 14–14 or the swaged in lugs 31–31 or the swaged in lugs 32–32 will insure the symmetrical spacing of the anchors between the main bars.

By reason of the fact that one or both of the tips 28 or 29 is turned down over a lug of a main bar, there is no danger that the anchor will drop off into the region below the grating. Therefore, even if the bolt 20 should become loose there is no danger that the anchor would be lost.

Though a preferred embodiment of the present invention has been described in detail, many modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is:

1. A grating having parallel main bars and cross bars secured together, adjacent main bars having lugs spaced at one inch or less, each of said adjacent main bars adjacent to the bottoms thereof and spaced from said cross bars, said lugs being presented toward each other and providing upper surfaces sloping downwardly to the region between said bars.

2. A grating having parallel main bars and cross bars secured together, adjacent main bars having lugs swaged therefrom at regions adjacent to the bottoms thereof and spaced from said cross bars, said lugs being presented toward each other and providing upper surfaces sloping downwardly to the region between said bars, the angle of slope of said surfaces to the horizontal being approximately thirty degrees.

3. An anchor for securing a grating to a support comprising a U-shaped member of channel formation providing two legs, one of said legs having a bendable tip, a bolt extending through said legs, the head of said bolt having a non-round portion, a washer underlying said head and being non-turnable with reference to said anchor, said head and said washer being disposed within the channel formation of one of said legs, and a nut located in the channel formation of the other of said legs, said nut being non-turnable with respect to said other leg, said
washer having a portion adapted to be turned up against the flat portion of said head to prevent relative rotation therebetween.

4. An anchor for securing a grating to a support comprising a U-shaped member of channel conformation providing two legs, one of said legs having a bendable tip, a bolt extending through said leg, the head of said bolt having a non-rotatable with respect to said anchor, said head and said washer being disposed within the channel conformation of one of said legs, and a nut located in the channel conformation of the other of said legs, said nut being non-rotatable with respect to said other leg, said washer having a portion adapted to be turned up against the flat portion of said head to prevent relative rotation therebetween.

5. In combination, a grating having parallel main bars secured together, adjacent bars having lugs swedged therefrom presented toward each other, a support for said grating located under an edge portion thereof, and a U-shaped clamp embracing said support and said lugs.

6. In combination, a grating having parallel main bars secured together, adjacent bars having lugs swedged therefrom presented toward each other, a support for said grating located under an edge portion thereof, a U-shaped clamp embracing said support and said lugs, a bolt extending through the legs of said U-shaped clamp, and a nut on said bolt for holding said clamp in clamping position.

7. In combination, a grating having parallel main bars secured together, adjacent bars having lugs swedged therefrom presented toward each other, a support for said grating located under an edge portion thereof, a U-shaped clamp embracing said support and said lugs, a bolt extending through the legs of said U-shaped clamp, and a nut on said bolt for holding said clamp in clamping position, and a washer underlyiing the head of said bolt, said washer being non-rotatable with respect to said clamp and adapted to have a portion thereof turned up to prevent relative rotation between said bolt and said washer.

8. In an anchor, in combination, a U-shaped clamping member of channel conformation, one of the legs of said U-shaped member having a bendable tip at its extremity, a bolt extending through the legs of said U-shaped member, a washer underlyiing the head of said bolt and being non-rotatable with respect to said anchor, said washer having a portion adapted to be turned up against the head of said bolt to prevent relative rotation between said washer and said bolt, and a nut located in the channel conformation of one of the legs of said U-shaped member, said nut being non-rotatable with respect to said U-shaped member, the head of said bolt having a screw driver slot therein, the end of said bolt being upset whereby to prevent it from becoming disengaged from said nut.

9. In an anchor, in combination, a U-shaped clamping member of channel conformation, one of the legs of said U-shaped member having a bendable tip at its extremity, a bolt extending through the legs of said U-shaped member, a washer underlyiing the head of said bolt and being non-rotatable with respect to said anchor, said washer having a portion adapted to be turned up against the head of said bolt to prevent relative rotation between said washer and said bolt, and a nut located in the channel conformation of one of the legs of said U-shaped member, said nut being non-rotatable with respect to said U-shaped member, the head of said bolt having a screw driver slot therein.