Dec. 11, 1928. 1,694,633

A. E. WELLS

TOOL FOR MAKING GRATINGS

Filed March 18, 1927 2 Sheets-Sheet 1

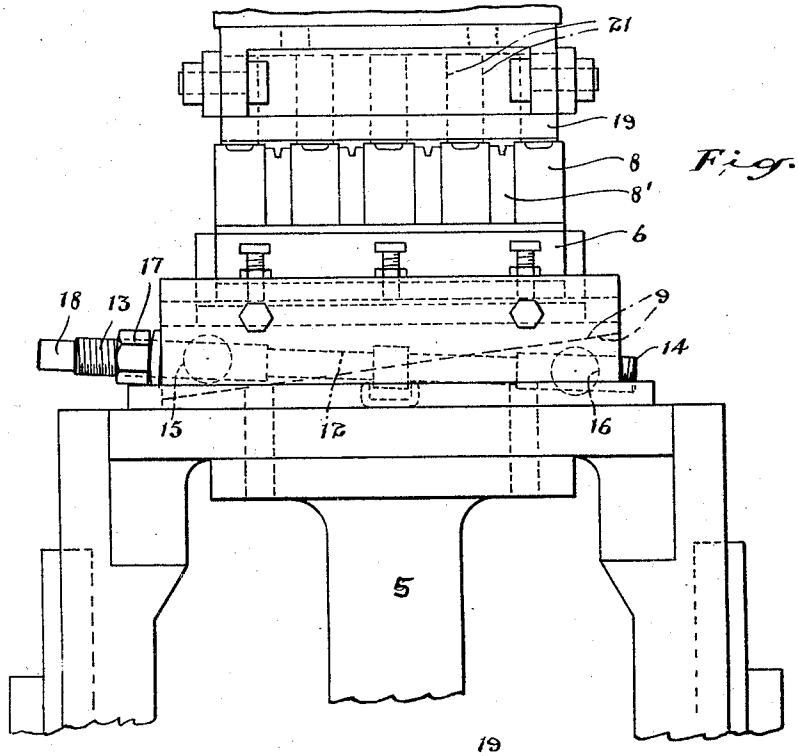


Fig. 1.

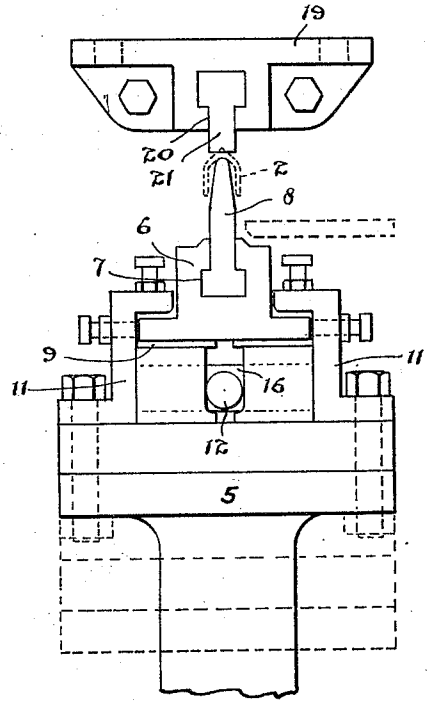


Fig. 2.

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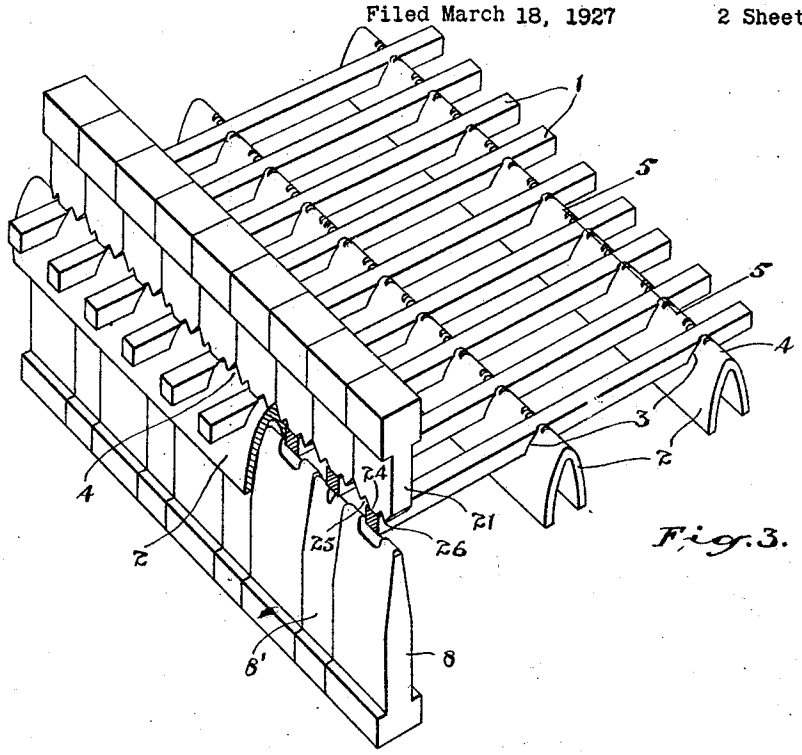


Fig. 3.

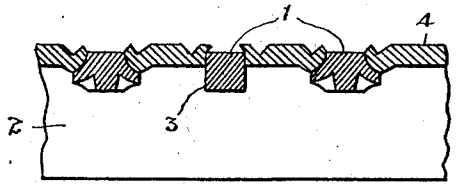


Fig. 5.

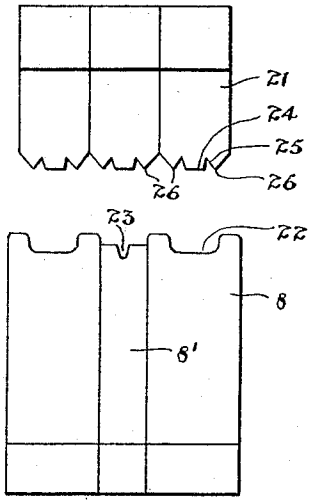


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TOOL FOR MAKING GRATINGS.

Application filed March 18, 1927. Serial No. 176,443.

The principal objects of the invention are, to simplify and reduce the cost of manufacture of interlocked bar gratings, and to provide a tool which may be easily and quickly adjusted and which will operate in a gang action on a plurality of bars.

The principal feature of the invention consists in the novel construction and arrangement of a gang of dies, whereby a plurality of spaced bars are rigidly connected to a cross supporting bar through the deforming action of the dies.

In the drawings, Figure 1 is an elevational view of a set of dies constructed in accordance with this invention.

Figure 2 is an end elevational view of the dies illustrated in Figure 1.

Figure 3 is a perspective view showing the dies in their relative position with respect to the bar members upon which they are to operate.

Figure 4 is an enlarged elevational view of a set of dies.

Figure 5 is an enlarged sectional view taken along the line 5—5 of Figure 3 showing the manner in which the bars of the grating are deformed.

The invention herein illustrated relates to the tools for performing a special operation in securing together all the bars of a grating such as shown and described in my United States Patent No. 1,620,846.

In constructing the grating a plurality of parallelly spaced square bars 1 are spaced and rigidly secured in their relative positions by the supporting inverted V bars 2.

The bars 2 are formed with notches 3 to receive the bars 1 and said notches are slightly deeper than the bars 1.

The metal of the apex 4 of the bars 2 is deformed to slightly overlap the top of the bars 1 and the underside of the bars 1 is deformed to engage the underside of the metal of the apex of the bars 2 to lock the said bars securely together.

In order to accomplish the above results in an economical and uniform manner that will produce a flat and uniformly shaped grating, it is desirable that the deforming of the several bars be accomplished in one operation.

In the construction shown, I provide upon the ram 5 of a press a holding block 6 which is formed with an inverted T-shaped slot 7 extending longitudinally thereof and in this slot are arranged a plurality of die blocks 8.

The holding block 6 is mounted upon longitudinally arranged wedge blocks 9 which are arranged in two pairs between the guides 11 secured to the ram.

The pairs of wedge blocks are operated by a threaded adjusting spindle 12, the oppositely threaded ends 13 and 14 of which engage tranverse trunnion members 15 and 16 which extend across the large ends of the respective pairs of wedge blocks.

A lock nut 17 is provided on one end of the spindle 12. The spindle is also provided with a squared end 18 by means of which it is turned with a wrench. This form of adjustment enables the raising and lowering of the die holding block so that it may be adjusted to the desirable position quite readily.

The upper die holder 19 which is adapted to be secured in the head of the press is provided with a T-shaped slot 20 in which the die blocks 21 are secured.

The die blocks 8 and 8′ are tapered at the upper ends to fit into the underside of the V bars and the upper edges of the blocks 8 are formed with notches 22 to receive the squared bars 1 without engaging same.

The blocks 8′ which alternate with the blocks 8 are slightly shorter than the blocks 8 and they are formed with narrow grooved notches 23, which notches are of a lesser width than the width of the bars 1.

The top edges of the blocks 8′ are adapted to engage the underside of the bars 1 and to press into same to squeeze the metal outwardly deforming it under the apex of the V bar so that the said bars are thus locked into the V bars.

The blocks 8 are considerably wider than the blocks 8′ so that the apexes of the blocks 8 engage the underside of the metal of the apex of the V bars at either side of the deformed portion of the squared bars.

The upper die blocks 21 are of uniform width and the bottom surface of each of these blocks is formed with a central anvil portion 24 and separated from the anvil portion by the notches 25 are the cutting edges 26 which are adapted to cut into the apex of the V bars.

In using the tools herein described, the bars 1 are assembled in the notched supporting cross bars 2 and the composite mem-

ber is placed between the dies with the flanges of the V bar straddling the dies 8 and 8'. Each alternate square bar extends through the notch 22 of the blocks 8 but the intermediate bars engage the tops of the blocks 8'.

As the upper and lower dies move toward each other the transverse cutting edges 26 of the upper blocks 21 cut into the apex of the V bars 2 at either side of the notch therein in which the bars 1 rest and the metal is forced inwardly, as is clearly shown in the sectional detail in Figure 5.

The top surfaces of the bars 1 are arranged slightly below the apex of the V bars and the cutting edges of the dies 21 cut into the bars 2 until the anvil portions 24 of said die blocks engage the top surface of the bars 1.

Simultaneously the movement of the lower set of die blocks presses the blocks 8' to shear into the metal of the squared bars at each side of the notch 22 therein and the metal is deformed at either side to spread into the underside of the V bar. The two bars are thus deformed in such a manner as to be rigidly interlocked.

There will be no looseness in the junction of the two sets of bars.

It will be seen that by the arrangement of the wide deep notches 22 in the die blocks 8 that each alternate bar 1 is deformed, leaving the other bars normal, as shown in Figure 5. The deforming operation is shifted in the securing of each cross bar so that the bars 1 are secured alternately by the deforming operation at every other bar.

A grating thus formed presents a very rigid structure and the tool for pressing the bars together in the manner described ensures uniform deformation of the bars and such deformation being effected entirely across the width of the grating at one operation, keeps the grating absolutely flat, thus avoiding kinks and irregularities in a surface that it is desired to have uniform.

What I claim as my invention is:—

1. A tool for making gratings, comprising a plurality of die blocks arranged in line and adapted to enter the underside of an inverted V bar, alternate blocks having their apexes arranged above the apexes of the intervening blocks, said intervening blocks having narrow notches therein, the edges of which are adapted to engage and deform bars extending through notches in the inverted V bars, and a plurality of die blocks adapted to engage the upper sides of said V bar and the intersecting bars.

2. A tool for making gratings, comprising a plurality of die blocks arranged in alignment having convergent tops, each alternate block having a wide central notch and the apexes adapted to engage the inner surface of an inverted V bar, alternate blocks of shorter length than the aforesaid blocks having rounded apexes with a narrow central notch, said narrow blocks being adapted to engage and deform the side walls of the cross bars extending through notches in the apex of said V bar to spread the metal thereof under the apexes of the V bar, and dies arranged above the aforesaid dies having central anvil portions to engage the bars resting in the notches in the V bar and having cutting edges arranged either side of the anvil adapted to cut into and deform the metal of the V bar at each side of the intersecting bar.

3. A tool for making gratings of the type having a plurality of straight parallelly arranged bars rigidly secured by parallel cross bars, comprising die blocks adapted to engage and deform portions only of said sets of bars at their intersections into overlapped interlocked relation to secure said bars together leaving the same in their straight form.

4. A tool for making gratings of the type having a plurality of straight parallelly arranged bars rigidly secured by parallel cross bars, comprising die blocks adapted to engage and form notches in both sets of said bars at each side of their points of intersection and deform the metal to interlock said bars without bending.

5. A tool for making gratings of the type having a plurality of straight parallelly arranged bars rigidly secured by parallel cross bars comprising die blocks adapted to engage and notch the metal of one set of bars to overlap the other set of bars and to notch the metal of the secondary set of bars to interlock with the overlapping parts of the other set.

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