Dec. 21, 1965 D. D. MUSGRAVE 3,224,736

BARBED STRIP

Filed May 31, 1963

FIG. 1.

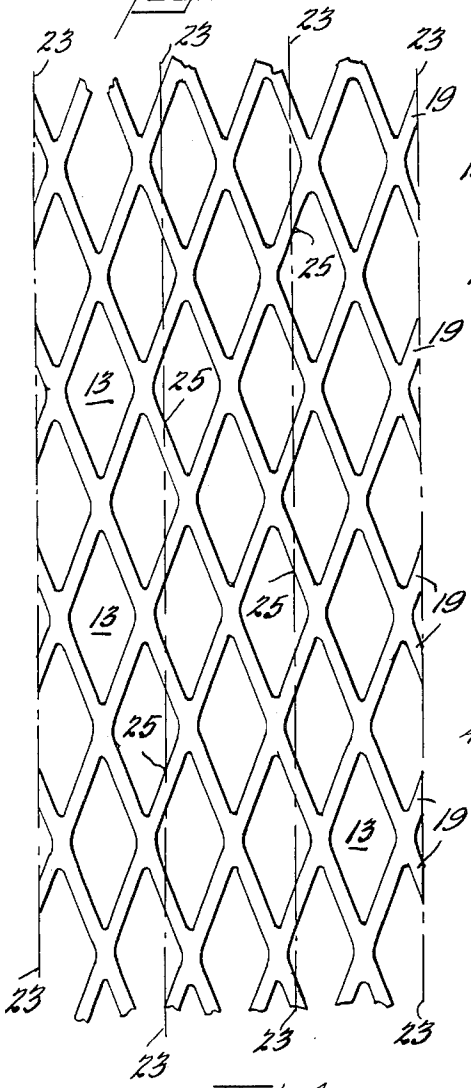


FIG. 2.

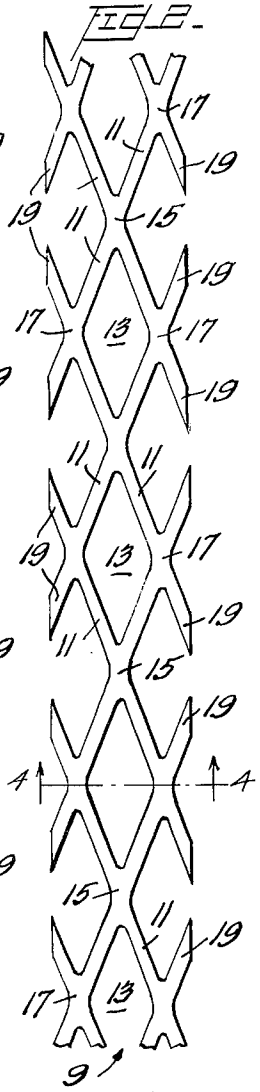


FIG. 3.

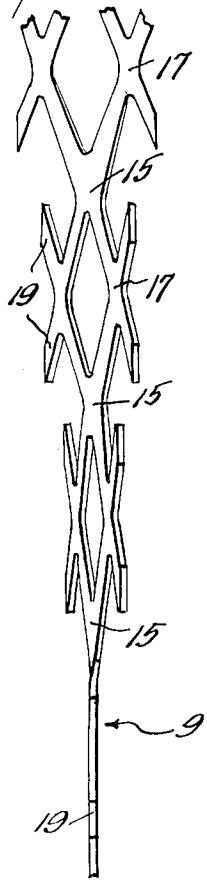


FIG. 7.

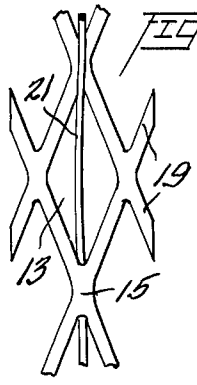


FIG. 4.

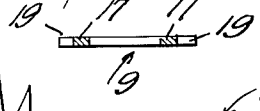
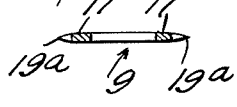


FIG. 5.



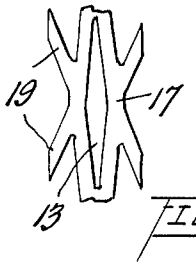


FIG. 8.

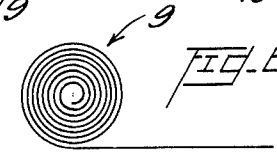


FIG. 6.

United States Patent Office 3,224,736 Patented Dec. 21, 1965

3,224,736

BARBED STRIP

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Filed May 31, 1963, Ser. No. 284,468
16 Claims. (Cl. 256—8)

This invention relates to a barbed strip for use in barricades or barbed entanglements employed in military operations and for forming fences and other barriers. It has been common practice to employ for these purposes ordinary woven wire made up of two metal wires twisted together longitudinally in helical fashion and having interlocked therewith at intervals barbs formed of curled sections of wire having projecting sharp ends. Such wire is awkward to handle for it is normally transported from the factory to the ultimate user in coils with many of the barbs exposed. Furthermore, the rolls or coils are very bulky.

Flat strips with barbs along their edges have the distinct advantage that they can be coiled on a reel. In this compact form they occupy relatively little space and the sides of the reel can cover the barbs, thus protecting the person handling the material. These strips are adapted for longitudinal twisting when in use in order to orient the barbs at several radial angles from the strip. Such a strip is disclosed in U.S. Patent No. 3,010,701, granted to Klemm.

The principal object of this invention is to provide a barbed strip and process for fabricating the same.

Another object is to provide such a strip which can be fabricated with minimum scrap loss.

Another object is to provide such a strip having considerable longitudinal flexibility.

Another object is to provide such a strip having considerable torsional or twist flexibility.

Another object is to provide such a strip which is adapted for reinforcement when used as an obstacle against heavy masses such as vehicles.

Another object is to provide such a strip which is adapted for easy attachment to structures such as fence posts.

Another object is to provide such a barbed strip which will be economical to fabricate.

These and other subjects and advantages of the present invention will become apparent upon consideration of the following detailed description taken in conjunction with the accompanying drawings in which:

FIGURE 1 shows a portion of a sheet of expanded metal and cutting lines to show how it may be cut into barbed strips.

FIGURE 2 shows a portion of a barbed strip embodying the principle of this invention, in its flat state.

FIGURE 3 shows a portion of barbed strip similar to that shown in FIGURE 2 but twisted about its longitudinal axis.

FIGURE 4 is a section taken in the plane indicated by numerals 4—4 on FIGURE 2.

FIGURE 5 is similar to FIGURE 4, but includes a modification.

FIGURE 6 shows the untwisted barbed strip in the form of a coil and drawn to a reduced scale.

FIGURE 7 shows a barbed strip reinforced for heavy-duty usage.

FIGURE 8 shows a portion of a barbed strip similar to that shown in FIGURE 2 but stretched longitudinally, thus changing its shape.

Referring to the drawing there is shown in FIGURE 2 a barbed strip **9** having a plurality of lattice members **11** which form diamond shaped openings **13**. It will be noted that openings **13** have the long dimension of their diamond shape substantially in alignment along the strip. Between each two diamond shaped openings the strip has

a neck portion **15** which may be fabricated with a width substantially greater than that of the lattice members **11**.

A similar neck portion **17** is formed at each place where two lattice members **11** meet to form the obtuse angle of the diamond shaped opening. Extending from neck portions **17** are barbs **19** which are substantially prolongations of lattice members **11**. FIGURE 4 shows a cross-section of the strip shown flat in FIGURE 2. In FIGURE 4 it will be noted that barbs **19** are approximately the same thickness as the rest of strip **9**.

To increase the effectiveness of the barbs they can be subjected to some suitable forming operation, such as rolling, to taper them as shown in FIGURE 5, where the modified barbs are numbered **19***a*.

Barbed strip **9** can be coiled as shown in FIGURE 6 to form a coil the convolutions of which are superposed upon each other. This is convenient for storage and transportation.

When used as an obstacle or barrier strip **9** may be twisted about its longitudinal axis as shown in FIGURE 3. Twisting the strip causes radial displacement of barbs **19** relative to each other so that the barrier is effective in all directions.

The lattice construction of the strip permits considerable flexibility for coiling and twisting. It also provides a certain flexibility along the length of the strip, thus assisting in preventing rupture due to tensile strains during rough usage.

If exceptionally severe usage is contemplated, such as occurs in the case of barriers intended to stop moving vehicles, the strip can be reinforced by interlacing a wire or cable **21** through openings **13** and affixing it to the same structure to which strip **9** is attached. A reinforced strip is shown in FIGURE 7.

Strip **9** can easily be attached to various supports by well known methods. Staples can be used around necks **15** or broad-headed nails can be used in openings **13**.

Barbed strip of the type illustrated generally in FIGURE 2 can be economically produced by slitting sheets of expanded metal along cutting lines as indicated by broken lines **23** on FIGURE 1 which shows a portion of a sheet of expanded metal. Expanded metal is available in a variety of material, of various thickness and with geometrical variations of lattice and opening arrangement. It being commercially available there is no need to technically describe it here. The shape shown was merely selected for convenience and is not to be considered limiting.

By proper selection of the cutting plane **23**, intersections **25** of the said cutting plane with lattice members **11** occur at an acute angle thus forming barbs **19**. Cutting plane **23** lies substantially parallel to the long dimension of diamond shaped openings **13**.

Fabrication of barbed strip from expanded metal involves minimum scrap loss, the only metal discarded being that trimmed from the side of the sheet.

The barbed strip shown in FIGURE 2 might be lengthened by stretching it longitudinally and thus causing openings **13** to become more narrow. A portion of such a modified strip is shown in FIGURE 8.

It is apparent that strip produced in the above described manners can be subjected to further well-known processes to modify physical properties, add protective coating, or otherwise improve the product.

What I claim is:

1. A barbed strip having a substantially flat cross-section and comprising: lattice members forming quadrilaterals each having one diagonal substantially parallel to the longitudinal axis of said strip; a first neck portion joining each adjacent pair of said quadrilaterals substantially at the junction of said diagonals; second neck por-

tions at each end of the other diagonal of said quadrilaterals; and pairs of barbs extending from each said second neck portion at acute angles relative to said longitudinal axis of said strip.

2. A barbed strip having a substantially flat cross-section and comprising: lattice members forming parallelograms having their major diagonals substantially parallel to the longitudinal axis of said strip; a first neck portion joining each adjacent pair of said parallelograms at the vertices of the acute interior angles of said parallelograms; second neck portions at the vertices of the obtuse interior angles of said parallelograms; and pairs of barbs extending from each said second neck portion at acute angles relative to said longitudinal axis of said strip.

3. The strip set forth in claim 2 further characterized by each of said parallelograms being a rhombus.

4. The strip set forth in claim 2 further characterized by said strip being twisted around said longitudinal axis.

5. The strip set forth in claim 2 further characterized by said strip being coiled into a coil.

6. The strip set forth in claim 2 further characterized by said strip being adapted for retaining a twist.

7. The strip set forth in claim 2 further characterized by flexible reinforcing means interlaced through said parallelograms substantially parallel to the main axis of said strip.

8. The strip set forth in claim 2 further characterized by the obtuse interior angles of said parallelograms being substantially greater than the obtuse angle between barbs of each pair of barbs extending from each said second neck portion.

9. A barbed strip comprising: a series of flat lattice units joined together longitudinally, said lattice units having substantially the shape of open quadrilaterals with two pairs of neck portions; the first of said pairs of neck portions consisting of material of said strip whereby said units are joined together; and the second of said pairs of neck portions having barbs protruding therefrom.

10. A barbed strip as set forth in claim 9 further characterized by said lattice units having substantially the shape of open parallelograms.

11. A barbed strip as set forth in claim 9 further characterized by said lattice units having substantially the shape of open rhombi.

12. A barbed strip as set forth in claim 9 further characterized by said strip being twisted around the longitudinal axis of said strip.

13. A barbed strip as set forth in claim 9 further characterized by said strip being coiled into a coil.

14. A barbed strip as set forth in claim 9 further characterized by said strip being adapted for retaining a twist.

15. A barbed strip as set forth in claim 9 further characterized by flexible reinforcing means interlaced through said lattice units and substantially parallel to the main axis of said strip.

16. A barbed strip as set forth in claim 10 further characterized by the obtuse interior angles of said lattice units being substantially greater than the angle between barbs of each pair of barbs extending from each said second neck portion.

References Cited by the Examiner

UNITED STATES PATENTS

276,039	4/1883	Hewitt	140—58
444,957	1/1891	Jordan	256—8
1,454,584	5/1923	Gosser	256—8
2,392,223	1/1946	Brickman	140—58
2,720,227	10/1955	Stockton	140—58
2,908,484	10/1959	Uhl	256—8
2,940,732	6/1960	MacChesney	256—8
3,010,701	11/1961	Klemm	256—8

FOREIGN PATENTS

835,584	9/1938	France.
746,940	3/1956	Great Britain.

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