FENCING PRODUCTS: MANUFACTURE, AVAILABILITY, AND USE

By Allan Ranson,
Livestock Development Officer (Cattle),
Lae

How many farmers know that many of the iron and wire products that they use on their farms are actually made in Papua New Guinea?

Titan New Guinea Pty Ltd, Lae, make a wide range of products which play an important role in the development of the smallholder livestock industries such as beef cattle, pigs, poultry, sheep and buffaloes. The products available to farmers which are made in Lae include:-

1) Nails — in all sizes — 25 mm to 150 mm.
2) Barbed wire — both high tensile and Iowa pattern.
3) Chain wire mesh.
4) Iron fence posts — (Waratahs).
5) Bright wire 11 mm to 3.15 mm.

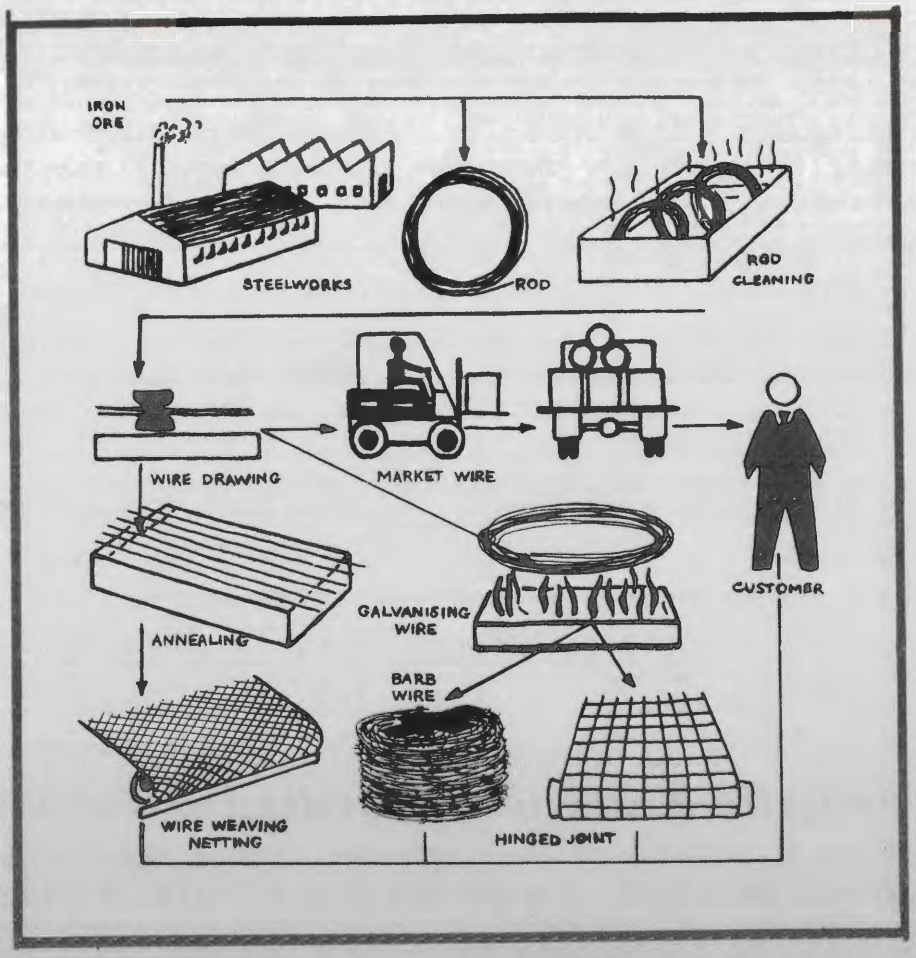
Other products important to farmers include:-

Hinged joint wire (pig wire).
Tie wire.
Plain fence wire — both heavy and standard galvanized.
Wire netting and staples.

How are these products made?

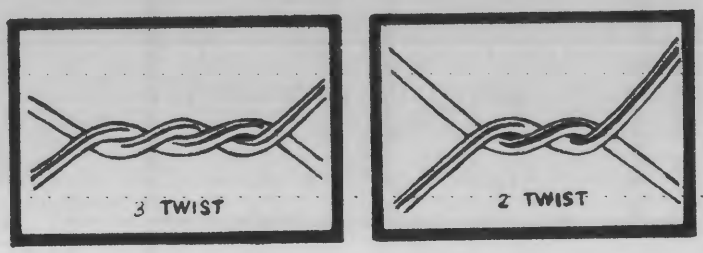
1) NAILS — Titan receives the "raw material" from the B.H.P. Steelworks in Australia. This is known as Hot Rolled Steel Rod and is in large rolls ranging in diameter from 12.5 mm to 5.5 mm. These rods are reduced to the desired size by being drawn or pulled through a tungsten carbide die. This process is known as Wire Drawing. (See Diagram 1). During this process the physical properties of the steel change, it becomes much harder and the tensile strength (ability to withstand stretching) increases. After the wire is reduced to the correct size it is cut to the required nail length, the point sharpened and the head formed.

Diagram 1. Manufacture of steel wire products



2) BARBED WIRE – This is made by feeding two strands of 2.5 mm (12.5 guage) standard or heavily galvanized wire into a machine which twists them and wraps the barbs around the two twisted wires. This is known as the Iowa pattern or "continuous twist". High tensile, heavily galvanized, 1.6 mm (16 guage) barbed wire has a reverse twist pattern so that it runs out flat when unreeled.

Diagram 2. Types of twist



Heavily galvanized wire carries approximately three times as much zinc coating as standard galvanized. This gives three times the life expectancy of the standard wire and compensates for the additional cost of the zinc coating. Because the heavy galvanized coatings give a longer life, a smaller high tensile wire can be used to give the same strength as the bigger Iowa pattern wire, thus the ex-factory prices for high tensile barbed wire are less than for Iowa pattern.

3) CHAIN WIRE MESH – This is made by feeding 2.5 mm (12.5 guage) galvanized wire into a machine which twists it and threads it into chain form which is suitable for security purposes. 3.15 mm (10 guage) and 4.0 mm (8 guage) wire can also be used.

4) IRON FENCE POSTS – The Y bar is imported from Australia in 7.35 m lengths. The factory cuts the bar into the correct lengths as required, sharpens the points, punches the holes and then black varnishes. The posts are available in lengths from 1.70 m to 1.80 m, and 2.1 m to 2.4 m.

5) BRIGHT WIRE – This is made by drawing the hot rolled steel rod down to the desired diameter in the process described for nails. This is used for making weldmesh. In Lae, weldmesh is made by A.R.C. Engineering Company.

Knots:

There are many different types of knots which can be used in fencing. Any type of knot actually lowers the breaking strain of the wire. In plain wires, the Figure of Eight knot (see Diagram 3) decreases the breaking strain the least and is probably the most common one used.

The Pin and Loop knot is the best where short strains are used and a minimum ammount of tension is to be lost.

With barbed wire the barbs help to improve the holding power of the knot by acting as an anchor.

Diagram 3. Knots in fencing wire

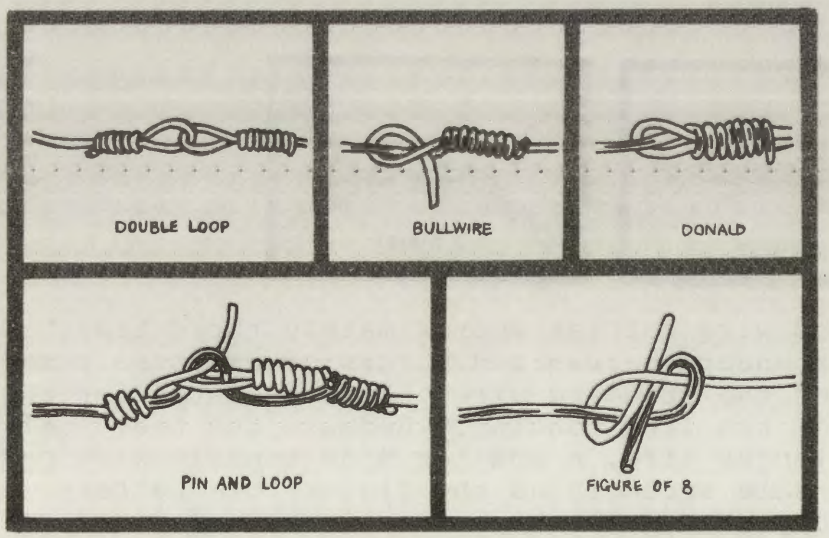
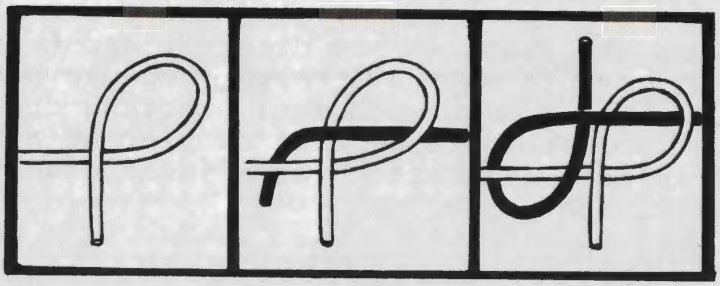


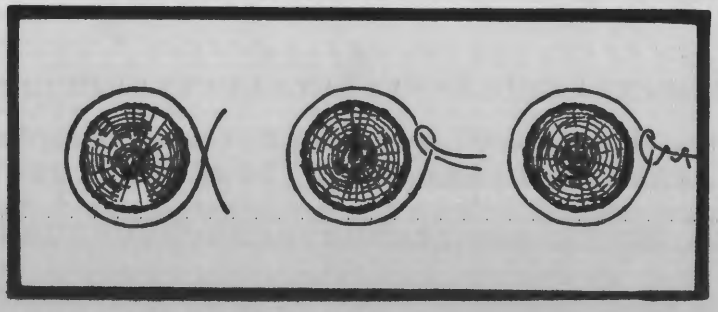
Diagram 4. Method of tying figure of eight knot



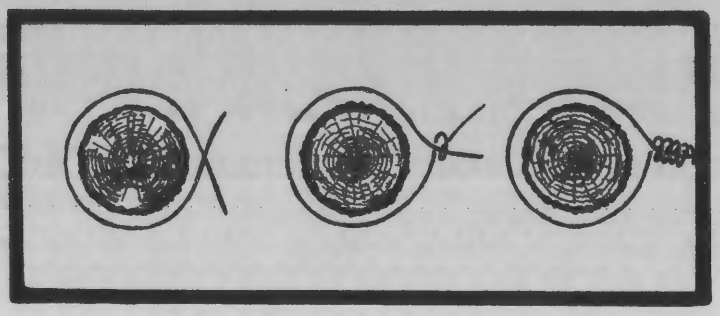
Tying off Wire to Strainer Posts:

A recommended method of tying off wire at strainers is as shown in Diagram 5 (5a right and 5b wrong).

Diagram 5. Tying off to posts



5a. Right



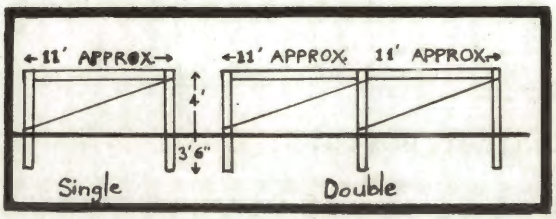
5b. Wrong

Strainer Assemblies:

A fence end should be immovable. A small movement of the strainer assembly results in a large loss of tension in the wires of a fence. There are several types of strainer end but the one

recommended is the horizontal stay type (see Diagram 6). In this method a wooden rail is placed horizontally between two posts and two strands of 4.0 mm (8 gauge) plain wire are placed diagonally between the posts — see diagram, and twitched tight. In very wet conditions it may be necessary to use a double horizontal stay. The common method of erecting strainers as practised by most smallholders — that of placing a thin diagonal into the ground is not satisfactory as in most cases it does not give any support to the fence.

Diagram 6. Horizontal stays



Fence Posts:

A fence post does two basic things:-

1. It supports and spaces the wires.
2. Prevents the fence from falling over.

On flat ground posts should be approximately 9 metres apart. This will vary on hilly or undulating ground where it is not possible to have regular spacings. In these areas, posts should always be at the top of rises and at the bottom of depressions. Wider spacing, (up to 30 m) are possible if high tensile wires are used. This type of fencing is known as suspension fencing (see article Harvest Volume 4 No. 1).

Droppers: Are used between posts to keep wires evenly spaced. They also transfer the stock load from one or more wires to all of the wires. Timber or wire are the most common types used.

Choice of Wires:

Fencing wire is available in two types:

Standard and High Tensile.

1. Standard (or soft) — available in 4.0 mm, 3.15 mm (most common) and 2.5 mm diameter with standard galvanised finish and can be used for most fencing jobs. It is relatively soft and can be re-strained many times, it has a lower chance of being overstrained and knot tying is fairly easy. Disadvantages are heavier weight, shorter strainer lengths, closer post spacing and because the wire stretches it is difficult to maintain tension.

2. High tensile wire is available in PNG in 2.5 mm. Advantages:- (i) is much tighter and easier to carry (ii) longer strains and fewer posts and (iii) overall cost advantage.

   Disadvantages:- (i) slightly harder to work with (ii) need for more accurate straining and (iii) lower

resistance to long term corrosion, and to damage caused by fire.

Handling of wire:

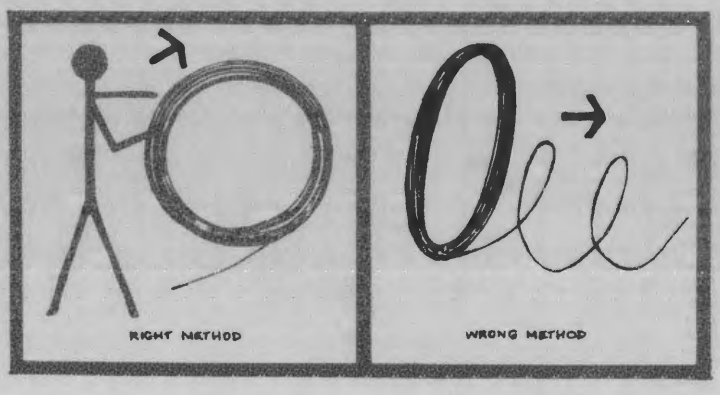
Plain wire should always be "bowled" along the ground to run out the wire. The loose end should never be pulled away from the coil (see Diagram 7).

Barbed Wire — A strong stick or iron bar should be placed through the centre of the reel. People support each end and walk along the fence line after fastening one end of the wire to a straining post.

Tension — The properties of wire can be destroyed by over straining, making the wire almost useless by stretching it past its elastic limit so that it will not return to its original length. Under load it will continue to stretch until it breaks.

Effect of Temperature on Tension — Wire will contract (become shorter) as temperatures fall and become slacker (increase in length) as temperatures rise. Thus fires have a bad effect on wires, especially high tensile wires which can unravel if burnt by fire. However, softer wires and Iowa pattern barbed wire will withstand the effects of fire much better.

Diagram 7. Handling plain wire



Diagrams: Meg van Gelderen