

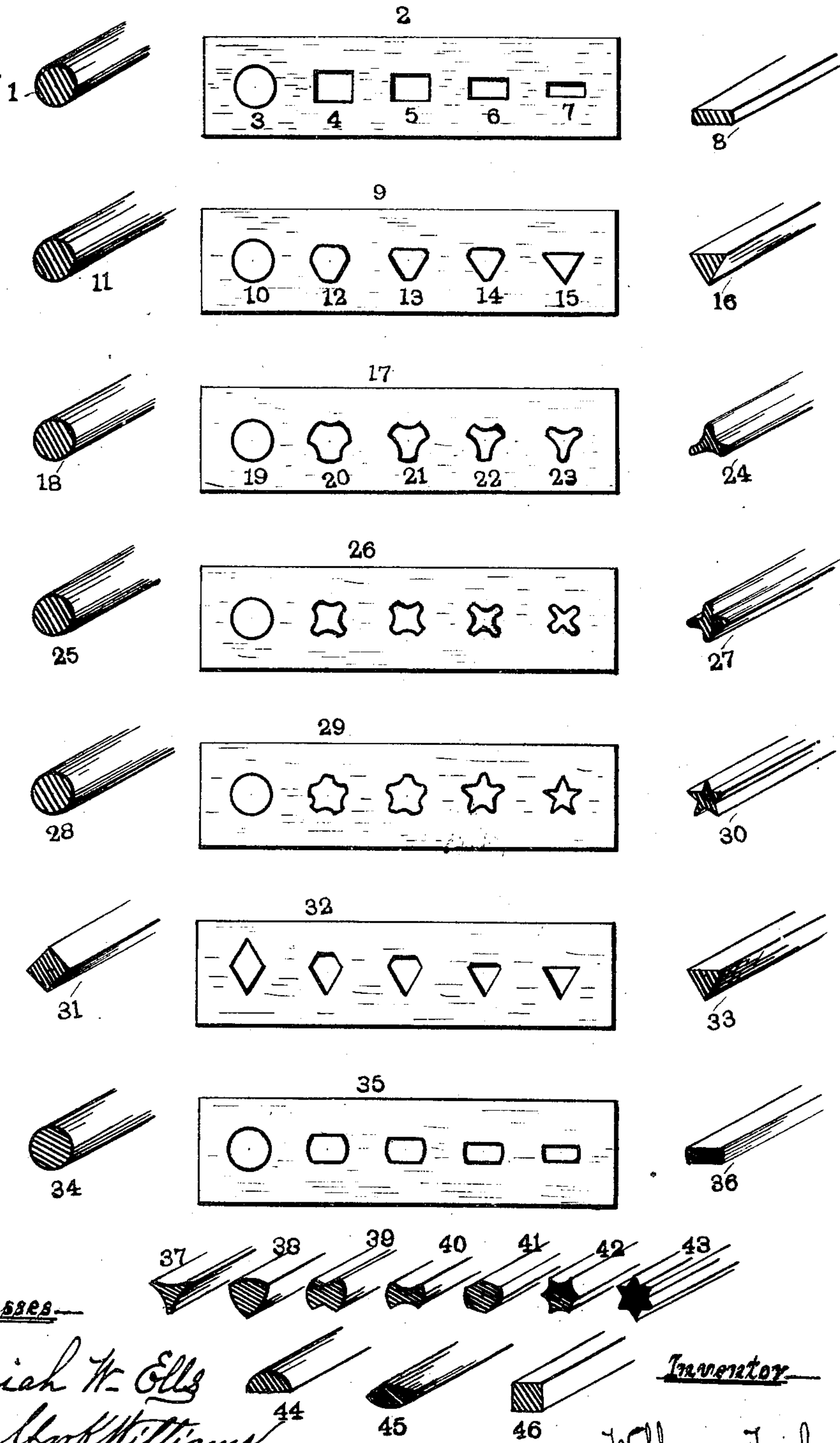
(No Model.)

W. TAYLOR.

DRAW PLATE.

No. 414,090.

Patented Oct. 29, 1889.



Witnesses

*Josiah W. Ellis*  
*James Clark Williams*

Inventor

*William Taylor*



# UNITED STATES PATENT OFFICE.

WILLIAM TAYLOR, OF ALLEGHENY, PENNSYLVANIA.

## DRAW-PLATE.

SPECIFICATION forming part of Letters Patent No. 414,090, dated October 29, 1889.

Application filed December 12, 1888. Serial No. 293,411. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM TAYLOR, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Devices for Manufacturing and Producing Wires of Various Shapes, of which the following is a specification.

That others may fully understand my invention, I will briefly state that the old process of wire-drawing consists in passing a suitable metallic rod or wire through a series of holes of less diameter, each of the same form, but of gradually-diminished size, whereby the whole circumference of the wire is affected, and its body attenuated, lengthened, and changed with a proportionable reduction of its diameter.

To enable others skilled in the art to fully understand my invention and put the same into practice, I will proceed to describe my improved means for manufacturing or drawing wire from one shape into that of other and different shapes by reference to the accompanying drawing.

For the purpose of converting a round rod 1 into a flat wire, I prepare a strong metallic plate 2 and provide the same with a series of transverse holes, the first of which corresponds in general outline with the circumference of the rod or wire to be operated on, and through this first hole 3 the rod 1 or initial wire is drawn for removing therefrom any undue roughness and giving it uniformity of size preparatory to converting it into other and different shapes. The wire is passed successively through the other holes of the series, whose outlines are rectangular parallelograms all of equal length and differing only in being consecutively less in width. The wire when drawn through the second hole 4 has two sides of said wire depressed, making them flat and leaving its edges round. The wire is then drawn through the third hole 5, which increases the width of its flattened surfaces, bringing them nearer together. The wire is next drawn through the fourth hole 6, which not only increases the width of its plain surfaces, but nearly squares its rounded edges. The wire is finally drawn through the fifth hole 7, which causes it to

assume the exact shape of said hole, whereby a flat rectangular wire 8 is produced, having a width equal to the diameter of the original rod or initial wire.

To convert a round wire to one of triangular form, I employ a draw-plate 9, having a series of holes all of equal width that gradually and consecutively change in outline from a complete circle to that of a complete triangle, and through these several holes in regular sequence the wire is drawn to bring it to the desired shape. After being drawn through the circular hole 10, for purposes hereinbefore stated, the wire 11 is passed through the second hole 12, which differs from a circle in having three equidistant and equal portions of its circumference bounded by three straight lines arranged at an angle of sixty degrees to each other, the intermediate portions of its circumference retaining a curvilinear form corresponding to the outline of the first or circular hole. The rod on passing through this second hole 12 assumes its shape by being elongated and depressed to the extent of having three equidistant portions of its surface flattened, each equaling in breadth one-sixth of its circumference. After its passage through the second hole 12 the wire is drawn through the third hole 13, which is similar in shape to that of the second hole, but differs therefrom in that its curvilinear faces or sides are narrowed and its straight ones proportionally widened. On passing through this third hole 13 the wire has its form brought to a corresponding shape. The wire is next passed through the fourth hole 14, which is so shaped as to further increase the width of its flat sides and lessen its curved portions. The wire is subsequently and finally passed through the fifth hole 15, whereby it is given the shape of a triangular wire 16, having three plain sides which meet in three parallel lines or angles, the corners or edges of which will each touch at equidistant points the original circle of the first hole when placed therein. Thus from a round wire one of triangular form is produced, each side equaling in width the diameter of the original or initial wire, and the three sides its circumference.

To convert a round wire into one having a trifoliated form a similar structure of draw-



plate 17 to that just described is used, and the holes are the same with this exception, that instead of having portions of their outline in right or straight lines those parts in this plate 17 form inward reverse curves constituting convex surfaces each separated from the other by portions that, if continued around the hole, would make a complete circle. The wire 18 is to be drawn through the first or circular hole 19 for purposes previously stated, and then through the second hole 20, whereupon the wire will have three separate portions of its circumference depressed, furrowed, or fluted, while the intermediate portions will retain their original form. By drawing it through the third hole 21 the furrows or flutes will be made deeper and wider. On its passage through the fourth hole 22 it will take the shape of a triangle having three concave sides separated by undisturbed parts of its original circumference. The fifth hole 23 is so shaped that the wire on being drawn through it will assume the form of a trifoliate or three-ribbed wire 24, having rounded edges and concaved sides, the extremities occupying the same relative position they did originally, each being separated from the other a distance equal to the diameter of the initial wire, and with an outline equaling its circumference.

To convert a round wire 25 into one having the form of a cross, a similar draw-plate 26 is used as that just described for making three-ribbed wire, the difference being that the several holes gradually change from a complete circle into the form of a cross, whereby the original wire as it is drawn through them in regular sequence is caused to assume the shape of a cross or four-ribbed wire 27, the extremities of which are separated from each other a distance equaling the diameter of the original round wire and with an outline equaling its circumference.

To convert a round wire 28 into one having the form of a five-pointed star, a draw-plate 29 is used, having holes that gradually change from a complete circle into the form of a five-pointed star, whereby the original wire as it is drawn through them in regular sequence is caused to gradually assume the shape of a five-pointed star or wire 30 having that shape, the several extremities of which occupy the same relative position to each other that they did in the original round wire. Therefore the diameter is the same.

To convert a square wire 31 into one of triangular form, a draw-plate 32 is used, having holes that gradually change in shape from a complete rhombus into the form of a complete triangle; whereby the original square wire 31 as it is drawn consecutively through them is caused to assume the shape of a triangular wire 33, each side thereof equaling in width the distance between the widest-separated corners or angles of the original square.

To convert a round wire 34 into one having flat sides and rounded edges, a draw-plate 35

is used, having holes that gradually change from a complete circle into the form of an oblong having straight sides and rounded ends, whereby the original round wire 34 as it is drawn consecutively through them is caused to assume the shape of a flat wire 36, having rounded or curved edges and of a breadth equaling the diameter of the original round wire.

The several and various shapes of wires represented in the drawing, numbers 37 to 46, inclusive, may, by the means and process described or similar means, in like manner be produced from round or square wire without undue strain or lessening the original diameter or width of the same.

I am aware that in the manufacture of wire draw-plates have been used having a series of many holes of gradually-decreasing size, and that wire has been drawn through them for increasing its length and reducing its diameter. I am also aware that by similar means wire has been drawn into various complex shapes; but in all such methods of manufacture the whole and entire surface of the wire has been subjected to the action of the draw-plate and reduced at each and every pass through its holes. The old method of manufacturing wire is to attack its entire surface and reduce its diameter at each and every pass. Under such harsh treatment the wire becomes very hard, requiring repeated annealings, which not only softens the wire, but oxidizes and roughens its surface, making it unfit for further drawing until the oxide is removed by a pickling and washing process. Even then it is more severe on the draw-plate and the wire is not so smooth as it would be were these things avoided.

In the practice of my invention the wire has a part only of its surface acted upon at each pass through the successive holes in the draw-plate, the remainder of its surface being unaffected and left in its original condition. Thus much friction is avoided. It is easier on the draw-plate and less severe on the wire, which does not become so hard under the drawing process as to require extra annealing and subsequent pickling. By my improved methods of wire-drawing the fiber, filaments, and molecules of metal under strain are given an opportunity to adjust themselves with relation to other and different portions not under strain, whereby the wire remains stronger and less liable to tear or break while undergoing the drawing process. Nor is the original surface or "skin" on the wire mutilated or injured, but is simply spread, condensed, and forced into a different shape, leaving the wire in that respect as proportionably strong as it was primarily.

By the means and process described wire of one form is converted into another and different form without any intermediate annealing. Therefore it possesses a smoother, harder, and better surface, that adds to its quality, improves its appearance, and en-



hances its value, as it is stiffer, brighter, and less liable to rust. In that respect it is particularly useful for manufacturing into wire nails and various things known in the arts.

5 Having thus described my invention and the means employed, I claim—

1. For the purpose of manufacturing wire by successive passes, a draw-plate provided with a series of separate holes each differing  
10 from the other in shape or form and having the same diameter or breadth between the widest-separated portions or extreme points of outline.

2. For the purpose of manufacturing wire  
15 by successive passes, a draw-plate provided with a series of separate holes each differing from the other in shape or form and having the same extent of outline and the same diameter or breadth between the widest-separated  
20 arated portions or extreme points of outline.

3. For the purpose of manufacturing wire by successive passes, a draw-plate provided with a series of separate holes each of the same diameter and having parts which conform to the shape of the initial wire and other  
25 intermediate parts which vary from said shape and successively vary from each other in their widths.

4. For the purpose of manufacturing wire  
30 by successive passes, a draw-plate having a series of holes bounded partly by segments of a circle with intermediate parts of other and

different shape which successively vary from each other in their widths.

5. For the purpose of manufacturing wire 35 by successive passes, a wire-drawing mechanism having a series of apertures of which one or more have walls with parts thereof conforming to the initial form of the wire and parts intermediate of those aforesaid which  
40 are nearer together than the corresponding parts of the initial wire, substantially as set forth.

6. For the purpose of manufacturing wire  
45 by successive passes, a wire-drawing mechanism having a series of apertures each formed with walls having parts which conform to the shape of the initial wire and other intermediate parts which vary from the said shape, the said intermediate parts varying suc-  
50 cessively from each other in their width, substantially as set forth.

7. For the purpose of manufacturing wire by successive passes, a wire-drawing mechanism having a series of apertures of which  
55 one is circular in section, another is triangular, and one or more others are bounded partly by the arcs of a circle and partly by intermediate lines which when extended form a triangle, substantially as set forth.

WILLIAM TAYLOR.

Witnesses:

JAMES CLARK WILLIAMS,  
WM. M. STEVENSON.