W. H. SOMMER.

METHOD OF GALVANIZING OR COATING FENCE AND OTHER FABRICS.

APPLICATION FILED NOV. 13, 1911.

1,053,664.

Patented Feb. 18, 1913.

2 SHEETS—SHEET 1.

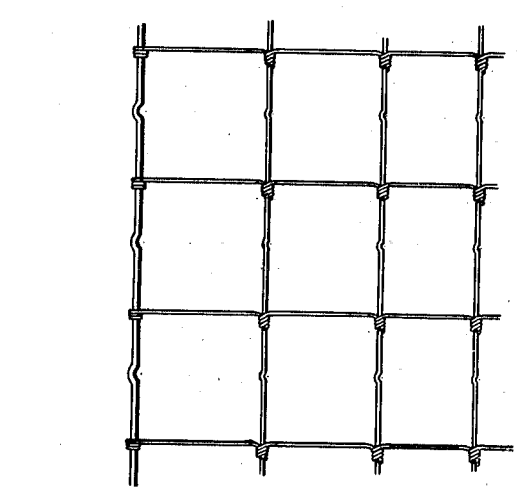


FIG. 6.

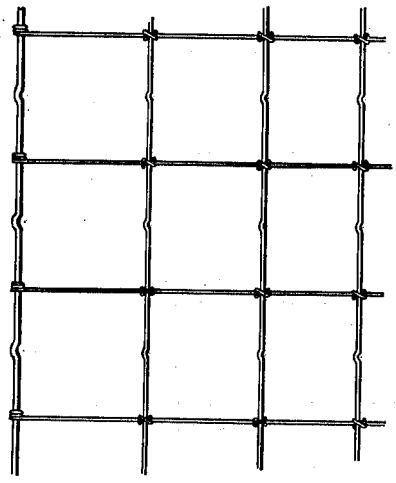
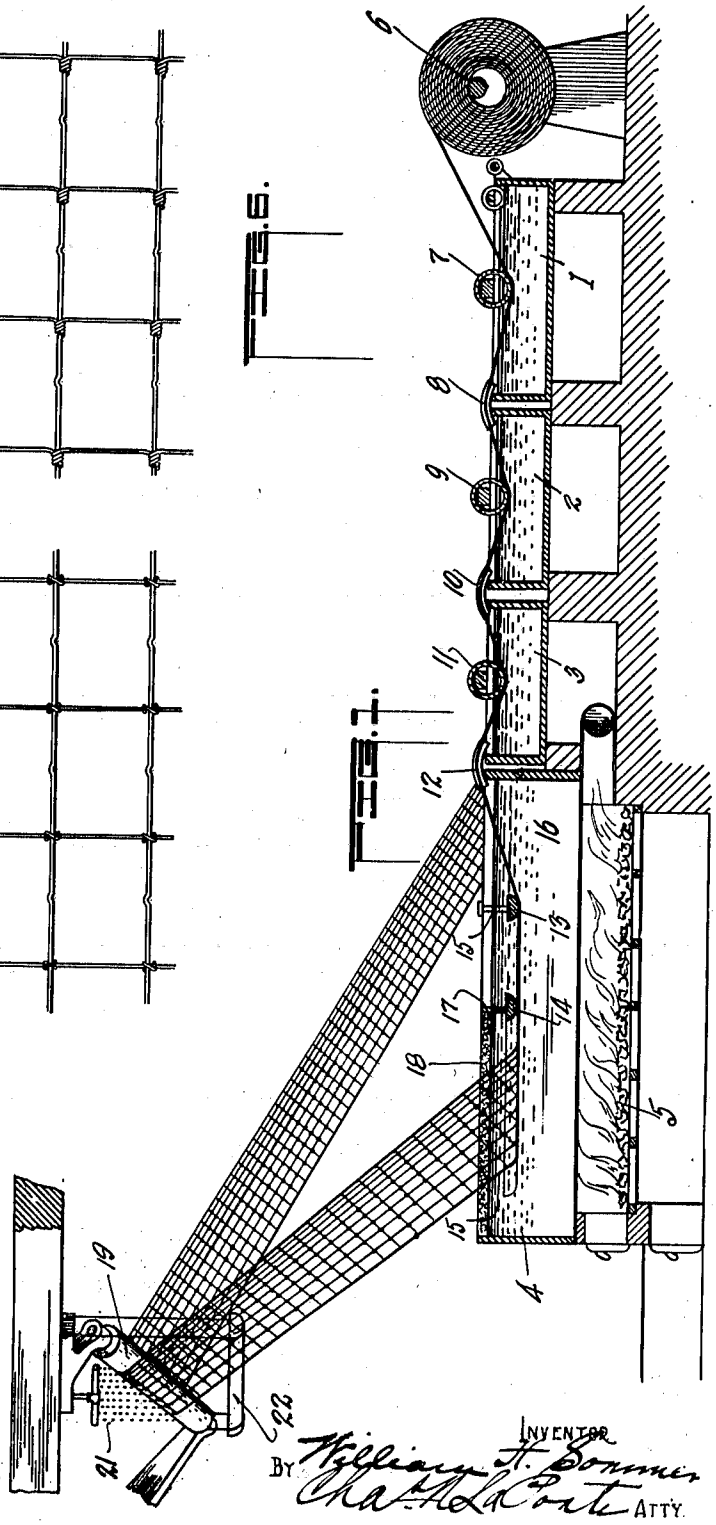


FIG. 7.

FIG. 8.



WITNESSES

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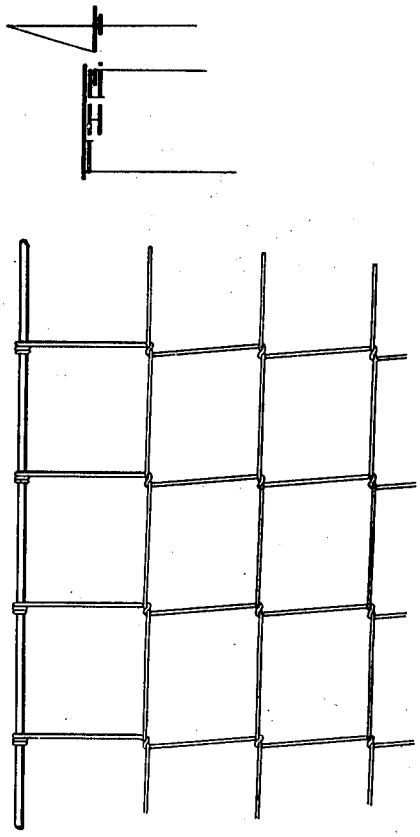

Fig. 1.

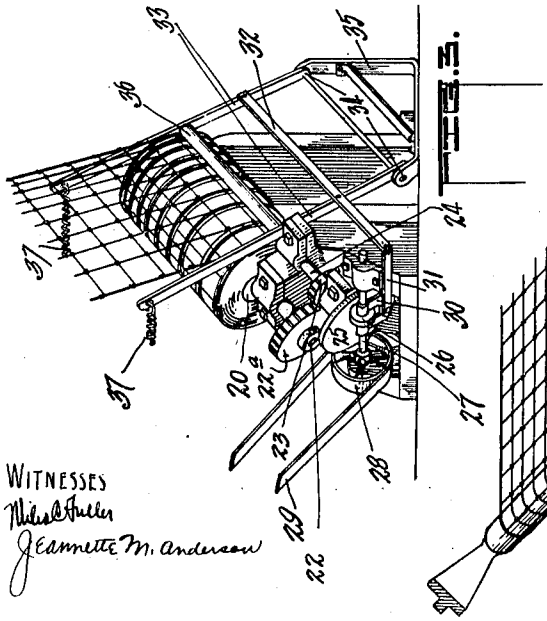

Fig. 3.

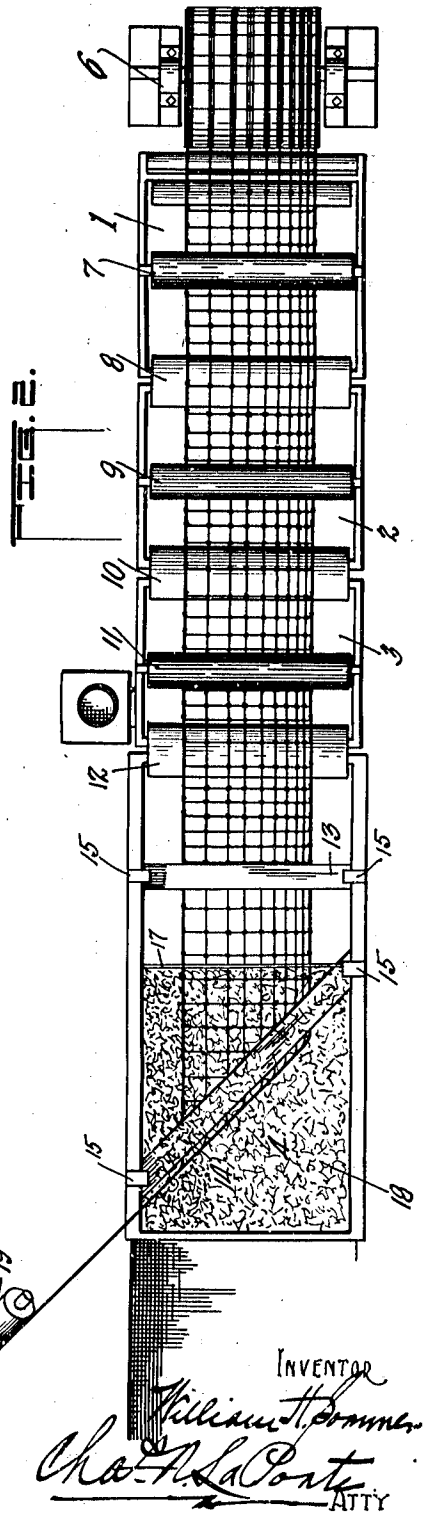

Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM H. SOMMER, OF PEORIA, ILLINOIS.

METHOD OF GALVANIZING OR COATING FENCE AND OTHER FABRICS.

1,053,664. Specification of Letters Patent. Patented Feb. 18, 1913.

Application filed November 13, 1911. Serial No. 660,144.

To all whom it may concern:

Be it known that I, WILLIAM H. SOMMER, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Methods of Galvanizing or Coating Fence and other Fabrics, of which the following is a specification.

This invention has reference to the galvanizing or coating of wire products, such as fence-fabrics or nettings, after weaving, and also to the coating of various other kinds of fabrics.

One of the objects of the present invention is to provide a practical method of galvanizing or coating, light and heavy fabrics, preferably wire fence fabrics, comprising longitudinal running or strand wires and transverse stays or picket wires, after weaving.

The invention has for its further object to galvanize or coat open-mesh wire-fences, fence-fabrics, poultry-fences and light nettings, formed of a series of running wires extending longitudinally of the article and a series of cross-wires connecting said running wires, by immersing the article in a suitable molten metal bath, preferably zinc, and turning the article at a given point in the bath, along a line diagonal to the plane of its traverse and withdrawing the article from the bath at an acute angle to the surface of the bath; whereby the running wires and cross-wires will be on an incline as they leave the bath, each set making its own angle with the surface of the bath, thereby allowing the flowing metal to run off or drain from the wires, leaving the same smooth.

Figure 1 is a longitudinal sectional view, partly in elevation, showing a galvanizing apparatus such as I prefer to employ to carry out my method of galvanizing completed fence fabrics and nettings after weaving; Fig. 2 is a plan view of an apparatus such as is disclosed in Fig. 1, certain structural details being omitted. Fig. 3 is a perspective view showing the winding reel or drum on which the fabric is wound after galvanizing and associated with said reel or drum certain mechanism whereby the winding up of the fabric may be at a uniform rate of speed; Fig. 4 shows a portion of a fence fabric which has proved an advantageous style to galvanize under the present method, such fence-fabric comprising the intermediate longitudinal running or strand wires, selvage wires and stay or picket wires; Fig. 5 shows a further style of fence fabric for galvanizing after weaving, and Fig. 6 shows a further and additional style for galvanizing after weaving.

In carrying out my invention I wish it to be understood that fence-fabrics and nettings which I have in mind to galvanize after weaving are those fabrics and nettings which are manufactured particularly for farm and poultry uses, being those nettings which in commercial use are made up of the lighter wires including numbers fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, and twenty and the fence-fabrics being those which are made up of the comparatively heavier wires, including numbers nine, ten, eleven, twelve, thirteen, and fourteen. It is understood, of course, that there is no limitation to be placed on the size of the wires which compose the fabrics and nettings which may be galvanized.

The sizes of the meshes of the poultry-fences and nettings are graduated from approximately one inch at the bottom to four to six inches at the top and four and six inches longitudinally thereof; the sizes of the meshes of the heavier fabrics are graduated approximately from one inch at the bottom to seven or more inches at the top and from four to six to nine to twelve and twenty-three to twenty-four inches longitudinally thereof.

I do not lay claim to being the first to galvanize fence-fabrics, poultry fences and nettings after weaving, as the broad idea seems to be a matter of record, although from my experience and observation no commercially successful, fence-fabric, poultry-fence or netting has been produced which comprises longitudinal running or strand wires, and transverse stays or picket wires, and which was galvanized after weaving, as the fabrics or nettings were passed through the molten-metal bath and delivered therefrom in a direction longitudinally of the longitudinal or running or strand wires which always retain the transverse stays or picket wires in a horizontal position and the surplus metal on the stay wires forms in drops on the wires, leaving such wires rough and with large amounts of the spelter adhering thereto, which not only gives the fence a bad appearance, but makes it unsalable and to

the manufacturer creates considerable loss. With my invention I obviate all of these objectionable features and after galvanizing the wires, both longitudinal running and strand wires and stays or picket wires, present a smooth appearance similar to when the wires are galvanized prior to the weaving process.

I am aware that it is not difficult, at least it has not seemed to be so, to galvanize a very light and a very small mesh netting; say, for instance where the wires are approximately as light as number twenty and where the meshes reach approximately half an inch, and where the netting is passed into and drawn out or delivered from the molten-metal in a direction generally longitudinally of the longitudinal or running wires, for capillarity will have a tendency to attract the metal, not otherwise wiped from the wires, to the juncture of the wires, or that point where the transverse wires cross the longitudinal running wires; but, where the fabrics or nettings are made up of the comparatively heavier wires and where the meshes, transversely and longitudinally of the fabrics and nettings, are much larger, as for instance, such as those stated above, if the fabrics or nettings are passed into and drawn out or delivered from the molten-metal in a direction generally longitudinally of the longitudinal or running wires, while capillarity may have some effect closely adjacent the juncture of the cross-wires, it will have no effect over the greater part of the wires extending between the meshes, and the surplus liquid which forms in drops on the wires and hardens, will remain, presenting not only a bad looking fence but one which is not commercially salable, and as suggested, creating considerable expense to the manufacturer. It is the object of the manufacturer of fence fabrics or nettings, whether they are galvanized before or after weaving, to coat the wires sufficiently without leaving any surplus thereon and thereby to present a smooth fabric.

The galvanizing apparatus, herein shown, comprises the tank 1 and contains a liquid bath composed of muriatic acid and water mixed in suitable proportions; a tank 2 containing a liquid bath, such for instance, water; a tank 3 which also contains a liquid bath, similar to the tank 1, preferably composed of muriatic acid and water mixed in suitable proportions, and a tank 4 supported immediately above a furnace 5. This tank contains preferably commercially pure zinc and a wiper preferably charcoal, although sand or asbestos may be used and to some may be more desirable than charcoal.

The tanks 1, 2, 3 and 4 are preferably arranged in the order shown in Fig. 1 and so disposed relatively to each other that the wire passing from one to the other maintains its general longitudinal direction of travel. The spacing between the tanks may be varied, that is to say, the tanks may have the same relative position shown or if it is found more convenient to space them farther apart, particularly the space between the tanks 3 and 4, it is understood that I contemplate such an arrangement of tanks. The fact is, that in practice the tank 4 will be spaced at considerable distance from the tank 3, much more than shown, whereby the wires passing from the tank 3 into the tank 4 may have an opportunity to dry.

The completed fabrics or fences which are intended to be galvanized after weaving, are placed on the shaft or unreeler 6, the fabric being passed into the acid bath, beneath what is known as a sinker 7. This sinker tends to keep the fabric submerged in the acid bath during its travel through the tank and said sinker is preferably composed of vitrified tile. The fabric leaving the acid bath in the tank 1 passes over the bridge 8, also preferably of vitrified tile, which said bridge spans the space between the tanks 1 and 2, and the fabric entering the water bath in the tank 2 passes beneath a sinker 9 which is of the same material and has the same function as the sinker 7. The fabric leaving the water bath in the tank 2 passes over a bridge 10 spanning the space between the tanks 2 and 3, which said bridge is of the same material and has the same function as the bridge 8. The fabric, after entering the acid bath in the tank 3 passes beneath a sinker 11, similar to and having all the functions of the sinkers 7 and 9. The fabric leaving the acid bath in the tank 3 passes over a bridge 12, which spans the space between the tanks 3 and 4 and of the same material and having substantially the same function as the bridges 8 and 10. The tank 4 is preferably a considerable distance from the tank 3, but for the purpose above specified, the bridge 12 may be of sufficient width to span the space between the tank 3 and the tank 4 or some other similar or equivalent means may be substituted, to support the wire or wires as they pass from the tank 3 to the tank 4.

In the tank 4, which is generally referred to as the spelter tank, there are arranged two sinkers, 13 and 14, both of which are suspended in the tank by the members 15, which may be such that the sinkers 13 and 14 may be adjusted vertically into the spelter if it should be deemed desirable. The sinker 13 is nearer the right hand end of the tank 4, looking at Fig. 1, than the sinker 14, and the wires entering the metal in the tank 4 after leaving the bridge or equivalent member 12, pass underneath the sinker 13 and longitudinally through the spelter and beneath the sinker 14 and leaving the sinker

14 are intended to be drawn out or leave the spelter tank in a manner which will be more clearly explained.

For convenience the molten-metal or zinc in the tank 4 is referred to as 16. The tank 4 is filled with this metal, reaching nearly to the top, and being heated by the furnace 5 is in a molten state in the said tank and by said furnace kept very hot. The sinker 13 is disposed in the tank 4 transversely of the path of travel of the fabric and approximately at right angles thereto, and the sinker 14 is disposed transversely and obliquely in the said tank 4 as clearly indicated in Fig. 2, the angle at which the sinker 14 is arranged in the tank 4 being preferably and approximately at an angle of forty-five degrees thereto. From the top of the sinker 14 to the top of the tank 4, and of approximately the same length of the sinker 14, is arranged a partition 17, said partition having for its object to keep the clear molten metal on the right hand or entrance side of the tank 4 and also for the further purpose of separating the wiper 18 which is disposed in the left hand end of the tank 4 and on the top of the molten metal 16. This wiper, as suggested, is preferably charcoal, although it may be sand, asbestos or other suitable material.

The action of the muriatic acid and water in the tank 1 is to remove all scale (iron oxid) or other foreign matter from the wires of the fabric fence or netting; the action of the water in the tank 2 is to clean the wire of the acid, and the action of the muriatic acid and water in the tank 3 is to further clean the wire and forms a soldering solution. The tanks 1, 2 and 3 are preferably heated to a suitable degree and this may be done by any suitable heating means.

As will be understood from the foregoing description and from an examination of the drawings, Figs. 1 and 2, the fence fabric or netting enters and travels a suitable distance in the molten-metal 16 in a straight line, or in a direction generally longitudinally of the longitudinal strand or running wires, the transverse stays or picket wires connecting said longitudinal strand or running wires moving laterally through the metal and in a direction at right angles to the length of the tank. This direction of travel of the fence fabric or netting, is maintained throughout its travel in the tank 4, until it leaves the sinker 14, which being obliquely disposed or at an angle of forty-five degrees, allows the longitudinal running or strand wires to be drawn up through the molten-metal, from the sinker 14 and out through the wiper 18 at an inclination laterally of the bath and approximately at an angle of forty-five degrees. The longitudinal strand or running wires passing up through the molten-metal and wiper and leaving the tank 4 at this angle, causes the transverse stays or picket wires, which had previously been traveling in the tank laterally or at right angles to the general longitudinal direction thereof to pass through the remainder of the molten-metal 16 and the wiper 18 at an inclination, and at right angles to the inclination of the longitudinal strand or running wires. However, as will be observed from an examination of Fig. 1 while the longitudinal strand or running wires are inclined in one direction, the transverse stays or picket wires are inclined in another direction, but at right angles thereto. The longitudinal strand or running wires and the transverse stays or picket wires, leaving the molten metal in the tank 4 in the manner indicated in Fig. 1 and passing through the wiper 18, will cause the surplus liquid on the longitudinal running or strand wires and the transverse stays or picket wires to drain back into the tank or on passing through the wiper, to be wiped lengthwise of the wire and back into the tank. In this way the heavier as well as the lighter fabrics and nettings may be commercially galvanized after weaving and without any surplus metal remaining on the wires, in the form of globules, especially the transverse stays or picket wires.

It is intended that the fabric or netting will travel at a reasonably slow rate of speed through the galvanizing apparatus, affording plenty of opportunity to properly galvanize the wire and allow it to drain or to be wiped so that when the fabric or netting leaves the galvanizing apparatus it will present a smooth appearance.

I deem it advisable to cause the fabric or netting after it leaves the tank 4 to travel in an oblique plane or at approximately forty-five degrees and to pass the galvanized fabric over a guide, roller or drum 19 which is also inclined at a suitable angle to prevent the fabric from buckling and leaving the guide, roller or drum 19 to cause the fabric to travel at approximately the same angle, forty-five degrees and be wound on a winding reel or drum 20, which said drum is preferably located adjacent the floor line where it may be easily handled and said drum suitably journaled at an angle, preferably forty-five degrees, whereby the fabric may be conveniently wound and whereby, is, obviated the chance, of the fabric or netting buckling. The manner of mounting the guide, roller or drum 19, is immaterial, except that it should be at a suitable distance from and elevated above the tank 4. If the distance is sufficient between the guide 19 and the tank 4, the wires of the fabric should cool by the time they pass over the guide 19. But to guard against any sticking of the wires of the fabric as they travel around the guide 19, I provide the water supply 21

which, running over the guide 19 will prevent the sticking alluded to. This water, after running off the guide 19 may be caught up and carried off by a trough 22.

I deem it essential to arrange the winding reel or drum 20 so that the fabric may be always uniformly wound on said reel or drum. In other words, when the roll of fence is growing larger on the winding reel or drum 20, the speed of said reel or drum should be decreased and vice versa when the roll is very small. I accomplish this uniform operation of the winding reel or drum in substantially the manner indicated in Fig. 3. In this figure the shaft 22 on which the winding reel or drum 20 is carried, has on one end a gear wheel 22^a. This gear wheel 22^a is in mesh with a much smaller gear wheel 23 carried on a short shaft 24. On the outer end of the short shaft 24 is a friction wheel 25 and operatively engaging the flat or frictional driven face of said wheel 25 is a friction pinion 26 which is operatively and yet slidably arranged on a driving shaft 27, said shaft 27 carrying a driving pulley 28 receiving its power through a belt 29 or other suitable means, which is in turn driven from some suitable source of power. Slidably arranged on the shaft 27 and disposed upon opposite sides of the frictional pinion 26 is a frame 30 and connected with this frame is an arm or bar 31, which at a suitable point is bent approximately at right angles and the longer portion thereof indicated as 32. This longer portion 32 of the arm or bar 31 is connected to the swinging frame comprising the spaced members 33 fulcrumed at 34 to a stationary support 35. The spaced members 33 extend up a suitable distance and between their ends support a roller or drum 36, which is arranged to bear against the reel or drum 20 when there is no fabric being wound thereon and to bear against and engage such fabric as the same is wound on the drum. The roller or drum 36 is maintained yieldingly in an engaging relation with the drum 20 or a roll of fabric being wound thereon by means of the springs 37 connected at one end to the upper or free ends of the members 33 and the opposite ends of said springs 37 are attached to or connected to some suitable stationary support. It is obvious now, that when the frame comprising the members 33 are moved outwardly, as the roll of fabric grows larger on the drum 20, that the pinion 26 will be moved longitudinally of the shaft 26 and toward the peripheral edge of the friction wheel 25, reducing the speed of the drum 20, and that when the frame with its members 33 are moved closer to the drum 20, that the pinion 26 will be nearer the center of the friction wheel 25, and thereby drive the drum 20 faster.

In Figs. 4, 5 and 6, I have shown three distinct types of wire fence fabrics or nettings; distinct, in that the stays or pickets attached to the longitudinal strands or running wires are connected by a different means, and similar, in that each fabric is made up of longitudinal running or strand wires and transverse stays or picket wires. Other forms than those shown may be galvanized after weaving and I do not wish to limit myself to the different styles herein shown.

I employ the reel or drum 20 to draw the fence fabric through the various tanks and over the guide 19. It may be deemed advisable to modify the structure so as to include other drawing means for the fabric, through the tanks, and I do not wish to be limited to the application of the power shown.

While I have laid special stress, in the foregoing description, to the "galvanizing" of wire fence fabrics, it is to be understood that as a substitute for galvanizing, a suitable coating material, such as paint, lacquer, etc., may be employed with equally as good results and it may be found of advantage to coat other than fence fabrics.

What I claim is:—

1. The process of galvanizing or coating an open-mesh fabric; which consists in immersing the fabric in a suitable bath and constantly turning the fabric at a given point along a line diagonal to the plane of its traverse, and withdrawing the fabric from the bath at an acute angle to the surface of the bath.

2. The process of galvanizing or coating an open-mesh fabric formed of a series of longitudinal members parallel to the selvage of the fabric, and others members at right angles to said longitudinal members; which consists in immersing the fabric in a suitable liquid bath and turning the fabric at a given point along a line diagonal to the plane of its traverse and withdrawing the fabric from said bath at an acute angle to the surface of the bath; whereby as the fabric is leaving the bath the liquid on each of said members will drain back into the bath axially of said members.

3. The process of galvanizing or coating an open-mesh fence fabric formed of a series of parallel running wires extending longitudinally of the fabric and a series of cross-wires connecting said parallel running wires; which consists in drawing the fabric through a suitable liquid bath in a direction longitudinal of its running wires, and at a predetermined point and before the wires are withdrawn from the bath, turning the fabric along a line diagonal to the plane of its traverse, in a manner which will cause the running wires to leave the bath at an acute angle to the surface of the bath; whereby each of said running wires and

cross-wires will leave the bath inclined in the direction of the bath so that the material draining therefrom will drain back into the bath.

4. The process of galvanizing or coating an open-mesh fabric composed of longitudinal members paralleling the selvage of the fabric and other members extending transversely across the said longitudinal members; which consists in immersing the fabric in a suitable bath and turning the fabric in the bath along a line transverse to the direction of entrance of the fabric in the bath, and withdrawing the fabric from the bath in a direction laterally of the bath and at an acute angle to the surface of the bath, whereby as the fabric leaves the bath the excess coating material on each of said members will drain back into the bath axially of all of said members.

5. The process of galvanizing or coating an open mesh fabric composed of longitudinal members paralleling the selvage of the fabric, and other members disposed at right angles to said longitudinal members; which consists in immersing the fabric in a suitable bath and withdrawing the said fabric from the bath in a manner and in a direction which will cause both the longitudinal and right angle members of the fabric to assume a position inclined toward the bath; whereby as the fabric leaves the bath the excess coating material on each of said members will drain back into the bath axially of all of said members.

6. The process of galvanizing or coating a fence fabric composed of a plurality of strands paralleling the selvage of the fabric and a plurality of stays disposed transversely to the strands and together with said strands producing open meshes of quadrilateral shape; which consists in immersing the fabric in a suitable bath and as said fabric is withdrawn from the bath to incline it in such a manner as to cause the strands and stays bordering each respective mesh to assume an acute angle with the surface of the bath and with the successive meshes of each cross row between adjacent stays leaving the bath in progression; whereby the excess coating material on each of the strands and stays will drain back into the bath axially of said strands and stays.

7. The process of galvanizing or coating a fence fabric composed of a plurality of strand wires paralleling the selvage of the fabric and a plurality of stay wires disposed transversely to the strands and together with said strands producing open meshes of quadrilateral shape; which consists in immersing the fabric in a suitable bath and as said fabric is withdrawn from the bath to incline it in such a manner as to cause the strand and stay wires bordering each respective mesh to assume an acute angle with the surface of the bath, and with each stay wire emerging from the bath gradually, from one end to the other of the stay, whereby as each of said stay and strand wires leave the bath, the excess coating material on each wire will drain back into the bath axially of said wires.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM H. SOMMER.

Witnesses:

JEANNETTE M. ANDERSON,

CHAS. N. LA PORTE.