March 5, 1940. N. S. HARTER 2,192,789

WIRE FABRIC PROCESSING APPARATUS

Original Filed Jan. 25, 1937 2 Sheets-Sheet 1

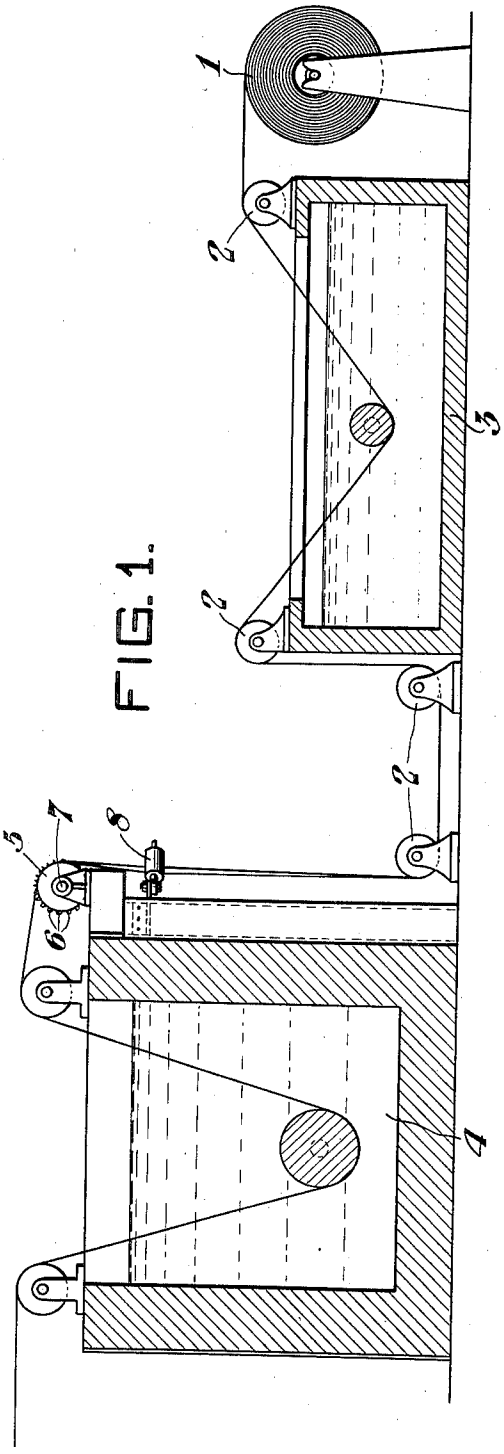


FIG. 1.

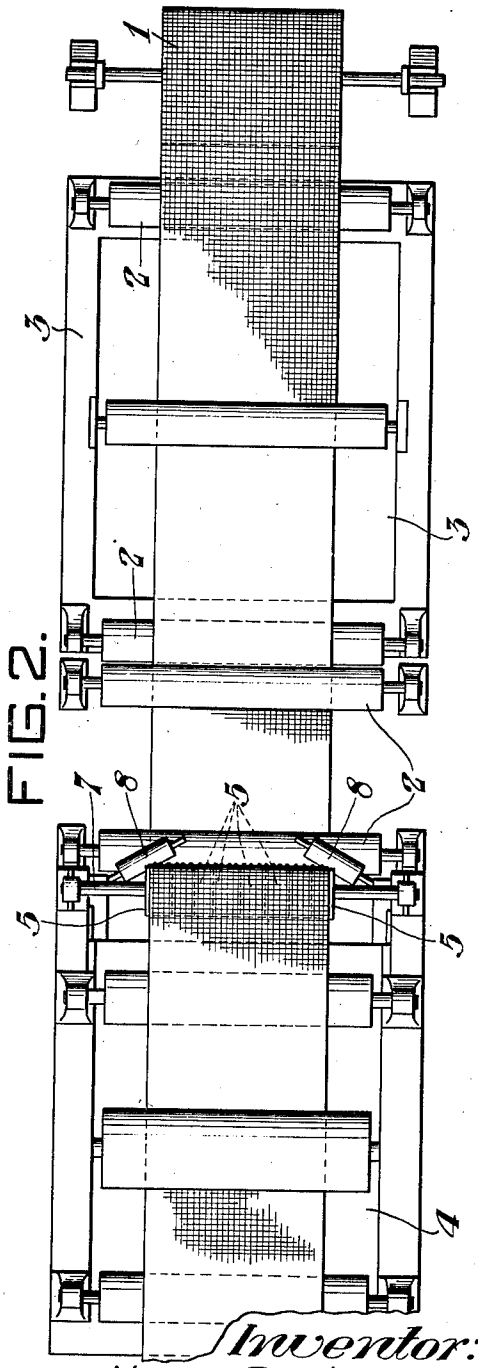


FIG. 2.

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WIRE FABRIC PROCESSING APPARATUS

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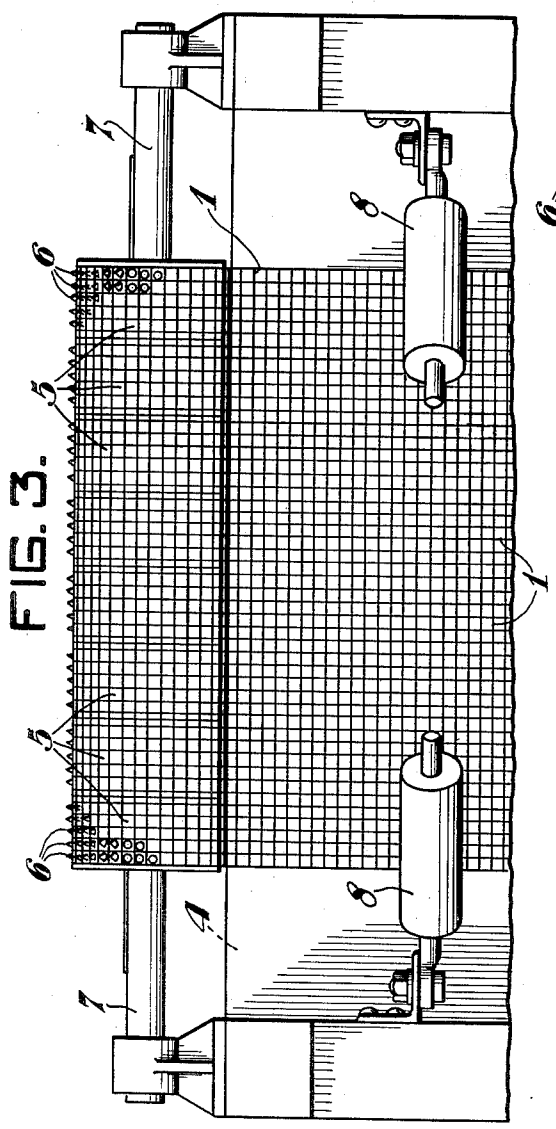


FIG. 3.

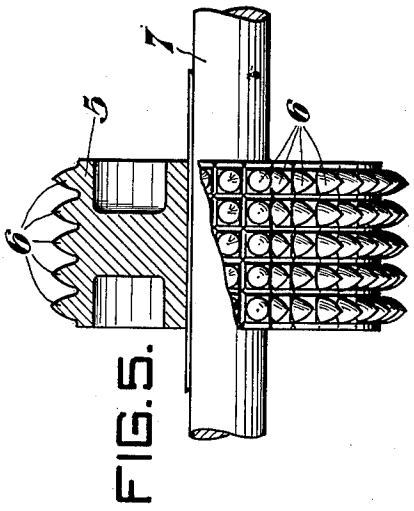


FIG. 5.

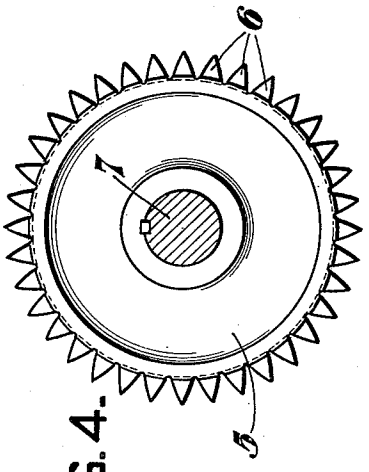


FIG. 4.

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Patented Mar. 5, 1940

2,192,789

UNITED STATES PATENT OFFICE

2,192,789

WIRE FABRIC PROCESSING APPARATUS

Noah S. Harter, Waukegan, Ill., assignor to The Cyclone Fence Company, a corporation of Illinois

Original application January 25, 1937, Serial No. 122,252. Divided and this application March 26, 1938, Serial No. 198,341

2 Claims. (Cl. 91—12.7)

This invention relates in general to the handling of wire fabric during continuous processing, and is particularly concerned with the coating of woven wire fabric by the continuous hot-dip process.

This is a division from co-pending application entitled "Wire fabric processing," filed January 25, 1937, and bearing Serial No. 122,252.

A specific example of woven wire fabric hot-dip galvanizing equipment embodying the features of the invention is illustrated by the accompanying drawings, in which:

Figure 1 is a vertical section.

Figure 2 is a top plan.

Figure 3 is an enlargement of an important feature.

Figures 4 and 5 are, respectively, end and side views of an element shown by Figure 3.

The wire fabric 1 is of the square mesh type and travels over a plurality of rollers 2 which guide it so that it successively dips into flux contained in a pot 3 and molten spelter contained in a heated pot 4. This general arrangement is conventional.

It is to be understood that the fabric is continuously pulled so that it continuously dips first into the flux and then into the spelter. There are several undesirable features connected with this procedure. One is that it is almost impossible to guide the fabric over the large number of guiding rollers required, without the fabric tending to creep transversely so as to ultimately damage the edges or jam. This trouble is encountered whenever relatively long lengths of fabric must be guided by means of a roller system. Further, spelter pots, as commercially provided the trade, do not permit the maintenance of an even temperature transversely throughout the pot, this resulting in uneven thermal stressing of the fabric sufficient to cause permanent strain, the condition being further complicated by the fact that the freezing spelter prevents subsequent removal of this strain. Wire fabric manufacturers also encounter difficulty in producing an attractive and usable product for the reason that the looms do not always form a perfect mesh pattern and, even if they do, the pattern is frequently distorted to some extent while it is being handled on its way from the looms to the spelter pot, this again resulting in a fabric frozen by the spelter into a distorted condition, which cannot subsequently be remedied.

The present invention is intended to provide a remedy for the aforementioned disadvantages.

Continuing with the discussion of the equipment illustrated by the drawings, one of the rollers, numeraled 5, which adjacently precedes the spelter pot 4, is provided with teeth 6 fitting the proper mesh pattern of the fabric. These teeth have pointed ends and their bases are so shaped that the interstices between them coincide exactly with both the proper mesh pattern and the proper spacing of the various wires from which the fabric is made.

Since the fabric is rectangular in the present instance, the teeth 6 are arranged in parallel rows and have rectangular bases of substantially the same size as the rectangular openings in the mesh. The teeth gradually change in shape from their pointed ends to their shaped bases.

The roller 5 is formed from a plurality of segments keyed to a properly journaled shaft 7 in such a manner that they turn synchronously, but can slide transversely relative one another. Relatively short rollers 8 are positioned adjacent the roller 5 at an angle respecting the fabric, and in such arrangement that they press the edge portions of the fabric into engagement with the roller 5. These rollers 8 are entirely free from the longitudinal central portion of the fabric.

When the fabric is continuously pulled to effect its movement it follows that it is continuously tensioned. The teeth 6 on the roller 5 function to distribute the tension on the fabric so that it is even throughout its width. This equalizing of the tension prevents it from shifting transversely on the succeeding guide-rollers. It also follows that the fabric enters the spelter pot under an absolutely even tension throughout, this being caused by the back tensioning resulting from the force required to pull the fabric over the preceding guide rollers and the equalizing or tension-distributing effect of the roller 5. It follows that even though the fabric is subject to uneven thermal stressing in the spelter pot, distorting strain will not result, the evenly tensioned longitudinal wires of the fabric functioning to hold the fabric during the operation so as to prevent distortion of its mesh pattern. This function is inherent to some extent, even though only the outer edge portions of the fabric are subjected to equalizing back tension.

A further function of the roller 5 is that even though the mesh pattern may not be absolutely true when it reaches this roller, the pointed ends of the teeth 6 will enter the mesh, whereby the mesh pattern will be trued by the wires sliding down between the various teeth until they nestle in the interstices between the rectangular bases

of these teeth. Therefore, the fabric reaches the roller 5 with its mesh pattern trued and with its longitudinal wires all under the same even tension. The mesh pattern cannot change materially in the spelter because of this tensioning of all the longitudinal wires, this effect persisting until the spelter has frozen the pattern against further distortion. The final result is galvanized wire fabric that is absolutely straight and has a relatively exact mesh pattern.

The roller 5 is made in segments so that it can accommodate slight variations in the width of the fabric that is produced by the looms. When it is necessary to separate the segments slightly to accommodate slightly wider fabric widths, some of the longitudinal wires of the fabric do not receive the even tensioning effect, nor will the pattern be trued over this area. However, it has been found sufficient in practical work to even the tension of the fabric throughout a majority of its width. When the fabric is materially wider, extra roller segments may be slipped onto the shaft 7 so as to provide a roller of the proper width. In all events it is possible, whenever desired, to provide the tension-evening and mesh pattern "truing" effect throughout the entire width of the fabric.

As previously mentioned, the rollers 8 press only the longitudinal edges of the fabric against the roller 5. Experience has proved that this procedure is of decided advantage in that it prevents the fabric from climbing over the various teeth of the roller 5 in those cases where the mesh pattern of the fabric advancing toward the roller is extremely distorted. Experience has also shown that a single roller pressing the entire width of the fabric against the roller 5 permits this undesirable climbing action.

I claim:

1. Wire fabric continuous hot-dip coating apparatus including a heated pot for the coating material, a plurality of rollers guiding said fabric so it continuously dips into said pot when continuously pulled, said rollers transmitting tension through said fabric while it is dipping into said pot when said fabric is continuously pulled and said fabric being subject to unequal thermal stressing while dipping into said pot from the heat of the contents of said pot, and a toothed roller engaging said fabric prior to its dipping into said pot and having respectively immovable teeth coinciding with the mesh pattern of said fabric which enter the openings of said fabric to positively distribute said tension throughout the width of said fabric dipping into said pot and so positively hold said fabric against distortion of its mesh pattern regardless of said unequal thermal stressing.

2. Wire fabric continuous hot-dip coating apparatus including a heated pot for the coating material, a plurality of rollers guiding said fabric so it continuously dips into said pot when continuously pulled, said rollers transmitting tension through said fabric while it is dipping into said pot when said fabric is continuously pulled and said fabric being subject to unequal thermal stressing while dipping into said pot from the heat of the contents of said pot, and a toothed roller engaging said fabric prior to its dipping into said pot and having respectively immovable teeth coinciding with the mesh pattern of said fabric which enter the openings of said fabric to positively distribute said tension throughout the width of said fabric dipping into said pot and so positively hold said fabric against distortion of its mesh pattern regardless of said unequal thermal stressing, said apparatus including means for pressing only the edge portions of said fabric against said toothed roller, said means being free from the longitudinal central portion of said fabric.

NOAH S. HARTER.