Jan. 26, 1937. R. D. HELLER 2,068,675

METHOD OF AND APPARATUS FOR MANUFACTURING SCREENS

Filed Jan. 16, 1935 2 Sheets-Sheet 1

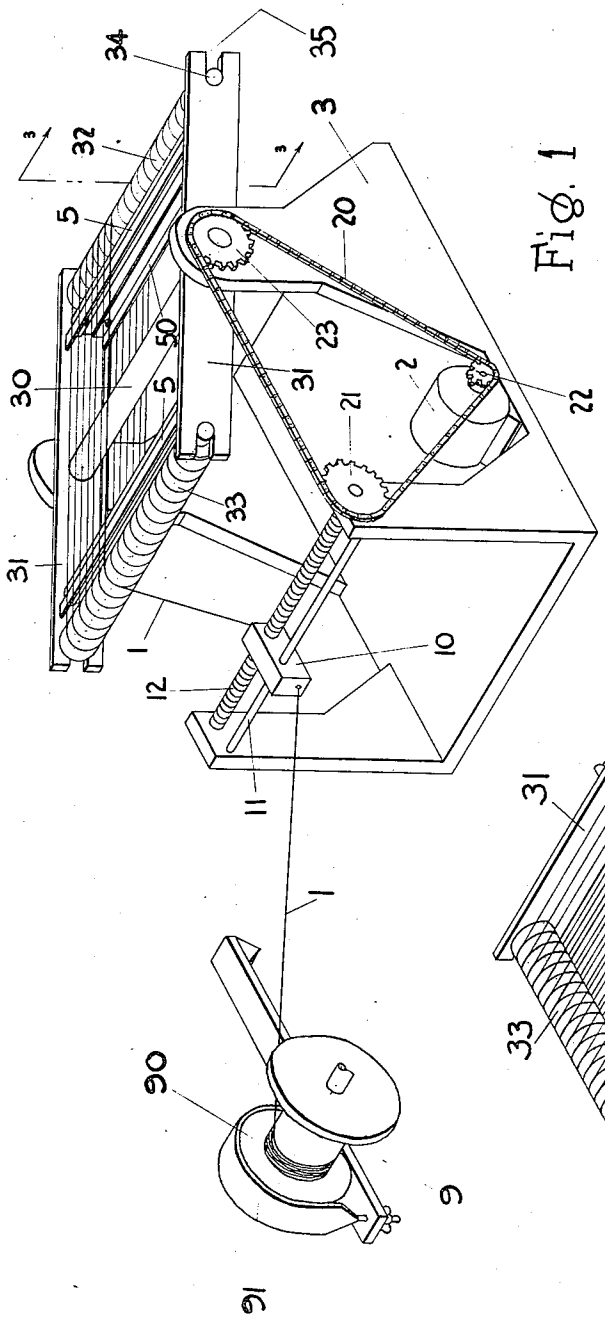

Fig. 1

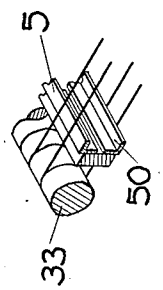

Fig. 3

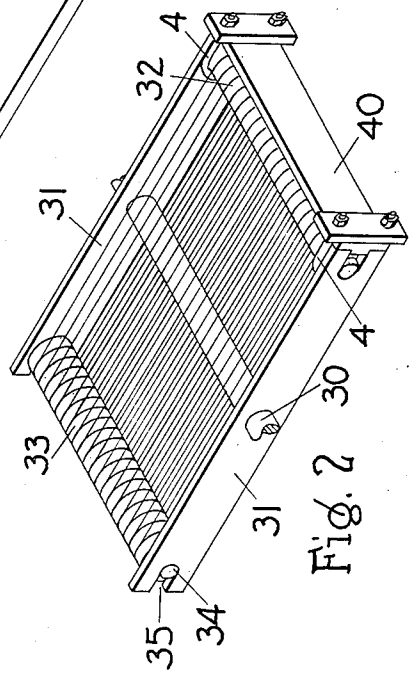

Fig. 2

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METHOD OF AND APPARATUS FOR MANUFACTURING SCREENS

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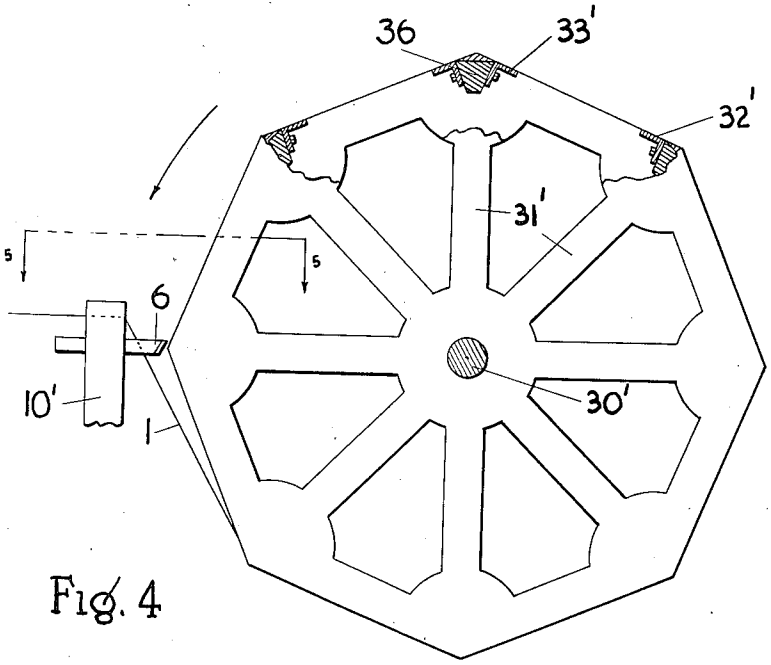
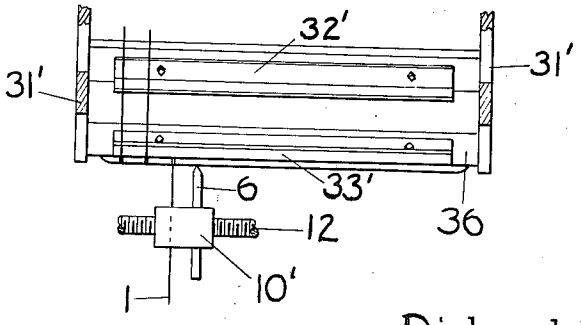


Fig. 4

Fig. 5



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METHOD OF AND APPARATUS FOR MANUFACTURING SCREENS

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Application January 16, 1935, Serial No. 2,064

9 Claims. (Cl. 140—92.2)

My invention relates to the manufacture of wire strand screens, which are particularly intended for use in trommels of the type disclosed in my application Serial No. 727,897, filed May 28, 1934, of which this application is a continuation in part.

Such trommels are made up of a plurality of screens forming the planiform faces of a polyhedral rotative cylinder for the separation and classification of ore in dry placer mining operations. Each such screen comprises a plurality of pre-tensioned wire strands, preferably disposed in parallel relation and permanently secured in such pretensioned relationship to transverse and bars, so that by engaging the end bars, when the screen is incorporated in the trommel, the wires may be tensioned and restored substantially to their pretensioned relationship.

It is an object of the present invention to provide a method whereby such screens may be quickly, conveniently, and cheaply manufactured in quantity.

It is also an object to provide such a machine and process whereby all strands in such screens will be equally pretensioned, and will be permanently secured, while thus pretensioned, to the end bars, to maintain this relationship when the end bars are later forced apart, and to provide a machine and process whereby the screen strands may be definitely laid at the required intervals or spacing.

My invention comprises the novel method, and the novel machine, illustrated in the accompanying drawings, and which will be more particularly described in this specification, and the scope of which will appear from the accompanying claims.

In the drawings are illustrated two possible forms of apparatus for carrying out my method.

Figure 1 is a perspective view of apparatus for carrying out the method, capable of manufacturing two screens at a time.

Figure 2 is a perspective view illustrating a means for tensioning the wires, parts of the apparatus being omitted.

Figure 3 is a detail perspective view showing how the wires may be secured to the end bars, prior to their severance.

Figure 4 is an elevation of a machine for carrying out the method in a slightly different way, capable of making several screens at a time.

Figure 5 is a detail section on the line 5—5 of Figure 4.

Essentially in forming the screens wire is unreeled from a supply reel 9, preferably being kept under uniform tension by means of a brake drum 90 and brake band 91, upon a frame which incorporates two or more spaced-apart substantially parallel members, each strand being laid a given distance from the previously laid strand until the desired width of screen is reached, whereupon with the strands all tensioned, either by the tension of the brake band referred to, or by additional tensioning means, all strands are secured either to the members about and along which they have been wrapped, or preferably to members placed between these two members which carry the wire, so that while the strands are in pretensioned condition they are all secured permanently, as by welding or soldering, to transversely extending end bars which then form a permanent part of the screen, whereupon the tension can be relaxed, and the strands are severed outside of the connection to the end bars, leaving strands which when again tensioned are of identical length, permanently secured at opposite ends to the two end bars, the end bars and strands connecting them thereby constituting a screen.

In Figure 1 is shown a support 3 in which is journaled a shaft 30 upon which is secured a rectangular frame consisting of the spacer bars 31 and transverse members such as the spindles 32 and 33. I prefer that the spindles have reduced ends 34 received in slots or notches 35 in the ends of the side bars 31, so that the spindles 32 and 33 may be forced apart, after the wires have been wrapped thereabout, to further tension the strands. The wire 1, coming from the reel 9, preferably passes through a wire guide 10 guided upon a rod 11 and advanced transversely of the support and the rotative frame by a screw 12 held in the support 3, the screw 12 and the shaft 30 being rotated at the same speed by means of a suitable drive from the motor 2, the drive means being represented by a chain 20 running from the motor sprocket wheel 22 over a sprocket wheel 21 on the screw 12 and a sprocket wheel 23 on the shaft 30. Thus as the frame, including the spindles 32 and 33, is rotated, the wire guide 10 is advanced lengthwise of the spindles 32 and 33 to space each strand a definite distance from the previously laid strand, this distance depending upon the pitch of the threads of the screw 12 and the relative rate of rotation of the screw 12 and the shaft 30.

When the wire has been laid along and around the spindles 32 and 33, if additional tension is desired, one or both of the spindles may be drawn lengthwise of the rotative frame by suitable means such as the U-bolts 4 engaging the spindle

and a cross bar 40 which can be mounted across the end of the frame from one side bar 31 to the other. By these or equivalent means the strands can be additionally tensioned.

With the strands held tensioned, all strands constituting one layer (the upper layer, for example) are secured to cross bars 5, which as shown are in the form of angle irons, which are supported within the rotative frame, inside of and adjacent the respective spindles. The securement may be by any suitable means; preferably it should be permanent, and to this end the wires may be welded or soldered to the angle irons 5. Similar cross bars 50 may be positioned for securement to the strands constituting the second or lower layer, and when all strands have been thus secured, while in pretensioned condition, the tension may be relaxed, if desired, and the wires are severed outside of the end bars 5, leaving, in the present instance, two screens, each consisting of end bars 5 or 50 and the strands which constituted one or the other layer of the wrapping upon the rotative frame.

It may be desired to more definitely locate the strands at the point where they are wrapped about the spindles 32 and 33, and to this end these spindles may be threaded or circumferentially grooved, in which case the wires will be laid in the grooves thus formed, and will be locally and definitely spaced by such grooves.

In the form shown in Figures 4 and 5 the apparatus is similar to that already described, as is the method, except that here provision is made for laying a considerable number of screens at one time. Thus the end bars 32′ and 33′ are secured in parallel definitely spaced relationship between two spiders 31′ upon a shaft 30′ in such relation that the end bars occupy the position of elements of a common cylinder. The wire is laid around and along these end bars, being tensioned as it is wrapped, the spiders, it will be understood, being rotated during the wrapping operation, and a suitable wire layer 10′ progressing lengthwise of the end bars during the wrapping to space the wires. When the wire is wrapped to the width of screen desired the strands are all permanently secured to all the end bars, and are then severed between the end bars of different pairs to produce a plurality of screens like those produced by the apparatus first described.

It is preferable, using this type of apparatus, that a groove be cut in or adjacent each end bar in advance of the laying of the strands thereon, and to this end the wire layer may incorporate a grooving tool 6 carried by the wire layer 10′ and spaced ahead of the wire by the width of spacing desired between adjacent strands and calculated on the basis of the pitch of the wire layer feed screw and the relative rate of rotation of the rotative frame and the screw, and since the end bars 32′ and 33′ may be of steel, and therefore difficult to groove readily, their outer surface, or as shown, the outer surface of bars 36 connecting the spiders, may be coated with solder, in which the groove may readily be cut by the tool 6, thus forming a groove for the reception of the next strand.

What I claim as my invention is:

1. A method of manufacturing screens for the purposes set forth, which comprises fixing a plurality of members in spaced apart relation, laying a wire strand progressively over and around said members in a plurality of convolutions, stretching the wire convolutions into evenly tensioned condition, securing to said members all wires constituting one layer, while said wires are held thus tensioned, and thereafter severing the wires outwardly of their securement to the spaced members.

2. A method of manufacturing screens for the purposes set forth, which comprises fixing a plurality of grooved members in spaced-apart relation, repeatedly laying a wire strand from one member to another, each time in grooves adjacent those receiving the precedingly-laid strand, to the width desired, thereafter stretching all strands simultaneously into uniformly tensioned condition, and securing to said members all strands so laid, while said strands are thus tensioned.

3. A method of manufacturing screens for the purposes set forth, which comprises laying a wire strand progressively along and around two spaced spindles, in definitely spaced relation, thereafter separating such spindles to tension all strands equally, securing to all strands constituting one layer, inside the spindles and while the strands are tensioned, two spaced end bars, and severing the strands outwardly of their securement to the end bars.

4. The method defined in claim 3, characterized by the securement of two additional end bars to all the strands constituting the second layer, prior to release of tension or severeance of the strands of the first layer.

5. A method of manufacturing screens for the purposes set forth, which comprises fixing more than two pairs of bars in spaced-apart relation and in the relation to each other of elements of a cylinder, laying a wire strand maintained constantly at a uniform tension progressively from a member to each bar in turn, in a helical path, to the width of screen desired, securing all strands to all such bars, while the strands are uniformly tensioned, and severing the strands between bars of different pairs to leave the strands secured to both bars of each pair.

6. The method of manufacturing screens for the purposes set forth, which comprises fixing a plurality of pairs of bars in spaced-apart relation, and in the relation to each other of elements of a cylinder, adjacent bars of different pairs being spaced apart by an element lying approximately in such cylinder, rotating such bars and spacing members, laying a wire strand maintained constantly at a uniform tension progressively from each bar to another, in turn, in a helical path, grooving the spacing elements, as the cylinder rotates, in advance of laying the strand thereon, to exactly locate the strand, securing all strands to all such bars, while the strands are uniformly tensioned, and severing all the strands at the spacing elements to leave the strands secured to both bars of each pair.

7. An apparatus for making trommel screens, comprising a support whereon may be supported two substantially parallel, spaced bars, spaced wire carrying means, one supported outwardly of each of the bars and in the common plane of the bars, for supporting a plurality of wire strands extending substantially parallel to each other and normal to and between the spaced bars, and tensioning means cooperating with said wire carrying means to tension equally all the wire strands supported thereby.

8. An apparatus for making trommel screens, comprising a support whereon may be supported two substantially parallel, spaced bars, spaced wire carrying means, one supported outwardly of

each of the bars and in the common plane of the bars, for supporting a plurality of wire strands extending substantially parallel to each other and normal to and between the spaced bars, and tensioning means reacting between the two spaced wire carrying means to force them apart, after the wire is wound thereon, thus to tension equally all the wire strands supported thereby.

9. An apparatus for making trommel screens, comprising two substantially parallel, spaced side plates, each notched at an end and having such notched ends of the two plates disposed adjacent, a spindle extending between said adjacent ends of the two side plates and having its ends received one in each of said side plate notches, and a second spindle held by and between the other two ends of said side plates, about which two spindles wire may be wound in spaced strands, and means operable to move said first spindle in its notches away from said second spindle to stretch the wire strands, for placing them all under uniform tension.

RICHARD D. HELLER.