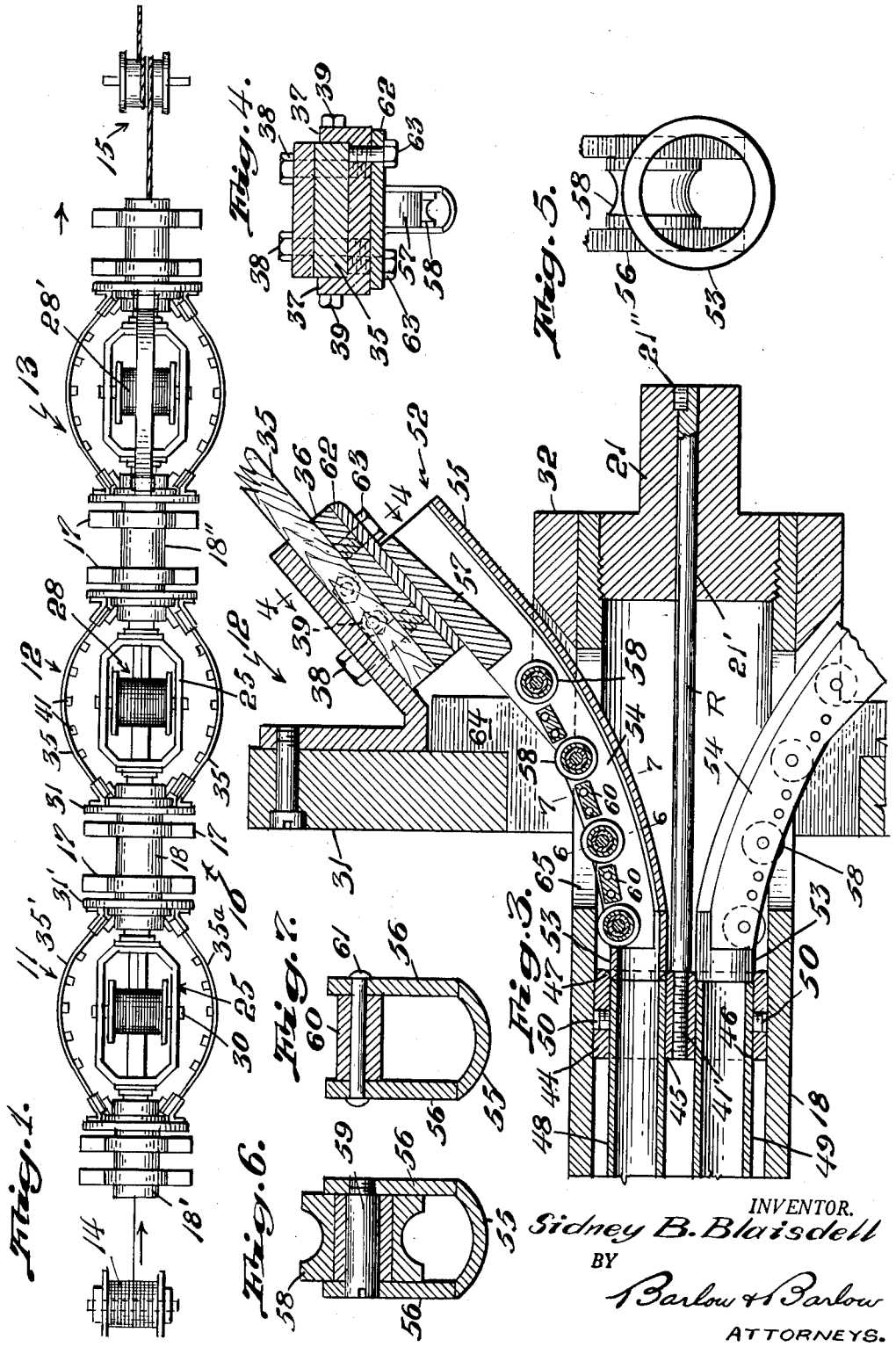
Nov. 15, 1955 S. B. BLAISDELL 2,723,525

WIRE TWISTING MACHINE

Filed June 23, 1953 2 Sheets-Sheet 1



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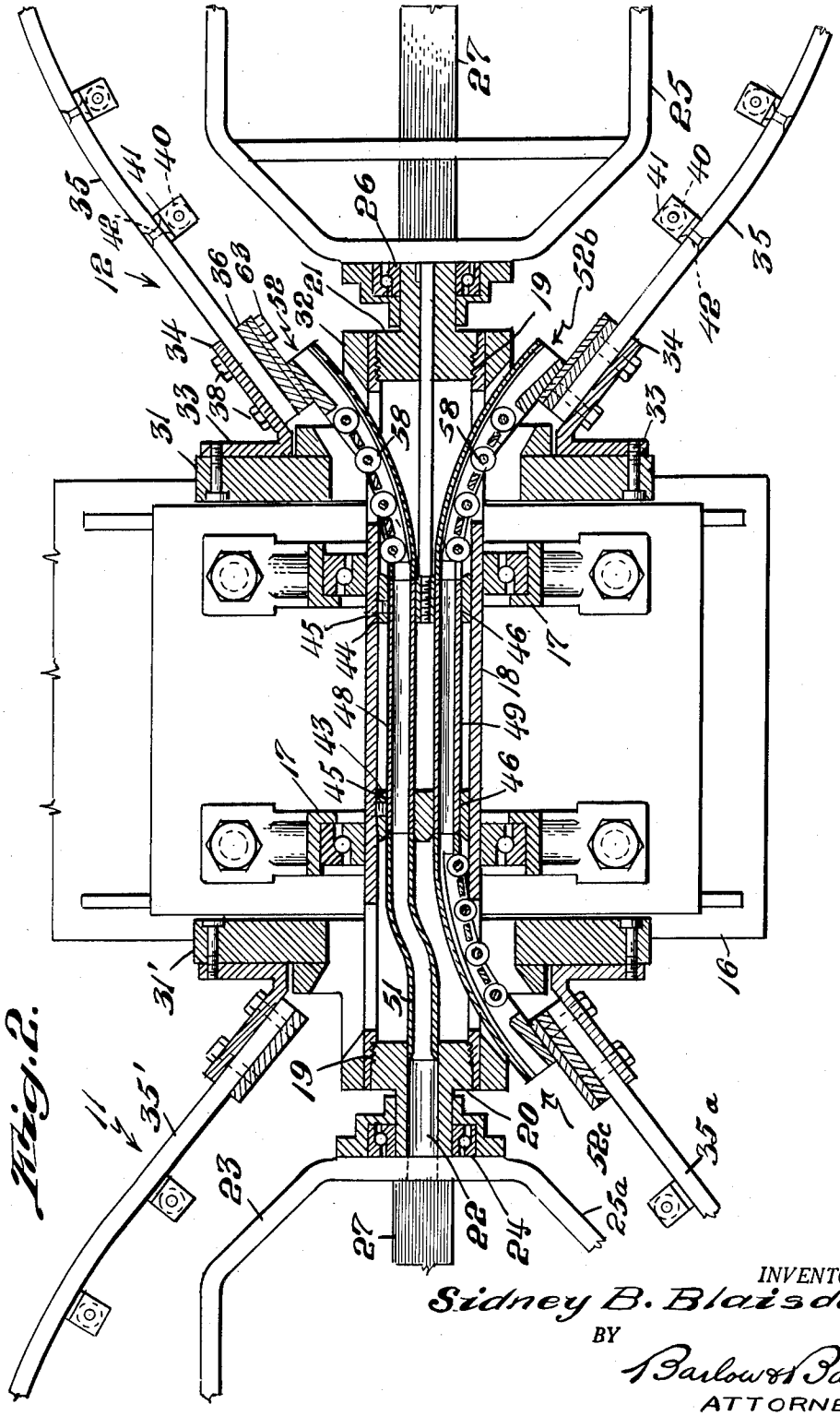


Fig. 2.

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WIRE TWISTING MACHINE

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This invention relates to a wire twisting machine.

Heretofore in wire twisting machines of the type herein disclosed, the wire strands to be twisted together were guided through the shafts between flyer sections by means of fixed tubular guides positioned within the shafts and with the end portions thereof bent outwardly to extend out of the shaft. In drawing or pulling the said strands through the shafts, the wire engaged against the surface of the said guides and developed considerable friction between the wire strands and the guide tubes. This is undesirable and particularly so because of the possibility of injury and the like to the covering of the wire strands, which covering in some instances may be merely a wrapping of paper material about the strand. The bows of the flyer sections in revolving the wire strands about the supply creel supporting cradle which extends between shaft sections had a tendency to place a so-called back twist in the individual wire strands because of this friction between the strand and guides having a tendency to hold and prevent rotation of the individual strands about their axis in response to the rotational action thereon by the revolving bow. Further, the prior art arrangement of guides is such as to prevent ready access thereto when removal of such guides was required.

An object of the invention is to improve generally on a wire twisting machine of the above character.

Another object of the invention is to provide a guide constructed so as to reduce friction on the wire strand as pulled along the guide.

A more specific object of the invention is to provide a guide having rotatable elements arranged and supported in a manner to provide in effect a relatively large rotatable arc to guide the wire strands in and out of the shaft section.

Another object of the invention is to provide a guide which will permit the strands to rotate about their axis in response to the rotational action thereon by the bows of the flyer sections in revolving the wire about the supply creel supporting cradle.

Another object of the invention is to provide a nest of straight tubular guides in a unit form to be inserted or removed as a unit from the shafts of the machine.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a plan view of a fragmental portion of a wire twisting machine embodying my invention;

Figure 2 is a view partly in section of a fragmental portion of the machine extending between flyer sections and on an enlarged scale;

Figure 3 is a view similar to the right end portion of that of Figure 2 but on an enlarged scale;

Figure 4 is a sectional view taken substantially along line 4—4 looking in the direction of the arrows thereon;

Figure 5 is an end view of a guiding element of the machine looking toward the same from the inner end thereof;

Figure 6 is a sectional view taken substantially along line 6—6 of Figure 3; and

Figure 7 is a sectional view taken substantially along line 7—7 of Figure 3.

In accordance with the invention, the guide section which guides the individual wire strands in and out of the shafts extending between the flyer sections is provided with a plurality of small freely rotatable rollers over which the strand is pulled to be passed through the shafts. These rollers are mounted on centers which are positioned on a relatively large arc, and there are sufficient of these small rollers to provide in effect an arcuate surface of relatively large radius over which the wire strand is pulled into and out of the said shafts, thus reducing friction as well as avoiding relatively sharp bends in the wire which have a tendency to open the covering on the wire. These guides are positioned to extend outwardly of the shaft at each end thereof and are connected to each other by straight tubular guides. The inner rollers have their wire engaging surfaces extending in a plane substantially centrally through the connecting straight guide whereby the wire strand is free thereof when pulled through the shaft. The tubular guides of each shaft are arranged in a unit which may be easily inserted or removed from the shaft when required.

Referring to Figure 1 of the drawings, **10** designates generally as by way of example a four-wire twisting machine shown very generally and having three flyer sections **11**, **12**, and **13** which extend in tandem as is usual and are driven in the usual manner (not shown). A first strand of wire is drawn from a supply **14** and as passed through the machine is combined with other strands from each flyer section to pass out at the other end of the machine twisted about each other in the usual manner to be taken up and packaged as pulled through the machine by a capstan **15**.

The flyer sections (see Figure 2) are substantially similar to each other; only the adjacent ends of the flyer sections **11**, **12** need be described for a clear understanding of the present invention. A bearing stand **16** extends between the flyer sections and has mounted on the upper side thereof pillow or the like bearings **17** in which is journalled a shaft **18** which is rotated in the usual manner (not shown). The end portions of the shaft are internally threaded as at **19** and threadedly receive end pieces **20**, **21** having projections which form trunnions at the ends of the shaft. The end piece or trunnion **20** has a central opening **22** therethrough. The right end of the cradle **23** of section **11** as seen in Figure 2 is mounted on the trunnion **20** as by means of a ball bearing **24**. The left end of the cradle **25** of section **12** is similarly mounted as at **26** on the trunnion **21**. The other end of each of the said cradles **23**, **25** are similarly mounted on the adjacent shafts between cradle sections. Each cradle is weighted as at **27** so as to be in an off-balance condition and held thereby substantially stationary as the shafts **18** are rotated. A supply creel **28** (Figure 1) is rotatably mounted as at **30** in each cradle.

A flyer plate **31** having a hub **32** is mounted at one end portion of the shaft **18** and may have a press fit engagement therewith and keyed (not shown) to the shaft so as to rotate with the shaft. A similar flyer plate designated **31'** is similarly mounted at the other end of the shaft. The plate **31** carries diametrically oppositely disposed brackets **33**, each having a foot portion **34** to which are attached one end of the bows **35** of the flyer section **12** as by means of a U-shape clamp plate **36** (see Figure 4), the arms **37** of which straddle the bow crosswise thereof. Bolts **38** extend through the foot portion **34** and the bow to threadedly engage the clamp plate.

Bolts 39 extend through the arms 37 to engage the adjacent edges of the bow, thus firmly securing the bow in position. The other ends of the bows are similarly attached to the shaft which extends between flyer sections 12 and 13. Each bow 35 carries a plurality of guide rollers 40 which are mounted on brackets 41 attached to the inner side of the bows 35 in an appropriate manner, as for example by rivets 42. A unit nest of straight guide tubes is received within the shaft 18 (see Figure 2) and comprises spaced similar collars 43, 44, each of which has diametrically oppositely disposed openings or bores 45 and 46 therethrough which are enlarged or flared at the outer ends as at 47 (see Figure 3). Guide tubes 48, 49 extend between the collars and are received in the said bores 45, 46 and secured thereto by set screws 50. The collar 44 has a central threaded bore 41' in which is received a rod R which extends through a bore 21' of the trunnion 21 and is there secured by a set screw 21''. Thus the guide unit is held in place and prevented from relative rotation with the shaft 18. A guide tube 51 extends from the bore 22 into detachable engagement with the flared portion 47 of bore 45 of collar 43 so as to extend in continuation of the tube 48 to the said bore 22. At the other end of the tube 48 there is provided a removable guide designated generally 52.

The guide 52 (see Figure 3) has a tubular inner end portion 53 (see Figure 5) and a section 54 of a general U shape in cross section (see Figures 6 and 7) providing a curved bottom wall 55 and parallel sides 56. A guide abutment 57 extends between the sides 56 at the outer end portion thereof and is spaced from the bottom wall 55. The abutment 57 may be made integral with the sides 56 but is herein shown as being made separate and welded in place and its inner side extends on a slant forming with the said sides 56 and wall 55 an inwardly converging delivery opening. The guide 52 has a plurality of spaced guide rollers 58 (see Figure 6) which extend between the sides 56 and are each mounted for free rotation on fixed pins 59. The spaces between the rollers 58 at the upper marginal edges of the sides 56 are filled by blocks 60 which are secured in place by rivets 61. The guide 52 is also provided at its outer end portion with a flange 62 (see also Figure 4) which engages against the clamp plate 36 to be secured thereto as by bolts 63. The guide 52 extends from the bow 35 through suitable openings 64 in the plate 31 and opening 65 in the shaft and the tubular portion 53 is received and supported in the flared portion 47 of the collar 44, thus providing a guide for the wire extending in continuation of the guide tube 48. The guide 52 extends on an arc of a radius which is substantially tangent to the inner side of the connecting tube 48 and to a plane substantially parallel to the bow 35. The rollers 58 are substantially equally spaced on the guide 52 and form in effect a larger roller, the surface of which is substantially tangent to the axis of the guide 48, thus providing in a relatively restricted area a desirable relatively long sweep or curvature in the wire strand as led from the shaft 18 to the bow 35. The guide tube 49 is provided with similar guides 52*b* and 52*c* (Figure 2) at the ends thereof.

The shaft section 18 and flyer sections above described are typical. The strand from a supply creel 28 is drawn therefrom to pass through the bore 22, guide tubes 51, 48, thence over guide rollers 58 and out of guide 52, over rollers 40 of bow 35 to be guided thereby to enter the next section shaft 18 through a guide similar to guide 52*c*, thence through a guide tube 49 and out of the shaft through a guide 52*b* and then guided by the guide rollers of a bow 35*a* to a next section shaft 18. In section 11 which is the first section, a strand is drawn from the supply 14 to pass through shaft 18' and out to be guided about the cradle 25*a* by the bow 35*a* and thence through shaft 18 between sections 11 and 12. The bow 35' merely acts as a dynamic balance for the bow 35*a*. The two wires pass out of shaft 18 and are guided about the cradle of section 12 by identical bows 35. These two wires and the additional wire from the supply of section 12 pass into shaft 18'' between sections 12 and 13. Thus, three strands of wire pass through shaft 18'' and the shaft 18'' is accordingly provided with three active guide tubes therethrough for the wires to be guided in and out thereof with a necessary like number of guides 52. The last section 13 has three active bows 35 for guiding the wires over the cradle 28' thereof, while a fourth bow acts as a dynamic balance.

When it is desirable that the shaft 18 be cleansed of debris and the like which accumulates within the shaft, the guides 52 are removed by removing the bolts 63 which frees the guide to be easily withdrawn. The cradles 25 may now be removed in the usual manner to free the trunnions 21 to remove the set screw 21'' upon which removal the guide tube unit may be drawn out of a shaft 18 by the rod R. Thus, the guides and inner side of the shafts 18 may be readily cleansed without a complete dismantling of the shafts.

I claim:

1. In a wire twisting machine having a flyer section, a rotatable tubular shaft at one end thereof and within which a wire strand passes relative to said flyer section, a guide for said wire strand extending into said shaft and having a plurality of rotatable rollers thereon engageable by said strand as passed through the guide, said rollers being relatively closely spaced and mounted on centers which are positioned on a relatively large arc.

2. In a wire twisting machine having a flyer section, a rotatable tubular shaft at one end thereof and within which a wire strand passes relative to said flyer section, a tubular guide within said shaft through which said strand passes, and a second guide extending into said shaft in continuation of said tubular guide and having a plurality of rotatable rollers thereon engageable by said strand as passed through the said second guide.

3. In a wire twisting machine as set forth in claim 2 wherein said second guide is generally U shape in cross section.

4. In a wire twisting machine as set forth in claim 2 wherein said second guide is detachably secured in place.

5. In a wire twisting machine as set forth in claim 2 wherein a second guide extends from each end of said tubular guide and the inner rollers of the second guides are in line with each other and with the axis of the tubular guide.

6. In a wire twisting machine having a plurality of flyer sections, a rotatable tubular shaft between said sections and within which a wire strand passes from one flyer section to another, a bow between adjacent shafts, the ends of which are fixed to said adjacent shafts to rotate therewith for carrying the said strand across a flyer section, and a guide for said strand extending from said bow to within said shafts and having a plurality of guide rollers thereon to be engaged by said strand when passing therethrough from said shaft to said bow and from said bow to the other of the said adjacent shafts, said rollers being relatively closely spaced and mounted on centers which are positioned on a relatively large arc.

7. In a wire twisting machine as set forth in claim 6 wherein said guide is supported at one end of the bow and detachably secured thereto.

8. In a wire twisting machine having a plurality of flyer sections, a rotatable tubular shaft between said sections and within which a plurality of wire strands pass from one flyer section to another, a guide unit within said shaft having a straight tubular guide for each of said wire strands, and a rod attached to said guide unit providing a handle for withdrawing said guide unit from said shaft.

9. In a wire twisting machine having a plurality of flyer sections, a rotatable tubular shaft between said sections and within which a wire strand passes from one

flyer section to another, a bow between adjacent shafts, the ends of which are fixed to said adjacent shafts to rotate therewith for carrying the said strand across a flyer section, and a guide for said strand extending from said bow to within said shafts and having a plurality of guide rollers thereon to be engaged by said strand when passing therethrough from said shaft to said bow and from said bow to the other of the said adjacent shafts, said bow being held in place by a clamp plate and said guide being provided with a flange to engage and be secured to said clamp plate.

10. In a wire twisting machine having a plurality of flyer sections, a rotatable tubular shaft between said sections and within which a wire strand passes from one flyer section to another, a bow between adjacent shafts, the ends of which are fixed to said adjacent shafts to rotate therewith for carrying the said strand across a flyer section, and a guide for said strand extending from said bow to within said shafts and having a plurality of guide rollers thereon to be engaged by said strand when passing therethrough from said shaft to said bow and from said bow to the other of the said adjacent shafts, said shaft having a tubular guide and said guide extending in continuation thereof, and the engaging surface of said rollers extending on an arc extending substantially tangential to the axis of said tubular guide.

11. In a wire twisting machine having a plurality of flyer sections, a rotatable tubular shaft between said sections and within which a wire strand passes from one flyer section to another, a bow between adjacent shafts, the ends of which are fixed to said adjacent shafts to rotate therewith for carrying the said strand across a flyer section, and an enclosed guide for said strand extending from said bow to within said shafts and carrying a plurality of guide rollers thereon to be engaged by said strand when passing therethrough from said shaft to said bow and from said bow to the other of the said adjacent shafts.

12. In a wire twisting machine having a plurality of flyer sections, a rotatable tubular shaft between said sections and within which a wire strand passes from one flyer section to another, a bow between adjacent shafts, the ends of which are fixed to said adjacent shafts to rotate therewith for carrying the said strand across a flyer section, and a guide for said strand extending from said bow to within said shafts and having a plurality of guide rollers thereon to be engaged by said strand when passing therethrough from said shaft to said bow and from said bow to the other of the said adjacent shafts, means to removably mount said guide in position.

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