

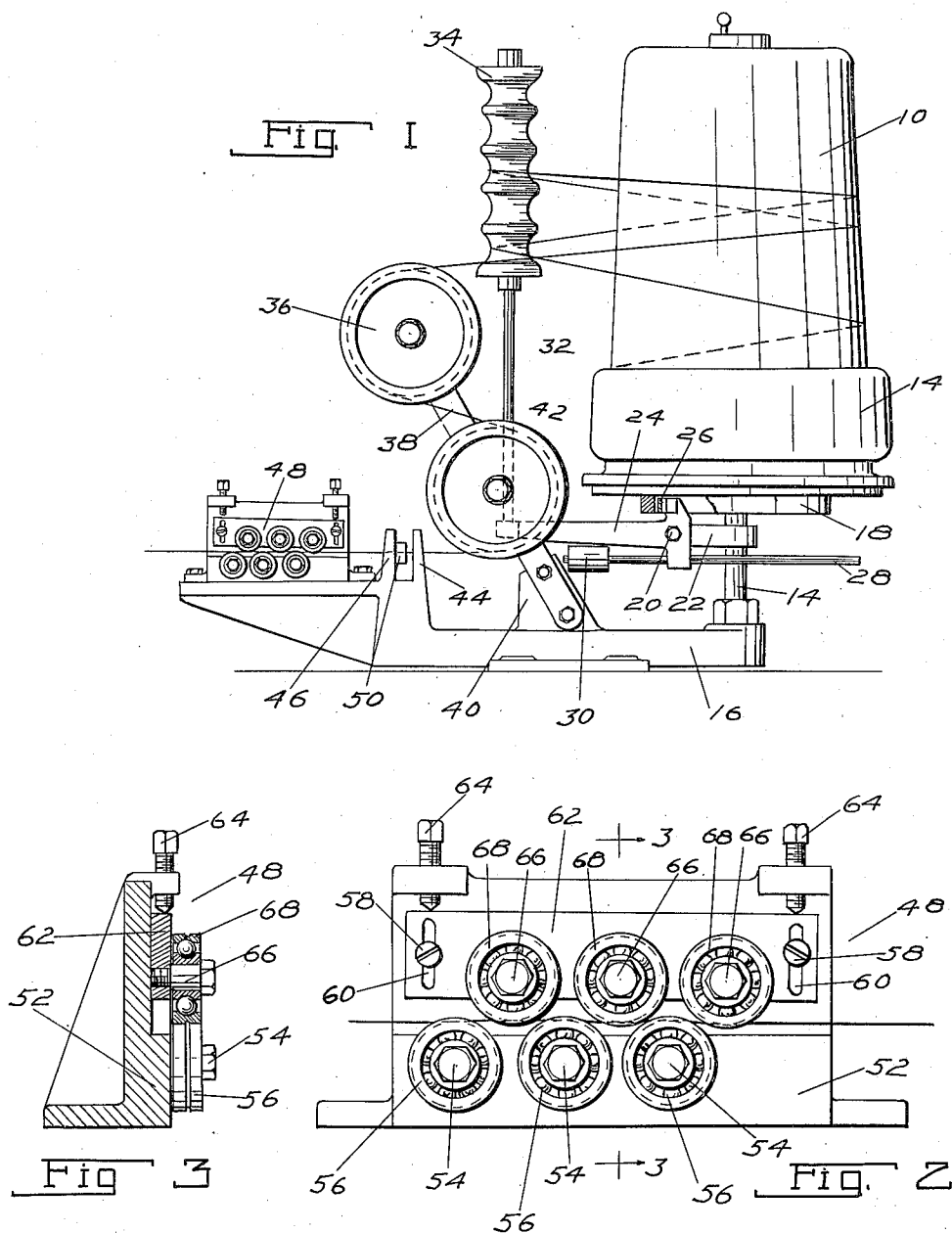
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WIRE HANDLING APPARATUS

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## UNITED STATES PATENT OFFICE

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## WIRE-HANDLING APPARATUS

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8 Claims. (Cl. 205—13)

This invention relates to handling wire, and more particularly to treating wire to prepare it for use in machines for stitching magazines and the like.

It has heretofore been necessary to take the wire from the swift on which it is wound after being drawn, or after being plated, and straighten it as a separate operation, then winding it on spools which are used in the stitching machines. An important object of the present invention is to eliminate some of these steps, by drawing the wire directly through a straightening device to the stitcher or other machine in which the wire is used.

It is important, in so handling the wire, that it come from the swift under a tension which is always uniform no matter what part of the swift the wire comes from, and that it be fed always at the same angle into the straightening device. The stitcher has an irregular, almost an intermittent feed, and yet it will not work properly if there is any variation in the tension. Not only will the stitches vary with slight variations in tension, or in the angle of feed or in the size of the wire, but any very great lack of uniformity will make the stitcher entirely inoperative.

To this end, the wire in passing from the swift to the straightening device passes under tension over a device which acts on the swift automatically to vary the action of a brake or the like so that the tension on the wire is maintained uniform. One desirable apparatus includes a roller over which the wire passes and which is urged toward the swift by tension on the wire.

This roller is mounted, for example by means of a vertical spindle, on one arm of a bellcrank lever projecting from underneath the swift. Another arm of the lever carries a brake acting on a brake surface on the bottom of the swift. Means, shown as a weight adjustably mounted on the bellcrank lever, is provided for yieldingly urging the brake against the brake surface on the swift, against the resistance of the tension on the wire.

Especially where plated wire is being handled, I prefer to provide between the swift and the straightening device, a die of substantially the same size as the wire and through which the wire passes to scrape off any adhering excess plating or other material to insure uniformity in the size of the wire.

The above and other objects and features of the invention, including various novel combinations of parts and desirable particular constructions, will be apparent from the following description of the illustrative embodiment shown in the accompanying drawing, in which:

Figure 1 is a side elevation of the apparatus, partly broken away to show the brake on the above-described bellcrank lever;

Figure 2 is a side elevation, on a larger scale, of the wire-straightening device; and

Figure 3 is a section through this device on the line 3—3 of Figure 2.

The apparatus illustrated comprises a swift 10, rotatably supported on a vertical spindle 12 and carrying wound thereon a supply or coil of wire 14. The spindle 12 is mounted on a suitable base 16. The base of the swift 10 is provided with a cylindrical flange or brake drum 18, coaxially arranged relative to the spindle 12.

Pivoted below the swift 10 at 20, on a bracket 22 carried by the spindle 12, is shown a bellcrank lever 24 having upwardly-extending, downwardly-extending, and horizontally-extending arms. The upwardly-extending arm carries a brake 26 engageable with the inner surface of the brake drum 18. The downwardly-extending arm carries (adjustably if desired) a horizontal rod 28 carrying a weight 30 yieldingly urging the brake 26 toward the braking surface on the flange 18.

The horizontal arm of the lever 24 extends at one side beyond the periphery of the swift 10, and is provided with a vertical spindle 32 extending up along one side of the swift and paralleling the spindle 12. This spindle 32 has rotatably mounted at its upper end a guide roller or spool 34 formed with circumferential grooves for guiding the wire 14.

The wire is preferably led over the lower part of this roller 34 from the supply or coil on the swift, thence back around the upper part of the swift, thence over the roller 34 again, back around the upper part of the swift 10, and thence to a guide roller 36 rotatably mounted for movement on a horizontal pin carried by a bracket 38 secured to a boss 40 on the base 16. This gives the wire a good frictional grip on the roller 34 in such a manner that the tension of the wire urges the roller 34 toward the swift 10 with a substantially constant leverage.

The tension on the wire thus urges the lever 24, in opposition to the weight 30, in a direction to cause the brake 26 to slip relatively to the braking surface on the flange 18. It will be seen that the brake 26 is operated automatically to maintain a regulated tension on the wire drawn from the swift.

The above-described swift is more fully de-

scribed, and is claimed, in my application No. 52,065, filed concurrently herewith.

The wire, after passing over the guide roller 36, may pass over a second guide roller 42 also mounted on a horizontal pin on the bracket 38, and thence through slots or openings in spaced projections 44 and 46 to a wire straightening device 48 shown in detail in Figures 2 and 3.

Between the projections 44 and 46 is shown a die block 50, formed with its die opening the same size as the wire and through which the wire is threaded, and which is held, by the tension on the wire, seated against the projection 46. This die smooths out any unevennesses in the coating of the wire.

The wire is drawn through the apparatus under tension by the stitcher or other mechanism to which the wire is fed.

The straightening device 48 preferably includes a body or supporting block 52, bolted or otherwise secured to an extension of the base 16, and provided with a plurality of (e. g. three) horizontal pins 54 rotatably carrying rollers 56 grooved to engage and support the bottom of the wire as it is drawn thereover.

The body 52 also carries clamp bolts 58 passing through adjusting slots 60 in an upper block 62, adapted to be forced downwardly by means such as thrust screws 64 threaded through lugs at the top of the body 52. The block 62 carries horizontal spindles 66 rotatably supporting grooved rollers 68 which are staggered with respect to the rollers 56, and which engage the top of the wire between the points where it is supported by the rollers 56.

By suitably adjusting thrust screws 64 downward, the bottoms of the rollers 68 are brought slightly below the tops of the rollers 56, whereby the wire is flexed back and forth as it is drawn through the device, and comes out substantially straight.

As shown in Figure 3, the rollers 56 and 68 may be mounted on their spindles 54 and 66 through the medium of ball bearings.

While one illustrative embodiment has been described in detail, it is not my intention to limit the scope of my invention to that particular embodiment, or otherwise than by the terms of the appended claims.

I claim:

1. A unit for feeding wire to a machine having an irregular feed and comprising a swift provided with a brake surface on its bottom and rotatable about an upright axis, a bellcrank lever pivoted below said swift and having one arm provided with a brake engageable with said brake surface and having another arm which extends beyond the periphery of said swift, a spindle carried by and extending upwardly from the end of said other arm and provided with a roller beside said swift, means acting on said bellcrank lever to urge the brake against the brake surface, the bellcrank lever being so constructed and arranged that tension on a wire unwound from the swift and passing over the roller and tending to draw the roller toward the swift will rock the bellcrank lever against the resistance of said means to withdraw the brake from the brake surface, a wire straightening device including rollers arranged to flex a section of the wire as it is drawn therethrough alternately in opposite directions, means for guiding the wire from the roller to the straightening device, and a die substantially the same size as the wire and through which the wire passes before it reaches the straightening device.

2. A unit for feeding wire to a machine having an irregular feed and comprising a swift provided with a brake surface on its bottom and rotatable about an upright axis, a bellcrank lever pivoted below said swift and having one arm provided with a brake engageable with said brake surface and having another arm which extends beyond the periphery of said swift, a spindle carried by and extending upwardly from the end of said other arm and provided with a roller beside said swift, and means acting on said bellcrank lever to urge the brake against the brake surface, the bellcrank lever being so constructed and arranged that tension on a wire unwound from the swift and passing over the roller and tending to draw the roller toward the swift will rock the bellcrank lever against the resistance of said means to withdraw the brake from the brake surface, and a device to which the wire passes from said roller and which frictionally resists movement of the wire.

3. A unit for feeding wire to a machine having an irregular feed and comprising a swift provided with a brake surface on its bottom and rotatable about an upright axis, a bellcrank lever pivoted below said swift and having one arm provided with a brake engageable with said brake surface and having another arm which extends beyond the periphery of said swift, a spindle carried by and extending upwardly from the end of said other arm and provided with a roller beside said swift, means acting on said bellcrank lever to urge the brake against the brake surface, the bellcrank lever being so constructed and arranged that tension on a wire unwound from the swift and passing over the roller and tending to draw the roller toward the swift will rock the bellcrank lever against the resistance of said means to withdraw the brake from the brake surface, and a wire straightening device including rollers arranged to flex a section of the wire as it is drawn therethrough alternately in opposite directions, means for guiding the wire from the roller to the straightening device.

4. A unit for feeding wire to a machine having an irregular feed and comprising a swift provided with a brake surface on its bottom and rotatable about an upright axis, a bellcrank lever pivoted below said swift and having one arm provided with a brake engageable with said brake surface and having another arm which extends beyond the periphery of said swift, a spindle carried by and extending upwardly from the end of said other arm and provided with a roller beside said swift, and means acting on said bellcrank lever to urge the brake against the brake surface, the bellcrank lever being so constructed and arranged that tension on a wire unwound from the swift and passing over the roller and tending to draw the roller toward the swift will rock the bellcrank lever against the resistance of said means to withdraw the brake from the brake surface, and a die the same size as the wire through which the wire passes from said roller and swift.

5. A unit for feeding wire to a machine having an irregular feed and comprising a swift from which wire can be unwound, means acting on the swift to resist the unwinding of the wire with a predetermined tension, a die the same size as the wire through which the wire passes from said swift as it is unwound therefrom, and a wire-straightening device acting on the wire as it comes from said die.

6. A unit for feeding wire to a machine having

an irregular feed and comprising a swift from which wire can be unwound, means acting on the swift to resist the unwinding of the wire with a predetermined tension, and a wire-straightening device acting on the wire being unwound from the swift, said means acting automatically to maintain the wire tension uniform at said device regardless of the part of the swift the wire comes from.

- 10 7. A unit comprising a swift provided with a brake surface on its bottom and rotatable about an upright axis, a bellcrank lever pivoted below said swift and having one arm provided with a brake engageable with said brake surface and  
15 having another arm which extends beyond the periphery of said swift, a spindle carried by and extending upwardly from the end of said other arm and provided with a roller beside said swift, and a weight acting on said bellcrank lever to  
20 urge the brake against the brake surface, the bellcrank lever being so constructed and arranged that tension on a wire unwound from the swift and passing over the roller and tending to draw the roller toward the swift will  
25 rock the bellcrank lever against the resistance of said means to withdraw the brake from the brake

surface, and a die the same size as the wire through which the wire passes from said roller and swift.

8. A unit comprising a swift provided with a brake surface on its bottom and rotatable about an upright axis, a bellcrank lever pivoted below said swift and having one arm provided with a brake engageable with said brake surface and having another arm which extends beyond the periphery of said swift, a spindle carried by and extending upwardly from the end of said other arm and provided with a roller beside said swift, and a weight acting on said bellcrank lever to urge the brake against the brake surface, the bellcrank lever being so constructed and arranged  
15 that tension on a wire unwound from the swift and passing over the roller and tending to draw the roller toward the swift will rock the bellcrank lever against the resistance of said means to withdraw the brake from the brake surface, and a  
20 die the same size as the wire through which the wire passes from said roller and swift, said weight being adjustably carried by the bellcrank lever below the bottom of the swift.

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