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FINAL-SHAPING ATTACHMENT FOR WIRE-DRAWING MACHINES

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FIG. 1.

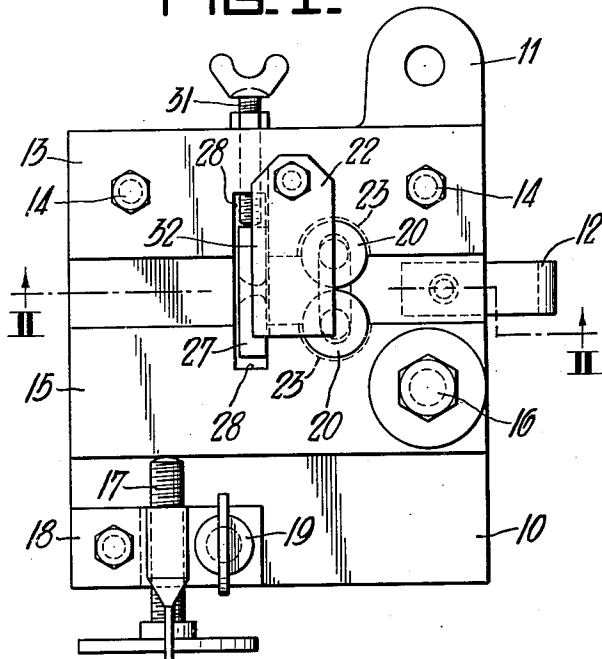


FIG. 4.

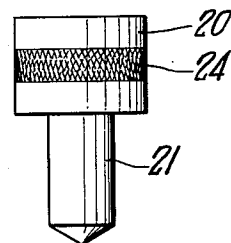


FIG. 2.

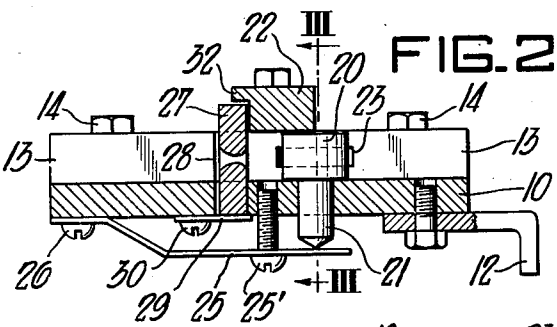
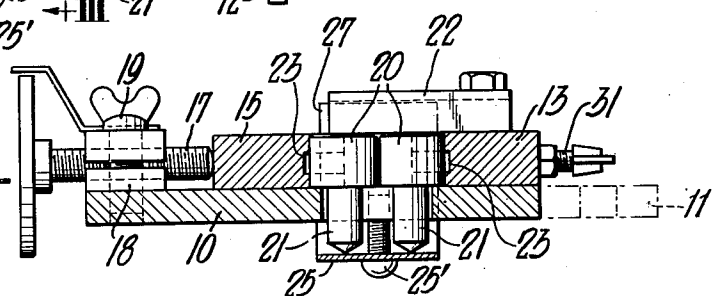


FIG. 3.



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UNITED STATES PATENT OFFICE

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FINAL-SHAPING ATTACHMENT FOR WIRE-DRAWING MACHINES

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4 Claims. (Cl. 80—40)

1

This invention relates to wire-drawing machines and, in particular, to an attachment for wet-drawing machines used in the production of fine wire such as staple wire.

Flattened wire is used in making staples for certain types of stapling machines. Such wire is reduced to final size by drawing it through a succession of dies having round holes therein of progressively decreasing diameters. The shaping of the wire must therefore be effected as the final operation. The use of dies for this shaping operation has been attempted but has been accompanied by considerable difficulty. It is accordingly the object of my invention to provide a flattening attachment for use in conjunction with a wet-drawing machine including flattening rolls and a mounting for the rolls which may be conveniently disposed in the machine so as to be subject to the cooling and lubricating effect of the liquid therein. The shaping or finishing operation may thus be performed at the same high speed at which the wire is drawn to reduce its cross-sectional area.

A present preferred embodiment of the invention comprises a horizontal supporting plate having a pair of opposed cooperating bearing blocks thereon, one fixed and the other adjustable toward and from the fixed block. The blocks have opposed part-cylindrical recesses accommodating the bodies of cooperating vertical rolls defining a pass therebetween effective to flatten the wire to the desired extent after it has been brought to the proper diameter in circular shape. The blocks and supporting plate are also recessed to accommodate a lead-in die ahead of the flattening rolls. I further provide means for effecting necessary adjustments of the movable bearing block and the lead-in die.

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the present preferred embodiment briefly described above. In the drawings,

Figure 1 is a plan view;

Figure 2 is a section therethrough taken on the plane of line II—II of Figure 1;

Figure 3 is a sectional elevation taken on line III—III of Figure 2; and

Figure 4 is an elevation of one of the rolls.

Referring in detail to the drawings, the wire-flattening attachment of my invention comprises a supporting plate 10 having an integral lug 11 and a bracket 12 secured thereto whereby the plate may be mounted in suitable position in a

2

wet-drawing machine. A bearing block 13 is fixed to one side of the plate 10 by screws 14. A bearing block 15 is pivoted on a bolt 16 in spaced relation to block 13. A screw 17 threaded through a split clamping block 18 effects limited angular adjustment of the free end of block 15 toward or from the block 13. A screw 19 threaded through the clamping block compresses the split portions of the latter about the screw 17 to secure it in adjusted position.

The blocks 13 and 15 have opposed part-cylindrical recesses in their adjacent edges in which rolls 20 of substantially the same radius are rotatably seated for bearing engagement therewith. The rolls have pins 21 extending downwardly therefrom through a slot in the plate 10. They are held in position by a keeper 22 secured to block 13. Circumferential grooves 23 are formed in the recesses in the blocks which accommodate the rolls 20, intermediate the ends thereof. The rolls 20 are of hard metal such as tungsten carbide and are highly polished adjacent their upper and lower ends. They are given a mat finish in a perimeter or band intermediate their ends as indicated at 24 in Figure 4. The pins 21 of the rolls 20 rest on a leaf-spring 25 secured at one end to the block 10 by screws 26. The free end of the spring 25 may be adjusted by a screw 25' to effect limited vertical adjustment of the rolls 20. The adjustability of the leaf-spring 25 is provided so that the rolls 20 may be centered between the base plate 10 and the keeper 22 without actually contacting either of the latter and also to compensate for wear of the ends of the pins 21 which contact the leaf-spring 25 and support the rolls 20 in vertical position. The operating speeds of the rolls 20 may be as high as 10,000 revolutions per minute and during their useful life appreciable wear occurs on the pivot ends of the pins 21.

The plate 10 is slotted transversely to accommodate a wire-drawing die 27 and the blocks 13 and 15 have notches 28 in their adjacent faces to receive the sides of the die. The die is supported vertically by a strip 29 secured to the bottom of plate 10 by screws 30 and bears against one side of the notches in blocks 13 and 15. An adjusting screw 31 is threaded into a tapped hole drilled transversely through block 13 to permit lateral adjustment of the die 27 relative to the rolls 20. The movement of the wire passing through the die tends to force the die against the adjusting screw 31. It is a preferred operating condition of the apparatus to maintain the longitudinal axis of the die 27 normal to a plane

passing through the central axes of the rolls 20 and midway between the latter for all operating positions of the block 15. Keeper 22 has a flange 32 overlying die 27 to secure it in position.

The attachment described above is adapted for mounting in any conventional wet-drawing machine. It preferably takes the place of the finish die and may conveniently be positioned just ahead of the holder for the latter. A rubber wiper mounted in the holder serves to wipe the wire dry before it is wound on a spool. The wire being processed, after being drawn through the necessary number of dies to reduce its diameter to the desired size, is inserted through the die 27 and passed between rolls 20 after which it traverses the rubber wiper previously mentioned and is then wound on a spool. Screw 17 is adjusted to effect the desired flattening of the wire passing between the rolls 20. The die 27 serves as a lead-in die unless slight additional elongation of the wire is desired at this stage in which case the die may serve to take a light draft on the wire just before it enters the rolls.

The radial load on the rolls 20 is sustained by the walls of the semi-circular recesses in the blocks 13 and 15. The recesses 23 allow clearance for material accumulating from the drawing and rolling and prevent any tendency of the rolls to rock. The mat or slightly roughened finish on the rolls in the band 24 insures that the friction between the wire and rolls will always be greater than that between the rolls and the bearing blocks thus precluding stoppage of the rolls by bearing friction. The entire attachment, of course, is subject to the lubricating effect of the liquid usually employed in wet-drawing machines. The mat portion 24 of the rolls are aligned with the recesses 23 and are thus out of contact with the bearing blocks. Thus the frictional resistance to rotation of the rolls is solely that occasioned by the contact of the highly polished end portions thereof with the walls of the semi-circular recesses in the bearing blocks.

It will be apparent from the foregoing that the invention permits the shaping of fine wire to a slightly flattened contour at the same high speed at which the wire is drawn through multiple-draft wet-drawing machines. A further application for the invention is in the production of

wire being drawn to shape which requires a rolling pass before the finishing draft. Where the finished shape and the reduction in area will permit, this can be done in a single operation by mounting the attachment of my invention directly ahead of the finishing die.

I claim:

1. A wire-finishing device comprising a supporting plate, a pair of spaced blocks mounted on said plate for movement relative to each other, said blocks having semi-cylindrical recesses in their adjacent edges located in opposed relation, cylindrical rolls of substantially the same radius as the recesses loosely disposed therein and having sliding bearing engagement therewith, means for adjusting said blocks to bring said rolls into properly spaced relation and shiftable means retaining said rolls in said recesses, said rolls having wire-engaging perimeters intermediate their ends and said recesses being relieved in the zone of said perimeters.

2. The apparatus defined by claim 1 characterized by said rolls being highly polished adjacent their ends and having a mat finish in the region of said perimeters.

3. The apparatus defined by claim 1 characterized by said last-mentioned means being a keeper secured to one of said blocks and overlying said rolls.

4. The apparatus defined by claim 1 characterized by said rolls having pins extending through said plate and means engaging said pins for adjusting said rolls axially.

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