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METHOD OF REMOVING FINS AND THE LIKE FROM ELONGATED CLAD METAL WORK

Filed June 8, 1959

Fig. 1.

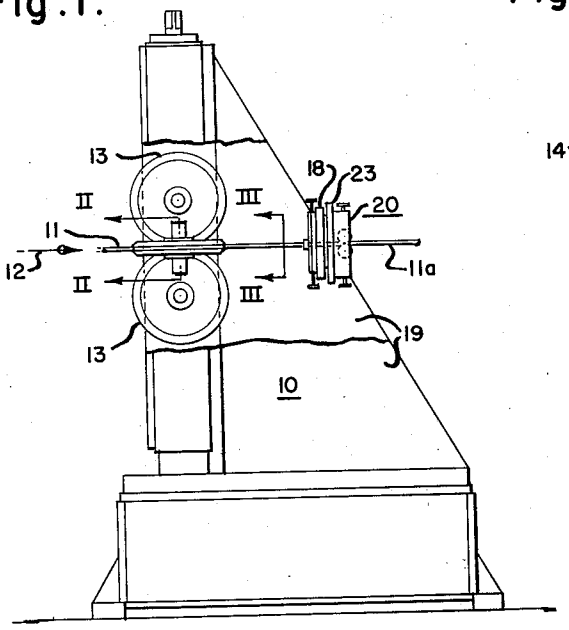


Fig. 2.

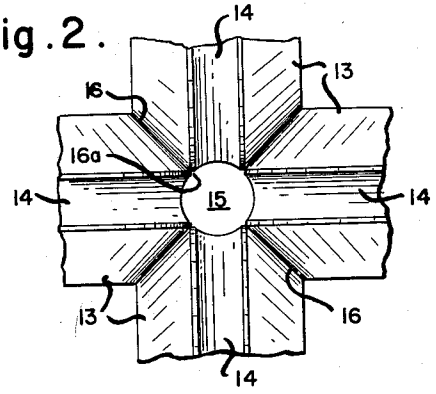


Fig. 3.

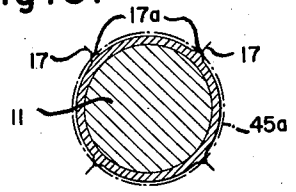


Fig. 4.

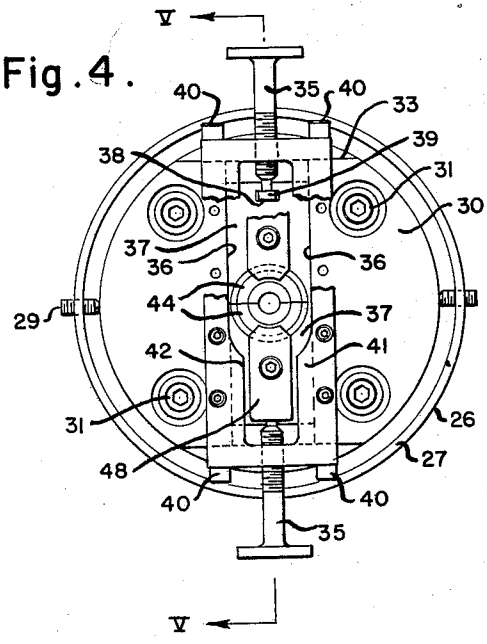
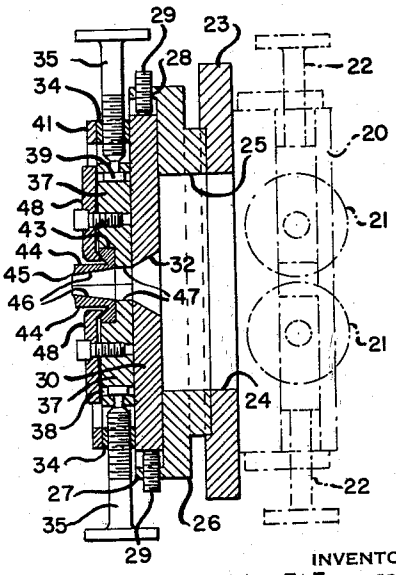


Fig. 5.



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METHOD OF REMOVING FINS AND THE LIKE FROM ELONGATED CLAD METAL WORK

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1 Claim. (Cl. 29—547)

This invention relates to a shaver employing rigidly held knife dies. More particularly, this invention pertains to a stationary shaver device for continuously removing generally longitudinally extending fins or ribs as those produced, for example, in a continuous roll manufacture of clad rods and wires.

In the production of clad rods and wires, such as the "Alumoweld" aluminum cladding of a ferrous core by the system described in United States patent application Serial No. 773,125 filed June 16, 1958 and now Patent No. 3,088,195, generally longitudinally and radially extending fins are produced in compacting and hot reduction rolling actions at the parting planes between the respective Turk's head rolls utilized for such work. Such fins may be of a height as to make the removal thereof desirable in the interest of producing an end product with a surface free of folds or scabs or other imperfection which might be caused by the further rolling of the clad rod or wire in the course of its manufacture if such fins were not so removed. Further, it is desirable to have such removal take place at operational speed and in the course of the movement of the metalwork along a pass line through successive rolling stands manufacturing the clad material, for economy and efficiency of operation. Still further, it is desirable that in the removal of such fins that such take place close to the surface of the work without tearing or gouging that surface. The device of this invention accomplishes those objectives and has both combinative structural and method aspects.

Other objects, features and advantages of this invention will be apparent from the following description and accompanying drawings, which are illustrative of one embodiment only, in which

FIGURE 1 is a view in side elevation with portions broken away illustrating a rolling mill stand for the manufacture of cad rod with the clad rod moving along the pass line and through a shaver apparatus of this invention;

FIGURE 2 is an enlarged view of a portion of the mill stand shown in FIGURE 1 taken along line II—II thereof to illustrate a rolling pass of a kind which may produce fins during such roll cladding;

FIGURE 3 is a schematic illustration of a clad rod issuing from such a roll pass with fins thereon to be removed taken along line III—III of FIGURE 1;

FIGURE 4 is a view of the front of a shaver apparatus of this invention; and

FIGURE 5 is a view in section taken along line V—V of FIGURE 4.

Referring to the drawings, a rolling mill stand 10 is provided in a plant for the fabrication of clad rod or wire 11*a* by the application of powder material to a solid, elongated core 11 moving therethrough along a pass line in the direction of arrow 12. Stand 10 is provided with Turk's head rolls 13 having peripheral grooves 14 therein which form a closed pass 15 through the rolls when they come nearest together for a fabrication operation with the mating parting surface faces of the rolls defining pass planes 16 between the respectively adjoining rolls, such pass planes being shown at the intercardinal points in the illustration, although they may be at any orientation around the axis of the pass line.

Despite precision manufacture of the rolls 13 and their engagement at the parting planes, fins 17 nevertheless tend to be produced on the surface of the cladding layer in the work 11*a* as it goes through pass 15, as illustrated in FIGURE 3. If the rolling of the clad rod as shown in FIGURE 3 were continued by entering it into a further closed pass, there would at least be a tendency for such fins to fold over and be rolled into the surface adjacent the base of the fins and mar the end product to that extent. Of course, where it is immaterial in the end product whether or not there are such defects, no fin removal would be required.

In the illustrated embodiment, as the clad work 11*a* moves along the pass line, preferably under the pulling of a capstan or other device toward the delivery end of the line, it is definned by a shaver apparatus 18 securely fixed between the mill standwing plate abutments 19 so as to straddle the pass line, in coaxial relation therewith. A guide 20 with a pair of vertically adjustable grooved guide rolls 21, also shown in chain outline in FIGURE 5, may also be provided and similarly straddle the pass line so that when the guide rolls 21 are screwed down by turnscrews 22 against clad rod 11*a*, the steadiness of the axis of the pass line and of the work 11*a* passing therealong is promoted.

Shaver 18 is bolted to a mounting bracket 23 extending between and fixed to the respective abutment plates 19 to hold it rigidly in place. It is provided with a central opening 24 in alignment with a central opening 25 in a centering plate 26 which is transversely fixed in a recess on the front of bracket 23 to which it is bolted. Plate 26 is provided with a forwardly extending cylindrical flange 27 which is drilled and tapped at angularly spaced locations to provide a plurality of threaded openings 28 therethrough around the periphery for the reception of centering screws 29 in threaded engagement therewith.

A tool holder 30 is bolted to centering plate 26 by bolts 31, with the bolt holes through plate 30 being wide enough to permit transverse adjustment of plate 30 for the centering thereof with a central rearwardly flared opening 32 therethrough in coaxial relation to the pass line. Plate 30 may be adjusted to central position by the set screws 29 before the bolts 31 are tightened.

Tool holder 30 is rabbeted horizontally at 33 as a rest for upper and lower crossbars 34 having drilled and tapped openings centrally therethrough for engagement by upper and lower hand-operated feed screws 35, respectively. In addition, the frontal portion of tool holder 30 is recessed to form sides 36 to define a slideway recess for upper and lower slides 37. The outer ends of the slides 37 are provided with T-shaped slots 38 to rotatably engage correspondingly shaped inner ends 39 on the feed screws 35. The bolts 40 hold the crossbars 34 in place against the surfaces 33. A cover 41 is bolted to the front face of tool holder 30, the cover having integral retainer wings 42 to overlie a portion of the respective slides 37 and keep them in the slideway recess.

Each slide 37 is provided with a semicircular recess 43 in which a semicircular knife die 44 with a forwardly projecting cutting edge 45 is seated. The inside of the knife die is hollow as shown in 46 and flares in a rearward direction for relief, a pair of knife dies 44 forming a hollow conical frustum in alignment with semicircular openings 47 through the slides 37. Each semicircular knife die is held in place by a clamping block 48 bolted to its slide. Hence, when an operation is started, the knife dies are positioned apart preferably until the work is moving along the line at which time the knife dies are brought together and the fins 17 removed along a dash-and-dot line 45*a*. The cutting circle 45*a* is somewhat larger than the surface diameter of a clad rod or wire exiting from pass 15.

Preferably, the innermost ends of the parting edges of the rolls 13 are ground to form a small conjoint V 16*a* opening toward the axis of the pass line at each of the parting planes. These V's in turn produce a slight radially outwardly tapered overfill 17*a* at the base of the fins 17, which overfill projects slightly above the surface of the clad rod. Hence, as the knives 45 cut, they pass through overfill portions 17*a* which appear to provide sufficient resistance to effect a relatively clean shearing cut without tearing or gouging and insure against the cutting line extending into the surface of the clad rod. At the same time, the base or remainder of overfills 17*a* is low enough for further pressing, including rolling, into flush relation with the surface of the clad rod or wire without forming any imperfection or surface defect.

Although the illustrated embodiment has been described in conjunction with clad rod or wire on which radial fins may be formed which extend longitudinally, the invention is also applicable generally to endwise-presented fins and ribs, such as generally helical fins and ribs, which are to be removed by relative movement between such fins or ribs and a shaver device of the invention; and, further, this invention is also applicable to the removal of fins and ribs on work having other cross sections than the one illustrated.

Various changes may be made in the embodiment of the illustrated shaver device, and other embodiments provided, without departing from the spirit of this invention or the scope of the appended claim.

We claim:

A method for removing longitudinally and radially extending fins unavoidably formed in the rolling of softer metal clad steel core rod or wire or the like moving under tension along a pass line by Turk's head rolls or the like, comprising, rolling a low outwardly tapering portion at the base of each of said fins, shaving through the base of each of said fins substantially at the same time close to the surface of said clad rod or wire during movement of said clad rod or wire to remove said fins and leave a portion of said base remaining at each fin location, and pressing said remaining portions radially into substantially flush relation with the longitudinally adjoining surface portions respectively of said clad rod or wire.

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