March 3, 1959 R. O. PETERSON 2,876,146

SURFACE TREATING ROD, WIRE, AND THE LIKE

Filed June 16, 1954 3 Sheets-Sheet 1

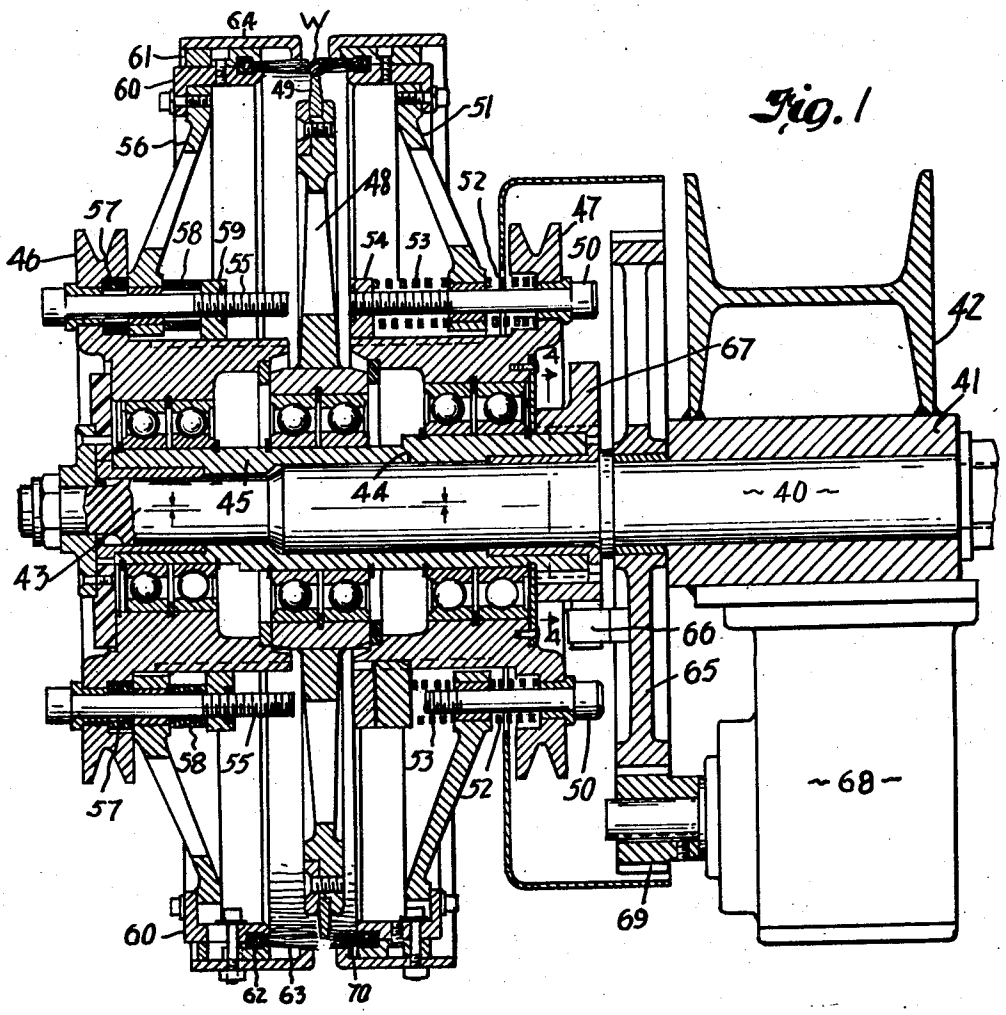


Fig. 1

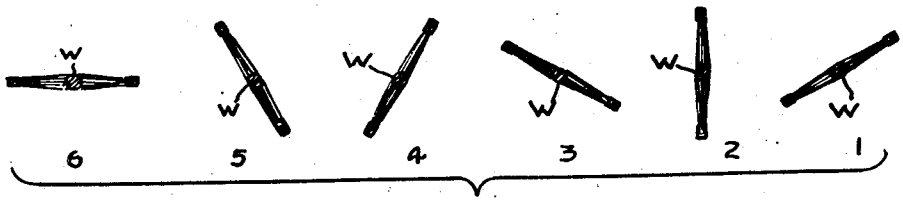


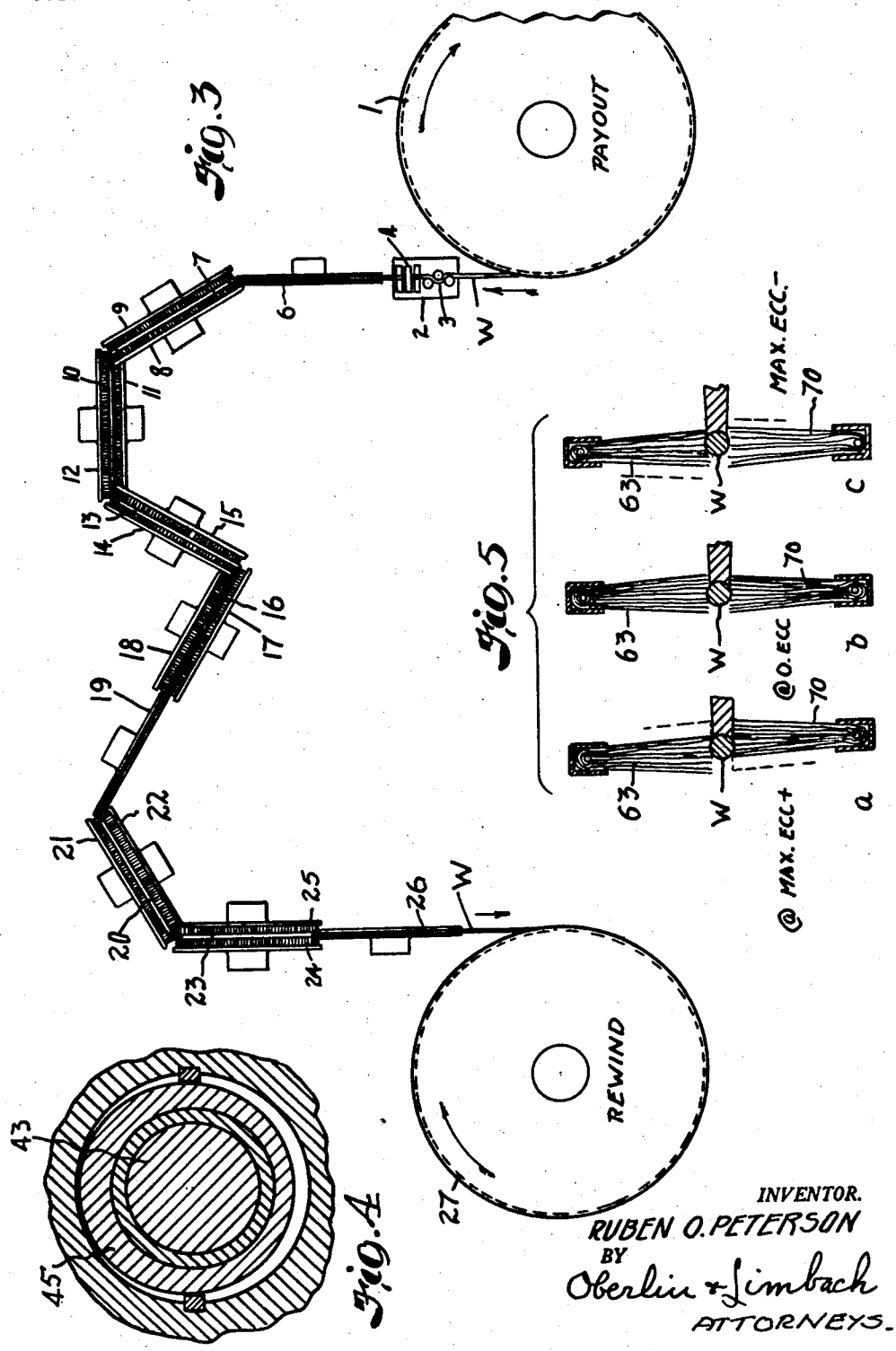
Fig. 2

INVENTOR.
RUBEN O. PETERSON
BY
Oberlin & Limbach
ATTORNEYS.

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SURFACE TREATING ROD, WIRE, AND THE LIKE

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INVENTOR.
RUBEN O. PETERSON
BY
Oberlin & Limbach
ATTORNEYS.

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SURFACE TREATING ROD, WIRE, AND THE LIKE

Filed June 16, 1954 3 Sheets-Sheet 3

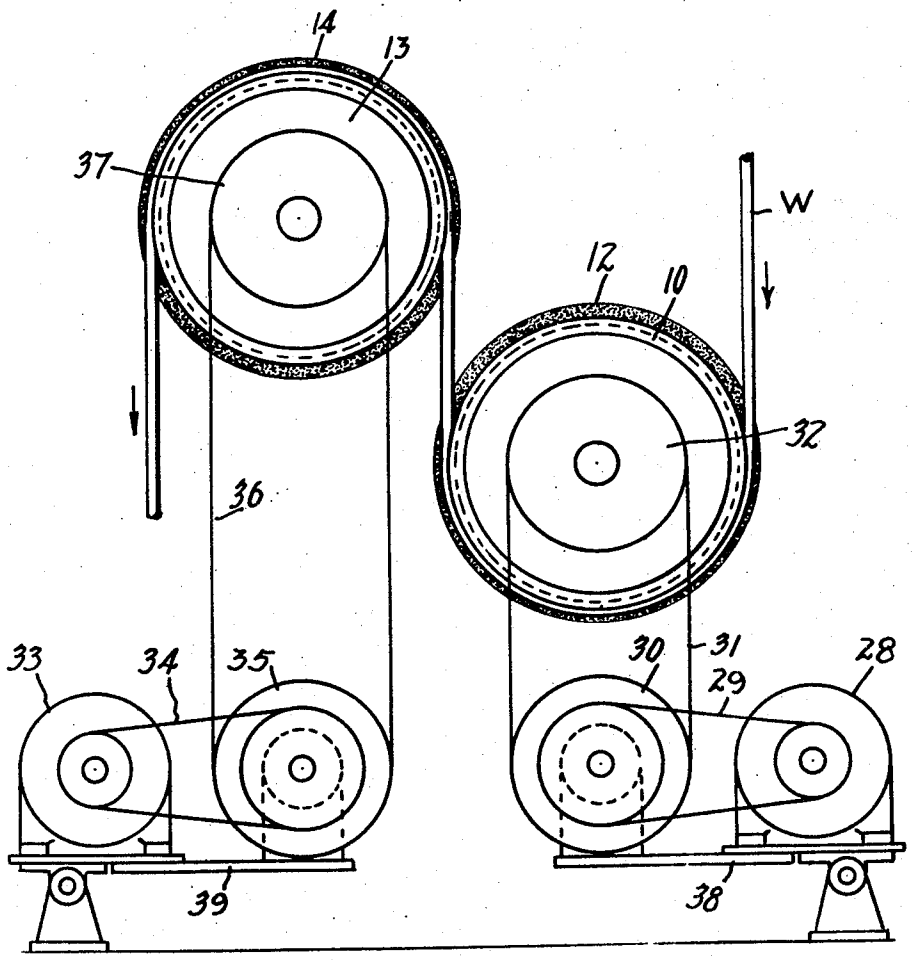


Fig. 6

INVENTOR.
RUBEN O. PETERSON
BY
Oberlin & Limbach
ATTORNEYS.

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2,876,146

SURFACE TREATING ROD, WIRE AND THE LIKE

Ruben O. Peterson, University Heights, Ohio, assignor to The Osborn Manufacturing Company, Cleveland, Ohio, a corporation of Ohio

Application June 16, 1954, Serial No. 437,215

27 Claims. (Cl. 134—9)

This invention relates as indicated to the surface treating of rod, wire and the like, and more particularly to certain novel apparatus and an improved method for the removal of scale and surface irregularities from the work and the provision of a superior surface finish thereon greatly facilitating subsequent drawing operations and the like as well as resulting in a much improved product.

It is, of course, necessary to remove scale from rod and the like preliminary to drawing of the same, and this has ordinarily been accomplished by passage through a pickling bath. While a sufficient treatment by such bath is quite effective to remove the scale, the employment of such baths results in a number of most unsatisfactory conditions. The chemicals, notably sulphuric acid, must frequently be replenished and the disposal of the waste liquor is becoming an increasingly serious problem. The fumes from the baths produce unhealthful working conditions and tend to corrode adjacent equipment and the building itself. Over a period of time, the metal dissolved from the work represents an appreciable loss and the scale which is removed is not in a very usable condition. Surface irregularities on the work-piece are not removed by the pickling operation and eventually produce long slivers during subsequent drawing operations, which slivers become pressed into the surface of the wire. Indeed, the pickling operation tends to enhance the effect of certain types of surface irregularities and to enlarge pits and pores therein. Hydrogen is adsorbed into the metal surface at such pits, minute surface cracks and grain interstices with resultant hydrogen embrittlement. All these effects tend to lower the quality of the finished product and may be shown, for example, by a reduced tensile strength in wire cable and the like.

It is accordingly a principal object of my invention to provide an apparatus and method for the removal of scale and surface defects from wire, rod and the like by mechanical means to produce a surface in excellent condition for subsequent drawing operations and the like.

It is a further object to provide an apparatus and method which will condition the surface of the wire or rod to retain lubricants in an efficient manner during passage through a die.

Another object is to provide an apparatus and method for the removal of scale which will permit recovery of such scale in excellent condition for subsequent employment in the powder metallurgy industry.

A further object is to provide an apparatus and method whereby the surface of the wire or rod may be beneficiated to obtain increased tensile strength and better working characteristics generally.

Other objects of the invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a longitudinal sectional view through the axis of rotation of a wire bushing unit adapted to be employed in accordance with my invention;

Fig. 2 diagrammatically illustrates the several angles at which the wire is engaged by successive brushing units completely to brush the entire periphery thereof;

Fig. 3 is a semi-diagrammatic top plan layout of wire treating mechanism for the removal of scale and surface conditioning of such wire in accordance with my invention;

Fig. 4 is a semi-diagrammatic transverse section taken on the line 4—4 of Fig. 1 and showing the eccentric mounting whereby oscillation of the rotating brush face is obtained;

Fig. 5 diagrammatically illustrates the positions of the opposed brush faces engaging the work as they are thus oscillated back and forth; and

Fig. 6 is a semi-diagrammatic view of drive means for certain of the brushing units, with the outer brushes being removed better to disclose the passage of the wire in engagement with the brush faces.

Referring now more particularly to said drawing and especially Fig. 3 thereof, the general path of travel of the wire will first be described. Such wire W may be unwound from a pay-out reel **1** and passed through a scale breaker unit **2** having both vertical rolls **3** and horizontal rolls **4**. The wire passes beneath a pulley **6** and then up and over a high pulley **7** between two power driven cup brushes **8** and **9**. It is then conducted under a low pulley **10** between opposed cup brushes **11** and **12**, such pulley **10** lying in a plane at an angle of 120° to the plane of pulley **7** and with its periphery directly aligned with that of pulley **7** so that the wire may pass from one pulley to the other without any twisting, although a different portion of the periphery of the wire will be engaged by pulley **10**. The wire is next brought up and over a high pulley **13** between power driven cup brushes **14** and **15**, such pulley **13** likewise being at an angle of 120° to pulley **10** so that now all portions of the wire periphery will have been exposed to the action of the brushes as more fully explained below.

The brushes are so arranged as to brush the traveling wire substantially longitudinally thereof and the brushes of the first three units above described will ordinarily be driven to brush the wire in the same direction. I generally prefer to provide three additional units with brushes operating in the opposite direction to ensure uniform and complete brushing action over the entire wire periphery.

To obtain this desired result, the fourth brushing unit comprising a low pulley **16** between opposed cup brushes **17** and **18** is arranged at a 90° angle to the plane of pulley **13**, and accordingly the action of the opposed brushes **17** and **18** on the wire will be most concentrated in regions intermediate the regions most heavily brushed by the preceding units. The wire is next led over a high pulley **19** and down under a low pulley **20** at a 120° angle to the plane of pulleys **16** and **19**. The opposed brushes **21** and **22** accordingly engage opposite sides of wire W at angles shifted 120° about the periphery of wire W relative to the regions most heavily brushed by brushes **17** and **18**. When the wire is now brought up over high pulley **23** between opposed cup brushes **24** and **25**, such pulley **23** being at a 120° angle to pulley **20**, it will be seen that the periphery of the wire has been brushed by six brushes rotating in one direction and by six brushes rotating in the other direction. I have discovered that with cup brushes of the type most effective in scale re-

moval, each pair of such brushes engaging a cylindrical work-piece on diametrically opposite sides effectively brush one-third of the periphery of such work-piece, each brush face engaging one-sixth of such periphery. Accordingly, by employing three pair of such brushes oriented in planes 120° from each other, the entire peripheral surface of the work-piece may be brushed. Three pair of additional brushes driven in a direction opposite to that of such first sets are similarly oriented 120° from each other about the periphery of the work-piece and moreover their planes of rotation are selected so that such brushes engage most heavily the longitudinally extending surface regions of the work-piece most lightly engaged by the preceding sets.

From the sixth brushing unit the fully brushed wire may be conducted beneath a low pulley **26** and wound on a power driven rewind reel **27**. The several brushing units will desirably be provided with suction hoods (not shown) effective to withdraw the scale particles and to accumulate the same in an appropriate bin or container. Such scale particles when reduced to the pure metal have a very substantial value for use in powder metallurgy.

Now referring more particularly to semi-diagrammatic Fig. 6, two of the brushing units are there illustrated for convenience as though they were in the same plane, although as shown in Fig. 3 they are actually arranged at an angle of 120° to each other. The wire W which may be traveling at a rate of about 1,000 feet per minute passes under low pulley **10** and then over high pulley **13**, such pulleys being idlers and the travel of the wire obtained by driving rewind reel **27**. The brushes such as **12** and **14** are, however, adapted to be driven in a manner explained more in detail below through electric motor **28**, belt **29**, pulley **30**, belt **31** and pulley **32**, and in the case of brush **14** through electric motor **33**, belt **34**, pulley **35**, belt **36** and pulley **37**. Such motors are carried by pivotally mounted platforms **38** and **39** whereby to maintain desired tension in belts **31** and **36**.

As will readily be seen from Fig. 6, the laterally exposed surface of wire W will be subjected to the action of each brush throughout the semi-circular arc such wire describes in contact with its pulley. While the wire may travel at about 1,000 feet per minute as above indicated, the brushes may be driven at about 6,000 feet per minute, surface speed. The grooves in the pulley perimeters are relatively shallow and the pulleys are not of as great a thickness as the wire diameter. Accordingly, at least one-sixth of the wire periphery is exposed to the action of each brush face, as best shown in Fig. 5, it being appreciated however that the brush bristles flex somewhat as they bear against the work, the point on the wire periphery most nearly approaching the brush back naturally being somewhat more heavily brushed than the regions on either side thereof. This is compensated for by the fact that the brushing action of subsequent brushing units somewhat overlaps that of preceding units.

Referring now to Fig. 1 of the drawing, a single brushing unit of preferred construction is there illustrated in longitudinal section. Such unit comprises a shaft **40** journalled for rotation in a bracket **41** welded to the underside of a supporting I-beam **42**. Such shaft includes stepped portions **43** and **44** of reduced diameter slightly eccentric to the portion of the shaft journalled in bracket **41** having a sleeve **45** keyed thereto. Rotatably journalled on such sleeve are three pulleys **46**, **47** and **48**, the latter pulley carrying a relatively thin radially extending peripheral flange member **49** grooved to support the traveling work-piece such as wire W. Such flange **49** and its outer peripheral groove will be shaped and dimensioned to support the work so as to present lateral surfaces of the latter to the faces of opposed brushes as described above and such flange may be removed and another appropriately shaped flange substituted therefor when a differently shaped or dimensioned work-piece is to be treated.

Pulley **48** is an idler pulley and will be driven through engagement with the travelling wire W. Pulleys **46** and **47** are adapted to be driven through belts as explained above and thus to drive the brushes carried thereby.

Inner pulley **47** is provided with a plurality of screws **50** extending parallel to its axis of rotation and mounting a generally frusto-conical hub member **51**. Springs **52** interposed between pulley **47** and hub **51** encircling screws **50** and springs **53** likewise encircling such screws between hub **51** and retainer ring **54** in which such screws are threaded serve yieldingly to mount such hub for movement toward and away from pulley **48**. The inner periphery of ring **54** may, moreover, be splined for interengagement with the opposed surface of pulley **47** to drive such hub therewith without imposing driving stress on such screws **50**.

Outer pulley **46** is similarly provided with a plurality of screws **55** extending parallel to the axis of rotation and mounting a frusto-conical hub member **56**. Springs **57** and **58** correspond to springs **52** and **53** respectively, encircling such screws between hub **56** and pulley **46** and between the hub and the retainer ring **59** in which the screws are threaded. The inner periphery of ring **59** may be splined for interengagement with the opposed surface of pulley **46**.

The brush elements are carried in clamping means mounted on the outer peripheries of the respective hubs **51** and **56** and comprise mating inner and outer rings **60** and **61** respectively grooved to receive an annular brush back **62** from which the brush material **63** extends generally parallel to the axis of rotation. As will be seen in Fig. 1, the brush holders carried by the respective hubs are identical in construction but support the brushes in opposition to each other adjacent the outer periphery of idler pulley flange **49**. Annular outer supports such as **64** are provided with inturned lips which bear against the outer surface of the layer of brush bristle material **63** adjacent the working ends of the latter to support such bristle material and prevent excessive outward shifting of the same under the action of centrifugal force when the brushes are rotated at high speed. The brush elements may themselves be formed of brush strip of the type described in my prior Patent 2,303,386.

Gear **65** is freely rotatably mounted on shaft **40** and is provided with a projecting lug **66** interengaged with flange member **67** secured to hub **45**. Such gear **65** may be driven at a very low rate of speed through worm gear speed reducer **68** and pinion gear **69**. The portion of inner sleeve **45** on which pulley **47** is journalled for relative rotation is eccentric, and accordingly as sleeve **45** is slowly turned on shaft or spindle **40** the axis of rotation of the brush carried by hub **51** is similarly shifted and the brush face moved slowly back and forth transversely of the traveling work-piece. Idler pulley **48** is journalled on a portion of sleeve **45** concentric with the axis of spindle **40**. Pulley **46** and consequently hub **56** and the brush carried thereby is journalled on a portion of sleeve **45** eccentric to the axis of spindle **40** so as to shift the working face of the brush carried thereby transversely of the work-piece in a direction diametrically opposite to that in which the brush face of the brush carried by hub **51** is simultaneously being shifted.

As best shown in diagrammatic Fig. 5, the opposed brushes **63** and **70** engaging opposite sides of the wire W are relatively slowly reciprocated back and forth transversely of the wire so that at one extreme position *a*, brush **63** will be at its farthest left position while brush **70** is at its farthest right position. At an intermediate position *b*, the two brush faces are directly opposed with the wire centrally therebetween, and in the third position *c* brush **70** is in its furthest right position while brush **63** is in its furthest left position. The brush faces themselves are, of course, traveling in the same direction at the same speed substantially longitudinally of the wire where engaging the latter.

In diagrammatic Fig. 2 the relative angular relation-

ship of the six brush assemblies engaging the work is indicated. The six brushes of the first three assemblies are arranged completely to brush the entire periphery of the wire as above explained, such brushes all traveling in the same direction. The six brushes of the fourth, fifth and sixth brush assemblies all travel in the same direction but in a direction opposite to that of the first three brush assemblies. They likewise brush the entire periphery of the wire but are oriented to brush most effectively those regions of the wire periphery least effectively brushed by the first three assemblies. The direction of rotation of each brush will be periodically reversed so as to preserve the total effect and preventing dulling or rounding of the bristle ends through over-long rotation in the same direction.

It will thus be seen that I have provided a method of surface treating rod, wire, and the like which is effective to remove scale therefrom and to surface-condition the same while the work is traveling continuously at a high rate of speed. My novel arrangement, moreover, permits the obtaining of a maximum brushing effectiveness from a minimum number of brushes and such brushes are mounted in a manner to ensure their continued efficiency in operation over a period of time with a minimum of adjustment and supervision. By employing brushes of the type generally known as cup brushes or equivalents thereof, the brush bristle material may be quite densely compacted and proper engagement of the bristle ends with the work obtained over a very considerable lineal distance without substantial flexing of the bristle end portions.

Crimped wire brush bristle material will ordinarily be preferred for my purpose but various other materials such as Tampico fiber, plastic coated wire and glass fiber, and fabric buff materials may be utilized depending on the type of operation to be performed, frequently with application of granular abrasive.

The guide means such as pulley or sheave **48** is adapted to direct the continuously travelling wire in an arcuate path between the generally co-axial opposed rotary brushes having brush material extending generally parallel to such axis to engage the exposed side portions of the curved wire lying in planes normal to such axis. The slightly eccentric journal mounts of the two brushes are rotated slowly relative to the speed of rotation of the brushes to shift the brush faces radially back and forth across the arcuately curved wire, thereby keeping such faces uniform with a minimum of regrinding. While the hubs of the sheave and two brushes are in frictional engagement for rotation together, they are, of course, also adapted to turn at different speeds depending on the drives for said brushes and the wire rewind means.

The drive means provided for each of the brushes as set forth above will preferably be arranged to rotate such brushes in either selected direction as may be desired. Ordinarily, preferably one-half the number of brushes will be rotated in one direction and the remainder rotated in the other direction at any given time. Periodically such brushes may be stopped and their direction of rotation reversed. If this is done regularly, equalization and compensation of brush bristle wear and directional set may be obtained and a more uniform brushing action gained by virtue of the sharpening effect which the reversal of direction of wear of the working ends of the brush bristles affords, this being particularly the case when wire bristles are employed. The electric motors such as **28** and **33** may, of course, be of the reversible type.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path, simultaneously actively brushing the opposite sides of such article lying in parallel planes, subsequently directing such travelling article in an arcuate path at an angle to such first arcuate path without twisting such article, and similarly brushing such second arcuate portion.

2. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path, simultaneously actively brushing the opposite sides of such article lying in parallel planes, subsequently directing such travelling article in an arcuate path at an angle to such first arcuate path without twisting such article, and similarly brushing such second arcuate portion, such brushing actions extending along substantially the entire longitudinal extent of such arcuate portions of such article.

3. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path, simultaneously actively brushing the opposite sides of such article lying in parallel planes, subsequently directing such travelling article in an arcuate path at an angle to such first arcuate path without twisting such article, and similarly brushing such second arcuate portion, such brushing actions extending along substantially the entire longitudinal extent of such arcuate portions of such article and being in directions parallel to such respective arcuate paths of travel of such article.

4. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path, simultaneously actively brushing the opposite sides of such article lying in parallel planes, subsequently directing such travelling article in a series of arcuate paths in planes at angles to each other and that of such first arcuate path without twisting such article, sufficient to expose the entire periphery of such article to brushing action of the type defined, and similarly brushing each such arcuate portion.

5. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path, simultaneously actively brushing the opposite sides of such article lying in parallel planes, subsequently directing such travelling article in a series of arcuate paths in planes at angles to each other and that of such first arcuate path without twisting such article, sufficient to expose the entire periphery of such article to brushing action of the type defined, and similarly brushing each such arcuate portion, such brushing actions extending along substantially the entire longitudinal extent of such arcuate portions of such article.

6. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path, simultaneously actively brushing the opposite sides of such article lying in parallel planes, subsequently directing such travelling article in a series of arcuate paths in planes at angles to each other and that of such first arcuate path without twisting such article, sufficient to expose the entire periphery of such article to brushing action of the type defined, and similarly brushing each such arcuate portion, such brushing actions extending along substantially the entire longitudinal extent of such arcuate portions of such article and being in directions parallel to such respective arcuate paths of travel of such article.

7. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path and actively brushing a side of such arcuately curved portion of such article lying in a flat plane in a direc-

tion longitudinally of such article, such brushing action being afforded by a rotary brush having its axis substantially at the axis of such arc, and oscillating such brush axis relatively slowly to traverse the brush face transversely of such arcuate portion of such article.

8. The method of surface conditioning a continuously travelling elongated article such as wire and the like which comprises directing such article in an arcuate path and actively brushing opposite sides of such arcuately curved portion of such article lying in flat planes in directions longitudinally of such article, such brushing action being afforded by rotary brushes having their axes of rotation substantially at the axis of such arc, and oscillating such brush axes relatively slowly to traverse the brush faces transversely of such arcuate portion of such article.

9. In mechanism for surface conditioning wire and the like including a payout reel, a rewind reel, and a scale breaker adapted to fracture scale on such wire travelling from said payout reel to said rewind reel; a plurality of sheaves over which such wire is adapted to pass, said sheaves being angularly related to each other and adjacent sheaves being arranged with their peripheries tangential to a common straight line, whereby such wire may pass from one said angularly related sheave to the next without twisting, and power driven rotary brushes mounted for rotation substantially coaxially with said respective sheaves with their brush material extending generally parallel to the axes of rotation to engage and brush the exposed side portions of such wire passing about said sheaves.

10. In mechanism for surface conditioning continuously travelling wire and the like, a plurality of sheaves over which such wire is adapted to pass, said sheaves being angularly related to each other and adjacent sheaves being arranged with their peripheries tangential to a common straight line, whereby such wire may pass from one said angularly related sheave to the next without twisting, and power driven rotary brushes mounted for rotation substantially co-axially with said respective sheaves with their brush material extending generally parallel to the axes of rotation to engage and brush the exposed side portions of such wire passing about said sheaves.

11. In mechanism for surface conditioning continuously travelling wire and the like, a plurality of sheaves over which such wire is adapted to pass, said sheaves being angularly related to each other and adjacent sheaves being arranged with their peripheries tangential to a common straight line, whereby such wire may pass from one said angularly related sheave to the next without twisting, and pairs of opposed power driven rotary brushes mounted for rotation substantially co-axially with said respective sheaves with their brush material extending generally parallel to the axes of rotation to engage and brush the opposite exposed side portions of such wire passing therebetween about said sheaves.

12. In mechanism for surface conditioning continuously travelling wire and the like, a plurality of sheaves over which such wire is adapted to pass, said sheaves being angularly related to each other and adjacent sheaves being arranged with their peripheries tangential to a common straight line, whereby such wire may pass from one said angularly related sheave to the next without twisting, pairs of opposed power driven rotary brushes mounted for rotation substantially co-axially with said respective sheaves with their brush material extending generally parallel to the axes of rotation to engage and brush the opposite exposed side portions of such wire passing therebetween about said sheaves, and means operative to oscillate the axes of said brushes to shift their work-engaging faces back and forth transversely of such wire relatively slowly in comparison to the high speed of rotation of said brushes.

13. In mechanism for surface conditioning continuously travelling wire and the like, a plurality of sheaves over which such wire is adapted to pass, said sheaves being angularly related to each other and adjacent sheaves being arranged with their peripheries tangential to a common straight line, whereby such wire may pass from one said angularly related sheave to the next without twisting, and three pairs of opposed power driven rotary brushes mounted for rotation substantially coaxially with said respective sheaves with their brush material extending generally parallel to the axes of rotation to engage and brush the opposite exposed side portions of such wire passing therebetween about said sheaves, the axes of said three pairs of brushes being angularly related uniformly to brush the entire periphery of such wire.

14. In mechanism for surface conditioning continuously travelling wire and the like, a plurality of sheaves over which such wire is adapted to pass, said sheaves being angularly related to each other and adjacent sheaves being arranged with their peripheries tangential to a common straight line, whereby such wire may pass from one said angularly related sheave to the next without twisting, and six pairs of opposed power driven rotary brushes mounted for rotation substantially coaxially with said respective sheaves with their brush material extending generally parallel to the axes of rotation to engage and brush the opposite exposed side portions of such wire passing therebetween about said sheaves, the axes of three of said pairs of brushes being angularly related to brush the entire periphery of such wire and the axes of the other three pairs being similarly angularly related but indexed relative to those of the first three pairs to brush such wire periphery with maximum force intermediate the portions of such periphery principally engaged by said first three pairs.

15. In mechanism for surface conditioning continuously travelling wire and the like, a plurality of sheaves over which such wire is adapted to pass, said sheaves being angularly related to each other and adjacent sheaves being arranged with their peripheries tangential to a common straight line, whereby such wire may pass from one said angularly related sheave to the next without twisting, six pairs of opposed power driven rotary brushes mounted for rotation substantially co-axially with said respective sheaves with their brush material extending generally parallel to the axes of rotation to engage and brush the opposite exposed side portions of such wire passing therebetween about said sheaves, the axes of three of said pairs of brushes being angularly related to brush the entire periphery of such wire and the axes of the other three pairs being similarly angularly related but indexed relative to those of the first three pairs to brush such wire periphery with maximum force intermediate the portions of such periphery principally engaged by said first three pairs, and means driving the brushes of said first three pairs in a direction opposite to that of the second three pairs.

16. In mechanism for surface conditioning continuously travelling wire and the like, a sheave about which such wire is adapted to pass with a side portion lying in a plane normal to the axis of said sheave exposed, a power driven rotary brush generally co-axial with said sheave and having brush material extending generally parallel to such axis to engage such exposed side portion of the arcuately curved wire on said sheave, and means operative to rotate said brush at a high speed relative to said sheave and wire thereon.

17. In mechanism for surface conditioning continuously travelling wire and the like, a sheave about which such wire is adapted to pass with both side portions lying in planes normal to the axis of said sheave exposed, a pair of opposed power driven rotary brushes generally co-axial with said sheave and having brush material extending generally parallel to such axis to engage such exposed side portions of the arcuately curved wire on

said sheave, and means operative to rotate said brushes at high speed relative to said sheave and wire thereon.

18. In mechanism for surface conditioning continuously travelling wire and the like, a sheave about which such wire is adapted to pass with a side portion lying in a plane normal to the axis of said sheave exposed throughout the region of arcuate engagement therewith, a power driven rotary tool generally co-axial with said sheave and having a working portion disposed to engage such exposed side portion of the arcuately curved wire on said sheave, and means operative to rotate said tool relative to said sheave and the wire thereon.

19. In mechanism for surface conditioning continuously travelling wire and the like, means operative continuously to advance such wire longitudinally, guide means operative to direct such travelling wire on an arcuate path with a side portion of such wire lying in a plane normal to the axis of such arc exposed, a power driven rotary tool generally co-axial with such axis of such arc having a working portion disposed to engage such exposed arcuate side portion of such wire, and means operative to rotate said tool at high speed relative to the rate of travel of such arcuately disposed wire.

20. In mechanism for surface conditioning continuously travelling wire and the like, means operative continuously to advance such wire longitudinally, guide means operative to direct such travelling wire on an arcuate path with both side portions of such wire lying in planes normal to the axis of such arc exposed, a pair of opposed power driven rotary tools generally co-axial with such axis of such arc having working portions disposed to engage such exposed arcuate side portions of such wire, and means operative to rotate said tools at high speed relative to the rate of travel of such arcuately disposed wire.

21. In mechanism for surface conditioning continuously travelling wire and the like, means operative continuously to advance such wire longitudinally, a plurality of guide means operative to direct such travelling wire in successive arcuate paths, said guide means being angularly related to each other to expose different side portions of such wire lying in planes normal to the respective axes of the arcs of curvature, pairs of opposed power driven rotary tools generally co-axial with such respective arcs of curvature having working portions disposed to engage such exposed arcuate side portions of such wire, and means operative to rotate said tools at high speed relative to the rate of travel of such arcuately disposed wire.

22. In mechanism for surface conditioning continuously travelling wire and the like, a spindle, a sheave about which such wire is adapted to pass freely rotatably journalled concentrically on said spindle, the wire-engaging periphery of said sheave being shaped to expose lateral portions of such wire, two opposed power driven rotary brushes slightly eccentrically journalled on said spindle on each side of said sheave respectively and having brush material extending generally parallel to the axis of said spindle and sheave to engage such exposed lateral portions of such wire on the latter, means operative to drive said brushes at a high rate of speed, and means operative to rotate said spindle at a relatively low rate of speed to shift the work-engaging faces of said brushes back and forth radially of said sheave.

23. In mechanism for surface conditioning continuously travelling wire and the like, a spindle, a sleeve on said spindle about which such wire is adapted to pass freely rotatably journalled on said sleeve concentrically thereof and of said spindle, the wire-engaging periphery of said sheave being shaped to expose lateral portions of such wire, two opposed power driven rotary brushes slightly eccentrically journalled on said sleeve on each side of said sheave respectively and having brush material extending generally parallel to the axis of said spindle and sheave to engage such exposed lateral portions of such wire on the latter, means operative to rotate said sleeve on said spindle at a relatively low rate of speed to shift the work-engaging faces of said eccentrically journalled brushes back and forth radially of said sheave.

24. The mechanism of claim 23, wherein said brushes are resiliently mounted for axial movement toward and away from said sheave.

25. The mechanism of claim 23, wherein said brushes are resiliently mounted for axial movement toward and away from said sheave, and means for regulating resilient pressure of said brushes against such wire.

26. In mechanism for surface conditioning a continuously travelling elongated article such as wire and the like, means operative continuously to advance such article longitudinally, means operative to direct such travelling article on a curved path with a side portion of such curved article, lying in a plane normal to the axis of curvature, exposed, a power driven rotary tool mounted for rotation about an axis parallel to and adjacent such axis of curvature, both of said axes being located on the same side of said travelling article, said tool having a yielding work-engaging face disposed so as to continuously engage a substantial longitudinal extent of such exposed arcuate side portion of such article and conform thereto, means operative to rotate said tool at high speed relative to such arcuately disposed article, and means operative to constantly press said tool against such exposed arcuate side portion of said article in a direction generally normal to such plane.

27. In mechanism for surface conditioning a continuously travelling elongated work-piece, means for directing said work-piece on an arcuate path with a side portion of such arcuately disposed work-piece exposed, a power driven rotary brushing tool having a working face generally normal to its axis of rotation mounted for rotation about such axis parallel to and adjacent the axis of such arcuate curvature, means operative to rotate said tool at high speed relative to such arcuately disposed article, and means operative relatively slowly to shift the axis of said rotary tool laterally back and forth to shift the working face of said tool back and forth across such work-piece in engagement therewith.

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