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Withrow

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[54] APPARATUS AND METHOD FOR LEVELING METAL STRIP

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[51] **Int. Cl.**.....**B21d 43/28,** B21c 37/02

[58] **Field of Search**.....72/294, 306, 311, 318, 378, 72/379, 206; 113/116 Y

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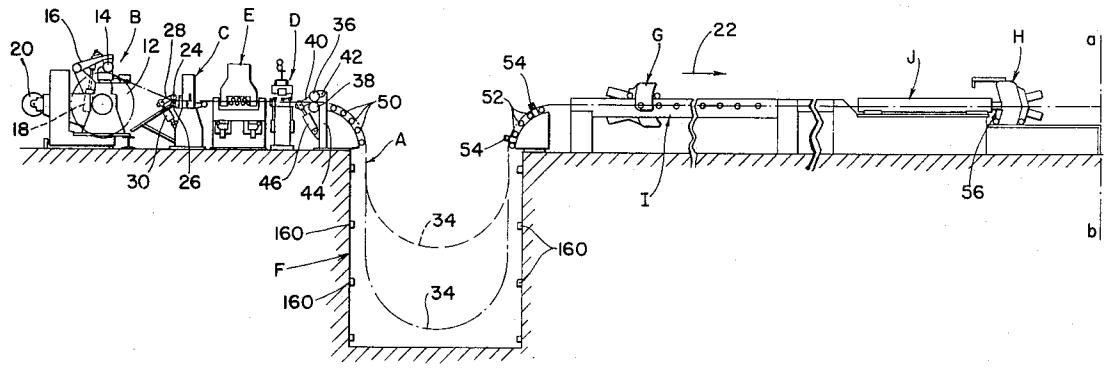
Assistant Examiner—Michael J. Keenan
Attorney—James H. Tilberry et al.

[57] **ABSTRACT**

Apparatus for leveling metal strip having a predetermined width includes gripping means for intermittently and successively gripping predetermined length portions of the strip at longitudinally-spaced locations. The strip is stretched between the longitudinally-spaced locations to produce a stretched strip portion having a width intermediate the spaced locations which is less than the predetermined width. Trimming means acts longitudinally of the strip to trim side portions thereof in order to reduce the predetermined width, at least at the spaced locations, to, or slightly less than, the poststretched width. The strip is continuously fed to a first looping means and continuously pulled from a second looping means. The gripping means is positioned between the first and second looping means. During a stretching operation, the size of the loop in the first looping means increases and the size of the loop in the second looping means decreases. Transfer means transfers a stretched portion of strip to the second looping means subsequent to a stretching operation. During the transfer step, the size of the loop in the first looping means decreases and the size of the loop in the second looping means increases. The trimming means is spaced from the second looping means in the direction of movement of the strip.

15 Claims, 5 Drawing Figures



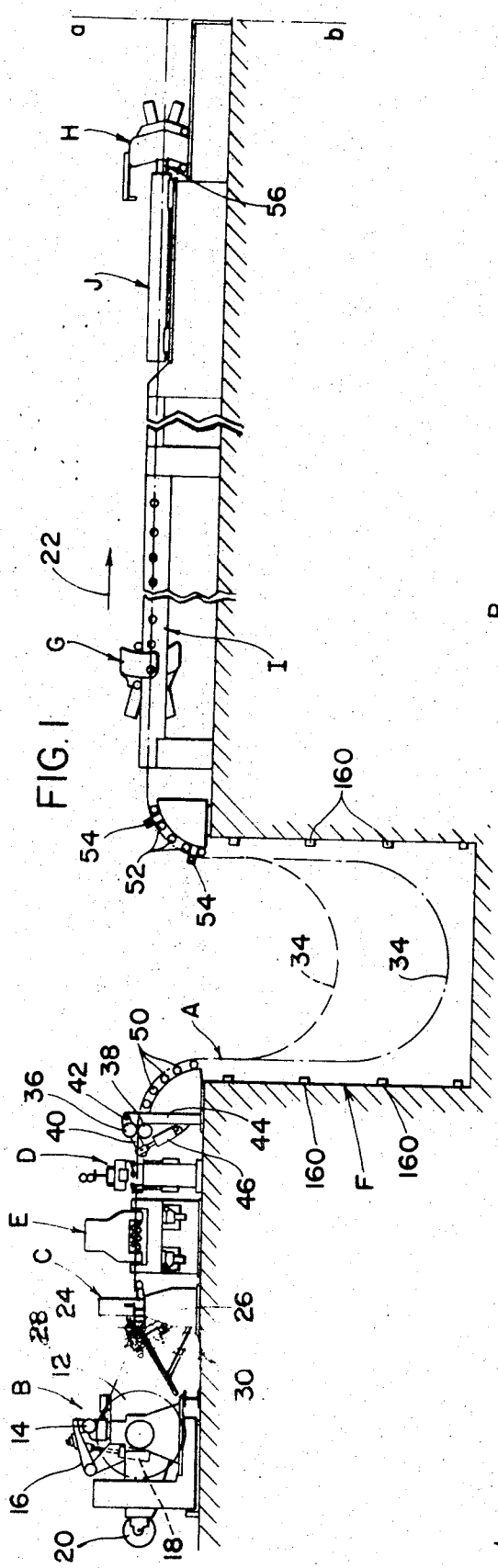

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FIG. 1

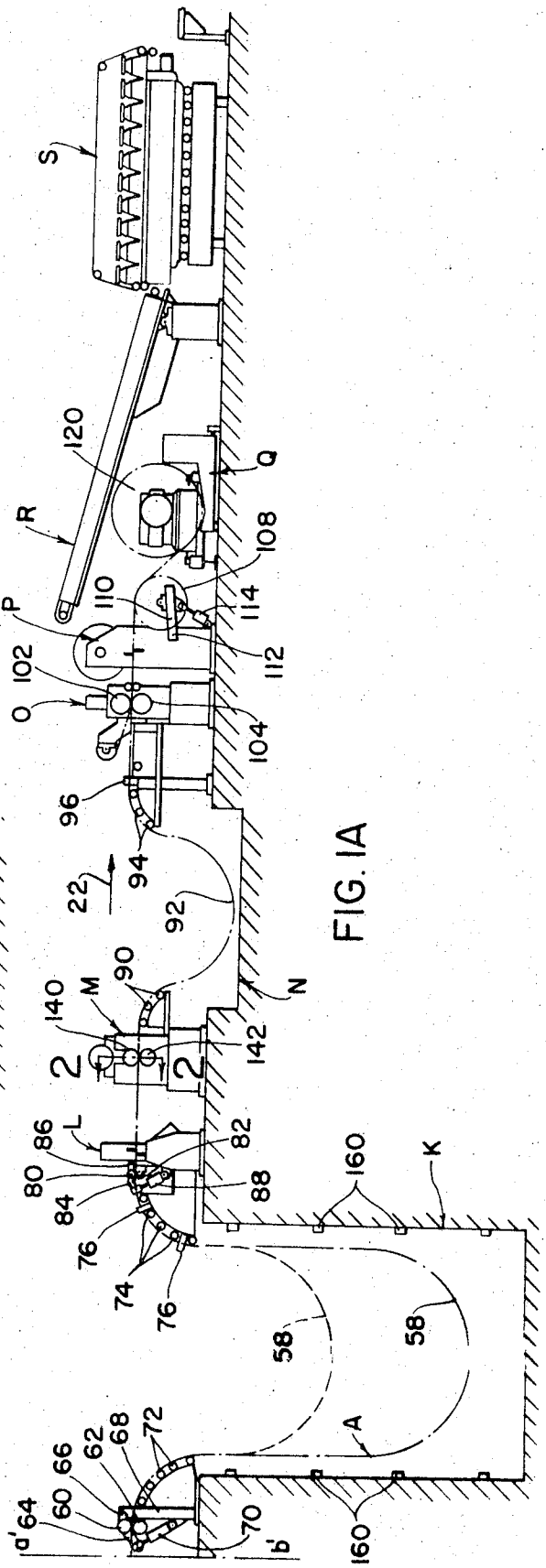
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FIG. 1A

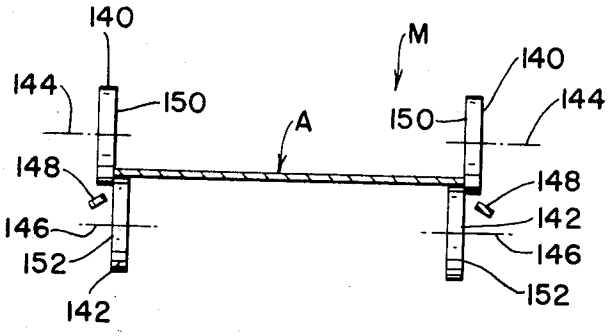
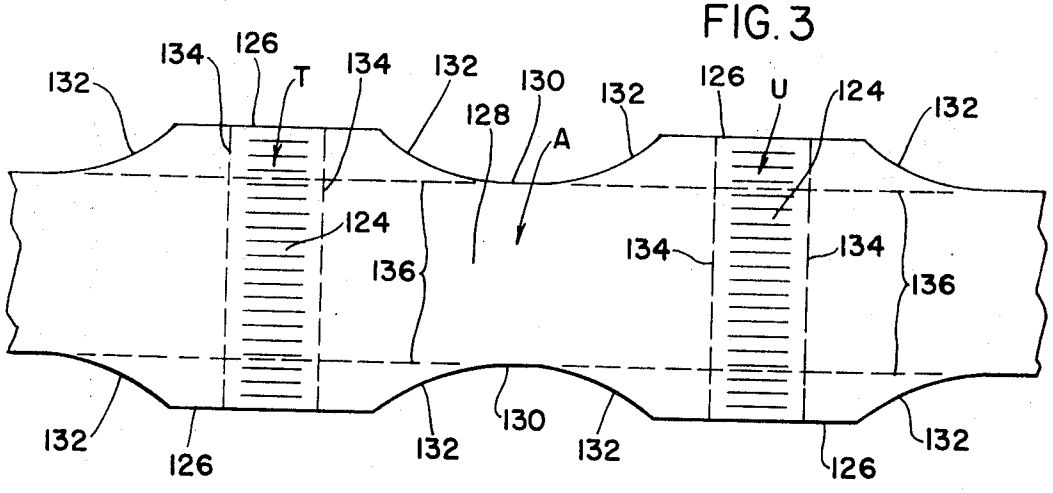


FIG. 2

FIG. 3



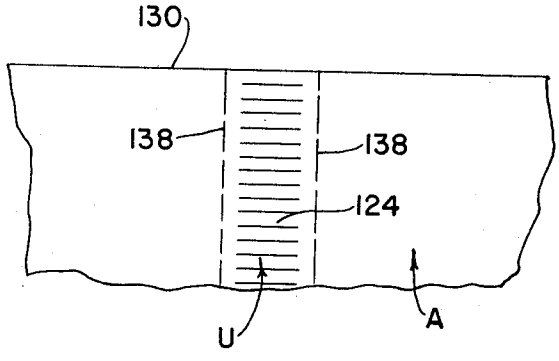


FIG. 4

APPARATUS AND METHOD FOR LEVELING METAL STRIP

BACKGROUND OF THE INVENTION

This application pertains to the art of leveling elongated metal strip and more particularly to trimming of metal strip which has been leveled. The invention is particularly applicable to use with a tension leveling apparatus and will be described with particular reference thereto. However, it will be recognized that the invention has broader applications and may be used independently of a leveling apparatus.

In one known apparatus and method for leveling elongated metal strip having a predetermined width, the strip is transversely sheared into sheets of predetermined length. Each sheet is gripped at its opposite end portions by gripping means. The gripping means is then moved apart in order to stretch the sheet between its opposite end portions and produce a stretched sheet. When the sheet is stretched, its width intermediate the end portions is reduced to a poststretched width less than the original predetermined width. Side edge portions adjacent the gripping means curve inward from prestretched edges to poststretched edges. Opposite end portions of the sheet are severely scored and marked by the gripping means. Such sheets are manually transferred from the tension leveling apparatus to a longitudinal trimmer where the side edges of the sheet are trimmed so that the entire sheet has a uniform width. The opposite side edges of the sheet are transversely sheared to remove those portions having gripping marks thereon. Tension leveling in this manner is inefficient because it requires transverse shearing both before and after leveling. Manual handling is also required. Unnecessary waste occurs because each sheet is gripped at new gripping points defined by the opposite end portions thereof.

In another apparatus and method for tension leveling and elongated metal strip having a predetermined width, the strip is not transversely sheared into sheets prior to tension leveling. Predetermined length portions of the strip are gripped at longitudinally-spaced locations by gripping means. The gripping means is moved to stretch the predetermined length portion and this reduces the width of the strip intermediate the spaced locations. The stretched length of strip is then transferred from the gripping means and a new predetermined length portion of the same strip is fed to the gripping means. One gripping means can grip the new predetermined length portion of strip at the same location that the trailing end of the stretched strip portion was gripped. Using a common gripping location eliminates waste at one end of each sheet as compared to an arrangement where sheets of predetermined length are transversely sheared prior to tension leveling. In apparatus of the type described, each stretched portion of strip is then transversely sheared into finished sheets and the gripping marks are transversely sheared therefrom. The sheets are then manually handled and taken to other apparatus for edge trimming so that each individual sheet will have a substantially uniform width along its length. This additional handling of the sheets is a waste of man power and often causes surface defects in the sheets.

Previous leveling apparatus which gripped successive predetermined length portions of a continuous strip also operated intermittently in such a manner that a long wait was necessary while moving a stretched strip portion from the gripping means and moving an unstretched portion of strip thereto.

SUMMARY OF THE INVENTION

An apparatus and method of the type described includes trimming means for trimming the entire strip longitudinally thereof, at least at the spaced locations having gripping marks thereon, in order to reduce the predetermined prestretched width at the spaced locations to substantially the same as, or slightly less than, the poststretched width. The strip is subsequently sheared transversely to remove those portions of the strip having gripping marks thereon and to divide the strip into finished sheets. With the improved trimming means, substantially shorter lengths of strip are removed in order to delete those portions having gripping marks thereon.

In accordance with a preferred arrangement, feed means is provided for feeding the strip through the apparatus in a predetermined longitudinal direction. The trimming means is spaced in that same predetermined longitudinal direction from the gripping means so that the trimming means operates upon the strip immediately after the stretching operation.

In accordance with one arrangement, the trimming means includes shearing discs positioned in spaced-apart relationship a distance substantially equal to the desired poststretched width of the stretched portion of the strip.

In accordance with another aspect of the present apparatus and method, first and second longitudinally-spaced looping means are provided for forming first and second longitudinally-spaced slack loops in the metal strip. Continuous feed means is provided for continuously feeding the strip to the first looping means and continuous pulling means is provided for continuously pulling the strip from the second looping means. Gripping means for gripping the strip at longitudinally-spaced locations is positioned intermediate the first and second looping means. The gripping means stops longitudinal movement of the strip during a stretching operation so that the size of the first loop increases and the size of the second loop decreases. Transfer means is provided for transferring a stretched strip portion from the gripping means to the second looping means so that the size of the second loop increases and the size of the first loop decreases during the transfer operation. Providing the slack loops makes it possible to rapidly transfer strip material to and from the gripping means.

It is a principle object of the present invention to increase the production rate for tension leveling, side trimming and transverse shearing of continuous strip into individual sheets and plates.

It is another object of the present invention to substantially reduce the manual handling of sheets and plates which are sheared from continuous strip, stretch leveled, side trimmed and then end sheared again.

It is a further object of the present invention to substantially reduce the man power required for handling sheets and plates in tension leveling of continuous strip and to substantially reduce the possibility of damaging such sheets and plates.

It is also an object of the present invention to reduce production costs by completing the tension leveling, side trimming and end shearing in a rapid manner to permit the fast delivery of finished sheets and plates after an order is received.

It is an additional object of the present invention to provide better quality control of length and width accuracy from one sheet to another which is sheared from a continuous strip by automating the entire apparatus.

It is another object of the present invention to provide an improved apparatus and method for leveling metal strip.

It is another object of the present invention to provide an improved apparatus and method for leveling strip by reducing the amount of scrap strip produced.

It is also an object of the present invention to provide an improved apparatus and method for leveling metal strip at a higher production speed in a more efficient manner.

It is an additional object of the present invention to provide an improved apparatus and method for trimming a metal strip which has been intermittently stretch leveled.

BRIEF DESCRIPTION OF THE DRAWING

The invention may take form in certain parts and arrangements of parts, a preferred embodiment of which will be described in detail in this specification and illustrated in the accompanying drawing which forms a part hereof.

FIG. 1 is a side elevational view of a portion of an apparatus for tension leveling metal strip;

FIG. 1A is a side elevational view of the remainder of the apparatus of FIG. 1;

FIG. 2 is a cross-sectional elevational view looking generally in the direction of arrows 2—2 of FIG. 1A;

FIG. 3 is a top plan view showing a portion of a metal strip subsequent to stretching in the apparatus of FIGS. 1 and 1A; and

FIG. 4 is a partial top plan view showing a portion of a metal strip subsequent to a trimming operation.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, wherein the showings are for purposes of illustrating a preferred embodiment of the invention only and not for purposes of limiting same, FIGS. 1 and 1A show an apparatus for tension leveling an elongated metal strip A. The apparatus includes an uncoiler B for uncoiling a coil 12 of strip A. Uncoiler B is of a known type and includes a holddown roll 14 which acts against the outer periphery of coil 12 and is mounted on a pivoted arm 16 which is movable toward and away from coil 12 by means of a hydraulic cylinder 18. Uncoiler B may also include a winder 20 for a paper strip which was placed upon strip A when formed into coil 12 in order to separate adjacent convolusions of strip. Winder 20 is adapted to wind such a paper strip back up as coil 12 is uncoiled. Metal strip A is fed in a predetermined longitudinal direction indicated by arrow 22 through the apparatus shown in FIGS. 1 and 1A. A first pair of upper and lower pinch feed rolls 24 and 26 are provided for pulling strip A from coil 12. At least one of rolls 24 and 26 is driven, and upper roll 24 is mounted on a pivoted arm 28 movable by a hydraulic cylinder 30 so that upper roll 24 can be moved out of engagement with strip A to stop feeding movement thereof. A crop shearing device C is positioned adjacent rolls 24 and 26 for shearing the trailing edge of one strip and the leading edge of another strip so that such edges can be welded together by a welding apparatus D. Strip A may be fed through a roller leveler E positioned intermediate shearer C and welding apparatus D.

In accordance with one arrangement, a first looping means in the form of a pit F is provided for forming a slack portion of strip A in the form of a free loop 34. Feed means, in the form of a pair of upper and lower rolls 36 and 38, continuously feeds strip A to first looping means F. At least one of rolls 36 and 38 is continuously driven, and upper roll 36 is mounted on an arm 40 pivoted at 42 to frame member 44. A hydraulic cylinder 46 selectively acts against pivoted arm 40 to raise upper roll 36 out of contact with strip A to stop feeding movement thereof, if so desired. A plurality of quadrant rolls 50 define an arcuate path over which strip A is fed to first looping means F. A plurality of additional quadrant rolls 52 positioned on the other side of looping means F define an arcuate path over which strip A is guided from first looping means F. Side guides 54 may be provided to act against the opposite side edges of strip A to guide it accurately in predetermined direction 22.

In accordance with one arrangement, strip A moves over quadrant rolls 52 from first looping means F to gripping means defined by longitudinally-spaced gripping jaws G and H. Gripping jaws G and H are adapted to grip the entire width of strip A at spaced locations in a known manner. Gripping jaws G may be mounted for longitudinal adjustment on a bed I for varying the longitudinal spacing between jaws G and H so that the length of strip A which is stretched may be selectively varied. Gripping jaws H are attached to rod 56 of hydraulic cylinder J. With jaws G and H gripping strip A, cylinder J may be activated to move jaws H away from jaws G in the direction of arrow 22 to stretch a portion of strip A and flatten wrinkles therein.

In a preferred arrangement, a second looping means K, in the form of a pit, is provided for forming a second free loop 58 in strip A. Transfer means is also provided for transferring a stretched strip portion of strip A from gripping jaws G and H to second looping means K, and for feeding an unstretched portion of strip from first looping means F to gripping jaws G and H. Such transfer means may be in the form of upper and lower pinch rolls 60 and 62. At least one of upper and lower rolls 60 and 62 is rotatably driven for feeding strip A in the direction of arrow 22. Upper roll 60 is mounted on pivot arm 64 which is pivoted at 66 to support 68. Hydraulic cylinder 70 is connected with pivot arm 64 so that roll 60 may be raised out of contact with strip A to stop transfer movement thereof. A plurality of quadrant rolls 72 define an arcuate path over which strip A is fed to second looping means K. A plurality of quadrant rolls 74 are provided on the opposite side of second looping means K to define an arcuate path over which strip A is guided from second looping means K. Side guides 76 may be provided for engaging the opposite side edges of strip A to guide its movement in longitudinal direction 22 from second looping means K.

Feed means for continuously pulling strip A from second looping means K may be in the form of upper and lower pinch rolls **80** and **82**. Upper roll **80** is mounted on pivot arm **84** pivoted at **86** from a suitable support. An hydraulic cylinder **88** is connected with pivot arm **84** so that upper roll **80** may be moved out of engagement with strip A to stop feeding movement thereof in the direction of arrow **22**. In the preferred arrangement, rolls **80** and **82** continuously pull strip A from second looping means K. A parting shear L may be positioned adjacent rolls **80** and **82**, and spaced therefrom in the direction of arrow **22**.

In the preferred arrangement, strip A is then fed through a longitudinal trimming means M which will be described hereafter in more detail. Strip A then moves over quadrant rolls **90** which define an arcuate path over which strip A is guided to an additional looping means in the form of a third pit N so that a slack portion of strip A hangs therein in the form of a third loop **92**. Additional quadrant rolls **94** are provided on the opposite side of pit N to define an arcuate path over which strip A moves. Side guides **96** may be provided adjacent quadrant rolls **94** for engaging the opposite side edges of strip A to guide its movement in the direction of arrow **22**. Strip A is then fed through another feed means O which includes upper and lower pinch rolls **102** and **104**. At least one of rolls **102** and **104** is rotatably driven to feed strip A in the direction of arrow **22**. Upper roll **102** may be mounted for movement away from strip A in the same manner as described with respect to the other pinch rolls for stopping feeding movement of strip A. It is also possible to de-energize the drive means for the driven roll for feed means O to stop movement of strip A at desired intervals. Strip A is then fed through a shear P for shearing short lengths thereof which have been damaged by gripping means G and H. Strip A may then be fed over a guide roll **108** rotatably mounted on a pivot arm **110** pivoted at **112** to a suitable support. Hydraulic cylinder **114** is connected with pivot arm **110** for lowering guide roll **104** out of engagement with strip A. Strip A may then be formed back into a coil **120** on coiling means Q. When forming strip A back into a coil **120** on coiling means Q, shear P would ordinarily not be utilized and coil **120** would be moved to a different location for subsequent shearing to remove damaged sections gripped by gripping means G and H. Instead of forming strip A back into coil **120**, coiling means Q may be removed and guide roll **108** dropped to a lower position. A driven conveyor R may then be lowered to a horizontal position for receiving lengths of strip fed through shear P. Lengths of strip fed onto conveyor R are fed to a vacuum lifting device S which lifts sequential lengths of strip and deposits them selectively on a completed strip table or a reject table in a known manner.

As best shown in FIG. **3**, gripping means G and H grip strip A at longitudinally-spaced locations T and U. Gripping means G and H form marks or perforations at spaced locations T and U as represented by lines **124**. At spaced locations T and U, strip A has a predetermined prestretched width as measured across prestretched longitudinal edges **126**. During movement of gripping means H away from gripping means G, a stretched strip portion **128** is formed between spaced locations T and U. During the stretching operation, the width of strip A is reduced to a poststretched width as measured across poststretched longitudinal edges **130**. The edges of strip A curve inwardly as indicated at **132** from prestretched edges **126** to poststretched edges **130** of stretched strip portion **128**.

Subsequent to stretching of strip A by gripping means G and H, it is desirable to remove spaced locations T and U having marks or perforations thereon as indicated by lines **124**. It is also desirable that the remaining stretched strip portions **128** left after removal of spaced locations T and U have a substantially uniform width along their entire length. In previous arrangements, strip A was transversely sheared along dotted lines **134** in order to remove spaced locations T and U. These individual sheets or plates were then manually handled and transferred to a side trimming apparatus for trimming the edges of each sheet or plate longitudinally so that each sheet or plate had a substantially uniform width along its entire length. Manual handling and side trimming in a separate apparatus is a waste of man power and greatly increase the chances of introducing surface imperfections in the individual sheets or plates.

In accordance with the invention, trimming means M is adapted to trim strip A longitudinally thereof generally along dotted lines **136** in order to reduce the width of strip A, at least at spaced locations T and U, to substantially the same as, or slightly less than, the poststretched width of stretched strip portion **128** as measured across poststretched longitudinal edges **130**. Subsequent to longitudinal trimming along lines **136**, strip A may be transversely sheared along dotted lines **138** to remove imperfections **124** formed therein by gripping jaws G and H. With this arrangement, subsequent transverse shearing of the continuous strip into sheets or plates of desirable lengths produces finished sheets or plates which require no further handling or trimming.

In one arrangement, shearing means M may include transversely spaced-apart pairs of upper and lower shearing discs **140** and **142** mounted for rotation on substantially horizontal axes **144** and **146**. Numeral **148** represents scrap longitudinal strip portions which have been cut along dotted lines **136** of FIGS. **3**. Shearing discs **140** and **142** may be rotatably driven by a suitable motor and gear arrangement. Inner surfaces **150** of discs **140** are positioned outwardly of outer surfaces **152** on discs **142** and in overlapping relationship thereto so that strip A is sheared along dotted lines **136** at the overlapping faces of surfaces **150** and **152**. Discs **140** and **142** are positioned so that overlapping shearing faces **150** and **152** thereof are spaced-apart a distance substantially the same as the poststretched width of stretched strip portion **128** as measured across poststretched longitudinal edges **130**.

In operation of the apparatus, the feed means defined by rolls **36** and **38** is continuously operated for continuously feeding strip A to first looping means F. Pulling means defined by rolls **80** and **82** is also continuously operated for continuously pulling strip A from second looping means K. The transfer means defined by rolls **60** and **62** is intermittently operated. Thus, the transfer means defined by rolls **60** and **62** is operated to feed an unstretched length of strip to gripping jaws G and H. This feeding movement of strip A in the direction of arrow **22** reduces the size of first

loop **34** in first looping means F to the position shown in dotted lines. The size of second loop **58** in second looping means K will then be in the shadow line positions shown. When jaws G and H grip strip A, the transfer means defined by rolls **60** and **62** is stopped by raising upper roll **60**, or by stopping the motor drive, so that movement of strip A intermediate first and second looping means F and K is stopped. During the stretching operation by gripping jaws G and H, longitudinal movement of strip A in the direction of arrow **22** is stopped. However, rolls **36** and **38** continue to feed strip A to first looping means F so that first loop **34** increases in size to the shadow line position shown. During the stretching operation, rolls **80** and **82** also continue to pull strip A from second looping means K so that the size of second loop **58** is reduced to that shown in dotted lines. Subsequent to the stretching operation, gripping jaws G and H are released from clamping engagement with strip A and the transfer means defined by rolls **60** and **62** is again operated by moving upper roll **60** back down into engagement with strip A or by starting the drive motor. This rapidly moves the stretched strip portion into second looping means K so that the size of loop **58** again increases to the position shown in shadow lines. Pulling of the stretched strip portion of strip A from between jaws G and H also causes a new unstretched portion of strip to move therebetween and the size of loop **34** once again decreases to the dotted line position shown. Intermittent movement of strip A to the gripping means is not slowed down in any manner due to the fact that slack is provided in strip A so that strip A can be moved in an extremely rapid manner for sequential stretching of adjacent strip lengths. Third looping means N provides slack loop **92** so that the feed means defined by rolls **102** and **104** may intermittently move stretched portions of strip A past shear means P to remove damaged spaced locations T and U therefrom by shearing transversely of strip A along dotted lines **138** of FIG. **4**.

Instead of forming slack first and second loops **34** and **58** in pits F and K, it will be recognized that it is possible to provide vertical loops in strip A by extending strip A upward over a loop roll which is vertically movable to vary the size of the loop formed in strip A. Suitable photocells **160** may also be provided in pits F and K for sensing the size of loops **34** and **58** to control the feeding operation of transfer rolls **60** and **66**, or to control the feed rolls or pulling rolls, and the operation of the gripping means. Photocells may also be provided for sensing perforations or imperfections in spaced locations T and U to stop feeding movement of strip A in accurate positions so that shear means P will remove only the damaged length of strip.

While the invention has been described with reference to a preferred embodiment, it is obvious that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification. The present invention includes all such equivalent alterations and modifications and is limited only by the scope of the claims.

Having thus described my invention, I claim:

1. Apparatus for intermittently and successively tension leveling predetermined length portions of an elongated metal strip having a longitudinal axis and a predetermined prestretched width across prestretched longitudinal edges, comprising; feed means for feeding said strip through said apparatus in a predetermined longitudinal direction, longitudinally-spaced gripping means for gripping said strip across said predetermined width in longitudinally-spaced locations at opposite end portions of a predetermined length portion of said strip, power means for moving said gripping means to stretch said predetermined length portion of said strip between said longitudinally-spaced locations to a post-stretched length portion of strip having a poststretched width intermediate said spaced locations less than said prestretched width, said feed means being operative for transferring said poststretched length portion from said gripping means and transferring a new predetermined length portion of said strip to said gripping means, and trimming means spaced in said predetermined direction from said gripping means for trimming said poststretched length of strip longitudinally thereof to reduce said width thereof at least at said spaced locations to not greater than said post-stretched width.

2. The device of claim **1** wherein said trimming means includes shearing discs spaced-apart a distance not greater than said poststretched width.

3. The device of claim **1** and further including transverse shearing means for shearing said strip substantially perpendicular to said longitudinal axis thereof, said transverse shearing means being spaced in said predetermined direction from said trimming means for shearing said strip into predetermined lengths and removing said spaced locations from said strip.

4. The device of claim **1** wherein said feed means includes first continuously driven rolls positioned ahead of said gripping means and second continuously driven rolls positioned ahead of said gripping means and second continuously driven rolls positioned downward of said gripping means, first looping means positioned between said first driven rolls and said gripping means for forming said strip into a loop, and second looping means positioned between said second driven rolls and said gripping means.

5. The device of claim **1** and further including coiling means spaced in said predetermined direction from said trimming means for coiling said strip into a continuous coil of substantially uniform width and having successive stretched lengths connected by marks from said gripping means.

6. Apparatus for intermittently and successively tension leveling predetermined length portions of an elongated metal strip having a longitudinal axis comprising; first looping means for forming a first loop in said strip, second looping means spaced longitudinally of said strip from said first looping means for forming a second loop in said strip, continuous feed means for continuously feeding said strip to said first looping means, continuous pulling means for continuously pulling said strip from said second looping means, gripping means for gripping said strip intermediate said first and second looping means in longitudinally-spaced locations and stopping longitudinal movement of said strip from said first looping means to said second looping means so that the size of said first loop increases and the size of said second loop decreases, power means for moving said gripping means to longitudinally stretch said strip between said spaced locations and produce a stretched strip portion, transfer means for transferring said

stretched strip portion from said gripping means to said second looping means so that the size of said second loop is increased and the size of said first loop is decreased.

7. The device of claim 6 wherein said strip has opposite side edges and a prestretched width across said edges, said stretched strip portion having a post-stretched width less than said prestretched width, and trimming means spaced from said second looping means in the direction of movement of said strip for trimming said strip along said opposite edges at least at said spaced locations to a width not greater than said post-stretched width.

8. The device of claim 7 and further including coiling means spaced from said trimming means in the direction of movement of said strip for coiling said strip into a continuous coil of substantially uniform width and having successive stretched lengths connected by marks from said gripping means.

9. A method for intermittently and successively tension leveling predetermined length portions of an elongated metal strip having a longitudinal axis and a predetermined prestretched width across opposite prestretched longitudinal edges, comprising the steps of; feeding said strip in a predetermined longitudinal direction, gripping said strip across said predetermined width in longitudinally-spaced locations with gripping means at opposite end portions of a predetermined length portion of said strip, moving said gripping means to stretch said predetermined length portion of said strip to a poststretched length portion of strip having a poststretched width intermediate said spaced locations less than said prestretched width, transferring said post-stretched length portion of strip from said gripping means while simultaneously transferring a new predetermined length portion of said strip to said gripping means, and trimming said opposite edges of said strip at least at said spaced locations to reduce said width thereof to not greater than said poststretched width.

10. The method of claim 9 and further including the steps of forming spaced-apart first and second loops in said strip, continuously feeding strip to said first loop and continuously pulling strip from said second loop, increasing the size of said first loop and decreasing the size of said second loop during said step of stretching said strip, and decreasing the size of said first loop and increasing the size of said second loop subsequent to said stretching step while carrying out said transferring step.

11. The method of claim 10 and further including the step of coiling said strip subsequent to said trimming step into a coil of substantially uniform width having successive stretched lengths connected by gripping marks.

12. The method of claim 9 and further including the step of coiling said strip subsequent to said trimming step into a coil of substantially uniform width having successive stretched lengths connected by gripping marks.

13. A method for intermittently and successively tension leveling predetermined length portions of an elongated metal strip having a longitudinal axis and a predetermined width, comprising the steps of; forming spaced-apart first and second loops in said strip, continuously feeding said strip to said first loop and continuously pulling said strip from said second loop, gripping said strip intermediate said first and second loops in longitudinally-spaced locations with gripping means, stretching said strip between said spaced locations to produce a stretched strip portion having a post-stretched with intermediate said spaced locations less than said predetermined width, increasing the size of said first loop and decreasing the size of said second loop during said stretching step, transferring said stretched strip portion from said gripping means to said second loop, and decreasing the size of said first loop and increasing the size of said second loop during said transferring step.

14. The method of claim 13 and including the step of trimming opposite side edges of said stretched strip portion at least at said spaced locations to a width not greater than said poststretched width.

15. The method of claim 14 and further including the step of coiling said strip subsequent to said trimming step into a coil of substantially uniform width having successive stretched lengths connected by gripping marks.

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