Feb. 10, 1970 S. R. HOOD ET AL 3,494,253

METALLIC STRIP MILLING MACHINE

Filed May 31, 1968 7 Sheets-Sheet 1

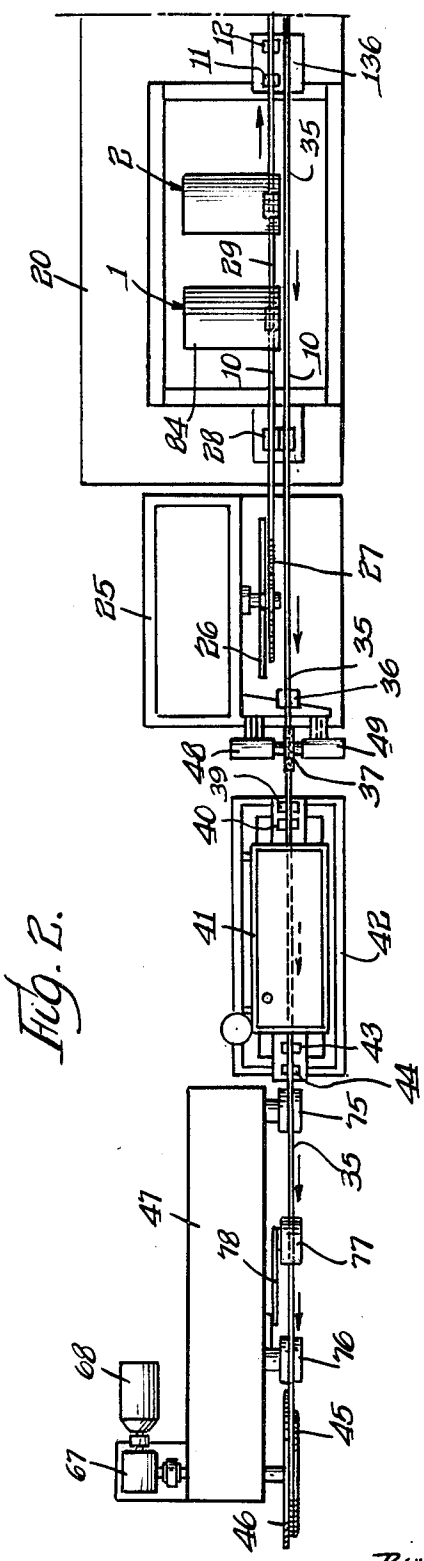


Fig. 2.

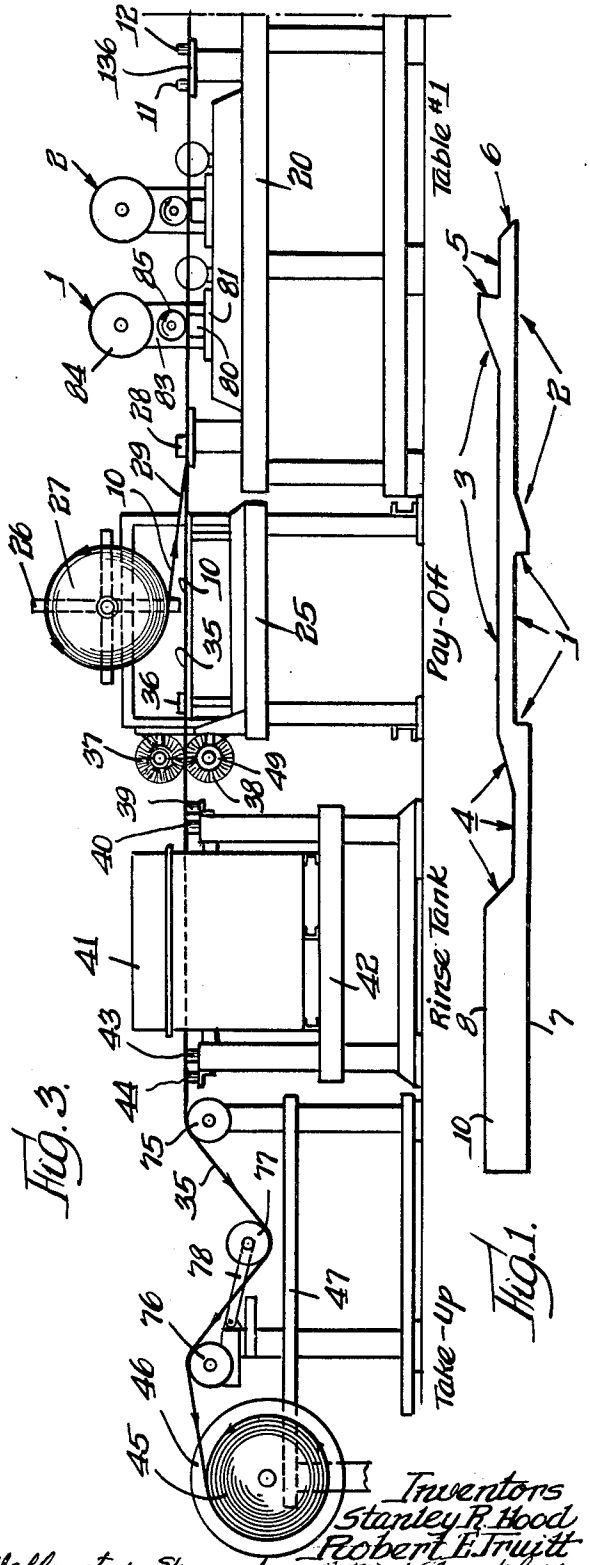


Fig. 3.

Fig. 1.

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METALLIC STRIP MILLING MACHINE

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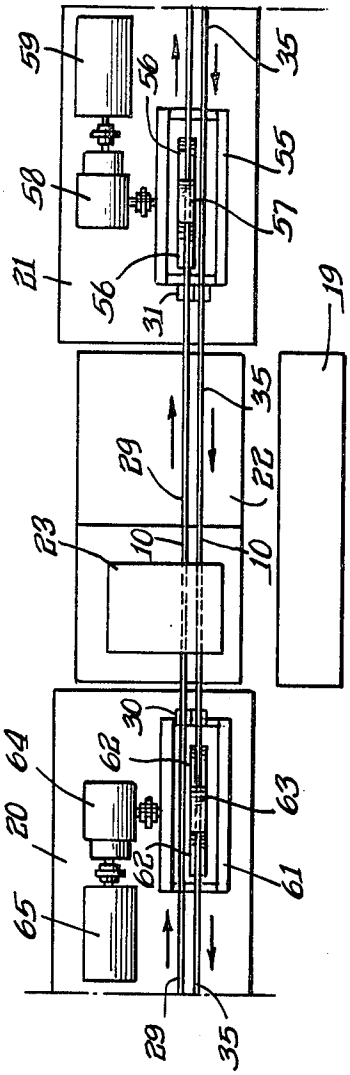


FIG. 2A.

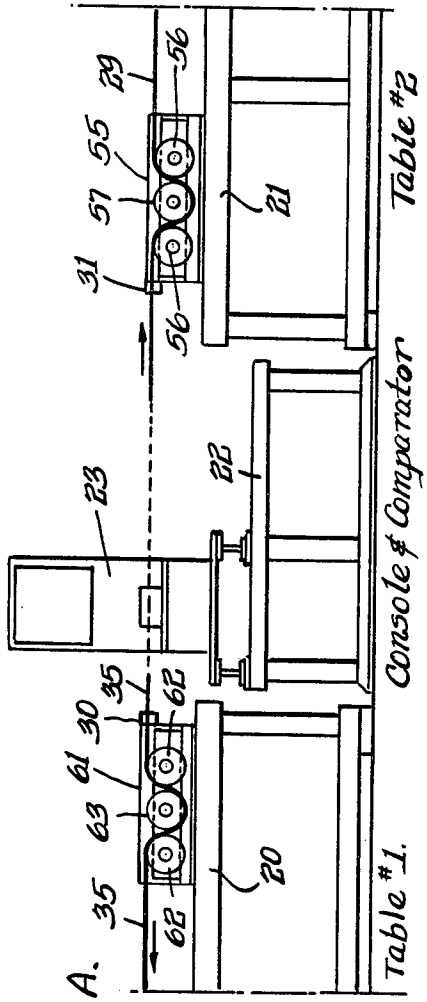


FIG. 3A.

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METALLIC STRIP MILLING MACHINE

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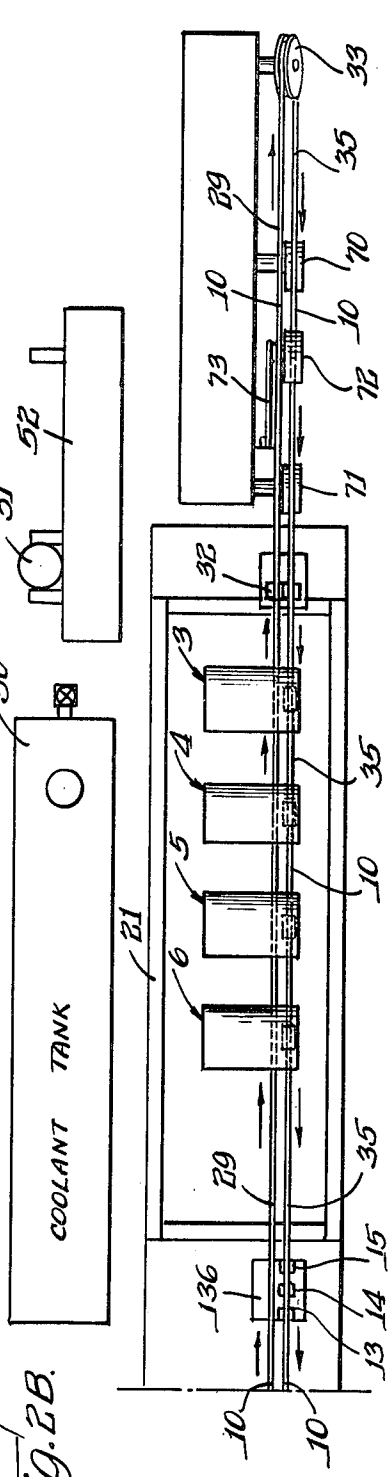


Fig. 2B.

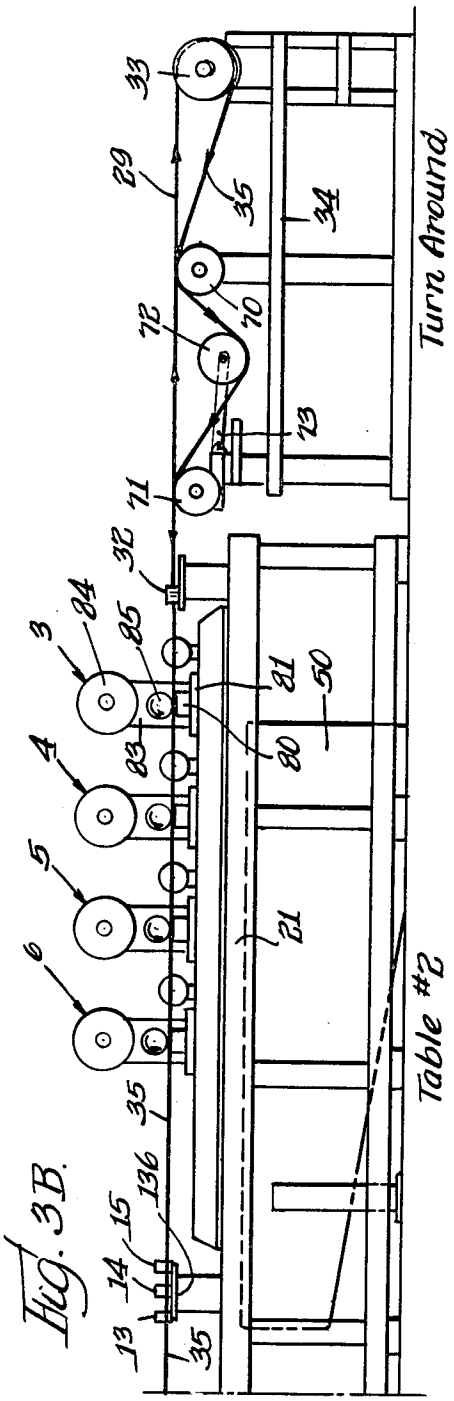


Fig. 3B.

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METALLIC STRIP MILLING MACHINE

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FIG. 4.

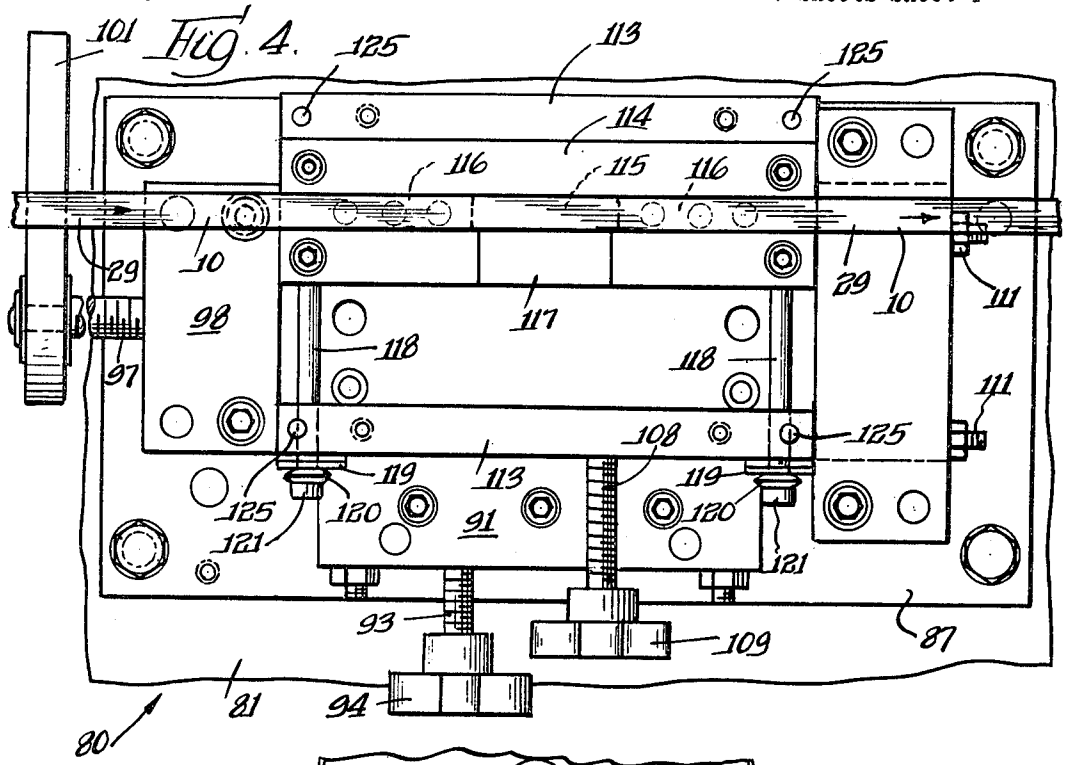
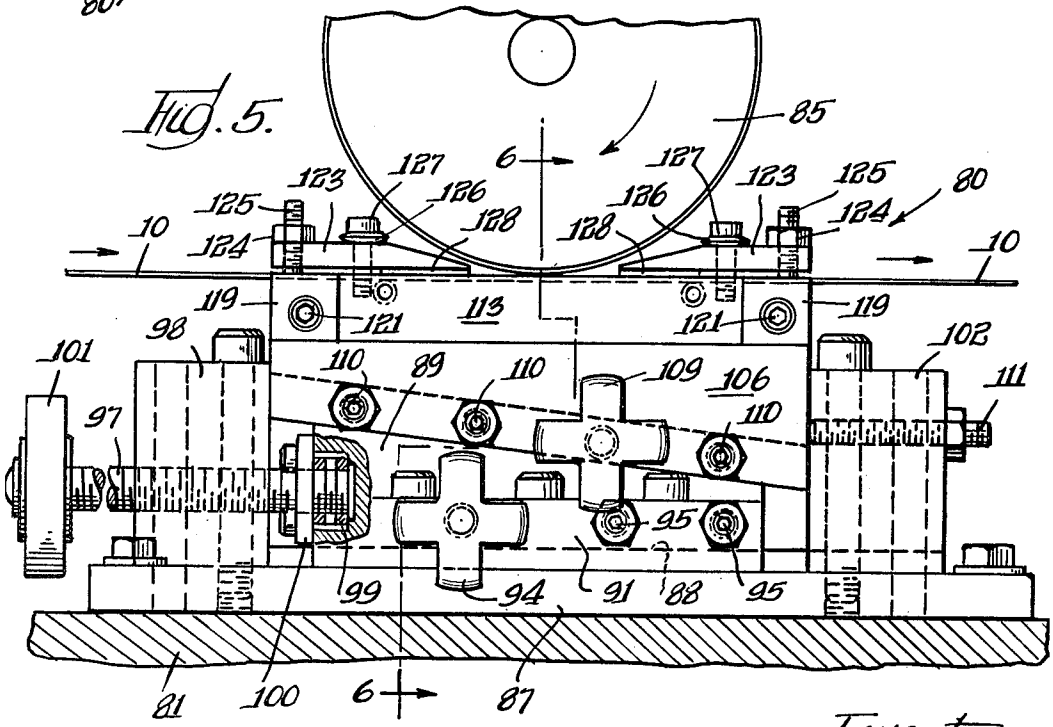


FIG. 5.



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METALLIC STRIP MILLING MACHINE

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Fig. 6.

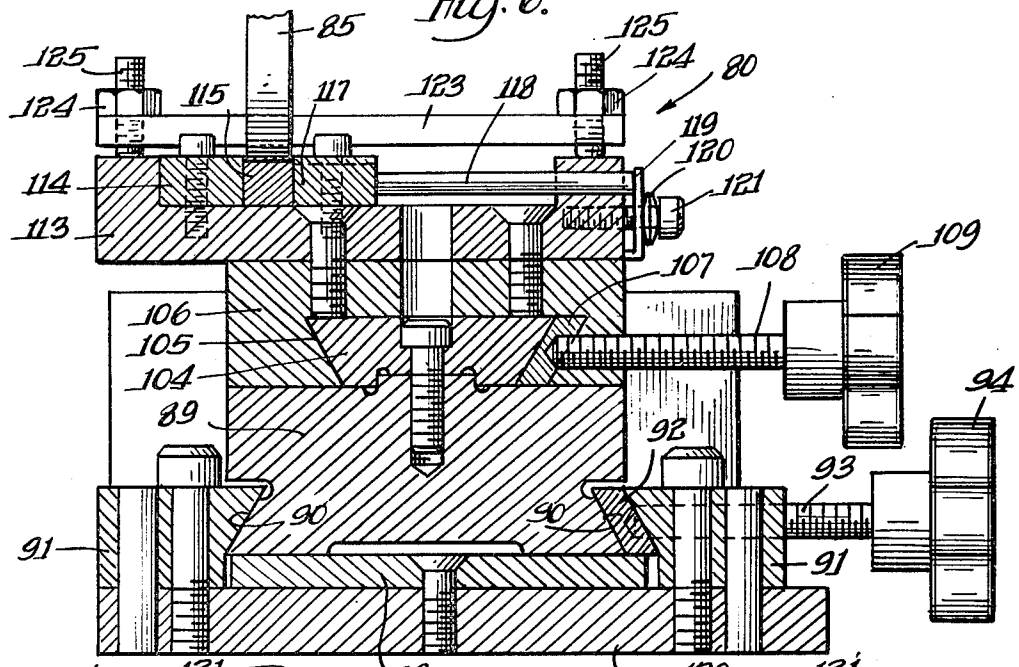


Fig. 7.

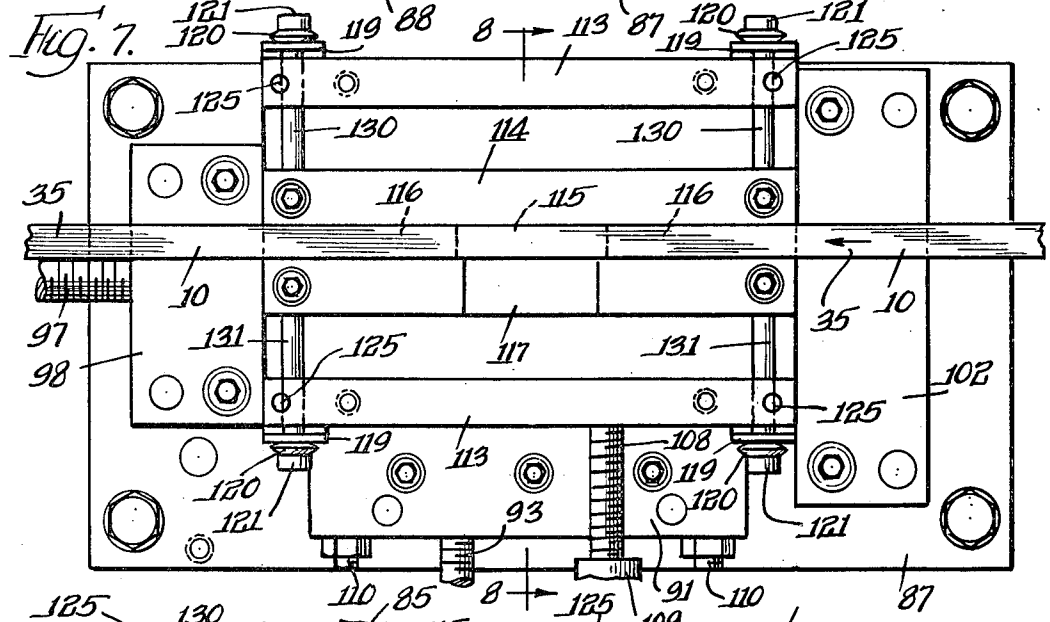
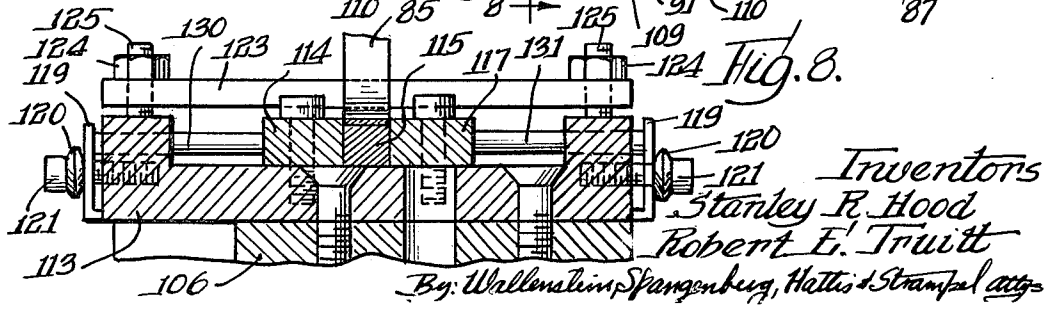


Fig. 8.



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Fig. 9.

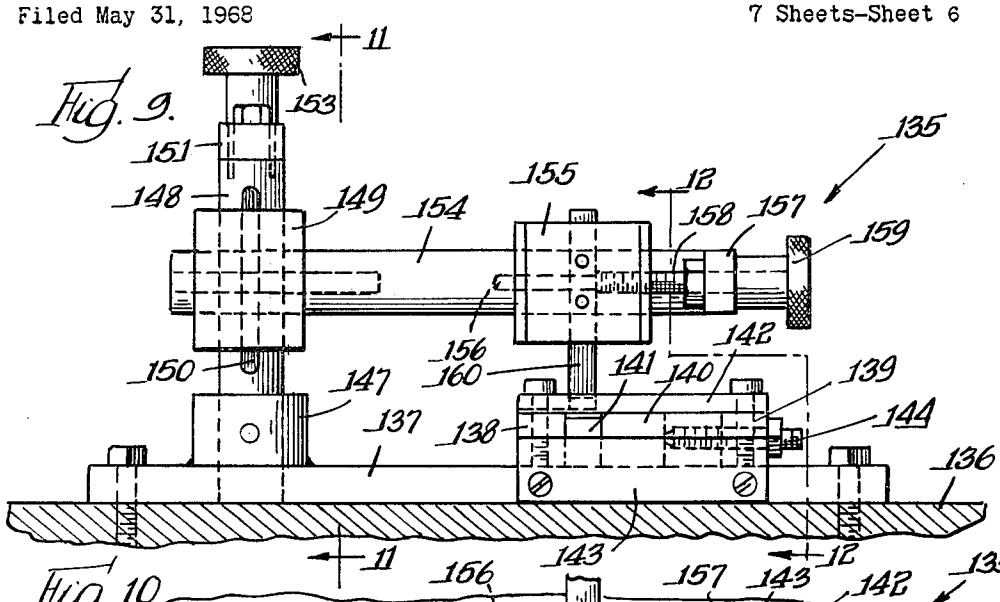


Fig. 10.

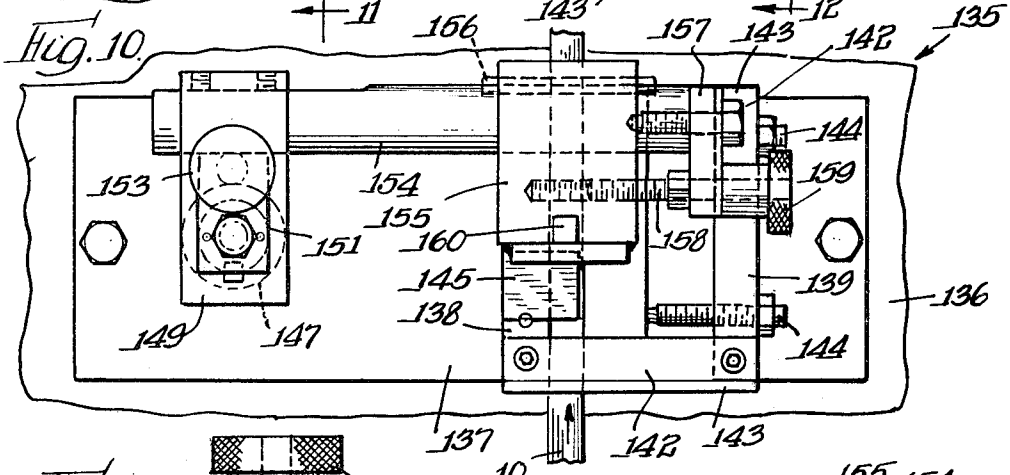


Fig. 11.

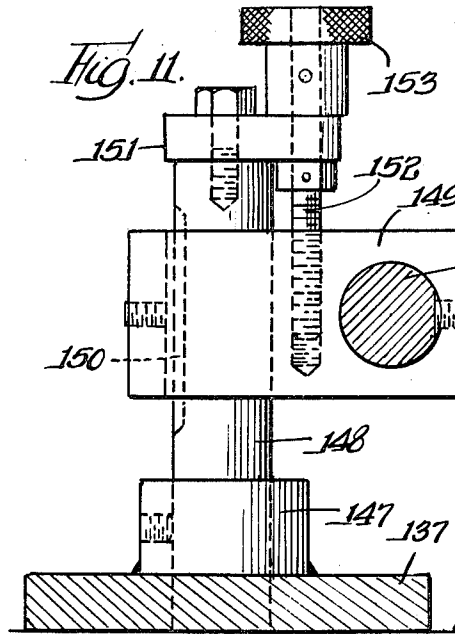
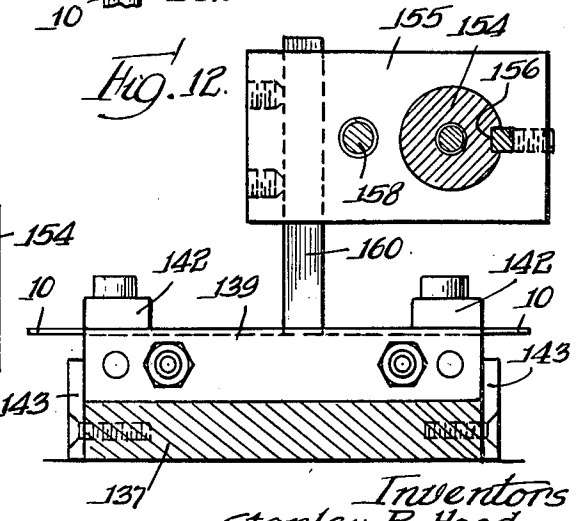


Fig. 12.



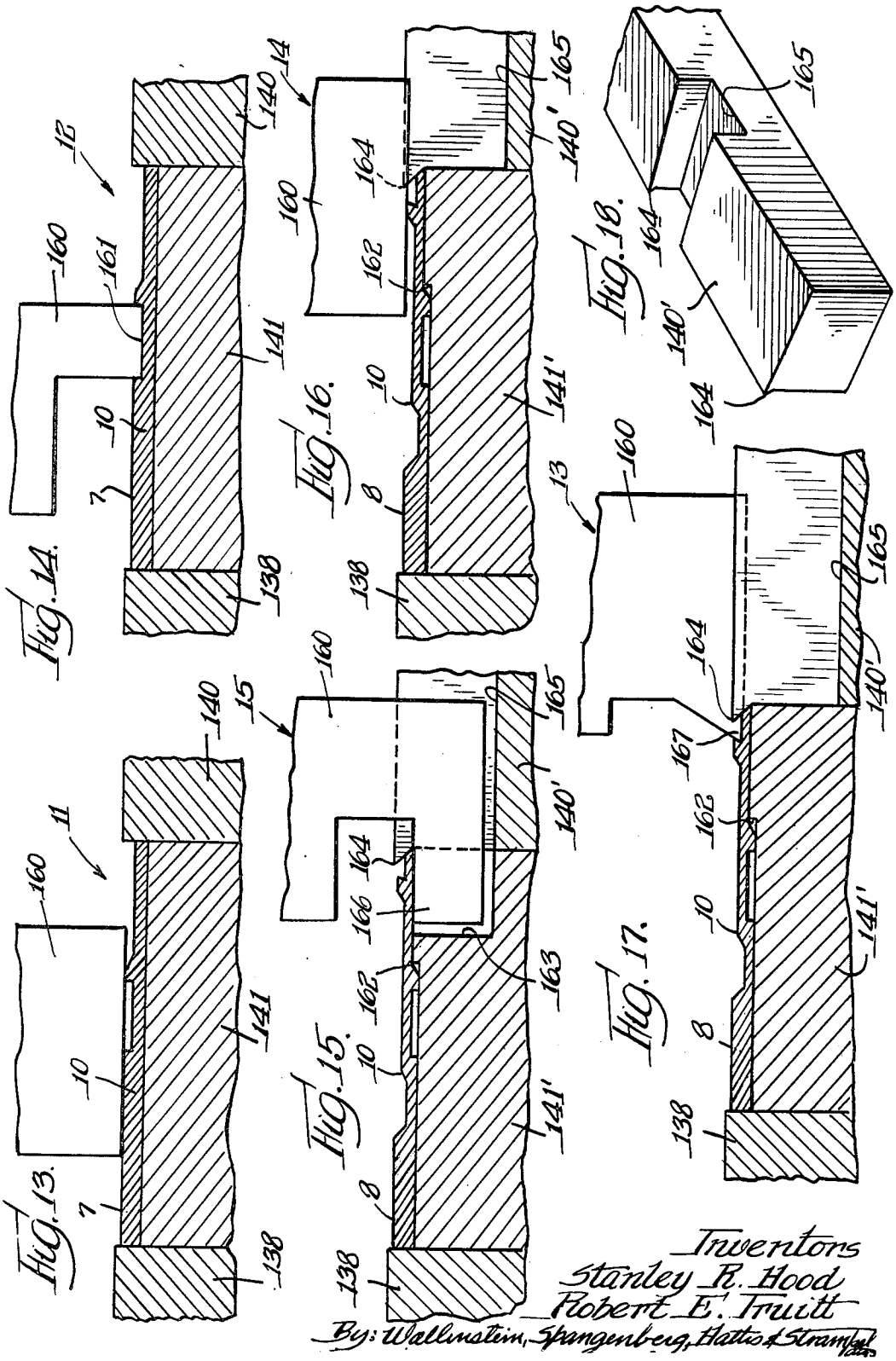
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METALLIC STRIP MILLING MACHINE

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United States Patent Office 3,494,253 Patented Feb. 10, 1970

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METALLIC STRIP MILLING MACHINE

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Int. Cl. B23c 9/00, 3/00, 7/00
U.S. Cl. 90—21 10 Claims

ABSTRACT OF THE DISCLOSURE

A milling machine is provided for simultaneously milling contours in opposite sides of a metallic strip, wherein the metallic strip is fed from a supply reel at one end of the machine in one path lengthwise along the machine and is reversed upside down by a reversing roll at the other end of the machine and fed in another adjacent path lengthwise along the machine to a take-up reel at said one end of the machine. At least one milling unit is provided toward said one end of the machine for milling the upwardly facing side of the metallic strip in said one path, and at least one other milling unit is provided toward said other end of the machine for milling the upwardly facing side of the metallic strip in said other adjacent path. An inspection station including a comparator is located adjacent the center of the machine for inspecting the upwardly facing milled sides of the metallic strip passing thereby in said paths.

A principal object of this invention is to provide a milling machine for simultaneously milling contours in opposite sides of a metallic strip, the machine being as described above. By so simultaneously milling contours in opposite sides of the metallic strip, more accurate milling is made possible, less handling of material is required and general operating costs and expenses are maintained at a minimum.

Preferably, the machine also includes deburring fixtures adjacent the milling units for removing burrs which may be formed by the milling operations. Also, suitable driving means for driving the metallic strip through the machine and suitable controls therefor are provided to assure accurate feeding of the metallic strip through the milling units and deburring fixtures. The milling units and deburring fixtures are adjustable in construction and operation for accommodating differently dimensioned metallic strips and milling differently dimensioned contours therein.

Such metallic strips with contours accurately milled on opposite sides may be readily fed to progressive dies in a suitable press for forming various different parts, such as, for example, keys electrical connectors, spring contacts and the like.

Further objects of this invention reside in the details of construction of the milling machine and in the cooperative relationships between the component parts thereof.

Other objects and advantages of this invention will become apparent to those skilled in the art upon reference to the accompanying specification, claims and drawings in which:

FIG. 1 is an enlarged cross sectional view of a metallic strip which has had contours milled on opposite sides thereof by the milling machine of this invention;

FIGS. 2 and 3 are top plan and side elevational views of one end of the milling machine of this invention;

FIGS. 2A and 3A are top plan and side elevational views of the center of the machine;

FIGS. 2B and 3B are top plan and side elevational views of the other end of the machine;

When FIGS. 2 and 3, 2A and 3B and 2B and 3B are layed end to end, they illustrate diagrammatically the milling machine of this invention;

FIG. 4 is a top plan view of the adjustable support utilized in the milling units which perform the milling operation in said one path with portions of the milling units omitted;

FIG. 5 is a side elevational view of the adjustable support illustrated in FIG. 4;

FIG. 6 is a vertical sectional view through the adjustable support taken substantially along the line **6—6** of FIG. 5;

FIG. 7 is a top plan view similar to FIG. 4 but illustrating the adjustable support for performing milling operations in said other adjacent path;

FIG. 8 is a sectional view through a portion of the adjustable support of FIG. 7, FIG. 8 being taken substantially along the line **8—8** of FIG. 7;

FIG. 9 is an elevational view of one of the deburring fixtures;

FIG. 10 is a top plan view of the deburring fixture illustrated in FIG. 9;

FIG. 11 is a vertical sectional view taken substantially along the line **11—11** of FIG. 9;

FIG. 12 is a vertical sectional view taken substantially along the line **12—12** of FIG. 9;

FIGS. 13, 14, 15, 16 and 17 are enlarged views illustrating certain details of the various deburring fixtures utilized in the machine; and

FIG. 18 is a partial perspective view of the guide plate utilized in the arrangements of FIGS. 15, 16 and 17.

Referring now to FIG. 1, there is illustrated on an enlarged scale a metallic strip **10** having opposite sides **7** and **8**. For example, this metallic strip **10** may have a thickness of .018 inch and a width of .370 inch. In the milling of the strip **10** by the milling machine of this invention the side **7** of the strip **10** faces upwardly and as the strip is moved along said one path lengthwise of the machine, a milling unit **1** mills the contour **1** and then a milling unit **2** mills the contour **2**. The strip **10** with the contours **1** and **2** milled therein is then reversed at the other end of the machine so as to place the side **8** upwardly. The strip then is advanced with the side **8** facing upwardly along said other adjacent path along the machine and a milling unit **3** then mills the contour **3**, a milling unit **4** mills the contour **4**, milling unit **5** mills the contour **5** and a milling unit **6** mills the contour **6**. The metallic strip **10** with the milled contours **1**, **2**, **3**, **4**, **5** and **6** is utilized by way of example to show the complete versatility of the milling machine of this invention.

The milling units **1** and **2** for milling the contours **1** and **2** on the side **7** of the metallic strip **10** are diagrammatically shown in FIGS. 2 and 3 and are generally designated **1** and **2**. These milling units **1** and **2** are carried by a table **20** identified as table #**1** and this table also carries deburring fixtures **11** and **12** for removing burrs resulting from the operation of the milling units **1** and **2**. The milling units **3**, **4**, **5** and **6** for forming the contours on the opposite side **8** of the metallic strip **10** are diagrammatically illustrated in FIGS. 2B and 3B, these milling units being generally designated as **3**, **4**, **5** and **6**. These milling units are carried by a table **21** which has been designated table #**2** and this table **21** also carries deburring fixtures **13**, **14** and **15** for removing burrs on side **8** of the strip **10** following milling thereof.

Interposed between tables **20** and **21** is a console and comparator station as shown in FIGS. 2A and 3A. This station includes a control console **19** and a support **22** for a comparator **23**.

Adjacent one end of the machine as illustrated in FIGS. 2 and 3 there is provided a pay-off station which includes

a support 25 for supporting a reel 26 carrying a coil 27 of the metallic strip 10. The reel 26 is provided with a friction brake so as to provide tension in the metallic strip 10 as it is uncoiled or payed-off from the coil 27.

As the metallic strip 10 is payed-off from the coil 27, it passes through a guide 28 along a path 29 extending lengthwise from said one end of the machine. The metallic strip 10 is passing along said on path 29 is then milled by the milling units 1 and 2 and deburred by the deburring fixtures 11 and 12 as illustrated in FIGS. 2 and 3. The metallic strip 10 moving along said one path 29 passes through a guide 30 and through comparator 23 so that it may be accurately inspected following the milling and deburring operations performed by the milling units 1 and 2 and the deburring fixtures 11 and 12 as shown in FIGS. 2A and 3A. The metallic strip 10 proceeds from the comparator 23 through a guide 31 and a guide 32, as shown in FIGS. 2B and 3B to a reversing roll 33 where the metallic strip is reversed or turned around so that the side 8 of the metallic strip is then caused to face upwardly. The reversing roll 33 is carried by a frame 34 of a turn around station and the reversed metallic strip 10 then proceeds from this end of the machine back to the other end of the machine along said other adjacent path 35. To assist in laterally locating the path 35 from the path 29 the reversing roll 23 is preferably canted as illustrated in FIG. 2B and 3B.

The metallic strip 10 with its side 8 upwardly moving along said other adjacent path 35 passes through a guide 32 and through the milling units 3, 4, 5 and 6 where the contours 3, 4, 5 and 6 are milled into the side 8 of the metallic strip 10. The metallic strip 10 then passes through deburring fixtures 15, 14 and 13 for removing burrs caused by the milling units in forming the contours. As shown in FIGS. 2A and 3A, the metallic strip 10 in said path 35 passes through a guide 31 and through the comparator 23 to a guide 30. The comparator provides for accurate inspection of the milling and deburring operations performed on the side 8 of the metallic strip 10 at the same time that inspection may be made of the milled and deburred contours on the side 7 of the metallic strip. Thus, complete and accurate and simultaneous inspection of both sides of the metallic strip may be performed. The metallic strip 10 in the path 35 after leaving the guide 30 passes through a guide 36 as shown in FIGS. 2 and 3 and between brushes 37 and 38 operatd by motors 48 and 49 for brushing both sides of the metallic strip 10 to remove any particles which may be adhering thereto. From the brushes 37 and 38 the metallic strip moving along the path 35 feeds through a guide 39, a wiper 40, a rinse tank 41 carried by a frame 42, a wiper 43 and a guide 44 to a take-up reel 46 arranged on a frame 47 of a take-up station. The reel 46 coils the completely contoured and cleaned metallic strip thereon in a coil 45. As shown in FIGS. 2B and 3B, the machine may also be provided with a coolant tank 50, a filter 51 and suitable piping carried by a frame 52 for supplying coolant to the milling units 1, 2, 3, 4, 5 and 6.

The metallic strip 10 is fed along the path 28 from the pay-off reel 26 past the milling units 1 and 2, the deburring units 11 and 12 and the comparator 23 by a driving means 55 illustrated in FIGS. 2A and 3A. The driving means 55 includes a pair of free running pressure rolls 56 and a driven roll 57 operated through a variable speed drive mechanism 58 by an electric motor 59, the metallic strip 10 coursing the rolls 56 and 57. Thus, a positive and accurately controlled feeding of the metallic strip 10 along the path 29 is provided. A control means is included at the console 19 adjacent the comparator 23 for controlling the variable speed drive 58 to regulate the speed of advance of the metallic strip 10. Thus, by inspection of the metallic strip at the comparator 23 the operator at the console can accurately regulate the speed of advance of the metallic strip 10 in accordance with conditions prevailing at the comparator.

The metallic strip 10 is fed along the path 35 through the milling untis 3, 4, 5 and 6, the deburring units 15, 14 and 13 and the comparator 23 by a drive means 61 on table 20 as illustrated in FIGS. 2A and 3A. This drive means 61 also includes a pair of pressure rolls 62 and a driven roll 63 which are coursed by the metallic strip 10 in the path 35, the driven roll 63 being driven through a variable speed drive 64 by an electric motor 65. The speed of operation of the driving means 61 is controlled so as to provide a desired tension in the metallic strip 10 as it passes along the path 35. Towards this end, the turn around station 34 which carries the reversing roll 33 is provided with a pair of rolls 70 and 71 over which the metallic strip 10 passes in the path 35. A roll 72 carried by an arm 73 rides on the top of the metallic strip 10 between the rolls 70 and 71 and it moves upwardly and downwardly depending upon the tension in the metallic tape. The arm 73 carrying the roll 72 operates a control device which in turn regulates the variable speed drive 64 for controlling the speed of operation of the driving means 61 and, hence, the tension in the metallic strip.

The take-up reel 46 is operated through a variable speed drive 67 by an electric motor 68 and it is controlled by a tension responsive device at the take-up station 47 for providing proper tension in the metallic strip 10 as it is being coiled on the reel 46. In this connection, the metallic strip 10 in the path 35 passes over rolls 75 and 76 and a roll 77 carried by an arm 78 rides on the upper surface of the metallic strip 10 between the rolls 75 and 76. The roll 77 will move upwardly and downwardly in accordance with the tension in the metallic strip 10 and this upward and downward movement causes the arm 78 to operate a control means for in turn controlling the variable speed drive 67 and, hence, the speed of rotation of the take-up reel 46. In this way, the metallic strip 10 is provided with the desired tension as it is coiled at 45 on the take-up reel 46.

As shown in FIGS. 2, 3 and 2B, 3B, each milling unit 1, 2, 3, 4, 5 and 6 includes a base 81 carried by the tables 20 and 21, and a frame 83 carried by the base 81 for carrying an electric motor 84 for rotating a cutter 85, the cutter 85 being above the metallic strip 10 being milled thereby. Each milling unit also includes an adjustable support 80 carried by the base 81 below the metallic strip 10.

The adjustable support 80 is shown in more detail in FIGS. 4, 5 and 6, the adjustable support being generally designated at 80 in these figures. The adjustable support includes a base plate 87 carried by the base 81 and it is provided with a lower slide wear plate 88. A lower slide 89 is slidably mounted on the wear plate 88 and it is provided with a pair of dovetail surfaces 90. A pair of gibbs 91 are secured to the base plate 87, one of the gibbs 91 engaging directly one of the dovetail surfaces 90 and the other gibb 91 having a gibb insert between it and the other dovetail surface 90. The gibbs 91 guide the lower slide 89 for longitudinal movement. When the lower slide 89 is properly positioned, a screw 93 operated by a knob 94 extending through one of the gibbs 91 presses the gibb insert 92 against the lower slide 89 for locking the same in place. To assure complete locking the gibb 91 is also provided with locking screws 95 which also engage the gibb insert 92. In this way, the lower slide 89 may be locked in desired position. A block 98 carried by the base plate 87 screw threadedly receives a screw 97 having ratchet handle 101 for rotating the same. The screw 97 extends into a cavity in the lower slide 89 and is provided with a collar 99 which is held in the cavity by a plate 100. Thus, when the locking device 94 is released, rotation of the screw 97 by the ratchet handle 101 provides longitudinal movement to the lower slide 89. The base plate 87 also carries a block 102 adjacent the other end of the lower slide 89.

The upper surface of the lower slide 89 is slanted and is provided with a dovetail piece 104 having dovetail sur-

faces **105**. An upper slide **106** is provided with matching dovetail surfaces for engaging the dovetail surfaces **105** of the dovetail piece **104**. A gibb piece **107** is interposed between the upper slide **106** and one side of the dovetail piece **104**. A screw **108** having a knob **109** extends through a portion of the upper slide **106** and engages the gibb piece **107** for pressing the same against the dovetail piece **104** for locking the lower slide **89** and the upper slide **106** together. To assure firm and accurate locking, additional screws **110** are provided for also engaging and pressing the gibb piece **107** against the dovetail piece **104**. Longitudinal movement of the upper slide **106** is prevented by the end blocks **98** and **102**. When the screw **108** is released and the bottom slide **89** is longitudinally moved, the upper slide will be adjusted upwardly and downwardly and when the proper adjusted position is obtained, then the screw **108** is tightened. To eliminate any possible forward or backward movement the end block **102** is provided with a screw **111** for holding the assembly tightly against the other end block **98**.

A guide and wear plate holder **113** is suitably secured to the top of the upper slide **106**, this holder **113** having longitudinally arranged ribs. The holder **113** carries a rear guide rail **114**, a wear plate **115** which is held in place by clamp members **116** and a front guide rail **117**, these rails and clamps being suitably secured in place on the holder **113**. A pair of pins **118** engage the front guide rail **117** and their outer ends are engaged by clamps **17** which press the rods **118** inwardly by means of spring washers **120** pressed against the clamps by screws **121**. In this way, the guide rails **114** and **117** and the wear plate **115** therebetween are firmly and accurately secured in place in the holder **113**. The upper surface of the wear plate **115** is depressed below the upper surfaces of the guide rails **114** and **117** for the purpose of guiding the metallic strip and firmly backing the same as it is being milled by the cutter **85**.

A pair of hold down clamps **123** arranged above the guide rails **114** and **117** and the wear plate clamps **116** is held in place by nuts **124** on studs **125** and by spring washers **126** pressed against the hold down clamps **123** by means of screws **127**. The under surfaces of the hold down clamps **123** are provided with pieces **128** of nylon or the like. These hold down clamps with their nylon surfaces positively hold the metallic strip **10** against the wear plate **115** as the upper surface of the metallic strip is being milled by the cutter **85**.

The arrangement shown in FIGS. 4, 5 and 6 is for milling the contours on the side **7** of the metallic strip **10** as the metallic strip is being advanced along the path **29**. FIGS. 7 and 8 illustrate the construction of the adjustable support **80** for supporting the metallic strip **10** in the path **35** as it is having its side **8** milled by the cutters. In this connection, the guide rails **114** and **117**, the wear plate **115** and the wear plate clamps **116** are maintained in the appropriate position by pins **130** and **131** which in turn are positioned by clamps **119** which are spring biased by the springs **120** and screws **121**.

The deburring fixtures **11**, **12**, **13**, **14** and **15** are carried by bases **136** and the construction of these deburring devices is illustrated in more detail in FIGS. 1 to 12. Here, each deburring fixture which is generally designated at **135** includes a base plate **137** secured to the base **136**. A pair of guide rails **138** and **139** are secured to the base plate **137**. An intermediate guide plate **140** holds a wear plate **141** against the guide rail **138**. The guide plate **140** is held against the base plate **137** by hold down plates **142** secured to the rails **138** and **139**. The fixture is also provided with a pair of end plates **143** suitably secured to the base plate **137**. A pair of screws **144** extending through the guide rail **139** engage the guide plate **140** for holding the same tightly against the guide rail **138**. The metallic strip **10** to be deburred moves along the wear plate **141** between the guide rail **138** and the guide plate **140** underneath the hold down plates **142**. A spring strip clamp **145** also operates to hold the metallic strip **10** down against the wear plate **141**.

The deburring fixture also includes a collar **147** secured to the base plate **137** which in turn carries a post **148** upon which is slidably mounted a bracket **149**, rotation of the bracket **149** with respect to the post **148** being prevented by a key carried by the bracket **149** extending into a key slot **150** in the post **148**. The top of the post **148** carries a bracket **151** which in turn journals for rotation a screw **152** extending into a screw threaded hole in the bracket **149**. The screw **152** is rotated by a knob **153** and as the knob **153** is rotated, the bracket **149** is adjusted upwardly and downwardly on the post **148**. The bracket **149** is provided with a hole for receiving a horizontal arm **154**, the arm **154** being secured in place on the bracket and being secured against rotation on the bracket by set screws extending through the bracket and engaging a flat on the arm **154**. A tool holder **155** is slidably mounted on the arm **154** and it is held against rotation with respect to the arm **154** by a key extending into a key slot **156** in the arm **154**. The end of the arm **154** is provided with a bracket **154** which rotatably mounts a screw **158** received in a screw threaded hole in the tool holder **155**, the screw being rotated by a knob **159**. Thus, by rotating the knob **159** the tool holder **155** may be horizontally adjusted along the horizontal arm **154**. The tool holder carries a tool **160** which is arranged above the metallic strip so as to remove burrs from the milled metallic strip.

FIGS. 13 to 17 are enlarged views showing the manner in which the deburring is accomplished. FIG. 13 illustrating the deburring action accomplished by the deburring fixture **11**, FIG. 14 illustrating the deburring action accomplished by the deburring fixture **12**, FIG. 15 illustrating the deburring action accomplished by the deburring fixture **15**, FIG. 16 illustrating the deburring action accomplished by the deburring fixture **14** and FIG. 17 illustrating the deburring action accomplished by the deburring fixture **13**. In FIG. 13 the metallic strip **10** is supported by the wear plate **141** between the guide rail **138** and the guide plate **140**. The deburring tool **160** is a straight tool and removes burrs from cuts **1** and **2** illustrated in FIG. 1. In FIG. 14 which represents the deburring fixture **12**, the tool **160** has a reduced portion **161** for removing burrs from cut **1** as illustrated in FIG. 1. The deburring fixtures illustrated in FIGS. 15, 16 and 17 have to do with removing burrs resulting from milling side **8** of the metallic strip **10**. In this connection, the wear plate **141** is contoured as illustrated at **162** for firmly supporting the metallic strip along cut **2** as illustrated in FIG. 1. Here, the wear plate **141'** is also provided with a slot **163** for receiving a portion **166** of the tool **160**. Here, also, the guide plate **140'** is provided with a lip **164** and with a slot **165** for accommodating the tool **160**. The tool portion **166** and the lip **164** operate to remove the burr from the underside of the sharp edge which was formed by cut **6** as illustrated in FIG. 1. In FIG. 16 which is representative of the deburring fixture **14**, the wear plate **141'** is also contoured at **162** for properly supporting the metallic strip **10**. Here, the lip **164** on the guide plate **140'** firmly holds the metallic strip **10** and the straight tool **160** operates to remove the burr from cuts **3** and **5** as illustrated in FIG. 1. In FIG. 17 which is representative of the deburring fixture **13**, the wear plate **141'** is also contoured to properly support the metallic strip **10** and the lip **164** also holds and guides the metallic strip **10**. Here, the tool **160** is provided with a pointed surface **167** for removing the burr from cut **5** as illustrated in FIG. 1.

While for purposes of illustration, one form of this invention has been disclosed, other forms thereof may become apparent to those skilled in the art upon reference to this disclosure and, therefore, this invention is to be limited only by the scope of the appended claims.

We claim:

1. A milling machine for milling contours on opposite sides of a metallic strip comprising, a supply reel adjacent one end of the machine carrying a coil of the metallic strip for paying out the metallic strip along one path extending lengthwise of the machine with one side of the metallic strip facing upwardly, a reversing roll adjacent the other end of the machine which is coursed by the metallic strip for reversing the metallic strip and feeding it along another adjacent path extending lengthwise of the machine with the other side of the metallic strip facing upwardly, a take-up reel adjacent said one end of the machine for coiling thereon the metallic strip from said other adjacent path, at least one milling unit adjacent said one end of the machine having a rotatable cutter above said one path for milling said one side of the metallic strip as it is advanced along said one path, at least one other milling unit adjacent said other end of the machine having a rotatable cutter above said other adjacent path for milling said other side of the metallic strip as it is advanced along said other adjacent path, and an inspection station adjacent the center of the machine including a comparator above said path and said other adjacent path for inspecting the upwardly facing milled sides of the metallic strip passing thereby in said paths.

2. A milling machine as defined in claim 1 including, at least one deburring fixture between said at least one milling unit and said inspection station having a tool above said one path for deburring the upwardly facing milled side of the metallic strip passing thereby in said one path, and at least one other deburring fixture between said at least one other milling unit and said inspection station having a tool above said other adjacent path for deburring the upwardly facing milled side of the metallic strip passing thereby in said other adjacent path.

3. A milling machine as defined in claim 1 including, first driving means between said inspection station and said other end of the machine having driving rolls engaging the metallic strip in said one path and variable speed drive means for said driving rolls, first control means at said inspection station including a console for controlling the speed of operation of said variable speed drive means, second driving means between said inspection station and said one end of the machine having driving rolls engaging the metallic strip in said other adjacent path and variable speed drive means for said driving rolls, and second control means including means responsive to the tension of the metallic strip in said other adjacent path between said reversing roll and said at least one other milling unit for controlling the speed of operation of said variable speed drive means of said second driving means.

4. A milling machine as defined in claim 3 including, third driving means including variable speed drive means for driving said take-up reel, and third control means including means responsive to the tension of the metallic strip in said other adjacent path as the metallic strip approaches said take-up reel for controlling the speed of operation of said variable speed drive means of said third driving means.

5. A milling machine as defined in claim 1 wherein each said milling unit comprises, a base carried by the machine for supporting the rotatable cutter above the metallic strip and an adjustable support carried by the base below the metallic strip and including a wear plate carried by the adjustable support for engaging the underside of the metallic strip, guide rails carried by the adjustable support on opposite sides of the wear plate for guiding the metallic strip along the wear plate, said wear plate and guide rails being selectively positioned on the adjustable support so as to align said wear plate with said one path or said other adjacent path of the metallic strip, and means for adjustably raising and lowering the adjustable support and the wear plate carried thereby with respect to the rotatable cutter.

6. A milling machine as defined in claim 5 wherein the wear plate of said at least one other milling unit is contoured to accommodate the milled underside of the metallic strip which was previously milled by said at least one milling unit.

7. A milling machine as defined in claim 5 including hold down clamps for holding the metallic strip against the wear plate.

8. A milling machine as defined in claim 7 wherein said hold down clamps have a surface of Teflon or the like engaging the metallic strip.

9. A milling machine as defined in claim 2 wherein each said deburring fixture comprises, a base carried by the machine, a wear plate carried by the base below the metallic strip, guide rails carried by the base on opposite sides of the wear plate for guiding the metallic strip along the wear plate, said wear plate and guide rails being selectively positioned on the base so as to align said wear plate with said one path or said other adjacent path of the metallic strip, a post carried by the base, an arm horizontally carried by the post above the metallic strip, a tool holder carried by the arm above the metallic strip, and a deburring tool carried by the tool holder above the metallic strip for deburring the metallic strip, at least some of the connections between the post, arm, tool holder and deburring tool being adjustable for appropriately positioning the deburring tool with respect to the metallic strip and the wear plate engaging the same.

10. A milling machine as defined in claim 9 wherein the wear plate of said at least one other deburring fixture is contoured to accommodate the milled and deburred underside of the metallic strip which was previously milled and deburred by said at least one milling unit and said at least one deburring fixture.

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