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H. A. BENTLEY
RIBBON CENTERING GUIDE
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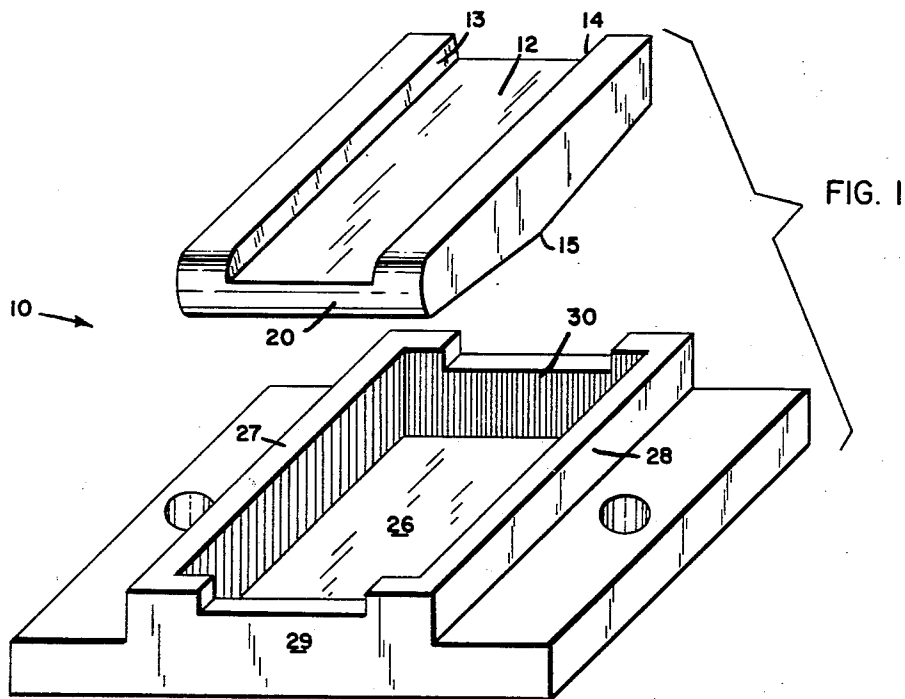
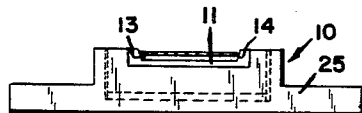
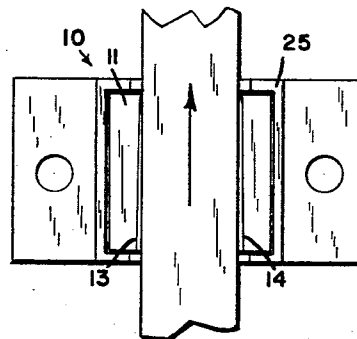


FIG. 2



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RIBBON CENTERING GUIDE

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This invention relates to ribbon feeding, more particularly to means for feeding elongate sheet material along a desired path of travel so as to insure the centering of the sheet material with respect to said path.

A variety of production and fabrication processes utilize elongate sheet material such as ribbons or the like. The relatively thin ribbon of material presents certain handling problems due to its flexibility which subject it to being readily distorted or deflected from its desired path of travel, interfering with the smooth flow and feeding of the material through the processing or fabrication equipment.

It is with the above problems and desiderata in mind, that the present means have been evolved, means including both method and apparatus implementing the guiding of an elongate sheet of strip material such as ribbon or the like so as to center said material with respect to a desired path of travel regardless of allowable variations within the commercial tolerances relating to the thickness or width of the material, and preventing binding of said material during its flow with respect to said guide means.

It is accordingly among the primary objects of this invention to provide improved means for guiding elongate strip material such as ribbon or the like along a desired flow path.

A further object of the invention is to provide improved guide means for elongate sheet material accommodating variations in thickness of said material.

Another object of the invention is to provide improved guide means accommodating variations in width of the elongate strip material being fed.

It is also an object of the invention to provide improved guide means preventing binding of the guided material with respect to the guide surfaces as the material is fed along a desired flow path.

Another object of the invention is to provide means serving to align fed material, with the centerline of the material lying along that of a desired flow path.

These and other objects of the invention which will become hereafter apparent are achieved by provision of centering guide means in the form of a block member movably mounted in a block cradle. The block cradle is formed with a bed surface having upstanding side walls and an upstanding front and rear wall defining the bounds of said bed surface. The block member is formed with a pivot ridge extending along its bottom surface adapted to lie on the bed surface of the block cradle. A slide bearing at the front end of the block member implements movement of the block with respect to the block cradle as will become hereafter apparent. The block member is formed with a material guide channel having two downwardly and forwardly converging spaced orienting surfaces at opposed sides of the channel. In use, flow of material through the guide channel is constrained by the orienting surfaces so that the material is centered with respect to the desired flow path, with the material contact being along two spaced substantially linear bearing surfaces, providing line contact.

An important feature of the invention resides in the use of the downwardly and forwardly converging orienting surfaces so that variations in width of the material are accommodated, the material riding up or down within the channel depending on its width.

Another feature of the invention resides in the fact that the fed material, normally rectangular in cross section, is contacted along only a line at the extremities of the bottom surface of the material, minimizing any binding tendencies.

Specific details of a preferred embodiment of the invention, and their mode of functioning, will be made most manifest and particularly pointed out in clear, concise and exact terms in conjunction with the accompanying drawings wherein:

FIGURE 1 is an exploded perspective view of the novel block and block cradle;

FIGURE 2 is a top plan view looking down on the novel guide means showing material being fed therethrough; and

FIGURE 3 is a front elevational view of the guide means as seen in FIGURE 2.

Referring now more particularly to the drawings, like numerals in the various figures will be employed to designate like parts.

The novel guiding and centering means 10 comprise a block member 11 machined out of tool steel or the like. The top surface of the block member 11 is formed with a material guide channel 12 having downwardly and forwardly converging orienting surfaces 13 and 14 on opposed sides of the channel. Orienting surfaces 13 and 14 are spaced from each other a distance such that at their points of maximum proximity surfaces 13 and 14 accommodate the narrowest tolerable width of material to be fed; and at their points of minimum proximity surfaces 13 and 14 accommodate the widest tolerable width of fed material.

The lower surface of block member 11 is provided with a pivot ridge 15 extending perpendicularly to the axis of channel 12. As best seen in FIGURE 1 this pivot ridge 15 is preferably formed at the center of the bottom surface of block member 11. The front surface of block member 11 is provided with a slide bearing 20 formed by shaping this front surface arcuately as viewed in FIGURE 1. The rear surface, as will be understood by those skilled in the art, may similarly be formed with a slide bearing, however, it has been found that the need for a slide bearing at the rear surface is unnecessary since the block member normally tends to move forwardly under the action of the material being guided thereby as will become hereafter apparent.

The block cradle 25, as best seen in FIGURE 1 is, as was block member 11, preferably formed of a machine tool steel or the like. Cradle 25 is formed with a bed surface 26, the area of which is delineated by upstanding sidewalls 27 and 28, and front wall 29 and rear wall 30. The area of bed surface 26 is such as to permit member 11 to rest thereon as viewed in FIGURE 2, with pivot ridge 15 contacting the bed surface 26.

In use the aforescribed novel guiding and centering means 10 is best employed to implement the orientation of elongate sheet material such as ribbon or the like, as this ribbon of material is being fed through a given processing or fabricating operation. The novel guiding and centering means 10 is positioned with the center line of material guide channel 12 aligned with the center line of the desired flow path for the material. The dimensioning of guide channel 12 is selected such as to accommodate the width of material being fed, with the material preferably contacting only the side walls of the channel as viewed in FIGURE 3. It will be observed that the downwardly and forwardly converging nature of the orienting surfaces forming the side walls of channel 12 is such that the material being fed is only contacted along a line at the extremity of the bottom surface of the material as seen in FIGURE 3. This line contact provides a runner effect, minimizing any binding tendency between the orienting

surface and the material. Normal variations in width and thickness of the material results in the fed material moving upwardly or downwardly with respect to the channel 12. Any irregularity in the dimensions of the material is accommodated by this movement which though displacing the material upwardly or downwardly continues to orient the material with its center line along that of the desired flow path. Any binding tendency is eliminated by the rocking action of the block member 11 on bed surface 26. Normally the movement of the ribbon of material tends to move the block member 11 towards front wall 29. Upon the binding of the ribbon in the channel 12 the block 11 rocks on ridge 15 to free the ribbon.

As illustration of a practical application of the device forming this invention involves its use with equipment of the kind shown in United States Letters Patent 3,000,084. The apparatus disclosed in the aforementioned patent folds a metallic ribbon and winds it about a tubular member to form a finned heat transfer element. The guiding and centering means here described may be used to direct the ribbon to the folding rolls. Variations in the width of the ribbon within the tolerances permitted by the width of the channel 12 will determine where initial engagement of the ribbon and the wall surfaces 13 and 14 will occur. The pivotal action afforded by ridge 15 permits a change in ribbon width of an order sufficient to change the initial contact point from a position below the ridge to one above the ridge and vice versa without binding the parts.

It is thus seen that simple guiding and centering means have been provided serving to center an elongate strip of sheet material with respect to a flow path along which it is being fed, with the novel means accommodating variations in material width or thickness without affecting centering efficiency.

While I have described a preferred embodiment of the invention, it will be understood the invention is not limited thereto since it may be otherwise embodied within the scope of the following claims.

I claim:

1. A method for guiding a ribbon of elongate strip material with respect to a given flow path along which the material is fed so as to align the fed material with respect to the flow path, said method comprising the steps of: arranging a downwardly and forwardly inclined orienting surface on opposed sides of the desired flow path; resting the lower edges of the material on the opposed orienting surfaces; feeding the material between the orienting surfaces; and moving the fed material up or down between the surfaces in response to width or thickness variations.

2. A method for guiding a ribbon of elongate strip material as in claim 1 including the steps of rockingly supporting the fed material on the orienting surfaces.

3. A method for guiding a ribbon of elongate strip material as in claim 1 including the steps of arranging the orienting surfaces at an equal distance from the centerline of the desired material flow path.

4. Means for guiding a ribbon of elongate strip material with respect to a given flow path along which the material is fed so as to align the fed material with respect to the flow path, said means comprising: downwardly and forwardly inclined orienting means positioned on opposite sides of the flow path, said orienting means spaced from each other at their point of maximum proximity a distance less than the narrowest tolerable width dimension of the fed material, and said orienting means spaced from each other at their point of minimum proximity a distance greater than the widest tolerable width dimension of the fed material.

5. Means for guiding a ribbon of elongate strip material as in claim 4 in which said orienting means are supported on pivot means permitting rocking of said orienting means.

6. Means as in claim 4 in which said orienting means are each arranged at an equal distance from the centerline of the desired material flow path.

7. A guide for centering a ribbon of material as it is fed with respect to a given flow path, said guide comprising: a block member; a pivot ridge on a lower surface of said block member extending in a direction perpendicular to the desired path of travel of the ribbon of material; a pair of opposed upwardly diverging ribbon orienting walls disposed on said block member and spaced from each other on opposite sides of the centerline of the desired material flow path an equal distance from the flow path centerline, said walls defining a ribbon guide channel; a block cradle supporting said block member; a bed surface on said cradle; and walls upstanding at the bounds of said bed surface confining the block member in said cradle.

8. A guide assembly for aligning elongated thin metallic strip material being fed through a path including said guide assembly wherein said strip material may vary, within predetermined limits, as to the width thereof, said guide assembly including a cradle member having upstanding walls defining a guide block accommodating enclosure and a guide block rockably mounted within said cradle member, said guide block being provided with spaced inclined side walls diverging inwardly in the direction of movement of said strip material through said block so that engagement of strip material of a relatively large width will effect rotation of the block to offer a wider passage downstream of the point of engagement thus preventing binding of the material in the block.

9. A guide assembly for aligning elongated thin metallic strip material being fed through a path including said guide assembly wherein said strip material may vary, within predetermined limits, as to the width thereof, said guide assembly including guide block support means and a guide block rockably mounted within said guide block support means, said guide block being provided with spaced inclined side walls diverging inwardly in the direction of movement of said strip material through said block so that engagement of strip material of a relatively large width will effect rotation of the block to offer a wider passage downstream of the point of engagement thus preventing binding of the material in the block.

10. A guide for a ribbon of material being fed, said guide comprising: a block member; a pivot ridge on said block member; and a pair of opposed upwardly diverging ribbon orienting walls on opposite sides of and defining a ribbon guide channel in said block member, a block cradle for supporting said block member, a bed surface on said cradle underlying the pivot ridge; and side walls and front and rear walls constraining said block member on said bed surface.

11. A guide as in claim 10 in which said block member is formed with a slide bearing implementing rocking motion of said block member on said pivot ridge.

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