

Nov. 17, 1964

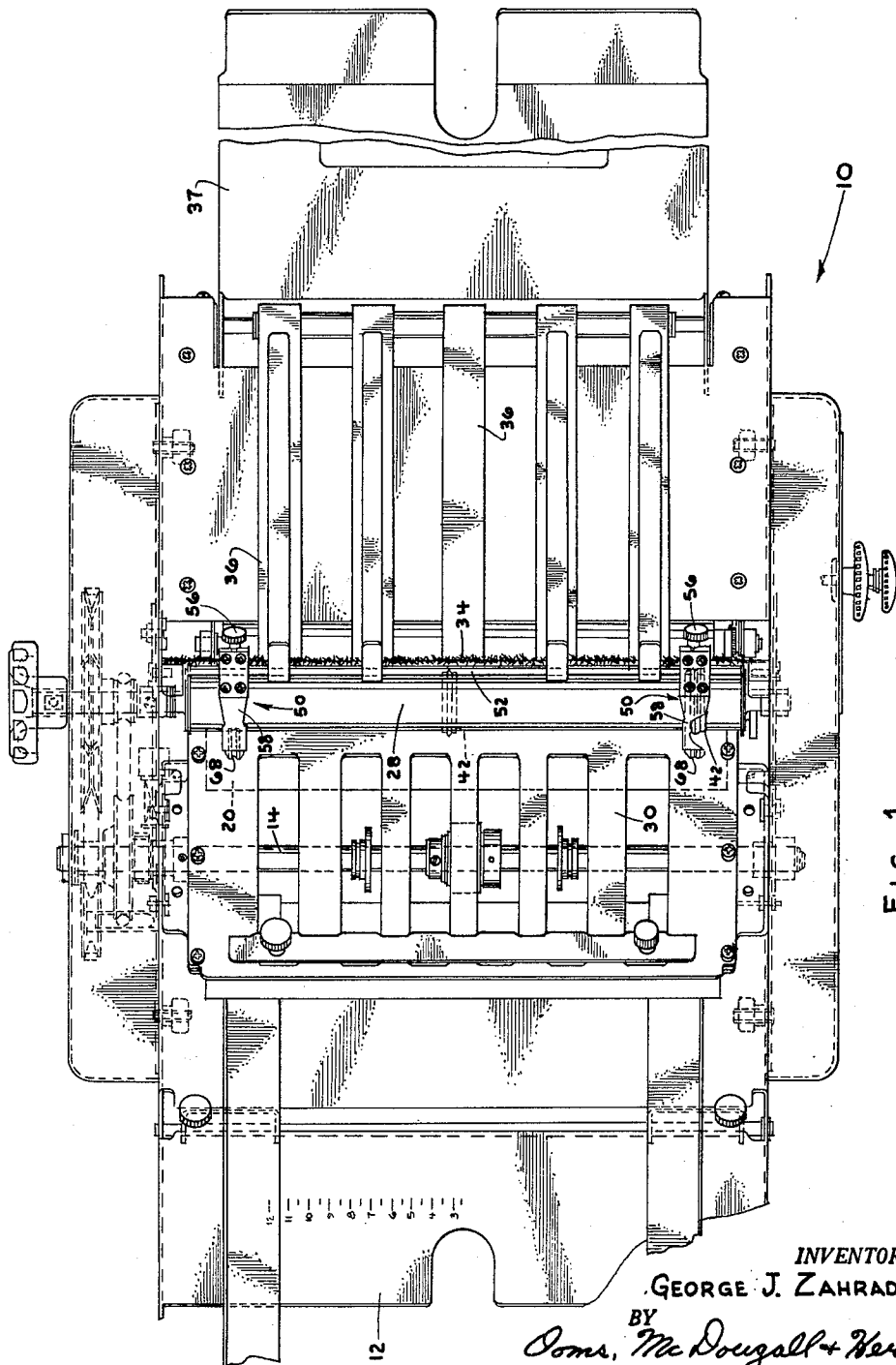
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3,157,398

SCORING MECHANISM

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3 Sheets-Sheet 1



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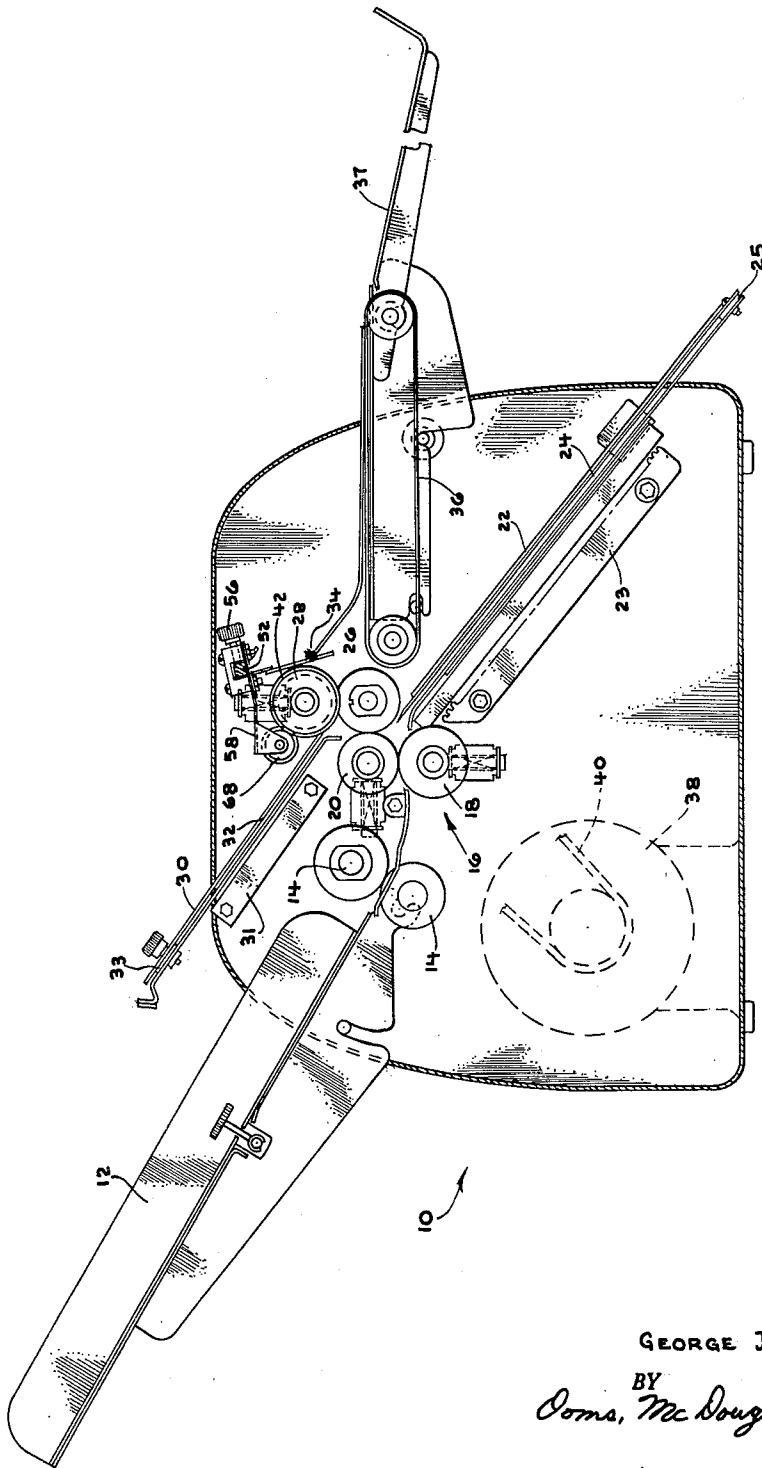


Fig. 2

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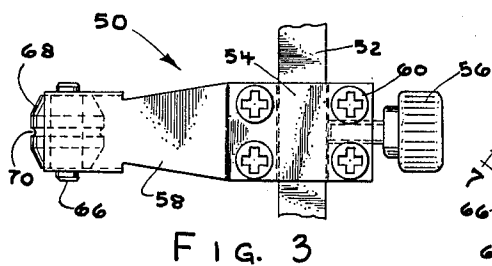


FIG. 3

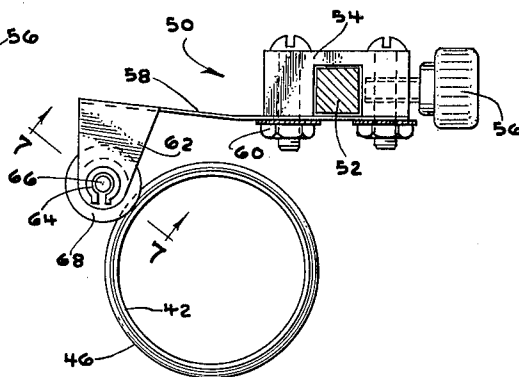


FIG. 4

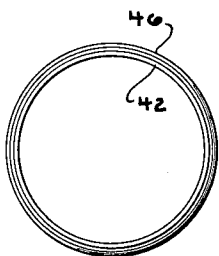


FIG. 5

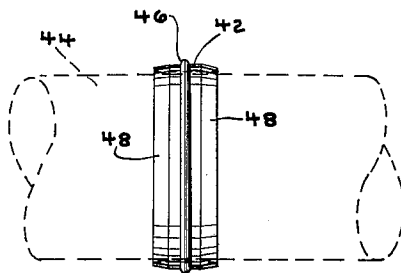


FIG. 6

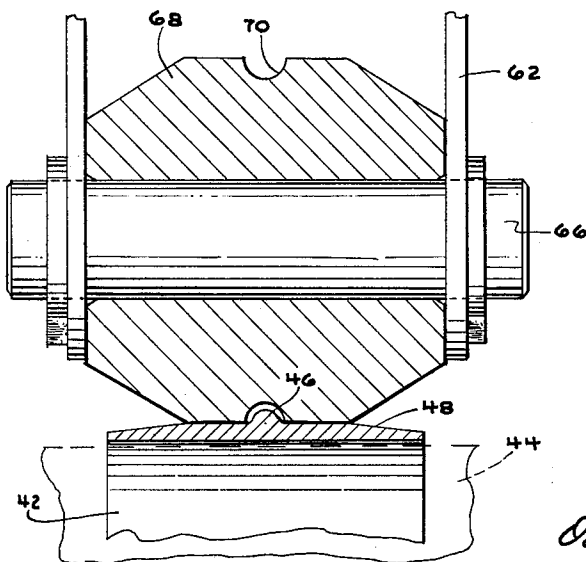


FIG. 7

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SCORING MECHANISM

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This invention relates to a scoring mechanism, and it relates more particularly to a scoring mechanism which is adapted to be integrated directly with a folding machine whereby paper and similar products passing from the folding machine will be scored simultaneously with the folding operation.

It has been the practice of the art to score paper and similar materials in order to facilitate bending of the materials during use and in order to provide a means for accurate folding of the paper along specific lines. It has also been found to be desirable in many cases to score paper and other materials which have been previously folded. Existing means for accomplishing scoring have, however, been provided independently of a folding operation. Prior art devices have been associated with folding machines for the scoring of paper, but only as separate mechanisms with no essential cooperation existing between the folding and scoring operation.

It is an object of this invention to provide an improved scoring mechanism which will produce scoring marks in paper and similar materials in a highly efficient manner.

It is a more particular object of this invention to provide a scoring mechanism which is adapted to be directly integrated with a folding machine whereby paper and similar materials passing from the folding machine can be scored in conjunction with the folding operation.

These and other objects of this invention will appear hereinafter and for purposes of illustration, but not of limitation, specific embodiments of this invention are shown in the accompanying drawings in which:

FIGURE 1 is a plan view of an improved folding machine which is adapted to score paper or other material at the same time the material is being folded;

FIGURE 2 is a vertical section of the apparatus of FIGURE 1;

FIGURE 3 is a detail view of guiding means employed in the device of this invention;

FIGURE 4 is a detail side view of the guide means shown in FIGURE 3;

FIGURE 5 is a detail side view of an improved scoring ring employed with the apparatus of this invention;

FIGURE 6 is an end view of the scoring ring shown in FIGURE 5; and

FIGURE 7 is an enlarged fragmentary section taken about the line 7-7 of FIGURE 4.

The present invention provides a scoring mechanism which generally includes a ring mounted on a pair of rollers which are used for transfer of material. The ring is provided with a diameter slightly in excess of the roller upon which it is mounted, and a ridge is formed in the ring for scoring of the materials as they pass between the rollers. A guide means is provided for adjusting and maintaining the position of the ring on the rollers. The guide means cooperates with the ring whereby the ring can be canted slightly with respect to its associated roller and driven laterally on the rotating roller in response to pressure on the guide means.

The guide means preferably comprises a wheel positioned adjacent the ring and mounted for movement transversely of the rollers. A recess in the wheel interfits with the scoring ridge on the ring whereby lateral pressure on the guide means will be transmitted to the ring and the ring canted thereby. It will be apparent that two or more of the scoring rings of this invention

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can be associated with one of the rollers which are adapted to transfer the material.

As noted, the scoring mechanism of this invention is eminently suitable for use in conjunction with a folding machine. The invention is particularly valuable when integrated with a folding machine of the type wherein material is passed into the machine, is buckled and then passed through a pair of rollers for folding of the paper. A machine of this type is described by Boblit et al., United States Patent No. 2,688,482, issued September 7, 1954. By providing the ring of this invention in a folding machine of this type, scoring of material can be easily accomplished without in any way disrupting the normal folding operation and by making only a simple modification of the apparatus.

In the accompanying drawings, particularly FIGURES 1 and 2, there is shown a folding machine 10 of the buckle type. The machine includes a feed chute 12 which is provided for passing of paper into the folding unit feed rollers 14. The feed rollers 14 then transfer the paper into the folding unit generally designated 16. The folding unit includes a first pair of rollers 18 and 20 and a first fold plate 22 mounted in the construction by means of the bracket 23. The folding unit 22 includes a paper receiving channel 24 which terminates in a closed end 25.

A first pair of folding rollers are made up of the roller 20 and the roller 26. A second pair of folding rollers comprises the roller 26 and a roller 28. Intermediate the pairs of folding rollers there is provided a second fold plate 30 mounted on the bracket 31. This fold plate includes an open channel 32 terminating in a closed end 33.

A tinsel brush 34 is preferably provided between the second folding rollers and the runout belts 36. As is conventional, the brush removes static electricity from the paper prior to its transfer by the belts 36 onto the receiving tray 37.

Operation of the buckle type folder is provided by means of the motor 38 and belt 40 adapted to drive the respective rollers. Paper fed from the chute 12 is adapted to pass between rollers 14 into the folding unit 16. The folding unit rollers 18 and 20 direct the paper into the channel 24 of the fold plate 22. The paper will buckle when the leading end strikes the closure 25 and the buckle will pass between rollers 20 and 26 providing a first fold in the paper. The folded portion of the paper will then become the leading end thereof and if a second fold is desired, the leading end will pass into fold plate 30. Upon striking the closure 33, the paper will again buckle and this buckle will pass between rollers 26 and 28 and thence onto the runout table. If only a single fold is desired, a suitable baffle can be provided for blocking off fold plate 30 and for directing the first folded end between the rollers 26 and 28.

The scoring mechanism of this invention, which is adapted to cooperate directly in the folding operation, is shown in detail in FIGURES 3 through 7. The mechanism comprises a scoring ring 42 which is adapted to fit around a roller 44. The ring is provided with an inner diameter slightly greater than the outer diameter of the roller.

The outer surface of the ring is formed with a ridge 46, the ridge having a rounded outer edge. The sides 48 of the ring taper toward the ring edges whereby the ring will be progressively thinner from the center to the side edges.

A guide means is adapted to ride on a cross bar 52 which is positioned parallel with respect to the roller upon which the ring is provided. The guide means comprises a bracket 54 which is movably mounted on the bar 52 and which can be releasably fixed with respect to the bar by means of a set screw 56. A spring 58 is

secured to the underside of the bracket by means of fasteners 60. The spring terminates in a pair of downwardly extending portions 62 which are provided with openings 64, these openings serving as journals for a shaft 65. A guide wheel 63 is secured to the shaft and is provided with a recess 70 for engagement with the ridge 46.

The scoring mechanism of this invention is ideally suited for use in conjunction with the folding machine above described. In the embodiment shown, a pair of rings 42 are associated with the upper roller 28 of the folding unit. The bar 52 is provided in the construction to extend across the machine in parallel with the roller 28. The guide means 50 is thus positioned above the roller 28 in such a manner that a pair of wheels 63 can be brought into engagement with rings 42 and resiliently pressed against the rings due to the action of the spring 53.

It will be apparent that during operation of the folding machine paper passing between the exit rollers 26 and 28 can be scored by one or more rings which are positioned in the path of the paper as is the ring 42 shown in dotted lines in FIGURE 1. It will be apparent that the scoring results can be accomplished concurrently with the folding operation and without interrupting in any way the progress of the paper. Furthermore, the necessity for an independent scoring mechanism is eliminated, and it will be apparent that the ring and guide means described can be easily incorporated into existing folding units.

The ring and cooperating guide means of this invention are of a particularly unique construction, since they are readily adjustable with respect to the roller with which they are associated. In the embodiment illustrated, the rings 42 can assume any position on the roller 28 by operation of the guide means 50. Specifically, when the set screw 56 is loosened with respect to the bar 52 the set screw will serve as a handle for moving the guide means and associated ring. This invention provides for movement of the ring and guide means in a simple and efficient manner if the positioning is carried out while the rollers 26 and 28 are in operation. The movement of the ring results due to the slight difference between the inner diameter of the ring 42 and the outer diameter of the roller 28. With this dimensional difference, lateral pressure applied to the handle 56 will slightly cant the ring 42 with respect to the roller 28 and the action of the roller will actually drive the ring laterally until the pressure is released. Only a slight amount of finger tip pressure is necessary, and the movement of the ring to any position can be easily and quickly accomplished. When the ring or rings are positioned as desired, the set screw making up the handle 56 is tightened to prevent riding of the ring out of position or accidental movement thereof.

The particular design of the ring 42 is important in order that the desired score mark will be produced without damage to the paper and in order to avoid marking of the paper by a portion of the ring other than the ridge 46. For this reason the ridge 46 is provided with a rounded top whereby a sharp edge will not be presented to the paper. In addition, the outer surface of the ring is tapered toward the side edges whereby contact of the paper with the ring beyond the ridge will not damage the paper. In the embodiment shown, the portion of the outer ring surface which is tapered includes the areas on either side of the ridge beginning midway between the ridge and the edges of the ring. With this design the ring will leave only the desired score mark without the presence of undesirable marks.

A specific example of a suitable ring is a ring with an inner diameter between 1.529 and 1.533 inches. Such a ring, when used in conjunction with a roller having an outer diameter between 1.490 and 1.497 inches, has been found to be practical. Other dimensions of the ring include a width of 0.5 inch with a taper of 6° extending from the midpoint on either side of the upstanding ridge to the edges of the ring. The ring has a thickness of

0.050 inch at the ridge point, the ridge itself being 0.020 inch high.

It will be apparent that the dimensions given are provided only for purposes of illustration and that changes in the various dimensions will be necessary for different size rollers, etc. The various size relationships given will provide smooth operation, but obviously other operable relationships are possible.

The character of the scoring ring and guide means described provides many distinct advantages. These means are simple and can be readily adapted into existing units. There is no need to replace any mechanisms when scoring is not desired, since the scoring rings can be easily moved out of the path of the paper as shown in FIGURE 2. The use of a separate scoring mechanism and repeated assembly and disassembly of parts is eliminated by means of this invention. Furthermore, in light of the simple character of the described mechanisms, it will be obvious that integration with existing units can be easily accomplished without a major modification of such units.

It will be understood that various modifications may be made in the above described scoring mechanism which provide the characteristics of this invention without departing from the spirit thereof, particularly as defined in the following claims.

I claim:

1. A mechanism for scoring material which is passing between a pair of rollers comprising a ring mounted on one of said rollers, said ring having a diameter slightly greater than the diameter of said one roller whereby said ring is adapted to cant relative to said one roller, a ridge formed in said ring for scoring said material, and guide means for adjusting and maintaining the position of said ring with respect to said one roller, a transverse supporting means mounted parallel with the axes of said rollers, said guide means being mounted on said supporting means whereby the guide means is adapted to be moved laterally with respect to said one roller to thereby effect movement of said ring along said one roller, said movement being accomplished by the application of slight pressure to said guide means while said one roller is rotating, this pressure operating to cant said ring whereby said one roller can drive said ring laterally until said pressure is released.

2. A mechanism according to claim 1 wherein said guide means comprises a wheel positioned adjacent said ring and mounted for lateral movement along the length of said rollers, said guide wheel having a recess adapted to interfit with said ridge.

3. A mechanism for scoring material which is passing between a pair of rollers comprising a ring mounted on one of said rollers, said ring having a diameter slightly greater than the diameter of said one roller whereby said ring is adapted to cant relative to said one roller, a ridge formed circumferentially in said ring for scoring said material, a transverse supporting means, and guide means comprising a wheel mounted on said supporting means in a position adjacent said ring, said wheel having a circumferential recess adapted to interfit with said ridge whereby the application of slight pressure to said guide means while said one roller is rotating, this pressure operating to cant said ring whereby said one roller can drive said ring laterally until said pressure is released.

4. A mechanism according to claim 3 wherein the said ridge is formed centrally on the outer face of said ring and is provided with a rounded outer portion for contact with said material and wherein the said outer face is tapered toward the side edges of said ring to provide a thinner ring section at said edges.

5. A mechanism according to claim 3 wherein said guide means is provided with locking means for maintaining the said wheel and associated ring in a predetermined position.

6. A mechanism according to claim 3 wherein a plurality of said rings and guide means are provided on said one

roller for provision of a plurality of scoring marks in said material.

7. In a folding machine wherein folded material is passed through a pair of rollers, the improvement comprising a scoring mechanism for scoring material which is passing between said rollers, said mechanism comprising a ring mounted on one of said rollers, said ring having a diameter slightly greater than the diameter of said one roller whereby said ring is adapted to cant relative to said one roller, a ridge formed circumferentially in said ring for scoring of said material and guide means comprising a wheel positioned adjacent said ring, a transverse supporting means mounted parallel to the axes of said rollers, said guide means being located on said supporting means whereby the guide means is adapted to move laterally along the length of said rollers, said guide wheel having a circumferential recess adapted to interfit with said ridge whereby the guide means is adapted to adjust the position of said ring with respect to said one roller when the guide means is moved laterally, and whereby the guide means is adapted to maintain said ring in a stationary position when the guide means is held stationary, said lateral movement being undertaken by the application of slight pressure to said guide means while said one roller is rotating, this pressure operating to cant said ring whereby said one roller can drive said ring laterally until said pressure is released.

8. In a folding machine wherein the material passing through said machine is buckled and is then passed to a pair of rollers for folding of the material, the improvement comprising a mechanism for scoring the material which is passing between said rollers, said mechanism including a ring mounted on one of said rollers, said ring having a diameter slightly greater than the diameter of said one roller whereby said ring is adapted to cant relative to said one roller, a ridge formed in said ring for scoring said material and guide means for adjusting and maintaining the position of said ring with respect to said one roller, a transverse supporting means mounted parallel with the axes of said rollers, said guide means being mounted on said supporting means whereby the guide means is adapted to be moved laterally with respect to said one roller to thereby effect movement of said ring along said one roller, said movement being accomplished by the application of slight pressure to said guide means while said one roller is rotating, this pressure operating to cant said ring whereby said one roller can drive said ring laterally until said pressure is released.

9. In a folding machine wherein material passing through said machine is buckled and is then passed to a pair of rollers for folding of the material, the improvement comprising a scoring mechanism for scoring material which is passing between said rollers, said mechanism comprising a ring mounted on one of said rollers, said ring having a diameter slightly greater than the diameter of said one roller whereby said ring is adapted to cant relative to said one roller, a ridge formed circumferentially in said ring for scoring of said material, a transverse supporting means, guide means comprising a wheel mounted on said supporting means in a position adjacent said ring, said wheel having a circumferential recess adapted to interfit with said ridge whereby the application of slight pressure to said guide means while said one roller is rotating, this pressure operating to cant said ring whereby said one roller can drive said ring laterally until said pressure is released.

10. A folding machine according to claim 9 wherein the said ridge is formed centrally on the outer face of said ring and is provided with a rounded outer portion for contact with said material and wherein the said outer face is tapered toward the side edges of said ring to provide a thinner ring section at said edges.

11. A folding machine according to claim 9 wherein said guide means is provided with locking means for maintaining the said wheel and associated ring in a predetermined position.

12. A folding machine according to claim 9 wherein a plurality of said rings and guide means are provided on said one roller for provision of a plurality of scoring marks in said material.

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