April 18, 1933. C. A. FRIBERG 1,904,825

METHOD AND APPARATUS FOR EDGE ROLLING OF CREPE PAPER

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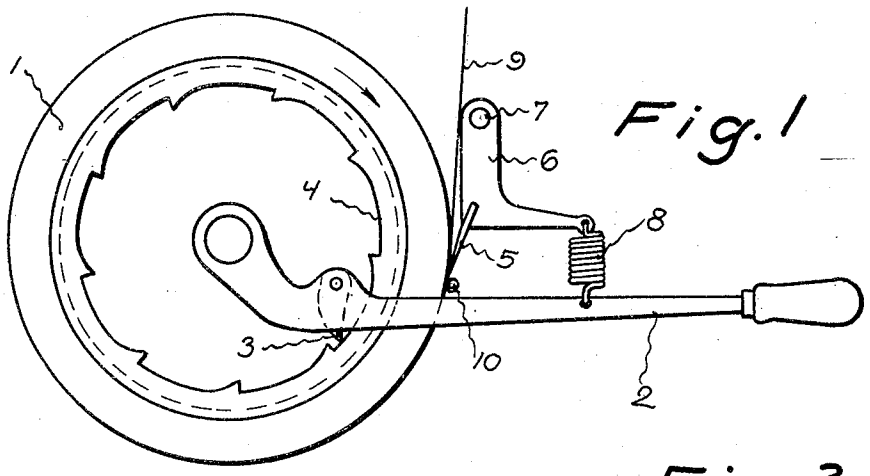
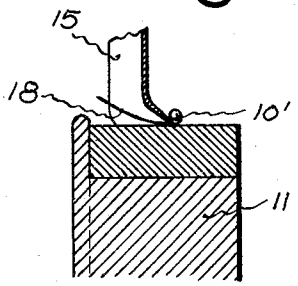


Fig. 1

Fig. 3



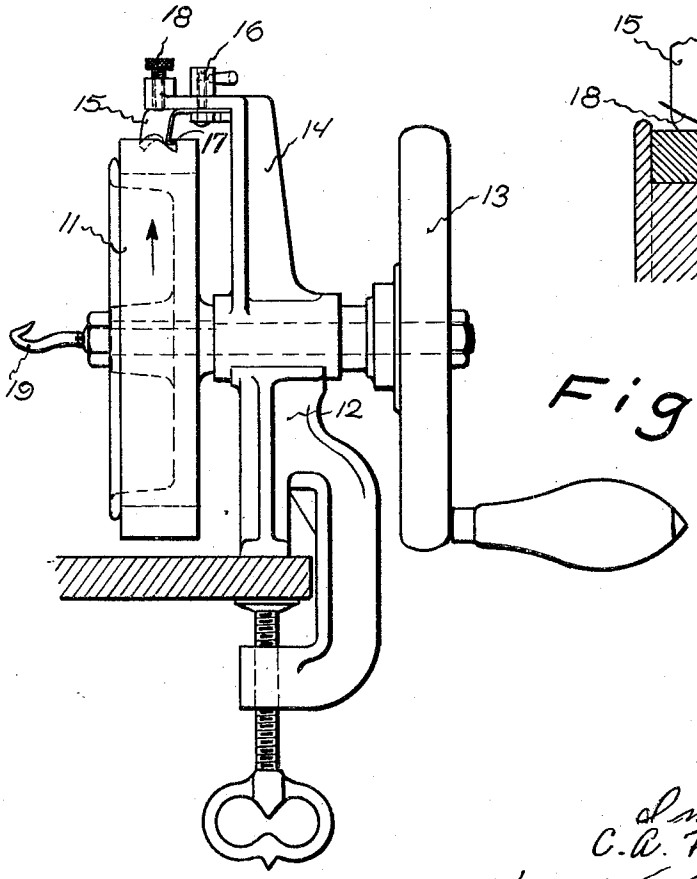


Fig. 2

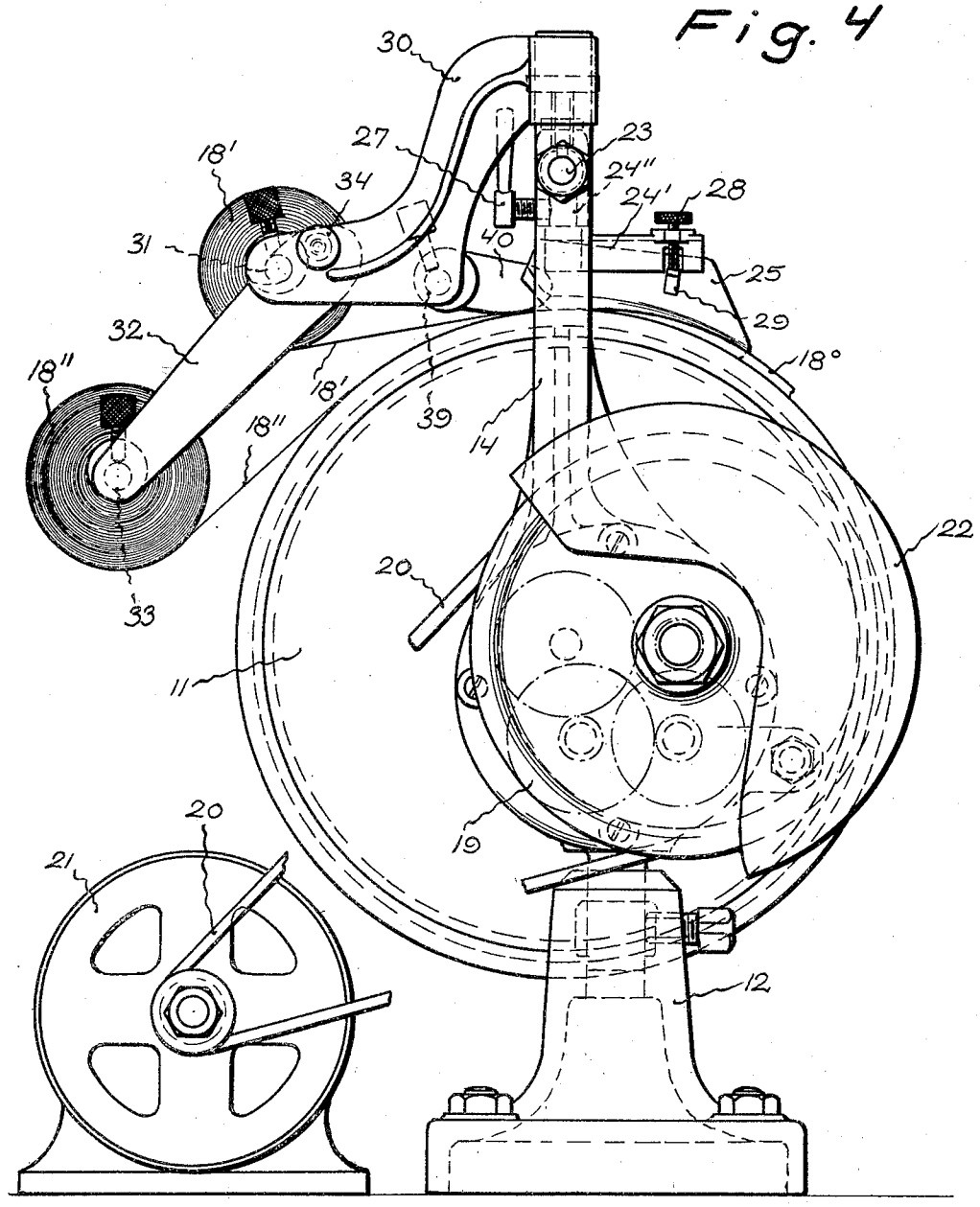
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METHOD AND APPARATUS FOR EDGE ROLLING OF CREPE PAPER

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Fig. 4



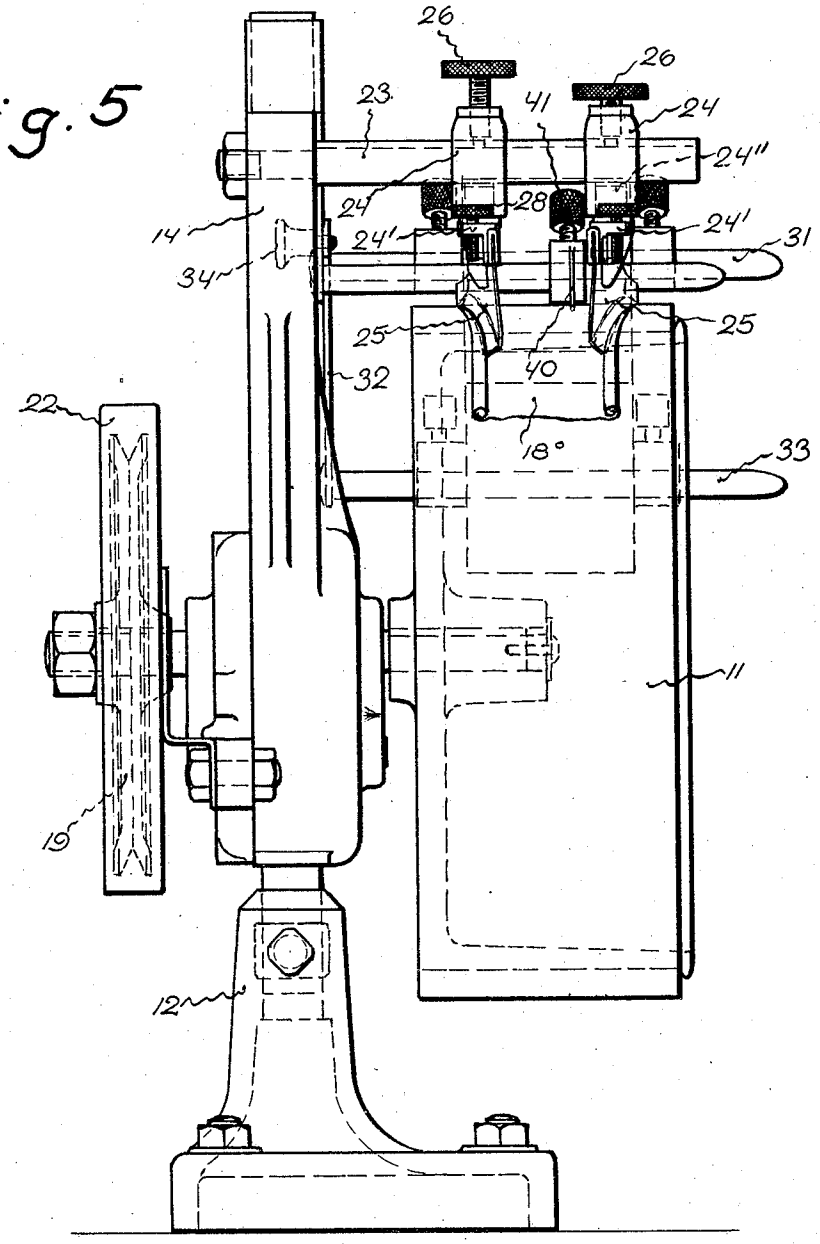
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METHOD AND APPARATUS FOR EDGE ROLLING OF CREPE PAPER

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Fig. 5



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Fig. 8

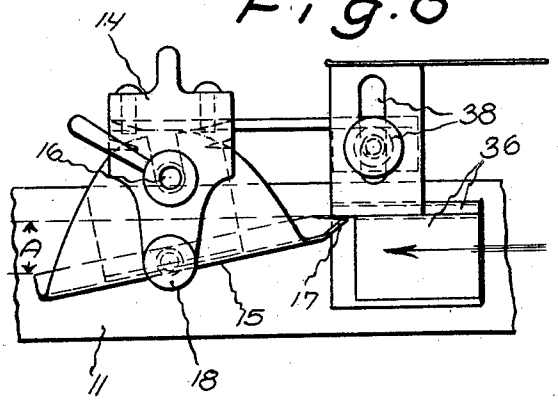


Fig. 9

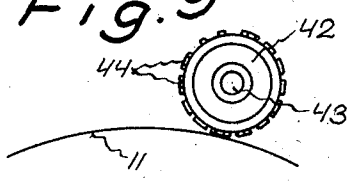


Fig. 7

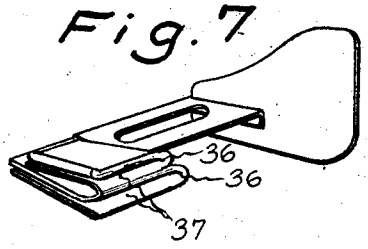
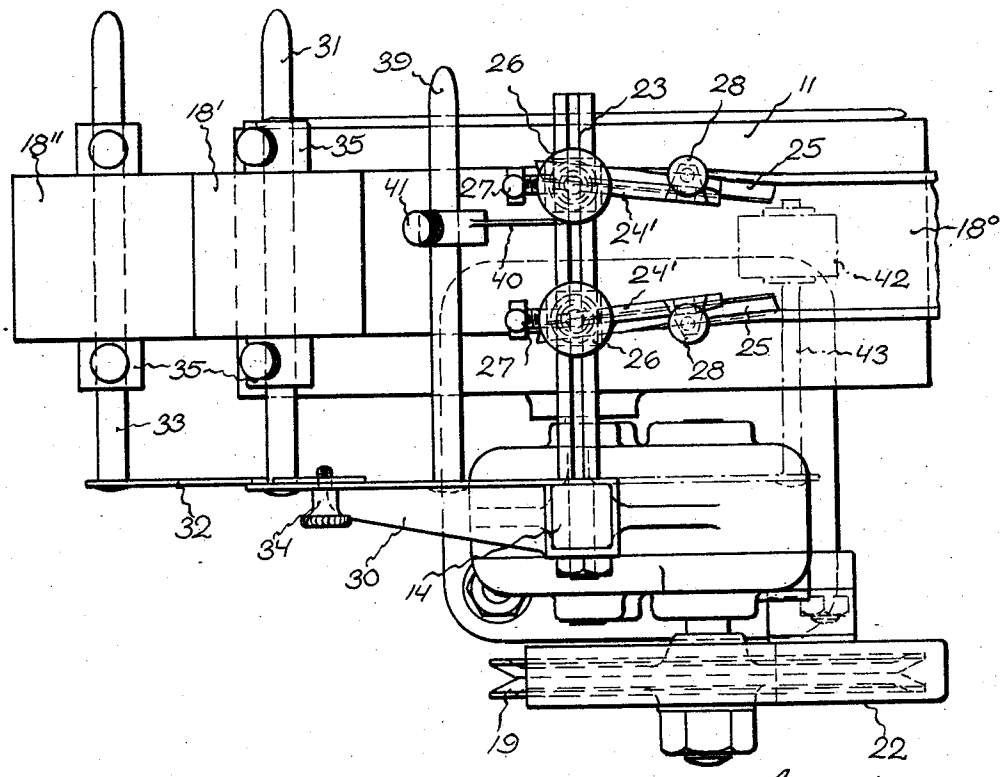


Fig. 6



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UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR EDGE ROLLING OF CREPE PAPER

Application filed January 7, 1931, Serial No. 507,249, and in Sweden September 24, 1930.

My present invention refers to an improved method and an apparatus for rolling the edges of crepe paper.

Crepe paper is frequently used for several different decoration purposes, and for such purposes it is often provided with a cylindrical edge portion produced by rolling of the edge of the same. An edge rolling of this kind has hitherto been performed by hand, which requires a rather great skill and practice, and sometimes the rolling has been manually performed around a string serving as a core in order to obtain the neat appearance aimed at. In any case, the hand rolling is very time wasting, and my present invention has for its primary object to replace the manual labour with a mechanical edge rolling method which may easily and rapidly be practiced by anyone by means of a suitable machine. Thereby no special skill is required and no core means, and the resulting rolled edge portion will be more uniform to the whole length than obtainable by hand rolling.

According to the invention the rolling of the edge is generally performed by pressing down the same against a resilient pad member by means of a working blade positioned at an acute angle to the face of the pad and by relative movement of the blade and the pad, so that the edge of the blade moves away from the edge of the paper inserted between the blade and the pad. When the edge of the blade slides over the paper, the latter is pressed down in the resilient pad and is thereby progressively folded or rolled over the edge of the blade. Thereby it is irrelevant if the blade has a sliding movement in relation to the paper edge in the direction of length of the latter simultaneously with its sliding movement away from said edge, i. e., in the transverse direction to the edge, this fact permitting a continuous operation of the machine. Likewise it is irrelevant of the pad moves in relation to the blade or the latter in relation to the former, or even if both move in opposite directions, but it is suitable to use a movable pad member carried out in the shape of a rotatable drum or wheel, the padding stuff on the same consisting preferably of rubber possessing suitable frictional properties and suitable hardness.

In the following the invention is to be explained in detail by reference to the accompanying drawings which show some different embodiments of the machine to be used, and it is supposed that the method of the edge rolling will also be understood from such explanations.

In the drawings:—

Fig. 1 is a diagrammatical elevation of a machine according to the invention and intended to explain the principles thereof,

Fig. 2 is an elevation of another machine according to the invention, and

Fig. 3 is a radial section of the contacting portions of the blade and the pad, this figure being drawn to a larger scale,

Fig. 4 is an elevation of another embodiment of the machine, and

Fig. 5 is another elevation of the same at right angle to Fig. 4,

Fig. 6 being a plan view of the same machine.

Fig. 7 is a perspective view of a paper edge guiding means adapted for coaction with the working blade, and

Fig. 8 is a plan view showing the relative position of the blade and the guide.

Fig. 9 is a diagrammatical end view of an impression means adapted for coaction with the pad, such means being also indicated in dot and dash lines in Fig. 6.

Referring to the drawings and especially to Fig. 1, the machine consists of a drum 1 rotatably mounted in a suitable framing (not shown), the said drum at its circumference being padded with a suitable rubber lining. The drum may be of any desired length, and is adapted to be rotated step by step in the direction of the arrow by means of a handle bar 2 supporting a pawl 3 coacting with a toothed annulus 4 connected with the drum 1. The edge of a thin working blade 5 extends axially to substantially the whole length of the drum and rests against the padded circumference of the drum, said edge, or eventually the whole blade, taking a position at an acute angle to

the working face of said drum. In the embodiment shown in the drawings, the blade 5 is supported by means of one or more arms 6 turnably mounted on a corresponding pin, or pins 7, or a common shaft, a tensional spring 8 connecting at least one of the arms 6 with the handle bar 2.

The paper has the reference 9, and after insertion of the edge thereof between the blade 5 and the circumference of the padded drum 1, and transversely of said drum the drum is rotated by means of the handle bar one step in the direction of the arrow. Then the paper, due to friction against the rubber lining of the drum, will be fed in edgewise between the drum and the blade, the edge of the latter pressing the edge of the paper a little into the resilient drum lining or pad. When the edge of the paper passes beyond the edge of the blade, it will be folded outwardly away from the surface of the drum, and since the folding is continuous during the passage of the paper it will result in a rolling of the paper edge as indicated at 10. When the rolling is performed to a desired degree, the handle bar 2 is turned in a counter-clockwise direction, whereby the blade 5 will be lifted free from the drum, so that the paper may freely fall down or be lifted up therebetween.

In order to obtain the desired result of the sliding movement of the blade edge on the surface of the paper it is required that the blade be positioned at a rather small angle to the surface of the drum at the line of contact, but naturally the result will not be spoiled in case this angle is varied within reasonable limits, as will be understood when comparing Figs. 1 and 3.

It is also to be understood that the pad member need not by necessity have a circular or cylindrical working surface, as it may also have a plane or flat surface, in which case the drum 1 may be replaced by a suitable supporting table for the paper, as easily will be understood without further explanation.

In the embodiment of invention shown in Fig. 1 the contact pressure of the blade against the pad member is comparatively small at the beginning of the working stroke, and therefore the paper may easily be fed in behind the blade, the increasing tension of the spring 8 at the continuation of the stroke causing an increased contact pressure during the progress of the operation.

The paper may be fed in by hand or automatically by suitable means adapted for the latter purpose, and the handle bar may be given the desired rocking motion by suitable mechanical means, both of such means being beyond the scope of the invention, however.

While the machine according to Fig. 1 is adapted for edge rolling of paper in the form of distinct sheets, the machine according to Fig. 2 has a more general utility and may also be easily used on paper of any size or length and shape whatever, the working of the same being continuous.

According to Fig. 2 the machine consists of a rubber lined disc or wheel 11 rotatably mounted in a suitable frame or foot member 12 and adapted to be rotated by a hand wheel 13 or its equivalent. The foot 12 is provided with an upstanding arm 14 supporting a blade 15 the edge of which is positioned, at an acute angle to the working face of the disc 11 (compare Fig. 3). The edge of the blade 15 is arc-shaped so as substantially to correspond with the circumference of the disc, and the front end of the edge is raised or diverging from the face of the disc for facilitating the insertion of the paper. Besides the same end of the edge is preferably provided with a point 17 (Fig. 8) for indicating the position of the paper edge in relation to the blade.

The shank of the blade 15 is fork-shaped and straddles a set screw 16 by means of which the blade is affixed to the arm 14 (compare also Fig. 8) and when loosening this screw the angle of inclination of the blade edge in relation to the plane of the disc may be adjusted at will for performing a rolled paper edge of smaller or greater diameter. A greater angle of inclination to said plane causes a greater diameter of the rolled paper edge, and vice versa.

The shank of the blade 15 is also somewhat elastic, the blade as a whole being preferably made from steel, and the arm 14 carries a pressure control screw 18, by means of which the contact pressure of the blade against the padded surface of the disc 11 may be controlled at will.

When using the machine last described, the paper by means of friction against the disc is fed in the direction of the arrows in Figs. 2 and 8 between the edge of the blade 15 and the circumference of the disc 11, whereby the edge of the paper is to be guided so as substantially to coincide with the point 17. During the rotation of the disc 11, the advancing edge of the paper 18 (Fig. 3) is pressed against the resilient padding of said disc, and since the edge of the blade 15, due to the inclination in relation to the plane of the disc, moves away (the distance A in Fig. 8) from the edge of the paper fed in during the passage of the paper beneath the same, the pressure will perform a rolling 10′ of the paper edge just in the same manner as described with reference to Fig. 1, although the production of such rolled edge may be performed continuously irrespective of the length of the edge to be rolled. The width of the paper is of no consequence when using both of the embodiments described, and narrow strips may be

edge rolled just in the same manner as larger sheets. The paper may be double folded at the edge, or two or more sheets may be rolled together at the edge, or edges, when fed in in a superimposed position, the rolling action of the blade being the same in any case.

Narrow paper strips may be treated in the manner described and both edges of the same may be rolled, one after the other, whereby the rolled edges may be positioned closely adjacent to or even in contact with each other. It is frequently desired to twist one or more such narrow strips together into a spiral or rope, and thereby the strips may be hooked on a hook member 19 affixed to the end of the disc shaft (Fig. 2).

Naturally the machine last described may be motor driven, if desired, the hand wheel 13 being then replaced by a belt or wire pulley, but the simple construction of the machine makes it preferably intended to be hand driven, the output after some practice being nevertheless at least one hundred times more per unit of time than hitherto has been possible by common hand rolling, irrespective of whether a string is used as a core or not. Besides, the result is exactly uniform throughout.

In case the machine is intended to be motor driven, it is preferable to provide the same with a mechanical guide for the paper, as described below with reference to Figs. 7 and 8.

The edge rolling machine shown in Figs. 4–6 inclusive is of a more advanced type, although based on the same principles as described above, and it is preferably intended to be motor driven. In these figures, 11 is the rubber lined disc which by means of a suitable train of gears (indicated in dot and dash lines in Fig. 4) is adapted to be driven by a wire pulley 19 serving as a substitute for the hand wheel described above, a wire 20 and a motor 21 or other source of power of suitable kind, a wire guard 22 surrounding the pulley at the discharge side so as to prevent the paper fed out to be entangled in the driving means. The frame or foot member has the reference 12, as above, and it carries an upstanding arm 14 in the same manner. At its upper end this arm 14 serves as a support for a transverse pin 23 carrying one or two sleeve-shaped clamping brackets 24, on which the blades 25 are mounted. The pin 23 is provided with a longitudinal slot as will be seen in Fig. 6, and the clamping brackets having a sliding support on the rod are provided with set screws 26 for locking the same in the desired position after adjustment. Naturally the outermost clamping bracket and the blade thereon may be removed or swung out of action in case it is desired that the machine shall act with one single blade only.

The blades are not directly secured to the clamping brackets, but they are supported by an angle bent member 24′ the upstanding branch of which consists of a pin 24″ turnably mounted in the sleeve shaped clamping bracket 24. The pin 24″ is also axially slidable in its hole and it is adapted to be fixed therein by means of a set screw 27. Hence after loosening of this set screw the blade 25 (by hand) may be more or less pressed down against the rubber padded surface of the disc 11, and it may be set into any desired angle of inclination to the plane of the disc.

Each of the members 24′ is provided with a downwardly open slot in which the upper edge of the blade 25 is inserted (compare Fig. 5), so that the blades are entirely guided by said members, and abutment means (not shown) are provided between the members 24′ and the blades for preventing the latter from taking part in the rotation of the disc 11 due to friction against the same by the intermediary of the paper fed in.

Further the pressing down of the blades against the circumference of the disc cannot be minutely controlled in the manner described above (after loosening of the set screws 27), but the contact pressure is minutely controlled by set screws 28 mounted in threaded bores in the members 24′ and resting against abutments 29 provided on the blades, as easily will be understood from Fig. 4. It will also be understood from this figure, in comparison with the description above, that it is not necessary that the contact pressure of the blade is uniform throughout the whole peripheral length of the same, and it is preferable that it be a little smaller at the entrance end of the paper and increasing a little towards the delivery end.

The machine shown in Figs. 4–6 serves also as an illustration of the manner employed when rolling together two strips of paper at both edges. The upper end of the arm 14 carries a support 30 for a transverse pin 31 which in its turn carries a roll 18′ of one of the paper strips to be used, the support 30 preferably having a sleeve connection with the arm, so as to make it possible to lift off the same, when a separate framing for supporting the roll of paper is to be used. The support 30 is extended by means of an arm 32 carrying another transverse pin 33 for supporting the second roll of paper 18″. The upper end of the arm 32 is hook-shaped and adapted to be hooked on the pin 31, whereupon it may be affixed in its position by means of a set screw 34. In this manner the arm 32 and the members mounted thereon may easily be removed when desired. The paper rolls may be mounted on the pins by sliding on the same from the

free ends of the latter, and they may be held in the correct position thereon by means of rings 35 adapted to be affixed by means of set screws as shown in Fig. 6, so that the paper strips are introduced in the correct position in relation to the blades. Naturally, one of the strips may be wider than the other so that the narrowest of them is rolled together with the other at one edge only.

When the paper strips have passed the blades 25 both edges are rolled, and the ribbon produced has the reference 18°. If one of the blades is removed, or positioned beyond the edge of the paper, or papers, one edge will be rolled only. In case either of the paper rolls is removed, the machine will act in the same manner on a single sheet of paper, and more than two strips may also be rolled together in the same manner, if suitable supports for the paper rolls are provided.

Whether the machine is constructed according to Fig. 2 or to Figs. 4–6 it may be suitable to provide a special guiding means for the paper adjacent to the feeding end of the blades, this being especially true in case the paper rolls 18′ and 18″ respectively are supported at some distance from the machine itself, for instance in case of large paper rolls which cannot be supported in the manner described due to their size. An embodiment of a guiding means of this kind is shown in Figs. 7 and 8, and according to said figures the guide consists of a folded plate having a guiding edge 36 in alignment with the point 17 of the corresponding blade, or blades. The guide shown in the drawings is intended for two superimposed sheets of paper, and it is provided with two entrances 37 (Fig. 7) each confined by a portion of the plate forming the guide as a whole. The side of the guide opposite to the guiding edges 36 is open, so that the paper edge may be transversely inserted between the guide plates. The position of the guide in relation to the blade is adjustable by means of a screw and slot connection 38 as easily will be understood from Fig. 8 without further explanation. From the said figure it will also be noted that the two guiding edges 36 need not be positioned exactly one above the other, but on the contrary, when folding two paper edges together, it is suitable that the paper forming the exterior of the rolled edge position passes a little outside of the paper forming the interior of said portion.

It is frequently desired that a paper edge, when rolled, shall be folded adjacent to the edge, or that a paper strip shall be folded between the rolled edges of the same, and the machine may also be used for such purpose. For the said purpose the support 30 carries another transverse pin 39 serving as a support for a folding line impression blade 40 having a comparatively blunt edge positioned in contact with the rubber padded circumference of the disc 11. This blade has slidable a socket mount on the pin 39 and may be affixed in the desired position by means of a set screw 41. When the said blade is to be used, it is adjusted in the position desired and pressed down (by hand) against the disc, whereupon it is locked by means of the screw. Then, when rotating the disc, the impression blade 40 will press down a longitudinal folding line in the paper, or papers, parallel to the edge of the same, and when stretching the paper a little after having passed the machine, it will automatically be folded along the said line.

One or more of the aforesaid line impression blades may be used simultaneously, for instance for treatment of the same paper strip, or strips, when passing the machine, and the result then obtained, when stretching the paper a little, will be a paper tube having a polygonal cross section and a number of sides corresponding to the number of impression blades used. Naturally the said blades may be set out of action by the means described, when desired.

Sometimes another kind of impression is desired, for instance some word or slogan having reference to the particular use of the papers treated in the machine, and even such impressions may be performed simultaneously with the edge rolling. For this purpose the disc may be arranged to coact with a printing wheel 42 shown in Fig. 9 and indicated in dotted lines in Fig. 6. This wheel may be freely rotatably mounted on a shaft 43 so as to be rotated by means of friction against the paper or strip to be printed, and the circumference of the same is provided with printing types 44 intended to be reproduced. Thereby the printing wheel may act merely by pressure only, and without any printing ink the waves or corrugations of the crepe paper are flattened out due to such pressure whereby the wheel may be provided with either raised or countersunk printing type, in which latter case the print will appear in relief on a flattened out portion of the paper. Printing ink may naturally also be used, whereby such ink by suitable means is transferred to the printing wheel in a manner well known to those skilled in the art, and then the printing pressure need not be so great. The diameter of the printing wheel may naturally differ according to the length of the sentence to be printed or the intervals between two adjacent sentences printed in succession, and in addition to words, figures or other devices may also be printed when desired.

Finally it is to be understood that the invention is not limited to the specific particulars of construction described above for the

sake of explanation, but it may be varied in many ways for adaptability according to different conditions, the main feature being the coaction between the working blade and the resilient surface which are movable in relation to each other in the manner described.

What I claim and desire to secure by Letters Patent is:—

1. A method for edge rolling crepe paper, comprising pressing the paper edge against a resilient pad surface, simultaneously moving such pad surface transversely in relation to a working blade the edge of which is positioned at an acute angle to said surface, and feeding the paper edge in between said working blade and pad surface, due to friction against the latter.

2. A method for edge rolling crepe paper, comprising pressing the paper edge against a resilient pad surface, simultaneously moving such surface in the direction of length of the paper edge relative to a working blade having an inclined position to said direction of movement and having an edge positioned at an acute angle to the pad surface, and feeding the paper inwardly by friction against the pad.

3. A method for edge rolling crepe paper, comprising pressing the paper edge against a rubber pad surface having a cylindrical working face, simultaneously rotating such surface relative to a working blade having a position inclined to the plane of rotation of and having an edge positioned at an acute angle to the said pad surface, and feeding the paper in the direction of length of its edge forward by friction against the pad.

4. An apparatus for edge rolling of crepe paper comprising a resilient pad member, preferably made from rubber, a working blade having an edge positioned at an acute angle to the surface of said pad member, means for pressing the edge of the blade against the pad, and means for establishing a relative movement of the pad and the blade in relation to each other.

5. In an apparatus according to claim 4, the additional feature that the face of the pad member has a cylindrical working face.

6. An apparatus for edge rolling of crepe paper comprising a pad member having a cylindrical working face and preferably made from rubber, a working blade having an edge which lengthwise takes an inclined position to the plane of revolution of said body and transversely is positioned at an acute angle to the generatrix of the same, means for pressing the edge of the blade against the pad member, and means for establishing a relative rotation of the pad and the blade in relation to each other.

7. An apparatus for edge rolling of crepe paper comprising a suitable foot or frame member, a disc rotatably mounted in said frame member, a resilient padding, preferably made from rubber, positioned on the circumference of said disc, a fixedly mounted working blade having an arc-shaped edge which lengthwise takes an inclining position to the plane of rotation of said disc and transversally is positioned at an acute angle to the circumference thereof, such blade being also positioned in contact with said circumference, means for pressing the edge of the blade against the padded circumference of the disc, and means for rotating the said disc when in contact with the blade.

8. In an apparatus according to claim 7, the additional feature that means are provided for adjustment of the contact pressure between the blade and the padded circumference of the disc.

9. In an apparatus according to claim 7, the additional feature that means are provided for adjustment of the angle of inclination of the blade edge in relation to the plane of rotation of the padded disc.

10. An apparatus for edge rolling of crepe paper comprising a suitable supporting means, a disc rotatably mounted in said supporting means, a resilient padding, preferably made from rubber, positioned on the circumference of said disc, a fixedly mounted working blade having an arc-shaped edge which lengthwise takes an inclined position to the plane of rotation of said disc and transversally is positioned at an acute angle to the circumference thereof, means for pressing the working blade against the padded circumference of the disc, means for rotating the said disc when in contact with the blade, and fixedly mounted impression means positioned adjacent to the working blade and adapted to coact with the rotating disc for making impression on the paper when fed forward at the rotation of the disc.

11. In an apparatus according to claim 10, the additional feature that the impression means consists of a blade positioned edgewise in relation to the disc and adapted to be pressed against the padded surface of the latter.

12. In an apparatus according to claim 10, the additional feature that the impression means consists of a rotatably mounted member positioned so as to be set into rotation by contact with the paper fed through by the padded disc.

13. An apparatus for edge rolling of crepe paper comprising a rotatably mounted drum, a resilient padding on the circumference of said drum, a pair of working blades provided with arc-shaped edges positioned in contact with said circumference, said blades in their direction of length being positioned at an opposite inclination to the plane of rotation of the drum, and being provided with edges positioned at an acute

angle to the surface of the same, means for pressing the edges of the blades against the padded surface of the drum, and means for establishing a rotation of the latter.

14. In an apparatus according to claim 13, the additional feature that means are provided for adjustment of the interdistance between the blades in a direction substantially parallel to the axis of rotation of the drum.

15. In an apparatus according to claim 13, the additional feature that means are provided for adjustment of the contact pressure beween the blades and the padded circumference of the drum.

16. An apparatus for edge rolling of crepe paper comprising a pad member having a cylindrical working face and preferably made from rubber, at least one working blade having an edge which lengthwise takes an inclined position to the plane of revolution of the said body and transversally is positioned at an acute angle to the generatrix of the same, means for pressing the edge of each blade against the circumference of the pad member, means for establishing a relative rotation of the pad and the blade in relation to each other, and guiding means for the paper positioned in advance of the end of the blade facing the direction of rotation.

17. In an apparatus according to claim 16, the additional features that means are provided for adjustment of the angle of inclination of the blade in relation to the plane of rotation of the pad member, and that means are also provided for a corresponding adjustment of the guide means in a direction substantially parallel to the axis of rotation of said member.

18. An apparatus for edge rolling of crepe paper comprising a foot or frame member, a drum rotatably mounted in said member, means for establishing a rotation of said drum, a resilient padding on the circumference of the drum, a pair of working blades provided with arc-shaped edges positioned in contact with the face of said padding, said blades in their direction of length being positioned at an opposite inclination to the plane of rotation of the drum, and being provided with edges positioned at an acute angle to the face of the same, means for pressing the blades against the padding, means for adjustment of such pressure, means for adjustment of the interdistance between the blades in a direction substantially parallel to the axis of rotation of the drum, means for reversing of at least one of said blades into a non-working position, means supported by the frame member and adapted rotatably to support at least one roll of the paper to be edge rolled, and means positioned between the blades and adapted to perform an impression in the paper when fed forward between the blades and the drum due to friction against the latter.

19. In an apparatus according to claim 18, the additional feature that the means for supporting the paper roll are removably mounted on the frame.

20. In an apparatus according to claim 18, the additional feature that means are provided for adjustment of the pressure of the blades against the drum.

21. In an apparatus according to claim 18, the additional feature that means are provided for adjustment of the position of the impression means between the blades in a direction substantially parallel to the axis of rotation of the drum.

22. In an apparatus according to claim 18, the additional feature that means are provided for adjustment of the axial position of the paper roll in relation to the blades.

23. In an apparatus according to claim 18, the additional feature that the impression means consists of a blade positioned edgewise to the face of the drum.

24. In an apparatus according to claim 18, the additional feature that the impression means is rotatably mounted so as to be set into rotation by contact with the paper fed through by the drum.

25. A method for edge rolling crepe paper, comprising pressing with a blade the paper edge against a resilient pad surface, the working edge of the blade extending at an acute angle to said surface, moving the resilient pad surface, and during such movement of the resilient pad surface relatively to the blade, sliding the paper over the working edge of the blade transversely thereto.

In testimony whereof I have signed my name to this specification.

CARL ALLAN FRIBERG.