

May 31, 1949.

L. J. B. R. FRENCH
MEANS FOR GREASING LININGS FOR BOOKS
AND FOR ANALOGOUS PURPOSES

2,471,482

Filed Nov. 1, 1946

2 Sheets-Sheet 1

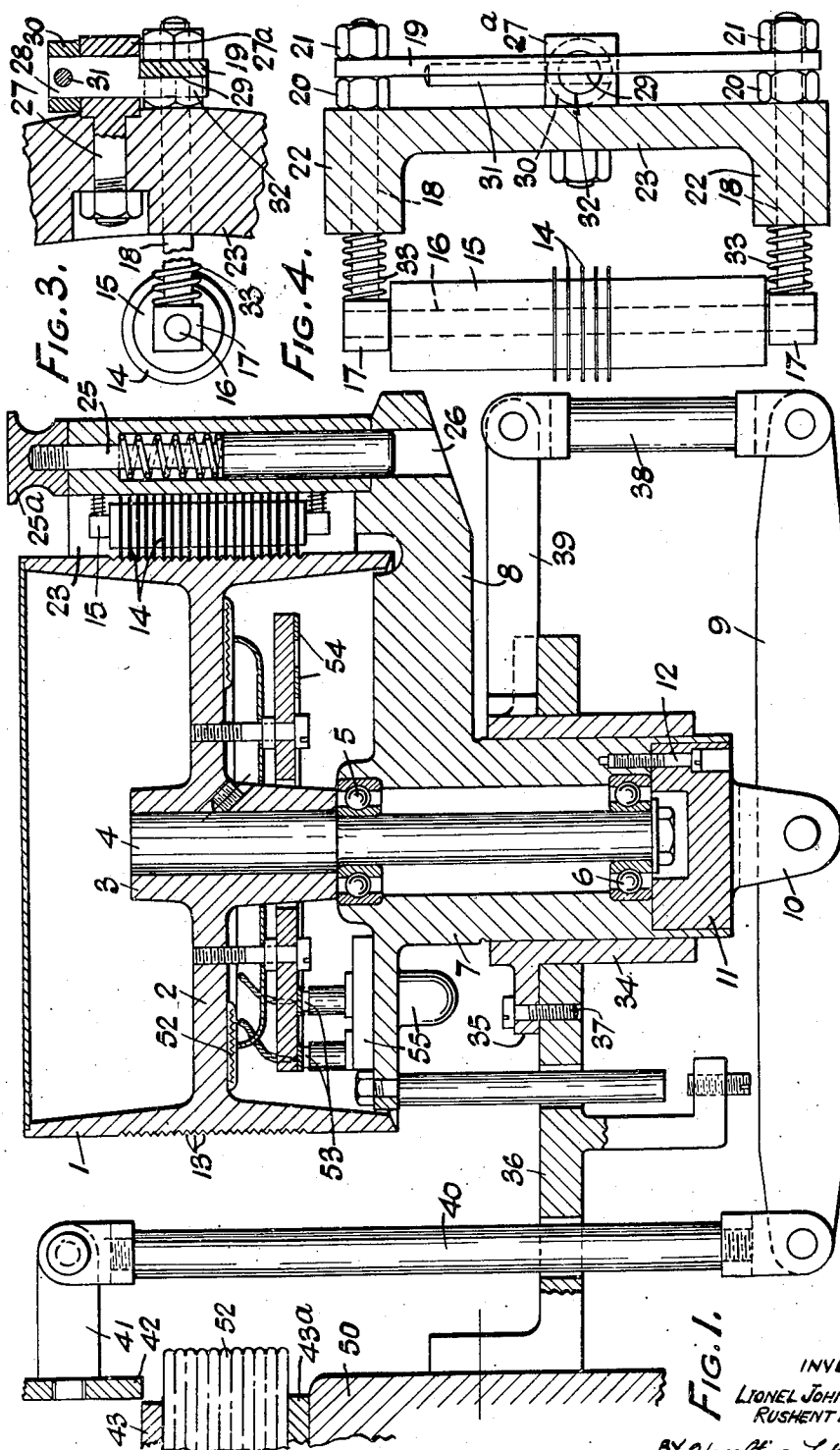


FIG. 1.
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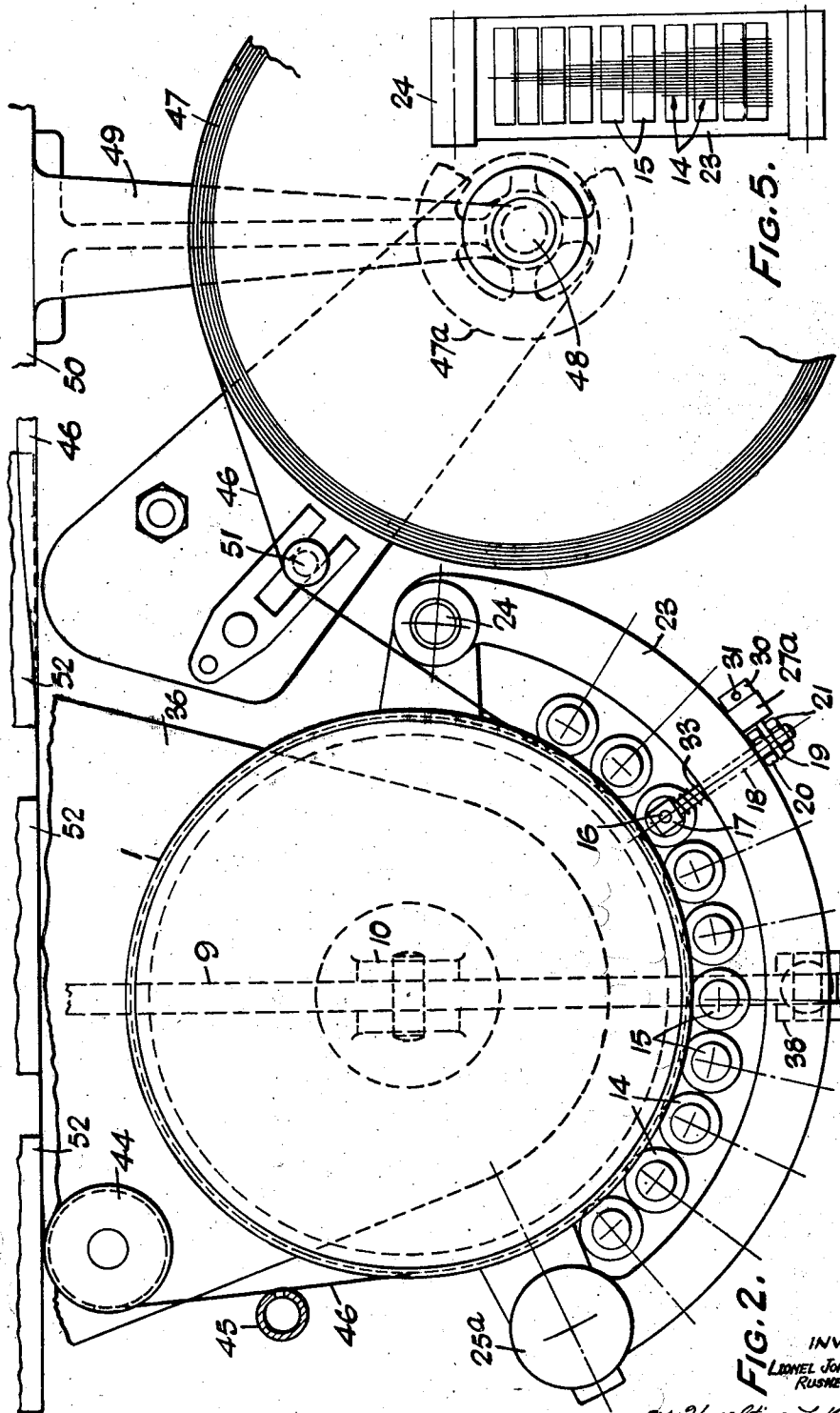
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UNITED STATES PATENT OFFICE

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MEANS FOR CREASING LININGS FOR BOOKS
AND FOR ANALOGOUS PURPOSES

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4 Claims. (Cl. 154—41)

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This invention relates to improved means for producing a series of parallel creases or corrugations in fabric, paper or like readily foldable sheet material, and more particularly the invention is useful in connection with what is known as "back stripping," an operation carried out in binding of books during which a strip of calico or other suitable material is glued as a lining to the spine of the book. With the device described the corrugations introduced into this lining provide the necessary extra material for the subsequent rounding and backing operation during which the strip lining resumes its original substantially smooth form, the corrugations being drawn out by the expansion of the book spine. These corrugations enable the book to be spread during rounding and backing without fear of splitting the lining on the back of the book whilst giving the book back a greater degree of flexibility.

The object of the present invention is to provide a creasing or corrugating device in which variations in the depth or width of the creases or folds, and selection in quantity of the number of lines or creases or folds can be effected readily, and still further in which there is minimum friction or other opposition to the passage of the linen or other sheet material through the creasing or folding means.

In order that the invention may be clearly understood and readily carried into effect, drawings are appended hereto illustrating an embodiment thereof, and wherein:

Figure 1, a sectional side elevation of the apparatus.

Figure 2 is a plan view.

Figure 3 is a detail sectional inverted plan view of one of the devices for retracting the rollers.

Figure 4 is a cross section through the support carrying the rollers, and

Figure 5 is a detail inside elevation of the set of rollers carrying fins which engage the fabric or paper strip.

Referring to the drawings the strip fabric or paper to be applied to the spines of the books 52 is indicated by the reference numeral 46 and it is fed from a supply spool 47 rotating on a centre pin 48 carried by a bracket 49 which is attached to the body of the machine, along the top 59 of which are conveyed the books 52 to receive the adherently coated fabric. A tension post 51 is carried by the bracket 49 to tension the material, and the spool 47 is adjustable transversely vertically, e. g. by a traversing screw with a hand wheel 47a carried by the bracket 49.

The creasing device comprises a cylinder 1

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which has an axial dimension greater than the pre-determined maximum width of work to be corrugated or creased, and its cylindrical wall has midway between its ends a flange 2 in the centre of which is formed a hollow boss 3 by which the cylinder is affixed to a shaft 4 journaled in bearings 5 and 6 in a central elongated boss 7 of a bracket 8 mounted for rising and falling movement under the control of a lever 9 fulcrumed midway between its ends on a lug 10 depending from a plug 11 fixed by screws 12 in the lower end of the boss 7.

The periphery of the cylinder is formed with a plurality of parallel V or similar section grooves 13 in which are engaged annular fins 14 formed on the peripheries of a plurality of rollers 15, these rollers being arranged in equi-distantly spaced relationship partly about the periphery of the cylinder so that they successively engage the work which is traversed between the cylinder 1 and the fins of the rollers, the arrangement being that, as shown in Figure 5, the first set of fins on a roller engaged by the work has a minimum number of peripheral fins, and the last roller has the maximum number, a convenient arrangement for the fins of these rollers being to progressively increase by one or other uniform number, the number of their fins in succession from one end roller to the other end roller.

The rollers are of uniform axial dimensions, and each roller is supported for individual adjustment towards and away from the periphery of the cylinder. For this purpose each roller is mounted on a centre pin 16 which rotates at its end in heads 17 formed on the ends of two parallel pins 18 which are opposed to the cylinder, these pins being bridged at their other ends by a transverse bar 19 fixed to the pins by threading on the pins nuts 20 and 21 to engage opposite faces of such bar. Such a construction of parallel pins and cross bar provides for each roller, in effect a shackle or yoke for carrying the appropriate rollers, and the two pins 18 of each shackle or yoke are slidable through bores formed in the upper and lower flanges or increased thickness parts 22 of a part annular or segmental bar 23 disposed in concentric relationship about part of the periphery of the cylinder, so that the finned rollers are interposed between the inner arcuate side of this bar and the periphery of the cylinder. One end of this arcuate bar 23 is carried on a pivot pin 24 fixed in the aforesaid bracket 8, and the other end is secured in position by a spring loaded plunger or bolt 25 having a head 25a and engaged in a hole 26 in such bracket 8,

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whereby the arcuate bar can be swung readily into and out of operative position.

The depth of bite or engagement of the fins on the peripheries of the rollers in the groove on the cylinder can be adjusted to fine limits by means of the nuts 20 and 21, which position the aforesaid cross-bars 19 in relation to the parallel pins 18 and also such rollers can be brought into and out of operation selectively by a cam device provided with the said cross-bars. Each such cam device can comprise a bolt 27 passed radially through the said arcuate bar 23, the head of the bolt comprising a rectangular or other suitably shaped block 27a in which rotates a pin 28 formed with a flat 29 on one end normally abutting against the bar 19 the pin 28 being secured in position by a collar 30 fixed by a radiating finger piece 31 by which the pin can be partially rotated to cause the part cylindrical surface 32 of the end of the pin to engage the appropriate cross-bar 19 connecting the adjacent pair of parallel pins 18 whereby the appropriate pair of pins are retracted relatively to the cylinder so as to disengage the fins 14 of the roller 15 carried thereby from the grooved surface of the cylinder. Coiled compression springs 33 on the pins return the rollers to the operative position.

The depending boss 7 in which are located upper and lower bearings 5 and 6 for the journals of the cylinder shaft 4 slides through a sleeve 34 when the lever 9 is articulated, the periphery of the sleeve being formed with a flange 35 abutting upon the bracket 36 in which the sleeve is fitted, screws 37 fixing the guide sleeve 34 relatively to the bracket. The rise and fall of the bracket 8 is due to the lever 9 being connected at one end by a link 38 to an arm 39 on the flange 35 and receiving motion at its other end by the push-pull action of a vertical rod 40 connected at its lower end to the lever and at its upper end to a bracket 41 projecting from a frame member 42 forming part of means supporting pulleys (not shown) over which is fed an endless conveyor belt, only the lower track 43 of which is shown. Opposed to the lower track of belt 43 is a co-operating conveyor belt, only the upper track 43a of which is shown.

The mechanism supporting the upper endless conveyor belt 43 is adjustable vertically to permit of the variation necessary to accommodate different thicknesses of books, and since the variation required for any particular thickness of books is exactly double the variation of position required by the strip or lining to be applied, the link 9 is pivoted as aforesaid in its centre so that the cylinder 1 and its supporting mechanism is moved exactly one half of the amount over which part 42 is moved.

The books are fed in the desired direction along the top 50 of the body of the machine by being gripped between the opposed tracks of these two conveyor belts and as they pass the aforesaid strip creasing means their spines have the creased fabric fed on to them in known manner, the creased fabric being guided away from the cylinder 1 over a guiding barrel 44 having the same axial dimensions and arrangement of grooves as the cylinder 1 so that the creasings of the fabric are not deformed. During the travel of the creased material from the cylinder 1 to the barrel 44 an adhesive is sprayed or wiped on to the fabric, the adhesive applying means being indicated diagrammatically at 45.

The frame member 42 is adjusted up or down relatively to the top 50 to accommodate the belts

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43 and 43a to the thickness of the books to be fed with the material. It will be apparent that adjustment of the frame member 42 will result in the cylinder 1 being adjusted axially up or down to vary the width of periphery of the drum disposed above the plane of the conveyor belt 43a. Thus the effective axial dimension of the cylinder 1 in use can be varied to suit different widths of books and corrugated fabric.

By providing the fins on the rollers in such manner that they progressively increase in number with respect to their rollers from one end of the set of rollers to the other, a considerable diminution in friction is ensured by reason of the progressive build up of the creasing of the material as it passes between the rollers and the cylinder. Still further, by providing means for selectively bringing the finned rollers into and out of operation the effective width of the material to be creased can be varied.

The cylinder 1 can be heated by electric resistance elements 52 connected to a source of electrical energy by brushes 53 engaging annular contact strips 54 and carried by an insulated housing 55 adapted to receive the necessary leads.

I claim:

1. In apparatus for feeding foldable sheet material such as linen or paper to articles to which the sheet material is united and for producing in the sheet material creases extending lengthwise of the direction of feed of the material, a freely rotatable cylinder with a plurality of circumferential grooves and adapted to be rotated by the traction of the sheet material over its periphery, a plurality of freely rotatable rollers parallel with the cylinder, peripheral fins on the rollers engaged in said grooves to produce said creases, a support for said rollers partly surrounding the cylinder means supporting each roller readily displaceably relatively to said support and means combined therewith adapted to be manipulated to retract the rollers selectively from the predetermined creasing position and to return the rollers to such predetermined position.

2. In apparatus for feeding foldable sheet material such as linen or paper to articles to which the sheet material is united and for producing in the sheet material creases extending lengthwise of the direction of feed of the material, a freely rotatable cylinder with a plurality of circumferential grooves and adapted to be rotated by the traction of the sheet material over its periphery, a plurality of freely rotatable rollers parallel with the cylinder, peripheral fins on the rollers engaged in said grooves to produce said creases, a support for said rollers partly surrounding the cylinder, means supporting each roller readily displaceably relatively to said support means combined therewith adapted to be manipulated to retract the rollers selectively from the predetermined creasing position and to return the rollers to such predetermined position, and means controllable by the articles to be fed with the creased material to adjust automatically the cylinder and associated finned rollers axially as a unit to accommodate the position of the cylinder and rollers to the thickness of said articles.

3. In apparatus for feeding foldable sheet material such as linen or paper to articles to which the sheet material is united and for producing in the sheet material creases extending lengthwise of the direction of feed of the material, a freely rotatable cylinder with a plurality of circumfer-

ential grooves and adapted to be rotated by the traction of the sheet material over its periphery, a plurality of freely rotatable rollers parallel with the cylinder, peripheral fins on the rollers engaged in said grooves to produce said creases, a support for said rollers partly surrounding the cylinder, spring means distinctive to each roller urging the rollers into said grooves, a device with each roller adapted to be actuated to retract each roller individually relative to the others from the work engaging position against the influence of said spring means and adapted to be actuated to free the rollers for return movement to the predetermined work engaging position by the reassertion of the spring means, and means controllable by the articles to be fed with the creased material to adjust automatically the cylinder and associated finned rollers axially as a unit to accommodate the position of the cylinder and rollers to the thickness of said articles.

4. In apparatus for feeding foldable sheet material such as linen or paper to articles to which the sheet material is united and for producing in the sheet material creases extending lengthwise of the direction of feed of the material, a freely rotatable cylinder with a plurality of circumferential grooves and adapted to be rotated by the traction of the sheet material over its periphery, a plurality of freely rotatable rollers parallel with the cylinder, peripheral fins on the rollers engaged in said grooves, to produce said creases, a support for said rollers partly surround-

ing the cylinder, means supporting each roller readily displaceably relatively to said support means combined therewith adapted to be manipulated to retract the rollers selectively from the predetermined creasing position and to return the rollers to such predetermined position, a bracket supporting the rotatable cylinder and the set of rollers with their support, a fixed guide in which said bracket is supported slidably along the axis of the cylinder, conveyor belts for translating the work into receiving engagement with the creased material, and means to adjust the cylinder carrying bracket automatically relative to said guide to raise and lower the cylinder along its axis to compensate for variations in the space occupied by the work between the conveyor belts.
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