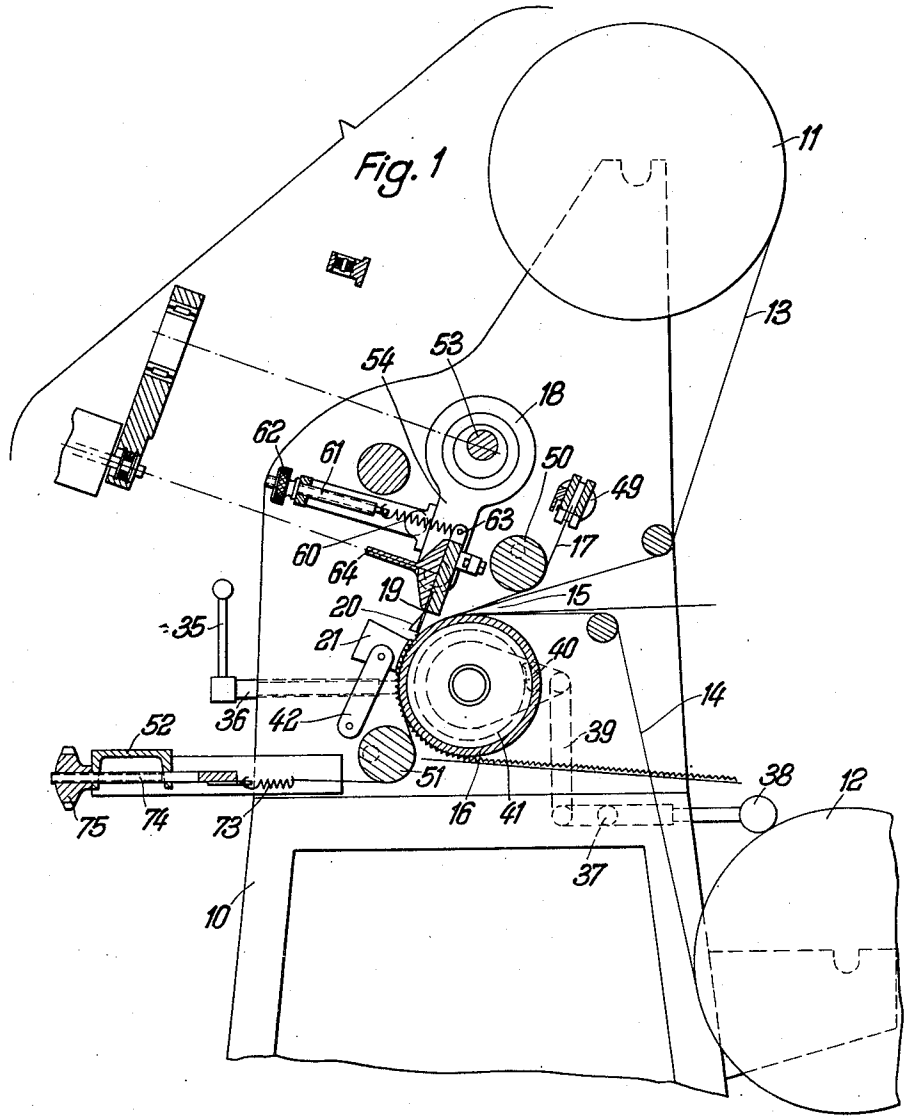
Aug. 14, 1956 F. BOCK ET AL 2,758,760

MACHINE FOR PRODUCING ACCORDION PLEATING

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Fig. 1



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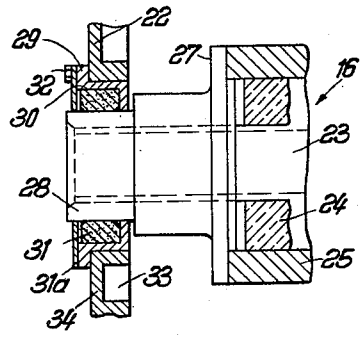


Fig. 2

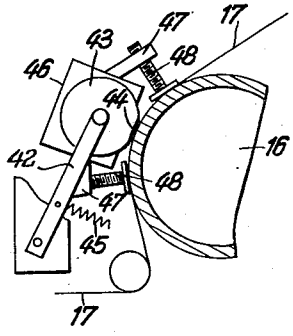


Fig. 3

Fig. 4

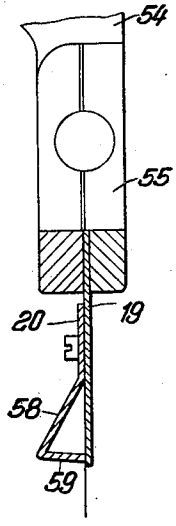
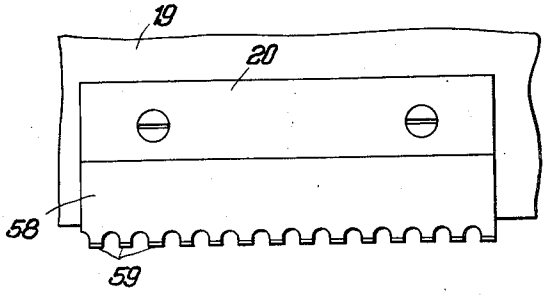


Fig. 5



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MACHINE FOR PRODUCING ACCORDION PLEATING

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Application November 2, 1954, Serial No. 466,382

Claims priority, application Germany November 6, 1953

7 Claims. (Cl. 223—30)

This invention relates to machines for producing accordion pleating and refers particularly to a machine for pleating materials made of polyamide threads.

For producing pleated fabrics made of ordinary material such as cotton, wool or the like, the known pleating machines use a pleating knife which provides pleats in the cloth fed between paper webs. The pleating of these materials can be carried out easily owing to the yieldability of the fabric threads but the pleats are not permanent or lasting. The formation of pleats in woven or knitted fabrics made of polyamide fibers, on the other hand, is very difficult and, owing to the known characteristics of these synthetic substances, requires special heat treatment in order to produce creases or pleats and to make these durable.

A machine for producing accordion pleating is known in which the fabric to be pleated is laid in pleats between an adjustable tension band and a heating cylinder by means of a pleating knife and the fabric is given the form of the pleats between the heating cylinder and an oscillatably adjustable top heating device.

The invention differs from this known construction in that the pleating knife attachment has a section set at an angle to the knife and another section radially directed to the cylinder; the radially directed section forming the pleats of the fabric as accordion pleats between the tension band and the cylinder.

Furthermore, the machine according to the invention incorporates various improvements which render it possible to provide accordion pleats even in wide materials, woven or knitted fabrics from polyamide threads, and to obtain a durable shaping and hardening of the edges of the pleats. To attain this object different improvements have been made in the construction the cooperation of which has led finally to a machine in which the polyamide textiles and fabrics can be worked in the manner described. The machine is extraordinarily efficient, is easy to operate, its construction is easily understandable and clear and reliable in operation.

Other features of the invention are set forth in the description and claims which follow.

The machine is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is an end view of a pleating machine partly in section;

Fig. 2 is a cross-section through a cylinder bearing and a part of the heating cylinder;

Fig. 3 shows an end view of the pivoted top heating device with the heating beam and the heating beam supports;

Fig. 4 is a cross section through the pleating knife with its attachment, and

Fig. 5 is a part elevation of the pleating knife with its attachment.

The machine is constructed in the following manner:

Two magazine rolls **11** and **12** for paper webs **13** and **14** are rotatably mounted on the machine frame **10** and

between these webs is fed a fabric web **15**, made of polyamide fibers, which is to be pleated. The three webs pass together over a heating cylinder **16** and are pleated into accordion pleats between the cylinder **16** and an adjustable tension band **17** by means of a pleating knife device **18** with a pleating knife **19** and a pleating knife attachment **20**. The pleats bear against the heating cylinder **16** which heats the inner edges thereof, and their outer edges bearing against the tension band **17** are directed towards a pivotally mounted top heating device **21** which heats these outer edges so that the pleats extending radially to the cylinder **16** are stiffened. The pleats do not therefore lie tangentially to the heating cylinder as in the known machines but are radially directed to this cylinder. The radial position of the pleats enables the pleating knife device not only to produce sharper pleating, but the edges of the pleats are also formed reliably and permanently by the heat produced by the heating means, namely the heating cylinder **16** and the top heating device **21**. As the material to be pleated may be up to 150 cms. in width, special provisions are made to maintain a uniform temperature over the entire length of the machine, prevent heat radiation at the different points, give easy accessibility and adjustment for the individual parts and to construct the parts so that the machine operates satisfactorily under all working conditions and fully meets all requirements.

For this purpose the individual parts are constructed in the following manner:

The heating cylinder **16** mounted in side walls **22** of the machine frame **10** has a bore **23** for accommodating an electric heating device. Forming the wall of the bore **23** is an aluminum cylinder **24** over which a casing **25** of centrifugally cast iron is drawn. By this arrangement a uniform distribution of the heat produced by the electric heating arrangement is attained by interposing the aluminum cylinder **24** in the casing **25** of centrifugally cast iron. The uniform distribution of heat is assisted by lining the casing **25** with a good heat conducting material or metal, such as aluminum, copper, lead or the like.

The casing **25** is fixed on a flanged bearing disc **27**, a journal **28** of which is mounted in steel sleeves **29** in the side frame walls **22**, which sleeves have a recess **30** for accommodating a ring member **31** made of fire clay or other heat resisting material. The ring member **31** is closed by a cover **31***a* secured on the sleeve **29** by bolts **32**. Recesses **33** are machined in the side frame walls **22**, so that a bridge **34** thus formed acts as a heat reflector. In the case of wear, the ring members **31** can easily be exchanged after removal of the cover **31***a*.

The construction of the bearing above described prevents radiation of heat and screens the cylinder **16** against loss of heat by its being mounted in bearing ring members **31** of nonconductive material. At the same time a uniform heat is transmitted to the pleats by the heating cylinder **16**.

Usually the cylinder **16** is stationary and held in position by a screw member **35** a shank **36** of which bears against the cylinder **16**. To facilitate the introduction of the paper webs and the fabric web the screw member **36** is loosened and the cylinder **16** progressively shifted. A handle **38**, pivoted at **37**, is provided for this purpose and with the aid of a link **39** shifts a pawl **40** which engages a ratchet wheel **41** and thus effects the movement of the cylinder **16** step by step. When the screw member **35** is loosened and the cylinder **16** is rotated in sequence, the step-by-step movement of the pleating knife **19**, which is driven by the pleating device **18**, is assisted.

During the heating and stiffening of the inner edges of the pleats by the cylinder **16**, the outer edges of the pleats are stiffened or hardened by the adjustable and pivotable

top heating device 21. The top heating device 21 consists of two arms 42 rotatably mounted on the right and left of the machine frame respectively, which arms carry a heating beam 43 provided with a recess 44 which conforms with the peripheral surface of the cylinder 16. This oscillatable heating beam 43 is forced in the direction of the arrow by a spring 45 acting on the arm 42. The heating beam 43 can be shifted away from the cylinder 16 against the action of the spring 45. With a cylinder 150 cms. in length it is naturally very difficult to maintain accurate spacing between the recess 44 of the heating beam 43 and the cylinder 16. To attain this object the heating beam 43 is oscillatably carried by a housing 46 having downwardly inclined lugs 47 in which two set screws 48 are fitted which can bear against the surface of the cylinder 16. When these set screws 48 have been properly adjusted the heating beam 43 can be turned so that there is a uniform space between the recess 44 and the cylinder 16 along the entire length of the cylinder, irrespective of the distance between the tension band 17 and the cylinder 16; as a result, all the outer edges of the pleats are uniformly heated.

The pleating of the fabric web 15 fed between the paper webs 13 and 14 is effected between the cylinder 16 and the tension band 17 by means of the pleating knife device 18. The tension band 17 is anchored to a pin 49 and extends under an eccentrically mounted roller 50, then over the cylinder 16 at a distance therefrom and finally under a second eccentrically mounted roller 51 to a tensioning device 52. The end of the tension band 17 is secured by a spring 73 to a spindle 74 adjustable with the aid of a nut 75 so that the spacing between the tension band 17 and the cylinder 16 can be regulated. By this means and by the adjustment of the knife stroke on the eccentric 18 the size of pleat can be determined. The accurate adjustment of the tension of the band 17 is effected by turning the eccentrically mounted rollers 50 and 51. The adjustment must be so chosen that the edges are not upset. The tension band 17 is provided in known manner with apertures through which the pleating knives pass.

The pleating knife device 18 comprises an eccentric 53 having on its connecting rod 54 a rotatable bar 55 for the pleating knives 19, which are spaced at a short distance apart and extend through suitably shaped and located apertures in the tension band 17. In the known pleating machines the pleating or laying of the pleats is effected so that the pleats lie substantially tangentially to the cylinder. According to the invention an attachment 20 is fitted on the pleating knife 19 and consists of a section 58 projecting at an angle and a second section 59 extending radially to the cylinder 16. Owing to the swinging movement of the knife 19 caused by the eccentric 18, the knife attachment 20 is first pushed downwards, then forwards and is then moved upwards. A spring 60 causes the knife to bear against the cylinder, which spring is fixed at one end to a spindle 61, adjustable by means of a nut 62, and at the other end to a lug 63 on the bar 55.

By the cooperation of all these improvements pleats are laid in accordion form in a perfect manner even in wide materials, woven or knitted fabrics of polyamide threads and the edges of these pleats keep their shape and stiffness. The machine is extremely efficient, can be easily operated, its parts are clearly and accessibly arranged and reliable in operation.

The individual parts can be used as improvements in connection with other machines or alone.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

We claim:

1. A machine for producing accordion pleating, in which the web of material to be pleated passes between two webs of paper, comprising a frame, a heating cylinder rotatably mounted in the frame and against which one side of the material contacts, an adjustable tension band mounted in the frame to press the material against said heating cylinder, a pleating knife eccentrically mounted in the frame and operating in the space adjacent the tension band and said heating cylinder to arrange the pleats in said material due to the eccentric mounting of the knife, an attachment on said pleating knife composed of a section arranged at an angle to said knife and having a second section radially directed relative to said cylinder forming the accordion pleats in the material between the tension band and the cylinder.

2. A machine according to claim 1, in which the pleating knife attachment is fixed on the pleating knife and is divided by slots registering with similar slots in the pleating knife.

3. A machine according to claim 1, in which a bar and a connecting rod are provided for the knife connected to the eccentric mounting to provide reciprocating motion to the knife.

4. A machine according to claim 1, in which two eccentrically mounted rollers are provided for the tension band to adjust the length of the band on the heating cylinder.

5. A machine according to claim 1, in which the heating cylinder is a composite body comprising an inner layer of aluminum and an outer layer of cast iron.

6. A machine according to claim 1, in which the side walls of the frame are provided with recesses forming a bridge acting as heat damper for the heating cylinder.

7. A machine according to claim 1, in which a top heating device is provided opposite the heating cylinder and having a curved surface corresponding to the periphery of the heating cylinder.

References Cited in the file of this patent

UNITED STATES PATENTS

2,289,290	Maxant	July 7, 1942
2,318,497	Kassel	May 4, 1943
2,323,896	Cahill	July 13, 1943