

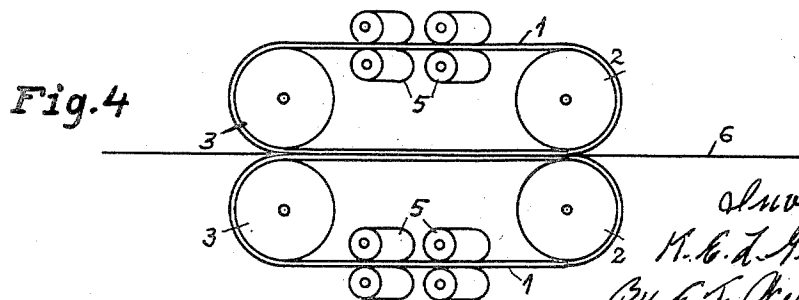
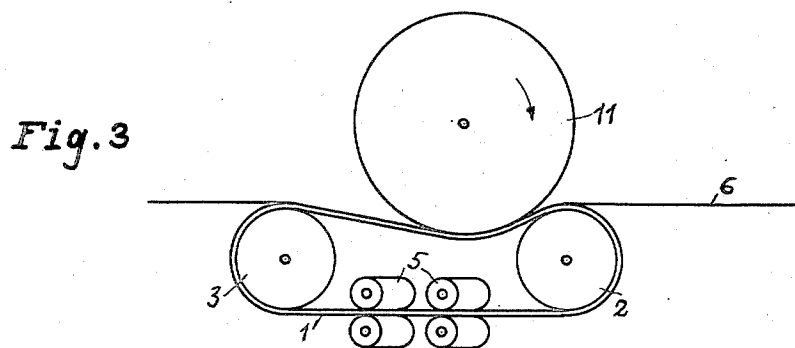
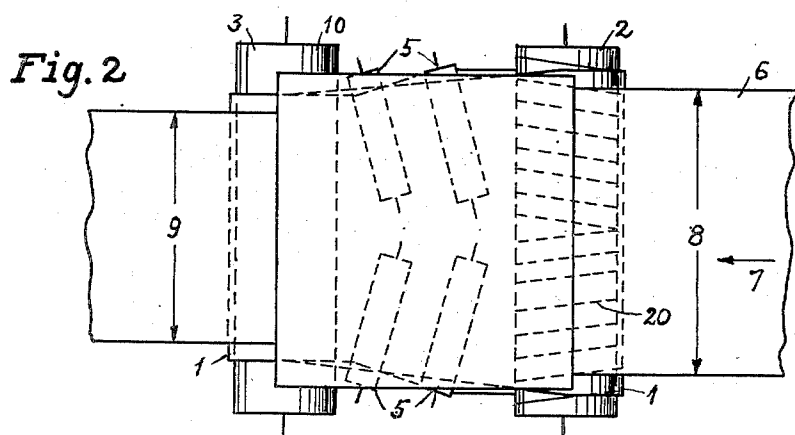
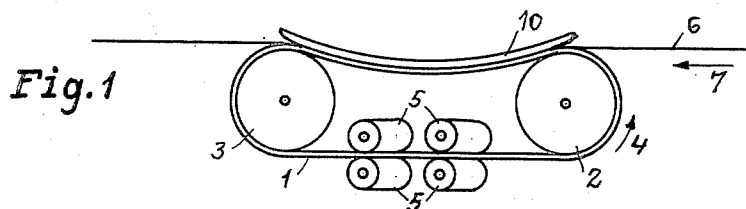
Dec. 26, 1950

K. E. L. GRETIVE
APPARATUS FOR CREPING PAPER
AND OTHER CREPABLE FOILS

2,535,734

Filed July 12, 1945

4 Sheets-Sheet 1



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Fig. 5

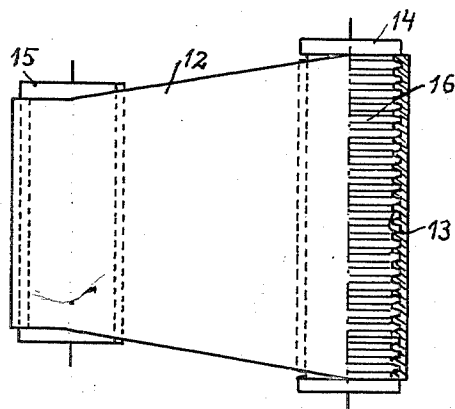


Fig. 6

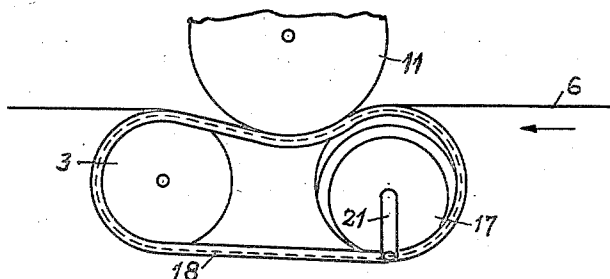


Fig. 7

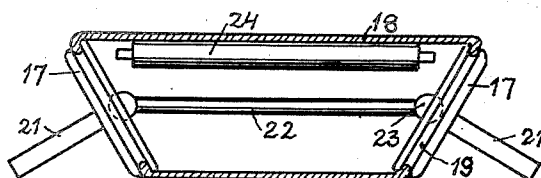
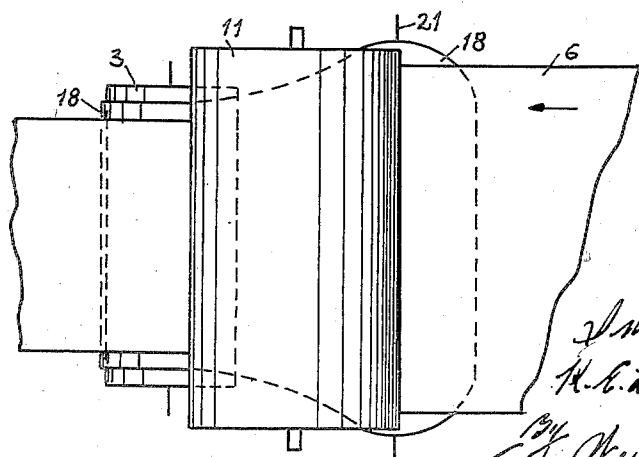


Fig. 8



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Fig. 9

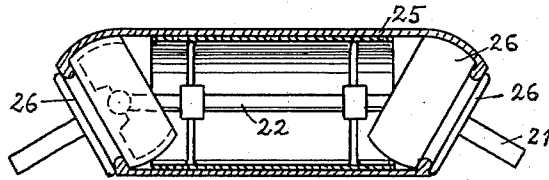


Fig. 10

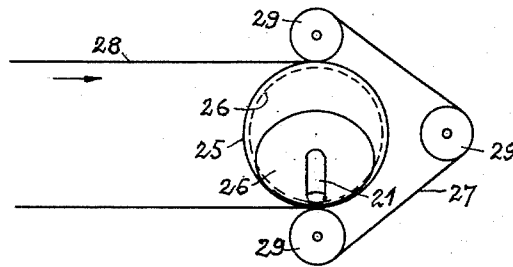


Fig. 11

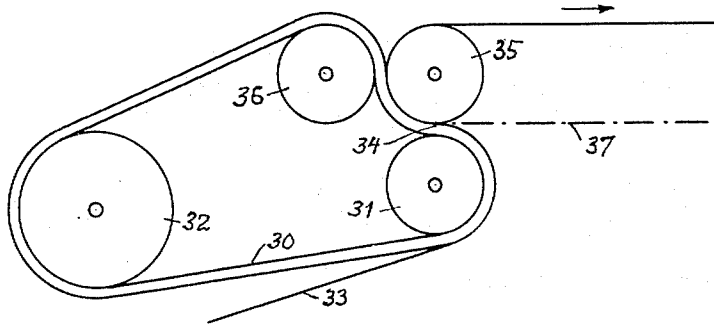
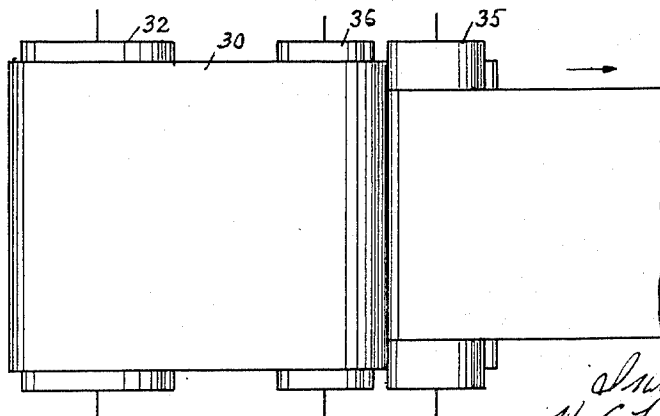


Fig. 12



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Fig. 13

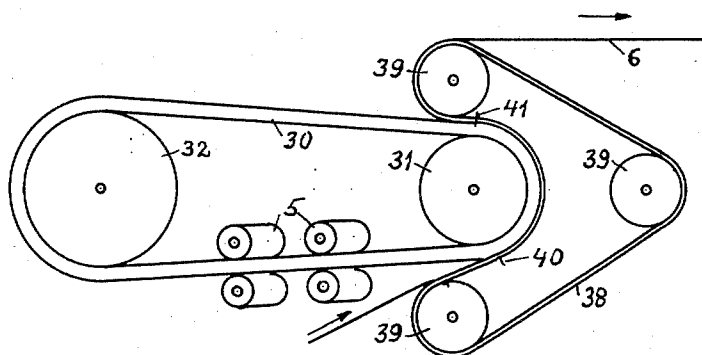


Fig. 14

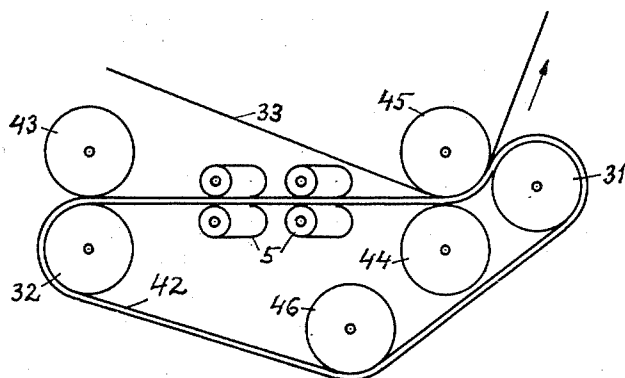


Fig. 15

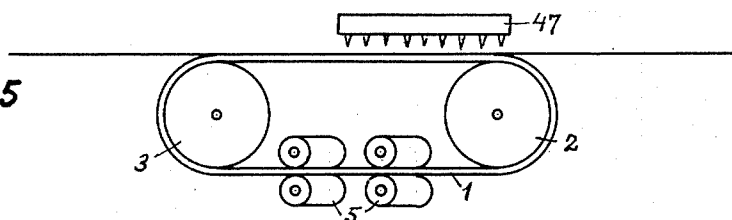
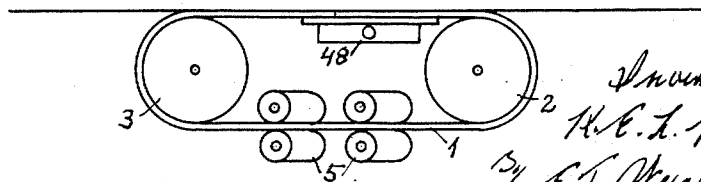


Fig. 16



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UNITED STATES PATENT OFFICE

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APPARATUS FOR CREPING PAPER AND
OTHER CREPABLE FOILS

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3 Claims. (Cl. 154—30)

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The present invention relates to a method of creping paper and other crepable foils.

The object of the invention is to make use of new means to obtain the creping effect.

It is known to manufacture creped paper by pushing together a length of paper so that small creases ensue in the paper in close formation. The present invention has for its object to bring about this creping work by means of an elastic band which at first is expanded in one or more directions and then the paper or other crepable foil is brought in contact with the band, whereupon this band is allowed to contract and thereby bring the paper along with it so that the paper also becomes contracted and thus creped. The band also can be pushed together after the contraction together with the contacting paper in order to bring about or increase the creping action. The band can be expanded transversely by means of an expanding means and in this state brought to a cylinder, to which also the paper is brought on the outside of the band, whereupon the band and the paper are led over a second cylinder, during which the band is allowed to contract itself and the paper, so that the paper becomes creped transversely. Two such bands with cylinders and expanding means may be arranged so that one of the bands is brought against the lower side of the paper and the other band against its upper side, so that the paper is exposed on its both sides to the creping action from the bands. Or the band can be led over a cylindric surface so that the outside of the band is lengthened, after which the outside of the band when brought forward automatically is contracted and the contacting paper thereby creped longitudinally. The outside of the band can also be contracted lengthwise by leading the band over a cylindric surface, whereby the paper is led between the cylinder face and the band before the outside of the band is being pushed together, whereby the paper becomes creped. If the band simultaneously is exposed to a transverse expansion and is bent over a cylindric surface, so that its outside is expanded also lengthwise, the band will, after being released, again contract and thereby crepe the paper in several directions at the same time. Finally, the band can be lengthened between two pairs of cylinders and the paper led to the expanded band and allowed to be brought along between the cylinders of one of the pairs, whereby the paper is contracted by the band, when the band has passed the last mentioned pair of cylinders and is itself contracted. The band may also be formed to a tube, the ends

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of which are each fixed to a disc, which discs are driven by axles lying in the same plane as the axis of the tube and incline towards said axis so that the generatrix of the tube is lengthened and shortened during each revolution, and the paper is brought against the band during the shortening of the generatrix.

The accompanying drawings show some diagrams to illustrate the invention. Figs. 1-10 show devices for a transverse creping and Figs. 11-14 devices for a longitudinal creping. Figs. 13 and 14 also show creping in several directions simultaneously. Fig. 1 is a side view and Fig. 2 a plan view of a device with a rubber band, two driving cylinders and a press plate; Fig. 3 a plan view of a similar device using a press cylinder instead of a press plate. Fig. 4 is a side view of a device using one creping rubber band on each side of the paper. Fig. 5 is a plan view of a device with grooved cylinders and rubber band, the rubber band being cut away from one half of the cylinders to show the grooves. Fig. 6 is a side view and Fig. 8 a plan view of another device with a special cylinder, which is shown in Fig. 7 in an axial section. Fig. 9 is an axial section through a similar special cylinder, and Fig. 10 a side view of a creping device with said cylinder. Fig. 11 is a side view and Fig. 12 a plan view of a further device. Figs. 13 and 14 are side views of still further devices. Figs. 15 and 16 show a blower box and a suction box respectively used as alternatives to the press plate in Fig. 1.

In Figs. 1-2 an endless rubber band 1 is driven by means of two cylinders 2 and 3 in the direction of the arrow 4. The lower part of the band is led between one or more pairs of rollers 5 on each side of the middle of the band. These rollers are obliquely arranged, so that the band becomes expanded transversely in a desired degree. The band therefore is broader when it passes the cylinder 2 than when it passes the cylinder 3. If the adhesive power between the band and the cylinder 2 is too small to keep the band widened, the cylinder 2 can be provided with helical grooves 20 from the middle towards the ends. When the band leaves the cylinder 2 and passes over to the cylinder 3 the band will automatically contract to its original width. If a paper 6 is running in the direction of the arrow 7 and is laid or pressed against the band 1 approximately where the band leaves the cylinder 2 and has the width 8, the paper will be contracted towards the middle as much as the band 1 is contracting until it is given the width 9 at the cylinder 3. During this contraction the paper be-

comes craped transversely. The adhesion between the paper and the rubber band must be sufficiently great in order to obtain the desired wrinkles. As means for the purpose the paper may be properly moistened. It is also appropriate to arrange a polished plate 10 against the paper, where it passes between the cylinders in order to keep the paper in close relation to the band. The paper will then slide on the plate. If such a sliding motion is not desired the plate can be substituted by a rotatable cylinder 11 as shown in Fig. 3.

Another form of this idea is shown in Fig. 4, where two bands 1 of the same kind, together with cylinders 2 and 3 and rollers 5 are arranged in such a way that one of the bands is applied on the lower side of the paper 6 and the other band on its upper side. In this case the paper is exposed to the craping action on its both sides.

In the device according to Figs. 1-2 the band is widened by means of the rollers 5. Another way to widen the band is shown in Fig. 5 and consists therein that the rubber band 12 is provided on its inside with longitudinal grooves or ridges 13 and that the cylinders 14 and 15 are provided with corresponding grooves 16, whereby the distances between the grooves or ridges are made larger on cylinder 14 than on cylinder 15. When the band in this case is put around the cylinders, it becomes broader on cylinder 14 than on cylinder 15.

Figs. 6-9 show still another way to widen the rubber band. Fig. 6 corresponds to Fig. 3 but instead of using the expanding rollers 5 and the cylinder 2 two discs 17 will be provided in such way that the rubber band 18 will run over the cylinder 3 and over the discs 17 whereby the edges of the band are formed to tori and engage corresponding grooves 19 in the circumference of the discs 17. This arrangement causes the band to be expanded transversely each time the band passes the discs 17. After passing said discs the band will retain its original width and thereby crape the paper 6.

The discs 17 are provided with shafts 21 which may be driven. In order to counteract the traction of the rubber band between the two discs a stay 22 may be arranged between the discs and preferably provided with spherical ends 23 resting in corresponding bearings in the centre of the discs. If desired the band may be supported by rollers 24 to assist in guiding the band.

Fig. 9 shows a similar view as Fig. 7, but the rubber band is here formed to a tube 25, the ends of which are fastened each to a disc 26. These discs are driven by shafts 21, which incline towards the axis of the tube with the result that the generatrix of the tube is gradually lengthened and shortened during each revolution. The axis of the tube and the shafts 21 are in the same plane. It is convenient that the circumference of the discs 26 is spherical so that the tube always retains the cylindric shape. For the same and other purposes the tube may be stiffened inside by means of a cylinder shaped plate which is carried by the stay 22. Fig. 10 shows the same tube 25 from one end together with a guiding band 27 which has about the same width as the paper 28 to be craped. The paper is applied to the tube where the generatrix of the tube is largest and is pressed against the tube by a stationary plate, as in Fig. 1, or by the band 27 which runs over rolls 29.

The devices described and shown in Figs. 1-10 are suitable for a transverse craping of paper

and other crapable material. I will now describe some devices for a longitudinal craping.

In Figs. 11-12 an endless rubber band 30 is driven over two cylinders 31 and 32. When the band passes the cylinders, its outside becomes lengthened and its inside shortened. The thicker the band is and the smaller the diameter of the cylinder the greater the lengthening and the shortening will be. If a paper 33 is made to follow upon the outside of the band at the cylinder 31 the paper will make contact with an expanded part of the band. When the rubber band arrives at the point 34, where it leaves the cylinder 31 and thus does not follow its bent surface, it will retain its normal nonexpanded form, viz. the outside of the band will become contracted and thereby the paper, which lies thereon and thus becomes craped. This craping effect therefore occurs when the point 34 is being passed. This effect can, however, be increased thereby that the rubber band is led over an extra cylinder 35, so that the band will become bent in an opposite direction and thus its inside shortened together with the paper lying therebetween, thus increasing the craping action. The extra cylinder 35 can be rotatable or standing or be substituted by a plate. To guide the band a cylinder 36 or a plate may be employed.

The paper could be brought in along the plane 37 instead of along the plane 33 and the cylinder 36 be dispensed with. Such a case is shown in Fig. 13, where, however, a guide is arranged for the paper, consisting of a belt 38 led over rolls 39. From the point 40, where the paper meets the band 30, to the point 41, where the paper leaves the cylinder 31, no craping of the paper occurs, but at the point 41 the band automatically shrinks and thereby draws the paper together so that it becomes craped.

The band according to Figs. 11-13 can consist of a nonelastic or less elastic material on the inside, that is on that side which is turned against the cylinders 31 and 32. By this means the outside of the band will become expanded out more when passing the cylinder 31 and contracted more when passing the cylinder 35. In this case therefore a band of less thickness can be used than otherwise to obtain the same effect.

Another device for longitudinal craping is shown in Fig. 14, where the rubber band 42 is led over the cylinders 31 and 32 but also between two pairs of cylinders; between which the band is expanded, namely between one pair of cylinders 32, 43 and one pair of cylinders 44, 45. To this expanded part of the band a paper 33 is led and contracted together with the band while the cylinder 45 is passed, whereby the paper is craped longitudinally. A further cylinder 46 may be put in to keep the band stretched during its movement between the cylinders 31 and 32. The rotating speed of the cylinders 32 and 43 is adjustable in relation to that of the cylinders 44, 45 to render it possible to properly expand the band 42 between these pairs of cylinders. The craping is effected just after that the paper has passed a plane through the axis of the cylinders 44, 45.

As understood from the description above a paper or other material suitable for craping may be craped both lengthwise and transversely directly after one another. This can also be done if the paper is craped lengthwise at first by means of known methods and then craped transversely according to this invention as shown in Figs.

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1-10. The craping can also, as described, be craped in several directions simultaneously, as shown in Figs. 13 and 14. These figures show expanding rollers 5, which are to be used when the craping work is to be performed in several directions. When only a longitudinal craping is desired, said rollers 5 are not provided in Figs. 13 and 14.

Where we have stated here above that the paper may be held against the rubber band or rubber tube by means of a plate, or a cylinder, or a belt, there may be used instead thereof compressed air to be blown from a blower box 47, Fig. 15, against the paper, or suction air from a suction box 48, Fig. 16, to suck on the back side of the rubber band. In this latter case the rubber band is perforated.

I claim:

1. In a machine for craping paper and other crappable material the combination comprising a driven endless band of elastic material, means for periodic expansion and contraction of the band in a transverse direction, means for bringing the crappable material in contact with the band at a point where the band is expanded and taking it off therefrom at a point where the band is contracted, said means for periodic expansion and contraction comprising two discs having the same diameter, a shaft to which each one is fixed and means for driving said discs at the same speed, said shafts inclining towards an axis through the centers of the discs, and the band being provided with protuberances along its edges gripping into the edges of the discs, causing extension and contraction of the band transversely during each revolution of the discs.

2. In a machine for craping paper and other crappable material, the combination of a driven endless band of elastic material, means for periodically expanding and contracting said band in a transverse direction, means for bringing the crappable material into contact with said band at a point where said band is expanded and taking it off therefrom at a point where said band is contracted, said means for periodically expanding and contracting said band comprising a cylinder and two discs between which said band is stretched, said discs having the same diameter, a shaft for each of said discs to which said discs

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are fixed, means for driving said discs at the same speed, said shafts inclining towards an axis through the centers of the discs, and the band being provided with protuberances along its edges gripping into the edges of the discs, causing extension and contraction of the band transversely during each revolution of the discs.

3. In a machine for craping paper and other crappable material, the combination comprising a driven endless band of elastic material, means for periodically expanding and contracting said band in a transverse direction, means for bringing the crappable material into contact with said band at the point where said band is expanded and taking it off therefrom at a point where said band is contracted, said means for periodically expanding and contracting said band comprising two discs upon the periphery of which said band is applied, said discs having the same diameter, a shaft for each of said discs, means for driving said discs at the same speed, said shafts inclining towards an axis through the centers of the discs, and supports for the band being provided between the discs, and the band being provided with protuberances along its edges gripping into the edges of the discs, causing extension and contraction of the band transversely during each revolution of the discs.

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