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PAPER ROLLING MACHINE

Filed March 18, 1929

2 Sheets-Sheet 1

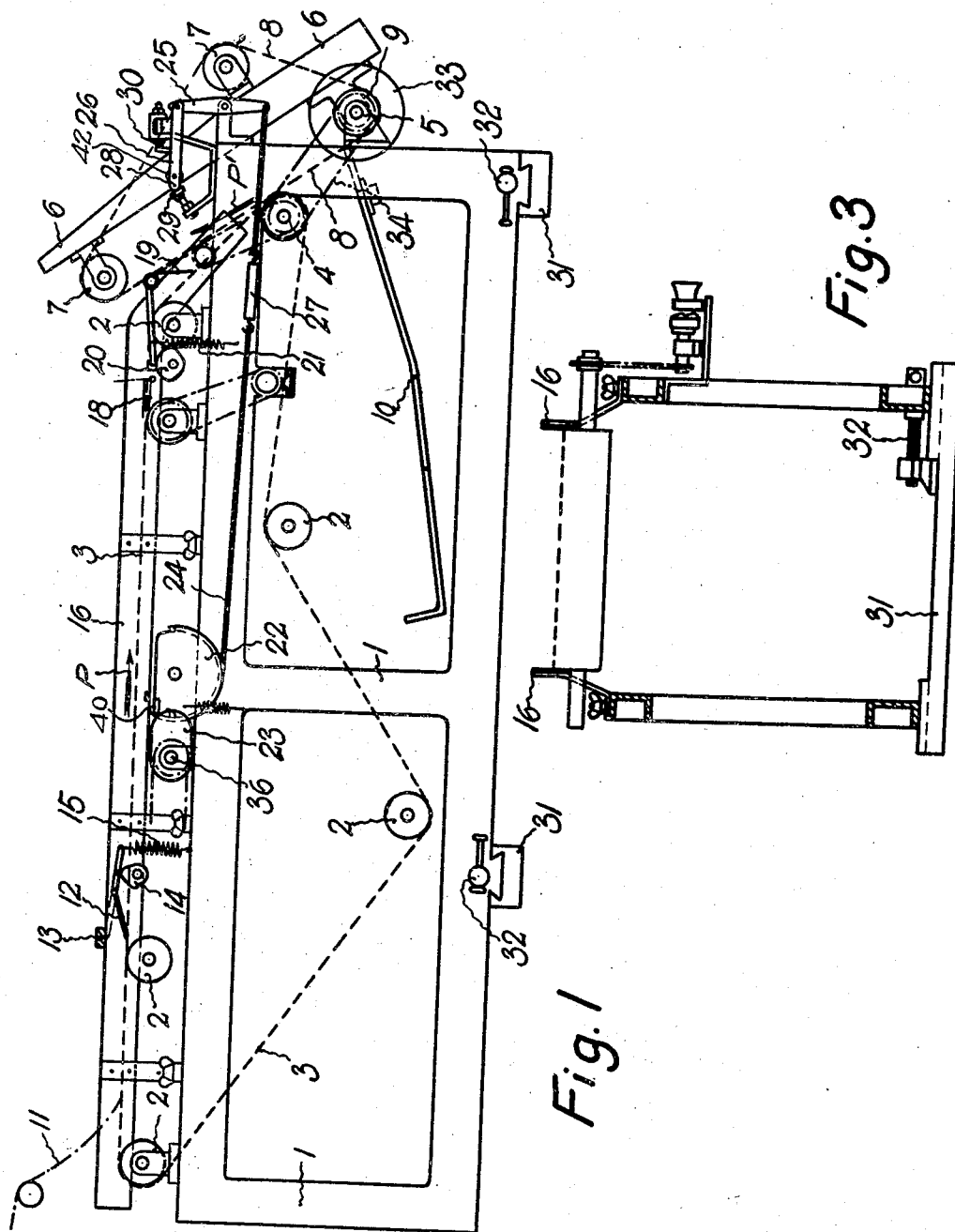


Fig. 1

Fig. 3

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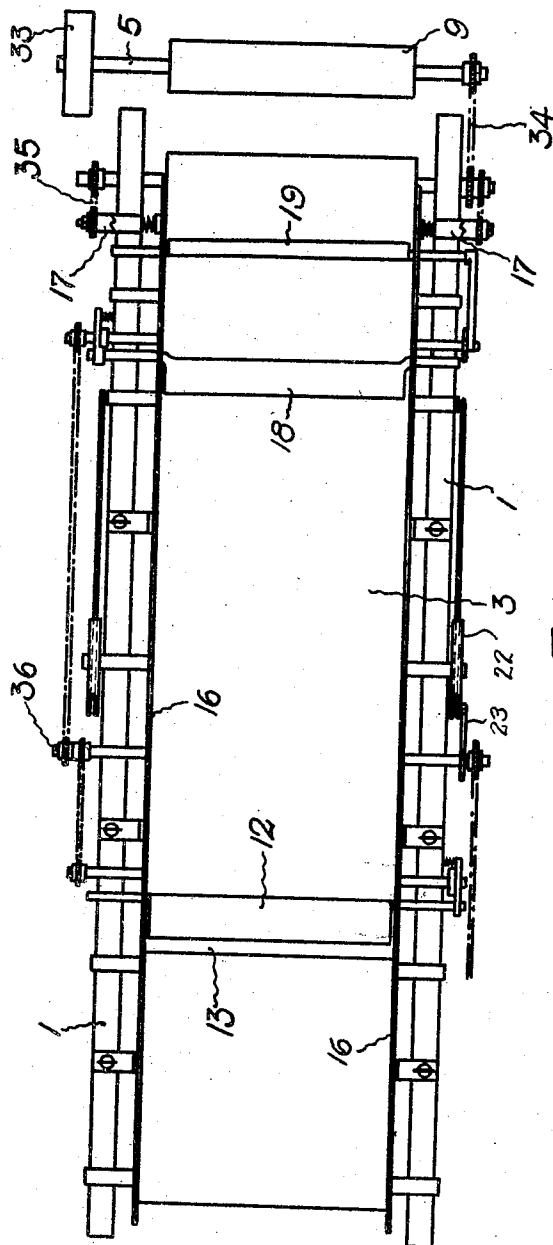


Fig. 2

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PAPER-ROLLING MACHINE

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My present invention refers to a machine rolling long or endless sheets of paper and the like, for instance so called crepe paper, into the shape of soft rolls.

5 It has already been proposed to produce somewhat similar rolls by means of machines provided with two movable endless belts mounted in angular opposition to each other so that a wedge-shaped working chamber is 10 formed between them, in which chamber the rolling is performed. The known machines of this kind, however, present some drawbacks, and it is the object of the present invention to do away with the same. The said 15 drawbacks are primarily to be found in the fact that the belts used for the rolling, in the known machines, run at one end over a common drum and form an obtuse angle in relation to each other at the working chamber. In this way it is impossible to obtain 20 a compact rolling of the paper without any substantial hollow centre portion, and the rolls must be removed manually from the machine.

25 According to my present invention endless belt members are also used for the rolling, such members forming between them a wedge-shaped working chamber, but the essential difference is that the belts run over 30 different and independent drums and form an acute angle at the working chamber. The advantages gained thereby are, that the belts may be run at different speeds so that the compactness of the rolls may be adjusted according to the resisting power of the material 35 to be rolled without forming hollow centre portions in the rolls, that the belts themselves are entirely sufficient for carrying out the rolling without using any other auxiliary 40 means, and that the working chamber may be provided with an opening between the belts so that the rolls may be automatically fed through said opening according to the ratio of production.

45 Further, according to my invention one belt

is displaceable in relation to the other, and the working chamber is positioned at such an inclination to the horizontal that the completed rolls, at the displacement of the first-mentioned belt, will fall down by gravity 50 through the open end of the working chamber, preferably on a collecting table placed underneath said chamber.

Due to these main differences from the known machines the invention forms a sheet-rolling machine which may be mounted directly in connection with the fast-running 55 crepe machines of modern type, whereby the rolling may be performed directly as the paper leaves the crepe machine and without a pre-rolling of the same, as has heretofore 60 been needed.

The invention, for obtaining the results desired, includes also various other valuable improvements, which are not comparable 65 with any corresponding means in the machines previously known, such other improvements being more fully described hereinafter. Among the said improvements the construction described in the following and 70 designed to obtain, by means of repeated end thrusts, an even end surface of the rolls, is especially to be mentioned, without which a satisfactory product, as far as crepe paper is concerned, cannot be obtained. 75

The invention is described with reference to the accompanying diagrammatic drawings, in which Fig. 1 shows an elevation of the complete rolling machine, and Fig. 2 a plan view of the same. Fig. 3 is a cross section 80 of the machine.

The machine consists of a main frame 1 of suitable kind, carrying a suitable number of supporting, tensioning and guiding drums 2 or the like for a conveyor belt 3 consisting 85 for instance of felt or the like material having a surface offering a certain amount of friction. This belt might be replaced by a plurality of parallel and narrower belt strips mounted on the same drums in spaced rela- 90

tion. The belt member 3 is driven in the direction of the arrow P in Fig. 1 and provides a substantially horizontal upper part for feeding the paper to be rolled. At the working end of the machine (the right end in the drawings) the belt member 3 runs in a downward inclination around the driving drum 4, and thence to the charging end of the machine.

A frame 6 is tiltably mounted on a shaft 5 in the main frame 1, such frame, by means of suitable supporting, tensioning and guiding drums 7 carrying another belt member 8 (Fig. 1) of the kind referred to above or any other suitable kind. The belt member 8 runs around a driving drum 9 mounted on the shaft 5 on which the frame 6 is tiltably mounted, and the drum 9 drives the belt in the direction of the arrow P¹, preferably at a little greater speed than the belt member 3. The part of the belt member 8 facing the belt member 3, running in opposition to the latter, is positioned at an acute angle to the end portion of the belt member 3, said angle pointing downwardly so that a wedge-shaped working chamber is formed between the belts, which chamber can be opened at its lower end by tilting the frame 6 around the shaft 5. At the driving drum 9 the belt member 8 extends a little further down than the belt member 3, and thus it also forms a guiding member for the rolls falling down through the open end of the working chamber, so that said rolls are collected on the table 10, which latter, of course, can be replaced by a conveyor belt of suitable kind adapted for automatically removing the rolls from the machine, if such an arrangement should be preferred, but otherwise the completed rolls may be manually removed in bulk from the collecting table.

The manner of working of the machine is as follows:—

The continuous sheet of paper 11 entering the machine from the left as indicated in Fig. 1 is fed in upon the upper horizontal part of the belt member 3 and follows the latter to the working chamber, through which it is carried in contact with the belt member 8, whereafter both of the belt members coact in performing the rolling action. When the roll has been completed, the frame 6 is tilted, so that the belt members are removed from each other, whereupon the roll falls down on the collecting table 10. It is to be noted, however, that for a perfect functioning the machine must be completed by a number of devices to be described in the following.

For many reasons, independent of the invention but advantageous for commercial effects, the crepe paper is not only rolled but also folded to a smaller or greater extent before the rolling, and for such purpose the machine is provided with folding means. This means consists of a gripping member 12

adapted for gripping the forward edge of the paper at the entrance of the machine when said edge arrives at a transverse bar 13, against which the paper is pressed by means of gripper 12, so that the folding is effected by the continued advance of the paper beneath the means just described. The action of the gripper 12 is controlled by means of a cam disc 14 and a return spring 15. When the paper edge enters the machine the gripper is resting and sliding on the surface of the belt member 3, and when the edge arrives at said gripper it is lifted by the latter into contact with the bar 13 by means of the cam disc. After the folding has reached the desired length, the gripper 12 is moved down again, releasing the edge previously gripped, whereafter the rolling of the folded sheet is performed in the manner described above, and the gripper has taken a position for gripping the edge of the next sheet. In this manner a sheet is rolled while folding the next one.

During the feeding movement of the paper on the belt member 3 the paper is guided in transverse direction by means of guide plates 16 which are adjustably mounted to fit the width of the paper to be rolled. These guiding plates are extended to the working chamber between the belt members in a manner to be understood from Fig. 1. In order to give the rolls even end surfaces the guiding plates at the working chamber are given a shaking or vibratory movement by means of oscillating devices 17 (Fig. 2) substantially of the same kind as used at the knot separators in paper machines. These oscillating devices are preferably adjustable so that the strength of the vibratory movement can be varied according to requirements.

A rockable tensioning and braking bar 18 is mounted in connection with the belt member 3 and rests flat on the latter so that the paper can pass over the upper side of the same. This bar is tilted up into the position shown in dot and dash lines in Fig. 1 when, for instance, one third of the length of paper to be rolled has passed over the same, and when the rest passes over the bar, it will have a retarding effect on the paper so as to effect a weak tensioning of the latter. By different shaping of this bar and by variation of its period of action it will be possible to produce more or less compact rolls. By variation of the speed of travel of the belt members 3 and 8 in relation to each other, so that the difference of speed will be greater or smaller, the compactness of the rolls may also be varied. Suitable means for such speed variation are preferably combined with at least one of the belt members.

Another transverse bar 19 is positioned at the upper part of the working chamber and has a somewhat similar action, said bar being adapted to press the paper weakly down against the belt-member 3 when the end of

the paper leaves the retarding bar 18 described above. By means of a cam disc 20 and a return spring 21 the bar 19 is lowered into contact with the paper when about one half of the length of the same has been rolled, and then the bar takes the position shown in full lines in Fig. 1. When the roll is completed, the bar is tilted up into the position shown in dot and dash lines so as to permit the next paper length to pass thereunder.

The completed rolls are discharged to the collecting table 10 by tilting of the frame 6, as hinted at above. This tilting movement is effected by means of a rotatable disc 22 having a pin or projection 40 coacting with the circumference of a cam disc 23 controlled by a return spring 41 which causes an oscillatory rotation of the former. By means of a wire 24 fastened thereto, the disc 22 is connected with a lever 25 having a fixed pivot and connected by means of a link 26, near the end of the latter, by a pin 42 to the frame 6, so that said frame will be tilted by the periodical tension appearing in the wire 24. A device of this kind is preferably arranged at each side of the main frame, and the wire 24 is preferably provided with a turnbuckle 27 or the like for variation of the length of the same according to the greater or smaller opening of the working chamber desired. At both sides the frame 6 is provided with abutments 28 which, for the purpose of controlling the tilting movements of the frame, coact with adjustable stop members 29 limiting the movement in the closing direction and resilient stop members 30 limiting the movement in the opening direction. By adjustment of the stop members 29 the angle of inclination between the belt members at the working chamber may be varied, and the resilient action of the stop members 30 will cause a recoil adapted to accelerate the closing movement. The shaft 5 forming a pivot for the frame 6 is mounted in bearings which are adjustable substantially in horizontal direction, so that the distance between the belt members at the working chamber may be varied.

The supporting, tensioning and guiding drums 2 and 7 respectively are also mounted in adjustable bearings, so that the belt members may be controlled substantially in the same manner as the belts in a paper-making machine.

As the paper 11 at the entrance of the machine does not always take the same position in transverse direction, the whole machine is preferably made adjustable in said direction. For such purpose the main frame 1 is supported by transverse guides 31, so as to be displaced therein by means of screws 32.

A belt pulley 33 is, for instance, employed for driving the machine, such pulley acting on the shaft 5 and the driving drum 9 for

the belt member 8. By means of a chain and sprocket connection 34 the rotation is transmitted between the drums 9 and 4. The vibration device 17 is driven by means of a chain and sprocket connection 35 from the shaft of the drum 4. The gripper 12, the tensioning and retarding bars 18, 19 and the tilting means for the frame 6 are driven from a shaft 36.

It is to be distinctly understood that the invention is not limited to the particulars described above for the sake of explanation, and most of them may be substituted by equivalents acting substantially in the same manner as described without departing from the principle of invention.

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

1. In a sheet-rolling machine, a main frame; an endless main belt mounted therein and having a downwardly-inclined portion; an auxiliary frame tiltably mounted in the main frame; an endless auxiliary belt carried by the tiltable frame to tilt therewith and having an inclined portion disposed opposite and at an acute angle to the inclined portion of the main belt and cooperating with the same to form a downwardly-pointing, wedge-shaped working chamber, to receive rolled sheets from said main belt, said chamber being substantially closed at its lower end; independent supporting and driving means for each belt; and means for tilting the auxiliary frame and belt relatively to the main belt in a direction to open said chamber end and discharge a rolled sheet therethrough.

2. In a sheet-rolling machine, a main frame; an endless main belt mounted therein and having a downwardly-inclined portion; an auxiliary frame tiltably mounted in the main frame; an endless auxiliary belt carried by the tiltable frame to tilt therewith and having an inclined portion disposed opposite and at an acute angle to the inclined portion of the main belt and cooperating with the same to form a downwardly-pointing, wedge-shaped working chamber to receive rolled sheets from said main belt, said chamber being substantially closed at its lower end; independent supporting and driving means for each belt; and means for automatically tilting the auxiliary frame and belt relatively to the main belt at regular intervals in a direction to open said chamber end and discharge a roller sheet therethrough.

3. In a sheet-rolling machine, a frame; an endless main belt mounted therein and having a downwardly-inclined portion; an endless auxiliary belt tiltably supported with relation to the frame and having an inclined portion disposed opposite and at an acute angle to the inclined portion of the main belt and cooperating with the same to form a downwardly-pointing, wedge-shaped work-

- ing chamber to receive roller sheets from said main belt, said chamber being substantially closed at its lower end; independent supporting and driving means for each belt; and means for tilting the auxiliary belt bodily away from the inclined portion of the main belt so as to open the closed end of the chamber and thereby discharge a rolled sheet therethrough.
4. A machine according to claim 3, in which the main frame embodies two side members arranged opposite each other in spaced relation; means being provided for moving one member bodily toward or from the other, to adjust the width of the frame.
5. In a sheet-rolling machine, two endless, continuously-running belts having definite portions thereof arranged opposite each other at an acute angle and coacting to form a downwardly-pointing, wedge-shaped working chamber which is substantially closed at its lower end, said chamber adapted to receive rolled sheets from one of the belts; independent supporting and driving means for each belt; and means for rocking the other belt bodily in a direction to move its inclined portion away from that of the first belt, thereby to open the closed end of the chamber and discharge a rolled sheet therethrough.
6. A machine according to claim 5, in which a device is additionally provided for actuating the belt-rocking means automatically at regular intervals.
7. A machine according to claim 5, in which a device is additionally provided for actuating the belt-rocking means automatically at regular intervals; such device embodying, in combination with a tiltable frame carrying the rocking belt and a lever system connected to said frame, a rotary cam, driving means therefor, a rotary member operated by said cam, and a flexible connection between the rotary member and the lever system.
8. A machine according to claim 5, in which a device is additionally provided for adjusting the smallest angle between the belts at the working chamber.
9. A machine according to claim 5, in which resilient means are additionally provided for limiting the extent of movement of the rocking belt and for adjusting the angles between the belts.
10. In a sheet-rolling machine, two endless, continuously-running belts having definite, downwardly-inclined portions thereof disposed opposite each other at an acute angle and coacting to form a wedge-shaped working chamber substantially closed at its lower end to receive rolled sheets from one of the belts, the other belt extending below said chamber; independent driving and supporting means for the two belts; and means for shifting said other belt laterally away from the inclined portion of the first-named belt so as to provide an interspace between the belts at the lower end of the chamber.
11. In a sheet-rolling machine, an endless belt having the portion thereof nearest its receiving end supported in substantially horizontal position, and the portion thereof nearest its delivery end supported in downwardly-inclined position; a folding gripper pivotally mounted above the horizontal portion of the belt and normally occupying a lowered position in which the sheet may pass over it; a clamping bar cooperative with the gripper; means for periodically raising the gripper to clamp the sheet against said bar and subsequently releasing it; a second endless belt having an inclined portion arranged opposite the inclined portion of the first belt and coacting with the same to form a downwardly-pointed, wedge-shaped working chamber to receive rolled sheets from the first belt, which chamber is substantially closed at its lower end; the second belt being mounted to swing laterally away from the inclined portion of the first-named belt so as to provide an interspace between the belts at the lower end of the chamber; guiding means for the sheet material adjustable in a direction transverse to the direction of feed of said material; similar guiding means positioned at the sides of the working chamber; means for imparting a vibratory movement to the last-named guiding means; and independent supporting and driving means for each belt.
12. A sheet-rolling machine according to claim 10, in which tensioning and braking means located adjacent the working chamber and adapted to exert a retarding action on the sheet material entering said chamber, are additionally provided.
13. A sheet-rolling machine according to claim 10, in which tensioning and braking means located adjacent the working chamber and adapted to exert a retarding action on the sheet material entering said chamber are additionally provided; such tensioning and braking means embodying a tiltable bar movable into and out of substantially vertical position, and operating means for said bar.
14. In a sheet-rolling machine, two endless, continuously-running belts having definite portions thereof arranged opposite each other at an acute angle and coacting to form a downwardly-pointing, wedge-shaped working chamber which is substantially closed at its lower end, said chamber adapted to receive rolled sheets from one of the belts; independent supporting and driving means for each belt; means for rocking the other belt bodily in a direction to move its inclined portion away from that of the first belt, thereby to open the closed end of the chamber and discharge a rolled sheet therethrough; and a pair of bars for exerting a retarding action

on the sheet material, one located somewhat
in advance of the working chamber, and the
other at the upper part of said chamber; the
first bar being movable into and out of a sub-
stantially vertical position, and the second
bar being adapted to press the material
against the first-named belt after it has left
the first bar.

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

HJALMAR ANDERSSON.