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O. T. CHALON

1,925,917

PAPER PRESS BELT

Filed June 7, 1932

Fig. 1.

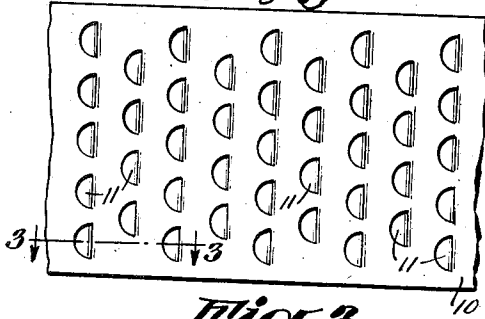


Fig. 2.

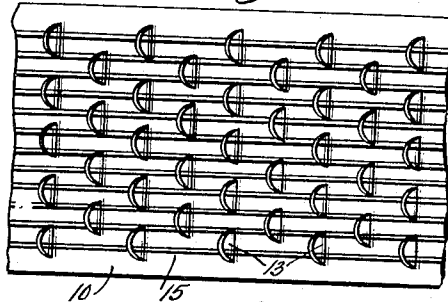


Fig. 3.

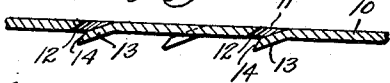


Fig. 4.

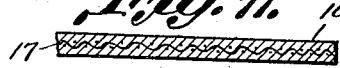


Fig. 5.

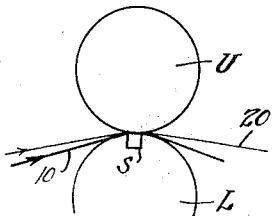


Fig. 6.

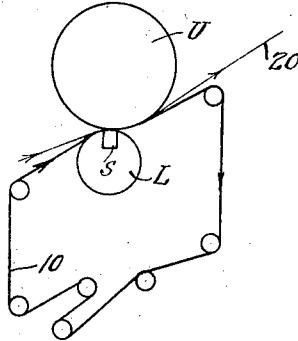


Fig. 7.

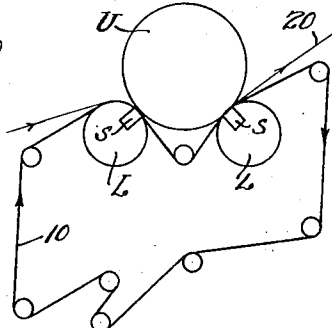


Fig. 8.

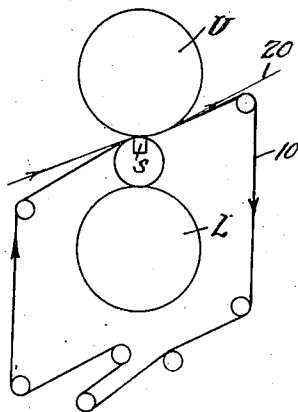


Fig. 9.

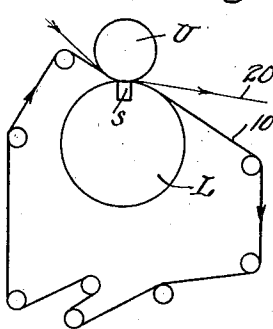


Fig. 10.

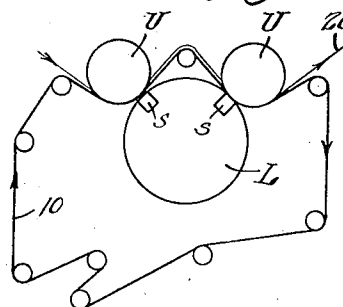


Fig. 11.



Inventor
Otto T. Chalon

By *Miller & Miller*
Attorneys

UNITED STATES PATENT OFFICE

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PAPER PRESS BELT

Otto T. Chalon, New York, N. Y.

Application June 7, 1932. Serial No. 615,935

7 Claims. (Cl. 92-49)

This invention relates to a paper press belt and has for an object to provide an improved endless paper press belt with self opening and self closing perforations.

5 In the manufacturing process of paper the wet paper web as it leaves the "wire" is freed as much as possible from its water contents by pressing the paper between one or more pairs of press rolls before it reaches the dryers.

10 By pressing the paper between these press rolls water accumulates on the lower of the two rolls and this water is apt to be drawn in between the rolls, thereby causing the wet paper to be crushed. To avoid this, endless wool felts, so called "press felts", passing through between the press rolls with the paper web separate the paper web from the lower press roll. These felts being of a more or less open weave permit the water that is being pressed out of the web to pass through the felt, the felt thereby separating the paper web from the water and preventing the crushing of the paper.

These press felts have to be made from wool of excellent quality to stand the various severe requirements. They are very expensive and they last, as a rule, only a few weeks. These felts very often cause a great deal of trouble and faulty paper in which case they have to be replaced with new ones. Press felts always cause more or less impressions of the weave in the paper so called "felt marks" which are objectionable. A felt of the nature just referred to is disclosed in Patent No. 1,844,294 issued February 9th, 1932.

35 The purpose of this invention is to replace these press felts with an endless belt, perforated in such a manner that the perforations in same open automatically to let off the water which the press rolls press out. To avoid impressions of these perforations on the surface of the paper, the perforations are made in such a way that they automatically close up when the belt passes the point where the pressure between the press rolls exists, thereby rendering the surface of the belt perfectly smooth.

By closing these perforations the endless belt presents a perfectly smooth surface, also imparting such a smooth surface to the paper which is not possible with press felts as they always cause in the paper "felt marks" to a greater or lesser degree. The shape, number, size and the arrangement of the perforations can be varied according to the requirements.

55 The belt moves at the same speed as the paper. The belt can be driven by the press

rolls or by any other device. Guide rolls hold the belt in proper position. One or more stretch rolls serve to give it the desired tension.

The belt may be made from rubber, natural or artificial leather or compositions thereof, guttapercha, balata, metal sheets, cellulose esters, viscose, or from other materials of sufficient flexibility, or from compositions containing the aforesaid materials. The belt may be reinforced with a fibre web or a metal web or both, or with threads, or wires, or both, running either crosswise or lengthwise, or both. The belts may also be made from fibres or fibre web coated or impregnated with rubber, guttapercha, rosins, viscose, cellulose esters, or other similar flexible materials, or from metal sheets in conjunction with one or more of the aforesaid materials.

The belts may be either smooth on one side, or on both sides, or they may carry designs on one side, or both sides. They may have ribs or elevations of another form on that surface that does not come in contact with the paper, to permit the water that has passed through the perforations to flow off more freely. The belt may also have the aforesaid ribs or elevations, respectively, on the side that comes in contact with the paper, if it is intended to impart to the paper certain effects, respectively, designs.

With the foregoing and other objects in view, as will hereinafter become apparent, this invention comprises the constructions, combinations, and arrangements of parts, hereinafter set forth, disclosed and shown on the accompanying drawing. In this drawing,

Figure 1 is a top plan view of a fragment of the endless paper press belt.

Figure 2 is a bottom view of a form showing ribs to permit water to flow off freely,

Figure 3 is a sectional view taken on line 3-3 of Figure 1.

Figures 4, 5, 6, 7, 8 and 9 are diagrammatic views showing different arrangements of the belt when the diameters of the press rolls are changed,

Figure 10 is a fragmentary plan view showing ribs or designs on top surface of belt imparting same effect to paper, (perforations being in closed position), and

Figure 11 is a modification sectional view showing belt reinforced with wire, etc.

There is shown at 10 a fragment of an endless paper press belt made of any suitable material such as above mentioned. A plurality of

series of perforations 11 are cut through the belt 10, each perforation 11 being bevelled as at 12, while a flap 13 formed by the act of perforating the belt has a bevelled edge 14 complementary to the bevel 12, it being apparent from Figures 1 and 3 that when the flap 13 is closed into the perforation 11, the bevel 14 and bevel 12 are complementary to each other, thus forming a perfectly smooth surface on the top of the belt 10. The belt 10 may be formed with an otherwise smooth surface on the top and bottom thereof, as shown in Figures 1 and 3, or it may be provided for the series of longitudinal ribs 15 as shown in Figure 2 on the bottom thereof, serving to keep the belt 10 slightly above the lower press roll in operation, thereby permitting the water that has passed through the perforations 11 to flow off more freely.

The ribs 15 are spaced on the lower side of the belt 10 when so desired, that is, on the inner surface of the belt that comes in contact with the lower press roll in operation. At 16, on the belt 10, shown in Figure 10, are shown a series of ribs on the upper surface of the belt 10, that is, the surface of the belt 10 that supports the paper as it passes through the press roll. The showing of the rib 16 is intended to diagrammatically represent any desired design or effect that it is desired to have cut in the paper, the rib 16 being placed on the upper surface of the roll 10, that is, that surface of the belt 10 which supports the paper, diagrammatically shown at 20. The belt 10 may be made either plain on both surfaces as shown in Figures 1 and 3, or with ribs 15 or other designs on the lower surface for assisting in draining the water off, as shown in Figure 2, or with ribs or other designs 16 on the upper surface, which ribs or other designs are to be impressed in the paper 20.

Obviously, both ribs 15 on the lower surface and designs 16 on the upper surface may be provided on the same belt. In Figure 11 a cross section of the belt 10 is shown wherein the belt 10 is provided with a metal or fiber reinforcement 17 running therethrough and reinforcing the same. If desired, this reinforcement material can be placed on the outer surface of the belt.

The width of the opening of the perforations may be governed by the diameter of the press rolls, the upper press roll being shown at U and the lower press roll at L. Figure 4 diagrammatically shows approximate comparison of the diameters of regular upper and lower press rolls, such as shown in the aforementioned Patent No. 1,844,294. If the belt is guided in such a way that it touches the lower roll before it touches the upper roll, the diameter of the lower roll should be decreased, as in Figure 5, to widen the openings. Instead of one lower roll of a smaller diameter two or more lower rolls of smaller diameter may be installed as in Figure 6. To widen the openings of the perforations a roll of smaller diameter may be inserted between the upper and the lower rolls of regular size, as in Figure 7. If the belt is guided in such a way that it touches the upper roll before it touches the lower roll the diameter of the upper roll

should be decreased to widen the openings as in Figure 8. Instead of one upper roll of smaller size, two or more upper rolls of smaller size may be installed as in Figure 9. Vacuum may be applied through suction rolls or suction boxes to draw off the water from the belt as indicated in Figures 1 to 6 by (s).

The novel features and the operation of this device will be apparent from the foregoing description. While the device has been shown and the structure described in detail, it is obvious that this is not to be considered limited to the exact form disclosed and that changes may be made therein within the scope of what is claimed without departing from the spirit of the invention.

As will be apparent from Figures 1, 2 and 3, the flaps 13 are self closing as the belt 10 passes over the lower press roll L, the bevelled edge 14 complementing the bevel 12 of the perforations 11, and providing a smooth surface supporting the paper over the pressure of the lower roll L.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. An endless press belt of flexible material having a plurality of self opening and closing perforations, a plurality of flaps depending from said belt, opening and closing the perforations automatically without exerting special pressure.

2. An endless press belt having a plurality of perforations therethrough, a depending flap formed on each of said perforations, each flap being attached to said belt, whereby said flaps may close into said belt, and whereby said flaps may open to permit the passing of fluid therethrough.

3. An endless press belt having a plurality of perforations therethrough, a depending flap formed on each of said perforations, each flap being attached to said belt, said belt having a smooth surface on the upper and on the lower side.

4. An endless press belt having a plurality of perforations therethrough, a depending flap formed on each of said perforations, each flap being attached to said belt, said belt having a smooth surface on one side.

5. An endless press belt having a plurality of perforations therethrough, a depending flap formed on each of said perforations, each flap being attached to said belt, said belt having a ribbed surface on one side, said surface being in any desired design.

6. An endless press belt having a plurality of perforations therethrough, a depending flap formed on each of said perforations, each flap being attached to said belt, said belt having a ribbed surface on both sides, said ribbed surface being in any desired design.

7. An endless press belt having a plurality of perforations therethrough, a depending flap formed on each of said perforations, each flap being attached to said belt, whereby said flap may close into said belt and whereby said flap may open to permit the passing of fluid therethrough, and reinforcing means provided throughout said belt.