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(54) Paper holder of video printer.

(57) Disclosed is a device for reducing a printing time by discharging a record paper under the condition of friction force just after printing completely, and for saving a substantial length of a ribbon by advancing a ribbon only for printing. Thus, when printing the third color C after printing the first and second colors Y and M, and a holding bar is separated from the record paper, the record paper is lifted by its resilient force. As a result, printing of three colors Y, M and C is performed simultaneously with the discharging of the printed record paper.

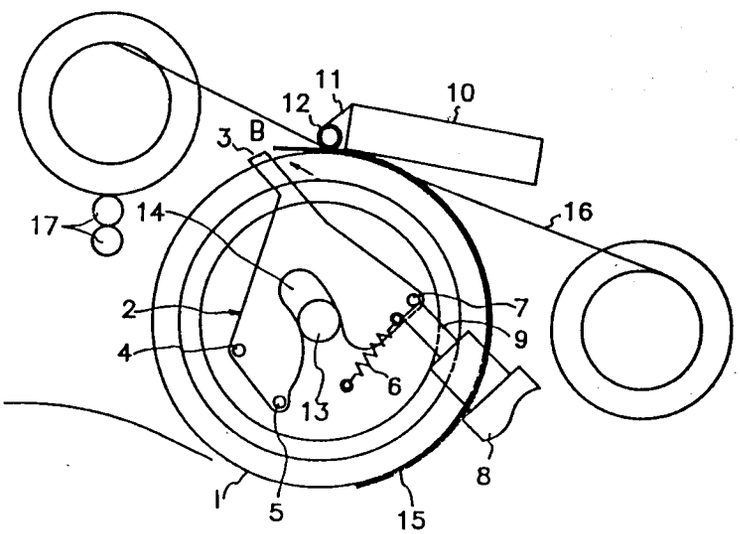

FIG. 5G

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BACKGROUND OF THE INVENTION

The present invention relates to an apparatus for holding a paper in a video printer, and more particularly the paper holder of the video printer for increasing a printing speed with a high picture quality.

Generally a video printer is introduced for printing a picture recorded by acquiring a video signal momentarily and the picture to be reproduced on a monitor through a recording device such as a still camera. There disclosed is a method of heat conductive sublimation for sublimating each of three colors of yellow(Y), magenta(M) and cyan(C) successively, which enables a gradation of the color to be expressed freely, thus expressing all kinds of colors of the video signal.

With reference to Fig.1, the video printer comprises an ink ribbon 16 applied with a dye of three colors Y, M and C consecutively, a heat sensitive record paper 15, and a thermal printing head (T.P.H.) 10 for pressing a platen drum 1 selectively.

If the platen drum 1 rotates after fixing the record paper 15 on its side surface, the record paper 15 and the ink ribbon 16 advance at the speed of the platen drum 1. Each of dyes Y, M and C is sublimated by the heat value of the T.P.H. 10, and is absorbed on the record paper 15. Various rate of the absorbed dyes Y, M and C makes various synthesized colors with different gradation so that the printing of all kinds of color is possible.

In the operation as described as above, a device for fixing the record paper on the platen drum of the video printer is required because the platen drum rotates three times for complete printing onto the record paper.

As shown in Fig.2, there is disclosed a holder for fixing the record paper on the platen drum, wherein the holder 23 is installed around a shaft 13 of the platen drum 1 and set by a spring 6, and a clamp bracket 22 actuates a side end of the holder 23 so as to let the holder fix or release the record paper.

The holder 23 is pushed by the clamp bracket 22 rotating anti-clockwise and is lifted from the surface of the platen drum 1 so as to receive the record paper. By returning the clamp bracket 22, the holder 23 is released to its original position by a restoring force of the spring 6 so as to fix the record paper 15 by pressing.

The T.P.H. 10 is lifted at a fixed position of the circumference of the platen drum 1 so as to make an opening for passing the holder 23 when the platen drum 1 rotates. The T.P.H. 10 generates a heat during the pressing of the ribbon just after passing the holder through the opening, transcribing the dyes on the ribbon to the heat sensitive record paper.

By repeating the above operation, the three colors of Y, M and C are printed. Thereafter, an arm end of the clamp bracket 22 pushes the holder 23 by rotating anti-clockwise, releasing a forefront tip of the printed record paper and discharging the printed record paper. At this time, the T.P.H. should press the record paper, because in case of the T.P.H. being detached from the record paper, the friction force is not supplied to the record paper and though the ribbon advances, the ribbon is damaged if not the friction force.

Accordingly it is required for advancing a black portion of the ribbon to provide an additional length of the ribbon even after printing the three colors completely. And it takes more time for the platen drum to rotate once more in addition to an actual printing time. So it results in wasting of printing time and material.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a device for reducing a printing time, by applying friction force to a record paper simultaneously with printing completion, thereby to discharge the record paper.

The object of the present invention is to provide a device for reducing a substantial length of a ribbon by discharging the printed paper right after printing completion.

According to the present invention, there is provided a paper holder for fixing a record paper on a platen drum in a video printer, comprising a holding bar for fixing the record paper on the platen drum, two clamp brackets formed at both end of the holding bar and installed on both side walls of the platen drum so as to rotate the holding bar around a hinge in the clamp bracket and set by a spring, a driving unit for actuating the clamp bracket, and a roller for applying a transmission friction force to the recording paper.

BRIEF DESCRIPTION OF DRAWINGS

These and other features of the invention will be understood from the following description of illustrative embodiment, with reference to the drawings, in which:

Fig.1 is a schematic diagram of a video printer;

Fig.2 is a schematic diagram of a conventional paper holder of a video printer;

Fig.3 is an exploded view of a paper holder of the inventive video printer;

Fig.4 is an exploded view of a heat sensitive recording head of the inventive video printer; and

Fig.5 is an operation diagram of a paper holder of the inventive video printer.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

With reference to Fig.3, two clamp brackets 2 which are connected to both side ends of a holding bar 3 respectively, are installed on both outer side walls of a platen drum 1 so as to rotate around a hinge 4 formed in each clamp bracket 2. A protrusion pin 5 is projected from the outer surface of the clamp bracket 2 with being apart from the hinge 4. One terminal of a spring 6 is mounted on an inside surface of the clamp bracket 2, and the other terminal thereof is mounted on the bottom or top surface of the platen drum 1, so as to pull the holding bar 3 toward a circumference of the platen drum 1 by its resilient force. Another protrusion pin 7 is formed near the spring 6 with opposing to the protrusion 5. Thus a flange 9 of a solenoid 8 is contactable with the protrusion pins 5 and 7.

With reference to Fig.4 and Figs.5A to 5H, T.P.H. 10 is positioned over a upper space of the platen drum 1 and is connected to a roller 12 through a leaf spring 11 at the forefront of the T.P.H. 10. Middle portion of the clamp bracket is curved toward the holding bar to form a slide groove 14 between the curve of said middle portion and a shaft 13 of the platen drum 1. Thus, when the flange 9 of the solenoid 8 pushes the protrusions 5 and 7, the clamp bracket 2 moves around a circumference of the shaft 13. A discharging roller 17 discharges a heat sensitive record paper 15, and a ribbon 16 is positioned between the T.P.H. 10 and the platen drum 1.

The operation of the present invention will be described as follows.

The record paper is transmitted through a guide passage and which is detected by a sensor (not shown). The flange 9 of the solenoid 8 pushes the projected pin 5 of the clamp bracket 2. So, the clamp bracket 2 is rotated anti-clockwise around the hinge 4 while the slide groove 14 moves around the circumference of the shaft 13. And the holding bar 3 moves toward from the surface of the platen drum 1 to be apart from the circumference of the platen drum 1 as shown in Fig.5B.

As shown in Fig.5C, the clamp bracket 2 is rotated at the hinge 4 clockwise, returning to its original position by a resilient force of the spring 6, as soon as an electric source of the solenoid 8 is cut. Accordingly the forefront tip of the record paper 15 is fixed between the holding bar 3 and the platen drum 1. Accordingly the record paper 15 moves along the surface of the platen drum 1 according as the platen drum 1 rotates in order to print a given color.

As shown in Fig.5D, if the holding bar 3 along with the record paper 15 delivers to the position A, the T.P.H. 10 is lifted so as to pass the holding bar 3. The platen drum 1 rotates further until the holding bar 3 arrives at a point B. Thereafter as shown in Fig.5E, the roller 12 of the T.P.H. 10 presses the ribbon 16 on the record paper 15 to provide a friction force to the record paper 15. Thereby the printing operation is performed by heat generated from the T.P.H. 10. The above printing operation is as same as that of the conventional video printer. That is, during the holding bar 3 continues to rotate further from the point B, the T.P.H. 10 generates heat and sublimates a dye of Y color, printing the Y color on the record paper 15 as shown in Fig.5F.

When the holding bar 3 returns to the point A after completing the printing of Y color, as shown in Fig.5D, the T.P.H. 10 is lifted again for passing the holding bar 3. The platen drum 1 further rotates to deliver to the point B, and at this time the color M is printed on the record paper 15 by repeating the same operation as shown in Figs.5E and 5F.

When the holding bar 3 arrives at the point B after printing the color Y and M in the above operation, it rotates by the angle of 15° more after two and half revolutions, which is detected by the sensor. At this time, the platen drum stops rotating. Then the flange 9 of the solenoid 8 pushes the protrusion 7 of the clamp bracket 2 anti-clockwise so as to move the holding bar 3 from the point B to the direction of an arrow, the holder being apart from surface of the platen drum 1 as shown in Fig.5G, and the record paper 15 being lifted by its resilient force.

With reference to Fig.5H, when cutting an electric source of the solenoid 8, the holding bar 3 presses the surface of the platen drum 1 by a restoring force of the spring 6, the record paper being over the holding bar. Thereafter the platen drum 1 continues to rotate for printing the color C. The record paper in which only Y and M colors are printed is fixed on the platen drum safely by a friction force of the roller 12. The discharging roller 17 transmits the print-completed paper to a discharging tray right after printing completion.

In conclusion, the paper holder increases the printing speed by preventing the platen drum from rotating unnecessarily and prevents the waste of the ribbon by discharging the printed paper right after printing completion of whole color.

While the present invention has been shown and described with reference to the preferred embodiment thereof, it will be understood by those skilled in the art that foregoing and other changes in form and details may be made without departing from the spirit and scope of the present invention.

Claims

1. An apparatus for holding a record paper on a platen drum in a video printer comprising:

two clamp brackets (2) each connected to each other through a holding bar (3) for pressing said record paper (15) on a side surface of said platen drum (1), said each clamp bracket being installed on top or bottom surface of said platen drum (1), so as to rotate around a hinge (4) formed in said clamp bracket (2);

a driving means (8, 9) for actuating said clamp brackets (2), so that said holding bar (3) is apart from said side surface of said platen drum (1);

a roller (12) connected to a thermal printing head (10) positioned over said side surface of said platen drum (1), for pressing a ribbon (16) to provide a transmission friction force to said record paper (15); and

whereby a plurality of colors (Y, M and C) are printed on said record paper (15) by heat generated from said thermal printing head (10), and if said holding bar (3) is apart from said side surface of said platen drum (1) by said driving means (8, 9) before printing of last color (C), the print-completed record paper is discharged right after said printing of said last color (C).

2. An apparatus as claimed in Claim 1, wherein middle portion of said clamp bracket (2) is curved toward said holding bar (3) to form a slide groove (14) between the curve of said middle portion and a shaft (13) of said platen drum (1), and said clamp bracket (2) comprising:

a first prominence pin (5) receiving a press from said driving means (8, 9), for moving said holing bar (3) upward, thereby inserting said record paper (15) between said holding bar (3) and said side surface of said platen drum (1), said first prominence pin (5) being positioned apart from said hinge (4);

a second prominence pin (7) receiving a press from said driving means (8, 9), for moving said holding bar (3) upward, thereby separating said record paper (15) from said holding bar (3), said second protrusion pin (7) being positioned so as to be opposite to said first protrusion pin (5); and

a spring means (6) for moving automatically said holding bar (3) toward said platen drum (1), thereby said holding bar (3) being contacted with said side surface of said platen drum (1) when said press applied to said first and second protrusion pins (5, 7) are removed, one terminal of said spring means (6) being mounted on an inside surface of said clamp bracket (2), and the other terminal thereof being mounted on said bottom or top surface of said platen drum (1).

3. An apparatus as claimed in Claim 1, wherein said driving means comprises a solenoid (8).

4. An apparatus as claimed in Claim 1, further comprising a resilient rod (11) connecting said roller (12) to said thermal printing head (10).

5. An apparatus for fixing a record paper on a platen drum in a video printer comprising:

a holding bar (3) for pressing said record paper on said platen drum (1);

a bracket (2) formed in a body of said holding bar (3) and installed on a side wall of said platen drum (1) so as to rotate said holding bar (3) around a hinge (4) and set by a spring (6);

a driving unit for actuating said bracket (2); and

a roller (12) for increasing a transmission friction force installed on a thermal printing head (10).

6. An apparatus as claimed in Claim 5, wherein said bracket (2) is installed on the side wall of said platen drum (1) so as to be rotated around said hinge (4), at least one projected pin (5), (7) is formed apart from said hinge (4) on said bracket (2), a side end of said bracket (2) is set by a resilient force so as to make said holding bar press a circumference of said platen drum (1), and a slide groove (14) is formed between said projected pins (5), (7) so as to slide said bracket (2) eccentrically.

7. An apparatus as claimed in Claim 5, wherein said driving unit comprises a solenoid (8).

8. An apparatus as claimed in Claim 5, wherein said roller (12) is installed and supported by a resilient rod on said thermal printing head (10).

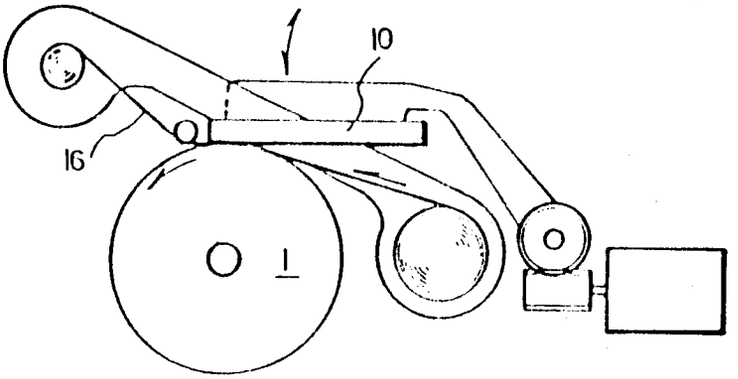

FIG. 1

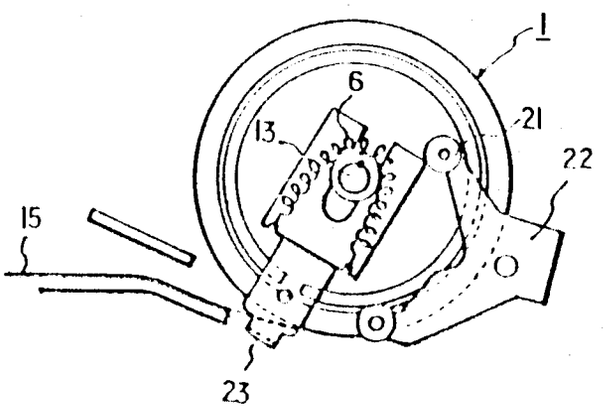

FIG. 2

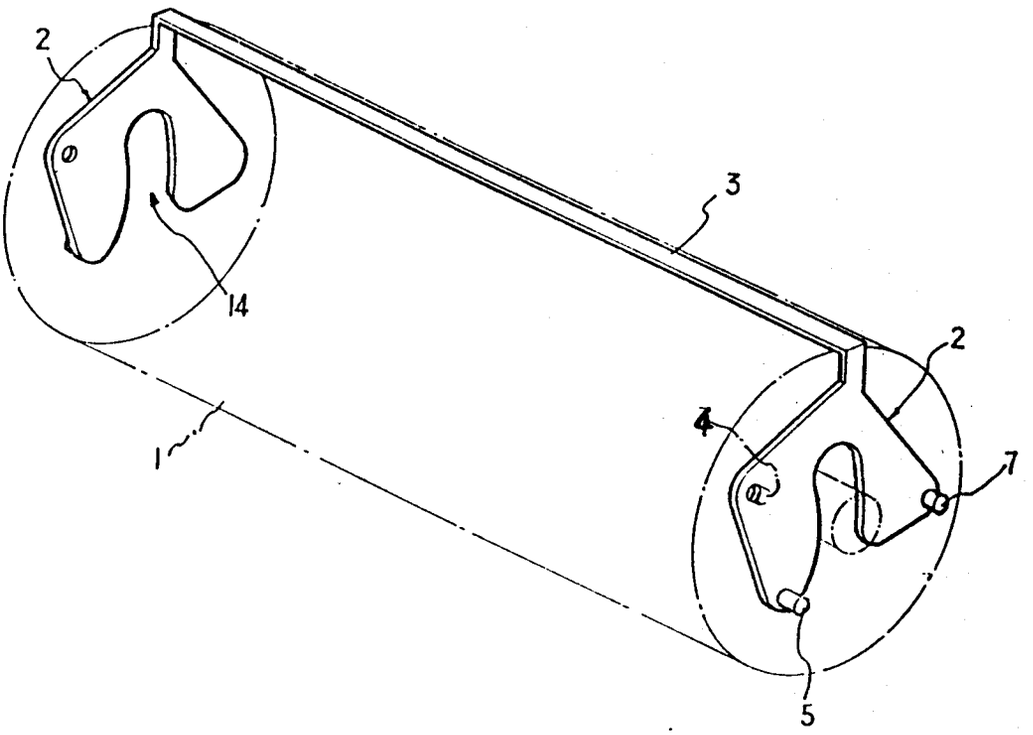

FIG. 3

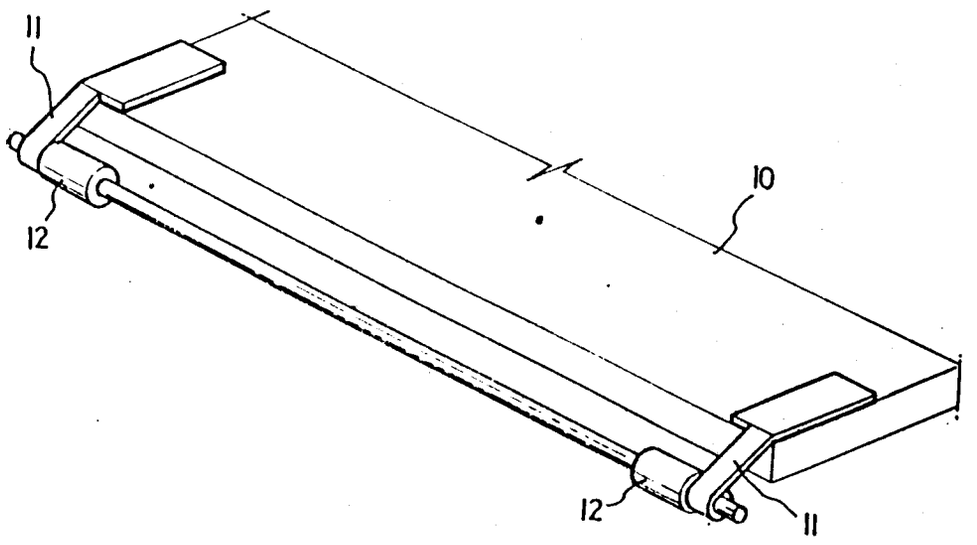

FIG. 4

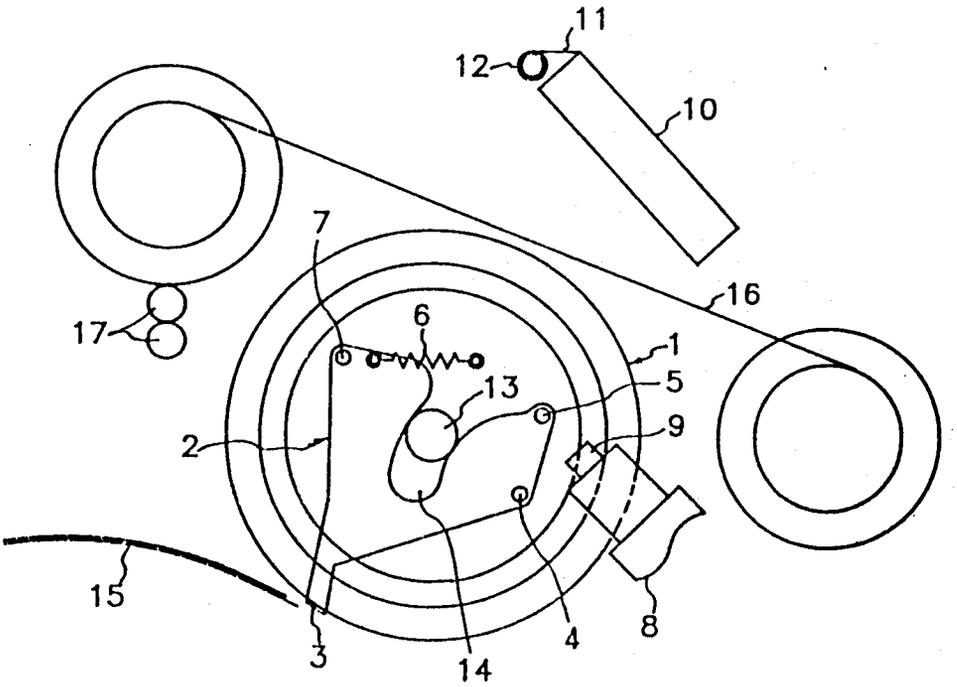
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FIG. 5A

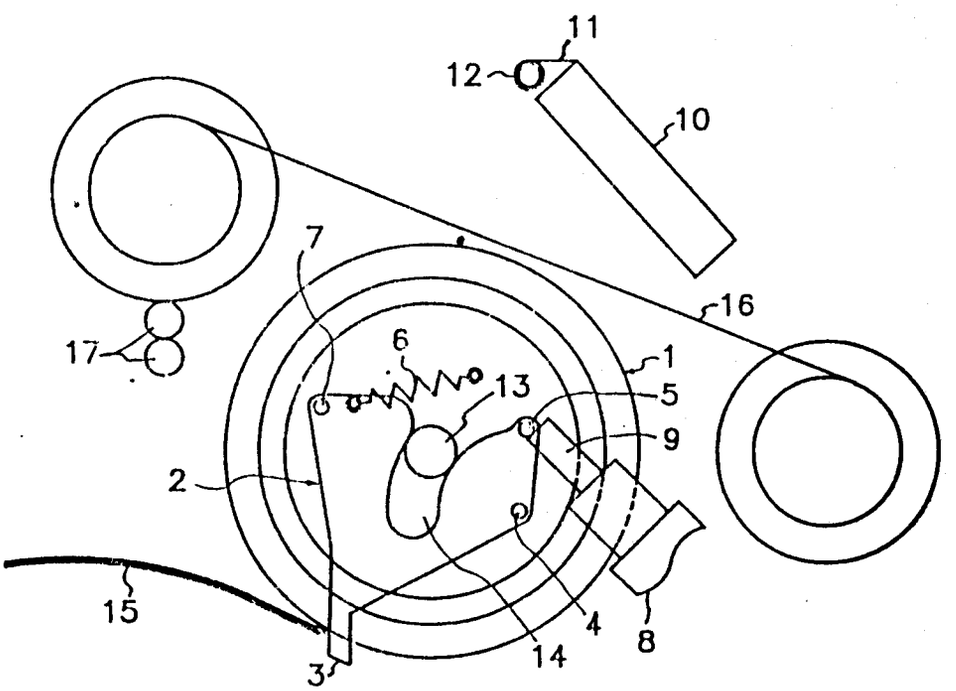
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FIG. 5B

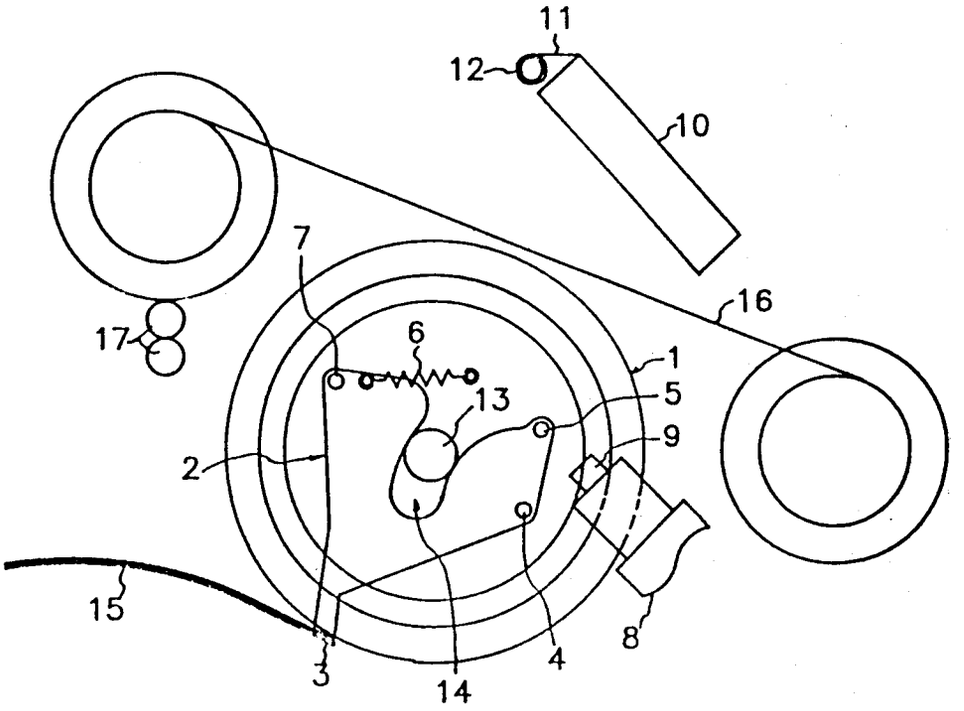
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FIG. 5C

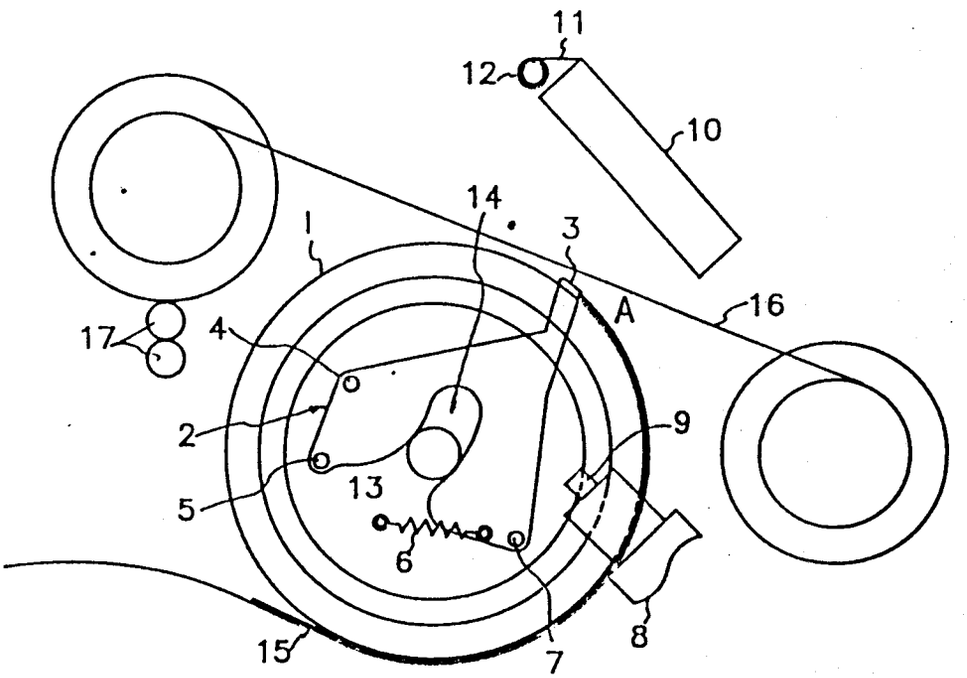
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FIG. 5D

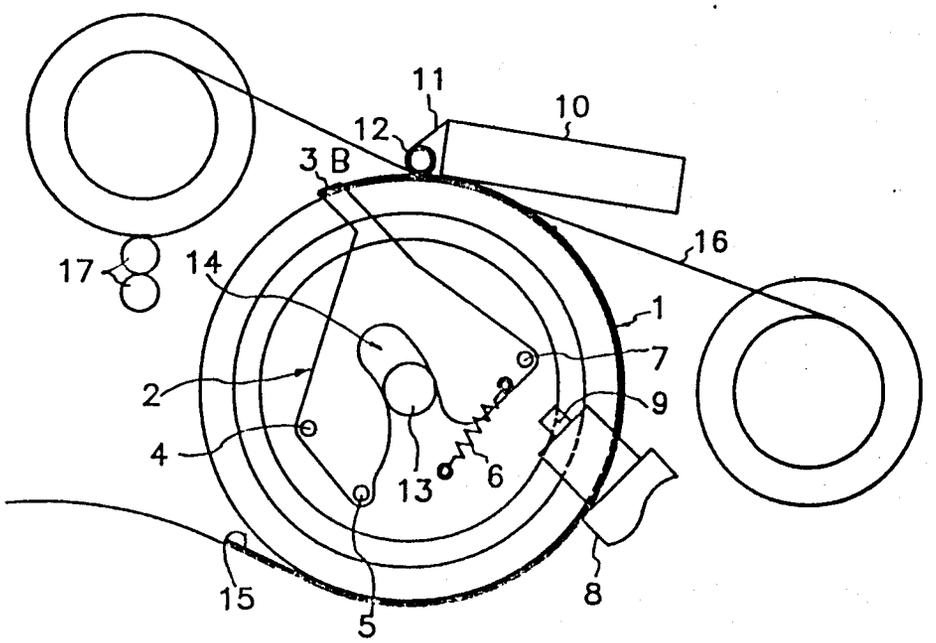

FIG. 5E

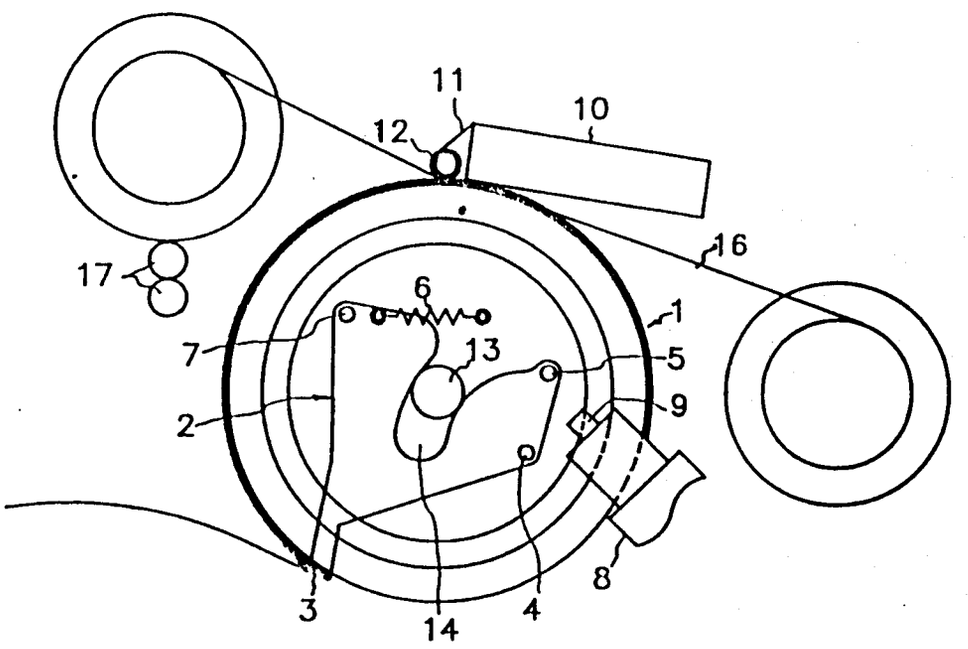

FIG. 5F

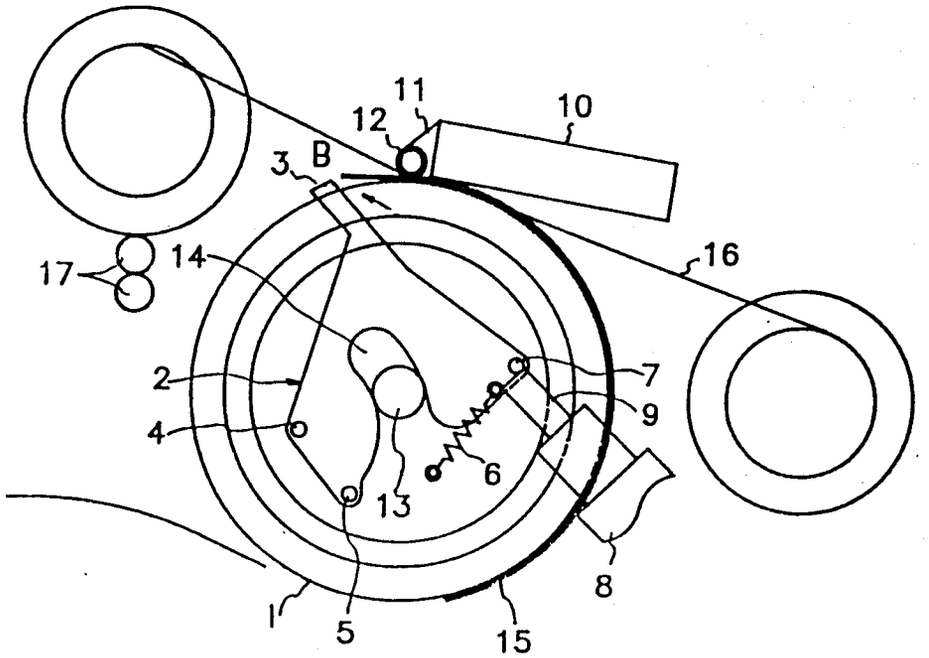
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FIG. 5G

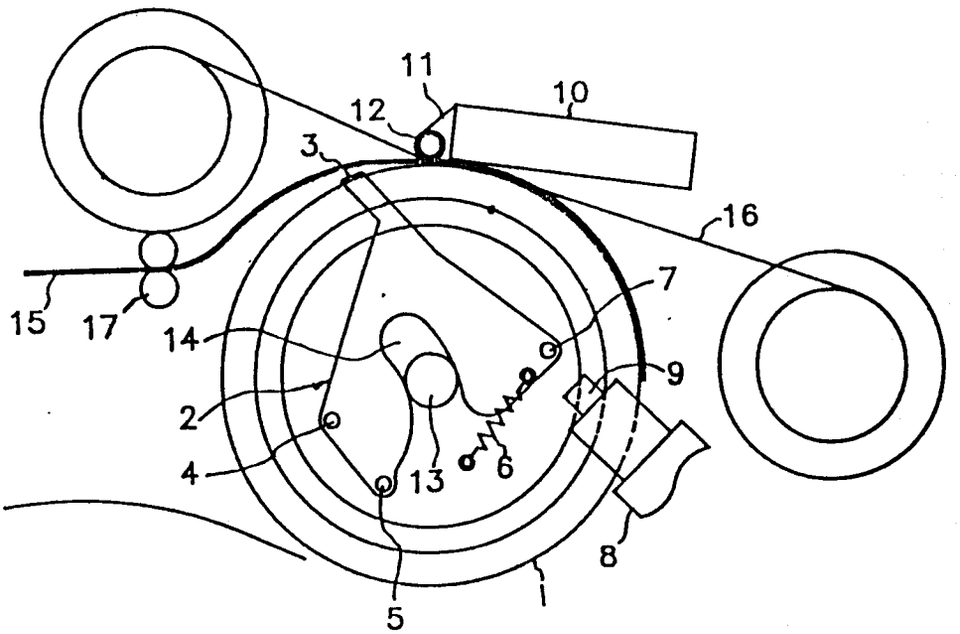
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FIG. 5H