United States Patent

Morimoto

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[54] STRIP MACHINE

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[52] **U.S. Cl.** .....**93/36 A,** 83/103
[51] **Int. Cl.** **B26d 7/18,** B31b 1/14
[58] **Field of Search** .....93/36 A; 83/102, 103

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[57] **ABSTRACT**

A strip machine comprising a waste strip roll and a press roll arranged opposite to each other. A waste contour corresponding to a waste portion to be cut from the material cardboard is placed on a soft plate such as rubber and a number of pins are pierced from the back side of said waste contour through said soft plate so that the tips of pins project from the surface of the soft plate. Such plate is removably placed on the circumferential surface of said strip roll. When another developed configuration of a cardboard box is applied to the strip roll, the old waste contour is replaced with a new one with a number of pins planted so that the positions of the pins are altered on the strip roll.

5 Claims, 6 Drawing Figures

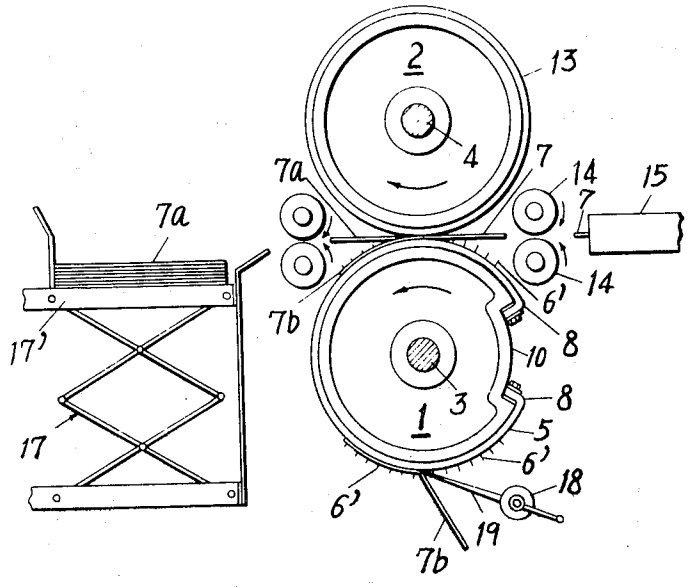


Fig. 1.

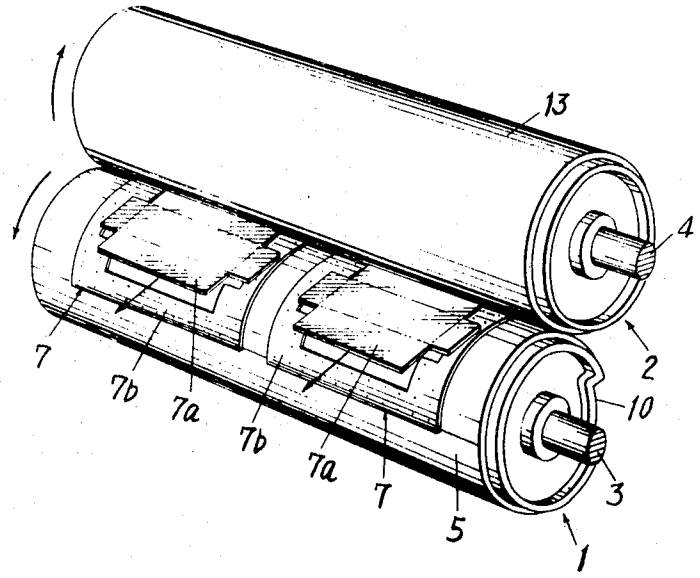
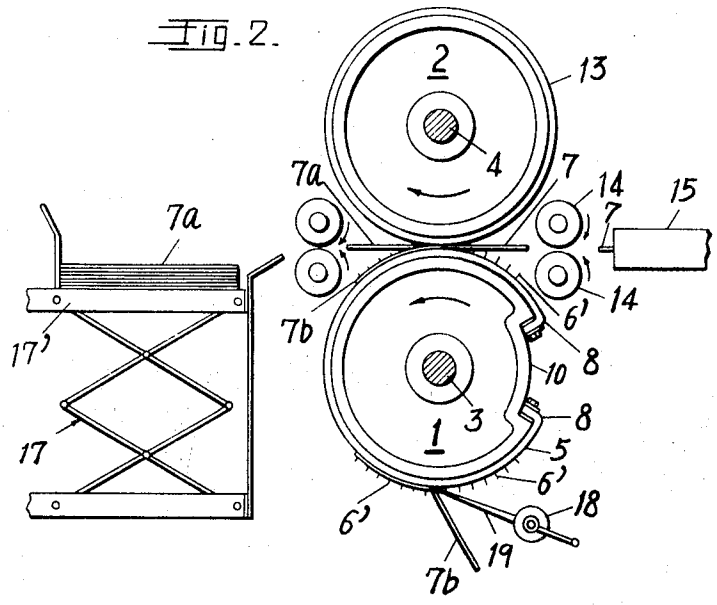


Fig. 2.



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Fig. 3.

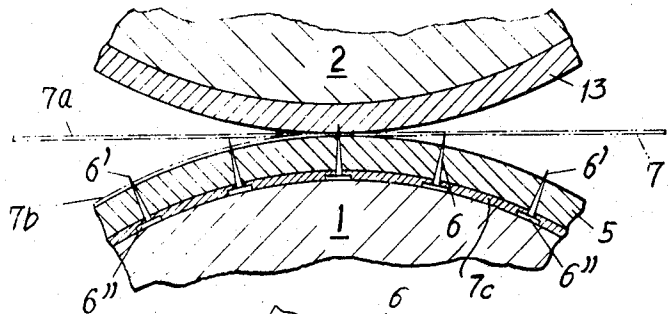


Fig. 4.

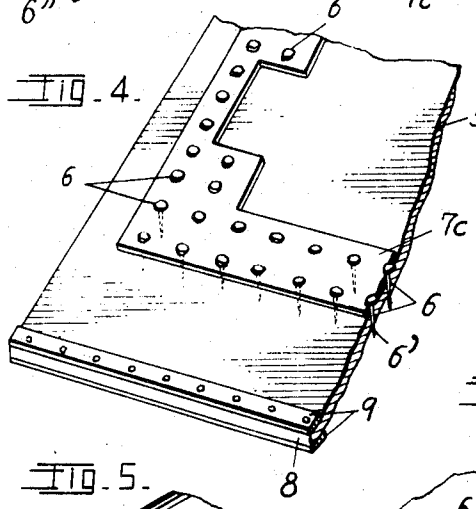


Fig. 5.

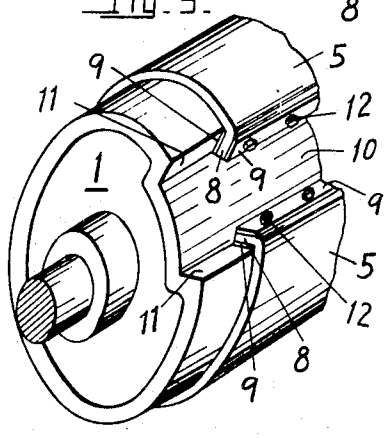
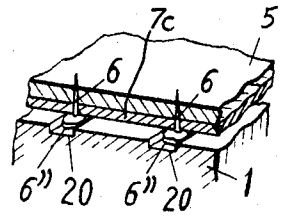


Fig. 6.



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STRIP MACHINE

This invention relates to a strip machine to be employed in cardboard-box-making process for removing the waste portion from the developed configuration of a cardboard box notched on material cardboard. More specifically, this invention relates to a strip machine comprising two rolls arranged in opposite relation to each other between which a material cardboard passes and the waste portion is removed therefrom by means of needles of thumbpins provided on the circumferential surface on one of said rolls.

One object of the present invention is to furnish a strip machine in which a waste strip roll has on its circumferential surface of number of needles or pins that are easily planted and replaced.

Another object of the present invention is to furnish a strip machine in which the position of planting pins on the strip roll is easily determined.

A further object of the present invention is to furnish a strip machine in which a press roll for pressing material cardboard and placed opposite said strip roll is provided with a means for receiving the tip of pins while the machine is in operation.

Still another object of the present invention is to furnish a strip machine that is suitable for high speed and continuous operation in cardboard-box-making process.

Still further object of the present invention is to furnish a strip machine in which the waste portion of material cardboard carried on said strip roll is automatically removed therefrom.

In order to achieve the objects of the present invention, the strip roll of this machine is provided on its circumferential surface with a soft plate having a number of pins planted from its back side and the press roll opposite said strip roll has likewise a soft plate on its circumferential surface to receive the tips of said pins.

Other objects and advantages of the present invention will become apparent as description proceeds with reference to the accompanying drawings in which:

FIG. **1** is a perspective view of rolls of a strip machine according to the present invention.

FIG. **2** is a side view of the strip machine of the present invention.

FIG. **3** is an enlarged sectional view of a part of rolls.

FIG. **4** is a back side view of a soft plate with a number of pins planted.

FIG. **5** is a perspective view of the roll showing a way of attaching the soft plate thereto.

FIG. **6** is a sectional view of the strip roll showing an annular groove formed on the surface thereof.

In the drawings, a waste strip roll **1** is shown engaged to a press roll **2** for pressing material cardboard, said rolls having shafts **3** and **4** respectively connected to a drive source (not shown).

The circumference of roll **1** is covered with a soft plate **50** of rubber or synthetic resin material for planting pins or needles. As is best seen in FIG. **4**, the soft plate **5** is planted with a number of pins **6** from its back side therethrough and the tip **6'** of each pin projects from the outer surface of the soft plate.

The region to be planted with the pins is defined by initially placing on the back side of the soft plate **5** a waste contour *7c* corresponding to waste portion *7b* cut from the material cardboard **7**, and then planting is made with pins through the region of the waste contour *7c*. The waste contour **7** may be, for example, of cardboard or paper, and the configuration may be that of a cardboard box.

It is important to determine the length of the projecting portion of the pin. This depends on the thickness of the material cardboard and the pin **6** should have a flat head **6''** to snugly fits the circumferential surface of the roll.

Instead of arranging the head **6''** of pin to directly contact the surface or roll **1**, the roll **1** may be provided across its circumferential surface a number of annular grooves **20**, as seen in FIG. **6** in which said head **6''** is positioned so that the pin will be free from displacement or distortion. Of course such grooves should be formed to register the position of pins **6** on the circumferential surface of roll **1**.

The side ends **8,8** of soft plate **5** are secured respectively between holder plates **9,9** on the sidewalls **11** of a groove **10** longitudinally extending on the roll and detachably retained by bolts **12**.

The circumferential surface of the press roll **2** is also covered with a soft plate **13** of rubber or synthetic resin so that the tip **6'** of pins **6** can plunge thereinto. The soft plate **13** may be fastened round the roll **2** in a like manner as the soft plate **5** is attached to roll **1** or instead may be shaped as a preformed cylinder may be fixed around the roll **2**.

The whole strip machine of the present invention is arranged as shown in FIG. **2**.

Forwardly of the rolls **1** and **2** a pair of idle rolls **14, 14** are provided to pass material cardboards. Further forwardly thereof, there is a feeder **15** for feeding material cardboards which is operated in associated relation with said rolls **1** and **2**.

Rearwardly of the rolls **1** and **2**, there are a pair of auxiliary rolls **16, 16** for delivering cardboards **7** died out in a developed configuration from material cardboards to a reception tray **17**. This reception tray **17** is of a construction to be vertically adjustable, that is, as the died out cardboards delivered on the frame **17'** of the tray **17** come to stack thereon, the frame **17'** is adjusted its height. For delivering such stacked cardboards cut in a developed configuration *7a* of a box to the next station for further process, any conveyor system instead of this tray may be provided.

Positioned below the roll **1** is a waste remover **18** for removing the waste portion *7b* of cardboard which has been transferred on the circumferential surface of roll **1**. This waste remover has a nail **19** with which the waste *7b* caught by pins **6** is removed. Such nail **19** is positioned in a place so that the pins **6** will not contact thereto. Instead of this, any type of remover, for example, a rotatable brush may be employed.

The material cardboard **7** fed from feeder **7** is guided by idle rolls **14, 14** and delivered between the rolls **1** and **2** whereupon only the waste portion *7b* is caught by the pin **6** of roll **1** and rotates therewith while the developed configuration *7a* of cardboard box is delivered through idle roll **16** to the reception tray **17**. When the waste portion *7b* rotated with the roll **1** reaches the under side of the roll, it is removed from pin **6** by remover **18** and drops down, such waste *7b* is conveyed to the next station by a conveyor (not shown).

When it is desired to remove the waste portion from another pattern of developed configuration of a box notched in material cardboard, the soft plate **5** now placed on roll **1** is removed and on the back said thereof a new pattern of the waste contour *7c* corresponding to the waste portion to be cut from the material cardboard is placed, then pins are planted over only the area of the waste contour.

It will be apparent from the above that the present invention provides easy planting and replacement of pins on the soft plate of roll to be registered with the waste portion from the developed configuration of a box in material cardboard and further provides the means to receive said pins.

I claim:

1. A strip machine comprising a s strip roll having an axially extending holding means, said roll being circumferentially covered with a removable soft plate of rubber or synthetic resin material having edges secured to said axially extending holding means, said soft plate overlying a waste contour corresponding in configuration to the portion to be died out, said plate having passing therethrough a number of pins in the region of said waste contour from the back side of said waste contour so that the tips of said pins project from the upper surface of said plate; and a press roll arranged in opposite relation to said strip roll also covered with a soft plate.

2. A strip machine comprising a strip roll having an axially extending holding means, said roll being circumferentially covered with a removable soft plate made of rubber or synthetic resin material having edges secured to said axially extending holding means, said soft plate overlying a waste contour corresponding to a waste portion to be cut from a notched developed configuration of a cardboard box, said plate having passing therethrough a number of pins in the re-

gion of said waste contour from the back side of said waste contour so that the tips of said pins project from the upper surface of said plate; and a press roll arranged in opposite relation to said strip roll also covered with a soft plate.

3. A strip machine comprising a strip roll having an axially extending holding means, said roll being circumferentially covered with a removable soft plate of rubber or synthetic resin material having edges secured to said axially extending holding means, said soft plate overlying a paper of waste contour corresponding to the configuration of a cardboard box blank, said plate having passing therethrough a number of pins in the region of said paper of waste contour from the back side of said paper so that the tips of said pins project from the upper surface of said plate; and a press roll arranged in opposite relation to said strip roll also covered with a soft plate.

4. A strip machine as claimed in claim 1, wherein said holding means comprises a groove axially extending on the circumferential surface of said roll, the side edges of said plate being secured on the sidewalls of said groove respectively.

5. A strip machine comprising a strip roll having a plurality of annular grooves on its circumferential surface, said roll being circumferentially covered with a removable soft plate of rubber or synthetic resin material overlying a waste contour corresponding in configuration to the portion to be died out, said plate having passing therethrough a number of pins in the region of said waste contour from the back side of waste contour so that the tips of said pins project from the upper surface of said plate and the heads of said pins are securely inserted in said grooves in said strip roll; and a press roll arranged in opposite relation to said strip roll also covered with a soft plate.

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