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Bottcher

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[54] **APPARATUS FOR CONNECTING AN UNCADENCED APPARATUS TO A FOLLOWING CADENCED APPARATUS FOR THE HANDLING OF SHEETS**

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[52] **U.S. Cl.**.....**271/47,** 271/50

[51] **Int. Cl.**.....**B65h 7/02,** B65h 9/14

[58] **Field of Search** 198/34; 271/50, 47, 60, 75, 271/76, 58

[56] **References Cited**

UNITED STATES PATENTS

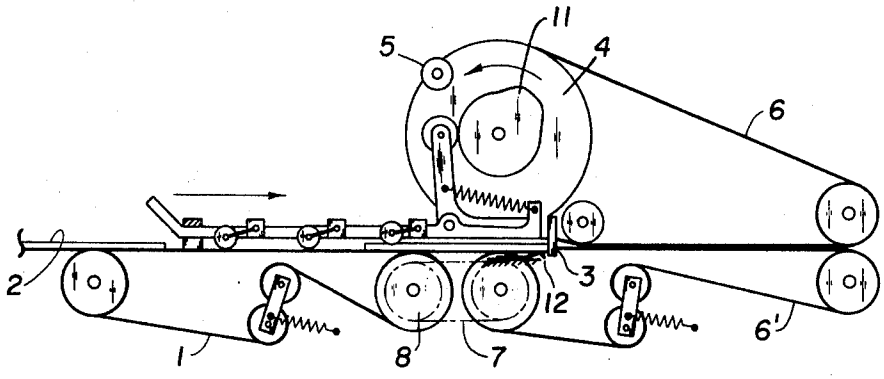
3,044,767	7/1962	Winkler	271/50
404,951	6/1889	Bartlau	271/50

Primary Examiner—Richard E. Aegerter
Attorney—Nolte and Nolte

[57] **ABSTRACT**

In a method of conveying sheets along a sheet conveying path from means for non-periodically delivering the sheets to means for receiving the sheets with a predetermined periodicity comprising stopping the sheets in the path and releasing the sheets with the same periodicity as the receiving means, the improvement comprising operating the receiving means at a higher rate of sheets receivable per unit time than the average rate of sheets delivered per unit time at which the delivering means is operated.

2 Claims, 4 Drawing Figures



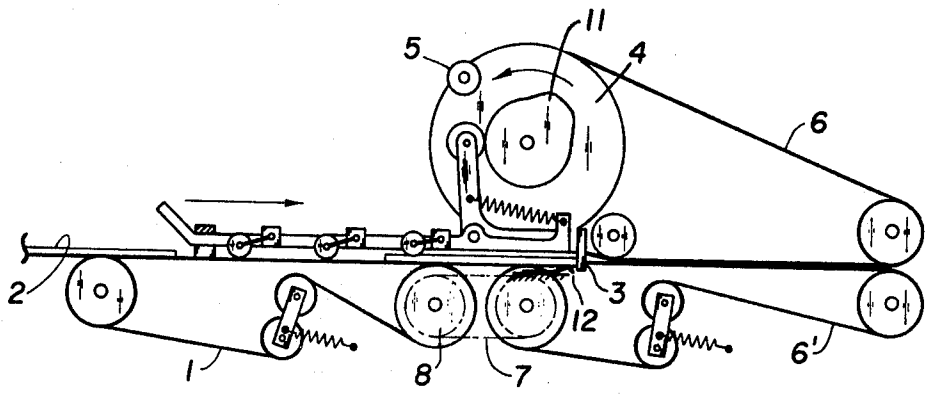


FIG. 1

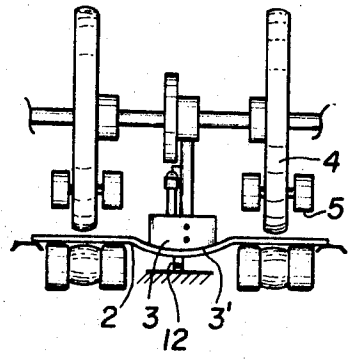


FIG. 2

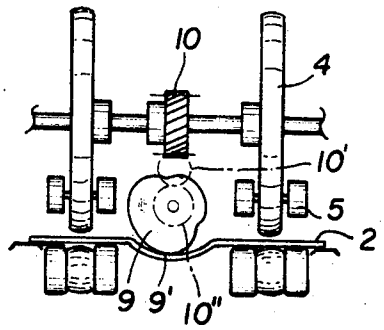


FIG. 3

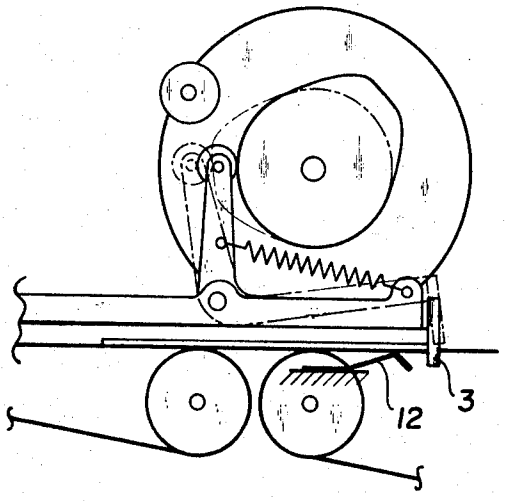


FIG. 4

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APPARATUS FOR CONNECTING AN UNCADENCED APPARATUS TO A FOLLOWING CADENCED APPARATUS FOR THE HANDLING OF SHEETS

This invention relates to a method for connecting an uncadenced machine or device, for example an upsetting folding machine, to a following cadenced machine or device, for example a thread sealing unit or a bundle delivery, for treating or processing sheets, as well as to a device for the execution of this method.

It is known practice to couple cadenced machines or devices for the treatment or processing of sheets with one another in order thus to obtain a production flow. The interconnected machines are subject to the same working rhythm, i.e., they are synchronized with one another. It is also known practice to combine the work flow of several machines into one work flow or to divide the work flow of one machine into several work flows. This results in a multiplication or a division of the rhythms. In that case, also, all machines must be mutually synchronized.

Devices are known which, by stopping the sheets and releasing them again the cadence of the following machine, transform the non-periodic sheet sequence into a periodic one. In their use, however, there often result machine stoppages in the following machine. The reason for the stoppages is that it happens that due to speed fluctuations two non-periodically supplied sheets are supplied for one operating cadence of the machine operating with a predetermined periodicity, and, hence, during one cadence release, two sheets pass through the stopping and releasing device overlapped.

An object of the invention is to avoid such machine stoppages and to obtain a smooth work flow.

A more specific object of the invention is to provide a method and an apparatus which permits connecting an uncadenced operating machine or device to a following cadenced machine or device for the treatment or processing of sheets and which excludes the supplying of two sheets during one cadence release.

According to the invention, the cadenced machine or device has more operating cadences per unit time than the average throughput of sheets per unit time of the uncadenced machine or device. Preferably, the uncadenced machine or device operates at an about 5 to about 10 percent lower sheet throughput than the following machine or device operated in cadence.

A device for the execution of the method of the invention is characterized in that between the machines or devices a sheet transport device with a rhythm-controlled sheet stopping and releasing device known in itself is arranged, which in a rhythmic manner releases the sheets to the following machine or device and which drives the sheet conveying means arranged before the sheet stopping and releasing device at the speed of the preceding machine or device and the sheet conveying means arranged after the sheet stopping and releasing device at the speed of the following machine or device.

The rhythmic sheet stopping and releasing device preferably comprises a sheet abutment arranged above the sheet conveying plane and extending, in lowered position, only slightly below the sheet conveying plane. On its underside, the sheet abutment may have a rounded portion extending transversely of the sheet conveying device. It is further advantageous that one or more sheet lifting springs extending into the sheet conveying plane from below be arranged before the sheet abutment.

By the method according to the invention, as well as the device for the execution thereof, unproductive cadences occur in the machine or device working in cadence. It is thereby achieved that the rate at which sheets are supplied can never become greater than the capacity of the machine or device working in cadence. Speed fluctuations are absorbed by the normally excessive cadence rate of the machine working in cadence. The invention thus insures a functionally reliable connection of uncadenced machines or devices to cadenced machines or devices for the treatment or processing of sheets.

The invention will now be further described by reference to a specific embodiment thereof, as illustrated in the drawings, in which:

FIG. 1 is a side elevation of the apparatus;

FIG. 2 is a front elevation of an embodiment of an apparatus according to FIG. 1 provided with a sheet abutment of one design;

FIG. 3 is a front elevation of an embodiment of an apparatus according to FIG. 1 provided with a sheet abutment of another design; and

FIG. 4 is a detail from the side elevation of FIG. 1.

The sheets 2 arriving on a sheet transport device or conveying means 1 are stopped by a sheet stopping and releasing device 3, in this case a cam-controlled sheet abutment of flat design, and released in the cadence of the following machine or device (not shown). An acceleration of the sheets 2 is effected by cadence discs 4, which are equipped with rubber elements 5 for intensified entrainment of the sheets 2. Further transport is taken over by sheet conveying means 6, 6'. By means of a belt drive 7 provided with an adjustable pulley 8, the speed of the sheet transport device 1 can be adapted to the sheet length and is kept lower than the speed of the conveying means 6, 6'. The sheet stopping device may alternatively be designed as a rhythmically rotating sheet abutment 9 of disk-shaped design, driven by gears 10, 10', 10'' (FIG. 3). By the form of the cam plate 11 or of the sheet abutment 9, the periodicity of sheet blocking and sheet passing is controllable.

The sheet abutment 3 and the sheet abutment 9 are provided with respective rounded portions 3' and 9' such that as the rounded portion 3' or 9' lowers, the sheet 2 just then below it is caused to sag slightly but is not hindered in its continued movement (FIGS. 2 and 3). An immediately following sheet is not caused to sag but is stopped at the abutment. As counterpressure means there acts from below a sheet lifting spring 12 (FIG. 4). The sheet stopping device may alternatively consist of known pneumatic means (not shown).

It is intended that the foregoing description illustrate the invention but not limit the scope thereof as defined by the appended claims.

What is claimed is:

1. In an apparatus for handling sheets comprising means for conveying sheets along a sheet conveying path, means for non-periodically delivering the sheets to the conveying means, means for receiving the sheets from the conveying means with a predetermined periodicity, means for stopping the sheets in the path and releasing the sheets with the same periodicity as

the receiving means, and means for operating the delivering means at a first predetermined average rate of sheets delivered per unit time, for conveying the sheets to the stopping and releasing means at the first rate, and for operating the receiving means at a second predetermined rate of sheets receivable per unit time and for conveying the sheets from the stopping and releasing means at the second rate, the second rate being higher than the first rate, the improvement that the means for stopping and releasing the sheets comprises a vertically displacably mounted abutment member having an uppermost sheet releasing position, in which the lowermost extremity of the member is above the sheet conveying path, and a lowermost sheet stopping position, in which the lowermost extremity of the member extends slightly into the path, and that said lowermost extremity of the member is rounded transversely of the direction of sheet movement in the sheet conveying path.

2. In an apparatus for handling sheets comprising means for conveying sheets along a sheet conveying path, means for non-periodically delivering the sheets to the conveying means, means for receiving the sheets from the conveying means with a predetermined periodicity, means for stopping the sheets in the path and releasing the sheets with the same periodicity as the receiving means, and means for operating the delivering means at a first predetermined average rate of sheets delivered per unit time, for conveying the sheets to the stopping and releasing means at the first rate, and for operating the receiving means at a second predetermined rate of sheets receivable per unit time and for conveying the sheets from the from the stopping and releasing means at the second rate, the second rate being higher than the first rate, the improvement that the means for stopping and releasing the sheets comprises a vertically displacably mounted abutment member having an uppermost sheet releasing position, in which the lowermost extremity of the member is above the sheet conveying path, and a lowermost sheet stopping position, in which the lowermost extremity of the member extends slightly into the path, and that beneath the sheet conveying path immediately before the member is positioned counterpressure means for pushing the sheets upwards.

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