United States Patent

Buschmann

[15] **3,684,277**

[45] **Aug. 15, 1972**

[54] **APPARATUS FOR BRAKING, OVERLAPPING AND STACKING SHEETS OF MATERIAL**

[72] Inventor: **Gerhard Buschmann,** Dusseldorf, Germany

[73] Assignee: **Jagenberg-Werke AG,** Dusseldorf, Germany

[22] Filed: **Dec. 28, 1970**

[21] Appl. No.: **101,653**

[30] **Foreign Application Priority Data**

Jan. 2, 1970 Germany.....P 20 00 078.6

[52] **U.S. Cl.**.....**271/46,** 271/74

[51] **Int. Cl.**.....**B65h 5/24**

[58] **Field of Search**.....271/46, 74, 77, 78, 58, 59, 271/49, 26 ES

[56] **References Cited**

UNITED STATES PATENTS

3,432,161	3/1969	Dale et al.	271/46
3,334,896	8/1967	Mullin	271/74
2,895,552	7/1959	Pomper et al.	271/74 X

Primary Examiner—Evon C. Blunk
Assistant Examiner—Bruce H. Stoner, Jr.
Attorney—Burgess, Dinklage & Sprung

[57] **ABSTRACT**

In an apparatus wherein a rotating roll of sheet material is cut into sheets of predetermined size which are advanced, braked, overlapped and stacked, using suction to brake the moving sheets, a special control belt is provided to minimize wear. The control belt is provided with perforations which, upon displacement of the belt, may be registered with openings in the suction box to transmit suction to the belt. The belt has additional holes or channels, alternated with the suction perforations, in which are seated sliding gaskets. The gaskets contact and move along a glide surface but the belt is out of contact with any surface so that the belt is not subject to wear, only the gaskets.

If the belt is endless, means are provided to prevent the gaskets from falling out of their positions during the return leg of the belt movement. Means are also provided to prevent slippage between the belt and its drive.

7 Claims, 9 Drawing Figures

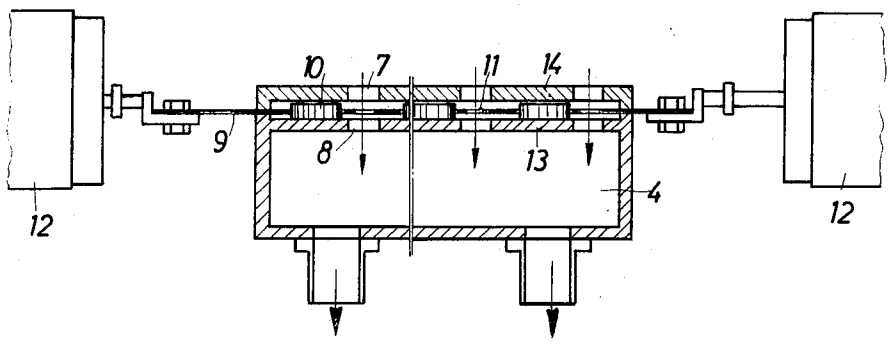


Fig.1

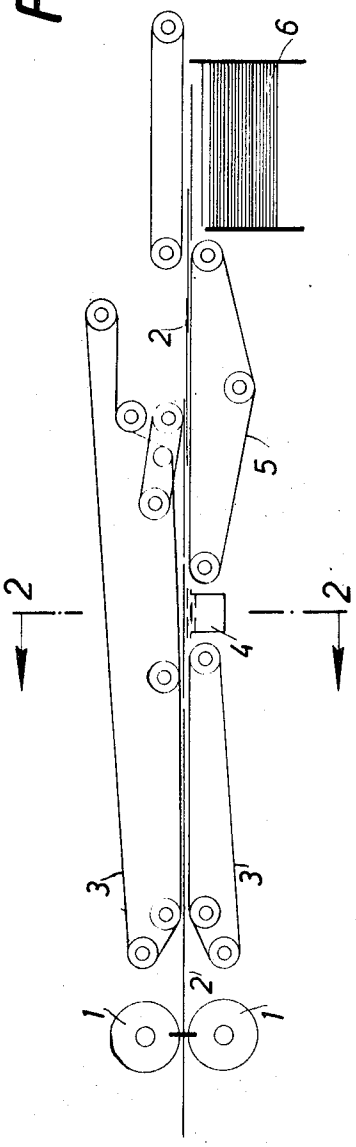


Fig.5

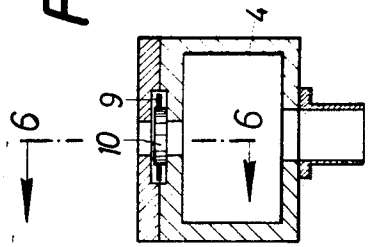


Fig.6

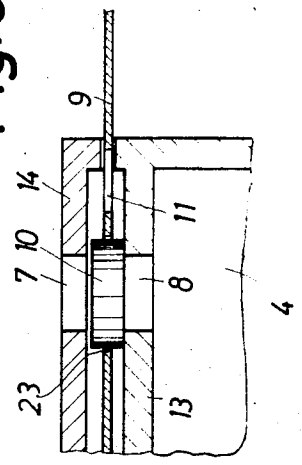


Fig. 2

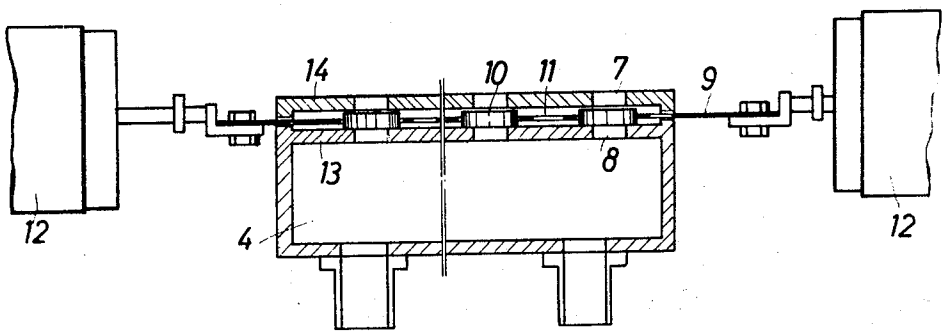
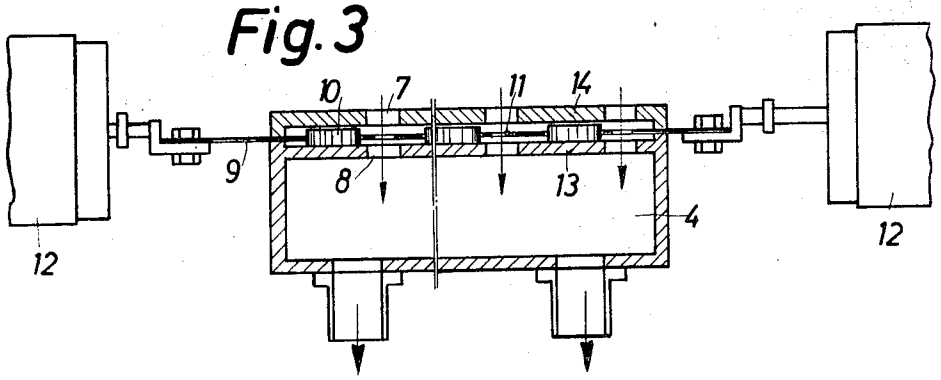


Fig. 3



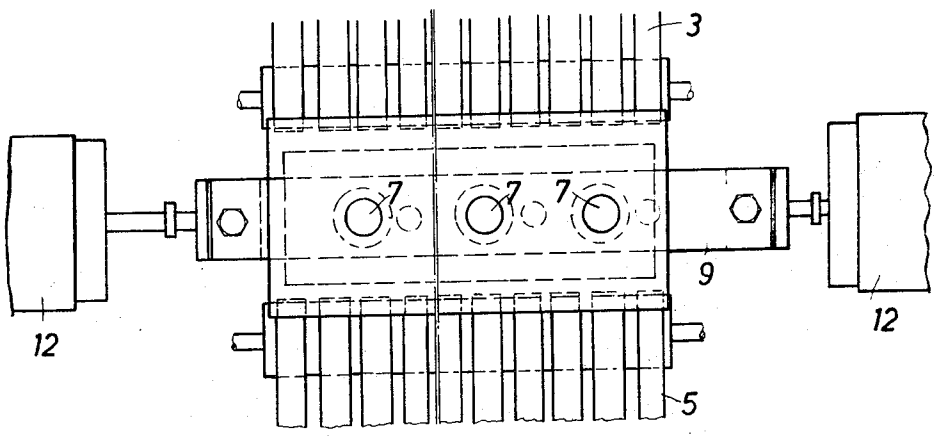


Fig. 4

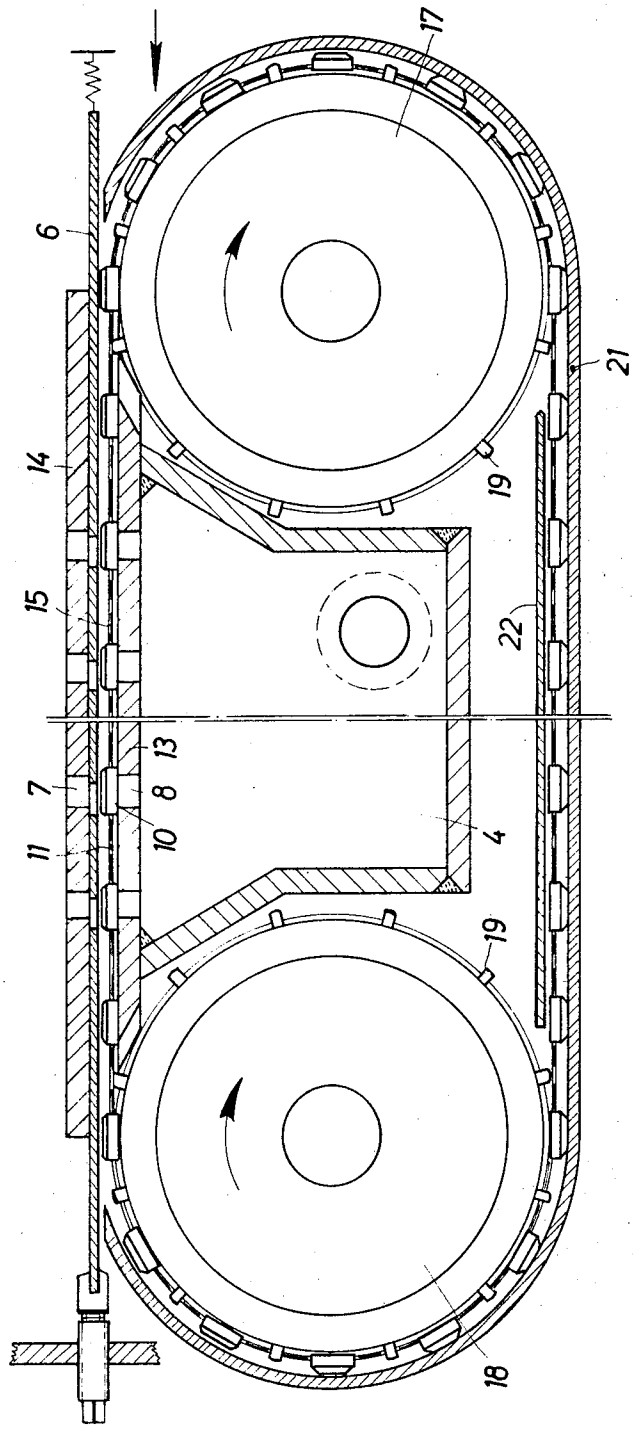


Fig.7

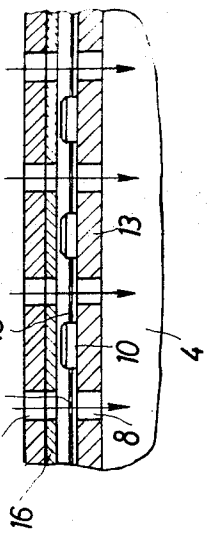


Fig.8

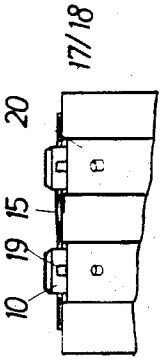


Fig.9

APPARATUS FOR BRAKING, OVERLAPPING AND STACKING SHEETS OF MATERIAL

The invention relates to an apparatus for braking and overlapping sheets of paper or the like which are discharged from sheet-producing machines such as crosscutters and which are to be stacked in a pile.

In machines of this type, and particularly in crosscutters which cut webs of paper, cardboard, or the like, running off a supply roll into sheets of predetermined size, it is necessary to brake the sheets leaving the crosscutting zone at high speed in order to stack the sheets in an orderly and snag-free manner.

A suitable apparatus for braking such fast moving sheets is shown in commonly assigned pending U.S. Pat. Application Ser. No. 23,420, filed Mar. 27, 1970. The braking device operates by means of suction and consists of a suction box or chamber and a movable, perforated control belt. By moving the belt relative to the chamber, the perforations in the belt align themselves with openings in the chamber and permit the negative pressure or suction within the chamber to act on sheet material beyond the belt. When the belt perforation is out of registry with the chamber opening the suction force is not transmitted.

While such belt performs satisfactorily, certain problems exist.

In the case of an endless belt, for example, the welded butt joint has been a critical point since it is all but impossible to join spring strip steel by butt welding without misalignment. The unevenness due to such misalignment gives rise to friction against the guides and the suction-box cover which causes damage to the belt and to the glide surfaces. Another area of potential improvement is the sealing of the suction box in the time interval during which the sheet is to pass the braking device unimpeded.

It is accordingly an object of the present invention to provide a control system for a suction brake which is long-lived and wear-resistant and which forms an effective seal for the suction box when desired.

These and other objects and advantages are realized in accordance with the present invention which provides a control belt system having perforations alternated with sliding gaskets, which gaskets are the only part of the belt system moving over stationary or fixed parts of the suction brake.

In a further development of the apparatus, for satisfactory and dependable guidance the sliding gaskets are made several times as thick as the control belt into which they are set.

Flexible guidance of the individual sliding gaskets in the control belt permits them to adapt themselves freely to their support at the instant of sealing, thus providing maximum sealing action.

Moreover, the thickness of these sliding gaskets need not be precisely fixed since only their undersides are involved in sealing. Since these sliding gaskets are made of a material having good sliding properties, i.e. low friction, such as plastics or the like, smooth movement is assured, and this will be reflected in effective operation of the suction-brake device and in long service life.

In the case of an endless control belt, guide rails are provided for positioning on both faces of the belt to secure the sliding gaskets against dropping out of the control belt during their return to active position. To prevent the sliding gaskets from dropping out of the guide zone of the control belt also in the vicinity of the drive and guide pulleys, the latter are provided with annular grooves of a depth equal to about one-half the thickness of the sliding gaskets. Here, too, an appropriately curved guide rail is externally provided.

A further advantage of the invention is the ease with which the sliding gaskets can be replaced without it being necessary to replace the control belt, which is difficult to fabricate. Since the control belt does not come into contact with stationary parts of the apparatus and is not subject to other stresses, all wear is avoided. Non-slip entrainment of the control belt is secured by providing the drive and guide pulleys with entrainment pins which engage the suction holes or perforations in the control belt.

The invention will be further described with reference to the accompanying drawings wherein:

FIG. 1 is a diagrammatic side elevation of a crosscutter with built-in suction-brake device;

FIG. 2 is a sectional side elevation of a suction-brake device in accordance with the invention, taken along line 2—2 of FIG. 1, with a reciprocating control belt in the closed, non-aspiring state;

FIG. 3 is a view similar to FIG. 2 but with the belt in opened, aspiring state;

FIG. 4 is a plan view of the apparatus in the closed state;

FIG. 5 is a cross section through the apparatus;

FIG. 6 is an enlarged partial view of the side elevation, viewed on line 6—6 of FIG. 5;

FIG. 7 is a sectional side elevation of another embodiment in which an endless, revolving control belt is provided in place of the reciprocating belt;

FIG. 8 is a partial view of the apparatus of FIG. 7 in the aspiring condition; and

FIG. 9 is a front view of the drive pulley with its shroud removed.

Referring now more particularly to the drawings, as shown in FIG. 1, the sheets 2 produced by a crosscutting device 1 are carried by the conveyor belts 3 within the range of the suction-brake device 4, which will be described presently in greater detail, and after being braked and overlapped reach the conveyor belts 5, which deposit the sheets 2 on the pile 6.

The principle of operation of the suction-brake device is the same as in above mentioned U.S. Pat. Application Ser No. 23,420, the present invention essentially relating to improvement in the control belt. The control belt 9 in FIGS. 2 to 4, which is moved back and forth by two magnets 12, carries along therewith a plurality of sliding gaskets 10 which move over glide surface 13. The belt 9 is provided with channels 23 (FIG. 6) which guide or confine the sliding gaskets 10 laterally so that the gaskets may move vertically independently of the belt but not laterally. Since sliding gaskets 10 alternate in the control belt 9 with suction holes 11, the holes 8 are covered in one position (FIG. 2) while in the other position (FIG. 3) a clear passage is established through holes 7 and 8 and the suction hole 11 in the control belt 9. Since the vertical position of the control belt 9 is determined by the magnets 12 and that of the sliding gaskets 10 is constant in relation thereto by reason of the glide surface 13, satisfactory mounting and trouble-free displacement of the sliding gaskets 10 are assured, i.e. only gaskets 10 contact the

glide surface while the belt 9 is out of contact therewith.

FIGS. 7 to 9 show another embodiment involving an endless control belt 15 which likewise runs transverse to the direction of sheet travel. Here, too, the same conditions apply as in the case of the reciprocating control belt 9 in FIGS. 2 to 4. To prevent the sliding gaskets 10 from falling out of their holes in the continuous control belt 15, guide rails 21 and 22 are provided. The guide rails 21 and 22 in conjunction with the annular grooves 20 (FIG. 9) secure the sliding gaskets 10 in position relative to the control belt 15.

Non-slip entrainment of the control belt 15 is assured by entrainment means or projections 19 disposed in the annular grooves 20 of the drive and guide pulleys 17 and 18. The projections enter the suction holes 11 provided between successive sliding gaskets 10 in the control belt 15. The degree of suction may be changed by adjusting the holes 7 in the cover plate 14 in known manner by means of the slide bar 16, as shown in FIGS. 7 and 8.

It will be appreciated that the instant specification and examples are set forth by way of illustration and not limitation, and that various modifications and changes may be made without departing from the spirit and scope of the present invention.

What is claimed is:

1. In an apparatus including means for braking, overlapping and stacking sheets of material such as paper, said braking means operating on the rear ends of said sheets and comprising a suction box having at least one opening, means controlling the transmission of suction from said box to said sheets, and means for actuating said control means, the improvement which comprises making said control means as a belt positioned over and out of contact with a glide surface, said belt being provided with at least one perforation through which suction can be transmitted when in registry with the opening in said suction box, said belt being provided with a channel and with a sliding gasket freely movable in said channel, said sliding gasket being supported on said glide surface and being displaceable with said belt to close off the opening in said suction box.

2. An apparatus according to claim 1, wherein said gasket is guided in its channel of said belt so as to be vertically but not laterally movable independently of the belt.

3. An apparatus according to claim 1, wherein the thickness of the sliding gasket is several times that of the control belt.

4. An apparatus according to claim 1, wherein the sliding gasket is made of a material having low friction properties.

5. An apparatus according to claim 2, wherein said belt is endless, said apparatus being provided with a plurality of gaskets in a plurality of channels alternated with a plurality of perforations and with guide rails on opposite faces of said belt to prevent said gaskets from falling vertically out of engagement with said belt.

6. An apparatus according to claim 5, including at least two guide pulleys for said endless belt, said pulleys being provided with grooves into which said gaskets extend during passage of said belt about said pulleys.

7. An apparatus according to claim 6, wherein said pulleys are provided in said grooves with projections spaced so as to engage successive perforations in said belt to prevent possible slippage between said belt and said pulleys.

* * * * *