

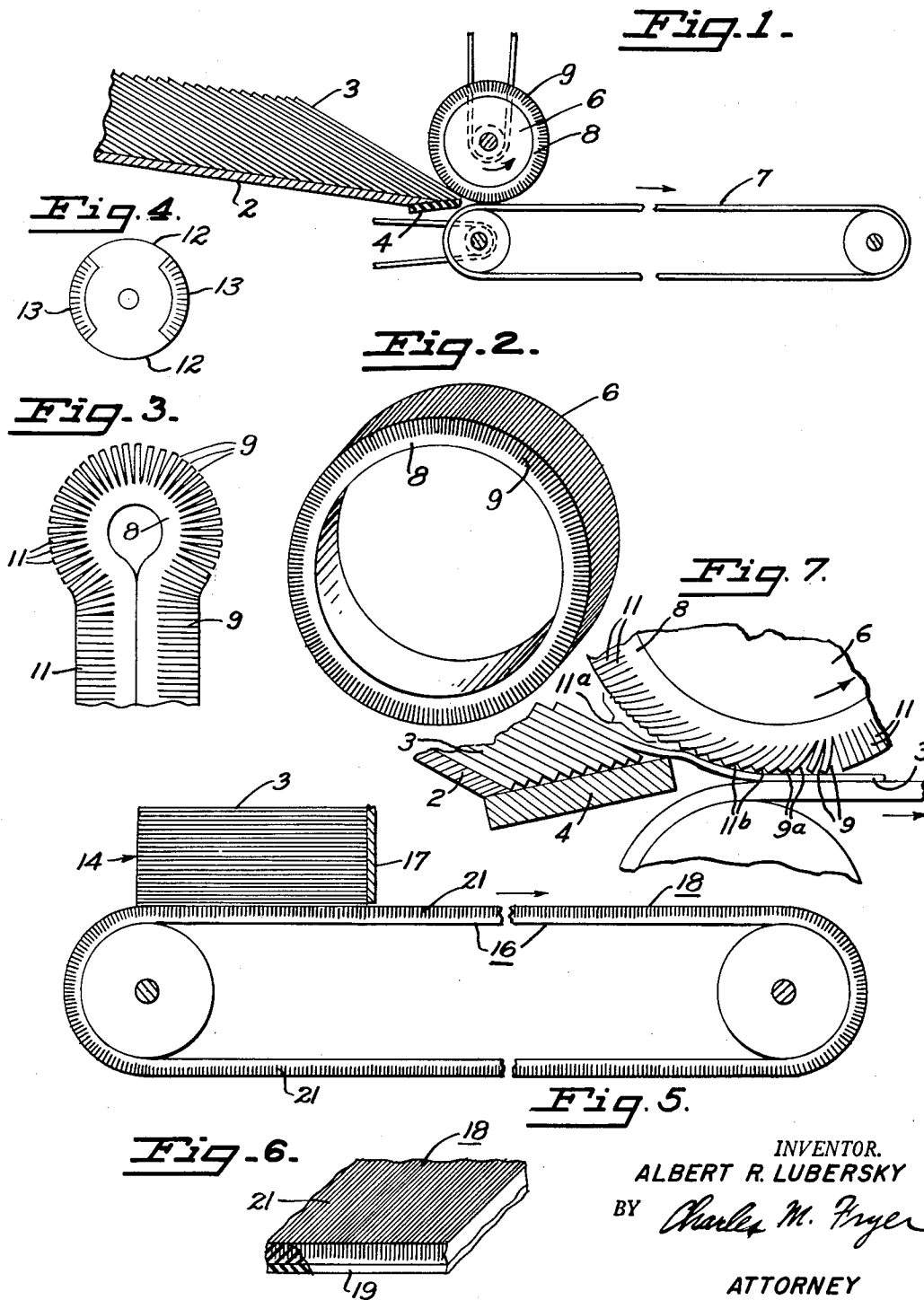
July 17, 1956

A. R. LUBERSKY

2,755,086

FEEDING METHOD AND APPARATUS FOR PAPER OR THE LIKE

Filed Jan. 5, 1953



1

2,755,086

FEEDING METHOD AND APPARATUS FOR PAPER OR THE LIKE

Albert R. Lubersky, Stockton, Calif., assignor to Fibre-board Products Inc., San Francisco, Calif., a corporation of Delaware

Application January 5, 1953, Serial No. 329,509

6 Claims. (Cl. 271—36)

This invention relates to the feeding of paper or the like, and more particularly to the feeding of stacked paperboard sheets.

It has heretofore been common practice in the paper industry to feed individual sheets of paperboard or paper from stacks thereof by moving a rubber member, which may be a covering on a combing wheel or a covering on an endless belt, in frictional engagement against the respective sheets in the stack. The sheets may be fed to any conventional apparatus in the plant for performing an operation thereon, such as setting up machinery for paperboard carton blanks. The rubber member, heretofore, employed has had a relatively smooth surface. This frequently results in misses because such rubber member collects soil and fiber from the sheets as it continually engages them, which causes slickness, thus reducing the frictional effect of the rubber surface, and necessitating frequent cleaning to maintain the rubber surface in condition.

The problem is particularly troublesome in connection with the feeding of paper or paperboard sheets which have ink printing on their surfaces, because when the rubber feed member misses because of slickness, this causes smearing of the ink over the sheet. Also, should the sheets have wax surface coatings, slickness of the smooth surfaced feed member develops rapidly.

Summarizing this invention, it has as its objects, among others, the provision of a simple and economical method and member for the feeding of paper or the like sheets, and in which the feed member is substantially self cleaning and provides enhanced frictional engagement with the sheets so as to obviate misses substantially. This is accomplished by employing a resilient feed member which is composed of a plurality of individual resilient sections movable relative to each other, and moving such feed member in frictional engagement against the respective sheets to be fed. The feed member is preferably of conventional relatively soft rubber heretofore employed in conventional feeding apparatus of the type related, but it is provided with a plurality or multiplicity of relatively closely spaced cuts in the form of slashes which thus form the plurality of individual resilient sections movable relative to each other.

Referring to the drawings:

Fig. 1 is a schematic sectional elevation of a conventional form of paperboard carton blank feed mechanism embodying a combing wheel with which the feed member of this invention is employed.

Fig. 2 is an isometric view of the feed member itself which is in the form of a tire or ring adapted to provide a covering over the combing wheel.

Fig. 3 is a fragmentary side elevational view of the rubber ring of Fig. 2 but in which portions of the ring are distorted by being held together, for purposes of illustration, to indicate more clearly formation of cuts in the ring.

Fig. 4 is a side elevational view of another form of combing wheel embodying spaced feed members, and

2

which may be employed in the apparatus of Fig. 1 for providing a conventional so-called intermittent feed.

Fig. 5 is a schematic view similar to Fig. 1 of another form of feeding apparatus of the so-called bottom continuous feed type, and in which the feeding member of this invention is employed.

Fig. 6 is a fragmentary isometric view, partly in section, illustrating the construction of the belt and feed member employed in the apparatus of Fig. 5.

Fig. 7 is a detail on an enlarged scale showing a portion of the structure shown in Fig. 1 illustrating approximately the action of the flexible finger ribs in removing a blank from the stack and illustrating the relative rubbing movement between the finger ribs by which the cleaning action is attained.

Referring to the apparatus of Fig. 1 which is of the so-called top combing continuous feed type, it comprises an inclined support table 2 on which is supported a stack of individual paperboard carton blanks 3; the blanks being mounted edgewise and all inclined relative to table 2. The usual dam or choke member 4 is provided adjacent the discharge end of table 2 so as to insure that only one paperboard sheet or blank, namely, the outermost one, is fed at a time. A continuously rotatable combing wheel 6 is provided adjacent choke 4, which is driven in a counterclockwise direction with reference to Fig. 1 to effect feeding of the respective carton sheets onto a continuously moving endless conveyor 7 which conducts the respective sheets to the equipment (not shown), for example, setting up equipment, which is to operate on the blanks. Combing wheel 6 and conveyor 7 are driven by any suitable means.

The feed member of this invention is employed as a covering or tire on combing wheel 6, being in the form of a rubber ring 8; the rubber being any conventional relatively soft rubber employed in conventional rubber feed devices. It frictionally engages the respective sheets 3 as they are supported on table 2 to cause the respective sheets to be moved onto conveyor 7; the stack of sheets being fed against the combing wheel by an operator.

In accordance with the invention, rubber ring 8 is provided with a plurality of relatively closely, or finely spaced and substantially parallel cuts 9 in the form of slashes that extend crosswise the full width and radially of the ring, about the entire periphery thereof. These cuts are of such character that substantially no material is removed during their formation, as they are formed with a sharp razor-like cutting instrument to provide true slashes. As a result of the formation of the slashes, a plurality of individual resilient finger rib sections 11 are provided at the surface of the ring which are movable by bending or flexing relative to each other, in the approximate manner shown in Fig. 7; all adjacent sections 11 being in surface to surface contact with each other in the undistorted position of the ring.

This structure not only provides for a self cleaning effect but enhances frictional engagement with the sheets, thus minimizing misses. Soil, such as dirt, and fiber which may collect on the feed member through constant engagement with the sheets being fed is readily cleaned off because of the self cleaning effect due to the relative movement between resilient sections 11. At the same time, slickness of the feed surface of the feed ring is obviated substantially. In contradistinction to rubber feed members having relatively smooth feed surfaces which have been previously employed and which had to be cleaned a couple times an hour, the feed member of this invention need usually only be cleaned not more than a couple of times a day.

The depth of the slashes may vary considerably depending upon the thickness of the rubber of the feed member; and their spacing may also vary. Usually, the

3

deeper the slashes and the closer they are with respect to each other, the better. A suitable depth of the slashes on a feed ring is about $\frac{3}{16}$ of an inch with a spacing of about $\frac{1}{16}$ of an inch between the adjacent slashes. In the preferred form, the slashes are at a right angle to the side of the ring, but they may be disposed at an oblique angle if so desired.

Figure 4 illustrates a conventional so-called intermittent feed combing wheel which may be employed in the form of apparatus illustrated in Fig. 1. Spaced sections 12 of the combing wheel have highly polished metal surfaces so that no feeding is effected when these sections are in engagement with the respective sheets. Other spaced sections are provided with slashed rubber coverings 13 of the character described to thus effect feeding of the sheets intermittently as the combing wheel is continuously rotated. Sections 13 are in the form of arcuately shaped inserts mounted on the combing wheel in the conventional manner heretofore employed for mounting similar smooth surfaced rubber inserts on wheels of such character.

Fig. 5 illustrates a conventional so-called bottom continuous feed type of apparatus in which the stack 14 of paperboard sheets 3 is supported in a vertical column on an endless belt conveyor 16 with the lowermost sheet of the stack resting on the belt; the belt being continuously driven in the direction indicated by the direction arrow in Fig. 5. A conventional dam or choke member 17 is provided ahead of stack 14 to permit only one sheet, namely, the lowermost one, to be removed from the stack at a time. Belt 16 is provided with a slashed rubber covering 18 of the character described; the covering being vulcanized to a rubberized fabric backing 19 forming part of the belt. Slashes 21 also extend crosswise the full width of the belt at a right angle to the sides thereof. They are preferably spaced approximately $\frac{1}{16}$ of an inch apart, are substantially parallel, and extend all along the entire surface of covering 18.

As hereinbefore stated, any matter which may collect on the feed member through its engagement with the sheets being fed is readily cleaned off by reason of the self-cleaning action which results from the relative movement between the resilient rib fingers. Fig. 7 illustrates on an enlarged scale the approximate movement of the fingers as they engage a blank to draw it off from the stack onto the conveyor 7. As will be readily appreciated, the positioning of the comb wheel 6 with respect to the adjacent choke 4 and the stack of blanks is initially such that some moderate degree of pressure will be maintained between the thin finger ribs 11 and the adjacent blank, that is, the topmost blank 3 of the stack. Accordingly as the wheel is rotated in the direction indicated by the arrow, these finger ribs will tend to drag against the surface of the adjacent blank and due to the frictional engagement with the blank they will be bent or flexed rearwardly as shown. In this action the circular peripheral surface contour of the wheel will be interrupted or broken as indicated at 11^a as a result of which it will be seen that any coating which may have formed across the slashes on the end edge surface of the finger ribs will be broken and also in this action and the bending or flexing action of the finger ribs the adhering material will be detached as the finger ribs slide or are rubbed one against another as they will be as further flexing takes place. In Fig. 7 this bending or flexing of the finger ribs shows at 11^b how the edge surfaces of the fingers will move along adjacent faces of following finger ribs to further effectively rub off any particles which may be adhering to the ribs. Due to

4

this drag action the engaged blank will be slipped from the top of the stack across the top corner of the choke 4 approximately in the manner illustrated in Fig. 7.

While the illustration of the manner in which the finger ribs flex and the description have been applied to the embodiment illustrated in Fig. 1, it is believed that it will be readily apparent that the same flexing action of the fingers and consequently the same rubbing together of the adjacent faces will be had in the form of the invention illustrated in Fig. 5. This will be so because the weight of the stack of blanks on the upwardly directed edges of the thin finger ribs 21 taken with the dragging movement of the fingers against the under face of the lowermost blank in the forward movement of the top run of the belt will compel the finger ribs to flex or bend and thus rub together in much the same way as they are shown in Fig. 7.

I claim:

1. A sheet material feeding device comprising an endless band of a soft elastic material, said band having inner and outer surfaces of a width materially greater than its thickness, the band having relatively finely spaced and relatively deep slashes therein across its outer surface and throughout the length of the band, the slashes having a depth at least approximately three times the spacing of the slashes, said slashes each being continuous across the full width of the band and forming flexible finger ribs extending entirely across the width of the band.

2. The invention according to claim 1 wherein said slashes have a depth greater than half the thickness of the band.

3. The invention according to claim 1 wherein said endless band is in the form of a soft rubber ring.

4. The invention according to claim 1 wherein said endless band is in the form of a soft rubber ring and said slashes are straight and lie in planes radially thereof.

5. The invention according to claim 1 wherein the slashes forming said finger ribs provide the ribs with opposing faces which are in rubbing contact.

6. A sheet material feeding device comprising a means for maintaining a plurality of sheets in a prescribed stacked position, said stack maintaining means being so constructed and arranged as to facilitate the removal of a terminal sheet from the stack, a continuously movable sheet removing body adjacent to said first means and having a wide endless surface disposed for movement across and in contact with at least a part of an opposing surface of a terminal sheet of an adjacent stack, said sheet removing body comprising at least in part a soft elastic portion having relatively finely spaced and relatively deep slashes extending across the full width of said surface, the slashes having a depth at least approximately three times the spacing of the slashes, the slashes being continuous across the full width of said surface and forming flexible finger ribs for yieldingly engaging the said opposing surface of a sheet.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,181	Clark	Dec. 13, 1949
1,457,158	Gammeter	May 29, 1923
2,197,662	Hughes	Apr. 16, 1940
2,200,842	Gray	May 14, 1940
2,224,886	Tyler	Dec. 17, 1940
2,240,426	Bourdon	May 6, 1941
2,592,581	Lorig	Apr. 15, 1952