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71 Applicant: **DEBEX (PROPRIETARY) LIMITED**
45 Main Street
Johannesburg, Transvaal(ZA)

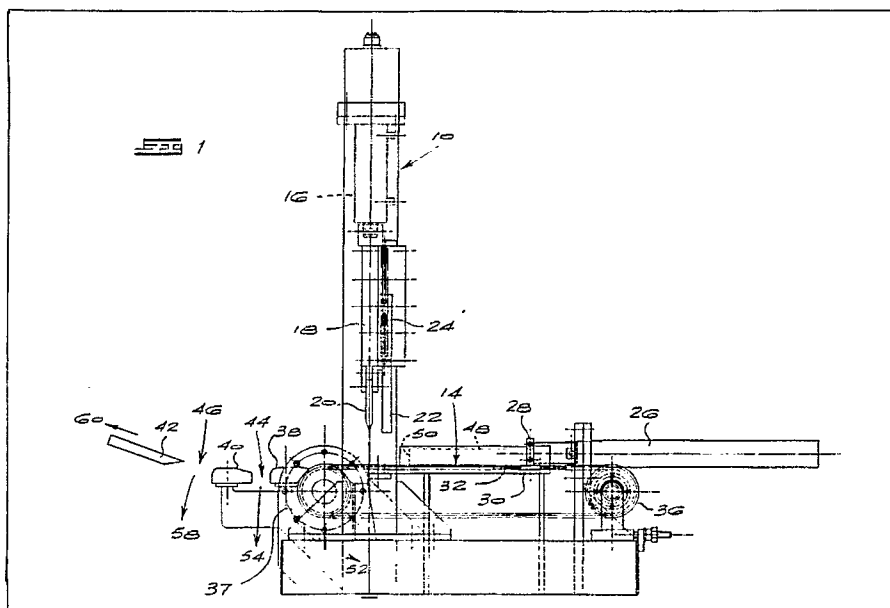
72 Inventor: **Hill, Bruce Stanford**
4 Swartgoud Street Winchester Hills
Johannesburg, Transvaal(SA)
Inventor: **Van Gruening, Louis Gerrit**
28 Sering Avenue
Secunda, Transvaal(SA)

74 Representative: **Senior, Alan Murray et al**
J.A. KEMP & CO 14 South Square Gray's Inn
London WC1R 5EU(GB)

54 **Directory splitter.**

57 The directory splitter is used to split, for subsequent pulping, a directory, such as a telephone directory (50), which has highly flexible pages sandwiched between relatively inflexible covers and in which the covers and pages are connected together at a glued spine. The splitter has a cutting site at which a cutting blade (20) severs the spine from the covers and pages. The covers and pages are then moved in a stack from the cutting site to a suction

site at which a perforated drum (37) connected to a suction source applies suction to the lower cover and separates it from the pages and the remaining cover. The pages and remaining cover are then moved in a stack to a separation site at which the pages are separated. The pages and the covers are therefore recovered separately. In addition, the spine is recovered apart from the pages and the covers.



THIS invention relates to a directory splitter. The term "directory" as used herein refers to books, such as telephone directories, which have soft, highly flexible pages sandwiched between relatively inflexible covers and which have a spine, usually of glued construction.

In the paper pulping industry, the spine of a telephone directory or similar book must be separated from the remainder of the book because the glue used in the spine is not suited to pulping. In addition, the covers must be separated from the pages because of their different composition. At present, the covers are ripped off manually and the spine is then cut off using a guillotine. The manual aspects of the procedure are time-consuming, labour intensive and inefficient.

SUMMARY OF THE INVENTION

The invention provides a directory splitter which comprises:

- a) a cutting site at which a blade is movable to sever the spine of the directory from the covers and pages of the directory;
- b) means for moving the covers and pages in a stack from the cutting site to a suction site;
- c) suction means at the suction site for applying suction to one cover to separate it from the pages and remaining cover;
- d) means for moving the pages and remaining cover from the suction site to a separation site;
- e) means at the separation site for separating the pages from the remaining cover; and
- f) means for separately recovering the pages and the covers.

The invention also provides a method of splitting a directory which comprises the following steps:

- a) cutting the spine of the directory from the covers and pages of the directory;
- b) moving the covers and pages in a stack from the cutting site to a suction site;
- c) at the suction site applying suction to one of the covers to separate it from the pages and the remaining cover;
- d) moving the pages and remaining cover in a stack to a separation site;
- e) at the separation site, separating the pages from the remaining cover; and
- f) separately recovering the pages and the covers.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail, by way of example only, with reference to

the accompanying drawings in which:

Figure 1 shows a side elevation of a directory splitter of the invention;

Figure 2 shows a plan view of the splitter of Figure 1; and

Figure 3 shows an end elevation of the splitter looking in the direction of the arrow 3 in Figure 1.

DESCRIPTION OF A PREFERRED EMBODIMENT

The directory splitter seen in the Figures is used to cut off the spine of a telephone directory and then to separate the loose covers from the loose pages.

The splitter includes a frame 10 having upright posts 12 and a bed plate 14. The frame mounts a pair of vertical, double-acting hydraulic cylinders 16 carrying a sub-frame 18 which in turn carries a blade 20 and a clamping member 22. The clamping member 22 is arranged alongside the blade and is supported by means of vertical compression springs 24.

A further double-acting hydraulic cylinder 26 is arranged at a horizontal attitude and carries a pusher plate 28 which moves over the bed plate 14 in a direction from side to side in Figure 1. The pusher plate 28 carries an element 30 which engages a chain 32 arranged to one side of the bed plate 14, the chain passing around toothed sprockets 34 and 36 which rotate about horizontal axes. The sprocket 34 carries a horizontally orientated drum 37 which is perforated, for example, by means of elongate slots in its cylindrical wall. The interior of the drum is connected to a suction source (not shown). First, second and third support plates 38, 40 and 42 are arranged downstream of the drum 36 with gaps 44 and 46 between them.

The sequence of operations of the illustrated splitter is as follows:

1) the cylinder 26 is retracted to move the pusher plate 28 fully to the right in Figures 1 and 2;

2) a directory 48 is placed on the bed plate 14 with its spine at the edge 50;

3) the cylinder 26 is extended with the result that the pusher plate 28 pushes the directory to the cutting site at which it is positioned beneath the blade 20. The dimensions of the machine and the stroke of the cylinder 26 are chosen such that a few millimetres only of the directory have passed beneath the blade;

4) while the cylinder 26 is momentarily inoperative, the cylinders 16 are extended to push the blade and clamping member down onto the directory adjacent the spine edge 50. The clamping member engages the directory and immobilises it while the blade continues downwardly, cutting

through the directory adjacent the spine. It will be appreciated that the spring mounting of the clamping member 22 permits lost motion to take place between the blade and the clamping member during cutting;

5) the cylinders 16 are retracted and the cylinder 26 is again extended to push the cut directory onto the drum 37 at the suction site. At this stage, the covers and the yes are in a stack which is preceded in the direction of motion by the severed spine. The drum 37 is rotating, anti-clockwise in Figure 1, by virtue of the action of the element 30 on the chain 32;

6) the bottom cover is sucked against the drum 37 by virtue of the action of the suction source and the low internal pressure of the drum. This cover is drawn around, in the anti-clockwise direction in Figure 1, by the drum and is deflected into a chute 52 for subsequent collection;

7) the cylinder 26 continues to extend, pushing the stack of pages and remaining cover, and the spine, onto the support plate 38. When the spine reaches the gap 44, it falls in the direction indicated by the arrow 54 leaving behind only the pages and the top cover;

8) the cylinder 26 continues to extend and pushes the stack, now composed of pages and top cover, over the gap 44 and onto the support plate 40. It will be noted that the leading edge 57 of the support plate 40 is inclined to pick up pages which have deflected downwardly during passage over the gap 44;

9) the cylinder 26 continues to extend and pushes the pages and top right over the support plate 40 to a final separation site. The pages, having a higher degree of flexibility than the top cover, bend downwardly and eventually fall through the gap 46, in the direction of the arrow 58, for subsequent collection. The top cover is picked up by the final support plate 42 and moves in the direction of the arrow 60 for collection.

10) the cylinder 26 is fully retracted ready for the next directory.

Thus the function of the described directory splitter is to sever the spine from the remainder of the directory and to collect the covers separately from the pages.

Although the described embodiment can handle only one directory at a time, it will be appreciated that, with a wider bed plate 14, blade 20 and so forth, a series of directories could be arranged end-to-end and pushed through the various stages simultaneously so that the cutting and separation steps are carried out on each of them at the same time.

Claims

1. A directory splitter characterised in that it comprises:

a) a cutting site at which a blade (20) is movable to sever the spine of the directory from the covers and pages of the directory;

b) means (26) for moving the covers and pages in a stack from the cutting site to a suction site;

c) suction means (37) at the suction site for applying suction to one cover to separate it from the pages and remaining cover;

d) means (26) for moving the pages and remaining cover from the suction site to a separation site;

e) means (40, 42) at the separation site for separating the pages from the remaining cover; and

f) means (52,54,58) for separately recovering the pages and the covers.

2. A directory splitter according to claim 1 characterised in that the blade (20) is movable at the cutting site under the action of a first double acting hydraulic cylinder (16) and in that means (22, 24) are provided at the cutting site for immobilising the directory while the blade (20) severs the spine from the covers and pages.

3. A directory splitter according to either one of the preceding claims characterised by a second hydraulic cylinder (26) for moving the directory to the cutting site, for moving the covers and pages from the cutting site to the suction site and for moving the pages and remaining cover from the suction site to the separation site.

4. A directory splitter according to any one of the preceding claims characterised in that a perforated drum (37) is provided at the suction site, the interior of the drum being connected to a suction source and the pages and covers being moved in a stack from the cutting site onto the surface of the drum (37) such that suction is applied to the lower cover in the stack to separate that cover from the pages and the remaining, upper cover.

5. A directory splitter according to claim 4 characterised in that the means for recovering the lower cover comprises a chute (52) at the suction site into which the lower cover is directed by the drum (37).

6. A directory splitter according to any one of the preceding claims characterised in that the means for recovering the pages comprises a gap (46) at the separation site through which the pages, but not the remaining cover, is obliged to fall under gravity.

7. A directory splitter according to any one of the preceding claims characterised by means for recovering the spine apart from the pages and the covers, such means comprising a gap (44) at the

separation site through which the spine, but not the pages or the covers, is obliged to fall under gravity.

8. A method of splitting a directory characterised by the following steps:

a) cutting the spine of the directory from the covers and pages of the directory; 5

b) moving the covers and pages in a stack from the cutting site to a suction site;

c) at the suction site applying suction to one of the covers to remove it from the pages and the remaining cover; 10

d) moving the pages and the remaining cover in a stack to a separation site;

e) at the separation site, separating the pages from the remaining cover; and 15

f) separately recovering the pages and the covers.

9. A method according to claim 8 and comprising the further step of recovering the severed spine separately from the pages and the covers. 20

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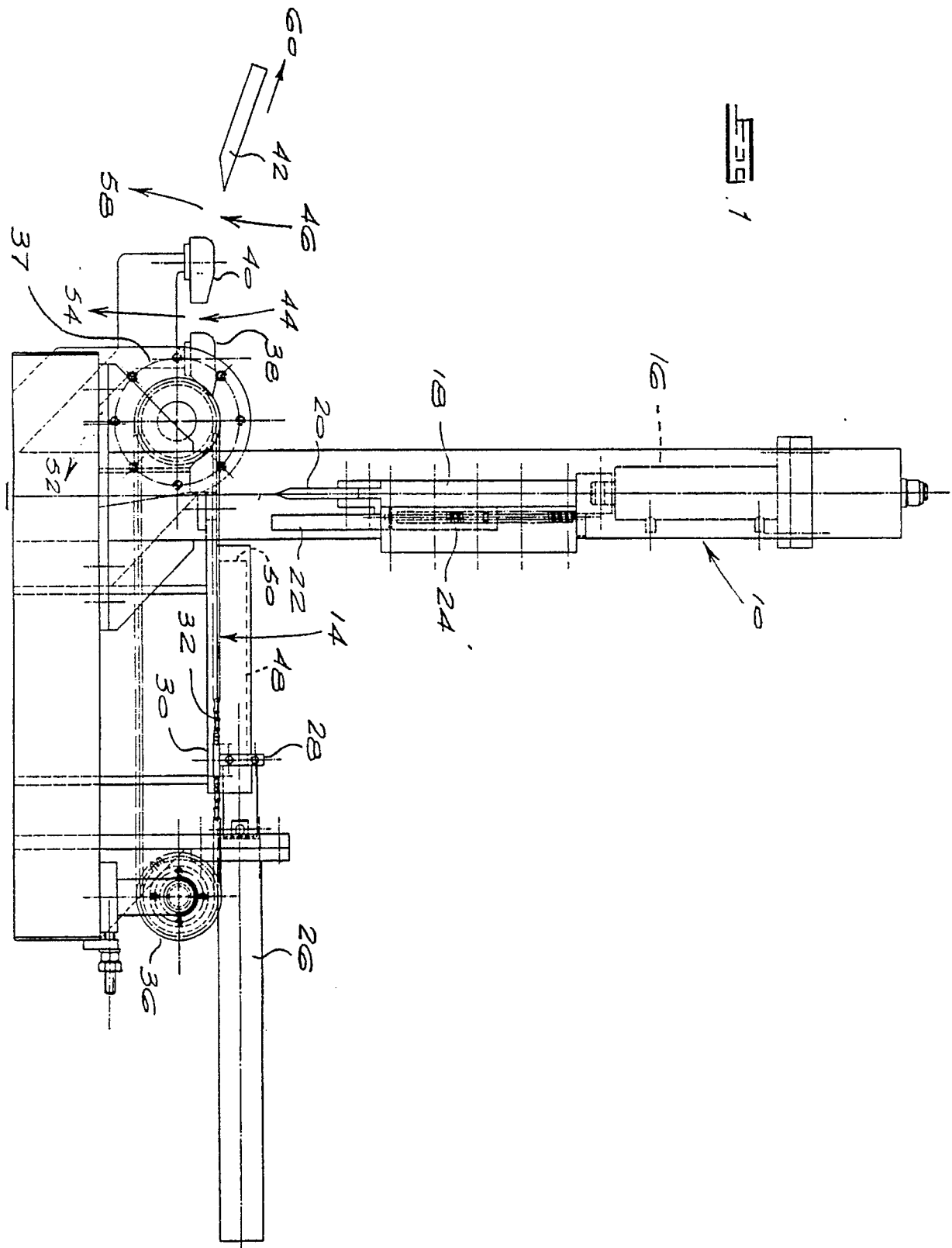
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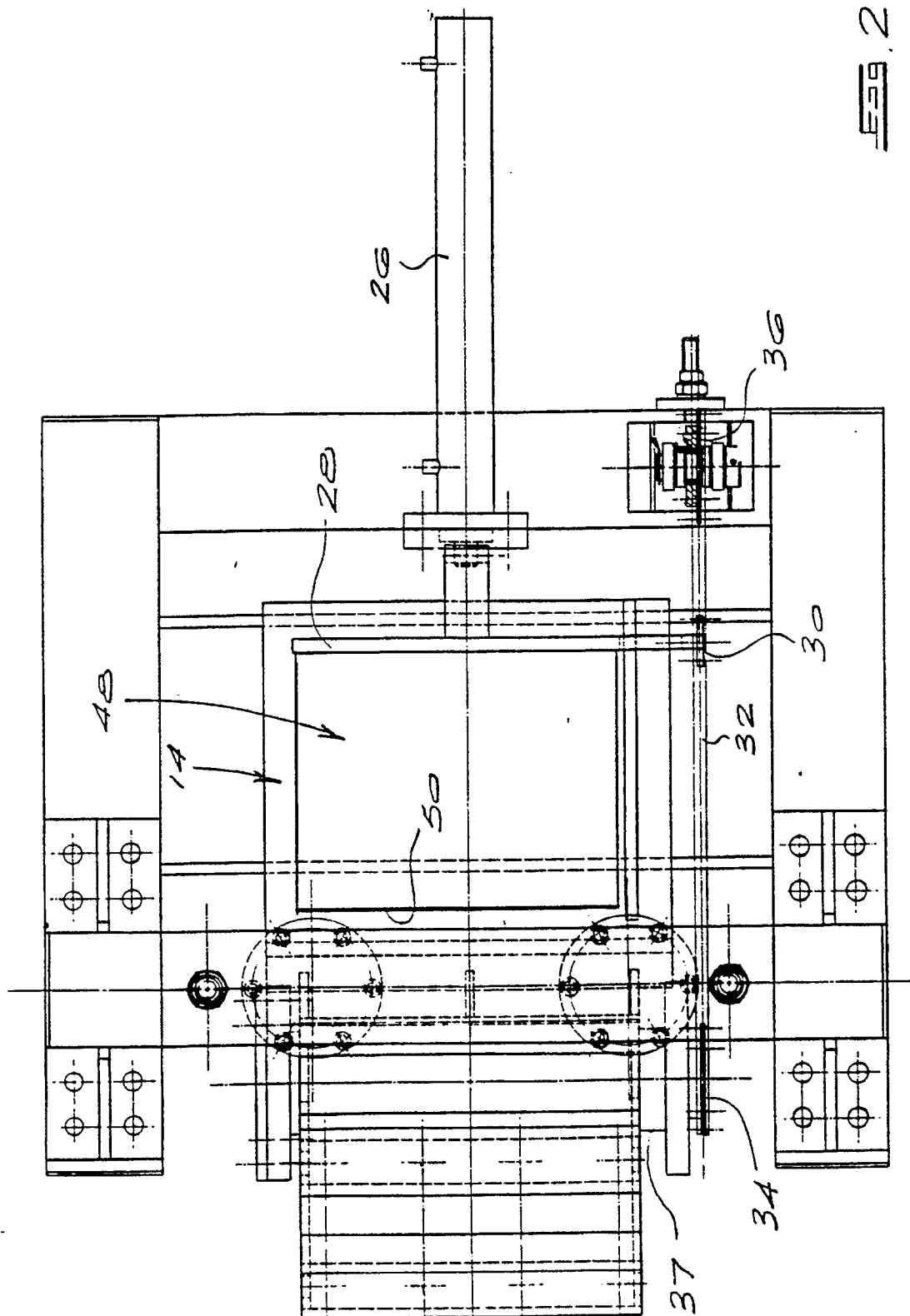


FIG. 3

