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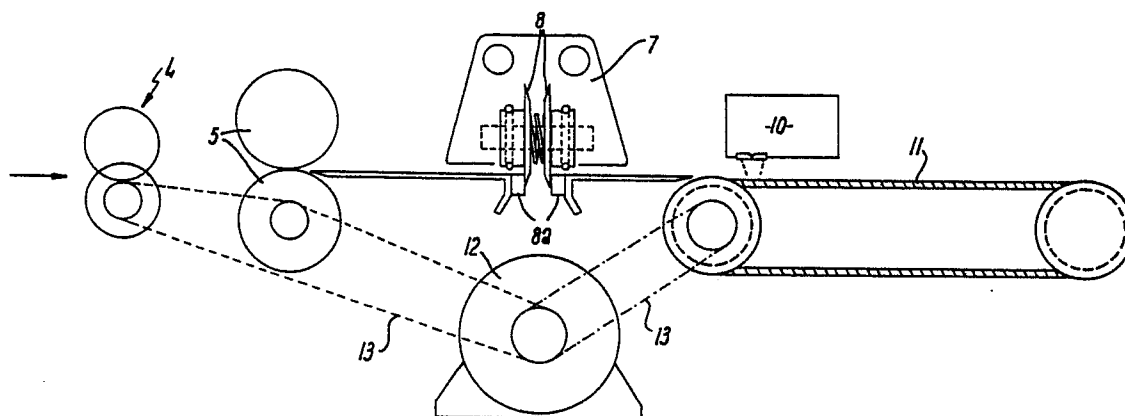
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Glasgow G2 4ER(GB)(54) **Paper cutting apparatus.**

(57) Apparatus is provided for feeding continuous lengths of paper in single or multiple layers to a transverse cutting mechanism 7. Sensor means 10 are provided for gauging the length of paper to be cut and operating the cutting mechanism accordingly. The apparatus operates continuously to cut a length of paper into a plurality of separate sheets of pre determined lengths.



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Paper Cutting Apparatus

This invention relates to paper cutting apparatus for use in cutting continuous lengths of paper into individual sheets especially but not exclusively computer print out paper.

Computer print out paper is generally in the form of a continuous length fan-folded into separate sheets. Perforations are usually provided between the individual sheets and along the side edges of the paper where a series of sprocket holes are usually provided for use in feeding the paper through a printer.

After printing individual sheets have to be separated as required and preferably the edge strips are removed for neatness.

Hitherto machines known as bursters have generally been used for this. These machines tear the individual sheets apart at the perforations by accelerating one sheet away from the other. Whilst such machines are capable of running efficiently at high speeds they have a number of disadvantages. Many users do not require the full capacity of such machines and thus find it difficult to justify the high capital cost of a machine that only operates effectively for a short period per day. Further, the bursting process leaves uneven edges. Moreover, in order to burst apart the sheets of paper effectively the machines have to be of substantial construction. Also, the perforated paper is only readily available in standard page lengths so that part pages in large numbers may be wasted because unperforated rolls of paper cannot be used in bursting machines. In addition, many known machines have a fixed running speed thus making them unsuitable for a variety of sizes of sheets of paper. Also some sheets of paper require only alternate perforations to be burst. For example, an advice note may have a tear off section for returning with a payment. Conventional machines are often not capable of coping with this. Furthermore, the bursting action causes a high level of noise which leads to restrictions on the location of the machines.

According to the present invention there is provided paper cutting apparatus for use in cutting continuous lengths of paper into individual sheets comprising, paper cutting means, sensing or metering means for measuring a length of paper to be cut, and cutting means associated with said sensing or metering means arranged for cutting transversely across the paper at the desired length.

Preferably, the cutting means comprises blade means which co-operate with an associated cutting edge.

Preferably also, the paper feeding means operates discontinuously and the paper cutting means operates in a fixed longitudinal position on the

apparatus.

Alternatively, the paper feeding means may operate continuously and the paper cutting means move longitudinally on the apparatus as it cuts transversely across the paper such that the paper is cut at right angles to its direction of movement.

Preferably also, the cutting means performs successive cuts across the paper from opposite sides of the apparatus.

Preferably also, the cutting means comprise a pair of spaced apart blades arranged to cut a strip across the width of the paper.

Preferably also, the sensing or metering means is selectively operable for measuring varying lengths of paper.

Preferably also, paper ejecting means are provided for ejecting cut paper from the apparatus, said ejecting means operating at a faster speed than said paper feeding means.

Preferably also, stacking means are provided for stacking cut sheets of said paper.

Preferably also, further cutting means are provided for trimming side edges of said paper.

Preferably also, decollation means are provided for separating sets of papers before feeding the paper into the cutting apparatus.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a diagrammatic representation of paper cutting apparatus in accordance with the present invention;

Fig. 2 is a perspective view of paper cutting apparatus in accordance with the present invention; and

Fig. 3 is a side view of the paper cutting apparatus of Fig. 2 with decollation apparatus included.

Referring to the drawings, one embodiment of paper cutting apparatus in accordance with the present invention comprises a cabinet 1 having a paper feed channel 2 which has movable side lays 3 for directing paper. A pair of side slitters 4 are provided at an inner end of the feed channel 2 together with paper feed rollers 5. The lateral spacing of the side lays 3 is adjustable to accommodate a wide range of different widths of paper.

A support rail 6 supports a movable slit head 7 which is provided with twin rotary cutting blades 8 which co-operate with angled counterblades 8a. A paper output channel 9 has a movable paper sensor 10 and a paper transport belt 11. The side slitters 4, paper feed rollers 5 and transport belt 11 are driven from a motor 12 by drive chains 13.

In setting up the apparatus for operation the

side lays 3 are first set to the width of the paper to be used and the paper can then be fed along the feed channel 2 through the side slitters 4 to the feed rollers 5. A hand control is then used to feed the paper slowly through the apparatus past the slitter head 7 until the position on the paper which is to be cut is positioned below the cutting blades 8. The position of the paper sensor 10 is then adjusted so that the sensing means of the sensor lines up with the leading edge of the paper at this point. An indicator light (not shown) which is extinguished at the position when the sensor 10 detects the paper assists this operation. A receiving tray 14, Fig. 3, for the cut paper slides out from the rear of the cabinet 1.

Once the paper has been initially positioned in the apparatus as described the apparatus can then be switched on and proceeds to operate in a sequence which will now be described.

The slitter head 7 is driven to travel along the support rail 6 with the cutting blades 8 co-operating with the angled counterblades 8a to trim a 2 mm wide section out of the paper at the position lined up for cutting. When the slitter head 7 has traversed along the length of the support rail 6 it serves to activate a microswitch which operates controls to stop the cutting action and activate the motor 12 which advances the paper. The transport belt 11, which operates faster than the feed rollers 5, ejects the cut sheet from the cabinet 1 into the receiving tray 14. At the same time the paper is advanced by the feed rollers 5 until the new leading edge is detected by the sensor 10. This operates appropriate controls to stop the motor 12 and causes the slitter head 7 and the cutting blades 8 to begin operation again and the process continues. As the paper is fed into the machine the side slitters 4 operate to trim the side edges of the paper.

After each cut the slitter head 7 may return to its starting position or perform the next cut in the opposite direction

The sequence of operation continues until the apparatus is stopped by an operator or the sensor 10 detects no further paper being fed into the apparatus.

The sensor 10 also acts as a safety device as, in addition to shutting the apparatus down if no paper is fed in in a predetermined time period, e.g. 10 seconds, it also shuts the apparatus down if it detects paper present for a period longer than a preset time, again 10 seconds, thus avoiding paper jams.

As an alternative to the provision of a moveable sensor 10 for measuring the length of cut a metering device may be used. This may, for example, be a device which counts the number of sprocket holes at the edges of the paper as the paper

advances through the machine. Alternatively a measuring device may be associated with the feed rollers 5 so that the length of paper passing through the machine may be ascertained.

The running speed of the apparatus is approximately 1800 sheets per hour and the apparatus has a number of advantages over conventional paper bursters when used for cutting computer type paper. The rotary cutting action is quiet. The apparatus can accommodate infinitely variable cutting sizes within the machine range and can also accommodate fan folded paper which is to be cut at alternate folds or perforations. The cut sheets produced by the apparatus have clean cut edges on all four sides. The apparatus is also capable of operating on up to four part paper sets without any need for adjustment. The cutting action removes the need for the paper to have perforations as with conventional burster machines, enabling low cost unperforated roll paper to be used. The amount of paper wastage is minimised as cuts may be made at any desired position.

Referring now in particular to Fig. 3 a decollator 15 for use in conjunction with the cutting apparatus is shown. The decollator 15 is driven by a flexible shaft 16 driven by the motor 12. If desired a magnetic clutch may be included between the motor 12 and the cutting and feeding apparatus thus allowing the motor 12 to be run continuously.

The decollator 15 allows a four part paper set 19 to be run through the apparatus. The parts may be deollated and collected at 20 or fed through the apparatus to be cut in any combination as desired. With suitable controls the apparatus can also be run as a decollator only with no cutting taking place.

Stands 17 and 18 allow the decollator 15 and the cutting apparatus to be positioned close together for efficient operation.

The embodiment of the apparatus described above in relation to the drawings serves only to illustrate an example of a range of machines falling within the scope of the present invention and incorporating various alternative features as appropriate for the usage of the apparatus.

Various examples will now be described. The twin blade device described is especially useful with perforated paper as the blades 8 cut on either side of the perforation thus ensuring clean edges are produced on the paper by removing a narrow strip of paper. If unperforated paper is to be used then apparatus having a single blade will produce satisfactory results. As an alternative to rotary blades straight blades may be provided.

In the embodiment described above the paper does not move continuously but stops while the cutting operation takes place. As an alternative the slitter head 7 may be arranged to move in the

direction of movement of the paper as the cut takes place thus allowing the paper to move continuously. After the cut takes place the slitter head returns to a start position on either the same or an opposite side of the paper. The slitter head 7 thus operates to cut the paper in the same direction each time or in opposite directions alternately.

The various embodiments described may be provided with side slitters 4 or not as desired.

Modifications and improvements may be incorporated without departing from the scope of the invention.

Claims

1. Paper cutting apparatus for use in cutting continuous lengths of paper into individual sheets comprising, paper feeding means, sensing or metering means for measuring a length of paper to be cut, and cutting means associated with said sensing or metering means arranged for cutting transversely across the paper at the desired length.

2. Paper cutting apparatus as claimed in Claim 1, wherein the cutting means comprises blade means which co-operate with an associated cutting edge.

3. Paper cutting apparatus as claimed in Claim 1 or 2, wherein the paper feeding means operates discontinuously and the paper cutting means operates in a fixed longitudinal position on the apparatus.

4. Paper cutting apparatus as claimed in Claim 1 or 2, wherein the paper feeding means operates continuously and the paper cutting means moves longitudinally on the apparatus as it cuts transversely across the paper such that the paper is cut at right angles to its direction of movement.

5. Paper cutting apparatus as claimed in any one of the preceding Claims, wherein the cutting means performs successive cuts across the paper from opposite sides of the apparatus.

6. Paper cutting apparatus as claimed in any one of the preceding Claims, wherein the cutting means comprise a pair of spaced apart blades arranged to cut a strip across the width of the paper.

7. Paper cutting apparatus as claimed in any one of the preceding Claims, wherein the sensing or metering means is selectively operable for measuring varying lengths of paper.

8. Paper cutting apparatus as claimed in any one of the preceding Claims, wherein paper ejecting means are provided for ejecting cut paper from the apparatus, said ejecting means operating at a faster speed than said paper feeding means.

9. Paper cutting apparatus as claimed in any one of the preceding Claims, wherein stacking means are provided for stacking cut sheets of paper.

10. Paper cutting apparatus as claimed in any one of the preceding Claims, wherein further cutting means are provided for trimming side edges of said paper.

11. Paper cutting apparatus as claimed in any one of the preceding Claims, wherein decollation means are provided for separating sets of papers before feeding the paper into the cutting apparatus.

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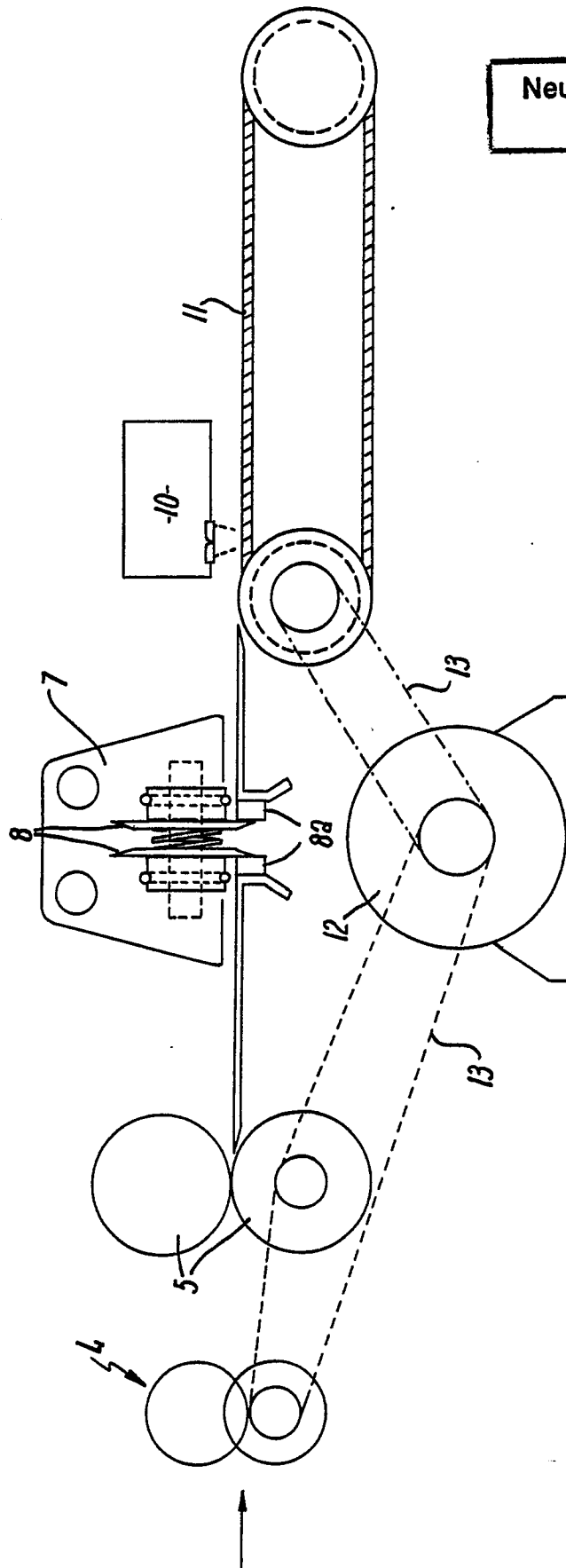
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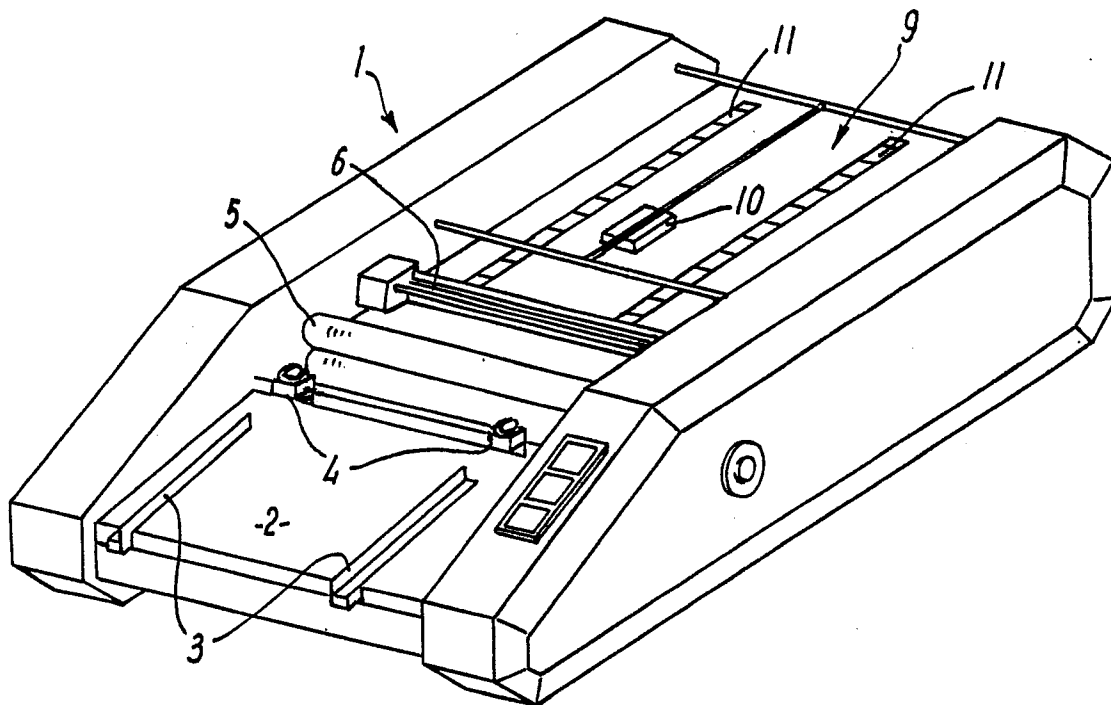
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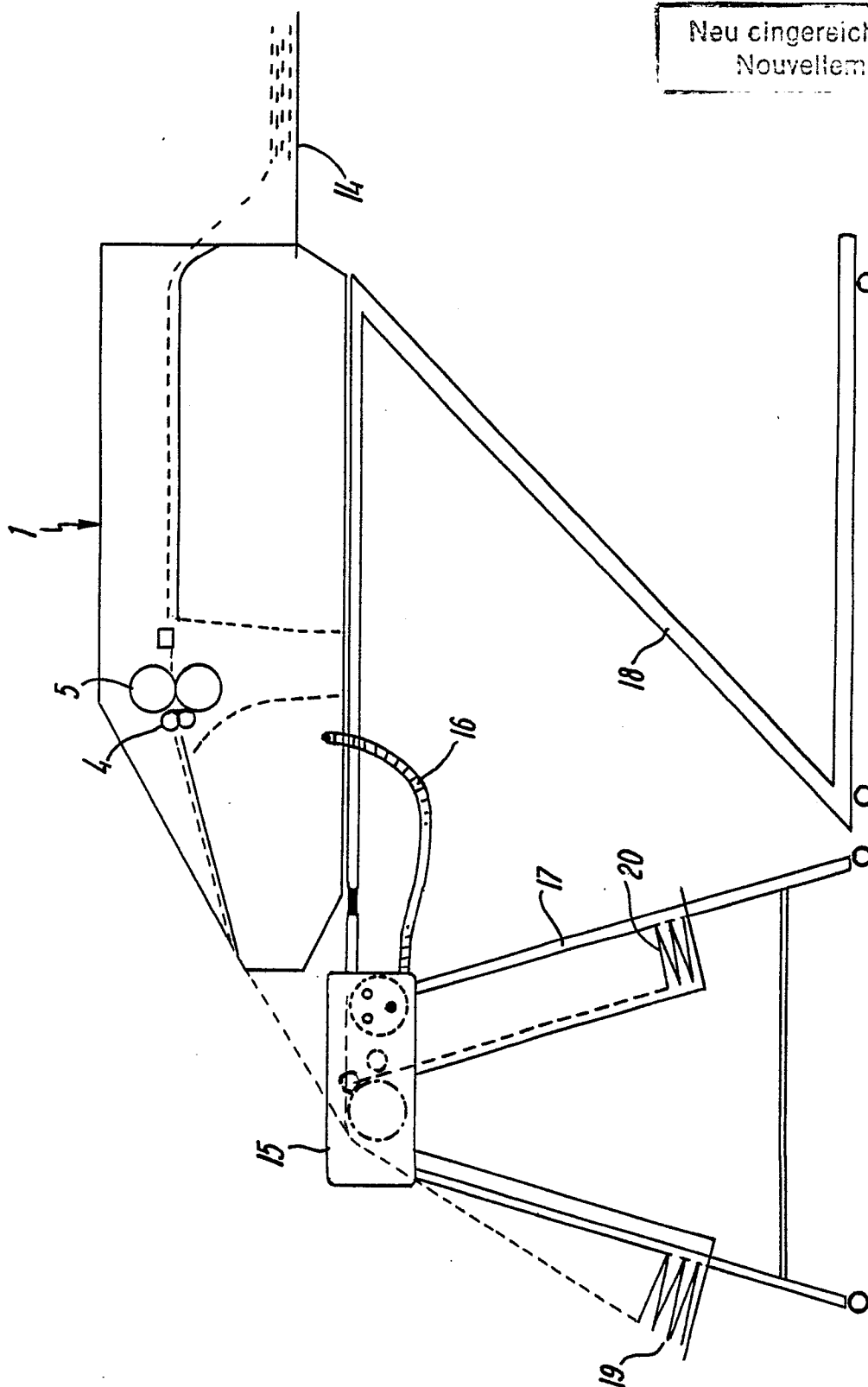


Neu eingereicht / Newly filed
Nouvellement déposé



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Neu eingereicht / Newly filed
Nouvellement déposé



FIE.3