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 [33] **Great Britain**
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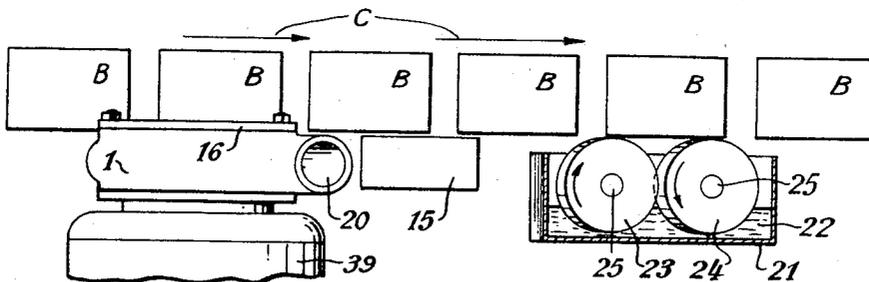
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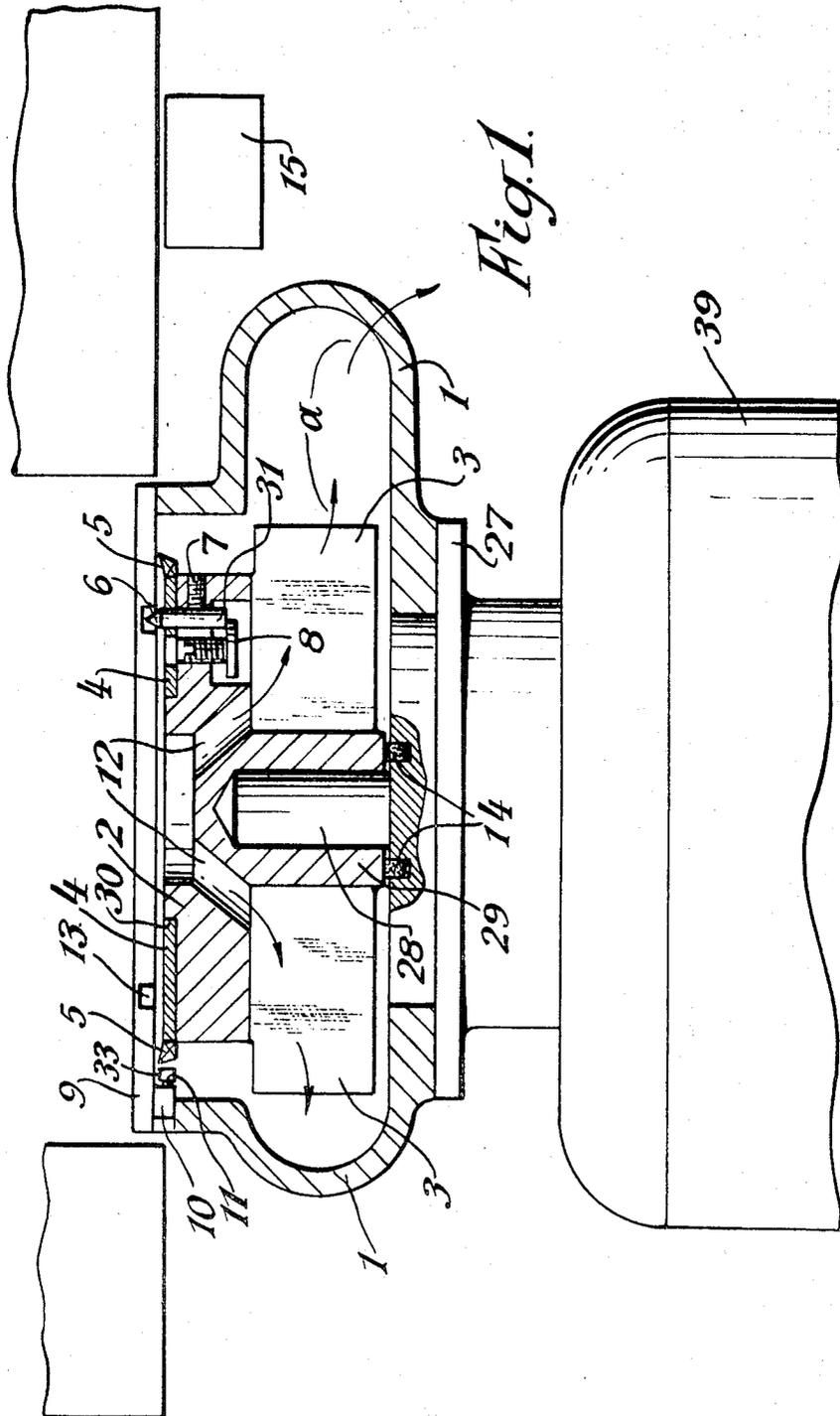
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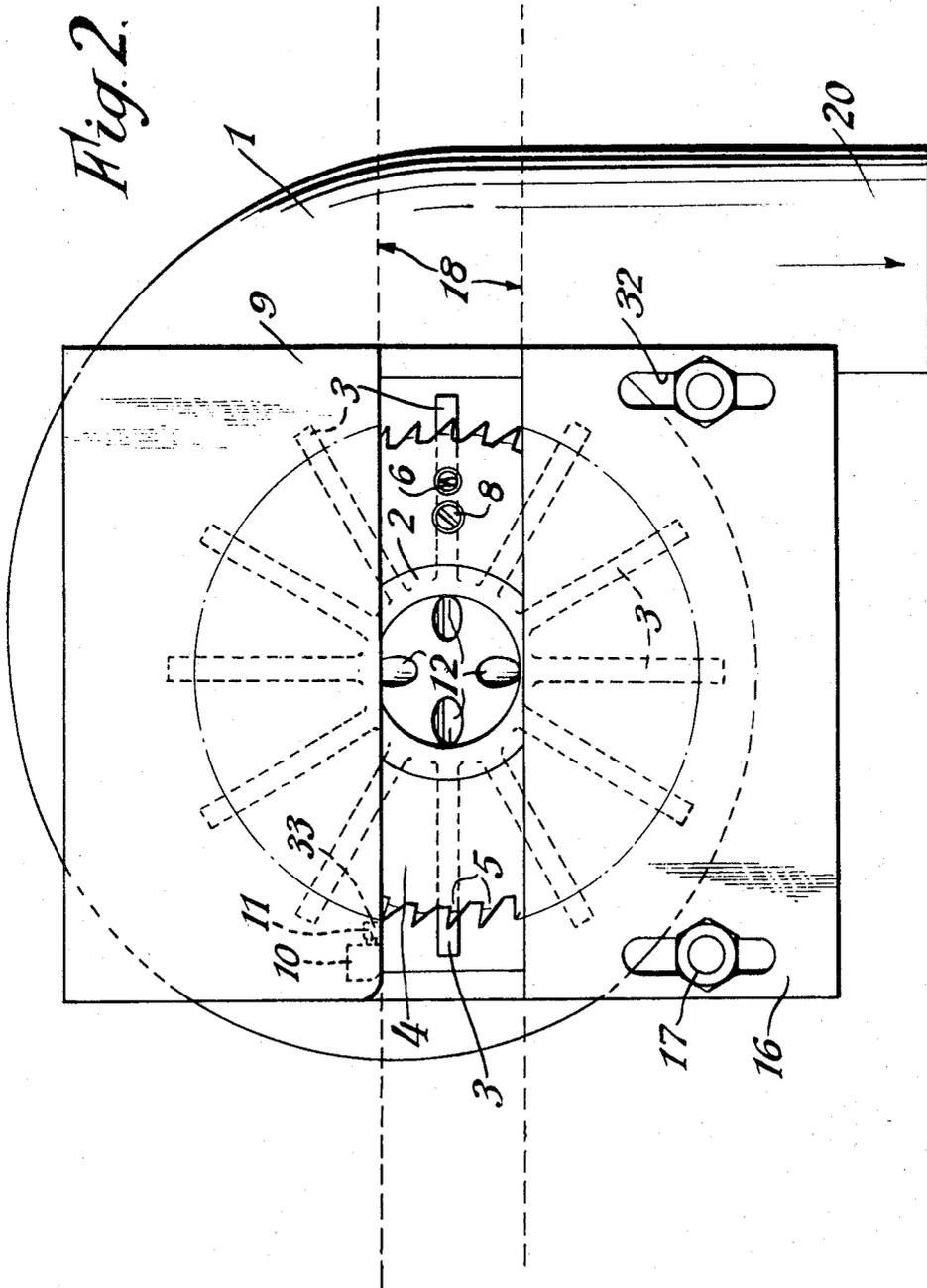
[54] **BOOK BINDING MACHINERY**
2 Claims, 4 Drawing Figs.
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 83/100
 [51] Int. Cl..... **B42c 19/00,**
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ABSTRACT: A machine for preparing the sheets of a book for binding comprises a cutter and means for drawing fiber end loosened by the cutter away from the sheets to provide a key for adhesive.





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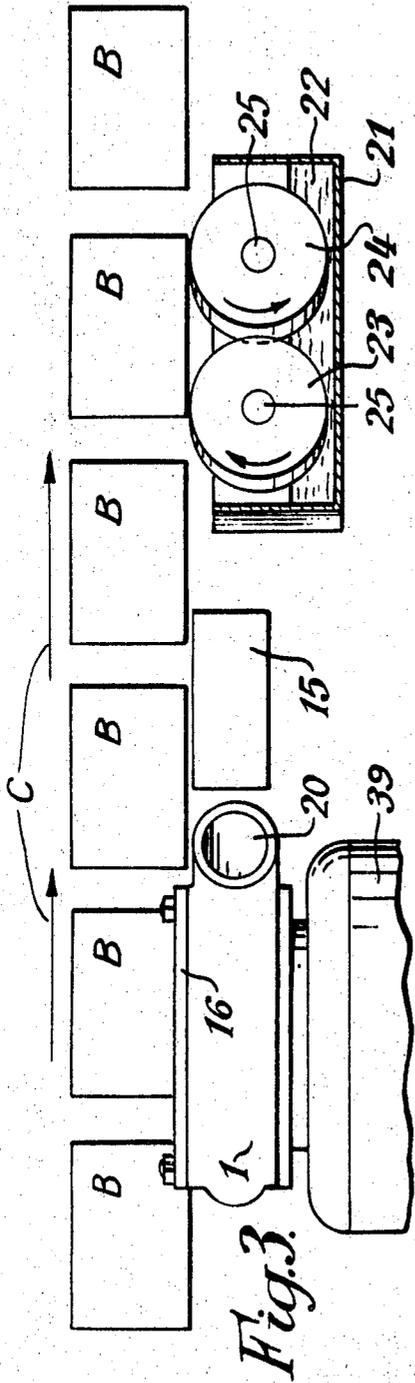


Fig. 3.

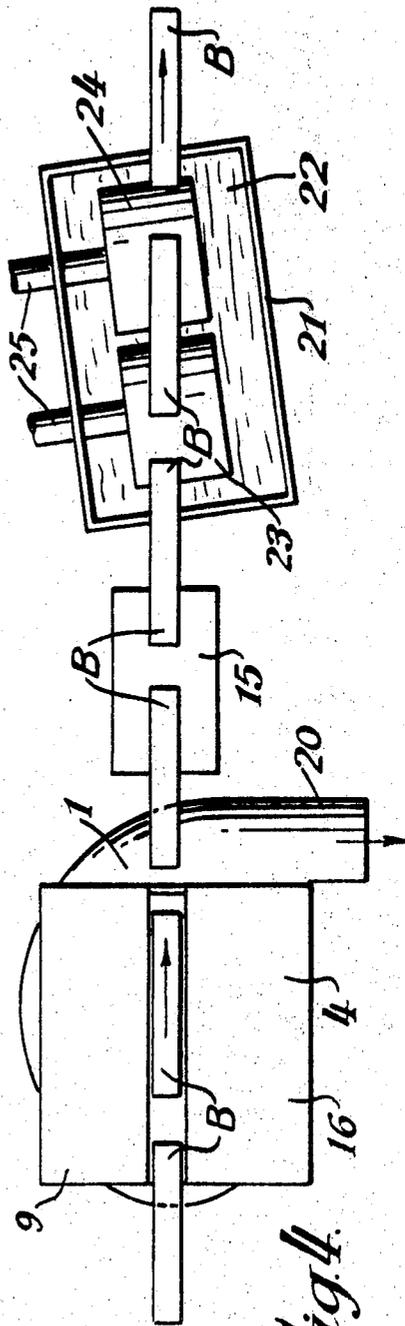


Fig. 4.

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BOOK BINDING MACHINERY

This invention relates to bookbinding and to those processes known in the trade variously as perfect binding, unsewn binding or adhesive binding in which the binding of the books is achieved by applying the adhesive to the edges of the sheets of the book followed by a paper lining or a paper cover.

There are already in existence a number of machines for producing books by this perfect binding process these machines being automatic or semiautomatic and of various types and outputs.

The books may consist of a number of single sheets or folded sections and on these machines means are provided for holding the complete set of single sheets or sections firmly for the operations which consist firstly in the case of folded sections of removing the back folds and then preparing the backs in a suitable manner to provide a good key for the adhesive.

With the books held in a suitable clamp, means are provided for moving the clamp holding the book over the cutters to remove the back folds, these cutters can be a plain circular knife or a cutter similar to a milling cutter as used on metal working machinery. It is usual to provide additional means for further roughening the backs on certain papers this second means being either a completely separate unit from the cutter or incorporated in the cutter itself.

According to the present invention there is provided a machine for preparing paper sheets for binding, such machine comprising cutting means across which the edge surfaces of a collated assembly of sheets are advanced and means for drawing fiber ends loosened by the cutting means away from the edge surfaces to prepare the said edge surfaces to receive adhesive.

The loosened fiber ends may be drawn away from the edge surfaces by producing suction in the region of the cutting means and/or by imparting an electrostatic charge to the cutting means.

The invention further provides a method of preparing paper sheets for binding which comprises advancing the edge surfaces of a collated assembly of sheets over cutting means to trim the said surfaces and drawing the fiber ends loosened by the cutting means away from the edge surfaces.

The invention will now be described by way of example and with reference to the accompanying drawings wherein:

FIG. 1 is a side view partly in section of a machine in accordance with a particular embodiment of the invention;

FIG. 2 is a plan view of the machine of FIG. 1;

FIG. 3 and 4 are side and plan views respectively showing the machine of FIGS. 1 and 2 in combination with a glueing station.

Referring now to FIGS. 1 and 2 of the drawings, a casing 1 of volute form is bolted to the upper surface of a horizontally disposed annular flange 27 concentric with a vertical output shaft 28 of an electric motor 39. The shaft 28 is coaxially disposed inside, and rotationally fast with, the stem 29 of an arbor 2. A plurality of angularly spaced fan blades 3 extend radially from the stem 29 of the arbor 2 so as to provide a centrifugal fan within the casing 1. Inclined airways 12 through the arbor 2 on either side of the stem 29 provide an inlet for the fan, an outlet 20 extending tangentially with respect to the blades 3 being provided in the casing 1 (see FIG. 2). In use rotation of the arbor 2 and the blades 3 will draw air downwardly through the airways 12 in the direction of the arrows a to an exit through the outlet 20. A circular cutter 4 is fixed by a suitable means within an annular recess 30 to the upper surface of the arbor 2 and includes a plurality of upwardly and outwardly projecting peripheral teeth 5, preferably formed of a hard-wear resistance substance such as tungsten carbide. One or more upwardly projecting cutting teeth 6 are provided on the upper surface of arbor 2 radially inwardly of the teeth 5. The, or each, tooth 6 is carried by a stem 31, the lower end surface of which is engaged by the head of a screw 8 engaged with a threaded socket in the arbor, and the side surface of which is engaged by a locking screw 7 extending radi-

ally within a threaded socket in the arbor. The stem 31 and the tooth 6 carried thereby are thus vertically adjustable to determine the depth of cut of the tooth 6. The teeth 5 and 6 cut against a plate 9 having recesses 13 to accommodate the tooth or teeth 6. The square head 33 of a screw 11 is positioned immediately adjacent the outer periphery of the teeth 5. The screw 11 is engaged in a mounting block 10 seated in a recess in casing 1 and abuts the undersurface of the plate 9. The screw 11 can be turned to move the head 33 radially inwardly to accommodate reductions in diameter of the cutter 4 caused by sharpening of the teeth 5. The mounting block 10 can be at least partially downwardly detached to allow the square head 33 to be turned, while in the functional position shown the square head 33 is located against turning by the undersurface of the plate 9. The arbor 2 and the cutter are insulated by a thin insulating sleeve from the shaft 28 and brushes 14 connected to an external source of electrostatic charge are provided at the lower end surface of the arbor stem 29. Thus a electrostatic charge can be imparted to the arbor and hence to the cutter.

Separate or additional air suction and static electric charge may be provided at the station 15.

FIG. 2 of the drawings shows that a passage 18 of adjustable width for assemblies of sheets traversing the machine is defined between the plate 9 and a plate 16. Slots 32 in the plate 16 are elongate in the width of the passage and bolts 17 pass through the slots 32 to locate the plate.

FIGS. 3 and 4 of the drawings show in addition to the cutting machine of FIG. 1 and 2 and the station 15 a glueing station including a glue tank 21 containing adhesive 22 and a roller 23 revolving with its top edge travelling in the direction of advance of collated assemblages of paper sheets, hereinafter referred to as books B. A similar roller 24 rotates in opposite direction, both rollers being held on shafts 25 and driven by suitable means. The rotational axes of the rollers 24 and 25 are inclined at an angle slightly less than 90° to the direction of advance of the books. In use books B having edge surfaces facing downwardly to define the book back travel from left to right in the direction of arrows C. They pass first through the passage 18 over the rotating cutter 4 where the teeth 5 remove the back folds in the case of folded sheets, or simply trim the single sheets, while the cutters 6 provide deeper scores or slots across the back of the book.

The high suction produced in the center of the arbor above the airways 12 directly in the path of the backs of books after they have been cut by the cutter 4 and the static electric charge in the arbor 2 and hence in the cutter 4 cause fiber ends loosened by the cutter to be drawn downwardly so that books leaving the cutter have fibers projecting downwardly from the edge surfaces of the leaves. This condition improves their ability to accept adhesive from the rollers 23 and 24. The high suction also cleans extraneous dirt, which might otherwise affect adhesion, from the sheets of the books. The centrifugal fan also draws air from the space between the periphery of the cutter 4 and the casing 1 to withdraw paper dust and swarf through the casing 1 to the outlet 20 and thence to a suitable receiver.

The arrangement of the assembly described above is found to effect a very considerable improvement in the strength of books produced by this process. The attraction of the static electrical attraction provided varies in effect with different types of paper and also with the humidity present in the paper but on all papers it does effect a marked improvement in binding strength. The depression of air in the center of the cutter also markedly improves the condition of a back of a book to receive the adhesive.

By known means it is also possible to induce a static charge in the cutter arbor 2 itself merely by its own speed of revolution. Where this static charge is induced in the cutter arbor 2 it is desirable that some means of providing a very short path to earth of the static charge so that there is no risk of high electrical shocks being transmitted to the remainder of the machine with a possibility of irritation or inconvenience to operators.

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I claim:

1. A machine for preparing paper sheets for binding, such machine comprising a casing, a drive shaft, a cutting disc on the shaft and rotatable at one surface of the casing, said cutting disc having cutting teeth at the periphery thereof to provide cutting means across which the edge surfaces of a collated assembly of sheets are advanced and an additional cutting tooth for forming scores or slits in the edge surfaces of the collated assembly of paper sheets, fan blades attached to the shaft, at least one passage through the central part of the disc whereby, in operation, suction is produced in the center of the disc and fiber ends loosened by the cutting means are drawn away from the edge surfaces to prepare the said edge surfaces to receive adhesive and means for applying glue to the edge surfaces of assemblages of sheets which have traversed the cutting means.

2. A machine for preparing paper sheets for binding, such machine comprising a casing, a drive shaft, a cutting disc on the shaft, and rotatable at one surface of the casing and having cutting teeth at the periphery thereof to provide cutting means across which the edge surfaces of a collated assembly of sheets are advanced, fan blades attached to the shaft, at least one passage through the central part of the disc means insulating the drive shaft from the cutting disc and means for inducing an electrostatic charge in the cutting disc whereby, in operation, the suction produced in the center of the disc and the electrostatic charge on said disc draw the fiber ends loosened by the cutting means away from the edge surfaces to prepare the said edge surfaces to receive adhesive, and means for applying glue to the edge surfaces of assemblages of sheets which have traversed the cutting means.

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