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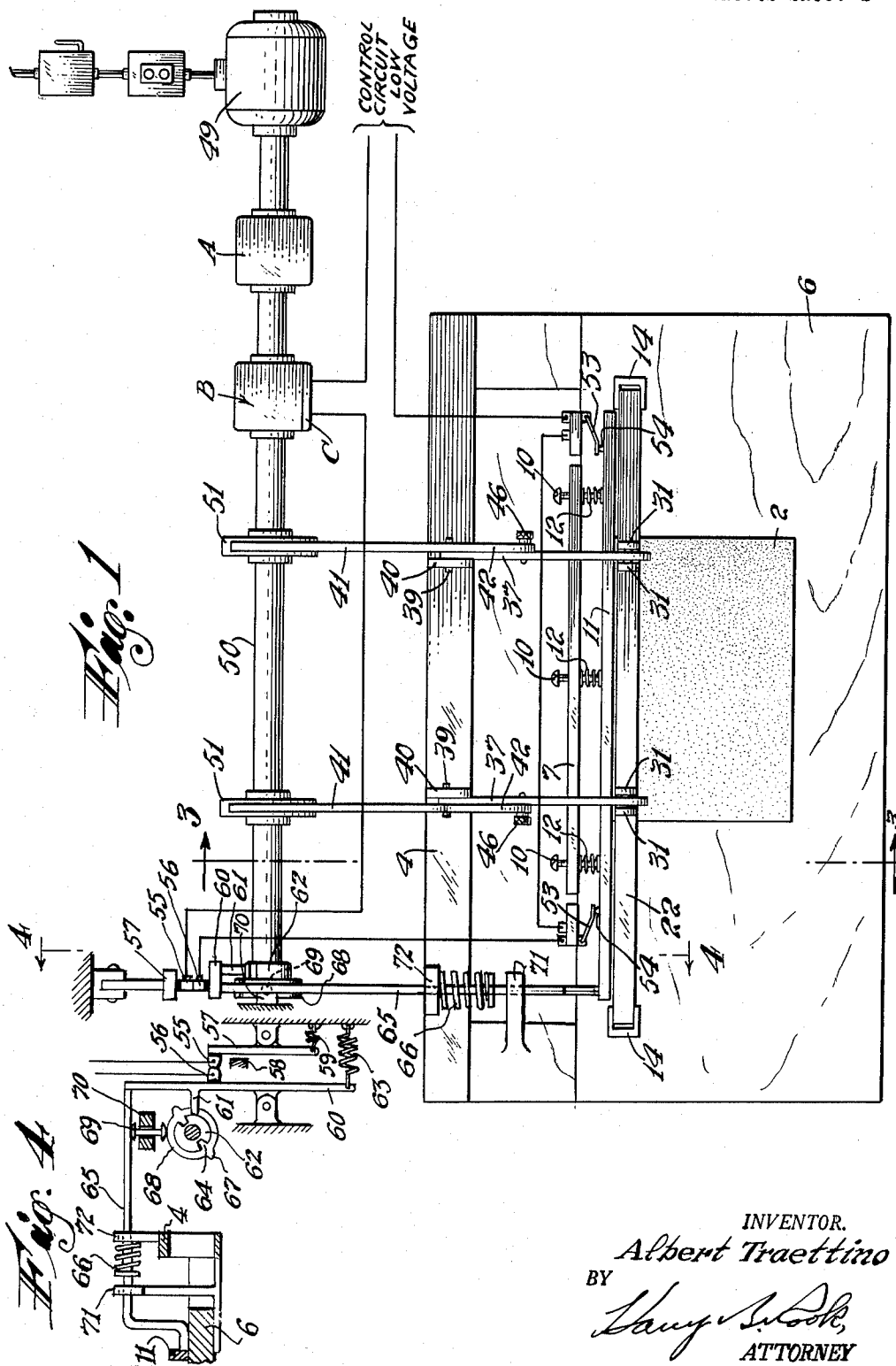
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2 Sheets-Sheet 1



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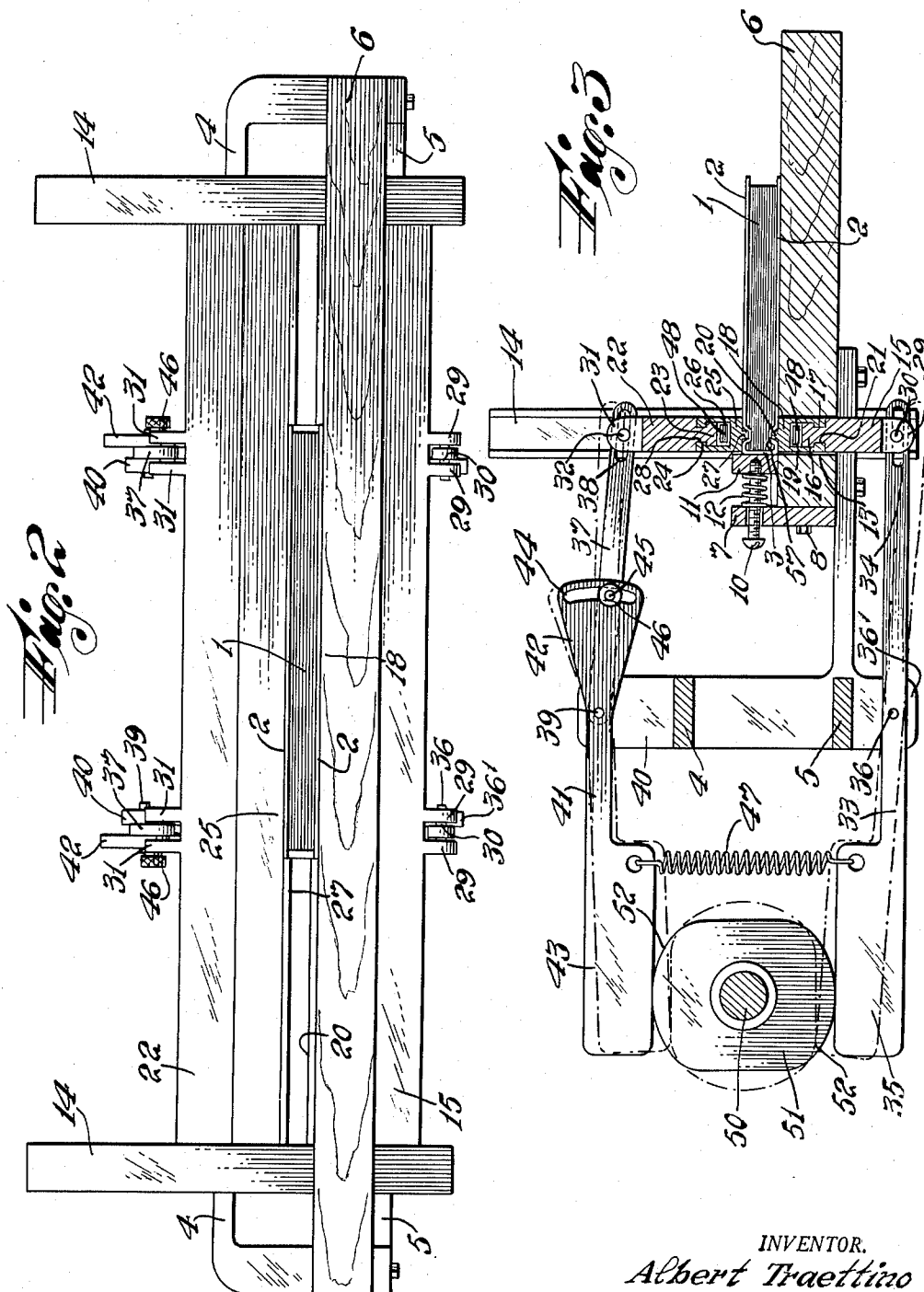
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2 Sheets-Sheet 2



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MACHINE FOR CREASING THE JOINTS OF BOOKS

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4 Claims. (Cl. 11—1)

This invention relates to new and useful improvements in machines for creasing the joints of books and is particularly valuable for use in small binderies.

It is common practice to crease the joints of books by placing beaded binding boards or ribbed plates between the books, with the beads or ribs placed to form the cover joints, and the books stacked in presses and subjected to pressure for several hours until the cover joints are set.

The primary object of the present invention is to provide a machine which eliminates the necessity of the use of press boards and also of placing the books in a press, thereby saving the cost of the boards, eliminating the cost of and space occupied by a press by making that space available for other purposes, dispensing with the labor of inserting the boards between the books and of stacking the books in and removing them from a press, and saving the hours lost while the books are in a press.

Another object of the invention is to provide a machine of this character which produces uniform and strong joints for the covers of books without damaging or defacing the material of the covers.

A further object is to provide a creasing machine of this kind which may be adjusted for creasing covers of books of different thicknesses.

Still another object of the invention is to provide a creasing machine of this kind which ensures the square relation of the book and cover when the binding is finished.

It is further proposed to produce a machine for creasing covers of books which is simple and durable in construction and which can be manufactured and sold at a reasonable cost.

For a further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings and to the appended claims in which the various novel features of the invention are set forth.

In the accompanying drawings forming a material part of this disclosure:

Figure 1 is a top plan view of a machine for creasing the covers of books embodying my invention, a book being shown between the creasing jaws.

Figure 2 is a front elevational view thereof.

Figure 3 is a sectional view taken on the plane of the line 3—3 of Figure 1, and

Figure 4 is a schematic transverse sectional view, on a reduced scale, taken approximately on the plane of the line 4—4 of Figure 1.

Referring to the drawing in detail, the book illustrated is composed of a filler 1 and a cover of heavy paper, leather or other suitable material having sides 2 pasted to the waste or outside leaves of the filler and a preshaped back 3.

A fragment of the frame of the machine is shown including upper and lower frame members 4 and 5, respectively, suitably fastened to a supporting table 6. An elongated flat rail 7 is fastened to the rear of the table by suitable fastening members 8, said rail projecting up-

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wardly above the table top. Screws 10 are slidably mounted in spaced openings in the rail and an elongated bar 11 is secured to the inner ends of the screws. Compression springs 12 encircle the shanks of the screws between the rail and the bar and urge the bar inwardly over the top of the table and away from the rail.

Adjacent its rear, the table 6 is formed with an elongated opening 13 which extends substantially the length of the table. A channel-shaped upright guide post 14 is fitted in each end of the opening 13, the post extending above and below the table.

Vertically reciprocable in the opening 13 is an elongated lower bar 15, the ends of which are slidable in the channels in the lower ends of the upright posts 14 and being guided thereby. The bar 15 is formed with a reduced inner end 16 having opposed grooves 17 in its sides. A creasing jaw or blade 18 of inverted U-shape in cross section is mounted on the bar 15 leaving a space 19 between the jaw and bar. The jaw or blade is formed with a central rib 20 on the surface of its inner end and with inwardly extending opposed tongues 21 at its outer end adapted to interlock with the grooves 17 on the bar 15 for securing the bar and jaw together.

An elongated bar 22 is vertically reciprocable in the channels of the upper ends of the upright posts 14 above the table top. Bar 22 is similar in construction to the bar 15 having a reduced inner end 23 with opposed side grooves 24. A creasing jaw or blade 25 is supported on the inner end of the bar 22, which jaw is U-shaped in cross section, leaving a space 26 between the jaw and bar. A central rib 27 is formed along the center of the surface of the inner end of the jaw together with inwardly extending opposed tongues 28 at its outer end adapted to interlock with the grooves 24 on the bar for securing the bar and jaw together.

At each side of its center, the lower reciprocable bar 15 is formed with a pair of closely spaced perforated lugs 29 for mounting a pivot pin 30 therebetween. The upper reciprocable bar 22 at similar points therealong is also provided with similar pairs of lugs 31 for mounting pivot pins 32 in line with the pins 30. An elongated lever bar 33 is flexibly connected at its inner end to each pin 30 by means of an elongated slot 34. The outer free end of the lever bar is formed with a rectangular-shaped enlargement 35. Midway its ends, each lever bar 33 is pivoted to a pivot pin 36 carried by a bracket 36' depending from the lower frame member 5.

An elongated lever bar 37 is also flexibly connected at its inner end to each pivot pin 32 of the upper bar 22 by means of an elongated slot 38. The outer ends of the lever bars 37 are pivotally connected to pivot pins 39 mounted on brackets 40 extending upwardly from the upper frame member 4. Another elongated lever member 41, having an enlarged fan-shaped inner end 42 and an enlarged offset rectangular-shaped outer end 43, in opposed relation to the similarly shaped outer end 35 of the lever bar 33, is pivoted midway its ends to each pivot pin 39. The inner fan-shaped end 42 of each lever member 41 is formed with an elongated arcuate-shaped transverse slot 44 for receiving a screw 45 which is secured to and protrudes from the surface of the adjacent lever bar 37 to afford relative swinging movement between the lever bar 37 and the lever member 41 for adjusting said parts. A nut 46 on the outer end of each screw 45 holds the parts in adjusted position. The enlarged outer ends of each pair of opposed lever bars 33 and 41 are connected by a compression spring 47 which normally pulls the lever bars toward each other thereby tilting said bars on their pivot points and normally moving the outer ends of the bars apart for moving the upper and lower bars 22 and 15, respec-

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tively, with their respective jaws or blades outwardly away from each other.

An electric heater 48 is interposed in each of the spaces 19 and 26 in the creasing jaws or blades 18 and 25, respectively, for heating the jaws or blades, the heaters being electrically connected to a source of electromotive power, and being movable with the jaws.

The mechanism for reciprocating the opposed lever bars 33 and 37 consists of an electric motor 49 suitably connected to a source of electromotive power and having its shaft connected through a speed reducing gear A and a suitable known electromagnetic clutch B to a cam shaft 50. The cam shaft 50 extends between and across the enlarged outer ends of the lever bars 33 and lever members 41. Secured to the cam shaft at the points where it passes between said enlarged ends are cam disks 51, the operating faces 52 of which are adapted to engage the opposed edges of said enlarged ends and force the outer ends of the lever bars and lever members away from each other and force their inner ends toward each other. The creasing jaws or blades 18 and 25 are thus simultaneously reciprocated.

It is desirable that the cam shaft 50 be prevented from turning continuously and that means be provided for causing the shaft to turn one-half revolution to crease one book and then to stop, and the invention utilizes the alignment bar 11 for controlling the starting of the cam. On the inner face of the stationary rail 7 and at each end thereof, there is a normally open spring-closed limit switch 53 having an operating arm extending into the path of movement of a finger 54 on the corresponding end of the alignment bar 11. The limit switches 53 are connected in series circuit with the actuating winding C of the electromagnetic clutch and the contacts 55 and 56 of a control switch. The contact 55 is mounted on a lever 57 which is pivotally mounted intermediate its ends on a fixed support (the machine frame) and normally influenced into engagement with a stop 58 by a spring 59. The other contact 56 is mounted on a lever 60 pivotally mounted intermediate its ends and having a finger 61 adjacent one end that is normally influenced into contact with the periphery of a control drum 62 by a spring 63. The drum 62 is mounted on the cam shaft 50 and has two notches 64 in its periphery spaced 180° apart, in one of which the finger 61 normally seats so that the contacts 55 and 56 are normally held out of engagement with each other to open the circuit through the winding of the electromagnetic clutch. An actuating rod 65 is interposed between the alignment bar 11 and one end of the switch lever 60 so that when the alignment bar is in its normal position without a book in the machine, the actuating rod is pushed away from the lever 60 by a spring 66, while when the alignment bar 11 is positioned by the insertion of a book into the machine, the lever 60 is actuated to move the finger 61 out of the corresponding notch and at the same time cause engagement of the contacts 55 and 56 to close the circuit through the electromagnetic clutch and thereby start the cam shaft 50. The cam shaft will then rotate one-half of a revolution, whereupon one of two ribs 67 that are spaced 180° apart on the periphery of a control cam 68 will engage a push rod 69 that is slidably mounted in a fixed portion 70 of the frame and is interposed between the actuating rod 65 and the control cam 68, whereby the actuating rod is pushed upwardly out of the engagement with the end of the switch lever 60 so as to permit the finger 61 to enter one of the notches 64 under the influence of the spring 63 and thus open the switch 55, 56 to stop the cam shaft 50 after one-half of a revolution thereof. It will be understood that the actuating rod 65 will be loosely mounted in suitable guides 71 and 72 to permit this operation.

In operation of the machine after the sides 2 of the cover of the book have been pasted on to the waste or outside leaves of the filler 1, the book is placed by

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hand flat on the supporting table 6 with its rear end positioned between the jaws or plates 18 and 25 and with its back 3 in contact with the alignment bar. The book is manually pushed rearwardly against the alignment bar and so as to move said bar until its fingers 54 engage the operating arms of both of the limit switches 53 as shown in Figure 1. The cam shaft 50 then rotates one-half of a revolution as above described. Upon insertion of the next book and actuation thereby of the alignment bar 11, the actuating rod 65 closes the contacts 55, 56 so as to close the circuit to the electromagnetic clutch winding and start the machine as soon as both limit switches 53 are closed by proper alignment of the book.

If the back 3 of the book should not be parallel with the creasing ribs 37 on the jaws, the bar would be tilted and one or the other limit switch would not be closed so that the cam shaft would not be started until the book was properly positioned to close both of the limit switches at the same time. This insures a proper positioning of the back of the book relative to the corresponding jaws before the machine can be started.

Rotation of the cam shaft 50 causes turning of the cam disks 51 bringing their operating faces 52 into camming engagement with the enlarged ends 35 and 43 of the lever bars 33 and lever members 41, respectively, for oscillating the lever bars 33 and 37 on their pivots whereby the creasing jaws or blades 18 and 25 are moved toward each other. The ribs 20 and 27 carried by the jaws 18 and 25, respectively, will thus for a short period hot press into the material of the sides 2 of the cover of the book and form opposed creases or grooves 57 at the cover joints as shown in Figure 3, following which the operating faces 52 of the cam disks pass from contact with the outer ends of the lever bars and lever members and the spring 47 retracts the lever bars and lever members with their creasing jaws thereby releasing the book, permitting it to be manually removed and the alignment bar 11 to be pushed automatically by the springs 12 to permit the limit switches to open.

The heat applied during the short interval of pressing by the creasing jaws may be comparatively low so as not to burn, scorch or discolor the cover material, but will be sufficient to set the creases so that they will retain their shape and be firmly secured to the filler.

The machine may be adjusted for books of different thicknesses by adjusting the connection between the lever bars 37 and the lever members 41 whereby the throw of the lever bars 37 may be shortened or lengthened and may be held in adjusted position by the nuts 46.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

What I claim is:

1. A machine for creasing the cover of a book comprising, in combination, a pair of opposed movable jaws shaped for creasing a cover of a book at opposed points thereon, said jaws being mounted for movement toward and from each other in a vertical plane, two pairs of levers, each lever being pivotally mounted between its ends and one lever of each pair being connected at one end to one jaw, and means including a cam between the other ends of the levers of each pair for actuating said levers to move said jaws, and means for simultaneously rotating said cams.

2. A machine for creasing the cover of a book comprising, in combination, a pair of opposed movable jaws shaped for creasing a cover of a book at opposed points thereon, said jaws being mounted for movement toward and from each other in a vertical plane, two pairs of levers, each lever being pivotally mounted between its ends and one lever of each pair being connected at one

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end to one jaw, and means including a cam between the other ends of the levers of each pair for actuating said levers to move said jaws, and means for simultaneously rotating said cams, and mechanism for controlling said means including an element actuated by a book during insertion of the book between said jaws.

3. A machine for creasing the cover of a book comprising, in combination, a pair of opposed movable jaws shaped for creasing a cover of a book at opposed points thereon, operating levers connected to said jaws, means for actuating said levers, and mechanism for controlling said means including an element actuated by a book during insertion of the book between said jaws, said mechanism including two spaced electrical switches connected in series circuit, each having an operating arm, and said element comprising an alignment bar mounted to be moved by a book during insertion of the book between said jaws so that both ends of said bar may simultaneously operate said limit switches if the book is

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properly aligned with said jaws or only one end of said bar will actuate one limit switch if the book is not properly aligned with said jaws, and means associated with said switches for controlling said means for actuating said levers.

4. A machine for creasing the cover of a book as defined in claim 3, wherein said alignment bar is located behind said jaws in the path of movement of a book cover into a position to be creased by said jaws, and with the addition of springs for normally urging said bar away from said operating arms of said limit switches.

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