Feb. 1, 1927. 1,616,101

R. E. ACKLEY

MECHANISM FOR PRINTING BOOK EDGES

Filed April 15, 1925 4 Sheets-Sheet 1

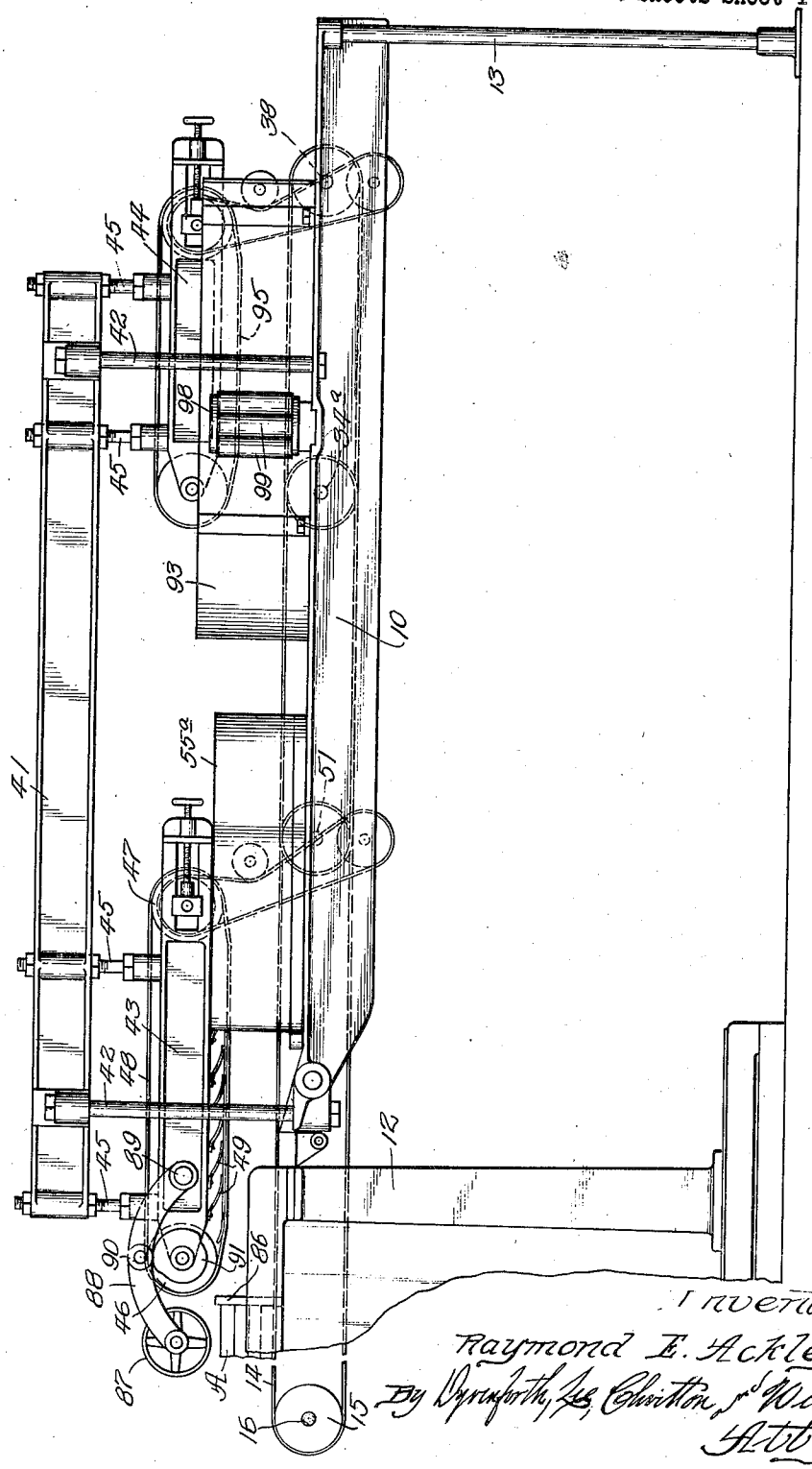


Fig. 1.

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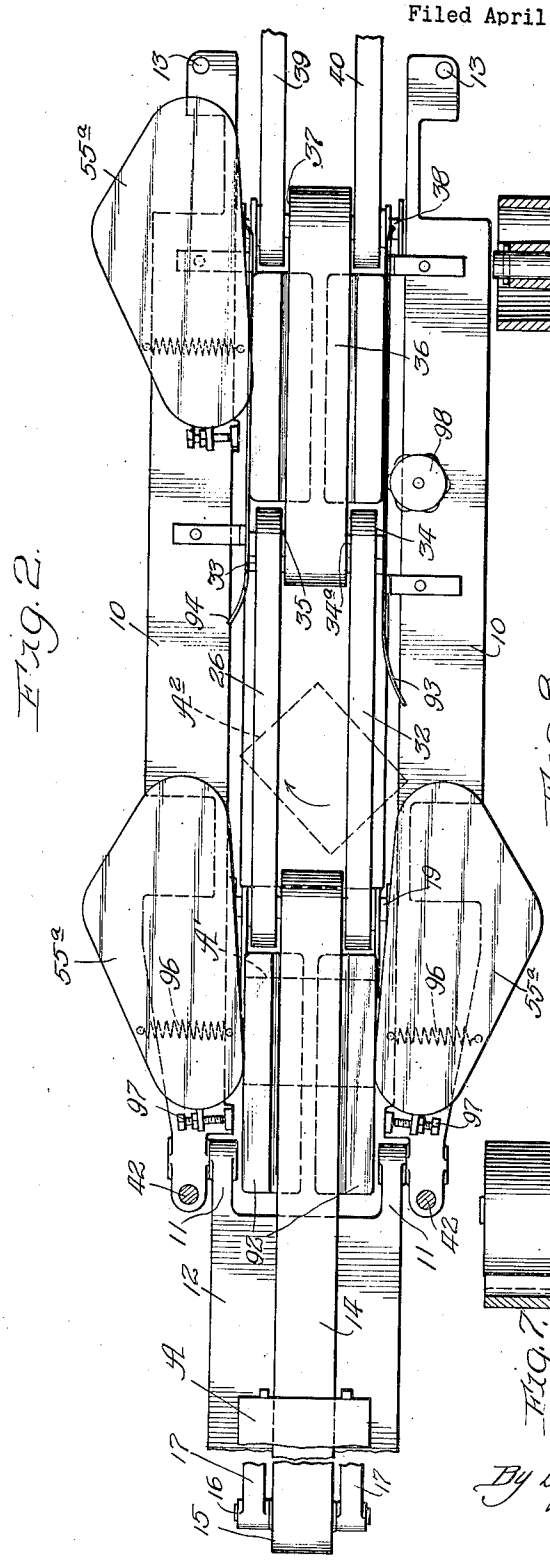


Fig. 2.

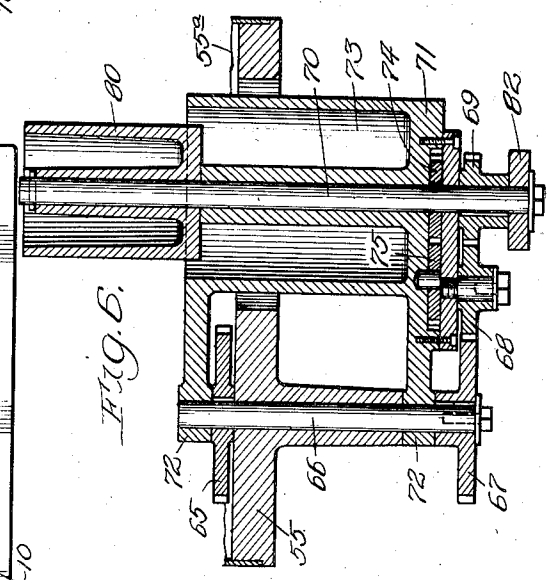


Fig. 6.

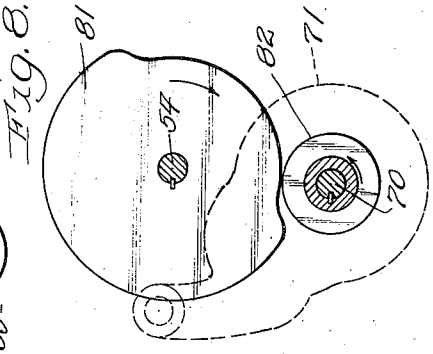


Fig. 8.

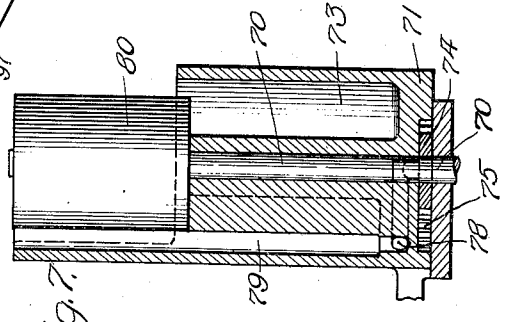


Fig. 7.

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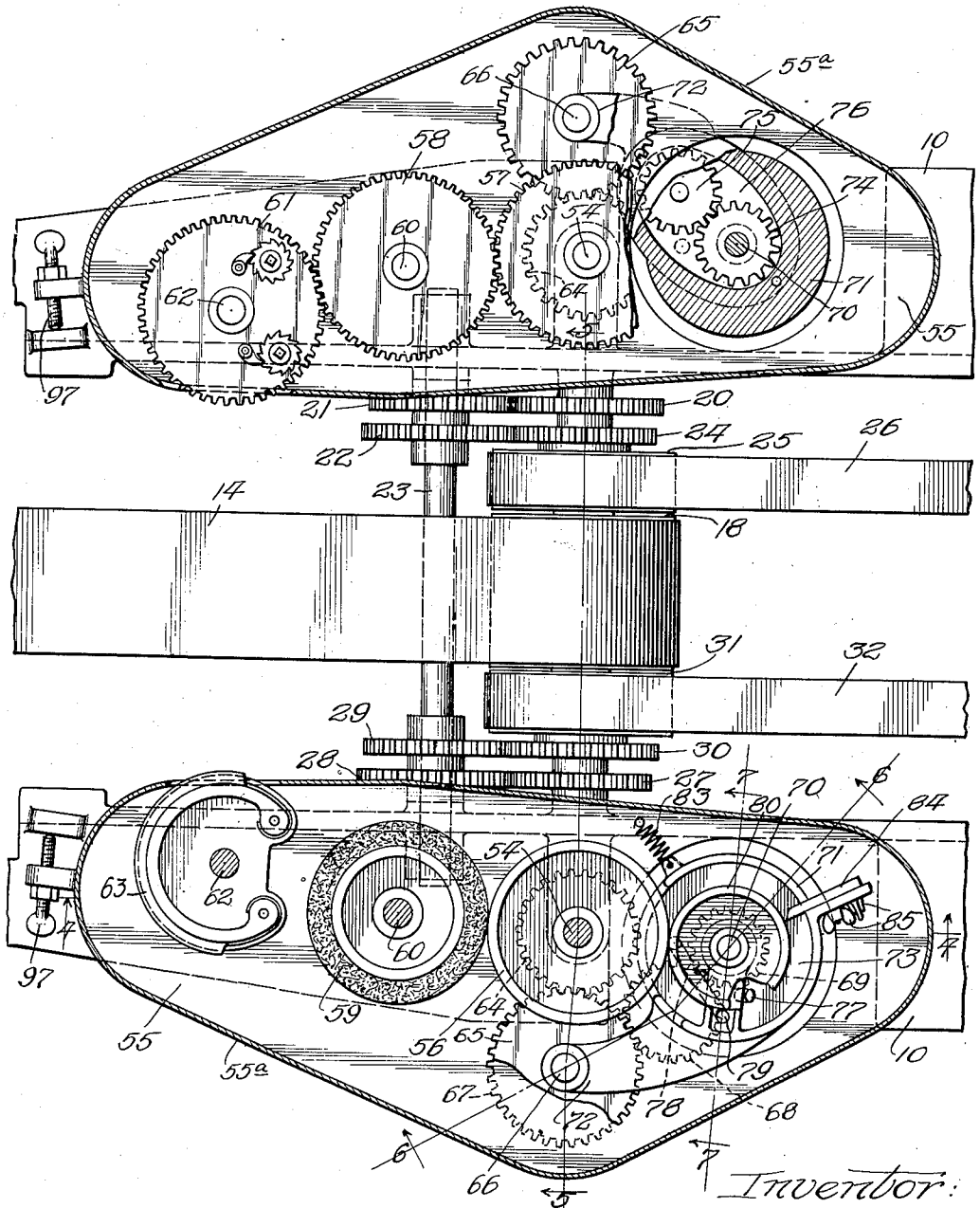
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MECHANISM FOR PRINTING BOOK EDGES

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Fig. 3.



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MECHANISM FOR PRINTING BOOK EDGES

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Fig. 4.

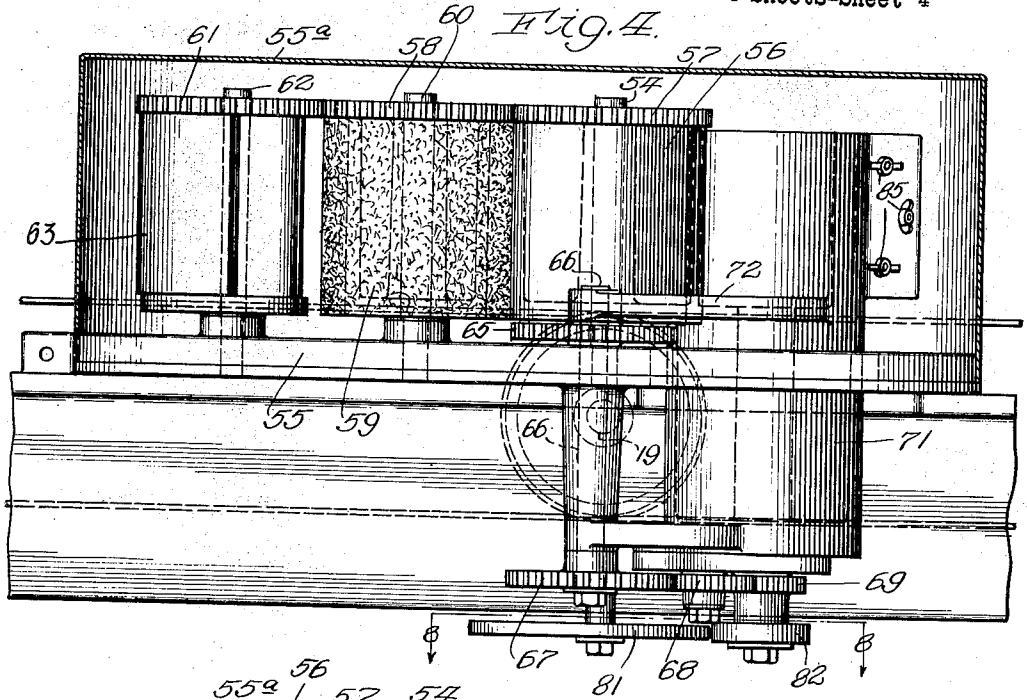
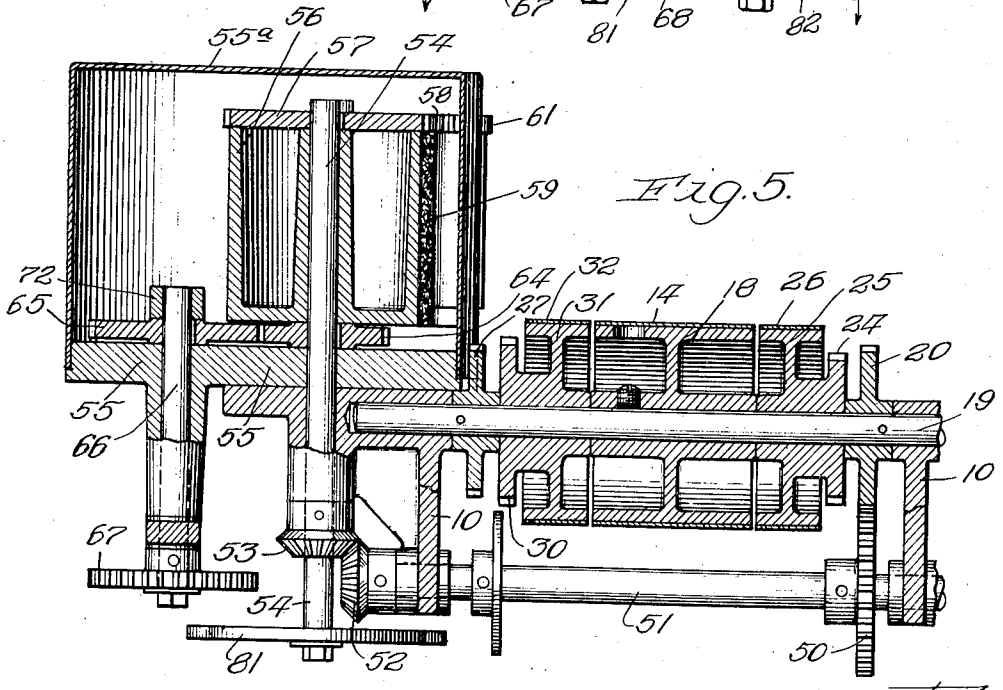


Fig. 5.



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Patented Feb. 1, 1927. 1,616,101

UNITED STATES PATENT OFFICE.

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MECHANISM FOR PRINTING BOOK EDGES.

Application filed April 15, 1925. Serial No. 23,323.

This invention relates to machines for printing edges of books and the like.

The primary object is to provide a machine for printing the head and foot of a book, turning it and printing the rear edge. It will be understood that these edges are preferably straight trimmed edges such as are found in telephone directories, catalogues and the like having paper covers.

Another object is to provide a self contained printing arm which readily adapts itself to this type of mechanism, and which is particularly adapted to print the edges while in a vertical plane.

These and other objects are accomplished by this machine which is fully described in the following specification and shown in the accompanying drawings, in which:

Figure 1 is a side elevation of the same;

Fig. 2 is a top plan view of the machine;

Fig. 3 is an enlarged top plan view of the forward printing arms;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Figs. 5, 6 and 7 are sections on the lines 5—5, 6—6 and 7—7 of Fig. 3; and

Fig. 8 is a section on the line 8—8 of Fig. 4.

The machine as illustrated comprises a main frame 10 supported at the forward end by brackets 11 on the machine 12, and at the rear end by standards 13.

A belt 14 is carried by a pulley 15 on a shaft 16 which is journaled in bearings 17, the latter being carried by the machine 12. At the opposite end the belt 14 passes around a pulley 18 which as shown in Fig. 5, is keyed to a shaft 19 which is journaled in suitable bearings in the main frame 10.

A gear 20 is also keyed to the shaft 19 and meshes with a gear 21 which is secured to a gear 22, both the latter being journaled upon the shaft 23. The gear 22 meshes with the gear 24 which is secured to a pulley 25, both being journaled on the shaft 19, and the pulley carrying a narrow belt 26.

Likewise, the gear 27 keyed to the shaft 19 meshes with the gear 28 which is secured to the gear 29, both the latter being journaled on the shaft 23. The gear 29 in turn meshes with the gear 30 which is secured to the pulley 31, over which passes the belt 32.

The two belts 26 and 32 in the opposite ends pass over pulleys 33 and 34 as shown in Fig. 2, and are suitably journaled upon a shaft 34^a so as to be freely rotatable thereon.

It will be noted that the gear 20 is larger than the gear 21 and the gear 22 being larger than the gear 24, the pulley 25 will rotate faster than the pulley 18 which is the same size. Likewise, the pulley 31 will rotate slower than the pulley 18 for the purpose of causing a book carried by these belts to be turned as will later be explained.

A pulley 35 is placed between the pulleys 33 and 34 and carries a belt 36 which passes over a pulley 37, the latter being keyed to a shaft 38 similar to the shaft 19 which is driven in the same direction and at the same speed as the shaft 19. Belts 39 and 40 are likewise driven at the same speed from pulleys on the same shaft as the pulley 37 and serve to carry the finished book from the machine.

An upper frame 41 (Fig. 1) is supported by means of standards 42 above the main frame 10 and carries two members 43 and 44 suspended therefrom by means of adjustable rods 45. Pulleys 46 and 47 are carried by the member 43 and over these passes a pressure belt 48.

The pressure belt overlies the belt 14 and has a series of spring fingers 49 which yieldably press the belt 48 toward the belt 14 so that a stack of books as A (Fig. 1) will be firmly held between the two belts which travel in the same direction at the same speed. The mechanism for driving these belts will later be explained.

Referring now to the printing mechanism shown in Fig. 3, and driving mechanism therefor, shown in Fig. 5, the gear 20 meshes with a gear 50 which is keyed to a shaft 51 which is suitably journaled on the main frame 10 and is driven from any suitable source of power. A bevel gear 52 meshes with a bevel gear 53 on the vertical shaft 54 which is journaled in the main frame 10. A printing arm frame 55 lies above the frame 10 and is journaled on the shaft 54. An inking roll 56 and a gear 57 are keyed to the shaft 54, the latter meshing with a gear 58 which is secured to a roller 59 carrying an inking pad, this roller being journaled on a pin 60. The gear 58 meshes with a gear 61 which is journaled on a pin 62 and carries a printing roller 63 which will later be described.

A gear 64 keyed on the shaft 54 (Fig. 5)

meshes with a gear 65 keyed on the shaft 66 which is journaled in a suitable bearing in the plate 55. A gear 67 is pinned to the lower end of the shaft 66 and meshes with an idler gear 68 which in turn meshes with a gear 69 which is keyed to a shaft 70 which is journaled in a casting 71 which is hingedly carried by means of two arms 72 on the shaft 66.

The casting 71 is hollow and contains an ink reservoir 73 surrounding the shaft 70. A gear 74 meshes with a gear 75 and the two are enclosed in an elliptical space 76 (Fig. 3) to form a gear-pump for the ink. The passage 77 (Fig. 3) leads from the receptacle 73 to the gear-pump 76 and serves as the inlet opening thereto. The passage 78 is the outlet of the pump and leads to the vertical passage 79 which carries the ink up along the surface of the ink roller 80 which is keyed to the shaft 70, the roller intermittently making contact with the ink roller 56.

A cam 81 is keyed on the bottom of the shaft 54 (Fig. 8) and has a follower 82 on the bottom of the shaft 70. A spring 83 (Fig. 3) normally draws the casting 71 forward so that the ink roller 80 is in contact with the roller 56. During a large portion of the revolution of the cam 81, the follower 82 is forced back carrying the ink roller 71 away from the roller 56. The roller 80 however is continuously supplied with ink, the thickness of the film of ink being regulated by means of a scraper plate 84, the distance from the roller 80 being regulated by means of thumb screws 85.

The printing roller 63 is adapted to receive a printing mat which is stretched around the printing roller and secured thereto in any desired manner.

The operation of the machine is as follows: A pile of books A are held at rest on the machine 12 (Fig. 1) by means of an intermittently retracted stop 86, while the belt 14 passes at a uniform rate beneath this pile of books.

As the stop 86 is withdrawn a pile of books A is carried forward by the belt 14. At this point a means is provided for starting the pile of books particularly as it starts forward with the belt, which consists of a weighted roller 87 which is pivotally carried by arms 88 pivotally mounted at 89 to the frame 43, and having rollers 90 which make contact with cams 91 on two ends of the shaft upon which the pulley 46 is mounted. The belts 14 and 48 are geared together as has previously been stated and the cam 91 is so timed as to drop the weighted roller 87 on the pile of books A before it starts to move and let the weight of the roller rest thereon until the pile has picked up the speed of the belt. As the pile of books moves forward it is caught between the conveyor belt 14 and the pressure belt 48, the series of spring fingers 49 supplying pressure thereto. It will also be understood that suitable spreading plates 92 underlie the conveyor belt 14 and serve to carry the weight of the pile of books and to accurately position the same with respect to the printing roller. While so held between these two belts which send the hooks along at a uniform rate, the printing rollers located on opposite sides as shown in Fig. 3, print the head and foot edges of the book after which it passes on to the conveyor belts.

As has previously been explained, these belts are traveling at different speeds, the belt 26 traveling faster than the belt 14, while the belt 32 travels an equal amount slower. This difference is so timed as to turn the pile of books in a clockwise direction as shown in Fig. 2, through a quarter of a revolution, thereby presenting the third trimmed edge of the book to the printing roller as will now be described.

As the pile of books leaves the belts 26, 32 the front edge of the book encounters the guide 93, while the rear edge a little later encounters the opposite guide 94. As the pile of books leaves the differential belts 26, 32 it passes on to the conveyor belt 36 and is pressed between this and the pressure belt 95 where the rear trimmed edge of the book is printed in the same way as that by which the head and foot edges were printed as was just described.

It will be understood that each printing arm is mounted to hinge about the vertical shaft 54 and that each is pressed inwardly by means of a spring 96 as shown in Fig. 2, the inward movement of the printing arm being regulated by an adjusting screw 97. A removable cover 55[a] is passed over the printing arm 55 and encloses the inking and printing rollers.

At 98 (Fig. 1) is provided a combing-wheel which is driven from a source (not shown) and which has a series of loosely held centrifugal members 99 which rattle against the edge of the books to jog them against the guide 94 so as to present all books of the pile uniformly to the printing roller.

The pressure belt 48 is suitably driven by mechanism (not shown) in detail, from the shaft 51 so that this belt, the conveyor belt and the printing mechanism are all in timed relation. Likewise the stop 86 is operated in timed relation to the conveyor belt, the mechanism for accomplishing this however not being shown since its operation will readily be understood.

Thus, by suitably forming the printing matter, a number of books in the pile A may have their edges simultaneously printed, after which the books pass on through the machine and are removed in any well known manner from the tension belts 39, 40.

While I have shown and described but a single embodiment of this invention, it is to be understood that it is capable of many modifications. Changes therefore in the construction and arrangement may be made which do not depart from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. Mechanism for printing the edges of books comprising means for feeding the books thereto, means for printing the two opposite trimmed edges of the book, means for turning the book about a vertical axis, and means for printing the other trimmed edge.

2. Mechanism for printing the edges of books comprising means for feeding the books thereto, means for simultaneously printing the two opposite trimmed edges of the book, means for turning the book about a vertical axis, and means for printing the other trimmed edge.

3. Mechanism for printing the edges of books comprising means of feeding the books thereto, mean conveying the books between the opposed faces of two conveyors moving at the same rate and in the same direction, means for applying pressure to one of said conveyors to grip said book, and means for printing an edge of said books while so gripped and conveyed.

4. Mechanism for printing the edges of books comprising means for feeding the books thereto, means for printing the two opposite trimmed edges of the book, means for revolving the book in a plane parallel to the surface on which the book rests, and means of printing the other trimmed edge.

5. Mechanism for printing the edges of books comprising means for feeding the books thereto, means for gripping and conveying the books between opposed faces of two conveyors traveling at the same speed, means for revolving the book on its underlying face while resting on a moving conveyor, and means for printing the other trimmed edge.

6. A machine for printing the edges of books comprising a conveyor belt for carrying the books through the machine, a pressure-belt overlying the conveyor belt and traveling at the same speed for gripping books therebetween, the adjacent faces of said belts being parallel and moving at the same rate and in the same direction, means for applying pressure to one of said conveyors to grip said book, and means adjacent said belts for printing the edge of said books as they are carried along by said belts.

7. A machine for printing the edges of books comprising a conveyor belt for carrying the books through the machine, a pressure-belt overlying the conveyor belt for gripping books therebetween, the adjacent faces of said belts being parallel and moving at the same speed, means adjacent said belts for printing the edge of said books as they are carried along by said belts, means for turning said books after leaving the printing mechanism, and means for printing another edge of said books.

8. A machine for printing the edges of books comprising a conveyor belt for carrying the books through the machine, a pressure-belt overlying the conveyor belt for gripping books therebetween, the adjacent faces of said belts being parallel and moving at the same speed, means adjacent said belts for printing the edge of said books as they are carried along by said belts, a pair of horizontally spaced belts running at different speeds for turning said books after leaving the printing mechanism, and means for printing another edge of said books.

9. A machine for printing the edges of books comprising a conveyor belt for carrying the books through the machine, a pressure-belt overlying the conveyor belt for gripping books therebetween, the adjacent faces of said belts being parallel and moving at the same speed, means adjacent said belts for printing the edge of said books as they are carried along by said belts, means for turning said books after leaving the printing mechanism, guides for aligning said books, and means for printing another edge of said books.

10. Mechanism for printing the edges of books comprising means for feeding the books thereto, means for printing the two opposite trimmed edges of the book, means for revolving the book by slipping on the supported surface of said book, and means for printing the other trimmed edge, said feeding and printing means being in timed relation.

11. Mechanism for printing the edges of books comprising means for feeding the books thereto, means for gripping and conveying the said books, between the opposed surfaces of two belts or conveyors, traveling at the same speed, during the printing operation, means for printing the two opposite trimmed edges of the book, intermediate means for conveying the book to a second printing position, means for revolving the book on its supporting surface while resting on and moving with said intermediate conveying means, and means for printing the other trimmed edge.

12. Mechanism for printing the edges of books comprising means for conveying the books in piles through the mechanism, means overlying the first mentioned means for gripping the books as they pass along, means for steadying said pile of books as it encounters the gripping means, and means for printing

an edge of said pile of books while so gripped.

13. Mechanism for printing the edges of books comprising means for conveying the books in piles through the mechanism, means overlying the first mentioned means for gripping the books as they pass along, a cam operated weighted roller adapted to be dropped upon said books for steadying said pile of books as it encounters the gripping means, and means for printing an edge of said pile of books while so gripped.

14. Mechanism for printing the edges of piles of books comprising means for conveying the books in piles through the mechanism, a second means traveling at the same speed and in the same direction as the first mentioned means, means for applying pressure to the second means for gripping said piles of books to hold them in alignment, and means for printing a vertical edge of said pile of books as they pass along.

In testimony whereof I have hereunto set my hand this 3 day of April, 1925.

RAYMOND E. ACKLEY.