This invention relates to printing presses and more especially to machines for printing advertising or other matter on the free edges or ends of the leaves of a book and the object is to produce a machine capable of efficiently producing impressions on the free edges of books as rapidly as the books can be fed by hand or otherwise to the machine.

A further object is to produce a machine which automatically accommodates itself to books of varying width and thickness, and a still further object is to produce a machine of this character which is of simple, strong, durable, compact and economical construction.

With these general objects in view, the invention consists in certain novel and useful features of construction and combinations of parts as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which:

Figure 1 is a plan view of a machine embodying the invention;

Figure 2 is a side view of the machine.

Figure 3 is a vertical longitudinal section on the line III—III of Figure 1;

Figure 4 is a horizontal section on the line IV—IV of Figure 3, with certain parts of the last-named figure omitted;

Figure 5 is an enlarged central cross section with certain parts at one side omitted;

Figure 6 is a horizontal section on the line VI—VI of Figure 3; and

Figure 7 is a fragmentary vertical section on the line VII—VII of Figure 2.

Referring to the drawings in detail where like reference characters identify corresponding parts, 1 indicates parallel sides secured to legs 2 and 3, and connected at one end by a cross brace 4, and the legs are connected by longitudinal braces 5 supporting a platform or shelf 6. The sides are connected about midway their length by a cross piece 7. Projecting upward from the sides at the opposite side of cross piece 5 from the legs 3, are uprights 6, connected to the legs 3 at corresponding sides by the longitudinal bars 7, the parts thus far enumerated constituting a skeleton framework for the operating parts of the machine.

Journaled in bearings 8 on the sides 1 between the parts 3 and 6 of the framework, is a transverse shaft 9 for a bed roller 10 for cooperative action with an overlying roller 11. Any suitable means may be provided to operate said rollers, that preferred being as follows: 12 is a motor mounted on shelf 4, and provided with a pulley 13 connected by a belt 14 to a large pulley 15 on a suitably supported shaft 16, and said shaft has a smaller pulley 17 connected by a belt 18 to a pulley 19 on shaft 9. The latter also has a pulley 20 connected by a belt 21 to a pulley 22 on a transverse shaft 23 journaled on the framework near legs 2 thereof. Said shaft also has a second pulley 24 connected by a crossed belt 25 to a pulley 26 on the shaft 27 of the roller 11, the power transmitting mechanism described thus providing for proper cooperative operation between rollers 10 and 11.

The shaft of roller 11 is journaled in bearings 28 having upwardly-projecting vertically-slotted arms 29 slidably fitting plates 30 and resistance bolts 31 extending through the said plates into the bars 7, and thrust-bolts 32 extend through the upper ends of the arms 29 and bear upon the resistance bolts, so that the roller 11 may be vertically adjusted to impose its weight on books of predetermined thickness and yet be capable of moving upward to provide for the passage of a thicker book.

To feed books through the machine, an endless conveyer is provided, comprising a roller 33, an endless apron 34 and a roller 35, the upper portion of the belt extending over and in contact with the bed roller 10. The roller 33 is mounted on shaft 23, and the shaft of roller 35 for conveyer-tightening purposes, is journaled in bearings having slotted arms engaged by screws 37 for guiding and clamping purposes. To adjust the conveyer, thrust-screws 38 bear against the bearings 36 and are mounted in brackets 39 secured to sides 1. As a means for taking slack out of the conveyer, its lower portion is engaged by a roller 40 having its shaft 41 journaled in plates 42 provided with threaded legs 43 extending through vertical slots 44 in legs 3 and engaged by nuts 45 for clamping the plates 42 at the desired point on the said legs.

To prevent sagging of the upper part of the conveyer between the roller 10 and rollers 33 and 35, a sectional table is employed, consisting of like members 46 secured on cross-pieces 47 fastened on the sides 1.
In order that the passage of a book between rollers 10 and 11 may be insured, the roller 11 is engaged by one or more friction belts 48 which also engage a roller or rollers 49 of such proportion and so supported that the lower part of the belt (or belts) shall converge with respect to conveyer 34, toward the rollers 10 and 11. The rollers 49—two being shown—are journaled in forked heads of bolts 50, extending through a transverse rocker bar 51 journaled in bars 52 secured to the framework, nuts 53 engaging the bolts 50 and the rocker bar to provide for tensioning adjustment of the said belt or belts 48. The bolts 50 are engaged by hanger bolts 54 depending from a transverse bar 55 secured at its ends to bars 52, and nuts 56 engage the hanger bolts and rest on bar 55 to support the rollers 49 at the desired height above the conveyer belt 34, it being noted that a torsion spring 56 on rocker bar 51 tends to hold the rollers 49 yieldingly depressed, the ends of the spring being secured to a bar 52 and a collar on the rocker bar.

In the horizontal plane of the space between the conveyer belt and the roller 11, and at the side of the framework where the imprints on the books are to be made, a horizontal printing wheel 57 is secured on a vertical shaft 58 journaled at its lower end in a step or socket-bearing 59 secured upon the shelf 5, and at its upper end in a bracket bearing 60 secured to a bar 61 connecting one of the legs 3 and an upright 6. Accurate printing elements 62 of rubber, metal or other suitable material are provided on the periphery of the wheel 57 opposite the space between the rollers 10 and 11, and in such horizontal plane the wheel has a diametrical passage 63 containing a pair of pins 64 projected when not prevented as hereinafter explained, beyond the periphery of the wheel by springs 65 interposed between the pins and shaft 58. In the proportion of parts shown, the printing wheel is adapted to make a half revolution with the passage of each book B, and each pin is adapted to intercept the path of travel of and be engaged by a book, the latter being utilized to apply endwise pressure on the pin to start turning movement of the wheel without relative slippage between the book and wheel which might occur if the frictional engagement between the book and type face was depended upon to start the wheel from its position of rest. Immediately after the turning movement of the wheel is started, its type face comes into engagement with the adjacent or opposing edge of the book to produce the impression thereon, it being understood that the books in the embodiment shown, are placed flatwise upon the conveyer by an attendant in rapid succession, but that the speed of travel is such that the books are spaced apart sufficiently on the conveyer, to insure the interposition between them of the pin 64. The parts are so proportioned in the construction shown, with respect to the length of the books that the wheel shall always turn a predetermined distance.

To effect rotation of the printing wheel after such action is started by the pressure of a book on a pin 64, a driven friction wheel 66 on shaft 9, engages frictionally the lower face of the printing wheel, such face having diametrically-opposite cut-away portions 67 for registry with the said wheel 66 at the end of each intermittent operation of the printing wheel, to remove the driving power therefrom, and to guard against any overrun of the printing wheel, a friction brake 68 engages the shaft 58.

To withdraw the projected pin 64 so that it shall not contact with the inking fount for the printing face or faces of the printing wheel, a strap cam 69 extends around the shaft 58, in the path of an arm 70 depending from each pin 64, as shown clearly by Figures 5 and 6. The inking fount referred to comprises a perforated cylindrical cup 71 journaled on a standard 72 upon shelf 5, an inverted perforated cup 73 fitting tightly into cup 71, with its perforations registering with the perforations of cup 71, and an absorbent pad P, inclosing the latter and adapted to supply ink to the type face or faces 62 as the latter through frictional engagement with the pad, impart rotation to the fount. The cup 71 has a threaded socket engaged by a clamping screw 74 swivelled in the cup member 73, and the latter has a worm-threaded surface 75 engaged by a worm 76 by which it is rotateably adjusted to cut off or establish communication between the perforations of the cups. Ink may be supplied through a filling cup 77 of cup 73.

As hereinbefore stated, the books are deposited successively upon the conveyer, and to provide an anti-friction guide for the books that they may be brought and held in proper printing relation to the printing wheel regardless of slight variations in the width of the books, or in the exact placement of the latter on the conveyer, a pair of bars equipped with vertical rollers are employed. One of these bars 78 is secured rigidly to a bracket 79, adjustably secured at 79 to a bracket 80 fastened to the upright 6, at the printing wheel side of the framework. A thrust screw 81 provides for adjustment of the guide bar to accommodate wear of the type face or replacement thereof for providing a different impression. The guide bar 78 is preferably of obtuse-angle form with its major or principal portion adjacent the printing wheel to afford a fixed resistance for the edge of the book while the impression is being made on such edge, the
other portion extending at an angle to the line of travel of the book, beyond the adjacent side margin of the conveyer, to deflect the book wholly upon the conveyer, if overlapping such margin thereof, and thereby insure continuous operation and freedom from injury to books or dislocations of books from the conveyer.

The other guide bar 82 is for engagement with the back or hinge-edge of the book, and is normally parallel with the line of travel and slightly less than a book width from guide bar 78. Guide bar 82 is pivotally carried by a pair of horizontal arms 83 mounted pivotally on vertical brackets 84 secured to the framework, tension springs 85 applying force tending to press the bar 82 and the books toward the opposite side of the machine and hence hold the books even if of slightly varying width, yielding against the guide bar 78 and the printing wheel to secure substantially uniform impressions, it being understood in this connection that the adjustment of guide bar 82 by the springs 85, is limited by a screw rod 86, rigidly secured to the said bar and extending through a longitudinally-slotted arm 87 projecting from the adjacent upright 6, a nut engaging the rod and arm to be adjusted toward or from the guide bar to accommodate wider or narrower books.

In view of the fact that the operation of the machine has been indicated in connection with the description of its various parts, it is thought no recapitulation of the operation is necessary other than the statement that the parts operate as indicated by the adjacent arrows, and that an attendant may remove the printed books from the conveyer or they may be discharged from the delivery box thereon to a suitable conveyer or into a suitable receptacle, not shown, as forming no essential part of this machine. It will also be understood that the rollers 10 and 11 hold the books with their leaves tightly compressed or compacted to insure good legible impressions and that the feed belts 48 under the power of the spring 56 and the weight of rollers 49 and the supporting elements thereof, serve to compress the books and force them uninterruptedly between the conveyer roller 11 and the roller 10 where the former is firmly upheld by the bed roller 10. It will be apparent that it is contemplated that the end edges may be printed by proper adjustment of the yieldingly-advanced guide bar 82, the books in this case being placed transversely instead of longitudinally upon the conveyer. It will be understood, of course, that the right is reserved to make all changes properly falling within the principle of construction and mode of operation involved and falling within the spirit and scope of the appended claims.

I claim:

1. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a bed roller underlying the conveyer and the first-named roller to prevent sagging of the interposed part of the conveyer under compressive action of the books, a rotatable printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, means cooperating with and overlying the conveyer for feeding the books between the first named roller and the conveyer preliminary to the printing operation, and means rotatable with the printing wheel for engagement by each book, to impart rotatable movement to the printer wheel.

2. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a bed roller underlying the conveyer and the first-named roller to prevent sagging of the interposed part of the conveyer under compressive action of the books, a rotatable printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, a second driven roller, means actuated by the last named roller to apply pressure on the books to feed them between the first named roller and the conveyer, and means rotatable with the printing wheel for engagement by each book, to impart rotatable movement to the printing wheel.

3. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a bed roller underlying the conveyer and the first-named roller to prevent sagging of the interposed part of the conveyer under compressive action of the books, a rotatable printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, a yieldingly depressed book-feeding means to hold the books pressed flatly against the conveyer, means to limit the depression of said yieldingly depressed means, and means rotatable with the printing wheel for engagement by each book, to impart rotatable movement to the printing wheel.

4. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a
printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, a yieldingly depressed roller to hold the books pressed flatly against the conveyer, and a belt for transmitting power from the first-named roller to the other roller to impart cooperative movement thereto.

5. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, means cooperating with the conveyer for feeding the books between the roller and the conveyer preliminary to the printing operation, and guiding means engaging the edge of the book to be printed and the opposite edge to insure firm contact between the former and the printing wheel; the guiding means engaging the edge not to be printed, applying yielding pressure thereon toward the printing wheel.

6. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, means cooperating with the conveyer for feeding the books between the roller and the conveyer preliminary to the printing operation, a fixed book guide in line with and in the plane of the printing face of the printing wheel, and a second book guide held yieldingly toward and parallel with the first-named guide and disposed opposite the same and the printing wheel to hold the books firmly against the latter until the printing operation is completed.

7. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, means cooperating with the conveyer for feeding the books between the roller and the conveyer preliminary to the printing operation, and guiding means engaging the edge of the book to be printed and the opposite edge to insure firm contact between the former and the printing wheel; the guiding means engaging the edge not to be printed, applying yielding pressure thereon toward the printing wheel.

8. A book edge printing machine, comprising a suitable framework, a driven conveyer thereon for the conveyance of books placed flatwise thereon, a driven roller above and spaced from the conveyer, a printing wheel disposed with its printing face in the plane of the space between the conveyer and said roller, means cooperating with the conveyer for feeding the books between the roller and the conveyer preliminary to the printing operation, and guiding means engaging the edge of the book to be printed and the opposite edge to insure firm contact between the former and the printing wheel; the guiding means engaging the edge not to be printed, applying yielding pressure thereon toward the printing wheel.
prising a suitable framework, a sectional table thereon, an endless conveyer extending over and upon the table, a pair of cooperating driven rollers, one engaging the underside of the conveyer between the sections of the table, and the other located above the conveyer in the plane of the underlying roller, a printing wheel having a projecting pin, means for guiding a book carried by the conveyer against said pin to start rotation of said wheel and bring the type face thereof against the adjacent edge of the book, driven means for imparting rotation to the wheel while in printing engagement with the book, an ink-applying means engaging the type face of the wheel as the same turns, and means to withdraw the said pin as it passes the ink-applying means.

13. A book edge printing machine, comprising a suitable framework, a sectional table thereon, an endless conveyer extending over and upon the table, a pair of cooperating driven rollers, one engaging the underside of the conveyer between the sections of the table, and the other located above the conveyer in the plane of the underlying roller, a printing wheel, a yieldingly-projected pin carried by the wheel, means for guiding a book carried by the conveyer, against said pin to start rotation of said wheel, driven means to continue rotation of the wheel while in printing relation to the book, an ink-applying means for the type face of the wheel, and a cam to withdraw the pin to avoid conflict with the ink-applying means and then release the pin for reprojection from the wheel.

14. In a printing machine, a driven conveyer, a pair of cooperating rollers at opposite sides of the conveyer to firmly hold a book against slippage as it is carried along by the conveyer, means to produce an imprint on an edge of the book while between the said rollers, and yield means for engaging the opposite parallel edge of the book and holding the latter against lateral slippage while engaged by the printing wheel.

15. In a printing machine, a driven conveyer, a sectional table upholding the upper portion of the conveyer, a driven roller engaging the underside of the conveyer between the sections of the table, a yieldingly-depressed driven cooperating roller above the first-named roller and spaced from the conveyer, a yieldingly-depressed guide roller above the conveyer, and a belt connecting the yieldingly-depressed rollers above the conveyer for cooperative action therewith.

In witness whereof I hereunto affix my signature.

EDWARD T. MOORE.