Nov. 13, 1934. W. F. GRUPE 1,980,400

GUMMED PAPER BOOKING MACHINE

Filed March 25, 1933 4 Sheets-Sheet 1

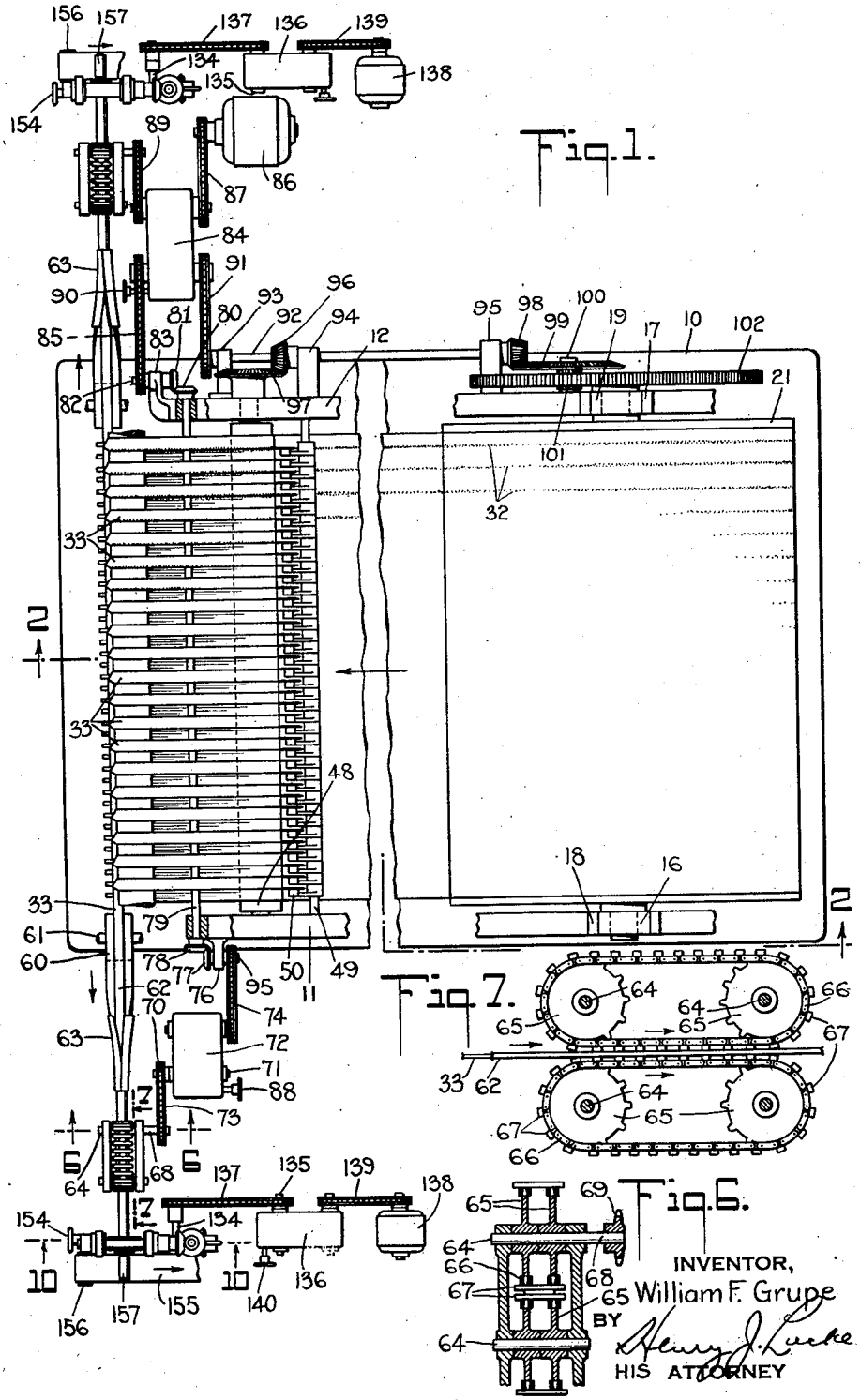


Fig. 1.

Fig. 7.

Fig. 6.

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Fig. 2.

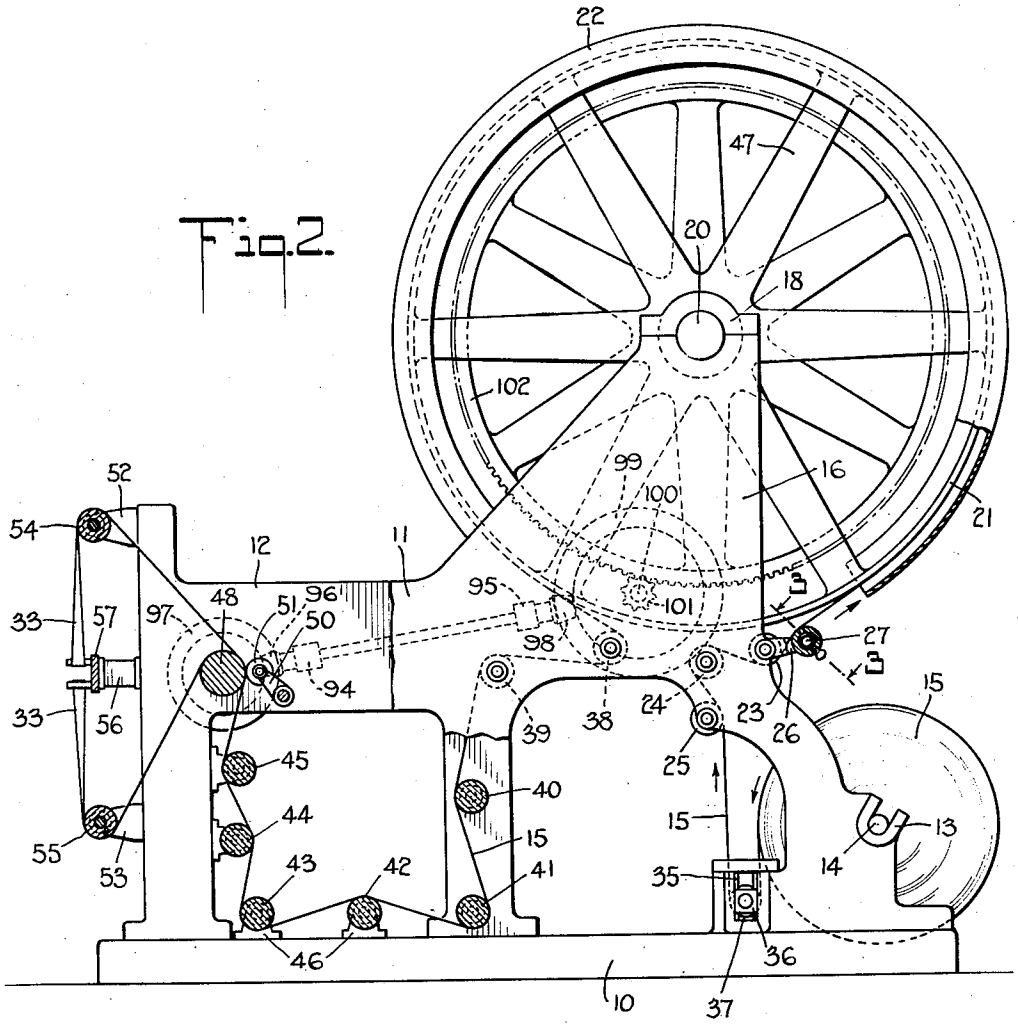
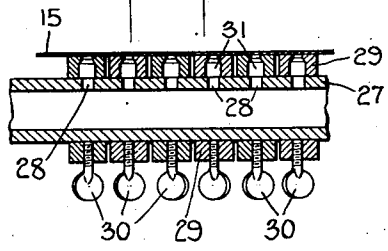


Fig. 3.



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Fig. 4.

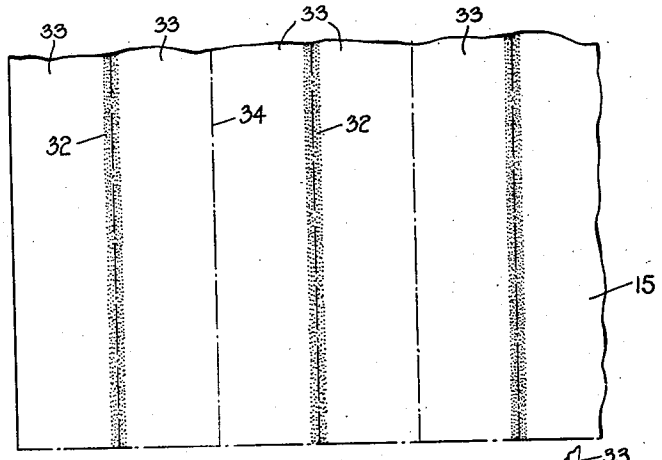


Fig. 5.

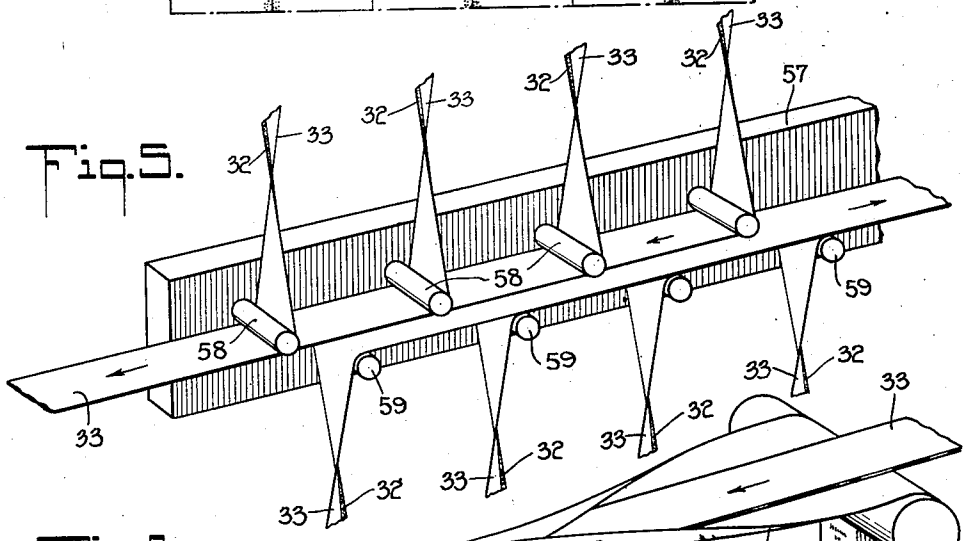


Fig. 8.

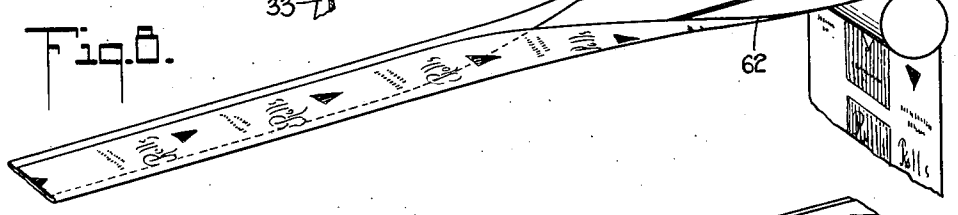
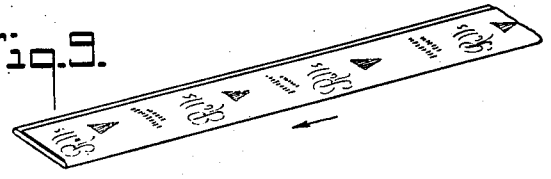
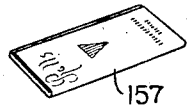


Fig. 9.





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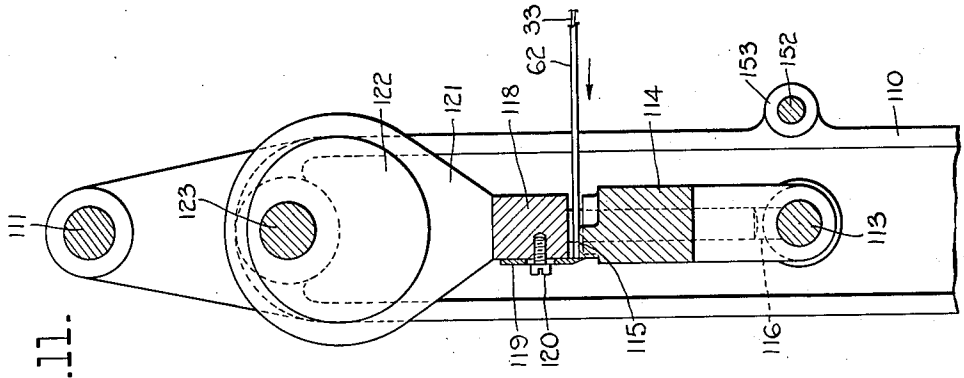


Fig. 11.

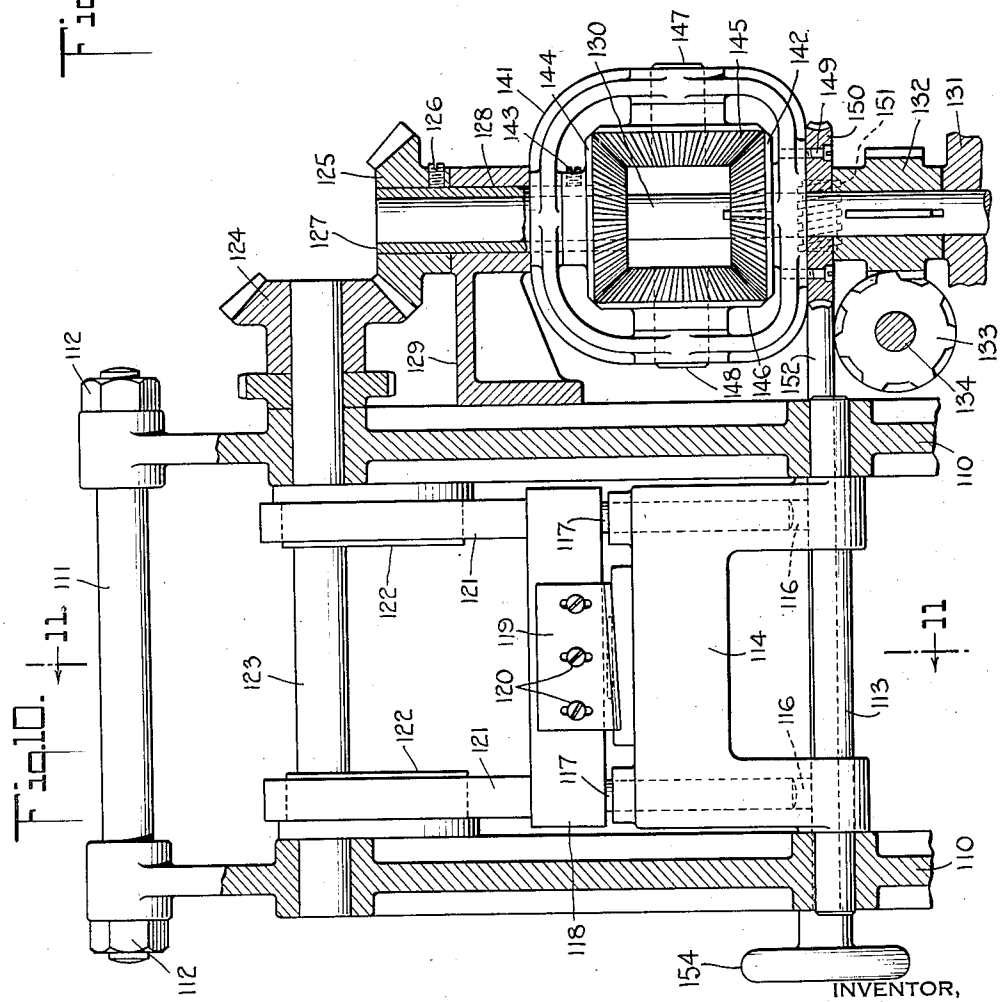


Fig. 10.

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Patented Nov. 13, 1934 1,980,400

UNITED STATES PATENT OFFICE

1,980,400

GUMMED PAPER BOOKING MACHINE

William F. Grupe, Lyndhurst, N. J., assignor to Harry H. Straus, New York, N. Y.

Application March 25, 1933, Serial No. 662,682

20 Claims. (Cl. 270—41)

My present invention relates to paper booking machines and more particularly to an improved machine for preparing books containing a plurality of superimposed sheets of paper.

My invention is applicable to the production of booked paper, preferably paper such as is used in the making of cigarettes and in which each book is composed of a plurality of sheets of paper arranged in superimposed relation to one another and in which each sheet of each book is provided with a line or stripe of dry adhesive along one edge, it being possible to moisten the adhesive to prepare the same for use, when the sheet of paper is utilized in the making of a cigarette or other package.

In carrying out my invention, a plurality of stripes or zones of adhesive are arranged parallel to each other along the length of indeterminate sheet of paper or equivalent, and the sheet severed along lines in proper relation to the adhesive.

Pursuant to preferred forms of my invention, a plurality of parallelly arranged spaced stripes or bands of adhesive, ultimately in dry form, are deposited to extend along the length of an indeterminate length of relatively wide paper or equivalent, the width of each stripe of adhesive being approximately twice the width of the stripe as ultimately used.

An object of my invention is the production of a machine for applying a plurality of stripes or zones of adhesive to be ultimately in dry form, the said stripes extending along the length of a relatively wide strip of paper of indeterminate length, and uniformly transversely across the width of such strip of paper, in combination with means for dividing the strip of relatively wide paper into a plurality of relatively narrow strips and in which each strip has a stripe or path of adhesive thereon.

An object of my invention also is the production of a machine in which means is provided for placing stripes of adhesive applied in fluid form and ultimately dried, which stripes extend lengthwise of a strip of relatively wide paper, such stripes being parallel to each other and spaced uniformly across the width of the strip of paper, in combination with means for slitting the strip of relatively wide paper into relatively narrow strips and with the line of cut for each strip extending lengthwise through substantially the central longitudinal portion of the stripe or path of adhesive attached thereto.

An object of my invention also is the production of a machine utilizing a relatively wide sheet of paper or other suitable material, wherein a plurality of stripes of adhesive ultimately in dry form are applied, such stripes extending longitudinally of an indeterminate length of relatively wide paper, and wherein the sheet is divided into strips that are relatively narrow in width, the slitting of the relatively wide sheet of paper into narrow strips being effected along lines substantially centrally with respect to each stripe of adhesive, and wherein the resulting strips are in turn slit into still more relatively narrow strips along a longitudinal medial line, and to thus divide the original relatively wide strip into a plurality of relatively narrow strips, each of which has along one edge thereof a stripe or band of adhesive in substantially dry form.

An object of my invention also is the production of a machine in which a relatively wide sheet of paper or other suitable material having thereon a plurality of stripes of adhesive to be ultimately in dry form, and with such stripes extending longitudinally of the length of the indeterminate length of relatively wide paper, is divided into strips that are relatively narrow in width, and in which the slitting of the relatively wide strip into the narrow strips takes place along lines substantially centrally with respect to the stripes of adhesive thereon, and the resulting strips are in turn slit into still more relatively narrow strips along a substantially medial line, and to thus divide the original relatively wide sheet into a plurality of relatively narrow strips, each of which has along one edge only a stripe of adhesive in substantially dry form, and associating such means with a device for dividing the resulting narrow strips into two groups or classes and to superimpose each group or class on each other to thereby collect each group or class into a multi-ply band in which the stripes of adhesive along such one edges are all superimposed upon each other.

An object of my invention is the production of means for adequately drying, and preferably by heat, adhesive applied to a moving sheet of paper, and to adequately cool the sheet of paper, or the strips into which the same may be cut, before booking the same.

An object of my invention is means for holding and retaining in extended form, a sheet of paper to which adhesive in liquid or semi-liquid form has been applied, such sheet of paper being thus held against distortion during the drying of the adhesive.

In the accompanying drawings illustrating one embodiment of my invention,

Fig. 1 is a plan view of the complete machine;

Fig. 2 is a view of the machine on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a plan view of a section of a strip of paper showing the zones of adhesive thereon and also showing the division lines by means of which the strip of paper is divided into a plurality of strips of paper, each strip having a zone of adhesive adjacent one edge thereof;

Fig. 5 is a perspective view of a portion of the machine showing the means utilized for arranging the gummed strips of paper in superimposed relation to each other and for dividing the strips of paper into two streams that travel in opposite directions;

Fig. 6 is an enlarged sectional end elevation on the line 6—6 of Fig. 1;

Fig. 7 is an end elevation on the line 7—7 of Fig. 1;

Fig. 8 is a perspective view of a length of a plurality of strips of gummed paper in process of being enclosed in a wrapping member;

Fig. 9 is a perspective view of a length of a plurality of superimposed strips of gummed paper completely enclosed in the wrapping envelope and having detached therefrom one length or "book" of cigarette papers;

Fig. 10 is a sectional elevation on the line 10—10 of Fig. 1; and

Fig. 11 is a section on the line 11—11 of Fig. 10.

Referring to the drawings, and particularly to Figs. 1, 2 and 3, there is shown a base 10 on which are uprights 11 and 12, respectively, such uprights being parallel to and spaced apart from each other, as shown. The uprights 11 and 12 constitute side frame members in which are formed bearings for mechanism to be hereinafter described. At one end of each of the side frame members 11 and 12 are formed U-shaped bearings 13, such bearings being in alignment with each other, and in which bearings is rotatably mounted a shaft 14, the U-shaped bearings 13 permitting ready removal of such shaft 14. The shaft 14 is utilized to support a roll of paper 15 of indeterminate length and of any desired width within the limits of the space between the uprights or side frame members 11 and 12.

Formed integral with the side frame members 11 and 12 and extending upwardly therefrom are bearing posts 16 and 17, respectively, and at the top of such posts are formed pillow blocks 18 and 19, respectively. The pillow blocks 18 and 19 are in alignment with each other and in such pillow blocks is rotatably mounted a shaft 20, and on such shaft between the members 16 and 17 is mounted a roller or drum 21 of any desired diameter and of a length of face substantially equal to or slightly greater than the width of the paper on the roll 15.

Secured to the posts 16 and 17 and extending around and practically enclosing the peripheral face of the roller 21 is a shield 22, this shield, as stated above, practically enclosing the peripheral face of the roller 21, but leaving a certain portion thereof open as indicated in Fig. 2.

In the side frame members 11 and 12 adjacent to the open portion of the enclosing shield 22 are aligned pairs of bearings, and in such pairs of bearings are arranged the rollers 23, 24 and 25, such rollers being parallel to each other and acting as guides for the sheet of paper from the roll 15. Adjacent to the roller 23 and secured to or formed integral with the side frame members 11 and 12 and extending lateral from the side frame members are arms 26, in which is secured a pipe or hollow shaft 27. This shaft 27 is provided with a plurality of parallelly arranged lateral perforations 28 in alignment with each other, as clearly shown in Fig. 3.

Adjustably mounted on the pipe 27 is a plurality of annular collars 29, there being one such collar 29 for each of the lateral perforations 28 in the pipe 27. The collars 29 are each provided with a thumb set-screw 30 and by means of which the collars may be individually adjusted on the pipe 27.

Pactically diametrically opposite the thumb set-screws 30 and in each of the annular collars 29 is a radial perforation 31 which, as will be seen from an inspection of Fig. 3, registers with the corresponding lateral perforation 28 in the pipe 27. The pipe 27 is adapted to be connected to any suitable source of supply of adhesive in liquid or semi-liquid form.

The distance between the adjacent lateral perforations 28 is determined by the width of the strips it is desired to cut from the roll of paper 15, and referring to Fig. 4 where the numeral 15 designates the sheet of paper and 32 designates the various lines of adhesive made thereon as the sheet of paper 15 is drawn across the opening of the orifices 31, it will be noted that the distance apart of the lines of adhesive 32 is equal substantially to twice the width of the desired strips, and in such Fig. 4, 33 designates the individual strips of paper into which the sheet 15 is to be ultimately cut.

It will be noted on reference to Fig. 2 that the line of cut between the two adjacent strips 33 at the lefthand side of Fig. 4 lies in the middle of the area of the adhesive 32, and therefore the opening of the orifices 32 is of such width as to provide a strip of adhesive 32 of sufficient width for the purpose.

Also, by reference to Fig. 4 it will be noted that there is a line of cut designated 34 which lies between the paths of the adhesive 32, so that in cutting the strips 33 from the strip of paper 15, it will be noted that the strips 33 are provided with adhesive at one longitudinal edge only.

In the side frame members 11 and 12 and adjacent to the base 10, and immediately below the rollers 23, 24 and 25, are arranged bearing slides 35 in each of which bearing slides is arranged a slidable bearing 36, and in such bearings is rotatably mounted an idler roll 37 under which passes the sheet of paper 15 from the roll. The weight of the roll 37 acts as a tensioning device for the sheet of paper 15 which, after being fed between the rollers 25, 24 and 23, passes over the orifices 31 in the annular collars 29 and then passes over the roller 21 and thence around a plurality of rollers 38, 39, 40, 41, 42, 43, 44 and 45, such rollers being preferably mounted as shown in Fig. 2 in the side frame members 11 and 12 and in the bearings 46, mounted on the base 10.

The object in passing the sheet of paper 15, to which the adhesive has been applied at a plurality of spaced points as above described, around the rollers 21 and within the shield 22, is to allow the adhesive sufficient time within which to dry, to enable the paper to be successfully operated on at a later stage in the operation of the machine.

To facilitate the drying, it is proposed to apply heat to the interior of the roller 21 which, as will be noted from an inspection of Fig. 2, is provided with a hollow center, the peripheral face

of the roller being supported on radial spokes 47, and such heat may take the form of heated dry air, forced through the interior of the roller 21 by means of a fan or by suction or in any other approved manner, or any other method of applying heat to the enclosed space between the shield 22 and the peripheral face of the roller 21 may be employed, such, for example, as applying heat directly to the outside of the shield 22 or by maintaining a heating coil within the shield 22, but as such particular heating means forms no part of my present invention, it has not been illustrated and will not be further described.

The sheet of paper 15 is pulled over the roller 45 by a positively driven feed roller 48 suitably mounted in bearings in the side frame members 11 and 12 and which roller lies parallel to the gang of rollers 38 to 45, inclusive, it being understood also that such gang of rollers 38 to 45, inclusive, are also arranged parallel to each other.

The material of the gang of rollers may be anything desired and is preferably metal. The material of the roller 48 may also be of metal, but preferably is of some material which will not be of a character to rapidly injure the cutting edge of the devices to be associated therewith. Adjacent to the roller 48 and mounted in the side frame members 11 and 12 is a shaft or rod 49 which lies parallel to the roller 48 and on which is mounted a plurality of arms 50 and on each of the arms 50 is rotatably mounted a disk 51, the peripheral edge of which is sharpened to act as a cutter.

Any suitable means may be employed for urging the arms 50 and therefore the disks 51 toward the roller 48 so as to bring the peripheral edge of the disks 51 into cutting relation with respect to the roller 48. The distance between the disks 51 is determined by the width of the strips 33 it is desired to cut from the sheet of paper 15, and it is to be understood therefore that there is a cutting disk for each of the cutting lines across the width of the strip of paper 15, as designated by the dot and dash lines shown in Fig. 4.

On a vertical face of the side frame members 11 and 12 and at the top and bottom thereof and extending laterally outward therefrom are pairs of bearing members 52 and 53, and in the top pair 52 of bearing members is rotatably mounted a roller 54, while in the pair of bearing members 53 is rotatably mounted a corresponding roller 55, such rollers being of any suitable diameter and arranged parallel to each other.

Beginning with one longitudinal edge of the sheet of paper 15, as for example the left-hand edge as shown in Fig. 4, the adjacent strip 33 is fed upwardly, as viewed in Fig. 2, over the roller 54 and thence downwardly and each alternate strip 33 from the sheet of paper 15 is fed likewise, that is, upwardly over the roller 54. The remaining strips 33 are fed under the roller 55 and thence upwardly and it will be noted that this division into groups of the strips 33 will result in the strip of adhesive 32 on each strip 33 being at adjacent edges, as will be obvious from an inspection of Fig. 5.

Between the pairs of bearings 52 and 53 and on the side frame members 11 and 12, and extending laterally outward therefrom, are members 56 of suitable length and secured to the ends of the members 56, and lying vertically, as viewed in Fig. 2, is a plate 57, such plate being of any suitable width and of a length to extend between the side frame members 11 and 12. This plate 57 is provided with two groups of laterally extending pins 58 and 59, respectively, each of the groups consisting of pins each equal in number to the number of strips 33 fed over the roller 54 and under the roller 55, respectively, and the individual members of each group of pins 58 and 59 are so positioned as to occupy a position practically vertically beneath the respective strip 33 with which the same is to be associated.

From the construction shown in Fig. 2, it is obvious that each strip 33 cut from the sheet of paper 15 must be given a quarter turn to pass under its associated pin 58 or over its associated pin 59 and all of the strips of each group are fed in the same direction, that is, all of the strips 33 passing under the group of pins 58 are fed in one direction or to the left as viewed in Fig. 5, and all of the strips 33 passing over the pins 59 are fed in the opposite direction or to the left as viewed in Fig. 5, and it will be obvious that such arrangement results in the strips 33 being divided into two groups, the individual members of each group being superimposed upon each other, and in each group the strips 32 of adhesive are arranged in vertical alignment over each other and on the same corresponding edge of the strips.

For commercial reasons and for commercial reasons only, it is usual to produce so-called "books", each book consisting of twenty sheets or leaves of the paper and to enclose each of such books in an outer covering or wrapper. For this purpose, therefore, each of the groups of strips 33 are fed over suitable rollers and into suitable apparatus for performing this essential operation, and the mechanism employed for this purpose being identical for each of the groups of sheets 33, only one of such group will be described.

Referring to Fig. 1 and considering the mechanism at the lower left-hand corner of such figure, the group of superimposed strips 33 of paper pass over a roller 60 mounted on a shaft 61. Over such roller 60 also passes a strip 62 of indeterminate length and which constitutes the outer wrapping for the superimposed group of strips 33.

The wrapping material 62 together with the superimposed group of sheets 33 is fed through a mechanism 63 which folds the outer wrapping 62 over the group of superimposed strips 33, and the now enclosed strips 33 are associated with a feeding device. This feeding device is shown in detail in Figs. 6 and 7, and referring to such figures, it will be noted that such feeding device constitutes essentially a pair of shafts 64 arranged parallel to and spaced apart from each other and on each of which shafts is arranged a sprocket wheel 65 and over the sprocket wheel 65 runs an endless sprocket chain 66, provided at spaced intervals along its length with transverse feeding bars 67.

Such mechanism as above described is arranged above the superimposed strips 33 enclosed in the wrapping material 62, and below such material is arranged a duplicate of that already described.

The mechanisms above and below the material being operated upon are interconnected so as to operate as a unit, and the associated reaches of the respective sprocket chains 66 move parallel to and in the same direction as each other and to thereby grip the material 62 and strips 33 through the machine, or for example, in the direction of the arrows in Fig. 1. It is to be understood

of course that the transverse bars 67 on the associated sprocket chains 66 are so arranged as to move together along the associated reaches of the sprocket chains in pairs, as indicated in Fig. 6, to thereby grip the covering material 62 that encloses the superimposed strips 33 at a plurality of transverse points in succession.

The effect of this construction therefore is to feed the superimposed strips of paper 33 enclosed in the outer wrapping 62 through the machine without distorting the arrangement of the elements of the material, as would be the case were a smooth faced or similar roll structure employed as a feeding apparatus.

One of the shafts 64 of the upper pair of shafts 64 has an extension 68 thereon, and on the end of the extension is secured a sprocket 69, such sprocket being in alignment with a sprocket 70 on a drive shaft 71 of a variable speed transmission device 72. Over the sprockets 69 and 70 runs a sprocket chain 73 and by means of which power is transmitted from the variable speed transmission device to the shaft 68 and thus to the feeding device.

The variable speed transmission device 72 is in turn operated over a sprocket chain driving device 74 from a shaft 75 that is rotatably mounted in a bearing 76 on the side frame member 11. The shaft 76 has secured to one end thereof a bevel pinion 77 which meshes with and is driven by a bevel pinion 78 secured to one end of a shaft 79 that is rotatably mounted in suitable bearings in the side frame members 11 and 12 and which extends therefore transversely across the entire machine. At the end of the shaft 79, remote from the bevel pinion 78, is a bevel pinion 80 which meshes with and drives a bevel pinion 81 secured to one end of a shaft 82 that is rotatably mounted in a bearing 83 formed on the side frame member 12. Power is transmitted to the shaft 82 from a variable speed transmission device 84 over a sprocket chain 85 and such variable speed transmission device 84 derives its power from a motor or other prime mover 86 over a sprocket chain 87.

The material feeding means above described has been that shown in the lower portion of Fig. 1 and the duplicate of such material feeding means is shown at the upper part of such Fig. 1. The feeding means shown at the lower part of Fig. 1 is driven from and controlled by the variable speed transmission device 72 and the control of the speed transmission device 72 is by means of the hand wheel 88. The upper material feeding means is driven from the variable speed control device 84 over a sprocket chain 89, such variable speed means being controlled by the hand wheel 90.

The motor or other prime mover 86 is the driving means for all of the mechanism above described, and the drum 21 as well as all of the other mechanism associated therewith is controlled in the following manner.

From the variable speed transmission device 84 extends a driving sprocket chain 91 to a shaft 92 rotatably mounted in bearings 93, 94, and 95 on the side frame member 12. Adjacent the bearing 94 and secured to the shaft 92 is a bevel pinion 96 which meshes with and drives a bevel gear 97 secured to one end of the roller 48, which as will be understood from the above description, is associated with the plurality of cutting disks 51. At the end of the shaft 92, remote from the bevel pinion 96 and adjacent to the bearing 95 is a bevel pinion 98 which meshes with and drives a bevel gear 99 rotatably mounted on a stub shaft 100 mounted in or secured to the side frame member 12. Secured to the bevel gear 100 is a pinion 101 which meshes with and drives a gear 102 secured to the outer end of the shaft 20 that carries the drum 21.

It will be obvious from the above description that the mechanism as thus far described is driven from the motor or other prime mover 86 and that a variable speed transmission device is interposed between the main part of the mechanism and such prime mover 86, and that also there is interposed between the prime mover and the paper feeding devices individual variable speed transmission devices. This construction is desirable as it controls the length feed of the strip of paper 15 in its path through the machine and also keeps the paper under tension and the individual strips 33 into which the strip of paper 15 is divided are also fed under tension under and over the pins 58 and 59, respectively. The tension on the paper after the strips 33 leave the roll 48 is controlled by the various feeding mechanisms above described, and due to the varying characteristics of the paper being operated upon, it is necessary to provide some means for controlling such tension. In this case, the variable speed transmission devices 72 and 84 provide for the carrying out of this function, and as stated above, the variable speed transmission device 72 is controlled by the hand wheel 88, while the variable speed transmission device 84 is controlled by the hand wheel 90.

It is necessary after the superimposed strips 33, enclosed in the wrapping 62, have passed through the feeding devices above described to cut the same into lengths or "books" and for this purpose I have arranged at each of the feeding devices a cutting mechanism and as each of such cutting mechanisms are identical, only one will be described in detail, it being understood that the other mechanism is identical or substantially identical thereto.

The cutting mechanism consists essentially of a pair of uprights 110, these uprights being arranged parallel to and spaced apart from each other and connected at their upper ends by a bar 111 provided with threaded ends and nuts 112 and by means of which the same are secured to the uprights. In the uprights 110, adjacent the lower part thereof as shown in Figs. 10 and 11, is arranged a pair of bearings in alignment with each other and in which bearings is a shaft 113. This shaft may be fixed in the bearings or rotatably thereon as desired, and on the shaft and also rotatable therewith or fixed thereto is a substantially rectangular frame member 114, this member at its upper end being provided with an anvil 115 to cooperate with a cutting knife to be hereinafter described.

Also, the frame member 114 is provided with a pair of parallelly arranged substantially vertically extending holes 116 in which are slidably mounted the vertically extending shafts 117 that are secured to a crosshead 118, and this crosshead carries a cutting blade 119 adjustably secured to the crosshead by the screws 120. The crosshead 118 has secured at each side thereof and on its upper face an eccentric strap 121, these eccentric straps being mounted on eccentrics 122 secured to a shaft 123 that is rotatably mounted in suitable bearings in the frame members 110. It is obvious from the description of the device as thus far given that the cutting blade 119 and the anvil 115 are linked together in op-

erative condition regardless of the relative positions of the cams 122 with respect to the position of the rectangular frame 114, and therefore the rotation of the shaft 123 for any purpose will not disturb the operative relationship of the cutter 119 and the anvil 115, the only effect of such rotative movement of the shaft 123 being to impart an oscillatory movement about the shaft 113 as a center of the crosshead 118 and the frame 114. If therefore, and referring to Fig. 11, a continuous feeding movement of the superimposed strips 33 of paper enclosed in the outer wrapping 62 takes place in the direction of the arrows shown, the cutter 119 may be utilized to sever a length or "book" from such paper, and if the rate of oscillatory movement of the crosshead 118 and rectangular frame 114 is proportioned properly to the speed of the feed of the paper, then obviously the length or book of paper may be severed therefrom without disturbing in the least the feeding movement of the paper as a whole.

Secured to one end of the shaft 123 is a bevel pinion 124 which meshes with and is driven by a bevel pinion 125. This bevel pinion 125 is secured by setscrew 126 to a sleeve shaft 127 rotatably mounted in a bearing 128 formed in a bracket 129 that is secured to one of the frame members 110. The sleeve shaft 127 forms the upper bearing for a drive shaft 130, such shaft also finding a bearing in a bracket 131 secured to the frame member 110.

Keyed to the drive shaft 130 adjacent to the bearing 131 is a worm 132 which meshes with and is driven by a corresponding worm 133 secured to a shaft 134. On the end of the shaft 134 is a sprocket (not shown) in alignment with a shaft 135 of a variable speed transmission device 136 see Fig. 1, and over the described sprockets runs a sprocket chain 137 and by means of which power is transmitted from the variable speed transmission device 136 to the shaft 130. The variable speed transmission device 136 is driven in the usual manner from a motor or other prime mover 138 through a sprocket chain 139 and the variable speed transmission device 136 is controlled by the hand wheel 140.

141, see Fig. 10, designates a substantially rectangular frame, rotatably on a vertical axis, consisting of the following. At its upper end the sleeve 127 and at its lower end the shaft 130. Within the confines of the rectangular frame 141 and keyed to the shaft 130 is a bevel pinion 142. Within the confines of the rectangular frame 141 and secured to the sleeve shaft 127 by setscrew 143 is a bevel pinion 144. The bevel pinions 142 and 144 mesh with the bevel pinions 145 and 146 rotatably mounted on the shafts 147 and 148, respectively, secured to the rectangular frame 141 and lying at right angles to the shaft 130.

The bevel pinions 142, 144, 145 and 146 are equal in pitch and diameter and the construction above described is such that rotation of the shaft 130 in one direction will cause a corresponding rotation of the bevel pinion 142 and a corresponding but opposite rotation of the bevel pinion 144 through the medium of the bevel pinions 145 and 146, and therefore it is obvious that there is imparted to the sleeve shaft 127 a rotative movement at the same speed as but in the opposite direction from the shaft 130.

Secured to the underside of the rectangular frame 141 by screws 149 is a worm wheel 150 which meshes with and is driven by a worm 151 secured to a shaft 152 that in turn is rotatably mounted in suitable bearings as the bearing 153 in the frame members 110. The shaft 152 at the end remote from the worm 151 is provided with a hand wheel 154 and by means of which it is possible to rotate the frame 141 on its vertical axis.

Associated with the cutting blade 119 and anvil 115 is a "book" collecting device consisting in the present instance of a belt 155 running on rollers 156 and driven in any suitable manner and at any desired speed, such belt receiving the books 157 as they are cut off from the enwrapped superimposed strips 33 of paper, see Fig. 1.

In the operation of the machine the tube or pipe 27 is connected to a suitable source of supply of adhesive in liquid or semi-liquid form, the roll of paper 15 is placed on the shaft 14 and the paper fed under the roll 37 and around the rolls 25, 24, 23, and thence around the drum 21, after which it is brought into association with the rolls 38, 39, 40, 41, 42, 43, 44 and 45 and around the roller 48, under the plurality of cutting disks 51. In the manner above described, the resulting strips 33 of paper are fed over or under the rolls 55 and thence under or over the pins 54, so as to bring the resulting plurality of strips into a pair of groups, each group consisting of a plurality of strips 33 of paper. Each group is then enwrapped in the wrapping material 62 and brought under the folding device 63 for such purpose, and thence to the paper feeding device above described and shown particularly in Figs. 6 and 7. The paper as it is fed through the feeding devices is then passed into association with the anvil 115 and the cutting blade 119 and it is assumed that the machine is in operation. The operator will properly manipulate the hand wheels 88 and 90 to regulate the variable speed transmission devices 72 and 84 to exert a proper degree of tension on the groups of strips 33 of paper through the medium of the paper feeding devices, and also manipulates the hand wheel 140 of the variable speed transmission device 136 to bring the cutting mechanism into proper relation with the enwrapped strips 33 of paper and particularly into proper position with respect to any distinguishing marks or indicia that may be found on such enwrapping material and in order that the same may be symmetrically arranged on the resulting "book".

The length of the resulting "book" of paper is determined by the rate of oscillatory movement of the crosshead 118 and rectangular frame 114 with respect to the speed of travel of the enwrapped paper as determined by the variable speed transmission devices 72 and 84, and such relative speed is determined by the proper manipulation of the various variable speed transmission devices and particularly the variable speed transmission device 136.

After determination of the length of the resulting "book", the relative position of cut to sever the book from the stream of oncoming paper so as to determine the position of cut relative to the indicia on the outer wrapper is determined by the operator who manipulates the hand wheel 154 to rotate the frame 141 on a vertical axis and thus change the relative position of the eccentrics 122 with respect to the speed of travel of the enwrapped sheets of paper.

It is to be understood that various modifications of my invention may be made and that I am not limited to the exact construction of the various elements or devices for carrying out my invention.

I claim.

1. In a paper booking machine, the combination of means for applying a band of adhesive to a moving sheet of paper, means for drying the adhesive while moving the paper continuously, means for dividing the paper on a line located between the outer limits of the strip of adhesive and means for guiding the resulting strips of paper from the cutting means.

2. In a paper booking machine, the combination of a drying chamber, a drum located therein, means located at the entrance end of said chamber for applying a band of adhesive to the moving sheet of paper at a plurality of spaced paths across the width of the strip of paper, a cutting device for cutting the sheet of paper into a plurality of strips and means for arranging the strips of paper into superimposed relation with respect to each other, and means for cutting books from such superimposed strips of paper.

3. In a paper booking machine, the combination of a drying chamber, a drum located therein, means located at the entrance end of said chamber for applying a band of adhesive to the moving sheet of paper at a plurality of spaced paths across the width of the strip of paper, a cutting device for cutting the sheet of paper into a plurality of strips and means for arranging the strips of paper into superimposed relation with respect to each other, means for cutting books from such superimposed strips of paper, and means for maintaining the strips of paper under tension after passing through the cutting devices.

4. In a paper booking machine, the combination of a heating chamber having a rotatable drum mounted therein, means for rotating the drum to feed a sheet of paper through the heating chamber, means at the entrance end of the heating chamber to deposit a band of adhesive in liquid form on the strip of paper and at a plurality of spaced points across the width of the paper, a plurality of cutting devices operable to cut the sheet of paper into a plurality of strips, means for dividing said strips into a plurality of groups, each group comprising a plurality of sheets in superimposed relation to each other, means for independently feeding each group from the cutting devices and maintaining the individual strips under tension, and means for cutting from each group a plurality of books of paper.

5. In a paper booking machine, the combination of a heating chamber having a drum rotatably mounted therein, means for rotating the drum including a variable speed device whereby a sheet of paper is fed through the heating chamber, means at the entrance end of the heating chamber for applying a band of adhesive to the continuously moving strip of paper, said bands being parallelly arranged along the length of the sheet of paper, means for dividing said sheet of paper into a plurality of strips, each strip having a band of adhesive along the edge thereof, means for dividing the strips of paper into a pair of groups, each group comprising a plurality of strips in superimposed relation to each other, a cutting device for severing books of paper from the groups of superimposed strips of paper, and means for feeding the groups of strips from the sheet cutting devices to the book cutting devices.

6. In a paper booking machine, the combination of a heating chamber having a drum rotatably mounted therein, driving means for said drum including a variable speed device, a liquid adhesive applying device for applying a plurality of bands to the moving sheet of paper along the length thereof and parallelly arranged with respect to each other and across the width of the sheet of paper, a plurality of paper slitting devices operating on the paper after its passage through the heating chamber for dividing the sheet of paper into a plurality of strips, each strip having a band of adhesive along one edge thereof, means for dividing the strips of paper into groups and arranging the strips of each group in superimposed relation with respect to each other and with the band of adhesive of each sheet of each group on the same edge of the strip, means for applying a covering material to each group of strips, and a cutting device for severing enwrapped books of paper from each group.

7. In a paper booking machine, the combination of a heating chamber having a drum rotatably mounted therein, driving means for said drum including a variable speed device, a liquid adhesive applying device for applying a plurality of bands to the moving sheet of paper along the length thereof and parallelly arranged with respect to each other and across the width of the sheet of paper, a plurality of paper slitting devices operating on the paper after its passage through the heating chamber for dividing the sheet of paper into a plurality of strips, each strip having a band of adhesive along one edge thereof, means for dividing the strips of paper into groups and arranging the strips of each group in superimposed relation with respect to each other and with the band of adhesive of each sheet of each group on the same edge of the strip, means for applying a covering material to each group of strips, a cutting device for severing enwrapped books of paper from each group, and driving means for the groups of superimposed strips of paper.

8. In a paper booking machine, the combination of a heating chamber having a drum rotatably mounted therein, driving means for said drum including a variable speed device, a liquid adhesive applying device for applying a plurality of bands to the moving sheet of paper along the length thereof and parallelly arranged with respect to each other and across the width of the sheet of paper, a plurality of paper slitting devices operating on the paper after its passage through the heating chamber for dividing the sheet of paper into a plurality of strips, each strip having a band of adhesive along one edge thereof, means for dividing the strips of paper into groups and arranging the strips of each group in superimposed relation with respect to each other and with the band of adhesive of each sheet of each group on the same edge of the strip, means for applying a covering material to each group of strips, a cutting device for severing enwrapped books of paper from each group, and variable speed driving means for the groups of superimposed strips of paper.

9. In a paper booking machine, the combination of a plurality of cutting devices operable to cut a sheet of paper of indeterminate length having thereon a plurality of parallelly arranged bands of dried adhesive into individual strips and with each strip having thereon a band of dried adhesive extending along one edge thereof only, means for dividing the plurality of strips of paper into two groups and arranging them in superimposed relation with respect to each other, and cutting means for cutting a succession of books of paper from each group.

10. In a paper booking machine, the combination of a plurality of cutting elements for divid-

ing a sheet of paper into a plurality of strips of predetermined width, means for dividing the strips into two groups, each group consisting of a plurality of strips of paper arranged in superimposed relation with respect to each other, a cutting device for cutting a succession of books from each group, means for operating said cutting device, feeding means for maintaining tension on the strips of paper after passage through the strip cutting means and feeding the same to the cutting device, and means for adjusting the speed of the cutting device and strip feeding means relative to each other whereby the speed of travel of the superimposed strips of paper of each group may be synchronized with the speed of operation of the book cutting means.

11. In a paper booking machine, the combination of a plurality of cutting elements for dividing a sheet of paper into a plurality of strips of predetermined width, means for dividing the strips into two groups, each group consisting of a plurality of strips of paper arranged in superimposed relation with respect to each other, a cutting device for cutting a succession of books from each group, means for operating said cutting device, feeding means for maintaining tension on the individual strips of paper after passage through the strip cutting means and feeding the same to the cutting device, and means for adjusting the speed of the cutting device and strip feeding means relative to each other whereby the speed of travel of the superimposed strips of paper of each group may be synchronized with the speed of operation of the book cutting means, and means for altering the position of the cutting device relative to the plurality of superimposed strips of paper operated upon by the feeding device.

12. In a paper booking machine, the combination of a plurality of cutting elements for dividing a sheet of paper into a plurality of strips of predetermined width, means for dividing the strips into two groups, each group consisting of a plurality of strips of paper arranged in superimposed relation with respect to each other, a cutting device for cutting a succession of books from each group, means for operating said cutting device, feeding means for maintaining tension on the individual strips of paper after passage through the strip cutting means and feeding the same to the cutting device, and means for adjusting the speed of the cutting device and strip feeding means relative to each other whereby the speed of travel of the superimposed strips of paper of each group may be synchronized with the speed of operation of the book cutting means, and manually operable means for moving the cutting device relative to the plurality of strips of paper being operated upon by the feeding device.

13. In a paper booking machine, the combination of a plurality of cutting elements for dividing a sheet of paper into a plurality of strips of predetermined width, means for dividing the strips into two groups, each group consisting of a plurality of strips of paper arranged in superimposed relation with respect to each other, a cutting device for cutting a succession of books from each group, means for operating said cutting device, feeding means for maintaining tension on the strips of paper after passage through the strip cutting means and feeding the same to the cutting device, and means for adjusting the speed of the cutting device and strip feeding means relative to each other whereby the speed of travel of the superimposed strips of paper of each group may be synchronized with the speed of operation of the book cutting means, and manually operable means for adjusting the book cutting means, longitudinally with respect to the plurality of superimposed strips of paper.

14. In a paper booking machine, the combination of a plurality of cutting elements for dividing a sheet of paper into a plurality of strips of predetermined width, means for dividing the strips into two groups, each group consisting of a plurality of strips of paper arranged in superimposed relation with respect to each other, means for wrapping said plurality of strips of each group in a wrapping material, a cutting device for cutting a succession of books from each enwrapped group of strips of paper, feeding means for continuously feeding the enwrapped groups of strips of paper to the cutting device, and means for operating the cutting device for cutting a succession of books from the continuously moving plurality of strips of paper.

15. In a paper booking machine, the combination of a plurality of cutting elements for dividing a sheet of paper into a plurality of strips of predetermined width, means for dividing the strips into two groups, each group consisting of a plurality of strips of paper arranged in superimposed relation with respect to each other, a cutting device for cutting a succession of books from each group, means for maintaining tension on the individual strips of paper after passage through the strip cutting means for continuously feeding the groups of individual sheets, and means for operating the cutting device in synchronism with the paper feeding means whereby continuous feed of the paper is permitted during the operation of cutting successive books from the groups.

16. In a paper booking machine, the combination of a plurality of cutting elements for dividing a sheet of paper into a plurality of strips of predetermined width, means for selecting certain of said strips to form the same into a group of superimposed strips, means for wrapping the superimposed strips in a covering of wrapping material, and a combined reciprocating and oscillatory cutting device for successively cutting books of enwrapped paper from the group during the continuous feeding thereof.

17. In a paper booking machine, the combination with means for feeding a plurality of superimposed strips of paper enveloped in a wrapping of covering material continuously, of a cutting device comprising an oscillatory frame, a cutter mounted for reciprocation therein, and means to simultaneously oscillate the frame and reciprocate the cutter to cut a succession of books from the enwrapped strips of paper.

18. In a paper booking machine, the combination with means for feeding a plurality of superimposed strips of paper enveloped in a wrapping of covering material continuously, of a cutting device comprising an oscillatory frame, a cutter mounted for reciprocation therein, means to simultaneously oscillate the frame and reciprocate the cutter to cut a succession of books from the enwrapped strips of paper, and manually operable means for adjusting the reciprocating stroke of the cutter with respect to the oscillatory movement of the frame.

19. In a paper booking machine, the combination with means for feeding a plurality of superimposed strips of paper enveloped in a wrapping of covering material continuously, of a cutting device comprising an oscillatory frame, a cutter

mounted for reciprocation therein, and means to simultaneously oscillate the frame and reciprocate the cutter to cut a succession of books from the enwrapped strips of paper in accurate register with a preprinted design on the wrapping of covering material and in synchronism with the speed of travel of the enwrapped paper.

20. In a paper booking machine, the combination with means for feeding a plurality of superimposed strips of paper enveloped in a wrapping of covering material continuously, of a cutting device comprising an oscillatory frame, a cutter mounted for reciprocation therein, means to simultaneously oscillate the frame and reciprocate the cutter in synchronism with the speed of travel of the enwrapped paper to cut a succession of books from the enwrapped paper, and manually operable means for adjusting the relative position of the cutter longitudinally of the enwrapped strips of paper.

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