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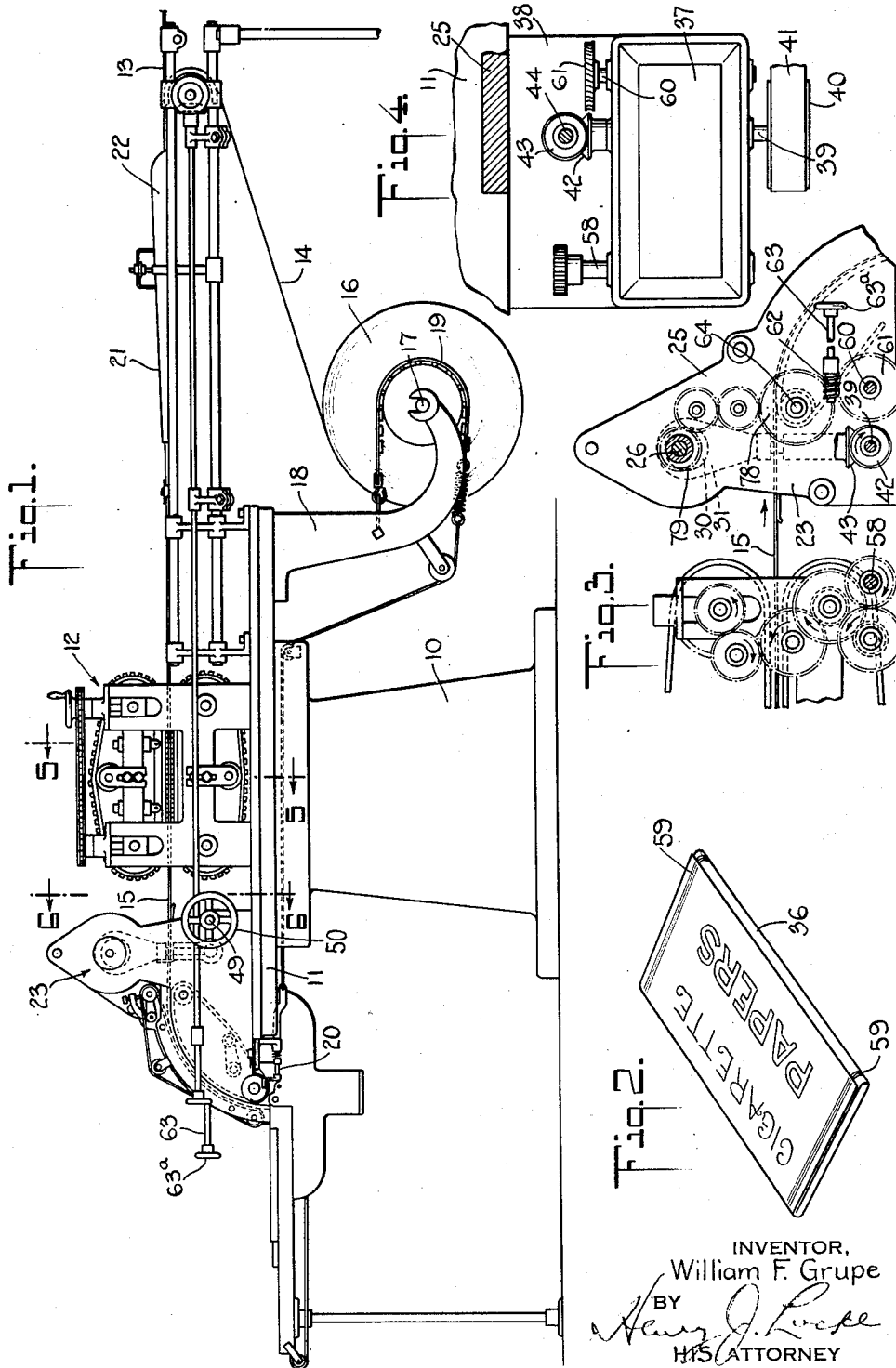
W. F. GRUPE

2,012,561

SEVERING AND COLLATING MEANS

Filed May 4, 1934

3 Sheets-Sheet 1



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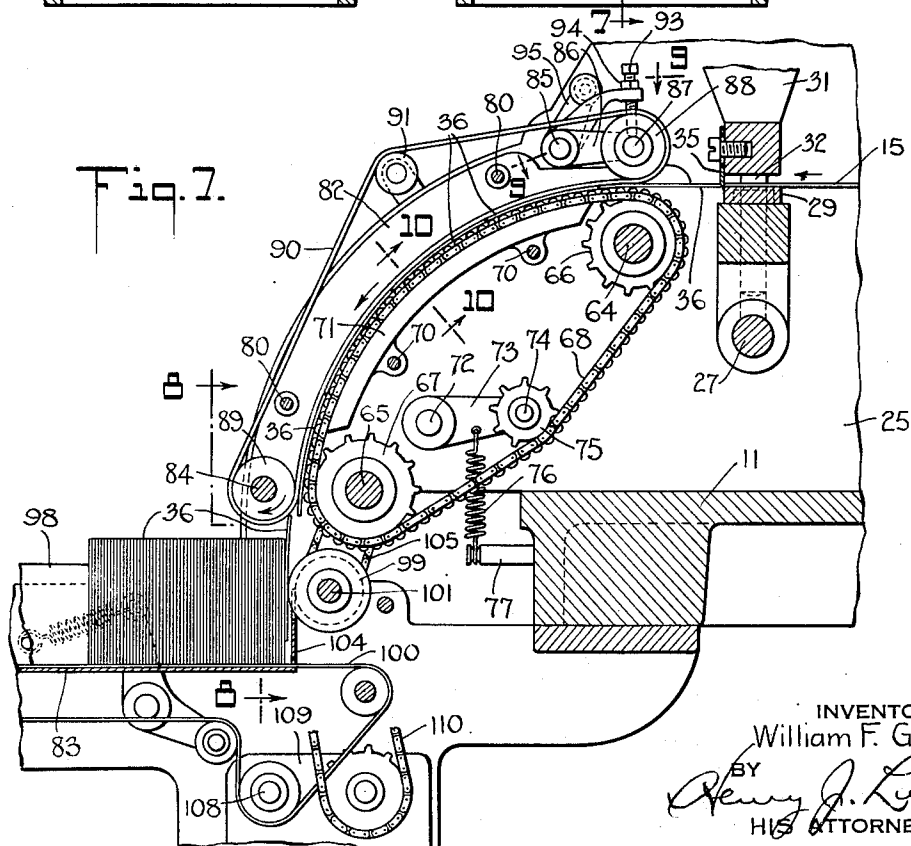
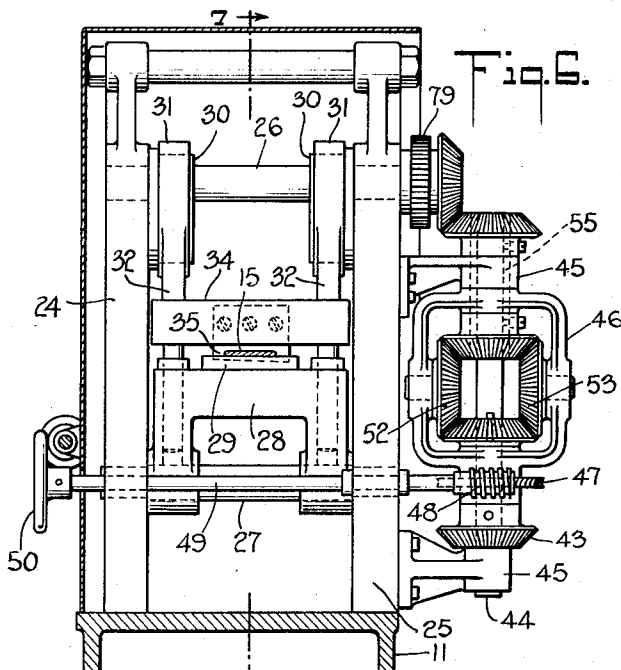
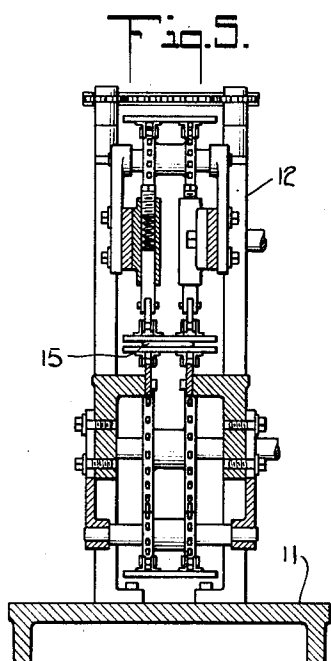
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SEVERING AND COLLATING MEANS

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3 Sheets-Sheet 2



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SEVERING AND COLLATING MEANS

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3 Sheets-Sheet 3

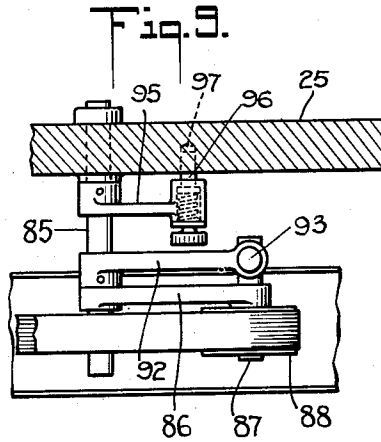
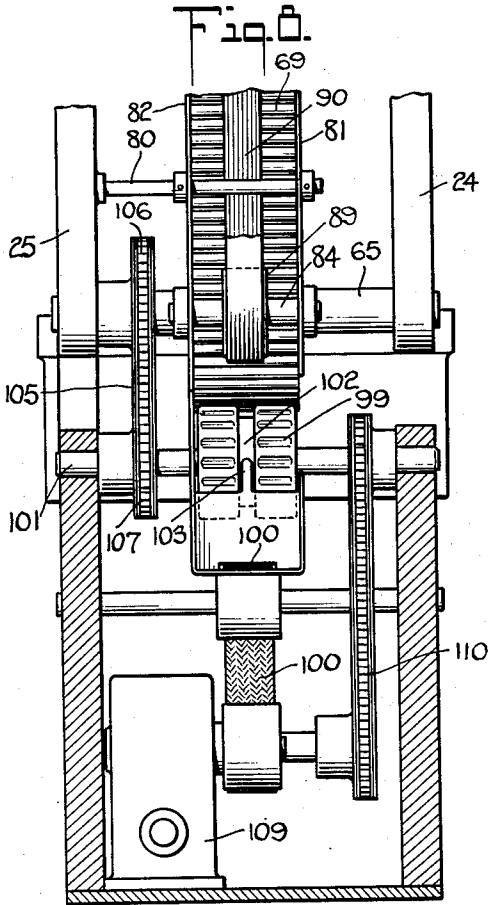


Fig. 10.

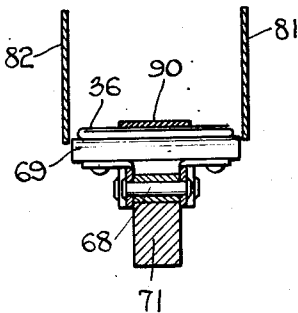
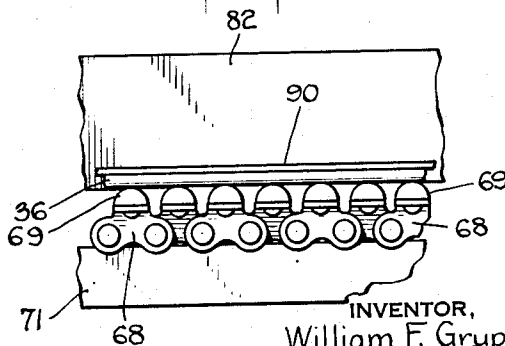


Fig. 11.



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UNITED STATES PATENT OFFICE

2,012,561

SEVERING AND COLLATING MEANS

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Application May 4, 1934, Serial No. 723,825

12 Claims. (Cl. 164—49)

My present invention relates to severing and collating means.

In my copending application, Serial #662,682, filed March 25, 1933, entitled Gummed paper booking machine, I have illustrated, described and claimed an improved mechanism for folding an indeterminate length of enclosing web of wrapping material about a plurality of superimposed strips of cigarette paper, also of indeterminate length, and during the simultaneous and continuous movement thereof, and delivering the enclosed strips of cigarette paper to a cutting device for severing cigarette paper books therefrom.

There is also incidentally disclosed in my said copending application mechanism illustrating a type of my present application. Such mechanism is designed to receive the severed lengths of cigarette paper in the form of books as delivered from the cutting device, and deliver the same in rapid succession to a receiving device in predetermined relation with respect to each other. From such receiving device the now stacked cigarette paper books may be removed in any desired manner for packing or shipping.

My present invention however, is not limited to the association with a cigarette paper book making machine, and is applicable in general to severing a web bearing spaced duplicated printed matter and for collating the severed portions relatively to one another.

A generic feature of my invention resides in the assembly of suitable severing means, including an adjustable severing device, means for forwarding the individual severed portions from the location of severing to suitable delivering means, and the provision in such delivering means for guiding the operator in adjusting the severing device of the severing means, whereby the delivered severed portions are of uniform character.

Further features of my invention will be more fully understood from the following detail of the description and the accompanying drawings, illustrating a cigarette paper book making machine is but one type of embodiment of my invention.

In the accompanying drawings:

Fig. 1 is a side elevation of a cigarette paper booking machine to which my invention is applied;

Fig. 2 is a perspective view of a cigarette paper book as made on the machine illustrated in Fig. 1;

Fig. 3 is an enlarged view of a portion of the mechanism shown at the left hand end of Fig. 1 and as viewed from the side opposite that shown in said Fig. 1;

Fig. 4 is a plan view of the driving mechanism for operating gearing shown in Fig. 3;

Fig. 5 is a vertical section on the line 5—5 of Fig. 1;

Fig. 6 is a vertical section on the line 6—6 of Fig. 1;

Fig. 7 is a vertical section on the line 7—7 of Fig. 6;

Fig. 8 is a section taken on the line 8—8 of Fig. 7;

Fig. 9 is a section taken on the line 9—9 of Fig. 7;

Fig. 10 is a section taken on the line 10—10 of Fig. 7, and

Fig. 11 is an elevation, on an enlarged scale, of a portion of the book feeding chain, and track therefor, shown in Fig. 7.

Referring to the drawings 10 designates the base of a cigarette paper bookmaking machine, provided at its top with a table or platform 11. On the table 11 is mounted a suitable feeding device 12, namely, of the pull feed type comprising suitable means for feeding a number of parallelly arranged superimposed strips of cigarette paper 13, of indeterminate length, enclosed in a web of wrapping material 14, also of indeterminate length. Such assembly of cigarette paper and wrapping material is designated, for convenience, by the reference numeral 15.

The strips of cigarette paper 13 are fed, in superimposed parallel relation, into the right hand end of the machine shown in Fig. 1, from a suitable source of supply (not shown). The web of wrapping material 14 is fed from a roll 16, mounted for rotation on a shaft 17 in the brackets 18, but one of which is shown. Suitable means is provided for applying the necessary tension to the cigarette paper 13 and wrapping material 14, the tension means for the cigarette paper 13 not being shown, while the tension means for the wrapping material is designated by the reference numeral 19. An adjusting mechanism for the tension means is designated by the reference numeral 20. The adjusting mechanism is located, as will be apparent, adjacent to the position occupied by the operator of the machine.

The wrapping material 14 is wrapped about the plurality of superimposed parallelly arranged strips of cigarette paper 13 by the device 21, the strips 13 being guided into the device 21 by the device 22.

The feeding device 12 is adapted to operate and feed the assembly 15 by suitable pulling ac-

tion, toward the left, as in Fig. 1, and into association with a book cutting device 23.

The book cutting device 23 is housed between the spaced parallelly arranged plates 24, 25, and comprises shafts 26 and 27, rotatably mounted in the plates 24, 25 and spaced apart from and parallel to each other. The shaft 27 oscillates in its bearings, and secured to the shaft, and extending upwardly therefrom, between the plates 23, 24, is a frame 28, and on the top of this frame 28 is secured a platen 29. Secured to the shaft 26, adjacent the plates 23, 24, are the eccentrics 30. Mounted on the eccentrics 30 are the eccentric straps 31, to each of which is attached the rods or shafts 32. These rods or shafts 32 reciprocate in holes 33 in the frame 28. The rods or shafts 32 are connected to a cross head 34, and on the cross head is a guillotine knife 35 which cooperates with the platen 29. As the shaft 26 rotates, the guillotine knife 35 reciprocates toward and from the platen 29, severing the cigarette paper books 36 from the assembly 15. Simultaneously with such movement, the frame 28 oscillates on the shaft 27, so that a swinging movement is imparted to the platen 29 and knife 35, in synchronism with the speed of travel of the assembly 15, and thus ensures that the feeding movement of the assembly 15 will not be interfered with.

The cutting device 23, as well as the feeding device 12, is operated from a transmission device 37, mounted on a shelf 38 secured to the plate 23. The intake shaft 39 of the transmission device 37 has secured thereto a pulley 40, over which runs a belt 41 leading from any suitable source of power (not shown). On the output side of the transmission device 37 is a bevel gear 42 meshing with and driving a bevel gear 43 secured to the lower end of a shaft 44 rotatably mounted in bearing brackets 45 secured to the plates 23. Mounted for rotation on the shaft 44, between the brackets 45 is a frame 46. Secured to the lower end of the frame 46 is a worm wheel 47, which meshes with and is driven by a worm 48 secured to the shaft 49. The shaft 49 is rotatably mounted in the plates 23, 24 and has secured to one end the hand wheel 50 and by means of which the shaft 49 may be rotated. Secured to the shaft 44, so as to be rotatable therewith, and within the confines of the frame 46 is a bevel gear 51, which meshes with and drives the bevel gears 52 and 53, mounted for free rotation in the frame 46.

The bevel gears 52 and 53 mesh with and drive a bevel gear 54 secured to a sleeve 55 that is rotatably mounted in the frame 46 and one of the brackets 45. This sleeve 55 has secured to its top end a bevel gear 56 which meshes with a bevel gear 57 secured to one end of the shaft 26.

The transmission device 37, and its output side, is provided with a shaft 58 which drives the feeding device 12. There is a fixed relation between the speed of travel of the assembly 15, as determined by the feeding device 12, and the reciprocating movement of the knife 35. The knife 35 is so operated as to sever the books 36 from the assembly 15 as to have the design, or pattern, or indicia 59 on the book symmetrically arranged thereon. Due to tension, humidity, or other causes, the pattern 59 becomes out of symmetry on the book 36, and the operator, by properly rotating the shaft 49 may vary the time of operation of the knife 35 with respect to the travel of the assembly 15, and thus restore the symmetry of the pattern with respect to the book 36. Again, the transmission device has, on the out-

put side, a shaft 60. Secured to this shaft 60 is a worm wheel 61 which engages with a worm 62 carried by a shaft 63. On the shaft 63, within convenient reach of the operator, is a hand wheel 64, and by means of which the shaft 63 may be rotated. The rotation of the shaft 63, by operating the usual mechanism within the transmission device 37, alters the speed ratio between the shafts 39 and 58, and thus provides another means for changing the operating relation between the knife 35 and feeding device 12.

Rotatably mounted in bearings in the plates 24, 25 are parallelly arranged shafts 64 and 65 equipped with sprocket wheels 66 and 67 respectively, and over such sprocket wheels runs an endless sprocket chain 68. The sprocket chain 68 is provided on one face with a plurality of parallelly arranged bars 69, of rubber or other suitable material, such bars extending transversely of the chain 68, as clearly shown in Figs. 10 and 11.

On bars 70, extending between the plates 24 and 25 is a curved track 71, over which the working reach of the chain 68 runs and is guided on a shaft 72, extending between the plates 24 and 25, is rotatably mounted an arm 73, carrying a stub shaft 74 on which is rotatably mounted a sprocket wheel 75, which engages with a reach of the chain 68. Secured to the arm 73 is one end of a coil spring 76, the other end of which is attached to a pin 77 on the table 11. The spring 76 tensions the chain 68 in its passage over the track 71.

The sprocket chain 68 is driven from the shaft 64, and for this purpose there is secured to the said shaft a gear 78, forming part of a train of gears driven from a gear 79 secured to the shaft 26. The speed of travel of the sprocket chain 68 thus bears a fixed relation to the speed of operation of the knife 35 and to the feeding device 12.

On bars 80, secured to the plates 24 and 25, are mounted relatively light housing plates 81 and 82, these plates extending downwardly, as shown in Figs. 7 and 8, and have secured thereto, or formed integral therewith, at their lower ends, a casing or trough 83. This casing or trough 83 receives the cigarette paper books 36 as they are fed from the sprocket chain 68, and from which they are removed from time to time by an attendant of the machine.

To ensure that the books 36 are kept in engagement with the sprocket chain 68 passing over the curved track 71, I have provided means which not only performs this function, but which additionally acts on the following end of a cigarette paper book 36 to move such following end out of the line of movement of the forward end of the next succeeding book 36.

The means above referred to comprises essentially an endless belt arranged as follows: Adjacent the shaft 65 and parallel to, but spaced apart therefrom, is a shaft 84. Bearings for this shaft 84 are provided in the housing plates 81 and 82, as clearly shown in Fig. 8. On this shaft is mounted a pulley 85. Adjacent the shaft 64 and rotatable in a bearing in the plate 25 is a shaft 86. Rotatably mounted on this shaft 86 is one end of an arm 87 to the outer face end of which is secured a shaft 87. On the shaft 87 is rotatably mounted a pulley 88. Over the pulleys 88 and 89 runs an endless belt 90, which also runs over an idler pulley 91 mounted on the housing plates 81 and 82. With the pulley 88 in the position shown in Fig. 7, it is obvious that the reach

of the belt adjacent to the sprocket chain 68 will conform to the path over which the chain 68 passes, and that if sufficient tension is placed on the belt 90, the books 36 will be held closely in engagement with the chain 68 and will be positively fed from the cutting knife 35 to the discharge point adjacent to the sprocket wheel 67.

To provide for applying the necessary tension to the belt 90, and also to provide for throwing the same out of operative relation with the sprocket chain 68, I have utilized the following instrumentalities. Secured to the shaft 85, adjacent to the arm 86, is one end of an arm 92. At the free end of this arm is an adjusting screw 93 provided with a lock nut 94 and this screw engages with the shaft 87. By properly moving the adjusting screw 93, the pulley 88 is moved toward or away from the sprocket chain 68, and the tension of the belt determined. The lock nut 94 holds the screw 93 in adjusted position.

Also secured to the shaft 85 is one end of an arm 95 having formed at its free end an enlargement in which is yieldingly mounted a slidable locking pin 96. This pin is adapted to engage with a hole 97 in the frame plate 25 and to thus hold the shaft 85, and parts carried thereby, in operative position, or in the position shown in Fig. 7. Should it be desired to move the belt 90 out of operative relation with the sprocket chain 68, the operator pulls the pin 96 out of the hole 97, rotates the shaft 85 in a counter-clockwise direction, and moves the pulley 88 upward, and to the left, as viewed in Fig. 7, thus lifting the belt 90 out of operative relation with the chain 68.

As the cigarette paper books 36 are fed along the chain 68, they are discharged downwardly from between the chain 68 and belt 90, and into position between the block 98 and serrated feeding wheel 99, the wheel 99 then feeding or forcing the book 36 into engagement with a belt 100 lying in the bottom of the trough 83. The serrated wheel 99 is secured to a shaft 101 rotatably mounted in bearings in the side plates of the trough 83, and is provided with a centrally arranged peripheral groove 102 in which is located a tongue 103 formed integral with the rear wall 104 of the trough 83. As the advance end of the book 36 is gripped between the serrated wheel 99 and the moving block 98, or succeeding books 36, between the wheel 99 and the preceding book 36, such book moves downward, and due to the resiliency of the book 36, and particularly due to the attraction existing between the book 36 and belt 90, the following end of the book 36 is moved forward, or to the left, as viewed in Fig. 7, such following end being therefore moved out of the path of the next succeeding book 36.

The serrated wheel 99 is positively driven by means of a sprocket chain 105 running over sprocket wheels 106 and 107, secured respectively to the shafts 65 and 101.

The belt 100, lying in the bottom of the trough 83, is also positively driven from the shaft 108 from a transmission reduction gear box 109 which is operated by a sprocket chain 110 from the shaft 101, as will be apparent from an inspection of Figs. 7 and 8.

It will be observed, see Fig. 7, that the roller 99 functions to pull the foremost book or other individual severed portion of the printed web downwardly from the chain 68, and also to push the same downwardly to or upon the delivery belt 100, thus automatically or positively jogging the same into alignment with the preceding delivered books or other severed portions. Such action of

the wheel 99 functions also to propel the thus aligned books or other severed portions upon the delivery means, independently of the belt 100. The belt 100 functions primarily to carry the "dead load" of the aligned books or other severed portions.

The books 36, being fed successively into the trough 83, are thus arranged in stacked relation, and the operator, who ordinarily stands at the machine at a point adjacent to the said trough 83, observes the position of the design element 59 on such books 36. From such observation, the operator can manipulate the various knife 35 adjusting devices to maintain the design 59 symmetrically on the book 36.

The machine illustrated has been described in some detail to clearly bring out the operation of the same in conjunction with the feeding and stacking means forming the subject matter of my present invention. Such improved feeding and stacking means is located, in sequence, subsequent to the enclosing, feeding, and book severing means of the machine, generally speaking. It is however, obvious that my present invention may be associated with any suitable means for enclosing, feeding and severing the cigarette paper books 36, and I therefore do not desire to limit the application of my invention to the precise details of the machine with which it is shown associated.

From the above, it will be apparent that my invention is applicable generally to the severing of a web bearing duplicated printed matter spaced from one another, my severing mechanism inclusive of an adjustable severing device, severing the individual portions of the web in symmetrical relation to the printed matter, the individual severing parts being forwarded by my delivery mechanism and collated, the delivering mechanism being arranged to expose the printed matter of the individual severed portions to guide the operator in the adjustment of the severing device.

Further, while I have necessarily described the specific illustrated type of my present invention somewhat in detail it is to be understood that I may vary the size, shape and arrangement of parts comprising the device within relatively wide limits without departing from the spirit of the invention.

I claim:

1. The combination with means for feeding a plurality of aligned individual portions bearing spaced duplicate printed matter, means for gripping the advance end of the foremost individual portion as it is delivered by said feeding device, and means for moving the following end of the gripped individual portion out of the line of travel of the advance end of the next succeeding individual portion.

2. The combination with means for feeding a plurality of aligned individual portions bearing spaced duplicate printed matter, means for gripping the advance end of the foremost individual portion as it is delivered by said feeding device, means for moving the following end of the gripped individual portion out of the line of travel of the advance end of the next succeeding individual portion, and means for collecting the individual portions in stacked relation.

3. The combination with means for feeding a plurality of aligned individual portions bearing spaced duplicate printed matter in succession, a collecting trough arranged at the exit end of such feeding means, and a device arranged intermediate the feeding means and collecting trough for moving the following end of a preceding individual

portion out of the line of travel of the advancing end of the succeeding individual portion.

4. The combination with means for feeding a plurality of individual portions bearing spaced duplicate printed matter in succession, a collecting trough arranged at the exit end of such feeding means, and a device arranged intermediate the feeding means and collecting trough for moving the following end of a preceding individual portion out of the line of travel of the advancing end of the succeeding individual portion, and during the continuous movement of said individual portions.

5. The combination with means for feeding a plurality of individual portions bearing spaced duplicate printed matter in succession, a collecting trough arranged at the exit end of such feeding means, and a device arranged intermediate the feeding means and collecting trough for moving the following end of a preceding individual portion out of the line of travel of the advancing end of the succeeding individual portion, and during the passage of the preceding individual portion from the feeding means to the collecting trough.

6. The combination with means for feeding a plurality of individual portions bearing spaced duplicate printed matter in succession, a collecting trough arranged at the exit end of such feeding means, a movable belt arranged in the collecting trough and means for moving said belt at a speed having a definite relation to the speed of travel of the feeding means and in a direction approximately at right angles to the direction of travel of the feeding means.

7. In a cigarette paper booking machine, an improved book feeding means, for feeding a plurality of books in succession and arranged end to end, comprising an endless conveyor chain, means for guiding a reach of said chain along an arcuate path, and a flexible belt engaging with said chain and conforming to the arcuate path of travel thereof, whereby the books are held in feeding engagement with the chain.

8. In a cigarette paper booking machine, an improved book feeding means, for feeding a plurality of books in succession and arranged end to end, comprising an endless conveyor chain, means for guiding a reach of said chain along an arcuate path, positive driving means therefor, and a flexible idler belt engaging with said chain and conforming to the arcuate path of travel thereof, whereby the books are held in feeding engagement with the chain.

9. The combination with means for feeding a plurality of books, means for gripping the advance end of a book as it is delivered by said feeding device, and means for moving the following end of the gripped book out of the line of travel of the advance end of the next succeeding book.

10. The combination with means for feeding a plurality of books, means for gripping the advance end of a book as it is delivered by said feeding device, means for moving the following end of the gripped book out of the line of travel of the advance end of the next succeeding book, and means for collecting the books in stacked relation.

11. The combination with means for feeding a plurality of books in succession, a collecting trough arranged at the exit end of such feeding means, and a device arranged intermediate the feeding means and collecting trough for moving the following end of a preceding book out of the line of travel of the advancing end of the succeeding book.

12. The combination with means for feeding a plurality of books in succession, a collecting trough arranged at the exit end of such feeding means, and a device arranged intermediate the feeding means and collecting trough for moving the following end of a preceding book out of the line of travel of the advancing end of the succeeding book, and during the continuous movement of said books.

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