Dec. 15, 1931. L. A. SCHMIDT 1,836,043

CUTTING AND COLLECTING MECHANISM FOR PRINTING MACHINES

Filed Feb. 27, 1930 3 Sheets-Sheet 1

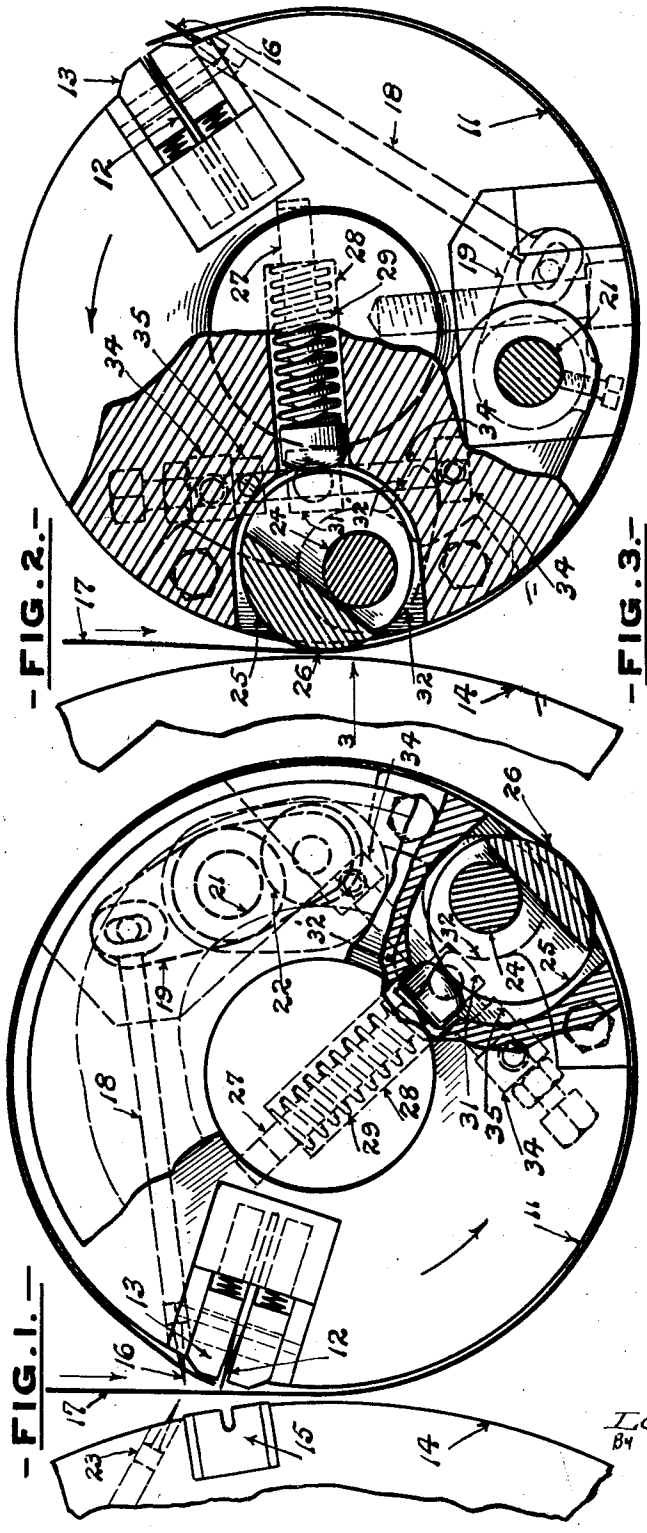


FIG. 1.

FIG. 2.

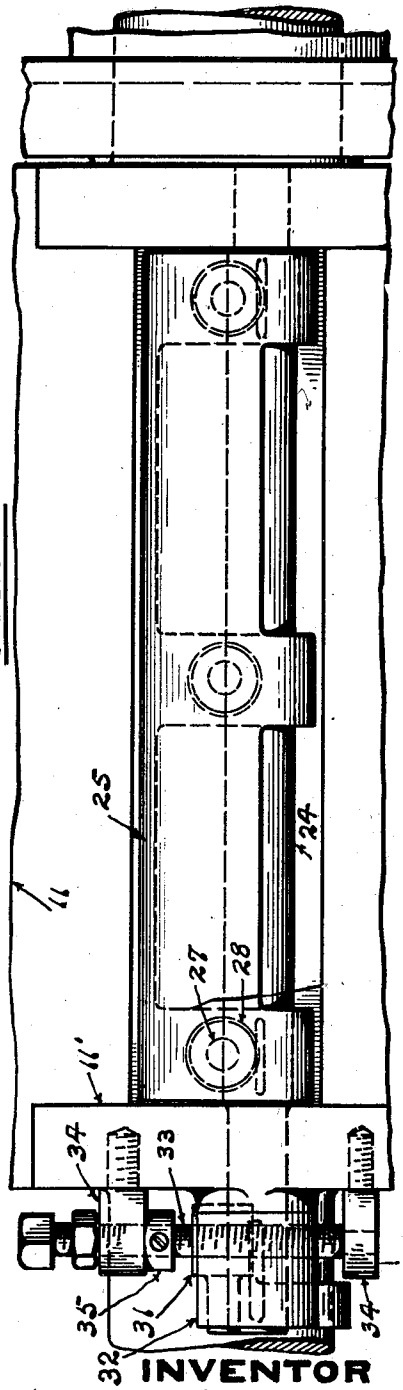


FIG. 3.

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CUTTING AND COLLECTING MECHANISM FOR PRINTING MACHINES

Filed Feb. 27, 1930 3 Sheets-Sheet 2

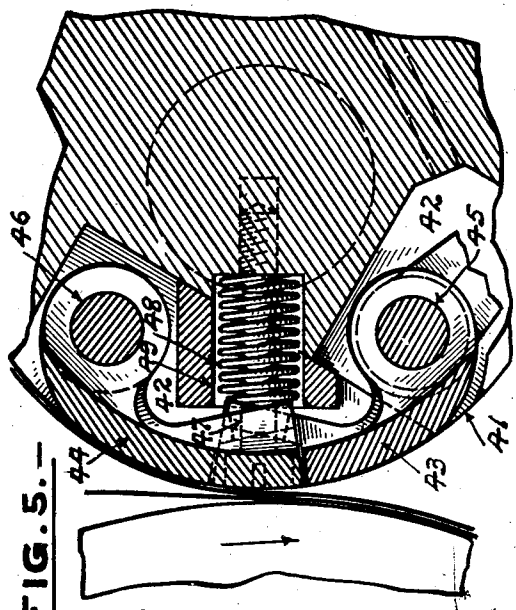


FIG. 5.

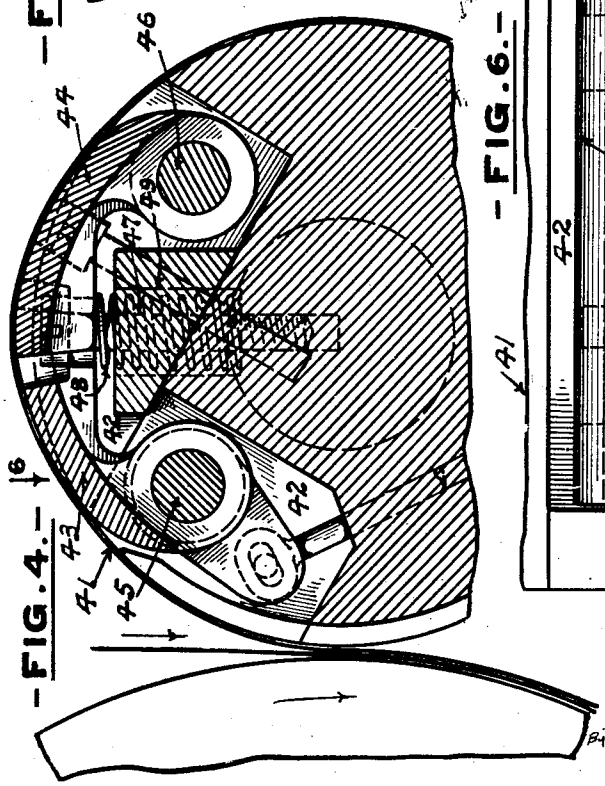


FIG. 4.

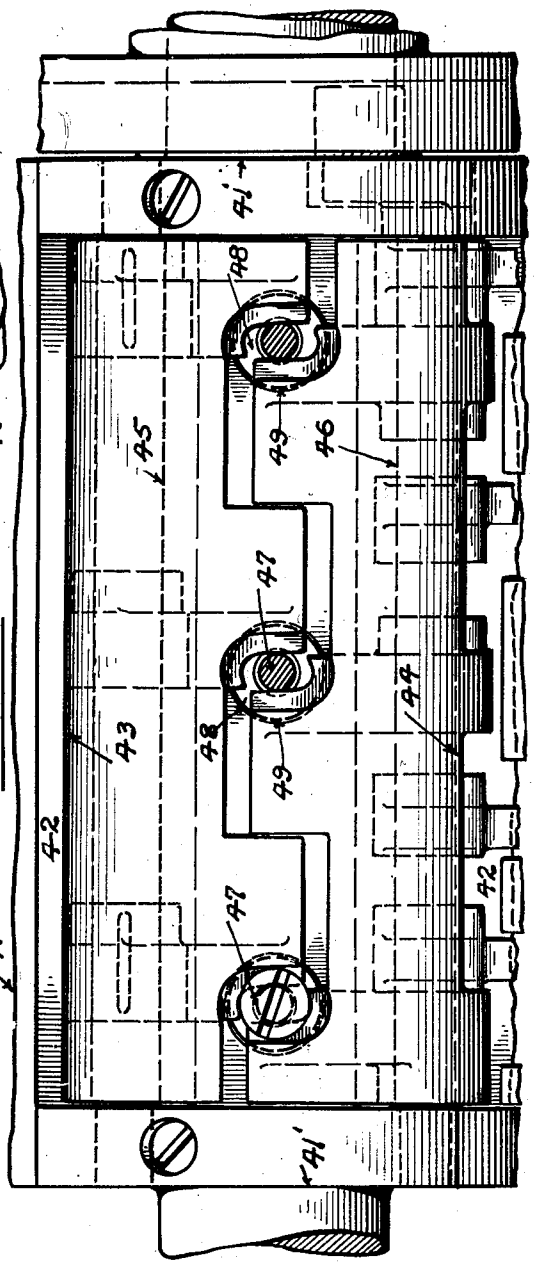


FIG. 6.

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CUTTING AND COLLECTING MECHANISM FOR PRINTING MACHINES

Filed Feb. 27, 1930 3 Sheets-Sheet 3

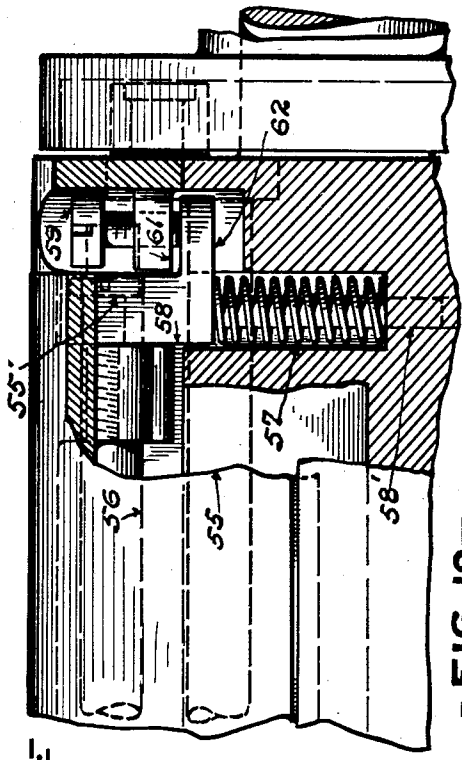


FIG. 8.

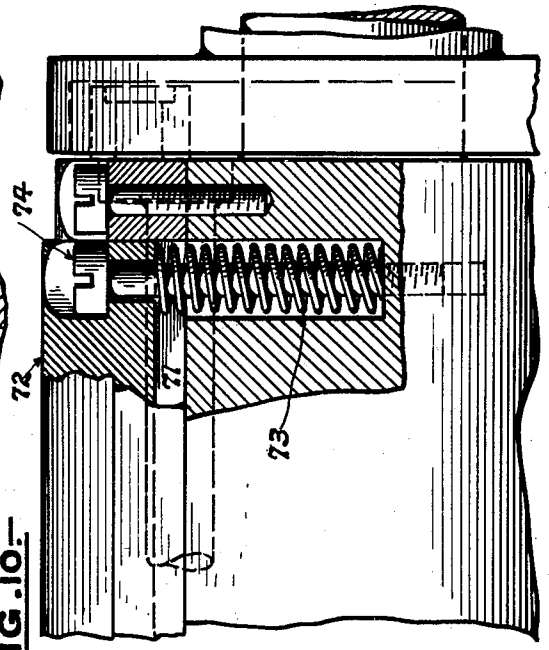


FIG. 10.

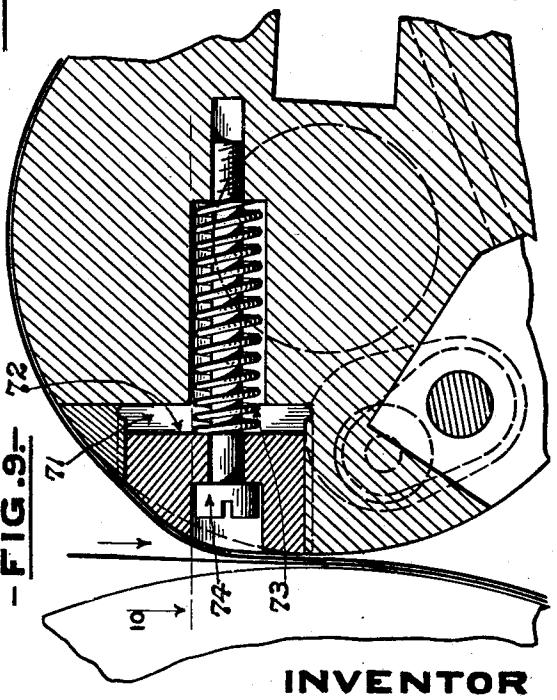


FIG. 9.

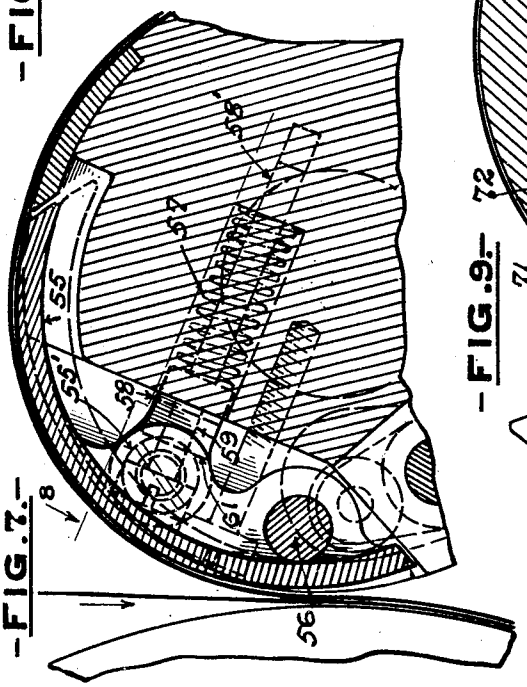


FIG. 7.

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Patented Dec. 15, 1931 1,836,043

UNITED STATES PATENT OFFICE

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CUTTING AND COLLECTING MECHANISM FOR PRINTING MACHINES

Application filed February 27, 1930. Serial No. 431,839.

This invention relates to cutting and collecting mechanism for rotary web printing machines such as are used in printing newspapers and similar products.

In the operation of machines of this class, after the webs have been printed, it is common practice to associate a number of them and pass the associated product between two cylinders, one of which carries a projecting knife and the other a suitable abutment for the knife. The product is thus cut into sheets to form sections of the newspaper. It is also common practice to collect these sections on one of the cylinders, and deliver two sections or groups of sheets which are then folded together. In a simple form of collecting mechanism, the circumference of the collecting cylinder is made the length of two sections of the product, and the circumference of the cutting cylinder is made the length of one section of the product. With this arrangement of cutting and collecting cylinders, when it is desired to deliver a collected product, the end of the group of associated webs is first carried around the cutting cylinder which, after it has made a complete revolution cuts off a sheet. The end of the web is then taken by the collecting cylinder, carried forward thereon and simultaneously the leading end of the cut sheet is transferred to the collecting cylinder; being laid over and in alignment with the end of the group of webs that it is carrying forward. The group of webs is again cut when the cutting cylinder completes its revolution and both cut products are carried on to the folding mechanism and delivered in a manner well known in the art. It will be understood that the cutting cylinder must be of such diameter that the product wound about it will be cut into sections of the proper length, for if the section is cut too short, it will not match with the following section with which it is folded and delivered, and if it is cut too long, its trailing end will again be cut when the second section is cut, and thus impose the unnecessary load on the cutting mechanism incident to cutting through an abnormal thickness of product. Double cutting is additionally objectionable as it produces clippings that are liable to clog the machine and otherwise interfere with its operation.

The cutting cylinder is usually made with a suitable diameter to properly cut a group of associated webs forming a certain number of pages. If this number is increased to any considerable extent, the thicker product when wrapped about the cylinder will have a greater length and will be too long, as the diameter of the cylindrical surface on which the cutting knife operates is increased to twice the extent that the thickness of the product is increased. Hence, it is necessary to so proportion the cutting cylinder that it will cut the heaviest products that will ever be operated upon, to the proper length. With a cylinder so arranged, when a light product is cut and collected, it is found that the first section of the paper is cut somewhat shorter than the second section. Means to overcome this difficulty, so that both first and second sections will be cut to equal lengths are disclosed in the present application.

An object of the invention is to provide means for varying the effective circumferential length of a cutting cylinder in order that it may function with a collecting cylinder to cut a variable number of associated webs into sections of substantially equal length and collect a plurality of such sections.

Another object of the invention is to provide a cutting cylinder having means for automatically varying its circumferential length when the thickness of the product to be cut is changed.

It is also an object of the invention to provide a cutting cylinder of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without

departing from the spirit of the invention.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a diagrammatic view partly in section showing a cutting cylinder, and a portion of a cooperating collecting cylinder, depicting one form of mechanism for varying the effective circumferential length of the cutting cylinder;

Figure 2 is a view similar to Figure 1 but showing the cylinders rotated to a different position;

Figure 3 is a side view of the mechanism shown in Figures 1 and 2, the view being taken in the direction of arrow 3 of Figure 2;

Figure 4 is a view similar to Figure 1, but showing a modified form of the invention;

Figure 5 is a view of the mechanism disclosed in Figure 4, but with the cylinders rotated to a different position;

Figure 6 is a plan view of the mechanism shown in Figures 4 and 5, as seen in the direction of arrow 6 of Figure 4;

Figure 7 is a view similar to Figure 1 showing another modified form of the invention;

Figure 8 is a view partly broken away and partly in section, showing the mechanism disclosed in Figure 7, as viewed in the direction of arrow 8 on Figure 7;

Figure 9 is a sectional view showing still another modified form of the invention; and

Figure 10 is a view partly in section showing the mechanism of Figure 9 as viewed in the direction of arrow 10.

Referring now to the drawings, 11 indicates a cutting cylinder having a cutting knife 12 and the usual arrangement of cheek blocks 13. Numeral 14 indicates a collecting cylinder with a cooperating abutment 15, for the cutting knife. Pins as shown at 16, serve to engage the end of the web or group of webs shown at 17 and hold it on the cylinder. Pin operating mechanism that is well known in the art is shown, and includes a pin holder 18, an operating arm 19, a shaft 21, and a cam roller 22 which engages a stationary cam fixed to the frame of the machine.

It will be understood that this arrangement provides means for extending the pins to take the ends of the webs, and withdrawing them when the webs are to be released from the cylinder. Similar pins 23 and suitable operating mechanism not shown are used on the collecting cylinder 14, and operate to engage the webs.

When a paper having two sections is to be delivered, pins 16 are arranged to engage the end of the web, and as the cylinder 11 rotates, the web is carried around the cylinder and cut when the cylinders reach the position shown in Figure 1. As the cylinders rotate, the pins 16, are immediately withdrawn and the pins 23, extended thereby engaging both the cut end of the web and the cut section that is carried on the cylinder 11. Both sections are then carried forward by the cylinder 14 and at the next revolution of the cylinder 11, the second section of the web is cut, after which the two sections are folded by mechanism not shown, and passed on to a delivery.

It will be understood that in order that the first and second sections of the product be cut to the same length, that the circumferential length of the cutting cylinder 11 must be properly proportioned to correspond with the circumferential length of the collecting cylinder 14, and that when a relatively large number of webs, forming a thick product is being cut, that it increases the effective diameter of the cutting cylinder, and the outer pages as they lay on the cutting cylinder, will be cut noticeably longer than in the case of a light product. It will also be understood that if the cylinder 11 is designed for cutting a relatively light product that when a heavy product is being cut, the outer sheets will be cut too long and when the section is transferred to the collecting cylinder, the trailing ends of all of these long sheets will be cut a second time when the second section is cut.

In order to avoid this difficulty, the cutting cylinder of the mechanism shown herein, is made the proper diameter for cutting the maximum thickness of product that it will ever be required to handle, and means are provided for increasing the effective circumferential length of the cylinder when a thinner product is being cut. Several means are shown. In Figure 1 they include a shaft 24, rotatably supported in suitable bearings in the end of the cylinder 11, and an eccentric member 25 that is keyed to the shaft having a face 26, adapted to support the webs 17. A thrust rod 27, is arranged to slide in a recess 28, and engages with the eccentric member 25. A spring 29, operates in the recess 28, and against the head of the thrust rod 27, thus biasing the eccentric member outward as shown in Figure 1, its motion in this direction being limited by a block 31, that is engaged by a projection 32′ formed on the casting 32, that is secured to the shaft 24. The block 31 is adjustable by means of the screw 33, which is supported in poppets 34, secured to the end wall 11′ of the cylinder 11. The adjusting screw 33 is screw threaded into the block 31 and provided with a collar 35. It will be understood that by turning the adjusting screw, that the block 31 may be moved, and thus adjust the extent to which the face of the eccentric member will protrude beyond the radius of the cylinder.

In operation, when the webs are taken by the pins 16, rotation of the cylinder will bring the face of the eccentric member into engagement with the webs as shown in Figure 2. If a thick product is being handled,

the eccentric member will be forced into the recesses of the cylinder to a point where its surface is flush with the surface of the cylinder. If a thinner product is being handled, however, the eccentric member will protrude beyond the surface of the cylinder to an extent that is governed by the thickness of the product. As the cylinder rotates toward the cutting position, the tension of the web will prevent the eccentric member from being thrust outward by the pressure of the springs on the eccentric member and the thrust of the springs will prevent the pull of the web from forcing the eccentric member into the recess further than it was initially pressed when it engaged the collecting cylinder. It will thus be seen that when a product of maximum thickness is being cut, the eccentric member is ineffective, but when a thinner product is being cut, the eccentric member acts to increase the effective circumferential length of the cutting cylinder and thus cut the sections of the web longer than they would otherwise be cut if the eccentric member was not used.

In the modified form of the invention shown in Figures 4 to 6 inclusive, a large portion of the surface of the cutting cylinder here indicated at 41, is cut away, forming a recess 42, and interlocking segments 43 and 44 are provided to bridge the gap. These segments are secured respectively to shafts 45 and 46 that are rotatably supported in the end walls 41′ of the cylinder. Adjusting screws 47 are threaded into the body of the cylinder and have pins that engage with suitably formed surfaces on the segments 43 and 44. A spring 48 in a bore 49 in the cylinder 41 acts on the inner surfaces of the interlocking segments 43 and 44 tending to thrust them outward to the position shown in Figure 4. When the cylinders rotate to the position shown in Figure 5, the interlocking segments will be forced inward, to an extent depending on the thickness of the webs as previously explained in connection with the form shown in Figures 1 to 3. The screw 47, provides means for adjusting the maximum outward movement of the interlocking segments.

In the form of the invention disclosed in Figures 7 and 8, a single movable segment 55 is used, and is pivoted at 56. A spring 57, acts on a thrust member 58, that is pivotally connected to the segment 55 by the screw 55′ and held in alignment by the rod 58′. This mechanism provides outward bias for the segment, the extent of which is limited by an adjusting screw 59, threaded into a lug 61, formed on the end of the collecting cylinder, and bearing against a lug 62, formed on the thrust member 58.

In the form of the invention shown in Figures 9 and 10, the collecting cylinder is recessed at 71, and block 72 is fitted to slide in the recess. A spring 73, acts to bias the block 72 outward and the outward motion is limited by the adjusting screw 74.

It will be understood that the operation of the mechanism comprising the several forms of the invention is similar, to the extent that all are arranged to bias a segment or other member, outward from a recess in the cylinder, to an extent that is determined by the thickness of the product being handled, and that when a light product comprising a relatively small number of webs is being cut, that they will be cut longer than could be done with the usual form of cutting cylinder having the proper diameter for cutting heavy products.

What is claimed is:

1. In a mechanism for cutting and collecting sections from a group of webs, a collecting cylinder, and a cutting cylinder having a movable member forming a portion of its circumferential surface, said member being arranged to normally protrude beyond the periphery of the body of the cylinder and to recede when it presses the webs against the collecting cylinder.

2. In a mechanism for cutting and collecting a product, a collecting cylinder, and a cutting cylinder having a recess in its cylindrical surface and a segment in the recesses movable to vary the effective peripheral dimension of the cutting cylinder.

3. In a mechanism for cutting and collecting a product, a collecting cylinder, a cutting cylinder having a recess in its cylindrical surface, and a segment movably supported in the recess and biased outward to engage the product.

4. In a mechanism for cutting and collecting a web product, a collecting cylinder, a cutting cylinder having a recess in its cylindrical surface, and a segment movably supported in the recess, said segment being normally pressed outward by a spring and adapted to be pressed inward when it presses the web against the collecting cylinder.

5. In a mechanism for cutting and collecting a product, a cutting cylinder having means acting automatically to vary its circumferential length when the thickness of the product varies.

6. In a mechanism for cutting and collecting a product, a cutting cylinder having means operated by the rotation of the cylinder for varying its circumferential length when the thickness of the product varies.

In witness whereof I have hereunto signed my name.

ELISABETH SCHMIDT,
Executrix of the Estate of Louis A. Schmidt, Deceased.