May 4, 1943. H. J. LUEHRS 2,318,173

MEANS FOR CUTTING SHEETS OF DIFFERENT LENGTHS FROM TRAVELING WEBS

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Fig. 1.

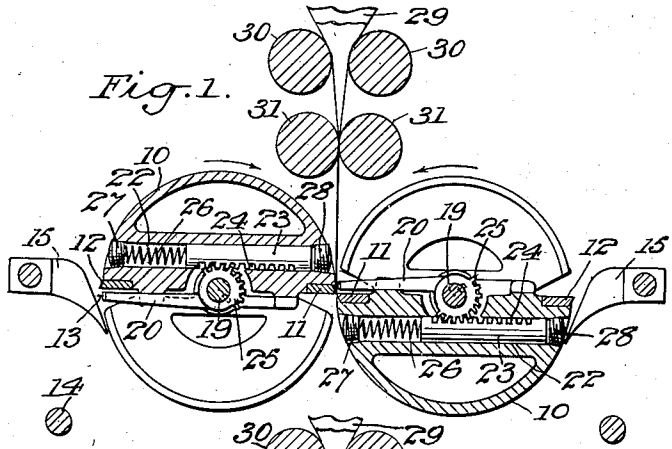


Fig. 2.

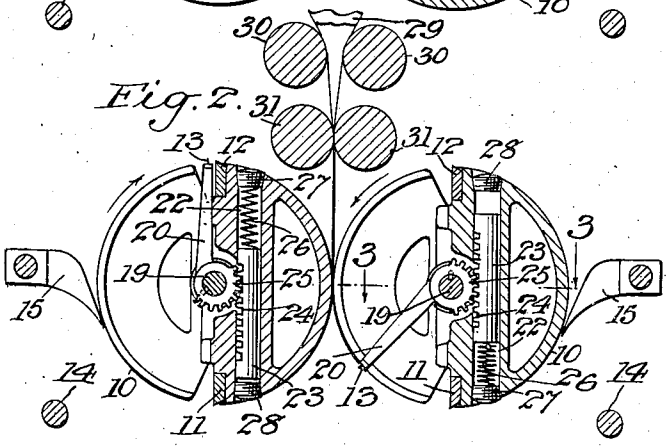


Fig. 3

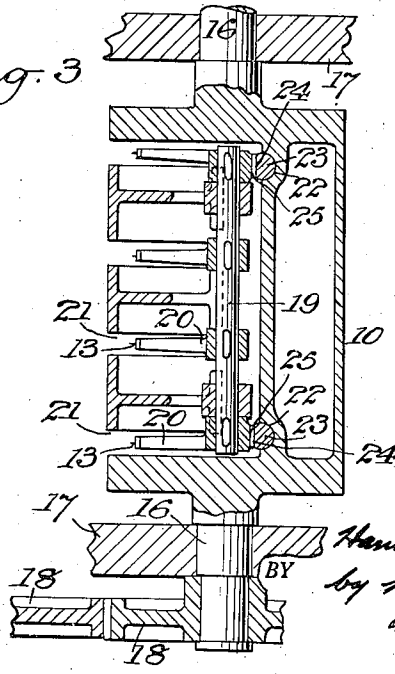
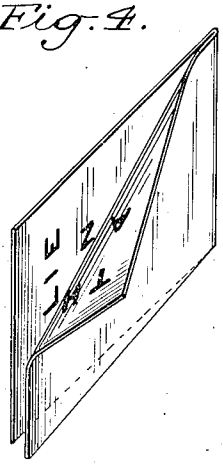


Fig. 4.



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MEANS FOR CUTTING SHEETS OF DIFFERENT LENGTHS FROM TRAVELING WEBS

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Application July 4, 1942, Serial No. 449,822

14 Claims. (Cl. 164—66)

My invention includes a novel means for cuting sheets of different lengths from a traveling web and delivering the sheets of a predetermined length alternately in two directions.

My invention also includes a pair of rotary cylinders having two pairs of successively coacting cutting blades and also two yieldingly mounted sets of impaling pins arranged to successively engage the web as the sheets of a predetermined length are severed therefrom and deliver the sheets in opposite directions to two delivery points.

My invention also includes cushioning means for said sets of impaling pins to eliminate shocks as the pins automatically return to their normal positions when handling sheets of a shorter selected length when they are severed from the traveling web.

A practical embodiment of my invention is represented in the accompanying drawing, in which—

Fig. 1 represents a vertical section through the pair of coacting rotary cutters, the parts being in the positions they assume when handling sheets of the maximum selected length;

Fig. 2 represents a similar view with the parts in the positions they assume when handling sheets of a shorter selected length;

Fig. 3 represents a detail horizontal section taken in the plane of the line 3—3 of Fig. 2, looking in the direction of the arrows; and

Fig. 4 represents a perspective view of one of the folded sheets delivered by the rotary cutters, a portion of one leaf of the sheet being turned back to show the printed matter located on the inside of the two leaves of the folded sheet where the side edges of the sheet are to be stitched to form a bottom fold bag and reversed to bring the printed matter on the outside of the bag.

The means for severing sheets of a predetermined length within wide limits from a traveling web are herein shown as comprising two coacting cutting and delivery cylinders 10, 10 of the proper diameter to handle the longest selected sheets. Each of these cylinders 10 is shown as provided with two diametrically opposed cutting blades 11, 12 arranged, in the present instance, to sever two sheets from the longitudinally folded traveling web during each rotation of the cylinders. Each of these rotary cylinders is also shown as provided with a yieldingly mounted air cushioned set of impaling pins 13, the two sets being arranged to successively engage the traveling web and to convey the sheets severed from the web alternately in opposite directions to deliver the sheets to two delivery points, indicated herein as the bars 14, 14.

Strippers 15, 15 are provided for stripping the sheets from the impaling pins 13 and from the cutting and delivery cylinders for alternately delivering the sheets to the two delivery bars 14, 14.

Each of the rotary cylinders 10 is provided with journals 16, 16 rotatably mounted in the side frames 17, 17, the journals at one side frame being shown as connected by the gears 18, 18 for causing the cylinders to rotate inunison. These cylinders 10 may be driven at a predetermined constant speed from any suitable source of power, not shown herein.

A yielding support is provided for each set of impaling pins 13, which support is shown as a rock shaft 19 disposed axially with respect to its rotary cylinder. The impaling pin carrying arms 20 project radially from the said rock shaft 19 through substantially semi-cylindrical slots 21 in the periphery of the cylinder, to bring the impaling pins slightly beyond the periphery in position to engage the traveling web. A transversely disposed piston chamber 22 is located at each end of the cylinder and it has a piston 23 slidably mounted therein, which piston has a rack 24 which meshes with a sector 25 on the said rock shaft 19, whereby the sliding movement of the piston 23 will swing one set of impaling pins 13 toward and away from the cutting blade 11 on one cylinder and the other set toward and away from the cutting blade 12 on the other cylinder.

The means which I have shown for yieldingly mounting the sets of impaling pins is a coil spring 26 located in each of the piston chambers 22 between a closure cap 27 and one end of the said piston 23.

The cushion which I have provided for preventing each of the pin supports from returning too quickly to its normal position adjacent its cuting blade after the support has been swung away therefrom when handling shorter sheets, is shown herein as the air space formed between the closure cap 28 and the adjacent end of the piston 23.

The means which I have shown in the present instance for feeding sheets of different predetermined lengths to the cutters is shown as including a former 29 over which the traveling web is longitudinally folded; feed rolls 30, 30 and nipping rolls 31, 31 being provided for feeding the web at the required speed according to the length of sheets to be cut therefrom and delivered to the two delivery points.

In operation, when sheets of the maximum length are to be cut from the traveling web and

delivered, as shown in Fig. 1, the speed of the web is the same as the surface speed of the rotary cutters. In this instance the impaling pins will maintain their normal position, adjacent their cutting blade as the cutters are rotated. As the web is carried forward by the impaling pins the strippers 15 strip the sheets from the impaling pins and the cutters as the sheets are severed from the web, and deliver the sheets.

When sheets of a lesser than the maximum length are to be cut from the web and delivered, the speed of the web is correspondingly reduced. This causes the set of impaling pins which engages the web as the preceding sheet is cut therefrom, to yield against the pressure of the spring 26 until the sheet is cut from the web. As the impaling pins return with the sheet to their normal position adjacent their cutting blade, the sheet is stripped from the impaling pins and the cutter. The impaling pins will then engage the web at the proper time, it being understood that in the meantime the impaling pins on the other rotary cutter have carried through their cycle of operations.

To prevent the impaling pins to be returned by the spring 22 at such a high speed as would tend to cause slapping or knocking, I provide the air cushion, hereinbefore described, to control this return speed.

While I have described this cutting mechanism in connection with a longitudinally folded traveling web for cutting bottom folded sheets therefrom, it is to be understood that this mechanism can be equally well employed in cutting non-folded sheets from a traveling web.

It will also be seen that by the use of the cutting mechanism hereinbefore set forth, sheets of different predetermined lengths may be cut from a traveling web without adjustment of the rotary cutters or changing their rotative speed.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention and hence I do not intend to be limited to the particular embodiment herein shown and described, but what I claim is:

1. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including yieldingly mounted sets of impaling pins on said cylinders for alternately engaging the web as the preceding sheets are severed therefrom.

2. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including yieldingly mounted air cushioned sets of impaling pins on said cylinders for alternately engaging the web as the preceding sheets are severed therefrom.

3. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including yieldingly mounted sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, and devices for stripping the alternate sheets from their respective impaling pins and cutters.

4. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including yieldingly mounted air cushioned sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, and devices for stripping the alternate sheets from their respective impaling pins and cutters.

5. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins on said cylinders for alternately engaging the web as the preceding sheets are severed therefrom, and yieldingly mounted supports for the sets of impaling pins.

6. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, and yieldingly mounted air cushioned supports for the sets of impaling pins.

7. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, yieldingly mounted supports for the sets of impaling pins, and devices for stripping the alternate sheets from their respective impaling pins and cutters.

8. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, yieldingly mounted air cushioned supports for the sets of impaling pins, and devices for stripping the alternate sheets from their respective impaling pins and cutters.

9. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, and yieldingly mounted supports for the sets of impaling pins, each support including a rock shaft, arms projecting therefrom and carrying the impaling pins, a piston having a rack and sector connection with the rock shaft and a spring pressing on the piston.

10. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, and yieldingly mounted supports for the sets of impaling pins, each support including a rock shaft, arms projecting therefrom and carrying the impaling pins, a piston having a rack and sector connection with the rock shaft and a spring pressing on the piston, and means for stripping the alternate sheets from their respective impaling pins and cutters.

11. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, and yieldingly mounted air cushioned supports for the sets of impaling pins, each support including a rock shaft, arms projecting therefrom and carrying the impaling pins, a slidable piston having a rack and sector connection with the rock shaft, a spring pressing on the piston and an air cushion for the piston.

12. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are

severed therefrom, and yieldingly mounted air cushioned supports for the sets of impaling pins, each support including a rock shaft, arms projecting therefrom and carrying the impaling pins, a slidable piston having a rack and sector connection with the rock shaft, a spring pressing on the piston and an air cushion for the piston, and means for stripping the alternate sheets from their respective impaling pins and cutters.

13. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, yieldingly mounted supports for the sets of impaling pins, each support including a rock shaft, arms projecting therefrom and carrying the impaling pins, a piston having a rack and sector connection with the rock shaft and a spring pressing on the piston, and devices for stripping the alternate sheets from their respective impaling pins and cutters.

14. A pair of rotary cutters for severing sheets of different lengths from a traveling web and delivering the sheets alternately in two directions, including sets of impaling pins for alternately engaging the web as the preceding sheets are severed therefrom, yieldingly mounted air cushioned supports for the sets of impaling pins, each support including a rock shaft, arms projecting therefrom and carrying the impaling pins, a slidable piston having a rack and sector connection with the rock shaft, a spring pressing on the piston and an air cushion for the piston, and devices for stripping the alternate sheets from their respective impaling pins and cutters.

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