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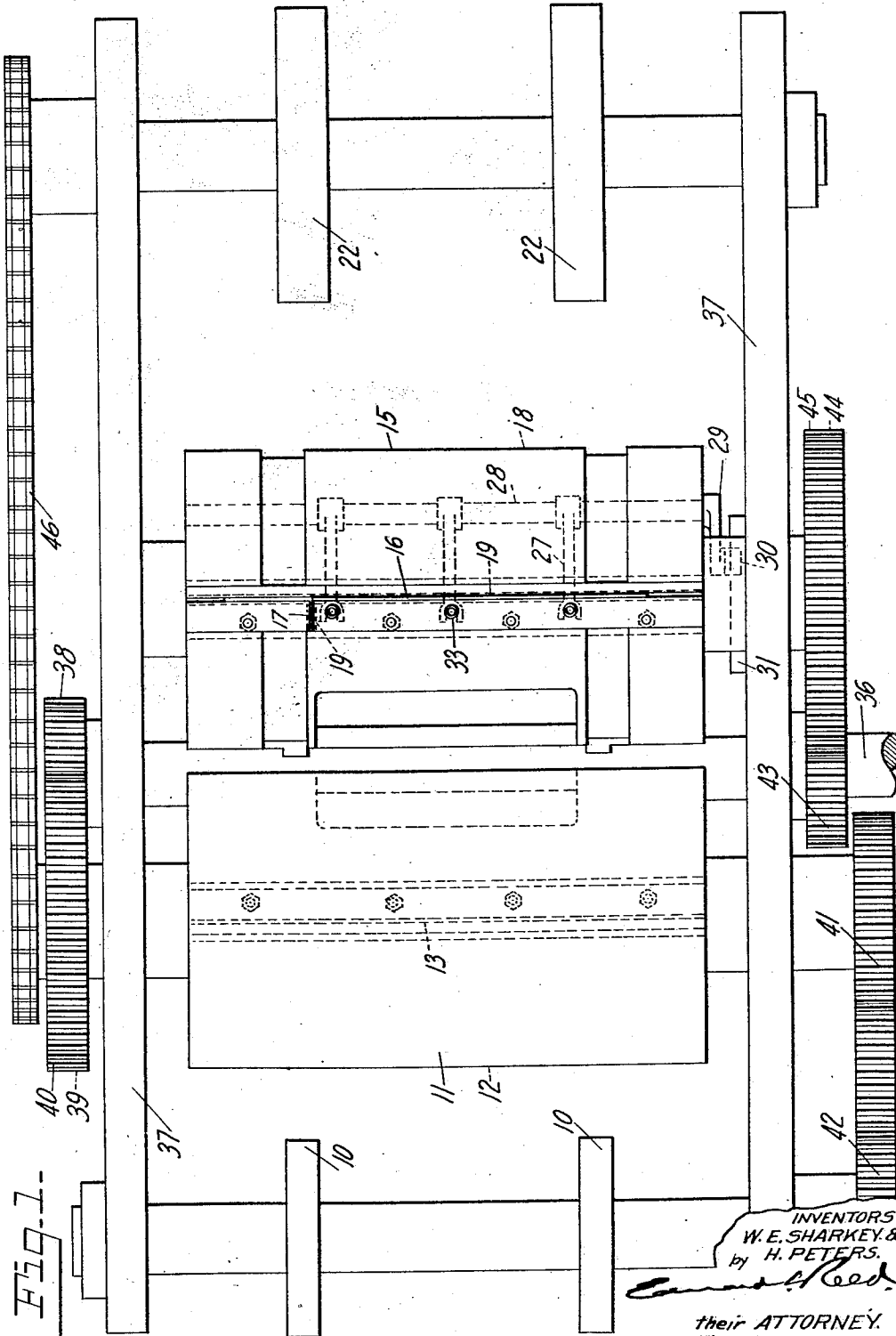
W. E. SHARKEY ET AL

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WEB CUTTING MECHANISM

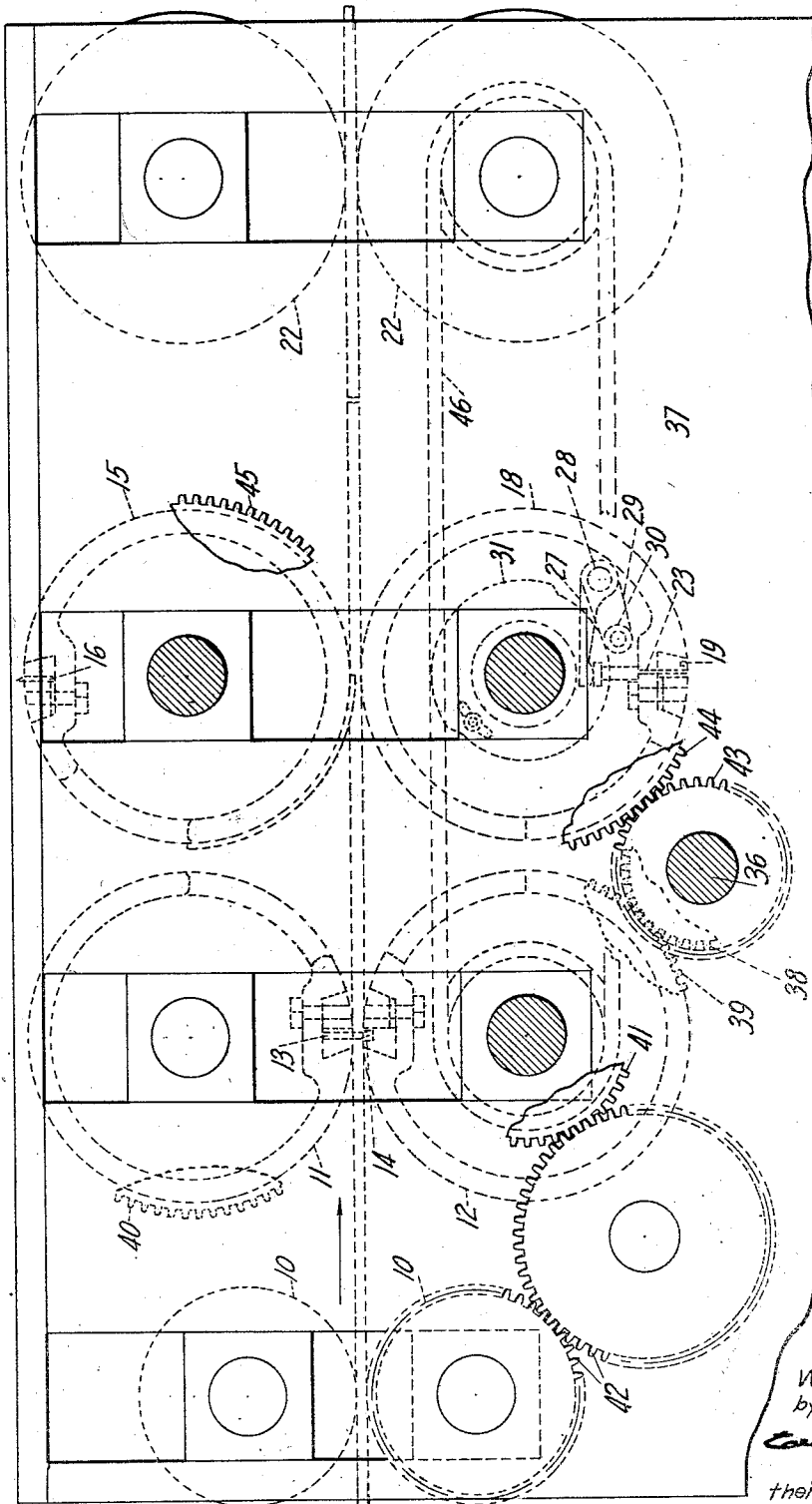
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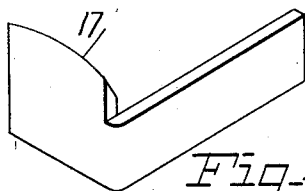
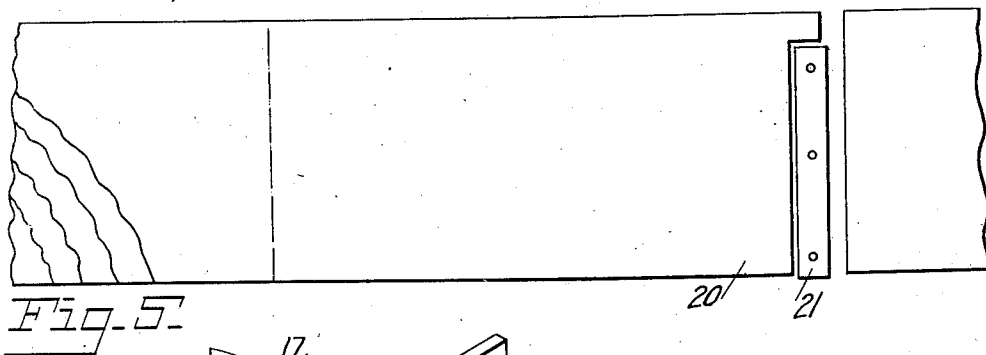
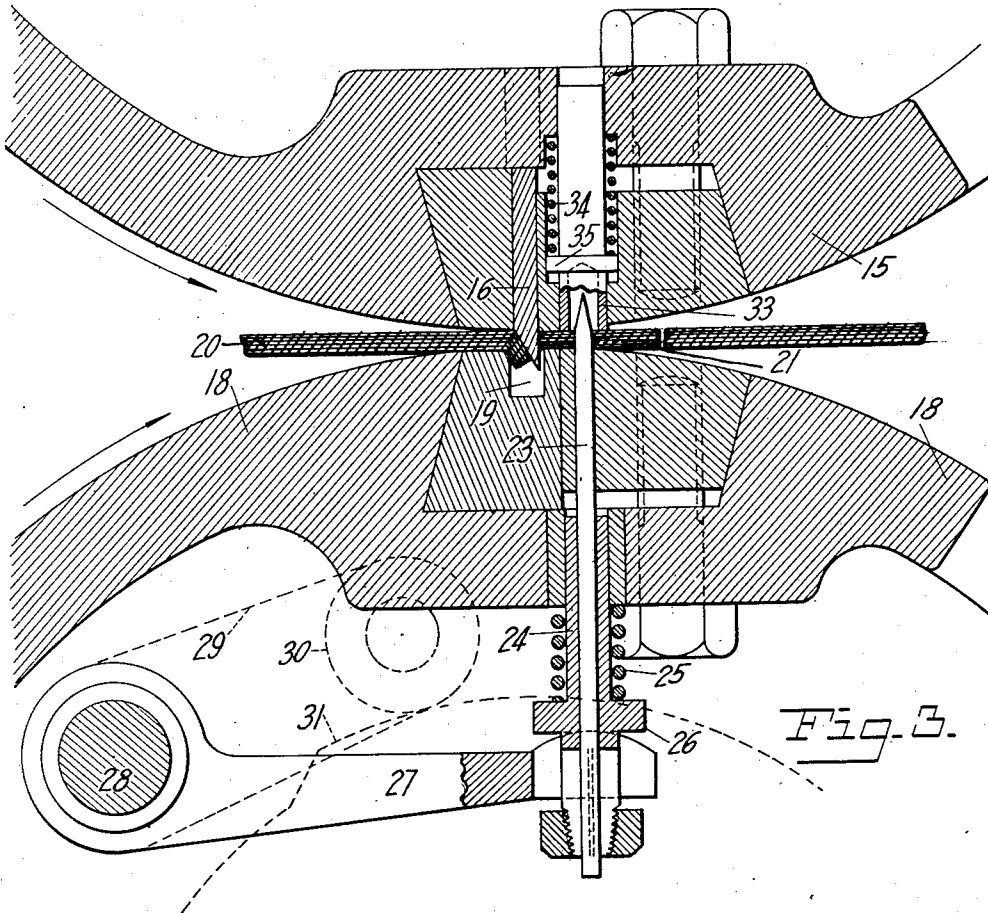
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UNITED STATES PATENT OFFICE

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WEB CUTTING MECHANISM

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13 Claims. (Cl. 164—68)

This invention relates to web cutting mechanism and is designed more particularly for cutting tubular webs into bag lengths or sections and properly shaping the end of each section.

5 In the manufacture of paper bags the web or webs from which the bags are to be formed are folded into tubular form and then severed into bag lengths and when the bag is to be of the valve type one end of the bag section is so cut as to provide the same with a projection or lip at one 10 corner which is subsequently folded in to form the valve.

One object of the present invention is to provide a single cutting mechanism which will operate both to sever the web into sections and to impart the desired shape to the end of each section. 15

A further object of the invention is to provide a cutting mechanism which, upon the passage of the web through the same, will first shape the end of the web and then sever therefrom a section of the desired length. 20

A further object of the invention is to provide such a cutting mechanism with simple but efficient means for removing and discharging that part of the end which is cut away in shaping the end of the section. 25

Other objects of the invention will appear as the mechanism is described in detail.

30 In the accompanying drawings Fig. 1 is a top plan view of a cutting mechanism embodying our invention; Fig. 2 is a side elevation of the same; Fig. 3 is a sectional detail view of the chip removing device; Fig. 4 is a detail view of one of the cutting blades; and Fig. 5 is a plan view of a portion of the web showing the manner in which the same is cut. 35

In these drawings we have illustrated one embodiment of our invention and have shown the same as designed primarily for use on a bag forming machine but it will be understood that the mechanism may take various forms and may be used for various purposes. 40

45 In bag forming machines of the type with which the present embodiment of the invention is designed for use the web or webs of paper are carried from a roll or rolls about folding devices which fold the same to tubular form and which then deliver the folded webs to the cutting mechanism which severs the same into bag lengths. 50 When a multiple wall bag is to be made a plurality of webs, usually four or five, are folded into tubular form one about the other so that the several tubes are nested one within the other and these nested tubes are then delivered to the cutters in flat web-like form. Inasmuch as the character of the web or the manner in which the tubular webs are formed, when the latter are used, are not essential to the invention it is not 55 necessary to show or describe the same. Suffice

it to say that the web, whether tubular or otherwise, is delivered to the cutting mechanism by means of feeding-in or draw rollers 10 which are mounted just in advance of the cutting mechanism. 5

Preferably the cutting mechanism comprises two sets of cutting devices one of which is adapted to sever the web into sections and the other of which is adapted to cut away a part of the end portion of the web to impart the desired shape thereto, the two cutting devices being so 10 timed and operated that the two operations will take place successively as the web moves past the cutting devices. In the form here illustrated each cutting device comprises a pair of 15 cooperating rotary elements and the two devices are arranged one beyond the other in the line of travel of the web. The first cutting device, in the line of travel of the web, is a severing device and it is here shown as comprising 20 an upper rotary cutting element 11 and a lower rotary cutting element 12, arranged to receive the web between them. The upper element is provided with a blade 13 which extends across the full width of the web and is adapted to enter a recess 14 in the lower rotary element to sever 25 the web, the edge of this recess serving as a cutter bar. The construction of the severing cutter does not differ substantially from what is well known. The second cutting device also 30 comprises two rotary cutting elements, the upper rotary element 15 having a blade 16 which extends across the web for a portion only of its length. In the present arrangement, it terminates a short distance from one edge of the web. 35 Mounted on this same rotary element, adjacent to the end of the blade 16, is a short blade 17 which extends circumferentially of the rotary element and lengthwise of the web. The lower rotary element 18 of the second pair of elements 40 is provided with recesses to receive the blades, one of these being shown at 19. The blades of the second pair of cutting elements are so arranged with relation to the web that they will engage the forward end of the web and sever a portion thereof, the transverse blade engaging 45 the web a short distance in the rear of its front end and partially severing a strip of material therefrom, while the short blade operates at the end of the cut of the first mentioned blade to completely sever this strip of material, as shown 50 in Fig. 5, where the reference numeral 20 indicates the web and the reference numeral 21 indicates the severed part of the web.

The two pairs of cutting elements are so arranged with relation one to the other that the second pair will operate to cut away a part of the web at the front end thereof before the first pair of cutting elements operates to sever the web. 55 The severing of the bag section from the web is 60

the last operation in the cutting process and following that operation the end of the web advances past the first pair of cutting elements to the second pair of cutting elements and as the front end thereof reaches the vertical center line extending through the second pair of cutting elements the blades operate to cut away the strip at the front end of the web, as shown at 21. As the web continues to advance the first pair of cutting elements will act thereon to sever the front part of the web from the body thereof and thus form a bag section. The severed bag section passes beyond the second pair of cutting elements but before it is released thereby it is engaged by a pair of feeding-out or delivery rollers 22 which deliver the same onto a conveyor or onto a pile at the end of the cutting mechanism.

It is desirable that that part of the web or section which is cut away by the second pair of cutting elements should be positively removed and for this purpose we prefer to employ a series of pins movably mounted on one of the rotary elements and so actuated that they will pierce the cut away part of the web, or chip, at approximately the time that this chip is severed from the bag section and will carry the same to a point of discharge and then release the chip. In the particular construction here shown three pins 23 are slidably mounted in the peripheral wall of the lower rotary cutting element 18 for substantially radial movement. Each pin is mounted in a sleeve 24 which is also slidably mounted in the rotary element and is acted upon by a spring 25 which tends to retract the same so as to withdraw the point of the pin into its guideway in the rotary element. The sleeve is provided with a grooved collar 26 which is engaged by the bifurcated end of an actuating arm 27 mounted on a shaft 28 journaled in suitable bearings in the rotary element and controlled in accordance with the rotation of the rotary element. In the present instance, a crank arm 29 is rigidly secured to the shaft 28 and has at its free end a roller, or other part 30, which rides over the periphery of the cam 31, rigidly mounted on the frame of the machine, or other suitable support, at the end of the rotary element. This cam is so arranged with relation to the pins 23 and the blade 16 on the rotary element 15 that the roller 30 will engage the high portion of the cam and impart an outward thrust to the several pins at approximately the time that the blade severs the chip from the bag section, thus causing the pins to pierce the chip. The length of the high portion of the cam is such that the pins will remain in their projecting positions until they approach their lowermost positions at which time the roller will pass off the high part of the cam and will permit the pins to be withdrawn by the springs, thereby releasing the chip and permitting it to drop by gravity. The cooperating rotary element 15 is, of course, provided with recesses to receive the points of the pins and in order that the chip may be pressed firmly onto the pin and retained thereon until the pins have moved away from the cooperating rotary element we have mounted in the rotary element 15 a radially movable socket 33, which is acted upon by a spring 34 which tends to force the outer end of the same beyond the periphery of the rotary element 15, this outward movement being limited by a head or collar 35 on the slidable socket. As the sockets and the pins are moved into line the sockets will be forced inwardly so that their inner ends are flush with the periphery of the rotary element

and the pins will be thrust into the sockets. As the rotary elements continue their movement the slidable sockets will be projected and will hold the chip firmly on the pins until it has been fully withdrawn.

The several cutting elements and the feeding rollers may be driven in any suitable manner. As here shown, a main drive shaft 36 extends transversely to the main supporting frame 37 and has secured thereto on one side of the frame a gear 38 which meshes with a gear 39 on the lower rotary cutting element 12 of the first pair and this gear 39 meshes with a gear 40 on the upper rotary element 11 and causes the two rotary elements to rotate in opposite directions. A gear 41 secured to the shaft of the lower cutting element is connected by gears 42 with the feeding-in rollers 10. A second gear 43 on the power shaft 36 meshes with a gear 44 on the shaft of the lower cutting element 18 of the second pair and this gear meshes with a corresponding gear 45 on the upper cutting element 15. The feeding-out rollers 22 are driven by a sprocket chain 46 engaging cooperating sprocket wheels on the shaft of the lower cutting element 12 and on the shaft of the feeding out rollers.

While we have shown and described one embodiment of our invention we wish it to be understood that we do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In a machine for dividing a continuously moving web into sections of predetermined shape, a cutting device arranged to completely sever, on each operation thereof, a portion of the front end of said web and impart a predetermined shape thereto, a separate cutting device mounted to the rear of the first mentioned cutting device to sever said web on a line spaced from the front end thereof, and means for operating said cutting devices in timed relation one to the other.

2. In a machine for dividing a continuously moving web into sections of predetermined shape, two separately mounted cutting devices arranged one beyond the other in the line of travel of said web, the first cutting device having means to sever said web across the entire width thereof, and the second cutting device having means to completely sever upon each operation thereof a portion of said web and impart a predetermined shape thereto, and means for operating said cutting devices in timed relation one to the other, said cutting devices being so arranged and operated that said second cutting device will operate on said web to completely sever said portion thereof before said first cutting device operates thereon.

3. In a machine for dividing a continuously moving web into sections of predetermined shape, a pair of rotary cutting elements arranged to receive said web between them and having means to divide said web into sections, a second pair of rotary cutting elements arranged beyond the first mentioned pair in the line of travel of said web and having means to impart a predetermined shape to the end of said web, said pairs of cutting elements being so arranged that the end of each section will be shaped before that section is severed from the web, and means for operating said cutting elements.

4. In a machine for dividing a continuously moving web into sections of predetermined shape,

two pairs of rotary cutting elements arranged one beyond the other in the line of movement of said web, one cutting element of the first mentioned pair having a blade extending across the full width of said web, one cutting element of the second pair having a blade extending across said web for a portion only of its width and also having a blade extending lengthwise of said web adjacent to the end of the other blade on said cutting element, the blades on the cutting element of the second pair being so arranged with relation to the blade on the cutting element of the first mentioned pair that they will cut away a portion of the front end of said web before said web is severed by the blade of the first mentioned pair of cutting elements, and means for operating said pairs of cutting elements.

5. In a machine for dividing a continuously moving web into sections of predetermined shape, a pair of rotary cutting elements having means for cutting away a part of the forward portion of said web, a second pair of rotary cutting elements having means for severing said forward portion from the web, a chip removing device carried by one element of the first mentioned pair and adapted to engage the cut away part of said web and carry the same to a point of discharge.

6. In a machine for dividing a continuously moving web into sections of predetermined shape, a pair of rotary cutting elements having means for cutting away a part of the forward portion of said web, a second pair of rotary cutting elements having means for severing said forward portion from the web, a chip removing device carried by one element of the first mentioned pair and comprising a radially movable pin, and means for causing said pin to pierce the cut away part of said web and for subsequently withdrawing said pin to release said cut away part.

7. In a mechanism comprising a pair of cooperating rotary cutting elements having means for severing a part of a web of material, a pin mounted on one of said cutting elements for radial movement with relation thereto, means controlled in accordance with the rotation of said cutting element to cause said pin to pierce the severed part of said web at approximately the time that said part is severed from the web and to thereafter cause said pin to be withdrawn to release said severed part of said web, and a yieldable socket carried by the other cutting element to receive the point of said pin and to press said part of said web firmly onto said pin.

8. In a mechanism comprising a pair of cooperating rotary cutting elements having means to sever a part of a web of material, a pin slidably mounted in the peripheral wall of one of said rotary elements adjacent to said severing means, a socket slidably mounted in the other rotary element to receive the point of said pin, and a spring acting on said socket to cause it to press the severed part of said web firmly on said pin.

9. In a machine for dividing a continuously moving web into sections of predetermined shape, a cutting device having means to sever the web across the entire width thereof, a second cutting device arranged beyond the first mentioned cutting device in the direction of travel of said web and comprising a movable support and blades arranged at an angle one to the other and secured

to said support for movement thereby into engagement with that part of the web which has passed said first mentioned cutting device to completely sever a portion thereof upon each operation of said cutting device, and means for operating said cutting devices in timed relation one to the other.

10. In a machine for dividing a continuously moving web into sections of predetermined shape, a cutting device comprising a rotatable supporting member and blades carried by said supporting member and arranged to completely sever a portion of the front end of said web along lines extending lengthwise of and transversely to said web, a second cutting device mounted separately from the first mentioned cutting device to sever said web along a line spaced from the front end thereof, and means for operating said cutting devices in timed relation.

11. In a machine for dividing a continuously moving web into sections of predetermined shape, a cutting device having means to sever the web across the entire width thereof and separate the web into sections, a second cutting device arranged beyond the first mentioned cutting device in the direction of travel of said web and comprising a movable support and blades secured to said support for movement thereby into engagement with each section of said web, said blades being arranged in intersecting relation to completely sever from said web upon each operation of said second cutting device a portion of predetermined shape, and means for actuating said cutting devices in timed relation, said cutting devices being so arranged with relation one to the other and their operation being so timed that said portion will be severed from each section before that section is severed from the web.

12. In a machine for dividing a continuously moving web into sections of predetermined shape, a cutting device comprising a rotatable supporting member, and blades carried by said supporting member and arranged to completely sever from the front end of said web a portion extending transversely to said web a distance less than the width of said web, a second cutting device mounted separately from the first mentioned cutting device to sever said web along a line spaced from the front end thereof, and means for operating said cutting devices in timed relation, said cutting devices being so arranged and operated that said portion will be severed from the front end of said web before the web is severed by said second cutting device.

13. In a machine for dividing a continuously moving web into sections of predetermined shape, a cutting device to completely sever a portion of said web upon each operation thereof, a chip removing device having a part arranged to pierce the severed portion of said web substantially simultaneously with the severing operation and having means to retract said part, a second cutting device mounted separately from the first mentioned cutting device to sever said web on a transverse line spaced to the rear of said severed portion, and means for operating said cutting devices and said chip removing device in timed relation one to the other.

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