

April 29, 1952

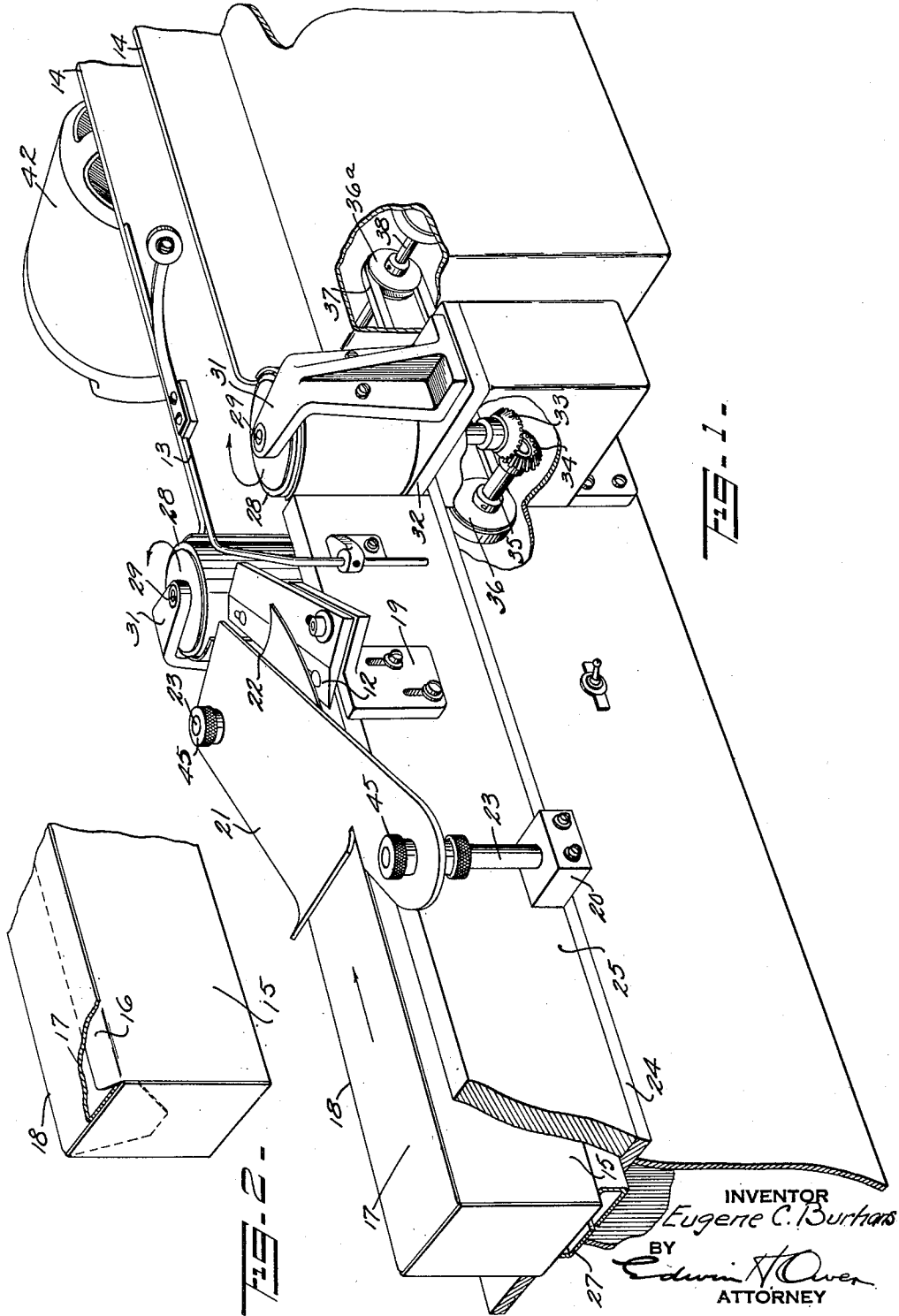
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CARTON OPENER

Filed July 19, 1950

2 SHEETS—SHEET 1



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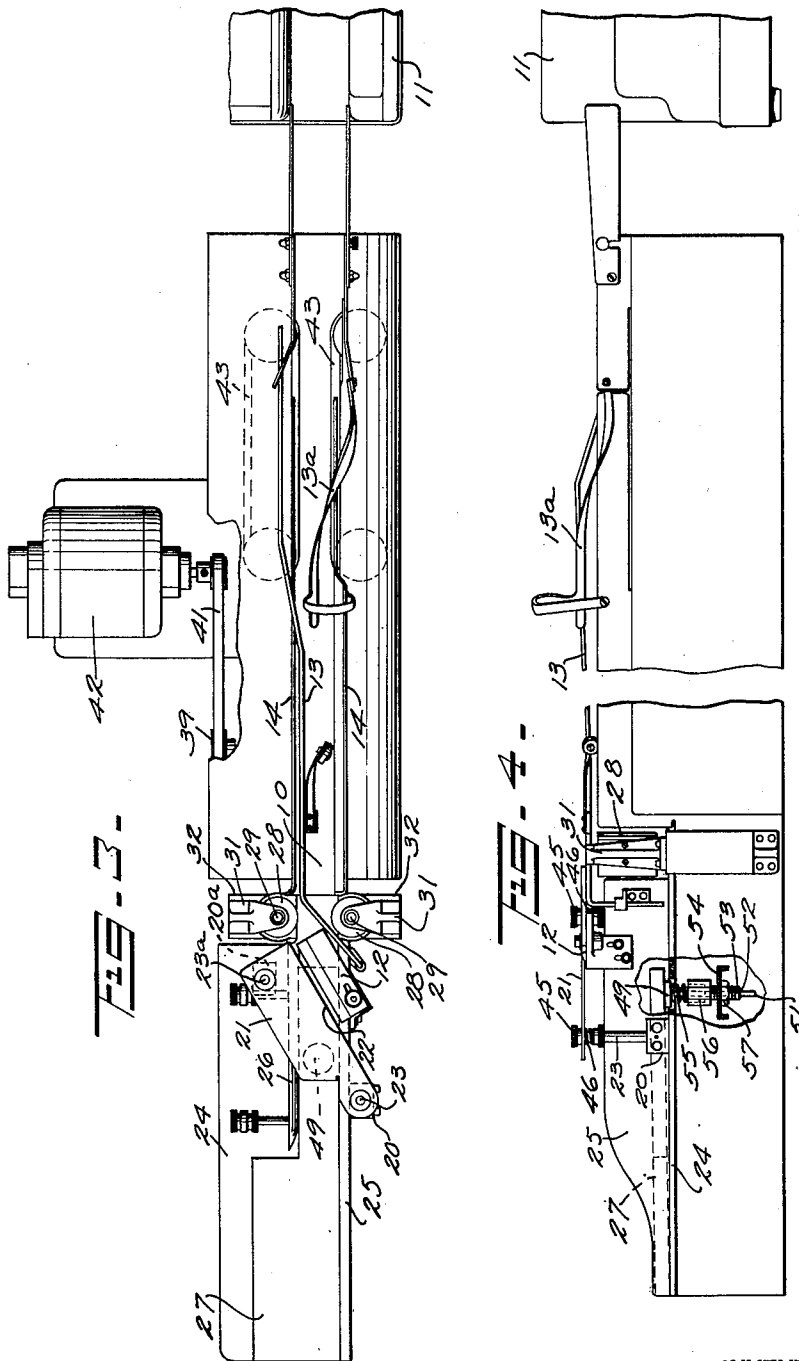
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2 SHEETS—SHEET 2



INVENTOR  
Eugene C. Burhans  
BY  
Edwin H. Owen  
ATTORNEY

# UNITED STATES PATENT OFFICE

2,595,122

## CARTON OPENER

Eugene C. Burhans, Lockport, N. Y.

Application July 19, 1950, Serial No. 174,684

3 Claims. (Cl. 30—2)

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This invention relates to an improvement in a device for mechanically opening cartons of cigarettes to thereby prepare the carton for tax stamping the ends of each package therein, and forms a continuation-in-part of application Serial Number 782,807 which issued as Letters Patent No. 2,574,087 on November 6, 1951.

In the device of the above named application one carton of cigarettes is manually fed to effect the cutting of the leading end of a carton, and a second carton, also manually fed, is moved into engagement with the first carton to push said first carton beyond the cutting knife. While the knife cuts through the trailing end of the first named carton it also enters the leading end of the second carton. Hence, the effort involved in manually moving the second carton while in direct contact with the first carton, produces fatigue of the operator and requires considerable skill to manipulate in effecting cutting of the leading end of the second carton in the precise location required.

In the device of the present invention, means is provided whereby an operator manually moves the carton through improved guide elements when effecting the cutting of the leading end, and thereafter the carton moves under power to effect the breaking of a glued portion between the cover flap and carton wall, also the cutting of the trailing end thereof.

It is the principal object of the invention therefore, to combine with a hand fed carton, means whereby, after an initial carton end cutting operation of one wall is completed, the carton is further driven under power to complete the further cutting of the trailing end of the carton.

It is a further object to include means whereby the vertical relation of the carton to the cutting element is maintained through the application of pressure on the under surface of the carton, and the provision of means to guide the upper wall of the carton close to the edge of the cutting blade.

A preferred embodiment of the invention is disclosed in the accompanying drawings, wherein:

Fig. 1 is a perspective view showing a carton moving within a guide channel in the direction of the arrow, and further shows how a cutting operation is performed on the leading end of the carton, and includes power driven elements positioned to effect the feed of the carton after the cutting of the leading end thereof;

Fig. 2 is a fragmentary perspective view of one end of a carton, with part broken away, and is particularly shown for the purpose of illustrating

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the structure of the carton at the location where cutting is effected;

Fig. 3 is a plan view of the structure shown in Fig. 1 and further includes flap opening elements which further condition the carton by turning the cut wall and cover flap portions back when the carton is fed to a tax imprinting machine; and

Fig. 4 is a side view of Fig. 3 with part broken away to show elements provided for applying pressure to the under surface of the carton.

In general, the device comprises a platform 10 along which cartons are adapted to be moved from a starting position at the extreme left end of Fig. 3 to a stamp imprinting machine, a portion of which is indicated at 11, at the extreme right of Fig. 3. Cooperating with the carton as it passes along the platform 10 is a sharp edged blade or cutting element 12, also wall and flap opening members 13—13a respectively, which bend the wall and flap portions outwardly to expose ends of the packages within the carton as the carton moves along the platform 10. Suitable side guides are provided for the carton, as at 14—14.

When a carton is entered into the machine, it is positioned as shown in Fig. 2, with the part which is normally the cover, located at the forward side as indicated at 15, said cover having a continuing flap portion 16 tucked within the top wall 17, which wall is normally the front wall of the carton. In effecting a cutting operation both ends of the carton are cut through at a position coinciding with the upper surface of the flap 16 and the under surface of the wall 17. The wall 17 is thus free to pivot about the corner indicated at 18.

Cartons also contain glued areas between the cover flap 16 and the inside surface of the wall 17, which become separated as the carton is moved relative to the blade 12.

A channel is provided for the support of the carton during the initial feeding operation and comprises a base 24, having a rigid side wall 25 and an adjustable side wall 26.

The blade 12 is rigidly supported on a bracket 19, secured to the channel wall 25 and has its cutting edge positioned directly in alignment with the under surface of the carton wall 17.

An upper guide 21 is also provided which is positioned so as to engage the upper surface of the wall 17 to maintain the correct relation between the said wall and the cutting edge of the blade 12. Said guide comprises a flat plate having one edge 22 aligned with and arranged close to the cutting edge of the blade 12. The guide

21 is yieldably supported on posts 23—23a being fixed in a block 20 secured to the wall 25, and the post 23a being fixed in a block 20a secured to the base 24.

When inserting a carton, it may be moved either along the base 24 or along the surface of a filler element 27, the latter being provided when standard size cigarettes are contained within the carton, and is removed when the larger King size cigarettes are contained within the carton. The filler element 27 is included in each of the drawings.

After the cutting of the leading end of the carton, means is provided whereby the carton may be fed under power to effect the further operations of breaking of the glue between the flap 16 and under side of the wall 17, also the final cutting of the trailing end of the carton. Said means comprises a pair of rollers 28—28 supported on vertical shafts 29—29, which shafts are supported in suitable bearings provided in brackets 31—31 and base portions 32—32 respectively. Each shaft extends downwardly and has a bevel gear 33 thereon which meshes with a similar bevel gear 34. The bevel gear 34 is carried by a shaft 35, which shaft is driven through a pulley and belt drive 36—36a and 37 respectively. The pulley 36a is mounted on a shaft 38, which shaft continues sideward and has a pulley 39 fixed thereon, as in Fig. 3, the latter pulley being driven through a belt drive 41 from a motor 42.

The rollers 28—28 are positioned relative to the carton so as to frictionally engage the sides of the leading end of the carton after it is moved beyond the blade 12, and are adapted to continue the forward movement of the carton under power along the platform 10 while the members 13—13a engage the wall 17 and flap 16 respectively to swing same outward about their pivot corners. When the carton advances beyond the drive of the rollers 28—28, the movement thereof is continued by a second drive source indicated at 43—43 in a manner fully described in the previously named patent application.

In order to successfully cut through carton after carton, each new carton must approach the blade 12 in the same precise relation to the cutting edge thereof. To accomplish this, the guide plate 21 is carefully adjusted relative to the cutting edge by means of adjusting thumb screws 45—45 against the compression of springs 46—46.

Having determined the position of the guide plate 21 relative to the cutting edge of the blade 12, means has also been provided to apply pressure from beneath each carton to urge the carton against the undersurface of the guide and thereby maintain the required accuracy of position to cut each carton. Referring to Fig. 4, the pressure means comprises a yieldable plunger 47, which comprises a head 49 and stem 51, the stem being slidably mounted within a bearing 52. The bearing comprises a screw 53, having an axial opening therein, within which the stem 51 slides. The screw portion 53 is threaded within a bracket 54 secured to the channel wall 25. A spring 55 is also mounted over the stem 51 and is seated on a hex head portion 56 of the screw 53.

In mounting the screw bearing 53, the screw portion is screwed into the bracket 54 and is locked in place by a lock nut 57. When in said locked position, the head 49 of the plunger projects a predetermined distance above the surface of the channel base 24 and will be depressed when engaged by the lower leading end of the

carton as the carton is inserted in the channel and moved beneath the guide 21. The pressure exerted by the head 49, either directly against the bottom of the carton or indirectly when the filler 27 is used, will assure the desired cutting relation of the blade 12 to the carton.

It is desired to point out that the structure as provided by this invention has resulted in a device which requires a minimum of skill to operate, whereas, the device disclosed in the above named patent application required exceptional operator skill for successful operation.

It is also desired to point out that manual feeding for effecting the initial cutting operation is more desirable than an automatic feed would be. In a carton opening device of this character, wherein the carton is moved against the cutting edge of a blade, and wherein slight variations are frequent in cartons of different brands, the operator control factor is very important. The operator, by the sense of touch, can quickly detect any difficulty encountered and withdraw the carton, whereas, in an automatic feeding operation the feed would continue and mutilate the carton and contents before the feed could be stopped.

Having described the invention, what is claimed is:

1. In a device for cutting the ends of an upwardly disposed front wall of a closed carton containing packages of cigarettes and breaking a sealed portion of the front wall away from the cover flap thereof to thereby prepare the carton for tax stamping the ends of each package therein; the combination of a channel for guiding the carton, a sharp edged blade horizontally positioned in the path of the leading end of the carton, the cutting edge of the blade registering with the lower surface of the uppermost wall of the carton and being adapted to cut through the leading end wall of the carton when the carton is manually forced thereagainst upon being started through the channel, driven feed rollers positioned at each side of the carton adjacent the cutting blade and adapted to engage with the carton after the initial cutting of the leading end wall, whereby the carton is thereafter moved by power to complete the operation of breaking a seal between the cover flap and front wall also the cutting of the trailing end wall, an upper guide extending across and above the channel with the undersurface thereof positioned a distance above the cutting edge of the blade equal to substantially the thickness of the carton wall and with one edge thereof close to the cutting edge of the blade, and adjustable supporting means for said upper guide at each side of the channel to effect vertical adjustment of the guide relative to the cutting edge of the blade.

2. In a device for cutting the ends of an upwardly disposed front wall of a closed carton containing packages of cigarettes and breaking a sealed portion of the front wall away from the cover flap thereof to thereby prepare the carton for tax stamping the ends of each package therein; the combination of a channel for guiding the carton, a sharp edged blade horizontally positioned in the path of the leading end of the carton, the cutting edge of the blade registering with the lower surface of the uppermost wall of the carton and being adapted to cut through the leading end wall of the carton when the carton is manually forced thereagainst upon being started through the channel, driven feed rollers positioned at each side of the carton adjacent

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the cutting blade and adapted to engage with the carton after the initial cutting of the leading end wall, whereby the carton is thereafter moved by power to complete the operation of breaking a seal between the cover flap and front wall also the cutting of the trailing end wall, an upper guide extending across and above the channel with the undersurface thereof positioned a distance above the cutting edge of the blade equal to substantially the thickness of the carton wall and with one edge thereof close to the cutting edge of the blade, adjustable supporting means for said upper guide at each side of the channel, to effect vertical adjustment of the guide relative to the cutting edge of the blade, and a yieldable pressure member engageable by the base of the carton when the carton is moved beneath the guide plate, whereby the upper wall of the carton bears firmly against the guide plate to assure accurate engagement of the cutting blade with the leading carton wall.

3. In a device for cutting the ends of an upwardly disposed front wall of a closed carton containing packages of cigarettes and breaking a sealed portion of the front wall away from the cover flap thereof to thereby prepare the carton for tax stamping the ends of each package therein; the combination of a channel for guiding the carton, a sharp edged blade horizontally positioned in the path of the leading end of the carton, the cutting edge of the blade registering with

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the lower surface of the uppermost wall of the carton and being adapted to cut through the leading end wall of the carton when the carton is manually forced thereagainst upon being started through the channel, driven feed rollers positioned at each side of the carton beyond the cutting blade and adapted to engage with the carton after the initial cutting of the leading end wall, whereby the carton is thereafter moved by power to complete the operation of breaking a seal between the cover flap and front wall also the cutting of the trailing end wall, and means to maintain a constant position of the carton relative to the cutting edge of the blade and comprising an upper guide plate extending across the channel and engageable by the upper surface of the carton to guide the carton relative to the blade, and a yieldable pressure element engageable by the base of the carton when the carton approaches a cutting position to effect upward pressure on said carton against the upper guide plate.

EUGENE C. BURHANS.

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