June 30, 1942. W. F. GRUPE ET AL 2,288,523

DELIVERY MECHANISMS

Filed July 14, 1939 5 Sheets-Sheet 1

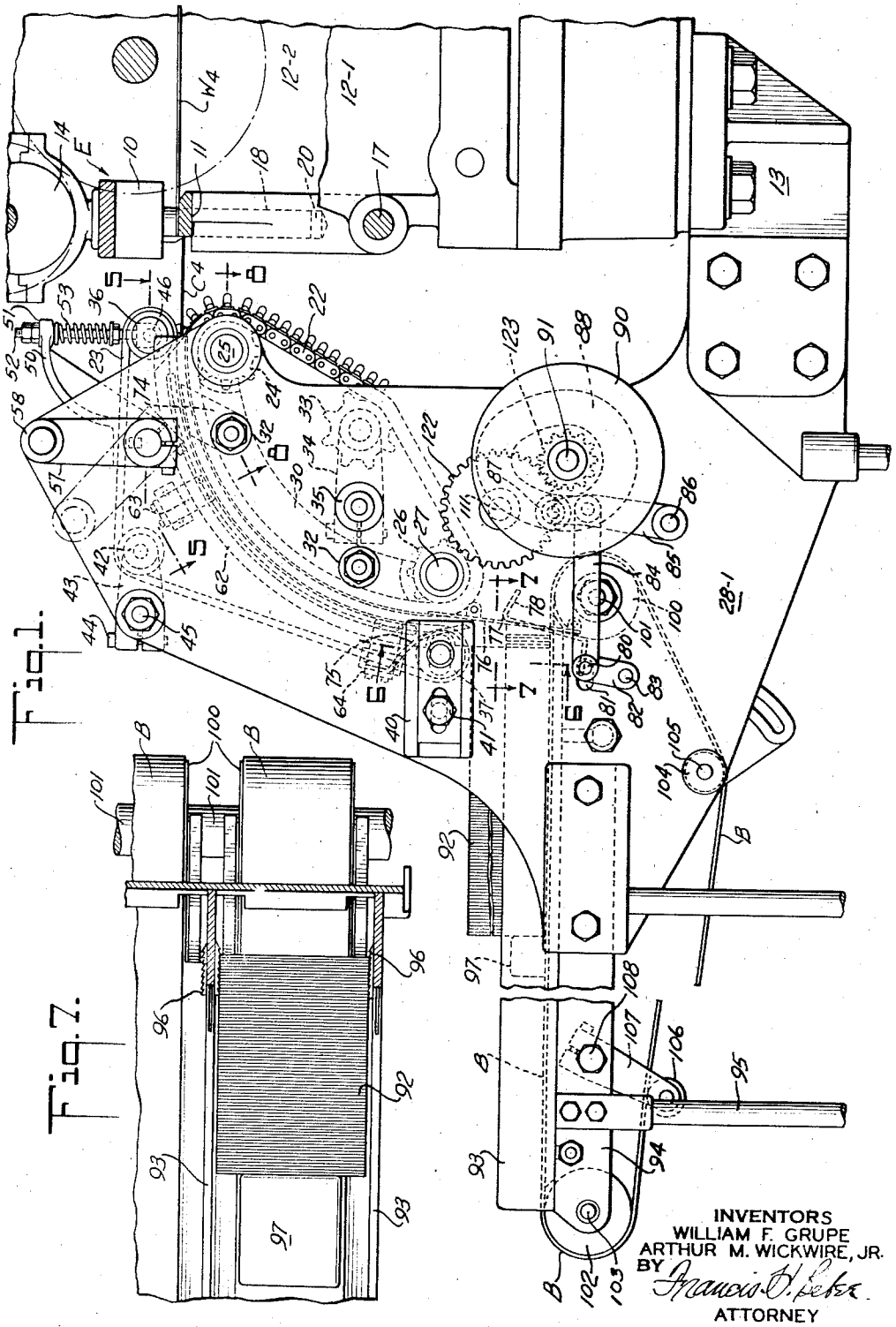


Fig. 1.

Fig. 7.

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DELIVERY MECHANISMS

Filed July 14, 1939 5 Sheets-Sheet 2

Fig. 2.

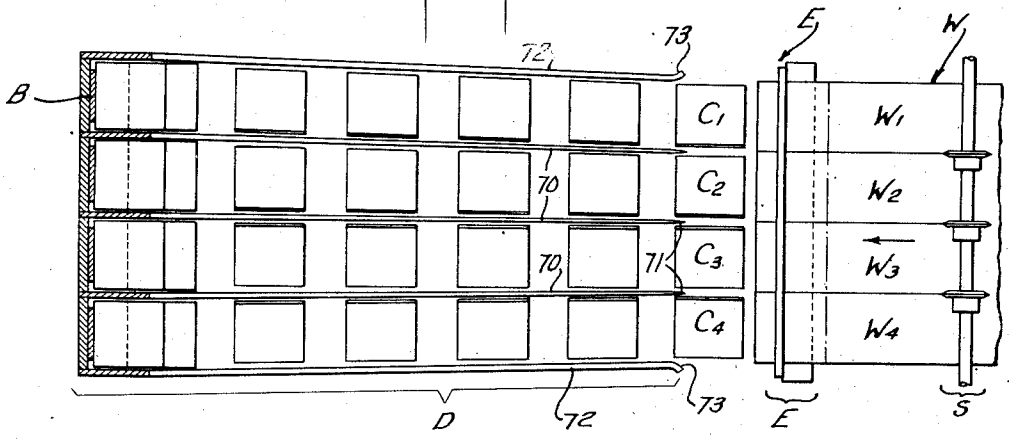
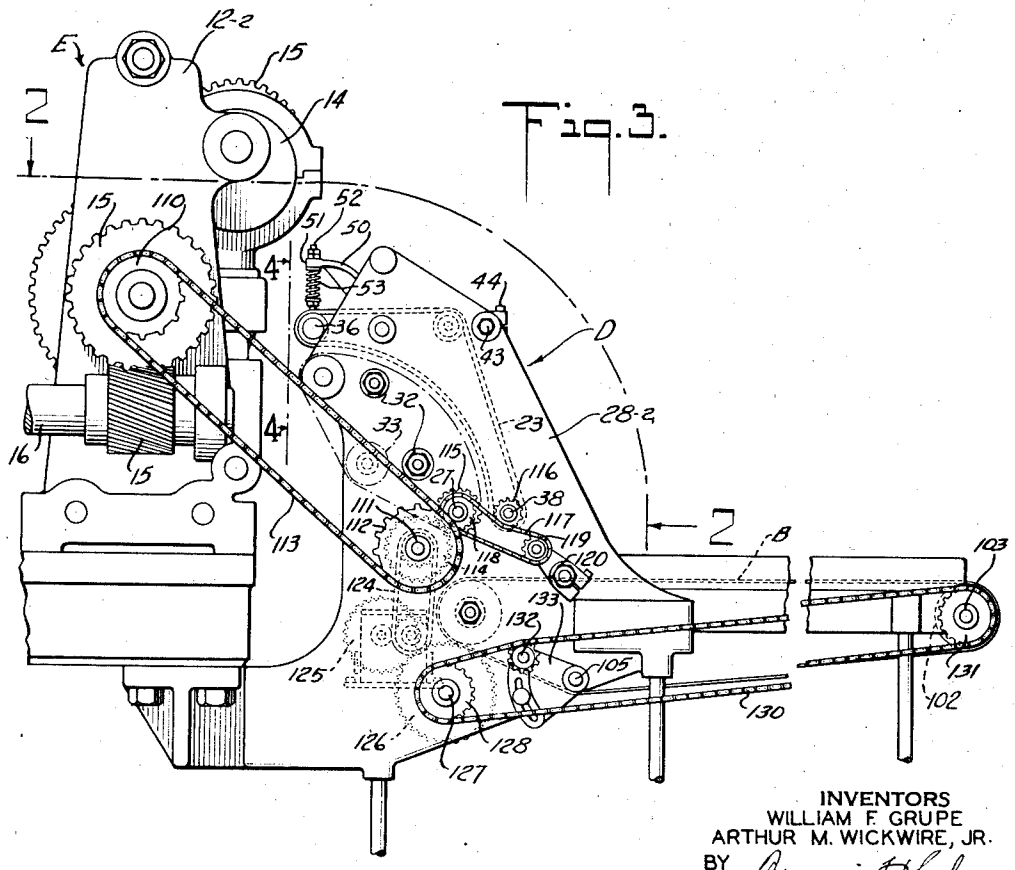


Fig. 3.



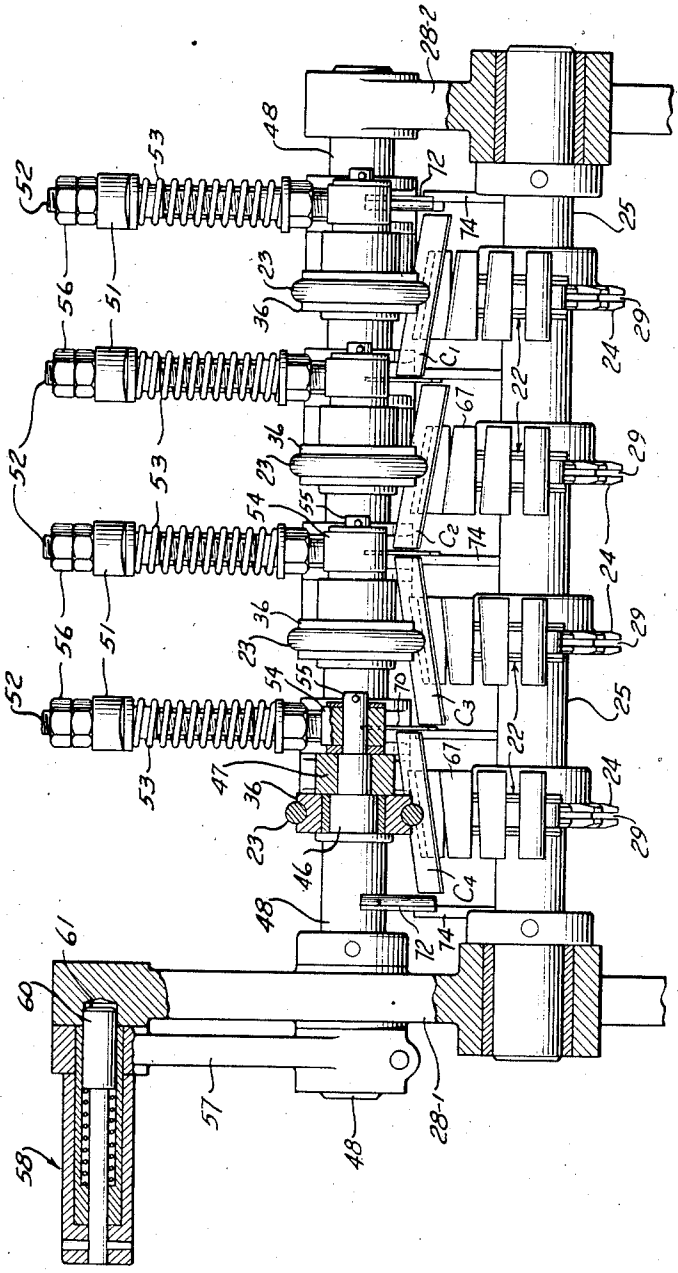
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Filed July 14, 1939 5 Sheets-Sheet 3

Fig. 4.



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DELIVERY MECHANISMS

Filed July 14, 1939 5 Sheets-Sheet 4

Fig. 5.

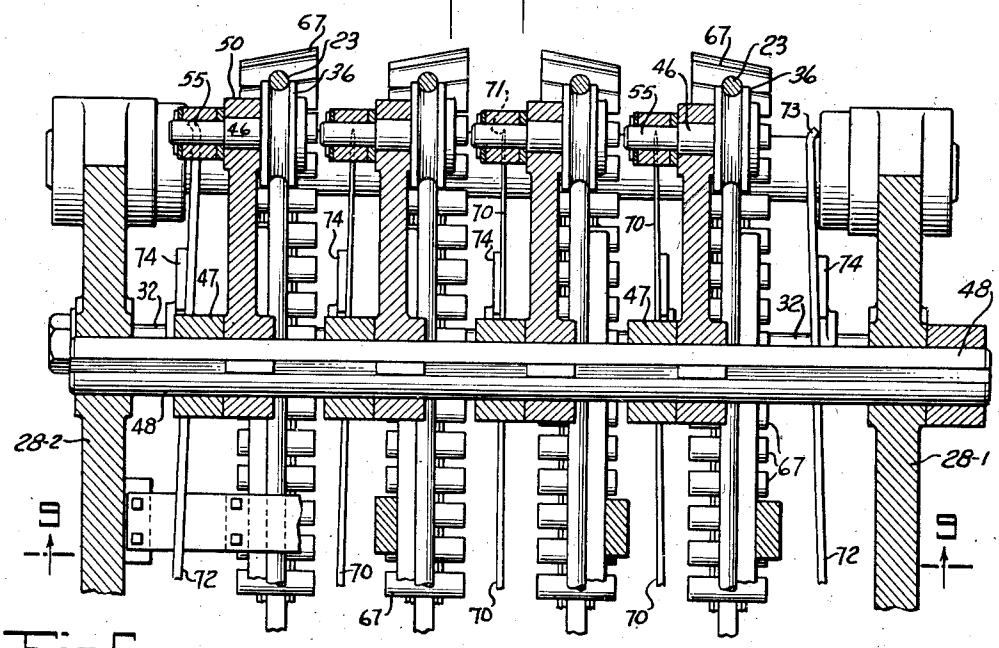
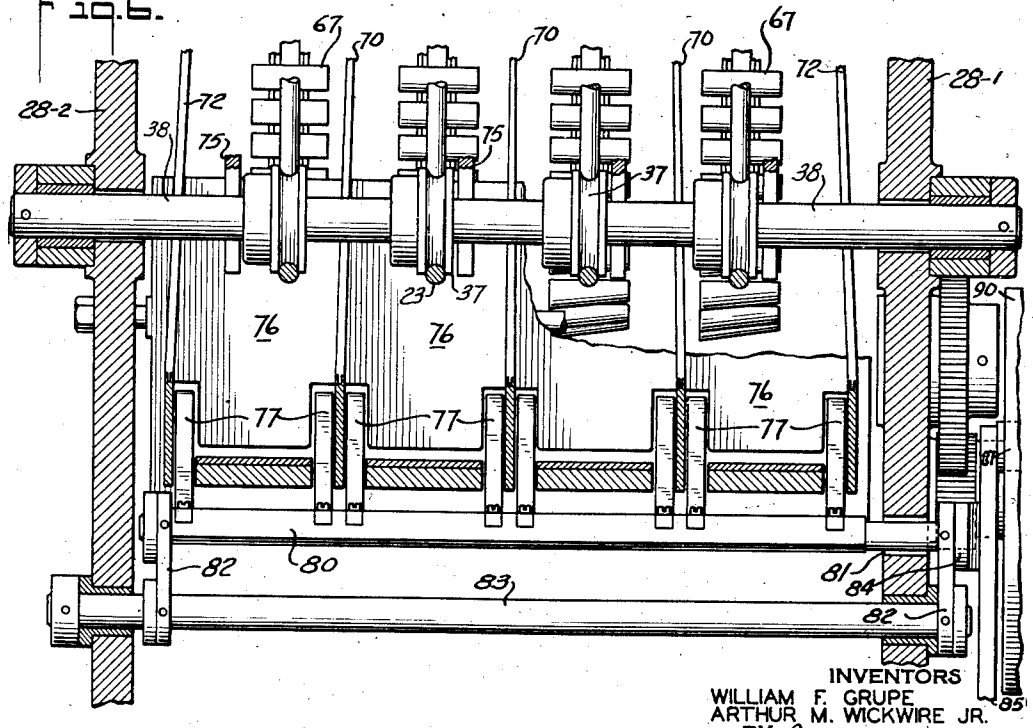


Fig. 6.



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DELIVERY MECHANISMS

Filed July 14, 1939 5 Sheets-Sheet 5

Fig. 8.

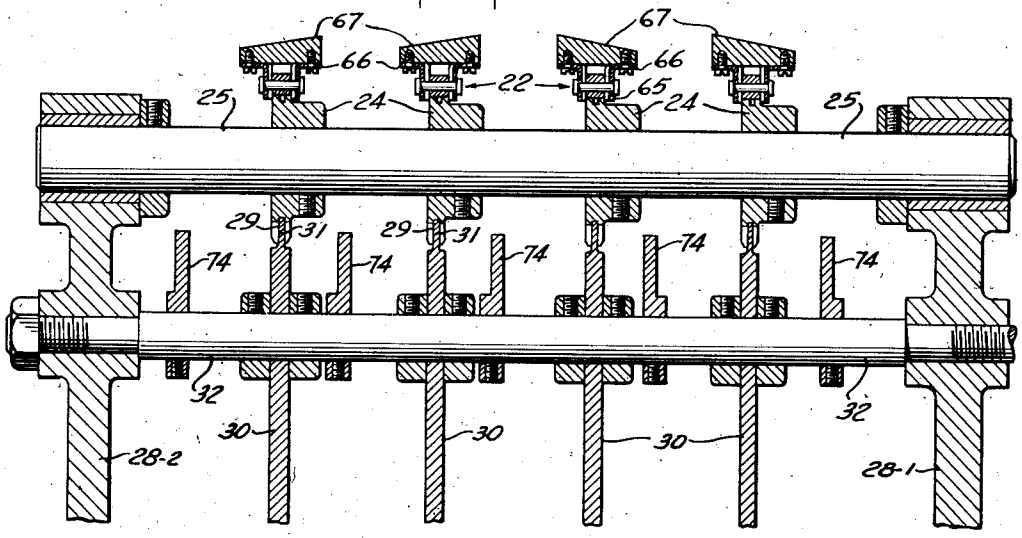
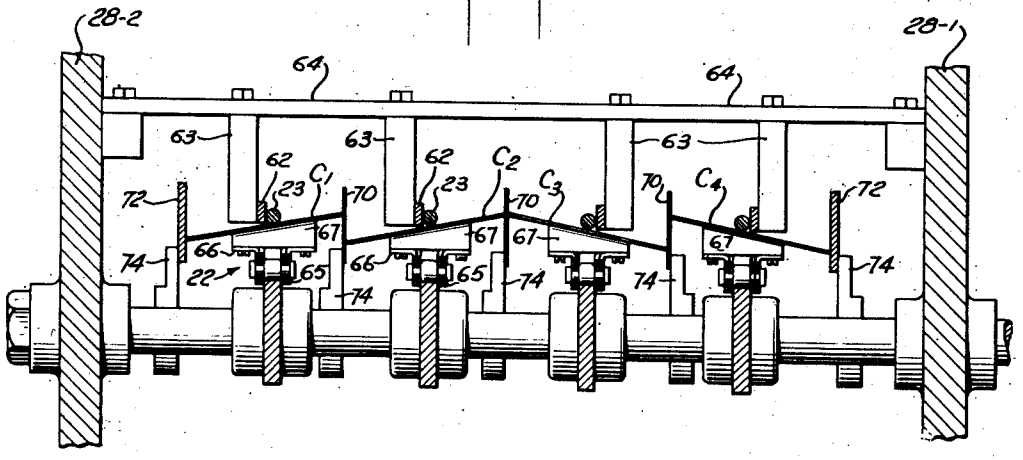


Fig. 9.



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Patented June 30, 1942 2,288,523

UNITED STATES PATENT OFFICE

2,288,523

DELIVERY MECHANISM

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Application July 14, 1939, Serial No. 284,490

14 Claims. (Cl. 271—63)

This invention relates to severing and collating apparatus of the type disclosed in Grupe United States Patent No. 2,012,561, and aims to provide an improved machine for separating laterally contiguous longitudinal rows of individual blanks and stacking the individual blanks of the separated rows into horizontal stacks.

In the Grupe patent referred to above, there is disclosed an apparatus for forming a single row of blanks from a horizontally moving web and stacking the single row of blanks in a horizontal stack wherein the individual blanks are vertically disposed. However, when a horizontally moving web is severed into a plurality of laterally contiguous longitudinal rows of individual blanks, it is necessary to separate the contiguous longitudinal rows in order that each individual row may be properly stacked. Difficulties are regularly encountered in attempting this operation, since it often happens that the contiguous longitudinal rows are not completely severed. Moreover, even though there are no irregularities in the severing operation, due to the fact that the longitudinal rows are contiguous, it is difficult to prevent the individual blanks in one row from being operated upon or entering into the feeding mechanism for an adjacent row. Because of these and other difficulties, all prior attempts to accomplish the operation contemplated by our present invention have not been entirely successful.

We have discovered that by laterally tilting each blank in the contiguous longitudinal rows simultaneously with or immediately after severing, the effective horizontal width of the blanks is shortened so that the rows may be initially separated a sufficient distance for proper handling and further separation and delivery in horizontal stacks wherein the individual blanks are vertically disposed. We have devised an improved apparatus for carrying out this operation and have included in this apparatus improved means for positively moving each separated blank out of the path of the next succeeding blank and into its respective stack.

In accordance with our invention, each blank is gripped substantially simultaneously with the severing operation between a cooperating feeding belt and feeding chain, either of which may include feeding members having sloping upper edges, the degrees of slope in any instance being sufficient to produce the required separation between the contiguous rows of blanks. Being thus initially separated the required distance and properly gripped between the feeding members, the individual blanks are moved in a curved path extending through an arc of substantially 90° so that they may be released from between the feeding members in a substantially vertical position. During this travel over the curved path while gripped between the feeding members, the individual longitudinal rows of blanks may be further separated any desired amount so that, upon being released from the feeding members, the individual blanks will be properly separated for delivery in horizontal stacks. Upon being released from the sloping feeding members, we have found it desirable to provide means for positively advancing each released card or blank into its respective horizontal stack so that it will be completely out of the path of the next succeeding blank released from the sloping feeding members. The means we have provided for this purpose operates in timed relation with the feeding of the individual blanks and is so arranged that each released blank is effectively forced into the forming horizontal stack and there held completely out of the path of movement of the next succeeding released blank which will be subsequently positively moved into the stack. In this manner laterally contiguous longitudinal rows of individual blanks may be effectively separated and delivered in horizontal stacks.

The above and other features and objects of the invention will become apparent upon consideration of the following detailed description of one specific embodiment thereof, and the accompanying drawings, in which:

Fig. 1 is a right side elevational view, partly in section, of one form of apparatus embodying our invention;

Fig. 2 is a diagrammatic plan view showing the formation of the cards or blanks and the path of the formed blanks from the cutter to the stacks, the view being taken substantially along the list 2—2 of Fig. 3;

Fig. 3 is a left side elevational view of the apparatus shown in Fig. 1;

Fig. 4 is a fragmentary elevational view, with certain parts in section, taken substantially along the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary detail sectional view taken substantially along the line 5—5 of Fig. 1;

Fig. 6 is a fragmentary detail sectional view taken substantially along the line 6—6 of Fig. 1;

Fig. 7 is fragmentary detail sectional view taken substantially along the line 7—7 of Fig. 1;

Fig. 8 is a fragmentary detail sectional view

taken substantially along the line 8—8 of Fig. 1; and

Fig. 9 is a fragmentary detail sectional view taken substantially along the line 9—9 of Fig. 5.

Referring now to the drawings, and particularly Fig. 2, it will be observed that a web W of cardboard, paper, or other material being operated upon, is fed from a convenient source of supply (not shown) to a slitter S where it is cut into four contiguous longitudinal sections or strips W_1, W_2, W_3 and W_4, respectively. Prior to the slitting operation, the web may be given any desired treatment such as coating or printing, or the application of a suitable adhesive in the event that the subsequently formed blanks are to be used as portions of containers. After slitting, the strips W_1, W_2, W_3, and W_4 are passed to an eccentric cutter E where they are cut transversely so as to form four aligned and laterally contiguous longitudinal rows of individual cards or blanks C_1, C_2, C_3, and C_4, which, after being cut, or simultaneously with the cutting, are immediately received and gripped by a feeding and delivery mechanism D which is adapted to separate the laterally contiguous rows of individual blanks, move them from their entering horizontal positions to a substantially vertical position and arrange them into four aligned horizontal stacks on a plurality of conveyor belts B. The operation of each of the individual mechanisms is timed with the speed of travel of the web and the subsequently formed individual blanks, so that the said blanks will be properly stacked for removal from the belts B by the attendant or operator.

The cutter E shown in Figs. 1 and 3, may be of any suitable type which is adapted to operate upon and in synchronism with a moving web, the cutter shown in the present instance being similar to that described in the Grupe patent referred to above, to which reference may be made for a more complete description of this mechanism. As indicated, the cutter C comprises an upper forming or cutting element 10 arranged for cooperative action with a lower forming or cutting element 11, both of said elements being supported in suitable side frames 12—1, and 12—2, which are mounted upon a base 13. The upper cutting element 10 is mounted upon an eccentric 14 which is driven by means of any suitable and conventional gearing 15 and a drive shaft 16 which, in turn, may be rotated through any convenient source of power (not shown). The lower cutting element 11 is pivotally mounted upon a shaft 17 and operatively connected with the upper cutting element 10 by means of rods or pins 18 carried by said upper element and adapted to reciprocate in sockets 20 provided in said lower cutting element. Due to the eccentric mounting of the upper cutting element 10, it will be apparent that said element will reciprocate up and down and also move forward with the web for cutting action with the lower element 11, which, because of the sliding connection provided by the pin 18 and sockets 20 will oscillate back and forth about the pivot 17. In this manner, the cutting of the individual blanks takes place simultaneously with the movement of the web and without any interruption thereof.

As the individual blanks C_1, C_2, C_3 and C_4 are formed by the eccentric cutter E, they are immediately and simultaneously gripped by the feeding mechanism of the delivery and stacking unit D, which forms the subject matter of our present invention. It will be noted that the blanks C_1, C_2, C_3 and C_4 are in an aligned transverse row and that the longitudinal rows of individual blanks are laterally contiguous as they leave the cutter E and pass to the delivery and stacking unit D, which will now be described in detail.

As shown in Figs. 1 and 4, each of the individual blanks C_1, C_2, C_3, and C_4 is tilted to produce the desired separation between the individual blanks and gripped between an endless feeding chain 22 and a cooperating endless feeding belt 23 simultaneously with the cutting operation performed by the eccentric cutter E. The method and means for producing the desired separation of the laterally contiguous blanks and insuring their proper feeding and further separation will be described more fully hereinafter. Each feeding chain 22 passes around an upper sprocket wheel 24 mounted upon a shaft 25 and a lower sprocket wheel 26 mounted upon a shaft 27, said shafts 25 and 27 being rotatably mounted in left and right side frames 28—1 and 28—2 respectively, suitably secured to the base 13 and otherwise supported in any convenient manner. The working reach of each chain 22 is guided in a uniformly curved path, extending through an arc of substantially 90°, by means of a curved guiding plate or track 30 having a reduced outer edge portion 31 which is adapted to project into correspondingly shaped slots 29 provided in the teeth of the sprocket wheels 24 and 26 (see Fig. 8). These guiding plates 30 extend from the upper sprocket wheel 24 to the lower sprocket wheel 26 and may be supported by means of suitable supporting rods or members 32. Tension in the feeding chain 22 is maintained and may be adjusted by means of idler sprockets 33 rotatably mounted on arms 34 adjustably secured to a shaft 35 so that by rotating said arms or the shaft 35 the tension in the feeding chain 22 may be increased or decreased, as desired.

The endless feeding belts 23, cooperating with the feeding chains 22, may be of any desired construction, but preferably comprise either leather, composition rubber or spring belts which are substantially circular in cross-section. Each of these belts runs around an upper throw-off pulley 36, suitably located adjacent the upper sprocket wheel 24, and a lower guide pulley 37 rotatably mounted on a shaft 38 which is journalled in slidable supporting blocks 40. Said blocks 40 are adjustably mounted in the side frames 28—1 and 28—2 and held in proper adjusted position by means of lock nuts 41. Similarly to the feeding chains 22, the desired tension may be maintained in the cooperating feeding belts 23 and adjusted by means of idler pulleys 42 rotatably mounted on arms 43 which are adjustably mounted, by means of set screws 44, on a shaft 45. Consequently, either by rotating the shaft 45 or individually rotating the arms 43 on said shaft the tension in the feeding belts 22 may be suitably adjusted. Each throw-off pulley 36, referred to above, is rotatably mounted on a stub shaft 46 (Fig. 4) supported by an arm 47 movably mounted upon a throw-off shaft 48. In order to allow for any increased thickness passing between the feeding belt and feeding chain, as might be caused by mill joints in the blanks or by the accidental simultaneous feeding of more than one blank, the mounting of the throw-off pulleys may be made resilient by the provision of an upwardly curved arm 50 keyed to the shaft 48 adjacent to arm 47 and having a lug 51 at the upper end thereof. Any elongated adjusting screw 52 having an adjustable tension

spring 53 mounted thereon extends through an opening provided in the lug 51 and downwardly to a collar 54 formed integral therewith and mounted upon a reduced portion 55 of the stub shaft 46, said elongated adjusting screw being held in proper position by means of nuts 56 on the upper end thereof. With this construction, if any increased thickness passes between the feeding belt 23 and the feeding chain 22, the arm 47 and the associated stub shaft will raise upwardly causing a compression of the associated spring 53.

Arms 47 and 50 and all of the parts associated therewith are held in proper operative position, as shown in Figs. 1 and 4, by means of an arm 57 mounted on the shaft 48 outside of the frame 28—1 and having a spring plunger lock handle 58 at the upper end thereof. The plunger 60 of said handle 58 registers with an opening or socket 61 provided in the side frame 28—1 when the arms 47 and 50 are in operative position. It will be apparent that by releasing the plunger 60 and turning the handle in a counter-clockwise direction, the entire throw-off mechanism may be moved to the inoperative position shown in dotted lines in Fig. 1. This permits a rapid release of the belts in the event that any of the cards become accidentally caught or otherwise impeded in their passage through the apparatus.

While the belts 23 are in operative relation with respect to the associated feeding chain, they may be maintained and guided in proper position with respect to the cards or blanks fed there-beneath by means of curved guiding strips 62 (Fig. 9) secured to brackets 63 mounted on transverse supporting members 64. Said supporting members 64 may be secured to the side frames 28—1 and 28—2 in any convenient manner. In Fig. 9, it will be noted that the guides 62 are arranged adjacent the associated feeding belts 23, which are substantially circular in cross-section, and act to maintain said belts substantially centrally above the cooperating feeding chains and approximately in alignment with the sprocket wheels.

As mentioned above, when operating upon a plurality of contiguous longitudinal rows of blanks, it is important to separate the contiguous rows prior to or simultaneously with their feeding into the delivery unit D, and we have found that this may be accomplished by tilting the individual blanks as they enter the feeding mechanism of the delivery unit. To effect this tilting of the individual blanks, each of the feeding chains 22, which comprises a conventional chain including links 65, has mounted upon each link, by means of brackets 66, a feeding block 67, as shown in Figs. 8 and 9. It will be noted that the upper edge of the feeding blocks 67 for the blanks C_1 and C_2 slope downwardly toward the right hand side frame 28—2, while the upper edges of the feeding blocks 67 for the blanks C_3 and C_4 slope downwardly toward the left hand side frame 28—2. Thus, by being gripped between the sloping edges of the feeding blocks and the cooperating feeding belt, the blanks will be tilted upon entering the delivery unit, and such tilting will cause the proper amount of separation between the adjacent longitudinal rows of blanks since the angle of slope of the upper edge of the feeding block 67 is sufficient for this purpose.

Upon being gripped and tilted in this manner the blanks are moved downwardly to proper position for delivery in individual aligned stacks composed of cards or blanks arranged in vertical position, as indicated in Fig. 1. During their travel between the feeding belts and the feeding blocks associated with the chains 22, the blanks are guided in channels formed by separators 70, having knifed edges 71 at the entrance ends thereof, and end or outside guides 72 provided with curved portions 73 at their entrance ends. This construction insures proper guiding of the cards into their respective channels, and the knife edges 71 provide proper separation of the cards in the event of any slight failure or lack of complete cutting by the slitter S. It will be noted that the outer guides 72 and the adjacent separators 70 are fanned outwardly (Fig. 2) from the center separator 70 to cause the blanks engaged by the feeding means to be separated further one from another before they are released for stacking and delivery. The separators 70 and the end guides 72 are rigidly supported at their upper ends by means of suitable brackets 74 secured to the upper supporting rod 32. The lower ends of the guides 72 and separators 70, however, are held in proper position by a plurality of resilient guide fingers 75 (Figs. 1 and 6) secured to the lower supporting member 64. These fingers are also curved inwardly and downwardly, as shown in Fig. 1, and serve to prevent the cards from falling forward when they are released from between the belts and cooperating feeding blocks. At the point where the cards are released from the feeding blocks, a backing plate 76 is provided so that the released blanks or cards may slide downwardly over this plate in a substantially vertical position.

In order that a released blank may be moved forward, or to the left as shown in Fig. 1, out of the path of the next succeeding card or blank and into the stacker, we have provided an automatically operating card advancing and stacking device which will now be described. Referring to Figs. 1 and 6, it will be seen that a plurality of upwardly projecting stacking or advancing fingers 77, having angularly bent upper ends 78, are secured to a transverse supporting member 80 which, at its right hand end, projects through a slot 81 provided in the side frame 28—1 and is mounted in upwardly projecting arms 82. The arms 82 are pivotally mounted on a shaft 83 and the arm which is at the right hand side of the unit and outside of the frame 28—1 is connected at its upper end by a link 84 to the central portion of a cam rider arm 85 which is pivotally connected by means of a stub shaft 86 to the frame 28—1. At its upper end the rider arm is provided with a cam follower roller 87 which is adapted to ride in a cam groove 88 provided in a cam 90 mounted on a stub shaft 91. The shape of the internal cam groove 88 and the speed of movement of the stub shaft 91 are such that each time a blank is released from the feeding mechanism the advancing fingers 77 will be moved forward with a sudden positive movement to force the blank into a stack 92 which is forming upon the conveyor belts B. After the released blank is properly positioned in the stack 92, the cam movement causes the advancing fingers to be moved back to the Fig. 1 position ready for the next succeeding blank. It will be noted that the angularly bent upper ends 78 of the fingers 77 will prevent any released card from dropping behind the fin-

gers 77, should they be released before said fingers have returned to the Fig. 1 position.

In Figs. 1 and 7 it will be seen that the stack 92 consists of a plurality of blanks C vertically disposed upon one of the belts B and maintained in proper lateral position upon the belt in collector troughs formed by means of guide walls 93 secured to a suitable frame 94 which projects outwardly from the side frames 28—1 and 28—2 and is supported by means of vertical legs 95. To maintain the stack 92 in proper longitudinal position upon the belt B and prevent the blanks adjacent the feeding mechanism from being released, angular ratchet teeth 96 may be provided on the guide walls 93. These serve to maintain the blank advanced by the fingers 77 in proper position in the stack. The forward end of the stack 92 is maintained in proper position by means of a weight 97 resting on the belt B.

A conveyor belt B is provided for each of the longitudinal rows of blanks formed by the cutting and severing mechanism described above. These belts are of the endless type and the working portions thereof are maintained in a substantially horizontal position and pass about rollers 100 mounted on a shaft 101 fixed in the side frames 28—1 and 28—2. This shaft 101 is positioned to the right of the advancing fingers 77 which are arranged between the various conveyor belts so that said belts may provide a support for the cards as they are released from the feeding mechanism. The belts also pass about driven rollers 102 mounted on a shaft 103 journalled in the frames 94. Additional guiding rollers 104 rotatably mounted on a shaft 105, and tension rollers 106 rotatably mounted in the ends of adjusting arms 107 may be provided for further guiding and controlling the belts B. Arms 107 are adjustably mounted on a shaft 108 which is supported by the frames 94. The speed of travel of the belt is controlled directly by the driven shaft 103 and is such that the stacks 92 of blanks are progressively increased in size as the blanks are delivered thereto; that is, the speed of the belts is correlated with the speed of delivery of the vertically disposed blanks.

As mentioned above, the speed of travel of the web, the speed of the eccentric cutter E, and the speed of the delivery and stacking apparatus D are all correlated with one another. The various moving parts of the delivery and stacking apparatus may be driven directly from one of the rotating shafts of the gearing 15 for actuating the eccentric cutter E. Thus, a sprocket 110 is provided on one of these rotating shafts for transmitting rotative power to a main drive shaft 111 through a sprocket 112 and chain 113. Main drive shaft 111 is journalled in the side frames 28—1 and 28—2, and, as shown in Fig. 3, is connected by a gear 114 to a gear 115 mounted on shaft 27, which is the lower sprocket shaft for the feeding chain 22, and thereby causes said chain to be moved at the desired speed. For moving the cooperating feeding belts 23 in timed relation with the feeding chains 22, a sprocket 116 is provided on the lower shaft 38 for said belt and is rotated by means of a chain 117 which passes around a sprocket 118, also mounted on the shaft 27, and a sprocket 119 mounted on the end of an adjustable arm 120.

In order that the advancing fingers 77 may be actuated in accordance with the speed of delivery of the blanks, the main drive shaft 111 extends beyond the side frame 28—1 and is provided with a gear 122 which meshes with a gear 123 mounted on the stub shaft 91 for the cam member 90 (Fig. 1). Finally, the conveyor belts B are operated at proper slower speeds by means of a chain and sprocket drive 124 (Fig. 3) which connects the main drive shaft 111 and a speed reducer 125 conveniently arranged between the side frames 28—1 and 28—2. The driving gear of the reducer 125 is connected by a gear 126 mounted on a shaft 127 for rotating a sprocket 128 also mounted on said shaft. An endless chain 130, which runs around the sprocket 128 and a sprocket 131 mounted on the driven shaft 103, causes the shaft 103 to move the conveyor belt B at the desired speed. Adjustments may be made in the tension of the chain 130 by means of an idler sprocket 132 mounted on an adjusting member 133 which is pivoted upon the shaft 105.

From the foregoing description, it will be apparent that by our present invention we have provided an apparatus for separating laterally contiguous longitudinal rows of individual blanks and stacking said blanks in separated rows of horizontal stacks. While we have shown, in the specific embodiment selected for illustration, a unit for operating upon four laterally contiguous rows of blanks, it will be apparent that the principles of our invention may be embodied in apparatus for use in conjunction with any number of rows of such blanks. Moreover, various changes may be made in the construction, and certain features thereof may be employed without others, without departing from the invention or sacrificing any of its advantages.

What we claim is:

1. Apparatus for delivering a plurality of laterally contiguous longitudinal rows of individual blanks, in horizontal stacks, comprising means for gripping said blanks as they are formed and tilting each gripped blank about its longitudinal axis so as to cause the laterally contiguous rows to be initially separated, means for moving the gripped blanks through paths for further separating the longitudinal rows and releasing the thus separated blanks, and means for stacking the released blanks in horizontal stacks wherein the individual blanks are vertically disposed.

2. Apparatus for delivering a plurality of laterally contiguous longitudinal rows of individual blanks, in horizontal stacks, comprising means for gripping and tilting the formed blanks about their longitudinal axes so as to cause the laterally contiguous rows to be initially separated; means for moving the gripped and tilted blanks to a position for delivery and releasing them in such position; and means for positively moving each released blank into a horizontally disposed stack.

3. Apparatus for delivering a plurality of laterally contiguous longitudinal rows of individual blanks, in horizontal stacks, comprising feeding means arranged in substantial alignment with each row of blanks and adapted to receive the blanks and move them to position for delivery in horizontal stacks, means associated with said feeding means for tilting each blank about its longitudinal axis and thus causing the laterally contiguous rows to be separated one from another, and means for positively moving each blank in delivery position into a horizontally disposed stack before the next succeeding blank is moved to delivery position by the feeding means.

4. Apparatus for deliverying a plurality of laterally contiguous rows of individual blanks in spaced horizontal stacks, comprising means for gripping said blanks in each row and tilting each

gripped blank about its longitudinal axis so as to cause the laterally contiguous rows to be initially separated, means for moving each gripped blank to a position for delivery and there releasing said blank, means for positively moving each released blank into a horizontally disposed stack, and means for maintaining the delivered blanks in proper position in their respective stacks.

5. Apparatus for delivering a plurality of laterally contiguous rows of individual blanks in spaced horizontal stacks, comprising cooperating feeding members for each row of blanks arranged to grip and move the blanks and release them in a vertical position, said feeding members including means for tilting each blank about its longitudinal axis and thus causing the contiguous rows of blanks to be initially separated one from another; and means for positively moving each released blank into a horizontally disposed stack.

6. Apparatus for delivering a plurality of laterally contiguous rows of individual blanks in spaced horizontal stacks, comprising a feeding chain having feeding members with sloping edges and a cooperating feeding belt for each row of blanks, said feeding chain and belt being adapted to grip the blanks as they are formed, tilt said blanks so as to cause the contiguous rows to be initially separated, and move the separated blanks to a position for delivery and there release them; and means for positively moving each released blank into an aligned horizontally disposed stack.

7. Apparatus for delivering a plurality of laterally contiguous rows of individual blanks in spaced horizontal stacks, comprising a feeding chain and a cooperating feeding belt for each row of blanks including means for tilting the blanks about their longitudinal axes to cause the rows to be initially separated; means for guiding said chains and cooperating feeding belts through diverging paths which are arranged to cause the rows of blanks to be laterally separated one from another for delivery; and means for moving the blanks fed by each of said chains and feeding belts into a horizontal stack of blanks aligned therewith.

8. Apparatus for delivering a plurality of laterally contiguous rows of individual blanks in spaced horizontal stacks, comprising blank feeding means for each row of blanks including a feeding chain and a cooperating feeding belt arranged in gripping relation therewith, said feeding belt having a resilient mounting at the point where the blanks are initially gripped and the links of said chain having sloping upper edges so that the laterally contiguous blanks will be separated when gripped by the feeding means; and means for moving the blanks from a position adjacent the outlet of said feeding means into an associated horizontal stack.

9. Apparatus for delivering a plurality of laterally contiguous rows of individual blanks in spaced horizontal stacks, comprising blank feeding means for each row of blanks including a feeding chain and a cooperating feeding belt arranged in gripping relation therewith, the links of said chain having sloping upper edges so that the laterally contiguous blanks will be separated when gripped by the feeding means; and means for releasing the feeding belts from their gripping relation with the feeding chains.

10. Apparatus for delivering a plurality of laterally contiguous rows of individual blanks in spaced horizontal stacks, comprising blank feeding means for each row of blanks including a feeding belt and a cooperating feeding chain arranged in gripping relation therewith and including means for causing the laterally contiguous blanks to be initially separated when gripped, the working reach of each blank feeding means extending through an arc of substantially 90° so that the blanks may be released in a vertical position; and means for moving the released blanks in each separated row into an associated horizontal stack.

11. Apparatus for delivering a plurality of laterally contiguous longitudinal rows of individual blanks, comprising means for gripping and tilting the formed blanks about their longitudinal axes so as to cause the laterally contiguous rows to be initially separated; means for moving the gripped and tilted blanks to a position for delivery and releasing them in such position; and means for collecting the thus released blanks at the delivery position.

12. Apparatus for delivering a plurality of laterally contiguous longitudinal rows of individual blanks, comprising means for tilting the formed blanks about their longitudinal axes so as to cause the laterally contiguous rows to be initially separated; means cooperating with such tilting means for moving the tilted blanks to a position for delivery and releasing them in such position; and means for collecting the thus released blanks at the delivery position.

13. Apparatus for delivery a plurality of laterally contiguous rows of individual blanks, comprising a feeding chain having feeding members with sloping edges and a cooperating feeding belt for each row of blanks, said feeding chain and belt being adapted to grip the blanks as they are formed, tilt said blanks so as to cause the contiguous rows to be initially separated, and move the separated blanks to a position for delivery and there release them; and means for collecting the thus released blanks at the delivery position.

14. Apparatus for delivering a plurality of laterally contiguous rows of individual blanks, comprising blank feeding means for each row of blanks including a feeding chain and a cooperating feeding belt arranged in gripping relation therewith, the links of said chain having sloping upper edges so that the laterally contiguous blanks will be separated when gripped by the feeding means; and means adjacent said blank feeding means for collecting the blanks as they are released thereby.

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