

Feb. 16, 1954

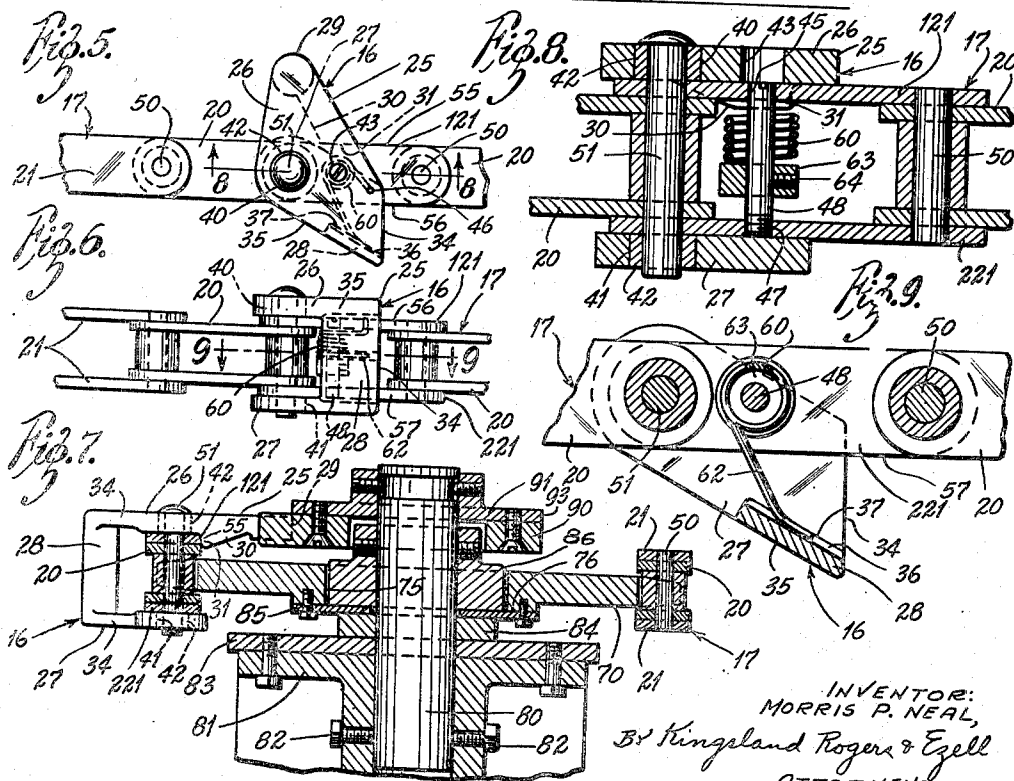
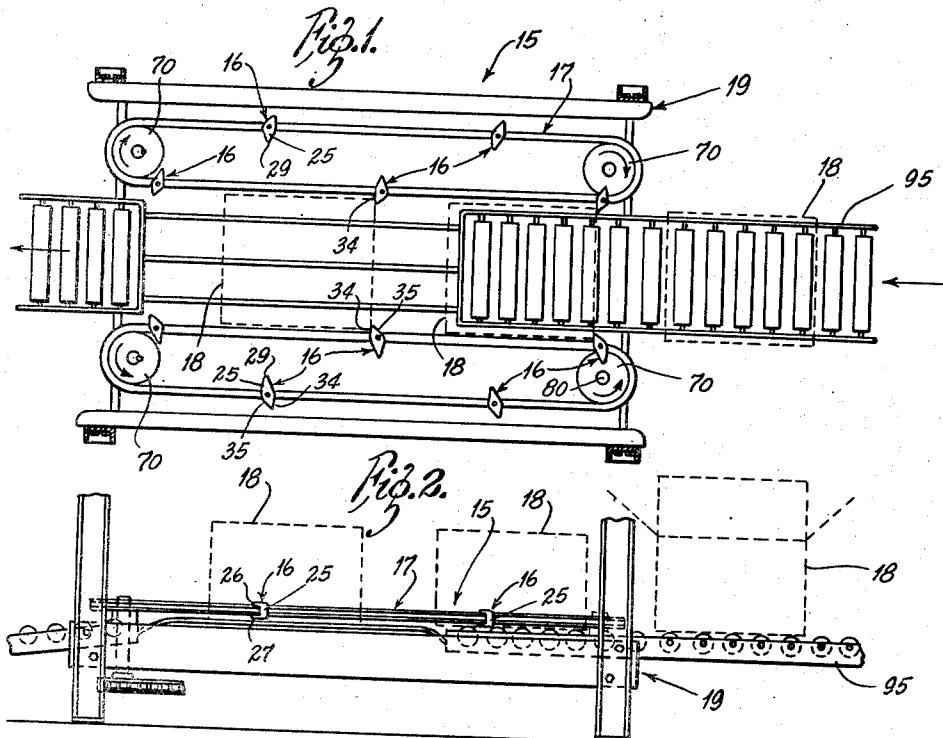
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COLLAPSIBLE LUG CONTAINER FEED CONSTRUCTION

Filed April 2, 1951

2 Sheets-Sheet 1



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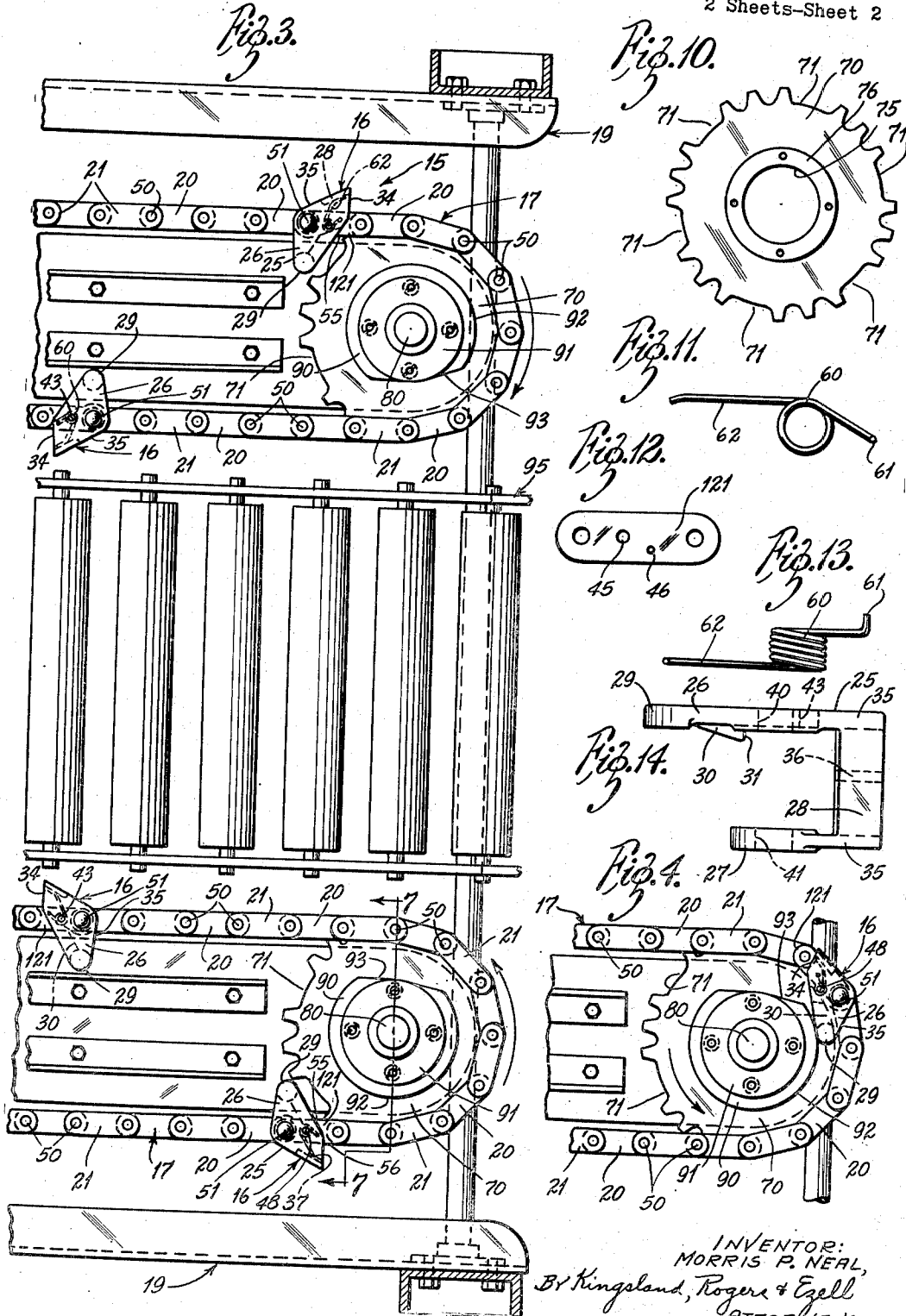
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UNITED STATES PATENT OFFICE

2,669,342

COLLAPSIBLE LUG CONTAINER FEED
CONSTRUCTIONMorris P. Neal, Quincy, Ill., assignor to A-B-C
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10 Claims. (Cl. 198-164)

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The present invention relates generally to feed constructions, and more particularly to novel feed constructions for moving cartons and the like without damage to cartons and without jamming or damaging the construction.

In summary, the present novel feed construction includes a novel collapsible lug assembled with a movable link chain and biased to a normal operating position wherein a face portion of the lug extends away from and at right angles to the chain to provide a pushing surface to propel containers and the like, such as through various types of processing or handling machines. The lug is collapsible with respect to the chain, thus eliminating the possibility of damage to the container when the relative positions of the container and the lug are such that the sides of the container rather than the rear end is contacted by the lug. In the particular adaptation illustrated herein, the chain is continuous and a cam arrangement is provided for automatically collapsing the lugs as it passes around a sprocket at the carton receiving end of the feed construction, which eliminates the possibility of the angular approach of the lug toward the carton, or the like, causing damage thereto.

It is an object of the present invention to provide a novel feed construction including a collapsible lug assembled with a link chain which is biased to a normal operating position in which it is adapted to engage the rear end of a carton, or the like, for propelling the same in the direction of movement of the chain.

It is another object of the invention to provide a novel collapsible feed lug for assembly with a link chain or the like which is biased into a position for pushing engagement with a carton, but which, upon contact with the sides of a carton, will be depressed or folded to a position wherein relative movement between the chain and the carton will not cause damage to the latter.

It is another object to provide a novel feed construction including a chain and a plurality of spaced propelling lugs connected thereto which are collapsible in a manner to permit the pushing of a carton therepast in one direction but not in the other.

It is another object to provide a novel feed construction comprising a sprocket assembly and spaced collapsible lugs connected to said chain in which said lugs are automatically depressed while passing around one of the sprockets.

Other objects are to provide a feed construction including a collapsible lug construction which is relatively inexpensive to manufacture

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and to assemble with a link chain, which may be cam operated at predetermined points in its path of travel, and which is simple and dependable in its operation of engaging and propelling cartons or the like.

The foregoing and other objects and advantages are apparent from the following description taken with the accompanying drawings, in which:

Fig. 1 is a diagrammatic top plan view of a carton flap sealing machine incorporating a feed construction by which cartons or the like are propelled therethrough which is constructed in accordance with the teachings of the present invention;

Fig. 2 is a side elevational view thereof;

Fig. 3 is an enlarged fragmentary top plan view thereof showing additional details of two sprocket and chain assemblies forming a part of said novel feed construction and constructed in accordance with the teachings of the present invention;

Fig. 4 is an enlarged fragmentary top plan view showing a collapsed lug passing around a sprocket;

Fig. 5 is a further enlarged fragmentary top plan view showing the collapsible lug of the present invention biased to its normal position in respect to the chain with which it is assembled;

Fig. 6 is a fragmentary side elevational view of the structure of Fig. 5;

Fig. 7 is an enlarged sectional elevation taken generally along the line 7-7 of Fig. 3, showing the manner in which a cam and a sprocket may be mounted on an idler shaft;

Fig. 8 is a fragmentary enlarged sectional elevation taken generally along the line 8-8 of Fig. 5, showing details of the collapsible lug construction;

Fig. 9 is an enlarged fragmentary sectional plan view taken generally along the line 9-9 of Fig. 6, showing additional details of the collapsible lug construction;

Fig. 10 is a bottom plan view of a removed sprocket;

Fig. 11 is a top plan view of a removed torsion spring;

Fig. 12 is a top plan view of a removed link plate;

Fig. 13 is a side elevational view of the removed torsion spring of Fig. 11; and

Fig. 14 is a side elevational view of a removed lug member.

Referring to the drawings more particularly by reference numerals, 15 indicates generally a

feed construction built in accordance with the teachings of the present invention and incorporated as part of a diagrammatically illustrated carton flap sealing machine 19 (Fig. 1). The feed construction 15 includes collapsible lugs 16 assembled with a link chain 17 for engagement with cartons 18 for propulsion through the machine 19.

The link chain 17, with which a plurality of collapsible lugs 16 are assembled, is preferably of the roller type in which riveted link assemblies 20 are connected by pairs of link plates 21, as best shown in Fig. 6. This type of chain is well known, and the addition of the collapsible lug 16 of the present invention thereto requires the removal of certain parts, the reworking of others, and the addition of elements, as will appear.

Each collapsible lug 16 includes a lug member 25 which embraces a portion of the chain 17 (Figs. 5, 6, 8, 9 and 14). This lug member 25 may be of any appropriate metal and may be cast, forged, or otherwise formed to the shape as shown in the several views of the drawing. Thus, the lug member 25 is seen to comprise parallel upper and lower plate sections 26 and 27 connected by a yoke section 28. As best shown in Fig. 5, the upper plate section 26 differs from the lower plate section 27 in that it is extended to include a cam engaging portion 29 having a depending lug-like portion 30 forming a perpendicular offset face 31. Both the upper plate section 26 and the lower plate section 27, the shape of the latter being best shown in Fig. 9, include straight forward edge portions 34 adapted to extend perpendicularly to the chain 17 when the collapsible lug 16 is in its normal biased position, as will appear. It will also be observed from Fig. 5 that the forward edges 34 are perpendicular to the plan of the face 31 of the lug-like portion 30. Additionally, the upper and lower plate sections 26 and 27 each have an outwardly disposed edge portion 35 which is rearwardly inclined toward the chain 17 when the lug 16 is in its normal biased position.

The yoke section 28 connecting the upper and lower plate sections 26 and 27 may be plate-like in form, and has a groove 36 formed in an inner face 37 intermediate the upper and lower sections 26 and 27 and parallel thereto (Figs. 9 and 14). Coaxial bores 40 and 41 are formed in the upper and lower plate sections 26 and 27, respectively, and each receives a press-fitted bushing 42, as best shown in Fig. 8. Additionally, the upper plate section 26 contains a hole or aperture 43 for a purpose to be described.

In preparing the chain 17 to receive a lug 16, one of the link plates 21 is reworked to incorporate therein a relatively large aperture 45 and a relatively small aperture 46 to form a special link plate 121 (Fig. 12). Similarly, the link plate 21 which is opposite to the special link plate 121 is reworked to incorporate therein a threaded aperture 47 so as to form a special link plate 221, as best shown in Fig. 8. It will be observed that the threaded aperture 47 in the special link plate 221 is coaxial with the aperture 45 in the special link plate 121 so as threadedly to receive a pin 48 inserted through the aperture 45 and extending between the special link plates 121 and 221.

With the special link plates 121 and 221 formed as described, an appropriate chain pin similar to the pin 50 in Fig. 8 may be withdrawn and the lug member 25 emplaced so as to embrace the plates 121 and 221, and a special pin 51 substituted for the withdrawn pin. It is to be noted

that, in the depicted embodiment, the lug member 25 including the bushings 42 is pivotable on the special pin 51, as are also the several engaged elements of the link assembly 20, the pin 51 being retained by press-fitted engagement with the special link plates 121 and 221, respectively. Thus mounted, the lug member 25 is clearly movable from a propelling position, as best shown in Figs. 5 and 9, to a collapsed position, best shown in Fig. 4, the propelling position being determined by abutment of the face 31 of the lug-like portion 30 with an edge 55 of the special link plate 121 and the collapsed position being determined by flush abutment of the inner surface 37 of the yoke section 28 with both an opposite edge 56 of the special link plate 121 and with an edge 57 of the special link plate 221.

A torsion spring 60, formed as clearly shown in Figs. 11 and 13, is mounted on the pin 48 with a bent portion 61 inserted in the relatively small aperture 46 in the special link plate 121 and with a substantially straight portion 62 disposed in the groove 36 in the yoke section 28 of the lug member 25. A collar 63 secured to the pin 48 by means of a setscrew 64 retains the spring 60 in appropriate position adjacent the special link plate 121. Thus mounted, the spring 60 is effective to bias the lug member 25 to its propelling position, as previously described. It will be observed that the access hole 43 in the upper plate section 26 of the lug member 25 facilitates the insertion of the pin 48 after the lug member 25 is itself assembled with the chain 16.

To accommodate the pin 48, the spring 60 and the collar 63 of the collapsible lugs 16, two sprockets 70, having a tooth pattern, as clearly depicted in Fig. 10, are provided for each chain 17, and the several collapsible lugs 16 associated with each chain 17 are spaced a predetermined number of links apart so as to cause these said parts disposed between the plates 121 and 221 to be disposed in one of the several wide spaces 71 as each lug 16 moves around a sprocket 70. In the depicted embodiment, each sprocket 70 has a tooth pattern based upon a total of 24 teeth, with each fourth tooth being removed down to the root circle, and the collapsible lugs 16 are spaced fourteen links apart in the chain 17. With the chain pitch such as to span two adjacent teeth of the sprocket 70, the spaces 71 are in position to accommodate the aforementioned parts of the lugs 16 as the latter passes around the sprocket.

Of the two sprockets 70 employed for each chain 17 used in the machine 19, one drives the chain 17 and the other acts as an idler. Thus, each sprocket 70 may have a relatively large bore 75 and an adjacent bolt face 76, the latter being adapted to receive an adapter (not shown) for connection with a rotatable shaft where the sprocket 70 acts in a driving capacity.

When the sprocket 70 is used as an idler, it may be mounted as clearly shown in Fig. 7 wherein a stationary shaft 80 is mounted in a shaft support 81 and rigidly secured therein by means of setscrews 82. As is clear from Fig. 7, a bearing plate 83 resting on an upper face of the support 81 mounts a spacer 84, of brass or the like, which, in turn, supports a retainer 85 secured by bolts to the bolt face 76 of the sprocket 70. A retaining collar 86 is disposed within the bore 75 of the sprocket 70 and is secured to the shaft 80 by setscrews. The retainer 85 is rotatable between the spacer 84 and collar 86, thus provid-

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ing for free rotation of the sprocket 70 about the shaft 80.

It is desirable that the collapsible lugs 16 be in collapsed positions as they approach and move into the path of travel of the containers 18 to avoid possible puncture of out of position cartons through a normal angular approach. This is achieved as is best shown in Figs. 4 and 7. A cam member 90 of phenolite or the like is secured to a cam hub 91 appropriately secured to the shaft 80. As is clear from Fig. 4, the cam contacting portion 29 of the lug members 25 will engage an arcuate edge 92 of the cam 90 during the travel of the lug member 25 around the sprocket 70. As each lug 16, however, arrives in position properly to engage a container 18, the cam contacting portion 29 reaches a substantially flat edge portion 93 of the cam 90, thereby permitting the spring 60 to bias the lug member 25 to its propelling position.

Operation

As is evident from the foregoing description, the collapsible lug 16 is automatic in its operation in that it is continuously biased towards its propelling position. During predetermined portions of its path of travel, however, as for example, in its passage around the sprocket 70 in approaching the path of travel of the containers 18, it may be caused to assume a depressed or non-propelling position by the cam action above described. Clearly, additional cams of appropriate shape may be provided at other points along the path of the lugs 16 if desired.

When a plurality of collapsible lugs 16 are assembled with chains 17, as shown in Figs. 1 and 2, for the purpose of propelling containers 18 through a carton sealer machine 19, it is apparent that the collapsible lugs 16 will engage the rear ends of the containers 18 only when the containers 18 have advanced far enough along a conveyor 95 or the like for the lug members 25 to reassume their propelling positions after passing around the idler sprocket 70. If, for example, a container 18 has advanced only to a position wherein an approaching lug 16 engages the side of the container 18, the lug member 25 will remain in a depressed position and will slide along the side of the container 18 without damage thereto. If, for any reason, it be desired manually to advance a container 18 through the machine 19 at a speed greater than that of the chains 17, or while the feed construction 15 is at rest, the collapsible construction of the lugs 16 permits this to be done without damage to the container 18.

Clearly, there has been provided a feed construction which fulfills the objects and advantages sought therefor.

It is to be understood that the foregoing description and the accompanying drawings have been given only by way of illustration and example. It is also to be understood that changes in form of the elements, rearrangement of parts, and substitution of equivalent elements, which will be obvious to those skilled in the art, are contemplated as within the scope of the present invention which is limited only by the claims which follow.

What is claimed is:

1. A collapsible lug container feed construction comprising, in combination, a pair of movable chains disposed in spaced relation and having adjacent runs in parallel, a plurality of lug members mounted on each chain so as to be op-

positely paired with their respective counterparts on the other chain, said lug members being individually pivotable between a propelling position and a collapsed position, a face portion on each lug member, said face portions being in perpendicular extension from their respective chains when said lug members are in propelling position, individual yieldable means engaging each lug member respectively for biasing the same toward its propelling position, rotatable sprocket means for each chain, supporting means for the sprocket means, and means mounted on said supporting means for engagement with said lug members for moving the same relative to the chains against the action of said biasing means.

2. A collapsible lug container feed construction comprising, in combination, a pair of movable chains disposed in spaced relation and having adjacent runs in parallel, a plurality of lug members mounted on each chain so as to be oppositely paired with their respective counterparts on the other chain, said lug members being individually pivotable between a propelling position and a collapsed position, a face portion on each lug member, said face portions being in perpendicular extension from their respective chains when said lug members are in propelling position, resilient means biasing each lug member toward its propelling position, rotatable sprocket means for each chain, said sprocket means including a toothed sprocket for each chain, said toothed sprockets having non-uniformly spaced teeth providing a plurality of wide spaces at the root circle thereof for receiving portions of said biasing means, and cam means engageable with each of said lug members for moving the same to its collapsed position.

3. A collapsible lug container feed construction comprising, in combination, a pair of movable chains disposed in spaced relation and having adjacent runs in parallel, a plurality of lug members mounted on each chain so as to be oppositely paired with their respective counterparts on the other chain, said lug members being individually pivotable between a propelling position and a collapsed position, a face portion on each lug member, said face portions being in perpendicular outward extension from their respective chains when said lug members are in propelling position, a cam contacting portion on each lug member, said cam contacting portions having a maximum inward extension from their respective chains when said lugs are in propelling position, resilient means biasing each lug member toward its propelling position, rotatable sprocket means for each chain, said sprocket means including a toothed sprocket for each chain, said toothed sprockets having non-uniformly spaced teeth providing a plurality of wide spaces at the root circle thereof for receiving portions of said biasing means, and cam means engageable with each of said lug members for moving the same to its collapsed position.

4. A collapsible lug container feed construction comprising, in combination, a pair of movable chains disposed in spaced relation and having adjacent runs in parallel, a plurality of lug members mounted on each chain so as to be oppositely paired with their respective counterparts on the other chain, said lug members being individually pivotable between a propelling position and a collapsed position, a face portion on each lug member, said face portions being in perpendicular extension from their respective

chains when said lug members are in propelling position, an edge portion on each lug member inclined rearwardly from the outer end of the face portion to the respective chains when said lug members are in propelling position, resilient means biasing each lug member toward its propelling position, rotatable sprocket means for each chain, said sprocket means including a toothed sprocket for each chain, said toothed sprockets having non-uniformly spaced teeth providing a plurality of wide spaces at the root circle thereof for receiving portions of said biasing means, and cam means engageable with each of said lug members for moving the same to its collapsed position.

5. In a collapsible lug container feed construction, in combination, a link chain, a lug member pivotally connected to the chain, a face portion on the lug member for propelling engagement with a carton or the like, an inclined edge portion on the lug member for non-propelling engagement with a carton or the like, spring means for disposing said face portion in a propelling position only in the absence of said non-propelling engagement, and cam engageable means on the lug member for disposing said face portion in a non-propelling position.

6. In a collapsible lug container feed construction, in combination, a link chain, a lug member comprising a pair of parallel plate sections connected by a yoke section, means pivotally connecting each of said plate sections to the chain, an offset face on one of the plate sections engageable with the chain for defining a propelling position of the lug member and for maintaining the lug member against pivotal movement due to a propelling load reaction, means biasing the lug member toward said propelling position, and cam engageable means on one of the plate sections for moving the lug member against the action of said biasing means to a non-propelling position.

7. In a collapsible lug container feed construction, in combination, a link chain, a lug member comprising a pair of parallel plate sections connected by a yoke section, means pivotally connecting each of said plate sections to the chain, an offset face on one of the plate sections engageable with the chain for defining a propelling position of the lug member and for maintaining the lug member against pivotal movement due to a propelling load reaction, means biasing the lug member toward said propelling position, a face portion on the lug member, an edge portion on the lug member, said face and edge portions respectively defining planes normal to and inclined to the chain when the lug member is in propelling position, and cam engageable means on one of the plate sections for moving the lug member against the action of said biasing means to a non-propelling position in which the plane defined by said edge portion is parallel to the chain.

8. In a collapsible lug container feed construc-

tion, in combination, a movable link chain having a pair of special link plates disposed in parallel and a special pin replacing a standard chain pin, a lug member embracing the special link plates and pivotally connected to the special pin, spring means disposed between the link plates and connected to at least one of the same, said spring means being also in engagement with the lug member for biasing the latter toward a predetermined propelling position, fixed stop means on the lug member for limiting the biased pivotal movement of the same, said stop means being adapted to absorb a propelling load reaction, and cam means on the lug member for moving the latter from said propelling position.

9. In a collapsible lug container feed construction, in combination, a movable link chain, a rotatable sprocket for the chain, stationary means for supporting the sprocket, a stationary cam mounted on the supporting means, a lug member pivotally connected to the chain, means on the lug member engageable with the chain for defining a propelling position and an alternate non-propelling position of the lug member, means acting between the chain and the lug member for biasing the latter toward said propelling position, and a cam engaging portion on the lug member for engaging said stationary cam for movement of the lug member toward said non-propelling position.

10. In a collapsible lug container feed construction, in combination, a movable link chain having a pair of special link plates disposed in parallel and a special pin replacing a standard chain pin, a lug member embracing the special link plates and pivotally connected to the special pin, spring means disposed between the link plates and connected to at least one of the same, said spring means being also in engagement with the lug member for biasing the latter toward a predetermined propelling position, a rotatable sprocket for the chain having non-uniformly spaced teeth providing a wide space for receiving said spring means during movement of the lug member therearound, stationary means for supporting the sprocket, a stationary cam mounted on the supporting means, and a cam engaging portion on the lug member for engaging said stationary cam for movement of the lug member from said propelling position.

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