March 15, 1955 J. L. REYNOLDS ET AL 2,704,013

APPARATUS FOR APPLYING LINING SHEETS TO CRATES

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FIG. 1.

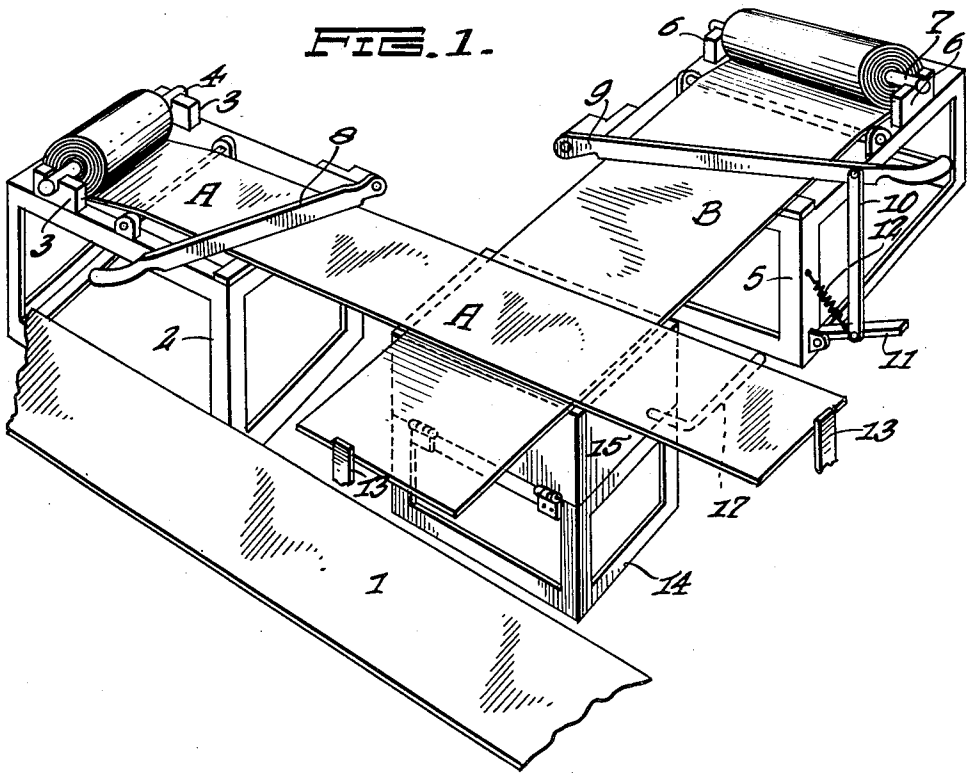
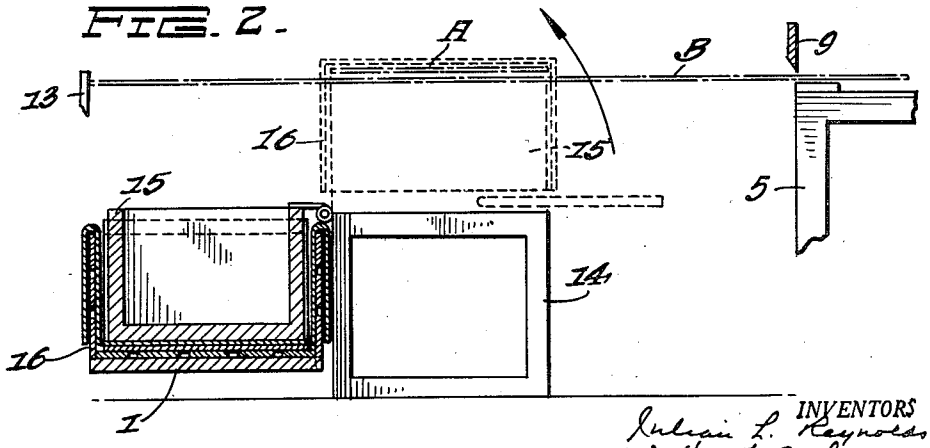


FIG. 2.



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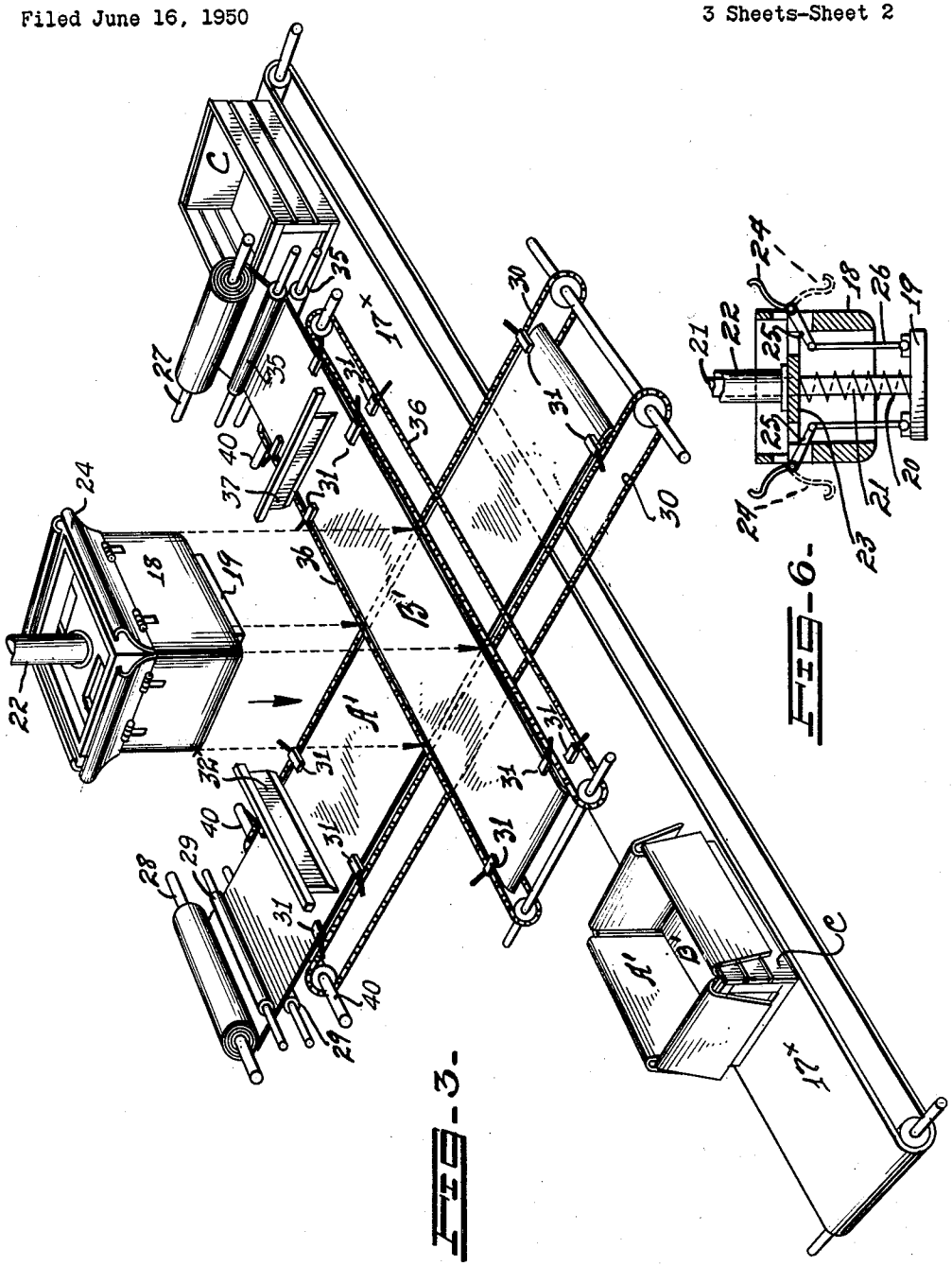


FIG-3-

FIG-6-

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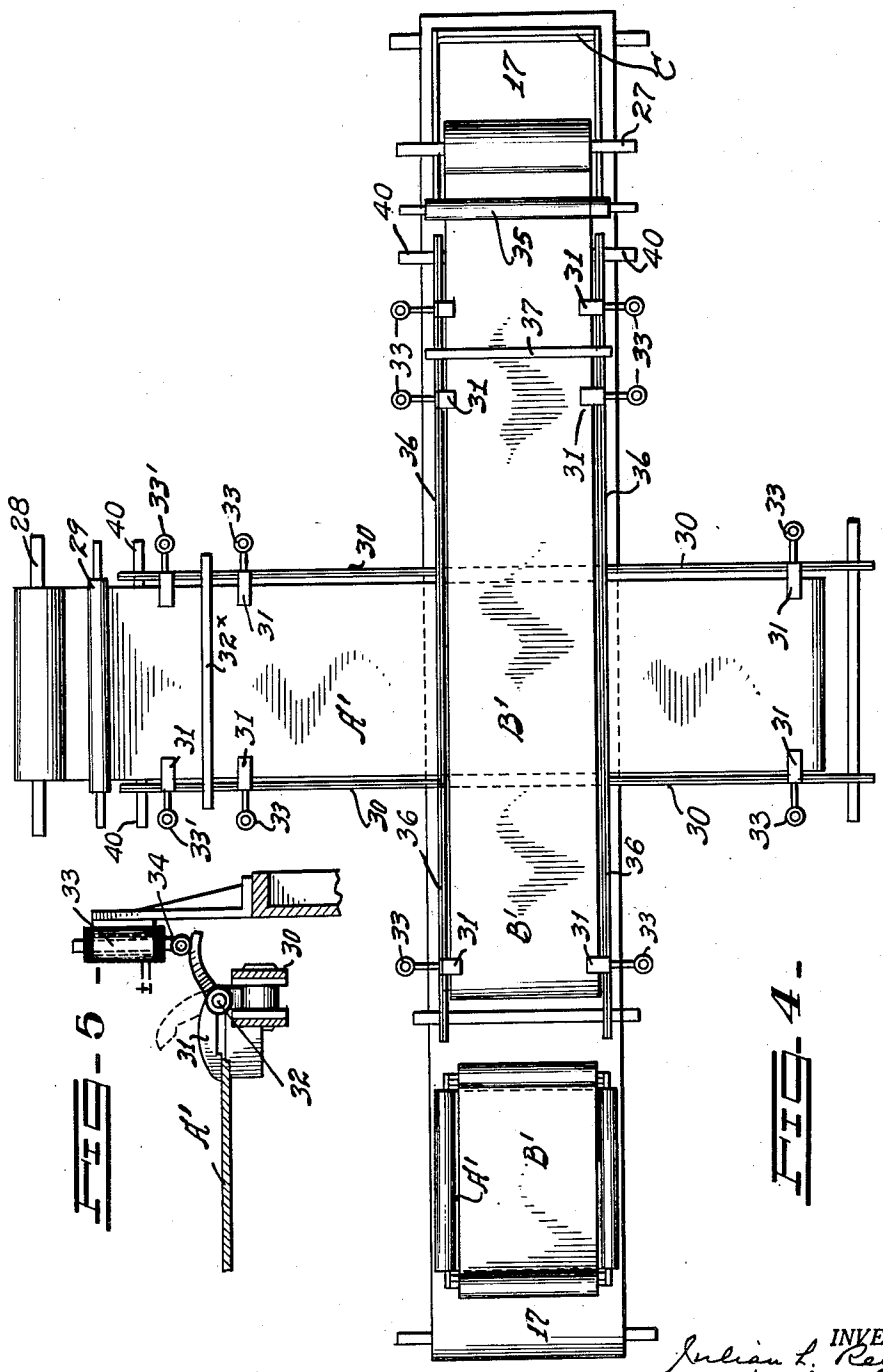


FIG. 4.

FIG. 5.

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APPARATUS FOR APPLYING LINING SHEETS TO CRATES

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Application June 16, 1950, Serial No. 168,482

2 Claims. (Cl. 93—36.01)

The present invention relates to the lining of crates, particularly crates for perishable produce, by sheets of metallic foil and similar flexible lining elements, particularly in such manner that the crates are not only lined but provided with integral lining flaps positioned outwardly of the crate walls for inner folding and covering of produce enclosed within the crates.

The invention will be described in the accompanying drawings, in which:

Fig. 1 is a perspective view, partly broken away, showing an assembly of mechanical units and two foil webs for use in a simplified form of the method.

Fig. 2 is a schematic view, partly in dotted lines and partly in sectional elevation, showing the foil liner forming device in two positions.

Fig. 3 is a view in perspective showing the primary elements of an apparatus for performing the method and which employs positively operated means for moving two webs of foil or the like transversely of each other in conjunction with a liner-forming plunger and cutting elements.

Fig. 4 is a top plan view of the structure shown in Fig. 3, the plunger not being shown.

Fig. 5 is a schematic view in partial transverse section of one of the feed chains and a clamp thereon, showing electrical means for releasing the clamp preliminary to a liner-forming operation.

Fig. 6 is a vertical section through the liner-forming plunger, body and certain associated parts.

In the packing of perishable produce, it has been customary to line wooden crates with paper and to pack the produce, for example, lettuce, in layers, a layer of ice being placed over each layer of produce, with a paper separator packed between layers, until the produce crate is fully loaded.

The present invention is adapted to effectively utilize the discovery that an arrangement of aluminum foil lining elements for crates, the assembly being in special manner to insure the outward passage of water as soon as it forms and the rapid dissipation of heat and high retention of cold by the foil, along with its non-absorption of moisture, conserves the major portion of the ice packed within the crate and the produce is kept in dried, firm condition. The invention also has wider application.

Referring to Figs. 1 and 2 of the drawings, we have shown at **1** a support, which may be a platform or the upper length of an endless belt. At **2** is a frame supporting spaced open-top bearing blocks **3** for a shaft **4** which may carry a roll of aluminum foil A. At right angles to the structure thus described is a frame **5** carrying spaced open-top bearing blocks **6** which support a shaft **7** carrying a roll of foil B, the latter being of greater width than the foil A.

The two foil strips are drawn out from their rolls in measured lengths relatively to cutter devices **8** and **9**. In the present example, manually operative knives are used, each knife being pivoted on a support carried by its respective frame member **2** or **5**. One or both of the knives may be operated by foot treadle. Thus knife **9** is connected to a link **10** leading to a foot lever **11** pivoted to the frame by means of a spring **12**. The knife is normally held above the path of the foil web B.

In order that the foil sections, when cut, will be of predetermined length, we have indicated at **13** the use of stops, and the latter may be supported by any suitable elements (not shown).

At **14** we have shown a base member to which is hinged

a forming box **15**, the latter being proportioned less than the length and width of the produce crate for which it is designed, as, for example, a produce crate of the type shown in Fig. 3 at C, such crate also being shown in transverse section at **16** in Fig. 2.

With the two foil webs in the position of Fig. 1, the operator will invert a crate, then place the crate above the foil webs and in register with the foil liner forming device **15**, which hereinafter will be termed the "forming box." Preliminary thereto the knives **8** and **9** will be operated to sever the crossed foil sections. When the operator lowers the crate until its interior bottom surface bears upon the foil liner A, the crate will be lined in a special manner and with extensions of the foil, as generally indicated in Fig. 3. The forming box **15** with the crate thereon may then be swung toward the position of Fig. 2. However, when the crate and forming box still lie at an angle relatively to the support **4**, the lined crate can be slipped off the box and dropped on the platform or endless belt **1**, so that the forming box may immediately be restored to the position shown in Fig. 1, and a fresh set of foil webs drawn over it, as shown in that figure. For convenience, in the subsequent movement of the forming box **15**, the latter may be provided with a handle, as indicated at **17**.

Referring to Fig. 3 showing another embodiment of the invention, it will be seen that an endless belt **17***x* is employed for moving crates C to and from the liner-applying position which is defined by dotted lines and arrows at the base of a liner-forming plunger. This plunger consists of a casing **18** shaped in accordance with the interior of the crate which is to be lined. The forming-plunger casing is open to receive a spring-loaded bottom **19**, Fig. 6, the latter being normally held down by means of a spring **20** bearing thereagainst and held in position by a rod **21** adapted to move upwardly in the tubular shaft **22**. The latter shaft **22** carries the forming plunger, and for that purpose is secured to a horizontal support **23** within the plunger casing **18**.

Hinged to each of the four sides of the plunger casing is a folding or forming plate **24**, and connected to each forming plate **24** is a lever **25** which projects through an opening in the plunger casing, and is connected to a link **26** secured to the bottom **19**. The tubular shaft **22** of the liner-forming plunger will be carried by a rock arm or other means for securing up and down movements to the plunger.

Mounted in a suitable frame (not shown) is a shaft **27** for a coil of metallic foil or other liner material, this material being indicated at B′. At right angles thereto and also to be mounted in a suitable frame (not shown) is a shaft **28** for a second coil of metallic foil or other lining material, said material being indicated at A′.

Referring to the liner material A′, it will be fed from its coil between upper and lower supporting rollers **29** to a first pair of endless feed chains **30** carrying a plurality of gripper or clamp elements **31** which are shown only schematically in Fig. 3, but which are shown in more detail in Fig. 5. As shown in the latter figure, each gripper member is pivoted at **32** on a link of its appropriate chain **30** and it will be normally spring-pressed into engagement with the material A′. Each gripper member has an arm extension by which it may be raised, and, at a predetermined time, all of the gripper members in advance of a cutter blade **32***x* will come into register with gripper release devices. Each device may be as shown in Fig. 5, and each consists of a solenoid **33** having a core rod **34**. When the solenoid is energized, the rod will be moved downwardly, thus releasing, in each case, the gripper member from the liner material A′.

Referring to the liner material B′, it will be fed through supporting rollers **35** to a second pair of endless feed chains **36**, each carrying a plurality of gripper members **31** of the same construction as previously described. Also when the liner material B′ has been drawn to the position of Fig. 3, all of the gripper members engaging the liner material B′ in advance of a cutter blade **37** will lie under release devices such as the one shown in Fig. 5.

With the elements in the position of Fig. 3, the cutter blades will be actuated (and they may have coacting blade

surfaces located below them and under the liner material, such elements not being shown). At that moment the operator will throw the solenoids **33** into action by a switch mechanism. The cut liner webs will thus be released. Thereupon the liner-forming plunger will be moved downward at a time when one of the unlined crates has been brought into the position indicated by the dotted lines and arrows, Fig. 3.

In the action of the liner-forming plunger, it will move the transversely arranged cut liner webs into the crate and against the inner walls thereof, this action continuing until false bottom **19** reaches the bottom of the crate, whereupon the link rods **26** will be raised and the folding plates **24** will be moved in the dotted line position, Fig. 6, thus forming outwardly and downwardly extending liner flaps in the manner shown at the left-hand end of Fig. 3.

Following the last operation, the liner-forming plunger is raised in the position of Fig. 3 and at a time when the webs of liner material extending from their rolls are still gripped by the grippers back of the knives. The feed chains will then be actuated to bring the liner material to the position shown in Fig. 3 for a succeeding operation. The opposed gripper fingers back of the cutter blade as to each pair of chains will pull the appropriate web to its position, as shown in Fig. 3, and as the following gripper members move to top position on the chain, they will be successively opened to the dotted line position, Fig. 5, and then released to gripping position. Any suitable cam or other means may be provided for such purpose adjacent the shafts **40**.

In Fig. 4 such quick gripper release-and-return devices are indicated at **33'** as solenoid members of the type shown in Fig. 5.

What we claim and desire to secure by Letters Patent is as follows:

1. An apparatus for producing a pair of crossed overlapped strips of metal foil as a lining within a crate comprising means for dispensing a first strip of metal foil from a first roll of foil, a first pair of endless spaced-apart vertically disposed and parallel opposed feed chains, a plurality of clamps disposed in opposed relation on said first pair of chains for gripping the opposed edges of said first strip of metal foil, means for dispensing a second strip of metal foil from a second roll of foil at right angles to said first strip of metal foil, a second pair of endless spaced-apart vertically disposed and parallel opposed feed chains disposed at right angles to said first pair of endless feed chains, a plurality of clamps disposed in opposed relation to said second pair of feed chains for gripping the opposed edges of said second strip of metal foil, to produce a second strip of metal foil in crossed overlap relationship to said first strip of metal foil, thereby producing a pair of crossed strips of metal foil having a common rectangular area, a first knofe for cutting off said first strip of metal foil, and a second knife for cutting off said second strip of metal foil, means disposed beneath said overlap area for locating an empty wooden crate underneath said area, and a plunger having a first rectangular casing provided with a top horizontal centrally apertured plunger support, a hollow reciprocal shaft secured to said horizontal support about said aperture, a rod disposed through said shaft and said aperture, a spring loaded plunger bottom secured to the base of said rod, a coil compression spring disposed about said rod between said plunger bottom and said top horizontal plunger support, a forming plate having projecting levers thereon hinged at the point of juncture of said plate and said levers to the top of each of the four sides of the said rectangular casing, and at least one reciprocal link disposed between the projecting end of said levers and the plunger bottom, whereby downward movement of said plunger upon the area of the overlapped foil disposed over a crate effects insertion of the overlapped foil area to the bottom of said crate and further downward movement of the plunger casing effects a folding over of a part of each of the cut foil strips over the respective top edges of the crate.

2. The device of claim 1 having solenoid clamp releasing members in advance of the knives for cutting the strip of foil, and further having clamps behind said knives for holding the foil adjacent a respective roll of foil during the time interval that the clamps in advance of the knives are in a released condition.

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