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Forthmann, Jr.

[11] **3,804,266**

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[54] **STRIP MATERIAL PACKING APPARATUS**

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[52] **U.S. Cl.** ..... **214/6 DK**, 214/6 H, 271/64, 271/68

[51] **Int. Cl.** **B65g 57/06**

[58] **Field of Search** ..... 214/6 DK, 6 H, 6 P, 6 G; 271/68, 71, 88

[56] **References Cited**

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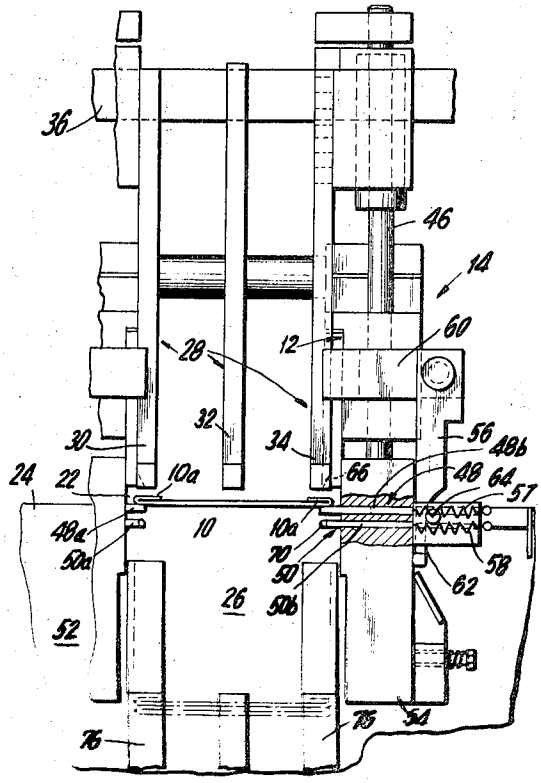
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Primary Examiner—Robert J. Spar
Attorney, Agent, or Firm—McGlew and Tuttle

[57] **ABSTRACT**

A device for packing individual lengths of strip material, particularly labels, comprises a support over which the strip materials are fed having a packing chute drop opening of a size large enough to receive the length of strip material. At least one first pair of support plates project from opposite sides of the opening into the opening by an amount to engage and support the individual lengths of strip material which are fed into alignment with the opening and at least one second pair of support plates are located below the first pair in a position to receive the strip material which is dropped by the first pair when they are opened. The labels fed over the opening are moved downwardly into the opening by a packing foot which also carries a cam for successively moving the first set of support plates out of alignment with the opening to drop the label onto the second set which are then moved out of the opening to permit the downward movement of the label into the packing chute. The second set of support plates include spaced engagement teeth which cooperate with the packing foot which moves into the opening so that the labels are wiped off the second support plate and downwardly into the packing chute in a manner to insure that they will not pop upwardly out of the opening. The device also includes a guide for a plurality of the packing chutes including a movable support plate which is movable backwardly and forwardly on the guide and carries a plurality of individual packing chutes which may be moved backwardly and forwardly with the support plate in order to align one of them with the drop opening. At least one of the individual packing chutes may be adjusted relatively to its support plate.

7 Claims, 7 Drawing Figures



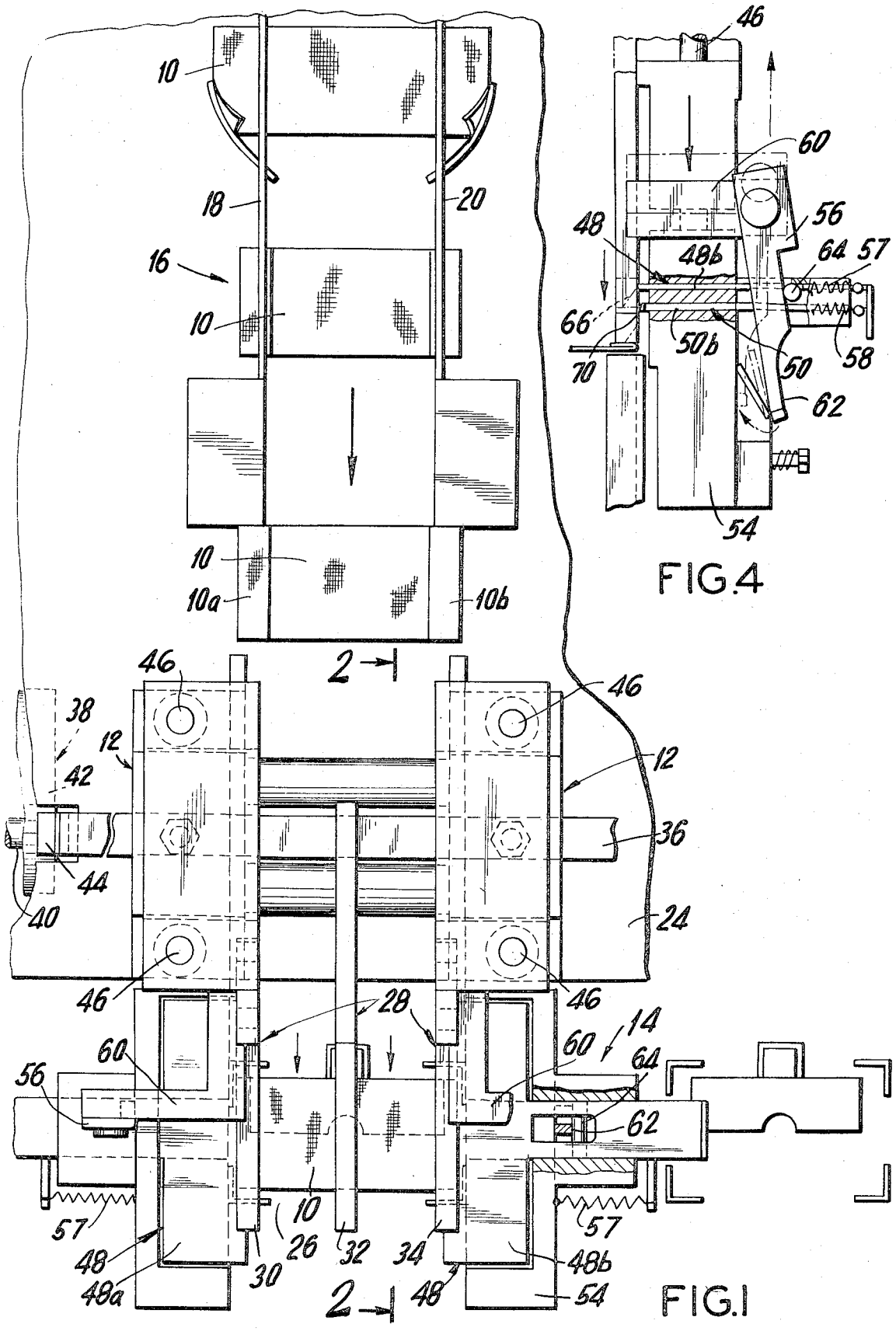

10
18
20
16
10
10
10a
10b
2
46
38
12
42
44
40
36
24
28
14
60
56
64
62
57
48
48a
30
26
32
34
48b
54

FIG.1

46
60
56
48
48b
64
57
66
50b
50
58
70
62
54

FIG.4

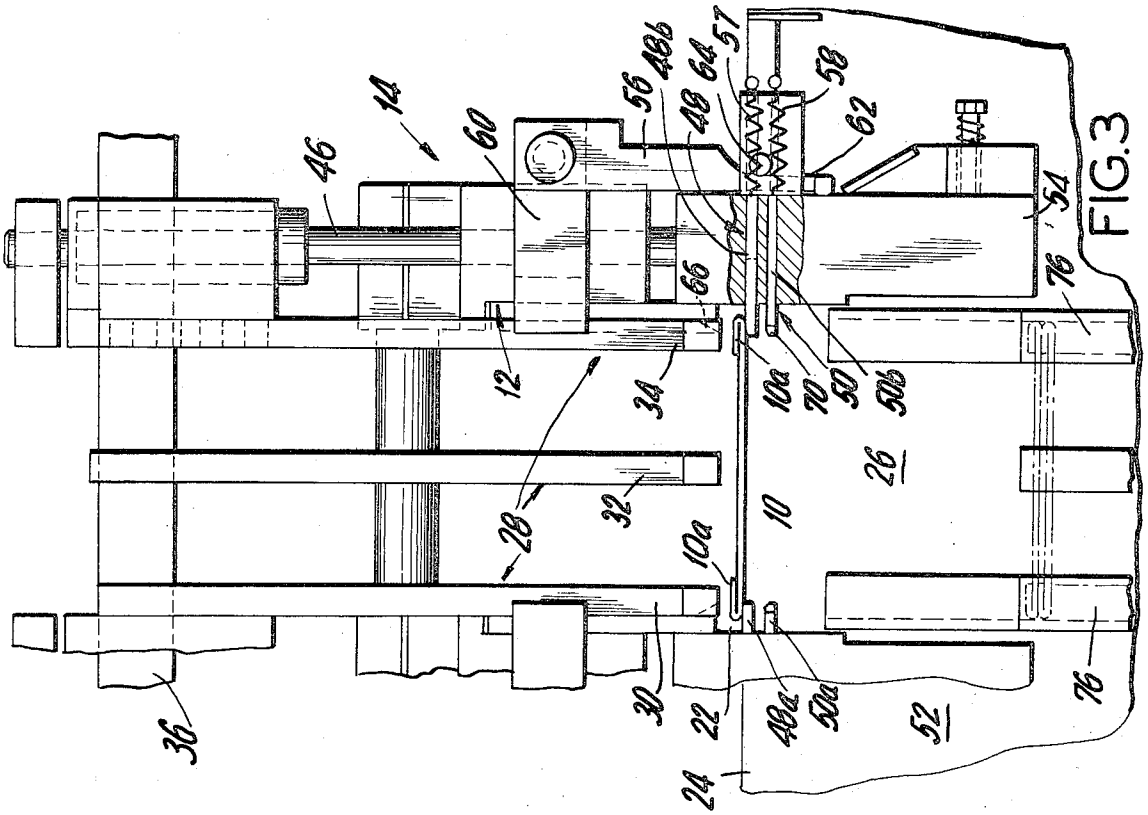

14
46
60
56
48b
48
64
57
58
62
54
76
66
12
34
10a
70
50
50b
26
28
32
10
30
22
48a
50a
52
24
36

FIG.3

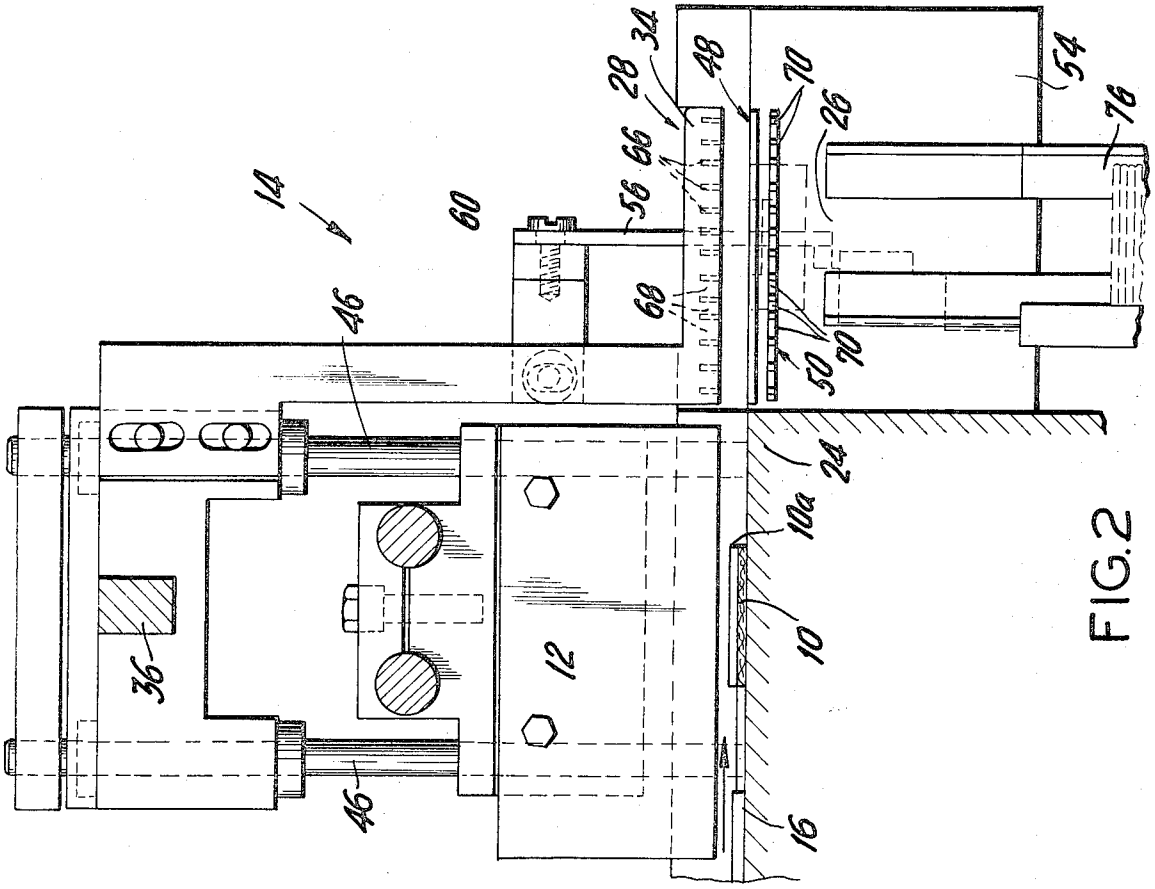

14
60
46
28
34
48
70
26
54
76
66
56
68
50
12
36
10a
10
24
16

FIG.2

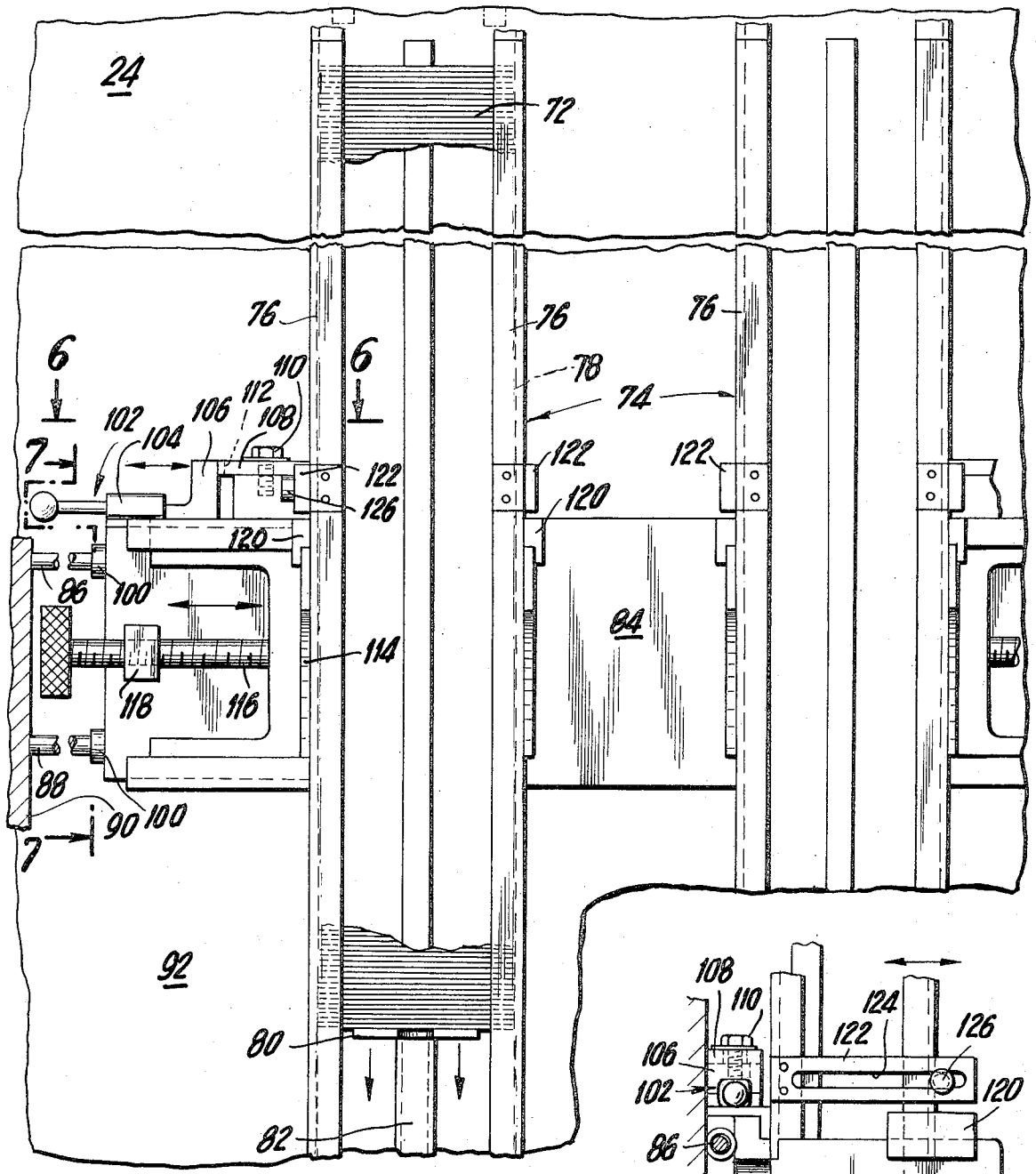


FIG.5

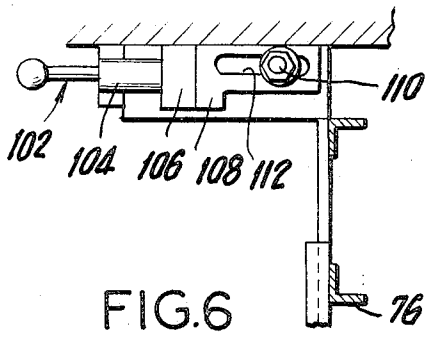


FIG.6

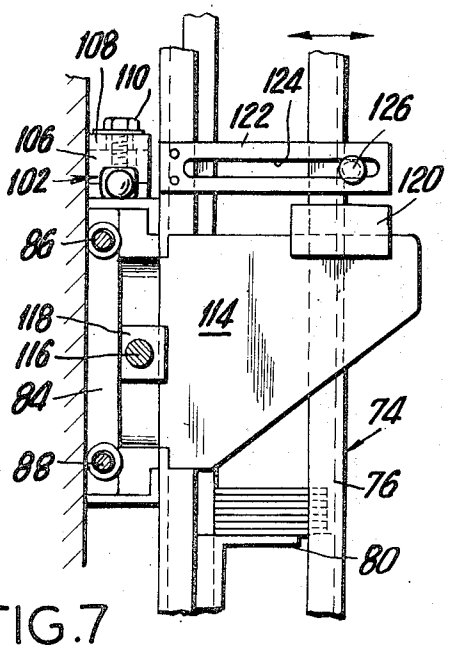


FIG.7

STRIP MATERIAL PACKING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates in general to stacking or packing devices and in particular to a new and useful device for feeding strip material, particularly labels, into a packing chute where they are packed into an elongated container.

2. Description of the Prior Art

At the present time it is customary to feed labels which have been severed from a continuous strip of the label material and folded at their ends into packing chutes where they are packed into containers by the action of downwardly movable packing feet. An example of such a device is shown and described in U.S. Pat. No. 3,342,013 granted to F. F. Forthmann, Jr. one of the inventors of the present invention. With the known construction the packing mechanism is not always suitable for very high speed operation, especially with labels which are made with synthetic materials and which do not hold the crease or fold so that they tend to pop outwardly after they are initially pushed downwardly into a stack.

SUMMARY OF THE INVENTION

In the present invention there is provided a packing mechanism which facilitates packing particularly labels at relatively high speeds and which may be used successfully even when the strip materials which are folded and packed tend to unfold and expand.

In accordance with the invention there is provided a trap door or support plate arrangement which makes it possible to align labels successively over a drop chute into which the labels are directed for packing into containers arranged therein. In order to insure that the labels which arrive at the openings after having been folded are packed downwardly into the chute and that they do not return upwardly, the device includes a double trap door arrangement in the form of an upper first support plate set with opposed plates which are movable mounted on the support table and are biased to project into the opening from respective opposite ends of the opening by an amount to support the particular length of label which is fed. A movable packing foot system is associated with the packing station and it includes at least one packing foot overlying the opening which moves downwardly through the opening to move each label in succession, which arrives into the opening and which is initially supported on the first plate, downwardly. The downward movement of the packing foot is accompanied by the withdrawal of the upper first support plates to permit the label to move downwardly from the first support plates down to the second support plates. The further downward movement of the packing foot causes stripping of the ends of the label from the second support plates as they are also retracted to permit the continued downward movement of the label into the chute. The upward movement of the packing foot causes immediate disengagement of the packing feet from the support plates and their closing movement so that the labels cannot move back upwardly again.

In accordance with a feature of the invention the packing feet include a comb-like formation with spaced teeth which engage in recesses between similarly spaced teeth of the second support plates so that the disengagement of the packing feet produces a wiping action which insures that the label is stripped downwardly and cannot disengage and move upwardly during the packing operation.

A further feature of the invention is the arrangement of the individual packing chutes which may be selectively aligned with the drop chute opening. A plurality of chutes are carried on a support plate which is guided on ball bearings on rod members which are arranged to extend laterally on each side of the drop chute opening. The chutes are carried on a plate which may be shifted backwardly and forwardly in order to align a selected chute with the opening and at the same time position one or more other chutes in a location which they may be loaded or unloaded. This makes it possible to permit the continued operation of the device while a container in one of the chutes which is filled with labels is unloaded from the chute and a new empty container is placed thereon. The individual chutes may also be adjusted in respect to its support plate in order to provide accurate alignment of the chutes with the opening so that the labels may be fed downwardly to deposit them into the packing container contained in the chute.

Accordingly it is an object of the invention to provide an improved packing device having means for facilitating the downward packing movement of individual strips in a manner to insure that they will not move backwardly and upwardly after they have been packed.

A further object of the invention is to provide a device for packing strip material such as labels which have been folded which includes first and second sets of trap doors or support plates arranged to extend into a drop chute opening and which operates in conjunction with a packing foot which moves downwardly to advance each label in succession which has been aligned with the chute from the upper support plates to the lower support plates and to simultaneously effect the retraction of the support plates as the packing operation proceeds and which is also effective to move the plates backwardly into an upwardly blocking position so that the labels do not move out of their packed condition.

A further object of the invention is to provide a packing device for strip material which includes a guide which is adapted to be positioned alongside one or more drop openings and which defines a trackway along which a support plate is movable, the support plate having a plurality of strip material packing chutes thereon which are arranged in substantially parallel relationship and which may be moved collectively with the support plate for positioning a selective chute into alignment with the drop opening.

A further object of the invention is to provide a packing apparatus which is simple in design, rugged in construction and economical to manufacture.

For an understanding of the principles of the invention, reference is made to the following description of typical embodiments thereof as illustrated in the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

In the Drawing:

FIG. 1 is a partial top plan view of a label folding and packing device constructed in accordance with the invention;

FIG. 2 is a section taken along the line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2 but of the opposite side of the device shown in FIG. 1;

FIG. 4 is a partial end elevational and vertical sectional view showing the cam for operating the first and second support plates for the labels;

FIG. 5 is an end elevational view of the lower portion of the device shown in FIG. 1 indicating the packing chute guide;

FIG. 6 is a section taken along the line 6—6 of FIG. 5; and

FIG. 7 is a section taken along the line 7—7 of FIG. 5.

Referring to the drawings in particular, the invention embodied therein comprises an apparatus for feeding a plurality of labels **10** into association with heater means generally designated **12** where the newly folded ends **10***a* are heated in order to aid in holding the fold of the ends of the labels when they are packed by a packing mechanism generally designated **14.** Feeding means for feeding the labels **10** and generally designated **16** comprises a device with spaced engagement feet **18** and **20** which overlie the respective ends of the labels and advance two of them past the heating means **12** and into alignment with an opening **22** of a support table **24** which overlies a packing chute **26.**

In accordance with the invention, packing foot means generally designated **28** is mounted on the support table **24** in a position overlying the opening **22** and it comprises a plurality of laterally spaced individual packing foot elements **30, 32** and **34** which overlie the opening **22** and which are carried on a cross member **36** which moves downwardly to cause the individual packing feet **30, 32** and **34** to engage a label **10** and move it into the chute **26.**

Drive means generally designated **36** is shown schematically in FIG. **1** and it includes a rotatable shaft **40** driven by a suitable motor (not shown) to rotate a cam **42.** The cam **42** controls the movement of an arm **44** to cause reciprocation of a frame carrying the cross member **36** with the feet **30, 32** and **34.** The frame is vertically reciprocable on rod elements **46** which are mounted on the support table **24.** The feet **30, 32** and **34** are reciprocated in a timed sequence in relation to the movement of the feeding means **16** which is also controlled by the rotation of the shaft **40** of the drive means **38.** The feed means **16** moves each label **10** past the heating means **12** to a position in which the labels are oriented completely within the opening **22** and in which they overlie an upper trap door or first support plate means generally designated **48** and second support plate means generally designated **50.** The first support plate means **48** includes a plate **48***a* and a plate **48***b* which are movably mounted in side blocks **52,** and **54** respectively. Biasing means in the form of a first spring **57** and a second spring **58** acts to bias the respective plates **48***a* and **48***b* and similar second plates **50***a* and **50***b* in directions to cause them to project into the opening **22** by an amount sufficient to support the label **10** between adjacent plates **48***a* and **48***b* and **50***a* and **50***b.*

When the foot means in the form of feet **30, 32** and **34** engage the label to move it downwardly it causes a similar downward movement of a cam plate **56** which is carried on a cam bracket **60** secured to the foot **30** and foot **34.** The cam plate **56** includes a lower end which extends through slots of the plates **48***a* and **50***a* and **48***b* and **50***b* respectively. The upper portion of a cam surface **62** of cam plate **56** bears against a pin **64** connected to the plates **48***a* and **48***b* respectively and the lower portion of the cam surface **62** bears in the associated slot against the plate **50***a* and **50***b* respectively on each side of the opening **22.** Downward movement of the feet **30, 32** and **34** is accompanied by downward movement of the cam plate **56** to open first the plates **48***a* and **48***b* by causing their respective outward opposite motion to cause the label **10** to move downwardly to engage on the plates **50***a* and **50***b.* Further downward movement of the cam plate **56** is effective to cause separation of the plates **50***a* and **50***b* and the movement of the labels downwardly still further. In order to facilitate a stripping of the label from the bottom plates **50***b* each foot **30** and **32** is provided with a series of teeth **66** having recesses **68** of a size to receive similar teeth **70** the associated second plates **50***a* and **50***b.* When the feet **30** and **34** are moved upwardly the cam **56** is also moved upwardly to permit the gradual moving together of the plates **50***a* and **50***b* and the entry of the teeth **70** into recesses **68** of the feet. This insures that the label **10** will be stripped off the associated support plates **50***a* and **50***b* and be moved downwardly onto the top of a stack **72.** Because the second plates **50***a* and **50***b* close inwardly it is not possible for the labels to pop upwardly again even due to the relaxing of the pressure on the stacks **72** which might be apt to occur upon relaxing of the folding and the expansion of the folded flaps of the labels after they have cooled.

In accordance with a further aspect of the invention the labels **10** are deposited into a packing chute or box stacker generally designated **74** as shown in FIG. **6** which comprises four vertically extending angle members **76** arranged at corner points to define a rectangular receiving chute for the labels **10** and which is large enough to accommodate a packing carton **78** which is inserted into the chute from the bottom upwardly over a support plate **80** which is frictionally engaged on a guide rod **82** which is supported beneath the packing chutes on a vertically adjustable support (not shown). The plate **80** will be displaced downwardly by the action of the packing feet during the operation of the packer. Biasing means (not shown) is advantageously associated with the support plate **80** to bias it upwardly to an initial position so that the initially fed labels will be pushed downwardly by the movement of the feet **30** and **34** during the operation thereof.

When the cardboard carton **78** is completely filled a bottom closure flap of the carton (not shown) is closed and the packed labels are removed from the stacker after the packing chute **74** which has been filled is displaced away from alignment with the opening **22** of the support table **24** and the guide rod **82** and the plate **80** are removed downwardly.

In accordance with a further feature of the invention a plurality of chutes generally designated **74** are carried on a backing plate **84** which is mounted on guide means in the form of spaced rod members **86** and **88** which are mounted on brackets **90, 90** at spaced locations on an end wall **92** of the support table **24.** The guide means also include rods **96** and **98** which are supported at their respective ends on the brackets **90.** The backing plate **84** carries roller bearings **100** for the rolling guiding movement of the backing plate **84** on the rods **96** and **98.** The backing plate **84** carries handle portions

102 at each end for facilitating the pushing movement of the plate 84 plus the packing chute 74 thereon for the purpose of shifting the alignment from a packing chute 74 which is already filled to one which is empty and which has been previously provided with a carton insert. The arrangement makes it possible to easily shift the backing plate 84 to align any desired packing chute with the drop opening 26. The handle 102 is advantageously provided with a magnetic portion 104 which may be engaged against a stop 106 which may be adjustably positioned on a carrier 108 at a location to align a selected chute 74 below the drop opening 26. The carrier may be adjusted by loosening securing bolt 110 to permit the carrier to be slid laterally within the limits of elongated slot 112 in order to properly locate the stop for the positioning of a selected packing chute 74 in an operative position.

In accordance with a further feature of the invention each chute is advantageously carried on a bracket 114 which may be shifted laterally on the associated backing plate 84 by rotating an adjusting spindle 116 which is engaged through a nut 118 carried on the backing plate 84. A suitable guide track 120 is provided for guiding the chutes 74 when they are moved to adjust their position on the associated gacking plate 84. Each chute 74 also includes side mounting brackets 122 having an elongated slot 124 for an adjusting bolt 126 which is secured to the front angle members 76. The securing bolts 126 may be loosened to permit the shifting movement of the front angle member 76 in relation to the rear angle member 76 in order to accommodate various sizes of labels and containers for the labels.

Thus the invention provides a simple device for packing all types of strip elements particularly labels which have edges which are folded and which are likely to unfold when the creasing pressure thereon is relaxed. The apparatus permits the rapid feeding of strip material such as folded labels over a drop opening into alignment with a stacking mechanism where the labels are successively advanced positively into a vertical stack and held in the stack so that they cannot expand outwardly during the stacking operation.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A device for packing individual lengths of strip material, particularly labels, comprising a support over which the strip materials are fed having a packing chute drop opening of a size large enough to receive the length of strip material, at least one first support plate movably carried on said support and projecting into the opening by an amount to engage and support individual lengths of strip material fed into alignment with the opening, at least one second support plate carried on said support and disposed below said first support plate and projecting into the opening by an amount to engage and support individual lengths of strip material which are released by said first support plate, means for feeding lengths of strip material along said support to align them in succession over the drop opening, packing foot means overlying the opening and including a foot movable downwardly into the opening to push each length of strip material which has been fed into alignment with the opening downwardly through the opening and for successively displacing said first support plate and thereafter said second support plate so as to move said plates out of supporting engagement with the strip material and to move the strip material downwardly into a vertical stack.

2. A device according to claim 1, including a packing chute guide located alongside said support adjacent the drop opening, a backing plate movable backwardly and forwardly along said guide, a plurality of strip material packing chutes on said backing plate arranged in substantially parallel relationship.

3. A device for packing individual lengths of strip material according to claim 2, including adjustment means carried on said backing plate and connected to at least one of said packing chutes for moving said chutes relative to said plate.

4. A device for packing individual lengths of strip material according to claim 1, wherein said at least one first support plate comprises an upper plate at each end of the opening projecting into the opening, means for biasing said upper plate at each end of the opening into the opening to position them so that they engage the strip material from each end thereof and support it, said packing foot means comprising a cam engageable with said upper plates for displacing them in respective opposite directions so that the area projecting into the opening is diminished and the label drops between them onto said second support plate.

5. A device according to claim 1, including means biasing said first support plate and said second support plate in a direction to project into the opening, said packing foot means including a cam engageable with said first and second support plate during downward movement of said packing foot means to initially move said first support plate outwardly to reduce the area projecting into the opening and to release the strip material downwardly onto said second support plate and thereafter to move said second support plate outwardly to permit the downward dropping movement of said strip material.

6. A device according to claim 1, wherein said second support plate is provided with a plurality of teeth extending along the edge thereof projecting into the opening, said packing foot means comprising a foot member having a plurality of teeth projecting outwardly therefrom engageable into the recesses between the teeth of said second support plate during the downward movement thereof in order to provide a stripping action with the support plate to remove the strip material held thereby downwardly.

7. The device according to claim 1, wherein said packing foot means comprises a cross member, means mounting said cross member for vertical reciprocation, a plurality of foot elements depending from said cross member and overlying the strip material over the opening at spaced locations, at least one of said foot members overlying said first and second support plates and acting on the strip material in the area of said first and second support plates, said packing foot means including a cam engageable with said support plates for successively opening and closing said first and second support plates.

* * * * *