United States Patent [19]

Hacker

[11] **3,729,090**

[45] **Apr. 24, 1973**

[54] VIBRATORY STRAIGHT LINE FEEDER

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[22] Filed: **Nov. 22, 1971**

[21] Appl. No.: **200,820**

Related U.S. Application Data

[63] Continuation of Ser. No. 33,439, April 30, 1970, abandoned.

[52] **U.S. Cl.**.....**198/220 CB,** 310/29

[51] **Int. Cl.**.....**B65g 27/00**

[58] **Field of Search**.....310/29; 198/220 R, 198/220 A, 220 CA, 220 CB, 220 DC

[56] **References Cited**

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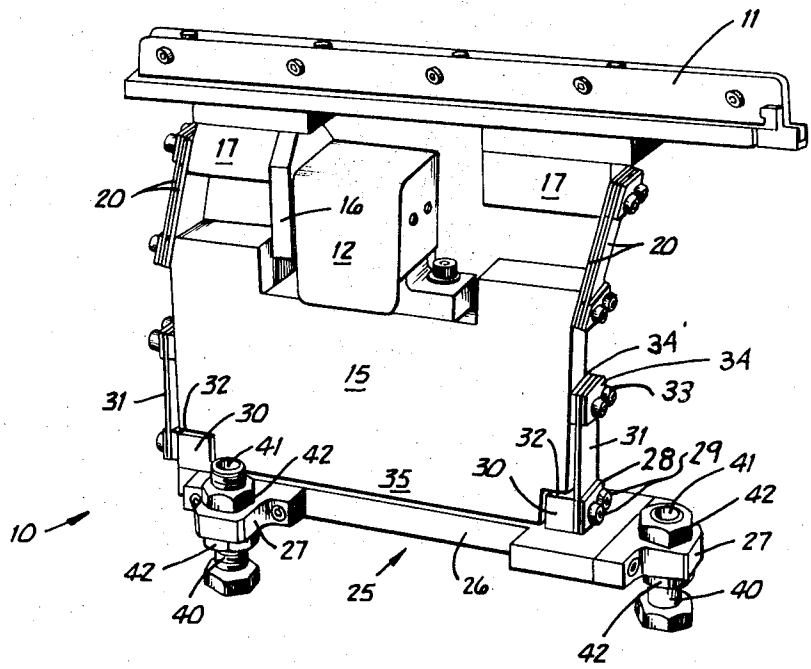
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[57] **ABSTRACT**

A linear vibratory parts feeder including a counterbalance weight which is connected to a parts container by means of flat leaf springs. A motor drive is mounted on the counterbalance weight and is connected to the parts container for vibrating it. A pair of limit blocks are fixed to the base and have a complementary configuration to recesses in the counterbalance weight. A second set of flat leaf springs is fixed to the counterbalance weight and the limit blocks. The limit blocks prevent excessive damaging deformation of the second set of leaf springs during shipment and handling but do not interfere with actual operation of the parts feeder.

7 Claims, 2 Drawing Figures



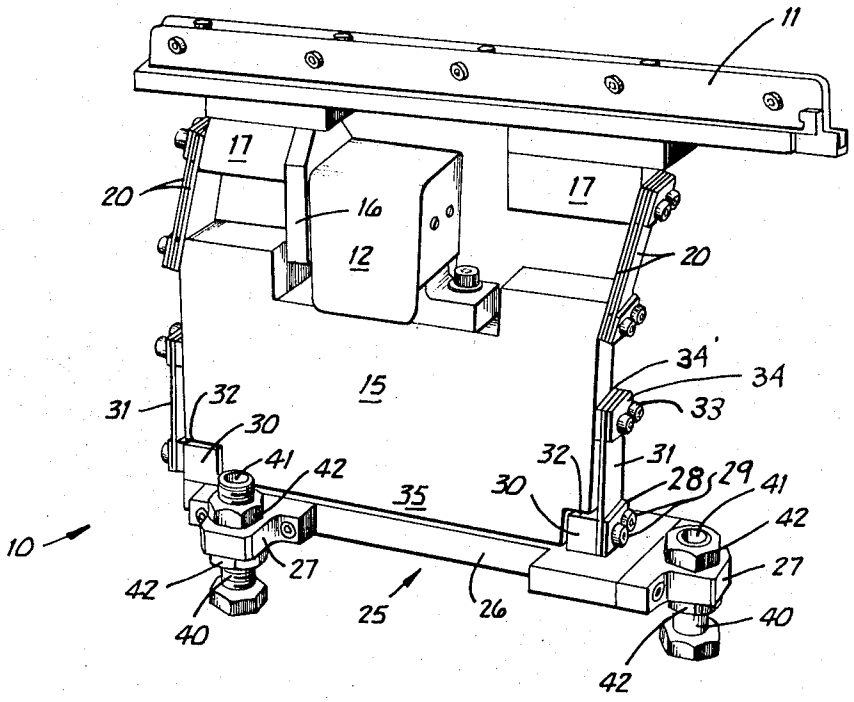


Fig. 1.

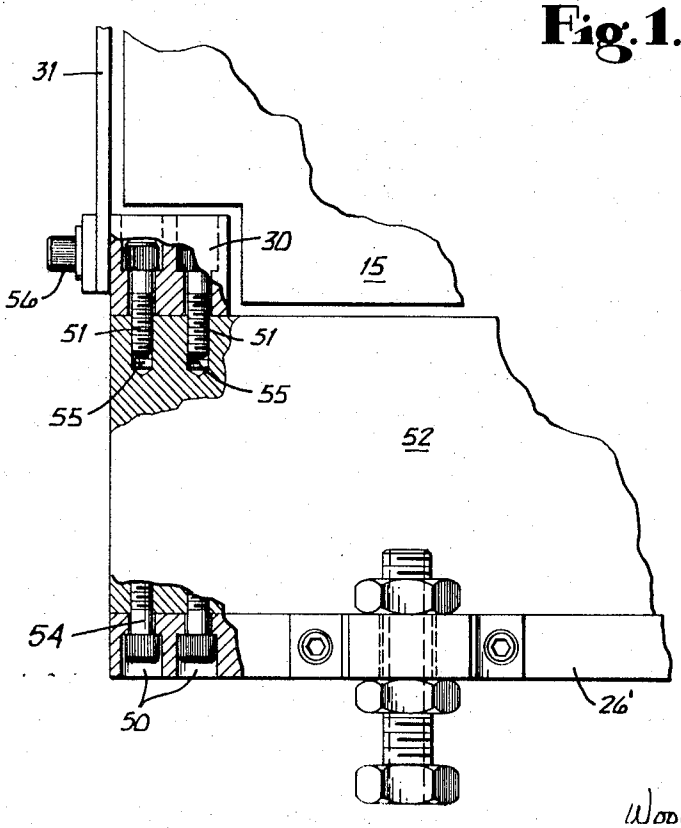


Fig. 2.

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VIBRATORY STRAIGHT LINE FEEDER

This application is a continuation of my former application Ser. No. 33,439, filed April 30, 1970, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to vibratory parts feeders.

2. Description of the Prior Art

Many vibratory feeders utilize flat leaf springs to support a container above a base with an electromagnet mounted on the base being utilized to vibrate the container. It is possible to damage the leaf springs during the handling and shipment of the feeder by moving the container sufficiently with respect to the base so as to exceed the elastic limit of the leaf springs. Disclosed herein is structure for limiting movement of the leaf springs so as to prevent damage thereto.

SUMMARY OF THE INVENTION

One embodiment of this invention might involve: in a linear vibratory parts feeder including a parts container, a counterbalance weight, spring means connecting said weight and said container, means mounted on said weight for vibrating said container, a base, and means for mounting said base on supporting structure; the improvement which comprises a limit member fixed to said base, flat leaf springs mounting said weight on said limit member, said limit member being spaced from said weight a sufficient distance to permit elastic deformation of said flat leaf springs during operation of said feeder but closely enough spaced to prevent damage to said flat leaf springs by excessive deformation thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a linear vibratory parts feeder embodying the present invention; and

FIG. 2 is an enlarged fragmentary vertical section taken as if through one end of the Figure of FIG. 1 of an alternative embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawings, there is illustrated a linear parts feeder **10** which includes a parts container **11** consisting of a trough along which parts are moved by vibration of the container. The parts container or trough **11** is driven and vibrated back and forth by a motor **12** fixedly mounted on a counterbalance weight or block **15** and having its armature **16** coupled to the parts container **11**. The parts container **11** has downwardly projecting portions **17** which are coupled to two sets of flat leaf springs **20**. The springs **20** are not vertical and instead are inclined as illustrated so that the parts container **11** is caused to move up and down by reason of the springs bending in a direction perpendicular to the flatness of the springs while the motor **12** vibrates the parts container **11**. Such movement causes the parts container **11** to intermittently move the parts in the direction away from which the springs **20** are inclined.

The parts feeder is mounted on a base **25** including a flat horizontal member **26** and removable mounting ears **27**. Three of the removable mounting ears **27** are

provided with only two being shown in FIG. **1**. The mounting ears **27** can be removed to facilitate mounting the linear parts feeder in cramped spaces. Fixed to the member **26** are limit blocks or members **30** to each of which is fixed a vertically extending flat leaf spring **31** by washer **28** and screws **29**. Each of the flat leaf springs **31** is also fixed to the counterbalance weight or block **15** by screws **33** and washer **34**. The spacer **34'** spaces the spring **31** away from counterbalance weight **15**. The springs **20** as well as the springs **31** have a tendency to bend only in a direction perpendicular to the flatness of the springs. During operation the springs **31** bend only about one fourth as much as the springs **20**.

The function of the limit blocks **30** is to block movement of the counterbalance weight **15** longitudinally thereof during handling and shipment so as to prevent excessive bending and damage to the springs **31**. The limit blocks **30**, however, are spaced sufficiently from the counterbalance weight **15** so that in normal operation of the device there is no contact between the limit blocks **30** and the counterbalance weight **15**. It will be noted that the counterbalance weight **15** has two recesses **32** which are complementary in configuration to the limit members **30**. The counterbalance weight **15** has a downwardly projecting portion **35** which extends between the limit members **30** so that no matter which direction, either toward one of the springs **31** or toward the other spring **31** that the counterbalance weight moves, this movement is limited and the springs are protected.

The removable mounting ears **27** may be secured to a supporting element or surface by means of hollow externallY threaded members **40**. In the manner described in my co-pending application, Serial No. **119**, the externally threaded members or bolts **40** have hollow interiors **41** and are vertically adjustable with respect to the mounting ears **27** by means of nuts **42** positioned on opposite sides of the mounting ears. The hollow members **40** are fixed to the supporting surface by means of bolts which extend through the hollow interiors **41**.

Referring now to FIG. **2**, some of the details of the structure of FIG. **1** are illustrated and also an alternative embodiment is shown. This alternative embodiment is identical to the structure illustrated in FIG. **1** with exception that the lower base plate or member **26** is drilled out and counterbored to form a lower base plate member **26'** with this drilling out being accomplished at the holes or openings **50** which normally receive the screws **51** fixing the limit members **30** to the base plate **26**. There is also added a riser plate **52** which can have any vertical dimension, thus permitting adjusting the vertical position of the parts receptacle **11**. The riser plate **52** has threaded bores **55** which receive the screws **51** and fix the limit members **30** in position. The cap screws **54** fix the plate **26'** to the riser plate **52**. The vertically extending flat leaf springs **31** are each fixed to the limit members **30** by a pair of cap screws **56**. Alternatively the riser plate **52** can be welded to the lower base plate or member **26'**.

It will be evident from the above description that the present invention provides an improved straight line vibratory parts feeder which incorporates means for protecting the lower flat leaf springs **31**. It will also be evident that the straight line feeder of the present in-

vention incorporates means for isolating the vibration produced in the device so that little vibration is transmitted through the base plate **26** or **26'** to the supporting element or surface.

The invention claimed is:

1. In a vibratory parts feeder combination having a parts container, a counterbalance weight, means connecting said weight and said container, means connected to said weight being operable to vibrate said container, a base, flexible leaf springs mounting said weight on said base, wherein the improvement comprises:

said base has limit means with a surface spaced from but adjacent to said weight, said limit means surface directly contacts and limits movement of said weight during excessive deformation of said leaf springs.

2. In a linear vibratory parts feeder including a parts container, a counterbalance weight, spring means connecting said weight and said container, means mounted on said weight for vibrating said container, a base, and means for mounting said base on supporting structure; the improvement which comprises a limit member fixed to said base, flat leaf springs mounting said weight on said limit member, said limit member being spaced from said weight a sufficient distance to permit elastic deformation of said flat leaf springs during operation of said feeder but closely enough spaced to prevent damage to said flat leaf springs by excessive deformation thereof, said feeder additionally comprising a second limit member, said second limit member also being fixed to said base, said weight having recesses therein complementary in configuration to said limit members, said weight having a downwardly projecting portion which extends between said limit members.

3. The linear vibratory parts feeder of claim **2** additionally comprising a riser plate formIng a part of said base, said riser plate having said limit members fixed thereto, said base including a second member to which said riser plate is fixed, said means for mounting said base on supporting structure comprising removable mounting ears secured to said second member.

4. The linear vibratory parts feeder combination of:

a parts container;

a counterbalance weight;

means connecting said weight and said container;

means connected to said weight for vibrating said container;

base structure having limit means directly contactable with said weight limiting horizontal movement thereof; and,

flat leaf springs mounting said weight on said base structure, said leaf springs being structure in addition to said base structure and said limit means.

5. The linear vibratory parts feeder combination of:

a parts container;

a counterbalance weight;

spring means connecting said weight and said container;

first means mounted on said weight for vibrating said container;

base structure having limit means contactable with said weight limiting horizontal movement thereof;

flat leaf springs mounting said weight on said base structure; and wherein:

said limit means has a first block with a vertical surface spaced from but adjacent to said weight.

6. The combination of claim **5** wherein:

said weight has a recess complementary in configuration to said first block.

7. The combination of claim **6** wherein:

said limit means has a second block with another vertical surface spaced from but adjacent to said weight;

said weight has another recess complementary in configuration to said second block; and,

said first and second blocks are positioned at opposite ends of said weight.

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