Dec. 20, 1966 A. C. SCHROEDER, SR 3,292,343

APPARATUS FOR COMPRESSING THE FLAPS OF LOADED SHIPPING CASES

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FIG. 6

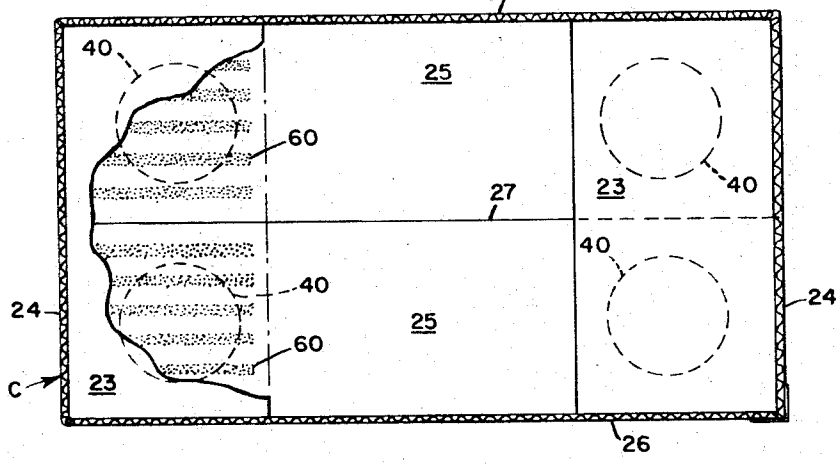


FIG. 1

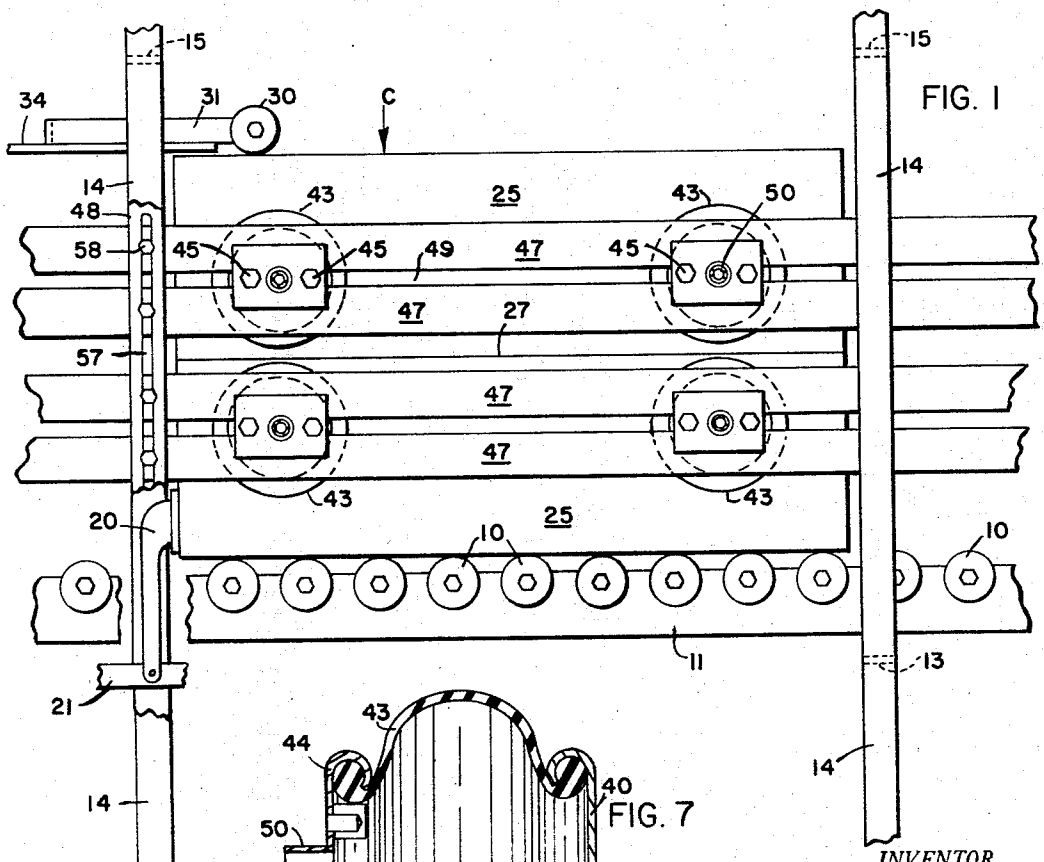
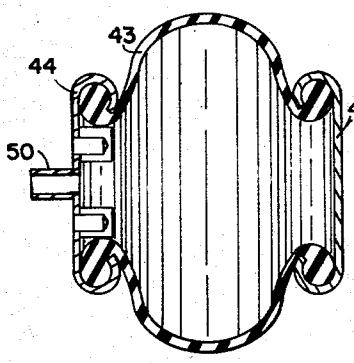


FIG. 7



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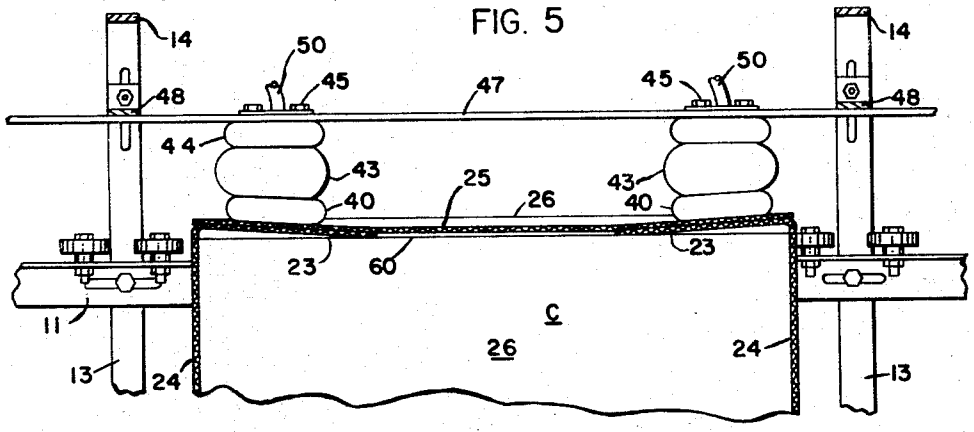
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APPARATUS FOR COMPRESSING THE FLAPS OF LOADED SHIPPING CASES

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FIG. 5



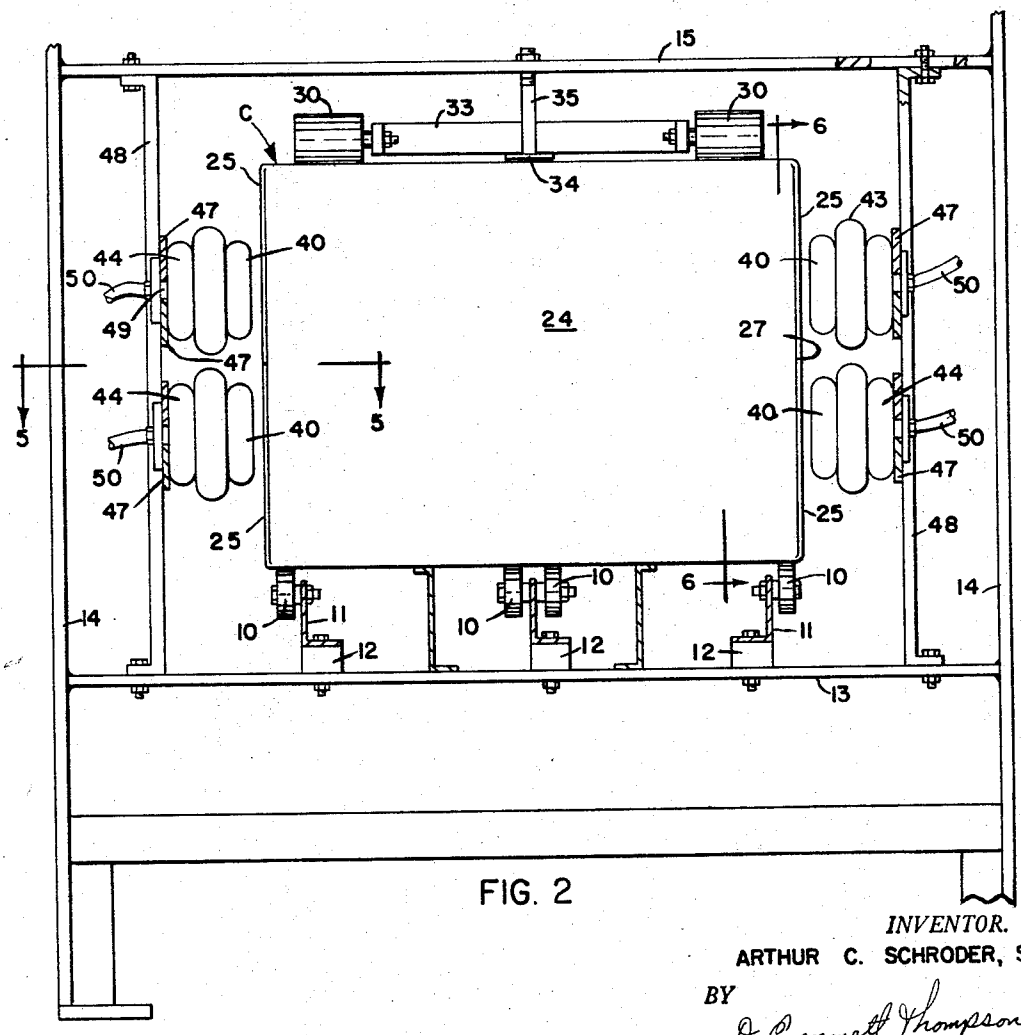


FIG. 2

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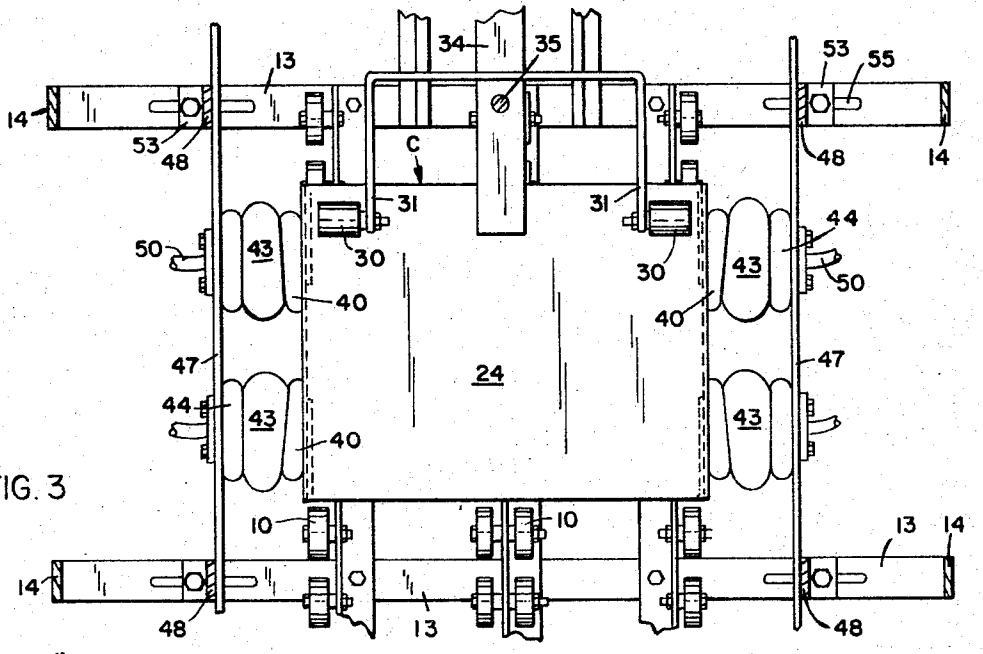


FIG. 3

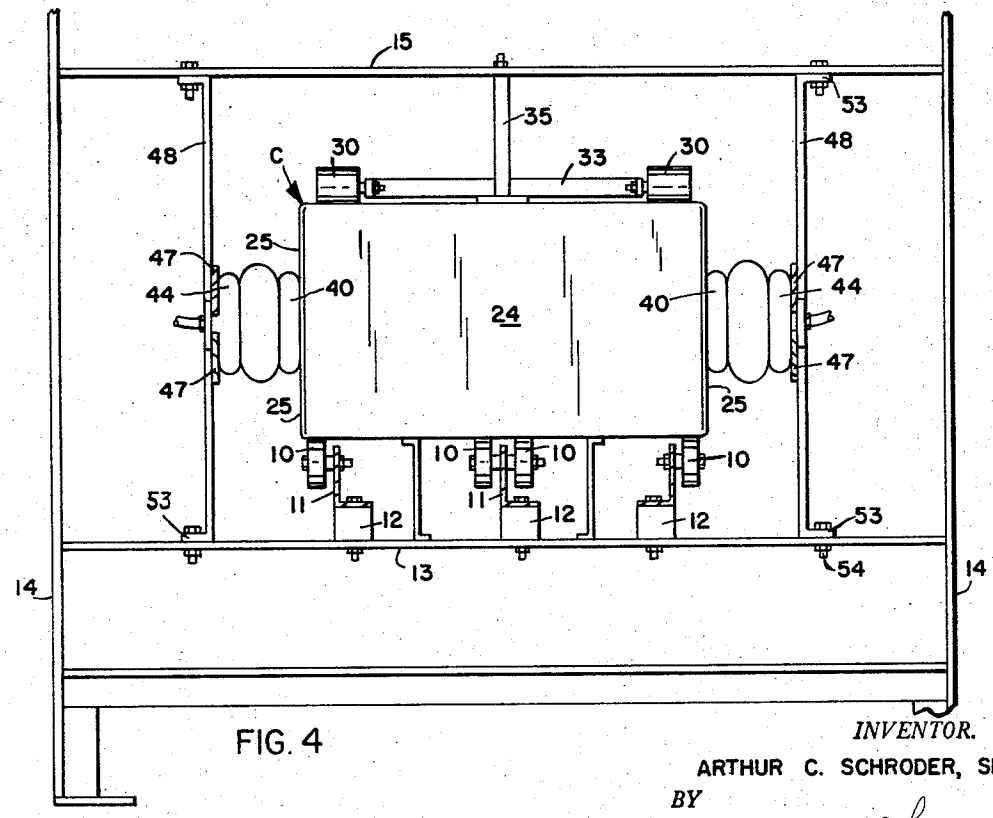


FIG. 4

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United States Patent Office 3,292,343 Patented Dec. 20, 1966

3,292,343

APPARATUS FOR COMPRESSING THE FLAPS OF LOADED SHIPPING CASES

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6 Claims. (Cl. 53—387)

This invention relates to apparatus for compressing the closed flaps of corrugated paperboard shipping cases. The invention is particularly suitable to be employed as part of case loading and closing machines, which function to select collapsed cases from a supply magazine, expand the cases to tubular form, load the cases with articles, preserve certain of the closure flaps with adhesive, and fold the flaps to overlapping closed position. A machine of this type is disclosed in my Patent No. 2,831,300, issued April 22, 1958.

In such machines, the loaded and closed cases are subjected to compression to move the overlapping closed flaps into engagement, so that the flaps may become adhered by the adhesive material applied to the flaps. Such compression units are of substantial length and apply pressure over the entire area of the side of the case formed by the closed flaps. The compression units are usually at least three times the length of a case, and the pressure is applied against the entire area of the flaps of all of the cases in the compression unit, the theory being to maintain the overlapping flaps in engagement for a period of time to permit the adhesive to penetrate the corrugated board. In such compression units, the pressure is also applied on the corners and side walls of the cases.

I have found that it is detrimental to apply any pressure on the edges of the case. Pressure applied in those areas tend to weaken the bend, or joint, between the flaps and the adjacent side walls of the case, and also tends to weaken the side wall of the case whereby, when loaded cases are palletized, or otherwise arranged in stack formation, the cases have a tendency to collapse.

Furthermore, there are many instances wherein the case is not completely filled—that is, the articles loaded into the case do not completely fill the case, and accordingly, when these cases are moved through the conventional compression chamber, or unit, the outer flaps are not moved, under pressure, against the inner flaps, as the latter simply swing down away from the outer flaps. The compression units usually employ elongated bars, or endless belts, backed up by pressure rolls, both arrangements extending the length of the compression unit, and these bars and belts exert considerable pressure on the edges, or side walls, of the cases and can not be moved inwardly any appreciable distance without injuring, or collapsing, the side wall of the case. Therefore, in a partially filled case, the outer flaps are not pushed against the inner flaps.

This invention has as an object a shipping case compression unit, or apparatus, employing compression pads which are located, or arranged, to engage only areas of the outer flaps, which areas are spaced inwardly from the side edges of the case, whereby these areas of the outer flaps, to which the compression pads apply pressure, may bow inwardly against the underlying inner flaps without exerting any pressure on the side walls of the case, the inner flaps swinging inwardly until such motion is resisted by the articles in the loaded case. During such movement of the outer and inner flaps, a rubbing or sliding action is obtained to effect a spreading, or smearing, of the adhesive over the confronting surfaces of the flaps to effect better adhesion between the inner and outer flaps, all whereby the compression unit need only be of such length as to accommodate one case and yet effect complete adhesion of the flaps.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

In the drawings:

FIGURE 1 is a side elevational view, with parts broken away, of a case compression apparatus embodying my invention.

FIGURE 2 is an end elevational view of the unit shown in FIGURE 1.

FIGURE 3 is a top plan view of the apparatus shown in FIGURES 1 and 2, with the upper cross members of the frame removed.

FIGURE 4 is a view, similar to FIGURE 2, wherein the compression unit employs only one pair of compression members at each side of the case for cases of smaller dimension.

FIGURE 5 is a sectional view taken on line 5—5, FIGURE 2.

FIGURE 6 is a sectional view of the case taken on line 6—6, FIGURE 2.

FIGURE 7 is a sectional view through one of the compression units.

In the arrangement shown in FIGURES 1, 2, 3 and 4, the cases C are supported on a series of rollers **10** mounted on rails **11** which are supported on blocks **12** fixed to cross members **13**. The cross members **13** are fixedly secured to bars **14** extending upwardly from the floor and being connected at their upper ends by cross members **15**.

The rails **11** may extend from the machine for automatically opening, loading and closing the cases. The loaded cases are advanced to the compression unit, as by pusher shoes **20** carried by reciprocating members **21** forming part of the carriage mechanism in the machine for advancing the cases through the machine.

The cases are of conventional form provided at opposite sides with flaps **23** joined to the end wall panels **24**, these flaps being folded inwardly to closed position, as shown in FIGURE 6. The confronting edges of the folded flaps **23** usually terminate in spaced apart relation. A pair of outer flaps **25** are joined to the side wall panels **26** of the case. These flaps **25** have a width substantially half the width of the case, so the confronting edges substantially abut when the flaps are folded to closed position, as indicated by the line **27**, as shown in the drawings.

As the filled cases are advanced to the position shown in FIGURE 1 by the pusher **20**, the cases pass under rollers **30** journalled on arms **31** of a U-shaped bracket **33** fixed to a plate **34** carried by a stud **35** fixed to an upper cross member **15**. The function of the upper roller assembly is to properly maintain the cases C on the rollers **10**.

In the arrangement shown, the cases C are advanced to the compression apparatus with the flaps arranged at the vertical sides of the case, and compression members are mounted in the framework at opposite sides of the case. These compression members, see FIGURE 7, include a compression pad **40** and fluid expansible means for moving these pads toward and from the case into and out of engagement with the outer folded flaps **25**. Previous to the advancement of the case to the position shown in the drawings by the pusher **20** and the folding of the flap to closed position, selected ones of the flaps are preserved with adhesive, the case loading machine being provided with adhesive applicators for that purpose, as set forth in Patent No. 2,831,300.

The compression pads **40** are mounted on the fluid expansible means so as to be free to move out of the normal plane parallel to the plane of the outer case flaps **25**. As shown in FIGURE 7, the expansible means consists of a

circular member 43 formed of resilient or elastic material, such as rubber, and having the general form of a wheel tire. The compression plates 40 are hermetically affixed to one side of the tire member 43, and a mounting plate 44 is so affixed to the opposite of the tire member, and is provided with threaded apertures to receive mounting bolts 45. These compression units are mounted on bars 47 fixed to the vertically extending bars 48. The bars 47 are arranged in pairs to provide a slot 49 through which the mounting bolts 45 extend. This arrangement provides for the convenient adjustment of the compression members in a direction lengthwise of the case. The plates 44 are also provided with central apertures to receive a conduit 50 connected to a source of fluid under pressure. The vertical bars 48 are formed with laterally extending flanges 53 apertured to receive bolts 54 positioned in elongated slots 55 in the lower and upper cross bars 13, 15, whereby the vertical bars 48 may be moved laterally to accommodate cases of different dimension from one flap side to the other. The vertical bars 48 are also formed with vertically extending slots 57 to receive bolts 58 for attaching the bars 47 to the bars 48 to provide for vertical adjustment of the compression units. The bars 48 are mounted on the cross members 13, 15, so as to normally space the compression pads 40 slightly outwardly from the flap sides of the case, as shown in FIGURE 2.

An important feature of this invention is that the compression units are so located that the compression pads engage only with areas of the outer flaps 25, which areas are positioned inwardly from the edges of side walls 24, 26, as illustrated in FIGURE 6. In FIGURE 6, the inner flap 23 at the left end of the view is broken away to show the application of adhesive on the inner surface of the outer flaps 25 in areas corresponding to the areas contacted, on the outer surface of the flaps 25, by the compression pads 40, this application of adhesive being in the form of stripes, as indicated at 60, FIGURE 6.

The case is advanced on the rollers 10 by the pusher 20 to the position as shown in FIGURE 1, and fluid under pressure is supplied to the conduits 50, causing the pads 40 to move inwardly from the position shown in FIGURE 2, to the position shown in FIGURES 3, 4 and 5. Due to the elasticity of the members 43, the pads 40 are free to move out of their normal plane, as shown in FIGURE 5, to conform to the inclination of the flaps under pressure. When the pads 40 are moved into engagement with the outer flaps 25, these flaps are bowed inwardly into engagement with the inner flaps 23, which may swing inwardly until they engage the load line 60, FIGURE 5, of the articles, or materials, packed in the case. In this operation, the outer flaps 25 are pressed firmly against the inner flaps 23, and during the inward movement of the flaps 25, 23, a rubbing or sliding action is effected between these flaps, causing a spreading, or smearing, of the adhesive 53. This operation takes place without exerting any pressure on the side panels 24, 26, of the case.

What I claim is:

1. Apparatus for compressing the closure flaps of a single loaded paperboard shipping case, the closure flaps being pre-served with adhesive and folded to overlapping closed position, said apparatus comprising pad supporting means, a pair of compression pads mounted on said supporting means and arranged in spaced apart relation to receive a case therebetween, means for supporting a case between said compression pads with areas of said flaps spaced inwardly from the side and end edges of the case aligned with said compression pads, and means operable to cause engagement of said compression pads only with said flap areas under a predetermined pressure, said compression pads having universal movements relative to said pad supporting means.

2. Apparatus for compressing the closure flaps of a single loaded corrugated board shipping case, the closure flaps being preserved with adhesive and folded to closed overlapping position, said apparatus comprising a pair of compression pads, means for supporting a case between said pads with areas of said flaps of said case spaced inwardly from the side and end edges of the case aligned with said pads, said compression pads being movable in a direction perpendicular to the plane of said folded flaps into and out of engagement therewith, said pads having limited universal movement relative to said plane, and means operable to cause engagement of said pads only with said flap areas under a predetermined pressure.

3. Apparatus for compressing the closure flaps of a single loaded corrugated shipping case, the closure flaps being pre-served with adhesive and folded to closed overlapping position, said apparatus comprising means for supporting the case, a plurality of compression pads, means operable to cause movement of said pads in a direction perpendicular to the normal plane of said flaps into engagement with selected areas only of said flaps, which areas are spaced inwardly from the side and end edges of the case, and each of said pads having limited universal movement relative to said plane.

4. Apparatus for compressing the closure flaps of a loaded corrugated shipping case, the closure flaps being preserved with adhesive and folded to closed overlapping position, said apparatus comprising means for supporting the case, a plurality of compression pads arranged in group patterns at opposite sides of the case, the compression pads of each group being aligned with areas of said flaps spaced inwardly from the side edges of the case, and means operable to cause engagement of said compression pads only with said areas of the flaps under a predetermined pressure.

5. Apparatus for compressing the closure flaps of a loaded corrugated shipping case, said case being formed on opposite sides with inner and outer closure flaps preserved with adhesive and folded to closed overlapping position, said apparatus comprising a frame, a case guideway for supporting a case, a compression pad mounted in the frame at opposite sides of the case in confronting relation to the outer folded flaps, fluid expansible means operable to move said pads into engagement with selected areas only of said outer flaps, said selected areas being spaced inwardly from the side edges of the case.

6. Case compression apparatus as defined in claim 5, wherein said pads are adjustable in the frame in a direction lengthwise of the case and transversely thereof.

References Cited by the Examiner

UNITED STATES PATENTS

1,194,262	8/1916	Wilder	53—387
3,114,226	12/1963	Taggart et al.	53—388 X

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