Oct. 16, 1956 S. C. NIELSEN 2,766,495

COLLAPSIBLE PACKING CASE AND CONNECTING FITTINGS THEREFOR

Filed April 7, 1951 2 Sheets-Sheet 1

FIG. 1

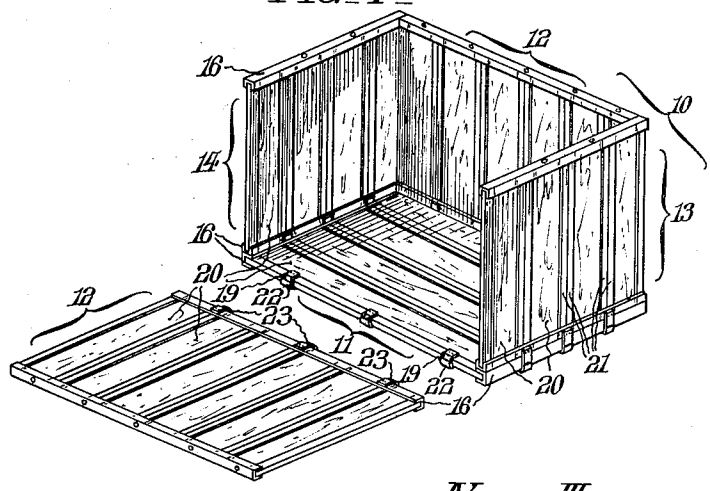


FIG. 2

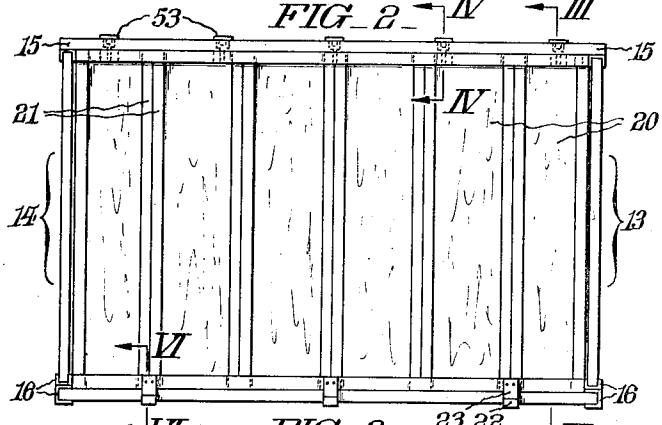
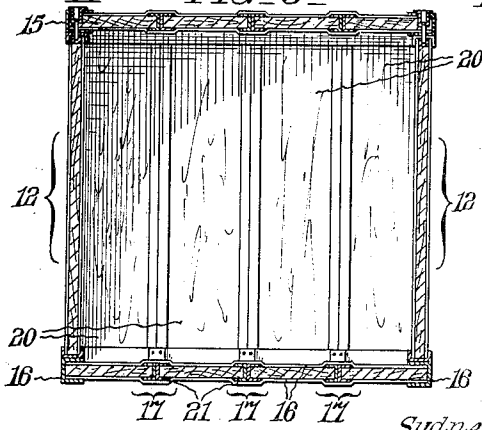


FIG. 3



INVENTOR:
Sydney C. Nielsen,
BY Paul & Paul
ATTORNEYS.

Oct. 16, 1956 S. C. NIELSEN 2,766,495

COLLAPSIBLE PACKING CASE AND CONNECTING FITTINGS THEREFOR

Filed April 7, 1951 2 Sheets-Sheet 2

FIG_4_

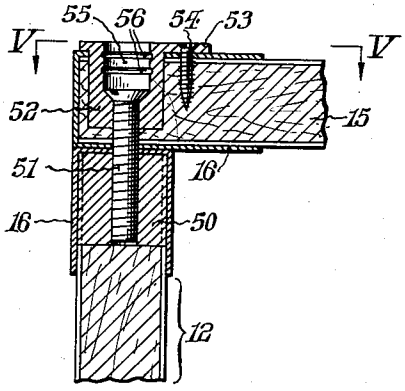


FIG_5_

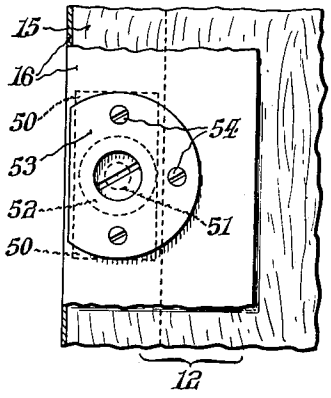


FIG_6_

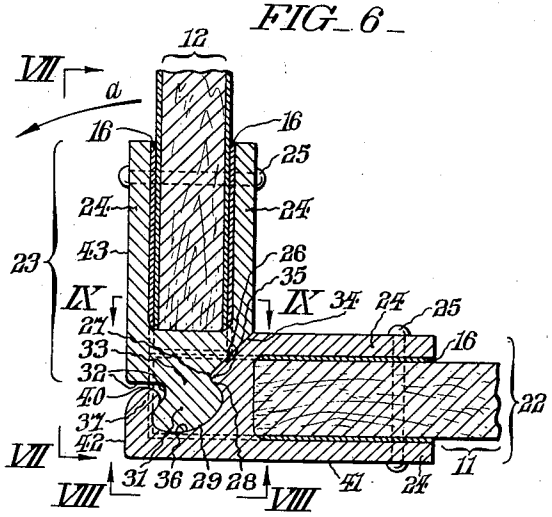


FIG_7_

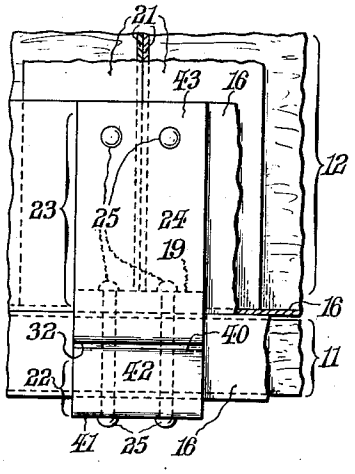


FIG_8_

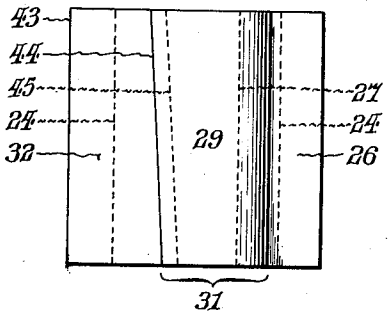
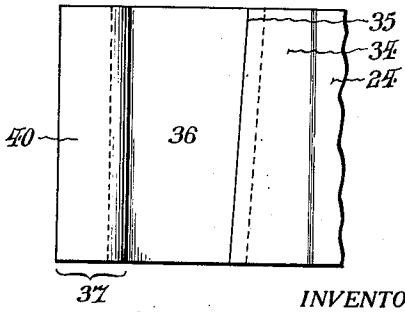


FIG_9_



INVENTOR:
Sydney C. Nielsen,
BY Paul & Paul
ATTORNEYS.

United States Patent Office

2,766,495

Patented Oct. 16, 1956

2,766,495

COLLAPSIBLE PACKING CASE AND CONNECTING FITTINGS THEREFOR

Sydney C. Nielsen, Camberwell, Victoria, Australia, assignor to Sydney J. Blundell, Camberwell, Victoria, Australia

Application April 7, 1951, Serial No. 219,799

3 Claims. (Cl. 20—92)

This invention relates to a non-weaving collapsible packing case, and to connecting fittings therefor. More particularly it relates to a non-weaving collapsible packing case having fittings including concealed interlocking elements which are thus protected or shielded from damage.

Heretofore it has been proposed to provide connecting fittings for packing cases, each consisting of a hook and a loop or eye. However, packing cases having such fittings have been characterized by a pronounced tendency to weave, and this shortens the useful life of the case and causes damage to the contents. Moreover, in fastenings or fittings of this type the connections are exposed and thus are likely to be damaged or interfered with.

The principal object of the present invention is to provide a packing case in which the sides and ends may be connected securely to the bottom by concealed fastenings which can be engaged and disengaged by relative tilting or sliding movements.

A further object of this invention is to provide a collapsible packing case having its sides and bottom securely connected by fittings which can be readily disconnected entirely from one another thus making it possible to disassemble the case into separate panels.

A still further object is to provide a tamper proof packing case in which all of the fastening elements are concealed.

Another object of the present invention is to provide a shipping case which can be disassembled and which is non-weaving, and to provide connecting fittings therefor.

The foregoing and other objects are attained by providing a collapsible case comprising a plurality of panel members, a male fitting having an enlarged head on one of said panel members, and a female fitting having an enlarged socket groove on another of said panel members, said head and groove being shaped to interlock with one another when the panel members are assembled in the form of a case.

Other objects and advantages of the present invention will be apparent from the accompanying drawings, in which:

Fig. 1 is a perspective view of a partly assembled packing case constituting one embodiment of the invention, with one side disconnected from the body of the case;

Fig. 2 is a side elevation of the packing case of Fig. 1 in assembled form, with a cover panel attached;

Fig. 3 is a sectional view taken as indicated by the lines and arrows III—III, which appear in Fig. 2;

Fig. 4 is an enlarged fragmentary view, partly in section, taken as indicated by the lines and arrows IV—IV, which appear in Fig. 2;

Fig. 5 is an enlarged, fragmentary plan view, taken as indicated by the lines and arrows V—V, which appear in Fig. 4;

Fig. 6 is an enlarged sectional view of one set of the fittings which appear in Fig. 1, taken as indicated by the lines and arrows VI—VI which appear in Fig. 2;

Fig. 7 is a view in elevation taken as indicated by the

lines and arrows VII—VII which appear in Fig. 6;

Fig. 8 is an enlarged end view of the male element of the fitting shown in Fig. 6, viewed as indicated by the lines and arrows VIII—VIII which appear in Fig. 6, the female element being removed for the sake of clarity; and

Fig. 9 is an enlarged plan view of the end portion of the female element of the fitting shown in Fig. 6, viewed as indicated by the lines and arrows IX—IX which appear in Fig. 6, the male element being removed for the sake of clarity.

It will be appreciated that the embodiment of the invention selected for illustration in the drawings constitutes one preferred embodiment thereof, which may be modified in many ways without departing from the scope of the invention.

Referring now particularly to Figs. 1–3 of the drawings, the reference number **10** represents a packing case having a bottom panel **11**, side panels **12**, front panel **13**, back panel **14**, and cover panel **15**. Channel irons **16** are affixed to all the outer edges of the panels **11—15**. Each of the aforesaid panels **11—15** consists of a plurality of rectangular panel sections **20** each carrying at its edges the intermediate channel irons **21**, which are arranged back to back and serve as reinforcing ribs for the assembled panels. The channel irons **16** and intermediate channel irons **21** are secured to the rectangular panel sections **20** by conventional fasteners such as screws or rivets, for example. The channel irons **16** have longitudinal offset tapered sections **17** which accommodate the flanges of the intermediate channel irons **21**, urging the adjacent channel irons toward one another, thereby securing the individual panel sections **20** together.

Secured in uniformly spaced rectangular grooves to each of the front, back and side edges of the bottom panel **11** are three female connecting fittings **22**. Similar spaced in grooves **19** on the bottom edges of each of the side, front, and back panels **12, 13, 14** are three male connecting fittings **23** matching the female fittings **22**. The fittings **22, 23** are readily interlocked when placed in registry with one another, and provide means whereby the packing case **10** is quickly assembled or taken apart.

Referring now more particularly to Figs. 6–9 of the drawings, each male and female connecting fitting **23, 22** has spaced flanges **24** accommodating the channel iron **16**. Flanges **24** are secured to channel irons **16** and to the panel sections **11, 12** by rivets **25**.

Each male connecting fitting **23** has a flat beveled face **26** extending outwardly at an angle of substantially 45 degrees to the inside flange **24**. At the extremity of the beveled face **26** is a rounded face **27** and another substantially flat face **28** at approximately right angles to the beveled face **26**. The flat face **28** terminates in a curved face **29** of substantially elliptical cross section, forming the enlarged head element **31** constituting the interlocking member of the male connecting fitting **23**. Enlarged head element **31** terminates in a substantially V-shaped notch or groove **32**, forming the restricted neck element **33** of the male connecting fitting **23**.

Female connecting fitting **22** has a beveled face **34** matching the beveled face **26**, a curved ridge **35** matching the rounded face **27** and an enlarged substantially elliptical socket groove **36** snugly accommodating the enlarged head **31**. The upwardly extending, inwardly curved flange **37** extends toward and coacts with curved ridge **35** to form a narrow inlet of lesser width than that of the socket groove **36** but of greater width than that of neck element **33**. The inwardly curved flange **37** has a rounded top edge **40** spaced from the surfaces of the V-shaped notch or groove **32** when the enlarged head **31** and socket groove **36** are in interlocked position, as indicated in Fig. 6. Free space is thereby provided for outwardly directed tilting movement of the entire male connecting fitting

23 in the direction indicated by the arrow (*a*) in Fig. 6. The enlarged head 31 revolves in socket groove 36 and serves as a pivot for such tilting movement. By tilting the male connecting fitting 23 in the manner indicated, the relatively narrow transverse dimension of the elliptical enlarged head 31 is aligned with the restricted inlet of socket groove 36, providing for its removal from socket groove 36.

It is important to observe that the female connecting fitting 22 has a flat outer face 41 and a flat end face 42 at right angles to face 41. Moreover the male connecting fitting 23 has a flat outer face 43 which extends to a point immediately adjacent the flat end face 42 when the male and female connecting fittings are interlocked. Thus the interlocking elements of the fittings are formed internally of the fittings and effectively shielded from damage due to external forces or causes.

Referring more particularly to Figs. 8 and 9 of the drawings, it will be observed that the outer edges 44 and 45 of the enlarged head 31 and V-shaped groove 32, respectively, are tapered lengthwise, in that they are disposed at an angle to the corresponding inner edges of the enlarged head 31 and rounded face 27. Correspondingly the socket groove 36 is tapered lengthwise at the same angle, in that the edge of curved ridge 35 and the entire inner face of socket groove 36 are disposed at an angle relative to the corresponding surfaces of the curved flange 37. Thus the male and female connecting fittings may readily be interlocked by placing the narrow end of enlarged head 31 in line with the wide end of socket groove 36 and sliding the enlarged head 31 bodily lengthwise into the socket groove 36. The extent of such sliding movement is limited by ultimate face-to-face contact established between the enlarged head 31 and socket groove 36.

Detachable means are provided for attaching the cover panel 15 to the side, front and back panels 12, 13, 14. Having particular reference to Figs. 4 and 5 of the drawings, side panel 12 carries a metal piece 50 vertically tapped for threaded engagement with screw 51, an appropriate aperture being provided in the web of its top channel iron 16 to accommodate screw 51. Cover panel 15 has an upwardly open cylindrical socket receiving the metallic insert 52 having an integral flange 53. Three screws 54, passing through apertures in flanges 53, serve to secure the metallic insert 52 to cover panel 15. Metallic insert 52 has a central vertical recess 55 shaped to fit screw 51, and also has a pair of horizontal ring grooves 56 of semi-circular cross section. While the screws 51 alone serve to secure the respective panels 15, 12 together, molten metal, wax or the like is preferably poured into central recess 55 and permitted to solidify. The solidified metal or wax forms a plug interlocked with ring grooves 56, forming an effective lock preventing unauthorized persons from removing screws 51. The solid plugs are conveniently melted down by authorized persons provided with appropriate equipment, for access to screws 51.

The connection of the side, front and back panels 12, 13, 14 to one another or to cover panel 15 locks the male and female connecting fittings 22, 23 against relative pivotal or longitudinal sliding movement, preventing the detachment of one from the other.

Each fitting according to this invention is composed of a male and a female member, one of which is attached to the bottom of a side or end of the case and the other of which is attached to the bottom of the case, the two members being so shaped that one can be inserted into the other when the side or end of the case is in a lowered position where it is positioned at an acute angle in relation to the bottom of the case, and so that when the side or end is swung up into a position at right angles to the bottom of the case, or approximately so, the two members of the fitting are locked together so that they cannot be disconnected without either reversing the movement or sliding the side or end in question in relation to the bottom of the case so that one of the members of the fitting is slid sideways out of the other.

Normally, the socket members will be attached to the bottom and the other co-acting male members will be attached to the sides and ends. When the sides and ends of the case have been connected to the bottom of the case and swung up to the vertical position, as above described, the sides and ends are supported to a sufficient extent to retain them in that position while the top of the case is being attached, but obviously any suitable temporary fastening means may be used to hold them more firmly until the lid is secured. The top may be connected to the sides and ends of the case very effectively by screws, bolts or like means. Where there is no danger of pilfering, the top may be secured, if desired, merely by nails but that would tend to shorten the life of the case. Alternatively, the top may be attached to the two sides or to the two ends by providing fittings similar to those used at the bottom of the case and by sliding the top into position. If these attachments are provided on the sides of the case the top is then connected to the ends by screws, bolts or like means but if these attachments are provided on the ends of the case, instead of on the sides, the top is connected to the sides by screws, bolts or like means. Normally, when it is desired to remove the contents from the case the top is removed and the sides and ends can be swung down but, if preferred, the top may be disconnected from an end or side and the latter may be swung down and disconnected so as to allow the contents of the case to be removed without completely disassembling the case.

The construction according to this invention not only has the gerat advantage of enabling the case to be assembled or disassembled rapidly but it provides a very strong and concealed fastening, the engaging portions of the fastening being inaccessible, and portions of the means attaching the fastening to the case being positioned inside the case. The top of fasteners used and the general construction of the case reduce distortion and other damage to an absolute minimum.

Although I have described in detail one embodiment of my invention with modifications thereof, it will be apparent that the device is capable of a wide variety of applications and uses, and that certain features thereof may be used to advantage without the use of other features. It is to be understood that the specific devices referred to and claimed herein are intended to comprehend all mechanical equivalents and reversals of parts which function in a similar manner to accomplish a similar result.

Having thus described my invention, I claim:

1. A detachable interlock structure comprising a male fitting having a neck and a head larger than said neck, said head having a curved external surface, and a female fitting having a socket groove curved to accommodate said head and a longitudinal inlet opening narrower than said socket groove, said head being of non-circular cross section with one principal transverse dimension larger than said inlet opening and another principal transverse dimension smaller than said inlet opening, said larger dimension being disposed across said inlet opening when the fittings are at right angles to one another and said smaller dimension being disposed across said inlet opening when the fittings are at another angle to one another, said head and socket groove being tapered lengthwise and also recessed relative to one another to provide free space for transverse relative tilting movement.

2. An interlocking fitting for the panels of a collapsible receptacle comprising a male connecting element having a pair of flanges spaced apart to receive one of said panels, a female connecting element also having a pair of flanges spaced apart to receive another of said panels, said male and female elements each having flat bevelled faces disposed at angles to contact one another when the flanges of the male and female elements are

at substantially right angles to one another, said male connecting element having a narrow neck and enlarged head having a large and a small principal transverse dimension and said female element having a restricted longitudinal inlet and an enlarged socket groove mating with said enlarged head to interlock said male and female elements when disposed at substantially right angles to one another and releasing to separate the said elements transversely when disposed at a larger angle relative to one another, said restricted inlet being wider than said narrow neck and said small principal transverse dimension.

3. A detachable interlocking fitting comprising a male connecting element including a body having outer and inner faces, substantially V-shaped grooves extending inwardly from said outside face and outwardly from said inside face to form a neck element narrower than said body, an enlarged head element in the form of a lug of substantially elliptical cross section having a large and a small principal transverse dimension extending transversely of said body and integral with said neck element; and a mating female connecting element including a body having outer and inner faces, a flange element having an outer face substantially perpendicular to the outside face of the body, a socket groove of substantially elliptical cross section extending transversely of said body, and curved projections on said flange element and said body defining a narrow longitudinal inlet passage for said

socket groove, said narrow inlet passage being wider than said neck element and said small principal transverse dimension but narrower than said enlarged head and said large principal transverse dimension, whereby said enlarged head and said socket groove are constructed to interlock internally of the bodies of said male and female connecting elements at a point shielded from external damage by the faces of said bodies and of said flange element and to release transversely outwardly upon rotation of the said enlarged head in the said socket groove disposing the said small principal transverse dimension across said inlet passage.

References Cited in the file of this patent

UNITED STATES PATENTS

317,460	Joyner	May 5, 1885
1,145,759	Dwyer	July 6, 1915
1,159,229	Keith	Nov. 2, 1915
1,534,468	Shea	Apr. 21, 1925
2,430,200	Wilson	Nov. 4, 1947

FOREIGN PATENTS

7,875	Great Britain	Aug. 13, 1903
12,571	Great Britain	June 3, 1904
524,228	Great Britain	Aug. 1, 1940
251,314	Switzerland	July 16, 1948