

1,040,242.

M. SCHÄFER.
FOLDING BOX.
APPLICATION FILED NOV. 4, 1911.

Patented Oct. 1, 1912.
3 SHEETS—SHEET 1.

Fig. 1

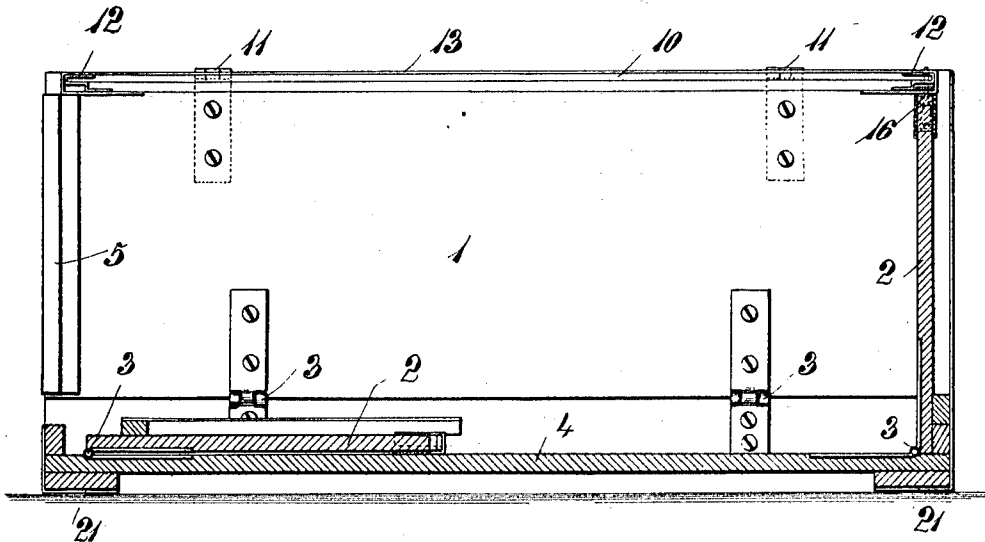


Fig. 5

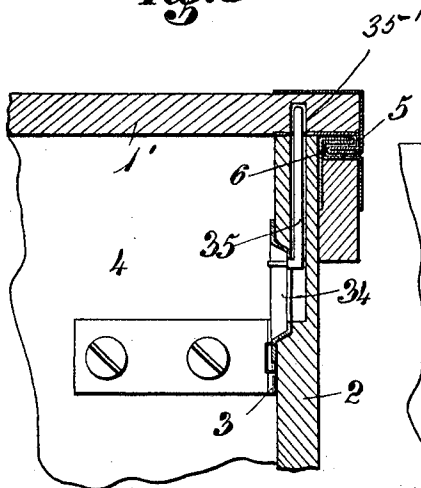
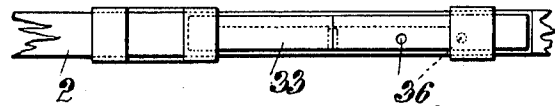
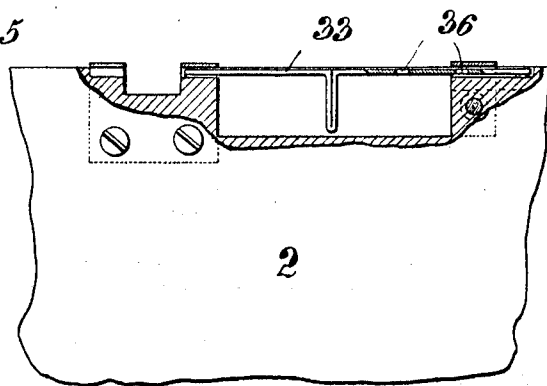


Fig. 6



Witnesses:
M. V. Lütken
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Fig. 7

Inventor:
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by B. Singer

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Fig. 4

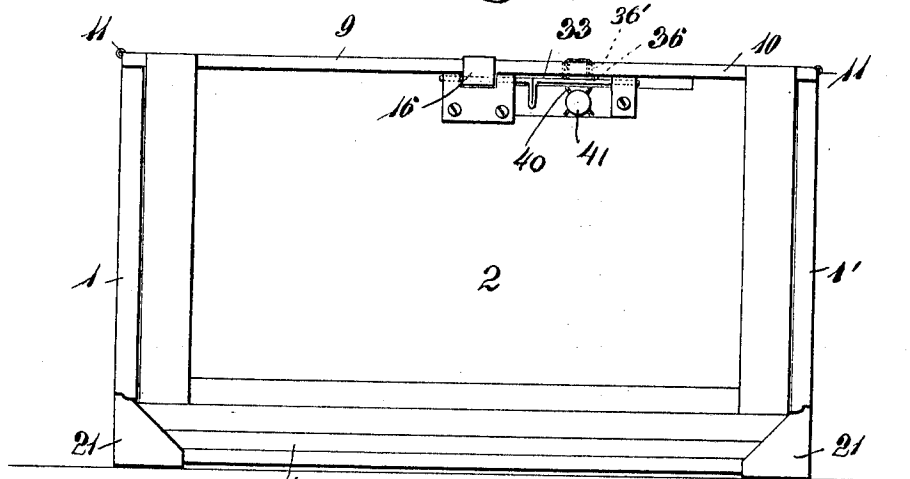


Fig. 2

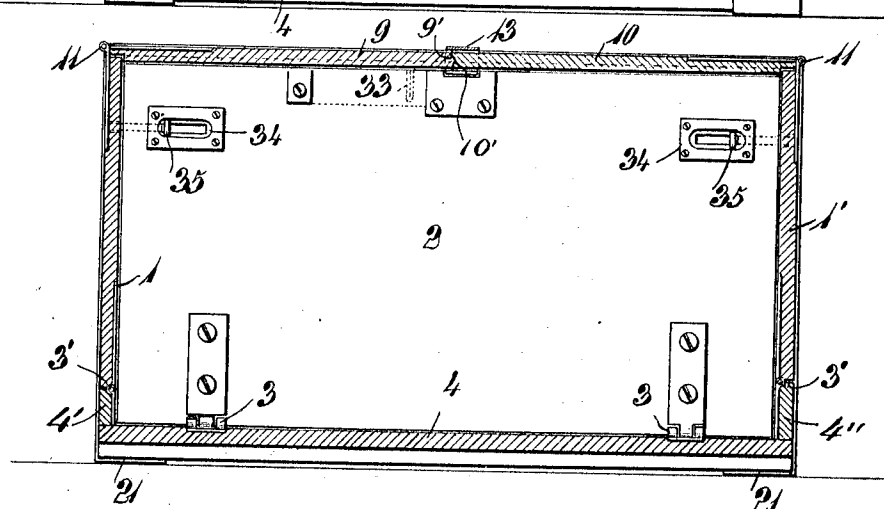
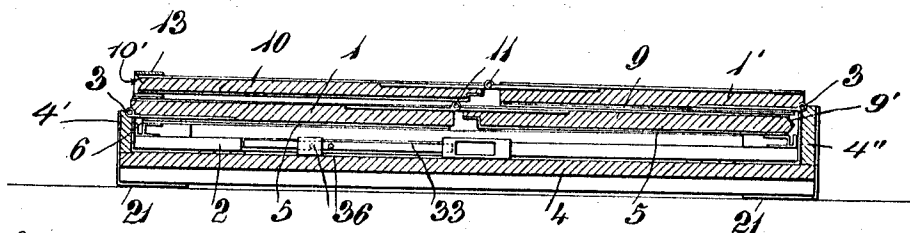


Fig. 3



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3 SHEETS-SHEET 3

Fig. 8

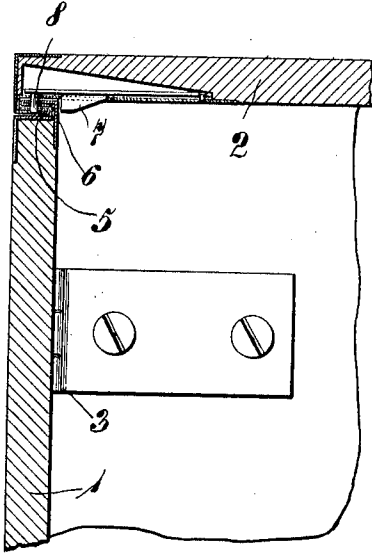


Fig. 9

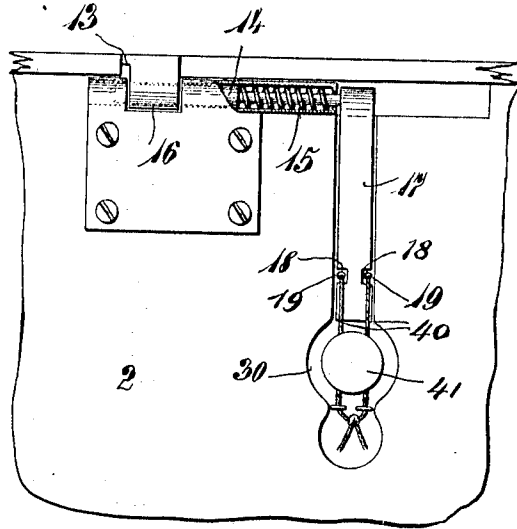


Fig. 10

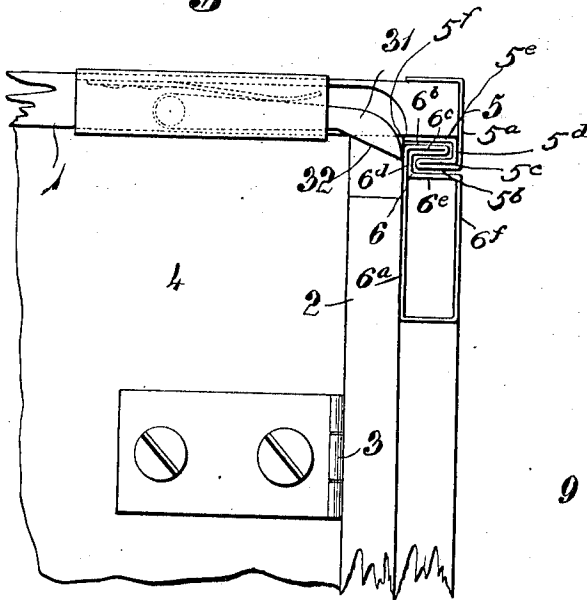
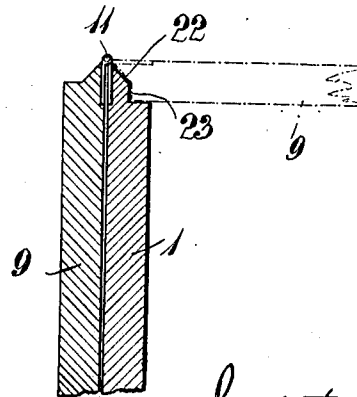


Fig. 11



Witnesses:
O. W. Beck
M. V. Fetterer

Inventor:
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by B. Singer
Att.

UNITED STATES PATENT OFFICE.

MENDEL SCHÄFER, OF CZERNOWITZ, AUSTRIA-HUNGARY.

FOLDING BOX.

1,040,242.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed November 4, 1911. Serial No. 658,552.

To all whom it may concern:

Be it known that I, MENDEL SCHÄFER, a subject of the Emperor of Austria-Hungary, residing at 4 Türkengasse, Czernowitz, Austria-Hungary, have invented new and useful Improvements in Folding Boxes, of which the following is a specification.

My present invention relates to boxes or crates, of that class which may be folded or knocked down to form a compact article for transportation or storage when not in use.

The principal objects of my invention are to so pivotally connect the base, sides ends and cover portions of the box that it may be quickly folded to a compact article of substantially rectangular form, and when assembled for use, is rigid and stable, resisting both bulging and indentation of wall portions. The construction is such that no tools are needed in assembling, and I particularly avoid the use of glue or other unreliable means for securing and connecting parts thereof.

Further objects of my invention are to so construct the box or crate that, when assembled for use, is of substantially rectangular form, thus avoiding lost space for the reception of articles to be transported in the box or crate, the advantage of which will be apparent especially considering the transportation of the box or crate, with its contents, charge for according to bulk or magnitude.

In the drawings, forming a part of this specification:—Figure 1 is a central longitudinal section through the box or crate, one of the end having been folded. Fig. 2 is a transverse section through the same. Fig. 3 is a transverse section through the box or crate in a folded condition. Fig. 4 is an end elevation of the box or crate. Fig. 5 is an enlarged fragmentary sectional view adjacent one corner of the same. Fig. 6 is a fragmentary elevation of a portion of one of the ends, parts being broken away to disclose details of construction. Fig. 7 is a top plan view of the structure disclosed in Fig. 6. Fig. 8 is a modification of the de-

vice shown in Fig. 5. Fig. 9 is a view similar to Fig. 6 showing a modification of the securing means for the lid of the box or crate. Fig. 10 is a fragmentary view in plane of a portion of the box or crate and one of its corners. Fig. 11 is a fragmentary view in vertical section through a portion of a side and lid of the box or crate.

Similar characters refer to similar parts throughout the several views.

In the drawings, 4 designates the base or bottom of the box, and 2 the ends pivotally connected thereto by hinges 3, in such a manner that the ends may be formed inwardly as shown in Fig. 1 of the drawing, to lie flat or next adjacent to the base 4. The base 4 carries laterally, wall or upstanding portions 4' and 4'' adjacent its side margins, such walls or upstanding portions being in stepped relation to each other, that is, one is somewhat higher than the other. To the portion 4' is pivotally connected a side 1, by hinges 3', adapted to fold inwardly and rest up or next adjacent to the ends 2, as shown in Fig. 3 of the drawing, while portion 4'' has pivoted thereto, by hinges 3', the opposite side 1', so spaced as to be folded to lie in a plane above or next adjacent to the plane of the side 1, as shown in Fig. 3 of the drawing.

The lid is formed in two substantially equal parts 9 and 10, the formed being pivotally connected by hinges 11 to the side 1 and the latter to side 1' by hinges 11. These lid parts are adapted to be swung to lie in the plane of the sides they are connected to and consequently, when the box is folded, lie next adjacent to the sides opposite from that to which they are connected, as clearly shown in Fig. 3 of the drawing.

From the foregoing and in connection with the drawing, it is made obvious that the box or crate may be folded flat to occupy a minimum amount of space, and that the shape when folded facilitates storing or shipping in a folded condition.

To assemble the box in readiness to receive the articles to be transported, several

devices are employed to form a rigid stable structure, the disposition and coaction of parts being such that the box may be quickly assembled, by a person not altogether familiar with the specific construction thereof. Adjacent each end of the upright margin of the end 2, I provide metal tongue and groove members 6 for coaction with similar tongue and groove members 5, which may be formed of a continuous sheet of metal having portions bent at right angles to each other and portions in parallel relation thereto. More particularly speaking, this member 6 includes portions bent in succeeding relation to each other, as shown in Fig. 10 of the drawing, that is, a straight portion 6^a for attachment to the end 2; a portion 6^b at right angles thereto; a retroverted portion 6^c parallel to portion 6^b; a portion 6^d parallel to portion 6^a and at right angles to portion 6^b; a portion 6^e at right angles to portion 6^d and a parallel to portion 6^a but spaced apart therefrom; and, a portion 6^f for attachment to the wall portion 2. The tongue and groove members are positioned with the tongue thereof extending toward, and the groove thereof open to, the outer side of their respective ends 2.

The sides 1 and 1' carry adjacent of their upright margins the tongue and groove members 5, provided with portions 5^a, 5^b, 5^c, 5^d, 5^e and 5^f, similar to the respective portions of member 6 and is positioned to coact with the respective portions of such members carried by the adjacent margins of the end 2 thereto. That is, the tongue of one member enters the groove of the other member, at the adjacent upright margins of the ends and sides.

In so far as the purpose of the coacting tongue and groove portions are concerned, any suitable catch mechanism may be provided to retain them in coacting relation to each other as hereinbefore described, however, consistent with the objects of my invention, I disclose catch mechanism which is conveniently disposed and arranged so as to not interfere with the compact folding of the box.

As shown in detail in Fig. 5 of the drawing, adjacent each pair of coacting members 5 and 6, I provide a bolt 35 carried by end 2 with its actuating portion disposed in a recessed plate 34, the bolt being adapted to enter a recess 35' in the side 1. Thus, when the bolt is thrown, as shown in Fig. 5, the end 2 cannot swing inwardly nor outwardly, neither can the side 1 swing away from the end 2, because of the interlocking members 5 and 6.

In Fig. 8 of the drawing, I show a modified form of the catch in which a spring catch 7 is movable in a recess formed in end 2, and provided with a pin 8 adapted to en-

ter perforations extending transversely through the metal sheet portions of members 6 and 5. The catch 7 may be manually displaced to fold the box, and is automatically sprung into locking engagement when the portion 1 is swung up and contacts with the beveled portion of the catch.

In Fig. 10, a further modification for retaining the sides and ends in assembled relation to each other, is shown, in which a spring actuated catch 31 is seated in a recess of side 1, normally projecting in the path of movement of end 2, and positioned to contact with member 6 when this member is in locking engagement with member 5. The member 31 is provided with a beveled portion 32 which the member 6 engages when the box is being assembled, forcing the same inward upon swinging the end 2 in place and springing into a retaining position when the parts are in coacting relation with each other. The margins of the sides 1 and 1' which are adjacent to the pivotal margin of the lid portions 9 and 10, I prefer to form as shown in Fig. 11 of the drawing, by which I obtain a tight, rigid joint when the lid is swung to a closing position, as indicated in dotted lines in such figure. This formation consists in coacting beveled portion 22 and coacting portions 23 at right angles to each other. At the margins where the lid portions 9 and 10 meet, I prefer to provide a tongue 9' and a groove 10' respectively at their margins as shown in Figs. 2 and 3, the portion 10 carrying a band iron 13, which, when the box is assembled, covers the joint between the lid portion, and inasmuch as the tongue and groove form locking engagement, one lid portion cannot be raised without the other, from a closed position. The band 13 is bent at ends to form eye members 16 which are adjacent to the ends 2. I provide a bolt 33 carried by the side 2 and adapted to be thrown to enter the eye member 16 to lock the lid in a closed position. This bolt 33 may be provided with apertures 36 adapted to register with apertures 36' in the lid, when the bolt is thrown, and through such apertures the wire 40 of a seal 41 is drawn and locks the bolt in place, as clearly shown in Fig. 4 of the drawing.

In Fig. 9 I show a modification of the locked means of the lid, in which a bolt portion is adapted to enter the eye 16, such bolt being normally thrown to a locked position by a spring 15. The bolt is provided with an arm 17 adapted to enter a groove 30 in the end 2, when the bolt is thrown. Apertures 19 are formed in the end 2 and the arm 17 has notches 18 adapted to register or become adjacent to the openings 19 when the bolt is in its groove, and a seal 41 may be provided joining a wire 40 or cord lockingly positioned through said aperture 19

and over said arm 17 as clearly shown in Fig. 9 of the drawing. In this way, as well as in the structure disclosed in Figs. 4 and 6, the locking means does not project beyond the plane of the ends of the box. Corner protectors 21 are provided at the bottom of the structure which aid in supporting the wall portions 4' and 4'', and limit the movement of ends 2.

In assembling the device from its folding condition as shown in Fig. 3, the side 1' and cover portion 10 are first raised, and the cover portion may be swung back as shown in Fig. 11 to lie next adjacent to its respective side portion; side 1 and cover 9 is then similarly raised; thus positioning the sides 1 and 1' in parallel relation, permitting ends 2 to be raised. When the tongue and groove members 5 and 6 come into locking engagement the catches have either been automatically thrown into a locking position or the catches may be manually thrown as described. This completes the body of the box which is rigid against bulging and indentation. The articles having been placed within the body portion, the lid portions are simultaneously swung into place, the tongue and grooves 9' and 10' coming into engagement under band 13. Following this, the bolts are thrown to eye member 16 and sealed into place.

I claim:—

1. A folding box or crate comprising, a rectangular base, wall portions hinged to said base adjacent opposite margins thereof and adapted to be swung inwardly and lie next adjacent to said base, second wall portions pivotally connected to the other opposite margins of said base and adapted to fold inwardly to lie in superposed relation to each other and to said first mentioned wall portion, coacting elongated tongue and groove members carried by and adjacent the upright margins of said wall portions, extending longitudinally thereof, and adapted to engage with each other to form a rigid structure, and catch members disposed within body of said wall portions adapted to hold said tongue and groove members in rigid engagement, combined substantially as described.

2. A folding box or crate comprising; a body portion, including, a rectangular base, wall portions hinged to said base adjacent opposite margins and adapted to be swung inwardly to lie next adjacent to said base, second wall portions pivotally connected to the other opposite margins of said base and adapted to fold inwardly to lie in superposed relation to each other and to said first mentioned wall portion, coacting elongated tongue and groove members carried by and adjacent the upright margins of said wall portions extending longitudinally thereof,

and adapted to engage with each other to form a rigid structure, and catch members disposed within the body of said wall portions adapted to hold said tongue and groove members in rigid engagement; a two-part lid hingedly connected at outer opposite margins to said second mentioned wall portions; and, means carried by said first mentioned wall portions for locking said lid in a closed position with respect to said body portion.

3. A folding box or crate comprising in combination, a rectangular base, wall portions hinged to said base adjacent opposite margins thereof and adapted to be swung inwardly and lie next adjacent to said base, second wall portions pivotally connected to the other opposite margins of said base and adapted to fold inwardly to lie in superposed relation to each other and to said first mentioned wall portion, coacting elongated tongue and groove members carried by and adjacent the upright margins of said wall portions, extending longitudinally thereof, and adapted to engage with each other to form a rigid structure, and catch mechanism disposed within the body of said second mentioned wall portion and normally projecting therefrom adapted to be depressed by engagement of said first mentioned wall portions when being swung into place, and subsequently springing into locking engagement to hold said tongue and groove members in rigid engagement.

4. A box or crate comprising in combination, a body portion, a lid therefor including two portions hinged to swing toward or away from each other, the adjacent margins of said portions being provided with a tongue and groove, a metal band carried by one of said lid portions adapted to cover said tongue and grooved margins of the lid portions and having eye portions at its ends, and locking means coacting with said eye portions of said metal bands to retain to said lid in a closed position with respect to said body portion.

5. A folding box or crate comprising; a body portion including, a rectangular base, wall portions hinged to said base adjacent opposite margins thereof and adapted to be swung inwardly to lie next adjacent to said base, second wall portions pivotally connected to the other opposite margins of said base and adapted to fold inwardly to lie in superposed relation to each other and to said first mentioned wall portion, coacting elongated tongue and groove members carried by and adjacent the upright margins of said wall portions, extending longitudinally thereof and adapted to engage with each other to form a rigid structure, and catch members adapted to hold said tongue and groove members in rigid engagement; a lid

for said body portion, including two portions hinged to swing toward or away from each other, the adjacent margins of said portions being provided with a tongue and
5 groove; a metal band carried by one of said lid portions adapted to cover the tongue and groove margins of said lid, and having eye portions at its ends; and, locking means co-acting with said eye portions of said metal band to retain said lid in a closed position. 10

In testimony whereof I affix my signature in presence of two witnesses.

MENDEL SCHÄFER.

Witnesses:

ALFRED BERAN,
AUGUST FUGGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."