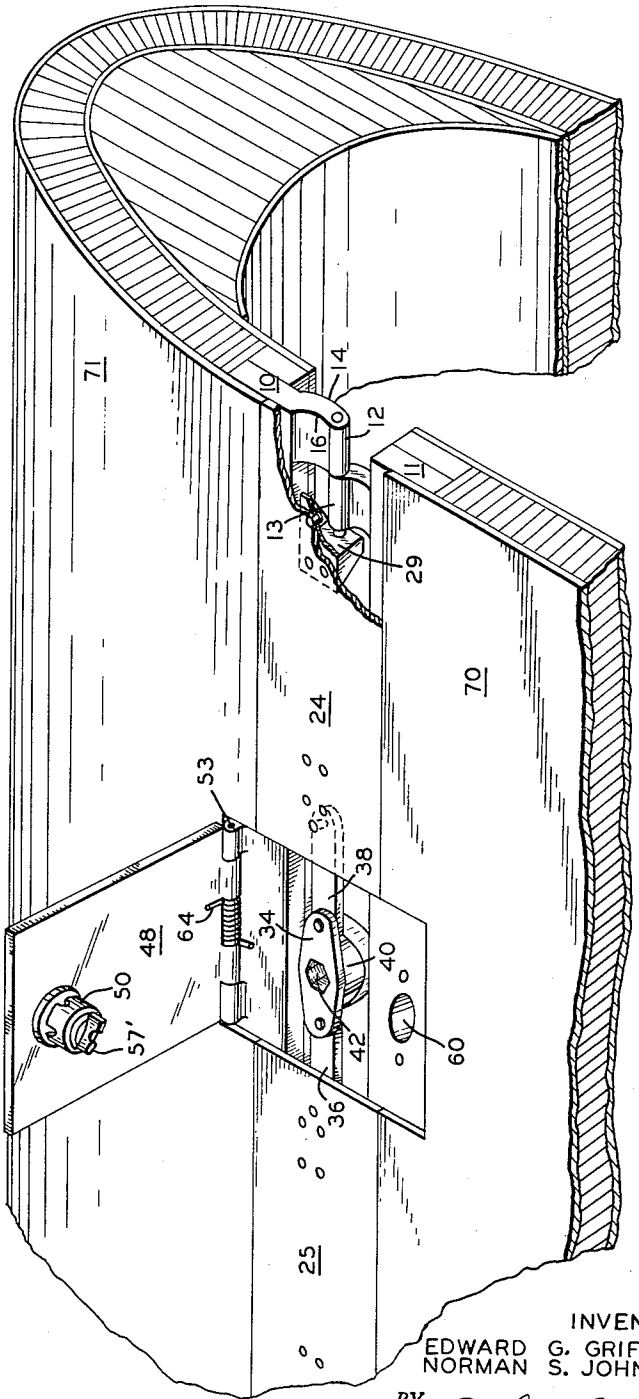
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CONTINUOUS SEAM FASTENER

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FIG. 1



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FIG. 2

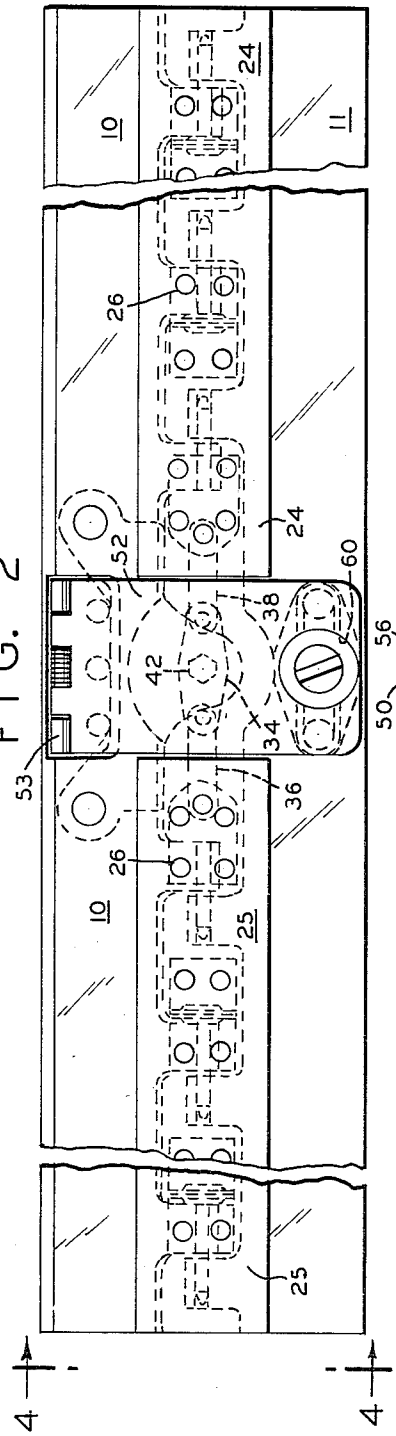
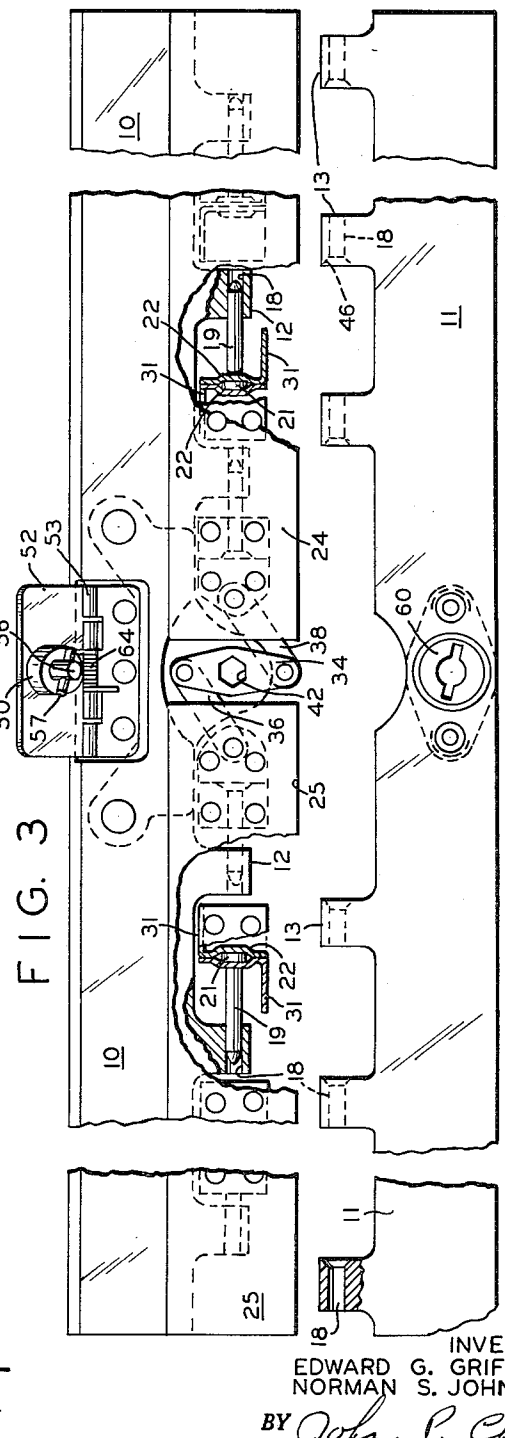


FIG. 3



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FIG. 4

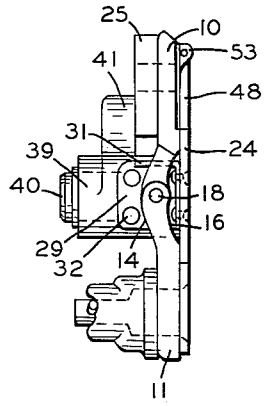
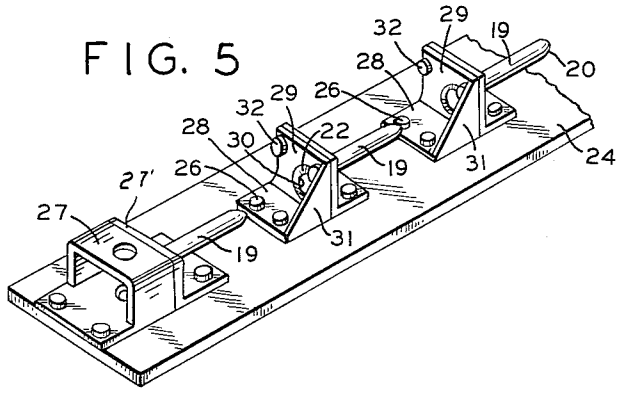


FIG. 5



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United States Patent Office 3,054,484
Patented Sept. 18, 1962

3,054,484

CONTINUOUS SEAM FASTENER

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Filed Dec. 9, 1960, Ser. No. 74,949
4 Claims. (Cl. 189—36)

This invention relates to continuous seam fasteners and relates more particularly to an elongated hinge-like fastener assembly wherein the two members to be detachably joined together may have limited relative pivotal movement therebetween and wherein there is provided a substantially continuous fastening means over every inch of the meeting edges of the two members.

The seam fastener of the present invention will have a variety of uses, particularly in aircraft, and one important application is for the installation of the leading edge to a vertical fin in an airplane. It is frequently necessary to obtain access to the inside of such a fin and the leading edge section may be hinged on one side thereof to the main fin by the use of an ordinary elongated hinge while the other edge is fitted with the continuous seam fastener of the present invention.

An important object of the invention is to provide a continuous seam fastener consisting essentially of a pair of elongated hinge plates or straps, each provided with interfitting knuckles having aligned openings which receive hinge pin elements or pintles carried in fixed relation on two oppositely movable locking strips, both being conjointly operated by a single actuator. Action of the strips in sliding the hinge pins out of the knuckles formed on one of the plates is quickly effected and when the plates are moved in the opposite directions and the pins are fully engaged a locking plate or door precisely fits between the oppositely movable pintle-carrying locking strips in secured relation and prevents any movement of them whatsoever.

A further object of the invention is to provide a continuous seam fastener employing a plurality of conjointly movable hinge pin elements as the fastening means and wherein some relative pivotal movement between the members being secured is permitted without weakening the fastener or effecting its operation in any manner.

Another object of the invention is to provide a continuous seam fastener wherein the fastening elements are quickly detached one from the other by the simple expedient of opening a hinged door to permit travel of two oppositely movable locking strips and then moving the latter by a quarter turn of a bell crank lever operated by a simple tool.

A further object of the invention is to provide a continuous seam fastener employing a plurality of pintles wherein the parts may be quickly re-engaged thru the provision of novel means for quickly lining up the longitudinally apertured knuckles carrying the pintles.

Yet another object of the invention is the provision of novel brackets for mounting the pintles.

In the drawings:

FIG. 1 is a broken perspective view showing the continuous seam fastener of the present invention and illustrating one application thereof.

FIG. 2 is a broken plan view of the fastener element with the combined cover and locking plate in closed position.

FIG. 3 is an exploded view with the fastener parts separated and the cover in open position.

FIG. 4 is an end elevation showing the fastener of the present invention and taken on line 4—4 of FIG. 2.

FIG. 5 is a broken perspective view of the locking strip and showing the method of mounting the pintles thereon.

The continuous seam fastener of the present invention includes two complemental plates or straps **10** and **11** having spaced, hollow knckles or connecting eyes **12** and **13**, respectively which are disposed in interfitting relation when the fastener is in assembled condition. The plates **10** and **11** are preferably extruded in order to provide them with uniform thickness and the knuckles with slightly increased thickness with a convex curvature on one side and a concave curvature on the other side as shown at **14** and **16** respectively. These knuckles are offset inwardly from the outer faces of the plates. (See FIGS. 1 and 4.) This greater thickness of the hollow knuckles provides additional strength where it is needed. In this thickened area each knuckle is provided with a longitudinal hinge-pin receiving hole **18** and these holes are aligned when the parts are assembled and each adjoining pair of knuckles receives a pintle-like element **19** provided with a rounded outer end **20**. The other end has a generally flat head **21** which is received between mating dimples **22** in a pair of pintle-supporting sheet metal brackets of identical construction and received in back-to-back relation at properly spaced points on locking strips **24** and **25**, by means of headed rivets **26**. These dimples are of such contour as to provide a flat base section of such width as to readily accommodate the entire head of the pintles between the mating dimples. These brackets are formed with a base wall **28**, a right angular wall **29** in which the dimple **22** is formed, and a hole **30** through which the pin passes. Only one hole in each pair is utilized. Walls **28** and **29** are structurally reinforced by means of a generally triangular web **31** and the contacting walls **29** in each pair are secured together by means of rivets **32**. The webbed construction of these brackets or cups, used back-to-back, gives great structural strength and permits the use of thinner gauge metal than in one bent from a single flat strip. All of the pintle supporting brackets may be identical in shape except the first one shown at the extreme left at **27** in FIG. 5.

Elongated plates **10** and **11** are of substantially identical construction except that plate **10** carries the slidable locking strips **24** and **25** with their pintle elements. The sliding movement of the locking strips and the slidable mounting thereof on plate **10**, which is generally referred to as the male plate, is effected as follows. The pins **19** are of such lengths that they always remain in the longitudinal holes **18** in the knuckles of the male plate **13**, regardless of the position of the locking strips. These strips are conjointly moved in opposite directions by an operating mechanism comprising a centrally pivoted lever **34** and links **36** and **38** pivotally connecting opposite ends thereof with the inner ends of locking strips **25** and **24**, respectively.

The pivotal mounting for bell-crank lever **34** comprises a barrel-like journal member **39** which receives a shaft portion **40** secured on lever **34** and the journal member has a side extension **41** affixed to plate **10**. The lever has a tool receiving opening **42** and when the lever is rotated by the tool in either direction, the locking strips **24** and **25** are moved from their normal extended position of FIGS. 1 and 2 inwardly to the position of FIG. 3 and the pintles **19** thus move out of the pintle receiving openings **18** in the knuckles **13** carried by female plate **11**. This permits the two plates to become disengaged.

Rotation in the opposite direction causes the locking strips to move outwardly and the pintles **19** to move into the openings **18** in knuckles **13**. These latter openings have flared terminals **46** at one end thereof to permit easy entry of the rounded ends of the pintles in case of slight misalignment. Engagement, however, is very easily

accomplished considering the number of holes which must be lined up with the pintles.

When in this position of FIGS. 1 and 2 the locking strips have their widest separation from each other and they are retained in this spaced position by a locking plate **52** hinged at **53** on elongated plate **10**. This locking plate is of a width to fit precisely between the locking strips when in extended position. A quick acting rotary stud fastener such as one which locks in a quarter turn enters a receptacle **60** affixed to plate **11** and secures the locking plate in closed relation. This fastener may include a rotatable stud **56** having a cross pin **57** at its inner end. The receptacle **60** may have helical ramps (not shown) up which the cross pin travels during the quarter turn of rotation. In order to indicate the unlocked condition of the locking plate a spring **64** urged it to this open position of FIG. 3.

The fastener in FIG. 1 is shown as having a different type of cross pin at **57'** and it will be appreciated that any type of high strength rotary fastener may be used for this purpose. Referring to FIG. 5, the ends of the pintles are shown as rounded while in FIG. 3 they are shown as more nearly pointed. Actually the pintless should have a bullet shaped end which facilitates entry into the flared openings of the second set of knuckles.

While there have been described herein what are at present considered preferred embodiments of the invention, it will be obvious to those skilled in the art that many modifications and changes may be made therein without departing from the essence of the invention. It is therefore to be understood that the exemplary embodiments are illustrative and not restrictive of the invention, the scope of which is defined in the appended claims, and that all modifications that come within the meaning and range of equivalency of the claims are intended to be included therein.

What we claim is:

1. A quickly releasable seam fastener for securing relatively movable members together along the full length of their meeting edges and comprising elongated first and second plates carried by said meeting edges and provided with interfitting knuckles having apertures which are aligned when the parts are in fastened relation, a pair of oppositely movable pintle-carrying locking strips slidably carried by the first plate, oppositely facing headed pintles rigidly mounted on the respective strips and positioned in the knuckle apertures in the first plate and movable into the knuckle apertures in the second plate when the fastener plates are engaged, and means for conjointly moving the locking strips toward each other to move the pintles out of the knuckles in the second plate, and movable away from each other when the plates are to be joined, thereby leaving a space between said strips, a locking plate movable into the area between the strips to retain them in their separated position, and fastening means for securing the locking plate in said area.

2. The structure recited in claim 1 wherein a quick-acting rotary stud fastener is employed for securing said locking plate in said area.

3. The structure recited in claim 1 wherein each pintle is mounted by means of a pair of angle brackets secured to the locking strips in back-to-back relation and formed with aligned, oppositely facing dimples providing a recess to receive and support the head of the pintle.

4. The structure recited in claim 1 wherein a bell crank lever is mounted for rotation on the first plate and whose ends are joined by links with the locking strips whereby rotation of the lever moves the strips toward or away from each other.

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