United States Patent

[11] 3,591,141

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[54] **OVERCENTER LOAD BINDER**
16 Claims, 2 Drawing Figs.

[52] U.S. Cl. 254/78
[51] Int. Cl. B66f 3/00
[50] Field of Search 254/77, 1, 79

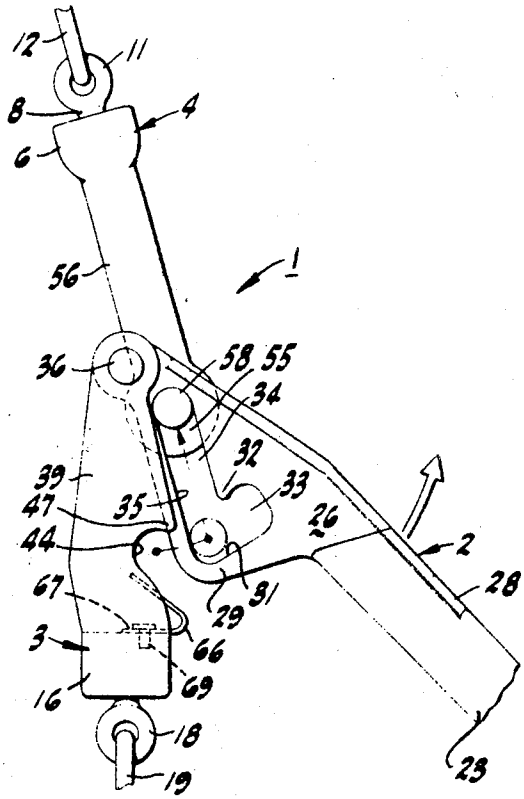
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ABSTRACT: An overcenter-type load binder, having improved self-locking safety characteristics, defined by an operating lever having a clevis configuration at one end, a pivoted yoke mounted at such end, and a movable shank mounted inwardly of such end. Generally L-shaped slots are formed in the clevis arms of the lever and the shank is provided with projecting pins which extend through and beyond the confines of the slots for engagement in self-locking recesses provided in the yoke. Interengagement of the pins and recesses during movement of the lever toward a load unbinding position prevents "flying" of the lever during such unbinding.



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SHEET 1 OF 2

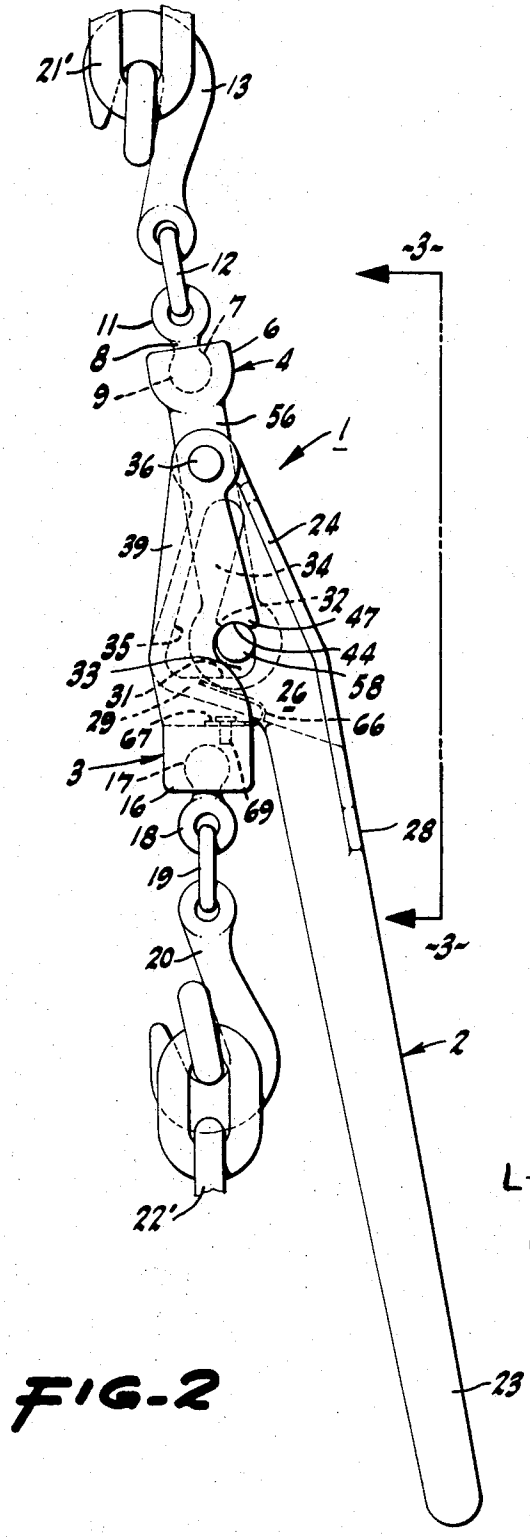


FIG-2

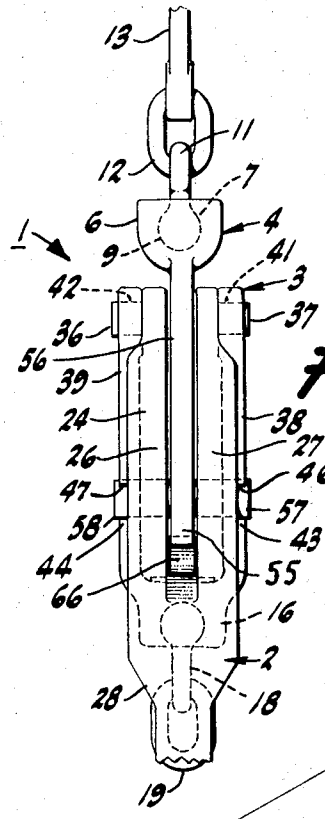


FIG-3

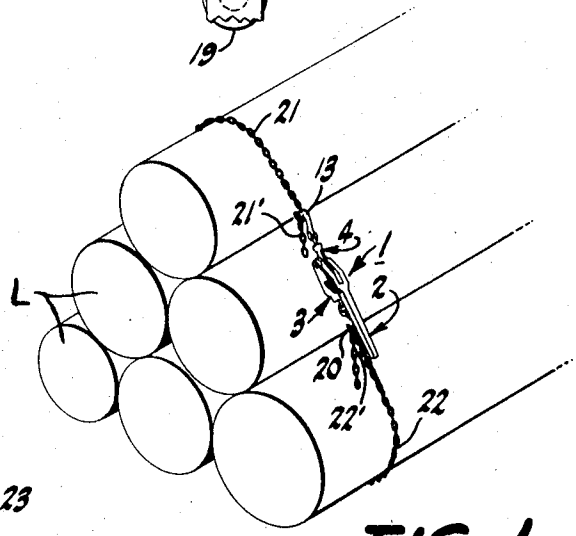


FIG-1

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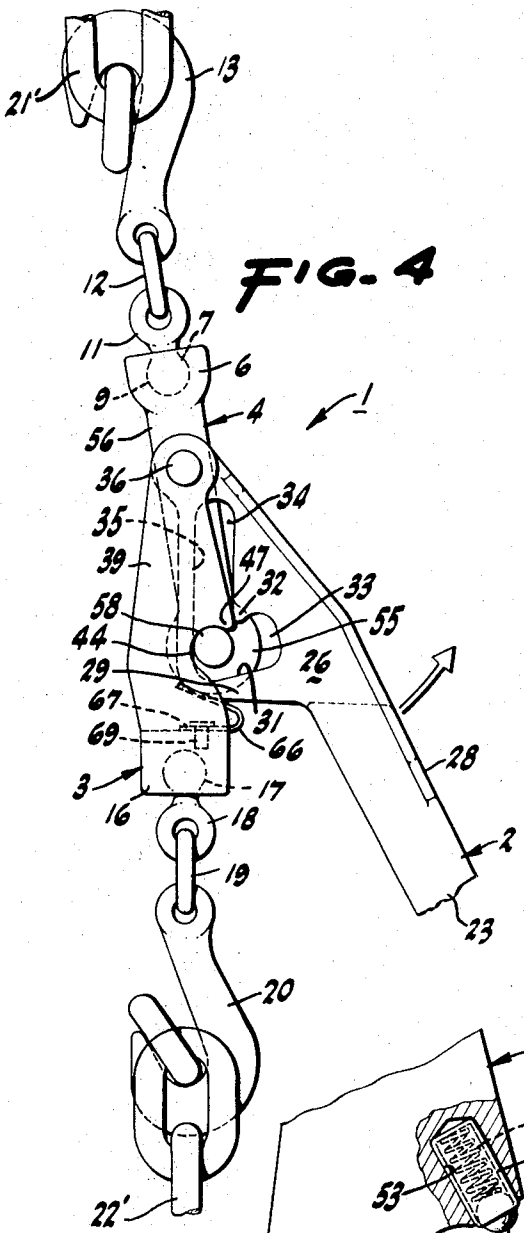


FIG. 4

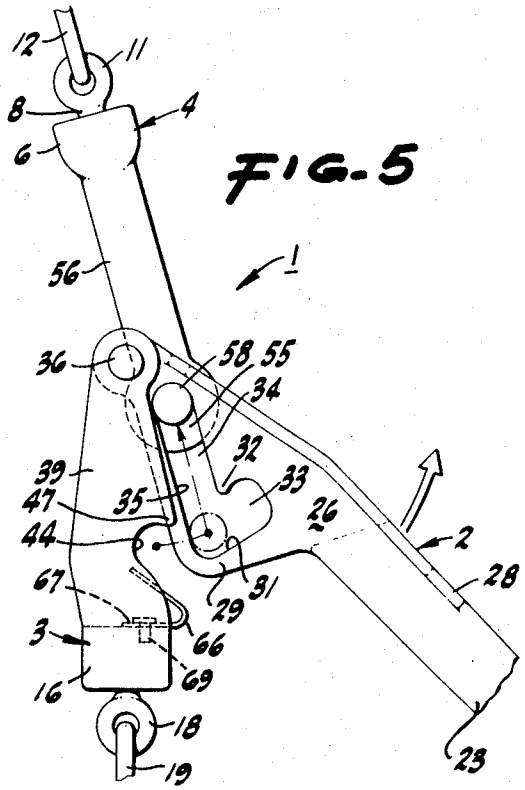


FIG. 5

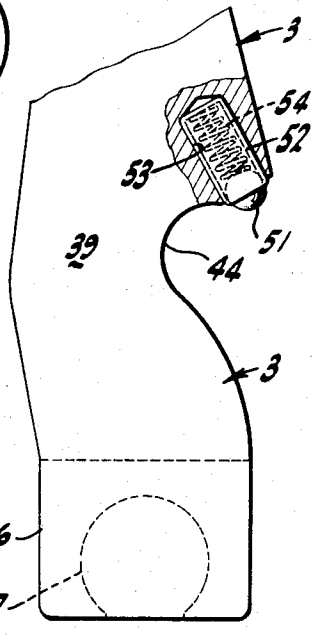


FIG. 6

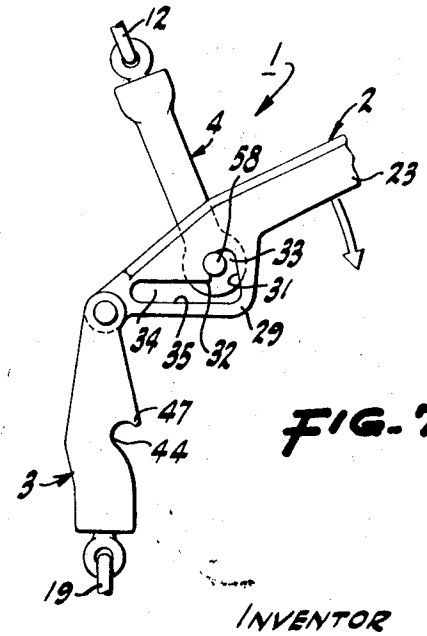


FIG. 7

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OVERCENTER LOAD BINDER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the field of devices for binding a load, and more particularly to the field of overcenter load binders in which a lever of dog leg configuration having yoke and shank members connected therewith is movable between first and second positions for binding or unbinding a load secured by hold down elements operatively connected with the shank and yoke by suitable means, such as grab hook members attached to the yoke and shank. The load binder of this invention may be utilized in any environment where prior known conventional overcenter load binders have been employed heretofore.

The field of this invention particularly relates to overcenter load binders, having safety characteristics heretofore unknown which prevent the operating lever from "flying" as the same is moved from a load-binding position toward a load-unbinding position so that injury to the operator of the lever is positively precluded. The subject binder further includes self-locking features which prevent inadvertent unbinding thereof when in use.

The improved binder of this invention is particularly well adapted for securing together or tensioning load holddown elements positioned around a load on a supporting platform. That is, the load binder of this invention is intended, among other uses, to bridge the gap between the end of load hold-down elements which are positioned to extend around a load to be sustained upon or bound to a load supporting surface.

2. Description of the Prior Art

Overcenter-type binders have been widely known and generally utilized for many years. By way of illustration, conventional overcenter load binders of the type commonly employed heretofore are shown in the U.S. Pats. to Williams No. 2,089,679 dated Aug. 10, 1937, and Stacy, No. 1,538,412 dated May 19, 1925. Certain shortcomings in such long-known types of overcenter load binders have been rectified within recent years by patented improvements thereto, such as the improvements detailed in Ratcliff, U.S. Pat. No. 3,271,007 dated Sept. 6, 1966 and Ratcliff, U.S. Pat. No. 3,395,892 dated Aug. 6, 1968.

However, prior known overcenter load binders, including those embodying recent improvements as noted, do not utilize nor incorporate therein the particular improved safe operating and self-locking features characteristic of this invention. While the binder disclosed in Ratcliff, U.S. Pat. No. 3,271,007 includes features which impart greatly improved safety characteristics thereto in comparison to conventional overcenters binders, such binder incorporates a special design which departs substantially from the construction of conventional widely accepted overcenter binders of this type utilized by the trade for many years.

The present invention retains the basic construction of a conventional overcenter binder and adds thereto interengaging self-locking and safety mechanisms which retain the general configuration and features recognized by and long accepted in the trade, while at the same time providing the improved safety characteristics noted at a cost competitive with conventional binders. Such self-locking and safety features are imparted by providing an interfitting slot, pin and recess construction in the principal components of the binder which do not require substantially an entire redesign of a conventional binder as was generally true of prior known improvements.

Thus, the drawbacks of prior known overcenter load binders are overcome by the present invention in a structure which retains the basic advantages for which conventional overcenter load binders have been long accepted. That is, the subject load binder retains the advantages of durability, simplicity, low cost, strength with comparative light weight, and one man operability, while at the same time providing greatly improved safety and self-locking features.

SUMMARY OF THE INVENTION

The present invention relates generally to an improved device for binding a load or tensioning a load holddown element, and more particularly to an overcenter-type load binder having means in conjunction with operable components thereof which are releasably engageable with load hold down elements to be utilized to secure a load to be sustained or bound thereby.

More particularly, the present invention relates to an overcenter-type load binder defined by three principal operating components, namely (1) an elongated dogleg contoured operating lever having a clevis portion at one end thereof, (2) a yoke pivotally connected with the clevis end of the binder, and (3) a shank movably connected with the lever generally in line with the offset dogleg portion of the lever. Means are connected with the shank and yoke which permit the binder to be operatively engaged with load holddown elements. Such means may take various forms, but, in conformance with the construction of conventional overcenter load binders well accepted in the trade, such means in the illustrated embodiment comprise grab hook member connected by swivels with the binder components noted.

Improved safety and self-locking features are imparted to the subject binder by providing generally L-shaped slots in the opposed clevis arms of the operating lever in which pins provided on the binder shank are receivable and through which such pins project for selective interengagement with accommodating recesses in the binder yoke when the operating lever is in a load-binding position. Interengagement of the pins with the yoke recesses insures that the lever may be moved to a load unbinding position without the danger of "flying" characteristic of conventional overcenter binders, as will be described. The interengaged pin and slot construction noted permits selective movement of the shank relative to the lever in such fashion that the load is preliminarily released a predetermined extent, independently of the particular position of the lever, which thereby prevents and positively precludes flying of the lever which has so often produced injury even death to operators using conventional binders.

From the foregoing, it should be understood that objects of this invention include: the provision of an improved overcenter-type load binder which incorporates therein self-locking and safety features heretofore unknown; the provision of an overcenter load binder requiring a minimum number of components characteristic of conventional load binders but which have been modified to impart the noted improved characteristics thereto without appreciably increasing the cost thereof; the provision in an overcenter load binder means of precluding "flying" of the operating lever thereof when the lever is moved from a load-binding toward a load-unbinding position; and the provision in an overcenter load binder of operatively interconnected slot, pin and recess structure which imparts the safety and self-locking features noted to the principal components of the binder.

These and other objects of the invention will become apparent from a study of the following detailed disclosure in which reference is directed to the appended drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a generally schematic view showing the subject binder employed to hold a series of cylindrical objects, such as logs, in place on a load supporting surface.

FIG. 2 is a side elevational view of the binder with the operating lever thereof shown in load-binding orientation.

FIG. 3 is a rear elevational view of a portion of the binder taken in the plane of line 3–3 of FIG. 2.

FIGS. 4 and 5 are partial side elevational views of the binder illustrating the sequence of operation thereof as the operating lever is moved toward the load-unbinding position.

FIG. 6 is a partial side elevation view of a modification of the yoke member of the subject binder.

FIG. 7 is a partial side elevational view of the binder with the operating lever thereof shown in the load-unbound orientation ready to be moved to the load-binding position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In keeping with the aforementioned advantages which make overcenter-type load binders attractive to users, the binder of this invention, generally designated **1**, comprises a minimum number of operative parts of sturdy metal, such as steel, and is defined by three principal operatively interconnected components, namely an elongated operating lever **2**, a yoke member **3**, and a shank member **4**.

The yoke and shank members each includes means associated therewith by which the binder may be operatively connected with load hold down elements in known fashion. In that connection, as seen in FIGS. **2** and **4**, the preferred embodiment illustrated uses conventional grab hook and swivel constructions for engaging the binder with load hold down elements. That is, at its free end **6**, the shank is formed with an internal ball shaped socket **7** in which a link **8** having an enlarged ball-shaped end **9** is swivelly received. The opposite end of link **8** is connected with a conventional grab hook **13** by a chain link **12**. The free end **16** of yoke **3** similarly is provided with an internal ball shaped socket **17** in which a link **18** corresponding in construction to link **8** just described is swivelly received and with which a conventional grab hook **20** is connected by a chain link **19**.

FIG. **1** shows a binder **1** in an illustrative load binding arrangement in which the respective grab hooks **13** and **20** are engaged with load holddown elements **21** and **22** positioned around a load to be bound. Such load, for purposes of illustration, comprise a stack of logs L, positioned on a load-supporting surface such as a logging trailer (not shown) and held in place thereon by the holddown elements positioned therearound. The load binder **1** bridges the gap between adjacent ends of the holddown elements and tensions the same to prevent shifting of the load when the operating lever **2** of the binder is in the closed load binding position. As noted, the ends of the respective holddown elements are defined by short lengths of coil chain **21'** and **22'** with which the grab hooks are engaged in known fashion. Other types of load holddown elements obviously may be employed if preferred.

It should be understood that operating lever **2** is manipulated in the fashion well known with overcenter load binders to move the same between the closed load-binding position shown in FIG. **2** and the open load-unbinding position shown in FIG. **7**. In that connection, when the grab hooks of the shank and yoke are connected with the load holddown elements, tension may be applied to the holddown elements by drawing the shank and yoke towards each other as the operating lever is moved toward and beyond its overcenter position as the lever is moved to the load-binding position shown. So long as the operating lever remains in the load-binding position, tension is maintained on the load holddown elements to maintain the load against shifting.

It should be understood that the improvements to conventional overcenter binders imparted by this invention reside in modifications made to the construction of the operating lever, the yoke and shank, as will be described.

The operating lever **2** includes a graspable handle portion **23** at one end thereof and a clevis portion **24** at its opposite end, the latter being defined by two parallel laterally spaced arms **26** and **27** which are joined with each other and with the handle portion between opposite ends of the lever at a location generally designated **28**. As best seen in FIG. **5**, each of the clevis arms includes an offset portion generally designated **29** which imparts a dog leg configuration to the lever which is characteristic of overcenter type load binders.

Provided in the offset portion of each clevis arm is a generally L-shaped slot **31** which includes a protuberance **32** projecting thereinto which effectively divides the slot into two operative portions, namely, a shorter portion **33** which extends generally transverse to the longitudinal axis of the operating lever, and an elongated portion **34** which projects generally in the same direction as, but somewhat angularly oriented to, the longitudinal axis of the operating lever, for the purpose to be described. The base **35** of the slot is generally straight as noted.

Pivot pins **36** and **37** are integral with and preferably formed in one piece with the respective clevis arms of the operating lever and project in coaxial relationship in opposite directions therefrom. The pins provide the means by which yoke **3** is pivotally mounted at one end of the operating lever as seen in FIG. **3**.

Yoke **3** comprises a pair of laterally spaced legs **38** and **39** (FIG. **3**) arranged in generally parallel relationship and interconnected with each other at the aforementioned end **16** of the yoke in which the ball socket **17** is formed. At the inner end opposite from socket **17**, the arms of the yoke are provided with apertures **41** and **42** through which the pivot pins **36** and **37** of the operating lever clevis portion are received. Thus yoke **3** is pivotally connected with one end of the operating lever in the manner best noted in FIG. **3**.

Provided in the upper surfaces of the arms **38** and **39** of the yoke (i.e. the surfaces facing the operating lever) are aligned generally arcuate recesses, such recesses being designated **43** and **44** respectively. The recesses each include a projecting tip which delimits one margin thereof, such projecting tips being designated **46** and **47** respectively as seen in FIG. **3**. Each tip normally precludes inadvertent separation of a locking portion of shank **4** from the recess in a manner to be described hereinafter.

In the embodiments shown in FIGS. **2** through **5**, the projecting tips **46** and **47** are formed integral with and in one piece with the yoke. However, in the alternate embodiment shown in FIG. **6**, the projecting tip which defines one margin of each yoke recess is comprised of a spring loaded detent structure which includes a depressible detent, designated **51**, received within a metal casing **52** which is press fitted into an elongated opening **53** formed in the respective yoke arms. A coil spring **54** normally urges the detent **51** to the extended position seen in FIG. **6**. The end of casing **52** adjacent its open end is restricted to preclude separation of the detent from the casing. While a spherical ball-shaped detent **51** is illustrated in the embodiment shown, it should be understood that spring-loaded detents of different configurations may be utilized if desired. The function of detent **51** on the operation of the binder is the same as that of tips **46** and **47**, namely to prevent inadvertent movement of the operating lever from the load-binding position, as will be described.

Shank **4**, as best seen in FIGS. **3** and **5**, comprises a generally flat body **56** having the aforementioend socket **7** at end **6** thereof. At its oppositvely rounded end **55**, the shank includes a pair of oppositely directed laterally extending coaxial pins **57** and **58**. When the load binder is assembled, pins **57** and **58** are positioned to project laterally into and through the L-shaped slots **31** formed in the offset dogleg portions **29** of the operating lever as best seen in FIGS. **3** and **5**. That is, the respective pins **57** and **58** extend laterally through and beyond the confines of the slots formed in the operating lever so that such pins are in a position to be seated in the recesses **43** and **44** of the yoke arms **38** and **39**.

Referring to FIG. **2** in which the operating lever of the load binder is shown in the load-binding or closed position, it will be noted that shank pins **57** and **58** are received within recesses **43** and **44** of the yoke and are normally maintained in such position, by the projecting tips **46** and **47** thereof. Additionally, the pins are situated within the upper or smaller portions **33** of the respective slots formed in the clevis portion of the operating lever. The projecting protuberances **32** of the respective slots normally maintain the pins in such smaller slot portions.

It should be understood that when the lever is in the closed position shown in FIG. **2**, that tension on the load holddown elements applied to the shank and yoke through the respective grab hooks and ball swivels maintains the pins and slots interengaged as shown. Thus, the operating lever is securely held in the closed position in the manner noted, thereby imparting self-locking characteristics to the binder. The manner manner in which the interengaged pins, recesses and slots preclude the operating lever from flying when the lever is moved from the load-binding position toward the unbound or

open position is shown in the sequence of operations illustrated in FIGS. 2, 4 and 5. As seen by comparing FIGS. 2 and 4, pins 57 and 58 remain stationary, (that is, positioned beneath the projecting tops 46 and 47 of the yoke arms) during initial movement of the operating lever from the fully closed position toward the open position. As force is applied to the operating lever to pivot the same towards the open position, the tension on the holddown elements which is applied to the shank 4 and yoke 3 is initially sufficient to prevent the pins from passing around the projecting tips 46 and 47 of the yoke arms.

However, pivotal movement of the operating lever causes the pins to ride over and clear the respective protuberances 32 of the L-shaped slots in the operating lever arms. Thus, while the pins are moving in the slots 31 from the small upper portions 33 thereof into the elongated larger portions 34 thereof in response to movement of the lever, the tension applied to the shank and yoke maintains the pins engaged in the yoke recesses beneath the tips 46 and 47 (or beneath the alternative detents 51 of FIG. 6).

However, continued movement of the operating lever brings the pins into contact with the base 35 of each slot as seen in FIG. $. At that stage the tensional force on the shank and yoke remains unchanged although the lever has moved partially to the unbinding position. However, as the pins strike the respective bases 35 of the respective slots, continued pivotal movement of the lever overcomes the confining effects of the tips of the yoke and the pins are urged over and around the tips of the yoke. As soon as the pins clear such projecting tips, the tension applied to the yoke and shank by the load forces the pins to travel rapidly longitudinally along the elongated portion 34 of the respective slots until the pins strike the end thereof as shown in the dotted and solid line illustrations of FIG. 5.

Such movement of the pins, and the shank therewith, releases initial tension on the binder without having the force of such tension removal transferrred directly to the operating lever. That is, as noted by comparing FIGS. 4 and 5, while tension force is being relieved as the shank pins are moving longitudinally through the slots, the operating lever itself has not moved past its overcenter position. Thus, the problem encountered with conventional binders in which the lever flies rapidly toward the unbound position as the operating lever passes its dead center position is positively precluded.

With the subject binder, when the pins reach the ends of slot portions 34, sufficient tension has been removed from the binder so that continued movement of the operating lever to the fully unbound open position may be effected without danger of the lever moving rapidly after it passes the dead center location.

When it is desired to move the operating lever from the open position to the closed position when a load is to be bound, it is merely necessary to position the shank pins 57 and 58 in the smaller portions 33 of the lever arms slots, FIG. 7, and to then pivot the operating lever to the fully closed position shown in FIG. 2. During such movement, the pins remain in position in the slots and clear the tips 46 and 47 on the yoke under urging of the operating lever during pivoted movement thereof.

Operation of the hoist of the binder with the modified yoke shown in FIG. 6 is essentially the same as that described, with the exception that the depressible spring urged detent 51 is retracted into its associated casing as the pins contact the same, rather than requiring the pins to ride out and over the integral projecting tips 46 and 47 as in the embodiment shown in FIGS. 2 through 5.

Illustrated in FIGS. 2 and 4 is means preferably employed with the subject binder for assisting in maintaining the operating lever in the closed position when the binder is oriented in a particular way. That is, spring means, defined by a curved leaf spring 66 which is welded or otherwise secured to a small backing plate 67, is positioned between the legs 38 and 39 of the yoke and maintained in place by pins or screws 69 as seen in FIG. 2. The free end of the curved leaf spring 66 engages the rounded end 55 of the shank as best seen in FIGS. 2 and 4 when the operating lever is in the load-binding closed position.

The purpose of such spring is as follows. It has been found that when a load binder of the subject type is utilized in an inverted or upside down position (in which the operating lever when closed extends upwardly rather than downwardly as in FIG. 2) and if a bottom load holddown element should accidentally become disengaged from or loosened relative to the binder, the spring 66 will maintain the shank pins engaged within the yoke recesses, which in turn will maintain the operating lever in the closed position even though the binder is inverted and under no appreciable load. Thus, the spring 66 is important under special operating conditions to assist in obviating unwanted separation of the binder from the load holddown elements when under no load or very light load conditions.

Having thus made a full disclosure of this invention and the improved characteristics thereof, attention is directed to the appended claims for the scope of protection to be afforded thereto.

I claim:

1. In an overcenter load binder comprising an operating lever, a yoke pivotally connected with said lever adjacent one end thereof, and a shank movably connected with said lever inwardly of said end, the improvement comprising

A. a generally L-shaped slot formed in said lever inwardly of said one end,

B. a pin on said shank projecting therefrom and received in said slot in said lever,

1. said pin extending through said slot and projecting laterally beyond the confines thereof, and

C. a recess in said yoke in which said pin is receivable when said operating lever is in a load-binding position, whereby engagement of said pin in said recess releasably maintains said lever in said load-binding position.

2. The binder of claim 1 in which said yoke recess includes

1. a projecting tip defining a margin thereof,

2. said tip normally precluding inadvertent separation of said pin from said recess.

3. The binder of claim 2 in which said projecting tip is integral with said yoke.

4. The binder of claim 2 in which said projecting tip is defined by a depressible spring-loaded detent positioned on said yoke.

5. The binder of claim 1 in which said lever includes

1. a protuberance projecting into said slot which normally maintains said pin within a predetermined portion of such slot when said lever is in said load binding position.

6. An overcenter load binder comprising

A. an operating lever having laterally spaced arms defining one end thereof,

B. a yoke pivotally connected with said lever adjacent said one end thereof,

C. a shank movably connected with said lever between said arms inwardly of said end,

D. generally L-shaped opposed aligned slots formed in said lever arms inwardly from said lever end,

E. pins on said shank projecting in opposite directions therefrom and movably received in said slots in said lever arms,

1. said pins extending through their associated slots and projecting laterally beyond the confines thereof, and

F. recesses in said yoke in which said projecting pins are receivable when said operating lever is in a load binding position for releasably maintained said lever in such position.

7. The binder of claim 6 in which said yoke recesses each includes

1. a projecting tip defining a margin thereof,

2'. said tip precluding inadvertent separation of an associated pin from such recess.

8. The binder of claim 7 in which said projecting tip is integral with said yoke.

9. The binder of claim 7 in which said projecting tip is defined by a depressible spring-loaded detent positioned on said yoke.

10. The binder of claim 6 in which said lever arms include

1. protuberances projecting into said slots which normally maintain said pins within predetermined portions of such slots when said lever is in said load binding position.

11. The binder of claim 6 which further includes

G. means connected with said shank and said yoke for engaging said binder with load holddown elements.

12. The binder of claim 11 in which each of said means comprises

1. a hook member mounted on a free end of each said shank and said yoke.

13. The binder of claim 6 which further includes

G. a spring member carried by said yoke and engageable with said shank when said lever is in said load binding position for assisting in maintaining said lever in such position when said binder is inverted.

14. An overcenter load binder comprising

A. an elongated operating lever movable between a load binding closed position and a load-releasing open position including

1. a graspable handle portion at one end thereof, and

2. a clevis portion at the other end thereof including a pair of laterally spaced arms joined with each other and with said handle portion between said ends of said lever,

a. each of said arms including an offset portion which imparts a dogleg configuration to said lever, and

b. an elongated generally L-shaped slot in each of said arms generally within said offset portion thereof,

B. a shank positioned between said clevis arms,

1. pins extending laterally in opposite directions from one end of said shank and movably received within and passing through said slots in said clevis arms and projecting laterally beyond the confines thereof,

C. means connected with a free end of said shank for engaging said binder with a load holddown element,

D. a yoke pivotally connected with said lever adjacent the ends of said clevis arms,

1. recesses in said yoke in which the projecting ends of said pins of said shank are releasably receivable for retaining said lever in said load binding position, and

E. means connected with a free end of said yoke for engaging said binder with another load holddown element.

15. The binder of claim 14 in which said yoke recesses each includes

1. a projecting tip defining a margin thereof,

2. said tip precluding inadvertent separation of an associated pin from such recess.

16. The binder of claim 14 in which said lever arms includes

1. protuberance projecting into said slots which normally maintain said pins within predetermined portions of such slots when said lever is in said load-binding position.