

July 25, 1961

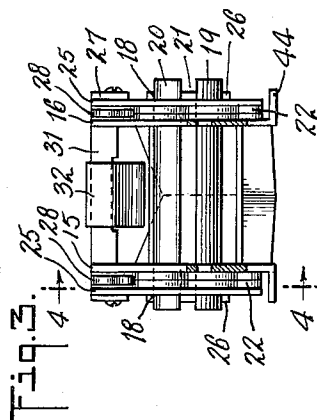
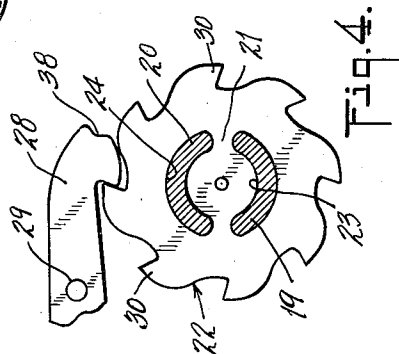
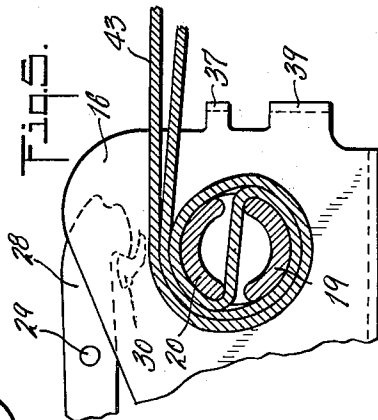
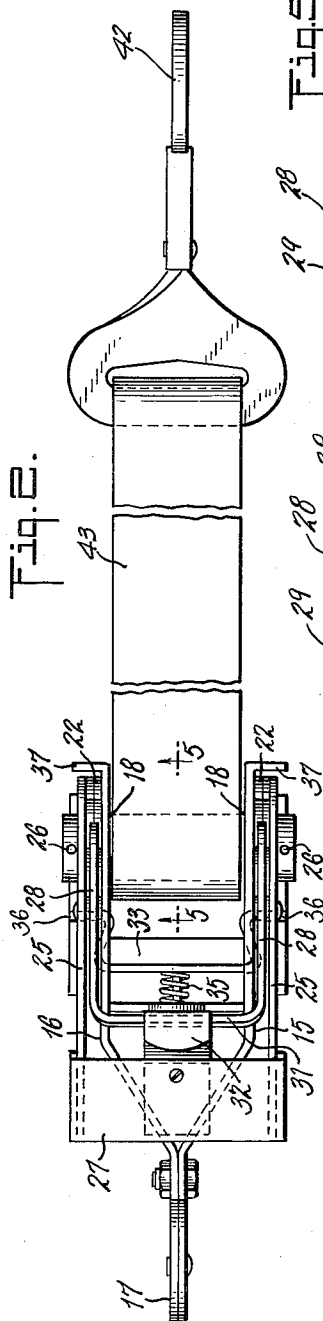
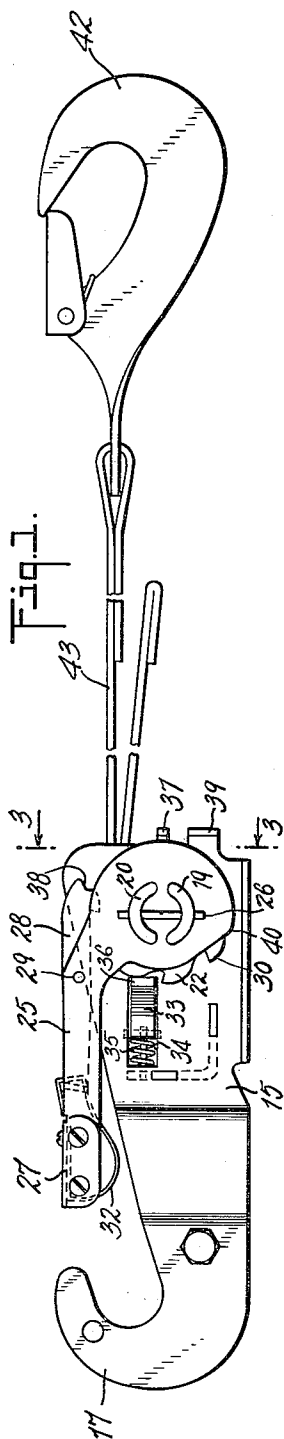
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2,993,680

QUICK ADJUSTMENT, RATCHET TENSIONED TIEDOWN

Filed May 10, 1960

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

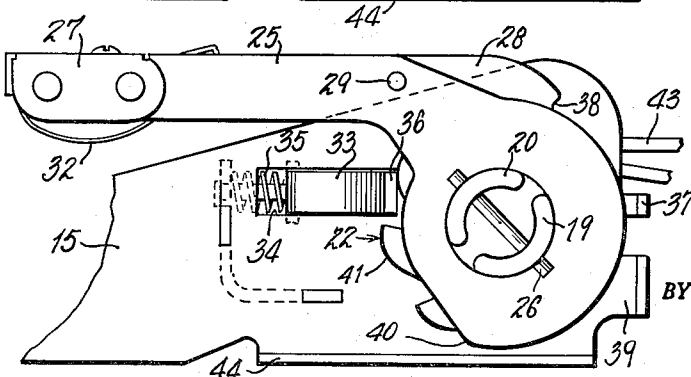
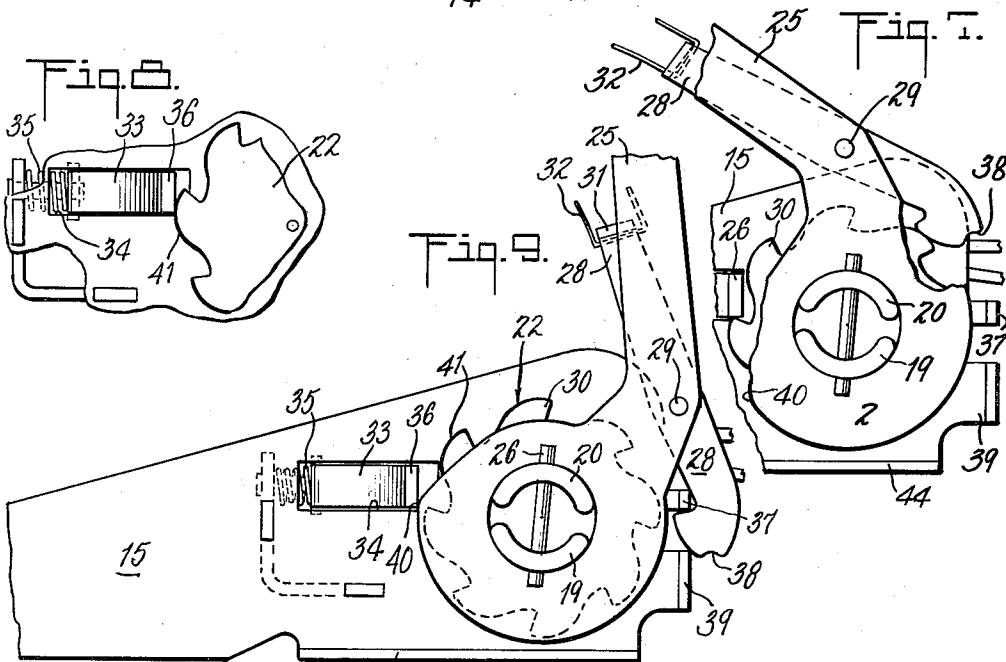
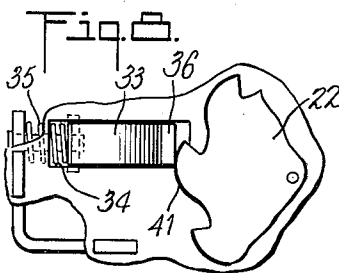
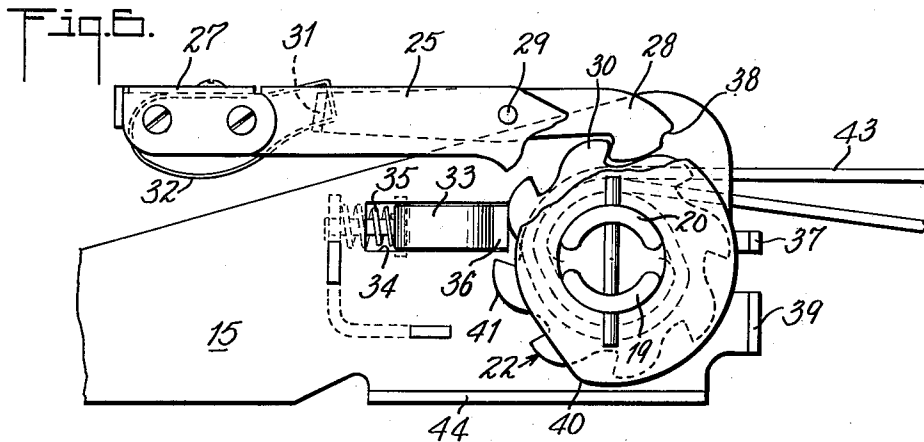


Fig. 10.

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QUICK ADJUSTMENT, RATCHET TENSIONED TIEDOWN

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3 Claims. (Cl. 254—164)

The invention herein disclosed relates to web tiedown gear and the general objects of the invention are to provide simple practical mechanism by which the web can be first quickly adjusted to take up slack and then be tensioned to a proper degree by readily operated ratchet mechanism.

Further important objects of the invention are to provide mechanism of this character which will be safe and secure in all ways, which will be locked in the holding position and which on the other hand can be quickly unlocked to release the web and be secured in the unlocked, free condition, permitting removal of the web and separation of the entire takeup mechanism from the web. In this latter, open condition the mechanism is ready for attachment to another stretch of webbing or for other such use.

The objects mentioned and those apparent from the following specification are attained by a novel combination of winding drum through which the web is threaded so that it may be pulled taut to any desired extent and novel ratchet and detent mechanism by which said drum may be actuated, held and released as desired.

Other novel features and results accomplished are set forth and will appear in the course of the following specification.

The drawings accompanying and forming part of this specification are illustrative of a presently preferred embodiment of the invention. Structure however may be modified and changed as regards the immediate illustration all within the true intent and scope of the invention as hereinafter defined and claimed.

FIG. 1 in the drawings is a side elevation showing the tiedown locked in the normal holding position.

FIG. 2 is a top plan view of the same.

FIG. 3 is an end elevation and partial section, as appearing on line 3—3 of FIG. 1.

FIG. 4 is an enlarged and broken cross sectional view as on the plane of line 4—4 of FIG. 3 showing one of the hooks or ratchet claws engaged with the companion ratchet wheel, with the latter forming a center support for the two segments forming the slotted drum.

FIG. 5 is a broken sectional view, as on the plane of line 5—5 of FIG. 2, showing how the web extending through the slot in the drum is wrapped about the drum in the ratchet tensioning operation.

FIGS. 6 and 7 are broken side elevations of the mechanism illustrating action of the holding detent and the ratchet claw, the latter view illustrating holding of the drum by the detent while the ratchet claw is being advanced to engage a fresh tooth in the ratchet wheel.

FIG. 8 is a broken part sectional detail showing how the cam faces on the ratchet teeth force back the spring holding detent while the ratchet wheel is being turned by the ratchet lever.

FIG. 9 is a broken side elevation showing the ratchet lever advanced and locked in the drum release position.

FIG. 10 is a broken side elevation showing the parts locked in the web tensioned relation.

FIGS. 1 and 2 show the body or frame of the mecha-

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nism as made up of spaced parallel side plates 15, 16 brought together and fashioned into a hook 17 at one end and having bearing openings 18 for the drum in the opposite spaced apart ends.

The drum is shown as made up of a pair of arcuate cross section substantially semi-cylindrical segments 19, 20 journaled in the bearings 18 and held in the spaced apart relation shown in FIG. 4 providing the through slot 21 for passage of the web by ratchet wheels 22 arcuately slotted at 23, 24 to receive the drum segments.

These ratchet wheels are located on the drum segments at the outer sides of the frame plates 15, 16 and are held in that relation by the overstanding ratchet levers 25 which are pivoted on the projecting ends of the drum segments, secured in that relation by transverse pins 26 in the nature of cotter pins or roll pins extending through the segments.

The ratchet wheels are thus keyed to the drum segments and these segments are supported in spaced relation forming a drum with a web passage therethrough by the ratchet wheels.

To provide desired thickness and strength the ratchet wheels may each be made up of a series of two or more corresponding laminations, as indicated in FIG. 2.

The ratchet levers 25 are shown connected together in their spaced apart relation by a handle forming piece 27.

The ratchet levers carry a pair of pawls or hooks 28 pivoted thereon at 29 for cooperative engagement with the teeth 30 of the ratchet wheels. These pawls are shown connected at the outer end by a cross bar 31, forming in effect a U-shaped yoke pivotally mounted within the U-shaped frame constituting the spaced ratchet levers.

A bowed spring 32 acting on the cross bar 31 holds the pawls tensioned in engagement with the ratchet wheels.

The drum is locked in advanced position by a spring detent shown in the form of a U-shaped piece 33 sliding in slots 34 in the sides of the frame and pressed by spring 35 into engagement with the ratchet teeth. The ends of this U-shaped piece are shown as struck out at 36 to fully engage the ratchet teeth and to provide projections for engagement by releasing cams on the ratchet levers.

To limit the free throw of the ratchet levers outturned lugs 37 are provided on the end of the frame positioned for engagement by the forward ends 38 of the pawls.

Thus far described the drum is held against retrograde or releasing movement either by the spring detent or by the ratchet lever when in the act of tensioning the web.

To effect the release of the web the drum is automatically uncoupled from both the detent and the ratchet lever by raising the ratchet lever as shown in FIG. 9 and pressing down on the cross bar 31 of the pawls to enable these pawls to ride over the stop lugs 37 where they will be held by lower projections 39 on the frame, released from the teeth of the ratchet wheels.

Also, at such times the cam projections 40 on the ratchet levers engage the outstruck ends 36 of the spring detent forcing same back clear of engagement with the ratchets.

In this full throw position of the ratchet levers therefore the drum will be free to turn, unrestrained by the ratchet levers or by the spring detent.

Further the ratchet levers will be locked in this position by engagement of the hooked ends of the pawls over the stop projections 37 and will remain so until the pawl

handle 31 is pressed to lift the pawl hooks clear of projections 37 whereupon the pawl carrying ratchet levers may be rocked back into lowered position, with cams 40 then releasing the spring detent to again engage the ratchet teeth.

FIG. 8 shows how the ratchet teeth are sloped as cams 41 to force back the spring holding detent in the forward rotary movement of the ratchet wheels.

In the release position illustrated in FIG. 9 with the hand lever 25 raised to the limit of its movement in that direction the pawls 28 are held by lugs 39 and 37 lifted from engagement with the ratchet wheels and the lever locked in this relation. Also the drum holding detent 33 is held by cams 40 of the hand lever out of engagement with the ratchet wheels. Consequently the drum is free to turn in either direction.

This may be the condition when the tiedown is applied over the load with the hook 17 at one end engaged with a holding ring or other form of anchorage and the hook 42 on the web 43 caught to a companion anchorage.

With the drum then free to rotate in either direction the end of the web may readily be passed through the slot in the drum and the free end of the web pulled tight to bring the web up taut.

Then to put the ratchet into action it is only necessary to press the handle 31 to lift the hooked ends of the pawls from holding projections 37 and rock the hand lever 25 down to drop the pawls and holding detent into engagement with the ratchet wheels, the position shown in FIG. 6.

Ratcheting may then be effected by lifting and lowering the hand lever 25 to turn the drum step by step, wrapping the web about the same in the manner shown in FIG. 5, where it will be so held by the spring detent 33.

The hand lever 25 will normally stand in the lowered position shown in FIGS. 1 and 6 but may be lifted and lowered at any time to take up slack or apply additional tension on the web.

While the web is securely held by the ratchet mechanism it may be immediately released at any time by simply pressing on the release handle 31 and raising the hand lever far enough to carry the hooks of the pawls over the stop projections 37 to the FIG. 9 position where both the pawls and the holding detent will be freed from the ratchet wheels.

The construction can be inexpensively produced from sheet metal parts so as to be both light and strong and so as to take up but small space. The parts are durable and the device as a whole is safe and dependable.

The outturned flanges 44 and the outwardly projected lugs 37 and 39 at the drum end of the frame may serve at times as guards to protect the ratchet mechanism against interference from canvas covers, ropes or the like over cargo parts secured by the tiedown gear.

What is claimed is:

1. Ratchet tensioned tiedown gear comprising a frame having means for anchoring it at one end and provided with aligned bearing openings at the opposite end, a web winding drum journaled in said bearing openings and having a web passage therethrough, said drum comprising opposed arcuate segments rotatably seated in said openings and projecting beyond the outer sides of said frame, ratchet disks engaged on the projecting ends of said drum segments at the outer sides of the frame, said ratchet disks having opposed arcuate slots receiving the projecting ends of the arcuate drum segments and thereby holding said segments spaced apart providing the web passage through the drum and securing said ratchet disks in keyed engagement on the ends of the drum, a U-shaped ratchet lever having spaced parallel arms rotatably engaged on the projecting ends of the drum at the outer sides of said ratchet disks, fastenings on the projecting ends of the drum segments at the outer sides of said arms and thereby rotatably securing said ratchet lever to the drum with the arms of said lever confining the ratchet disks on

the projecting ends of the drum, a U-shaped yoke between the arms of the ratchet lever and comprising parallel pawls pivotally supported on the arms of the ratchet lever in line with the ratchet disks at the inner sides of said arms, spring means normally holding said pivoted yoke with said pawls in engagement with the ratchet disks and a spring holding latch on the frame engageable with the teeth of said ratchet disks.

2. Ratchet tensioned tiedown gear comprising a frame having means for anchoring it at one end and provided with aligned bearing openings at the opposite end, a web winding drum journaled in said bearing openings and having a web passage therethrough, said drum comprising opposed arcuate segments rotatably seated in said openings and projecting beyond the outer sides of said frame, ratchet disks engaged on the projecting ends of said drum segments at the outer sides of the frame, said ratchet disks having opposed arcuate slots receiving the projecting ends of the arcuate drum segments and thereby holding said segments spaced apart providing the web passage through the drum and securing said ratchet disks in keyed engagement on the ends of the drum, a U-shaped ratchet lever having spaced parallel arms rotatably engaged on the projecting ends of the drum at the outer sides of said ratchet disks, fastenings on the projecting ends of the drum segments at the outer sides of said arms and thereby rotatably securing said ratchet lever to the drum with the arms of said lever confining the ratchet disks on the projecting ends of the drum, a U-shaped yoke between the arms of the ratchet lever and comprising parallel pawls pivotally supported on the arms of the ratchet lever in line with the ratchet disks at the inner sides of said arms, spring means normally holding said pivoted yoke with said pawls in engagement with the ratchet disks and a spring holding latch on the frame engageable with the teeth of said ratchet disks, said holding latch having portions projecting outwardly beyond the ratchet disks into the range of movement of said ratchet lever arms and said arms having cam portions engageable with said end projections of the holding latch in pivotal movement of the ratchet lever in respect to the drum.

3. Ratchet tensioned tiedown gear comprising a frame having means for anchoring it at one end and provided with aligned bearing openings at the opposite end, a web winding drum journaled in said bearing openings and having a web passage therethrough, said drum comprising opposed arcuate segments rotatably seated in said openings and projecting beyond the outer sides of said frame, ratchet disks engaged on the projecting ends of said drum segments at the outer sides of the frame, said ratchet disks having opposed arcuate slots receiving the projecting ends of the arcuate drum segments and thereby holding said segments spaced apart providing the web passage through the drum and securing said ratchet disks in keyed engagement on the ends of the drum, a U-shaped ratchet lever having spaced parallel arms rotatably engaged on the projecting ends of the drum at the outer sides of said ratchet disks, fastenings on the projecting ends of the drum segments at the outer sides of said arms and thereby rotatably securing said ratchet lever to the drum with the arms of said lever confining the ratchet disks on the projecting ends of the drum, a U-shaped yoke between the arms of the ratchet lever and comprising parallel pawls pivotally supported on the arms of the ratchet lever in line with the ratchet disks at the inner sides of said arms, spring means normally holding said pivoted yoke with said pawls in engagement with the ratchet disks and a spring holding latch on the frame engageable with the teeth of said ratchet disks, said holding latch having portions projecting outwardly beyond the ratchet disks into the range of movement of said ratchet lever arms and said arms having cam portions engageable with said end projections of the holding latch

in pivotal movement of the ratchet lever in respect to the drum, stops engageable by said pawls limiting pivotal movement of the ratchet lever in one direction and located to stop movement of said lever required for said cams to release the holding latch and said yoke having a handle by which the pawls forming part of the yoke may be rocked to clear them of said stops to enable further movement of the ratchet lever to effect the latch releasing engagement of the cams with said latch.

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