Oct. 31, 1950 W. W. SAUNDERS 2,528,389

YARN CARRIER FOR KNITTING MACHINES

Filed March 8, 1949 3 Sheets-Sheet 1

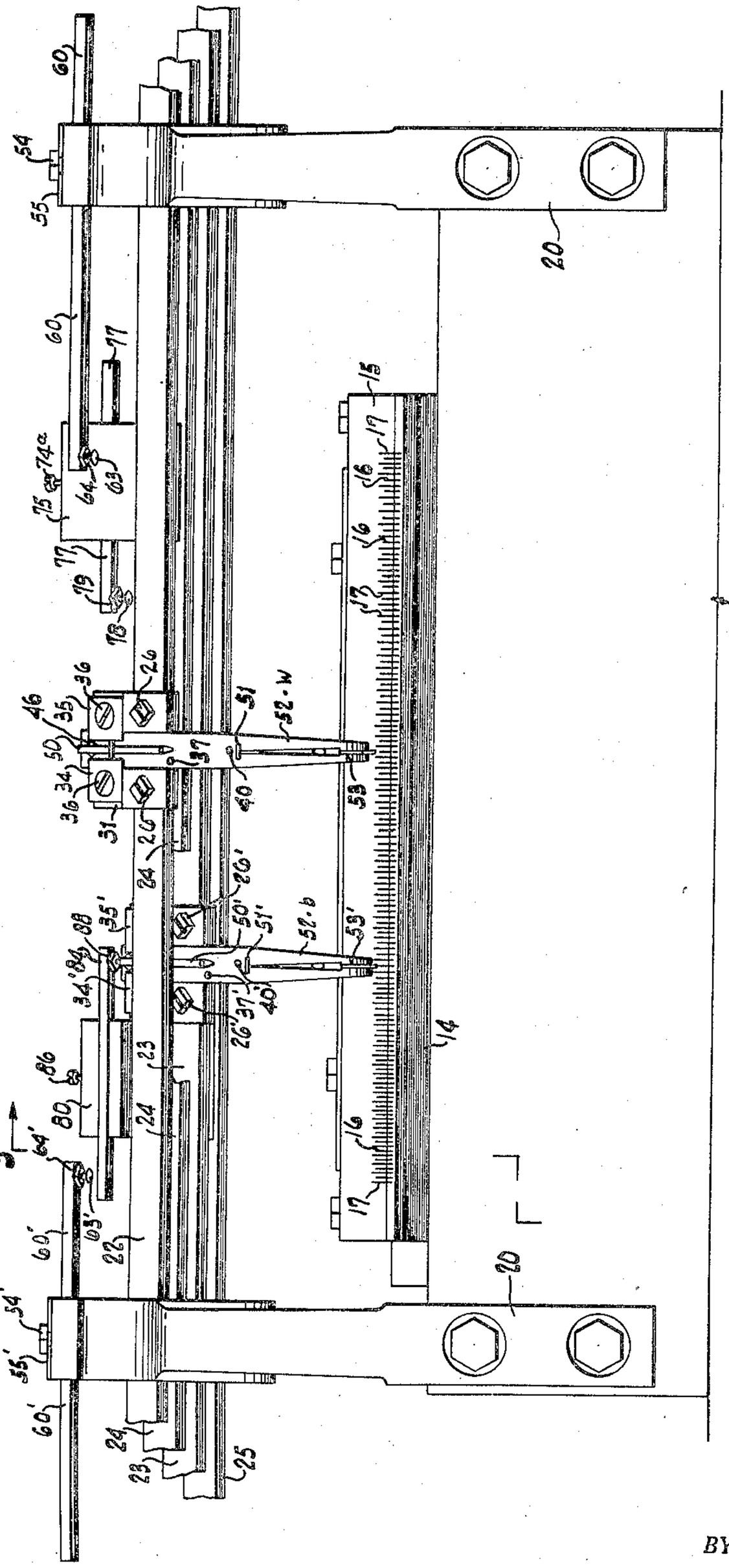


FIG. 1

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FIG. 2

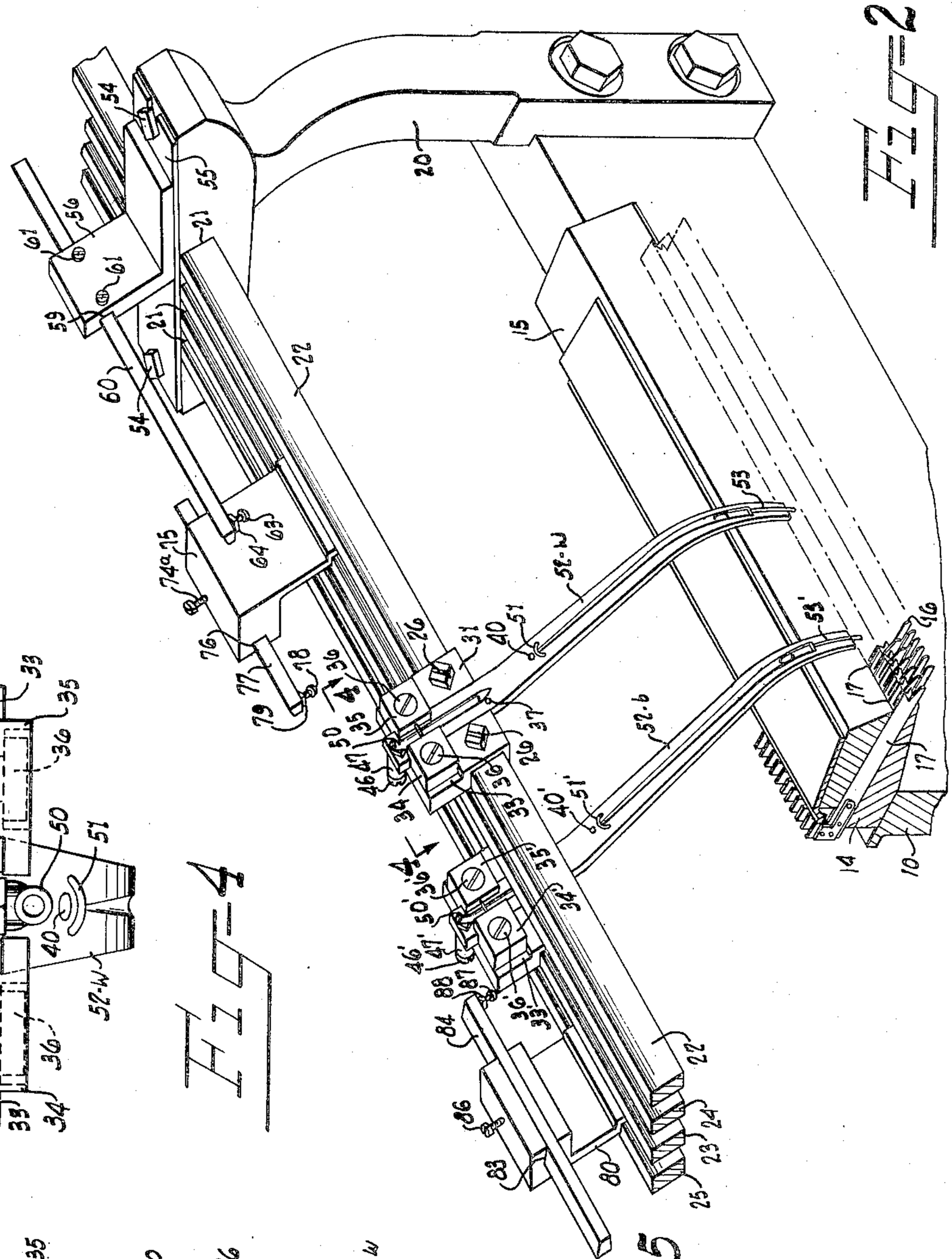


FIG. 4

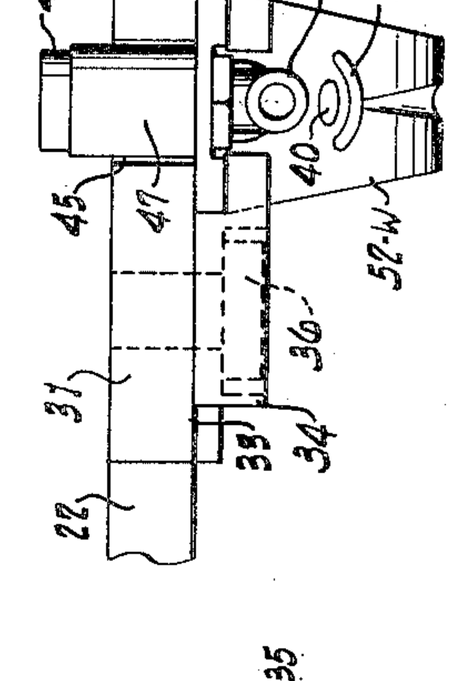


FIG. 5

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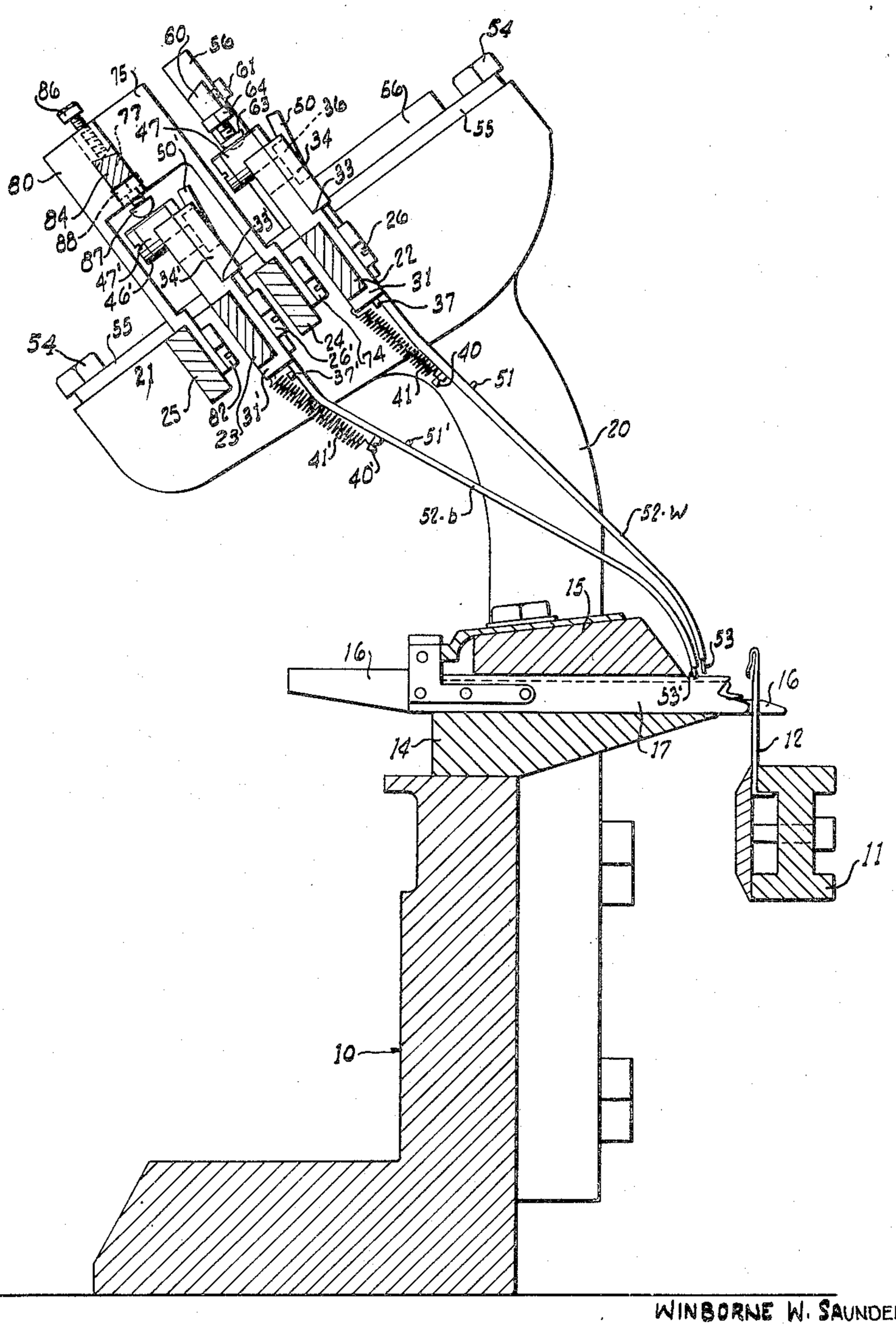


Fig—3

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2,528,389

# UNITED STATES PATENT OFFICE

2,528,389

## YARN CARRIER FOR KNITTING MACHINES

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Application March 8, 1949, Serial No. 80,277

2 Claims. (Cl. 66—126)

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This invention relates to full fashion knitting machines and more especially to provide means thereon to prevent damage to the sinkers in the event that the mechanism for retracting the sinkers becomes inoperative during the travel of the yarn carrier.

During knitting on a full fashion knitting machine having sinkers and dividers, it is necessary that the yarn carriers feed the yarn at a point low enough to cause the dividers to engage the yarn and hold it during a knitting operation. This means that since the dividers have their upper edge at a lower elevation than the sinkers that the yarn carriers which are fixed on the carrier bars must have their feeding ends disposed at a level below the top edges of the sinkers and at the end of travel of a yarn carrier and immediately before the carrier starts movement across the top of the dividers and sinkers, it is necessary that the mechanism for retracting the sinkers becomes operative immediately before travel of the yarn carrier takes place because, if the sinkers are not retracted, the lower end of the yarn carrier will engage the top edges of the sinkers and greatly damage both the sinkers and the lower end of the yarn carrier.

It is an object of this invention to provide means for lowering the yarn carriers to the point where they are normally operated in full fashion knitting machines at each end of the path of travel of the yarn carriers together with means for causing them to immediately move upwardly as they begin their travel along a path which is disposed immediately above the top edge of the sinkers if they were not retracted. In this manner, damage to the sinkers is avoided when they are failed to be retracted.

Broadly the invention comprises having the yarn carriers mounted on alternate carrier bars with the other bars having means thereon for engaging the top ends of the yarn carriers and depressing them at each end of their stroke. These carrier bars having the depressing means thereon are moved during knitting of a stocking blank to correspond to the change in length of stroke of the yarn carriers; the two associated carrier bars on each side thereof having the depressing means will likewise be regulated in their movements to at all times engage the upper ends of the yarn carriers at the ends of their strokes to depress them and to cause their lower ends to be disposed below the level of the upper edges of the sinkers and immediately above the upper edges of the dividers.

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Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of a section of a full fashion knitting machine and showing my invention applied thereto and omitting the needle bar;

Figure 2 is an isometric view of a portion of a section of a full fashion knitting machine and showing a portion of the invention applied thereto and omitting the needle bar;

Figure 3 is a vertical sectional view taken substantially along the line **3—3** in Figure 1;

Figure 4 is a top plan view taken along the line **4—4** in Figure 2 and showing one of the carrier bars with the upper end of the yarn carrier thereon;

Figure 5 is a vertical sectional view taken through the upper portion of one of the carrier fingers and the carrier bar associated therewith.

Referring more specifically to the drawings, the numeral **10** indicates a portion of a knitting machine frame having a needle bar **11** with a plurality of conventional needles **12** therein. The knitting machine also embodies a transversely slotted bar **14** with a top bar **15** disposed thereabove. In this slotted bar **14** are mounted for back and forth sliding movement a plurality of dividers **16** and a plurality of sinkers **17** whose upper edges are disposed at a higher level than the dividers **16**. The dividers **16** and sinkers **17** are disposed in alternate relation to each other in a conventional manner. The main frame **10** has rising therefrom a plurality of stands **20** having upwardly opening slots **21** therein in which a plurality of carrier bars, narrowing and widening bars and the like, are mounted for sliding movement. The carrier bars, all of which are not shown in the drawings, comprise a welt yarn carrier bar **22** and a body yarn carrier bar **23** and alternate carrier bars **24** and **25**. It is of course evident that the machine has suitable carrier bars for feeding reinforcing yarn and the like but the bars shown clearly illustrate the use to which my invention can be placed on a machine having as many carrier bars as desired.

Now these carrier bars and other bars, as above stated, are, by suitable pattern control means, moved backward and forward for the yarn carriers to lay the yarn across the dividers for knitting from course to course and of course during narrowing and widening the length of stroke of the yarn carrier is varied.

Now, the conventional yarn carriers have here-

tofore been fixedly mounted on their associated carrier bars and, as above stated, during their back and forth movement relative to the sinkers, if the sinkers failed to be retracted during the sweep of the yarn carrier a smash up would occur. Therefore, instead of mounting these yarn carriers in a rigid manner, they are mounted in a slidable and resilient manner for the purposes already stated. This is effected by securing a fitting **31** on a carrier bar **22** by means of suitable screws **26** and this fitting **31** has a substantially vertically disposed guideway therein in which the upper end of the yarn carrier is mounted.

The fitting **31** is off-set as at **33** in which are disposed removable guide members **34** and **35** which have lips on their proximate edges which fit over the outer surface of the yarn carriers and which are secured in position by means of screws **36**. This allows up and down sliding movement of the yarn carrier in the vertical guideways in the fittings **31** and beneath the members **34** and **35**.

The yarn carrier finger has a pin **37** mounted therein which projects inwardly and is adapted to engage the lower surface of its carrier bar to limit upward movement of the yarn carrier. The yarn carrier has a spring perch **40** mounted therein to which a tension spring **41** is secured, the other end of the tension spring being secured to a spring perch **42** in the lower inturned edge of the fitting **31**.

The spring **41** normally holds the pin **37** against the lower edge of the fitting **31** and thus limits upward movement of the yarn carrier. The upper edge of the fitting **31** has a notch **45** cut therein and the upper end of the yarn carrier has a screw **46** mounted therein and projecting backwardly on which is mounted a roller **47**. The depth of the notch **45** limits downward movement of the roller **47** and consequently the downward movement of the yarn carrier, as will be presently described.

The yarn carrier has a conventional tube **50** near its upper end and also has a guiding loop **51** intermediate its ends and a tube **53** at its lower end for guiding the yarn from a source of supply not shown to the needles and dividers of the machine. The bars **22** to **25**, inclusive, are loosely confined in the stands **20** by means of plates or covers **55** and **55'** secured in position by screws **54** and **54'**. Now, in order to depress a yarn carrier such as **52**—*w* for the welt yarn or a carrier **52**—*b* for the body yarn, the structures being identical, I mount on the upper ends of each of the covers **55** for the carrier bar stands **20** a right-angular bar **56**. The two end pieces namely plates **55** and angle brackets **56** are identical and like reference characters will apply with prime notations added.

Each of the upright portions of the angle bars **56** has a dovetailed horizontally disposed groove **59** therein in which is mounted for sliding movement bars **60** and **60'** which may be adjusted in any desired position by means of set screws **61** penetrating the upright leg of the angle brackets **56** and pressing against the bar **60** to lock it in an adjusted position. The outer ends of these bars **60** and **60'** have set screws **63** and **63'** therein secured in position by lock nuts **64** and **64'** and these are adapted to engage the roller **47** at each end of travel of the carrier bar to press the carrier bar downwardly from the position shown in Figure 1 to the depressed position shown for carrier bar **52**—*w* to the position shown for carrier bar **52***b* in Figure 1.



The arrangement just described controls the depressing of the yarn carrier **52**—*w* at each end of its stroke the adjustment for the position of the screws **63** when once made will serve for the knitting of the welt and will not have to be changed gradually. However, in knitting a body yarn, for example, or other yarns for which carriers and carrier bars are not shown in these drawings, it is of course apparent that the movement of the depressing means for such yarn carriers **52**—*b* will have to be varied at the same time the length of stroke of the yarn carrier **52**—*b* is varied during narrowing and widening. It has already been stated that the yarn carrier bars are indicated by reference characters **22** and **23** and the alternate bars are indicated at **24** and **25** and these are adapted to control the depressing of the yarn carrier **52**—*b*. The mechanism for yarn carrier **52**—*b* is identical for the yarn carrier **52**—*w* and like reference characters will apply with the prime notation added.

On carrier bar **24** for example, there would be secured by a screw **74** a fitting **75** which has a rearwardly projecting portion in the rear face of which is cut a dovetailed groove **76** in which a mating bar **77** is mounted for sliding movement. A suitable set-screw **74***a* is threadably mounted in this member **75** for clampingly holding the bar **77** in position. This bar **77** likewise has a downwardly projecting set screw **78** threadably secured therein with a lock nut **79** for holding it in adjusted position similar to the structure already described for the bar **60** and **60'**. The carrier bar **25** likewise has a fitting **80** secured thereon by any suitable means such as a screw **82** and this fitting **80** rises upwardly and on its front face has a dovetailed groove **83** in which is slidably mounted a mating bar **84** and this likewise is confined in position by means of a set screw **86** threadably mounted in the fitting **80** and clampingly engaging the mating bar **84** for holding it in adjusted position. The end of bar **84** which is nearest to bar **77** has a set screw **87** threadably mounted therein and which is locked in position by a lock nut **88** and this set screw **87** of course projects downwardly in the same manner as the set screw **78**.

Now, during knitting the bars **24** and **25** will be moved towards each other or away from each other in accordance with the length of stroke of the body yarn carrier **52**—*b* so that at the end of the stroke of the carrier bar **23** the roller **47'** will pass beneath the lower end of set screw **78** at one end of its stroke and set screw **87** at the other end of its stroke to depress the yarn carrier downwardly to where the lower end of its tube will be disposed below the tops of the sinkers **17** but above the tops of the dividers **16** and immediately upon movement being imparted to the carrier bar **23** the roller **47'** will rise from beneath the set screw **87** or the set screw **78** depending at which end of the stroke the yarn carrier **52**—*b* is located, and will thus cause the lower end of the tube on the yarn carrier to be disposed above the level of the upper edges of the sinkers **17** so that in the event that the sinkers should not be retracted there will be no damage done to either of the sinkers or the yarn carrier on account of the elevation of the lower end of the yarn carrier being above that of the upper edge of the sinkers when they are in extended position.

In the drawings and specification there has

been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a full fashioned knitting machine having needles, sinkers, and dividers, and having a carrier bar equipped with a yarn carrier whose lower end is adapted to feed a yarn in close proximity to the needles, the yarn carrier being mounted on the carrier bar for vertical sliding movement, tension means normally holding the yarn carrier in raised position, adjustable means disposed at each end of travel of the yarn carrier and adapted to engage the upper end of the yarn carrier when it has reached the limit of its travel to depress the yarn carrier to cause its lower end to deposit its yarn at a level lower than the top of the sinkers, whereby upon movement of the yarn carrier across the tops of the sinkers, the lower ends of the yarn carrier will be disposed at a higher level than that occupied by the tops of the sinkers, other slidable bars disposed in alternate relation, an additional carrier bar having a yarn carrier thereon and being disposed between the alternate bars and each of the alternate bars having adjustable means mounted thereon adapted to engage a yarn carrier mounted on the additional carrier bar disposed between the alternate bars at each end of the travel of the carrier bar, the alternate bars having the means thereon for engaging the upper end of the yarn carrier on the additional carrier bar disposed between the alternate bars, being movable to cause their depressing means to be moved towards and away from each other in response to narrowing or widening operations to thereby occupy the right position to depress the yarn carriers at each end of travel of the yarn carrier on the additional carrier bar.

2. In a full fashioned knitting machine having a plurality of carrier bars each equipped with



a downwardly projecting yarn carrier for feeding a yarn to the needles of a knitting machine, the carrier bars including at least a welt bar and an additional carrier bar for feeding another yarn to the needles, means for mounting the yarn carriers on the carrier bars for vertical sliding movement, tension means normally urging the yarn carriers upwardly, stop means for limiting upward movement of the yarn carriers against the tension of said tension means, adjustable means mounted on the machine and having portions thereon adapted to engage the upper ends of the yarn carrier on one of the carrier bars at the ends of its travel to depress the yarn carrier to a point lower than the upper edges of the sinkers whereby upon movement of the yarn carrier for the welt yarns, the yarn carrier associated therewith will move upwardly to traverse the sinkers immediately above the upper edges thereof and out of engagement therewith, a second slidable carrier bar disposed in the machine, additional slidable bars associated with the second slidable carrier bar and each having a projection thereon in alinement with the yarn carrier mounted thereon, the additional slidable bars being movable towards and away from each other in proportion to the movement of the additional carrier bar to thereby cause the projections thereon to engage the upper end of the other yarn carrier upon its back and forth movement to depress the said other yarn carrier at the ends of its stroke.

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