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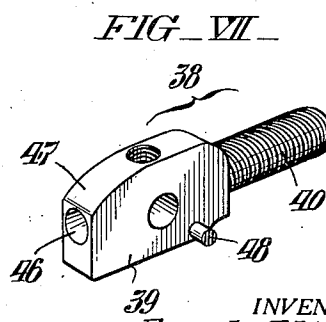
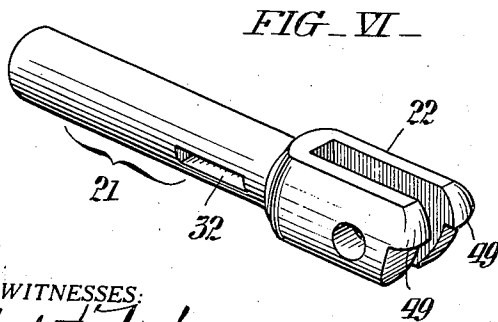
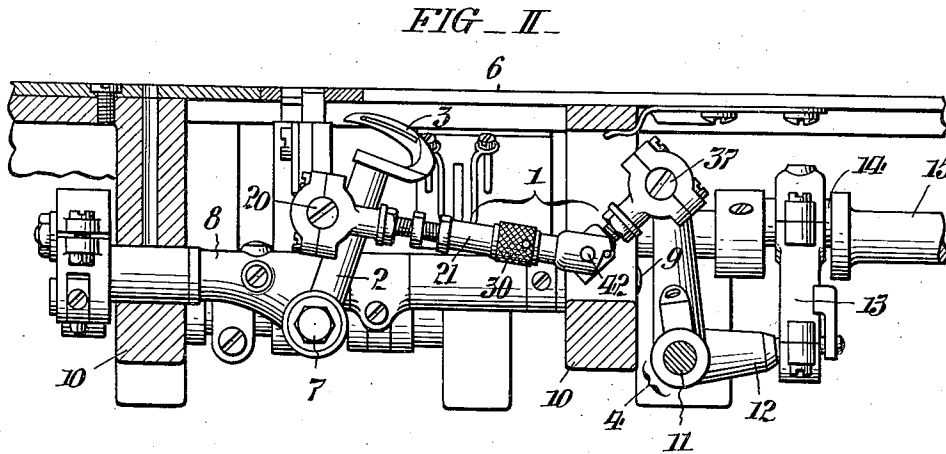
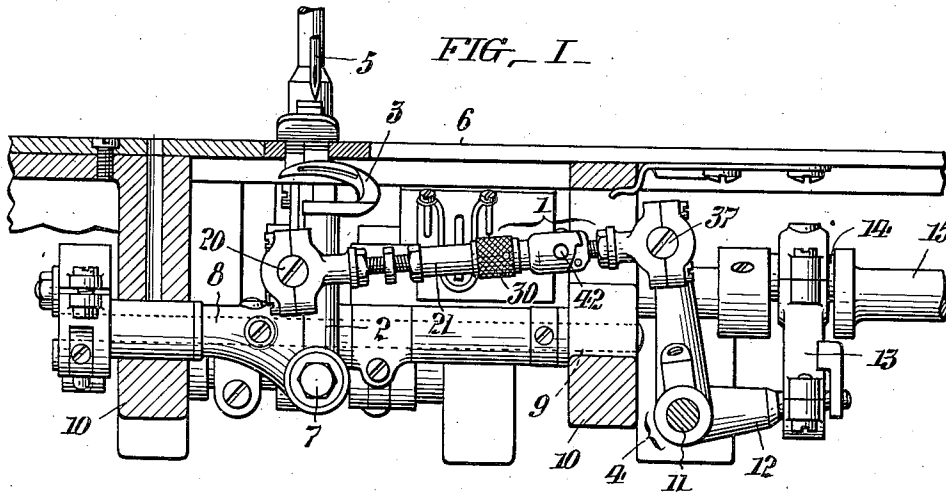
F. A. KUCERA

2,197,256

COLLAPSIBLE CONNECTING ROD

Filed June 22, 1937

2 Sheets-Sheet 1



WITNESSES:

Hubert Hicks
William Bee, Jr.

INVENTOR:

Frank A. Kucera,

BY Tracy Paul
ATTORNEYS.

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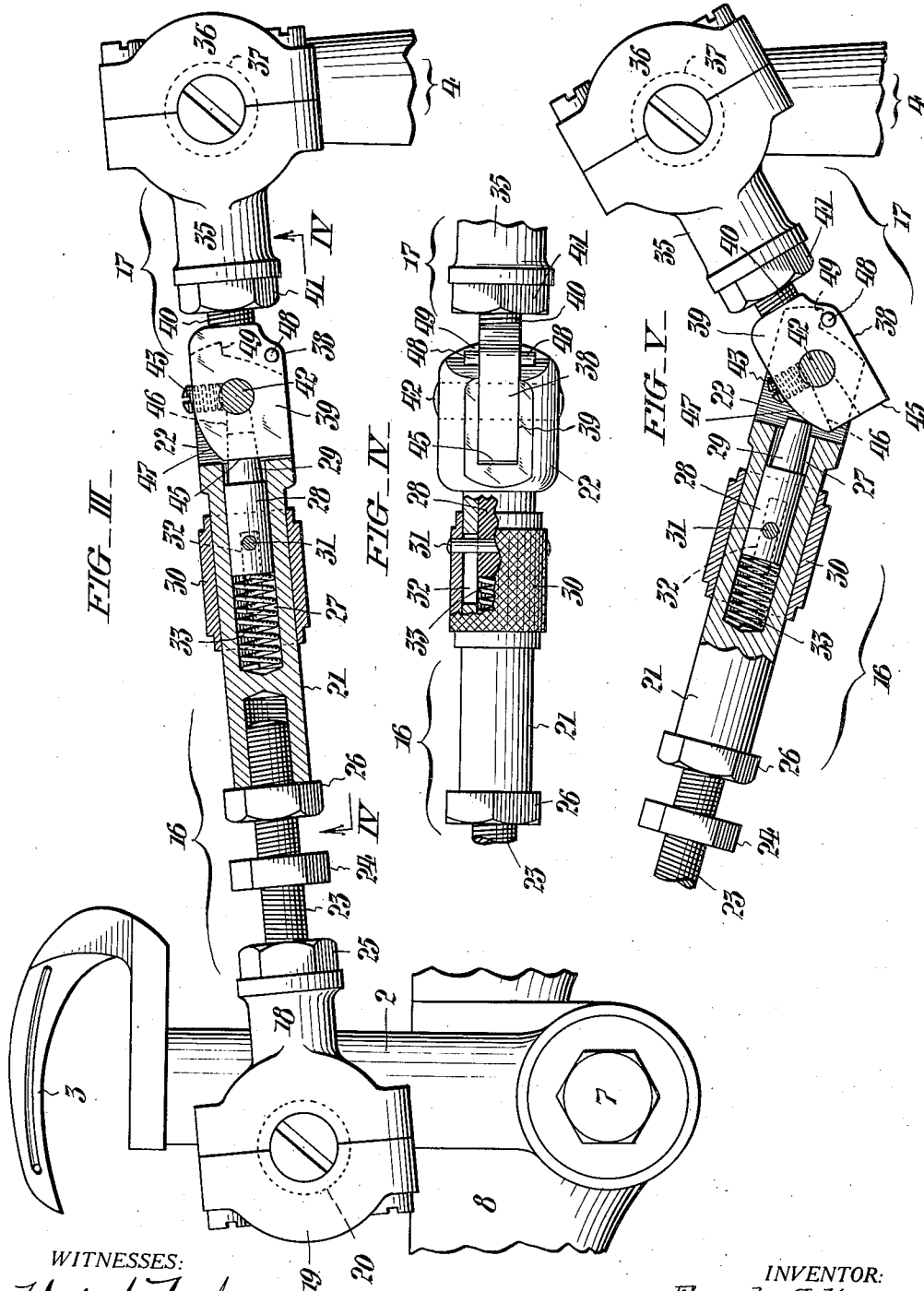
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2 Sheets-Sheet 2



WITNESSES:

Hubert Fuchs
William Bree, Jr.

INVENTOR:

Frank A. Kucera,
Tracy Paul
ATTORNEYS.

UNITED STATES PATENT OFFICE

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COLLAPSIBLE CONNECTING ROD

Frank A. Kucera, Chicago, Ill., assignor to Union
Special Machine Company, Chicago, Ill., a cor-
poration of Illinois

Application June 22, 1937, Serial No. 149,610

9 Claims. (Cl. 74—579)

This invention relates to connecting rods having components which are connected by a pivot or knuckle joint so that the rod may be collapsed or buckled. Such a rod is useful for example, with looper mechanism of sewing machines as exemplified in U. S. Patent No. 1,850,949, granted to Clarence C. Smith on March 22, 1932.

One of the aims of my invention is to insure against the development of looseness between the components of a connecting rod of the sort referred to and so prevent rattling during the operation of the rod, and at the same time to render the rod rigid against the possibility of accidental collapse either under endwise tension or compression in use.

Another object of my invention is to limit the extent of angular movement of the components incident to collapsing of the rod, and to provide for the maintenance of the rod yieldingly in collapsed position with capacity for being easily and quickly extended by exertion of slight lateral pressure thereupon at the region of pivoting of its components.

One way in which the foregoing and other objects and advantages can be readily realized in practice is clearly set forth in the following detailed description of the attached drawings, wherein Fig. I is a fragmentary view in longitudinal section of a chain stitch sewing machine with looper mechanism incorporating the connecting rod of my invention.

Fig. II is a view like Fig. I showing the connecting rod in collapsed condition.

Fig. III is a fragmentary view on an enlarged scale, partly in side elevation and partly in longitudinal section, showing the rod in its normal condition.

Fig. IV is a detail illustration viewed as indicated by the arrows IV—IV in Fig. III, a portion of the rod having been broken away for exposure of important parts at the interior.

Fig. V is a view corresponding to Fig. III but with the rod collapsed.

Figs. VI and VII are perspective views respectively of the pivot ends of the rod components.

In Figs. I and II of these illustrations, my improved collapsible rod is designated comprehensively by the numeral 1 and shown as serving in the capacity of a link between a carrier 2 for the looper 3 of a sewing machine and a bell crank member 4. The looper 3 cooperates with the needle 5 of the sewing machine beneath the bed plate or work support 6 of the latter in a well known way to produce stitches, the looper carrier 2 being fulcrumed at 7 on a sleeve 8 which

latter is secured to a horizontal shaft 9 journaled for oscillation in pendant bearing lugs 10 of the work support 6. The bell crank member 4 is affixed to a transverse rock shaft 11, and has its horizontal arm 12 connected, by means of a pitman 13, with an actuating crank 14 on a drive shaft 15 which extends longitudinally beneath the work support 6 of the machine. As presently explained, the connecting rod 1 is so constructed that it may be collapsed as shown in Fig. II to effect retraction of the looper 3 from the path of the needle 5 and so render it conveniently accessible for threading.

Referring now more particularly to Figs. III—VII, it will be observed that the connecting rod of my invention comprises two main components 16 and 17, each of which is in turn of composite construction. As shown, the component 16 has an outer end member 18 with a split bearing 19 adapted, in the present instance, to receive the ball head 20 of a stud on the looper carrier 2; a cylindric inner end member 21 (separately illustrated in perspective in Fig. VI) with a clevised head 22, and with an intermediate portion 23 in the form of a screw whereof the opposite ends are reversely threaded and engage into the contiguous ends of said end portions 18 and 21. By turning the screw member 23 in one direction or the other, the component 16 may be lengthened and shortened as may be desired or required, said screw member being provided with a polygonal collar 24 for convenience of adjusting it, and being fixable in adjusted positions by the jam nuts shown at 25 and 26. Confined to sliding movement in an axial cavity 27 of the cylindric end member 21 of the rod component 16 is a bolt 28 having a tapered outer end 29; and surrounding said end member 21 is a knurled sleeve 30, which, by means of a diametral pin 31 extending through longitudinal slots 32 at opposite sides of the end member 21, is secured to said bolt. As shown, the bolt 28 is subject to a helical compression spring 33 which tends to urge it outward of the cavity 27 in the end member 21 of the component 16.

The component 17 of the rod likewise has an outer end member 35 with a split bearing 36 for engaging, in this instance, the ball of a stud 37 on the member 4 of a sewing machine; and an inner end member 38 (separately illustrated in Fig. VIII) fitting with a flat head 39 within the clevised head 22 of the contiguous end member 21 of the component 16, and a screw shank 40 axially engaged in the end member 35. By virtue of this construction, the rod component 17 can

be shortened or lengthened like the component 16 as desired or required, a jam nut 41 being relied upon to fix the parts in adjusted positions.

A pin 42 extending crosswise of the rod through registering transverse apertures in the interlapping portions of the members 22 and 38 serves to pivotally unite the components 16 and 17, said pin being held in place in the member 38 by a set screw shown at 43. Extending inward from the square end face 45 of the member 38 is a socket 46 which is tapered to correspond with the tapered end 29 of the bolt 28 and which is adapted to receive said bolt as shown in Fig. III.

Under the pressure of the spring 33, a snug wedging interengagement is maintained between the tapered end of the bolt 28 and the socket 46 with the result that the development of looseness between the inter pivoted rod components 16 and 17 is definitely precluded and rattling of the bar during operation of the sewing machine avoided. The bolt 28 moreover acts as a means to positively lock the components 16 and 17 in direct axial alignment so that the rod cannot accidentally collapse or buckle in use. Upon withdrawing the bolt 28 from the socket 46 of the component 17 by manipulating the slide collar 30, the rod can be collapsed as shown in Fig. V by pressing upon the same from above at the region of the pivot 42, in which condition it will be yieldingly maintained through coaction of the tapered end 29 of the bolt 28 with a curved camming surface 47 on the head 39 of the end member 38 of the component 17. The extent of relative angular movement between the components 16 and 17 in the collapse of the rod is limited as shown in Fig. V through engagement of lateral stud projections 48 on the member 38 of the component 17 with stop lugs 49 formed on the head 22 of the member 21 of the component 16. Restoration of the rod to its normal condition is effected by slight upward pressure at the region of the pivot 42 incident to which the bolt 28 will ride the curved cam surface 47 and finally be forced into the socket 46 by the spring 33 automatically.

In cases where lengthwise adjustment of the rod is not important or essential, the components 16 and 17 may be integrally formed respectively instead of being of multipartite construction as herein shown and described. It is of course to be understood that the use of my improved collapsible connecting rod is not intended to be restricted to sewing machines.

Having thus described my invention, I claim:

1. A collapsible connecting rod comprising a pair of components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; means for locking the rod against collapse in its normal condition including a bolt which is confined to longitudinal sliding movement on one of said components and which is adapted to engage a socket in the other component and means associated with one of said components for automatically holding the bolt retracted when the rod is collapsed, and for controlling the bolt to cause it to automatically relock the components when the latter are brought into alignment from collapsed condition.

2. A collapsible connecting rod comprising a pair of lengthwise adjustable components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated;

a pivot interconnecting the contiguous ends of the rod components; means for locking the rod against collapse in its normal condition including a bolt which is confined to longitudinal sliding movement on one of said components and which is adapted to engage a socket in the other component and means associated with one of said components for automatically holding the bolt retracted when the rod is collapsed, and for controlling the bolt to cause it to automatically relock the components when the latter are brought into alignment from collapsed condition.

3. A collapsible connecting rod comprising a pair of components which are normally aligned axially, and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; means for locking the rod against collapse in its normal extended condition including a bolt which is confined to longitudinal sliding movement on one of the components, and which has a tapered end adapted to engage a correspondingly tapered socket in the other component with a wedge fit and means associated with one of said components for automatically holding the bolt retracted when the rod is collapsed, and for controlling the bolt to cause it to automatically relock the components when the latter are brought into alignment from collapsed condition.

4. A collapsible connecting rod comprising a pair of components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; means for locking the rod against collapse in its normal extended condition including a bolt which is confined to longitudinal sliding movement on one of said components and which is adapted to engage a socket in the other component, and a spring operative upon the bolt to yieldingly hold it engaged in the socket and means associated with one of said components for automatically holding the bolt retracted when the rod is collapsed, and for controlling the bolt to cause it to automatically relock the components when the latter are brought into alignment from collapsed condition.

5. A collapsible connecting rod comprising a pair of components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; means for locking the rod against collapse in its normal extended condition including a bolt which is confined to longitudinal sliding movement in an axial cavity in one of the components and which is adapted to engage an axial socket in the other component and means associated with one of said components for automatically holding the bolt retracted when the rod is collapsed, and for controlling the bolt to cause it to automatically relock the components when the latter are brought into alignment from collapsed condition.

6. A collapsible connecting rod comprising a pair of components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; means for locking the rod against collapse in its normal extended condition including a

bolt which is confined to sliding movement in an axial cavity in one of the components and which is adapted to engage an axial socket in the other component; and means exteriorly of the rod for manipulating the bolt and means associated with one of said components for automatically holding the bolt retracted when the rod is collapsed, and for controlling the bolt to cause it to automatically relock the components when the latter are brought into alignment from collapsed condition.

7. A collapsible connecting rod comprising a pair of components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; and means for locking the rod against collapse in its normal extended condition including a bolt which is confined to longitudinal sliding movement in an axial cavity in one of the components and which is adapted to engage an axial socket in the other component, and a manipulating collar slidable on the rod and connected to the bolt by a pin extending through the longitudinal slot in the bolt carrying component.

8. A collapsible connecting rod comprising a pair of components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; and means for locking the rod against collapse in its normal extended condition, including a bolt which is confined to longitudinal sliding

movement in one of the components and which is adapted to engage a socket in the other component, and a spring for maintaining the bolt in engagement with the socket; stops respectively on the components for limiting relative angular movement of said components incident to collapsing the rod; and a cam surface on the socketed component at the region of interpivoting adapted to cooperate with the end of the bolt to yieldingly maintain the rod in collapsed condition.

9. A collapsible connecting rod comprising a pair of components which are normally aligned axially and which have pivots at their remote ends for connection respectively to an actuator and to an element to be actuated; a pivot interconnecting the contiguous ends of the rod components; means for locking the rod against collapse in its normal extended condition including a bolt which is confined to longitudinal sliding movement in an axial cavity in one of the components and which is adapted to engage an axial socket in the other component, and a spring for maintaining the bolt yieldingly engaged in the socket; means exteriorly of the rod for manipulating the bolt; interengaging stops respectively on the components for limiting the relative angular movement of said components incident to collapsing the rod; and a cam surface on the socketed component at the region of interpivoting adapted to cooperate with the end of the bolt to yieldingly maintain the rod in collapsed condition.

FRANK A. KUCERA.