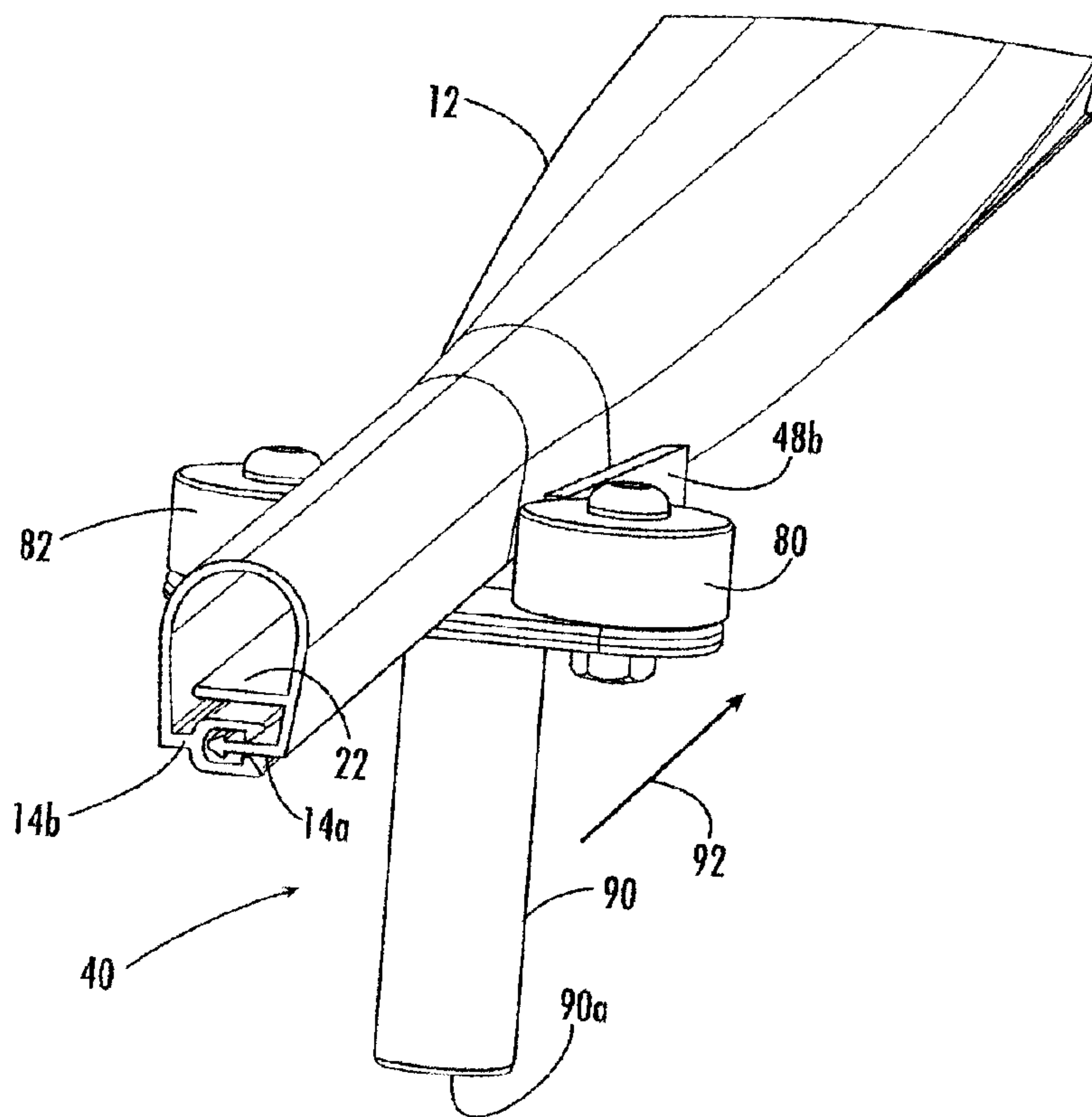




(86) Date de dépôt PCT/PCT Filing Date: 2000/09/29
 (87) Date publication PCT/PCT Publication Date: 2001/04/19
 (45) Date de délivrance/Issue Date: 2009/04/14
 (85) Entrée phase nationale/National Entry: 2002/03/22
 (86) N° demande PCT/PCT Application No.: US 2000/026930
 (87) N° publication PCT/PCT Publication No.: 2001/028056
 (30) Priorité/Priority: 1999/10/12 (US09/415,828)

(51) Cl.Int./Int.Cl. *H02G 3/04* (2006.01),
H02G 1/02 (2006.01), *H02G 7/00* (2006.01)
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(54) Titre : APPAREIL PORTATIF PERMETTANT D'INSTALLER UNE GAINE DE PROTECTION CONTRE LE
CONTOURNEMENT SUR UN EQUIPEMENT ET DES LIGNES ELECTRIQUES SOUS TENSION
 (54) Title: HAND-HELD APPARATUS FOR INSTALLING FLASHOVER PROTECTION COVERS ON ENERGIZED
ELECTRICAL CONDUCTORS AND EQUIPMENT



(57) **Abrégé/Abstract:**

Hand-held devices that can be used to quickly install flashover protection covers around energized electrical conductors and equipment are provided. Each device includes a guide assembly that defines a pair of spaced-apart, converging passageways that are configured to slidably receive the elongated edge portions of a flexible panel therethrough. The converging passageways force together the opposite edge portions of a flexible panel being advanced through the guide assembly.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

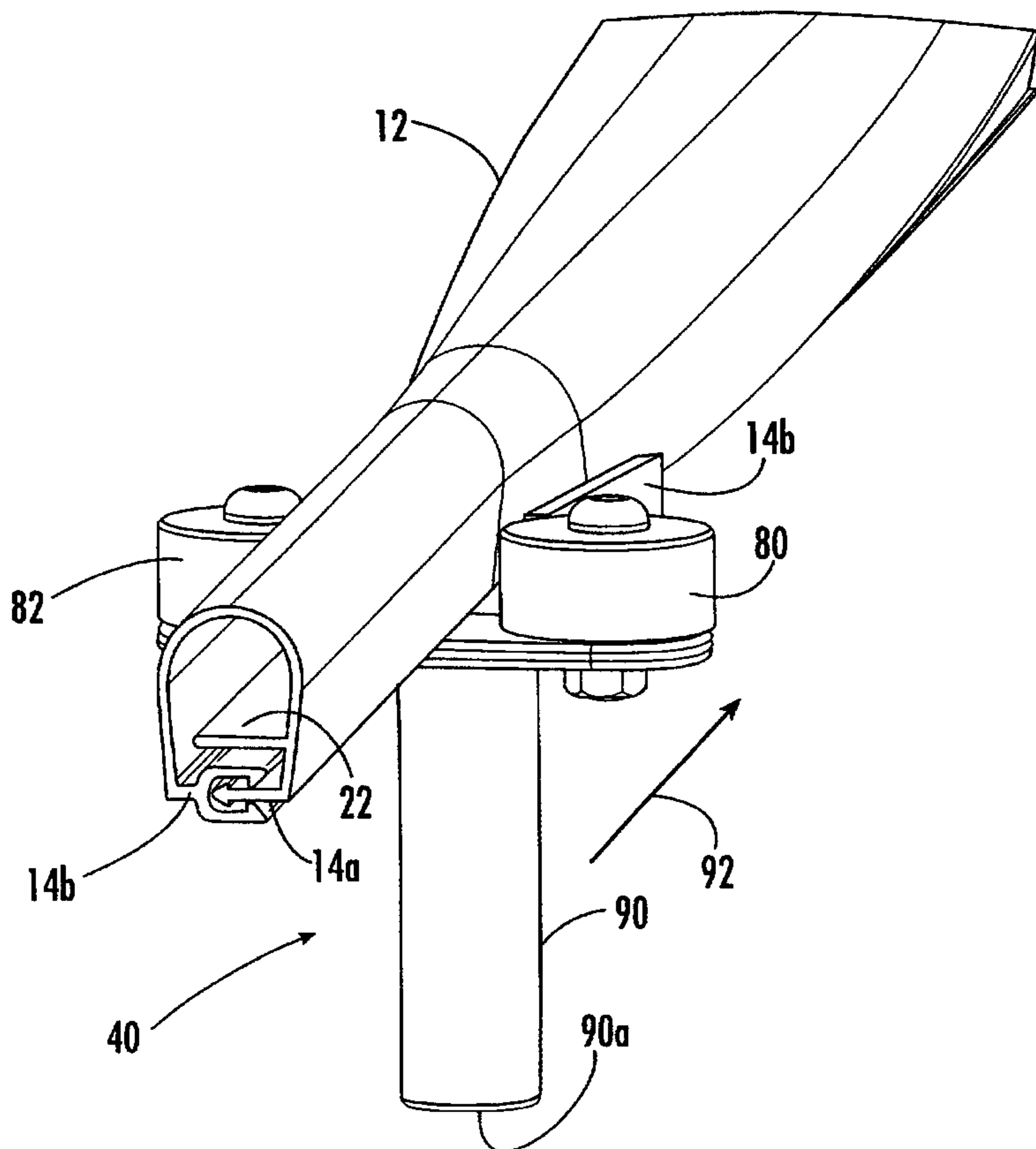
(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
19 April 2001 (19.04.2001)

PCT

(10) International Publication Number
WO 01/28056 A1

- (51) International Patent Classification⁷: H02G 3/04 (74) Agent: BODDIE, Needham, J., II; c/o Gerstner, Marguerite, Tyco Electronics Corporation, Intellectual Property Law Department, 307 Constitution Drive, MS 106/1B, Menlo Park, CA 94025-1164 (US).
- (21) International Application Number: PCT/US00/26930
- (22) International Filing Date:
29 September 2000 (29.09.2000) (81) Designated States (*national*): AU, BR, CA, IL, JP, KR, MX, NO, NZ, VN.
- (25) Filing Language: English
- (26) Publication Language: English (84) Designated States (*regional*): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
- (30) Priority Data:
09/415,828 12 October 1999 (12.10.1999) US
- (71) Applicant: TYCO ELECTRONICS CORPORATION [US/US]; 2901 Fulling Mill Road, Middletown, PA 17057-3163 (US). **Published:**
— With international search report.
- (72) Inventor: FRYE, Terry, E.; 106 Settlers Circle, Cary, NC 27513 (US).
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HAND-HELD APPARATUS FOR INSTALLING FLASHOVER PROTECTION COVERS ON ENERGIZED ELECTRICAL CONDUCTORS AND EQUIPMENT



(57) Abstract: Hand-held devices that can be used to quickly install flashover protection covers around energized electrical conductors and equipment are provided. Each device includes a guide assembly that defines a pair of spaced-apart, converging passageways that are configured to slidably receive the elongated edge portions of a flexible panel therethrough. The converging passageways force together the opposite edge portions of a flexible panel being advanced through the guide assembly.

WO 01/28056 A1

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10 HAND-HELD APPARATUS FOR INSTALLING FLASHOVER
 PROTECTION COVERS ON ENERGIZED ELECTRICAL
 CONDUCTORS AND EQUIPMENT

15 Field of the Invention

 The present invention relates generally to
insulating covers and, more particularly, to devices
for installing insulating covers.

20 Background of the Invention

 Electrical power may be transmitted from a
generation source to consumers via overhead conductors
strung between towers or poles. Electrical power is
conventionally transmitted in phases wherein multiple
25 conductors are utilized. One or more of these
conductors may be a "hot" conductor that carries a
specified amount of alternating current electric power.
Flashover may result if contact is made between two hot
conductors or between a hot conductor and ground. Non-
30 grounded contact with a hot conductor, such as when a
bird sits upon a hot conductor, typically does not
result in flashover.

 The transmission of electrical power from a
generation source to residential areas typically
35 involves a combination of transmission devices which
make up a transmission system. In a typical
transmission system, power is generated by a power
plant such as a hydroelectric installation, a steam
installation or a nuclear plant. The output from a

power plant generator is normally about 25 kilovolts (kv). The output from a power plant generator is typically transmitted to a step-up substation where the voltage is increased to a transmission line voltage of 5 230 kv or higher. The next substation encountered is typically a transmission substation where the transmission voltage is decreased from the transmission line voltage to a sub-transmission voltage of approximately 69 kv. A distribution substation is then 10 typically used to step the voltage down from the transmission voltage to a distribution voltage of about 5 to 35 kv. The distribution voltage is the voltage that is transmitted to a residential area, either through overhead or underground distribution systems. 15 Single phase transformers are typically provided at the residential level to reduce voltage to a 240-120 volt, single phase, three wire residential power entrance.

Because uninsulated conductors are typically less expensive than insulated conductors, many electric 20 power suppliers utilize uninsulated conductors for the transmission and distribution of electric power. Although uninsulated conductors may be less expensive to install than insulated conductors, potentially costly problems may arise from the use of uninsulated 25 conductors. Adequate clearances between conductors and/or other grounded objects may not be sustainable during adverse weather conditions (*i.e.*, storms and high winds). As a result, the potential for flashover caused by uninsulated conductors contacting each other 30 or other objects may be increased. Another source of flashover may be caused by large birds and animals which have sufficient size to make contact with a hot conductor and a grounded object or another conductor. In addition, falling trees and tree branches may cause

contact between hot conductors and ground which may result in flashover.

Substations typically include various steel structures for supporting power transmission and distribution equipment, such as circuit breakers, transformers, capacitors, regulators, hook switches and the like. Uninsulated conductors typically extend between the equipment in a substation in various directions and configurations. Because workers often work in close proximity to the equipment in a substation, it is typically desirable to cover at least some portions of the uninsulated conductors as well as grounded structures in the vicinity of uninsulated conductors.

Flashover may result in power outages which are undesirable to electric power suppliers and to consumers. For existing power transmission and distribution systems, electric power suppliers may find it desirable to replace uninsulated conductors with insulated ones in order to reduce the likelihood of flashover. Unfortunately, the cost of replacing uninsulated conductors with insulated conductors may be expensive. Furthermore, an interruption in the delivery of power may be required to replace uninsulated conductors. This may be economically disadvantageous to an electric power supplier as well as being undesirable to electric power consumers.

Insulating covers for protecting workers from hot, uninsulated conductors, as well as for protecting against flashover, are available. These covers conventionally include thick rubber tubing, heat-shrinkable tape, and wrap-around covers. Unfortunately, there are drawbacks associated with installation methods for each of these types of covers. Thick rubber

tubing can be somewhat bulky and difficult to install. Furthermore, tubing covers may require that a conductor be disconnected from service so that the conductor can be inserted through the tubing. Such electrical power service interruptions may be economically disadvantageous to an electric power supplier as well as being undesirable to electric power consumers.

Netherlands Patent No. 7603441 illustrates an apparatus that appears to join together and/or separate apart two semi-circular cover portions that are configured to engage with each other in overlapping, concentric relationship therewith to form a cover (Figs. 1 and 3).

The use of heat-shrinkable tape typically requires the use of a torch or other heat source for shrinking the tape to a conductor. The use of a torch or other heat source, particularly around substation equipment, is generally undesirable and can be labour intensive. Wrap-around covers typically do not snap together and typically are secured to a conductor or other structure using ties. Unfortunately, this method can be a somewhat labour intensive process as well.

Insulating covers are available that do not require that a conductor be removed from service. These covers are typically flexible panels having elongated opposite edge portions that are configured to be joined together to enclose a conductor or other elongated structure (e.g., as illustrated in International Publication No. WO 99/30399). Unfortunately, operations for joining the edges together on these types of covers can be labour intensive.

Summary of the Invention

In one aspect, the present invention provides hand-held devices that can be used to quickly install flashover protection covers around energized electrical conductors and other equipment.

In accordance with one aspect of the invention there is provided a hand-held apparatus for installing a cover around an article. The cover includes an elongated flexible panel having generally parallel opposite first and second edge portions that are configured to be joined together to enclose the article. The apparatus includes a frame having opposite first and second sides. The apparatus also includes an elongated guide assembly secured to the frame first side. The elongated guide

4a

assembly includes opposite first and second ends, a first elongated passageway configured to slidably receive the flexible panel first edge portion therethrough, and a second elongated passageway configured to slidably receive the flexible panel second edge portion therethrough. The first and second elongated passageways converge towards the guide assembly second end. The elongated guide assembly is configured to join together the first and second edge portions of the flexible panel as the flexible panel is advanced through the guide assembly from the guide assembly first end to the guide assembly second end. The apparatus also includes a handle secured to the frame second side.

10 The hand-held apparatus may include a pair of spaced apart rollers rotationally mounted to the frame downstream from the elongated guide assembly second end, and the rollers may be configured to frictionally engage the cover exiting from the elongated guide assembly second end.

15 The elongated guide assembly may include an elongated bottom wall having opposite first and second ends, a pair of spaced-apart, elongated side walls that extend upwardly from the bottom wall, the elongated side walls converging towards the elongated bottom wall first end to define a guide assembly outlet, and the elongated side walls diverging towards the elongated bottom wall second end to define a guide assembly inlet, and a partition extending upwardly from the bottom wall between the elongated side walls.

20 The partition may include a base member that extends upwardly from the bottom wall between the elongated side walls, an elongated top wall transversely connected to the base member in spaced-apart relationship with the bottom wall, the top wall including opposite upper and lower surfaces and opposite elongated edges, each elongated edge being maintained in spaced apart relationship with a respective one of the pair of converging side walls to permit passage therebetween of a portion of the flexible panel adjacent a respective edge portion thereof, a first portion of the top wall lower surface and a first portion of the bottom wall defining the first elongated passageway, and a second portion of the top wall lower surface adjacent the top wall lower surface first portion and a second portion of the bottom wall adjacent the bottom wall first portion defining the second elongated passageway.

4b

At least a portion of each elongated edge may be in spaced apart relationship with a respective one of the converging side walls may be in parallel spaced apart relationship with a portion of a respective one of the converging side walls.

The frame may include a flat, rigid plate.

5 The article may be an electrical conductor.

The hand-held apparatus may include provisions for securing the handle to a manipulator pole to facilitate remote operation of the apparatus.

10 In accordance with another aspect of the invention there is provided a method of installing a cover around an article. The cover includes an elongated flexible panel having generally parallel opposite first and second edge portions that are configured to be joined together to enclose the article. The method involves the steps of surrounding the article with the flexible panel, and joining together the opposite first and second edge portions of the flexible panel using a hand-held apparatus. The hand-held apparatus includes a frame having opposite first and second sides, and an
15 elongated guide assembly secured to the frame first side. The elongated guide assembly includes opposite first and second ends, a first elongated passageway configured to slidably receive the flexible panel first edge portion therethrough, and a second elongated passageway configured to slidably receive the flexible panel second edge portion therethrough. The first and second elongated passageways converge
20 towards the guide assembly second end. The elongated guide assembly is configured to join together the first and second edge portions of the flexible panel as the flexible panel is advanced through the guide assembly from the guide assembly first end to the guide assembly second end. The hand held apparatus also includes a handle secured to the frame second side.

25 The method may involve frictionally engaging the cover exiting from the elongated guide assembly second end using a pair of spaced apart rollers rotationally mounted to the frame downstream from the elongated guide assembly second end.

30 The elongated guide assembly may include an elongated bottom wall having opposite first and second ends, and a pair of spaced-apart, elongated side walls that extend upwardly from the bottom wall, the elongated side walls converging towards the elongated bottom wall first end to define a guide assembly outlet, and the elongated side walls diverging towards the elongated bottom wall second end to

define a guide assembly inlet, and a partition extending upwardly from the bottom wall between the elongated side walls.

5 The partition may include a base member that extends upwardly from the bottom wall between the elongated side walls, an elongated top wall transversely connected to the base member in spaced-apart relationship with the bottom wall, the top wall including opposite upper and lower surfaces and opposite elongated edges, each elongated edge being maintained in spaced apart relationship with a respective one of the pair of converging side walls to permit passage therebetween of a portion of the flexible panel adjacent a respective edge portion thereof, a first portion of the top wall lower surface and a first portion of the bottom wall defining the first elongated passageway, and a second portion of the top wall lower surface adjacent the top wall lower surface first portion and a second portion of the bottom wall adjacent the bottom wall first portion defining the second elongated passageway.

15 At least a portion of each elongated edge in spaced apart relationship with a respective one of the converging side walls may be in parallel spaced apart relationship with a portion of a respective one of the converging side walls.

The frame may include a flat, rigid plate.

The article may include an electrical conductor.

flashover protection cover of **Fig. 1** being advanced through the guide assembly.

Detailed Description of the Invention

5 The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should
10 not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements
15 throughout the discussion of the drawings.

Flashover Protection Covers

Referring now to **Figs. 1-2**, an exemplary flashover protection cover **10** for covering an energized
20 conductor, or other structure, is illustrated in an uninstalled configuration (**Fig. 1**) and in an installed configuration (**Fig. 2**). The flashover protection cover **10** includes an elongated flexible panel **12** that defines a longitudinal direction (indicated by arrow **13**). The
25 flashover protection cover **10** has opposite first and second surfaces **12a**, **12b**, and generally parallel, opposite first and second edge portions **14a**, **14b**, as illustrated. The first and second edge portions **14a**, **14b** are configured to be joined together such that the
30 first surface **12a** forms a longitudinally extending chamber **16** (**Fig. 2**) configured to enclose an electrical conductor **20**, or other structure, that extends along the longitudinal direction **13**. The second surface **12b** forms an outer surface of the flashover protection

cover 10.

In the illustrated embodiment, edge portion 14b is configured to removably receive edge portion 14a therewithin. Edge portion 14a has an "arrowhead" configuration with shoulder portions 15 configured to be retained by elastic members 17 of edge portion 14b. The illustrated embodiment provides means for maintaining the panel edge portions 14a, 14b joined together under adverse conditions, while allowing the cover to be removed, if necessary, at a later time.

Still referring to Figs. 1-2, a wall or creepage extender 22 is connected to the panel inner surface 12a adjacent the first edge portion 14a, as illustrated. The creepage extender 22 is preferably configured to be longitudinally coextensive with the first chamber 16 when the panel edge portions 14a, 14b are joined together. The creepage extender 22 has a free edge portion 22b that is generally parallel with the first edge portion 14a, as illustrated. The creepage extender 22 is designed to retain any electrical flashover or arcing from the conductor 20 within the longitudinally extending chamber 16.

Flashover protection covers that may be installed via hand-held devices according to the present invention may have various shapes, sizes and configurations, and are not limited to the illustrated flashover protection cover of Figs. 1 and 2. Flashover protection covers are conventionally formed from polymeric materials of high dielectric strength, including, but not limited to, medium and high density polyethylene, and natural and synthetic rubber. However, flashover protection covers formed from virtually any type of material may be installed via hand-held devices according to the present invention.

Flashover Protection Cover Installation Apparatus

Referring now to **Figs. 3-9**, a hand-held apparatus **40** for installing a flashover protection cover **10** around an energized electrical conductor **20** (or other equipment or structure portion) according to an embodiment of the present invention, is illustrated. The hand-held apparatus **40** includes a rigid frame or plate **42** that has opposite first and second sides **42a**, **42b**. A guide assembly **44** is secured to the first side **42a** of the plate **42** and a handle **90** is secured to the second side **42b** of the plate **42**.

It is understood that hand-held devices according to the present invention are not limited to having the illustrated flat plate **42**. A rigid frame having virtually any shape and/or configuration may be utilized to secure the guide assembly **44** and handle **90** thereto, in accordance with the present invention. For example a rigid frame having an angled configuration may be utilized within the spirit and intent of the present invention.

The illustrated guide assembly **44** includes an elongated bottom wall **46** having opposite first and second ends **46a**, **46b**. A pair of spaced-apart, elongated side walls **48a**, **48b** extend upwardly from the bottom wall **46**, as illustrated. The elongated side walls **48a**, **48b** converge towards the elongated bottom wall first end **46a** to define a guide assembly outlet **50** (**Fig. 4**). The elongated side walls **48a**, **48b** diverge towards the elongated bottom wall second end **46b** to define a guide assembly inlet **52** (**Fig. 4**).

The illustrated guide assembly **44** also includes a partition **54**, the function of which is to help align the various portions of a flexible panel **12**

passing through the guide assembly **44** during installation of a cover. As will be described below, the illustrated partition **54** helps align the first and second edge portions **14a**, **14b** of a flexible panel **12** for engagement. In addition, the partition **54** helps prevent the creepage extender **22** from becoming entangled with the second edge portion **14b** during cover installation. Preferably, the partition **54**, the bottom wall **46** and the side walls **48a**, **48b** of the guide assembly **44** are formed from non-conductive materials having good machinability and wear resistance.

Exemplary materials include, but are not limited to, DELRIN® brand materials and TEFLON® brand materials.

The partition **54** includes a base member **56** that extends upwardly from the bottom wall **46** between the elongated side walls **48a**, **48b**, as illustrated. An elongated top wall **58** is transversely connected to the base member **56** so as to be maintained in spaced-apart relationship with the bottom wall **46**. The top wall **58** and bottom wall **46** may be in parallel or non-parallel spaced-apart relationship. The top wall **58** includes opposite upper and lower surfaces **60**, **62** and opposite elongated edges **64**, **66**.

As illustrated in the enlarged view of the hand-held apparatus in **Fig. 5**, the guide assembly **44** defines a pair of spaced-apart, converging passageways **70**, **72** that are configured to slidably receive the flexible panel first and second edge portions **14a**, **14b** therethrough, respectively. A portion **62a** of the top wall lower surface **62**, a portion **46d** of the bottom wall **46**, and the side wall **48b** define a first elongated passageway **70**, as illustrated. A portion **62b** of the top wall lower surface **62**, a portion **46e** of the bottom wall **46**, and the side wall **48a** define a second elongated

passageway 72, as illustrated.

The top wall elongated edges 64, 66 are maintained in spaced-apart relationship with the respective converging side walls 48a, 48b to permit
5 passage therebetween of a portion of a flexible panel. Preferably, each top wall elongated edge 64, 66 is in parallel spaced-apart relationship with a respective one of the converging side walls 48a, 48b, as illustrated in Fig. 7.

10 Accordingly, as illustrated in Fig. 6, the first elongated passageway 70 is configured to slidably receive the flexible panel first edge portion 14a therethrough. The second elongated passageway 72 is configured to slidably receive the flexible panel
15 second edge portion 14b therethrough. Preferably, the top wall upper surface 60 is configured to slidably receive the creepage extender 22 of the illustrated flexible panel 12 thereon. Thus, the guide assembly 44 is configured to join together the first and second
20 edge portions 14a, 14b of the flexible panel 12 as the flexible panel 12 is advanced through the guide assembly 44 from the guide assembly inlet 52 to the guide assembly outlet 50.

Figs. 8 and 9 illustrate a flexible panel 12
25 entering the guide assembly inlet 52 and exiting via the guide assembly outlet 50 as an assembled cover 10. By grasping the handle 90 and moving the apparatus 40 along the longitudinal direction 13, relative to the flexible panel 12 (as illustrated by arrow 92), a user
30 can quickly and easily engage the edge portions 14a, 14b thereof.

Referring back to Fig. 5, the illustrated bottom wall portion 46e of the second elongated passageway 72 includes an elongated channel 47 formed

therein. The channel 47 is provided to accommodate the thicker configuration of the flexible cover second edge portion 14b relative to the first edge portion 14a so that the second edge portion 14b is properly aligned with the first edge portion 14a as the first and second edge portions 14a, 14b are joined together. It is understood that a guide assembly according to the present invention may have various configurations and shapes to accommodate flexible panels having different shapes and configurations.

Still referring to Fig. 5, a pair of spaced-apart rollers 80, 82 are rotationally mounted to the rigid plate 42, via bolt 83 and nut 84, downstream from the elongated guide assembly outlet 50, as illustrated. The rollers 80, 82 are configured to frictionally engage the cover 10 as it advances from the guide assembly outlet 50 and insure that the first and second edge portions 14a, 14b are fully joined. The rollers 80, 82 make frictional contact with the cover 10 to help ensure that the ends 14a, 14b of the flexible panel 12 are properly joined together as the cover 10 exits from the guide assembly outlet 50. The rollers 80, 82 are not driven rollers (*i.e.*, they are "free-wheeling").

Preferably, the rollers 80, 82 have a spaced-apart distance that is less than a spaced-apart distance of the converging side walls 48a, 48b at the elongated guide assembly outlet 50, as illustrated in Fig. 7. In Fig. 7, D_1 represents the distance between the converging side walls 48a, 48b at the guide assembly outlet 50, and D_2 represents the distance between the rollers 80, 82. As illustrated, D_1 is greater than D_2 . In addition, the rollers 80, 82 preferably are formed from non-conductive, polymeric

material, such as neoprene, that provides good frictional contact with the cover 10 exiting the guide assembly outlet 50.

The illustrated handle 90 extends outwardly from the rigid plate second side 42b. Handles having various shapes and configurations may be utilized. The present invention is not limited to the illustrated handle 90. Preferably, the handle 90 is formed from non-conductive materials including, but not limited to, DELRIN® brand materials and TEFLON® brand materials. Preferably, the free end 90a of the handle 90 is configured to be secured to a manipulator pole to facilitate remote operation of the apparatus. An exemplary manipulator device is referred to as a "hot stick" in the electrical power industry. Hot sticks are available from Hastings Fiber Glass Products, Inc., Hastings MI and A. B. Chance, Co., Centralia, MO.

The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although a few exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims. In the claims, means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures. Therefore, it is to be understood that the foregoing is illustrative of the present invention and is not to be construed as limited

to the specific embodiments disclosed, and that
modifications to the disclosed embodiments, as well as
other embodiments, are intended to be included within
the scope of the appended claims. The invention is
5 defined by the following claims, with equivalents of
the claims to be included therein.

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A hand-held apparatus (40) for installing a cover around an article, wherein
5 the cover comprises an elongated flexible panel (12) having generally parallel
opposite first and second edge portions (14a, 14b) that are configured to be
joined together to enclose the article, the apparatus comprising:
- a frame (42) having opposite first and second sides (42a, 42b);
10
- an elongated guide assembly (44) secured to the frame first side (42a),
comprising:
- opposite first and second ends;
- 15
- a first elongated passageway (70) configured to slidably receive
the flexible panel first edge portion (14a) therethrough; and
- a second elongated passageway (72) configured to slidably
20 receive the flexible panel second edge portion (14b)
therethrough, wherein the first and second elongated
passageways (70, 72) converge towards the guide assembly
second end;
- 25
- wherein the elongated guide assembly is configured to join
together the first and second edge portions (14a, 14b) of the
flexible panel (12) as the flexible panel (12) is advanced
through the guide assembly (44) from the guide assembly first
end to the guide assembly second end; and
- 30
- a handle (90) secured to the frame second side (42b).

2. A hand-held apparatus (40) according to Claim 1 further comprising a pair of spaced apart rollers (80, 82) rotationally mounted to the frame (42) downstream from the elongated guide assembly second end, wherein the rollers (80, 82) are configured to frictionally engage the cover exiting from the elongated guide assembly second end.
- 5
3. A hand-held apparatus (40) according to Claim 1 wherein the elongated guide assembly (44) comprises:
- 10 an elongated bottom wall (46) having opposite first and second ends (46a, 46b);
- a pair of spaced-apart, elongated side walls (48a, 48b) that extend upwardly from the bottom wall (46), wherein the elongated side walls (48a, 48b) converge towards the elongated bottom wall first end (46a) to define a guide assembly outlet (50) and wherein the elongated side walls (48a, 48b) diverge towards the elongated bottom wall second end (46b) to define a guide assembly inlet (52); and
- 15
- a partition (54) extending upwardly from the bottom wall (46) between the elongated side walls (48a, 48b).
- 20
4. A hand-held apparatus (40) according to Claim 3 wherein the partition (54) comprises:
- 25 a base member (56) that extends upwardly from the bottom wall (46) between the elongated side walls (48a, 48b);
- an elongated top wall (50) transversely connected to the base member (56) in spaced-apart relationship with the bottom wall (46), wherein the top wall (50) comprises opposite upper and lower surfaces (60, 62) and opposite elongated edges (64, 66), wherein each elongated edge (64, 66) is maintained in spaced apart relationship with a respective
- 30

one of the pair of converging side walls (48a, 48b) to permit passage therebetween of a portion of the flexible panel (12) adjacent a respective edge portion thereof, wherein a first portion (62a) of the top wall lower surface (62) and a first portion (46d) of the bottom wall (46) define the first elongated passageway (70), and wherein a second portion (62b) of the top wall lower surface (62) adjacent the top wall lower surface first portion (62a) and a second portion (46e) of the bottom wall (46) adjacent the bottom wall first portion (46d) define the second elongated passageway (72).

5

10

5. A hand-held apparatus (40) according to Claim 4 wherein at least a portion of each elongated edge (64, 66) in spaced apart relationship with a respective one of the converging side walls (48a, 48b) is in parallel spaced apart relationship with a portion of a respective one of the converging side walls (48a, 48b).

15

6. A hand-held apparatus (40) according to Claim 1 wherein the frame (42) comprises a flat, rigid plate.

20

7. A hand-held apparatus (40) according to Claim 1 wherein the article is an electrical conductor.

8. A hand-held apparatus (40) according to Claim 1 further comprising means for securing the handle (90) to a manipulator pole to facilitate remote operation of the apparatus (40).

25

9. A method of installing a cover around an article, wherein the cover comprises an elongated flexible panel (12) having generally parallel opposite first and second edge portions (14a, 14b) that are configured to be joined together to enclose the article, the method comprising the steps of:

30

surrounding the article with the flexible panel (12); and

joining together the opposite first and second edge portions (14a, 14b)

of the flexible panel (12) using a hand-held apparatus (40) comprising:

a frame (42) having opposite first and second sides (42a, 42b);

5 an elongated guide assembly (44) secured to the frame first side (42a), comprising: opposite first and second ends;

10 a first elongated passageway (70) configured to slidably receive the flexible panel (12) first edge portion therethrough (14a);
and

15 a second elongated passageway (72) configured to slidably receive the flexible panel (12) second edge portion (14b) therethrough, wherein the first and second elongated passageways (70, 72) converge towards the guide assembly second end;

20 wherein the elongated guide assembly (14) is configured to join together the first and second edge portions (14a, 14b) of the flexible panel (12) as the flexible panel (12) is advanced through the guide assembly (44) from the guide assembly first end to the guide assembly second end; and

25 a handle (90) secured to the frame second side (42b).

25

10. A method according to Claim 9 further comprising frictionally engage the cover exiting from the elongated guide assembly second end using a pair of spaced apart rollers (80, 82) rotationally mounted to the frame (42) downstream from the elongated guide assembly second end.

30

11. A method according to Claim 9 wherein the elongated guide assembly (44) comprises:

an elongated bottom wall (46) having opposite first and second ends (46a, 45b);

5 a pair of spaced-apart, elongated side walls (48a, 48b) that extend upwardly from the bottom wall (46), wherein the elongated side walls (48a, 48b) converge towards the elongated bottom wall first end (46a) to define a guide assembly outlet (50) and wherein the elongated side walls (48a, 48b) diverge towards the elongated bottom wall second end (46b) to define a guide assembly inlet (52); and

10

a partition (54) extending upwardly from the bottom wall (46) between the elongated side walls (48a, 48b).

12. A method according to Claim 11 wherein the partition (54) comprises:

15

a base member (56) that extends upwardly from the bottom wall (46) between the elongated side walls (48a, 48b);

20

an elongated top wall (50) transversely connected to the base member (56) in spaced-apart relationship with the bottom wall (46), wherein the top wall (50) comprises opposite upper and lower surfaces (60, 62) and opposite elongated edges (64, 66), wherein each elongated edge (64, 66) is maintained in spaced apart relationship with a respective one of the pair of converging side walls (48a, 48b) to permit passage therebetween of a portion of the flexible panel (12) adjacent a respective edge portion thereof, wherein a first portion (62a) of the top wall lower surface (62) and a first portion (46d) of the bottom wall (46) define the first elongated passageway (70), and wherein a second portion (62b) of the top wall lower surface (62) adjacent the top wall lower surface first portion (62a) and a second portion (46e) of the bottom wall (46) adjacent the bottom wall first portion (46d) define the second elongated passageway (72).

30

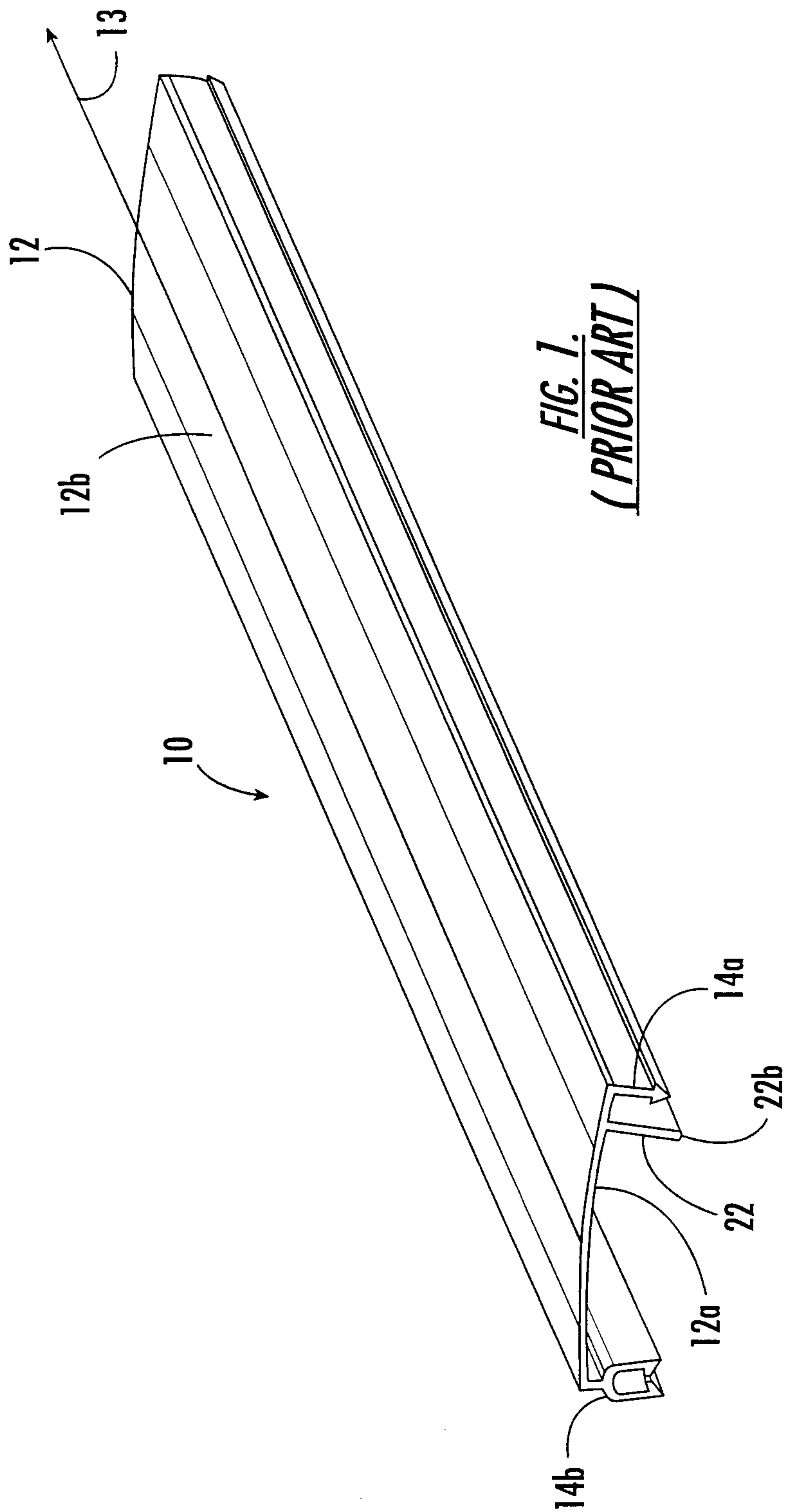
13. A method according to Claim **12** wherein at least a portion of each elongated edge (**64, 66**) in spaced apart relationship with a respective one of the converging side walls (**48a, 48b**) is in parallel spaced apart relationship with a portion of a respective one of the converging side walls (**48a, 48b**).

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14. A method according to Claim **9** wherein the frame (**42**) comprises a flat, rigid plate.

15. A method according to Claim **9** wherein the article is an electrical conductor.

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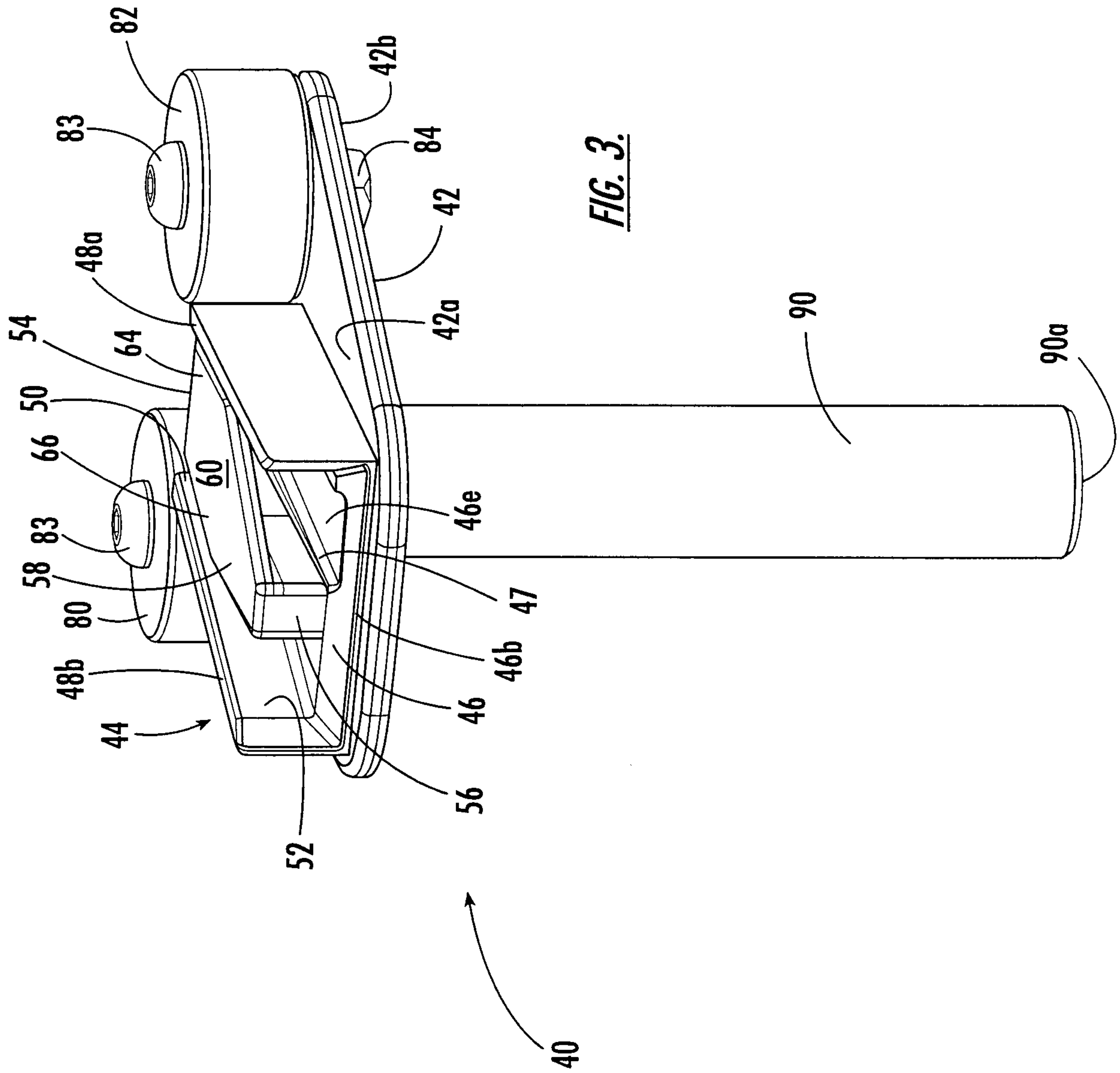


FIG. 3.

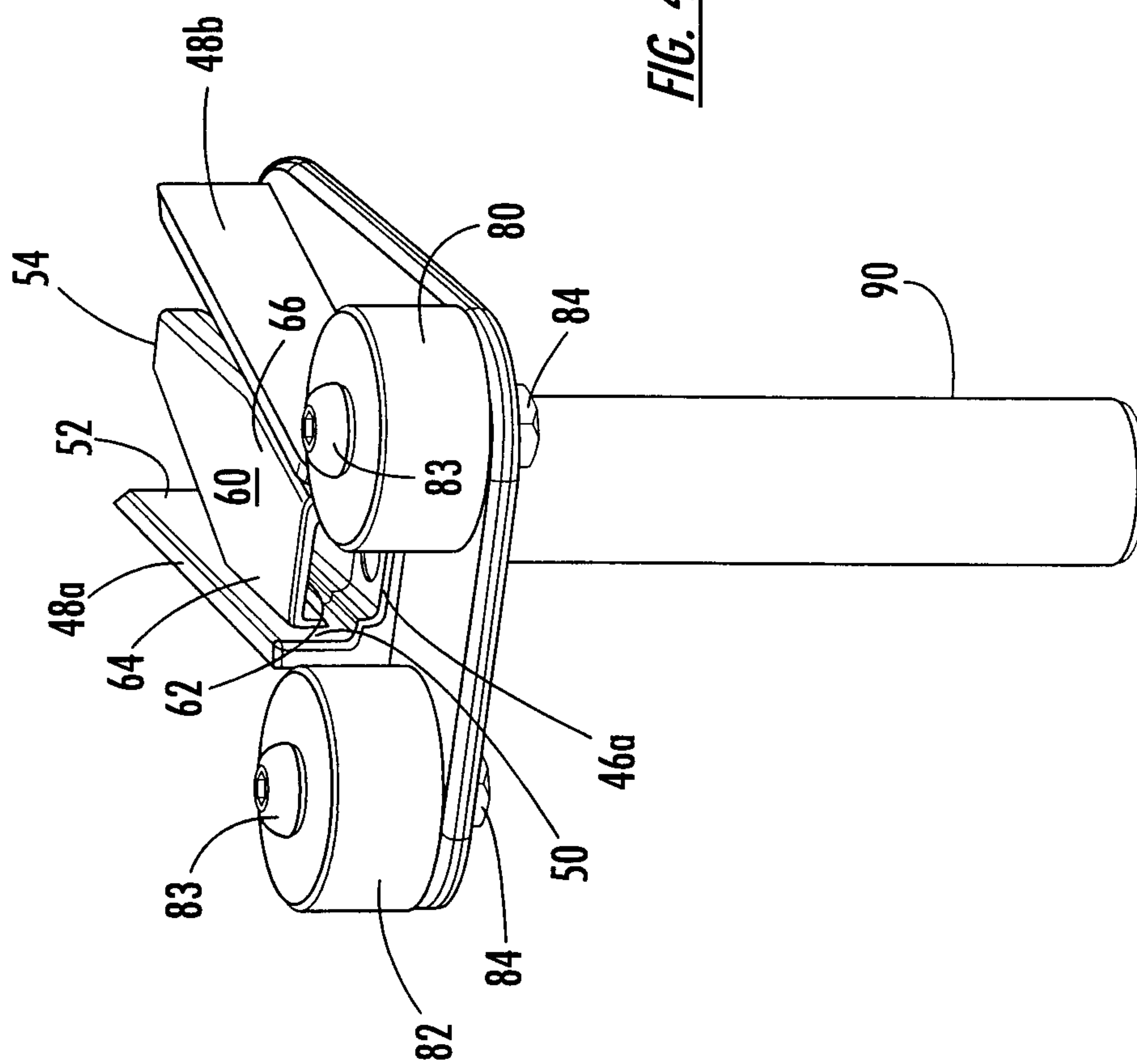


FIG. 4.

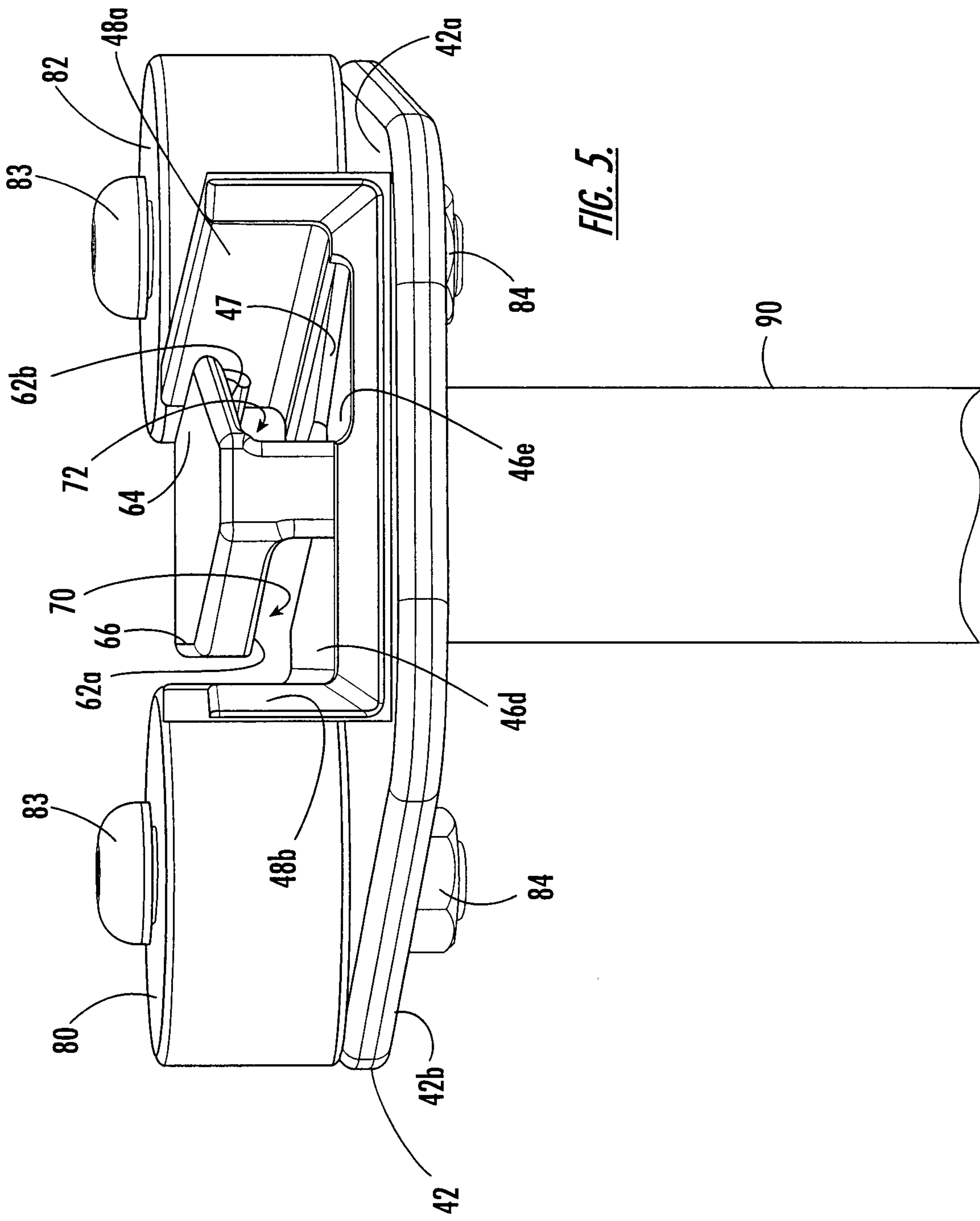


FIG. 5.

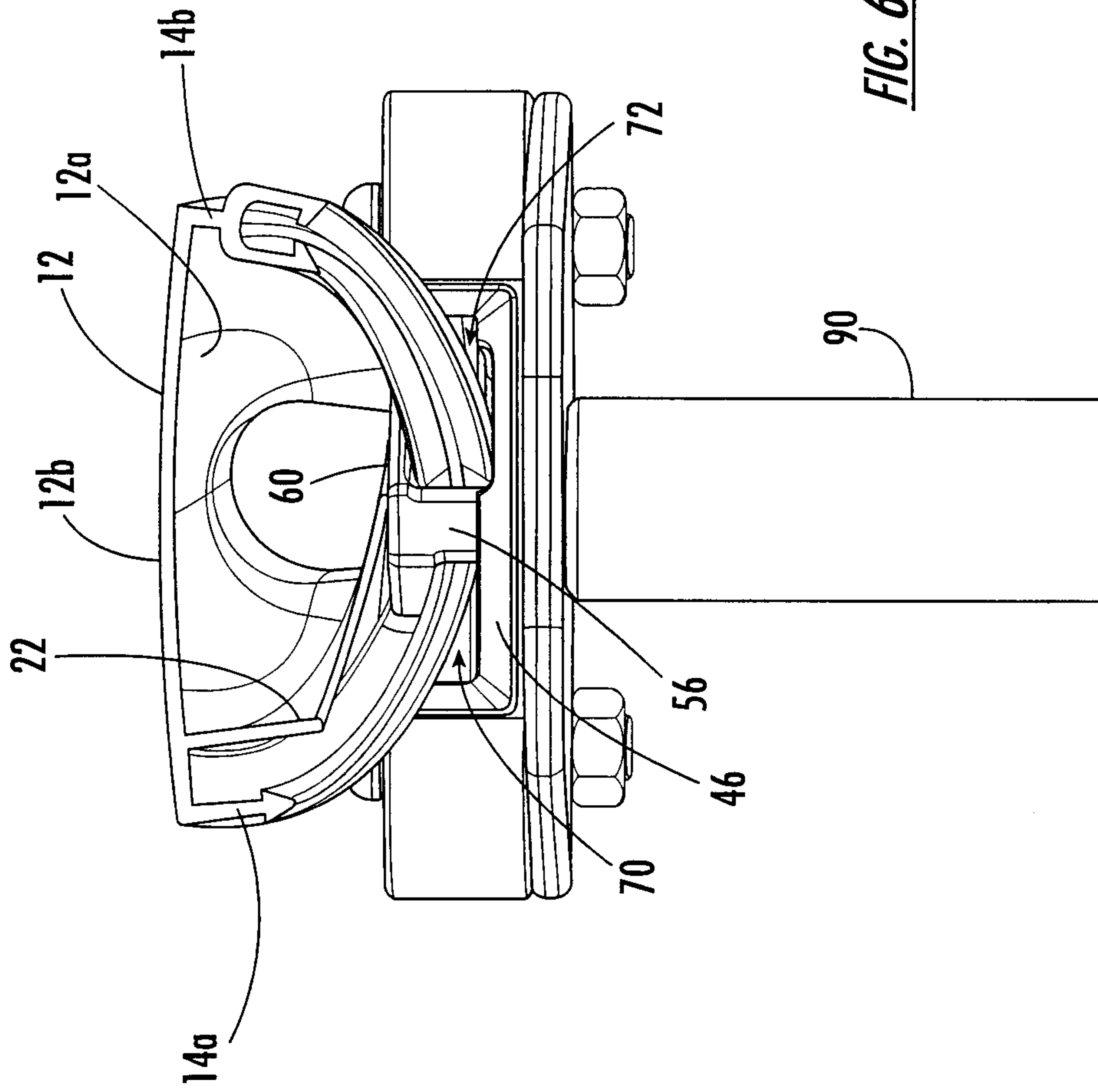


FIG. 6.

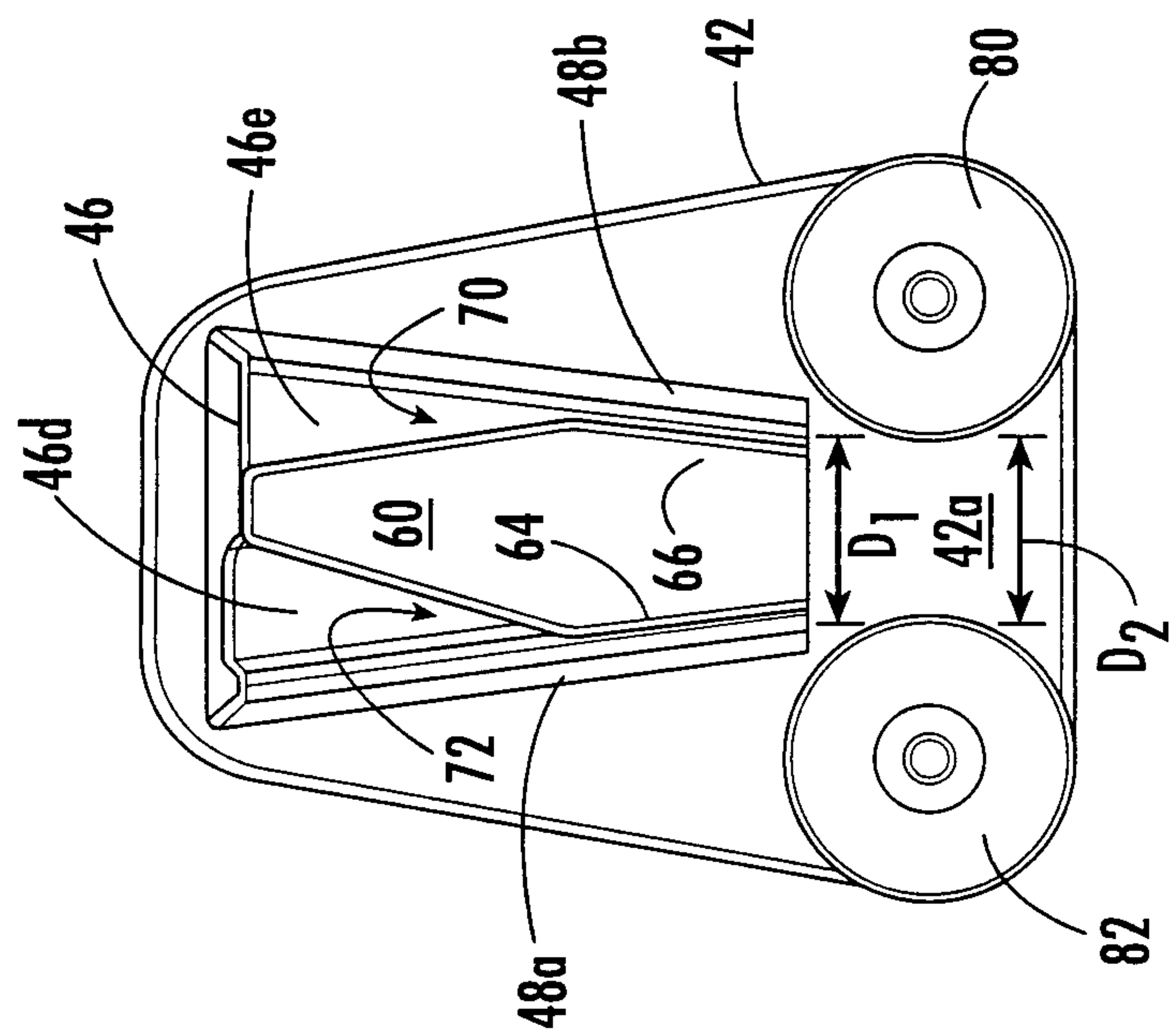
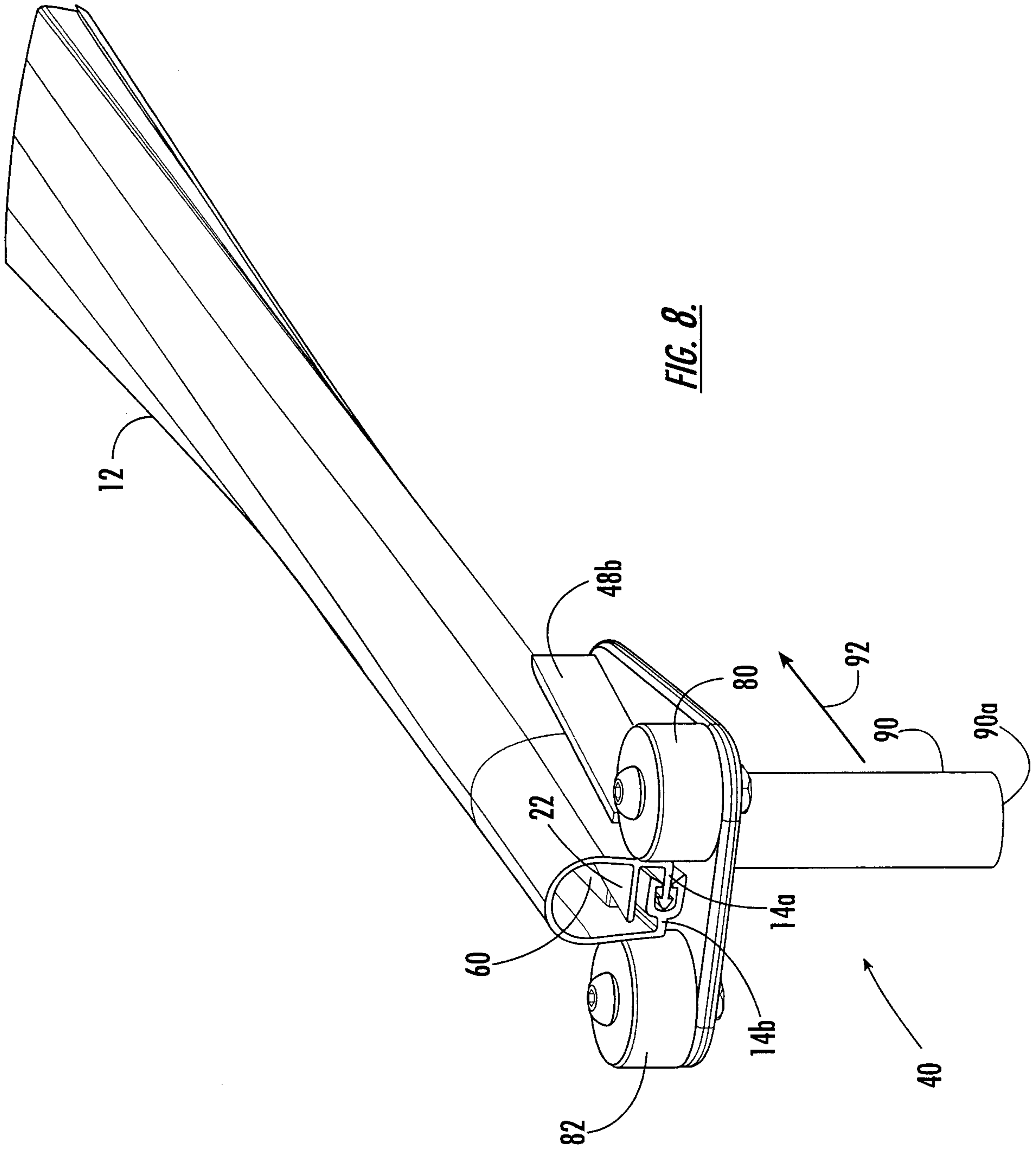


FIG. 7.



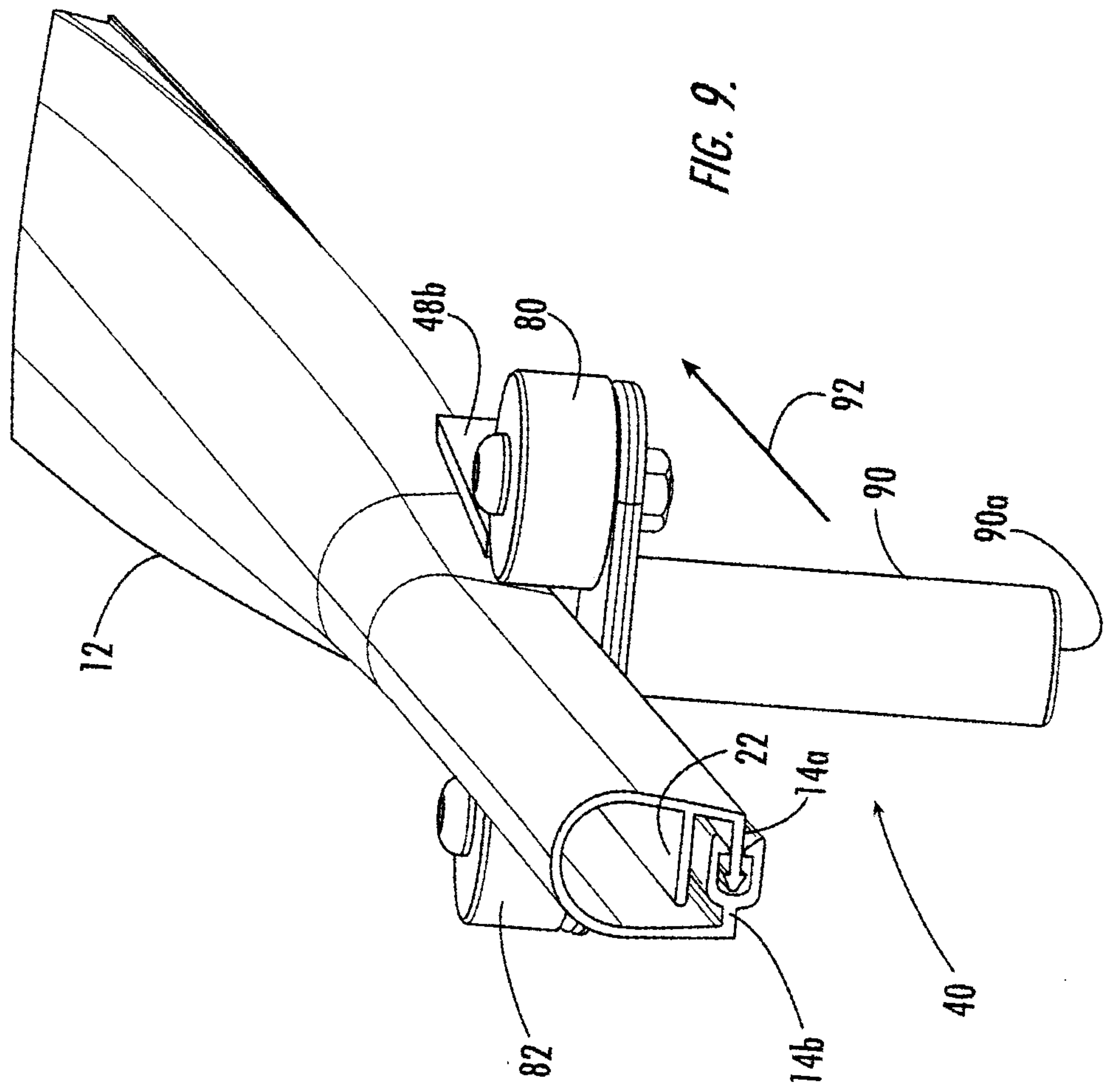


FIG. 9.

