United States Patent [19]

Prout

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[54] **UNIVERSAL WRIST SYSTEM**

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[52] **U.S. Cl.** **3/12.4**

[51] **Int. Cl.** **A61f 1/06**

[58] **Field of Search** 3/12–12.8

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[57] **ABSTRACT**

A universal wrist system in which terminals with different types of shafts and different types of mountings may be used. A wrist forearm connector member is adapted to be molded into a prosthetic forearm. The wrist forearm connector member has a passage therethrough and a substantially flat ring-shaped mounting surface positioned at one end of the passage and extending around the opening into the passage. At least one opening is provided into the surface of the forearm connector member. A removable terminal mounting unit has a boss, an elongated receptable extending into the boss, an opening for receiving the shaft of a terminal device and a connector to secure the shaft of the terminal device in the receptacle. A ring-shaped surface surrounds the boss and is adapted for mounting in abuttment with the wrist forearm connector face with the boss extending into the passage of the wrist forearm connector member. At least one opening is provided in the surface of the removable terminal mounting unit. A locking member is removably extendable between the openings of both of the surfaces for rigidly securing the surfaces of the wrist forearm connector and the terminal mounting unit together.

12 Claims, 8 Drawing Figures

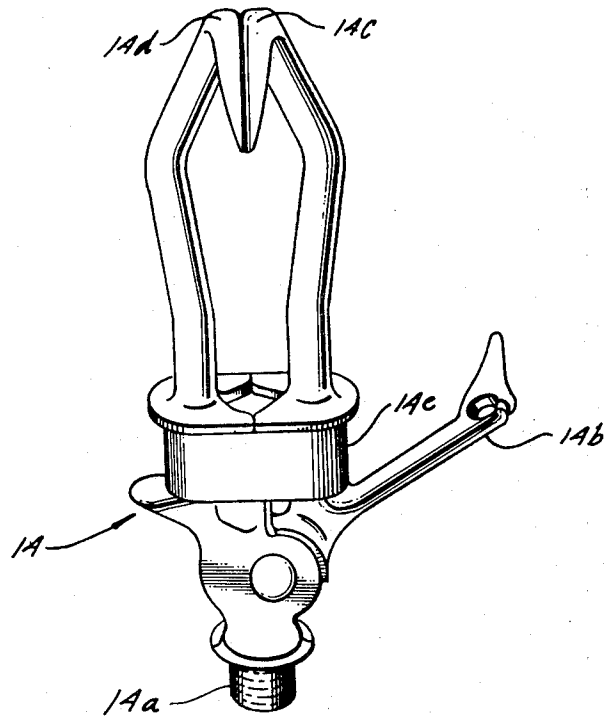
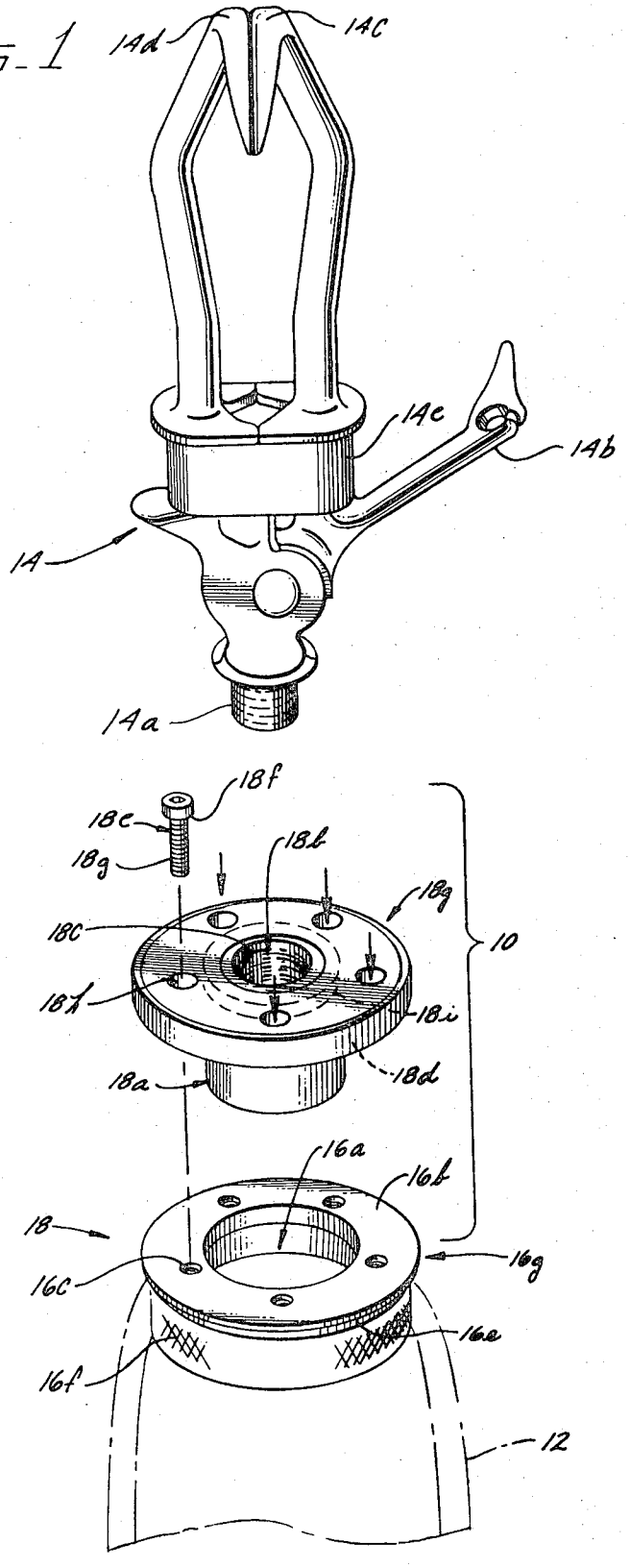


FIG. 1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16f
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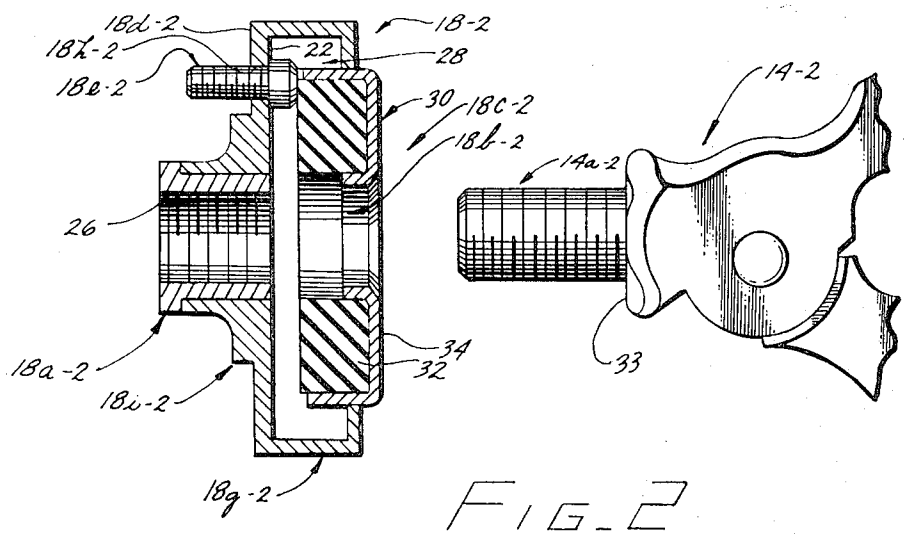
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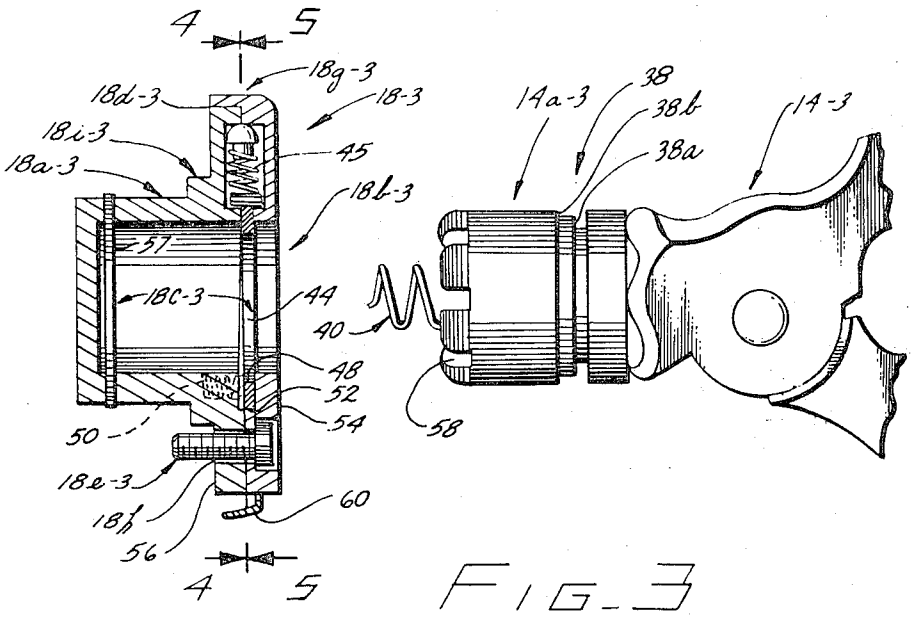
18g-2

FIG_2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14a-3
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38a
14-3

FIG_3

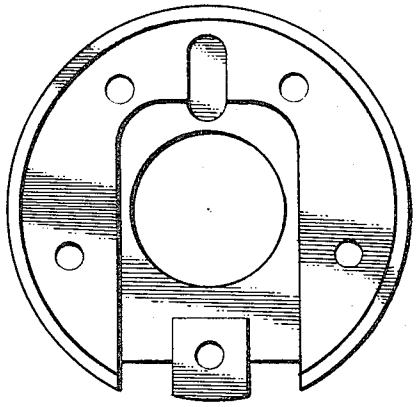

FIG_4

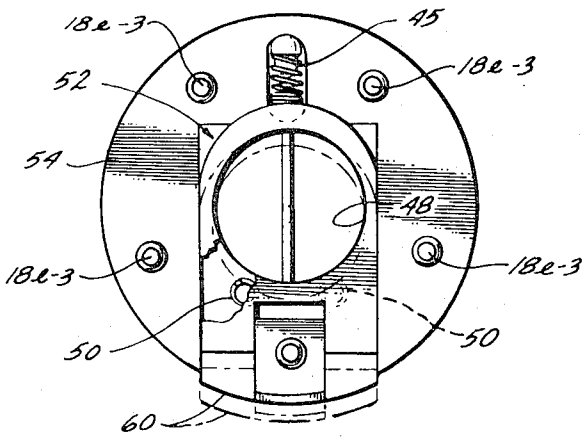

FIG_5

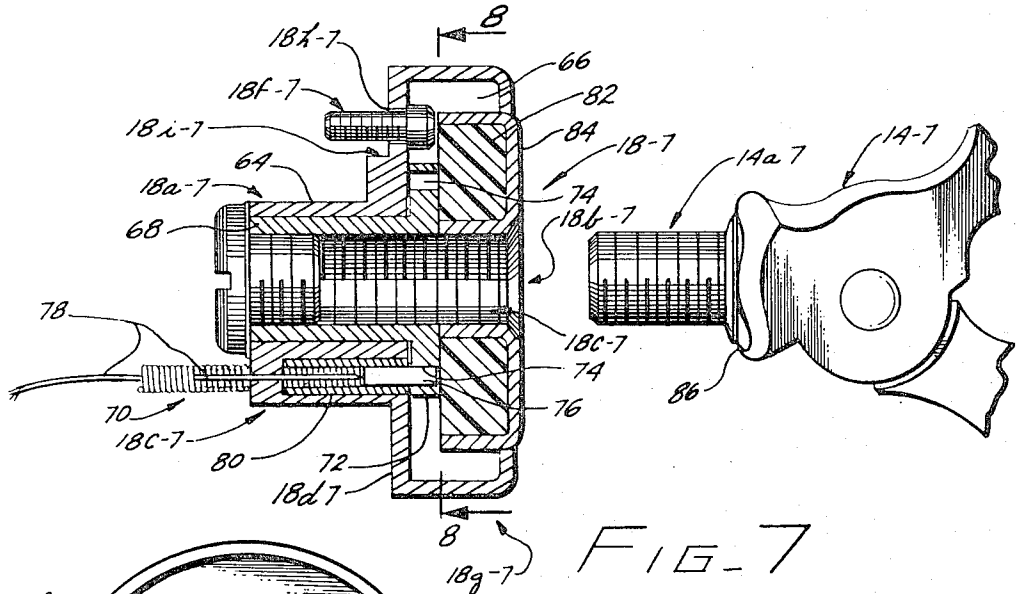

FIG_7

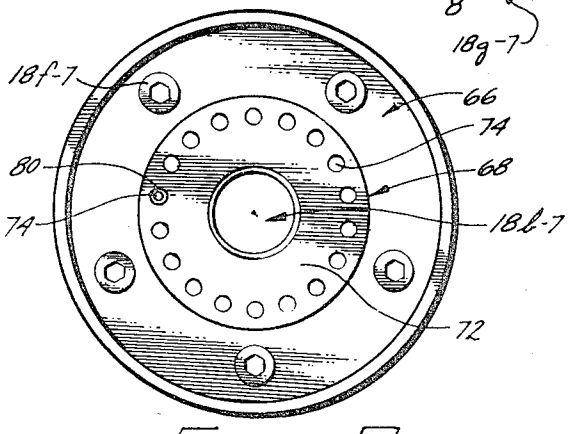

FIG_8

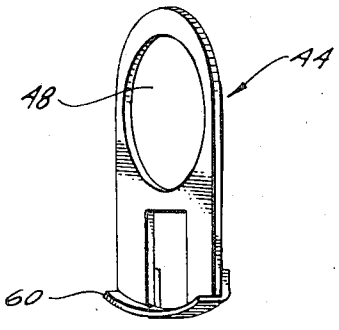

FIG_6

UNIVERSAL WRIST SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to prosthetic wrist apparatus of the type used between a prosthetic arm and a prosthetic terminal device.

2. Description of the Prior Art

A prosthetic wrist is used for connecting a prosthetic terminal device such as a hand or a hook to a prosthetic arm. Generally the known prosthetic wrist is a unit which is specially adapted for providing a specific type of mounting for a terminal device.

For example, a friction type prosthetic wrist unit is known which has a body portion adapted to be molded onto the end of a prosthetic forearm. The body portion has a cavity at one end with a threaded bushing extending through the bottom of the cavity. A ring-shaped rubber cushion with a ring-shaped metallic cover is positioned into the cavity. The threaded shaft of a terminal mates with the threaded bushing and frictionally engages the metallic cover.

By way of further example, a wrist disconnect type unit has a body portion which is adapted to be mounted in the end of a prosthetic forearm. The body portion is an integral part of a locking mechanism for securing a terminal device on the end of the prosthetic forearm. To this end, the body portion has a passage therethrough and is adapted to slidably mount a yoke locking mechanism. A spring biases the yoke to a locked position which is in an interferring relation in the passage through the body. An internally threaded tubular-shaped insert is placed in the passage. A groove in the insert forms an interferring fit with the spring biased yoke. A terminal device with a threaded shaft mates with the threaded insert.

A further example is a quick-disconnect wrist unit that has a body portion adapted to be molded on the end of a prosthetic forearm and, as an integral part thereof, a tubular portion projects out of the end of the body portion. A ring-shaped face fits over the tube and a groove is provided in the tube around which a retainer ring fits to hold the face in place. Again, an internally threaded insert is inserted into the end of the assembly and a terminal with a threaded shaft mates with the threaded insert.

Another prosthetic wrist unit has been proposed which has a tubular-shaped body portion adapted to be molded onto the end of a prosthetic forearm. The tubular body member has a circular opening therein into which a prefabricated tubular-shaped insert is placed. The insert has a threaded opening therein with a plastic insert for receiving the threaded shaft of a terminal device. The insert is placed into the opening of the body portion and a set screw is passed through the side of an axially elongated disk-shaped portion to engage the side of the plastic insert frictionally engaging the shaft of the terminal device so that it does not rotate.

Another prosthetic wrist unit is known which allows the terminal to rotate. In such an arrangement, a tubular-shaped body portion is adapted to be molded or otherwise affixed to a prosthetic forearm. Two cone-shaped oilite bearings are installed on the body portion, one on the outside and one on the inside of inwardly flanged surfaces on the tubular-shaped body portion. The assembly is made specifically for the aforementioned type of terminal mounting and it is difficult to remove the mounting for the terminal because access must be gained to the inside of the body portion.

In summary, the aforementioned prior art devices suffer from the disadvantage that each is a unitary structure for a particular type of mounting. If it is desired to use a different type of mounting for a terminal device, then the body portion as well as the associated connecting parts are discarded and a different mounting is used.

SUMMARY OF THE INVENTION

The present invention involves a universal wrist system and provides a very simple and inexpensive system in which terminals with different types of shafts and different types of mountings may be used. According to an embodiment of the present invention, a universal prosthetic wrist system is provided for connecting the shaft of a prosthetic terminal device to a forearm of an amputee with different types of terminal mountings. The system includes a wrist forearm connector member adapted to be molded into a prosthetic forearm. The wrist forearm connector member has a passage therethrough, a substantially flat ring-shaped mounting surface positioned at one end of the passage and extending around the opening into the passage. At least one opening is provided into the surface of the forearm connector member. A removable terminal mounting unit is also provided having a boss, an elongated receptacle extending into the boss with an opening for receiving the shaft of a terminal device, and a connector to secure the shaft of the terminal device in the receptacle. A ring-shaped surface surrounds the boss and is adapted for mounting in abutment with the wrist forearm connector face with the boss extending into the passage of the wrist forearm connector member. At least one opening is provided in the surface of the removable terminal mounting unit. A locking member is removably extendable between the openings of both of the surfaces for rigidly securing the surfaces of the wrist forearm connector and the terminal mounting unit together.

With such an arrangement, one basic forearm connector may be affixed to the forearm of the amputee and different removable terminal mounting units may be selected depending on the particular type of mounting desired. For example, if it is desired to have a friction wrist connection in which a threaded shaft of a terminal is screwed into a fixed position with respect to the forearm of the amputee, one removable terminal mounting unit is selected. If desired to provide a wrist disconnect type of mounting for a grooved shaft of a terminal device, the appropriate removable terminal mounting unit is selected. If desired to provide a rotational mounting for the terminal, again, the appropriate removable terminal mounting is selected. Once having selected the appropriate removable terminal mounting unit, it is merely fitted on the end of the wrist forearm connector member and secured in place.

In addition to the universal mounting, the aforementioned structure also has the advantage that the distance between the end of the forearm for the amputee and the terminal device is minimized because of the interface connection between the wrist forearm connector member and the removable terminal mounting unit. For example, if set screws and the like were to be used through the side of the forearm connector member to secure the removable terminal mounting unit in place,

the length of the wrist forearm connector would have to be increased. Minimum length of the forearm connector member is important in minimizing length of the overall assembly to allow the terminal to be handled with ease by the amputee.

Preferably, the removable terminal mounting has a further boss positioned adjacent the removable terminal mounting unit surface which has substantially the same outer shape and size as the adjacent portion of the passage in the wrist forearm connector to thereby extend into the wrist forearm connector and mechanically prevent sliding movement between surfaces.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows an exploded view of a universal wrist system showing a terminal device with a shaft and the dashed outline of a forearm for an amputee. A removable terminal mounting unit is shown in schematic form;

FIG. **2** shows a cross-sectional view of a friction wrist-type removable terminal mounting unit with a portion of a terminal device for use therewith;

FIG. **3** shows a cross-sectional view of a wrist disconnect type removable terminal mounting unit with a portion of a terminal unit for use therewith;

FIG. **4** shows a view of the cover plate for the wrist disconnect unit of FIG. **3** taken along the lines **4—4** of FIG. **3**;

FIG. **5** shows a cross-sectional view of the wrist disconnect unit of FIG. **3** taken along the lines **5—5** of FIG. **3**;

FIG. **6** is a pictorial view of the yoke locking member used in the wrist disconnect unit of FIG. **3**;

FIG. **7** shows a cross-sectional view of a rotational type removable terminal mounting unit with a portion of a terminal device for use therewith; and

FIG. **8** shows a cross-sectional view of the rotational mounting unit taken along the lines **8—8** of FIG. **7**.

DETAILED DESCRIPTION

Refer to FIG. **1**. FIG. **1** is an exploded view showing a prosthetic terminal device **14** and universal wrist system **10** for connecting the forearm **12** of an amputee to the shaft **14***a* of the prosthetic terminal device **14** through different types of terminal mountings. In the system **10***a*, a tubular-shaped wrist forearm connector **16** is provided which is adapted to be molded into a prosthetic forearm. To aid in molding into the prosthetic forearm **12**, a groove **16***e* is provided adjacent to a knurled partially conical-shaped base portion **16***f*. The forearm connector member **16** has a passage **16***a* passing completely therethrough. A ring shaped collar portion extends from the groove **16***e* to the end of the passage **16***a* at the front end of the fore-arm connector **16**. The inner portion of the ring-shaped collar portion is stepped inwardly into the passage **16***a* with respect to the other portion of the passage forming a side surface in abutting contact with a side surface **18***i* of the removable terminal mounting unit **18***g*. A substantially flat, ring-shaped mounting surface **16***b* is positioned on the disk portion at one end of the passage and extends completely around the opening to the passage. The five threaded openings **16***c* are provided equally spaced around in the surface **16***b*. To be explained in detail, the threaded openings **16***c* are provided for connecting the removable terminal mounting unit to the forearm connector **16**.

Immediately above the forearm connector **16** is schematically shown the removable terminal mounting unit **18**. The removable terminal mounting unit **18** has a disk-shaped portion **18***g* with a boss **18***a* extending therefrom. An elongated receptacle **18***b* extends through the disk-shaped portion **18***g* into the boss **18***a* with an opening for receiving the shaft **14***a* of the terminal device **14**. A removable terminal mounting unit has a connector **18***c* (indicated by dashed lines) for securing the shaft of the terminal device in the receptacle. Examples of various connectors **18***c* are shown in the subsequently described embodiments of the invention. A ring-shaped surface **18***d* on the underside of the disk portion **18***g* surrounds the boss and is adapted for mounting in abutment with the surface **16***b* of the wrist forearm connector such that the boss extends into the passage of the wrist forearm connector member **16**. Five spaced apart openings **18***h* are provided in the surface **18***d* of the removable terminal mounting unit **18** and are aligned with the five openings in the surface of the forearm connector member **16**. A locking member **18***e* is provided for each of the openings in the two surfaces. In the embodiment disclosed herein, the locking member **18***e* is a bolt having a head forming a shoulder **18***f* which bears against an upper surface of the terminal mounting unit and a threaded portion **18***g* which is threaded into the threaded opening **16***c* of the forearm connector member **16**. One locking member **18***e* is shown and the rest are illustrated as arrows for simplicity. An additional ring-shaped boss **18***i* is positioned adjacent to the surface **18***d* and extends downward from the disk portion **18***g* around the boss **18***a*. The boss **18***i* has substantially the same outer shape and configuration as the adjacent portion of the passage **16***a* (in disk portion **16***g*) to mechanically prevent sliding movement between surfaces **16**b and **18***d*.

As depicted in FIG. **1**, the wrist forearm connector member and the terminal mounting unit have substantially circular outer configurations around the respective ring-shaped surfaces of susubstantially the same outer diameter, thereby providing a universal prosthetic wrist system having a very pleasing appearance.

The terminal **14** depicted herein has a pair of pivoted hooks **14***c* and **14***d* which are normally biased closed by means of a resilient, preferably rubber, band **14***e*. An extension member **14***b* may be attached to a cable or the like for actuating the hook **14***c* with respect to the hook **14***d* in the manner well known in the prosthetic art. Although a hook-type terminal device has been disclosed herein, it should be understood that other types of terminal devices may be used, such as a prosthetic hand.

With the general configuration of the universal prosthetic wrist system of FIG. **1** in mind, refer now to the frictional wrist-type terminal mounting unit depicted in FIG. **2**. The same reference numerals used to identify portions of the removable terminal mounting unit and the terminal device of FIG. **1** are used to identify the corresponding parts of these devices in FIG. **2**, except that a "-**2**" is added to associate the various parts with the particular embodiment of the invention depicted in FIG. **2**. Thus, a terminal **14-2** has a threaded shaft **14***a*-**2**. A removable terminal mounting **18-2** has a disk-shaped portion **18***g*-**2**, bosses **18***a*-**2** and **18***i*-**2** extending from the disk-shaped portion **18***g*-**2**, an elongated receptacle **18***b*-**2** extending into the boss for receiving

the shaft of the terminal device, a connector 18*c*-2 to secure the shaft of the terminal device in place, a ring-shaped surface 18*d*-2 to surround the boss and adapted for mounting in abutment with the face 16*b* of wrist forearm connector 16 with the boss extending into the passage 16*a*, and openings 18*h* -2 in the surface 18*d*-2 (only one being shown in FIG. 2, it being understood that the four other openings 18*h*-2 are equally spaced around the surface 18*i*-2 and in alignment with the openings 16*c* of the forearm connector member). Locking members or bolts 18*e*-3 extend between the openings in the surfaces of the wrist forearm connector and the terminal mounting unit for securing the two together.

Consider now the particular type of mounting employed in the friction wrist terminal mounting unit of FIG. 2. The connector 18*c*-2 includes a further surface 22 parallel with and facing in the opposite direction from the ring-shaped surface 18*d*-2. The openings 18*h*-2 extend between the surfaces 22 and 18*d*-2. In this manner, the shoulder of the locking member 18*e*-2 bears against the surface 22 and the threaded portion of the locking member 18*e*-2 is threaded into the threaded opening 16*c* of the forearm connector member to secure the two parts together. The further ring-shaped boss 18*i*-2 is positioned adjacent the surface 18*d*-2 and is of substantially the same outer shape and size as the adjacent portion of the passage through the wrist forearm connector. This configuration provides a mounting which prevents sliding movement between the surfaces 18*d*-2 and 16*b*.

The connector 18*c*-2 of the friction wrist mounting unit of FIG. 2 includes a threaded sleeve 26 into which the threaded shaft 14*a*-2 mates. The terminal mounting unit 18-2 has a circular cavity 28 at the bottom of which surface 22 is positioned. A second part 30 of the connector 18*c*-2 includes a ring-shaped resilient member 32 which engages the bottom portion of the cavity specifically bearing against the tops of the locking members 18*e*-2. The second part 30 also includes a ring-shaped cover member 34 which covers the resilient material and a base 33 of the terminal 14-2 frictionally engages the ring cover member 34, thereby securing the terminal in place in the removable terminal mounting unit 18-2.

Refer now to the wrist disconnect-type removable terminal mounting unit depicted in FIG. 3. Again, the same reference numerals used for wrist disconnect mounting the unit 18 and terminal 14 of FIG. 1 are used to indicate the corresponding parts of the wrist disconnect mounting unit of FIG. 3, except that "-3" has been added to identify the specific structure of FIG. 3. Depicted in FIG. 3 is a terminal unit 14-3 having a shaft 14*a*-3 with a groove 38 and, exially extending from the bottom thereof, a compression spring 40. The shaft 14*a*-3 with the groove 38 is adapted for connection to the wrist disconnect type terminal mounting unit 18-3. The removable terminal mounting unit 18-3 includes a disk-shaped portion 18*g*-3, ring-shaped bosses 18*a*-3 and 18*i*-3 extending from the bottom portion of disk-portions 18*g*-3 adjacent to ring-shaped surface 18*d*-3, an elongated receptacle 18*b*-3 extending into boss 18*a*-3 for receiving the shaft 14*a*-3 of the terminal 14-3, a connector 18*c*-3 and five equally spaced openings 18*h*-3 in the surface 18*d*-3. Locking members or bolts 18*e*-3 extend through each of the openings 18*h*-3 for securing the surfaces 18*d*-3 and 16*b* (FIG. 1) together.

Referring now to FIGS. 3, 5 and 6, the connector 18*c*-3 is of the wrist disconnect-type and includes a movable yoke member 44 which moves back and forth in a transverse direction into an interferring position with respect to the receptacle 18*b*-3. The connector 18*c*-3 includes a spring 45 which normally biases the movable member 44 into the interferring position within the receptacle and thereby engages the groove 38 of the terminal 14-3, securing the terminal in place within the receptacle of the terminal mounting unit 18-3. The movable member 44 has a circular opening 48 which is large enough to allow the shaft 14*a*-3 of the terminal 14-3 to pass therethrough. A pair of springs 50 actuate the movable member 48 (to the right as seen in FIG. 3) against a wall of a cavity 52 provided under a cover plate 54. The cover plate 54 mounts on a lower housing 56 which contains the lower portion of the receptacle 18*b*-3. Also included in the connector 18*c*-3 is a locking rod 57. The locking rod 57 is provided for mating with grooves 58 provided in the bottom of the shaft 14*a*-3 of the terminal 14-3.

To insert the shaft of the terminal 14-3 into the terminal mounting unit 18-3, an operator actuates a handle 60 of the movable member 44 which is external to the terminal mounting unit 18-3. The handle 60 is actuated towards the terminal mounting unit, thereby compressing the spring 45 and causing the opening 48 to axially align itself with the receptacle 18*b*-3. The terminal 14*a*-3 is then inserted through the opening 48 into the receptacle 18*b*-3 until it is positioned with aligned grooves 58 about the rod 57 at the bottom of the receptacle 18*b*-3. After the shaft of the terminal 14-3 is so positioned, the handle 60 is released, allowing the spring 45 to return the movable member 44 back to the position shown in FIG. 3 and into the groove 38, thereby securing the terminal 14-3 in the receptacle 18*b*-3.

Two shoulders are shown in groove 38. Shoulder 38*a* is of smaller diameter than shoulder 38*b*. When shaft 14*a*-3 is positioned with shoulder 38*b* engaging the movable member 44, the bottom grooves 58 of shaft 14*a*-3 are out of engagement with the rod 57, allowing terminal 14-3 to be rotated and angularly adjusted. When shaft 14*a*-3 is positioned with shoulder 38*a* engaging movable member 44, the shaft is seated with grooves 58 around rod 57, preventing rotation. The spring 40 automatically forces shaft 14*a*-3 to the right when handle 60 is actuated, so as to move the member 44 out of engagement with either of shoulders 38*a* or 38*b*.

Refer now to the rotational terminal mounting unit shown in FIGS. 7 and 8. Again, similar reference numerals to those used in FIG. 1 are used to identify the corresponding parts of the rotational terminal mounting unit of FIGS. 7 and 8. A "-7" is used to specifically identify the corresponding portions of the rotational terminal mounting unit of FIGS. 7 and 8. Thus, the rotational terminal mounting unit 18-7 has ring-shaped bosses 18*a*-7 and 18*i*-7 extending from the bottom portion of disk-shaped portion 18*g*-7 adjacent to ring-shaped surface 18*d*-7, an elongated receptacle 18*b*-7 extending into the boss 18*a*-7 with an opening for receiving a threaded shaft 14*a*-7 of a terminal 14-7, a connector 18*c*-7 in the form of threads for securing the shaft 14*a*-7 in the receptacle 18*b*-7 and five equally

spaced openings **18***h*-7 in the surface **18***d*-7. A connector or threaded bolt **18***e*-7 is provided for each opening **18***h*-7 for securing the surfaces **18***d*-7 and **16***b* (FIG. 1) together. The ring-shaped surface **18** *d*-7 is adapted for mounting in abutment with the surface **16***b* of the wrist forearm connector (FIG. 1), with the boss **18***a*-7 extending into the passage of the wrist forearm connector member. The rotational terminal mounting unit has a housing portion **64** with a circular-shaped cavity **66** around the elongated receptacle.

The connector **18***c*-7 includes a tubular-shaped member **68** journaled or rotatably mounted within the housing **64** and forms a part of the elongated receptacle **18***b*-7. The connector **18***c*-7 also includes a lock **70** for selectively locking the tubular-shaped member against rotation. To this end, the lock **70** has a flanged portion **72** which has a plurality of openings **74**, all at the same radial position around the flanged portion **72.** The lock **70** also includes a pin **76** which is selectively engaged into the openings **74** to stop rotation of the rotatable member **68.** The pin **76** is attached to a cable **78** which can be remotely actuated by the amputee. A spring **80** normally biases the pin **76** into an aligned opening **74** to lock rotation of member **68.**

Also included in the connector **18***c*-7 is a ring-shaped resilient member **82** which is positioned in the cavity **66** and bears against the flanged portion **72** of the rotatable member **68.** The resilient material **82** may be rubber, plastic or other suitable material which bears against the flange **72** and, through friction, helps prevent rotation therebetween.

A ring-shaped metallic cover **84,** having a U-shaped cross-sectional configuration, covers the resilient member **82** at the exterior of the terminal mounting unit. Also included in the connector **18***c*-7 are threads which are formed on the inside surfaces of the rotatable tubular member **68** and on the inside surface of the ring-shaped cover **84,** thereby providing a mating connection for the threaded shaft **14***a*-7 of the terminal **14-7.** A base **86** of the terminal **14-7** frictionally engages the metallic cover **84,** thereby preventing it from being unthreaded under normal use. Similar to the terminal mounting unit in the other figures, additional boss **18***i*-7 is of substantially the same outer shape and size as the adjacent portion of the passage **16**a through the wrist forearm connector **16** (FIG. 1) so that when positioned together, the boss **18***a*-7 prevents sliding movement between the surfaces **18***d*-7 of the terminal mounting unit **18-7** and the surface **16***b* of the forearm connector member.

Although an exemplary embodiment of the invention has been disclosed for purposes of illustration, it will be understood that various changes, modifications and substitutions may be incorporated in such embodiment without departing from the spirit of the invention as defined by the claims appearing hereinafter.

What is claimed is:

1. A universal prosthetic wrist system for connecting the forearm of an amputee to the shaft of a prosthetic terminal device through different types of terminal mountings, the combination comprising:

a. a tubular-shaped wrist forearm connector comprising a member having front and back ends and adapted to be molded into a prosthetic forearm, the member comprising:

2. a first circular passage extending therethrough from the front end to the back end having a first ring-shaped side surface;

2. an annular groove around the perimeter of said connector and positioned towards the front end thereof into which a forearm may be molded;

3. a ring-shaped collar portion extending from the groove to the end of the passage at said front end and having, at its front end, a substantially flat, ring-shaped front mounting surface extending around said passage, the inner portion of said ring-shaped collar portion being stepped inwardly into said passage with respect to other portions of said passage and forming said first side surface; and

4. at least one opening into said front mounting surface;

b. a removable terminal mounting unit having front and back ends and an outer perimeter in between the ends comprising:

1. a disk-shaped portion having a front end and a boss extending in the opposite direction from a back end of the removable terminal mounting unit, the boss comprising a second ring-shaped side surface in abutting engagement with said first side surface;

2. an elongated receptacle in the boss and opening out of the front end of the disk-shaped portion for receiving the shaft of a terminal device;

3. A connector for securing the shaft of the terminal device in said elongated receptacle;

4. a back flat annular-shaped mounting surface on the disk-shaped portion towards the back end of said terminal mounting unit surrounding said boss and in abutment with the wrist forearm connector member front mounting surface with said boss extending into the passage of said wrist forearm connector member; and

5. at least one opening in said back mounting surface alignable with the opening in said front mounting surface;

c. the forearm connector comprising a construction adjacent the front mounting surface thereof, allowing unobstructed access to such front mounting surface for the outer perimeter of said removable mounting unit as the latter is mounted and removed from such front mounting surface; and

d. a locking member removably extending between the openings in both said front and back mounting surfaces for rigidly securing such surfaces of the wrist forearm connector and terminal mounting unit together.

2. A universal prosthetic wrist system according to claim **1** wherein said wrist forearm connector and removable terminal mounting unit have outer structural configurations around the respective ring-shaped surfaces of substantially the same perimeter.

3. A universal prosthetic wrist system according to claim **1** wherein said boss of said removable terminal mounting unit comprises a further ring-shaped side surface inwardly stepped from the second side surface so as to be spaced away from the side of the first circular passage of said forearm connector.

4. A universal prosthetic wrist system according to claim **1** wherein said removable terminal mounting unit comprises a front facing surface facing in substantially the opposite direction from the back mounting surface

thereof, the opening to the back mounting surface of the removable terminal mounting member extending from the back mounting surface to the front facing surface, the locking member comprising a shoulder engaging the front facing surface and a threaded portion threaded into the opening in the front mounting surface of the wrist forearm connector to thereby secure the front and back mounting surfaces together.

5. A universal prosthetic wrist system according to claim **1** wherein the connector in the receptacle of the removable terminal mounting unit comprises threads in the receptacle for receiving a threaded shaft on a terminal device.

6. A universal prosthetic wrist system according to claim **1** wherein the removable terminal mounting unit comprises a ring-shaped cavity area around said elongated receptacle having a bottom structure and a second connector part comprising a first ring-shaped resilient member for engaging the bottom structure of said cavity and a second ring-shaped member covering said resilient material against which a terminal device may bear, said receptacle comprising threads for receiving a threaded shaft on a terminal device.

7. A universal prosthetic wrist system according to claim **1** wherein the connector in the receptacle of the removable terminal mounting unit comprises a member movable in the elongated receptacle in a transverse direction to the receptacle.

8. A universal prosthetic wrist system according to claim **7** comprising spring bias means for normally biasing said movable member into an obstructive position in said receptacle to secure a groove shaft of a terminal device in place.

9. A universal prosthetic wrist system according to claim **8** comprising a member rigidly connected across said receptacle for engaging a groove in the end of a terminal device shaft and thereby locking the angular position of the shaft.

10. A universal prosthetic wrist system according to claim **1** wherein the connector of the removable terminal mounting unit comprises:

a. a ring-shaped cavity around said elongated receptacle;

b. a rotatable tubular-shaped member mounted in said elongated receptacle;

c. means for selectively locking said tubular-shaped member against rotation; and

d. a ring-shaped member positioned in said cavity and comprising a resilient portion bearing against an end of said tubular-shaped member.

11. A universal prosthetic wrist system according to claim **10** wherein said elongated receptacle comprises threads in the side thereof for receiving a threaded shaft of a terminal device.

12. A universal wrist system according to claim **1** wherein said connector in said removable terminal mounting unit comprises a rotatable mounting for the shaft of the terminal device and a controllable lock for preventing rotation thereof, a cable connected to said lock for controlling the locking thereof and extending through said passage.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,798,680 Dated Mar. 26, 1974

Inventor(s) Wesley C. Prout

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 4, line 40, "susubstantially" should read --substantially--; Col. 5, line 11, "18e-3" should be --18e-2--; line 55, "exially" should be --axially--; Col. 7, line 49, "18a-7" should be --18i-7--; Col. 8, line 1, "2" should be --1--; Col. 10, line 1, "groove" should be --grooved--.

Signed and sealed this 17th day of September 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents