

Description

There is disclosed in EP—A1—0,032,616, which falls within the terms of Article 54(3), EPC, a hand tool for successively connecting wires to respective electrical terminals arranged in a row extending along a housing of an electrical connector, the tool comprising a wire insertion head, defining a connector guideway, a wire insertion ram, means for driving the ram towards and away from the guideway transversely of the length thereof, and means connected to the ram for advancing the connector step by step along the guideway to bring each terminal in turn into alignment with the ram to allow the ram to connect a wire to the terminal.

In this known tool, the connector advancing means comprises a wheel, the periphery of which engages the connector and which is driven by the ram through a link extending beneath the guideway.

The invention is intended to provide a hand tool, in which the actuation of the connector advancing means can be more positively felt by the operator than is the case with the known tool, which is of more compact construction than the known tool and which can readily be provided with means for adjusting the connector advancing means to comply with the spacing between the terminals of the row.

According to the invention, a hand tool as defined in the first paragraph of this specification is characterised in that the connector advancing means comprises a cam plate formed with a cam slot extending transversely of the path of movement of the ram and receiving a camming pin which is fixed with respect to the ram, the cam plate carrying a connector advancing pawl arranged to be spring biased into engagement with the connector, the cam plate being drivable by the ram transversely of the path of movement thereof.

The pawl can be arranged to engage teeth on the connector with a snap action during the operation of the connector advancing means, so that the operator is immediately aware that the tool is ready for further operation after a wire has been connected to a terminal of the connector.

The connector advancing means can be substantially completely enclosed in a channel formed in the insertion head and covered by a cover plate.

Advantageously, the ram is received in a yoke member connected to a ram drive shaft, the camming pin extending from the yoke member, a connecting pin being insertable into first bores or alternatively into second bores, in the yoke member and ram, to connect the ram to the yoke member, the first bores being spaced from the second bores lengthwise of the path of movement of the ram, the connector advancing means being thereby adjustable to comply with the spring between the terminals of the row.

For a better understanding of the invention reference will now be made by way of example to the accompanying drawings, in which:—

Figure 1 is a perspective view of a hand tool, according to a first embodiment of the invention, for use in successively connecting wires to respective electrical terminals arranged in a row extending along a housing of an electrical connector;

Figure 2 is a fragmentary section taken on the lines II—II of Figure 1 showing part of the tool in a first position;

Figure 3 is a view similar to that of Figure 2 but showing the parts in a second and subsequent position;

Figure 4 is a fragmentary section taken on the lines IV—IV of Figure 1 showing the tool when adjusted for use where the terminals of the row have a first centre-to-centre spacing;

Figure 5 is a view similar to that of Figure 4 but showing the tool when adjusted for use where the terminals have a second centre-to-centre spacing;

Figure 6 is an exploded perspective view of an adjustment mechanism of the tool;

Figure 7 is a fragmentary sectional view illustrating a modification of the tool by means of an insert;

Figure 8 is a fragmentary sectional view of a hand tool according to a second embodiment of the invention, for use in successively connecting wires to respective electrical terminals arranged in a row along a housing of an electrical connector; and

Figure 9 is a plan view of the tool of Figure 8 with parts emitted.

As shown in Figure 1, the tool 10 according to the first embodiment comprises hand grip 12 having an actuating lever 14, a full stroke ratchet mechanism constructed according to the teaching of US—A—3,039,337, spanning the free ends of the hand grip 12 and the lever 14.

As its forward end, the tool 10 has an insertion head 18 having a tubular portion 20 (Figures 4 and 5) received in an axial bore 22 of a tool barrel 23 on the hand grip 12. The portion 20 has an axial bore 24 receiving an actuation rod 26. The rod 26 is biased by a compression spring 28 and is driven by the lever 14 according to the teaching of US—A—3,742,571.

The head 18 has a transverse guideway or groove 30, as best seen in Figures 4 and 5, to receive an electrical connector 78 of the kind disclosed in US—A—4,243,288. The insulating housing of the connector 78 has on each side thereof a row of pockets 79 (Figure 1) each containing a wire-receiving portion of an electrical terminal (not shown), each wire receiving portion having a wire-receiving slot. The housing of the connector 78 also has on each side thereof a row of indexing slots 77 each of which is aligned with one of the pockets 79, the slots 77 being defined by barriers 77' (Figures 2

and 3) formed on the connector housing. Opening into one wall of the groove 30 is a spring loaded ratchet stop comprising a pawl 32, a loading spring 34, and a screw threaded plug 36. In the opposite wall of the groove 30 is a horizontal slot 38 receiving a cam plate 40 having an oblique slot 42 therein. The forward part of the plate 40 has a recess 44 containing a driving pawl 46 having a connector engaging tooth 48 and being loaded by a compression spring 50, the pawl 46 being parallel with the plate 40.

The rod 26 has at its forward end, a yoke member 52 (Figures 4 to 6) with an axial threaded bore 54 receiving a screw threaded end portion of the rod 26. The yoke member 52 has a longitudinally extending channel 56 (Figure 6) with which communicate a first pair of horizontal lateral bores 58 and a second pair of horizontal lateral bores 60 (one shown), and a vertical bore 62 in the base of the channel 56. A wire insertion ram 64 received in the slot 56, is joined to the yoke member 52 by means of a removable pin 66 which can be passed through either of the bores 58 or 60 and through the appropriate bore 68 or 70 in the ram 64. The bottom of the ram 64 is formed with a recess 72, the leading end 74 of the ram 64 being shaped for engaging a wire to drive it into the wire-receiving slot of a terminal of the connector 78. The yoke member 52 also has a pin 76 which depends through the bore 62 into the slot 42 of the plate 40. A ram and wire guide plate 81 secured to the head 18 is provided with a vertical wire slot 82 at its forward end.

In operation, a connector 78 is inserted into the slot 30, as shown in Figure 1, so that the tooth 48 of the pawl 46 engages in a desired one of the slots 77 in the housing of the connector 78, and a wire 80 is inserted into the slot 82. The actuating lever 14 is squeezed against the hand grip 12 driving the actuation rod 26 forward against the restraining action of the spring 28, whereby, the yoke member 52 moves forwardly so that the leading end 74 of the insertion ram 64 engages the wire 80 and drives it into the wire-receiving slot of the terminal of the connector 78, which slot has been aligned with the ram 64, by virtue of the engagement of the pawl 46 in the slot 77. At the same time the forward movement of the yoke member 52 causes a lateral movement of the plate 40 (downward as seen in Figures 2 and 3) by virtue of the engagement of the pin 76 in bore 62 and in the oblique slot 42. At the end of the forward motion of the yoke member 52, the tooth 48 of the pawl 46 slides over the next adjacent barrier 77' on the connector housing (as shown in Figure 3) and engages in the next successive slot 77 with a snap action to index the connector through the tool (upwards as seen in Figures 2 and 3) by one step. The pawl 32 secures the connector 78 against return movement. Repeated actuation of the lever 14 causes the connector to be

indexed step-by-step through the tool so that wires inserted sequentially into the slot 82 can each be connected to one of the terminals on that side of the connector which faces the ram 64.

Since the connector 78 has two opposite rows of terminals it must be passed through the tool twice in order to connect wires to the terminals of each row.

The tool can also be adapted for use with a narrower connector (not shown) having only a single row of terminals, by placing an insert 84, Figure 7, in the groove 30 to reduce the width thereof sufficiently to cause the narrower connector to fit snugly in the groove 30. In this case the pawl 32 is replaced by a pawl 32' of a greater length than the pawl 32 and which extends through an opening 85 in the insert 84. In order to adjust the tool to accommodate an electrical connector having a different centre-to-centre spacing between the terminals of the or each row, it is only necessary to remove the pin 66 and realign it with the appropriate bore 58 or 60 in the yoke member 52 and the appropriate bore 68 or 70 in the insertion member 64.

According to Figure 4, the pin 66 is positioned in the bores 58 and 68, and according to Figure 5, the pin 66 is positioned in the bores 60 and 70 whereby the travel of ram 64 and thus of the pin 36 is increased by a length L.

The second embodiment of the invention will now be described with reference to Figures 8 and 9.

The hand tool of the second embodiment includes an insertion head 112 fixed at one end to a tubular tool barrel 113 receiving a wire insertion ram 114. The head 112 comprises a removable connector guide member 115.

A channel 118 formed in the head 112 receives a connector indexing mechanism 119 comprising a slidable cam plate 121 mounted on roller bearings 122 located in a track 123 constituted by a recess in the base of the channel 118, and the rotational axes of which extend at right angles to the path of movement of the ram 114. A mounting plate 124 fixed to one end of the cam plate 121 carries a spring biased connector indexing pawl 125. A transversely inclined cam slot 126 is provided adjacent to the other end of the cam plate 121.

A cover plate 127 extending across the channel 118 defines in co-operation with the guide member 115, a guideway 116 for an electrical connector (not shown) of similar type to the connector 78 but having a row of teeth along its base. The cover plate 127 is formed with a slot 128 extending lengthwise of the guideway 116 at a position remote from the ram 114, through which slot 128 the pawl 125 protrudes. A further slot 129 in the plate 127 extends transversely of the slot 128 near that end of the plate 127 which is remote from the slot 128. A camming pin 131 screw threaded

into the ram 114, projects through the slot 129 into the slot 126.

The rotational axes of the bearings 122 also extend at right angles to the length of the guideway 116.

The ram 114 and barrel 113 are respectively connected to an actuating lever (not shown) and to a hand grip (not shown), which may be similar to those described above with reference to the first embodiment.

In operation, with a connector (not shown) received in the guideway 116, forward movement of the ram 114 upon the actuating lever being squeezed, causes the pin 131 to move along the cam slot 126 so that the cam plate 121 is moved transversely of the direction of advance of the ram 114, as indicated by the arrow in Figure 9, the pawl 125 being depressed by a tooth on the base of the connector against the action of the spring of the pawl 125 and subsequently rising with a snap action. As the ram 114 returns, the movement of the cam plate 121 is reversed so that the pawl 125 engages the tooth, to advance the connector by one step along the guideway 116 to bring the next successive terminal into alignment with the ram 114.

The plates 121 and 127 and their associated parts can readily be assembled to the insertion head prior to the assembly of the connector guide member 115, the ram 114 and the pin 131.

Claims

1. A hand tool for successively connecting wires to respective electrical terminals arranged in a row extending along a housing of an electrical connector, the tool comprising a wire insertion head (18 or 112), defining a connector guideway (30 or 116), a wire insertion ram (64 or 114), means (14, 28) for driving the ram (64 or 114) towards and away from the guideway (30 or 116) transversely of the length thereof, and means (46 or 125) connected to the ram (64 or 114) for advancing the connector step by step along the guideway (30 or 116) to bring each terminal in turn into alignment with the ram (64 or 114) to allow the ram (64 or 114) to connect a wire to the terminal, characterised in that the connector advancing means comprises a cam plate (40 or 121) formed with a cam slot (42 or 126) extending transversely of the path of movement of the ram (64 or 114) and receiving a camming pin (76 or 131) which is fixed with respect to the ram (64 or 114), the cam plate (40 or 121) carrying a connector advancing pawl (46 or 125) arranged to be spring biased into engagement with the connector, the cam plate (40 or 121) being drivable by the ram (64 or 114) transversely of the path of movement thereof.

2. A tool according to Claim 1, characterised in that the cam plate (40 or 121) is slidably mounted in a recess in the insertion head (18 or

112), the cam slot (42 or 126) being remote from the pawl (46 or 125) and the pin (76 or 131) projecting into the recess through an opening in the insertion head (18 or 112).

3. A tool according to Claim 1 or 2, characterised in that the ram (64) is received in a yoke member (52) connected to a ram drive shaft (26), the camming pin (76 or 131) extending from the yoke member (52), a connecting pin (66) being insertable into first bores (58 and 68) or alternatively into second bores (60 and 70), in the yoke member (52) and ram (64), to connect the ram (64) to the yoke member (52), the first bores (58 and 68) being spaced from the second bores (60 and 70) lengthwise of the path of movement of the ram (64).

4. A tool according to Claim 3, characterised in that the ram (64) is received in an axial channel (56) in the yoke member (52), the camming pin (76) being slidably received in an opening (62) in the bore of the channel (56), the first and second bores (58 and 68) and (60 and 70) comprising bores (58 and 60) formed in the walls of the channel (56) and through bores (68 and 70) in the ram (64).

5. A tool according to any one of the preceding claims, characterised in that the pawl (46) is mounted in a recess (44) in the cam plate (40) and is parallel therewith, a biasing spring (50) for the pawl (46) also being mounted in the recess (44).

6. A tool according to any one of the preceding claims, characterised in that a spring loaded ratchet stop (32) projects from a side wall of the guideway (30), which is remote from the ram (64), in substantial alignment with the pawl (46).

7. A tool according to Claim 6, characterised by an insert (84) positioned in the guideway (30) against that said remote side wall thereof to reduce the width of the guideway (30), the ratchet stop (32) protruding through an opening (85) in the insert (84).

8. A tool according to Claim 1 or 2, characterised in that the pawl (125) projects perpendicularly from the cam plate (121) through an opening (128) in a cover plate (127) provided between the cam plate (121) and the ram (114).

9. A tool according to Claim 8, characterised in that the guideway (116) is defined by the cover plate (127) and by a guideway member (125), detachably connected to the insertion head (112).

10. A tool according to Claim 1, 2, 8 or 9, characterised in that the cam plate (121) is mounted upon roller bearings (122) having axes of rotation which extend at right angles to the length of the guideway (116) and to the path of movement of the ram (114).

Patentansprüche

1. Handwerkzeug zum aufeinanderfolgenden Verbinden von Drähten mit jeweiligen elek-



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into the ram 114, projects through the slot 129 into the slot 126.

The rotational axes of the bearings 122 also extend at right angles to the length of the guideway 116.

The ram 114 and barrel 113 are respectively connected to an actuating lever (not shown) and to a hand grip (not shown), which may be similar to those described above with reference to the first embodiment.

In operation, with a connector (not shown) received in the guideway 116, forward movement of the ram 114 upon the actuating lever being squeezed, causes the pin 131 to move along the cam slot 126 so that the cam plate 121 is moved transversely of the direction of advance of the ram 114, as indicated by the arrow in Figure 9, the pawl 125 being depressed by a tooth on the base of the connector against the action of the spring of the pawl 125 and subsequently rising with a snap action. As the ram 114 returns, the movement of the cam plate 121 is reversed so that the pawl 125 engages the tooth, to advance the connector by one step along the guideway 116 to bring the next successive terminal into alignment with the ram 114.

The plates 121 and 127 and their associated parts can readily be assembled to the insertion head prior to the assembly of the connector guide member 115, the ram 114 and the pin 131.

Claims

1. A hand tool for successively connecting wires to respective electrical terminals arranged in a row extending along a housing of an electrical connector, the tool comprising a wire insertion head (18 or 112), defining a connector guideway (30 or 116), a wire insertion ram (64 or 114), means (14, 28) for driving the ram (64 or 114) towards and away from the guideway (30 or 116) transversely of the length thereof, and means (46 or 125) connected to the ram (64 or 114) for advancing the connector step by step along the guideway (30 or 116) to bring each terminal in turn into alignment with the ram (64 or 114) to allow the ram (64 or 114) to connect a wire to the terminal, characterised in that the connector advancing means comprises a cam plate (40 or 121) formed with a cam slot (42 or 126) extending transversely of the path of movement of the ram (64 or 114) and receiving a camming pin (76 or 131) which is fixed with respect to the ram (64 or 114), the cam plate (40 or 121) carrying a connector advancing pawl (46 or 125) arranged to be spring biased into engagement with the connector, the cam plate (40 or 121) being drivable by the ram (64 or 114) transversely of the path of movement thereof.

2. A tool according to Claim 1, characterised in that the cam plate (40 or 121) is slidably mounted in a recess in the insertion head (18 or

112), the cam slot (42 or 126) being remote from the pawl (46 or 125) and the pin (76 or 131) projecting into the recess through an opening in the insertion head (18 or 112).

3. A tool according to Claim 1 or 2, characterised in that the ram (64) is received in a yoke member (52) connected to a ram drive shaft (26), the camming pin (76 or 131) extending from the yoke member (52), a connecting pin (66) being insertable into first bores (58 and 68) or alternatively into second bores (60 and 70), in the yoke member (52) and ram (64), to connect the ram (64) to the yoke member (52), the first bores (58 and 68) being spaced from the second bores (60 and 70) lengthwise of the path of movement of the ram (64).

4. A tool according to Claim 3, characterised in that the ram (64) is received in an axial channel (56) in the yoke member (52), the camming pin (76) being slidably received in an opening (62) in the bore of the channel (56), the first and second bores (58 and 68) and (60 and 70) comprising bores (58 and 60) formed in the walls of the channel (56) and through bores (68 and 70) in the ram (64).

5. A tool according to any one of the preceding claims, characterised in that the pawl (46) is mounted in a recess (44) in the cam plate (40) and is parallel therewith, a biasing spring (50) for the pawl (46) also being mounted in the recess (44).

6. A tool according to any one of the preceding claims, characterised in that a spring loaded ratchet stop (32) projects from a side wall of the guideway (30), which is remote from the ram (64), in substantial alignment with the pawl (46).

7. A tool according to Claim 6, characterised by an insert (84) positioned in the guideway (30) against that said remote side wall thereof to reduce the width of the guideway (30), the ratchet stop (32) protruding through an opening (85) in the insert (84).

8. A tool according to Claim 1 or 2, characterised in that the pawl (125) projects perpendicularly from the cam plate (121) through an opening (128) in a cover plate (127) provided between the cam plate (121) and the ram (114).

9. A tool according to Claim 8, characterised in that the guideway (116) is defined by the cover plate (127) and by a guideway member (125), detachably connected to the insertion head (112).

10. A tool according to Claim 1, 2, 8 or 9, characterised in that the cam plate (121) is mounted upon roller bearings (122) having axes of rotation which extend at right angles to the length of the guideway (116) and to the path of movement of the ram (114).

Patentansprüche

1. Handwerkzeug zum aufeinanderfolgenden Verbinden von Drähten mit jeweiligen elek-



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trischen Anschlüssen, die in einer sich entlang eines Gehäuses eines elektrischen Verbinders erstreckenden Reihe angeordnet sind, mit einem Drahteinsetzkopf (18 oder 112), der einen Verbinderrührungsweg (30 oder 116) bildet, einem Drahteinsetzstößel (64 oder 114), Einrichtungen (14, 28) zum Antreiben des Stößels (64 oder 114) zum Führungsweg (30 oder 116) hin oder von diesem weg, und zwar quer zu dessen Länge, und mit Einrichtungen (46 oder 125), die mit dem Stößel (64 oder 114) verbunden sind, um den Verbinder Schritt für Schritt entlang des Führungsweges (30 oder 116) vorzuschieben, um jeden Anschluß seinerseits in Ausrichtung mit dem Stößel (64 oder 114) zu bringen, so daß der Stößel (64 oder 114) einen Draht mit dem Anschluß verbinden kann, dadurch gekennzeichnet, daß die Verbindervorschubeinrichtung eine Nockenplatte (40 oder 121) umfaßt, die mit einem Nockenschlitz (42 oder 126) versehen ist, der sich quer zum Bewegungspfad des Stößels (64 oder 114) erstreckt und einen Nockenstift (76 oder 131) aufnimmt, welcher bezüglich des Stößels (64 oder 114) festgelegt ist, daß die Nockenplatte (40 oder 121) eine Verbindervorschubklaue (46 oder 125) trägt, die derart angeordnet und ausgebildet ist, daß sie in Eingriff mit dem Verbinder federvorgespannt ist und daß die Nockenplatte (40 oder 121) durch den Stößel (64 oder 114) quer zu dessen Bewegungspfad antreibbar ist.

2. Werkzeug nach Anspruch 1, dadurch gekennzeichnet, daß die Nockenplatte (40 oder 121) gleitend in einer Ausnehmung in dem Einsetzkopf (18 oder 112) angebracht ist, daß der Nockenschlitz (42 oder 126) von der Klaue (48 oder 125) entfernt ist, und daß der Stift (76 oder 121) in die Ausnehmung durch eine Öffnung in dem Einsetzkopf (18 oder 112) hineinragt.

3. Werkzeug nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Stößel (64) in einem Jochelement (52) aufgenommen ist, das mit einer Stößelantriebswelle (26) verbunden ist, daß sich der Nockenstift (76 oder 131) von dem Jochelement (52) weg erstreckt, daß ein Verbindungsstift (66) in erste Bohrungen (58 und 68) oder alternativ in zweite Bohrungen (60 und 70) in dem Jochelement (52) und dem Stößel (64) einsetzbar ist, um den Stößel (64) mit dem Jochelement (52) zu verbinden, und daß die ersten Bohrungen (58 und 68) von den zweiten Bohrungen (60 und 70) in Längsrichtung des Bewegungspfades des Stößels (64) im Abstand angeordnet sind.

4. Werkzeug nach Anspruch 3, dadurch gekennzeichnet, daß der Stößel (64) in einem axialen Kanal (56) in dem Jochelement (52) aufgenommen ist, daß der Nockenstift (76) gleitend in einer Öffnung (62) in der Bohrung des Kanals (56) aufgenommen ist, und daß die ersten und zweiten Bohrungen (58 und 68 und 60 und 70) Bohrungen (58 und 60) umfassen, die in den Wänden des Kanals (56) geformt

sind, und Durchgangsbohrungen (68 und 70) in dem Stößel (64).

5. Werkzeug nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Klaue (46) in einer Ausnehmung (44) in der Nockenplatte (40) und parallel damit angebracht ist, und daß eine Vorspannfeder (50) für die Klaue (46) ebenfalls in der Ausnehmung (44) angebracht ist.

6. Werkzeug nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß ein federbelasteter Klinkenanschlag (32) aus einer Seitenwand des Führungsweges (30) herausragt, die von dem Stößel (64) entfernt ist, und zwar im wesentlichen ausgerichtet mit der Klaue (46).

7. Werkzeug nach Anspruch 6, dadurch gekennzeichnet, daß ein Einsatz (84) in dem Führungsweg (30) an der entfernten Seite dessen Wand angeordnet ist, um die Breite des Führungsweges (30) zu vermindern, und daß der Klinkenanschlag (32) durch eine Öffnung (85) in dem Einsatz (84) hindurchragt.

8. Werkzeug nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Klaue (125) senkrecht von der Nockenplatte (121) weg durch eine Öffnung (128) in einer Deckplatte (127) ragt, die zwischen der Nockenplatte (121) und dem Stößel (114) vorgesehen ist.

9. Werkzeug nach Anspruch 8, dadurch gekennzeichnet, daß der Führungsweg (116) durch die Deckplatte (127) und durch ein Führungswegelement (125) gebildet ist, das lösbar mit dem Einsetzkopf (112) verbunden ist.

10. Werkzeug nach Anspruch 1, 2, 8 oder 9, dadurch gekennzeichnet, daß die Nockenplatte (121) auf Kugellagern (122) angebracht ist, deren Rotationsachsen sich in rechten Winkeln zur Länge des Führungsweges (116) und zum Bewegungspfad des Stößels (114) erstrecken.

Revendications

1. Outil à main pour connecter les uns à la suite des autres des fils à des bornes électriques respectives disposées en une rangée s'étendant le long d'un boîtier d'un connecteur électrique, l'outil comprenant une tête (18 ou 112) d'insertion de fils, définissant une rainure (30 ou 116) de guidage d'un connecteur, un coulisseau (64 ou 114) d'insertion de fil, des moyens (14, 28) destinés à entraîner le coulisseau (64 ou 114) afin de le rapprocher et l'éloigner de la rainure (30 ou 116) de guidage, transversalement à sa longueur, et des moyens (46 ou 125) reliés au coulisseau (64 ou 114) afin de faire avancer le connecteur cran par cran le long de la rainure (30 ou 116) de guidage pour amener chacune des bornes tour à tour en alignement sur le coulisseau (64 ou 114) de façon à permettre au coulisseau (64 ou 114) de connecter un fil à la borne, caractérisé en ce que les moyens d'avance du connecteur comprennent une came plate (40 ou 121) dans

laquelle est formée une rainure (42 ou 126) de came s'étendant transversalement au trajet du mouvement du coulisseau (64 ou 114) et recevant un doigt de came (76 ou 131) qui est fixe par rapport au coulisseau (64 ou 114), la came plate (40 ou 121) portant un cliquet (46 ou 125) d'avance de connecteur disposé de façon à être rappelé par ressort en prise avec le connecteur, la came plate (40 ou 121) pouvant être entraînée par le coulisseau (64 ou 114) transversalement au trajet de son mouvement.

2. Outil selon la revendication 1, caractérisé en ce que la came plate (40 ou 121) est montée de façon à pouvoir coulisser dans un évidement de la tête (18 ou 112) d'insertion, la rainure de came (42 ou 126) étant éloignée du cliquet (48 ou 125) et le doigt (76 ou 131) faisant saillie dans l'évidement à travers une ouverture ménagée dans la tête (18 ou 122) d'insertion.

3. Outil selon la revendication 1 ou 2, caractérisé en ce que le coulisseau (64) est logé dans une chape (52) reliée à un arbre (26) d'entraînement du coulisseau, le doigt de came (76 ou 131) dépassant de la chape (52), un axe (66) d'articulation pouvant être inséré dans des premiers trous (58 et 68) ou, en variante, dans des seconds trous (60 et 70) de la chape (52) et du coulisseau (64) afin de relier le coulisseau (64) à la chape (52), les premiers trous (58 et 68) étant espacés des seconds trous (60 et 70) dans la direction longitudinale du trajet du mouvement du coulisseau (64).

4. Outil selon la revendication 3, caractérisé en ce que le coulisseau (64) est logé dans un couloir axial (56) de la chape (52), le doigt (76) de came étant logé de façon à pouvoir coulisser dans une ouverture (62) dans l'alésage du couloir (56), les premier et second trous (58 et 68) et (60 et 70) comprenant des trous (58 et 60) formés dans les parois du couloir (56) et

des trous (66 et 70) formés dans le coulisseau (64).

5. Outil selon l'une quelconque des revendications précédentes, caractérisé en ce que le cliquet (46) est monté dans un évidement (44) de la came plate (40) et est parallèle à celle-ci, un ressort (50) de rappel du cliquet (46) étant également monté dans l'évidement (44).

6. Outil selon l'une quelconque des revendications précédentes, caractérisé en ce qu'une butée (32) d'encliquetage sollicitée par un ressort dépasse d'une paroi latérale de la rainure (30) de guidage, qui est éloignée du coulisseau (64), sensiblement en alignement avec le cliquet (46).

7. Outil selon la revendication 6, caractérisé par un élément rapporté (84) positionné dans la rainure (30) de guidage, contre ladite paroi latérale éloignée de celle-ci, afin de réduire la largeur de la rainure (30) de guidage, la butée (32) d'encliquetage dépassant par une ouverture (85) ménagée dans l'élément rapporté (84).

8. Outil selon la revendication 1 ou 2, caractérisé en ce que le cliquet (125) fait saillie perpendiculairement de la came plate (121) à travers une ouverture (128) ménagée dans une plaque (127) de recouvrement prévue entre la came plate (121) et le coulisseau (114).

9. Outil selon la revendication 8, caractérisé en ce que la rainure (116) de guidage est définie par la plaque (127) de recouvrement et par un élément (125) de rainure de guidage relié de façon amovible à la tête (112) d'insertion.

10. Outil selon la revendication 1, 2, 8 ou 9, caractérisé en ce que la came plate (121) est montée sur des galets d'appui (122) ayant des axes de rotation qui s'étendent perpendiculairement à la longueur de la rainure (116) de guidage et au trajet du mouvement du coulisseau (114).

