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Description

This invention relates to a series of electrical connector assemblies and in particular those comprising a socket and a corresponding plug which is received in the socket.

Connector assemblies of this general type are now commonly used for connecting subscribers telephone apparatus to the public network; use of a socket and plug allowing easy movement of replacement of the telephone. For such use plugs and sockets having 4 or 6 terminals in plugs and sockets of the same overall sizes are usually used. Such assemblies can be easily mass produced using injection moulding and automatic assembly techniques. However, there is now a considerable need for a series of electrical connectors of the same general type having a larger number of terminals. This is particularly so in the telecommunications and computer related fields.

In producing a series of connectors having a varying number of terminals it is convenient for the various members of the series to differ only in the width of the engageable portion of the plug and the corresponding socket recess. This can lead to smaller plugs being inadvertently inserted into larger sockets which can result in damage to either or both of the pieces of equipment so connected. Even if plugs and sockets of the same size are being connected it is often desirable to prevent plugs intended for a particular purpose from being inserted into sockets of the same size intended for some other purpose. Keying systems to prevent both such mismatches are known (see, for example, DE-616 550) but involve the use of a number of complicated systems each requiring a plurality of keys and keyways to avoid any mismatching of plugs and sockets. Such systems also require an overly complicated series of moulds.

The present invention provides a series of electrical connector assemblies, each assembly comprising a socket and a corresponding plug, one member of each assembly having a single coding key, the other member of said assembly having a single keyway which is complementary to said single coding key; each plug having an engageable portion for engaging in a predetermined direction within a recess formed in said corresponding socket with said single coding key in mating engagement with said single keyway, said engageable portion comprising a first pair of opposed plug sidewalls and a second pair of opposed plug sidewalls disposed transversely to said first pair of plug sidewalls, said first and second pairs of sidewalls extending in said predetermined direction, said recess comprising a first pair of opposed recess sidewalls and a second pair of opposed recess sidewalls disposed transversely to said first pair of recess sidewalls, the width of said engageable portions and said corresponding recesses, as measured between said first pairs of sidewalls, being different for each of the assemblies of the series, characterised in that the heights of said engageable portions

and recesses as measured between said second sidewalls or the cross-sectional dimensions of said key and keyway of each assembly of said series as viewed in said predetermined direction, are dimensioned to prevent insertion of a given plug of the series into any socket of the series having a recess width as measured between said first pair of recess sidewalls which is greater than the width between said first plug sidewalls of said given plug, the height of said engageable position of said given plug being greater than the height of said any socket, or said coding key and keyway of each assembly of said series having different cross-sectional dimensions, as viewed in said predetermined direction, from those of said coding key and keyway of the other assemblies of said series, whereby inadvertent connection of plug and socket terminals is precluded by preventing mis-matches between non-corresponding plugs and sockets in the series.

Since the series of assemblies need only have one coding key and keyway, visual inspection to determine whether a plug will fit a particular socket is rendered easy. The design of the plugs and sockets is also rendered simple since they each require only one coding key and keyway. The height of the plugs and sockets together with the cross-sectional dimensions of the keys and keyways may in combination prevent mismatching of narrower plugs with wider sockets. Preferably though the heights of the engageable portions of the narrower plugs are greater than the heights of the recesses of the wider sockets as measured between each of their second pairs of sidewalls so that the height referred to above prevents mismatching of narrower and wider members of the series. Using the height of the plugs in this way enables the coding keys and keyways of the assemblies to be used to provide two further levels of series of coding if required. The cross-sectional dimensions of the coding keys and keyways as viewed in the direction of the engagement of the plug and socket and optionally their location may, however, be the same for all members of the series and no further coding provided. Alternatively the coding key and keyway may have different cross-sectional dimensions as viewed in the direction of engagement of said plug and socket to prevent insertion of plugs of assemblies of said sub-series in other sockets of said sub-series. Whether or not the cross-sectional dimensions of the coding keys and keyways are varied their position on the sidewall they are located on may be varied for each of the members of the series to prevent plugs of members of this further sub-series from being inserted into sockets of other members of the further sub-series.

Alternatively, instead of varying the height of the engageable portions and recesses to prevent narrow plugs from being inserted into wider sockets the cross-sectional dimensions of the coding key and keyway may be made different for each member of the series of assemblies in order to fulfil this function. The coding key may be

provided on either the plugs or recesses of the assemblies. If it is provided on the plugs one or more of the cross-sectional dimensions of the keys and keyways are larger for the narrower plugs than for the wider sockets of the series. Conversely, if the keys are provided on the sockets one or more of the cross-sectional dimensions of the keys and keyways are smaller for the narrower plugs than for the wider sockets of the series.

The cross-sectional dimensions of the keys and keyways may be varied as above whilst preferably keeping the heights of the engageable portions and recesses as measured between their second pairs of sidewalls the same. This height though may be allowed to vary within certain limits if the variation in cross-sectional dimensions of the coding keys and keyways is always sufficient to prevent narrower plugs fitting into wider sockets.

In varying the cross-sectional dimensions of the coding key and keyway the height of the coding key and keyway as measured in the direction between the second pairs of sidewalls may be made different for all members of the series. When the coding keys are located on the plugs the keys and keyways are of greater height for those assemblies with narrower sockets. Conversely when the coding keys are located in the sockets the keys and keyways are of greater height for those assemblies with wider sockets. Alternatively or additionally the width of the coding key and keyway may also be varied as measured in the direction between said first pairs of sidewalls. When the coding keys are located on the plugs the keys and keyways are preferably of greater width for those assemblies with narrower sockets. Conversely when the coding keys are located in the sockets the keys and keyways are of greater width for those assemblies with wider sockets.

Again a further level of coding may be provided when the cross-sectional dimensions of the coding key and keyway are used to prevent mismatching of narrower plugs with wider sockets by forming for each member of the series of assemblies a sub-series of assemblies wherein the coding key and keyway is located at a different position on one of the sidewalls for each member of the sub-series to prevent insertion of plugs of assemblies of the sub-series into sockets of the assemblies of the sub-series.

Such an arrangement enables a single coding key and keyway to provide two levels of coding. One which prevents narrower plugs being inserted into wider sockets and the other which allows differentiation between plugs and sockets of the same width. This dual coding system is considerably simpler than any system using a plurality of different sets of keys and keyways to provide two such levels of coding and the design and manufacture of plugs according to the present invention is thus greatly simplified.

In making the assemblies according to the present invention it is possible to have the keys

located either on the plugs or in the sockets. Preferably however the keys are provided on the plugs to enable the plug's engageable portion to be reduced in height to the minimum required by the cable to be inserted into the plug and connected to the terminals. It is also possible to locate the keys and keyways on either the first or second pairs of sidewalls provided always that narrower plugs are prevented from being inserted into wider sockets by the height of the engageable portion of the plug and or the cross-sectional dimensions of the key and keyway. However it is much preferred to locate the key and keyway on the second pairs of sidewalls since this avoids the need for extremely lengthy keys and keyways which can in certain circumstances be necessary if they are located on the first sidewall and the narrower plugs are not of greater height than the wider sockets.

Preferred embodiments of the present invention will now be described with reference to the following drawings in which:

Figure 1 shows a schematic end-on view in the direction of engagement of the plug and socket of the disposition of the sidewalls and keys or keyways for a plug or socket forming a member of a series according to an embodiment of the present invention.

Figure 2 shows a series of plugs or sockets according to an embodiment of the present invention viewed in the same manner as in Figure 1, some of which are of different heights to prevent mismatching of narrower plugs with wider sockets.

Figure 3 shows a series of plugs or sockets according to an embodiment of the present invention viewed in the same manner as in Figure 1, some of which have keys and keyways of different cross-sectional dimensions to prevent mismatching of narrower plugs with wider sockets.

Figure 4 shows a number of plugs or sockets according to an embodiment of the present invention where the keyway is provided on the plug.

Figure 5 shows a number of plugs or sockets according to an embodiment of the present invention where the keys and keyways are provided on the first pairs of sidewalls.

In Figure 1 an end-on view of the engageable portion of a plug or alternatively of the corresponding socket recess opening is shown. Details such as terminals, catches and the like have been omitted for clarity and only the disposition of the sidewalls and key or keyway are shown. The engageable portion of the plug and the socket recess are preferably of constant cross-section though this is not essential providing the plugs can be readily inserted into and removed from their corresponding sockets. A first pair of opposed sidewalls separated by a width W_p and a second pair of opposed sidewalls separated by an height h_p and disposed transversely, in this instance orthogonally, to the first pair of sidewalls, form the main body of the recess or engageable portion. The sidewalls in Figure 1 are shown as flat surfaces. Whilst this is preferable it

is not essential and other suitable contours may be used as required. On the upper one of the second sidewalls a key or keyway is provided of width W_k and height h_k . If the keyway is to be provided on the plug the plug and socket adopt the contour shown by the dotted line. In Figure 1 the key or keyway is shown as being trapezoidal, whilst this shape is preferable it is not essential and other suitable cross-sections may be used. In the following description the views shown will be referred to as plugs. It is to be understood though, that the views are equally those of the recesses corresponding to the engageable portions of the plugs.

In Figure 2 a series of plugs 1, 2, 3, 4 are shown for which the height h_p increases with decreasing width W_p . Though the key cross-sectional dimensions are constant the narrower plugs eg 1 are prevented from insertion into sockets corresponding to the wider plug eg 2, 3, 4 by the variation in h_p . In the case of each member of the series of plugs 1, 2, 3, 4 two further sub-series of plugs may be defined by changing the position of the key on the upper sidewall or by changing its cross-sectional dimensions. The plugs 4, 5, 6 and 7 for example, are all of the same width W_p but will not fit into each others sockets due to the varying location of their keys along the upper second sidewall. Plugs 7, 8 and 9 again are all of the same width but will not fit into each other's sockets even though their keys are located at the same place along the upper second sidewall. This is because the cross-sectional dimensions of their keys are different. In this instance the width W_k of the keyway increases as the height h_k of the keyway decreases. Other suitable variations in the key cross-section may be used though to achieve the same effect.

In Figure 3 a series of plugs are shown all having the same height h_p . In the case of plugs 10, 11, 12 and 13 which are all of different width W_p , the narrower plugs eg 10 are prevented from insertion into the sockets of the wider plugs eg 11, 12, 13 by their key heights h_k increasing as their width W_p decreases. Alternatively narrower plugs can be prevented from insertion into wider sockets by the width W_k of the keyway being increased as the plug width W_p decreases. Such a series of plugs are 13, 14 and 15. Again in the case of each of the members of the above series a further sub-series of coding may be provided by altering the position of the keyway on the upper second sidewall as shown by plugs 15, 16 and 17 and also 10, 18 and 19.

In each of the above series the key is shown as being provided on the plug. However it may alternatively be located on the recess sidewall instead. In this case the variation of the key height h_k and width W_k with increasing plug width W_p is reversed with respect to that required when the key is on the plug. For example in Figure 4 plugs 20 and 21 are two plugs of different widths with keyways provided on the recess lower second sidewall. Plug 20 cannot be inserted into the recess corresponding to plug 21 since the keyway

in plug 20 is not of the same height h_k as that of the key in the recess 21.

The key height h_k is thus increased with increasing plug width W_p . Similarly plug 22 shows that to prevent narrower plugs from being inserted into wider plugs by variation of the key width W_k the key width W_k must be decreased with decreasing plug width W_p .

Figure 5 shows plugs where the key is located on one of the first sidewalls. This is quite acceptable for plugs where insertion of narrower plugs into wider sockets is prevented by variation of the plug height h_p eg 23, 24. When the plugs and sockets are of the same height though eg 25, 26 the key width W_k may need to be unacceptably large. Plugs 24 and 25 however show that differentiation between plugs of the same width may still be achieved by varying the location of the key on the sidewall it is located on. The scope for such variation is restricted though when compared with that available when the key is located on the second sidewall. The second sidewall is generally longer than the first sidewall partly due to the common use of ribbon cables in the applications for which the connectors are primarily intended and mainly due to the linear arrangement of the terminals in the engageable portion of the plug. For these reasons the key and keyway are preferably always located on one of the second pairs of sidewalls.

Claims

1. A series of electrical connector assemblies, each assembly comprising a socket and a corresponding plug, one member of each assembly having a single coding key, the other member of said assembly having a single keyway which is complementary to said single coding key; each plug having an engageable portion for engaging in a predetermined direction within a recess formed in said corresponding socket with said single coding key in mating engagement with said single keyway, said engageable portion comprising a first pair of opposed plug sidewalls and a second pair of opposed plug sidewalls disposed transversely to said first pair of plug sidewalls, said first and second pairs of sidewalls extending in said predetermined direction, said recess comprising a first pair of opposed recess sidewalls and a second pair of opposed recess sidewalls disposed transversely to said first pair of recess sidewalls, the width of said engageable portions and said corresponding recesses, as measured between said first pairs of sidewalls, being different for each of the assemblies of the series, characterised in that the heights of said engageable portions and recesses as measured between said second sidewalls or the cross-sectional dimensions of said key and keyway of each assembly of said series as viewed in said predetermined direction, are dimensioned to prevent insertion of a given plug of the series into any socket of the series having a recess width as measured between said first pair of recess

sidewalls which is greater than the width between said first plug sidewalls of said given plug, the height of said engageable portion of said given plug being greater than the height of said any socket, or said coding key and keyway of each assembly of said series having different cross-sectional dimensions, as viewed in said predetermined direction, from those of said coding key and keyway of the other assemblies of said series, whereby inadvertent connection of plug and socket terminals is precluded by preventing mismatches between non-corresponding plugs and sockets in the series.

2. A series of assemblies according to claim 1 wherein the heights of the engageable portions as measured between said second pair of plug sidewalls of said narrower plugs of the series are greater than the heights of the recesses as measured between said second recess sidewalls of said wider sockets.

3. A series of assemblies according to claim 2 wherein said coding key and keyway are each of the same cross-sectional dimensions as viewed in the direction of engagement of said plug and socket for all members of said series.

4. A series of assemblies according to claim 2 including for each member of said series a sub-series of assemblies each having the same width as measured between said first pairs of recess and plug sidewalls, each member of said sub-series having a key and keyway of different cross-sectional dimensions as viewed in the direction of engagement of said plug and socket to prevent insertion of plugs of assemblies of said sub-series into sockets of other assemblies of said sub-series.

5. A series of assemblies according to claim 1 wherein said coding key and keyway of each member of said series are of different cross-sectional dimensions as viewed in the direction of engagement of said plug and socket to those of said coding key and keyway of all other members of said series.

6. A series of assemblies according to claim 5 wherein said engageable portions of said plugs and said recesses of said sockets are of the same height as measured between said second pair of sidewalls for all members of the series.

7. A series of assemblies according to claim 5 or claim 6 wherein said coding key and keyway of each member of said series are of different height than said coding key and keyway of all other members of said series.

8. A series of assemblies according to any one of claims 6 or 7 wherein said coding key and keyway of each member of said series are of different width as than of said coding key and keyway of all other members of said series.

9. A series of assemblies according to any one of the preceding claims including for each member of said series or sub-series a further series of assemblies wherein said coding key and keyway is located at a different position on one of said sidewalls for each member of said further series to prevent insertion of plugs of assemblies

of said further series into sockets of other assemblies of said further series.

10. A series of assemblies according to any one of the preceding claims wherein said coding key and keyway are located on said second sidewalls.

11. A series of assemblies according to any one of the preceding claims wherein said coding keys are located on said plugs and said coding keyways are located in said sockets.

Patentansprüche

1. Serie von Sätzen elektrischer Steckverbinder, bei der jeder Satz ein Sockel und einen entsprechenden Stecker umfaßt, ein Element jedes Satzes einen einzigen Kodierkeil aufweist und das andere Einzelstück des Satzes eine zum einzigen Kodierkeil komplementäre einzige Keilnut besitzt; wobei jeder Stecker eine einrückbare Partie zum Zusammenwirken in einer vorbestimmten Richtung in einer Aussparung des entsprechenden Sockels, bei paarender Verbindung des einzigen Kodierkeiles mit der einzigen Keilnut, besitzt; wobei die einrückbare Partie ein erstes Paar einander gegenüberstehender Steckerseitenwände und ein zweites Paar einander gegenüberstehender Steckerseitenwände aufweist, die quer zu dem ersten Paar Steckerwände verlaufen, wobei sich die ersten und zweiten Paare von Steckerseitenwänden in der vorbestimmten Richtung erstrecken; wobei die Aussparung ein erstes Paar einander gegenüberstehender Aussparungsseitenwände und ein zweites Paar einander gegenüberstehender Aussparungsseitenwände quer zum ersten Paar von Aussparungsseitenwänden besitzt, und wobei die Breite der einrückbaren Partien und der entsprechenden Aussparungen, gemessen zwischen dem ersten Paar Seitenwände, bei jedem der Sätze der Serie verschieden ist, dadurch gekennzeichnet, daß die Höhen der einrückbaren Partien und Aussparungen, gemessen zwischen den zweiten Seitenwänden, oder, daß die Querschnittsabmessungen des Keiles und der Keilnut jedes Satzes der Serie, gesehen in der vorbestimmten Richtung, so bemessen sind, daß das Einstecken eines gegebenen Steckers der Serie in einen beliebigen Sockel der Serie mit einer Aussparungsbreite, die, gemessen zwischen dem ersten Paar Aussparungsseitenwänden, größer als die Breite zwischen den ersten Steckerseitenwänden des gegebenen Steckers ist, verhindert wird, wobei die Höhe der einrückbaren Partie des gegebenen Steckers größer als die Höhe des beliebigen Steckers ist, oder wobei der Kodierkeil und die Keilnut jedes Satzes der Serie unterschiedliche Querschnittsabmessungen, gesehen in der vorbestimmten Richtung, gegenüber denjenigen des Kodierkeiles und der Keilnut der anderen Sätze der Serie besitzen, wodurch eine unbeabsichtigte Verbindung der Stecker- und Sockelkontakte durch Verhindern von Fehlpassungen zwischen einander nicht entsprechenden Steckern und Sockeln der Serie ausgeschlossen wird.

2. Serie von Sätzen nach Anspruch 1, dadurch

gekennzeichnet, daß die Höhen der einrückbaren Partien, gemessen zwischen dem zweiten Paar von Steckerseitenwänden der schmaleren Stecker der Serie, größer sind als die Höhen der Aussparungen, gemessen zwischen den zweiten Aussparungsseitenwänden der breiteren Sockel.

3. Serie von Sätzen nach Anspruch 2, dadurch gekennzeichnet, daß der Kodierkeil und die Keilnut bei allen Elementen der Serie jeweils die gleichen Querschnittsabmessungen besitzt, gesehen in der Einrückrichtung des Steckers und Sockels.

4. Serie von Sätzen nach Anspruch 2, bei der für jedes Element der Serie eine Unterserie von Sätzen vorhanden ist, wobei jedes Element die gleiche Breite, gemessen zwischen dem ersten Seitenwandpaar der Aussparung und des Steckers, aufweist, jedes Element der Unterserie einen Keil und eine Keilnut unterschiedlicher Querschnittsabmessungen in der Einrückrichtung des Steckers und Sockels gesehen, besitzt, um das Einstecken von Steckern von Sätzen der Unterserien in Sockel von anderen Sätzen der Unterserien zu vermeiden.

5. Serie von Sätzen gemäß Anspruch 1, dadurch gekennzeichnet, daß der Kodierkeil und die Keilnut jedes Elementes der Serie unterschiedliche Querschnittsabmessungen gegenüber jenen des Kodierkeils und der Keilnut aller anderen Elemente der Serie besitzen, gesehen in der Einrückrichtung von Stecker und Sockel.

6. Serie von Sätzen nach Anspruch 5, dadurch gekennzeichnet, daß die einrückbaren Partien der Stecker und Aussparungen der Sockel aller Elemente der Serie die gleiche Höhe besitzen, gemessen zwischen dem zweiten Paar Seitenwänden.

7. Serie von Sätzen nach dem Ansprüche 5 oder 6, dadurch gekennzeichnet, daß der Kodierkeil und die Keilnut jedes Elementes der Serie eine andere Höhe als der Kodierkeil und die Keilnut aller anderen Elemente der Serie besitzen.

8. Serie von Sätzen nach Anspruch 6 oder 7, dadurch gekennzeichnet, daß der Kodierkeil und die Keilnut jedes Elementes der Serie eine andere Breite als diejenige des Kodierkeils und der Keilnut aller anderen Elemente der Serie besitzen.

9. Serie von Sätzen nach einem der vorhergehenden Ansprüche, bei der für jedes Element der genannten Serie oder Unterserie eine weitere Serie von Sätzen vorhanden ist, dadurch gekennzeichnet, daß der Kodierkeil und die Keilnut jedes Elementes der weiteren Unterserie an einem anderen Anbringungsort einer der Seitenwände angebracht ist, um das Einstecken von Steckern von Sätzen der weiteren Serie in Sockel von Sätzen der weiteren Serie zu verhindern.

10. Serie von Sätzen nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Kodierkeil und die Keilnut an den zweiten Seitenwänden angebracht sind.

11. Serie von Sätzen nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Kodierkeile an den Steckern und die Keilnuten in den Sockeln angebracht sind.

Revendications

1. Une série d'ensembles de connecteurs électriques, chaque ensemble comprenant une douille et une fiche correspondante, un élément de chaque ensemble comportant un seul tenon de codage tandis que l'autre élément dudit ensemble comporte une seule encoche qui est complémentaire dudit tenon de codage; chaque fiche comportant une partie d'engagement pouvant être engagée dans une direction prédéterminée à l'intérieur d'un évidement formé dans ladite douille correspondante de telle sorte que ledit tenon de codage individuel s'adapte dans ladite encoche, ladite partie d'engagement comprenant une première paire de parois latérales de fiche opposées et une seconde paire de parois latérales de fiche opposées qui sont disposées transversalement à ladite première paire de parois latérales de fiche, lesdites première et seconde paires de parois latérales s'étendant dans ladite direction prédéterminée, ledit évidement comprenant une première paire de parois latérales d'évidement opposées et une seconde paire de parois latérales d'évidement opposées qui sont disposées transversalement à ladite première paire de parois latérales d'évidement, la largeur desdites parties d'engagement et desdits évidements correspondants, mesurée entre lesdites premières paires de parois latérales, étant différente pour chacun des ensembles de la série, caractérisée en ce que les hauteurs desdites parties d'engagement et desdits évidements, mesurées entre lesdites secondes parois latérales, ou bien les dimensions de section droite dudit tenon et de ladite encoche de chaque ensemble de ladite série, considérées dans ladite direction prédéterminée, sont dimensionnées de façon à empêcher l'insertion d'une fiche donnée de la série dans une douille quelconque de la série, comportant une largeur d'évidement, mesurée entre les parois latérales d'évidement de ladite première paire, qui est supérieure à la largeur existant entre lesdites premières parois latérales de ladite fiche donnée, la hauteur de ladite partie d'engagement de ladite fiche donnée étant plus grande que la hauteur de ladite douille quelconque, ou bien ledit tenon de codage et ladite encoche de chaque ensemble de ladite série ayant des dimensions de section droite différentes, considérées dans ladite direction prédéterminée, de celles dudit tenon de codage et de ladite encoche des autres ensembles de ladite série, afin qu'une connexion incorrecte de bornes d'une fiche et d'une douille soit empêchée en évitant des défauts d'adaptation entre des fiches et des douilles non correspondantes dans la série.

2. Une série d'ensembles selon la revendication 1, dans laquelle les hauteurs des parties d'engagement, mesurées entre les parois latérales de fiche de ladite seconde paire, desdites fiches étroites de la série sont plus grandes que les hauteurs des évidements, mesurées entre lesdites secondes parois latérales d'évidements desdites douilles larges.

3. Une série d'ensembles selon la revendication

2, dans laquelle ledit tenon de codage et ladite encoche de codage ont chacun les mêmes dimensions de section droite, considérées dans la direction d'engagement desdites fiche et douille pour tous les éléments de ladite série.

4. Une série d'ensembles selon la revendication 2, comprenant pour chaque élément de ladite série, une sous-série d'ensembles ayant chacun la même largeur, mesurée entre lesdites premières paires de parois latérales d'évidement et fiche, chaque élément de ladite sous-série comportant un tenon et une encoche de dimensions de section droite différentes, considérées dans la direction d'engagement desdites fiche et douille afin d'empêcher une insertion de fiches d'ensembles de ladite sous-série dans des douilles d'autres ensembles de ladite sous-série.

5. Une série d'ensembles selon la revendication 1, dans laquelle ledit tenon et ladite encoche de codage de chaque élément de ladite série ont des dimensions de section droite différentes, considérées dans la direction d'engagement desdites fiche et douille, de celles desdits tenons et encoches de codage de tous les autres éléments de ladite série.

6. Une série d'ensembles selon la revendication 5, dans laquelle lesdites parties d'engagement desdites fiches et lesdits évidements desdites douilles ont la même hauteur, mesurée entre les parois latérales de ladite seconde paire, pour tous les éléments de la série.

7. Une série d'ensembles selon la revendication

5 ou la revendication 6, dans laquelle ledit tenon et ladite encoche de codage de chaque élément de ladite série ont une hauteur différente de celles desdits tenons et encoches de codage de tous les autres éléments de ladite série.

8. Une série d'ensembles selon une quelconque des revendications 6 ou 7, dans laquelle ledit tenon et ladite encoche de codage de chaque élément de ladite série ont une largeur différente de celles desdits tenons et encoches de codage de tous les autres éléments de ladite série.

9. Une série d'ensembles selon une quelconque des revendications précédentes, comprenant pour chaque élément de ladite série ou de ladite sous-série une autre série ou un autre ensemble où ledit tenon et ladite encoche de codage sont placés dans une position différente sur une desdites parois latérales pour chaque élément de ladite autre série afin d'empêcher une insertion de fiches d'ensembles de ladite autre série dans des douilles d'autres ensembles de ladite autre série.

10. Une série d'ensembles selon une quelconque des revendications précédentes, dans laquelle ledit tenon et ladite encoche de codage sont placés sur lesdites secondes parois latérales.

11. Une série d'ensembles selon une quelconque des revendications précédentes, dans laquelle lesdits tenons de codage sont placés sur lesdites fiches et lesdites encoches de codage sont placées dans lesdites douilles.

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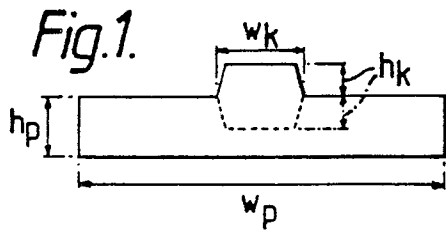


Fig.2.

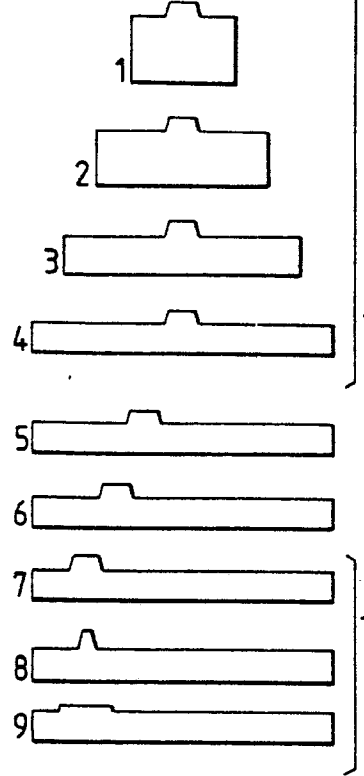


Fig.3.

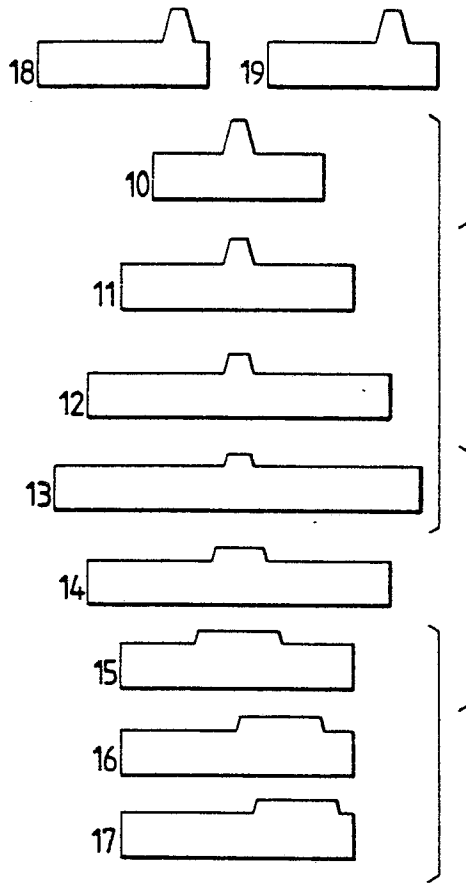


Fig.4.

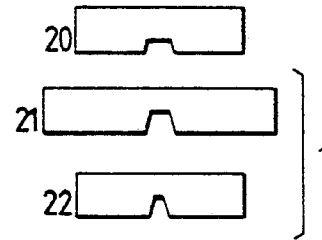


Fig.5.

