

July 12, 1955

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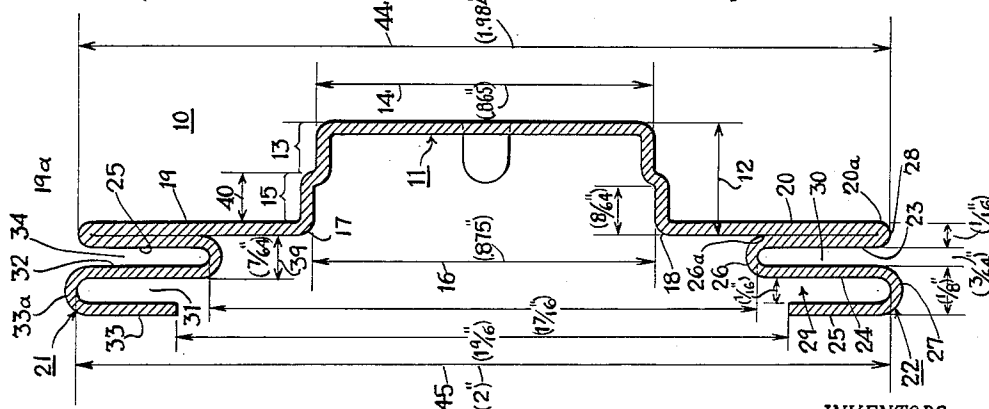
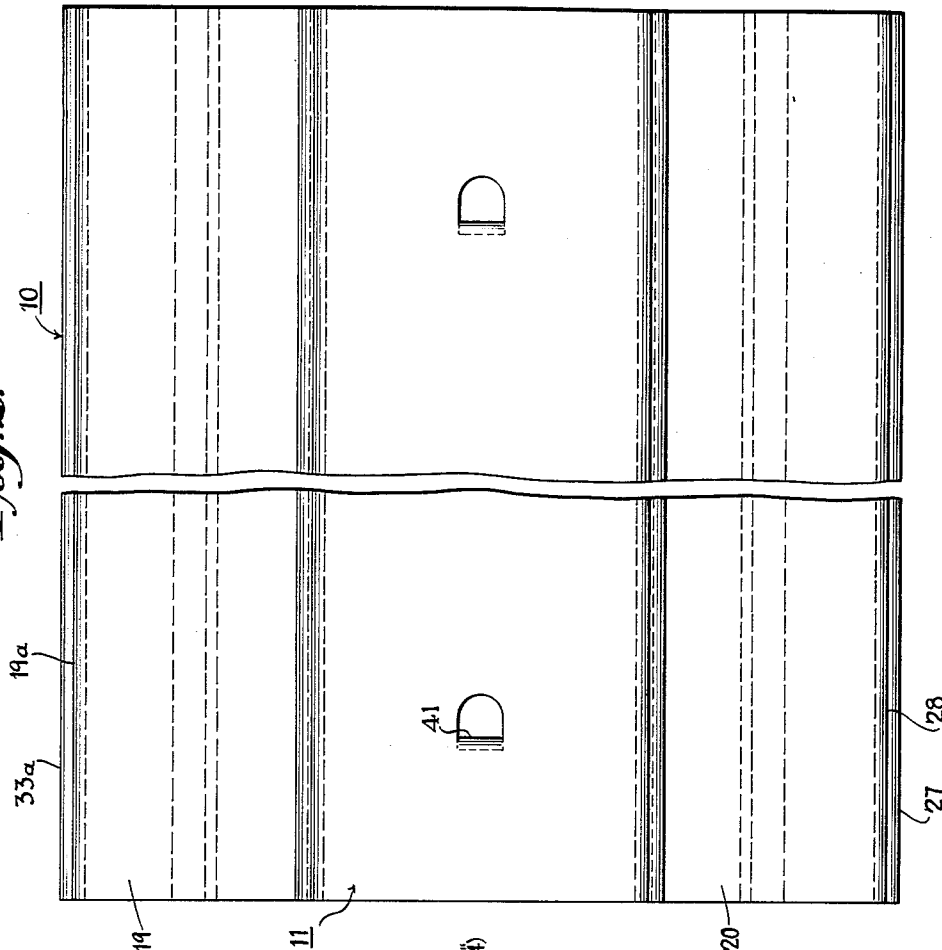
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EXTENSION ARM

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Fig. 2.



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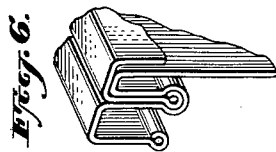
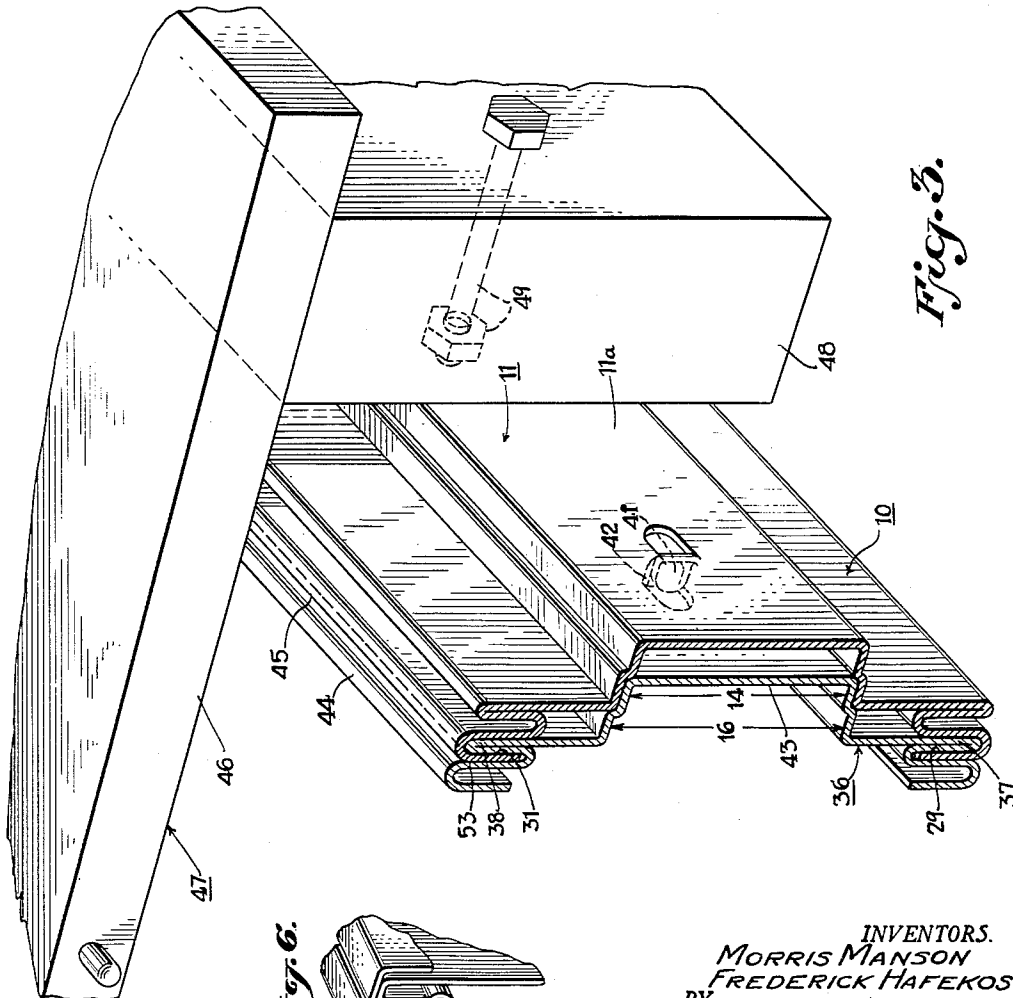
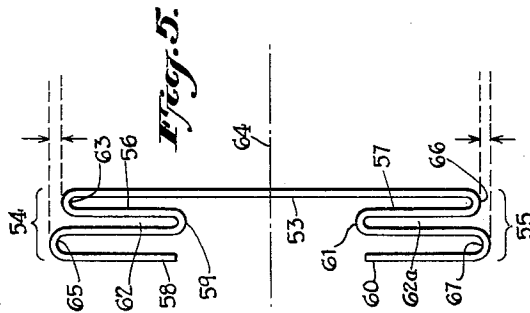
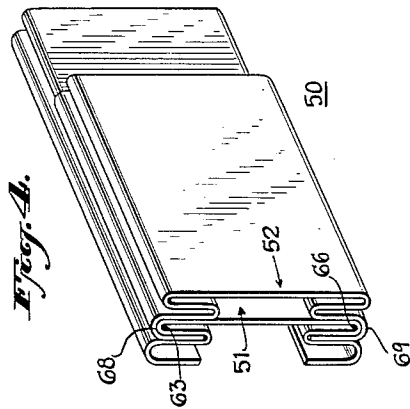
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2,712,972

EXTENSION ARM

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11 Claims. (Cl. 311—71)

This invention relates to extension arms and more particularly to such arms for furniture, such as tables, thereby to permit easy separation of portions thereof as for the insertion of extra leaves.

The invention in one aspect thereof is constituted by the combination of a pair of slide elements which are associated in longitudinally shiftable and nested relationship, each slide element comprising a main channel member having a flared outer portion which is adapted for engaging in nested relation with a base portion of the channel member of the next adjacent slide element, a transverse inner dimension of the flared portion being substantially equal to but slightly greater than the transverse outer dimension of said base portion whereby a satisfactory frictional contact is obtained and a suitable load bearing function is achieved thereby. The channel members are held in nested relationship in a novel manner through the intermediary of a pair of oppositely and outwardly extending primary flanges for each slide element, each flange being secured longitudinally along its respective edge of the flared portion of the channel member and preferably integral therewith. Connected to each of such flanges and extending longitudinally therealong is a channel which is, by such connection, held in spaced and parallel relationship thereto. Such channel member has a mouth extending longitudinally of the slide element which opens inwardly toward the main channel member, there thus being two opposed subchannel members having longitudinally extending mouths which open toward one another. Such opposed subchannel members are constructed and arranged for receiving the primary flanges of the next adjacent element, this being made possible by virtue of the spaced relationship of each subchannel member to its respective flange. Such spaced relationship in effect forms a pair of opposite and outwardly opening (exteriorly accessible) subchannel members into each of which there is received one side of the first mentioned subchannel member. In order for the primary subchannel members to receive the opposite edges of said flanges and thereby to be held to said main channel members in nested relationship, the dimension between the edges of said oppositely directed flanges is slightly less than the dimension as measured between the bottoms of said primary subchannel members. The maximum dimension of each slide element as measured from opposite outer surfaces of said first mentioned subchannel members is uniform with respect to all of the slide elements. Consequently a plurality of said elements in nested relationship can be associated with, for example, the under surface of a table, said slide elements being in a vertical attitude and the outer fold of each such subchannel member, if desired, engaging the under surface of the table.

One of the objects of the present invention is to provide an extension arm which is impervious to humidity and which will not become jammed or stick.

A further object is to provide an extension arm which

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is of extraordinarily low cost and which is well adapted for mass production techniques, each slide element thereof being fabricatable from a single strip of metal by a relatively simple bending operation.

A further object is to provide an extension arm which is smoothly workable.

Another object is to provide such an extension arm which is of simple and light construction but with adequate rigidity in both horizontal and vertical planes.

Another object is to provide such an extension arm which, when fully extended, has a little or negligible degree of sag.

A further object is to provide a device of this type particularly adapted for extension tables upon which a plurality of spare table leaves can be supported without sag and with easy registry of all leaves.

A further object is to provide an extension arm with a heretofore unattainable high range of extension commensurate with heretofore unattained low cost.

A further object is to provide a device of this character which eliminates complicated anti-friction structures, such as ball bearings.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for purposes of illustration only and are not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawings:

Fig. 1 is a transverse cross sectional view of a single slide element embodying one form of the invention;

Fig. 2 is a plan view of the slide element shown in Fig. 1;

Fig. 3 is a perspective view of a pair of the nestable slide elements shown in Fig. 1 in nested relationship and associated with, for example, one of the separable halves of a table top;

Fig. 4 is a perspective view of a pair of slide elements in nested relationship with one another, said elements embodying another but non-analogous form of the invention;

Fig. 5 is a transverse cross sectional view of one of the slide elements shown in Fig. 4; and

Fig. 6 is a fragmentary transverse cross sectional view of a feature of construction which may be employed in the embodiment of Fig. 4.

Referring to the drawings, with particular reference to Figs. 1-3, inclusive, the novel extension arm comprises a plurality of duplicate, nestable, slidably engageable slide elements, each of which may be fabricated with great ease and at low cost under mass production techniques from a single strip of sheet metal or other suitable sheet material.

The basic slide element of the invention is well shown in cross section in Fig. 1 and is designated by the numeral 10 and consists, in this form of the invention, in a main channel member 11 having a depth 12. The main channel member 11 is constructed and arranged especially for nesting engagement with a corresponding channel member of the next adjacent element in the manner well illustrated in Fig. 3. However, reverting again to Fig. 1, such channel member, in order to effect such nesting relationship, is formed in two portions, namely, a base portion 13 having a selected outer transverse dimension 14; and a top or flared portion 15 having a selected transverse inner dimension 16 which preferably is slightly greater than the dimension 14, for example, the dimension 16 may be .010 inch larger. Consequently, there is insured a satisfac-

tory frictional engagement between the opposed inner surfaces of the flared portion 15 with the nesting or interfitting outer areas of the next adjacent slide element corresponding to the base portion 13.

The flared portion 15 of the main channel member 11 has a pair of opposite upper lips 17 and 18 which comprise corners from each of which there extends an outwardly directed primary flange. Consequently there are a pair of such primary flanges designated 19 and 20 which are respectively secured along the lips 17 and 18 and which are outwardly directed with respect to the main channel member 11.

Such primary flanges 19 and 20, together with their associated means to appear herebelow, comprise the means for holding the several nested slide elements in nesting relationship with one another in such a way that a novel bearing association therebetween is effected.

Said primary flanges 19 and 20 are preferably but not necessarily substantially coplanar and are integral with the main channel 11.

Also the slide elements are preferably but not necessarily symmetrical with respect to a central plane passing longitudinally down the middle of the channel 11. Any asymmetrical characteristic should be common to all slide elements to insure proper nesting and telescopic engagement.

Viewing the slide element 10 in a horizontal attitude, that is with the primary flanges 19 and 20 substantially horizontal, it is seen that there are secured to the respective outer edges 19a and 20a thereof a pair of double subchannel members 21 and 22, respectively, which are in transverse cross section respectively in the shape of a reverse S and an S, such reverse S and S conformation being substantially flattened.

The subchannel member 22 consists of a peak wall 23, a center wall 24 and a base wall 25 all extending longitudinally of the slide element. The peak and center walls 23 and 24 are interconnected by a fold or bend 26 and the center and base walls 24 and 25 are interconnected by a fold or bend 27. The outer edge of the peak wall 23 is connected preferably throughout its entire length with the outer edge of the primary flange 20 by means of the bend or fold 28.

Consequently, it is seen that the center and base walls 24 and 25, together with their interconnecting fold or bend 27, define a subchannel 29 and the peak and center walls 23 and 24 define a subchannel 30.

The outer margin portion of the primary flange 20, together with the peak wall 23, which is adjacent thereto, form a double thickness which is slightly less than the width of the channel 29. The reason for this is that the channel 29 of the slide element 10 is designed for receiving such a double thickness of the next adjacent and nesting slide element, as is well shown in Fig. 3.

The conformation of the double subchannel member 21 is analogous to but reversed with respect to the subchannel member 22 above described in detail. Thus the subchannel member 21 is provided with a channel 31 formed between a center wall 32 and a base wall 33; and also with a subchannel 34 formed between the center wall 32 and a peak wall 35.

Referring now to Fig. 3, there are shown the above-described slide element 10 in telescopically engaged and nesting relation with a duplicate slide element 36. In the opposed intumed channels 29 and 31 of the slide element 10, there are respectively received flanges 37 and 38 which are analogous respectively to the flanges 20 and 19 (Fig. 1), it being understood, of course, that the peak walls analogous to 23 and 35 are also received in channels 29 and 31, respectively, thereby forming the above-mentioned double thickness.

Any desired number of such identical nestable slide

elements may be so associated with one another successively in the relationship shown in Fig. 3.

Viewed from another point of view, the walls 24 and 25, together with their interconnecting bend 27, comprise a primary subchannel member which is secured to the primary flange 20 and spaced relative thereto, the walls of said subchannel member being substantially parallel to the primary flange and the interconnection between the subchannel member and such flange, although in fact along the fold 28 (Fig. 1), is in a sense at the point of engagement of the fold or bend 26 with the adjacent surface of the flange 20, that is, along a line designated by the point 26a. Consequently the primary flange 20 protrudes sufficiently from said connecting point or line to provide a flange which may be engaged by the channel 29 of the next adjacent slide element, it being, of course, understood that analogous but oppositely disposed structure is associated with the opposite side of the slide element.

In order to facilitate the proper nesting relationship of the several slide elements, the dimension 39 is slightly greater than the dimension 40 (Fig. 1). By way of example, dimension 39 may be $\frac{7}{8}$ of an inch and dimension 40 $\frac{3}{4}$.

By way of example only, there are set forth on Fig. 1 a typical set of dimensions for the various parts of the channel member, although it is, of course understood that the invention is not limited to these dimensions and that the latter are shown only for the purpose of giving the relative sizes and disposition of the parts.

In order to limit the motion of one slide element, such as 36, with respect to another slide element, such as 10, as viewed in Fig. 3, a pair of limit-stop ears may be employed, one of which is shown at 41, formed in the floor 11a of the channel member 11. Such limit-stop ears 41 may be struck out of the surface of floor of the channel member at opposite extremities of its length and there can cooperate with a limit-stop ear 42 which may be punched or struck from floor 43 of the next adjacent slide element 36.

Referring again to Fig. 1, reference is made to relative dimensions 44 and 45 which respectively are the transverse dimension between the outer lips of the primary flanges 19 and 20, and the transverse dimension between the opposite floors or bottoms of the opposite channels 29 and 31. In order to insure a proper fit of such primary flanges 19 and 21, together with the adjacent peak walls 23 and 35, within their respective channels 29 and 31 of the next adjacent slide element, the dimension 44 is slightly less than the dimension 45.

The normal attitude for the slide elements, such as 10 and 36 (Fig. 3) is substantially vertical, as shown, thereby to insure necessary rigidity, both in the vertical and horizontal planes.

The upper edges of the folds 44 and 45 are coplanar when such slide elements in the vertical attitude of Fig. 3 and thereby such top bends both are capable, if desired, of being placed extremely close to and, if desired, in frictional contact with the underside of a table top 46. Thus all of the slide elements, including as many more as desired over and above those shown in Fig. 3, may be nestably associated therewith and all of their upper edges will be coplanar, thereby avoiding problems of registering the separable halves of table 47 of which the aforementioned top 46 is one of such halves.

The combination of the several extension arms may be secured to the table, as is well shown in Fig. 3. For example, one of the slide elements, such as 10, can be secured to a wooden block 48 which is rigidly secured by suitable means to the under surface of the table top 46. The means for rigidly securing the slide element 10 to such block 48 may comprise a plurality of nut and bolt interconnections, one of which is shown at 49. It is, of course, understood that the slide element 36 or some other slide element nestably secured in a succession of

such elements, can be analogously secured to another wooden block analogous to 48 or secured to the cooperating and extendable element of the piece of furniture in any suitable manner.

Referring to the embodiment shown in Figs. 4 and 5, an extension arm 50 is provided comprising a plurality of slide elements, for example, 51 and 52, each of which is substantially similar to the slide element 10 above described with the exception that the main channel 11 has been omitted from each and in lieu thereof the primary flanges thereof (analogous to 19 and 20, Fig. 1) are associated without the aforementioned intervening channel member (11, Fig. 1).

The basic element 51 of the extension arm 50 itself thus is in the form of a channel member having a floor or bottom 53 with sides 54 and 55 which have been partially collapsed, preferably by bending, to the form well shown in Fig. 5, the side 55 being collapsed in such a way that its transverse cross section is in the shape of a flattened S and wall 54 of a reverse S. Each of the elements 54 and 55 have peak walls 56 and 57 which preferably but not necessarily are held in spaced relationship from the floor 53 of the channel member.

Thus the embodiment of Figs. 4 and 5 comprises also a series of duplicate nestable slide elements, the basic element of which comprises a channel member having sides 54 and 55 shaped to form inturned lips 58, 59 and 60, 61. The inturned lips 59, 61 are each in the form of a channel having a mouth which opens outwardly of the overall channel member, that is, the inturned lips 59 and 61 form channels 62 and 62a respectively which are exteriorly accessible, viz., the mouths thereof open exteriorly of the slide element. The inturned lips 59 and 61 are disposed in the same relative positions on opposite sides of the slide element but pointing towards one another. The same is true of the inturned lips 58 and 60 which also are preferably but not necessarily coplanar.

As shown in Fig. 5, the edge 63 is closer to the axis 64 than the edge 65. The same relative disposition is true of the edges 66, 67. The edges 63 and 66, respectively, comprise the outer longitudinal edges of the oppositely disposed and outwardly protruding primary flanges which are analogous to the primary flanges 20 and 19 (Fig. 1). Such outwardly protruding flanges are received by the inwardly directed subchannel members 68 and 69 (Fig. 4) of the slide element 52.

The reason for the difference in the disposition of the edges 63 and 65 with respect to the axis 64 is to permit the next slide element to nest easily thereupon and to permit each element to be a complete duplicate of all of the others.

Reverting to Fig. 3, it is seen that each slide element, such as 10, engages each next adjacent nested slide element, such as 36, along four longitudinally extending areas as follows:

(a) the outer edge of the bend or fold 53 (Fig. 3) engages the inner edge or bottom surface of the channel 31 formed by the center and base walls 34 and 33 interconnected by bend 33a;

(b) and (c) the opposite inner surfaces of the flared portion of each channel member 11 engages the outer surface of the restricted or base portion of the next adjacent channel member; and

(d) along the lower edge of the channel members shown (Fig. 3) there is an engagement analogous to that between the bend 53 and the bottom or inner surface of the channel 31.

If desired, face-to-face inner longitudinally extending edges of the base walls 25 and 33 (Fig. 1) may have beads secured thereto which may cooperate with and extend into a suitable passage formed in the channels 30 and 34 of the next adjacent slide element, such passages embracing the bead substantially throughout its periphery thereby providing a locking means for aiding in with-

standing loads upon the extension arm when in an extended condition.

There is thus provided a novel extension arm having a desirable and important characteristic in that the top edges of such elements when nested and vertically disposed are at a common level. This is of practical importance in the application of the extension arm, for example, to extension tables which have separable halves, because one side of the table must be secured to the extension arm at one level and the other side of the extension table must be secured to such extension arm at the same level. Otherwise, the primary halves of the table top could be at different levels but secured to the same extension arm, the latter being extended, and thence problems of placing the spare leaves in register would arise. In addition to the above, it is necessary to present a perfectly level top surface for the support of the spare leaves or cross bars of the table and this is accomplished by virtue of the common level of the top edges of the various slide elements.

Although only two modifications of the invention have been illustrated and described in detail, it is to be expressly understood that the invention is not limited thereto. Various changes may be made in the design and arrangement of the parts illustrated as will be apparent to those skilled in the art. For a definition of the limits of the invention, reference will be had primarily to the appended claims.

What is claimed is:

1. A slide element including a pair of outwardly directed primary flanges, a pair of exteriorly accessible subchannel members positioned next to and along respective of said flanges, and a pair of interiorly accessible subchannel members positioned next to and along respective of said first-mentioned subchannel members and conformed to receive in longitudinal sliding engagement the respective primary flanges of another such member.

2. In an extension arm element for nesting with a plurality of duplicates thereof, a channel member having a floor and sides, said sides forming: a base portion, a flared portion adapted for nesting with the base portion of the next adjacent extension arm element, a pair of outwardly directed primary flanges secured respectively along the opposite edges of said flared portion, a pair of exteriorly accessible subchannel members positioned next to and along respective of said flanges, and a pair of interiorly accessible subchannel members positioned next to and along respective of said first-mentioned subchannel members and conformed to receive in longitudinal sliding engagement the respective primary flanges of such next adjacent extension arm element.

3. In an extension arm element for nesting with a plurality of duplicates thereof, a channel member having a floor and sides, said sides forming: a base portion of relatively restricted outer dimension measured transversely thereof, a flared portion having an inner transverse dimension for nesting upon the outer sides of a next adjacent channel member of a duplicate extension arm element, a pair of opposite primary flanges along the opposite edges of said flared portion, a pair of exteriorly accessible subchannel members extending longitudinally along respective opposite edges of said primary flanges; and a pair of interiorly accessible and oppositely disposed subchannel members extending alongside respective of said first-mentioned subchannel members and conformed to receive the respective primary flanges of such next adjacent extension arm element.

4. An extension arm comprising in combination: a pair of nestable duplicate slide elements, each of said elements including: a main channel member having a flared portion for engaging in nested relationship with the channel member of the next adjacent slide element, a pair of primary flanges extending outwardly of said channel member respectively along opposite edges of said flared portion, a pair of parallel subchannel members secured to

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respective of said opposite flanges and extending longitudinally of said slide element and said main channel member, said subchannel members having longitudinally extending mouths opening toward one another, one side of each of said subchannel members comprising an inturned secondary flange, said slide elements being associated with one another wherein said subchannel members on one slide element receives said oppositely directed flanges on the other slide element.

5. An extension arm including a nestable channel member adapted for cooperation with a plurality of identical channel members which slidably engage same, such channel member having a primary portion with a preselected transverse outer dimension at the bottom of such channel member and a secondary portion having a preselected transverse inner dimension substantially equal to but slightly greater than the aforementioned preselected transverse outer dimension whereby the secondary portion may slidably fit in relatively close frictional engagement in nested relation over the primary portion of a next adjacent and duplicate channel member, a pair of primary flange members extending outwardly respectively from the opposite edges of said channel member, said flange members being integral with said channel member, a pair of double groove members secured to the outer lips respectively of said flanges and extending longitudinally thereof, said double groove members being respectively transversely substantially S-shaped and reverse S-shaped, each double groove member having an inturned flange thereby to form with a mid-flange of such double groove member a channel for receiving the primary flange of the next adjacent channel member.

6. An extension arm comprising in combination: a plurality of duplicate slide elements, each slide element comprising a main channel member having a bottom portion with a preselected uniform outer transverse dimension and a top portion having a selected inner transverse uniform dimension substantially similar to but slightly in excess of said preselected outer dimension whereby the top portion of one of such channel members is nestable with respect to the bottom portion of the channel of the next adjacent slide element, a pair of outwardly extending primary flanges integral with respective opposite edges of said channel member; a pair of secondary flanges parallel to said primary flanges and secured thereto, said secondary flanges thereby forming with their respective primary flanges subchannel members which are substantially perpendicular to the first-mentioned channel member; a pair of tertiary flanges secured to respective of said secondary flanges respectively along the outer edges thereof thereby forming another pair of subchannel members but having mouths in opposite and face-to-face relationship which open inwardly toward said first-mentioned channel member as opposed to the mouths of the first-mentioned subchannel which open outwardly with respect to the first-mentioned main channel member, a transverse dimension as measured from opposite edges of said primary flanges being less than the transverse dimension as measured from the opposite bottoms of said second-mentioned subchannel members.

7. A slide element for an extension arm comprising: a main channel member having a base portion with a selected transverse outer dimension uniformly along the length thereof and a bell portion extending longitudinally thereof having a selected inner dimension substantially equal to but slightly greater than that of the first-mentioned outer dimension, a pair of primary flanges extending longitudinally on opposite edges of said bell channel portion throughout the length of said slide element and having opposite parallel outer edges having a selected transverse distance between same; a pair of double groove members secured respectively to said outer edges of said flanges, said double groove members being in transverse cross section substantially S and reverse S-shaped, the

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peak of each S and reverse S being connected to the outer edge of said flanges thereby to form a pair of substantially coplanar subchannels with the mouths thereof facing outwardly with respect to said main channel member and another pair of substantially coplanar subchannels with the mouths thereof facing one another inwardly toward said main channel member, the aforementioned transverse dimension of said opposite outer edges of said flanges being less than the transverse dimension between the floors of said last mentioned channels.

8. An extension arm comprising in combination a pair of slide elements, each slide element including a channel member having an outer base transverse dimension and a flared portion having an inner transverse dimension substantially equal to the aforementioned outer transverse dimension whereby said flared portion of one of said channel members is nestable upon the base portion of the other channel member, said flared portion having a selected depth, a pair of primary flanges secured respectively along the parallel edges of said flared portion of said channel member and a pair of double subchannel members secured respectively along the outer edges of said flange members, said double subchannel members being transversely substantially S and reverse S-shaped, respectively, each being secured to its respective flange by a flange fold and each having a peak fold and a base fold, said folds extending longitudinally of the slide element and being parallel with one another, thereby forming a pair of opposed inturned flanges along the bases respectively of said double subchannel members, which flanges, together with the mid-portion of each of said subchannel members, form a subchannel into which the opposite primary flanges extend of the next adjacent slide element.

9. An extension arm having in combination a pair of nestable slide elements, each slide element comprising: an integral folded sheet metal member having a center channel member having a flared outer portion conformed to nest upon a restricted base portion of the center channel member of the other slide element, the transverse inner dimension of said flared portion of one channel member being substantially equal to but slightly greater than the transverse outer dimension of the base portion of said other channel member; a pair of opposed subchannel members extending longitudinally of said slide element each forming a subchannel which is substantially perpendicular to the first-mentioned center channel member, the mouths of said subchannel members opening outwardly with respect to said center channel member, each of said subchannel members having a primary lip, there being a selected distance between the opposed primary lips of said subchannel members, each of the latter having a secondary lip extending longitudinally thereof, a pair of inwardly extending flanges secured respectively to said secondary lips thereby to form with respective of said subchannel members another pair of subchannel members having opposed mouths in face-to-face relationship opening inwardly toward said center channel member, said other subchannel members being constructed and arranged to receive opposed primary lips of the next adjacent duplicate slide element, the transverse dimension between said primary lips being less than the transverse dimension between the bottoms of said other subchannels.

10. An extension arm having in combination: a pair of duplicate nestable slide elements, each slide element comprising: a main channel member having a flared outer portion for engaging in nested relation with a base portion of the channel member of the next adjacent slide element, a pair of subchannel members secured longitudinally along respective opposite edges of said main channel member, said subchannel members having longitudinally extending mouths opening outwardly with respect to said main channel; another pair of subchannel members each secured to the longitudinally extending edge of its respective first-mentioned subchannel member

and having a longitudinally extending mouth opening inwardly with respect to said main channel, said other subchannel members being constructed and arranged for receiving respectively oppositely extending sides of subchannel members of the next adjacent slide element; the transverse dimension between the opposed bottoms of said second-mentioned subchannel members being greater than the transverse dimension between the opposed edges of said first-mentioned subchannel members, the depth of the flared portion of the main channel member being substantially equal to the transverse dimension of a first-mentioned subchannel member.

11. A slide element for an extension arm comprising: a main channel member having a bottom and two opposite sides, the transverse cross-section of each of such sides respectively being in the shape of a substantially flattened S and reverse S, such sides being connected respectively to the outer edges of the aforementioned channel bottom thereby to form a pair of substantially coplanar subchannels with the mouths thereof opening outwardly of

the extension arm and another pair of substantially coplanar subchannels with the mouths thereof in opposed face-to-face relation and thus facing inwardly of the main channel formed by said main channel member; the transverse dimension of said opposite outer edges being less than the transverse dimension between the opposite floors of said last-mentioned subchannels whereby a plurality of such extension arms in nested relationship have the outer edges of said second-mentioned coplanar subchannels in substantially a common plane.

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