

Feb. 11, 1964

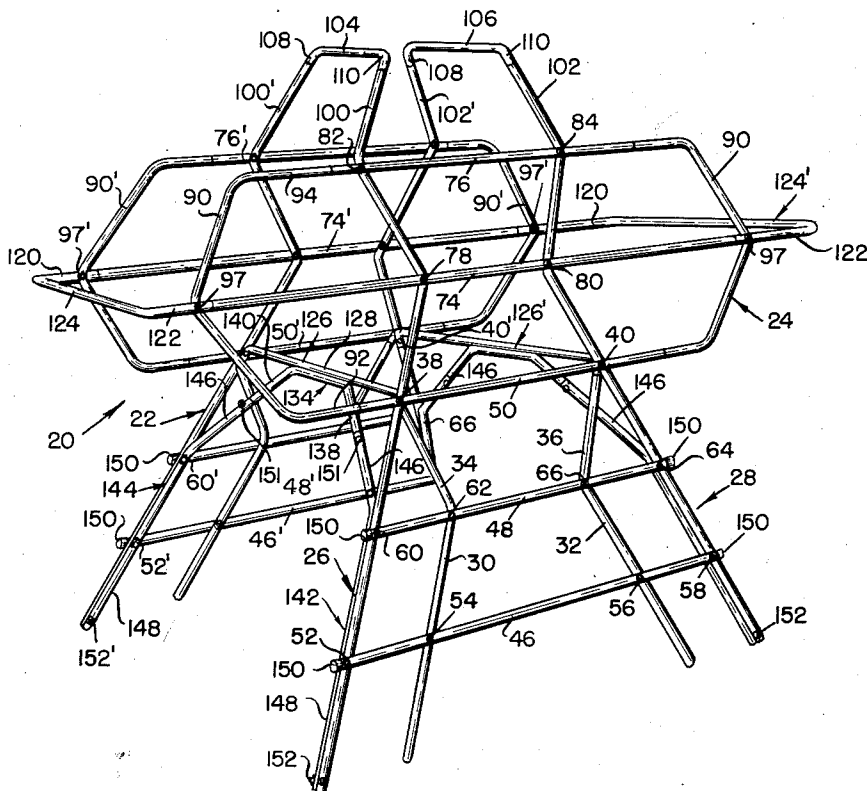
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3,120,955

PLAYGROUND CLIMBING APPARATUS

Filed April 7, 1961

4 Sheets-Sheet 1



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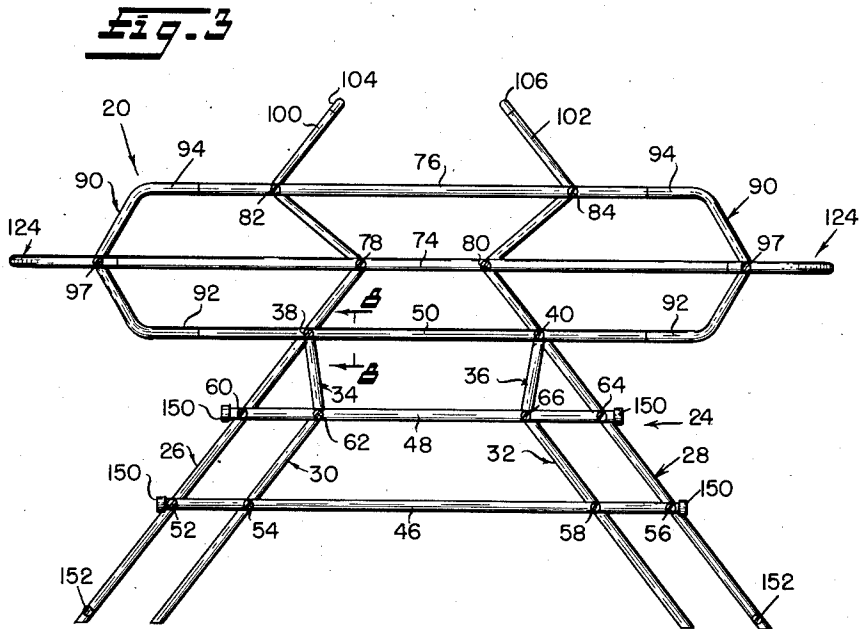
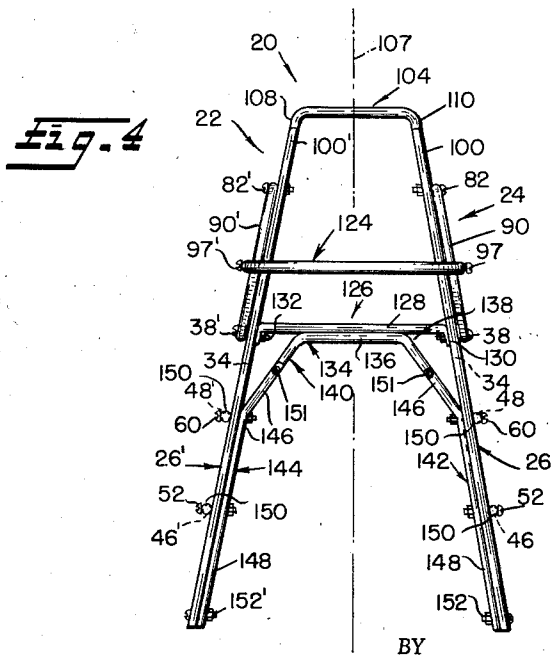
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PLAYGROUND CLIMBING APPARATUS

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4 Sheets-Sheet 2



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PLAYGROUND CLIMBING APPARATUS

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4 Sheets-Sheet 3

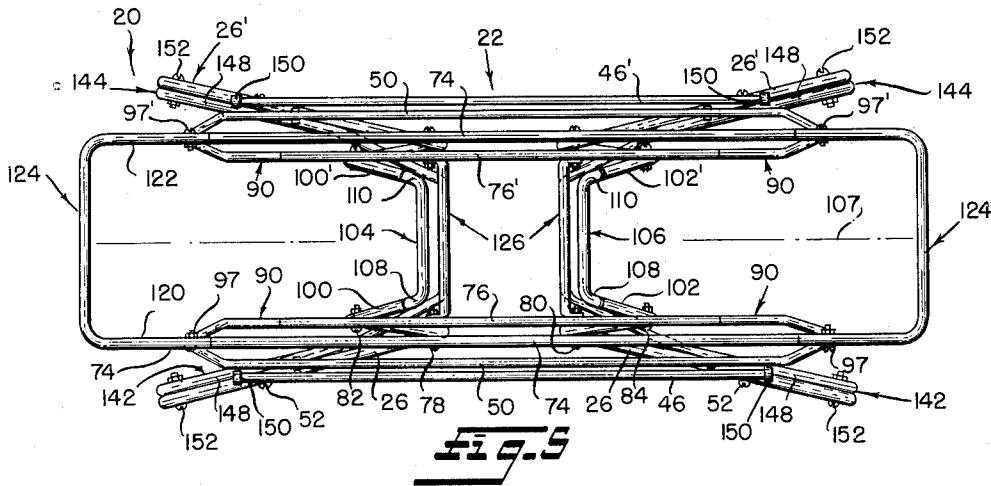
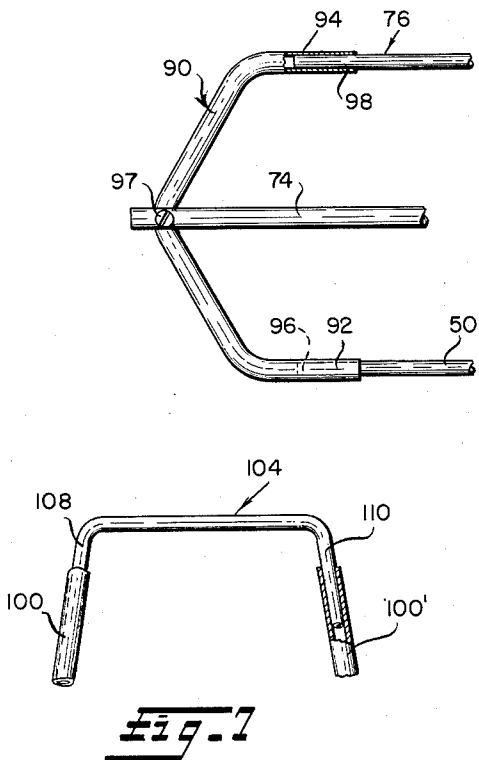


Fig. 6

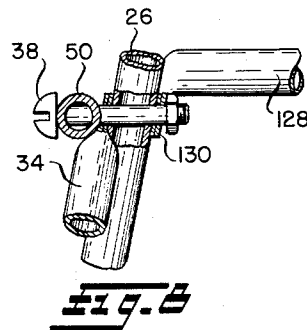


Fig. 8

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4 Sheets-Sheet 4

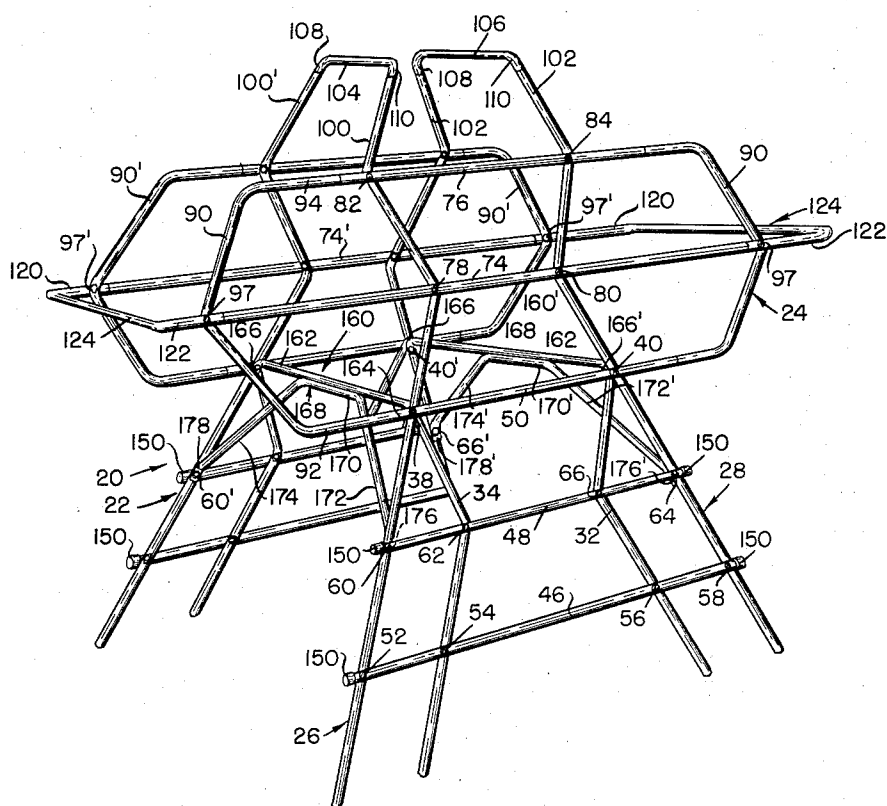


Fig. 9

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PLAYGROUND CLIMBING APPARATUS
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Filed Apr. 7, 1961, Ser. No. 101,398

17 Claims. (Cl. 272-60)

The present invention relates to play equipment for children and more particularly to an improved apparatus upon which children can climb, swing, hang or the like, thus obtaining healthy enjoyable exercise while at play.

Many kinds of playground type equipment and exercise apparatus devised for the amusement and physical development of children through climbing, hanging, swinging or the like have heretofore been provided. Such devices, to be practical and serviceable, must be structurally stable and of strong and rugged construction. To accomplish this result, the component parts used in the past in making playground equipment have been made up of large numbers of elements, are heavy and bulky, require large cartons for shipping and storage by retailers, require considerable assembly time and effort and, because of the high shipping and storage costs, in some cases equalling or exceeding the original cost of production, the ultimate consumer cost is made unduly high.

Such prior playground type equipment has not found a ready market for use in the yards of homes because its bulk and weight militate against convenient packaging for over-the-counter sale and because of the tedious and difficult assembling of the component parts requiring special assembly tools or skill not possessed by many parents.

Accordingly, it is a primary object of this invention to provide an improved safe, lightweight, structurally stable climbing apparatus adapted for home and school use comprising relatively few component parts, requiring little packing or storage space when dismantled, and assuring quick and simple assembly even by unskilled persons.

Another object of this invention is to provide a climbing apparatus with a minimum number of assembled parts which are simple and economical to manufacture and which, when assembled, are mutually reinforcing to provide a structurally integrated apparatus that can survive the abuse normally incurred in use.

A still further object of the instant invention is to provide a climbing apparatus capable of use by one or more persons which assures maximum physical exercise yet, due to its unique construction, is extremely safe.

Another object of the instant invention resides in providing a playground or backyard piece of equipment comprised of a minimum number of elements that may be compactly packaged in knocked-down form for over-the-counter sale and readily assembled by the ultimate purchaser of minimum mechanical skill using conventional tools commonly found in the average home.

Other objects and advantages of the invention will become more apparent by reference to the appended claims and from the following description and drawings wherein:

FIGURE 1 is a perspective view of the apparatus of the present invention in its finally assembled form;

FIGURE 2 is a perspective view of one of the side sub-assemblies of the apparatus of FIGURE 1;

FIGURE 3 is a side elevational view of the climbing apparatus of the instant invention;

FIGURE 4 is an end view of the climbing apparatus of the instant invention;

FIGURE 5 is a top plan view of the climbing apparatus of the instant invention;

FIGURE 6 is a partially sectional side view of a U-

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shaped reinforcing member used in the climbing apparatus of the instant invention;

FIGURE 7 is a partially sectional side view of a reinforcing connecting member used in the climbing apparatus of the instant invention;

FIGURE 8 is a partially sectional side view of a typical connection used in the climbing apparatus of the instant invention, taken substantially along the line 8-8 of FIGURE 3; and

FIGURE 9 is a perspective view of a modification of the climbing apparatus of the present invention.

Referring in detail to the drawings wherein like reference numerals indicate like parts, therein shown in FIGURE 1 is the climbing apparatus 20 of the instant invention.

Climbing apparatus 20 is comprised of two identical structural side frame subassemblies 22 and 24, one of which is shown in FIGURE 2 and will be described in detail. Subassemblies 22 and 24 are connected together by tubular reinforcing connecting members to form a unitary structurally sound reinforced climbing apparatus in a manner to become more apparent from the following description.

Returning to FIGURE 2, subassembly 24 is comprised of two spaced angularly related bent major tubular ground engaging support legs 26 and 28 and two spaced bent minor tubular ground engaging support legs 30 and 32. The straight lower portions of major tubular support legs 26 and 28 and minor tubular support legs 30 and 32 are disposed parallel to one another and the upper bent angularly extending portions 34 and 36 of minor support legs 30 and 32 respectively extend in a substantially vertical direction toward major support legs 26 and 28 respectively and are connected thereto by bolt and nut assemblies 38 and 40 respectively. The major and minor support legs are additionally connected together by three spaced horizontal reinforcing tubular members 46, 48 and 50. Long horizontal reinforcing tubular member 46 is connected to major and minor support legs 26 and 30 by bolt and nut assemblies 52 and 54 respectively and to major and minor support legs 28 and 32 respectively by bolt and nut assemblies 56 and 58. Medium length horizontal reinforcing tubular member 48 is connected to major and minor support legs 26 and 30 by bolt and nut assemblies 60 and 62 respectively and to major and minor support legs 28 and 32 respectively by bolt and nut assemblies 64 and 66.

Short horizontal reinforcing tubular member 50 is connected to major and minor support legs 26 and 30 at their juncture by bolt and nut assembly 38 and to major and minor support legs 28 and 32 at their juncture by bolt and nut assembly 40.

As is best shown in FIGURES 1 and 3, in reinforced interconnected position major and minor support legs 26 and 30 converge toward major and minor support legs 28 and 32, and reinforcing tubular members 46, 48 and 50 are horizontally disposed relative to the ground engaging ends of each of the major and minor support legs such that subassembly 24 forms an A-frame type reinforced structure.

Referring again to FIGURE 2, the upper ends of bent major support legs 26 and 28, which extend along beyond the tops of minor support legs 30 and 32, are connected together at their first and second bends by spaced horizontal tubular reinforcing members 74 and 76 by bolt and nut assemblies 78, 80, 82 and 84 respectively. The side frame subassemblies 22 and 24 thus each comprise horizontal members 46, 48, 50, 74 and 76 and upright members 26, 28, 30 and 32 rigidly interconnected as described above and shown in FIGURE 2.

In the final assembly as shown in FIGURES 1 and 3,

horizontal reinforcing tubular members 50, 74 and 76 of each of the subassemblies 22 and 24 are interconnected at their opposite ends by identical U-shaped tubular reinforcing members 90, best seen in FIGURE 6. In the actual process of assembly of this unit, members 90 are not placed in position on the subassemblies 22 and 24 until after the subassemblies 22 and 24 have been placed in upright positions and interconnected, as will be described presently. The hollow parallel extending ends 92 and 94 of each tubular U-shaped member 90 are of slightly larger internal diameter than the external diameter of ends 96 and 98 of reinforcing members 50 and 76 and slide over the ends 96 and 98 respectively. By this construction U-shaped members 90 connect and space the associated ends of tubular reinforcing members 60 and 76 apart the same distance as is determined for the central portions thereof by the bolt and nut assemblies 38, 40, 82 and 84 which connect reinforcing members 50 and 76 to major support legs 26 and 28. In final assembly, the U-shaped members 90 are maintained in their assembled positions and provide further structural integrity between horizontal reinforcing members 50 and 74 by bolts 97 rigidly connecting the ends of the horizontal reinforcing members 74 to the central portion of each associated U-shaped support member 90.

From the foregoing description it will be apparent to one skilled in the art that the subassemblies 22 and 24, above described and shown in FIGURE 2, are of structurally integral reinforced construction wherein each of the members interacts to provide a simple rigid structure which is easily assembled by the average parent by simply bolting each horizontal reinforcing member to the outside of an appropriate support leg through the through bores provided in each of the members.

It will further be apparent that cantilever extending end portions of the horizontal reinforcing members 50, 74 and 76 are reinforced in final assembly by the U-shaped reinforcing members 90 and that the bottom portion of the subassembly is reinforced by virtue of the fact that two major and minor support legs are provided.

Further, it will be seen that forces applied to the top portion of the subassembly are divided between major and minor support legs 26 and 30 at a critical force transfer point afforded by bolt 38. This connection will be fully explained later.

Referring now to FIGURES 1, 3, 4 and 5, subassembly 24, once assembled, is connected to identical subassembly 22. To this end the top portions 100 and 102 of tubular major support legs 26 and 28 of subassembly 24 are connected to the corresponding top portions 100' and 102' of tubular major support legs 26' and 28' of subassembly 22 by tubular U-shaped reinforcing connecting members 104 and 106 respectively.

The legs 108 and 110 of each U-shaped member 104 and 106 diverge slightly (see FIGURES 4 and 5) from their connecting portion and snugly fit into the hollow top portions of the appropriate tubular major support legs to fix the subassemblies 24 and 22 longitudinally parallel to each other at their top portion and to cause the subassemblies to diverge from each other downwardly relative to the longitudinal center plane 107 (FIGURES 4 and 5) of the final assembly.

To further fix the subassemblies in the position just described the parallel hollow ends 120 and 122 of a tubular U-shaped reinforcing connecting member 124 (FIGURE 3) are slid over the ends of horizontal reinforcing member 74 of subassembly 24 and complementary reinforcing member 74' of subassembly 22 and bolted to complementary U-shaped reinforcing members 90 and 90' and the ends of reinforcing members 74 and 74' by bolt and nut assemblies 97 and 97' respectively to thereby interconnect, reinforce, and properly space the subassemblies 22 and 24.

The subassemblies 22 and 24 are further reinforced and fixed in position by identical tubular reinforcing connect-

ing units 126 and 126' at approximately their median points. Each reinforcing unit 126 and 126', best seen in FIGURES 1 and 4, comprises a horizontal tubular reinforcing part 128 having downwardly bent crimped ends forming flanges 130 and 132 and a tubular reinforcing part 134 having a horizontally extending portion 136 of approximately $\frac{2}{3}$ the length of reinforcing part 128 and diverging leg portions 138 and 140. Slidably received on the terminal ends of diverging leg portions 138 and 140 of reinforcing part 134 are bent tubular reinforcing extensions 142 and 144, each having a short bent portion 146 and an elongated straight portion 148. The tubular extensions are secured at their bent end portions 146 to the respective diverging leg portions 138 and 140 by bolt and nut assemblies 151. The horizontal portion 136 of reinforcing part 134 is welded to the central portion of reinforcing part 128 preferably along substantially the entire length of their contacting surfaces to form the rigid reinforcing connecting unit 126.

Reinforcing connecting unit 126 is reinforcingly connected between subassemblies 24 and 22 intermediate their length in the following manner. The depending crimped ends 130 and 132 of part 128 are bolted to the subassemblies 22 and 24 by previously mentioned bolt and nut assemblies 38 and corresponding bolt and nut assemblies 38' and the reinforcing extensions 142 and 144 of reinforcing part 134 are bolted to the major supporting legs of the respective subassemblies 24 and 22 at their bent and intermediate their straight portions 148 by previously mentioned bolt and nut assemblies 60 and 52 respectively and corresponding bolt and nut assemblies 60' and 52' respectively. Also each reinforcing extension 142 and 144 is bolted adjacent the terminal end of its straight portion to the respective major support legs adjacent their ground engaging ends by bolt and nut assemblies 152 and 152'. Reinforcing unit 126' is similarly connected to subassemblies 24 and 22 by bolt and nut assemblies 64, 64', 40 and 40'.

It should be noted that each of the bolt connections of the parts of the subassembly are easily made. For example, in reference to FIGURE 8, bolt 38 is easily inserted successively through aligned bores in horizontal reinforcing member 50, major support leg 26 and the bent end 34 of minor support leg 30, and the crimped end flange 130 of part 128 of reinforcing connecting member 126 and the associated nut then attached when these members are in their proper relative positions to rigidly fix these members together.

The subassemblies having been described alone and in their connected positions, the manner in which the components interact to form a new and better structurally reinforced climbing apparatus will now be explained.

The climbing apparatus of the instant invention, as before mentioned, is easily assembled in that each of the connections is a bolt connection and/or merely requires the interfitting of hollow tubes over a rod.

The climbing apparatus of the instant invention is safe in that the only protruding ends upon which a child might possibly fall and be cut are the ends of horizontal reinforcing members 46, 46', 48 and 48'. To eliminate this possibility, these ends are covered by identical resilient snugly fitting protective caps 150, preferably formed of rubber or plastic and having a smooth exterior surface. All of the other exposed ends of the subassembly components are closed by the U-shaped members 104, 106, 124 and 124'.

The climbing apparatus of the instant invention is structurally stable. The subassemblies 24 and 22 extend inwardly toward each other at their tops and are connected together by reinforcing connecting members to form an elongated pyramid-like structure. An overturning moment about an axis through the longitudinal centerline of the climbing apparatus must be of maximum magnitude, greater than that which would be exerted by the weight of even several children climbing upon the apparatus

simultaneously, to overturn the climbing apparatus as all forces about that axis are applied within the confines of the structure. For example, upon climbing up the side of the climbing apparatus by stepping from one horizontal reinforcing member to another of subassembly 24, a child's weight will be transferred directly from the horizontal members to the major and minor support legs of subassembly 24 and the overturning moment caused by such weight will be transferred through U-shaped reinforcing connecting members 104 and 106 as a direct force to the major and minor support legs of subassembly 22. The vertical component of the child's weight will pass between the points at which the legs of subassembly 24 engage the ground and the points at which the legs of subassembly 22 engage the ground and thus will exert a stabilizing moment counteracting any overturning moment which the child might exert on the apparatus 20 by throwing his weight laterally while holding on to the apparatus. Due to the tubular U-shaped configuration of U-shaped reinforcing connecting members 104 and 106 and the manner in which they fit into the hollow ends of the major support legs, the force transferred through these members will easily be absorbed and transferred without bending them.

Also, the overturning moments caused by swinging on the U-shaped reinforcing connector members 104, 106 and 124 of the climbing apparatus are about an axis through the transverse centerline of the climbing apparatus. Due to the outwardly extending of the major and minor support legs along the longitudinal axis of the climbing apparatus, a downward force applied to U-shaped member 124, for example, by a child's swinging or climbing on it, acts through a very short overturning moment arm which is resisted by the entire weight of the climbing apparatus acting through a long resisting moment arm.

Further, the major and minor support legs will not buckle or sway because of the application of such a force because reinforcing connecting members 104, 106, 124 and 126 cooperate between the support legs of the subassembly to rigidly reinforce them with respect to each other.

Also, each subassembly is structurally stable in that substantially equally spaced horizontal reinforcing members extend between the support legs from top to bottom of the structure; bending of the top cantilever extending horizontal reinforcing members 50, 74 and 76 is effectively resisted by the force distributing effect of U-shaped members 90; bending of the lower reinforcing members 46 and 48 is resisted by supporting them from both major and minor support legs; and bending of the major support legs is resisted in that a portion of any non-direct force applied to them is transferred in part to the minor support legs through bolt 38 and then to the ground.

It will be appreciated that the most critical point in the climbing apparatus is the connection effected by bolts 38, 38', 40 and 40' for all forces applied to the top portion of the climbing apparatus are transferred through these connections. Consequently, (referring only to a single connection) part 128 of reinforcing member 126 or 126' is connected at this point to major support leg 26 as is the substantially vertical portion of minor support leg 30. It will be seen, therefore, that this construction relieves and distributes the forces at the connection through bolt 38 from major support leg 26 of subassembly 24 to minor support leg 30 through the substantially vertical portion 34 of minor support leg 30, and to major support leg 26' of subassembly 22 through reinforcing connection member 126 and that the diverging portions 138 and 140 of part 134 of reinforcing connecting member 126, being connected by their reinforcing extensions 142 and 146 to the major support legs of the subassemblies, further reinforce this connection and prevent its buckling. The reinforcing extensions perform the further important function of reinforcing the major support legs of the subassemblies throughout their lengths, thus imparting addi-

tional structural rigidity to the major supporting legs, thereby increasing their load carrying capacity.

It will also be apparent that the force transferring action of the connection afforded by bolt 38 is followed through by interconnecting reinforcing member 48 to minor support leg 30 by bolt 62 at the point where minor support leg 30 changes direction and by connecting reinforcing member 48 to major support leg 26 by bolt 60 at the point where the reinforcing extension 142 laterally while holding on to the apparatus. Due to the tubular U-shaped configuration of U-shaped reinforcing connecting members 104 and 106 and the manner in which they fit into the hollow ends of the major support legs, the force transferred through these members will easily be absorbed and transferred without bending them.

Also, the overturning moments caused by swinging on the U-shaped reinforcing connector members 104, 106 and 124 of the climbing apparatus are about an axis through the transverse centerline of the climbing apparatus. Due to the outwardly extending of the major and minor support legs along the longitudinal axis of the climbing apparatus, a downward force applied to U-shaped member 124, for example, by a child's swinging or climbing on it, acts through a very short overturning moment arm which is resisted by the entire weight of the climbing apparatus acting through a long resisting moment arm.

Further, the major and minor support legs will not buckle or sway because of the application of such a force because reinforcing connecting members 104, 106, 124 and 126 cooperate between the support legs of the subassembly to rigidly reinforce them with respect to each other.

Also, each subassembly is structurally stable in that substantially equally spaced horizontal reinforcing members extend between the support legs from top to bottom of the structure; bending of the top cantilever extending horizontal reinforcing members 50, 74 and 76 is effectively resisted by the force distributing effect of U-shaped members 90; bending of the lower reinforcing members 46 and 48 is resisted by supporting them from both major and minor support legs; and bending of the major support legs is resisted in that a portion of any non-direct force of diverging leg 138 of reinforcing connecting member 126 connects to major support leg 26.

A modification of the climbing apparatus of FIGURES 1-8 is shown in FIGURE 9. Only those parts which differ from those in the preferred form of the invention will be described in detail and given new reference numerals.

In this modification reinforcing connecting units 126 and 126' are replaced by reinforcing connecting units 160 and 160'. Each reinforcing connecting unit 160 and 160' comprises a horizontal tubular reinforcing part 162 having downwardly crimped ends forming flanges 164 and 166 respectively and a tubular reinforcing part 168 having a horizontally extending portion 170 of approximately $\frac{2}{3}$ the length of reinforcing part 162 and diverging leg portions 172 and 174. Reinforcing part 168 is welded to the central portion of reinforcing part 162, preferably along substantially the entire length of their contacting surfaces to form the rigid reinforcing connecting unit 160.

Reinforcing connecting unit 160 is connected between subassemblies 24 and 22 intermediate their length in the following manner. The depending crimped ends 164 and 166 of part 162 are bolted to the subassemblies 24 and 22 by previously mentioned bolt and nut assemblies 38 and corresponding bolt and nut assemblies 38', and the crimped ends 176 and 178 of part 170 are bolted to the major supporting legs of the subassemblies by previously mentioned bolt and nut assemblies 60 and corresponding bolt and nut assemblies 60'. Reinforcing unit 160' is similarly connected to subassemblies 24 and 22 by bolt and nut assemblies 64, 64', 40 and 40'.

It will be seen that this construction relieves and distributes the forces at the connection through bolt 38 from major support legs 26 of subassembly 24 to minor support

leg 30 through the substantially vertical portion 34 of minor support leg 30, and to major support leg 26' of subassembly 22 through reinforcing connection member 160 and that the diverging portions 172 and 174 of part 170 of reinforcing connecting member 160 further reinforce this connection and prevent its buckling.

The climbing apparatus embodying reinforcing units 160 and 160' is suitable for normal backyard use whereas the climbing apparatus embodying reinforcing unit 126 and 126', being of especially rugged construction in that the major support legs are reinforced by the reinforcing extensions 142 and 146, is particularly adapted for use in playgrounds and the like.

It will be seen that the basic structure of the instant invention is easily adapted for either such usage by merely replacing one reinforcing connecting member with the other form thereof.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A climbing apparatus comprising: a pair of spaced reinforced longitudinally extending complementary sub-assemblies, each having spaced elongated major ground engaging support legs interconnected together intermediate their lengths by a plurality of spaced essentially horizontal reinforcing members, said major support legs being inclined toward each other such that their upper ends are closer together than their lower ground engaging ends, the upper ends of the major ground engaging support legs of one subassembly being connected to corresponding upper ends of the major ground engaging support legs of the other subassembly by removable U-shaped reinforcing connecting members, such that the subassemblies are closer together at their upper ends than at their lower ends, the major ground engaging support legs of said subassemblies being further connected together at their central portions by a reinforcing connecting spacing member whereby said subassemblies are rigidly reinforcingly fixed relative to each other.

2. A self-supporting, non-tippable, rigid climbing apparatus for children having at least one rigid side framework comprising a first pair of rigid parallel bars arranged to form the bases of a trapezoid, a second pair of rigid bars crossing and interconnected to said first pair of bars at their intersection therewith by bolt and nut connections to complete said trapezoid, and bar means interconnecting at least two of the bars of said first and second pairs of bars to immobilize the bars of said first and second pairs against relative movement and whereby said apparatus may be at least partially collapsed for storage or shipment.

3. The apparatus of claim 2 wherein said bars are hollow metal tubes.

4. The apparatus defined in claim 2 wherein said bar means comprises a fifth bar end connecting the bars of said first pair.

5. The apparatus defined in claim 4 wherein the ends of said fifth bar are parallel and interfit with adjacent ends of said first pair of bars in removable telescopic relation.

6. The apparatus defined in claim 2 wherein said bar means comprises a fifth bar interconnecting at least one of the bars of said first pair and at least one of the bars of said second pair.

7. The apparatus defined in claim 2 wherein said bar

means comprises a fifth bar extending between and fixed to the ends of the bars of said first pair.

8. The apparatus defined in claim 4 wherein the longitudinal axes of each of said bars of said second pair are in the form of obtuse angles at their connections to the bar forming the shorter base of the trapezoid.

9. A self-supporting climbing apparatus for children having at least one rigid side framework comprising a first pair of rigid parallel bars arranged to form the bases of a trapezoid, a second pair of rigid bars crossing and interconnected to said first pair of bars at their intersection therewith by bolt and nut connections to complete said trapezoid, and a fifth bar of generally U-shaped configuration end connecting the ends of said first pair of bars to immobilize the bars of said first and second pairs against relative movement.

10. A self-supporting climbing apparatus comprising a pair of at least substantially identical rigid frameworks each composed of crossed bars defining at least one substantially equilateral trapezoid and comprising at least a pair of base forming bars and a pair of side forming bars interconnected by bolt and nut assemblies at the corners of the trapezoid and a fifth rigid bar means interconnecting at least two of the bars of said pairs of bars to immobilize the bars of said pairs against relative motion; and means rigidly interconnecting said pair of frameworks so that they define a substantially rectangular truncated pyramid; whereby at least a portion of said apparatus may be disassembled.

11. The apparatus defined in claim 10 wherein said last named means comprises at each end of said apparatus a relatively short and a relatively long rigid bar interconnected to the adjacent side forming bars of said pair of frameworks adjacent their tops and mid points respectively and a further rigid bar connected between said relatively long rigid bar and at least one of the side forming bars connected thereto to prevent relative motion of said short and long bars relative to said frameworks.

12. The apparatus as defined in claim 11 wherein said relatively short bars interfit in telescopic relation with the oppositely associated ones of said side forming bars, so as to be slidably removable therefrom.

13. The apparatus defined in claim 10 wherein said last named means includes at each end a rigid bar interfitting in removable telescopic relation with the adjacent ends of the upper base forming bars of said frameworks.

14. The apparatus defined in claim 10 wherein said fifth bar means in said frameworks interconnect said base forming bars thereof.

15. The apparatus defined in claim 14 wherein said fifth bar means in said frameworks are bent so that their ends are parallel and interfit with the adjacent ends of said base forming bars thereof in telescopic relation.

16. The apparatus defined in claim 10 wherein said fifth bar means in said frameworks interconnect at least one of said base forming bars thereof and at least one of said side forming bars thereof.

17. The apparatus defined in claim 6 wherein said bar means includes ground engaging means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,120,955

February 11, 1964

Edward T. Carlin

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 15, for "60" read -- 50 --; column 6, line 9, strike out "laterally"; line 10, beginning with "while holding on to the" strike out all to and including "force" in line 43, same column 6.

Signed and sealed this 7th day of July 1964.

(SEAL)

Attest:

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Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents