

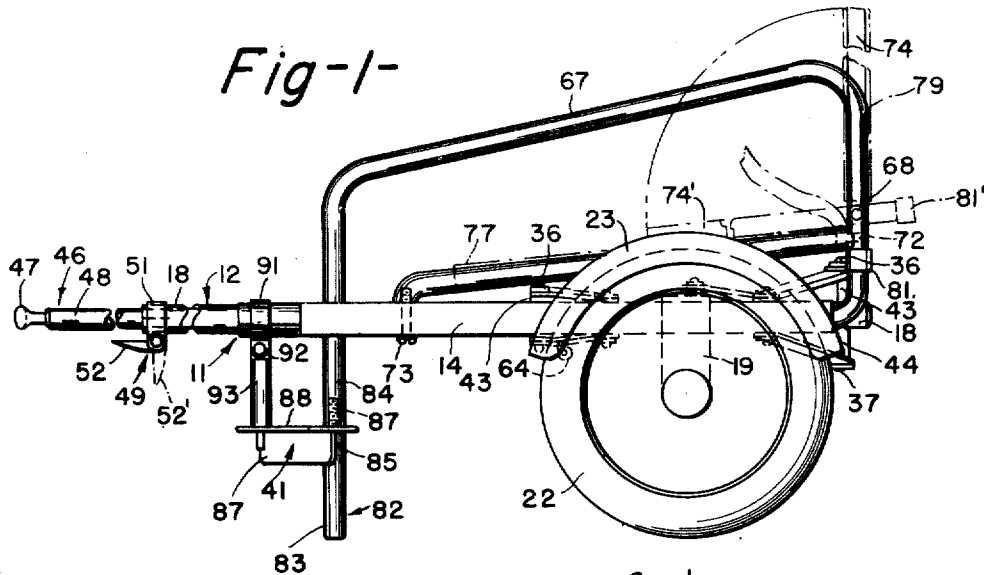
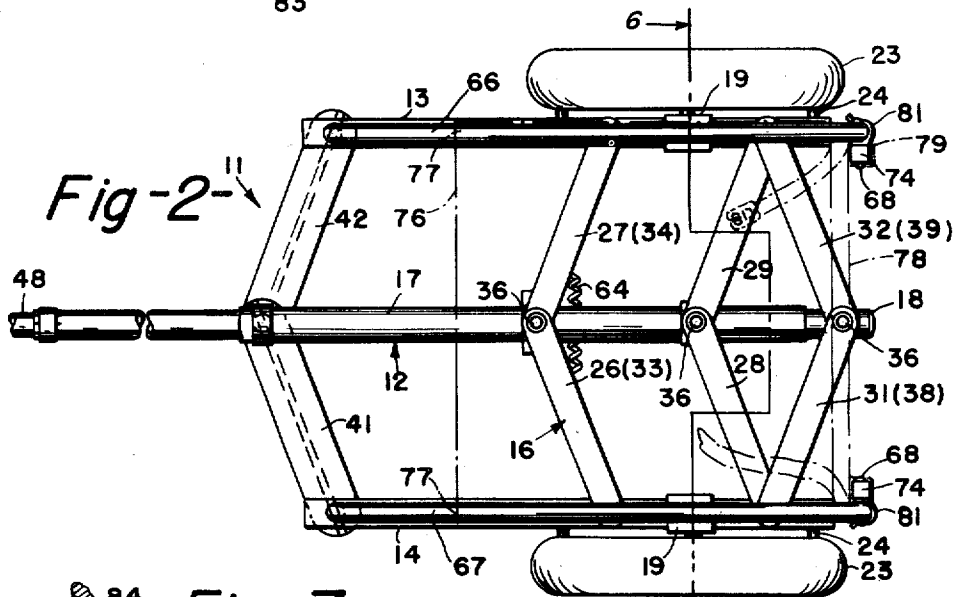
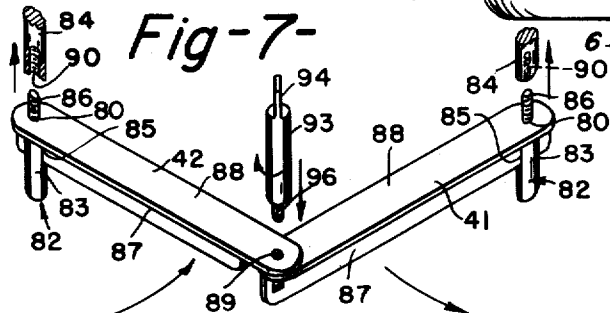
May 19, 1953

L. SCHON
COLLAPSIBLE CARRIAGE

2,639,162

Filed May 17, 1949

2 Sheets-Sheet 1



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Fig-3-

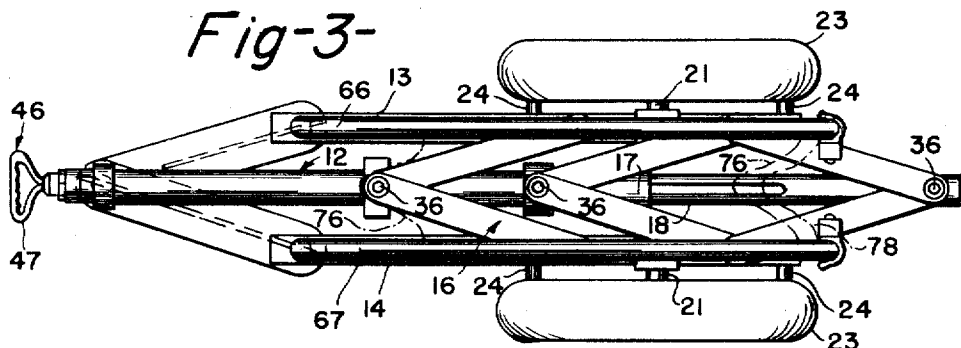


Fig-4-

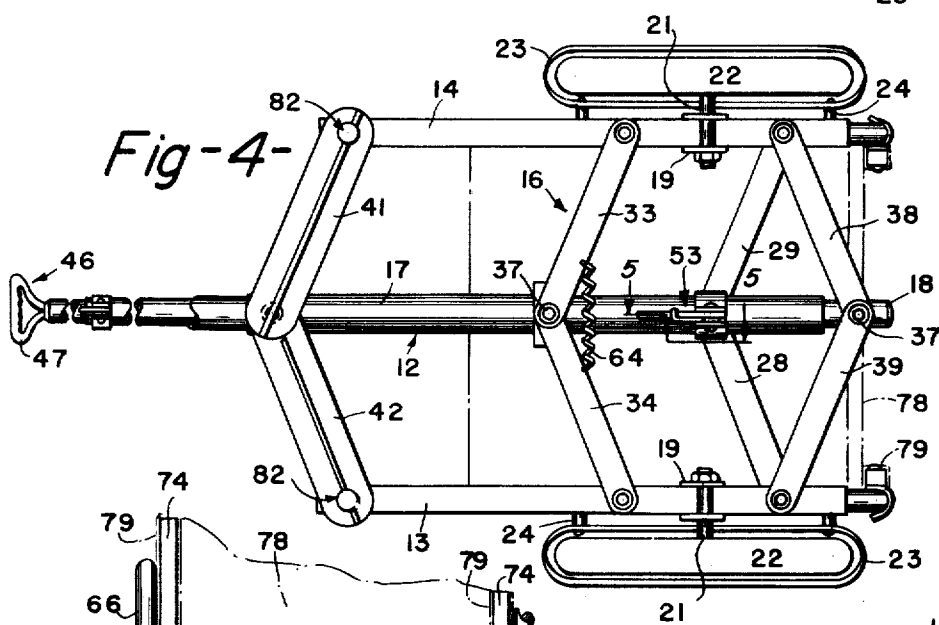
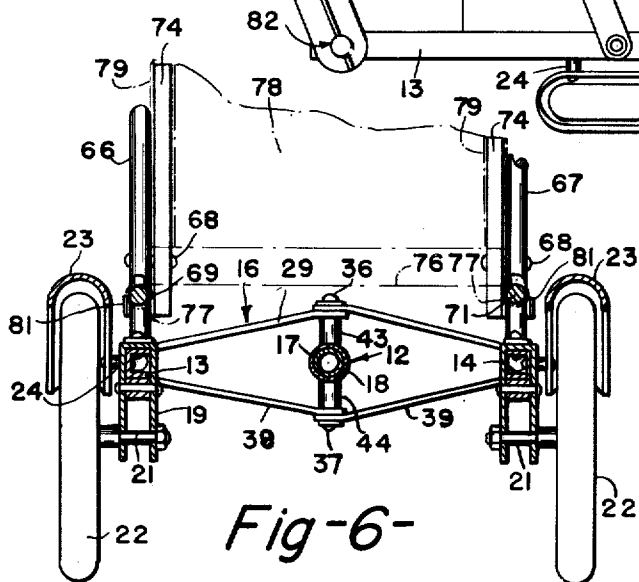


Fig-6-

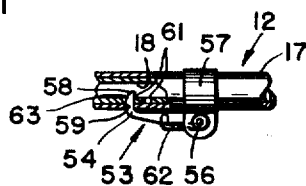


Fig-5-

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UNITED STATES PATENT OFFICE

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COLLAPSIBLE CARRIAGE

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4 Claims. (Cl. 280—42)

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The invention relates to vehicles, and relates more particularly to wheel borne hand driven carriages of the collapsible type.

The invention has among its objects to provide such a carriage that is of sturdy construction, yet light in weight, is simple to manufacture, and which can be stored in a very narrow and short space while being arranged to be expanded to a normal size carriage for the purpose used.

Further objects and advantages of the invention will be set forth in part in the following specification and in part will be obvious therefrom without being specifically referred to, the same being realized and attained as pointed out in the claims hereof.

For the purpose of clarity and simplicity, the carriage will be described in the following as a carriage for infants, but it will be understood that the invention is not limited thereto and is equally applicable to carriages of other types. Furthermore, in the ensuing description of an exemplification it has been assumed that the infant sitting in the carriage is facing the person pushing or pulling the carriage, but it will be understood that the invention encompasses other arrangements of the seat, save as limited by the claims hereof.

With the above and other objects of the invention in view, the invention consists in the novel construction, arrangement and combination of various devices, elements and parts, as set forth in the claims hereof, one embodiment of the same being illustrated in the accompanying drawings and described in the specification.

In the accompanying drawings,

Fig. 1 is a side elevational view of a carriage in accordance with the invention;

Fig. 2 is a top view of the same, the carriage being unfolded;

Fig. 3 is a view similar to Fig. 2, but the carriage being folded;

Fig. 4 is an underside view of the carriage as shown in Fig. 2;

Fig. 5 is a detail sectional view, partly in elevation, taken on line 5—5 of Fig. 4;

Fig. 6 is a sectional view taken on line 6—6 of Fig. 2; and

Fig. 7 is an extended view, in perspective, illustrating the foot rest detail of the carriage.

In carrying the invention into effect in one of the embodiments which has been selected for illustration in the accompanying drawings and for description in this specification, and refer-

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ring now particularly to Figs. 1 and 2, there is provided a frame structure generally indicated at 11. The frame structure 11 comprises a middle portion 12, two side portions 13 and 14, and a series of links forming a link system generally designated 16 for interconnecting said portions.

The middle portion 12 includes two telescoping tubes, namely an outer tube 17 and an inner tube 18, that are axially slidably shiftable relative to each other. The tubes 17 and 18 are hollow and may be of circular or square cross section or of other suitable sectional shape.

The side portions 13 and 14 may be made of tubes or, preferably, of U-beams facing inwardly, as best shown in Fig. 6. These side portions are movable towards and from the middle portion, in tied symmetrical and parallel movement, and this movement is brought about by the link system 16, as will be explained further below. The side portions 13 and 14 are arranged at the same height as the middle portion 12, as best shown in Fig. 6, and are spaced therefrom at one extreme position when the carriage structure is expanded to be used, as shown in Figs. 2 and 4, and are adjacent the middle portion in another extreme position, as best shown in Fig. 3, when the carriage is collapsed or folded.

Each side portion has a downward extension 19 that carries an axle 21 on which, in turn, is mounted a carriage wheel 22. The wheels 22 are freely turnable about the axle 21, but since the axle is rigidly mounted on the extension 19 to the side portion, the plane of rotation of the wheel will always be parallel to the side portion, the middle portion and therefore to that of the other wheel.

In the preferred embodiment that has been illustrated in the accompanying views, two wheels 22 are shown supporting the carriage structure; it will be understood, however, that the number of wheels may be varied to any suitable number depending on particular conditions for which the carriage is manufactured, while still remaining within the orbit circumscribing the scope of the invention.

Each wheel 22 is provided with a protecting shield 23 that is mounted at 24 to the side portion. The wheels 22, as well as the shields 23, are movable laterally together with the side portions between the extreme positions thereof.

A series of links form the scissors type link system 16 and includes interconnected pairs of links above and below the exterior of the outside tube 17. The links 26, 27, 28, 29, 31 and 32 are disposed above the tube 17 and the links 33,

34, 38 and 39, as well as the links forming foot rests and designated 41 and 42, are disposed below the tube 17; the foot rests 41 and 42 are spaced for a certain distance beneath the exterior of the tube 17. The upper links 27 and 29 that are disposed on one side of the middle portion are parallel to each other and to the link 31 disposed on the other side of the middle portion; the links 26 and 28 which are disposed on said other side are parallel to each other and to the link 32 disposed on said first side; some of the upper links have corresponding lower links parallel thereto and movable therewith, the upper link 26 being parallel to and corresponding with the lower link 33, the upper link 27 corresponding to the lower link 34, and the upper links 31 and 32 corresponding to the lower links 38 and 39, respectively, as clearly indicated by parenthesized reference numerals denoting the lower links next to the numerals of the upper links in Fig. 2. The foot rests 41 and 42 have no corresponding upper links, since the space above and immediately below the middle portion must remain unobstructed to accommodate the legs of the seated infant. Likewise, the upper links 28 and 29 have no corresponding lower links in order to leave room for the latching device described further below.

When the carriage is in the fully expanded position illustrated in Fig. 2, the link pairs 26 and 27 (38 and 34), 28 and 29, 31 and 32 (38 and 39), and 41 and 42, form each therebetween a large angle, but the links are preferably stopped short of alignment in order to facilitate subsequent folding of the carriage. Conversely, when the carriage is folded, as illustrated in Fig. 3, the link pairs form therebetween a small angle. The angle formed between each link pair is substantially the same.

The link pair 31 and 32 (38 and 39) opens and closes angularly in an opposing direction as the remaining link pairs, since it is facing the same.

Each link of a pair is pivoted near one of its ends to an end of the other link, and pivoted therewith with relation to the middle portion 12. As best shown in Fig. 5, the outer tube 17, as well as the inner tube 18, is provided with upper and lower extensions 43 and 44, respectively, to accommodate the pivot points generally designated 36 and 37, respectively, of the upper links and of the lower links. The extensions 43 and 44 serve the purpose to space the upper links from the lower ones, thereby increasing the rigidity of the construction and rendering the same resistant against twisting. The rearward extensions are larger than the forward extensions, as shown in Fig. 1, in order to clear the seat at the front and to provide maximum torque resistance at the rear.

The upper link pair 31 and 32, and the lower link pair 38 and 39 are pivoted to the inner tube 18, and the remaining link pairs are pivoted to the outer tube 17. The free end of each link is pivoted to a side portion, the links of one side all being pivoted to one side portion and all those of the other side to the second side portion.

Referring now to Fig. 2, when the inner tube 18 is moved to the right relative to the outer tube 17, each link pair will be folded to bring one link adjacent to the other; thereby the side portions are moved towards the middle portion and finally reaching the collapsed position shown in Fig. 3. Conversely, if the inner tube 18 in that collapsed position of Fig. 3, is moved to the left relative to the outer tube 17, the links

of each pair will unfold, finally reaching the extreme position illustrated in Figs. 2 and 4.

A handle generally indicated at 46 includes a hand gripping portion 47 and a cylindrically, for instance tubular, portion 48 that is disposed on the inside of the inner tube 18 and slidable therein. In the folded position the handle 46 is pushed into the tube 18 substantially for its entire length, in order to decrease the overall length of the carriage. In the unfolded position, on the other hand, the handle 46 may be drawn out for its full length, or any length therebetween, suitable for conveniently pushing the carriage.

A locking mechanism 49 is provided at the end of the inner tube 18 and is composed of a ring 51 encircling the tube and a cam (not shown) on a lever 52 pivoted to the ring 51 and adapted to exert pressure against the tube 18 in one position of the lever 52 (shown in solid lines in Fig. 1) to lock the cylindrical portion 48 relative to the tube 18. In another position of the lever 52 (shown in broken lines in Fig. 1, at 52') the pressure of the cam against the tube 18 is released and thereby the cylindrical portion 48 is freed to be slidably shifted. The cam is not shown in detail as its structure and function is well known to those skilled in this and related arts.

Returning to the scissors type linkage system 16 of the carriage structure, when the structure is in the extreme expanded position shown for instance in Fig. 4, the inner tube 18 may be latched relative to the outer tube 17 by means of a latch indicated at 53. As best shown in Fig. 5, the latch 53 includes a latching lever 54 swingable about a pivot 56 that is formed on a ring 57 encircling the outer tube 17 and immovably secured thereto. The latching lever 54 is provided with a finger 58 that protrudes through a hole 59 in the outer tube 17 and is adapted to engage one of a series of holes 61 provided in the inner tube 18. The latching lever 54 is biased towards protruding through said holes, under the tension of a spring 62, and in the extreme expanding position of the structure will engage one of the holes 61, and may engage another of the holes 61 in an intermediate position between the extreme positions if it is desired to unfold the carriage less than full.

The latch may be released by manually tilting the latching lever 54 against the power of the spring 62. However, it may also be released by pushing the handle 46 for its entire length into the inner tube 18. This is brought about as follows: The finger 58 is provided on its forward side with an inclined surface 63 against which the end of the cylindrical portion 48 of the handle 46 (not shown in detail) will strike when the latter is pushed into the tube 18, while at the same time moving the outer tube against the inner tube. When the finger 58 does not engage one of the holes 61, it nevertheless normally protrudes through the hole 59 of the outer tube 17, always ready under the impulse of the spring 62 to engage automatically one of the holes 61 when the latter is brought in registry with the hole 59.

A spring 64 may be provided between one of the pairs of links to urge the same into one of the extreme positions, but it may also be provided at several link pairs or at any other suitable position between two movable members of the collapsible structure for such purpose.

A tubular bent bar is secured to each side

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portion, the bar 66 being secured to the side portion 13 and the bar 67 secured to the side portion 14. Each bar provides a slanting arm rest and has a vertical part at the rear of the carriage provided with a pivot point 68. A seat supporting portion is removably associated with each side portion, the seat portion 69 being on the side portion 13, and the seat portion 71 on the side portion 14. The seat supporting portions 69 and 71 may be secured, for instance, at one end by pin and hole connection, as shown at 72, to the vertical part of the arm rest, and be screwed at its other end to the side portion, as shown at 73.

A back rest support 74 is pivoted at the pivot point 68 to each vertical part of the arm rest, and swingable about the pivot 68 between an upright position (shown in Fig. 1 in solid lines) and a downward and forward tilted position (shown in broken lines in Fig. 1, at 74').

A flexible seat 76 that has two lateral sleeves 77, and which is shown in broken lines in Figs. 1 and 2, is mounted with its sleeves on the seat supporting portions 69 and 71; the seat will be folded when the carriage is being collapsed. A flexible back rest 78 that has two sleeves 79 is mounted with its sleeves on the back rest supports 74, as shown in broken lines in Fig. 2. Before operating the linkage system for collapsing the carriage, the operator will first bend the back rest supports 74 forwardly and downwardly (into the position shown at 74'), whereby the overall height of the carriage is brought to a minimum, and then proceed with the folding of the carriage. Upon such folding, the backrest will also automatically be folded.

The seat as well as the backrest may be made of plastic or textile or any other similar suitable material, sufficiently flexible and pliable to permit easy folding in order to prevent obstruction of the collapsing of the carriage.

Each back rest support 74 is provided at its lower end with a clasp 81 adapted to encircle, for a portion, the vertical part of the arm rest below the pivot 68 for releasably locking the support 74 in upright position. The clasp is readily disengageable from the vertical part when the back rest support is manually tilted forwardly.

A supporting leg 82 is mounted on the underside of each of the side portions 13 and 14, for steadying the unfolded carriage where two wheels 22 are being used in the construction. The legs 82 are preferably located spaced from the wheels for as large a distance as possible in order to provide for maximum stability. For simplifying the construction in connection with the foot rests 41 and 42, each leg is made of two longitudinal parts, a lower part 83 that may be solid and provides the leg part resting on the ground, and which carries on its upper end a vertical slot 85 and a threaded hole (not shown) intercommunicating with the slot 85, and an upper leg part 84 that may be hollow and carries a thread 90 on its interior near the lower end and is rigidly secured to a side portion.

Each of the foot rests is provided on the underside with a rib or webbing 87 adapted to fit into the slots 85 of the lower leg parts 83, and is provided on the upper side with a flat portion 88 for receiving a foot in resting position and has on the flat portion 88 on one end a hole 80. A screw piece 86 may be screwed into the thread 90 and protrude through the hole 80 and be also threaded into the thread of the lower leg 83.

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On the other end each foot rest has a threaded hole 89, and the rib 87 of one foot rest is partially cut off to permit overlapping of the flat portions 88 at that point, and the other foot rest has a slot in the rib in registry with the hole 89 in order to receive a screw protruding through and threading simultaneously into the holes 89 of both foot rests for pivotally connecting the same to each other and to the middle portion 12.

A ring 91 is mounted on the outer tube 17 and clamps in pivotal connection at 92 the flattened upper part 94 of a connecting piece 93 that extends below the frontward end of the outer tube 17. The connecting piece 93 carries on its lower end a screw 96 that is designed to be threaded into the holes 89 of the foot rests.

In assembling the foot rest parts, during manufacture, to the rest of the carriage, the foot rests will be pivoted and the legs fastened to the structure and will all hold by themselves against accidental removal, but a certain sequence of operation should be observed:

The lower leg parts 83 are first connected with their slots 85 to the ribs 87 of the foot rests. The screw pieces 86 are thereupon threaded into the leg parts 83 and protrude through the holes 80 of the foot rests. Thereupon the lower-leg-part-foot-rest assembly is threaded into the thread 90 of the upper leg parts that are fixed to the underside of the side portions 13 and 14. When this threading is completed for both foot-rest-assemblies, the two holes 89 will be in registry, as the thread parts are so dimensioned to bring about such registry. Then, the connecting piece 93 is threaded into the holes 89 and finally the flattened upper part 94 is pivoted at 92, by means of a pin, to the ring 91.

The operation of the carriage is as follows: When the carriage is folded (Fig. 3), the forward end of the inner tube 18 may be grasped with one hand and the forward part of the outer tube 17 be grasped with the other hand. Then the inner tube is shifted forwardly relative to the outer tube, whereby the two side pieces 13 and 14 will move laterally apart from each other, symmetrically, and also away from the middle portion 12. By this movement the pliable seat 76 will be straightened out between the two support portions 69 and 71, and the back rest will similarly be straightened between the support portions 74. Thereafter, the back rest support portions 74 are manually tilted upwards and backwards until the clasps 81 thereof engage the vertical parts of the arm rests 67 below the pivot point 68. Finally, the lock 49 is opened by moving the lever 52 to a vertical position, and the handle 46 is drawn out of the inner tube 18 to any desired length, and the lock 49 is applied by moving the lever 52 to a horizontal position. As soon as the handle 46 was begun to be withdrawn, the latch 53 is ready automatically to lock the structure in the expanded position.

In folding the carriage, the opposite procedure will be observed. As soon as the handle 46 is released by the lock 49, the handle can be pushed into the inner tube 17, and its inner end will disengage the latch 53. The back rest supports may be tilted downwardly, and the carriage be collapsed by shifting the outer tube 17 relative to the inner tube 18.

Certain of the advantages of the invention have already been herein referred to. It may be useful, however, to allude particularly at this point to the small space occupied by the car-

riage when it is folded due to its extremely small size; yet, when unfolded, the carriage provides a comfortable seat for an infant and sufficient length for easy pushing and pulling. The rigidity of the construction avoids twisting and prevents tilting of the carriage when in use. The entire structure may preferably be made of light weight material, such as aluminum, magnesium, or the like in order to reduce the weight and to facilitate the handling of the carriage.

It will be apparent to those skilled in the art that the novel principles of the invention disclosed herein in connection with specific exemplifications thereof will suggest various other modifications and applications of the same. It is accordingly desired that in construing the breadth of the appended claims they shall not be limited to the specific exemplifications of the invention described herein.

Having thus described the invention, what I claim as new and desire to be secured by Letters Patent, is as follows:

1. In a collapsible carriage, comprising a frame structure, a pair of wheels connected with relation to said structure, and a propelling handle associated with said structure and shiftable relative thereto between two opposite stations for increasing and decreasing respectively the overall length, said structure including two telescoping parts reciprocable relative to each other between two extreme positions, and a linkage system including a plurality of links, some of said links being pivotally interconnected, and a pair of links thereof pivoted at one end of one of said telescoping parts and another pair of links thereof pivoted to said other telescoping part, wheel holding means connected to said link system near the points of interconnection of said links and movable laterally of said frame and adapted to be restrained from angular movement and arranged to hold said wheels freely rotatable, spring tensioned latching means intermediate said telescoping parts and operable automatically to lock the same when moved to one of said extreme positions, and latch releasing means associated with said handle and movable thereby in a path, said latching means including a projection protruding into said path

in the locking position and being movable out of said path for latch release, said latch releasing means being operable to move said projection upon impact therewith to release the locking engagement between said parts when said handle is moved towards length decreasing position.

2. In a collapsible carriage, as claimed in claim 1, further characterized in that said projection has a cam facing said latch releasing means when moved into the path thereof, whereby upon impact with said latch releasing means the latter will depress said cam to move said projection off said path to effectuate said release.

3. In a collapsible carriage, as claimed in claim 1, further characterized in that said projection has a curved surface operable for engagement by said latch releasing means in said path, for subsequent depression by said latch releasing means of said projection off said path, to effectuate release.

4. Two endwise interconnected links, for use in connection with a collapsible carriage structure comprising two side portions movable towards and from each other and at all times being disposed parallel, each of said links having a free end pivoted to a side portion, each free end including a screw connected to said link and adapted to be threaded in a socket of said side portion by rotating the entire link about said screw, the length of said screw being so arranged that upon completion of the threading of both links their ends to be interconnected will register and the links will form therebetween a predetermined angle depending on the momentary space between the two side portions, said last named ends having each a threaded hole to receive a screw uniting the same.

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