

[72] Inventor **Mary G. Smith**  
 905 W. 13th, Wichita, Kansas  
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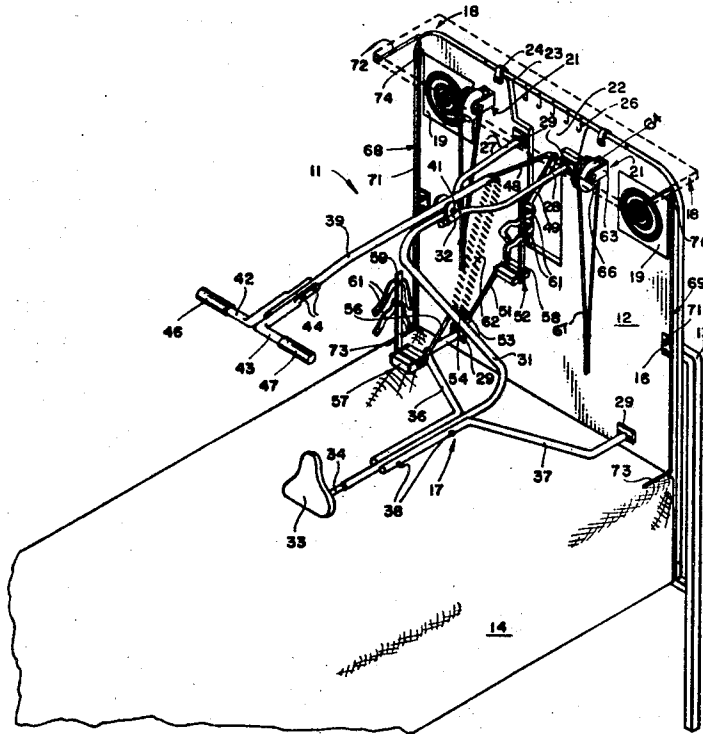
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Primary Examiner—L. W. Trapp  
 Attorney—John H. Widdowson

[54] **PHYSICAL THERAPY APPARATUS FOR PERSONS AT BEDREST**  
 10 Claims, 9 Drawing Figs.

[52] U.S. Cl. .... 128/25,  
 272/58, 272/73  
 [51] Int. Cl. .... A61h 1/00  
 [50] Field of Search ..... 272/73, 58,  
 79, 80; 128/25

**ABSTRACT:** A physical therapy apparatus for persons at bedrest is provided which is adapted to be secured to the bedpost of a bed so that a person in bed can utilize the apparatus without the necessity of the person being moved from the bed to another location. The apparatus is provided with a bicycle-type exerciser, both power and manually operated, and coordination restoring attachments thus enabling a person to undergo physical therapy in their own bed.



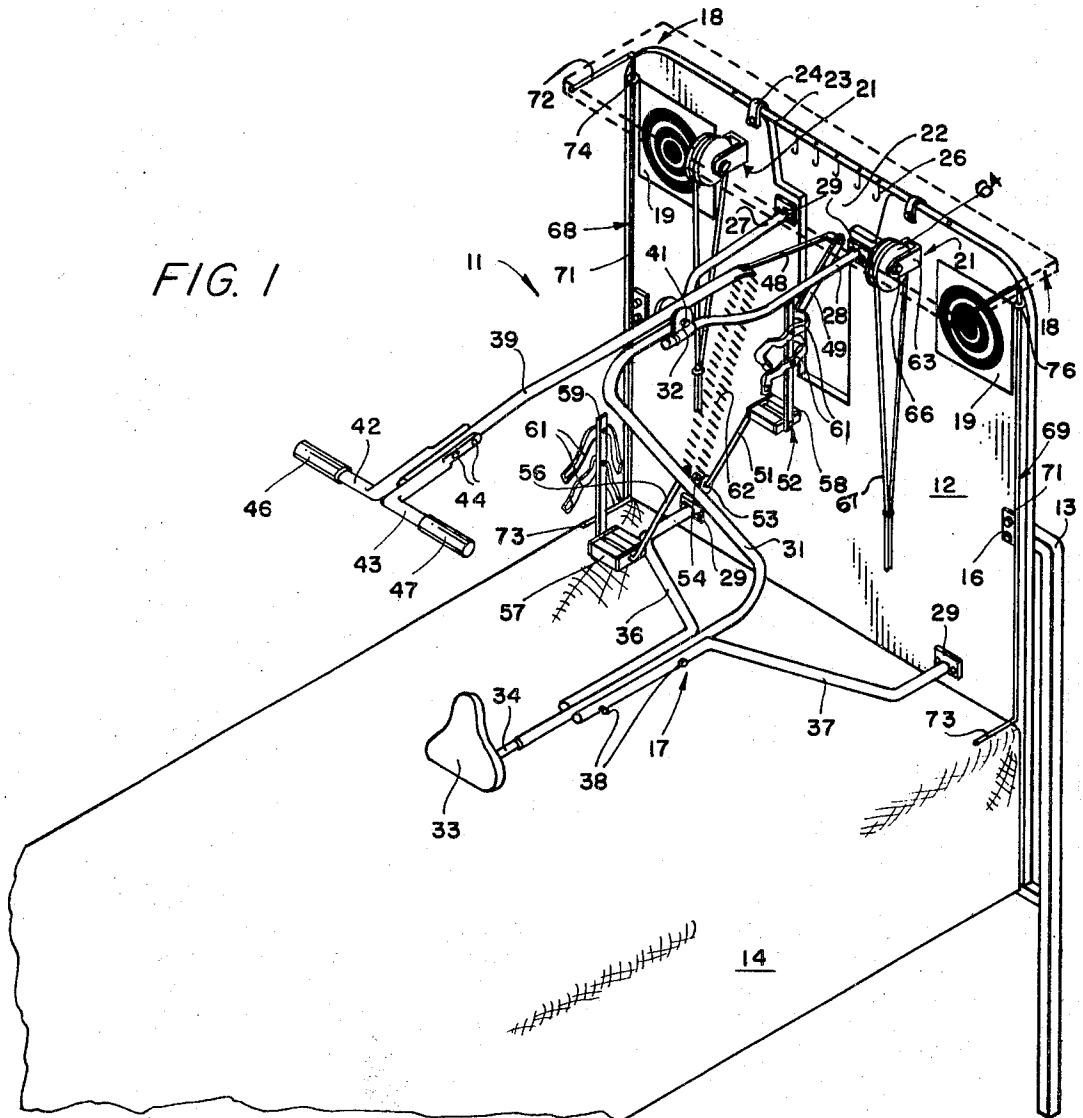


FIG. 1

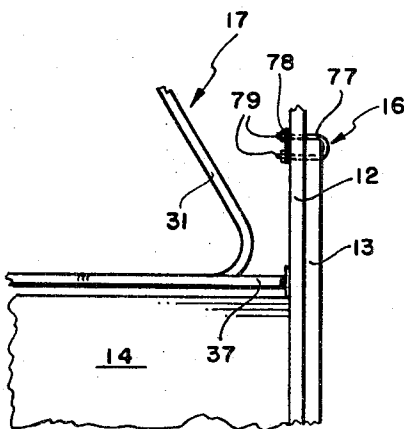
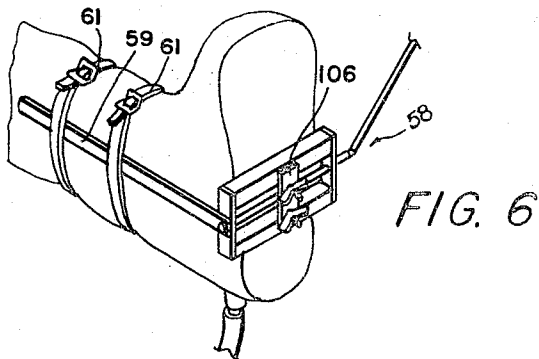
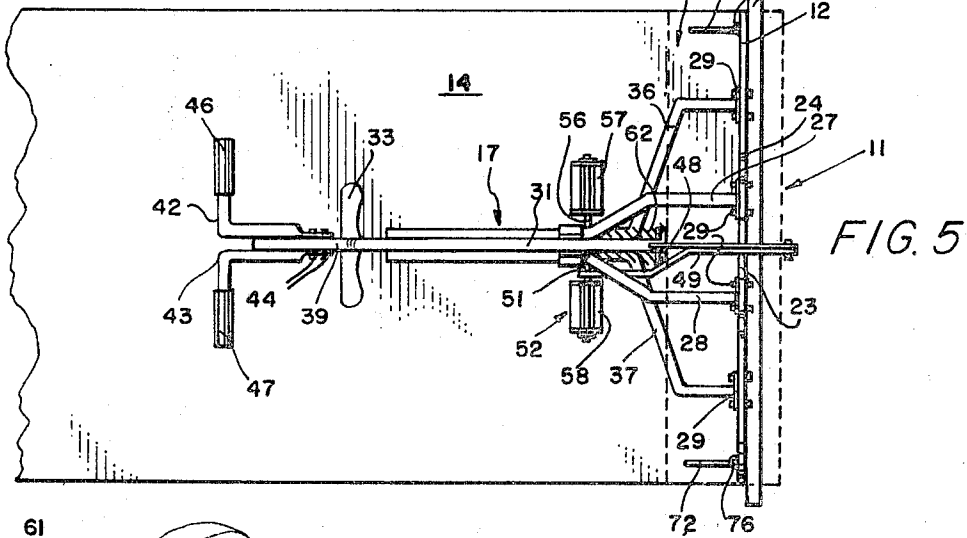
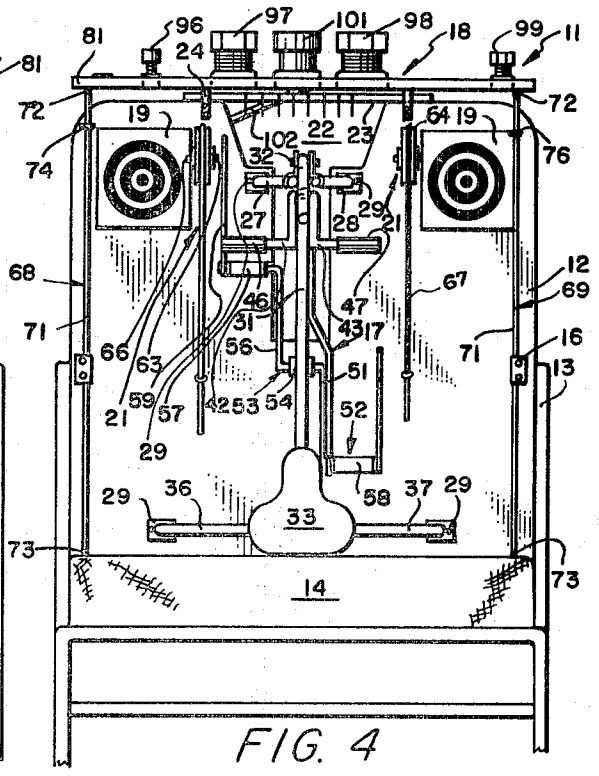
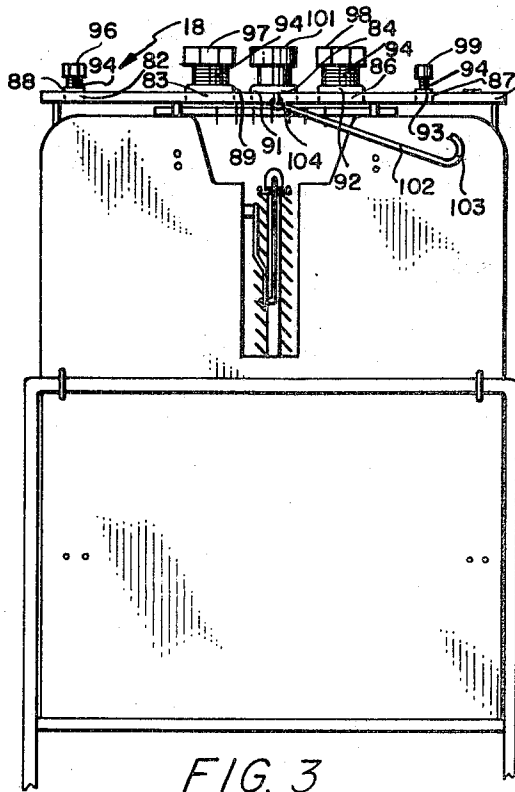


FIG. 2

INVENTOR.

MARY G. SMITH

BY *John H. Willman*  
*Alan M. Rudick*  
ATTORNEYS



INVENTOR.  
MARY G. SMITH  
BY *John T. Wickstrom*  
*Helen M. Burdick*  
ATTORNEYS

FIG. 7

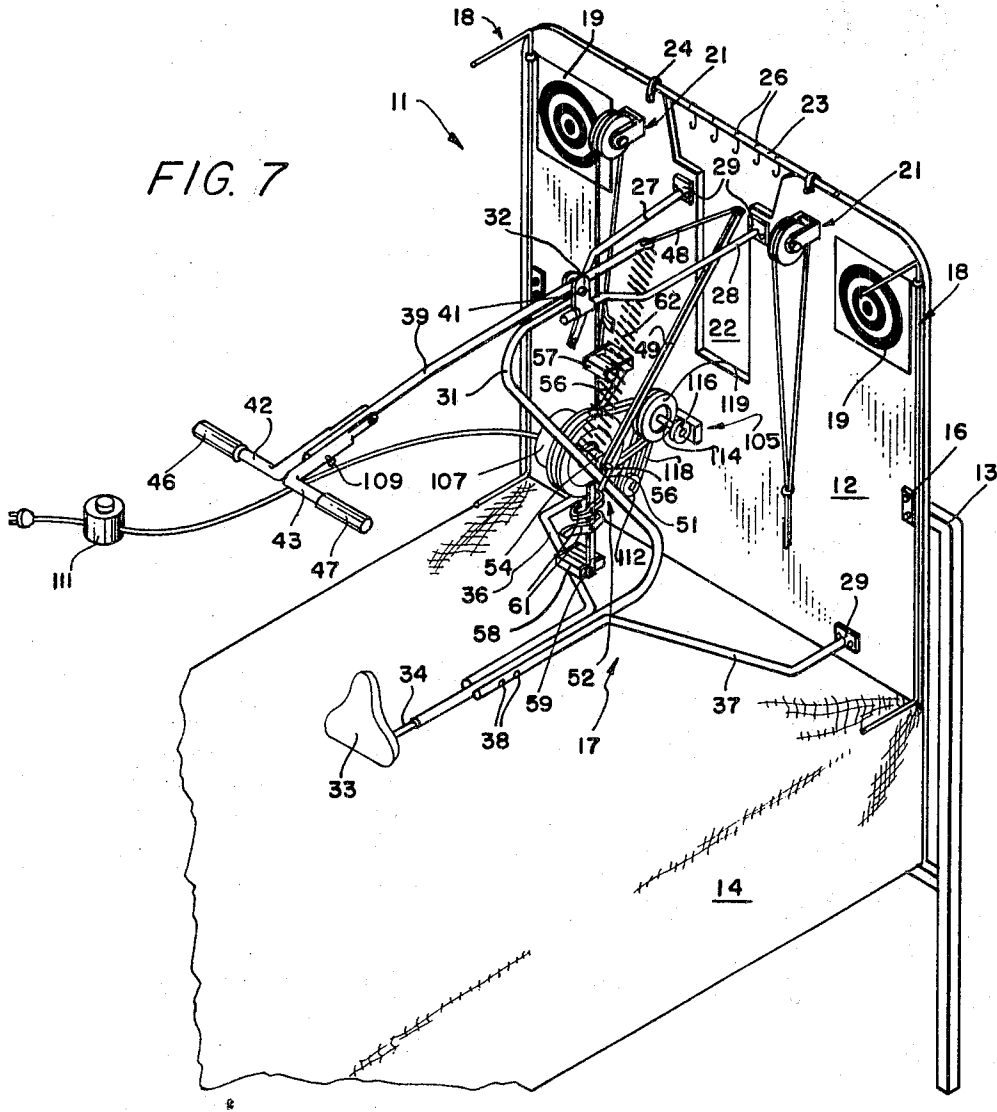


FIG. 8

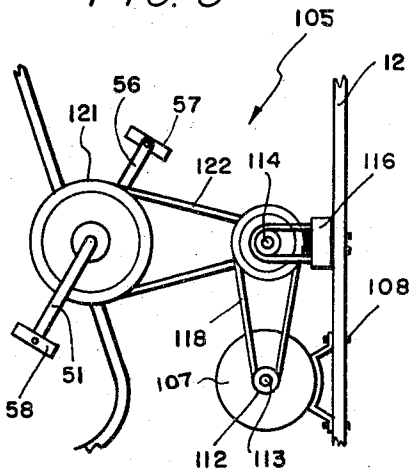
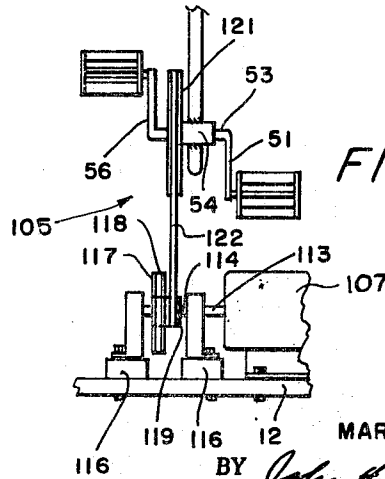


FIG. 9



INVENTOR.

MARY G. SMITH

BY *John H. Wildman*

*Alex M. Burdick*

ATTORNEYS

## PHYSICAL THERAPY APPARATUS FOR PERSONS AT BEDREST

This invention relates to a physical therapy apparatus. In one aspect it relates to a physical therapy apparatus for persons at bedrest. In another aspect it relates to a physical therapy apparatus having a bicycle-type exerciser machine positioned on a base member so that the base member and thus the bicycle-type exerciser machine can be mounted on the bedpost of the bed thus enabling persons at bedrest to be treated in bed. In another aspect it relates to a bicycle-type exerciser machine having power means to drive the pedals and oscillate the handle bars so that a person at bedrest having no control over the use of their arms and legs can readily employ the machine.

In another aspect the invention relates to a connecting means mounted on the pedals of the bicycle-type exerciser machine so that persons at bedrest having no control over the coordination of their legs can have their legs secured thereto so that the same can be exercised by the means of the exerciser.

In another aspect the invention relates to a physical therapy apparatus which includes coordination restoring means thus enabling persons at bedrest to undergo physical therapy in their own bed.

Various types of physical therapy apparatus including so-called bicycle-type exercisers are known. These physical therapy apparatus of the prior art are usually very expensive and mechanically complicated. Further, the physical therapy apparatus of the prior art are normally of such size that a separate room is provided for the apparatus thus creating the necessity of the person being moved to the other location to use the physical therapy apparatus. The movement of persons at bedrest is often difficult and undesirable. Because of the expense and size of most of the physical therapy apparatus of the prior art it is impossible and/or impractical for the use of the same in the bedridden person's home, let alone their own bedroom.

In accordance with the present invention a new physical therapy apparatus for persons at bedrest has been provided which overcomes the disadvantages and deficiencies apparent in the prior art. The physical therapy apparatus for persons at bedrest utilizes a base member which is readily mounted upon the bedpost of a bed so that the entire apparatus can be positioned within the bed and thus adjacent the person so that the person can employ the physical therapy apparatus without the need of being moved from one location to another.

Further, improved mechanical operating means are provided which efficiently provide for the desirable control and movement between the foot pedals and the handlebar structures of the bicycle-type exerciser machine of the physical therapy apparatus of the present invention thus enabling a person to undergo physical therapy who is completely lacking in muscle control of the arms and legs. Further according to the invention a physical therapy apparatus for persons at bedrest is provided wherein the bicycle-type machine component can be operated with or without power means, thus making it more versatile and eliminating the need for excessively large power means.

Further according to the invention a physical therapy apparatus is provided which is relatively simple in construction, compact, and inexpensive which enables persons at bedrest to undergo a variety of physical therapy treatments in their own bed thus eliminating the necessity of moving persons at bedrest from one room to another for treatment.

One preferred specific embodiment of the physical therapy apparatus for persons at bedrest of the invention includes support members mounted on the pedals of the bicycle-type exerciser machine so that a person having no control and coordination of the leg members of the body can have their feet and legs secured to the pedals of the bicycle-type exerciser machine thus allowing the legs to undergo physical therapy, and at the same time, allowing patient to have a secure feeling by having their legs attached thereto. Various coordination

restoring means are likewise secured to the base member of the physical therapy apparatus so that the person at bedrest is afforded a wide variety of physical therapy treatments by the one unit.

The mechanical means of the bicycle-type physical therapy machine is provided with a foot pedal crank assembly rotatably mounted on a suitable frame means and a handlebar post assembly carried by the frame means. In the drive means of the invention these assemblies are operably connected thereby so that the handlebar post assembly is moved when the foot pedal crank assembly is rotated and vice versa. This interconnection is important in that it allows a person having control of the legs to readily exercise the arm members and vice versa. As is readily apparent this movement occurs whether the electric power means drives the foot pedal crank assembly or whether the same is manually powered.

An object of the invention is to provide a physical therapy apparatus for persons at bedrest.

Another object of the invention is to provide a physical therapy apparatus having a bicycle-type machine for exercising the legs and arms of persons at bedrest.

A further object of the invention is to provide a bicycle-type exercise machine which can be secured to the end post of the bed so that persons at bedrest can readily employ the same in physical therapy treatment and which is provided with connecting means secured to the pedal portions of the bicycle-type exercise machine so that a person's legs can be securely attached to the pedals of the same.

Another object of the invention is to provide a new physical therapy apparatus for persons at bedrest having a bicycle-type machine which can be operated with or without the use of power means while the person remains in bed.

A further object of the invention is to provide mechanical movements and means for driving the foot pedals and handlebar structure of the bicycle-type machine of the physical therapy apparatus.

Another object of the invention is to provide a physical therapy apparatus for persons at bedrest having coordination restoring means secured thereto in addition to the bicycle-type machine thus enabling a person to undergo a variety of physical therapy exercises in their own bed.

A still further object of the invention is to provide a physical therapy apparatus for persons at bedrest having mounting means for mounting the same on the bed.

A still further object of the invention is to provide a physical therapy apparatus for persons at bedrest which is relatively simple in construction and operation, inexpensive, durable, and which affords persons at bedrest a variety of exercising devices employed in physical therapy treatment.

Various other objects, advantages, and features of the invention will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of one embodiment of the physical therapy apparatus for persons at bedrest of the invention;

FIG. 2 is an enlarged fragmentary view showing the mounting means employed to mount the base of the physical therapy apparatus of the invention to the bedpost of a bed;

FIG. 3 is a rear elevational view of the physical therapy apparatus for persons at bedrest of the present invention showing the same connected to the bedpost of a bed;

FIG. 4 is a front elevational view of the physical therapy apparatus for persons at bedrest of the present invention showing the same positioned with respect to a bed;

FIG. 5 is a top elevational view of the physical therapy apparatus for persons at bedrest of the present invention;

FIG. 6 is an enlarged, fragmentary view of the connecting means for maintaining the person's legs securely to the pedal members of the bicycle-type exerciser machine of the physical therapy apparatus of the present invention;

FIG. 7 is a perspective view of another embodiment of the physical therapy apparatus for persons at bedrest of the

present invention showing power means to drive the pedals and oscillate the handlebars of the bicycle-type exerciser machine of the physical therapy apparatus of the present invention;

FIG. 8 is an enlarged side elevational view of the power means of FIG. 7 employed to drive the pedals and oscillate the handlebars of the bicycle-type exerciser machine of the physical therapy apparatus of the present invention; and

FIG. 9 is an enlarged top elevational view of the power means connected to the pedals of the bicycle-type exerciser machine of the physical therapy apparatus of the present invention.

The following is a discussion and description of preferred specific embodiments of the physical therapy apparatus for persons at bedrest of the invention, such being made with reference to the drawings wherein the same reference numerals are used to indicate the same or similar parts and/or structures. It is to be understood that such discussion and description is not to unduly limit the scope of the invention.

Referring to the drawings, and in particularly to FIGS. 1, 4 and 5, the physical therapy apparatus for persons at bedrest, generally indicated by a numeral 11, is shown having base member 12 secured to end post 13 of bed 14 by mounting means 16. Bicycle-type exerciser machine 17 is secured to the inner surface of base member 12 so that bicycle-type exerciser machine 17 is positioned within bed 14 as shown thus enabling person's at bedrest to operate the same. Coordination restoring means 18, which will be discussed in detail hereinafter is positioned at the upwardly extending edge portion of base member 12 for storing coordination restoring means 18 when the same is not in use. A pair of target members 19 are positioned at the upwardly extending corner portions of base member 12 and a pair of pulley means 21 are likewise secured to the upwardly extending portion of base member 12 and positioned in a parallel spaced relationship with each other.

Base member 12 is provided with an opening 22 in the upwardly extending portion thereof and rod member 23 is secured to the upper edge of base member 12 by any suitable means such as clamp members 24 thus securing rod member 23 across the top portion of opening 22. A plurality of hook members 26 (see FIG. 1) are slidably positioned on rod member 23 and hook members 26 are employed to hold and thus store various objects used to entertain persons at bedrest and employed in the exercising of such persons, such as weights, darts, bowling pins, sandbags and the like.

Bicycle-type exerciser machine 17 is provided with forward leg members 27 and 28 each of which is positioned within clamp member 29 at one end. Clamp member 29 is then affixed to base member 12 adjacent opening 22 by any suitable means, such as screws, bolts and the like thus rigidly securing clamp member 29 and the forward leg members 27 and 28 to base member 12. Forward leg members 27 and 28 converge at their other end as shown. Forward leg members 27 and 28 are constructed to be mirror images of each other and are in a facing relationship with each other. A body member 31, here shown as a substantially Z-shaped member, is secured at one end to converging end portion of forward leg members 27 and 28 by connecting member 32 and body member 31 is positioned so that its other end extends upwardly so that seat member 33 positioned upon rod member 34 can be slidably positioned within body member 31 as shown, and then secured in place as by any suitable means such as a bolt, clamp and the like (not shown). One end portion of each of rearward leg members 36 and 37 are positioned within clamp member 29 and clamp member 29 is then secured to base member 12 by any suitable means such as screws, bolts, and the like, thus securing rearward leg members 36 and 37 to base member 12. The other end of rearward leg members 36 and 37 converge until the end portions thereof are adjacent and parallel body member 31. The upwardly extending end portions of rearward leg members 36 and 37 are fixably secured to body member 31 by any suitable means such as bolt members 38. Rearward leg members 36 and 37 are likewise constructed to be mirror

images of each other and are in a facing relationship with each other as shown.

Handlebar means are provided which consist of a handlebar support member 39 which is pivotally secured to connecting means 32 by pin element 41 and two handle members, 42 and 43, which are of substantially L-shaped structure, as shown, and which are secured to the upwardly extending end portion of handlebar support member 39 by any suitable means such as bolts 44. Handle members 42 and 43 are covered with collar members 46 and 47, respectively, and collar members 46 and 47 are preferably made of a plastic or rubbery material thus enabling the person to readily grasp handle members 42 and 43 without the person's hands slipping thereon. Linkage means, which will be discussed hereinafter operatively connect the handlebar means and pedal means 52 so that they operate together at all times. The downwardly extending end portion of handlebar support member 39 is secured to one end of linkage member 48. The other end of linkage member 48 is, in turn, pivotally connected to one end of a second linkage member 49. The other end of second linkage member 49 is then secured to crank arm 51 of pedal means 52. As is readily apparent from the drawings, opening 22 within base member 12 is necessary in order to allow unrestricted movement of first and second linkage members 48 and 49 when handlebar support member 39 and pedal means 52 of the bicycle-type exerciser machine 17 are moved.

Pedal means 52 is provided with shaft 53 rotatably mounted on body member 31 in any suitable manner, such as by the use of pillow block 54. Crank arms 51 and 56 each have one end portion thereof secured to opposite end portions of shaft 53 and are secured there to so as to extend from shaft 53 180° apart. Foot pedals 57 and 58 are secured to the other end portion of crank arms 56 and 51, respectively. Pedals 57 and 58 can be of the conventional bicycle-type pedal but are modified (see FIG. 6) to have coupling means affixed to the lower surface of pedals 58 and 59 so that the foot portion of a person positioned within a suit for circulation of hydraulic fluid around the body, such as disclosed in my copending U.S. Pat. application entitled SUIT FOR CIRCULATION OF FLUID AROUND BODY, Ser. No. 689,626, filed Dec. 11, 1967, now U.S. Pat. No. 3,521,621, can have their feet secured to pedals 57 and 58. A support member 59 is pivotally connected to pedals 57 and 58 and support members 59 are provided with strap members 61, or any other suitable connecting means, so that the person's legs can be secured to and supported on pedal members 57 and 58. By securing the person's legs to the supports the person is provided with a sense of security even though the person has no control over the muscles in the leg.

Resilient means, such as spring elements 62 are secured at one end to downwardly extending end portion of handlebar support member 39, as shown, and the other end of spring elements 62 are secured to body member 31 of bicycle-type exercising machine 17 at a point adjacent but in front of the pillow block 54. As is readily apparent, pedals 57 and 58 and handlebar support member 39 cooperate together to move at all times and spring elements 62 add tension to the same so that a person can readily improve muscle tone and coordination by employing bicycle-type exerciser machine 17. The force required to operate pedals 57 and 58 and handlebar support member 31 can readily be varied by varying the tension on spring elements 62.

Physical therapy apparatus 11 is further provided with a pair of pulley means 21, each of which are provided with a bracket 63 securely fixed to the inner surface of base member 12. A pulley wheel 64 is then rotatably positioned within bracket 63 by pin element 66 and belt member 67 is entrained over pulley wheels 64. Pulley wheels 64 and thus belt member 67 are employed to hang sandbags, weights, and the like, thereon so that the patient within a bed can use same to improve strength within various parts of the body by moving the same.

Dart targets 19, positioned on base member 12 are employed for the purpose of improving coordination of the pa-

tient by the throwing of the dart (not shown) at dart targets 19, and, at the same time, entertain persons at bedrest thus preventing boredom so that their willingness to improve can be maintained at the desired high level, and develop aim and direction.

Two support members 68 and 69 are each provided with a body central portion 71 and having end portions 72 and 73 positioned at substantially 90° with respect to central portion 71 and substantially parallel to each other. Central portion 71 of support members 68 and 69 is slidably positioned parallel to base member 12 by eyelet members 74 and 76 so that support members 68 and 69 can be slidably raised and then rotated so as to be positioned in front of handle members 42 and 43 of handlebar support member 39. As is readily apparent when support members 68 and 69 are raised and rotated as discussed immediately above, end portion 73 of support members 68 and 69 is forced against base member 12 thus maintaining coordination restoring means 18 which is secured to end portion 72 of support members 68 and 69 in a stable position in front of the patient lying in bed 14, thus affording the patient access to coordination restoring means 18.

Referring now to FIG. 2, mounting means 16 for mounting base member 12 to end post 13 of bed 14 is shown as U-bolt member 77 positioned over the top rung of end post 13. U-bolt member 77 extends through base member 12 and plate element 78 which is positioned against the inner surface of base member 12. A pair of locknuts 79 are positioned upon the threaded end portion of U-bolt member 78. By employing the combination of U-bolt member 77, plate element 78 and locknuts 79 base member 12 can be secured to bed 14 without the fear of base member 12 becoming loosened from the bed and thus creating fear within the mind of the patient. Rearward leg member 37 and body member 31 of bicycle-type machine 17 are likewise shown in their position with respect to bed 14. As is readily apparent, by the positioning bicycle-type apparatus 17 as shown the apparatus is firmly maintained upon base member 12 and maintained in a parallel spaced relationship but in a close proximity with bed 14.

Referring now to FIGS. 3 and 4 coordination restoring means 18 is shown having attachment base member 81 positioned upon and secured to end portion 72 of support members 68 and 69. Attachment base member 81 is provided with a plurality of openings 82, 83, 84, 86 and 87 therein and a plurality of rib members 88, 89, 91, 92 and 93 positioned around the circumference of the openings 82, 83, 84, 86 and 87. Openings 82, 83, 86 and 87 are each provided with threads therein (not shown) which mate with corresponding threads 94 of screw-type block members 96, 97, 98, and 99. Rib members 88, 89, 92 and 93 are likewise provided with mating threads (not shown). As is readily apparent the various sizes of block members 96, 97, 98 and 99 and openings 82, 83, 86 and 87 vary thus providing variation in coordination restoring means 18. Block members 96, 97, 98 and 99 are preferably formed of a light, durable plastic material and are provided with oversized threads so that the person does not expend excessive energy in handling the block members and also to prevent injury to the person if they should drop one of the block members. Opening 84 in attachment base member 81 preferably differs from the above-mentioned opening in base member 81 in that opening 84 is a friction-type opening and friction-type block member 101 is adapted so as to be capable of being inserted within opening 84. By employing the threaded and friction-type block member the patient is able to restore coordination within his arms and hands, and, at the same time, is afforded a variety of physical therapy treatment so that the patient does not become bored and thus maintain a good attitude which is necessary if the person is to recover from their physical injuries.

In order to provide stability to coordination restoring attachment means 18 when the same is in a lowered position for access by a person at bedrest a hook means 102 is pivotally connected at one end to attachment base member 81 by swivel means 104 as shown in FIG. 3. The other end portion

103 of hook means 102 is adapted to hook over the handlebar means of bicycle-type exerciser apparatus 17 and thus maintain and secure coordination restoring attachment means 18 in a stable lowered position.

Referring now to FIG. 6 an enlarged embodiment of one of the pedal members, such as pedal member 58, of bicycle-type exerciser machine 17 is shown having connecting means comprising support member 59 and straps 61, positioned thereon. Support member 59 and straps 61 are very important in that a person having no control or coordination over the feet and legs can have their leg secured to the pedal thus enabling the person to use the apparatus. Further, a coupling means, such as plate element 106, is affixed to the lower surface of pedal 58 and pedal 57 (not shown). Plate element 106 is provided with two openings therein which are aligned and communicate with openings in pedal 58 and pedal 57 (not shown) so that connecting means, such as disclosed in the copending U.S. Pat. application entitled SUIT FOR CIRCULATION OF FLUID AROUND BODY, Ser. No. 689,626, filed Dec. 11, 1967, can be inserted therethrough thus securing the sole portion of the above-mentioned suit and thus the person's feet to the pedals of the bicycle-type apparatus.

Referring now to FIGS. 7, 8, and 9, a second preferred specific embodiment of the physical therapy apparatus of the invention is shown. In order to more fully understand the operation of the apparatus as depicted in FIGS. 7, 8, and 9 wherein a drive and operating means is provided for bicycle-type exerciser machine 17 described in FIGS. 1, 4, and 5, the entire apparatus will be described in order to provide a clearer and more descriptive understanding of the embodiment shown in FIGS. 7, 8, and 9.

Physical therapy apparatus for persons at bedrest, generally indicated by numeral 11, is shown having the base member 12 secured to end post 13 of bed 14 by mounting means 16. Bicycle-type exerciser machine 17 is secured to the inner surface of base member 12 so that bicycle-type exerciser machine 17 is positioned within bed 14 as shown thus enabling persons at bedrest to operate the same. Coordination restoring means 18, which was discussed in detail with reference to FIGS. 3 and 4, is positioned at the upwardly extending edge portion of base member 12 for storing coordination restoring means 18 when the same is not in use. Target members 19 and pulley means 21 are likewise secured to the upwardly extending portion of base member 12 and positioned so that the persons at bedrest have easy access to the same thus enabling them to employ the same in physical therapy treatment as previously described.

Base member 12 is provided with an opening 22 in the upwardly extending portion thereof and rod member 23 is secured to the upper edge of base member 12 by any suitable means such as clamp members 24 thus securing rod member 23 across the top portion of opening 22. A plurality of hook members 26 are slidably positioned on rod member 23 and hook members 26 are employed to hold and thus store various objects used to entertain the persons at bedrest and employed in the exercising of such persons, such as weights, darts, bowling pins, sandbags, and the like.

Bicycle-type exerciser machine 17 is provided with forward leg members 27 and 28, each of which is positioned within clamp member 29 at one end. Clamp member 29 is then affixed to base member 12 adjacent opening 22 by any suitable means, such as screws, bolts and the like, thus rigidly securing clamp member 29 and thus forward leg members 27 and 28 to base member 12. Forward leg members 27 and 28 converge at the other end as shown and are constructed to be mirror images of each other and are in a facing relationship with each other. A body member 31, here shown as a substantially Z-shaped member, is secured at one end to converging end portions of forward leg members 27 and 28 by connecting member 32 and body member 31 is positioned so that its other end extends upwardly so that seat member 33 positioned upon rod member 34 can be slidably positioned within body members 31 as shown, and then secured in place by any suitable means such as a bolt, clamp, and the like. One end portion of

each of the rearward leg members 36 and 37 is positioned within clamp member 29 and clamp member 29 is then secured to base member 12 by any suitable means such as screws, bolts, and the like, thus securing rearward leg members 36 and 37 to base member 12. The other end portion of rearward leg members 36 and 37 converge until the end portions thereof are adjacent and parallel body member 31. The upwardly extending end portions of rearward leg members 36 and 37 are fixably secured to body member 31 by any suitable means such as bolt members 38. Rearward leg members 36 and 37 are likewise constructed to be mirror images of each other and are in a facing relationship with each other as shown.

Handlebar means are provided which consist of a handlebar support member 39 which is pivotally secured to connecting means 32 by pin element 41 and two handle members, 42 and 43, which are of a substantially L-shaped structure as shown, and which are secured to the upwardly extending end portion of handlebar support member 39 by any suitable means such as bolts 44. Handle members 42 and 43 are each covered with collar members 46 and 47, respectively, and collar members 46 and 47 are preferably made of a plastic or rubberlike material thus preventing the person's hands from slipping from handle members 42 and 43. The downwardly extending end portion of handlebar support member 39 is secured to one end of first linkage member 48. The other end of first linkage member 48 is, in turn, pivotally connected to one end of a second linkage member 49. The other end of second linkage member 49 is then secured to crank arm 51 of pedal means 52. As is readily apparent from the drawings, opening 22 within base member 12 is necessary in order to allow unrestricted movement of first linkage member 48 and second linkage member 49 when handlebar support member 39 and pedal means 52 of bicycle-type exerciser machine 17 are moved.

Pedal means 52 is provided with shaft 53 rotatably mounted on body member 31 by any suitable means, such as by the use of pillow block 54. Crank arms 51 and 56 have one end portion thereof secured to opposite end portions of shaft 53 and are secured thereto so as to extend from shaft 53, 180° apart. Foot pedals 57 and 58 are secured to the other end portion of crank arms 56 and 51, respectively. Pedals 57 and 58 can be of the conventional bicycle-type pedal but are modified as shown in FIG. 6 to have a connecting means, such as plate element 106 positioned thereon as previously discussed. Plate element 106 is especially desirable so that persons employing a suit for circulation of fluid around the body, such as disclosed in my copending U.S. Pat. application entitled SUIT FOR CIRCULATION OF FLUID AROUND BODY, Ser. No. 689,626, filed Dec. 11, 1967, can have their feet secured to the pedals 57 and 58 by connecting means provided on the sole portion of the suit above mentioned. A support member 59 is pivotally connected to each of pedals 57 and 58 and each support member 59 is provided with strap 61, or any other suitable connecting means, so that the person's legs can be secured and supported from pedal members 57 and 58. By securing the person's legs to the support members, the person is provided with a sense of security even though the person has no control over the muscles in the legs.

A resilient means, such as the two spring elements 62 are secured at one end to downwardly extending end portion of handle bar support member 39, as shown, and the other end of spring members 62 are secured to body member 31 of bicycle-type exercising machine 17 at a point adjacent but in front of pillow block 54. As is readily apparent, pedals 57 and 58 and handlebar support member 39 cooperate together at all times and springs 62 add tension to the same so that the person can readily improve muscle tone and coordination by employing bicycle-type machine 17 previously described. However, the force required to operate pedals 57 and 58 and the handlebar support member 39 is many times too great a force to be exerted by a person at bedrest. When such a case is encountered a drive and operating means 105 is provided and is mounted in

operating relationship with pedal means 52 of bicycle-type apparatus 17 so that the pedal means 52 and handlebar support member 39 can be moved for the patient by a power means, but, at the same time providing the persons at bedrest with the desired exercise of the muscles.

Suitable power means, such as electric motor 107 is mounted on base member 12 in any suitable manner, such as mounting bolts 108. Motor 107 preferably is positioned on the lower portion of base 12 and near rearward leg member 36 as shown in FIG. 7. Motor 107 preferably has two or more speeds which may be varied by a variable speed control means such as switch 109 mounted on handle member 43 or the speed of motor 107 can be varied by using rheostat 111. As is readily apparent the speed of motor 107 can be varied by employing, in combination, both switch 109 and rheostat 111.

Referring now to FIGS. 8 and 9 drive and operating means 105 is shown in detail. Pulley 112 is mounted on shaft 113 of electric motor 107. A second shaft 114 is mounted for rotation on base 12 in any suitable manner, such as pillow blocks 116. A second pulley 117 is affixed to shaft 114 to turn therewith. Pulley 117 receives a V-belt 118 which is connected to first pulley 112 on electric motor 107. A third pulley 119 is also affixed to shaft 114 of fourth pulley 121 as affixed to crank arm 56 of pedal means 52 and positioned adjacent pillow block 54 as shown. Fourth pulley 121 receives a second V-belt 122 which is connected to third pulley 119 on shaft 114. As is readily apparent, the four pulleys 112, 117, 119 and 121 and the two V-belts 118 and 122 cooperate so that as pulleys 112 and shafts 113 are driven by electric motor 107, shaft 114 is also driven thus driving pulleys 117, 119, and 121 thereby rotating pedal means 52 and thus oscillating handlebar support member 39 at the desired rate.

Electric wires (not shown) extend from electric motor 107 through the hollow tubular body structure of bicycle-type machine 17 to switch 109 so that switch 109 is in electrical contact with motor 107. As is readily apparent, the apparatus shown in FIGS. 7, 8, and 9 can be operated without the need for external power. However, by utilizing an electric motor to drive pedal means 52 and oscillate handlebar support member 39 a person having absolutely no control over the muscles in their arms or legs can utilize the apparatus while remaining in bed and thus allow persons having such a disability to exercise their muscles and thus prevent further deterioration of the muscles.

While the invention has been described in connection with specific embodiments, it will be evident to those skilled in the art that various modifications of this invention can be made or followed in light of this discussion and description, without departing from the spirit of the disclosure or the scope of the claims.

I claim:

1. A physical therapy apparatus for persons at bedrest comprising, in combination:
  - a. a base member;
  - b. a body member;
  - c. mounting means for mounting said base member in vertical relation to an end of a bed, said mounting means maintaining said base member substantially parallel to said end;
  - d. a pair of forward leg members each of which is affixed to one end portion of said body member at one end and to said base member at the other end, said forward leg members being constructed and assembled so as to be mirror images and in a facing relationship with each other;
  - e. a pair of rearward leg members, each of which is affixed to the other end portion of said body member at one end and to said base member at the other end, said rearward leg members being constructed and assembled so as to be mirror images and in a facing relationship with each other; and
  - f. a bicycle-type exerciser machine mounted on said base member in a facing relationship with said bed, said machine having a handlebar means pivotally connected



to the forward portion of said body member, a pedal means operatively connected intermediate said body means, linkage means pivotally connecting the lower end portion of said handlebar means and pedal means so that as said handlebar means is caused to oscillate said pedal means are caused to rotate and vice versa, resilient means secured at one end to the downwardly extending end portion of said handlebar means and to said body member at the other end, and a seat member connected to the rearward portion of said body member, said base member, body member, mounting means and bicycle-type exerciser machine being constructed and assembled so that persons at bedrest can undergo physical therapy treatment by employing said apparatus while remaining in their bed.

2. The physical therapy apparatus according to claim 1 wherein said linkage means comprises a first linkage member secured at one end portion to the downwardly extending end portion of said handlebar means and a second linkage member is pivotally connected at one end to said first linkage member and to a crank arm of said pedal means at the other end, said first and second linkage member being constructed and assembled so as to move to-and-fro through an opening in said base member unrestricted when said handlebar means is oscillated and said pedal means is rotated.

3. The physical therapy apparatus according to claim 2 which includes a rod member affixed to said base member so as to enclose said opening therein, and hook members slidably positioned on said rod member, said hook members serving to store sandbags, bowling pins, and the like when same are not being used in conjunction with said apparatus.

4. The physical therapy apparatus for persons at bedrest according to claim 1 wherein said pedal means comprises:

- a. a shaft rotatably mounted intermediate on said body member by a pillow block;
- b. a pair of crank arms, each of said crank arms having one end portion thereof secured to said shaft so that said crank arms extend from said shaft 180° apart;
- c. a pair of foot pedals, each of said foot pedals being secured to the other end portion of one of said crank arms; and
- d. connecting means, each pivotally connected to said pedals, said connecting means being constructed and assembled so that a person's legs can be secured to and supported on said pedals.

5. The physical therapy apparatus for persons at bedrest according to claim 4 wherein said connecting means comprises:

- a. a support member pivotally connected to said pedal and extending a sufficient distance perpendicular to said pedals to adequately support a person's legs;
- b. members secured to said support member, said strap member being constructed so as to maintain the leg of a person firmly adjacent said support member and thus on said pedal; and
- c. coupling means positioned on and affixed to the lower surface of said pedal, said coupling means having openings therein communicating with openings in said pedal so that pin elements positioned upon the sole portion of the person's clothes can be inserted through said openings thus securing the person's feet to said pedals.

6. The physical therapy apparatus for persons at bedrest according to claim 5 which includes a drive and operating means to oscillate said handlebar support means and rotate said crank arms and thus said pedals of said pedal means comprising:

- a. a motor member having a shaft mounted on said base member, said motor member being positioned on the lower portion of said base in close proximity with one of said rearward leg members;
- b. a first pulley mounted on said shaft;
- c. a second shaft mounted for rotation on said base and in a parallel spaced relationship with said shaft of said motor member;

d. a second pulley mounted on said second shaft and fixed thereto so as to turn therewith;

e. a first V-belt connected to said first pulley and said second pulley;

f. a third pulley connected to said shaft of said motor member;

g. a fourth pulley connected to one of said crank arms of said pedal means in close proximity with said body member of said bicycle-type exerciser machine; and

h. a second V-belt connected to said third and fourth pulley, said first, second, third and fourth pulleys and said first and second V-belts being connected so that upon activating said motor member said crank arms of said pedal means are caused to rotate and said handlebar support member is caused to oscillate.

7. The physical therapy apparatus for persons at bedrest according to claim 6 wherein said drive and operating means further include a variable speed control means for controlling the output of said motor member and thus the speed of rotation of said crank arms of said pedal means and the oscillation of said handlebar means and said variable speed control means is selected from the group consisting of a multiple switch mounted on a handle member of said handlebar means and operatively connected to said motor member, a rheostat operatively connected to said motor member, and combinations thereof.

8. The physical therapy apparatus for persons at bedrest according to claim 7 which includes a coordination restoring means comprising:

- a. a support means slidably positioned parallel to the interior surface said base member and said support means is adapted to rotate through a radius of substantially 90° so as to be substantially perpendicular to said base and positioned between said person at bedrest and said bicycle-type exerciser machine;
- b. an attachment base member positioned upon and secured to the upwardly extending portion of said support means, said attachment base member having a plurality of openings extending therethrough;
- c. a plurality of rib members secured to upper surface of said attachment base member and encompassing said opening therein;
- d. a plurality of block members, said block members being constructed and adapted to be inserted within the plurality of openings in said attachment base member; and
- e. a hook means connected to said attachment base member, said hook means being constructed and positioned so as to hook over said handlebar means when said support means and thus said attachment base member are in a lowered position for access of said coordination restoring means by a person at bedrest.

9. The physical therapy apparatus for persons at bedrest according to claim 8 which further includes:

- a. a plurality of dart targets affixed to said base member and positioned on the upper corner portion of said base; and
- b. a plurality of pulley means secured to said base and positioned intermediate said dart targets, said targets and pulley means being constructed and adapted to allow persons at bedrest to utilize same both for improving coordination and as entertainment.

10. a physical therapy apparatus for persons at bedrest comprising, in combination:

- a. a base member;
- b. mounting means for mounting said base member in vertical relationship to an end of a bed, said mounting means maintaining said base member substantially parallel to said end and comprising a plurality of U-bolt members having their end portions threaded and adapted to be positioned over the top rung of said end and have their threaded end portions extended through openings within said base member, a plate element having openings therein, said plate element being constructed to pass over the threaded end portions of said U-bolt members and

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being positioned adjacent said base member, and a plurality of locknuts adapted to be positioned upon the threaded end portion of said U-bolt members thus maintaining said base member in a stable position with respect to said end post; and

c. a bicycle-type exerciser machine mounted on said base

member in a facing relation to said bed, said base member, mounting means and said bicycle-type exerciser machine being constructed and assembled so that persons at bedrest can undergo physical therapy treatment by employing said apparatus while remaining in their bed.

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**UNITED STATES PATENT OFFICE**  
**CERTIFICATE OF CORRECTION**

Patent No. 3,540,435 Dated November 17, 1970

Inventor(s) Mary G. Smith

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 9, line 53, before "members" insert -- strap --.

Signed and sealed this 13th day of April 1971.

(SEAL)  
Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

WILLIAM E. SCHUYLER,  
Commissioner of Patent