Sept. 26, 1967 W. GRZYBOWSKI 3,343,837

SPRING-BIASED EXERCISING DEVICE

Filed Dec. 14, 1964 3 Sheets-Sheet 1

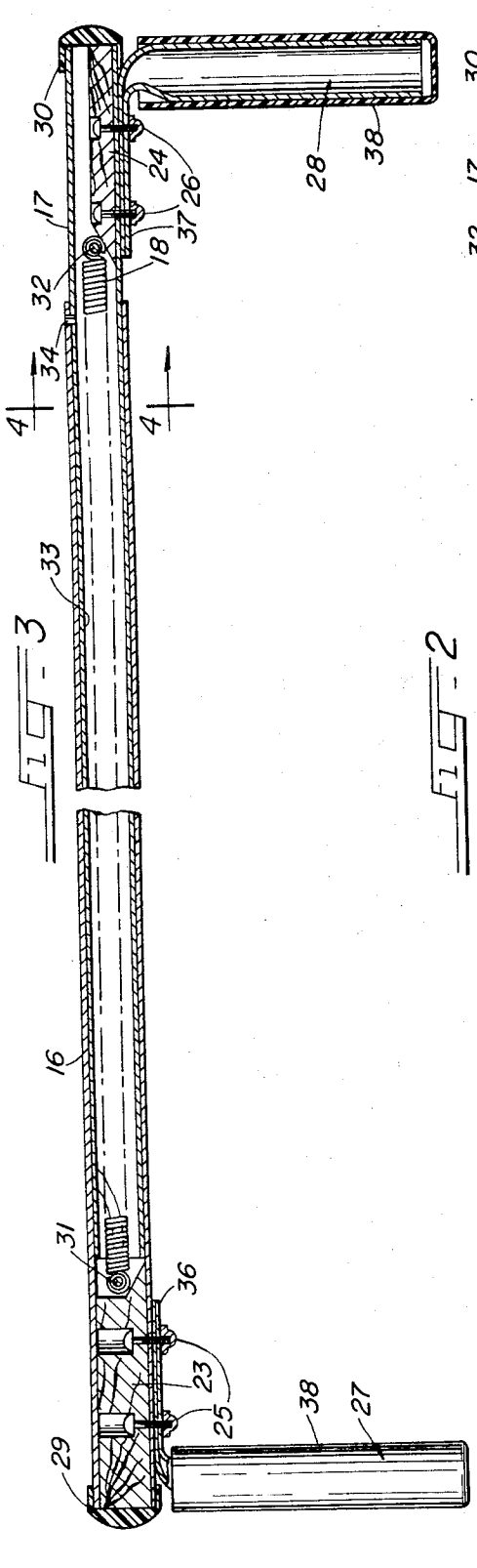

FIG - 3

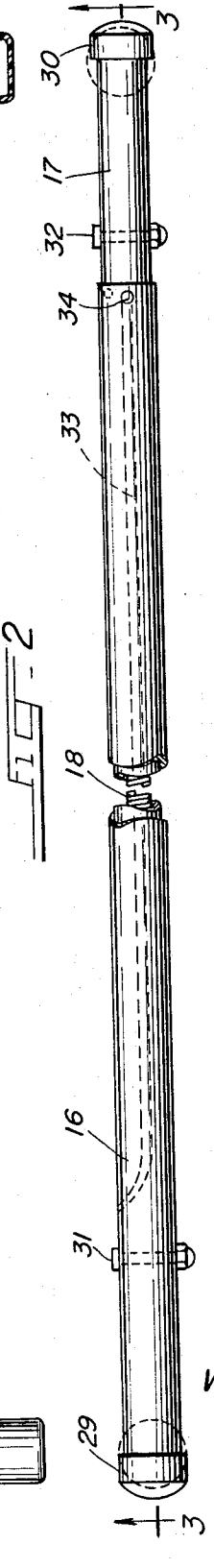

FIG - 2

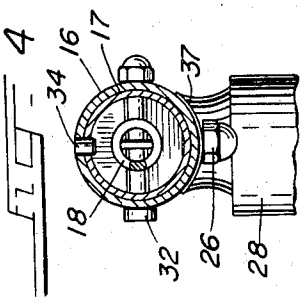

FIG - 4

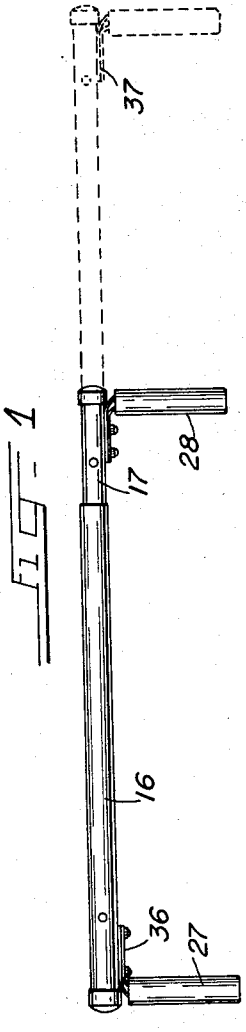

FIG - 1

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Filed Dec. 14, 1964 3 Sheets-Sheet 2

FIG. 5

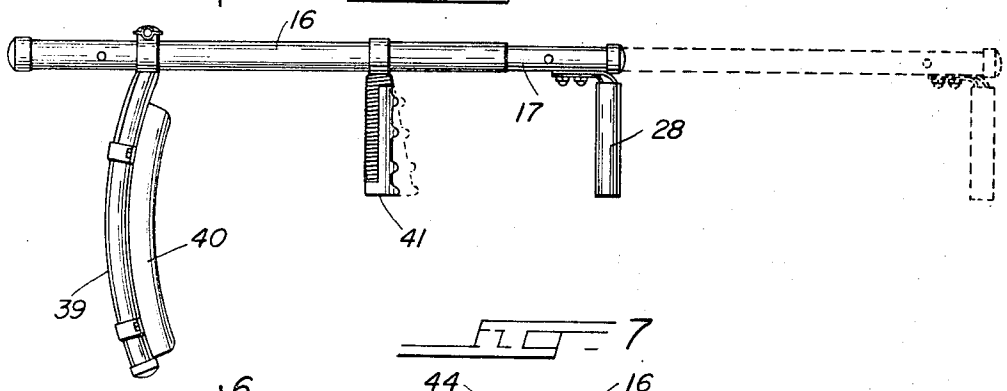


FIG. 6

FIG. 7

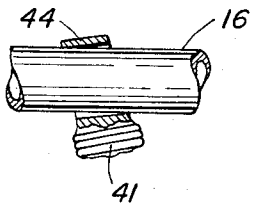
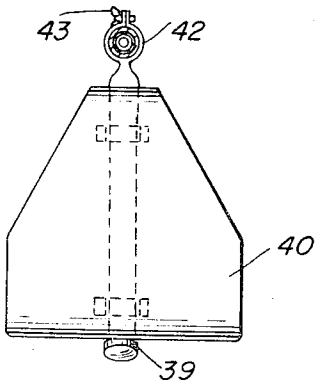


FIG. 8



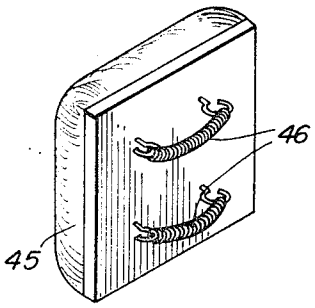
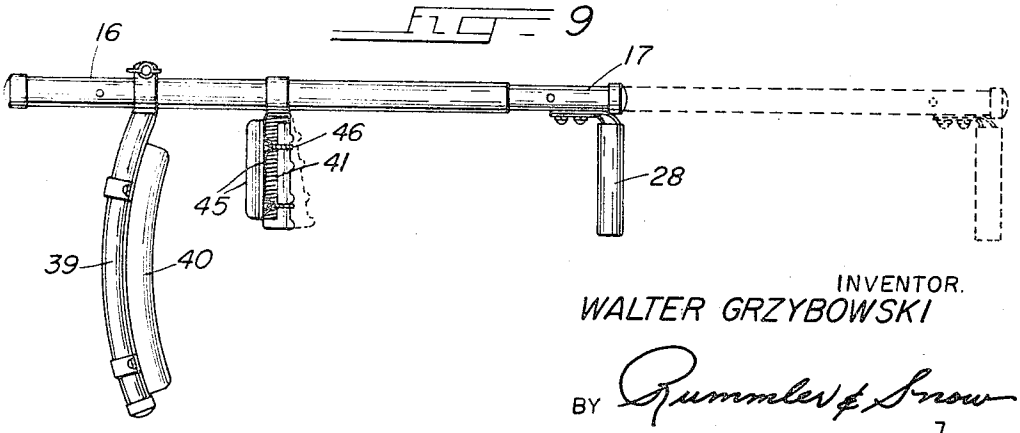


FIG. 9



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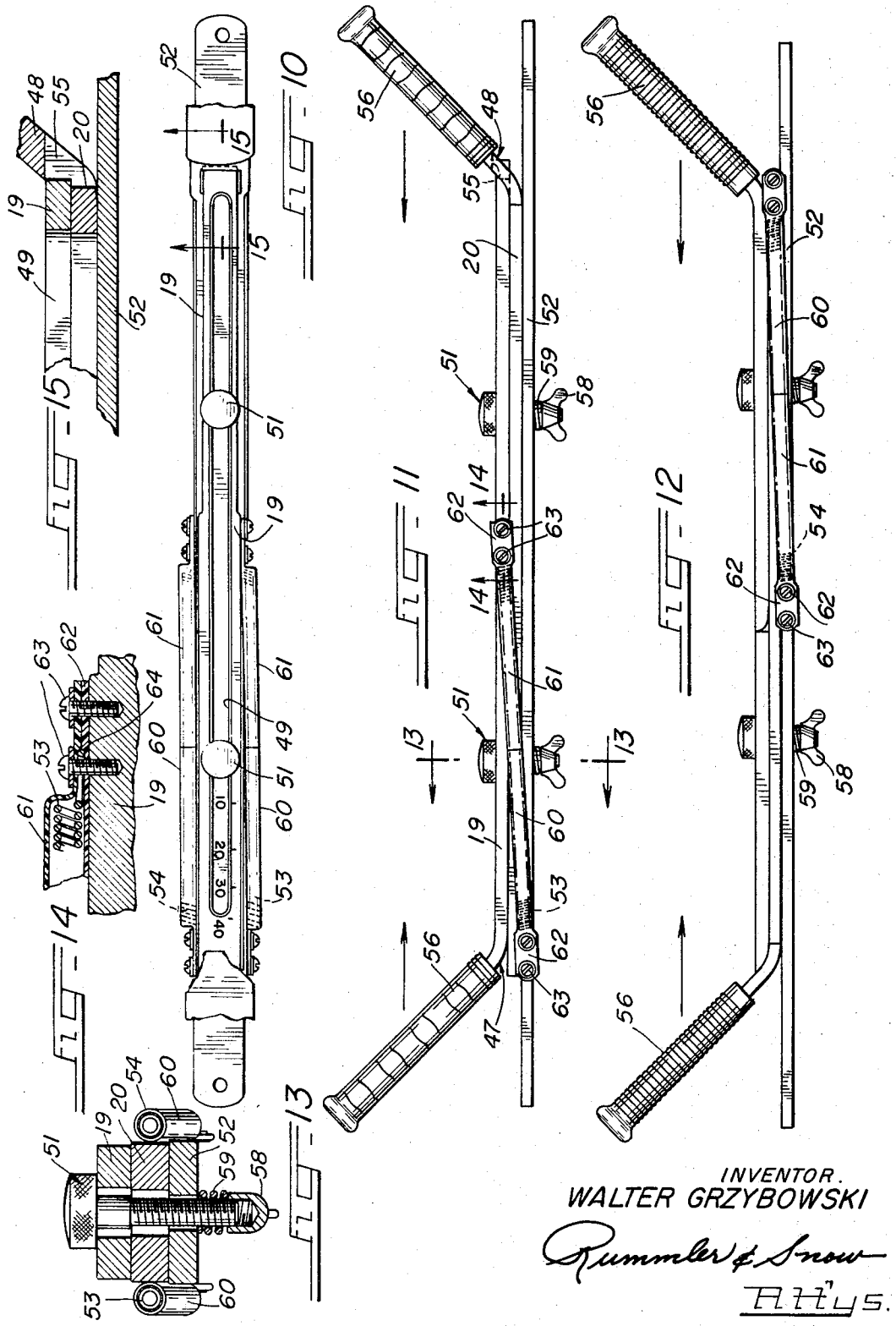

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3,343,837

SPRING-BIASED EXERCISING DEVICE

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6 Claims. (Cl. 272—83)

This invention relates to therapeutic exercisers for the hands and arms of patients.

The main objects of this invention are: to provide an improved structuring of exercisers especially adapted for effecting physiotherapeutic benefits for the hands and arms of an individual; to provide the improved structuring of exercisers of this kind wherein the yielding resistance is to the moving of the hands and arms outwardly away from each other or pushing the hands and arms inwardly toward each other; to provide improved accessories for modifying one adaptation of such structured exercisers as will permit the use thereof with one arm at a time; and to provide physiotherapeutic exercisers of this kind of such simple and practical construction as to make their manufacture very economical, their use extremely facile, and the results therefrom highly gratifying.

In the adaptations shown in the accompanying drawings:

FIG. 1 is a side elevational view of a retracted physiotherapeutic exerciser constructed in accordance with this invention adapted for use in moving the hands and arms outwardly away from each other;

FIG. 2 is an enlarged, top view of the structure shown in FIG. 1;

FIG. 3 is a further-enlarged longitudinal, sectional view of the same taken on the plane of the line 3—3 of FIG. 2;

FIG. 4 is an enlarged, cross-sectional detail taken on the plane of the line 4—4 of FIG. 3;

FIG. 5 is a side elevational view of a modification of the adaptation shown in FIG. 1 which permits exercising one arm and hand;

FIG. 6 is a front view of a cushioned substitute part taken on the plane of the line 6—6 of FIG. 5;

FIG. 7 is an enlarged, fragmentary detail showing the manner of fixing the position of an accessory part of the modified adaptation in FIG. 5;

FIG. 8 is a perspective view of a cushion adapted for attachment to the aforesaid accessory;

FIG. 9 is a view similar to FIG. 5 but indicating, in dotted outline, the patient's interposed shoulder between the cushioned substitute part and the accessory;

FIG. 10 is a plan view of another adaptation of a physiotherapeutic exerciser constructed in accordance with this invention, for moving the hands and arms inwardly toward each other;

FIG. 11 is a side elevation of the adaptation shown in FIG. 10;

FIG. 12 is the opposite side elevational of the adaptation shown in FIG. 10;

FIG. 13 is an enlarged, cross-sectional detail taken on the plane of the line 13—13 of FIG. 11;

FIG. 14 is an enlarged, cross-sectional detail taken on the plane of the line 14—14 of FIG. 11; and

FIG. 15 is an enlarged, fragmentary, cross-sectional detail taken on the plane of the line 15—15 of FIG. 10.

The essential concept of this invention involves a pair of superimposed elements each mounting a hand grip and relatively shiftable longitudinal of each other against a normally-reacting pressure.

Basically, a physiotherapeutic exerciser embodying the foregoing concept comprises a pair of superimposed elements interconnected by one or more extension springs.

In the one adaptation, herein shown in FIGS. 1, 2, 3, 5 and 9, the elements are telescoping outer and inner tubes 16 and 17 embracing an extension spring 18. In the other adaptation, herein shown in FIGS. 10, 11 and 12, the elements are in the form of flat bars 19 and 20 with a pair of exteriorly-arranged extension springs 21 and 22.

The detail structure of these two adaptations will be taken up in the above order.

In the one adaptation, the telescoping tubes 16 and 17 have blocks 23 and 24 fixed in the opposite ends by suitable pairs of fasteners 25 and 26, respectively, which as herein shown also anchor hand grips 27 and 28 to the opposite ends of the respective tubes 16 and 17. The outer ends of the tubes 16 and 17 are closed by the caps 29 and 30. The lengths of these tubes 16 and 17 are such that in their spring-retracted relationship the hand grips 27 and 28 are spaced apart about 24 inches.

The spring 18 has its opposite ends anchored to the opposed inner ends of the blocks 23 and 24 by pins 31 and 32 disposed radially of the tubes 16 and 17 and extending through the conventional loop ends of the spring 18.

The inner tube 17 has a peripheral slot 33 extending nearly the full length thereof. A pin 34, fixed adjacent the outer end of the outer tube 16, rides in the slot 33 to keep the tubes from turning and to limit their outward extension.

The hand grips 27 and 28 herein are shown as sections of tubing with one end portion of each flattened to provide arcuate-shaped extension 36 and 37 whereby the hand grips are anchored to the respective tubes by the fasteners 25 and 26. Preferably a sleeve 38, of suitable flexible, friction material, embraces each of the hand grips 27 and 28.

A modification of the adaptation shown in FIGS. 1, 2 and 3 is illustrated in FIGS. 5–9. This provides for positioning the exerciser over the shoulder of a patient to permit concentrating the exertion of one arm and hand. Such a modification involves an arcuate-shaped tubular part 39, as a substitute for the hand grip 27, and an accessory pad 41, both of which are slidably supported on the outer tube 16.

The part 39 is of arcuate form approximating that of the upper rear portion of the human shoulder. The upper end of the part 39 terminates in a split ring 42 with a wing-nut fastener 43 for clamping the part 39 at a desired point on the tube 16. Preferably, this arcuate part 39 mounts a cushion 40 of a contour such as shown in FIG. 6.

The accessory pad 41 is of rectangular contour and has an integrated ring 44 embracing the tube 16. The inner diameter of the ring 44 is enough larger than the outside diameter of the tube 16 so that a slight angling of the pad 41 to the axis of the tube 16 fixes the position of the pad 41 on the tube 16 so long as pressure is applied to maintain such angled disposition.

By use of such arcuate-shaped part 39 and the accessory pad 41 it is possible to position the exerciser over the shoulder of a patient somewhat as shown in FIG. 9. This so disposes the exerciser forward of the patient's body as to permit the exercising of the one arm and hand.

If and when desired a supplemental cushion 45, such as shown in FIG. 8, may be set over the rearward face of the accessory pad 41 to contact the front area of the patient's shoulder. Such a cushion 45 here is shown with a pair of springs 46 (FIG. 8) for embracively positioning the cushion on the pad 41, as shown in FIG. 9.

The exerciser of the adaptation shown in FIGS. 1 through 9 may be used in two different ways. One of these

ways affords a yielding resistance to the repeated pulling of the two hands and arms of a patient outwardly away from each other and allowing the spring **18** to pull the hands and arms inwardly toward each other. The second way affords a yielding resistance to the pushing of one hand and arm outwardly from the corresponding shoulder and allowing retraction by the spring **18** to pull the hand and arm back toward the body.

For the way of using the one modification (FIGS. 1–4) it is only necessary for the patient to grip the sleeve-covered hand grips **27** and **28** and pull them outwardly from each other against the resistance of the spring **18**. Upon releasing such outward pull the spring **18** will retract the hand grips **27** and **28** inwardly to the full limit permitted by the collapsing of the spring **18**. Such repeated pulling of the hand grips **27** and **28** away from each other, with the intermittent releasing of such pull, will cause the desired exertion of the patient's muscles to effect an improved condition for the patient.

For the way of using other modification (FIGS. 5–9) the padded arcuate part **39** is adjusted to the desired position on the tube **16** and secured in place by the wing nut **43**. This padded part **39** then is placed against the back of the patient's shoulder. The accessory **41** then is pulled rearwardly on the tube **16** to press against the front part of the patient's shoulder. This positioning of the accessory **41** so angles the ring **44** to the tube **16** as to ensure the retained positioning of the accessory against the patient's shoulder.

With the exerciser so positioned, the hand grip **28** is grasped by the patient's one hand and the arm is extended forwardly against the action of the spring **18**. Upon relaxing such outthrust of the arm the spring **18** will draw the hand grip **28** back toward the patient's body. The repeated extending and retracting of the one arm will secure the result for that arm comparable to that resulting from the use of both hands and arms in repeated pulling the hand grips outwardly and releasing them, as above described.

In the other adaptation (FIGS. 10–15) the bars **19** and **20**, with integrated hand grips **47** and **48**, are formed with longitudinal registering slots **49** through which extend pairs of spring-tensioned fasteners **51** for slidably retaining the bars superimposed on a supporting member **52** and biased outwardly by a pair of springs **53** and **54**. These springs serve to dispose the hand grips **47** and **48** away from each other a predetermined distance, approximately 24 inches. This makes it possible for a patient to acquire the exercising of the hands and arms by pushing the hand grips inwardly against the action of these springs **53** and **54**. In order to make possible this pushing inwardly of the hand grips **47** and **48**, it is necessary for one of the bars, for example bar **20**, to be formed with an opening **55** (FIGS. 11 and 15) adjacent the junction of the hand grip **48** to allow the end of the other bar **19** to move outwardly beyond the junction of the hand grip **48** with the bar **20**.

Sleeves **56** of molded friction material, are set over the hand grips **47** and **48** to afford a larger and more comfortable area for the contact of the hands during the use of the exerciser.

The fasteners **51**, as best shown in FIG. 13, are the conventional-headed bolts **57** with wing-nuts **58**. Between each of the nuts **58** and the member **52** is a spring **59**. The adjustment of the two nuts **58** tension the springs **59**, to supplement that of the springs **53** and **54**, so as to determine the degree of resistance to which the patient is to be subjected in the use of the exerciser of this adaptation.

Each of the springs **53** and **54** is encased in a pair of axially-opposed sections of tubing **60** and **61**. The opposite ends of each pair of tube sections are flattened to provide pads **62** apertured for the reception of screws **63** to anchor the tube sections, one each to the supporting member **52** and the other to the bar **19** or **20** respectively. Such tube sections **60** and **61** serve to protect the patient or parts of the clothing from being pinched or caught in the retracting springs **53** and **54**, as might be the case if these springs were exposed through their entire length. The looped ends **64** of these springs **53** and **54** are secured to the respective bars **19** and **20** and to the supporting member **52** (FIG. 14).

The use of the exerciser of the adaptation of FIGS. 10–15 is as follows:

The fasteners **51** have the wing nuts **58** adjusted to effect tensioning of the springs **59** (FIG. 13) to an amount needed to provide the desired resistance to pressures the patient is expected to exert in pushing the hand grips **47** and **48** toward each other. The hand grips **47** and **48**, being held apart by the retracted springs **53–54**, the patient grips the sleeve-covered hand grips **47** and **48** and pushes them inwardly against the increasing resistance of the springs **53–54**, to whatever amount of distance may appear practical for the patient's needs. Upon relaxing the push of the hands inwardly the springs **53–54** will urge the hand grips **47** and **48** outwardly away from each other as shown in FIGS. 11–12. Such repeated pushing of the hand grips **47** and **48** inwardly and releasing them will cause the desired exertion of the patient's muscles to effect an improved condition for the patient.

It will be understood that details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A physiotherapeutic exerciser comprising a support member, a pair of flat bars shiftably mounted on said support member for relative reciprocable movement longitudinally of each other, a transversely disposed hand grip fixed adjacent the opposite ends of the respective bars, a pair of extension springs, one end of each of the pair of springs attached to the supporting member and the other end of each attached to one of the respective bars.

2. A physiotherapeutic exerciser comprising, a pair of telescopically mounted outer and inner tubes, an extension spring enclosed within the tubes and having its opposite ends fastened to the respective tubes to bias the tubes into a contracted relationship, a hand grip fixed adjacent the exposed end of the inner tube, an arcuate-shaped tubular part shiftably mounted adjacent the outer end of the outer tube and having a clamp for fixing the position of the part on the tube, a cushion secured to the concave face of the tubular part, an accessory part slidably mounted on the outer tube inwardly of the arcuate-shaped tubular part and adapted for fixed positioning thereon by a forwardly angled disposition of the accessory, with respect to the tube, to space the accessory from the cushion on the arcuate-shaped tubular part to set the exerciser over a patient's shoulder and permit exercising the one adjacent arm.

3. A physiotherapeutic exerciser comprising, a flat supporting member, a pair of flat bars superimposed one on the other and on the supporting member, a hand grip integrated with one end of each of the bars, means for reciprocably supporting the bars on the member for longitudinal relative shifting of each other on the supporting member, and a pair of extension springs arranged along each perimeter of the superimposed bars and member with one end of each spring fixed to the member and the other end of each spring fixed to one of the bars, the springs biasing the bars outwardly to permit the pushing of the hand grips inwardly toward each other by the exerting pressure of the hands and arms of a patient.

4. A physiotherapeutic exerciser as set forth in claim **3** wherein each of the springs is encased in tubes.

5. A physiotherapeutic exerciser as set forth in claim **3** wherein each spring is encased in a pair of axially-aligned tubes with one end of each of one pair of tubes

anchored to the supporting member with the adjacent end of the respective spring interposed, and the one end of other of each pair of tubes is anchored to one of the respective bars with the adjacent end of the spring interposed.

6. A physiotherapeutic exerciser as set forth in claim 3 wherein the bars are longitudinally slotted, and the means for reciprocably supporting the bars on the member are nut-and-bolt fasteners with an interposed embracing spring and are axially adjustable transversely of the superimposed bars and member for tensioning interposed springs to alter resistance to the pressure required to push the hand grips inwardly toward each other.

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