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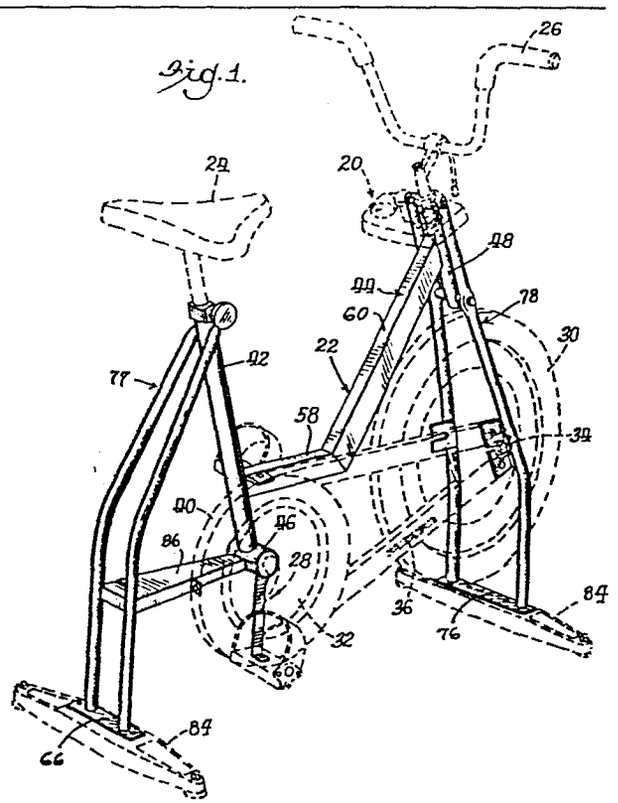
## (54) Box beam bicycle type frame.

(57) Frame (22) for a bicycle type apparatus such as an exerciser or vehicle, having a closed, rectangular box beam cross-section reach tube (44) secured between a handlebar head tube (48) and a seat mast (42). The reach tube (44) has an angular configuration including a rear horizontal section (58) extending along the chain guard, and an upwardly and forwardly extending diagonal section (60).

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This invention relates generally to bicycle type apparatus and more particularly to bicycle type exercisers, although it may be equally applicable to the upwardly open type frame used on girls' and ladies' bicycles.

Bicycle type exercisers are stationary but otherwise similar in many respects to bicycles and use some of the same parts. An upwardly open girls' or ladies' bicycle frame is often used, having twin, parallel, curved reach tubes. One example in shown in Fig. 1 of U. S. Patent 3,664,027 issued May 23, 1972 to Albert J. Fritz and Rudolph L. Schwinn. A further example of that prior art construction is shown in Figs. 5 and 6.

It is important to the comfort and well-being of the user that the frame be absolutely rigid and free from noticeable deflection in operation. In practice, this is hard to achieve with the above-mentioned conventional upwardly open frame.

Accordingly, this invention provides a frame of less weight and more strength and rigidity for bicycle type apparatus of the kind described.

In particular, the present invention provides a bicycle type exerciser, and the like, having a frame comprising a handlebar head tube, a seat mast, and a reach tube, comprising a closed rectangular box beam cross section having the long axis of its cross section upright and co-planar with the head tube and seat mast, said reach tube having an angular configuration in side view including a rear horizontal section secured at its rear end to the seat mast and a front diagonal section extending

upwardly and forwardly and secured at its front end to the head tube.

In the drawings:

FIGURE 1 is a perspective view of a bicycle type exerciser embodying this invention;

FIG. 2 is a fragmentary view of FIG. 1;

FIG. 3 is a fragmentary side view of FIG. 1;

FIG. 4 is an enlarged cross-section of FIG. 3 taken on line 4-4;

FIG. 5 is a view similar to FIG. 3 of a curved, twin reach tube arrangement representing the prior art; and

FIGS. 6 and 7 are schematic side views of testing apparatus used in demonstrating the improved rigidity of the frame of the present invention compared with that of a conventional prior art frame.

Referring now more particularly to the specific embodiment of the invention shown in the drawing, a stationary bicycle type exerciser generally designated 20 is shown.

The exerciser has a support frame generally designated 22, a saddle assembly 24, a handlebar assembly 26, a pedal and crank assembly 28 rotating an adjustable resistance friction wheel 30 through sprockets 32, 34, and a chain 36 protected by a chain guard 38 and a sprocket guard 40, all made and operating in a well-known manner.

Turning attention to the frame 22 which has increased strength and rigidity as a result of the present invention, it has the usual seat mast tube 42 extending upwardly and rearwardly from a crank hanger 46 to the saddle assembly 24, and a head tube 48 supporting the handlebar assembly 26. Rear and front fork assemblies 77 and 78 respectively include foot plates 66 and 76 mounted on floor-engaging feet 84. A horizontal bracket 86 connects the rear fork assembly to the crank hanger.

The crux of the present invention is the reach tube 44 which forms part of the frame and is secured between the handlebar head 48 and the seat mast 42; as contrasted with twin, parallel, curved reach tubes 50, 52 conventionally used as shown in FIGS. 5 and 6.

The improved reach tube 44 comprises a closed, rectangular box beam, the cross-section of which is shown in FIG. 4. For effective vertical rigidity, and securement by welding between the head tube 48 and seat mast 42, the cross-sectional dimension should be substantially longer along the vertical axis Y-Y than along the horizontal axis X-X. Preferably, the long sides 54, 54 of the reach tube cross-section should be more than about twice the length of the short sides 56, 56. In the specific, example mentioned above, the reach tube has been made of cold rolled steel .062" thick, with long and short sides of 2" and 1" respectively.

The reach tube 44 has an angular configuration in side view with a rear, horizontal section 58 welded at its rear end to the seat mast 42, and a front diagonal section 60 extending upwardly and forwardly and welded at its front end to the head tube 48.

Referring to FIG. 2, the top surface 62 of the horizontal reach tube section 58 extends along, and preferably at a level slightly above the upper surface 64 of the chain guard. It is not unusual for users to attempt to stand on the chain guard which is of relatively light construction. With the above-described construction, the chain guard will be protected from that kind of abuse because most of the downward load applied by the user will be borne by the reach tube.

As will now be described, the improved rectangular cross-section reach tube 44 is cheaper, makes more efficient use of material, and is substantially twice as rigid vertically as the conventional pair of reach tubes 50, 52 shown in FIG. 5. Typically, the reach tubes 50,

52 are made of .062" thick round tube stock, 1.00" outside diameter, making a total cross-sectional area of 0.390 square inches and using 0.110 lbs. of steel per running inch. In the above-described configuration, reach tube 44 is made of .062" thick rectangular tube stock 2" x 1" in outside cross section, making a total cross-sectional area of only .372 square inches, and using only 0.105 lbs. of steel per running foot.

Thus, the improved reach tube 44 actually uses less material than the prior conventional reach tube pair 50, 52 shown in Figs. 5 and 6. It is substantially stronger and more rigid as verified by actual tests as will now be described in connection with Figs. 6 and 7.

As shown in Fig. 6, a frame 22a using conventional twin reach tubes 50, 52 with the dimensions described above was tested for vertical rigidity clamping the rear foot plate 66 down by clamp means 68 to block 70 fixed to floor 72 in any suitable manner. A roller 74 was placed between front foot plate 76 and the floor so that the front fork assembly 78 was free to deflect forwardly under load. A press 80 was loaded downwardly with a load of 250 lbs. applied to a roller 82 mounted at the top of the seat mast tube 42a simulating the weight of a 250 lb. operator. Downward deflection of the roller 82, simulating deflection of the saddle assembly 24 under this loading was measured as .024".

Under exactly the same conditions as shown in Fig. 7, the frame 22 with the improved single tube reach tube 44 deflected only .014".

Thus, the important vertical rigidity of the frame is almost doubled, using less steel, when compared with the conventional double tube frame under exactly the same load conditions.

CLAIMS

1. A bicycle type exerciser, and the like, having a frame comprising a handlebar head tube, a seat mast, and a reach tube, comprising a closed rectangular box beam cross-section having the long axis of its cross-section upright and co-planar with the head tube and seat mast, said reach tube having an angular configuration in side view including a rear horizontal section secured at its rear end to the seat mast and a front diagonal section extending upwardly and forwardly and secured at its front end to the head tube.

2. An exerciser according to claim 1, including a chain guard having a substantially horizontal upper surface extending along side said rear substantially horizontal section of the reach tube in position for said horizontal section to protect the chain guard against downward load applied by the foot of a user.

3. An exerciser according to claim 2, in which said horizontal upper surface of the chain guard is positioned at a level below the upper surface of said rear substantially horizontal section of the reach tube.

4. An exerciser according to claim 1, in which the cross-section of the reach tube is substantially higher than it is wide to thereby selectively stiffen the reach tube in a vertical direction.

5. An exerciser according to claim 4, in which the cross-section of the reach tube has a vertical dimension at least twice its width.

Fig. 1.

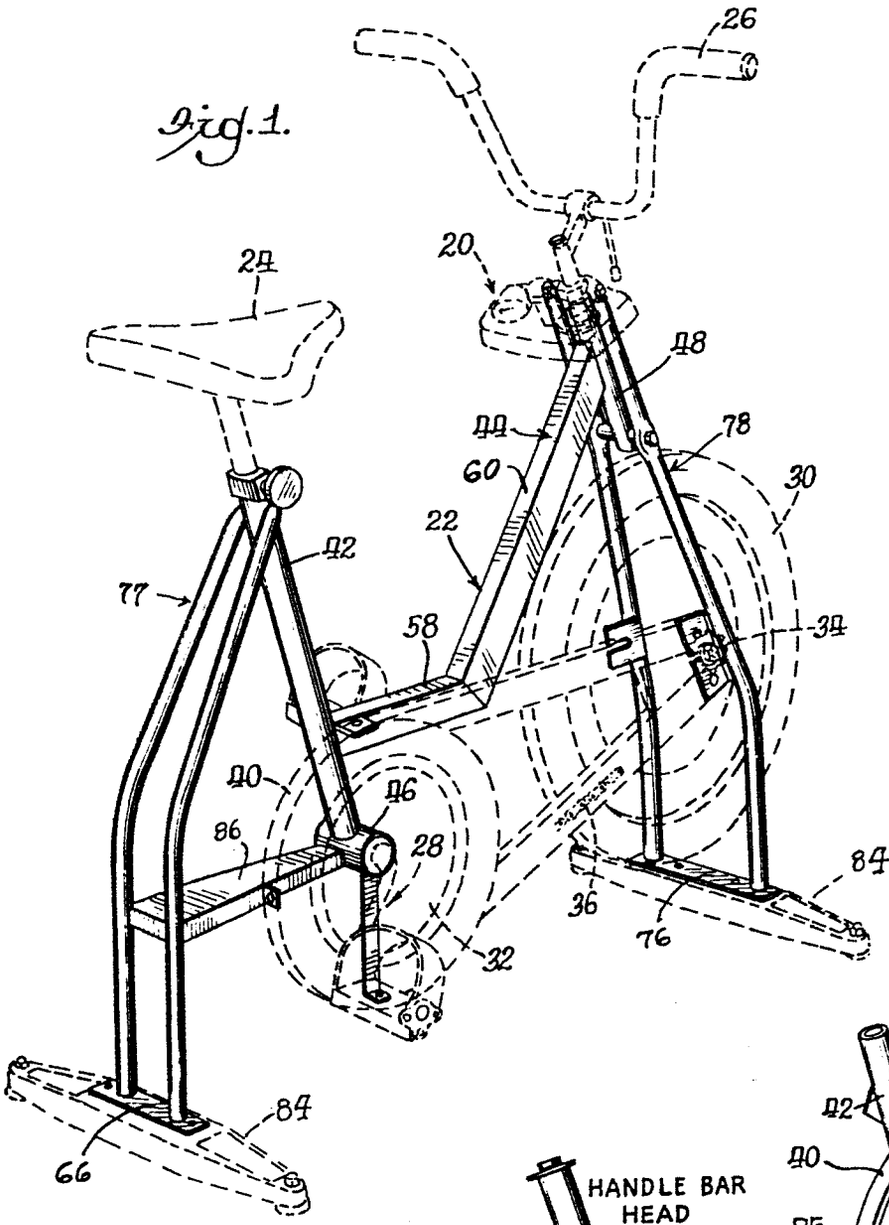
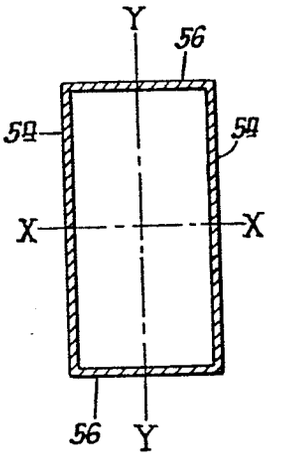



Fig. 4.



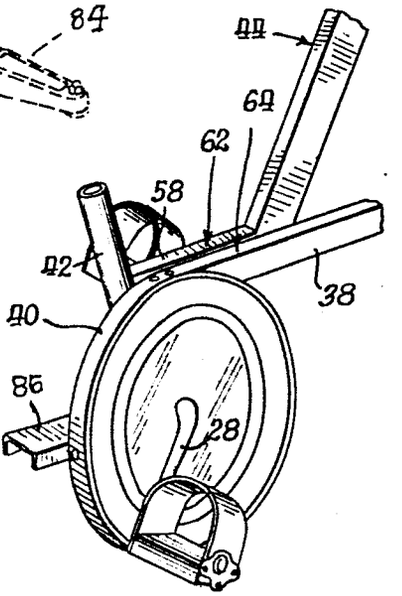




Fig. 2.

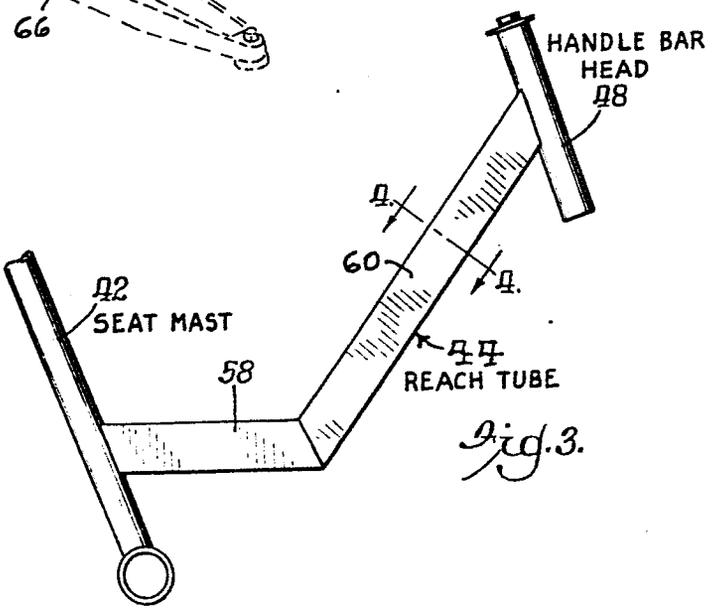



Fig. 3.

Fig. 5.
(PRIOR ART)

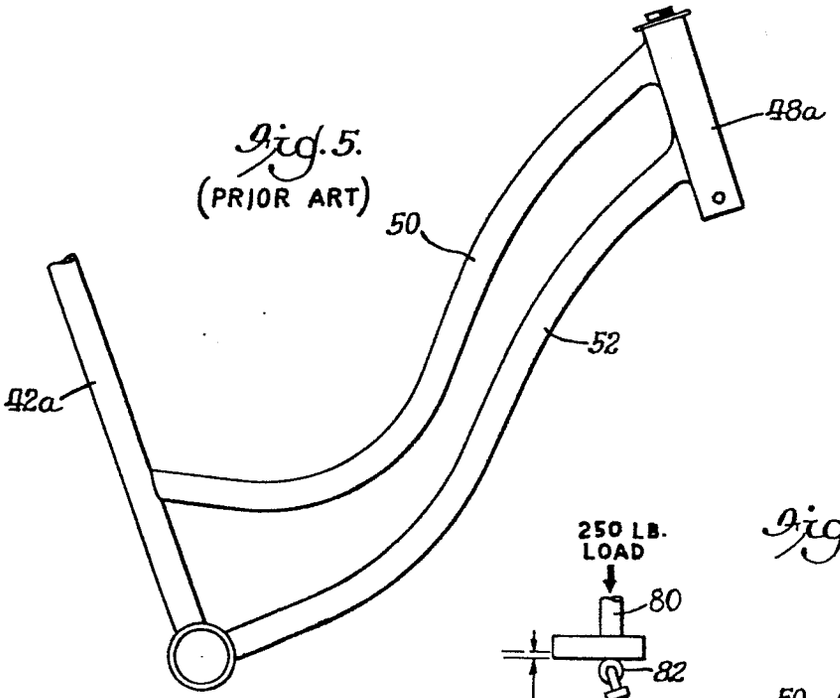
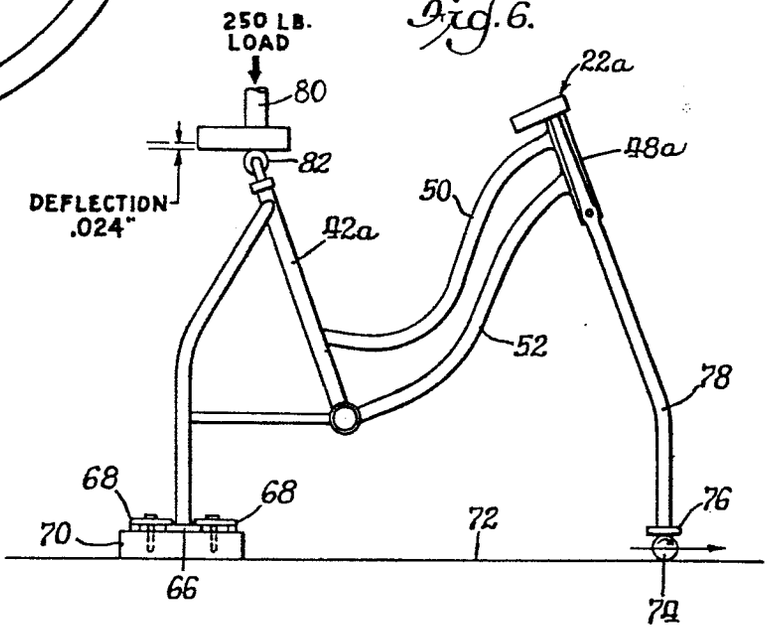



Fig. 6.



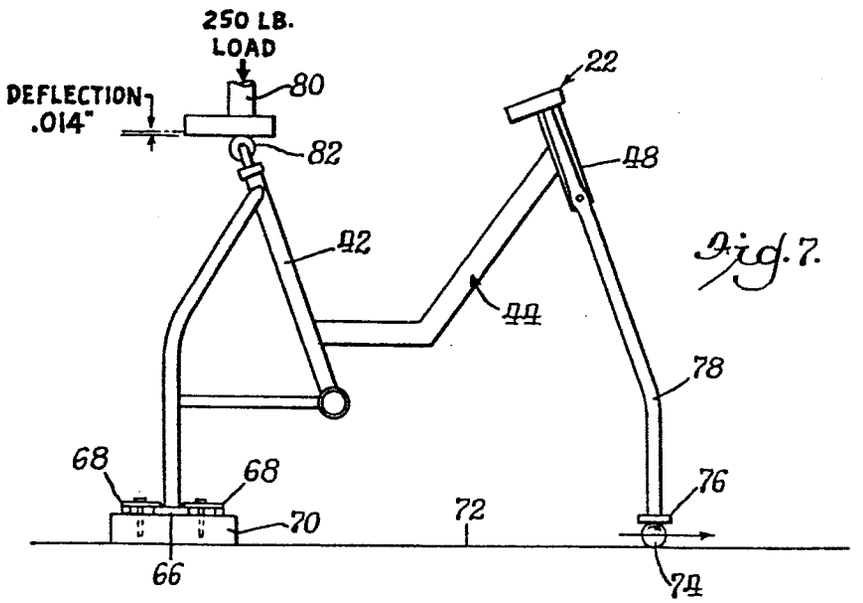




Fig. 7.

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# EUROPEAN SEARCH REPORT

0142605
Application number

## DOCUMENTS CONSIDERED TO BE RELEVANT

EP 84107364.6

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.4) |
|---|---|---|---|
| A | GB - A - 1 281 731 (RALEIGH INDUSTRIES)<br>* Fig. 1,3,4,6 and context * | 1,4 | A 63 B 69/16 |
| A | DD - A - 9 127 (RINKOWSKI)<br>* Fig. 1; lines 17-23 (page 1) * | 1 | |
| A | US - A - 518 411 (CASSE)<br>* Fig. 1 (frame A) * | 1 | |

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 63 B 21/00
A 63 B 23/00
A 63 B 69/00
B 62 K 19/00

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| VIENNA | 17-01-1985 | SCHÖNWÄLDER |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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