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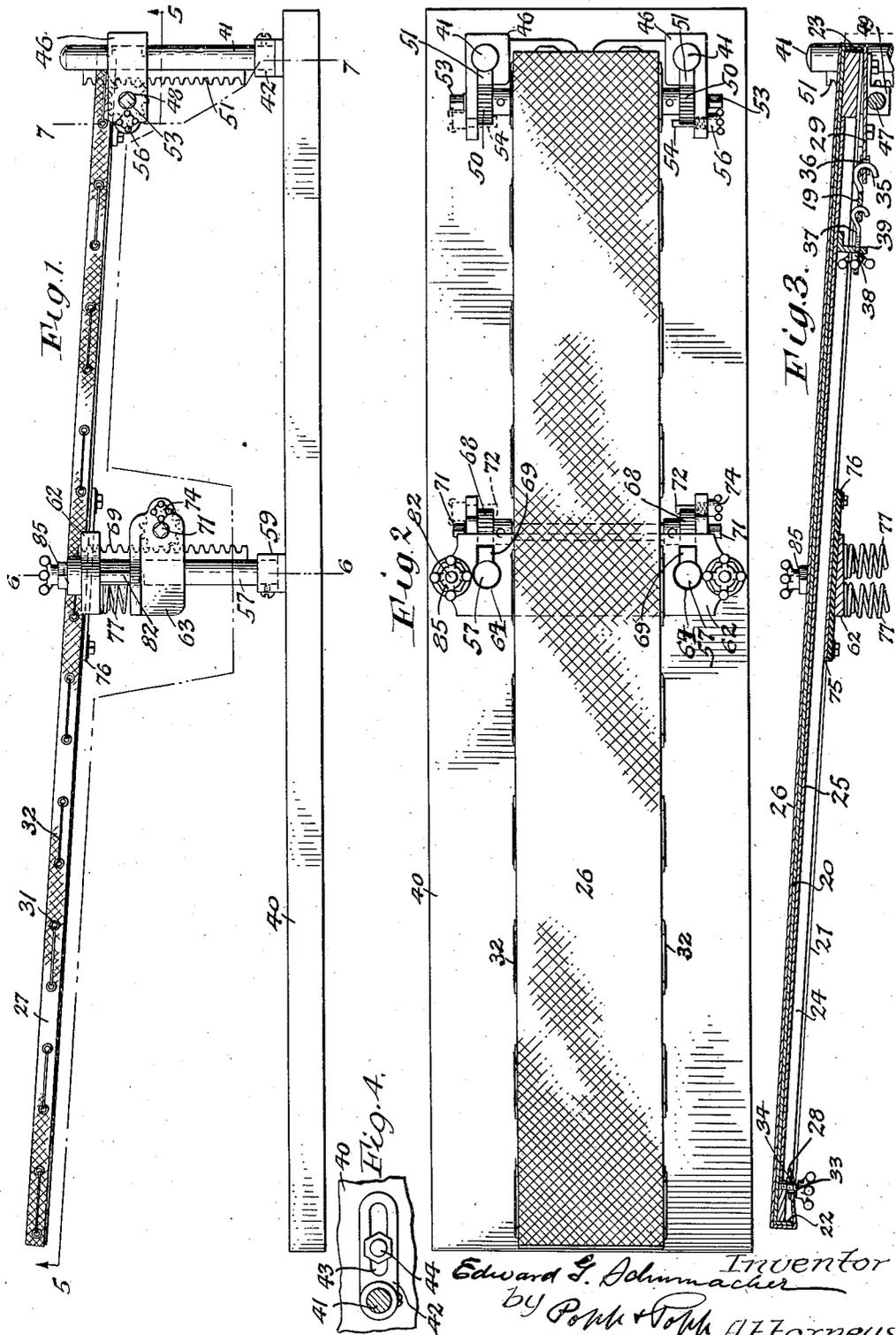
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DIVING BOARD

Filed May 9, 1946

3 Sheets-Sheet 1



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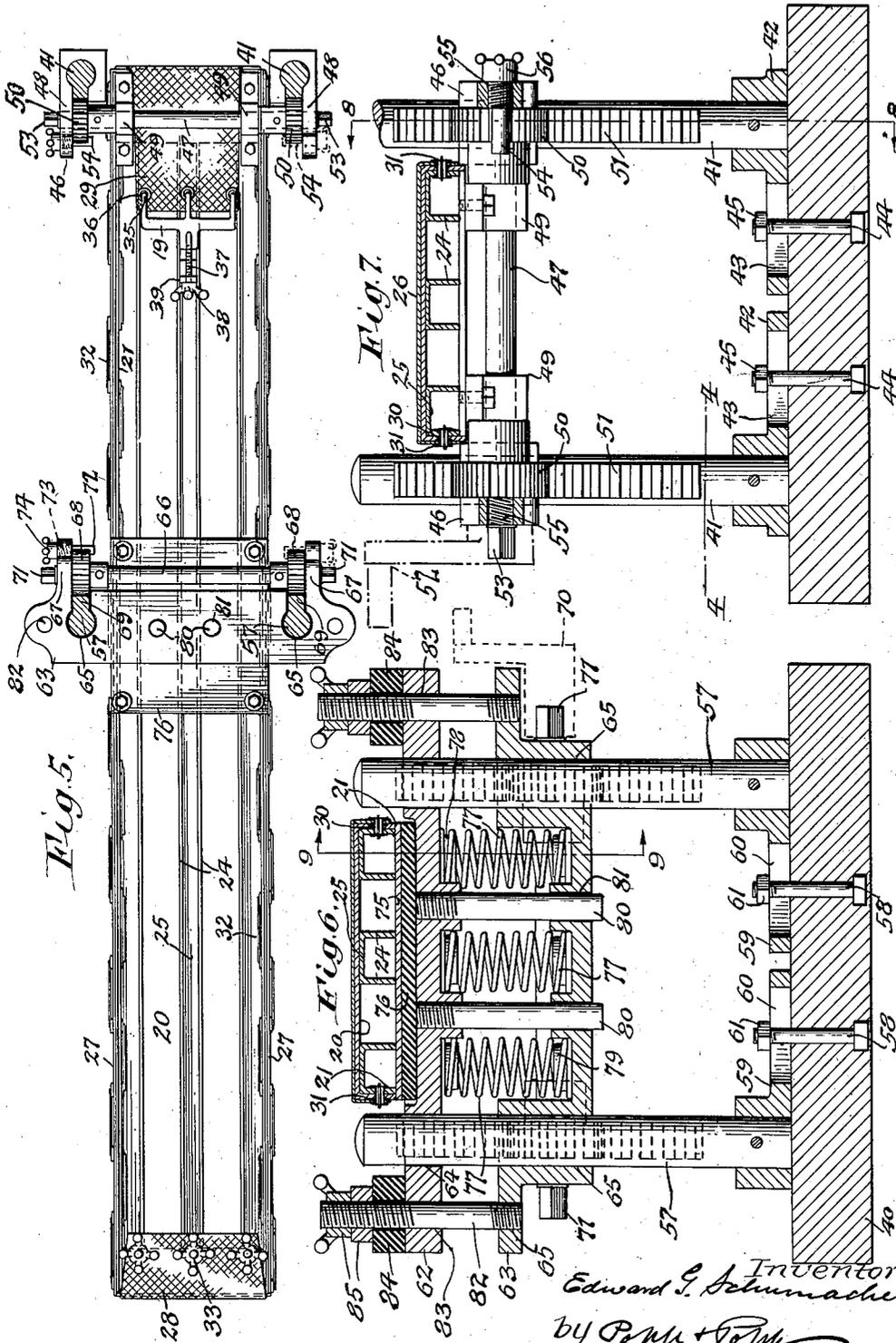
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# UNITED STATES PATENT OFFICE

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## DIVING BOARD

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13 Claims. (Cl. 272-66)

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This invention relates to a diving apparatus which is more particularly intended for use in connection with artificial swimming pools located either indoors or outdoors but is also useful in other installations.

At the present time the body of a diving apparatus is usually made of wood planks which have a springy or flexible quality so that the diver can take-off easily and gracefully and also aid him in increasing the extent of his jump before descending into the water. Wood suitable for diving boards is becoming increasingly scarce and it is therefore difficult and costly to maintain diving apparatus containing such equipment when the same is broken.

In the use of so called "spring boards" it is also desirable to adjust them so as to permit different types of diving and also to permit persons of different weights to use the apparatus most effectively.

It is one of the principal objects of this invention to provide a board or take-off member for diving apparatus which is made wholly of metal so as to reduce the cost of this part of diving equipment.

Another object of this invention is to provide means for mounting the board of a diving apparatus so as to permit of using the same for low or high diving, also to permit of different kinds of dives and to readily adapt the board for persons of different weight.

With these objects in view this invention consists of the improved means which are shown in the accompanying drawing and described in the following specification and summed up in the appended claims.

In the drawings:

Fig. 1 is a side elevation of a diving apparatus embodying a form of this invention which is so constructed that the rear end of the diving board may be adjusted vertically to suit different requirements but hold this end of the diving board in a normally fixed position and also supporting the intermediate part of the diving board so that the same is vertically adjustable to suit different requirements and also permit the diver to take-off easily and with a springy action from the front end of the board.

Fig. 2 is a top plan view of the diving apparatus shown in Fig. 1.

Fig. 3 is a fragmentary vertical longitudinal section of the diving apparatus.

Fig. 4 is a fragmentary horizontal section taken on line 4-4, Fig. 7.

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Fig. 5 is a horizontal section taken on line 5-5, Fig. 1 and looking upwardly.

Figs. 6 and 7 are vertical transverse sections, on an enlarged scale, taken on the correspondingly numbered lines in Fig. 1.

Fig. 8 is a fragmentary vertical section taken on line 8-8, Fig. 7.

Fig. 9 is a fragmentary vertical section taken on line 9-9, Fig. 6.

Fig. 10 is a side elevation of a diving apparatus embodying this invention but showing a modified form of the same.

Fig. 11 is a top plan view of the diving apparatus shown in Fig. 10.

Figs. 12 and 13 are vertical cross sections taken on the correspondingly numbered lines in Fig. 10.

In the following description similar characters of reference indicate like parts in the several views of the drawings.

The diving apparatus embodying this invention and illustrated in Figs. 1-9 consists generally of a base or foundation, a diving board arranged above the base, means for normally supporting the board at its rear end in a fixed position but permitting vertical adjustment of the same, means whereby the intermediate part of the board is resiliently supported but is capable of vertical adjustment, and means for detachably mounting a mat on the spring board so as to guard against slippage of the diver thereon.

Instead of making the take-off board of resilient wood as has been customary heretofore, the present board is made wholly of metal as follows:

The numeral 20 represents the top plate of the board made of sheet metal which is comparatively long and narrow corresponding to the general dimensions of wooden spring boards heretofore in common use.

Along its longitudinal edges this top plate is provided with downwardly projecting longitudinal flanges 21 of sheet metal and at its transverse front and rear ends the same is also provided with downwardly projecting sheet metal flanges 22, 23, thereby providing a structure which is very light and strong and capable of withstanding the load imposed on the same during a diving operation.

For the purpose of further increasing the strength of this board its underside is provided with a plurality of longitudinal ribs 24 which project downwardly from the underside of the top plate 20, these ribs being preferably formed in pairs by bending a strip of sheet metal into U-form in cross section and securing the horizontal

web 25 of the respective pair to the underside of the top plate 20 by spot welding, brazing or other suitable means as shown in Figs. 6 and 7.

In its operative position this board or take-off member may be arranged either horizontally or in an inclined position in which the upper surface of the same rises from its rear end and toward its front end to suit the particular kind of diving which is to be performed.

In order to prevent the diver from slipping on the board the upper side of the top plate is covered by means of a mat, the body 26 of which is comparatively long and narrow and of such dimensions that it covers the entire upper side of the board and also provides longitudinal flaps 27 which project downwardly from the longitudinal edges of the body and engage with the outer sides of the longitudinal flanges 21 of the board while the front end of the body of the mat is provided with a transverse front flap 28 which is turned downwardly against the front side of the front flange 22 and rearwardly toward the underside of the board and the rear end of the body of the mat having a rear flap 29 which is turned downwardly against the rear side of the rear flange 23 and forwardly toward the underside of the rear part of the board, as shown in Fig. 3.

Various means may be provided for detachably connecting this mat with the diving board along its longitudinal and transverse front and rear edges but those which are shown in the drawings are preferably constructed as follows:

The numeral 30 represents longitudinal rows of openings formed in the longitudinal flanges of the spring board and 31 represents a plurality of openings arranged in longitudinal rows on the longitudinal flaps of the mat, each of these openings being preferably lined with a grommet, thereby avoiding the formation of cutting edges in the openings of the board flanges 21 and also preventing tearing out holes in the longitudinal flaps of the mat.

In attaching the mat to the diving board the openings in the longitudinal flaps of the mat are placed in register with the openings in the longitudinal flanges of the board and then these flanges and flaps are connected with each other by means of lacing 32 which is passed back and forth through successive openings and lengthwise of the respective flanges and flaps so that the same are connected in a manner which permits of readily applying the mat to the board and also removing the same therefrom.

Means are also provided for stretching the mat lengthwise of the board so that the same is taut or even thereon. Although this may be accomplished by various means it is preferable to employ for this purpose means for fixedly securing one end of this mat to one end of the board while the other end of the same is connected with the board by means which permit of drawing the mat tight.

As shown in Figs. 3 and 5 this is accomplished by connecting the rearwardly turned front flap 28 of the mat with the underside of the board by means of a plurality of clamping bolts 33 passing through openings or eyes 34 on the rearwardly turned part of the front flap of the mat, and pulling the rear flap 29 of the mat forwardly by means of an equalizing bar 19 having a plurality of hooks 35 engaging with eyes 36 on the rear flap 29, and a tightening bolt 37 which is connected at its rear end with the equalizing bar 19 and has a screw nut 38 bear-

ing against a downwardly projecting bracket 39 on the underside of the board.

By these means tightening of the screw nut 38 will cause the rear flap of the mat to be drawn forwardly and thereby put tension on the body of the mat which will cause the same to lie evenly on the upper surface of the board and provide a foot hold for the diver which will prevent him from slipping.

The board of the diving apparatus is mounted above the base or foundation 40 adjacent to the edge of the basin containing the pool of water which base may be constructed of any suitable material such as concrete or the like. At its rear end the board is mounted on the base by means which normally support the board rigidly in position but which are so constructed that this end of the board may be adjusted vertically relative to the base. The particular construction of the means for thus mounting the rear end of the board on the base which are shown in Figs. 1, 2, 3, 4, 5, 7 and 8 are constructed as follows:

The numeral 41, 41 represents two upright posts or standards which are arranged on opposite sides of the rear part of the diving board and are supported at their lower ends on the base while their upper parts are connected with the diving board by means which permit the latter to be adjusted vertically on these posts. Although various means may be employed for mounting the lower ends of these posts on the base, it is preferable to employ means for this purpose which are constructed as follows:

At its lower end each of the boards is secured to an adaptor preferably in the form of an arm 42 which rests on top of the base and is provided with a horizontal slot 43 which receives the upper part of an anchor bolt 44 which has its lower end secured in the base or foundation. When the diving apparatus is erected on the foundation the slots of the adaptor arms are placed over the bodies of the anchor bolts 44 and clamped down on the base or foundation by means of nuts 45 on these bolts bearing against the upper side of the adaptor arms. By these means these posts 41 may be properly secured to the base notwithstanding that there may be some inaccuracy in the location on the anchor bolts 44 on the base inasmuch as the adaptor arms may be shifted horizontally on the anchor bolts within certain limits and still enable the post to be located in the proper position on the base before tightening the nuts of the anchor bolts.

The numerals 46, 46 represent vertically movable slides, crossheads or carriages each of which is mounted on one of the posts 41, and 47 represents a horizontal shaft arranged transversely underneath the rear part of the board and journaled at its opposite ends in bearings 48 on the crossheads 46 while its intermediate part is journaled in bearings 49 on the underside of the rear part of the board. Vertical movement of the crossheads and the rear part of the diving board is effected by means which include gear wheels or pinions 50 secured to the shaft 47 and meshing with vertical racks 51 on the posts. Upon turning these gear wheels in one direction or the other, the rear part of the diving board and the crossheads 46 are raised or lowered relative to the posts 41. This turning movement of the shaft 47 and the gear wheels 50 may be effected in any suitable manner, such for example as a crank or handle

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shown by dotted lines 52 in Fig. 7 applied to the square end 53 of this shaft.

After the crossheads and the rear part of the board have been raised or lowered to the desired position on the posts 41 these parts are held stationary by locking means which may be variously constructed but preferably consist of locking pins 54 each of which is mounted on one of the crossheads 46 in such a manner that the same may be moved with its inner end into and out of engagement with a notch formed between two adjacent teeth of one of the gear wheels 50. Each of these locking pins is preferably connected by a screw joint 55 with the respective crosshead 46 and adapted to be turned by a handle 56 on the outer end thereof. By turning this locking pin the screw joint between the same and the respective crosshead will cause the inner end of this locking pin to move into or out of engagement with the adjacent teeth on the respective gear wheel 50 and thereby either lock this wheel against turning or permit the same to turn when adjustment of the rear end of the board is desired.

The means for mounting the intermediate part of the take-off board on the foundation or base so that the board is yieldingly supported and also permit of adjusting the same vertically to suit different requirements are constructed as follows:

57, 57 represent two upright posts which are arranged on opposite sides of the intermediate part of the take-off board and each of which has its lower end mounted on the base so that the same can adapt itself to upright anchoring bolts 58 on the base. These attaching means are preferably similar to those which are used in connection with the rear posts 41 and each of these comprises an adaptor arm 59 resting on the base and secured to the lower end of the respective post, said arm being provided with a radial horizontal slot 60 which receives the shank of an anchor bolt 58 and is pressed down on the base by means of a screw nut 61 applied to the upper end of the shank and bearing against the upper side of said arm. By means of this adaptable fastening the anchor bolts 58 need not be mounted on the base with absolute accuracy but nevertheless permits the respective post 57 to be connected therewith and located in the proper position on the base.

Below the intermediate part of the take-off board is arranged an upper crosshead 62 engaging with the underside of the take-off board and slidable vertically on the upper parts of the posts 57, and a lower crosshead 63 mounted on these posts and vertically adjustable thereon for which purpose these crossheads are provided respectively with openings 64, 65 which receive said posts. The lower crosshead 63 may be adjusted vertically on the posts 57 in various ways but preferably by means which include a horizontal shaft 66 arranged transversely below the take-off board and journaled adjacent to its opposite ends in bearings 67 at opposite ends of the lower crosshead 63, and gear wheels or pinions 68 secured to the opposite end portions of this shaft and meshing with vertical racks 69 mounted on the adjacent sides of the posts 57. By turning the shaft 66 and its gear wheels in one direction or the other these wheels will roll either upwardly or downwardly on these racks and move the parts mounted thereon accordingly. The turning movement of the shaft 66 is preferably effected by means of a crank 70 shown by dotted

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lines in Fig. 6 and adapted to be connected with the squared end 71 of this shaft.

After the lower crosshead 63 has been moved into the desired vertical position on the posts 57 this crosshead may be locked against vertical motion by means which preferably consist of locking pins 72 each of which is adapted to move horizontally on the adjacent part of the lower crosshead into and out of the space between two of the teeth on the adjacent gear wheel 68. This movement of the locking pin is preferably accomplished by means of a screw connection 73 between the same and an opening in the lower crosshead 63 and the turning of this locking pin may be effected by means of a knob or handle 74 arranged on the outer end of the same.

Cushioning means are provided between the upper crosshead 62 and the lower crosshead which cushioning means, as shown in Figs. 1, 3, 5, 6 and 9 preferably comprise a bearing plate 75 of metal secured to the underside of the intermediate part of the take-off board, and an elastic plate 76 of rubber or similar material arranged between the upper crosshead 62 and the bearing plate and secured to the diving board. By these means an elastic or cushioned support for the take-off board on the upper crosshead 62 is provided.

The main spring effect for yieldingly supporting the take-off board is provided by a plurality of helical springs 77 which are arranged in a group between the upper and lower crossheads 62, 63, each of these springs being held at its upper end against horizontal displacement on the upper crosshead 62 by means of a retaining stud 78 projecting downwardly from this crosshead and entering the upper end of the coil of this spring, and a retaining stud 79 mounted on the lower crosshead 63 and entering the lower end of the respective spring.

When the weight of the diver rests on the take-off board these springs 77 are compressed and as he jumps from the same these springs expand, thereby rendering the take-off board yielding and enabling the diver to take-off from the same and perform fancy diving as readily as has been possible when using flexible wooden planks.

In order to hold the upper and lower crossheads 62, 63 in alinement with each other and prevent any binding action of the upper crosshead on the posts 57, independent guide means are provided which preferably comprise a plurality of upright guide rods 80 each of which is secured at its upper end to the underside of the upper crosshead 62 and has its lower part slidable vertically in a guide opening 81 in the lower crosshead 63, as shown in Fig. 6.

Means are provided for limiting the upward movement of the upper crosshead under the effects of the springs 77 when the latter expand, which means preferably comprise upright limiting rods 82 arranged adjacent to the posts 57—57 and each secured at its lower end to the adjacent end of the lower crosshead 63 and sliding with its upper part through an opening 83 in the corresponding end of the upper crosshead 62, a rubber buffer or cushion 84 resting upon the upper crosshead and surrounding the respective limiting rod, and adjusting screw nuts 85, applied to the upper end of the respective limiting rod and bearing against the upper side of the buffer 84, as best shown in Fig. 6. By tightening the screw nuts 85 more or less the main springs 77 may be compressed more or less in addition to the initial compression imparted to these springs

before mounting the same between the upper and lower crossheads.

When the weight of the diver depresses the take-off board the upper crosshead slides downwardly on the limiting rods and when the weight of the diver is taken off from this board the latter is again elevated between springs 77 until the upper crosshead is arrested by the buffers and adjusting screw nuts on the upper ends of these rods.

The modified form of diving apparatus embodying this invention, and shown in Figs. 10, 11, 12 and 13 is constructed as follows:

So far as the base or foundation and the take-off or spring board are concerned, these are substantially like the corresponding parts shown in Figs. 1-9.

The means for pivotally supporting the rear end of the board on the foundation are so organized that the board is only capable of turning about a horizontal fulcrum but is incapable of vertical adjustment relative to the base.

In this construction the numeral 86 represents a transverse cross bar secured to the upper side of the base by means of anchor bolts 87 passing through the opposite ends of the same and anchored at their lower ends in the base. Adjacent to opposite ends of this cross bar the same is provided with two upright posts 88 arranged on opposite sides of the rear end part of the take-off board. The numeral 89 represents a horizontal shaft arranged transversely underneath the rear part of the take-off board and journaled in bearings 90, 90 secured to the underside of this board. The opposite ends of this shaft project through openings 91, 91 in the adjacent parts of the rear posts 88 and are held against displacement thereon by means of screw nuts 92 engaging with the shaft and bearing against the outer sides of these posts, as shown in Figs. 10, 11 and 13.

Yielding means are provided for supporting the intermediate part of the take-off board which preferably comprise a cross bar 93 secured at its opposite ends to the top of the base by means of anchor bolts 94, and a crosshead 95 having its central part engaging with a plate 96 on the underside of the intermediate part of the take-off board while its opposite ends are slidable vertically on two upright posts 97 which rise from the cross bar 93 on opposite longitudinal sides of the take-off board. This crosshead 95 and the take-off board mounted thereon are yieldingly held in an elevated position by means of springs 98 interposed between the crosshead 95 and the crossbar 93 and held against displacement by means of upper and lower retaining studs 99 arranged respectively on the crosshead 95 and the cross bar 93 and entering the upper and lower ends of these springs as best shown in Fig. 12. The upward movement of the crosshead 95 is limited by means of rubber buffers or cushions 100 mounted on the guide posts 97 and resting on the upper side of the crosshead 95 and adjustable screw nuts 101 arranged on these guide posts above the buffers 100.

The crosshead 95 is also guided with reference to the cross bar 93 by means of upright guide rods 102 secured at their upper ends to the upper crosshead 95 and sliding at their lower ends in guideways 103 on the lower cross bar 93, as shown in Fig. 12.

During a diving operation the weight of the diver depresses the board and compresses the springs 98 and when the weight of the diver is removed from the board the latter is again

elevated by means of these springs until the crosshead 95 engages the underside of the respective buffers, thereby enabling the diver to use this board with the same yielding or cushioning effect as when using ordinary resilient wooden planks.

Both forms of this invention are very efficient in operation, they are compact in construction and capable of being readily installed and maintained in an operative condition. They can also be manufactured at comparatively low cost and are not liable to be broken in use thereby avoiding expensive replacements as has been necessary heretofore when using wooden planks for the spring board.

I claim as my invention:

1. A diving apparatus comprising a board constructed of sheet metal and including a top plate and flanges projecting downwardly from the edges of said plate, a mat arranged on top of said plate, and means for detachably connecting said mat with said board including lacing passing through corresponding openings in said flanges and said mat.

2. A diving apparatus comprising a board constructed of sheet metal and including a top plate and flanges projecting downwardly from the edges of said plates, a mat arranged on top of said plate and means for tightening said mat lengthwise on the board including bolts connecting an end of said mat with said plate, a bar connected with the opposite end of said mat, and a tightening screw connecting said bar with said plate.

3. A diving apparatus comprising a board, a base, and means adjustably supporting said board on said base including posts rising from said base and each provided with a gear rack, gear wheels meshing with said racks, crossheads slidable on said posts and having bearings, a shaft connected with said wheels and journaled in said bearings, and locking pins movable on said crossheads and adapted to engage with the teeth of said wheels.

4. A diving apparatus comprising a board, a base, means whereby the rear end of the board is mounted on said base, and means adjustably supporting the intermediate part of said board on the base including posts rising from said base and provided with gear racks, a crosshead guided on said posts and supporting said board, and gear wheels mounted on said crosshead and meshing with said gear racks.

5. A diving apparatus comprising a board, a base, means which mount the rear end of the board on said base, and means adjustably supporting the intermediate part of said board on the base including posts rising from said base and provided with gear racks, a crosshead guided on said posts and supporting said board, gear wheels mounted on said crosshead and meshing with said gear racks, and means which hold said crosshead and gear wheels against movement after adjustment.

6. A diving apparatus comprising a board, vertically adjustable means for normally supporting the rear end of the board in a fixed position, and vertically resilient means for supporting the intermediate part of the board.

7. A diving apparatus comprising a board, vertically adjustable means for normally supporting the rear end of the board in a fixed position, and vertically resilient and vertically adjustable means for supporting the intermediate part of the board.

8. A diving apparatus comprising a board, a

base and means whereby said board is adjustably supported on said base including posts rising from said base and each provided with a gear rack, crossheads slidable on said posts, bearing means mounted on said board, a shaft journaled on said slides and bearing means, gear wheels connected with said shaft and meshing with said gear racks, and means holding said slides in position on said posts after adjustment.

9. A diving apparatus comprising a board, a base, means which mount the rear end of the board on said base, and means adjustably supporting the intermediate part of said board on the base including posts rising from said base and provided with gear racks, upper and lower crossheads slidable on said posts and said upper crosshead supporting said board, gear pinions mounted on the lower crosshead and meshing with said gear racks, locking means which hold said lower crosshead against movement on said posts, and cushion means interposed between said crossheads.

10. A diving apparatus comprising a board, a base, means which mount the rear end of the board on said base, and means adjustably supporting the intermediate part of said board on the base including posts rising from said base and provided with gear racks, upper and lower crossheads slidable on said posts and said upper crosshead supporting said board, gear pinions mounted on the lower crosshead and meshing with said gear racks, means holding said lower crosshead against vertical movement on said posts, a vertical guide rod secured at its upper end to said upper crosshead and slidable in said lower crosshead and spring means interposed between said crossheads.

11. A diving apparatus comprising a board, a base, means whereby the rear end of the board is mounted on the base, means whereby the intermediate part of the board is mounted on the base including posts rising from said base, upper and lower crossheads slidable vertically on said posts and said upper crosshead supporting said board, means whereby said lower crosshead is adjusted on said posts, cushion means interposed between said crossheads and means whereby the

upward movement of said upper crosshead relative to the lower crosshead is limited.

12. A diving apparatus comprising a board, a base, means whereby the rear end of the board is mounted on the base, means whereby the intermediate part of the board is mounted on the base including posts rising from said base, upper and lower crossheads slidable vertically on said posts and said upper crosshead supporting said board, means whereby said lower crosshead is adjusted on said posts, cushion means interposed between said crossheads and means whereby the upward movement of said upper crosshead is limited relative to the lower crosshead including adjusting rods connected at their lower ends with said lower crosshead, cushions resting on said upper crosshead, and screw nuts arranged on the upper ends of said adjusting rods and bearing against said cushions.

13. A diving apparatus comprising a board, a base, means whereby the rear end of the board is mounted on the base, means whereby the intermediate part of the board is mounted on the base including posts rising from said base, upper and lower crossheads slidable vertically on said posts and said upper crosshead supporting said board, means whereby said lower crosshead is adjusted on said posts, cushion means interposed between said upper crosshead and said board, cushion means interposed between said crossheads and means whereby the upward movement of said upper crosshead relative to the lower crosshead is limited.

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