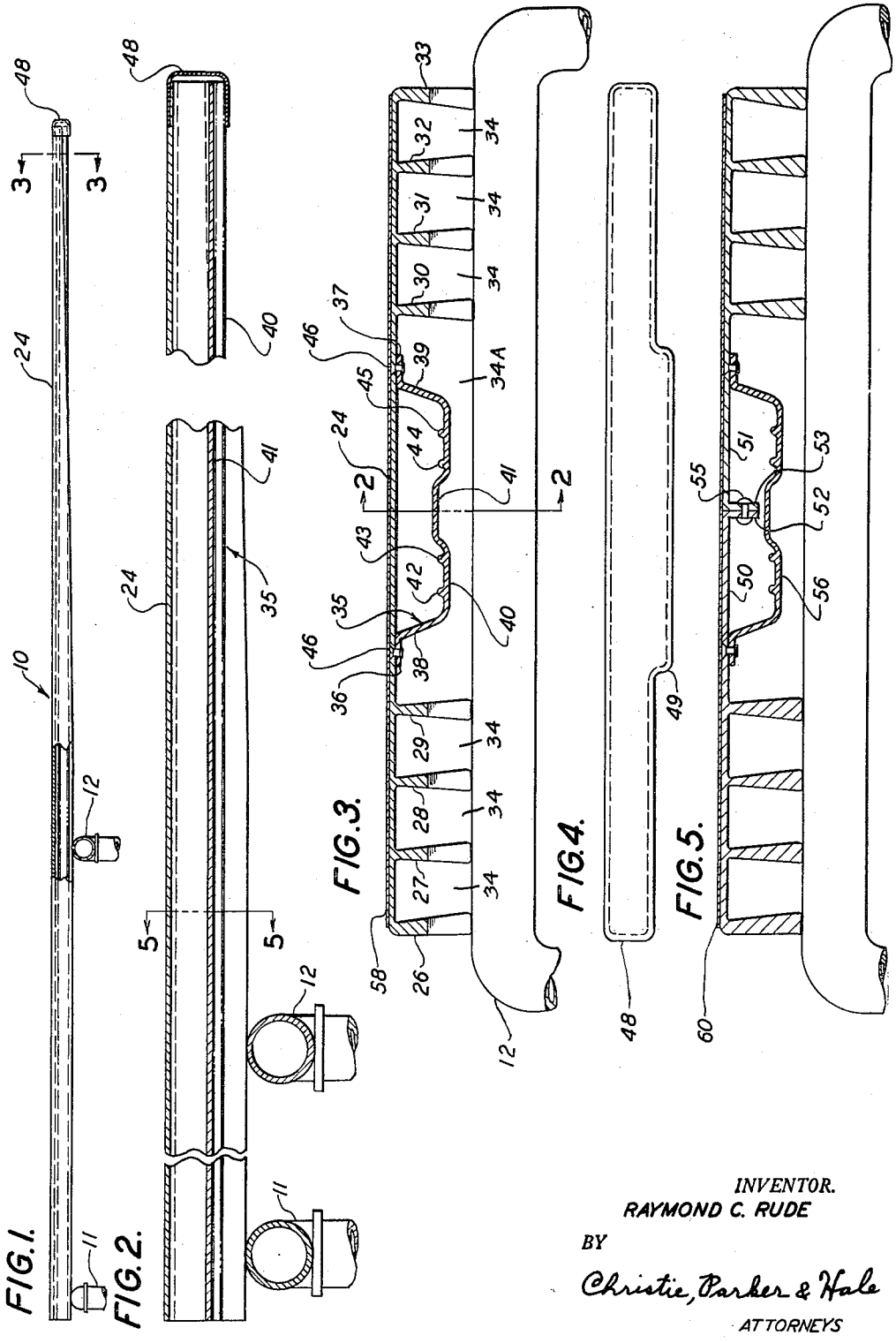
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METAL SPRINGBOARD

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INVENTOR.
RAYMOND C. RUDE
BY
Christie, Parker & Hale
ATTORNEYS

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METAL SPRINGBOARD

Raymond C. Rude, Pasadena, Calif.

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This invention relates to metal springboards of the type used in private and public swimming pools. This application is a continuation-in-part of my co-pending application Serial No. 388,316 filed October 26, 1953, now Patent No. 2,805,859 and entitled "Metal Springboard."

In my co-pending application I described and claimed a metal springboard which, in one embodiment, comprised a flat top plate having a plurality of longitudinally extending transversely spaced ribs formed integrally with the undersurface of the plate and defining a plurality of downwardly opening spaces. A board of this type may be extruded as a single piece or as two longitudinal sections flanged together along a longitudinal centerline to effectively form a unitary ribbed plate as described.

I have now found that a springboard of the type described in my co-pending application and particularly the embodiment mentioned above is further improved in its properties of balance and resistance to twist by provision of a torsional brace cooperating with the integrally formed ribs to provide an optimum degree of structural stability without detriment to flexure and other functional characteristics of the board.

As mentioned above, the board may be extruded or otherwise formed with the top plate and parallel ribs as a single integral unit or in two longitudinal sections adapted to be fastened together along the longitudinal centerline of the board. In either event, the torsion brace is a separate upwardly opening channel-shaped member extending longitudinally of the board and fastened to the underside of the board along the opposite longitudinal edges of the brace. Briefly, the brace is symmetrically disposed about the centerline of the board and lies between the innermost pair of parallel ribs.

In the event the board is fabricated of two longitudinal sections flanged together along the longitudinal centerline, the torsional brace conveniently encloses the flanged connection.

It is important that this brace enclose, with the undersurface of the board, a certain volume in order to develop the desired torsional resistance. I have found that this enclosed volume should be in the order of that developed by a channel-shaped brace member having a uniform cross-section of approximately four square inches extending from end to end of the board. The total volume enclosed by a torsional brace of this size extending from end to end of a 16 foot board will, of course, be greater than that of a like brace extending from end to end of a 10 or 12 foot board. However, this cross-section of approximately four square inches can be taken as a preferred minimum regardless of the board dimension.

The invention will be clearly understood from the following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevation partially in section of a board in accordance with the invention, showing a part of the anchoring and fulcrum means;

Fig. 2 is a longitudinal sectional elevation taken on the line 2—2 of Fig. 3;

Fig. 3 is a transverse sectional elevation taken on the line 3—3 of Fig. 1;

Fig. 4 is an end elevation of the board of Fig. 1; and

Fig. 5 is a transverse section of a springboard in accordance with an alternative embodiment of the invention.

Figs. 1, 2, 3 and 4 show, in the different above identified views, a metal springboard **10** illustrated as being anchored at one end to an anchoring member **11** and supported between its ends on a fulcrum member **12**. The anchoring member and fulcrum member may be conventional; they form no part of the invention and therefore are not described in detail. The board **10** consists of a single top plate **24** of lightweight resilient material, such as 24ST aluminum alloy or any of the other aluminum alloys or materials mentioned in my co-pending application.

The plate **24** is of uniform thickness from end to end and has a plurality of ribs **26**, **27**, **28**, **29**, **30**, **31**, **32** and **33** formed integrally with its undersurface and projecting perpendicularly to the plane of the plate. The two outer ribs **26** and **33** define the longitudinal sides of the board. The three ribs **27**, **28** and **29** are evenly spaced inwardly from the outer rib **26**, the group of four ribs being formed nearer the outer edge of the board than they are to the center of the board. Similarly, the three ribs **30**, **31** and **32** are evenly spaced inwardly from the longitudinal outer rib **33** and this group is also formed closer to the outer edge of the board than the longitudinal centerline of the board. The ribs define a plurality of narrow downwardly opening longitudinal spaces **34**. A wider space **34A** is defined by the innermost ribs **29** and **30**.

Commencing at a point just forward of the fulcrum **12**, the several ribs **26**, **27**, **28**, etc. taper uniformly toward the outer end of the board, the section of Fig. 3 showing that at or adjacent the outer end of the board the ribs are of a height of less than half of their height at the fulcrum **12**.

In accordance with the present invention, a torsion brace **35** is fastened along its longitudinal edges **36** and **37** to the underside of the plate **24** symmetrically about the longitudinal centerline of the board and lying between the inner ribs **29** and **30**. The torsional brace is generally channel-shaped with sides **38**, **39** terminating respectively in the lips **36** and **37** and connected by a central bottom portion **40**. The bottom portion is preferably reverse channeled at **41** along its central axis for increased strength and may be provided as illustrated with longitudinal ribs **42**, **43**, **44**, **45**. The object of this construction is to obtain a maximum of strength with a minimum of weight. The brace is preferably fastened to the underside of the board with a plurality of rivets **46**, as illustrated, but other fastening techniques can also be employed.

As shown in Fig. 2 the torsion member **35** is of substantially uniform cross-section and extends from end to end of the board. In the region of maximum dimension of the ribs **26**, **27**, **28**, etc. the ribs project outwardly from the bottom of the plate further than the torsion member. However, again as shown in Fig. 2, the tapered ribs reach a smaller dimension adjacent the outer unsupported end of the board than the torsion member, whereby the latter projects below the ribs. The outer end of the board is provided with a cap **48**, which, as shown in Fig. 4, is centrally enlarged at **49** to enable the cap to fit over the end of the torsion brace. As mentioned above, for the torsion brace to be effective it is necessary that it enclose with the undersurface of the board a certain

minimum volume. I have found that if the uniform cross-section of the torsion brace channel is at least about four square inches, a sufficient volume is enclosed throughout the length of the brace to provide the desired torsional reinforcement.

The embodiment of the springboard of the invention shown in transverse sectional elevation in Fig. 5 differs from that shown in Figs. 1 through 4 in the fact that it is fabricated from two substantially identical longitudinal sections. The two sections identified in the drawing with reference numerals **50** and **51** are each provided with integrally formed reinforcing ribs identical in shape and orientation with the ribs **26, 27, 28**, etc. of the previously described board and the ribs define a plurality of longitudinally extending spaces identical to spaces **34** of the board of Figs. 1 through 4.

In this embodiment the two sections **50** and **51** are provided along their inner longitudinal edges with flanges **52** and **53** respectively which may be joined together as by rivets **55** to form a single board of identical construction to that previously described save for the flanges and the longitudinal juuction between the two sections. As in the foregoing embodiment a torsional brace **56** is provided anchored along its longitudinal edges to the undersurface of the board, the edges being equidistant from and on opposite sides of the centerline of the board and the brace being disposed between the innermost integral ribs. In this construction it is important that the brace **56** be spaced from the lower edge of the flanges **52** and **53** so that the twist stability developed by the brace is not interfered with by structural engagement of the brace and flanges. An occasional contact between the brace and flanges **52** and **53** when the board is flexed is in no way detrimental.

Another important feature of the board, as illustrated, is the cross-sectioanl shape of the reinforcing ribs. As shown in Figs. 3 and 5, the ribs taper from a relatively narrow neck at the undersurface of the top plate to a considerably thicker outer edge. Under load, the plate is under tension and the outer edge of each of the ribs is under compression. The intermediate portion of the rib represents a neutral axis and a great deal of weight is saved without impairing the strength of the board by minimizing the amount of metal in the region of the neutral axis.

Still another very important advantage results from the preferred cross-sectional shape of the ribs. As the height of the ribs decreases toward the outer end of the board, there is in effect a compound taper. This results in a distribution of flexibility away from the fulcrum point which is of great advantage in both function and durability.

As described in greater detail in my co-pending application referred to above, and as shown in the sectional elevations of Figs. 3 and 5, the top plate of the board of the invention may be provided with a friction-surfacing material identified as **58** in Fig. 3 and as **60** in Fig. 5. Preferably this surfacing material consists of a plurality of narrow abrasive strips disposed transversely across the board in uniformly spaced relation and from end to end of the board. The present invention in no way relates to the surfacing of the board and is not limited to the particular surfacing mentioned or to any friction surfacing.

I claim:

1. A metal springboard adapted to be supported at one end by anchoring means and between its ends by fulcrum means, the board comprising a top plate having a flat upper surface extending from end to end of the board, a plurality of longitudinally extending spaced parallel ribs formed integrally with the underside of the top plate and defining a plurality of downwardly opening longitudinal spaces, said ribs being displaced outwardly from either side of the longitudinal centerline of the plate, and an upwardly opening channel-shaped torsion brace anchored to the underside of the board and extending longitudinally thereof and between the innermost ones of said ribs.

2. A metal springboard adapted to be supported at one end by anchoring means and between its ends by fulcrum means, the board comprising two substantially identical elements each comprising a top plate having a flat upper surface extending from end to end of the board, a plurality of longitudinally extending spaced parallel ribs formed integrally with the top plate and on the underside thereof and defining a plurality of downwardly opening spaces, a flange depending from one longitudinal edge of the top plate, means fastening the flanges of the two elements together with the top plates coplanar, and an upwardly opening channel-shaped torsion brace anchored to the underside of the board and enclosing the flanges of the top plate.

3. A metal springboard adapted to be supported at one end by anchoring means and between its ends by fulcrum means, the board comprising two substantially identical longitudinal half sections with each section comprising a top plate having a flat upper surface extending from end to end of the board, a plurality of longitudinally extending evenly spaced parallel ribs formed integrally with the top plate and on the underside thereof, the ribs being displaced toward the outer edge of the plate with one rib coinciding with the outer edge of the plate, a flange depending from the inner edge of the plate, means joining the flanges of the two sections together with the top plates coplanar, such joint defining the approximate longitudinal centerline of the board, and a channel-shaped torsion brace anchored along each of its longitudinal edges to the underside of the board on opposite sides of the joined-together flanges whereby the torsion brace encloses the flanges from end to end of the board.

4. A metal springboard adapted to be supported at one end by anchoring means and between its ends by fulcrum means, the board comprising a top plate having a flat upper surface extending from end to end of the board, a plurality of longitudinally extending spaced parallel ribs formed integrally with the top plate and on the underside thereof, the ribs increasing in lateral thickness outwardly from the region of the juncture of the ribs with the under surface of the plate, and a channel-shaped torsion brace anchored to the underside of the board symmetrically about the longitudinal centerline of the board.

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