Sept. 1, 1942. W. MOELLER 2,294,509

LIFESAVING NET

Filed Aug. 22, 1940 2 Sheets-Sheet 1

Fig. 2.

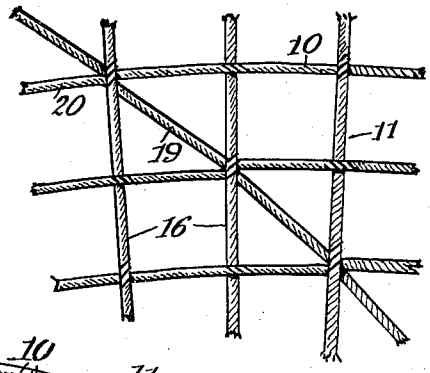
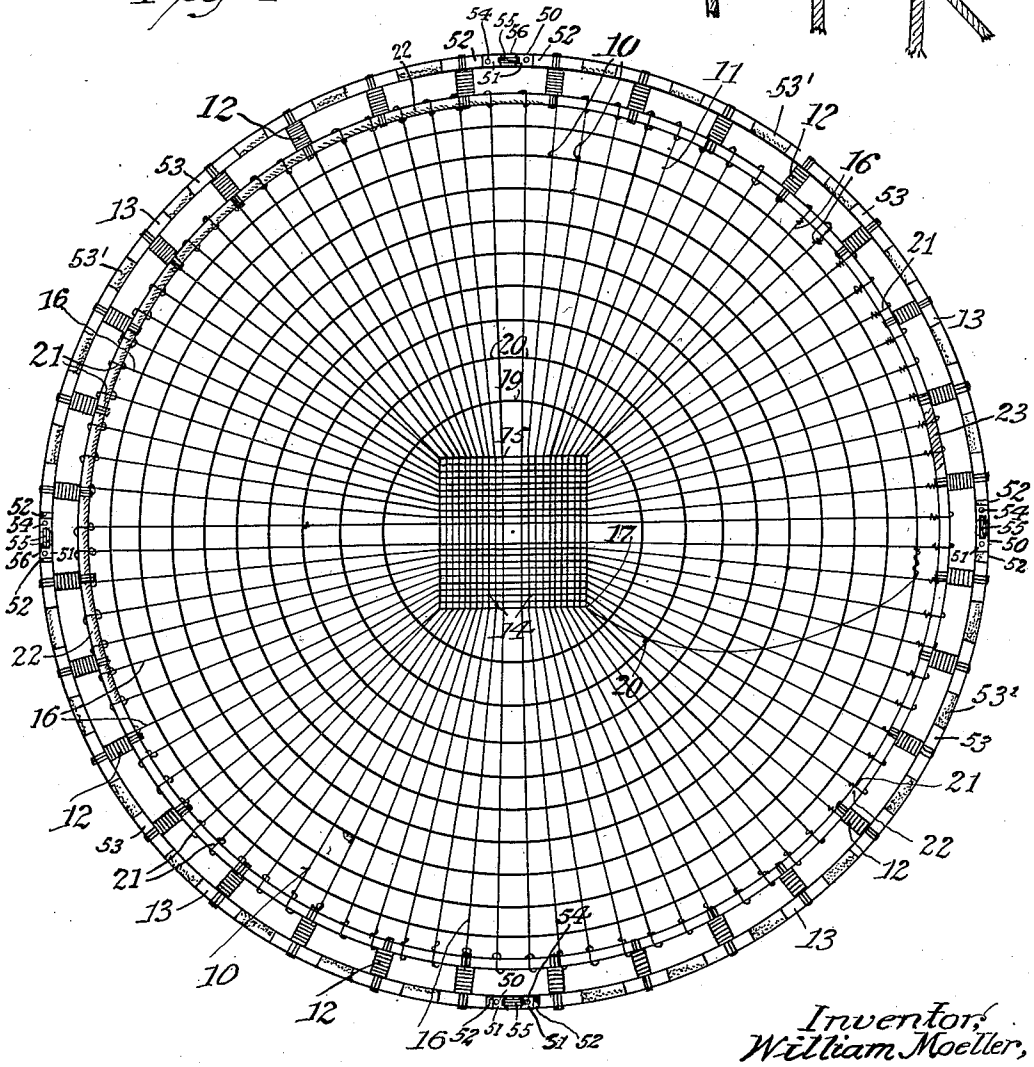



Fig. 1.




Inventor,
William Moeller,
by A.R. Appleman
Attorney

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Filed Aug. 22, 1940 2 Sheets-Sheet 2

Fig. 4.

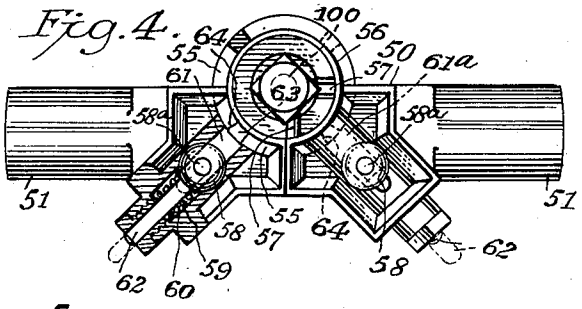



Fig. 5.

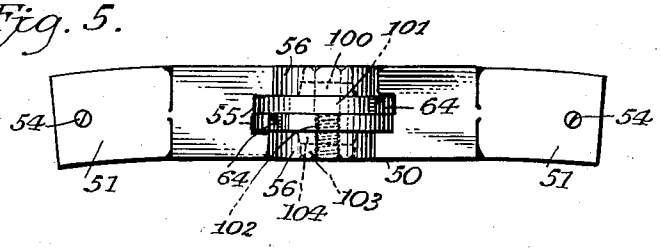



Fig. 6.

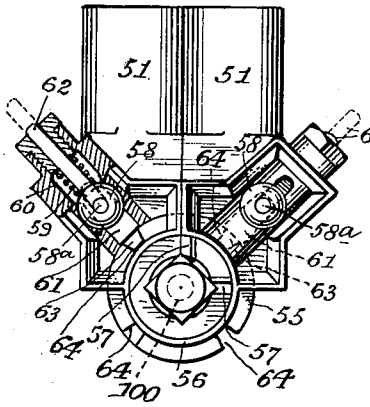



Fig. 7.

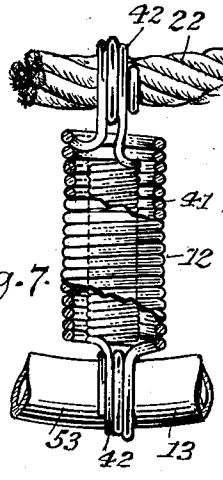



Fig. 8.

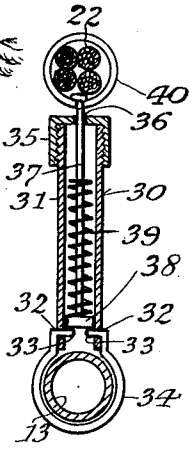
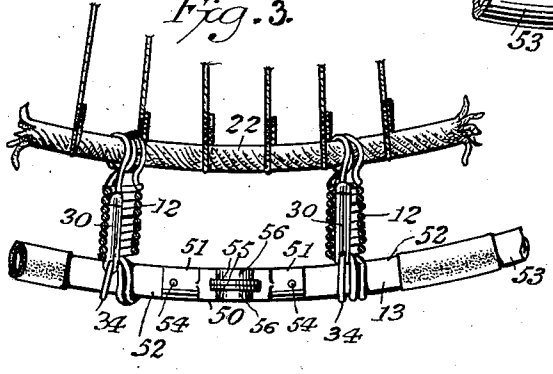



Fig. 3.




Inventor,
William Moeller,
by A. R. Appleman
Attorney.

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# UNITED STATES PATENT OFFICE

2,294,509

## LIFESAVING NET

William Moeller, Jersey City, N. J.

Application August 22, 1940, Serial No. 353,591

10 Claims. (Cl. 227—46)

This invention relates to life saving nets. The old style rope life nets were made of 3-strand rope, the meshes being formed by seizing the cross ropes and the spiral rope with waxed twine, resulting in an unequally balanced product. The hazards of this net had not been fully realized until I, personally disclosed to many prominent fire chiefs, the danger to the men holding the net as well as to the person jumping. At the time of impact, the jumper would strike the ground and several of the men holding the net would be dragged forward, sprawling into the net. Lack of substantial support thus made this net a dangerous piece of equipment and to obviate the above danger, I am submitting this new type of life saving net for approval.

The invention further relates to life saving apparatus and more particularly to life saving nets possessing new and more efficient features of construction regarding strength and resiliency and which may be quickly set up for rapid adjustment, to be held at or near a burning building by a group of firemen for catching jumping firemen and other citizens with safe results, and the said life saving net of this invention is well equipped to receive and hold the said jumpers from unusually high altitudes with a great degree of safety both to the said jumpers and to the supporters of the net.

It is thought best, at this time, to clearly describe the construction and materials preferably employed, and operation of the net as handled from the ground.

In this connection, I may first point out that the main body of the net is made of 4-strand pure hemp rope, interwoven into interlocked or non-slipping spider-web meshes of unique form and provided with a central set-up of a 4-strand pure hemp rope of laboratory-tested breaking strength of 1,800 pounds average. A sufficient number of spider or cross ropes of the above type are interwoven into a square, to form a center-piece of 18'' x 18''. This center-piece made in four sections, in such a way that there is left sufficient horizontal and vertical space centrally of the said center-piece, to permit easy folding of the net, either in halves or quarters.

A spiral rope, which is the last rope of the square formation, is directed radially outward to form a circle. After the formation of the first circle, it is locked and the same spiral rope is directed 4 to 5 inches outward to form another circle which is also locked, and this manipulation of the spiral rope is continued until nine or ten circles have been completed, according to the size of the net required, as shown in Fig. 1 of the drawings.

This invention further has for its principal mechanical feature, the provision of a rigid metallic ring, preferably consisting of a circular form of 9 feet, more or less, in diameter, constructed of a light weight material such as chrome molybdenum hollow steel tubing, made in two or four sections, hinged and locked together when in use, to form a continuous circular frame; and within this frame, spaced in parallelism therefrom, a continuous border rope is located and spliced; also provided are shock absorbers, properly spaced, and secured, one end to the metal frame and the inner end to said border rope; and within said shock absorbers and attached to the border rope at their inner ends and to the frame ring at their outer ends are auxiliary shock absorbers, acting in conjunction with the larger enclosing spring shock absorbers for producing the cushioning action for a falling body, and thus carrying out my invention.

Referring now to the two sheets of official drawings, disclosing my life net as a whole, after which the details of its construction in its favorite form is shown in several views, and in these drawings, it is not my desire to be limited as to the exact constructions shown, as many other forms may be adopted which would come within the description and claims and no limitation is intended by the language employed, both in the description and claims.

In the drawings,

Fig. 1 is a developed or expanded face view of my new life net, set up for instant use.

Fig. 2 is a fragmentary detail showing the type of lock mesh present in the bowl of the net.

Fig. 3 is a fragmentary view showing parts of the outer pipe ring and inner rope ring connected by shock absorbers 12.

Fig. 4 is a partial sectional plan view of one of the lock hinges placed at four equal points on the net supporting metallic ring.

Fig. 5 is a plan view thereof.

Fig. 6 is a partial section of the hinge with two parts of the net ring shown in a closed position and the lock pins pushed inwardly into their sockets for locking said hinge.

Fig. 7 shows a portion of the pipe and border rings connected by a pair of shock absosrbers of one type.

Fig. 8 is a side sectional view of a form of auxiliary shock absorber.

The box hinges 50, are operated 100% easier

than all former hinges on life nets and are also stronger. By the hinges being in the box and disk form with a sleeve 51 on the opposite end of each box for receiving the terminals 52 of the metallic ring sections 53, and fastened thereto by ¼'' screw pins 54 breakage from the said ring sections is avoided. The disks 55 are supported by a circular web 56 and this web is supported by quarter radial ribs 57 from the side walls of the box proper.

The locking device is placed one side of the center of the companion disks for the purpose of permitting the lock bolt to enter each of the opposite recesses 64 simultaneously for providing a double lock of double strength and can be released simultaneously with the fingers pressing outwardly on the knobs 58 without undue pressure upon the opposite springs 59 within the opposite channels 60.

The knobs 58, are secured on upwardly directed pins 58—A, from slide blocks 61, 61—A, formed with a reduced bolt 62, and at their inner ends with a squared nose 63, which normally enter into interlocked engagement with sockets or recesses 64, formed at the opposite sides of the disks 55.

From the following description, it will be apparent that the new life saving net, forming the subject matter of this invention, is different in design and construction from any net of its kind heretofore manufactured. The details of construction may be described as follows:

The net proper 10 is made of 4-strand pure hemp rope, interwoven into non-slipping spider-web meshes 11, one of the principal objects of the design being to provide maximum resiliency and equalization of strength. Attached to the net is a series of energy absorbing members 12, encircled and yieldingly supported by a rigid frame 13. The life saving net 10, when not in use, may be folded up either into halves or quarters, for transportation or storage and reopened for almost instantaneous action within a period of from 6 to 7 seconds. All details are described below and illustrated in the accompanying drawings.

The center-piece 14, as clearly illustrated in Fig. 1, is the basis of the construction and is formed by closely interweaving a series of ropes to form a square 15, from which emanate the cross or radial ropes 16. The center-piece is designed in four sections to permit the net to be folded more easily and compactly, either into halves or quarters.

Fig. 2 is a part or section of the net, illustrating the method of interweaving the cross ropes with the endless spiral rope into non-slipping meshes to form a spider-web design. The spiral rope, starting as one of the cross ropes, is woven into the centerpiece as at 17, Fig. 1, and is then interwoven and securely locked in position into the cross ropes to form a complete circle 19. It then continues at 20, further from the center, to form another complete circle. This procedure continues until the required number of circles (9 or 10) have been made. The end of each cross rope is made into a 3-tuck eye splice at 21, into which is inserted a frame rope 22, to which a series of shock absorbers 12, are attached. The ends of the frame rope are joined together by a short-splice at 23, thus forming a complete endless border.

I may employ an auxiliary shock absorber 30, placed in every main spring shock absorber 12, and which may consist of a metal casing 31, having opposite holes 32, at one end to receive the terminals 33, of a metal ring 34, for encircling the metal main ring 13, of the net structure.

As shown in Fig. 8, of the drawings, the upper or inner end of the casing 30, may carry a screw cap 35, provided with a central hole 36, through which a plunger rod 37, having a lower head 38, on which an auxiliary spring 39, may rest, and said rod may have a ring 40, welded thereto and encircling the frame rope 22.

In lieu of the auxiliary casing for limiting the contraction of the auxiliary spring 39, I may employ naked auxiliary springs 41, having their ends coiled into loops 42, for disposal within the larger springs or energy absorbing members, if desired, and still have a 3-loop connection of the shock absorber to the opposite metallic ring and the frame rope.

The component disks and companion parts of the hinge are held in interlocked connection by a central pivot bolt 100, passing through aligned companion apertures formed into a registering smooth bore 101, provided in one disk and a threaded bore 102, provided in the opposite disk; the threaded end of the lock bolt having a threaded lock nut 103, screwed home against the adjacent hub 104, of the near disk, as shown in Fig. 5 of the drawings.

What I claim is:

1. The combination in a life net, a rigid metallic frame, a border rope extending around and inward of the frame and spaced at a constant distance therefrom, main shock absorbers connected to said metal frame and to said rope and auxiliary shock absorbers operable within each main shock absorber and having connections with the metal frame at one end and with the border rope at the other end to absorb all peripheral shocks subjected to said net within the said frame.

2. In combination with a life net mounted within a metallic ring and an endless border rope; shock absorbers connecting said ring and said border rope; the net having a center-piece made up in quarters permitting said net to be folded more compactly in halves or quarters thereby eliminating injury to the material in the fold when the said net is repeatedly folded for storage.

3. In the combination as disclosed in claim 2, and the ropes of said center-piece except one, being continued into a spider-web formation and having their ends spliced to the said border rope as shown.

4. The combination in a life saving net, of a rigid metallic outer frame comprising sections; lock-joints and hinged parts for interconnecting said sections; said parts comprising disks and reinforcing box parts rotatable on a central bolt; sleeves extending oppositely from said pivoted members and adapted to receive in inter-locked relation the adjacent ends of said frame sections; resiliently slidable lock-bolts for engaging the said disks and for maintaining the frame sections in open or folded positions; a border rope resiliently attached to said frame at intervals, and a life saving net extending throughout the area of said rope ring and connected thereto at short intervals, said device serving to avoid injury of persons jumping from a burning building or the like into said net when properly supported.

5. The combination of a grasping metallic ring comprising interlocked sections; an endless border rope; shock absorbers resiliently connected to

the ring and border rope; a life net within and connected to said border rope; a center-piece of spider ropes made up in quarters centrally of the life net; a free rope emanating from the center-piece and extended in spaced circles around said center-piece and interspliced to each successive spider rope in its path as its end is carried outwardly to be interconnected to its other integral outermost terminal, as shown and described.

6. The combination in a life saving net of a surrounding metallic ring jointed at four equidistant points; hinged connections for said joints, comprising interpivoted members having extensions formed for receiving the adjacent ends of the metallic ring sections, cross pins passing through said hinged extensions and through said adjacent ends of the ring sections, a closed rope ring disposed within and parallel with said metallic ring, shock absorbers cross connected to the said outer and inner rings, a life net having a central pad of crossed ropes continued radially and outwardly and connected to said rope ring, the ropes of said pad forming central cross spaces whereby said net may be compactly folded on the cross lines of said hinges for preventing damage to the cross ropes in frequent folding operations.

7. The combination of a life saving net, a normally rigid metallic frame comprising four similar sections connected by hinged joints, a continuous rope ring within said frame; resilient radial devices connecting said frame and ring, auxiliary devices housed within said resilient devices and also having connection with said frame and ring, said life saving net being spliced to said ring and being formed with a square center-piece made of crossed, rectangularly laid ropes with the central crossed ropes of the center-piece omitted to permit compact folding thereof, to avoid injury in packing.

8. The combination with a life saving net, an outer metallic frame divided at circumferential intervals for forming equal sections connected by hinged joints, said joints comprising similar opposite parts including component contacting lock-disks having supporting circular webs, a central bore having a smooth portion in one disk and a threaded portion in the opposite disk, a pivot bolt, a head on the smooth portion and a nut on the threaded end for locking the parts together, an inner rope frame for receiving said life saving net, and means arranged centrally of said net for permitting compact folding thereof for storage.

9. A life saving net comprising in combination with an outer metallic ring member composed of hinged joints of equal length and foldable one over another; an inner ring of flexible material; expansible outer and inner connections attached to and across between the said ring members; a life net provided with a squared center-piece of spaced ropes with crossed centrally located vacant channels for permitting easy folding of the net along those lines without injury in frequent bending or packing; said ropes being carried outwardly from the center-piece radially and spliced to said inner ring, and a single rope carried around the center-piece in continuous rings and spliced to each radial rope in turn and to itself at its end; and said hinged joints of the outer ring member having lock-sockets and spring actuated bolts for entering said sockets for locking the companion parts of said joints in an open or closed position, and means for releasing said bolts from their sockets.

10. In combination with a sectional grasping ring a marginal fibrous ring therewithin, resilient devices connecting said rings at intervals and a life saving net disposed within and connected to said fibrous ring; box hinges connecting the parts of the sectional ring, the hinges comprising opposite contacting disks, each provided with diametrically opposite notches; spring pressed lock bolts having locking noses for engaging the notches, and means operated by fingers for withdrawing the noses from said notches when the bolt connected joint is to be broken for folding the parts for storage, as described.

WILLIAM MOELLER.