

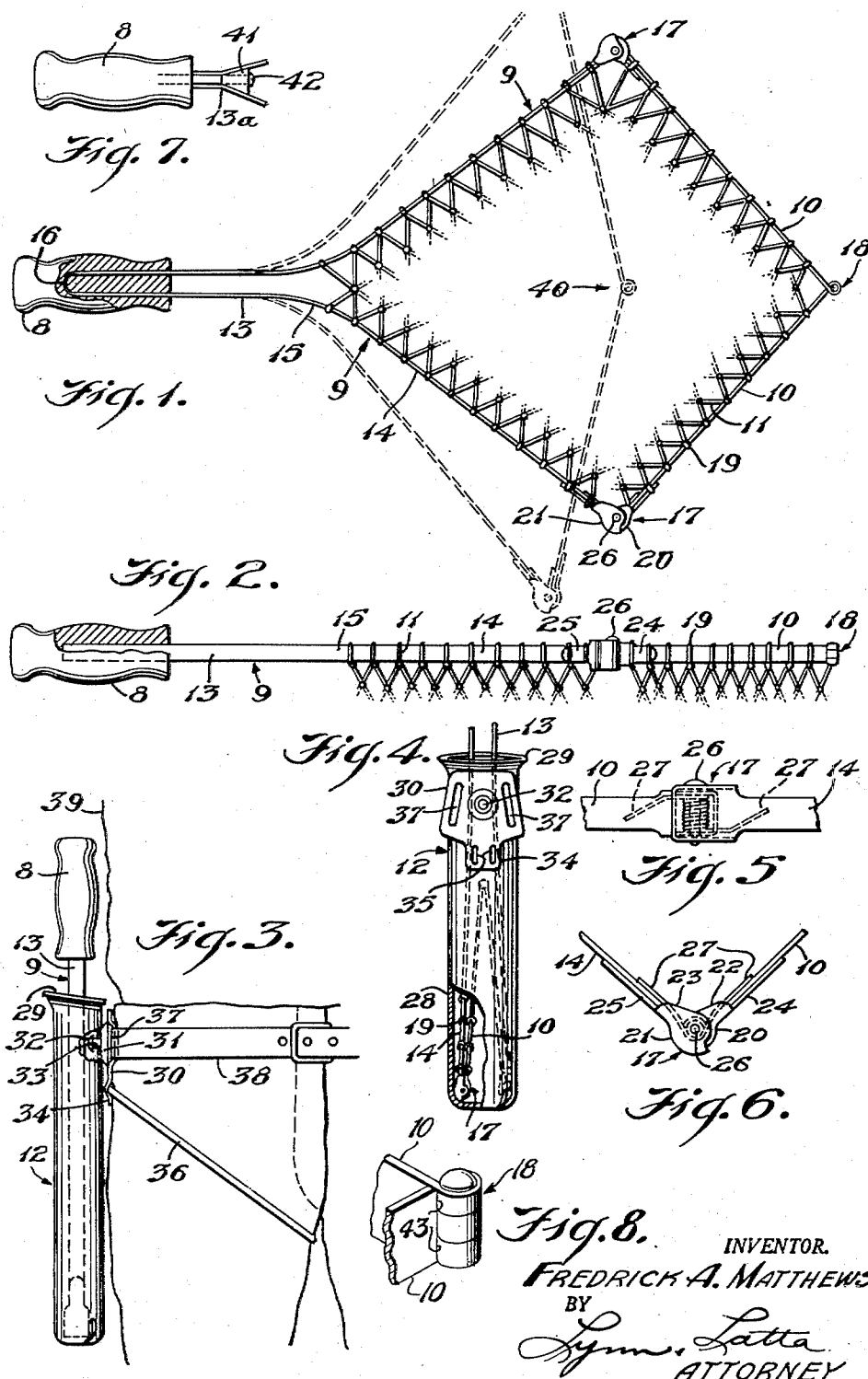
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F. A. MATTHEWS

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FOLDING LANDING NET

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INVENTOR.

FREDRICK A. MATTHEWS

BY

Lynn Latta
ATTORNEY

UNITED STATES PATENT OFFICE

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FOLDING LANDING NET

Fredrick A. Matthews, Van Nuys, Calif.

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This invention relates to fisherman's landing nets. It relates particularly to a folding type of landing net and has as its general object to provide a landing net in combination with a holster in which the landing net is normally carried, and from which the net may be quickly removed when its use is required.

A particular object of my invention is to provide a folding landing net which, when removed from its holster will automatically open to a fully spread position, ready for immediate use. While automatically opening collapsible landing nets have been previously proposed, such prior proposals usually require the manual manipulation of a latching device, and that the handle of the net be given a swinging impulse to effect the opening thereof. With two stages of manual manipulation thus required, there is a definite element of delay in opening the net. In contrast to this, my invention contemplates the opening of the net by a single continuous movement in whipping the net out of the holster. In achieving this result, I provide a net frame having a pair of resilient arms which are rigidly mounted in a handle and are preformed in a spread relation toward which they are constantly biased, by their inherent resiliency, while confined in the holster.

I find that best results are secured by employing a pair of spring arms which function initially (upon withdrawal from the holster) to spread the frame and then function to maintain the frame in the spread condition. I find that the successful accomplishment of this result depends upon a proper balance between the degree of force with which the resilient arms are biased away from each other when in the folded condition, and the degree of force with which the resilient arms are biased toward each other as the frame passes the dead center position during the spreading movement. The optimum condition that is aimed at is a maximum closing bias in the fully opened frame, which in turn provides maximum stability of the frame in the open position. In this connection, the invention aims to avoid the necessity for any type of latching or locking device for securing the frame in the open position, depending solely upon the closing bias of the resilient arms of the frame. One of the prior proposals for a folding net frame requires that the outer frame members be forced outwardly beyond the resilient arm members, and, in addition, considers it necessary to employ latching devices for locking the frame in the open position, to order to avoid unwanted collapse of the frame.

The use of such latching devices not only complicates the mechanism but also requires undesirable manual manipulation.

Having provided a suitable balance between opening and closing bias so as to provide maximum form retaining characteristics in the open position, my invention incorporates a further feature which is essential to the automatic opening. This feature involves the instantaneous release of the extremities of the resilient side arms for complete freedom of spreading movement. I attain such instantaneous and complete release by the employment of a separate holster as the means for confining the net frame in its folded condition with the handle of the frame projecting outwardly of the holster. With this arrangement, the extremities of the resilient arms are the last, rather than the first parts of the frame to be withdrawn from the holster, and accordingly the frame continues to be confined in its fully folded condition until the release of these extremities from the holster. Upon such release, therefore, the arms are suddenly freed, throughout their entire length, for unconfined spreading movement, and the full amount of kinetic energy stored within the arms brings about the movement of the arms at such velocity that the momentum of said arms is sufficient to swing the frame past the dead center position against the resistance of the maximum closing bias which thereafter becomes effective to provide form retention in the open position.

So far as I am aware, my invention is the first to contemplate this arrangement of folding net and holster to make possible the optimum ratio between opening and closing bias.

While it is possible to utilize the resiliency in the spring arms of the frame as the sole means for controlling net opening, I find that improved results can be obtained by providing spring means in the lateral hinges joining the spring arms to the outer arms of the frame, which spring means functions to give an additional opening and antirebound bias to the frame. Accordingly, another object of the invention is to provide a folding landing net in which the frame thereof incorporates a combination of resiliency in the inner arms and resiliency in the lateral hinges to provide a balancing of opening and closing bias which yields optimum stability in the open position combined with automatic opening from the folded position.

Another object of my invention is to provide a folding landing net in which the frame thereof incorporates stop means for limiting move-

ment of the frame beyond the full open position, which stop means is incorporated in the outer central hinge, eliminating the need for limiting means at the lateral hinges.

A further object is to utilize a stop means which has the further function of cooperating with the inward bias of the side hinges to establish tension throughout the frame, taking out looseness and providing stability in the open frame.

Another object of the invention is to provide a folding landing net in which the frame thereof incorporates side hinge fittings which are so constructed and arranged with reference to the inner arms of the frame as to protect the net itself against being cut by contact with the holster and to provide smooth sliding of the folded net frame in the holster.

Another object of the invention is to provide a folding landing net holster having means for fastening the same to the leg of a fisherman in such a manner as to permit the holster to swing freely. In connection with this object the invention contemplates the provision of a holster mounting bracket having means for anchoring the same to the wearer's leg so as to securely hold the bracket in a fixed position with reference to the person's body.

Another object of the invention is to provide a folding landing net embodying a frame of relatively simple, inexpensive and yet durable construction, and in which the inner arms of the frame are anchored with maximum permanency in the handle of the net.

Other objects will become apparent in the ensuing specification and appended drawings in which:

Fig. 1 is a plan view of a net incorporating my invention, shown in full lines in the fully open position and in broken lines in an intermediate position of the opening movement;

Fig. 2 is a side view of the frame portion of the net;

Fig. 3 is a front view of a portion of the body of a fisherman with my improved holstered net attached thereto;

Fig. 4 is a view looking at the inner side of the holster, with the folded net therein indicated in dotted lines;

Fig. 5 is a side view of one of the lateral hinges of the net frame;

Fig. 6 is a plan view of the hinge shown in Fig. 5;

Fig. 7 is a view of the handle portion of a landing net embodying a modified form of my invention including means for adjusting the tension in the spring arms;

Fig. 8 is a detail view of the end hinge of the net frame.

As an example of one form in which the invention may be embodied, I have shown in the drawings a folding landing net having a handle 8, an articulated frame 9 comprising a first pair of arms 14 and a second pair of arms 10, a net 11 strung upon the frame, and a holster 12 in which the net is normally carried and confined in a collapsed condition. The holster 12 functions not only as a support for carrying the net attached to the fisherman's body while not in use, but also is useful in guarding the net against snagging on brush and weeds.

Arms 14 constitute integral extensions of parallel shaft members 13, which join them to handle 8.

The arms 14 are of spring material, and may

be either of flat ribbon form as shown in the drawings, or of round wire form. Arms 14, in the open position of the net, diverge away from the handle 8 and are joined to shaft members 13 by a pair of connecting portions 15 which, in the unstressed condition of the frame, are curved.

The parallel shaft members 13 extend into the handle 8 and are joined by a loop 16. The loop and the adjacent portions 13 of the arms 9 being embedded in the handle 8, the frame is securely and permanently anchored in the handle with no possibility of the arms 9 pulling out of the handle. A preferred mode of arriving at this construction is to mold the shaft members 13 and loop 16 into the handle 8, which may be of a molded plastic material.

The arms 10 may or may not be of spring material. However, the proper functioning of the net depends upon the preservation of the original shape of the arms 10 (whether it be perfectly straight or slightly bent) and it is therefore important that the arms be of sufficiently rigid shape retaining material to avoid accidental bending, and the best material for this purpose is the hardened spring material of the arms 14.

The arms 10 are joined to the arms 14 by lateral hinges 17, and to each other by a central, outer hinge 18. Each of the hinges 17 is of a bulbous type, providing a periphery which projects outwardly beyond the area embraced by the corresponding arms 14. As indicated in Fig. 4, in the holstered condition of the net, these bulbous hinges provide the sole bearing engagement between the frame and the holster, placing the frame arms 14 away from the wall of the holster sufficiently to prevent any rubbing contact between the net loops 19 (by means of which the net is strung upon the arms 9) and the wall of the holster. This is important, since it avoids the extreme wear that would be occasioned by any engagement of the loops 19 under spring pressure between the arms 14 and the holster wall. Bearing engagement between the hinges 17 and the holster wall is maintained throughout the withdrawal of the net from the holster, thus providing for smooth and easy withdrawal of the net from the holster.

Each hinge 17 (Fig. 6) comprises a pair of fittings 20 and 21 of arcuate shape having side wings 22, 23 respectively, embraced one within the other, and having shank portions 24, 25, suitably secured to the respective arms 10, 14. In order to minimize projections that might catch against the net, the shank portions 24, 25 are preferably welded to their respective arms. Likewise the meshing of the fittings 20 and 21 and the arcuate shapes thereof are such as to minimize projections in the hinge itself.

The wings 22, 23 are connected by a pivot pin 26 around which is coiled a mouse trap type spring 27. The ends of the spring 27 engage against the inner sides of the arms 10, 14 respectively, tending to increase the angle between said arms 10 and 14.

The holster 12 includes a tubular casing portion 28 which may, for example, be formed from aluminum tubing flattened so that the width of the holster (as viewed in Fig. 4) is greater than the thickness of the holster (as viewed in Fig. 3). At the upper end of the holster is a belled mouth 29 which permits the hinges 17 to slip out of the holster freely, and with minimum wear thereon, and facilitates reinsertion of the net.

The holster includes a mounting bracket 30

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having a raised central portion 31 embossed therein and a post 32 mounted in said raised central portion 31. The post 32 is extended through an opening 33 in the inner wall of the holster casing 28, and its inner end is headed so as to secure the casing 28 to the bracket 30 with the wall of the casing bearing against the raised portion 31 of the bracket.

The bracket 30 has an extension 34 which is provided with openings 35 through which a strap 36 may be passed. The body of the bracket 30 is provided with slots 37 through which is passed a strap 38 (preferably the belt of the person wearing the holster). It may now be noted that with the belt 38 strapped around the waist of a person (indicated at 39 in Fig. 3) and with the strap 36 passed downwardly around the leg, that the bracket 30 will be firmly supported and held in a position in which its longitudinal axis is securely fixed. With the bracket 30 thus fixed, the casing 28 of the holster may freely swing upon the pivot 32. Conversely, the pivot between the holster and the bracket permits the bracket to be firmly secured to the body to minimize flopping of the holster against the wearer's leg, and digging of the handle into the side of the person's body.

In the operation of my improved landing net, the net is normally carried in the holster as shown in Figs. 3 and 4. The holster functions to confine the frame arms 10 folded inwardly between the arms 14 as shown in Fig. 4, and with the net tucked in between the folded arms 10. With the arms 14 thus folded inwardly, the normally curved connecting portions 15 are straightened out and placed under tension by the confinement of the frame in the holster. The tension thus developed tends to spread the arms 14 apart, thereby establishing an opening bias in the frame as confined by the holster in folded condition. If the arms 10 were detached from the arm portions 14, the latter would, in their unstressed state, assume positions which (in a net frame omitting the hinge springs 27) would be disposed inwardly of the full line position shown in Fig. 1. In the assembled frame, however, inward movement of the arms to such unstressed positions is, in the opened net, prevented by the engagement of shoulders 43 on one of the respective arms 10 with the inner face of the other arm 10 at the hinge 18, as shown in Fig. 8. Consequently the arms 14 will be stressed with a closing bias which, in cooperation with the limiting action of the hinge 18 arising from such engagement of the shoulders 43 against the adjoining arm 10, establishes tension throughout the frame, with the hinges 17 attempting to move closer to each other. The result is that projection of the frame away from the handle beyond the open position is prevented by the limiting action of hinge 18, and thus the frame is yieldingly locked in the open position.

The actions of the arms 9 in producing this closing bias arising from the stressing of the portions 15 thereof, may either be supplemented or wholly replaced by the action of the springs 27 tending to spread the arms 10 and 14 to a wider angle. With the arms 10, 14 connected together by the handle 8 and the hinge 18 respectively, the spreading action of the springs 27 will set up a closing bias tending to move the hinges 17 toward each other.

The closing bias is at a maximum value as the hinge 18, moving, from the closed to the open condition, in the direction indicated by arrow 40 in Fig. 1, passes through a "dead center" position

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in which arms 10 are in alignment with each other, i. e., in mutual alignment (a position just preceding the position shown in dotted lines in Fig. 1). This movement is assisted by the momentum of the arms 10 derived from the outward movement of said arms 10 in the direction 40 from the collapsed condition of the holstered net shown in Fig. 4. This momentum in turn is derived from the energy stored in the curved connecting portions 15 and arms 14 when stressed inwardly by the confining action of the holster. This stored energy is utilized as the arms 14 swing outwardly from the completely collapsed position to a position wherein the curved connecting portions 15 and arms 14 reach their unstressed state, and is converted into kinetic energy which brings about the movement of arms 10 at such velocity that the momentum of said arms carries them past their positions of mutual alignment, bending the arms 14 outwardly beyond their unstressed positions and thus stressing them with a closing bias. The stressing of the arms 14 and of the springs 27 and the dimensions and relations of the arms are such that this outward stressing of the arms 14, although it gradually absorbs the momentum of the movement thereof in direction 40, never becomes sufficiently great to effect complete absorption of this momentum. That is to say there is a sufficient excess of momentum to carry the arms 10 through their positions of mutual alignment. This is made possible by instantaneous release of the hinges from their fully collapsed condition for complete freedom of opening movement, and this in turn is made possible by the holstering of the net with the hinges 17 at the bottom of the holster, so that the hinges are the last parts of the net to be released from the holster and consequently the entire expanding force of the arms 14 is allowed to become operative instantaneously.

All parts of the frame are preferably finished with a rust resistant metal plating, or the material of the arms may in itself be rust resistant (e. g. stainless steel). The rivets and hinge pins may be of material such as "Monel" metal. The plastic material of the handle provides resistance against the action of moisture and air. The net 11 is preferably treated with a mildew resisting chemical. Thus, it is possible to provide a net that can be used for many years, since the construction of the hinges and arms is likewise designed for permanency.

In Fig. 7 I have shown a modified form of the invention in which the stressing of the arms 14 may be varied by means of a wedge 41 interposed between the arms portion 13a and adapted to be adjusted toward and from the handle 8 by means of an adjusting screw 42 extending through the wedge and threaded into the handle. The wedge 41 cooperates with spreading portions of the arms 14.

I claim as my invention:

1. A self opening collapsible landing net and holster assembly comprising, in combination: a holster; a net; a handle; a pair of resilient substantially parallel shaft members projecting in spaced relation from one end of said handle; and an articulated net supporting and mouth defining frame comprising first and second pairs of arms, connecting members normally having a bend integrally uniting the arms of the first pair to the respective shaft members with said arms of the first pair normally diverging from said shaft members, lateral hinges joining the outer ends of the arms of the first pair to the arms of the sec-

ond pair, and a center hinge joining the arms of the second pair to each other, whereby the frame may assume a collapsed position in which the arms of the second pair are folded between the arms of the first pair with the center hinge projecting toward the handle and the arms of the second pair drawn together so that all arms are substantially parallel; the frame, in said collapsed position, being received within the holster with the lateral hinges clearing each other and disposed adjacent the bottom of the holster, and the handle projecting from the holster; the frame being adapted to open from said collapsed position, in a snap-opening movement, triggered by release of said lateral hinges from the holster, in which opening movement the arms of the first pair spread apart and the arms of the second pair are projected along the axis of and away from the handle, through an on-center position in which they are aligned with each other with the arms of the first pair at maximum angle of spread; and the normal angular relation between the arms of the first pair and said shaft members being such that, at said maximum angle of spread the arms of the first pair will be subjected to a resilient closing bias resisting return of the arms of the second pair from their aforesaid positions of maximum projection so as to maintain the frame in its said distended position, whereas in said collapsed position, the arms of the first pair will be subjected to a spreading bias which in itself is operative, when the frame is released from the holster, to effect the aforesaid opening movement and projection of the arms of the second pair with sufficient force to develop therein, momentum which is effective to project them through said on-center position, spreading the arms of the first pair with a toggle action and stressing them so as to develop said closing bias.

2. A self opening collapsible landing net and holster assembly comprising, in combination: a holster; a net; a handle; a pair of resilient substantially parallel shaft members projecting in spaced relation from one end of said handle; and an articulated net supporting and mouth defining frame comprising first and second pairs of substantially straight arms, connecting members normally having a bend integrally uniting the arms of the first pair to the respective shaft members with said arms of the first pair normally diverging from said shaft members, lateral hinges joining the outer ends of the arms of the first pair to the arms of the second pair, and a center hinge joining the arms of the second pair to each other, whereby the frame may assume a collapsed position in which the arms of the second pair are folded between the arms of the first pair with the center hinge projecting toward the handle and the arms of the second pair drawn together so that all arms are substantially parallel; the frame, in said collapsed position, being received within the holster with the lateral hinges clearing each other and disposed adjacent the bottom of the holster, and the handle projecting from the holster; the frame being adapted to open from said collapsed position, in a snap-opening movement, triggered by release of said lateral hinges from the holster, in which opening movement the arms of the first pair spread apart and

the arms of the second pair are projected along the axis of and away from the handle, through an on-center position in which they are aligned with each other with the arms of the first pair at maximum angle of spread; and the normal angular relation between the arms of the first pair and said shaft members being such that, at said maximum angle of spread the arms of the first pair will be subjected to a resilient closing bias resisting return of the arms of the second pair from their aforesaid positions of maximum projection so as to maintain the frame in its said distended position, whereas in said collapsed position, the arms of the first pair will be subjected to a spreading bias which in itself is operative, when the frame is released from the holster, to effect the aforesaid opening movement and projection of the arms of the second pair with sufficient force to develop therein, momentum which is effective to project them through said on-center position, spreading the arms of the first pair with a toggle action and stressing them so as to develop said closing bias.

3. A net and holster assembly as defined in claim 2, wherein said lateral hinges project outwardly beyond said arms of the first pair to provide bearings for engaging the opposed inner walls of the holster, the normal spacing of said shaft members being less than the distance between said opposed inner walls, whereby said bearing engagement may be the sole engagement between the frame and said opposed inner walls as the frame is withdrawn from the holster.

4. A net and holster assembly as defined in claim 2, wherein said central hinge includes means to limit hinging movement thereof in the direction of projection of said arms of the second pair, whereby to determine the position of maximum projection of said center hinge away from the handle and thereby determine the angular relation between the several arms in the open position of the frame.

5. A net and holster assembly as defined in claim 1, wherein said lateral hinges include spring means biasing them in the direction of relative spreading movement of the respective arms connected by them and cooperating with said closing bias in maintaining the frame in the distended position.

FREDRICK A. MATTHEWS.

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