July 8, 1952 K. O. MATZ 2,602,689

COLLAPSIBLE HOOK STRUCTURE

Filed Oct. 12, 1949

FIG. 1.

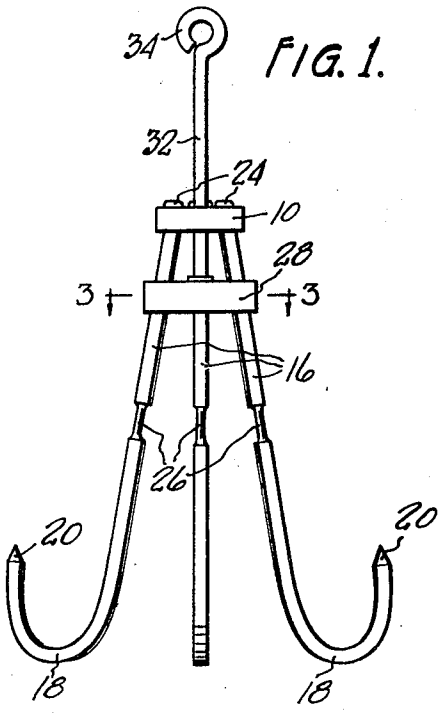


FIG. 2.

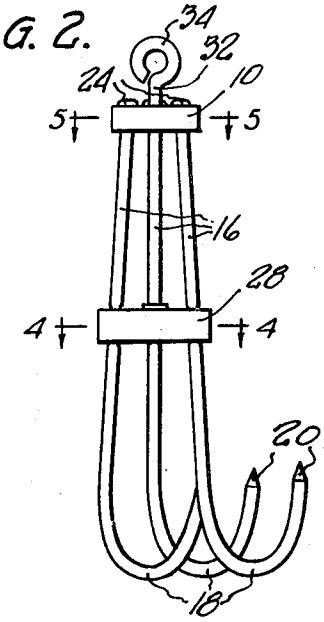


FIG. 3.

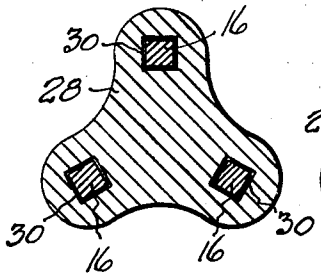


FIG. 4.

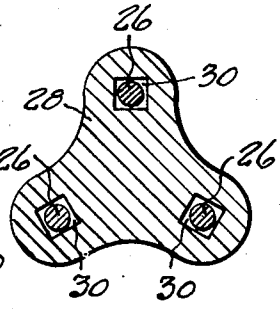


FIG. 6.

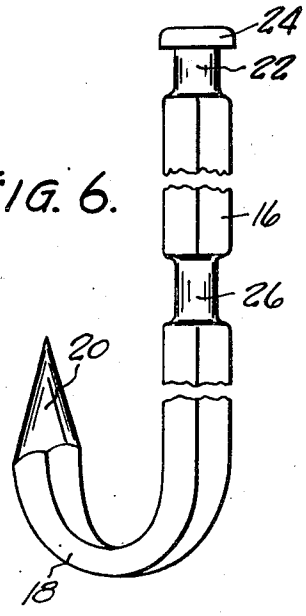
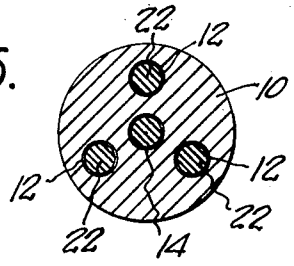


FIG. 5.



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COLLAPSIBLE HOOK STRUCTURE

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6 Claims. (Cl. 294—66)

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This invention relates to a collapsible hook structure, and more particularly to a structure used as a grapnel hook, a boat anchor, or the like.

Devices of this character, and particularly grapnel hooks, are quite large and, when not in use for their intended purpose, require substantial storage space. Thus rescue squads, police emergency squads, and other units which use grapnel hooks for their work and which are required to transport the same from place to place, encounter difficulty because of the size and the non-collapsible character of the unit, and also possible injury or difficulty due to the fact that the structure presents a number of projections which may be engaged accidentally by persons walking past the same.

It is the primary object of this invention to provide a collapsible hook structure in which the parts are so combined and arranged that the structure is held in extended position during use, and particularly during the exertion of a pull thereon, but which can be collapsed to substantially flat condition with its overall longitudinal and lateral dimensions reduced to accommodate its convenient storage and transportation.

A further object is to provide a structure of this character wherein a plurality of hook members are swivelly connected to a head and are normally positioned by a longitudinally slidable cross-head in locked non-rotative divergent relation, said cross-head and hooks cooperating in one selected relative slidable position thereof to accommodate inward swinging of said hooks and also the rotation of said hooks, whereby said hooks may assume substantially parallel position in adjacent planes.

Other objects will be apparent from the following specification.

In the drawing:

Fig. 1 is a side view of the device in extended position.

Fig. 2 is a side view of the device in collapsed position.

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 2.

Fig. 5 is a transverse sectional view taken on line 5—5 of Fig. 2.

Fig. 6 is an enlarged view of one of the hook members.

Referring to the drawing, wherein the invention is illustrated as applied to a grapnel hook, the numeral 10 designates a rigid plate forming a cross-head and having a series of apertures 12 formed therein, which apertures are substantially equi-spaced from each other and from the center of the head 10. The cross-head 10 also has a central aperture 14 formed therein.

A plurality of hook members, preferably of the construction best illustrated in Fig. 6, is provided in the device. Each of these hook members has

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an elongated shank portion 16, a return bent portion 18, and a pointed end portion 20. The hook members are of substantially uniform cross-sectional shape throughout their length, and, as here illustrated, are preferably of square or rectangular cross-section. It will be understood, however, that the cross-sectional shape of the hook members may be of any shape found suitable, it being essential, however, that said shape be non-circular, for purposes to be mentioned hereinafter.

Adjacent its free upper end the shank of each hook has a reduced dimension cylindrical portion 22. Said cylindrical portion 22 is positioned between the major portion of the hook shank 16 and an enlarged head 24 formed integrally at the free or upper end of the shank, as illustrated in Fig. 6. The cylindrical portion 22 of each hook shank fits in one of the apertures 12 of the plate or head 10, and the parts are held in assembled relation by virtue of the fact that the apertures 12 are smaller than the head 24 or the non-circular shank portion 16. The cylindrical portions 22 fit in the openings 12 with clearance, however, sufficient to permit rotation of the grapnel hooks and also at least a limited amount of lateral swinging or swiveling movement of the hook relative to the cross-head 10. The head 24 may either be formed by a separate member secured to the end of the shank or may constitute a portion up-set at the end of the hook shank after the hook has been assembled upon the cross-head 10.

At the intermediate portion of the shank 16 is provided a second reduced dimension cylindrical portion 26.

A second plate or cross-head 28 is provided in the device, said plate being provided with a number of apertures 30 therein equal to the number of apertures 12, the same being preferably spaced apart a distance greater than the spacing of the apertures 12 but being substantially equi-spaced and equi-angularly related. Each of the apertures 30 is of a shape substantially conforming with the cross-sectional shape of the shank portion 16 of the hook and is of a size to freely and slidably, but non-rotatably, receive a hook shank therein, as illustrated in Fig. 3. The plate 28 has a rod 32 secured thereto centrally thereof in any suitable manner. The rod 32 has a free sliding fit with the aperture 14 of the cross-head 10 and preferably terminates in an eye portion 34.

In the use of the device the parts are positioned and related as illustrated in Fig. 1, with the shiftable or slidable plate or cross-head 28 fitting around the shank portions 16 of the hooks between the cross-head 10 and the reduced hook portions 26. The hook will be suspended from a cable, chain or other suitable line, at the eye 34 of the rod 32 so that the weight of the assembly will be suspended from the rod 32. This permits relative downward movement of the hook members and the cross-head 10 to cause the

parts to assume the position illustrated in Fig. 1.

It will be observed that the shanks 16 of the hooks are urged to a downwardly diverging relation by reason of the fact that apertures 30 of the plate 28 are spaced apart a distance greater than the apertures 12 of the plate 10. The extent to which the hooks are permitted to diverge is determined by the clearance of the parts in the respective openings of the plates 10 and 28. Inasmuch as the non-circular portions 16 of the shanks fit within the non-circular apertures 30 of the plates 28, the hooks are held against rotation and the prongs or points 18, 20 thereof are held in outwardly diverging position or relation as illustrated. As long as the device is continued in normal usage with some pull being exerted upon the rod 32, the device will remain in its extended operative position illustrated in Fig. 1. The device is so constructed that it has ample strength for its intended use when it is operatively positioned.

The device can be collapsed to a much smaller compass, as illustrated in Fig. 2, by positioning the plate 28 in register with the reduced cylindrical portions 26 of the hook shanks. It will be observed that the rod 32 is of such length that when the plate 28 registers with the shank portions 26, the eye 34 thereof will be near to but clear of the upper plate 10 and the heads 24, thus reducing the length of the device as illustrated in Fig. 2. Also, when the reduced cylindrical portions 26 are located in the apertures 30 thereof, as illustrated in Fig. 4, the hooks may be rotated so that their prongs or points all extend in the same direction and lie substantially parallel to one another. This greatly reduces the lateral dimensions required of the space within which the device may be stored.

The sliding movement of the cross-head 28 away from the cross-head 10 in adjusting the parts from the operative position shown in Fig. 1 to the storage position shown in Fig. 2 entails reduction in all dimensions of the device. The over-all length of the device is reduced to a length only slightly greater than the over-all length of one of the individual hooks. In other words, only the eye portion 34 of the rod 32 projects lengthwise beyond the constituent hooks in the Fig. 2 position. Also it will be apparent that as the spacing between the parts 10 and 28 increases, the angular displacement of the shank of each of the hooks relative to the rod 32 is reduced, thereby tending to swing the shanks of the various hooks toward parallel compactly arranged position. The reduction in length, the inward swinging of the hook shanks toward parallel relation, and the rotation of the hook prongs so that they can lie substantially parallel to one another, close spaced and facing in the same direction, greatly reduces the amount of storage space required, as compared to the storage space which would be required for the same hook in its extended position shown in Fig. 1. This facilitates handling of the hook in collapsed form as well as storage thereof by avoiding danger of impaling a user upon the hook prongs.

It will be apparent that the number of hooks used in the structure may vary, and that the shape of the hooks may vary. In other words, it is not essential that the use and purpose of the structure be limited to grapnel hooks. Where hooks for other purposes, such as boat anchor hooks, are involved, it will be apparent that the same advantages of collapsibility for a boat anchor can be provided. Thus, while the preferred embodiment of the invention has been illustrated and described, it will be understood that changes may be made in the construction within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A collapsible hook structure comprising a plurality of hooks, each hook having an elongated shank of non-circular cross-sectional shape interrupted intermediate its ends by a reduced portion of substantially circular cross-sectional shape, a head member rotatably mounting said hooks at their ends, and a cross-slide member having apertures of a size and shape to slidably receive said hook shanks and restrain the same against rotation, said hooks being rotatable when said cross-slide member registers with the reduced circular portions of said hook shanks.

2. A collapsible hook structure comprising a plurality of hooks each having an elongated shank, a pair of cross-heads each having a plurality of apertures receiving said hook shanks, a predetermined portion adjacent the end of each shank having a rotative non-slide fit in one of the apertures of one cross-head and the apertures of the other cross-head receiving said shanks with a non-rotative slide fit, said shanks each including a reduced portion spaced from said predetermined shank portion and accommodating rotation when located in said last named cross-head apertures.

3. A collapsible hook structure comprising a plurality of hooks each having an elongated shank of non-circular cross-sectional shape, each shank including a pair of longitudinally spaced reduced dimension portions located between shank portions of larger size, one reduced shank portion being located adjacent the end of each shank, a plate having a plurality of apertures each journalling said end reduced dimension portion and of a size smaller than the shank portions on opposite sides of the journaled portion, and a cross-head having a plurality of apertures each slidably and non-rotatably receiving a non-circular portion of a hook shank and adapted to be positioned in register with the second reduced dimension shank portion.

4. A collapsible hook structure as defined in claim 3, wherein the apertures of said plate are spaced apart distances different than the spacing between the apertures of said cross-head.

5. A collapsible hook structure as defined in claim 3, and a suspension member carried by said cross-head, said cross-head being held spaced from said second reduced dimension shank portions when depending from said suspension member.

6. A collapsible hook structure as defined in claim 3, and a suspension member carried by said cross-head, said plate having an aperture slidably receiving said suspension member.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,271,435	Cloutier	July 2, 1918

FOREIGN PATENTS

Number	Country	Date
253,192	Italy	May 19, 1927