United States Patent

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[54] **HANGER FOR CABLES**
6 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **248/62,** 24/269, 248/68
[51] **Int. Cl.** **F16l 3/14**
[50] **Field of Search** 248/68, 62, 74, 59; 24/269; 29/509; 254/79; 140/93.4, 93.3

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ABSTRACT: A hanger for pipes, cables and the like including a lug member secured to a wall and having a slot to receive the hook portion of a channel member. A locking member is provided to hold the hook portion in the slot in a shock-absorbing manner when the assembly is complete. The channel member has slots which receive banding material to individually secure pipes or cables to the underside of the channel member. The banding material is secured by taking the two free ends and rolling the same tightly into a roll about an axis which is generally parallel to the pipe or cable being secured. In cases where high-shock loads are to be encountered, a second strip of banding material is rolled about the first and preferably it is rolled in an opposite direction. A tool is provided for rolling the banding material and an additional tool is provided to cooperate with the first in removing the first from the rolled banding material without disturbing or weakening the tight roll.

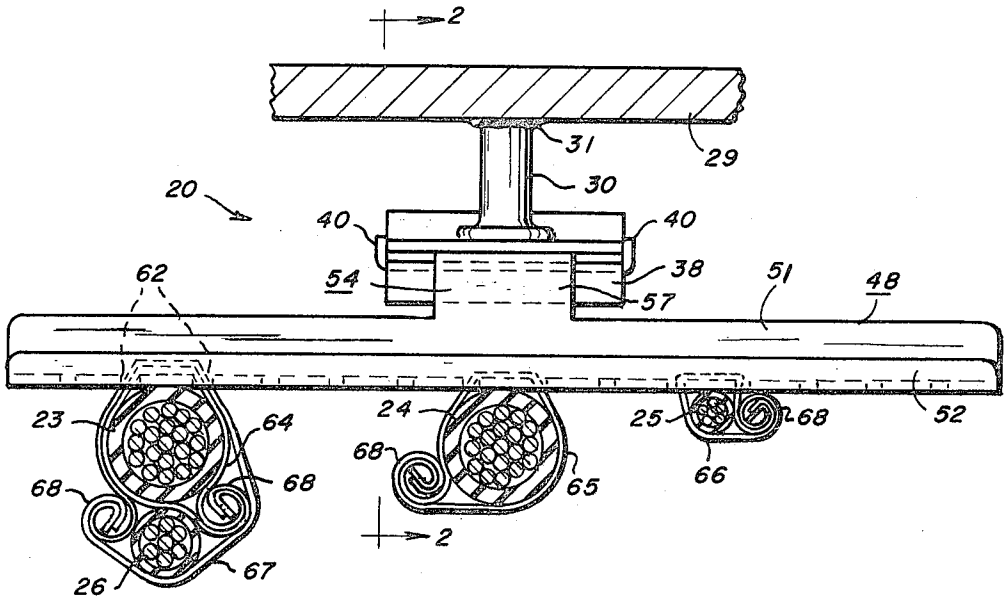
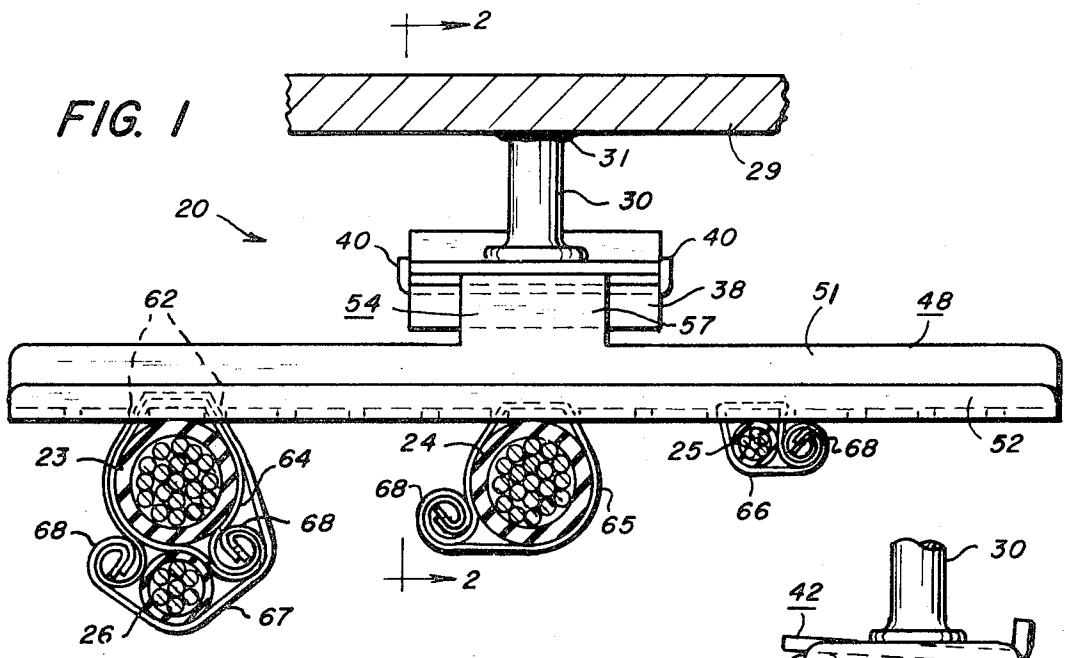


FIG. 1



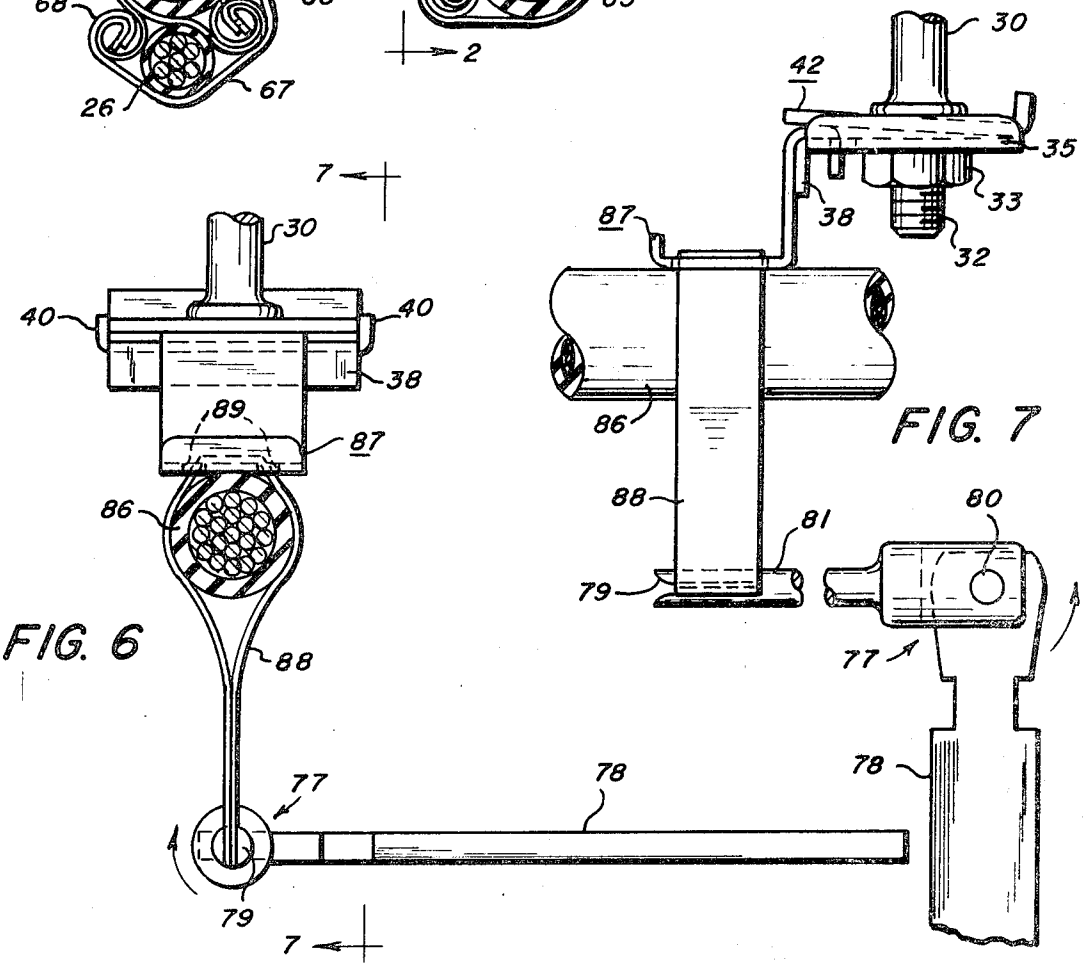


FIG. 6

FIG. 7

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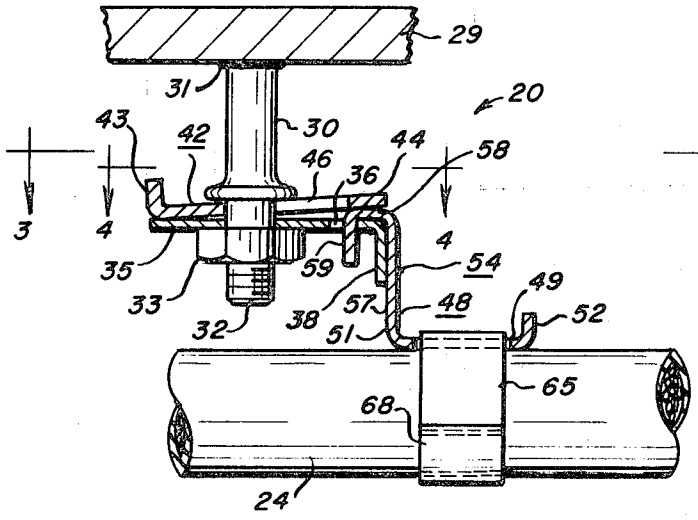


FIG. 2

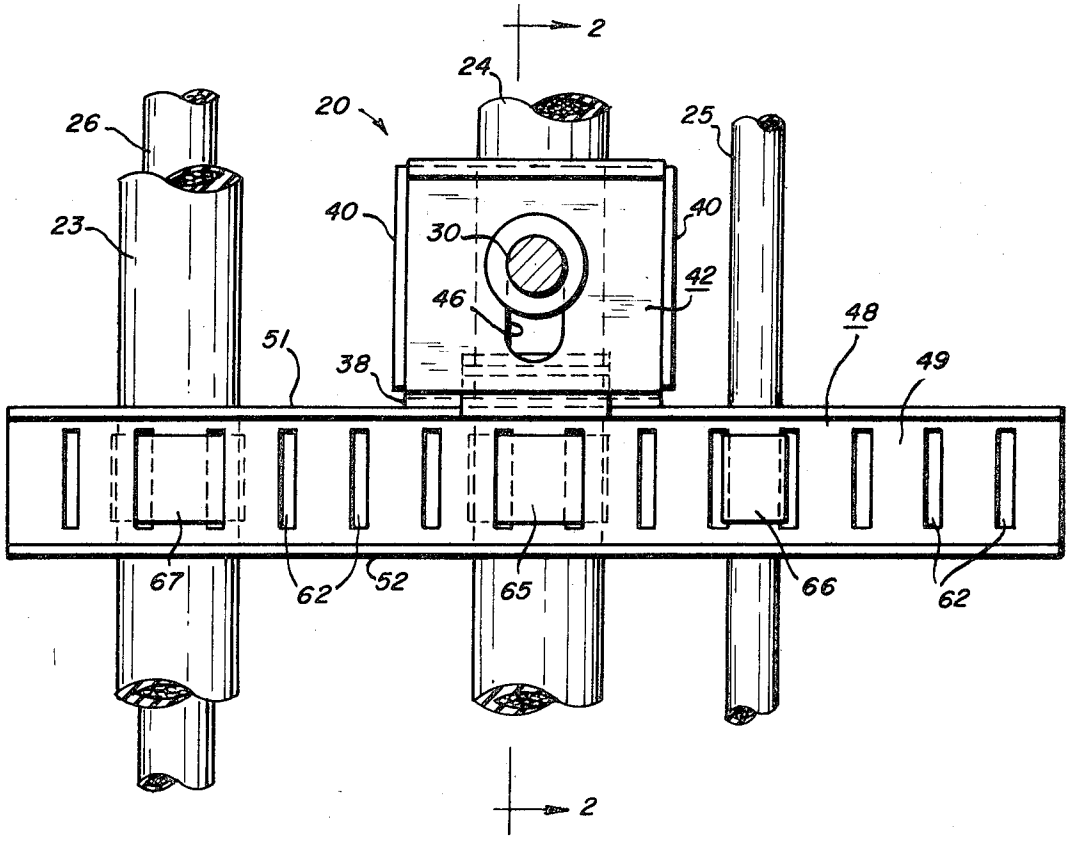
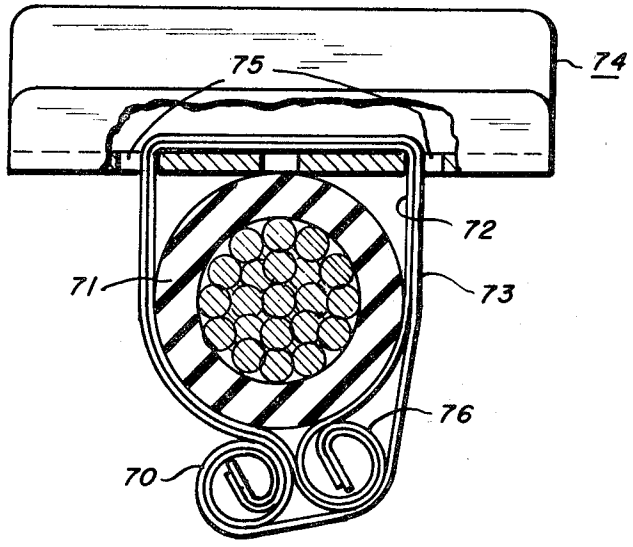


FIG. 3

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FIG. 5



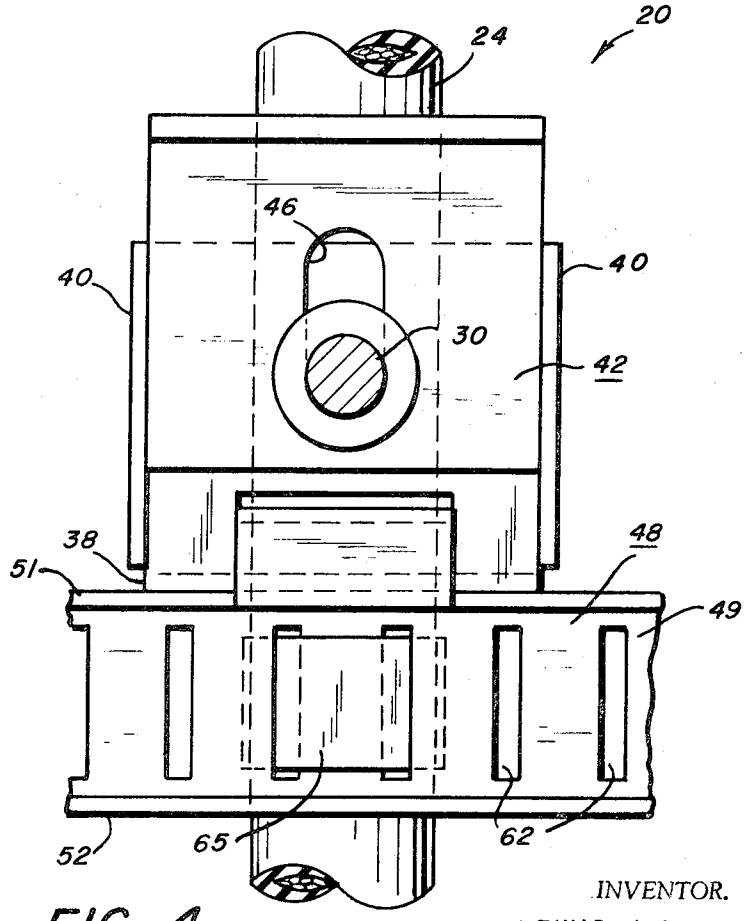


FIG. 4

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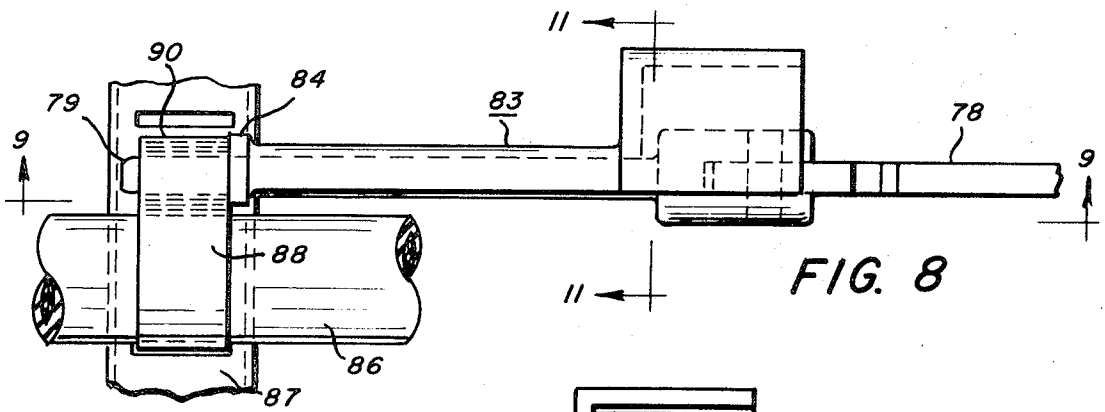


FIG. 8

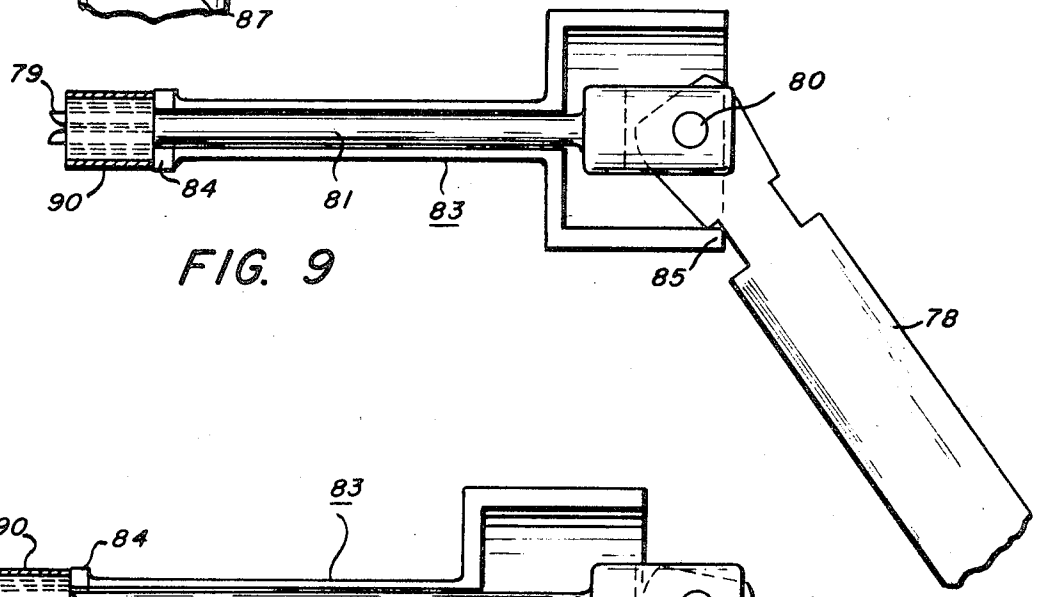


FIG. 9

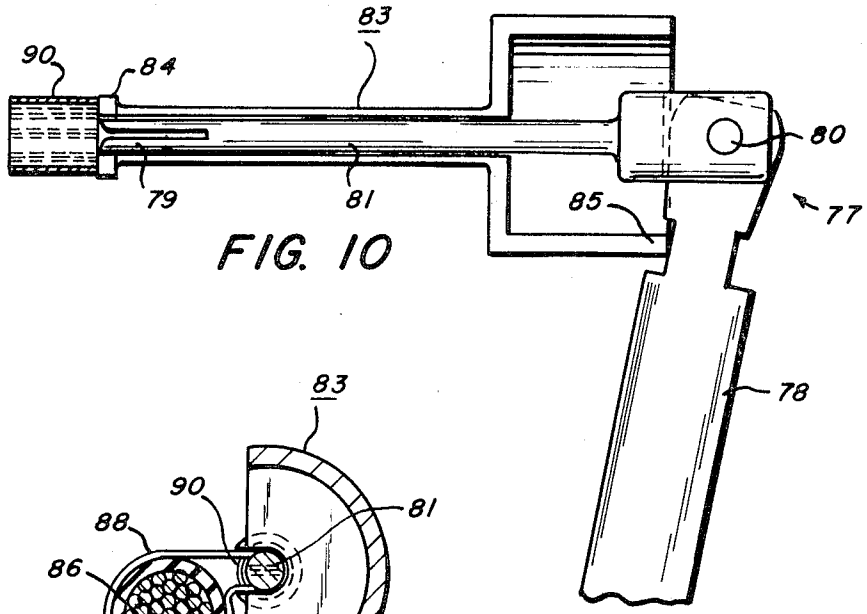


FIG. 10

FIG. 11

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HANGER FOR CABLES

The present invention relates to a hanger construction for supporting pipes, cables and the like on various wall or bulkhead constructions. These constructions may be in buildings, ships, vehicles, or other structures, and these structures are often subjected to disconnecting forces such as shock loads. The invention relates also to the banding material connection between the hanger construction and the cables or pipes which are supported thereby and also relates to the tools which are utilized in making the connections.

As might be expected, many constructions have been proposed for supporting single or multiple cables which are to be connected to the bulkheads, walls, or overheads in ships. Although the prior art constructions have met with limited success in accomplishing their intended results, they have also been subject to many disadvantages. One of the most prior art constructions has utilized a hanger construction wherein a plurality of cables have been secured to a channel member by means of metal banding wherein one metal band extends completely around all of the cables. One of the distinct disadvantages of this particular construction is that if, for one reason or another, one of the cables must be removed from the connection, it is necessary that all of the cables be disconnected. A workman must therefore handle all of the cables rather than just the single one that need be removed. Another disadvantage inherent in the above referred to hanger construction is that it is usually desirable that insulation be placed next to the bulkhead or the wall after the assembly has been at least initially completed. It is difficult for a workman temporarily to remove this construction so as to be able to put the insulation in place and then replace the hanger construction with the plurality of cables secured thereto. In the above referred to prior art construction which utilizes a single band of metal material to hold a multiplicity of cables it is also difficult and inconvenient to secure the ends of the banding material which are wrapped about the cables. This is usually accomplished by means of a clip which must be properly oriented about the ends of the banding material and then it is necessary to bring a relatively cumbersome tool into contact with the clip in order to properly squeeze the same and distort the same into contact with the opposed ends of the banding material. In those prior art constructions wherein there is disclosed means of singly holding cables in place, there has been the large disadvantage of finding a convenient mechanism for securely holding each of the cables and in providing a convenient and timesaving mechanism for quickly and yet securely holding each of the cables.

The present invention does away with all of the disadvantages mentioned hereinabove in connection with the prior art constructions in that it provides a means for securely fastening cables, pipes or the like to a hanger construction on a one at a time basis in such a manner that if one of the cables must be removed for one reason or another, it can be conveniently and economically removed without having to remove a multiplicity of cables. By the same token, the construction to which the cables are attached can also be conveniently removed and reconnected to a bulkhead or other wall construction as the cables are being longitudinally strung. When the cables have all been finally put in place a convenient, quick and economical method has been provided for locking the entire assembly in position. This convenient and quick mechanism not only provides a lockwasher-type effect for a nut which is utilized to secure the hanger construction in place, but also provides a construction which will initially give with shock loads and which will in turn hold as well after suffering a shock load. In addition the present invention discloses a tool for conveniently and quickly wrapping the banding material which is utilized to hold a given cable in place and the tools of the present invention also provide a convenient means for removing the same from the banding material without damaging or loosening the means of securing the banding material.

Other objects and a fuller understanding of this invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is an elevational view partially in section showing the hanger construction of the present invention holding a multiplicity of cables in accordance with the teachings of the invention;

FIG. 2 is a view taken generally along the line 2—2 of FIG. 1;

FIG. 3 is a view taken generally along the line 3—3 of FIG. 2;

FIG. 4 is an enlarged view taken generally along the line 4—4 of FIG. 2 and showing the parts in a slightly different position with respect to each other;

FIG. 5 is a view similar to a portion of FIG. 1 and showing a modification of the present invention in that two bands are utilized to hold a cable in position which is desirable under heavy shock loads;

FIG. 6 is a view similar to FIG. 1 but showing a short channel construction which is capable of securing only a single cable and this Figure also shows the tool construction utilized for wrapping the banding material into a tight roll so as to securely hold the cable in position;

FIG. 7 is a view taken generally along the line 7—7 of FIG. 6 and showing the tool as having initially rapped the banding material only ninety degrees in the direction indicated toward accomplishing the wrapping of the banding material to its ultimate position as shown in FIG. 1;

FIG. 8 is a bottom view of the construction shown in FIG. 7 after the banding material has been completely wrapped to its final position to hold the cable in its ultimate operative position, for example as the middle cable shown in FIG. 1;

FIG. 9 is a view taken generally along the line 9—9 of FIG. 8 and shows the structure of the device utilized in combination with the tool of FIGS. 6 and 7 to conveniently remove the working end of the tool from the wrapped band;

FIG. 10 is a view similar to FIG. 9 but showing the tool as removed from the wrapped band; and

FIG. 11 is a view taken generally along the line 11—11 of FIG. 8.

The metal hanger construction of the present invention is indicated generally by the reference numeral 20 in FIGS. 1, 2, 3, and 4 of the drawings and the hanger construction is shown supported from a wall or overhead 29 by means of a stud 30 which is stud-welded at one of its ends to the wall 29 as at 31. The opposite end of the stud is provided with threads 32 and secured to the threaded end of the stud 30 is a lug member 35. This is accomplished by means of the threaded end 32 extending through a circular opening in the lug member 35 and the lug member is prevented from falling therefrom by means of a nut 33 threadably secured to the threaded end 32. The lug member 35 is provided with an angle portion 38 which is integrally secured thereto and which extends generally at right angles to the extent of the lug member. The lug member 35 is also provided with opposed raised edge portions 40. A locking member 42 is provided to cooperate with the lug member 35 for securing a channel member 48 in place in its final assembled condition and as seen fits between the raised edge portions 40. The locking member 42 is provided with first and second end portions 43 and 44 respectively, and between these mentioned end portions is provided an elongated opening 46 through which fits the threaded end 32 of the stud 30. The elongated opening 46 permits the locking member to be moved between the position in which it is shown in FIGS. 2 and 3 (locked), and its unlocked position in which it is shown in FIG. 4.

The channel member 48 is provided with a base portion 49 which has a plurality of spaced slots 62 which extend therethrough, all of which extend generally parallel to each other. The channel member 48 is also provided with first and second flange portions 51 and 52, respectively, and the first flange portion 51 is provided with an integrally connected hook portion 54. The hook portion 54 includes first, second, and third parts, 57, 58, and 59, respectively. The first part is

immediately connected to the first flange portion 51 and extends generally at right angles to the base portion 49 of the channel member, and the second part 58 of the hook portion 54 extends generally at right angles to the first part and the third part 59 of the hook portion extends generally at right angles to the second part and in a direction generally parallel to the first part 57.

In order to detachably secure the channel member 48 to the lug member 35, the locking member 42 assumes the position shown in FIG. 4, at which time the third part 59 of the hook portion 54 can be conveniently placed into slot 36 which is provided in the lug member 35. This holds the channel member 48 loosely in position with the first part 57 of the hook portion 54 conveniently in engagement with the angle portion 38 of the lug member 35. The locking member 42 is preferably moved to the position of FIG. 2 (to hold the channel member 48 firmly) it is then convenient for a workman to secure cables in position on the underside of the base portion 49 of channel member 48.

For a convenient understanding of the invention, FIGS. 1 and 3 have illustrated cables 23, 24, 25, and 26 connected to the bottom of the base portion 49. It will be appreciated by those skilled in the art that other cables may be conveniently assembled or connected to the base portion 49 at least to the extent that space will permit. It will also be appreciated by those skilled in the art that fewer cables may be utilized if desired. In order to secure the cables 23 through 26 in position as shown in FIG. 1, it is necessary for example in the case of cable 23, that a stainless steel band 64 be inserted through appropriate slots 62 in the base portion 49 of channel member 48 and brought down on either side of cable 23. The precise method of wrapping this banding material, which is preferably of a stainless steel construction, is shown in greater detail in FIGS. 6 and 7 and will be described more in detail hereinafter, but in any event, the ends of the banding material are brought downwardly in a position parallel and coextensive to each other and the extreme ends are then rolled or wrapped in an upwardly extending manner until a roll or band is formed which is identified in all instances in FIG. 1 by the reference numeral 68. In like manner a band 65 is wrapped in a right roll about cable 24 to assume the position shown in FIG. 1 and another band 66 is wrapped about cable 25 as shown in FIG. 1. The wrapping of bands 64 and 66 is in a direction which would appropriately be described as a counterclockwise direction as viewed in FIG. 1 and the wrapping of the roll 68 in band 65 is in a clockwise direction. Cable 26 illustrates how the cables can be conveniently wrapped or positioned one on top of the other in what may be referred to as a "piggyback" construction. In this particular instance a stainless steel band 67 is inserted through the same slots as band 64 in order to hold cable 26 and the ends of the band are wrapped in a clockwise direction so as to position the roll 68 with respect to band 67 in the manner shown.

It will be appreciated by those skilled in the art that there are a plurality of the hanger constructions 20 positioned at appropriate longitudinal positions on a wall in order to appropriately support a run of the cables 23 through 26 which may extend along the length of a ship for quite a distance. After the cables 23 through 26 have been appropriately secured to the channel member 48 as hereinabove described, and for one reason or another it may be desired to remove one of the cables or simply reposition it, a workman can conveniently remove the same by either cutting the band which supports it or by utilizing an appropriate tool to unwrap the roll 68. It will also be appreciated by those skilled in the art that in many constructions it is necessary that insulation be placed adjacent the wall 29 for the usual reasons. In the construction of ships for example, it is usually not possible to have the workmen who are accomplishing a given function available to accomplish their function in a given order. To further explain, it would, in most instances be desirable that the insulation be placed prior to the hanging of the cables, however, as often as not, the workmen who are to place the insulation arrive at a given area after other workmen have placed the cables. The present construction is uniquely advantageous from this standpoint in that with the locking member 42 in the position shown in FIG. 4, it is quite easy to remove the channel member with the attached cables, by the simple expedient of removing the hook portion 54 from the slot 56 in the lug member. This lowers the cables at this particular position sufficiently that a workman can conveniently put the insulation in place and thereafter the hook portion 54 can be again conveniently inserted in slot 36. This same procedure can be conveniently used for all of the hanger constructions supporting a given run of cable.

After the insulation has been put in place and it is desired to secure the channel members in position, it is only necessary to move the locking member 42 by way of the elongated opening 46 to the position shown in FIG. 2. The nut 33 is then tightened, which causes a force to be exerted on the locking member 42 which in turn causes the second end portion 44 of the locking member to engage the second part 58 of the hook portion, firmly holding the hook portion in the slot 36. It is preferred that the locking member be constructed of a spring steel type material which means that a slight bowing force is exerted on the locking member as it is viewed in FIG. 2. This accomplishes two important results, one of which is that the locking member in this function and construction serves as a lockwasher to prevent the loosening of nut 33 and in addition when extreme shock loads are imparted to the channel member, or to the lug member 35 by way of the stud and wall 29, the second end portion 44 of the locking member will give slightly, taking up this shock load and when the shock load is dissipated, it again firmly engages the hook portion holding it in the slot 36 with substantially the same force as it exerted before.

FIG. 5 shows the teachings of the present invention as utilized in situations where extremely high shock loads are encountered and which require a greater holding force to assure that the means for holding the cable are not caused to become unattached. In this respect, there is shown in FIG. 5 a channel member 74 of the same construction as shown in channel member 48, and this is utilized to support a cable 71. In this construction there are utilized two stainless steel bands identified by the reference numerals 72 and 73. The first stainless steel band 72 is brought through appropriate slots 75 in the base portion of channel member 74 and the band 72 is wrapped in a counterclockwise direction so as to produce a holding roll 76. The second band 73 is then brought through the same slots 75 and this band is rolled in a clockwise direction so as to produce a roll 70. It will be seen from viewing FIG. 5 that the roll 70 which is produced has a tendency to dig or bite into the back side of roll 76 which serves to hold roll 76 extremely firmly. It is preferred that the rolls 70 and 76 be produced by rolling in opposite directions, however, under some conditions they may be rolled in the same direction.

FIGS. 6 through 11 show the tools constructed in accordance with the teachings of the present invention which are utilized for wrapping or winding the stainless steel bands (64–67, 72, 73) about the cables so as to produce the extremely tight roll of metal which keeps the bands from unwrapping. Additionally a retracting tool 83 is disclosed in combination with the winding tool, which enables the winding tool 77 to be retracted or removed from this tight roll without disturbing the roll. FIGS. 6 and 7 also demonstrate that the channel member which is utilized may be much shorter in longitudinal extent that the channel member 48 shown in FIG. 1. In this regard there is shown a channel member 87 which is only of a length to handle a single cable 86 as shown. The wrapping is accomplished by means of inserting a stainless steel band 88 through slots 89 in the base of the channel member 87 and the sides of the stainless steel band 88 are brought downwardly on either side of the cable 86 in the manner indicated and the bight portion of the band is supported by the base of the channel member 87. The winding tool 77 which is utilized for wrapping the banding material 88

from the condition in which it is shown in FIG. 6 to the condition in which it ultimately is located as shown in FIG. 8, includes a work shaft 81 which has first and second end portions. The first end portion of the work shaft is provided with wall means which define a slotted end 79 which slot extends in generally an axially extending direction with respect to the axis of the work shaft. As seen in FIG. 6, the lower ends of the banding material 88 are received in the slotted end 79. A handle 78 is provided and is connected to the second end portion of the work shaft by a pivot 80. This enables the handle to be swung 180° from the position which is shown in FIG. 7 and in the direction of the arrow shown in FIG. 7. Referring to FIG. 6, the wrapping is accomplished by exerting a force on the handle to rotate the work shaft and in the direction shown by the arrow in FIG. 6. As pointed out hereinabove, the winding tool may be rotated in either direction. FIG. 7 shows the winding tool 77 as having been rotated through 90° from the position shown in FIG. 6. As will be appreciated by those skilled in the art, the amount of face which is necessary to wind the banding material can be varied substantially by increasing the length of the handle 78. The work shaft 81 is continually rotated until the banding material is completely rolled into roll 90 as it is identified in FIGS. 8, 9 and 10. It will be appreciated, particularly from viewing FIGS. 6 and 7 that because of the length of handle 78 it is only possible to rotate the work shaft a number of degrees before handle 78 strikes cable 86. For example, something slightly in excess of 180° from the position shown in FIG. 6, after which time it is necessary to swing the handle 78 about pivot 80 180° and thereafter continue exerting a force on the banding material to complete the finished roll 90. After the roll 90 has been completed as shown in FIGS. 8, 9, and 10, it will be appreciated that an extremely large force has been applied to the banding material to produce the roll and the banding material is quite tightly intertwined in the slotted end 79 of the work shaft 81.

In order to be able to conveniently remove the slotted end 79 from the finished roll 90 and in a direction generally axially of the roll, it is necessary to provide a construction which will not in any way tend to unroll the roll so as to weaken the connection which has been made. To accomplish this result, the retracting tool 83 has been provided and the retracting tool is comprised of a generally shell-like construction which has a roll engaging end 84 and a handle or lever engaging wall 85. In order for the retracting tool 83 to accomplish its intended function, the roll engaging end which is semicircular in configuration is placed against an axial end of the roll 90 as seen in FIGS. 8, 9 and 10 and the handle engaging wall 85 is brought into position relative to the handle 78 as shown. A force is then exerted by a workman on the handle 78 in a direction generally axially parallel to the axis of the work shaft and toward the roll 90. This causes an axially removing force to be exerted on the work shaft tending to pull the slotted end from engagement with the banding material of the roll yet the roll-engaging end 84 of the retracting tool prohibits disturbance of the roll 90. In this manner the work shaft is retracted.

It will therefore be appreciated that the above disclosed and described structure accomplishes the objects as set forth in this specification and does away with the recited disadvantages in the prior art. The present hanger construction provides a convenient means of quickly and efficiently connecting and disconnecting the hanger constructions from a wall or bulkhead during the initial stages of construction and provides a quick and efficient means of locking the hanger constructions to the wall when the assembly has been completed. This means of locking provides for the efficient dissipation of shock loads which are attendant in many constructions within which the hangers are found. Additionally, there is provided a means for quickly and conveniently attaching cables to the hanger constructions on a one at a time basis and the cables may be "piggy-backed" one to the other. This involves the wrapping of metal banding material in an extremely tight roll which serves to hold the cables in position and in and circumstances where higher shock loads are experienced there is disclosed the means of utilizing two lengths of banding material and in the preferred embodiment the two banding materials are rolled into position in opposite directions to accomplish best results. The winding and retracting tools disclosed provide rugged and efficient mechanisms for making the connections. The winding tool wraps the banding material into an extremely tight roll and the retracting tool aids in removing the winding tools without adversely affecting the completed roll.

Although this invention has been described in its preferred form with a certain degree of particularly, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A metal hanger structure for supporting pipes, cables and the like comprising the combination of a lug member adapted to be carried in a generally horizontal plane, said lug member having an angle portion extended downwardly along an edge thereof ad disposed substantially normal to the said horizontal plane, said lug member having a slot extending therethrough and the opening of the slot extending in generally the same direction as said angle portion, a channel member having a base portion adapted to be disposed in a generally horizontal plane and first and second parallel flange portions extending upwardly therefrom along the spaced edges thereof, the said first flange portion having a hook portion integral therewith, said hook portion having a first part extending upwardly from said first flange portion and a second part extended from said first part laterally in a direction away from the second flange portion, and a third part extended from said second part downwardly, said third part residing in said slot of said lug member to support said channel member, a locking member for securing said lug and channel members together and having first and second end portions, said first end portion of said locking member engaging said lug member and said second end portion engaging said second part of said hook portion, means securing said locking member to said lug member between said first and second end portions thereof, said base portion having a plurality of spaced parallel slots extending therethrough along lines extending between said first and second flange portion, pairs of said parallel slots being adapted to accommodate clamping members extending therethrough for clamping a said pipe, cable or the like to said base portion adjacent the bottom side thereof.

2. A metal hanger for supporting pipes, cables and the like, from a wall comprising the combination of longitudinal channel member having a base portion adapted to be disposed in a horizontal plane and having parallel flange portions extending upwardly along the opposite edges of said base portion, said base portion having a plurality of parallel slots formed therein and disposed transversely of the longitudinal dimension of said channel member, said parallel slots being adapted to receive securing means for the securing of pipes, cables and the like to said channel member, said flange portions imparting strength and rigidity to said channel member, a first of said flange portions having a hook portion integrally formed therewith and extending in the plane of, and upwardly from, said first flange portion, hence laterally away from said channel member, and hence downwardly toward the plane of said base portion, a lug member adapted to be supported by the wall and adapted to be disposed in a horizontal plane, said lug member having a slot extending therethrough to receive in hooked engagement the said hook portion of said channel member, said lug member having a downwardly turned edge portion adapted to abuttingly engage said hook portion in hooked engagement with said slot, the arrangement of channel member and the lug member being such that said channel member may be carried by said lug member upon hooking the said hook portion in the said slot of the lug member and abutting of the said edge portion with the lug member, and said channel member may carry

pipes, cables and the like extending transversely thereof and secured thereto by means of securing means in selected of said slots.

3. A metal hanger as claimed in claim 2, and in which said lug member has parallel raised edge portions angularly disposed to said downwardly turned edge portion for imparting strength to the lug portion supporting the channel member in hooked interengagement therewith.

4. A metal hanger as claimed in claim 2, and including a securing band extended through selected of said slots in the channel member for the binding of a pipe, cable or the like to the channel member below said base portion thereof.

5. The method of securing a pipe, cable or the like to the underside of a metal hanger having a horizontally disposed support member, and the horizontally disposed support member having a plurality of parallel slots extending therethrough and disposed transversely of the support member, comprising the steps of positioning a pipe, cable or the like on the underside of, and generally transversely of, the support member; placing a metal band through selected of said slots to embrace the base portion between the selected slots and to dispose the free ends of the band below said support member, placing the metal band along the opposite sides of said pipe, cable or the like; placing the free ends of the said band together to position the adjacent portions of the bank in interengagement; rolling up the adjacent portions about an axis generally parallel to said pipe, cable or the like to form a tight roll of said band, said roll of said band by resistance to unrolling, banding the pipe, cable or the like to said support member, placing a second metal band over and in engagement with said first band through said slots and along the sides of said pipe, cable or the like, and rolling the second metal band in an opposite direction to rotation of the rolling of said first band to bind the second band about the first band after the rolling of the first band, said second band aiding in restraining the unwinding of said first rolled band.

6. The combination of elongated support means, said support means having a plurality of transversely extending parallel slots formed therein, metal band means for binding a pipe, cable or the like to said support means, said band means being insertable through selected of said slots to have free end portions extending downwardly from the support member and the bight positioned thereof above, and carried by, said support means, said free end portions of said band means being rolled up around a common axis to bind the pipe, cable or the like to said support means, said band means having such degree of stiffness as to permit the rolling up by force of he band means and to resist unrolling upon removal of such force, second band means extending along with, and overlying, the first-named band means to supplement the binding of the pipe, cable or the like to said support means, the second band means being rolled over the first band means to aid in resisting unrolling of the first band means, said second band means being rolled in the opposite direction of rotation as said first named band means.

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